3GPP TSG CN Plenary Meeting #14 Kyoto, Japan, 12^{th –}14th December 2001

Source:	TSG CN WG 1
Title:	CR to R99 (with mirror CRs) on Work Item QoS enhancements towards 24.008
Agenda item:	7.19
Document for:	APPROVAL

Introduction:

This document contains 3 CRs on **R99 (with mirror CRs) to** Work Item "**QoS enhancements**", that have been agreed by **TSG CN WG1**, and are forwarded to TSG CN Plenary meeting #14 for approval.

Spec	CR	Rev	Phase	Subject	Cat	Version- Current	Version- New	Doc-2nd- Level
24.008	499		R99	Correction on maximum transfer delay value in QoS IE	F	3.9.0	3.10.0	N1-011535
24.008	500		Rel-4	Correction on maximum transfer delay value in QoS IE	A	4.4.0	4.5.0	N1-011536
24.008	501		Rel-5	Correction on maximum transfer delay value in QoS IE	A	5.1.0	5.2.0	N1-011537

3GPP TSG-CN1 Meeting #20 Brighton, England, 15,-19, October 200

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Other comments:	ж									

How to create CRs using this form:

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- 1) Fill out the above form. The symbols above marked # contain pop-up help information about the field that they are closest to.
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10.5.6.5 Quality of service

The purpose of the quality of service information element is to specify the QoS parameters for a PDP context.

The QoS IE is defined to allow backward compatibility to earlier version of Session Management Protocol.

The quality of service is a type 4 information element with a length of 13octets.

The *quality of service* information element is coded as shown in figure 10.5.138/3GPP TS 24.008 and table 10.5.156/3GPP TS 24.008.

8	7	6	5	4	3	2	1	
		C	Quality of	service I	El			octet 1
		Lengt	h of qual	ity of serv	vice IE			Octet 2
0	0		Delay			Reliability	/	octet 3
sp	are		class			class		
	Pe	ak		0	F	Preceden	ce	octet 4
	throu	ghput	-	spare		class		
	0 0 0				Mean			octet 5
	spare			throughput				
Т	raffic Clas	SS	Deliver	y order	Delive	ery of erro	oneous	Octet 6
						SDU		
		Ν	Maximum	SDU siz	е			Octet 7
		Max	imum bit	rate for u	plink			Octet 8
		Maxin	num bit ra	ate for do	wnlink			Octet 9
	Residu	al BER			SDU e	rror ratio		Octet 10
		Transfe	er delay			Traffic H	Handling	Octet 11
						prio	ority	
								Octet 12
		Guara	anteed bi	t rate for	uplink			
		Guarar	nteed bit	rate for d	ownlink			Octet 13

Figure 10.5.138/3GPP TS 24.008: Quality of service information element

Table 10.5.156/3GPP TS 24.008: Quality of service information element

Reliability class, octet 3 (see 3GPP TS 23.107) Bits 321 In MS to network direction: 000 Subscribed reliability class In network to MS direction: 000 Reserved In MS to network direction and in network to MS direction : 0 0 1 Acknowledged GTP, LLC, and RLC; Protected data 010 Unacknowledged GTP; Acknowledged LLC and RLC, Protected data 011 Unacknowledged GTP and LLC; Acknowledged RLC, Protected data 1 0 0 Unacknowledged GTP, LLC, and RLC, Protected data Unacknowledged GTP, LLC, and RLC, Unprotected data 101 111 Reserved All other values are interpreted as Unacknowledged GTP and LLC; Acknowledged RLC, Protected data in this version of the protocol. Delay class, octet 3 (see 3GPP TS 22.060 and 3GPP TS 23.107) Bits 654 In MS to network direction: 000 Subscribed delay class In network to MS direction: 000 Reserved In MS to network direction and in network to MS direction :

3

- 0 0 1 Delay class 1
 0 1 0 Delay class 2
 0 1 1 Delay class 3
 1 0 0 Delay class 4 (best effort)
 1 1 1 Reserved

All other values are interpreted as <i>Delay class 4 (best effort)</i> in this version of the protocol. Bit 7 and 8 of octet 3 are spare and shall be coded all 0. Precedence class, octet 4 (see 3GPP TS 23.107) Bits 3 2 1 In MS to network direction: 0 0 0 Subscribed precedence In network to MS direction: 0 0 0 Reserved In MS to network direction and in network to MS direction : 0 0 1 High priority 0 1 0 Normal priority 0 1 1 Low priority 1 1 1 Reserved
All other values are interpreted as Normal priority in this version of the protocol.
Bit 4 of octet 4 is spare and shall be coded as 0.
Peak throughput, octet 4 (see 3GPP TS 23.107) Bits 8 7 6 5 In MS to network direction: 0 0 0 0 Subscribed peak throughput In network to MS direction: 0 0 0 0 Reserved In MS to network direction and in network to MS direction : 0 0 0 1 Up to 1 000 octet/s 0 0 1 0 Up to 2 000 octet/s 0 0 1 1 Up to 4 000 octet/s 0 1 0 Up to 8 000 octet/s 0 1 0 Up to 16 000 octet/s 0 1 1 Up to 16 000 octet/s 0 1 1 Up to 128 000 octet/s 1 0 0 Up to 128 000 octet/s 1 0 0 Up to 256 000 octet/s 1 1 1 Reserved
All other values are interpreted as <i>Up to 1 000 octet/s</i> in this version of the protocol. Mean throughput, octet 5 (see 3GPP TS 23.107) Bits 5 4 3 2 1

Г	
	In MS to network direction:
	0 0 0 0 0 Subscribed mean throughput
	In network to MS direction:
	0 0 0 0 0 Reserved In MS to network direction and in network to MS direction :
	0001 100 octet/h
	0 0 0 1 0 200 octet/h
	0 0 0 1 1 500 octet/h
	0 0 1 0 0 1 000 octet/h
	0 0 1 0 1 2 000 octet/h
	0 0 1 1 0 5 000 octet/h
	0 0 1 1 1 10 000 octet/h
	0 1 0 0 0 20 000 octet/h
	0 1 0 0 1 50 000 octet/h
	0 1 0 1 0 100 octet/h
	0 1 0 1 1 200 000 octet/h
	0 1 1 0 0 500 000 octet/h
	0 1 1 0 1 1 000 000 octet/h
	0 1 1 1 0 2 000 000 octet/h
	0 1 1 1 1 5 000 000 octet/h 1 0 0 0 0 10 000 octet/h
	1 0 0 0 1 20 000 000 octet/h
	1 0 0 1 0 50 000 octet/h
	11110 Reserved
	1 1 1 1 Best effort
	The value Best effort indicates that throughput shall be made available to the MS on a per need and availability basis.
	All other values are interpreted as Best effort in this
	version of the protocol.
	Bits 8 to 6 of octet 5 are spare and shall be coded all 0.
	Delivery of erroneous SDUs, octet 6 (see 3GPP TS 23.107)
	Bits
	321
	In MS to network direction:
	0 0 0 Subscribed delivery of erroneous SDUs
	In network to MS direction:
	000 Reserved
	In MS to network direction and in network to MS direction :
	0 0 1 No detect ('-')
	010 Erroneous SDUs are delivered ('yes')
	0 1 1 Erroneous SDUs are not delivered ('no')
	1 1 1 Reserved
	The network shall map all other values not explicitly defined onto one of the values defined in this version of the protocol.
	The network shall return a negotiated value which is explicitly defined in this version of this protocol.
	The MS shall consider all other values as reserved.
	Delivery order, octet 6 (see 3GPP TS 23.107)
	Bits
	543
	In MS to network direction:
	0 0 Subscribed delivery order
	In network to MS direction:
	0 0 Reserved
	In MS to network direction and in network to MS direction :
	0 1 With delivery order ('yes')
	1 0 Without delivery order ('no')
	1 1 Reserved
- 1	

