ETSI TS 129 208 V5.0.0 (2002-06)

Technical Specification

Digital cellular telecommunications system (Phase 2+);
Universal Mobile Telecommunications System (UMTS);
End to end Quality of Service (QoS) signalling flows
(3GPP TS 29.208 version 5.0.0 Release 5)

GLOBAL SYSTEM FOR
MOBILE COMMUNICATIONS

Reference
DTS/TSGN-0329208v500

Keywords
GSM, UMTS

ETSI

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Foreword

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Contents

Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

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1 Scope

The present specification shows QoS signalling flows for resource reservation to provide end-to-end QoS. The flows are used as bases of developing QoS related protocol descriptions for new and existing specifications. The following two types of flows are described:

1) flows defining the interaction of GPRS session management procedures over the Gn interface, service based local policy (SBLP) procedures over the Go interface and QoS interworking (e.g. RSVP) over the Mb interface; and

2) end-to-end flows of RSVP and GPRS bearer level.

The relationship between SIP/SDP session level and the bearer level (RSVP and GPRS) in flows showing both SIP/SDP session level and the bearer level in end-to-end flows are described in 3GPP TS 24.228 [2]. The present specification adds detailed flows involving the network interfaces Gn, Go and Mb and also further details the flows with detailed RSVP and GPRS bearer level flows not showing the SIP/SDP session level.

The present specification also describes the mapping of QoS parameters among SDP, UMTS QoS parameters, and QoS authorization parameters.

2 References

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

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

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

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1]   3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2]   3GPP TS 24.228: "Signalling flows for the IP multimedia call control based on SIP and SDP; Stage 3".

[3]   3GPP TS 24.229: "IP Multimedia Call Control Protocol based on SIP and SDP; Stage 3".

[4]   3GPP TS 23.060: "General Packet Radio Service (GPRS); Service description; Stage 2".

[5]   3GPP TS 26.234: "End-to-end transparent streaming service; Protocols and codecs".

[6]   3GPP TS 26.236: "Packet switched conversational multimedia applications; Default codecs".

[7]   3GPP TS 29.207: "Policy control over Go interface".

[8]   3GPP TS 23.107: "Quality of Service (QoS) concept and architecture".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions as given in 3GPP TR 21.905 [1] apply.

3.2 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [1] and the following apply:

COPS	Common Open Policy Service protocol
DEC	COPS Decision message
DRQ	COPS Delete Request State message
IMS	IP Multimedia CN Subsystem
PCF	Policy Control Function
REQ	COPS Request message
RPT	COPS Report State message

4 Authorize QoS resources

4.1 Authorize QoS resources at originating PCF

This clause covers the Authorize QoS resources procedure at the originating PCF.
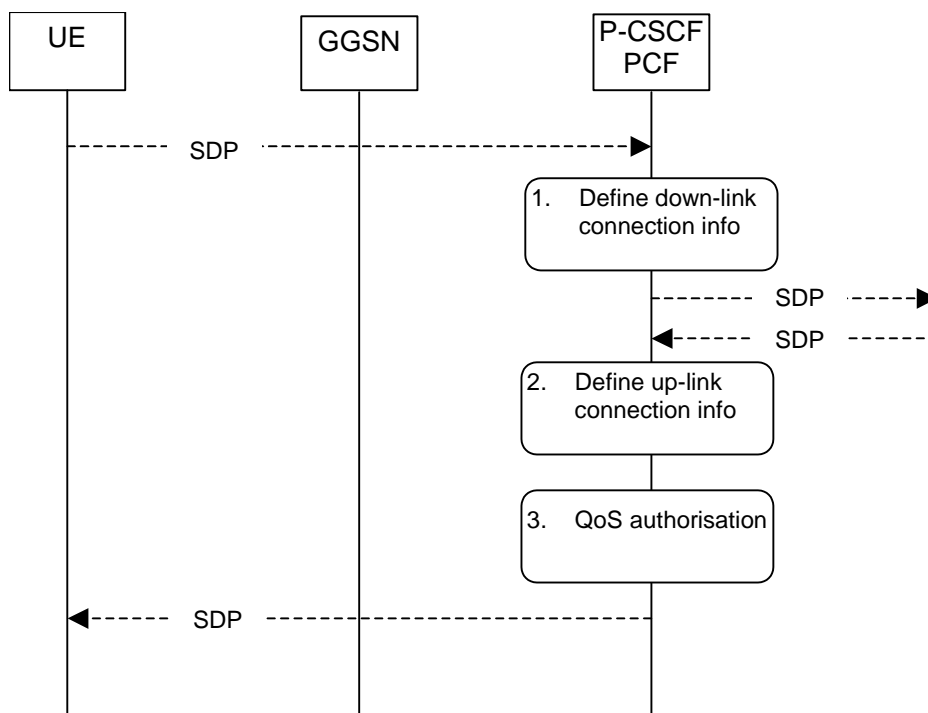
1. The P-CSCF(PCF) gets the SDP parameters defined by the originator and identifies the connection information needed (IP address of the down link media flow, media ports to be used etc…).
2. The P-CSCF(PCF) gets the negotiated SDP parameters from the terminating side through SIP signalling interaction. The P-CSCF(PCF) identifies the connection information needed (IP address of the up-link media flow, media ports to be used etc…).
3. The P-CSCF(PCF) uses the SDP parameters in order to define the QoS resource authorisation. The PCF authorises every media component negotiated for the session. The authorization shall be expressed in terms of IP QoS parameters. An authorization token is generated by the PCF and sent to the UE.

Figure 4.1: Authorize QoS resources at originating PCF

4.2 Authorize QoS resources at terminating PCF

This clause covers the Authorize QoS resources procedure at the terminating PCF.
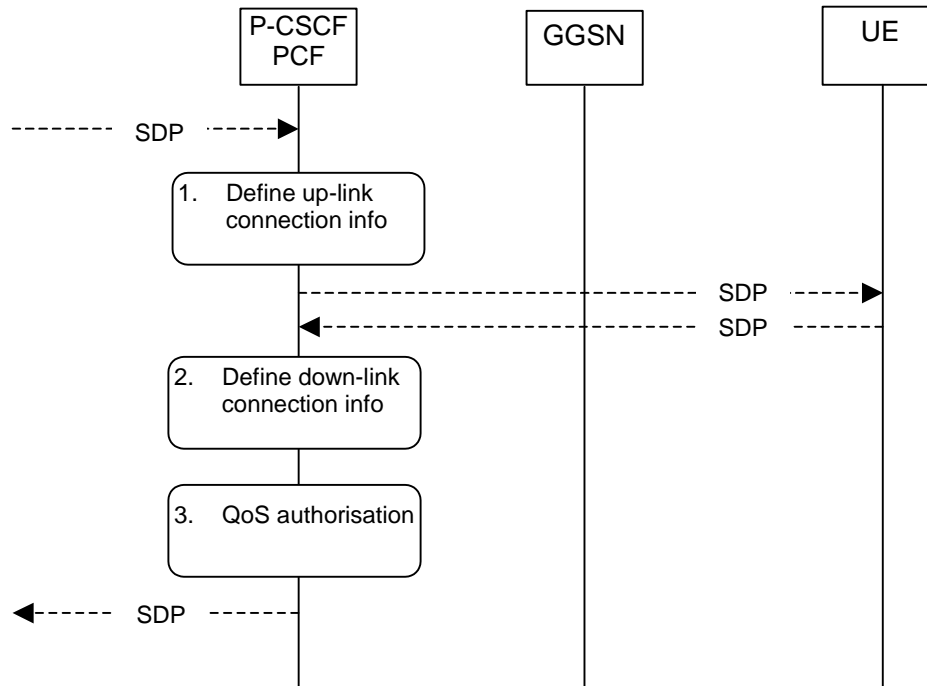
1. The P-CSCF(PCF) gets the SDP parameters defined by the originator and identifies the connection information needed (IP address of the up-link media flow, media ports to be used etc…). An authorization token is generated by the PCF and sent to the UE.
2. The P-CSCF(PCF) receives the negotiated SDP parameters from the UE. The P-CSCF(PCF) identifies the connection information needed (IP address of the down-link media flow, media ports to be used etc…).
3. The P-CSCF(PCF) uses the SDP parameters in order to define the QoS resource authorisation. The PCF authorises every media component negotiated for the session. The authorization shall be expressed in terms of IP QoS parameters.

