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| INTERNATIONAL TELECOMMUNICATION UNION | | **Focus Group On Car Communication** |
| **TELECOMMUNICATION STANDARDIZATION SECTOR**  STUDY PERIOD 2013-2016 | | **FG CarCOM-R-11** |
| **English only**  **Original: English** |
|  |  | Aachen, 12-13 November 2012 |
| **REPORT** | | |
| **Source:** | Chairman | |
| **Title:** | Report of FG CarCOM meeting held in Aachen on 12-13 November 2012 | |

***Abstract***

*ITU-T FG CarCOM held its 11th meeting in Aachen on 12-13 Nov. 2012. There were no incoming or outgoing liaison statements at this meeting. There were 5 new contributions discussed during the meeting. Some related to previously introduced topics such as an appendix on how different implementations affect delay, a reference-free SNR measure which predicts ITU-T P.56 SNR measurements, and a noise distortion metric. New topics addressed wre a simulation based test approach for signal enhancement subsystems. An updated draft of FG.VSSR was available for the meeting including parameters and test procedures which were available in a contribution on a file based test approach as presented last FG CarCom meeting in Detroit. This section was enhanced further and the new draft as FG.VSSR was distributed after the meeting. The next meeting will be at ITU-T in Geneva, Switzerland on 18-19 February 2013. There are also plans to hold one more meeting after this somewhere in the Detroit, Michigan, USA area on 18-19 February 2013.*

**1.0 Introduction**

This document is a meeting report from the 11th meeting of ITU-T FG CarCOM which was hosted by HEAD acoustics GmbH in Herzogenrath, Germany on 12-13 Nov. 2012.

The meeting documents are available on the ITU-T website and may be downloaded for free at: <http://www.itu.int/md/T09-FG.CARCOM2-121112/sum/en>

In this report, the participants are identified by their initials (see the table in Annex 1). Annex 2 provides the list of documents.

**2.0 Review of Liaison Statements (LS)**

There were no incoming or outgoing LS at this meeting.

**3.0 New Contributions**

**3.1 “*Proposal of a Noise Distortion Measure*” from Volkswagen AG, Technische Universität Braunschweig (C-40)**

This contribution contains an update of the proposed text for an annex in FG.VSSR that describes an objective measure of noise distortion. This noise distortion measure, which has been discussed at previous meetings, is intended to optimize performance of a noise reduction system.

As agreed the proposed text was included in Annex E. The measurement itself was listed in section 8.3.42 as an additional measurement.

**3.2 “*Proposal of a Reference-free SNR Measurement*” from Volkswagen AG, Technische Universität Braunschweig (C-41)**

This contribution provides an update on enhancements made to the reference-free SNR measure previously to FG CarCOM which predicts SNR measurements made using ITU-T P.56 without the need for a reference signal.

As agreed this measurement parameter was included in the microphone subsystem section of FG.VSSR and the details of the measurement method (e.g., how it works, how you can use it, etc.) in Annex F. The measurement description in section 8.2.1.14 was updated accordingly.

**3.3 “*Proposal of a Braunschweig Database of Dynamically Changing Automotive Room Impulse Responses for Inclusion into FG.VSSR*” from Volkswagen AG, Technische Universität Braunschweig (C-42)**

This contribution proposes a simulation approach to test the echo performance of a signal enhancement subsystem.

The group agreed to use this approach as an alternative approach to the file-based testing of e signal enhancement subsystem. It was discussed that such an approach would require a description of the generation process of dynamically changing room impulse responses. Furthermore it was felt that it was useful to further extend the procedure to other impulse responses need to fully test a signal enhancement subsystem. It was agreed to describe this method in an annex if a complete description can be made available in advance to the next FG CarCom meeting.

**3.4 “*Annex: Frame process and Delay*” from Asahi Kasei Corporation (C-43)**

This contribution provides an updated version of proposed text for an annex to FG.VSSR which is intended to give system designers some guidance on good design and how to avoid large delays due to poor implementation.

The updated version was inserted in FG.VSSR as Annex G. In conjunction with this annex chapter 7.5 “System Delay, Subsystem Delay and Buffering” was updated and appropriate referencing to Annex G was inserted.

**3.5 “*Draft 18 of FG.VSSR*” from Chairman (C-44)**

This contribution contains the 18th draft of FG.VSSR which represents the input version to the current FG CarCom meeting and includes an updated version of the contribution C-39.

A new section giving the definition of the performance classes was created during the meeting in section 6.

