3GPP TSG CT Plenary Meeting #28 **CP-050102**
1st – 3rd June 2005 Quebec, Canada.

Source: TSG CT WG4

Title: Corrections on Trace management

Agenda item: 9.25

Document for: APPROVAL

Doc-2nd-Level	Spec	CR #	Rev	Rel	Tdoc Title	CAT	C_Version
C4-050889	29.060	554	3	Rel-6	IE description to allow Signalling Activated Trace of the BM-SC	F	6.8.0
C4-050737	29.002	769	1	Rel-6	Correction to Trace parameters to allow trace at the BM-SC	F	6.9.0

3GPP TSG-CT WG4 Meeting #27 **C4-050737**
Cancun, MEXICO. 25th to 29th April 2005.

CR-Form-v7.1

CHANGE REQUEST

⌘ **29.002** **CR** **769** ⌘ **rev** **1** ⌘ Current version: **6.9.0** ⌘

*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:	⌘	Correction to Trace parameters to allow trace at the BM-SC
Source:	⌘	Vodafone
Work item code:	⌘	OAM-Trace
Date:	⌘	14/04/2005
Category:	⌘	**F**
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:

Ph2	*(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)*
Rel-7	*(Release 7)*

Reason for change:	⌘	At S2 #45, 23.246 CR143 was approved to add the stage 2 requirement to allow Trace of MBMS sessions. This has the knock on effect that signalling based Trace activation/deactivation needs to be communicated to the BM-SC when triggered by the SGSN (and via the GGSN). Therefore, 29.060 and 29.002 need to be modified to incorporate the stage 3 protocol impacts of the stage 2 requirement.
Summary of change:	⌘	Trace parameters are expanded to include elements relating to the BM-SC
Consequences if not approved:	⌘	No mechanism to trigger Trace at the BM-SC will be defined, thus not meeting the stage 2 requirements in 23.246.

Clauses affected:	⌘	17.7.2			
		Y	**N**		
Other specs affected:	⌘	**X**		Other core specifications	⌘ 23.246 CR143, 29.061 CR163, 29.060 CR554
			X	Test specifications	
		X		O&M Specifications	32.421, 32.422, 32.423
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.

