NOKIA

7750 SERVICE ROUTER
VIRTUALIZED SERVICE ROUTER

GX AVPS REFERENCE GUIDE
RELEASE 16.0.R1

3HE 14129 AAAA TQZZA 01

Issue: 01

May 2018

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1 Gx AVP

1.1 In This Section

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 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.

1.2 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 certain 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 towards 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).

1.2.1 Reserved Keywords in the 7750 SR

The reserved keywords used to identify referenced object type within the 7750 SR are listed in Table 2. See Table 4 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 7x50. See Table 3.
ingr-v6:	charging-rule-name	Used to identify referenced object type within 7x50. See Table 3.

Table 2 **Reserved Keywords in the 7750 SR (Continued)**

Reserved Keywords in the 7750 SR	Used in AVP	Comments
egr-v4:	charging-rule-name	Used to identify referenced object type within 7x50. See Table 3.
egr-v6:	charging-rule-name	Used to identify referenced object type within 7x50. See Table 3.
in-othr-v4:	charging-rule-name	Used to identify referenced object type within 7x50. See Table 3.
in-othr-v6:	charging-rule-name	Used to identify referenced object type within 7x50. See Table 3.
sub-id	charging-rule-name	Used to identify referenced object type within 7x50. See Table 3.
sla-profile:	charging-rule-name	Used to identify referenced object type within 7x50. See Table 3.
sub-profile:	charging-rule-name	Used to identify referenced object type within 7x50. See Table 3.
inter-dest:	charging-rule-name	Used to identify referenced object type within 7x50. See Table 3.
cat-map:	charging-rule-name	Used to identify referenced object type within 7x50. See Table 3.
aa-functions:	adc-rule-name, charging-rule-name	Used to identify referenced object type within 7x50. See Table 3.
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 Table 4 and Table 5.
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. Table 4 and Table 5.
aa-functions:urlparam:<string>	charging-rule-name	Used to identify the AA Sub http url param directly in a charging-rule-name AVP in a charging rule-install. See Table 4 and Table 5.
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 Table 4 and Table 5.
aa-um	charging-rule-name	Used to identify referenced object type within 7x50. See Table 3.

1.2.2 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 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 RFC 4005 / §4.2	—	Refer to the*7750 SR and VSR RADIUS Attributes Reference Guide*.
8	Framed-IP-Address	RFC 4005 / §6.11.1	—	This AVP specifies the IPv4 address of the subscriber host. The IPv4 address is obtained prior to Gx session establishment. The IPv4 address cannot be assigned to the subscriber host by PCRF via Gx but is instead used only for reporting.
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 RFC 4005 / §4.5	—	Refer to the *7750 SR and VSR RADIUS Attributes Reference Guide*.
31	Calling-Station-ID	RFC 4005 / §4.6	—	Refer to the *7750 SR and VSR RADIUS Attributes Reference Guide*.
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

Table 3 **Standard Diameter AVPs (description) (Continued)**

AVP ID	AVP Name	Section Defined	Application	Description
61	NAS-Port-Type	RFC 2865 / §5.41 RFC 4005 / §4.4 RFC 4603	—	Refer to the *7750 SR and VSR RADIUS Attributes Reference Guide*.
87	NAS-Port-Id	RFC 2869 / §5.17 RFC 4005 / §4.3	—	Refer to the *7750 SR and VSR RADIUS Attributes Reference Guide*.
92	NAS-Filter-Rule	RFC 4849	Gx-PM-ESM	Refer to the *7750 SR and VSR RADIUS Attributes Reference Guide*. 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 prior to 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.
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 prior to 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.

Table 3 **Standard Diameter AVPs (description) (Continued)**

AVP ID	AVP Name	Section Defined	Application	Description
257	Host-IP-Address	RFC 6733 / §5.3.5	—	This AVP is used to inform a Diameter peer of the sender's IP address. The IPv4 address used is the one configured in the *diameter-peer-policy*. If none is configured, then 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. The diameter base protocol does not require application id since its support is mandatory. 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. 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 a subscriber **host**, which can be DHCPv4/v6, PPPoX or ARP host. Session-id AVP is unique per host. 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.

Table 3 **Standard Diameter AVPs (description) (Continued)**

AVP ID	AVP Name	Section Defined	Application	Description
265	Supported-Vendor-Id	RFC 6733 / §5.3.6	—	This AVP is used in CER/CEA messages in order to inform the peer that the sender supports a subset of) the vendor-specific AVPs defined by the vendor identified in this AVP. Supported vendors in the 7750 SR are: 3GPP — 10415 ETSI — 13019 ALU — 6527 BBF — 3561
266	Vendor-Id	RFC 6733 / §5.3.3	—	The value of this AVP is the IANA assigned code to a specific vendor. 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. 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. Supported vendor-id AVPs in the 7750 SR are: 3GPP — 10415 ETSI — 13019 ALU — 6527
267	Firmware-Revision	RFC 6733 / §5.3.4	—	The SR OS version is reported.
268	Result-Code	RFC 6733 / §7.1	—	This AVP indicates whether a particular request was completed successfully or an error occurred. All *answer* messages in Diameter/Gx must include one Result-Code AVP or Experimental-Result AVP. For the list of supported error codes see Table 10.

Table 3 **Standard Diameter AVPs (description) (Continued)**

AVP ID	AVP Name	Section Defined	Application	Description
269	Product-Name	RFC 6733 / §5.3.7	—	This AVP specifies the vendor-assigned name.
278	Origin-State-Id	RFC 6733 / §8.16	—	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. Since Gx sessions are not persistent in the 7750 SR, Origin-State-Id increases each time the 7750 SR is rebooted.
279	Failed-AVP	RFC 6733 / §7.5	—	This is a Grouped AVP that provides debugging information in cases where a request is rejected or not fully processed due to the erroneous information in specific AVP. The value of the Result-Code AVP will provide information on the reason for the Failed-AVP AVP. The Failed-AVP AVP contains the entire AVP that could not be processed successfully.
281	Error-Message	RFC 6733 / §7.3	—	This AVP provides more information of the failure that is indicated in the Result-Code AVP.
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.
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. In case that it is omitted, the DRA (Diameter relay-agent) that receives the message will select the destination host to which the message will be sent.

Table 3 **Standard Diameter AVPs (description) (Continued)**

AVP ID	AVP Name	Section Defined	Application	Description
295	Termination-Cause	RFC 6733 / §8.15	—	This AVP is used to indicate the reason why a session was terminated on the 7750 SR. The supported termination causes in the 7750 SR are given in Table 13.
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. The result-code AVP values defined in Diameter Base RFC (6733, §7.1) are also applicable to Experimental-Result AVP. For a list of Gx-specific Experimental-Result-Code values supported in the 7750 SR, see the Table 10. For Gx application, the vendor-id AVP is set to 10415 (3GPP). 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 29.214 / §5.5	—	This AVP specifies vendor-assigned (3GPP — Gx) values representing the result of processing the request. For a list of the 7750 SR supported values for Gx refer to Table 10.

Table 3 **Standard Diameter AVPs (description) (Continued)**

AVP ID	AVP Name	Section Defined	Application	Description
302	Logical-Access-Id	ETSI TS 283 034 / §7.3.3 BBF TR-134 (§7.1.4.1)	—	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: • *circuit-id* from DHCPv4 Option (82,1) • *circuit-id* from PPPoE tag (0x105, 0x00000de9 [dsl forum], 0x01 — DSL Forum TR-101) • *interface-id* from DHCPv6 option 18. The vendor-id in CER is set to ETSI (13019).
313	Physical-Access-Id	ETSI TS 283 034 / §7.3.14 BBF TR-134 (§7.1.4.1)	—	This AVP contains information about the identity of the physical access to which the user device is connected, namely: • *remote-id* from DHCPv4 Option (82,2) • *remote-id* from PPPoE tag (0x105, 0x00000de9 [dsl forum], 0x02 — DSL Forum TR-101) • *remote-id* from DHCPv6 option 37. The vendor-id in CER is set to ETSI (13019).
412	CC-Input-Octets	RFC 4006 / §8.24	Gx-UM-ESM 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 Gx-UM-AA	This AVP contains the number of requested, granted or used octets towards 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.

