### Technical Specification Group Services and System Aspects Meeting #10, Bangkok, Thailand, 11-14 December 2000

**TSGS#10(00) 0683** revision of SP-000535

Source: Ad hoc group

Title: CRs to 22.105 on Alignment of delay definition (R99/Rel-4)

**Document for:** Approval

Agenda Item: 7.1.3

Spec	CR	Rev	Phase	Cat	Subject	Vers	New Vers
22.105	028	1	R99	F	Alignment of delay definition	3.9.0	3.10.0
22.105	029		Rel-4	Α	Alignment of delay definition	4.0.0	4.1.0

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Title:	Alig	nment of dela	y definition	on							
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Reason for change:	' K	Correction	of feature.								
Summary of change		Addition of	note to s	ection 5.	5						
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## 5.5 Supported End User QoS

This section outlines the QoS requirements that shall be provided to the end user / applications and describes them as requirements between communicating entities (i.e. end to end). The QoS values in the tables represent end to end performance, including mobile to mobile calls and satellite components. Delay values represent one -way delay (i.e. from originating entity to terminating entity). The values included in the following tables are commonly accepted values from an end-user viewpoint [12]. The delay contribution within the mobile network should be kept to minimumsince there may be additional delay contributions from external networks.

-Figure 2 below summarises the major groups of application in terms of QoS requirements. Applications and new applications may be applicable to one more groups.

Error tolerant	Conversational voice and video	Voice messaging	Streaming audio and video	Fax
Error	Telnet,	E-commerce,	FTP, still image,	E-mail arrival
intolerant	interactive games	WWW browsing,	paging	notification
	Conversational	Interactive	Streaming	Background
	(delay <<1 sec)	(delay approx 1 sec	(delay <10 sec)	(delay >10 sec)

Figure 2: Summary of applications in terms of QoS requirements

The following tables further elaborate end user / application QoS requirements.

Table 1: End-user Performance Expectations - Conversational / Real-time Services

Mediu m	Application	Degree of symmetry	Data rate	Key performance parameters and target values				
				End-to-end One- way Delay	Delay Variation within a call	Information loss		
Audio	Conversational voice	Two-way	4-25 kb/s	<150 msec preferred <400 msec limit Note 1.	< 1 msec	< 3% FER		

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Video	Videophone	Two-way	32-384	< 150 msec		< 1% FER
			kb/s	preferred		
				<400 msec limit		
				Lip-synch : <		
				100 msec		
Data	Telemetry	Two-way	<28.8	< 250 msec	N.A	
	- two-way		kb/s			Zero
	control					
Data	Interactive	Two-way	< 1 KB	< 250 msec	N.A	Zero
	games					
Data	Telnet	Two-way	< 1 KB	< 250 msec	N.A	Zero
		(asymmetr				
		ic)				

Note 1: The overall one way delay in the mobile network (e.g. from UE to PLMN border) is approximately 100msec.

Table 2: End-user Performance Expectations - Interactive Services

Medium	Application	Degree of symmetry	Data rate	Key performance parameters and target values				
				One-way Delay	Delay Variation	Information loss		
Audio	Voice messaging	Primarily one-way	4-13 kb/s	< 1 sec for playback < 2 sec for record	< 1 msec	< 3% FER		
Data	Web- browsing - HTML	Primarily one-way		< 4 sec /page	N.A	Zero		
Data	Transaction services – high priority e.g. e- commerce, ATM	Two-way		< 4 sec	N.A	Zero		
Data	E-mail (server access)	Primarily One-way		< 4 sec	N.A	Zero		

Table 3: End-user Performance Expectations - Streaming Services

Medium	Application	Degree of symmetry	Data rate	Key performance parameters and target values			
				One-way Delay	Delay Variation	Information loss	
Audio	High quality streaming audio	Primarily one-way	32- 128 kb/s	< 10 sec	< 1 msec	< 1% FER	
Video	One-way	One-way	32- 384 kb/s	< 10 sec		< 1% FER	
Data	Bulk data transfer/retri eval	Primarily one-way		< 10 sec	N.A	Zero	
Data	Still image	One-way		< 10 sec	N.A	Zero	
Data	Telemetry - monitoring	One-way	<28.8 kb/s	< 10 sec	N.A	Zero	