Traffic class, octet 6 (see 3GPP TS 23.107)
Bits
876 In MS to network direction:
0 0 0 Subscribed traffic class
In network to MS direction:
000 Reserved
In MS to network direction and in network to MS direction :
0 0 1 Conversational class
0 1 0 Streaming class 0 1 1 Interactive class
0 1 1 Interactive class 1 0 0 Background class
1 1 1 Reserved
The network shall map all other values not explicitly defined onto one of the values defined in this version of the protocol. The network shall return a negotiated value which is explicitly defined in this version of this protocol.
The MS shall consider all other values as reserved.
Maximum SDU size, octet 7 (see 3GPP TS 23.107)
In MS to network direction:
0 0 0 0 0 0 0 Subscribed maximum SDU size
1 1 1 1 1 1 1 Reserved In network to MS direction:
0 0 0 0 0 0 0 Reserved
1111111 Reserved
In MS to network direction and in network to MS direction :
For values in the range 00000001 to 10010110 the Maximum SDU size value is binary coded in 8 bits, using a granularity of 10 octets, giving a range of values from 10 octets to 1500 octets. Values above 10010110 are as below:
10010111 1502 octets
1 0 0 1 1 0 0 0 1510 octets 1 0 0 1 1 0 0 1 1520 octets
The network shall map all other values not explicitly defined onto one of the values defined in this version of the protocol. The network shall return a negotiated value which is explicitly defined in this version of this protocol.
The MS shall consider all other values as reserved.
Maximum bit rate for uplink, octet 8 Bits
87654321
In MS to network direction:
0 0 0 0 0 0 0 0 Subscribed maximum bit rate for uplink In network to MS direction:
0 0 0 0 0 0 0 Reserved
In MS to network direction and in network to MS direction :
0 0 0 0 0 0 0 1 The maximum bit rate is binary coded in 8 bits, using a granularity of 1 kbps
0 0 1 1 1 1 1 1 giving a range of values from 1 kbps to 63 kbps in 1 kbps increments.
0 1 0 0 0 0 0 0 The maximum bit rate is 64 kbps + ((the binary coded value in 8 bits –01000000) * 8 kbps)
01111111 giving a range of values from 64 kbps to 568 kbps in 8 kbps increments.
100000 The maximum bit rate is 576 kbps + ((the binary coded value in 8 bits –10000000) * 64 kbps)
1 1 1 1 1 1 1 0 giving a range of values from 576 kbps to 8640 kbps in 64 kbps increments.
111111 0kbps
Maximum bit rate for downlink, octet 9 (see 3GPP TS 23.107)
Coding is identical to that of Maximum bit rate for uplink.

Residual Bit Error Rate (BER), octet 10 (see 3GPP TS 23.107) Bits 8765 In MS to network direction: Subscribed residual BER 0000 In network to MS direction: 0000 Reserved In MS to network direction and in network to MS direction : The Residual BER value consists of 4 bits. The range is from $5*10^{-2}$ to $6*10^{-8}$. 0001 5*10⁻² 1*10⁻² 0010 5*10⁻³ 0011 4*10⁻³ 0100 1*10⁻³ 0101 1*10⁻⁴ 0110 1*10⁻⁵ 0111 1*10⁻⁶ 1000 6*10⁻⁸ 1001 1111 Reserved The network shall map all other values not explicitly defined onto one of the values defined in this version of the protocol. The network shall return a negotiated value which is explicitly defined in this version of the protocol. The MS shall consider all other values as reserved. SDU error ratio, octet 10 (see 3GPP TS 23.107) Bits 4321 In MS to network direction: Subscribed SDU error ratio 0000 In network to MS direction: 0000 Reserved In MS to network direction and in network to MS direction : The SDU error ratio value consists of 4 bits. The range is is from 1*10⁻¹ to 1*10⁻⁶. 0001 1*10⁻² 7*10⁻³ 0010 1*10⁻³ 0011 1*10⁻⁴ 0100 1*10⁻⁵ 0101 1*10⁻⁶ 0110 1*10⁻¹ 0111 1111 Reserved The network shall map all other values not explicitly defined onto one of the values defined in this version of the protocol. The network shall return a negotiated value which is explicitly defined in this version of the protocol. The MS shall consider all other values as reserved. Traffic handling priority, octet 11 (see 3GPP TS 23.107) Bits 21 In MS to network direction: 0.0 Subscribed traffic handling priority In network to MS direction: 00 Reserved In MS to network direction and in network to MS direction : 01 Priority level 1 10 Priority level 2 Priority level 3 11 The Traffic handling priority value is ignored if the Traffic Class is Conversation class, Streaming class or Background class. Transfer delay, octet 11 (See 3GPP TS 23.107) Bits 876543

	In MS to netw	vork direction:
	000000	Subscribed transfer delay
	In network to	MS direction:
		Reserved
	In MS to netw	vork direction and in network to MS direction :
	0 0 0 0 0 1	The Transfer delay is him any coded in C hits, using a granularity of 10 ma
- 1	0 0 0 0 0 1 0 0 1 1 1 1	The Transfer delay is binary coded in 6 bits, using a granularity of 10 ms giving a range of values from 10 ms to 150 ms in 10 ms increments
ļ	001111	_giving a range of values from To his to 150 his in To his increments
	010000	The transfer delay is 200 ms + ((the binary coded value in 6 bits – 010000) * 50 ms)
	011111	giving a range of values from 200 ms to 950 ms in 50ms increments
	100000	The transfer delay is 1000 ms + ((the binary coded value in 6 bits – 100000) * 100 ms)
	111110	giving a range of values from 1000 ms to 4100-4000 ms in 100ms increments
	111111	Reserved
	The Transfer	delay value is ignored if the Traffic Class is Interactive class or Background class.
		bit rate for uplink, octet 12 (See 3GPP TS 23.107)
	Ouaranteeur	
	Codina is ide	ntical to that of Maximum bit rate for uplink.
	0	
		eed bit rate for uplink value is ignored if the Traffic Class is Interactive class or Background class, or
		rate for uplink is set to 0 kbps.
	Guaranteed I	bit rate for downlink, octet 13(See 3GPP TS 23.107)
	0 K · · · ·	
	Coding is ide	ntical to that of Maximum bit rate for uplink.
	The Guarant	eed bit rate for downlink value is ignored if the Traffic Class is Interactive class or Background class, or
		rate for downlink is set to 0 kbps.

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Other comments:	ж						

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10.5.6.5 Quality of service

The purpose of the quality of service information element is to specify the QoS parameters for a PDP context.

