3GPP TSG CN Plenary Meeting #13 **Tdoc NP-010448**
Beijing, China, 19th - 21st September 2001

Source: TSG CN WG2

Title: CRs on R99 and Rel-4 Work Item CAMEL3, Pack 2

Agenda item: 7.2

Document for: APPROVAL

Introduction:

This document contains 4 CRs on R99 and Rel-4 Work Item ”CAMEL3”, that have been agreed by TSG CN WG2, and are forwarded to TSG CN Plenary meeting #13 for approval.

Spec	CR	Rev	Doc-2nd-Level	Phase	Subject	Cat	Ver_C
29.078	192	1	N2-010587	R99	Corrections to ASN.1 syntax	F	3.8.0
29.078	197		N2-010588	Rel-4	Corrections to ASN.1 syntax	A	4.1.0
29.078	198	1	N2-010602	R99	Using gsmSCF address from GPRS-CSI for re-establishing TC dialogues	F	3.8.0
29.078	199		N2-010615	Rel-4	Using gsmSCF address from GPRS-CSI for re-establishing TC dialogues	A	4.1.0

3GPP TSG-CN WG2 Meeting #19
Dresden, Germany, 9th - 13th July, 2001

Tdoc N2-010587
(revision of N2-010551)

CHANGE REQUEST

⌘ **29.078** **CR** **192** ⌘ rev **1** ⌘ Current version: 3.8.0 ⌘

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

Title:	⌘	Corrections to ASN.1 syntax
Source:	⌘	Ericsson
Work item code:	⌘	CAMEL3
Date:	⌘	11 July, 2001
Category:	⌘	F
Release:	⌘	R99

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*

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

Reason for change:	⌘	3GPP TS 29.078 V3.8.0 contains a number of ASN.1 syntax errors. These errors do not lead to ambiguity w.r.t. understanding the functionality of the CAP protocol. However, they result in compilation errors. To assist designers in implementing the CAP protocol, it is vital that all syntax errors are removed. The syntax corrections proposed in this CR do not alter the functionality of CAP. The corrections are needed also for the Rel-4 and Rel-5 versions of 29.078.
Summary of change:	⌘	Corrections to ASN.1 syntax
Consequences if not approved:	⌘	Syntax errors would remain in the CAP specification, leading to syntax compilation errors.

Clauses affected:	⌘	5, 6, 7 and 8		
Other specs Affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	
Other comments:	⌘	Some data types that are IMPORT-ed from MAP Modules are not EXPORT-ed in the MAP specification. That requires a separate CR on 29.002.		

****** First Modified Section ******

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,
    GeographicalInformation,
    GSN-Address,
    LocationInformation,
    LSAIdentity,
    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)}

    TCInvokeIdSet
FROM TCAPMessages tc-Messages

    EXTENSION,
    PARAMETERS-BOUND,
    SupportedExtensions {}
FROM CAP-classes classes

    ExtensionContainer
FROM MAP-ExtensionDataTypes {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0)
gsm-Network(1) modules(3) map-ExtensionDataTypes(21) version6(6)}

;

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

AChBillingChargingCharacteristics {PARAMETERS-BOUND : bound} ::= OCTET STRING (SIZE
    (bound.&minAChBillingChargingLength .. bound.&maxAChBillingChargingLength))
    (CONSTRAINED BY {-- shall be the result of the BER-encoded value of the type --
```

```
    CAMEL-AChBillingChargingCharacteristics {bound}})
-- The AChBillingChargingCharacteristics parameter specifies the charging related information
-- to be provided by the gsmSSF and the conditions on which this information has to be reported
-- back to the gsmSCF with the ApplyChargingReport operation. The value of the
-- AChBillingChargingCharacteristics of type OCTET STRING carries a value of the ASN.1 data type:
-- CAMEL-AChBillingChargingCharacteristics. The normal encoding rules are used to encode this
-- value.
-- The violation of the UserDefinedConstraint shall be handled as an ASN.1 syntax error.

AdditionalCallingPartyNumber {PARAMETERS-BOUND : bound}     ::= Digits {bound}
-- Indicates the Additional Calling Party Number.

AlertingPattern                                          ::= OCTET STRING (SIZE(3))
-- Indicates a specific pattern that is used to alert a subscriber
-- (e.g. distinctive ringing, tones, etc.).
-- The encoding of the last octet of this parameter is as defined in 3GPP TS 29.002 [13].
-- Only the trailing OCTET is used, the remaining OCTETS shall be sent as NULL (zero)
-- The receiving side shall ignore the leading two OCTETS.

AOCBeforeAnswer                     ::= SEQUENCE {
    aOCInitial                          [0] CAI-GSM0224,
    aOCSubsequent                       [1] AOCSubsequent                       OPTIONAL
    }

AOCGPRS                             ::= SEQUENCE {
    aOCInitial                          [0] CAI-GSM0224,
    aOCSubsequent                       [1] AOCSubsequent                       OPTIONAL
    }

AOCSubsequent                       ::= SEQUENCE {
    cAI-GSM0224                         [0] CAI-GSM0224 ,
    tariffSwitchInterval                [1] INTEGER (1..86400)                  OPTIONAL
    }
-- tariffSwitchInterval is measured in 1 second units

AppendFreeFormatData    ::= ENUMERATED {
    overwrite       (0),
    append          (1)
    }

ApplicationTimer                                         ::=INTEGER (0..2047)
-- Used by the gsmSCF to set a timer in the gsmSSF. The timer is in seconds.

AssistingSSPIPRoutingAddress {PARAMETERS-BOUND : bound}     ::= Digits {bound}
-- Indicates the destination address of the gsmSRF for the assist procedure.

BackwardServiceInteractionInd       ::= SEQUENCE {
    conferenceTreatmentIndicator        [1] OCTET STRING (SIZE(1))  OPTIONAL,
    -- acceptConferenceRequest  'xxxx xx01'B
    -- rejectConferenceRequest  'xxxx xx10'B
    -- network default is accept conference request
    callCompletionTreatmentIndicator    [2] OCTET STRING (SIZE(1))  OPTIONAL,
    -- acceptCallCompletionServiceRequest   'xxxx xx01'B,
    -- rejectCallCompletionServiceRequest   'xxxx xx10'B
    -- network default is accept call completion service request
    ...
    }

BasicGapCriteria {PARAMETERS-BOUND : bound}                     ::= CHOICE {
    calledAddressValue          [0] Digits {bound},
    gapOnService                [2] GapOnService,
    calledAddressAndService     [29] SEQUENCE {
        calledAddressValue          [0] Digits {bound},
        serviceKey                  [1] ServiceKey,
        ...
        },
    callingAddressAndService    [30] SEQUENCE {
        callingAddressValue         [0] Digits {bound},
        serviceKey                  [1] ServiceKey,
        ...
        }
    }
-- Both calledAddressValue and callingAddressValue can be
-- incomplete numbers, in the sense that a limited amount of digits can be given.
-- For the handling of numbers starting with the same digit string refer to the detailed
-- procedure of the CallGap operation

BCSMEvent {PARAMETERS-BOUND : bound} ::= SEQUENCE {
    eventTypeBCSM       [0] EventTypeBCSM,
    monitorMode         [1] MonitorMode,
    legID               [2] LegID                                   OPTIONAL,
    dpSpecificCriteria  [30] DpSpecificCriteria {bound}             OPTIONAL
    }
-- Indicates the BCSM Event information for monitoring.

BearerCapability {PARAMETERS-BOUND : bound} ::= CHOICE {
    bearerCap               [0] OCTET STRING (SIZE(2..bound.&maxBearerCapabilityLength))
    }
-- Indicates the type of bearer capability connection to the user. For bearerCap, the ISUP User
-- Service Information, ETS 300 356-1 [8]
-- encoding shall be used.
```

```
CAI-GSM0224                         ::= SEQUENCE {
    e1                                  [0] INTEGER (0..8191)                   OPTIONAL,
    e2                                  [1] INTEGER (0..8191)                   OPTIONAL,
    e3                                  [2] INTEGER (0..8191)                   OPTIONAL,
    e4                                  [3] INTEGER (0..8191)                   OPTIONAL,
    e5                                  [4] INTEGER (0..8191)                   OPTIONAL,
    e6                                  [5] INTEGER (0..8191)                   OPTIONAL,
    e7                                  [6] INTEGER (0..8191)                   OPTIONAL
    }
-- Indicates Charge Advice Information to the Mobile Station. For information regarding
-- parameter usage, refer to 3GPP TS 22.040 [26].

CalledPartyBCDNumber {PARAMETERS-BOUND : bound}     ::= OCTET STRING (SIZE(
    bound.&minCalledPartyBCDNumberLength .. bound.&maxCalledPartyBCDNumberLength))
-- Indicates the Called Party Number, including service selection information.
-- Refer to 3GPP TS 24.008 [12]
-- for encoding. This data type carries only the "type of number", "numbering plan
-- identification" and "number digit" fields defined in 3GPP TS 24.008 [12];
-- it does not carry the "called party
-- BCD number IEI" or "length of called party BCD number contents".

CalledPartyNumber {PARAMETERS-BOUND : bound}    ::= OCTET STRING (SIZE(
    bound.&minCalledPartyNumberLength .. bound.&maxCalledPartyNumberLength))
-- Indicates the Called Party Number. Refer to ITU-T Q.763 [20] for encoding.

CallingPartyNumber {PARAMETERS-BOUND : bound}   ::= OCTET STRING (SIZE(
    bound.&minCallingPartyNumberLength .. bound.&maxCallingPartyNumberLength))
-- Indicates the Calling Party Number. Refer to ETS 300 356-1 [8] for encoding.

CallResult {PARAMETERS-BOUND : bound} ::= OCTET STRING (SIZE(
    bound.&minCallResultLength .. bound.&maxCallResultLength))
    (CONSTRAINED BY {-- shall be the result of the BER-encoded value of type -
    CAMEL-CallResult {bound}})

-- The violation of the UserDefinedConstraint shall be handled as an ASN.1 syntax error.

-- This parameter provides the gsmSCF with the charging related information previously requested
-- using the ApplyCharging operation. This shall include the partyToCharge parameter as
-- received in the related ApplyCharging operation to correlate the result to the request

CAMEL-AChBillingChargingCharacteristics {PARAMETERS-BOUND : bound} ::= CHOICE {
    timeDurationCharging                [0] SEQUENCE {
            maxCallPeriodDuration           [0] INTEGER (1..864000),
            releaseIfdurationExceeded       [1] BOOLEAN DEFAULT FALSE,
            tariffSwitchInterval            [2] INTEGER (1..86400)          OPTIONAL,
            tone                            [3] BOOLEAN DEFAULT FALSE,
            extensions                      [4] Extensions~~SEQUENCE~~
~~SIZE(1..bound.&numOfExtensions) OF~~
                                                ~~ExtensionField~~  {bound} OPTIONAL,
            ...
        }
    }
--  tariffSwitchInterval is measured in 1 second units.
--  maxCallPeriodDuration is measured in100 millisecond units

CAMEL-CallResult {PARAMETERS-BOUND : bound}     ::= CHOICE {
    timeDurationChargingResult          [0] SEQUENCE {
        partyToCharge                       [0] ReceivingSideID,
        timeInformation                     [1] TimeInformation,
        callActive                          [2] BOOLEAN                 DEFAULT TRUE,
        callReleasedAtTcpExpiry             [3] NULL                    OPTIONAL,
        extensions                          [4] Extensions~~SEQUENCE~~
~~SIZE(1..bound.&numOfExtensions) OF~~
                                                ~~ExtensionField~~  {bound}     OPTIONAL,
        ...
        }
    }

CAMEL-FCIBillingChargingCharacteristics {PARAMETERS-BOUND : bound} ::= CHOICE{
    fCIBCCCAMELsequence1        [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{
    fCIBCCCAMELsequence1        [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{
    fCIBCCCAMELsequence1        [0] SEQUENCE {
        freeFormatData              [0] OCTET STRING (SIZE(
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```
            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,
    ...
    }

Carrier {PARAMETERS-BOUND : bound} ::= OCTET STRING (SIZE(
    bound.&minCarrierLength .. bound.&maxCarrierLength))
-- This parameter is only used for North America (na)
-- It contains the carrier selection field (first octet) followed by Carrier ID
-- information (North America (na)).

-- The Carrier selection is one octet and is encoded as:
-- 00000000     No indication
-- 00000001     Selected carrier identification code (CIC) pre subscribed and not
--              input by calling party
-- 00000010     Selected carrier identification code (CIC) pre subscribed and input by
--              calling party
-- 00000011     Selected carrier identification code (CIC) pre subscribed, no
--              indication of whether input by calling party (undetermined)
-- 00000100     Selected carrier identification code (CIC) not pre subscribed and
--              input by calling party
-- 00000101
--  to          Spare
-- 11111110
-- 11111111     Reserved

-- Refer to ANSI ISUP T1.113 [53] for encoding of na carrier ID information (3 octets).

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.

CGEncountered                               ::= ENUMERATED {
    noCGencountered         (0),
    manualCGencountered     (1),
    scpOverload             (2)
    }
-- Indicates the type of automatic call gapping encountered, if any.

ChargeNumber {PARAMETERS-BOUND : bound} ::= LocationNumber {bound}
-- Information sent in either direction indicating the chargeable number for the call and
-- consisting of the odd/even indicator, nature of address indicator, numbering plan indicator,
-- and address signals.
-- Uses the LocationNumber format which is based on the Q.763 Location Number format
-- For example, the ChargeNumber may be a third party number to which a call is billed for
-- the 3rd party billing service. In this case, the calling party may request operator assistance
-- to charge the call to, for example, their home number.

-- For NA, this parameter uniquely identifies the chargeable number for a call sent into a North
-- American long distance carrier. It transports the ChargeNumber Parameter Field
--  as defined in ANSI ISUP T1.113 [53]. This provides
--  - 1 octet for the nature of address indicator field, plus
--  - 1 octet for a numbering plan field, plus
--  - up to 5 octets for the address signal (up to 10 digits)

-- The Charge Number in ANSI T1.113 [53] normally contains a 10 digit national number within
-- the North American Numbering Plan (NANP); longer (e.g. international) charge numbers are not
-- supported in T1.113 [53].

ChargingCharacteristics             ::= CHOICE {
    maxTransferredVolume            [0] INTEGER (1..4294967295),
    maxElapsedTime                  [1] INTEGER (1..86400)
    }
--  maxTransferredVolume is measured in number of bytes
--  maxElapsedTime is measured in seconds

ChargingResult                      ::= CHOICE {
    transferredVolume               [0] TransferredVolume,
    elapsedTime                     [1] ElapsedTime
    }

ChargingRollOver                    ::= CHOICE {
    transferredVolumeRollOver       [0] TransferredVolumeRollOver,
    elapsedTimeRollOver             [1] ElapsedTimeRollOver
    }
-- transferredVolumeRollOver shall be reported if ApplyChargingReportGPRS reports volume and
```

```
-- a roll-over has occurred in one or more volume counters. Otherwise, it shall be absent.
-- elapsedTimeRollOver shall be reported if ApplyChargingReportGPRS reports duration and
-- a roll-over has occurred in one or more duration counters. Otherwise, it shall be absent.

CollectedDigits                         ::= SEQUENCE {
    minimumNbOfDigits       [0] INTEGER (1..30) DEFAULT 1,
    maximumNbOfDigits       [1] INTEGER (1..30),
    endOfReplyDigit         [2] OCTET STRING (SIZE (1..2))  OPTIONAL,
    cancelDigit             [3] OCTET STRING (SIZE (1..2))  OPTIONAL,
    startDigit              [4] OCTET STRING (SIZE (1..2))  OPTIONAL,
    firstDigitTimeOut       [5] INTEGER (1..127)            OPTIONAL,
    interDigitTimeOut       [6] INTEGER (1..127)            OPTIONAL,
    errorTreatment          [7] ErrorTreatment              DEFAULT stdErrorAndInfo,
    interruptableAnnInd     [8] BOOLEAN                     DEFAULT TRUE,
    voiceInformation        [9] BOOLEAN                     DEFAULT FALSE,
    voiceBack               [10] BOOLEAN                    DEFAULT FALSE
    }
-- The use of voiceBack and the support of voice recognition via voiceInformation
-- is network operator specific.
-- The endOfReplyDigit, cancelDigit, and startDigit parameters have been
-- designated as OCTET STRING, and are to be encoded as BCD, one digit per octet
-- only, contained in the four least significant bits of each OCTET. The following encoding shall
-- be applied for the non-decimal characters:
-- 1011 (*), 1100 (#).
-- The usage is service dependent.
-- firstDigitTimeOut and interDigitTimeOut are measured in seconds.

CollectedInfo                           ::= CHOICE {
    collectedDigits         [0] CollectedDigits
    }

ConnectedNumberTreatmentInd             ::= ENUMERATED {
    noINImpact                  (0),
    presentationRestricted      (1),
    presentCalledINNumber       (2),
    presentCallINNumberRestricted   (3)
}
-- This parameter is used to suppress or to display the connected number.

ControlType                             ::= ENUMERATED {
    sCPOverloaded               (0),
    manuallyInitiated           (1)
    }

CompoundCriteria {PARAMETERS-BOUND : bound} ::= SEQUENCE {
    basicGapCriteria            [0] BasicGapCriteria {bound},
    scfID                       [1] ScfID {bound}               OPTIONAL
    }

CorrelationID {PARAMETERS-BOUND : bound}    ::= Digits {bound}
-- used by gsmSCF for correlation with a previous operation.

DateAndTime                             ::= OCTET STRING (SIZE(7))
--  DateAndTime is BCD encoded. The year digit indicating millenium occupies bits
--  0-3 of the first octet, and the year digit indicating century occupies bits
--  4-7 of the first octet.
--  The year digit indicating decade occupies bits 0-3 of the second octet,
--  whilst the digit indicating the year within the decade occupies bits 4-7 of
--  the second octet.
--  The most significant month digit occupies bits 0-3 of the third octet,
--  and the least significant month digit occupies bits 4-7 of the third octet.
--  The most significant day digit occupies bits 0-3 of the fourth octet,
--  and the least significant day digit occupies bits 4-7 of the fourth octet.
--  The most significant hours digit occupies bits 0-3 of the fifth octet,
--  and the least significant digit occupies bits 4-7 of the fifth octet.
--  The most significant minutes digit occupies bits 0-3 of the sixth octet,
--  and the least significant digit occupies bits 4-7 of the sixth octet.
--  The most significant seconds digit occupies bits 0-3 of the seventh octet,
--  and the least seconds significant digit occupies bits 4-7 of the seventh octet.
--  For the encoding of digits in an octet, refer to the timeAndtimezone parameter.

DestinationRoutingAddress {PARAMETERS-BOUND : bound} ::= SEQUENCE SIZE(1) OF
                                                    CalledPartyNumber {bound}
-- Indicates the Called Party Number.

Digits {PARAMETERS-BOUND : bound}                   ::= OCTET STRING (SIZE(
    bound.&minDigitsLength .. bound.&maxDigitsLength))
-- Indicates the address signalling digits.
-- Refer to ETS 300 356-1 [8] Generic Number & Generic Digits parameters for encoding.
-- The coding of the subfields 'NumberQualifier' in Generic Number and 'TypeOfDigits' in
-- Generic Digits are irrelevant to the CAP;
-- the ASN.1 tags are sufficient to identify the parameter.
-- The ISUP format does not allow to exclude these subfields,
-- therefore the value is network operator specific.
-- The following parameters should use Generic Number:
-- AdditionalCallingPartyNumber for InitialDP
-- AssistingSSPIPRoutingAddress for EstablishTemporaryConnection
-- CorrelationID for AssistRequestInstructions
-- CalledAddressValue for all occurrences, CallingAddressValue for all occurrences.
--
-- The following parameters should use Generic Digits:
```

```
-- CorrelationID in EstablishTemporaryConnection
-- number in VariablePart
-- digitsResponse in ReceivedInformationArg
-- In the digitsResponse the digits may also include the '*', '#', a, b , c and d digits
-- by using the IA5 character encoding scheme. If the BCD even or BCD odd encoding
-- scheme is used, the following encoding shall be applied for the non-decimal characters:
-- 1011 (*), 1100 (#).

-- Note that when CorrelationID is transported in Generic Digits, then the digits shall
-- always be BCD encoded.

DpSpecificCriteria {PARAMETERS-BOUND : bound}       ::= CHOICE {
    applicationTimer        [1] ApplicationTimer
    }
--  The gsmSCF may set a timer in the gsmSSF for the No Answer event.
--  If the user does not answer the call within the allotted time,
--  the gsmSSF reports the event to the gsmSCF

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

ElapsedTimeRollOver             ::= CHOICE {
    rO-TimeGPRSIfNoTariffSwitch     [0] INTEGER (0..255),
    rO-TimeGPRSIfTariffSwitch       [1] SEQUENCE {
        rO-TimeGPRSSinceLastTariffSwitch    [0] INTEGER (0..255)    OPTIONAL,
        rO-TimeGPRSTariffSwitchInterval     [1] INTEGER (0..255)    OPTIONAL
        }
    }
--  rO-TimeGPRSIfNoTariffSwitch, rO-TimeGPRSSinceLastTariffSwitch and
--  rO-TimeGPRSTariffSwitchInterval
--  present counters indicating the number of parameter range rollovers.

EndUserAddress  {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 EndUserAddress, 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 bits of the octet to 1.
-- The receiver of this parameter shall ignore the most significant 4 bits of this octet.

ErrorTreatment                                      ::= ENUMERATED {
    stdErrorAndInfo         (0),
    help                    (1),
    repeatPrompt            (2)
    }
-- stdErrorAndInfomeans returning the "ImproperCallerResponse" error in the event of an error
-- condition during collection of user info.

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.

EventSpecificInformationSMS     ::= CHOICE {
    o-smsFailureSpecificInfo        [0] SEQUENCE {
        failureCause                    [0] SMSCause                            OPTIONAL,
        ...
        },
    o-smsSubmittedSpecificInfo      [1] SEQUENCE {
        -- no specific info defined—
        ...
        }
    }

EventTypeBCSM                                       ::= ENUMERATED {
    collectedInfo                   (2),
    analyzedInformation             (3),
    routeSelectFailure              (4),
    oCalledPartyBusy                (5),
    oNoAnswer                       (6),
    oAnswer                         (7),
    oDisconnect                     (9),
    oAbandon                        (10),
    termAttemptAuthorized           (12),
    tBusy                           (13),
    tNoAnswer                       (14),
    tAnswer                         (15),
    tDisconnect                     (17),
    tAbandon                        (18)
    }

-- Indicates the BCSM detection point event.
-- Values collectedInfo, analyzedInformation and termAttemptAuthorized can only be used for TDPs

EventTypeSMS                        ::= ENUMERATED {
    sms-CollectedInfo                   (1),
    o-smsFailure                        (2),
    o-smsSubmitted                      (3)
    }
-- Value sms-CollectedInfo can only be used for TDPs.

Extensions {PARAMETERS-BOUND : bound} ::= SEQUENCE SIZE (1..bound.&numOfExtensions) OF
ExtensionField

_ExtensionField {PARAMETERS-BOUND : bound}  ::= SEQUENCE {
    type                EXTENSION.&id                   ({SupportedExtensions {bound}}),
                        -- shall identify the value of an EXTENSION type
    criticality         CriticalityType                 DEFAULT ignore,
    value               [1] EXTENSION.&ExtensionType    ({SupportedExtensions {bound}}{@type}),
    ...
    }
-- This parameter indicates an extension of an argument data type.
-- Its content is network operator specific

FCIBillingChargingCharacteristics {PARAMETERS-BOUND : bound} ::= OCTET STRING (SIZE(
    bound.&minFCIBillingChargingLength .. bound.&maxFCIBillingChargingLength))
    (CONSTRAINED BY {-- shall be the result of the BER-encoded value of type --
    CAMEL-FCIBillingChargingCharacteristics {bound}})
-- This parameter indicates the billing and/or charging characteristics.
-- The violation of the UserDefinedConstraint shall be handled as an ASN.1 syntax error.

FCIGPRSBillingChargingCharacteristics {PARAMETERS-BOUND : bound} ::= OCTET STRING (SIZE(
    bound.&minFCIBillingChargingLength .. bound.&maxFCIBillingChargingLength))
    (CONSTRAINED BY {-- shall be the result of the BER-encoded value of type -
    CAMEL-FCIGPRSBillingChargingCharacteristics {bound}})
-- This parameter indicates the GPRS billing and/or charging characteristics.
-- The violation of the UserDefinedConstraint shall be handled as an ASN.1 syntax error.

FCISMSBillingChargingCharacteristics {PARAMETERS-BOUND : bound} ::= OCTET STRING (SIZE(
    bound.&minFCIBillingChargingLength .. bound.&maxFCIBillingChargingLength))
    (CONSTRAINED BY {-- shall be the result of the BER-encoded value of type -
    CAMEL-FCISMSBillingChargingCharacteristics {bound}})
-- This parameter indicates the SMS billing and/or charging characteristics.
-- The violation of the UserDefinedConstraint shall be handled as an ASN.1 syntax error.

ForwardServiceInteractionInd                        ::= SEQUENCE {
    conferenceTreatmentIndicator    [1] OCTET STRING (SIZE(1))          OPTIONAL,
    -- acceptConferenceRequest  'xxxx xx01'B
    -- rejectConferenceRequest  'xxxx xx10'B
```

```
    -- network default is accept conference request
    callDiversionTreatmentIndicator [2] OCTET STRING (SIZE(1))      OPTIONAL,
    -- callDiversionAllowed     'xxxx xx01'B
    -- callDiversionNotAllowed  'xxxx xx10'B
    -- network default is Call Diversion allowed
    callingPartyRestrictionIndicator [4] OCTET STRING (SIZE(1))     OPTIONAL,
    -- noINImpact               'xxxx xx01'B
    -- presentationRestricted   'xxxx xx10'B
    -- network default is noINImpact
    ...
    }

GapCriteria {PARAMETERS-BOUND : bound}::= CHOICE {
    basicGapCriteria            BasicGapCriteria {bound},
    compoundGapCriteria         CompoundCriteria {bound}
    }

GapIndicators                                           ::= SEQUENCE {
    duration                    [0] Duration,
    gapInterval                 [1] Interval,
    ...
    }
-- Indicates the gapping characteristics.
-- No gapping when gapInterval equals 0.

GapOnService                                            ::= SEQUENCE {
    serviceKey                  [0] ServiceKey,
    ...
    }

GapTreatment {PARAMETERS-BOUND : bound}                 ::= CHOICE {
    informationToSend           [0] InformationToSend {bound},
    releaseCause                [1] Cause {bound}
    }
-- The default value for Cause is the same as in ISUP.


GenericNumber {PARAMETERS-BOUND : bound}            ::= OCTET STRING (SIZE(
    bound.&minGenericNumberLength .. bound.&maxGenericNumberLength))
--  Indicates a generic number. Refer to ETS 300 356-1 [8] Generic number for 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
            (bound.&minGPRSCauseLength .. bound.&maxGPRSCauseLength))
-- Shall only include the cause value.

--  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 3GPP TS 29.060 and
-- to/from 3GPP TS 24.008 GMM cause and SM cause values are outside scope of this document.


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,
            endUserAddress              [3] EndUserAddress {bound}      OPTIONAL,
```

```
            qualityOfService                [4] QualityOfService        OPTIONAL,
            timeAndTimeZone                 [5] TimeAndTimezone {bound}     OPTIONAL,
            ...,
            gGSNAddress                     [6] GSN-Address             OPTIONAL
            },

    detachSpecificInformation           [2] SEQUENCE {
            initiatingEntity                [0] InitiatingEntity        OPTIONAL,
            ...,
            routeingAreaUpdate              [1] NULL                    OPTIONAL
            },

    disconnectSpecificInformation       [3] SEQUENCE {
            initiatingEntity                [0] InitiatingEntity        OPTIONAL,
            ...,
            routeingAreaUpdate              [1] NULL                    OPTIONAL
            },

    pDPContextEstablishmentSpecificInformation
                                        [4] SEQUENCE {
            accessPointName                 [0] AccessPointName {bound} OPTIONAL,
            endUserAddress                  [1] EndUserAddress {bound}      OPTIONAL,
            qualityOfService                [2] QualityOfService        OPTIONAL,
            locationInformationGPRS         [3] LocationInformationGPRS OPTIONAL,
            timeAndTimeZone                 [4] TimeAndTimezone {bound}     OPTIONAL,
            pDPInitiationType               [5] PDPInitiationType       OPTIONAL,
            ...,
            secondaryPDP-context            [6] NULL                    OPTIONAL
            },

    pDPContextEstablishmentAcknowledgementSpecificInformation
                                        [5] SEQUENCE {
            accessPointName                 [0] AccessPointName {bound} OPTIONAL,
            chargingID                      [1] GPRSChargingID          OPTIONAL,
            endUserAddress                  [2] EndUserAddress {bound}      OPTIONAL,
            qualityOfService                [3] QualityOfService        OPTIONAL,
            locationInformationGPRS         [4] LocationInformationGPRS OPTIONAL,
            timeAndTimeZone                 [5] TimeAndTimezone {bound}     OPTIONAL,
            ...,
            gGSNAddress                     [6] GSN-Address             OPTIONAL
            }
        }

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

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

InbandInfo {PARAMETERS-BOUND : bound}               ::= SEQUENCE {
    messageID               [0] MessageID {bound},
    numberOfRepetitions     [1] INTEGER (1..127)                        OPTIONAL,
    duration                [2] INTEGER (0..32767)                      OPTIONAL,
    interval                [3] INTEGER (0..32767)                      OPTIONAL,
    ...
    }
-- Interval is the time in seconds between each repeated announcement. Duration is the total
-- amount of time in seconds, including repetitions and intervals.
-- The end of announcement is either the end of duration or numberOfRepetitions,
-- whatever comes first.
-- duration with value 0 indicates infinite duration

InformationToSend {PARAMETERS-BOUND : bound}        ::= CHOICE {
    inbandInfo              [0] InbandInfo {bound},
    tone                    [1] Tone
    }

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

InvokeID        ::= TCInvokeIdSet

IPRoutingAddress {PARAMETERS-BOUND : bound}             ::= CalledPartyNumber {bound}
-- Indicates the routing address for the IP.
```

```
IPSSPCapabilities {PARAMETERS-BOUND : bound}        ::= OCTET STRING (SIZE(
    bound.&minIPSSPCapabilitiesLength .. bound.&maxIPSSPCapabilitiesLength))
--  Indicates the gsmSRF resources available. The parameter has two parts, a standard and a
--  bilateral part. The standard part indicates capabilities defined as optional in CAP V.2
--  that shall be recognised (but not necessarily supported) by a CAP V.2 gsmSCF. The bilateral
--  part contains further information that is not specified in this standard, but which is set
--  according to bilateral agreements between network operators and/or equipment vendors.
--  The last octet of the standard part is indicated by bit 7 being set to 0, otherwise Bit 7 of
--  a standard part octet is set to 1 indicating that the standard part continues in the following
--  octet. Coding is as follows:

--  Octet 1                 Standard Part for CAP V.3
--  Bit Value               Meaning
--  0   0                   IPRoutingAddress not supported
--      1                   IPRoutingAddress supported
--  1   0                   VoiceBack not supported
--      1                   VoiceBack supported
--  2   0                   VoiceInformation not supported, via speech recognition
--      1                   VoiceInformation supported, via speech recognition
--  3   0                   VoiceInformation not supported, via voice recognition
--      1                   VoiceInformation supported, via voice recognition
--  4   0                   Generation of voice announcements from Text not supported
--      1                   Generation of voice announcements from Text supported
--  5   -                   Reserved
--  6   -                   Reserved
--  7   0                   End of standard part
--      1                   This value is reserved in CAP V.3
--
--  Octets 2 to 4           Bilateral Part: Network operator / equipment vendor specific


LegType                                             ::= OCTET STRING (SIZE(1))
leg1 LegType                                        ::= '01'H
leg2 LegType                                        ::= '02'H

LocationInformationGPRS     ::= SEQUENCE {
    cellGlobalIdOrServiceAreaIdOrLAI    [0] OCTET STRING (SIZE(5..7))   OPTIONAL,
    routeingAreaIdentity                [1] RAIdentity                  OPTIONAL,
    geographicalInformation             [2] GeographicalInformation     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].
-- sai-Present indicates that the cellGlobalIdOrServiceAreaIdOrLAI parameter contains
-- a Service Area Identity.

LocationNumber {PARAMETERS-BOUND : bound}            ::= OCTET STRING (SIZE (
    bound.&minLocationNumberLength .. bound.&maxLocationNumberLength))
-- Indicates the Location Number for the calling party.
-- Refer to ETS 300 356-1 [8] for encoding.

MessageID {PARAMETERS-BOUND : bound}                 ::= CHOICE {
    elementaryMessageID     [0] Integer4,
    text                    [1] SEQUENCE {
        messageContent          [0] IA5String (SIZE(
            bound.&minMessageContentLength .. bound.&maxMessageContentLength)),
        attributes              [1] OCTET STRING (SIZE(
            bound.&minAttributesLength .. bound.&maxAttributesLength)) OPTIONAL
    },
    elementaryMessageIDs    [29] SEQUENCE SIZE (1.. bound.&numOfMessageIDs) OF Integer4,
    variableMessage         [30] SEQUENCE {
        elementaryMessageID     [0] Integer4,
        variableParts           [1] SEQUENCE SIZE (1..5) OF VariablePart {bound}
        }
    }
-- Use of the text parameter is network operator/equipment vendor specific.

MonitorMode                                         ::= ENUMERATED {
    interrupted                 (0),
    notifyAndContinue           (1),
    transparent                 (2)
    }
-- Indicates the event is relayed and/or processed by the SSP.
-- Transparent means that the gsmSSF or gprsSSF does not notify the gsmSCF of the event.
-- For the use of this parameter refer to the procedure descriptions in clause 11.

MSNetworkCapability                             ::= OCTET STRING (SIZE (8))
--  MS Network Capability describes the GPRS terminal capabilites related to the network, i.e. SMS
--  point to point service over packet data channels. For encoding refer to 3GPP TS 24.008 [12].

MSRadioAccessCapability                 ::= OCTET STRING (SIZE (3..32))
-- MS Radio Access Capability describes the terminal capabilites relevant for the radio network,
-- which may affect the way the network handles the mobile.
-- For encoding refer to 3GPP TS 24.008 [12].
```

```
NAOliInfo                          ::= OCTET STRING (SIZE (1))
--  NA Oli information takes the same value as defined in ANSI ISUP T1.113 [53]
--  e.g.     '3D'H  – Decimal value 61 - Cellular Service (Type 1)
--           '3E'H  – Decimal value 62 - Cellular Service (Type 2)
--           '3F'H  – Decimal value 63 - Cellular Service (roaming)

OriginalCalledPartyID {PARAMETERS-BOUND : bound}               ::= OCTET STRING (SIZE(
    bound.&minOriginalCalledPartyIDLength .. bound.&maxOriginalCalledPartyIDLength))

--  Indicates the original called number. Refer to ETS 300 356-1 [8] Original Called Number
--  for encoding.

OCSIApplicable                                  ::= NULL
--  Indicates that the Originating CAMEL Subscription Information, if present, shall be
--  applied on the outgoing call leg created with a Connect operation. For the use of this
--  parameter see 3GPP TS 23.078 [42].

PDPID                                  ::= OCTET STRING (SIZE (1))
--  PDP Identifier is a counter used to identify a specific PDP Context within a control
--  relationship between gprsSSF and gsmSCF.

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

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].

ReceivingSideID                    ::= CHOICE {receivingSideID [1] LegType}

-- used to identify LegID in operations sent from gsmSSF to gsmSCF

RedirectingPartyID {PARAMETERS-BOUND : bound}       ::= OCTET STRING (SIZE (
    bound.&minRedirectingPartyIDLength .. bound.&maxRedirectingPartyIDLength))
-- Indicates redirecting number.
-- Refer to ETS 300 356-1 [8] Redirecting number for encoding.

RequestedInformationList {PARAMETERS-BOUND : bound}     ::= SEQUENCE SIZE (1.. numOfInfoItems) OF
RequestedInformation {bound}

RequestedInformationTypeList {PARAMETERS-BOUND : bound} ::= SEQUENCE SIZE (1.. numOfInfoItems) OF
RequestedInformationType

RequestedInformation {PARAMETERS-BOUND : bound}         ::= SEQUENCE {
    requestedInformationType    [0] RequestedInformationType,
    requestedInformationValue   [1] RequestedInformationValue {bound},
    ...
    }

RequestedInformationType                                ::= ENUMERATED {
    callAttemptElapsedTime      (0),
    callStopTime                (1),
    callConnectedElapsedTime    (2),
    releaseCause                (30)
    }

RequestedInformationValue {PARAMETERS-BOUND : bound} ::= CHOICE {
    callAttemptElapsedTimeValue     [0] INTEGER (0..255),
    callStopTimeValue               [1] DateAndTime,
    callConnectedElapsedTimeValue   [2] Integer4,
    releaseCauseValue               [30] Cause {bound}
    }
-- The callAttemptElapsedTimeValue is specified in seconds. The unit for the
-- callConnectedElapsedTimeValue is 100 milliseconds

RPCause             ::= OCTET STRING (SIZE (1))
-- RP cause according to 3GPP TS 24.011 [45].
-- GsmSCF shall send this cause in the ReleaseSMS operation.
-- The received cause is sent to the originating MS by the VMSC/SGSN.

ScfID {PARAMETERS-BOUND : bound}                        ::= OCTET STRING (SIZE(
    bound.&minScfIDLength .. bound.&maxScfIDLength))
-- defined by network operator.
-- Indicates the gsmSCF identity.