17.7.2 Operation and maintenance data types

```
MAP-OM-DataTypes {
   itu-t identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-OM-DataTypes (12) version9 (9)}

DEFINITIONS

IMPLICIT TAGS

::=

BEGIN

EXPORTS
   ActivateTraceModeArg,
   ActivateTraceModeRes,
   DeactivateTraceModeArg,
   DeactivateTraceModeRes
;

IMPORTS
   AddressString,
   IMSI
FROM MAP-CommonDataTypes {
   itu-t identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-CommonDataTypes (18) version9 (9)}

   ExtensionContainer
FROM MAP-ExtensionDataTypes {
   itu-t identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-ExtensionDataTypes (21) version9 (9)}

;
```

```
ActivateTraceModeArg ::= SEQUENCE {
     imsi                              [0] IMSI                          OPTIONAL,
     traceReference                    [1] TraceReference,
     traceType                         [2] TraceType,
     omc-Id                            [3] AddressString                 OPTIONAL,
     extensionContainer                [4] ExtensionContainer            OPTIONAL,
     ...,
     traceReference2                   [5] TraceReference2               OPTIONAL,
     traceDepthList                    [6] TraceDepthList                OPTIONAL,
     traceNE-TypeList                  [7] TraceNE-TypeList              OPTIONAL,
     traceInterfaceList                [8] TraceInterfaceList            OPTIONAL,
     traceEventList                    [9] TraceEventList                OPTIONAL
     }
```

```
TraceReference ::= OCTET STRING (SIZE (1..2))
```

```
TraceReference2 ::= OCTET STRING (SIZE (3))
```

```
TraceType ::= INTEGER
     (0..255)
     -- Trace types are fully defined in  3GPP TS 52.008. [61]
```

```
TraceDepthList ::= SEQUENCE {
     msc-s-TraceDepth                  [0] TraceDepth                    OPTIONAL,
     mgw-TraceDepth                    [1] TraceDepth                    OPTIONAL,
     sgsn-TraceDepth                   [2] TraceDepth                    OPTIONAL,
     ggsn-TraceDepth                   [3] TraceDepth                    OPTIONAL,
     rnc-TraceDepth                    [4] TraceDepth                    OPTIONAL,
     bmsc-TraceDepth                   [x] TraceDepth                    OPTIONAL,
     ...}
```

```
TraceDepth ::= ENUMERATED {
     minimum (0),
     medium (1),
     maximum (2),
     ...}
-- The value medium is applicable only for RNC. For other network elements, if value medium
-- is received, value minimum shall be applied.
```

```
TraceNE-TypeList ::= BIT STRING {
     msc-s (0),
     mgw (1),
     sgsn (2),
     ggsn (3),
     rnc (4),
     bm-sc (x)} (SIZE (65..16))
-- Other bits than listed above shall be discarded.
```

```
TraceInterfaceList ::= SEQUENCE {
     msc-s-List                          [0] MSC-S-InterfaceList          OPTIONAL,
     mgw-List                            [1] MGW-InterfaceList            OPTIONAL,
     sgsn-List                           [2] SGSN-InterfaceList           OPTIONAL,
     ggsn-List                           [3] GGSN-InterfaceList           OPTIONAL,
     rnc-List                            [4] RNC-InterfaceList            OPTIONAL,
     bmsc-List                           [x] BMSC-InterfaceList           OPTIONAL,
     ...}
```

```
MSC-S-InterfaceList ::= BIT STRING {
     a (0),
     iu (1),
     mc (2),
     map-g (3),
     map-b (4),
     map-e (5),
     map-f (6),
     cap (7),
     map-d (8),
     map-c (9)} (SIZE (10..16))
-- Other bits than listed above shall be discarded.
```

```
MGW-InterfaceList ::= BIT STRING {
     mc (0),
     nb-up (1),
     iu-up (2)} (SIZE (3..8))
-- Other bits than listed above shall be discarded.
```

```
SGSN-InterfaceList ::= BIT STRING {
     gb (0),
     iu (1),
     gn (2),
     map-gr (3),
     map-gd (4),
     map-gf (5),
     gs (6),
     ge (7)} (SIZE (8..16))
-- Other bits than listed above shall be discarded.
```

```
GGSN-InterfaceList ::= BIT STRING {
     gn (0),
     gi (1),
     gmb (x)} (SIZE (32..8))
-- Other bits than listed above shall be discarded.
```

```
RNC-InterfaceList ::= BIT STRING {
     iu (0),
     iur (1),
     iub (2),
     uu (3)} (SIZE (4..8))
-- Other bits than listed above shall be discarded.
```

```
BMSC-InterfaceList ::= BIT STRING {
     gmb (0)} (SIZE (1..8))
-- Other bits than listed above shall be discarded.
```

```
TraceEventList ::= SEQUENCE {
     msc-s-List                          [0] MSC-S-EventList              OPTIONAL,
     mgw-List                            [1] MGW-EventList                OPTIONAL,
     sgsn-List                           [2] SGSN-EventList               OPTIONAL,
     ggsn-List                           [3] GGSN-EventList               OPTIONAL,
     bmsc-List                           [x] BMSC-EventList               OPTIONAL,
     ...}
```

```
MSC-S-EventList ::= BIT STRING {
     mo-mtCall (0),
     mo-mt-sms (1),
     lu-imsiAttach-imsiDetach (2),
     handovers (3),
     ss (4)} (SIZE (5..16))
-- Other bits than listed above shall be discarded.
```

```
MGW-EventList ::= BIT STRING {
     context (0)} (SIZE (1..8))
-- Other bits than listed above shall be discarded.
```

```
SGSN-EventList ::= BIT STRING {
     pdpContext (0),
     mo-mt-sms (1),
     rau-gprsAttach-gprsDetach (2),
     mbmsContext (x)} (SIZE (43..16))
-- Other bits than listed above shall be discarded.
```

```
GGSN-EventList ::= BIT STRING {
     pdpContext (0),
     mbmsContext (x)} (SIZE (21..8))
-- Other bits than listed above shall be discarded.
```

```
BMSC-EventList ::= BIT STRING {
     mMbmsContextMulticastServiceActivation (0)} (SIZE (1..8))
-- Other bits than listed above shall be discarded.
```

```
ActivateTraceModeRes ::= SEQUENCE {
     extensionContainer                  [0] ExtensionContainer            OPTIONAL,
     ...,
     traceSupportIndicator               [1]  NULL                         OPTIONAL
     }
```

```
DeactivateTraceModeArg ::= SEQUENCE {
     imsi                                [0] IMSI                          OPTIONAL,
     traceReference                      [1] TraceReference,
     extensionContainer                  [2] ExtensionContainer            OPTIONAL,
     ...,
     traceReference2                     [3] TraceReference2               OPTIONAL
     }
```

```
DeactivateTraceModeRes ::= SEQUENCE {
     extensionContainer                  [0] ExtensionContainer            OPTIONAL,
     ...}
```

```
END
```

