

Statement of Compliance towards 3GPP Technical Specification 29.213 (Release 13)

Ericsson Service-Aware Policy Controller

STATEMENT OF COMPLIANCE

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Introduction

This document describes to what extent SAPC implementation of Policy Charging Rule Function (PCRF) role conforms with the 3GPP Technical Specification (TS) 29.213 V13.7.0 (2016-09) standard with the exemptions or additions stated in this document.

General Considerations

This document is structured following the chapters of the 3GPP Technical Specification 29.213 V13.7.0 (2016-09)

The following terms explain the columns in the fill-in tables in the document:

Qualifier	Defines whether the implementation of a certain entity is Mandatory (M), Optional, (Op) or Conditional (C).
Compliance	Defines whether the implementation of a certain entity is Compliant by the system.
Comment	It may contain additional information.
No requirement (NR)	The TS statement contains general information for the understanding of other statements not applicable to SAPC (the statements may be applicable for other nodes).

One of the following statements (with the associated interpretation) is given to each of the requirements of the Technical Specification:

Not compliant (NC) The TS statement is not fulfilled.

Compliant (C) All of the TS statements are fulfilled.

Partially compliant (PC) Not completely all of the TS statements are fulfilled, the exceptions are described.

In this context, 'is/shall/will' statements are considered as mandatory, 'may' statements are considered as optional, and 'can' statements are considered as conditional.



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1 Scope

No requirement.

2 References

No requirement.

3 Definitions and abbreviations

3.1 Definitions

No requirement.

3.2 Abbreviations

No requirement.

4 Signalling Flows over Gx, Gxx, Rx,Sd, Sy and S9

4.0 General

Table 1 General



Text	Qualifier	Compliance	Comment
<p>There are three distinct network scenarios for an IP-CAN Session:</p> <p>Case 1. No Gateway Control Session is required, no Gateway Control Establishment occurs at all (e.g. 3GPP Access where GTP-based S5/S8 are employed, and Non-3GPP access where GTP-based S2a or GTP-based S2b is employed).</p>	M	C	
<p>Case 2. A Gateway Control Session is required. There are two subcases:</p> <p>2a) The BBERF assigns a Care of Address (CoA) to the UE and establishes a Gateway Control Session prior to any IP-CAN session establishment that will apply for all IP-CAN sessions using that CoA.</p> <p>2b) At IP-CAN session establishment a Gateway Control Session is required before the PCEF announces the IP-CAN Session to the PCRF. At BBERF change and pre-registration the Gateway Control Session shall match an IP-CAN session that the PCEF has already announced. Each IP-CAN session is handled in a separate Gateway Control Session. The PCRF shall select whether case 2a or case 2b applies based on the information received in the Gateway Control Session Establishment. For a user identified with a Subscription-Id AVP, when the PDN identifier included as part of the Called-Station-Id AVP is received, case 2b applies. If not received, case 2a applies.</p>	M	NC	Gateway Control sessions are not supported.



4.1 IP-CAN Session Establishment

Table 2 IP-CAN Session Establishment

Text	Qualifier	Compliance	Comment
1. The BBERF may initiate a Gateway Control Session Establishment procedure as defined in 4.4.1 (applicable for cases 2a during initial attach and 2b, as defined in clause 4.0), if appropriate. In this step, the PCRF determines whether the cases 2a or 2b applies, as defined in clause 4.0.	Op	NC	Gateway Control sessions are not supported.
2. The PCRF links the Gx session for the new IP-CAN session with the corresponding Gateway Control Session as defined in clause 4.0. The PCRF maintains aligned set of PCC and QoS rules in the PCEF and BBERF(s) as applicable for the case.	M	NC	
For case 2a and if IP flow mobility is supported, the PCEF provides, when available, the IP flow mobility routing rules	M	NC	



Text	Qualifier	Compliance	Comment
<p>For the case when the UE is roaming in a Visited Access scenario, steps 3a-3c are executed instead of step 3.</p> <p>3b. The V-PCRF determines that the request is for a roaming user and concludes the IP-CAN session uses visited access. V-PCRF stores the received information</p> <p>3c. If there is not an already established S9 session for this roaming user, the V-PCRF sends a CCR to the H-PCRF with the CC-Request-Type AVP set to the value INITIAL_REQUEST. The V-PCRF includes the Subsession-Enforcement-Info AVP within the CCR with a new S9 subsession identifier assigned by the V-PCRF to this IP-CAN session within the Subsession-Id AVP, and the Subsession-Operation AVP set to the value ESTABLISHMENT. If there is an already established S9 session for this roaming user, the V-PCRF sends a CCR to the H-PCRF with the CC-Request-Type AVP set to the value UPDATE_REQUEST. The V-PCRF includes the Subsession-Enforcement-Info AVP within the CCR with a new S9 subsession identifier assigned by the V-PCRF to this IP-CAN session within the Subsession-Id AVP, and the Subsession-Operation AVP set to the value ESTABLISHMENT.</p>	M	NC	
4. The H-PCRF stores the information received in the Diameter CCR.	M	C	
For cases 2a and 2b, the H-PCRF links the Gx session with the Gateway Control Session(s).	M	NC	



Text	Qualifier	Compliance	Comment
5. If the H-PCRF requires subscription-related information and does not have it, the H-PCRF sends a request to the SPR in order to receive the information.	M	C	
6. The SPR replies with the subscription related information containing the information about the allowed service(s), QoS information and PCC Rules information, and may include MPS EPS Priority, MPS Priority Level and IMS Signalling Priority for establishing a PS session with priority.	M	PC	The SAPC stores the QoS information and PCC rules information in the local SPR. MPS EPS Priority, MPS Priority Level and IMS Signalling Priority are not supported
7. If the PCRF determines that the policy decision depends on the status of the policy counters available at the OCS and no Sy session yet has been established for this subscriber, the PCRF sends an Initial Spending Limit Report Request as defined in clause 4.7.1. If the Sy session is already established for this subscriber, the PCRF may send, if required, an Intermediate Spending Limit Report Request as defined in clause 4.7.2.	M	PC	The SAPC does not support the Intermediate Spending Limit Report Request.
8. The H-PCRF selects or generates PCC Rule(s) to be installed..	M	C	
The H-PCRF may also make a policy decision by deriving an authorized QoS and by deciding whether service flows described in the PCC Rules are to be enabled or disabled	Op	C	
If MPS EPS Priority, MPS Priority Level, and IMS Signalling Priority are present for the user, the PCRF takes the information into account.	M	NC	



Text	Qualifier	Compliance	Comment
If NBIFOM is supported, the PCRF determines whether the NBIFOM applies to the IP-CAN session and selects the NBIFOM mode.	Op	NC	
9. The H-PCRF stores the selected PCC Rules. The H-PCRF selects the Bearer Control Mode that will apply during the IP-CAN session if applicable for the particular IP-CAN. If the H-PCRF controls the binding of IPCAN Bearers, the H-PCRF stores information about the IP-CAN Bearer to which the PCC Rules have been assigned. If the BBERF/PCEF controls the binding of IP-CAN bearers, the H-PCRF may derive the QoS information per QCI applicable to that IP-CAN session for non-GBR bearers.	M	C	
10. When user profile configuration indicates that Application Detection and Control function is enabled , the H-PCRF makes the policy decision for the application detection and control. For the non-roaming case, or for the case when the UE is roaming in a Home Routed scenario, the H-PCRF selects the applicable PCC Rules to be provided for application detection and control for the PCEF supporting ADC feature, or the applicable ADC rules for the solicited application reporting with a TDF. For the case when the UE is roaming in a Visited Access scenario, the H-PCRF selects the applicable PCC Rules to be provided for application detection and control. For solicited application reporting with a TDF, the H-PCRF finds the TDF by using the TDF-Information AVP received from the PCEF in step 3, or, if not received, using a pre-configured TDF address	Op	PC	TDF interactions and ADC rules are not supported



Text	Qualifier	Compliance	Comment
11. Only applicable for non-roaming case, and for the case when the UE is roaming in a home routed case, In case of solicited application reporting with a TDF, the PCRF initiates a TDF Session Establishment procedure, according to clause 4.6.1, with the selected TDF.	Op	NC	
12. If traffic steering control over St applies and the H-PCRF determines that traffic steering control information is needed for the IP-CAN session, the PCRF initiates an St session establishment procedure according to subclause 4.9.1 with the TSSF. The TSSF identifier is pre-configured on the PCRF per e.g. PCEF.	Op	NC	
13. For the non-roaming case, and for the case when the UE is roaming in a Home-Routed scenario, the H-PCRF provisions the PCC Rules to the PCEF using Diameter CCA. The H-PCRF also provides the selected Bearer Control Mode if applicable for the particular IP-CAN and if available, the QoS information per QCI.	M	C	
If the PCEF has indicated that the support for extended TFT filters is available in the IP-CAN session, then the PCRF may, by indicating the PCRF support for extended TFT filters, enable the use of the extended TFT filter format in the IP-CAN session.	Op	NC	The SAPC does not support TFT filters.
The PCRF may also provide event triggers listing events for which the PCRF desires PCC Rule Requests.	Op	C	

Text	Qualifier	Compliance	Comment
Furthermore, the PCRF may provide authorized QoS including the APN-AMBR and the Default-EPS-Bearer- QoS, User Location Information, user CSG information (if received from the BBERF) and Presence Area Information.	Op	PC	CSG information is not supported.
If usage monitoring is enabled, the H-PCRF may provide the applicable thresholds for usage monitoring control at PCEF within the Usage-Monitoring-Information AVP.	Op	C	
If NBIFOM is supported, the H-CRF provides the decision on whether the NBIFOM is supported and the selected NBIFOM mode if applicable.	Op	NC	
For types of IP-CAN, where the PCRF controls IP-CAN Bearers, e.g. GPRS, the PCRF indicates the IP-CAN Bearer where the PCC Rules are to be installed and that the authorized QoS refers to. Otherwise, the PCRF operates without any further reference to any specific bearer.	M	NC	
If the PCEF supports Application Detection and Control feature, the PCRF provisions the applicable PCC Rules to the PCEF for the corresponding IP-CAN session.	M	C	



Text	Qualifier	Compliance	Comment
<p>For the case when the UE is roaming in a Visited Access scenario, steps a-e are executed:</p> <p>13a. The PCC Rules, if they were selected in step 9, are provisioned by the H-PCRF to the V-PCRF by using a CCA. The H-PCRF includes PCC Rules in the Subsession-Decision AVP of the CCA, along with the S9 subsession identifier as received in step 3c within the Subsession-Id AVP. Other parameters listed in step 9 are also applicable here.</p> <p>13b. The V-PCRF enforces visited operator policies regarding QoS authorization requested by the H-PCRF as indicated by the roaming agreements.</p> <p>13c. In case of TDF, if Application Detection and Control function is enabled for the IP-CAN session, the V-PCRF extracts ADC rules from the received PCC rules from the H-PCRF and stores the ADC rules.</p> <p>13d. The V-PCRF informs the H-PCRF when a request has been denied and may provide the acceptable QoS Information for the service.</p> <p>13e. The H-PCRF acknowledges the CCR and may additionally include new or modified PCC rules to the VPCRF. When user profile configuration indicates that Application Detection and Control function is enabled, some of those PCC Rules may be dedicated for application detection and control.</p> <p>13f. In case of solicited application reporting with a TDF, the V-PCRF initiates a TDF Session Establishment procedure, according to clause 4.6.1, with the selected TDF, and provides ADC Rules extracted from the corresponding PCC Rules.</p> <p>13g. The V-PCRF provisions PCC rules received from the H-PCRF to the PCEF by using CCA. The parameters listed in step 9a are applicable here. User</p>	M	NC	

