



# 7750 Service Router

## Virtualized Service Router

Release 26.10.R1

## Gx AVPs Reference Guide

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# 1 Getting started

## 1.1 About this guide

This document details the Diameter Gx interface specification.

The tables in this document provide Attribute Value Pair (AVP) details organized per message type.

The SR OS also provides a Diameter Python interface that enables flexible insertion, deletion, and formatting of AVPs received from and sent to a Diameter application server. For more information about the Diameter Python API, see the *7450 ESS, 7750 SR, and VSR Triple Play Service Delivery Architecture Guide*.



**Note:** Unless otherwise indicated, CLI commands, contexts, and configuration examples in this guide apply for both the MD-CLI and the classic CLI.

### 1.1.1 Audience

This document is intended for network administrators who are responsible for configuring and operating 7750 SR and VSR service routers and using Diameter applications. It is assumed that the network administrators have an understanding of networking principles and configurations, routing processes, protocols, and standards.

### 1.1.2 References

RFC 2865, "Remote Authentication Dial In User Service (RADIUS)", June 2000

RFC 4006, "Diameter Credit-Control Application", August 2005

RFC 6733, "Diameter Base Protocol", October 2012

3GPP TS 32.299 v9.4.0, "Diameter charging applications", June 2010

*7450 ESS, 7750 SR, and VSR RADIUS Attributes Reference Guide*

## 2 Gx AVP

This guide provides an overview of supported Gx Attribute Value Pairs (AVP) for the 7750 SR. The implementation is based on Gx Release v11.12, doc 3GPP 29212-bc0.doc.

The AVP descriptions are organized per application.

[Table 1: Attribute conventions](#) displays the conventions used in this guide.

Table 1: Attribute conventions

| Attribute | Description                                                        |
|-----------|--------------------------------------------------------------------|
| 0         | This attribute must not be present in packet.                      |
| 0+        | Zero or more instances of this attribute may be present in packet. |
| 0-1       | Zero or one instance of this attribute may be present in packet.   |
| 1         | Exactly one instance of this attribute must be present in packet.  |

## 3 AVPs

Certain AVPs are applicable in only one direction, while others are applicable to both directions.

AVPs sent by the 7750 SR are used to:

- inform the PCRF of the host creation/termination and the subscriber host identity in the 7750 SR
- inform the PCRF of the functionality supported in the 7750 SR
- report specific events related to the subscriber-host
- report the status of the rules
- report usage monitoring
- report status of the host (existent/non-existent)

AVPs sent by PCRF toward the 7750 SR are used to:

- install or activate policies
- request usage monitoring
- terminate the subscriber-host
- request status of the subscriber-host (existent/non-existent)

AVPs that apply to both directions are used for base Diameter functionality such as peering establishment, routing of the Diameter messages, session identification and reporting of catastrophic failures (OSI change).

## 4 Reserved keywords in the 7750 SR

The reserved keywords used to identify referenced object type within the 7750 SR are listed in [Reserved keywords in the 7750 SR](#). See [Standard diameter AVPs \(description\)](#) for further reference.

Table 2: Reserved keywords in the 7750 SR

| Reserved keywords in the 7750 SR | Used in AVP        | Comments                                                                                                                  |
|----------------------------------|--------------------|---------------------------------------------------------------------------------------------------------------------------|
| ingr-v4:                         | charging-rule-name | Used to identify referenced object type within SR OS. See <a href="#">Table 3: Standard diameter AVPs (description)</a> . |
| ingr-v6:                         | charging-rule-name | Used to identify referenced object type within SR OS. See <a href="#">Table 3: Standard diameter AVPs (description)</a> . |
| egr-v4:                          | charging-rule-name | Used to identify referenced object type within SR OS. See <a href="#">Table 3: Standard diameter AVPs (description)</a> . |
| egr-v6:                          | charging-rule-name | Used to identify referenced object type within SR OS. See <a href="#">Table 3: Standard diameter AVPs (description)</a> . |
| in-othr-v4:                      | charging-rule-name | Used to identify referenced object type within SR OS. See <a href="#">Table 3: Standard diameter AVPs (description)</a> . |
| in-othr-v6:                      | charging-rule-name | Used to identify referenced object type within SR OS. See <a href="#">Table 3: Standard diameter AVPs (description)</a> . |
| sub-id                           | charging-rule-name | Used to identify referenced object type within SR OS. See <a href="#">Table 3: Standard diameter AVPs (description)</a> . |
| sla-profile:                     | charging-rule-name | Used to identify referenced object type within SR OS. See <a href="#">Table 3: Standard diameter AVPs (description)</a> . |
| sub-profile:                     | charging-rule-name | Used to identify referenced object type within SR OS. See <a href="#">Table 3: Standard diameter AVPs (description)</a> . |
| inter-dest:                      | charging-rule-name | Used to identify referenced object type within SR OS. See <a href="#">Table 3: Standard diameter AVPs (description)</a> . |

| Reserved keywords in the 7750 SR | Used in AVP                       | Comments                                                                                                                                                                                                                          |
|----------------------------------|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| cat-map:                         | charging-rule-name                | Used to identify referenced object type within SR OS. See <a href="#">Table 3: Standard diameter AVPs (description)</a> .                                                                                                         |
| aa-functions:                    | adc-rule-name, charging-rule-name | Used to identify referenced object type within SR OS. See <a href="#">Table 3: Standard diameter AVPs (description)</a> .                                                                                                         |
| aa-functions:app:<string>        | charging-rule-name                | Used to identify the AA app-profile directly in the charging-rule-name AVP in a charging-rule-install. See <a href="#">Table 3: Standard diameter AVPs (description)</a> and .                                                    |
| aa-functions:aso:<char>:val      | charging-rule-name                | Used to identify the AA ASO characteristic and value directly in a charging-rule-name AVP in a charging rule-install. <a href="#">Table 4: Standard diameter AVPs (format)</a> and <a href="#">Table 5: NOKIA-specific AVPs</a> . |
| aa-functions:urlparam:<string>   | charging-rule-name                | Used to identify the AA Sub HTTP URL parameter directly in a charging-rule-name AVP in a charging rule-install. See <a href="#">Table 4: Standard diameter AVPs (format)</a> and <a href="#">Table 5: NOKIA-specific AVPs</a> .   |
| aa-functions:subscope:<val>      | charging-rule-name                | Used to identify the AA Sub scope directly in a charging-rule-name AVP in a charging rule-install. See <a href="#">Table 4: Standard diameter AVPs (format)</a> and <a href="#">Table 5: NOKIA-specific AVPs</a> .                |
| aa-um                            | charging-rule-name                | Used to identify referenced object type within SR OS. See <a href="#">Table 3: Standard diameter AVPs (description)</a> .                                                                                                         |

## 5 Standard diameter AVPs

Applications for which the described AVPs apply:

- Gx-PM-ESM—Policy Management for Enhanced Subscriber Management
- Gx-UM-ESM—Usage Monitoring for Enhanced Subscriber Management
- Gx-PM-AA—Policy Management for Application Assurance
- Gx-UM-AA—Usage Monitoring Application Assurance

The AVPs listed in [Table 3: Standard diameter AVPs \(description\)](#) that do not have an associated application are AVPs that are used for generic purposes and their use can extend through all applications.

Table 3: Standard diameter AVPs (description)

| AVP ID | AVP name                | Section defined                    | Application | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|--------|-------------------------|------------------------------------|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5      | NAS-Port                | RFC 2865 / §5.5<br>RFC 4005 / §4.2 | —           | See the <i>7450 ESS</i> , <i>7750 SR</i> , and <i>VSR RADIUS Attributes Reference Guide</i> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 8      | Framed-IP-Address       | RFC 4005 / §6.11.1                 | —           | This AVP specifies the IPv4 address of the subscriber host. The IPv4 address is obtained before Gx session establishment. The IPv4 address cannot be assigned to the subscriber host by PCRF via Gx but is instead used only for reporting.                                                                                                                                                                                                                                                                                                                      |
| 18     | 3GPP-SGNS-MCC-MNC       | 29.061                             | —           | GTP S11 Access uses the value configured with the following command:<br><br><pre>configure subscriber-mgmt gtp<br/>serving-network</pre>                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 22     | 3GPP-User-Location-Info | 29.061                             | —           | In CCR-I, this contains the User Location Information as signaled in the incoming GTP-C message for GTP Access hosts.<br><br>For a CCR-U triggered by either USER_LOCATION_CHANGE (ULC), ECGI_CHANGE, or TAI_CHANGE will include ULI values as follows: <ul style="list-style-type: none"> <li>• If the trigger was ULC and the ULI contains anything other than ECGI or TAI, the ULI is signaled as received in GTP.</li> <li>• If the trigger was ULC and either TAI or ECGI changed from its last known value, both TAI and ECGI will be included.</li> </ul> |

| AVP ID | AVP name           | Section defined                                 | Application | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------|--------------------|-------------------------------------------------|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        |                    |                                                 |             | <ul style="list-style-type: none"> <li>If the trigger was ECGI_CHANGE and ECGI changed from its last known value, ECGI is included.</li> <li>If the trigger was TAI_CHANGE and TAI change from its last known value, TAI is included.</li> </ul>                                                                                                                                                                                                                                                                                                                            |
| 25     | Class              | RFC 2865 / §5.25                                | —           | This attribute is available to be sent by the PCRF to the 7750 SR and is echoed unmodified by the 7750 SR to the PCRF. The 7750 SR does not interpret this attribute locally.                                                                                                                                                                                                                                                                                                                                                                                               |
| 30     | Called-Station-Id  | RFC 2865 / §5.30<br>RFC 4005 / §4.5             | —           | See the <i>7450 ESS, 7750 SR, and VSR RADIUS Attributes Reference Guide</i> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 31     | Calling-Station-ID | RFC 4005 / §4.6                                 | —           | See the <i>7450 ESS, 7750 SR, and VSR RADIUS Attributes Reference Guide</i> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 55     | Event-Timestamp    | RFC 6733 / §8.21                                | —           | This AVP records the time that this event occurred on the 7750 SR, in seconds since January 1, 1900 00:00 UTC.                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 61     | NAS-Port-Type      | RFC 2865 / §5.41<br>RFC 4005 / §4.4<br>RFC 4603 | —           | See the <i>7450 ESS, 7750 SR, and VSR RADIUS Attributes Reference Guide</i> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 87     | NAS-Port-Id        | RFC 2869 / §5.17<br>RFC 4005 / §4.3             | —           | See the <i>7450 ESS, 7750 SR, and VSR RADIUS Attributes Reference Guide</i> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 92     | NAS-Filter-Rule    | RFC 4849                                        | Gx-PM-ESM   | See the <i>7450 ESS, 7750 SR, and VSR RADIUS Attributes Reference Guide</i> .<br><br>This AVP is nested within the Charging-Rule-Definition AVP.                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 97     | Framed-IPv6-Prefix | RFC 4005 / §6.11.6                              | —           | This AVP specifies the IPv6-prefix and prefix-length that is assigned to the host via SLAAC (Router Advertisement) to the WAN side of the user. The IPv6-prefix and prefix-length is obtained before Gx session establishment. The facilities to provide the IPv6-prefix and prefix-length to the subscriber-host are DHCP server/local pools, RADIUS or LUDB. The IPv6-prefix/prefix-length cannot be assigned to the subscriber host by PCRF via Gx. Instead the IPv6-prefix and prefix-length is the one being reported to the PCRF during the host instantiation phase. |

| AVP ID | AVP name                       | Section defined   | Application | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|--------|--------------------------------|-------------------|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 123    | Delegated-IPv6-Prefix          | RFC 4818          | —           | This attribute carries the Prefix (ipv6-prefix/prefix-length) assigned to the host via DHCPv6 (IA-PD) for the LAN side of the user (IPoE, PPPoE). The IPv6-prefix/prefix-length is obtained before Gx session establishment. The facilities to provide the IPv6-prefix/prefix-length to the subscriber-host are DHCP server/local pools, RADIUS or LUDB. The IPv6-prefix/prefix-length cannot be assigned to the subscriber host by PCRF via Gx. Instead the IPv6-prefix/prefix-length is the one being reported to the PCRF during the host instantiation phase. |
| 257    | Host-IP-Address                | RFC 6733 / §5.3.5 | —           | This AVP is used to inform a Diameter peer of the sender's IP address.<br><br>The IPv4 address used is the one configured in the <b>diameter-peer-policy</b> . If none is configured, then the system IP address is used.                                                                                                                                                                                                                                                                                                                                         |
| 258    | Auth-Application-Id            | RFC 6733 / §6.8   | —           | This AVP indicates supported Diameter applications. The application support is exchanged in CER/CEA when the peering sessions is established.<br><br>The diameter base protocol does not require application ID because its support is mandatory.<br><br>The Gx application ID value is 16777238 and it is advertised in Auth-Application-Id AVP within the grouped Vendor-Specific-Application-Id AVP in CER message.<br><br>In addition, each Gx specific message carries Auth-Application-Id AVP with the value of 16777238.                                   |
| 260    | Vendor-Specific-Application-Id | RFC 6733 / §6.11  | —           | This is a Grouped AVP that is used to advertise support of a vendor-specific Diameter application in CER/CEA messages. Gx is one such application. This AVP contains the Vendor-Id AVP of the application and the auth-application-id AVP.                                                                                                                                                                                                                                                                                                                        |
| 263    | Session-id                     | RFC 6733 / §8.8   | —           | This AVP must be present in all messages and it is used to identify a specific IP-Can session. IP-Can session corresponds to                                                                                                                                                                                                                                                                                                                                                                                                                                      |

| AVP ID | AVP name            | Section defined   | Application | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|--------|---------------------|-------------------|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        |                     |                   |             | a subscriber host, which can be DHCPv4/v6, PPPoX or ARP host. Session-id AVP is unique per host.<br><br>Dual stack host (IPoE or PPPoX) share a single session-id.                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 264    | Origin-Host         | RFC 6733 / §6.3   | —           | This AVP must be present in all messages and it is used to identify the endpoint (Diameter peer) that originated the message.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 265    | Supported-Vendor-Id | RFC 6733 / §5.3.6 | —           | This AVP is used in CER/CEA messages to inform the peer that the sender supports a subset of the vendor-specific AVPs defined by the vendor identified in this AVP.<br><br>Supported vendors in the 7750 SR are:<br>3GPP — 10415<br>ETSI — 13019<br>NOKIA — 6527<br>BBF — 3561                                                                                                                                                                                                                                                                                                                                   |
| 266    | Vendor-Id           | RFC 6733 / §5.3.3 | —           | The value of this AVP is the IANA assigned code to a specific vendor.<br><br>This AVP may be part of the Vendor-Specific-Application-Id AVP, Failed-AVP AVP, Experimental-Result AVP to identify the vendor associated with the relevant message/AVP.<br><br>In case of a standalone Vendor-Id AVP (outside of any grouped AVP) that is conveyed in CER/CEA messages, it is envisioned that this AVP along with the Product-Name AVP and the Firmware-Revision AVP may provide useful debugging information.<br><br>Supported Vendor-Id AVPs in the 7750 SR are:<br>3GPP — 10415<br>ETSI — 13019<br>NOKIA — 6527 |
| 267    | Firmware-Revision   | RFC 6733 / §5.3.4 | —           | The SR OS version is reported.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

| AVP ID | AVP name          | Section defined   | Application | Description                                                                                                                                                                                                                                                                                                                                                                       |
|--------|-------------------|-------------------|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 268    | Result-Code       | RFC 6733 / §7.1   | —           | <p>This AVP indicates whether a particular request was completed successfully or an error occurred.</p> <p>All answer messages in Diameter/Gx must include one Result-Code AVP or Experimental-Result AVP.</p> <p>For the list of supported error codes see <a href="#">Table 10: Result codes (Result-Code AVP)</a>.</p>                                                         |
| 269    | Product-Name      | RFC 6733 / §5.3.7 | —           | This AVP specifies the vendor-assigned name.                                                                                                                                                                                                                                                                                                                                      |
| 278    | Origin-State-Id   | RFC 6733 / §8.16  | —           | <p>This AVP is used to inform the PCRF of the loss of the state on the 7750 SR side. Its value monotonically increases each time the PCRF is rebooted with the loss of the previous state.</p> <p>Because Gx sessions are not persistent in the 7750 SR, Origin-State-Id increases each time the 7750 SR is rebooted.</p>                                                         |
| 279    | Failed-AVP        | RFC 6733 / §7.5   | —           | <p>This is a Grouped AVP that provides debugging information in cases where a request is rejected or not fully processed because of the erroneous information in specific AVP. The value of the Result-Code AVP will provide information about the reason for the Failed-AVP AVP.</p> <p>The Failed-AVP AVP contains the entire AVP that could not be processed successfully.</p> |
| 281    | Error-Message     | RFC 6733 / §7.3   | —           | This AVP provides more information of the failure that is indicated in the Result-Code AVP.                                                                                                                                                                                                                                                                                       |
| 282    | Route Record      | RFC 6733 / §6.7.1 |             | This AVP identifies the peer from which the request is received and is used for routing loop detection. An SR node inserts the origin-host of the peer in the Route-Record AVP of all transit request messages.                                                                                                                                                                   |
| 283    | Destination-Realm | RFC 6733 / §6.6   | —           | This AVP represents the realm to which this message is to be routed. The value of this AVP is either explicitly configured in the 7750 SR.                                                                                                                                                                                                                                        |

| AVP ID | AVP name                 | Section defined                  | Application | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|--------|--------------------------|----------------------------------|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 285    | Re-Auth-Request-Type     | RFC 6733 / §8.12                 | —           | This AVP is mandatory in RAR requests. The content of this AVP is ignored by the 7750 SR.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 293    | Destination-Host         | RFC 6733 / §6.5                  | —           | This AVP represents the host to which this message is to be sent. The value of this AVP can be explicitly configured.<br><br>In case that it is omitted, the DRA (Diameter relay-agent) that receives the message selects the destination host to which the message is sent.                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 295    | Termination-Cause        | RFC 6733 / §8.15                 | —           | This AVP is used to indicate the reason why a session was terminated on the 7750 SR.<br><br>The supported termination causes in the 7750 SR are specified in <a href="#">Table 13: Termination causes (Termination-Cause AVP)</a> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 296    | Origin-Realm             | RFC 6733 / §6.4                  | —           | This AVP contains the realm of the originator of message. In the 7750 SR, the Origin-Realm is explicitly configured per Diameter peer.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 297    | Experimental-Result      | RFC 6733 / §7.6                  | —           | This is a Grouped AVP that indicates whether a particular vendor-specific request completed successfully or whether an error occurred. It contains a vendor-assigned value representing the result of processing a request.<br><br>The result-code AVP values defined in Diameter Base RFC (6733, §7.1) are also applicable to Experimental-Result AVP.<br><br>For a list of Gx-specific Experimental-Result-Code values supported in the 7750 SR, see <a href="#">Table 10: Result codes (Result-Code AVP)</a> . For Gx application, the Vendor-Id AVP is set to 10415 (3GPP).<br><br>All answer messages defined in vendor-specific application must include either one Result-Code AVP or one Experimental-Result AVP. |
| 298    | Experimental-Result-Code | RFC 6733 / §7.7<br>29.214 / §5.5 | —           | This AVP specifies vendor-assigned (3GPP — Gx) values representing the result of processing the request.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

| AVP ID | AVP name           | Section defined                                   | Application           | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|--------|--------------------|---------------------------------------------------|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        |                    |                                                   |                       | For a list of the 7750 SR supported values for Gx see <a href="#">Table 10: Result codes (Result-Code AVP)</a> .                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 302    | Logical-Access-Id  | ETSI TS 283 034 / §7.3.3<br>BBF TR-134 (§7.1.4.1) | —                     | <p>This AVP contains information describing the subscriber agent circuit identifier corresponding to the logical access loop port of the Access Node from which the subscriber's requests are initiated, namely:</p> <ul style="list-style-type: none"> <li>• <b>circuit-id</b> from DHCPv4 Option (82,1)</li> <li>• <b>circuit-id</b> from PPPoE tag (0x105, 0x00000de9 [dsl forum], 0x01 — DSL Forum TR-101)</li> <li>• <b>interface-id</b> from DHCPv6 option 18.</li> </ul> <p>The Vendor-Id in CER is set to ETSI (13019).</p> |
| 313    | Physical-Access-Id | ETSI TS283 034 / §7.3.14<br>BBF TR-134 (§7.1.4.1) | —                     | <p>This AVP contains information about the identity of the physical access to which the user device is connected, namely:</p> <ul style="list-style-type: none"> <li>• <b>remote-id</b> from DHCPv4 Option (82,2)</li> <li>• <b>remote-id</b> from PPPoE tag (0x105, 0x00000de9 [dsl forum], 0x02 — DSL Forum TR-101)</li> <li>• <b>remote-id</b> from DHCPv6 option 37.</li> </ul> <p>The Vendor-Id in CER is set to ETSI (13019).</p>                                                                                             |
| 412    | CC-Input-Octets    | RFC 4006 / §8.24                                  | Gx-UM-ESM<br>Gx-UM-AA | This AVP contains the number of requested, granted or used octets from the user.                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 414    | CC-Output-Octets   | RFC 4006 / §8.25                                  | Gx-UM-ESM<br>Gx-UM-AA | This AVP contains the number of requested, granted or used octets toward the user.                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 415    | CC-Request-Number  | RFC 4006 / §8.2                                   | —                     | This AVP identifies each request within one session. Each request within a session has a unique CC-Request-Number that is used for matching requests with answers.                                                                                                                                                                                                                                                                                                                                                                  |
| 416    | CC-Request-Type    | RFC 4006 / §8.3                                   | —                     | <p>This AVP identifies the request type:</p> <p>INITIAL_REQUEST (CCR-I)<br/>UPDATE_REQUEST (CCR-U)<br/>TERMINATION_REQUEST (CCR-T)</p>                                                                                                                                                                                                                                                                                                                                                                                              |