Figure 4.2: Authorize QoS resources at terminating PCF

5 Resource reservation flows with Service-based local policy

5.1 Resource reservation without End-to-end RSVP

This clause defines a mobile originated procedure without End to End RSVP with service based local policy. The service based local policy is done via exchange of information through the Go interface. The Go interface allows the service based local policy and QoS interworking information to be requested by the GGSN from a PCF.

The figure 5.1 presents the "Resource Reservation" procedure at PDP context activation to both the Mobile Originating (MO) side and Mobile Terminating (MT) side.
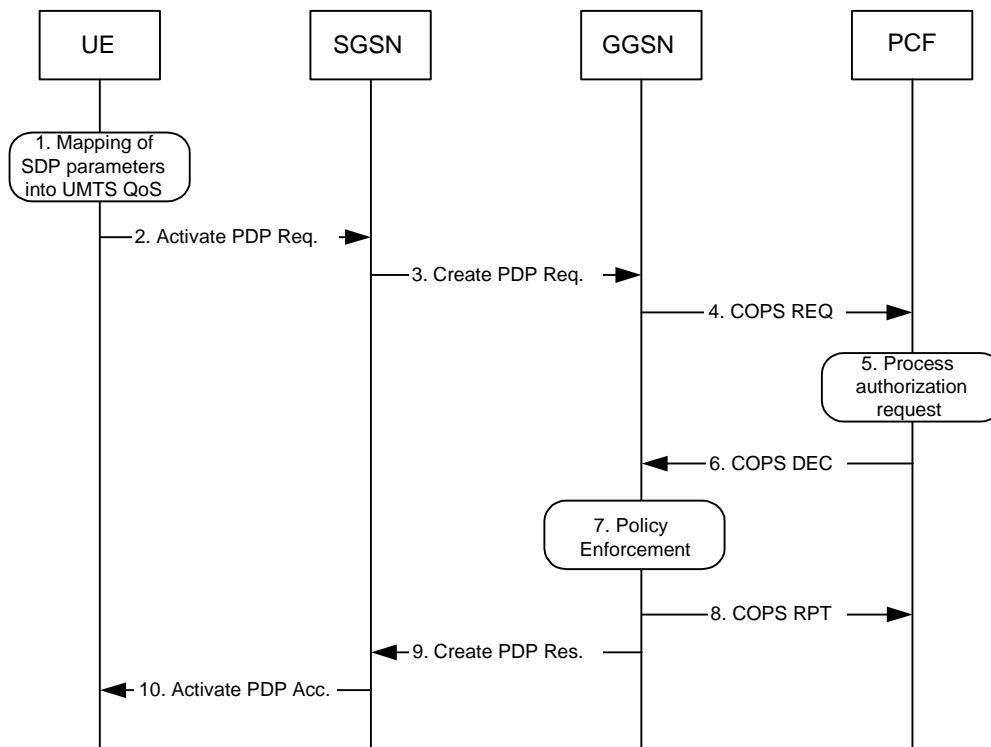
Figure 5.1: Resource reservation without End-to-end RSVP

1. Mapping from SDP to UMTS QoS parameters

The UE uses the SDP parameters in order to define the UMTS QoS parameter needed to request a PDP context. The QoS parameter mapping mechanism is described in clause 7.2.

2. GPRS: Activate PDP Context Request (UE to SGSN)

The UE sends an Activate PDP Context Request message to the SGSN with the UMTS QoS parameters The UE shall include binding information in the PDP context activation messages to associate the PDP context bearer with policy information. The authorization token is sent by the P-CSCF to the UE during SIP signalling.

3. GPRS: Create PDP Context Request (SGSN to GGSN)

The SGSN carries out the procedures identified in 3GPP TS 23.060 [4] related to the PDP context activation.

4. COPS: REQ (GGSN to PCF)

The GGSN receives the PDP context activation request with the binding information. The GGSN uses the authorisation token in order to localise the PCF. The GGSN sends a COPS REQ message to the PCF and includes the binding information.

5. Process Resource Request (PCF)

The PCF receives the information sent by the GGSN. The PCF identifies the multimedia session by using the binding information. The PCF performs an authorization decision.

6. COPS: DEC (PCF to GGSN)

The decision taken by the PCF is returned via the COPS DEC message. The DEC message includes the policy information to be used by the GGSN in order to perform the policy-based admission control.

7. Policy Enforcement (GGSN)

The GGSN enforces the PCF policy decision based on the received authorization information from the PCF for the media flows carried by the PDP context.

8. COPS: RPT (GGSN to PCF)

The GGSN sends COPS RPT message back to the PCF and reports its success or failure in carrying out the PCF decision.

9. GPRS: Create PDP Context Response (GGSN to SGSN)

The GGSN accepts the PDP context request based on the results of the authorisation policy decision enforcement. If the requested QoS parameters are not within the authorized QoS, the GGSN either rejects the PDP context activation request or downgrades the requested UMTS QoS parameters.

10. GPRS: Activate PDP Context Accept (SGSN to UE)

The SGSN sends an Activate PDP Context Accept message to the UE indicating that the PDP context has been activated and that the QoS requirements have been authorized successfully for both downlink and uplink.

5.2 Resource reservation with End-to-end RSVP

Editor's Note: This clause is FFS.

6 Other flows over Go interface

6.1 Approval of QoS commit

Through Approval of QoS Commit the PCF makes a final decision to enable the allocated QoS resource for the authorized media stream if the QoS resources are not enable at the time they are authorized by the PCF.

The Approval of QoS Commit procedure is triggered by the P-CSCF receiving a 200 OK message.

