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

CR-Form-v4

CHANGE REQUEST

| ⌘ | **24.008** CR **499** | ⌘ | ev | **-** | ⌘ | Current version: | **3.9.0** | ⌘ |

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network ☐ Core Network **X**

Title: ⌘	Correction of maximum transfer delay value in Qos IE	
Source: ⌘	Nokia	
Work item code: ⌘	QoS	***Date:*** ⌘ 10-Oct-01
Category: ⌘ **F**		***Release:*** ⌘ R99

Use <u>one</u> of the following categories:
F (correction)
A (corresponds to a correction in an earlier release)
B (addition of feature),
C (functional modification of feature)
D (editorial modification)
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use <u>one</u> of the following releases:
2   (GSM Phase 2)
R96   (Release 1996)
R97   (Release 1997)
R98   (Release 1998)
R99   (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change: ⌘	The binary coded maximum value and the given decimal value of transfer delay do not match. This CR proposes to align the false decimal value with the correct binary coded value.
Summary of change: ⌘	Maximum transfer delay decimal value 4100ms is changed to 4000ms, which is in line with binary coding of the maximum delay value.
Consequences if not approved: ⌘	Two different maximum values of transfer delay exist. 4100ms delay may be implemented to correspond with binary coded value 111111, which is reserved value, or maximum binary value of 111110 may be implemented to correspond with 4100ms instead of 4000ms.

Clauses affected: ⌘	10.5.6.5
Other specs affected: ⌘	☐ Other core specifications ⌘
	☐ Test specifications
	☐ O&M Specifications
Other comments: ⌘	

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.

