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Technical Specification

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Diameter applications;
3GPP specific codes and identifiers
(3GPP TS 29.230 version 6.4.0 Release 6)



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Foreword

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1 Scope

The present document lists the 3GPP specific Diameter protocol codes, including the AVP codes and Experimental result codes.

This document lists also the application identifiers assigned to 3GPP specific Diameter applications by IANA and the Diameter command code range which is assigned to 3GPP by IANA.

2 References

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

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.

protocol".

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

[1]	3GPP TS 29.228: " IP Multimedia (IM) Subsystem Cx and Dx interfaces; Signalling flows and message contents".
[2]	3GPP TS 29.229: "Cx and Dx interfaces based on the Diameter protocol; Protocol details".
[3]	3GPP TS 29.328: " IP Multimedia (IM) Subsystem Sh interface; Signalling flows and message contents".
[4]	3GPP TS 29.329: " Sh Interface based on the Diameter protocol; Protocol details".
[5]	3GPP TS 32.299 "3GPP Diameter charging application".
[6]	3GPP TS 29.234: "3GPP System to WLAN Interworking; Stage 3 Description".
[7]	3GPP TS 29.109: "Generic Authentication Architecture (GAA); Zh and Zn Interfaces based on the Diameter protocol; Protocol details".
[8]	3GPP TS 29.209: "Technical Specification Group Core Network; Policy control over Gq interface".
[9]	IETF RFC 3588: "Diameter Base Protocol".
[10]	IETF RFC 3589: "Diameter Command Codes for Third Generation Partnership Project (3GPP) Release 5".
[11]	IANA"s Enterprise-Numbers: http://www.iana.org/assignments/enterprise-numbers
[12]	IANA"s AAA parameters register: ftp://ftp.iana.org/assignments/aaa-parameters/
[13]	3GPP TS 29.061: "Interworking between the Public Land Mobile Network (PLMN) supporting packet based services and Packet Data Networks (PDN)".
[14]	3GPP TS 32.296: "Telecommunication management; Online Charging System (OCS): Applications and interfaces;".
[15]	3GPP TS 29.210: " Charging rule provisioning over Gx interface".
[16]	3GPP TS 29.140: "Multimedia Messaging Service (MMS); MM10 interface based on Diameter

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply.

3GPP specific: A definition which is used in conjunction with the 3GPP"s vendor identifier.

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

AVP Attribute-Value-Pair CR Change Request

IANA Internet Assigned Numbers Authority
IETF Internet Engineering Task Force

LS Liaison Statement

4 Application identifiers

The Diameter applications are identified with the application identifiers as specified in the RFC 3588 [9]. There are two kind of applications: IETF standards track applications and vendor specific applications. All application identifiers are assigned by IANA [12]. This chapter lists the application identifiers asigned by IANA to all 3GPP Diameter applications.

The application identifiers are transferred in Diameter command"s header in the Application-ID field.

4.1 3GPP specific application identifiers

The 3GPP specific application identifiers allocated by IANA are listed in the following table.

Application identifier Application 3GPP TS 16777216 3GPP Cx/Px 29.228 [1] and 29.229 [2] 16777217 3GPP Sh/Ph 29.328 [3] and 29.329 [4] 3GPP Re 16777218 32.296 [14] 16777219 3GPP Wx 29.234 [6] 16777220 3GPP Zn 29.109 [7] 3GPP Zh 16777221 29.109 [7] 16777222 3GPP Gq 29.209 [8] 16777223 3GPP Gmb 29.061 [13] 16777224 3GPP Gx 29.210 [15] 3GPP Gx over Gy 16777225 29.210 [15] 29.140 [16] 3GPP MM10 16777226

Table 4.1: 3GPP specific application identifiers

5 Command codes

The command codes are used for communicating the command associated with the Diameter message. The command code is carried in the Diameter header's Command-Code field. The command codes can be divided into standard command codes allocated by IANA and experimental command codes for testing purposes only.

5.1 Command codes allocated for 3GPP

Based on the IETF RFC 3589 [10] the IANA has allocated a standard command code range 300 - 313 for 3GPP. The command codes are presented in the following table.

Table 5.1: Command codes allocated for 3GPP

Command code	Command name	Abbreviation	Specified in 3GPP TS
300	User-Authorization-Request/-Answer	UAR/UAA	
301	Server-Assignment-Request/-Answer	SAR/SAA	
302	Location-Info-Request/-Answer	LIR/LIA	
303	Multimedia-Auth-Request/-Answer	MAR/MAA	29.229 [2]
304	Registration-Termination-Request/-	RTR/RTA	
	Answer		
305	Push-Profile-Request/-Answer	PPR/PPA	
306	User-Data-Request/-Answer	UDR/UDA	
307	Profile-Update-Request/-Answer	PUR/PUA	29.329 [4]
308	Subscribe-Notifications-Request/-Answer	SNR/SNA	29.329 [4]
309	Push-Notification-Request/-Answer	PNR/PNA	
310	Boostrapping-Info-Request/Answer	BIR/BIA	29.109 [7]
311	Message-Process-Request/Answer	MPR/MPA	29.140 [16]

Editors note: The following command codes have been allocated to 3GPP, but they have not been used yet...

312		
313		

6 Vendor identifier

The vendor identifier (also known as Enterprise number) indicates the vendor specific attributes, result codes and application identifiers in Diameter commands. The vendor identifier is used in the Vendor-ID field of the AVP header and in the Vendor-Id AVP. The Vendor-Id AVP is used to identify the vendor in the Vendor-Specific-Application-Id and Experimental-Result-Code grouped AVPs.

6.1 3GPP"s vendor identifier

The IANA has allocated a vendor identifier value 10415 for 3GPP [11].

7 Attribute-Value-Pair codes

The AVP codes are used together with the vendor identifier to identify each attribute uniquely. There are multiple AVP namespaces. The IETF IANA namespace, that is, the AVPs with vendor identifier zero or without vendor identifier, is controlled by IANA. Each vendor controls the AVP codes within their AVP namespaces.

7.1 3GPP specific AVP codes

The 3GPP specific AVPs have the Vendor-Specific bit ('V' bit) set in the AVP header and they carry the 3GPP"s vendor identifier in the Vendor-ID field of the AVP header. The 3GPP specific AVP codes are presented in the following table.

