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Contents

Intellectual Property Rights 2
Legal Notice 2
Modal verbs terminology 2
Foreword 9
Introduction 9
1 Scope 10
2 References 10
3 Definitions, symbols and abbreviations 12
3.1 Definitions 12
3.2 Abbreviations 12
4 Interfaces 13
5 Test configurations 14
5.1 Setup for terminals 14
5.1.1 Setup for handset terminals 15
5.1.2 Setup for headset terminals 15
5.1.3 Setup for hands-free terminals 16
5.1.3.1 Vehicle-mounted hands-free 16
5.1.3.2 Desktop hands-free 17
5.1.3.3 Hand-held hands-free 17
5.1.3.4 Softphone including speakers and microphone 18
5.1.3.5 Softphone with separate speakers 21
5.1.4 Position and calibration of HATS 25
5.1.5 Test setup for quality in the presence of ambient noise measurements 25
5.1.5.1 Handset 25
5.1.5.2 Hand-held hands-free 26
5.2 Setup of the electrical interfaces 28
5.2.1 Codec approach and specification 28
5.2.2 Direct digital processing approach 29
5.3 Accuracy of test equipment 30
5.4 Test signals 31
5.5 Void 32
5.5.1 Void 32
5.5.2 Void 32
6 Test conditions 32
6.1 Environmental conditions 32
6.1.1 Handset and headset terminals 32
6.1.2 Hands-free terminals 32
6.2 System simulator conditions 33
7 Narrowband telephony transmission performance test methods 33
7.1 Applicability 33
7.2 Overall loss/loudness ratings 33
7.2.1 General 33
7.2.2 Connections with handset UE 34
7.2.2.1 Sending loudness rating (SLR) 34
7.2.2.2 Receiving loudness rating (RLR) 34
7.2.2.3 Receiving loudness rating (RLR) in the presence of background noise 34
7.2.3 Connections with desktop and vehicle-mounted hands-free UE 35
7.2.3.1 Sending loudness rating (SLR) 35
7.2.3.2 Receiving Loudness Rating (RLR) 36
7.2.4 Connections with hand-held hands-free UE 36
7.2.4.1 Sending loudness rating (SLR) 36

iTeh STANDARD PREVIEW
(standards.iteh.ai)
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https://standards.iteh.ai/catalog/standards/sist/0dc03b7a-80a0-405c-ba22-dc4b36f42ecc/etsi-ts-126-132-v15.2.0-2019-10

7.2.4.2 Receiving loudness rating (RLR) 36
7.2.5 Connections with headset UE 37
7.3 Idle channel noise (handset and headset UE) 37
7.3.1 Sending 37
7.3.2 Receiving 38
7.4 Sensitivity/frequency characteristics 38
7.4.1 Handset and headset UE sending 38
7.4.2 Handset and headset UE receiving 38
7.4.3 Desktop and vehicle-mounted hands-free UE sending 39
7.4.4 Desktop and vehicle-mounted hands-free UE receiving 39
7.4.5 Hand-held hands-free UE sending 39
7.4.6 Hand-held hands-free UE receiving 39
7.5 Sidetone characteristics 40
7.5.1 Connections with handset UE 40
7.5.1.1 void 40
7.5.1.2 Connections with handset UE – HATS method 40
7.5.2 Headset UE 40
7.5.3 Hands-free UE (all categories) 41
7.5.4 Sidetone delay for handset or headset 41
7.6 Stability loss 41
7.7 Acoustic echo control 43
7.7.1 General 43
7.7.2 Acoustic echo control in a hands-free UE 43
7.7.3 Acoustic echo control in handset UE 43
7.7.4 Acoustic echo control in a headset UE 43
7.8 Distortion 43
7.8.1 Sending distortion 43
7.8.2 Receiving 45
7.9 Void 46
7.10 Delay 46
7.10.0 UE Delay Measurement Methodologies 46
7.10.1 Delay in sending direction (Handset UE) 46
7.10.1a Delay in sending direction (headset UE) 47
7.10.2 Delay in receiving direction (handset UE) 48
7.10.2a Delay in receiving direction (headset UE) 49
7.10.3 Delay in sending + receiving direction using "echo" method (handset UE) 49
7.10.3a Delay in sending + receiving direction using "echo" method (headset UE) 51
7.10.4 Delay and speech quality in conditions with packet arrival time variations and packet loss 51
7.10.4.1 Delay in sending direction 51
7.10.4.2 Delay in receiving direction 51
7.10.4.3 Speech quality loss in conditions with packet arrival time variations and packet loss 52
7.10.5 UE send clock accuracy 53
7.10.6 UE receiving with clock skew 53
7.11 Echo control characteristics 53
7.11.1 Test set-up and test signals 53
7.11.2 Test method 54
7.11.2.1 Signal alignment 55
7.11.2.2 Signal level computation and frame classification 55
7.11.2.3 Classification into categories 55
7.12 Quality (speech quality, noise intrusiveness) in the presence of ambient noise 55
7.12.1 Handset 55
7.12.2 Hand-held hands-free 57
7.13 Jitter buffer management behaviour 58
7.13.0 General 58
7.13.1 Delay histogram 58
7.13.2 Speech quality loss histogram 59

