3GPP TSG-CN Meeting #22 **NP-030568**
10th - 12th December. Maui, Hawaii.

Source: TSG CN WG3

Title: CRs on Rel-5 Work Item TEI (HSDPA).

Agenda item: 8.9

Document for: APPROVAL

Introduction:

This document contains **2** CRs on **Rel-5 Work Item TEI (HSDPA),** including the corresponding mirror CRs (as required).

These CRs have been agreed by TSG CN WG3 and are forwarded to TSG CN Plenary meeting for approval.

WG_tdoc	Title	Spec	CR	Rev	Cat	Rel
N3-030774	HSDPA impacts to Radius	29.061	099	1	F	Rel-5
N3-030694	HSDPA impacts to Go interface	29.208	048		F	Rel-5

3GPP TSG CN WG3 Meeting #30 **N3-030694**
Bangkok, THAILAND, 27th – 31st October 2003

CR-Form-v7

CHANGE REQUEST

⌘ **29.208** **CR** **048** ⌘ **rev** **-** ⌘ Current version: **5.5.1** ⌘

*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 [X] Radio Access Network [ ] Core Network [X]

Title:	⌘	HSDPA impacts to Go interface
Source:	⌘	TSG_CN WG3
Work item code:	⌘	TEI (HSDPA)
Date:	⌘	7th of October 2003
Category:	⌘	**F**
Release:	⌘	Rel-5

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:	⌘	In the SA-Plenary#21, The TS 23.107 CR that upgrades the maximum bitrate upto 16 mega was approved in order to support HSDPA. Accrodingly, the TS 24.008 CR was also approved in the CN-Plenary#21. These upgrades has the impact to Go interface since maximum bitrate information as the part of QoS is handled in Go interface.
Summary of change:	⌘	The following updates are proposed in this CR. - The mapping rule for Maximum Authorized Data Rate DL and UL per Client in PDF is modified to set upper limit as 16000 K bps. - The mapping rule for Maximum Authorized Bandwidth DL and UL per PDP Context in UE is modified to set upper limit as 16000 K bps.
Consequences if not approved:	⌘	- HSDPA capable MS may be restricted to enjoy high speed packet services due to improper QoS subscription check in SGSN. - The extended QoS information cannot be referred by CAP operation.

Clauses affected:	⌘	7.1.1, 7.2.2

Other specs affected: ⌘	Y	N		⌘
		X	Other core specifications	
		X	Test specifications	
		X	O&M Specifications	

Other comments:	⌘	The related CR S2-032688 (CR#139r1 for 23.107) has been approved in TSG SA-P#21.

How to create CRs using this form:

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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 ******

7.1.1 SDP parameters to Authorized IP QoS parameters mapping in PDF

The QoS authorization is to be based on the parameters Maximum Authorized QoS Class and Maximum Authorized Data Rate UL/DL.

When a session is initiated or modified the PDF shall use the mapping rules in table 7.1.1.1 to derive the Authorized IP QoS parameters Maximum Authorized Data Rate DL/UL and the Maximum Authorized QoS Class from the SDP Parameters. In the case of forking, the various forked responses may have different QoS requirements for the IP flows of the same media component. Each Authorized IP QoS Parameter shall be set to the highest value requested for the IP flow(s) of that media component by any of the active forked responses. These values are derived by the rules in table 7.1.1.1

Table 7.1.1.1: Rules for derivation of the Maximum Authorized Data Rates and Maximum Authorized QoS Class per flow identifier in the PDF

Authorized IP QoS Parameter per flow identifier	Derivation from SDP Parameters (see note 4)

