**3GPP TSG-SA WG3 LI Meeting** ***Tdoc S3LI02_174***
**San Diego, California. 12 – 14 November 2002**

# Packet Activity Detection IRI Reporting – TS 33.108

Spec: 3GPP TS 33.108v5.0.0

Release: Rel-6

Source: Telcordia Technologies and CALEA Implementation Section

Document for: Discussion & Action.

## Summary

Similar to wireline systems, wireless systems establish a communication path across the accessing system from the subject's device to a network before communication between a subject and an associate can begin. Currently, the establishment or release of this communication path is reported via the BEGIN and END Intercept-Related Information (IRI) records, respectively. These IRI records identify when an intercept subject has established or ended the ability to communicate over a communication path. After a communication path is established by a wireless accessing system between the subject device(s) and the network, the interception subject can communicate with an associate over the connecting path.

Packet activity detection and IRI reporting is a mechanism for identifying the IRI associated with packets sent by or to the interception subject. Currently TS 33.107 and 33.108 do not support such a capability. In general, there are two general forms of interception orders, one which entitles LEAs to receive IRI and another that entitles the receipt of both IRI and communication content. In performing IRI type interception, one of the key pieces of information is the identification of the communicating parties. Right now TS 33.108 will not provide this information (it will only report that a PDP context has been setup or not and the network endpoint of the PDP context). It will not identify the IRI for the communicating parties of the packets being exchanged.

When delivery of only IRI is authorized and in the absence of packet activity detection and IRI reporting, LEAs will be missing critical information to which they are entitled. The omission from TS 33.107 and TS 33.108 of any capability for reporting IRI associated with packets (e.g., IP addresses, protocol, port numbers) sent or received by the interception subject (either on a per-packet or on an aggregate basis) fails to meet law enforcement's legitimate needs for acquiring lawfully authorized information.

This contribution provides proposed changes to TS 33.108 to support the Packet Activity Dection and IRI reporting capability.

**3GPP TSG-SA WG3 LI Meeting #7** **Tdoc ⌘ S3LI02_174**
**San Diego, California, 12-14 November 2002**

CR-Form-v7

# CHANGE REQUEST

⌘ **33.108** **CR** **CRNum** ⌘ **rev** **-** ⌘ Current version: **5.0.0** ⌘

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

***Proposed change affects:*** UICC apps⌘ ☐ ME ☐ Radio Access Network ☐ Core Network ☒

| | | |
|---|---|---|
| ***Title:*** | ⌘ | Changes to TS 33.108 to support Packet Activity IRI Reporting. |
| ***Source:*** | ⌘ | Telcordia Technologies and Federal Bureau of Investigation |
| ***Work item code:*** | ⌘ | Security |
| ***Date:*** | ⌘ | 12/11/2002 |
| ***Category:*** | ⌘ | **B** |
| ***Release:*** | ⌘ | Rel-6 |

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

*Use one of the following releases:*

| | |
|---|---|
| *2* | *(GSM Phase 2)* |
| *R96* | *(Release 1996)* |
| *R97* | *(Release 1997)* |
| *R98* | *(Release 1998)* |
| *R99* | *(Release 1999)* |
| *Rel-4* | *(Release 4)* |
| *Rel-5* | *(Release 5)* |
| *Rel-6* | *(Release 6)* |

| | | |
|---|---|---|
| ***Reason for change:*** | ⌘ | To meet LEA needs to identify the IRI for the communicating parties of the packets being exchanged. Currently this LEA need has not been met. |
| ***Summary of change:*** | ⌘ | Text is being added to the specification to address the need to support the capability to detect and report IRI related to packets received from or sent to the interception subject. |
| ***Consequences if not approved:*** | ⌘ | Misal The standard will not be able to support lawful interception needs that require identification of all IRI. |

| | | |
|---|---|---|
| ***Clauses affected:*** | ⌘ | 6.5, 6.5.1.5, B.3 |

| | | Y | N | | | |
|---|---|---|---|---|---|---|
| ***Other specs affected:*** | ⌘ | X | | Other core specifications | ⌘ | TS 33.107 |
| | | | | Test specifications | | |
| | | | | O&M Specifications | | |

| | | |
|---|---|---|
| ***Other comments:*** | ⌘ | |

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

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.
2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

*** FIRST CHANGE ***

## 6.5 IRI for packet domain

Intercept related information will in principle be available in the following phases of a data transmission:

1. At connection attempt when the target identity becomes active, at which time packet transmission may or may not occur (set up of a data context, target may be the originating or terminating party);
2. At the end of a connection, when the target identity becomes inactive (removal of a data context);
3. At certain times when relevant information are available.

