**3GPP TSG CT Meeting #28** **CP-0500034**
**1st – 3rd June 2005. Quebec, CANADA.**

**Source:** **CT3**

**Title:** **CR to Rel-6 on Work Item "End to End QoS"**

**Agenda item:** **9.25**

**Document for:** **APPROVAL**

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**Introduction:**

This document contains 1 CR to Rel-6 on Work Item “E2EQoS” that have been agreed by TSG CT WG3, and are forwarded to TSG CT Plenary for approval.

| WG_tdoc | Spec | CR | R | Cat | Title | Rel | C_Ver | Work Item |
|---|---|---|---|---|---|---|---|---|
| C3-050401 | 29.208 | 100 | 1 | F | UE QoS Mapping | Rel-6 | 6.3.0 | E2EQoS |

**3GPP TSG-CT WG3 Meeting #36** ***Tdoc ⌘ C3-050401***

**Cancun, Mexico. 25th - 29th April 2005.**

*CR-Form-v7.1*

# CHANGE REQUEST

⌘ **29.208** **CR** **100** ⌘ **rev** **1** ⌘ Current version: **6.3.0** ⌘

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

| | | |
|---|---|---|
| ***Title:*** | ⌘ | UE QoS Mapping |
| ***Source:*** | ⌘ | Siemens |
| ***Work item code:*** | ⌘ | E2EQoS |
| ***Date:*** | ⌘ | 18/04/2005 |
| ***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:*** | ⌘ | According to current text in Clause 7.2, the UE should "check" that the requested QoS not exceed the Maximum Authorized QoS. However, it is left open how the UE should react if this condition is not fulfilled, i.e. if the UE should use the requested or authorized QoS to configure the PDP context. It the UE uses a requested QoS exceeding the authorised QoS, the network would downgrade the QoS and additional signalling load would result. |
| ***Summary of change:*** | ⌘ | If the requested QoS exceeds the authorized QoS, the UE should use the authorized QoS to configure the PDP context. |
| ***Consequences if not approved:*** | ⌘ | The network would downgrade the QoS and additional signalling load would result. If the UE is not prepared for the downgrading, a call failure might result. |

| | | |
|---|---|---|
| ***Clauses affected:*** | ⌘ | 7.2.1 |

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

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

## 7.2 QoS parameter mapping in the UE

Figure 7.2 indicates the entities participating in the generation of the requested QoS parameters when activate or modify a PDP Context in the UE. The steps are:

1. The Application provides the UMTS BS Manager, possibly via the IP BS Manager and the Translation/Mapping function, with relevant information to perform step 2 or step 4. (Not subject to standardization within 3GPP).

2. If needed, information from step 1 is used to access a proper set of UMTS QoS Parameters. See 3GPP TS 26.236 [6] for Conversational Codec Applications and 3GPP TS 26.234 [5] for Streaming Codec Applications.

3. If SDP is available then the SDP Parameters should give guidance for the UMTS BS Manager (possibly via the IP Manager and the Translation/Mapping function) ,according to the rules in clause 7.2.1, to set the Maximum Bitrate UL/DL and the Guaranteed Bitrate UL/DL. Furthermore if the SDP Parameters are received in an IMS context in which SBLP is applied, i.e. an authorization token has been received, the Maximum Authorized Bandwidth UL/DL and Maximum Authorised Traffic Class should be derived according to the rules in clause 7.2.2.

4. A set of UMTS QoS Parameters values from step 2 (or directly from step 1) is possibly merged together with the Maximum Bitrate UL/DL and the Guaranteed Bitrate UL/DL from step 3. The result should constitute the requested UMTS QoS Parameters. If the PDP Context is activated or modified in an IMS context in which SBLP is applied, the UE should check that the requested Guaranteed Bitrate UL/DL or requested Maximum Bitrate UL/DL (depending on the requested Traffic Class) does not exceed the Maximum Authorized Bandwidth UL/DL derived in step 3. Furthermore, if the UE has implemented the mapping rule for Maximum Authorized Traffic Class, as defined in clause 7.2.2, the UE should check that the requested Traffic Class does not exceed the Maximum Authorised Traffic Class derived in step 3.