Table 7.1: 3GPP specific AVP codes

AVP Code	Attribute Name	Data Type	Specified in the 3GPP TS
Specific At	AVP codes from 1 to 255 are reserved for backward tributes (See TS 29.061 [13])		GPP RADIUS Vendor
Note: The	AVP codes from 256 to 299 are reserved for future	use.	
300	Authentication-Method		
301	Authentication-Information-SIM		
302	Authorization -Information-SIM		
303	WLAN-User-Data		
304	Charging-Data		
305	WLAN-Access		
306	WLAN- 3GPP-IP-Access		
307	APN-Authorized		
308	APN-Id		
309	APN-Barring-Type		29.234 [6]
310	WLAN-Direct-IP-Access		
311	Session-Request-Type		
312	Routing-Policy		
313	Max-Requested-Bandwidth		
314	Charging-Characteristics		
315	Charging-Nodes		
316	Primary-OCS-Charging-Function-Name		
317	Secondary-OCS-Charging-Function-Name		
318	3GPP-AAA-Server-Name		
319	Maximum-Number-Accesses	Unsigned32	
Note: The	AVP codes from 320 to 399 are reserved for TS 29.	.234	
			29.109 [7]
	AVP codes from 400 to 499 are reserved for TS 29.		Т
500	Abort-Cause	Enumerated	
501	Access-Network-Charging-Address	Address	
502	Access-Network-Charging-Identifier	Grouped	
503	Access-Network-Charging-Identifier-Value	OctetString	
504	AF-Application-Identifier	OctetString	
505	AF-Charging-Identifier	OctetString	
506	Authorization-Token	OctetString	
507	Flow-Description	IPFilterRule	
508 509	Flow-Grouping	Grouped Unsigned32	
	Flows Flows		
510		Grouped	
511	Flow-Status	Enumerated	29.209 [8]
512	Flow-Usage	Enumerated	
513 514	Gq-Specific-Action	Enumerated	
514	Max-Requested-Bandwidth	Unsigned32	
	Max-Requested-Bandwidth-DL Max-Requested-Bandwidth-UL	Unsigned32 Unsigned32	
516 517	Media-Component-Description	Grouped	
517	Media-Component-Description Media-Component-Number	Unsigned32	
519	Media-Sub-Component AVP	Grouped	
520	Media-Type	Enumerated	
521	RR-Bandwidth	Unsigned32	
522	RS-Bandwidth	Unsigned32	
523	SIP-Forking-Indication	Enumerated	
	The AVP codes from 524 to 599 are reserved for TS		I
600	Visited-Network-Identifier	OctetString	29.229 [2]
601	Public-Identity	UTF8String	
602	Server-Name	UTF8String	
603	Server-Capabilities	Grouped	
604	Mandatory-Capability	Unsigned32	
605	Optional-Capability	Unsigned32	
606	User-Data	OctetString	
607	SIP-Number-Auth-Items	Unsigned32	
608	SIP-Authentication-Scheme	UTF8String	
609	SIP-Authenticate	OctetString	
003	Oii -Autileliuoate	Ocieioiiiig	<u> </u>

610	SIP-Authorization	OctetString	
611	SIP-Authentication-Context	OctetString	
612	SIP-Auth-Data-Item	Grouped	29.229 [2], 29.234 [6]

