Technical Specification Group Services and System Aspects Meeting #28, 06 - 08 June 2005, Quebec, Canada

Source:	SA WG2
Title:	CRs to TS 23.107: RAB Allocation/Retention Priority and Addition of GERAN to the scope section (ReI-6)
Document for:	Approval
Agenda Item:	7.2.3

SA Doc	TS No.	CR No	Re	Rel	Cat	Subject		SA2 Doc	WI	Clauses affected	
			v				Cur				
SP-050334	23.107	0154	2	Rel-6	F	RAB Allocation/Retention Priority	6.2.0	S2-050727	TEI6	2, 6.4.4.1, 6.5.2, 8.2	
SP-050334	23.107	0156	1	Rel-6	F	Addition of GERAN to the scope section	6.2.0	S2-050911	TEI6	1 (Scope)	

3GPP TSG-SA WG2 Meeting #45 Beijing, China, 4th – 8th April 2005

Tdoc **#** S2-050727

		C	HANGE	EREQ	UE	ST			С	R-Form-v7.1
æ	23.107	CR	0154	ж rev	2	¥	Current vers	^{ion:} 6.2	2.0	æ
For HELP on using this form, see bottom of this page or look at the pop-up text over the \Re symbols.										
Proposed chang	e affects:	UICC app	os <mark>#</mark>	ME	Radi	io Ac	cess Networ	k 🗶 Cor	e Ne	twork X
Title:	RAB Allo	ocation/Re	etention Price	ority						
Source:	8 Siemens	6								
Work item code:	ж <mark>ТЕІ6</mark>						Date: 🔀	30/03/20	05	
Category:	Image: Second condition Use one of F (condition F (condition A (condition B (and C (further D (condition D (condition	f the follown prection) orresponds Idition of fe nctional mod Alitorial mod xplanations o 3GPP <u>TR</u>	ing categorie to a correctio vature), odification of lification) of the above 21.900.	es: on in an ea feature) e categorie	<i>rlier rel</i> s can	lease	Release: 38 Use <u>one</u> of Ph2 () R96 R97 R98 R99 Rel-4 Rel-5 Rel-6 Rel-7	Rel-6 the followin (GSM Phas (Release 1 (Release 1 (Release 1 (Release 4 (Release 5 (Release 6 (Release 7	g rele se 2) 996) 997) 998) 999))))	pases:

Reason for change: 🕷	The RAB attribute Allocation/Retention Priority (ARP) is only specified with 3 possible values although 15 priorities are possible according to TS 25.413. Furthermore, the specification describes a direct mapping from the UMTS bearer service ARP attribute to the RAB ARP attribute. This results in the usage of the three highest RAB priorities for PS services.
Summary of change: 🔀	The value range of the RAB attribute ARP is extended to 15 possible values apart from GERAN when the Gb Bearer Service is used. The mapping from UMTS bearer service attributes to the RAB ARP bearer service attribute is described by specifying mandatory and optional rules for PS and CS domains. References for the mandatory attributes for CS services are also added.
Consequences if # not approved:	While for PS services three highest RAB priorities are used, for CS services more and mostly lower RAB priorities are selected. Consequently, under network congestion, CS services could not be setup or could be even pre-empted by normal PS services. TS 23.107 would not be aligned to TS 25.413 which allows for 15 values. Moreover, with only 3 RAB ARP values at lu interface it would not be possible to take into account number of cases such as emergency calls in the CS domain.

Clauses affected:	# 2, 6.4.4.1, 6.5.2, 8.2				
		Υ	Ν		
Other specs	ж		Χ	Other core specifications	3
affected:			Χ	Test specifications	
			Χ	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 <u>http://www.3gpp.org/specs/CR.htm</u>. Below is a brief summary:

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

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under <u>ftp://ftp.3gpp.org/specs/</u> For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

Start of 1st modified section

2 References

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

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.
- [1] 3GPP TS 23.110: "UMTS Access Stratum Services and Functions".
- [2] 3GPP TS 22.100: "UMTS Phase 1".
- [3] 3GPP TS 23.121: "Architectural Requirements for Release 1999".
- [4] (Void)
- [5] 3GPP TS 22.105: "Services & Service capabilities".
- [6] 3GPP TS 24.008: "Mobile radio interface layer 3 specification; Core Network Protocols Stage 3"
- [7] 3GPP TS 23.207: "End-to-end QoS concept and architecture"
- [8] 3GPP TS 23.008: "Organization of subscriber data"
- [9] 3GPP TS 23.067: "enhanced Multi-Level Precedence and Pre-emption service (eMLPP) Stage 2"

End of 1st modified section

Start of 2nd modified section

6.4.4.1 List of attributes

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, RAN 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 RAN and to RAN 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.

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

[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. applications with adapting codecs.)]

