DATA SHEET

ACOPT 21 (Code 6844)
Option 3QUEST

ACOPT 35 (Code 6866)
Option 3QUEST Super-wideband/ Fullband

Overview

3QUEST (3-fold QUality Evaluation of Speech in Telecommunications) is an optional calculation method for the HEAD acoustics analysis system ACQUA which allows the instrumental speech quality evaluation of telecommunication terminals with noise-suppression technology in the presence of background noise. ACOPT 21 covers narrowband and wideband scenarios and implements the standardized methods of ETSI EG 202 396-3 and TS 103 106. ACOPT 35 covers super-wideband and fullband scenarios and implements the standardized methods of ETSI TS 103 281, Model A.

Measurement Microphone at phone position *

Processed Speech, $p(k)$

Unprocessed Speech (incl. background noise) $u(k)$ *

Clean Speech $c(k)$

Play & Record

3QUEST

* not required for 3QUEST-SWB/FB

Estimation of speech, noise and global quality (S-/N-/G-MOS)

Short description

The 3QUEST algorithm calculates three MOS values (Mean Opinion Scores) on a scale of 1 to 5 according to ITU-T Rec. P.835:

• S-MOS = Speech MOS, evaluates distortion of speech

• N-MOS = Noise MOS, evaluates noticeable intrusiveness of the background noise

• G-MOS = Global MOS, overall quality evaluation

In comparison to other evaluation models designed to predict ITU-T P.800 listening tests (TOSQA, PESQ, POLQA), the main advantage of 3QUEST lies in the consideration of the influence of different background noises and the calculation of three MOS values, thus allowing a more meaningful statement regarding the causes of the quality impression.

The respective databases for all 3QUEST methods are based on numerous listening tests with auditory evaluation according to ITU-T Rec. P.835 and were partly carried out and validated by co-operation partners.

In comparison to the previous 3QUEST versions (ACOPT 21), the new version 3QUEST-SWB/FB (ACOPT 35) no longer requires an unprocessed reference signal. In addition, the new method is even more robust against unknown data than before.

Note: All 3QUEST test methods cover speech plus noise at the send side and therefore are only applicable in sending direction (acoustic-electrically).

Applications

• Instrumental quality evaluation of telecommunication terminals (handset/ hands-free) with noise-suppression technology in the presence of background noise, in the following scenarios:

  – ACOPT 21: wideband and narrowband scenarios according to ETSI EG 202 396-3 and TS 103 106

  – ACOPT 35: super-wideband/ fullband scenarios according to ETSI TS 103 281, Model A

System requirements

3QUEST (ACOPT 21) and 3QUEST-SWB/ FB (ACOPT 35) require the following system components:

Software

• **ACQUA**, communication analysis system as one of the following variants (version 4.0.40 or later):

  – Full-license (Code 6810)

  – Workplace (Code 6830, for postanalysis and documentation only)

  – Compact system (Code 6860) Note: Existing customers need a valid software maintenance agreement (SMA).

• Alternatively (instead of ACQUA):

  – **3QUEST Batch (Code 6977)**, Batch Processor 3QUEST Batch

Accessories

Hardware

• **labCORE (Code 7700)**, modular multi-channel front end with *lab*CORE modules:

  – **coreBUS (Code 7710)**, I/O bus mainboard

- *coreOUT-Amp2* **(Code 7720)**, power amplifier output module (two channels)
- *coreIN-Mic4* **(Code 7730)**, microphone input module, (four channels)

• Alternatively to *lab*CORE, 3QUEST or 3QUEST-SWB/FB measurements are feasible with previous front ends:

- **MFE VI.1 (Code 6462)**, measurement front end with integrated power amplifier

• **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 **or** **HHP III.1 (Code 1403)**, handset positioner

• **Radio Communication Tester** (not delivered by HEAD acoustics)

• **Measurement microphone** (only for ACOPT 21)

Options

• **ACOPT 09 (Code 6819)**, option SLVM P.56 (highly recommended for use in combination with ACOPT 35)

For simulation of realistic background noise scenarios one of the following background noise simulation systems depending on the measurement standard used for the device under test:

• One of the following background noise simulation systems:

- **3PASS *lab* (Code 6990)**, for testing at fixed microphone positions (e.g. mobile phones), including necessary system components (cf. separate data sheet)

- **3PASS *flex* (Code 6995)**, for testing multi-microphone systems, microphone arrays, beamforming microphones, including necessary system components (cf. separate data sheet)

- **HAE-BGN (Code 6970)**, automated equalization for background noise simulation in labs, including necessary system components (cf. separate data sheet)

- **HAE-car (Code 6971)**, automated equalization for background noise simulation in car cabins, including necessary system components (cf. separate data sheet)

Standard delivery items

Depending on the selected ACOPT:

• **3QUEST, ACOPT 21 (Code 6844)**, as V2C file for ACQUA

• **3QUEST-SWB/FB, ACOPT 35 (Code 6866)**, as V2C file for ACQUA
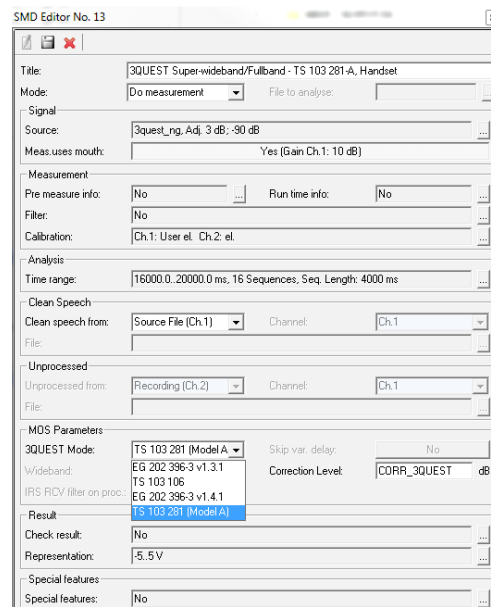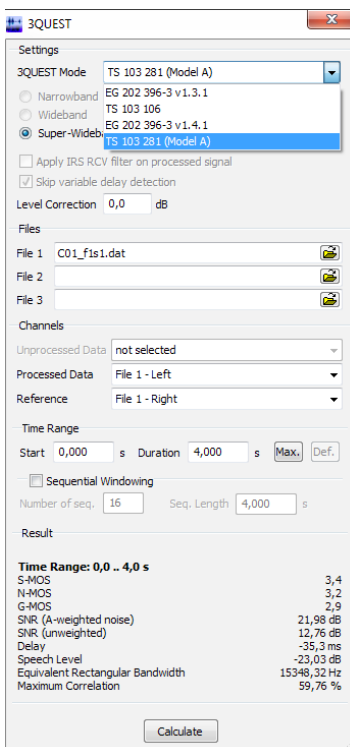
Settings window and SMD editor for 3QUEST-SWB/FB in communication analysis system ACQUA