Source: **TSG SA WG2**
Title: **CRs on 23.107 v.3.1.1**
Agenda Item: **5.2.3**

The following Change Requests (CRs) have been approved by TSG SA WG2 and are requested to be approved by TSG SA plenary #7.
Note: the source of all these CRs is now S2, even if the name of the originating company(ies) is still reflected on the cover page of all the attached CRs.

CR on 23.107 v.3.1.1

spec	CR #	Title	release	cat	S2 TDoc #
23.107	012r1	Editorial modification of the QoS attributes units	R99	D	S2-000237
23.107	013r1	Generation of QoS parameters for CS data services for call setup and interworking	R99	C	S2-000240
23.107	014	Clarification of Inter-release handover	R99	F	S2-000199
23.107	016	Extension of Maximum N-PDU size	R99	F	S2-000254
23.107	017r1	Correction of value ranges	R99	F	S2-000546
23.107	018	Correction of maximum bit rate values	R99	F	S2-000376
23.107	019r1	Clarification of the Allocation/Retention Priority Attribute	R99	F	S2-000495

3GPP TSG SA WG2 Meeting #11
Puerto Vallarta, Mexico, 24-28.January.2000

***Document* S2-000237**
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

23.107	CR	012r1	Current Version:	3.1.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to:	SA#7	For approval	X	strategic		*(for SMG use only)*
list expected approval meeting # here ↑		for information		non-strategic		

Form: CR cover sheet, version 2 for 3GPP and SMG *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

Proposed change affects: *(at least one should be marked with an X)*	(U)SIM		ME		UTRAN / Radio	X	Core Network	X

Source: NTT DoCoMo **Date:** 21. Jan. 2000

Subject: Editorial modifications of the QoS attributes units

Work item: QoS

Category: *(only one category shall be marked with an X)*

F	Correction	X	**Release:**	Phase 2	
A	Corresponds to a correction in an earlier release			Release 96	
B	Addition of feature			Release 97	
C	Functional modification of feature			Release 98	
D	Editorial modification			Release 99	X
				Release 00	

Reason for change: There are inconsistencies on attributes units between sections.
In the section 6.4.3.1 and 6.4.4.1: Maximum SDU size [bits], Transfer delay [s]
In the list of 6.5.1 and 6.5.2: Maximum SDU size [octets], Transfer delay [ms]
Maximum SDU size should be given in “octets”, and Transfer delay should be given in “ms” as described in the list of 6.5.1 and 6.5.2.

Clauses affected: 6.4.3.1, 6.4.4.1

Other specs affected:

Other 3G core specifications		→ List of CRs:
Other GSM core specifications		→ List of CRs:
MS test specifications		→ List of CRs:
BSS test specifications		→ List of CRs:
O&M specifications		→ List of CRs:

Other comments:

help.doc

<--------- double-click here for help and instructions on how to create a CR.

6.4.3 UMTS Bearer Service Attributes

6.4.3.1 List of attributes

-----skipped-----

Maximum SDU size (octets~~bits~~)

Definition: the maximum allowed SDU size

(Purpose: The maximum SDU size is used for admission control and policing.)

-----skipped-----

Transfer delay (ms)

Definition: Indicates maximum delay for 95th 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: used to specify the delay tolerated by the application. It allows UTRAN to set transport formats and ARQ parameters.)

Note: 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.

-----skipped-----

6.4.4 Radio Access Bearer Service Attributes

Radio Access Bearer Service Attributes shall be applied to both CS and PS domains.

6.4.4.1 List of attributes

-----skipped-----

Maximum SDU size (octetsts~~bits~~)

Definition: the maximum allowed SDU size

(Purpose: The maximum SDU size is used for admission control and policing.)

-----skipped-----

Transfer delay (ms)

Definition: Indicates maximum delay for 95th 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: specifies the UTRAN part of the total transfer delay for the UMTS bearer. It allows UTRAN to set transport formats and ARQ parameters.)

3GPP TSG SA2 Meeting #11
Puerto Vallarta, Mexico, 24-28 January 2000

***Document* S2-000240**
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

23.107	CR	013r1	Current Version:	3.1.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to:	TSG SA#7	for approval	X	strategic		(for SMG use only)
list expected approval meeting # here ↑		for information		non-strategic		

Form: CR cover sheet, version 2 for 3GPP and SMG *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

Proposed change affects: (U)SIM [ ] ME [ ] UTRAN / Radio [ ] Core Network [X]
(at least one should be marked with an X)

Source: Ericsson **Date:** 2000-01-13

Subject: Generation of QoS parameters for CS data services for call setup and interworking UMTS- CS

Work item: End-to-end QoS

Category: *(only one category shall be marked with an X)*

F	Correction		**Release:**	Phase 2	
A	Corresponds to a correction in an earlier release			Release 96	
B	Addition of feature			Release 97	
C	Functional modification of feature	X		Release 98	
D	Editorial modification			Release 99	X
				Release 00	

Reason for change:
The determination of QoS parameters for CS services for call setup and handover procedure needs to be enhanced/clarified as follows:
. According to S2-99A05, S2-99967, services identified by BC IE used for determination of RAB parameters are speech, data non transparent, and data transparent. All other possible services shall not be considered for release 99.
. N3 has not defined exact UMTS bearer service attributes for CS QoS, but only RAB attributes mapped from BC IE.
. Introduction of principles for HO from GSM to UMTS.

Clauses affected: 5 and 9.1.1

Other specs affected:

Other 3G core specifications	[ ]	→ List of CRs:
Other GSM core specifications	[ ]	→ List of CRs:
MS test specifications	[ ]	→ List of CRs:
BSS test specifications	[ ]	→ List of CRs:
O&M specifications	[ ]	→ List of CRs:

Other comments:


help.doc

<--------- double-click here for help and instructions on how to create a CR.