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 ftp://ftp.3gpp.org/specs/ 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	
Quality of service IEI								octet 1
Length of quality of service IE								Octet 2
0 0 spare		Delay class		Reliability class				octet 3
Peak throughput				0 spare	Precedence class			octet 4
0 0 0 spare			Mean throughput					octet 5
Traffic Class			Delivery order		Delivery of erroneous SDU			Octet 6
Maximum SDU size								Octet 7
Maximum bit rate for uplink								Octet 8
Maximum bit rate for downlink								Octet 9
Residual BER				SDU error ratio				Octet 10
Transfer delay						Traffic Handling priority		Octet 11
Guaranteed bit rate for uplink								Octet 12
Guaranteed bit rate for downlink								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
3 2 1
In MS to network direction:
0 0 0   Subscribed reliability class
In network to MS direction:
0 0 0   Reserved
In MS to network direction and in network to MS direction :
0 0 1   Acknowledged GTP, LLC, and RLC; Protected data
0 1 0   Unacknowledged GTP; Acknowledged LLC and RLC, Protected data
0 1 1   Unacknowledged GTP and LLC; Acknowledged RLC, Protected data
1 0 0   Unacknowledged GTP, LLC, and RLC, Protected data
1 0 1   Unacknowledged GTP, LLC, and RLC, Unprotected data
1 1 1   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
6 5 4
In MS to network direction:
0 0 0   Subscribed delay class
In network to MS direction:
0 0 0   Reserved
In MS to network direction and in network to MS direction :

```
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 *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
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 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
1 1 1 1   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

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 :
0 0 0 0 1   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   100 000 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   10 000 000 octet/h
1 0 0 0 1   20 000 000 octet/h
1 0 0 1 0   50 000 000 octet/h
1 1 1 1 0   Reserved
1 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
3 2 1
In MS to network direction:
0 0 0   Subscribed delivery of erroneous SDUs
In network to MS direction:
0 0 0   Reserved
In MS to network direction and in network to MS direction :
0 0 1   No detect ('-')
0 1 0   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
5 4 3
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

Traffic class, octet 6 (see 3GPP TS 23.107)
Bits
8 7 6
In MS to network direction:
0 0 0　　　Subscribed traffic class
In network to MS direction:
0 0 0　　　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
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 0　　　Subscribed maximum SDU size
1 1 1 1 1 1 1 1　　　Reserved
In network to MS direction:
0 0 0 0 0 0 0 0　　　Reserved
1 1 1 1 1 1 1 1　　　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:
1 0 0 1 0 1 1 1　　　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
8 7 6 5 4 3 2 1
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 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)
0 1 1 1 1 1 1 1　　giving a range of values from 64 kbps to 568 kbps in 8 kbps increments.

1 0 0 0 0 0 0 0　　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.

1 1 1 1 1 1 1 1　　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
8 7 6 5
In MS to network direction:
0 0 0 0   Subscribed residual BER
In network to MS direction:
0 0 0 0   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 $6*10^{-8}$.
0 0 0 1 $5*10^{-2}$
0 0 1 0 $1*10^{-2}$
0 0 1 1 $5*10^{-3}$
0 1 0 0 $4*10^{-3}$
0 1 0 1 $1*10^{-3}$
0 1 1 0 $1*10^{-4}$
0 1 1 1 $1*10^{-5}$
1 0 0 0 $1*10^{-6}$
1 0 0 1 $6*10^{-8}$
1 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 the protocol.

The MS shall consider all other values as reserved.

SDU error ratio, octet 10 (see 3GPP TS 23.107)
Bits
4 3 2 1
In MS to network direction:
0 0 0 0   Subscribed SDU error ratio
In network to MS direction:
0 0 0 0   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 $1*10^{-6}$.
0 0 0 1 $1*10^{-2}$
0 0 1 0 $7*10^{-3}$
0 0 1 1 $1*10^{-3}$
0 1 0 0 $1*10^{-4}$
0 1 0 1 $1*10^{-5}$
0 1 1 0 $1*10^{-6}$
0 1 1 1 $1*10^{-1}$
1 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 the protocol.

The MS shall consider all other values as reserved.

Traffic handling priority, octet 11 (see 3GPP TS 23.107)
Bits
2 1
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 :
0 1   Priority level 1
1 0   Priority level 2
1 1   Priority level 3

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
8 7 6 5 4 3

In MS to network direction:
0 0 0 0 0 0   Subscribed transfer delay
In network to MS direction:
0 0 0 0 0 0   Reserved
In MS to network direction and in network to MS direction :

0 0 0 0 0 1   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

0 1 0 0 0 0   The transfer delay is 200 ms + ((the binary coded value in 6 bits – 010000) * 50 ms)
0 1 1 1 1 1   giving a range of values from 200 ms to 950 ms in 50ms increments

1 0 0 0 0 0   The transfer delay is 1000 ms + ((the binary coded value in 6 bits – 100000) * 100 ms)
1 1 1 1 1 0   giving a range of values from 1000 ms to ~~4100~~ 4000 ms in 100ms increments

1 1 1 1 1 1   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.

CR-Form-v4

CHANGE REQUEST

| ⌘ | **24.008** CR **500** | ⌘ | ev | **-** | ⌘ | Current version: | **4.4.0** | ⌘ |

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘   (U)SIM ☐   ME/UE **X**   Radio Access Network ☐   Core Network **X**

Title:	⌘	Correction of maximum transfer delay value in Qos IE
Source:	⌘	Nokia
Work item code: ⌘		QoS ***Date:*** ⌘ 10-Oct-01
Category: ⌘	**A**	***Release:*** ⌘ REL-4

Use one of the following categories:
F (correction)
A (corresponds to a correction in an earlier release)
B (addition of feature),
C (functional modification of feature)
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Detailed explanations of the above categories can
be found in 3GPP TR 21.900.

Use one of the following releases:
2   (GSM Phase 2)
R96   (Release 1996)
R97   (Release 1997)
R98   (Release 1998)
R99   (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change:	⌘	The binary coded maximum value and the given decimal value of transfer delay do not match. This CR proposes to align the false decimal value with the correct binary coded value.
Summary of change: ⌘		Maximum transfer delay decimal value 4100ms is changed to 4000ms, which is in line with binary coding of the maximum delay value.
Consequences if not approved:	⌘	Two different maximum values of transfer delay exist. 4100ms delay may be implemented to correspond with binary coded value 111111, which is reserved value, or maximum binary value of 111110 may be implemented to correspond with 4100ms instead of 4000ms.

Clauses affected:	⌘	10.5.6.5
Other specs affected:	⌘ ☐	Other core specifications ⌘
	☐	Test specifications
	☐	O&M Specifications
Other comments:	⌘	

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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	
Quality of service IEI								octet 1
Length of quality of service IE								Octet 2
0 0 spare		Delay class			Reliability class			octet 3
Peak throughput				0 spare	Precedence class			octet 4
0 0 0 spare			Mean throughput					octet 5
Traffic Class			Delivery order		Delivery of erroneous SDU			Octet 6
Maximum SDU size								Octet 7
Maximum bit rate for uplink								Octet 8
Maximum bit rate for downlink								Octet 9
Residual BER				SDU error ratio				Octet 10
Transfer delay						Traffic Handling priority		Octet 11
Guaranteed bit rate for uplink								Octet 12
Guaranteed bit rate for downlink								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
3 2 1
In MS to network direction:
0 0 0   Subscribed reliability class
In network to MS direction:
0 0 0   Reserved
In MS to network direction and in network to MS direction :
0 0 1   Acknowledged GTP, LLC, and RLC; Protected data
0 1 0   Unacknowledged GTP; Acknowledged LLC and RLC, Protected data
0 1 1   Unacknowledged GTP and LLC; Acknowledged RLC, Protected data
1 0 0   Unacknowledged GTP, LLC, and RLC, Protected data
1 0 1   Unacknowledged GTP, LLC, and RLC, Unprotected data
1 1 1   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
6 5 4
In MS to network direction:
0 0 0   Subscribed delay class
In network to MS direction:
0 0 0   Reserved
In MS to network direction and in network to MS direction :

