

User Behavior in Telecommunication – Do We Miss Something in QoS/QoE- Standardization?

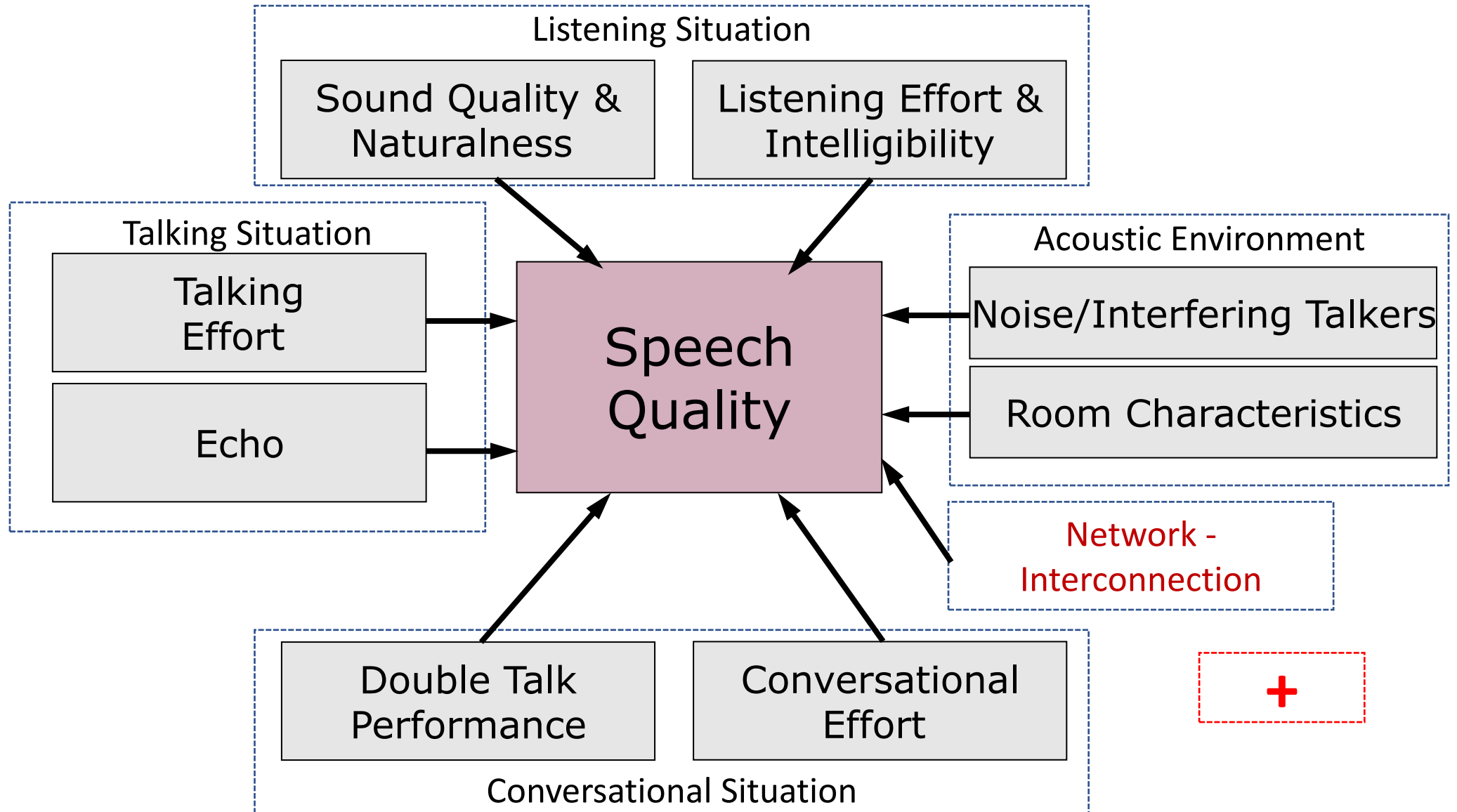
ITU-T Workshop Mexico City 18.-19.9.23

Dr.-Ing. Hans W. Gierlich

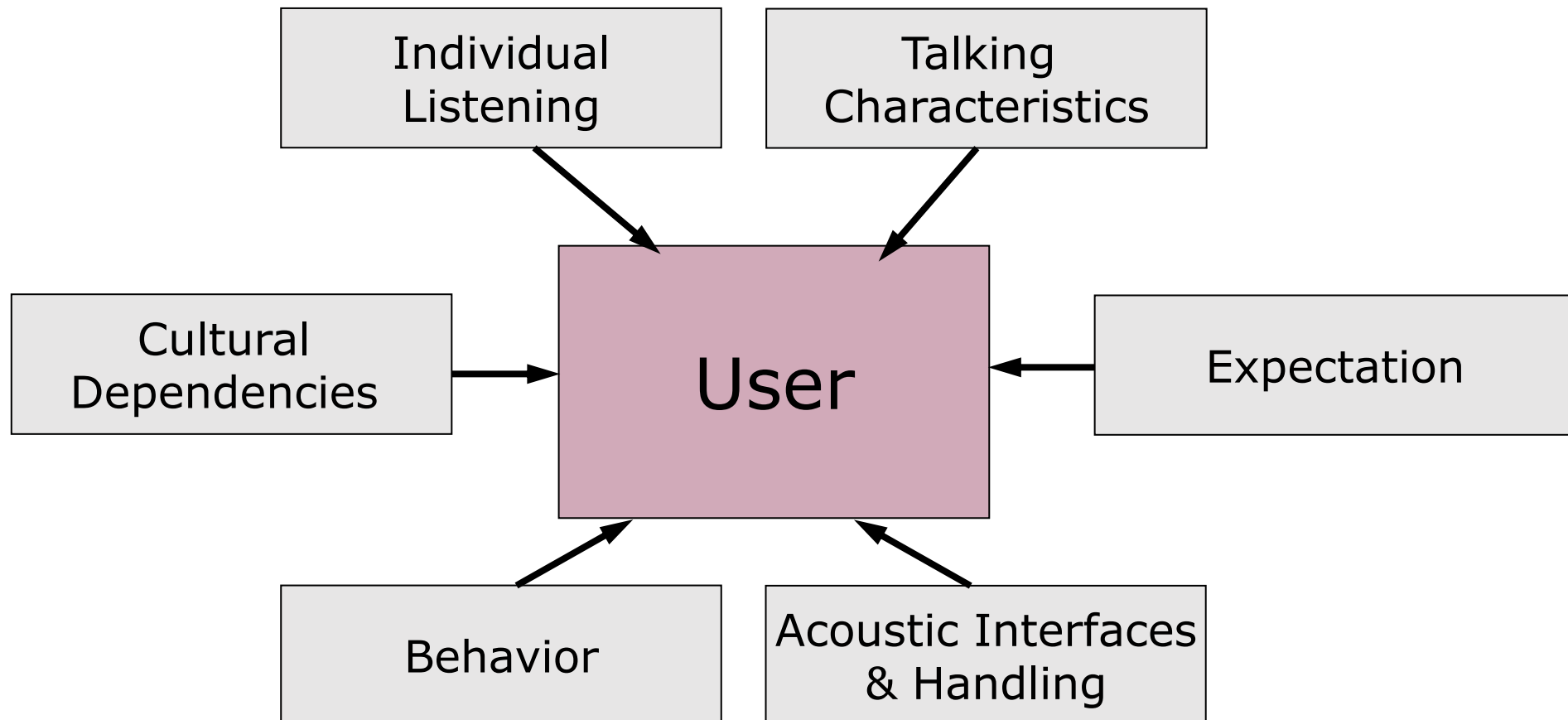
**Whatsoever the connection –
the first contact of a user is the terminal**

Why do we believe that networks and network aspects should be in focus and regulated while quality aspects of terminals and interconnected devices are „up to the market“?