Maximum Authorized Data Rate DL (Max_DR_DL) and UL (Max_DR_UL) per flow identifier (see note 5)	

```
/* Direction of the IP flow(s) identified by the flow identifier */

IF a=recvonly THEN
      IF <SDP direction> = mobile originated THEN
            Direction:= downlink;
      ELSE /* mobile terminated */
            Direction:= uplink;
      ENDIF;
ELSE
      IF a=sendonly THEN
            IF <SDP direction> = mobile originated THEN
                  Direction: = uplink;
            ELSE /* mobile terminated */
                  Direction:= downlink;
            ENDIF;
      ELSE /*sendrecv, inactive or no direction attribute*/
            Direction:=both;
      ENDIF;
ENDIF;
/* Max_DR_UL and Max_DR_DL */

IF media IP flow(s) THEN
   IF b_AS=AS:<bandwidth> is present THEN
      IF Direction=downlink THEN
         Max_DR_UL:= 0;
         Max_DR_DL:= b_AS;
      ELSE
         IF Direction=uplink THEN
            Max_DR_UL:= b_AS;
            Max_DR_DL:= 0;
         ELSE /*Direction=both*/
            Max_DR_UL:= b_AS;
            Max_DR_DL:= b_AS;
         ENDIF;
      ENDIF;
   ELSE
      bw:= as set by the operator;
      IF Direction=downlink THEN
         Max_DR_UL:= 0;
         Max_DR_DL:= bw;
      ELSE
         IF Direction=uplink THEN
            Max_DR_UL:= bw;
            Max_DR_DL:= 0;
         ELSE /*Direction=both*/
            Max_DR_UL:= bw;
            Max_DR_DL:= bw;
         ENDIF;
      ENDIF;
   ENDIF;
ELSE /* RTCP IP flow(s) */
   IF b_RS=RS:<bandwidth> and b_RR=RR:<bandwidth> is present THEN
      Max_DR_UL:= (b_RS + b_RR) / 1000;
      Max_DR_DL:= (b_RS + b_RR) / 1000;
   ELSE
      IF b_AS=AS:<bandwidth> is present THEN
         IF b_RS=RS:<bandwidth> is present and b_RR=RR:<bandwidth> is not
present THEN
            Max_DR_UL:= MAX[0.05 * b_AS, b_RS / 1000];
            Max_DR_DL:= MAX[0.05 * b_AS, b_RS / 1000];
         ENDIF;
         IF b_RS=RS:<bandwidth> is not present and b_RR=RR:<bandwidth> is
present THEN
            Max_DR_UL:= MAX[0.05 * b_AS, b_RR / 1000];
            Max_DR_DL:= MAX[0.05 * b_AS, b_RR / 1000];
         ENDIF;
         IF b_RS=RS:<bandwidth> and b_RR=RR:<bandwidth> is not present THEN
            Max_DR_UL:= 0.05 * b_AS;
            Max_DR_DL:= 0.05 * b_AS;
         ENDIF;
      ELSE
         Max_DR_UL:= as set by the operator;
         Max_DR_DL:= as set by the operator;
      ENDIF;
   ENDIF;
ENDIF;
```

Maximum Authorized QoS Class [MaxClass] per flow identifier (see notes 1, 2 and 3)	IF (all media IP flows of media type "audio" or "video" for the session have the same direction) THEN
	MaxClassDerivation:=B; /*streaming*/
	ELSE
	MaxClassDerivation:=A; /*conversational*/
	ENDIF;
	
	CASE <media> OF
	"audio": MaxClass:= MaxClassDerivation
	"video": MaxClass:= MaxClassDerivation
	"application": MaxClass:=A; /*conversational*/
	"data": MaxClass:=E; /*interactive with priority 3*/
	"control": MaxClass:=C; /*interactive with priority 1*/
	/*new media type*/
	OTHERWISE: MaxClass:=F; /*background*/
	END;

NOTE 1: The Maximum Authorized QoS Class for a RTCP IP flow is the same as for the corresponding RTP media IP flow.
NOTE 2: When audio or video IP flow (s) are removed from a session, the maximum Authorized QoS class shall keep the originally assigned value.
NOTE 3: When audio or video IP flow(s) are added to a session, the PDF shall derive the maximum Authorized QoS Class taking into account the already existing media IP flow(s) within the session.
NOTE 4: The SDP parameters are described in RFC 2327 [9].
NOTE 5: The 'b=RS:' and 'b=RR:' SDP bandwidth modifiers are defined in RFC 3556 [10].

The PDF shall per ongoing session store the Authorized IP QoS parameters per flow identifier.

