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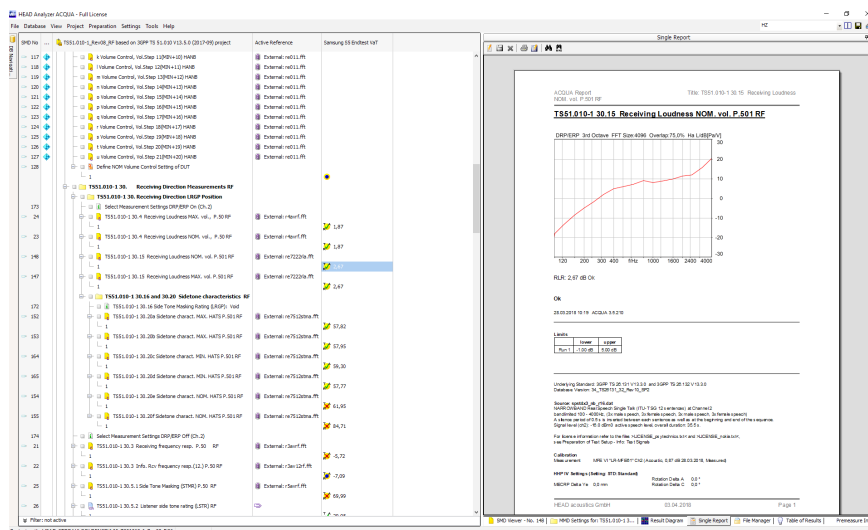Web: www.head-acoustics.com

TS 51.010 (Code 6742)

Measurement standard according to 3GPP specification TS 51.010

Overview

The 3GPP standard TS 51.010 specifies the requirements and test methods for GSM conformance testing of mobile telephony devices.

HEAD acoustics has implemented the speech quality measurements required by the 3GPP standard into the automated test suite TS 51.010 for the communication quality analysis system ACQUA.

TS 51.010 thus allows manufacturers of mobile telephony devices to ensure that their GSM implementations meet the 3GPP requirements.

Measurement tree and result diagram for TS 51.010
in communication analysis system ACQUA

Short Description

TS 51.010 is a measurement standard for the HEAD acoustics communication analysis system ACQUA. It comprises pre-defined measurement descriptors for analysis of GSM (Global System for Mobile Communication) terminals according to 3GPP specification TS 51.010.

In combination with ACQUA, the measurement front end *lab*CORE (alternatively its predecessor MFE VI.1) as well as optionally the artificial head HMS II.3 and the handset positioner HHP IV, this standard allows the automated analysis of mobile telephony devices according to 3GPP TS 51.010.

Please note: The test cases specified in TS 51.010 are limited and do not represent realistic background noise scenarios. HEAD acoustics recommends to optimize GSM implementations using advanced quality tests with more realistic test scenarios. For this purpose HEAD acoustics offers different test suites of sophisticated ETSI and 3GPP standards.

Applications

- Automated analysis of mobile telephony devices according to 3GPP TS 51.010 Version 13.5.0 (2017-09)

System Requirements

TS 51.010 requires the following system components:

Software

- **ACQUA** Communication Analysis System as one of the following variants (version 3.5.200, incl. Update 1 or later):
  - Full-license (Code 6810)
  - Workplace (Code 6830, for post-analysis and documentation only)
  - Compact Systems (Code 6860.xx)

Hardware

- ***lab*CORE (Code 7700)**, modular multi-channel front end with *lab*CORE modules:
  - ***core*BUS (Code 7710)**, I/O bus mainboard
  - ***core*OUT-Amp2 (Code 7720)**, power amplifier output module (two channels)

- ***core*IN-Mic4 (Code 7730)**, microphone input module (four channels)
- Alternatively to *lab*CORE, TS 51.010 measurements are feasible with previous front ends:
  - **MFE VI.1 (Code 6462)**, measurement front end with integrated power amplifier
- **Radio Communication Tester** (not delivered by HEAD acoustics)

Options

- **HMS II.3 (Code 1230)**, Head and Torso Simulator (HATS) according to ITU-T P.57 and P.58 with pinna type 3.3 or 3.4. Note: Additional left ear simulator (HIS L, Code 1231) required for binaural headset measurements.
- **HHP IV (Code 1406)**, motorized handset positioner