In addition, information on non-transmission related actions of a target constitute IRI and is sent via HI2, e.g. information on subscriber controlled input.

The intercept related information (IRI) may be subdivided into the following categories:

1. Control information for HI2 (e.g. correlation information);
2. Basic data context information, for standard data transmission between two parties.

The events defined in ref [11] are used to generate records for the delivery via HI2.

There are eight different event types received at DF2 level. According to each event, a Record is sent to the LEMF if this is required. The following table gives the mapping between event type received at DF2 level and record type sent to the LEMF.

**Table 6.1: Mapping between UMTS Data Events and HI2 records type**

| Event | IRI Record Type |
|---|---|
| GPRS attach | REPORT |
| GPRS detach | REPORT |
| PDP context activation (successful) | BEGIN |
| PDP context modification | CONTINUE |
| PDP context activation (unsuccessful) | REPORT |
| Start of intercept with PDP context active | BEGIN |
| PDP context deactivation | END |
| Location update | REPORT |
| SMS | REPORT |
| ServingSystem | REPORT |
| Packet Activity IRI Reporting (PAIR) | PAR (Packet Activity Reporting) |

A set of information is used to generate the records. The records used transmit the information from mediation function to LEMF. This set of information can be extended in the GSN or DF2 MF, if this is necessary in a specific country. The following table gives the mapping between information received per event and information sent in records.

**Table 6.2: Mapping between Events information and IRI information**

| parameter | description | HI2 ASN.1 parameter |
|---|---|---|
| Observed MSISDN | Target Identifier with the MSISDN of the target subscriber (monitored subscriber). | partyInformation (party-identiity) |
| Observed IMSI | Target Identifier with the IMSI of the target subscriber (monitored subscriber). | partyInformation (party-identity) |
| Observed IMEI | Target Identifier with the IMEI of the target subscriber (monitored subscriber) | partyInformation (party-identity) |
| observed PDP address | PDP address used by the target.. | partyInformation (services-data-information) |
| event type | Description which type of event is delivered: PDP Context Activation, PDP Context Deactivation,GPRS Attach, etc. | gPRSevent |
| event date | Date of the event generation in the xGSN | timeStamp |
| event time | Time of the event generation in the xGSN | |
| access point name | The APN of the access point | partyInformation (services-data-information) |
| PDP type | This field describes the PDP type as defined in TS GSM 09.60, TS GSM 04.08, TS GSM 09.02 | partyInformation (services-data-information) |
| Initiator | This field indicates whether the PDP context activation, deactivation, or modification is MS directed or network initiated. | initiator |
| correlation number | Unique number for each PDP context delivered to the LEMF, to help the LEA, to have a correlation between each PDP Context and the IRI. | gPRSCorrelationNumber |
| lawful interception identifier | Unique number for each lawful authorization. | lawfulInterceptionIdentifier |
| location information | This field provides the service area identity, RAI and/or location area identity that is present at the SGSN at the time of event record production. | locationOfTheTarget |
| SMS | The SMS content with header which is sent with the SMS-service | sMS |
| failed context activation reason | This field gives information about the reason for a failed context activation of the target subscriber. | gPRSOperationErrorCode |
| failed attach reason | This field gives information about the reason for a failed attach attempt of the target subscriber. | gPRSOperationErrorCode |
| service center address | This field identifies the address of the relevant server within the calling (if server is originating) or called (if server is terminating) party address parameters for SMS-MO or SMS-MT. | serviceCenterAddress |
| umts QOS | This field indicates the Quality of Service associated with the PDP Context procedure. | qOS |
| context deactivation reason | This field gives information about the reason for context deactivation of the target subscriber. | gPRSOperationErrorCode |
| network identifier | Operator ID plus SGSN or GGSN address. | networkIdentifier |
| iP assignment | Observed PDP address is statically or dynamically assigned. | iP-assignment |
| SMS originating address | Identifies the originator of the SMS message. | DataNodeAddress |
| SMS terminating address | Identifies the intended recipient of the SMS message. | DataNodeAddress |
| SMS initiator | Indicates whether the SMS is MO, MT, or Undefined | sms-initiator |
| serving SGSN number | An E.164 number of the serving SGSN. | ServingSGSN-Number |
| Serving SGSN address | An IP address of the serving SGSN. | ServingSGSN-Address |
| Originating Address | Reports the source address in an IP packet when reporting packet activity. | originatingAddress |
| Destination Address | Reports the destination address in an IP packet when reporting packet activity. | destinationAddresss |
| Packet Activity Count | Reports the number of packets detected over a given monitoring reporting interval. | packetActivityCount |
| Packet Report Type | Reports the reason (e.g., count threshold reached) for the generation of the packet activity report record. | packetActivityReportType |
| Originating Port | Reports the source transport layer port in an IP packet | packetActivityProtocolInfo |