613	SIP-Item-Number	Unsigned32	
614	Server-Assignment-Type	Enumerated	
615	Deregistration-Reason	Grouped	
616	Reason-Code	Enumerated	
617	Reason-Info	UTF8String	
618	Charging-Information	Grouped	
619	Primary-Event-Charging-Function-Name	DiameterURI	
620	Secondary-Event-Charging-Function-Name	DiameterURI	
621	Primary-Charging-Collection-Function-Name	DiameterURI	
622	Secondary-Charging-Collection-Function-Name	DiameterURI	29.229 [2]
623	User-Authorization-Type	Enumerated	
624	User-Data-Already-Available	Enumerated	
625	Confidentiality-Key	OctetString	
626	Integrity-Key	OctetString	
627	User-Data-Request-Type	Enumerated	
628	Supported-Features	Grouped	
629	Feature-List-ID	Unsigned32	
630	Feature-List		
		Unsigned32	
631	Supported-Applications	Grouped	
	he AVP codes from 632 to 699 are reserved for TS		
700	User-Identity	Grouped	
701	MSISDN	OctetString	
702	User-Data	OctetString	
703	Data-Reference	Enumerated	
704	Service-Indication	OctetString	29.329 [4]
705	Subs-Req-Type	Enumerated	[•]
706	Requested-Domain	Enumerated	
707	Current-Location		
		Enumerated	
708	Identity-Set	Enumerated	
Note:	he AVP codes from 709 to 799 are reserved for TS 2	29.329.	
			32.299 [5]
Note: 1	The AVD ender from 200 to 200 are recomined for TC	22 200	
14010.	The AVP codes from 800 to 899 are reserved for TS		
900	TMGI	OctectString	
	TMGI		
900	TMGI Required-MBMS-Bearer-Capabilities	OctectString UTF8String	
900 901 902	TMGI Required-MBMS-Bearer-Capabilities MBMS-StartStop-Indication	OctectString UTF8String Enumerated	29.061 [13]
900 901 902 903	TMGI Required-MBMS-Bearer-Capabilities MBMS-StartStop-Indication MBMS-Service-Area	OctectString UTF8String Enumerated OctectString	29.061 [13]
900 901 902 903 904	TMGI Required-MBMS-Bearer-Capabilities MBMS-StartStop-Indication MBMS-Service-Area MBMS-Session-Duration	OctectString UTF8String Enumerated OctectString Unsigned32	29.061 [13]
900 901 902 903 904 905	TMGI Required-MBMS-Bearer-Capabilities MBMS-StartStop-Indication MBMS-Service-Area MBMS-Session-Duration Alternative-APN	OctectString UTF8String Enumerated OctectString Unsigned32 UTF8String	29.061 [13]
900 901 902 903 904 905 906	TMGI Required-MBMS-Bearer-Capabilities MBMS-StartStop-Indication MBMS-Service-Area MBMS-Session-Duration Alternative-APN MBMS-Service-Type	OctectString UTF8String Enumerated OctectString Unsigned32 UTF8String Enumerated	29.061 [13]
900 901 902 903 904 905 906 Note: 7	TMGI Required-MBMS-Bearer-Capabilities MBMS-StartStop-Indication MBMS-Service-Area MBMS-Session-Duration Alternative-APN MBMS-Service-Type The AVP codes from 907 to 999 are reserved for TS	OctectString UTF8String Enumerated OctectString Unsigned32 UTF8String Enumerated 29.061	29.061 [13]
900 901 902 903 904 905 906 Note: 7	TMGI Required-MBMS-Bearer-Capabilities MBMS-StartStop-Indication MBMS-Service-Area MBMS-Session-Duration Alternative-APN MBMS-Service-Type he AVP codes from 907 to 999 are reserved for TS Bearer-Usage	OctectString UTF8String Enumerated OctectString Unsigned32 UTF8String Enumerated 29.061 Enumerated	29.061 [13]
900 901 902 903 904 905 906 Note: 7	TMGI Required-MBMS-Bearer-Capabilities MBMS-StartStop-Indication MBMS-Service-Area MBMS-Session-Duration Alternative-APN MBMS-Service-Type he AVP codes from 907 to 999 are reserved for TS Bearer-Usage Charging-Rule-Install	OctectString UTF8String Enumerated OctectString Unsigned32 UTF8String Enumerated 29.061 Enumerated Grouped	29.061 [13]
900 901 902 903 904 905 906 Note: 7 1000 1001 1002	TMGI Required-MBMS-Bearer-Capabilities MBMS-StartStop-Indication MBMS-Service-Area MBMS-Session-Duration Alternative-APN MBMS-Service-Type he AVP codes from 907 to 999 are reserved for TS Bearer-Usage Charging-Rule-Install Charging-Rule-Remove	OctectString UTF8String Enumerated OctectString Unsigned32 UTF8String Enumerated 29.061 Enumerated Grouped Grouped	29.061 [13]
900 901 902 903 904 905 906 Note: 7	TMGI Required-MBMS-Bearer-Capabilities MBMS-StartStop-Indication MBMS-Service-Area MBMS-Session-Duration Alternative-APN MBMS-Service-Type he AVP codes from 907 to 999 are reserved for TS Bearer-Usage Charging-Rule-Install	OctectString UTF8String Enumerated OctectString Unsigned32 UTF8String Enumerated 29.061 Enumerated Grouped	29.061 [13]
900 901 902 903 904 905 906 Note: 7 1000 1001 1002	TMGI Required-MBMS-Bearer-Capabilities MBMS-StartStop-Indication MBMS-Service-Area MBMS-Session-Duration Alternative-APN MBMS-Service-Type he AVP codes from 907 to 999 are reserved for TS Bearer-Usage Charging-Rule-Install Charging-Rule-Remove	OctectString UTF8String Enumerated OctectString Unsigned32 UTF8String Enumerated 29.061 Enumerated Grouped Grouped Grouped	29.061 [13]
900 901 902 903 904 905 906 Note: 7 1000 1001 1002 1003 1004	TMGI Required-MBMS-Bearer-Capabilities MBMS-StartStop-Indication MBMS-Service-Area MBMS-Session-Duration Alternative-APN MBMS-Service-Type he AVP codes from 907 to 999 are reserved for TS Bearer-Usage Charging-Rule-Install Charging-Rule-Remove Charging-Rule-Definition Charging-Rule-Base-Name	OctectString UTF8String Enumerated OctectString Unsigned32 UTF8String Enumerated 29.061 Enumerated Grouped Grouped Grouped OctetString	29.061 [13]
900 901 902 903 904 905 906 Note: 7 1000 1001 1002 1003 1004 1005	TMGI Required-MBMS-Bearer-Capabilities MBMS-StartStop-Indication MBMS-Service-Area MBMS-Session-Duration Alternative-APN MBMS-Service-Type The AVP codes from 907 to 999 are reserved for TS Bearer-Usage Charging-Rule-Install Charging-Rule-Remove Charging-Rule-Definition Charging-Rule-Base-Name Charging-Rule-Name	OctectString UTF8String Enumerated OctectString Unsigned32 UTF8String Enumerated 29.061 Enumerated Grouped Grouped Grouped OctetString OctetString	29.061 [13]
900 901 902 903 904 905 906 Note: 7 1000 1001 1002 1003 1004 1005 1006	TMGI Required-MBMS-Bearer-Capabilities MBMS-StartStop-Indication MBMS-Service-Area MBMS-Session-Duration Alternative-APN MBMS-Service-Type he AVP codes from 907 to 999 are reserved for TS Bearer-Usage Charging-Rule-Install Charging-Rule-Remove Charging-Rule-Definition Charging-Rule-Base-Name Charging-Rule-Name Event-Trigger	OctectString UTF8String Enumerated OctectString Unsigned32 UTF8String Enumerated 29.061 Enumerated Grouped Grouped Grouped OctetString OctetString Enumerated	29.061 [13]
900 901 902 903 904 905 906 Note: 7 1000 1001 1002 1003 1004 1005 1006 1007	TMGI Required-MBMS-Bearer-Capabilities MBMS-StartStop-Indication MBMS-Service-Area MBMS-Session-Duration Alternative-APN MBMS-Service-Type he AVP codes from 907 to 999 are reserved for TS Bearer-Usage Charging-Rule-Install Charging-Rule-Remove Charging-Rule-Definition Charging-Rule-Base-Name Charging-Rule-Name Event-Trigger Metering-Method	OctectString UTF8String Enumerated OctectString Unsigned32 UTF8String Enumerated 29.061 Enumerated Grouped Grouped Grouped OctetString OctetString Enumerated Enumerated	29.061 [13]