Side is a j3GPP TSG-CT WG4 Meeting #27 **C4-050889**
Cancun, Mexico. 25th to 29th April 2005.

CR-Form-v7.1

CHANGE REQUEST

⌘ **29.060** **CR** **554** ⌘ **rev** **3** ⌘ Current version: **6.8.0** ⌘

*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:	⌘	IE description to allow Signalling Activated Trace of the BM-SC
Source:	⌘	Vodafone
Work item code:	⌘	OAM-Trace
Date:	⌘	14/04/2005
Category:	⌘	**F**
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:

Ph2	*(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)*
Rel-7	*(Release 7)*

Reason for change:	⌘	At S2 #45, 23.246 CR143 was approved to add the stage 2 requirement to allow Trace of MBMS sessions. This has the knock on effect that signalling based Trace activation/deactivation needs to be communicated to the BM-SC when triggered by the SGSN (and via the GGSN). Therefore, 29.060 and 29.002 need to be modified to incorporate the stage 3 protocol impacts of the stage 2 requirement.
Summary of change:	⌘	The 'Additional BM-SC Trace Info' IE is added to MBMS messages as required.
Consequences if not approved:	⌘	No mechanism to trigger Trace at the BM-SC will be defined, thus not meeting the stage 2 requirements in 23.246.

Clauses affected:	⌘	7.5A.1.5, 7.5A.1.7, 7.7, 7.7.XX (new)			
		Y	**N**		
Other specs affected:	⌘	**X**		Other core specifications	⌘ 23.246 CR143, 29.061 CR163, 29.002 CR769
			X	Test specifications	
		X		O&M Specifications	32.421, 32.422, 32.423
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 Modified Section ******

7.5A.1.5 Create MBMS Context Request

A Create MBMS Context Request shall be sent from an SGSN node to a GGSN node as part of the MBMS Context Activation procedure. After sending the Create MBMS Context Request message, the SGSN marks the MBMS UE context as 'waiting for response'. A valid request creates a MBMS UE Context within the SGSN and GGSN, (see 3GPP TS 23.246 [26]). Furthermore, a valid request creates a GTP tunnel in the GTP-C plane, however no GTP-U tunnel is created at this step.

The Tunnel Endpoint Identifier Control Plane field specifies a downlink Tunnel Endpoint Identifier for control plane messages which is chosen by the SGSN. The GGSN shall include this Tunnel Endpoint Identifier in the GTP header of all subsequent downlink control plane messages which are related to the requested MBMS UE context.

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

The IMSI information element together with the Enhanced NSAPI information element uniquely identifies the MBMS UE context to be created.

The End User Address information element contains the PDP type and IP Multicast PDP address that the UE requires to be activated. The SGSN shall include either the UE provided APN, a subscribed APN or an SGSN selected APN in the message. The Access Point Name information element identifies the access point of packet data network that the UE requires to connect to receive the required MBMS service. The Selection Mode information element shall indicate the origin of the APN in the message. The APN and End User Address information element shall uniquely identify the MBMS service.

