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Digital Enhanced Cordless Telecommunications (DECT); Test specification; Part 2: Audio and speech

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This standard includes the English version of the European Standard.

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Contents

Intellectual Property Rights	16
Foreword.....	16
Modal verbs terminology.....	17
1 Scope	18
2 References	19
2.1 Normative references	19
2.2 Informative references.....	22
3 Definition of terms, symbols and abbreviations.....	24
3.1 Terms.....	24
3.2 Symbols.....	27
3.3 Abbreviations	27
4 Interpretation of the measurement results	29
5 General test requirements.....	30
5.0 General	30
5.1 Test philosophy	30
5.1.1 Testable items	30
5.1.2 Testing of the codecs	30
5.1.3 Testing of the audio types.....	30
5.1.4 Devices with analog line interfaces	31
5.1.5 Equipment supporting an ETSI approved profile	31
5.1.6 Equipment not supporting an ETSI approved profile	32
5.1.7 Applicant's declaration.....	32
6 General testing conditions	32
6.1 Acoustical environment.....	32
6.2 Lower Tester (LT).....	33
6.2.1 Description.....	33
6.2.2 Connections between the EUT and the LT	33
6.2.3 Functions and abilities	33
6.2.4 Accuracy of measurements and test signal generation	33
6.3 Power and environment.....	34
6.3.1 Environment for tests.....	34
6.3.2 Power supply limitations	34
6.3.3 Power source.....	34
6.4 Test configurations	34
6.4.1 General.....	34
6.4.2 Testing a DECT system	35
6.4.3 Testing a separate PP or FP	35
6.4.4 Reference FP (ReFP) and Reference PP (RePP).....	36
6.5 Digital signal levels	37
6.5.1 Digital signal levels for codecs G.711 and G.726.....	37
6.6 General test conditions	37
6.7 Ideal codecs (for codecs G.726, G.711, G.722, G.729.1, MPEG-AAC and LC3plus).....	38
6.7.0 General.....	38
6.7.1 Ideal codec for codecs G.726, G.711 and LC3plus in NB mode	38
6.7.2 Ideal codec for codecs G.722, G.729.1, MPEG-4 and LC3plus (wideband mode)	39
6.7.3 Ideal codec for MPEG-4 or LC3plus (super-wideband mode)	40
6.7.4 Ideal codec for LC3plus in fullband, FBHR, FBLFE or ultra-band mode.....	40
6.8 Electro-acoustical equipment	40
6.8.0 General.....	40
6.8.1 Artificial mouth and artificial ear	40
6.8.2 Head And Torso Simulator (HATS)	40
6.9 Speech coding scheme.....	41
6.9.1 Requirement for speech coding algorithm	41

6.9.2	Applicant's declaration on speech coding algorithm.....	41
6.9.3	Requirement for the TAP in the FP	41
6.9.4	Applicant's declaration on the TAP in the FP	41
6.10	Test setup.....	41
6.10.1	Set-up for handset type 1a or 1b	41
6.10.2	Set-up for handset type 2a	41
6.10.3	Set-up for handset or headset other than type 1a, 1b or 2a	42
6.10.3.0	Super-wideband and fullband applications	42
6.10.3.1	Positioning handset or headset	42
6.10.3.2	Position and calibration of HATS	42
6.10.4	Set-up for hands-free measurements.....	43
6.10.4.0	Super-wideband and fullband applications	43
6.10.4.1	Positioning handsfree	44
6.10.4.2	Position and calibration of HATS	50
6.10.4.2.1	Sending.....	50
6.10.4.2.2	Receiving.....	50
6.10.5	Set-up for measurements in loudspeaking mode	51
6.10.6	Setup for background noise simulation.....	51
6.10.7	Setup of variable echo path.....	52
6.10.8	Setup for testing positional robustness of handsets.....	54
7	Test of audio specifications.....	55
7.1	Overall description	55
7.1.1	Introduction to DECT audio specifications	55
7.1.2	Introduction to the audio types	55
7.1.3	List of Audio types	56
7.1.4	Audio types for Portable Parts.....	57
7.1.5	Audio types for Fixed Parts	58
7.1.6	Complete DECT system	58
7.1.7	Structure of the specification of the audio types.....	59
7.1.8	Audio Types and codecs.....	66
7.1.9	Audio Types and physical interfaces	67
7.2	Audio types applicable to Portable Parts.....	67
7.2.0	General.....	67
7.2.1	Performance levels of DECT Portable Parts (handsets).....	67
7.2.2	Type 0: Reference PP (RePP).....	68
7.2.3	PP Type 1a: "Classic" GAP narrowband handset	69
7.2.3.1	Introduction.....	69
7.2.3.2	Compatible services and codecs.....	69
7.2.3.3	Specification.....	69
7.2.4	PP Type 1b: "Improved" GAP narrowband handset.....	69
7.2.4.1	Introduction.....	69
7.2.4.2	Compatible services and codecs.....	69
7.2.4.3	Specification.....	70
7.2.5	PP Type 1c: HATS-tested "standard" narrowband handset	70
7.2.5.1	Introduction.....	70
7.2.5.2	Compatible services and codecs.....	70
7.2.5.3	Specification.....	70
7.2.6	PP Type 1d: HATS-tested "improved" narrowband handset	70
7.2.6.1	Introduction.....	70
7.2.6.2	Compatible services and codecs.....	70
7.2.6.3	Specification.....	71
7.2.7	PP Type 3a: HATS tested narrowband "standard" loudspeaking handsfree	71
7.2.7.1	Introduction.....	71
7.2.7.2	Compatible services and codecs.....	71
7.2.7.3	Specification.....	71
7.2.8	PP Type 3b: HATS tested narrowband "improved" loudspeaking handsfree	71
7.2.8.1	Introduction.....	71
7.2.8.2	Compatible services and codecs.....	72
7.2.8.3	Specification.....	72
7.2.9	PP Type 2a: P.311-tested wideband handset.....	72
7.2.9.1	Introduction.....	72