QoS/QoE from the User's Point of View

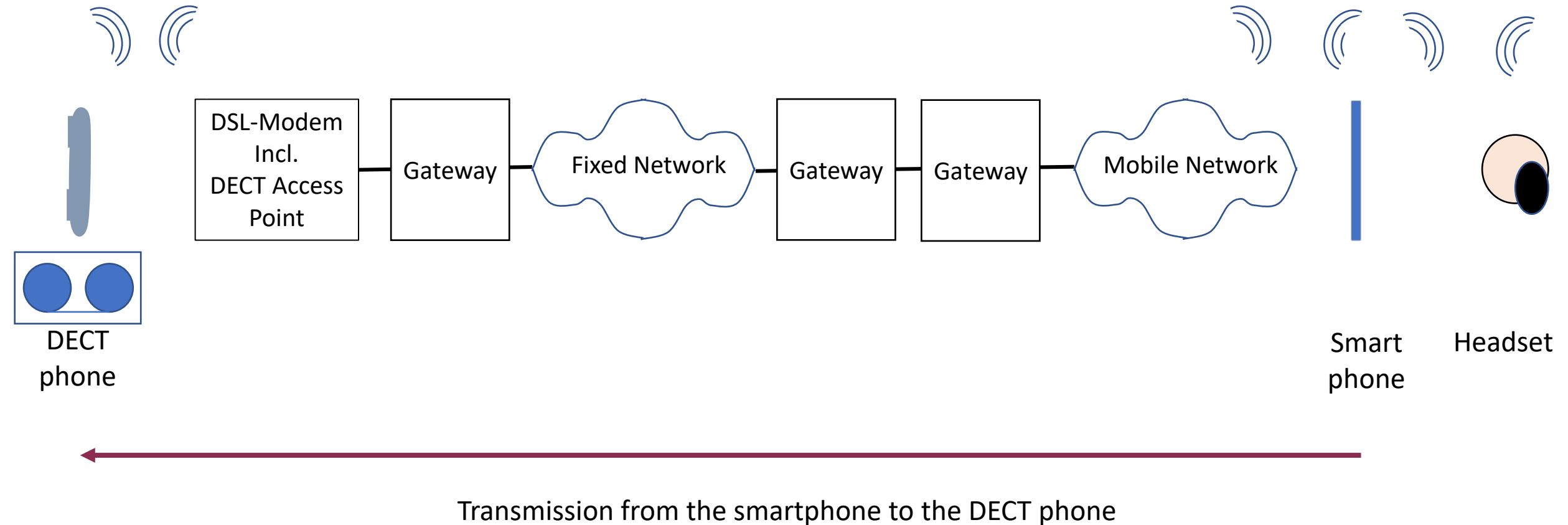


The Individual User

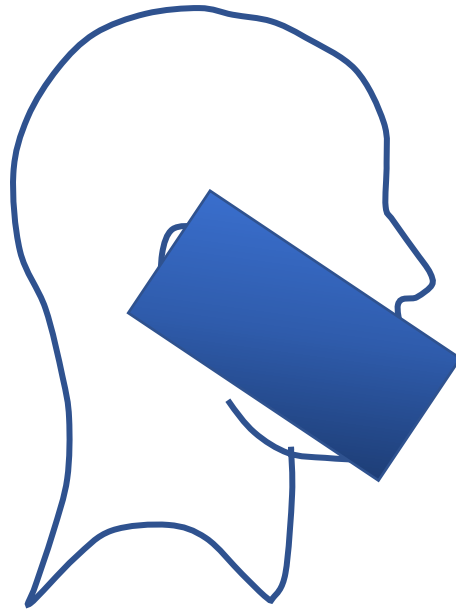


For Illustration: Some (Audio-) Examples

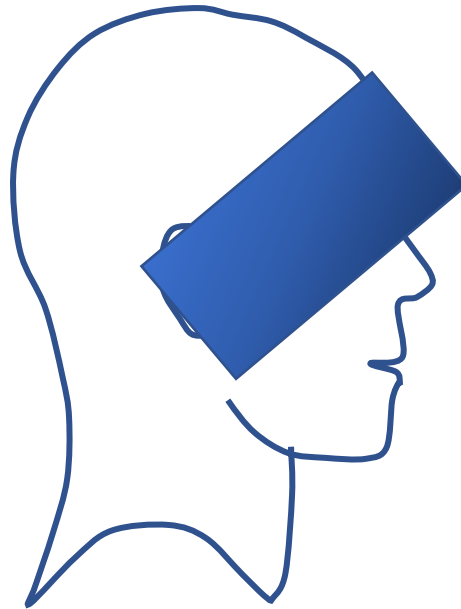
Audio Examples - Experimental Setup



Handset usage