The QoS IE is defined to allow backward compatibility to earlier version of Session Management Protocol.

The quality of service is a type 4 information element with a length of 13octets.

The *quality of service* information element is coded as shown in figure 10.5.138/3GPP TS 24.008 and table 10.5.156/3GPP TS 24.008.

8	7	6	5	4	3	2	1	
		C	uality of	service II	ΞΙ			octet 1
		Lengt	h of quali	ity of serv	/ice IE			Octet 2
0	0		Delay			Reliabilit	у	octet 3
sp	are		class			class		
	Pe	ak		0	F	Preceden	се	octet 4
	throu	ghput	-	spare		class		
	0 0 0				Mean			octet 5
	spare			t	hroughp	ut		
Traffic Class Delive				y order	order Delivery of erroneous			Octet 6
						SDU		
		Ν	/laximum	SDU siz	е			Octet 7
		Maxi	mum bit	rate for u	plink			Octet 8
		Maxim	num bit ra	ate for do	wnlink			Octet 9
	Residu	al BER			SDU e	rror ratio		Octet 10
		Transfe	er delay			Traffic I	Handling	Octet 11
						prie	ority	
								Octet 12
		Guara	anteed bi	t rate for	uplink			
		Guarar	nteed bit	rate for d	ownlink			Octet 13

Figure 10.5.138/3GPP TS 24.008: Quality of service information element

Table 10.5.156/3GPP TS 24.008: Quality of service information element

Reliability class, octet 3 (see 3GPP TS 23.107) Bits 321 In MS to network direction: 000 Subscribed reliability class In network to MS direction: 000 Reserved In MS to network direction and in network to MS direction : 0 0 1 Acknowledged GTP, LLC, and RLC; Protected data 010 Unacknowledged GTP; Acknowledged LLC and RLC, Protected data 011 Unacknowledged GTP and LLC; Acknowledged RLC, Protected data 1 0 0 Unacknowledged GTP, LLC, and RLC, Protected data Unacknowledged GTP, LLC, and RLC, Unprotected data 101 111 Reserved All other values are interpreted as Unacknowledged GTP and LLC; Acknowledged RLC, Protected data in this version of the protocol. Delay class, octet 3 (see 3GPP TS 22.060 and 3GPP TS 23.107) Bits 654 In MS to network direction: 000 Subscribed delay class In network to MS direction: 000 Reserved In MS to network direction and in network to MS direction :

- 0 0 1Delay class 10 1 0Delay class 20 1 1Delay class 31 0 0Delay class 4 (best effort)1 1 1Reserved

of the protocol. Bit 7 and 8 of octet 3 are spare and shall be coded all 0. Precedence class, octet 4 (see 3GPP TS 23.107) Bits 32 1 In MS to network direction: 0 0 0 Subscribed precedence In network to MS direction: 0 0 1 Reserved In MS to network direction and in network to MS direction : 0 0 1 High priority 0 1 0 Normal priority 0 1 1 Low priority 1 1 1 Low priority 1 1 1 Reserved All other values are interpreted as <i>Normal priority</i> in this version of the protocol. Bit 4 of octet 4 is spare and shall be coded as 0. Peak throughput, octet 4 (see 3GPP TS 23.107) Bits 8 7 6 5 In MS to network direction: 0 0 0 0 Subscribed peak throughput In network to MS direction: 0 0 0 0 Reserved In MS to network direction: 0 0 0 0 Reserved In MS to network direction: 0 0 1 Up to 1 000 octet/s 0 1 1 Up to 4 000 octet/s 0 1 1 Up to 1 000 octet/s 0 1 1 Up to 1 000 octet/s 0 1 1 Up to 64 000 octet/s 0 1 1 Up to 64 000 octet/s 0 1 1 Up to 26 000 octet/s 1 1 1 Reserved All other values are interpreted as <i>Up to 1 000 octet/s</i> in this version of the protocol. Mean throughput, octet 5 (see 3GPP TS 23.107) Bits 5 4 3 2 1		All other values are interpreted as Delay class 4 (best effort) in this version
Precedence class, octet 4 (see 3GPP TS 23.107) Bits 3 2 1 In MS to network direction: 0 0 0 Subscribed precedence In network to MS direction and in network to MS direction : 0 0 1 High priority 0 1 1 Low priority 0 1 1 Low priority 1 1 1 Reserved All other values are interpreted as <i>Normal priority</i> in this version of the protocol. Bit 4 of octet 4 is spare and shall be coded as 0. Peak throughput, octet 4 (see 3GPP TS 23.107) Bits 8 7 6 5 In MS to network direction: 0 0 0 Subscribed peak throughput In metwork to MS direction: 0 0 0 Subscribed peak throughput In metwork to MS direction: 0 0 0 Subscribed peak throughput In MS to network direction: 0 0 0 Subscribed peak throughput In MS to network direction: 0 0 0 Up to 2 000 octet/s 0 1 1 Up to 4 000 octet/s 0 1 1 Up to 6 000 octet/s 0 1 1 Up to 6 000 octet/s 0 1 1 Up to 64 000 octet/s 0 1 1 Up to 64 000 octet/s 1 1 1 Reserved All other values are interpreted as <i>Up to 1 000 octet/s</i> in this version of the protocol. Mean throughput, octet 5 (see 3GPP TS 23.107) Bits		
Bits 3 2 1 In MS to network direction: 0 0 Subscribed precedence In network to MS direction: 0 0 0 Reserved In MS to network direction and in network to MS direction : 0 0 1 High priority 0 1 0 Normal priority 0 1 1 Low priority 1 1 1 Reserved All other values are interpreted as <i>Normal priority</i> in this version of the protocol. Bit 4 of octet 4 is spare and shall be coded as 0. Peak throughput, octet 4 (see 3GPP TS 23.107) Bits 8 7 6 5 In MS to network direction: 0 0 0 Subscribed peak throughput In network to MS direction: 0 0 0 Reserved In MS to network direction and in network to MS direction : 0 0 0 Reserved In MS to network direction and in network to MS direction : 0 0 0 Up to 2000 octet/s 0 1 0 Up to 2000 octet/s 0 1 0 Up to 32 000 octet/s 0 1 1 Up to 64 000 octet/s 1 1 1 Dy to 64 000 octet/s 1 1 1 Reserved All other values are interpreted as <i>Up to 1 000 octet/s</i> in this version of the protocol. Mean throughput, octet 5 (see 3GPP TS 23.107) Bits 1 1 1 Reserved		
In MS to network direction: 0 0 0 Subscribed precedence In network to MS direction and in network to MS direction : 0 0 0 Reserved In MS to network direction and in network to MS direction : 0 0 1 High priority 0 1 0 Normal priority 0 1 1 Low priority 1 1 1 Reserved All other values are interpreted as <i>Normal priority</i> in this version of the protocol. Bit 4 of octet 4 is spare and shall be coded as 0. Peak throughput, octet 4 (see 3GPP TS 23.107) Bits 8 7 6 5 In MS to network direction: 0 0 0 0 Subscribed peak throughput In network to MS direction: 0 0 0 0 Reserved In MS to network direction: 0 0 0 0 Reserved In MS to network direction and in network to MS direction : 0 0 0 1 Up to 1000 octet/s 0 0 1 Up to 1000 octet/s 0 1 0 Up to 2 000 octet/s 0 1 1 Up to 4 000 octet/s 0 1 0 Up to 800 octet/s 0 1 1 Up to 16 000 octet/s 0 1 1 Up to 16 000 octet/s 0 1 1 Up to 16 000 octet/s 1 1 1 Up to 4000 octet/s 1 1 1 Reserved All other values are interpreted as <i>Up to 1 000 octet/s</i> in this version of the protocol. Mean throughput, octet 5 (see 3GPP TS 23.107) Bits		
 0.0 Subscribed precedence In network to MS direction: 0.0 Reserved In MS to network direction and in network to MS direction : 0.0 High priority 0.1 Low priority 1.1 Reserved All other values are interpreted as <i>Normal priority</i> in this version of the protocol. Bit 4 of octet 4 is spare and shall be coded as 0. Peak throughput, octet 4 (see 3GPP TS 23.107) Bits 8 7 6 5 In MS to network direction: 0.0 0 Subscribed peak throughput In network to MS direction: 0.0 0 Reserved In network direction: 0.0 0 Reserved In NS to network direction: 0.0 0 Reserved In the top octet/s 0.1 Up to 1000 octet/s 0.1 Up to 32.000 octet/s 0.1 Up to 32.000 octet/s 0.1 Up to 4000 octet/s 0.1 Up to 4000 octet/s 1.1 Up to 4000 octet/s 1.1 Up to 56 000 octet/s 1.1 Up to 56 000 octet/s 1.1 Up to 526 000 octet/s 1.1 Reserved All other values are interpreted as <i>Up to 1 000 octet/s</i> in this version of the protocol. 		
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version of the protocol. Mean throughput, octet 5 (see 3GPP TS 23.107) Bits		
Mean throughput, octet 5 (see 3GPP TS 23.107) Bits		
Bits		
	l	

