HEAD acoustics

DATA SHEET

Code 6789

EN 50332

Maximum Sound Pressure Measurements:
Headphones and Portable Audio Equipment

OVERVIEW

EN 50332

Code 6789

Maximum Sound Pressure Measurements:
Headphones and Portable Audio Equipment

The European standard EN 50332 specifies maximum sound pressure level and input/output voltage measurements for headphones, earphones and headsets associated with portable audio equipment. Complying with EN 50332 is mandatory for distributing corresponding devices in a large number of countries. Thus, compliance with EN 50332 is important for any manufacturer of mobile consumer electronics.
HEAD acoustics implemented the requirements from EN 50332 in an automated test suite for the communication quality analysis system ACQUA.

KEY FEATURES

Assessment measurements for one-package sets

Assessment measurements for wired /wireless headphones, earphones and headsets

Assessment of player characteristics via digital or analog connection

Complete implementation of EN 50332-1 / -2 / -3

APPLICATIONS

Automated analysis of maximum sound pressure level for headphones, earphones and headsets associated with portable audio equipment according to the European standards:

- EN 50332-1: 2013
- EN 50332-2: 2013
- EN 50332-3: 2017

DETAILS

Hearing impairment is a serious health issue. A common cause of hearing damage in humans is exposition to high sound pressure levels over long periods of time. This is typical for noisy work environments where hearing protection is mostly mandatory nowadays. However, it also happens in other, less obvious situations. People often are prone to listen to music at high sound pressure levels. This takes place during concerts, in clubs, but also while listening to audio from portable audio devices via headphones. The latter use case is especially dangerous because it rarely is perceived as hazardous. With headphones, it is very easy to reach critical sound pressure levels at the ear drum. Additionally, the duration of exposure is usually long (e.g. on the daily commute). The result – irreversible gradual hearing damage – most often is diagnosed when the damage has been done. Therefore, the European Union ratified EN 50332 to prevent hearing damage due to excessive sound pressure levels from headphones and portable audio devices.

DESCRIPTION

EN 50332 defines maximum output voltages for source devices as well as a maximum efficiency for headphones, earphones and headsets. This results in a natural limit to the maximum sound pressure level that can be achieved when these devices are combined. Many European countries demand compliance with EN 50332 for selling corresponding devices. Thus, manufacturers are obligated to assess their products for compliance during development.

HEAD acoustics implemented the European standard entirely into the measurement standard EN 50332 for ACQUA. If desired, measurements can be modified or extended to conduct additional customized tests. Further, tests can be combined to create individual test sequences.

The EU standard EN 50332 is divided into three parts:

- General method for “one package equipment” (EN 50332-1: 2013)
- Matching of sets with headphones if either or both are offered separately, or are offered as one package equipment but with standardized connectors between the two allowing to combine components of different manufacturers or different design (EN 50332-2: 2013)
- Measurement method for sound dose management (EN 50332-3: 2017)

The ACQUA standard EN 50332 addresses all parts, allowing evaluation of portable audio source devices and headphones separately. The connection between audio device and headphones is either wired (USB / TRS) or via Bluetooth® wireless technology.

Additionally, the test suite provides measurements for FM receivers to test compliance with EN 50332.

APPLICABLE MEASUREMENT CATEGORIES

- One package set characteristics (EN 50332-1)
- Player characteristics, Analog (EN 50332-2)
- Player characteristics, Digital (EN 50332-2)
- Analog headphone / earphone characteristics (EN 50332-2)
- LAeq measurements Bluetooth device / USB device (EN 50332-2)
- FM receiver tests (EN 50332-1/2)
- Sound dose management (EN 50332-3)

OPTIONS

Hardware

*core*USB-DR (Code 7705)
› I/O module, USB Device Reference

*core*BT2 (Code 7782)
› I/O module, Bluetooth reference access point

CPB II (Code 6098)
› Adapter 3.5 mm Headphone Plug <> BNC

6.3 mm <> 3.5 mm phones adapter
› Third-party device (not provided by HEAD acoustics)

Radio Transceiver for FM tests
› Third party device (not provided by HEAD acoustics)

SCOPE OF DELIVERY

EN 50332 (Code 6789)
› Revision 08
› delivered as ACQUA database backup
V2C File
› License file for ACQUA dongle
Revision history
› PDF file

GENERAL REQUIREMENTS

Hardware

*lab*CORE (Code 7700)
› Modular multi-channel hardware platform
*core*BUS (Code 7710)
› *lab*CORE I/O Bus mainboard
*core*IN-Mic4 (Code 7730)
› Microphone input board