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 Maximum SDU size.

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

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

[Purpose: Describes the bitrate the RAB 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 RAN.. 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.*]

Note: Delivery order should be set to 'no' for PDP Type = 'IPv4' or 'IPv6'

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).]

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. SDU format information also supports definition of allowed subflow bitrates.

NOTE 1: SDU format information is used by RAN 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: RAN 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, RAN needs to know the exact format of SDU payload to be able to demultiplex the SDU onto different radio bearer services. When rate control is applied to services having a constant SDU size, e.g. CS data, the subflow bitrate is used to calculate the allowed inter PDU transmission interval (IPTI).]

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 2: 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 RAN.]

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 3: '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 (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: permits the derivation of the RAN part of the total transfer delay for the UMTS bearer. 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.]

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 RAN 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. TFor PS services the Allocation/Retention Priority attribute of the Radio access bearer is derived from the UMTS bearer service attributes Allocation/Retention Priority. Other attributes may be used in addition. For CS services the Allocation/Retention Priority attribute of the Radio access bearer is derived from the eMLPP priority level attribute [9] and/or the CS Allocation/Retention Priority attribute [8] and/or the Mobile Station Category attribute [8] (which is only available for subscribers in their home PLMN). Other attributes may be used in addition. a subscription parameter 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: <u>The parameter is not negotiated from the mobile terminal.</u> 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, RAN may, based on experience, calculate a statistical multiplex gain for use in admission control on the radio and RAN Access 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.

[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.]

End of 2nd modified section

Start of 3rd modified section

6.5.2 Ranges of Radio Access Bearer Service Attributes for UTRAN and for GERAN

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

Traffic class	Conversational	Streaming class	Interactive class	Background class
	class			-
Maximum bitrate (kbps)	<= 16 000 (2) (7)	<= 16 000 (2) (7)	<= 16 000 -	<= 16 000 -
			overhead (2) (3) (7)	overhead (2) (3) (7)
Delivery order	Yes/No	Yes/No	Yes/No	Yes/No
Maximum SDU size (octets)	<=1 500 or 1 502	<=1 500 or 1 502 (4)	<=1 500 or 1 502	<=1 500 or 1 502
	(4)		(4)	(4)
SDU format information (1)	(5)	(5)		
Delivery of erroneous SDUs	Yes/No/-	Yes/No/-	Yes/No/-	Yes/No/-
Residual BER	5*10 ⁻² , 10 ⁻² , 5*10 ⁻³ ,	5*10 ⁻² , 10 ⁻² , 5*10 ⁻³ ,	4*10 ⁻³ , 10 ⁻⁵ , 6*10 ⁻⁸	4*10 ⁻³ , 10 ⁻⁵ , 6*10 ⁻⁸
	10 ⁻³ , 10 ⁻⁴ , 10 ⁻⁵ , 10 ⁻⁶	10 ⁻³ , 10 ⁻⁴ , 10 ⁻⁵ , 10 ⁻⁶	(6)	(6)
SDU error ratio	10 ⁻² , 7*10 ⁻³ , 10 ⁻³ ,	10 ⁻¹ , 10 ⁻² , 7*10 ⁻³ , 10 ⁻³ ,	10 ⁻³ , 10 ⁻⁴ , 10 ⁻⁶	10 ⁻³ , 10 ⁻⁴ , 10 ⁻⁶
	10 ⁻⁴ , 10 ⁻⁵	10 ⁻⁴ , 10 ⁻⁵		
Transfer delay (ms)	80 – maximum	250 – maximum value		
	value			
Guaranteed bit rate (kbps)	<= 16 000 (2) (7)	<= 16 000 (2) (7)		
Traffic handling priority			1,2,3	
Allocation/Retention priority	1,2 <u>,, <mark>3</mark>15</u>	1,2 <u>,, <mark>3</mark>15</u>	1,2 <u>,, <mark>315</mark></u>	1,2 <u>,, <mark>3</mark>15</u>
(1)				
Source statistic descriptor	Speech/unknown	Speech/unknown		
Signalling Indication			Yes/No	

Table 5: Value ranges for Radio Access Bearer Service Attributes for UTRAN and for GERAN

1) This parameter is not applicable limited to the values 1, 2 and 3 for GERAN when the Gb Bearer Service is used.

2) The granularity of the bit rate attributes shall be studied. Although the UMTS network has capability to support a large number of different bitrate values, the number of possible values shall 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 1 500 octets.
- 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 derived from CRC lengths of 8, 16 and 24 bits on layer 1.
- 7) In case of GERAN the highest bitrate value is 473.6 kbps.