5 CS QoS in release '99

For UMTS release '99 CS-CC, the QoS related bearer definitions of GSM (as defined in bearer capability information element, octet 6 and its extensions) are sufficient.

Based on the Bearer Capability information element the following services can be identified:

a) **speech:** from the Information Transfer Capability (ITC) parameter

b) **data, non-transparent:** from the ITC and Connection element (CE) parameters

~~— among the non-transparent data, **facsimile** is identified by the ITC~~

c) **data, transparent:** from the ITC and CE parameters

~~For each of the above services an appropriate UMTS Bearer service shall be defined. The definition shall include exact UMTS bearer attribute values or list of supported values.~~

~~Note: This service mapping is the task of TSG N3 and SA4.~~

For each of the above services, associated call control parameters, including the Bearer Capability information element, can be considered to define the UMTS bearer service.

The further mapping to Radio Access Bearer attributes is done according to the principles described in clause 8.

Note: The mapping from GSM CC to UMTS RAB parameters is in the responsibility of CN WG1 and CN WG3.

9 Interworking

The model for the UMTS QoS classes and parameters may not be any existing network or QoS protocol/mechanisms as such. The main goal of the specification is not to copy existing QoS mechanisms but rather to create a future proof concept that will provide means to transport different types of data with different QoS requirements. Thus the interworking of UMTS and existing network technologies has to be ensured. This chapter presents the most common technologies that UMTS shall be capable to interwork with.

9.1 UMTS-GSM CS/GPRS

9.1.1 UMTS-GSM CS

The mapping between UMTS-GSM CS is based on GSM CS mechanisms and CC parameters.

9.1.1.2 Handover from GSM to UMTS

In case a GSM call is set up in the CN, the BC IE parameters are mapped into channel type parameters at call setup.

If the CN has to perform a handover towards UMTS, the non-anchor MSC needs to perform an assignment based on UMTS specific radio access bearer parameters.

As the BSSMAP protocol is used over the E-interface, the non-anchor MSC shall use the received Channel Type parameter (~~including~~e.g. ‘speech or data indicator’, the type of data service (transparent/non-transparent) and user rate) to derive the QoS RAB parameters.

3GPP TSG SA WG2 Meeting #11
Puerto Vallarta, Mexico, 24.-28. 01. 2000

***Document* S2-000199**
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

23.107	CR	014	Current Version:	3.1.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to:	SA #7	for approval	X	strategic		(for SMG use only)
list expected approval meeting # here ↑		for information		non-strategic		

Form: CR cover sheet, version 2 for 3GPP and SMG *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

Proposed change affects: (U)SIM [ ] ME [ ] UTRAN / Radio [ ] Core Network [X]
(at least one should be marked with an X)

Source: Nokia **Date:** 25.01.2000

Subject: Clarification of Inter-release handover

Work item:

Category: *(only one category shall be marked with an X)*

F	Correction	[X]	**Release:**	Phase 2	[ ]
A	Corresponds to a correction in an earlier release	[ ]		Release 96	[ ]
B	Addition of feature	[ ]		Release 97	[ ]
C	Functional modification of feature	[ ]		Release 98	[ ]
D	Editorial modification	[ ]		Release 99	[X]
				Release 00	[ ]

Reason for change: It is not clear in Annex C of 23.107v3.1.0 which PDP contexts are to be deleted when a handover from R99 to R97/98 occurs. This CR clarifies this issue by aligning the description in Annex C with the correct description in 23.060v3.2.0, section 11.1.1.

Clauses affected: Annex C

Other specs affected:

Other 3G core specifications	[ ]	→ List of CRs:
Other GSM core specifications	[ ]	→ List of CRs:
MS test specifications	[ ]	→ List of CRs:
BSS test specifications	[ ]	→ List of CRs:
O&M specifications	[ ]	→ List of CRs:

Other comments:


help.doc

<--------- double-click here for help and instructions on how to create a CR.

Annex C (normative): Determine which QoS profile is of highest QoS

In handovers from Release 99 to GPRS Release 97/98 networks, it will be necessary to determine which PDP context of a set of PDP contexts provides the highest QoS, since of a set of PDP contexts with the same APN and PDP address all ~~other~~ PDP contexts except the one with the highest QoS profile will be deactivated.

If several PDP contexts have been activated for the same APN and PDP address in the first SGSN (secondary PDP context activation), then all PDP contexts except the PDP context with the highest-quality QoS profile are deleted in the MS and in the first SGSN, and the first SGSN shall initiate deletion of these PDP contexts in the GGSN.

To determine which PDP context that has the highest QoS table 8 is used. Only the PDP context(s) with the highest QoS ranking will be maintained and the rest will be deactivated. In a second step, if more than one PDP context remain, Maximum bitrate attribute is compared. All PDP contexts except the PDP context(s) with the highest Maximum bitrate will be deactivated.

If more than one PDP context remain after the second step, all PDP contexts except that with the lowest NSAPI are deactivated.

