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Skype-AS   (Code 60000)

Skype Hardware Certification Audio Specification incl. Reference Client

Skype Embedded Client Test Setup

Overview

Speech quality assessment of VoIP systems and components is quite a challenge due to the various kinds of signal processing involved (e.g. echo cancellers and non linear processors, various speech coders, VAD/voice activity detection, jitter buffer, PLC/packet loss concealment). All these aspects have a significant influence on conversational speech quality. Current national and international standards, however, are not sufficient to assess all the relevant parameters.

To solve this problem the test suite Skype-AS has been developed by the Skype audio laboratory for the HEAD acoustics communication analysis system ACQUA, providing **comprehensive tests** for the analysis of

- **Basic parameters (loudness, frequency response, delay) with various conditions**
  - *Loud speech, normal speech, quiet speech*
  - *Normal distance, long distance*
- **Speech to noise ratio SpNR (as opposed to signal to noise ratio SNR) tested with natural speech**
- **Echo tests**
  - *Important for hands-free*
  - *Single talk, double talk*
- **New innovative test signals** *(phase-independent signal for delay testing, signal for delay vs. time)*

Note: Additional 3rd party Hard-/Software is necessary for conducting some measurements which are out of scope of the HEAD acoustics measurement system. For further information please refer to the respective Skype specification.

OPTIONS

- **ACQUA-Skype Compact,** Compact Skype Test System, ACQUA-Compact Software, incl. MFE VI.1, Skype-AS Standard (Code 6860.18)

DELIVERY

- **Skype-AS** (Code 60000), as ACQUA database on DVD
- **Skype installation** on DVD
- **Skype reference / DUT editor** on DVD
- **Documentation** on DVD:
  - Manual
  - Skype Hardware Certification Specification, Audio Requirements for Computer Accessories
  - Skype Hardware Certification Specification, Skype SDK-based Audio Devices
- **V2C file** (for ACQUA 3.1.200 or later), on license CD
- **2 Dongles** (for Skype reference / DUT editor)

DESCRIPTION

The tests implemented in Skype-AS cover important **conversational speech quality** aspects such as:

- Delay measurements in sending and receiving direction
- One-way speech quality tests under single talk conditions in sending and receiving direction
- Echo tests
- Quality during double talk.

Skype-AS comprises tests for Skype accessories and equipment with embedded Skype client (division by acoustic user interface):

- Headset
- Handset
  - Handset mode
  - Handset in speakerphone mode
- Speakerphone
  - Handheld
  - Personal speakerphone
  - Group speakerphone
  - Long range speakerphone
- Other (no acoustic interface)

The Skype-AS test suite contains separate test projects for the following Skype test use cases:

- ACC (PC/MAC Accessories)
- SDK (Embedded Devices)

APPLICATIONS

- **Automated analysis** of handsets, headsets, speakerphones and other accessories used for Skype telephony
- **Conformance testing** according to Skype audio specifications

SYSTEM REQUIREMENTS

Skype-AS requires the following system components:

- **ACQUA (Code 6810 etc.):** Advanced Communication Quality Analysis, Version 3.1.200 or later. *Note: Valid SMA (Software Maintenance Agreement) required!*
- **2 or 3 PCs with Windows(R) XP or Windows(R) 7** (2 for embedded client tests, 3 for accessories tests), each with 3x USB ports
- **DSB II** Digital Sound Board (Code 2406)
- **MFE VI.1** USB Measurement Front End, Analog, with Integrated Mouth Amplifier (Code 6462)
- **MFE VI-BEQ** Option Binaural Equalization for MFE VI.1 (Code 6461). *Alternatively for speakerphone measurements: instead of HATS and MFE VI-BEQ, a free field measurement microphone (fulfilling the IEC 60651 type 0 or 1 requirement) and an artificial mouth (fulfilling the requirements of ITU-T P.51)*
- **2 × CXX II.3** Cable AES/EBU XLR male 3-pin <> XLR female 3-pin, 2.95 m (Code 5177-3)
- **HMS II.3** Artificial Head Measurement System (Code 1230). *Note: pinna type 3.3 required! Alternatively: other ITU-T P.58 compliant artificial head and torso simulator (HATS)*
- **ACOPT 16 (PESQ)** Perceptual Evaluation of Speech Quality (Code 6836), for NB only
- **ACOPT 30 (POLQA)**, Perceptual Objective Listening Quality Analysis (Code 6857), for SWB only
- **Webcam** for Reference PC (not provided by HEAD acoustics, for ACC Speakerphone measurements only, only if DUT supports video functionality).

