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DECT – CI (Common Interface) – Del 8: Kodning og transmission af tale og lyd

Digital Enhanced Cordless Telecommunications (DECT); Common Interface (CI); Part 8: Speech and audio coding and transmission

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CONTENTS

Intellectual Property Rights	12
Foreword.....	12
Modal verbs terminology.....	12
1 Scope	13
2 References	13
2.1 Normative references	13
2.2 Informative references.....	15
3 Definitions, symbols and abbreviations	16
3.1 Definitions.....	16
3.2 Symbols and abbreviations.....	17
4 Configurations	19
4.1 Reference configuration	19
4.1.1 Basic configuration	19
4.1.2 Portable Part (PP)	21
4.1.2.1 Functional organization.....	21
4.1.2.2 Volume control	21
4.1.3 Fixed Part (FP).....	21
4.1.3.1 Digital interface.....	21
4.1.3.2 Analog interface	23
4.1.3.3 FP adaptive volume control	23
4.2 Test configurations	23
5 Encoding.....	23
5.0 General	23
5.1 32 kbit/s full term (ADPCM) G.726.....	24
5.1.1 Algorithm.....	24
5.1.2 Bit sequence.....	24
5.1.3 Characteristics of G.726 ADPCM codec	24
5.2 64 kbit/s PCM G.711	24
5.2.1 Algorithm.....	24
5.2.2 Bit sequence.....	24
5.2.3 Characteristics of G.711 PCM codec.....	25
5.2.4 Automatic detection of FAX/modem tone and switch to G.711	25
5.3 Wideband speech codec G.722 at 64 kbit/s.....	25
5.3.0 General.....	25
5.3.1 Algorithm.....	25
5.3.2 Bit sequence.....	25
5.3.3 Characteristics of G.722 wideband codec.....	25
5.3.4 Optional Packet Loss Concealment algorithm (PLC).....	26
5.4 Wideband speech codec G.729.1 up to 32 kbit/s.....	26
5.4.1 Algorithm.....	26
5.4.2 Bit sequence.....	26
5.4.3 Characteristics of G.729.1 codec	26
5.4.4 Packet Loss Concealment algorithm (PLC).....	27
5.4.5 Supported bit rate in DECT	27
5.5 Super-wideband MPEG-4 speech and audio coding	27
5.5.1 Algorithm.....	27
5.5.2 64 kbit/s, MPEG-4 ER AAC-LD codec.....	28
5.5.3 32 kbit/s, MPEG-4 ER AAC-LD codec.....	28
5.6 Other codings	28
6 Transmission aspects.....	29
6.1 Relative level.....	29
6.2 Acoustic reference level	29
6.3 Volume control.....	29

This is a preview of "DS/EN 300 175-8 V2.7...". [Click here to purchase the full version from the ANSI store.](#)

7.1	Overall description	29
7.1.1	Introduction to DECT audio specifications	29
7.1.2	Introduction to the audio types	29
7.1.3	List of Audio types	30
7.1.4	Audio types for Portable Parts	31
7.1.5	Audio types for Fixed Parts	32
7.1.6	Complete DECT system	32
7.1.7	Structure of the specification of the audio types	32
7.1.8	Audio Types and codecs	38
7.1.9	Audio Types and physical interfaces	38
7.2	Audio types applicable to Portable Parts	38
7.2.0	General	38
7.2.1	Performance levels of DECT Portable Parts (handsets)	38
7.2.2	Type 0: Reference PP (RePP)	39
7.2.3	PP Type 1a: "Classic" GAP narrowband handset	40
7.2.3.1	Introduction	40
7.2.3.2	Compatible services and codecs	40
7.2.3.3	Specification	40
7.2.4	PP Type 1b: "Improved" GAP narrowband handset	40
7.2.4.1	Introduction	40
7.2.4.2	Compatible services and codecs	40
7.2.4.3	Specification	40
7.2.5	PP Type 1c: HATS-tested "standard" narrowband handset	41
7.2.5.1	Introduction	41
7.2.5.2	Compatible services and codecs	41
7.2.5.3	Specification	41
7.2.6	PP Type 1d: HATS-tested "improved" narrowband handset	41
7.2.6.1	Introduction	41
7.2.6.2	Compatible services and codecs	41
7.2.6.3	Specification	41
7.2.7	PP Type 3a: HATS tested narrowband "standard" loudspeaking handsfree	42
7.2.7.1	Introduction	42
7.2.7.2	Compatible services and codecs	42
7.2.7.3	Specification	42
7.2.8	PP Type 3b: HATS tested narrowband "improved" loudspeaking handsfree	42
7.2.8.1	Introduction	42
7.2.8.2	Compatible services and codecs	42
7.2.8.3	Specification	42
7.2.9	PP Type 2a: P.311-tested wideband handset	43
7.2.9.1	Introduction	43
7.2.9.2	Compatible services and codecs	43
7.2.9.3	Specification	43
7.2.10	PP Type 2b: HATS-tested "standard" wideband handset or headset	43
7.2.10.1	Introduction	43
7.2.10.2	Compatible services and codecs	43
7.2.10.3	Specification	43
7.2.11	PP Type 2c: HATS tested "improved" wideband handset or headset	44
7.2.11.1	Introduction	44
7.2.11.2	Compatible services and codecs	44
7.2.11.3	Specification	44
7.2.12	PP Type 4a: HATS tested wideband "standard" loudspeaking handsfree	44
7.2.12.1	Introduction	44
7.2.12.2	Compatible services and codecs	44
7.2.12.3	Specification	44
7.2.13	PP Type 4b: HATS tested wideband "improved" loudspeaking and handsfree	45
7.2.13.1	Introduction	45
7.2.13.2	Compatible services and codecs	45
7.2.13.3	Specification	45
7.2.14	PP Type 5a: super-wideband 14 kHz handset	45
7.2.14.1	Introduction	45
7.2.14.2	Compatible services and codecs	45