8 Wideband telephony transmission performance test methods 60
8.1 Applicability 60
8.2 Overall loss/loudness ratings 60
8.2.1 General 60
8.2.2 Connections with handset UE 60

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8.2.2.1 Sending loudness rating (SLR) 60
8.2.2.2 Receiving loudness rating (RLR) 60
8.2.2.3 Receiving loudness rating (RLR) in the presence of background noise 61
8.2.3 Connections with desktop and vehicle-mounted hands-free UE 61
8.2.3.1 Sending loudness rating (SLR) 62
8.2.3.2 Receiving loudness rating (RLR) 62
8.2.4 Connections with hand-held hands-free UE 62
8.2.4.1 Sending loudness rating (SLR) 62
8.2.4.2 Receiving loudness rating (RLR) 63
8.2.5 Connections with headset UE 63
8.3 Idle channel noise (handset and headset UE) 63
8.3.1 Sending 63
8.3.2 Receiving 64
8.4 Sensitivity/frequency characteristics 64
8.4.1 Handset and headset UE sending 64
8.4.2 Handset and headset UE receiving 64
8.4.3 Desktop and vehicle-mounted hands-free UE sending 65
8.4.4 Desktop and vehicle-mounted hands-free UE receiving 65
8.4.5 Hand-held hands-free UE sending 65
8.4.6 Hand-held hands-free UE receiving 66
8.5 Sidetone characteristics 66
8.5.1 Connections with handset UE 66
8.5.2 Headset UE 66
8.5.3 Hands-free UE (all categories) 67
8.5.4 Sidetone delay for handset or headset 67
8.6 Stability loss 67
8.7 Acoustic echo control 69
8.7.1 General 69
8.7.2 Acoustic echo control in a hands-free UE 69
8.7.3 Acoustic echo control in a handset UE 69
8.7.4 Acoustic echo control in a headset UE 69
8.8 Distortion 69
8.8.1 Sending distortion 69
8.8.2 Receiving 71
8.9 Void 72
8.10 Delay 72
8.10.0 UE Delay Measurement Methodologies 72
8.10.1 Delay in sending direction (handset UE) 73
8.10.1a Delay in sending direction (headset UE) 73
8.10.2 Delay in receiving direction (handset UE) 74
8.10.2a Delay in receiving direction (headset UE) 75
8.10.3 Delay in sending + receiving direction using "echo" method (handset UE) 75
8.10.3a Delay in sending + receiving direction using "echo" method (headset UE) 77
8.10.4 Delay and speech quality in conditions with packet arrival time variations and packet loss 77
8.10.4.1 Delay in sending direction 77
8.10.4.2 Delay in receiving direction 77
8.10.4.3 Speech quality loss in conditions with packet arrival time variations and packet loss 78
8.10.5 UE send clock accuracy 79
8.10.6 UE receiving with clock skew 79
8.11 Echo control characteristics 79
8.11.1 Test set-up and test signals 79
8.11.2 Test method 80
8.11.2.1 Signal alignment 81
8.11.2.2 Signal level computation and frame classification 81
8.11.2.3 Classification into categories 81
8.12 Quality (speech quality, noise intrusiveness) in the presence of ambient noise 82
8.12.1 Handset 82
8.12.2 Hand-held hands-free 83
8.13 Jitter buffer management behaviour 84
8.13.0 General 84
8.13.1 Delay histogram 84
8.13.2 Speech quality loss histogram 85