Based on the discussions on the general approach how to measure the signal enhancement subsystem it was decided to leave it up to the user whether he would like to use a file-based testing approach or a simulation. The section 8.3.1 was revised accordingly during the meeting.

The proposed sections on Delay (sections 8.3.2 – 8.3.4) were discussed and accepted.

It was agreed to use and SLR test instead of the proposed JLR test to test the send path of the signal enhancement subsystem (section 8.3.5). The prerecorded input signal from the MS-Subsystem is used as the test signal, as a reference the acoustical signal at the MRP is used. The text in FG.VSSR needs to be adapted accordingly.

In section 8.3.6 no JLR test will be performed since it is very difficult to define a JLR for different types of subsystem realizations (volume control in the audio subsystem or in the signal enhancement subsystem, equalizer may be in one or both). Instead a level measurement based on a nominal level plan is performed. The measurement is performed using speech as a test signal analyzed with P.56. The text in FG.VSSR needs to be adapted accordingly.

For the sensitivity frequency response tests in send the same approach will be taken as for the SLR (inserting a pre-recorded microphone signal and use the signal at the MRP as the reference). The text was updated accordingly in the meeting. The relevant sensitivity frequency response characteristics tolerances for the different performance classes were discussed and agreed during the meeting.

***Day 2*** discussions started on the measurement of receive sensitivity frequency response of the signal enhancement subsystem. It was agreed to keep and align with the requirements of the audio subsystem and correct the measured response characteristics by the frequency response characteristics of the audio subsystem. Alternatively a R2 to DRP simulation can be used. All masks were updated; narrowband requirements were added for the audio subsystem.

It was decided not to provide any AGC Performance classes but rather give design guidelines for AGC. It still may be that these can be backed up by informative measurements. **HG** volunteered to provide text for such an annex.

For testing the send and receive speech quality (8.3.9, 8.3.10) it was decided to use P.863 (POLQA) – it is better suitable for wideband and AGC than PESQ. However POLQA is very sensitive on frequency response changes so the equalization should be switched off in order to prove the quality of signal enhancement. If possible the measurement also could be performed with an MRP – S2 and R2 – DRP simulation. The test procedures need to be adapted; input from test results is needed for determining limits.

It was felt that the measurement of the signal enhancement speech quality stability is not needed, these sections should be deleted.

No new input was available on the intelligibility measurement. The group came to the conclusion that none of the known procedure is suitable.

The idle noise measurements in send and receive (8.3.15, 8.3.16) were discussed. It was agreed to perform the noise measurement with EQ on and EQ off. With EQ on the noise level should not increase by more than 3 dB (A).This does not apply if the noise level is always below a threshold tbd.. The test description has to be updated.

The out of band tests (8.3.17, 8.3.18) should be performed with equalizer active. Potentially requirements need to be relaxed. Input is expected – if agreed it would also be relaxed in P.1100 and P.1110. The test description has to be updated.

The send distortion is tested with the equalizer active, in receive tests are made without EQ because EQ only compensates for LS-FRQ. A second test is made to verify the distortion performance with EQ on and check that there is no degradation. The test description has to be updated.

TCLw shall be tested in narrowband, in wideband an unweighted echo loss should be measured which better corresponds to subjective tests and no wideband weighting is available. The test description has to be updated.

A discussion on requirements on noise reduction in receive led to the conclusion that such noise reduction is not preferred due to cascading issues if a noise cancelled signal is already transmitted. A test could be inserted which verifies that there is no noise reduction active on the receive side.

**4.0 Meeting discussions**

**4.1 Day 1 discussions**

The Chairmanwelcomed participants; the agenda was reviewed and approved.

There were no incoming or outgoing LS at this meeting.

The IPR policy statement was read aloud and there were no IPR claims made by the delegates.

Each of the contributions was introduced and discussed. Results of these discussions can be found in the corresponding subsection for each contribution in Section 3 of this report.

Draft 18 of FG.VSSR was introduced and discussed intensively. The results are reported in Section 3 of this report.

**4.2 Conference call discussions**

At the end of Day 1 there was a conference call for those who could not attend the meeting in person (see Annex 1).

**HG** started by summarizing the discussion during the meeting so far. There were no significant comments on the summary. The participants agreed on the conclusions of the meeting.

During the conference call the next and last meeting date of FG CarCom was discussed and agreed. Since no participant from North America was available and there was no concrete offer for a meeting in Detroit it was agreed to have the Meeting February 18-19, 2012 at the ITU-T in Geneva.