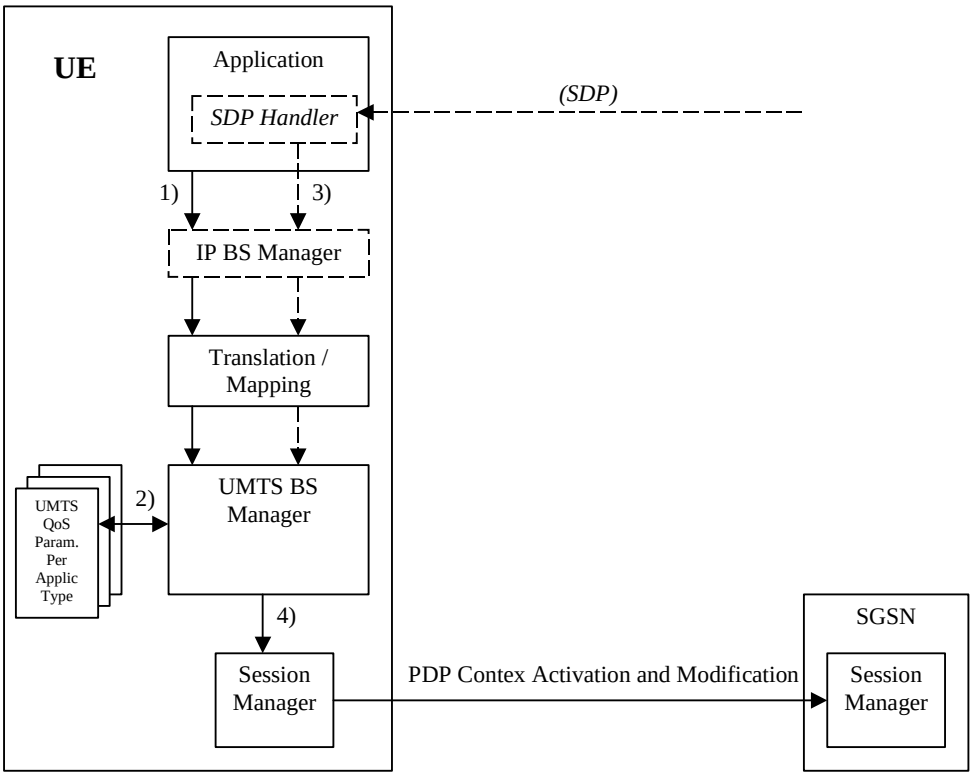


**Figure 7.2: Framework for generating requested QoS parameters in the UE**

## 7.2.1 SDP to UMTS QoS parameter mapping in UE

If SDP Parameters are available, then before activating or modifying a PDP Context the UE should check if the SDP Parameters give guidance for setting the requested UMTS QoS Parameters. The UE should use the mapping rule in table 7.2.1 to derive the Maximum and Guaranteed Bitrate DL/UL from the SDP Parameters.

**Table 7.2.1: Recommended rules for derivation of the requested Maximum and Guaranteed Bitrate DL/UL per media component in the UE**

