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Easier, faster and more economical phone testing

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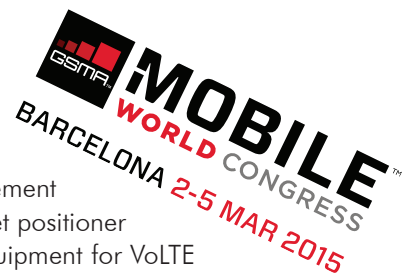
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| Fairs & Conferences |

HEAD acoustics at Mobile World Congress 2015

The Mobile World Congress (MWC) in Barcelona is the most important conference and trade fair on the subject of mobile communications. After a very successful event in 2014 HEAD acoustics will again exhibit at MWC. From March 2 - 5, 2015 HEAD acoustics intend to present the newest product developments and technologies at **booth 7K74** in hall 7.

"Booth visitors will get an overview of our highly developed product range from our measurement front ends to our motorized handset positioner HHP IV MotoMount through to equipment for VoLTE testing", says Christian Schüring, Sales Manager Telecom at HEAD acoustics.



Further conferences in 2015 where you can meet HEAD acoustics:

DAGA • Nürnberg, Germany • March 16 - 19, 2015

JSAE Automotive Engineering Exposition • Yokohama, Japan • May 20 - 22, 2015

➤ www.head-acoustics.de/eng/trade_fair.htm

HHP IV: Easier, faster and more economical phone testing

New motorized handset positioner with easy to use remote control

HEAD acoustics has developed its new motorized handset positioner HHP IV *MotoMount*. Now customers can experience a new and more comfortable way of voice quality measurement. Thanks to its motorization and automatable control, HHP IV *MotoMount* no longer requires manual user interaction during measurement sequences.

Mounted to the artificial head HMS II.3, HHP IV *MotoMount* allows reproducible measurements of the transfer characteristics of handsets as a function of application force and positioning according to ITU-T Recommendation P.64.

Both "standard test positions" (STP) according to ITU-T P.64 for the pinna types 3.3 and 3.4 are supported - on the left and right ear side of the artificial head. Moreover, HHP IV fulfills the requirements regarding the "recommended test position" (RTP) specified by IEEE 269 as well as ITU-T Recommendation P.64. Furthermore, the ability to

reach almost any arbitrary position and angle within the specified limits allows a close-to-reality simulation of user behavior, in particular with regard to positional robustness testing.

With HHP IV *MotoMount*, the voice quality analysis of handsets in dependence of position and application force becomes much easier, faster and more economical. The handset positioner is able to automatically place a clamped-in handset (e.g. a mobile phone) in a wide variety of positions in x_e , y_e , and z_e direction. Furthermore, the handset application force to the outer ear of the artificial head can be adjusted with high precision.

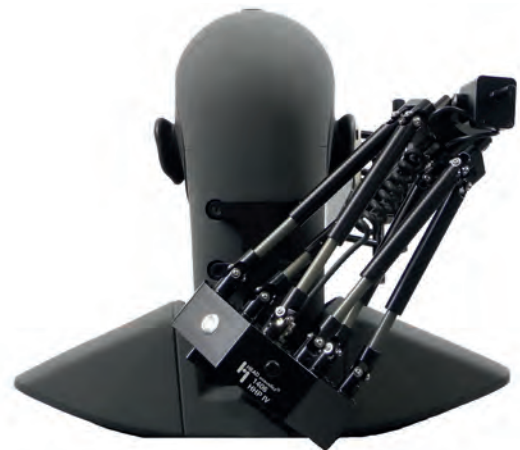
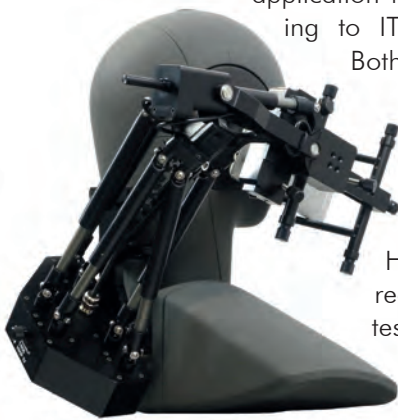
The construction of HHP IV *MotoMount* is sturdy and yet filigree, based on the principles of hexapod parallel kinematics. It is equipped with seven highly accurate linear actuators which are electronically controlled via touch panel.