This is a preview of "DS/EN 300 175-8 V2.7...". [Click here to purchase the full version from the ANSI store.](#)

7.2.15	PP Type 5b: super-wideband 14 kHz loudspeaking handstree	45
7.2.15.1	Introduction	45
7.2.15.2	Compatible services and codecs	45
7.2.15.3	Specification	45
7.2.16	PP Type 6: PPs with external 2 wire, 3,1 kHz telephony interface	46
7.2.16.1	Introduction	46
7.2.16.2	Compatible services and codecs	46
7.2.16.3	Specification	46
7.3	Audio transmission types applicable to Fixed Parts	46
7.3.0	General	46
7.3.1	FP Type 0: Reference FP (ReFP)	46
7.3.2	FP Type 1a: "classical" Fixed Part for ISDN Network	47
7.3.2.1	Introduction	47
7.3.2.2	Compatible services and codecs	47
7.3.2.3	Specifications	47
7.3.2.3.1	Transcoding and equalization	47
7.3.2.3.2	PP type detection	48
7.3.2.3.3	Activation of audio processing functions	48
7.3.2.3.4	Transmission specification	48
7.3.3	FP Type 1b: "new" Fixed Part for ISDN Network	48
7.3.3.1	Introduction	48
7.3.3.2	Compatible services and codecs	49
7.3.3.3	Specification	49
7.3.3.3.1	Transcoding and equalization	49
7.3.3.3.2	PP type detection	49
7.3.3.3.3	Activation of audio processing functions	49
7.3.3.3.4	Transmission specification	50
7.3.4	FP Type 2: FP with analog 2-wire interface, 3,1 kHz service	50
7.3.4.1	Introduction	50
7.3.4.2	Compatible services, physical interfaces and codecs	50
7.3.4.3	Specification	50
7.3.4.3.1	Transcoding, equalization and conversion	50
7.3.4.3.2	PP type detection and activation of audio processing functions	51
7.3.4.3.3	Transmission specification	51
7.3.5	FP Type 3: VoIP narrowband Fixed Part	51
7.3.5.1	Introduction	51
7.3.5.2	Compatible services, physical interfaces and codecs	51
7.3.5.3	Specification	52
7.3.5.3.1	Transcoding and equalization	52
7.3.5.3.2	PP type detection	52
7.3.5.3.3	Activation of audio processing functions	52
7.3.5.3.4	Transmission specification	53
7.3.6	FP Type 4: ISDN wideband Fixed Part	53
7.3.6.1	Introduction	53
7.3.6.2	Compatible services and codecs	53
7.3.6.3	Specification	54
7.3.6.3.1	Transcoding and equalization	54
7.3.6.3.2	PP type detection	54
7.3.6.3.3	Activation of audio processing functions	54
7.3.6.3.4	Transmission specification	54
7.3.7	FP Type 5: VoIP wideband Fixed Part	55
7.3.7.1	Introduction	55
7.3.7.2	Compatible services, physical interfaces and codecs	55
7.3.7.3	Specification	55
7.3.7.3.1	Transcoding and equalization	55
7.3.7.3.2	PP type detection	55
7.3.7.3.3	Activation of audio processing functions	56
7.3.7.3.4	Transmission specification	56
7.3.8	FP Type 6a: FP handling an Internal call inside a DECT FP (any service)	56
7.3.8.1	Introduction	56
7.3.8.2	Compatible services, physical interfaces and codecs	56