Text	Qualifier	Compliance	Comment
14. If case 2a or 2b applies, the PCRF aligns the set of QoS rules at the BBERF with the set of active rules at the PCEF.	M	NC	
NOTE 4: The PCRF can reject the IP-CAN session establishment, e.g. the PCRF cannot obtain the subscription related information from the SPR and the PCRF cannot make the PCC rule decisions, as described in 3GPP TS 29.212	M	C	

4.2 IP-CAN Session Termination

4.2.1 UE-Initiated

4.2.1.1 AF located in HPLMN

Table 3 UE-Initiated IP-CAN Session Termination

Text	Qualifier	Compliance	Comment
2. If case 2b applies (as defined in clause 4.0), the BBERF-initiated Gateway Control Session Termination procedure as defined in clause 4.4.4 (BBERF-Initiated Gateway Control Session Termination) is initiated.	M	NC	
3. For the non-roaming case, and for the case when the UE is roaming in a Home Routed scenario, the PCEF sends a CCR to the H-PCRF, indicating the IP-CAN Session termination. The PCEF requests the termination of the Gx session using the CC-Request-Type AVP set to the value TERMINATION_REQUEST. If the usage monitoring is enabled, the PCEF informs the H-PCRF about the resources that have been consumed by the user since the last report.	M	C	



Text	Qualifier	Compliance	Comment
If the Required-Access-Info AVP is included in any PCC Rule, the PCEF informs the H-PCRF about the access network information.	M	C	
If RAN-NAS-Cause feature is supported, the PCEF informs the H-PCRF about the access network information and the failure cause(s), if available.	C	NC	



Text	Qualifier	Compliance	Comment
<p>For the case when the UE is roaming in a Visited Access scenario, steps 3a~3b are executed instead of step 3:</p> <p>3a. The PCEF sends a CCR to the V-PCRF, indicating the IP-CAN Session termination. The PCEF requests the termination of the Gx session using the CC-Request-Type AVP set to the value TERMINATION_REQUEST. If the usage monitoring is enabled, the PCEF informs the V-PCRF about the resources that have been consumed by the user since the last report. If the Required-Access-Info AVP is included in any PCC Rule, the PCEF informs the V-PCRF about access network information.</p> <p>3b. If there is an active TDF session between the TDF and the V-PCRF, for roaming UE with visited access, the TDF Session termination is initiated as defined in Section 4.6.2. For this case, the PCRF described in Section 4.6.2 acts as a V-PCRF.</p> <p>3c. If congestion reporting is active for the user id and PDN id, for roaming UE with visited access, the V-PCRF initiates a UE context removal as defined in clause 4.8.5.</p> <p>3d. The V-PCRF sends the CCR to the H-PCRF. If case 2b or case 1 applies and this is the last subsession associated with the S9 session, the V-PCRF sends a CCR to the H-PCRF to request the termination of the S9 session using the CC-Request-Type AVP set to the value TERMINATION_REQUEST. Otherwise, the VPCRF sends a CCR to the H-PCRF with a CC-Request-Type AVP set to the value UPDATE_REQUEST and a Subsession-Enforcement-Info within which the Subsession-Operation AVP set to value TERMINATION to request the termination of the corresponding S9 subsession.</p>	Op	PC	<p>TDF interactions are not supported</p> <p>S9 interface is not supported.</p>



Text	Qualifier	Compliance	Comment
4. The H-PCRF identifies AF sessions that are bound to IP flows of the removed IP-CAN Session.	M	C	When the SAPC receives a CCR Termination from the PCEF, the SAPC removes the IP-CAN session and also the associated AF sessions.
5. The PCRF acknowledges the session termination by sending a Diameter CCA message.	M	C	
7. If there is an activeTDF session between the TDF and the H-PCRF, for non-roaming UE/roaming UE with home routed access, the TDF Session termination is initiated as defined in Section 4.6.2.	Op	NC	
8.If congestion reporting is active for the user id and PDN id, for non-roaming UE or UE is roaming in home routed case, the H-PCRF initiates a UE context removal as defined in clause 4.8.5.	Op	NC	
9. The H-PCRF indicates the session abort to the H-AF by sending a Diameter ASR message to the H-AF.	M	C	
10.The H-AF responds by sending an ASA to the H-PCRF.	M	C	
11.The H-AF sends an STR to the H-PCRF to indicate that the session has been terminated.	M	C	
12. The H-PCRF responds by sending a Diameter STA message to the AF.	M	C	



Text	Qualifier	Compliance	Comment
If the provided PCC rules are related to an AF session associated with a sponsor, usage thresholds were provided by the H-AF earlier, and the H-PCRF has usage data that has not yet been reported to the H-AF, the H-PCRF informs the H-AF about the resources that have been consumed by the user since the last report. If the BBERF in step 2 or PCEF in step 3 reports the access network information and if the AF requested the H-PCRF to report access network information in step 10 previously and/or the RAN-NAS-Cause feature is supported, the H-PCRF informs the H-AF about the access network information and/or RAN/NAS release cause(s) if available.	M	PC	BBERF interactions are not supported. The SAPC does not support sponsor service.
13. If this is the last IP-CAN session for this subscriber the Final Spending Limit Report Request as defined in clause 4.7.3 is sent.	M	C	



Text	Qualifier	Compliance	Comment
14. If case 2a applies (as defined in clause 4.0), the Gateway Control and QoS Rules Provision procedure as defined in clause 4.4.3 (Gateway Control and QoS Rules Provision) may be initiated to remove the QoS rules associated with the IP-CAN session being terminated. This applies e.g. in case the Gateway Control Session remains to serve other IP-CAN sessions. Alternatively, if UE acquires a care of address (CoA) that is used for the S2c reference point and the H-PCRF determines that all QoS rules are to be removed and the Gateway Control Session to be terminated, the PCRF initiated Gateway Control Session Termination procedure as defined in clause 4.4.4 (PCRF-Initiated Gateway Control Session Termination) is initiated. This applies e.g. in case the UE is detached and the CoA acquired by the UE is not used for any other IP-CAN session.	M	NC	



Text	Qualifier	Compliance	Comment
15. The H-PCRF sends a cancellation notification request to the SPR if it has subscribed such notification. The H-PCRF stores the remaining usage allowance in the SPR if all IP-CAN sessions of the user to the same APN are terminated. Step 14 may be initiated any time after step 5 or 5a (as applicable).	C	NC	
17. If the H-PCRF has provided traffic steering control information to the TSSF for the IP-CAN session, the H-PCRF initiates the St session termination procedure to the TSSF to remove the traffic steering control information associated to the UE IPv4 address and/or to the UE IPv6 prefix for the terminated IP-CAN session according to the subclause 4.9.3. NOTE 5: Step 17 can be initiated any time after step 5.	C	NC	

4.2.1.2 AF located in VPLMN

NC

4.2.2 PCEF-Initiated

No requirement.

4.2.2.1 AF located in the HPLMN

Table 4 AF located in the HPLMN

Text	Qualifier	Compliance	Comment
5 - 7. Same as Steps 3~5 in figure 4.2.1.1.1.			See steps 2-5 in Table 3
8 - 14. Same as Steps 7~15 in figure 4.2.1.1.1.			See steps 7-15 in Table 3



4.2.2.2 AF located in the VPLMN

NC

4.2.3 PCRF-Initiated

No requirement.

4.2.3.1 AF located in HPLMN

Table 5 AF located in HPLMN

Text	Qualifier	Compliance	Comment
1. The H-PCRF detects that the termination of an IP-CAN Session is required.	M	C	
2. The H-PCRF sends a Diameter RAR including the Session-Release-Cause AVP to request that the PCEF terminates the IP CAN session.	M	C	



Text	Qualifier	Compliance	Comment
<p>For the case when the UE is roaming in a Visited Access scenario, steps 2a~2b are executed instead of step 2:</p> <p>2a. If case 2b or case 1 applies and the subsession being terminated is the last subsession over S9, the H-PCRF sends a RAR including the Session-Release-Cause AVP to the V-PCRF to indicate the termination of the S9 session. Otherwise, the H-PCRF sends a RAR to the V-PCRF including the Subsession-Decision-Info AVP with the Session-Release-Cause AVP to indicate the request for terminating the S9 subsession corresponding to the IP-CAN session.</p> <p>2b. The V-PCRF sends a RAR including the Session-Release-Cause AVP to the PCEF.</p>	M	NC	
<p>4. For the non-roaming case, and for the case when the UE is roaming in a Home Routed scenario, the PCEF sends a RAA to acknowledge the RAR. For the case when the UE is roaming in a Visited Access scenario, steps 4a~4b are executed instead of step 4:</p> <p>4a. The PCEF sends a RAA to the V-PCRF.</p> <p>4b. The V-PCRF sends a RAA to the H-PCRF and acknowledges the request for terminating the S9 session or the S9 subsession corresponding to the IP-CAN session.</p>	M	C	S9 is not supported

4.2.3.2

AF located in VPLMN

NC



4.3 IP-CAN Session Modification

4.3.1 Network-Initiated IP-CAN Session Modification

4.3.1.1 Interactions between BBERF, PCEF, TDF, OCS, TSSF and PCRF(PCC/QoS/ADC Rule Provisioning in PUSH mode)

Table 6 Figure 4.3.1.1.1 Interactions between BBERF, PCEF, TDF, OCS, TSSF and PCRF for PCRF-Initiated IP-CAN Session Modification

Text	Qualifier	Compliance	Comment
<p>1. The H-PCRF receives an internal or external trigger to re-evaluate PCC Rules and policy decision for an IPCAN Session. Possible external trigger events are described in clause 4.3.1.2.</p> <p>In addition, this procedure is triggered by:</p> <ul style="list-style-type: none"> - PCEF subscribed event -SPR subscription data modification (e.g. change in MPS EPS Priority, MPS Priority Level and/or IMS Signalling Priority). - OCS status of a policy counter identifier(s) has changed and the PCRF requested notification for spending limits apply. - Application detection information report from TDF. 	M	PC	<p>TDF interactions are not supported.</p> <p>MPS EPS Priority, MPS Priority Level and/or IMS Signalling Priority are not supported.</p>



Text	Qualifier	Compliance	Comment
2. The H-PCRF selects the PCC Rule(s) to be installed, modified or removed for the IP-CAN Session. In case of PCEF supporting Application Detection and Control feature, some of those PCC rules may be used for application detection and control. The H-PCRF may also update the policy decision by defining an authorized QoS and enable or disable the service flow(s) of PCC Rules. If the BBERF/PCEF controls the binding of IP-CAN bearers, the H-PCRF may add or change QoS information per QCI applicable to that IP-CAN session. In case TDF, the H-PCRF selects the applicable ADC rules for the solicited application reporting with a TDF.	M	PC	TDF interactions and ADC rules are not supported.
If NBIFOM applies to the IP-CAN session and Network-initiated mode is selected, the H-PCRF determines the access that is to be used for the transfer of traffic and include the allowed access type in the PCC rules. If NBIFOM applies to the IP-CAN session, the H-PCRF determines one access is to be removed from multi access IP-CAN session.	C	NC	
3. The H-PCRF stores the updated PCC Rules and ADC rules if available.	M	PC	ADC rules are not supported
4. Step 4 is only applicable if the Bearer Control Mode (BCM) selected is UE-only or, for UE/NW the PCRF determines that UE mode applies for the affected PCC Rules, and the PCRF receives an external trigger from the AF.	C	NC	



