SLOVENSKI STANDARD
SIST EN 302 039-2 V1.1.2:2005

01-januar-2005

±bhY¯][YbHbc˙ca fYÿˆYˉfˈBŁˈЁˉ Yħfħ]˙bUˉVcfˉna cÿbcgħ]˙]bhY¯][YbHbY[Uˉca fÿˆˉUˉfˈ7ˉG(ˉŁˈЁ 5˙d`]_UˉȲˉg_]˙dfcˈc_c`]bhY¯][YbHbY[Uˉca fÿˆˉUˉfħB5DˉŁˈЁˉGdYˉWˉ7_UˉȲˉUˉdfcˈc_cˉ`UˈЁˈ&" XY˙ˈJa Ygb]_ˈȲˉb_WˉȲˉUˉ_ca i ħUˉWˉˆYˉghˈcf]hYj !Ȳˉb_WˉȲˉUˉ_fa]ˉˆYbˉˆUˉghcf]hYj ˙fG7 : !GG:ˉŁ

Intelligent Network (IN); Intelligent Network Capability Set 4 (CS4); Intelligent Network Application Protocol (INAP); Protocol specification; Part 2: Service Switching Function - Switching Control Function (SSF-SCF) Interface

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Ta slovenski standard je istoveten z: EN 302 039-2 Version 1.1.2

ICS:

33.040.35	Telefonska omrežja	Telephone networks

SIST EN 302 039-2 V1.1.2:2005   **en**

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ETSI EN 302 039-2 V1.1.2 (2002-11)

European Standard (Telecommunications series)

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Intelligent Network Capability Set 4 (CS4);
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ETSI

Reference
DEN/SPAN-120065-2

Keywords
CS4, IN, INAP, protocol

ETSI

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Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

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Foreword

This European Standard (Telecommunications series) has been produced by ETSI Technical Committee Services and Protocols for Advanced Networks (SPAN).

The present document is part 2 of a multi-part deliverable covering Intelligent Network (IN); Intelligence Network Capability Set 4 (CS4); Intelligent Network Application Protocol (INAP); Protocol specification, as identified below:

Part 1:   "Common aspects";

Part 2:   "Service Switching Function - Switching Control Function (SSF-SCF) Interface".

The present document describes the enhancement for SSF-SCF interface.

The present document and EN 302 039-1 [1] define the Intelligent Network (IN) Application Protocol (INAP) for IN Capability Set-4 based and written as delta documents upon ETSI Core INAP CS-3 (EN 301 931-1 [2] and EN 301 931-2 [3]).

This set of documents define enhancements made on the SSF to SCF interface (the present document) as a subset of the ITU-T IN CS4 Recommendations Q.1248.1 [10], Q.1248.2 [11]. For the other interfaces, the ETSI Core INAP CS3 series of EN 301 931 [2] and [3] apply.

National transposition dates	
Date of adoption of this EN:	15 November 2002
Date of latest announcement of this EN (doa):	28 February 2003
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 August 2003
Date of withdrawal of any conflicting National Standard (dow):	31 August 2003

1   Scope

The present document specifies the protocol enhancements on the SSF-SCF interface for IN CS4.

2   References

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

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

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies.

[1]   ETSI EN 302 039-1: "Intelligent Network (IN); Intelligent Network Capability Set 4 (CS4); Intelligent Network Application Protocol (INAP); Protocol specification; Part 1: Common aspects".

[2]   ETSI EN 301 931-1: "Intelligent Network (IN); Intelligent Network Capability Set 3 (CS3); Intelligent Network Application Protocol (INAP); Protocol specification; Part 1: Common aspects".

[3]   ETSI EN 301 931-2: "Intelligent Network (IN); Intelligent Network Capability Set 3 (CS3); Intelligent Network Application Protocol (INAP); Protocol specification; Part 2: SCF-SSF interface".

[4]   ETSI EN 301 931-3: "Intelligent Network (IN); Intelligent Network Capability Set 3 (CS3); Intelligent Network Application Protocol (INAP); Protocol specification; Part 3: SCF-SRF interface ".

[5]   ETSI TS 122 024:"Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Description of Charge Advice Information (CAI) (3GPP TS 22.024)".

[6]   ETSI EN 301 070-1: "Integrated Services Digital Network (ISDN); Signalling System No.7; ISDN User Part (ISUP) version 3 interactions with the Intelligent Network Application Part (INAP); Part 1: Protocol specification [ITU-T Recommendation Q.1600 (1997, modified]".

[7]   ESTI TS 123 040: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Technical realization of the Short Message Service (SMS) (3GPP TS 23.040)".