One of the following HEAD Measurement Systems:
HMS II.3
HMS II.3 (Code 1703)
› HEAD measurement system, basic version with right ear simulator, 3.3 pinna & artificial mouth
HIS L (Code 1701)
› HEAD impedance simulator, left
HMS II.3 LN
HMS II.3 LN (Code 1703.1)
› HEAD measurement system, low-noise version with right ear simulator, 3.3 pinna & artificial mouth
HIS L LN (Code 1701.1)
› HEAD impedance simulator, left, low-noise version
HMS II.3 LN HEC
HMS II.3 LN HEC (Code 1703.2)
› HEAD measurement system, low-noise version with human-like ear canal simulator right & artificial mouth
HIS L LN HEC (Code 1701.2)
› HEAD impedance simulator, left, low noise, human-like ear canal version
HMS II.4
HMS II.4 (Code 1704)
› HEAD measurement system, basic version with right ear simulator, 3.3 pinna
HIS L (Code 1701)
› HEAD impedance simulator, left

Software

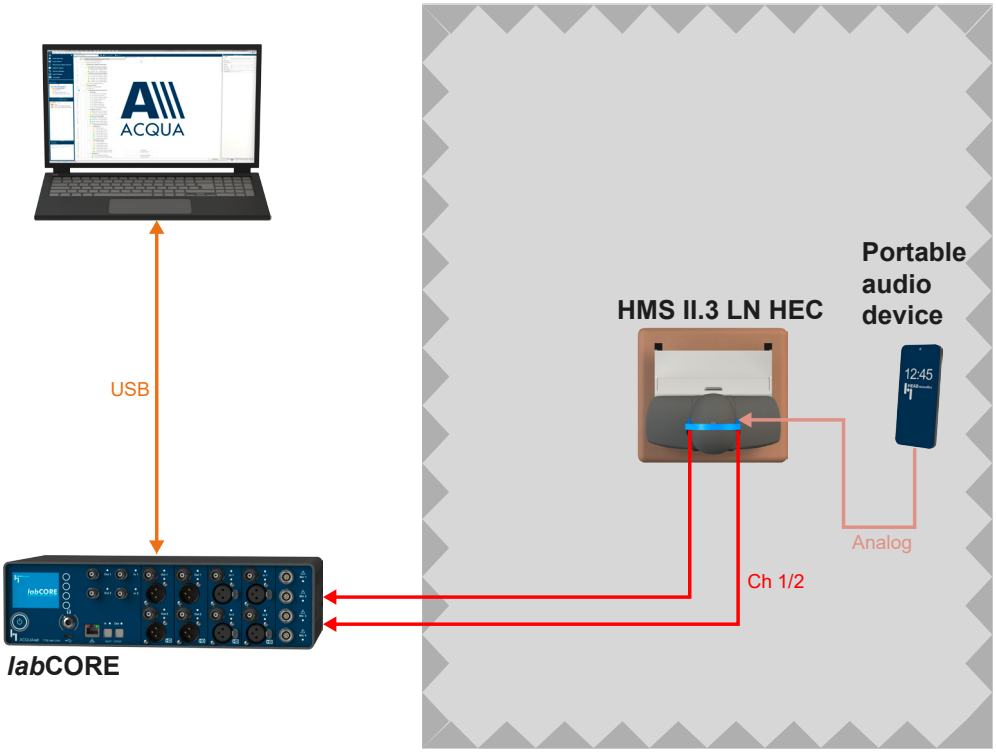
One of the following ACQUA versions:
ACQUA (Code 6810)
› Advanced Communication Quality Analysis Software, Full version
ACQUA Compact (Code 6860)
› Advanced Communication Quality Analysis Software, Compact Test System

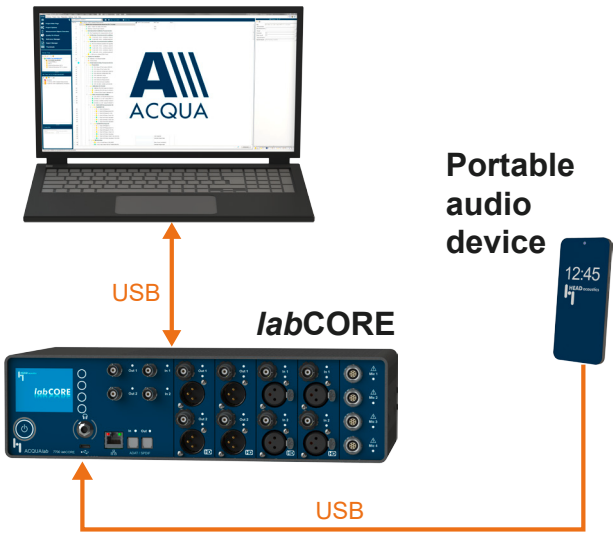
IN PRACTICE

APPLICATION EXAMPLES

Configuration to measure one-package set characteristics

The principal configuration of measuring a one-package set. The portable audio device connects to the headphone via TRS connector. The headphone is mounted on HMS II.3 LN HEC according to EN 50332. Both microphones (left & right ear) of HMS II.3 LN HEC are connected to *lab*CORE. *lab*CORE transmits the received audio data to ACQUA for analysis.



