

**3GPP TSG-SA Meeting #26**  
**13<sup>th</sup> ñ 16<sup>th</sup> December 2004. Athens, Greece.**

**TSGS#26(04) 0912**  
**rev TSGS#26(04) 0895**

**Source:** TSG SA WG2  
**Title:** CRs on 23.107 (QoS)  
**Agenda item:** 7.2.3  
**Document for:** APPROVAL

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The following CRs have been agreed by TSG SA WG2 and are requested to be approved by TSG SA plenary #26.

**Note:** the source of all these CRs is now SA2, even if the name of the originating company(ies) is still reflected on the cover page of all the attached CRs.

<b>S2 doc #</b>	<b>Title</b>	<b>Spec</b>	<b>CR #</b>	<b>Rev</b>	<b>Cat</b>	<b>C_Ver</b>	<b>Rel</b>	<b>WI</b>
<u>S2-043920</u>	Clarification on delivery order set to no	23.107	152	3	F	5.12.0	Rel-5	TEI5
<u>S2-043921</u>	Clarification on delivery order set to no	23.107	153	3	A	6.1.0	Rel-6	TEI6

CR-Form-v7.1

## CHANGE REQUEST

**23.107 CR 152** rev **3** Current version: **5.12.0**

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

**Proposed change affects:**  UICC apps  ME  Radio Access Network  Core Network

<b>Title:</b>	Clarification on delivery order set to no		
<b>Source:</b>	Vodafone, Ericsson		
<b>Work item code:</b>	TEI5	<b>Date:</b>	18/11/2004
<b>Category:</b>	<b>F</b>	<b>Release:</b>	Rel-5
Use <i>one</i> of the following categories: <b>F</b> (correction) <b>A</b> (corresponds to a correction in an earlier release) <b>B</b> (addition of feature), <b>C</b> (functional modification of feature) <b>D</b> (editorial modification) Detailed explanations of the above categories can be found in 3GPP <a href="#">TR 21.900</a> .		Use <i>one</i> of the following releases: <b>Ph2</b> (GSM Phase 2) <b>R96</b> (Release 1996) <b>R97</b> (Release 1997) <b>R98</b> (Release 1998) <b>R99</b> (Release 1999) <b>Rel-4</b> (Release 4) <b>Rel-5</b> (Release 5) <b>Rel-6</b> (Release 6) <b>Rel-7</b> (Release 7)	

<b>Reason for change:</b>	Following the change to suggest that delivery order be set to "no" in CR #148, it is necessary to clarify which entities are responsible for setting/policing this attribute value
<b>Summary of change:</b>	Adds text for the SGSN to verify the use of delivery order. Also for the UE to set to "no" where possible.
<b>Consequences if not approved:</b>	It is unclear which entity is responsible for setting delivery order to "no" for IP PDP types, otherwise it may cause further misimplementations

<b>Clauses affected:</b>	6.4.3.1, 9.1.2.2						
<b>Other specs affected:</b>	<table border="1" style="border-collapse: collapse;"> <tr> <td style="padding: 2px;">Y</td> <td style="padding: 2px;">N</td> </tr> <tr> <td style="text-align: center; padding: 2px;"><input checked="" type="checkbox"/></td> <td style="text-align: center; padding: 2px;"><input checked="" type="checkbox"/></td> </tr> </table>	Y	N	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Other core specifications	
	Y	N					
	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>					
	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Test specifications				
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	O&M Specifications					
<b>Other comments:</b>							

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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.

**\*\*\*\*\* FIRST MODIFIED SECTION \*\*\*\*\*****6.4.3.1 List of attributes****Traffic class ('conversational', 'streaming', 'interactive', 'background')**

Definition: type of application for which the UMTS bearer service is optimised

*[Purpose: By including the traffic class itself as an attribute, UMTS can make assumptions about the traffic source and optimise the transport for that traffic type.]*

**Maximum bitrate (kbps)**

Definition: maximum number of bits delivered by UMTS and to UMTS at a SAP within a period of time, divided by the duration of the period. The traffic is conformant with Maximum bitrate as long as it follows a token bucket algorithm where token rate equals Maximum bitrate and bucket size equals Maximum SDU size.

The conformance definition should not be interpreted as a required implementation algorithm. The token bucket algorithm is described in annex B.