[8]   ITU-T Recommendation E.410: "International network management - General information".

[9]   ITU-T Recommendation Q.1236: "Intelligent Network Capability Set 3 - Management Information Model Requirements and Methodology".

[10]   ITU-T Recommendation Q.1248.1: "Interface recommendation for Intelligent Network Capability Set 4: Interface Recommendation for Intelligent Network Capability Set 4 - Common aspects".

[11]   ITU-T Recommendation Q.1248.2: " Interface recommendation for Intelligent Network Capability Set 4: SCF-SSF Interface".

[12]   ITU-T Recommendation H.323: "Packet-based multimedia communications systems".

[13]   ITU-T Recommendation H.450.3: "Call diversion supplementary service for H.323".

[14]   ITU-T Recommendation Q.763: "Signalling System No. 7 - ISDN User Part formats and codes".

[15]   ITU-T Recommendation Q.850: "Usage of cause and location in the Digital Subscriber Signalling System No. 1 and the Signalling System No. 7 ISDN User Part".

[16]   ITU-T Recommendation Q.735.1: "Stage 3 description for community of interest supplementary services using Signalling System No. 7: Closed user group (CUG)".

[17]   ITU-T Recommendation Q.931: "ISDN user-network interface layer 3 specification for basic call control".

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

[19]   ITU-T Recommendation Q.1601: "Signalling system No. 7 - Interaction between N-ISDN and INAP CS2".

[20]   ITU-T Recommendation Q.1238: "Interface Recommendation for intelligent network capability set 3".

3   Abbreviations

For the purposes of the present document, the abbreviations given in EN 301 931-1 [2] apply.

4   Operation procedures

EN 301 931-2 [3], clause 11 is applicable with the enhancements specified in the present document.

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4.1   Modified operations (standards.iteh.ai)

The following operations defined in EN 301 931-2 [3] are modified by the present document.

4.1.1   Connect

The following parameter defined in clause 5 is added to the operation argument:

-        IpRelatedInformation.

Existing cug-Interlock and cug-OutgoingAcces parameters are no longer restricted for the support of CAMEL.

4.1.2   ContinueWithArgument

The following parameter defined in clause 5 is added to the operation argument:

-        ipRelatedInformation.

4.1.3   InitialDP

The following parameter defined in clause 5 is added to the operation argument:

-        ipRelatedInformation.

4.1.4   InitiateCallAttempt

The following parameters defined in clause 5 are added to the operation argument:

-        incomingSignallingBufferCopy.

-        ipRelatedInformation.

4.1.5   MergeCallSegments

The following parameter defined in clause 5 is added to the operation argument:

-      mergeSignallingPaths.

4.1.6   MoveLeg

The following parameters defined in clause 5 are added to the operation argument:

-      detachSignallingPath.

-      exportSignallingPath.

4.1.7   SelectFacility

The following parameter defined in clause 5 is added to the operation argument:

-      ipRelatedInformation.

4.1.8   SplitLeg

The following parameter defined in clause 5 is added to the operation argument:

-      detachSignallingPath.

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4.2   New operations(standards.iteh.ai)

The following new operation is defined by the present document.

4.2.1   CallFiltering procedure

4.2.1.1   General description

The CallFiltering operation is used to allow the SCF to influence basic call gapping procedures based in the CCF by sending information from the SCF to the SSF. The SSF relays the received information transparently to the CCF. This way, the SCF can influence the rate at which call attempts are allowed through. The operation thus influences the filtering of calls, as opposed to service requests as is done by the Callgap operation.

4.2.1.2   Argument Parameters

The operation argument consists of the following parameters. These parameters are defined in clause 13.

-      destination Index
       This index is a pointer to the Destination (see ITU-T Recommendation E.410 [8]) to which calls are filtered.

-      gapIndicators
       The parameter contains the gapDuration and the gapInterval.

-      registratorIdentifier
       This parameter identifies the SCF and is to be used by the SSF to verify that the SCF is allowed to influence CCF-based call gapping procedures.

-      extensions

4.2.1.3   Invoking entity (SCF)

4.2.1.3.1   Normal procedure

SCF precondition:

    1)   The SCF receives an indication from the SMF an overload condition persists and callfiltering has to be initiated at the SSF.

SCF postcondition:

    1)   The SCME is in the state "idle".

If the congestion level changes new "CallFIltering" operations may be sent for active filter criteria but with a new filter interval. If the congestion situation has ended, the filtering criteria may be removed.

4.2.1.3.2   Error handling

Generic error handling for the operation related error are described in clause 13 of EN 301 931-2 [3] and the TCAP services which are used for reporting operation errors as described in clause 10 of EN 301 931-1 [2].