Very useful is the self calibrateable mechanism of HHP IV. The user can easily calibrate the handset positioner with a specifically for HHP IV developed calibration disc which is axially-symmetrical (e.g. can be used on both

ears of the artificial head. Once mounted to the artificial head the self calibrateable mechanism starts automatically to adjust the HHP IV *MotoMount*.

HHP IV *MotoMount* features at a glance:

- Fully integrated in ACQUA, HEAD acoustics Advanced Communication Quality Analysis system
- Fully automated testing with ACQUA
- Motorized positioning allows fully automated testing procedures
- Reproducible measurement results
- Simulation of user behavior based on automated positional robustness measurements
- Realistic measurement with reproducible acoustic leak between handset and ear
- Robust and yet filigree construction
- Good fixation and range of width of handsets
- Highly precise adjustment and control of application force

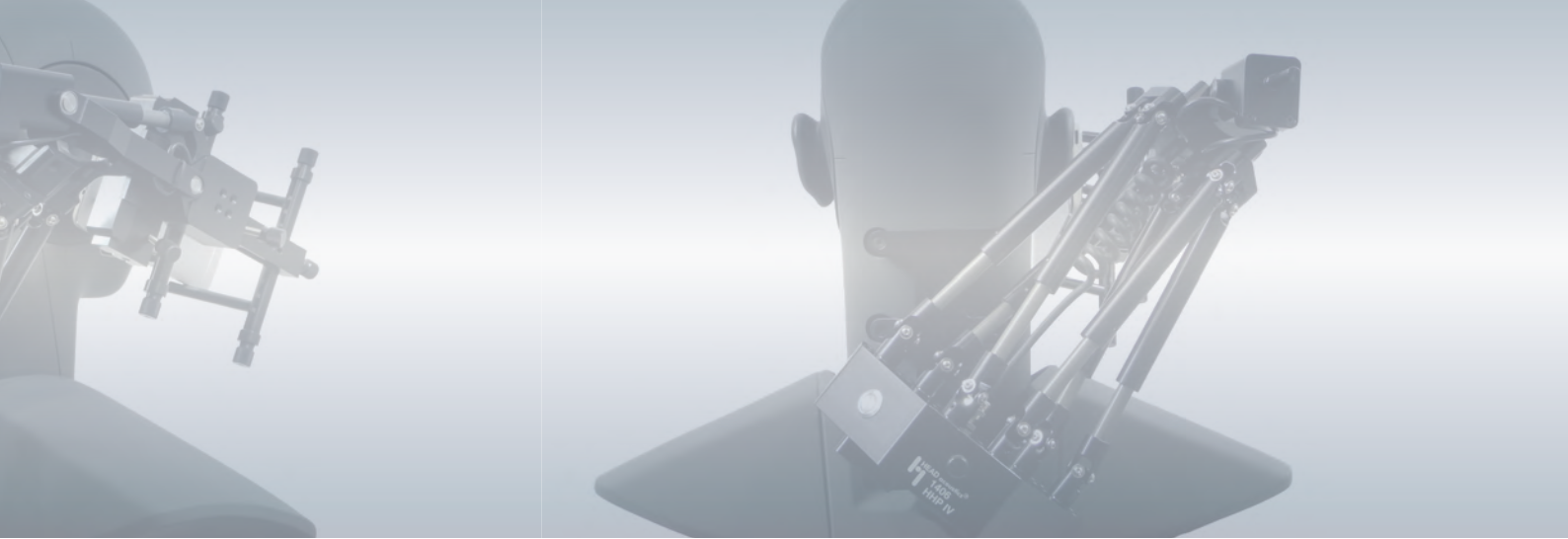


Upgrade Possibilities

Customers who want to experience this new dimension of voice quality measurement technology can easily upgrade from former HEAD acoustics handset positioner to HHP IV by using different available upgrade paths.

Detailed information on HHP IV:

➤ www.head-acoustics.de/eng/telecom_hhp_IV.htm



Remote Control

The seven highly accurate linear actuators of HHP IV can be electronically controlled via a small 5" remote unit with touchscreen. With this remote control the user can fast and easily adjust the position of the handset positioner. With the upcoming ACQUA 3.3.200, configuration and control of HHP IV will be implemented in ACQUA (via USB, Ethernet or WLAN).