When the GGSN requests the Authorized UMTS QoS parameters for an activated/modified PDP Context carrying IP flows of media component(s), the PDF shall use the rules in table 7.1.1.2 to calculate the Authorized IP QoS parameters per Client Handle.

Table 7.1.1.2: Rules for calculating the Maximum Authorized Data Rates and Maximum Authorized QoS Class per Client Handle in the PDF

Authorized IP QoS Parameter per Client Handle	Calculation Rule

Maximum Authorized Data Rate DL and UL per Client Handle	Maximum Authorized Data Rate DL/UL per Client Handle is the sum of all Maximum Authorized Data Rate DL/UL for all the flow identifiers associated with that Client Handle.
	
	IF Maximum Authorized Data Rate DL/UL per Client Handle > ~~2 047~~16000 kbps THEN
	Maximum Authorized Data Rate DL/UL per Client Handle = ~~2 047~~16000 kbps
	/* See 3GPP TS 23.107 [8] */
	
	END;

Maximum Authorized QoS Class per Client Handle	Maximum Authorized QoS Class per Client Handle = MAX [Maximum Authorized QoS Class per flow identifier among all the flow identifiers associated with that Client Handle. (The MAX function ranks the possible Maximum Authorized QoS Class values as follows: "A" > "B" > "C" > "D" > "E" > "F") /* See 3GPP TS 29.207 [7]) */

****** Next modified section ******

7.2.2 SDP parameters to Authorized UMTS QoS parameters mapping in UE

If the PDP Context is activated or modified in an IMS context in which SBLP is applied, i.e. an authorization token has been received, then the UE should use the mapping rules in table 7.2.2.1 to derive the Maximum Authorized Bandwidth UL/DL per flow identifier.

Table 7.2.2.1 also has a mapping rule for derivation of Maximum Authorized Traffic Class per flow identifier which applies for session initiation and modification.

In future releases this mapping rule may change. For release 5 this mapping rule is optional for the Rein the case of forking, the various forked responses may have different QoS requirements for the same IP flows of a media component. When the Authorized UMTS QoS Parameters are used by the UE, they shall be set equal to the highest values requested for the IP flows of that media component by any of the active forked responses. The UE should use the mapping rule in table 7.2.2.1 for each forked response.

Table 7.2.2.1: Rules for derivation of the Maximum Authorized Bandwidth DL/UL and the Maximum Authorized Traffic Class per flow identifier in the UE

Authorized UMTS QoS Parameter per flow identifier	Derivation from SDP Parameters (see note 4)

Authorized UMTS QoS Parameter per flow identifier	Derivation from SDP Parameters (see note 4)

Maximum Authorized Bandwidth DL (Max_BW_DL) and UL (Max_BW_UL) per flow identifier (see note 5)	IF SBLP is applied THEN
	
	/* The Direction of the IP flow(s) identified by the flow identifier */
	
	IF a=recvonly THEN
	  IF <SDP direction> = mobile originated THEN
	  Direction:= downlink;
	  ELSE /* mobile terminated */
	  Direction:= uplink;
	  ENDIF;
	ELSE;
	  IF a=sendonly THEN
	  IF <SDP direction> = mobile originated THEN
	  Direction: = uplink;
	  ELSE /* mobile terminated */
	  Direction:= downlink;
	  ENDIF;
	  ELSE /*sendrecv, inactive or no direction attribute*/
	  Direction:=both;
	  ENDIF;
	ENDIF;
	
