



Code 60038

P.1140-NB

ITU-T P.1140, Emergency Call (eCall) Devices, Narrowband Part

OVERVIEW

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In the event of a car accident, emergency call systems automatically trigger a hands-free call to an emergency call center. For ensuring optimal call quality between car and response service, the ITU specified comprehensive tests in Recommendation ITU-T P.1140 for speech communication during emergency calls originating from vehicles. HEAD acoustics implemented the included methods for narrowband (NB) communication in the ACQUA standard P.1140-NB.

The ACQUA standard provides assessments according to the narrowband part of Recommendation ITU-T P.1140 (07/2022) which is referenced in CEN EN 17240:2024 (CTP 1.1.15.1).

Furthermore, it provides assessments according to UN Regulation No. 144 (ECE/TRANS/WP.29/2017/132) which is referencing to Recommendation ITU-T P.1140 (06/2015).

KEY FEATURES

Implementation of the narrowband part from Recommendation ITU-T P.1140 (07/2022) as ACQUA project

Recommendation ITU-T P.1140 is the only globally published standard for NG-eCall and eCall quality testing

Measurements for packet-switched networks with permitted audio codecs (AMR, EVS-NB) especially required to test Next Generation eCall (NG-eCall, NG112) devices

Complete implementation of UN Regulation No. 144 referencing to Recommendation P.1140 (06/2015) as ACQUA project

APPLICATIONS

Quality analysis, experimental development, and optimization of speech communication with emergency call in-vehicle systems for

Next Generation eCall (NG-eCall, NG112) in accordance with

- › Recommendation ITU-T P.1140 (07/2022)
- › CEN EN 17240:2024 (CTP 1.1.15.1)

eCall

in accordance with either

- › Recommendation ITU-T P.1140 (07/2022)
- or
- › UN Regulation No. 144 (paragraph 26.6.1) referring to Recommendation ITU-T P.1140 (06/2015)

DETAILS

Ensuring sufficient speech communication quality at both ends of an emergency call is vital. Recommendation ITU-T P.1140 verifies elemental as well as advanced quality criteria for in-vehicle hands-free communication in case of an emergency. Testing according to Recommendation ITU-T P.1140 includes integrated eCall in-vehicle systems as well as aftermarket eCall kits.

DESCRIPTION

General

The ACQUA standard P.1140-NB provides an implementation of measurements and requirements to verify compliance of audio performance according to Recommendation ITU-T P.1140 for narrowband speech transmission.

Structure

The ACQUA standard consists of two ACQUA projects. Both projects include measurements and analyses for eCall systems which are capable of processing narrowband signals.

The main project provides measurements and analyses for assessing test results according to the requirements from Recommendation ITU-T P.1140 (07/2022). Thus, it applies to state-of-the-art eCall systems supporting Next Generation eCall.

The second project provides legacy measurements and analyses for assessing test results according to the audio performance requirements in UN Regulation No. 144, which still refers to the superseded Recommendation ITU-T P.1140 (06/2015). Recommendation ITU-T P.1140 (06/2015) is not applicable to packet-switched networks.

Equipment

Applying the ACQUA standard P.1140-NB includes various equipment which is mostly provided by HEAD acoustics. This equipment comprises operating software (ACQUA), a background noise simulation system (3PASS *flex*, HAE-car for legacy tests), sophisticated analysis methods (POLQA, Double Talk), as well as hardware devices (*labCORE*, HMS II.3). The measurement equipment is complemented by third-party equipment (pressure-field microphone, radio communication tester).