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

```
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.

SendingSideID                       ::= CHOICE {sendingSideID [0] LegType}
-- used to identify LegID in operations sent from gsmSCF to gsmSSF

ServiceInteractionIndicatorsTwo                          ::= SEQUENCE {
    forwardServiceInteractionInd        [0] ForwardServiceInteractionInd        OPTIONAL,
    -- applicable to operations InitialDP, Connect and ContinueWithArgument.
    backwardServiceInteractionInd       [1] BackwardServiceInteractionInd       OPTIONAL,
    -- applicable to operations Connect and ContinueWithArgument.
    bothwayThroughConnectionInd         [2] BothwayThroughConnectionInd         OPTIONAL,
    -- applicable to ConnectToResource and EstablishTemporaryConnection
    connectedNumberTreatmentInd         [4] ConnectedNumberTreatmentInd         OPTIONAL,
    -- applicable to Connect and ContinueWithArgument
    nonCUGCall                          [13] NULL                               OPTIONAL,
    -- applicable to Connect and ContinueWithArgument
    -- indicates that no parameters for CUG shall be used for the call (i.e. the call shall
    -- be a non-CUG call).
    -- If not present, it indicates one of three things:
    --  a) continue with modified CUG information (when one or more of either CUG Interlock Code
    --     and Outgoing Access Indicator are present), or
    --  b) continue with original CUG information (when neither CUG Interlock Code or Outgoing
    --     Access Indicator are present), i.e. no IN impact.
    --  c) continue with the original non-CUG call.
    holdTreatmentIndicator              [50] OCTET STRING (SIZE(1))             OPTIONAL,
    -- applicable to InitialDP, Connect and ContinueWithArgument
    -- acceptHoldRequest    'xxxx xx01'B
    -- rejectHoldRequest    'xxxx xx10'B
    -- network default is accept hold request
    cwTreatmentIndicator                [51] OCTET STRING (SIZE(1))             OPTIONAL,
    -- applicable to InitialDP, Connect and ContinueWithArgument
    -- acceptCw 'xxxx xx01'B
    -- rejectCw 'xxxx xx10'B
    -- network default is accept cw
    ectTreatmentIndicator               [52] OCTET STRING (SIZE(1))             OPTIONAL,
    -- applicable to InitialDP, Connect and ContinueWithArgument
    -- acceptEctRequest 'xxxx xx01'B
    -- rejectEctRequest 'xxxx xx10'B
    -- network default is accept ect request
    ...
    }

SGSNCapabilities                            ::= OCTET STRING (SIZE (1))

--  Indicates the SGSN capabilities. The coding of the parameter is as follows:
--  Bit Value               Meaning
--  0   0                   AoC not supported by SGSN
--      1                   AoC supported by SGSN
--  1   -                   This bit is reserved in CAP V.3
--  2   -                   This bit is reserved in CAP V.3
--  3   -                   This bit is reserved in CAP V.3
--  4   -                   This bit is reserved in CAP V.3
--  5   -                   This bit is reserved in CAP V.3
--  6   -                   This bit is reserved in CAP V.3
--  7   -                   This bit is reserved in CAP V.3

SMSCause    ::= ENUMERATED {
    systemFailure               (0),
    unexpectedDataValue         (1),
    facilityNotSupported        (2),
    sM-DeliveryFailure          (3),
    releaseFromRadioInterface   (4)
    }
-- MO SMS error values which are reported to gsmSCF.
-- Most of these values are received from the SMSC as a response to
-- MO-ForwardSM operation.

SMSEvent                            ::= SEQUENCE {
    eventTypeSMS                        [0] EventTypeSMS,
    monitorMode                         [1] MonitorMode
    }

TimeInformation                     ::= CHOICE {
    timeIfNoTariffSwitch                [0] TimeIfNoTariffSwitch,
    timeIfTariffSwitch                  [1] TimeIfTariffSwitch
    }
-- Indicates call duration information

TimeIfNoTariffSwitch                ::= INTEGER(0..864000)
-- TimeIfNoTariffSwitch is measured in 100 millisecond intervals

TimeIfTariffSwitch                  ::= SEQUENCE {
    timeSinceTariffSwitch               [0] INTEGER(0..864000),
    tariffSwitchInterval                [1] INTEGER(1..864000)                  OPTIONAL
    }
```

```
-- timeSinceTariffSwitch and tariffSwitchInterval are measured in 100 millisecond intervals

TimerID                             ::= ENUMERATED {
    tssf                                (0)
    }
-- Indicates the timer to be reset.

TimerValue                          ::= Integer4
-- Indicates the timer value (in seconds).

TimeAndTimezone {PARAMETERS-BOUND : bound}::= OCTET STRING (SIZE(
    bound.&minTimeAndTimezoneLength .. bound.&maxTimeAndTimezoneLength))
--  Indicates the time and timezone, relative to GMT. This parameter BCD encoded.
--  The year digit indicating millenium occupies bits 0-3 of the first octet, and the year
--  digit indicating century occupies bits 4-7 of the first octet.
--  The year digit indicating decade occupies bits 0-3 of the second octet, whilst the digit
--  indicating the year within the decade occupies bits 4-7 of the second octet.
--  The most significant month digit occupies bits 0-3 of the third octet, and the least
--  significant month digit occupies bits 4-7 of the third octet.
--  The most significant day digit occupies bits 0-3 of the fourth octet, and the least
--  significant day digit occupies bits 4-7 of the fourth octet.
--  The most significant hours digit occupies bits 0-3 of the fifth octet, and the least
--  significant hours digit occupies bits 4-7 of the fifth octet.
--  The most significant minutes digit occupies bits 0-3 of the sixth octet, and the least
--  significant minutes digit occupies bits 4-7 of the sixth octet.
--  The most significant seconds digit occupies bits 0-3 of the seventh octet, and the least
--  significant seconds digit occupies bits 4-7 of the seventh octet.
--
--  The timezone information occupies the eigth octet. For the encoding of Timezone refer to
--  Reference [29], 3GPP TS 23.040 [46].
--
--  The BCD digits are packed and encoded as follows:
--
--  Bit  7  6  5   4  |  3  2  1  0
--       2nd digit    | 1st digit          Octet 1
--       3rd digit    | 4th digit          Octet 2
--                      ..                   ..
--       nth digit    | n-1th digit        Octet m
--
--       0000       digit 0
--       0001       digit 1
--       0010       digit 2
--       0011       digit 3
--       0100       digit 4
--       0101       digit 5
--       0110       digit 6
--       0111       digit 7
--       1000       digit 8
--       1001       digit 9
--       1010       spare
--       1011       spare
--       1100       spare
--       1101       spare
--       1110       spare
--       1101       spare
--
-- where the leftmost bit of the digit is either bit 7 or bit 3 of the octet.

Tone                                    ::= SEQUENCE {
    toneID              [0] Integer4,
    duration            [1] Integer4            OPTIONAL,
    ...
    }
-- The duration specifies the length of the tone in seconds, value 0 indicates infinite duration.

TPDataCodingScheme                  ::= OCTET STRING (SIZE (1))
-- TP Data Coding Scheme according to 3GPP TS 23.040 [46]

TPProtocolIdentifier                ::= OCTET STRING (SIZE (1))
-- indicates the protocol used above SM-Transfer Layer as specified in 3GPP TS 23.040 [46].

TPShortMessageSubmissionInfo        ::= OCTET STRING (SIZE (1))
-- contains the 1st octect of the SMS-SUBMIT TPDU or the SMS-COMMAND TPDU as specified in 3GPP TS
23.040 [46].

TPValidityPeriod                    ::= OCTET STRING (SIZE (1..7))
-- indicates the length of the validity period or the absolute time of the validity
-- period termination as specified in 3GPP TS 23.040 [46].
-- the length of ValidityPeriod is either 1 octet or 7 octets

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.
```

```
TransferredVolumeRollOver           ::= CHOICE {
    rO-VolumeIfNoTariffSwitch       [0] INTEGER (0.. 255),
    rO-VolumeIfTariffSwitch         [1] SEQUENCE {
        rO-VolumeSinceLastTariffSwitch      [0] INTEGER (0.. 255)   OPTIONAL,
        rO-VolumeTariffSwitchInterval       [1] INTEGER (0.. 255)   OPTIONAL
        }
    }
--  rO-VolumeIfNoTariffSwitch, rO-VolumeSinceLastTariffSwitch and rO-VolumeTariffSwitchInterval
--  present counters indicating the number of parameter range rollovers.

UnavailableNetworkResource ::= ENUMERATED {
    unavailableResources            (0),
    componentFailure                (1),
    basicCallProcessingException    (2),
    resourceStatusFailure           (3),
    endUserFailure                  (4)
    }
-- Indicates the network resource that failed.

VariablePart {PARAMETERS-BOUND : bound}                     ::= CHOICE {
    integer             [0] Integer4,
    number              [1] Digits {bound}, -- Generic digits
    time                [2] OCTET STRING (SIZE(2)), -- HH: MM, BCD coded
    date                [3] OCTET STRING (SIZE(4)), -- YYYYMMDD, BCD coded
    price               [4] OCTET STRING (SIZE(4))
    }
--  Indicates the variable part of the message. Time is BCD encoded.
--  The most significant hours digit occupies bits 0-3 of the first octet, and the least
--  significant digit occupies bits 4-7 of the first octet. The most significant minutes digit
--  occupies bits 0-3 of the second octet, and the least significant digit occupies bits 4-7
--  of the second octet.
--
--  Date is BCD encoded. The year digit indicating millenium occupies bits 0-3 of the first octet,
--  and the year digit indicating century occupies bits 4-7 of the first octet. The year digit
--  indicating decade occupies bits 0-3 of the second octet, whilst the digit indicating the year
--  within the decade occupies bits 4-7 of the second octet.
--  The most significant month digit occupies bits 0-3 of the third octet, and the least
--  significant month digit occupies bits 4-7 of the third octet. The most significant day digit
--  occupies bits 0-3 of the fourth octet, and the least significant day digit occupies bits 4-7
--  of the fourth octet.
--  Price is BCD encoded. The digit indicating hundreds of thousands occupies bits 0-3 of the
--  first octet, and the digit indicating tens of thousands occupies bits 4-7 of the first octet.
--  The digit indicating thousands occupies bits 0-3 of the second octet, whilst the digit
--  indicating hundreds occupies bits 4-7 of the second octet. The digit indicating tens occupies
--  bits 0-3 of the third octet, and the digit indicating 0 to 9 occupies bits 4-7 of the third
--  octet. The tenths digit occupies bits 0-3 of the fourth octet, and the hundredths digit
--  occupies bits 4-7 of the fourth octet.
--
--  For the encoding of digits in an octet, refer to the timeAndtimezone parameter

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

END
```

5.2 Error types

```
CAP-errortypes {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0) umts-network(1)
modules(3) cap-errortypes(51) version3(2)}
-- This module contains the type definitions for the CAP Error Types.
-- Where a parameter of type CHOICE is tagged with a specific tag value, the tag is automatically
-- replaced with an EXPLICIT tag of the same value.

DEFINITIONS IMPLICIT TAGS ::= BEGIN


IMPORTS

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

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

    InvokeID,
    UnavailableNetworkResource
FROM CAP-datatypes datatypes

    errcode-canceled,
    errcode-cancelFailed,
    errcode-eTCFailed,
    errcode-improperCallerResponse,
    errcode-missingCustomerRecord,
    errcode-missingParameter,
    errcode-parameterOutOfRange,
```

```
    errcode-requestedInfoError,
    errcode-systemFailure,
    errcode-taskRefused,
    errcode-unavailableResource,
    errcode-unexpectedComponentSequence,
    errcode-unexpectedDataValue,
    errcode-unexpectedParameter,
    errcode-unknownLegID,
    errcode-unknownPDPID
FROM CAP-errorcodes errorcodes

;

-- TYPE DEFINITION FOR CAP ERROR TYPES FOLLOWS

canceled ERROR              ::= {
    CODE    errcode-canceled
    }
-- The operation has been canceled.

cancelFailed ERROR          ::= {
    PARAMETER   SEQUENCE {
        problem                 [0] ENUMERATED {
            unknownOperation        (0),
            tooLate                 (1),
            operationNotCancellable (2)
            },
        operation               [1] InvokeID,
        ...
        }
    CODE    errcode-cancelFailed
    }
-- The operation failed to be canceled.

eTCFailed ERROR             ::= {
    CODE    errcode-eTCFailed
    }
-- The establish temporary connection failed.

improperCallerResponse ERROR ::= {
    CODE    errcode-improperCallerResponse
    }
-- The caller response was not as expected.

missingCustomerRecord ERROR ::= {
    CODE    errcode-missingCustomerRecord
    }
-- The Service Logic Program could not be found in the gsmSCF.

missingParameter ERROR      ::= {
    CODE    errcode-missingParameter
    }
-- An expected optional parameter was not received.

parameterOutOfRange ERROR   ::= {
    CODE    errcode-parameterOutOfRange
    }
-- The parameter was not as expected (e.g. missing or out of range).

requestedInfoError ERROR    ::= {
    PARAMETER    ENUMERATED {
            unknownRequestedInfo        (1),
            requestedInfoNotAvailable   (2)
            }
    CODE    errcode-requestedInfoError
    }
-- The requested information cannot be found.

systemFailure ERROR         ::= {
    PARAMETER   UnavailableNetworkResource
    CODE    errcode-systemFailure
    }
-- The operation could not be completed due to a system failure at the serving physical entity.

taskRefused ERROR           ::= {
    PARAMETER   ENUMERATED {
            generic                     (0),
            unobtainable                (1),
            congestion                  (2)
            }
    CODE    errcode-taskRefused
    }
-- An entity normally capable of the task requested cannot or chooses not to perform the task at
-- this time. This includes error situations like congestion and unobtainable address as used in
-- e.g. the connect operation.)

unavailableResource ERROR   ::= {
    CODE    errcode-unavailableResource
    }
-- A requested resource is not available at the serving entity.
```

```
unexpectedComponentSequence ERROR ::= {
    CODE    errcode-unexpectedComponentSequence
    }
-- An incorrect sequence of Components was received (e.g."DisconnectForwardConnection"
-- followed by "PlayAnnouncement").

unexpectedDataValue ERROR ::= {
    CODE    errcode-unexpectedDataValue
    }
-- The data value was not as expected (e.g. routing number expected but billing number received)

unexpectedParameter ERROR ::= {
    CODE    errcode-unexpectedParameter
    }
-- A parameter received was not expected.

unknownLegID ERROR      ::= {
    CODE    errcode-unknownLegID
    }
-- Leg not known to the gsmSSF.

unknownPDPID ERROR      ::= {
    CODE    errcode-unknownPDPID
    }
-- PDPID not known by the receiving entity.

END
```

5.3 Operation codes

```
CAP-operationcodes {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0) umts-network(1)
modules(3) cap-operationcodes(53) version3(2)}


DEFINITIONS ::= BEGIN

IMPORTS

    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)}

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

;

-- the operations are grouped by the identified operation packages.

-- gsmSCF activation Package
    opcode-initialDP                        Code ::= local: 0
-- gsmSCF/gsmSRF activation of assist Package
    opcode-assistRequestInstructions        Code ::= local: 16
-- Assist connection establishment Package
    opcode-establishTemporaryConnection     Code ::= local: 17
-- Generic disconnect resource Package
    opcode-disconnectForwardConnection      Code ::= local: 18
-- Non-assisted connection establishment Package
    opcode-connectToResource                Code ::= local: 19
-- Connect Package (elementary gsmSSF function)
    opcode-connect                          Code ::= local: 20
-- Call handling Package (elementary gsmSSF function)
    opcode-releaseCall                      Code ::= local: 22
-- BCSM Event handling Package
    opcode-requestReportBCSMEvent           Code ::= local: 23
    opcode-eventReportBCSM                  Code ::= local: 24
-- gsmSSF call processing Package
    opcode-continue                         Code ::= local: 31
    opcode-continueWithArgument             Code ::= local: 56
-- Timer Package
    opcode-resetTimer                       Code ::= local: 33
-- Billing Package
    opcode-furnishChargingInformation       Code ::= local: 34
-- Charging Package
    opcode-applyCharging                    Code ::= local: 35
    opcode-applyChargingReport              Code ::= local: 36
-- Traffic management Package
    opcode-callGap                          Code ::= local: 41
-- Call report Package
    opcode-callInformationReport            Code ::= local: 44
    opcode-callInformationRequest           Code ::= local: 45
-- Signalling control Package
    opcode-sendChargingInformation          Code ::= local: 46
-- Specialized resource control Package
    opcode-playAnnouncement                 Code ::= local: 47
    opcode-promptAndCollectUserInformation  Code ::= local: 48
    opcode-specializedResourceReport        Code ::= local: 49
-- Cancel Package
```

```
    opcode-cancel                           Code ::= local: 53
-- Activity Test Package
    opcode-activityTest                     Code ::= local: 55

-- Sms Activation Package
    opcode-initialDPSMS                     Code ::= local: 60
-- Sms Billing Package
    opcode-furnishChargingInformationSMS    Code ::= local: 61
-- Sms Connect Package
    opcode-connectSMS                       Code ::= local: 62
-- Sms Event Handling Package
    opcode-requestReportSMSEvent            Code ::= local: 63
    opcode-eventReportSMS                   Code ::= local: 64
-- Sms Processing Package
    opcode-continueSMS                      Code ::= local: 65
-- Sms Release Package
    opcode-releaseSMS                       Code ::= local: 66
-- Sms Timer Package
    opcode-resetTimerSMS                    Code ::= local: 67

-- Gprs Activity Test Package
    opcode-activityTestGPRS                 Code ::= local: 70
-- Gprs Charging Package
    opcode-applyChargingGPRS                Code ::= local: 71
    opcode-applyChargingReportGPRS          Code ::= local: 72
-- Gprs Cancel Package
    opcode-cancelGPRS                       Code ::= local: 73
-- Gprs Connect Package
    opcode-connectGPRS                      Code ::= local: 74
-- Gprs Processing Package
    opcode-continueGPRS                     Code ::= local: 75
-- Gprs Exception Information Package
    opcode-entityReleasedGPRS               Code ::= local: 76
-- Gprs Billing Package
    opcode-furnishChargingInformationGPRS   Code ::= local: 77
-- Gprs Scf Activation Package
    opcode-initialDPGPRS                    Code ::= local: 78
-- Gprs Release Package
    opcode-releaseGPRS                      Code ::= local: 79
-- Gprs Event Handling Package
    opcode-eventReportGPRS                  Code ::= local: 80
    opcode-requestReportGPRSEvent           Code ::= local: 81
-- Gprs Timer Package
    opcode-resetTimerGPRS                   Code ::= local: 82
-- Gprs Charge Advice Package
    opcode-sendChargingInformationGPRS      Code ::= local: 83

END
```

5.4 Error codes

```
CAP-errorcodes {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0) umts-network(1)
modules(3) cap-errorcodes(57) version3(2)}


DEFINITIONS ::= BEGIN

IMPORTS

    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)}

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

;

errcode-canceled                        Code ::= local: 0
errcode-cancelFailed                    Code ::= local: 1
errcode-eTCFailed                       Code ::= local: 3
errcode-improperCallerResponse          Code ::= local: 4
errcode-missingCustomerRecord           Code ::= local: 6
errcode-missingParameter                Code ::= local: 7
errcode-parameterOutOfRange             Code ::= local: 8
errcode-requestedInfoError              Code ::= local: 10
errcode-systemFailure                   Code ::= local: 11
errcode-taskRefused                     Code ::= local: 12
errcode-unavailableResource             Code ::= local: 13
errcode-unexpectedComponentSequence     Code ::= local: 14
errcode-unexpectedDataValue             Code ::= local: 15
errcode-unexpectedParameter             Code ::= local: 16
errcode-unknownLegID                    Code ::= local: 17
errcode-unknownPDPID                    Code ::= local: 50

END
```

5.5 Classes

```
CAP-classes {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0) umts-network(1)
modules(3) cap-classes(54) version3(2)}

DEFINITIONS ::= BEGIN

IMPORTS

    ROS-OBJECT-CLASS,
    Code
FROM Remote-Operations-Information-Objects ros-InformationObjects


    id-rosObject-gsmSRF,
    id-rosObject-gsmSSF,
    ros-InformationObjects,
    gsmSSF-gsmSCF-Protocol,
    gsmSCF-gsmSRF-Protocol
FROM CAP-object-identifiers {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0)
umts-network(1) modules(3) cap-object-identifiers(100) version3(2)}

    capSsfToScfGeneric,
    capAssistHandoffssfToScf
FROM CAP-gsmSSF-gsmSCF-pkgs-contracts-acs gsmSSF-gsmSCF-Protocol

    gsmSRF-gsmSCF-contract
FROM CAP-gsmSCF-gsmSRF-pkgs-contracts-acs gsmSCF-gsmSRF-Protocol

    CriticalityType
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)}

;

gsmSSF ROS-OBJECT-CLASS ::= {
    INITIATES   {capSsfToScfGeneric|
                 capAssistHandoffssfToScf}
    RESPONDS    {capSsfToScfGeneric}
    ID          id-rosObject-gsmSSF
    }

gsmSRF ROS-OBJECT-CLASS ::= {
    INITIATES   {gsmSRF-gsmSCF-contract}
    ID          id-rosObject-gsmSRF
    }

EXTENSION ::= CLASS {
    &ExtensionType,
    &criticality    CriticalityType DEFAULT ignore,
    &id Code
    }

WITH SYNTAX {
    EXTENSION-SYNTAX    &ExtensionType
    CRITICALITY         &criticality
    IDENTIFIED BY       &id
    }
-- Example of addition of an extension named 'Some Network Specific Indicator' of type
-- BOOLEAN, with criticality 'abort' and to be identified as extension number 1
-- Example of definition using the above information object class:
--
-- SomeNetworkSpecificIndicator EXTENSION ::= {
--  EXTENSION-SYNTAX    BOOLEAN
--  CRITICALITY         abort
--  IDENTIFIED BY       local: 1
--  }

-- Example of transfer syntax, using the ExtensionField datatype as specified in subclause 5.
-- Assuming the value of the extension is set to TRUE, the extensions parameter
-- becomes a Sequence of type INTEGER ::= 1, criticality ENUMERATED ::= 1 and value [1]
-- EXPLICIT BOOLEAN ::= TRUE.
--
-- Use of Q.1400 [28] defined Extension is for further study.
-- In addition the extension mechanism marker is used to identify the future minor additions
-- to CAP.

firstExtension EXTENSION ::= {
    EXTENSION-SYNTAX    NULL
    CRITICALITY         ignore
    IDENTIFIED BY       local: 1
    }
-- firstExtension is just an example.

SupportedExtensions {PARAMETERS-BOUND : bound} EXTENSION ::= {firstExtension, ...
-- full set of network operator extensions --
}
-- SupportedExtension is the full set of the network operator extensions.
```

```
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-GPRS-CAUSE-LENGTH             &minGPRSCauseLength
    MAXIMUM-FOR-GPRS-CAUSE-LENGTH             &maxGPRSCauseLength
    MINIMUM-FOR-IP-SSP-CAPABILITIES           &minIPSSPCapabilitiesLength
    MAXIMUM-FOR-IP-SSP-CAPABILITIES           &maxIPSSPCapabilitiesLength
    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
}

cAPapSpecificBoundSet 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        174
    MINIMUM-FOR-GENERIC-NUMBER              3
    MAXIMUM-FOR-GENERIC-NUMBER              11
    MINIMUM-FOR-GPRS-CAUSE-LENGTH           1
    MAXIMUM-FOR-GPRS-CAUSE-LENGTH           1
    MINIMUM-FOR-IP-SSP-CAPABILITIES         1
    MAXIMUM-FOR-IP-SSP-CAPABILITIES         4
    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
```

5.6 Object IDentifiers (IDs)

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

```
DEFINITIONS ::= BEGIN

-- This module assigns object identifiers for Modules, Packages, Contracts and AC's
-- used by CAP

-- For Modules from TC, 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)}


-- For CAP Modules
datatypes                       OBJECT IDENTIFIER ::=
    {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0) umts-network(1) modules(3)
    cap-datatypes(52) version3(2)}

errortypes                      OBJECT IDENTIFIER ::=
    {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0) umts-network(1) modules(3)
    cap-errortypes(51) version3(2)}

operationcodes                  OBJECT IDENTIFIER ::=
    {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0) umts-network(1) modules(3)
    cap-operationcodes(53) version3(2)}

errorcodes                      OBJECT IDENTIFIER ::=
    {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0) umts-network(1) modules(3)
    cap-errorcodes(57) version3(2)}

classes                         OBJECT IDENTIFIER ::=
    {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0) umts-network(1) modules(3)
    cap-classes(54) version3(2)}


gsmSSF-gsmSCF-Operations        OBJECT IDENTIFIER ::=
    {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0) umts-network(1) modules(3)
    cap-gsmSSF-gsmSCF-ops-args(101) version3(2)}

gsmSSF-gsmSCF-Protocol          OBJECT IDENTIFIER ::=
    {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0) umts-network(1) modules(3)
    cap-gsmSSF-gsmSCF-pkgs-contracts-acs(102) version3(2)}

gsmSCF-gsmSRF-Operations        OBJECT IDENTIFIER ::=
    {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0) umts-network(1) modules(3)
    cap-gsmSCF-gsmSRF-ops-args(103) version3(2)}

gsmSCF-gsmSRF-Protocol          OBJECT IDENTIFIER ::=
    {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0) umts-network(1) modules(3)
    cap-gsmSCF-gsmSRF-pkgs-contracts-acs(104) version3(2)}


sms-Operations                  OBJECT IDENTIFIER ::=
    {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0) umts-network(1) modules(3)
    cap-SMS-ops-args(105) version3(2)}

smsSSF-gsmSCF-Protocol          OBJECT IDENTIFIER ::=
    {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0) umts-network(1) modules(3)
    cap-smsSSF-gsmSCF-pkgs-contracts-acs(106) version3(2)}

gprsSSF-gsmSCF-Operations       OBJECT IDENTIFIER ::=
    {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0) umts-network(1) modules(3)
    cap-GPRS-ops-args(107) version3(2)}

gprsSSF-gsmSCF-Protocol         OBJECT IDENTIFIER ::=
    {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0) umts-network(1) modules(3)
    cap-gprsSSF-gsmSCF-pkgs-contracts-acs(108) version3(2)}


id-CAP                          OBJECT IDENTIFIER ::=
    {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0)
    umts-network(1) cap3(20)}
id-CAP0E                        OBJECT IDENTIFIER ::=
    {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0)
    umts-network(1) cap3OE(21)}
id-ac                                   OBJECT IDENTIFIER ::= {id-CAP       ac(3)}
id-acE                                  OBJECT IDENTIFIER ::= {id-CAP0E     ac(3)}
id-as                                   OBJECT IDENTIFIER ::= {id-CAP       as(5)}
id-asE                                  OBJECT IDENTIFIER ::= {id-CAP0E     as(5)}
id-rosObject                            OBJECT IDENTIFIER ::= {id-CAP       rosObject(25)}
id-contract                             OBJECT IDENTIFIER ::= {id-CAP       contract(26)}
id-contractE                            OBJECT IDENTIFIER ::= {id-CAP0E     contract(26)}
id-package                              OBJECT IDENTIFIER ::= {id-CAP       package(27)}
id-packageE                             OBJECT IDENTIFIER ::= {id-CAP0E     package(27)}

-- for ac, as, rosObject, contract and package, the values are identical to Q.1218

-- ROS Objects

id-rosObject-gsmSCF                     OBJECT IDENTIFIER ::= {id-rosObject 4}
```

```
id-rosObject-gsmSSF                         OBJECT IDENTIFIER ::= {id-rosObject 5}
id-rosObject-gsmSRF                         OBJECT IDENTIFIER ::= {id-rosObject 6}

-- gsmSSF/gsmSCF AC
id-ac-CAP-gsmSSF-scfGenericAC               OBJECT IDENTIFIER ::= {id-acE 4}
id-ac-CAP-gsmSSF-scfAssistHandoffAC         OBJECT IDENTIFIER ::= {id-acE 6}

-- gsmSRF/gsmSCF AC
id-ac-gsmSRF-gsmSCF                         OBJECT IDENTIFIER ::= {id-ac 14}

-- gprsSSF/gsmSCF AC
id-ac-CAP-gprsSSF-gsmSCF-AC                 OBJECT IDENTIFIER ::= {id-acE 50}
id-ac-CAP-gsmSCF-gprsSSF-AC                 OBJECT IDENTIFIER ::= {id-acE 51}

-- gprsSSF/gsmSCF or gsmSSF/gsmSCF AC
id-ac-cap3-sms-AC                           OBJECT IDENTIFIER ::= {id-acE 61}

-- gsmSSF/gsmSCF Contracts
id-CAPSsfToScfGeneric                       OBJECT IDENTIFIER ::= {id-contractE 3}
id-CAPAssistHandoffssfToScf                 OBJECT IDENTIFIER ::= {id-contractE 5}

-- gsmSRF/gsmSCF Contracts
id-contract-gsmSRF-gsmSCF                   OBJECT IDENTIFIER ::= {id-contract 13}

-- gprsSSF/gsmSCF Contracts
id-cap3GprsSsfTogsmScf                      OBJECT IDENTIFIER ::= {id-contract 14}
id-cap3GsmScfCFToGgprsSsfSF                     OBJECT IDENTIFIER ::= {id-contract 15}

-- gprsSSF/gsmSCF or gsmSSF/gsmSCF Contracts
id-cap3SmsSsfTogsmScf                       OBJECT IDENTIFIER ::= {id-contract 16}

-- gsmSSF/gsmSCF Operation Packages
id-package-scfActivation                    OBJECT IDENTIFIER ::= {id-package 11}
id-package-gsmSRF-scfActivationOfAssist     OBJECT IDENTIFIER ::= {id-package 15}
id-package-assistConnectionEstablishment    OBJECT IDENTIFIER ::= {id-package 16}
id-package-genericDisconnectResource        OBJECT IDENTIFIER ::= {id-package 17}
id-package-nonAssistedConnectionEstablishment
                                            OBJECT IDENTIFIER ::= {id-package 18}
id-package-connect                          OBJECT IDENTIFIER ::= {id-package 19}
id-package-callHandling                     OBJECT IDENTIFIER ::= {id-packageE 20}
id-package-bcsmEventHandling                OBJECT IDENTIFIER ::= {id-package 21}
id-package-ssfCallProcessing                OBJECT IDENTIFIER ::= {id-packageE 24}
id-package-timer                            OBJECT IDENTIFIER ::= {id-package 26}
id-package-billing                          OBJECT IDENTIFIER ::= {id-package 27}
id-package-charging                         OBJECT IDENTIFIER ::= {id-package 28}
id-package-trafficManagement                OBJECT IDENTIFIER ::= {id-package 29}
id-package-callReport                       OBJECT IDENTIFIER ::= {id-package 32}
id-package-signallingControl                OBJECT IDENTIFIER ::= {id-package 33}
id-package-activityTest                     OBJECT IDENTIFIER ::= {id-package 34}
id-package-cancel                           OBJECT IDENTIFIER ::= {id-packageE 36}

-- gsmSRF/gsmSCF Operation Packages
id-package-specializedResourceControl       OBJECT IDENTIFIER ::= {id-package 42}
id-package-gsmSRF-scfCancel                 OBJECT IDENTIFIER ::= {id-package 43}

-- gprsSSF/gsmSCF Operation Packages
id-package-gprsContinue                     OBJECT IDENTIFIER ::= {id-package 49}
id-package-gprsExceptionInformation         OBJECT IDENTIFIER ::= {id-package 50}
id-package-gprsScfCFActivationPackage           OBJECT IDENTIFIER ::= {id-package 51}
id-package-gprsConnectPackage               OBJECT IDENTIFIER ::= {id-package 52}
id-package-gprsReleasePackage               OBJECT IDENTIFIER ::= {id-package 53}
id-package-gprsEventHandlingPackage         OBJECT IDENTIFIER ::= {id-package 54}
id-package-gprsSCFTimerPackage              OBJECT IDENTIFIER ::= {id-package 55}
id-package-gprsSCFBillingPackage            OBJECT IDENTIFIER ::= {id-package 56}
id-package-gprsSCFChargingPackage           OBJECT IDENTIFIER ::= {id-package 57}
id-package-gprsSCFActivityTestPackage       OBJECT IDENTIFIER ::= {id-package 58}
id-package-gprsSCFCancelPackage             OBJECT IDENTIFIER ::= {id-package 59}
id-package-gprsSCFChargeAdvicePackage       OBJECT IDENTIFIER ::= {id-package 60}

-- gprsSSF/gsmSCF or gsmSSF/gsmSCF Operation Packages
id-package-smsActivation                    OBJECT IDENTIFIER ::= {id-package 61}
id-package-smsConnect                       OBJECT IDENTIFIER ::= {id-package 62}
id-package-smsContinue                      OBJECT IDENTIFIER ::= {id-package 63}
id-package-smsRelease                       OBJECT IDENTIFIER ::= {id-package 64}
id-package-smsEventHandling                 OBJECT IDENTIFIER ::= {id-package 65}
id-package-smsBilling                       OBJECT IDENTIFIER ::= {id-package 66}
id-package-smsTimer                         OBJECT IDENTIFIER ::= {id-package 67}

-- gsmSSF/gsmSCF Abstract Syntaxes
id-as-gsmSSF-scfGenericAS                   OBJECT IDENTIFIER ::= {id-asE 4}
id-as-assistHandoff-gsmSSF-scfAS            OBJECT IDENTIFIER ::= {id-asE 6}

-- gsmSRF/gsmSCF Abstract Syntaxes
id-as-basic-gsmSRF-gsmSCF                   OBJECT IDENTIFIER ::= {id-as 14}

-- gprsSSF/gsmSCF Abstract Syntaxes
id-as-gprsSSF-gsmSCF-AS                     OBJECT IDENTIFIER ::= {id-as 50}
id-as-gsmSCF-gprsSSF-AS                     OBJECT IDENTIFIER ::= {id-as 51}

-- gprsSSF/gsmSCF or gsmSSF/gsmSCF Abstract Syntaxes
```

```
id-as-sms-AS                    OBJECT IDENTIFIER ::= {id-as 61}

END
```

5.7 User Abort Data

```
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)}

DEFINITIONS ::= 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.
--                              This abort reason is used for CAP defined GPRS-ReferenceNumber.
-- missing-reference            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 TC 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 Circuit Switched Call Control

6.1 gsmSSF/CCF - gsmSCF Interface

6.1.1 Operations and arguments

```
CAP-gsmSSF-gsmSCF-ops-args {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0)
umts-network(1) modules(3) cap-gsmSSF-gsmSCF-ops-args(101) version3(2)}

DEFINITIONS IMPLICIT TAGS ::= BEGIN

-- This module contains the operations and operation arguments used for the
-- gsmSSF – 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

    errortypes,
    datatypes,
    operationcodes,
    classes,
    tc-Messages,
    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)}

    Ext-BasicServiceCode,
    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)}

    CUG-Index,
    CUG-Interlock,
    CUG-Info,
    LocationInformation,
    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)}

    PARAMETERS-BOUND
FROM CAP-classes classes

    opcode-activityTest,
    opcode-applyCharging,
    opcode-applyChargingReport,
    opcode-assistRequestInstructions,
    opcode-callGap,
    opcode-callInformationReport,
    opcode-callInformationRequest,
    opcode-cancel,
    opcode-connect,
    opcode-connectToResource,
    opcode-continue,
    opcode-continueWithArgument,
    opcode-disconnectForwardConnection,
    opcode-establishTemporaryConnection,
    opcode-eventReportBCSM,
    opcode-furnishChargingInformation,
    opcode-initialDP,
    opcode-releaseCall,
```

```
    opcode-requestReportBCSMEvent,
    opcode-resetTimer,
    opcode-sendChargingInformation
FROM CAP-operationcodes operationcodes

    AChBillingChargingCharacteristics {},
    AdditionalCallingPartyNumber {},
    AlertingPattern,
    AssistingSSPIPRoutingAddress {},
    BCSMEvent ~~{}~~,
    BearerCapability {},
    CalledPartyNumber {},
    CalledPartyBCDNumber {},
    CallingPartyNumber {},
    CallingPartysCategory,
    CallResult {},
    Carrier,
    Cause {},
    CGEncountered,
    ChargeNumber {},
    ControlType,
    CorrelationID {},
    DestinationRoutingAddress {},
    EventSpecificInformationBCSM {},
    EventTypeBCSM,
    ExtensionsExtensionField {},
    FCIBillingChargingCharacteristics {},
    GapCriteria {},
    GapIndicators,
    GapTreatment,
    GenericNumbers {},
    HighLayerCompatibility,
    InvokeID,
    IPRoutingAddress {},
    IPSSPCapabilities {},
    leg1,
    LocationNumber {},
    MonitorMode,
    NAOliInfo,
    OCSIApplicable,
    OriginalCalledPartyID {},
    ReceivingSideID,
    RedirectingPartyID {},
    RedirectionInformation,
    RequestedInformationList {},
    RequestedInformationTypeList ~~{}~~,
    ScfID {},
    SCIBillingChargingCharacteristics {},
    SendingSideID,
    ServiceInteractionIndicatorsTwo,
    TimeAndTimezone {},
    TimerID,
    TimerValue
FROM CAP-datatypes datatypes

    cancelFailed,
    eTCFailed,
    missingCustomerRecord,
    missingParameter,
    parameterOutOfRange,
    requestedInfoError,
    systemFailure,
    taskRefused,
    unexpectedComponentSequence,
    unexpectedDataValue,
    unexpectedParameter,
    unknownLegID
FROM CAP-errortypes errortypes

;

activityTest OPERATION ::= {
    RETURN RESULT TRUE
    CODE    opcode-activityTest
    }
-- Direction: gsmSCF -> gsmSSF, Timer: Tat
-- This operation is used to check for the continued existence of a relationship
-- between the gsmSCF and gsmSSF, assistSSF or gsmSRF. If the relationship is
-- still in existence, then the gsmSSF will respond. If no reply is received,
-- then the gsmSCF will assume that the gsmSSF, assistSSF or grmSRF has failed
-- in some way.

applyCharging {PARAMETERS-BOUND : bound} OPERATION ::= {
    ARGUMENT        ApplyChargingArg {bound}
    RETURN RESULT   FALSE
    ERRORS          {missingParameter |
                    unexpectedComponentSequence |
                    unexpectedParameter |
                    unexpectedDataValue |
                    parameterOutOfRange |
```

```
                    systemFailure |
                    taskRefused|
                    unknownLegID}
    CODE            opcode-applyCharging
    }
-- Direction: gsmSCF -> gsmSSF, Timer: Tac
-- This operation is used for interacting from the gsmSCF with the gsmSSF charging mechanisms.
-- The ApplyChargingReport operation provides the feedback from the gsmSSF to the gsmSCF.