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9 Super-wideband telephony transmission performance test methods 86
9.1 Applicability 86
9.2 Overall loss/loudness ratings 86
9.2.1 General 86
9.2.2 Connections with handset UE 86
9.2.2.1 Sending loudness rating (SLR) 86
9.2.2.2 Receiving loudness rating (RLR) 86
9.2.2.3 Receiving loudness rating (RLR) in the presence of background noise 86
9.2.3 Connections with desktop and vehicle-mounted hands-free UE 87
9.2.3.1 Sending loudness rating (SLR) 87
9.2.3.2 Receiving loudness rating (RLR) 87
9.2.4 Connections with hand-held hands-free UE 87
9.2.4.1 Sending loudness rating (SLR) 87
9.2.4.2 Receiving loudness rating (RLR) 87
9.2.5 Connections with headset UE 87
9.3 Idle channel noise (handset and headset UE) 87
9.3.1 Sending 87
9.3.2 Receiving 88
9.4 Sensitivity/frequency characteristics 88
9.4.0 General 88
9.4.1 Handset and headset UE sending 88
9.4.1.1 Handset UE sending 88
9.4.1.2 Headset UE sending 89
9.4.2 Handset and headset UE receiving 89
9.4.2.1 Handset UE receiving 89
9.4.2.2 Headset UE receiving 89
9.4.3 Desktop and vehicle-mounted hands-free UE sending 89
9.4.4 Desktop and vehicle-mounted hands-free UE receiving 90
9.4.5 Hand-held hands-free UE sending 90
9.4.6 Hand-held hands-free UE receiving 90
9.5 Sidetone characteristics 91
9.5.1 Connections with handset UE 91
9.5.2 Headset UE 91
9.5.3 Hands-free UE (all categories) 91
9.5.4 Sidetone delay for handset or headset 91
9.6 Stability loss 91
9.7 Acoustic echo control 92
9.7.1 General 92
9.7.2 Acoustic echo control in a hands-free UE 92
9.7.3 Acoustic echo control in a handset UE 93
9.7.4 Acoustic echo control in a headset UE 93
9.8 Distortion 93
9.8.1 Sending distortion 93
9.8.2 Receiving 93
9.9 Void 93
9.10 Delay 93
9.10.0 UE Delay Measurement Methodologies 93
9.10.1 Delay in sending direction (handset UE) 93
9.10.1a Delay in sending direction (headset UE) 94
9.10.2 Delay in receiving direction (handset UE) 94
9.10.2a Delay in receiving direction (headset UE) 94
9.10.3 Delay in sending + receiving direction using "echo" method (handset UE) 94
9.10.3a Delay in sending + receiving direction using "echo" method (headset UE) 94
9.10.4 Delay and speech quality in conditions with packet arrival time variations and packet loss 94
9.10.4.1 Delay in sending direction 94
9.10.4.2 Delay in receiving direction 94
9.10.4.3 Speech quality loss in conditions with packet arrival time variations and packet loss 95
9.10.5 UE send clock accuracy 95
9.10.6 UE receiving with clock skew 96
9.11 Echo control characteristics 96
9.11.1 Test set-up and test signals 96
9.11.2 Test method 96

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https://standards.iteh.ai/catalog/standards/sist/adc83b7a-80a0-4d1c-ba22-de4b36f42ece/etsi-ts-126-132-v15.2.0-2019-10

9.11.2.1 Signal alignment 96
9.11.2.2 Signal level computation and frame classification 96
9.11.2.3 Classification into categories 96
9.12 Quality (speech quality, noise intrusiveness) in the presence of ambient noise 96
9.12.1 Handset 96
9.12.2 Hand-held hands-free 98
9.13 Jitter buffer management behaviour 99
9.13.0 General 99
9.13.1 Delay histogram 99
9.13.2 Speech quality loss histogram 100