	/* Max_BW_UL and Max_BW_DL */
	
	IF media IP flow(s) THEN
	  IF b_{AS}=AS:<bandwidth> is present THEN
	  IF Direction=downlink THEN
	  Max_BW_UL:= 0;
	  Max_BW_DL:= b_{AS};
	  ELSE
	  IF Direction=uplink THEN
	  Max_BW_UL:= b_{AS};
	  Max_BW_DL:= 0;
	  ELSE /*Direction=both*/
	  Max_BW_UL:= b_{AS};
	  Max_BW_DL:= b_{AS};
	  ENDIF;
	  ENDIF;
	  ELSE
	  bw:= as set by the UE manufacturer;
	  IF Direction=downlink THEN
	  Max_BW_UL:= 0;
	  Max_BW_DL:= bw;
	  ELSE
	  IF Direction=uplink THEN
	  Max_BW_UL:= bw;
	  Max_BW_DL:= 0;
	  ELSE /*Direction=both*/
	  Max_BW_UL:= bw;
	  Max_BW_DL:= bw;
	  ENDIF;
	  ENDIF;
	  ENDIF;
	ELSE /* RTCP IP flow(s) */
	  IF b_{RS}=RS:<bandwidth> and b_{RR}=RR:<bandwidth> is present THEN
	  Max_BW_UL:= (b_{RS} + b_{RR}) / 1000;
	  Max_BW_DL:= (b_{RS} + b_{RR}) / 1000;
	  ELSE
	  IF b_{AS}=AS:<bandwidth> is present THEN
	  IF b_{RS}=RS:<bandwidth> is present and b_{RR}=RR:<bandwidth> is not present THEN
	  Max_BW_UL:= MAX[0.05 * b_{AS}, b_{RS} / 1000];
	  Max_BW_DL:= MAX[0.05 * b_{AS}, b_{RS} / 1000];
	  ENDIF;
	  IF b_{RS}=RS:<bandwidth> is not present and b_{RR}=RR:<bandwidth> is present THEN
	  Max_BW_UL:= MAX[0.05 * b_{AS}, b_{RR} / 1000];
	  Max_BW_DL:= MAX[0.05 * b_{AS}, b_{RR} / 1000];
	  ENDIF;
	  IF b_{RS}=RS:<bandwidth> and b_{RR}=RR:<bandwidth> is not present THEN
	  Max_BW_UL:= 0.05 * b_{AS};
	  Max_BW_DL:= 0.05 * b_{AS};
	  ENDIF;
	  ELSE
	  Max_BW_UL:= as set by the UE manufacture;
	  Max_BW_DL:= as set by the UE manufacture;
	  ENDIF;
	  ENDIF;
	ENDIF;

Authorized UMTS QoS Parameter per flow identifier	Derivation from SDP Parameters (see note 4)

Maximum Authorized Traffic Class [MaxTrafficClass] per flow identifier (see NOTE 1, 2 and3)	IF SBLP is applied THEN
	IF (all media IP flows of media type “audio” or “video” for the session have the same direction) THEN
	MaxService:= streaming;
	ELSE
	MaxService:= conversational;
	ENDIF;
	
	CASE <media> OF
	“audio”: MaxTrafficClass:= MaxService;
	“video”: MaxTrafficClass:= MaxService;
	“application”: MaxTrafficClass:=conversational;
	“data”: MaxTrafficClass:=interactive with priority 3;
	“control”: MaxTrafficClass:=interactive with priority 1;
	/*new media type*/
	OTHERWISE: MaxTrafficClass:=background;
	END;
	ELSE
	No authorization is done ;
	ENDIF ;

NOTE 1: The Maximum Authorized Traffic Class for a RTCP IP flow is the same as for the corresponding RTP media IP flow.
NOTE 2: When audio or video IP flow(s) are removed from a session, the maximum Authorized Traffic Class shall keep the originally assigned value.
NOTE 3: When audio or video IP flow(s) are added to a session, the UE shall derive the maximum Authorized Traffic Class taking into account the already existing media IP flows within the session
NOTE 4: The SDP parameters are described in RFC 2327 [9].
NOTE 5: The ’b=RS:’ and ‘b=RR:’ SDP bandwidth modifiers are defined in RFC 3556 [10].

The UE should per ongoing session store the Authorized UMTS QoS parameters per flow identifier.

Before activate or modify a PDP context the UE should check that the requested Guaranteed Bitrate UL/DL (if the Traffic Class is Conversational or Streaming) or the requested Maximum Bitrate UL/DL (if the Traffic Class is Interactive or Background) does not exceed the Maximum Authorized Bandwidth UL/DL per PDP context (calculated according to the rule in table 7.2.2.2). Furthermore, if the rule in table 7.2.2.1 for calculating Traffic Class per flow identifier is implemented, the UE should check that the requested UMTS QoS parameter Traffic Class does not exceed the Maximum Authorized Traffic Class per PDP context (calculated according to the rule in table 7.2.2.2).