The Maximum bitrate is the upper limit a user or application can accept or provide. All UMTS bearer service attributes may be fulfilled for traffic up to the Maximum bitrate depending on the network conditions.

*[Purpose: Maximum bitrate can be used to make code reservations in the downlink of the radio interface. Its purpose is 1) to limit the delivered bitrate to applications or external networks with such limitations 2) to allow maximum wanted user bitrate to be defined for applications able to operate with different rates (e.g. applications with adapting codecs).]*

**Guaranteed bitrate (kbps)**

Definition: guaranteed number of bits delivered by UMTS at a SAP within a period of time (provided that there is data to deliver), divided by the duration of the period. The traffic is conformant with the guaranteed bitrate as long as it follows a token bucket algorithm where token rate equals Guaranteed bitrate and bucket size equals Maximum SDU size.

The conformance definition should not be interpreted as a required implementation algorithm. The token bucket algorithm is described in annex B.

UMTS bearer service attributes, e.g. delay and reliability attributes, are guaranteed for traffic up to the Guaranteed bitrate. For the traffic exceeding the Guaranteed bitrate the UMTS bearer service attributes are not guaranteed.

*[Purpose: Describes the bitrate the UMTS bearer service shall guarantee to the user or application. Guaranteed bitrate may be used to facilitate admission control based on available resources, and for resource allocation within UMTS.]*

**Delivery order (y/n)**

Definition: indicates whether the UMTS bearer shall provide in-sequence SDU delivery or not.

*[Purpose: the attribute is derived from the user protocol (PDP type) and specifies if out-of-sequence SDUs are acceptable or not. This information cannot be extracted from the traffic class. Whether out-of-sequence SDUs are dropped or re-ordered depends on the specified reliability]*

**Note:**—Delivery order should be set to 'no' for PDP Type = 'IPv4' or 'IPv6'. [The SGSN should ensure that the appropriate value is set.](#)

**Maximum SDU size (octets)**

Definition: the maximum SDU size for which the network shall satisfy the negotiated QoS.

*[Purpose: The maximum SDU size is used for admission control and policing and/or optimising transport (optimized transport in for example the RAN may be dependent on the size of the packets). Handling by the network of packets larger than Maximum SDU size is implementation specific (e.g. they may be dropped or forwarded with decreased QoS).]*

*Note: The Maximum Transfer Unit (MTU) of the IP layer and the Maximum SDU Size have no relationship; in particular the GGSN should not perform IP fragmentation based on the Maximum SDU Size.*

**SDU format information (bits)**

Definition: list of possible exact sizes of SDUs

*[Purpose: RAN needs SDU size information to be able to operate in transparent RLC protocol mode, which is beneficial to spectral efficiency and delay when RLC re-transmission is not used. Thus, if the application can specify SDU sizes, the bearer is less expensive.]*

**SDU error ratio**

Definition: Indicates the fraction of SDUs lost or detected as erroneous. SDU error ratio is defined only for conforming traffic.

NOTE 1: By reserving resources, SDU error ratio performance is independent of the loading conditions, whereas without reserved resources, such as in Interactive and Background classes, SDU error ratio is used as target value.

*[Purpose: Used to configure the protocols, algorithms and error detection schemes, primarily within RAN.]*

**Residual bit error ratio**

Definition: Indicates the undetected bit error ratio in the delivered SDUs. If no error detection is requested, Residual bit error ratio indicates the bit error ratio in the delivered SDUs.

*[Purpose: Used to configure radio interface protocols, algorithms and error detection coding.]*

**Delivery of erroneous SDUs (y/n/-)**

Definition: Indicates whether SDUs detected as erroneous shall be delivered or discarded.

NOTE 2: 'yes' implies that error detection is employed and that erroneous SDUs are delivered together with an error indication, 'no' implies that error detection is employed and that erroneous SDUs are discarded, and '-' implies that SDUs are delivered without considering error detection.

*[Purpose: Used to decide whether error detection is needed and whether frames with detected errors shall be forwarded or not.]*

**Transfer delay (ms)**

Definition: Indicates maximum delay for 95<sup>th</sup> percentile of the distribution of delay for all delivered SDUs during the lifetime of a bearer service, where delay for an SDU is defined as the time from a request to transfer an SDU at one SAP to its delivery at the other SAP.

