



Description

HMS II.3 is ideally suited for all measurements in the field of telecommunications under realistic conditions. It provides a recording and speech simulation system and thus supports measurements in sending and receiving direction. HMS II.3 has been designed for testing all kinds of transducers in handsets, headsets, hands-free devices, voice-operated equipment, hearing aids and hearing protectors.

The artificial mouth of HMS II.3 is compliant with ITU-T P.58 in its free-field characteristics, including diffraction and reflection at the shoulders and torso. Thus, it realistically reproduces the acoustic behavior of a test person. HMS II.3 also meets ITU-T P.58 regarding its geometrical dimensions. Its diffraction and reflection characteristics are comparable to those of a listening person.

HMS II.3 is delivered with the anatomically shaped pinna simulator type 3.3 according to Recommendation ITU-T P.57. Type 3.3 is recommended when the anatomy of the human ear plays an important part, e.g. for intra-concha headsets or hearing aids. When desired, HMS II.3-33 can also be retrofitted with the simplified pinna simulator type 3.4 according to Recommendation ITU-T P.57. This pinna allows the use of different ear canals.

The right ear comes equipped with an IEC 60318-4 (2010-01)-compliant impedance simulator. For binaural measurements, the left ear can be equipped likewise. HMS II.3 can also be retrofitted with low-noise ear simulator(s) of HMS II.3-LN.

HMS II.3-33 also is a main part of the GCF/PTCRB-certified test platforms TP89, TP90 and TP190. As such, it is a vital component for GCF- and PTCRB-approved audio testing of 2G and 3G mobile equipment according to the Standards 3GPP TS26.131, TS26.132 and TS51.010-1.

Applications

- Measurement in send/receive direction of:
 - Telephone terminal equipment
 - Hands-free devices
- Measurement of arbitrary:
 - over-/on-/in-ear devices (headsets/headphones/earphones/in-ears)
 - active and passive hearing protection systems
 - hearing aids (e.g. intra-concha)

DATA SHEET

HMS II.3-33 (Code 1230.1)

HEAD Measurement System with Ear Simulator and Artificial Mouth

Overview

HMS II.3 is an artificial head measurement system with an IEC 60318-4-compliant ear simulator and a full-band-capable artificial mouth. HMS II.3 is ideally suited for measuring close-to-the-ear transducers in handsets, headsets, headphones, hearing protectors and hearing aids. By realistically replicating all acoustically relevant structures of the human anatomy, HMS II.3 also allows measurements of far-to-the-ear transducers such as hands-free equipment.

HMS II.3 is equipped with an impedance simulator in the right ear and an artificial mouth, both meeting the requirements in the Recommendations ITU-T P.57 and P.58. The mouth reproduces the complete spectrum of human voice, allowing super-wideband as well as fullband measurements in sending direction.

HMS II.3 is delivered with anatomically shaped pinnae type 3.3 and can be retrofitted with simplified pinnae type 3.4, both according to ITU-T P.57.

Key Features

- Geometric and acoustic characteristics according to ITU-T P.58
- Award-winning design
- Convenient mobile use in conjunction with portable hardware

Ear simulator:

- Ear simulator according to IEC 60318-4 (2010-01)
- Supports ITU-T P.57 pinnae types:
 - Anatomically shaped type 3.3
 - Simplified type 3.4
- Individual digital equalization via BEQ options
- High quality microphone with low inherent noise floor

Artificial mouth:

- Low-distortion two-way design with wide frequency range for SWB/FB measurements
- Radiation characteristics according to ITU-T P.58
- Supports digital equalization in ACQUA

Playback and recording

For measurements, HMS II.3 connects to the communication analysis system ACQUA via the hardware platform *labCORE*. In combination with the necessary hardware modules including *coreBEQ*, individual equalization of binaural acoustical signals is possible. This includes support for various equalization variants, e.g. as laid out in Recommendation ITU-T P.581. If available, the Binaural Equalizer BEQ II.1 can be used alternatively to *labCORE*.

The artificial mouth of HMS II.3-33 is powered by the *labCORE*'s optional *coreOUT-Amp2* module. ACQUA allows comfortable and precise equalization of the mouth. The two-way design of the mouth provides an excellent unequalized frequency response and a wide frequency range, making it ideally suited for super-wideband and fullband measurements.

In conjunction with the optional power box *labPWR 1.2* for *labCORE*, mobile recording and playback (e.g. in vehicles) are also possible with HMS II.3-33.

