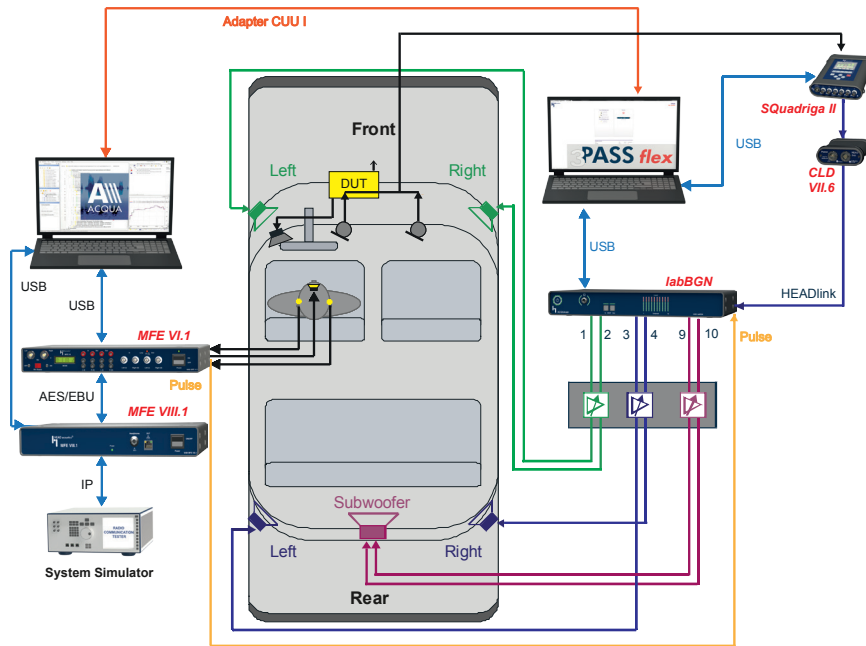


DATA SHEET

P.1120 (Code 60043)

ITU-T P.1120,

Super-wideband & Fullband Car Hands-free
 Terminals



Configuration Example

DESCRIPTION

The International Telecommunications Union (ITU) has established a recommendation regarding the speech quality of super-wideband and fullband hands-free communication in vehicles. The requirements and test methods described in this specification have been co-developed by HEAD acoustics and are available for use with the communication analysis system ACQUA as measurement standard P.1120.

In combination with ACQUA and the artificial head measurement system HMS II.3, P.1120 allows the automated analysis and experimental optimization of complete systems and subsystems for hands-free communication in vehicles.

P.1120 comprises numerous standard values such as loudness rating, transfer function, idle channel noise in sending and receiving direction, echo attenuation and minimum activation levels. In addition, P.1120 takes into account several other important aspects:

- Consideration of car type specific conditions by measuring the hands-free terminal in its original mounting state. For retrofit solutions: use of a car cabin with typical acoustic characteristics.
- Tests under silent conditions as well as with realistic background noise, acoustic driving simulation equalized to target car, consideration of different speeds, engines and car body styles.
- Artificial head measurement system as "user" of the hands-free terminal.
- Primary focus on conversation parameters such as double talk performance and quality of background noise transmission.

Some of the measurements are based on other recommendations and standards specified by e.g. ITU-T and 3GPP (3rd Generation Partnership Project).

Overview

The integration of hands-free systems in cars is a challenging topic. The arrangement of microphones and loudspeakers, the variety of background noise situations and additional artifacts due to RF problems significantly influence speech quality.

P.1120 is a test suite which implements the super-wideband and fullband test cases specified by ITU-T P.1120. Some methods described in P.1120 are based on other ITU-T recommendations and have been successfully adapted to the car environment. The test methods focus on

- **Standard telephometric requirements such as frequency responses and loudness ratings in single talk situations**
- **Echo performance and level variation in single and double talk situations**
- **Quality of background noise transmission**

P.1120 can be used by manufacturers and suppliers of the automotive industry to qualify and optimize complete hands-free systems, e.g.:

- **Built-in hands-free systems**
- **After-market hands-free car kits**
- **Corded headsets**
- **Wireless headsets**

APPLICATIONS

- **Automated speech quality analysis** of car hands-free terminals according to ITU-T Recommendation P.1120
- **Experimental development and optimization** of car hands-free terminals with objective evaluation of speech quality
- **Optimized positioning** of hands-free microphones and loudspeakers in cars

TEST SIGNALS

- Real speech signals according to ITU-T P.501
- Speech sequences
- Activation sequences
- Special noise sequences
- Composite source signals (CSS)
- CSS combinations for double talk simulation
- AM/FM modulated sine signals for echo measurements
- Background noise

Database Revision	Based on Specification Version	Min. ACQUA Version
1	ITU-T P.1120 (03/2017)	3.5.200

Overview of database revision and specification version.