In MS to netwo	rk direction:
	Subscribed mean throughput
In network to M	
	Reserved
	rk direction and in network to MS direction :
	00 octet/h
00010 2	00 octet/h
00011 5	00 octet/h
	000 octet/h
	000 octet/h
	000 octet/h
	0 000 octet/h
	0 000 octet/h 0 000 octet/h
	00 000 octet/h
	00 000 octet/h
	00 000 octet/h
01101 1	000 000 octet/h
	000 000 octet/h
	000 000 octet/h
	0 000 000 octet/h
	0 000 000 octet/h
	0 000 000 octet/h Reserved
-	Best effort
	effort indicates that throughput shall be made available to the MS on a per need and availability basis.
	are interpreted as Best effort in this
version of the p	rotocol.
	etet 5 are spare and shall be coded all 0.
Delivery of erro Bits 3 2 1	neous SDUs, octet 6 (see 3GPP TS 23.107)
In MS to netwo	rk direction:
In MS to netwo	scribed delivery of erroneous SDUs
In MS to netwo 0 0 0 Subs In network to M	scribed delivery of erroneous SDUs S direction:
In MS to netwo 0 0 0 Subs In network to M 0 0 0 Rese	scribed delivery of erroneous SDUs S direction: erved
In MS to netwo 0 0 0 Subs In network to M 0 0 0 Rese In MS to netwo	scribed delivery of erroneous SDUs S direction: erved rk direction and in network to MS direction :
In MS to netwo 0 0 0 Subs In network to M 0 0 0 Rese In MS to netwo 0 0 1 No c	scribed delivery of erroneous SDUs S direction: erved rk direction and in network to MS direction : letect ('-')
In MS to netwo 0 0 0 Subs In network to M 0 0 0 Rese In MS to netwo 0 0 1 No c 0 1 0 Erro	scribed delivery of erroneous SDUs S direction: erved rk direction and in network to MS direction : letect ('-') neous SDUs are delivered ('yes')
In MS to netwo 0 0 0 Subs In network to M 0 0 0 Rese In MS to netwo 0 0 1 No c 0 1 0 Erro 0 1 1 Erro	scribed delivery of erroneous SDUs S direction: erved rk direction and in network to MS direction : letect ('-')
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In MS to netwo 0 0 0 Subs In network to M 0 0 0 Rese In MS to netwo 0 0 1 No c 0 1 0 Erro 0 1 1 Erro 1 1 1 Rese The network sh	scribed delivery of erroneous SDUs S direction: erved rk direction and in network to MS direction : letect ('-') neous SDUs are delivered ('yes') neous SDUs are not delivered ('no')
In MS to netwo 0 0 0 Subs In network to M 0 0 0 Rese In MS to netwo 0 0 1 No c 0 1 0 Erro 0 1 1 Erro 1 1 1 Rese The network sh	scribed delivery of erroneous SDUs IS direction: erved rk direction and in network to MS direction : letect ('-') neous SDUs are delivered ('yes') neous SDUs are not delivered ('no') erved
In MS to netwo 0 0 0 Subs In network to M 0 0 0 Rese In MS to netwo 0 0 1 No c 0 1 0 Erro 0 1 1 Erro 1 1 1 Rese The network sh The network sh The MS shall c Delivery order, Bits	scribed delivery of erroneous SDUs IS direction: erved rk direction and in network to MS direction : letect ('-') neous SDUs are delivered ('yes') neous SDUs are not delivered ('no') erved all map all other values not explicitly defined onto one of the values defined in this version of the protocol. all return a negotiated value which is explicitly defined in this version of this protocol.
In MS to netwo 0 0 0 Subs In network to M 0 0 0 Rese In MS to netwo 0 1 No c 0 1 0 Erro 0 1 1 Erro 1 1 1 Rese The network sh The network sh The MS shall c Delivery order, Bits 5 4 3	scribed delivery of erroneous SDUs S direction: erved rk direction and in network to MS direction : letect ('-') neous SDUs are delivered ('yes') neous SDUs are not delivered ('no') erved all map all other values not explicitly defined onto one of the values defined in this version of the protocol. all return a negotiated value which is explicitly defined in this version of this protocol. onsider all other values as reserved. octet 6 (see 3GPP TS 23.107)
In MS to netwo 0 0 0 Subs In network to M 0 0 0 Rese In MS to netwo 0 0 1 No c 0 1 0 Erro 0 1 1 Erro 1 1 1 Rese The network sh The network sh The MS shall c Delivery order, Bits 5 4 3 In MS to netwo	scribed delivery of erroneous SDUs S direction: erved rk direction and in network to MS direction : letect ('-') neous SDUs are delivered ('yes') neous SDUs are not delivered ('no') erved all map all other values not explicitly defined onto one of the values defined in this version of the protocol. all return a negotiated value which is explicitly defined in this version of this protocol. onsider all other values as reserved. octet 6 (see 3GPP TS 23.107) rk direction:
In MS to netwo 0 0 0 Subs In network to M 0 0 0 Rese In MS to netwo 0 0 1 No c 0 1 0 Erro 0 1 1 Erro 1 1 1 Rese The network sh The network sh The MS shall c Delivery order, Bits 5 4 3 In MS to netwo 0 0 Subscrit	scribed delivery of erroneous SDUs IS direction: erved rk direction and in network to MS direction : letect ('-') neous SDUs are delivered ('yes') neous SDUs are not delivered ('no') erved all map all other values not explicitly defined onto one of the values defined in this version of the protocol. all return a negotiated value which is explicitly defined in this version of this protocol. onsider all other values as reserved. octet 6 (see 3GPP TS 23.107) rk direction: bed delivery order
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In MS to netwo 0 0 0 Subs In network to M 0 0 0 Rese In MS to netwo 0 0 1 No c 0 1 0 Erro 0 1 1 Erro 1 1 1 Rese The network sh The network shall c Delivery order, Bits 5 4 3 In MS to netwo 0 0 Subscritt In network to M 0 0 Reserved	scribed delivery of erroneous SDUs S direction: erved rk direction and in network to MS direction : letect ('-') neous SDUs are delivered ('yes') neous SDUs are not delivered ('no') erved all map all other values not explicitly defined onto one of the values defined in this version of the protocol. all return a negotiated value which is explicitly defined in this version of this protocol. onsider all other values as reserved. octet 6 (see 3GPP TS 23.107) rk direction: bed delivery order S direction:
In MS to netwo 0 0 0 Subs In network to M 0 0 0 Reset In MS to netwo 0 0 1 No c 0 1 0 Erro 0 1 1 Erro 1 1 1 Reset The network sh The network shall c Delivery order, Bits 5 4 3 In MS to netwo 0 0 Subscritt In network to M 0 0 Reserved In MS to netwo	scribed delivery of erroneous SDUs S direction: erved rk direction and in network to MS direction : letect ('-') neous SDUs are delivered ('yes') neous SDUs are not delivered ('no') erved all map all other values not explicitly defined onto one of the values defined in this version of the protocol. all return a negotiated value which is explicitly defined in this version of this protocol. onsider all other values as reserved. octet 6 (see 3GPP TS 23.107) rk direction: bed delivery order S direction: d rk direction and in network to MS direction :
In MS to netwo 0 0 0 Subs In network to M 0 0 0 Rese In MS to netwo 0 0 1 No c 0 1 0 Erro 0 1 1 Erro 1 1 1 Rese The network sh The network sh The MS shall c Delivery order, Bits 5 4 3 In MS to netwo 0 0 Subscritt In network to M 0 0 Reserved In MS to netwo 0 1 With del	scribed delivery of erroneous SDUs S direction: erved rk direction and in network to MS direction : letect ('-') neous SDUs are delivered ('yes') neous SDUs are not delivered ('no') erved all map all other values not explicitly defined onto one of the values defined in this version of the protocol. all return a negotiated value which is explicitly defined in this version of this protocol. onsider all other values as reserved. octet 6 (see 3GPP TS 23.107) rk direction: bed delivery order S direction:
In MS to netwo 0 0 0 Subs In network to M 0 0 0 Rese In MS to netwo 0 0 1 No c 0 1 0 Erro 0 1 1 Erro 1 1 1 Rese The network sh The network sh The MS shall c Delivery order, Bits 5 4 3 In MS to netwo 0 0 Subscritt In network to M 0 0 Reserve In MS to netwo 0 1 With del	scribed delivery of erroneous SDUs S direction: erved rk direction and in network to MS direction : letect ('-') neous SDUs are delivered ('yes') neous SDUs are not delivered ('no') erved all map all other values not explicitly defined onto one of the values defined in this version of the protocol. all return a negotiated value which is explicitly defined in this version of this protocol. onsider all other values as reserved. octet 6 (see 3GPP TS 23.107) rk direction: bed delivery order S direction: id rk direction and in network to MS direction : ivery order ('yes') delivery order ('no')