900 901 902 903 904 905 906 Note: 7 1000 1001 1002 1003 1004 1005 1006 1007 1008	TMGI Required-MBMS-Bearer-Capabilities MBMS-StartStop-Indication MBMS-Service-Area MBMS-Session-Duration Alternative-APN MBMS-Service-Type he AVP codes from 907 to 999 are reserved for TS Bearer-Usage Charging-Rule-Install Charging-Rule-Remove Charging-Rule-Definition Charging-Rule-Base-Name Charging-Rule-Name Event-Trigger Metering-Method Offline	OctectString UTF8String Enumerated OctectString Unsigned32 UTF8String Enumerated 29.061 Enumerated Grouped Grouped Grouped OctetString OctetString Enumerated Enumerated Enumerated	29.061 [13]
900 901 902 903 904 905 906 Note: 7 1000 1001 1002 1003 1004 1005 1006 1007 1008 1009	TMGI Required-MBMS-Bearer-Capabilities MBMS-StartStop-Indication MBMS-Service-Area MBMS-Session-Duration Alternative-APN MBMS-Service-Type The AVP codes from 907 to 999 are reserved for TS Bearer-Usage Charging-Rule-Install Charging-Rule-Remove Charging-Rule-Definition Charging-Rule-Base-Name Charging-Rule-Name Event-Trigger Metering-Method Offline Online	OctectString UTF8String Enumerated OctectString Unsigned32 UTF8String Enumerated 29.061 Enumerated Grouped Grouped Grouped OctetString OctetString Enumerated Enumerated Enumerated	
900 901 902 903 904 905 906 Note: 7 1000 1001 1002 1003 1004 1005 1006 1007 1008 1009 1010	TMGI Required-MBMS-Bearer-Capabilities MBMS-StartStop-Indication MBMS-Service-Area MBMS-Session-Duration Alternative-APN MBMS-Service-Type The AVP codes from 907 to 999 are reserved for TS Bearer-Usage Charging-Rule-Install Charging-Rule-Definition Charging-Rule-Base-Name Charging-Rule-Name Event-Trigger Metering-Method Offline Online Precedence	OctectString UTF8String Enumerated OctectString Unsigned32 UTF8String Enumerated 29.061 Enumerated Grouped Grouped Grouped OctetString OctetString Enumerated Enumerated Enumerated Enumerated Enumerated Unsigned32	29.061 [13]
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900 901 902 903 904 905 906 Note: 7 1000 1001 1002 1003 1004 1005 1006 1007 1008 1009 1010 1011 1012	TMGI Required-MBMS-Bearer-Capabilities MBMS-StartStop-Indication MBMS-Service-Area MBMS-Session-Duration Alternative-APN MBMS-Service-Type The AVP codes from 907 to 999 are reserved for TS Bearer-Usage Charging-Rule-Install Charging-Rule-Definition Charging-Rule-Definition Charging-Rule-Name Event-Trigger Metering-Method Offline Online Precedence Reporting-Level TFT-Filter	OctectString UTF8String Enumerated OctectString Unsigned32 UTF8String Enumerated 29.061 Enumerated Grouped Grouped Grouped OctetString OctetString Enumerated Enumerated Enumerated Unsigned32 Enumerated IPFilterRule	
900 901 902 903 904 905 906 Note: 7 1000 1001 1002 1003 1004 1005 1006 1007 1008 1009 1010	TMGI Required-MBMS-Bearer-Capabilities MBMS-StartStop-Indication MBMS-Service-Area MBMS-Session-Duration Alternative-APN MBMS-Service-Type The AVP codes from 907 to 999 are reserved for TS Bearer-Usage Charging-Rule-Install Charging-Rule-Definition Charging-Rule-Base-Name Charging-Rule-Name Event-Trigger Metering-Method Offline Online Precedence Reporting-Level	OctectString UTF8String Enumerated OctectString Unsigned32 UTF8String Enumerated 29.061 Enumerated Grouped Grouped Grouped OctetString OctetString Enumerated	
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900 901 902 903 904 905 906 Note: 7 1000 1001 1002 1003 1004 1005 1006 1007 1008 1009 1010 1011 1012 1013 1014 Note: 7	TMGI Required-MBMS-Bearer-Capabilities MBMS-StartStop-Indication MBMS-Service-Area MBMS-Session-Duration Alternative-APN MBMS-Service-Type he AVP codes from 907 to 999 are reserved for TS Bearer-Usage Charging-Rule-Install Charging-Rule-Remove Charging-Rule-Definition Charging-Rule-Base-Name Charging-Rule-Name Event-Trigger Metering-Method Offline Online Precedence Reporting-Level TFT-Filter TFT-Packet-Filter-Information ToS-Traffic-Class he AVP codes from 1015 to 1099 are reserved for T Served-User-Identity VASP-ID	OctectString UTF8String Enumerated OctectString Unsigned32 UTF8String Enumerated 29.061 Enumerated Grouped Grouped Grouped OctetString OctetString Enumerated Enumerated Enumerated Enumerated Unsigned32 Enumerated Unsigned32 Enumerated IPFilterRule Enumerated Grouped UTF8Str	
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900 901 902 903 904 905 906 Note: 7 1000 1001 1002 1003 1004 1005 1006 1007 1008 1009 1010 1011 1012 1013 1014 Note: 7 1100 1101 1102 1103 1104	TMGI Required-MBMS-Bearer-Capabilities MBMS-StartStop-Indication MBMS-Service-Area MBMS-Session-Duration Alternative-APN MBMS-Service-Type he AVP codes from 907 to 999 are reserved for TS Bearer-Usage Charging-Rule-Install Charging-Rule-Remove Charging-Rule-Definition Charging-Rule-Base-Name Charging-Rule-Name Event-Trigger Metering-Method Offline Online Precedence Reporting-Level TFT-Filter TFT-Packet-Filter-Information ToS-Traffic-Class he AVP codes from 1015 to 1099 are reserved for T Served-User-Identity VASP-ID VAS-ID Trigger-Event Sender-Address	OctectString UTF8String Enumerated OctectString Unsigned32 UTF8String Enumerated 29.061 Enumerated Grouped Grouped Grouped OctetString OctetString Enumerated Enumerated Enumerated Unsigned32	
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900 901 902 903 904 905 906 Note: 7 1000 1001 1002 1003 1004 1005 1006 1007 1008 1009 1010 1011 1012 1013 1014 Note: 7 1100 1101 1102 1103 1104 1105	TMGI Required-MBMS-Bearer-Capabilities MBMS-StartStop-Indication MBMS-Service-Area MBMS-Session-Duration Alternative-APN MBMS-Service-Type The AVP codes from 907 to 999 are reserved for TS Bearer-Usage Charging-Rule-Install Charging-Rule-Definition Charging-Rule-Definition Charging-Rule-Base-Name Charging-Rule-Name Event-Trigger Metering-Method Offline Online Precedence Reporting-Level TFT-Filter TFT-Packet-Filter-Information ToS-Traffic-Class The AVP codes from 1015 to 1099 are reserved for T Served-User-Identity VASP-ID VAS-ID Trigger-Event Sender-Address Initial-Recipient-Address Result-Recipient-Address Result-Recipient-Address	OctectString UTF8String Enumerated OctectString Unsigned32 UTF8String Enumerated 29.061 Enumerated Grouped Grouped Grouped OctetString OctetString Enumerated Enumerated Enumerated Enumerated Enumerated Enumerated Enumerated Unsigned32 Enumerated OctetString TS 29.210 Groupe UTF8Str UTF8Str Groupe Groupe	
900 901 902 903 904 905 906 Note: 7 1000 1001 1002 1003 1004 1005 1006 1007 1008 1009 1010 1011 1012 1013 1014 Note: 7 1100 1101 1102 1103 1104 1105 1106	TMGI Required-MBMS-Bearer-Capabilities MBMS-StartStop-Indication MBMS-Service-Area MBMS-Session-Duration Alternative-APN MBMS-Service-Type The AVP codes from 907 to 999 are reserved for TS Bearer-Usage Charging-Rule-Install Charging-Rule-Remove Charging-Rule-Definition Charging-Rule-Base-Name Charging-Rule-Name Event-Trigger Metering-Method Offline Online Precedence Reporting-Level TFT-Filter TFT-Packet-Filter-Information ToS-Traffic-Class The AVP codes from 1015 to 1099 are reserved for TS Served-User-Identity VASP-ID VAS-ID Trigger-Event Sender-Address Initial-Recipient-Address	OctectString UTF8String Enumerated OctectString Unsigned32 UTF8String Enumerated 29.061 Enumerated Grouped Grouped Grouped OctetString OctetString Enumerated Enumerated Enumerated Enumerated Enumerated Enumerated Unsigned32 Enumerated OctetString	