Text	Qualifier	Compliance	Comment
<p>The PCRF may start a timer to wait for a UE requested bearer resource initiation, modification or removal procedure initiated by the UE, as depicted in figure 4.3.2.1.1 or figure 4.3.2.2.1.</p> <p>If a UE requested bearer resource initiation, modification or termination procedure initiated by the terminal is received for the affected PCC rules while the timer is running, all subsequent steps in the present figure shall not be executed and, for case 1, the steps in figure 4.3.2.1.1 (on provisioning based on PULL procedure at PCEF –initiated IP-CAN session modification when the AF is located in the HPLMN), 4.3.2.2.1 (on provisioning based on PULL procedure at PCEF-initiated IP-CAN session modification when the AF is located in the VPLMN) and for cases 2a and 2b, the steps in figure 4.4.2.1.1 (Home Routed case) or 4.4.2.2.1 (Visited Access case) shall be executed instead.</p> <p>Otherwise, the PCRF shall proceed with the subsequent steps (provisioning based on PUSH procedure) in the present figure after timer expiry.</p> <p>NOTE 1: For IMS Emergency session step 4 is not applicable.</p>	Op	NC	

Text	Qualifier	Compliance	Comment
<p>5. For case 2a and 2b, if Gxx applies for the IP-CAN session and the user is not roaming, or the user is roaming in a Home Routed scenario or a Visited Access scenario for case 2a when the available QoS rule are not related to any IP-CAN session, the H-PCRF may initiate Gateway Control and QoS rules provisioning procedures described in clause 4.4.3.</p> <p>NOTE 2: This step is not executed if this procedure is triggered by PCEF subscribed events and/or credit re-authorisation triggers reported by the BBERF.</p>	Op	NC	
<p>6. The H-PCRF sends a Diameter RAR to request that the PCEF installs, modifies or removes PCC Rules and updates the policy decision, or to report PCEF subscribed events and/or credit re-authorisation triggers reported by the BBERF. The report includes the User Location Information and the User CSG Information (If received from the BBERF)</p>	M	PC	The SAPC does not support BBERF interaction.
<p>If the provided PCC rules are related to an AF session associated with a sponsor, the H-PCRF includes, in the Charging-Rule-Definition AVP, the Sponsor-Identity AVP and the Application-Service-Provider-Id entity AVP that it received from the AF if the Reporting-Level AVP is set to the value SPONSORED_CONNECTIVITY_LEVEL and, if AF provided the application usage thresholds, the Usage-Monitoring-Information AVP.</p>	M	NC	



Text	Qualifier	Compliance	Comment
If the AF requests the access network information, the H-PCRF includes Required-Access-Info AVP in the Charging-Rule-Definition AVP and/or Charging-Rule-Remove AVP. In addition, the H-PCRF includes the Event-Trigger set to the value "ACCESS_NETWORK_INFO_REPORT" if not provided yet.	Op	NC	
If the Sharing-Key-UL AVP and/or Sharing-Key-DL AVP are provided within the Media-Component-Description AVP, the PCRF may apply the mechanisms for resource sharing as specified at 3GPP TS 29.212 [9]. The PCRF includes the Removal-Of-Access AVP set to the value REMOVAL_OF_ACCESS (0) and the IP-CAN-Type AVP set to the value of removed access to remove one access from the multi access IP-CAN session.	Op	NC	



Text	Qualifier	Compliance	Comment
<p>6a. The H-PCRF sends a Diameter RAR to the V-PCRF to request that the PCEF installs, modifies or removes PCC Rules and updates the policy decision. In the case of VPLMN supporting Application Detection and Control feature for solicited application reporting, some of those PCC Rules may be used for application detection and control. If the provided PCC rules are related to an AF session associated with a sponsor that has requested sponsoring the service, the H-PCRF includes, in the Charging-Rule-Definition AVP, the Sponsor-Identity AVP and the Application-Service-Provider-Identity AVP that it received from the AF if the Reporting-Level AVP is set to the value SPONSORED_CONNECTIVITY_LEVEL and, if AF provided the application usage thresholds, the Usage-Monitoring-Information AVP.</p> <p>If the AF requests the access network information, the H-PCRF includes Required-Access-Info AVP in the Charging-Rule-Definition AVP and/or Charging-Rule-Remove AVP. In addition, the H-PCRF includes the Event-Trigger set to the value "ACCESS_NETWORK_INFO_REPORT" if not provided yet.</p> <p>6b. The V-PCRF enforces visited operator policies regarding PCC rules requested by the H-PCRF based on roaming agreements or locally configured policy. In case of TDF, V-PCRF extracts the ADC rules from the PCC Rules received from the H-PCRF and stores them. NOTE: If the V-PCRF rejects provisioned PCC rules received from the H-PCRF, the remaining steps in this call flow are not followed. Instead, the V-PCRF shall notify the H-PCRF by sending a Diameter RAA, including the Experimental-Result-Code AVP set to the value PCC_RULE_EVENT, identify the failed PCC rules as specified</p>	M	PC	<p>The SAPC does not support BBERF interaction.</p> <p>TDF interactions are not supported.</p> <p>ADC is not supported.</p>



Text	Qualifier	Compliance	Comment
8. The PCEF sends a Diameter RAA to acknowledge the RAR. The PCEF informs the H-PCRF about the outcome of the PCC rule operation	M	C	
When the UE is roaming, steps a ~ d are executed instead of step 8: a. The BBERF informs the V-PCRF about the outcome of the operation by sending a Diameter RAA command. b. The PCEF informs the V-PCRF about the outcome of the PCC rule operation by sending a Diameter RAA command. c. The V-PCRF stores the received information. d. The V-PCRF informs the H-PCRF about the outcome of the operation by sending a Diameter RAA command.	M	NC	
9. In case of TDF, solicited application reporting, for non-roaming UE/roaming UE with home routed access, HPCRF initiates the TDF session establishment, modification, or termination. If the last ADC rule is deactivated, the H-PCRF requests the TDF to terminate the TDF session toward the H-PCRF as defined in clause 4.6.2. If there is no active TDF session between the TDF and the H-PCRF, the H-PCRF requests the TDF to establish the TDF session towards H-PCRF and provides ADC Rules to the TDF as defined in clause 4.6.1. If there is already an active TDF session between the TDF and the H-PCRF, H-PCRF provides the ADC rules to the TDF as defined in clause 4.6.3.2.	Op	NC	



Text	Qualifier	Compliance	Comment
10. If traffic steering control over St applies, if the PCRF determines that the traffic steering control information needs to be provisioned for the IP-CAN session; the PCRF initiates the St session establishment procedure according to the subclause 4.9.1. If the PCRF determines that the traffic steering control information provisioned to the TSSF needs to be updated, the PCRF initiates the St session modification procedure according to the subclause 4.9.2. If the PCRF determines that the traffic steering control information is not needed for the IP-CAN session any more, the PCRF initiates the St session termination procedure according to the subclause 4.9.3.	C	NC	



Text	Qualifier	Compliance	Comment
11. In case of spending limits, for non-roaming/roaming UE with both home routed and visited access, HPCRF initiates Initial/ Intermediate/ Final Spending Limit Report Request. The H-PCRF sends an Initial Spending Limit Report Request if this is the first time a status notification of policy counter is requested for the user as defined in clause 4.7.1. If the H-PCRF decides to modify the list of subscribed policy counters the HPCRF sends an Intermediate Spending Limit Report Request as defined in clause 4.7.2. If the H-PCRF decides to unsubscribe any future status notification of policy counters, it sends a Final Spending Limit Report Request to cancels the request for reporting the change of the status of the policy counters available at the OCS as defined in clause 4.7.3.	M	PC	The SAPC does not support Intermediate Spending Limit Report Request or Roaming Scenarios.
12. If usage monitoring is enabled and the H-PCRF either removed the last PCC rule applicable for certain monitoring key , disabled usage monitoring or requested usage report, the PCEF shall initiate an IP-CAN session modification procedure.	M	C	

4.3.1.2 Interactions between PCRF, AF and SPR

4.3.1.2.1 AF Session Establishment

AF located in HPLMN

Table 7 AF session establishment triggers PCRF-Initiated IP-CAN Session Modification (AF in HPLMN)

Text	Qualifier	Compliance	Comment
2. The AF provides the Service Information to the H-PCRF by sending a Diameter AAR for a new Rx Diameter session. If this AF session is associated with a sponsor, Sponsor-Identity AVP, optionally the Sponsoring-Action AVP set to applicable value and the Application-Service-Provider-Identity AVP are included in Sponsored-Connectivity-Data AVP. If usage thresholds are to be associated with this sponsored AF session, then Granted-Service-Unit AVP is included in Sponsored-Connectivity-Data AVP..	M	NC	
The AF can request access network information within the AAR by adding Required-Access-Info AVP(s) and Specific-Action AVP set to the value "ACCESS_NETWORK_INFORMATION_REPORT".	M	C	
If the Service can be subject to resource sharing, the AF includes the Sharing-Key-UL AVP and/or Sharing-Key-DL AVP within the Media-Component-Description AVP. If the service has negotiated the background data transfer policy, the AF includes the reference id of the transfer policy within the Reference-Id AVP.	C	NC	The SAPC does not support service resource sharing.
3. The H-PCRF stores the received Service Information.	M	C	
4. If the H-PCRF requires subscription related information and does not have it, the PCRF sends a request to the SPR in order to receive the information.	M	C	



Text	Qualifier	Compliance	Comment
If the Reference-Id AVP is received, the PCRF retrieves the corresponding transfer policy from the SPR and derives the PCC rules for the background data transfer according to the transfer policy.	C	NC	
6. If the AF session is associated with a sponsor, - if the UE is in the non-roaming case or UE is roaming with the home routed case and operator policies allow accessing the sponsored data connectivity with this roaming case, the H-PCRF authorizes the request based on sponsored data connectivity profile obtained from the SPR;	M	NC	
- if the UE is roaming with the home routed case and operator policies do not allow accessing the sponsored data connectivity with this roaming case or the UE is roaming with the visited access case, the H-PCRF rejects the request	M	NC	
The H-PCRF identifies the affected established IP-CAN Session(s) using the information previously received from the PCEF/V-PCRF and the Service Information received from the AF.	M	C	
7. The H-PCRF sends a Diameter AAA to the AF. The PCRF indicates whether the support for UE IP address/mask in the TFT filter is available in the IP-CAN session.	M	PC	The SAPC does not support TFT filters.
8. The H-PCRF interacts with the PCEF/BBERF/V-PCRF according to figure 4.3.1.1.1 (Interactions between BBERF/PCEF and PCRF for PCRF-Initiated IP-CAN Session Modification).	M	C	

AF located in VPLMN



NC

4.3.1.2.2

AF session modification

AF located in HPLMN

Table 8 AF session modification triggers PCRF-Initiated IP-CAN Session Modification (AF in HPLMN)

Text	Qualifier	Compliance	Comment
If this AF session is associated with a sponsor, Sponsor-Identity AVP, optionally if the AF wants to enable sponsored data connectivity the Sponsoring-Action AVP set to the value "ENABLE_SPONSORING" and Application-Service-Provider-Identity are included in Sponsored-Connectivity-Data AVP. If application usage thresholds are to be associated with this sponsored AF session, then Granted-Service-Unit AVP is included in Sponsored-Connectivity-Data AVP. If this AF session is associated with a sponsor and the AF wants to disable sponsored data connectivity the AF includes the Sponsoring-Action AVP set to the value "DISABLE_SPONSORING" within the Sponsored-Connectivity-Data AVP.	M	NC	
The AF can request access network information within the AAR by adding Required-Access-Info AVP(s) and Specific-Action AVP set to the value "ACCESS_NETWORK_INFO_REPORT".	M	C	



Text	Qualifier	Compliance	Comment
If resource sharing conditions have been changed, the AF includes the Sharing-Key-UL AVP and/or Sharing-Key-DL AVP within the Media-Component-Description AVP. If the service has negotiated the background data transfer policy, the AF includes the reference id of the transfer policy within the Reference-Id AVP.	C	NC	
4. The PCRF stores the received Service Information.	M	C	
If the Reference-Id AVP is received, the PCRF retrieves the corresponding transfer policy from the SPR and derives the PCC rules for the background data transfer according to the transfer policy.	C	NC	
5. The H-PCRF identifies the affected established IP-CAN Session(s) using the information previously received from the PCEF and the Service Information received from the AF.	M	C	
6.H- PCRF sends a Diameter AAA to the AF.	M	C	
7. The H-PCRF interacts with the BBERF/PCEF/V-PCRF according to figure 4.3.1.1.1.	M	C	Interactions towards BBERF and V-PCRF are not supported.

