

ISO/IEC 17592:2004-07 (E)

Information technology - 120 mm (4,7 Gbytes per side) and 80 mm (1,46 Gbytes per side) DVD rewritable disk (DVD-RAM)

Contents		Page
Section 1 - General		1
1	Scope	1
2	Conformance	1
2.1	Optical Disk	1
2.2	Generating system	1
2.3	Receiving system	2
3	Normative references	2
4	Terms and definitions	2
5	Conventions and notations	4
5.1	Representation of numbers	4
5.2	Names	4
6	List of acronyms	4
7	General description of the optical disk	5
8	General requirements	6
8.1	Environments	6
8.1.1	Test environment	6
8.1.2	Operating environment	6
8.1.3	Storage environment	6
8.1.4	Transportation	6
8.2	Safety requirement	6
8.3	Flammability	6
9	Reference Drive	7
9.1	Optical Head	7
9.2	Read channels	8
9.3	Rotation speed	8
9.4	Disk clamping	8
9.5	Normalized servo transfer function	8
9.6	Reference Servo for axial tracking	8
9.7	Reference Servo for radial tracking	10
Section 2 - Dimensional, mechanical and physical characteristics of the disk		11
10	Dimensional characteristics	11
10.1	Overall dimensions	12
10.2	First transition area	13
10.3	Second transition area	13
10.4	Clamping Zone	13
10.5	Third transition area	13
10.6	Rim area	14
10.7	Remark on tolerances	14
10.8	Label	14

11	Mechanical characteristics	14
11.1	Mass	14
11.2	Moment of inertia	14
11.3	Dynamic imbalance	15
11.4	Sense of rotation	15
11.5	Runout	15
11.5.1	Axial runout	15
11.5.2	Radial runout	15
12	Optical characteristics	15
12.1	Index of refraction	15
12.2	Thickness of the transparent substrate	15
12.3	Angular deviation	15
12.4	Birefringence of the transparent substrate	16
12.5	Reflectivity	16
Section 3 - Format of information		17
13	Data format	17
13.1	Data Frames	17
13.1.1	Data ID	18
13.1.2	Data ID Error Detection code (IED)	18
13.1.3	Reserved bytes	19
13.1.4	Error Detection Code (EDC)	19
13.2	Scrambled Frames	19
13.3	ECC Blocks	20
13.4	Recording Frames	21
13.5	Recording code and NRZI conversion	22
13.6	Recorded Data Field	23
13.7	DC component suppress Control (DCC)	24
13.7.1	DCC for the data in the Rewritable Area	24
13.7.2	DCC for the data in the Embossed Area	24
13.7.3	PID and PED recording	25
14	Track format	25
14.1	Track shape	25
14.2	Track path	25
14.3	Track pitch	26
14.4	Track layout	26
14.5	Rotation speed	26
14.6	Radial alignment	28
14.7	Sector number	28
15	Sector format	29
15.1	Sector layout	29
15.1.1	Sector layout in the Rewritable Area	29
15.1.2	Sector layout in the Embossed Area	30
15.2	VFO fields	30
15.3	Address Mark (AM)	31
15.4	Physical ID (PID) fields	31
15.5	PID Error Detection code (PED) fields	32
15.6	Postamble 1 and Postamble 2 (PA 1, PA 2) fields	32
15.7	Mirror field	34
15.8	Gap field	34
15.9	Guard 1 field	34
15.10	Pre-Synchronous code (PS) field	34
15.11	Data field	34
15.12	Postamble 3 (PA 3) field	34
15.13	Guard 2 field	34
15.14	Recording polarity randomization	35
15.15	Buffer field	35