1109	Routeing-Address	UTF8Str	
1110	Originating-Interface	Enumer	29.140 [16]
1111	Delivery-Report	Enumer	
1112	Read-Reply	Enumer	
1113	Sender-Visibility	Enumer	
1114	Service-Key	UTF8Str	
1115	Billing-Information UTF		
1116	Status	Group	
1117	Status-Code	UTF8Str	
1118	Status-Text UTF8Str		
Note:	The AVP codes from 1119 to 1199 are reserved for Ta	S 29.140	

8 Experimental result codes

The Diameter answer messages must carry either Result-Code AVP or Experimental-Result AVP. The values of Result-Code AVP are controlled by IANA. The Experimental-Result AVP is a grouped AVP containing the Vendor-Id AVP and Experimental-Result-Code AVP, thus the experimental result codes are controlled in a vendor-specific manner.

8.1 3GPP specific result codes

The 3GPP specific result codes are always transferred in the Experimental-Result AVP, which has the Vendor-Id with value of 3GPP"s vendor identifier. The 3GPP specific result codes shall follow the same classification as defined for the values of Result-Code AVP in IETF RFC 3588 [9]. That means, the result codes are grouped to following ranges:

- 1xxx (Informational)
- 2xxx (Success)
- 4xxx (Transient Failures)
- 5xxx (Permanent Failures)

8.1.1 Informational

The Informational result codes shall use the values from 1001 to 1999 in the Experimental-Result-Code AVP.

Editor"s note: No informational result codes have been yet defined in 3GPP.

8.1.2 Success

The Success result codes shall use the values from 2001 to 2999 in the Experimental-Result-Code AVP. The reserved 3GPP specific Success result codes are presented in the following table.

Table 8.1.2: 3GPP specific Success result codes

Experimental Result Code	Result text	Specified in the TS		
2001	DIAMETER_FIRST_REGISTRATION			
2002	DIAMETER_SUBSEQUENT_REGISTRATION			
2003	DIAMETER_UNREGISTERED_SERVICE	29.229 [2]		
2004	DIAMETER_SUCCESS_SERVER_NAME_NOT_STORED			
2005	DIAMETER_SERVER_SELECTION			
Note: The Expe	rimental Result Codes from 2006 to 2020 are reserved for the	ΓS 29.229.		
		29.109 [7]		
Note: The Experimental Result Codes from 2401 to 2420 are reserved for the TS 29.109.				

8.1.3 Transient Failures

The Transient Failure result codes shall use the values from 4001 to 4999 in the Experimental-Result-Code AVP. The reserved 3GPP specific Transient Failure result codes are presented in the following table.

Table 8.1.3: 3GPP specific Transient Failure result codes

Experimental	Experimental Result text				
Result Code					
4100	DIAMETER_USER_DATA_NOT_AVAILABLE	29.329 [4]			
4101	DIAMETER_PRIOR_UPDATE_IN_PROGRESS	29.329 [4]			
Note: The Exper	Note: The Experimental Result Codes from 4102 to 4120 are reserved for the TS 29.329.				
		32.299 [5]			
Note: The Experimental Result Codes from 41xx to 41yy are reserved for the TS 32.299.					

8.1.4 Permanent Failures

The Permanent Failure result codes shall use the values from 5001 to 5999 in the Experimental-Result-Code AVP. The reserved 3GPP specific Permanent Failure result codes are presented in the following table.