The following figure is applicable to the Mobile Originating (MO) side and the Mobile Terminating (MT) side.
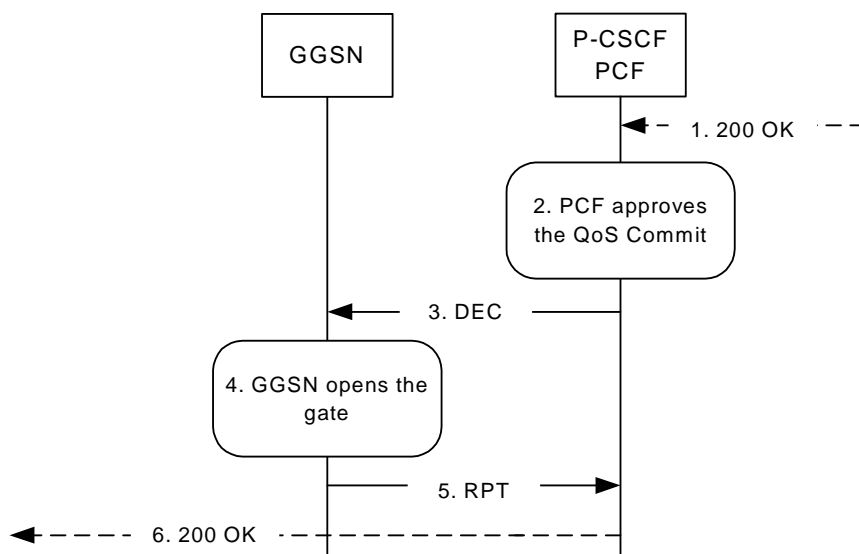
1. P-CSCF receives the 200 OK message.
2. PCF approves the QoS Commit.
3. PCF sends a COPS DEC message to the GGSN to open the 'gate' e.g., enable the use of the authorised QoS resources.
4. GGSN receives the COPS DEC message and opens the 'gate' e.g., enables the use of the authorised QoS resources.
5. GGSN sends a COPS RPT message back to the PCF.
6. P-CSCF forwards the 200 OK message.

**Figure 6.1: Approval of QoS Commit to both the Mobile Originating (MO) side
and the Mobile Terminating (MT) side**

6.2 Removal of QoS commit

The "Removal of QoS commit" procedure is used e.g. when a media component of a session is put on hold. (e.g. in case of a media re-negotiation or call hold). The PCF decision of "Removal of QoS commit " shall be sent as a separate decision to the GGSN corresponding to the previous "Authorize QoS Resources" request.

6.2.1 Removal of QoS commit at Session on Hold

The following figure presents the "Removal of QoS commit" procedure at session on hold to both the Mobile Originating (MO) side and the Mobile Terminating (MT) side.

1.   P-CSCF receives the Hold message.
2.   P-CSCF forwards the Hold message.
3.   PCF removes the QoS commit for the session.
4.   PCF sends a COPS DEC message to the GGSN to close the related 'gates'.
5.   GGSN receives the COPS DEC message, closes the 'gates'.
6.   GGSN sends a COPS RPT message back to the PCF.

Figure 6.2.1: Removal of QoS commit at Session on Hold to both the Mobile Originating (MO) side and the Mobile Terminating (MT) side

6.2.2 Removal of QoS commit at Codec or media flow change or remove

The following figure presents the "Removal of QoS commit" procedure at Codec or media flow change or remove to both the Mobile Originating (MO) side and the Mobile Terminating (MT) side.

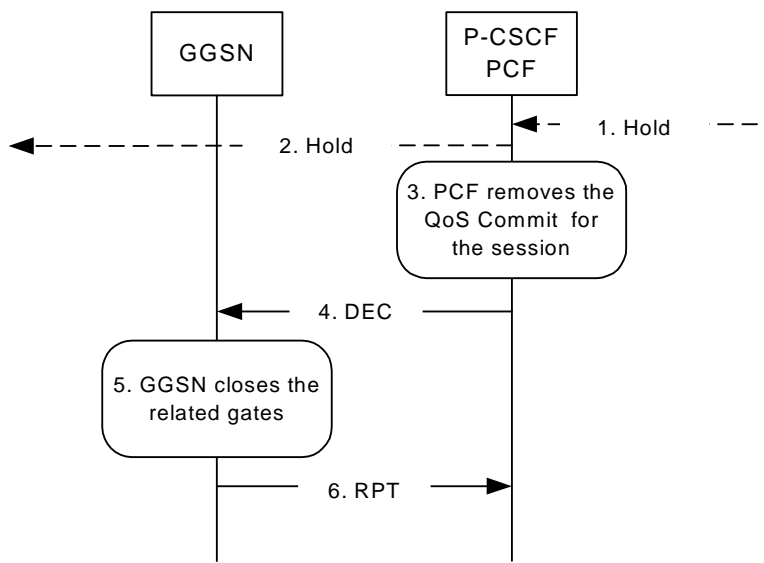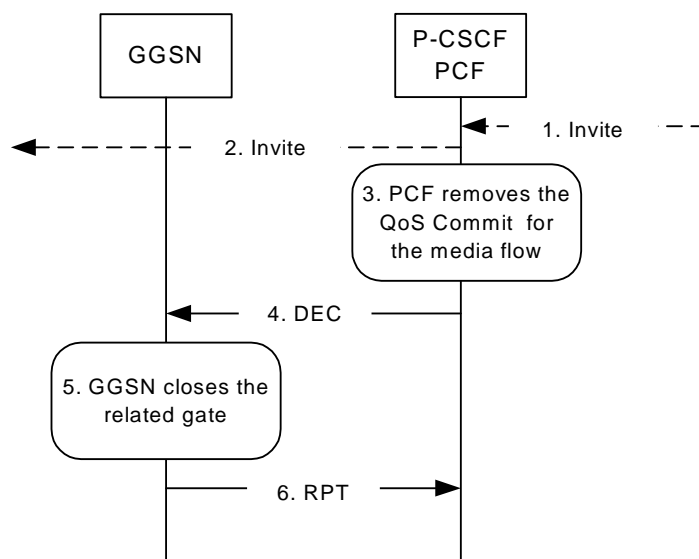1. P-CSCF receives the INVITE message for codec or media change, remove.
2. P-CSCF forwards the INVITE message.
3. PCF removes the QoS commit for the related media flow.
4. PCF sends a COPS DEC message to the GGSN to close the related 'gate'.
5. GGSN receives the COPS DEC message, closes the 'gate'.
6. GGSN sends a COPS RPT message back to the PCF.

**Figure 6.2.2: Removal of QoS commit at codec or media flow change
or remove to both the Mobile Originating (MO) side and the Mobile Terminating (MT) side**

6.3 Revoke authorization for GPRS and IP resources

The "Revoke Authorization for GPRS and IP resources" procedure is used e.g. upon session release. The PCF decision of "Revoke Authorization for UMTS and IP Resources" shall be sent as a separate decision to the GGSN corresponding to the previous "Authorize QoS Resources" request.