DATABASE CONTENTS

P.1140-NB consists of measurements and requirements for the analysis of:

- › Delay
- › Loudness rating
- › Frequency response
- › Idle channel noise
- › Echo attenuation
- › Switching characteristics
- › Double Talk performance
- › Variation of Receive Loudness Rating in the presence of background noise
- › Background noise transmission (silent call performance)
- › Delay and speech quality for packet-switched connections

OPTIONS

HRR I (Code 6597)

- › HEAD acoustics Rotating Reflector

RELEASE NOTES

Database revision and specification version		
Database revision	Based on specification	ACQUA version
Revision 03	Recommendation ITU-T P.1140 (07/2022) UN Regulation No. 144 (ECE/TRANS/WP.29/2017/132) referencing to Recommendation ITU-T P.1140 (06/15)	at least 5.1.200 including update 1

SCOPE OF DELIVERY

P.1140-NB (Code 60038)

- › delivered as ACQUA database backup
- V2C File

- › License file for ACQUA dongle

Revision history

- › PDF file

Audio files (*.dat) with background noise test signals

GENERAL REQUIREMENTS

Hardware Platform

labCORE (Code 7700)

- › Modular multi-channel hardware platform

coreBUS (Code 7710)

- › *labCORE* I/O bus mainboard

coreOUT-Amp2 (Code 7720)

- › *labCORE* power amplifier board

coreIN-Mic4 (Code 7730)

- › *labCORE* microphone input board

coreBEQ (Code 7740)

- › *labCORE* binaural equalization, incl. filter set for one artificial head (delivered with *labCORE*)

Head and Torso Simulator

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, and 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 and, artificial mouth

- › HIS L LN (Code 1701.1)

- » Head Impedance Simulator, left, low-noise version

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GENERAL REQUIREMENTS

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 and artificial mouth
- › HIS L LN HEC (Code 1701.2)
 - » Head Impedance Simulator, left, low noise, human-like ear canal version

HMS II.6¹

- › HMS II.6 (Code 1706)
 - » Head Measurement System, with artificial mouth and free-field microphones (left and right)

Network Simulation

Radio communication tester (third-party equipment)

- › For NG-eCall testing, one of the following features is required:
 - » Forwarding of NG-eCall service URN to *labCORE* SIP client
 - » Forwarding RTP stream from IMS server to *labCORE*

Microphone

Measurement microphone (third-party equipment)

- › 200 V polarization, LEMO 7-pin (1B), pressure field

Measurement and Analysis Software

One of the following software applications:

ACQUA (Code 6810)

- › Advanced Communication Quality Analysis Software, full license Version

ACQUA Compact (Code 6860)

- › Compact test system

Background Noise Simulation

One of the following background noise simulation systems:

3PASS *flex* (Code 6995)

- › Advanced background noise simulation system with automated equalization - flex version
- HAE-car (Code 6971)
- › Basic background noise simulation system for car cabins with semi-automated equalization

Packet-Switched Network (NG-eCall)

coreIP (Code 7770)

- › I/O module, Voice over IP reference gateway
- coreIP-IMP (Code 7771)
- › *labCORE* VoIP impairment option (coreIP module required)

ACOPT 30 (Code 6857)

- › Option POLQA

One of the following codec extensions for *labCORE*:

coreIP-AMR (Code 7772)

- › *labCORE* VoIP AMR codec option (coreIP module required)

coreIP-EVS (Code 7773)

- › *labCORE* VoIP EVS codec option (coreIP module required)

Echo During Double Talk

ACOPT 32 (Code 6859)