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This section outlines the QoS requirements that shall be provided to the end user / applications and describes them as requirements between communicating entities (i.e. end to end). The QoS values in the tables represent end to end performance, including mobile to mobile calls and satellite components. Delay values represent one -way delay (i.e. from originating entity to terminating entity). The values included in the following tables are commonly accepted values from an end-user viewpoint [12]. The delay contribution within the mobile network should be kept to minimum since there may be additional delay contributions from external networks.

Figure 2 below summarises the major groups of application in terms of QoS requirements. Applications and new applications may be applicable to one more groups.

Error tolerant	Conversational voice and video	Voice messaging	Streaming audio and video	Fax
Error intolerant	Telnet, interactive games	E-commerce, WWW browsing,	FTP, still image, paging	E-mail arrival notification
	Conversational (delay <<1 sec)	Interactive (delay approx1 sec	Streaming ) (delay <10 sec)	Background (delay >10 sec)

Figure 2: Summary of applications in terms of QoS requirements

The following tables further elaborate end user / application QoS requirements.

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Table 1: End-user Performance Expectations - Conversational / Real-time Services

Medium	Application	Degree of symmetry	Data rate	Key performance parameters and target values				
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Video	Videophone	Two-way	32-384 kb/s	< 150 msec preferred <400 msec limit Lip-synch: < 100 msec		< 1% FER		
Data	Telemetry - two-way control	Two-way	<28.8 kb/s	< 250 msec	N.A	Zero		
Data	Interactive games	Two-way	< 1 KB	< 250 msec	N.A	Zero		
Data	Telnet	Two-way (asymmetric)	< 1 KB	< 250 msec	N.A	Zero		

Note 1: The overall one way delay in the mobile network (from UE to PLMN border) is approximately 100msec.

**Table 2: End-user Performance Expectations - Interactive Services** 

Medium	Application	Degree of	Data rate	9				
		symmetry		values				
				One-way Delay	Delay Variation	Information loss		
Audio	Voice messaging	Primarily one-way	4-13 kb/s	< 1 sec for playback < 2 sec for record	< 1 msec	< 3% FER		
Data	Web-browsing - HTML	Primarily one- way		< 4 sec /page	N.A	Zero		
Data	Transaction services – high priority e.g. e- commerce, ATM	Two-way		< 4 sec	N.A	Zero		
Data	E-mail (server access)	Primarily One-way		< 4 sec	N.A	Zero		

CR page 9 **Table 3: End-user Performance Expectations - Streaming Services** 

Medium	Application	Degree of symmetry	Data rate	Key performance parameters and target values		
				One-way Delay	Delay Variation	Information loss
Audio	High quality streaming audio	Primarily one- way	32-128 kb/s	< 10 sec	< 1 msec	< 1% FER
Video	One-way	One-way	32-384 kb/s	< 10 sec		< 1% FER
Data	Bulk data transfer/retrieval	Primarily one- way		< 10 sec	N.A	Zero
Data	Still image	One-way		< 10 sec	N.A	Zero
Data	Telemetry - monitoring	One-way	<28.8 kb/s	< 10 sec	N.A	Zero

## 5.6 Radio Interface optimisation

The following requirements shall lead the radio interface optimisation process;

- support of high bit rate (around the Peak Bit Rate), bursty, asymmetric, non-real time bearer capabilities;
- support of high bit rate (around the Peak Bit Rate), bursty, asymmetric, real time bearer capabilities;
- the ability to extend or reduce the bandwidth associated with a bearer capability in order to adapt to bit rate or radio condition variations, and to add or drop service components.

However, the services provided by existing systems (speech in particular) shall be supported in a spectrally efficient manner (at least as efficiently as in GSM) for the same quality of service.

In order to allow the support of flexible, bandwidth on demand services, bearer services should be provided with the finest possible granularity that can be efficiently supported.