*[Purpose: relates to the delay tolerated by the application. In conjunction with the SDU error ratio attribute, care needs to be taken in deriving the value for the 95th percentile when an application desires, for example, that 99.9% of all transmitted packets are delivered within a certain time. This attribute allows RAN to set transport formats and ARQ parameters.]*

NOTE 3: Transfer delay of an arbitrary SDU is not meaningful for a bursty source, since the last SDUs of a burst may have long delay due to queuing, whereas the meaningful response delay perceived by the user is the delay of the first SDU of the burst.

**Traffic handling priority**

Definition: specifies the relative importance for handling of all SDUs belonging to the UMTS bearer compared to the SDUs of other bearers.

*[Purpose: Within the interactive class, there is a definite need to differentiate between bearer qualities. This is handled by using the traffic handling priority attribute, to allow UMTS to schedule traffic accordingly. By definition, priority is an alternative to absolute guarantees, and thus these two attribute types cannot be used together for a single bearer.]*

**Allocation/Retention Priority**

Definition: specifies the relative importance compared to other UMTS bearers for allocation and retention of the UMTS bearer. The Allocation/Retention Priority attribute is a subscription attribute which is not negotiated from the mobile terminal.

NOTE 4: The addition of a user-controlled Allocation/Retention Priority attribute is for further study in future releases.

*[Purpose: Priority is used for differentiating between bearers when performing allocation and retention of a bearer. In situations where resources are scarce, the relevant network elements can use the Allocation/Retention Priority to prioritize bearers with a high Allocation/Retention Priority over bearers with a low Allocation/Retention Priority when performing admission control.]*

#### **Source statistics descriptor (ěspeechí/íunknowní)**

Definition: specifies characteristics of the source of submitted SDUs.

*[Note: The number of different source statistics descriptors that should be allowed is FFS.]*

*[Purpose: Conversational speech has a well-known statistical behaviour (or the discontinuous transmission (DTX) factor). By being informed that the SDUs for a UMTS bearer are generated by a speech source, RAN, the SGSN and the GGSN and also the UE may, based on experience, calculate a statistical multiplex gain for use in admission control on the relevant interfaces.]*

#### **Signalling Indication (Yes/No)**

Definition: Indicates the signalling nature of the submitted SDUs. This attribute is additional to the other QoS attributes and does not over-ride them. This attribute is only defined for the interactive traffic class. If signalling indication is set to ěYesí, the UE should set the traffic handling priority to ě1í.

*[Purpose: Signalling traffic can have different characteristics to other interactive traffic, eg higher priority, lower delay and increased peakiness. This attribute permits enhancing the RAN operation accordingly. An example use of the Signalling Indication is for IMS signalling traffic.]*

Note: this indication is sent by the UE in the QoS IE.

### **\*\*\*\*\* NEXT MODIFIED SECTION \*\*\*\*\***

#### **9.1.2.2 Determining R99 attributes from R97/98 attributes**

This mapping is applicable in the following cases:

- hand over of PDP Context from GPRS R97/98 SGSN to GPRS R99 or UMTS SGSN;
- PDP Context Activation in a serving R99 SGSN with a R97/98 GGSN. When GGSN respond to the PDP Context Activation, mapping of the changed R97/98 QoS attributes received from the GGSN to R99 QoS attributes is performed in the serving SGSN.

This mapping is also applicable if a R99 UE allows an application to request a PDP Context Activation with R97/98 QoS attributes, e.g. via AT command.

**Table 6: Rules for determining R99 attributes from R97/98 attributes**

Resulting R99 Attribute		Derived from R97/98 Attribute	
Name	Value	Value	Name
Traffic class	Interactive	1, 2, 3	Delay class
	Background	4	
Traffic handling priority	1	1	Delay class
	2	2	
	3	3	
SDU error ratio	$10^{-6}$	1, 2	Reliability class
	$10^{-4}$	3	
	$10^{-3}$	4, 5	
Residual bit error ratio	$10^{-5}$	1, 2, 3, 4	Reliability class
	$4 \cdot 10^{-3}$	5	
Delivery of erroneous SDUs	'no'	1, 2, 3, 4	Reliability class
	'yes'	5	
Maximum bitrate [kbps]	8	1	Peak throughput class
	16	2	
	32	3	
	64	4	
	128	5	
	256	6	
	512	7	
	1024	8	
	2048	9	
Allocation/Retention priority	1	1	Precedence class
	2	2	
	3	3	
Delivery order	'yes'	'yes'	Reordering Required (Information in the SGSN and the GGSN PDP Contexts)
	'no'	'no'	
Maximum SDU size	1 500 octets	(Fixed value)	

NOTE: As the allocation/retention priority attribute is not available in the UE (see 6.4.4.1) the mapping of the allocation/retention priority attribute is not relevant for the UE.

