



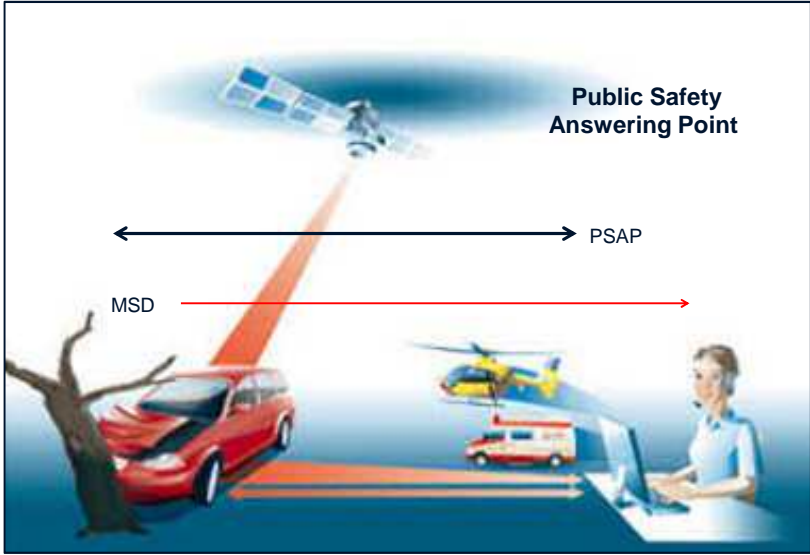
HEARING IS A FASCINATING SENSATION

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The new ITU-T Work on
“Speech communication requirements for emergency calls originating from vehicles “