ApplyChargingArg {PARAMETERS-BOUND : bound} ::= SEQUENCE {
    aChBillingChargingCharacteristics   [0] AChBillingChargingCharacteristics {bound},
    partyToCharge                       [2] SendingSideID   DEFAULT sendingSideID : leg1,
    extensions                          [3] Extensions~~SEQUENCE SIZE (1..bound.&numOfExtensions) OF
                                            ExtensionField~~ {bound}  OPTIONAL,
    ...
    }

-- The partyToCharge parameter indicates the party in the call to which the ApplyCharging operation
-- shall be applied.

applyChargingReport {PARAMETERS-BOUND : bound} OPERATION ::= {
    ARGUMENT        ApplyChargingReportArg {bound}
    RETURN RESULT   FALSE
    ERRORS          {missingParameter |
                    unexpectedComponentSequence |
                    unexpectedParameter |
                    unexpectedDataValue |
                    parameterOutOfRange |
                    systemFailure |
                    taskRefused}
    CODE            opcode-applyChargingReport
    }
-- Direction: gsmSSF -> gsmSCF, Timer: Tacr
-- This operation is used by the gsmSSF to report to the gsmSCF the occurrence of a
-- specific charging event as requested by the gsmSCF using the ApplyCharging operation.

ApplyChargingReportArg {PARAMETERS-BOUND : bound} ::= CallResult {bound}

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 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 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] Extensions ~~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.

callGap {PARAMETERS-BOUND : bound} OPERATION ::= {
    ARGUMENT        CallGapArg {bound}
    RETURN RESULT   FALSE
    ALWAYS RESPONDS FALSE
    CODE            opcode-callGap
    }
-- Direction: gsmSCF -> gsmSSF, Timer: Tcg
-- This operation is used to request the gsmSSF to reduce the rate at which specific service
-- requests are sent to the gsmSCF.

CallGapArg {PARAMETERS-BOUND : bound}::= SEQUENCE {
    gapCriteria     [0] GapCriteria {bound},
    gapIndicators   [1] GapIndicators,
    controlType     [2] ControlType                                     OPTIONAL,
    gapTreatment    [3] GapTreatment {bound}                            OPTIONAL,
    extensions      [4] Extensions ~~SEQUENCE SIZE(1..bound.&numOfExtensions) OF
                                            ExtensionField~~ {bound}    OPTIONAL,
    ...
    }
```

```
-- OPTIONAL denotes network operator optional. If gapTreatment is not present, the gsmSSF will
-- use a default treatment depending on network operator implementation.

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] Extensions 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] Extensions SEQUENCE SIZE(1..bound.&numOfExtensions) OF
                                        ExtensionField {bound}  OPTIONAL,
    legID                           [3] SendingSideID               OPTIONAL,
    ...
    }
-- OPTIONAL denotes network operator optional.

cancel {PARAMETERS-BOUND : bound} OPERATION ::= {
    ARGUMENT        CancelArg {bound}
    RETURN RESULT   FALSE
    ERRORS          {cancelFailed |
                     missingParameter |
                     taskRefused}
    CODE            opcode-cancel
    }
-- Direction: gsmSCF -> gsmSSF, or gsmSCF -> gsmSRF, Timer: Tcan
-- This operation cancels the correlated previous operation or all previous requests. The following
-- operations can be canceled: PlayAnnouncement, PromptAndCollectUserInformation.

CancelArg {PARAMETERS-BOUND : bound}::= CHOICE {
    invokeID            [0] InvokeID,
    allRequests         [1] NULL
    }
-- The InvokeID has the same value as that which was used for the operation to be cancelled.

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.

ConnectArg {PARAMETERS-BOUND : bound} ::= SEQUENCE {
    destinationRoutingAddress       [0] DestinationRoutingAddress {bound},
    alertingPattern                 [1] AlertingPattern                     OPTIONAL,
    originalCalledPartyID           [6] OriginalCalledPartyID {bound}       OPTIONAL,
    extensions                      [10] Extensions 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}
    CODE            opcode-connectToResource
    }
-- Direction: gsmSCF -> gsmSSF, Timer: Tctr
-- This operation is used to connect a call from the gsmSSF to 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] Extensions SEQUENCE SIZE(1..bound.&numOfExtensions) OF
                                                   ExtensionField {bound}       OPTIONAL,
    serviceInteractionIndicatorsTwo [7] ServiceInteractionIndicatorsTwo         OPTIONAL,
    ...
    }

continue OPERATION ::= {
    RETURN RESULT   FALSE
    ALWAYS RESPONDS FALSE
    CODE            opcode-continue
    }
-- Direction: gsmSCF -> gsmSSF, Timer: Tcue
-- This operation is used to request the gsmSSF to proceed with call processing at the
-- DP at which it previously suspended call processing to await gsmSCF instructions
-- (i.e. proceed to the next point in call in the BCSM). The gsmSSF continues call
-- processing without substituting new data from gsmSCF.

continueWithArgument {PARAMETERS-BOUND : bound} OPERATION ::= {
    ARGUMENT        ContinueWithArgumentArg {bound}
    RETURN RESULT   FALSE
    ERRORS          {missingParameter |
                     parameterOutOfRange |
                     unexpectedComponentSequence |
                     unexpectedDataValue |
                     unexpectedParameter}
    CODE            opcode-continueWithArgument
    }

-- Direction: gsmSCF -> gsmSSF, Timer: Tcwa
-- This operation is used to request the gsmSSF to proceed with call processing at the
-- DP at which it previously suspended call processing to await gsmSCF instructions
-- (i.e. proceed to the next point in call in the BCSM). The gsmSSF continues call
-- processing with the modified call setup information as received from the gsmSCF.

ContinueWithArgumentArg {PARAMETERS-BOUND : bound} ::= SEQUENCE {
    alertingPattern                 [1] AlertingPattern                         OPTIONAL,
    extensions                      [6] Extensions SEQUENCE SIZE(1..bound.&numOfExtensions) OF
                                                   ExtensionField {bound}       OPTIONAL,
    serviceInteractionIndicatorsTwo [7] ServiceInteractionIndicatorsTwo         OPTIONAL,
    callingPartysCategory           [12] CallingPartysCategory                  OPTIONAL,
    genericNumbers                  [16] GenericNumbers {bound}                 OPTIONAL,
    cug-Interlock                   [17] CUG-Interlock                          OPTIONAL,
    cug-OutgoingAccess              [18] NULL                                   OPTIONAL,
    chargeNumber                    [50] ChargeNumber {bound}                   OPTIONAL,
    carrier                         [52] Carrier {bound}                        OPTIONAL,
    suppressionOfAnnouncement       [55] SuppressionOfAnnouncement              OPTIONAL,
    naOliInfo                       [56] NAOliInfo                              OPTIONAL,
    ...
    }

disconnectForwardConnection OPERATION ::= {
    RETURN RESULT   FALSE
    ERRORS          {systemFailure |
                     taskRefused |
                     unexpectedComponentSequence}
```

```
    CODE            opcode-disconnectForwardConnection
    }
-- Direction: gsmSCF -> gsmSSF, Timer: Tdfc
-- This operation is used to disconnect a forward temporary connection or a connection to a
-- resource. Refer to clause 11 for a description of the procedures associated with this operation.

establishTemporaryConnection {PARAMETERS-BOUND : bound} OPERATION ::= {
    ARGUMENT        EstablishTemporaryConnectionArg {bound}
    RETURN RESULT   FALSE
    ERRORS          {eTCFailed |
                     missingParameter |
                     systemFailure |
                     taskRefused |
                     unexpectedComponentSequence |
                     unexpectedDataValue |
                     unexpectedParameter}
    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] Extensions 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,
    ...
    }

eventReportBCSM {PARAMETERS-BOUND : bound} OPERATION ::= {
    ARGUMENT        EventReportBCSMArg {bound}
    RETURN RESULT   FALSE
    ALWAYS RESPONDS FALSE
    CODE            opcode-eventReportBCSM
    }
-- Direction: gsmSSF -> gsmSCF, Timer: Terb
-- This operation is used to notify the gsmSCF of a call-related event (e.g. BCSM
-- events such as busy or no answer) previously requested by the gsmSCF in a
-- RequestReportBCSMEvent operation.

EventReportBCSMArg {PARAMETERS-BOUND : bound} ::= SEQUENCE {
    eventTypeBCSM                   [0] EventTypeBCSM,
    eventSpecificInformationBCSM    [2] EventSpecificInformationBCSM {bound}            OPTIONAL,
    legID                           [3] ReceivingSideID                                 OPTIONAL,
    miscCallInfo                    [4] MiscCallInfo                DEFAULT {messageType request},
    extensions                      [5] Extensions SEQUENCE SIZE(1..bound.&numOfExtensions) OF
                                                                        ExtensionField {bound}  OPTIONAL,
    ...
    }

furnishChargingInformation {PARAMETERS-BOUND : bound} OPERATION ::= {
    ARGUMENT        FurnishChargingInformationArg {bound}
    RETURN RESULT   FALSE
    ERRORS          {missingParameter |
                     taskRefused |
                     unexpectedComponentSequence |
                     unexpectedDataValue |
                     unexpectedParameter}
    CODE            opcode-furnishChargingInformation
    }
-- Direction: gsmSCF -> gsmSSF, Timer: Tfci
-- This operation is used to request the gsmSSF to generate, register a call record
-- or to include some information in the default call record.
-- The registered call record is intended for off line charging of the call.

FurnishChargingInformationArg {PARAMETERS-BOUND : bound} ::=
FCIBillingChargingCharacteristics{bound}

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

```
-- Direction: gsmSSF -> gsmSCF, Timer: Tidp
-- This operation is used after a TDP to indicate request for service.

InitialDPArg {PARAMETERS-BOUND : bound} ::= SEQUENCE {
    serviceKey                      [0] ServiceKey  ,
    calledPartyNumber               [2] CalledPartyNumber {bound}                   OPTIONAL,
    callingPartyNumber              [3] CallingPartyNumber {bound}                  OPTIONAL,
    callingPartysCategory           [5] CallingPartysCategory                       OPTIONAL,
    cGEncountered                   [7] CGEncountered                               OPTIONAL,
    iPSSPCapabilities               [8] IPSSPCapabilities {bound}                   OPTIONAL,
    locationNumber                  [10] LocationNumber {bound}                     OPTIONAL,
    originalCalledPartyID           [12] OriginalCalledPartyID {bound}              OPTIONAL,
    extensions                      [15] Extensions SEQUENCE SIZE(1..bound.&numOfExtensions) OF
                                                ExtensionField {bound}              OPTIONAL,
    highLayerCompatibility          [23] HighLayerCompatibility OPTIONAL,
    additionalCallingPartyNumber    [25] AdditionalCallingPartyNumber {bound}       OPTIONAL,
    bearerCapability                [27] BearerCapability {bound}                   OPTIONAL,
    eventTypeBCSM                   [28] EventTypeBCSM                              OPTIONAL,
    redirectingPartyID              [29] RedirectingPartyID {bound}                 OPTIONAL,
    redirectionInformation          [30] RedirectionInformation                     OPTIONAL,
    cause                           [17] Cause {bound}                              OPTIONAL,
    serviceInteractionIndicatorsTwo [32] ServiceInteractionIndicatorsTwo            OPTIONAL,
    carrier                         [37] Carrier {bound}                            OPTIONAL,
    cug-Index                       [45] CUG-Index                                  OPTIONAL,
    cug-Interlock                   [46] CUG-Interlock                              OPTIONAL,
    cug-OutgoingAccess              [47] NULL                                       OPTIONAL,
    iMSI                            [50] IMSI                                       OPTIONAL,
    subscriberState                 [51] SubscriberState                            OPTIONAL,
    locationInformation             [52] LocationInformation                        OPTIONAL,
    ext-basicServiceCode            [53] Ext-BasicServiceCode                       OPTIONAL,
    callReferenceNumber             [54] CallReferenceNumber                        OPTIONAL,
    mscAddress                      [55] ISDN-AddressString                         OPTIONAL,
    calledPartyBCDNumber            [56] CalledPartyBCDNumber {bound}               OPTIONAL,
    timeAndTimezone                 [57] TimeAndTimezone {bound}                    OPTIONAL,
    gsm-ForwardingPending           [58] NULL                                       OPTIONAL,
    initialDPArgExtension           [59] InitialDPArgExtension                      OPTIONAL,
    ...
    }

InitialDPArgExtension               ::= SEQUENCE {
    gmscAddress                         [0] ISDN-AddressString                      OPTIONAL,
    ...
}
-- If iPSSPCapabilities is not present then this denotes that a colocated gsmSRF is not
-- supported by the gsmSSF. If present, then the gsmSSF supports a colocated gsmSRF capable
-- of playing announcements via elementaryMessageIDs and variableMessages, the playing of
-- tones and the collection of DTMF digits. Other supported capabilities are explicitly
-- detailed in the IPSSPCapabilities parameter itself.
-- Carrier is included at the discretion of the gsmSSF operator.

releaseCall {PARAMETERS-BOUND : bound} OPERATION ::= {
    ARGUMENT        ReleaseCallArg {bound}
    RETURN RESULT   FALSE
    ALWAYS RESPONDS FALSE
    CODE            opcode-releaseCall
    }
-- Direction: gsmSCF -> gsmSSF, Timer: Trc
-- This operation is used to tear down an existing call at any phase of the call for all parties
-- involved in the call.

ReleaseCallArg {PARAMETERS-BOUND : bound} ::= Cause {bound}
-- A default value of decimal 31 (normal unspecified) shall be given.

requestReportBCSMEvent {PARAMETERS-BOUND : bound} OPERATION ::= {
    ARGUMENT        RequestReportBCSMEventArg {bound}
    RETURN RESULT   FALSE
    ERRORS          {missingParameter |
                     parameterOutOfRange |
                     systemFailure |
                     taskRefused |
                     unexpectedComponentSequence |
                     unexpectedDataValue |
                     unexpectedParameter |
                     unknownLegID}
    CODE            opcode-requestReportBCSMEvent
    }
-- Direction: gsmSCF -> gsmSSF, Timer: Trrb
-- This operation is used to request the gsmSSF to monitor for a call-related event
-- (e.g. BCSM events such as busy or no answer), then send a notification back to the gsmSCF when
-- the event is detected.
-- NOTE:
--      Every EDP must be explicitly armed by the gsmSCF via a RequestReportBCSMEvent operation.
--      No implicit arming of EDPs at the gsmSSF after reception of any operation (different
--      from RequestReportBCSMEvent) from the gsmSCF is allowed.

RequestReportBCSMEventArg {PARAMETERS-BOUND : bound} ::= SEQUENCE {
    bcsmEvents  [0] SEQUENCE SIZE(1..bound.&numOfBCSMEvents) OF BCSMEvent {bound},
    extensions  [2] Extensions SEQUENCE SIZE(1..bound.&numOfExtensions) OF ExtensionField {bound}
    OPTIONAL,
    ...
```

```
    }
-- Indicates the BCSM related events for notification.

resetTimer {PARAMETERS-BOUND : bound} OPERATION ::= {
    ARGUMENT        ResetTimerArg {bound}
    RETURN RESULT   FALSE
    ERRORS          {missingParameter |
                     parameterOutOfRange |
                     taskRefused |
                     unexpectedComponentSequence |
                     unexpectedDataValue |
                     unexpectedParameter}
    CODE            opcode-resetTimer
    }
-- Direction: gsmSCF -> gsmSSF, Timer: Trt
-- This operation is used to request the gsmSSF to refresh an application timer in the gsmSSF.

ResetTimerArg {PARAMETERS-BOUND : bound} ::= SEQUENCE {
    timerID         [0] TimerID DEFAULT tssf,
    timervalue      [1] TimerValue,
    extensions      [2] Extensions SEQUENCE SIZE(1..bound.&numOfExtensions) OF
                                                        ExtensionField {bound}  OPTIONAL,
    ...
    }

sendChargingInformation {PARAMETERS-BOUND : bound} OPERATION ::= {
    ARGUMENT        SendChargingInformationArg {bound}
    RETURN RESULT   FALSE
    ERRORS          {missingParameter |
                     unexpectedComponentSequence |
                     unexpectedParameter |
                     parameterOutOfRange |
                     systemFailure |
                     taskRefused |
                     unexpectedDataValue |
                     unknownLegID}
    CODE            opcode-sendChargingInformation
    }
-- Direction: gsmSCF -> gsmSSF, Timer: Tsci
-- This operation is used to instruct the gsmSSF on the charging information to send by the gsmSSF.
-- The charging information can either be sent back by means of signalling or internal
-- if the gsmSSF is located in the local exchange. In the local exchange
-- this information may be used to update the charge meter or to create a standard call record.

SendChargingInformationArg {PARAMETERS-BOUND : bound}::= SEQUENCE {
    sCIBillingChargingCharacteristics   [0] SCIBillingChargingCharacteristics {bound},
    partyToCharge                       [1] SendingSideID,
    extensions                          [2] Extensions SEQUENCE SIZE(1..bound.&numOfExtensions) OF
                                                ExtensionField {bound}  OPTIONAL,
    ...
    }
END
```

The following value ranges apply for operation specific timers in CAP:

short:	1 s - 10 s
medium:	1 s - 60 s
long:	1 s - 30 minutes

Table 6-1 lists all operation timers and the value range for each timer. The definitive value for each operation timer may be network specific and has to be defined by the network operator.

Table 6-1: Timer value ranges

Operation Name	Timer	Value range
ActivityTest	T_{at}	short
ApplyCharging	T_{ac}	short
ApplyChargingReport	T_{acr}	short
AssistRequestInstructions	T_{ari}	short
CallInformationReport	T_{cirp}	short
CallInformationRequest	T_{cirq}	short
Cancel	T_{can}	short
CallGap	T_{cg}	short
Connect	T_{con}	short
ConnectToResource	T_{ctr}	short
Continue	T_{cue}	short
ContinueWithArgument	T_{cwa}	short
DisconnectForwardConnection	T_{dfc}	short
EstablishTemporaryConnection	T_{etc}	medium
EventReportBCSM	T_{erb}	short
FurnishChargingInformation	T_{fci}	short
InitialDP	T_{idp}	short
ReleaseCall	T_{rc}	short
RequestReportBCSMEvent	T_{rrb}	short
ResetTimer	T_{rt}	short
SendChargingInformation	T_{sci}	short

6.1.2 gsmSSF/gsmSCF packages, contracts and ACs

6.1.2.1 gsmSSF/gsmSCF ASN.1 module

```
CAP-gsmSSF-gsmSCF-pkgs-contracts-acs {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0)
umts-network(1) modules(3) cap-gsmSSF-gsmSCF-pkgs-contracts-acs(102) version3(2)}

DEFINITIONS ::= BEGIN

-- This module specifies the Operation Packages, Contracts, Application Contexts
-- and Abstract Syntaxes used for the gsmSSF – 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

    PARAMETERS-BOUND,
    cAPSpecificBoundSet
FROM CAP-classes classes

    CONTRACT,
    OPERATION-PACKAGE,
    OPERATION
FROM Remote-Operations-Information-Objects ros-InformationObjects

    TCMessage {}
FROM TCAPMessages tc-Messages

    APPLICATION-CONTEXT,
    dialogue-abstract-syntax
FROM TC-Notation-Extensions tc-NotationExtensions

    activityTest,
    applyCharging {},
    applyChargingReport {},
    assistRequestInstructions {},
    callGap {},
    callInformationReport {},
    callInformationRequest {},
    cancel {},
    connect {},
```

```
    connectToResource {},
    continue,
    continueWithArgument {},
    disconnectForwardConnection,
    establishTemporaryConnection {},
    eventReportBCSM {},
    furnishChargingInformation {},
    initialDP {},
    releaseCall {},
    requestReportBCSMEvent {},
    resetTimer {},
    sendChargingInformation {}
FROM CAP-gsmSSF-gsmSCF-ops-args gsmSSF-gsmSCF-Operations

    playAnnouncement {},
    promptAndCollectUserInformation {},
    specializedResourceReport
FROM CAP-gsmSCF-gsmSRF-ops-args gsmSCF-gsmSRF-Operations

    specializedResourceControlPackage {}
FROM CAP-gsmSCF-gsmSRF-pkgs-contracts-acs gsmSCF-gsmSRF-Protocol

    id-ac-CAP-gsmSSF-scfGenericAC,
    id-ac-CAP-gsmSSF-scfAssistHandoffAC,
    id-CAPSsfToScfGeneric,
    id-CAPAssistHandoffssfToScf,
    id-as-gsmSSF-scfGenericAS,
    id-as-assistHandoff-gsmSSF-scfAS,
    id-package-scfActivation,
    id-package-gsmSRF-scfActivationOfAssist,
    id-package-assistConnectionEstablishment,
    id-package-genericDisconnectResource,
    id-package-nonAssistedConnectionEstablishment,
    id-package-connect,
    id-package-callHandling,
    id-package-bcsmEventHandling,
    id-package-ssfCallProcessing,
    id-package-timer,
    id-package-billing,
    id-package-charging,
    id-package-trafficManagement,
    id-package-callReport,
    id-package-signallingControl,
    id-package-activityTest,
    id-package-cancel,
    classes,
    ros-InformationObjects,
    tc-Messages,
    tc-NotationExtensions,
    gsmSSF-gsmSCF-Operations,
    gsmSCF-gsmSRF-Operations,
    gsmSCF-gsmSRF-Protocol
FROM CAP-object-identifiers {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0)
umts-network(1) modules(3) cap-object-identifiers(100) version3(2)}

;

-- Application Contexts

capssf-scfGenericAC APPLICATION-CONTEXT ::= {
    CONTRACT                    capSsfToScfGeneric
    DIALOGUE MODE               structured
    ABSTRACT SYNTAXES           {dialogue-abstract-syntax |
                                gsmSSF-scfGenericAbstractSyntax}
    APPLICATION CONTEXT NAME    id-ac-CAP-gsmSSF-scfGenericAC}

capssf-scfAssistHandoffAC APPLICATION-CONTEXT ::=   {
    CONTRACT                    capAssistHandoffssfToScf
    DIALOGUE MODE               structured
    ABSTRACT SYNTAXES           {dialogue-abstract-syntax |
                                assistHandoff-gsmSSF-scfAbstractSyntax}
    APPLICATION CONTEXT NAME    id-ac-CAP-gsmSSF-scfAssistHandoffAC}


-- Contracts

capSsfToScfGeneric CONTRACT ::= {
-- dialogue initiated by gsmSSF with InitialDP Operation
    INITIATOR CONSUMER OF
            {scfActivationPackage {cAPSpecificBoundSet}}
    RESPONDER CONSUMER OF
            {activityTestPackage|
            assistConnectionEstablishmentPackage {cAPSpecificBoundSet} |
            bcsmEventHandlingPackage {cAPSpecificBoundSet} |
            billingPackage {cAPSpecificBoundSet} |
            callHandlingPackage {cAPSpecificBoundSet} |
            callReportPackage {cAPSpecificBoundSet} |
            cancelPackage {cAPSpecificBoundSet} |
            chargingPackage {cAPSpecificBoundSet} |
            connectPackage {cAPSpecificBoundSet} |
```

```
            genericDisconnectResourcePackage {cAPSpecificBoundSet} |
            nonAssistedConnectionEstablishmentPackage {cAPSpecificBoundSet} |
            signallingControlPackage {cAPSpecificBoundSet} |
            specializedResourceControlPackage {cAPSpecificBoundSet} |
            ssfCallProcessingPackage {cAPSpecificBoundSet} |
            timerPackage {cAPSpecificBoundSet} |
            trafficManagementPackage {cAPSpecificBoundSet}}
    ID      id-CAPSsfToScfGeneric
    }

capAssistHandoffssfToScf CONTRACT ::= {
-- dialogue initiated by gsmSSF with AssistRequestInstructions
    INITIATOR CONSUMER OF
            {gsmSRF-scfActivationOfAssistPackage {cAPSpecificBoundSet}}
    RESPONDER CONSUMER OF
            {activityTestPackage|
            callHandlingPackage {cAPSpecificBoundSet} |
            cancelPackage {cAPSpecificBoundSet} |
            genericDisconnectResourcePackage {cAPSpecificBoundSet} |
            nonAssistedConnectionEstablishmentPackage {cAPSpecificBoundSet} |
            specializedResourceControlPackage {cAPSpecificBoundSet} |
            timerPackage {cAPSpecificBoundSet}}
    ID      id-CAPAssistHandoffssfToScf
    }


-- Operation Packages

scfActivationPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {initialDP {bound}}
    ID      id-package-scfActivation}
gsmSRF-scfActivationOfAssistPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {assistRequestInstructions {bound}}
    ID      id-package-gsmSRF-scfActivationOfAssist}
assistConnectionEstablishmentPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {establishTemporaryConnection {bound}}
    ID      id-package-assistConnectionEstablishment}
genericDisconnectResourcePackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {disconnectForwardConnection}
    ID      id-package-genericDisconnectResource}
nonAssistedConnectionEstablishmentPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {connectToResource {bound}}
    ID      id-package-nonAssistedConnectionEstablishment}
connectPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {connect {bound}}
    ID      id-package-connect}
callHandlingPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {releaseCall {bound}}
    ID      id-package-callHandling}
bcsmEventHandlingPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {requestReportBCSMEvent {bound}}
    SUPPLIER INVOKES    {eventReportBCSM {bound}}
    ID      id-package-bcsmEventHandling}
ssfCallProcessingPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {continueWithArgument {bound} | continue}
    ID      id-package-ssfCallProcessing}
timerPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {resetTimer {bound}}
    ID      id-package-timer}
billingPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {furnishChargingInformation {bound}}
    ID      id-package-billing}
chargingPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {applyCharging {bound}}
    SUPPLIER INVOKES    {applyChargingReport {bound}}
    ID      id-package-charging}
trafficManagementPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES {callGap {bound}}
    ID id-package-trafficManagement}
callReportPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {callInformationRequest {bound}}
    SUPPLIER INVOKES    {callInformationReport {bound}}
    ID      id-package-callReport}
signallingControlPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {sendChargingInformation {bound}}
    ID      id-package-signallingControl}
activityTestPackage OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {activityTest}
    ID      id-package-activityTest}
        cancelPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {cancel {bound}}
    ID      id-package-cancel}



-- Abstract Syntaxes

gsmSSF-scfGenericAbstractSyntax ABSTRACT-SYNTAX ::= {
    GenericSSF-gsmSCF-PDUs
    IDENTIFIED BY   id-as-gsmSSF-scfGenericAS}
GenericSSF-gsmSCF-PDUs ::= TCMessage {{SsfToScfGenericInvokable},
```

```
                {SsfToScfGenericReturnable}}
| SsfToScfGenericInvokable OPERATION ::= {
                activityTest |
                applyCharging {cAPSpecificBoundSet} |
                applyChargingReport {cAPSpecificBoundSet} |
                callInformationReport {cAPSpecificBoundSet} |
                callInformationRequest {cAPSpecificBoundSet} |
|               cancel {cAPSpecificBoundSet} |
                connect {cAPSpecificBoundSet} |
                continueWithArgument {cAPSpecificBoundSet} |
                connectToResource {cAPSpecificBoundSet} |
                disconnectForwardConnection |
                establishTemporaryConnection {cAPSpecificBoundSet} |
                eventReportBCSM {cAPSpecificBoundSet} |
                furnishChargingInformation {cAPSpecificBoundSet} |
                initialDP {cAPSpecificBoundSet} |
                releaseCall {cAPSpecificBoundSet} |
                requestReportBCSMEvent {cAPSpecificBoundSet} |
                resetTimer {cAPSpecificBoundSet} |
                sendChargingInformation {cAPSpecificBoundSet} |
                playAnnouncement {cAPSpecificBoundSet} |
                promptAndCollectUserInformation {cAPSpecificBoundSet} |
                specializedResourceReport
                }
| SsfToScfGenericReturnable OPERATION ::= {
                activityTest |
                applyCharging {cAPSpecificBoundSet} |
                applyChargingReport {cAPSpecificBoundSet} |
                callGap {cAPSpecificBoundSet} |
                callInformationRequest {cAPSpecificBoundSet} |
|               cancel {cAPSpecificBoundSet} |
                connect {cAPSpecificBoundSet} |
                connectToResource {cAPSpecificBoundSet} |
                continue |
                continueWithArgument {cAPSpecificBoundSet} |
                disconnectForwardConnection |
                establishTemporaryConnection {cAPSpecificBoundSet}|
                furnishChargingInformation {cAPSpecificBoundSet}|
                initialDP {cAPSpecificBoundSet}|
                releaseCall {cAPSpecificBoundSet}|
                requestReportBCSMEvent {cAPSpecificBoundSet}|
                resetTimer {cAPSpecificBoundSet}|
                sendChargingInformation {cAPSpecificBoundSet}|
                playAnnouncement {cAPSpecificBoundSet}|
                promptAndCollectUserInformation {cAPSpecificBoundSet}
                }

  assistHandoff-gsmSSF-scfAbstractSyntax ABSTRACT-SYNTAX ::= {
      AssistHandoffsSF-gsmSCF-PDUs
      IDENTIFIED BY   id-as-assistHandoff-gsmSSF-scfAS}
  AssistHandoffsSF-gsmSCF-PDUs ::= TCMessage {{AssistHandoffssfToScfInvokable},
                {AssistHandoffssfToScfReturnable}}
  AssistHandoffssfToScfInvokable OPERATION ::= {
                activityTest |
                assistRequestInstructions {cAPSpecificBoundSet}|
|               cancel {cAPSpecificBoundSet}|
                connectToResource {cAPSpecificBoundSet}|
                disconnectForwardConnection |
                playAnnouncement {cAPSpecificBoundSet}|
                promptAndCollectUserInformation {cAPSpecificBoundSet}|
                resetTimer {cAPSpecificBoundSet}|
                specializedResourceReport
                }
  AssistHandoffssfToScfReturnable OPERATION ::= {
                activityTest |
                assistRequestInstructions {cAPSpecificBoundSet}|
|               cancel {cAPSpecificBoundSet}|
                connectToResource {cAPSpecificBoundSet}|
                disconnectForwardConnection |
                playAnnouncement {cAPSpecificBoundSet}|
                promptAndCollectUserInformation {cAPSpecificBoundSet}|
                resetTimer {cAPSpecificBoundSet}
                }

  END
```

6.2 gsmSCF/gsmSRF interface

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 {},
    ExtensionsExtensionField {},
    InformationToSend {}
FROM CAP-datatypes datatypes

    canceled,
    improperCallerResponse,
    missingParameter,
    parameterOutOfRange,
    systemFailure,
    taskRefused,
    unavailableResource,
    unexpectedComponentSequence,
    unexpectedDataValue,
    unexpectedParameter
FROM CAP-errortypes errortypes

    PARAMETERS-BOUND
FROM CAP-classes classes

    ros-InformationObjects,
    operationcodes,
    datatypes,
    errortypes,
    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)}

;

playAnnouncement {PARAMETERS-BOUND : bound} OPERATION ::= {
    ARGUMENT        PlayAnnouncementArg {bound}
    RETURN RESULT   FALSE
    ERRORS          {canceled |
                     missingParameter |
                     parameterOutOfRange |
                     systemFailure |
                     taskRefused |
                     unexpectedComponentSequence |
                     unexpectedDataValue |
                     unexpectedParameter |
                     unavailableResource}
    LINKED          {specializedResourceReport}
    CODE            opcode-playAnnouncement
    }
-- Direction: gsmSCF -> gsmSRF, Timer: Tpa
-- This operation is to be used after Establish Temporary Connection (assist procedure
-- with a second gsmSSF) or a Connect to Resource (no assist) operation. It may be used
-- for inband interaction with a mobile station, or for interaction with an ISDN user.
-- In the former case, the gsmSRF is usually collocated with the gsmSSF for standard
-- tones (congestion tone...) or standard announcements.
-- In the latter case, the gsmSRF is always collocated with the gsmSSF in the switch.
-- Any error is returned to the gsmSCF. The timer associated with this operation must
-- be of a sufficient duration to allow its linked operation to be correctly correlated.

PlayAnnouncementArg {PARAMETERS-BOUND : bound}::= SEQUENCE {
    informationToSend           [0] InformationToSend {bound},
    disconnectFromIPForbidden   [1] BOOLEAN DEFAULT TRUE,
    requestAnnouncementComplete [2] BOOLEAN DEFAULT TRUE,
    extensions                  [3] Extensions SEQUENCE SIZE(1..bound.&numOfExtensions) OF
                                        ExtensionField {bound}  OPTIONAL,
    ...
    }

promptAndCollectUserInformation {PARAMETERS-BOUND : bound} OPERATION ::= {
    ARGUMENT        PromptAndCollectUserInformationArg {bound}
    RESULT          ReceivedInformationArg {bound}
```

```
    ERRORS          {canceled |
                    improperCallerResponse |
                    missingParameter |
                    parameterOutOfRange |
                    systemFailure |
                    taskRefused |
                    unexpectedComponentSequence |
                    unavailableResource |
                    unexpectedDataValue |
                    unexpectedParameter
                    }
    CODE            opcode-promptAndCollectUserInformation
    }
-- Direction: gsmSCF -> gsmSRF, Timer: Tpc
-- This operation is used to interact with a user to collect information.

PromptAndCollectUserInformationArg {PARAMETERS-BOUND : bound}::= SEQUENCE {
    collectedInfo               [0] CollectedInfo,
    disconnectFromIPForbidden   [1] BOOLEAN DEFAULT TRUE,
    informationToSend           [2] InformationToSend {bound}       OPTIONAL,
    extensions                  [3] Extensions SEQUENCE SIZE(1..bound.&numOfExtensions) OF
                                    ExtensionField {bound}      OPTIONAL,
    ...
    }

ReceivedInformationArg {PARAMETERS-BOUND : bound}::= CHOICE {
    digitsResponse              [0] Digits {bound}
    }

specializedResourceReport OPERATION ::= {
    ARGUMENT        SpecializedResourceReportArg
    RETURN RESULT   FALSE
    ALWAYS RESPONDS FALSE
    CODE            opcode-specializedResourceReport
    }
-- Direction: gsmSRF -> gsmSCF, Timer: Tsrr
-- This operation is used as the response to a PlayAnnouncement operation when the announcement
-- completed report indication is set.

