EURESCOM P905 (AQUAVIT)
Audio and audiovisual quality for mobile services

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Outline

- ✓ Personal Profile
- ✓ Framework and Objectives of AQUAVIT
- ✓ Test beds of AQUAVIT
- ✓ Test methods developed in AQUAVIT
- ✓ Results of Investigations
- ✓ Conclusions

Personal Profile

Harald Klaus

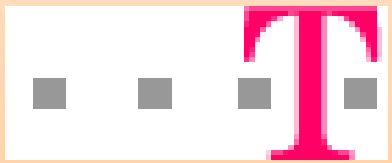
- ✓ **Studied electrotechnical engineering at the Technical University of Berlin**
- ✓ **Research assistant for speech recognition applications and speech quality assessment**
- ✓ **Head of quality assessment of tele-services at T-Systems Nova Berkom in Berlin**
- ✓ **Rapporteur in ITU-T Study Group 12 for instrumental speech quality assessment methods**
- ✓ **Rapporteur in ETSI Technical Committee STQ**

The EURESCOM Project P905 (AQUAVIT)

Framework of EURESCOM P905

AQUAVIT = Assessment of Quality for Audio-Visual Signals over IP and UMTS

- ✓ **Start: January 1999**
- ✓ **End: December 2000**
- ✓ **3 Partners...**



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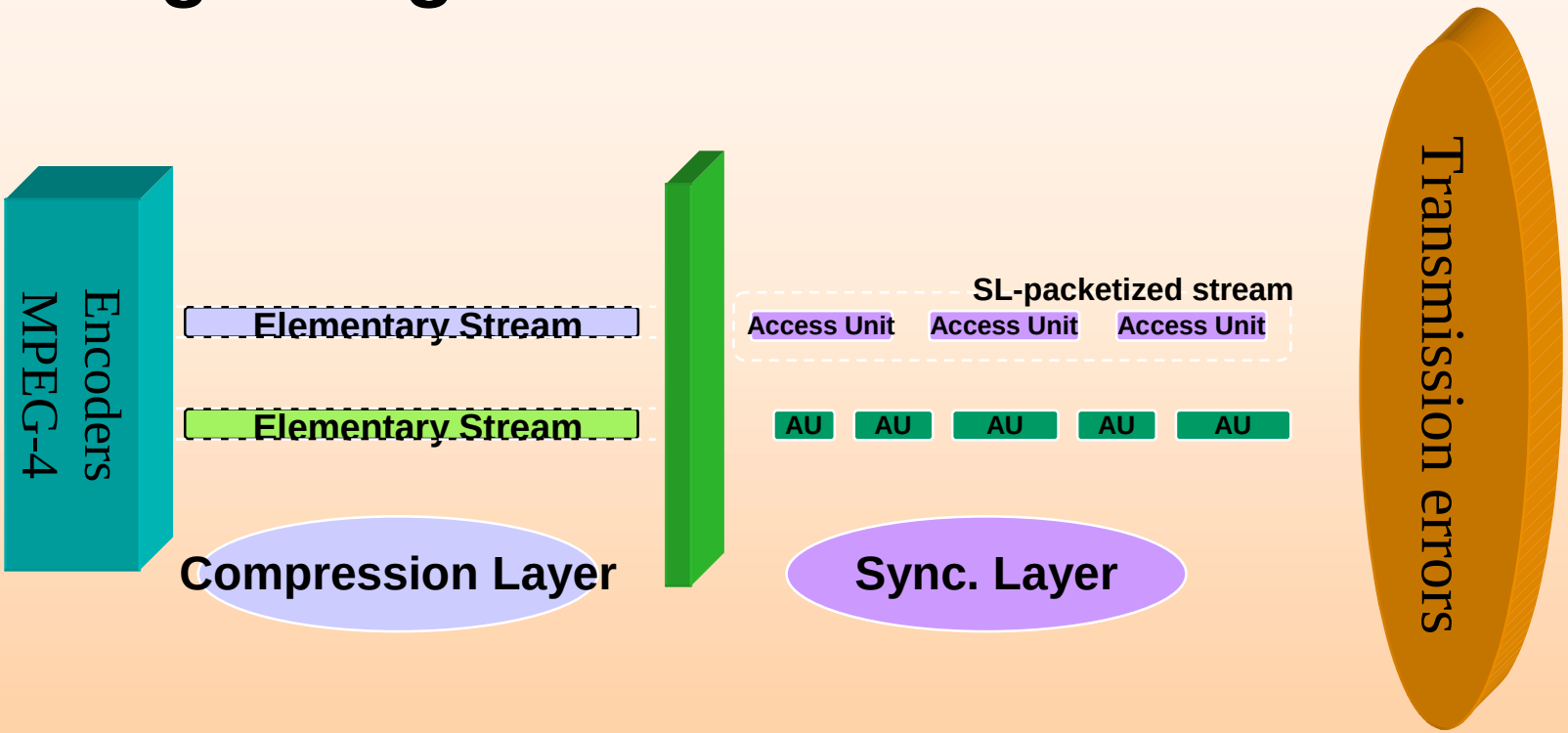
Objectives of AQUAVIT