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h A Typical Emergency Call



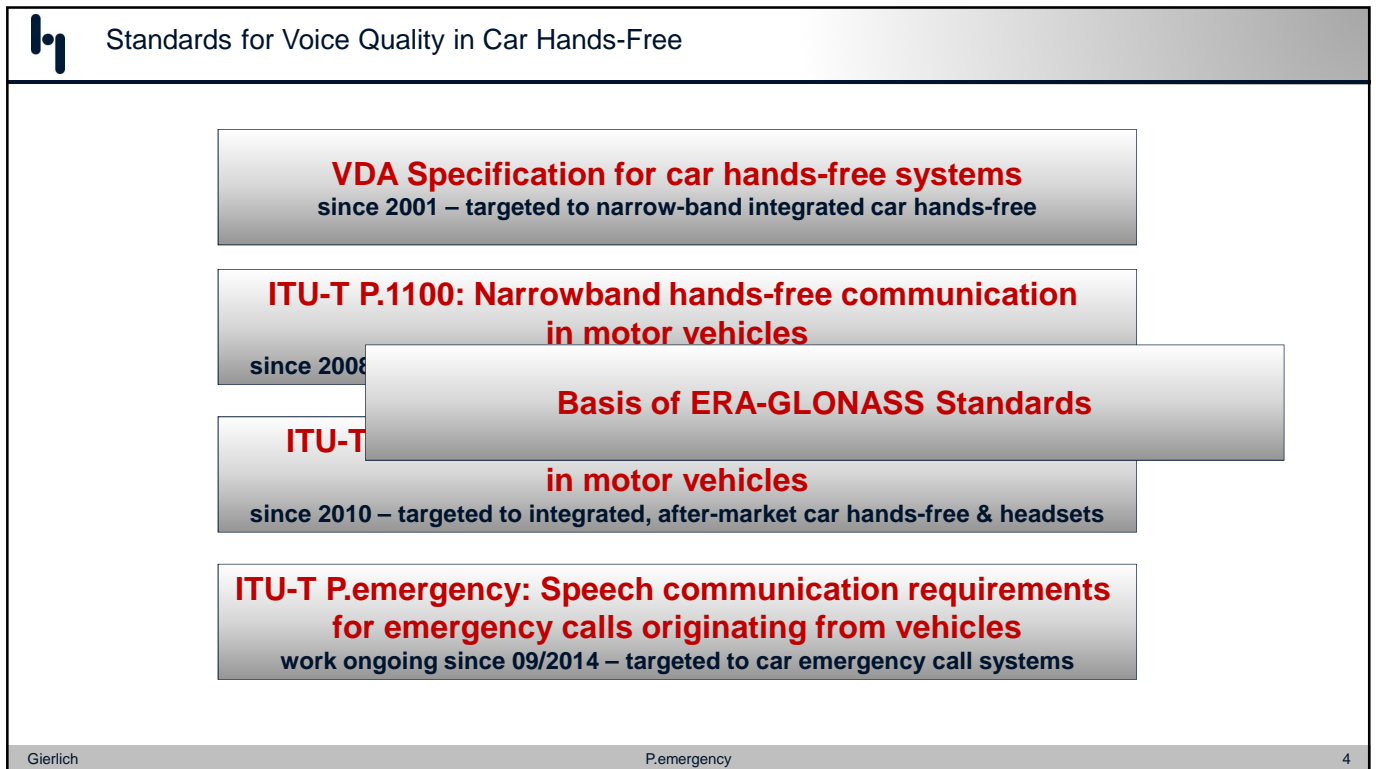
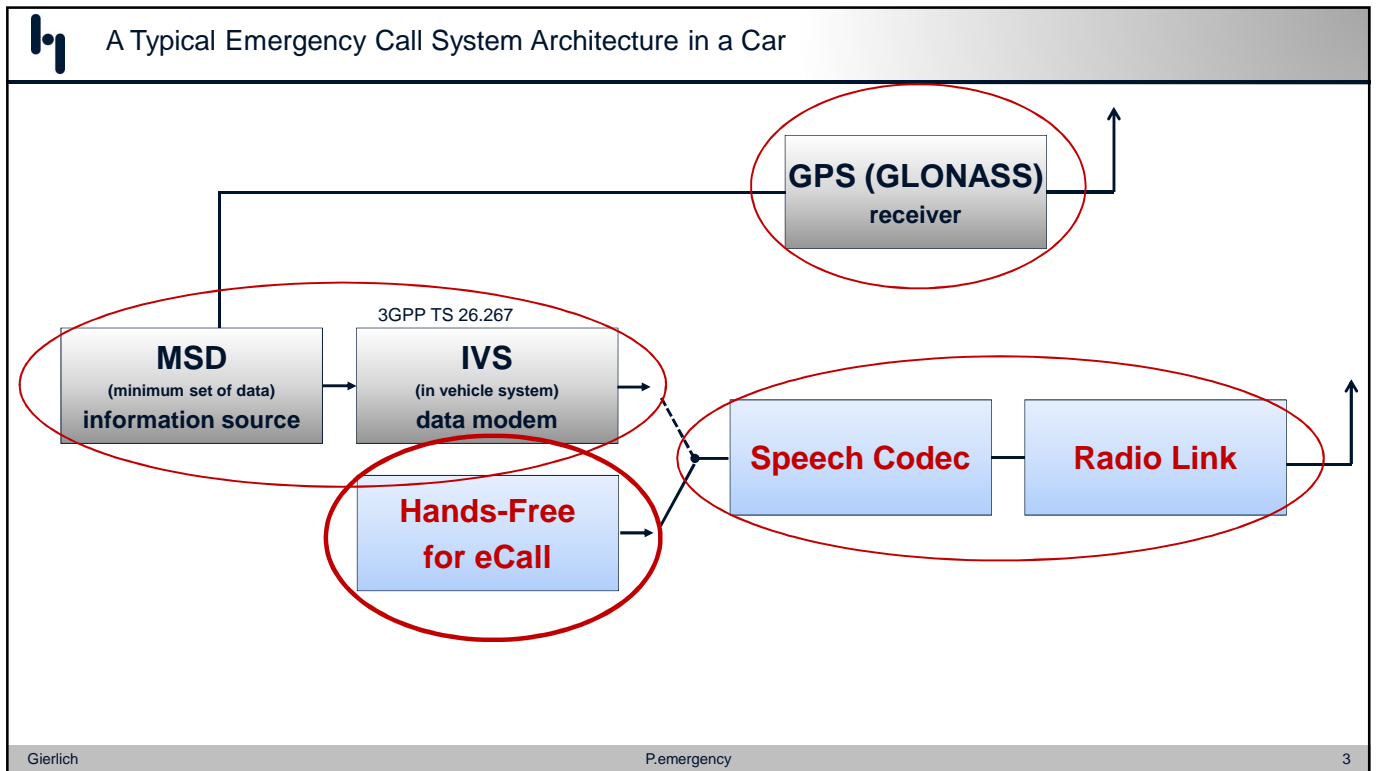
Public Safety Answering Point