SpecializedResourceReportArg ::= NULL

END
```

The following value ranges apply for operation specific timers in CAP:

short:	1 s - 10 s
medium:	1 s - 60 s
long:	1 s - 30 minutes

Table 6-2 lists all operation timers and the value range for each timer. The definitive value for each operation timer may be network specific and has to be defined by the network operator.

Table 6-2: Operation timers and their value range

Operation Name	Timer	Value range
PlayAnnouncement	T_{pa}	long
PromptAndCollectUserInformation	T_{pc}	long
SpecializedResourceReport	T_{srr}	short

6.2.2 gsmSRF/gsmSCF contracts, packages and ACs

6.2.2.1 gsmSRF/gsmSCF ASN.1 modules

```
CAP-gsmSCF-gsmSRF-pkgs-contracts-acs {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0)
umts-network(1) modules(3) cap-gsmSCF-gsmSRF-pkgs-contracts-acs(104) version3(2)}

DEFINITIONS ::= BEGIN

-- This module specifies the Operation Packages, Contracts, Application Contexts
-- and Abstract Syntaxes 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

    PARAMETERS-BOUND,
```

```
    cAPSpecificBoundSet
FROM CAP-classes classes

    CONTRACT,
    OPERATION-PACKAGE,
    OPERATION
FROM Remote-Operations-Information-Objects ros-InformationObjects

    TCMessage {}
FROM TCAPMessages tc-Messages

    APPLICATION-CONTEXT,
    dialogue-abstract-syntax
FROM TC-Notation-Extensions tc-NotationExtensions

    playAnnouncement {},
    promptAndCollectUserInformation {},
    specializedResourceReport
FROM CAP-gsmSCF-gsmSRF-ops-args gsmSCF-gsmSRF-Operations

    activityTest,
    cancel {},
    assistRequestInstructions {}
FROM CAP-gsmSSF-gsmSCF-ops-args gsmSSF-gsmSCF-Operations

    gsmSRF-scfActivationOfAssistPackage {}
FROM CAP-gsmSSF-gsmSCF-pkgs-contracts-acs gsmSSF-gsmSCF-Protocol

    id-package-specializedResourceControl,
    id-package-activityTest,
    id-ac-gsmSRF-gsmSCF,
    id-contract-gsmSRF-gsmSCF,
    id-package-gsmSRF-scfCancel,
    id-as-basic-gsmSRF-gsmSCF,
    classes,
    ros-InformationObjects,
    tc-Messages,
    tc-NotationExtensions,
    gsmSCF-gsmSRF-Operations,
    gsmSSF-gsmSCF-Operations,
    gsmSSF-gsmSCF-Protocol
FROM CAP-object-identifiers {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0)
umts-network(1) modules(3) cap-object-identifiers(100) version3(2)}

;

-- Application Contexts

gsmSRF-gsmSCF-ac APPLICATION-CONTEXT ::= {
    CONTRACT                    gsmSRF-gsmSCF-contract
    DIALOGUE MODE               structured
    TERMINATION                 basic
    ABSTRACT SYNTAXES           {dialogue-abstract-syntax |
                                gsmSRF-gsmSCF-abstract-syntax}
    APPLICATION CONTEXT NAME    id-ac-gsmSRF-gsmSCF}

-- Contracts

gsmSRF-gsmSCF-contract CONTRACT ::= {
    INITIATOR CONSUMER OF
            {gsmSRF-scfActivationOfAssistPackage {cAPSpecificBoundSet}}
    RESPONDER CONSUMER OF
            {specializedResourceControlPackage {cAPSpecificBoundSet}|
            activityTestPackage {cAPSpecificBoundSet}|
            gsmSRF-scfCancelPackage {cAPSpecificBoundSet}}
    ID      id-contract-gsmSRF-gsmSCF}

-- Operation Packages

specializedResourceControlPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {playAnnouncement {bound} |
                        promptAndCollectUserInformation {bound}
    }
    SUPPLIER INVOKES    {specializedResourceReport}
    ID                  id-package-specializedResourceControl}

gsmSRF-scfActivationOfAssistPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {assistRequestInstructions {bound}}
    ID      id-package-gsmSRF-scfActivationOfAssist}


gsmSRF-scfCancelPackage {PARAMETERS-BOUND : bound}  OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {cancel {bound}}
    ID                  id-package-gsmSRF-scfCancel}

activityTestPackage {PARAMETERS-BOUND : bound}  OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {activityTest}
    ID                  id-package-activityTest}

-- Abstract Syntaxes
```

```
gsmSRF-gsmSCF-abstract-syntax ABSTRACT-SYNTAX ::= {
    BASIC-gsmSRF-gsmSCF-PDUs
    IDENTIFIED BY   id-as-basic-gsmSRF-gsmSCF}

BASIC-gsmSRF-gsmSCF-PDUs ::= TCMessage {{GsmSRFgsmSCFInvokable},{GsmSRFgsmSCFReturnable}}

GsmSRFgsmSCFInvokable OPERATION ::= {
        activityTest |
        assistRequestInstructions {cAPSpecificBoundSet}|
        cancel {cAPSpecificBoundSet}|
        playAnnouncement {cAPSpecificBoundSet}|
        promptAndCollectUserInformation {cAPSpecificBoundSet}|
        specializedResourceReport
        }

GsmSRFgsmSCFReturnable OPERATION ::= {
        activityTest |
        assistRequestInstructions {cAPSpecificBoundSet}|
        cancel {cAPSpecificBoundSet}|
        playAnnouncement {cAPSpecificBoundSet}|
        promptAndCollectUserInformation {cAPSpecificBoundSet}
        }

END
```

****** Next Modified Section ******

7 MO SMS Control

This clause defines the operations, arguments, packages and appliaction contexts used for CSE control of MO SMS over the gsmSCF – gprsSSF and gsmSCF – gsmSSF interfaces.

7.1 SMS operations and arguments

```
CAP-SMS-ops-args {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0) umts-network(1)
modules(3) cap-SMS-ops-args(105) version3(2)}

DEFINITIONS IMPLICIT TAGS::= BEGIN

-- This module contains the operations and operation arguments used for the
-- gsmSSF/gprsSSF – gsmSCF interface, for the control of MO-SMS.

-- 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,
    tc-Messages
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)
csS2(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)}

    LocationInformation
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-connectSMS,
    opcode-continueSMS,
    opcode-eventReportSMS,
    opcode-furnishChargingInformationSMS,
    opcode-initialDPSMS,
    opcode-releaseSMS,
    opcode-requestReportSMSEvent,
    opcode-resetTimerSMS
FROM CAP-operationcodes operationcodes

    CalledPartyBCDNumber {},
    EventSpecificInformationSMS,
    EventTypeSMS,
    ExtensionsExtensionField {},
    FCISMSBillingChargingCharacteristics,
    LocationInformationGPRS,
    RPCause,
    SMSEvent,
    TimeAndTimezone {},
    TimerID,
    TimerValue,
    TPDataCodingScheme,
    TPProtocolIdentifier,
    TPShortMessageSubmissionInfo,
    TPValidityPeriod
FROM CAP-datatypes datatypes
```

```
    missingCustomerRecord,
    missingParameter,
    parameterOutOfRange,
    systemFailure,
    taskRefused,
    unexpectedComponentSequence,
    unexpectedDataValue,
    unexpectedParameter
FROM CAP-errortypes errortypes

;

connectSMS {PARAMETERS-BOUND : bound} OPERATION ::= {
    ARGUMENT        ConnectSMSArg {bound}
    RETURN RESULT   FALSE
    ERRORS          {missingParameter |
                     parameterOutOfRange |
                     systemFailure |
                     taskRefused |
                     unexpectedComponentSequence |
                     unexpectedDataValue |
                     unexpectedParameter}
    CODE            opcode-connectSMS
    }
--  Direction: gsmSCF -> gsmSSF or gprsSSF, Timer: Tconsms
--  This operation is used to request the gsmSSF/gprsSSF to perform the SMS processing
--  actions to route
--  or forward a short message to a specified destination.

ConnectSMSArg {PARAMETERS-BOUND : bound} ::= SEQUENCE {
    callingPartysNumber                 [0] ISDN-AddressString                  OPTIONAL,
    destinationSubscriberNumber         [1] CalledPartyBCDNumber {bound}        OPTIONAL,
    sMSCAddress                         [2] ISDN-AddressString                  OPTIONAL,
    extensions                          [10] Extensions SEQUENCE SIZE(1..bound.&numOfExtensions) OF
                                                    ExtensionField {bound}      OPTIONAL,
    ...
    }

continueSMS OPERATION ::= {
    RETURN RESULT   FALSE
    ALWAYS RESPONDS FALSE
    CODE            opcode-continueSMS
    }
-- Direction: gsmSCF -> gsmSSF/gprsSMS, Timer: Tcuesms
-- This operation is used to request the gsmSSF/gprsSSF to proceed with
-- Short Message processing at the DP at which it previously suspended
-- Short Message processing to await gsmSCF instructions (i.e. proceed
-- to the next Point in Association in the SMS FSM). The gsmSSF/gprsSSF
-- continues SMS processing without substituting new data from gsmSCF.

eventReportSMS {PARAMETERS-BOUND : bound} OPERATION ::= {
    ARGUMENT        EventReportSMSArg {bound}
    RETURN RESULT   FALSE
    ALWAYS RESPONDS FALSE
    CODE            opcode-eventReportSMS
    }
--  Direction: gsmSSF or gprsSSF -> gsmSCF, Timer: Terbsms
--  This operation is used to notify the gsmSCF of a SM related event (e.g., FSM events such
--  as submission or failure) previously requested by the gsmSCF in a RequestReportSMSEvent
--  operation.

EventReportSMSArg {PARAMETERS-BOUND : bound} ::= SEQUENCE {
    eventTypeSMS                    [0] EventTypeSMS,
    eventSpecificInformationSMS     [1] EventSpecificInformationSMS         OPTIONAL,
    miscCallInfo                    [2] MiscCallInfo    DEFAULT {messageType request },
    extensions                      [10] Extensions SEQUENCE SIZE(1..bound.&numOfExtensions) OF
                                                    ExtensionField {bound}      OPTIONAL,
    ...
    }

furnishChargingInformationSMS {PARAMETERS-BOUND : bound}        OPERATION ::= {
    ARGUMENT        FurnishChargingInformationSMSArg {bound}
    RETURN RESULT   FALSE
    ERRORS          {missingParameter |
                     taskRefused |
                     unexpectedComponentSequence |
                     unexpectedDataValue |
                     unexpectedParameter}
    CODE            opcode-furnishChargingInformationSMS
    }
--  Direction: gsmSCF –> gsmSSF or gprsSSF, Timer: Tfcisms
--  This operation is used to request the gsmSSF/gprsSSF to generate, register a charging record
--  or to include some information in the default SM record. The registered charging record is
--  intended for off line charging of the SM.

FurnishChargingInformationSMSArg {PARAMETERS-BOUND : bound}        ::=
   FCISMSBillingChargingCharacteristics {bound}

initialDPSMS {PARAMETERS-BOUND : bound} OPERATION ::= {
```

```
    ARGUMENT        InitialDPSMSArg {bound}
    RETURN RESULT   FALSE
    ERRORS          {missingCustomerRecord |
                    missingParameter |
                    parameterOutOfRange |
                    systemFailure |
                    taskRefused |
                    unexpectedComponentSequence |
                    unexpectedDataValue |
                    unexpectedParameter}
    CODE            opcode-initialDPSMS
    }
--  Direction: gsmSSF or gprsSSF -> gsmSCF, Timer: Tidpsms
--  This operation is used after a TDP to indicate request for service.

InitialDPSMSArg {PARAMETERS-BOUND : bound} ::= SEQUENCE {
    serviceKey                          [0] ServiceKey,
    destinationSubscriberNumber         [1] CalledPartyBCDNumber {bound}        OPTIONAL,
    callingPartyNumber                  [2] ISDN-AddressString                  OPTIONAL,
    eventTypeSMS                        [3] EventTypeSMS                        OPTIONAL,
    iMSI                                [4] IMSI                                OPTIONAL,
    locationInformationMSC              [5] LocationInformation                 OPTIONAL,
    locationInformationGPRS             [6] LocationInformationGPRS             OPTIONAL,
    sMSCAddress                         [7] ISDN-AddressString                  OPTIONAL,
    timeAndTimezone                     [8] TimeAndTimezone {bound}             OPTIONAL,
    tPShortMessageSubmissionInfo        [9] TPShortMessageSubmissionInfo        OPTIONAL,
    tPProtocolIdentifier                [10] TPProtocolIdentifier               OPTIONAL,
    tPDataCodingScheme                  [11] TPDataCodingScheme                 OPTIONAL,
    tPValidityPeriod                    [12] TPValidityPeriod                   OPTIONAL,
    extensions                          [13] Extensions SEQUENCE SIZE(1..bound.&numOfExtensions) OF
                                                ExtensionField {bound}          OPTIONAL,
    ...
    }

releaseSMS                      OPERATION ::= {
    ARGUMENT        ReleaseSMSArg
    RETURN RESULT   FALSE
    ALWAYS RESPONDS FALSE
    CODE            opcode-releaseSMS
    }
--  Direction: gsmSCF -> gsmSSF or gprsSSF, Timer: Trelsms
--  This operation is used to prevent an attempt to submit a short message.

ReleaseSMSArg                       ::= RPCause

requestReportSMSEvent {PARAMETERS-BOUND : bound} OPERATION ::= {
    ARGUMENT        RequestReportSMSEventArg {bound}
    RETURN RESULT   FALSE
    ERRORS          {missingParameter |
                    parameterOutOfRange |
                    systemFailure |
                    taskRefused |
                    unexpectedComponentSequence |
                    unexpectedDataValue |
                    unexpectedParameter}
    CODE            opcode-requestReportSMSEvent
    }
--  Direction: gsmSCF -> gsmSSF or gprsSSF, Timer: Trrbsms
--  This operation is used to request the gsmSSF or gprsSSF to monitor for a
--  SM related event (e.g., FSM events such as submission or failure), then
--  send a notification back to the gsmSCF when the event is detected.

RequestReportSMSEventArg {PARAMETERS-BOUND : bound} ::= SEQUENCE {
    sMSEvents                           [0] SEQUENCE SIZE (1..bound.&numOfSMSEvents)    OF SMSEvent,
    extensions                          [10] Extensions SEQUENCE SIZE (1..bound.&numOfExtensions)
    OF
                                                ExtensionField {bound}      OPTIONAL,
    ...
    }
--  Indicates the SM related events for notification.

resetTimerSMS {PARAMETERS-BOUND : bound} OPERATION ::= {
    ARGUMENT        ResetTimerSMSArg {bound}
    RETURN RESULT   FALSE
    ERRORS          {missingParameter |
                    parameterOutOfRange |
                    taskRefused |
                    unexpectedComponentSequence |
                    unexpectedDataValue |
                    unexpectedParameter}
    CODE            opcode-resetTimerSMS
    }
-- Direction: gsmSCF -> gsmSSF/gprsSSF, Timer: Trtsms
-- This operation is used to request the gsmSSF/gprsSSF to refresh an application
-- timer in the gsmSSF/gprsSSF.

ResetTimerSMSArg {PARAMETERS-BOUND : bound} ::= SEQUENCE {
    timerID         [0] TimerID DEFAULT tssf,
    timervalue      [1] TimerValue,
```

```
    extensions      [2] Extensions SEQUENCE SIZE(1..bound.&numOfExtensions) OF
                                                        ExtensionField {bound}  OPTIONAL,
    ...
    }

END
```

7.1.1 Operation timers

The following value ranges apply for operation specific timers in CAP:

short:	1 to 20 seconds;
medium:	1 to 60 seconds;
long:	1 second to 30 minutes

Table 7-1 lists all operation timers and the value range for each timer. The definitive value for each operation timer may be network specific and has to be defined by the network operator.

Table 7-1: Operation timers and their value range

Operation Name	Timer	Value range
ConnectSMS	T_{consms}	short
ContinueSMS	T_{cuesms}	short
EventReportSMS	T_{erbsms}	short
FurnishChargingInformationSMS	Tfcisms	short
InitialDPSMS	T_{idpsms}	short
ReleaseSMS	T_{relsms}	short
RequestReportSMSEvent	T_{rrbsms}	short
ResetTimerSMS	T_{rtsms}	short

7.2 SMS contracts, packages and ACs

7.2.1 SMS ASN.1 module

```
CAP-smsSSF-gsmSCF-pkgs-contracts-acs {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0)
umts-network(1) modules(3) cap-smsSSF-gsmSCF-pkgs-contracts-acs(106) version3(2)}

DEFINITIONS ::= BEGIN

-- This module specifies the Operation Packages, Contracts, Application Contexts
-- and Abstract Syntaxes used for the gsmSSF/gprsSSF – gsmSCF interface, for the
-- control of MO-SMS.

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

IMPORTS

    PARAMETERS-BOUND,
    cAPSpecificBoundSet
FROM CAP-classes classes

    CONTRACT,
    OPERATION-PACKAGE,
    OPERATION
FROM Remote-Operations-Information-Objects ros-InformationObjects

    TCMessage {}
FROM TCAPMessages tc-Messages

    APPLICATION-CONTEXT,
    dialogue-abstract-syntax
FROM TC-Notation-Extensions tc-NotationExtensions

    connectSMS{},
    continueSMS,
    eventReportSMS{},
    furnishChargingInformationSMS{},
    initialDPSMS{},
    releaseSMS,
    requestReportSMSEvent{},
    resetTimerSMS{}
FROM CAP-SMS-ops-args sms-Operations
```

```
    id-ac-cap3-sms-AC,
    id-cap3SmsSsfTogsmScf,
    id-package-smsActivation,
    id-package-smsConnect,
    id-package-smsContinue,
    id-package-smsRelease,
    id-package-smsEventHandling,
    id-package-smsBilling,
    id-package-smsTimer,
    sms-Operations,
    tc-NotationExtensions,
    tc-Messages,
    ros-InformationObjects,
    classes,
    id-as-sms-AS
FROM CAP-object-identifiers {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0)
umts-network(1) modules(3) cap-object-identifiers(100) version3(2)}

;

-- Application Contexts

cap3-sms-AC APPLICATION-CONTEXT ::= {
    CONTRACT                    cap3SMS
    DIALOGUE MODE               structured
    ABSTRACT SYNTAXES           {dialogue-abstract-syntax |
                                sms-AbstractSyntax}
    APPLICATION CONTEXT NAME    id-ac-cap3-sms-AC}


-- Contracts

cap3SMS CONTRACT ::= {
-- dialogue initiated by gprsSSF or gsmSSF with InitialDPSMS Operation
    INITIATOR CONSUMER OF
            {smsActivationPackage {cAPSpecificBoundSet}}
    RESPONDER CONSUMER OF
            {smsConnectPackage {cAPSpecificBoundSet} |
            smsReleasePackage {cAPSpecificBoundSet} |
            smsEventHandlingPackage {cAPSpecificBoundSet} |
            smsTimerPackage {cAPSpecificBoundSet} |
            smsBillingPackage {cAPSpecificBoundSet} |
            smsProcessingPackage {cAPSpecificBoundSet}}
    ID      id-cap3SmsSsfTogsmScf
    }


-- Operation Packages

smsActivationPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {initialDPSMS {bound}}
    ID      id-package-smsActivation}
smsConnectPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {connectSMS {bound}}
    ID      id-package-smsConnect}
smsProcessingPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {continueSMS}
    ID      id-package-smsContinue}
smsReleasePackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {releaseSMS}
    ID      id-package-smsRelease}
smsEventHandlingPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {requestReportSMSEvent {bound}}
    SUPPLIER INVOKES    {eventReportSMS {bound}}
    ID      id-package-smsEventHandling}
smsBillingPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {furnishChargingInformationSMS {bound}}
    ID      id-package-smsBilling}
smsTimerPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {resetTimerSMS {bound}}
    ID      id-package-smsTimer}


-- Abstract Syntaxes

sms-AbstractSyntax ABSTRACT-SYNTAX ::= {
    Generic-sms-PDUs
    IDENTIFIED BY   id-as-sms-AS}

Generic-sms-PDUs ::= TCMessage {{SmsInvokable}, {SmsReturnable}}

SmsInvokable OPERATION ::= {
    connectSMS {cAPSpecificBoundSet} |
    eventReportSMS {cAPSpecificBoundSet} |
    furnishChargingInformationSMS {cAPSpecificBoundSet} |
    initialDPSMS {cAPSpecificBoundSet} |
    requestReportSMSEvent {cAPSpecificBoundSet} |
    resetTimerSMS {cAPSpecificBoundSet}
    }
```

```
SmsReturnable OPERATION ::= {
    connectSMS {cAPSpecificBoundSet} |
    continueSMS |
    furnishChargingInformationSMS {cAPSpecificBoundSet}|
    initialDPSMS {cAPSpecificBoundSet}|
    releaseSMS {}|
    requestReportSMSEvent {cAPSpecificBoundSet}|
    resetTimerSMS {cAPSpecificBoundSet}
    }

END
```

***** Next Modified Section *****

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)
csS2(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

    AccessPointName {},
    GPRSCause {},
    ChargingCharacteristics,
    ChargingResult,
    ChargingRollOver,
    EndUserAddress {},
    ExtensionsExtensionField {},
    FCIGPRSBillingChargingCharacteristics,
    GPRSChargingID,
    GPRSEventSpecificInformation {},
    GPRSEvent,
    GPRSEventType,
    GPRSMSClass,
    LocationInformationGPRS,
    PDPID,
    PDPInitiationType,
```

```
    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,
    tariffSwitchInterval            [1] INTEGER (1..86400)              OPTIONAL,
    pDPID                           [2] PDPID                           OPTIONAL,
    ...
    }
-- tariffSwitchInterval 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,
    ...,
    chargingRollOver                [4] ChargingRollOver            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 when the GPRS Session is detached or a PDP Context is diconnected and
--  the associated event is not armed for reporting.
--  The usage of this operation is independent of the functional entity that initiates the Detach
--  or PDP Context Disconnection and is independent of the cause of the Detach or PDP Context
--  Disconnect.

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
--  RequestReportGPRSEvent operation.

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},
    gPRSMSClass                     [5] GPRSMSClass                     OPTIONAL,
    endUserAddress                  [6] EndUserAddress {bound}                  OPTIONAL,
    qualityOfService                [7] QualityOfService                OPTIONAL,
    accessPointName                 [8] AccessPointName{bound}          OPTIONAL,
    routeingAreaIdentity            [9] RAIdentity                      OPTIONAL,
    chargingID                      [10] GPRSChargingID                 OPTIONAL,
    sGSNCapabilities                [11] SGSNCapabilities               OPTIONAL,
    locationInformationGPRS         [12] LocationInformationGPRS        OPTIONAL,
    pDPInitiationType               [13] PDPInitiationType              OPTIONAL,
    extensions                      [14] ExtensionsSEQUENCE SIZE(1..bound.&numOfExtensions)     OF
                                         ExtensionField {bound}         OPTIONAL,
    ...,
    gGSNAddress                     [15] GSN-Address                    OPTIONAL,
    secondaryPDP-context            [16] NULL                           OPTIONAL
    }
--  The RouteingAreaIdentity parameter is not used.
--  The receiving entity shall ignore RouteingAreaIdentity if received.
--  The RouteingAreaIdentity is conveyed in the LocationInformationGPRS parameter.

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 activiation), 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 ,
    cCAP-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(1) cap-GPRS-ReferenceNumber(5) version3(2)}

cCAP-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
```

8.1.1 Operation timers

The following value ranges apply for operation specific timers in CAP:

short:	1 to 20 seconds;
medium:	1 to 60 seconds;
long:	1 second to 30 minutes

Table 8-1 lists all operation timers and the value range for each timer. The definitive value for each operation timer may be network specific and has to be defined by the network operator.

Table 8-1: Operation timers and their value range

Operation Name	Timer	Value range
ActivityTestGPRST	T_{atg}	short
ApplyChargingGPRS	T_{acg}	short
ApplyChargingReportGPRS	T_{acrg}	short
CancelGPRS	T_{cag}	short
ConnectGPRS	T_{cong}	short
ContinueGPRS	T_{cueg}	short
EntityReleasedGPRS	T_{erg}	short
EventReportGPRS	T_{ereg}	short
FurnishChargingInformationGPRS	T_{fcig}	short
InitialDPGPRS	T_{idpg}	short
ReleaseGPRS	T_{rg}	short
RequestReportGPRSEvent	T_{rrqe}	short
ResetTimerGPRS	T_{rtg}	short
SendChargingInformationGPRS	T_{scig}	short

8.2 gsmSCF/gprsSSF contracts, packages and ACs

8.2.1 gprsSSF/gsmSCF ASN.1 module

```
CAP-gprsSSF-gsmSCF-pkgs-contracts-acs {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0)
umts-network(1) modules(3) cap-gprsSSF-gsmSCF-pkgs-contracts-acs(108) version3(2)}

DEFINITIONS ::= BEGIN

-- This module specifies the Operation Packages, Contracts, Application Contexts
-- and Abstract Syntaxes 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

    PARAMETERS-BOUND,
    cAPSpecificBoundSet
FROM CAP-classes classes

    CONTRACT,
    OPERATION-PACKAGE,
    OPERATION
FROM Remote-Operations-Information-Objects ros-InformationObjects

    TCMessage {}
FROM TCAPMessages tc-Messages
```

```
    APPLICATION-CONTEXT,
    dialogue-abstract-syntax
FROM TC-Notation-Extensions tc-NotationExtensions

    activityTestGPRS {},
    applyChargingGPRS {},
    applyChargingReportGPRS {},
    cancelGPRS {},
    connectGPRS {},
    continueGPRS {},
    entityReleasedGPRS {},
    furnishChargingInformationGPRS {},
    initialDPGPRS {},
    releaseGPRS {},
    eventReportGPRS {},
    requestReportGPRSEvent {},
    resetTimerGPRS {},
    sendChargingInformationGPRS {}
FROM CAP-gprsSSF-gsmSCF-ops-args gprsSSF-gsmSCF-Operations

    id-ac-CAP-gprsSSF-gsmSCF-AC,
    id-ac-CAP-gsmSCF-gprsSSF-AC,
    id-cap3GprsSsfTogsmScf,
    id-cap3GsmScfToGprsSsf,
    id-as-gprsSSF-gsmSCF-AS,
    id-as-gsmSCF-gprsSSF-AS,
    id-package-gprsScfActivation,
    id-package-gprsConnect,
    id-package-gprsContinue,
    id-package-gprsRelease,
    id-package-gprsEventHandling,
    id-package-gprsExceptionInformation,
    id-package-gprsTimer,
    id-package-gprsBilling,
    id-package-gprsCharging,
    id-package-gprsChargeAdvice,
    id-package-gprsActivityTest,
    id-package-gprsCancel,
    classes,
    ros-InformationObjects,
    tc-Messages,
    tc-NotationExtensions,
    gprsSSF-gsmSCF-Operations
FROM CAP-object-identifiers {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0)
umts-network(1) modules(3) cap-object-identifiers(100) version3(2)}

;


-- Application Contexts

cap3-gprssf-scfAC APPLICATION-CONTEXT ::= {
    CONTRACT                    cap3GprsSsfToScf
    DIALOGUE MODE               structured
    ABSTRACT SYNTAXES           {dialogue-abstract-syntax |
                                gprsSSF-fgsmSCFAbstractSyntax}
    APPLICATION CONTEXT NAME    id-ac-CAP-gprsSSF-gsmSCF-AC}

cap3-gsmscf-gprssfAC APPLICATION-CONTEXT ::= {
    CONTRACT                    cap3GsmScfToGprsSsf
    DIALOGUE MODE               structured
    ABSTRACT SYNTAXES           {dialogue-abstract-syntax |
                                gsmSCF-gprsSSFAbstractSyntax}
    APPLICATION CONTEXT NAME    id-ac-CAP-gsmSCF-gprsSSF-AC}


-- Contracts

cap3GprsSsfToScf CONTRACT ::= {
-- dialogue initiated by gprsSSF with InitialDPGPRS, ApplyChargingReportGPRS,
-- EntityReleaseGPRS and EventReportGPRS Operations
    INITIATOR CONSUMER OF
            {gprssScfActivationPackage {cAPSpecificBoundSet} |
            gprsEventHandlingPackage {cAPSpecificBoundSet} |
            gprsChargingPackage {cAPSpecificBoundSet} |
            gprsExceptionInformationPackage {cAPSpecificBoundSet}}
    RESPONDER CONSUMER OF
            {gprsConnectPackage {cAPSpecificBoundSet} |
            gprsProcessingPackage {cAPSpecificBoundSet} |
            gprsReleasePackage {cAPSpecificBoundSet} |
            gprsEventHandlingPackage {cAPSpecificBoundSet} |
            gprsTimerPackage {cAPSpecificBoundSet} |
            gprsBillingPackage {cAPSpecificBoundSet} |
            gprsChargingPackage {cAPSpecificBoundSet} |
            gprsCancelPackage {cAPSpecificBoundSet} |
            gprsChargeAdvicePackage {cAPSpecificBoundSet}}
    ID      id-cap3GprsSsfTogsmScf
    }

cap3GsmScfToGprsSsf CONTRACT ::= {
```

```
-- dialogue initiated by gsmSCF with ApplyChargingGPRS, ActivityTestGPRS,
-- CancelGPRS, FurnishChargingInformationGPRS, ReleaseGPRS,
-- RequestReportGPRSEvent and SendChargingInformationGPRS Operations
    INITIATOR CONSUMER OF
            {gprsReleasePackage {cAPSpecificBoundSet} |
            gprsEventHandlingPackage {cAPSpecificBoundSet} |
            gprsBillingPackage {cAPSpecificBoundSet} |
            gprsChargingPackage {cAPSpecificBoundSet} |
            gprsActivityTestPackage {cAPSpecificBoundSet} |
            gprsCancelPackage {cAPSpecificBoundSet} |
            gprsChargeAdvicePackage {cAPSpecificBoundSet}}
    RESPONDER CONSUMER OF
            {}
    ID      id-cap3GsmScfToGprsSsf
    }


-- Operation Packages

gprsScfActivationPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    { initialDPGPRS {bound}}
    ID      id-package-gprsScfActivation}
gprsConnectPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {connectGPRS {bound}}
    ID      id-package-gprsConnect}
gprsProcessingPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {continueGPRS {bound}}
    ID      id-package-gprsContinue}
gGprsReleasePackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {releaseGPRS {bound}}
    ID      id-package-gprsRelease}
gprsEventHandlingPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {requestReportGPRSEvent {bound}}
    SUPPLIER INVOKES    {eventReportGPRS {bound}}
    ID      id-package-gprsEventHandling}
gprsExceptionInformationPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {entityReleasedGPRS {bound}}
    ID      id-package-gprsExceptionInformation}
gprsTimerPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {resetTimerGPRS {bound}}
    ID      id-package-gprsTimer}
gprsBillingPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {furnishChargingInformationGPRS {bound}}
    ID      id-package-gprsBilling}
gprsChargingPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {applyChargingGPRS {bound}}
    SUPPLIER INVOKES    {applyChargingReportGPRS {bound}}
    ID      id-package-gprsCharging}
gprsChargeAdvicePackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {sendChargingInformationGPRS {bound}}
    ID      id-package-gprsChargeAdvice}
gprsActivityTestPackage OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {activityTestGPRS {bound}}
    ID      id-package-gprsActivityTest}
gprsCancelPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {cancelGPRS {bound}}
    ID      id-package-gprsCancel}



-- Abstract Syntaxes

gprsSSF-gsmSCFAbstractSyntax ABSTRACT-SYNTAX ::= {
    GenericGprsSSF-gsmSCF-PDUs
    IDENTIFIED BY   id-as-gprsSSF-gsmSCF-AS}

GenericGprsSSF-gsmSCF-PDUs ::= TCMessage {{GprsSsfToGsmScfInvokable},
            {GprsSsfToGsmScfReturnable}}

GprsSsfToGsmScfGenericInvokable OPERATION ::= {
            activityTestGPRS {cAPSpecificBoundSet} |
            applyChargingGPRS {cAPSpecificBoundSet} |
            applyChargingReportGPRS {cAPSpecificBoundSet} |
            cancelGPRS {cAPSpecificBoundSet} |
            connectGPRS {cAPSpecificBoundSet} |
            entityReleasedGPRS {cAPSpecificBoundSet} |
            eventReportGPRS {cAPSpecificBoundSet} |
            furnishChargingInformationGPRS {cAPSpecificBoundSet} |
            initialDPGPRS {cAPSpecificBoundSet} |
            releaseGPRS {cAPSpecificBoundSet} |
            requestReportGPRSEvent {cAPSpecificBoundSet} |
            resetTimerGPRS {cAPSpecificBoundSet} |
            sendChargingInformationGPRS {cAPSpecificBoundSet}
            }

GprsSsfToGsmScfReturnable OPERATION ::= {
            activityTestGPRS {cAPSpecificBoundSet} |
            applyChargingGPRS {cAPSpecificBoundSet} |
            applyChargingReportGPRS {cAPSpecificBoundSet} |
            cancelGPRS {cAPSpecificBoundSet} |
            connectGPRS {cAPSpecificBoundSet} |
```

```
            continueGPRS {cAPSpecificBoundSet} |
            entityReleasedGPRS {cAPSpecificBoundSet} |
            furnishChargingInformationGPRS {cAPSpecificBoundSet}|
            initialDPGPRS {cAPSpecificBoundSet}|
            releaseGPRS {cAPSpecificBoundSet}|
            requestReportGPRSEvent {cAPSpecificBoundSet}|
            resetTimerGPRS {cAPSpecificBoundSet}|
            sendChargingInformationGPRS {cAPSpecificBoundSet}
            }

gsmSCF-gprsSSFGenericAbstractSyntax ABSTRACT-SYNTAX ::= {
    GenericGsmSCF-gprsSSF-PDUs
    IDENTIFIED BY   id-as-gsmSCF-gprsSSF-AS}

GenericGsmSCF-gprsSSF-PDUs ::= TCMessage {{GsmScfToGprsSsfInvokable}, {GsmScfToGprsSsfReturnable}}

GsmScfToGprsSsfInvokable OPERATION ::= {
            activityTestGPRS {cAPSpecificBoundSet} |
            applyChargingGPRS {cAPSpecificBoundSet}|
            cancelGPRS {cAPSpecificBoundSet}|
            furnishChargingInformationGPRS {cAPSpecificBoundSet}|
            releaseGPRS {cAPSpecificBoundSet}|
            requestReportGPRSEvent {cAPSpecificBoundSet}|
            sendChargingInformationGPRS {cAPSpecificBoundSet}
            }

GsmScfToGprsSsfReturnable OPERATION ::= {
            activityTestGPRS {cAPSpecificBoundSet} |
            applyChargingGPRS {cAPSpecificBoundSet}|
            cancelGPRS {cAPSpecificBoundSet}|
            furnishChargingInformationGPRS {cAPSpecificBoundSet}|
            releaseGPRS {cAPSpecificBoundSet}|
            requestReportGPRSEvent {cAPSpecificBoundSet}|
            sendChargingInformationGPRS {cAPSpecificBoundSet}
            }

END
```

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

3GPP TSG-CN WG2 Meeting #19
Dresden, Germany, 9th - 13th July, 2001

Tdoc N2-010588

CHANGE REQUEST

⌘ **29.078** **CR** **197** ⌘ rev ⌘ Current version: 4.1.0 ⌘

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

Title:	⌘	Corrections to ASN.1 syntax
Source:	⌘	Ericsson
Work item code:	⌘	CAMEL3
Date:	⌘	11 July, 2001
Category:	⌘	A
Release:	⌘	Rel-4

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*

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

Reason for change:	⌘	3GPP TS 29.078 V3.8.0 contains a number of ASN.1 syntax errors. These errors do not lead to ambiguity w.r.t. understanding the functionality of the CAP protocol. However, they result in compilation errors. To assist designers in implementing the CAP protocol, it is vital that all syntax errors are removed. The syntax corrections proposed in this CR do not alter the functionality of CAP. The corrections are needed also for the Rel-4 and Rel-5 versions of 29.078.
Summary of change:	⌘	Corrections to ASN.1 syntax
Consequences if not approved:	⌘	Syntax errors would remain in the CAP specification, leading to syntax compilation errors.

Clauses affected:	⌘	5, 6, 7 and 8
Other specs Affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	Some data types that are IMPORT-ed from MAP Modules are not EXPORT-ed in the MAP specification. That requires a separate CR on 29.002.

****** First Modified Section ******

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,
    GeographicalInformation,
    GSN-Address,
    LocationInformation,
    LSAIdentity,
    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)}

    TCInvokeIdSet
FROM TCAPMessages tc-Messages

    EXTENSION,
    PARAMETERS-BOUND,
    SupportedExtensions {}
FROM CAP-classes classes

    ExtensionContainer
FROM MAP-ExtensionDataTypes {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0)
gsm-Network(1) modules(3) map-ExtensionDataTypes(21) version6(6)}

;

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

AChBillingChargingCharacteristics {PARAMETERS-BOUND : bound} ::= OCTET STRING (SIZE
    (bound.&minAChBillingChargingLength .. bound.&maxAChBillingChargingLength))
    (CONSTRAINED BY {-- shall be the result of the BER-encoded value of the type --
```

```
    CAMEL-AChBillingChargingCharacteristics {bound}})
-- The AChBillingChargingCharacteristics parameter specifies the charging related information
-- to be provided by the gsmSSF and the conditions on which this information has to be reported
-- back to the gsmSCF with the ApplyChargingReport operation. The value of the
-- AChBillingChargingCharacteristics of type OCTET STRING carries a value of the ASN.1 data type:
-- CAMEL-AChBillingChargingCharacteristics. The normal encoding rules are used to encode this
-- value.
-- The violation of the UserDefinedConstraint shall be handled as an ASN.1 syntax error.

AdditionalCallingPartyNumber {PARAMETERS-BOUND : bound}     ::= Digits {bound}
-- Indicates the Additional Calling Party Number.

AlertingPattern                                          ::= OCTET STRING (SIZE(3))
-- Indicates a specific pattern that is used to alert a subscriber
-- (e.g. distinctive ringing, tones, etc.).
-- The encoding of the last octet of this parameter is as defined in 3GPP TS 29.002 [13].
-- Only the trailing OCTET is used, the remaining OCTETS shall be sent as NULL (zero)
-- The receiving side shall ignore the leading two OCTETS.

AOCBeforeAnswer                     ::= SEQUENCE {
    aOCInitial                          [0] CAI-GSM0224,
    aOCSubsequent                       [1] AOCSubsequent                       OPTIONAL
    }

AOCGPRS                             ::= SEQUENCE {
    aOCInitial                          [0] CAI-GSM0224,
    aOCSubsequent                       [1] AOCSubsequent                       OPTIONAL
    }

AOCSubsequent                       ::= SEQUENCE {
    cAI-GSM0224                         [0] CAI-GSM0224 ,
    tariffSwitchInterval                [1] INTEGER (1..86400)                  OPTIONAL
    }
-- tariffSwitchInterval is measured in 1 second units

AppendFreeFormatData    ::= ENUMERATED {
    overwrite       (0),
    append          (1)
    }

ApplicationTimer                                         ::=INTEGER (0..2047)
-- Used by the gsmSCF to set a timer in the gsmSSF. The timer is in seconds.

AssistingSSPIPRoutingAddress {PARAMETERS-BOUND : bound}     ::= Digits {bound}
-- Indicates the destination address of the gsmSRF for the assist procedure.

BackwardServiceInteractionInd       ::= SEQUENCE {
    conferenceTreatmentIndicator        [1] OCTET STRING (SIZE(1))  OPTIONAL,
    -- acceptConferenceRequest  'xxxx xx01'B
    -- rejectConferenceRequest  'xxxx xx10'B
    -- network default is accept conference request
    callCompletionTreatmentIndicator    [2] OCTET STRING (SIZE(1))  OPTIONAL,
    -- acceptCallCompletionServiceRequest   'xxxx xx01'B,
    -- rejectCallCompletionServiceRequest   'xxxx xx10'B
    -- network default is accept call completion service request
    ...
    }

BasicGapCriteria {PARAMETERS-BOUND : bound}                     ::= CHOICE {
    calledAddressValue          [0] Digits {bound},
    gapOnService                [2] GapOnService,
    calledAddressAndService     [29] SEQUENCE {
        calledAddressValue          [0] Digits {bound},
        serviceKey                  [1] ServiceKey,
        ...
        },
    callingAddressAndService    [30] SEQUENCE {
        callingAddressValue         [0] Digits {bound},
        serviceKey                  [1] ServiceKey,
        ...
        }
    }
-- Both calledAddressValue and callingAddressValue can be
-- incomplete numbers, in the sense that a limited amount of digits can be given.
-- For the handling of numbers starting with the same digit string refer to the detailed
-- procedure of the CallGap operation

BCSMEvent {PARAMETERS-BOUND : bound} ::= SEQUENCE {
    eventTypeBCSM       [0] EventTypeBCSM,
    monitorMode         [1] MonitorMode,
    legID               [2] LegID                                   OPTIONAL,
    dpSpecificCriteria  [30] DpSpecificCriteria {bound}             OPTIONAL
    }
-- Indicates the BCSM Event information for monitoring.