4.2.1.4   Responding entity (SSF)

4.2.1.4.1   Normal procedure

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SSF precondition:

    1)   None.

SSF postcondition:

    1)   SSME-FSM is in the state "Idle".

The SSF relays the received information transparently to the CCF-based call filtering process. In case callfiltering to the specific destinations is already active at the CCF, than the new gapIndicator parameter overwrites the existing parameter values.

A manual initiated call filter will prevail over an automatic initiated call filter.

If a call matches several destinationIndexes, then the control corresponding with the most specific destinationIndex should be applied.

The service request gap process is stopped if the indicated duration equals zero.

4.2.1.4.2   Error handling

Generic error handling for the operation related error are described in clause 13 of EN 301 931-2 [3] and the TCAP services which are used for reporting operation errors as described in clause 10 of EN 301 931-1 [2].

    NOTE: In case of error (i.e. invalid registrator identifier), a TaskRefused error is returned.

5 Parameter descriptions

EN 301 931-2 [3], clause 12 is applicable with the enhancements of the new following parameters specified in the present document.

5.1 DetachSignallingPath

This indicator is used in the argument of CPH operations. It tells the CCF whether the signalling path between the Signalling Termination represented by an exported leg and the Signalling Terminations represented by the other legs should be broken or not. When this parameter is absent, the behaviour of the CCF is implementation dependent.

5.2 DestinationIndex

This parameter contains a pointer to a call destination (see ITU-T Recommendation E.410 [8]).

5.3 ExportSignallingPath

This indicator is used by the MoveLeg procedure. It tells the CCF whether the signalling path between the Signalling Termination represented by the exported leg and the Signalling Terminations represented by the other legs of the target CS should be impacted or not. If the parameter is absent, the behaviour of the CCF is implementation dependent. The detailed impact is outside the scope of the present document and should not be specified in the present document.

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5.4 IncomingSignallingBufferCopy (standards.iteh.ai)

This indicator is used in the InitiateCallAttempt procedure. When present, the parameters of the setup.ind primitive sent by the CCF should be populated with the information received in the operation argument and in the setup.req primitive from the Signalling Termination associated with the joined controlling leg (if any) of the call segment association. If this indicator is absent, the parameters of the setup.ind primitive sent by the CCF will be populated with the information received in the operation argument and some locally defined information as defined in ITU-T Recommendation Q.1236 [9].

5.5 IPRelatedInformation

IPRelatedInformation: This parameter contains a number of sub-parameters that are specific to the interworking with IP-based networks. Currently available sub-parameters are:

- alternativeCalledPartyIds: one or more identities representing a destination in the form of a valid URL. The mapping on call signalling parameters is protocol dependent.

NOTE 1: In SIP environments, such identities are represented as SIP URLs, mapped to the "To:" field. In ITU-T Recommendation H.323 [12] environments, such identities are represented as alias addresses, mapped to the destinationAddress field.

- alternativeOriginatingPartyIds: one or more identities representing an originating party in the form of a valid. The mapping on call signalling parameters is protocol dependent.

NOTE 2: In SIP environments, such identities are represented as SIP URLs mapped to the "From:" field. In ITU-T Recommendation H.323 [12] environments, such identities are represented as alias addresses, mapped to the sourceAddress field.

- alternativeOriginalCalledPartyIds: one or more identities representing the original destination of a forwarded call, in the form of a valid URL. The mapping on call signalling parameters is protocol dependent.

NOTE 3: In SIP environments, such identities may be represented as SIP URLs, mapped to the "Record-route:" field. In ITU-T Recommendation H.323 [12] environments, such identities are represented as alias addresses, mapped to the ITU-T Recommendation H.450.3 [13] parameters.

- alternativeRedirectingPartyIds: one or more identities representing a redirecting party, in the form of a valid URL. The mapping on call signalling parameters is protocol dependent.

NOTE 4: In SIP environments, such identities may be represented as SIP URLs mapped to the "Record-route:" field. In ITU-T Recommendation H.323 [12] environments, such identities are represented as alias addresses, mapped to the ITU-T Recommendation H.450.3 [13] parameters.

5.6 MergeSignallingPaths

This indicator is used by the MergeCallSegment procedure. It tells the CCF whether the signalling path between the Signalling Termination represented by the imported legs and the Signalling Terminations represented by the other legs of the target CS should be impacted or not. If the parameter is absent, the behaviour of the CCF is implementation dependent. The detailed impact is outside the scope of the present document and should be specified in the present document.