Table 3 **Standard Diameter AVPs (description) (Continued)**

AVP ID	AVP Name	Section Defined	Application	Description
416	CC-Request-Type	RFC 4006 / §8.3	—	This AVP identifies the request type: INITIAL_REQUEST (CCR-I) UPDATE_REQUEST (CCR-U) TERMINATION_REQUEST (CCR-T)
418	CC-Session-Failover	RFC 4006 / §8.4	—	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. 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, refer to “Gx Fallback Function” section in the Gx Configuration Guide.
421	CC-Total-Octets	RFC 4006 / §8.23	Gx-UM-ESM 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	—	This AVP controls whether the subscriber will be 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. If this AVP is not supplied via PCRF, the locally configured options in the 7750 SR will determine the behavior. For further details, refer to “Gx Fallback Function” section in the Gx Configuration Guide.

Table 3 **Standard Diameter AVPs (description) (Continued)**

AVP ID	AVP Name	Section Defined	Application	Description
431	Granted-Service-Unit	RFC 4006 / §8.17	Gx-UM-ESM Gx-UM-AA	This grouped AVP is sent by PCRF to the 7750 SR for usage monitoring purposes. Once the granted amount of units is consumed by the user, a report is sent from the 7750 SR to the PCRF. The amount of consumed units can be measured on three different levels: • session level (host level) • PCC rule level (credit category in the 7750 SR) • ADC rule level (AA level in the 7750 SR)
433	Redirect-Address-Type	RFC 4006 / §8.38	Gx-PM-ESM	This AVP specifies the address type of the HTTP redirect server. URL (2) type is the only address type supported in the 7750 SR.
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*.

Table 3 **Standard Diameter AVPs (description) (Continued)**

AVP ID	AVP Name	Section Defined	Application	Description
444	Subscription-Id-Data	RFC 4006 / §8.48	—	This AVP is part of the subscription-id AVP and is used to identify the host by: • Circuit-id • Dual-stack-remote-id • Imei • Imsi • Mac of the host • Msisdn • Subscriber-id • Username (ppp-username or a string returned in the Username attribute via RADIUS or NASREQ) Subscription **type** (*subscription-id-type* AVP) has to be explicitly set via CLI. The data will be formatted according to the type set.
446	Used-Service-Unit	RFC 4006 / §8.19	Gx-UM-ESM Gx-UM-AA	This AVP is of type Grouped and it represents the measured volume threshold for usage monitoring control purposes. It is sent in the Usage-Monitoring-Report AVP from the 7750 SR to the PCRF when 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	—	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: • E.164 format (ITU-T E.164) • IMSI format (ITU-T E.212) • NAI format (RFC 2486) • Private format
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.

Table 3 **Standard Diameter AVPs (description) (Continued)**

AVP ID	AVP Name	Section Defined	Application	Description
459	User-Equipment-Info-Type	RFC 4006 / §8.50	—	This AVP is nested within the User-Equipment-Info AVP. The following types are supported in the 7750 SR: • IMEISV – contains the IMEI and software version according to 3GPP TS 23.003 document. • MAC address • Eui64 based on 48-bit MAC address with 0xfffe inserted in the middle. • Modified_eui64 — similar to eui64 but with inverted 'u' bit as defined in: **http://standards.ieee.org/develop/regauth/tut/eui64.pdf** and RFC 4291.
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	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. Supported values are: • ENABLED (2) • DISABLED (3) 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 will fail. Flow-Status = DISABLED can be the sole action within the PCC rule. Traffic associated with this action, will be dropped.

Table 3 **Standard Diameter AVPs (description) (Continued)**

AVP ID	AVP Name	Section Defined	Application	Description
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.
628	Supported-Features	29.229 / §6.3.29 29.212 / §5.4.1	—	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. The 7750 SR will advertise the support for the following: • Gx Rel 8,9,10,11, 12 • ADC The 7750 SR sends this AVP with M-bit cleared. This AVP is ignored when received by the 7750 SR.
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 an application has multiple feature lists defined. Gx reference point has only one feature list defined (feature-list-id = 1). The vendor-id is set to 10415 (3GPP).
630	Feature-List	29.229 / §6.3.31	—	This AVP contains a bitmask indicating the supported feature in Gx. The Gx features in feature-list 1 are defined in 3GPP TS 29.212, §5.4.1, table 5.4.1.1. The 7750 SR advertises the support for the following features: • Gx Rel 8,9,10, 11 • ADC

Table 3 **Standard Diameter AVPs (description) (Continued)**

AVP ID	AVP Name	Section Defined	Application	Description
1001	Charging-Rule-Install	29.212 / §5.3.2	—	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. Each override, NAS filter insert or a PCC rule that is to be instantiated is identified by the charging-rule-name AVP.
1002	Charging-Rule-Remove	29.212 / §5.3.3	—	This AVP is of type Grouped and is used to remove PCC rules from an IP CAN session. Note that Gx overrides (ESM string overrides, updates of queue/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.
1003	Charging-Rule-Definition	29.212 / §5.3.4	—	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, etc.), NAS filter insert or a complete new PCC rule definition. The override/PCC rule (defined by the Charging-Rule-Definition) is instantiated via Charging-Rule-Install AVP.

Table 3 **Standard Diameter AVPs (description) (Continued)**

AVP ID	AVP Name	Section Defined	Application	Description
1005	Charging-Rule-Name	29.212 / §5.3.6	—	This AVP is used to: • Reference a predefined rule in the node. This predefined rule represents an override of an existing rule. The override will be activated by including Charging-Rule-Name AVP nested within the Charging-Rule-Install AVP sent from the PCRF to the 7750 SR. • Name the PCC. rule which is defined through Charging-Rule-Definition AVP. Once the PCC rule is installed, it can be removed by referencing the PCC rule name. • Report rule/override status in case of a rule/override activation failure. The status will be reported within Charging-Rule-Report AVP sent from the node to the PCRF.
1006	Event-Trigger	29.212 / §5.3.7	—	This AVP can be sent from the PCRF to subscribe to a particular event in the 7750 SR. When certain events occur on the 7750 SR, they will be reported to the PCRF in the related AVP along with the event trigger indication. The supported events are listed in Table 12.

Table 3 **Standard Diameter AVPs (description) (Continued)**

AVP ID	AVP Name	Section Defined	Application	Description
1010	Precedence	29.212 / §5.3.11	Gx-PM-ESM	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. PCC rules without the Precedence value will be automatically ordered by the system in order to optimize the use of system resource. In case that there is a mix of PCC rules with and without the Precedence value, PCC rules without the explicit Precedence value will be ordered after the PCC rules with the explicitly set Precedence value.
1014	ToS-Traffic-Class	29.214 / §5.3.15	Gx-PM-ESM	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).
1016	QoS-Information	29.212 / §5.3.16	Gx-PM-ESM	This AVP is used to rate-limit a flow within a PCC rule definition. It can also be used to define QoS overrides that can be submitted from PCRF to the 7750 SR. The overrides are nested in Charging-Rule-Definition AVP and are activated in the 7750 SR via Charging-Rule-Install AVP. The supported QoS overrides are: • Queue rates, bursts size and weight • Policer rates and burs size • Subscriber egress aggregate rate limit • Arbiter rates

Table 3 **Standard Diameter AVPs (description) (Continued)**

AVP ID	AVP Name	Section Defined	Application	Description
1018	Charging-Rule-Report	29.212 / §5.3.18	—	This AVP is of type Grouped and is used to report the status of PCC rules in the 7750 SR. **Failure** to install or activate one or more policy rules will be always reported in CCR-u messages. One or more Charging-Rule-Report AVP(s) in CCR-u command will be included, indicating the failed rules. 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.
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	—	This AVP indicates the type of Connectivity Access Network in which the user is connected. The supported value in the 7750 SR is xDSL (code 2).