Traffic class, octet 6 (see 3GPP TS 23.107) Bits 876 In MS to network direction: Subscribed traffic class 000 In network to MS direction: 000 Reserved In MS to network direction and in network to MS direction : 001 Conversational class 010 Streaming class Interactive class 011 100 Background class 111 Reserved The network shall map all other values not explicitly defined onto one of the values defined in this version of the protocol. The network shall return a negotiated value which is explicitly defined in this version of this protocol. The MS shall consider all other values as reserved. Maximum SDU size, octet 7 (see 3GPP TS 23.107) In MS to network direction: 00000000 Subscribed maximum SDU size Reserved 11111111 In network to MS direction: 00000000 Reserved 11111111 Reserved In MS to network direction and in network to MS direction : For values in the range 00000001 to 10010110 the Maximum SDU size value is binary coded in 8 bits, using a granularity of 10 octets, giving a range of values from 10 octets to 1500 octets. Values above 10010110 are as below: 10010111 1502 octets 10011000 1510 octets 1520 octets 10011001 The network shall map all other values not explicitly defined onto one of the values defined in this version of the protocol. The network shall return a negotiated value which is explicitly defined in this version of this protocol. The MS shall consider all other values as reserved. Maximum bit rate for uplink, octet 8 Bits 87654321 In MS to network direction: 0000000 Subscribed maximum bit rate for uplink In network to MS direction: 0000000 Reserved In MS to network direction and in network to MS direction : 0000001 The maximum bit rate is binary coded in 8 bits, using a granularity of 1 kbps 00111111 giving a range of values from 1 kbps to 63 kbps in 1 kbps increments. 0100000 The maximum bit rate is 64 kbps + ((the binary coded value in 8 bits -01000000) * 8 kbps) giving a range of values from 64 kbps to 568 kbps in 8 kbps increments. 01111111 10000000 The maximum bit rate is 576 kbps + ((the binary coded value in 8 bits -10000000) * 64 kbps) giving a range of values from 576 kbps to 8640 kbps in 64 kbps increments. 11111110 11111111 0kbps Maximum bit rate for downlink, octet 9 (see 3GPP TS 23.107)

Coding is identical to that of Maximum bit rate for uplink.

Residual Bit Error Rate (BER), octet 10 (see 3GPP TS 23.107) Bits 8765 In MS to network direction: Subscribed residual BER 0000 In network to MS direction: 0000 Reserved In MS to network direction and in network to MS direction : The Residual BER value consists of 4 bits. The range is from $5*10^{-2}$ to $6*10^{-8}$. 0001 5*10⁻² 1*10⁻² 0010 5*10⁻³ 0011 4*10⁻³ 0100 1*10⁻³ 0101 1*10⁻⁴ 0110 1*10⁻⁵ 0111 1*10⁻⁶ 1000 6*10⁻⁸ 1001 1111 Reserved The network shall map all other values not explicitly defined onto one of the values defined in this version of the protocol. The network shall return a negotiated value which is explicitly defined in this version of the protocol. The MS shall consider all other values as reserved. SDU error ratio, octet 10 (see 3GPP TS 23.107) Bits 4321 In MS to network direction: Subscribed SDU error ratio 0000 In network to MS direction: 0000 Reserved In MS to network direction and in network to MS direction : The SDU error ratio value consists of 4 bits. The range is is from $1*10^{-1}$ to $1*10^{-6}$. 0001 1*10⁻² 7*10⁻³ 0010 1*10⁻³ 0011 1*10⁻⁴ 0100 1*10⁻⁵ 0101 1*10⁻⁶ 0110 1*10⁻¹ 0111 1111 Reserved The network shall map all other values not explicitly defined onto one of the values defined in this version of the protocol. The network shall return a negotiated value which is explicitly defined in this version of the protocol. The MS shall consider all other values as reserved. Traffic handling priority, octet 11 (see 3GPP TS 23.107) Bits 21 In MS to network direction: 0.0 Subscribed traffic handling priority In network to MS direction: 0.0 Reserved In MS to network direction and in network to MS direction : 01 Priority level 1 10 Priority level 2 Priority level 3 11 The Traffic handling priority value is ignored if the Traffic Class is Conversation class, Streaming class or Background class. Transfer delay, octet 11 (See 3GPP TS 23.107) Bits 876543

