

Description

The standards IEC 602820-1 and IEC 602820-2 were created by the International Electrotechnical Commission (IEC) to establish basic requirements for the acoustic properties of building intercom system terminal devices. This includes handheld (handsets) as well as hands-free devices. The goal is to establish a base level of communication quality for all users of the intercom system. The European Committee for Electrotechnical Standardization (CENELEC) has adopted both standards for the European Union.

Part 1 of the standard lays out acoustic performance requirements for intercom system handheld/hands-free devices in these categories:

- Minimum SPL
- Loudness rating
- Frequency response
- Distortion
- Signal-to-noise ratio
- Sidetone masking rating
- Idle noise
- Ringtone SPL
- Acoustic stability (Larsen-Effect)

Part 2 contains additional acoustic requirements for handheld/hands-free devices in IP-based intercom systems:

- Delay
- Echo return loss
- Switching time

The standards define further requirements regarding security features, adaptability to environmental conditions and image transmission characteristics, none of which are part of this suite.

All tests in IEC 62820-1 are acoustic end-to-end tests in one direction, treating the system inbetween as a “black box”. To achieve this, separated measurement equipment for use at both end-points of the intercom system is mandatory. Also, both terminals must be acoustically separated, e.g. by placing them in separate rooms. The equipment requirements depend on the test case (see following pages). For any test case, both setups connect to one common labCORE unit controlled via one ACQUA-PC.

For handset testing, the standard describes measurements with a type 1 artificial ear or a type 3.2 simplified pinna simulator. Both of these types are outdated (cf. ITU-T P.57, chapter 5) and might lead to inconclusive results with today’s more compact

Overview of database revisions and specification versions

Database Revision	Based on Specification Versions	Min. ACQUA Version
1	IEC 62820-1-1:2016 IEC 62820-1-2:2017	4.0.200

DATA SHEET

IEC 62820-1 (Code 60057)

Building intercom systems using the Internet protocol (IP)

Overview

The IEC standard 62820-1-1 defines requirements to the acoustic performance of terminal devices in building intercom systems. The supplementary IEC 62820-1-2 adds performance requirements for IP-based systems. HEAD acoustics implemented the tests in both standards in the automated measurement suite IEC 62820-1 for the analysis software ACQUA.

The test suite verifies the acoustic properties of handheld and hands-free intercom equipment through acoustic end-to-end testing, aiming to ensure a base level of communication quality.

The test suite IEC 62820-1 can be used by manufacturers and suppliers of building intercom systems to qualify and optimize their systems and components.

Key Features

- Measurement suite to test building intercom systems and devices
- Supports analog and IP-based intercom systems
- Contains tests for handheld and hands-free devices
- Purely acoustic end-to-end testing

Applications

- Testing building intercom systems and handheld/hands-free devices for compliance with the Norms:
 - IEC 62820-1-1
 - IEC 62820-1-2
- Experimental optimization of building intercom systems and handheld/hands-free devices

handsets. The use of modern equipment for handset measurements is therefore recommended – head and torso simulator including artificial ear with anatomically shaped pinna of type 3.3 as well as a handset positioner.

Using two HATS with ear simulators and artificial mouths allows measurements in both directions and thus ultimate use case flexibility without the need transfer hardware between the rooms. The scope of this all-purpose setup includes the option of performing measurements outside of this test suite.

General Requirements

Software

- **ACQUA (Code 6810 etc.)**,
Advanced Communication Analysis System

Hardware

- **labCORE (Code 7700)**,
Modular multi-channel hardware platform with
 - **coreBUS (Code 7710)**,
labCORE I/O bus mainboard
 - **coreOUT-Amp2 (Code 7720)**,
Power amplifier board (2 channels)
 - **coreIN-Mic4 (Code 7730)**,
Microphone input board