| AVP ID | AVP name                        | Section defined  | Application           | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|--------|---------------------------------|------------------|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 418    | CC-Session-Failover             | RFC 4006 / §8.4  | —                     | <p>This AVP controls whether the secondary peer will be used in case that the primary peer is unresponsive (peer failover behavior). The unresponsiveness is determined by the timeout of the previously sent message.</p> <p>If this AVP is not supplied via PCRF, the locally configured options in the 7750 SR will determine the peer failover behavior. For further details on the peer failover behavior, see "Gx Fallback Function" section in the Gx Configuration Guide.</p> |
| 421    | CC-Total-Octets                 | RFC 4006 / §8.23 | Gx-UM-ESM<br>Gx-UM-AA | This AVP contains the number of requested, granted or used octets regardless of the direction (sent or received).                                                                                                                                                                                                                                                                                                                                                                     |
| 427    | Credit-Control-Failure-Handling | RFC 4006 / §8.14 | —                     | <p>This AVP controls whether the subscriber is terminated or instantiated with default parameters in case that the PCRF is unresponsive. The unresponsiveness is determined by the timeout of the previously sent message.</p> <p>If this AVP is not supplied via PCRF, the locally configured options in the 7750 SR determines the behavior. For further details, see the "Gx Fallback Function" section in the Gx Configuration Guide.</p>                                         |
| 431    | Granted-Service-Unit            | RFC 4006 / §8.17 | Gx-UM-ESM<br>Gx-UM-AA | <p>This grouped AVP is sent by PCRF to the 7750 SR for usage monitoring purposes. When the granted amount of units is consumed by the user, a report is sent from the 7750 SR to the PCRF.</p> <p>The amount of consumed units can be measured on three different levels:</p> <ul style="list-style-type: none"> <li>• Session level (host level)</li> <li>• PCC rule level (credit category in the 7750 SR)</li> <li>• ADC rule level (AA level in the 7750 SR)</li> </ul>           |
| 433    | Redirect-Address-Type           | RFC 4006 / §8.38 | Gx-PM-ESM             | <p>This AVP specifies the address type of the HTTP redirect server.</p> <p>URL (2) type is the only address type supported in the 7750 SR.</p>                                                                                                                                                                                                                                                                                                                                        |

| AVP ID | AVP name                | Section defined  | Application           | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--------|-------------------------|------------------|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 435    | Redirect-Server-Address | RFC 4006 / §8.39 | Gx-PM-ESM             | This AVP specifies the URL string of the redirect server.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 443    | Subscription-Id         | RFC 4006 / §8.46 | —                     | This AVP is of type Grouped and is used to identify the subscriber host in the 7750 SR. The nested AVPs are subscription-id-data and subscription-id-type.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 444    | Subscription-Id-Data    | RFC 4006 / §8.48 | —                     | <p>This AVP is part of the subscription-id AVP and is used to identify the host by:</p> <ul style="list-style-type: none"> <li>• Circuit-id</li> <li>• Dual-stack-remote-id</li> <li>• Imei</li> <li>• Imsi</li> <li>• Mac of the host</li> <li>• Msisdn</li> <li>• Subscriber-id</li> <li>• Username (ppp-username or a string returned in the Username attribute via RADIUS or NASREQ)</li> </ul> <p>Subscription type (subscription-id-type AVP) has to be explicitly set via CLI. The data is formatted according to the type set.</p> <p>For GTP S11 access, the value configured with the following command is ignored and the session always includes two subscription-Id AVPs for both IMSI and MSISDN.</p> <ul style="list-style-type: none"> <li>• <b>MD-CLI</b> <pre>configure subscriber-mgmt diameter-gx-policy gx avp- subscription-id</pre> </li> <li>• <b>classic CLI</b> <pre>configure subscriber-mgmt diameter-application-policy gx avp-subscription-id</pre> </li> </ul> |
| 446    | Used-Service-Unit       | RFC 4006 / §8.19 | Gx-UM-ESM<br>Gx-UM-AA | <p>This AVP is of type Grouped and it represents the measured volume threshold for usage monitoring control purposes.</p> <p>It is sent in the Usage-Monitoring-Report AVP from the 7750 SR to the PCRF when</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

| AVP ID | AVP name                  | Section defined  | Application | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|--------|---------------------------|------------------|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        |                           |                  |             | the granted unit threshold is reached or in response to a usage-report request from the PCRF.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 450    | Subscription-Id-Type      | RFC 4006 / §8.47 | —           | <p>This AVP is used to determine which type of identifier is carried by the subscription-id AVP. The following formats (types) are supported in the 7750 SR:</p> <ul style="list-style-type: none"> <li>• E.164 format (ITU-T E.164)</li> <li>• IMSI format (ITU-T E.212)</li> <li>• NAI format (RFC 2486)</li> <li>• Private format</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                |
| 458    | User-Equipment-Info       | RFC 4006 / §8.49 | —           | This is a Grouped AVP that carries information about the identity and the capabilities of the host.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 459    | User-Equipment-Info-Type  | RFC 4006 / §8.50 | —           | <p>This AVP is nested within the User-Equipment-Info AVP. The following types are supported in the 7750 SR:</p> <ul style="list-style-type: none"> <li>• IMEISV – contains the IMEI and software version according to 3GPP TS 23.003 document.</li> <li>• MAC address</li> <li>• Eui64 based on 48-bit MAC address with 0xfffe inserted in the middle.</li> <li>• Modified_eui64 — similar to eui64 but with inverted 'u' bit as defined in: <a href="http://standards.ieee.org/develop/regauth/tut/eui64.pdf">http://standards.ieee.org/develop/regauth/tut/eui64.pdf</a> and RFC 4291.</li> </ul> <p>The equipment type must be explicitly set through the CLI. For GTP S11 access, the configuration is ignored and always uses IMEISV.</p> |
| 460    | User-Equipment-Info-Value | RFC 4006 / §8.51 | —           | This AVP carries the value that is defined by the User-Equipment-Info-Type AVP.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 507    | Flow-Description          | 29.214 / §5.3.8  | Gx-PM-ESM   | This AVP is nested within Flow-Information AVP. It identifies traffic within the PCC rule based on the 5 tuple.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 511    | Flow-Status               | 29.214 / §5.3.11 | Gx-PM-ESM   | <p>This AVP is used to set the service gating action for the service represented by the PCC rule. It is nested inside of Charging-Rule-Definition AVP.</p> <p>Supported values are:</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

| AVP ID | AVP name                     | Section defined                     | Application | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|--------|------------------------------|-------------------------------------|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        |                              |                                     |             | <ul style="list-style-type: none"> <li>ENABLED (2)</li> <li>DISABLED (3)</li> </ul> <p>The service identified by PCC rule is by default enabled (Flow-Status = ENABLED). If explicitly configured within the PCC rule, it must be accompanied with one or more additional actions. Otherwise, the entire PCC rule instantiation fails.</p> <p>Flow-Status = DISABLED can be the sole action within the PCC rule. Traffic associated with this action, is dropped.</p>                                                                             |
| 515    | Max-Requested-Bandwidth-DL   | 29.214 / §5.3.14                    | Gx-PM-ESM   | Depending on the context in which it is configured (nested), this AVP represents the egress PIR of a queue or a policer.                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 516    | Max-Requested-Bandwidth-UL   | 29.214 / §5.3.15                    | Gx-PM-ESM   | Depending on the context in which it is configured (nested), this AVP represents the ingress PIR of a queue or a policer.                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 554    | Extended-Max-Requested-BW-DL | 29.214 / §5.3.52                    | Gx-PM-ESM   | For higher rate requirements, this AVP can be used in place of the Max-Requested-Bandwidth-DL AVP.                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 555    | Extended-Max-Requested-BW-UL | 29.214 / §5.3.52                    | Gx-PM-ESM   | For higher rate requirements, this AVP can be used in place of the Max-Requested-Bandwidth-UL AVP.                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 628    | Supported-Features           | 29.229 / §6.3.29<br>29.212 / §5.4.1 | —           | <p>This is a Grouped AVP that is used during Gx session establishment to inform the destination host about the required and optional features that the origin-host supports. One instance of Supported-Features AVP is needed per Feature-List-id.</p> <p>The 7750 SR supports the following features from 3GPP document 29.212, section §5.4.1:</p> <ul style="list-style-type: none"> <li>Gx Rel 8, 9, 10</li> <li>ADC</li> <li>Extended-BW-NR (optional)</li> </ul> <p>The Vendor-Id AVP in Supported-Features AVP is set to 10415 (3GPP).</p> |
| 629    | Feature-List-Id              | 29.229 / §6.3.30                    | —           | This AVP contains the identity of a feature list. This AVP allows differentiation between multiple feature lists in case that                                                                                                                                                                                                                                                                                                                                                                                                                     |

| AVP ID | AVP name                 | Section defined  | Application | Description                                                                                                                                                                                                                                                                                                                                                                                                          |
|--------|--------------------------|------------------|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        |                          |                  |             | <p>an application has multiple feature lists defined.</p> <p>Gx reference point and ADC are advertised in Feature-List-Id=1 and Extended-BW-NR is advertised in Feature-List-Id=2.</p>                                                                                                                                                                                                                               |
| 630    | Feature-List             | 29.229 / §6.3.31 | —           | <p>This AVP contains a bitmask indicating the supported feature in Gx.</p> <p>The Gx features in the Feature-List AVP are defined in 3GPP TS 29.212, §5.4.1.</p>                                                                                                                                                                                                                                                     |
| 909    | RAI                      | 29.061           | —           | <p>For GTP S11 access this contains the RAI if it was signaled in GTP.</p>                                                                                                                                                                                                                                                                                                                                           |
| 1001   | Charging-Rule-Install    | 29.212 / §5.3.2  | —           | <p>This AVP is of type Grouped and is used to enforce overrides, install NAS filter inserts and install or modify PCC rules in the node as instructed by PCRF.</p> <p>Each override, NAS filter insert or a PCC rule that is to be instantiated is identified by the charging-rule-name AVP.</p>                                                                                                                     |
| 1002   | Charging-Rule-Remove     | 29.212 / §5.3.3  | —           | <p>This AVP is of type Grouped and is used to remove PCC rules from an IP CAN session.</p> <p>Be aware that Gx overrides (ESM string overrides, updates of queue and policer rates, filter overrides, category-map overrides), cannot be removed. For those cases, the Charging-Rule-Remove AVP is ignored, even if the M-bit in the AVP is set.</p>                                                                 |
| 1003   | Charging-Rule-Definition | 29.212 / §5.3.4  | —           | <p>This AVP is of type Grouped and is used for rule overrides, NAS filter inserts or PCC rules installation. It contains nested AVPs that define the overrides (rate changes of a subscriber, a queue or a policer, and so on), NAS filter insert or a completely new PCC rule definition.</p> <p>The override/PCC rule (defined by the Charging-Rule-Definition) is instantiated via Charging-Rule-Install AVP.</p> |
| 1005   | Charging-Rule-Name       | 29.212 / §5.3.6  | —           | <p>This AVP is used to:</p> <ul style="list-style-type: none"> <li>Reference a predefined rule in the node. This predefined rule represents an override of an existing rule. The</li> </ul>                                                                                                                                                                                                                          |

| AVP ID | AVP name          | Section defined  | Application | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|--------|-------------------|------------------|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        |                   |                  |             | <p>override is activated by including Charging-Rule-Name AVP nested within the Charging-Rule-Install AVP sent from the PCRF to the 7750 SR.</p> <ul style="list-style-type: none"> <li>Name the PCC rule which is defined through Charging-Rule-Definition AVP. When the PCC rule is installed, it can be removed by referencing the PCC rule name.</li> <li>Report rule/override status in case of a rule/override activation failure. The status is reported within Charging-Rule-Report AVP sent from the node to the PCRF.</li> </ul>                                                                  |
| 1006   | Event-Trigger     | 29.212 / §5.3.7  | —           | <p>This AVP can be sent from the PCRF to subscribe to a particular event in the 7750 SR.</p> <p>When specific events occur on the 7750 SR, they are reported to the PCRF in the related AVP along with the event trigger indication.</p> <p>The supported events are listed in <a href="#">Table 12: Event triggers (Event-Trigger AVP)</a>.</p>                                                                                                                                                                                                                                                           |
| 1010   | Precedence        | 29.212 / §5.3.11 | Gx-PM-ESM   | <p>This AVP is carried within a PCC rule definition (Charging-Rule-Definition) and it determines the order in which PCC rules are installed for the subscriber-host. PCC rules with lower values are evaluated before PCC rules with higher values.</p> <p>PCC rules without the Precedence value will be automatically ordered by the system to optimize the use of system resource.</p> <p>In case that there is a mix of PCC rules with and without the Precedence value, PCC rules without the explicit Precedence value are ordered after the PCC rules with the explicitly set Precedence value.</p> |
| 1014   | ToS-Traffic-Class | 29.212 / §5.3.15 | Gx-PM-ESM   | <p>This AVP is nested within Flow-Information AVP. It identifies traffic within the PCC rule based on DSCP bits. The only supported mask in this AVP is 11111100 (6 bits denoting DSCP field).</p>                                                                                                                                                                                                                                                                                                                                                                                                         |

| AVP ID | AVP name             | Section defined  | Application | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|--------|----------------------|------------------|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1016   | QoS-Information      | 29.212 / §5.3.16 | Gx-PM-ESM   | <p>This AVP has a multi-faceted function:</p> <ul style="list-style-type: none"> <li>As part of PCC rule definition in CCA or RAR, this AVP is used to rate-limit a flow.</li> <li>The AVP defines QoS overrides that can be submitted from PCRF to the SR OS router in a CCA or RAR message. The overrides are nested in Charging-Rule-Definition AVP and are activated in SR OS through the Charging-Rule-Install AVP.</li> </ul> <p>The supported QoS overrides are:</p> <ul style="list-style-type: none"> <li>Queue rates, bursts sizes, and weights</li> <li>Policer rates and burst sizes</li> <li>Subscriber egress aggregate rate limit</li> <li>Arbiter rates</li> </ul> <p>The AVP defines APN Uplink and Downlink Aggregate Maximum Bitrate (AMBR) in a CCA or RAR message. In this case, the AVP is included on the message level. The SR OS can map the AMBR on QoS overrides using the following commands.</p> <ul style="list-style-type: none"> <li><b>MD-CLI</b> <pre>configure groups group subscriber- mgmt diameter-gx-policy gx three- gpp-qos-mapping</pre> </li> <li><b>classic CLI</b> <pre>configure subscriber-mgmt diameter-application-policy gx 3gpp-qos-mapping</pre> </li> </ul> <p>For GTP S11 access, the AVP can also be used to signal the APN AMBR value received in GTP in a CCR message. In this case the AVP is included on message level.</p> |
| 1018   | Charging-Rule-Report | 29.212 / §5.3.18 | —           | <p>This AVP is of type Grouped and is used to report the status of PCC rules in the 7750 SR.</p> <p>Failure to install or activate one or more policy rules is always reported in CCR-u messages. One or more Charging-</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

| AVP ID | AVP name              | Section defined  | Application | Description                                                                                                                                                                                                                                                                                                                                                                                        |
|--------|-----------------------|------------------|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        |                       |                  |             | <p>Rule-Report AVPs in CCR-u command is included, indicating the failed rules.</p> <p>The report about successful rule activation or rule resource allocation is not sent to the PCRF even in the cases when the PCRF specifically demands such reports from the 7750 SR.</p>                                                                                                                      |
| 1019   | PCC-Rule-Status       | 29.212 / §5.3.19 | —           | This AVP describes the status of the rules as active or inactive and is nested within the Charging-Rule-Report AVP.                                                                                                                                                                                                                                                                                |
| 1025   | Guaranteed-Bitrate-DL | 29.212 / §5.3.25 | Gx-PM-ESM   | Depending on the context in which it is configured (nested), this AVP represents the egress CIR of a queue or a policer.                                                                                                                                                                                                                                                                           |
| 1026   | Guaranteed-Bitrate-UL | 29.212 / §5.3.26 | Gx-PM-ESM   | Depending on the context in which it is configured (nested), this AVP represents the ingress CIR of a queue or a policer.                                                                                                                                                                                                                                                                          |
| 1027   | IP-CAN-Type           | 29.212 / §5.3.27 | —           | <p>This AVP indicates the type of Connectivity Access Network in which the user is connected.</p> <p>For GTP S11 access, the AVP value is set to 3GPP-EPS (code 5). For any other access type the AVP value is set to xDSL (code 2).</p>                                                                                                                                                           |
| 1028   | QoS-Class-Identifier  | 29.212 / §5.3.17 | —           | <p>This AVP identifies a QoS forwarding class within the router. Mapping between QCIs and forwarding classes in the 7750 SR is the following:</p> <ul style="list-style-type: none"> <li>• QCI 1 — FC H1</li> <li>• QCI 2 — FC H2</li> <li>• QCI 3 — FC EF</li> <li>• QCI 4 — FC L1</li> <li>• QCI 5 — FC NC</li> <li>• QCI 6 — FC AF</li> <li>• QCI 7 — FC L2</li> <li>• QCI 8 — FC BE</li> </ul> |
| 1031   | Rule-Failure-Code     | 29.212 / §5.3.38 | —           | This AVP is sent from the router to the PCRF within a Charging-Rule-Report or ADC-Rule-Report AVP to identify the reason a rule is being reported. For the list of supported failure codes in the 7750 SR,                                                                                                                                                                                         |

| AVP ID | AVP name                     | Section defined  | Application | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|--------|------------------------------|------------------|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        |                              |                  |             | see <a href="#">Table 11: Rule failure codes (Rule-Failure-Code AVP)</a> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 1032   | RAT-Type                     | 29.212 / §5.3.31 | —           | <p>This AVP identifies the radio access technology used for this connection.</p> <p>For WLAN-GW UEs, the AVP value is fixed and set to WLAN(0).</p> <p>For GTP S11 access, the AVP value is set to the value signaled in GTP.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 1040   | APN-Aggregate-Max-Bitrate-DL | 29.212           | —           | <p>When received in an RAR or CCA, this value can be mapped to a local egress QoS override with the following commands.</p> <ul style="list-style-type: none"> <li> <b>MD-CLI</b> <pre>configure groups group subscriber-mgmt diameter-gx- policy gx three-gpp-qos-mapping apn-ambr-dl</pre> </li> <li> <b>classic CLI</b> <pre>configure subscriber-mgmt diameter-application-policy gx 3gpp-qos-mapping apn-amb-dl</pre> </li> </ul> <p>The AVP can be configured to override an egress policer PIR rate, an egress queue PIR rate, an egress arbiter rate, an egress user scheduler rate, an egress aggregate rate, an egress high-scale SLA aggregate rate, or to ignore the override.</p> <p>This uses the generic ESM override mechanism and any override received from another source (such as RADIUS or Alc-Queue AVP) can remove or change this value.</p> <p>For GTP S11 access, the value received in GTP is also reflected in a CCR.</p> |
| 1041   | APN-Aggregate-Max-Bitrate-UL | 29.212           | —           | <p>When received in an RAR or CCA, this value can be mapped to a local ingress qos override with the following commands.</p> <ul style="list-style-type: none"> <li> <b>MD-CLI</b> <pre>configure groups group subscriber- mgmt diameter-gx-policy gx three- gpp-qos-mapping apn-ambr-ul</pre> </li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

| AVP ID | AVP name              | Section defined   | Application           | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|--------|-----------------------|-------------------|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        |                       |                   |                       | <ul style="list-style-type: none"> <li><b>classic CLI</b></li> </ul> <pre>configure subscriber-mgmt diameter-application-policy gx 3gpp-qos-mapping apn-amb-ul</pre> <p>The AVP can be configured to override an ingress policer PIR rate, an ingress queue PIR rate, an ingress arbiter rate, an ingress user scheduler rate, or to ignore the override.</p> <p>This uses the generic ESM override mechanism and any override received from another source (such as RADIUS or Alc-Queue AVP) can remove or change this value.</p> <p>For GTP S11, the access value received in GTP also reflected in a CCR.</p> |
| 1045   | Session-Release-Cause | 29.212 / §5.3.33  | Gx-PM-ESM<br>Gx-PM-AA | This AVP terminates the Gx session from the PCRF side. The reason for session termination is included in this AVP. The reason for the session termination is ignored by the router.                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 1050   | AN-GW-Address         | 29.212 / § 5.3.49 | —                     | This AVP is the system IPv4 address of the 7750 SR.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 1058   | Flow-Information      | 29.212 / §5.3.53  | Gm-PM-ESM             | <p>This is a Grouped AVP carrying information about traffic identification with the PCC rule. This AVP is nested within Charging-Rule-Definition AVP.</p> <p>Possible traffic identifiers within this AVP are:</p> <ul style="list-style-type: none"> <li>Flow-Description AVP — 5 tuple information</li> <li>ToS-Traffic-Class AVP — DSCP bits</li> <li>Flow-Direction AVP — ingress or egress direction of the traffic</li> </ul>                                                                                                                                                                              |
| 1065   | PDN-Connection-ID     | 29.212            | —                     | For GTP S11, the access value contains the APN as received in GTP.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 1066   | Monitoring-Key        | 29.212 / §5.3.59  | Gx-UM-ESM<br>Gx-UM-AA | <p>This AVP is used for usage monitoring, as an identifier for a usage monitoring control instance.</p> <p>This AVP can be nested within:</p> <ul style="list-style-type: none"> <li><b>Charging-Rule-Definition AVP</b></li> </ul>                                                                                                                                                                                                                                                                                                                                                                              |

| AVP ID | AVP name                     | Section defined  | Application           | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|--------|------------------------------|------------------|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        |                              |                  |                       | <p>In this case, the Monitoring-Key AVP is used to represent the PCC rule for which usage monitoring may be needed.</p> <ul style="list-style-type: none"> <li> <b>Usage-Monitoring-Information AVP</b> <p>In this case, the Monitoring-Key AVP is used to trigger or report the usage monitoring action for the entity represented by the Monitoring-Key AVP.</p> <p>The usage monitoring can be performed on multiple levels as requested by the Usage-Monitoring-Level AVP nested within the Usage-Monitoring-Information AVP:</p> <ul style="list-style-type: none"> <li>If the level is IP-CAN session, then the monitoring-key is an arbitrary octet string set by the PCRF – usage monitoring is performed for the entire IP-CAN session (which represent a host/sla-profile instance)</li> <li>If the level is pcc rule, then the Monitoring-Key refers to either the predefined category (name) in the 7750 SR, or the PCC rule represented by the Monitoring-Key AVP as defined in the Charging-Rule-Definition AVP.</li> <li>If the level is adc rule, then the monitoring-key is an arbitrary unique name that refers to a unique Tdf-App-Id defined in an Adc-Rule.</li> </ul> <p>There can be up to three monitoring-keys in a single Gx messages.</p> </li> </ul> |
| 1067   | Usage-Monitoring-Information | 29.212/ §5.3.60  | Gx-UM-ESM<br>Gx-UM-AA | <p>This AVP is of type Grouped and it contains the usage monitoring control information. It is used to activate usage monitoring and grant service units when it is sent from the PCRF toward the 7750 SR.</p> <p>The 7750 SR uses this AVP to report usage monitoring to the PCRF.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 1068   | Usage-Monitoring-Level       | 29.212 / §5.3.61 | Gx-UM-ESM<br>Gx-UM-AA | <p>This AVP is sent by PCRF to indicate the level on which usage monitoring is performed in the 7750 SR:</p> <ul style="list-style-type: none"> <li>IP-CAN session level</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