Table 3 **Standard Diameter AVPs (description) (Continued)**

AVP ID	AVP Name	Section Defined	Application	Description
1028	QoS-Class-Identifier	29.212 / §5.3.17	—	This AVP identifies a QoS forwarding class within the router. Mapping between QCIs and forwarding classes in the 7750 SR is the following: • QCI 1 — FC H1 • QCI 2 — FC H2 • QCI 3 — FC EF • QCI 4 — FC L1 • QCI 5 — FC NC • QCI 6 — FC AF • QCI 7 — FC L2 • QCI 8 — FC BE
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, see Table 11.
1032	RAT-Type	29.212 / §5.3.31	—	This AVP is used to identify the radio access technology that is serving the UE. This is used for WiFi users and the supported value in the router is WLAN(0).
1045	Session-Release-Cause	29.212 / §5.3.33	Gx-PM-ESM Gx-PM-AA	This AVP is used to terminate the Gx session from the PCRF side. The reason for session termination will be 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.

Table 3 **Standard Diameter AVPs (description) (Continued)**

AVP ID	AVP Name	Section Defined	Application	Description
1058	Flow-Information	29.212 / §5.3.53	Gm-PM-ESM	This is a Grouped AVP carrying information about traffic identification with the PCC rule. This AVP is nested within Charging-Rule-Definition AVP. Possible traffic identifiers within this AVP are: • Flow-Description AVP — 5 tuple information. • ToS-Traffic-Class AVP — DSCP bits. • Flow-Direction AVP — ingress or egress direction of the traffic.
1066	Monitoring-Key	29.212 / §5.3.59	Gx-UM-ESM Gx-UM-AA	This AVP is used for usage monitoring, as an identifier for a usage monitoring control instance. This AVP can be nested within: • Charging-Rule-Definition AVP — in this case the Monitoring-Key AVP is used to represent the PCC rule for which usage monitoring might be needed. • Usage-Monitoring-Information AVP — 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.

Table 3 **Standard Diameter AVPs (description) (Continued)**

AVP ID	AVP Name	Section Defined	Application	Description
1066 cont'd	Monitoring-Key	29.212 / §5.3.59	Gx-UM-ESM Gx-UM-AA	The usage monitoring can be performed on multiple levels as requested by the Usage-Monitoring-Level AVP nested within the Usage-Monitoring-Information AVP: • If the level is IP-CAN session, then the monitoring-key is an arbitrary octetstring set by the PCRF – usage monitoring is performed for the entire IP-CAN session (which represent a host/ sla-profile instance) • If the level is pcc rule, then the Monitoring-Key will refer 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. • 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. There can be up to three monitoring-keys in a single Gx messages.
1067	Usage-Monitoring-Information	29.212/ §5.3.60	Gx-UM-ESM Gx-UM-AA	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 towards the 7750 SR. The 7750 SR will use this AVP to report usage monitoring to the PCRF.

Table 3 **Standard Diameter AVPs (description) (Continued)**

AVP ID	AVP Name	Section Defined	Application	Description
1068	Usage-Monitoring-Level	29.212 / §5.3.61	Gx-UM-ESM Gx-UM-AA	This AVP is sent by PCRF to indicate the level on which usage monitoring is performed in the 7750 SR: • IP-CAN session level • PCC rule level • ADC rule level If usage-monitoring-level AVP is not provided, its absence indicates the pcc rule level usage monitoring.
1069	Usage-Monitoring-Report	29.212 / §5.3.62	Gx-UM-ESM Gx-UM-AA	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. A single value for this AVP is defined: 0 — usage_monitoring_report_required
1070	Usage-Monitoring-Support	29.212 / §5.3.63	Gx-UM-ESM Gx-UM-AA	This AVP is sent by the PCRF to indicate whether the usage monitoring will be disabled for certain monitoring key. The following value is defined: 0 — usage_monitoring_disabled When usage-monitoring is disabled for a certain monitoring-key in this fashion, the 7750 SR will generate a new CCR-u with the event-trigger AVP set to ‘usage_report’ to report the accumulated usage for the disabled usage monitoring entities.

Table 3 **Standard Diameter AVPs (description) (Continued)**

AVP ID	AVP Name	Section Defined	Application	Description
1080	Flow-Direction	29.212 / §5.3.65	Gx-PM-ESM	This AVP is nested within the Flow-Information AVP. It identifies the direction in which the PCC rule is applied (ingress or egress). Supported values are: • DOWNLINK (1) — egress direction • UPLINK (2) — ingress direction. The direction to which the PCC rule is applied can come from the following two sources, in the order of preference: • Flow-Direction AVP inside of the Flow-Information AVP. • Inside of the Flow-Description AVP as part of IPFilterRule type (direction field).
1085	Redirect-Information	29.212/§5.3.82	Gx-PM-ESM	This is a Grouped AVP that contains HTTP redirect information. This can be used in: • PCC rules to HTTP redirect a flow or a group of flows. • HTTP redirect overrides to override currently applied URL within the subscriber filter.

Table 3 **Standard Diameter AVPs (description) (Continued)**

AVP ID	AVP Name	Section Defined	Application	Description
1086	Redirect-Support	29.212/§5.3.83	Gx-PM-ESM	This AVP is nested inside of Redirect-Information AVP. The values of this AVPs are: • REDIRECTION_DISABLED (0) • REDIRECTION-ENABLED (1) The behavior for Redirect-Support in the 7750 SR is the following: • If the AVP value is: REDIRECTION_ENABLED — The 7750 SR will accept it and HTTP redirect will be in effect. • If the AVP value is different from: REDIRECTION_ENABLED and M-bit is set (or inherited from parent AVP): — The 7750 SR will reject it and the rule will fail. • 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 will ignore it and the HTTP redirect will not be explicitly disabled. Not receiving this AVP has the same effect as it was received with value REDIRECTION_ENABLED.
1088	TDF-Application-Identifier	29.212/§5.3.77	Gx-UM-AA	This AVP is of type OctetString. This AVP can be used in both PCC and ADC rules. For AA, this identifier is a reference to a preconfigured charging-group, app-group or application.
1092	ADC-Rule-Install	29.212 / §5.3.85	Gx-PM-AA 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 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.

Table 3 **Standard Diameter AVPs (description) (Continued)**

AVP ID	AVP Name	Section Defined	Application	Description
1094	ADC-Rule-Definition	29.212 / §5.3.87	Gx-PM-AA Gx-UM-AA	This AVP is of type Grouped and it contains the rules that are to be activated. AA rules that can be applied to a subscriber via Gx are: • Application-profile activation/ override. A preexisting application-profile must be defined in the 7750 SR. • Application characteristic overrides. • 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 given TDF-Application-Identifier.
1096	ADC-Rule-Name	29.212 / §5.3.89	Gx-PM-AA 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 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.

1.2.3 Standard Diameter AVPs (format)

Table 4 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 — Vendor specific bit
- M — Mandatory bit
- P — This 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 RFC6733, §4.5; 29.212, §5.3.

Flags for the Gx re-used AVPs will be set as described in RFC6733, §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 VSAs 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 ALU vendor-specific attributes will have the M-bit cleared.