This is a preview of "DS/EN 300 175-8 V2.7...". [Click here to purchase the full version from the ANSI store.](#)

7.3.9	FP Type 6b: FP handling an n-party conference inside a DECT FP (any service)	57
7.3.9.1	Introduction	57
7.3.9.2	Compatible services, physical interfaces and codecs	57
7.3.9.3	Specification for the conference bridge.....	57
7.3.10	FP Type 7: DECT Repeater part (REP)	57
7.3.10.1	Introduction	57
7.3.10.2	Compatible services, physical interfaces and codecs	57
7.3.10.3	Specification.....	57
7.4	Additional features	58
7.4.1	Introduction.....	58
7.4.2	Echo canceller in Fixed Part	58
7.4.3	Echo suppressor in Fixed Part.....	59
7.5	Transmission characteristics for Portable Parts	59
7.5.1	Transmission characteristics for Portable Part type 1a ("Classic GAP" handset)	59
7.5.1.1	PP frequency responses.....	59
7.5.1.1.1	Sending	59
7.5.1.1.2	Receiving.....	60
7.5.1.2	PP sending and receiving loudness ratings.....	60
7.5.1.2.1	Nominal values	60
7.5.1.2.2	User-controlled volume control in PP	60
7.5.1.2.3	PP adaptive volume control	61
7.5.1.3	Sidetone.....	61
7.5.1.3.1	Talker sidetone	61
7.5.1.3.2	Listener sidetone.....	61
7.5.1.4	Terminal coupling loss	62
7.5.1.4.1	Weighted Terminal Coupling Loss (TCLw).....	62
7.5.1.4.2	Stability loss	62
7.5.1.5	Distortion	62
7.5.1.5.1	Sending	62
7.5.1.5.2	Receiving.....	63
7.5.1.5.3	Sidetone	63
7.5.1.6	Out of band signals.....	63
7.5.1.6.1	Sending (discrimination against out of band input signals).....	63
7.5.1.6.2	Receiving (spurious out of band signals).....	63
7.5.1.7	Noise	63
7.5.1.7.1	Sending.....	63
7.5.1.7.2	Band-limited noise.....	63
7.5.1.7.3	Receiving.....	63
7.5.1.7.4	Level of sampling frequency (receiving).....	64
7.5.1.8	Acoustic shock	64
7.5.1.8.0	General	64
7.5.1.8.1	Continuous signal	64
7.5.1.8.2	Peak signal.....	64
7.5.1.9	PP Delay.....	64
7.5.1.10	PP ambient noise rejection	64
7.5.2	Additional requirements for PP type 1b ("improved GAP" handset)	64
7.5.2.0	General	64
7.5.2.1	Terminal coupling loss	64
7.5.2.1.1	Weighted Terminal Coupling Loss (TCLw).....	64
7.5.2.2	Attenuation Range in Sending Direction during Double Talk $A_{H,S,dt}$	65
7.5.2.3	Attenuation Range in Receiving Direction during Double Talk $A_{H,R,dt}$	65
7.5.2.4	Activation in Sending Direction.....	65
7.5.2.5	Activation in Receiving Direction.....	66
7.5.3	Transmission characteristics for PP types 1c and 1d (HATS tested, narrowband telephony handsets).....	66
7.5.3.1	PP frequency responses.....	66
7.5.3.1.1	Sending.....	66
7.5.3.1.2	Receiving.....	67
7.5.3.2	PP sending and receiving loudness ratings.....	69
7.5.3.2.1	Nominal values	69
7.5.3.2.2	User-controlled volume control in PP	70
7.5.3.2.3	PP adaptive volume control.....	70

This is a preview of "DS/EN 300 175-8 V2.7...". Click here to purchase the full version from the ANSI store.