| AVP ID | AVP name                 | Section defined  | Application           | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|--------|--------------------------|------------------|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        |                          |                  |                       | <ul style="list-style-type: none"> <li>PCC rule level</li> <li>ADC rule level</li> </ul> <p>If usage-monitoring-level AVP is not provided, its absence indicates the pcc rule level usage monitoring.</p>                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 1069   | Usage-Monitoring-Report  | 29.212 / §5.3.62 | Gx-UM-ESM<br>Gx-UM-AA | <p>This AVP is sent by the PCRF to indicate that the accumulated usage monitoring is to be reported by the 7750 SR regardless of whether a usage monitoring threshold is reached. In other words, this AVP indicated immediate request for a usage monitoring report.</p> <p>A single value for this AVP is defined:</p> <p>0 — usage_monitoring_report_required</p>                                                                                                                                                                                                                                                                    |
| 1070   | Usage-Monitoring-Support | 29.212 / §5.3.63 | Gx-UM-ESM<br>Gx-UM-AA | <p>This AVP is sent by the PCRF to indicate whether the usage monitoring is disabled for specific monitoring key.</p> <p>The following value is defined:</p> <p>0 — usage_monitoring_disabled</p> <p>When usage-monitoring is disabled for a specific monitoring-key in this fashion, the 7750 SR generates a new CCR-u with the event-trigger AVP set to 'usage_report' to report the accumulated usage for the disabled usage monitoring entities.</p>                                                                                                                                                                                |
| 1080   | Flow-Direction           | 29.212 / §5.3.65 | Gx-PM-ESM             | <p>This AVP is nested within the Flow-Information AVP. It identifies the direction in which the PCC rule is applied (ingress or egress).</p> <p>Supported values are:</p> <ul style="list-style-type: none"> <li>DOWNLINK (1) for egress direction</li> <li>UPLINK (2) for ingress direction</li> </ul> <p>The direction to which the PCC rule is applied can come from the following two sources, in the order of preference:</p> <ul style="list-style-type: none"> <li>Flow-Direction AVP inside of the Flow-Information AVP.</li> <li>Inside of the Flow-Description AVP as part of IPFilterRule type (direction field).</li> </ul> |
| 1085   | Redirect-Information     | 29.212/§5.3.82   | Gx-PM-ESM             | <p>This is a Grouped AVP that contains HTTP redirect information. This can be used in:</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

| AVP ID | AVP name                   | Section defined  | Application          | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------|----------------------------|------------------|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        |                            |                  |                      | <ul style="list-style-type: none"> <li>PCC rules to HTTP redirect a flow or a group of flows.</li> <li>HTTP redirect overrides to override currently applied URL within the subscriber filter.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 1086   | Redirect-Support           | 29.212/§5.3.83   | Gx-PM-ESM            | <p>This AVP is nested inside of Redirect-Information AVP.</p> <p>The values of this AVPs are:</p> <ul style="list-style-type: none"> <li>REDIRECTION_DISABLED (0)</li> <li>REDIRECTION-ENABLED (1)</li> </ul> <p>The behavior for Redirect-Support in the 7750 SR is the following:</p> <ul style="list-style-type: none"> <li>If the AVP value is REDIRECTION_ENABLED, the 7750 SR accepts it and HTTP redirect is in effect.</li> <li>If the AVP value is different from REDIRECTION_ENABLED and M-bit is set (or inherited from parent AVP), the 7750 SR rejects it and the rule fails.</li> <li>If the AVP value is different from REDIRECTION_ENABLED and M-bit is not set in this AVP or any of parent AVPs, the 7750 SR ignores it and the HTTP redirect is not explicitly disabled.</li> </ul> <p>Not receiving this AVP has the same effect as it was received with value REDIRECTION_ENABLED.</p> |
| 1088   | TDF-Application-Identifier | 29.212/§5.3.77   | Gx-UM-AA             | <p>This AVP is of type OctetString.</p> <p>This AVP can be used in both PCC and ADC rules.</p> <p>For AA, this identifier is a reference to a preconfigured charging-group, app-group or application.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 1092   | ADC-Rule-Install           | 29.212 / §5.3.85 | Gx-PM-AA<br>Gx-UM-AA | This AVP is of type Grouped and is used to install or modify ADC (AA) rules in the 7750 SR as instructed by the PCRF.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 1093   | ADC-Rule-Remove            | 29.212/§5.3.86   | Gx-PM-AA<br>Gx-UM-AA | This AVP is of type Grouped, and it is used to deactivate or remove ADC rules in the 7750 SR as instructed from the PCRF.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 1094   | ADC-Rule-Definition        | 29.212 / §5.3.87 | Gx-PM-AA             | This AVP is of type Grouped and it contains the rules that are to be activated.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

| AVP ID | AVP name             | Section defined   | Application          | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|--------|----------------------|-------------------|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        |                      |                   | Gx-UM-AA             | AA rules that can be applied to a subscriber via Gx are: <ul style="list-style-type: none"> <li>Application-profile activation/override. A preexisting application-profile must be defined in the 7750 SR.</li> <li>Application characteristic overrides.</li> <li>Monitoring Key and a TDF-Application-Identifier. This installation of this rule has the effect of creating a usage monitoring instance for the subscriber for the specified TDF-Application-Identifier.</li> </ul> |
| 1096   | ADC-Rule-Name        | 29.212 / §5.3.89  | Gx-PM-AA<br>Gx-UM-AA | This AVP specifies the name of the ADC rule that is applied. This is an arbitrary string assigned by the PCRF and is used by the 7750 SR to report the rule status. In case that AA-Functions AVP is used (app-profile and ASO assignment/modification), this arbitrary name string must be prepended with a 7750 SR reserved keyword "AA-Functions:".                                                                                                                                |
| 1097   | ADC-Rule-Report      | 29.212 / §5.3.90  | Gx-PM-AA<br>Gx-UM-AA | This AVP is of type Grouped and is used to report the status of ADC rules which cannot be activated or enforced in the 7750 SR.                                                                                                                                                                                                                                                                                                                                                       |
| 2848   | Extended-APN-AMBR-DL | 29.212 / §5.3.134 |                      | For higher rate requirements, this AVP can be used in place of the APN-Aggregate-Max-Bitrate-DL AVP.                                                                                                                                                                                                                                                                                                                                                                                  |
| 2849   | Extended-APN-AMBR-UL | 29.212 / §5.3.135 |                      | For higher rate requirements, this AVP can be used in place of the APN-Aggregate-Max-Bitrate-UL AVP.                                                                                                                                                                                                                                                                                                                                                                                  |
| 2850   | Extended-GBR-DL      | 29.212 / §5.3.136 | Gx-PM-ESM            | For higher rate requirements, this AVP can be used in place of the Guaranteed-Bitrate-DL AVP.                                                                                                                                                                                                                                                                                                                                                                                         |
| 2851   | Extended-GBR-UL      | 29.212 / §5.3.137 | Gx-PM-ESM            | For higher rate requirements, this AVP can be used in place of the Guaranteed-Bitrate-UL AVP.                                                                                                                                                                                                                                                                                                                                                                                         |

## 5.1 Standard diameter AVPs (format)

Table 4: Standard diameter AVPs (format) lists standard diameter AVPs.

Incl/Excl – The attribute can be suppressed via CLI.

Flags (as set by the 7750 SR when the AVP is constructed):

- V indicates Vendor specific bit.
- M indicates Mandatory bit.



**Note:** The P flag bit is always set to 0.

UTF8String is a human-readable string using UTF-8 transformation format (which is for 7-bit encoding the same as US-ASCII).

OctetString is a basic data type which contains an arbitrary data. For example, Charging-Rule-Name AVP is OctetString according to RFC 6733 but in the 7750 SR it is displayed as readable string (UTF8String).

Flags for Gx specific AVPs are defined in RFC 6733, §4.5; 29.212, §5.3.

Flags for the Gx re-used AVPs are set as described in RFC 6733, §4.5 and in 3GPP 29.219, §5.4 — “The AVPs from Diameter base protocol are not included in Table 5.4, but they are re-used for the Gx reference point. Unless otherwise stated, re-used AVPs shall maintain their 'M', 'P' and 'V' flag settings. Where 3GPP RADIUS AVPs are re-used, unless otherwise stated, they shall be translated to Diameter AVPs as described in RFC 4005 [12] with the exception that the 'M' flag shall be set and the 'P' flag may be set”.

The NOKIA-specific AVPs will have the M-bit cleared.

NA — This keyword (Not Advertised) denotes that the AVP is not originated by the 7750 SR and therefore the 7750 SR does not set the flag bits. However, the 7750 SR recognizes the AVPs and corresponding values listed in the table, regardless of the M-bit flags set by PCRF. However, if the V-bit is present in the received AVP, then the Vendor-Id filed in the AVP layout also must be present and set to the correct value because the AVP with V-bit set is identified by the <avp-id, vendor-id> pair.

*Table 4: Standard diameter AVPs (format)*

| AVP ID | AVP name                | Incl/Excl | Type        | Flags | Limits   | Format                                                                                                                                                               |
|--------|-------------------------|-----------|-------------|-------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5      | NAS-Port                | Yes       | Unsigned32  | M     | 4 octets | See the 7450 ESS, 7750 SR, and VSR RADIUS Attributes Reference Guide.                                                                                                |
| 8      | Framed-IP-Address       | No        | OctetString | M     | 4 octets | Example:<br>ip-address 10.11.12.13<br>Framed-IP-Address = 0a0b0c0d<br>As defined in RFC 4005, §6.11.1.                                                               |
| 22     | 3GPP-User-Location-Info | Yes       | OctetString | V     | —        | Vendor-Id = 10415 (3GPP)<br>See 3GPP TS 29.061 for encoding details.<br>For example:<br>3GPP-User-Location-Info = 130 (TAI and ECGI), MNC 001, MCC 001, ECI 1, TAC 1 |

| AVP ID | AVP name           | Incl/<br>Excl | Type        | Flags | Limits                                                              | Format                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|--------|--------------------|---------------|-------------|-------|---------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 30     | Called-Station-Id  | Yes           | UTF8String  | M     | 64 chars                                                            | Example: Called-Station-Id = mac:ssid or mac only if ssid is not available.                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 31     | Calling-Station-ID | Yes           | UTF8String  | M     | 64 chars                                                            | llid   mac   remote-id   sap-id   sap-string (a 64 character string configured at the SAP level)<br>Example: include-avp calling-station-id sap-id<br><ul style="list-style-type: none"> <li> <b>MD-CLI</b> <pre>configure subscriber-mgmt diameter-gx-policy gx include-avp calling-station-id type sap-id</pre> </li> <li> <b>classic CLI</b> <pre>configure subscriber-mgmt diameter-application-policy gx include-avp calling-station-id sap-id</pre> </li> </ul> Calling-Station-Id = 1/1/2:1.1 |
| 55     | Event-Time stamp   | No            | Time        | M     | 4 octets                                                            | See the 7450 ESS, 7750 SR, and VSR RADIUS Attributes Reference Guide.                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 61     | NAS-Port-Type      | Yes           | Enumerated  | M     | 4 octets                                                            | The values for this attribute are defined in the RFC 2865, 4005 and 4603.<br>See the 7450 ESS, 7750 SR, and VSR RADIUS Attributes Reference Guide.                                                                                                                                                                                                                                                                                                                                                   |
| 87     | NAS-Port-Id        | Yes           | UTF8String  | M     | 253 octets                                                          | See the 7450 ESS, 7750 SR, and VSR RADIUS Attributes Reference Guide.                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 92     | NAS-Filter-Rule    | NA            | UTF8String  | NA    | Max 10 attributes per message or max 10 filter entries per message. | See the 7450 ESS, 7750 SR, and VSR RADIUS Attributes Reference Guide.                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 97     | Framed-IPv6-Prefix | No            | OctetString | M     | —                                                                   | SLAAC wan-host<br><ipv6-prefix/prefix-length> with prefix-length 64<br>The AVP layout is:                                                                                                                                                                                                                                                                                                                                                                                                            |

| AVP ID | AVP name                       | Incl/<br>Excl | Type              | Flags | Limits    | Format                                                                                                                                                                                                                                                                                               |
|--------|--------------------------------|---------------|-------------------|-------|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        |                                |               |                   |       |           | <1 octet Reserved> <1 octet Length><br><max 16 octets for Prefix>                                                                                                                                                                                                                                    |
| 123    | Delegated-IPv6-Prefix          | No            | OctetString       | M     | —         | <ipv6-prefix/prefix-length> with prefix-length [48 to 64]<br>The AVP layout is:<br><1 octet Reserved> <1 octet Length><br><max 16 octets for Prefix>                                                                                                                                                 |
| 257    | Host-IP-Address                | No            | Address           | M     | —         | IPv4 Address                                                                                                                                                                                                                                                                                         |
| 258    | Auth-Application-Id            | No            | Unsigned32        | M     | —         | Example:<br>Gx Auth-Application-Id = 16777238                                                                                                                                                                                                                                                        |
| 260    | Vendor-Specific-Application-Id | No            | Grouped           | M     | —         | This AVP contains the Vendor-Id AVP and Auth-Application-Id AVP.<br>For Gx, the Vendor-Id = 10415 (3GPP) and the Auth-Application-Id = 16777238.                                                                                                                                                     |
| 263    | Session-id                     | No            | UTF8String        | M     | 102 bytes | The session-id must be globally and eternally unique. The format of the session-id is the following:<br><DiameterIdentity>;<high 32 bits>;<low 32 bits><br>In the 7750 SR the session-id is defined as:<br>diameter-identity;boxuptime; seq-number<br>Example:<br>router.workstation.be;1391362206;1 |
| 264    | Origin-Host                    | No            | Diameter Identity | M     | 80 bytes  | Example:<br>Origin-Host = host-name-1@domain-name-1                                                                                                                                                                                                                                                  |
| 265    | Supported-Vendor-Id            | No            | Unsigned32        | M     | —         | IANA assigned vendor number:<br>3GPP — 10415<br>ETSI — 13019<br>NOKIA — 6527                                                                                                                                                                                                                         |
| 266    | Vendor-Id                      | No            | Unsigned32        | M     | —         | IANA assigned vendor number:<br>3GPP — 10415                                                                                                                                                                                                                                                         |

| AVP ID | AVP name             | Incl/<br>Excl | Type              | Flags | Limits   | Format                                                                                                                                                                      |
|--------|----------------------|---------------|-------------------|-------|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        |                      |               |                   |       |          | ETSI — 13019<br>NOKIA — 6527<br>BBF — 3561                                                                                                                                  |
| 267    | Firmware-Revision    | No            | Unsigned32        | —     | —        | Reference to the major/minor release version.<br>Example:<br>805 — Release 8R5                                                                                              |
| 268    | Result-Code          | No            | Unsigned32        | M     | —        | See <a href="#">Table 10: Result codes (Result-Code AVP)</a> for Error Codes.                                                                                               |
| 269    | Product-Name         | No            | UTF8String        | —     | —        | Vendor-assigned name for the product.<br>Example:<br>"SR OS"                                                                                                                |
| 278    | Origin-State-Id      | No            | Unsigned32        | M     | —        | Example:<br>Origin-State-Id = 10                                                                                                                                            |
| 279    | Failed-AVP           | No            | Grouped           | M     | —        | This AVP contains the AVP that could not be processed successfully.                                                                                                         |
| 281    | Error-Message        | No            | UTF8String        | —     | —        | String describing the cause of the failure.                                                                                                                                 |
| 282    | Route-Record         | No            | Diameter Identity | M     | 80 bytes | Example:<br>Route-Record: host-1                                                                                                                                            |
| 283    | Destination-Realm    | No            | Diameter Identity | M     | 80 bytes | Example:<br>Destination-Realm = domain.com                                                                                                                                  |
| 285    | Re-Auth-Request-Type | No            | Enumerated        | NA    | —        | This AVP is always received in RAR message and it is never sent by the 7750 SR.<br>0 — AUTHORIZE_ONLY<br>1 — AUTHORIZE_AUTHENTICATE<br>Example:<br>Re-Auth-Request-Type = 0 |
| 293    | Destination-Host     | No            | Diameter Identity | M     | 80 bytes | Operator configurable.                                                                                                                                                      |
| 295    | Termination-Cause    | No            | Enumerated        | M     | —        | For a list of the 7750 SR supported values for Gx see <a href="#">Table 13: Termination causes (Termination-Cause AVP)</a> .                                                |

| AVP ID | AVP name                 | Incl/<br>Excl | Type              | Flags | Limits   | Format                                                                                                                                                                                                                                                        |
|--------|--------------------------|---------------|-------------------|-------|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 296    | Origin-Realm             | No            | Diameter Identity | M     | 80 bytes | Example:<br>Origin-Realm = origin-domain.com                                                                                                                                                                                                                  |
| 297    | Experimental-Result      | No            | Grouped           | M     | —        | A grouped AVP containing: <ul style="list-style-type: none"> <li>• Vendor-Id AVP</li> <li>• Experimental-Result-Code AVP</li> </ul> Example:<br>Experimental-Result = {Vendor-Id = 10415 (3GPP)<br>Experimental-Result-Code = DIAMETER_PCC_RULE_EVENT (5142)} |
| 298    | Experimental-Result-Code | No            | Unsigned32        | M     | —        | For a list of the 7750 SR supported values for Gx see <a href="#">Table 10: Result codes (Result-Code AVP)</a> .                                                                                                                                              |
| 302    | Logical-Access-Id        | Yes           | OctetString       | V     | —        | Vendor ID = 13019 (ETSI)                                                                                                                                                                                                                                      |
| 313    | Physical-Access-Id       | Yes           | UTF8String        | V     | —        | Vendor ID = 13019 (ETSI)                                                                                                                                                                                                                                      |
| 412    | CC-Input-Octets          | No            | Unsigned64        | M     | —        | Example:<br>CC-Input-Octets = 1000000                                                                                                                                                                                                                         |
| 414    | CC-Output-Octets         | No            | Unsigned64        | M     | —        | Example:<br>CC-Output-Octets = 1000000                                                                                                                                                                                                                        |
| 415    | CC-Request-Number        | No            | Unsigned32        | M     | —        | Monotonically increasing from 0 for all requests within one session.                                                                                                                                                                                          |
| 416    | CC-Request-Type          | No            | Enumerated        | M     | —        | Example:<br>CC-Request-Type = 1 (CCR-i)<br>3. CC-Request-Type = 2 (CCR-u)<br>CC-Request-Type = 3 (CCR-t)                                                                                                                                                      |
| 418    | CC-Session-Failover      | No            | Enumerated        | M     | —        | FAILOVER_NOT_SUPPORTED (0)<br>FAILOVER_SUPPORTED (1)<br>Example:<br>CC-Session-Failover = 1                                                                                                                                                                   |
| 421    | CC-Total-Octets          | No            | Unsigned64        | M     | —        | Example:<br>CC-Total-Octets = 2000000                                                                                                                                                                                                                         |

| AVP ID | AVP name                        | Incl/<br>Excl | Type       | Flags | Limits    | Format                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------|---------------------------------|---------------|------------|-------|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 427    | Credit-Control-Failure-Handling | No            | Enumerated | M     | —         | TERMINATE (0)<br>CONTINUE (1)<br>RETRY_AND_TERMINATE (2)<br>Example:<br>Credit-Control-Failure-Handling = 1                                                                                                                                                                                                                                                                                                                            |
| 431    | Granted-Service-Unit            | No            | Grouped    | M     | —         | This AVP can contain the following AVPs: <ul style="list-style-type: none"> <li>• CC-Total-Octets</li> <li>• CC-Input-Octets</li> <li>• CC-Output-Octets</li> </ul>                                                                                                                                                                                                                                                                    |
| 433    | Redirect-Address-Type           | No            | Enumerated | M     | —         | Example:<br>Redirect-Address-Type = 2<br>(URL type)                                                                                                                                                                                                                                                                                                                                                                                    |
| 435    | Redirect-Server-Address         | No            | UTF8String | M     | 255 chars | Example:<br>Redirect-Server-Address = http://www.operator.com/portal.php&                                                                                                                                                                                                                                                                                                                                                              |
| 443    | Subscription-Id                 | Yes           | Grouped    | M     | —         | This AVP contains the following AVPs: <ul style="list-style-type: none"> <li>• Subscription-Id-Type</li> <li>• Subscription-Id-Data</li> </ul>                                                                                                                                                                                                                                                                                         |
| 444    | Subscription-Id-Data            | Yes           | UTF8String | M     | —         | Example:<br>Username — Subscription-Id-Data = user1@domain.com<br>Mac — Subscription-Id-Data = 11:22:33:44:55:66<br>Circuit-id — Subscription-Id-Data = dslam1 eth 2/1:100<br>Dual-stack-remote-id — Subscription-Id-Data = myRemoteId<br>Subscriber-id — Subscription-Id-Data = sub-id-1<br>Imsi Subscription-Id-Data = 204047910000598<br>Msisdn Subscription-Id-Data = 13109976224<br>Imei — Subscription-Id-Data = 356938035643809 |