The SGSN shall include an SGSN Address for control plane, which may differ from that provided by the underlying network service (e.g. IP). If the GGSN is IPv6 capable, the IPv4/IPv6 capable SGSN shall include IPv6 addresses in the field SGSN Address for signalling. Otherwise, it shall include IPv4 addresses in this field. The GGSN shall store the SGSN Address and use them when sending control plane on this GTP tunnel for the UE.

The SGSN shall include a Recovery information element into the Create MBMS Context Request if the SGSN is in contact with the GGSN for the very first time or if the SGSN has restarted recently and the new Restart Counter value has not yet been indicated to the GGSN or if the SGSN has noticed that the path between itself and the GGSN has failed at some point and has deleted all the active PDP contexts, MBMS UE contexts and MBMS Bearer contexts associated with the GGSN as a result and the new Restart Counter value has not yet been indicated to the GGSN. The GGSN that receives a Recovery information element in the Create MBMS Context Request message element shall handle it in the same way as when receiving an Echo Response message. The Create MBMS Context Request message shall be considered as a valid activation request for the MBMS UE context included in the message.

The SGSN shall include Trace Reference, Trace Type, Trigger Id, OMC Identity and Additional Trace Info in the message if GGSN trace is activated in the GGSN. The SGSN shall copy Trace Reference, Trace Type, and OMC Identity from the trace request received from the HLR or OMC and the Trace Activity Control shall be set to Trace Activation.

If BM-SC trace is to be activated in the BM-SC (via the GGSN), the SGSN shall include Additional BM-SC Trace Info in the message. The SGSN shall populate the Additional MBMS Trace Info IE with the values of the relevant parameters included in the trace request received from the HLR or OMC, and the Trace Activity Control For BM-SC value shall be set to Trace Activation.

If Additional Trace Info and Additional MBMS Trace Info are both included within the message, the values of Trace Reference2 and Trace Recording Session Reference shall be the same in each IE.

For more detailed description of Trace Session activation/deactivation procedures see 3GPP TS 32.422 [31]

For SGSN and GGSN trace record description see 3GPP TS 32.423 [32]

The SGSN shall include the Routeing Area Identity (RAI) of the SGSN where the UE is registered. The MCC and MNC components shall be populated with the MCC and MNC, respectively, of the SGSN where the UE is registered. The LAC and RAC components shall be populated by the SGSN with the LAC and RAC, respectively, of where the UE is located at the time of the MBMS Context invocation.

The optional Private Extension contains vendor or operator specific information.

The MBMS Protocol Configuration Options (MBMS PCO) information element may be included in the request when the MS provides the GGSN with MBMS specific parameters. The SGSN includes this IE in the Create MBMS Context Request if the associated Activate MBMS Context Request from the MS includes MBMS protocol configuration options. The SGSN shall copy the content of this IE transparently from the content of the MBMS PCO IE in the Activate MBMS Context Request message.

Table 7.5A.5: Information Elements in a Create MBMS Context Request

Information element	Presence requirement	Reference
IMSI	Conditional	7.7.2
Routeing Area Identity (RAI)	Mandatory	7.7.3
Recovery	Optional	7.7.11
Selection mode	Conditional	7.7.12
Tunnel Endpoint Identifier Control Plane	Conditional	7.7.14
Trace Reference	Optional	7.7.24
Trace Type	Optional	7.7.25
End User Address	Mandatory	7.7.27
Access Point Name	Mandatory	7.7.30
SGSN Address for signalling	Mandatory	GSN Address 7.7.32
MSISDN	Conditional	7.7.33
Trigger Id	Optional	7.7.41
OMC Identity	Optional	7.7.42
MBMS Protocol Configuration Options	Optional	7.7.58
Additonal Trace Info	Optional	7.7.62
Enhanced NSAPI	Mandatory	7.7.67
Additional MBMS Trace Info	Optional	7.7.XX
Private Extension	Optional	7.7.46

****** Second Modified Section ******

7.5A.1.7 Update MBMS Context Request

An Update MBMS Context Request message shall be sent from a SGSN to a GGSN as part of the GPRS Inter SGSN Routeing Update procedure or to redistribute contexts due to load sharing. The message shall be sent by the new SGSN at the Inter SGSN Routeing Update procedure. The GGSN shall update the MBMS UE context fields accordingly.