7.5.3.3.1	Talker sidetone	71
7.5.3.3.2	D Factor	71
7.5.3.3.3	Sidetone delay	71
7.5.3.4	Terminal coupling loss	71
7.5.3.4.1	TCLw of Portable Part.....	71
7.5.3.4.2	Stability loss	72
7.5.3.5	Distortion	72
7.5.3.5.1	Sending Distortion.....	72
7.5.3.5.2	Receiving Distortion.....	72
7.5.3.6	Out of band signals.....	72
7.5.3.6.1	Out-of-band Signals in Send direction	72
7.5.3.6.2	Out-of-band signals in receiving direction	73
7.5.3.7	Noise	73
7.5.3.7.1	Sending.....	73
7.5.3.7.2	Receiving.....	73
7.5.3.8	Acoustic shock	74
7.5.3.8.0	General	74
7.5.3.8.1	Continuous signal	74
7.5.3.8.2	Peak signal.....	74
7.5.3.9	Delay	74
7.5.3.10	Variation of gain with input level-sending	74
7.5.3.11	Double Talk Performance	75
7.5.3.11.0	General	75
7.5.3.11.1	Attenuation Range in Sending Direction during Double Talk $A_{H,S,dt}$	75
7.5.3.11.2	Attenuation Range in Receiving Direction during Double Talk $A_{H,S,dt}$	75
7.5.3.11.3	Detection of Echo Components during Double Talk.....	76
7.5.3.11.4	Minimum activation level and sensitivity of double talk detection	76
7.5.3.12	Switching characteristics.....	76
7.5.3.12.0	General	76
7.5.3.12.1	Activation in Sending Direction	76
7.5.3.12.2	Activation in Receiving Direction	77
7.5.3.12.3	Silence Suppression and Comfort Noise Generation.....	77
7.5.3.12.4	Performance in sending direction in the presence of background noise	77
7.5.3.12.5	Speech Quality in the Presence of Background Noise.....	77
7.5.3.12.6	Quality of Background Noise Transmission (with Far End Speech).....	78
7.5.3.12.7	Quality of background noise transmission (with Near End Speech)	78
7.5.3.13	Quality of echo cancellation.....	78
7.5.3.13.0	General	78
7.5.3.13.1	Temporal echo effects	78
7.5.3.13.2	Spectral Echo Attenuation	78
7.5.4	Transmission characteristics for PP types 3a and 3b (narrowband loudspeaking and handsfree devices).....	79
7.5.4.1	Sending sensitivity/frequency response	79
7.5.4.2	Receive sensitivity/frequency response.....	79
7.5.4.3	Sending loudness rating	82
7.5.4.4	Receive loudness rating.....	82
7.5.4.5	Sending distortion	83
7.5.4.6	Receiving distortion	83
7.5.4.7	Out-of-band signals in sending direction	83
7.5.4.8	Out-of-band signals in receiving direction	84
7.5.4.9	Sending noise	84
7.5.4.10	Receiving noise	84
7.5.4.11	Terminal Coupling Loss of PP	85
7.5.4.12	Stability Loss of PP	85
7.5.4.13	Double Talk Performance	85
7.5.4.13.0	General	85
7.5.4.13.1	Attenuation Range in Sending Direction during Double Talk $A_{H,S,dt}$	85
7.5.4.13.2	Attenuation Range in Receiving Direction during Double Talk $A_{H,R,dt}$	86
7.5.4.13.3	Detection of Echo Components during Double Talk.....	86
7.5.4.13.4	Minimum activation level and sensitivity of double talk detection	87
7.5.4.14	Switching characteristics.....	87

This is a preview of "DS/EN 300 175-8 V2.7...". [Click here to purchase the full version from the ANSI store.](#)