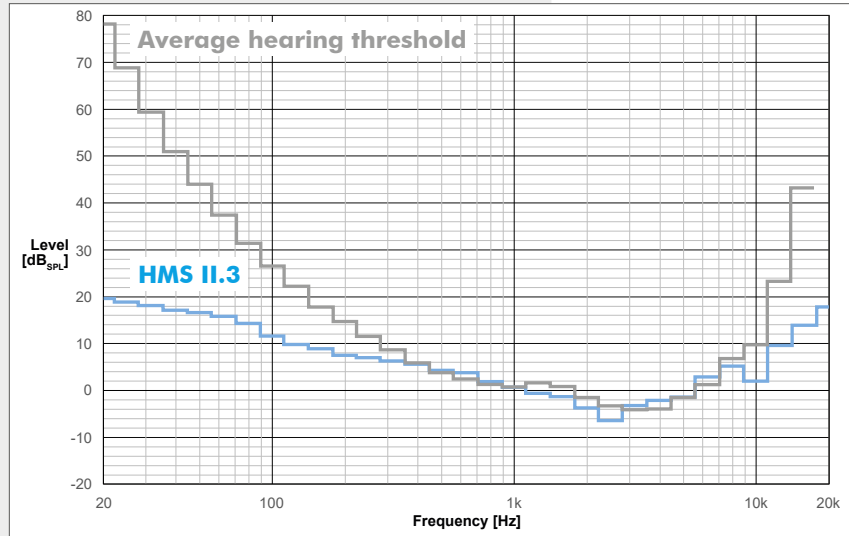
Accessories

For measurements of handsets with HMS II.3-33, it can be equipped with the optional handset positioners HHP IV or HHP III.1. HHP IV is fully motorized and thus remotely controllable as well as fully automatable via ACQUA. HHP III.1 only allows manual positioning of the handset. Both allow precise positioning of any handset as well as precise adjustment of application forces to the pinna, ensuring meaningful and repeatable measurement results.

Another accessory for HMS II.3 is the artificial nose AN HMS, enabling measurements of nose-supported devices, e.g. AR/VR glasses and headsets.

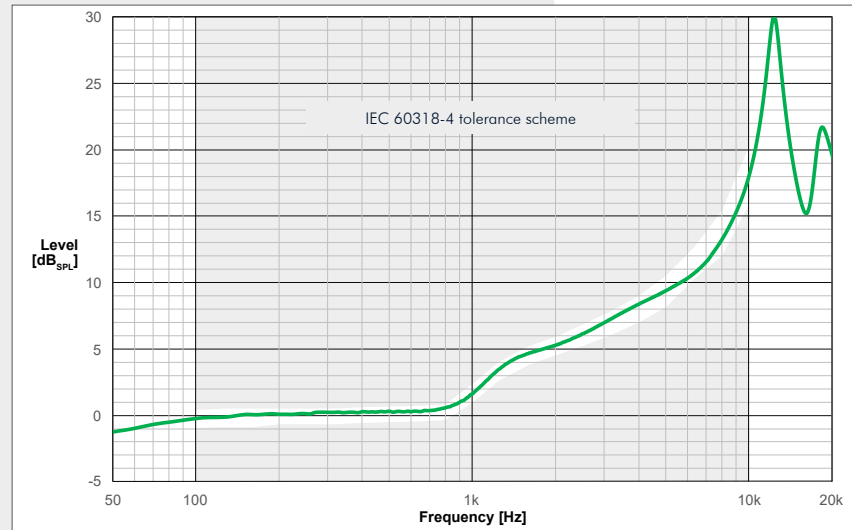
The supplied Torso Box HTB VI acoustically simulates a human torso. Its compact design allows easy handling and transportation of the complete system, e.g. for mobile applications.

Measurements - artificial ear



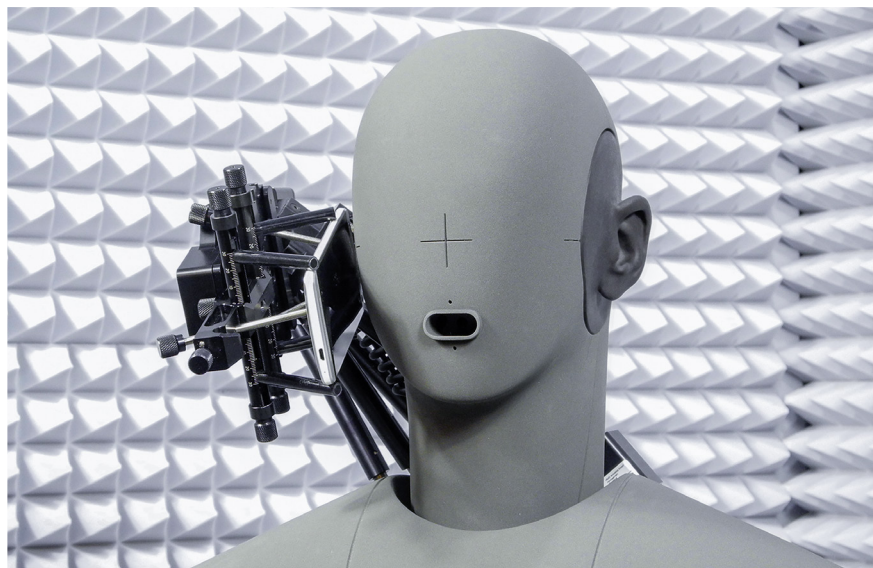
Self-noise of HMS II.3 ear simulator

- All curves are diffuse-field equalized
- HMS II.3 is measured with 4096 FFT
- Avg. hearing threshold acc. ISO 389-7