| | | |
|---|---|---|
| Number | when reporting packet activity. | (originatingPortNumber) |
| Destination Port Number | Reports the destination transport layer port in an IP packet when reporting packet activity. | packetActivityProtocolInfo (destinationPortNumber) |
| Transport Protocol | Reports the Protocol used by the Transport Layer for the source in an IP packet (e.g., TCP, UDP). | packetActivityProtocolInfo (transportProtocol) |

NOTE: LIID parameter must be present in each record sent to the LEMF.

*** SECOND CHANGE ***

### 6.5.1.5 PAR record information

The PAR record is used to report IRI for the parties to packet communications after a communication path is established by a wireless accessing system between the subject device(s) and the network.

To support the reporting of the PAIR event, the 3G xGSN shall be enabled to perform content interception and the DF3 shall be enabled to perform the PAIR event detection and processing. The PAIR event is the interception of each such packet and the extraction of the IRI from that packet. The PAIR event shall be reported via the PAR record either individually or on an aggregate basis as described below.

The PAR record shall be generated when:

- Reporting is performed on an individual intercepted packet basis and a packet is intercepted
- Reporting is performed on an aggregate basis and
  - a count threshold is reached for each originatingAddress/destinationAddress combination
  - a monitoring interval timer expires
  - PDP context is deactivated and packets have been intercepted, but IRI for the intercepted packets have not been reported.

A PAR record may optionally be triggered when:

- the interception subject generates or receives IP packets, and the originatingAddress / destinationAddress combination changes between consecutive packets generated or received by the intercept subject.

**Table 6-16: Parameters for Reporting Packet Activity Events**

| Parameter | MOC | Description/Conditions |
|---|---|---|
| observed MSISDN | C | Provide at least one and others when available. |
| observed IMSI | | |
| observed IMEI | | |
| observed PDP address | C | Provide to identify the PDP address of the intercept subject. |
| event type | C | Provide PAIR event type. |
| event date | M | Provide the date and time the event is detected. |
| event time | | |
| Access Point Name | C | Provide to identify the packet data network to which the intercept subject is connected. |
| PDP type | C | Provide to describe the PDP type of the observed PDP address. |

| Parameter | MOC | Description/Conditions |
|---|---|---|
| network identifier | M | Shall be provided. |
| correlation number | C | Provide to uniquely identify the PDP context delivered to the LEMF and to correlate IRI records with CC. |
| lawful intercept identifier | M | Shall be provided. |
| xGSN address | C | Provide to identify the xGSN node. |
| Packet Report Type | C | Provide to identify the reason for the generation of the packet activity report (e.g., end of default time interval) when PAIR is performed on an aggregate basis. |
| Originating Address | M | Provide to report the source address in an IP packet for PAIR. |
| Destination Address | M | Provide to report the destination address in an IP packet for PAIR. |
| Packet Activity Count | C | Provide to identify the number of packets detected with the same originatingAddress/destinationAddress combination when PAIR is performed on an aggregate basis. |
| Packet Activity Protocol Info | M | Provide the set of observed triplets (transport protocol [e.g., TCP], originating transport port number, and destination transport port number) over the packet activity reporting interval and associated with the same originatingAddress/destinationAddress combination. |