6 ASN.1 definitions

6.1 Data Types

```
-- The Definition of SSF - SCF Data Types Follows

IN-SSF-SCF-datatypes {itu-t(0) identified-organization(4) etsi(0) inDomain(1) in-network(1) cs4(40)
modules(1) in-ssf-scf-datatypes(6) version1(0)}


DEFINITIONS IMPLICIT TAGS::=

BEGIN
IMPORTS
    common-classes,
    common-datatypes,
    ssf-scf-classes,
    scf-srf-classes,
    scf-srf-datatypes,
    tc-Messages

FROM IN-object-identifiers {itu-t(0) identified-organization(4) etsi(0) inDomain(1) in-network(1)
cs4(40) modules(1) in-object-identifiers(0) version1(0)}

    COMMON-BOUNDS
FROM IN-common-classes common-classes

    TRIGGER,
    SCF-SSF-BOUNDS
FROM IN-SSF-SCF-Classes ssf-scf-classes

    SCF-SRF-BOUNDS
FROM IN-CS3-scf-srf-classes scf-srf-classes

    Extensions{},
    Integer4
FROM IN-common-datatypes common-datatypes

            InformationToSend {}

FROM IN-CS3-scf-srf-datatypes scf-srf-datatypes


    AddOnChargingInformation,
    ChargingTariffInformation,
    ChargingMessageType
FROM Tariffing-DataTypes {itu-t(0) identified-organization etsi (0) 1296 version2(3)}
```

```
    ISDN-AddressString
FROM MAP-CommonDataTypes {itu-t(0) identified-organization(4) etsi(0) mobileDomain(0) gsm-Network(1)
modules(3) map-CommonDataTypes(18) version6(6)}
;-- The following three definitions are local short-hand notation for convenience.
B1::= COMMON-BOUNDS      -- defined in part 1
B2::= SCF-SSF-BOUNDS         -- defined herein.
B3::= SCF-SRFBOUNDS      -- defined in EN 301 931-3.
```

```
AChBillingChargingCharacteristics {B2: b2} ::= OCTET STRING (SIZE
        (b2.&minAChBillingChargingLength..b2.&maxAChBillingChargingLength))
-- The AChBillingChargingCharacteristics parameter specifies charging related information.
-- Its content is network operator specific.
-- The internal structure of this parameter can be defined using ASN.1 and the related Basic
-- Encoding Rules (BER). In such a case the value of this parameter (after the first tag and length
-- information) is the BER encoding of the defined ASN.1 internal structure.
-- The tag of this parameter as defined by ETSI is never replaced.
-- CAMEL:
-- 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.
```

```
AChChargingAddress  {B2: b2} ::= CHOICE {
        legID           [2]  LegID,
        srfCallSegment  [50] CallSegmentID {b2},
        bNCF            [51] LegID
}
```

```
ActionIndicator ::= ENUMERATED {
    activate        (1),
    deactivate      (2),
    retrieve        (3)
    }
-- indicates the action to be performed by the ManageTriggerData operation.
```

```
ActionOnProfile::= ENUMERATED {
    activate        (0),
    deactivate      (1)
    }
-- indicates the action to be performed by the SetServiceProfile operation.
```

```
ActionPerformed ::= ENUMERATED {
    activated       (1),
    deactivated     (2),
    alreadyActive   (3),
    alreadyInactive (4),
    isActive        (5),
    isInactive      (6),
    tDPunknown      (7)
    }
-- indicates the result of the operation ManageTriggerData
```

```
AdditionalCallingPartyNumber  {B2: b2}::= Digits {b2}
-- Indicates the Additional Calling Party Number.  Refer to ITU-T Recommendation Q.763
-- Generic Number for encoding.
```

```
AlertingPattern::= OCTET STRING (SIZE(3))
-- Indicates a specific pattern that is used to alert a subscriber
-- (e.g. distinctive ringing, tones, etc.).
-- Only the trailing OCTET is used, the remaining OCTETS should be sent as NULL (zero)
-- The receiving side ignores the leading two OCTETS.
-- Only applies if SSF is the terminating local exchange for the subscriber.
-- Refer to the ITU-T Recommendation Q.931  Signal parameter
-- respective TS 129 002 for encoding.
```

```
AlternativeIdentities {B2:b2} ::= SEQUENCE  (SIZE (1.. b2.&maxAlternativeIdentities) )
                                OF AlternativeIdentity


AlternativeIdentity ::= CHOICE {
    url     [0] IA5String (SIZE(1..512))        -- any RFC1738 compliant URL (e.g.; SIP URL)
                }
--Email addresses shall be  represented as URLs.



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

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


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


AssistingSSPIPRoutingAddress  {B2: b2}::= Digits {b2}