Typical transfer impedance of HMS II.3 ear simulator

- Curve and tolerance scheme standardized to 500 Hz



HMS II.3-33 with optional motorized handset positioner HHP IV

General Requirements

Hardware:

- **labCORE (Code 7700)**, Modular multi-channel hardware platform
 - **coreBUS (Code 7710)**, I/O bus mainboard
 - **coreOUT-Amp2 (Code 7720)**, Power amplifier board, for sending direction
 - **coreIN-Mic4 (Code 7730)**, Microphone input board, for receiving direction
 - **coreBEQ (Code 7740)**, Binaural equalization

Software:

- **ACQUA (Code 6810)**, Basic analysis software, full-license version

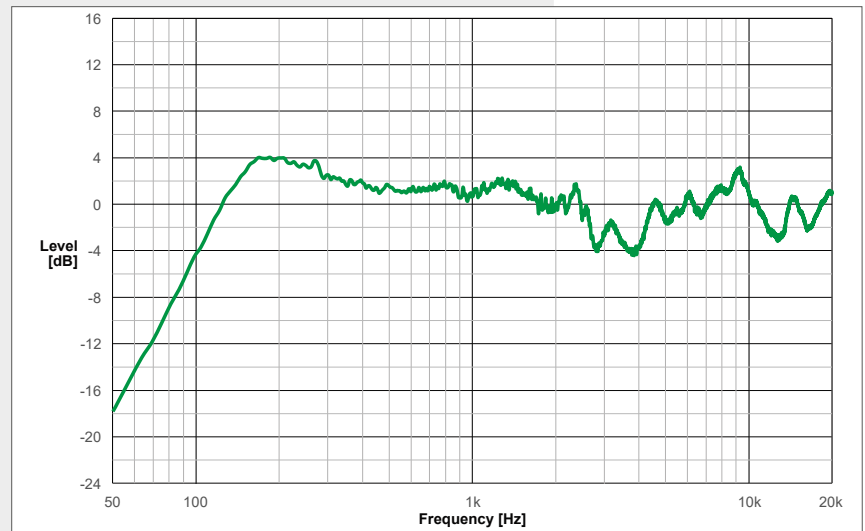
Options

- **HIS L (Code 1231)**, Impedance simulator for left ear including microphone
- **HIS L/R-LN (Cd. 1231.3/1232.3)**, HEAD Impedance Simulator, Left/Right, Low-Noise Version, for HMS II.3/4/5
- **HEL/HER III.1 (Code 1248/1249)**, Simplified pinna type 3.4 (left/right) according to ITU-T P.57
- **HEL/HER IV.2 (Code 1381/1382)**, Anatomically shaped pinna type 3.3 (left/right) according to ITU-T P.57
- **ECS I.1-I.3 (Code 1357.2-1357.4)**, Ear canal simulation cylindrical / small / medium / large (for pinna type 3.4)