NA — This keyword (Not Advertised) denotes that the AVP is not originated by the 7750 SR and thus the 7750 SR does not set the flag bits. However, the 7750 SR will recognize 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 a proper value since 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	Refer to the *7750 SR and VSR RADIUS Attributes Reference Guide*.
8	Framed-IP-Address	No	OctetString	M	4 octets	Example: ip-address 10.11.12.13 Framed-IP-Address = 0a0b0c0d As defined in RFC 4005, §6.11.1.
30	Called-Station-Id	Yes	UTF8String	M	64 chars	Example: Called-Station-Id = mac:ssid or mac only if ssid is not available.

Table 4 **Standard Diameter AVPs (format) (Continued)**

AVP ID	AVP Name	Incl/ Excl	Type	Flags	Limits	Format
31	Calling-Station-ID	Yes	UTF8String	M	64 chars	llid | mac | remote-id | sap-id | sap-string (64 char. string configured at sap-level) Example: include-avp calling-station-id sap-id Calling-Station-Id = 1/1/2:1.1
55	Event-Time stamp	No	Time	M	4 octets	Refer to the *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. Refer to the *7750 SR and VSR RADIUS Attributes Reference Guide*.
87	NAS-Port-Id	Yes	UTF8String	M	253 octets	Refer to the *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.	Refer to the *7750 SR and VSR RADIUS Attributes Reference Guide*.
97	Framed-IPv6-Prefix	No	OctetString	M	—	SLAAC wan-host <ipv6-prefix/prefix-length> with prefix-length 64 The AVP layout is: <1 octet Reserved> <1 octet Length> <max 16 octets for Prefix>
123	Delegated-IPv6-Prefix	No	OctetString	M	—	<ipv6-prefix/prefix-length> with prefix-length [48 to 64] The AVP layout is: <1 octet Reserved> <1 octet Length> <max 16 octets for Prefix>
257	Host-IP-Address	No	Address	M	—	IPv4 Address
258	Auth-Application-Id	No	Unsigned32	M	—	Example: Gx Auth-Application-Id = 16777238

Table 4 **Standard Diameter AVPs (format) (Continued)**

AVP ID	AVP Name	Incl/ Excl	Type	Flags	Limits	Format
260	Vendor-Specific-Application-Id	No	Grouped	M	—	This AVP contains the Vendor-Id AVP and Auth-Application-Id AVP. 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: <DiameterIdentity>;<high 32 bits>;<low 32 bits> In the 7750 SR the session-id is defined as: diameter-identity;boxuptime; seq-number Example: router.workstation.be;1391362206;1
264	Origin-Host	No	DiameterIdentity	M	80 bytes	Example: Origin-Host = host-name-1@domain-name-1
265	Supported-Vendor-Id	No	Unsigned32	M	—	IANA assigned vendor number: 3GPP — 10415 ETSI — 13019 ALU — 6527
266	Vendor-Id	No	Unsigned32	M	—	IANA assigned vendor number: 3GPP — 10415 ETSI — 13019 ALU — 6527 BBF — 3561
267	Firmware-Revision	No	Unsigned32	—	—	Reference to the major/minor release version. Example: 805 — Release 8R5
268	Result-Code	No	Unsigned32	M	—	See Table 10 for Error Codes.
269	Product-Name	No	UTF8String	—	—	Vendor-assigned name for the product. Example: “SR-OS”

Table 4 **Standard Diameter AVPs (format) (Continued)**

AVP ID	AVP Name	Incl/ Excl	Type	Flags	Limits	Format
278	Origin-State-Id	No	Unsigned32	M		Example: 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.
283	Destination-Realm	No	DiameterIdentity	M	80 bytes	Example: 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. 0 — AUTHORIZE_ONLY 1 — AUTHORIZE_AUTHENTICATE Example: Re-Auth-Request-Type = 0
293	Destination-Host	No	DiameterIdentity	M	80 bytes	Operator configurable.
295	Termination-Cause	No	Enumerated	M	—	For a list of the 7750 SR supported values for Gx refer to Table 13.
296	Origin-Realm	No	DiameterIdentity	M	80 bytes	Example: Origin-Realm = origin-domain.com
297	Experimental-Result	No	Grouped	M	—	A grouped AVP containing: • Vendor-Id AVP • Experimental-Result-Code AVP Example: Experimental-Result = {Vendor-id = 10415 (3GPP) 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 refer to Table 10.
302	Logical-Access-Id	Yes	OctetString	V	—	Vendor ID = 13019 (ETSI)

Table 4 **Standard Diameter AVPs (format) (Continued)**

AVP ID	AVP Name	Incl/ Excl	Type	Flags	Limits	Format
313	Physical-Access-Id	Yes	UTF8String	V	—	Vendor ID = 13019 (ETSI)
412	CC-Input-Octets	No	Unsigned64	M	—	Example: CC-Input-Octets = 1000000
414	CC-Output-Octets	No	Unsigned64	M	—	Example: 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: CC-Request-Type = 1 (CCR-i) 3. CC-Request-Type = 2 (CCR-u) CC-Request-Type = 3 (CCR-t)
418	CC-Session-Failover	No	Enumerated	M	—	FAILOVER_NOT_SUPPORTED (0) FAILOVER_SUPPORTED (1) Example: CC-Session-Failover = 1
421	CC-Total-Octets	No	Unsigned64	M	—	Example: CC-Total-Octets = 2000000
427	Credit-Control-Failure-Handling	No	Enumerated	M	—	TERMINATE (0) CONTINUE (1) RETRY_AND_TERMINATE (2) Example: Credit-Control-Failure-Handling = 1
431	Granted-Service-Unit	No	Grouped	M	—	This AVP can contain the following AVPs: • CC-Total-Octets • CC-Input-Octets • CC-Output-Octets
433	Redirect-Address-Type	No	Enumerated	M	—	Example: Redirect-Address-Type = 2 (URL type)
435	Redirect-Server-Address	No	UTF8String	M	255 chars	Example: Redirect-Server-Address = http://www.operator.com/portal.php&

Table 4 **Standard Diameter AVPs (format) (Continued)**

AVP ID	AVP Name	Incl/ Excl	Type	Flags	Limits	Format
443	Subscription-Id	Yes	Grouped	M	—	This AVP contains the following AVPs: • Subscription-Id-Type • Subscription-Id-Data
444	Subscription-Id-Data	Yes	UTF8String	M	—	Example: Username — Subscription-Id-Data = user1@domain.com Mac — Subscription-Id-Data = 11:22:33:44:55:66 Circuit-id — Subscription-Id-Data = dslam1 eth 2/1:100 Dual-stack-remote-id — Subscription-Id-Data = myRemoteId Subscriber-id — Subscription-Id-Data = sub-id-1 Imsi Subscription-Id-Data = 204047910000598 Msisdn Subscription-Id-Data = 13109976224 Imei — Subscription-Id-Data = 356938035643809
446	Used-Service-Unit	No	Grouped	M	—	This AVP contains the following AVPs: • CC-Total-Octets • CC-Input-Octets • CC-Output-Octets
450	Subscription-Id-Type	Yes	Enumerated	M	—	Example: Subscription-Id-Type = 0 (end_user_e164) Subscription-Id-Type = 1 (end_user_imsi) Subscription-Id-Type = 3 (end_user_nai) Subscription-Id-Type = 4 (end_user_private)
458	User-Equipment-Info	Yes	Grouped	M	—	This AVP contains the following AVPs: • User-Equipment-Info-Type • User-Equipment-Info-Value

