

**TSG-SA Working Group 1 (Services) meeting #3**  
**Hampton Court, Surrey, UK 10<sup>th</sup>-12<sup>th</sup> May 1999**  
**Agenda Item: 6.3**

**TSGS1#3(99)328**

**Source: Ericsson**

**Title: Quality of Service – Refinement of requirements**

**Document for: Discussion / Decision**

<b>CHANGE REQUEST No :</b>		<b>A010</b>	<i>Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.</i>	
Technical Specification / Report	UMTS	22.05	Version:	3.4.0
Submitted to	#4	for approval	<input checked="" type="checkbox"/>	without presentation ("non-strategic")
TSG_SA		for information	<input type="checkbox"/>	with presentation ("strategic")
<i>list TSG plenary meeting no. here ↑</i>				<input checked="" type="checkbox"/>

PT SMG CR cover form is available from: [http://docbox.etsi.org/tech-org/smg/Document/smg/tools/CR\\_form/crf28\\_1.zip](http://docbox.etsi.org/tech-org/smg/Document/smg/tools/CR_form/crf28_1.zip)

**Proposed change affects:**

*(at least one should be marked with an X)*

USIM  TE  Network

**Work item:** Quality of service requirements

**Source:** Ericsson

**Date:** 1999-04-30

**Subject:** Refinement of Quality of Service requirements

**Category:**

*(one category and one release only shall be marked with an X)*

F Correction   
 A Corresponds to a correction in an earlier release   
 B Addition of feature   
 C Functional modification of feature   
 D Editorial modification

**Release:**

Phase 2   
 Release 96   
 Release 97   
 Release 98   
 UMTS 99

**Reason for change:**

Refinement of requirements on bearers to reflect results of the work in the TSGS1 QoS ad-hoc group and at the same time convert these into end-to-end requirements instead of network parameters.

**Clauses affected:** 5.2.1, 5.2.2, 5.4

**Other specs affected:**

Other releases of same spec  → List of CRs:  
 Other core specifications  → List of CRs:  
 MS test specifications / TBRs  → List of CRs:  
 BSS test specifications  → List of CRs:  
 O&M specifications  → List of CRs:

**Other comments:**

For clarity; in some paragraphs some changes proposed in Tdoc S1-99xxa is included as underlined / strikethrough text. For those changes revision control is not used.



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

## 5.2.1 Information transfer attributes

### Connection mode attribute

The two possible values for this attribute are connection oriented and connectionless. In a connection oriented mode, information is delivered to the destination entity in the same order as it was provided by the source entity, but an establishment/release phase is required at the beginning and the end of the information transfer. In a connectionless mode, information can directly be transferred, but with no guaranty of ordered delivery.

### Traffic type attribute

~~The four possible values for this attribute are constant bit rate, variable bit rate, available bit rate and unspecified bit rate.~~

It is required that the bearer service provides guaranteed/constant bitrate and a non-guaranteed/dynamically variable bitrate.

Real time and non real time applications shall be supported.

- Real time video, audio and speech must be supported. This implies the:
  - ability to provide a real time stream of guaranteed bit rate and end to end delay
  - ability to provide a real time conversational service of guaranteed bit rate and end to end delay
- Non real time interactive and file transfer service must be supported. This implies the:
  - ability to support message transport with differentiation as regards QoS between different users.
- Multimedia applications shall be supported. This implies the:
  - ability to support several user flows to/from one user having different traffic types (e.g. real time, non real time)

### Symmetry attribute

The three possible values for this attribute are unidirectional, bi-directional symmetric and bi-directional asymmetric.

### Communication configuration attribute

This attribute indicate the spatial arrangement for transferring information between the implicated access points. The possible values are point-to-point, and point-to-multipoint. When the value of the attribute is point-to-multipoint, it shall be further characterised as multicast or broadcast. The addresses of the source entity and the destination entities should also be provided. One multipoint address should be reserved for broadcasting.

### Information transfer rate attributes

Information transfer rate is the amount of information transmitted per unit of time from a source access point to destination access point(s).

The three attributes used to characterise the information transfer rate are the peak bit rate, the minimum bit rate and the mean bit rate. . The possible values for these three attributes are not a limited set, but a continuous range of values. More parameters may certainly be needed, such as the sustainable bit rate or the occupancy (FFS).