7.2.9.2	Compatible services and codecs.....	72
7.2.9.3	Specification.....	72
7.2.10	PP Type 2b: HATS-tested "standard" wideband handset or headset	72
7.2.10.1	Introduction.....	72
7.2.10.2	Compatible services and codecs.....	72
7.2.10.3	Specification.....	72
7.2.11	PP Type 2c: HATS tested "improved" wideband handset or headset.....	73
7.2.11.1	Introduction.....	73
7.2.11.2	Compatible services and codecs.....	73
7.2.11.3	Specification.....	73
7.2.12	PP Type 4a: HATS tested wideband "standard" loudspeaking handsfree	73
7.2.12.1	Introduction.....	73
7.2.12.2	Compatible services and codecs.....	73
7.2.12.3	Specification.....	74
7.2.13	PP Type 4b: HATS tested wideband "improved" loudspeaking and handsfree.....	74
7.2.13.1	Introduction.....	74
7.2.13.2	Compatible services and codecs.....	74
7.2.13.3	Specification.....	74
7.2.14	PP Type 5a: super-wideband 14 kHz handset or headset.....	74
7.2.14.1	Introduction.....	74
7.2.14.2	Compatible services and codecs.....	74
7.2.14.3	Specification.....	74
7.2.15	PP Type 5b: super-wideband 14 kHz loudspeaking handsfree	74
7.2.15.1	Introduction.....	74
7.2.15.2	Compatible services and codecs.....	74
7.2.15.3	Specification.....	75
7.2.16	PP Type 6: PPs with external 2 wire, 3,1 kHz telephony interface.....	75
7.2.16.1	Introduction.....	75
7.2.16.2	Compatible services and codecs.....	75
7.2.16.3	Specification.....	75
7.2.17	PP Type 7a: fullband 20 kHz handset or headset.....	75
7.2.17.1	Introduction.....	75
7.2.17.2	Compatible services and codecs.....	75
7.2.17.3	Specification.....	75
7.2.18	PP Type 7b: fullband 20 kHz loudspeaking handsfree	75
7.2.18.1	Introduction.....	75
7.2.18.2	Compatible services and codecs.....	75
7.2.18.3	Specification.....	75
7.2.19	PP Types 7c, d, e, f: fullband 20 kHz stereo audio device.....	76
7.2.19.1	Introduction.....	76
7.2.19.2	Compatible services and codecs.....	76
7.2.19.3	Specification.....	76
7.2.20	PP Type 7g: FBHR 24 kHz headset device	76
7.2.20.1	Introduction.....	76
7.2.20.2	Compatible services and codecs.....	76
7.2.20.3	Specification.....	76
7.2.21	PP Type 7h: FBHR 24 kHz loudspeaking device	76
7.2.21.1	Introduction.....	76
7.2.21.2	Compatible services and codecs.....	76
7.2.21.3	Specification.....	76
7.2.22	PP Type 7i: FBLFE 250 Hz loudspeaking device	77
7.2.22.1	Introduction.....	77
7.2.22.2	Compatible services and codecs.....	77
7.2.22.3	Specification.....	77
7.2.23	PP Type 7j: fullband 20 kHz low-latency microphone device.....	77
7.2.23.1	Introduction.....	77
7.2.23.2	Compatible services and codecs.....	77
7.2.23.3	Specification.....	77
7.2.24	PP Type 8a: ultra-band 48 kHz headset device.....	77
7.2.24.1	Introduction.....	77
7.2.24.2	Compatible services and codecs.....	77
7.2.24.3	Specification.....	77

7.2.25	PP Type 8b: ultra-band 48 kHz loudspeaking device	77
7.2.25.1	Introduction	77
7.2.25.2	Compatible services and codecs	78
7.2.25.3	Specification	78
7.3	Audio transmission types applicable to Fixed Parts	78
7.3.0	General	78
7.3.1	FP Type 0: Reference FP (ReFP)	78
7.3.2	FP Type 1a: "classical" Fixed Part for ISDN Network	79
7.3.2.1	Introduction	79
7.3.2.2	Compatible services and codecs	79
7.3.2.3	Specifications	79
7.3.2.3.1	Transcoding and equalization	79
7.3.2.3.2	PP Type detection	80
7.3.2.3.3	Activation of audio processing functions	80
7.3.2.3.4	Transmission specification	80
7.3.3	FP Type 1b: Fixed Part for ISDN Network	80
7.3.3.1	Introduction	80
7.3.3.2	Compatible services and codecs	80
7.3.3.3	Specification	81
7.3.3.3.1	Transcoding and equalization	81
7.3.3.3.2	PP Type detection	81
7.3.3.3.3	Activation of audio processing functions	81
7.3.3.3.4	Transmission specification	82
7.3.4	FP Type 2: FP with analog 2-wire interface, 3,1 kHz service	82
7.3.4.1	Introduction	82
7.3.4.2	Compatible services, physical interfaces and codecs	82
7.3.4.3	Specification	82
7.3.4.3.1	Transcoding, equalization and conversion	82
7.3.4.3.2	PP Type detection and activation of audio processing functions	82
7.3.4.3.3	Transmission specification	83
7.3.5	FP Type 3: VoIP narrowband Fixed Part	83
7.3.5.1	Introduction	83
7.3.5.2	Compatible services, physical interfaces and codecs	83
7.3.5.3	Specification	84
7.3.5.3.1	Transcoding and equalization	84
7.3.5.3.2	PP Type detection	84
7.3.5.3.3	Activation of audio processing functions	84
7.3.5.3.4	Transmission specification	85
7.3.6	FP Type 4: ISDN wideband Fixed Part	85
7.3.6.1	Introduction	85
7.3.6.2	Compatible services and codecs	85
7.3.6.3	Specification	85
7.3.6.3.1	Transcoding and equalization	85
7.3.6.3.2	PP Type detection	85
7.3.6.3.3	Activation of audio processing functions	86
7.3.6.3.4	Transmission specification	86
7.3.7	FP Type 5: VoIP wideband, super-wideband, fullband, FBHR or ultra-band Fixed Part	86
7.3.7.1	Introduction	86
7.3.7.2	Compatible services, physical interfaces and codecs	86
7.3.7.3	Specification	87
7.3.7.3.1	Transcoding and equalization	87
7.3.7.3.2	PP type detection	87
7.3.7.3.3	Activation of audio processing functions	88
7.3.7.3.4	Transmission specification	88
7.3.8	FP Type 6a: FP handling an Internal call inside a DECT FP (any service)	88
7.3.8.1	Introduction	88
7.3.8.2	Compatible services, physical interfaces and codecs	88
7.3.8.3	Specification	88
7.3.9	FP Type 6b: FP handling an n-party conference inside a DECT FP (any service)	89
7.3.9.1	Introduction	89
7.3.9.2	Compatible services, physical interfaces and codecs	89
7.3.9.3	Specification for the conference bridge	89

7.3.10	FP Type 7: DECT Repeater Part (REP).....	89
7.3.10.1	Introduction.....	89
7.3.10.2	Compatible services, physical interfaces and codecs.....	89
7.3.10.3	Specification.....	89
7.4	Additional features.....	90
7.4.1	Introduction.....	90
7.4.2	Echo canceller in Fixed Part.....	90
7.4.3	Echo suppressor in Fixed Part.....	91
7.5	Transmission characteristics for Portable Parts.....	91
7.5.1	Transmission characteristics for Portable Part type 1a ("Classic GAP" handset).....	91
7.5.1.1	PP frequency responses.....	91
7.5.1.1.1	Sending.....	91
7.5.1.1.2	Receiving.....	92
7.5.1.2	PP sending and receiving loudness ratings.....	92
7.5.1.2.1	Nominal values.....	92
7.5.1.2.2	User-controlled volume control in PP.....	93
7.5.1.2.3	PP adaptive volume control.....	94
7.5.1.3	Sidetone.....	94
7.5.1.3.1	Talker sidetone.....	94
7.5.1.3.2	Listener sidetone.....	95
7.5.1.4	Terminal coupling loss.....	96
7.5.1.4.1	Weighted Terminal Coupling Loss (TCLw).....	96
7.5.1.4.2	Stability loss.....	97
7.5.1.5	Distortion.....	98
7.5.1.5.1	Sending.....	98
7.5.1.5.2	Receiving.....	99
7.5.1.5.3	Sidetone.....	99
7.5.1.6	Out of band signals.....	99
7.5.1.6.1	Sending (discrimination against out of band input signals).....	99
7.5.1.6.2	Receiving (spurious out of band signals).....	100
7.5.1.7	Noise.....	100
7.5.1.7.1	Sending.....	100
7.5.1.7.2	Band-limited noise.....	100
7.5.1.7.3	Receiving.....	101
7.5.1.7.4	Level of sampling frequency (receiving).....	101
7.5.1.8	Acoustic shock.....	101
7.5.1.8.1	Continuous signal.....	101
7.5.1.8.2	Peak signal.....	101
7.5.1.9	PP Delay.....	102
7.5.1.10	PP ambient noise rejection.....	103
7.5.2	Additional requirements for PP type 1b ("improved GAP" handset).....	103
7.5.2.0	General.....	103
7.5.2.1	Terminal coupling loss.....	103
7.5.2.1.1	Weighted Terminal Coupling Loss (TCLw).....	103
7.5.2.2	Attenuation Range in Sending Direction during Double Talk $A_{H,S,dt}$	104
7.5.2.3	Attenuation Range in Receiving Direction during Double Talk $A_{H,R,dt}$	106
7.5.2.4	Activation in Sending Direction.....	106
7.5.2.5	Activation in Receiving Direction.....	108
7.5.3	Transmission characteristics for PP types 1c and 1d (HATS tested, narrowband telephony handsets).....	109
7.5.3.1	Frequency responses.....	109
7.5.3.1.1	Sending.....	109
7.5.3.1.2	Receiving.....	110
7.5.3.2	Sending and receiving loudness ratings.....	113
7.5.3.2.1	Nominal values.....	113
7.5.3.2.2	Void.....	114
7.5.3.2.3	Void.....	114
7.5.3.2.4	Microphone mute.....	114
7.5.3.2.5	Positional robustness.....	115
7.5.3.2.6	Send Loudness Level.....	115
7.5.3.2.7	Receive Loudness Level.....	115
7.5.3.3	Sidetone.....	116

