

Measurement tree and result diagram for TS 103 737/38 in communication analysis system ACQUA

## Description

The European standards TS 103 737 and TS 103 738 specify transmission requirements for narrowband mobile and wireless terminals (handsets, headsets, hands-free) from a QoS perspective as perceived by the user. In addition to basic testing procedures, the standards also describe advanced tests according to further quality parameters as perceived by the user.

The tests specified by the ETSI standards were implemented by HEAD acoustics as measurement standard TS 103 737/38 for the advanced communication quality analysis system ACQUA. This test suite applies to any narrowband mobile and wireless terminal with 2G, 3G, 4G, WiFi and Bluetooth® connection.

For the determination of background noise transmission quality, a standardized arrangement according to ETSI TS 103 224 is used in a separate test room setup. It allows a close-to-reality noise playback for all types of background noise.

The latest specification version 1.3.1 of October 2018 adds the following features:

- Measurements with packet impairments (for speech quality in receiving direction)
- Positional robustness measurements for loudness rating and frequency response

In conjunction with ACQUA, the respective ACOPTs for TOSQA, 3QUEST, POLQA and Speech-based Double Talk as well as the measurement hardware platform labCORE, the TS 103 737/38 test suite with its predefined measurement descriptors and automated test sequences allows the fast and easy acquisition, analysis and documentation of measurement data.

## Applications

Conformance tests of any narrowband mobile and wireless terminal with 2G, 3G, 4G, WiFi and Bluetooth® connection according to ETSI test specifications TS 103 737 and TS 103 738

Overview of database revisions and specification versions		
Database revision	Based on specification version	Min. ACQUA version
2	ETSI TS 103 737 V1.2.1 (07/2017) ETSI TS 103 738 V1.2.1 (07/2017)	3.5.200 incl. Update 1
3	ETSI TS 103 737 V1.3.1 (10/2018) ETSI TS 103 738 V1.3.1 (10/2018)	4.0.200

(Older releases are available upon request)

## DATA SHEET

### TS 103 737/38 (Code 60019)

#### Narrowband Mobile & Wireless Terminals

### Overview

Speech quality assessment of mobile and wireless terminals (handsets, headsets, hands-free) is a challenge due to the various kinds of signal processing involved (e.g. noise reduction algorithms, various kinds of speech processing and the transmission delay itself). These aspects have a significant influence on conversational speech quality.

Therefore, ETSI (European Telecommunications Standards Institute) has defined the test specifications TS 103 737 and TS 103 738 which have been implemented by HEAD acoustics as measurement standards for the communication analysis system ACQUA.

In contrast to other standards which define minimum performance requirements, TS 103 737 and TS 103 738 specify advanced tests which enable manufacturers and service providers to achieve outstanding end-to-end speech performance as perceived by the user.

### General Requirements

TS 103 737/38 requires the following system components:

#### Software

- **ACQUA** Communication Analysis System as one of the following variants (version 4.0.200 or later):
  - Full-license (Code 6810)
  - Workplace (Code 6830, for post-analysis and documentation only)
  - Compact Systems (Code 6860.xx)
- **ACOPT 10 (Code 6820)**, option TOSQA
- **ACOPT 21 (Code 6844)**, option 3QUEST
- **ACOPT 30 (Code 6857)**, option POLQA
- **ACOPT 32 (Code 6859)**, option Speech-based Double Talk
- **3PASS lab (Code 6990)**, background noise simulation system, including necessary system components (cf. separate data sheet)