6.3.1 Mobile initiated session release / Network initiated session release

The following figure presents the "Revoke Authorization for UMTS and IP Resources" at upon Mobile initiated session release / Network initiated session release to both the Mobile Originating (MO) side and the Mobile Terminating (MT) side.
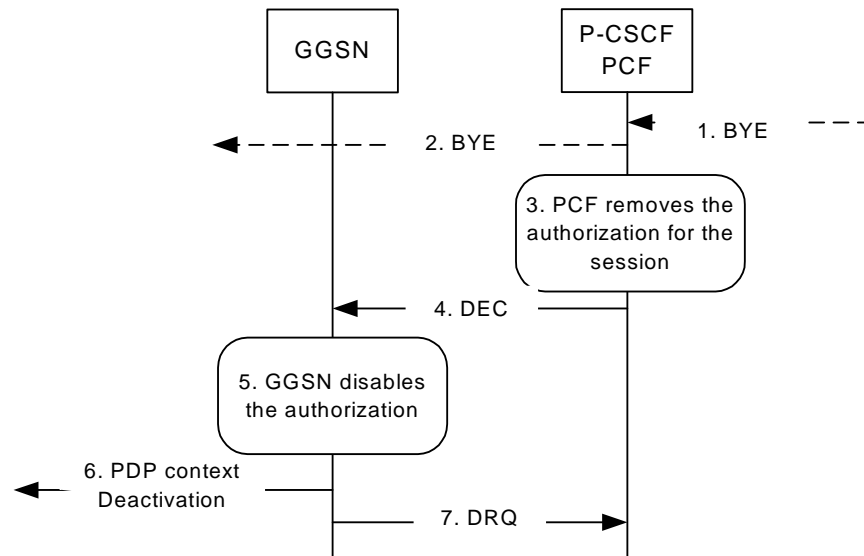
1.   One mobile party hangs up or the P-CSCF or S-CSCF initiates BYE message.
2.   P-CSCF forwards the BYE message.
3.   PCF removes the authorisation for resources that had previously been issued for this endpoint for this session.
4.   PCF sends a COPS DEC message to the GGSN. It includes binding information, which identifies the PDP context to be deactivated.
5.   GGSN receives the COPS DEC message, and disables the use of the authorized QoS resources.
6.   GGSN initiates deactivation of the PDP context used for the IP multimedia session, in case the UE has not done it before.
7.   GGSN sends a COPS DRQ message back to the PCF.

Figure 6.3.1: Revoke authorization for GPRS and IP resources -
Mobile initiated session release / Network initiated session release
to both Mobile Originating (MO) and Mobile termination side

6.4   Indication of PDP Context Release

The "Indication of PDP Context Release" procedure is used upon the release of a PDP Context that was established based on authorisation from the PCF in e.g. accidental/malicious removal of a PDP Context that is related to an IMS session.

The following figure presents the "Indication of PDP Context Release" to both the Mobile Originating (MO) side and the Mobile Terminating (MT) side.
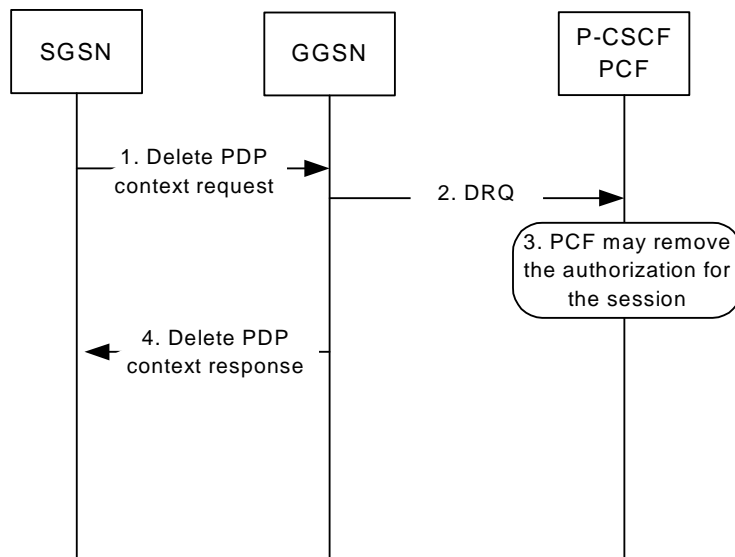
1.   SGSN deactivates the PDP context related to the media flow by sending the Delete PDP Context Request message to the GGSN.
2.   GGSN sends a COPS DRQ message to the P-CSCF(PCF).
3.   P-CSCF(PCF) receives the COPS DRQ message and PCF may remove the authorization for the session.
4.   GGSN sends the Delete PDP Context Response message to the SGSN to acknowledge the PDP context deletion.
NOTE: Step 4 may also occur at the same time or before Step 3.

**Figure 6.4.1: Indication of PDP Context Release to both the Mobile Originating (MO) side
and the Mobile Terminating (MT) side**

The following figure presents the case when the GGSN initiates the release of a PDP context, i.e. after an error condition has been detected in GGSN.

1. GGSN sends a COPS DRQ message to the P-CSCF(PCF).
2. GGSN deactivates the PDP context related to the media flow(s) by sending the Delete PDP Context Request message to the SGSN.
3. SGSN sends the Delete PDP Context Response message to the GGSN to acknowledge the PDP context deletion.
4. P-CSCF(PCF) receives the COPS DRQ message and PCF may remove the authorization for the media flow(s) authorized for this PDP context.
NOTE: Step 4 may also occur at the same time or before Step 2 and Step 3.

**Figure 6.4.2: Indication of GGSN-initiated PDP Context Release to both
the Mobile Originating (MO) side and the Mobile Terminating (MT) side**

6.5 Modification of PDP Context

The "Modification of PDP Context" procedure is used when a PDP Context is modified such that the requested QoS falls outside of the limits that were authorized at PDP context activation (or last modification) or such that the maximum bit rate (downlink and uplink) is downgraded to 0 kbit/s. In these cases, the GGSN communicates with the PCF as described below.

6.5.1 Authorization of PDP Context Modification

The figure 6.5.1 presents the "Modification of PDP Context" procedure to both the Mobile Originating (MO) side and the Mobile Terminating (MT) side when the UMTS QoS which were authorized at PDP context activation (or last modification) has been changed by UE.
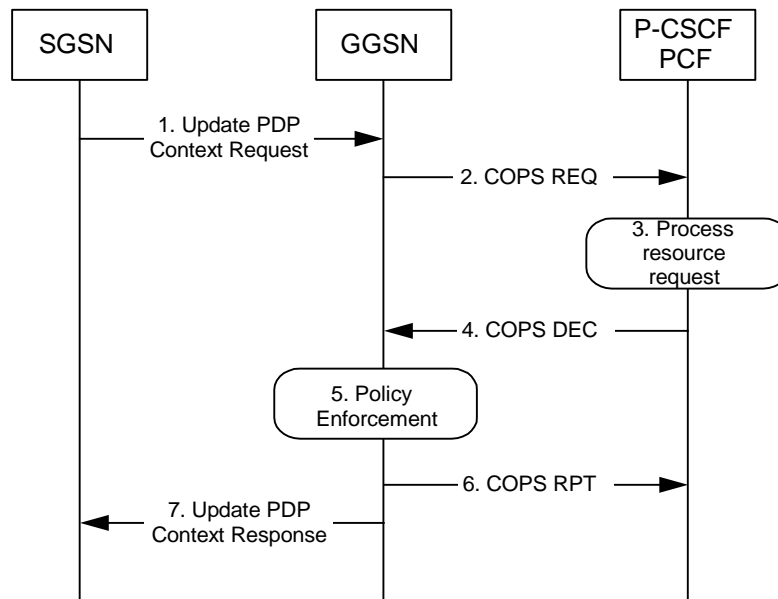
1.   A request to modify the PDP context related to the media flow is indicated by sending the Update PDP Context Request message to the GGSN with the changed UMTS QoS parameters.