As the reordering required attribute is not available in the MS the MS ~~shall~~ should set the R99 delivery order attribute to the value "no" for PDP Type = "IPv4" or "IPv6", otherwise the MS shall set the delivery order attribute to the value "subscribed" (see 3GPP TS 24.008).

\*\*\*\* END OF CHANGES \*\*\*\*

CR-Form-v7.1

## CHANGE REQUEST

23.107 **CR 153** rev 3 Current version: 6.1.0

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

**Proposed change affects:** UICC apps  ME  Radio Access Network  Core Network

<b>Title:</b>	<span style="border: 1px solid black; padding: 2px;">☞</span> Clarification on delivery order set to no		
<b>Source:</b>	<span style="border: 1px solid black; padding: 2px;">☞</span> Vodafone, Ericsson		
<b>Work item code:</b>	<span style="border: 1px solid black; padding: 2px;">☞</span> TEI-6	<b>Date:</b>	<span style="border: 1px solid black; padding: 2px;">☞</span> 18/11/2004
<b>Category:</b>	<span style="border: 1px solid black; padding: 2px;">☞</span> <b>A</b> Use <u>one</u> of the following categories: <i>F</i> (correction) <i>A</i> (corresponds to a correction in an earlier release) <i>B</i> (addition of feature), <i>C</i> (functional modification of feature) <i>D</i> (editorial modification) Detailed explanations of the above categories can be found in 3GPP <a href="#">TR 21.900</a> .		<b>Release:</b> <span style="border: 1px solid black; padding: 2px;">☞</span> Rel-6 Use <u>one</u> of the following releases: <i>Ph2</i> (GSM Phase 2) <i>R96</i> (Release 1996) <i>R97</i> (Release 1997) <i>R98</i> (Release 1998) <i>R99</i> (Release 1999) <i>Rel-4</i> (Release 4) <i>Rel-5</i> (Release 5) <i>Rel-6</i> (Release 6) <i>Rel-7</i> (Release 7)

<b>Reason for change:</b>	<span style="border: 1px solid black; padding: 2px;">☞</span> Following the change to suggest that delivery order be set to "no" in CR #148, it is necessary to clarify which entities are responsible for setting/policing this attribute value
<b>Summary of change:</b>	<span style="border: 1px solid black; padding: 2px;">☞</span> Adds text for the SGSN to verify the use of delivery order. Also for the UE to set to "no" where possible.
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\*\*\*\*\* FIRST MODIFIED SECTION \*\*\*\*\*

### 6.4.3.1 List of attributes

#### Traffic class ('conversational', 'streaming', 'interactive', 'background')

Definition: type of application for which the UMTS bearer service is optimised

*[Purpose: By including the traffic class itself as an attribute, UMTS can make assumptions about the traffic source and optimise the transport for that traffic type.]*

#### Maximum bitrate (kbps)

Definition: maximum number of bits delivered by UMTS and to UMTS at a SAP within a period of time, divided by the duration of the period. The traffic is conformant with Maximum bitrate as long as it follows a token bucket algorithm where token rate equals Maximum bitrate and bucket size equals Maximum SDU size.

The conformance definition should not be interpreted as a required implementation algorithm. The token bucket algorithm is described in annex B.

The Maximum bitrate is the upper limit a user or application can accept or provide. All UMTS bearer service attributes may be fulfilled for traffic up to the Maximum bitrate depending on the network conditions.

*[Purpose: Maximum bitrate can be used to make code reservations in the downlink of the radio interface. Its purpose is 1) to limit the delivered bitrate to applications or external networks with such limitations 2) to allow maximum wanted user bitrate to be defined for applications able to operate with different rates (e.g. applications with adapting codecs).]*

#### Guaranteed bitrate (kbps)

Definition: guaranteed number of bits delivered by UMTS at a SAP within a period of time (provided that there is data to deliver), divided by the duration of the period. The traffic is conformant with the guaranteed bitrate as long as it follows a token bucket algorithm where token rate equals Guaranteed bitrate and bucket size equals Maximum SDU size.