MEASUREMENTS

The following table gives a summary of the measurements included in P.1120:

SMD Title	Super-Wideband Headset	Super-Wideband Desktop Vehicle Hands-free	Fullband Headset	Fullband Desktop Vehicle Hands-free
	HESB	DVSB	HEFB	DVFB
Verification of environmental conditions	•	•	•	•
Delay SND/RCV/Echo/Round Trip	•	•	•	•
Loudness Rating SND/RCV	•	•	•	•
Frequency Response SND/RCV	•	•	•	•
Listening Speech Quality Stability SND/RCV	•	•	•	•
Idle Channel Noise SND/RCV	•	•	•	•
Distortion SND/RCV	•	•	•	•
Terminal Coupling Loss	•	•	•	•
Echo Level vs Time	•	•	•	•
Spectral Echo Attenuation	•	•	•	•
Initial Convergence without Background Noise	•	•	•	•
Initial Convergence with Background Noise	•	•	•	•
Echo performance with time variant Echo Path CSS/Speech	•	•	•	•
Activation SND/RCV	•	•	•	•
Attenuation Range during Double Talk SND/RCV	•	•	•	•
Detection of Echo Components during Double Talk	•	•	•	•
Sent Speech Attenuation during Double Talk	•	•	•	•
Relative Approach	•	•	•	•
Quality of Background Noise Transmission With Far/Near End Speech	•	•	•	•
Comfort Noise Injection	•	•	•	•
BGN Level, Lombard Effect Factor	•	•	•	•
U - Clock Drift	•	•	•	•
U - Listening Speech Quality POLQA	•	•	•	•
U - Pre. Speech Quality in the Presence of BGN LVL	•	•	•	•
U - Speech Quality in the Presence of BGN	•	•	•	•

SYSTEM REQUIREMENTS

P.1120 requires the following system components:

- **ACQUA** Communication Analysis System as one of the following versions:
 - Full-license (Code 6810)
 - Workplace (Code 6830, for post-analysis and documentation only)
 - Compact Systems (Code 6860.xx)
- **ACOPT 09** (Code 6819): **SLVM P.56** Active Speech Level according to ITU-T P.56. *Note: only required for chapter "Useful Measurements".*
- **ACOPT 17** (Code 6839): **Relative Approach**
- **ACOPT 30** (Code 6857): **POLQA** Perceptual Objective Listening Quality Analysis
- **ACOPT 32** (Code 6859): **Speech-based Double Talk**, Calculation of „Echo control characteristics“ based on 3GPP TS 26.132. *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.*

- **ACOPT 35** (Code 6866): **3QUEST Super-wideband/Fullband** according to ETSI TS 103 281, Model A. *Note: only required for chapter "Useful Measurements".*
- **HMS II.3-33 or II.3-34** (Code 1230.1 or 1230.2): HEAD Measurement System. *Note: Depending on DUT headset type, pinna type 3.3 or 3.4 required. For binaural test cases, additional left ear simulator HIS L (Code 1231) required.*
- **MFE VI.1** (Code 6462): USB Measurement Front End Analog with Integrated Power Amplifier
- **MFEVI-BEQ** (Code 6461): Option Binaural Equalization for MFE VI/VI.1
- **MFE VIII.1** (Code 6484): Reference Gateway
- **3PASS flex** (Code 6995), 3D Playback of Acoustic Sound Scenarios, including necessary components. *Alternatively: HAE-car* (Code 6970), Background noise simulation system, including necessary components. *Note: HAE-car is not recommended for distributed microphones and directional microphones.*

- **System simulator** with appropriate super-wideband and fullband speech codec (not provided by HEAD acoustics)

OPTIONS

- **ACOPT 20:** Quality Pie (Code 6843)
- **Rotating reflecting surface** according to ITU-T P.1120 (not provided by HEAD acoustics)

DELIVERY ITEMS

- **P.1120** Measurement standard, delivered as ACQUA database (Code 60043)
- **V2C file**
- **Manual** as PDF

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