When reporting the Packet Activity event (by the DF3) on an aggregate basis:

- A count of the number of intercepted packets with a given originating/destination address combination is maintained to provide input to a common PAR record. If this count reaches or exceeds a provisioned threshold for the intercept subject, then a PAR record is generated. The range of the count threshold is 500 to 5000 with a default value of 2500.
- A packet activity monitoring interval is utilized to govern the amount of time over which intercepted packets with a given originating/destination address combination provide input to a common PAR record. If this monitoring interval reaches or exceeds a provisioned threshold for the intercept subject, then a PAR record is generated. The range of the timer threshold is 30 seconds to 5 minutes in (30 second increments) with a default value of 1 minute.

*** THIRD CHANGE ***

# B.3 Intercept related information (HI2)

Declaration of ROSE operation umts-sending-of-IRI is ROSE delivery mechanism specific. When using FTP delivery mechanism, data umtsIRIContent must be considered. Note that while the PAIR event and the PAR record are described in this Section since the PAR record is formulated as IRI, the PAR record is actually transmitted over the HI3 interface rather than an HI2 interface since the DF3 detects the PAIR event and only has access to the HI3 interface.

**ASN1 description of IRI (HI2 interface)**

```
UmtsHI2Operations {itu-t(0) identified-organization(4) etsi(0) securityDomain(2) lawfulintercept(2)
threeGPP(4) hi2(1) version-1(1)}

DEFINITIONS IMPLICIT TAGS ::=
```

```
BEGIN

IMPORTS

        OPERATION,
        ERROR
            FROM Remote-Operations-Information-Objects
            {joint-iso-itu-t(2) remote-operations(4) informationObjects(5) version1(0)}

        LawfulInterceptionIdentifier,
        TimeStamp,
        Network-Identifier,
        National-Parameters,
        DataNodeAddress,
        IPAddress,
        IP-value,
        X25Address

            FROM HI2Operations
            {itu-t(0) identified-organization(4) etsi(0) securityDomain(2)
                  lawfulIntercept(2) hi2(1) version3(3)}; -- TS 101 671 Edition 3

-- Object Identifier Definitions

-- Security DomainId
lawfulInterceptDomainId OBJECT IDENTIFIER ::= {itu-t(0) identified-organization(4) etsi(0)
securityDomain(2) lawfulIntercept(2)}

-- Security Subdomains
threeGPPSUBDomainId OBJECT IDENTIFIER ::= {lawfulInterceptDomainId threeGPP(4)}
hi2DomainId OBJECT IDENTIFIER   ::= {threeGPPSUBDomainId hi2(1) version-1(1)}

umts-sending-of-IRI  OPERATION ::=
{
    ARGUMENT    UmtsIRIContent
    ERRORS      { OperationErrors }
    CODE        global:{threeGPPSUBDomainId hi2(1) opcode(1)}
}
-- Class 2 operation . The timer shall be set to a value between 3 s and 240 s.
-- The timer.default value is 60s.
-- NOTE:    The same note as for HI management operation applies.

UmtsIRIContent      ::= CHOICE
{
    iRI-Begin-record        [1] IRI-Parameters, -- include at least one optional parameter
    iRI-End-record          [2] IRI-Parameters,
    iRI-Continue-record     [3] IRI-Parameters, -- include at least one optional parameter
    iRI-Report-record       [4] IRI-Parameters  -- include at least one optional parameter
    iRI-PAR-record          [5] IRI-Parameters,
    --at least one optional parameter must be included within the
    --iRI-PAR-Record
}

unknown-version         ERROR ::= { CODE local:0}
missing-parameter       ERROR ::= { CODE local:1}
unknown-parameter-value ERROR ::= { CODE local:2}
unknown-parameter       ERROR ::= { CODE local:3}

OperationErrors ERROR ::=
{
    unknown-version |
    missing-parameter |
    unknown-parameter-value |
    unknown-parameter
}
-- This values may be sent by the LEMF, when an operation or a parameter is misunderstood.

IRI-Parameters      ::= SEQUENCE
{