BearerCapability {PARAMETERS-BOUND : bound} ::= CHOICE {
    bearerCap               [0] OCTET STRING (SIZE(2..bound.&maxBearerCapabilityLength))
    }
-- Indicates the type of bearer capability connection to the user. For bearerCap, the ISUP User
-- Service Information, ETS 300 356-1 [8]
-- encoding shall be used.
```

```
CAI-GSM0224                         ::= SEQUENCE {
    e1                                  [0] INTEGER (0..8191)                   OPTIONAL,
    e2                                  [1] INTEGER (0..8191)                   OPTIONAL,
    e3                                  [2] INTEGER (0..8191)                   OPTIONAL,
    e4                                  [3] INTEGER (0..8191)                   OPTIONAL,
    e5                                  [4] INTEGER (0..8191)                   OPTIONAL,
    e6                                  [5] INTEGER (0..8191)                   OPTIONAL,
    e7                                  [6] INTEGER (0..8191)                   OPTIONAL
    }
-- Indicates Charge Advice Information to the Mobile Station. For information regarding
-- parameter usage, refer to 3GPP TS 22.040 [26].

CalledPartyBCDNumber {PARAMETERS-BOUND : bound}     ::= OCTET STRING (SIZE(
    bound.&minCalledPartyBCDNumberLength .. bound.&maxCalledPartyBCDNumberLength))
-- Indicates the Called Party Number, including service selection information.
-- Refer to 3GPP TS 24.008 [12]
-- for encoding. This data type carries only the "type of number", "numbering plan
-- identification" and "number digit" fields defined in 3GPP TS 24.008 [12];
-- it does not carry the "called party
-- BCD number IEI" or "length of called party BCD number contents".

CalledPartyNumber {PARAMETERS-BOUND : bound}    ::= OCTET STRING (SIZE(
    bound.&minCalledPartyNumberLength .. bound.&maxCalledPartyNumberLength))
-- Indicates the Called Party Number. Refer to ITU-T Q.763 [20] for encoding.

CallingPartyNumber {PARAMETERS-BOUND : bound}   ::= OCTET STRING (SIZE(
    bound.&minCallingPartyNumberLength .. bound.&maxCallingPartyNumberLength))
-- Indicates the Calling Party Number. Refer to ETS 300 356-1 [8] for encoding.

CallResult {PARAMETERS-BOUND : bound} ::= OCTET STRING (SIZE(
    bound.&minCallResultLength .. bound.&maxCallResultLength))
    (CONSTRAINED BY {-- shall be the result of the BER-encoded value of type -
    CAMEL-CallResult {bound}})

-- The violation of the UserDefinedConstraint shall be handled as an ASN.1 syntax error.

-- This parameter provides the gsmSCF with the charging related information previously requested
-- using the ApplyCharging operation. This shall include the partyToCharge parameter as
-- received in the related ApplyCharging operation to correlate the result to the request

CAMEL-AChBillingChargingCharacteristics {PARAMETERS-BOUND : bound} ::= CHOICE {
    timeDurationCharging                [0] SEQUENCE {
            maxCallPeriodDuration           [0] INTEGER (1..864000),
            releaseIfdurationExceeded       [1] BOOLEAN DEFAULT FALSE,
            tariffSwitchInterval            [2] INTEGER (1..86400)          OPTIONAL,
            tone                            [3] BOOLEAN DEFAULT FALSE,
            extensions                      [4] Extensions~~SEQUENCE~~
~~SIZE(1..bound.&numOfExtensions) OF~~
                                                ~~ExtensionField~~  {bound} OPTIONAL,
            ...
        }
    }
--  tariffSwitchInterval is measured in 1 second units.
--  maxCallPeriodDuration is measured in100 millisecond units

CAMEL-CallResult {PARAMETERS-BOUND : bound}     ::= CHOICE {
    timeDurationChargingResult          [0] SEQUENCE {
        partyToCharge                       [0] ReceivingSideID,
        timeInformation                     [1] TimeInformation,
        callActive                          [2] BOOLEAN                 DEFAULT TRUE,
        callReleasedAtTcpExpiry             [3] NULL                    OPTIONAL,
        extensions                          [4] Extensions~~SEQUENCE~~
~~SIZE(1..bound.&numOfExtensions) OF~~
                                                ~~ExtensionField~~  {bound}     OPTIONAL,
        ...
        }
    }

CAMEL-FCIBillingChargingCharacteristics {PARAMETERS-BOUND : bound} ::= CHOICE{
    fCIBCCCAMELsequence1        [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{
    fCIBCCCAMELsequence1        [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{
    fCIBCCCAMELsequence1        [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,
    ...
    }

Carrier {PARAMETERS-BOUND : bound} ::= OCTET STRING (SIZE(
    bound.&minCarrierLength .. bound.&maxCarrierLength))
-- This parameter is only used for North America (na)
-- It contains the carrier selection field (first octet) followed by Carrier ID
-- information (North America (na)).

-- The Carrier selection is one octet and is encoded as:
-- 00000000     No indication
-- 00000001     Selected carrier identification code (CIC) pre subscribed and not
--              input by calling party
-- 00000010     Selected carrier identification code (CIC) pre subscribed and input by
--              calling party
-- 00000011     Selected carrier identification code (CIC) pre subscribed, no
--              indication of whether input by calling party (undetermined)
-- 00000100     Selected carrier identification code (CIC) not pre subscribed and
--              input by calling party
-- 00000101
--  to          Spare
-- 11111110
-- 11111111     Reserved

-- Refer to ANSI ISUP T1.113 [53] for encoding of na carrier ID information (3 octets).

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.

CGEncountered                               ::= ENUMERATED {
    noCGencountered         (0),
    manualCGencountered     (1),
    scpOverload             (2)
    }
-- Indicates the type of automatic call gapping encountered, if any.

ChargeNumber {PARAMETERS-BOUND : bound} ::= LocationNumber {bound}
-- Information sent in either direction indicating the chargeable number for the call and
-- consisting of the odd/even indicator, nature of address indicator, numbering plan indicator,
-- and address signals.
-- Uses the LocationNumber format which is based on the Q.763 Location Number format
-- For example, the ChargeNumber may be a third party number to which a call is billed for
-- the 3rd party billing service. In this case, the calling party may request operator assistance
-- to charge the call to, for example, their home number.

-- For NA, this parameter uniquely identifies the chargeable number for a call sent into a North
-- American long distance carrier. It transports the ChargeNumber Parameter Field
--  as defined in ANSI ISUP T1.113 [53]. This provides
--  - 1 octet for the nature of address indicator field, plus
--  - 1 octet for a numbering plan field, plus
--  - up to 5 octets for the address signal (up to 10 digits)

-- The Charge Number in ANSI T1.113 [53] normally contains a 10 digit national number within
-- the North American Numbering Plan (NANP); longer (e.g. international) charge numbers are not
-- supported in T1.113 [53].

ChargingCharacteristics             ::= CHOICE {
    maxTransferredVolume            [0] INTEGER (1..4294967295),
    maxElapsedTime                  [1] INTEGER (1..86400)
    }
--  maxTransferredVolume is measured in number of bytes
--  maxElapsedTime is measured in seconds

ChargingResult                      ::= CHOICE {
    transferredVolume               [0] TransferredVolume,
    elapsedTime                     [1] ElapsedTime
    }

ChargingRollOver                    ::= CHOICE {
    transferredVolumeRollOver       [0] TransferredVolumeRollOver,
    elapsedTimeRollOver             [1] ElapsedTimeRollOver
    }
-- transferredVolumeRollOver shall be reported if ApplyChargingReportGPRS reports volume and
```

```
-- a roll-over has occurred in one or more volume counters. Otherwise, it shall be absent.
-- elapsedTimeRollOver shall be reported if ApplyChargingReportGPRS reports duration and
-- a roll-over has occurred in one or more duration counters. Otherwise, it shall be absent.

CollectedDigits                         ::= SEQUENCE {
    minimumNbOfDigits       [0] INTEGER (1..30) DEFAULT 1,
    maximumNbOfDigits       [1] INTEGER (1..30),
    endOfReplyDigit         [2] OCTET STRING (SIZE (1..2))  OPTIONAL,
    cancelDigit             [3] OCTET STRING (SIZE (1..2))  OPTIONAL,
    startDigit              [4] OCTET STRING (SIZE (1..2))  OPTIONAL,
    firstDigitTimeOut       [5] INTEGER (1..127)            OPTIONAL,
    interDigitTimeOut       [6] INTEGER (1..127)            OPTIONAL,
    errorTreatment          [7] ErrorTreatment              DEFAULT stdErrorAndInfo,
    interruptableAnnInd     [8] BOOLEAN                     DEFAULT TRUE,
    voiceInformation        [9] BOOLEAN                     DEFAULT FALSE,
    voiceBack               [10] BOOLEAN                    DEFAULT FALSE
    }
-- The use of voiceBack and the support of voice recognition via voiceInformation
-- is network operator specific.
-- The endOfReplyDigit, cancelDigit, and startDigit parameters have been
-- designated as OCTET STRING, and are to be encoded as BCD, one digit per octet
-- only, contained in the four least significant bits of each OCTET. The following encoding shall
-- be applied for the non-decimal characters:
-- 1011 (*), 1100 (#).
-- The usage is service dependent.
-- firstDigitTimeOut and interDigitTimeOut are measured in seconds.

CollectedInfo                           ::= CHOICE {
    collectedDigits         [0] CollectedDigits
    }

ConnectedNumberTreatmentInd             ::= ENUMERATED {
    noINImpact                  (0),
    presentationRestricted      (1),
    presentCalledINNumber       (2),
    presentCallINNumberRestricted   (3)
}
-- This parameter is used to suppress or to display the connected number.

ControlType                             ::= ENUMERATED {
    sCPOverloaded               (0),
    manuallyInitiated           (1)
    }

CompoundCriteria {PARAMETERS-BOUND : bound} ::= SEQUENCE {
    basicGapCriteria            [0] BasicGapCriteria {bound},
    scfID                       [1] ScfID {bound}               OPTIONAL
    }

CorrelationID {PARAMETERS-BOUND : bound}    ::= Digits {bound}
-- used by gsmSCF for correlation with a previous operation.

DateAndTime                             ::= OCTET STRING (SIZE(7))
--  DateAndTime is BCD encoded. The year digit indicating millenium occupies bits
--  0-3 of the first octet, and the year digit indicating century occupies bits
--  4-7 of the first octet.
--  The year digit indicating decade occupies bits 0-3 of the second octet,
--  whilst the digit indicating the year within the decade occupies bits 4-7 of
--  the second octet.
--  The most significant month digit occupies bits 0-3 of the third octet,
--  and the least significant month digit occupies bits 4-7 of the third octet.
--  The most significant day digit occupies bits 0-3 of the fourth octet,
--  and the least significant day digit occupies bits 4-7 of the fourth octet.
--  The most significant hours digit occupies bits 0-3 of the fifth octet,
--  and the least significant digit occupies bits 4-7 of the fifth octet.
--  The most significant minutes digit occupies bits 0-3 of the sixth octet,
--  and the least significant digit occupies bits 4-7 of the sixth octet.
--  The most significant seconds digit occupies bits 0-3 of the seventh octet,
--  and the least seconds significant digit occupies bits 4-7 of the seventh octet.
--  For the encoding of digits in an octet, refer to the timeAndtimezone parameter.

DestinationRoutingAddress {PARAMETERS-BOUND : bound} ::= SEQUENCE SIZE(1) OF
                                                    CalledPartyNumber {bound}
-- Indicates the Called Party Number.

Digits {PARAMETERS-BOUND : bound}                   ::= OCTET STRING (SIZE(
    bound.&minDigitsLength .. bound.&maxDigitsLength))
-- Indicates the address signalling digits.
-- Refer to ETS 300 356-1 [8] Generic Number & Generic Digits parameters for encoding.
-- The coding of the subfields 'NumberQualifier' in Generic Number and 'TypeOfDigits' in
-- Generic Digits are irrelevant to the CAP;
-- the ASN.1 tags are sufficient to identify the parameter.
-- The ISUP format does not allow to exclude these subfields,
-- therefore the value is network operator specific.
-- The following parameters should use Generic Number:
-- AdditionalCallingPartyNumber for InitialDP
-- AssistingSSPIPRoutingAddress for EstablishTemporaryConnection
-- CorrelationID for AssistRequestInstructions
-- CalledAddressValue for all occurrences, CallingAddressValue for all occurrences.
--
-- The following parameters should use Generic Digits:
```

```
-- CorrelationID in EstablishTemporaryConnection
-- number in VariablePart
-- digitsResponse in ReceivedInformationArg
-- In the digitsResponse the digits may also include the '*', '#', a, b , c and d digits
-- by using the IA5 character encoding scheme. If the BCD even or BCD odd encoding
-- scheme is used, the following encoding shall be applied for the non-decimal characters:
-- 1011 (*), 1100 (#).

-- Note that when CorrelationID is transported in Generic Digits, then the digits shall
-- always be BCD encoded.

DpSpecificCriteria {PARAMETERS-BOUND : bound}       ::= CHOICE {
    applicationTimer        [1] ApplicationTimer
    }
--  The gsmSCF may set a timer in the gsmSSF for the No Answer event.
--  If the user does not answer the call within the allotted time,
--  the gsmSSF reports the event to the gsmSCF

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

ElapsedTimeRollOver             ::= CHOICE {
    rO-TimeGPRSIfNoTariffSwitch     [0] INTEGER (0..255),
    rO-TimeGPRSIfTariffSwitch       [1] SEQUENCE {
        rO-TimeGPRSSinceLastTariffSwitch    [0] INTEGER (0..255)    OPTIONAL,
        rO-TimeGPRSTariffSwitchInterval     [1] INTEGER (0..255)    OPTIONAL
        }
    }
--  rO-TimeGPRSIfNoTariffSwitch, rO-TimeGPRSSinceLastTariffSwitch and
--  rO-TimeGPRSTariffSwitchInterval
--  present counters indicating the number of parameter range rollovers.

EndUserAddress  {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 EndUserAddress, 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 bits of the octet to 1.
-- The receiver of this parameter shall ignore the most significant 4 bits of this octet.

ErrorTreatment                                      ::= ENUMERATED {
    stdErrorAndInfo         (0),
    help                    (1),
    repeatPrompt            (2)
    }
-- stdErrorAndInfomeans returning the "ImproperCallerResponse" error in the event of an error
-- condition during collection of user info.

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.

EventSpecificInformationSMS     ::= CHOICE {
    o-smsFailureSpecificInfo        [0] SEQUENCE {
        failureCause                    [0] SMSCause                            OPTIONAL,
        ...
        },
    o-smsSubmittedSpecificInfo      [1] SEQUENCE {
        -- no specific info defined—
        ...
        }
    }

EventTypeBCSM                                       ::= ENUMERATED {
    collectedInfo                   (2),
    analyzedInformation             (3),
    routeSelectFailure              (4),
    oCalledPartyBusy                (5),
    oNoAnswer                       (6),
    oAnswer                         (7),
    oDisconnect                     (9),
    oAbandon                        (10),
    termAttemptAuthorized           (12),
    tBusy                           (13),
    tNoAnswer                       (14),
    tAnswer                         (15),
    tDisconnect                     (17),
    tAbandon                        (18)
    }

-- Indicates the BCSM detection point event.
-- Values collectedInfo, analyzedInformation and termAttemptAuthorized can only be used for TDPs

EventTypeSMS                        ::= ENUMERATED {
    sms-CollectedInfo                   (1),
    o-smsFailure                        (2),
    o-smsSubmitted                      (3)
    }
-- Value sms-CollectedInfo can only be used for TDPs.

Extensions {PARAMETERS-BOUND : bound} ::= SEQUENCE SIZE (1..bound.&numOfExtensions) OF
ExtensionField

_ExtensionField {PARAMETERS-BOUND : bound}  ::= SEQUENCE {
    type                EXTENSION.&id                   ({SupportedExtensions {bound}}),
                        -- shall identify the value of an EXTENSION type
    criticality         CriticalityType                 DEFAULT ignore,
    value               [1] EXTENSION.&ExtensionType    ({SupportedExtensions {bound}}{@type}),
    ...
    }
-- This parameter indicates an extension of an argument data type.
-- Its content is network operator specific

FCIBillingChargingCharacteristics {PARAMETERS-BOUND : bound} ::= OCTET STRING (SIZE(
    bound.&minFCIBillingChargingLength .. bound.&maxFCIBillingChargingLength))
    (CONSTRAINED BY {-- shall be the result of the BER-encoded value of type --
    CAMEL-FCIBillingChargingCharacteristics {bound}})
-- This parameter indicates the billing and/or charging characteristics.
-- The violation of the UserDefinedConstraint shall be handled as an ASN.1 syntax error.

FCIGPRSBillingChargingCharacteristics {PARAMETERS-BOUND : bound} ::= OCTET STRING (SIZE(
    bound.&minFCIBillingChargingLength .. bound.&maxFCIBillingChargingLength))
    (CONSTRAINED BY {-- shall be the result of the BER-encoded value of type -
    CAMEL-FCIGPRSBillingChargingCharacteristics {bound}})
-- This parameter indicates the GPRS billing and/or charging characteristics.
-- The violation of the UserDefinedConstraint shall be handled as an ASN.1 syntax error.

FCISMSBillingChargingCharacteristics {PARAMETERS-BOUND : bound} ::= OCTET STRING (SIZE(
    bound.&minFCIBillingChargingLength .. bound.&maxFCIBillingChargingLength))
    (CONSTRAINED BY {-- shall be the result of the BER-encoded value of type -
    CAMEL-FCISMSBillingChargingCharacteristics {bound}})
-- This parameter indicates the SMS billing and/or charging characteristics.
-- The violation of the UserDefinedConstraint shall be handled as an ASN.1 syntax error.

ForwardServiceInteractionInd                        ::= SEQUENCE {
    conferenceTreatmentIndicator    [1] OCTET STRING (SIZE(1))          OPTIONAL,
    -- acceptConferenceRequest  'xxxx xx01'B
    -- rejectConferenceRequest  'xxxx xx10'B
```

```
    -- network default is accept conference request
    callDiversionTreatmentIndicator [2] OCTET STRING (SIZE(1))      OPTIONAL,
    -- callDiversionAllowed     'xxxx xx01'B
    -- callDiversionNotAllowed  'xxxx xx10'B
    -- network default is Call Diversion allowed
    callingPartyRestrictionIndicator [4] OCTET STRING (SIZE(1))     OPTIONAL,
    -- noINImpact               'xxxx xx01'B
    -- presentationRestricted   'xxxx xx10'B
    -- network default is noINImpact
    ...
    }

GapCriteria {PARAMETERS-BOUND : bound}::= CHOICE {
    basicGapCriteria            BasicGapCriteria {bound},
    compoundGapCriteria         CompoundCriteria {bound}
    }

GapIndicators                                           ::= SEQUENCE {
    duration                    [0] Duration,
    gapInterval                 [1] Interval,
    ...
    }
-- Indicates the gapping characteristics.
-- No gapping when gapInterval equals 0.

GapOnService                                            ::= SEQUENCE {
    serviceKey                  [0] ServiceKey,
    ...
    }

GapTreatment {PARAMETERS-BOUND : bound}                 ::= CHOICE {
    informationToSend           [0] InformationToSend {bound},
    releaseCause                [1] Cause {bound}
    }
-- The default value for Cause is the same as in ISUP.


GenericNumber {PARAMETERS-BOUND : bound}            ::= OCTET STRING (SIZE(
    bound.&minGenericNumberLength .. bound.&maxGenericNumberLength))
--  Indicates a generic number. Refer to ETS 300 356-1 [8] Generic number for 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
            (bound.&minGPRSCauseLength .. bound.&maxGPRSCauseLength))
-- Shall only include the cause value.

--  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 3GPP TS 29.060 and
-- to/from 3GPP TS 24.008 GMM cause and SM cause values are outside scope of this document.


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,
            endUserAddress              [3] EndUserAddress {bound}      OPTIONAL,
```

```
            qualityOfService                [4] QualityOfService        OPTIONAL,
            timeAndTimeZone                 [5] TimeAndTimezone {bound}     OPTIONAL,
            ...,
            gGSNAddress                     [6] GSN-Address             OPTIONAL
            },

    detachSpecificInformation           [2] SEQUENCE {
            initiatingEntity                [0] InitiatingEntity        OPTIONAL,
            ...,
            routeingAreaUpdate              [1] NULL                    OPTIONAL
            },

    disconnectSpecificInformation       [3] SEQUENCE {
            initiatingEntity                [0] InitiatingEntity        OPTIONAL,
            ...,
            routeingAreaUpdate              [1] NULL                    OPTIONAL
            },

    pDPContextEstablishmentSpecificInformation
                                        [4] SEQUENCE {
            accessPointName                 [0] AccessPointName {bound} OPTIONAL,
            endUserAddress                  [1] EndUserAddress {bound}      OPTIONAL,
            qualityOfService                [2] QualityOfService        OPTIONAL,
            locationInformationGPRS         [3] LocationInformationGPRS OPTIONAL,
            timeAndTimeZone                 [4] TimeAndTimezone {bound}     OPTIONAL,
            pDPInitiationType               [5] PDPInitiationType       OPTIONAL,
            ...,
            secondaryPDP-context            [6] NULL                    OPTIONAL
            },

    pDPContextEstablishmentAcknowledgementSpecificInformation
                                        [5] SEQUENCE {
            accessPointName                 [0] AccessPointName {bound} OPTIONAL,
            chargingID                      [1] GPRSChargingID          OPTIONAL,
            endUserAddress                  [2] EndUserAddress {bound}      OPTIONAL,
            qualityOfService                [3] QualityOfService        OPTIONAL,
            locationInformationGPRS         [4] LocationInformationGPRS OPTIONAL,
            timeAndTimeZone                 [5] TimeAndTimezone {bound}     OPTIONAL,
            ...,
            gGSNAddress                     [6] GSN-Address             OPTIONAL
            }
        }

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

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

InbandInfo {PARAMETERS-BOUND : bound}               ::= SEQUENCE {
    messageID               [0] MessageID {bound},
    numberOfRepetitions     [1] INTEGER (1..127)                        OPTIONAL,
    duration                [2] INTEGER (0..32767)                      OPTIONAL,
    interval                [3] INTEGER (0..32767)                      OPTIONAL,
    ...
    }
-- Interval is the time in seconds between each repeated announcement. Duration is the total
-- amount of time in seconds, including repetitions and intervals.
-- The end of announcement is either the end of duration or numberOfRepetitions,
-- whatever comes first.
-- duration with value 0 indicates infinite duration

InformationToSend {PARAMETERS-BOUND : bound}        ::= CHOICE {
    inbandInfo              [0] InbandInfo {bound},
    tone                    [1] Tone
    }

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

InvokeID        ::= TCInvokeIdSet

IPRoutingAddress {PARAMETERS-BOUND : bound}             ::= CalledPartyNumber {bound}
-- Indicates the routing address for the IP.
```

```
IPSSPCapabilities {PARAMETERS-BOUND : bound}        ::= OCTET STRING (SIZE(
    bound.&minIPSSPCapabilitiesLength .. bound.&maxIPSSPCapabilitiesLength))
--  Indicates the gsmSRF resources available. The parameter has two parts, a standard and a
--  bilateral part. The standard part indicates capabilities defined as optional in CAP V.2
--  that shall be recognised (but not necessarily supported) by a CAP V.2 gsmSCF. The bilateral
--  part contains further information that is not specified in this standard, but which is set
--  according to bilateral agreements between network operators and/or equipment vendors.
--  The last octet of the standard part is indicated by bit 7 being set to 0, otherwise Bit 7 of
--  a standard part octet is set to 1 indicating that the standard part continues in the following
--  octet. Coding is as follows:

--  Octet 1                 Standard Part for CAP V.3
--  Bit Value               Meaning
--  0   0                   IPRoutingAddress not supported
--      1                   IPRoutingAddress supported
--  1   0                   VoiceBack not supported
--      1                   VoiceBack supported
--  2   0                   VoiceInformation not supported, via speech recognition
--      1                   VoiceInformation supported, via speech recognition
--  3   0                   VoiceInformation not supported, via voice recognition
--      1                   VoiceInformation supported, via voice recognition
--  4   0                   Generation of voice announcements from Text not supported
--      1                   Generation of voice announcements from Text supported
--  5   -                   Reserved
--  6   -                   Reserved
--  7   0                   End of standard part
--      1                   This value is reserved in CAP V.3
--
--  Octets 2 to 4           Bilateral Part: Network operator / equipment vendor specific


LegType                                             ::= OCTET STRING (SIZE(1))
leg1 LegType                                        ::= '01'H
leg2 LegType                                        ::= '02'H

LocationInformationGPRS     ::= SEQUENCE {
    cellGlobalIdOrServiceAreaIdOrLAI    [0] OCTET STRING (SIZE(5..7))   OPTIONAL,
    routeingAreaIdentity                [1] RAIdentity                  OPTIONAL,
    geographicalInformation             [2] GeographicalInformation     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].
-- sai-Present indicates that the cellGlobalIdOrServiceAreaIdOrLAI parameter contains
-- a Service Area Identity.

LocationNumber {PARAMETERS-BOUND : bound}            ::= OCTET STRING (SIZE (
    bound.&minLocationNumberLength .. bound.&maxLocationNumberLength))
-- Indicates the Location Number for the calling party.
-- Refer to ETS 300 356-1 [8] for encoding.

MessageID {PARAMETERS-BOUND : bound}                 ::= CHOICE {
    elementaryMessageID     [0] Integer4,
    text                    [1] SEQUENCE {
        messageContent          [0] IA5String (SIZE(
            bound.&minMessageContentLength .. bound.&maxMessageContentLength)),
        attributes              [1] OCTET STRING (SIZE(
            bound.&minAttributesLength .. bound.&maxAttributesLength)) OPTIONAL
    },
    elementaryMessageIDs    [29] SEQUENCE SIZE (1.. bound.&numOfMessageIDs) OF Integer4,
    variableMessage         [30] SEQUENCE {
        elementaryMessageID     [0] Integer4,
        variableParts           [1] SEQUENCE SIZE (1..5) OF VariablePart {bound}
        }
    }
-- Use of the text parameter is network operator/equipment vendor specific.

MonitorMode                                         ::= ENUMERATED {
    interrupted                 (0),
    notifyAndContinue           (1),
    transparent                 (2)
    }
-- Indicates the event is relayed and/or processed by the SSP.
-- Transparent means that the gsmSSF or gprsSSF does not notify the gsmSCF of the event.
-- For the use of this parameter refer to the procedure descriptions in clause 11.

MSNetworkCapability                             ::= OCTET STRING (SIZE (8))
--  MS Network Capability describes the GPRS terminal capabilites related to the network, i.e. SMS
--  point to point service over packet data channels. For encoding refer to 3GPP TS 24.008 [12].

MSRadioAccessCapability                 ::= OCTET STRING (SIZE (3..32))
-- MS Radio Access Capability describes the terminal capabilites relevant for the radio network,
-- which may affect the way the network handles the mobile.
-- For encoding refer to 3GPP TS 24.008 [12].
```

```
NAOliInfo                          ::= OCTET STRING (SIZE (1))
--  NA Oli information takes the same value as defined in ANSI ISUP T1.113 [53]
--  e.g.     '3D'H  – Decimal value 61 - Cellular Service (Type 1)
--           '3E'H  – Decimal value 62 - Cellular Service (Type 2)
--           '3F'H  – Decimal value 63 - Cellular Service (roaming)

OriginalCalledPartyID {PARAMETERS-BOUND : bound}               ::= OCTET STRING (SIZE(
    bound.&minOriginalCalledPartyIDLength .. bound.&maxOriginalCalledPartyIDLength))

--  Indicates the original called number. Refer to ETS 300 356-1 [8] Original Called Number
--  for encoding.

OCSIApplicable                                  ::= NULL
--  Indicates that the Originating CAMEL Subscription Information, if present, shall be
--  applied on the outgoing call leg created with a Connect operation. For the use of this
--  parameter see 3GPP TS 23.078 [42].

PDPID                                  ::= OCTET STRING (SIZE (1))
--  PDP Identifier is a counter used to identify a specific PDP Context within a control
--  relationship between gprsSSF and gsmSCF.

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

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].

ReceivingSideID                    ::= CHOICE {receivingSideID [1] LegType}

-- used to identify LegID in operations sent from gsmSSF to gsmSCF

RedirectingPartyID {PARAMETERS-BOUND : bound}       ::= OCTET STRING (SIZE (
    bound.&minRedirectingPartyIDLength .. bound.&maxRedirectingPartyIDLength))
-- Indicates redirecting number.
-- Refer to ETS 300 356-1 [8] Redirecting number for encoding.

RequestedInformationList {PARAMETERS-BOUND : bound}     ::= SEQUENCE SIZE (1.. numOfInfoItems) OF
RequestedInformation {bound}

RequestedInformationTypeList {PARAMETERS-BOUND : bound} ::= SEQUENCE SIZE (1.. numOfInfoItems) OF
RequestedInformationType

RequestedInformation {PARAMETERS-BOUND : bound}         ::= SEQUENCE {
    requestedInformationType    [0] RequestedInformationType,
    requestedInformationValue   [1] RequestedInformationValue {bound},
    ...
    }

RequestedInformationType                                ::= ENUMERATED {
    callAttemptElapsedTime      (0),
    callStopTime                (1),
    callConnectedElapsedTime    (2),
    releaseCause                (30)
    }

RequestedInformationValue {PARAMETERS-BOUND : bound} ::= CHOICE {
    callAttemptElapsedTimeValue     [0] INTEGER (0..255),
    callStopTimeValue               [1] DateAndTime,
    callConnectedElapsedTimeValue   [2] Integer4,
    releaseCauseValue               [30] Cause {bound}
    }
-- The callAttemptElapsedTimeValue is specified in seconds. The unit for the
-- callConnectedElapsedTimeValue is 100 milliseconds

RPCause             ::= OCTET STRING (SIZE (1))
-- RP cause according to 3GPP TS 24.011 [45].
-- GsmSCF shall send this cause in the ReleaseSMS operation.
-- The received cause is sent to the originating MS by the VMSC/SGSN.

ScfID {PARAMETERS-BOUND : bound}                        ::= OCTET STRING (SIZE(
    bound.&minScfIDLength .. bound.&maxScfIDLength))
-- defined by network operator.
-- Indicates the gsmSCF identity.

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

```
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.

SendingSideID                       ::= CHOICE {sendingSideID [0] LegType}
-- used to identify LegID in operations sent from gsmSCF to gsmSSF

ServiceInteractionIndicatorsTwo                          ::= SEQUENCE {
    forwardServiceInteractionInd        [0] ForwardServiceInteractionInd        OPTIONAL,
    -- applicable to operations InitialDP, Connect and ContinueWithArgument.
    backwardServiceInteractionInd       [1] BackwardServiceInteractionInd       OPTIONAL,
    -- applicable to operations Connect and ContinueWithArgument.
    bothwayThroughConnectionInd         [2] BothwayThroughConnectionInd         OPTIONAL,
    -- applicable to ConnectToResource and EstablishTemporaryConnection
    connectedNumberTreatmentInd         [4] ConnectedNumberTreatmentInd         OPTIONAL,
    -- applicable to Connect and ContinueWithArgument
    nonCUGCall                          [13] NULL                               OPTIONAL,
    -- applicable to Connect and ContinueWithArgument
    -- indicates that no parameters for CUG shall be used for the call (i.e. the call shall
    -- be a non-CUG call).
    -- If not present, it indicates one of three things:
    --  a) continue with modified CUG information (when one or more of either CUG Interlock Code
    --     and Outgoing Access Indicator are present), or
    --  b) continue with original CUG information (when neither CUG Interlock Code or Outgoing
    --     Access Indicator are present), i.e. no IN impact.
    --  c) continue with the original non-CUG call.
    holdTreatmentIndicator              [50] OCTET STRING (SIZE(1))             OPTIONAL,
    -- applicable to InitialDP, Connect and ContinueWithArgument
    -- acceptHoldRequest    'xxxx xx01'B
    -- rejectHoldRequest    'xxxx xx10'B
    -- network default is accept hold request
    cwTreatmentIndicator                [51] OCTET STRING (SIZE(1))             OPTIONAL,
    -- applicable to InitialDP, Connect and ContinueWithArgument
    -- acceptCw 'xxxx xx01'B
    -- rejectCw 'xxxx xx10'B
    -- network default is accept cw
    ectTreatmentIndicator               [52] OCTET STRING (SIZE(1))             OPTIONAL,
    -- applicable to InitialDP, Connect and ContinueWithArgument
    -- acceptEctRequest 'xxxx xx01'B
    -- rejectEctRequest 'xxxx xx10'B
    -- network default is accept ect request
    ...
    }

SGSNCapabilities                            ::= OCTET STRING (SIZE (1))

--  Indicates the SGSN capabilities. The coding of the parameter is as follows:
--  Bit Value               Meaning
--  0   0                   AoC not supported by SGSN
--      1                   AoC supported by SGSN
--  1   -                   This bit is reserved in CAP V.3
--  2   -                   This bit is reserved in CAP V.3
--  3   -                   This bit is reserved in CAP V.3
--  4   -                   This bit is reserved in CAP V.3
--  5   -                   This bit is reserved in CAP V.3
--  6   -                   This bit is reserved in CAP V.3
--  7   -                   This bit is reserved in CAP V.3

SMSCause    ::= ENUMERATED {
    systemFailure               (0),
    unexpectedDataValue         (1),
    facilityNotSupported        (2),
    sM-DeliveryFailure          (3),
    releaseFromRadioInterface   (4)
    }
-- MO SMS error values which are reported to gsmSCF.
-- Most of these values are received from the SMSC as a response to
-- MO-ForwardSM operation.

SMSEvent                            ::= SEQUENCE {
    eventTypeSMS                        [0] EventTypeSMS,
    monitorMode                         [1] MonitorMode
    }

TimeInformation                     ::= CHOICE {
    timeIfNoTariffSwitch                [0] TimeIfNoTariffSwitch,
    timeIfTariffSwitch                  [1] TimeIfTariffSwitch
    }
-- Indicates call duration information

TimeIfNoTariffSwitch                ::= INTEGER(0..864000)
-- TimeIfNoTariffSwitch is measured in 100 millisecond intervals

TimeIfTariffSwitch                  ::= SEQUENCE {
    timeSinceTariffSwitch               [0] INTEGER(0..864000),
    tariffSwitchInterval                [1] INTEGER(1..864000)                      OPTIONAL
    }
```

```
-- timeSinceTariffSwitch and tariffSwitchInterval are measured in 100 millisecond intervals

TimerID                             ::= ENUMERATED {
    tssf                                (0)
    }
-- Indicates the timer to be reset.

TimerValue                          ::= Integer4
-- Indicates the timer value (in seconds).

TimeAndTimezone {PARAMETERS-BOUND : bound}::= OCTET STRING (SIZE(
    bound.&minTimeAndTimezoneLength .. bound.&maxTimeAndTimezoneLength))
--  Indicates the time and timezone, relative to GMT. This parameter BCD encoded.
--  The year digit indicating millenium occupies bits 0-3 of the first octet, and the year
--  digit indicating century occupies bits 4-7 of the first octet.
--  The year digit indicating decade occupies bits 0-3 of the second octet, whilst the digit
--  indicating the year within the decade occupies bits 4-7 of the second octet.
--  The most significant month digit occupies bits 0-3 of the third octet, and the least
--  significant month digit occupies bits 4-7 of the third octet.
--  The most significant day digit occupies bits 0-3 of the fourth octet, and the least
--  significant day digit occupies bits 4-7 of the fourth octet.
--  The most significant hours digit occupies bits 0-3 of the fifth octet, and the least
--  significant hours digit occupies bits 4-7 of the fifth octet.
--  The most significant minutes digit occupies bits 0-3 of the sixth octet, and the least
--  significant minutes digit occupies bits 4-7 of the sixth octet.
--  The most significant seconds digit occupies bits 0-3 of the seventh octet, and the least
--  significant seconds digit occupies bits 4-7 of the seventh octet.
--
--  The timezone information occupies the eigth octet. For the encoding of Timezone refer to
--  Reference [29], 3GPP TS 23.040 [46].
--
--  The BCD digits are packed and encoded as follows:
--
--  Bit  7  6  5   4  |  3  2  1  0
--       2nd digit    | 1st digit          Octet 1
--       3rd digit    | 4th digit          Octet 2
--                      ..                   ..
--       nth digit    | n-1th digit        Octet m
--
--       0000       digit 0
--       0001       digit 1
--       0010       digit 2
--       0011       digit 3
--       0100       digit 4
--       0101       digit 5
--       0110       digit 6
--       0111       digit 7
--       1000       digit 8
--       1001       digit 9
--       1010       spare
--       1011       spare
--       1100       spare
--       1101       spare
--       1110       spare
--       1101       spare
--
-- where the leftmost bit of the digit is either bit 7 or bit 3 of the octet.

Tone                                    ::= SEQUENCE {
    toneID              [0] Integer4,
    duration            [1] Integer4            OPTIONAL,
    ...
    }
-- The duration specifies the length of the tone in seconds, value 0 indicates infinite duration.

TPDataCodingScheme                  ::= OCTET STRING (SIZE (1))
-- TP Data Coding Scheme according to 3GPP TS 23.040 [46]

TPProtocolIdentifier                ::= OCTET STRING (SIZE (1))
-- indicates the protocol used above SM-Transfer Layer as specified in 3GPP TS 23.040 [46].

TPShortMessageSubmissionInfo        ::= OCTET STRING (SIZE (1))
-- contains the 1st octect of the SMS-SUBMIT TPDU or the SMS-COMMAND TPDU as specified in 3GPP TS
23.040 [46].

TPValidityPeriod                    ::= OCTET STRING (SIZE (1..7))
-- indicates the length of the validity period or the absolute time of the validity
-- period termination as specified in 3GPP TS 23.040 [46].
-- the length of ValidityPeriod is either 1 octet or 7 octets

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.
```

```
TransferredVolumeRollOver           ::= CHOICE {
    rO-VolumeIfNoTariffSwitch       [0] INTEGER (0.. 255),
    rO-VolumeIfTariffSwitch         [1] SEQUENCE {
        rO-VolumeSinceLastTariffSwitch      [0] INTEGER (0.. 255)   OPTIONAL,
        rO-VolumeTariffSwitchInterval       [1] INTEGER (0.. 255)   OPTIONAL
        }
    }
--  rO-VolumeIfNoTariffSwitch, rO-VolumeSinceLastTariffSwitch and rO-VolumeTariffSwitchInterval
--  present counters indicating the number of parameter range rollovers.

UnavailableNetworkResource ::= ENUMERATED {
    unavailableResources            (0),
    componentFailure                (1),
    basicCallProcessingException    (2),
    resourceStatusFailure           (3),
    endUserFailure                  (4)
    }
-- Indicates the network resource that failed.

VariablePart {PARAMETERS-BOUND : bound}                     ::= CHOICE {
    integer             [0] Integer4,
    number              [1] Digits {bound}, -- Generic digits
    time                [2] OCTET STRING (SIZE(2)), -- HH: MM, BCD coded
    date                [3] OCTET STRING (SIZE(4)), -- YYYYMMDD, BCD coded
    price               [4] OCTET STRING (SIZE(4))
    }
--  Indicates the variable part of the message. Time is BCD encoded.
--  The most significant hours digit occupies bits 0-3 of the first octet, and the least
--  significant digit occupies bits 4-7 of the first octet. The most significant minutes digit
--  occupies bits 0-3 of the second octet, and the least significant digit occupies bits 4-7
--  of the second octet.
--
--  Date is BCD encoded. The year digit indicating millenium occupies bits 0-3 of the first octet,
--  and the year digit indicating century occupies bits 4-7 of the first octet. The year digit
--  indicating decade occupies bits 0-3 of the second octet, whilst the digit indicating the year
--  within the decade occupies bits 4-7 of the second octet.
--  The most significant month digit occupies bits 0-3 of the third octet, and the least
--  significant month digit occupies bits 4-7 of the third octet. The most significant day digit
--  occupies bits 0-3 of the fourth octet, and the least significant day digit occupies bits 4-7
--  of the fourth octet.
--  Price is BCD encoded. The digit indicating hundreds of thousands occupies bits 0-3 of the
--  first octet, and the digit indicating tens of thousands occupies bits 4-7 of the first octet.
--  The digit indicating thousands occupies bits 0-3 of the second octet, whilst the digit
--  indicating hundreds occupies bits 4-7 of the second octet. The digit indicating tens occupies
--  bits 0-3 of the third octet, and the digit indicating 0 to 9 occupies bits 4-7 of the third
--  octet. The tenths digit occupies bits 0-3 of the fourth octet, and the hundredths digit
--  occupies bits 4-7 of the fourth octet.
--
--  For the encoding of digits in an octet, refer to the timeAndtimezone parameter

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

END
```