2.   If the GGSN supports a Local Policy Decision Point(LPDP), it can consult the local policy decision stored in the LPDP before sending the COPS REQ message to the PCF. In case the requested QoS is within the already authorized QoS and the binding information is not changed, the GGSN does not need to send an authorization request to the PCF and proceeds to step 5. Otherwise, the GGSN sends a COPS REQ message to the PCF.

3.   The PCF receives the COPS REQ message and performs an authorization decision according to the requested modification.

4.   The decision taken by the PCF is returned via the COPS DEC message. The DEC message includes the policy information to be used by the GGSN in order to perform the policy-based admission control.

5.   The GGSN enforces the policy decision based on the authorization information cached on the GGSN LPDP or received from the PCF for the media flows carried by the PDP context.

6.   The GGSN sends COPS RPT message back to the PCF and reports its success or failure in carrying out the PCF decision and notifies state changes if any.

7.   The Update PDP Context Response message is sent to the SGSN to acknowledge the PDP context modification.

Figure 6.5.1: Authorization of PDP Context Modification to both the Mobile Originating (MO) side and the Mobile Terminating (MT) side

6.5.2   Indication of PDP Context Modification

The figure 6.5.2 presents the "Indication of PDP Context Modification" procedure to both the Mobile Originating (MO) side and the Mobile Terminating (MT) side when the maximum bit rate (downlink and uplink) for the PDP context is modified to and from 0 kbit/s.
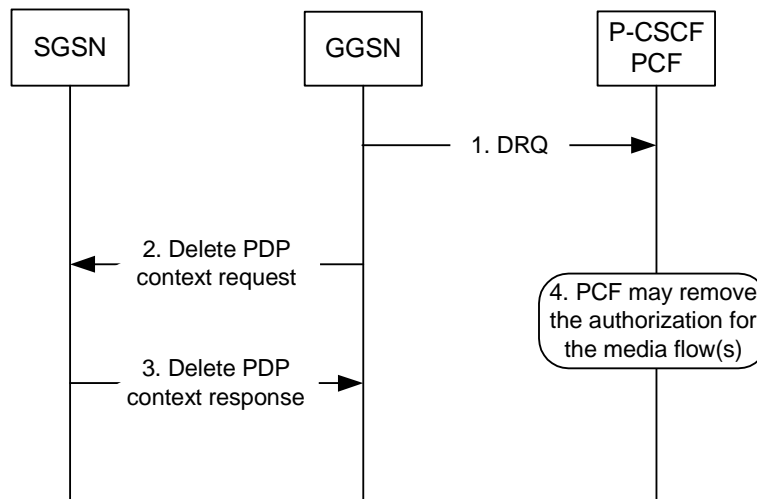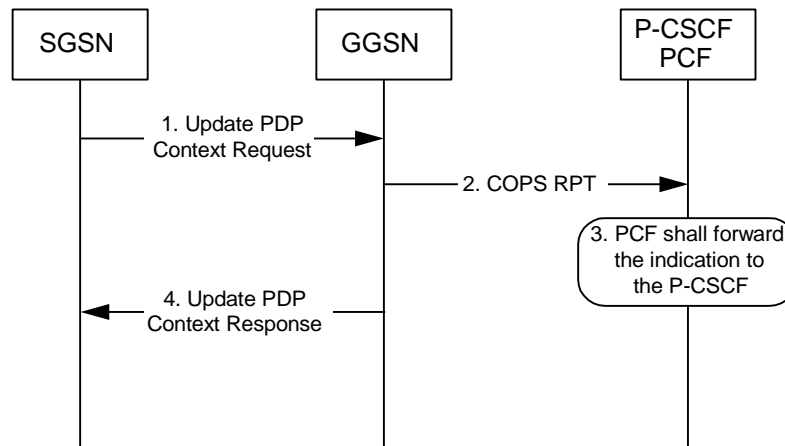
1. SGSN modifies the PDP context related to the media flow(s) by sending the Update PDP Context Request message to the GGSN.
2. GGSN sends a COPS RPT message to the PCF notifying the PDP context modification.
3. PCF receives the COPS RPT message and forwards the indication to the P-CSCF.
4. GGSN sends the Update PDP Context Response message to the SGSN to acknowledge the PDP context modification.

NOTE: Step 4 may also occur at the same time or before Step 3.

Figure 6.5.2: Indication of PDP Context Modification to both the Mobile Originating (MO) side and the Mobile Terminating (MT) side

7 QoS parameter mapping

7.1 QoS parameter mapping between IMS and GPRS

Within the IM sub-system, session establishment and modification involves an end-to-end message-exchange using SIP/SDP with negotiation of Codecs as defined in 3GPP TS 24.229 [3] and 3GPP TS 24.228 [2]. Upon completion of the negotiation, the P-CSCF shall forward the relevant SDP information to the PCF. The PCF notes and authorises the chosen media flows and Codec preference, maps from SDP parameters to Authorized IP QoS parameters for transfer to the GGSN via the Go interface. The GGSN will map from the Authorized IP QoS parameters to the Authorized UMTS QoS parameters. The SIP/SDP message will also have been passed on to the UE, where the UE will perform its own mapping from the SDP parameters and applications to some UMTS QoS Parameters in order to populate the requested QoS field within the PDP context activation or modification. If the SDP parameters are received in an IMS context the UE will also map from the SDP parameters to some Authorized UMTS QoS parameters. Upon receiving the PDP context activation or modification, the GGSN shall compare the UMTS QoS parameters against the Authorized UMTS QoS parameters. If the request lies within the limits authorised by the PCF, the PDP context activation or modification shall be accepted.

Figure 7.1 indicates the network entities where QoS mapping functionality is required. This mapping is performed by:

1. The PCF maps from the SDP parameters determined from the SIP signalling to the Authorized IP QoS parameters that shall be passed to the GGSN via the Go interface (see clause 7.1.1).

2. The GGSN maps from the Authorized IP QoS parameters received from PCF to the Authorized UMTS QoS parameters (see clause 7.1.2). The GGSN compares then the UMTS QoS parameters of the PDP context against the Authorized UMTS QoS parameters (see clause 7.1.3).

3. The UE in which a mapping is made from the SDP parameters to some UMTS QoS parameters (see clause 7.2.1) and, if the SDP parameters are received in an IMS context, also to some Authorized UMTS QoS parameters (see clause 7.2.2).