The conformance definition should not be interpreted as a required implementation algorithm. The token bucket algorithm is described in annex B.

UMTS bearer service attributes, e.g. delay and reliability attributes, are guaranteed for traffic up to the Guaranteed bitrate. For the traffic exceeding the Guaranteed bitrate the UMTS bearer service attributes are not guaranteed.

*[Purpose: Describes the bitrate the UMTS bearer service shall guarantee to the user or application. Guaranteed bitrate may be used to facilitate admission control based on available resources, and for resource allocation within UMTS.]*

#### Delivery order (y/n)

Definition: indicates whether the UMTS bearer shall provide in-sequence SDU delivery or not.

*[Purpose: the attribute is derived from the user protocol (PDP type) and specifies if out-of-sequence SDUs are acceptable or not. This information cannot be extracted from the traffic class. Whether out-of-sequence SDUs are dropped or re-ordered depends on the specified reliability]*

**Note:**—Delivery order should be set to 'no' for PDP Type = 'IPv4' or 'IPv6'. The SGSN shall ensure that the appropriate value is set.

#### Maximum SDU size (octets)

Definition: the maximum SDU size for which the network shall satisfy the negotiated QoS.

*[Purpose: The maximum SDU size is used for admission control and policing and/or optimising transport (optimized transport in for example the RAN may be dependent on the size of the packets). Handling by the network of packets larger than Maximum SDU size is implementation specific (e.g. they may be dropped or forwarded with decreased QoS).]*

*Note: The Maximum Transfer Unit (MTU) of the IP layer and the Maximum SDU Size have no relationship; in particular the GGSN should not perform IP fragmentation based on the Maximum SDU Size.*

**SDU format information (bits)**

Definition: list of possible exact sizes of SDUs

*[Purpose: RAN needs SDU size information to be able to operate in transparent RLC protocol mode, which is beneficial to spectral efficiency and delay when RLC re-transmission is not used. Thus, if the application can specify SDU sizes, the bearer is less expensive.]*

**SDU error ratio**

Definition: Indicates the fraction of SDUs lost or detected as erroneous. SDU error ratio is defined only for conforming traffic.

NOTE 1: By reserving resources, SDU error ratio performance is independent of the loading conditions, whereas without reserved resources, such as in Interactive and Background classes, SDU error ratio is used as target value.

*[Purpose: Used to configure the protocols, algorithms and error detection schemes, primarily within RAN.]*

**Residual bit error ratio**

Definition: Indicates the undetected bit error ratio in the delivered SDUs. If no error detection is requested, Residual bit error ratio indicates the bit error ratio in the delivered SDUs.

*[Purpose: Used to configure radio interface protocols, algorithms and error detection coding.]*

**Delivery of erroneous SDUs (y/n/-)**

Definition: Indicates whether SDUs detected as erroneous shall be delivered or discarded.

NOTE 2: 'yes' implies that error detection is employed and that erroneous SDUs are delivered together with an error indication, 'no' implies that error detection is employed and that erroneous SDUs are discarded, and '-' implies that SDUs are delivered without considering error detection.

*[Purpose: Used to decide whether error detection is needed and whether frames with detected errors shall be forwarded or not.]*

**Transfer delay (ms)**

Definition: Indicates maximum delay for 95<sup>th</sup> percentile of the distribution of delay for all delivered SDUs during the lifetime of a bearer service, where delay for an SDU is defined as the time from a request to transfer an SDU at one SAP to its delivery at the other SAP.

*[Purpose: relates to the delay tolerated by the application. In conjunction with the SDU error ratio attribute, care needs to be taken in deriving the value for the 95th percentile when an application desires, for example, that 99.9% of all transmitted packets are delivered within a certain time. This attribute allows RAN to set transport formats and ARQ parameters.]*

NOTE 3: Transfer delay of an arbitrary SDU is not meaningful for a bursty source, since the last SDUs of a burst may have long delay due to queuing, whereas the meaningful response delay perceived by the user is the delay of the first SDU of the burst.

**Traffic handling priority**

Definition: specifies the relative importance for handling of all SDUs belonging to the UMTS bearer compared to the SDUs of other bearers.