In MS to network direction: 0 0 0 0 0 0 Subscribed transfer delay In network to MS direction: Reserved 000000 In MS to network direction and in network to MS direction : 000001 The Transfer delay is binary coded in 6 bits, using a granularity of 10 ms 0 0 1 1 1 1-giving a range of values from 10 ms to 150 ms in 10 ms increments 010000 The transfer delay is 200 ms + ((the binary coded value in 6 bits - 010000) * 50 ms) giving a range of values from 200 ms to 950 ms in 50ms increments 011111 100000 The transfer delay is 1000 ms + ((the binary coded value in 6 bits - 100000) * 100 ms) giving a range of values from 1000 ms to 4100 4000 ms in 100ms increments 111110 111111 Reserved The Transfer delay value is ignored if the Traffic Class is Interactive class or Background class. Guaranteed bit rate for uplink, octet 12 (See 3GPP TS 23.107) Coding is identical to that of Maximum bit rate for uplink. The Guaranteed bit rate for uplink value is ignored if the Traffic Class is Interactive class or Background class, or Maximum bit rate for uplink is set to 0 kbps. Guaranteed bit rate for downlink, octet 13(See 3GPP TS 23.107) Coding is identical to that of Maximum bit rate for uplink.

The Guaranteed bit rate for downlink value is ignored if the Traffic Class is Interactive class or Background class, or Maximum bit rate for downlink is set to 0 kbps.

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How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: <u>http://www.3gpp.org/3G_Specs/CRs.htm</u>. Below is a brief summary:

- 1) Fill out the above form. The symbols above marked # contain pop-up help information about the field that they are closest to.
- 2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under <u>ftp://ftp.3gpp.org/specs/</u> For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.
- 3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

10.5.6.5 Quality of service

The purpose of the quality of service information element is to specify the QoS parameters for a PDP context.

The QoS IE is defined to allow backward compatibility to earlier version of Session Management Protocol.

The quality of service is a type 4 information element with a length of 13octets.

The *quality of service* information element is coded as shown in figure 10.5.138/3GPP TS 24.008 and table 10.5.156/3GPP TS 24.008.

8	7	6	5	4	3	2	1		
		Q	uality of	service II	ΞΙ			octet 1	
		Lengt	h of quali	ity of serv	/ice IE			Octet 2	
0 0			Delay			Reliabilit	у	octet 3	
spare			class			class			
	Pe	eak		0	F	receden	се	octet 4	
	throu	ghput		spare		class			
0	0 0				Mean			octet 5	
spare				t					
Traff	Deliver	Delivery order Delive			ery of erroneous				
						SDU			
	Maximum SDU size							Octet 7	
		Maxi	mum bit	rate for u	plink			Octet 8	
		Maxim	num bit ra	ate for do	wnlink			Octet 9	
F	Residual BER				SDU error ratio				
	Transfer delay					Traffic I	Handling	Octet 11	
						pri	ority		
								Octet 12	
		Guara	anteed bi	t rate for	uplink				
		Guarar	nteed bit	rate for d	ownlink			Octet 13	

Figure 10.5.138/3GPP TS 24.008: Quality of service information element

Table 10.5.156/3GPP TS 24.008: Quality of service information element

Reliability class, octet 3 (see 3GPP TS 23.107) Bits 321 In MS to network direction: 000 Subscribed reliability class In network to MS direction: 000 Reserved In MS to network direction and in network to MS direction : 0 0 1 Acknowledged GTP, LLC, and RLC; Protected data 010 Unacknowledged GTP; Acknowledged LLC and RLC, Protected data 011 Unacknowledged GTP and LLC; Acknowledged RLC, Protected data 1 0 0 Unacknowledged GTP, LLC, and RLC, Protected data Unacknowledged GTP, LLC, and RLC, Unprotected data 101 111 Reserved All other values are interpreted as Unacknowledged GTP and LLC; Acknowledged RLC, Protected data in this version of the protocol. Delay class, octet 3 (see 3GPP TS 22.060 and 3GPP TS 23.107) Bits 654 In MS to network direction: 000 Subscribed delay class In network to MS direction: 000 Reserved In MS to network direction and in network to MS direction :

- 0 0 1Delay class 10 1 0Delay class 20 1 1Delay class 31 0 0Delay class 4 (best effort)1 1 1Reserved

	All other values are interpreted as Delay class 4 (best effort) in this version
	of the protocol. Bit 7 and 8 of octet 3 are spare and shall be coded all 0.
	Precedence class, octet 4 (see 3GPP TS 23.107)
	Bits
	321
	In MS to network direction:
	0 0 0 Subscribed precedence In network to MS direction:
	000 Reserved
	In MS to network direction and in network to MS direction :
	0 0 1 High priority
	0 1 0 Normal priority
	0 1 1 Low priority 1 1 1 Reserved
	I I I Reserved
	All other values are interpreted as Normal priority in this version of the protocol.
	Bit 4 of octet 4 is spare and shall be coded as 0.
	Peak throughput, octet 4 (see 3GPP TS 23.107)
	Bits
	8765
	In MS to network direction: 0 0 0 0 Subscribed peak throughput
	In network to MS direction:
	0000 Reserved
	In MS to network direction and in network to MS direction :
	0 0 0 1 Up to 1 000 octet/s 0 0 1 0 Up to 2 000 octet/s
	0 0 1 1 Up to 4 000 octet/s
	0 1 0 0 Up to 8 000 octet/s
	0 1 0 1 Up to 16 000 octet/s
	0 1 1 0 Up to 32 000 octet/s
	0 1 1 1 Up to 64 000 octet/s 1 0 0 0 Up to 128 000 octet/s
	1 0 0 1 Up to 256 000 octet/s
	1111 Reserved
	All other values are interpreted as Up to 1 000 octet/s in this
	version of the protocol.
	Mean throughput, octet 5 (see 3GPP TS 23.107) Bits
	5 4 3 2 1
l	