The Enhanced NSAPI information element together with the Tunnel Endpoint Identifier in the GTP header unambiguously identifies a MBMS UE Context in the GGSN.

The IMSI shall be included if the message is sent during an Inter SGSN change when changing the GTP version from GTP v0 to GTP v1; this is required, as the TEID in the header of the message is set to all zeros in this case.

The Tunnel Endpoint Identifier Control Plane field specifies a downlink Tunnel Endpoint Identifier Control Plane messages which is chosen by the SGSN. The GGSN shall include this Tunnel Endpoint Identifier in the GTP header of all subsequent downlink control plane messages that are related to the requested PDP context.

The SGSN shall include an SGSN Address for control plane, which may differ from that provided by the underlying network service (e.g. IP).

If an IPv4/IPv6 capable SGSN received IPv4 GGSN addresses from the old SGSN, it shall include IPv4 addresses in the fields SGSN Address for Control Plane and IPv6 addresses in the fields Alternative SGSN Address for Control Plane. Otherwise, an IPv4/IPv6 capable SGSN shall use only SGSN IPv6 addresses if it has GGSN IPv6 addresses available. If the GGSN supports IPv6 below GTP, it shall store and use the IPv6 SGSN addresses for communication with the SGSN and ignore the IPv4 SGSN addresses. If the GGSN supports only IPv4 below GTP, it shall store and use the IPv4 SGSN addresses for communication with the SGSN and ignore the IPv6 SGSN addresses. When active

contexts are being redistributed due to load sharing, G-PDUs that are in transit across the Gn-interface are in an undetermined state and may be lost.

The SGSN shall include a Recovery information element into the Update MBMS Context Request if the SGSN is in contact with the GGSN for the very first time or if the SGSN has restarted recently and the new Restart Counter value has not yet been indicated to the GGSN or if the SGSN has noticed that the path between itself and the GGSN has failed at some point and has deleted all the active PDP contexts, MBMS UE contexts and MBMS Bearer contexts associated with the GGSN as a result and the new Restart Counter value has not yet been indicated to the GGSN. The GGSN that receives a Recovery information element in the Update MBMS Context Request message element shall handle it in the same way as when receiving an Echo Response message. The Update PDP Context Request message shall be considered as a valid update request for the MBMS UE context indicated in the message.

The SGSN shall include Trace Reference, Trace Type, Trigger Id, OMC Identity and Additional Trace Info in the message if GGSN trace is activated while the MBMS UE context is active. The SGSN shall copy Trace Reference, Trace Type, OMC Identity and Additional Trace Info from the trace request received from the HLR or OMC and the Trace Activity Control shall be set to Trace Activation.

If SGSN deactivates the Trace Session to GGSN, the SGSN shall include the Additional Trace Info in the message and the Trace Activity Control shall be set to Trace Deactivation.

If BM-SC trace is to be activated in the BM-SC (via the GGSN), the SGSN shall include Additional MBMS Trace Info in the message. The SGSN shall populate the Additional BM-SC Trace Info IE with the values of the relevant parameters included in the trace request received from the HLR or OMC, and the Trace Activity Control For BM-SC value shall be set to Trace Activation.

If the SGSN deactivates the Trace Session to the BM-SC, then the SGSN shall include the Additional MBMS Trace Info in the message and the Trace Activity Control For BM-SC value shall be set to Trace Deactivation.

If Additional Trace Info and Additional MBMS Trace Info are both included within the message, the values of Trace Reference2 and Trace Recording Session Reference shall be the same in each IE.

For more detailed description of Trace Session activation/deactivation procedures see 3GPP TS 32.422 [31]

For SGSN and GGSN trace record description see 3GPP TS 32.423 [32]The SGSN shall include the Routeing Area Identity (RAI) of the SGSN where the UE is registered. The MCC and MNC components shall be populated with the MCC and MNC, respectively, of the SGSN where the UE is registered. The LAC and RAC components shall be populated by the SGSN with the value of 'FFFE' and 'FF', respectively.

The optional Private Extension contains vendor or operator specific information.