7.5.4.14.1	Activation in Sending Direction	87
7.5.4.14.2	Activation in Receiving Direction	87
7.5.4.14.3	Silence Suppression and Comfort Noise Generation.....	88
7.5.4.14.4	Performance in sending direction in the presence of background noise.....	88
7.5.4.14.5	Speech Quality in the Presence of Background Noise.....	88
7.5.4.14.6	Quality of Background Noise Transmission (with Far End Speech).....	88
7.5.4.14.7	Quality of background noise transmission (with Near End Speech)	88
7.5.4.15	Quality of echo cancellation.....	89
7.5.4.15.0	General	89
7.5.4.15.1	Temporal echo effects	89
7.5.4.15.2	Spectral Echo Attenuation	89
7.5.5	Transmission characteristics for PP type 2a (P.311 tested, wideband handset).....	89
7.5.5.0	General	89
7.5.5.1	Sending characteristics.....	89
7.5.5.1.1	Loudness rating	89
7.5.5.1.2	Sensitivity/frequency characteristics	90
7.5.5.1.3	Noise.....	90
7.5.5.1.4	Distortion.....	90
7.5.5.1.5	Discrimination against out-of-band input signals	90
7.5.5.2	Receiving characteristics.....	90
7.5.5.2.1	Loudness rating	90
7.5.5.2.2	Sensitivity/frequency characteristics	90
7.5.5.2.3	Noise.....	90
7.5.5.2.4	Distortion.....	91
7.5.5.2.5	Spurious out-of-band receiving signals	91
7.5.5.3	Sidetone characteristics	91
7.5.5.3.1	Talker sidetone	91
7.5.5.3.2	Sidetone distortion.....	91
7.5.5.4	Echo path loss characteristics.....	91
7.5.5.4.1	Weighted terminal coupling loss	91
7.5.5.4.2	Stability loss	92
7.5.6	Transmission characteristics for PP type 2b and 2c (HATS tested wideband handsets)	92
7.5.6.1	PP frequency responses.....	92
7.5.6.1.1	Sending.....	92
7.5.6.1.2	Receiving.....	93
7.5.6.2	PP send and receive loudness ratings	95
7.5.6.2.1	Nominal values.....	95
7.5.6.2.2	User-controlled volume control in PP	96
7.5.6.2.3	PP adaptive volume control.....	96
7.5.6.3	Sidetone.....	96
7.5.6.3.1	Talker sidetone	96
7.5.6.3.2	D Factor.....	97
7.5.6.3.3	Sidetone delay	97
7.5.6.4	Terminal coupling loss.....	97
7.5.6.4.1	Weighted Terminal Coupling Loss (TCLw).....	97
7.5.6.4.2	Stability loss	97
7.5.6.5	Distortion	98
7.5.6.5.1	Sending Distortion.....	98
7.5.6.5.2	Receiving Distortion.....	98
7.5.6.6	Noise	98
7.5.6.6.1	Sending.....	98
7.5.6.6.2	Receiving.....	99
7.5.6.7	Acoustic shock.....	99
7.5.6.7.0	General	99
7.5.6.7.1	Continuous signal	99
7.5.6.7.2	Peak signal.....	99
7.5.6.8	Delay.....	99
7.5.6.9	Variation of gain with input level-sending	99
7.5.6.10	Double talk Performance.....	100
7.5.6.10.0	General	100
7.5.6.10.1	Attenuation Range in Sending Direction during Double Talk $A_{H,S,dt}$	100

This is a preview of "DS/EN 300 175-8 V2.7...". [Click here to purchase the full version from the ANSI store.](#)

7.5.6.10.3	Detection of Echo Components during Double Talk.....	101
7.5.6.10.4	Minimum activation level and sensitivity of double talk detection.....	101
7.5.6.11	Switching characteristics.....	102
7.5.6.11.0	General.....	102
7.5.6.11.1	Activation in Sending Direction.....	102
7.5.6.11.2	Activation in Receiving Direction.....	102
7.5.6.11.3	Silence Suppression and Comfort Noise Generation.....	102
7.5.6.11.4	Performance in Sending in the Presence of Background Noise.....	102
7.5.6.11.5	Speech Quality in the Presence of Background Noise.....	103
7.5.6.11.6	Quality of Background Noise Transmission (with Far End Speech).....	103
7.5.6.11.7	Quality of background noise transmission (with Near End Speech).....	103
7.5.6.12	Quality of echo cancellation.....	103
7.5.6.12.0	General.....	103
7.5.6.12.1	Temporal echo effects.....	103
7.5.6.12.2	Spectral Echo Attenuation.....	104
7.5.7	Transmission characteristics for PP types 4a and 4b (HATS Tested wideband loudspeaking and handsfree devices).....	104
7.5.7.1	Sending sensitivity/frequency response.....	104
7.5.7.2	Receive sensitivity/frequency response.....	105
7.5.7.3	Sending loudness rating.....	108
7.5.7.4	Receive loudness rating.....	108
7.5.7.5	Sending distortion.....	109
7.5.7.6	Receiving distortion.....	109
7.5.7.7	Out-of-band signals in sending direction.....	110
7.5.7.8	Out-of-band signals in receiving direction.....	110
7.5.7.9	Sending noise.....	110
7.5.7.10	Receiving noise.....	110
7.5.7.11	Terminal Coupling Loss.....	111
7.5.7.12	Stability Loss.....	111
7.5.7.13	Double Talk Performance.....	111
7.5.7.13.0	General.....	111
7.5.7.13.1	Attenuation Range in Sending Direction during Double Talk $A_{H,S,dt}$	112
7.5.7.13.2	Attenuation Range in Receiving Direction during Double Talk $A_{H,R,dt}$	112
7.5.7.13.3	Detection of Echo Components during Double Talk.....	112
7.5.7.13.4	Minimum activation level and sensitivity of double talk detection.....	113
7.5.7.14	Switching characteristics.....	113
7.5.7.14.0	General.....	113
7.5.7.14.1	Activation in Sending Direction.....	113
7.5.7.14.2	Activation in Receiving Direction.....	113
7.5.7.14.3	Silence Suppression and Comfort Noise Generation.....	114
7.5.7.14.4	Performance in sending direction in the presence of background noise.....	114
7.5.7.14.5	Speech Quality in the Presence of Background Noise.....	114
7.5.7.14.6	Quality of Background Noise Transmission (with Far End Speech).....	114
7.5.7.14.7	Quality of background noise transmission (with Near End Speech).....	114
7.5.7.15	Quality of echo cancellation.....	115
7.5.7.15.1	Temporal echo effects.....	115
7.5.7.15.2	Spectral Echo Attenuation.....	115
7.6	Transmission characteristics for Fixed Parts.....	115
7.6.1	Transmission characteristics for FP type 1a ("Classic" Fixed Part with ISDN Network interface, 3,1 kHz service).....	115
7.6.1.1	Reduction of echo from PP.....	115
7.6.1.2	FP Network echo control.....	116
7.6.1.3	FP adaptive volume control.....	117
7.6.1.4	FP Delay.....	117
7.6.2	Transmission characteristics for FP type 1b ("new" Fixed Part with ISDN Network interface, 3,1 kHz service).....	117
7.6.2.0	General.....	117
7.6.2.1	FP Network echo control.....	117
7.6.2.2	FP adaptive volume control.....	117
7.6.2.3	FP Delay.....	118
7.6.3	Transmission characteristics for FP type 2 (Fixed Part with analog 2-wire interface, 3,1 kHz service).....	118