Table 8

QoS ranking	2	conversational	Traffic class
	3	streaming	Traffic class
	1	Interactive	Traffic class
		1	Traffic handling priority
	4	Interactive	Traffic class
		2	Traffic handling priority
	5	Interactive	Traffic class
		3	Traffic handling priority
	6	Background	Traffic class

3GPP TSG SA WG2 Meeting #11
Puerto Vallarta, Mexico, 24-28 January, 2000

***Document* S2-000254**
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

23.107	CR	016	Current Version:	3.1.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to:	SA#7	for approval	X	strategic		(for SMG use only)
list expected approval meeting # here ↑		for information		non-strategic		

Form: CR cover sheet, version 2 for 3GPP and SMG *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

Proposed change affects: *(at least one should be marked with an X)*	(U)SIM		ME	X	UTRAN / Radio	X	Core Network	X

Source: Drafting group (NTT DoCoMo) **Date:** 28. Jan. 2000

Subject: Extension of Maximum N-PDU size

Work item: QoS

Category: *(only one category shall be marked with an X)*

F	Correction	X	**Release:**	Phase 2	
A	Corresponds to a correction in an earlier release			Release 96	
B	Addition of feature			Release 97	
C	Functional modification of feature			Release 98	
D	Editorial modification			Release 99	X
				Release 00	

Reason for change: Most PDP-PDUs from outside of the PLMN, e.g. ISP, are transferred as data units up to 1,500 octets. In case of PDP type = PPP, it is needed to add 2 octets as a header in PPP frame format. Totally the N-PDU length is 1,502 octets within the PLMN. This CR is to extend N-PDU size up to 1502 octets.

Clauses affected: 6.5.1, 6.5.2

Other specs affected:

Other 3G core specifications	X	→ List of CRs:	23.060
Other GSM core specifications		→ List of CRs:	
MS test specifications		→ List of CRs:	
BSS test specifications		→ List of CRs:	
O&M specifications		→ List of CRs:	

Other comments:

help.doc

<--------- double-click here for help and instructions on how to create a CR.

6.5.1 Ranges of UMTS Bearer Service Attributes

The following table lists the value ranges of the UMTS bearer service attributes. The value ranges reflect the capability of UMTS network.

Table 4: Value ranges for UMTS Bearer Service Attributes

Traffic class	Conversational class	Streaming class	Interactive class	Background class
Maximum bitrate (kbps)	<2000 (1) (2)	<2000 (1) (2)	< 2000 - overhead (2) (3)	<2000 - overhead (2) (3)
Delivery order	Yes/No	Yes/No	Yes/No	Yes/No
Maximum SDU size (octets)	<=1500 or 1502 (4)	<=1500 or 1502 (4)	<=1500 or 1502 (4)	<=1500 or 1502 (4)
SDU format information	(5)	(5)		
Delivery of erroneous SDUs	Yes/No/- (6)	Yes/No/- (6)	Yes/No/- (6)	Yes/No/- (6)
Residual BER	$5*10^{-2}$, 10^{-2}, 10^{-3}, 10^{-4} (7)	$5*10^{-2}$, 10^{-2}, 10^{-3}, 10^{-4}, 10^{-5}, 10^{-6} (7)	$4*10^{-3}$, 10^{-5}, $6*10^{-8}$ (8) (7)	$4*10^{-3}$, 10^{-5}, $6*10^{-8}$ (8) (7)
SDU error ratio	10^{-2}, 10^{-3}, 10^{-4}, 10^{-5} (7)	10^{-2}, 10^{-3}, 10^{-4}, 10^{-5} (7)	10^{-3}, 10^{-4}, 10^{-6} (7)	10^{-3}, 10^{-4}, 10^{-6} (7)
Transfer delay (ms)	100 – maximum value(7)	500 – maximum value (7)		
Guaranteed bit rate (kbps)	<2000 (1) (2)	<2000 (1) (2)		
Traffic handling priority			1,2,3 (9)	
Allocation/Retention priority	1,2,3 (9)	1,2,3 (9)	1,2,3 (9)	1,2,3 (9)

1) Bitrate of 2000 kbps requires that UTRAN operates in transparent RLC protocol mode, in this case the overhead from layer 2 protocols is negligible.

2) The granularity of the bit rate parameters must be studied. Although the UMTS network has capability to support a large number of different bitrate values, the number of possible values must be limited not to unnecessarily increase the complexity of for example terminals, charging and interworking functions. Exact list of supported values shall be defined together with S1, N1, N3 and R2.

3) Impact from layer 2 protocols on maximum bitrate in non-transparent RLC protocol mode shall be estimated.

4) In case of PDP type = PPP, maximum SDU size is 1502 octets. In other cases, maximum SDU size is 1500 octets.~~Maximum SDU size shall at least allow UMTS network to support external PDUs having as high MTU as Internet/Ethernet (1500 octets). The need for higher values must be investigated by N1, N3, S1, R2, R3.~~

5) Definition of possible values of exact SDU sizes for which UTRAN can support transparent RLC protocol mode, is the task of RAN WG3.

6) If *Delivery of erroneous SDUs* is set to 'Yes' error indications can only be provided on the MT/TE side of the UMTS bearer. On the CN Gateway side error indications can not be signalled outside of UMTS network in release 1999.

7) Values are indicative. Exact values on Residual BER, SDU error ratio and transfer delay shall defined together with S1, N1, N3 and R2.

8) Values are derived from CRC lengths of 8, 16 and 24 bits on layer 1.

9) Number of priority levels shall be further analysed by S1, N1 and N3.

6.5.2 Ranges of Radio Access Bearer Service Attributes

The following table lists the value ranges of the radio access bearer service attributes. The value ranges reflect the capability of UTRAN.