Table 7.5A.7: Information Elements in an Update MBMS Context Request

Information element	Presence requirement	Reference
IMSI	Conditional	7.7.2
Routeing Area Identity (RAI)	Mandatory	7.7.3
Recovery	Optional	7.7.11
Tunnel Endpoint Identifier Control Plane	Conditional	7.7.14
Trace Reference	Optional	7.7.24
Trace Type	Optional	7.7.25
SGSN Address for Control Plane	Mandatory	GSN Address 7.7.32
Alternative SGSN Address for Control Plane	Conditional	GSN Address 7.7.32
Trigger Id	Optional	7.7.41
OMC Identity	Optional	7.7.42
Additional Trace Info	Optional	7.7.62
Enhanced NSAPI	Mandatory	7.7.67
Additional MBMS Trace Info	Optional	7.7.XX
Private Extension	Optional	7.7.46

****** Third Modified Section ******

7.7 Information Elements

A GTP Signalling message may contain several information elements. The TLV (Type, Length, Value) or TV (Type, Value) encoding format shall be used for the GTP information elements. The information elements shall be sorted, with the Type fields in ascending order, in the signalling messages. The Length field contains the length of the information element excluding the Type and Length field.

For all the length fields, bit 8 of the lowest numbered octet is the most significant bit and bit 1 of the highest numbered octet is the least significant bit.

Within information elements, certain fields may be described as spare. These bits shall be transmitted with the value defined for them. To allow for future features, the receiver shall not evaluate these bits.

The most significant bit in the Type field is set to 0 when the TV format is used and set to 1 for the TLV format.

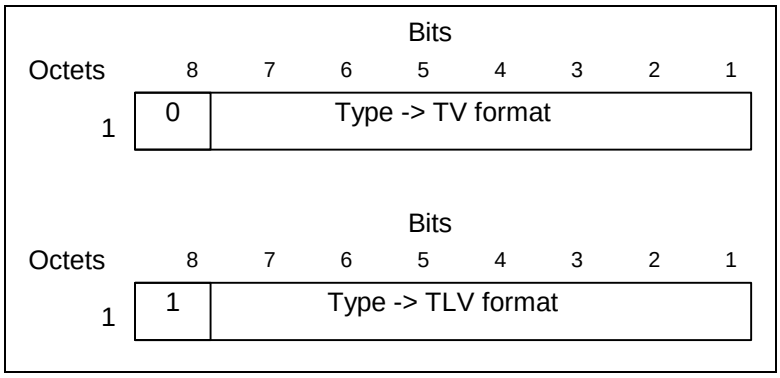

Figure 8: Type field for TV and TLV format

Table 37: Information Elements

IE Type Value	Format	Information Element	Reference
1	TV	Cause	7.7.1
2	TV	International Mobile Subscriber Identity (IMSI)	7.7.2
3	TV	Routeing Area Identity (RAI)	7.7.3
4	TV	Temporary Logical Link Identity (TLLI)	7.7.4
5	TV	Packet TMSI (P-TMSI)	7.7.5
6-7	Spare		
8	TV	Reordering Required	7.7.6
9	TV	Authentication Triplet	7.7.7
10	Spare		
11	TV	MAP Cause	7.7.8
12	TV	P-TMSI Signature	7.7.9
13	TV	MS Validated	7.7.10
14	TV	Recovery	7.7.11
15	TV	Selection Mode	7.7.12
16	TV	Tunnel Endpoint Identifier Data I	7.7.13
17	TV	Tunnel Endpoint Identifier Control Plane	7.7.14
18	TV	Tunnel Endpoint Identifier Data II	7.7.15
19	TV	Teardown Ind	7.7.16
20	TV	NSAPI	7.7.17
21	TV	RANAP Cause	7.7.18
22	TV	RAB Context	7.7.19
23	TV	Radio Priority SMS	7.7.20
24	TV	Radio Priority	7.7.21
25	TV	Packet Flow Id	7.7.22
26	TV	Charging Characteristics	7.7.23
27	TV	Trace Reference	7.7.24