Table 8.1.4: 3GPP specific Permanent Failure result codes

5001 DIAMETER_ERROR_USER_UNKNOWN	Experimental Result Code	Result text	Specified in the TS				
DIAMETER_ERROR_IDENTITY_NOT_REGISTERED	5001	DIAMETER_ERROR_USER_UNKNOWN					
DIAMETER_ERROR_ROAMING_NOT_ALLOWED	5002	DIAMETER_ERROR_IDENTITIES_DONT_MATCH					
DIAMETER_ERROR_ROAMING_NOT_ALLOWED	5003						
S006 DIAMETER_ERROR_AUTH_SCHEME_NOT_SUPPORTED	5004						
S006 DIAMETER_ERROR_AUTH_SCHEME_NOT_SUPPORTED			00 000 101				
DIAMETER_ERROR_IN_ASSIGNMENT_TYPE							
DIAMETER ERROR TOO MUCH DATA							
DIAMETER_ERROR_NOT_SUPPORTED_USER_DATA 5010 DIAMETER_MISSING_USER_ID Note: The Experimental Result Codes from 5011 to 5020 are reserved for the TS 29.229. 32.299 [5] Note: The Experimental Result Codes from 5021 to 5040 are reserved for the TS 32.299. 5041 DIAMETER_ERROR_USER_NO_WLAN_SUBSCRIPTION 5042 DIAMETER_ERROR_W-APN_UNUSED_BY_USER 5043 DIAMETER_ERROR_NO_ACCESS_INDEPENDENT_SUBSC RIPTION 5044 DIAMETER_ERROR_USER_NO_W-APN_SUBSCRIPTION Note: The Experimental Result Codes from 5041 to 5060 are reserved for the TS 29.234. 5061 GQ_INVALID_SERVICE_INFORMATION 5062 GQ_FILTER_RESTRICTIONS Note: The Experimental Result Codes from 5063 to 5080 are reserved for the TS 29.209. 5100 DIAMETER_ERROR_USER_DATA_NOT_RECOGNIZED 5101 DIAMETER_ERROR_USER_DATA_CANNOT_BE_MODIFIE D							
Note: The Experimental Result Codes from 5011 to 5020 are reserved for the TS 29.229.							
Note: The Experimental Result Codes from 5011 to 5020 are reserved for the TS 29.229. 32.299 [5]							
Note: The Experimental Result Codes from 5021 to 5040 are reserved for the TS 32.299. So41			S 29.229.				
Note: The Experimental Result Codes from 5021 to 5040 are reserved for the TS 32.299.	•						
DIAMETER_ERROR_USER_NO_WLAN_SUBSCRIPTION	Note: The Expe	rimental Result Codes from 5021 to 5040 are reserved for the T					
DIAMETER_ERROR_W-APN_UNUSED_BY_USER							
DIAMETER_ERROR_NO_ACCESS_INDEPENDENT_SUBSC RIPTION							
RIPTION 5044 DIAMETER_ERROR_USER_NO_W-APN_SUBSCRIPTION Note: The Experimental Result Codes from 5041 to 5060 are reserved for the TS 29.234. 5061 GQ_INVALID_SERVICE_INFORMATION 5062 GQ_FILTER_RESTRICTIONS Note: The Experimental Result Codes from 5063 to 5080 are reserved for the TS 29.209. 5100 DIAMETER_ERROR_USER_DATA_NOT_RECOGNIZED 5101 DIAMETER_ERROR_OPERATION_NOT_ALLOWED 5102 DIAMETER_ERROR_OPERATION_NOT_ALLOWED 5103 DIAMETER_ERROR_USER_DATA_CANNOT_BE_MODIFIE D 5104 DIAMETER_ERROR_USER_DATA_CANNOT_BE_MODIFIE D 5105 DIAMETER_ERROR_TRANSPARENT_DATA OUT_OF_SYNC Note: The Experimental Result Codes from 5106 to 5119 are reserved for the TS 29.329. 5120 DIAMETER_ERROR_START_INDICATION 5121 DIAMETER_ERROR_START_INDICATION 5122 DIAMETER_ERROR_START_INDICATION 5122 DIAMETER_ERROR_STOP_INDICATION 5123 DIAMETER_ERROR_STOP_INDICATION 5124 DIAMETER_ERROR_STOP_INDICATION 5125 DIAMETER_ERROR_STOP_INDICATION 5126 DIAMETER_ERROR_STOP_INDICATION 5127 DIAMETER_ERROR_STOP_INDICATION 5128 DIAMETER_ERROR_STOP_INDICATION 5129 DIAMETER_ERROR_SERVICE_AREA Note: The Experimental Result Codes from 5124 to 5139 are reserved for the TS 29.061 5140 DIAMETER_ERROR_INITIAL_PARAMETERS 5141 DIAMETER_ERROR_TRIGGER_EVENT Note: The Experimental Result Codes from 5142 to 5159 are reserved for the TS 29.210. 29.109 [7]			29.234 [6]				
Note: The Experimental Result Codes from 5041 to 5060 are reserved for the TS 29.234. 5061		_ = = = = = = = = = = = = = = = = = = =					
S061 GQ_INVALID_SERVICE_INFORMATION 5062 GQ_FILTER_RESTRICTIONS	5044	DIAMETER_ERROR_USER_NO_W-APN_SUBSCRIPTION					
S062 GQ_FILTER_RESTRICTIONS Codes from 5063 to 5080 are reserved for the TS 29.209.	Note: The Expe	rimental Result Codes from 5041 to 5060 are reserved for the T	S 29.234.				
Note: The Experimental Result Codes from 5063 to 5080 are reserved for the TS 29.209. 5100 DIAMETER_ERROR_USER_DATA_NOT_RECOGNIZED 5101 DIAMETER_ERROR_OPERATION_NOT_ALLOWED 5102 DIAMETER_ERROR_USER_DATA_CANNOT_BE_READ 5103 DIAMETER_ERROR_USER_DATA_CANNOT_BE_MODIFIE D 5104 DIAMETER_ERROR_USER_DATA_CANNOT_BE_MODIFIED 5105 DIAMETER_ERROR_USER_DATA_CANNOT_BE_NOTIFIED 5106 DIAMETER_ERROR_TRANSPARENT_DATA OUT_OF_SYNC Note: The Experimental Result Codes from 5106 to 5119 are reserved for the TS 29.329. 5120 DIAMETER_ERROR_START_INDICATION 5121 DIAMETER_ERROR_START_INDICATION 5121 DIAMETER_ERROR_STOP_INDICATION 5122 DIAMETER_ERROR_STOP_INDICATION 5123 DIAMETER_ERROR_STOP_INDICATION 5124 DIAMETER_ERROR_SERVICE_AREA Note: The Experimental Result Codes from 5124 to 5139 are reserved for the TS 29.061 5140 DIAMETER_ERROR_INITIAL_PARAMETERS 5141 DIAMETER_ERROR_TRIGGER_EVENT Note: The Experimental Result Codes from 5142 to 5159 are reserved for the TS 29.210. 29.109 [7]	5061	GQ INVALID SERVICE INFORMATION	101 000 00				