    hi2DomainId             [0] OBJECT IDENTIFIER,  -- 3GPP HI2 domain
    iRIversion              [23] ENUMERATED
    {
        version2(2),
        …
    } OPTIONAL,
```

```
        -- if not present, it means version 1 is handled
    lawfulInterceptionIdentifier    [1] LawfulInterceptionIdentifier,
        -- This identifier is associated to the target.
    timeStamp               [3] TimeStamp,
        -- date and time of the event triggering the report.)
    initiator               [4] ENUMERATED
    {
        not-Available       (0),
        originating-Target  (1),
            -- in case of GPRS, this indicates that the PDP context activation
            -- or deactivation is MS requested
        terminating-Target  (2),
            -- in case of GPRS, this indicates that the PDP context activation or
            -- deactivation is network initiated
    ...
    } OPTIONAL,

    locationOfTheTarget     [8] Location OPTIONAL,
        -- location of the target subscriber
    partyInformation        [9] SET SIZE (1..10) OF PartyInformation OPTIONAL,
        -- This parameter provides the concerned party, the identiy(ies) of the party
        --)and all the information provided by the party.

    serviceCenterAddress    [13] PartyInformation OPTIONAL,
        -- e.g. in case of SMS message this parameter provides the address of  the relevant
        -- server within the calling (if server is originating) or called (if server is
        -- terminating) party address parameters
    sMS                     [14] SMS-report OPTIONAL,
        -- this parameter provides the SMS content and associated information

    national-Parameters     [16] National-Parameters OPTIONAL,
    gPRSCorrelationNumber   [18] GPRSCorrelationNumber OPTIONAL,
    gPRSevent               [20] GPRSEvent OPTIONAL,
        -- This information is used to provide particular action of the target
        -- such as attach/detach
    sgsnAddress             [21] DataNodeAddress OPTIONAL,
    gPRSOperationErrorCode  [22] GPRSOperationErrorCode OPTIONAL,
    ggsnAddress             [24] DataNodeAddress OPTIONAL,
    qOS                     [25] UmtsQos OPTIONAL,
    networkIdentifier       [26] Network-Identifier OPTIONAL,
    sMSOriginatingAddress   [27] DataNodeAddress OPTIONAL,
    sMSTerminatingAddress   [28] DataNodeAddress OPTIONAL,
    iMSevent                [29] IMSEvent OPTIONAL,
    sIPMessage              [30] OCTET STRING  OPTIONAL,
    servingSGSN-number      [31] OCTET STRING (SIZE (1..20))    OPTIONAL,
    servingSGSN-address     [32] OCTET STRING (SIZE (5..17))    OPTIONAL,
    originatingAddress          [33] IPAddress  OPTIONAL,
        -- The sourceAddress parameter contains the source ip address
        --  in the intercepted ip packet.
    destinationAddress          [34] IPAddress  OPTIONAL,
        -- The destinationAddress parameter contains the
        -- destination ip address in the intercepted ip packet.
    packetActivityCount         [35] Count OPTIONAL,
        -- For aggregate reporting, the packetactivityCount parameter reports the number
        -- of packets detected that utilized the same originatingAddress/terminatingAddress
        -- combination over a given packet activity interval
    packetActivityReportReason  [36] ReportReason OPTIONAL,
        -- For aggregate reporting, the packetActivityReason parameter
        -- indicates the reason for generating the PAR record.
    PacketActivityProtocolInfo  [37] PacketActivityProtocolInfo OPTIONAL
    ...
}
```

```
-- PARAMETERS FORMATS
```

```
PartyInformation            ::= SEQUENCE
{
    party-Qualifier     [0]  ENUMERATED
    {
        gPRS-Target(3),
        ...
    },
    partyIdentity       [1] SEQUENCE
    {
        imei                    [1] OCTET STRING (SIZE (8)) OPTIONAL,
            -- See MAP format [4]

        imsi                    [3] OCTET STRING (SIZE (3..8)) OPTIONAL,