New Clamping Devices

With CDM-R (Clamping Device *MotoMount*, regular) and CDM-W (Clamping Device *MotoMount*, wide) two different clamping devices are available for HHP IV. While CDM-R allows the testing of handsets with a width of up to 93 mm, CDM-W can be used from 81 mm up to 200 mm, e.g. for tablet PCs.

Dimensions and weight of test objects (for both):

- Length: ≥ 50 mm
- Height: 0 - 45 mm
- Weight: ≤ 600 g



| Product News |

VoIP testing with new Opus codec and MFE VIII.1

With the new audio codec Opus HEAD acoustics offers an additional Voice over IP (VoIP) codec for the use with the reference gateway MFE VIII.1. "The optional codec Opus is another step forward in VoIP testing with our test system", says Christian Schüring, Sales Manager Telecom at HEAD acoustics.

Opus can handle audio bandwidth from narrowband (8 kHz) to fullband (48 kHz). Both, speech and music are supported.



ACQUA Measurement Front End MFE VIII.1

Further codecs are in preparation. For details on prices and availability, please contact your regional HEAD acoustics representative or the HEAD acoustics Telecom sales team in Germany.

ACQUA 3.3.100 with new features

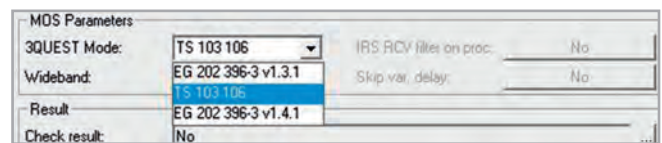
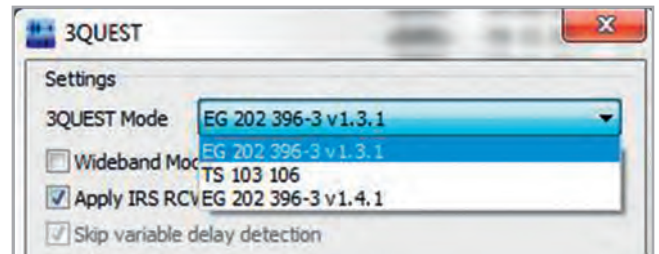
Updates on 3QUEST, Automated Double Talk Analysis and POLQA

The next ACQUA version 3.3.100 is available as of now. Three new features are implemented concerning 3QUEST, Automated Double Talk Analysis and POLQA. Below we present you the main features.

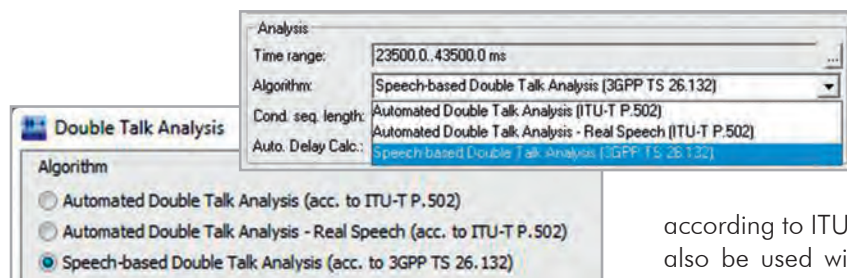
3QUEST

3QUEST (3-fold Quality Evaluation of Speech in Telecommunications) is one of the most common calculation methods for ACQUA which allows the objective speech quality evaluation of telecommunication terminals. It is based on the ETSI standards EG 202 396-3 and TS 103 106 which cover both wideband and narrowband scenarios including background noise.

Now 3QUEST is updated according to version 1.4.1 of standard EG 202 396-3. While the quality evaluations are based on auditive databases of the EG standard, the calculation method was technically adapted to TS 103 106. Up to customers' choice, the previous version 1.3.1 can also still be calculated.