5.2 Error types

```
CAP-errortypes {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0) umts-network(1)
modules(3) cap-errortypes(51) version3(2)}
-- This module contains the type definitions for the CAP Error Types.
-- Where a parameter of type CHOICE is tagged with a specific tag value, the tag is automatically
-- replaced with an EXPLICIT tag of the same value.

DEFINITIONS IMPLICIT TAGS ::= BEGIN


IMPORTS

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

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

    InvokeID,
    UnavailableNetworkResource
FROM CAP-datatypes datatypes

    errcode-canceled,
    errcode-cancelFailed,
    errcode-eTCFailed,
    errcode-improperCallerResponse,
    errcode-missingCustomerRecord,
    errcode-missingParameter,
    errcode-parameterOutOfRange,
```

```
    errcode-requestedInfoError,
    errcode-systemFailure,
    errcode-taskRefused,
    errcode-unavailableResource,
    errcode-unexpectedComponentSequence,
    errcode-unexpectedDataValue,
    errcode-unexpectedParameter,
    errcode-unknownLegID,
    errcode-unknownPDPID
FROM CAP-errorcodes errorcodes

;

-- TYPE DEFINITION FOR CAP ERROR TYPES FOLLOWS

canceled ERROR              ::= {
    CODE    errcode-canceled
    }
-- The operation has been canceled.

cancelFailed ERROR          ::= {
    PARAMETER   SEQUENCE {
        problem                 [0] ENUMERATED {
            unknownOperation        (0),
            tooLate                 (1),
            operationNotCancellable (2)
            },
        operation               [1] InvokeID,
        ...
        }
    CODE    errcode-cancelFailed
    }
-- The operation failed to be canceled.

eTCFailed ERROR             ::= {
    CODE    errcode-eTCFailed
    }
-- The establish temporary connection failed.

improperCallerResponse ERROR ::= {
    CODE    errcode-improperCallerResponse
    }
-- The caller response was not as expected.

missingCustomerRecord ERROR ::= {
    CODE    errcode-missingCustomerRecord
    }
-- The Service Logic Program could not be found in the gsmSCF.

missingParameter ERROR      ::= {
    CODE    errcode-missingParameter
    }
-- An expected optional parameter was not received.

parameterOutOfRange ERROR   ::= {
    CODE    errcode-parameterOutOfRange
    }
-- The parameter was not as expected (e.g. missing or out of range).

requestedInfoError ERROR    ::= {
    PARAMETER    ENUMERATED {
            unknownRequestedInfo        (1),
            requestedInfoNotAvailable   (2)
            }
    CODE    errcode-requestedInfoError
    }
-- The requested information cannot be found.

systemFailure ERROR         ::= {
    PARAMETER   UnavailableNetworkResource
    CODE    errcode-systemFailure
    }
-- The operation could not be completed due to a system failure at the serving physical entity.

taskRefused ERROR           ::= {
    PARAMETER   ENUMERATED {
            generic                     (0),
            unobtainable                (1),
            congestion                  (2)
            }
    CODE    errcode-taskRefused
    }
-- An entity normally capable of the task requested cannot or chooses not to perform the task at
-- this time. This includes error situations like congestion and unobtainable address as used in
-- e.g. the connect operation.)

unavailableResource ERROR   ::= {
    CODE    errcode-unavailableResource
    }
-- A requested resource is not available at the serving entity.
```

```
unexpectedComponentSequence ERROR ::= {
    CODE    errcode-unexpectedComponentSequence
    }
-- An incorrect sequence of Components was received (e.g."DisconnectForwardConnection"
-- followed by "PlayAnnouncement").

unexpectedDataValue ERROR ::= {
    CODE    errcode-unexpectedDataValue
    }
-- The data value was not as expected (e.g. routing number expected but billing number received)

unexpectedParameter ERROR ::= {
    CODE    errcode-unexpectedParameter
    }
-- A parameter received was not expected.

unknownLegID ERROR      ::= {
    CODE    errcode-unknownLegID
    }
-- Leg not known to the gsmSSF.

unknownPDPID ERROR      ::= {
    CODE    errcode-unknownPDPID
    }
-- PDPID not known by the receiving entity.

END
```

5.3 Operation codes

```
CAP-operationcodes {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0) umts-network(1)
modules(3) cap-operationcodes(53) version3(2)}


DEFINITIONS ::= BEGIN

IMPORTS

    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)}

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

;

-- the operations are grouped by the identified operation packages.

-- gsmSCF activation Package
    opcode-initialDP                        Code ::= local: 0
-- gsmSCF/gsmSRF activation of assist Package
    opcode-assistRequestInstructions        Code ::= local: 16
-- Assist connection establishment Package
    opcode-establishTemporaryConnection     Code ::= local: 17
-- Generic disconnect resource Package
    opcode-disconnectForwardConnection      Code ::= local: 18
-- Non-assisted connection establishment Package
    opcode-connectToResource                Code ::= local: 19
-- Connect Package (elementary gsmSSF function)
    opcode-connect                          Code ::= local: 20
-- Call handling Package (elementary gsmSSF function)
    opcode-releaseCall                      Code ::= local: 22
-- BCSM Event handling Package
    opcode-requestReportBCSMEvent           Code ::= local: 23
    opcode-eventReportBCSM                  Code ::= local: 24
-- gsmSSF call processing Package
    opcode-continue                         Code ::= local: 31
    opcode-continueWithArgument             Code ::= local: 56
-- Timer Package
    opcode-resetTimer                       Code ::= local: 33
-- Billing Package
    opcode-furnishChargingInformation       Code ::= local: 34
-- Charging Package
    opcode-applyCharging                    Code ::= local: 35
    opcode-applyChargingReport              Code ::= local: 36
-- Traffic management Package
    opcode-callGap                          Code ::= local: 41
-- Call report Package
    opcode-callInformationReport            Code ::= local: 44
    opcode-callInformationRequest           Code ::= local: 45
-- Signalling control Package
    opcode-sendChargingInformation          Code ::= local: 46
-- Specialized resource control Package
    opcode-playAnnouncement                 Code ::= local: 47
    opcode-promptAndCollectUserInformation  Code ::= local: 48
    opcode-specializedResourceReport        Code ::= local: 49
-- Cancel Package
```

```
    opcode-cancel                           Code ::= local: 53
-- Activity Test Package
    opcode-activityTest                     Code ::= local: 55

-- Sms Activation Package
    opcode-initialDPSMS                     Code ::= local: 60
-- Sms Billing Package
    opcode-furnishChargingInformationSMS    Code ::= local: 61
-- Sms Connect Package
    opcode-connectSMS                       Code ::= local: 62
-- Sms Event Handling Package
    opcode-requestReportSMSEvent            Code ::= local: 63
    opcode-eventReportSMS                   Code ::= local: 64
-- Sms Processing Package
    opcode-continueSMS                      Code ::= local: 65
-- Sms Release Package
    opcode-releaseSMS                       Code ::= local: 66
-- Sms Timer Package
    opcode-resetTimerSMS                    Code ::= local: 67

-- Gprs Activity Test Package
    opcode-activityTestGPRS                 Code ::= local: 70
-- Gprs Charging Package
    opcode-applyChargingGPRS                Code ::= local: 71
    opcode-applyChargingReportGPRS          Code ::= local: 72
-- Gprs Cancel Package
    opcode-cancelGPRS                       Code ::= local: 73
-- Gprs Connect Package
    opcode-connectGPRS                      Code ::= local: 74
-- Gprs Processing Package
    opcode-continueGPRS                     Code ::= local: 75
-- Gprs Exception Information Package
    opcode-entityReleasedGPRS               Code ::= local: 76
-- Gprs Billing Package
    opcode-furnishChargingInformationGPRS   Code ::= local: 77
-- Gprs Scf Activation Package
    opcode-initialDPGPRS                    Code ::= local: 78
-- Gprs Release Package
    opcode-releaseGPRS                      Code ::= local: 79
-- Gprs Event Handling Package
    opcode-eventReportGPRS                  Code ::= local: 80
    opcode-requestReportGPRSEvent           Code ::= local: 81
-- Gprs Timer Package
    opcode-resetTimerGPRS                   Code ::= local: 82
-- Gprs Charge Advice Package
    opcode-sendChargingInformationGPRS      Code ::= local: 83

END
```

5.4 Error codes

```
CAP-errorcodes {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0) umts-network(1)
modules(3) cap-errorcodes(57) version3(2)}


DEFINITIONS ::= BEGIN

IMPORTS

    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)}

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

;

errcode-canceled                        Code ::= local: 0
errcode-cancelFailed                    Code ::= local: 1
errcode-eTCFailed                       Code ::= local: 3
errcode-improperCallerResponse          Code ::= local: 4
errcode-missingCustomerRecord           Code ::= local: 6
errcode-missingParameter                Code ::= local: 7
errcode-parameterOutOfRange             Code ::= local: 8
errcode-requestedInfoError              Code ::= local: 10
errcode-systemFailure                   Code ::= local: 11
errcode-taskRefused                     Code ::= local: 12
errcode-unavailableResource             Code ::= local: 13
errcode-unexpectedComponentSequence     Code ::= local: 14
errcode-unexpectedDataValue             Code ::= local: 15
errcode-unexpectedParameter             Code ::= local: 16
errcode-unknownLegID                    Code ::= local: 17
errcode-unknownPDPID                    Code ::= local: 50

END
```

5.5 Classes

```
CAP-classes {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0) umts-network(1)
modules(3) cap-classes(54) version3(2)}

DEFINITIONS ::= BEGIN

IMPORTS

    ROS-OBJECT-CLASS,
    Code
FROM Remote-Operations-Information-Objects ros-InformationObjects


    id-rosObject-gsmSRF,
    id-rosObject-gsmSSF,
    ros-InformationObjects,
    gsmSSF-gsmSCF-Protocol,
    gsmSCF-gsmSRF-Protocol
FROM CAP-object-identifiers {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0)
umts-network(1) modules(3) cap-object-identifiers(100) version3(2)}

    capSsfToScfGeneric,
    capAssistHandoffssfToScf
FROM CAP-gsmSSF-gsmSCF-pkgs-contracts-acs gsmSSF-gsmSCF-Protocol

    gsmSRF-gsmSCF-contract
FROM CAP-gsmSCF-gsmSRF-pkgs-contracts-acs gsmSCF-gsmSRF-Protocol

    CriticalityType
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)}

;

gsmSSF ROS-OBJECT-CLASS ::= {
    INITIATES   {capSsfToScfGeneric|
                 capAssistHandoffssfToScf}
    RESPONDS    {capSsfToScfGeneric}
    ID          id-rosObject-gsmSSF
    }

gsmSRF ROS-OBJECT-CLASS ::= {
    INITIATES   {gsmSRF-gsmSCF-contract}
    ID          id-rosObject-gsmSRF
    }

EXTENSION ::= CLASS {
    &ExtensionType,
    &criticality    CriticalityType DEFAULT ignore,
    &id Code
    }

WITH SYNTAX {
    EXTENSION-SYNTAX    &ExtensionType
    CRITICALITY         &criticality
    IDENTIFIED BY       &id
    }
-- Example of addition of an extension named 'Some Network Specific Indicator' of type
-- BOOLEAN, with criticality 'abort' and to be identified as extension number 1
-- Example of definition using the above information object class:
--
-- SomeNetworkSpecificIndicator EXTENSION ::= {
--  EXTENSION-SYNTAX    BOOLEAN
--  CRITICALITY         abort
--  IDENTIFIED BY       local: 1
--  }

-- Example of transfer syntax, using the ExtensionField datatype as specified in subclause 5.
-- Assuming the value of the extension is set to TRUE, the extensions parameter
-- becomes a Sequence of type INTEGER ::= 1, criticality ENUMERATED ::= 1 and value [1]
-- EXPLICIT BOOLEAN ::= TRUE.
--
-- Use of Q.1400 [28] defined Extension is for further study.
-- In addition the extension mechanism marker is used to identify the future minor additions
-- to CAP.

firstExtension EXTENSION ::= {
    EXTENSION-SYNTAX    NULL
    CRITICALITY         ignore
    IDENTIFIED BY       local: 1
    }
-- firstExtension is just an example.

SupportedExtensions {PARAMETERS-BOUND : bound} EXTENSION ::= {firstExtension, ...
-- full set of network operator extensions --
}
-- SupportedExtension is the full set of the network operator extensions.
```

```
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-GPRS-CAUSE-LENGTH             &minGPRSCauseLength
    MAXIMUM-FOR-GPRS-CAUSE-LENGTH             &maxGPRSCauseLength
    MINIMUM-FOR-IP-SSP-CAPABILITIES           &minIPSSPCapabilitiesLength
    MAXIMUM-FOR-IP-SSP-CAPABILITIES           &maxIPSSPCapabilitiesLength
    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
}

cAPapSpecificBoundSet 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        174
    MINIMUM-FOR-GENERIC-NUMBER              3
    MAXIMUM-FOR-GENERIC-NUMBER              11
    MINIMUM-FOR-GPRS-CAUSE-LENGTH           1
    MAXIMUM-FOR-GPRS-CAUSE-LENGTH           1
    MINIMUM-FOR-IP-SSP-CAPABILITIES         1
    MAXIMUM-FOR-IP-SSP-CAPABILITIES         4
    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
```

5.6 Object IDentifiers (IDs)

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

```
DEFINITIONS ::= BEGIN

-- This module assigns object identifiers for Modules, Packages, Contracts and AC's
-- used by CAP

-- For Modules from TC, 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)}


-- For CAP Modules
datatypes                       OBJECT IDENTIFIER ::=
    {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0) umts-network(1) modules(3)
    cap-datatypes(52) version3(2)}

errortypes                      OBJECT IDENTIFIER ::=
    {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0) umts-network(1) modules(3)
    cap-errortypes(51) version3(2)}

operationcodes                  OBJECT IDENTIFIER ::=
    {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0) umts-network(1) modules(3)
    cap-operationcodes(53) version3(2)}

errorcodes                      OBJECT IDENTIFIER ::=
    {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0) umts-network(1) modules(3)
    cap-errorcodes(57) version3(2)}

classes                         OBJECT IDENTIFIER ::=
    {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0) umts-network(1) modules(3)
    cap-classes(54) version3(2)}


gsmSSF-gsmSCF-Operations        OBJECT IDENTIFIER ::=
    {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0) umts-network(1) modules(3)
    cap-gsmSSF-gsmSCF-ops-args(101) version3(2)}

gsmSSF-gsmSCF-Protocol          OBJECT IDENTIFIER ::=
    {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0) umts-network(1) modules(3)
    cap-gsmSSF-gsmSCF-pkgs-contracts-acs(102) version3(2)}

gsmSCF-gsmSRF-Operations        OBJECT IDENTIFIER ::=
    {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0) umts-network(1) modules(3)
    cap-gsmSCF-gsmSRF-ops-args(103) version3(2)}

gsmSCF-gsmSRF-Protocol          OBJECT IDENTIFIER ::=
    {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0) umts-network(1) modules(3)
    cap-gsmSCF-gsmSRF-pkgs-contracts-acs(104) version3(2)}


sms-Operations                  OBJECT IDENTIFIER ::=
    {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0) umts-network(1) modules(3)
    cap-SMS-ops-args(105) version3(2)}

smsSSF-gsmSCF-Protocol          OBJECT IDENTIFIER ::=
    {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0) umts-network(1) modules(3)
    cap-smsSSF-gsmSCF-pkgs-contracts-acs(106) version3(2)}

gprsSSF-gsmSCF-Operations       OBJECT IDENTIFIER ::=
    {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0) umts-network(1) modules(3)
    cap-GPRS-ops-args(107) version3(2)}

gprsSSF-gsmSCF-Protocol         OBJECT IDENTIFIER ::=
    {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0) umts-network(1) modules(3)
    cap-gprsSSF-gsmSCF-pkgs-contracts-acs(108) version3(2)}


id-CAP                          OBJECT IDENTIFIER ::=
    {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0)
    umts-network(1) cap3(20)}
id-CAP0E                        OBJECT IDENTIFIER ::=
    {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0)
    umts-network(1) cap3OE(21)}
id-ac                                   OBJECT IDENTIFIER ::= {id-CAP       ac(3)}
id-acE                                  OBJECT IDENTIFIER ::= {id-CAP0E     ac(3)}
id-as                                   OBJECT IDENTIFIER ::= {id-CAP       as(5)}
id-asE                                  OBJECT IDENTIFIER ::= {id-CAP0E     as(5)}
id-rosObject                            OBJECT IDENTIFIER ::= {id-CAP       rosObject(25)}
id-contract                             OBJECT IDENTIFIER ::= {id-CAP       contract(26)}
id-contractE                            OBJECT IDENTIFIER ::= {id-CAP0E     contract(26)}
id-package                              OBJECT IDENTIFIER ::= {id-CAP       package(27)}
id-packageE                             OBJECT IDENTIFIER ::= {id-CAP0E     package(27)}

-- for ac, as, rosObject, contract and package, the values are identical to Q.1218

-- ROS Objects

id-rosObject-gsmSCF                     OBJECT IDENTIFIER ::= {id-rosObject 4}
```

```
id-rosObject-gsmSSF                         OBJECT IDENTIFIER ::= {id-rosObject 5}
id-rosObject-gsmSRF                         OBJECT IDENTIFIER ::= {id-rosObject 6}

-- gsmSSF/gsmSCF AC
id-ac-CAP-gsmSSF-scfGenericAC               OBJECT IDENTIFIER ::= {id-acE 4}
id-ac-CAP-gsmSSF-scfAssistHandoffAC         OBJECT IDENTIFIER ::= {id-acE 6}

-- gsmSRF/gsmSCF AC
id-ac-gsmSRF-gsmSCF                         OBJECT IDENTIFIER ::= {id-ac 14}

-- gprsSSF/gsmSCF AC
id-ac-CAP-gprsSSF-gsmSCF-AC                 OBJECT IDENTIFIER ::= {id-acE 50}
id-ac-CAP-gsmSCF-gprsSSF-AC                 OBJECT IDENTIFIER ::= {id-acE 51}

-- gprsSSF/gsmSCF or gsmSSF/gsmSCF AC
id-ac-cap3-sms-AC                           OBJECT IDENTIFIER ::= {id-acE 61}

-- gsmSSF/gsmSCF Contracts
id-CAPSsfToScfGeneric                       OBJECT IDENTIFIER ::= {id-contractE 3}
id-CAPAssistHandoffssfToScf                 OBJECT IDENTIFIER ::= {id-contractE 5}

-- gsmSRF/gsmSCF Contracts
id-contract-gsmSRF-gsmSCF                   OBJECT IDENTIFIER ::= {id-contract 13}

-- gprsSSF/gsmSCF Contracts
id-cap3GprsSsfTogsmScf                      OBJECT IDENTIFIER ::= {id-contract 14}
id-cap3GsmScfCFToGgprsSsfSF                     OBJECT IDENTIFIER ::= {id-contract 15}

-- gprsSSF/gsmSCF or gsmSSF/gsmSCF Contracts
id-cap3SmsSsfTogsmScf                       OBJECT IDENTIFIER ::= {id-contract 16}

-- gsmSSF/gsmSCF Operation Packages
id-package-scfActivation                    OBJECT IDENTIFIER ::= {id-package 11}
id-package-gsmSRF-scfActivationOfAssist     OBJECT IDENTIFIER ::= {id-package 15}
id-package-assistConnectionEstablishment    OBJECT IDENTIFIER ::= {id-package 16}
id-package-genericDisconnectResource        OBJECT IDENTIFIER ::= {id-package 17}
id-package-nonAssistedConnectionEstablishment
                                            OBJECT IDENTIFIER ::= {id-package 18}
id-package-connect                          OBJECT IDENTIFIER ::= {id-package 19}
id-package-callHandling                     OBJECT IDENTIFIER ::= {id-packageE 20}
id-package-bcsmEventHandling                OBJECT IDENTIFIER ::= {id-package 21}
id-package-ssfCallProcessing                OBJECT IDENTIFIER ::= {id-packageE 24}
id-package-timer                            OBJECT IDENTIFIER ::= {id-package 26}
id-package-billing                          OBJECT IDENTIFIER ::= {id-package 27}
id-package-charging                         OBJECT IDENTIFIER ::= {id-package 28}
id-package-trafficManagement                OBJECT IDENTIFIER ::= {id-package 29}
id-package-callReport                       OBJECT IDENTIFIER ::= {id-package 32}
id-package-signallingControl                OBJECT IDENTIFIER ::= {id-package 33}
id-package-activityTest                     OBJECT IDENTIFIER ::= {id-package 34}
id-package-cancel                           OBJECT IDENTIFIER ::= {id-packageE 36}

-- gsmSRF/gsmSCF Operation Packages
id-package-specializedResourceControl       OBJECT IDENTIFIER ::= {id-package 42}
id-package-gsmSRF-scfCancel                 OBJECT IDENTIFIER ::= {id-package 43}

-- gprsSSF/gsmSCF Operation Packages
id-package-gprsContinue                     OBJECT IDENTIFIER ::= {id-package 49}
id-package-gprsExceptionInformation         OBJECT IDENTIFIER ::= {id-package 50}
id-package-gprsScfCFActivationPackage           OBJECT IDENTIFIER ::= {id-package 51}
id-package-gprsConnectPackage               OBJECT IDENTIFIER ::= {id-package 52}
id-package-gprsReleasePackage               OBJECT IDENTIFIER ::= {id-package 53}
id-package-gprsEventHandlingPackage         OBJECT IDENTIFIER ::= {id-package 54}
id-package-gprsSCFTimerPackage              OBJECT IDENTIFIER ::= {id-package 55}
id-package-gprsSCFBillingPackage            OBJECT IDENTIFIER ::= {id-package 56}
id-package-gprsSCFChargingPackage           OBJECT IDENTIFIER ::= {id-package 57}
id-package-gprsSCFActivityTestPackage       OBJECT IDENTIFIER ::= {id-package 58}
id-package-gprsSCFCancelPackage             OBJECT IDENTIFIER ::= {id-package 59}
id-package-gprsSCFChargeAdvicePackage       OBJECT IDENTIFIER ::= {id-package 60}

-- gprsSSF/gsmSCF or gsmSSF/gsmSCF Operation Packages
id-package-smsActivation                    OBJECT IDENTIFIER ::= {id-package 61}
id-package-smsConnect                       OBJECT IDENTIFIER ::= {id-package 62}
id-package-smsContinue                      OBJECT IDENTIFIER ::= {id-package 63}
id-package-smsRelease                       OBJECT IDENTIFIER ::= {id-package 64}
id-package-smsEventHandling                 OBJECT IDENTIFIER ::= {id-package 65}
id-package-smsBilling                       OBJECT IDENTIFIER ::= {id-package 66}
id-package-smsTimer                         OBJECT IDENTIFIER ::= {id-package 67}

-- gsmSSF/gsmSCF Abstract Syntaxes
id-as-gsmSSF-scfGenericAS                   OBJECT IDENTIFIER ::= {id-asE 4}
id-as-assistHandoff-gsmSSF-scfAS            OBJECT IDENTIFIER ::= {id-asE 6}

-- gsmSRF/gsmSCF Abstract Syntaxes
id-as-basic-gsmSRF-gsmSCF                   OBJECT IDENTIFIER ::= {id-as 14}

-- gprsSSF/gsmSCF Abstract Syntaxes
id-as-gprsSSF-gsmSCF-AS                     OBJECT IDENTIFIER ::= {id-as 50}
id-as-gsmSCF-gprsSSF-AS                     OBJECT IDENTIFIER ::= {id-as 51}

-- gprsSSF/gsmSCF or gsmSSF/gsmSCF Abstract Syntaxes
```

```
id-as-sms-AS                    OBJECT IDENTIFIER ::= {id-as 61}

END
```

5.7 User Abort Data

```
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)}

DEFINITIONS ::= 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.
--                              This abort reason is used for CAP defined GPRS-ReferenceNumber.
-- missing-reference            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 TC 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 Circuit Switched Call Control

6.1 gsmSSF/CCF - gsmSCF Interface

6.1.1 Operations and arguments

```
CAP-gsmSSF-gsmSCF-ops-args {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0)
umts-network(1) modules(3) cap-gsmSSF-gsmSCF-ops-args(101) version3(2)}

DEFINITIONS IMPLICIT TAGS ::= BEGIN

-- This module contains the operations and operation arguments used for the
-- gsmSSF – 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

    errortypes,
    datatypes,
    operationcodes,
    classes,
    tc-Messages,
    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)
csS2(20) modules(0) in-cs2-datatypes (0) version1(0)}

    Ext-BasicServiceCode,
    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)}

    CUG-Index,
    CUG-Interlock,
    CUG-Info,
    LocationInformation,
    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)}

    PARAMETERS-BOUND
FROM CAP-classes classes

    opcode-activityTest,
    opcode-applyCharging,
    opcode-applyChargingReport,
    opcode-assistRequestInstructions,
    opcode-callGap,
    opcode-callInformationReport,
    opcode-callInformationRequest,
    opcode-cancel,
    opcode-connect,
    opcode-connectToResource,
    opcode-continue,
    opcode-continueWithArgument,
    opcode-disconnectForwardConnection,
    opcode-establishTemporaryConnection,
    opcode-eventReportBCSM,
    opcode-furnishChargingInformation,
    opcode-initialDP,
    opcode-releaseCall,
```

```
    opcode-requestReportBCSMEvent,
    opcode-resetTimer,
    opcode-sendChargingInformation
FROM CAP-operationcodes operationcodes

    AChBillingChargingCharacteristics {},
    AdditionalCallingPartyNumber {},
    AlertingPattern,
    AssistingSSPIPRoutingAddress {},
    BCSMEvent ~~{}~~,
    BearerCapability {},
    CalledPartyNumber {},
    CalledPartyBCDNumber {},
    CallingPartyNumber {},
    CallingPartysCategory,
    CallResult {},
    Carrier,
    Cause {},
    CGEncountered,
    ChargeNumber {},
    ControlType,
    CorrelationID {},
    DestinationRoutingAddress {},
    EventSpecificInformationBCSM {},
    EventTypeBCSM,
    ExtensionsExtensionField {},
    FCIBillingChargingCharacteristics {},
    GapCriteria {},
    GapIndicators,
    GapTreatment,
    GenericNumbers {},
    HighLayerCompatibility,
    InvokeID,
    IPRoutingAddress {},
    IPSSPCapabilities {},
    leg1,
    LocationNumber {},
    MonitorMode,
    NAOliInfo,
    OCSIApplicable,
    OriginalCalledPartyID {},
    ReceivingSideID,
    RedirectingPartyID {},
    RedirectionInformation,
    RequestedInformationList {},
    RequestedInformationTypeList ~~{}~~,
    ScfID {},
    SCIBillingChargingCharacteristics {},
    SendingSideID,
    ServiceInteractionIndicatorsTwo,
    TimeAndTimezone {},
    TimerID,
    TimerValue
FROM CAP-datatypes datatypes

    cancelFailed,
    eTCFailed,
    missingCustomerRecord,
    missingParameter,
    parameterOutOfRange,
    requestedInfoError,
    systemFailure,
    taskRefused,
    unexpectedComponentSequence,
    unexpectedDataValue,
    unexpectedParameter,
    unknownLegID
FROM CAP-errortypes errortypes

;

activityTest OPERATION ::= {
    RETURN RESULT TRUE
    CODE    opcode-activityTest
    }
-- Direction: gsmSCF -> gsmSSF, Timer: Tat
-- This operation is used to check for the continued existence of a relationship
-- between the gsmSCF and gsmSSF, assistSSF or gsmSRF. If the relationship is
-- still in existence, then the gsmSSF will respond. If no reply is received,
-- then the gsmSCF will assume that the gsmSSF, assistSSF or grmSRF has failed
-- in some way.

applyCharging {PARAMETERS-BOUND : bound} OPERATION ::= {
    ARGUMENT        ApplyChargingArg {bound}
    RETURN RESULT   FALSE
    ERRORS          {missingParameter |
                    unexpectedComponentSequence |
                    unexpectedParameter |
                    unexpectedDataValue |
                    parameterOutOfRange |
```

```
                    systemFailure |
                    taskRefused|
                    unknownLegID}
    CODE            opcode-applyCharging
    }
-- Direction: gsmSCF -> gsmSSF, Timer: Tac
-- This operation is used for interacting from the gsmSCF with the gsmSSF charging mechanisms.
-- The ApplyChargingReport operation provides the feedback from the gsmSSF to the gsmSCF.

ApplyChargingArg {PARAMETERS-BOUND : bound} ::= SEQUENCE {
    aChBillingChargingCharacteristics   [0] AChBillingChargingCharacteristics {bound},
    partyToCharge                       [2] SendingSideID   DEFAULT sendingSideID : leg1,
    extensions                          [3] Extensions~~SEQUENCE SIZE (1..bound.&numOfExtensions) OF
                                            ExtensionField~~ {bound}  OPTIONAL,
    ...
    }

-- The partyToCharge parameter indicates the party in the call to which the ApplyCharging operation
-- shall be applied.

applyChargingReport {PARAMETERS-BOUND : bound} OPERATION ::= {
    ARGUMENT        ApplyChargingReportArg {bound}
    RETURN RESULT   FALSE
    ERRORS          {missingParameter |
                    unexpectedComponentSequence |
                    unexpectedParameter |
                    unexpectedDataValue |
                    parameterOutOfRange |
                    systemFailure |
                    taskRefused}
    CODE            opcode-applyChargingReport
    }
-- Direction: gsmSSF -> gsmSCF, Timer: Tacr
-- This operation is used by the gsmSSF to report to the gsmSCF the occurrence of a
-- specific charging event as requested by the gsmSCF using the ApplyCharging operation.

ApplyChargingReportArg {PARAMETERS-BOUND : bound} ::= CallResult {bound}

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 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 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] Extensions ~~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.

callGap {PARAMETERS-BOUND : bound} OPERATION ::= {
    ARGUMENT        CallGapArg {bound}
    RETURN RESULT   FALSE
    ALWAYS RESPONDS FALSE
    CODE            opcode-callGap
    }
-- Direction: gsmSCF -> gsmSSF, Timer: Tcg
-- This operation is used to request the gsmSSF to reduce the rate at which specific service
-- requests are sent to the gsmSCF.

CallGapArg {PARAMETERS-BOUND : bound}::= SEQUENCE {
    gapCriteria     [0] GapCriteria {bound},
    gapIndicators   [1] GapIndicators,
    controlType     [2] ControlType                                     OPTIONAL,
    gapTreatment    [3] GapTreatment {bound}                            OPTIONAL,
    extensions      [4] Extensions ~~SEQUENCE SIZE(1..bound.&numOfExtensions) OF
                                            ExtensionField~~ {bound}    OPTIONAL,
    ...
    }
```

```
-- OPTIONAL denotes network operator optional. If gapTreatment is not present, the gsmSSF will
-- use a default treatment depending on network operator implementation.

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] Extensions 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] Extensions SEQUENCE SIZE(1..bound.&numOfExtensions) OF
                                        ExtensionField {bound}  OPTIONAL,
    legID                           [3] SendingSideID               OPTIONAL,
    ...
    }
-- OPTIONAL denotes network operator optional.

cancel {PARAMETERS-BOUND : bound} OPERATION ::= {
    ARGUMENT        CancelArg {bound}
    RETURN RESULT   FALSE
    ERRORS          {cancelFailed |
                     missingParameter |
                     taskRefused}
    CODE            opcode-cancel
    }
-- Direction: gsmSCF -> gsmSSF, or gsmSCF -> gsmSRF, Timer: Tcan
-- This operation cancels the correlated previous operation or all previous requests. The following
-- operations can be canceled: PlayAnnouncement, PromptAndCollectUserInformation.

CancelArg {PARAMETERS-BOUND : bound}::= CHOICE {
    invokeID            [0] InvokeID,
    allRequests         [1] NULL
    }
-- The InvokeID has the same value as that which was used for the operation to be cancelled.

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.

ConnectArg {PARAMETERS-BOUND : bound} ::= SEQUENCE {
    destinationRoutingAddress       [0] DestinationRoutingAddress {bound},
    alertingPattern                 [1] AlertingPattern                     OPTIONAL,
    originalCalledPartyID           [6] OriginalCalledPartyID {bound}       OPTIONAL,
    extensions                      [10] Extensions 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}
    CODE            opcode-connectToResource
    }
-- Direction: gsmSCF -> gsmSSF, Timer: Tctr
-- This operation is used to connect a call from the gsmSSF to 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] Extensions SEQUENCE SIZE(1..bound.&numOfExtensions) OF
                                                   ExtensionField {bound}       OPTIONAL,
    serviceInteractionIndicatorsTwo [7] ServiceInteractionIndicatorsTwo         OPTIONAL,
    ...
    }

continue OPERATION ::= {
    RETURN RESULT   FALSE
    ALWAYS RESPONDS FALSE
    CODE            opcode-continue
    }
-- Direction: gsmSCF -> gsmSSF, Timer: Tcue
-- This operation is used to request the gsmSSF to proceed with call processing at the
-- DP at which it previously suspended call processing to await gsmSCF instructions
-- (i.e. proceed to the next point in call in the BCSM). The gsmSSF continues call
-- processing without substituting new data from gsmSCF.

continueWithArgument {PARAMETERS-BOUND : bound} OPERATION ::= {
    ARGUMENT        ContinueWithArgumentArg {bound}
    RETURN RESULT   FALSE
    ERRORS          {missingParameter |
                     parameterOutOfRange |
                     unexpectedComponentSequence |
                     unexpectedDataValue |
                     unexpectedParameter}
    CODE            opcode-continueWithArgument
    }

-- Direction: gsmSCF -> gsmSSF, Timer: Tcwa
-- This operation is used to request the gsmSSF to proceed with call processing at the
-- DP at which it previously suspended call processing to await gsmSCF instructions
-- (i.e. proceed to the next point in call in the BCSM). The gsmSSF continues call
-- processing with the modified call setup information as received from the gsmSCF.

