



World Class Standards

Multimedia Quality as perceived by the User

Motivation & Activities

MEASUREMENT OF AUDIO AND VIDEO
QUALITY IN NETWORKS

Prague, Czech Republic, June 7-8, 2007

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Outline

- Some Words on Who we are**
- Motivation for Multimedia Quality**
- Basic Understanding of Quality**
- Key Parameters affecting Multimedia Quality**
- Current Activities in ETSI STQ**
- Some Conclusions**



World Class Standards

ETSI

- A European standards organization
- Active in all areas of ICT
- Setting globally-applicable standards for
 - telecommunications
 - radiocommunications
 - broadcasting
 - related topics
- Independent, not-for-profit organization, created in 1988
- ISO 9001:2000 certified
- Offering direct participation
- 660 Member companies and organisations
- We have some 18 000 publications - freely available!



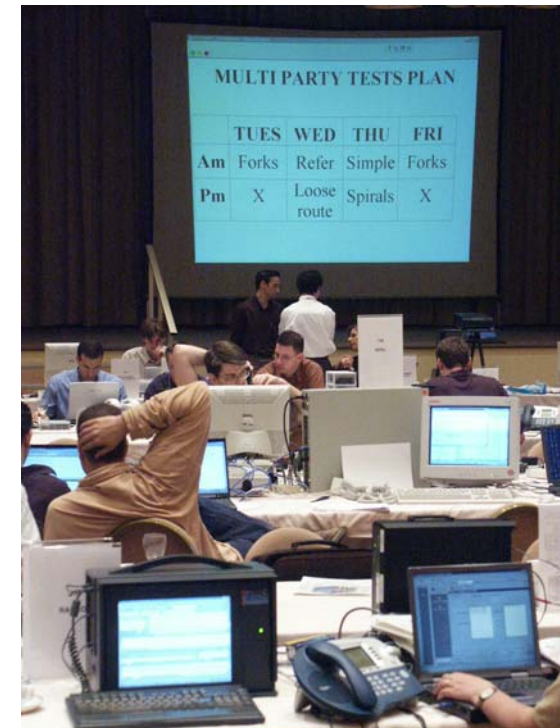
<http://www.etsi.org>

<http://portal.etsi.org>

ETSI – a Service Provider

In addition to standards-making, ETSI provides a range of supporting services, notably...

- ❑ Creation of test specifications and methodologies
- ❑ Interoperability testing (*Plugtests*TM)
- ❑ Forum hosting (*Forapolis*)





ETSI STQ - *A Center of Excellence*

- ❑ **ETSI's Technical Committee STQ:**
Speech processing, Transmission and Quality aspects:
 - **Commitment to End-to-End Multimedia Quality for NGN**
 - Realtime Mouth-to-Ear Communication
 - User-Media Interaction
 - Streaming Media
- ❑ **Across ALL technology platforms**
 - **End-to-End single Media Quality**
 - **Multimedia Transmission Performance**
 - **QoS Parameters for networks and services**
 - **Distributed Speech Recognition**
 - **QoS aspects for picture and video quality in GSM™ and Third Generation networks**
 - **VoIP & MMoIP**