Table 7.2.2.2: Rules for calculating the Maximum Authorized Bandwidths and Maximum Authorized Traffic Class per PDP Context in the UE

Authorized UMTS QoS Parameter per PDP Context	Calculation Rule

Maximum Authorized Bandwidth DL and UL per PDP Context	IF SBLP is applied THEN
	
	Maximum Authorized Bandwidth DL/UL per PDP Context is the sum of all Maximum Authorized Bandwidth DL/UL for all the flow identifiers associated with that PDP Context ;
	
	IF Maximum Authorized Bandwidth DL/UL per PDP Context > ~~2047~~ 16000 kbps THEN
	Maximum Authorized Bandwidth DL/UL per PDP Context = ~~2047~~ 16000 kbps
	~~/* See~~
	~~ref [8] */~~
	END;
	
	ELSE
	No authorization is done ;
	ENDIF ;

Maximum Authorized Traffic Class per PDP Context	IF SBLP is applied THEN
	
	Maximum Authorised Traffic Class per PDP Context = MAX [Maximum Authorised Traffic Class per flow identifier among all the flow identifiers associated with that PDP Context] ;
	
	ELSE
	No authorization is done ;
	ENDIF ;
	
	(The MAX function ranks the possible Maximum Authorised Traffic Class values as follows: Conversational > Streaming > Interactive > Background)

3GPP TSG-CN WG3 Meeting #30 **N3-030774**
Bangkok, Thailand. 27th - 31st October 2003.

CR-Form-v7

CHANGE REQUEST

⌘ **29.061** **CR** **099** ⌘ **rev** **1** ⌘ Current version: **5.7.0** ⌘

*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:	⌘	HSDPA impacts to RADIUS
Source:	⌘	TSG_CN WG3
Work item code:	⌘	TEI (HSDPA)
Date:	⌘	20th of October 2003
Category:	⌘	**F**
Release:	⌘	Rel-5

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R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
Rel-4	*(Release 4)*
Rel-5	*(Release 5)*
Rel-6	*(Release 6)*

Reason for change:	⌘	In the SA-Plenary#21, The TS 23.107 CR that upgrades the maximum bitrate upto 16 mega was approved in order to support HSDPA. Accrodingly, the TS 24.008 CR was also approved in the CN-Plenary#21. These upgrades has the impact to GPRS Negotiated QoS profile Sub-attribute in RADIUS.
Summary of change:	⌘	The following updates are proposed in this CR. - The definition of Rel5 3GPP-GPRS Negotiated QoS profile was added to the RADIUS according to the QoS expansion for HSDPA in 24.008. - When the 14th octet was added to the QoS information element in 24.008, the corresponding expansion to the GPRS Negotiated QoS profile Sub-attribute in RADIUS (29.061) was left so that this CR treat this expantion together with the expantion for HSDPA.
Consequences if not approved:	⌘	The extended QoS information cannot be referred over the RADIUS interface and this may result an inappropriate RADIUS check.

Clauses affected:	⌘	16.4.7

		Y	N		
Other specs affected:	⌘		X	Other core specifications	⌘
			X	Test specifications	
			X	O&M Specifications	

Other comments:	⌘	The related CR S2-032688 (CR#139r1 for 23.107) has been approved in TSG SA-P#21.

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16.4.7 Sub-attributes of the 3GPP Vendor-Specific attribute

Table 7 describes the sub-attributes of the 3GPP Vendor-Specific attribute of the Access-Request, Accounting-Request START, Accounting-Request STOP and Accounting-Request Interim-Update messages.