5100 DIAMETER_ERROR_USER_DATA_NOT_RECOGNIZED 5101 DIAMETER_ERROR_OPERATION_NOT_ALLOWED 5102 DIAMETER_ERROR_USER_DATA_CANNOT_BE_READ 5103 DIAMETER_ERROR_USER_DATA_CANNOT_BE_MODIFIE D 5104 DIAMETER_ERROR_USER_DATA_CANNOT_BE_NOTIFIED 5105 DIAMETER_ERROR_TRANSPARENT_DATA OUT_OF_SYNC Note: The Experimental Result Codes from 5106 to 5119 are reserved for the TS 29.329. 5120 DIAMETER_ERROR_START_INDICATION 5121 DIAMETER_ERROR_STOP_INDICATION 5122 DIAMETER_ERROR_STOP_INDICATION 5122 DIAMETER_ERROR_UNKNOWN_MBMS_BEARER_SERVIC 5123 DIAMETER_ERROR_SERVICE_AREA Note: The Experimental Result Codes from 5124 to 5139 are reserved for the TS 29.061 5140 DIAMETER_ERROR_INITIAL_PARAMETERS 5141 DIAMETER_ERROR_INITIAL_PARAMETERS 5141 DIAMETER_ERROR_TRIGGER_EVENT Note: The Experimental Result Codes from 5142 to 5159 are reserved for the TS 29.210. 29.109 [7]	5062	GQ_FILTER_RESTRICTIONS	29.209 [6]				
5101 DIAMETER_ERROR_OPERATION_NOT_ALLOWED 5102 DIAMETER_ERROR_USER_DATA_CANNOT_BE_READ 5103 DIAMETER_ERROR_USER_DATA_CANNOT_BE_MODIFIE D 5104 DIAMETER_ERROR_USER_DATA_CANNOT_BE_MODIFIED 5105 DIAMETER_ERROR_TRANSPARENT_DATA OUT_OF_SYNC Note: The Experimental Result Codes from 5106 to 5119 are reserved for the TS 29.329. 5120 DIAMETER_ERROR_START_INDICATION 5121 DIAMETER_ERROR_STOP_INDICATION 5122 DIAMETER_ERROR_STOP_INDICATION 5123 DIAMETER_ERROR_UNKNOWN_MBMS_BEARER_SERVIC E 5123 DIAMETER_ERROR_SERVICE_AREA Note: The Experimental Result Codes from 5124 to 5139 are reserved for the TS 29.061 5140 DIAMETER_ERROR_INITIAL_PARAMETERS 5141 DIAMETER_ERROR_TRIGGER_EVENT Note: The Experimental Result Codes from 5142 to 5159 are reserved for the TS 29.210. 29.109 [7]	Note: The Expe	S 29.209.					
5102 DIAMETER_ERROR_USER_DATA_CANNOT_BE_READ 5103 DIAMETER_ERROR_USER_DATA_CANNOT_BE_MODIFIE D 5104 DIAMETER_ERROR_USER_DATA_CANNOT_BE_NOTIFIED 5105 DIAMETER_ERROR_TRANSPARENT_DATA OUT_OF_SYNC Note: The Experimental Result Codes from 5106 to 5119 are reserved for the TS 29.329. 5120 DIAMETER_ERROR_START_INDICATION 5121 DIAMETER_ERROR_STOP_INDICATION 5122 DIAMETER_ERROR_STOP_INDICATION 5122 DIAMETER_ERROR_UNKNOWN_MBMS_BEARER_SERVIC E 5123 DIAMETER_ERROR_SERVICE_AREA Note: The Experimental Result Codes from 5124 to 5139 are reserved for the TS 29.061 5140 DIAMETER_ERROR_INITIAL_PARAMETERS 5141 DIAMETER_ERROR_TRIGGER_EVENT Note: The Experimental Result Codes from 5142 to 5159 are reserved for the TS 29.210. 29.109 [7]	5100	DIAMETER_ERROR_USER_DATA_NOT_RECOGNIZED					
5103 DIAMETER_ERROR_USER_DATA_CANNOT_BE_MODIFIE D 5104 DIAMETER_ERROR_USER_DATA_CANNOT_BE_NOTIFIED 5105 DIAMETER_ERROR_TRANSPARENT_DATA OUT_OF_SYNC Note: The Experimental Result Codes from 5106 to 5119 are reserved for the TS 29.329. 5120 DIAMETER_ERROR_START_INDICATION 5121 DIAMETER_ERROR_STOP_INDICATION 5122 DIAMETER_ERROR_UNKNOWN_MBMS_BEARER_SERVIC E 5123 DIAMETER_ERROR_SERVICE_AREA Note: The Experimental Result Codes from 5124 to 5139 are reserved for the TS 29.061 5140 DIAMETER_ERROR_INITIAL_PARAMETERS 5141 DIAMETER_ERROR_TRIGGER_EVENT Note: The Experimental Result Codes from 5142 to 5159 are reserved for the TS 29.210. 29.109 [7]	5101	DIAMETER_ERROR_OPERATION_NOT_ALLOWED					
D 29.329 [4] 5104	5102	DIAMETER_ERROR_USER_DATA_CANNOT_BE_READ					
5104 DIAMETER_ERROR_USER_DATA_CANNOT_BE_NOTIFIED 5105 DIAMETER_ERROR_TRANSPARENT_DATA OUT_OF_SYNC Note: The Experimental Result Codes from 5106 to 5119 are reserved for the TS 29.329. 5120 DIAMETER_ERROR_START_INDICATION 5121 DIAMETER_ERROR_STOP_INDICATION 5122 DIAMETER_ERROR_UNKNOWN_MBMS_BEARER_SERVIC E 5123 DIAMETER_ERROR_SERVICE_AREA Note: The Experimental Result Codes from 5124 to 5139 are reserved for the TS 29.061 5140 DIAMETER_ERROR_INITIAL_PARAMETERS 5141 DIAMETER_ERROR_TRIGGER_EVENT Note: The Experimental Result Codes from 5142 to 5159 are reserved for the TS 29.210. 29.109 [7]	5103	DIAMETER_ERROR_USER_DATA_CANNOT_BE_MODIFIE	29.329 [4]				
S105 DIAMETER_ERROR_TRANSPARENT_DATA OUT_OF_SYNC	5104	DIAMETER ERROR USER DATA CANNOT BE NOTIFIED					
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5120 DIAMETER_ERROR_START_INDICATION 5121 DIAMETER_ERROR_STOP_INDICATION 5122 DIAMETER_ERROR_UNKNOWN_MBMS_BEARER_SERVIC 29.061 [13] E 5123 DIAMETER_ERROR_SERVICE_AREA Note: The Experimental Result Codes from 5124 to 5139 are reserved for the TS 29.061 5140 DIAMETER_ERROR_INITIAL_PARAMETERS 29.210 [15] 5141 DIAMETER_ERROR_TRIGGER_EVENT 29.210 [15] Note: The Experimental Result Codes from 5142 to 5159 are reserved for the TS 29.210. 29.109 [7]	Note: The Expe		S 29.329.				
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5122 DIAMETER_ERROR_UNKNOWN_MBMS_BEARER_SERVIC E 5123 DIAMETER_ERROR_SERVICE_AREA Note: The Experimental Result Codes from 5124 to 5139 are reserved for the TS 29.061 5140 DIAMETER_ERROR_INITIAL_PARAMETERS 5141 DIAMETER_ERROR_TRIGGER_EVENT Note: The Experimental Result Codes from 5142 to 5159 are reserved for the TS 29.210. 29.109 [7]							
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Annex A (informative): Assignment of the Diameter codes and identifiers in 3GPP