```
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 *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
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 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
1 1 1 1   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

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 :
0 0 0 0 1   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   100 000 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   10 000 000 octet/h
1 0 0 0 1   20 000 000 octet/h
1 0 0 1 0   50 000 000 octet/h
1 1 1 1 0   Reserved
1 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
3 2 1
In MS to network direction:
0 0 0   Subscribed delivery of erroneous SDUs
In network to MS direction:
0 0 0   Reserved
In MS to network direction and in network to MS direction :
0 0 1   No detect ('-')
0 1 0   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
5 4 3
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

Traffic class, octet 6 (see 3GPP TS 23.107)
Bits
8 7 6
In MS to network direction:
0 0 0   Subscribed traffic class
In network to MS direction:
0 0 0   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
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 0   Subscribed maximum SDU size
1 1 1 1 1 1 1 1   Reserved
In network to MS direction:
0 0 0 0 0 0 0 0   Reserved
1 1 1 1 1 1 1 1   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:
1 0 0 1 0 1 1 1   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
8 7 6 5 4 3 2 1
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 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)
0 1 1 1 1 1 1 1   giving a range of values from 64 kbps to 568 kbps in 8 kbps increments.

1 0 0 0 0 0 0 0   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.

1 1 1 1 1 1 1 1   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
8 7 6 5
In MS to network direction:
0 0 0 0   Subscribed residual BER
In network to MS direction:
0 0 0 0   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 $6*10^{-8}$.
0 0 0 1 $5*10^{-2}$
0 0 1 0 $1*10^{-2}$
0 0 1 1 $5*10^{-3}$
0 1 0 0 $4*10^{-3}$
0 1 0 1 $1*10^{-3}$
0 1 1 0 $1*10^{-4}$
0 1 1 1 $1*10^{-5}$
1 0 0 0 $1*10^{-6}$
1 0 0 1 $6*10^{-8}$
1 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 the protocol.

The MS shall consider all other values as reserved.