Table 7: The sub-attributes of the 3GPP Vendor-Specific attribute of the Access-Request, Accounting-Request START, Accounting-Request STOP and Accounting-Request Interim-Update messages

Sub-attr #	Sub-attribute Name	Description	Presence Requirement	Associated attribute (Location of Sub-attr)
1	3GPP-IMSI	IMSI for this user	Optional	Access-Request, Accounting-Request START, Accounting-Request STOP, Accounting-Request Interim-Update
2	3GPP-Charging-Id	Charging ID for this PDP Context (this together with the GGSN-Address constitutes a unique identifier for the PDP context).	Optional	Access-Request, Accounting-Request START, Accounting-Request STOP, Accounting-Request Interim-Update
3	3GPP-PDP Type	Type of PDP context, e.g. IP or PPP	Conditional (mandatory if attribute 7 is present)	Access-Request Accounting-Request START, Accounting-Request STOP, Accounting-Request Interim-Update
4	3GPP-CG-Address	Charging Gateway IP address	Optional	Access-Request, Accounting-Request START, Accounting-Request STOP, Accounting-Request Interim-Update
5	3GPP-GPRS-Negotiated-QoS-Profile	QoS profile applied by GGSN	Optional	Access-Request, Accounting-Request START, Accounting-Request STOP, Accounting-Request Interim-Update
6	3GPP-SGSN-Address	SGSN IP address that is used by the GTP control plane for the handling of control messages. It may be used to identify the PLMN to which the user is attached.	Optional	Access-Request, Accounting-Request START, Accounting-Request STOP, Accounting-Request Interim-Update
7	3GPP-GGSN-Address	GGSN IP address that is used by the GTP control plane for the context establishment. It is the same as the GGSN IP address used in the GCDRs.	Optional	Access-Request, Accounting-Request START, Accounting-Request STOP, Accounting-Request Interim-Update
8	3GPP-IMSI-MCC-MNC	MCC and MNC extracted from the user's IMSI (first 5 or 6 digits, as	Optional	Access-Request, Accounting-Request START, Accounting-Request STOP,

Sub-attr #	Sub-attribute Name	Description	Presence Requirement	Associated attribute (Location of Sub-attr)
		applicable from the presented IMSI).		Accounting-Request Interim-Update
9	3GPP-GGSN- MCC-MNC	MCC-MNC of the network the GGSN belongs to.	Optional	Access-Request, Accounting-Request START, Accounting-Request STOP, Accounting-Request Interim-Update
10	3GPP-NSAPI	Identifies a particular PDP context for the associated PDN and MSISDN/IMSI from creation to deletion.	Optional	Access-Request, Accounting-Request START, Accounting-Request STOP Accounting-Request Interim-Update
11	3GPP- Session-Stop-Indicator	Indicates to the AAA server that the last PDP context of a session is released and that the PDP session has been terminated.	Optional	Accounting Request STOP
12	3GPP- Selection-Mode	Contains the Selection mode for this PDP Context received in the Create PDP Context Request Message	Optional	Access-Request, Accounting-Request START, Accounting-Request STOP, Accounting-Request Interim-Update
13	3GPP-Charging-Characteristics	Contains the charging characteristics for this PDP Context received in the Create PDP Context Request Message (only available in R99 and later releases)	Optional	Access-Request, Accounting-Request START, Accounting-Request STOP, Accounting-Request Interim-Update
14	3GPP-CG-IPv6-Address	Charging Gateway IPv6 address	Optional	Access-Request, Accounting-Request START, Accounting-Request STOP, Accounting-Request Interim-Update
15	3GPP-SGSN-IPv6-Address	SGSN IPv6 address that is used by the GTP control plane for the handling of control messages. It may be used to identify the PLMN to which the user is attached.	Optional	Access-Request, Accounting-Request START, Accounting-Request STOP, Accounting-Request Interim-Update
16	3GPP-GGSN-IPv6-Address	GGSN IPv6 address that is used by the GTP control plane for the context establishment.	Optional	Access-Request, Accounting-Request START, Accounting-Request STOP, Accounting-Request Interim-Update
17	3GPP- IPv6-DNS-	List of IPv6	Optional	Access-Accept

Sub-attr #	Sub-attribute Name	Description	Presence Requirement	Associated attribute (Location of Sub-attr)
	Servers	addresses of DNS servers for an APN		
18	3GPP-SGSN-MCC-MNC	MCC and MNC extracted from the RAI within the Create PDP Context Request or Update PDP Context Request message.	Optional	Access-Request, Accounting-Request START, Accounting-Request STOP, Accounting-Request Interim-Update

