



**ITU-T Workshop on
"From Speech to Audio: bandwidth extension,
binaural perception"**

Lannion, France, 10-12 September 2008

**Summary of Session 4:
Terminals characteristics and
teleconferencing**

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Issues with wideband terminals

- Wideband design is challenging due to
 - Receiver characteristics
 - Typical terminal design
 - Interaction between plastics and transducers
- Super Wideband would be a real challenge due to
 - Reflections/interactions between terminal and environment (e.g. table)
 - Limited frequency response for transducers

Wideband terminal - User Experience

- Effect of closeness for handset/headset not desired
- Problems in call centers due to pickup of high frequencies
- Hands-free reproduction is more desirable due to ambient merge effect

Network musical performance

- Latency requirements for musicians < 25 ms
- PLC Concept based on G.711 could be used for music:
 - PLC adaptation
 - Support of arbitrary block sizes
 - Support of variable playout jitter
- Different codecs possible, goal: codec freely available:
 - ULD (Ultra-low delay audio codec)
 - Bluetooth SBC
 - CELT (Constrained-Energy Lapped Transform)
- Codec performance test -> CELT seems to be the best choice

Wideband echo loss requirements

- Based on different subjective experiments, the following conclusions can be drawn:
 - Echo in the frequency band 3.1 kHz – 5.6 kHz is most critical
 - Echo below 1.3 kHz is less critical
 - Influence of attenuation is stronger than influence of Delay
 - E-model estimation of NB echo is clearly on the safe side
 - New weighting for TCLW wideband required
 - Investigation of spectral echo very important

Wideband echo loss requirements

- Proposal for wideband spectral echo loss requirement