SDU error ratio, octet 10 (see 3GPP TS 23.107)
Bits
4 3 2 1
In MS to network direction:
0 0 0 0   Subscribed SDU error ratio
In network to MS direction:
0 0 0 0   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 $1*10^{-6}$.
0 0 0 1 $1*10^{-2}$
0 0 1 0 $7*10^{-3}$
0 0 1 1 $1*10^{-3}$
0 1 0 0 $1*10^{-4}$
0 1 0 1 $1*10^{-5}$
0 1 1 0 $1*10^{-6}$
0 1 1 1 $1*10^{-1}$
1 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 the protocol.

The MS shall consider all other values as reserved.

Traffic handling priority, octet 11 (see 3GPP TS 23.107)
Bits
2 1
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 :
0 1   Priority level 1
1 0   Priority level 2
1 1   Priority level 3

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
8 7 6 5 4 3

In MS to network direction:
0 0 0 0 0 0   Subscribed transfer delay
In network to MS direction:
0 0 0 0 0 0   Reserved
In MS to network direction and in network to MS direction :

0 0 0 0 0 1   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

0 1 0 0 0 0   The transfer delay is 200 ms + ((the binary coded value in 6 bits – 010000) * 50 ms)
0 1 1 1 1 1   giving a range of values from 200 ms to 950 ms in 50ms increments

1 0 0 0 0 0   The transfer delay is 1000 ms + ((the binary coded value in 6 bits – 100000) * 100 ms)
1 1 1 1 1 0   giving a range of values from 1000 ms to 4100 4000 ms in 100ms increments

1 1 1 1 1 1   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.

CR-Form-v4

CHANGE REQUEST

| ⌘ | **24.008** CR **501** | ⌘ | ev | **-** | ⌘ | Current version: | **5.1.0** | ⌘ |

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network ☐ Core Network **X**

Title:	⌘	Correction of maximum transfer delay value in Qos IE

Source:	⌘	Nokia

Work item code: ⌘	QoS		**Date:** ⌘	10-Oct-01

Category:	⌘	**A**		**Release:** ⌘	REL-5

Use *one* of the following categories:
F (correction)
A (corresponds to a correction in an earlier release)
B (addition of feature),
C (functional modification of feature)
D (editorial modification)
Detailed explanations of the above categories can
be found in 3GPP TR 21.900.

Use *one* of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change:	⌘	The binary coded maximum value and the given decimal value of transfer delay do not match. This CR proposes to align the false decimal value with the correct binary coded value.

Summary of change:	⌘	Maximum transfer delay decimal value 4100ms is changed to 4000ms, which is in line with binary coding of the maximum delay value.

Consequences if not approved:	⌘	Two different maximum values of transfer delay exist. 4100ms delay may be implemented to correspond with binary coded value 111111, which is reserved value, or maximum binary value of 111110 may be implemented to correspond with 4100ms instead of 4000ms.

Clauses affected:	⌘	10.5.6.5

Other specs affected:	⌘	☐ Other core specifications	⌘	
		☐ Test specifications		
		☐ O&M Specifications		