| AVP ID | AVP name                  | Incl/<br>Excl | Type                           | Flags | Limits | Format                                                                                                                                                                                                                                                                                                                                    |
|--------|---------------------------|---------------|--------------------------------|-------|--------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 446    | Used-Service-Unit         | No            | Grouped                        | M     | —      | This AVP contains the following AVPs: <ul style="list-style-type: none"> <li>• CC-Total-Octets</li> <li>• CC-Input-Octets</li> <li>• CC-Output-Octets</li> </ul>                                                                                                                                                                          |
| 450    | Subscription-Id-Type      | Yes           | Enumerated                     | M     | —      | Example:<br>Subscription-Id-Type = 0 (end_user_e164)<br>Subscription-Id-Type = 1 (end_user_imsi)<br>Subscription-Id-Type = 3 (end_user_nai)<br>Subscription-Id-Type = 4 (end_user_private)                                                                                                                                                |
| 458    | User-Equipment-Info       | Yes           | Grouped                        | M     | —      | This AVP contains the following AVPs: <ul style="list-style-type: none"> <li>• User-Equipment-Info-Type</li> <li>• User-Equipment-Info-Value</li> </ul>                                                                                                                                                                                   |
| 459    | User-Equipment-Info-Type  | Yes           | Enumerated                     | —     | —      | Example:<br>User-Equipment-Info-Type = 0 (emissive)<br>User-Equipment-Info-Type = 1 (mac)<br>User-Equipment-Info-Type = 2 (eui64)<br>User-Equipment-Info-Type = 3 (modified_eui64)                                                                                                                                                        |
| 460    | User-Equipment-Info-Value | Yes           | OctetString                    | —     | —      | —                                                                                                                                                                                                                                                                                                                                         |
| 507    | Flow-Description          | No            | IPFilterRule (RFC6733, §4.3.1) | NA,M  | —      | The IPFilterRule format within PCC rule in the 7750 SR has the following syntax:<br>action dir proto from src to dst<br>action — permit<br>dir — direction: in or out<br>proto — an IP protocol specified by number. The <b>ip</b> keyword means any protocol matches.<br>src and dest — <address/mask> and ports (including port ranges) |

| AVP ID | AVP name                                 | Incl/<br>Excl | Type       | Flags | Limits | Format                                                                                                                                                                                                                                                                                                                         |
|--------|------------------------------------------|---------------|------------|-------|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        |                                          |               |            |       |        | Example:<br>Flow-Description = allow in 6 from 192.168.7.0/24 3000-40000 to 172.16.10.0/26 10000-20000                                                                                                                                                                                                                         |
| 511    | Flow-Status                              | No            | Enumerated | NA,M  | —      | Example:<br>Flow-Status = 3 — matched traffic inside of the PCC rule is dropped.                                                                                                                                                                                                                                               |
| 515    | Max-<br>Requested-<br>Bandwidth-<br>DL   | No            | Unsigned32 | NA, V | —      | The units of this parameter are kb/s for overrides and b/s when used within PCC rules.<br>The rate accounts for the IP header and above (no L2 header).<br>Vendor-Id = 10415 (3GPP)<br>Example:<br>Max-Requested-Bandwidth-DL = 1000 — 1 Mb/s in overrides<br>Max-Requested-Bandwidth-DL = 1000000 — 1 Mb/s in PCC rules       |
| 516    | Max-<br>Requested-<br>Bandwidth-<br>UL   | No            | Unsigned32 | NA, V | —      | The units of this parameter are kb/s for overrides and b/s when used within PCC rules.<br>The rate accounts for the IP header and above (no Layer 2 header).<br>Vendor-Id = 10415 (3GPP)<br>Example:<br>Max-Requested-Bandwidth-UL = 1000 — 1 Mb/s for overrides<br>Max-Requested-Bandwidth-UL = 1000000 — 1 Mb/s in PCC rules |
| 554    | Extended-<br>Max-<br>Requested-<br>BW-DL | NA            | Unsigned32 | NA, V | —      | The units of this parameter are kb/s.<br>Vendor-Id = 10415 (3GPP)<br>Example:<br>Extended-Max-Requested-BW-DL = 1000 — 1 Mb/s                                                                                                                                                                                                  |
| 555    | Extended-<br>Max-<br>Requested-<br>BW-UL | NA            | Unsigned32 | NA, V | —      | The units of this parameter are kb/s.<br>Vendor-Id = 10415 (3GPP)<br>Example:                                                                                                                                                                                                                                                  |

| AVP ID | AVP name                 | Incl/<br>Excl | Type        | Flags | Limits    | Format                                                                                                                                                                                                                                                                                                                                                                       |
|--------|--------------------------|---------------|-------------|-------|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        |                          |               |             |       |           | Extended-Max-Requested-BW-UL = 1000 — 1 Mb/s                                                                                                                                                                                                                                                                                                                                 |
| 628    | Supported-Features       | No            | Grouped     | V     | —         | This AVP contains the following AVPs: <ul style="list-style-type: none"> <li>• Vendor-Id</li> <li>• Feature-List-Id</li> <li>• Feature-List</li> </ul> Vendor-Id = 10415 (3GPP)<br>Example for Extended-BW-NR:<br>Supported-Features <ul style="list-style-type: none"> <li>• Vendor-Id = 10415 3GPP</li> <li>• Feature-List-Id = 2</li> <li>• Feature-List = 128</li> </ul> |
| 629    | Feature-List-Id          | No            | Unsigned32  | V     | —         | Vendor-Id = 10415 (3GPP)<br>Example:<br>Feature-List-Id = 2                                                                                                                                                                                                                                                                                                                  |
| 630    | Feature-List             | No            | Unsigned32  | V     | —         | Vendor-Id = 10415 (3GPP)<br>Example:<br>Feature-List = 128                                                                                                                                                                                                                                                                                                                   |
| 909    | RAI                      | Yes           | OctetString | V     | 12 octets | Vendor-Id = 10415 (3GPP)<br>See 3GPP TS 29.061 for encoding details.<br>For example:<br>RAI = MCC 001, MNC 001, LAC 0xA2C1, RAC 0x0A                                                                                                                                                                                                                                         |
| 1001   | Charging-Rule-Install    | No            | Grouped     | NA, V | —         | Vendor-Id = 10415 (3GPP)<br>This AVP contains the following AVPs: <ul style="list-style-type: none"> <li>• Charging-Rule-Definition</li> <li>• Charging-Rule-Name</li> </ul>                                                                                                                                                                                                 |
| 1002   | Charging-Rule-Remove     | No            | Grouped     | NA, V | —         | Vendor-Id = 10415 (3GPP)<br>This AVP contains the following AVP:<br>Charging-Rule-Name                                                                                                                                                                                                                                                                                       |
| 1003   | Charging-Rule-Definition | No            | Grouped     | NA, V | —         | Vendor-Id = 10415 (3GPP)<br>This AVP contains the following nested AVPs:                                                                                                                                                                                                                                                                                                     |

| AVP ID | AVP name           | Incl/<br>Excl | Type        | Flags | Limits                                                                                         | Format                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|--------|--------------------|---------------|-------------|-------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        |                    |               |             |       |                                                                                                | <ul style="list-style-type: none"> <li>Charging-Rule-Name (provides the name to the overrides so that they can be referred in the Charging-Rule-Report – successful or failed rule instantiation)</li> <li>QoS-Information (defines Qos overrides)</li> <li>NAS-Filter-Rule</li> <li>Alc-NAS-Filter-Rule-Shared</li> <li>AA-Functions</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 1005   | Charging-Rule-Name | No            | OctetString | V,M   | 100 chars for PCC rules (defined via Charging-Rule-Definition AVP)<br>128 chars for overrides. | Vendor-Id = 10415 (3GPP)<br>This is an arbitrary rule name for PCC rules or a predefined string representing the overrides in the 7750 SR. Syntax for predefined names used in overrides are:<br>Filters: <ul style="list-style-type: none"> <li>Ingr-v4:&lt;id&gt;</li> <li>Ingr-v6:&lt;id&gt;</li> <li>Egr-v4:&lt;id&gt;</li> <li>Egr-v6:&lt;id&gt;</li> <li>In-Othr-v4:&lt;id&gt; (one-time-http-redirect)</li> </ul> ESM Strings: <ul style="list-style-type: none"> <li>Sub-Id: (64 Byte)</li> <li>Sla-Profile:sla-profile-string (16 Byte)</li> <li>Sub-Profile:sub-profile-string (16 Byte)</li> <li>Inter-Dest:Inter-Dest-String to associate subscriber with Vport</li> </ul> HTTP Redirect Override <ul style="list-style-type: none"> <li>V4-http-url:url-string</li> <li>V6-http-url:url-string</li> </ul> Category-Map (for usage monitoring):<br>Cat-Map:category-map-name<br>HTTP Redirect Override: <ul style="list-style-type: none"> <li>V4-http-url:url-string</li> </ul> |

| AVP ID | AVP name          | Incl/<br>Excl | Type        | Flags | Limits     | Format                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|--------|-------------------|---------------|-------------|-------|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        |                   |               |             |       |            | <ul style="list-style-type: none"> <li>V6-http-url:url-string</li> </ul> <p>AA Strings:</p> <ul style="list-style-type: none"> <li><b>AA-Functions: &lt;name-string&gt;</b><br/>This prefix indicates that the rule contains aa-specific information.</li> <li><b>AA-UM: &lt;name-string&gt;</b><br/>This prefix indicates that the rule contains aa-specific usage-monitoring information, or points to a predefined aa-specific usage-monitoring rule.</li> </ul> <p>Example:</p> <p>Charging-Rule-Name = ingr-v4:5—reference to the predefined ingress IPv4 filter in 7450 ESS, 7750 SR, 7950 XRS, and VSR. The filter ID is 5.</p> <p>Charging-Rule-Name =sla-profile:my-premium-sla—reference to the predefined sla-profile in 7450 ESS, 7750 SR, 7950 XRS, and VSR. The sla-profile name is 'my-premium-sla'.</p> |
| 1006   | Event-Trigger     | No            | Enumerated  | V     | —          | <p>Vendor-Id = 10415 (3GPP)</p> <p>For the list of supported event-triggers in the 7750 SR, see <a href="#">Table 12: Event triggers (Event-Trigger AVP)</a>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 1010   | Precedence        | No            | Unsigned32  | NA, M | 0 to 65535 | <p>Vendor-Id = 10415 (3GPP)</p> <p>Example:</p> <p>Precedence = 100</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 1014   | Tos-Traffic-Class | No            | OctetString | NA, M | —          | <p>Encoded as two octets. The first octet contains the IPv4 Type-of-Service or the IPv6 Traffic-Class field and the second octet contains the ToS/Traffic Class mask field. The only supported mask is 11111100 (6 bits denoting DSCP support).</p> <p>Example:</p> <p>ToS-Traffic-Class = 00101000 11111100<br/>— DSCP AF11</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 1016   | QoS-Information   | NA            | Grouped     | NA, V | —          | Vendor-Id 10415 (3GPP)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

| AVP ID | AVP name              | Incl/<br>Excl | Type       | Flags | Limits | Format                                                                                                                                                                                                                                                                                                                                                                                                        |
|--------|-----------------------|---------------|------------|-------|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        |                       |               |            |       |        | <p>When used to signal a flow rate limiter in a PCC rule, this AVP contains the following nested AVPs:</p> <ul style="list-style-type: none"> <li>• Max-Requested-Bandwidth-UL</li> <li>• Max-Requested-Bandwidth-DL</li> <li>• Guaranteed-Bitrate-UL</li> <li>• Guaranteed-Bitrate-DL</li> </ul>                                                                                                             |
| 1018   | Charging-Rule-Report  | No            | Grouped    | V,M   | —      | <p>Vendor-Id = 10415 (3GPP)</p> <p>This AVP contains the following nested AVPs:</p> <ul style="list-style-type: none"> <li>• Charging-Rule-Name</li> <li>• PCC-Rule-Status</li> <li>• Rule-Failure-Code</li> </ul> <p>Example: Charging-Rule-Report {<br/> Charging-Rule-Name = sla-profile:failed-profile<br/> PCC-Rule-Status = 1 (inactive)<br/> Rule-Failure-Code = 4 (GW/7750 SR_MALFUNCTION)<br/> }</p> |
| 1019   | PCC-Rule-Status       | No            | Enumerated | V,M   | —      | <p>Vendor-Id = 10415 (3GPP)</p> <p>Supported values in the 7750 SR:</p> <p>1 – inactive</p> <p>Example:</p> <p>PCC-Rule-Status = 0 — rule is active</p>                                                                                                                                                                                                                                                       |
| 1025   | Guaranteed-Bitrate-DL | NA            | Unsigned32 | NA,V  | —      | <p>The units of this parameter are kb/s for overrides and b/s when used within PCC rules.</p> <p>The rate accounts for the IP header and above (no Layer 2 header).</p> <p>Vendor-Id = 10415 (3GPP)</p> <p>Example:</p> <p>Guaranteed-Bandwidth-DL = 1000 — 1 Mb/s in overrides</p> <p>Guaranteed-Bandwidth-DL = 1000000 — 1 Mb/s in PCC rules</p>                                                            |

| AVP ID | AVP name                     | Incl/<br>Excl | Type       | Flags | Limits         | Format                                                                                                                                                                                                                                                                                                                                             |
|--------|------------------------------|---------------|------------|-------|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1026   | Guaranteed-Bitrate-UL        | NA            | Unsigned32 | V     | —              | <p>The units of this parameter are kb/s for overrides and b/s when used within PCC rules.</p> <p>The rate accounts for the IP header and above (no Layer 2 header).</p> <p>Vendor-Id = 10415 (3GPP)</p> <p>Example:</p> <p>Guaranteed-Bandwidth-UL = 1000 — 1 Mb/s in overrides</p> <p>Guaranteed-Bandwidth-UL = 1000000 — 1 Mb/s in PCC rules</p> |
| 1027   | IP-CAN-Type                  | Yes           | Enumerated | V     | —              | <p>Vendor-Id = 10415 (3GPP)</p> <p>Example:</p> <p>IP-CAN-Type = 2 — xDSL</p> <p>IP-CAN-Type = 5 — 3GPP-EPS</p>                                                                                                                                                                                                                                    |
| 1028   | QoS-Class-Identifier         | NA            | Enumerated | NA,M  | —              | <p>Vendor-Id = 10415 (3GPP)</p> <p>Example:</p> <p>QoS-Class-Identifier = 3 — maps to FC EF.</p>                                                                                                                                                                                                                                                   |
| 1031   | Rule-Failure-Code            | No            | Enumerated | V,M   | —              | <p>Vendor-Id = 10415 (3GPP)</p> <p>Example:</p> <p>Rule-Failure-Code = 1 — UNKNOWN_RULE_NAME</p>                                                                                                                                                                                                                                                   |
| 1032   | RAT-Type                     | Yes           | Enumerated | V     | —              | <p>Vendor-Id = 10415 (3GPP)</p> <p>Example:</p> <p>RAT-Type = 0 — WLAN</p> <p>RAT-Type = 1004 — EUTRAN</p>                                                                                                                                                                                                                                         |
| 1040   | APN-Aggregate-Max-Bitrate-DL | Yes           | Unsigned32 | V     | $2^{32}-1$ b/s | <p>Vendor-Id = 10415 (3GPP)</p> <p>Rate in bits per second (b/s)</p> <p>For example:</p> <p>APN-Aggregate-Max-Bitrate-DL = 100000000 (100 Mb/s)</p>                                                                                                                                                                                                |
| 1041   | APN-Aggregate-Max-Bitrate-UL | Yes           | Unsigned32 | V     | $2^{32}-1$ b/s | <p>Vendor-Id = 10415 (3GPP)</p> <p>Rate in bits per second (b/s)</p> <p>For example:</p>                                                                                                                                                                                                                                                           |

| AVP ID | AVP name              | Incl/<br>Excl | Type        | Flags | Limits    | Format                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|--------|-----------------------|---------------|-------------|-------|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        |                       |               |             |       |           | APN-Aggregate-Max-Bitrate-UL = 10000000 (10 Mb/s)                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 1045   | Session-Release-Cause | NA            | Enumerated  | V,M   | —         | <p>Vendor-Id = 10415 (3GPP)</p> <p>This AVP is only received by the 7750 SR and it is never sent by the 7750 SR.</p> <p>0 — UNSPECIFIED-REASON</p> <p>1 — UE_SUBSCRIPTION_REASON</p> <p>This value is used to indicate that the subscription of UE has changed (for example, removed) and the session needs to be terminated.</p> <p>2 — INSUFFICIENT_SERVER_RESOURCES</p> <p>This value is used to indicate that the server is overloaded and needs to abort the session.</p> <p>Example:</p> <p>Session-Release-Cause = 0</p> |
| 1050   | AN-GW-Address         | Yes           | IPv4Address | V     | —         | <p>Vendor-Id = 10415 (3GPP)</p> <p>Example:</p> <p>AN-GW-Address = 10.10.10.10</p>                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 1058   | Flow-Information      | No            | Grouped     | V     | —         | <p>Vendor-Id = 10415 (3GPP)</p> <p>The following AVPs can be nested inside:</p> <ul style="list-style-type: none"> <li>Flow-Description</li> <li>ToS-Traffic-Class</li> <li>Flow-Direction</li> </ul>                                                                                                                                                                                                                                                                                                                           |
| 1065   | PDN-Connection-ID     | Yes           | UTF8String  | V     | 100 chars | <p>Vendor-Id = 10415 (3GPP)</p> <p>For example:</p> <p>PDN-Connection-ID = example-apn.mnc001.mcc001.gprs</p>                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 1066   | Monitoring-Key        | No            | OctetString | NA,V  | 32 bytes  | <p>Vendor-Id = 10415 (3GPP)</p> <p>Category name configured in the 7750 SR, a string used for session monitoring or a Monitoring-Key AVP set in PCC rule definition with the Charging-Rule-Definition AVP.</p>                                                                                                                                                                                                                                                                                                                  |

| AVP ID | AVP name                     | Incl/<br>Excl | Type       | Flags | Limits | Format                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|--------|------------------------------|---------------|------------|-------|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        |                              |               |            |       |        | Example:<br>Monitoring-Key = monitor-pcc-rule-1                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 1067   | Usage-Monitoring-Information | No            | Grouped    | V     | —      | Vendor-Id = 10415 (3GPP)<br>This AVP contains the following nested AVPs: <ul style="list-style-type: none"> <li>• Monitoring-Key</li> <li>• Granted-Service-Unit</li> <li>• Used-Service-Unit</li> <li>• Usage-Monitoring-Level</li> <li>• Usage-Monitoring-Report</li> <li>• Usage-Monitoring-Support</li> </ul>                                                                                                                                                                                                           |
| 1068   | Usage-Monitoring-Level       | No            | Enumerated | V     | —      | Vendor-Id = 10415 (3GPP)<br>The following values are defined:<br>0 – session_level<br>1 – pcc_rule_level<br>2 – adc_rule_level<br>Example:<br>Usage-Monitoring-Level = 0 — usage monitoring is performed based on sla-profile (IP-CAN session level) of the host.<br>Usage-Monitoring-Level = 1 — usage monitoring is performed based on predefined category as indicated by the monitoring-key AVP<br>Usage-Monitoring-Level = 2 — usage monitoring is performed based on ADC rule, as indicated by the monitoring-key AVP |
| 1069   | Usage-Monitoring-Report      | No            | Enumerated | V     | —      | Vendor-Id = 10415 (3GPP)<br>Example:<br>Usage-Monitoring-Report = 0<br>(usage_monitoring_report_required)                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 1070   | Usage-Monitoring-Support     | No            | Enumerated | NA,V  | —      | Vendor-Id = 10415 (3GPP)<br>Example:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

| AVP ID | AVP name                   | Incl/<br>Excl | Type        | Flags | Limits        | Format                                                                                                                                                                                                                                                                                         |
|--------|----------------------------|---------------|-------------|-------|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        |                            |               |             |       |               | Usage-Monitoring-Support = 0 —<br>usage_monitoring_disabled                                                                                                                                                                                                                                    |
| 1080   | Flow-Direction             | No            | Enumerated  | NA,M  | —             | Vendor-Id = 10415 (3GPP)<br>Example:<br>Flow-Direction = 1 — egress<br>Flow-Direction = 2 — ingress                                                                                                                                                                                            |
| 1085   | Redirect-Information       | No            | Grouped     | NA,V  | —             | Vendor-Id = 10415 (3GPP)<br>This AVP can contain the following AVPs:<br><ul style="list-style-type: none"> <li>• Redirect-Support</li> <li>• Redirect-Address-Type</li> <li>• Redirect-Server-Address</li> </ul>                                                                               |
| 1086   | Redirect-Support           | No            | Enumerated  | NA,V  | —             | Vendor-Id = 10415 (3GPP)<br>Example:<br>Redirect-Support = 1 — redirection is enabled                                                                                                                                                                                                          |
| 1088   | TDF-Application-Identifier |               | OctetString | NA,V  | 32 chars long | Vendor-Id = 10415 (3GPP)<br>Example: 0_rated, BitTorrent                                                                                                                                                                                                                                       |
| 1092   | ADC-Rule-Install           | No            | Grouped     | NA,V  | —             | Vendor-Id = 10415 (3GPP)<br>This AVP contains the following nested AVPs:<br>ADC-Rule-Definition                                                                                                                                                                                                |
| 1093   | ADC-Rule-Remove            |               | Grouped     | NA,V  | —             | Vendor-Id = 10415 (3GPP)<br>This AVP contains the following nested AVPs:<br>ADC-Rule-Name                                                                                                                                                                                                      |
| 1094   | ADC-Rule-Definition        | No            | Grouped     | NA,V  | —             | Vendor-Id = 10415 (3GPP)<br>This AVP contains the following nested AVPs:<br><ul style="list-style-type: none"> <li>• ADC-Rule-Name</li> <li>• MonitoringKey</li> <li>• TDF-Application-Id</li> <li>• AA-Functions { <ul style="list-style-type: none"> <li>– AA profile</li> </ul> </li> </ul> |

| AVP ID | AVP name             | Incl/<br>Excl | Type        | Flags | Limits                                                          | Format                                                                                                                                                                                             |
|--------|----------------------|---------------|-------------|-------|-----------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        |                      |               |             |       |                                                                 | <ul style="list-style-type: none"> <li>– AA-App-Service-Options {</li> <li>– AA-App-Service-Options-Name</li> <li>– AA-App-Service-Options-Value</li> </ul> }<br>}                                 |
| 1096   | ADC-Rule-Name        | No            | OctetString | V     | 17 chars for prefix/separator (optional) plus 32 chars for name | Vendor-Id = 10415 (3GPP)<br>Example:<br>For app-profile and ASO changes:<br>ADC-Rule-Name = "AA-Functions: Adc RuleWithAAFtn"<br>For usage monitoring:<br>ADC-Rule-Name = "AdcRule WithoutAAFtn"   |
| 1097   | ADC-Rule-Report      | No            | Grouped     | V     | —                                                               | Vendor-Id = 10415 (3GPP)<br>This AVP contains the following nested AVPs: <ul style="list-style-type: none"> <li>• ADC-Rule-Name</li> <li>• PCC-Rule-Status</li> <li>• Rule-Failure-Code</li> </ul> |
| 2848   | Extended-APN-AMBR-DL | NA            | Unsigned32  | NA, V | —                                                               | The units of this parameter are kb/s.<br>Vendor-Id = 10415 (3GPP)<br>Example:<br>Extended-APN-AMBR-DL = 1000 — 1 Mb/s                                                                              |
| 2849   | Extended-APN-AMBR-UL | NA            | Unsigned32  | NA, V | —                                                               | The units of this parameter are kb/s.<br>Vendor-Id = 10415 (3GPP)<br>Example:<br>Extended-APN-AMBR-UL = 1000 — 1 Mb/s                                                                              |
| 2850   | Extended-GBR-DL      | NA            | Unsigned32  | NA, V | —                                                               | The units of this parameter are kb/s.<br>Vendor-Id = 10415 (3GPP)<br>Example:<br>Extended-GBR-DL = 1000 — 1 Mb/s                                                                                   |

| AVP ID | AVP name        | Incl/<br>Excl | Type       | Flags | Limits | Format                                                                                                           |
|--------|-----------------|---------------|------------|-------|--------|------------------------------------------------------------------------------------------------------------------|
| 2851   | Extended-GBR-UL | NA            | Unsigned32 | NA, V | —      | The units of this parameter are kb/s.<br>Vendor-Id = 10415 (3GPP)<br>Example:<br>Extended-GBR-UL = 1000 — 1 Mb/s |