7.5.3.3.1	SideTone Masking Rating (STMR).....	116
7.5.3.3.2	Void.....	116
7.5.3.3.3	Sidetone delay	116
7.5.3.4	Terminal coupling loss.....	117
7.5.3.4.1	Terminal Coupling Loss weighted (TCLw).....	117
7.5.3.4.2	Stability loss	118
7.5.3.5	Distortion	119
7.5.3.5.1	Sending Distortion.....	119
7.5.3.5.2	Receiving Distortion.....	120
7.5.3.6	Out of band signals.....	120
7.5.3.6.1	Out-of-Band Signals in Send direction.....	120
7.5.3.6.2	Out-of-band signals in receiving direction	121
7.5.3.7	Noise	121
7.5.3.7.1	Sending.....	121
7.5.3.7.2	Receiving.....	122
7.5.3.8	Acoustic shock	123
7.5.3.8.0	General	123
7.5.3.8.1	Continuous signal	123
7.5.3.8.2	Void.....	123
7.5.3.9	Delay.....	123
7.5.3.10	Void.....	124
7.5.3.11	Double Talk Performance	124
7.5.3.11.0	General	124
7.5.3.11.1	Attenuation Range in Sending Direction during Double Talk $A_{H,S,dt}$	125
7.5.3.11.2	Attenuation Range in Receiving Direction during Double Talk $A_{H,R,dt}$	126
7.5.3.11.3	Detection of Echo Components during Double Talk.....	127
7.5.3.11.4	Minimum activation level and sensitivity of double talk detection	128
7.5.3.12	Switching characteristics.....	128
7.5.3.12.0	General	128
7.5.3.12.1	Activation in Sending Direction	128
7.5.3.12.2	Activation in Receiving Direction	129
7.5.3.12.3	Silence Suppression and Comfort Noise Generation.....	129
7.5.3.12.4	Performance in sending direction in the presence of background noise	129
7.5.3.12.5	Speech Quality in the Presence of Background Noise.....	130
7.5.3.12.6	Quality of Background Noise Transmission (with Far End Speech).....	131
7.5.3.12.7	Void.....	131
7.5.3.12.8	Positional Robustness of Speech Quality in the Presence of Background Noise	132
7.5.3.13	Quality of echo cancellation.....	132
7.5.3.13.0	General	132
7.5.3.13.1	Temporal echo effects	132
7.5.3.13.2	Spectral Echo Attenuation.....	133
7.5.3.13.3	Variable echo path.....	133
7.5.4	Transmission characteristics for PP types 3a and 3b (narrowband loudspeaking and handsfree devices).....	134
7.5.4.1	Sending sensitivity/frequency response	134
7.5.4.2	Receive sensitivity/frequency response.....	135
7.5.4.3	Send loudness rating	137
7.5.4.4	Receive loudness rating.....	137
7.5.4.5	Sending distortion	138
7.5.4.6	Receiving distortion	139
7.5.4.7	Out-of-band signals in sending direction	139
7.5.4.8	Out-of-band signals in receiving direction.....	140
7.5.4.9	Sending noise	141
7.5.4.10	Receiving noise	141
7.5.4.11	Terminal Coupling Loss weighted (TCLw)	142
7.5.4.12	Stability Loss.....	142
7.5.4.13	Double Talk Performance	143
7.5.4.13.0	General	143
7.5.4.13.1	Attenuation Range in Sending Direction during Double Talk $A_{H,S,dt}$	143
7.5.4.13.2	Attenuation Range in Receiving Direction during Double Talk $A_{H,R,dt}$	145
7.5.4.13.3	Detection of Echo Components during Double Talk.....	145
7.5.4.13.4	Minimum activation level and sensitivity of double talk detection	147

7.5.4.14	Switching characteristics.....	147
7.5.4.14.0	General	147
7.5.4.14.1	Activation in Sending Direction	147
7.5.4.14.2	Activation in Receiving Direction	148
7.5.4.14.3	Silence Suppression and Comfort Noise Generation.....	148
7.5.4.14.4	Performance in sending direction in the presence of background noise	148
7.5.4.14.5	Speech Quality in the Presence of Background Noise.....	149
7.5.4.14.6	Quality of Background Noise Transmission (with Far End Speech).....	150
7.5.4.15	Quality of echo cancellation.....	150
7.5.4.15.0	General	150
7.5.4.15.1	Temporal echo effects	151
7.5.4.15.2	Spectral Echo Attenuation.....	151
7.5.4.15.3	Variable echo path.....	152
7.5.4.16	Microphone mute	152
7.5.4.17	Delay	152
7.5.4.18	Send Loudness Level	153
7.5.4.19	Receive Loudness Level	153
7.5.5	Transmission characteristics for PP type 2a (P.311 tested, wideband handset).....	154
7.5.5.0	General	154
7.5.5.1	Sending characteristics.....	155
7.5.5.1.1	Loudness rating	155
7.5.5.1.2	Sensitivity/frequency characteristics	155
7.5.5.1.3	Noise.....	155
7.5.5.1.4	Distortion.....	155
7.5.5.1.5	Discrimination against out-of-band input signals	155
7.5.5.2	Receiving characteristics.....	156
7.5.5.2.1	Loudness rating	156
7.5.5.2.2	Sensitivity/frequency characteristics	156
7.5.5.2.3	Noise.....	156
7.5.5.2.4	Distortion.....	156
7.5.5.2.5	Spurious out-of-band receiving signals	157
7.5.5.3	Sidetone characteristics.....	157
7.5.5.3.1	Talker sidetone	157
7.5.5.3.2	Sidetone distortion.....	157
7.5.5.4	Echo path loss characteristics.....	157
7.5.5.4.1	Weighted terminal coupling loss	157
7.5.5.4.2	Stability loss	157
7.5.6	Transmission characteristics for PP types 2b and 2c (HATS tested wideband handsets).....	158
7.5.6.1	Frequency responses	158
7.5.6.1.1	Sending.....	158
7.5.6.1.2	Receiving.....	159
7.5.6.2	Send and receive loudness ratings.....	162
7.5.6.2.1	Nominal values.....	162
7.5.6.2.2	Void.....	164
7.5.6.2.3	Void.....	164
7.5.6.2.4	Microphone mute.....	164
7.5.6.2.5	Positional robustness	164
7.5.6.2.6	Send Loudness Level.....	164
7.5.6.2.7	Receive Loudness Level.....	165
7.5.6.3	Sidetone.....	165
7.5.6.3.1	SideTone Masking Rating (STMR).....	165
7.5.6.3.2	Void.....	166
7.5.6.3.3	Sidetone delay	166
7.5.6.4	Terminal coupling loss.....	166
7.5.6.4.1	Terminal Coupling Loss (TCL).....	166
7.5.6.4.2	Stability loss	167
7.5.6.5	Distortion	168
7.5.6.5.1	Sending Distortion.....	168
7.5.6.5.2	Receiving Distortion.....	169
7.5.6.6	Noise	170
7.5.6.6.1	Sending.....	170
7.5.6.6.2	Receiving.....	170