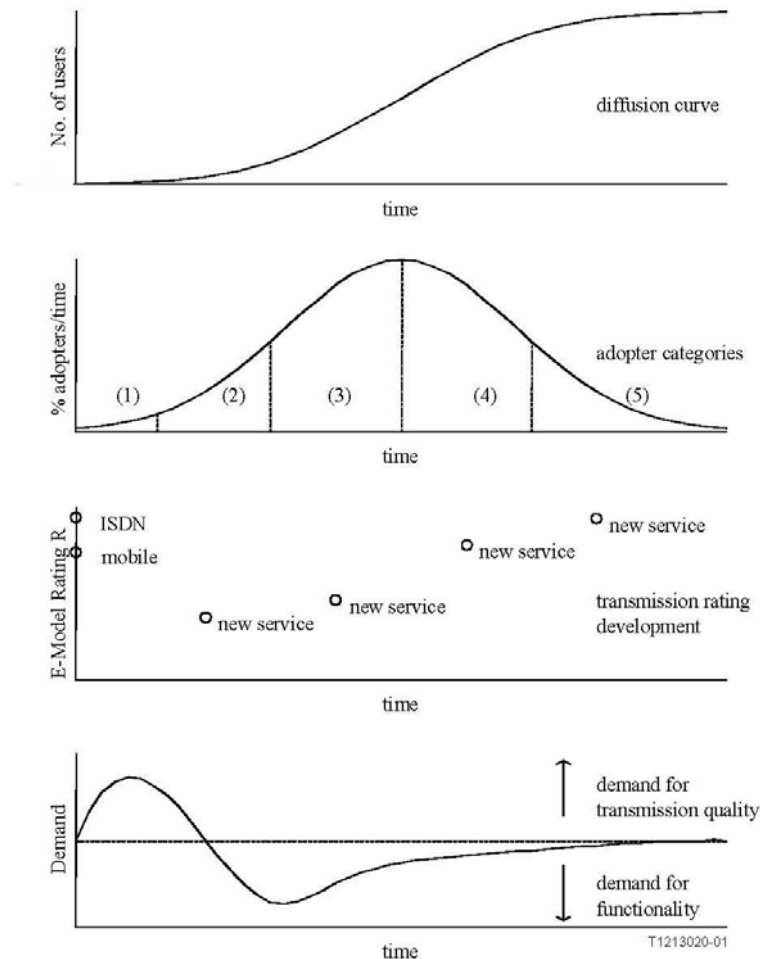
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Motivation for Multimedia Quality

- ❑ **Quality as perceived by the User**
 - **A Promotional Factor for the Market**
- ❑ **User compares Quality of New Telecommunication Services**
 - **With Quality experienced in the Past**
 - **With other Telecommunication Service offers**
 - **With Quality experienced for Entertainment Services**
- ❑ **Individual Quality Threshold**
 - **Users try new Service only few times (~ 3x ... 5x)**
 - **If Quality below Individual Threshold Users give up**
 - **e.g. Download of a Website takes too long**
 - **User remembers this experience**
 - **Will try a few times and conclude this as Static Effect:
"This website is not useable - let's try the Offer of the Competitor..."**

Diffusion, Transmission Quality and Expectation for an Innovation



❑ Diffusion Theory generally accepted for describing Consumer Behaviour on the Introduction of an Innovation or New Service

❑ Number of Users develops in S-shaped Curve

❑ 5 Classes of Users:

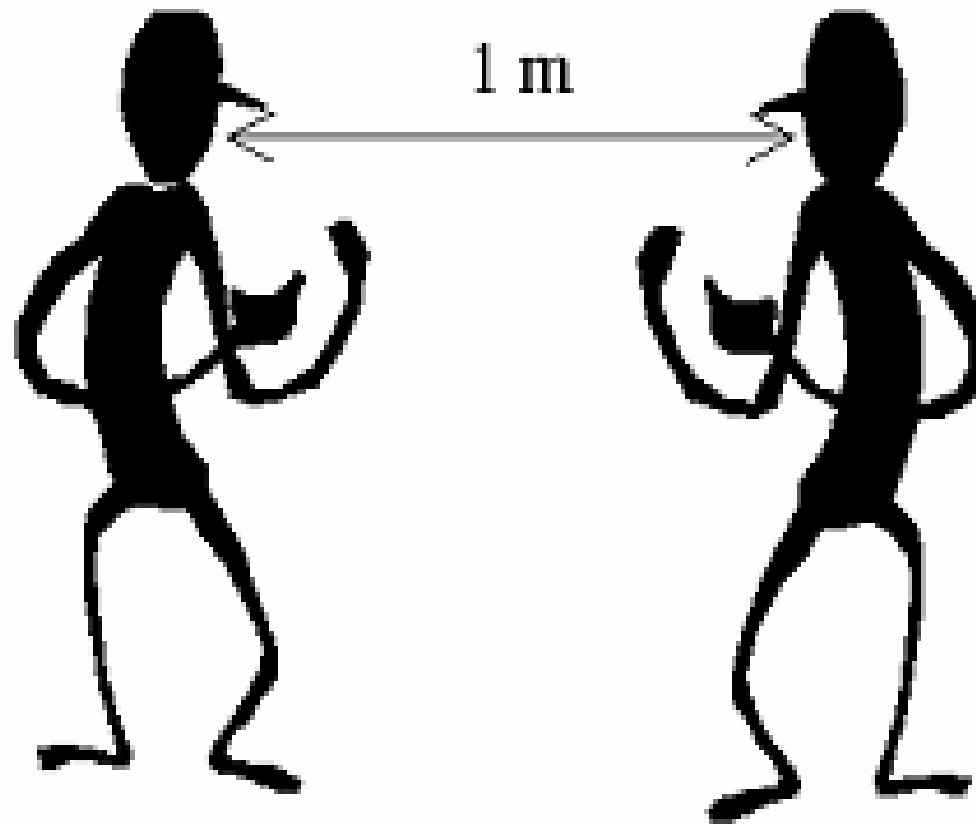
- (1) Innovators
- (2) Early Adaptors
- (3) Early Majority
- (4) Late Majority
- (5) Laggards