In MS to networe 0 0 0 0 0 0 S	rk direction:
00000 0	Subscribed mean throughput
In network to M	
	Reserved
	rk direction and in network to MS direction :
	00 octet/h
00010 2	00 octet/h
00011 5	00 octet/h
	000 octet/h
	000 octet/h
	000 octet/h
	0 000 octet/h
	0 000 octet/h 0 000 octet/h
	00 000 octet/h
	00 000 octet/h
	00 000 octet/h
01101 1	000 000 octet/h
	000 000 octet/h
	000 000 octet/h
	0 000 000 octet/h
	0 000 000 octet/h
	0 000 000 octet/h Reserved
-	Best effort
	effort indicates that throughput shall be made available to the MS on a per need and availability basis.
	are interpreted as Best effort in this
version of the p	rotocol.
	tet 5 are spare and shall be coded all 0.
Delivery of erro Bits 3 2 1	neous SDUs, octet 6 (see 3GPP TS 23.107)
In MS to netwo	rk direction:
000 Subs	scribed delivery of erroneous SDUs
0 0 0 Subs In network to M	scribed delivery of erroneous SDUs S direction:
000 Subs In network to M 000 Rese	scribed delivery of erroneous SDUs S direction: erved
0 0 0 Subs In network to M 0 0 0 Rese In MS to network	scribed delivery of erroneous SDUs S direction: erved rk direction and in network to MS direction :
0 0 0 Subs In network to M 0 0 0 Rese In MS to networ 0 0 1 No d	scribed delivery of erroneous SDUs S direction: erved rk direction and in network to MS direction : letect ('-')
0 0 0 Subs In network to M 0 0 0 Rese In MS to networ 0 0 1 No d 0 1 0 Error	scribed delivery of erroneous SDUs S direction: erved rk direction and in network to MS direction : letect ('-') neous SDUs are delivered ('yes')
0 0 0 Subs In network to M 0 0 0 Rese In MS to networ 0 0 1 No d 0 1 0 Error 0 1 1 Error	scribed delivery of erroneous SDUs S direction: erved rk direction and in network to MS direction : letect ('-')
0 0 0 Subs In network to M 0 0 0 Rese In MS to netword 0 0 1 No d 0 1 0 Error 0 1 1 Error	scribed delivery of erroneous SDUs S direction: erved rk direction and in network to MS direction : letect ('-') neous SDUs are delivered ('yes') neous SDUs are not delivered ('no')
0 0 0 Subs In network to M 0 0 0 Rese In MS to networ 0 0 1 No d 0 1 0 Error 0 1 1 Error 1 1 1 Rese The network sh	scribed delivery of erroneous SDUs S direction: erved rk direction and in network to MS direction : letect ('-') neous SDUs are delivered ('yes') neous SDUs are not delivered ('no')
0 0 0 Subs In network to M 0 0 0 Rese In MS to networ 0 0 1 No d 0 1 0 Error 0 1 1 Error 1 1 1 Rese The network sh	scribed delivery of erroneous SDUs IS direction: erved rk direction and in network to MS direction : letect ('-') neous SDUs are delivered ('yes') neous SDUs are not delivered ('no') erved
0 0 0 Subs In network to M 0 0 0 Rese In MS to netword 0 1 No d 0 1 0 Error 0 1 1 Error 1 1 1 Rese The network sh The network sh The MS shall co Delivery order, Bits	scribed delivery of erroneous SDUs IS direction: erved rk direction and in network to MS direction : letect ('-') neous SDUs are delivered ('yes') neous SDUs are not delivered ('no') erved all map all other values not explicitly defined onto one of the values defined in this version of the protocol. all return a negotiated value which is explicitly defined in this version of this protocol.
0 0 0 Subs In network to M 0 0 0 Rese In MS to netword 0 1 No d 0 1 0 Error 0 1 1 Error 1 1 1 Rese The network sh The network sh The MS shall co Delivery order, Bits 5 4 3	scribed delivery of erroneous SDUs S direction: erved rk direction and in network to MS direction : letect ('-') neous SDUs are delivered ('yes') neous SDUs are not delivered ('no') erved all map all other values not explicitly defined onto one of the values defined in this version of the protocol. all return a negotiated value which is explicitly defined in this version of this protocol. onsider all other values as reserved. octet 6 (see 3GPP TS 23.107)
0 0 0 Subs In network to M 0 0 0 Rese In MS to netword 0 1 No d 0 1 0 Error 0 1 1 Error 1 1 1 Rese The network sh The network sh The MS shall co Delivery order, Bits 5 4 3 In MS to netword	scribed delivery of erroneous SDUs S direction: erved rk direction and in network to MS direction : letect ('-') neous SDUs are delivered ('yes') neous SDUs are not delivered ('no') erved all map all other values not explicitly defined onto one of the values defined in this version of the protocol. all return a negotiated value which is explicitly defined in this version of this protocol. onsider all other values as reserved. octet 6 (see 3GPP TS 23.107) rk direction:
0 0 0 Subs In network to M 0 0 0 Rese In MS to netword 0 1 No d 0 1 0 Error 0 1 1 Error 1 1 1 Rese The network sh The network sh The MS shall co Delivery order, Bits 5 4 3 In MS to netword 0 0 Subscritt	scribed delivery of erroneous SDUs IS direction: erved rk direction and in network to MS direction : letect ('-') neous SDUs are delivered ('yes') neous SDUs are not delivered ('no') erved all map all other values not explicitly defined onto one of the values defined in this version of the protocol. all return a negotiated value which is explicitly defined in this version of this protocol. onsider all other values as reserved. octet 6 (see 3GPP TS 23.107) rk direction: bed delivery order
0 0 0 Subs In network to M 0 0 0 Rese In MS to netword 0 1 No d 0 1 0 Error 0 1 1 Error 1 1 1 Rese The network sh The network sh The MS shall co Delivery order, Bits 5 4 3 In MS to netword 0 0 Subscritt In network to M	scribed delivery of erroneous SDUs S direction: erved rk direction and in network to MS direction : letect ('-') neous SDUs are delivered ('yes') neous SDUs are not delivered ('no') erved all map all other values not explicitly defined onto one of the values defined in this version of the protocol. all return a negotiated value which is explicitly defined in this version of this protocol. onsider all other values as reserved. octet 6 (see 3GPP TS 23.107) rk direction: bed delivery order S direction:
0 0 0 Subs In network to M 0 0 0 Rese In MS to netword 0 1 No d 0 1 0 Error 0 1 1 Error 1 1 1 Rese The network sh The network sh The MS shall co Delivery order, Bits 5 4 3 In MS to netword 0 0 Subscrib In network to M 0 0 Reserved	scribed delivery of erroneous SDUs S direction: erved rk direction and in network to MS direction : letect ('-') neous SDUs are delivered ('yes') neous SDUs are not delivered ('no') erved all map all other values not explicitly defined onto one of the values defined in this version of the protocol. all return a negotiated value which is explicitly defined in this version of this protocol. onsider all other values as reserved. octet 6 (see 3GPP TS 23.107) rk direction: bed delivery order S direction:
0 0 0 Subs In network to M 0 0 0 Rese In MS to netword 0 1 No d 0 1 0 Error 0 1 1 Error 1 1 1 Rese The network sh The network sh The MS shall co Delivery order, Bits 5 4 3 In MS to netword 0 0 Subscrib In network to M 0 0 Reserve In MS to netword	scribed delivery of erroneous SDUs S direction: erved rk direction and in network to MS direction : letect ('-') neous SDUs are delivered ('yes') neous SDUs are not delivered ('no') erved all map all other values not explicitly defined onto one of the values defined in this version of the protocol. all return a negotiated value which is explicitly defined in this version of this protocol. onsider all other values as reserved. octet 6 (see 3GPP TS 23.107) rk direction: bed delivery order S direction: d rk direction and in network to MS direction :
0 0 0 Subs In network to M 0 0 0 Rese In MS to netword 0 1 No d 0 1 0 Error 0 1 1 Error 1 1 1 Rese The network sh The network sh The MS shall co Delivery order, Bits 5 4 3 In MS to netword 0 0 Subscritt In network to M 0 0 Reserver In MS to netword 0 1 With del	scribed delivery of erroneous SDUs S direction: erved rk direction and in network to MS direction : letect ('-') neous SDUs are delivered ('yes') neous SDUs are not delivered ('no') erved all map all other values not explicitly defined onto one of the values defined in this version of the protocol. all return a negotiated value which is explicitly defined in this version of this protocol. onsider all other values as reserved. octet 6 (see 3GPP TS 23.107) rk direction: bed delivery order S direction:
0 0 0 Subs In network to M 0 0 0 Rese In MS to netword 0 1 No d 0 1 0 Error 0 1 1 Error 1 1 1 Rese The network sh The network sh The MS shall co Delivery order, Bits 5 4 3 In MS to netword 0 0 Subscrib In network to M 0 0 Reserve In MS to netword 0 1 With del	scribed delivery of erroneous SDUs S direction: erved rk direction and in network to MS direction : letect ('-') neous SDUs are delivered ('yes') neous SDUs are not delivered ('no') erved all map all other values not explicitly defined onto one of the values defined in this version of the protocol. all return a negotiated value which is explicitly defined in this version of this protocol. onsider all other values as reserved. octet 6 (see 3GPP TS 23.107) rk direction: bed delivery order S direction: id rk direction and in network to MS direction : ivery order ('yes') delivery order ('no')