The mapping that takes place in the UE and the network shall be compatible in order to ensure that the GGSN will be able to correctly authorise the session.
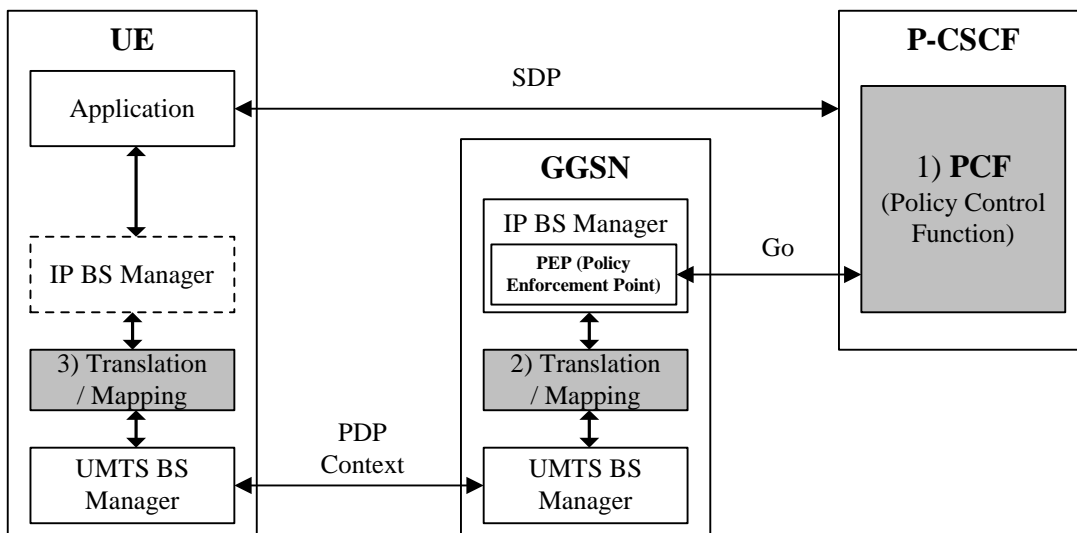
NOTE 1: SDP parameters to Authorized IP QoS parameters mapping.
NOTE 2: Authorized IP QoS parameters to Authorized UMTS QoS parameters mapping.
NOTE 3: SDP parameters to UMTS QoS parameters/Authorized UMTS QoS parameters mapping.

Figure 7.1: Framework for QoS mapping between IMS and GPRS

7.1.1 SDP parameters to Authorized IP QoS parameters mapping in PCF

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

The PCF 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 DiffServ PHB from the SDP Parameters.

**Table 7.1.1.1: Rules for derivation of the Maximum Authorized Data Rates
and Maximum Authorized DiffServ PHB per media flow in the PCF**

Authorized IP QoS Parameter per media flow	Derivation from SDP Parameters

Maximum Authorized Data Rate DL and UL per media flow (see note 1)	/* Check if the media use codec(s) */
	IF [(\<media> = ("audio" or "video")) and (\<transport> = "RTP/AVP")] THEN
	
	  /* Check if Streaming */
	  IF a=("sendonly" or "recvonly") THEN
	    Maximum Authorized Data Rate DL/UL per media flow is set equal to Maximum Bitrate DL/UL. See reference [5] ;
	Editor's note: Whether Maximum Authorized Data Rate per media flow is set to Maximum or Guaranteed Bitrate is ffs.
	
	  /* Conversational as default !*/
	  ELSE
	    Maximum Authorized Data Rate DL/UL per media flow is set equal to Maximum Bitrate DL/UL. See reference [6] ;
	Editor's note: Whether Maximum Authorized Data Rate per media flow is set to Maximum or Guaranteed Bitrate is ffs.
	  ENDIF ;
	
	/* Check for presence of bandwidth attributes */
	ELSEIF b=AS:\<bandwidth-value> is present THEN
	  Maximum Authorized Data Rate DL/UL per media flow = "bandwidth-value" ;
	
	/* SDP do not give any guidance! /
	ELSE
	  Maximum Authorized Data Rate DL/UL per media flow is set according to operator policy ;
	ENDIF ;

Maximum Authorized DiffServ PHB per media flow (see note 2)	IF [(\<media> = ("audio" or "video")) and (a="sendrecv")] THEN
	  Maximum Authorised DiffServ PHB per media flow = "EF" ;
	ELSEIF [(\<media> = ("audio" or "video")) and (a=("sendonly" or "recvonly"))] THEN
	  Maximum Authorised DiffServ PHB per media flow = "AF4" ;
	ELSEIF \<media> = ("application" or "control") THEN
	  Maximum Authorised DiffServ PHB per media flow = "AF3" ;
	ELSE Maximum Authorised DiffServ PHB per media flow = "BE" ;
	END ;

NOTE 1: For a RTP media flow the Maximum Authorized Bandwidth DL/UL are the sum of the RTP flow DL/UL and the associated RTCP flow DL/UL.	
NOTE 2: The Maximum Authorized Traffic Class for a RTCP flow is the same as the corresponding RTP flow.	

The PCF shall per ongoing session store the Authorized IP QoS parameters per media flow.

When the GGSN requests the Authorized UMTS QoS parameters for an activated/modified PDP Context carrying one or more media flows (eventually with associated RTCP signalling), the PCF shall use the rules in table 7.1.1.2 to calculate the Authorized IP QoS parameters.

**Table 7.1.1.2: Rules for calculating the Maximum Authorized Data Rate
and Maximum Authorized Diffserv PHB Parameters per Binding Information in the PCF**

Authorized IP QoS Parameter per Binding	Calculation Rule

Maximum Authorized Data Rate DL and UL per Binding Information	Maximum Authorized Data Rate DL/UL per Binding Information is the sum of all Maximum Authorized Data Rate DL/UL per media flow for all the media flows identified by the Binding Information
	
	IF Maximum Authorized Data Rate DL/UL per Binding Information > 2047 kbps THEN
	    Maximum Authorized Data Rate DL/UL per Binding Information = 2047 kbps /* See ref [8] */
	
	END;

Maximum Authorized Diffserv PHB per Binding Information	Maximum Authorized Diffserv PHB per Binding Information = MAX [Maximum Authorized Diffserv PHB per media flow among all the media flows carried by the current PDP Context] (The MAX function ranks the possible Maximum Authorized Diffserv PHB values as follows: "EF" > "AF4" > "AF3" > "BE")

7.1.2   Authorized IP QoS parameters to Authorized UMTS QoS parameters mapping in GGSN

The Translation/Mapping function in the GGSN shall derive the Authorized UMTS QoS parameters from the Authorized IP QoS parameters received from the PCF according to the rules in table 7.1.2.