❑ Trade-off between Transmission Quality and New Functionality

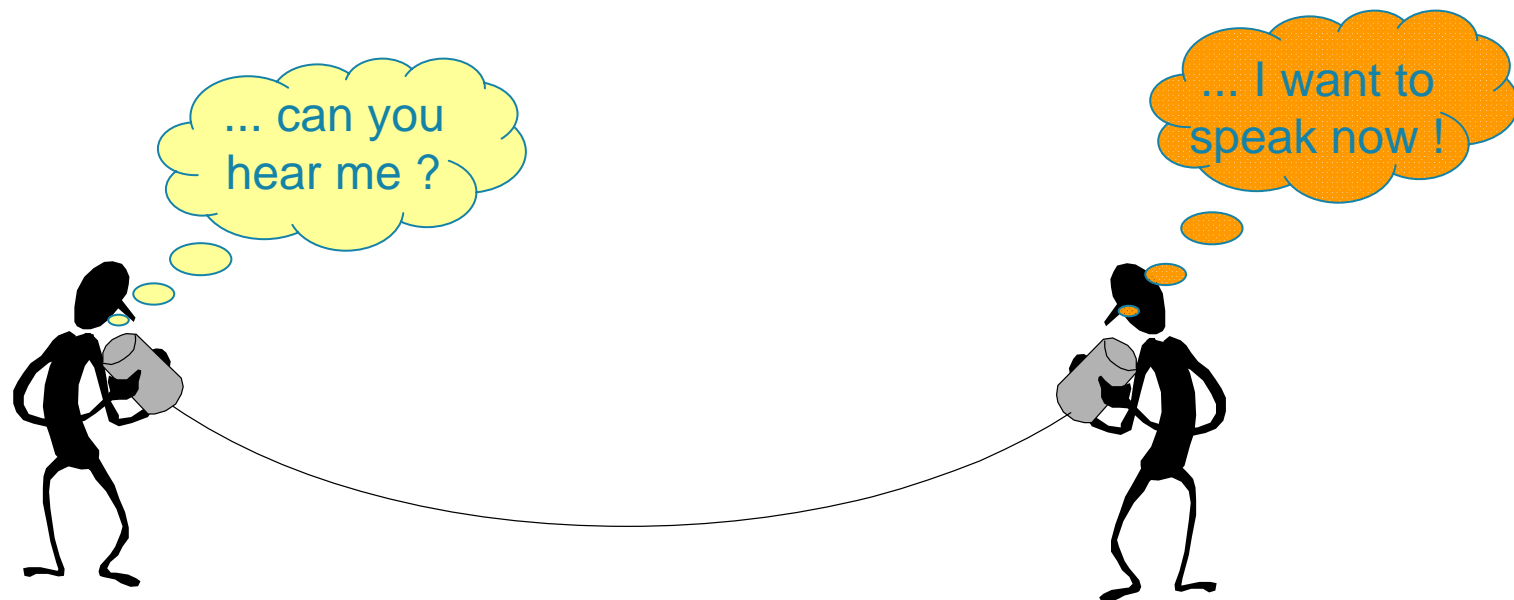
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