Table 5: Value ranges for Radio Access Bearer Service Attributes

Traffic class	Conversational class	Streaming class	Interactive class	Background class
Maximum bitrate (kbps)	<2000 (1) (2)	<2000 (1) (2)	< 2000 - overhead (2) (3)	<2000 - overhead (2) (3)
Delivery order	Yes/No	Yes/No	Yes/No	Yes/No
Maximum SDU size (octets)	<=1500 or 1502 (4)	<=1500 or 1502 (4)	<=1500 or 1502 (4)	<=1500 or 1502 (4)
SDU format information	(5)	(5)		
Delivery of erroneous SDUs	Yes/No/-	Yes/No/-	Yes/No/-	Yes/No/-
Residual BER	$5*10^{-2}$, 10^{-2}, 10^{-3}, 10^{-4} (6)	$5*10^{-2}$, 10^{-2}, 10^{-3}, 10^{-4}, 10^{-5}, 10^{-6} (6)	$4*10^{-3}$, 10^{-5}, $6*10^{-8}$ (6) (7)	$4*10^{-3}$, 10^{-5}, $6*10^{-8}$ (6) (7)
SDU error ratio	10^{-2}, 10^{-3}, 10^{-4}, 10^{-5} (6)	10^{-2}, 10^{-3}, 10^{-4}, 10^{-5} (6)	10^{-3}, 10^{-4}, 10^{-6} (6)	10^{-3}, 10^{-4}, 10^{-6} (6)
Transfer delay (ms)	80 – maximum value(6)	500 – maximum value (6)		
Guaranteed bit rate (kbps)	<2000 (1) (2)	<2000 (1) (2)		
Traffic handling priority			1,2,3 (8)	
Allocation/Retention priority	1,2,3 (8)	1,2,3 (8)	1,2,3 (8)	1,2,3 (8)
Source statistic descriptor	Speech/unknown	Speech/unknown		

1) Bitrate of 2000 kbps requires that UTRAN operates in transparent RLC protocol mode, in this case the overhead from layer 2 protocols is negligible.

2) The granularity of the bit rate parameters must be studied. Although the UMTS network has capability to support a large number of different bitrate values, the number of possible values must be limited not to unnecessarily increase the complexity of for example terminals, charging and interworking functions. Exact list of supported values shall be defined together with S1, N1, N3 and R2.

3) Impact from layer 2 protocols on maximum bitrate in non-transparent RLC protocol mode shall be estimated.

4) In case of PDP type = PPP, maximum SDU size is 1502 octets. In other cases, maximum SDU size is 1500 octets. ~~Maximum SDU size shall at least allow UMTS network to support external PDUs having as high MTU as Internet/Ethernet (1500 octets). The need for higher values must be investigated by N1, N3, S1, R2, R3.~~

5) Definition of possible values of exact SDU sizes for which UTRAN can support transparent RLC protocol mode, is the task of RAN WG3.

6) Values are indicative. Exact values on Residual BER, SDU error ratio and transfer delay shall defined together with S1, N1, N3 and R2.

7) Values are derived from CRC lengths of 8, 16 and 24 bits on layer 1.

8) Number of priority levels shall be further analysed by S1, N1 and N3.

3GPP TSG SA2 Meeting #12
Tokyo, Japan, 6 - 9 March 2000

***Document* S2-000546**
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

23.107	CR	017r1	Current Version:	3.1.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to:	TSG SA #7	for approval	X	strategic		(for SMG use only)
list expected approval meeting # here ↑		for information		non-strategic		

Form: CR cover sheet, version 2 for 3GPP and SMG *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

Proposed change affects: *(at least one should be marked with an X)*	(U)SIM		ME	X	UTRAN / Radio	X	Core Network	X

Source: Ericsson **Date:** 2000-03-08

Subject: Correction of value ranges

Work item: End-to-end QoS

Category: *(only one category shall be marked with an X)*

F	Correction	X	**Release:**	Phase 2	
A	Corresponds to a correction in an earlier release			Release 96	
B	Addition of feature			Release 97	
C	Functional modification of feature			Release 98	
D	Editorial modification			Release 99	X
				Release 00	

Reason for change:

a) TSG SA4 has in a CR to 26.102 (CR# 1 rev 1) defined the RAB QoS values applicable for transport of AMR speech frames. The CR was endorsed by the Joint TSG-S4#9 – SMG11#14 meeting in Puerto Vallarta. For the SDU error ratio and residual BER attributes, some of the values proposed by SA4 is missing in the table of Value ranges for Radio Access Bearer Service Attributes of 23.107. For consistency reason the missed values is also proposed to be added to the table of Value ranges for UMTS Bearer Service Attributes.

b) In a response LS to SA2 (Tdoc S2-000087) CN3 defined mapping of CS data to RAB attributes. They identified a streaming service with delay < 250 ms, and SDU error ratio of 10%. It is therefore proposed to extend the value range of the streaming class to contain these values.

Clauses affected: 6.5.1, 6.5.2

Other specs affected:

Other 3G core specifications		→ List of CRs:
Other GSM core specifications		→ List of CRs:
MS test specifications		→ List of CRs:
BSS test specifications		→ List of CRs:
O&M specifications		→ List of CRs:

Other comments:


help.doc

<--------- double-click here for help and instructions on how to create a CR.

6.5.1 Ranges of UMTS Bearer Service Attributes

The following table lists the value ranges of the UMTS bearer service attributes. The value ranges reflect the capability of UMTS network.