7.5.6.7	Acoustic shock	171
7.5.6.7.0	General	171
7.5.6.7.1	Continuous signal	171
7.5.6.8	Delay	171
7.5.6.9	Void.....	172
7.5.6.10	Double talk Performance.....	172
7.5.6.10.0	General	172
7.5.6.10.1	Attenuation Range in Sending Direction during Double Talk $A_{H,S,dt}$	173
7.5.6.10.2	Attenuation Range in Receiving Direction during Double Talk $A_{H,R,dt}$	174
7.5.6.10.3	Detection of Echo Components during Double Talk.....	175
7.5.6.10.4	Minimum activation level and sensitivity of double talk detection	176
7.5.6.11	Switching characteristics.....	177
7.5.6.11.0	General	177
7.5.6.11.1	Activation in Sending Direction	177
7.5.6.11.2	Activation in Receiving Direction	177
7.5.6.11.3	Silence Suppression and Comfort Noise Generation.....	178
7.5.6.11.4	Performance in Sending in the Presence of Background Noise.....	178
7.5.6.11.5	Speech Quality in the Presence of Background Noise.....	178
7.5.6.11.6	Quality of Background Noise Transmission (with Far End Speech).....	179
7.5.6.11.7	Void	180
7.5.6.11.8	Positional Robustness of Speech Quality in the Presence of Background Noise	180
7.5.6.12	Quality of echo cancellation.....	180
7.5.6.12.0	General	180
7.5.6.12.1	Temporal echo effects	180
7.5.6.12.2	Spectral Echo Attenuation.....	181
7.5.6.12.3	Variable echo path.....	182
7.5.6.13	Out of band signals.....	182
7.5.6.13.1	Out-of-band signals in sending direction.....	182
7.5.6.13.2	Out-of-band signals in receiving direction	182
7.5.7	Transmission characteristics for PP types 4a and 4b (HATS Tested wideband loudspeaking and handsfree devices).....	183
7.5.7.1	Sending sensitivity/frequency response	183
7.5.7.2	Receive sensitivity/frequency response.....	184
7.5.7.3	Send loudness rating	187
7.5.7.4	Receive loudness rating.....	187
7.5.7.5	Sending distortion	188
7.5.7.6	Receiving distortion	189
7.5.7.7	Out-of-band signals in sending direction	190
7.5.7.8	Out-of-band signals in receiving direction.....	190
7.5.7.9	Sending noise	191
7.5.7.10	Receiving noise	191
7.5.7.11	Terminal Coupling Loss.....	192
7.5.7.12	Stability Loss.....	193
7.5.7.13	Double Talk Performance	194
7.5.7.13.0	General	194
7.5.7.13.1	Attenuation Range in Sending Direction during Double Talk $A_{H,S,dt}$	194
7.5.7.13.2	Attenuation Range in Receiving Direction during Double Talk $A_{H,R,dt}$	196
7.5.7.13.3	Detection of Echo Components during Double Talk.....	196
7.5.7.13.4	Minimum activation level and sensitivity of double talk detection	198
7.5.7.14	Switching characteristics.....	198
7.5.7.14.0	General	198
7.5.7.14.1	Activation in Sending Direction	199
7.5.7.14.2	Activation in Receiving Direction	199
7.5.7.14.3	Silence Suppression and Comfort Noise Generation.....	199
7.5.7.14.4	Performance in sending direction in the presence of background noise	200
7.5.7.14.5	Speech Quality in the Presence of Background Noise.....	200
7.5.7.14.6	Quality of Background Noise Transmission (with Far End Speech).....	201
7.5.7.15	Quality of echo cancellation.....	202
7.5.7.15.1	Temporal echo effects	202
7.5.7.15.2	Spectral Echo Attenuation.....	202
7.5.7.15.3	Variable echo path.....	203
7.5.7.16	Microphone mute	203

7.5.7.17	Delay	203
7.5.7.18	Send Loudness Level	204
7.5.7.19	Receive Loudness Level	205
7.5.8	Transmission characteristics for PP type 5a ("super-wideband 14 kHz handset or headset")	206
7.5.8.1	Frequency responses	206
7.5.8.1.1	Sending.....	206
7.5.8.1.2	Receiving.....	207
7.5.8.2	Send and receive loudness ratings.....	209
7.5.8.2.1	Send Loudness Rating	209
7.5.8.2.2	Receive Loudness Rating	210
7.5.8.2.3	Send Loudness Level.....	211
7.5.8.2.4	Receive Loudness Level.....	212
7.5.8.3	Sidetone.....	212
7.5.8.3.1	SideTone Masking Rating STMR (Mouth to ear)	212
7.5.8.3.2	Sidetone Delay.....	213
7.5.8.4	Terminal Coupling Loss.....	213
7.5.8.4.1	Unweighted Terminal Coupling Loss.....	213
7.5.8.4.2	Stability Loss.....	214
7.5.8.5	Distortion	215
7.5.8.5.1	Sending Distortion.....	215
7.5.8.5.2	Receiving Distortion.....	216
7.5.8.6	Noise	217
7.5.8.6.1	Sending.....	217
7.5.8.6.2	Receiving.....	217
7.5.8.7	Acoustic shock	218
7.5.8.7.0	General	218
7.5.8.7.1	Continuous signal	218
7.5.8.8	Delay	218
7.5.8.9	Double talk Performance.....	218
7.5.8.9.0	General	218
7.5.8.9.1	Attenuation range in send direction during double talk $A_{H,S,dt}$	219
7.5.8.9.2	Attenuation range in receive direction during double talk $A_{H,R,dt}$	220
7.5.8.9.3	Detection of echo components during double talk	221
7.5.8.10	Switching Characteristics.....	222
7.5.8.10.0	Note	222
7.5.8.10.1	Activation in send direction.....	223
7.5.8.10.2	Silence suppression and comfort noise generation	223
7.5.8.10.3	Performance in Sending in the Presence of Background Noise.....	223
7.5.8.10.4	Speech quality in the presence of background noise	224
7.5.8.10.5	Positional Robustness of Speech Quality in the Presence of Background Noise	225
7.5.8.10.6	Quality of background noise transmission (with far end speech).....	225
7.5.8.11	Quality of echo cancellation.....	226
7.5.8.11.1	Temporal echo effects	226
7.5.8.11.2	Spectral echo attenuation.....	226
7.5.8.11.3	Variable echo path.....	227
7.5.9	Transmission characteristics for PP type 5b ("super-wideband 14 kHz loudspeaking and handsfree devices")	227
7.5.9.1	Sending sensitivity/frequency response	227
7.5.9.2	Receive sensitivity/frequency response.....	229
7.5.9.2.1	Handheld terminal	229
7.5.9.2.2	Desktop terminal	230
7.5.9.2.3	Terminals intended to be used simultaneously by several users.....	231
7.5.9.3	Sending loudness rating	231
7.5.9.3.1	Nominal Value.....	231
7.5.9.3.2	Microphone mute.....	231
7.5.9.4	Receive loudness rating.....	232
7.5.9.5	Sending distortion	233
7.5.9.5.1	Signal to harmonic distortion versus frequency	233
7.5.9.5.2	Signal to harmonic distortion for higher input level.....	234
7.5.9.6	Receiving distortion	234
7.5.9.7	Sending noise	235
7.5.9.8	Receiving noise	235