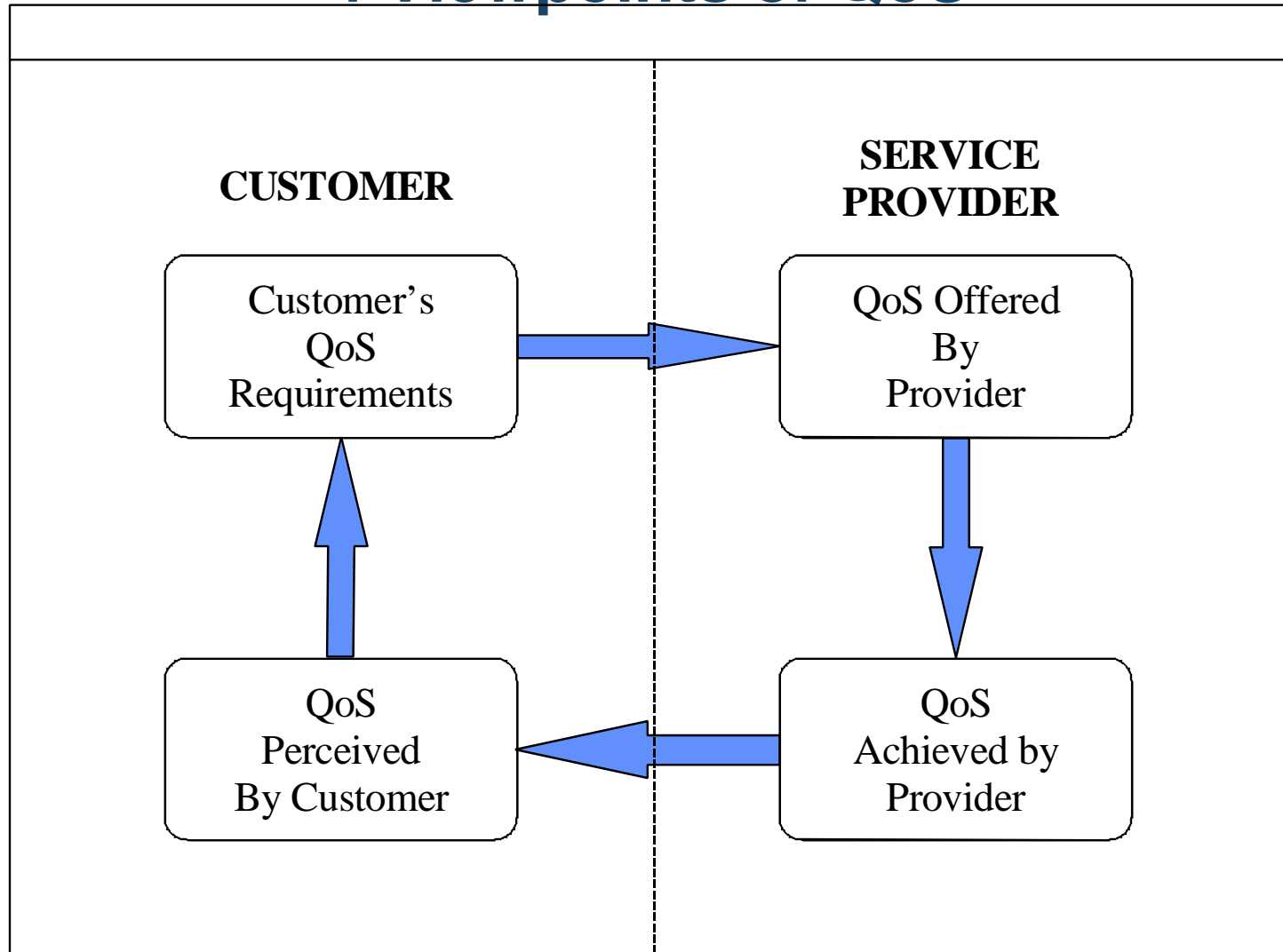
Where it All Begins: Real Communication Situation



... and where End-to-End Quality comes to Play: Employing a Telecommunication System