Table 4: Value ranges for UMTS Bearer Service Attributes

Traffic class	Conversational class	Streaming class	Interactive class	Background class
Maximum bitrate (kbps)	<2000 (1) (2)	<2000 (1) (2)	< 2000 - overhead (2) (3)	<2000 - overhead (2) (3)
Delivery order	Yes/No	Yes/No	Yes/No	Yes/No
Maximum SDU size (octets)	<1500 (4)	<1500 (4)	<1500 (4)	<1500 (4)
SDU format information	(5)	(5)		
Delivery of erroneous SDUs	Yes/No/- (6)	Yes/No/- (6)	Yes/No/- (6)	Yes/No/- (6)
Residual BER	$5*10^{-2}$, 10^{-2}, $5*10^{-3}$, 10^{-3}, 10^{-4}, 10^{-6} ~~(7)~~	$5*10^{-2}$, 10^{-2}, $5*10^{-3}$, 10^{-3}, 10^{-4}, 10^{-5}, 10^{-6} ~~(7)~~	$4*10^{-3}$, 10^{-5}, $6*10^{-8}$ (78) ~~(7)~~	$4*10^{-3}$, 10^{-5}, $6*10^{-8}$ (78) ~~(7)~~
SDU error ratio	10^{-2}, $7*10^{-3}$, 10^{-3}, 10^{-4}, 10^{-5} ~~(7)~~	10^{-1}, 10^{-2}, $7*10^{-3}$, 10^{-3}, 10^{-4}, 10^{-5} ~~(7)~~	10^{-3}, 10^{-4}, 10^{-6} ~~(7)~~	10^{-3}, 10^{-4}, 10^{-6} ~~(7)~~
Transfer delay (ms)	100 – maximum value ~~(7)~~	~~500~~ ~~200~~250 – maximum value ~~(7)~~		
Guaranteed bit rate (kbps)	<2000 (1) (2)	<2000 (1) (2)		
Traffic handling priority			1,2,3 (89)	
Allocation/Retention priority	1,2,3 (89)	1,2,3 (89)	1,2,3 (89)	1,2,3 (89)

1) Bitrate of 2000 kbps requires that UTRAN operates in transparent RLC protocol mode, in this case the overhead from layer 2 protocols is negligible.

2) The granularity of the bit rate parameters must be studied. Although the UMTS network has capability to support a large number of different bitrate values, the number of possible values must be limited not to unnecessarily increase the complexity of for example terminals, charging and interworking functions. Exact list of supported values shall be defined together with S1, N1, N3 and R2.

3) Impact from layer 2 protocols on maximum bitrate in non-transparent RLC protocol mode shall be estimated.

4) Maximum SDU size shall at least allow UMTS network to support external PDUs having as high MTU as Internet/Ethernet (1500 octets). The need for higher values must be investigated by N1, N3, S1, R2, R3.

5) Definition of possible values of exact SDU sizes for which UTRAN can support transparent RLC protocol mode, is the task of RAN WG3.

6) If *Delivery of erroneous SDUs* is set to 'Yes' error indications can only be provided on the MT/TE side of the UMTS bearer. On the CN Gateway side error indications can not be signalled outside of UMTS network in release 1999.

~~7) Values are indicative. Exact values on Residual BER, SDU error ratio and transfer delay shall defined together with S1, N1, N3 and R2.~~

78) Values are derived from CRC lengths of 8, 16 and 24 bits on layer 1.

89) Number of priority levels shall be further analysed by S1, N1 and N3.

6.5.2 Ranges of Radio Access Bearer Service Attributes

The following table lists the value ranges of the radio access bearer service attributes. The value ranges reflect the capability of UTRAN.

Table 5: Value ranges for Radio Access Bearer Service Attributes

Traffic class	Conversational class	Streaming class	Interactive class	Background class
Maximum bitrate (kbps)	<2000 (1) (2)	<2000 (1) (2)	< 2000 - overhead (2) (3)	<2000 - overhead (2) (3)
Delivery order	Yes/No	Yes/No	Yes/No	Yes/No
Maximum SDU size (octets)	<1500 (4)	<1500 (4)	<1500 (4)	<1500 (4)
SDU format information	(5)	(5)		
Delivery of erroneous SDUs	Yes/No/-	Yes/No/-	Yes/No/-	Yes/No/-
Residual BER	$5*10^{-2}$, 10^{-2}, $5*10^{-3}$ 10^{-3}, 10^{-4} , 10^{-6} ~~(6)~~	$5*10^{-2}$, 10^{-2}, $5*10^{-3}$, 10^{-3}, 10^{-4}, 10^{-5}, 10^{-6} ~~(6)~~	$4*10^{-3}$, 10^{-5}, $6*10^{-8}$ ~~(6)~~ (6~~7~~)	$4*10^{-3}$, 10^{-5}, $6*10^{-8}$ ~~(6)~~ (6~~7~~)
SDU error ratio	10^{-2}, $7*10^{-3}$, 10^{-3}, 10^{-4}, 10^{-5} ~~(6)~~	10^{-1}, 10^{-2}, $7*10^{-3}$, 10^{-3}, 10^{-4}, 10^{-5} ~~(6)~~	10^{-3}, 10^{-4}, 10^{-6} ~~(6)~~	10^{-3}, 10^{-4}, 10^{-6} ~~(6)~~
Transfer delay (ms)	80 – maximum value~~(6)~~	~~500~~ ~~200~~250 – maximum value ~~(6)~~		
Guaranteed bit rate (kbps)	<2000 (1) (2)	<2000 (1) (2)		
Traffic handling priority			1,2,3 (7~~8~~)	
Allocation/Retention priority	1,2,3 (7~~8~~)	1,2,3 (7~~8~~)	1,2,3 (7~~8~~)	1,2,3 (7~~8~~)
Source statistic descriptor	Speech/unknown	Speech/unknown		

1) Bitrate of 2000 kbps requires that UTRAN operates in transparent RLC protocol mode, in this case the overhead from layer 2 protocols is negligible.

2) The granularity of the bit rate parameters must be studied. Although the UMTS network has capability to support a large number of different bitrate values, the number of possible values must be limited not to unnecessarily increase the complexity of for example terminals, charging and interworking functions. Exact list of supported values shall be defined together with S1, N1, N3 and R2.