Standard Delivery Items

- **TS 51.010 (Code 6742)**, as ACQUA database
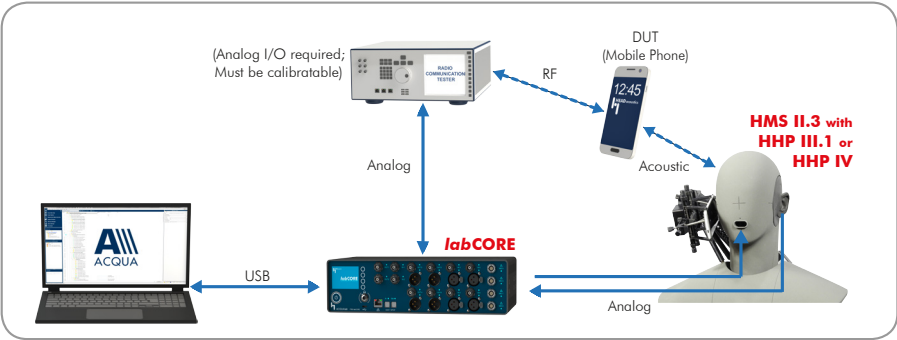- **V2C file**
- **Documentation** as PDF

Database Revision	Based on Specification Version	Min. ACQUA Version
8	3GPP TS 51.010-1 V13.5.0 (2017-09)	3.5.200 incl. Update 1

Overview of database revision and specification version

Measurements

The following table gives an overview of the measurements included in TS 51.010:

SMD Title	RF	SMD Title	RF
0.1 Overall delay in receiving direction	•	30.8 Sidetone distortion 1 kHz	•
0.2 Delay in receiving direction of device under test	•	30.9.1 Out of band signals, sending	•
0.3 Overall delay in receiving direction excl. MFE	•	30.9.2 Out of band signals, rcv, 500 Hz	•
0.4 Overall delay in sending direction	•	30.9.2 Out of band signals, rcv, 1 kHz	•
0.5 Delay in sending direction of device under test	•	30.9.2 Out of band signals, rcv, 2 kHz	•
0.6 Calculation: Echo delay	•	30.9.2 Out of band signals, rcv, 3,35k	•
30.10 Ambient noise less 30dB 20uPa RF	•	30.10.1 Idle channel noise, sending	•
30.1 Sending frequency resp. P.50	•	30.10.2 Idle channel noise, rcv. nom. Vol.	•
30.2 Sending loudness rating P.50	•	30.10.2 Idle channel noise, rcv. max. Vol.	•
30.3 Receiving frequency resp. P.50	•	30.11 Ambient noise rej. noise sens.	•
30.4 Receiving loudness max. vol., P.50	•	30.11 Ambient noise rej. speech sens P.50	•
30.4 Receiving loudness nom. vol., P.50	•	30.11 Ambient noise rejection calculation	•
30.5.1 Side Tone Masking Rating (STMR) P.50	•	30.12 Sending frequency resp P.501	•
30.5.2 Listener Side Tone Rating (LSTR)	•	30.13 Sending loudness rating P.501	•
30.6.1 Echo loss source file: P.50	•	30.14a Rcv frequency resp. type I P.501	•
30.6.1 Info. Echo loss, source: sweep	•	30.14b Rcv frequency resp. type 3.x P.501 R.-7	•
30.6.1 Info. Echo loss, source: PN-Sequ.	•	30.14c Rcv frequency resp. type 3.x P.501 R.8+	•
30.6.1 Info. Echo loss, source: Mult.sin	•	30.15 Receiving loudness nom. vol. P.501	•
30.6.2 Stability margin check oscillation	•	30.15 Receiving loudness max. vol. P.501	•
30.6.2 Stability margin, 200 Hz- 4000 Hz	•	30.17.1 Echo loss P.501	•
30.7.1 Distortion sending	•	30.17.2 Stability 200 Hz- 4000 Hz	•
30.7.1 Info. Activ. distortion SND	•	30.18c Distortion Sending with activation	•
30.7.2 Distortion receiving	•	30.20a Sidetone charact. max. HATS P.501	•
30.8 Sidetone distortion 315 Hz	•	30.20c Sidetone charact. min. HATS P.501	•
30.8 Sidetone distortion 500 Hz	•	30.20e Sidetone charact. nom. HATS P.501	•

Configuration Example