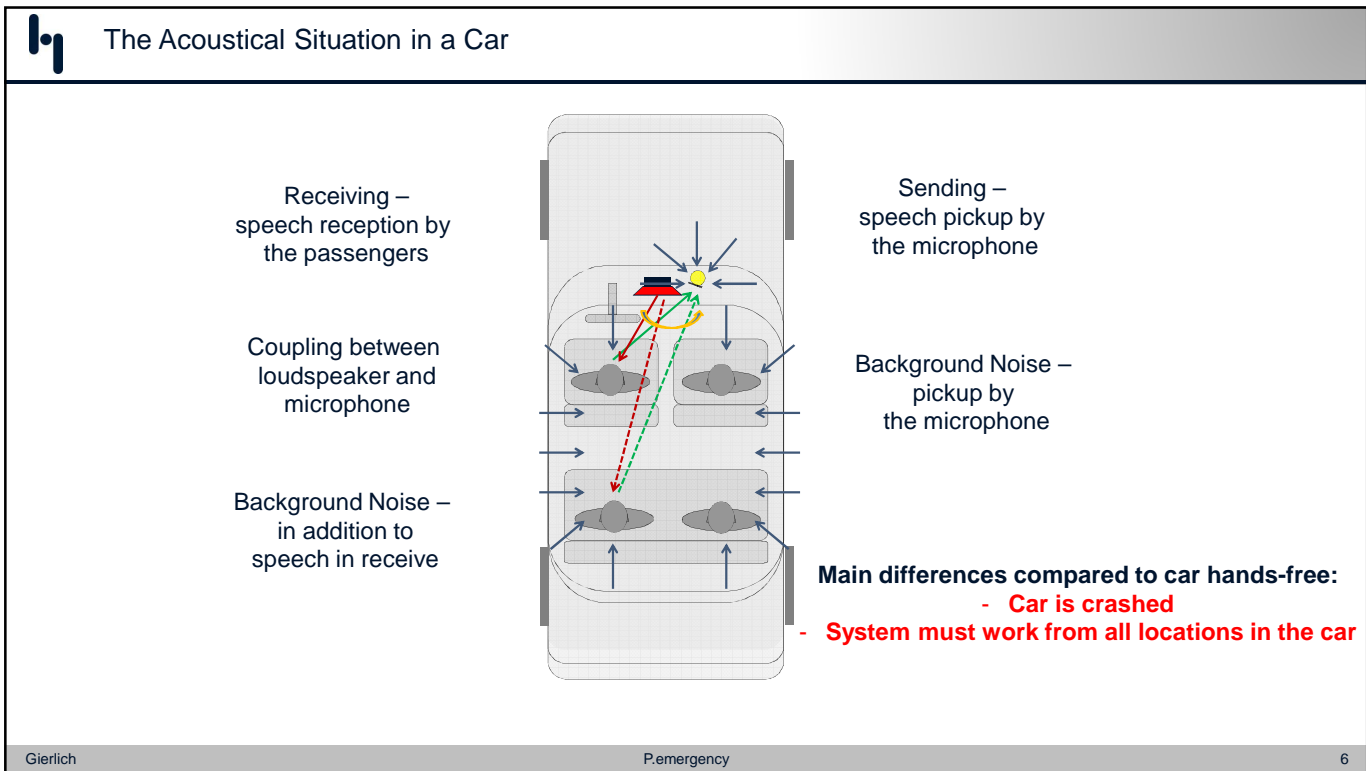
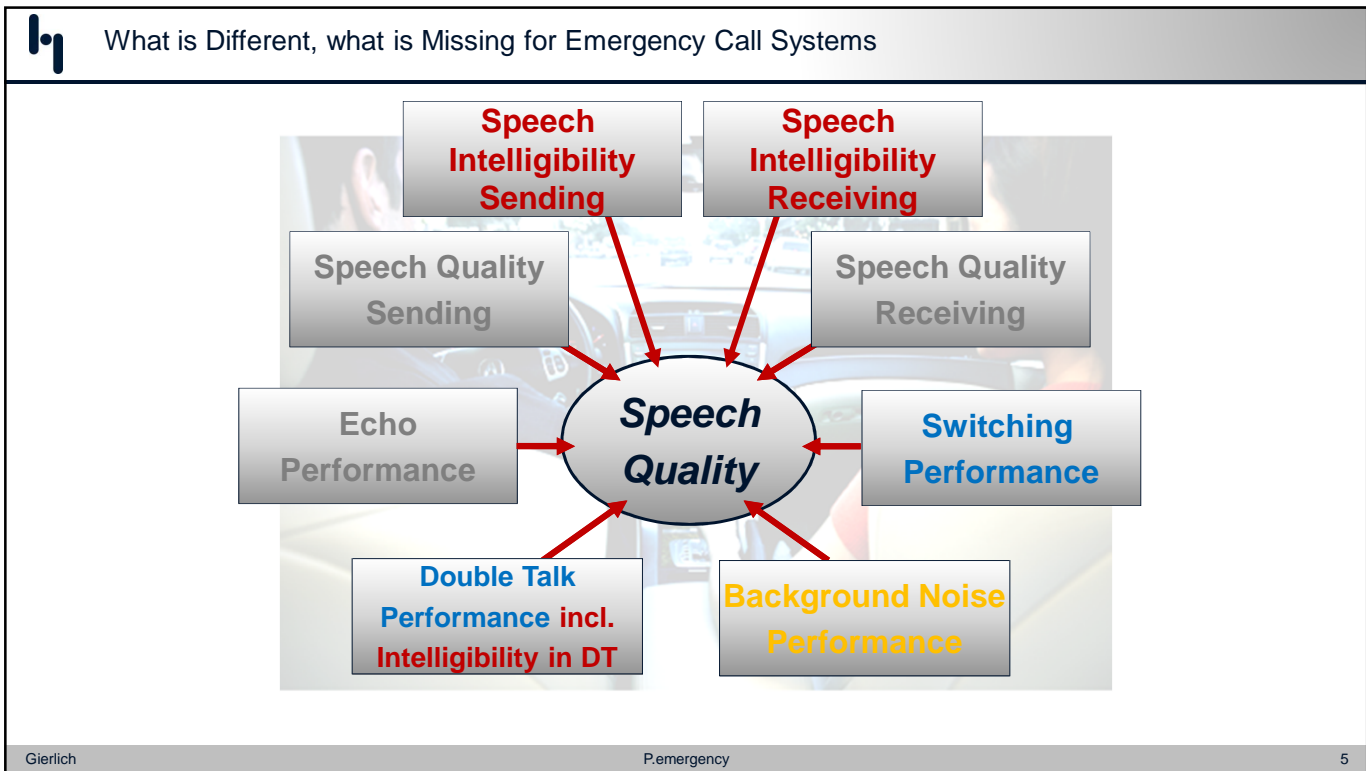
PSAP