The new 3QUEST mode is available in ACQUAlyzer (above) and in the SMD



The user can choose between three algorithms - now also Automated Double Talk Analysis according to ITU-T P.502 is available

Automated Double Talk Analysis

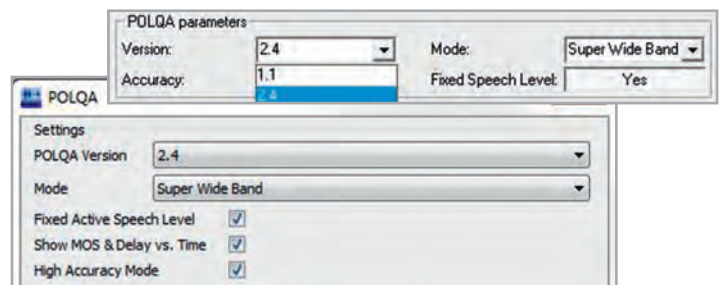
HEAD acoustics has extended the Automated Double Talk Analysis according to ITU-T Recommendation P.502. Now it can also be used with real speech instead of CSS signal. This measurement requires ACOPT 32, Option Speech Based Double Talk Analysis. Please note that Automated Double Talk Analysis with CSS signal still works without ACOPT 32.

POLQA

This option offers a single measurement descriptor (SMD) and calculation method for determining MOS values (Mean Opinion Scores) according to POLQA (Perceptual Objective Listening Quality Analysis).

POLQA is a voice quality testing technology for circuit switched, mobile and IP based networks. It was standardized by the International Telecommunication Union (ITU-T) as Recommendation P.863, and can be applied for voice quality analysis of HD Voice, 3G and 4G/LTE networks.

Now POLQA version 2.4 is available which is according to update of ITU-T P.863. Both new and old version (v1.1) can be calculated with ACQUA.



The user can change the POLQA version (above) and further settings for the measurement

TS 26.131/32: New HEAD acoustics revision

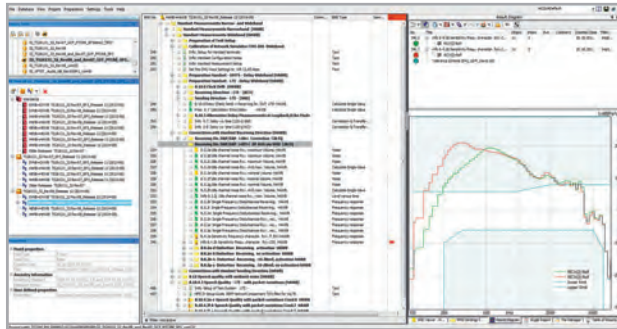
Full LTE speech quality measurements implemented

The 3GPP specifications TS 26.131 and TS 26.132 have again undergone a major revision that led to the recent publication of Release 12. HEAD acoustics is the first test solution provider who makes a full implementation of Release 12 available.

Experts agree that Release 12 of the 3GPP specifications constitutes an important step forward in the global standardization of wideband-capable telecommunication devices including LTE terminals. Numerous measurements have been modified or added in order to establish a close-to-reality and forward-looking standard:

- LTE speech quality measurements have been introduced with the latest version of Release 12 and have been implemented in the latest revision of the measurement standard TS 26131-32 for the HEAD acoustics communication analysis system ACQUA.
- VoLTE specific measurements require MFE IX (or another IP network simulator). The network impairments (TCN file) according to TS 26.131/32 are included in the delivery of the ACQUA measurement standard and can easily be uploaded to MFE IX.
- Configuration methods for different LTE radio testers are now available.
- The use of MFE VIII.1 as reference gateway offers considerable advantages, particular with regard to delay and jitter handling.

The new revision of standard TS 26131-32 requires ACQUA version 3.2.200 with ACOPT 21 (3QUEST)



Measurement standard TS 26131-32 in communication analysis system ACQUA

and the corresponding standard license as well as the measurement front end MFE VIII.1 and further front ends and components. Further information on the measurement standard TS 26131-32 can be found in the updated data sheet on the website.



ACQUA Measurement Front End MFE VIII.1

Alternative measurement standard for VoLTE mobile terminals

VZW (Verizon Wireless) VoLTE is the new HEAD acoustics measurement standard for the communication analysis system ACQUA. The tests implemented in the VZW VoLTE test suite cover all electro-acoustic performance aspects of VoLTE mobile terminals as defined and required by Verizon Wireless in the document "Codec and Voice quality test plan" from May 2014.

VZW VoLTE provides comprehensive tests which cover requirements for handset and handheld hands-free configurations. Also tests for the analysis of delay, speech

transmission quality, echo, quality of background noise transmission as well as codec functionality tests via the electrical headset interface are provided.