4 Viewpoints of QoS

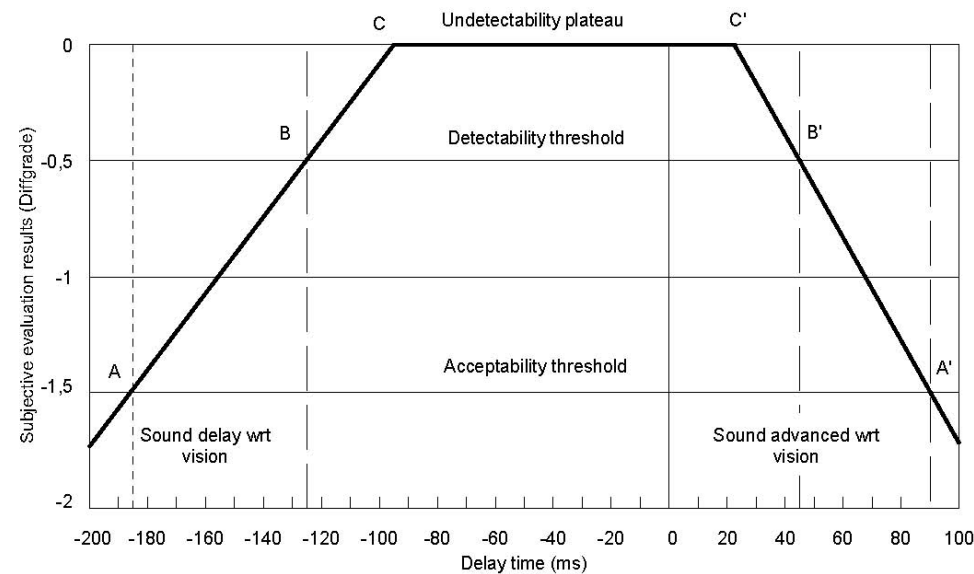


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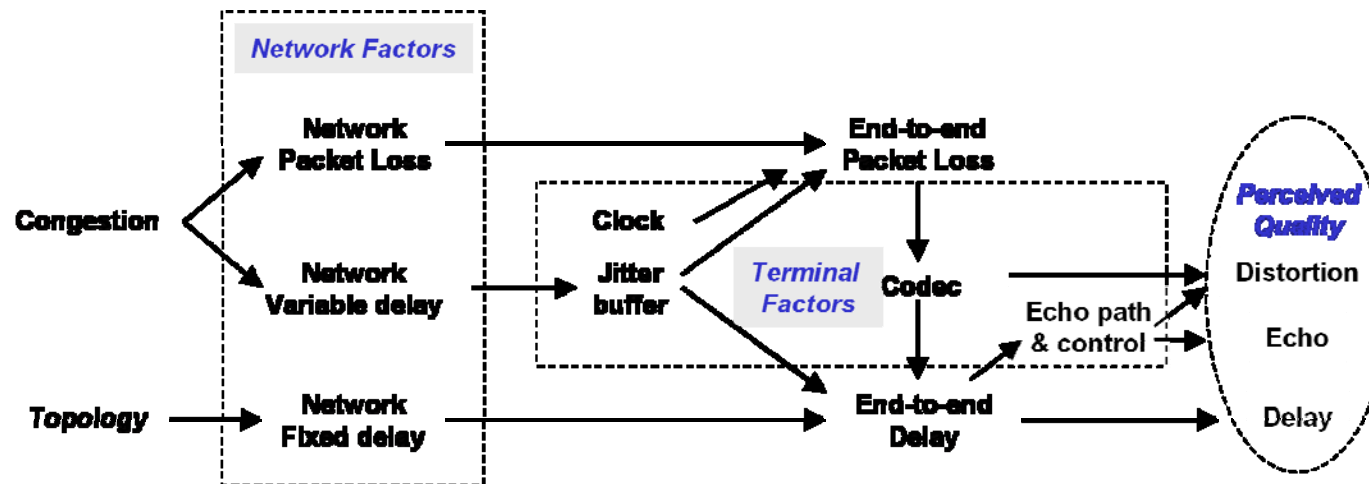
Key Parameters affecting MM Quality

- Media Distortion
- End-to-End Delay
- Echo Effects
- Information Loss
- Background Noise Distortion
- Loss of Synchronization between Media Streams



Impairments in packet networks

- ❑ Distinction between Effects
 - that occur in the Network and
 - Mechanisms in the Terminals that are affected
- ❑ Terminals can be used to correct for the Effects in the Network
- ❑ Remaining Issues are:
 - End-to-End Delay is increased when compensating for other Effects
 - Loss of Information can be Concealed but Not Recovered