## 6 NOKIA-specific AVPs

Table 5: NOKIA-specific AVPs

| AVP ID | AVP name                           | Application           | Description                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------|------------------------------------|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 92     | Alc-PPPoE-LCP-Keepalive-Interval   | Gx-PM-ESM             | Specifies the interval in seconds at which PPPoE LCP Echo-Request messages are sent. Overrides the LCP keepalive interval value configured in <b>subscriber-mgmt ppp-policy</b> for PPPoE PTA sessions or in the Base router or VPRN service <b>l2tp group</b> context for L2TP LNS sessions.                                                                                                                                               |
| 93     | Alc-PPPoE-LCP-Keepalive-Multiplier | Gx-PM-ESM             | Specifies the number of PPPoE Echo-Request messages that can be missed before the PPPoE session is terminated. Overrides the LCP keepalive multiplier value configured in <b>subscriber-mgmt ppp-policy</b> for PPPoE PTA sessions or in the Base router or VPRN service <b>l2tp group</b> context for L2TP LNS sessions.                                                                                                                   |
| 99     | Alc-IPv6-Address (IA-NA)           | Gx-PM-ESM<br>Gx-PM-AA | Attribute that carries the IPv6 address assigned to the IPoE/PPPoE host via DHCPv6 (IA-NA). The IPv6 address is obtained before Gx session establishment. The facilities to provide the IPv6 address to the subscriber-host are DHCP server, RADIUS or LUDB. The IPv6 address cannot be assigned to the subscriber host by PCRF via Gx. Instead the IPv6 address is the one being reported to the PCRF during the host instantiation phase. |
| 158    | Alc-NAS-Filter-Rule-Shared         | Gx-PM-ESM             | See the <i>7450 ESS, 7750 SR, and VSR RADIUS Attributes Reference Guide</i> .<br><br>This AVP is nested within Charging-Rule-Definition AVP.                                                                                                                                                                                                                                                                                                |
| 1001   | AA-Functions                       | Gx-PM-AA              | This is a grouped AVP that contains a set AA related AVPs used to apply overrides to the AA subscriber.<br><br>AA-Function AVP encompasses application-profile instantiation and overrides as well as the overrides of the ASOs within the application profile.<br><br>(AA subscriber state must exist for application profiles and ASO overrides to be applied).                                                                           |
| 1002   | AA-App-Profile-Name                | Gx-PM-AA              | The name of the application profile (app-profile) that is to be applied (instantiated or overridden) to the subscriber.<br><br>The app-profile must be predefined in the 7750 SR.                                                                                                                                                                                                                                                           |

| AVP ID | AVP name                    | Application | Description                                                                                                                                                                                                                                                         |
|--------|-----------------------------|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1003   | AA-App-Service-Options      | Gx-PM-AA    | This AVP is of type grouped and it contains AVPs related to application service options (ASO) which are configurable strings in AA context used to further refine identification criteria within the same application and consequently apply more targeted actions. |
| 1004   | AA-App-Serv-Options-Name    | Gx-PM-AA    | AA service option name.                                                                                                                                                                                                                                             |
| 1005   | AA-App-Serv-Options-Value   | Gx-PM-AA    | AA service option value.                                                                                                                                                                                                                                            |
| 1006   | Alc-Queue                   | Gx-PM-ESM   | This AVP is a grouped AVP that contains AVPs related to the queue parameters that can be overridden.                                                                                                                                                                |
| 1007   | Alc-Queue-Id                | Gx-PM-ESM   | Queue ID of a queue for which the parameters are being modified.                                                                                                                                                                                                    |
| 1008   | Alc-Committed-Burst-Size-UL | Gx-PM-ESM   | Committed burst size (CBS) of an ingress queue or an ingress policer in bytes.<br><br>Specifies the CBS value of the dynamic policer used for an ingress PCC rule when included in the QoS-Information -> Alc-Dynamic-Policer AVP grouped AVP.                      |
| 1009   | Alc-Maximum-Burst-Size-UL   | Gx-PM-ESM   | Maximum burst size (MBS) of an ingress queue or an ingress policer in bytes.<br><br>Specifies the MBS value of the dynamic policer used for an ingress PCC rule when included in the QoS-Information -> Alc-Dynamic-Policer AVP grouped AVP.                        |
| 1010   | Alc-Committed-Burst-Size-DL | Gx-PM-ESM   | Committed burst size (CBS) of an egress queue or an egress policer in bytes.<br><br>Specifies the CBS value of the dynamic policer used for an egress PCC rule when included in the QoS-Information -> Alc-Dynamic-Policer AVP grouped AVP.                         |
| 1011   | Alc-Maximum-Burst-Size-DL   | Gx-PM-ESM   | Maximum burst size (MBS) of an egress queue or an egress policer in bytes.<br><br>Specifies the MBS value of the dynamic policer used for an egress PCC rule when included in the QoS-Information --> Alc-Dynamic-Policer AVP grouped AVP.                          |
| 1014   | Alc-Policer                 | Gx-PM-ESM   | This AVP is a grouped AVP that contains AVPs related to the policer parameters that can be overridden.                                                                                                                                                              |
| 1015   | Alc-Policer-Id              | Gx-PM-ESM   | Policer ID of a policer for which the parameters are being modified.                                                                                                                                                                                                |
| 1016   | Alc-Sub-Egress-Rate-Limit   | Gx-PM-ESM   | This AVP contains the aggregate egress rate for the subscriber.                                                                                                                                                                                                     |

| AVP ID | AVP name                   | Application | Description                                                                                                                                                                                                                                                                                                                                                                                                      |
|--------|----------------------------|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1017   | Alc-Arbiter-Rate-Limit-DL  | Gx-PM-ESM   | This AVP contains the egress arbiter rate for the subscriber.                                                                                                                                                                                                                                                                                                                                                    |
| 1018   | Alc-Arbiter-Rate-Limit-UL  | Gx-PM-ESM   | This AVP contains the ingress arbiter rate for the subscriber.                                                                                                                                                                                                                                                                                                                                                   |
| 1021   | Alc-Arbiter                | Gx-PM-ESM   | This AVP is a grouped AVP that contains AVPs related to the arbiter parameters that can be overridden.                                                                                                                                                                                                                                                                                                           |
| 1022   | Alc-Arbiter-Name           | Gx-PM-ESM   | Arbiter name for which the parameters are being modified:<br><b>root</b> for the root arbiter<br><b>arbiter name</b> for an intermediate arbiter<br><b>_tmnx_no_parent</b> (PCC rule only) sets no parent for the dynamic policer<br>Specifies the parent arbiter name of the dynamic policer used for a PCC rule when included in the QoS-Information -> Alc-Dynamic-Policer -> Alc-Policer-Parent grouped AVP. |
| 1024   | Alc-Next-Hop-IP            | Gx-PM-ESM   | This AVP contain IPv4 or IPv6 next-hop address which can be within the same routing context or within a different routing context as specified by Alc-v4-Next-Hop-Service-Id or Alc-v6-Next-Hop-Service-Id AVPs.                                                                                                                                                                                                 |
| 1025   | Alc-v4-Next-Hop-Service-Id | Gx-PM-ESM   | This AVP contains the service ID of the routing context where the IPv4 traffic is redirected. The next-hop IPv4 address can be explicitly set via Alc-Next-Hop-IP AVP or it can be implicitly determined via routing lookup.                                                                                                                                                                                     |
| 1026   | Alc-v6-Next-Hop-Service-Id | Gx-PM-ESM   | This AVP contains the service ID of the routing context where the IPv6 traffic is redirected. The next-hop IPv6 address can be explicitly set via Alc-Next-Hop-IP AVP or it can be implicitly determined via routing lookup.                                                                                                                                                                                     |
| 1027   | Alc-Filter-Action          | Gx-PM-ESM   | This AVP sets the gating action within the filter portion of the PCC rule.<br>The support values in the node are: <ul style="list-style-type: none"> <li>FORWARD (1)</li> <li>DROP (2)</li> </ul>                                                                                                                                                                                                                |
| 1028   | Alc-QoS-Action             | Gx-PM-ESM   | This AVP is used to create an allowlist entry related to the QoS part of the PCC rule.<br>The supported value is:<br>FORWARD (1)<br>Alc-QoS-Action = Forward—Assuming that traffic is not dropped by the filtering action, it transparently passes                                                                                                                                                               |

| AVP ID | AVP name              | Application | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|--------|-----------------------|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        |                       |             | traffic through the QoS policy, without any QoS-related action taken.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 1029   | AA-Sub-Http-Url-Param | GX-PM-AA    | This AVP is used to indicate an <b>http url</b> parameter to be applied to the subscriber AA context.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 1030   | AA-Sub-Scope          | GX-PM-AA    | This AVP is used to indicate the scope of an AA application on the subscriber. AA can be applied on the overall subscriber level (all subscriber hosts) or at a specific subscriber-host level (MAC or device).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 1036   | Alc-SPI-Sharing       | Gx-PM-ESM   | <p>Grouped AVP</p> <p>This can be included in a Gx CCA or Gx RAR message to set or override the SPI sharing method for this subscriber session to SPI sharing per group or to the default SPI sharing method as specified in the SLA profile.</p> <pre>configure subscriber-mgmt sla-profile def-instance-sharing {per-sap   per-session}</pre> <p>To set SPI sharing per group, a group is identified with an integer SPI group ID. An SPI is shared by all subscriber sessions with the same subscriber ID, SAP, SLA profile and SPI group ID. The Alc-SPI-Sharing-Type must be set to "per group" and the Alc-SPI-Sharing-Id must contain the SPI group ID.</p> <p>To set SPI sharing to the default SPI sharing method as specified in the SLA profile, set the Alc-SPI-Sharing-Type to "default". The Alc-SPI-Sharing-Id AVP must not be present.</p> <p>Setting this AVP for an IPoE host with IPoE session disabled on the group interface results in a setup failure.</p> <p>Unsupported values result in a subscriber session setup failure.</p> |
| 1037   | Alc-SPI-Sharing-Type  | Gx-PM-ESM   | <p>Values:</p> <p>0= default</p> <p>2= per group</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 1038   | Alc-SPI-Sharing-Id    | Gx-PM-ESM   | <p>Value is function of the Alc-SPI-Sharing-Type:</p> <p>"default" (0) — The Alc-SPI-Sharing-Id AVP must not be present.</p> <p>"per group" (2) — The group ID used for SPI sharing. Valid values are 0 to 65535.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

| AVP ID | AVP name                        | Application | Description                                                                                                                                                                                                                                                                                                                                                                                   |
|--------|---------------------------------|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1039   | Alc-Policer-Parent              | Gx-PM-ESM   | Grouped AVP included in the Alc-Dynamic-Policer AVP to specify the Arbiter parent parameters of the dynamic policer used for the PCC Rule.                                                                                                                                                                                                                                                    |
| 1040   | Alc-Parent-Level                | Gx-PM-ESM   | Specifies the parent level of the dynamic policer used for a PCC rule. Included in the QoS-Information -> Alc-Dynamic-Policer -> Alc-Policer-Parent grouped AVP.                                                                                                                                                                                                                              |
| 1041   | Alc-Parent-Weight               | Gx-PM-ESM   | Specifies the parent weight of the dynamic policer used for a PCC rule. Included in the QoS-Information -> Alc-Dynamic-Policer -> Alc-Policer-Parent grouped AVP.                                                                                                                                                                                                                             |
| 1042   | Alc-Stat-Mode-UL                | Gx-PM-ESM   | Specifies the stat-mode of the dynamic policer used for an ingress PCC rule. Included in the QoS-Information -> Alc-Dynamic-Policer AVP grouped AVP.                                                                                                                                                                                                                                          |
| 1043   | Alc-Stat-Mode-DL                | Gx-PM-ESM   | Specifies the stat-mode of the dynamic policer used for an egress PCC rule. Included in the QoS-Information -> Alc-Dynamic-Policer AVP grouped AVP.                                                                                                                                                                                                                                           |
| 1044   | Alc-Packet-Byte-Offset-UL       | Gx-PM-ESM   | Specifies the packet-byte-offset of the dynamic policer used for an ingress PCC rule. Included in the QoS-Information -> Alc-Dynamic-Policer AVP grouped AVP.                                                                                                                                                                                                                                 |
| 1045   | Alc-Packet-Byte-Offset-DL       | Gx-PM-ESM   | Specifies the packet-byte-offset of the dynamic policer used for an egress PCC rule. Included in the QoS-Information -> Alc-Dynamic-Policer AVP grouped AVP.                                                                                                                                                                                                                                  |
| 1046   | Alc-Dynamic-Policer             | Gx-PM-ESM   | Grouped AVP included in the QoS-Information AVP for a PCC Rule definition to specify the dynamic policer parameters for the PCC Rule. Parameters not specified are taken from the dynamic-policer configuration in the <b>sap-ingress</b> or <b>sap-egress</b> QoS policy. The PCC rule instantiation fails when this AVP is included for a PCC rule that does not require a dynamic policer. |
| 1047   | Alc-Spi-Host-And-Session-Limits | Gx-PM-ESM   | Grouped AVP included in a Charging-Rule-Definition AVP to override the per SLA profile instance .<br><br><pre>configure subscriber-mgmt sla-profile host-limits configure subscriber-mgmt sla-profile session-limits</pre>                                                                                                                                                                    |
| 1048   | Alc-Sub-Host-And-Session-Limits | Gx-PM-ESM   | Grouped AVP included in a Charging-Rule-Definition AVP to override the per subscriber <b>host-limits</b> and <b>session-limits</b> configured in the subscriber profile.<br><br><pre>configure subscriber-mgmt sub-profile sub-profile-name</pre>                                                                                                                                             |

| AVP ID | AVP name                          | Application | Description                                                                                                                                                                                                                                                                                                                                                                   |
|--------|-----------------------------------|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1049   | Alc-Host-Limits-IPv4-Arp          | Gx-PM-ESM   | Overrides the IPv4 ARP limit configured in the <b>sla-profile</b> (when included in the Alc-Spi-Host-And-Session-Limits grouped AVP) or <b>sub-profile</b> (when included in the Alc-Sub-Host-And-Session-Limits grouped AVP) <b>host-limits</b> context.                                                                                                                     |
| 1050   | Alc-Host-Limits-IPv4-Dhcp         | Gx-PM-ESM   | Overrides the IPv4 DHCP limit configured in the <b>sla-profile</b> (when included in the Alc-Spi-Host-And-Session-Limits grouped AVP) or <b>sub-profile</b> (when included in the Alc-Sub-Host-And-Session-Limits grouped AVP) <b>host-limits</b> context.                                                                                                                    |
| 1051   | Alc-Host-Limits-IPv4-Overall      | Gx-PM-ESM   | Overrides the IPv4 overall limit configured in the <b>sla-profile</b> (when included in the Alc-Spi-Host-And-Session-Limits grouped AVP) or <b>sub-profile</b> (when included in the Alc-Sub-Host-And-Session-Limits grouped AVP) <b>host-limits</b> context.                                                                                                                 |
| 1052   | Alc-Host-Limits-IPv4-Ppp          | Gx-PM-ESM   | Overrides the IPV4 PPP limit configured in the <b>sla-profile</b> (when included in the Alc-Spi-Host-And-Session-Limits grouped AVP) or <b>sub-profile</b> (when included in the Alc-Sub-Host-And-Session-Limits grouped AVP) <b>host-limits</b> context.                                                                                                                     |
| 1053   | Alc-Host-Limits-IPv6-Overall      | Gx-PM-ESM   | Overrides the IPv6 IPoE DHCP PD host limit configured in the <b>sla-profile</b> (when included in the Alc-Spi-Host-And-Session-Limits grouped AVP) or <b>sub-profile</b> (when included in the Alc-Sub-Host-And-Session-Limits grouped AVP) <b>host-limits</b> context.                                                                                                       |
| 1054   | Alc-Host-Limits-IPv6-Pd-Ipoe-Dhcp | Gx-PM-ESM   | Overrides the IPv6 IPoE DHCP PD host limit configured in the <b>sla-profile</b> (when included in the Alc-Spi-Host-And-Session-Limits grouped AVP) or <b>sub-profile</b> (when included in the Alc-Sub-Host-And-Session-Limits grouped AVP) <b>host-limits</b> context.<br><br>(when included in the Alc-Sub-Host-And-Session-Limits grouped AVP) <b>host-limits</b> context. |
| 1055   | Alc-Host-Limits-IPv6-Pd-Overall   | Gx-PM-ESM   | Overrides the IPv6 DHCP PD host limit configured in the <b>sla-profile</b> (when included in the Alc-Spi-Host-And-Session-Limits grouped AVP) or <b>sub-profile</b> (when included in the Alc-Sub-Host-And-Session-Limits grouped AVP) <b>host-limits</b> context.                                                                                                            |
| 1056   | Alc-Host-Limits-IPv6-Pd-Ppp-Dhcp  | Gx-PM-ESM   | Overrides the IPv6 PPPoE DHCP PD host limit configured in the <b>sla-profile</b> (when included in the Alc-Spi-Host-And-Session-Limits grouped AVP) or <b>sub-profile</b> (when included in the Alc-Sub-Host-And-Session-Limits grouped AVP) <b>host-limits</b> context.                                                                                                      |

| AVP ID | AVP name                            | Application | Description                                                                                                                                                                                                                                                                |
|--------|-------------------------------------|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1057   | Alc-Host-Limits-IPv6-Wan-Ipoe-Dhcp  | Gx-PM-ESM   | Overrides the IPv6 IPoE DHCP WAN host limit configured in the <b>sla-profile</b> (when included in the Alc-Spi-Host-And-Session-Limits grouped AVP) or <b>sub-profile</b> (when included in the Alc-Sub-Host-And-Session-Limits grouped AVP) <b>host-limits</b> context.   |
| 1058   | Alc-Host-Limits-IPv6-Wan-Ipoe-Slaac | Gx-PM-ESM   | Overrides the IPv6 IPoE SLAAC WAN host limit configured in the <b>sla-profile</b> (when included in the Alc-Spi-Host-And-Session-Limits grouped AVP) or <b>sub-profile</b> (when included in the Alc-Sub-Host-And-Session-Limits grouped AVP) <b>host-limits</b> context.  |
| 1059   | Alc-Host-Limits-IPv6-Wan-Overall    | Gx-PM-ESM   | Overrides the IPv6 IPoE DHCP WAN host limit configured in the <b>sla-profile</b> (when included in the Alc-Spi-Host-And-Session-Limits grouped AVP) or <b>sub-profile</b> (when included in the Alc-Sub-Host-And-Session-Limits grouped AVP) <b>host-limits</b> context.   |
| 1060   | Alc-Host-Limits-IPv6-Wan-Ppp-Dhcp   | Gx-PM-ESM   | Overrides the IPv6 PPPoE DHCP WAN host limit configured in the <b>sla-profile</b> (when included in the Alc-Spi-Host-And-Session-Limits grouped AVP) or <b>sub-profile</b> (when included in the Alc-Sub-Host-And-Session-Limits grouped AVP) <b>host-limits</b> context.  |
| 1061   | Alc-Host-Limits-IPv6-Wan-Ppp-Slaac  | Gx-PM-ESM   | Overrides the <b>ipv6-wan-ppp-slaac</b> limit configured in the <b>sla-profile</b> (when included in the Alc-Spi-Host-And-Session-Limits grouped AVP) or <b>sub-profile</b> (when included in the Alc-Sub-Host-And-Session-Limits grouped AVP) <b>host-limits</b> context. |
| 1062   | Alc-Host-Limits-Lac-Overall         | Gx-PM-ESM   | Overrides the <b>lac-overall</b> limit configured in the <b>sla-profile</b> (when included in the Alc-Spi-Host-And-Session-Limits grouped AVP) or <b>sub-profile</b> (when included in the Alc-Sub-Host-And-Session-Limits grouped AVP) <b>host-limits</b> context.        |
| 1063   | Alc-Host-Limits-Overall             | Gx-PM-ESM   | Overrides the <b>overall</b> limit configured in the <b>sla-profile</b> (when included in the Alc-Spi-Host-And-Session-Limits grouped AVP) or <b>sub-profile</b> (when included in the Alc-Sub-Host-And-Session-Limits grouped AVP) <b>host-limits</b> context.            |
| 1064   | Alc-Session-Limits-IPoE             | Gx-PM-ESM   | Overrides the <b>ipoe</b> limit configured in the <b>sla-profile</b> (when included in the Alc-Spi-Host-And-Session-Limits grouped AVP) or <b>sub-profile</b> (when included in the Alc-Sub-Host-And-Session-Limits grouped AVP) <b>session-limits</b> context.            |
| 1065   | Alc-Session-Limits-PPPoE-Local      | Gx-PM-ESM   | Overrides the <b>pppoe-local</b> limit configured in the <b>sla-profile</b> (when included in the Alc-Spi-Host-And-Session-Limits grouped AVP) or <b>sub-profile</b> (when included in the                                                                                 |

| AVP ID | AVP name                         | Application | Description                                                                                                                                                                                                                                                              |
|--------|----------------------------------|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        |                                  |             | Alc-Sub-Host-And-Session-Limits grouped AVP) <b>session-limits</b> context.                                                                                                                                                                                              |
| 1066   | Alc-Session-Limits-PPPoE-Lac     | Gx-PM-ESM   | Overrides the <b>pppoe-lac</b> limit configured in the <b>sla-profile</b> (when included in the Alc-Spi-Host-And-Session-Limits grouped AVP) or <b>sub-profile</b> (when included in the Alc-Sub-Host-And-Session-Limits grouped AVP) <b>session-limits</b> context.     |
| 1067   | Alc-Session-Limits-PPPoE-Overall | Gx-PM-ESM   | Overrides the <b>pppoe-overall</b> limit configured in the <b>sla-profile</b> (when included in the Alc-Spi-Host-And-Session-Limits grouped AVP) or <b>sub-profile</b> (when included in the Alc-Sub-Host-And-Session-Limits grouped AVP) <b>session-limits</b> context. |
| 1068   | Alc-Session-Limits-L2TP-Lns      | Gx-PM-ESM   | Overrides the <b>l2tp-lns</b> limit configured in the <b>sla-profile</b> (when included in the Alc-Spi-Host-And-Session-Limits grouped AVP) or <b>sub-profile</b> (when included in the Alc-Sub-Host-And-Session-Limits grouped AVP) <b>session-limits</b> context.      |
| 1069   | Alc-Session-Limits-L2TP-Lts      | Gx-PM-ESM   | Overrides the <b>l2tp-lts</b> limit configured in the <b>sla-profile</b> (when included in the Alc-Spi-Host-And-Session-Limits grouped AVP) or <b>sub-profile</b> (when included in the Alc-Sub-Host-And-Session-Limits grouped AVP) <b>session-limits</b> context.      |
| 1070   | Alc-Session-Limits-L2TP-Overall  | Gx-PM-ESM   | Overrides the <b>l2tp-overall</b> limit configured in the <b>sla-profile</b> (when included in the Alc-Spi-Host-And-Session-Limits grouped AVP) or <b>sub-profile</b> (when included in the Alc-Sub-Host-And-Session-Limits grouped AVP) <b>session-limits</b> context.  |
| 1071   | Alc-Session-Limits-Overall       | Gx-PM-ESM   | Overrides the <b>overall</b> limit configured in the <b>sla-profile</b> (when included in the Alc-Spi-Host-And-Session-Limits grouped AVP) or <b>sub-profile</b> (when included in the Alc-Sub-Host-And-Session-Limits grouped AVP) <b>session-limits</b> context.       |