*[Purpose: Within the interactive class, there is a definite need to differentiate between bearer qualities. This is handled by using the traffic handling priority attribute, to allow UMTS to schedule traffic accordingly. By definition, priority is an alternative to absolute guarantees, and thus these two attribute types cannot be used together for a single bearer.]*

**Allocation/Retention Priority**

Definition: specifies the relative importance compared to other UMTS bearers for allocation and retention of the UMTS bearer. The Allocation/Retention Priority attribute is a subscription attribute which is not negotiated from the mobile terminal, but the value might be changed either by the SGSN or the GGSN network element.

NOTE 4: The addition of a user-controlled Allocation/Retention Priority attribute is for further study in future releases.

*[Purpose: Priority is used for differentiating between bearers when performing allocation and retention of a bearer. In situations where resources are scarce, the relevant network elements can use the Allocation/Retention Priority to prioritize bearers with a high Allocation/Retention Priority over bearers with a low Allocation/Retention Priority when performing admission control.]*

#### **Source statistics descriptor (ěspeechí/íunknowní)**

Definition: specifies characteristics of the source of submitted SDUs.

*[Note: The number of different source statistics descriptors that should be allowed is FFS.]*

*[Purpose: Conversational speech has a well-known statistical behaviour (or the discontinuous transmission (DTX) factor). By being informed that the SDUs for a UMTS bearer are generated by a speech source, RAN, the SGSN and the GGSN and also the UE may, based on experience, calculate a statistical multiplex gain for use in admission control on the relevant interfaces.]*

#### **Signalling Indication (Yes/No)**

Definition: Indicates the signalling nature of the submitted SDUs. This attribute is additional to the other QoS attributes and does not over-ride them. This attribute is only defined for the interactive traffic class. If signalling indication is set to ěYesí, the UE should set the traffic handling priority to ě1í.

*[Purpose: Signalling traffic can have different characteristics to other interactive traffic, eg higher priority, lower delay and increased peakiness. This attribute permits enhancing the RAN operation accordingly. An example use of the Signalling Indication is for IMS signalling traffic.]*

Note: this indication is sent by the UE in the QoS IE.

**\*\*\*\*\* NEXT MODIFIED SECTION \*\*\*\*\***

### **9.1.2.2 Determining R99 attributes from R97/98 attributes**

This mapping is applicable in the following cases:

- hand over of PDP Context from GPRS R97/98 SGSN to GPRS R99 or UMTS SGSN;
- PDP Context Activation in a serving R99 SGSN with a R97/98 GGSN. When GGSN respond to the PDP Context Activation, mapping of the changed R97/98 QoS attributes received from the GGSN to R99 QoS attributes is performed in the serving SGSN.

This mapping is also applicable if a R99 UE allows an application to request a PDP Context Activation with R97/98 QoS attributes, e.g. via AT command.

Table 6: Rules for determining R99 attributes from R97/98 attributes

Resulting R99 Attribute		Derived from R97/98 Attribute	
Name	Value	Value	Name
Traffic class	Interactive	1, 2, 3	Delay class
	Background	4	
Traffic handling priority	1	1	Delay class
	2	2	
	3	3	
SDU error ratio	$10^{-6}$	2	Reliability class
	$10^{-4}$	3	
	$10^{-3}$	4, 5	
Residual bit error ratio	$10^{-5}$	2, 3, 4	Reliability class
	$4 \cdot 10^{-3}$	5	
Delivery of erroneous SDUs	'no'	2, 3, 4	Reliability class
	'yes'	5	
Maximum bitrate [kbps]	8	1	Peak throughput class
	16	2	
	32	3	
	64	4	
	128	5	
	256	6	
	512	7	
	1024	8	
	2048	9	
Allocation/Retention priority	1	1	Precedence class
	2	2	
	3	3	
Delivery order	'Yes'	'yes'	Reordering Required (Information in the SGSN and the GGSN PDP Contexts)
	'no'	'no'	
Maximum SDU size	1 500 octets	(Fixed value)	

NOTE: As the allocation/retention priority attribute is not available in the UE (see 6.4.4.1) the mapping of the allocation/retention priority attribute is not relevant for the UE.

As the reordering required attribute is not available in the MS the MS ~~shall~~ should set the R99 delivery order attribute to the value "no" for PDP Type = "IPv4" or "IPv6", otherwise the MS shall set the delivery order attribute to the value "subscribed" (see 3GPP TS 24.008).

\*\*\*\*\* END OF CHANGES \*\*\*\*\*