This is a preview of "DS/EN 300 175-8 V2.7...". [Click here to purchase the full version from the ANSI store.](#)

7.6.3.2	Network echo control.....	118
7.6.3.3	Additional requirements for DECT FP provided with a 2-wire PSTN interface.....	119
7.6.3.3.0	Test methods.....	119
7.6.3.3.1	General requirements.....	119
7.6.3.3.2	Speech performance characteristics.....	119
7.6.3.4	FP Delay.....	120
7.6.4	Transmission characteristics for FP type 3 (Fixed Part with VoIP interface, 3,1 kHz service).....	120
7.6.4.1	Send delay.....	120
7.6.4.2	Receive delay.....	120
7.6.4.3	Adaptive volume control.....	121
7.6.5	Transmission characteristics for FP type 4 (Fixed Part with ISDN network interface, wideband service).....	121
7.6.5.1	FP adaptive volume control.....	121
7.6.5.2	FP Delay.....	121
7.6.6	Transmission characteristics for FP type 5 (Fixed Part with VoIP interface, wideband service).....	121
7.6.6.1	Send Delay.....	121
7.6.6.2	Receive delay.....	122
7.6.6.3	FP adaptive volume control.....	122
8	Additional features.....	122
8.1	Loudspeaking hands-free and headset facilities.....	122
8.1.1	Loudspeaking hands-free facility.....	122
8.1.2	Headset facility.....	122
8.2	Tandem with mobile radio network.....	122
8.2.0	General.....	122
8.2.1	Tandem with GSM.....	123
8.2.1.0	Configuration.....	123
8.2.1.1	Network echo control.....	123
8.2.1.2	Terminal coupling loss.....	123
8.2.1.3	The GSM mobile transmitter operates in continuous mode.....	123
8.2.1.4	The GSM mobile transmitter operates in discontinuous mode, DTX.....	123
8.3	DECT connected to the GSM fixed network.....	123
8.3.0	General.....	123
8.3.1	Network echo control.....	124
8.3.2	Terminal coupling loss.....	124
8.4	Wireless Relay Stations (WRS).....	124
8.4.0	General.....	124
8.4.1	Modified FP network echo control requirements for implementation of 2 and 3 CRFP links in cascade.....	125
Annex A (informative): Description of "reference" echo control devices.....		126
A.0	General.....	126
A.1	Handset echo.....	126
A.1.0	Applicability.....	126
A.1.1	Overview.....	126
A.1.1.1	Connection to the PSTN/ISDN.....	126
A.1.1.1.0	General.....	126
A.1.1.1.1	Local and national calls.....	126
A.1.1.1.2	Long distance connections with echo control devices in the PSTN/ISDN, e.g. calls via satellites.....	126
A.1.1.2	Connection to the GSM network.....	127
A.1.2	Implementation of the FP echo control function.....	127
A.1.2.0	General.....	127
A.1.2.1	Suppression threshold.....	128
A.1.2.2	Static characteristics of activation control.....	128
A.1.2.3	Dynamic characteristics of activation control.....	128
A.2	Network echo.....	128
A.2.0	Applicability.....	128
A.2.1	Soft suppressor implementation of requirement 2.....	129
A.2.1.0	General.....	129

This is a preview of "DS/EN 300 175-8 V2.7...". [Click here to purchase the full version from the ANSI store.](#)