Combined with the advanced communication quality analysis system ACQUA and the calibrated measurement front end MFE VI.1, the VZW VoLTE test suite with its predefined measurement descriptors and automated measurement sequences allows the fast and easy acquisition, analysis and documentation of measurement data.

More information:

➔ www.head-acoustics.de/eng/telecom_measurement_standards.htm

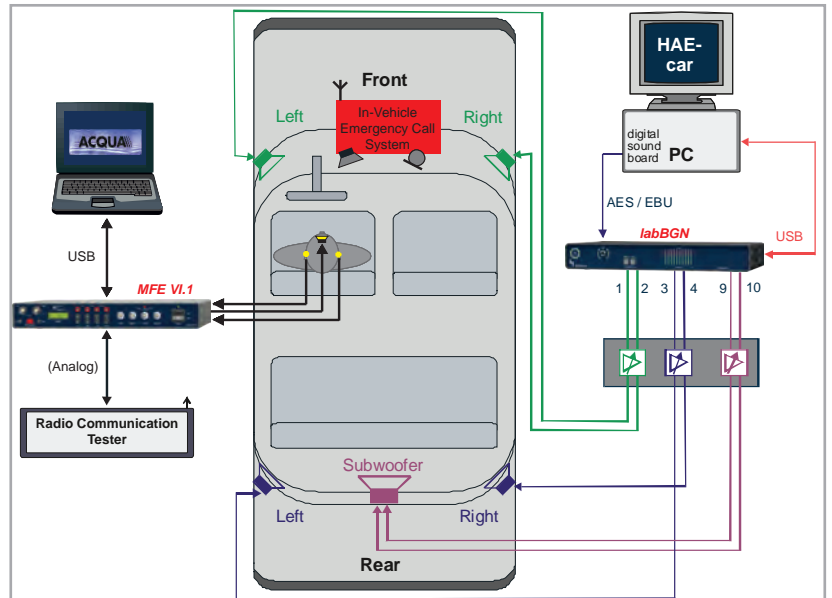
New ACQUA measurement standards for eCall devices

Emergency call (eCall) systems trigger an automatic emergency call in the event of an accident. For this purpose, technology based on hands-free functionality is used in the car. To ensure optimal communication between the crashed car and the rescue service, appropriate measurement technology and test methods must be provided. With **GOST R55531-NB** and **UG GOST R55531-WB** HEAD acoustics has now developed and implemented two new measurement standards for the communication quality analysis system ACQUA.

The Basis for the two measurement standards is the Russian standard GOST R 55531-2013 (ERA-GLONASS). It provides test methods for verification of in-vehicle eCall system conformity to quality requirements for loudspeaker communication in vehicle cabins.

With the measurement standard GOST R55531-NB for ACQUA, HEAD acoustics has implemented tests for narrowband measurements as described in the ERA-GLONASS standard. It provides tests for the analysis of delay, speech transmission quality, quality during double talk, echo and quality of background noise transmission. UG GOST R55531-WB is the optional upgrade of the narrowband part of the GOST R55531 standard and provides tests which cover all requirements with regard to communication quality in the wideband range.

GOST R55531-NB and GOST R55531-WB comprise numerous standard values such as loudness rating, spectral echo attenuation and suppression of



Same measurement setup for GOST R55531, P.1100 and P.1110

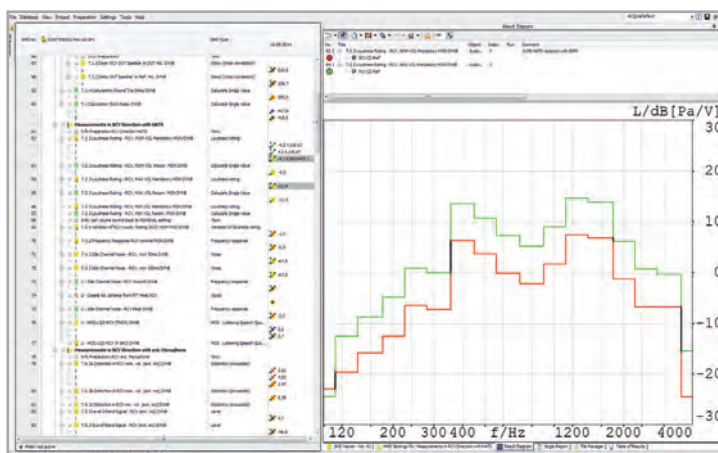
out-of-band signals. In addition, the two measurement standards take into account several other important aspects:

- Tests under different conditions for e.g. vehicle movement (standing with engine switched on/off), vehicle environment (quiet street, heavy-traffic route) etc.
- Artificial head measurement system as “user” of the eCall system
- Primary focus on conversation parameters such as double talk performance and quality of background noise transmission

Some of the measurements have partially been developed out of ITU-T Recommendation P.1100 and P.1110 for speech quality assessment of narrowband respectively wideband car hands-free terminals.

Detailed information can be found in the data sheet on our website.

➔ www.head-acoustics.de/eng/telecom_measurement_standards.htm



Measurement tree and result diagram for GOST R55531-NB in communication analysis system ACQUA

HQS-eCall: Advanced speech quality tests for eCall

In continuation of the development of new standards, HEAD acoustics implemented advanced speech quality tests for eCall systems in the HEAD acoustics Quality Standard HQS-eCall. Due to its comprehensive tests and analysis features, this upcoming standard is an excellent tuning tool for developers.

HQS-eCall tests are entirely based on real speech test signals. The application of real speech has the definite advantage against other signals: this is *the* use case for speech processing algorithms, which behave signal dependent. Furthermore, the recorded signals used for analysis can also be auditory judged.

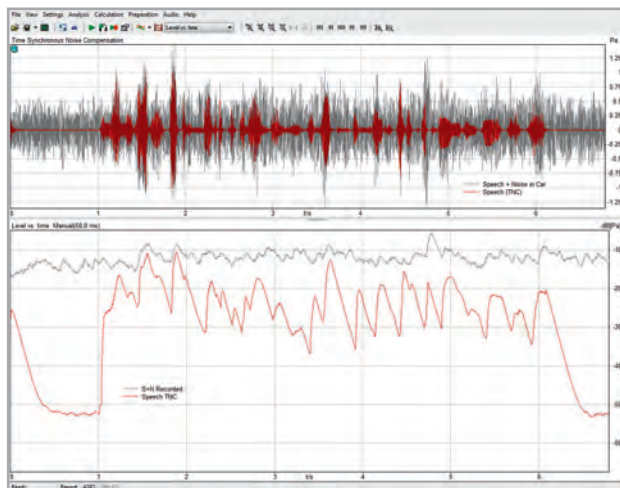
Consequently, double talk performance tests and the perceptual based echo assessment method implemented in HQS-eCall use real speech samples. The HEAD acoustics EQUEST method determines auditory validated E-MOS scores to characterize the echo performance - in addition to one dimensional attenuation values expressed in dB.

HQS-eCall further considers realistic background noise scenarios for eCall testing instead of being limited to stationary driving conditions. Analyses are implemented to cover the so called "Silent Call" problematic, when the noise from the test vehicle is transmitted in sending direction and attenuated or partly suppressed by the implemented noise reduction algorithm. The PSAP side (Public Safety Answering Point) may not be able to identify the transmitted background noise completely. HQS-eCall provides such tests validated by auditory results.

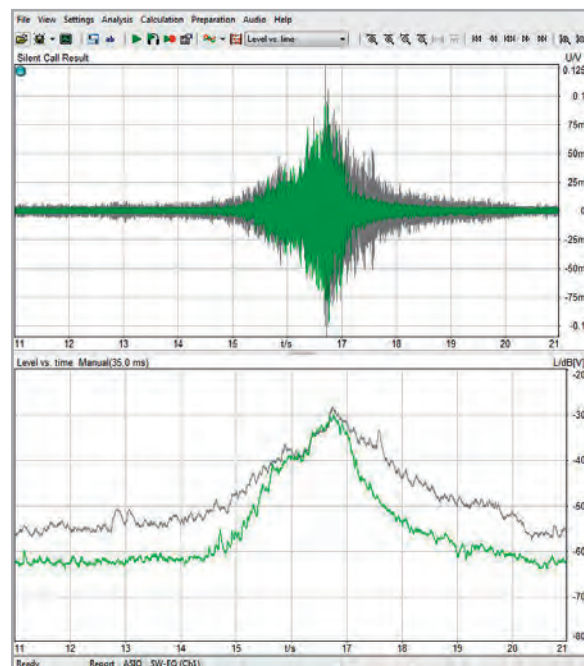
The Time-Synchronized Noise Compensation (TNC) feature within HQS-eCall allows the compensation of ambient noise in the recording to reliably analyze parameters in noisy conditions, such as the Automatic Volume Control (AVC) and its control mechanism. The TNC feature removes the noise without impairing the transmitted and recorded test signal in receiving direction.

