



Measurement standard TS 26 131-32 in ACQUA 4

Description

The tests implemented in the HEAD acoustics test suite TS 26 131-32 cover all relevant acoustic requirements for 2G/3G/LTE/WLAN mobile terminals for narrow band and wideband scenarios. Typical terminal types to be approved for TS 26.131/132-conformity are handsets, headsets and desktop / vehicle-mounted / handheld hands-free devices.

If desired, measurements in the test suite can be modified or extended for additional tests as well as combined to create individual test sequences. However, testing for standard conformity requires unaltered measurements.

3GPP Release 15 of this standard contains metrics to assess speech quality such as:

- Delay
- Loudness rating
- Distortion
- Speech quality
- Measurements with packet impairments
- Echo control

With its predefined measurement descriptors and automated measurement sequences, the test suite TS 26 131-32 allows fast and easy acquisition, analysis and documentation of measurement data.

GCF/PTCRB Tests

In combination with particular combinations of HEAD acoustics hardware and software, TS 26 131-32 forms the test platforms TP89¹, TP90² and TP190³. All of these platforms are officially approved by GCF/PTCRB.

Test reports generated with the measurement standard TS 26 131-32 (without any user modification), the respectively specified hardware and software plus the ACOPTs 23 and 24 include a statement that the test results have been achieved on a GCF/PTCRB-approved test platform.

Overview of database revisions and specification versions			
Database revision	Based on specification version	Min. ACQUA version with	
		MFE	labCORE
13 GCF PTCRB	V12.5.0/12.8.0 Release 12 (2016-03)	4.0.200	4.1.100
14	V15.1 Release 15 (2018-09)	4.0.200	4.1.100

(Older releases are available upon request)

DATA SHEET

TS 26 131-32 (Code 6777)

3GPP Release 12 (GCF/PTCRB-cert.)
3GPP Release 15

2G/3G/LTE/WLAN mobile terminal
acoustic measurements

Overview

3GPP TS 26.131 and TS 26.132 specify test methods to assess the minimum requirements for the acoustic characteristics of narrowband (NB) and wideband (WB) 2G/3G/LTE/WLAN terminals.

HEAD acoustics has implemented these speech quality measurements into the automated test suite TS 26 131-32. In combination with other HEAD acoustics components, TS 26 131-32 forms the test platforms TP89¹, TP90² and TP190³ which are approved by GCF/PTCRB (Global Certification Forum, PCS Type Certification Review Board).

TS 26 131-32 allows manufacturers of 2G/3G/LTE/WLAN terminals to ensure that their implementations meet the requirements of 3GPP/GCF/PTCRB.



Applications

- Conformance testing of 2G/3G/LTE/WLAN mobile terminals according to 3GPP TS 26.131 / TS 26.132, Version 15.1 Release 15 (2018-09)
- GCF/PTCRB approval testing of 2G/3G/LTE mobile terminals according to 3GPP TS 26.131 / TS 26.132, Version 12.5.0/12.8.0 Release 12 (2016-03)
- Experimental development and optimization of 2G/3G/LTE/WLAN mobile terminals with instrumental evaluation of speech quality

1) TP89: only for MFE III.1 and database according to Specification Release 9

2) TP90: only for MFE VI.1 and database according to Specification Release 12.4.0 / 12.6.0

3) TP190: only for labCORE and database according to Specification Release 12.5.0 / 12.8.0

General requirements

TS 26 131-32 requires the following system components based on current Release 15 (c.f. table on page 1):

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)**, VoIP AMR extension
- **HMS II.3-33 (Code 1230.1)**, HEAD Measurement System with pinna type 3.3. Note: additional left ear simulator HIS L (Code 1231) required (for binaural use cases).
- **HHP IV (Code 1406)**, motorized handset positioner (optional, depending on DUT), alternatively HHP III.1 (Code 1403)
- **Radio communication tester** depending on use case (NB/WB, 2G/3G/LTE), (not delivered by HEAD acoustics)

Software

- **ACQUA**, Advanced Communication Quality Analysis System as one of the following variants:
 - Full-license (Code 6810)
 - Workplace (Code 6830, for post-analysis and documentation only)
 - Compact Systems (Code6860.xx)
- **ACOPT 21 (Code 6844)**, 3QUEST
- **ACOPT 30 (Code 6857)**, POLQA
- One or both of the following **background noise simulation systems** including respective system components:
 - **HAE-BGN (Code 6971)**, mandatory for several use cases
 - **3PASS lab (Code 6990)**, recommended for handheld hands-free use cases

Options

- **UG TS 26 SWB/FB (Code 60028)**, Extension Super-wideband & Fullband
- **BT-Vol HHP IV (Code 1415)**, Bluetooth Volume Control of Device Under Test for HHP IV
- **ACOPT 32 (Code 6859)**, Speech-based Double Talk, Calculation of “Echo control characteristics” based on 3GPP TS 26.132 V13.3.0 (2016-06). Note: The requirements defined in this specification are still under study. The reference implementation published by 3GPP is continuously being optimized

and developed. ACOPT 32 is continuously adapted to these ongoing developments of the 3GPP specification.