## 6.1 NOKIA-specific AVPs (format)

Table 6: NOKIA-specific AVPs (format)

| AVP ID | AVP name       | Conf | Type      | Flags | Limits   | Format                                |
|--------|----------------|------|-----------|-------|----------|---------------------------------------|
| 92     | Alc-PPPoE-LCP- | NA   | integer32 | NA, V | [4..300] | Alc-PPPoE-LCP-Keepalive-Interval = 10 |

| AVP ID | AVP name                           | Conf | Type        | Flags | Limits                                                                                                                     | Format                                                                                                                                                                                                                                                                    |
|--------|------------------------------------|------|-------------|-------|----------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        | Keepalive-Interval                 |      |             |       |                                                                                                                            |                                                                                                                                                                                                                                                                           |
| 93     | Alc-PPPoE-LCP-Keepalive-Multiplier | NA   | integer32   | NA, V | [1..5]                                                                                                                     | Alc-PPPoE-LCP-Keepalive-Multiplier = 2                                                                                                                                                                                                                                    |
| 99     | Alc-IPv6-Address (IA-NA)           | No   | OctetString | V     | —                                                                                                                          | The AVP layout is:<br><16 octets for address>                                                                                                                                                                                                                             |
| 158    | Alc-NAS-Filter-Rule-Shared         | NA   | UTF8String  | NA, V | Max 50 attributes per message or max 50 filter entries per message.                                                        | See the <i>7450 ESS, 7750 SR, and VSR RADIUS Attributes Reference Guide</i> .                                                                                                                                                                                             |
| 1001   | AA-Functions                       | NA   | Grouped     | NA, V | One per ADC rule.<br><br>AA-Functions AVP must contain at least one AA-App-Profile-Name or one AA-App-Service-Options AVP. | This AVP contains the following nested AVPs: <ul style="list-style-type: none"> <li>AA-App-Profile-Name</li> <li>AA-App-Service-Options { <ul style="list-style-type: none"> <li>AA-App-Service-Options-Name</li> <li>AA-App-Service-Options-Value</li> </ul> </li> </ul> |
| 1002   | AA-App-Profile-Name                | NA   | UTF8String  | NA, V | 32 chars                                                                                                                   | Example:<br>AA-App-Profile-Name = MyAppProfile                                                                                                                                                                                                                            |
| 1003   | AA-App-Service-Options             | NA   | Grouped     | NA, V | Max 32 per AA-Functions                                                                                                    | This AVP contains the following nested AVPs: <ul style="list-style-type: none"> <li>AA-App-Serv-Options-Name</li> <li>AA-App-Serv-Options-Value</li> </ul>                                                                                                                |
| 1004   | AA-App-Serv-Options-Name           | NA   | UTF8String  | NA, V | 32 chars<br>Max one AVP per AA-App-                                                                                        | Example:<br>A-App-Serv-Options-Name = p2p                                                                                                                                                                                                                                 |

| AVP ID | AVP name                    | Conf | Type       | Flags | Limits                                                 | Format                                                                                                                                                                                                                                                                                                                                                                                                                        |
|--------|-----------------------------|------|------------|-------|--------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        |                             |      |            |       | Service-Options AVP                                    |                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 1005   | AA-App-Serv-Options-Value   | NA   | UTF8String | NA,V  | 32 chars<br>Max one AVP per AA-App-Service-Options AVP | AA-App-Serv-Options-Value = HiPrioSub                                                                                                                                                                                                                                                                                                                                                                                         |
| 1006   | Alc-Queue                   | NA   | Grouped    | NA,V  | —                                                      | This AVP contains the following nested AVPs: <ul style="list-style-type: none"> <li>Alc-Queue-Id</li> <li>Max-Requested-Bandwidth-UL</li> <li>Max-Requested-Bandwidth-DL</li> <li>Guaranteed_Bitrate_UL</li> <li>Guaranteed_Bitrate_DL</li> <li>Alc-Committed-Burst-Size-UL</li> <li>Alc-Maximum-Burst-Size-UL</li> <li>Alc-Committed-Burst-Size-DL</li> <li>Alc-Maximum-Burst-Size-DL</li> <li>AAIc-Wrr-Weight-DL</li> </ul> |
| 1007   | Alc-Queue-Id                | NA   | Unsigned32 | NA,V  | —                                                      | Example:<br>Alc-Queue-Id = 3                                                                                                                                                                                                                                                                                                                                                                                                  |
| 1008   | Alc-Committed-Burst-Size-UL | NA   | Unsigned32 | NA,V  | —                                                      | Example:<br>Alc-Committed-Burst-Size-UL = 300000<br>Burst size of 300,000 bytes.                                                                                                                                                                                                                                                                                                                                              |
| 1009   | Alc-Maximum-Burst-Size-UL   | NA   | Unsigned32 | NA,V  | —                                                      | Example:<br>Alc-Maximum-Burst-Size-UL = 300000<br>Burst size of 300,000 bytes.                                                                                                                                                                                                                                                                                                                                                |
| 1010   | Alc-Committed-Burst-Size-DL | NA   | Unsigned32 | NA,V  | —                                                      | Example:<br>Alc-Committed-Burst-Size-DL = 300000<br>Burst size of 300,000 bytes.                                                                                                                                                                                                                                                                                                                                              |
| 1011   | Alc-Maximum-Burst-Size-DL   | NA   | Unsigned32 | NA,V  | —                                                      | Example:<br>Alc-Maximum-Burst-Size-DL = 300000<br>Burst size of 300,000 bytes.                                                                                                                                                                                                                                                                                                                                                |

| AVP ID | AVP name                  | Conf | Type       | Flags | Limits   | Format                                                                                                                                                                                                                                                                                                                                                                                              |
|--------|---------------------------|------|------------|-------|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1013   | Alc-Wrr-Weight-DL         | NA   | Unsigned32 | NA,V  | —        | Example:<br>Alc-Wrr-Weight-DL = 2                                                                                                                                                                                                                                                                                                                                                                   |
| 1014   | Alc-Policer               | NA   | Grouped    | NA,V  | —        | This AVP contains the following nested AVPs: <ul style="list-style-type: none"> <li>Alc-Policer-Id</li> <li>Max-Requested-Bandwidth-UL</li> <li>Max-Requested-Bandwidth-DL</li> <li>Guaranteed_Bitrate_UL</li> <li>Guaranteed_Bitrate_DL</li> <li>Alc-Committed-Burst-Size-UL</li> <li>Alc-Maximum-Burst-Size-UL</li> <li>Alc-Committed-Burst-Size-DL</li> <li>Alc-Maximum-Burst-Size-DL</li> </ul> |
| 1015   | Alc-Policer-Id            | NA   | Unsigned32 | NA,V  | —        | Example:<br>Alc-Policer-Id = 10                                                                                                                                                                                                                                                                                                                                                                     |
| 1016   | Alc-Sub-Egress-Rate-Limit | NA   | Unsigned32 | NA,V  | —        | Example:<br>Alc-Sub-Egress-Rate-Limit = 10000000                                                                                                                                                                                                                                                                                                                                                    |
| 1017   | Alc-Arbiter-Rate-Limit-DL | NA   | Unsigned32 | NA,V  | —        | Example: Alc-Arbiter-Rate-Limit-DL = 10000000                                                                                                                                                                                                                                                                                                                                                       |
| 1018   | Alc-Arbiter-Rate-Limit-UL | NA   | Unsigned32 | NA,V  | —        | Example:<br>Alc-Arbiter-Rate-Limit-UL = 10000000                                                                                                                                                                                                                                                                                                                                                    |
| 1021   | Alc-Arbiter               | NA   | Grouped    | NA,V  | —        | This AVP contains the following nested AVPs: <ul style="list-style-type: none"> <li>Alc-Arbiter-Name</li> <li>Alc-Arbiter-Rate-Limit-UL</li> <li>Alc-Arbiter-Rate-Limit-DL</li> </ul>                                                                                                                                                                                                               |
| 1022   | Alc-Arbiter-Name          | NA   | UTF8String | NA,V  | 32 chars | Example:<br>Alc-Arbiter-Name = arbiter-1                                                                                                                                                                                                                                                                                                                                                            |
| 1023   | Alc-Next-Hop              | NA   | Grouped    | NA,V  | —        | This AVP can contain the following AVPS: <ul style="list-style-type: none"> <li>Alc-Next-Hop-IP</li> <li>Alc-v4-Next-Hop-Service-Id</li> </ul>                                                                                                                                                                                                                                                      |

| AVP ID | AVP name                   | Conf | Type       | Flags | Limits                 | Format                                                                                                                                          |
|--------|----------------------------|------|------------|-------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
|        |                            |      |            |       |                        | <ul style="list-style-type: none"> <li>Alc-v6-Next-Hop-Service-Id</li> </ul>                                                                    |
| 1024   | Alc-Next-Hop-IP            | NA   | Address    | NA,V  | 16 octets              | IPv4 or IPv6 address.<br>Example:<br>Alc-Next-Hop-IP = 10.10.10.10<br>Alc-Next-Hop-IP = 2001:0db8::1                                            |
| 1025   | Alc-v4-Next-Hop-Service-Id | NA   | Unsigned32 | NA,V  | 1 to 2148007978        | Example:<br>Alc-v4-Next-Hop-Service-Id = 10                                                                                                     |
| 1026   | Alc-v6-Next-Hop-Service-Id | NA   | Unsigned32 | NA,V  | 1 to 2148007978        | Example:<br>Alc-v6-Next-Hop-Service-Id = 10                                                                                                     |
| 1027   | Alc-Filter-Action          | NA   | Enumerated | NA,V  | 1 or 2                 | Example:<br>Alc-Filter-Action = 2—matched traffic inside of the PCC rule is dropped.                                                            |
| 1028   | Alc-QoS-Action             | NA   | Enumerated | NA,V  | 1                      | Example:<br>Alc-QoS-Action = 1—matched traffic inside of the PCC rule is not subjected to QoS related actions.                                  |
| 1029   | AA-Sub-Http-Url-Param      | NA   | UTF String | NV    | 32 chars               | —                                                                                                                                               |
| 1030   | AA-Sub-Scope               | NA   | Enumerated | NV    | —                      | 1 = subscriber scope<br>2 = MAC or device scope                                                                                                 |
| 1036   | Alc-SPI-Sharing            | NA   | Grouped    | V     | —                      | This AVP contains the following nested AVPs: <ul style="list-style-type: none"> <li>Alc-SPI-Sharing-Type</li> <li>Alc-SPI-Sharing-Id</li> </ul> |
| 1037   | Alc-SPI-Sharing-Type       | NA   | Enumerated | V     | 0 or 2                 | For example:<br>Alc-SPI-Sharing-Type = 2 -> SLA Profile Instance sharing per group                                                              |
| 1038   | Alc-SPI-Sharing-Id         | NA   | Unsigned32 | V     | 0 to 65535 (per group) | For example:<br>Alc-SPI-Sharing-Id = 100                                                                                                        |
| 1039   | Alc-Policer-Parent         | NA   | Grouped    | NA,V  | —                      | This AVP can contain the following nested AVPs: <ul style="list-style-type: none"> <li>Alc-Arbiter-Name</li> </ul>                              |

| AVP ID | AVP name          | Conf | Type       | Flags | Limits             | Format                                                                                                                                                                                                                                                                                                                                         |
|--------|-------------------|------|------------|-------|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        |                   |      |            |       |                    | <ul style="list-style-type: none"> <li>Alc-Parent-Level</li> <li>Alc-Parent-Weight</li> </ul>                                                                                                                                                                                                                                                  |
| 1040   | Alc-Parent-Level  | NA   | Unsigned32 | NA,V  | 1 to 8             | For example:<br>Alc-Parent-Level = 8                                                                                                                                                                                                                                                                                                           |
| 1041   | Alc-Parent-Weight | NA   | Unsigned32 | NA,V  | 1 to 100           | For example:<br>Alc-Parent-Weight = 20                                                                                                                                                                                                                                                                                                         |
| 1042   | Alc-Stat-Mode-UL  | NA   | Enumerated | NA,V  | 0 to 9             | Values:<br>0 = no_stats<br>1 = minimal<br>2 = offered_profile_no_cir<br>3 = offered_total_cir<br>4 = offered_priority_no_cir<br>5 = offered_profile_cir<br>6 = offered_priority_cir<br>7 = offered_limited_profile_cir<br>8 = offered_profile_capped_cir<br>9 = offered_limited_capped_cir<br><br>Example:<br>Example: Alc-Stat-Mode-UL = 1    |
| 1043   | Alc-Stat-Mode-DL  | NA   | Enumerated | NA,V  | 0 to 6 and 8 to 10 | Values:<br>0 = no_stats<br>1 = minimal<br>2 = offered_profile_no_cir<br>3 = offered_total_cir<br>4 = offered_profile_cir<br>5 = offered_limited_capped_cir<br>6 = offered_profile_capped_cir<br>8 = offered_total_cir_exceed<br>9 = offered_four_profile_no_cir<br>10 = offered_total_cir_four_profile<br><br>Example:<br>Alc-Stat-Mode-DL = 1 |

| AVP ID | AVP name                        | Conf | Type      | Flags | Limits     | Format                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------|---------------------------------|------|-----------|-------|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1044   | Alc-Packet-Byte-Offset-UL       | NA   | integer32 | NA,V  | -32 to +31 | Example:<br>Alc-Packet-Byte-Offset-UL = 8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 1045   | Alc-Packet-Byte-Offset-DL       | NA   | integer32 | NA,V  | -64 to +31 | Example:<br>Alc-Packet-Byte-Offset-DL = -22                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 1046   | Alc-Dynamic-Policer             | NA   | Grouped   | NA,V  | —          | <p>For an ingress PCC rule, this AVP can contain the following nested AVPs:</p> <ul style="list-style-type: none"> <li>• Alc-Policer-Parent</li> <li>• Alc-Committed-Burst-Size-UL</li> <li>• Alc-Maximum-Burst-Size-UL</li> <li>• Alc-Stat-Mode-UL</li> <li>• Alc-Packet-Byte-Offset-UL</li> </ul> <p>For an egress PCC rule, this AVP can contain the following nested AVPs:</p> <ul style="list-style-type: none"> <li>• Alc-Policer-Parent</li> <li>• Alc-Committed-Burst-Size-DL</li> <li>• Alc-Maximum-Burst-Size-DL</li> <li>• Alc-Stat-Mode-DL</li> <li>• Alc-Packet-Byte-Offset-DL</li> </ul> |
| 1047   | Alc-Spi-Host-And-Session-Limits | NA   | Grouped   | NA,V  | —          | <p>This AVP can contain the following nested AVPs:</p> <ul style="list-style-type: none"> <li>• NOKIA-1049 Alc-Host-Limits-IPv4-Arp</li> <li>• NOKIA-1050 Alc-Host-Limits-IPv4-Dhcp</li> <li>• NOKIA-1051 Alc-Host-Limits-IPv4-Overall</li> <li>• NOKIA-1052 Alc-Host-Limits-IPv4-Ppp</li> <li>• NOKIA-1053 Alc-Host-Limits-IPv6-Overall</li> <li>• NOKIA-1054 Alc-Host-Limits-IPv6-Pd-Ipoe-Dhcp</li> <li>• NOKIA-1055 Alc-Host-Limits-IPv6-Pd-Overall</li> <li>• NOKIA-1056 Alc-Host-Limits-IPv6-Pd-Ppp-Dhcp</li> <li>• NOKIA-1057 Alc-Host-Limits-IPv6-Wan-Ipoe-Dhcp</li> </ul>                      |

| AVP ID | AVP name                        | Conf | Type    | Flags | Limits | Format                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------|---------------------------------|------|---------|-------|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        |                                 |      |         |       |        | <ul style="list-style-type: none"> <li>NOKIA-1058 Alc-Host-Limits-IPv6-Wan-Ipoe-Slaac</li> <li>NOKIA-1059 Alc-Host-Limits-IPv6-Wan-Overall</li> <li>NOKIA-1060 Alc-Host-Limits-IPv6-Wan-Ppp-Dhcp</li> <li>NOKIA-1061 Alc-Host-Limits-IPv6-Wan-Ppp-Slaac</li> <li>NOKIA-1062 Alc-Host-Limits-Lac-Overall</li> <li>NOKIA-1063 Alc-Host-Limits-Overall</li> <li>NOKIA-1064 Alc-Session-Limits-IPoE</li> <li>NOKIA-1065 Alc-Session-Limits-PPPoE-Local</li> <li>NOKIA-1066 Alc-Session-Limits-PPPoE-Lac</li> <li>NOKIA-1067 Alc-Session-Limits-PPPoE-Overall</li> <li>NOKIA-1068 Alc-Session-Limits-L2TP-Lns</li> <li>NOKIA-1069 Alc-Session-Limits-L2TP-Lts</li> <li>NOKIA-1070 Alc-Session-Limits-L2TP-Overall</li> <li>NOKIA-1071 Alc-Session-Limits-Overall</li> </ul> |
| 1048   | Alc-Sub-Host-And-Session-Limits | NA   | Grouped | NA,V  | —      | <p>This AVP can contain the following nested AVPs:</p> <ul style="list-style-type: none"> <li>NOKIA-1049 Alc-Host-Limits-IPv4-Arp</li> <li>NOKIA-1050 Alc-Host-Limits-IPv4-Dhcp</li> <li>NOKIA-1051 Alc-Host-Limits-IPv4-Overall</li> <li>NOKIA-1052 Alc-Host-Limits-IPv4-Ppp</li> <li>NOKIA-1053 Alc-Host-Limits-IPv6-Overall</li> <li>NOKIA-1054 Alc-Host-Limits-IPv6-Pd-Ipoe-Dhcp</li> </ul>                                                                                                                                                                                                                                                                                                                                                                        |

| AVP ID | AVP name                  | Conf | Type      | Flags | Limits              | Format                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------|---------------------------|------|-----------|-------|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        |                           |      |           |       |                     | <ul style="list-style-type: none"> <li>NOKIA-1055 Alc-Host-Limits-IPv6-Pd-Overall</li> <li>NOKIA-1056 Alc-Host-Limits-IPv6-Pd-Ppp-Dhcp</li> <li>NOKIA-1057 Alc-Host-Limits-IPv6-Wan-Ipoe-Dhcp</li> <li>NOKIA-1058 Alc-Host-Limits-IPv6-Wan-Ipoe-Slaac</li> <li>NOKIA-1059 Alc-Host-Limits-IPv6-Wan-Overall</li> <li>NOKIA-1060 Alc-Host-Limits-IPv6-Wan-Ppp-Dhcp</li> <li>NOKIA-1061 Alc-Host-Limits-IPv6-Wan-Ppp-Slaac</li> <li>NOKIA-1062 Alc-Host-Limits-Lac-Overall</li> <li>NOKIA-1063 Alc-Host-Limits-Overall</li> <li>NOKIA-1064 Alc-Session-Limits-IPoE</li> <li>NOKIA-1065 Alc-Session-Limits-PPPoE-Local</li> <li>NOKIA-1066 Alc-Session-Limits-PPPoE-Lac</li> <li>NOKIA-1067 Alc-Session-Limits-PPPoE-Overall</li> <li>NOKIA-1068 Alc-Session-Limits-L2TP-Lns</li> <li>NOKIA-1069 Alc-Session-Limits-L2TP-Lts</li> <li>NOKIA-1070 Alc-Session-Limits-L2TP-Overall</li> <li>NOKIA-1071 Alc-Session-Limits-Overall</li> </ul> |
| 1049   | Alc-Host-Limits-IPv4-Arp  | NA   | integer32 | NA,V  | -2, -1, [0..131071] | -2 = use the configured value<br>-1 = no limit<br>Alc-Host-Limits-IPv4-Arp = 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 1050   | Alc-Host-Limits-IPv4-Dhcp | NA   | integer32 | NA,V  | -2, -1, [0..131071] | -2 = use the configured value<br>-1 = no limit<br>Alc-Host-Limits-IPv4-Dhcp = 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