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Three NGN Work Items

- ❑ **(1) Performance Planning Guidelines for NGN Interconnect**
 - **NGN Interconnect Scenarios**
 - **End-to-End Performance Planning Guidelines for the PSTN Services in NGNs**

- ❑ **(2) Audiovisual QoS for Communication over IP Networks**
 - **Access Technologies covered include both wired (e.g. xDSL) and wireless (e.g. UMTS, WLAN) technologies.**
 - **Display Size range covered is from those of small mobile terminals (e.g. 2") up to large TV sets (e.g. 40" or more).**
 - **Applicable to**
 - Broadcasting and Streaming applications such as IPTV and VoD
 - Interactive point-to-point applications such as videotelephony and videoconferencing.

Three NGN Work Items (cont'd)

- **(3) NGN Multimedia User-to-User QoS Classes**
 - **Meet QoS Requirements of Users for Common Applications**
 - **Take into account Network Performance given in ITU-T Rec. Y.1541 and 3GPP TS23.107**
 - **Must be met under Reference Load Conditions**
 - **Separate Set of Quality Classes for**
 - **Media related QoS Requirements**
 - e.g., Delay, Distortion, Information Loss
 - **Functional QoS Requirements**
 - e.g., Connection Set-up Delay, Connection Answer Signal Delay
 - **Examples of User Experiences with Media and Functional QoS in Traditional Networks**
 - e.g., Landline Conversational Quality with Digital Core and Analogue Access, Call Setup Delay in ISDN

Four VoIP Terminal Standards

- ❑ **New Standards Specify Equipment Requirements which enable Manufacturers and Service Providers to enable Good Quality End-to-End Speech Performance**
- ❑ **Transmission Requirements from a QoS Perspective as Perceived by the User for**
 - **(1) Narrowband VoIP Terminals**
 - **(2) Wideband VoIP Terminals**
 - **(3) Narrowband VoIP Loudspeaking and Handsfree Terminals**
 - **(4) Wideband VoIP Loudspeaking and Handsfree Terminals**
- ❑ **Two types of softphones considered**
 - **Type #1 to be used like Desktop type (e.g., Notebook)**
 - **Type #2 to be used like Handheld type (e.g., PDA)**

Four VoIP Terminal Standards (cont'd)

- ❑ **Basis for the Target Frequency Responses in Sending and Receiving is Orthotelephonic Reference Response between 2 Users in 1m Distance under Free Field Conditions**
 - **New, more Realistic Test Methodology**
 - **Compatible with Entertainment & Multimedia Approach**

- ❑ **Additional Requirements for Signal Processing in Terminals**
 - **New Double Talk Performance Requirements**
 - **New Requirements for Switching Characteristics**
 - **Includes Quality of Echo Cancellation Tests**