MSD

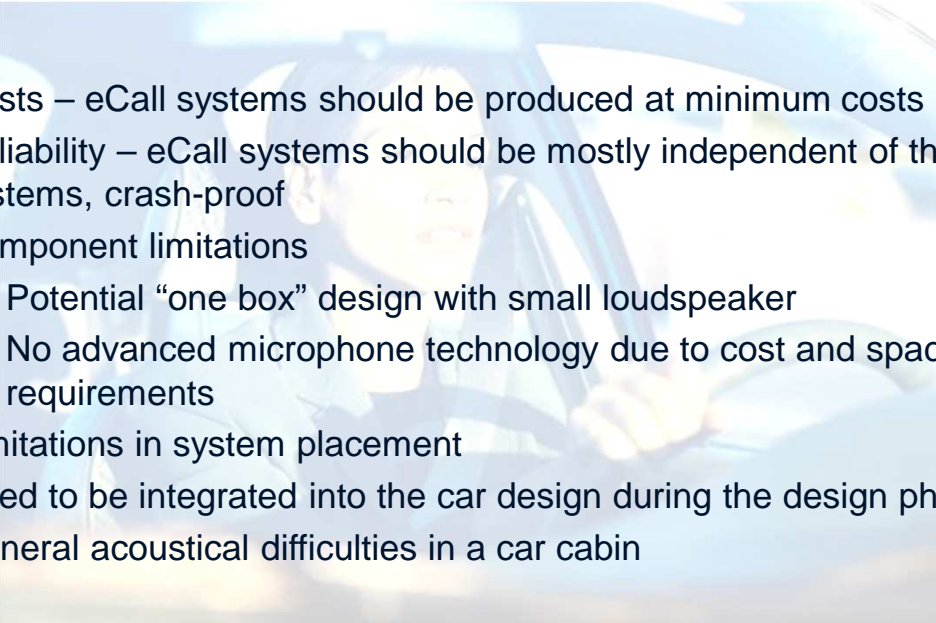
Source: ADAC

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h System Constraints for eCall Systems



- Costs – eCall systems should be produced at minimum costs
- Reliability – eCall systems should be mostly independent of the car systems, crash-proof
- Component limitations
 - Potential “one box” design with small loudspeaker
 - No advanced microphone technology due to cost and space requirements
- Limitations in system placement
- Need to be integrated into the car design during the design phase
- General acoustical difficulties in a car cabin

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h The Different Parameters Influencing the Quality of eCall Speech Services

Parameter in present standards	Relevance to eCall speech services
<ul style="list-style-type: none"> • Delay • Frequency Response • Loudness Ratings • Distortions • System noise • Out of Band signals • Terminal Coupling Loss • Background noise performance • Echo performance • Double talk performance • Switching performance • Comfort noise insertion 	<ul style="list-style-type: none"> • Probably less important • Should be targeted to intelligibility • Important basic parameter • Probably less important • Less important if below certain limits • Less important if below certain limits • Probably less stringent requirement sufficient • Important information in the background noise should be preserved • Probably less stringent requirements needed • Important due to less disciplined conversation • Important due to less disciplined conversation • Less relevant
<ul style="list-style-type: none"> • Speech Intelligibility 	<ul style="list-style-type: none"> • Most important, new tests required

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Major considerations for P.emergency in ITU-T

- The recommendation will deal only and exclusively with emergency call systems.
- The main focus of this recommendation is on speech intelligibility as well as on conversational aspects of speech quality such as double talk capability.
- Silent call scenarios are considered to be very important and need to be integrated in P.emergency.
- P.emergency will not consider post-crash scenarios, at least not in the first versions
- ITU-T SG12 recognizes the urgent need for such a Recommendation and the goal is to finalize a first version already by May 2015.
- Start with narrowband.



