ETSI ES 202 396-1 V1.10.1 (2026-01)

ETSI STANDARD

Speech and multimedia Transmission Quality (STQ);
Speech quality performance
in the presence of background noise;
Part 1: Background noise simulation technique
and background noise database

Reference
RES/STQ-313

Keywords
noise, performance, quality, speech

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Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° w061004871

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Contents

Intellectual Property Rights 5
Foreword 5
Modal verbs terminology 5
Introduction 5
1 Scope 7
2 References 7
2.1 Normative references 7
2.2 Informative references 8
3 Definition of terms, symbols and abbreviations 9
3.1 Terms 9
3.2 Symbols 9
3.3 Abbreviations 9
4 Overview of existing methods for realistic sound reproduction 9
4.1 Introduction 9
4.2 Surround Sound Techniques 10
4.3 IOSONO® 11
4.4 Eidophonie 11
4.5 Four-loudspeaker arrangement for playback of binaurally recorded signals 12
4.6 NTT Background-Noise Database 13
4.7 General conclusions 13
5 Recording arrangement 14
5.1 Binaural recordings 14
5.2 Equalization procedure 14
6 Loudspeaker Setup for Background Noise Simulation 16
6.1 Test Room Requirements 16
6.2 Loudspeaker Positioning 17
6.3 Equalization and Calibration 18
6.3.1 Overview 18
6.3.2 Separate equalization for each of the four loudspeakers 18
6.3.3 Separate level adjustment for each loudspeaker 20
6.3.4 Equalization for the two left-hand and the two right-hand loudspeakers 20
6.3.5 Equalization and level adjustment for the subwoofer 21
6.3.6 Delay compensation 21
6.3.7 Overall equalization for all loudspeakers 22
6.3.8 Troubleshooting failed equalizations 23
6.3.9 Automated equalization and calibration procedure 23
6.4 Accuracy of the reproduction arrangement 23
6.4.0 Introduction 23
6.4.1 Comparison between original sound field and simulated sound field 23
6.4.2 Displacement of the test arrangement in the simulated sound field 25
6.4.3 Transmission of background noise: Comparison of terminal performance in the original sound field and the simulated sound field 27
6.5 Simulation of additional acoustic conditions 30
7 Background Noise Simulation in cars 31
7.1 General setup 31
7.2 Recording arrangement 32
7.2.0 Introduction 32
7.2.1 Recording setup with the terminal's microphone 32
7.2.2 Recording setup with a pair of cardioid microphones 33
7.3 Equalization and calibration with the terminal's microphone 33
7.3.1 Overview 33
7.3.2 Separate equalization for each of the four loudspeakers 34

7.3.3 Separate level adjustment for each loudspeaker 36
7.3.4 Equalization for the two front and the two rear loudspeakers 36
7.3.5 Equalization and level adjustment for the subwoofer 37
7.3.6 Delay adjustment 37
7.3.7 Overall equalization 38
7.3.8 Troubleshooting failed equalizations 38
7.4 Equalization and Calibration with a pair of cardioid microphones 38
7.4.1 Overview 38
7.4.2 Pair-wise equalization for the left-hand loudspeakers 39
7.4.3 Separate level adjustment for the left-hand loudspeakers 41
7.4.4 Pair-wise equalization and separate level adjustment for the right-hand loudspeakers 41
7.4.5 Equalization and level adjustment for the subwoofer 41
7.4.6 Delay compensation 41
7.4.7 Overall equalization 42
7.4.8 Troubleshooting failed equalizations 42
7.5 Accuracy of the reproduction arrangement 43
7.5.1 Comparison between original sound field and simulated sound field 43
7.5.2 Transmission of background noise: Comparison of terminal performance in the original sound field and the simulated sound field 44
7.6 Automated equalization and calibration procedure 46

8 Background Noise Database 46
8.0 Introduction 46
8.1 Binaural signals 47
8.2 Binaural signals identical to the background noise recordings provided in ETSI TS 103 224 50
8.3 Stereophonic signals 51

Annex A (informative): Comparison of Tests in Sending Direction and D-Values Conducted in Different Rooms 53

A.0 Introduction 53
A.1 Test Setup 53
A.2 Results of the Tests 54
A.2.0 Introduction 54
A.2.1 Sending Frequency Response Characteristics and SLR 54
A.2.2 D-Value with Pink Noise 54
A.2.3 D-Value with Cafeteria Noise 55
A.3 Conclusions 55

Annex B (informative): Graphs of test results in Annex A 56

History 64

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Foreword

This ETSI Standard (ES) has been produced by ETSI Technical Committee Speech and multimedia Transmission Quality (STQ).

The present document is part 1 of a multi-part deliverable covering Speech and multimedia Transmission Quality (STQ); Speech quality performance in the presence of background noise, as identified below:

ETSI ES 202 396-1: "Background noise simulation technique and background noise database";

ETSI EG 202 396-2: "Background noise transmission - Network simulation - Subjective test database and results";

ETSI EG 202 396-3: "Background noise transmission - Objective test methods".

Modal verbs terminology

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Introduction

Background noise is present in most of the conversations today. Background noise may impact the speech communication performance to terminal and network equipment significantly. Therefore testing and optimization of such equipment is necessary using realistic background noises. Furthermore reproducible conditions for the tests are required which can be guaranteed only under lab type condition.

The present document addresses this issue by describing a methodology for recording and playback of background noises under well-defined and calibratable conditions in a lab-type environment. Furthermore a database with real background noises is included.

1 Scope

The quality of background noise transmission is an important factor, which significantly contributes to the perceived overall quality of speech. Both existing and, even more notably, the new generation of terminals, networks and system configurations, including broadband services, can be greatly improved when designed properly, with consideration and presence of background noise. The present document:

- describes a noise simulation environment using realistic background noise scenarios for laboratory use;
- contains a database including the relevant background noise samples for subjective and objective evaluation.

The present document provides information about the recording techniques needed for background noise recordings and discusses the advantages and drawbacks of existing methods. Additionally, the present document describes the requirements for laboratory conditions. The loudspeaker setup and the loudspeaker calibration and equalization procedure are described. The simulation environment specified can be used for the evaluation and optimization of terminals and of complex configurations including terminals, networks and other configurations. The main application areas should be: office, home and car environment.

The setup and database as described in the present document are applicable for:

- Objective performance evaluation of terminals in different (simulated) background noise environments.
- Speech processing evaluation by using the pre-processed speech signal in the presence of background noise, recorded by a terminal.
- Subjective evaluation of terminals by performing conversational tests, specific double talk tests or talking and listening tests in the presence of background noise.
- Subjective evaluation in third party listening tests by recording the speech samples of terminals in the presence of background noise.

2 References

2.1 Normative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

Referenced documents which are not found to be publicly available in the expected location might be found in the ETSI docbox.

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The following referenced documents are necessary for the application of the present document.

[1] Recommendation ITU-T P.57: "Artificial ears".

[2] Recommendation ITU-T P.58: "Head and torso simulator for telephonometry".

[3] ETSI TS 103 224: "Speech and multimedia Transmission Quality (STQ); A sound field reproduction method for terminal testing including a background noise database".