The implemented "Quick Check" in HQS-eCall provides the option to identify potential shortcomings in an eCall system before starting time-intensive tunings. These "Quick Check" tests are running automatically without any necessary interaction from the test engineer. Results are displayed in an ITU-T P.505 recommended "Quality Pie Chart" and show the general performance parameters to quickly identify shortcomings - the "Quick Check" is an indispensable tool for an efficient eCall system tuning in the lab.

For details on prices and availability, please contact your regional HEAD acoustics representative or the HEAD acoustics Telecom sales team in Germany.



Result of Time-Synchronous Noise Compensation (TNC) (grey: speech and noise recorded in the car before TNC analysis; red: speech after TNC analysis)



Silent Call Result, level vs. time analysis of reference signal in the car cabin (grey) and transmitted signal in uplink (green)

ITU-T meeting at HEAD acoustics with good progress on P.emergency New revisions of Recommendations P.1100 and P.1110 consented

In December HEAD acoustics hosted a two-day Rapporteur meeting of Q.4 of the standardization body ITU-T at its company headquarters in Herzogenrath to discuss the new draft Recommendation P.emergency. This standard will provide tests to verify and optimize speech quality of eCall systems in vehicles. The third day was dedicated to the final update and study group consensus during the WP1/SG12 meeting of the ITU-T Recommendations P.1100 and P.1110.

The group discussed scope and content of P.emergency. Besides the definition of use cases, eCall specific tests and measurements were defined. P.emergency differs clearly from the two "traditional" car hands-free Recommendations P.1100 and P.1110 by focusing on intelligibility and important aspects of conversational quality in the emergency call situation, whereas P.1100

and P.1110 are more focused on different speech quality aspects in the car hands-free situation. "It was a very successful meeting and I think that we can achieve our objective to pass the standard on the next meeting of Study Group 12 in May", says Hans W. Gierlich, Managing Director of HEAD acoustics Telecom and rapporteur of the responsible question 4 in ITU-T SG12.

On the last day the WP1 of ITU-T met and consented the new revisions of ITU-T Recommendations P.1100 and P.1110. Major changes in these two standards include the use of new real speech signals described in Recommendation ITU-T P.501, the increase of the test signal level by 3dB in sending direction and now the new automated real speech based double talk measurements developed by HEAD acoustics according to Recommendation ITU-T P.502 are used.

HEAD acoustics successfully hosted eCall seminar Profound and vivid insights on a current issue

"Speech Quality Testing on eCall": At the beginning of December 2014 HEAD acoustics hosted a seminar on the topic of emergency call (eCall). The one and a half day seminar addressed various aspects of speech quality of emergency call systems in vehicles (eCall). Currently car manufacturers and suppliers are working all out on that topic not least because of legal reasons.

Nearly 20 participants registered for the seminar, which delivered profound and vivid insights. The presentations dealt with fundamentals in speech quality testing

for hands-free, the current status of relevant standards such as Russian ERA-GLONASS or ITU-T P.emergency as well as the question regarding necessary considerations on future implementations. "For us, it was very important to cover all relevant aspects of optimizing speech quality testing for eCall systems", says Frank Kettler, Manager Telecom Consulting at HEAD acoustics, who organized the seminar.

Besides the theoretical part, live tests in a driving simulator in the HEAD acoustics test rooms were conducted. So, the participants were able to understand the practical implementation and discuss the results online. For these tests HEAD acoustics provided its own implementations of the relevant hands-free specification ITU-T P.1100 and the ERA-GLONASS GOST R55531 standard as well as new analysis methods for the assessment of the quality of eCall modules.



Speaker Frank Kettler (top left) at a presentation on speech quality testing on eCall. During the seminar participants were given profound insights on this current topic.