ContinueWithArgumentArg {PARAMETERS-BOUND : bound} ::= SEQUENCE {
    alertingPattern                 [1] AlertingPattern                         OPTIONAL,
    extensions                      [6] Extensions SEQUENCE SIZE(1..bound.&numOfExtensions) OF
                                                   ExtensionField {bound}       OPTIONAL,
    serviceInteractionIndicatorsTwo [7] ServiceInteractionIndicatorsTwo         OPTIONAL,
    callingPartysCategory           [12] CallingPartysCategory                  OPTIONAL,
    genericNumbers                  [16] GenericNumbers {bound}                 OPTIONAL,
    cug-Interlock                   [17] CUG-Interlock                          OPTIONAL,
    cug-OutgoingAccess              [18] NULL                                   OPTIONAL,
    chargeNumber                    [50] ChargeNumber {bound}                   OPTIONAL,
    carrier                         [52] Carrier {bound}                        OPTIONAL,
    suppressionOfAnnouncement       [55] SuppressionOfAnnouncement              OPTIONAL,
    naOliInfo                       [56] NAOliInfo                              OPTIONAL,
    ...
    }

disconnectForwardConnection OPERATION ::= {
    RETURN RESULT   FALSE
    ERRORS          {systemFailure |
                     taskRefused |
                     unexpectedComponentSequence}
```

```
    CODE            opcode-disconnectForwardConnection
    }
-- Direction: gsmSCF -> gsmSSF, Timer: Tdfc
-- This operation is used to disconnect a forward temporary connection or a connection to a
-- resource. Refer to clause 11 for a description of the procedures associated with this operation.

establishTemporaryConnection {PARAMETERS-BOUND : bound} OPERATION ::= {
    ARGUMENT        EstablishTemporaryConnectionArg {bound}
    RETURN RESULT   FALSE
    ERRORS          {eTCFailed |
                     missingParameter |
                     systemFailure |
                     taskRefused |
                     unexpectedComponentSequence |
                     unexpectedDataValue |
                     unexpectedParameter}
    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] Extensions 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,
    ...
    }

eventReportBCSM {PARAMETERS-BOUND : bound} OPERATION ::= {
    ARGUMENT        EventReportBCSMArg {bound}
    RETURN RESULT   FALSE
    ALWAYS RESPONDS FALSE
    CODE            opcode-eventReportBCSM
    }
-- Direction: gsmSSF -> gsmSCF, Timer: Terb
-- This operation is used to notify the gsmSCF of a call-related event (e.g. BCSM
-- events such as busy or no answer) previously requested by the gsmSCF in a
-- RequestReportBCSMEvent operation.

EventReportBCSMArg {PARAMETERS-BOUND : bound} ::= SEQUENCE {
    eventTypeBCSM                   [0] EventTypeBCSM,
    eventSpecificInformationBCSM    [2] EventSpecificInformationBCSM {bound}            OPTIONAL,
    legID                           [3] ReceivingSideID                                 OPTIONAL,
    miscCallInfo                    [4] MiscCallInfo                DEFAULT {messageType request},
    extensions                      [5] Extensions SEQUENCE SIZE(1..bound.&numOfExtensions) OF
                                                                        ExtensionField {bound}  OPTIONAL,
    ...
    }

furnishChargingInformation {PARAMETERS-BOUND : bound} OPERATION ::= {
    ARGUMENT        FurnishChargingInformationArg {bound}
    RETURN RESULT   FALSE
    ERRORS          {missingParameter |
                     taskRefused |
                     unexpectedComponentSequence |
                     unexpectedDataValue |
                     unexpectedParameter}
    CODE            opcode-furnishChargingInformation
    }
-- Direction: gsmSCF -> gsmSSF, Timer: Tfci
-- This operation is used to request the gsmSSF to generate, register a call record
-- or to include some information in the default call record.
-- The registered call record is intended for off line charging of the call.

FurnishChargingInformationArg {PARAMETERS-BOUND : bound} ::=
FCIBillingChargingCharacteristics{bound}

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

```
-- Direction: gsmSSF -> gsmSCF, Timer: Tidp
-- This operation is used after a TDP to indicate request for service.

InitialDPArg {PARAMETERS-BOUND : bound} ::= SEQUENCE {
    serviceKey                      [0] ServiceKey  ,
    calledPartyNumber               [2] CalledPartyNumber {bound}                OPTIONAL,
    callingPartyNumber              [3] CallingPartyNumber {bound}               OPTIONAL,
    callingPartysCategory           [5] CallingPartysCategory                    OPTIONAL,
    cGEncountered                   [7] CGEncountered                            OPTIONAL,
    iPSSPCapabilities               [8] IPSSPCapabilities {bound}                OPTIONAL,
    locationNumber                  [10] LocationNumber {bound}                  OPTIONAL,
    originalCalledPartyID           [12] OriginalCalledPartyID {bound}           OPTIONAL,
    extensions                      [15] Extensions SEQUENCE SIZE(1..bound.&numOfExtensions) OF
                                                 ExtensionField {bound}          OPTIONAL,
    highLayerCompatibility          [23] HighLayerCompatibility OPTIONAL,
    additionalCallingPartyNumber    [25] AdditionalCallingPartyNumber {bound}    OPTIONAL,
    bearerCapability                [27] BearerCapability {bound}                OPTIONAL,
    eventTypeBCSM                   [28] EventTypeBCSM                           OPTIONAL,
    redirectingPartyID              [29] RedirectingPartyID {bound}              OPTIONAL,
    redirectionInformation          [30] RedirectionInformation                  OPTIONAL,
    cause                           [17] Cause {bound}                           OPTIONAL,
    serviceInteractionIndicatorsTwo [32] ServiceInteractionIndicatorsTwo         OPTIONAL,
    carrier                         [37] Carrier {bound}                         OPTIONAL,
    cug-Index                       [45] CUG-Index                               OPTIONAL,
    cug-Interlock                   [46] CUG-Interlock                           OPTIONAL,
    cug-OutgoingAccess              [47] NULL                                    OPTIONAL,
    iMSI                            [50] IMSI                                    OPTIONAL,
    subscriberState                 [51] SubscriberState                         OPTIONAL,
    locationInformation             [52] LocationInformation                     OPTIONAL,
    ext-basicServiceCode            [53] Ext-BasicServiceCode                    OPTIONAL,
    callReferenceNumber             [54] CallReferenceNumber                     OPTIONAL,
    mscAddress                      [55] ISDN-AddressString                      OPTIONAL,
    calledPartyBCDNumber            [56] CalledPartyBCDNumber {bound}            OPTIONAL,
    timeAndTimezone                 [57] TimeAndTimezone {bound}                 OPTIONAL,
    gsm-ForwardingPending           [58] NULL                                    OPTIONAL,
    initialDPArgExtension           [59] InitialDPArgExtension                   OPTIONAL,
    ...
    }

InitialDPArgExtension               ::= SEQUENCE {
    gmscAddress                         [0] ISDN-AddressString                   OPTIONAL,
    ...
}
-- If iPSSPCapabilities is not present then this denotes that a colocated gsmSRF is not
-- supported by the gsmSSF. If present, then the gsmSSF supports a colocated gsmSRF capable
-- of playing announcements via elementaryMessageIDs and variableMessages, the playing of
-- tones and the collection of DTMF digits. Other supported capabilities are explicitly
-- detailed in the IPSSPCapabilities parameter itself.
-- Carrier is included at the discretion of the gsmSSF operator.

releaseCall {PARAMETERS-BOUND : bound} OPERATION ::= {
    ARGUMENT        ReleaseCallArg {bound}
    RETURN RESULT   FALSE
    ALWAYS RESPONDS FALSE
    CODE            opcode-releaseCall
    }
-- Direction: gsmSCF -> gsmSSF, Timer: Trc
-- This operation is used to tear down an existing call at any phase of the call for all parties
-- involved in the call.

ReleaseCallArg {PARAMETERS-BOUND : bound} ::= Cause {bound}
-- A default value of decimal 31 (normal unspecified) shall be given.

requestReportBCSMEvent {PARAMETERS-BOUND : bound} OPERATION ::= {
    ARGUMENT        RequestReportBCSMEventArg {bound}
    RETURN RESULT   FALSE
    ERRORS          {missingParameter |
                     parameterOutOfRange |
                     systemFailure |
                     taskRefused |
                     unexpectedComponentSequence |
                     unexpectedDataValue |
                     unexpectedParameter |
                     unknownLegID}
    CODE            opcode-requestReportBCSMEvent
    }
-- Direction: gsmSCF -> gsmSSF, Timer: Trrb
-- This operation is used to request the gsmSSF to monitor for a call-related event
-- (e.g. BCSM events such as busy or no answer), then send a notification back to the gsmSCF when
-- the event is detected.
-- NOTE:
--      Every EDP must be explicitly armed by the gsmSCF via a RequestReportBCSMEvent operation.
--      No implicit arming of EDPs at the gsmSSF after reception of any operation (different
--      from RequestReportBCSMEvent) from the gsmSCF is allowed.

RequestReportBCSMEventArg {PARAMETERS-BOUND : bound} ::= SEQUENCE {
    bcsmEvents  [0] SEQUENCE SIZE(1..bound.&numOfBCSMEvents) OF BCSMEvent {bound},
    extensions  [2] Extensions SEQUENCE SIZE(1..bound.&numOfExtensions) OF ExtensionField {bound}
    OPTIONAL,
    ...
```

```
    }
-- Indicates the BCSM related events for notification.

resetTimer {PARAMETERS-BOUND : bound} OPERATION ::= {
    ARGUMENT        ResetTimerArg {bound}
    RETURN RESULT   FALSE
    ERRORS          {missingParameter |
                     parameterOutOfRange |
                     taskRefused |
                     unexpectedComponentSequence |
                     unexpectedDataValue |
                     unexpectedParameter}
    CODE            opcode-resetTimer
    }
-- Direction: gsmSCF -> gsmSSF, Timer: Trt
-- This operation is used to request the gsmSSF to refresh an application timer in the gsmSSF.

ResetTimerArg {PARAMETERS-BOUND : bound} ::= SEQUENCE {
    timerID         [0] TimerID DEFAULT tssf,
    timervalue      [1] TimerValue,
    extensions      [2] Extensions SEQUENCE SIZE(1..bound.&numOfExtensions) OF
                                                        ExtensionField {bound}  OPTIONAL,
    ...
    }

sendChargingInformation {PARAMETERS-BOUND : bound} OPERATION ::= {
    ARGUMENT        SendChargingInformationArg {bound}
    RETURN RESULT   FALSE
    ERRORS          {missingParameter |
                     unexpectedComponentSequence |
                     unexpectedParameter |
                     parameterOutOfRange |
                     systemFailure |
                     taskRefused |
                     unexpectedDataValue |
                     unknownLegID}
    CODE            opcode-sendChargingInformation
    }
-- Direction: gsmSCF -> gsmSSF, Timer: Tsci
-- This operation is used to instruct the gsmSSF on the charging information to send by the gsmSSF.
-- The charging information can either be sent back by means of signalling or internal
-- if the gsmSSF is located in the local exchange. In the local exchange
-- this information may be used to update the charge meter or to create a standard call record.

SendChargingInformationArg {PARAMETERS-BOUND : bound}::= SEQUENCE {
    sCIBillingChargingCharacteristics   [0] SCIBillingChargingCharacteristics {bound},
    partyToCharge                       [1] SendingSideID,
    extensions                          [2] Extensions SEQUENCE SIZE(1..bound.&numOfExtensions) OF
                                                ExtensionField {bound}  OPTIONAL,
    ...
    }
END
```

The following value ranges apply for operation specific timers in CAP:

short:	1 s - 10 s
medium:	1 s - 60 s
long:	1 s - 30 minutes

Table 6-1 lists all operation timers and the value range for each timer. The definitive value for each operation timer may be network specific and has to be defined by the network operator.

Table 6-1: Timer value ranges

Operation Name	Timer	Value range
ActivityTest	T_{at}	short
ApplyCharging	T_{ac}	short
ApplyChargingReport	T_{acr}	short
AssistRequestInstructions	T_{ari}	short
CallInformationReport	T_{cirp}	short
CallInformationRequest	T_{cirq}	short
Cancel	T_{can}	short
CallGap	T_{cg}	short
Connect	T_{con}	short
ConnectToResource	T_{ctr}	short
Continue	T_{cue}	short
ContinueWithArgument	T_{cwa}	short
DisconnectForwardConnection	T_{dfc}	short
EstablishTemporaryConnection	T_{etc}	medium
EventReportBCSM	T_{erb}	short
FurnishChargingInformation	T_{fci}	short
InitialDP	T_{idp}	short
ReleaseCall	T_{rc}	short
RequestReportBCSMEvent	T_{rrb}	short
ResetTimer	T_{rt}	short
SendChargingInformation	T_{sci}	short

6.1.2 gsmSSF/gsmSCF packages, contracts and ACs

6.1.2.1 gsmSSF/gsmSCF ASN.1 module

```
CAP-gsmSSF-gsmSCF-pkgs-contracts-acs {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0)
umts-network(1) modules(3) cap-gsmSSF-gsmSCF-pkgs-contracts-acs(102) version3(2)}

DEFINITIONS ::= BEGIN

-- This module specifies the Operation Packages, Contracts, Application Contexts
-- and Abstract Syntaxes used for the gsmSSF – 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

    PARAMETERS-BOUND,
    cAPSpecificBoundSet
FROM CAP-classes classes

    CONTRACT,
    OPERATION-PACKAGE,
    OPERATION
FROM Remote-Operations-Information-Objects ros-InformationObjects

    TCMessage {}
FROM TCAPMessages tc-Messages

    APPLICATION-CONTEXT,
    dialogue-abstract-syntax
FROM TC-Notation-Extensions tc-NotationExtensions

    activityTest,
    applyCharging {},
    applyChargingReport {},
    assistRequestInstructions {},
    callGap {},
    callInformationReport {},
    callInformationRequest {},
    cancel {},
    connect {},
```

```
    connectToResource {},
    continue,
    continueWithArgument {},
    disconnectForwardConnection,
    establishTemporaryConnection {},
    eventReportBCSM {},
    furnishChargingInformation {},
    initialDP {},
    releaseCall {},
    requestReportBCSMEvent {},
    resetTimer {},
    sendChargingInformation {}
FROM CAP-gsmSSF-gsmSCF-ops-args gsmSSF-gsmSCF-Operations

    playAnnouncement {},
    promptAndCollectUserInformation {},
    specializedResourceReport
FROM CAP-gsmSCF-gsmSRF-ops-args gsmSCF-gsmSRF-Operations

    specializedResourceControlPackage {}
FROM CAP-gsmSCF-gsmSRF-pkgs-contracts-acs gsmSCF-gsmSRF-Protocol

    id-ac-CAP-gsmSSF-scfGenericAC,
    id-ac-CAP-gsmSSF-scfAssistHandoffAC,
    id-CAPSsfToScfGeneric,
    id-CAPAssistHandoffssfToScf,
    id-as-gsmSSF-scfGenericAS,
    id-as-assistHandoff-gsmSSF-scfAS,
    id-package-scfActivation,
    id-package-gsmSRF-scfActivationOfAssist,
    id-package-assistConnectionEstablishment,
    id-package-genericDisconnectResource,
    id-package-nonAssistedConnectionEstablishment,
    id-package-connect,
    id-package-callHandling,
    id-package-bcsmEventHandling,
    id-package-ssfCallProcessing,
    id-package-timer,
    id-package-billing,
    id-package-charging,
    id-package-trafficManagement,
    id-package-callReport,
    id-package-signallingControl,
    id-package-activityTest,
    id-package-cancel,
    classes,
    ros-InformationObjects,
    tc-Messages,
    tc-NotationExtensions,
    gsmSSF-gsmSCF-Operations,
    gsmSCF-gsmSRF-Operations,
    gsmSCF-gsmSRF-Protocol
FROM CAP-object-identifiers {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0)
umts-network(1) modules(3) cap-object-identifiers(100) version3(2)}

;

-- Application Contexts

capssf-scfGenericAC APPLICATION-CONTEXT ::= {
    CONTRACT                    capSsfToScfGeneric
    DIALOGUE MODE               structured
    ABSTRACT SYNTAXES           {dialogue-abstract-syntax |
                                gsmSSF-scfGenericAbstractSyntax}
    APPLICATION CONTEXT NAME    id-ac-CAP-gsmSSF-scfGenericAC}

capssf-scfAssistHandoffAC APPLICATION-CONTEXT ::=   {
    CONTRACT                    capAssistHandoffssfToScf
    DIALOGUE MODE               structured
    ABSTRACT SYNTAXES           {dialogue-abstract-syntax |
                                assistHandoff-gsmSSF-scfAbstractSyntax}
    APPLICATION CONTEXT NAME    id-ac-CAP-gsmSSF-scfAssistHandoffAC}


-- Contracts

capSsfToScfGeneric CONTRACT ::= {
-- dialogue initiated by gsmSSF with InitialDP Operation
    INITIATOR CONSUMER OF
            {scfActivationPackage {cAPSpecificBoundSet}}
    RESPONDER CONSUMER OF
            {activityTestPackage|
            assistConnectionEstablishmentPackage {cAPSpecificBoundSet} |
            bcsmEventHandlingPackage {cAPSpecificBoundSet} |
            billingPackage {cAPSpecificBoundSet} |
            callHandlingPackage {cAPSpecificBoundSet} |
            callReportPackage {cAPSpecificBoundSet} |
            cancelPackage {cAPSpecificBoundSet} |
            chargingPackage {cAPSpecificBoundSet} |
            connectPackage {cAPSpecificBoundSet} |
```

```
            genericDisconnectResourcePackage {cAPSpecificBoundSet} |
            nonAssistedConnectionEstablishmentPackage {cAPSpecificBoundSet} |
            signallingControlPackage {cAPSpecificBoundSet} |
            specializedResourceControlPackage {cAPSpecificBoundSet} |
            ssfCallProcessingPackage {cAPSpecificBoundSet} |
            timerPackage {cAPSpecificBoundSet} |
            trafficManagementPackage {cAPSpecificBoundSet}}
    ID      id-CAPSsfToScfGeneric
    }

capAssistHandoffssfToScf CONTRACT ::= {
-- dialogue initiated by gsmSSF with AssistRequestInstructions
    INITIATOR CONSUMER OF
            {gsmSRF-scfActivationOfAssistPackage {cAPSpecificBoundSet}}
    RESPONDER CONSUMER OF
            {activityTestPackage|
            callHandlingPackage {cAPSpecificBoundSet} |
            cancelPackage {cAPSpecificBoundSet} |
            genericDisconnectResourcePackage {cAPSpecificBoundSet} |
            nonAssistedConnectionEstablishmentPackage {cAPSpecificBoundSet} |
            specializedResourceControlPackage {cAPSpecificBoundSet} |
            timerPackage {cAPSpecificBoundSet}}
    ID      id-CAPAssistHandoffssfToScf
    }


-- Operation Packages

scfActivationPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {initialDP {bound}}
    ID      id-package-scfActivation}
gsmSRF-scfActivationOfAssistPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {assistRequestInstructions {bound}}
    ID      id-package-gsmSRF-scfActivationOfAssist}
assistConnectionEstablishmentPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {establishTemporaryConnection {bound}}
    ID      id-package-assistConnectionEstablishment}
genericDisconnectResourcePackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {disconnectForwardConnection}
    ID      id-package-genericDisconnectResource}
nonAssistedConnectionEstablishmentPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {connectToResource {bound}}
    ID      id-package-nonAssistedConnectionEstablishment}
connectPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {connect {bound}}
    ID      id-package-connect}
callHandlingPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {releaseCall {bound}}
    ID      id-package-callHandling}
bcsmEventHandlingPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {requestReportBCSMEvent {bound}}
    SUPPLIER INVOKES    {eventReportBCSM {bound}}
    ID      id-package-bcsmEventHandling}
ssfCallProcessingPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {continueWithArgument {bound} | continue}
    ID      id-package-ssfCallProcessing}
timerPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {resetTimer {bound}}
    ID      id-package-timer}
billingPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {furnishChargingInformation {bound}}
    ID      id-package-billing}
chargingPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {applyCharging {bound}}
    SUPPLIER INVOKES    {applyChargingReport {bound}}
    ID      id-package-charging}
trafficManagementPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES {callGap {bound}}
    ID id-package-trafficManagement}
callReportPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {callInformationRequest {bound}}
    SUPPLIER INVOKES    {callInformationReport {bound}}
    ID      id-package-callReport}
signallingControlPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {sendChargingInformation {bound}}
    ID      id-package-signallingControl}
activityTestPackage OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {activityTest}
    ID      id-package-activityTest}
        cancelPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {cancel {bound}}
    ID      id-package-cancel}



-- Abstract Syntaxes

gsmSSF-scfGenericAbstractSyntax ABSTRACT-SYNTAX ::= {
    GenericSSF-gsmSCF-PDUs
    IDENTIFIED BY   id-as-gsmSSF-scfGenericAS}
GenericSSF-gsmSCF-PDUs ::= TCMessage {{SsfToScfGenericInvokable},
```

```
                {SsfToScfGenericReturnable}}
| SsfToScfGenericInvokable OPERATION ::= {
                activityTest |
                applyCharging {cAPSpecificBoundSet} |
                applyChargingReport {cAPSpecificBoundSet} |
                callInformationReport {cAPSpecificBoundSet} |
                callInformationRequest {cAPSpecificBoundSet} |
|               cancel {cAPSpecificBoundSet} |
                connect {cAPSpecificBoundSet} |
                continueWithArgument {cAPSpecificBoundSet} |
                connectToResource {cAPSpecificBoundSet} |
                disconnectForwardConnection |
                establishTemporaryConnection {cAPSpecificBoundSet} |
                eventReportBCSM {cAPSpecificBoundSet} |
                furnishChargingInformation {cAPSpecificBoundSet} |
                initialDP {cAPSpecificBoundSet} |
                releaseCall {cAPSpecificBoundSet} |
                requestReportBCSMEvent {cAPSpecificBoundSet} |
                resetTimer {cAPSpecificBoundSet} |
                sendChargingInformation {cAPSpecificBoundSet} |
                playAnnouncement {cAPSpecificBoundSet} |
                promptAndCollectUserInformation {cAPSpecificBoundSet} |
                specializedResourceReport
                }
| SsfToScfGenericReturnable OPERATION ::= {
                activityTest |
                applyCharging {cAPSpecificBoundSet} |
                applyChargingReport {cAPSpecificBoundSet} |
                callGap {cAPSpecificBoundSet} |
                callInformationRequest {cAPSpecificBoundSet} |
|               cancel {cAPSpecificBoundSet} |
                connect {cAPSpecificBoundSet} |
                connectToResource {cAPSpecificBoundSet} |
                continue |
                continueWithArgument {cAPSpecificBoundSet} |
                disconnectForwardConnection |
                establishTemporaryConnection {cAPSpecificBoundSet}|
                furnishChargingInformation {cAPSpecificBoundSet}|
                initialDP {cAPSpecificBoundSet}|
                releaseCall {cAPSpecificBoundSet}|
                requestReportBCSMEvent {cAPSpecificBoundSet}|
                resetTimer {cAPSpecificBoundSet}|
                sendChargingInformation {cAPSpecificBoundSet}|
                playAnnouncement {cAPSpecificBoundSet}|
                promptAndCollectUserInformation {cAPSpecificBoundSet}
                }

  assistHandoff-gsmSSF-scfAbstractSyntax ABSTRACT-SYNTAX ::= {
      AssistHandoffsSF-gsmSCF-PDUs
      IDENTIFIED BY   id-as-assistHandoff-gsmSSF-scfAS}
  AssistHandoffsSF-gsmSCF-PDUs ::= TCMessage {{AssistHandoffssfToScfInvokable},
                {AssistHandoffssfToScfReturnable}}
  AssistHandoffssfToScfInvokable OPERATION ::= {
                activityTest |
                assistRequestInstructions {cAPSpecificBoundSet}|
|               cancel {cAPSpecificBoundSet}|
                connectToResource {cAPSpecificBoundSet}|
                disconnectForwardConnection |
                playAnnouncement {cAPSpecificBoundSet}|
                promptAndCollectUserInformation {cAPSpecificBoundSet}|
                resetTimer {cAPSpecificBoundSet}|
                specializedResourceReport
                }
  AssistHandoffssfToScfReturnable OPERATION ::= {
                activityTest |
                assistRequestInstructions {cAPSpecificBoundSet}|
|               cancel {cAPSpecificBoundSet}|
                connectToResource {cAPSpecificBoundSet}|
                disconnectForwardConnection |
                playAnnouncement {cAPSpecificBoundSet}|
                promptAndCollectUserInformation {cAPSpecificBoundSet}|
                resetTimer {cAPSpecificBoundSet}
                }

  END
```

6.2 gsmSCF/gsmSRF interface

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 {},
    Extensions~~ExtensionField~~ {},
    InformationToSend {}
FROM CAP-datatypes datatypes

    canceled,
    improperCallerResponse,
    missingParameter,
    parameterOutOfRange,
    systemFailure,
    taskRefused,
    unavailableResource,
    unexpectedComponentSequence,
    unexpectedDataValue,
    unexpectedParameter
FROM CAP-errortypes errortypes

    PARAMETERS-BOUND
FROM CAP-classes classes

    ros-InformationObjects,
    operationcodes,
    datatypes,
    errortypes,
    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)}

;

playAnnouncement {PARAMETERS-BOUND : bound} OPERATION ::= {
    ARGUMENT        PlayAnnouncementArg {bound}
    RETURN RESULT   FALSE
    ERRORS          {canceled |
                     missingParameter |
                     parameterOutOfRange |
                     systemFailure |
                     taskRefused |
                     unexpectedComponentSequence |
                     unexpectedDataValue |
                     unexpectedParameter |
                     unavailableResource}
    LINKED          {specializedResourceReport}
    CODE            opcode-playAnnouncement
    }
-- Direction: gsmSCF -> gsmSRF, Timer: Tpa
-- This operation is to be used after Establish Temporary Connection (assist procedure
-- with a second gsmSSF) or a Connect to Resource (no assist) operation. It may be used
-- for inband interaction with a mobile station, or for interaction with an ISDN user.
-- In the former case, the gsmSRF is usually collocated with the gsmSSF for standard
-- tones (congestion tone...) or standard announcements.
-- In the latter case, the gsmSRF is always collocated with the gsmSSF in the switch.
-- Any error is returned to the gsmSCF. The timer associated with this operation must
-- be of a sufficient duration to allow its linked operation to be correctly correlated.

PlayAnnouncementArg {PARAMETERS-BOUND : bound}::= SEQUENCE {
    informationToSend           [0] InformationToSend {bound},
    disconnectFromIPForbidden   [1] BOOLEAN DEFAULT TRUE,
    requestAnnouncementComplete [2] BOOLEAN DEFAULT TRUE,
    extensions                  [3] Extensions ~~SEQUENCE SIZE(1..bound.&numOfExtensions) OF
                                    ExtensionField~~ {bound}  OPTIONAL,
    ...
    }

promptAndCollectUserInformation {PARAMETERS-BOUND : bound} OPERATION ::= {
    ARGUMENT        PromptAndCollectUserInformationArg {bound}
    RESULT          ReceivedInformationArg {bound}
```

```
    ERRORS          {canceled |
                    improperCallerResponse |
                    missingParameter |
                    parameterOutOfRange |
                    systemFailure |
                    taskRefused |
                    unexpectedComponentSequence |
                    unavailableResource |
                    unexpectedDataValue |
                    unexpectedParameter
                    }
    CODE            opcode-promptAndCollectUserInformation
    }
-- Direction: gsmSCF -> gsmSRF, Timer: Tpc
-- This operation is used to interact with a user to collect information.

PromptAndCollectUserInformationArg {PARAMETERS-BOUND : bound}::= SEQUENCE {
    collectedInfo               [0] CollectedInfo,
    disconnectFromIPForbidden   [1] BOOLEAN DEFAULT TRUE,
    informationToSend           [2] InformationToSend {bound}       OPTIONAL,
    extensions                  [3] Extensions SEQUENCE SIZE(1..bound.&numOfExtensions) OF
                                    ExtensionField {bound}      OPTIONAL,
    ...
    }

ReceivedInformationArg {PARAMETERS-BOUND : bound}::= CHOICE {
    digitsResponse              [0] Digits {bound}
    }

specializedResourceReport OPERATION ::= {
    ARGUMENT        SpecializedResourceReportArg
    RETURN RESULT   FALSE
    ALWAYS RESPONDS FALSE
    CODE            opcode-specializedResourceReport
    }
-- Direction: gsmSRF -> gsmSCF, Timer: Tsrr
-- This operation is used as the response to a PlayAnnouncement operation when the announcement
-- completed report indication is set.

SpecializedResourceReportArg ::= NULL

END
```

The following value ranges apply for operation specific timers in CAP:

short:	1 s - 10 s
medium:	1 s - 60 s
long:	1 s - 30 minutes

Table 6-2 lists all operation timers and the value range for each timer. The definitive value for each operation timer may be network specific and has to be defined by the network operator.

Table 6-2: Operation timers and their value range

Operation Name	Timer	Value range
PlayAnnouncement	T_{pa}	long
PromptAndCollectUserInformation	T_{pc}	long
SpecializedResourceReport	T_{srr}	short

6.2.2 gsmSRF/gsmSCF contracts, packages and ACs

6.2.2.1 gsmSRF/gsmSCF ASN.1 modules

```
CAP-gsmSCF-gsmSRF-pkgs-contracts-acs {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0)
umts-network(1) modules(3) cap-gsmSCF-gsmSRF-pkgs-contracts-acs(104) version3(2)}

DEFINITIONS ::= BEGIN

-- This module specifies the Operation Packages, Contracts, Application Contexts
-- and Abstract Syntaxes 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

    PARAMETERS-BOUND,
```

```
    cAPSpecificBoundSet
FROM CAP-classes classes

    CONTRACT,
    OPERATION-PACKAGE,
    OPERATION
FROM Remote-Operations-Information-Objects ros-InformationObjects

    TCMessage {}
FROM TCAPMessages tc-Messages

    APPLICATION-CONTEXT,
    dialogue-abstract-syntax
FROM TC-Notation-Extensions tc-NotationExtensions

    playAnnouncement {},
    promptAndCollectUserInformation {},
    specializedResourceReport
FROM CAP-gsmSCF-gsmSRF-ops-args gsmSCF-gsmSRF-Operations

    activityTest,
    cancel {},
    assistRequestInstructions {}
FROM CAP-gsmSSF-gsmSCF-ops-args gsmSSF-gsmSCF-Operations

    gsmSRF-scfActivationOfAssistPackage {}
FROM CAP-gsmSSF-gsmSCF-pkgs-contracts-acs gsmSSF-gsmSCF-Protocol

    id-package-specializedResourceControl,
    id-package-activityTest,
    id-ac-gsmSRF-gsmSCF,
    id-contract-gsmSRF-gsmSCF,
    id-package-gsmSRF-scfCancel,
    id-as-basic-gsmSRF-gsmSCF,
    classes,
    ros-InformationObjects,
    tc-Messages,
    tc-NotationExtensions,
    gsmSCF-gsmSRF-Operations,
    gsmSSF-gsmSCF-Operations,
    gsmSSF-gsmSCF-Protocol
FROM CAP-object-identifiers {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0)
umts-network(1) modules(3) cap-object-identifiers(100) version3(2)}

;

-- Application Contexts

gsmSRF-gsmSCF-ac APPLICATION-CONTEXT ::= {
    CONTRACT                    gsmSRF-gsmSCF-contract
    DIALOGUE MODE               structured
    TERMINATION                 basic
    ABSTRACT SYNTAXES           {dialogue-abstract-syntax |
                                gsmSRF-gsmSCF-abstract-syntax}
    APPLICATION CONTEXT NAME    id-ac-gsmSRF-gsmSCF}

-- Contracts

gsmSRF-gsmSCF-contract CONTRACT ::= {
    INITIATOR CONSUMER OF
            {gsmSRF-scfActivationOfAssistPackage {cAPSpecificBoundSet}}
    RESPONDER CONSUMER OF
            {specializedResourceControlPackage {cAPSpecificBoundSet}|
            activityTestPackage {cAPSpecificBoundSet}|
            gsmSRF-scfCancelPackage {cAPSpecificBoundSet}}
    ID      id-contract-gsmSRF-gsmSCF}

-- Operation Packages

specializedResourceControlPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {playAnnouncement {bound} |
                        promptAndCollectUserInformation {bound}
    }
    SUPPLIER INVOKES    {specializedResourceReport}
    ID                  id-package-specializedResourceControl}

gsmSRF-scfActivationOfAssistPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {assistRequestInstructions {bound}}
    ID      id-package-gsmSRF-scfActivationOfAssist}


gsmSRF-scfCancelPackage {PARAMETERS-BOUND : bound}  OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {cancel {bound}}
    ID                  id-package-gsmSRF-scfCancel}

activityTestPackage {PARAMETERS-BOUND : bound}  OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {activityTest}
    ID                  id-package-activityTest}

-- Abstract Syntaxes
```

```
gsmSRF-gsmSCF-abstract-syntax ABSTRACT-SYNTAX ::= {
    BASIC-gsmSRF-gsmSCF-PDUs
    IDENTIFIED BY   id-as-basic-gsmSRF-gsmSCF}

BASIC-gsmSRF-gsmSCF-PDUs ::= TCMessage {{GsmSRFgsmSCFInvokable},{GsmSRFgsmSCFReturnable}}

GsmSRFgsmSCFInvokable OPERATION ::= {
        activityTest |
        assistRequestInstructions {cAPSpecificBoundSet}|
        cancel {cAPSpecificBoundSet}|
        playAnnouncement {cAPSpecificBoundSet}|
        promptAndCollectUserInformation {cAPSpecificBoundSet}|
        specializedResourceReport
        }

GsmSRFgsmSCFReturnable OPERATION ::= {
        activityTest |
        assistRequestInstructions {cAPSpecificBoundSet}|
        cancel {cAPSpecificBoundSet}|
        playAnnouncement {cAPSpecificBoundSet}|
        promptAndCollectUserInformation {cAPSpecificBoundSet}
        }

END
```

*** Next Modified Section ***

7 MO SMS Control

This clause defines the operations, arguments, packages and appliaction contexts used for CSE control of MO SMS over the gsmSCF – gprsSSF and gsmSCF – gsmSSF interfaces.

7.1 SMS operations and arguments

```
CAP-SMS-ops-args {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0) umts-network(1)
modules(3) cap-SMS-ops-args(105) version3(2)}

DEFINITIONS IMPLICIT TAGS::= BEGIN

-- This module contains the operations and operation arguments used for the
-- gsmSSF/gprsSSF – gsmSCF interface, for the control of MO-SMS.

-- 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,
    tc-Messages
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)
csS2(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)}

    LocationInformation
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-connectSMS,
    opcode-continueSMS,
    opcode-eventReportSMS,
    opcode-furnishChargingInformationSMS,
    opcode-initialDPSMS,
    opcode-releaseSMS,
    opcode-requestReportSMSEvent,
    opcode-resetTimerSMS
FROM CAP-operationcodes operationcodes

    CalledPartyBCDNumber {},
    EventSpecificInformationSMS,
    EventTypeSMS,
    ExtensionsExtensionField {},
    FCISMSBillingChargingCharacteristics,
    LocationInformationGPRS,
    RPCause,
    SMSEvent,
    TimeAndTimezone {},
    TimerID,
    TimerValue,
    TPDataCodingScheme,
    TPProtocolIdentifier,
    TPShortMessageSubmissionInfo,
    TPValidityPeriod
FROM CAP-datatypes datatypes
```

```
    missingCustomerRecord,
    missingParameter,
    parameterOutOfRange,
    systemFailure,
    taskRefused,
    unexpectedComponentSequence,
    unexpectedDataValue,
    unexpectedParameter
FROM CAP-errortypes errortypes

;

connectSMS {PARAMETERS-BOUND : bound} OPERATION ::= {
    ARGUMENT        ConnectSMSArg {bound}
    RETURN RESULT   FALSE
    ERRORS          {missingParameter |
                     parameterOutOfRange |
                     systemFailure |
                     taskRefused |
                     unexpectedComponentSequence |
                     unexpectedDataValue |
                     unexpectedParameter}
    CODE            opcode-connectSMS
    }
--  Direction: gsmSCF -> gsmSSF or gprsSSF, Timer: Tconsms
--  This operation is used to request the gsmSSF/gprsSSF to perform the SMS processing
--  actions to route
--  or forward a short message to a specified destination.

ConnectSMSArg {PARAMETERS-BOUND : bound} ::= SEQUENCE {
    callingPartysNumber                 [0] ISDN-AddressString                  OPTIONAL,
    destinationSubscriberNumber         [1] CalledPartyBCDNumber {bound}        OPTIONAL,
    sMSCAddress                         [2] ISDN-AddressString                  OPTIONAL,
    extensions                          [10] Extensions SEQUENCE SIZE(1..bound.&numOfExtensions) OF
                                                ExtensionField {bound}      OPTIONAL,
    ...
    }

continueSMS OPERATION ::= {
    RETURN RESULT   FALSE
    ALWAYS RESPONDS FALSE
    CODE            opcode-continueSMS
    }
-- Direction: gsmSCF -> gsmSSF/gprsSMS, Timer: Tcuesms
-- This operation is used to request the gsmSSF/gprsSSF to proceed with
-- Short Message processing at the DP at which it previously suspended
-- Short Message processing to await gsmSCF instructions (i.e. proceed
-- to the next Point in Association in the SMS FSM). The gsmSSF/gprsSSF
-- continues SMS processing without substituting new data from gsmSCF.

eventReportSMS {PARAMETERS-BOUND : bound} OPERATION ::= {
    ARGUMENT        EventReportSMSArg {bound}
    RETURN RESULT   FALSE
    ALWAYS RESPONDS FALSE
    CODE            opcode-eventReportSMS
    }
--  Direction: gsmSSF or gprsSSF -> gsmSCF, Timer: Terbsms
--  This operation is used to notify the gsmSCF of a SM related event (e.g., FSM events such
--  as submission or failure) previously requested by the gsmSCF in a RequestReportSMSEvent
--  operation.