Parameter in and their purpose

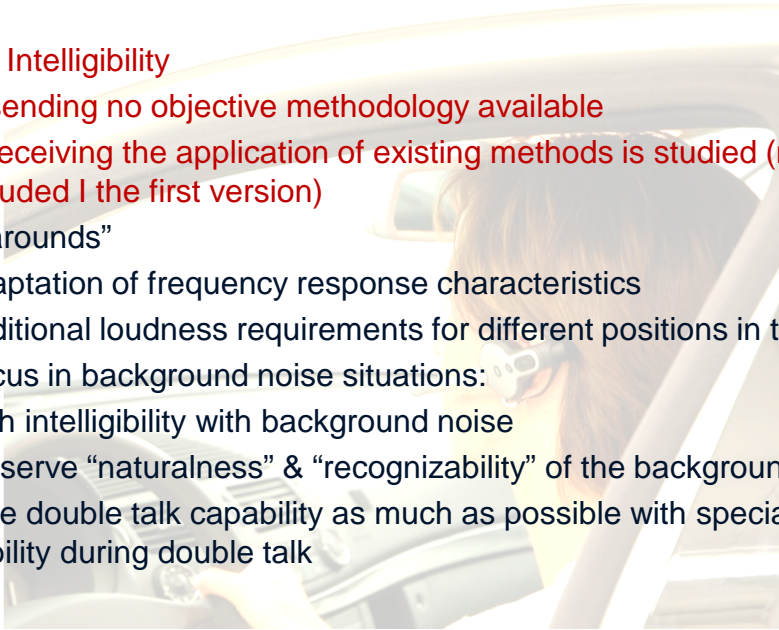
- Delay
- Frequency Response
- Loudness Ratings
- System noise (idle channel)
- Terminal Coupling Loss & additional echo performance tests
- Switching performance
-
- Double talk performance
-
- Background noise performance
-
- Speech intelligibility in the presence of background noise

*Ensure delay is below limits of relevant mobile stds.
 Target to intelligibility rather than quality
 Considers the different passenger locations in cars
 Keep from existing standards
 Important to ensure proper communication from the car to PSAP, less demanding requirements than HFT
 Important to ensure complete transmission of words from the passengers to the PSAP side
 Important parameter in conversation due to less disciplined behavior of injured passengers
 Taking into account the transmission of noise in silent calls (no passenger speaking)
 Focusing on intelligibility rather than on quality, ensuring a high intelligibility with background noise*



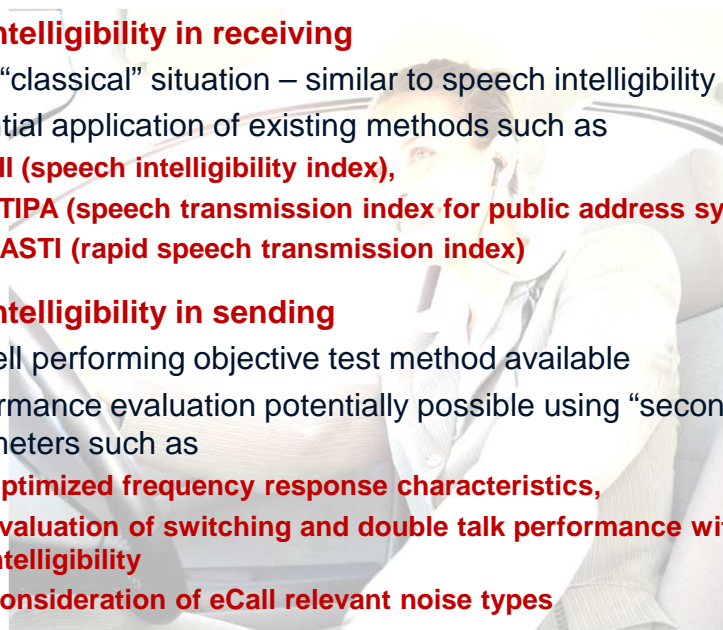
Challenges in Testing and Requirements for eCall Speech Services