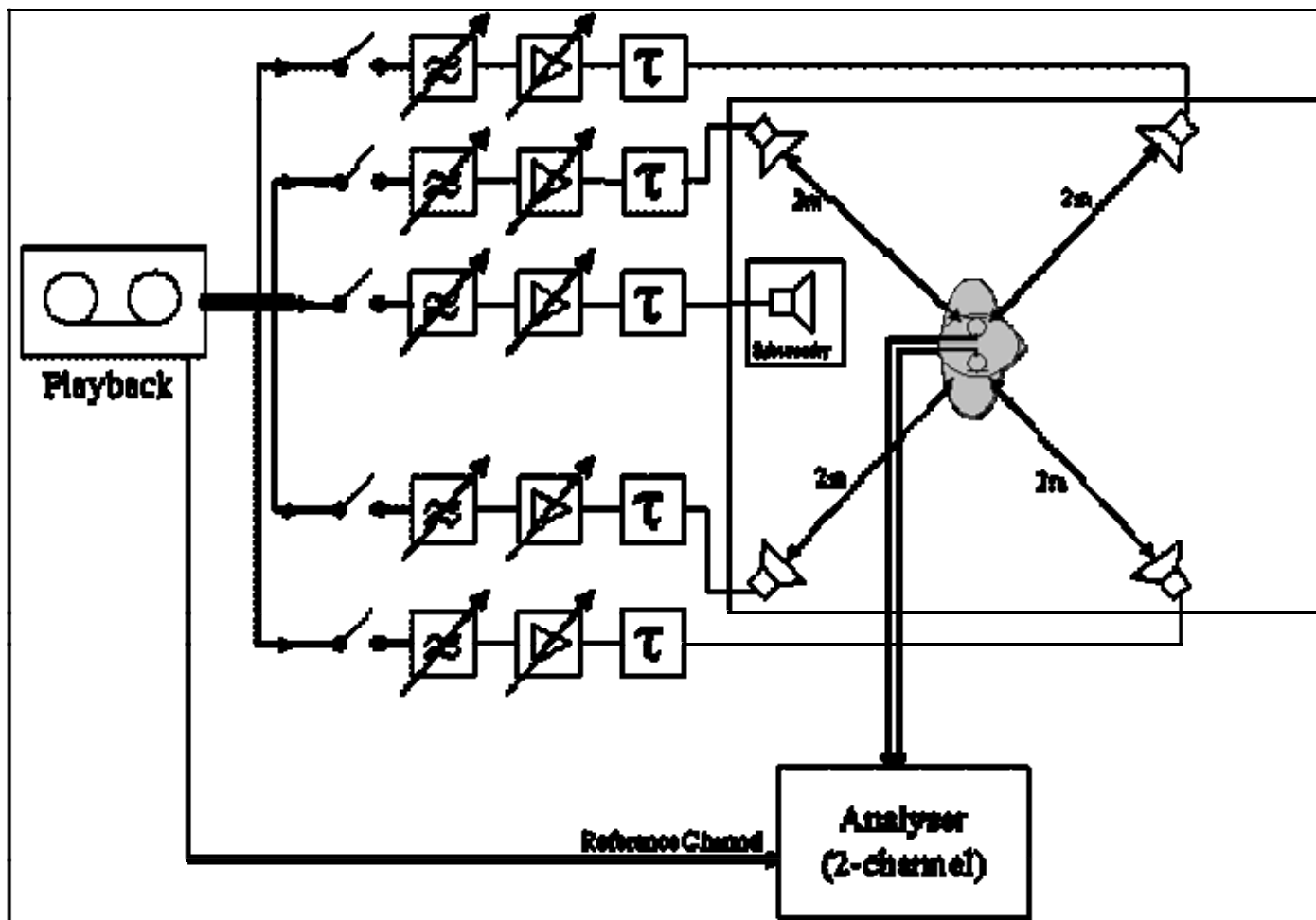
- ❑ **Release #1 in Approval Process**
 - **Work continues...**

Background Noise Transmission Quality

- ❑ **STQ completed significant work on Background Noise Testing Methodologies**
 - **Aimed at improving the Quality of Wideband Speech Applications**
 - **Provides a standardized Performance**
Evaluation Methodology for the Transmission of Background Noise

- ❑ **Essential for the high quality Wideband Communications needed by many of the Applications that the European Commission is promoting such as**
 - **e-Government**
 - **e-Health**
 - **e-Learning**
 - **e-Business**

Background Noise Transmission



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Some Conclusions

- ❑ **End-to-End Delay and Quality of Background Noise Transmission**
 - extremely critical for User Acceptance of New Services

- ❑ **Quality must be delivered at Initial Deployment of New Service**
 - Users give new Service Offerings only Limited Number of Try-outs
 - Once Users are dissatisfied they rarely come back ever

- ❑ **...Much More to tell:**
 - Modelling & Predicting Users' Opinion
 - Simulating Networks' Behaviour
 - Speech Quality Test Event as part of ETSI Plugtests
 - **ETSI Workshop on Speech and Noise in Wideband Communication**
 - 22 - 23 May 2007, ETSI Headquarters, Sophia Antipolis, France

Any Questions ?



Three Excellent Reasons for Joining STQ

- Participate in the creation & improvement of standards for end-to-end media quality**
- Share your own knowledge on media quality and make STQ even better**
- Listen to the discussions during regular STQ sessions and special workshops & become part of the excellence**
- For immediate contact: info@etsi-stq.org**

Getting information

- ETSI website
- ETSI portal
- 3GPP website
- MESA website
- Other hosted sites

- E-mail exploder lists
 - For all of ETSI's activities

- Helpdesk
 - +33 4 92 94 49 00
 - helpdesk@etsi.org

