

ISO/IEC 23003-4:2025-03 (E)

Information technology - MPEG audio technologies - Part 4: Dynamic range control

Contents

Page

Foreword	v
Introduction	vi
1 Scope	1
2 Normative references	1
3 Terms, definitions and symbols	1
3.1 Terms and definitions	1
3.2 Symbols	3
4 Mnemonics	3
5 Technical overview	4
6 DRC decoder	5
6.1 DRC decoder configuration	5
6.1.1 Overview	5
6.1.2 Description of logical blocks	6
6.1.3 Derivation of peak and loudness values	10
6.2 Dynamic DRC gain payload	15
6.3 DRC set selection	15
6.3.1 Overview	15
6.3.2 Pre-selection based on Signal Properties and Decoder Configuration	16
6.3.3 Selection based on requests	18
6.3.4 Final selection	21
6.3.5 Applying multiple DRC sets	21
6.3.6 Album mode	21
6.3.7 Ducking and Loudness Leveling	22
6.3.8 Precedence	22
6.4 Time domain DRC application	22
6.4.1 Overview	22
6.4.2 Framing	23
6.4.3 Time resolution	23
6.4.4 Time alignment	23
6.4.5 Decoding	24
6.4.6 Gain modifications and interpolation	27
6.4.7 Spline interpolation	34
6.4.8 Look-ahead in decoder	35
6.4.9 Node reservoir	36
6.4.10 Applying the compression	37
6.4.11 Dynamic equalization	40
6.4.12 Multi-band DRC filter bank	42
6.5 Sub-band domain DRC	45
6.6 Generation of DRC gain values at the decoder	49
6.6.1 Overview	49
6.6.2 Description of logical blocks	50
6.6.3 Algorithmic details	51
6.6.4 Combining parametric and non-parametric DRCs	58
6.7 Loudness equalization support	58
6.8 Equalization tool	59
6.8.1 Overview	59
6.8.2 EQ payloads	59
6.8.3 EQ filter elements	60

6.8.4	EQ set selection.....	61
6.8.5	Application of EQ set.....	61
6.9	Complexity management.....	68
6.9.1	General.....	68
6.9.2	DRC and downmixing complexity estimation.....	68
6.9.3	EQ complexity estimation.....	70
6.10	Loudness normalization.....	71
6.10.1	Overview.....	71
6.10.2	Loudness normalization based on target loudness.....	71
6.10.3	Loudness Leveling.....	74
6.11	DRC in streaming scenarios.....	74
6.11.1	DRC configuration.....	74
6.11.2	Error handling.....	75
6.12	DRC configuration changes during active processing.....	75
7	Syntax.....	76
7.1	Syntax of DRC payload.....	76
7.2	Syntax of DRC gain payload.....	76
7.3	Syntax of static DRC payload.....	77
7.4	Syntax of DRC gain sequence.....	102
7.5	Syntax of parametric DRC tool.....	102
7.6	Syntax of equalization tools.....	108
8	Reference software.....	122
8.1	Reference software structure.....	122
8.1.1	General.....	122
8.2	Bitstream decoding software.....	122
8.2.1	General.....	122
8.2.2	MPEG-D DRC decoding software.....	122
9	Conformance.....	122
9.1	General.....	122
9.2	Conformance testing.....	123
9.2.1	Conformance test data and test procedure.....	123
9.2.2	Naming conventions.....	124
9.2.3	File format definitions.....	126
9.2.4	Conformance test tools.....	128
9.3	Encoder conformance for MPEG-D DRC bitstreams.....	129
9.3.1	Characteristics and test procedure.....	129
9.3.2	Configuration payload.....	129
9.3.3	Interface payload.....	144
9.3.4	Frame Payload.....	147
9.3.5	Requirements depending on profiles and levels.....	148
9.4	Decoder conformance test categories and conditions.....	149
9.4.1	General.....	149
9.4.2	Conformance test categories.....	149
9.4.3	Conformance test conditions.....	150
Annex A	(normative) Tables.....	159
Annex B	(normative) External interface to DRC tool.....	193
Annex C	(informative) Audio codec specific information.....	205
Annex D	(informative) DRC gain generation and encoding.....	210
Annex E	(informative) DRC set selection and adjustment at decoder.....	221
Annex F	(informative) Loudness normalization.....	228
Annex G	(informative) Peak limiter.....	229
Annex H	(informative) Equalization.....	234
Annex I	(normative) Profiles and levels.....	236
Annex J	(informative) Reference software disclaimer.....	244
Annex K	(informative) Reference software.....	245
Bibliography	246