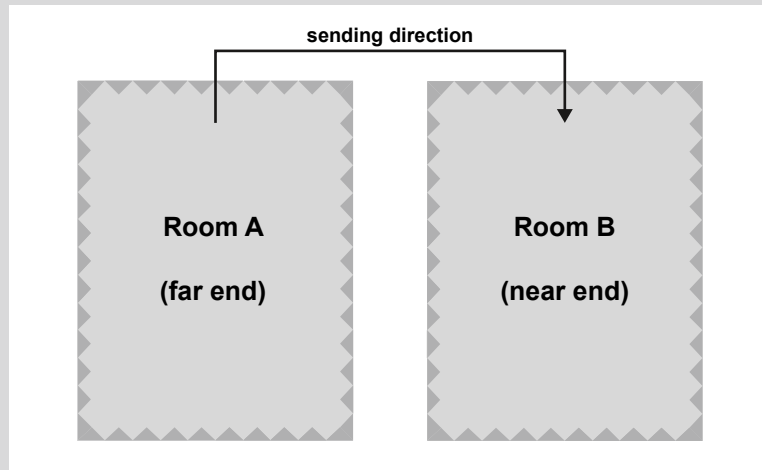
Options

To determine the necessary hardware for both rooms, please identify your use-case(s) via the illustrations on this and the next page.

Delivery Items

- **IEC 62820-1 (Code 60057)**,
delivered as ACQUA database
- **V2C file**
- **Documentation** as PDF

General measurement room configuration



Tests according to IEC 62820-1 require acoustically separated setups for sending and receiving signals, e.g. by testing across two rooms as shown in this illustration. Room A contains the sending intercom terminal and is defined as the far end, room B with the receiving intercom terminal is the near end.

IEC 62820-1 only defines tests in sending direction, thus the DUT is always the

receiving device in room B. In case the receiving characteristics of the terminal in room A shall be tested as well, it must be transferred to room B while another device serves as the new sending terminal in room A. Only the all-purpose setup (see next page) allows testing in both directions without transferring hardware between the rooms.

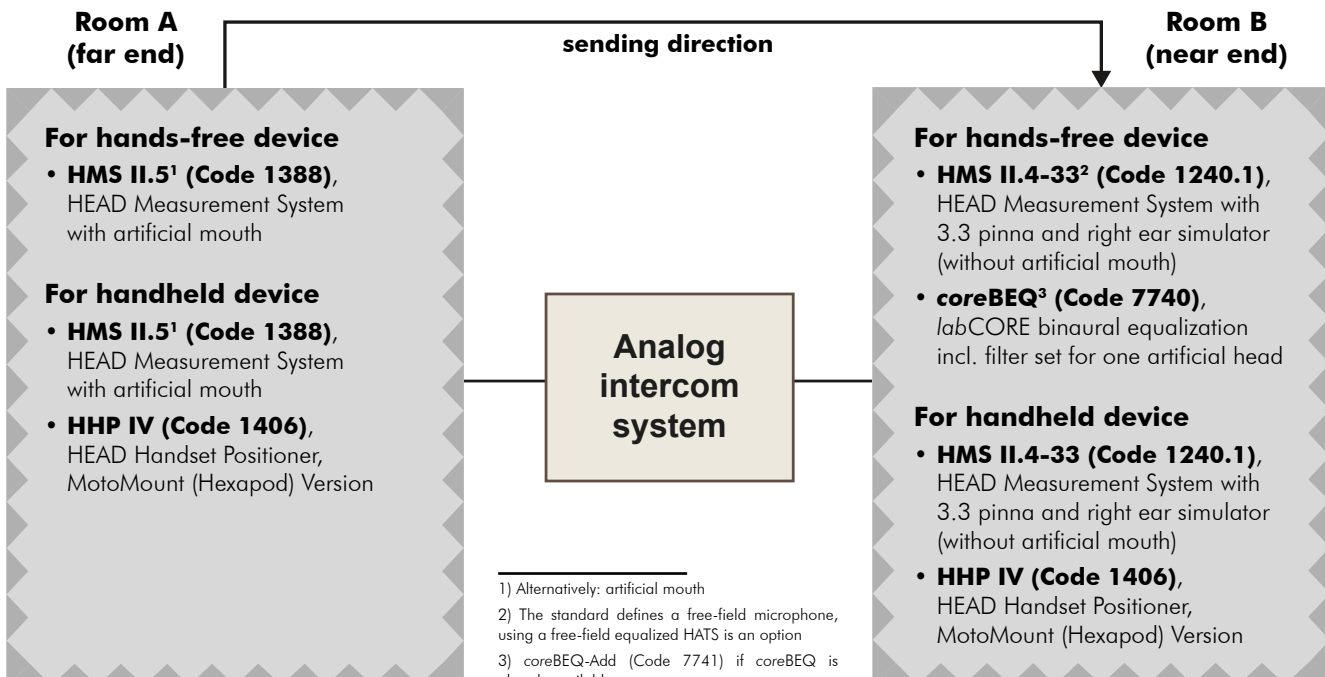
Hardware options for analog intercom systems