16	Format of the Information Zone	35
16.1	Division of the Information Zone	35
16.2	Lead-in Zone	38
16.2.1	Structure of Lead-in Zone	38
16.2.2	Initial Zone	39
16.2.3	Reference Code Zone	39
16.2.4	Buffer Zone 1	39
16.2.5	Buffer Zone 2	39
16.2.6	Control Data Zone	39
16.2.7	Connection Zone	52
16.2.8	Guard Track Zones 1 and 2	53
16.2.9	Disk Test Zone	53
16.2.10	Drive Test Zone	53
16.2.11	Disk Identification Zone	54
16.2.12	DMA 1 and DMA 2	56
16.3	Data Zone	56
16.3.1	Structure of Data Zone and of the Defect Management Areas (DMAs)	56
16.3.2	Guard Track Zones	57
16.3.3	Partitioning	57
16.3.4	Number of blocks in the supplementary spare area	60
16.4	Lead-out Zone	61
16.4.1	Structure of Lead-out Zone	61
16.4.2	DMA 3 and DMA 4	61
16.4.3	Reserved Zone	61
16.4.4	Guard Track Zone 1	61
16.4.5	Drive Test Zone	61
16.4.6	Disk Test Zone	61
16.4.7	Guard Track Zone 2	62
17	Defect management	62
17.1	Defect Management Areas (DMAs)	62
17.2	Disk Definition Structure (DDS)	63
17.3	Spare sectors	65
17.4	Slipping Algorithm	66
17.5	Linear Replacement Algorithm	67
17.6	Primary Defect List (PDL)	68
17.7	Secondary Defect List (SDL)	69
17.8	Formatting of the disk	72
17.8.1	Initialization	72
17.8.2	Re-initialization	73
17.8.3	Data field number resulting from Initialization and Re-initialization	73
17.9	Write procedure	74
17.10	Read procedure	74
17.10.1	Read procedure	74
17.10.2	Blank ECC Block	74
Section 4 - Characteristics of embossed information		75
18	Method of testing	75
18.1	Environment	75
18.2	Reference Drive	75
18.2.1	Optics and mechanics	75
18.2.2	Read power	75
18.2.3	Read channels	75
18.2.4	Tracking channel	75
18.2.5	Tracking	75
18.3	Definition of signals	75
19	Signals from lands and grooves	80
19.1	Push-pull signal	80
19.2	Divided push-pull signal	80
19.3	On-track signal	80

19.4	Phase depth	81
19.5	Wobble signal	81
20	Signals from Header fields	81
20.1	VFO 1 and VFO 2	82
20.2	Address Mark, PID, PED and Postamble	82
20.3	Signals from Header 1, Header 2, Header 3 and Header 4	83
20.4	Phase depth	84
21	Signals from Embossed Area	84
21.1	High Frequency (HF) signal	84
21.1.1	Modulated amplitude	84
21.1.2	Signal asymmetry	84
21.1.3	Cross-track signal	84
21.2	Jitter	84
21.3	Servo signal	84
21.3.1	Differential phase tracking error signal	85
21.3.2	Tangential push-pull signal	85
Section 5 - Characteristics of the recording layer		87
22	Method of testing	87
22.1	Environment	87
22.2	Reference Drive	87
22.2.1	Optics and mechanics	87
22.2.2	Read power	87
22.2.3	Read channel	87
22.2.4	Tracking	87
22.3	Write conditions	87
22.3.1	Write pulse	87
22.3.2	Write power	88
22.3.3	Adaptive write control table	89
22.3.4	Adaptive write pulse control mode	90
22.4	Definition of signals	90
23	Write characteristics	91
23.1	Modulated amplitude and Signal asymmetry	91
23.2	Jitter	91
Section 6 - Characteristics of user data		92
24	Method of testing	92
Annex A (normative) Measurement of the angular deviation		93
Annex B (normative) Measurement of birefringence		95
Annex C (normative) Measurement of the differential phase tracking error		97
Annex D (normative) Reflectivity calibration and measuring method		101
Annex E (normative) Tapered cone for disk clamping		103
Annex F (normative) Measuring conditions for the operation signals		104
Annex G (normative) 8-to-16 Recording code with RLL (2,10) requirements		106
Annex H (normative) Definition of the write pulse		116
Annex J (normative) Burst Cutting Area (BCA)		119
Annex K (informative) Guideline for randomization of the Gap length, the Guard 1 length and the recording polarity		127
Annex L (informative) Transportation		128
Annex M (informative) Guideline for sector replacement		129