MEASUREMENTS

The following measurements are included in Skype-AS:

SMD Title	ACC			SDK		
	Handset	Headset	Speakerphone	Handset	Headset	Speakerphone
Crest Factor - loud speech level (1m, 1.5m)	n/a	n/a	n/a	n/a	n/a	●
Echo path - Acoustic Echo Cancellation	●	●	●	●	●	●
Echo path - AEC (Convergence time)	●	●	●	●	●	●
Echo path - AEC (Single Talk and Double Talk)	●	●	●	●	●	●
Echo path - Round trip delay	●	●	●	●	●	●
Echo path - Round trip delay (wired, wireless)	●	●	●	n/a	n/a	n/a
Echo path - Sidetone delay	●	●	●	n/a	n/a	n/a
Receive path - Frequency response (SWB)	n/a	●	●	n/a	n/a	●
Receive path - Frequency response (WB)	●	●	●	n/a	n/a	n/a
Receive path - Frequency response	n/a	n/a	n/a	●	n/a	n/a
Receive path - Frequency response (8 kHz codec, 16 kHz codec)	n/a	n/a	n/a	●	●	●
Receive path - Frequency resp. stability	n/a	n/a	n/a	●	●	●
Receive path - Frequency response stability (WB)	●	●	n/a	n/a	n/a	n/a
Receive path - loudness level adjustment range	●	●	n/a	●	●	n/a
Receive path - prefered loudness level (monaural)	●	●	●	●	●	●
Receive path - prefered loudness level (binaural)	n/a	●	n/a	n/a	n/a	n/a
Receive path - prefered loudness level (<=45")	n/a	n/a	●	n/a	n/a	●
Receive path - prefered loudness level (>45")	n/a	n/a	●	n/a	n/a	n/a
Receive path - prefered loudness level (>=46")	n/a	n/a	n/a	n/a	n/a	●
Receive path - prefered loudness level (AIO, ex. AIO)	n/a	n/a	●	n/a	n/a	n/a
Receive path - loudness level adjustment range	n/a	●	n/a	n/a	n/a	n/a
Receive path - maximum loudness level	n/a	●	n/a	n/a	●	n/a
Receive path - Single frequency interference	●	●	●	●	●	●
Receive path - Speech signal to noise ratio	●	●	●	●	●	●
Receive path - Total quality loss (normal, ideal network)	●	●	●	●	●	●
Receive path - Total Harmonic Distortion (sines, sweeps)	n/a	n/a	●	n/a	n/a	●
Ring tone loudness	●	n/a	n/a	●	n/a	n/a
Send path - Frequency response (SWB)	n/a	●	●	n/a	n/a	●
Send path - Frequency response (WB)	●	●	●	n/a	n/a	n/a
Send path - Frequency response	n/a	n/a	n/a	●	n/a	n/a
Send path - Frequency response (8 kHz codec, 16 kHz codec)	n/a	n/a	n/a	●	●	●
Send path - Frequency resp. stability	n/a	n/a	n/a	●	●	n/a
Send path - Frequency response stability (WB)	●	●	n/a	n/a	n/a	n/a
Send path - signal level with loud, normal, quiet speech	●	●	●	●	●	●
Send path - signal level (1.5m) with loud, normal, quiet speech	n/a	n/a	●	n/a	n/a	●
Send path - signal level with loud, normal speech(1m)	n/a	n/a	●	n/a	n/a	●
Send path - signal level with normal, quiet speech(4m)	n/a	n/a	●	n/a	n/a	●
Send path - Single frequency interference (fan, no fanm ex.AIO, 4m)	n/a	n/a	●	n/a	n/a	n/a
Send path - Single frequency interference	●	●	●	●	●	●
Send path - Speech signal to noise ratio	●	●	●	●	●	●
Send path - Speech signal to noise ratio (fan, no fan, ex.AIO)	n/a	n/a	●	n/a	n/a	n/a
Send path - Speech signal to noise ratio(1.5m)	n/a	n/a	n/a	n/a	n/a	n/a
Send path - Speech signal to noise ratio(4m)	n/a	n/a	●	n/a	n/a	●
Send path - SpNR during speech activity (fa, no fan, ex.AIO)	n/a	n/a	●	n/a	n/a	n/a
Send path - SpNR during speech activity(1.5m)	n/a	n/a	n/a	n/a	n/a	n/a
Send path - SpNR during speech activity(4m)	n/a	n/a	●	n/a	n/a	n/a
Send path - SpNR during speech activity	●	●	●	●	●	●
Send path - Total quality loss	●	●	●	●	●	●
Send path - Total quality loss (ideal network)	●	●	●	●	●	●
Send path signal level during double talk	●	●	●	●	●	●
Send path signal level during double talk(4m)	n/a	n/a	n/a	n/a	n/a	●
TCLw - for DUT with built in AEC	●	●	●	n/a	n/a	n/a
TCLw - for DUT without in built AEC	●	●	●	n/a	n/a	n/a
TCLw (max volume) - for DUT with built-in AEC	n/a	●	●	n/a	n/a	n/a
TCLw (max volume) - for DUT without built-in AEC	n/a	●	●	n/a	n/a	n/a
TCLw - DUT without AEC (tablet, long range)	n/a	n/a	●	n/a	n/a	n/a
TCLw - DUT wo AEC (tablet, long range) - max vol	n/a	n/a	●	n/a	n/a	n/a

Note: Some measurements included in the Skype specifications do not form part of the Skype-AS database. Additional 3rd party Hardware/Software is necessary for conducting these measurements which are out of scope of the HEAD acoustics measurement system. For further information please refer to the respective Skype specification.

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