## 5.2.2 Information quality attributes

~~Information quality attributes characterise the bit integrity and delay requirements of the applications.~~

~~Other parameters may be needed.~~

### Maximum transfer delay attribute

Transfer delay is the time between the request to transfer the information at one access point to its delivery at the other access point. In clause 5.4 requirements on maximum transfer delay is defined.

~~This attribute sets the maximum transfer delay of the information. The two reference points for the maximum transfer delay are the Iu interface and the point located between the mobile termination and the terminal adaptation function. The possible values for this attribute are not a limited set, but a continuous range of values.~~

#### **Delay variation attribute**

~~This attribute sets~~ Delay variation characteristics is the variation in the received information. No requirements on delay variation are defined as it is assumed that the application's requirement on delay variation is expressed through maximum transfer delay requirements.

~~This attribute is important for real-time services, e.g. video conference, where a value approaching 0 would typically be requested. The possible values for this attribute are not a limited set, but a continuous range of values.~~

#### **Bit error ratio attribute**

~~The ratio between incorrect and total transferred information bits. The possible values for this attribute are not a limited set, but a continuous range of values.~~ Requirements on bit error ratio are defined in clause 5.4.

#### **Error characteristics attribute**

~~This attribute characterises the arrivals of errors. The two possible values are uniform and bursty.~~

## 5.3 Supported bit rates

It shall be possible for one application to specify its traffic requirements to the network by requesting a bearer service with any value for the connection mode, traffic type, symmetry and information transfer rate attributes. It shall be possible for the network to satisfy these requirements without wasting resources on the radio and network interfaces due to granularity limitations in bit rates.

It shall be possible for one mobile termination to have several active bearer services simultaneously, each of which could be connection oriented or connectionless.

The only limiting factor for satisfying application requirements shall be the cumulative bit rate per mobile termination at a given instant (i.e. when summing the bit rates of one mobile termination's simultaneous connection oriented and connectionless traffic, irrespective of the traffic being real time or non real time) in each radio environment :

- At least 144 kbits/s in satellite radio environment (Note 1).
- At least 144 kbits/s in rural outdoor radio environment.
- At least 384 kbits/s in urban/suburban outdoor radio environments.
- At least 2048 kbits/s in indoor/low range outdoor radio environment.

NOTE 1 : This Peak Bit Rate may only be achieved in a nomadic operating mode.

## 5.4 Supported QoS

It shall be possible for one application to specify its QoS requirements to the network by requesting a bearer service with any ~~value for the~~ maximum transfer delay, delay variation, and bit error ratio. ~~rate and error characteristic attributes.~~

The following table indicates the range of values that shall be supported by ~~UMTS~~ end-to-end ~~for the QoS attributes.~~ These requirements are valid for both connectionoriented and connectionless traffic. It shall be possible for the network to satisfy these requirements without wasting resources on the radio and network interfaces due to granularity limitations in QoS.

	Real Time (Constant Delay)	Non Real Time (Variable Delay)
Operating environment	BER/Max Transfer Delay	BER/Max Transfer Delay
<b>Satellite (Terminal relative speed to ground up to 1000 km/h for plane)</b>	Max Transfer Delay less than 400 ms BER 10-3 - 10-7 (Note 1)	Max Transfer Delay 1200 ms or more (Note 2) BER = 10-5 to 10-8
<b>Rural outdoor (Terminal relative speed to ground up to 500 km/h) (Note 3)</b>	Max Transfer Delay 20 - 300 ms BER 10-3 - 10-7 (Note 1)	Max Transfer Delay 150 ms or more (Note 2) BER = 10-5 to 10-8
<b>Urban/ Suburban outdoor (Terminal relative speed to ground up to 120 km/h)</b>	Max Transfer Delay 20 - 300 ms BER 10-3 - 10-7 (Note 1)	Max Transfer Delay 150 ms or more (Note 2) BER = 10-5 to 10-8
<b>Indoor/ Low range outdoor (Terminal relative speed to ground up to 10 km/h)</b>	Max Transfer Delay 20 - 300 ms BER 10-3 - 10-7 (Note 1)	Max Transfer Delay 150 ms or more (Note 2) BER = 10-5 to 10-8
<p>NOTE 1; There is likely to be a compromise between BER and delay.</p> <p>NOTE 2; The Max Transfer Delay should be here regarded as the target value for 95% of the data.</p> <p>NOTE 3; The value of 500 km/h as the maximum speed to be supported in the rural outdoor environment was selected in order to provide service on high speed vehicles (e.g. trains). This is not meant to be the typical value for this environment (250 km/h is more typical).</p>		