- ✓ Development of test beds for IP and UMTS
- ✓ Development of subjective and objective test methods
- ✓ Quality assessment of typical audio-video transmission scenarios for IP and UMTS
- ✓ Correlation between subjective and objective quality evaluations

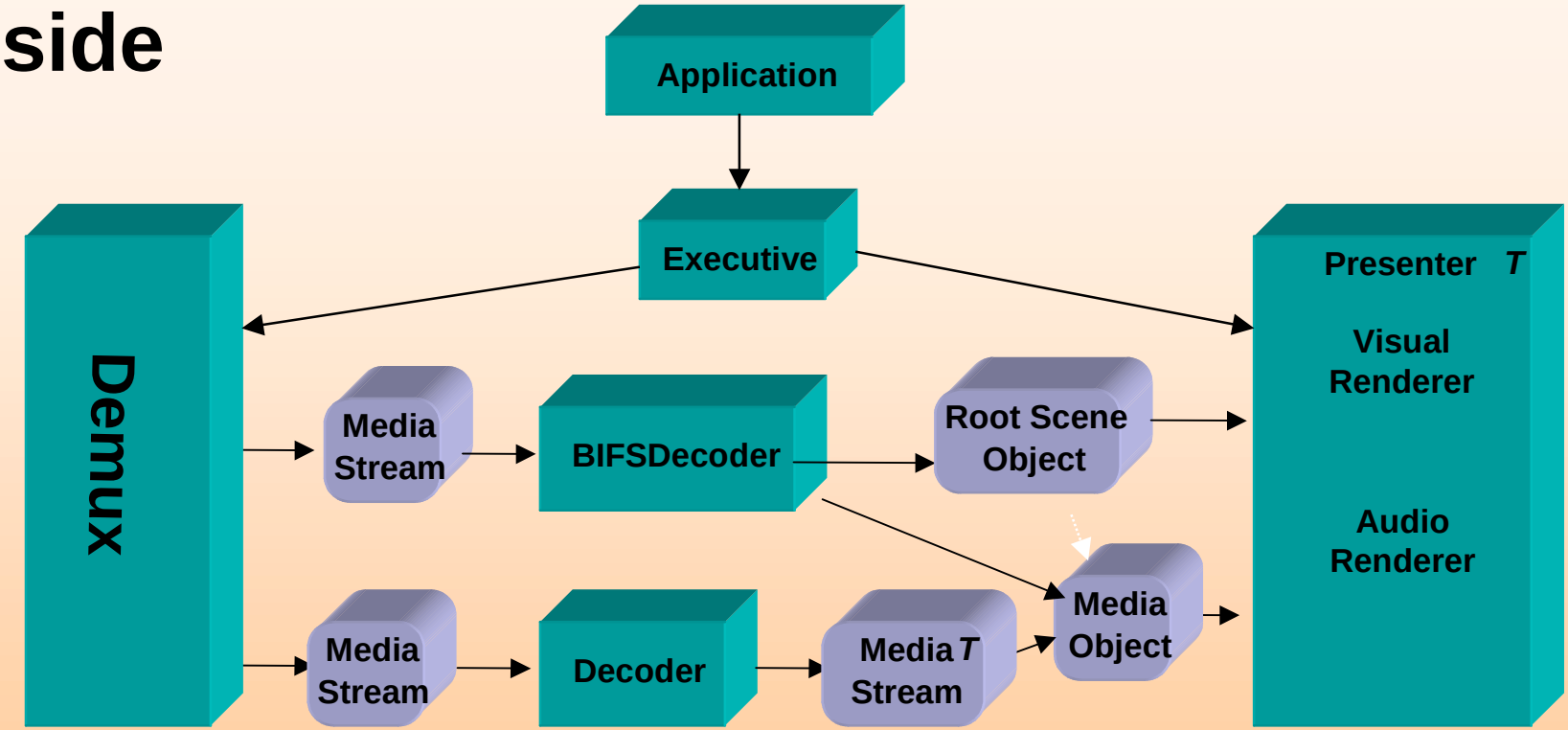
Testbeds

Coding of signals for UMTS on send side



Testbeds (2)