7.5.9.9	Terminal Coupling Loss.....	236
7.5.9.9.1	Unweighted Terminal Coupling Loss.....	236
7.5.9.9.2	Stability Loss.....	237
7.5.9.10	Double Talk Performance	237
7.5.9.10.0	General	237
7.5.9.10.1	Attenuation Range in Sending Direction during Double Talk $A_{H,S,dt}$	238
7.5.9.10.2	Attenuation Range in Receiving Direction during Double Talk $A_{H,R,dt}$	239
7.5.9.10.3	Detection of Echo Components during Double Talk.....	240
7.5.9.10.4	Minimum activation level and sensitivity of double talk detection	241
7.5.9.11	Switching characteristics.....	242
7.5.9.11.0	Note	242
7.5.9.11.1	Activation in Sending Direction.....	242
7.5.9.11.2	Silence Suppression and Comfort Noise Generation.....	242
7.5.9.11.3	Performance in sending direction in the presence of background noise	243
7.5.9.11.4	Speech Quality in the Presence of Background Noise.....	243
7.5.9.11.5	Quality of Background Noise Transmission (with Far End Speech).....	244
7.5.9.12	Quality of echo cancellation.....	245
7.5.9.12.1	Temporal echo effects	245
7.5.9.12.2	Spectral Echo Attenuation.....	245
7.5.9.12.3	Variable echo path.....	246
7.5.9.13	Delay.....	246
7.5.9.14	Send Loudness Level	246
7.5.9.15	Receive Loudness Level	247
7.5.10	Transmission characteristics for PP type 7a ("fullband 20 kHz handset or headset").....	248
7.5.10.1	Frequency responses	248
7.5.10.1.1	Sending.....	248
7.5.10.1.2	Receiving.....	249
7.5.10.2	Send and receive loudness ratings.....	251
7.5.10.2.1	Send Loudness Rating	251
7.5.10.2.2	Receive Loudness Rating	252
7.5.10.2.3	Send Loudness Level.....	253
7.5.10.2.4	Receive Loudness Level.....	253
7.5.10.3	Sidetone.....	254
7.5.10.3.1	SideTone Masking Rating STMR (Mouth to ear)	254
7.5.10.3.2	Sidetone Delay.....	254
7.5.10.4	Terminal Coupling Loss.....	255
7.5.10.4.1	Unweighted Terminal Coupling Loss.....	255
7.5.10.4.2	Stability Loss.....	256
7.5.10.5	Distortion	257
7.5.10.5.1	Sending Distortion.....	257
7.5.10.5.2	Receiving Distortion.....	258
7.5.10.6	Noise	259
7.5.10.6.1	Sending.....	259
7.5.10.6.2	Receiving.....	259
7.5.10.7	Acoustic shock	260
7.5.10.7.0	General	260
7.5.10.7.1	Continuous signal	260
7.5.10.8	Delay.....	260
7.5.10.9	Double talk Performance.....	260
7.5.10.9.0	General	260
7.5.10.9.1	Attenuation range in send direction during double talk $A_{H,S,dt}$	261
7.5.10.9.2	Attenuation range in receive direction during double talk $A_{H,R,dt}$	262
7.5.10.9.3	Detection of echo components during double talk	263
7.5.10.10	Switching Characteristics.....	264
7.5.10.10.0	Note	264
7.5.10.10.1	Activation in send direction.....	265
7.5.10.10.2	Silence suppression and comfort noise generation	265
7.5.10.10.3	Performance in Sending in the Presence of Background Noise.....	265
7.5.10.10.4	Speech quality in the presence of background noise	266
7.5.10.10.5	Positional Robustness of Speech Quality in the Presence of Background Noise	267
7.5.10.10.6	Quality of background noise transmission (with far end speech).....	267
7.5.10.11	Quality of echo cancellation.....	268

7.5.10.11.1	Temporal echo effects	268
7.5.10.11.2	Spectral echo attenuation.....	268
7.5.10.11.3	Variable echo path.....	269
7.5.11	Transmission characteristics for PP type 7b ("fullband 20 kHz loudspeaking and handsfree devices")	269
7.5.11.1	Sending sensitivity/frequency response	269
7.5.11.2	Receive sensitivity/frequency response.....	271
7.5.11.2.0	General	271
7.5.11.2.1	Handheld terminal	271
7.5.11.2.2	Desktop terminal	272
7.5.11.2.3	Terminals intended to be used simultaneously by several users.....	273
7.5.11.3	Sending loudness rating	273
7.5.11.3.1	Nominal Value.....	273
7.5.11.3.2	Microphone Mute	273
7.5.11.4	Receive loudness rating.....	274
7.5.11.5	Sending distortion	275
7.5.11.5.1	Signal to harmonic distortion versus frequency	275
7.5.11.5.2	Signal to harmonic distortion for higher input level.....	276
7.5.11.6	Receiving distortion	276
7.5.11.7	Sending noise	277
7.5.11.8	Receiving noise	278
7.5.11.9	Terminal Coupling Loss.....	278
7.5.11.9.1	Unweighted Terminal Coupling Loss.....	278
7.5.11.9.2	Stability Loss	279
7.5.11.10	Double Talk Performance	280
7.5.11.10.0	General	280
7.5.11.10.1	Attenuation Range in Sending Direction during Double Talk $A_{H,S,dt}$	280
7.5.11.10.2	Attenuation Range in Receiving Direction during Double Talk $A_{H,R,dt}$	282
7.5.11.10.3	Detection of Echo Components during Double Talk.....	282
7.5.11.10.4	Minimum activation level and sensitivity of double talk detection	284
7.5.11.11	Switching characteristics.....	284
7.5.11.11.0	Note	284
7.5.11.11.1	Activation in Sending Direction.....	284
7.5.11.11.2	Silence Suppression and Comfort Noise Generation.....	285
7.5.11.11.3	Performance in sending direction in the presence of background noise	285
7.5.11.11.4	Speech Quality in the Presence of Background Noise.....	286
7.5.11.11.5	Quality of Background Noise Transmission (with Far End Speech).....	286
7.5.11.12	Quality of echo cancellation.....	287
7.5.11.12.1	Temporal echo effects	287
7.5.11.12.2	Spectral Echo Attenuation	287
7.5.11.12.3	Variable echo path.....	288
7.5.11.13	Delay.....	288
7.5.11.14	Send Loudness Level	289
7.5.11.15	Receive Loudness Level	289
7.5.12	Transmission characteristics for PP types 7c, d, e, f ("fullband 20 kHz stereo audio device").....	290
7.5.13	Transmission characteristics for PP type 7g ("FBHR 24 kHz headset device")	290
7.5.14	Transmission characteristics for PP type 7h ("FBHR 24 kHz loudspeaking device").....	290
7.5.15	Transmission characteristics for PP type 7i ("FBLFE 250 Hz loudspeaking device")	290
7.5.16	Transmission characteristics for PP type 7j ("fullband 20 kHz low-latency microphone device")	290
7.5.17	Transmission characteristics for PP type 8a ("ultra-band 48 kHz headset device")	290
7.5.18	Transmission characteristics for PP type 8b ("ultra-band 48 kHz loudspeaking device").....	291
7.6	Transmission characteristics for Fixed Parts	291
7.6.1	Transmission characteristics for FP type 1a ("Classic" Fixed Part with ISDN Network interface, 3,1 kHz service)	291
7.6.1.1	Reduction of echo from PP	291
7.6.1.2	FP Network echo control	293
7.6.1.3	FP adaptive volume control	294
7.6.1.4	FP Delay.....	294
7.6.2	Transmission characteristics for FP type 1b ("new" Fixed Part with ISDN Network interface, 3,1 kHz service)	296
7.6.2.0	General	296
7.6.2.1	FP Network echo control	296