For analog intercom systems, one talker at the far end is mandatory. It can be simulated via HMS II.5 or a standalone artificial mouth. Using HMS II.5 adds the advantage of being retrofittable with one or two ear simulators, effectively becoming an HMS II.3-33 or, when retrofitted with low-noise ear simulators, HMS II.3-LN.

For handheld devices, the motorized handset positioner HHP IV ensures exact placement of the handset and full repeatability.

Hands-free DUTs at the near end are tested via a free-field equalized HMS II.4-33 or a free-field microphone as defined by the

standard. Using HMS II.4-33 instead of a microphone adds the advantages of replicating the acoustics of a human torso and, when equipped with the motorized handset positioner HHP IV, tests of handheld equipment as well.

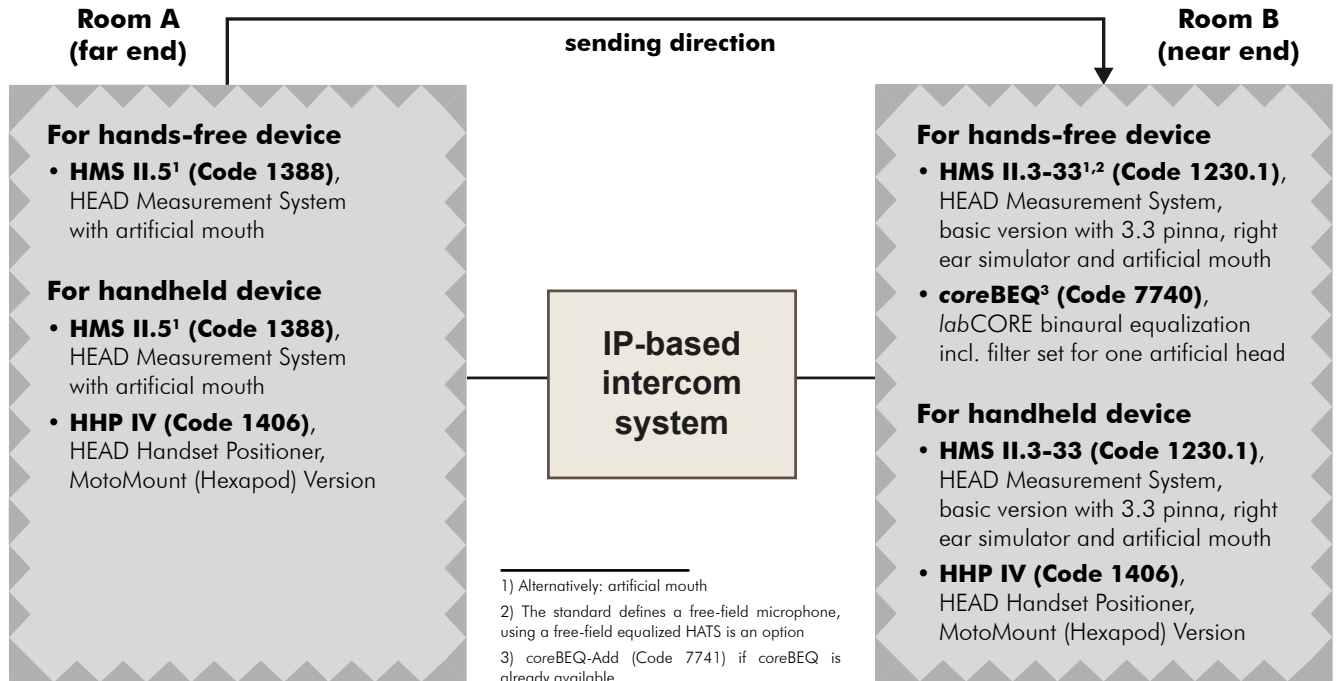


Hardware options for IP-based intercom systems

For IP-based intercom systems, the hardware options are similar to the analog use-case. The main difference is the supplementary second talker at the near end. At the far end, a talker is simulated via HMS II.5 or a standalone artificial

mouth. For handheld devices, the motorized handset positioner HHP IV ensures exact placement of the handset and full repeatability.

Hands-free DUTs at the near end are tested with a free-field equalized HMS II.3-33 or a combination of free-field microphone and artificial mouth as defined by the standard. For handheld DUTs, the motorized handset positioner HHP IV is added.