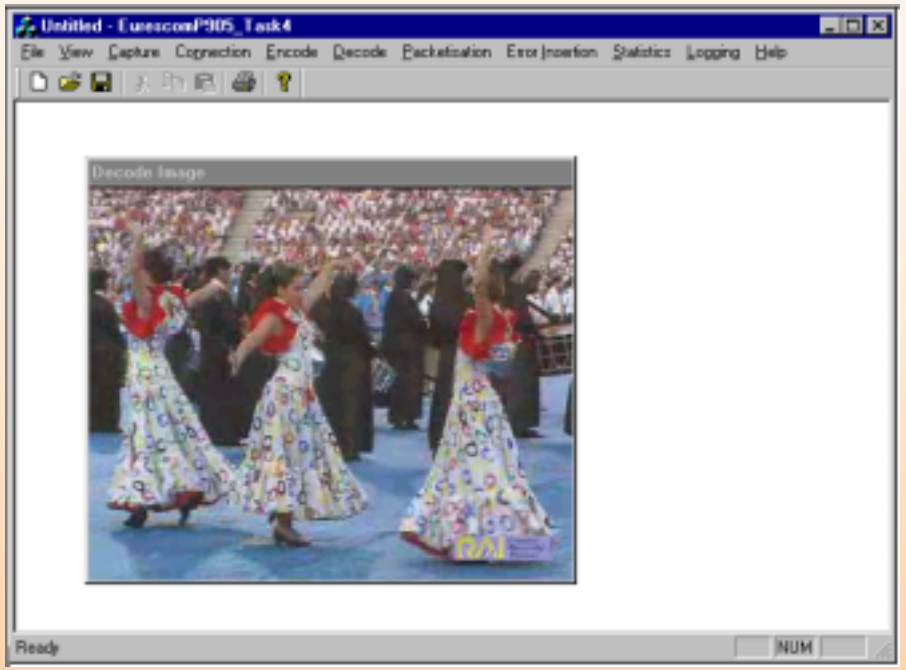
Decoding of signals for UMTS on receive side



Testbeds (3)

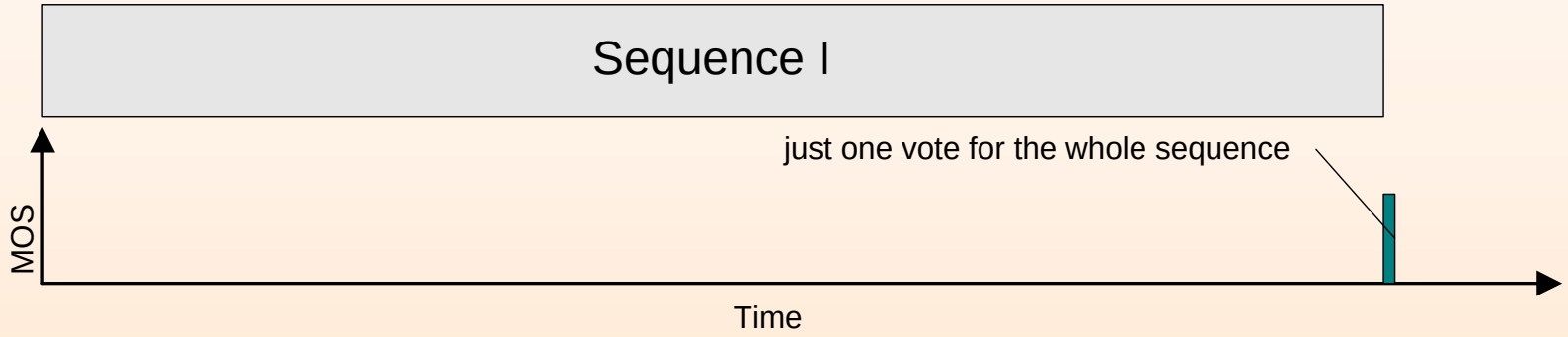
IP Testbed

- ✓ Running on standard PCs in realtime
- ✓ Adjustable set of parameters for
  - ✓ Coding/Decoding
  - ✓ Bit rate
  - ✓ Bit and Frame Errors
  - ✓ Error distribution
- ✓ Windows user interface