7.6.2.2	FP adaptive volume control	297
7.6.2.3	FP Delay.....	297
7.6.3	Transmission characteristics for FP type 2 (Fixed Part with analog 2-wire interface, 3,1 kHz service).....	299
7.6.3.1	FP adaptive volume control	299
7.6.3.2	Network echo control.....	299
7.6.3.3	Additional requirements for DECT FP provided with a 2-wire PSTN interface.....	301
7.6.3.3.0	Test methods.....	301
7.6.3.3.1	General requirements.....	302
7.6.3.3.2	Speech performance characteristics.....	302
7.6.3.4	FP Delay.....	303
7.6.4	Transmission characteristics for FP type 3 (Fixed Part with VoIP interface, 3,1 kHz service)	304
7.6.4.1	Void.....	304
7.6.4.2	Void.....	304
7.6.4.3	Adaptive volume control.....	304
7.6.4.4	Clock accuracy	305
7.6.4.5	Send Jitter.....	305
7.6.4.6	Delay	306
7.6.5	Transmission characteristics for FP type 4 (Fixed Part with ISDN network interface, wideband service).....	306
7.6.5.1	FP adaptive volume control	306
7.6.5.2	FP Delay.....	306
7.6.6	Transmission characteristics for FP type 5 (Fixed Part with VoIP interface, wideband, super-wideband, fullband, FBHR or ultra-band service)	308
7.6.6.1	Void.....	308
7.6.6.2	Void.....	308
7.6.6.3	FP adaptive volume control	308
7.6.6.4	Clock accuracy	308
7.6.6.5	Send Jitter.....	309
7.6.6.6	Delay	309
7.7	Transmission characteristics for a complete DECT system consisting of PP and FP with VoIP interface	309
7.7.1	Send and receive delay - round trip delay.....	309
8	Testing of the audio codecs	311
8.1	Test philosophy	311
8.2	Testing requirements for speech coding and packet loss concealment algorithms.....	311
8.2.1	G.726 ADPCM codec operating at 32 kbit/s	311
8.2.2	G.711 PCM codec operating at 64 kbit/s	312
8.2.3	G.722 wideband codec operating at 64 kbit/s	312
8.2.4	Packet Loss Concealment (PLC) for codec G.722.....	312
8.2.5	G.729.1 wideband codec operating at 30 kbit/s with PLC algorithm	312
8.2.6	MPEG-4 ER AAC-LD super-wideband codec operating at 64 kbit/s.....	313
8.2.7	MPEG-4 ER AAC-LD wideband codec operating at 32 kbit/s	313
8.2.8	LC3plus narrowband, wideband, super-wideband, fullband, FBHR, ultra-band codec operating at 32 to 512 kbit/s	313
9	Additional features	315
9.1	Loudspeaking hands-free and headset facilities	315
9.1.1	Loudspeaking hands-free facility.....	315
9.1.2	Headset facility	315
9.2	Tandem with mobile radio network.....	316
9.2.0	General.....	316
9.2.1	Tandem with GSM	316
9.2.1.0	Configuration	316
9.2.1.1	Network echo control.....	316
9.2.1.2	Terminal coupling loss.....	316
9.2.1.3	The GSM mobile transmitter operates in continuous mode	316
9.2.1.4	The GSM mobile transmitter operates in discontinuous mode, DTX	316
9.3	DECT connected to the GSM fixed network.....	317
9.3.0	General.....	317
9.3.1	Network echo control.....	317

9.3.2	Terminal coupling loss.....	317
9.4	Wireless Relay Stations (WRS).....	317
9.4.0	General.....	317
9.4.1	Modified FP network echo control requirements for implementation of 2 and 3 CRFP links in cascade.....	318
Annex A (informative):	Key parameters.....	319
Annex B (informative):	Description of the CSS.....	320
B.1	General	320
B.2	Test signal	320
B.3	Measurement	321
B.4	Calculation	321
Annex C (normative):	Description of the cross-correlation method	324
C.1	Test signal	324
C.2	Calculation	324
Annex D (informative):	Acoustic shock requirements	325
D.0	General	325
D.1	Continuous signal.....	325
D.2	Peak signal.....	325
Annex E (informative):	Echo related topics.....	326
E.1	Summary table on echo parameters for PPs and FPs	326
E.2	General information about Delay-Echo interaction for DECT terminals.....	333
Annex F (informative):	Guidelines on specific requirements.....	335
F.1	Delay considerations for FPs with VoIP interface	335
F.1.1	Delay considerations for FP type 3 (Fixed Part with VoIP interface, 3,1 kHz service)	335
F.1.1.0	General.....	335
F.1.1.1	Send delay.....	335
F.1.1.2	Receive delay.....	336
F.1.2	Delay considerations for FP type 5 (Fixed Part with VoIP interface, wideband, super-wideband, fullband, FBHR or ultra-band service)	337
F.1.2.0	General.....	337
F.1.2.1	Send Delay.....	337
F.1.2.2	Receive delay.....	338
F.2	Guidelines for audio codec testing of MPEG-4 ER AAC-LD implementations at 64 kbps	339
F.2.1	Guidelines for Decoder testing.....	339
F.2.2	Guidelines for Encoder testing	340
F.3	Derivation of Delay requirements for PPs and FPs with VoIP interface	341
Annex G (normative):	Allowed tolerances	343
G.1	Description of the allowed frequency gap in the lower limit frequency response mask for wideband, super-wideband and fullband applications.....	343
Annex H (informative):	Bibliography.....	344
History		345

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Foreword

This European Standard (EN) has been produced by ETSI Technical Committee Digital Enhanced Cordless Telecommunications (DECT).

The present document contains text pertaining to approval testing of the Digital Enhanced Cordless Telecommunications (DECT) Common Interface. Such text should be considered as guidance to approval (or licensing) authorities.

Details of the DECT Common Interface may be found in ETSI EN 300 175-1 [1] to ETSI EN 300 175-8 [8]. Further details of the DECT system may be found in the ETSI Technical Reports, ETSI TR 101 178 [i.1] and ETSI ETR 043 [i.7].

The present document is part 2 of a multi-part deliverable covering the approval test specification for Digital Enhanced Cordless Telecommunications (DECT), as identified below:

Part 1: "Radio";

Part 2: "Audio and speech".