The RADIUS vendor Attribute is encoded as follows (as per RFC 2865 [38])

Bits

Octets	8	7	6	5	4	3	2	1
1	Type = 26							
2	Length = n							
3	Vendor id octet 1							
4	Vendor id octet 2							
5	Vendor id octet 3							
6	Vendor id octet 4							
7-n	String							

$n \geq 7$

3GPP Vendor Id = 10415

The string part is encoded as follows:

Bits

Octets	8	7	6	5	4	3	2	1
1	3GPP type =							
2	3GPP Length = m							
3 –m	3GPP value							

$m \geq 2$ and $m \leq 248$

The 3GPP specific attributes encoding is clarified below.

1 **-** 3GPP-***IMSI***

Bits

Octets	8	7	6	5	4	3	2	1
1	3GPP type = 1							
2	3GPP Length= m							
3-m	IMSI digits 1-n (UTF-8 encoded)							

3GPP Type: 1

$n \leq 15$

Length: $m \leq 17$

IMSI value: Text:

This is the UTF-8 encoded IMSI; The definition of IMSI shall be in accordance with 3GPP TS 23.003 [40] and 3GPP TS 29.060 [24]. There shall be no padding characters between the MCC and MNC, and between the MNC and MSIN. If the IMSI is less than 15 digits, the padding in the GTP information element shall be removed by the GGSN and not encoded in this sub-attribute.

2 - 3GPP-***Charging ID***

Bits

Octets	8	7	6	5	4	3	2	1
1	3GPP type = 2							
2	3GPP Length= 6							
3	Charging ID value Octet 1							
4	Charging ID value Octet 2							
5	Charging ID value Octet 3							
6	Charging ID value Octet 4							

3GPP Type: 2

Length: 6

Charging ID value: 32 bits unsigned integer

3 - 3GPP-***PDP type***

Bits

Octets	8	7	6	5	4	3	2	1
1	3GPP type = 3							
2	3GPP Length= 6							
3	PDP type octet 1							
4	PDP type octet 2							
5	PDP type octet 3							
6	PDP type octet 4							

3GPP Type: 3

Length: 6

PDP type value: Unsigned 32 bits integer

PDP type octet possible values:

0 = IPv4

1 = PPP

2 = IPv6

4 - 3GPP-***Charging Gateway address***

Bits

Octets	8	7	6	5	4	3	2	1
1	3GPP type = 4							
2	3GPP Length= 6							
3	Charging GW addr Octet 1							
4	Charging GW addr Octet 2							
5	Charging GW addr Octet 3							
6	Charging GW addr Octet 4							

3GPP Type: 4

Length: 6

Charging GW address value: Address

5 - 3GPP-***GPRS Negotiated QoS profile***

Bits

Octets	8	7	6	5	4	3	2	1
1	3GPP type = 5							
2	3GPP Length= L							
3 -L	UTF-8 encoded QoS profile							

3GPP Type: 5

Length: L ≤ 33 (release 5) or L ≤ 27 (release 99) or L = 11 (release 98)

QoS profile value: Text

UTF-8 encoded QoS profile syntax:

"<Release indicator> – <release specific QoS IE UTF-8 encoding>"

<Release indicator> = UTF-8 encoded number :

"98" = Release 98

"99"= Release 99

“05”= Release 5

<release specific QoS profile UTF-8 encoding> = UTF-8 encoded QoS profile for the release indicated by the release indicator.

The UTF-8 encoding of a QoS IE is defined as follows: each octet is described by 2 UTF-8 encoded digits, defining its hexadecimal representation. The QoS profile definition is in 3GPP TS 24.008 [54].

The release 98 QoS profile data is 3 octets long, which then results in a 6 octets UTF-8 encoded string.

The release 99 QoS profile data is 11 octets long, which results in a 22 octets UTF-8 encoded string.

The release 5 QoS profile data is 14 octets long, which results in a 28 octets UTF-8 encoded string.