```

```
            -- See MAP format [4] International Mobile
            -- Station Identity E.212 number beginning with Mobile Country Code

        msISDN                  [6] OCTET STRING (SIZE (1..9)) OPTIONAL,
            -- MSISDN of the target, encoded in the same format as the AddressString
            -- parameters defined in MAP format document ref [4], § 14.7.8

        e164-Format             [7] OCTET STRING    (SIZE (1 .. 25)) OPTIONAL,
            -- E164 address of the node in international format. Coded in the same format as
            -- the calling party number  parameter of the ISUP (parameter part:[5])

        sip-url                 [8] OCTET STRING OPTIONAL,  -- See RFC 2543

        ...
    },

    services-Data-Information   [4] Services-Data-Information OPTIONAL,
        -- This parameter is used to transmit all the information concerning the
        -- complementary information associated to the basic data call
    ...
}
```

```
Location    ::= SEQUENCE
{
    globalCellID        [2] GlobalCellID    OPTIONAL,
        --see MAP format (see [4])
    rAI                 [4] Rai     OPTIONAL,
        -- the Routeing Area Identifier is coded in accordance with the § 10.5.5.15 of
        -- document ref [9] without the Routing Area Identification IEI (only the
        -- last 6 octets are used)
    gsmLocation         [5] GSMLocation OPTIONAL,
    umtsLocation        [6] UMTSLocation OPTIONAL,
    sAI                 [7] Sai OPTIONAL,
        -- format:  PLMN-ID 3 octets (no. 1 – 3)
        --          LAC     2 octets (no. 4 – 5)
        --          SAC     2 octets (no. 6 – 7)
        --          (according to 3GPP TS 25.413)
    ...
}
```

```
GlobalCellID    ::= OCTET STRING  (SIZE (5..7))
Rai             ::= OCTET STRING (SIZE (6))
Sai             ::= OCTET STRING (SIZE (7))
```

```
GSMLocation     ::= CHOICE
{
    geoCoordinates  [1] SEQUENCE
    {
        latitude        [1] PrintableString (SIZE(7..10)),
                            -- format :     XDDMMSS.SS
        longitude       [2] PrintableString (SIZE(8..11)),
                            -- format :     XDDDMMSS.SS
        mapDatum        [3] MapDatum DEFAULT wGS84,
        ...
    },
        -- format :     XDDDMMSS.SS
        --              X           : N(orth), S(outh), E(ast), W(est)
        --              DD or DDD   : degrees (numeric characters)
        --              MM          : minutes (numeric characters)
        --              SS.SS       : seconds, the second part (.SS) is optionnal
        -- Example :
        --          latitude short form     N502312
        --          longitude long form     E1122312.18

    utmCoordinates  [2] SEQUENCE
    {
        utm-East        [1] PrintableString (SIZE(10)),
        utm-North       [2] PrintableString (SIZE(7)),
            -- example  utm-East    32U0439955
            --          utm-North   5540736
        mapDatum        [3] MapDatum DEFAULT wGS84,
        ...
    },

    utmRefCoordinates   [3] SEQUENCE
    {
        utmref-string       PrintableString (SIZE(13)),
```

```
        mapDatum            MapDatum DEFAULT wGS84,
        ...
    },
        -- example  32UPU91294045

    wGS84Coordinates    [4] OCTET STRING (SIZE(7..10))
        -- format is as defined in GSM 03.32; polygon type of shape is not allowed.
}

MapDatum ::= ENUMERATED
{
    wGS84,
    wGS72,
    eD50,   -- European Datum 50
    ...
}
```

```
UMTSLocation ::= CHOICE {
    point                   [1] GA-Point,
    pointWithUnCertainty    [2] GA-PointWithUnCertainty,
    polygon                 [3] GA-Polygon
}
```

```
GeographicalCoordinates ::= SEQUENCE {
    latitudeSign            ENUMERATED { north, south },
    latitude                INTEGER (0..8388607),
    longitude               INTEGER (-8388608..8388607),
    ...
}
```

```
GA-Point ::= SEQUENCE {