AF located in VPLMN

NC

4.3.1.2.3

AF session termination

AF located in HPLMN

Table 9 Removal of PCC/QoS Rules at AF session release (AF in HPLMN)

Text	Qualifier	Compliance	Comment
3. The H-PCRF identifies the affected IP-CAN Session where PCC Rules and, if available, QoS Rules for the IP flow(s) of this AF session are installed. These PCC/QoS Rules need to be removed.	M	PC	The SAPC does not support QoS Rules.
If the PCC rules are related to an AF session associated with a sponsor and usage thresholds were provided by AF earlier then step 4 is performed after step 5 is completed, so that the Diameter STA includes information about the resources that have been consumed by the user since the last report.	M	NC	
If the AF did not request access network information, and if no usage thresholds due to an AF session associated with a sponsor were provided that relate to the installed PCC rules and RAN-NAS-Cause feature is not supported, step 4a applies. If AF requested access network information, or usage thresholds due to an AF associated with a sponsor were provided that relate to the installed PCC rules, step 4b applies. If RAN-NAS-Cause is supported but Enh-RAN-NAS-Cause is not supported over Gx and the previous conditions do not apply, step 4a applies. Otherwise step 4b applies.	M	PC	The SAPC does not support including the information about the resource consumed or RAN/NAS/TW AN/Untrusted WLAN release cause(s) in STA.
4a. The H-PCRF sends Diameter STA, session termination answer, to the AF.	M	C	



Text	Qualifier	Compliance	Comment
4b. The H-PCRF sends Diameter STA, session termination answer, to the AF and includes access network information and/or information about the resources that have been consumed by the user since the last report or RAN/NAS/TWAN/Untrusted WLAN release cause(s) if available obtained in step 5.	M	PC	The SAPC does not support including the information about the resource consumed or RAN/NAS/TWAN/Untrusted WLAN release cause(s) in STA.
5. The H-PCRF interacts with the BBERF/PCEF/V-PCRF according to figure 4.3.1.1.1.	M	C	

AF located in VPLMN

NC

4.3.2 PCEF-Initiated IP-CAN Session Modification (PCC Rule Provisioning in PULL Mode)

4.3.2.1 PCEF-initiated IP-CAN Session Modification. AF located in HPLMN

Table 10 PCEF-initiated IP-CAN Session Modification. AF located in HPLMN

Text	Qualifier	Compliance	Comment
1. For case 2a and 2b, the BBERF may initiate Gateway Control and QoS rules request procedure described in clause 4.4.2.	M	NC	

Text	Qualifier	Compliance	Comment
3.The PCEF informs the H-PCRF about the IP-CAN session modification for non-roaming case and Home Routed roaming scenario. The PCEF sends a CCR command to the H-PCRF including the CC-Request-Type AVP set to the value "UPDATE_REQUEST". For an IP-CAN Session modification where an existing IP-CAN bearer is modified, the PCEF supplies the specific event that caused the IP-CAN Session modification within the Event-Trigger AVP and the PCC rule name(s) and their status within the Charging-Rule-Report AVP.	M	C	
For an IP-CAN Session modification where an existing IP-CAN bearer is terminated, the PCEF supplies the affected PCC rule name(s), their status set to inactive, the rule failure code and, if available, the RAN/NAS/TWAN/Untrusted WLAN cause(s) within the Charging-Rule-Report AVP.	M	PC	RAN/NAS/TW AN/Untrusted WLAN cause(s) are not supported.
In the case where the UE initiates a resource modification request procedure, the PCEF includes the Packet-Filter-Information AVP, Packet-Filter-Operation AVP and QoS-Information AVP, if applicable.	M	NC	



Text	Qualifier	Compliance	Comment
In the case of PCEF supporting Application Detection and Control feature, when the start or stop of the application's traffic, identified by TDF-Application-Identifier, is detected, if PCRF has previously subscribed to the APPLICATION_START/APPLICATION_STOP Event-Triggers, the PCEF shall report the information regarding the detected application's traffic in the Application-Detection-Information AVP in the CCR command.	M	C	
3c. The V-PCRF sends a CCR command with the CC-Request-Type AVP set to "UPDATE_REQUEST" to the H-PCRF. The V-PCRF includes the Subsession-Enforcement-Info AVP and the assigned S9 subsession identifier within Subsession-Id AVP. The Subsession-Operation AVP is set to the value "MODIFICATION".	M	NC	
4. If the H-PCRF requires subscription-related information and does not have it, the PCRF sends a request to the SPR in order to receive the information.	M	C	
5. The SPR replies with the subscription related information containing the information about the allowed service(s) and PCC Rules information.	M	C	The SAPC stores the PCC rules information in the local SPR.
6. If the AF requested a notification of the corresponding event, the H-PCRF sends a Diameter RAR with the Specific-Action AVP set to indicate the event that caused the request.	M	C	

Text	Qualifier	Compliance	Comment
If the session modification affected a sponsored data flow and the H-PCRF detects that the usage threshold provided by the AF has been reached, this message includes the accumulated usage in the Used-Service-Unit AVP within the Sponsored-Connectivity-Data AVP and the Specific-Action AVP set to the value USAGE_REPORT.	M	NC	
7. If step 6 takes place, the AF may take the application specific procedure (e.g. for IMS refer to 3GPP TS 23.228, replies with a Diameter RAA and may provide updated service information within. Additionally, the AF may terminate the Rx session as per clause 4.3.1.2.3	Op	C	
8-11. If all service data flows for an AF session are deleted, the AF session is terminated.	M	C	
If the session modification affected a sponsored data flow and the H-PCRF detects the UE is roaming with home routed case, the H-PCRF initiates the AF session termination. If the IP-CAN session is associated with a sponsor, usage thresholds were provided by the AF earlier, and the H-PCRF has usage data that has not yet been reported to the AF, the H-PCRF informs the AF, in step 11, about the resources that have been consumed by the user since the last report.	M	NC	
If RAN-NAS-Cause feature is supported and RAN/NAS/TWAN/Untrusted WLAN cause(s) and/or access network information were received in step 3, the H-PCRF sends this information to the AF in step 11.	M	NC	



Text	Qualifier	Compliance	Comment
NOTE 2: Initial/intermediate /Final Spending Limit Report Request can be triggered at any time after this if PCRF, based on policy decisions, find the need to initialize, modify, or deactivate spending limit reporting for the subscriber according to clause 4.7.1/2/3 respectively.	Op	PC	The SAPC does not support Intermediate Spending Limit Report Request or Roaming Scenarios.
12. The H-PCRF selects or generates PCC Rule(s) to be installed. The H-PCRF may also identify existing PCC rules that need to be modified or removed. In the case of VPLMN supporting Application Detection and Control feature for solicited application reporting, some of those PCC Rules may be used for application detection and control.. The PCC Rules may relate to any of the matching AF sessions or may exist in the PCRF without matching to any AF session. The H-PCRF may also make a policy decision by deriving an authorized QoS and by deciding whether service data flows described in the PCC Rules are to be enabled or disabled. The H-PCRF may also update the ADC decisions and select the ADC rules to be installed, modified or removed for the IP-CAN session in the non-roaming case	M	PC	ADC rules are not supported.
If the NBIFOM applies to the IP-CAN session, the PCRF can also make a decision of NBIFOM as defined in clause 4.5.25.2 of 3GPP TS 29.212 [9].	C	NC	

Text	Qualifier	Compliance	Comment
13. For the non-roaming case, and for the case when the UE is roaming in a Home Routed scenario, the H-PCRF provisions the PCC Rules to the PCEF using CCA command. The H-PCRF also provides the selected Bearer Control Mode, if changed and applicable for the IP-CAN type. The PCRF may also provide a new list of event triggers for which the PCRF requires to be notified. The PCRF may provide QoS information within the APN-AMBR AVP and the Default-EPS-Bearer-QoS AVP. In the case of PCEF supporting Application Detection and Control feature, the H-PCRF may provision the PCC rules for application detection and control to the PCEF.	M	C	
13a. The H-PCRF sends a Diameter CCA to the V-PCRF including the PCC Rules to be provisioned within the Subsession-Decision AVP, along with the S9 subsession identifier as received in step 3b within the Subsession-Id AVP. Other parameters listed in step 9 are also applicable here.	M	NC	
13b. The V-PCRF validates the QoS parameters requested within the PCC Rules and enforces visited operator policies regarding QoS authorization requested by the H-PCRF as indicated by the roaming agreements. In case of TDF, the V-PCRF extracts and validates the ADC rules from the PCC rules received from the H-PCRF according to the local policy and roaming agreements if provided by the H-PCRF	M	NC	



Text	Qualifier	Compliance	Comment
NOTE: If the V-PCRF rejects provisioned PCC rules received from the H-PCRF, the remaining steps in this call flow are not followed. Instead, the V-PCRF shall notify the H-PCRF by sending a Diameter CCR, including the Experimental-Result-Code AVP set to the value PCC_RULE_EVENT, identify the failed PCC rules as specified in TS 29.215 [22], and additionally may provide the acceptable QoS Information for the service.	M	NC	
13c. The V-PCRF provisions PCC rules to the PCEF by using CCA command. The parameters listed in step 13a are applicable here.	M	NC	
13d. In case of TDF, solicited application reporting, the H-PCRF provisions the ADC rules to the TDF as defined in clause 4.6.3.2. In case of TDF, unsolicited application reporting, the H-PCRF initiates the TDF session termination as defined in subclause 4.6.2 if the PCEF reported the UE_IP_ADDRESS_RELEASE to the H-PCRF and there is an active IPv4 address related TDF session for that IP-CAN session	M	NC	
14. In case of TDF, solicited application reporting, the H-PCRF provisions the ADC rules to the TDF as defined in clause 4.6.3.2. In case of TDF, unsolicited application reporting, the H-PCRF initiates the TDF session termination as defined in clause 4.6.2 if the PCEF reported the UE_IP_ADDRESS_RELEASE to the H-PCRF and there is an active Ipv4 address related TDF session for that IP-CAN session.	M	NC	



Text	Qualifier	Compliance	Comment
16. If traffic steering control over St applies, if the PCRF determines that the traffic steering control information needs to be provisioned for the IP-CAN session; the PCRF initiates the St session establishment procedure according to the subclause 4.9.1. If the PCRF determines that the traffic steering control information provisioned to the TSSF needs to be updated, the PCRF initiates the St session modification procedure according to the subclause 4.9.1. If the PCRF determines that the traffic steering control information is not needed for the IP-CAN session any more, the PCRF initiates the St session termination procedure according to the subclause 4.9.2.	C	NC	
18. If the PCRF requested to confirm that the resources associated to a PCC Rule have been successfully allocated or the resource release procedure has concluded, the PCEF-initiated IP-CAN session modification procedure is performed again starting from step 3.	M	C	
19. For case 2a and 2b, the BBERF may initiate Gateway Control and QoS rules Provision procedure described in clause 4.4.3.	Op	NC	

4.3.2.2 PCEF-initiated IP-CAN Session Modification. AF located in the VPLMN

NC

4.4 Gateway Control Session Procedures

Gateway Control Sessions are not supported.