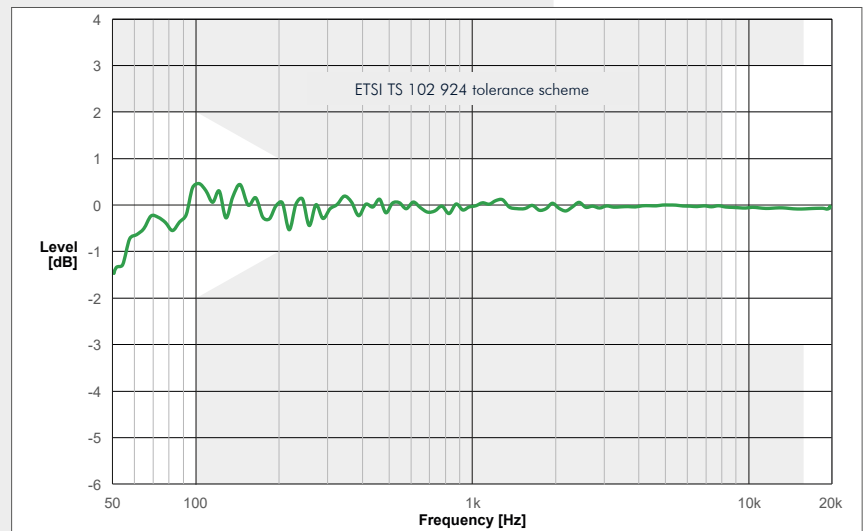


HMS II.3-33 on Torso Box HTB VI

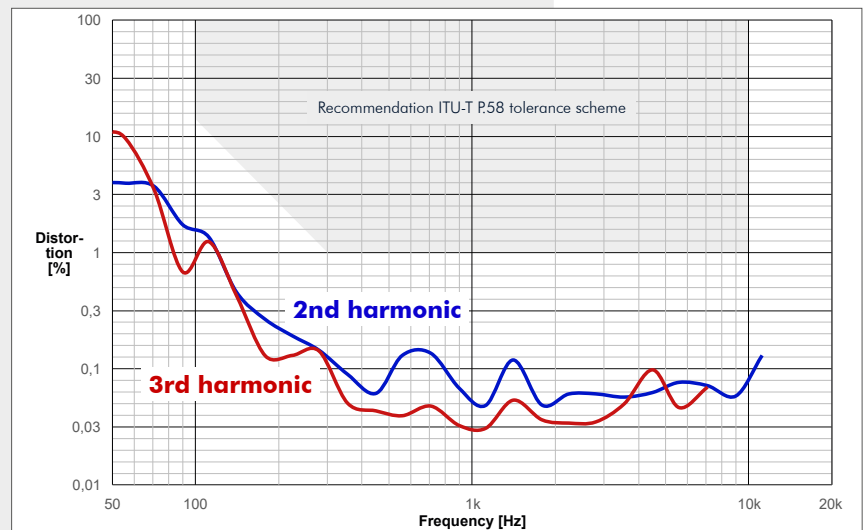
Measurements - artificial mouth



Typical unequalized frequency response of two-way mouth



Typical frequency response of equalized two-way mouth



Harmonic distortion of equalized two-way mouth at 0 dB_{p0}

Technical Data	
Artificial Ear (receiving direction)	
Transmission range	3 Hz – 20000 Hz
Dynamic range lower limit	23 dB _{SPL} (A)
Dynamic range upper limit	164 dB _{SPL}
Microphone sensitivity	12.5 mV / Pa
Polarization voltage	200 V
Supply voltage	HIS revision 01: + 120 V (recommended), ± 60 V (possible) HIS revision 02 and newer: ± 60 V (recommended), + 120 V (possible)
Frequency response	According to ITU-T P.58
Directivity characteristics	According to ITU-T P.58
Artificial Mouth (sending direction)	
Loudspeaker configuration	2-way
Transmission range	Approx. 50 Hz – 20000 Hz
Power limit	Max. 20 W (sine) Max. 50 W (music) (max. power is electrically limited beyond 6 kHz)
Impedance	4 Ω
Frequency response (equalized)	Exceeds ETSI TS 102 924
Distortion factor	Exceeds ITU-T P.58
Directivity characteristics	According to ITU-T P.58
Environmental conditions	
Operating temperature range	0°C – 50 °C, 32°F – 122°F
Storage temperature range	-20°C – 70°C, -4°F – 158°F
Humidity	20% – 80% relative humidity (non-condensing environment)
Dimensions	
Overall dimensions (W x H x D)	450 x 400 x 180 mm
Weight	Approx. 5.4 kg

- **HHP III.1 (Code 1403)**, Handset positioner for HMS II.3, VariMount version
- **HHP IV (Code 1406)**, Handset positioner for HMS II.3, MotoMount (Hexapod) version
- **AN HMS (Code 1418)**, Extension for HEAD measurement system HMS: Artificial nose
- **HWS (Code 1960)**, HEAD wind-screen for outdoor recordings, for use with HMM, HMS & HRS
- **HMT III (Code 1961)**, Height-adjustable tripod for HEAD measurement system HMS
- **HSC IV-V4 (Code 1524-V4)**, Carrying case for HMS II.x
- **TLP (Code 1967)**, Triaxial laser pointer for HMS/HSU positioning incl. two batteries and carrying case

Delivery items

- **HMS II.3-33 (Code 1230.1)**, HEAD measurement system, basic version with 3.3 pinna, right ear simulator & artificial mouth
- **HIS R (Code 1232)**, HEAD impedance simulator, right, for HMS II.3 / 4 / 5
- **HEL/HER IV.2 (Code 1381/1382)**, ITU-T type 3.3 flexible pinna for HMS II.x left/right ear, 35 shore OO hardness
- **HTB VI (Code 1574)**, HEAD torso box for HMS II/III/IV & HSU
- **CSB II (Code 9849)**, Adapter Speakon male <-> Banana plug
- **HCC-HMS (Code 1641)**, Carrying case for accessory parts HMS II.x, contains:
 - Microphone holder with 1/2" clip-on adapter
 - MRP pointer
 - Lip ring
 - Calibration adapter
 - 2.5 mm Allen key
 - Ear canal key
- **Manual**