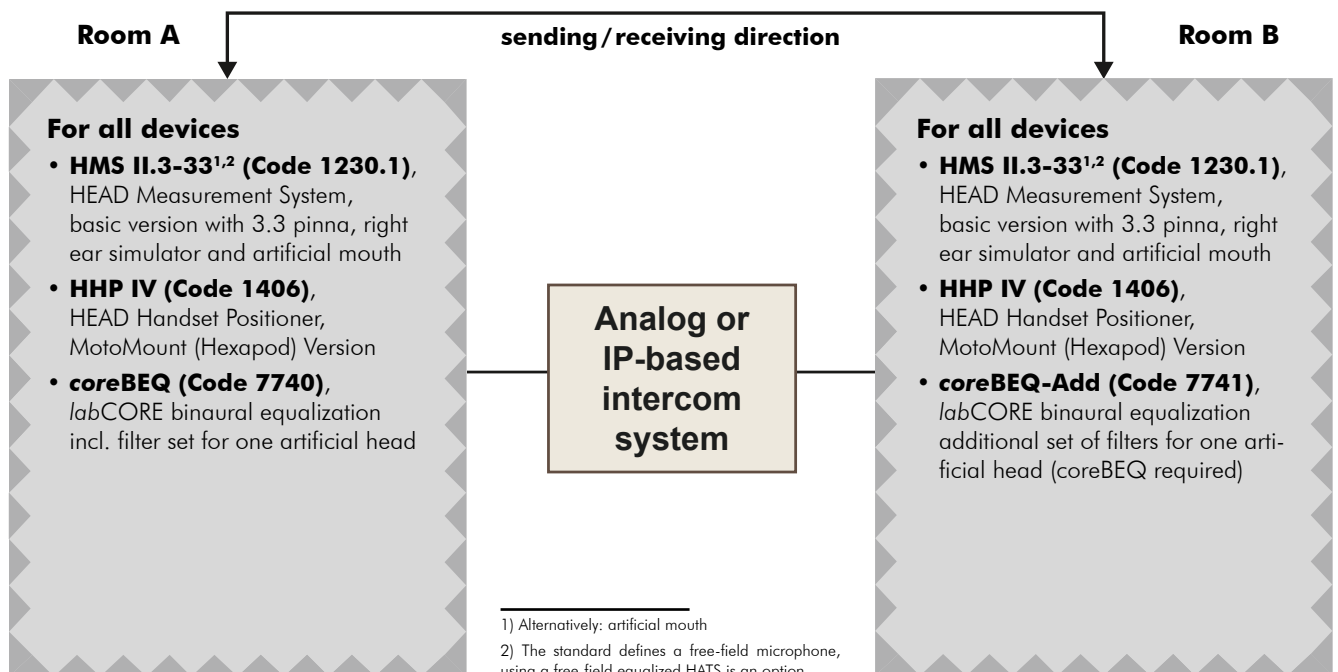


All-purpose test setup

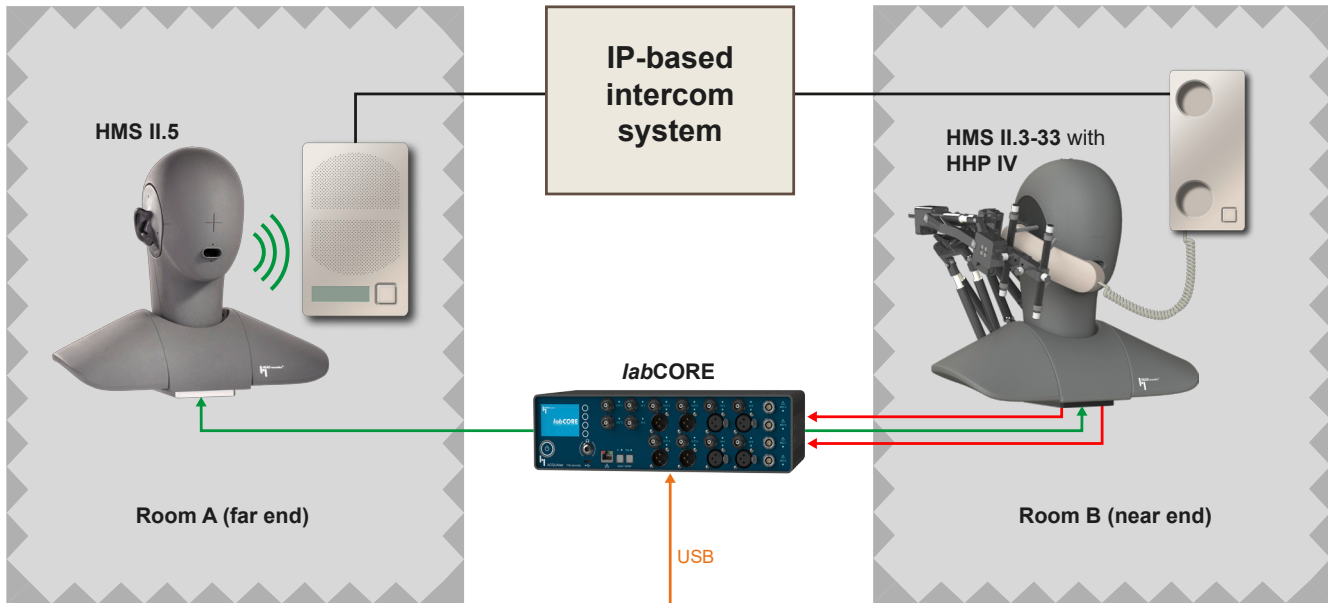
To cover all possible intercom system types and use cases, it is possible to equip both rooms with HATS capable of talking and listening. The motorized handset posi-

tioners HHP IV support handheld DUTs, coreBEQ and coreBEQ-Add allow free-field equalization of the artificial ears.

This all-purpose setup allows testing in both directions, supports analog as well as IP-based intercom systems. Additionally, it allows arbitrary measurements outside of IEC 62820-1.



Configuration example



Exemplary measurement setup of an IP-based intercom system according to IEC 62820-1. HMS II.5 simulates the talker for a free-field terminal at the far end. The combination of HMS II.3-33 and HHP IV simulate the listener and second talker for the handheld DUT at the near end.

labCORE equipped with coreBUS, coreOUT-Amp2 and coreIN-Mic4 allows simultaneous connection of both HATS. The ACQUA-PC runs the tests contained in the IEC 62820-1 test suite.