

ISO/IEC 13170:2009-11 (E)

Information technology - 120 mm (8,54 Gbytes per side) and 80 mm (2,66 Gbytes per side) DVD re-recordable disk for dual layer (DVD-RW for DL)

Contents		Page
Foreword		vii
Introduction		viii
1	Scope	1
2	Conformance	1
2.1	Optical Disk	1
2.2	Generating system	2
2.3	Receiving system	2
3	Normative references	2
4	Terms and definitions	2
5	Conventions and notations	5
5.1	Representation of numbers	5
5.2	Names	6
6	Acronyms	6
7	General description of a disk	7
8	General requirement	8
8.1	Environments	8
8.1.1	Test environment	8
8.1.2	Operating environment	8
8.1.3	Storage environment	9
8.1.4	Transportation	9
8.2	Safety requirements	9
8.3	Flammability	10
9	Reference measurement devices	10
9.1	Pick-Up Head (PUH)	10
9.1.1	PUH for measuring recorded disks	10
9.1.2	PUH for measuring unrecorded disks	12
9.2	Measurement conditions	13
9.2.1	Recorded and unrecorded disk	13
9.2.2	Recorded disk	13
9.2.3	Unrecorded disk	13
9.3	Normalized servo transfer function	14
9.4	Reference servo for axial tracking	14
9.4.1	Recorded disk	14
9.4.2	Unrecorded disk	16
9.5	Reference servo for radial tracking	17
9.5.1	Recorded disk	17
9.5.2	Unrecorded disk	18
10	Dimensional characteristics	19
10.1	Overall dimensions	21
10.2	First transition area	21

10.3	Second transition area	22
10.4	Clamping Zone	22
10.5	Third transition area	22
10.6	R-Information Zone	23
10.6.1	Sub-divisions of the R-Information Zone	23
10.7	Information Zone	23
10.7.1	Sub-divisions of the Information zone	23
10.8	Track geometry	24
10.8.1	Track Path	25
10.9	Channel bit length	25
10.10	Rim area	25
10.11	Remark on tolerances	26
10.12	Label	26
11	Mechanical parameters	26
11.1	Mass	26
11.2	Moment of inertia	26
11.3	Dynamic imbalance	26
11.4	Sense of rotation	26
11.5	Runout	27
11.5.1	Axial runout	27
11.5.2	Radial runout	27
12	Optical parameters	27
12.1	Recorded and unrecorded disk parameters	27
12.1.1	Index of refraction	27
12.1.2	Thickness of the transparent substrate	27
12.1.3	Angular deviation	28
12.1.4	Birefringence of the transparent substrate	28
12.2	Recorded disk reflectivity	29
12.3	Unrecorded disk parameters	29
12.3.1	Polarity of reflectivity modulation	29
12.3.2	Recording power sensitivity variation	29
13	Operational signals for recorded disk	29
13.1	Measurement conditions	29
13.2	Read conditions	29
13.3	Recorded disk high frequency (HF) signals	29
13.3.1	Modulated amplitude	29
13.3.2	Signal asymmetry	30
13.3.3	Cross-track signal	30
13.4	Quality of signals	30
13.4.1	Jitter	30
13.4.2	Random errors	31
13.4.3	Defects	31
13.5	Servo signals	31
13.5.1	Differential phase tracking error signal	31
13.5.2	Tangential push-pull signal	32
13.6	Groove wobble signal	33
14	Operational signals for the unrecorded disk	34
14.1	Measurement conditions	34
14.2	Recording conditions	34
14.3	Write strategy for media testing	34
14.3.1	Write strategy for Layer 0	35
14.3.2	Write strategy for Layer 1	35
14.3.3	Definition of the write pulse	37
14.4	Servo signals	38
14.4.1	Radial push-pull tracking error signal	38
14.4.2	Defects	39
14.5	Addressing signals	40
14.5.1	Land Pre-Pit signal	40
14.5.2	Groove wobble signal	41
14.5.3	Relation in phase between wobble and Land Pre-Pit	42
15	Operational signals for Embossed Zone	43
15.1	Operational signals from the Control data blocks	43