4.5 Multiple BBERF Signalling Flows

BBERF interactions are not supported.

4.6 Application Detection and Enforcement Procedures

NC

4.7 Spending limits Procedures over Sy reference point

No requirement.

4.7.1 Initial Spending Limit Report Request

Table 11 Initial Spending Limit Report Request

Text	Qualifier	Compliance	Comment
1. The H-PCRF retrieves subscription information that indicates that policy decisions depend on policy counter(s) held at the OCS and optionally the list of policy counter identifier(s).	M	PC	The SAPC does not specify the policy counter identifier(s) to retrieve. Instead, omits this AVP to request all the policy counters available to user.
2. The H-PCRF sends a Diameter SLR command if no Sy session yet has been established for this subscriber. The Diameter SLR command includes the Subscription-Id AVP (e.g. IMSI) and optionally the list of policy counter identifier(s) within Policy-Counter-Identifier AVPs. The request also includes the SL-Request-Type AVP which set to the value INITIAL_REQUEST (0).	M	C	The SAPC does not specify the policy counter identifier(s) to retrieve. Instead, omits this AVP to request all the policy counters available to user.

4.7.2 Intermediate Spending Limit Report Request

NC

4.7.3 Final Spending Limit Report Request

Table 12 Final Spending Limit Report Request

Text	Qualifier	Compliance	Comment
1. The PCRF decides that policy decisions for a given user no longer depend on policy counter(s) to which the PCRF has existing subscriptions for status change notification.	M	C	The SAPC sends the STR at the termination procedures of the last IP CAN session existing for the subscriber.
2. The H-PCRF sends the Diameter STR command to the OCS to cancel the notification request from the OCS on policy counter status. The request includes the Termination-Cause which contains the reason why the session was terminated set to "DIAMETER_LOGOUT".	M	C	

4.7.4 Spending Limit Report

Table 13 Spending Limit Report

Text	Qualifier	Compliance	Comment
3. The H-PCRF acknowledges the request by sending a Diameter SNA command with a Result-Code AVP set to DIAMETER_SUCCESS and use the status of the received policy counter(s) as input to its policy decision to apply operator defined actions, e.g. downgrade the QoS. The PCRF shall ignore an unknown policy counter status report for all unknown policy counter identifiers in the SNR from the OCS.	M	C	

4.8 Call flows for User Plane Congestion Management

NC



4.9 Traffic Steering Control Procedures over St reference point

NC

4.10 Negotiation for future background data transfer procedure over Nt reference point

NC

5 Binding Mechanism

No requirement.

5.1 Overview

No requirement.



5.2 Session Binding

Table 14 Session Binding

Text	Qualifier	Compliance	Comment
When the PCRF accepts an AA-Request from the AF over the Rx interface with service information, the PCRF shall perform session binding and associate the described service IP flows within the AF session information (and therefore the applicable PCC rules) to one and only one existing IP-CAN session. When the PCRF receives an AA-Request from the P-CSCF acting as an AF over the Rx interface for P-CSCF Restoration, the PCRF shall perform session binding and associate the request to the existing IMS PDN connection and perform P-CSCF Restoration for that impacted IMS PDN connection. This association is done comparing the user IP address received via the Rx interface in either the Frame-IP-Address AVP or the Framed-Ipv6-Prefix AVP with the Ipv4 address or Ipv6 prefix received via the Gx interface. The UE Identity if present in the Subscription-Id AVP and the PDN information if available in the Called-Station-Id AVP may also assist on this association.	M	PC	The SAPC does not support P-CSCF Restoration.



Text	Qualifier	Compliance	Comment
<p>The Domain identity if available in the IP-Domain-Id AVP may also assist on this association, e.g. if other user identity information than the UE IP address is unavailable and the UE IP addresses is not unique for a certain APN.</p> <p>NOTE 1: The UE IP address is unique per Domain identity.</p> <p>NOTE 2: The IP-Domain-Id AVP is helpful in the following scenario: Within a PLMN, there are several separate IP address domains, with PCEF(s) that allocate IPv4 IP addresses out of the same private address range to UEs. The same IP address can thus be allocated to UEs served by PCEFs in different address domains. If one PCRF controls several PCEFs in different IP address domains, the UE IP address is thus not sufficient for the session binding. An AF can serve UEs in different IP address domains, either by having direct IP interfaces to those domains, or by having interconnections via NATs in the user plane between PCEFs and the AF. If a NAT is used, the AF obtains the IP address allocated to the UE via application level signalling and supplies it for the session binding as Framed-IP-Address to the PCRF. The AF supplies an IP-Domain-Id value denoting the IP address domain behind the NAT in addition. The AF can derive the appropriate value from the source address (allocated by the NAT) of incoming user plane packets.</p> <p>NOTE 3 When the scenario described in NOTE 2 applies and the AF is a P-CSCF it is assumed that the P-CSCF has direct IP interfaces to the different IP address domains and that no NAT is located between P-GW and P-CSCF. How a non-IMS AF obtains the UE private IP address to be provided to the PCRF is out of scope of the present release; it is unspecified how to support</p>	M	C	

Text	Qualifier	Compliance	Comment
If the Domain identity is not used to assist association, the PCRF will determine that the UE has an IP-CAN session if the IP address (IPv4 or IPv6) received over the Rx interface matches the IPv4 address or IPv6 prefix received via one or more of the following interfaces: Gx interface and S9 interface, and if the UE identity is used to assist the association, the UE identity received over the Rx interface matches the UE identity received via one or more of the following interfaces: Gx interface and S9 interface.	OP	PC	The SAPC does not support S9 interface.
If the Domain identity is used to assist association, the PCRF will determine that the UE has an IP-CAN session if the Domain identity received over the Rx interface matches the PCEF Identity received via the Gx interface, and the IP address (IPv4) received over the Rx interface matches the IPv4 address received via the Gx interface.	OP	C	
For the roaming scenario, the Domain identity may be used for session binding when the AF and PCEF are located in same PLMN, i.e. for the home routed case, the Domain identity may be used by the (H-)PCRF for session binding, and for the visited case, Domain identity could be used by the V-PCRF for session binding.	OP	C	
For an IP-CAN session associated to a dedicated APN for the purpose of offering services to remote UEs via a ProSe UE-to-network relay UE, the PCRF shall use the UE IPv6 prefix alone in the session binding.	M	NC	



Text	Qualifier	Compliance	Comment
NOTE 4: In case the UE identity in the IP-CAN and the application level identity for the user are of different kinds, the PCRF needs to maintain, or have access to, the mapping between the identities. Such mapping is not subject to specification within this TS.	M	PC	The SAPC matches the information received over the Rx interface with the information received during IP-CAN session establishment over the Gx interface.
NOTE 5: An IPv6 address provided over Rx matches an IPv6 prefix provided over Gx or S9 if the IPv6 address belongs to the IPv6 (sub-)network prefix.	M	PC	The SAPC does not support S9 interface.
NOTE 6: The PCRF derives the PCEF identity from the Origin-Host AVP of the CCR command received from the PCEF. In order to correlate the PCEF Identity and the domain identity received over the Rx interface, the PCRF uses configured mapping between those identities. The Domain Identity is useful for assistance in session binding if the Origin-Host of the Gx CCR command is not modified by intermediate Diameter proxies deployed between the PCEF and the PCRF.	M	C	The SAPC uses configured mapping between PCEF identity and the domain identity received over the Rx interface.
NOTE 7: The PCEF identity is not transported over S9 reference point in the present release. So for the visited access with AF located in HPLMN case, session binding assisted with Domain identity is not supported in the present release. Session binding is still possible based on other available information in addition to the IP address when provided by the AF, according to the current procedures.	M	C	The SAPC uses configured mapping between PCEF identity and the domain identity received over the Rx interface.

Text	Qualifier	Compliance	Comment
If the PCRF uses the Called-Station-Id AVP to assist the association, the PCRF shall apply the procedures in Annex I to match APN information.	M	PC	The SAPC compares whole APN information to decide if two APNs are matched.
As a result from the session binding function, the PCRF identifies what IP-CAN session the current AF session is related with. If the PCRF is not capable of executing the Session Binding, the PCRF shall issue an AA-Answer command to the AF with a negative response.	M	C	

5.3

PCC Rule Authorization and QoS Rule Generation

Table 15 PCC Rule Authorization and QoS Rule Generation

Text	Qualifier	Compliance	Comment
The PCRF shall perform the PCC rule authorization and QoS rule generation when the PCRF receives session information from an AF over Rx interface, when the PCRF receives notification of IP-CAN session events (e.g. establishment, modification) from the PCEF over Gx or S9 interface, when the PCRF receives IP-CAN events from the BBERF over Gxa/Gxc interface, or the PCRF receives a notification from the SPR that calls for a policy decision.	M	PC	BBERF and S9 interactions are not supported



Text	Qualifier	Compliance	Comment
The PCRF shall also perform PCC Rule Authorization and QoS Rule generation for dynamic PCC Rules already provisioned to the PCEF and dynamic QoS rules already provisioned to the BBERF due to internal PCRF triggers (e.g. policies are included or modified within PCRF).	M	NC	BBERF interactions are not supported
If the PCRF receives any traffic mapping information from the BBF that does not match any service data flow filter, the PCRF shall also perform PCC and/or QoS rule authorization when the UE's subscriber profile allows subscription based authorization. In this case, the PCRF shall treat the received traffic mapping information as if it is service data flow filter information.	M	NC	

Text	Qualifier	Compliance	Comment
<p>If the PCRF receives from the AF a reference ID together with the AF session information, the PCRF may provide it to the SPR in order to retrieve the corresponding transfer policy. The PCRF shall derive the PCC rules for the background data transfer according to the retrieved transfer policy.</p> <p>NOTE 1: A transfer policy is only valid within its time window. The removal of outdated transfer policies from the SPR is up to implementation.</p>	Op	NC	
<p>If the PCRF receives information from the SPR for the invocation/revocation of a Priority EPS Bearer service (i.e. the MPS EPS Priority is set/removed or the MPS Priority Level changes while the MPS EPS Priority is set) , then the PCRF should change the QCI/ARP of the dynamic PCC/QoS rules that have the same QCI/ARP as for the present default EPS bearer with the new QCI/ARP assigned to the default EPS bearer.</p>	M	NC	
<p>If there are active non-MPS services, the QCI/ARP of the PCC/QoS rules related to the non-MPS services shall also be changed.</p>	M	NC	



Text	Qualifier	Compliance	Comment
The PCRF assigns appropriate QoS parameters (QCI, ARP, GBR, MBR, etc.) to each PCC or QoS rule.	M	PC	QoS rules are not supported.
The PCRF takes the information received over Rx into account for determining the appropriate QCI/ARP.	M	C	
If the Rx authorization indicates IMS Multimedia Priority Service, then the PCRF shall allow the prioritization of the MPS session according to clauses 4.5.x.1.3 and 4a.5.x.1.3 in 3GPP TS 29.212 [9] for Gx/Gxx respectively.	M	C	
If the Rx authorization indicates Group Communication Service prioritization as described in TS 23.468 [34], then the PCRF shall allow the prioritization of the Group Communication session according to clause 4.5.19 in TS 29.212 [9].	M	NC	



Text	Qualifier	Compliance	Comment
The PCRF authorizes the affected PCC rules and /or QoS rules after successful Session Binding. By the authorization process the PCRF will determine whether the user can have access to the requested services and under what constraints. If so, the PCC rules and QoS rules are created or modified. If the Session Information is not authorized, a negative answer shall be issued to the AF by sending an AA-Answer command.	M	PC	QoS rules are not supported.
The PCRF assigns an appropriate QCI to each PCC or QoS rule. IP-CAN specific restrictions and other information available to the PCRF (e.g. users subscription information, operator policies) shall be taken into account. Each PCC or QoS rule shall receive a QCI that can be supported by the IP-CAN. The PCRF shall ensure consistency between the QoS rules and PCC rules authorized for the same service data flow when QoS rules are derived from corresponding PCC rules.	M	PC	QoS rules are not supported.