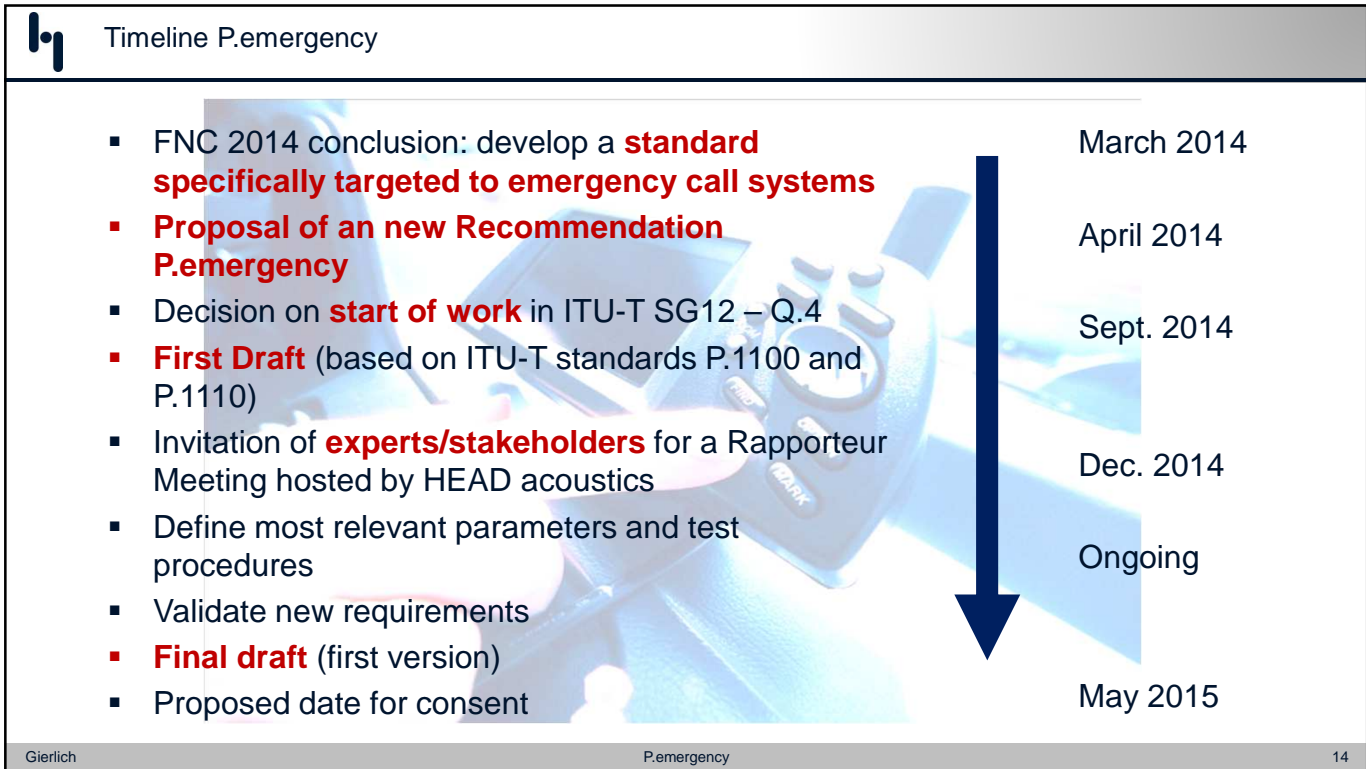
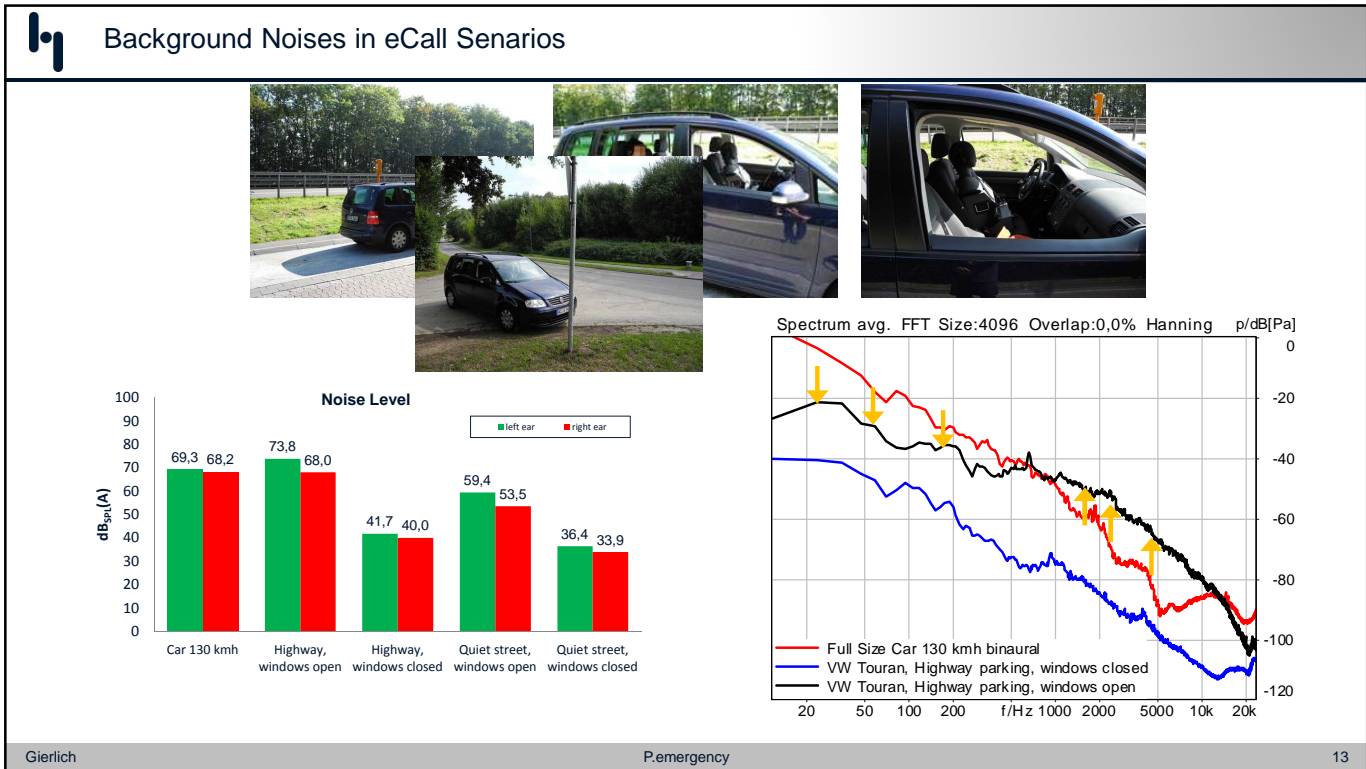
- **Speech Intelligibility**
 - In sending no objective methodology available
 - In receiving the application of existing methods is studied (not likely to be included I the first version)
- “Work-arounds”
 - Adaptation of frequency response characteristics
 - Additional loudness requirements for different positions in the car
- New focus in background noise situations:
 - High intelligibility with background noise
 - Preserve “naturalness” & “recognizability” of the background noise
- Preserve double talk capability as much as possible with special focus on intelligibility during double talk



Considerations for Speech Intelligibility Testing in eCall Systems

- **Speech Intelligibility in receiving**
 - More “classical” situation – similar to speech intelligibility in rooms
 - Potential application of existing methods such as
 - **SII (speech intelligibility index),**
 - **STIPA (speech transmission index for public address systems)**
 - **RASTI (rapid speech transmission index)**
- **Speech Intelligibility in sending**
 - No well performing objective test method available
 - Performance evaluation potentially possible using “second order” parameters such as
 - **Optimized frequency response characteristics,**
 - **Evaluation of switching and double talk performance with focus on speech intelligibility**
 - **Consideration of eCall relevant noise types**







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