National transposition dates	
Date of adoption of this EN:	12 May 2022
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Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the [ETSI Drafting Rules](#) (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

1 Scope

The present document specifies the tests applicable to all Digital Enhanced Cordless Telecommunications (DECT) equipment accessing any DECT frequency band (including applicable IMT-2000 frequency bands) and the tests applicable to DECT speech and audio transmission using any of the codecs and any of the audio specifications described in ETSI EN 300 175-8 [8].

The aims of the present document are to ensure:

- efficient use of frequency spectrum;
- no harm done to any connected network and its services;
- no harm done to other radio networks and services;
- no harm done to other DECT equipment or its services;
- interworking of terminal equipment via any public telecommunications network, including the ISDN/PSTN network and the Internet,

through testing those provisions of ETSI EN 300 175-1 [1] to ETSI EN 300 175-8 [8] which are relevant to these aims.

The tests of ETSI EN 300 176 are split into two parts:

- part 1 [9] covers testing of radio frequency parameters, security elements and those DECT protocols that facilitate the radio frequency tests and efficient use of frequency spectrum;
- part 2 (the present document) describes testing of speech and audio requirements between network interface and DECT PT, or between a DECT CI air interface and alternatively a DECT PT or FT.
The present document is not applicable to terminal equipment specially designed for the disabled (e.g. with amplification of received speech as an aid for the hard of hearing).

DECT terminal equipment consists of the following elements:

- a) Fixed Part (FP);
- b) Portable Part (PP);
- c) Cordless Terminal Adapter (CTA);
- d) Wireless Relay Stations (WRS) (FP and PP combined).

The present document is structured to allow tests of either:

- a) the FP and PP together; or
- b) the FP and PP as separate items.

Where the DECT FP is connected to a PSTN, and there are any peculiarities in the requirements for voice telephony, these will be accommodated within the FP.

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 at <https://docbox.etsi.org/Reference/>.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

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

- [1] ETSI EN 300 175-1: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 1: Overview".
- [2] ETSI EN 300 175-2: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 2: Physical layer (PHL)".
- [3] ETSI EN 300 175-3: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 3: Medium Access Control (MAC) layer".
- [4] ETSI EN 300 175-4: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 4: Data Link Control (DLC) layer".
- [5] ETSI EN 300 175-5: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 5: Network (NWK) layer".
- [6] ETSI EN 300 175-6: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 6: Identities and addressing".
- [7] ETSI EN 300 175-7: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 7: Security features".
- [8] ETSI EN 300 175-8: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 8: Speech and audio coding and transmission".
- [9] ETSI EN 300 176-1: "Digital Enhanced Cordless Telecommunications (DECT); Test specification; Part 1: Radio".
- [10] Void.
- [11] Void.
- [12] ETSI ETS 300 540: "Digital cellular telecommunications system (Phase 2) (GSM); Transmission planning aspects of the speech service in the GSM Public Land Mobile Network (PLMN) system (GSM 03.50)".
- [13] Void.
- [14] Void.
- [15] Recommendation ITU-T G.111 (1993): "Loudness ratings (LRs) in an international connection".
- [16] Recommendation ITU-T G.122 (1993): "Influence of national systems on stability and talker echo in international connections".
- [17] Recommendation ITU-T G.223 (1988): "Assumptions for the calculation of noise on hypothetical reference circuits for telephony".
- [18] Void.

- [19] Recommendation ITU-T G.711: "Pulse code modulation (PCM) of voice frequencies".
- [20] Recommendation ITU-T G.712: "Transmission performance characteristics of pulse code modulation channels".
- [21] Recommendation ITU-T G.722: "7 kHz audio-coding within 64 kbit/s".
- [22] Recommendation ITU-T G.722 (Appendix III): "A high quality packet loss concealment algorithm for G.722".
- [23] Recommendation ITU-T G.722 (Appendix IV): "A low-complexity algorithm for packet loss concealment with G.722".
- [24] Recommendation ITU-T G.726: "40, 32, 24, 16 kbit/s Adaptive Differential Pulse Code Modulation (ADPCM)".
- [25] Recommendation ITU-T G.729.1: "G.729 based embedded variable bit-rate coder: An 8-32 kbit/s scalable wideband coder bitstream interoperable with G.729".
- [26] Recommendation ITU-T G.1020: "Performance parameter definitions for quality of speech and other voiceband applications utilizing IP networks".
- [27] Recommendation ITU-T O.41: "Psophometer for use on telephone-type circuits".
- [28] Recommendation ITU-T O.132 (1988): "Quantizing distortion measuring equipment using a sinusoidal test signal".
- [29] Recommendation ITU-T O.133 (1993): "Equipment for measuring the performance of PCM encoders and decoders".
- [30] Void.
- [31] Recommendation ITU-T P.50 (1999): "Artificial voices".
- [32] Recommendation ITU-T P.51 (1996): "Artificial mouth".
- [33] Recommendation ITU-T P.56: "Objective measurement of active speech level".
- [34] Recommendation ITU-T P.57: "Artificial ears".
- [35] Recommendation ITU-T P.58: "Head and torso simulator for telephonometry".
- [36] Recommendation ITU-T P.64: "Determination of sensitivity/frequency characteristics of local telephone systems".
- [37] Recommendation ITU-T P.79: "Calculation of loudness ratings for telephone sets".
- [38] Recommendation ITU-T P.311: "Transmission characteristics for wideband digital handset and headset telephones".
- [39] Recommendation ITU-T P.340: "Transmission characteristics and speech quality parameters of hands-free terminals".
- [40] Recommendation ITU-T P.380: "Electro-acoustic measurements on headsets".
- [41] Recommendation ITU-T P.501: "Test signals for use in telephony and other speech-based applications".
- [42] Recommendation ITU-T P.502: "Objective test methods for speech communication systems using complex test signals".
- [43] Recommendation ITU-T P.581: "Use of head and torso simulator for hands-free and handset terminal testing".
- [44] ISO 3 (1973): "Preferred numbers -- Series of preferred numbers".