Table 4 **Standard Diameter AVPs (format) (Continued)**

AVP ID	AVP Name	Incl/ Excl	Type	Flags	Limits	Format
459	User-Equipment-Info-Type	Yes	Enumerated	—	—	Example: User-Equipment-Info-Type = 0 (emissive) User-Equipment-Info-Type =1 (mac) User-Equipment-Info-Type = 2 (eui64) 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: action dir proto from src to dst action — permit dir — direction: in or out proto — an IP protocol specified by number. The **ip** keyword means any protocol will match. src and dest — <address/mask> and ports (including port ranges) Example: Flow-Description = permit 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: Flow-Status = 3 — matched traffic inside of the PCC rule is dropped.
515	Max-Requested-Bandwidth-DL	No	Unsigned32	NA, V	—	The units of this parameter are kb/s for overrides and b/s when used within PCC rules. The rate accounts for the IP header and above (no L2 header). Vendor-ID = 10415 (3GPP) Example: Max-Requested-Bandwidth-DL = 1000 — 1 Mb/s in overrides Max-Requested-Bandwidth-DL = 1000000 — 1 Mb/s in PCC rules

Table 4 **Standard Diameter AVPs (format) (Continued)**

AVP ID	AVP Name	Incl/ Excl	Type	Flags	Limits	Format
516	Max-Requested-Bandwidth-UL	No	Unsigned32	NA, V	—	The units of this parameter are kb/s for overrides and b/s when used within PCC rules. The rate accounts for the IP header and above (no Layer 2 header). Vendor-ID = 10415 (3GPP) Example: Max-Requested-Bandwidth-UL = 1000 v 1 Mb/s for overrides Max-Requested-Bandwidth-UL = 1000000 — 1 Mb/s in PCC rules
628	Supported-Features	No	Grouped	V	—	This AVP contains the following AVPs: • Vendor-Id • Feature-List-Id • Feature-List Vendor-ID = 10415 (3GPP) Example: Supported-Features • {Vendor-Id = 10415 3GPP • Feature-List-Id = 1 • Feature-List = 72}
629	Feature-List-Id	No	Unsigned32	V	—	Vendor-ID = 10415 (3GPP) Example: Feature-List-Id = 1 Feature-List-Id of 1 is defined in 29.212 / §5.4.1, table 5.4.1.1.
630	Feature-List	No	Unsigned32	V	—	Vendor-ID = 10415 (3GPP) Example: Feature-List = 262219.
1001	Charging-Rule-Install	No	Grouped	NA, V	—	Vendor-ID = 10415 (3GPP) This AVP contains the following AVPs: • Charging-Rule-Definition • Charging-Rule-Name

Table 4 **Standard Diameter AVPs (format) (Continued)**

AVP ID	AVP Name	Incl/ Excl	Type	Flags	Limits	Format
1002	Charging-Rule-Remove	No	Grouped	NA, V	—	Vendor-ID = 10415 (3GPP) This AVP contains the following AVP: • Charging-Rule-Name
1003	Charging-Rule-Definition	No	Grouped	NA, V	—	Vendor-ID = 10415 (3GPP) This AVP contains the following nested AVPs: • 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) • QoS-Information (defines Qos overrides) • NAS-Filter-Rule • Alc-NAS-Filter-Rule-Shared • AA-Functions

Table 4 **Standard Diameter AVPs (format) (Continued)**

AVP ID	AVP Name	Incl/ Excl	Type	Flags	Limits	Format
1005	Charging-Rule-Name	No	OctetString	V,M	100 chars for PCC rules (defined via Charging-Rule-Definition AVP) 128 chars for overrides.	Vendor-ID = 10415 (3GPP) 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: Filters: • Ingr-v4:<id> • Ingr-v6:<id> • Egr-v4:<id> • Egr-v6:<id> • In-Othr-v4:<id> (one-time-http-redirect) ESM Strings: • Sub-Id:*sub-id-name* (32 Byte) • Sla-Profile:*sla-profile-string* (16Byte) • Sub-Profile:*sub-profile-string* (16Byte) • Inter-Dest:*Inter-Dest-String* to associate subscriber with Vport HTTP Redirect Override • V4-http-url:url-string • V6-http-url:url-string Category-Map (for usage monitoring): • Cat-Map:*category-map-name* HTTP Redirect Override: • V4-http-url:url-string • V6-http-url:url-string

Table 4 **Standard Diameter AVPs (format) (Continued)**

AVP ID	AVP Name	Incl/ Excl	Type	Flags	Limits	Format
1005 cont.						AA Strings: • *AA-Functions: <name-string>* this prefix indicates that the rule contains aa-specific information. • *AA-UM: <name-string>* this prefix indicates that the rule contains aa-specific usage-monitoring information, or points to a predefined aa-specific usage-monitoring rule. Example: Charging-Rule-Name = ingr-v4:5 → reference to the predefined ingress IPv4 filter in 7450 ESS, 7750 SR, and 7950 XRS. The filter id is 5. Charging-Rule-Name =sla-profile:my-premium-sla → reference to the predefined sla-profile in 7450 ESS, 7750 SR, and 7950 XRS. The sla-profile name is 'my-premium-sla'.
1006	Event-Trigger	No	Enumerated	V	—	Vendor-ID = 10415 (3GPP) For the list of supported event-triggers in the 7750 SR, see Table 12.
1010	Precedence	No	Unsigned32	NA, M	0 to 65535	Vendor-ID = 10415 (3GPP) Example: Precedence = 100
1014	Tos-Traffic-Class	No	OctetString	NA, M	—	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). Example: ToS-Traffic-Class = 00101000 11111100 — DSCP AF11

Table 4 **Standard Diameter AVPs (format) (Continued)**

AVP ID	AVP Name	Incl/ Excl	Type	Flags	Limits	Format
1016	QoS-Information	NA	Grouped	NA, V	—	This AVP contains the following nested AVPs: • Max-Requested-Bandwidth-UL • Max-Requested-Bandwidth-DL • Guaranteed-Bitrate-UL • Guaranteed-Bitrate-DL • Alc-Queue • Alc-Queue-id • Alc-Committed-Burst-Size-UL • Alc-Committed-Burst-Size-DL • Alc-Maximum-Burst-Size-UL • Alc-Maximum-Burst-Size-DL • Alc-Wrr-Weight-UL • Alc-Wrr-Weight-DL • Alc-Policer • Alc-Policer-Id • Alc-Sub-Egress-Rate-Limit • Alc-Arbiter • Alc-Arbiter-Name • Alc-Arbiter-Rate-Limit-DL • Alc-Arbiter-Rate-Limit-UL Vendor-ID 10415 (3GPP)

Table 4 **Standard Diameter AVPs (format) (Continued)**

AVP ID	AVP Name	Incl/ Excl	Type	Flags	Limits	Format

1018	Charging-Rule-Report	No	Grouped	V,M	—	Vendor-ID = 10415 (3GPP)
						This AVP contains the following nested AVPs:
						• Charging-Rule-Name
						• PCC-Rule-Status
						• Rule-Failure-Code
						Example:
						Charging-Rule-Report {
						Charging-Rule-Name = sla-profile:failed-profile
						PCC-Rule-Status = 1 (inactive)
						Rule-Failure-Code = 4 (GW/ 7750 SR_MALFUNCTION)
						}

1019	PCC-Rule-Status	No	Enumerated	V,M	—	Vendor-ID = 10415 (3GPP) Supported values in the 7750 SR: 1 – inactive Example: PCC-Rule-Status = 0 — rule is active
1025	Guaranteed-Bitrate-DL	NA	Unsigned32	NA,V	—	The units of this parameter are kb/s for overrides and b/s when used within PCC rules. The rate accounts for the IP header and above (no Layer 2 header). Vendor-ID = 10415 (3GPP) Example: Guaranteed-Bandwidth-DL = 1000 — 1 Mb/s in overrides Guaranteed-Bandwidth-DL = 1000000 — 1 Mb/s in PCC rules