Text	Qualifier	Compliance	Comment
If PrioritySharing feature is supported over Rx reference point as described in 3GPP TS 29.214 [10], the PCRF shall apply the priority sharing procedures as described in 3GPP TS 29.212 [9], subclauses 4.5.27 and 4a.5.17, if applicable.	M	NC	
In roaming scenarios, the V-PCRF may further authorize the rules received from the H-PCRF based on local operator policy. Depending on the local policy, the V-PCRF may change the authorized QoS for the affected rules. If local authorization of the rules fails, the V-PCRF shall issue a negative answer to the H-PCRF.	M	NC	

5.4 Bearer Binding

Table 16 Bearer Binding

Text	Qualifier	Compliance	Comment
NOTE 1: The PCRF provides the appropriate ARP/QCI for both PCC Rules and default bearer QoS so that the PCEF can perform a valid bearer binding.	M	C	
The PCRF shall supply the PCC rules to be installed, modified or removed over Gx interface to PCEF	M	C	



Text	Qualifier	Compliance	Comment
. If there are gateway controls sessions associated with the Gx session, the PCRF shall also supply the QoS rules to be installed, modified, or removed over Gxa/Gxc interface to the BBERF.	M	PC	BBERF interactions are not supported.
The PCRF may control the provisioning of packet filters to the UE, i.e. which filters are required to be sent to the UE, as described in 3GPP TS 29.212.	OP	NC	
The Bearer Binding Function may also be located in the PCRF (e.g. as specified in Annex D for GPRS running UE only IP-CAN bearer establishment mode).	Op	NC	
Selection of the Bearer Binding location shall be based on the Bearer Control Mode selected by the PCRF.	M	C	

6 QoS Parameters Mapping

No requirement.



6.1 Overview

Table 17 Overview

Text	Qualifier	Compliance	Comment
One QoS mapping function is located at the PCRF, which maps the service information received over the Rx interface into IP QoS parameters (e.g. QCI, GBR, MBR, ARP, ...). This mapping is access independent. Clause 6.3 specifies the QoS mapping functions at the PCRF applicable for all accesses.	M	C	
The PCRF notes and authorizes the IP flows described within this service information by mapping from service information to Authorized IP QoS parameters for transfer to the PCEF/BBERF via the Gx/Gxx interface.	M	PC	BBERF interactions are not supported.

6.1.1 UE-Initiated IP-CAN bearers

NC.

6.1.2 Network-Initiated IP-CAN bearers

Table 18 Network-Initiated IP-CAN bearers

Text	Qualifier	Compliance	Comment
2. The PCRF shall map from the service information received over the Rx interface to the Authorized IP QoS parameters that shall be passed to the PCEF/BBERF via the Gx/Gxx interface. The mapping is performed for each IP flow. Upon a request from the PCEF/BBERF, the PCRF combines per direction the individual Authorized IP QoS parameters per flow (see clause 6.3).	M	PC	BBERF interactions are not supported.

6.2 QoS parameter mapping Functions at AF

No requirement.

6.3 QoS parameter mapping Functions at PCRF

Table 19 QoS parameter mapping Functions at PCRF

Text	Qualifie r	Complianc e	Comment
When a session is initiated or modified the PCRF shall derive Authorized IP QoS parameters (i.e. QCI, Authorized Maximum/Guaranteed Data Rate DL/UL, ARP) from the service information.	M	C	
If the selected Bearer Control Mode (BCM) is UE-only this process shall be performed according to the mapping rules in table 6.3.1 to avoid undesired misalignments with the UE QoS parameters mapping.	C	C	Bearer Control Mode UE Only is only supported for the default bearer.
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 should be set to the highest value requested for the IP flow(s) of that media component by any of the active forked responses.	M	C	



Table 20 Rules for derivation of the Maximum Authorized Data Rates, Authorized Guaranteed Data Rates and Maximum Authorized QoS Class per IP flow or bidirectional combination of IP flows in the PCRF

Text	Qualifier	Compliance	Comment
Table 6.3.1:Maximum Authorized Data Rate DL (Max_DR_DL) and UL (Max_DR_UL)	M	PC	Codec-Data AVP is not supported.
Table 6.3.1:Authorized Guaranteed Data Rate DL (Gua_DR_DL) and UL (Gua_DR_UL)	M	PC	Min-Requested-Band width-DL AVP is not supported. Codec-Data AVP is not supported.
Table 6.3.1:Authorized QoS Class Identifier [QCI]	M	PC	MPS-Identifier AVP is not supported.
NOTE 16: For GPRS and EPS, the PCRF shall assign an Authorized Guaranteed Data Rate UL/DL value within the limit supported by the serving network.	M	C	This is performed by configuration.
The PCRF should per ongoing session store the Authorized IP QoS parameters per for each IP flow or bidirectional combination of IP flows (as described within a Media Subcomponent AVP).	M	C	
If the PCRF provides a QoS-Information AVP within a Charging-Rule-Definition AVP it may apply the rules in table 6.3.2 to combine the Authorized QoS per IP flow or bidirectional combination of IP flows (as derived according to table 6.3.1) for all IP flows described by the corresponding PCC rule.	Op	C	

Text	Qualifier	Compliance	Comment
If the PCRF provides a QoS-Information AVP for an entire IP CAN bearer (for a UE-initiated IP-CAN bearer in the GPRS case) or IP CAN session, it may apply the rules in table 6.3.2 to combine the Authorized QoS per IP flow or bidirectional combination of IP flows (as derived according to table 6.3.1) for all IP flows allowed to be transported within the IP CAN bearer or session. It is recommended that the rules in table 6.3.2 are applied for all IP flows with corresponding AF session.	Op	PC	The SAPC only supports default IP CAN Bearer in UE-only mode.
The PCRF may increase the authorized QoS further to take into account the requirements of predefined PCC rules without ongoing AF sessions.	OP	C	
For a UE initiated PDP context within GPRS, the PCRF applies the binding mechanism described in Clause 5 to decide which flows are allowed to be transported within the IP CAN bearer.	M	NC	

Table 21 Rules for calculating the Maximum Authorized/Guaranteed Data Rates, QCI and ARP in the PCRF

Text	Qualifier	Compliance	Comment
Table 6.3.2:Maximum Authorized Data Rate DL and UL	M	C	
Table 6.3.2: Guaranteed Authorized Data Rate DL and UL	M	C	



Text	Qualifie r	Complianc e	Comment
Table 6.3.2: QCI	M	C	
Table 6.3.2: ARP	M	PC	MPS-Identifier AVP is not supported.

6.4 QoS parameter mapping Functions at PCEF

No requirement.

6.4.1 GPRS

No requirement.

6.4.1.1 Authorized IP QoS parameters per PDP Context to Authorized UMTS QoS parameters mapping in GGSN

No requirement.

6.4.1.2 Comparing UMTS QoS Parameters against the Authorized UMTS QoS parameters in GGSN for UE initiated PDP context

No requirement.

6.4.2 3GPP-EPS

No requirement.

6.4.2.1 Authorized IP QoS parameters per PDP Context to Authorized UMTS QoS parameters mapping in P-GW

No requirement.

6.4.2.2 Comparing UMTS QoS Parameters against the Authorized UMTS QoS parameters in P-GW for UE initiated PDP context

No requirement.

6.5 QoS parameter mapping Functions at UE for a UE-initiated GPRS PDP Context

No requirement.



6.5.1 SDP to UMTS QoS parameter mapping in UE

No requirement.

6.5.2 SDP parameters to Authorized UMTS QoS parameters mapping in UE

No requirement.

7 PCRF addressing

No requirement.

7.1 General

No requirement.

7.2 DRA Definition

No requirement.

7.3 DRA Procedures

No requirement.

7.4 DRA flows

No requirement.

8 Diameter race condition handling

8.1 Overview

No requirement.



8.2 Procedures for Gx, Gxx, Sd and S9

Table 22 Procedures for race condition handling in the Gx, Gxx, Sd and S9

Text	Qualifier	Compliance	Comment
This clause describes the optional procedures for handling Diameter race conditions in a deterministic manner for the following interfaces: Gx, Gxx, Sd and S9. These procedures apply to the PCEF (Gx), BBERF (Gxx), TDF (Sd) and PCRF (Gx, Gxx, Sd and S9).	M	PC	The S9 interface is not supported. Handling of diameter race conditions in the Gxx and Sd interface is not supported.
A node that supports the procedures defined in this clause and is configured to comply with them, shall advertise such support by setting the corresponding PendingTransaction feature bit in the Supported-Features AVP during session establishment as defined in 3GPP TS 29.212 [9] for Gx, Gxx and Sd and 3GPP TS 29.215 [22] for S9.	M	PC	The S9 interface is not supported. Handling of diameter race conditions in the Gxx and Sd interface is not supported.
On receipt of a Diameter request for an existing Diameter session, the recipient Diameter node shall check if it has an ongoing transaction on that session	M	C	
1. If there are no ongoing transactions on the session, the node shall process the incoming request normally.	M	C	
2. If there is an ongoing transaction on the session and optionally, if the recipient node cannot determine that the incoming request can be safely handled without creating a state mismatch:	M	C	

Text	Qualifier	Compliance	Comment
a. The client shall reject the incoming request with a Diameter experimental result code of DIAMETER_PENDING_TRANSACTION as defined in 3GPP TS 29.212 [9].	NR		This statement is not applicable to SAPC.
b. The server shall either reject the incoming request with a Diameter experimental result code of DIAMETER_PENDING_TRANSACTION or shall wait for one of the following conditions to occur:	M	C	The SAPC does not reject the incoming request with a Diameter experimental result code of DIAMETER_PENDING_TRANSACTION.
i. The ongoing transaction completes. In this case, the session is updated at the server based on the completion of the ongoing transaction and afterwards, the incoming request (e.g. CCR) is processed normally based on the updated session state.	M	PC	The SAPC can process the incoming request even before the ongoing transaction completes.
ii. The waiting period has exceeded its allotted time. In this case, the server shall reject the incoming request with a Diameter experimental result code of DIAMETER_PENDING_TRANSACTION.	M	NC	The SAPC does not reject the incoming request with a Diameter experimental result code of DIAMETER_PENDING_TRANSACTION.
3. On receipt of a DIAMETER_PENDING_TRANSACTION result code, a client shall retry the request.	NR		This statement is not applicable to SAPC.