15.1.1	Measurement conditions	43
15.1.2	Read conditions	43
15.1.3	High frequency (HF) signals	43
15.1.4	Quality of signals	43
15.1.5	Servo signals	43
15.1.6	Groove wobble signal	44
15.2	Operational signals from the Servo Blocks	44
15.2.1	Measurement conditions	45
15.2.2	Read conditions	45
15.2.3	Servo signals	45
15.2.4	Addressing signals	45
16	General	46
17	Data Frames	46
17.1	Identification Data (ID)	47
17.2	ID Error Detection Code	48
17.3	RSV	48
17.4	Error Detection Code	48
18	Scrambled Frames	49
19	ECC Block configuration	50
20	Recording Frames	51
21	Modulation	52
22	Physical Sectors	53
23	Suppress control of the d.c. component	54
24	Linking scheme	55
24.1	Structure of linking	55
24.2	2K-Link and 32K-Link	56
24.3	Lossless-Link	56
25	General description of the Information Zone	58
25.1	Layout of the Information Zone	58
25.2	Physical Sector numbering	59
26	Lead-in Zone, Middle Zone and Lead-out Zone	60
26.1	Lead-in Zone	60
26.1.1	Initial Zone	61
26.1.2	Buffer Zone 0	61
26.1.3	RW-Physical Format Information Zone	61
26.1.4	Reference Code Zone	65
26.1.5	Buffer Zone 1	65
26.1.6	Control Data Zone	65
26.1.7	Extra Border Zone	81
26.2	Middle Zone	82
26.3	Lead-out Zone	82
27	General description of the Unrecorded Zone	83
27.1	Layout of the Unrecorded Zone	83
27.2	ECC Block address	84
27.3	ECC Block numbering	84
28	Pre-pit Data format	85
28.1	General description	85
28.2	Pre-pit block structure	87
28.3	Pre-pit data block configuration	89
28.3.1	Relative address	90
28.3.2	ECC Block address data configuration	91
28.3.3	Parity A and Parity B	91
28.3.4	Field ID0	92
28.3.5	Field ID1	93
28.3.6	Field ID2	95
28.3.7	Field ID3 and Field ID4	95
28.3.8	Field ID5	98
29	Data structure of R-Information Zone and ODTA	98
29.1	Layout of Disk Testing Area and Recording Management Area	98
29.2	Structure of the Disk Testing Area	99
29.3	Data configuration of the Recording Management Area (RMA)	101

29.3.1	Sector format of the Recording Management Area	101
29.3.2	Logical data structure of RMA	103
29.3.3	Recording Management Data (Format2 RMD and Format3 RMD)	104
Annex A (normative)	Measurement of the angular deviation	125
Annex B (normative)	Measurement of birefringence	127
Annex C (normative)	Measurement of the differential phase tracking error	130
Annex D (normative)	Measurement of light reflectance	134
Annex E (normative)	Tapered cone for disk clamping	136
Annex F (normative)	Measurement of jitter	137
Annex G (normative)	8-to-16 Modulation with RLL (2,10) requirements	140
Annex H (normative)	Optimum Power Control	150
Annex I (normative)	Measurement of the groove wobble amplitude	154
Annex J (normative)	Measurement methods for the operational signals for an unrecorded disk	156
Annex K (normative)	NBCA Code	157
Annex L (normative)	Format operation	163
Annex M (normative)	Measurement method of the Land Pre-Pit signal	166
Annex N (normative)	Construction of Information Zone	167
Annex O (normative)	Recording order	169
Annex P (normative)	Clearance in the number of sectors	170
Annex Q (normative)	Layer jump recording	172
Annex R (informative)	Measurement method of the Space layer thickness in a disk	174
Annex S (informative)	Transportation	175