3) Impact from layer 2 protocols on maximum bitrate in non-transparent RLC protocol mode shall be estimated.

4) Maximum SDU size shall at least allow UMTS network to support external PDUs having as high MTU as Internet/Ethernet (1500 octets). The need for higher values must be investigated by N1, N3, S1, R2, R3.

5) Definition of possible values of exact SDU sizes for which UTRAN can support transparent RLC protocol mode, is the task of RAN WG3.

~~6) Values are indicative. Exact values on Residual BER, SDU error ratio and transfer delay shall defined together with S1, N1, N3 and R2.~~

6~~7~~) Values are derived from CRC lengths of 8, 16 and 24 bits on layer 1.

7~~8~~) Number of priority levels shall be further analysed by S1, N1 and N3.

3GPP TSG SA2 Meeting #12
Tokyo, Japan, 6 - 9 March 2000

***Document* S2-000376**
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

23.107	CR	018	Current Version:	3.1.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to:	TSG SA #7	for approval	X	strategic		(for SMG use only)
list expected approval meeting # here ↑		for information		non-strategic		

Form: CR cover sheet, version 2 for 3GPP and SMG *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

Proposed change affects: *(at least one should be marked with an X)*	(U)SIM		ME	X	UTRAN / Radio	X	Core Network	X

Source: Ericsson **Date:** 2000-03-03

Subject: Correction of maximum bit rate values

Work item: End-to-end QoS

Category: *(only one category shall be marked with an X)*			**Release:**	
F	Correction	X	Phase 2	
A	Corresponds to a correction in an earlier release		Release 96	
B	Addition of feature		Release 97	
C	Functional modification of feature		Release 98	
D	Editorial modification		Release 99	X
			Release 00	

Reason for change: Possible maximum value of maximum bitrate and guaranteed bit rate is stated as 2048 kbps in the mapping tables and as 2000 kbps in the value range tables. It is proposed to align the values and define possible maximum/guaranteed bit rate to 2048 kbps.

Clauses affected: 6.5.1, 6.5.2

Other specs affected:			
Other 3G core specifications		→ List of CRs:	
Other GSM core specifications		→ List of CRs:	
MS test specifications		→ List of CRs:	
BSS test specifications		→ List of CRs:	
O&M specifications		→ List of CRs:	

Other comments:


help.doc

<--------- double-click here for help and instructions on how to create a CR.

6.5.1 Ranges of UMTS Bearer Service Attributes

The following table lists the value ranges of the UMTS bearer service attributes. The value ranges reflect the capability of UMTS network.

Table 4: Value ranges for UMTS Bearer Service Attributes

Traffic class	Conversational class	Streaming class	Interactive class	Background class
Maximum bitrate (kbps)	<2048~~00~~ (1) (2)	<2048~~00~~ (1) (2)	< 2048~~00~~ - overhead (2) (3)	<2048~~00~~ - overhea (2) (3)
Delivery order	Yes/No	Yes/No	Yes/No	Yes/No
Maximum SDU size (octets)	<1500 (4)	<1500 (4)	<1500 (4)	<1500 (4)
SDU format information	(5)	(5)		
Delivery of erroneous SDUs	Yes/No/- (6)	Yes/No/- (6)	Yes/No/- (6)	Yes/No/- (6)
Residual BER	$5*10^{-2}$, 10^{-2}, 10^{-3}, 10^{-4} (7)	$5*10^{-2}$, 10^{-2}, 10^{-3}, 10^{-4}, 10^{-5}, 10^{-6} (7)	$4*10^{-3}$, 10^{-5}, $6*10^{-8}$ (8) (7)	$4*10^{-3}$, 10^{-5}, $6*10^{-8}$ (8) (7)
SDU error ratio	10^{-2}, 10^{-3}, 10^{-4}, 10^{-5} (7)	10^{-2}, 10^{-3}, 10^{-4}, 10^{-5} (7)	10^{-3}, 10^{-4}, 10^{-6} (7)	10^{-3}, 10^{-4}, 10^{-6} (7)
Transfer delay (ms)	100 – maximum value(7)	500 – maximum value (7)		
Guaranteed bit rate (kbps)	<2048~~00~~ (1) (2)	<2048~~00~~ (1) (2)		
Traffic handling priority			1,2,3 (9)	
Allocation/Retention priority	1,2,3 (9)	1,2,3 (9)	1,2,3 (9)	1,2,3 (9)

1) Bitrate of 2048~~00~~ kbps requires that UTRAN operates in transparent RLC protocol mode, in this case the overhead from layer 2 protocols is negligible.

2) The granularity of the bit rate parameters must be studied. Although the UMTS network has capability to support a large number of different bitrate values, the number of possible values must be limited not to unnecessarily increase the complexity of for example terminals, charging and interworking functions. Exact list of supported values shall be defined together with S1, N1, N3 and R2.

3) Impact from layer 2 protocols on maximum bitrate in non-transparent RLC protocol mode shall be estimated.

4) Maximum SDU size shall at least allow UMTS network to support external PDUs having as high MTU as Internet/Ethernet (1500 octets). The need for higher values must be investigated by N1, N3, S1, R2, R3.

5) Definition of possible values of exact SDU sizes for which UTRAN can support transparent RLC protocol mode, is the task of RAN WG3.

6) If *Delivery of erroneous SDUs* is set to 'Yes' error indications can only be provided on the MT/TE side of the UMTS bearer. On the CN Gateway side error indications can not be signalled outside of UMTS network in release 1999.