End of 3rd modified section

Start of 4th modified section

8.2 From UMTS Bearer Service Attributes to Radio Access Bearer Service Attributes

When establishing a UMTS bearer and the underlaying Radio Access Bearer for support of a service request, some attribute on UMTS level does typically not have the same value as corresponding attribute on Radio Access Bearer level. For example requested transfer delay for the UMTS bearer shall typically be larger that the requested transfer delay for the core network will use a part of the acceptable delay.

For the following attributes/settings the attribute value for the UMTS bearer will normally be the same as the corresponding attribute value for the Radio Access Bearer:

- maximum bitrate;
- delivery order;
- delivery of erroneous SDUs;
- NOTE 1: If *Delivery of erroneous SDUs* is set to 'Yes' the handling of error indications on UMTS Bearer level and Radio Access Bearer level differs. 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. Error indications can be provided on both end-points of the Radio Access Bearer.
- guaranteed bit rate;
- traffic handling priority;
- maximum SDU size;
- SDU format information.
- NOTE 2: List of exact sizes of SDU's shall be the same, exact format of SDU payload does not exist on UMTS Bearer level.

For the following attributes the attribute value for the UMTS bearer will normally not be the same as the corresponding attribute value for the Radio Access Bearer. The relation between the attribute values for UMTS Bearer service and Radio Access Bearer service is implementational and depends for example on network dimensioning.

- **Residual BER** for Radio Access Bearer service shall be reduced with the bit errors introduced in the core network, by Core Network Bearer service.
- **SDU error ratio** for Radio Access Bearer service shall be reduced with the errors introduced in the core network, by Core Network Bearer service.

For the following attribute the value range for the UMTS bearer is not the same as the corresponding attribute value ranges for the Radio Access Bearer. The value for the Radio Access Bearer service attribute shall be derived from the values of one or more UMTS bearer service attributes:

- For PS services the Allocation/Retention Priority shall be derived from the UMTS bearer service attributes
 Allocation/Retention Priority. Other attributes may be used in addition. For CS services the Allocation/Retention
 Priority shall be derived from the eMLPP priority level attribute and/or the CS Allocation/Retention Priority
 attribute and/or the Mobile Station Category attribute [8] (which is only available for subscribers in their home
 PLMN). Other attributes may be used in addition.
- NOTE 3: The usage of other attributes can ensure that e.g. emergency calls would receive an appropriate RAB Allocation/Retention Priority.
- NOTE 4: To ensure backwards compatibility different values of an UMTS bearer service attribute can be mapped to the same value of the RAB Allocation/Retention Priority attribute if necessary.

The following attributes/settings only exist on the Radio Access Bearer level:

- **SDU format information** exact format of SDU payload is retrieved from the codec integrated in the core network.
- **Source statistics descriptor** is set to speech if the Radio Access Bearer transports compressed speech generated by the codec integrated in the core network.

End of 4th modified section

Tdoc **x** S2-050911

	CHANGE REQUEST	CR-Form-v7.1
æ	23.107 CR 0156 x rev 1 ^x C	eurrent version: 6.2.0
For <u>HELP</u> or	using this form, see bottom of this page or look at the p	pop-up text over the # symbols.
Proposed chang	e affects: UICC apps <mark>#</mark> ME Radio Acc	ess Network X Core Network X
Title:	Addition of GERAN to the scope section	
Source:	# Siemens	
Work item code:	¥ TEI6	Date: 🔀 07/04/2005
Category:	 F F 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 <u>TR 21.900</u>. 	Release:Rel-6Use oneof the following releases:Ph2(GSM Phase 2)R96(Release 1996)R97(Release 1997)R98(Release 1998)R99(Release 1999)Rel-4(Release 4)Rel-5(Release 5)Rel-6(Release 7)

Reason for change: 🔀	It is currently not very clear if the current scope of TS 23.107 also covers the GERAN since it uses the term UMTS instead of the term 3GPP System as defined in TS 21.905.
Summary of change:⊯	The scope section is updated by clarifying that TS 23.107 provides the framework and the architecture for QoS in the 3GPP System.
Consequences if R not approved:	The scope section of TS 23.107 may give the impression that it does not cover QoS aspects for GERAN.
Clauses affected: 🕷	1
Other specs % affected:	Y N X Other core specifications X Test specifications X 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 <u>http://www.3gpp.org/specs/CR.htm</u>. Below is a brief summary:

- 1) Fill out the above form. The symbols above marked **B** contain pop-up help information about the field that they are closest to.
- 2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be

downloaded from the 3GPP server under <u>ftp://ftp.3gpp.org/specs/</u> For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

Start of modified section

1 Scope

The present document provides the framework for Quality of Service within <u>UMTS the 3GPP system</u>. The main purpose is to specify the list of attributes applicable to <u>the UMTS</u> Bearer Service and <u>the Radio Access Bearer Service</u>, as well as describe the Quality of Service architecture to be used in <u>UMTS the 3GPP networkssystem</u>.

End of modified section