EventReportSMSArg {PARAMETERS-BOUND : bound} ::= SEQUENCE {
    eventTypeSMS                    [0] EventTypeSMS,
    eventSpecificInformationSMS     [1] EventSpecificInformationSMS         OPTIONAL,
    miscCallInfo                    [2] MiscCallInfo    DEFAULT {messageType request },
    extensions                      [10] Extensions SEQUENCE SIZE(1..bound.&numOfExtensions) OF
                                                ExtensionField {bound}      OPTIONAL,
    ...
    }

furnishChargingInformationSMS {PARAMETERS-BOUND : bound}        OPERATION ::= {
    ARGUMENT        FurnishChargingInformationSMSArg {bound}
    RETURN RESULT   FALSE
    ERRORS          {missingParameter |
                     taskRefused |
                     unexpectedComponentSequence |
                     unexpectedDataValue |
                     unexpectedParameter}
    CODE            opcode-furnishChargingInformationSMS
    }
--  Direction: gsmSCF -> gsmSSF or gprsSSF, Timer: Tfcisms
--  This operation is used to request the gsmSSF/gprsSSF to generate, register a charging record
--  or to include some information in the default SM record. The registered charging record is
--  intended for off line charging of the SM.

FurnishChargingInformationSMSArg {PARAMETERS-BOUND : bound}        ::=
   FCISMSBillingChargingCharacteristics {bound}

initialDPSMS {PARAMETERS-BOUND : bound} OPERATION ::= {
```

```
    ARGUMENT        InitialDPSMSArg {bound}
    RETURN RESULT   FALSE
    ERRORS          {missingCustomerRecord |
                    missingParameter |
                    parameterOutOfRange |
                    systemFailure |
                    taskRefused |
                    unexpectedComponentSequence |
                    unexpectedDataValue |
                    unexpectedParameter}
    CODE            opcode-initialDPSMS
    }
--  Direction: gsmSSF or gprsSSF -> gsmSCF, Timer: Tidpsms
--  This operation is used after a TDP to indicate request for service.

InitialDPSMSArg {PARAMETERS-BOUND : bound} ::= SEQUENCE {
    serviceKey                          [0] ServiceKey,
    destinationSubscriberNumber         [1] CalledPartyBCDNumber {bound}        OPTIONAL,
    callingPartyNumber                  [2] ISDN-AddressString                  OPTIONAL,
    eventTypeSMS                        [3] EventTypeSMS                        OPTIONAL,
    iMSI                                [4] IMSI                                OPTIONAL,
    locationInformationMSC              [5] LocationInformation                 OPTIONAL,
    locationInformationGPRS             [6] LocationInformationGPRS             OPTIONAL,
    sMSCAddress                         [7] ISDN-AddressString                  OPTIONAL,
    timeAndTimezone                     [8] TimeAndTimezone {bound}             OPTIONAL,
    tPShortMessageSubmissionInfo        [9] TPShortMessageSubmissionInfo        OPTIONAL,
    tPProtocolIdentifier                [10] TPProtocolIdentifier               OPTIONAL,
    tPDataCodingScheme                  [11] TPDataCodingScheme                 OPTIONAL,
    tPValidityPeriod                    [12] TPValidityPeriod                   OPTIONAL,
    extensions                          [13] Extensions SEQUENCE SIZE(1..bound.&numOfExtensions) OF
                                                ExtensionField {bound}          OPTIONAL,
    ...
    }

releaseSMS                      OPERATION ::= {
    ARGUMENT        ReleaseSMSArg
    RETURN RESULT   FALSE
    ALWAYS RESPONDS FALSE
    CODE            opcode-releaseSMS
    }
--  Direction: gsmSCF -> gsmSSF or gprsSSF, Timer: Trelsms
--  This operation is used to prevent an attempt to submit a short message.

ReleaseSMSArg                       ::= RPCause

requestReportSMSEvent {PARAMETERS-BOUND : bound} OPERATION ::= {
    ARGUMENT        RequestReportSMSEventArg {bound}
    RETURN RESULT   FALSE
    ERRORS          {missingParameter |
                    parameterOutOfRange |
                    systemFailure |
                    taskRefused |
                    unexpectedComponentSequence |
                    unexpectedDataValue |
                    unexpectedParameter}
    CODE            opcode-requestReportSMSEvent
    }
--  Direction: gsmSCF -> gsmSSF or gprsSSF, Timer: Trrbsms
--  This operation is used to request the gsmSSF or gprsSSF to monitor for a
--  SM related event (e.g., FSM events such as submission or failure), then
--  send a notification back to the gsmSCF when the event is detected.

RequestReportSMSEventArg {PARAMETERS-BOUND : bound} ::= SEQUENCE {
    sMSEvents                           [0] SEQUENCE SIZE (1..bound.&numOfSMSEvents)    OF SMSEvent,
    extensions                          [10] Extensions SEQUENCE SIZE (1..bound.&numOfExtensions)
    OF
                                                ExtensionField {bound}      OPTIONAL,
    ...
    }
--  Indicates the SM related events for notification.

resetTimerSMS {PARAMETERS-BOUND : bound} OPERATION ::= {
    ARGUMENT        ResetTimerSMSArg {bound}
    RETURN RESULT   FALSE
    ERRORS          {missingParameter |
                    parameterOutOfRange |
                    taskRefused |
                    unexpectedComponentSequence |
                    unexpectedDataValue |
                    unexpectedParameter}
    CODE            opcode-resetTimerSMS
    }
-- Direction: gsmSCF -> gsmSSF/gprsSSF, Timer: Trtsms
-- This operation is used to request the gsmSSF/gprsSSF to refresh an application
-- timer in the gsmSSF/gprsSSF.

ResetTimerSMSArg {PARAMETERS-BOUND : bound} ::= SEQUENCE {
    timerID         [0] TimerID DEFAULT tssf,
    timervalue      [1] TimerValue,
```

```
    extensions      [2] Extensions SEQUENCE SIZE(1..bound.&numOfExtensions) OF
                                                        ExtensionField {bound}  OPTIONAL,
    ...
    }

END
```

7.1.1 Operation timers

The following value ranges apply for operation specific timers in CAP:

short:	1 to 20 seconds;
medium:	1 to 60 seconds;
long:	1 second to 30 minutes

Table 7-1 lists all operation timers and the value range for each timer. The definitive value for each operation timer may be network specific and has to be defined by the network operator.

Table 7-1: Operation timers and their value range

Operation Name	Timer	Value range
ConnectSMS	T_{consms}	short
ContinueSMS	T_{cuesms}	short
EventReportSMS	T_{erbsms}	short
FurnishChargingInformationSMS	Tfcisms	short
InitialDPSMS	T_{idpsms}	short
ReleaseSMS	T_{relsms}	short
RequestReportSMSEvent	T_{rrbsms}	short
ResetTimerSMS	T_{rtsms}	short

7.2 SMS contracts, packages and ACs

7.2.1 SMS ASN.1 module

```
CAP-smsSSF-gsmSCF-pkgs-contracts-acs {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0)
umts-network(1) modules(3) cap-smsSSF-gsmSCF-pkgs-contracts-acs(106) version3(2)}

DEFINITIONS ::= BEGIN

-- This module specifies the Operation Packages, Contracts, Application Contexts
-- and Abstract Syntaxes used for the gsmSSF/gprsSSF – gsmSCF interface, for the
-- control of MO-SMS.

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

IMPORTS

    PARAMETERS-BOUND,
    cAPSpecificBoundSet
FROM CAP-classes classes

    CONTRACT,
    OPERATION-PACKAGE,
    OPERATION
FROM Remote-Operations-Information-Objects ros-InformationObjects

    TCMessage {}
FROM TCAPMessages tc-Messages

    APPLICATION-CONTEXT,
    dialogue-abstract-syntax
FROM TC-Notation-Extensions tc-NotationExtensions

    connectSMS{},
    continueSMS,
    eventReportSMS{},
    furnishChargingInformationSMS{},
    initialDPSMS{},
    releaseSMS,
    requestReportSMSEvent{},
    resetTimerSMS{}
FROM CAP-SMS-ops-args sms-Operations
```

```
    id-ac-cap3-sms-AC,
    id-cap3SmsSsfTogsmScf,
    id-package-smsActivation,
    id-package-smsConnect,
    id-package-smsContinue,
    id-package-smsRelease,
    id-package-smsEventHandling,
    id-package-smsBilling,
    id-package-smsTimer,
    sms-Operations,
    tc-NotationExtensions,
    tc-Messages,
    ros-InformationObjects,
    classes,
    id-as-sms-AS
FROM CAP-object-identifiers {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0)
umts-network(1) modules(3) cap-object-identifiers(100) version3(2)}

;

-- Application Contexts

cap3-sms-AC APPLICATION-CONTEXT ::= {
    CONTRACT                    cap3SMS
    DIALOGUE MODE               structured
    ABSTRACT SYNTAXES           {dialogue-abstract-syntax |
                                sms-AbstractSyntax}
    APPLICATION CONTEXT NAME    id-ac-cap3-sms-AC}


-- Contracts

cap3SMS CONTRACT ::= {
-- dialogue initiated by gprsSSF or gsmSSF with InitialDPSMS Operation
    INITIATOR CONSUMER OF
            {smsActivationPackage {cAPSpecificBoundSet}}
    RESPONDER CONSUMER OF
            {smsConnectPackage {cAPSpecificBoundSet} |
            smsReleasePackage {cAPSpecificBoundSet} |
            smsEventHandlingPackage {cAPSpecificBoundSet} |
            smsTimerPackage {cAPSpecificBoundSet} |
            smsBillingPackage {cAPSpecificBoundSet} |
            smsProcessingPackage {cAPSpecificBoundSet}}
    ID      id-cap3SmsSsfTogsmScf
    }


-- Operation Packages

smsActivationPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {initialDPSMS {bound}}
    ID      id-package-smsActivation}
smsConnectPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {connectSMS {bound}}
    ID      id-package-smsConnect}
smsProcessingPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {continueSMS}
    ID      id-package-smsContinue}
smsReleasePackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {releaseSMS}
    ID      id-package-smsRelease}
smsEventHandlingPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {requestReportSMSEvent {bound}}
    SUPPLIER INVOKES    {eventReportSMS {bound}}
    ID      id-package-smsEventHandling}
smsBillingPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {furnishChargingInformationSMS {bound}}
    ID      id-package-smsBilling}
smsTimerPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {resetTimerSMS {bound}}
    ID      id-package-smsTimer}


-- Abstract Syntaxes

sms-AbstractSyntax ABSTRACT-SYNTAX ::= {
    Generic-sms-PDUs
    IDENTIFIED BY   id-as-sms-AS}

Generic-sms-PDUs ::= TCMessage {{SmsInvokable}, {SmsReturnable}}

SmsInvokable OPERATION ::= {
    connectSMS {cAPSpecificBoundSet} |
    eventReportSMS {cAPSpecificBoundSet} |
    furnishChargingInformationSMS {cAPSpecificBoundSet} |
    initialDPSMS {cAPSpecificBoundSet} |
    requestReportSMSEvent {cAPSpecificBoundSet} |
    resetTimerSMS {cAPSpecificBoundSet}
    }
```

```
SmsReturnable OPERATION ::= {
    connectSMS {cAPSpecificBoundSet} |
    continueSMS |
    furnishChargingInformationSMS {cAPSpecificBoundSet}|
    initialDPSMS {cAPSpecificBoundSet}|
    releaseSMS {}|
    requestReportSMSEvent {cAPSpecificBoundSet}|
    resetTimerSMS {cAPSpecificBoundSet}
    }

END
```

****** Next Modified Section ******

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)
csS2(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

    AccessPointName {},
    GPRSCause {},
    ChargingCharacteristics,
    ChargingResult,
    ChargingRollOver,
    EndUserAddress{},
    ExtensionsExtensionField {},
    FCIGPRSBillingChargingCharacteristics,
    GPRSChargingID,
    GPRSEventSpecificInformation {},
    GPRSEvent,
    GPRSEventType,
    GPRSMSClass,
    LocationInformationGPRS,
    PDPID,
    PDPInitiationType,
```

```
    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,
    tariffSwitchInterval            [1] INTEGER (1..86400)              OPTIONAL,
    pDPID                           [2] PDPID                           OPTIONAL,
    ...
    }
-- tariffSwitchInterval 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,
    ...,
    chargingRollOver                [4] ChargingRollOver            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 when the GPRS Session is detached or a PDP Context is diconnected and
--  the associated event is not armed for reporting.
--  The usage of this operation is independent of the functional entity that initiates the Detach
--  or PDP Context Disconnection and is independent of the cause of the Detach or PDP Context
--  Disconnect.

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
--  RequestReportGPRSEvent operation.

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},
    gPRSMSClass                     [5] GPRSMSClass                     OPTIONAL,
    endUserAddress                  [6] EndUserAddress {bound}                  OPTIONAL,
    qualityOfService                [7] QualityOfService                OPTIONAL,
    accessPointName                 [8] AccessPointName{bound}          OPTIONAL,
    routeingAreaIdentity            [9] RAIdentity                      OPTIONAL,
    chargingID                      [10] GPRSChargingID                 OPTIONAL,
    sGSNCapabilities                [11] SGSNCapabilities               OPTIONAL,
    locationInformationGPRS         [12] LocationInformationGPRS        OPTIONAL,
    pDPInitiationType               [13] PDPInitiationType              OPTIONAL,
    extensions                      [14] ExtensionsSEQUENCE SIZE(1..bound.&numOfExtensions)     OF
                                         ExtensionField {bound}         OPTIONAL,
    ...,
    gGSNAddress                     [15] GSN-Address                    OPTIONAL,
    secondaryPDP-context            [16] NULL                           OPTIONAL
    }
--  The RouteingAreaIdentity parameter is not used.
--  The receiving entity shall ignore RouteingAreaIdentity if received.
--  The RouteingAreaIdentity is conveyed in the LocationInformationGPRS parameter.

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 activiation), 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 ,
    cCAP-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(1) cap-GPRS-ReferenceNumber(5) version3(2)}

cCAP-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
```

8.1.1 Operation timers

The following value ranges apply for operation specific timers in CAP:

short: 1 to 20 seconds;
medium: 1 to 60 seconds;
long: 1 second to 30 minutes

Table 8-1 lists all operation timers and the value range for each timer. The definitive value for each operation timer may be network specific and has to be defined by the network operator.

Table 8-1: Operation timers and their value range

Operation Name	Timer	Value range
ActivityTestGPRST	T_{atg}	short
ApplyChargingGPRS	T_{acg}	short
ApplyChargingReportGPRS	T_{acrg}	short
CancelGPRS	T_{cag}	short
ConnectGPRS	T_{cong}	short
ContinueGPRS	T_{cueg}	short
EntityReleasedGPRS	T_{erg}	short
EventReportGPRS	T_{ereg}	short
FurnishChargingInformationGPRS	T_{fcig}	short
InitialDPGPRS	T_{idpg}	short
ReleaseGPRS	T_{rg}	short
RequestReportGPRSEvent	T_{rrqe}	short
ResetTimerGPRS	T_{rtg}	short
SendChargingInformationGPRS	T_{scig}	short

8.2 gsmSCF/gprsSSF contracts, packages and ACs

8.2.1 gprsSSF/gsmSCF ASN.1 module

```
CAP-gprsSSF-gsmSCF-pkgs-contracts-acs {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0)
umts-network(1) modules(3) cap-gprsSSF-gsmSCF-pkgs-contracts-acs(108) version3(2)}

DEFINITIONS ::= BEGIN

-- This module specifies the Operation Packages, Contracts, Application Contexts
-- and Abstract Syntaxes 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

    PARAMETERS-BOUND,
    cAPSpecificBoundSet
FROM CAP-classes classes

    CONTRACT,
    OPERATION-PACKAGE,
    OPERATION
FROM Remote-Operations-Information-Objects ros-InformationObjects

    TCMessage {}
FROM TCAPMessages tc-Messages
```

```
    APPLICATION-CONTEXT,
    dialogue-abstract-syntax
FROM TC-Notation-Extensions tc-NotationExtensions

    activityTestGPRS {},
    applyChargingGPRS {},
    applyChargingReportGPRS {},
    cancelGPRS {},
    connectGPRS {},
    continueGPRS {},
    entityReleasedGPRS {},
    furnishChargingInformationGPRS {},
    initialDPGPRS {},
    releaseGPRS {},
    eventReportGPRS {},
    requestReportGPRSEvent {},
    resetTimerGPRS {},
    sendChargingInformationGPRS {}
FROM CAP-gprsSSF-gsmSCF-ops-args gprsSSF-gsmSCF-Operations

    id-ac-CAP-gprsSSF-gsmSCF-AC,
    id-ac-CAP-gsmSCF-gprsSSF-AC,
    id-cap3GprsSsfTogsmScf,
    id-cap3GsmScfToGprsSsf,
    id-as-gprsSSF-gsmSCF-AS,
    id-as-gsmSCF-gprsSSF-AS,
    id-package-gprsScfActivation,
    id-package-gprsConnect,
    id-package-gprsContinue,
    id-package-gprsRelease,
    id-package-gprsEventHandling,
    id-package-gprsExceptionInformation,
    id-package-gprsTimer,
    id-package-gprsBilling,
    id-package-gprsCharging,
    id-package-gprsChargeAdvice,
    id-package-gprsActivityTest,
    id-package-gprsCancel,
    classes,
    ros-InformationObjects,
    tc-Messages,
    tc-NotationExtensions,
    gprsSSF-gsmSCF-Operations
FROM CAP-object-identifiers {ccitt(0) identified-organization(4) etsi(0) mobileDomain(0)
umts-network(1) modules(3) cap-object-identifiers(100) version3(2)}

;


-- Application Contexts

cap3-gprssf-scfAC APPLICATION-CONTEXT ::= {
    CONTRACT                    cap3GprsSsfToScf
    DIALOGUE MODE               structured
    ABSTRACT SYNTAXES           {dialogue-abstract-syntax |
                                gprsSSF-fgsmSCFAbstractSyntax}
    APPLICATION CONTEXT NAME    id-ac-CAP-gprsSSF-gsmSCF-AC}

cap3-gsmscf-gprssfAC APPLICATION-CONTEXT ::= {
    CONTRACT                    cap3GsmScfToGprsSsf
    DIALOGUE MODE               structured
    ABSTRACT SYNTAXES           {dialogue-abstract-syntax |
                                gsmSCF-gprsSSFAbstractSyntax}
    APPLICATION CONTEXT NAME    id-ac-CAP-gsmSCF-gprsSSF-AC}


-- Contracts

cap3GprsSsfToScf CONTRACT ::= {
-- dialogue initiated by gprsSSF with InitialDPGPRS, ApplyChargingReportGPRS,
-- EntityReleaseGPRS and EventReportGPRS Operations
    INITIATOR CONSUMER OF
            {gprsSscfActivationPackage {cAPSpecificBoundSet} |
            gprsEventHandlingPackage {cAPSpecificBoundSet} |
            gprsChargingPackage {cAPSpecificBoundSet} |
            gprsExceptionInformationPackage {cAPSpecificBoundSet}}
    RESPONDER CONSUMER OF
            {gprsConnectPackage {cAPSpecificBoundSet} |
            gprsProcessingPackage {cAPSpecificBoundSet} |
            gprsReleasePackage {cAPSpecificBoundSet} |
            gprsEventHandlingPackage {cAPSpecificBoundSet} |
            gprsTimerPackage {cAPSpecificBoundSet} |
            gprsBillingPackage {cAPSpecificBoundSet} |
            gprsChargingPackage {cAPSpecificBoundSet} |
            gprsCancelPackage {cAPSpecificBoundSet} |
            gprsChargeAdvicePackage {cAPSpecificBoundSet}}
    ID      id-cap3GprsSsfTogsmScf
    }

cap3GsmScfToGprsSsf CONTRACT ::= {
```

```
-- dialogue initiated by gsmSCF with ApplyChargingGPRS, ActivityTestGPRS,
-- CancelGPRS, FurnishChargingInformationGPRS, ReleaseGPRS,
-- RequestReportGPRSEvent and SendChargingInformationGPRS Operations
    INITIATOR CONSUMER OF
            {gprsReleasePackage {cAPSpecificBoundSet} |
            gprsEventHandlingPackage {cAPSpecificBoundSet} |
            gprsBillingPackage {cAPSpecificBoundSet} |
            gprsChargingPackage {cAPSpecificBoundSet} |
            gprsActivityTestPackage {cAPSpecificBoundSet} |
            gprsCancelPackage {cAPSpecificBoundSet} |
            gprsChargeAdvicePackage {cAPSpecificBoundSet}}
    RESPONDER CONSUMER OF
            {}
    ID      id-cap3GsmScfToGprsSsf
    }


-- Operation Packages

gprsScfActivationPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    { initialDPGPRS {bound}}
    ID      id-package-gprsScfActivation}
gprsConnectPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {connectGPRS {bound}}
    ID      id-package-gprsConnect}
gprsProcessingPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {continueGPRS {bound}}
    ID      id-package-gprsContinue}
gGprsReleasePackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {releaseGPRS {bound}}
    ID      id-package-gprsRelease}
gprsEventHandlingPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {requestReportGPRSEvent {bound}}
    SUPPLIER INVOKES    {eventReportGPRS {bound}}
    ID      id-package-gprsEventHandling}
gprsExceptionInformationPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {entityReleasedGPRS {bound}}
    ID      id-package-gprsExceptionInformation}
gprsTimerPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {resetTimerGPRS {bound}}
    ID      id-package-gprsTimer}
gprsBillingPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {furnishChargingInformationGPRS {bound}}
    ID      id-package-gprsBilling}
gprsChargingPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {applyChargingGPRS {bound}}
    SUPPLIER INVOKES    {applyChargingReportGPRS {bound}}
    ID      id-package-gprsCharging}
gprsChargeAdvicePackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {sendChargingInformationGPRS {bound}}
    ID      id-package-gprsChargeAdvice}
gprsActivityTestPackage OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {activityTestGPRS {bound}}
    ID      id-package-gprsActivityTest}
gprsCancelPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {cancelGPRS {bound}}
    ID      id-package-gprsCancel}



-- Abstract Syntaxes

gprsSSF-gsmSCFAbstractSyntax ABSTRACT-SYNTAX ::= {
    GenericGprsSSF-gsmSCF-PDUs
    IDENTIFIED BY   id-as-gprsSSF-gsmSCF-AS}

GenericGprsSSF-gsmSCF-PDUs ::= TCMessage {{GprsSsfToGsmScfInvokable},
            {GprsSsfToGsmScfReturnable}}

GprsSsfToGsmScfGenericInvokable OPERATION ::= {
            activityTestGPRS {cAPSpecificBoundSet} |
            applyChargingGPRS {cAPSpecificBoundSet} |
            applyChargingReportGPRS {cAPSpecificBoundSet} |
            cancelGPRS {cAPSpecificBoundSet} |
            connectGPRS {cAPSpecificBoundSet} |
            entityReleasedGPRS {cAPSpecificBoundSet} |
            eventReportGPRS {cAPSpecificBoundSet} |
            furnishChargingInformationGPRS {cAPSpecificBoundSet} |
            initialDPGPRS {cAPSpecificBoundSet} |
            releaseGPRS {cAPSpecificBoundSet} |
            requestReportGPRSEvent {cAPSpecificBoundSet} |
            resetTimerGPRS {cAPSpecificBoundSet} |
            sendChargingInformationGPRS {cAPSpecificBoundSet}
            }

GprsSsfToGsmScfReturnable OPERATION ::= {
            activityTestGPRS {cAPSpecificBoundSet} |
            applyChargingGPRS {cAPSpecificBoundSet} |
            applyChargingReportGPRS {cAPSpecificBoundSet} |
            cancelGPRS {cAPSpecificBoundSet} |
            connectGPRS {cAPSpecificBoundSet} |
```

```
            continueGPRS {cAPSpecificBoundSet} |
            entityReleasedGPRS {cAPSpecificBoundSet} |
            furnishChargingInformationGPRS {cAPSpecificBoundSet}|
            initialDPGPRS {cAPSpecificBoundSet}|
            releaseGPRS {cAPSpecificBoundSet}|
            requestReportGPRSEvent {cAPSpecificBoundSet}|
            resetTimerGPRS {cAPSpecificBoundSet}|
            sendChargingInformationGPRS {cAPSpecificBoundSet}
            }

gsmSCF-gprsSSFGenericAbstractSyntax ABSTRACT-SYNTAX ::= {
    GenericGsmSCF-gprsSSF-PDUs
    IDENTIFIED BY   id-as-gsmSCF-gprsSSF-AS}

GenericGsmSCF-gprsSSF-PDUs ::= TCMessage {{GsmScfToGprsSsfInvokable}, {GsmScfToGprsSsfReturnable}}

GsmScfToGprsSsfInvokable OPERATION ::= {
            activityTestGPRS {cAPSpecificBoundSet} |
            applyChargingGPRS {cAPSpecificBoundSet}|
            cancelGPRS {cAPSpecificBoundSet}|
            furnishChargingInformationGPRS {cAPSpecificBoundSet}|
            releaseGPRS {cAPSpecificBoundSet}|
            requestReportGPRSEvent {cAPSpecificBoundSet}|
            sendChargingInformationGPRS {cAPSpecificBoundSet}
            }

GsmScfToGprsSsfReturnable OPERATION ::= {
            activityTestGPRS {cAPSpecificBoundSet} |
            applyChargingGPRS {cAPSpecificBoundSet}|
            cancelGPRS {cAPSpecificBoundSet}|
            furnishChargingInformationGPRS {cAPSpecificBoundSet}|
            releaseGPRS {cAPSpecificBoundSet}|
            requestReportGPRSEvent {cAPSpecificBoundSet}|
            sendChargingInformationGPRS {cAPSpecificBoundSet}
            }

END
```

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

3GPP TSG-CN2 Meeting #19
Dresden, Germany, 9 - 13 July 2001

Tdoc N2-010602
(revision of N2-010590)

CHANGE REQUEST

⌘ **29.078** **CR** **198** ⌘ rev **1** ⌘ Current version: **3.8.0** ⌘

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

Title:	⌘	Using gsmSCF address from GPRS-CSI for re-establishing TC dialogues
Source:	⌘	Ericsson, T-Mobil
Work item code:	⌘	CAMEL3
Date:	⌘	12 July 2001
Category:	⌘	F (essential correction)
Release:	⌘	R99

Use one 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)*

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

Reason for change: ⌘

Current situation

For GPRS CAMEL communication, the TC dialogue between the gprsSSF and the gsmSCF may be segmented for the duration of an active CAMEL relationship between the gsmSCF and a GPRS Session or a single PDP Context.

This principle is inplemented in CAP as from the early days of the development of CAMEL control of GPRS.

When the gprsSSF starts a new CAMEL relationship with the gsmSCF, it uses the gsmSCF address from GPRS-CSI. The gsmSCF then responds with its own address. That address shall be used for the continuation of the TC dialogue. According to current CAP specification, that address shall also be used for establishing new TC dialogues within the context of the ongoing CAMEL relationship.

To enable the gprsSSF to establish a new TC dialogue with the same gsmSCF that responded on the InitialDPGPRS CAP Operation, the CAP specification specifies that the gprsSSF shall memorise the gsmSCF Address returned by the gsmSCF when the CAMEL relationship was started.

Problem definitions

When a TC dialogue is closed within the context of an ongoing CAMEL relationship, the gsmSCF address of that SCP is no longer available in gprsSSF. The ITU-T Recommendation for TC and SCCP do not offer primitives to convey the gsmSCF address to the TC-User (ie. to CAP). Hence, CAP does not have this address available for establishing a new TC dialogue within an existing CAMEL relationship.

Proposed solution

The gprsSSF shall be allowed to use the gsmSCF address from GPRS-CSI for

	establishing a new TC dialogue within an existing CAMEL relationship. GPRS-CSI is always available in gprsSSF. With this proposed enhancement, the gprsSSF may use one of the following two mechanisms: (1) convey the gsmSCF address from SCCP or TC to the TC-User, by means of vendor specific implementation, and use that address for the establishment of new TC dialogues within an existing CAMEL relationship; (2) use the gsmSCF address from GPRS-CSI for the establishment new TC dialogues within an existing CAMEL relationship. It shall be a vendor's option to decide which mechanism shall be implemented in the gprsSSF.
Summary of change: ⌘	Specify that the gprsSSF may use the gsmSCF from GPRS-CSI for the establishment a new TC dialogue within an existing CAMEL relationship.
Consequences if not approved: ⌘	CAP can not be implemented with standard ITU-T Recommendations of TC and SCCP.

Clauses affected:	⌘	11.31, 12.1.7		
Other specs Affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	
Other comments:	⌘	The requirement on the gprsSSF to memorise the gsmSCF address is currently specified in section 11.31 ("InitialDPGPRS Procedure") and in section 12.1.7 ("gprsSSF-gsmSCF interface"). The present CR proposes that this requirement be specified in section 12.1.7 only. Rationale of that proposal is that the usage of the gsmSCF address is part of the CAP signalling details, which are specified in section 12. Hence, it ought not to be repeated in the Procedure handling section.		

— First modified section —

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.

- gPRSMSClass:
  This parameter contains the MS Station capabilites 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.

- endUserAddress:
  This parameter identifies the PDP type, PDP type organisation and the actual PDP address. 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 Ackonwledgement' 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].

- routeingAreaIdentity:
  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 3GPP TS 23.003.

- secondaryPDP-context
  This parameter indicates that the PDP context is requested as a secondary PDP context.

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 TC 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 TC services which are used for reporting operation errors are described in clause 12.

— Next modified section —

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 TC-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 ***TC***-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-ReferenceNumber in the TC message. This GPRS-ReferenceNumber 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 TC 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 TC message with an internal SCF Process.

The SCP shall include the GPRS-ReferenceNumber 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 TC 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 TC messages that open a new TC dialogue shall include the GPRS-ReferenceNumber 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 TC dialogue, transporting the GPRS-ReferenceNumber 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 TC 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 TC message, i.e. TC-BEGIN. It shall contain the GPRS-Reference as assigned by the SGSN in the originationReference. The gprsSSF may intiate the subsequent TC dialogues for this GPRS dialogue with the following operations:

- ApplyChargingReportGPRS
- EntityReleasedGPRS
- EventReportGPRS

~~The gprsSSF shall memorise the gsmSCF address used in the first response message to the InitialDPGPRS, and use it in the further TC dialogues. The gsmSCF shall memorise the gprsSSF address received along with the InitialDPGPRS, and use it in the further TC dialogues for the relationship between these processes.~~

For the establishment of a new TC dialogue within the context of the current GPRS dialogue, the gprsSSF may apply one of the following mechanisms:

(1) the gprsSSF shall memorise the gsmSCF address used in the first response message to the InitialDPGPRS and use it to open the new TC dialogue;

(2) the gprsSSF shall use the gsmSCF address from GPRS-CSI to open the new TC dialogue.

The gsmSCF shall memorise the gprsSSF address received along with the InitialDPGPRS and use it for the opening of new TC dialogues within the context of the current GPRS dialogue.

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

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

The CAP operation that opens a TC 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 TC dialogue this message shall contain also the previously received destinationReference. If an operation opens a GPRS dialogue then the TC message reply shall contain the originationReference as assigned by the sender, i.e. the gsmSCF.

The TC 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 TC 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 rersult;
- 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 TC dialogue is established, TC dialogue may be terminated by TC-END primitive with zero component(s) after all pending operations have been sent. When the gprsSSF sends the last EventReportGPRS, EntityReleasedGPRS or ApplyChargingReportGPRS, then after reception of the result or error, 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 TC dialogue is established, TC dialogue shall be terminated by a TC-END primitive with zero components.

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 TC 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 TC 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 TC dialogue shall be terminated by a TC-END primitive with zero components after 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 as specified in clause 5.7. 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 TC 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 TC 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 TC 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.
  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.

- - 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.

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

3GPP TSG-CN2 Meeting #19
Dresden, Germany, 9 - 13 July 2001

Tdoc N2-010615

CHANGE REQUEST

⌘	**29.078**	**CR**	**199**	⌘	rev		⌘	Current version:	**4.1.0**	⌘

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

Title:	⌘	Using gsmSCF address from GPRS-CSI for re-establishing TC dialogues
Source:	⌘	Ericsson, T-Mobil
Work item code:	⌘	CAMEL3
Date:	⌘	13 July 2001
Category:	⌘	A
Release:	⌘	Rel-4

Use one 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)*

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

Reason for change: ⌘

Current situation

For GPRS CAMEL communication, the TC dialogue between the gprsSSF and the gsmSCF may be segmented for the duration of an active CAMEL relationship between the gsmSCF and a GPRS Session or a single PDP Context.

This principle is inplemented in CAP as from the early days of the development of CAMEL control of GPRS.

When the gprsSSF starts a new CAMEL relationship with the gsmSCF, it uses the gsmSCF address from GPRS-CSI. The gsmSCF then responds with its own address. That address shall be used for the continuation of the TC dialogue. According to current CAP specification, that address shall also be used for establishing new TC dialogues within the context of the ongoing CAMEL relationship.

To enable the gprsSSF to establish a new TC dialogue with the same gsmSCF that responded on the InitialDPGPRS CAP Operation, the CAP specification specifies that the gprsSSF shall memorise the gsmSCF Address returned by the gsmSCF when the CAMEL relationship was started.

Problem definitions

When a TC dialogue is closed within the context of an ongoing CAMEL relationship, the gsmSCF address of that SCP is no longer available in gprsSSF. The ITU-T Recommendation for TC and SCCP do not offer primitives to convey the gsmSCF address to the TC-User (ie. to CAP). Hence, CAP does not have this address available for establishing a new TC dialogue within an existing CAMEL relationship.

Proposed solution

The gprsSSF shall be allowed to use the gsmSCF address from GPRS-CSI for

	establishing a new TC dialogue within an existing CAMEL relationship. GPRS-CSI is always available in gprsSSF. With this proposed enhancement, the gprsSSF may use one of the following two mechanisms: (1) convey the gsmSCF address from SCCP or TC to the TC-User, by means of vendor specific implementation, and use that address for the establishment of new TC dialogues within an existing CAMEL relationship; (2) use the gsmSCF address from GPRS-CSI for the establishment new TC dialogues within an existing CAMEL relationship. It shall be a vendor's option to decide which mechanism shall be implemented in the gprsSSF.
Summary of change: ⌘	Specify that the gprsSSF may use the gsmSCF from GPRS-CSI for the establishment a new TC dialogue within an existing CAMEL relationship.
Consequences if not approved: ⌘	CAP can not be implemented with standard ITU-T Recommendations of TC and SCCP.

Clauses affected:	⌘	11.31, 12.1.7		
Other specs Affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	
Other comments:	⌘	The requirement on the gprsSSF to memorise the gsmSCF address is currently specified in section 11.31 ("InitialDPGPRS Procedure") and in section 12.1.7 ("gprsSSF-gsmSCF interface"). The present CR proposes that this requirement be specified in section 12.1.7 only. Rationale of that proposal is that the usage of the gsmSCF address is part of the CAP signalling details, which are specified in section 12. Hence, it ought not to be repeated in the Procedure handling section.		

— First modified section —

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.

- gPRSMSClass:
  This parameter contains the MS Station capabilites 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.

- endUserAddress:
  This parameter identifies the PDP type, PDP type organisation and the actual PDP address. 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 Ackonwledgement' 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].

- routeingAreaIdentity:
  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 3GPP TS 23.003.

- secondaryPDP-context
  This parameter indicates that the PDP context is requested as a secondary PDP context.

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 TC 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 TC services which are used for reporting operation errors are described in clause 12.

— Next modified section —

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 TC-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 ***TC***-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-ReferenceNumber in the TC message. This GPRS-ReferenceNumber 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 TC 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 TC message with an internal SCF Process.

The SCP shall include the GPRS-ReferenceNumber 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 TC 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 TC messages that open a new TC dialogue shall include the GPRS-ReferenceNumber 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 TC dialogue, transporting the GPRS-ReferenceNumber 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 TC 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 TC message, i.e. TC-BEGIN. It shall contain the GPRS-Reference as assigned by the SGSN in the originationReference. The gprsSSF may intiate the subsequent TC dialogues for this GPRS dialogue with the following operations:

- ApplyChargingReportGPRS
- EntityReleasedGPRS
- EventReportGPRS

~~The gprsSSF shall memorise the gsmSCF address used in the first response message to the InitialDPGPRS, and use it in the further TC dialogues. The gsmSCF shall memorise the gprsSSF address received along with the InitialDPGPRS, and use it in the further TC dialogues for the relationship between these processes.~~

For the establishment of a new TC dialogue within the context of the current GPRS dialogue, the gprsSSF may apply one of the following mechanisms:

(1) the gprsSSF shall memorise the gsmSCF address used in the first response message to the InitialDPGPRS and use it to open the new TC dialogue;

(2) the gprsSSF shall use the gsmSCF address from GPRS-CSI to open the new TC dialogue.

The gsmSCF shall memorise the gprsSSF address received along with the InitialDPGPRS and use it for the opening of new TC dialogues within the context of the current GPRS dialogue.

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

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

The CAP operation that opens a TC 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 TC dialogue this message shall contain also the previously received destinationReference. If an operation opens a GPRS dialogue then the TC message reply shall contain the originationReference as assigned by the sender, i.e. the gsmSCF.

The TC 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 TC 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 rersult;
- 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 TC dialogue is established, TC dialogue may be terminated by TC-END primitive with zero component(s) after all pending operations have been sent. When the gprsSSF sends the last EventReportGPRS, EntityReleasedGPRS or ApplyChargingReportGPRS, then after reception of the result or error, 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 TC dialogue is established, TC dialogue shall be terminated by a TC-END primitive with zero components.

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 TC 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 TC 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 TC dialogue shall be terminated by a TC-END primitive with zero components after 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 as specified in clause 5.7. 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 TC 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 TC 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 TC 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.
  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.

- - 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.

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