7) Values are indicative. Exact values on Residual BER, SDU error ratio and transfer delay shall defined together with S1, N1, N3 and R2.

8) Values are derived from CRC lengths of 8, 16 and 24 bits on layer 1.

9) Number of priority levels shall be further analysed by S1, N1 and N3.

6.5.2 Ranges of Radio Access Bearer Service Attributes

The following table lists the value ranges of the radio access bearer service attributes. The value ranges reflect the capability of UTRAN.

Table 5: Value ranges for Radio Access Bearer Service Attributes

Traffic class	Conversational class	Streaming class	Interactive class	Background class
Maximum bitrate (kbps)	<2048~~00~~ (1) (2)	<2048~~00~~ (1) (2)	< 2048~~00~~ - overhead (2) (3)	<2048~~00~~ - overhead (2) (3)
Delivery order	Yes/No	Yes/No	Yes/No	Yes/No
Maximum SDU size (octets)	<1500 (4)	<1500 (4)	<1500 (4)	<1500 (4)
SDU format information	(5)	(5)		
Delivery of erroneous SDUs	Yes/No/-	Yes/No/-	Yes/No/-	Yes/No/-
Residual BER	$5*10^{-2}$, 10^{-2}, 10^{-3}, 10^{-4} (6)	$5*10^{-2}$, 10^{-2}, 10^{-3}, 10^{-4}, 10^{-5}, 10^{-6} (6)	$4*10^{-3}$, 10^{-5}, $6*10^{-8}$ (6) (7)	$4*10^{-3}$, 10^{-5}, $6*10^{-8}$ (6) (7)
SDU error ratio	10^{-2}, 10^{-3}, 10^{-4}, 10^{-5} (6)	10^{-2}, 10^{-3}, 10^{-4}, 10^{-5} (6)	10^{-3}, 10^{-4}, 10^{-6} (6)	10^{-3}, 10^{-4}, 10^{-6} (6)
Transfer delay (ms)	80 – maximum value(6)	500 – maximum value (6)		
Guaranteed bit rate (kbps)	<2048~~00~~ (1) (2)	<2048~~00~~ (1) (2)		
Traffic handling priority			1,2,3 (8)	
Allocation/Retention priority	1,2,3 (8)	1,2,3 (8)	1,2,3 (8)	1,2,3 (8)
Source statistic descriptor	Speech/unknown	Speech/unknown		

1) Bitrate of 2048~~00~~ kbps requires that UTRAN operates in transparent RLC protocol mode, in this case the overhead from layer 2 protocols is negligible.

2) The granularity of the bit rate parameters must be studied. Although the UMTS network has capability to support a large number of different bitrate values, the number of possible values must be limited not to unnecessarily increase the complexity of for example terminals, charging and interworking functions. Exact list of supported values shall be defined together with S1, N1, N3 and R2.

3) Impact from layer 2 protocols on maximum bitrate in non-transparent RLC protocol mode shall be estimated.

4) Maximum SDU size shall at least allow UMTS network to support external PDUs having as high MTU as Internet/Ethernet (1500 octets). The need for higher values must be investigated by N1, N3, S1, R2, R3.

5) Definition of possible values of exact SDU sizes for which UTRAN can support transparent RLC protocol mode, is the task of RAN WG3.

6) Values are indicative. Exact values on Residual BER, SDU error ratio and transfer delay shall defined together with S1, N1, N3 and R2.

7) Values are derived from CRC lengths of 8, 16 and 24 bits on layer 1.

8) Number of priority levels shall be further analysed by S1, N1 and N3.

3GPP TSG SA WG2 Meeting #12
Tokyo, Japan, 6.-9.3.2000

Document S2-000495
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

23.107	CR	019r1	Current Version:	3.1.1

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to:	SA#7	for approval	X	strategic		(for SMG use only)
list expected approval meeting # here ↑		for information		non-strategic		

Form: CR cover sheet, version 2 for 3GPP and SMG *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

Proposed change affects: *(at least one should be marked with an X)*	(U)SIM		ME	X	UTRAN / Radio	X	Core Network	X

Source: Nokia **Date:** 03.03.1999

Subject: Clarification of the Allocation/Retention Priority Attribute

Work item: Release 99 Stage 2

Category: *(only one category shall be marked with an X)*

F	Correction	X	**Release:**	Phase 2	
A	Corresponds to a correction in an earlier release			Release 96	
B	Addition of feature			Release 97	
C	Functional modification of feature			Release 98	
D	Editorial modification			Release 99	X
				Release 00	

Reason for change:

The wording in the definition of the Allocation/Retention Priority attribute in 23.107 is not entirely clear. This CR aligns the definition with the understanding that N1 and N2 have regarding this parameter.

The Allocation/Retention Priority parameter should be a subscription parameter which allows the operators to differentiate between users and thus establish separate user classes. If the Allocation/Retention Priority is not a subscription parameter, it would possibly interfere with the Traffic Handling Priority and the implicit prioritization in the Traffic Class attribute.

Also, if the Allocation/Retention Priority is not a subscription parameter, this implies that there are possibly different admission control priorities for different bearers for the same user. However, for this purpose, no QoS attribute needs to be defined since the user can control these priorities simply by cancelling flows which seem to block other flows from that user. Having a special QoS attribute just for this purpose adds unnecessary complexity, and it is not likely that this "feature" would ever be used.

Clauses affected: 6.4.3.1, 6.4.4.1

Other specs affected:

Other 3G core specifications		→ List of CRs:
Other GSM core specifications		→ List of CRs:
MS test specifications		→ List of CRs:
BSS test specifications		→ List of CRs:
O&M specifications		→ List of CRs:

Other comments:

6.4.3.1 List of attributes

Note: The text within square brackets explaining the purpose of each attribute can be excluded later if that information is given elsewhere in the technical report.

