



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 narrowband 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.

UG TS 26 SWB/FB extends the test suite by adding measurements for super-wideband (SWB) and fullband (FB) LTE/WLAN terminals.

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 combination of TS 26 131-32 and UG TS 26 SWB/FB allows fast and easy acquisition, analysis and documentation of measurement data for NB/WB/SWB/FB devices.

## GCF/PTCRB Tests

In conjunction with particular combinations of HEAD acoustics hardware and software, the combination of TS 26 131-32 and UG TS 26 SWB/FB forms the test platforms TP89<sup>1</sup>, TP90<sup>2</sup> and TP190<sup>3</sup>. All of these platforms are officially approved by GCF/PTCRB.

Test reports generated with the measurement suites (without any user modification), with the respectively specified hardware and software as well as 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
5 GCF PTCRB	V12.5.0/12.8.0 Release 12 (2016-03)	4.0.200	4.1.100
6	V15.1 Release 15 (2018-09)	4.0.200	4.1.100

(Older releases are available upon request)

## DATA SHEET

### UG TS 26 SWB/FB (Code 60028)

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

2G/3G/LTE/WLAN mobile terminal  
acoustic measurements, extension  
super-wideband and fullband

## Overview

UG TS 26 SWB/FB is an optional software extension for the automated test suite TS 26 131/32 (Code 6777). The suite covers all speech quality measurements for narrowband (NB) and wideband (WB) as specified in 3GPP TS 26.131 and TS 26.132. This extension provides additional measurements for super-wideband (SWB) and fullband (FB) LTE/WLAN terminals.

Together with other HEAD acoustics components, TS 26 131-32 and UG TS 26 SWB/FB form the test platforms TP89<sup>1</sup>, TP90<sup>2</sup> and TP190<sup>3</sup> which are approved by GCF/PTCRB (Global Certification Forum, PCS Type Certification Review Board).

The combination of TS 26 131-32 and UG TS 26 SWB/FB allows manufacturers of 2G/3G/LTE/WLAN terminals to ensure that their NB/WB/SWB/FB mobile devices 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
  - **coreIP-EVS (Code 7773)**, VoIP EVS 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 09 (Code 6819)**, Speech level voltmeter
- **ACOPT 21 (Code 6844)**, 3QUEST
- **ACOPT 30 (Code 6857)**, POLQA
- **ACOPT 35 (Code 6866)**, 3QUEST SWB/FB
- 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
- **TS 26 131-32 (Code 6777)**, 2G/3G/LTE/WLAN mobile terminal acoustic measurements

### Options

- **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

- **UG TS 26 SWB/FB (Code 60028)**, as ACQUA database
- **V2C file** (for ACQUA)
- **Manual** as PDF

## Measurements

The table gives an overview of the measurements included in UG TS 26 SWB/FB

GCF/PTCRB-certified (TP190, database rev. 5 GCF PTCRB)

	Handset	Headset	Desktop & vehicle hands-free	Handheld hands-free	Handset	Headset	Desktop & vehicle hands-free	Handheld hands-free
<b>SMD title</b>	<b>Super-wideband</b>				<b>Fullband</b>			
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
<b>SMD title</b>	<b>Super-wideband</b>				<b>Fullband</b>			
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