Table 4 **Standard Diameter AVPs (format) (Continued)**

AVP ID	AVP Name	Incl/ Excl	Type	Flags	Limits	Format
1026	Guaranteed-Bitrate-UL	NA	Unsigned32	V	—	The units of this parameter are kb/s for overrides and b/s when used within PCC rules. The rate accounts for the IP header and above (no Layer 2 header). Vendor-ID = 10415 (3GPP) Example: Guaranteed-Bandwidth-UL = 1000 — 1 Mb/s in overrides Guaranteed-Bandwidth-UL = 1000000 — 1 Mb/s in PCC rules
1027	IP-CAN-Type	Yes	Enumerated	V	—	Vendor-ID = 10415 (3GPP) Example: IP-CAN-Type = 2 — xDSL
1028	QoS-Class-Identifier	NA	Enumerated	NA,M	—	Vendor-ID = 10415 (3GPP) Example: QoS-Class-Identifier = 3 — maps to FC EF.
1031	Rule-Failure-Code	No	Enumerated	V,M	—	Vendor-ID = 10415 (3GPP) Example: Rule-Failure-Code = 1 — UNKNOWN_RULE_NAME
1032	RAT-Type	Yes	Enumerated	V	—	Vendor-ID = 10415 (3GPP) Example: RAT-Type = 0 — WLAN

Table 4 **Standard Diameter AVPs (format) (Continued)**

AVP ID	AVP Name	Incl/ Excl	Type	Flags	Limits	Format
1045	Session-Release-Cause	NA	Enumerated	V,M	—	Vendor-ID = 10415 (3GPP) This AVP is only received by the 7750 SR and it is never sent by the 7750 SR. 0 — UNSPECIFIED-REASON 1 — UE_SUBSCRIPTION_REASON This value is used to indicate that the subscription of UE has changed (e.g., removed) and the session needs to be terminated. 2 — INSUFFICIENT_SERVER_ RESOURCES This value is used to indicate that the server is overloaded and needs to abort the session. Example: Session-Release-Cause = 0
1050	AN-GW-Address	Yes	IPv4Address	V	—	Vendor-ID = 10415 (3GPP) Example: AN-GW-Address = 10.10.10.10
1058	Flow-Information	No	Grouped	V	—	Vendor-ID = 10415 (3GPP) The following AVPs can be nested inside: • Flow-Description • ToS-Traffic-Class • Flow-Direction
1066	Monitoring-Key	No	OctetString	NA,V	32 bytes	Vendor-ID = 10415 (3GPP) 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. Example: Monitoring-Key = monitor-pcc-rule-1

Table 4 **Standard Diameter AVPs (format) (Continued)**

AVP ID	AVP Name	Incl/ Excl	Type	Flags	Limits	Format
1067	Usage-Monitoring-Information	No	Grouped	V	—	Vendor-ID = 10415 (3GPP) This AVP contains the following nested AVPs: • Monitoring-Key • Granted-Service-Unit • Used-Service-Unit • Usage-Monitoring-Level • Usage-Monitoring-Report • Usage-Monitoring-Support
1068	Usage-Monitoring-Level	No	Enumerated	V	—	Vendor-ID = 10415 (3GPP) The following values are defined: 0 – session_level 1 – pcc_rule_level 2 – adc_rule_level Example: Usage-Monitoring-Level = 0 — usage monitoring is performed based on sla-profile (IP-CAN session level) of the host. Usage-Monitoring-Level = 1 — usage monitoring is performed based on predefined category as indicated by the monitoring-key AVP 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) Example: Usage-Monitoring-Report = 0 (usage_monitoring_report_required)
1070	Usage-Monitoring-Support	No	Enumerated	NA,V	—	Vendor-ID = 10415 (3GPP) Example: Usage-Monitoring-Support = 0 — usage_ monitoring_disabled

Table 4 **Standard Diameter AVPs (format) (Continued)**

AVP ID	AVP Name	Incl/ Excl	Type	Flags	Limits	Format
1080	Flow-Direction	No	Enumerated	NA,M	—	Vendor-ID = 10415 (3GPP) Example: Flow-Direction = 1 — egress Flow-Direction = 2 — ingress
1085	Redirect-Information	No	Grouped	NA,V	—	Vendor-ID = 10415 (3GPP) This AVP can contain the flowing AVPs: • Redirect-Support • Redirect-Address-Type • Redirect-Server-Address
1086	Redirect-Support	No	Enumerated	NA,V	—	Vendor-ID = 10415 (3GPP) Example: Redirect-Support = 1 — redirection is enabled.
1088	TDF-Application-Identifier		OctetString	NA,V	32 chars long	Vendor-ID = 10415 (3GPP) Example: 0_rated, BitTorrent
1092	ADC-Rule-Install	No	Grouped	NA,V	—	Vendor-ID = 10415 (3GPP) This AVP contains the following nested AVPs: • ADC-Rule-Definition
1093	ADC-Rule-Remove		Grouped	NA,V	—	Vendor-ID = 10415 (3GPP) This AVP contains the following nested AVPs: • ADC-Rule-Name

Table 4 **Standard Diameter AVPs (format) (Continued)**

AVP ID	AVP Name	Incl/ Excl	Type	Flags	Limits	Format

1094	ADC-Rule-Definition	No	Grouped	NA,V	—	Vendor-ID = 10415 (3GPP)
						This AVP contains the following nested AVPs:
						• ADC-Rule-Name
						• MonitoringKey
						• TDF-Application-Id
						• AA-Functions {
						– AA profile
						– AA-App-Service-Options {
						– AA-App-Service-Options-Name
						– AA-App-Service-Options-Value
						}
						}

1096	ADC-Rule-Name	No	OctetString	V	17 chars for prefix/ separator (optional) plus 32 chars for name	Vendor-ID = 10415 (3GPP) Example: For app-profile and ASO changes: ADC-Rule-Name = “AA-Functions: AdcRuleWithAAFtn” For usage monitoring: ADC-Rule-Name = "AdcRuleWithoutAAFtn"
1097	ADC-Rule-Report	No	Grouped	V	—	Vendor-ID = 10415 (3GPP) This AVP contains the following nested AVPs: • ADC-Rule-Name • PCC-Rule-Status • Rule-Failure-Code

1.2.4 ALU-Specific AVPs

Table 5 **ALU-Specific AVPs**

AVP ID	AVP Name	Application	Description
99	Alc-IPv6-Address (IA-NA)	Gx-PM-ESM Gx-PM-AA	Attribute that carries the IPv6 address assigned to the IPoE/PPPoE host via DHCPv6 (IA-NA). The IPv6address is obtained prior to 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	Refer to the *7750 SR and VSR RADIUS Attributes Reference Guide*. 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. AA-Function AVP encompasses application-profile instantiation/overrides and the overrides of the ASOs within the application-profile. (AA subscriber state must exist for app-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. The app-profile must be predefined in the 7750 SR.
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.

Table 5 **ALU-Specific AVPs (Continued)**

AVP ID	AVP Name	Application	Description
1008	Alc-Committed-Burst-Size-UL	Gx-PM-ESM	Committed burst size of an ingress queue or a policer in bytes.
1009	Alc-Maximum-Burst-Size-UL	Gx-PM-ESM	Maximum burst size of an ingress queue or a policer in bytes.
1010	Alc-Committed-Burst-Size-DL	Gx-PM-ESM	Committed burst size of an egress queue or a policer in bytes.
1011	Alc-Maximum-Burst-Size-DL	Gx-PM-ESM	Maximum burst size of an egress queue or a policer in bytes.
1013	Alc-Wrr-Weight-DL	Gx-PM-ESM	Weight with which a queue is parented into the HSMDA scheduler. This AVP is only applicable to HSMDA boards.
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.
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.
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 will be 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 will be 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.