**Table 7.1.2: Rules for derivation of the Authorized UMTS QoS Parameters
from the Authorized IP QoS Parameters**

Authorized UMTS QoS Parameter	Derivation from Authorized IP QoS Parameters
Maximum Authorized Bandwidth DL and UL	Maximum Authorized Bandwidth DL/UL = Maximum Authorized Data Rate DL/UL

Maximum Authorized Traffic Class	IF Maximum Authorized Diffserv PHB = "EF" THEN
	    Maximum Authorized Traffic Class = "Conversational"
	
	ELSEIF Maximum Authorized Diffserv PHB = "AF4" THEN
	    Maximum Authorized Traffic Class = "Streaming"
	
	ELSEIF Maximum Authorized Diffserv PHB = "AF3" THEN
	    Maximum Authorized Traffic Class = "Interactive"
	
	ELSE Maximum Authorized Traffic Class = "Background"
	ENDIF ;

7.1.3   Comparing UMTS QoS Parameters against the Authorized UMTS QoS parameters in GGSN

Upon receiving a PDP context activation, the UMTS BS Manager in the GGSN requests the Authorized UMTS QoS parameters from the PCF, and might request the Authorized UMTS QoS Parameters if a PDP context is modified (see [7] for details). The GGSN compares the requested UMTS QoS parameters against the corresponding Authorized UMTS QoS parameters. If all the requested parameters lie within the limits, the PDP context activation or modification shall be accepted. If any of the requested parameters do not lie within their respective limit, the GGSN shall either reject the activation or modification of the PDP context or downgrade the requested UMTS QoS parameters.

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 present then the SDP Parameters might give guidance for the UMTS BS Manager to set the Maximum Bitrate UL/DL, Guaranteed Bitrate UL/DL and the Maximum SDU Size. The Application deliver extracted SDP information, possibly via the IP BS Manager, to the Translation/Mapping function. The Translation/Mapping function finally derives the UMTS QoS parameters according to the rules in clause 7.2.1. Furthermore if the SDP Parameters are received in an IMS context it is recommended that the Maximum Authorized Bandwidth UL and DL and Maximum Authorised Traffic Class are 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 eventually merged together with the Maximum Bitrate UL/DL, the Guaranteed Bitrate UL/DL and the Maximum SDU Size from step 3. The result constitutes a recommendation of requested UMTS QoS Parameters. If the PDP Context is activated or modified in an IMS context it is recommended that the UE checks that the actual requested Maximum Bitrate UL/DL are not greater than the Maximum Authorized Bandwidth UL/DL. Furthermore, if the UE has implemented the mapping rule for Maximum Authorized Traffic Class, as defined in clause 7.2.2, it is also recommended that the requested Traffic Class is not greater than the Maximum Authorised Traffic Class derived in step 3.
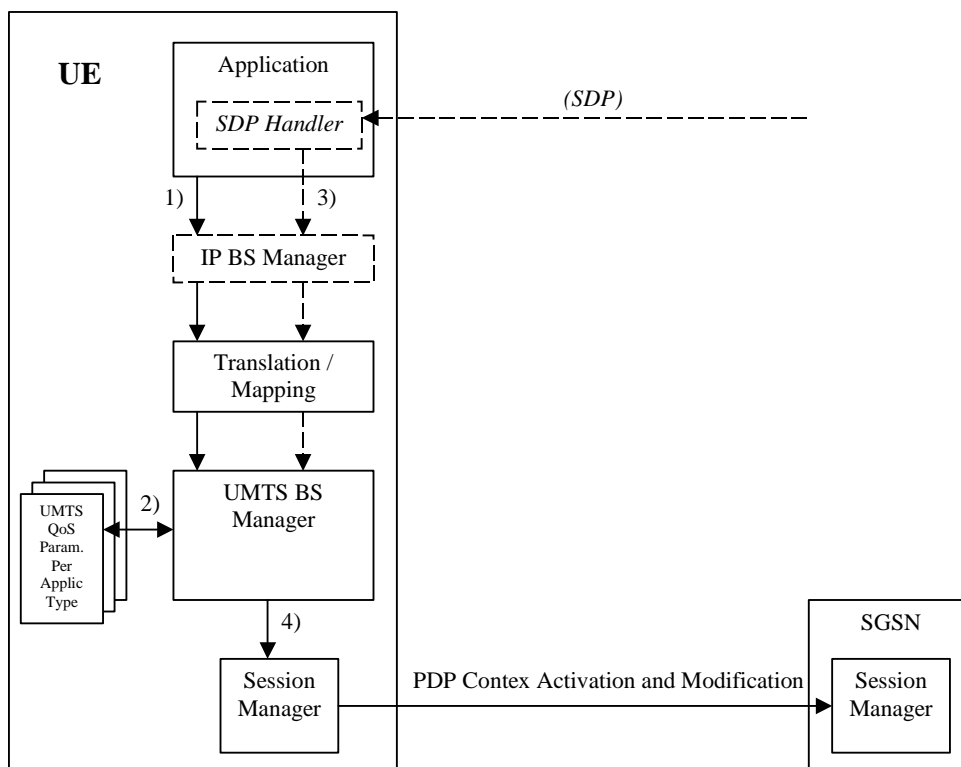

Figure 7.2: Framework for generating requested QoS parameters in the UE

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 is recommended to use the mapping rules in table 7.2.1 to derive the Maximum and Guaranteed Bitrate DL/UL and Maximum SDU Size from the SDP Parameters.

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

UMTS QoS Parameter	Derivation from SDP Parameters

Maximum Bitrate DL/UL and Guaranteed Bitrate DL/UL	/* Check if the media use codec(s) */
	IF [(<media> = ("audio" or "video")) and (<transport> = "RTP/AVP")] THEN
	
	  /* Check if Streaming */
	  IF a= ("sendonly" or "recvonly") THEN
	    Maximum Bitrate DL/UL and Guaranteed Bitrate DL/UL as specified in reference [5] ;
	  /* Conversational as default !*/
	  ELSE
	    Maximum Bitrate DL/UL and Guaranteed Bitrate DL/UL as specified in reference [6] ;
	  ENDIF ;
	
	/* Check for presence of bandwidth attribute */
	ELSEIF b=AS:<bandwidth-value> is present THEN
	    Maximum Bitrate DL/UL and Guaranteed Bitrate DL/UL = "bandwidth-value" ;
	ELSE
	
	/* SDP do not give any guidance ! */
	Maximum Bitrate DL/UL and Guaranteed Bitrate DL/UL as specified by the UE manufacturer;
	ENDIF ;

Maximum SDU size	/* Check if the media use codec(s) */
	IF [(<media> = ("audio" or "video")) and (<transport> = "RTP/AVP")] THEN
	
	  /* Check if Streaming */
	  IF a= ("sendonly" or "recvonly") THEN
	    Maximum SDU Size as specified in reference [5] ;
	
	  /* Conversational as default !*/
	  ELSE
	    Maximum SDU Size as specified in reference [6] ;
	  ENDIF ;
	
	ELSE
	Maximum SDU Size as specified by the UE manufacturer ;
	ENDIF ;

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 then it is recommended that the UE uses the mapping rules in table 7.2.2.1 to derive the Maximum Authorized Bandwidth UL/DL.

Table 7.2.2.1 also has a mapping rule for derivation of Maximum Authorized Traffic Class. In future releases this mapping rule may change. For the reason of future compatibility, the release 5 mapping rule is optional for the UE.

In the case this mapping rule is implemented then it is recommended that the UE use the mapping rule in table 7.2.2.1 to derive the Maximum Authorised Traffic Class from the SDP Parameters.