This annex defines the recommended assignment procedure of Diameter codes and identifiers within the 3GPP.

A.1 Application identifiers

If a working group detects it will require a new application identifier, it should contact the 3GPP TSG-CN WG 4 via a Liaison Statement. The LS shall contain the name of the Diameter application and a reference to the corresponding 3GPP TS. The 3GPP TSG-CN WG 4 will then request the application identifier from IANA. When the application identifier is received, the corresponding working group will be informed by 3GPP TSG-CN WG 4 and the table 4.1 in this specification will be updated.

According to RFC 3588 the creation of a new application should be avoided if at all possible and therefore it is recommended to use the existing application identifiers whenever possible.

A.2 Command codes

If a working group detects there is a need for a new command code(s) from the 3GPP"s range, it should contact the 3GPP TSG-CN WG 4 via an LS. The LS shall contain the reference to the 3GPP TS, which specifies the command(s). The 3GPP TSG-CN WG 4 will inform the assigned command code(s) to the corresponding working group and the table 5.1 in this specification will be updated.

It should be noted that the standard command codes allocated for 3GPP are scarce resource and getting new ones would require IETF specification work to be done. Therefore it is recommended to use the existing command codes whenever possible.

A.3 AVP codes

If a working group detects a Diameter application needs new 3GPP specific AVP codes, it should contact the 3GPP TSG-CN WG 4 via an LS. The LS shall contain the name of the Diameter application and a reference to the corresponding 3GPP TS. The 3GPP TSG-CN WG 4 will allocate a range of 100 AVP codes for the application. The range will be informed to the corresponding working group and the table 7.1 will be updated in this specification to show the reserved range. The working group can use the allocated range as a working assumption when defining the actual AVPs.

When the corresponding working group has specified the AVPs, and the specification has been approved and is under CR control, it should inform the AVPs to the 3GPP TSG-CN WG 4 via an LS. The LS should list the used AVP codes in the form of the table 7.1.

If there will be defined new AVPs for a Diameter application through the CR procedure, the assigned AVP range can be used, but the 3GPP TSG-CN WG 4 should be also informed about the new AVP codes via an LS.

Re-using of the existing AVPs is recommended, but special attention should be paid on the use of enumerated AVPs. Defining new values for an enumerated AVP should be agreed case by case with the working group responsible of the particular enumerated AVP. 3GPP TSG-CN WG 4 shall be informed via an LS about the new values assigned to the enumerated AVP.

A.4 Result codes

If a working group detects a Diameter application needs new 3GPP specific result codes, it should contact the 3GPP TSG-CN WG 4 via an LS. The LS shall contain the name of the Diameter application and a reference to the corresponding 3GPP TS. The 3GPP TSG-CN WG 4 will allocate a range of 20 result codes from each required result

code group for the application. The ranges will be informed to the corresponding working group and the tables in the chapter 8 of this specification will be updated to show the reserved ranges. The working group can use the allocated ranges as a working assumption when defining the actual result codes.

When the corresponding working group has specified the result codes, and the specification has been approved and is under CR control, it should convey the codes to the 3GPP TSG-CN WG 4 via an LS. The LS should list the used result codes in the form of the tables in chapter 8.

If there will be defined new result codes for a Diameter application through the CR procedure, the assigned result code ranges can be used, but the 3GPP TSG-CN WG 4 should be also informed about the new result codes via an LS.

Re-using of the existing result codes is recommended.

Annex B (informative): Change history

	Change history						
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New
2004-06	CN#24	NP-040292			Version 2.0.0 presented for information and approval	2.0.0	6.0.0
2004-09	CN#25	NP-040401	001		Correction of Charging application reference	6.0.0	6.1.0
2004-09	CN#25	NP-040401	002		Correction of the Application-Id code	6.0.0	6.1.0
2004-09	CN#25	NP-040401	003		Removal of User Data Request Type AVP	6.0.0	6.1.0
2004-09	CN#25	NP-040412	004	1	Re-numbering of 3GPP specific AVP codes.	6.0.0	6.1.0
2004-12	CN#26	NP-040579	006		Inclusion of missing Cx AVPs	6.1.0	6.2.0
2004-12	CN#26	NP-040580	007	1	Reservation of command code 310	6.1.0	6.2.0
2004-12	CN#26	NP-040579	009	1	Addition of Gmb interface	6.1.0	6.2.0
2004-12	CN#26	NP-040600	010	2	Documenting the Reuse of the 3GPP specific application identifier of Ro for Re on the Charging Interfaces	6.1.0	6.2.0
2004-12	CN#26	NP-040579	011		Gq interface allocations	6.1.0	6.2.0
2004-12	CN#26	NP-040579	012		Addition of Gx interface	6.1.0	6.2.0
2005-03	CN#27	NP-050047	040	1	WLAN Diameter AVP and result codes	6.2.0	6.3.0
		NP-050039	043		Allocations for Gx interface		
		NP-050039	045		Allocations for Gmb interface		
		NP-050039	046		Allocations for MMS, MM10 Interface		
2005-06	CT#28	CP-050088	0050		Gx interface allocation correction	6.3.0	6.4.0
		CP-050196	0051	1	Addition of Maximum-Number-Accesses AVP]	

History

Document history		
V6.2.0	December 2004	Publication
V6.3.0	March 2005	Publication
V6.4.0	June 2005	Publication