| AVP ID | AVP name                            | Conf | Type      | Flags | Limits                 | Format                                                                                    |
|--------|-------------------------------------|------|-----------|-------|------------------------|-------------------------------------------------------------------------------------------|
| 1051   | Alc-Host-Limits-IPv4-Overall        | NA   | integer32 | NA,V  | -2, -1,<br>[0..131071] | -2 = use the configured value<br>-1 = no limit<br>Alc-Host-Limits-IPv4-Overall = 2        |
| 1052   | Alc-Host-Limits-IPv4-Ppp            | NA   | integer32 | NA,V  | -2, -1,<br>[0..131071] | -2 = use the configured value<br>-1 = no limit<br>Alc-Host-Limits-IPv4-Ppp = 2            |
| 1053   | Alc-Host-Limits-IPv6-Overall        | NA   | integer32 | NA,V  | -2, -1,<br>[0..131071] | -2 = use the configured value<br>-1 = no limit<br>Alc-Host-Limits-IPv6-Overall = 2        |
| 1054   | Alc-Host-Limits-IPv6-Pd-Ipoe-Dhcp   | NA   | integer32 | NA,V  | -2, -1,<br>[0..131071] | -2 = use the configured value<br>-1 = no limit<br>Alc-Host-Limits-IPv6-Pd-Ipoe-Dhcp = 2   |
| 1055   | Alc-Host-Limits-IPv6-Pd-Overall     | NA   | integer32 | NA,V  | -2, -1,<br>[0..131071] | -2 = use the configured value<br>-1 = no limit<br>Alc-Host-Limits-IPv6-Pd-Overall = 2     |
| 1056   | Alc-Host-Limits-IPv6-Pd-Ppp-Dhcp    | NA   | integer32 | NA,V  | -2, -1,<br>[0..131071] | -2 = use the configured value<br>-1 = no limit<br>Alc-Host-Limits-IPv6-Pd-Ppp-Dhcp = 2    |
| 1057   | Alc-Host-Limits-IPv6-Wan-Ipoe-Dhcp  | NA   | integer32 | NA,V  | -2, -1,<br>[0..131071] | -2 = use the configured value<br>-1 = no limit<br>Alc-Host-Limits-IPv6-Wan-Ipoe-Dhcp = 2  |
| 1058   | Alc-Host-Limits-IPv6-Wan-Ipoe-Slaac | NA   | integer32 | NA,V  | -2, -1,<br>[0..131071] | -2 = use the configured value<br>-1 = no limit<br>Alc-Host-Limits-IPv6-Wan-Ipoe-Slaac = 2 |
| 1059   | Alc-Host-Limits-IPv6-Wan-Overall    | NA   | integer32 | NA,V  | -2, -1,<br>[0..131071] | -2 = use the configured value<br>-1 = no limit<br>Alc-Host-Limits-IPv6-Wan-Overall = 2    |
| 1060   | Alc-Host-Limits-IPv6-Wan-Ppp-Dhcp   | NA   | integer32 | NA,V  | -2, -1,<br>[0..131071] | -2 = use the configured value<br>-1 = no limit<br>Alc-Host-Limits-IPv6-Wan-Ppp-Dhcp = 2   |

| AVP ID | AVP name                           | Conf | Type      | Flags | Limits              | Format                                                                                   |
|--------|------------------------------------|------|-----------|-------|---------------------|------------------------------------------------------------------------------------------|
| 1061   | Alc-Host-Limits-IPv6-Wan-Ppp-Slaac | NA   | integer32 | NA,V  | -2, -1, [0..131071] | -2 = use the configured value<br>-1 = no limit<br>Alc-Host-Limits-IPv6-Wan-Ppp-Slaac = 2 |
| 1062   | Alc-Host-Limits-Lac-Overall        | NA   | integer32 | NA,V  | -2, -1, [0..131071] | -2 = use the configured value<br>-1 = no limit<br>Alc-Host-Limits-Lac-Overall = 2        |
| 1063   | Alc-Host-Limits-Overall            | NA   | integer32 | NA,V  | -2, -1, [1..131071] | -2 = use the configured value<br>-1 = no limit<br>Alc-Host-Limits-Overall = 2            |
| 1064   | Alc-Session-Limits-IPoE            | NA   | integer32 | NA,V  | -2, -1, [0..131071] | -2 = use the configured value<br>-1 = no limit<br>Alc-Session-Limits-IPoE = 2            |
| 1065   | Alc-Session-Limits-PPPoE-Local     | NA   | integer32 | NA,V  | -2, -1, [0..131071] | -2 = use the configured value<br>-1 = no limit<br>Alc-Session-Limits-PPPoE-Local = 2     |
| 1066   | Alc-Session-Limits-PPPoE-Lac       | NA   | integer32 | NA,V  | -2, -1, [0..131071] | -2 = use the configured value<br>-1 = no limit<br>Alc-Session-Limits-PPPoE-Lac = 2       |
| 1067   | Alc-Session-Limits-PPPoE-Overall   | NA   | integer32 | NA,V  | -2, -1, [0..131071] | -2 = use the configured value<br>-1 = no limit<br>Alc-Session-Limits-PPPoE-Overall = 2   |
| 1068   | Alc-Session-Limits-L2TP-Lns        | NA   | integer32 | NA,V  | -2, -1, [0..131071] | -2 = use the configured value<br>-1 = no limit<br>Alc-Session-Limits-L2TP-Lns = 2        |
| 1069   | Alc-Session-Limits-L2TP-Lts        | NA   | integer32 | NA,V  | -2, -1, [0..131071] | -2 = use the configured value<br>-1 = no limit<br>Alc-Session-Limits-L2TP-Lts = 2        |
| 1070   | Alc-Session-Limits-L2TP-Overall    | NA   | integer32 | NA,V  | -2, -1, [0..131071] | -2 = use the configured value<br>-1 = no limit<br>Alc-Session-Limits-L2TP-Overall = 2    |

| AVP ID | AVP name                   | Conf | Type      | Flags | Limits              | Format                                                                           |
|--------|----------------------------|------|-----------|-------|---------------------|----------------------------------------------------------------------------------|
| 1071   | Alc-Session-Limits-Overall | NA   | integer32 | NA,V  | -2, -1, [0..131071] | -2 = use the configured value<br>-1 = no limit<br>Alc-Session-Limits-Overall = 2 |

## 7 Diameter-based AVP applicability

The following tables use the following symbols:

- **0**  
The AVP must not be present in the message.
- **0+**  
Zero or more instances of the AVP may be present in the message.
- **0-1**  
Zero or one instance of the AVP may be present in the message. It is considered an error if there is more than one instance of the AVP.
- **1**  
One instance of the AVP must be present in the message.
- **1+**  
At least one instance of the AVP must be present in the message.
- **N**  
The AVP is nested inside of a grouped AVP that is present in this message.

Table 7: Diameter-based AVP applicability

| AVP ID | AVP name                       | CER | CEA | DPR | DPA | DWR | DWA | ASR | ASA |
|--------|--------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|
| 257    | Host-IP-Address                | 1   | 1+  | 0   | 0   | 0   | 0   | 0   | 0   |
| 258    | Auth-Application-Id            | 1   | 0+  | 0   | 0   | 0   | 0   | 1   | 0   |
| 260    | Vendor-Specific-Application-Id | 0+  | 0+  | 0   | 0   | 0   | 0   | 0   | 0   |
| 263    | Session-id                     | 0   | 0   | 0   | 0   | 0   | 0   | 1   | 1   |
| 264    | Origin-Host                    | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   |
| 265    | Supported-Vendor-Id            | 1+  | 0+  | 0   | 0   | 0   | 0   | 0   | 0   |
| 266    | Vendor-Id                      | 1   | 1   | 0   | 0   | 0   | 0   | 0   | 0   |
| 267    | Firmware-Revision              | 1   | 0-1 | 0   | 0   | 0   | 0   | 0   | 0   |
| 268    | Result-Code                    | 0   | 1   | 0   | 1   | 0   | 1   | 0   | 1   |
| 269    | Product-Name                   | 1   | 1   | 0   | 0   | 0   | 0   | 0   | 0   |
| 273    | Disconnect-Cause               | 0   | 0   | 1   | 0   | 0   | 0   | 0   | 0   |

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| AVP ID | AVP name             | CER | CEA | DPR | DPA | DWR | DWA | ASR | ASA |
|--------|----------------------|-----|-----|-----|-----|-----|-----|-----|-----|
| 278    | Origin-State-Id      | 1   | 0-1 | 0   | 0   | 0   | 0-1 | 0-1 | 0-1 |
| 279    | Failed-AVP           | 0   | 0-1 | 0   | 0-1 | 0   | 0-1 | 0   | 0-1 |
| 281    | Error-Message        | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   |
| 283    | Destination-Realm    | 0   | 0   | 0   | 0   | 0   | 0   | 1   | 0   |
| 293    | Destination-Host     | 0   | 0   | 0   | 0   | 0   | 0   | 1   | 0   |
| 294    | Error-Reporting-Host | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0-1 |
| 296    | Origin-Realm         | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   |

## 8 Gx AVP applicability

Table 8: Gx AVP applicability

| AVP ID | AVP name                | CCR | CCA | RAR | RAA |
|--------|-------------------------|-----|-----|-----|-----|
| 5      | NAS-Port                | 0-1 | 0   | 0   | 0   |
| 8      | Framed-IP-Address       | 0-1 | 0   | 0   | 0-1 |
| 18     | 3GPP-SGNS-MCC-MNC       | 0-1 | 0   | 0   | 0-1 |
| 22     | 3GPP-User-Location-Info | 0-1 | 0   | 0   | 0   |
| 30     | Called-Station-Id       | 0-1 | 0   | 0   | 0   |
| 31     | Calling-Station-ID      | 0-1 | 0   | 0   | 0   |
| 55     | Event-Timestamp         | 0-1 | 0-1 | 0-1 | 1   |
| 61     | NAS-Port-Type           | 0-1 | 0   | 0   | 0   |
| 87     | NAS-Port-Id             | 0-1 | 0   | 0   | 0   |
| 92     | NAS-Filter-Rule         | 0   | 0+  | 0+  | 0   |
| 97     | Framed-IPv6-Prefix      | 0-1 | 0   | 0   | 0-1 |
| 123    | Delegated-IPv6-Prefix   | 0-1 | 0   | 0   | 0-1 |
| 258    | Auth-Application-Id     | 1   | 1   | 1   | 0   |
| 263    | Session-id              | 1   | 1   | 1   | 1   |
| 264    | Origin-Host             | 1   | 1   | 1   | 1   |
| 266    | Vendor-Id               | 0   | N   | 0   | 0   |
| 268    | Result-Code             | 0   | 1   | 0   | 0-1 |
| 278    | Origin-State-Id         | 1   | 0-1 | 0-1 | 1   |
| 279    | Failed-AVP              | 0-1 | 0+  | 0   | 0-1 |
| 281    | Error-Message           | 0-1 | 0-1 | 0   | 0-1 |
| 282    | Route-Record            | 0+  | 0   | 0+  | 0   |
| 283    | Destination-Realm       | 1   | 0   | 1   | 0   |
| 285    | Re-Auth-Request-Type    | 0   | 0   | 1   | 0   |

| AVP ID | AVP name                        | CCR | CCA | RAR | RAA |
|--------|---------------------------------|-----|-----|-----|-----|
| 293    | Destination-Host                | 0-1 | 0   | 1   | 0   |
| 295    | Termination-Cause               | 0-1 | 0   | 0   | 0   |
| 296    | Origin-Realm                    | 1   | 1   | 1   | 1   |
| 297    | Experimental-Result             | 0   | 0-1 | 0   | 0-1 |
| 298    | Experimental-Result-Code        | 0   | N   | 0   | N   |
| 302    | Logical-Access-Id               | 0-1 | 0   | 0   | 0   |
| 313    | Physical-Access-Id              | 0-1 | 0   | 0   | 0   |
| 412    | CC-Input-Octets                 | N   | N   | N   | 0   |
| 414    | CC-Output-Octets                | N   | N   | N   | 0   |
| 415    | CC-Request-Number               | 1   | 1   | 0   | 0   |
| 416    | CC-Request-Type                 | 1   | 1   | 0   | 0   |
| 418    | CC-Session-Failover             | 0   | 0-1 | 0   | 0   |
| 421    | CC-Total-Octets                 | N   | N   | N   | 0   |
| 427    | Credit-Control-Failure-Handling | 0   | 0-1 | 0   | 0   |
| 431    | Granted-Service-Unit            | 0   | 0-1 | N   | 0   |
| 433    | Redirect-Address-Type           | 0   | N   | N   | 0   |
| 433    | Redirect-Server-Address         | 0   | N   | N   | 0   |
| 443    | Subscription-Id                 | 1-2 | 0   | 0   | 0   |
| 444    | Subscription-Id-Data            | N   | 0   | 0   | 0   |
| 446    | Used-Service-Unit               | N   | 0   | 0   | 0   |
| 450    | Subscription-Id-Type            | N   | 0   | 0   | 0   |
| 458    | User-Equipment-Info             | 0-1 | 0   | 0   | 0   |
| 459    | User-Equipment-Info-Type        | N   | 0   | 0   | 0   |
| 460    | User-Equipment-Info-Value       | N   | 0   | 0   | 0   |
| 507    | Flow-Description                | 0   | N   | N   | 0   |
| 511    | Flow-Status                     | 0   | N   | N   | 0   |

| AVP ID | AVP name                     | CCR | CCA    | RAR    | RAA |
|--------|------------------------------|-----|--------|--------|-----|
| 515    | Max-Requested-Bandwidth-DL   | 0   | N      | N      | 0   |
| 516    | Max-Requested-Bandwidth-UL   | 0   | N      | N      | 0   |
| 554    | Extended-Max-Requested-BW-DL | 0   | N      | N      | 0   |
| 555    | Extended-Max-Requested-BW-UL | 0   | N      | N      | 0   |
| 628    | Supported-Features           | 0-1 | 0+     | 0      | 0   |
| 629    | Feature-List-Id              | N   | N      | 0      | 0   |
| 630    | Feature-List                 | N   | N      | 0      | 0   |
| 909    | RAI                          | 0-1 | 0      | 0      | 0   |
| 1001   | Charging-Rule-Install        | 0   | 0+     | 0+     | 0   |
| 1002   | Charging-Rule-Remove         | 0   | 0+     | 0+     | 0   |
| 1003   | Charging-Rule-Definition     | 0   | N      | N      | 0   |
| 1005   | Charging-Rule-Name           | N   | N      | N      | N   |
| 1006   | Event-Trigger                | 0+  | 0+     | 0+     | 0   |
| 1010   | Precedence                   | 0   | N      | N      | 0   |
| 1014   | ToS-Traffic-Class            | 0   | N      | N      | 0   |
| 1016   | QoS-Information              | 0-1 | 0-1, N | 0-1, N | 0   |
| 1018   | Charging-Rule-Report         | 0+  | 0      | 0      | 0+  |
| 1019   | PCC-Rule-Status              | N   | 0      | 0      | N   |
| 1025   | Guaranteed-Bitrate-DL        | 0   | N      | N      | 0   |
| 1026   | Guaranteed-Bitrate-UL        | 0   | N      | N      | 0   |
| 1027   | IP-CAN-Type                  | 0-1 | 0      | 0      | 0-1 |
| 1028   | QoS-Class-Identifier         | 0   | N      | N      | 0   |
| 1031   | Rule-Failure-Code            | N   | 0      | 0      | N   |
| 1032   | RAT-Type                     | 0-1 | 0      | 0      | 0-1 |
| 1033   | Event-Report-Indication      | 0   | 0      | 0-1    | 0   |

| AVP ID | AVP name                     | CCR | CCA | RAR | RAA |
|--------|------------------------------|-----|-----|-----|-----|
| 1040   | APN-Aggregate-Max-Bitrate-DL | N   | N   | N   | 0   |
| 1041   | APN-Aggregate-Max-Bitrate-UL | N   | N   | N   | 0   |
| 1045   | Session-Release-Cause        | 0   | 0   | 0-1 | 0   |
| 1050   | AN-GW-Address                | 0-1 | 0   | 0   | 0-1 |
| 1058   | Flow-Information             | 0   | 0+  | 0+  | 0   |
| 1065   | PDN-Connection-ID            | 0-1 | 0   | 0   | 0   |
| 1066   | Monitoring-Key               | N   | N   | N   | 0   |
| 1067   | Usage-Monitoring-Information | 0+  | 0+  | 0+  | 0   |
| 1068   | Usage-Monitoring-Level       | 0   | N   | N   | 0   |
| 1069   | Usage-Monitoring-Report      | 0   | N   | N   | 0   |
| 1070   | Usage-Monitoring-Support     | 0   | N   | N   | 0   |
| 1080   | Flow-Direction               | 0   | N   | N   | 0   |
| 1085   | Redirect-Information         | 0   | 0-1 | 0-1 | 0   |
| 1086   | Redirect-Support             | 0   | N   | N   | 0   |
| 1088   | TDF-Application-Identifier   | 0   | N   | N   | 0   |
| 1092   | ADC-Rule-Install             | 0   | 0+  | 0+  | 0   |
| 1093   | ADC-Rule-Remove              | 0   | 0   | 0   | 0   |
| 1094   | ADC-Rule-Definition          | 0   | 0   | 0   | 0   |
| 1096   | ADC-Rule-Name                | N   | N   | N   | N   |
| 1097   | ADC-Rule-Report              | 0+  | 0+  | 0   | 0+  |
| 2848   | Extended-APN-AMBR-DL         | 0   | N   | N   | 0   |
| 2849   | Extended-APN-AMBR-UL         | 0   | N   | N   | 0   |
| 2850   | Extended-GBR-DL              | 0   | N   | N   | 0   |
| 2850   | Extended-GBR-UL              | 0   | N   | N   | 0   |

## 9 NOKIA-specific AVP applicability

Table 9: NOKIA-specific AVP applicability

| AVP ID | AVP name                           | CCR | CCA     | RAR     | RAA |
|--------|------------------------------------|-----|---------|---------|-----|
| 92     | Alc-PPPoE-LCP-Keepalive-Interval   | 0   | 0-1     | 0       | 0   |
| 93     | Alc-PPPoE-LCP-Keepalive-Multiplier | 0   | 0-1     | 0       | 0   |
| 99     | Alc-IPv6-Address (IA-NA)           | 0-1 | 0       | 0       | 0-1 |
| 158    | Alc-NAS-Filter-Rule-Shared         | 0   | 0+      | 0+      | 0   |
| 1001   | AA-Functions                       | 0   | 0+      | 0+      | 0   |
| 1002   | AA-App-Profile-Name                | 0   | N       | N       | 0   |
| 1003   | AA-App-Service-Options             | 0   | N       | N       | 0   |
| 1004   | AA-App-Serv-Options-Name           | 0   | N       | N       | 0   |
| 1005   | AA-App-Serv-Options-Value          | 0   | N       | N       | 0   |
| 1006   | Alc-Queue                          | 0   | N       | N       | 0   |
| 1007   | Alc-Queue-Id                       | 0   | N       | N       | 0   |
| 1008   | Alc-Committed-Burst-Size-UL        | 0   | N (0-1) | N (0-1) | 0   |
| 1009   | Alc-Maximum-Burst-Size-UL          | 0   | N (0-1) | N (0-1) | 0   |
| 1010   | Alc-Committed-Burst-Size-DL        | 0   | N (0-1) | N (0-1) | 0   |
| 1011   | Alc-Maximum-Burst-Size-DL          | 0   | N (0-1) | N (0-1) | 0   |
| 1013   | Alc-Wrr-Weight-DL                  | 0   | N       | N       | 0   |
| 1014   | Alc-Policer                        | 0   | N       | N       | 0   |
| 1015   | Alc-Policer-Id                     | 0   | N       | N       | 0   |
| 1016   | Alc-Sub-Egress-Rate-Limit          | 0   | N       | N       | 0   |
| 1017   | Alc-Arbiter-Rate-Limit-DL          | 0   | N       | N       | 0   |
| 1018   | Alc-Arbiter-Rate-Limit-UL          | 0   | N       | N       | 0   |
| 1021   | Alc-Arbiter                        | 0   | N       | N       | 0   |

| AVP ID | AVP name                          | CCR | CCA     | RAR     | RAA |
|--------|-----------------------------------|-----|---------|---------|-----|
| 1022   | Alc-Arbiter-Name                  | 0   | N (0-1) | N (0-1) | 0   |
| 1023   | Alc-Next-Hop                      | 0   | N       | N       | 0   |
| 1024   | Alc-Next-Hop-IP                   | 0   | N       | N       | 0   |
| 1025   | Alc-v4-Next-Hop-Service-Id        | 0   | N       | N       | 0   |
| 1026   | Alc-v6-Next-Hop-Service-Id        | 0   | N       | N       | 0   |
| 1027   | Alc-Filter-Action                 | 0   | 0+      | 0+      | 0   |
| 1028   | Alc-QoS-Action                    | 0   | 0+      | 0+      | 0   |
| 1036   | Alc-SPI-Sharing                   | 0   | 0-1     | 0-1     | 0   |
| 1037   | Alc-SPI-Sharing-Type              | 0   | N       | N       | 0   |
| 1038   | Alc-SPI-Sharing-Id                | 0   | N       | N       | 0   |
| 1039   | Alc-Policer-Parent                | 0   | N (0-1) | N (0-1) | 0   |
| 1040   | Alc-Parent-Level                  | 0   | N (0-1) | N (0-1) | 0   |
| 1041   | Alc-Parent-Weight                 | 0   | N (0-1) | N (0-1) | 0   |
| 1042   | Alc-Stat-Mode-UL                  | 0   | N (0-1) | N (0-1) | 0   |
| 1043   | Alc-Stat-Mode-DL                  | 0   | N (0-1) | N (0-1) | 0   |
| 1044   | Alc-Packet-Byte-Offset-UL         | 0   | N (0-1) | N (0-1) | 0   |
| 1045   | Alc-Packet-Byte-Offset-DL         | 0   | N (0-1) | N (0-1) | 0   |
| 1046   | Alc-Dynamic-Policer               | 0   | N (0-1) | N (0-1) | 0   |
| 1047   | Alc-Spi-Host-And-Session-Limits   | 0   | 0-1     | 0-1     | 0   |
| 1048   | Alc-Sub-Host-And-Session-Limits   | 0   | 0-1     | 0-1     | 0   |
| 1049   | Alc-Host-Limits-IPv4-Arp          | 0   | 0-1     | 0-1     | 0   |
| 1050   | Alc-Host-Limits-IPv4-Dhcp         | 0   | 0-1     | 0-1     | 0   |
| 1051   | Alc-Host-Limits-IPv4-Overall      | 0   | 0-1     | 0-1     | 0   |
| 1052   | Alc-Host-Limits-IPv4-Ppp          | 0   | 0-1     | 0-1     | 0   |
| 1053   | Alc-Host-Limits-IPv6-Overall      | 0   | 0-1     | 0-1     | 0   |
| 1054   | Alc-Host-Limits-IPv6-Pd-Ipoe-Dhcp | 0   | 0-1     | 0-1     | 0   |