IE Type Value	Format	Information Element	Reference
28	TV	Trace Type	7.7.25
29	TV	MS Not Reachable Reason	7.7.25A
117-126	Reserved for the GPRS charging protocol (see GTP' in 3GPP TS 32.295 [33])		
127	TV	Charging ID	7.7.26
128	TLV	End User Address	7.7.27
129	TLV	MM Context	7.7.28
130	TLV	PDP Context	7.7.29
131	TLV	Access Point Name	7.7.30
132	TLV	Protocol Configuration Options	7.7.31
133	TLV	GSN Address	7.7.32
134	TLV	MS International PSTN/ISDN Number (MSISDN)	7.7.33
135	TLV	Quality of Service Profile	7.7.34
136	TLV	Authentication Quintuplet	7.7.35
137	TLV	Traffic Flow Template	7.7.36
138	TLV	Target Identification	7.7.37
139	TLV	UTRAN Transparent Container	7.7.38
140	TLV	RAB Setup Information	7.7.39
141	TLV	Extension Header Type List	7.7.40
142	TLV	Trigger Id	7.7.41
143	TLV	OMC Identity	7.7.42
144	TLV	RAN Transparent Container	7.7.43
145	TLV	PDP Context Prioritization	7.7.45
146	TLV	Additional RAB Setup Information	7.7.45A
147	TLV	SGSN Number	7.7.47
148	TLV	Common Flags	7.7.48
149	TLV	APN Restriction	7.7.49
150	TLV	Radio Priority LCS	7.7.25B
151	TLV	RAT Type	7.7.50
152	TLV	User Location Information	7.7.51
153	TLV	MS Time Zone	7.7.52
154	TLV	IMEI(SV)	7.7.53
155	TLV	CAMEL Charging Information Container	7.7.54
156	TLV	MBMS UE Context	7.7.55
157	TLV	Temporary Mobile Group Identity (TMGI)	7.7.56
158	TLV	RIM Routing Address	7.7.57
159	TLV	MBMS Protocol Configuration Options	7.7.58
160	TLV	MBMS Service Area	7.7.60
161	TLV	Source RNC PDCP context info	7.7.61
162	TLV	Additional Trace Info	7.7.62
163	TLV	Hop Counter	7.7.63
164	TLV	Selected PLMN ID	7.7.64
165	TLV	MBMS Session Identifier	7.7.65
166	TLV	MBMS 2G/3G Indicator	7.7.66
167	TLV	Enhanced NSAPI	7.7.67
168	TLV	MBMS Session Duration	7.7.59
XXX	TLV	Additional MBMS Trace Info	7.7.XX
239-250	Reserved for the GPRS charging protocol (see GTP' in 3GPP TS 32.295 [33])		
251	TLV	Charging Gateway Address	7.7.44
252-254	Reserved for the GPRS charging protocol (see GTP' in 3GPP TS 32.295 [33])		
255	TLV	Private Extension	7.7.46

****** New Section ******

7.7.XX Additional MBMS Trace Info

The Additional MBMS Trace Info IE is used to inform the GGSN of Additional Trace parameters to be passed to the BM-SC over the Gmb interface. An Additional MBMS Trace Info consists of Trace Reference2, Trace Recording Session Reference, Triggering events in BM-SC, Trace Depth for BM-SC, List of interfaces to trace in BM-SC and a Trace Activity Control For BM-SC. The encoding of these elements is defined in 3GPP TS 32.422 [31].

The Trace Activity Control For BM-SC is used to indicate to BM-SC whether the Trace is activated or deactivated.

Octets	Bits 8	7	6	5	4	3	2	1
1	Type = XXX (Decimal)							
2-3	Length							
4-6	Trace Reference2							
	Trace Recording Session Reference							
7-8	Triggering events in BM-SC							
9	Trace Depth for BM-SC							
10	List of interfaces in BM-SC							
11	Trace Activity Control For BM-SC							

Figure 7.7.XX.1: Additional MBMS Trace Info Information Element

Trace Activity Control	Value (Decimal)
Trace Activation	1
Trace Deactivation	0
All other values are reserved	

Figure 7.7.XX.2: Trace Activity Control For BM-SC Value