    geographicalCoordinates     GeographicalCoordinates,
    ...
}
```

```
GA-PointWithUnCertainty ::=SEQUENCE {
    geographicalCoordinates     GeographicalCoordinates,
    uncertaintyCode             INTEGER (0..127)
}
```

```
maxNrOfPoints                       INTEGER ::= 15
```

```
GA-Polygon ::= SEQUENCE (SIZE (1..maxNrOfPoints)) OF
    SEQUENCE {
        geographicalCoordinates     GeographicalCoordinates,
        ...
    }
```

```
SMS-report      ::= SEQUENCE
{
    sMS-Contents    [3] SEQUENCE
    {
        sms-initiator       [1] ENUMERATED  -- party which sent the  SMS
        {
            target          (0),
            server          (1),
            undefined-party (2),
            ...
        },
        transfer-status     [2] ENUMERATED
        {
            succeed-transfer    (0),        -- the transfer of the SMS message succeeds
            not-succeed-transfer(1),
            undefined           (2),
            ...
        } OPTIONAL,
        other-message       [3] ENUMERATED  -- in case of terminating call, indicates if
                                            -- the server will send other SMS
        {
            yes         (0),
            no          (1),
            undefined   (2),
            ...
        } OPTIONAL,
        content             [4] OCTET STRING (SIZE (1 .. 270)) OPTIONAL,
                                    -- Encoded in the format defined for the SMS mobile
```

```
        ...
    }
}

GPRSCorrelationNumber ::= OCTET STRING (SIZE(8..20))

GPRSEvent ::= ENUMERATED
{
    pDPContextActivation                    (1),
    startOfInterceptionWithPDPContextActive (2),
    pDPContextDeactivation                  (4),
    gPRSAttach                              (5),
    gPRSDetach                              (6),
    locationInfoUpdate                      (10),
    sMS                                     (11),
    pDPContextModification                  (13),
    servingSystem                           (14),
    packetActivityIRIReporting              (15),
    ...
}
-- see ref [10]

IMSevent ::= ENUMERATED
{
    sIPmessage  (1),
    ...
}

Services-Data-Information ::= SEQUENCE
{
    gPRS-parameters [1] GPRS-parameters OPTIONAL,
    ...
}

GPRS-parameters ::= SEQUENCE
{
    pDP-address-allocated-to-the-target     [1] DataNodeAddress OPTIONAL,
    aPN                     [2] OCTET STRING (SIZE(1..100)) OPTIONAL,
    pDP-type                [3] OCTET STRING (SIZE(2)) OPTIONAL,
    ...
}

GPRSOperationErrorCode ::= OCTET STRING (SIZE(2))
-- refer to standard [9] for values(GMM cause or SM cause parameter).

UmtsQos ::= CHOICE
{
    qosIu [1] OCTET STRING (SIZE(3..11)),
        -- The qosIu parameter shall be coded in accordance with the § 10.5.6.5 of
        -- document ref [9] or ref [21] without the Quality of service IEI and Length of
        -- quality of service IE (only the last 3, or 11 octets are used. That is, first
        -- two octets carrying 'Quality of service IEI' and 'Length of quality of service
        -- IE' shall be excluded).
    qosGn [2] OCTET STRING (SIZE(3..254))
        -- qosGn parameter shall be coded in accordance with § 7.7.34 of document ref [17]
}


PacketActivityProtocolInfo ::= SEQUENCE OF
{
    transportProtocol    [0] TransportProtocol OPTIONAL,
    -- The transportProtocol parameter reports the
    -- Transport Protocol used by the Transport Layer(e.g., TCP, UDP, SCTP)
    -- in an IP packet when reporting packet activity. The
    -- transportProtocol parameter shall be coded in accordance
    -- with document reference [51].
   originatingPortNumber         [1] PortNumber  OPTIONAL,
    -- The originatingPortNumber is the source transport layer port
    -- in an IP packet when reporting packet activity.  The
    -- originatingPortNumber parameter shall be coded in accordance with
    -- document references [52], [UDP][1], and [SCTP][2].
```