## Hardware

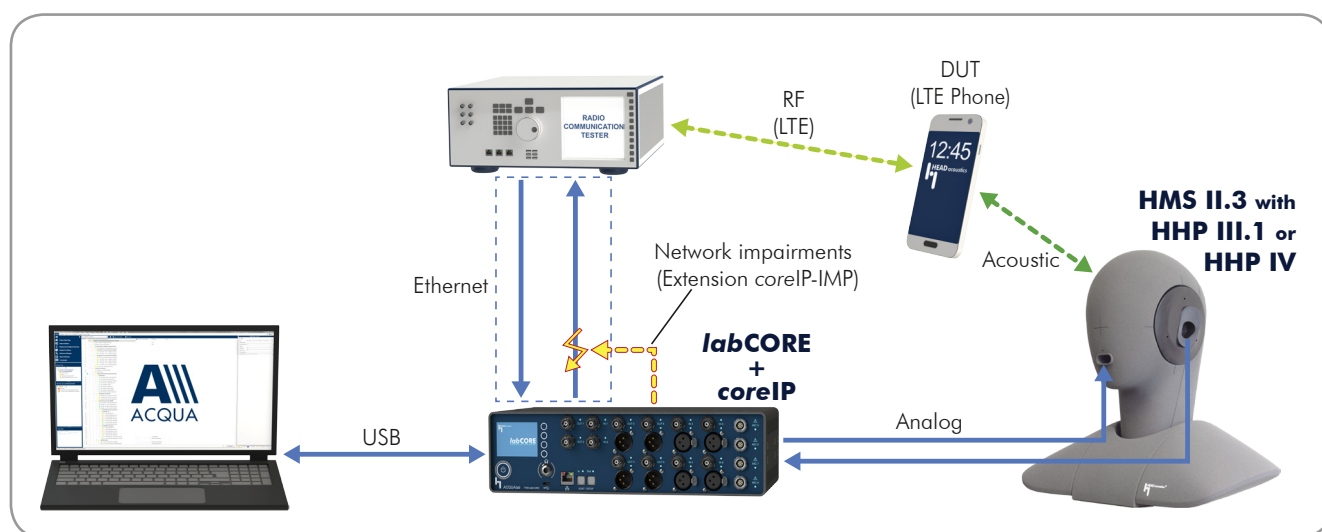
- **labCORE (Code 7700)**, modular multi-channel hardware platform with labCORE extensions:
  - **coreBUS (Code 7710)**, I/O bus mainboard
  - **coreOUT-Amp2 (Code 7720)**, power amplifier board
  - **coreIN-Mic4 (Code 7730)**, microphone input board
  - **coreBEQ (Code 7740)**, binaural equalization
  - **coreIP (Code 7770)**, Voice over IP extension
  - **coreIP-IMP (Code 7771)**, VoIP impairment extension
  - **coreIP-AMR (Code 7772)**, AMR extension
  - **coreBT (Code 7780)**, Bluetooth hardware extension
  - **coreBT-EXT (Code 7781)**, Bluetooth software extension
- **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
- **Radio Communication Tester** (not delivered by HEAD acoustics)

## Options

- **ACOPT 20 (Code 6843)**, option Quality Pie
- **coreIP-EVS (Code 7773)**, EVS extension
- **BT-Vol HHP IV (Code 1415)**, Bluetooth volume control of DUT for motorized handset positioner HHP IV

## Delivery Items

- **TS 103 737/38 (Code 60019)**, as ACQUA database
- **V2C file**



Configuration example

## Measurements

new/changed with Release 1.3.1

The following table gives an overview of the measurements included TS 103 737/38:

SMD Title	Handset	Headset	Desktop hands-free	Handheld hands-free	Softphone
Delay in Send Direction	•	•	•	•	•
Delay in Receive Direction	•	•	•	•	•
Round Trip Delay	•	•	•	•	•
Receive Loudness Rating (RLR) + Positional Robustness	•	•	•	•	•
Receive Frequency Response + Positional Robustness	•	•	•	•	•
Receive Noise	•	•	•	•	•
Receive Distortion	•	•	•	•	•
Attenuation Range in Receive Direction during Double Talk	•	•	•	•	•
Attenuation Range in Receive Direction during Double Talk with Variable Echo Path	n/a	n/a	•	n/a	•
Send Frequency Response + Positional Robustness	•	•	•	•	•
Send Loudness Rating (SLR) + Positional Robustness	•	•	•	•	•
Microphone Mute SLR	•	•	•	•	•
Send Noise	•	•	•	•	•
Send Distortion	•	•	•	•	•
Attenuation Range in Send Direction during Double Talk	•	•	•	•	•
Attenuation Range in Send Direction during Double Talk with Variable Echo Path	n/a	n/a	•	n/a	•
Activation in Send Direction	•	•	•	•	•
Sidetone Delay	•	•	n/a	n/a	n/a
Sidetone Masking Rating (STMR)	•	•	n/a	n/a	n/a
Stability Loss	•	•	•	•	•
Terminal Coupling Loss weighted	•	•	•	•	•
Temporal Echo Effects	•	•	•	•	•
Spectral Echo Attenuation	•	•	•	•	•
Variable Echo Path	•	n/a	•	n/a	•
Echo Attenuation during Double Talk	•	•	•	•	•
Comfort Noise Level/Spectral	•	•	•	•	•
Speech Quality in the Presence of Background Noise	•	•	•	•	•
BGNT with Far End Speech	•	•	•	•	•
Objective Listening Speech Quality in Send Direction	•	•	•	•	•
Objective Listening Speech Quality in Receive Direction + Packet Impairments	•	•	•	•	•
Useful - Clock Drift Measurement	•	•	•	•	•