Text	Qualifier	Compliance	Comment
On the other hand, if a server had rejected a request from the client with a DIAMETER_PENDING_TRANSACTION, the server should not retry the failed request until it receives the re-attempted request from the client. This is to avoid having both the client and server concurrently retry their requests.	M	NC	The SAPC does not reject the incoming request with a Diameter experimental result code of DIAMETER_PENDING_TRANSACTION.
In all other cases, if the session on the client still needs to be updated, the server shall retry the request.	M	C	
4. Nodes should limit the number of times they re-attempt the same request due to receipt of a DIAMETER_PENDING_TRANSACTION.	M	C	
5. The only exception to the rules above is a session termination request (CCR with a CC-Request-Type set to TERMINATION_REQUEST) or a request for session release (e.g. RAR with Session-Release-Cause). In both cases, the request should be handled immediately.	M	C	

9 Annex A (Informative) Examples of deriving the Maximum Authorized parameters from the SDP parameters

No requirement.

10 Annex B (normative) Signalling Flows for IMS

10.1 B.0 General

10.2 B.1 Subscription to Notification of Signalling Path Status at IMS Registration

NC.

10.3 B.1a. Subscription to Notification of Change of IP-CAN Type at IMS Registration

NC.

10.4 B.1b Provisioning of SIP signalling flow information at IMS Registration

NC.

10.5 B.2 IMS Session Establishment

No requirement.

10.5.1 B.2.1 Provisioning of service information at Originating P-CSCF and PCRF

Table 23 Figure B.2.1.1: PCC Procedures for IMS Session Establishment at originating P-CSCF and PCRF

Text	Qualifie r	Complianc e	Comment
6. The P-CSCF forwards the derived session information to the PCRF by sending a Diameter AAR over a new Rx Diameter session.	M	C	
7. The PCRF stores the received session information and performs session binding.	M	C	



Text	Qualifie r	Complianc e	Comment
8. The PCRF sends a Diameter AAA to the P-CSCF.	M	C	
10. The PCRF executes interactions according to figure 4.3.1.1.1 or 4.3.2.1.1. This step implies provisioning of PCC/QoS rules and is executed in parallel with steps 8 and 9.	M	PC	The SAPC does not support neither UE-Initiated IP-CAN Bearer Establishment nor IP-CAN Bearer Modification (Figure 4.3.2.1.1)
11. If the P-CSCF requested access network information in step 6, the PCRF forwards the access network information received in step 10 in a Diameter RAR.	Op	C	

Table 24 Figure B.2.1.2: PCC Procedures for IMS Session Establishment at originating P-CSCF and PCRF, provisioning of service information derived from SDP offer and answer

Text	Qualifie r	Complianc e	Comment
The P-CSCF forwards the derived service information to the PCRF by sending a Diameter AAR over a new Rx Diameter session. It indicates that only an authorization check of the service information is requested.	M	C	
4. The PCRF checks and authorizes the service information, performs session binding but does not provision PCC/QoS rules at this stage.	M	PC	Scenarios with AF and BBERF are not supported. The SAPC provisions PCC rules
5. The PCRF replies to the P-CSCF with a Diameter AAA.	M	C	

Text	Qualifier	Compliance	Comment
7. If the P-CSCF requested access network information in step 3, the PCRF executes interactions according to Figure 4.3.1.1.1. This step implies provisioning of PCC/QoS rules.	Op	C	
8. If the P-CSCF requested access network information in step 3, the PCRF forwards the access network information received in step 7 in a Diameter RAR.	Op	C	
14. The PCRF stores the received session information.	M	C	
15. The PCRF replies to the P-CSCF with a Diameter AAA.	M	C	
16. The PCRF authorizes the session information. The PCRF executes interactions according to Figure 4.3.1.1.1 or Figure 4.3.2.1.1. This step implies provisioning of PCC/QoS rules and authorized QoS.	M	PC	The SAPC does not support neither UE-Initiated IP-CAN Bearer Establishment nor IP-CAN Bearer Modification (Figure 4.3.2.1.1)

10.5.2

B.2.2 Provisioning of service information at terminating P-CSCF and PCRF

Table 25 Figure B.2.2.1 PCC Procedures for IMS Session Establishment at termination P-CSCF and PCRF

Text	Qualifier	Compliance	Comment
6. The P-CSCF forwards the derived service information to the PCRF by sending a Diameter AAR over a new Rx Diameter session.	M	C	
7. The PCRF stores the received session information and performs session binding.	M	C	



Text	Qualifie r	Complianc e	Comment
8. The PCRF sends a Diameter AAA to the P-CSCF.	M	C	
10. The PCRF executes interactions according to section 4.3.1.2.1 or Figure 4.3.2.1.1. This step implies provisioning of PCC/QoS rules and is executed in parallel with steps 8 and 9.	M	PC	The SAPC does not support neither UE-Initiated IP-CAN Bearer Establishment nor IP-CAN Bearer Modification (Figure 4.3.2.1.1)
11. If the P-CSCF requested access network information in step 6, the PCRF forwards the access network information received in step 10 in a Diameter RAR.	Op	C	

Table 26 Figure B.2.2.2 PCC Procedures for IMS Session Establishment at terminating P-CSCF and PCRF, provisioning of service information derived form SDP offer and answer

Text	Qualifie r	Complianc e	Comment
3. The P-CSCF forwards the derived session information to the PCRF by sending a Diameter AAR over a new Rx Diameter session. It indicates that the service information that the AF has provided to the PCRF is preliminary and needs to be further negotiated between the two ends.	M	C	
4. The PCRF checks and authorizes the session information, performs session binding but does not provision PCC/QoS Rules at this stage.	M	PC	QoS rules are not supported. The SAPC provisions PCC rules
5. The PCRF replies to the P-CSCF with a Diameter AAA.	M	C	

Text	Qualifier	Compliance	Comment
7. If the UE initiates a bearer resource modification request, the PCRF provides the PCEF/BBERF with PCC/QoS rules according to figure 4.3.1.1.1 based on the SDP offer.	C	PC	The SAPC does not support neither UE-Initiated IP-CAN Bearer Establishment nor IP-CAN Bearer Modification (Figure 4.3.2.1.1)
11. The PCRF sends a Diameter AAA to the P-CSCF.	M	C	
12. The PCRF authorizes the session information. The PCRF executes interactions according to Figure 4.3.1.1.1 or Figure 4.3.2.1.1. This step implies provisioning of PCC/QoS rules and authorized QoS.	M	PC	The SAPC does not support neither UE-Initiated IP-CAN Bearer Establishment nor IP-CAN Bearer Modification (Figure 4.3.2.1.1)
14. If the P-CSCF requested access network information in step 3 or 10, the PCRF forwards the access network information received in step 12 in a Diameter RAR.	Op	C	

10.6 B.3 IMS Session Modification

No requirement.

10.6.1 B.3.1 Provisioning of service information

Table 27 Provisioning of service information at IMS session modification

Text	Qualifier	Compliance	Comment
6. The P-CSCF sends a Diameter AAR for an existing Diameter session and includes the derived updated service information.	M	C	



Text	Qualifie r	Complianc e	Comment
7. The PCRF stores the received updated session information and identifies the affected established IP-CAN Session(s).	M	C	
8. The PCRF answers with a Diameter AAA.	M	C	
10. The PCRF executes interactions according to figure 4.3.1.1.1	M	PC	The SAPC does not support neither UE-Initiated IP-CAN Bearer Establishment nor IP-CAN Bearer Modification (Figure 4.3.2.1.1)
Due to the updated service information, this step may imply provisioning of PCC/QoS rules or the need to enable or disable IP Flows (see Clauses B.3.2 and B.3.3, respectively).	C	PC	The SAPC does not support the roaming scenario (Figure 4.3.1.1.1) referenced in Clauses B.3.2 and B.3.3 Scenarios with AF and BBERF are not supported.
11. If the P-CSCF requested access network information in step 6, the PCRF forwards the access network information received in step 10 in a Diameter RAR.	Op	C	

Table 28 Figure B.3.1.2. Provisioning of service information derived from SDP offer and answer at IMS session modification

Text	Qualifie r	Complianc e	Comment
3. The P-CSCF forwards the derived service information to the PCRF by sending a Diameter AAR over the existing Rx Diameter session for the corresponding SIP session. It indicates that the service information that the AF has provided to the PCRF is preliminary and needs to be further negotiated between the two ends.	M	C	
4. The PCRF checks and authorizes the session information, but does not configure the PCEF at this stage.	M	C	
5. The PCRF replies to the P-CSCF with a Diameter AAA.	M	C	
6. If the UE initiates a bearer resource modification request, the PCRF provides the PCEF/BBERF with PCC/QoS rules according to figure 4.3.1.1.1 based on the SDP offer.	M	PC	QoS rules are not supported.
11. The PCRF answers with a Diameter AAA.	M	C	
12. The PCRF interacts with the GW according to figure 4.3.1.1.1.	M	PC	The SAPC does not support neither UE-Initiated IP-CAN Bearer Establishment nor IP-CAN Bearer Modification (Figure 4.3.2.1.1)



Text	Qualifier	Compliance	Comment
This step may imply provisioning of PCC/QoS rules and authorized QoS. The PCRF may need to enable or disable IP Flows (see Clauses B.3.2 and B.3.3, respectively) due to the updated service information.	C	PC	The SAPC does not support the roaming scenario (Figure 4.3.1.1.1) referenced in Clauses B.3.2 and B.3.3 Scenarios with BBERF are not supported.
14. If the P-CSCF requested access network information in step 3 or 10, the PCRF forwards the access network information received in step 12 in a Diameter RAR.	Op	C	

10.6.2

B.3.2 Enabling of IP Flows

Table 29 Enabling of IP Flows

Text	Qualifier	Compliance	Comment
The PCRF makes a final decision to enable the allocated QoS resource for the authorized IP flows of the media component (s) if the QoS resources are not enabled at the time they are authorized by the PCRF or if the media IP flow(s) previously placed on hold are resumed, i.e. the media IP flow(s) of the media component that was placed on hold at the time of the resource authorization or at a later stage is reactivated (with SDP direction sendrecv, sendonly, recvonly or none direction).	M	C	
2. The P-CSCF sends a Diameter AAR message to the PCRF, requesting that gates shall be opened.	M	C	

Text	Qualifier	Compliance	Comment
3. The PCRF approves the enabling of IP flows and PCRF updates flow status of affected PCC rules.	M	C	
4. The PCRF sends a Diameter AAA to the P-CSCF.	M	C	
6. The PCRF executes interactions according to figure 4.3.1.1.1. This step implies opening the 'gates' by updating the flow status of PCC rules.	M	PC	The SAPC does not support the roaming scenario (Figure 4.3.1.1.1)

10.6.3

B.3.3 Disabling of IP Flows

Table 30 Disabling of IP Flows at Media on Hold

Text	Qualifier	Compliance	Comment
2.The P-CSCF sends a Diameter AAR request to the PCRF, requesting that gates shall be closed.	M	C	
3. The PCRF updates flow status of affected PCC rules for the media on hold.	M	C	
4. The PCRF sends a Diameter AAA message back to the P-CSCF.	M	C	
6. The PCRF executes interactions according to figure 4.3.1.1.1. This step implies closing the relevant media IP flow gate(s), leaving the possible related RTP gate(s) open to keep the connection alive.	M	PC	The SAPC does not support the roaming scenario (Figure 4.3.1.1.1)



10.6.4

B.3.4 Media Component Removal

Table 31 Revoke authorization for IP resources at media component removal for both Mobile Originating (MO) and Mobile Terminating (MT) side

Text	Qualifier	Compliance	Comment
2. The P-CSCF sends Diameter AAR to the PCRF with modified service information.	M	C	
3. The PCRF stores the Session information and identifies the affected IP-CAN Session(s).	M	C	
4. The PCRF sends a Diameter AAA message back to the P-CSCF.	M	C	
6. The PCRF makes a decision on what PCC/QoS rules need to be modified or removed and executes interactions according to figure 4.3.1.1.1.	M	PC	The SAPC does not support neither UE-Initiated IP-CAN Bearer Establishment nor IP-CAN Bearer Modification (Figure 4.3.2.1.1) QoS rules are not supported.