10 Fullband telephony transmission performance test methods 101
10.1 Applicability 101
10.2 Overall loss/loudness ratings 101
10.2.1 General 101
10.2.2 Connections with handset UE 101
10.2.2.1 Sending loudness rating (SLR) 101
10.2.2.2 Receiving loudness rating (RLR) 101
10.2.2.3 Receiving loudness rating (RLR) in the presence of background noise 101
10.2.3 Connections with desktop and vehicle-mounted hands-free UE 101
10.2.3.1 Sending loudness rating (SLR) 101
10.2.3.2 Receiving loudness rating (RLR) 102
10.2.4 Connections with hand-held hands-free UE 102
10.2.4.1 Sending loudness rating (SLR) 102
10.2.4.2 Receiving loudness rating (RLR) 102
10.2.5 Connections with headset UE 102
10.3 Idle channel noise (handset and headset UE) 102
10.3.1 Sending 102
10.3.2 Receiving 102
10.4 Sensitivity/frequency characteristics 103
10.4.0 General 103
10.4.1 Handset and headset UE sending 103
10.4.2 Handset and headset UE receiving 103
10.4.3 Desktop and vehicle-mounted hands-free UE sending 103
10.4.4 Desktop and vehicle-mounted hands-free UE receiving 103
10.4.5 Hand-held hands-free UE sending 103
10.4.6 Hand-held hands-free UE receiving 103
10.5 Sidetone characteristics 103
10.5.1 Connections with handset UE 103
10.5.2 Headset UE 103
10.5.3 Hands-free UE (all categories) 103
10.5.4 Sidetone delay for handset or headset 103
10.6 Stability loss 104
10.7 Acoustic echo control 105
10.7.1 General 105
10.7.2 Acoustic echo control in a hands-free UE 105
10.7.3 Acoustic echo control in a handset UE 105
10.7.4 Acoustic echo control in a headset UE 106
10.8 Distortion 106
10.8.1 Sending distortion 106
10.8.2 Receiving 106
10.9 Void 106
10.10 Delay 106
10.10.0 UE Delay Measurement Methodologies 106
10.10.1 Delay in sending direction (handset UE) 106
10.10.1a Delay in sending direction (headset UE) 106
10.10.2 Delay in receiving direction (handset UE) 106
10.10.2a Delay in receiving direction (headset UE) 106
10.10.3 Delay in sending + receiving direction using "echo" method (handset UE) 106
10.10.3a Delay in sending + receiving direction using "echo" method (headset UE) 107
10.10.4 Delay and speech quality in conditions with packet arrival time variations and packet loss 107
10.10.4.1 Delay in sending direction 107

iTeh STANDARD PREVIEW
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Full standard:
https://standards.iteh.ai/catalog/standards/sist/0dc03b7a-80a0-405c-ba22-dc4b36f2ee/etsi-ts-126-132-v15.2.0-2019-10

10.10.4.2 Delay in receiving direction 107
10.10.4.3 Speech quality loss in conditions with packet arrival time variations and packet loss 107
10.10.5 UE send clock accuracy 107
10.10.6 UE receiving with clock skew 107
10.11 Echo control characteristics 107
10.11.1 Test set-up and test signals 107
10.11.2 Test method 107
10.11.2.1 Signal alignment 107
10.11.2.2 Signal level computation and frame classification 107
10.11.2.3 Classification into categories 107
10.12 Quality (speech quality, noise intrusiveness) in the presence of ambient noise 108
10.12.1 Handset 108
10.12.2 Hand-held hands-free 108
10.13 Jitter buffer management behaviour 108

Annex A (informative): Void 109

Annex B (informative): Reference algorithm for echo control characteristics evaluation. 110

B.1 General 110

B.2 Test script 111

B.3 Reference algorithm 112
B.3.1 Main algorithm 112
B.3.2 Delay compensation 114
B.3.3 Signal level computation and frame classification 114
B.3.4 Level vs time computation 117
B.3.5 Categorization 118
B.3.6 Auxiliary functions for reporting data 120
B.3.7 Other helper functions 121

Annex C (informative): Measurement method for determining the one way radio delays of LTE radio network simulators 123

C.1 Measurement setup 123

Annex D (normative): Clock skew measurement 124

D.1 Test procedure 124

D.2 Clock skew estimation algorithm 124

Annex E (normative): Packet delay and loss profiles for UE delay testing of MTSI-based speech with LTE access 126

E.1 General 126

E.2 Simulation model for generating packed delay and loss profiles 126

E.3 Packet delay and loss profiles for simulated stationary operating conditions with DRX 20 ms and DRX 40 ms 129

Annex F (normative): Packet delay and loss profiles for jitter buffer management behaviour 130

F.1 General 130

F.2 Packet delay and loss profiles 130

Annex G (informative): Change history 132

History 135

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https://standards.iteh.ai/catalog/standards/sist/08c03b7a-80ad-405c-ba22-d6ab36f42ecc/etsi-ts-126-132-v15.2.0-2019-10

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This Technical Specification has been produced by the 3GPP.

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Introduction

The present document specifies test methods to allow the minimum performance requirements for the acoustic characteristics of GSM, 3G, LTE and WLAN terminals when used to provide narrowband, wideband, super-wideband or fullband telephony to be assessed.

The objective for narrowband services is to reach a quality as close as possible to ITU-T standards for PSTN circuits. However, due to technical and economic factors, there cannot be full compliance with the general characteristics of international telephone connections and circuits recommended by the ITU-T.

The performance requirements are specified in TS 26.131; the test methods and considerations are specified in the main body of the text.