| AVP ID | AVP name                            | CCR | CCA | RAR | RAA |
|--------|-------------------------------------|-----|-----|-----|-----|
| 1055   | Alc-Host-Limits-IPv6-Pd-Overall     | 0   | 0-1 | 0-1 | 0   |
| 1056   | Alc-Host-Limits-IPv6-Pd-Ppp-Dhcp    | 0   | 0-1 | 0-1 | 0   |
| 1057   | Alc-Host-Limits-IPv6-Wan-Ipoe-Dhcp  | 0   | 0-1 | 0-1 | 0   |
| 1058   | Alc-Host-Limits-IPv6-Wan-Ipoe-Slaac | 0   | 0-1 | 0-1 | 0   |
| 1059   | Alc-Host-Limits-IPv6-Wan-Overall    | 0   | 0-1 | 0-1 | 0   |
| 1060   | Alc-Host-Limits-IPv6-Wan-Ppp-Dhcp   | 0   | 0-1 | 0-1 | 0   |
| 1061   | Alc-Host-Limits-IPv6-Wan-Ppp-Slaac  | 0   | 0-1 | 0-1 | 0   |
| 1062   | Alc-Host-Limits-Lac-Overall         | 0   | 0-1 | 0-1 | 0   |
| 1063   | Alc-Host-Limits-Overall             | 0   | 0-1 | 0-1 | 0   |
| 1064   | Alc-Session-Limits-IPoE             | 0   | 0-1 | 0-1 | 0   |
| 1065   | Alc-Session-Limits-PPPoE-Local      | 0   | 0-1 | 0-1 | 0   |
| 1066   | Alc-Session-Limits-PPPoE-Lac        | 0   | 0-1 | 0-1 | 0   |
| 1067   | Alc-Session-Limits-PPPoE-Overall    | 0   | 0-1 | 0-1 | 0   |
| 1068   | Alc-Session-Limits-L2TP-Lns         | 0   | 0-1 | 0-1 | 0   |
| 1069   | Alc-Session-Limits-L2TP-Lts         | 0   | 0-1 | 0-1 | 0   |
| 1070   | Alc-Session-Limits-L2TP-Overall     | 0   | 0-1 | 0-1 | 0   |
| 1071   | Alc-Session-Limits-Overall          | 0   | 0-1 | 0-1 | 0   |

## 10 Result codes (Result-Code AVP)

Table 10: Result codes (Result-Code AVP)

| Result code ID         | Result code name             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------------|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Success</b>         |                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 2001                   | DIAMETER_SUCCESS             | The request was successfully completed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Protocol errors</b> |                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 3001                   | DIAMETER_COMMAND_UNSUPPORTED | Rx: treated as an error.<br>Tx: not supported.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 3002                   | DIAMETER_UNABLE_TO_DELIVER   | Rx: peer failover procedure on the Diameter base level is invoked. After the same response (3002) is received from all eligible peers, the application level (NASREQ/Gx/Gy) is notified. The message can then be retransmitted one last time with the destination-host AVP cleared. For a message to be retransmitted on the application level, server failover procedure must be enabled.<br><br>Tx: diameter base replies with 3002 if it cannot route the received request message to its destination (this applies to Diameter multichassis configuration). |
| 3003                   | DIAMETER_REALM_NOT_SERVED    | Rx: treated as an error.<br>Tx: not supported.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 3004                   | DIAMETER_TOO_BUSY            | Rx - The peer failover procedure on the Diameter base level is invoked. After the same response (3004) is received from all eligible peers, the application level (NASREQ, Gx, Gy) is notified. The message can then be retransmitted one last time with the destination-host AVP cleared. For a message to be retransmitted on the application level, server failover procedure must be enabled.<br><br>Tx: not supported.                                                                                                                                     |
| 3005                   | DIAMETER_LOOP_DETECTED       | Rx: treated as an error.<br>Tx: not supported.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 3006                   | DIAMETER_REDIRECT_INDICATION | Rx: treated as an error.<br>Tx: not supported.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

| Result code ID            | Result code name                   | Description                                                                                                                                                                                                                                                  |
|---------------------------|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3007                      | DIAMETER_APPLICATION_UNSUPPORTED   | Rx: treated as an error.<br>Tx: not supported.                                                                                                                                                                                                               |
| 3008                      | DIAMETER_INVALID_HDR_BITS          | Rx: treated as an error.<br>Tx: not supported.                                                                                                                                                                                                               |
| 3009                      | DIAMETER_INVALID_AVP_BITS          | Rx: treated as an error.<br>Tx: not supported.                                                                                                                                                                                                               |
| 3010                      | DIAMETER_UNKNOWN_PEER              | Rx: treated as an error.<br>Tx: not supported.                                                                                                                                                                                                               |
| <b>Permanent failures</b> |                                    |                                                                                                                                                                                                                                                              |
| 5001                      | DIAMETER_AVP_UNSUPPORTED           | Rx: treated as an error.<br>Tx:<br>Reception of an unrecognized AVP with M-bit set triggers a response (RAA) message that contains the Result-Code AVP whose value is set to DIAMETER_AVP_UNSUPPORTED, and the Failed-AVP AVP containing the offending AVP.  |
| 5002                      | DIAMETER_UNKNOWN_SESSION           | Rx: treated as an error.<br>Tx:<br>In case that a message from PCRF is received for a non-existing session, the 7750 SR replies with this value.                                                                                                             |
| 5004                      | DIAMETER_INVALID_AVP_VALUE         | Rx: treated as an error.<br>Tx:<br>Reception of an AVP with invalid value triggers a response message (RAA) that contains the Result-Code AVP whose value is set to DIAMETER_INVALID_AVP_VALUE, and the Failed-AVP containing the AVP that caused the error. |
| 5005                      | DIAMETER_MISSING_AVP               | Rx: treated as an error.<br>Tx: not supported.                                                                                                                                                                                                               |
| 5007                      | DIAMETER_CONTRADICTING_AVPS        | Rx: treated as an error.<br>Tx: not supported.                                                                                                                                                                                                               |
| 5008                      | DIAMETER_AVP_NOT_ALLOWED           | Rx: treated as an error.<br>Tx: not supported.                                                                                                                                                                                                               |
| 5009                      | DIAMETER_AVP_OCCURS_TOO_MANY_TIMES | Rx: treated as an error.<br>Tx: not supported.                                                                                                                                                                                                               |

| Result code ID                        | Result code name                  | Description                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------------|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5010                                  | DIAMETER_NO_COMMON_APPLICATION    | Rx: treated as an error.<br>Tx: not supported.                                                                                                                                                                                                                                                                                                                                            |
| 5011                                  | DIAMETER_UNSUPPORTED_VERSION      | Rx: treated as an error.<br>Tx:<br>As an example, a RAA message carries this AVP as a response to a RAR message that was received by a SR OS node while the Gx session was in a session terminating state. A session terminating state is considered a state where the SR OS node is waiting for a CCA-T message as a response to a previously initiated CCR-T message by the SR OS node. |
| 5012                                  | DIAMETER_UNABLE_TO_COMPLY         | Rx: treated as an error.<br>Tx:<br>For example, a RAA message carries this AVP as a response to a RAR message that was received by a SR OS node while the Gx session was in a session terminating state. A session terminating state is considered a state where the SR OS node is waiting for a CCA-T message as a response to a previously initiated CCR-T message by the SR OS node.   |
| 5013                                  | DIAMETER_INVALID_BIT_IN_HEADER    | Rx: treated as an error.<br>Tx: not supported.                                                                                                                                                                                                                                                                                                                                            |
| 5014                                  | DIAMETER_INVALID_AVP_LENGTH       | Rx: treated as an error.<br>Tx: not supported.                                                                                                                                                                                                                                                                                                                                            |
| 5015                                  | DIAMETER_INVALID_MESSAGE_LENGTH   | Rx: treated as an error.<br>Tx: not supported.                                                                                                                                                                                                                                                                                                                                            |
| 5016                                  | DIAMETER_INVALID_AVP_BIT_COMBO    | Rx: treated as an error.<br>Tx: not supported.                                                                                                                                                                                                                                                                                                                                            |
| 5017                                  | DIAMETER_NO_COMMON_SECURITY       | Rx: treated as an error.<br>Tx: not supported.                                                                                                                                                                                                                                                                                                                                            |
| <b>Gx specific permanent failures</b> |                                   |                                                                                                                                                                                                                                                                                                                                                                                           |
| 5140                                  | DIAMETER_ERROR_INITIAL_PARAMETERS | Rx: treated as an error.<br>Tx: not supported.                                                                                                                                                                                                                                                                                                                                            |
| 5141                                  | DIAMETER_ERROR_TRIGGER_EVENT      | Rx: treated as an error.<br>Tx: not supported.                                                                                                                                                                                                                                                                                                                                            |
| 5142                                  | DIAMETER_PCC_RULE_EVENT           | Rx: treated as an error.                                                                                                                                                                                                                                                                                                                                                                  |

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| Result code ID | Result code name        | Description                                    |
|----------------|-------------------------|------------------------------------------------|
|                |                         | Tx: not supported.                             |
| 5148           | DIAMETER_ADC_RULE_EVENT | Rx: treated as an error.<br>Tx: not supported. |

## 11 Rule failure codes (Rule-Failure-Code AVP)

Table 11: Rule failure codes (Rule-Failure-Code AVP)

| Rule failure code ID | Rule failure name                | Description                                                                                                                                                                                                                                                                                                                                          |
|----------------------|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1                    | UNKNOWN_RULE_NAME                | Rx: treated as an error.<br>Tx: not supported.                                                                                                                                                                                                                                                                                                       |
| 4                    | GW/7750 SR_MALFUNCTION           | This value indicates the problem related to the value carried in the AVP. For example, the value references a non-existing object (rule), the value is out of bounds or any other unexpected error.<br><br>The error-message AVP in CCR/RAA carried on the top level or Failed-AVP provides more information about the event for debugging purposes. |
| 5                    | RESOURCE_LIMITATION              | Rx: treated as an error.<br>Tx: not supported.                                                                                                                                                                                                                                                                                                       |
| 14                   | TDF_APPLICATION_IDENTIFIER_ERROR | Rx: treated as an error.<br>Tx: not supported.                                                                                                                                                                                                                                                                                                       |

## 12 Event triggers (Event-Trigger AVP)

Table 12: Event triggers (Event-Trigger AVP)

| Event trigger ID | Event trigger name     | Description                                                                                                                                                                                                                                                                                                                                                                                                                        |
|------------------|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2                | RAT_CHANGE             | For GTP S11 access, this is triggered if a new RAT Type is received in GTP.                                                                                                                                                                                                                                                                                                                                                        |
| 13               | USER_LOCATION_CHANGE   | For WLAN-GW, this is triggered for any UE location change.<br>For GTP S11 access, this is triggered if a ULI was received in GTP with either non-ECGI/TAI values or a ECGI/TAI value that changed.                                                                                                                                                                                                                                 |
| 14               | NO_EVENT_TRIGGERS      | Sent in CCA and RAR by the PCRF to indicate that PCRF does not require any Event Trigger notification except for those events that do not require subscription and are always provisioned.                                                                                                                                                                                                                                         |
| 18               | UE_IP_ADDRESS_ALLOCATE | When used in a CCR command, this value indicates that the 7750 SR generated the request because a client's IPv4 address is allocated. The Framed-IP-Address, Framed-IPv6-Prefix, Delegated-IPv6-Prefix or Allocated-IPv6-Address AVPs is provided in the same request. This event trigger is reported when the corresponding event occurs, even if the event trigger is not provisioned by the PCRF.                               |
| 19               | UE_IP_ADDRESS_RELEASE  | When used in a CCR command, this value indicates that the 7750 SR generated the request because a client's IP address/prefix is released. The Framed-IP-Address, Framed-IPv6-Prefix, Delegated-IPv6-Prefix or Allocated-IPv6-Address AVPs is provided in the same request. This event trigger shall be reported when the corresponding event occurs, even if the event trigger is not provisioned by the PCRF.                     |
| 21               | AN_GW_CHANGE           | This value is sent by the PCRF to inform the Diameter client in the SR to trigger a notification for every subscriber during a switchover in a multichassis configuration. This notification contains the IP address of the newly active BNG (AN_GW_ADDRESS) sent in a CCR-U message.<br><br>If the Diameter client in the SR OS node is not armed with this event-trigger, the subscriber switchover is not reported to the PCRF. |

| Event trigger ID | Event trigger name             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|------------------|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 22               | SUCCESSFUL_RESOURCE_ALLOCATION | Not supported.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 26               | TAI_CHANGE                     | For GTP S11 access, this is triggered if a ULI is signaled in GTP with a TAI that changed from the last value received.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 27               | ECGI_CHANGE                    | For GTP S11 access, this is triggered if a ULI is signaled in GTP with a ECGI that changed from the last value received.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 33               | USAGE_REPORT                   | <p>This value is used in a CCA and RAR commands by the PCRF when requesting usage monitoring on the 7750 SR. The PCRF also provides in the CCA or RAR command the Usage-Monitoring-Information AVPs including the Monitoring-Key AVP and the Granted-Service-Unit AVP.</p> <p>When used in a CCR command, this value indicates that the 7750 SR generated the request to report the accumulated usage for one or more monitoring keys. The 7750 SR provides the accumulated usage volume using the Usage-Monitoring-Information AVPs including the Monitoring-Key AVP and the Used-Service-Unit AVP.</p> |

## 13 Termination causes (Termination-Cause AVP)

Table 13: Termination causes (Termination-Cause AVP)

| Termination cause ID | Termination cause name        | Description                                                                                                                                                        | Reference            |
|----------------------|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| 1                    | DIAMETER_LOGOUT               | Example reasons: <ul style="list-style-type: none"> <li>• Clear subscriber via CLI</li> <li>• PADT Received</li> </ul>                                             | [RFC 3588][RFC 6733] |
| 2                    | DIAMETER_SERVICE_NOT_PROVIDED | Example reason:<br>Subscriber-host is terminated via force-NACK received via RADIUS CoA                                                                            | [RFC 3588][RFC 6733] |
| 3                    | DIAMETER_BAD_ANSWER           | Example reason:<br>Problem with initial parameters during sub-host instantiation while Gx fallback is disabled or default subscriber parameters are not available. | [RFC 3588][RFC 6733] |
| 4                    | DIAMETER_ADMINISTRATIVE       | Example reasons: <ul style="list-style-type: none"> <li>• Host deleted via RADIUS DISCONNECT</li> <li>• Service shutdown for PPPoE subscriber</li> </ul>           | [RFC 3588][RFC 6733] |
| 5                    | DIAMETER_LINK_BROKEN          | Example reasons: <ul style="list-style-type: none"> <li>• SAP is deleted</li> <li>• SHCV check fails</li> </ul>                                                    | [RFC 3588][RFC 6733] |
| 8                    | DIAMETER_SESSION_TIMEOUT      | Example reason:<br>When idle timeout for the subscriber-host is enabled and its value is reached.                                                                  | [RFC 3588][RFC 6733] |

## 14 Standards and protocol support

**Note:**

The information provided in this chapter is subject to change without notice and may not apply to all platforms.

Nokia assumes no responsibility for inaccuracies.

### 14.1 Access Node Control Protocol (ANCP)

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RFC 5881, *Bidirectional Forwarding Detection (BFD) IPv4 and IPv6 (Single Hop)*

RFC 5882, *Generic Application of Bidirectional Forwarding Detection (BFD)*

RFC 5883, *Bidirectional Forwarding Detection (BFD) for Multihop Paths*

RFC 7130, *Bidirectional Forwarding Detection (BFD) on Link Aggregation Group (LAG) Interfaces*

RFC 7880, *Seamless Bidirectional Forwarding Detection (S-BFD)*

RFC 7881, *Seamless Bidirectional Forwarding Detection (S-BFD) for IPv4, IPv6, and MPLS*

RFC 7883, *Advertising Seamless Bidirectional Forwarding Detection (S-BFD) Discriminators in IS-IS*

RFC 7884, *OSPF Extensions to Advertise Seamless Bidirectional Forwarding Detection (S-BFD) Target Discriminators*

RFC 9247, *BGP - Link State (BGP-LS) Extensions for Seamless Bidirectional Forwarding Detection (S-BFD)*

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draft-ietf-idr-flowspec-interfaceset-03, *Applying BGP flowspec rules on a specific interface set*  
draft-ietf-idr-flowspec-path-redirect-05, *Flowspec Indirection-id Redirect – localised ID*  
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RFC 1772, *Application of the Border Gateway Protocol in the Internet*  
RFC 1997, *BGP Communities Attribute*  
RFC 2385, *Protection of BGP Sessions via the TCP MD5 Signature Option*  
RFC 2439, *BGP Route Flap Damping*  
RFC 2545, *Use of BGP-4 Multiprotocol Extensions for IPv6 Inter-Domain Routing*  
RFC 2858, *Multiprotocol Extensions for BGP-4*  
RFC 2918, *Route Refresh Capability for BGP-4*  
RFC 4271, *A Border Gateway Protocol 4 (BGP-4)*  
RFC 4360, *BGP Extended Communities Attribute*  
RFC 4364, *BGP/MPLS IP Virtual Private Networks (VPNs)*  
RFC 4456, *BGP Route Reflection: An Alternative to Full Mesh Internal BGP (IBGP)*  
RFC 4486, *Subcodes for BGP Cease Notification Message*  
RFC 4659, *BGP-MPLS IP Virtual Private Network (VPN) Extension for IPv6 VPN*  
RFC 4684, *Constrained Route Distribution for Border Gateway Protocol/MultiProtocol Label Switching (BGP/MPLS) Internet Protocol (IP) Virtual Private Networks (VPNs)*  
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RFC 4760, *Multiprotocol Extensions for BGP-4*  
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RFC 5004, *Avoid BGP Best Path Transitions from One External to Another*  
RFC 5065, *Autonomous System Confederations for BGP*  
RFC 5291, *Outbound Route Filtering Capability for BGP-4*  
RFC 5396, *Textual Representation of Autonomous System (AS) Numbers – asplain*  
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RFC 5668, *4-Octet AS Specific BGP Extended Community*  
RFC 6286, *Autonomous-System-Wide Unique BGP Identifier for BGP-4*  
RFC 6368, *Internal BGP as the Provider/Customer Edge Protocol for BGP/MPLS IP Virtual Private Networks (VPNs)*  
RFC 6793, *BGP Support for Four-Octet Autonomous System (AS) Number Space*  
RFC 6810, *The Resource Public Key Infrastructure (RPKI) to Router Protocol*

RFC 6811, *Prefix Origin Validation*  
RFC 6996, *Autonomous System (AS) Reservation for Private Use*  
RFC 7311, *The Accumulated IGP Metric Attribute for BGP*  
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RFC 7607, *Codification of AS 0 Processing*  
RFC 7674, *Clarification of the Flowspec Redirect Extended Community*  
RFC 7854, *BGP Monitoring Protocol (BMP)*  
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RFC 7999, *BLACKHOLE Community*  
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RFC 8212, *Default External BGP (EBGP) Route Propagation Behavior without Policies*  
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RFC 9552, *Distribution of Link-State and Traffic Engineering Information Using BGP*

## 14.4 Bridging and management

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IEEE 802.1ag, *Connectivity Fault Management*  
IEEE 802.1ah, *Provider Backbone Bridges*  
IEEE 802.1ak, *Multiple Registration Protocol*  
IEEE 802.1aq, *Shortest Path Bridging*  
IEEE 802.1AX, *Link Aggregation*  
IEEE 802.1D, *MAC Bridges*

IEEE 802.1p, *Traffic Class Expediting*  
IEEE 802.1Q, *Virtual LANs*  
IEEE 802.1s, *Multiple Spanning Trees*  
IEEE 802.1w, *Rapid Reconfiguration of Spanning Tree*  
IEEE 802.1X, *Port Based Network Access Control*

## 14.5 Broadband Network Gateway (BNG) Control and User Plane Separation (CUPS)

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3GPP TS 29.502, *Session Management Services*  
3GPP TS 29.503, *Unified Data Management Services*  
3GPP TS 29.512, *Session Management Policy Control Service*  
3GPP TS 29.518, *Access and Mobility Management Services*  
3GPP TS 32.255, *5G data connectivity domain charging*  
3GPP TS 32.290, *Services, operations and procedures of charging using Service Based Interface (SBI)*  
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BBF TR-459, *Control and User Plane Separation for a Disaggregated BNG*  
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## 14.9 Ethernet VPN (EVPN)

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RFC 9784, *Virtual Ethernet Segments for EVPN and Provider Backbone Bridge EVPN*  
RFC 9785, *Preference-Based EVPN Designated Forwarder (DF) Election*  
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RFC 2973, *IS-IS Mesh Groups*

RFC 3359, *Reserved Type, Length and Value (TLV) Codepoints in Intermediate System to Intermediate System*

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RFC 5303, *Three-Way Handshake for IS-IS Point-to-Point Adjacencies*

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RFC 5310, *IS-IS Generic Cryptographic Authentication*

RFC 5311, *Simplified Extension of Link State PDU (LSP) Space for IS-IS*

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RFC 8202, *IS-IS Multi-Instance – single topology*

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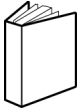
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