Table 5 **ALU-Specific AVPs (Continued)**

AVP ID	AVP Name	Application	Description
1027	Alc-Filter-Action	Gx-PM-ESM	This AVP sets the gating action within the filter portion of the PCC rule. The support values in the node are: • FORWARD (1) • DROP (2)
1028	Alc-QoS-Action	Gx-PM-ESM	This AVP is used to create a white-list entry related to the QoS part of the PCC rule. The supported value is: • FORWARD (1) Alc-QoS-Action = Forward → Assuming that traffic is not dropped by the filtering action, it will transparently pass 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 **http url** 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	Grouped AVP 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 (**configure subscriber-mgmt sla-profile** *sla-profile-name* **def-instance-sharing** *spi-sharing-type*). 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. 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. Setting this AVP for an IPoE host with IPoE session disabled on the group interface results in a setup failure. Unsupported values result in a subscriber session setup failure.

Table 5 **ALU-Specific AVPs (Continued)**

AVP ID	AVP Name	Application	Description
1037	Alc-SPI-Sharing-Type	Gx-PM-ESM	Values: 0= default 2= per group
1038	Alc-SPI-Sharing-Id	Gx-PM-ESM	Value is function of the Alc-SPI-Sharing-Type: “default” (0) — The Alc-SPI-Sharing-Id AVP must not be present. “per group” (2) — The group ID used for SPI sharing. Valid values are 0 to 65535.

1.2.5 ALU-Specific VSAs (format)

Table 6 **ALU-Specific VSAs (format)**

AVP ID	AVP Name	Conf	Type	Flags	Limits	Format
99	Alc-IPv6-Address (IA-NA)	No	OctetString	V	—	The AVP layout is: <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.	Refer to the *7750 SR and VSR RADIUS Attributes Reference Guide*.

1001	AA-Functions	NA	Grouped	NA,V	One per ADC rule.
					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:
						• AA-App-Profile-Name
						• AA-App-Service-Options {
						– AA-App-Service-Options-Name
						– AA-App-Service-Options-Value
						}

1002	AA-App-Profile-Name	NA	UTF8String	NA,V	32 chars	Example: AA-App-Profile-Name = MyAppProfile

Table 6 **ALU-Specific VSAs (format) (Continued)**

AVP ID	AVP Name	Conf	Type	Flags	Limits	Format
1003	AA-App-Service-Options	NA	Grouped	NA,V	Max 32 per AA-Functions	This AVP contains the following nested AVPs: • AA-App-Serv-Options-Name • AA-App-Serv-Options-Value
1004	AA-App-Serv-Options-Name	NA	UTF8String	NA,V	32 chars Max one AVP per AA-App-Service-Options AVP	Example: A-App-Serv-Options-Name = p2p
1005	AA-App-Serv-Options-Value	NA	UTF8String	NA,V	32 chars 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: • Alc-Queue-Id • Max-Requested-Bandwidth-UL • Max-Requested-Bandwidth-DL • Guaranteed_Bitrate_UL • Guaranteed_Bitrate_DL • Alc-Committed-Burst-Size-UL • Alc-Maximum-Burst-Size-UL • Alc-Committed-Burst-Size-DL • Alc-Maximum-Burst-Size-DL • AAlc-Wrr-Weight-DL

Table 6 **ALU-Specific VSAs (format) (Continued)**

AVP ID	AVP Name	Conf	Type	Flags	Limits	Format
1007	Alc-Queue-Id	NA	Unsigned32	NA,V	—	Example: Alc-Queue-Id = 3
1008	Alc-Committed-Burst-Size-UL	NA	Unsigned32	NA,V	—	Example: Alc-Committed-Burst-Size-UL = 300000 Burst size of 300,000 bytes.
1009	Alc-Maximum-Burst-Size-UL	NA	Unsigned32	NA,V	—	Example: Alc-Maximum-Burst-Size-UL = 300000 Burst size of 300,000 bytes.
1010	Alc-Committed-Burst-Size-DL	NA	Unsigned32	NA,V	—	Example: Alc-Committed-Burst-Size-DL = 300000 Burst size of 300,000b bytes.
1011	Alc-Maximum-Burst-Size-DL	NA	Unsigned32	NA,V	—	Example: Alc-Maximum-Burst-Size-DL = 300000 Burst size of 300,000 bytes.
1013	Alc-Wrr-Weight-DL	NA	Unsigned32	NA,V	—	Example: Alc-Wrr-Weight-DL = 2

Table 6 **ALU-Specific VSAs (format) (Continued)**

AVP ID	AVP Name	Conf	Type	Flags	Limits	Format
1014	Alc-Policer	NA	Grouped	NA,V	—	This AVP contains the following nested AVPs: • Alc-Policer-Id • Max-Requested-Bandwidth-UL • Max-Requested-Bandwidth-DL • Guaranteed_Bitrate_UL • Guaranteed_Bitrate_DL • Alc-Committed-Burst-Size-UL • Alc-Maximum-Burst-Size-UL • Alc-Committed-Burst-Size-DL • Alc-Maximum-Burst-Size-DL
1015	Alc-Policer-Id	NA	Unsigned32	NA,V	—	Example: Alc-Policer-Id = 10
1016	Alc-Sub-Egress-Rate-Limit	NA	Unsigned32	NA,V	—	Example: 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: Alc-Arbiter-Rate-Limit-UL = 10000000
1021	Alc-Arbiter	NA	Grouped	NA,V	—	This AVP contains the following nested AVPs: • Alc-Arbiter-Name • Alc-Arbiter-Rate-Limit-UL • Alc-Arbiter-Rate-Limit-DL

Table 6 **ALU-Specific VSAs (format) (Continued)**

AVP ID	AVP Name	Conf	Type	Flags	Limits	Format
1022	Alc-Arbiter-Name	NA	UTF8String	NA,V	32 chars	Example: Alc-Arbiter-Name = root
1023	Alc-Next-Hop	NA	Grouped	NA,V	—	This AVP can contain the following AVPS: • Alc-Next-Hop-IP • Alc-v4-Next-Hop-Service-Id • Alc-v6-Next-Hop-Service-Id
1024	Alc-Next-Hop-IP	NA	Address	NA,V	16 octets	IPvv4 or IPv6 address. Example: Alc-Next-Hop-IP = 10.10.10.10 Alc-Next-Hop-IP = 2001:0db8::1
1025	Alc-v4-Next-Hop-Service-Id	NA	Unsigned32	NA,V	1 to 2148007978	Example: Alc-v4-Next-Hop-Service-Id = 10
1026	Alc-v6-Next-Hop-Service-Id	NA	Unsigned32	NA,V	1 to 2148007978	Example: Alc-v6-Next-Hop-Service-Id = 10
1027	Alc-Filter-Action	NA	Enumerated	NA,V	1 or 2	Example: Alc-Filter-Action = 2 → matched traffic inside of the PCC rule is dropped.
1028	Alc-QoS-Action	NA	Enumerated	NA,V	1	Example: Alc-QoS-Action = 1 → matched traffic inside of the PCC rule will not be subjected to QoS related actions.
1029	AA-Sub-Http-Url-Param	NA	UTF String	NV	32 characters	—
1030	AA-Sub-Scope	NA	Enumerated	NV	—	1 = subscriber scope 2 = MAC or device scope

Table 6 **ALU-Specific VSAs (format) (Continued)**

AVP ID	AVP Name	Conf	Type	Flags	Limits	Format
1036	Alc-SPI-Sharing	NA	Grouped	V	—	This AVP contains the following nested AVPs: • Alc-SPI-Sharing-Type • Alc-SPI-Sharing-Id
1037	Alc-SPI-Sharing-Type	NA	Enumerated	V	0 or 2	For example: 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: Alc-SPI-Sharing-Id = 100

1.2.6 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 are 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

Table 7 **Diameter-Based AVP Applicability (Continued)**

AVP ID	AVP Name	CER	CEA	DPR	DPA	DWR	DWA	ASR	ASA
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
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

1.2.7 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
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

Table 8 **Gx AVP Applicability (Continued)**

AVP ID	AVP Name	CCR	CCA	RAR	RAA
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
283	Destination-Realm	1	0	1	0
285	Re-Auth-Request-Type	0	0	1	0
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