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1 Scope

The present document is applicable to any terminal capable of supporting narrowband, wideband, super-wideband or fullband telephony, either as a stand-alone service or as the telephony component of a multimedia service. The present document specifies test methods to allow the minimum performance requirements for the acoustic characteristics of GSM, 3G, LTE and WLAN terminals when used to provide narrowband, wideband, super-wideband or fullband telephony to be assessed.

NOTE For 3G, LTE and WLAN, acoustic requirements are specified in TS 26.131, test methods are specified in TS 26.132. For GSM, most acoustic requirements are specified in TS 43.050, test methods are specified in TS 51.010. These specifications are in many cases harmonized with or even refer to TS 26.131 and TS 26.132. See TS 43.050 and TS 51.010 for details. The reason for including GSM, UMTS, LTE and WLAN terminals within the scope of the present specification is to avoid, whenever possible, duplication of test method descriptions for terminals supporting multiple access technologies..

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
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- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TS 26.131: "Terminal Acoustic Characteristics for Telephony; Requirements".

[2] ITU-T Recommendation B.12 (1988): "Use of the decibel and the neper in telecommunications".

[3] ITU-T Recommendation G.103 (1998): "Hypothetical reference connections".

[4] ITU-T Recommendation G.111 (1993): "Loudness ratings (LRs) in an international connection".

[5] ITU-T Recommendation G.121 (1993): "Loudness ratings (LRs) of national systems".

[6] ITU-T Recommendation G.122 (1993): "Influence of national systems on stability and talker echo in international connections".

[7] Void.

[8] ITU-T Recommendation P.11 (1993): "Effect of transmission impairments".

[9] ITU-T Recommendation P.38 (1993): "Transmission characteristics of operator telephone systems (OTS)".

[10] ITU-T Recommendation P.50 (1993): "Artificial voices".

[11] 3GPP TS 43.058 : "Digital Cellular Telecommunications System Characterization test methods and quality assessment for hands-free mobiles".

[12] IEC Publication 60651: "Sound Level Meters".

[13] ITU-T Recommendation P.51 (1996): "Artificial mouth".

[14] ITU-T Recommendation P.57 (12/2011): "Artificial ears".

[15] ITU-T Recommendation P.58 (05/2013): "Head and torso simulator for telephonometry."

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[16] ITU-T Recommendation P.79 (11/2007) with Annex A: "Calculation of loudness ratings for telephone sets."

[17] 3GPP TS 46.077 : "Minimum Performance Requirements for Noise Suppresser Application to the AMR Speech Encoder".

[18] ITU-T Recommendation P.64 (11/2007): "Determination of sensitivity/frequency characteristics of local telephone systems".

[19] ITU-T Recommendation P.581 (02/2014): "Use of head and torso simulator (HATS) for hands-free and handset terminal testing".

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[25] Void.

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[36] ETSI EG 202 396-3 (2011-02) V1.3.1: "Speech quality performance in the presence of background noise; Part 3: *Background noise transmission – objective test methods*: Background noise simulation technique and background noise database".

[37] ITU-T Recommendation P.56 (12/2011): "Objective measurement of active speech level".

[38] IEC 61672: "Electroacoustics – sound level meters - part 1: specifications".

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[42] 3GPP TS 23.203: "Policy and charging control architecture".

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[45] ITU-T Recommendation P.863.1 (09/2014): "Application guide for Recommendation ITU-T P.863".

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3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document the terms *narrowband, wideband, super-wideband and fullband* refer to signals associated with the corresponding operating modes of the speech codecs specified in 5.2.

For the purposes of the present document, the terms dB, dBr, dBm0, dBm0p and dBA, shall be interpreted as defined in ITU-T Recommendation G.100 [42]; the term dBPa shall be interpreted as the sound pressure level relative to 1 pascal expressed in dB (0 dBPa is equivalent to 94 dB SPL).

A 3GPP softphone is a telephony system running on a general purpose computer or PDA complying with the 3GPP terminal acoustic requirements (TS 26.131 and 26.132).

For the purposes of the present document the term *clock skew* is defined as the difference between the clock of the device under test (C_{DUT}) and the clock of the reference client (C_{REF}). The skew of C_{DUT} relative to C_{REF} is defined in parts per million (PPM) as: $(C_{DUT} - C_{REF}).10^6 / C_{REF}$.

3.2 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [47] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in 3GPP TR 21.905 [47].

ADC Analogue to Digital Converter
AMR Adaptive Multi Rate
CSS Composite Source Signal
DAC Digital to Analogue Converter
DRP Eardrum Reference Point
DTX Discontinuous Transmission
EEC Electrical Echo Control