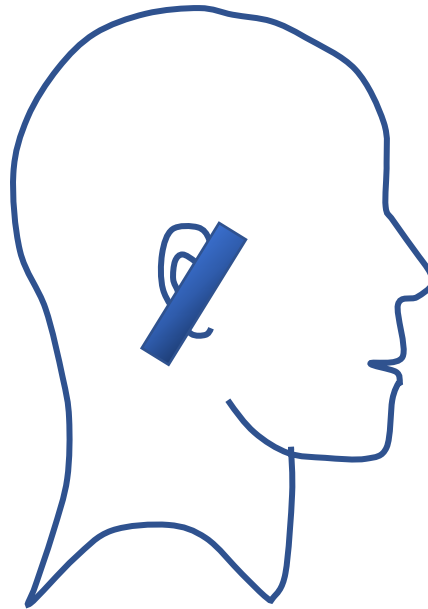
Handset usage



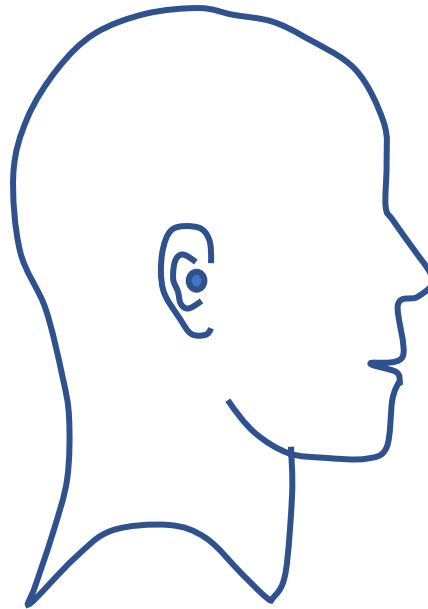
Handset usage



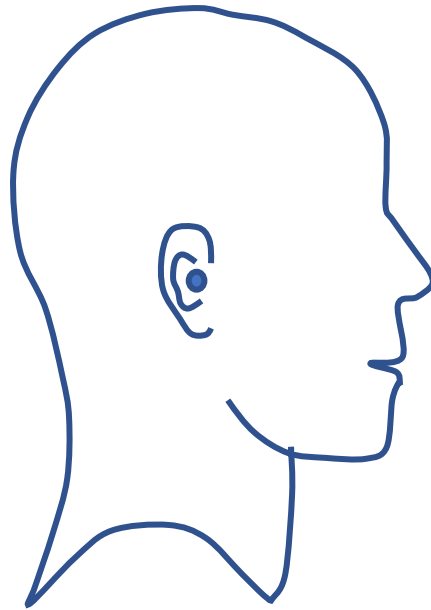
Handset usage



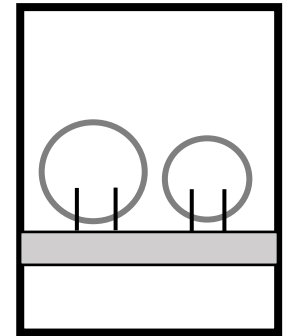
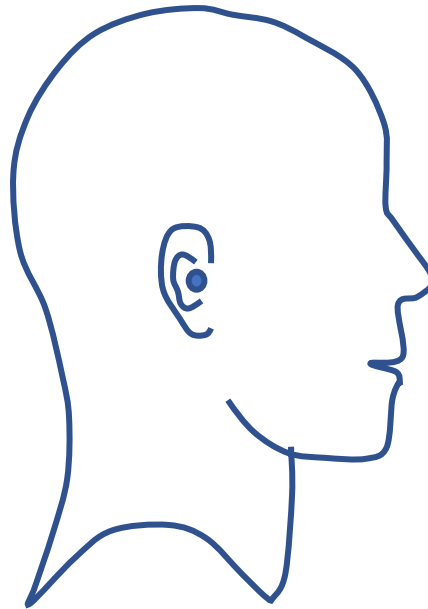
Handset usage