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

Authorized UMTS QoS Parameter per media flow	Derivation from SDP Parameters

Maximum Authorized Bandwidth DL and UL per media flow	/* Check if IMS context (the criteria for this check is an UE manufactures issue) */
	IF IMS context THEN
	
	/* Check if the media use codec(s) */
	  IF [(<media> = ("audio" or "video")) and (<transport> = "RTP/AVP")] THEN
	
	    /* Check if Streaming */
	    IF a=("sendonly" or "recvonly") THEN
	      Maximum Authorized Bandwidth DL/UL set equal to Maximum Bitrate DL/UL. See reference [5] ;
	Editor's note: Whether Maximum Authorized Bandwidth is set to Maximum or Guaranteed Bitrate is ffs.
	
	    /* Conversational as default !*/
	    ELSE
	      Maximum Authorized Bandwidth DL/UL set equal to Maximum Bitrate DL/UL. See reference [6] ;
	Editor's note: Whether Maximum Authorized Bandwidth is set to Maximum or Guaranteed Bitrate is ffs.
	    ENDIF ;
	
	  /* Check for presence of bandwidth attributes */
	  ELSEIF b=AS:<bandwidth-value> is present THEN
	    Maximum Authorized Bandwidth DL/UL = "bandwidth-value" ;
	
	  /* SDP do not give any guidance! /
	  ELSE
	    Maximum Authorized Bandwidth DL/UL as specified by the UE manufacturer ; ENDIF ;
	
	ELSE
	  No authorization is done ;
	ENDIF ;

Maximum Authorized Traffic Class per media flow	/* Check if IMS context (the criteria for this check is an UE manufactures issue) */
	IF IMS context THEN
	IF [(<media> = ("audio" or "video")) and (a="sendrecv")] THEN
	  Maximum Authorised Traffic Class = "Conversational" ;
	ELSEIF [(<media> = ("audio" or "video")) and (a=("sendonly" or "recvonly"))] THEN
	  Maximum Authorised Traffic Class = "Streaming" ;
	ELSEIF <media> = ("application" or "control") THEN
	  Maximum Authorised Traffic Class = "Interactive" ;
	
	ELSE Maximum Authorised Traffic Class = "Background" ;
	END ;
	
	ELSE
	  No authorization is done ;
	ENDIF ;

It is recommended that the UE per ongoing session store the Authorized UMTS QoS parameters per media flow.

Furthermore it is recommended that the UE checks that the requested UMTS QoS parameters Traffic Class and Maximum Bitrate UL/DL not exceeds the values of the corresponding Authorized UMTS QoS parameters (calculated according to the rules in table 7.2.2.2) before activating/modifying a PDP Context.

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

Authorized UMTS QoS Parameter per PDP Context	Calculation Rule

Maximum Authorized Bandwidth DL and UL per PDP Context	/* Check if IMS context (the criteria for this check is an UE manufactures issue) */
	IF IMS context THEN
	
	   Maximum Authorized Bandwidth DL/UL per PDP Context is the sum of all Maximum Authorized Bandwidth DL/UL per media flow for all the media flows carried by the PDP Context ;
	
	IF Maximum Authorized Bandwidth DL/UL per PDP Context > 2047 kbps THEN
	   Maximum Authorized Bandwidth DL/UL per PDP Context = 2047 kbps /* See ref [8] */
	   END;
	
	ELSE
	   No authorization is done ;
	   ENDIF ;

Maximum Authorized Traffic Class per PDP Context	/* Check if IMS context (the criteria for this check is an UE manufactures issue) */
	IF IMS context THEN
	
	   Maximum Authorised Traffic Class per PDP Context = MAX [Maximum Authorised Traffic Class per media flow among all the media flows carried by the 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)

Annex A (informative):
Change history

<table>
<tr><th colspan="8">Change history</th></tr>
<tr><th>Date</th><th>TSG #</th><th>TSG Doc.</th><th>CR</th><th>Rev</th><th>Subject/Comment</th><th>Old</th><th>New</th></tr>
<tr><td>2001-10</td><td></td><td>N3-010484</td><td></td><td></td><td>The first TS 29.208 V0.1.0 has been produced based on TSab.cde V0.0.0 in N3-010482 discussed at CN3 #19 in Brighton, U.K.</td><td>0.0.0</td><td>0.1.0</td></tr>
<tr><td>2001-11</td><td></td><td>N3-010612</td><td></td><td></td><td>Tdocs N3-010608, N3-010554, N3-010526, N3-010609, and N3-010603 are agreed with some modifications at CN3 #20 – Cancun, Mexico and incorporated. Raised to Version 0.2.0.</td><td>0.1.0</td><td>0.2.0</td></tr>
<tr><td>2002-02</td><td></td><td>N3-020121</td><td></td><td></td><td>Tdocs N3-020057, N3-020110, N3-020111, and N3-020122 are agreed at CN3 #21 – Sophia Antipolis, France and incorporated. Raised to Version 0.3.0.</td><td>0.2.0</td><td>0.3.0</td></tr>
<tr><td>2002-02</td><td></td><td>N3-020164</td><td></td><td></td><td>Tdocs N3-020142, N3-020143, and N3-020125 are agreed with some modifications at Go drafting session in CN3 #21 Bis – Sophia Antipolis, France and incorporated. Raised to Version 0.3.0.</td><td>0.3.0</td><td>0.4.0</td></tr>
<tr><td>2002-02</td><td></td><td>NP-020078</td><td></td><td></td><td>Some editorial cleaning - presented to NP#15 for information</td><td>0.4.0</td><td>1.0.0</td></tr>
<tr><td>2002-04</td><td></td><td>N3-020365</td><td></td><td></td><td>Tdocs N3-020235, N3-020238, N3-020344, N3-020345, and N3-020363 are agreed at CN3 #22 – Fort Lauderdale, Florida, USA and incorporated. Raised to Version 1.1.0.</td><td>1.0.0</td><td>1.1.0</td></tr>
<tr><td>2002-05</td><td></td><td>N3-020515</td><td></td><td></td><td>Tdocs N3-020490, N3-020495, and N3-020509 are agreed at CN3 #23 – Budapest, Hungary and incorporated. Raised to Version 1.2.0.</td><td>1.1.0</td><td>1.2.0</td></tr>
<tr><td>2002-05</td><td></td><td>N3-020518</td><td></td><td></td><td>Tdocs N3-020513 is agreed at CN3 #23 – Budapest, Hungary and incorporated. Raised to Version 1.3.0.</td><td>1.2.0</td><td>1.3.0</td></tr>
<tr><td>2002-05</td><td></td><td>N3-020518</td><td></td><td></td><td>Comments agreed at CN3 #23 – Budapest, Hungary are incorporated. Raised to Version 1.4.0.</td><td>1.3.0</td><td>1.4.0</td></tr>
<tr><td>2002-06</td><td>NP#16</td><td>NP-020166</td><td></td><td></td><td>Approved at NP#16 and placed under change control</td><td>2.0.0</td><td>5.0.0</td></tr>
</table>

History

Document history		
V5.0.0	June 2002	Publication