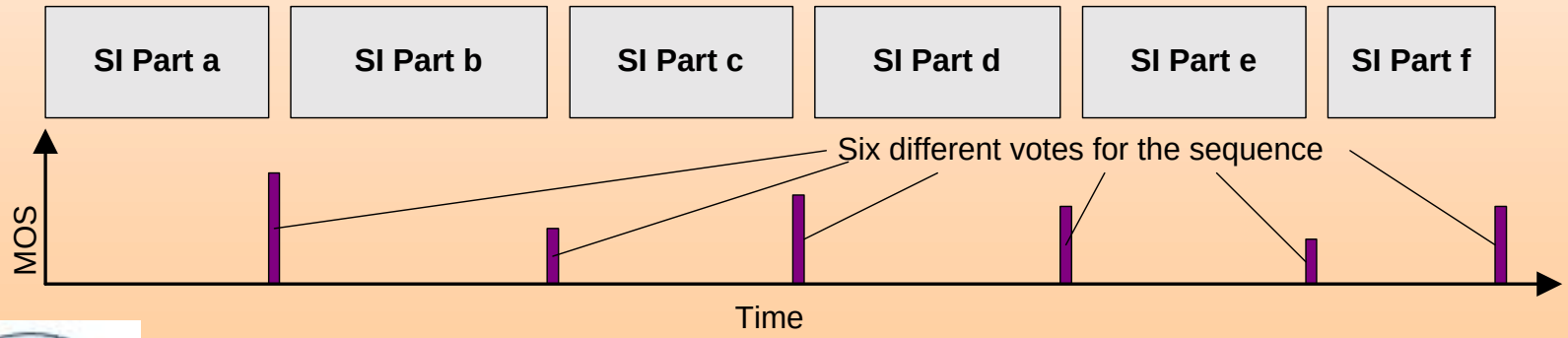


Subjective test methods

Speech quality evaluation



a) ordinary way of voting



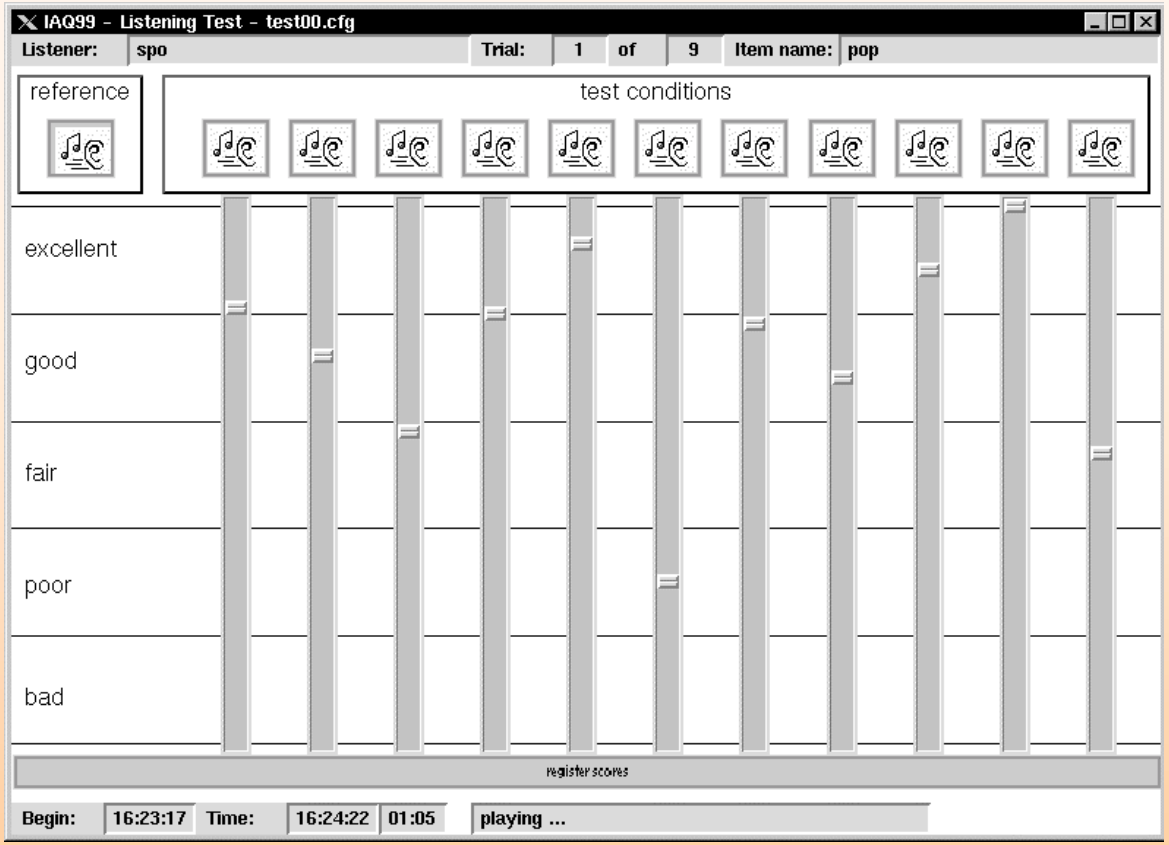
b) simulation of continuos voting