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.

(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. non transparent circuit switched data))

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 k*Maximum SDU size. For release 99, k=1. A value of k greater than one Maximum SDU size may be specified in future releases to capture burstiness of sources. Signalling to specify the value of k may be provided in future releases.

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

(Purpose: Guaranteed bitrate may be used to facilitate admission control based on available resources, and for resource allocation within UMTS. Quality requirements expressed by e.g. delay and reliability attributes only apply to incoming traffic up to the guaranteed bitrate.)

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)

Maximum SDU size (bits)

Definition: the maximum allowed SDU size

(Purpose: The maximum SDU size is used for admission control and policing.)

SDU format information (bits)

Definition: list of possible exact sizes of SDUs

(Purpose: UTRAN 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 that 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 UTRAN.)

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: '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 (s)

Definition: Indicates maximum delay for 95th 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: used to specify the delay tolerated by the application. It allows UTRAN to set transport formats and ARQ parameters.)

Note: 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 parameter which is not negotiated from the mobile terminal.

Note: 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.)

6.4.4.1 List of attributes

Note: The text within square brackets explaining the purpose of each attribute can be excluded later if that information is given elsewhere in the technical report.

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

Definition: type of application for which the Radio Access Bearer service is optimised

(Purpose: By including the traffic class itself as an attribute, UTRAN can make assumptions about the traffic source and optimise the transport for that traffic type. In particular, buffer allocation may be based on traffic class.)

Maximum bitrate (kbps)

Definition: maximum number of bits delivered by UTRAN and to UTRAN at a SAP within a period of time, divided by the duration of the period. The traffic is conformant with the 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.

(Purpose: 1) to limit the delivered bitrate to applications or external networks with such limitations, 2) to allow maximum wanted RAB bitrate to be defined for applications able to operate with different rates (e.g. non transparent circuit switched data))

Guaranteed bitrate (kbps)

Definition: guaranteed number of bits delivered 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 k Maximum SDU size. For Release 99, k = 1. A value of k greater than one Maximum SDU size may be specified in future releases to capture burstiness of sources. Signalling to specify the value of k may be provided in future releases.

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

(Purpose: Guaranteed bitrate may be used to facilitate admission control based on available resources, and for resource allocation within UTRAN. Quality requirements expressed by e.g. delay and reliability attributes only apply to incoming traffic up to the guaranteed bitrate. The guaranteed bitrate at the RAB level may be different from that on UMTS bearer level, for example due to header compression.)

Delivery order (y/n)

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

(Purpose: 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)

Maximum SDU size (bits)

Definition: the maximum allowed SDU size

(Purpose: The maximum SDU size is used for admission control and policing.)

SDU format information (bits)

Definition: list of possible exact sizes of SDUs. If unequal error protection shall be used by a Radio Access Bearer service, SDU format information defines the exact subflow format of the SDU payload.

Note: SDU format information is used by UTRAN to define which bits of the payload that belongs to each subflow. Exact syntax of SDU format information attribute is the task of RAN WG3

(Purpose: UTRAN needs SDU format 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. Moreover, in case of unequal error protection, UTRAN needs to know the exact format of SDU payload to be able to demultiplex the SDU onto different radio bearer services.)

SDU error ratio

Definition: Indicates the fraction of SDUs lost or detected as erroneous. SDU error ratio is defined only for conforming traffic. In case of unequal error protection., SDU error ratio is set per subflow and represents the error ratio in each subflow. SDU error ratio is only set for subflows for which error detection is requested.

Note: 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 protocols, algorithms and error detection schemes, primarily within UTRAN.)

Residual bit error ratio

Definition: Indicates the undetected bit error ratio for each subflow in the delivered SDUs. For equal error protection, only one value is needed. If no error detection is requested for a subflow, Residual bit error ratio indicates the bit error ratio in that subflow of the delivered SDUs.

(Purpose: Used to configure radio interface protocols, algorithms and error detection coding. For services requiring unequal error protection, residual bit error ratio is given for each subflow.)

Delivery of erroneous SDUs (y/n/-)

Definition: Indicates whether SDUs with detected errors shall be delivered or not. In case of unequal error protection, the attribute is set per subflow.

Note: '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.

In case of unequal protection, different subflows may have different settings. Whenever there is a detected error in a subflow with 'no', the SDU is discarded, irrespective of settings in other subflows. For an SDU with multiple subflows with a 'yes' setting, there may be one error indication per subflow, or, if there is only one error indication per SDU, it indicates that an error was detected in at least one of these subflows. Exact definitions are the task of RAN3.

(Purpose: Used to decide whether error detection is needed and whether frames with detected errors shall be forwarded or discarded.)

Transfer delay (s)

Definition: Indicates maximum delay for 95th 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: specifies the UTRAN part of the total transfer delay for the UMTS bearer. It allows UTRAN to set transport formats and ARQ parameters.)

Traffic handling priority

Definition: specifies the relative importance for handling of all SDUs belonging to the radio access 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 UTRAN 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 Radio access bearers for allocation and retention of the Radio access bearer. The Allocation/Retention Priority attribute is a subscription parameter which is not negotiated from the mobile terminal.

Note: 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 (‘speech’/’unknown’)

Definition: specifies characteristics of the source of submitted SDUs.

(Purpose: Conversational speech has a well-known statistical behaviour (or the discontinuous transmission (DTX) factor). By being informed that the SDUs for a RAB are generated by a speech source, UTRAN may, based on experience, calculate a statistical multiplex gain for use in admission control on the radio and Iu interfaces.)