Table 8 **Gx AVP Applicability (Continued)**

AVP ID	AVP Name	CCR	CCA	RAR	RAA
443	Subscription-Id	1	0	0	0
444	Subscription-Id-Data	N	0	0	0
446	Used-Service-Unit	N	0	0	0
450	Subscription-Id-Type	1	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
515	Max-Requested-Bandwidth-DL	0	N	N	0
516	Max-Requested-Bandwidth-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
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	N	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

Table 8 **Gx AVP Applicability (Continued)**

AVP ID	AVP Name	CCR	CCA	RAR	RAA
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
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
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+

1.2.8 ALU-Specific AVP Applicability

Table 9 **ALU-Specific AVP Applicability**

AVP ID	AVP Name	CCR	CCA	RAR	RAA
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	N	0
1009	Alc-Maximum-Burst-Size-UL	0	N	N	0
1010	Alc-Committed-Burst-Size-DL	0	N	N	0
1011	Alc-Maximum-Burst-Size-DL	0	N	N	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
1022	Alc-Arbiter-Name	0	N	N	0

Table 9 **ALU-Specific AVP Applicability (Continued)**

AVP ID	AVP Name	CCR	CCA	RAR	RAA
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

1.2.9 Result Codes (Result-Code AVP)

Table 10 **Result Codes (Result-Code AVP)**

Result Code Id	Result Code Name	Description
Success		
2001	DIAMETER_SUCCESS	The request was successfully completed.
Protocol Errors		
3001	DIAMETER_COMMAND_UNSUPPORTED	Rx: treated as an error. Tx: not supported.
3002	DIAMETER_UNABLE_TO_DELIVER	Rx: Ignored. Consequently, the originally sent message will timeout in the 7750 SR and potentially it be retransmitted (following the peer failover procedure). Tx: not supported.
3003	DIAMETER_REALM_NOT_SERVED	Rx: treated as an error. Tx: not supported.

Table 10 **Result Codes (Result-Code AVP) (Continued)**

Result Code Id	Result Code Name	Description
3004	DIAMETER_TOO_BUSY	Rx: Ignored. Consequently, the originally sent message will timeout in the 7750 SR and potentially it be retransmitted (following the peer failover procedure). Tx: not supported.
3005	DIAMETER_LOOP_DETECTED	Rx: treated as an error. Tx: not supported.
3006	DIAMETER_REDIRECT_INDICATION	Rx: treated as an error. Tx: not supported.
3007	DIAMETER_APPLICATION_UNSUPPORTED	Rx: treated as an error. Tx: not supported.
3008	DIAMETER_INVALID_HDR_BITS	Rx: treated as an error. Tx: not supported.
3009	DIAMETER_INVALID_AVP_BITS	Rx: treated as an error. Tx: not supported.
3010	DIAMETER_UNKNOWN_PEER	Rx: treated as an error. Tx: not supported.
Permanent Failures		
5001	DIAMETER_AVP_UNSUPPORTED	Rx: treated as an error. Tx: Reception of an **unrecognized AVP** with M-bit set will trigger a response (RAA) message that contains the Result-Code AVP whose value is set to DIAMETER_AVP_UNSUPORTED, and the Failed-AVP AVP containing the offending AVP.
5002	DIAMETER_UNKNOWN_SESSION	Rx: treated as an error. Tx: In case that a message from PCRF is received for a non-existing session, the 7750 SR will reply with this value.
5004	DIAMETER_INVALID_AVP_VALUE	Rx: treated as an error. Tx: Reception of an AVP with **invalid value** will trigger 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. Tx: not supported.

Table 10 **Result Codes (Result-Code AVP) (Continued)**

Result Code Id	Result Code Name	Description
5007	DIAMETER_CONTRADICTING_AVPS	Rx: treated as an error. Tx: not supported.
5008	DIAMETER_AVP_NOT_ALLOWED	Rx: treated as an error. Tx: not supported.
5009	DIAMETER_AVP_OCCURS_TOO_MANY_TIMES	Rx: treated as an error. Tx: not supported.
5010	DIAMETER_NO_COMMON_APPLICATION	Rx: treated as an error. Tx: not supported.
5011	DIAMETER_UNSUPPORTED_VERSION	Rx: treated as an error. Tx: As an example, a RAA message will carry 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. Tx: For example, a RAA message will carry 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. Tx: not supported.
5014	DIAMETER_INVALID_AVP_LENGTH	Rx: treated as an error. Tx: not supported.
5015	DIAMETER_INVALID_MESSAGE_LENGTH	Rx: treated as an error. Tx: not supported.
5016	DIAMETER_INVALID_AVP_BIT_COMBO	Rx: treated as an error. Tx: not supported.
5017	DIAMETER_NO_COMMON_SECURITY	Rx: treated as an error. Tx: not supported.
Gx Specific Permanent Failures		

Table 10 **Result Codes (Result-Code AVP) (Continued)**

Result Code Id	Result Code Name	Description
5140	DIAMETER_ERROR_INITIAL_PARAMETERS	Rx: treated as an error. Tx: not supported.
5141	DIAMETER_ERROR_TRIGGER_EVENT	Rx: treated as an error. Tx: not supported.
5142	DIAMETER_PCC_RULE_EVENT	Rx: treated as an error. Tx: not supported.
5148	DIAMETER_ADC_RULE_EVENT	Rx: treated as an error. Tx: not supported.

1.2.10 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. 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. The error-message AVP in CCR/RAA carried on the top level or Failed-AVP will provide more information about the event for debugging purposes.
5	RESOURCE_LIMITATION	Rx: treated as an error. Tx: not supported.
14	TDF_APPLICATION_IDENTIFIER_ERROR	Rx: treated as an error. Tx: not supported.

1.2.11 Event Triggers (Event-Trigger AVP)

Table 12 **Event Triggers (Event-Trigger AVP)**

Event Trigger Id	Event Trigger Name	Description
13	USER_LOCATION_CHANGE	This AVP is used when the UE moves between the access points (WiFi).
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 Alc-IPv6-Address AVPs will be 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 Alc-IPv6-Address AVPs will be 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.
22	SUCCESSFUL_RESOURCE_ALLOCATION	Not supported.
33	USAGE_REPORT	This value is used in a CCA and RAR commands by the PCRF when requesting usage monitoring on the 7750 SR. The PCRF will also provide in the CCA or RAR command the Usage-Monitoring-Information AVP(s) including the Monitoring-Key AVP and the Granted-Service-Unit AVP. 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 AVP(s) including the Monitoring-Key AVP and the Used-Service-Unit AVP.

1.2.12 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: • Clear subscriber via CLI • PADT Received	[RFC 3588][RFC 6733]
2	DIAMETER_SERVICE_NOT_PROVIDED	Example reasons: • Subscriber-host is terminated via force-NACK received via RADIUS CoA	[RFC 3588][RFC 6733]
3	DIAMETER_BAD_ANSWER	Example reason: • 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: • Host deleted via RADIUS DISCONNECT • Service shutdown for PPPoE subscriber	[RFC 3588][RFC 6733]
5	DIAMETER_LINK_BROKEN	Example reasons: • SAP is deleted • SHCV check fails	[RFC 3588][RFC 6733]
8	DIAMETER_SESSION_TIMEOUT	Example reason: • When idle timeout for the subscriber-host is enabled and its value is reached.	[RFC 3588][RFC 6733]

2 Standards and Protocol Support



Note: The information presented is subject to change without notice.

Nokia assumes no responsibility for inaccuracies contained herein.

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RFC 6718, *Pseudowire Redundancy*

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RFC 2868, *RADIUS Attributes for Tunnel Protocol Support*

RFC 2869, *RADIUS Extensions*

RFC 3162, *RADIUS and IPv6*

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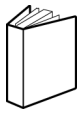
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