Subjective test methods

Speech quality evaluation

Subjective test methods

Audio quality evaluation



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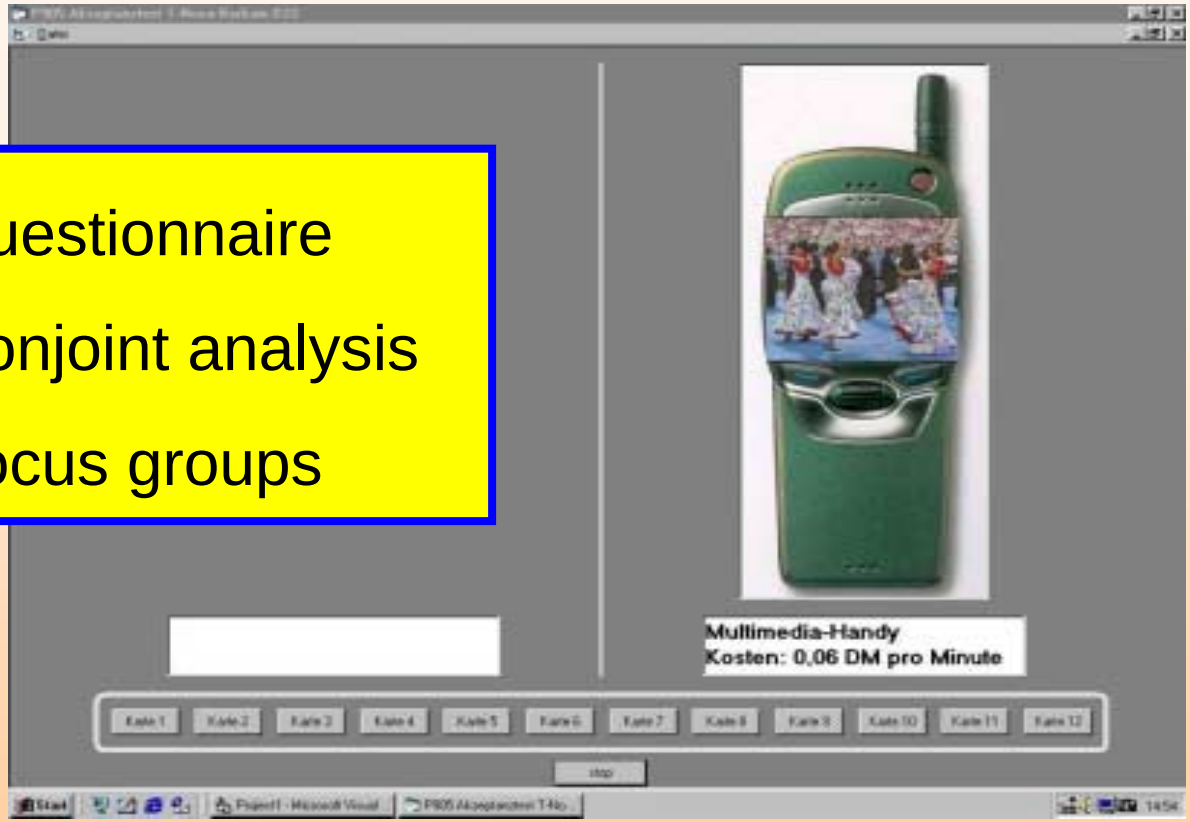
Subjective test methods