A.2.1.2	Dynamic characteristics	130
A.2.2	Additional echo control for a 2-wire interface of requirement 1	130
A.2.3	Echo canceller used for both requirements 1 and 2	131
Annex B (informative):	Local loop application	132
B.0	General	132
B.1	DECT tethered local loop replacement with 2-wire PP end system.....	132
B.1.0	Configuration	132
B.1.1	TCLw requirements.....	132
B.1.2	Network echo	133
Annex C (informative):	GSM Discontinuous Transmission (DTX), and Voice Activity Detection (VAD).....	134
Annex D (informative):	Speech levels in relation to ambient room noise and examples of adaptive volume control settings	135
Annex E (informative):	Echo related topics.....	136
E.1	Summary table on echo parameters for PPs and FPs	136
E.2	General information about Delay-Echo interaction for DECT terminals.....	142
Annex F (informative):	Guidelines on specific requirements.....	145
F.1	Delay requirements for FPs with VoIP interface	145
F.1.1	Delay requirements for FP type 3 (Fixed Part with VoIP interface, 3,1 kHz service).....	145
F.1.1.0	General.....	145
F.1.1.1	Send delay.....	145
F.1.1.2	Receive delay.....	146
F.1.2	Delay requirements for FP type 5 (Fixed Part with VoIP interface, wideband service).....	147
F.1.2.0	General.....	147
F.1.2.1	Send Delay.....	147
F.1.2.2	Receive delay.....	148
Annex G (informative):	Bibliography.....	150
Annex H (informative):	Change history	151
History		152

This is a preview of "DS/EN 300 175-8 V2.7...". [Click here to purchase the full version from the ANSI store.](#)

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Foreword

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

The present document is part 8 of a multi-part deliverable ([1] to [7]). Full details of the entire series can be found in part 1 [1].

Further details of the DECT system may be found in ETSI TR 101 178 [i.6] and ETSI ETR 043 [i.7].

National transposition dates	
Date of adoption of this EN:	25 September 2017
Date of latest announcement of this EN (doa):	31 December 2017
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	30 June 2018
Date of withdrawal of any conflicting National Standard (dow):	30 June 2019

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).

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1 Scope

The present document is one of the parts of the specification of the Digital Enhanced Cordless Telecommunications (DECT) Common Interface (CI).

This part of the DECT CI specifies the speech and audio coding and transmission requirements.

In order to ensure satisfactory interworking of different portable and fixed units, it is necessary to specify the transmission performance of the analog information over the digital link. This requires not only use of a common speech algorithm, but also standardization of frequency responses, reference speech levels (or loudness) at the air interface and various other parameters.

The present document applies to DECT equipment which includes all the necessary functions to provide real-time two-way speech conversation. Several speech services are defined in the present document, including conventional 3,1 kHz telephony, wideband 7 kHz voice transmission and super-wideband 14 kHz service. DECT Fixed part providing such services may be connected to the public circuit switched (PSTN/ISDN) network, to private networks or to the Internet.

Tethered fixed point local loop applications are not required to comply with the requirements of the present document.

For the DECT systems which connect to the Public Switched Telephone Network (PSTN) via an analog interface, the additional requirements, which are implemented in the FP, have as much as possible been aligned with ETSI TBR 038 [29].

A summary of the control and the use of the DECT echo control functions, to guide on need for options to manufacturers and installers, is found in annex A.

Information concerning test methods can be found in ETSI EN 300 176-1 [9] and ETSI EN 300 176-2 [10] (previously covered by ETSI TBR 010 [i.5]). The test methods take into account that DECT is a digital system.

The present document includes New Generation DECT, a further development of the DECT standard introducing wideband speech, improved data services, new slot types and other technical enhancements.

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 <http://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".