One or both of the following ACOPTs will add the label “GCF approved” and/or “PTCRB approved” to test reports:

- **ACOPT 23 (Code 6848)**, Option GCF
- **ACOPT 24 (Code 6849)**, Option PTCRB

Delivery Items

- **TS 26 131-32 (Code 6777)**, Measurement Standard delivered as ACQUA database
- **V2C file** (for ACQUA 4.0.200 or later)
- **Manual** as PDF

Measurements

The table gives an overview of the measurements included in TS 26 131-32

GCF/PTCRB-certified (TP190, database rev. 13 GCF PTCRB)

SMD title	Handset	Headset	Desktop & vehicle hands-free	Handheld hands-free	Handset	Headset	Desktop & vehicle hands-free	Handheld hands-free
	Narrowband				Wideband			
Prep. Overall Delay in Receiving Direction	•	•	•	•	•	•	•	•
Delay in Receiving Direction DUT	•	•	•	•	•	•	•	•
Prep. Overall Delay in Sending Direction	•	•	•	•	•	•	•	•
Delay in Sending Direction DUT	•	•	•	•	•	•	•	•
Delay Check Send. + Receiving Direction DUT	•	•	n/a	n/a	•	•	n/a	n/a
Alternative Delay Meas. in Loopback/Echo Mode	•	•	n/a	n/a	•	•	n/a	n/a
Ambient noise less than - 64 dBPa(A)	•	•	•	•	•	•	•	•
Volume Control Iteration SMDs	•	•	n/a	•	•	•	n/a	•
Volume Control via Bluetooth	•	•	n/a	•	•	•	n/a	•
Application Force Control (HHP IV)	•	n/a	n/a	n/a	•	n/a	n/a	n/a
Tagged Measurements to handle e.g. Variables	•	•	•	•	•	•	•	•
Query Equipment Delay Parameter via Script SMDs	•	•	•	•	•	•	•	•

	Handset	Headset	Desktop & vehicle hands-free	Handheld hands-free	Handset	Headset	Desktop & vehicle hands-free	Handheld hands-free
SMD title	Narrowband				Wideband			
Send Loudness Rating (SLR)	•	•	•	•	•	•	•	•
Receive Loudness Rating nom.(RLR)	•	•	•	•	•	•	•	•
Receive Loudness Rating max.(RLR)	•	•	•	•	•	•	•	•
Receive Loudness Rating min.(RLR)	•	•	n/a	n/a	•	•	n/a	n/a
Receive Loudness Rating, nom. (RLR) CSS	•	•	•	•	•	•	n/a	•
Receive Loudness Rating, max. (RLR) CSS	•	•	•	•	•	•	n/a	n/a
Receive Loudness Rating (RLR) with background noise	•	•	n/a	n/a	•	•	n/a	n/a
Idle channel noise Sending AVG	•	•	n/a	n/a	•	•	n/a	n/a
Single Frequency Disturbances Sending	•	•	n/a	n/a	•	•	n/a	n/a
Idle channel noise Rcv. AVG., nominal Volume	•	•	n/a	n/a	•	•	n/a	n/a
Idle channel noise Rcv. AVG. maximum Volume	•	•	n/a	n/a	•	•	n/a	n/a
Single Frequency Disturbances Receiving	•	•	n/a	n/a	•	•	n/a	n/a
Sensitivity frequency charact. Sending	•	•	•	•	•	•	•	•
Sensitivity, frequency character. Rcv	•	•	•	•	•	•	•	•
Sidetone charact., HATS, Vol. nom.	•	•	n/a	n/a	•	•	n/a	n/a
Sidetone charact., HATS, Vol. max.	•	•	n/a	n/a	•	•	n/a	n/a
Sidetone charact., HATS, Vol. min.	•	•	n/a	n/a	•	•	n/a	n/a
Sidetone Delay for Handset	•	•	n/a	n/a	•	•	n/a	n/a
Sidetone delay, Volume nominal, calculation	•	•	n/a	n/a	•	•	n/a	n/a
Stability loss	•	•	n/a	n/a	•	•	n/a	n/a
Acoustic echo control, nom. Vol. compr.	•	•	•	•	•	•	•	•
Acoustic echo control, max. Vol. compr.	•	•	•	•	•	•	•	•
Acoustic echo control ANY Vol. compr.	•	•	•	•	•	•	•	•
Distortion Sending, activation	•	•	•	•	•	•	•	•
Distortion Sending	•	•	•	•	•	•	•	•
Distortion Receiving, activation	•	•	•	•	•	•	•	•
Distortion Receiving	•	•	•	•	•	•	•	•
Echo Control Chara. Speech short DT SND 1of2	•	•	•	•	•	•	•	•
Echo Control Chara. Speech long DT SND 2of2	•	•	•	•	•	•	•	•
Speech quality with ambient noise (HAE-BGN)	•	n/a	n/a	•	•	n/a	n/a	•
Analyze 3QUEST (HAE-BGN)	•	n/a	n/a	•	•	n/a	n/a	•
Average G, N, S-MOS (HAE-BGN)	•	n/a	n/a	•	•	n/a	n/a	•
Speech quality with ambient noise (3PASS)	n/a	n/a	n/a	•	n/a	n/a	n/a	•
Analyze 3QUEST (3PASS)	n/a	n/a	n/a	•	n/a	n/a	n/a	•
Average G, N, S-MOS (3PASS)	n/a	n/a	n/a	•	n/a	n/a	n/a	•
Clock Drift Adjustment	•	•	n/a	n/a	•	•	n/a	n/a
Alternative Delay Measurement in Loopback/Echo Mode	•	•	n/a	n/a	•	•	n/a	n/a
Delay and speech quality in conditions with packet arrival time var. + packet loss (MFE VIII.1 + IX)	•	•	n/a	n/a	•	•	n/a	n/a
Delay and speech quality in conditions with packet arrival time var. + packet loss (MFE VIII.1 IMP)	•	•	n/a	n/a	•	•	n/a	n/a
Delay histogram	•	•	n/a	n/a	•	•	n/a	n/a
Speech quality loss histogram	•	•	n/a	n/a	•	•	n/a	n/a