Traffic class, octet 6 (see 3GPP TS 23.107) Bits 876 In MS to network direction: Subscribed traffic class 000 In network to MS direction: 000 Reserved In MS to network direction and in network to MS direction : 001 Conversational class 010 Streaming class Interactive class 011 100 Background class 111 Reserved The network shall map all other values not explicitly defined onto one of the values defined in this version of the protocol. The network shall return a negotiated value which is explicitly defined in this version of this protocol. The MS shall consider all other values as reserved. Maximum SDU size, octet 7 (see 3GPP TS 23.107) In MS to network direction: 00000000 Subscribed maximum SDU size Reserved 11111111 In network to MS direction: 00000000 Reserved 11111111 Reserved In MS to network direction and in network to MS direction : For values in the range 00000001 to 10010110 the Maximum SDU size value is binary coded in 8 bits, using a granularity of 10 octets, giving a range of values from 10 octets to 1500 octets. Values above 10010110 are as below: 10010111 1502 octets 10011000 1510 octets 1520 octets 10011001 The network shall map all other values not explicitly defined onto one of the values defined in this version of the protocol. The network shall return a negotiated value which is explicitly defined in this version of this protocol. The MS shall consider all other values as reserved. Maximum bit rate for uplink, octet 8 Bits 87654321 In MS to network direction: 0000000 Subscribed maximum bit rate for uplink In network to MS direction: 0000000 Reserved In MS to network direction and in network to MS direction : 0000001 The maximum bit rate is binary coded in 8 bits, using a granularity of 1 kbps 00111111 giving a range of values from 1 kbps to 63 kbps in 1 kbps increments. 01000000 The maximum bit rate is 64 kbps + ((the binary coded value in 8 bits -01000000) * 8 kbps) giving a range of values from 64 kbps to 568 kbps in 8 kbps increments. 01111111 10000000 The maximum bit rate is 576 kbps + ((the binary coded value in 8 bits -10000000) * 64 kbps) giving a range of values from 576 kbps to 8640 kbps in 64 kbps increments. 11111110 11111111 0kbps Maximum bit rate for downlink, octet 9 (see 3GPP TS 23.107)

Coding is identical to that of Maximum bit rate for uplink.

Residual Bit Error Rate (BER), octet 10 (see 3GPP TS 23.107) Bits 8765 In MS to network direction: Subscribed residual BER 0000 In network to MS direction: 0000 Reserved In MS to network direction and in network to MS direction : The Residual BER value consists of 4 bits. The range is from $5*10^{-2}$ to $6*10^{-8}$. 0001 5*10⁻² 1*10⁻² 0010 5*10⁻³ 0011 4*10⁻³ 0100 1*10⁻³ 0101 1*10⁻⁴ 0110 1*10⁻⁵ 0111 1*10⁻⁶ 1000 6*10⁻⁸ 1001 1111 Reserved The network shall map all other values not explicitly defined onto one of the values defined in this version of the protocol. The network shall return a negotiated value which is explicitly defined in this version of the protocol. The MS shall consider all other values as reserved. SDU error ratio, octet 10 (see 3GPP TS 23.107) Bits 4321 In MS to network direction: Subscribed SDU error ratio 0000 In network to MS direction: 0000 Reserved In MS to network direction and in network to MS direction : The SDU error ratio value consists of 4 bits. The range is is from $1*10^{-1}$ to $1*10^{-6}$. 0001 1*10⁻² 7*10⁻³ 0010 1*10⁻³ 0011 1*10⁻⁴ 0100 1*10⁻⁵ 0101 1*10⁻⁶ 0110 1*10⁻¹ 0111 1111 Reserved The network shall map all other values not explicitly defined onto one of the values defined in this version of the protocol. The network shall return a negotiated value which is explicitly defined in this version of the protocol. The MS shall consider all other values as reserved. Traffic handling priority, octet 11 (see 3GPP TS 23.107) Bits 21 In MS to network direction: 0.0 Subscribed traffic handling priority In network to MS direction: 0.0 Reserved In MS to network direction and in network to MS direction : 01 Priority level 1 10 Priority level 2 Priority level 3 11 The Traffic handling priority value is ignored if the Traffic Class is Conversation class, Streaming class or Background class. Transfer delay, octet 11 (See 3GPP TS 23.107) Bits 876543

In MS to network direction: 0 0 0 0 0 0 Subscribed transfer delay In network to MS direction: Reserved 000000 In MS to network direction and in network to MS direction : 000001 The Transfer delay is binary coded in 6 bits, using a granularity of 10 ms 001111 giving a range of values from 10 ms to 150 ms in 10 ms increments 010000 The transfer delay is 200 ms + ((the binary coded value in 6 bits - 010000) * 50 ms) giving a range of values from 200 ms to 950 ms in 50ms increments 011111 100000 The transfer delay is 1000 ms + ((the binary coded value in 6 bits - 100000) * 100 ms) giving a range of values from 1000 ms to 4100 4000 ms in 100ms increments 111110 111111 Reserved The Transfer delay value is ignored if the Traffic Class is Interactive class or Background class. Guaranteed bit rate for uplink, octet 12 (See 3GPP TS 23.107) Coding is identical to that of Maximum bit rate for uplink. The Guaranteed bit rate for uplink value is ignored if the Traffic Class is Interactive class or Background class, or Maximum bit rate for uplink is set to 0 kbps. Guaranteed bit rate for downlink, octet 13(See 3GPP TS 23.107) Coding is identical to that of Maximum bit rate for uplink.

The Guaranteed bit rate for downlink value is ignored if the Traffic Class is Interactive class or Background class, or Maximum bit rate for downlink is set to 0 kbps.