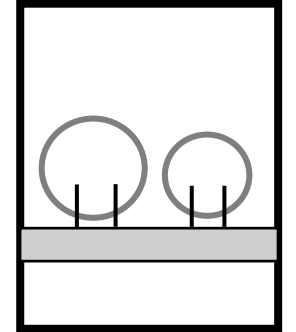
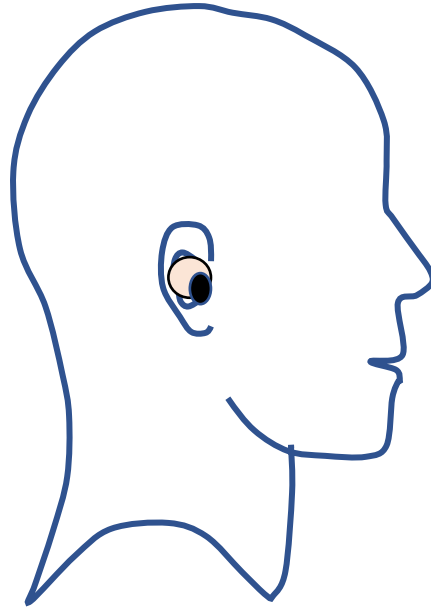
Hands-Free Usage



Hands-Free Usage with Noise

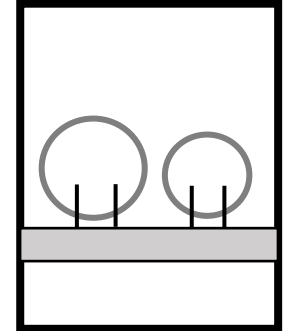
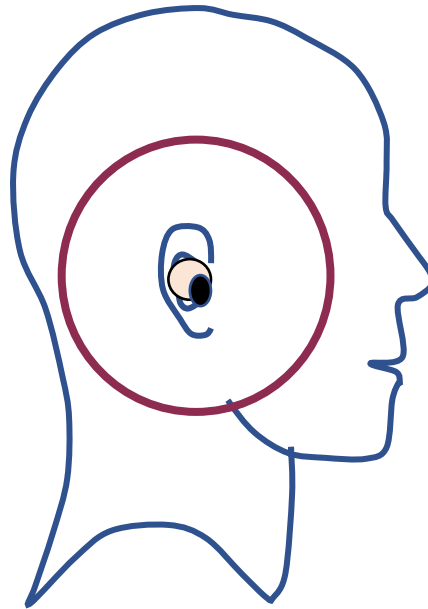


Headset Usage



Headset Usage, Noise & Reverberation

Reverberation



Standardization

Network QoS and QoE:

- E-Series Recommendations dealing with
 - Network planning
 - Network operation
 - Network management
 - Network monitoring
 - QoS and QoE concepts
- Often subject to regulation

Terminal Standards

- Terminals
 - ITU-T P.1010: Fundamental voice transmission objectives for VoIP terminals and gateways
 - ITU-T: Terminal & interfaces (wireless, headset, car hands-free), perceptual based methods
 - 3GPP: Mobile terminal acoustic requirements
 - ETSI: Wireless & VoIP terminal acoustic requirements, environment simulation, perceptual based methods (speech quality, listening effort)
 - Safety standards (max. acoustic sound pressure)

User Behavior – What is Covered so Far

- User static (not moving) in various acoustic environments (ITU-T P. 570, ETSI TS 103 224, ETSI TS 103 281 ...)
- Time variant echo path – to some extent simulating terminal movement (ETSI TS 103 237 – 740 ...)
- Some handset terminal movement (ETSI TS 103 237 – 740 ...)

User Behavior – What is Missing

- The combination of terminals and interconnected devices such as headsets
- The user behavior including:
 - Moving in an acoustic environment with time variant conditions
 - Moving the device
 - Parallel tasks performed by the user

Conclusions

- Any QoS and QoE discussion has to be user-centric and holistic
- User behavior has changed dramatically the last years - Standardization & testing need to follow faster
- Regulation should consider the impact of terminals and interconnected devices on the user experience
- Regulators and operators are powerful – the user is not: What could be changed?