[1] STD0006 " User Datagram Protocol (UDP)", 28 August 1980.

```
    destinationPortNumber        [2] PortNumber  OPTIONAL,
    -- The destinationPortNumber is the destination transport layer port
    -- in an IP packet when reporting packet activity.  The
    -- destinationPortNumber parameter shall be coded in accordance with
    -- document references [52], [UDP], and [SCTP].

}

TransportProtocol::= OCTET STRING (SIZE (1))
-- From “Assigned Numbers” RFC 1700 available from the IETF or more recent information
-- can be found at http://www.iana.org/assignments/protocol-numbers.

PortNumber ::= INTEGER (0..65535)

Count ::= INTEGER (0..65535)

ReportReason ::= ENUMERATED
{
   timerExpiry (0),
   countThreshold (1),
   pDPContextDeactivaed (2)
   addressChange (3),
…
}


END -- OF UmtsHI2Operations
```

[2] RFC 2960 " Stream Control Transmission Protocol (SCTP)", October 2000.

Page: 2
[H1] Document numbers are allocated by the Working Group Secretary.

Page: 2
[H2] Enter the specification number in this box. For example, 04.08 or 31.102. Do not prefix the number with anything . i.e. do not use "TS", "GSM" or "3GPP" etc.

Page: 2
[H3] Enter the CR number here. This number is allocated by the 3GPP support team. It consists of at least three digits, padded with leading zeros if necessary.

Page: 2
[H4] Enter the revision number of the CR here. If it is the first version, use a "-".

Page: 2
[H5] Enter the version of the specification here. This number is the version of the specification to which the CR will be applied if it is approved. Make sure that the latest version of the specification (of the relevant release) is used when creating the CR. If unsure what the latest version is, go to http://www.3gpp.org/specs/specs.htm.

Page: 2
[H6] For help on how to fill out a field, place the mouse pointer over the special symbol closest to the field in question.

Page: 2
[H7] Mark one or more of the boxes with an X.

Page: 2
[H8] SIM / USIM / ISIM applications.

Page: 2
[H9] Enter a concise description of the subject matter of the CR. It should be no longer than one line. Do not use redundant information such as "Change Request number xxx to 3GPP TS xx.xxx".

Page: 2
[H10] Enter the source of the CR. This is either (a) one or several companies or, (b) if a (sub)working group has already reviewed and agreed the CR, then list the group as the source.

Page: 2
[H11] Enter the acronym for the work item which is applicable to the change. This field is mandatory for category F, B & C CRs for release 4 and later. A list of work item acronyms can be found in the 3GPP work plan. See http://www.3gpp.org/ftp/information/work_plan/ .
The list is also included in a MS Excel file included in the zip file containing the CR cover sheet template.

Page: 2
[H12] Enter the date on which the CR was last revised. Format to be interpretable by English version of MS Windows ® applications, e.g. 19/02/2002.

Page: 2
[H13] Enter a single letter corresponding to the most appropriate category listed below. For more detailed help on interpreting these categories, see the Technical Report 21.900 "TSG working methods".

Page: 2
[H14] Enter a single release code from the list below.

Page: 2
[H15] Enter text which explains why the change is necessary.

Page: 2
[H16] Enter text which describes the most important components of the change. i.e. How the change is made.

Page: 2
[H17] Enter here the consequences if this CR was to be rejected. It is necessary to complete this section only if the CR is of category "F" (i.e. correction).

Page: 2
[H18] Enter the number of each clause which contains changes.

Page: 2
[H19] Tick "yes" box if any other specifications are affected by this change. Else tick "no". You MUST fill in one or the other.

Page: 2
[H20] List here the specifications which are affected or the CRs which are linked.

Page: 2
[H21] Enter any other information which may be needed by the group being requested to approve the CR. This could include special conditions for it's approval which are not listed anywhere else above.

Page: 2
[H22] This is an example of pop-up text.