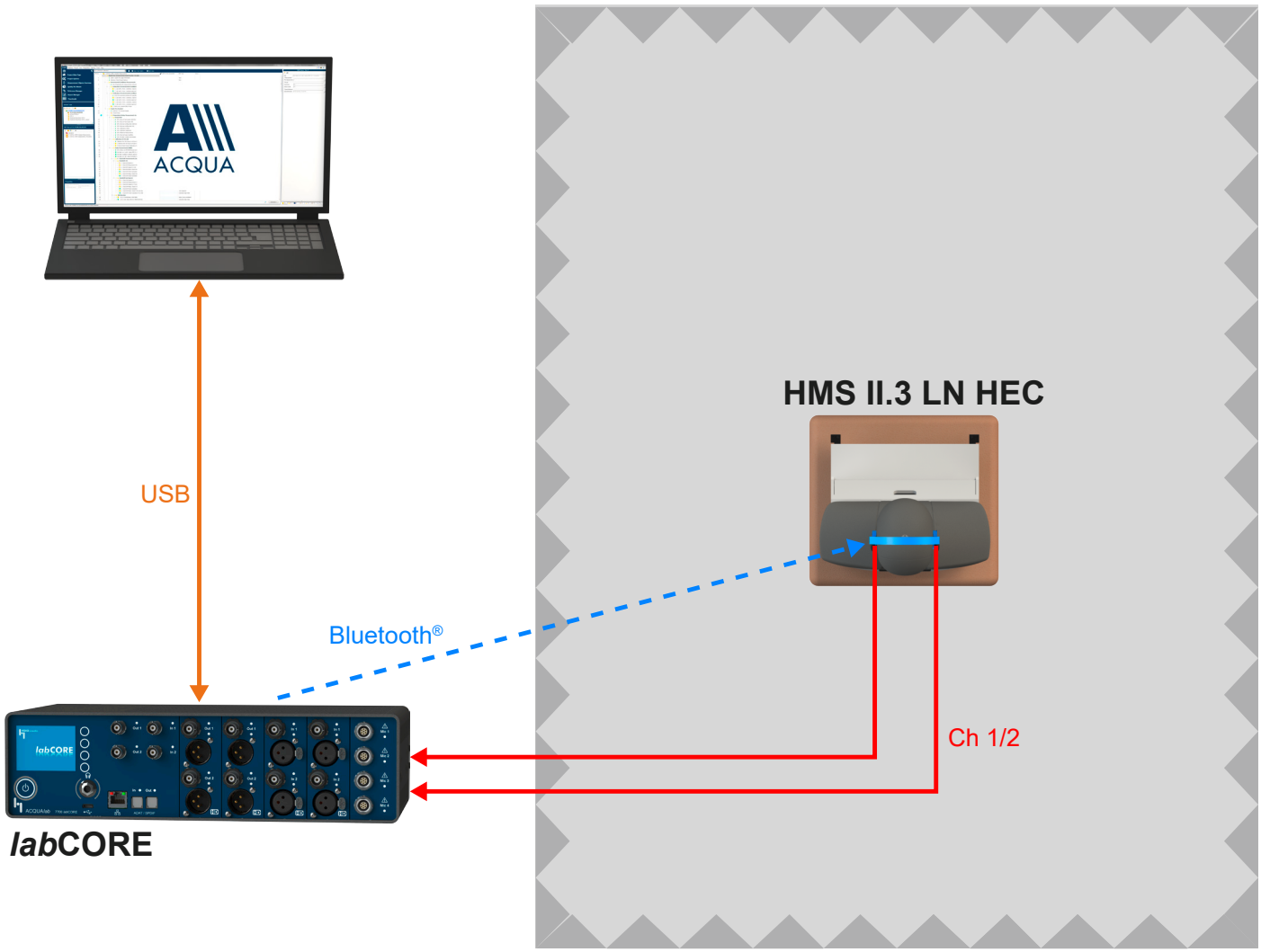


Configuration for measurement of player characteristics (USB conncetion)

The principal configuration for measuring player characteristics of portable audio devices via USB interface according to EN 50332. The portable audio device (e.g. smartphone) is connected to the USB-C socket of *lab*CORE. The *lab*CORE extension *core*USB-DR simulates a headset to the portable audio device. *lab*CORE transmits audio data to ACQUA for analysis. The signal path of this measurement is solely electrical.

Configuration for LAeq measurements of Bluetooth devices

The principal configuration for measuring the maximum output level of Bluetooth headphones according to EN 50332. The headphones are mounted on HMS II LN HEC according to EN 50332. Furthermore, the headphones connect via Bluetooth wireless technology to *lab*CORE. Both microphones (left & right ear) of HMS II.3 LN HEC are connected to *lab*CORE. *lab*CORE transmits the received audio data to ACQUA for analysis.



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