Video & A/V quality evaluation

Subjective test methods

Acceptability tests

- Questionnaire
- Conjoint analysis
- Focus groups

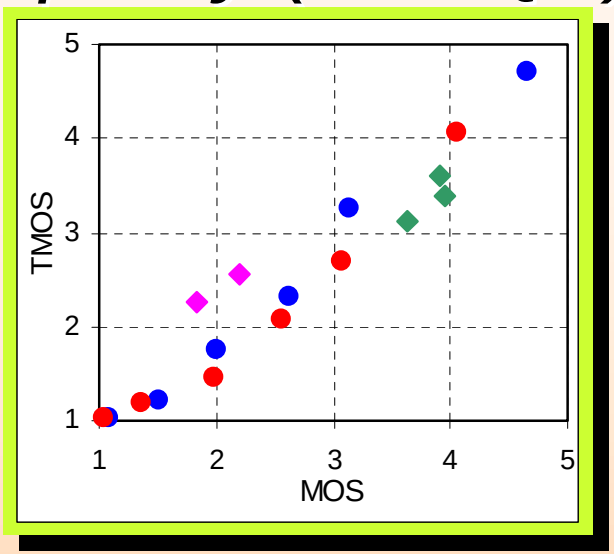


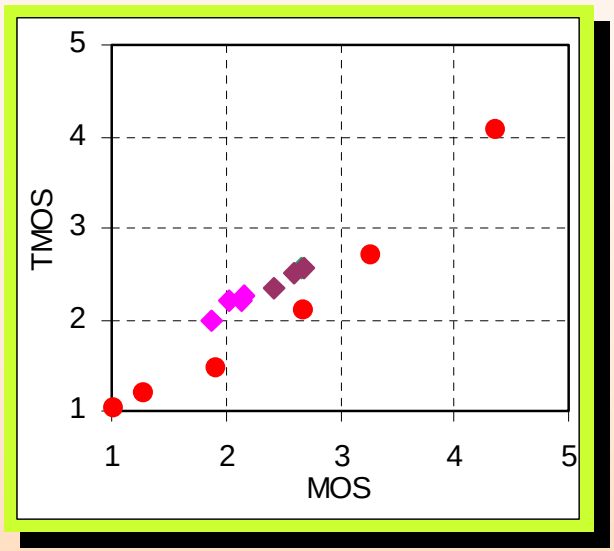
Objective test methods

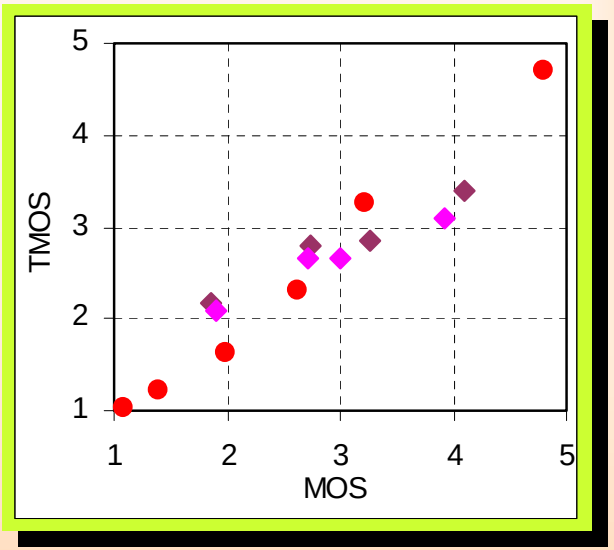
- ✓ TOSQA (Telecommunication objective speech quality assessment)
- ✓ PEAQ (Perceptual evaluation of audio quality)
- ✓ A new video quality assessment model developed by British Telecom

Results of investigations

Correlation of subjective and objective speech quality (TOSQA)