10.7

B.4 IMS Session Termination

No requirement.

10.7.1

B.4.1 Mobile initiated session release / Network initiated session release

Table 32 IMS session termination without access network information retrieval

Text	Qualifier	Compliance	Comment
3. The Interactions in Figure 4.3.1.2.3.1.1 or Figure 4.3.1.2.3.2.1 are applicable.	M	PC	The SAPC does not support neither UE-Initiated IP-CAN Bearer Establishment nor IP-CAN Bearer Modification



10.7.2 B.4.2 IP-CAN Bearer Release/Loss

Table 33 IP-CAN Bearer Release/Loss

Text	Qualifier	Compliance	Comment
An IP-CAN Bearer Release or Loss event may affect all IP-Flows within an IMS Session. Flows in clause 4.3.2.2 apply.	M	NC	The SAPC does not support UE-initiated IP-CAN Bearer Termination referenced in clause 4.3.2.2

10.8 B.5 P-CSCF Restoration

NC.

11 Annex C (normative) NAT Related Procedures

No requirement.

11.1 C.1 Support for media traversal of NATs using ICE

Table 34 Support for media traversal of NATs using ICE

Text	Qualifier	Compliance	Comment
NOTE 7: In this release, only one IP address per subscription is supported by session binding at the PCRF. Multiple UEs behind a NAT will use the same IP CAN session and IP address.	M	C	

11.2 C.2 P-CSCF procedures

No requirement.



- 11.3

C.3 PCRF procedures

NC.
- 11.4

C.4 P_CSCF procedures to support media traversal through hosted NAT without ICE

No requirement.

12

Annex D (normative) Access specific procedures for GPRS

Table 35 D.2 Binding Mechanisms

Text	Qualifie r	Complianc e	Comment
- For "UE-only" IP-CAN bearer establishment mode, the PCRF performs bearer binding.	M	NC	

Text	Qualifier	Compliance	Comment
- For "UE/NW" IP-CAN bearer establishment mode, the PCRF performs the binding of the PCC rules for user controlled services while the PCEF performs the binding of the PCC rules for the network controlled services.	M	C	
<p>If the PCEF performs the bearer binding, the PCRF shall follow the procedures as described in subclause 5.4 with the exceptions described in this subclause.</p> <p>If the Bearer Binding function is located at the PCRF, the PCRF shall compare the TFT(s) of all IP-CAN bearer(s) within the IP-CAN session received via PCEF from the UE with the existing service data flow filter information. The PCRF shall indicate to the PCEF the IP-CAN bearer within the IP-CAN session where the PCC Rules shall be installed, modified or removed. This is done including the Bearer-Identifier AVP together with the associated PCC Rules within the corresponding RAR and/or CCA commands.</p> <p>- When the PCRF does not require additional filter information coming from the UE in order to decide on bearer binding, the PCRF shall supply the PCC rules to be installed over the Gx interface to the PCEF within a RAR command.</p> <p>- Otherwise, the PCRF shall wait for the PCEF requesting a policy decision for the establishment of a new IPCAN bearer or the modification of an existing one within a CCR command over the Gx interface.</p>	Op	NC	The SAPC does not perform bearer binding



Table 36 D.3.1.1 Network-initiated IP-CAN Session Modification

Text	Qualifie r	Complianc e	Comment
<p>If the timer in step 4 expires and the PCRF still requires additional filter information coming from the UE in order to decide on bearer binding for new PCC rules to be installed, all subsequent steps in figure 4.3.1.1.1 shall not be executed, and further reactions of the PCRF are left unspecified. As a possible option, the PCRF could abort the AF session.</p> <p>When the PCRF performs the bearer binding, once the PCC rules are selected, the PCRF identifies the IP-CAN bearer for each of the PCC rules and the authorized QoS.</p> <p>The PCRF may provision PCC Rules and authorized QoS for several IP-CAN Bearers within the same RAR command</p>	Op	NC	

Table 37 D.3.1.2.1 UE-initiated IP-CAN Bearer Establishment or IP-CAN Bearer Modification

Text	Qualifie r	Complianc e	Comment
3. The PCRF stores the received information in the Diameter CCR.	M	NC	



Text	Qualifier	Compliance	Comment
<p>4. The PCRF binds the IP-CAN Session to existing of AF session(s) using the information received from the GW and the Service Information included in the stored PCC rules, which was previously received from the AF(s) , as depicted in figure 4.3.1.1.1.</p> <p>The PCRF also binds the IP-CAN Bearers within the IP-CAN Session to all matching IP flow(s) of existing AF session(s) using the bearer information received from the GW and the Service Information received from the AF(s). If IP flow(s), which have previously been bound to other bearers, have been bound to the modified bearer, PCC Rules in other bearer(s) may need to be removed. For GPRS, an IP flow may need to be removed if a matching higher priority TFT filter in the newly established PDP context takes precedence over a matching lower priority TFT filter in another PDP context. Furthermore, if IP Flow(s), which have previously been bound to the modified bearer are be bound to other bearer(s), PCC Rules may need to be installed in other bearers. For GPRS, an IP flow may be bound to another PDP context if it was previously bound to the modified PDP context due to a removed higher priority TFT filter, and a lower priority TFT filter in the other PDP context matches the IP flow.</p>	M	NC	



Text	Qualifie r	Complianc e	Comment
5. If the PCRF requires subscription-related information and does not have it, the PCRF sends a request to the SPR in order to receive the information.	M	NC	
7. For IP CAN session modification, if the AF requested a notification of the corresponding event at the initial authorization of the AF session, the PCRF shall sent a Diameter RAR with the Specific-Action AVP set to indicate the trigger event that caused the request.	M	NC	
9. The PCRF selects the new PCC Rule(s) to be installed. The PCRF can also identify existing PCC Rules that need to be modified or removed. The PCC Rules may relate to any of the matching AF sessions identified in step 4 or may exist in the PCRF without matching to any AF session. The PCRF may also make a policy decision by defining an authorized QoS and by deciding whether service flows described in the PCC Rules are to be enabled or disabled. For types of IP-CAN, where the PCRF controls IP-CAN Bearers, e.g. GPRS, the PCC Rules may affect the IP-CAN Bearer identified in the CCR of step 2 or any other IP-CAN Bearer identified in step 4.	M	NC	
10. The PCRF stores the modified PCC Rules.	M	NC	

Text	Qualifier	Compliance	Comment
11. The PCC Rules are provisioned by the PCRF to the GW using Diameter CCA. The PCRF may also provide authorized QoS. The PCRF identifies the affected IP-CAN Bearer for each of the PCC Rules and the authorized QoS. The PCRF may provision PCC Rules and authorized QoS for several IP-CAN Bearers within the same CCA.	M	NC	
14. The PCRF may start a timer to wait for PDP context modification requests from the UE.	M	NC	
15. The PCRF interacts with the GW according to figure 4.3.1.1.1.	M	NC	

Table 38 D.3.1.2.2 UE-Initiated IP-CAN Bearer Termination

Text	Qualifier	Compliance	Comment
<p>3. The PCRF identifies the IP flows bound to the removed bearer and updates the stored bearer information. The PCRF re-evaluates the binding of IP flows, as IP flows may now be bound to other bearers. For GPRS, an IP flow may be bound to another PDP Context if it was previously bound to the removed PDP context due to a higher priority TFT filter, and a lower priority TFT filter in another PDP context matches the IP flow.</p> <p>The following steps 4 and 5 are performed for each of the other bearers identified in step 3.</p>	M	NC	



Text	Qualifie r	Complianc e	Comment
4. The PCRF selects the PCC Rule(s) to be installed or modified for the affected bearer. The PCRF may also update the policy decision for this bearer.	M	NC	
5. The PCRF stores the updated PCC Rules for the affected bearer.	M	NC	
6. The PCRF acknowledges the bearer termination by sending a Diameter CCA message. The PCRF provides PCC Rules and possibly updated authorized QoS for each of the other bearers identified in step 3. The PCRF identifies the affected IP-CAN Bearer for each of the PCC Rules and the authorized QoS.	M	NC	
9. If the PCRF has provided PCC Rules and possibly updated authorized QoS for other bearers in step 6, the GW installs or modifies the identified PCC Rules. The GW also enforces the authorized QoS and enables or disables service flow according to the flow status of the corresponding PCC Rules.	M	NC	
10. The PCRF indicates the session abort to the AF by sending a Diameter ASR message to the AF.	M	NC	
13. The PCRF responds by sending a Diameter STA message to the AF.	M	NC	

Text	Qualifier	Compliance	Comment
10a. The PCRF indicates the release of the bearer by sending a Diameter RAR to the AF.	M	NC	
13a. If step 12a occurs, the PCRF responds by sending a AAA to the AF.	M	NC	

13 Annex E(normative) Fixed Broadband Access Interworking with EPC

No requirement.

13.1 E.1 General

No requirement.

13.2 E.2 Definitions and abbreviations

No requirement.

13.3 E.3 Binding Mechanisms

No requirement.

13.3.1 E.3.1 EPC-routed traffic

NC.

13.3.2 E.3.2 NSW0 traffic

NC.



14 E.4 PCC Procedures

No requirement.

14.1 E.4.1 Introduction

No requirement.

14.2 E.4.2 IP-CAN Session Establishment

NC.

14.3 E.4.3 IP-CAN Session Termination

NC.

14.4 E.4.4 IP-CAN Session Modification

NC.

15 E.5 3GPP HNB Procedures – CS Support

No requirement.

15.1 E.5.1 S9a CS Session Establishment

NC.

15.2 E.5.2 S9a CS Session Modification

NC.



15.3 E.5.3 S9a CS Session Termination
NC.

16 E.6 PCRF Addressing

No requirement.

17 E.7 BPCF Addressing

NC.

18 E.8 Session Linking Function

NC.

19 Annex F (normative): Access specific
aspects, Fixed Broadband Access network
convergence

NC.



20 Annex G (normative): Diameter overload control mechanism

NC.

21 Annex H (normative): Access specific procedures for 3GPP EPS

No requirement.

22 Annex I (normative): APN matching procedures

Table 39 Annex H (normative): APN matching procedures

Text	Qualifier	Compliance	Comment
The PCRF or DRA shall consider the different possible encoding formats of the APN defined in 3GPP TS 23.003 [37], clause 9.1. When the PCRF or DRA needs to compare an APN only containing the APN Network Identifier, with an APN containing both APN Network Identifier and APN Operator Identifier, the PCRF shall consider those APNs as matching if their APN Network Identifiers match. The PCRF shall perform a case-insensitive comparison for APN Network Identifiers and APN Operator Identifiers.	M	PC	The SAPC compares whole APN information to decide if two APNs are matched.

23 Annex J (normative): Diameter message priority mechanism

NC.



Reference List

Standard

- [1] 3GPP Technical Specification Policy and Charging Control signalling flows and QoS parameter mapping, 29.213