**4.3 Day 2 discussions**

The discussions on FG.VSSR continued the second day. Again, results of these discussions can be found in Section 3 of this report.

A new draft reflecting the changes done during the meeting was sent to the FG CarCom list.

During the wrap-up discussion future meetings were finally agreed. The next meeting will be by ITU-T in Genva on 18-19 February 2013.

**HG** once again thanked the delegates, and then closed the meeting.

**5.0 Work plan**

Below is the current work plan for FG CarCOM:

* February 18 – 19, 2013 Detroit meeting of FG CarCOM:
  + Work on final version of FG.VSSR

**Action items:**

**Remaining work from previous meetings:**

1. **SP** to add “Interpretation” columns to each of the Performance class tables
2. **PN** to work on annex/appendix containing wind buffet test procedure
3. **SP** and **HG** to draft annex which describes vehicle profiling process
4. **SP** to draft annex which describes software test program used for signal enhancement subsystem measurements
5. **ALL: To provide input on measurements!**

**New work:**

1. **CS and SP** to provide more examples on appendix G on “Frame process and delay”
2. **HG** to further work on drafting new text for the signal enhancement subsystem
3. **HG** to provide text for an Annex for an AGC design guideline
4. **MAJ** to provide test for an annex on simulation approach for signal enhancement subsystem testing

Annex 1

**List of participants**

**Attended meeting in person:**

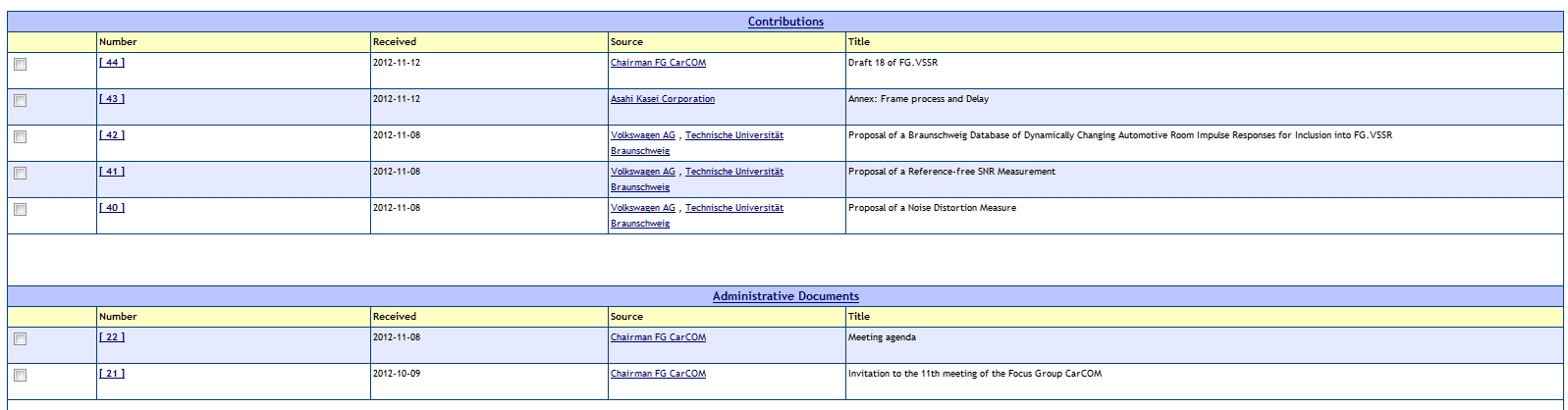
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| Stefan Bleiholder | **SB** | HEAD acoustics GmbH |
| Balazs Fodor | **BF** | Braunschweig Technical University - Germany |
| Mats Forsen | **MF** | Forsen Data AB- Sweden |
| Hans Gierlich | **HG** | HEAD acoustics GmbH – FG CarCOM Chair- Germany |
| Yoji Ishikawa | **YI** | Asahi Kasai Cooperation - Japan |
| Marc-Andre Jung | **MAJ** | Braunschweig Technical University - Germany |
| Yushi Naito | **YN** | Mitsubishi Electric Corporation, SG16 Chair – Japan |

**Conference call participants:**

|  |  |  |
| --- | --- | --- |
| Tim Fingscheid | **TF** | Braunschweig Technical University, Germany |
| Gerhardt Schmidt | **GS** | CAU- Germany |

Annex 2

List of documents



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