Experiment 1
narrow band & wideband speech

ρ = 96.6%

Experiment 2a
Only narrow band speech

ρ = 95.4%

Experiment 2b
Only wideband speech

ρ = 98.2%

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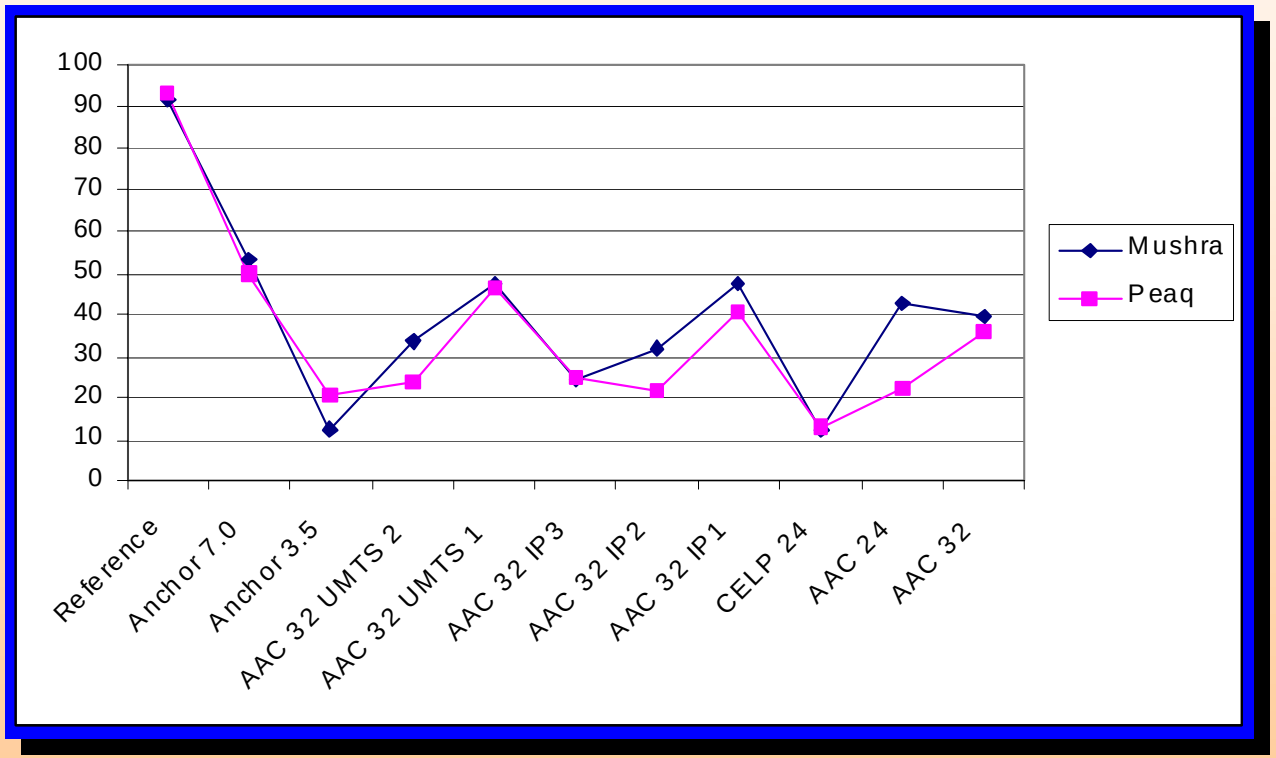
Results of investigations

Subjective test results - audio quality

Low quality conditions (average of all sequences)