-- Indicates the destination address of the SRF for the assist procedure.
-- Refer to ITU-T Recommendation Q.763 Generic Number for encoding.
BackwardGVNS  {B2: b2}::= OCTET STRING (SIZE(
b2.&minBackwardGVNSLength..b2.&maxBackwardGVNSLength))
-- Indicates the GVNS Backward information. Refer to ITU-T Recommendation Q.735-1 for encoding.


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

    holdTreatmentIndicator              [3] OCTET STRING (SIZE(1))  OPTIONAL,
    -- acceptHoldRequest    'xxxx xx01'B
    -- rejectHoldRequest    'xxxx xx10'B
    -- network default is accept hold request

    ectTreatmentIndicator               [4] OCTET STRING (SIZE(1))  OPTIONAL,
    -- acceptEctRequest 'xxxx xx01'B
    -- rejectEctRequest 'xxxx xx10'B
    -- network default is accept ect request
...
    }

BasicGapCriteria {B2: b2} ::= CHOICE {
    calledAddressValue          [0] Digits {b2},
    gapOnService                [2] GapOnService,
    gapAllInTraffic             [3] NULL,
    calledAddressAndService     [29] SEQUENCE {
        calledAddressValue          [0] Digits {b2},
        serviceKey                  [1] ServiceKey,
        ...
        },
    callingAddressAndService    [30] SEQUENCE {
        callingAddressValue         [0] Digits {b2},
        serviceKey                  [1] ServiceKey,
        locationNumber              [2] LocationNumber {b2}      OPTIONAL,
    ...
        }
    }
-- Both calledAddressValue and callingAddressValue can be
-- incomplete numbers, in the sense that a limited amount of digits can be given.
-- For encoding of the digits, refer to ITU-T Recommendation Q.763 Generic Number.
```

```
BCSMEvent  {B2: b2}::= SEQUENCE {
    eventTypeBCSM      [0] EventTypeBCSM,
    monitorMode        [1] MonitorMode,
    legID              [2] LegID  OPTIONAL,
    dpSpecificCriteria [30] DpSpecificCriteria {b2}   OPTIONAL,
    ...
    }
-- Indicates the BCSM Event information for monitoring.

BearerCapability  {B2: b2}::= CHOICE {
    bearerCap          [0] OCTET STRING
        (SIZE(2..b2.&maxBearerCapabilityLength)),
    tmr                [1] OCTET STRING (SIZE(1))

    }
-- Indicates the type of bearer capability connection to the user.
-- For narrowband bearerCapability, either
-- DSS1 (ES 300 403-1) or the ISUP User Service Information (ITU-T Recommendation Q.763)
-- encoding can be used. Refer
-- to the ITU-T Recommendation Q.763 Transmission Medium Requirement parameter for tmr encoding.


BothwayThroughConnectionInd::= ENUMERATED {
    bothwayPathRequired    (0),
    bothwayPathNotRequired  (1)
    }
-- The default is bothwayPathRequired.

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,
...
    }
-- Support for CAMEL
-- Indicates Charge Advice Information to the Mobile Station. For information regarding
-- parameter usage, refer to TS 122 024.

CalledDirectoryNumber  {B2: b2}::= OCTET STRING (SIZE
                    (b2.&minCalledDirectoryNumberLength..
                b2.&maxCalledDirectoryNumberLength))
-- Indicates the Called Directory Number.
-- Refer to ITU-T Recommendation Q.763  'Called Directory Number' for encoding.


CalledPartyBCDNumber {B2: b2} ::= OCTET STRING (SIZE
        (b2.&minCalledPartyBCDNumberLength.. b2.&maxCalledPartyBCDNumberLength))
-- Indicates the Called Party Number, including service selection information.
-- Refer to TS 124 008  for encoding.
-- This data type carries only the "type of number", "numbering plan identification" and
-- "number digit" fields defined in TS 124 008;
-- it does not carry the "called party BCD number IEI" or
-- "length of called party BCD number contents".

CalledPartyNumber  {B2: b2}::= OCTET STRING (SIZE
                    (b2.&minCalledPartyNumberLength..
                b2.&maxCalledPartyNumberLength))
-- Indicates the Called Party Number. Refer to ITU-T Recommendation Q.763 for encoding.


CallingGeodeticLocation {B2: b2}::= OCTET STRING ( SIZE
(b2.&minCallingGeodeticLocationLength..b2.&maxCallingGeodeticLocationLength))
-- The coding of this parameter is based on the appropriate mapping with the
-- ISUP parameter Calling Geodetic Location.
-- Refer to ITU-T Recommendation Q.763 for encoding.
```

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