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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] Void.
- [9] ETSI EN 300 176-1: "Digital Enhanced Cordless Telecommunications (DECT); Test specification; Part 1: Radio".
- [10] ETSI EN 300 176-2: "Digital Enhanced Cordless Telecommunications (DECT); Test specification; Part 2: Audio and speech".
- [11] Recommendation ITU-T G.701: "Vocabulary of digital transmission and multiplexing, and pulse code modulation (PCM) terms".
- [12] Recommendation ITU-T G.726: "40, 32, 24, 16 kbit/s Adaptive Differential Pulse Code Modulation (ADPCM)".
- [13] Recommendation ITU-T G.711 (1988): "Pulse Code Modulation (PCM) of voice frequencies".
- [14] Recommendation ITU-T G.722 (2012): "7 kHz audio-coding within 64 kbit/s".
- [15] Void.
- [16] Void.
- [17] Recommendation ITU-T G.729.1 (2006): "G.729-based Embedded Variable bit-rate coder: An 8-32 kbit/s scalable wideband coder bitstream interoperable with G.729".
- [18] Void.
- [19] ISO/IEC 14496-3:2009: "Information technology -- Coding of audio-visual objects -- Part 3: Audio" (ISO/IEC JTC1/SC29/WG11 (MPEG)).
- [20] Recommendation ITU-T P.311 (2011): "Transmission characteristics for wideband digital handset and headset telephones".
- [21] Recommendation ITU-T P.10: "Vocabulary for performance and quality of service".
- [22] Recommendation ITU-T P.340: "Transmission characteristics and speech quality parameters of hands-free terminals".
- [23] Recommendation ITU-T P.58: "Head and torso simulator for telephony".
- [24] Recommendation ITU-T G.111: "Loudness Ratings (LRs) in an international connection".
- [25] Recommendation ITU-T G.1020: "Performance parameter definitions for quality of speech and other voiceband applications utilizing IP networks".
- [26] Recommendation ITU-T P.57: "Artificial ears".
- [27] Recommendation ITU-T P.502: "Objective test methods for speech communication systems using complex test signals".
- [28] Recommendation ITU-T P.51: "Artificial mouth".
- [29] 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".
- [30] Recommendation ITU-T G.131: "Talker echo and its control".

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planning aspects of the speech service in the GSM Public Land Mobile Network (PLMN) system (GSM 03.50)".

- [32] Recommendation ITU-T O.41: "Psophometer for use on telephone-type circuits".
- [33] 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".

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] IETF RFC 791 (STD 5): "Internet Protocol".
- [i.2] IETF RFC 768 (STD 6): "User Datagram Protocol".
- [i.3] IETF RFC 3550: "RTP: A Transport Protocol for Real-Time Applications".
- [i.4] ETSI TBR 008 (1998): "Integrated Services Digital Network (ISDN); Telephony 3,1 kHz teleservice; Attachment requirements for handset terminals".
- [i.5] ETSI TBR 010: "Digital Enhanced Cordless Telecommunications (DECT); General Terminal Attachment Requirements; Telephony Applications".
- [i.6] ETSI TR 101 178: "Digital Enhanced Cordless Telecommunications (DECT); A High Level Guide to the DECT Standardization".
- [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 (2007): "Transmission impairments due to speech processing".
- [i.14] Recommendation ITU-T G.107 (2009): "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".

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- [i.17] Recommendation ITU-T G.729: "Coding of speech at 8 kbit/s using conjugate-structure algebraic-code-excited linear prediction (CS-ACELP)".
- [i.18] Recommendation ITU-T G.101 (2003): "The transmission plan".
- [i.19] Recommendation ITU-T G.164 (1988): "Echo suppressors".
- [i.20] Recommendation ITU-T G.165 (1993): "Echo cancellers".
- [i.21] Recommendation ITU-T G.168 (2009): "Digital network echo cancellers".
- [i.22] IEEE 802.11™: "IEEE Standard for 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.23] 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.24] Recommendation ITU-T Y.1541: "Network performance objectives for IP-based services".

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

2-wire interface: in the context of the present document, it means the telephony analog interface over 2-wires used in the local loop

4-wire interface: in the context of the present document, 4-wire interface means any digital or analog interface with separate channels for both directions, irrespective of the physical transmission technology

NOTE: In most cases it refers to ISDN digital interface.

artificial ear: device for the calibration of earphones incorporating an acoustic coupler and a calibrated microphone for the measurement of the sound pressure and having an overall acoustic impedance similar to that of the median adult human ear over a given frequency band

artificial head: equipment including artificial ear(s) and artificial mouth

NOTE: Practical implementations are defined as HATS and LRGP (see the respective definitions).

artificial mouth: device consisting of a loudspeaker mounted in an enclosure and having a directivity and radiation pattern similar to those of the average human mouth

audio types: sets of specifications defining the acoustic and audio transmission behaviour of any DECT device (i.e. PP or FP) involved in an audio service, for a given application scenario and desired performance level. Each audio type specifies the transmission levels, equalization, echo suppression and any other relevant acoustic and audio transmission parameters

codec: combination of an analog-to-digital encoder and a digital-to-analog decoder operating in opposite directions of transmission in the same equipment

diffuse field frequency response of HATS (sound pick-up): difference, in dB, between the third-octave spectrum level of the acoustic pressure at the ear-Drum Reference Point (DRP) and the third-octave spectrum level of the acoustic pressure at the HATS Reference Point (HRP) in a diffuse sound field with the HATS absent