- › Option Speech-based Double Talk analysis

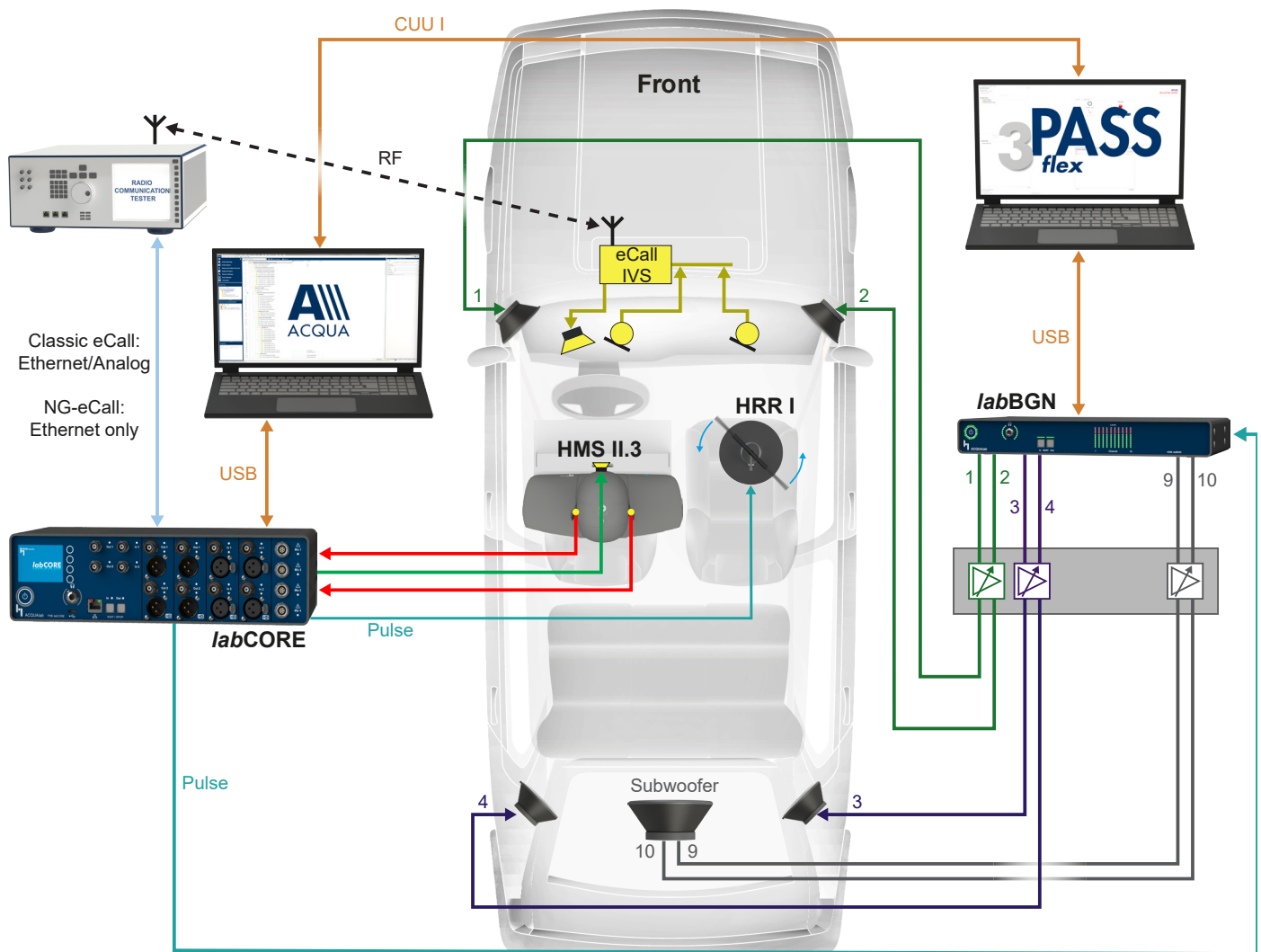
¹ Recommendation ITU-T P.1140 requires an artificial head according to Recommendation ITU-T P.58. When equalized, HMS II.6 can be treated as P.58-compliant for far-field measurement purposes.

IN PRACTICE

APPLICATION EXAMPLES

Measurements configuration for Recommendation ITU-T P.1140 (07/2022)

Measurement configuration for compliance testing according to Recommendation ITU-T P.1140 (07/2022). The device under test is a car with an eCall in-vehicle system (IVS). A radio communication tester establishes the RF connection to the eCall IVS. HMS II.3 simulates the user conducting a narrowband hands-free emergency call. HRR I provides a time-variant echo path. 3PASS flex simulates background noise. Together, *labCORE* and ACQUA generate, send, and receive signals and automatically trigger background noise playback for precise synchronization.





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