Other comments:	⌘	

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. 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 ftp://ftp.3gpp.org/specs/ 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	
Quality of service IEI								octet 1
Length of quality of service IE								Octet 2
0 0 spare		Delay class			Reliability class			octet 3
Peak throughput				0 spare	Precedence class			octet 4
0 0 0 spare			Mean throughput					octet 5
Traffic Class			Delivery order		Delivery of erroneous SDU			Octet 6
Maximum SDU size								Octet 7
Maximum bit rate for uplink								Octet 8
Maximum bit rate for downlink								Octet 9
Residual BER				SDU error ratio				Octet 10
Transfer delay						Traffic Handling priority		Octet 11
Guaranteed bit rate for uplink								Octet 12
Guaranteed bit rate for downlink								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
3 2 1
In MS to network direction:
0 0 0   Subscribed reliability class
In network to MS direction:
0 0 0   Reserved
In MS to network direction and in network to MS direction :
0 0 1   Acknowledged GTP, LLC, and RLC; Protected data
0 1 0   Unacknowledged GTP; Acknowledged LLC and RLC, Protected data
0 1 1   Unacknowledged GTP and LLC; Acknowledged RLC, Protected data
1 0 0   Unacknowledged GTP, LLC, and RLC, Protected data
1 0 1   Unacknowledged GTP, LLC, and RLC, Unprotected data
1 1 1   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
6 5 4
In MS to network direction:
0 0 0   Subscribed delay class
In network to MS direction:
0 0 0   Reserved
In MS to network direction and in network to MS direction :

```
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 *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
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 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
1 1 1 1   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

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 :
0 0 0 0 1   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   100 000 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   10 000 000 octet/h
1 0 0 0 1   20 000 000 octet/h
1 0 0 1 0   50 000 000 octet/h
1 1 1 1 0   Reserved
1 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
3 2 1
In MS to network direction:
0 0 0   Subscribed delivery of erroneous SDUs
In network to MS direction:
0 0 0   Reserved
In MS to network direction and in network to MS direction :
0 0 1   No detect ('-')
0 1 0   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
5 4 3
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

Traffic class, octet 6 (see 3GPP TS 23.107)
Bits
8 7 6
In MS to network direction:
0 0 0   Subscribed traffic class
In network to MS direction:
0 0 0   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
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 0   Subscribed maximum SDU size
1 1 1 1 1 1 1 1   Reserved
In network to MS direction:
0 0 0 0 0 0 0 0   Reserved
1 1 1 1 1 1 1 1   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:
1 0 0 1 0 1 1 1   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
8 7 6 5 4 3 2 1
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 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)
0 1 1 1 1 1 1 1   giving a range of values from 64 kbps to 568 kbps in 8 kbps increments.

1 0 0 0 0 0 0 0   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.

1 1 1 1 1 1 1 1   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

8 7 6 5

In MS to network direction:

0 0 0 0   Subscribed residual BER

In network to MS direction:

0 0 0 0   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 $6*10^{-8}$.

0 0 0 1 $5*10^{-2}$
0 0 1 0 $1*10^{-2}$
0 0 1 1 $5*10^{-3}$
0 1 0 0 $4*10^{-3}$
0 1 0 1 $1*10^{-3}$
0 1 1 0 $1*10^{-4}$
0 1 1 1 $1*10^{-5}$
1 0 0 0 $1*10^{-6}$
1 0 0 1 $6*10^{-8}$
1 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 the protocol.

The MS shall consider all other values as reserved.

SDU error ratio, octet 10 (see 3GPP TS 23.107)

Bits

4 3 2 1

In MS to network direction:

0 0 0 0   Subscribed SDU error ratio

In network to MS direction:

0 0 0 0   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 $1*10^{-6}$.

0 0 0 1 $1*10^{-2}$
0 0 1 0 $7*10^{-3}$
0 0 1 1 $1*10^{-3}$
0 1 0 0 $1*10^{-4}$
0 1 0 1 $1*10^{-5}$
0 1 1 0 $1*10^{-6}$
0 1 1 1 $1*10^{-1}$
1 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 the protocol.

The MS shall consider all other values as reserved.

Traffic handling priority, octet 11 (see 3GPP TS 23.107)

Bits

2 1

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 :

0 1   Priority level 1
1 0   Priority level 2
1 1   Priority level 3

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

8 7 6 5 4 3

In MS to network direction:
0 0 0 0 0 0   Subscribed transfer delay
In network to MS direction:
0 0 0 0 0 0   Reserved
In MS to network direction and in network to MS direction :

0 0 0 0 0 1   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

0 1 0 0 0 0   The transfer delay is 200 ms + ((the binary coded value in 6 bits – 010000) * 50 ms)
0 1 1 1 1 1   giving a range of values from 200 ms to 950 ms in 50ms increments

1 0 0 0 0 0   The transfer delay is 1000 ms + ((the binary coded value in 6 bits – 100000) * 100 ms)
1 1 1 1 1 0   giving a range of values from 1000 ms to 4100 4000 ms in 100ms increments

1 1 1 1 1 1   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.