| UMTS QoS Parameter per media component | Derivation from SDP Parameters |
|---|---|
| **Maximum Bitrate DL/UL and Guaranteed Bitrate DL/UL per media component** | /* Check if the media use codec(s) */<br>IF [(<media> = ("audio" or "video")) and (<transport> = "RTP/AVP")] THEN<br><br>/* Check if Streaming */<br>IF a= ("sendonly" or "recvonly") THEN<br>Maximum Bitrate DL/UL and Guaranteed Bitrate DL/UL per media component as specified in reference [5] ;<br>/* Conversational as default !*/<br>ELSE<br>Maximum Bitrate DL/UL and Guaranteed Bitrate DL/UL per media component as specified in reference [6] ;<br>ENDIF ;<br><br>/* Check for presence of bandwidth attribute for each media component */<br>ELSEIF b=AS:<bandwidth-value> is present THEN<br>IF media stream only downlink THEN<br>Maximum Bitrate DL = Guaranteed Bitrate DL =<bandwidth>;<br>ELSEIF mediastream only uplink THEN<br>Maximum Bitrate UL = Guaranteed Bitrate UL =<bandwidth>;<br>ELSEIF mediastreams both downlink and uplink THEN<br>Maximum Bitrate DL = Guaranteed Bitrate DL =<bandwidth>;<br>Maximum Bitrate UL = Guaranteed Bitrate UL =<bandwidth>;<br>ENDIF;<br>ELSE<br><br>/* SDP does not give any guidance ! */<br>Maximum Bitrate DL/UL and Guaranteed Bitrate DL/UL per media component as specified by the UE manufacturer;<br>ENDIF ; |

## 7.2.2 SDP parameters to Authorized UMTS QoS parameters mapping in UE

If the PDP Context is activated or modified and 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 for all applications using SDP 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.

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

| Authorized UMTS QoS Parameter per flow identifier | Derivation from SDP Parameters (see note 4) |
|---|---|
| | Max_BW_DL:= 0.05 * $b_{AS}$;<br>ENDIF;<br>ELSE<br>Max_BW_UL:= as set by the UE manufacture;<br>Max_BW_DL:= as set by the UE manufacture;<br>ENDIF;<br>ENDIF;<br>ENDIF;<br><br>ELSE<br>No authorization is done ;<br>ENDIF ; |
| **Maximum Authorized Traffic Class [MaxTrafficClass] per flow identifier (see NOTE 1, 2 and3)** | IF SBLP is applied THEN<br>IF (all media IP flows of media type "audio" or "video" for the session are unidirectional and have the same direction) THEN<br>MaxService:= streaming;<br>ELSE<br>MaxService:= conversational;<br>ENDIF;<br><br>CASE <media> OF<br>"audio": MaxTrafficClass:= MaxService;<br>"video": MaxTrafficClass:= MaxService;<br>"application": MaxTrafficClass:=conversational;<br>"data": MaxTrafficClass:=interactive with priority 3;<br>"control": MaxTrafficClass:=interactive with priority 1;<br>/*new media type*/<br>OTHERWISE: MaxTrafficClass:=background;<br>END;<br>ELSE<br>No authorization is done ;<br>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 parameter MaxService 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 parameter MaxService 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). If the requested Guaranteed Bitrate UL/DL or the requested Maximum Bitrate UL/DL exceeds the Maximum Authorized Bandwidth UL/DL per PDP context, the UE should reduce the the requested Guaranteed Bitrate UL/DL or the requested Maximum Bitrate UL/DL to the Maximum Authorized Bandwidth UL/DL per PDP context. 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). If the requested UMTS QoS parameter Traffic Class exceeds the Maximum Authorized Traffic Class per PDP context, the UE should reduce the the requested UMTS QoS parameter Traffic Class to the Maximum Authorized Traffic Class per PDP context.

**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<br><br>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 ;<br><br>IF Maximum Authorized Bandwidth DL/UL per PDP Context > 16000 kbps THEN<br>Maximum Authorized Bandwidth DL/UL per PDP Context = 16000 kbps<br>/* See ref [8] */<br>END;<br><br>ELSE<br>No authorization is done ;<br>ENDIF ; |
| **Maximum Authorized Traffic Class per PDP Context** | IF SBLP is applied THEN<br><br>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] ;<br><br>ELSE<br>No authorization is done ;<br>ENDIF ;<br><br>(The MAX function ranks the possible Maximum Authorised Traffic Class values as follows: Conversational > Streaming > Interactive with priority 1 > Interactive with priority 2 > Interactive with priority 3 > Background) |