- [45] IEC 61260-1: "Electroacoustics -- Octave-band and fractional-octave-band filters Part 1: Specifications".
- [46] ISO 9614 (all parts): "Acoustics -- Determination of sound power levels of noise sources using sound intensity".
- [47] Void.
- [48] ISO/IEC 14496-3:2009: "Information Technology -- Coding of audio-visual objects -- Part 3: Audio".
- [49] ETSI TBR 038: "Public Switched Telephone Network (PSTN); Attachment requirements for a terminal equipment incorporating an analogue handset function capable of supporting the justified case service when connected to the analogue interface of the PSTN in Europe".
- [50] ETSI EN 300 700: "Digital Enhanced Cordless Telecommunications (DECT); Wireless Relay Station (WRS)".
- [51] ETSI I-ETS 300 245-3: "Integrated Services Digital Network (ISDN); Technical characteristics of telephony terminals; Part 3: Pulse Code Modulation (PCM) A-law, loudspeaking and handsfree telephony".
- [52] Directive 2006/95/EC of the European Parliament and of the Council of 12 December 2006 on the harmonisation of the laws of Member States relating to electrical equipment designed for use within certain voltage limits (codified version).
- [53] Recommendation ITU-T G.191: "Software tools for speech and audio coding standardization".
- [54] Recommendation ITU-T G.726 (Appendix II): "Digital test sequences for the verification of the G.726 40, 32, 24 and 16 kbit/s ADPCM algorithm".
- [55] Recommendation ITU-T G.722 (Appendix II): "Digital test sequences for the verification of the G.722 64 kbit/s SB-ADPCM 7 kHz codec".
- [56] Recommendation ITU-T G.729.1 (Amendment 1): "New Annex A on G.729.1 usage in H.245, plus corrections to the main body and updated test vectors".
- [57] Recommendation ITU-T P.360: "Efficiency of devices for preventing the occurrence of excessive acoustic pressure by telephone receivers and assessment of daily noise exposure of telephone users".
- [58] ETSI TS 103 634: "Digital Enhanced Cordless Telecommunications (DECT); Low Complexity Communication Codec plus (LC3plus)".
- [59] ETSI TS 103 224: "Speech and multimedia Transmission Quality (STQ); A sound field reproduction method for terminal testing including a background noise database".
- [60] ETSI TS 102 924: "Speech and multimedia Transmission Quality (STQ); Transmission requirements for Super-Wideband / Fullband handset and headset terminals from a QoS perspective as perceived by the user".
- [61] ETSI TS 102 925: "Speech and multimedia Transmission Quality (STQ); Transmission requirements for Super-Wideband / Fullband handsfree and conferencing terminals from a QoS perspective as perceived by the user".
- [62] Void.
- [63] Void.
- [64] ETSI TS 103 281: "Speech and multimedia Transmission Quality (STQ); Speech quality in the presence of background noise: Objective test methods for super-wideband and fullband terminals".
- [65] Void.
- [66] Recommendation ITU-T P.10: "Vocabulary for performance, quality of service and quality of experience".

- [67] ISO 3745: "Acoustics -- Determination of sound power levels and sound energy levels of noise sources using sound pressure -- Precision methods for anechoic rooms and hemi-anechoic rooms".
- [68] Void.
- [69] ETSI TS 126 071: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; Mandatory speech CODEC speech processing functions; AMR speech Codec; General description (3GPP TS 26.071)".
- [70] ETSI TS 126 171: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; Speech codec speech processing functions; Adaptive Multi-Rate - Wideband (AMR-WB) speech codec; General description (3GPP TS 26.171)".
- [71] ETSI TS 126 441: "Universal Mobile Telecommunications System (UMTS); LTE; Codec for Enhanced Voice Services (EVS); General overview (3GPP TS 26.441)".
- [72] IETF RFC 6716: "Definition of the Opus Audio Codec".
- [73] Recommendation ITU-T G.701: "Vocabulary of digital transmission and multiplexing, and pulse code modulation (PCM) terms".
- [74] Recommendation ITU-T P.700: "Calculation of loudness for speech communication".
- [75] Recommendation ITU-T P.341: "Transmission characteristics for wideband digital loudspeaking and hands-free telephony terminals".
- [76] Recommendation ITU-T P.342: "Transmission characteristics for narrow-band digital loudspeaking and hands-free telephony terminals".
- [77] ETSI TS 103 706: "Digital Enhanced Cordless Telecommunications (DECT); Advanced Audio Profile".

2.2 Informative 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.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

- [i.1] ETSI TR 101 178: "Digital Enhanced Cordless Telecommunications (DECT); A High Level Guide to the DECT Standardization".
- [i.2] IETF RFC 791 (STD 5): "Internet Protocol".
- [i.3] IETF RFC 768 (STD 6): "User Datagram Protocol".
- [i.4] IETF RFC 3550: "RTP: Transport Protocol for Real-time Applications".
- [i.5] ETSI TBR 008 (1998): "Integrated Services Digital Network (ISDN); Telephony 3,1 kHz teleservice; Attachment requirements for handset terminals".
- [i.6] Void.
- [i.7] ETSI ETR 043: "Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Services and facilities requirements specification".
- [i.8] ETSI ES 202 737: "Speech and multimedia Transmission Quality (STQ); Transmission requirements for narrowband VoIP terminals (handset and headset) from a QoS perspective as perceived by the user".

- [i.9] ETSI ES 202 738: "Speech and multimedia Transmission Quality (STQ); Transmission requirements for narrowband VoIP loudspeaking and handsfree terminals from a QoS perspective as perceived by the user".
 - [i.10] ETSI ES 202 739: "Speech and multimedia Transmission Quality (STQ); Transmission requirements for wideband VoIP terminals (handset and headset) from a QoS perspective as perceived by the user".
 - [i.11] ETSI ES 202 740: "Speech and multimedia Transmission Quality (STQ); Transmission requirements for wideband VoIP loudspeaking and handsfree terminals from a QoS perspective as perceived by the user".
 - [i.12] ETSI I-ETS 300 245-6: "Integrated Services Digital Network (ISDN); Technical characteristics of telephony terminals; Part 6: Wideband (7 kHz), loudspeaking and hands free telephony".
 - [i.13] Recommendation ITU-T G.113 (2001): "Transmission impairments due to speech processing".
 - [i.14] Recommendation ITU-T G.107 (2005): "The E-Model, a computational model for use in transmission planning".
 - [i.15] Recommendation ITU-T G.108 (1999): "Application of the E-model: A planning guide".
 - [i.16] Recommendation ITU-T G.109 (1999): "Definition of categories of speech transmission quality".
 - [i.17] Void.
 - [i.18] Recommendation ITU-T G.101 (2003): "The transmission plan".
 - [i.19] Recommendation ITU-T G.131 (2003): "Talker echo and its control".
 - [i.20] Recommendation ITU-T G.164 (1988): "Echo suppressors".
 - [i.21] Recommendation ITU-T G.165 (1993): "Echo cancellers".
 - [i.22] Recommendation ITU-T G.168 (2004): "Digital network echo cancellers".
 - [i.23] ISO/IEC 14496-4:2004: "Information technology -- Coding of audio-visual objects -- Part 4: Conformance testing".
 - [i.24] Recommendation ITU-R BS.1387-1: "Method for objective measurements of perceived audio quality".
 - [i.25] Void.
 - [i.26] Void.
 - [i.27] IEEE 802.11™: "Information technology - Telecommunications and information exchange between systems - Local and metropolitan area networks - Specific requirements - Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications".
 - [i.28] IEEE 802.3™: "IEEE Standard for Information Technology - Telecommunications and Information Exchange between systems - Local and metropolitan area networks - Specific requirements Part 3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications".
 - [i.29] European Broadcasting Union (EBU) - Tech 3253: "Sound Quality Assessment Material (SQAM)".
- NOTE: Available at <https://tech.ebu.ch/publications/sqamcd>.
- [i.30] ISO 1999: "Acoustics -- Determination of occupational noise exposure and estimation of noise-induced hearing impairment".
 - [i.31] Recommendation ITU-T Y.1541: "Network performance objectives for IP-based services".
 - [i.32] ETSI EG 202 518: "Speech and multimedia Transmission Quality (STQ); Acoustic Output of Terminal Equipment; Maximum Levels and Test Methodology for Various Applications".

- [i.33] Void.
- [i.34] ETSI EG 202 396-3: "Speech and multimedia Transmission Quality (STQ); Speech quality performance in the presence of background noise; Part 3: Background noise transmission - Objective test methods".
- [i.35] Recommendation ITU-T P.310: "Transmission characteristics for narrow-band digital handset and headset telephones".
- [i.36] TIA-920.130-A: "Telecommunications Telephone Terminal Equipment Transmission Requirements for Wideband Digital Wireline Telephones with Headset".
- [i.37] Void.

koniec náhľadu – text ďalej pokračuje v platenej verzii STN