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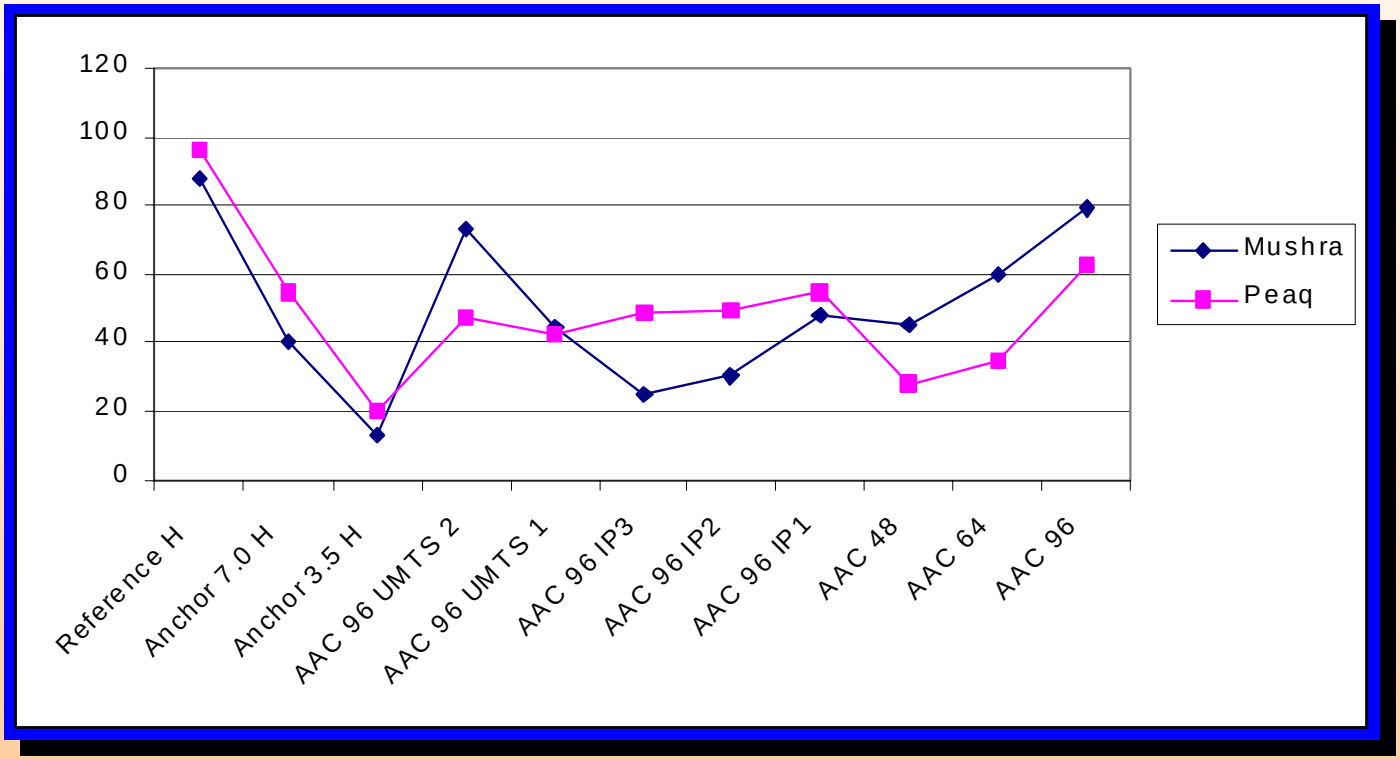
Results of investigations

Subjective test results - audio quality

High quality conditions (average of all sequences)



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Results of investigations

Acceptability test results

- ✓ **Quality and cost are the equally important main factors to the population questioned.**

- ✓ **Benefit of mobility does not compensate for any deficit in quality.**

Conclusions

- ✓ AQUAVIT developed a bundle of improved subjective quality methods for assessment of
  - ✓ Speech quality (narrowband and wideband)
  - ✓ Audio quality (intermediate and high quality)
  - ✓ Video and A/V quality (intermediate and high q.)
- ✓ All tests use the same set of material
- ✓ Results of all tests can be directly used for comparisons

User-centred Quality Engineering.
Quality assessment at T-Systems Nova.

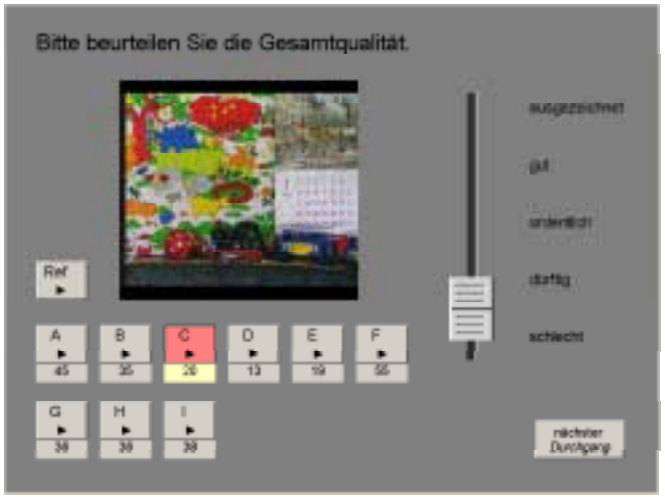
New test services of T-System Nova are based on AQUAVIT methods and results

Consulting

- Test concepts and test design
- Quality Monitoring and Reporting
- Process Optimization

Speech, audio and A/V quality measures

- According to international recommendations and standards
- Optimized, efficient test procedures
- Tests with representative user groups
- Intrusive and non-intrusive measurement methods
- Measurements with Head-and-Torso simulators (HATS)



Our Labs

- High quality according to ITU requirements
- for auditory and instrumental quality assessment
- for recordings using HATS
- for speech and audio production

T-Systems

T-Systems Nova Berkom
Harald Klaus
Head of Quality Assessment