

# ISO/IEC 12862:2009-06 (E)

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

---

<b>Contents</b>		<b>Page</b>
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 .....	6
5.1	Representation of numbers .....	6
5.2	Names .....	6
6	Abbreviated terms .....	6
7	General description of a disk .....	8
8	General requirement .....	8
8.1	Environments .....	8
8.1.1	Test environment .....	8
8.1.2	Operating environment .....	9
8.1.3	Storage environment .....	9
8.1.4	Transportation .....	10
8.2	Safety requirements .....	10
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 .....	13
9.4	Reference servo for axial tracking .....	14
9.4.1	Recorded disk .....	14
9.4.2	Unrecorded disk .....	15
9.5	Reference servo for radial tracking .....	16
9.5.1	Recorded disk .....	16
9.5.2	Unrecorded disk .....	17
10	Dimensional characteristics .....	18
10.1	Overall dimensions .....	20
10.2	First transition area .....	20

10.3	Second transition area .....	21
10.4	Clamping Zone .....	21
10.5	Third transition area .....	21
10.6	R-Information Zone .....	22
10.6.1	Sub-divisions of the R-Information Zone .....	22
10.7	Information Zone .....	22
10.7.1	Sub-divisions of the Information zone .....	22
10.8	Track geometry .....	23
10.8.1	Track Path .....	24
10.9	Channel bit length .....	24
10.10	Rim area .....	24
10.11	Remark on tolerances .....	25
10.12	Label .....	25
11	Mechanical parameters .....	25
11.1	Mass .....	25
11.2	Moment of inertia .....	25
11.3	Dynamic imbalance .....	25
11.4	Sense of rotation .....	25
11.5	Runout .....	26
11.5.1	Axial runout .....	26
11.5.2	Radial runout .....	26
12	Optical parameters .....	26
12.1	Recorded and unrecorded disk parameters .....	26
12.1.1	Index of refraction .....	26
12.1.2	Thickness of the transparent substrate .....	26
12.1.3	Angular deviation .....	27
12.1.4	Birefringence of the transparent substrate .....	27
12.2	Recorded disk reflectivity .....	27
12.3	Unrecorded disk parameters .....	28
12.3.1	Polarity of reflectivity modulation .....	28
12.3.2	Recording power sensitivity variation .....	28
13	Operational signals for recorded disk .....	28
13.1	Measurement conditions .....	28
13.2	Read conditions .....	28
13.3	Recorded disk high frequency (HF) signals .....	28
13.3.1	Modulated amplitude .....	28
13.3.2	Signal asymmetry .....	29
13.3.3	Cross-track signal .....	29
13.4	Quality of signals .....	29
13.4.1	Jitter .....	29
13.4.2	Random errors .....	29
13.4.3	Defects .....	30
13.5	Servo signals .....	30
13.5.1	Differential phase tracking error signal .....	30
13.5.2	Tangential push-pull signal .....	30
13.6	Groove wobble signal .....	32
14	Operational signals for the unrecorded disk .....	33
14.1	Measurement conditions .....	33
14.2	Recording conditions .....	33
14.3	Write strategy for media testing .....	33
14.3.1	Definition of the write pulse .....	34
14.4	Servo signals .....	35
14.4.1	Radial push-pull tracking error signal .....	35
14.4.2	Defects .....	36
14.5	Addressing signals .....	36
14.5.1	Land Pre-Pit signal .....	36
14.5.2	Groove wobble signal .....	38
14.5.3	Relation in phase between wobble and Land Pre-Pit .....	38
15	General .....	39
16	Data Frames .....	39
16.1	Identification Data (ID) .....	40
16.2	ID Error Detection Code .....	41

16.3	RSV .....	41
16.4	Error Detection Code .....	41
17	Scrambled Frames .....	42
18	ECC Block configuration .....	43
19	Recording Frames .....	44
20	Modulation .....	45
21	Physical Sectors .....	46
22	Suppress control of the d.c. component .....	47
23	Linking scheme .....	48
23.1	Structure of linking .....	48
23.2	2K-Link and 32K-Link .....	49
23.3	Lossless-Link .....	49
24	General description of the Information Zone .....	51
24.1	Layout of the Information Zone .....	51
24.2	Physical Sector numbering .....	52
25	Lead-in Zone, Middle Zone and Lead-out Zone .....	53
25.1	Lead-in Zone .....	53
25.1.1	Initial Zone .....	54
25.1.2	Buffer Zone 0 .....	54
25.1.3	R-Physical Format Information Zone .....	54
25.1.4	Reference Code Zone .....	58
25.1.5	Buffer Zone 1 .....	58
25.1.6	Control Data Zone .....	58
25.1.7	Extra Border Zone .....	73
25.2	Middle Zone .....	74
25.3	Lead-out Zone .....	74
25.3.1	Structure of Lead-out Zone with Format4 RMD .....	74
25.3.2	Superficial Extra Border Zone .....	75
26	General description of the Unrecorded Zone .....	75
26.1	Layout of the Unrecorded Zone .....	76
26.2	ECC Block address .....	77
26.3	ECC Block numbering .....	77
27	Pre-pit Data format .....	77
27.1	General description .....	77
27.2	Pre-pit block structure .....	80
27.3	Pre-pit data block configuration .....	82
27.3.1	Relative address .....	83
27.3.2	ECC Block address data configuration .....	83
27.3.3	Parity A and Parity B .....	83
27.3.4	Field ID0 .....	84
27.3.5	Field ID1 .....	85
27.3.6	Field ID2 .....	86
27.3.7	Field ID3 and Field ID4 .....	87
27.3.8	Field ID5 .....	89
28	Data structure of R-Information Zone and ODTA .....	90
28.1	Layout of Disk Testing Area and Recording Management Area .....	90
28.2	Structure of the Disk Testing Area .....	91
28.3	Data configuration of the Recording Management Area (RMA) .....	93
28.3.1	Sector format of the Recording Management Area .....	93
28.3.2	Recording Management Data (Format1 RMD and Format4 RMD) .....	95
Annex A (normative) Measurement of the angular deviation .....		127
Annex B (normative) Measurement of birefringence .....		129
Annex C (normative) Measurement of the differential phase tracking error .....		132
Annex D (normative) Measurement of light reflectance .....		136
Annex E (normative) Tapered cone for disk clamping .....		138

<b>Annex F (normative) Measurement of jitter .....</b>	<b>139</b>
<b>Annex G (normative) 8-to-16 Modulation with RLL (2,10) requirements .....</b>	<b>142</b>
<b>Annex H (normative) Optimum Power Control .....</b>	<b>152</b>
<b>Annex I (normative) Measurement of the groove wobble amplitude .....</b>	<b>154</b>
<b>Annex J (normative) Measurement methods for the operational signals for an unrecorded disk ....</b>	<b>156</b>
<b>Annex K (normative) NBCA Code .....</b>	<b>157</b>
<b>Annex L (normative) Border Zone .....</b>	<b>163</b>
<b>Annex M (normative) Measurement method of the Land Pre-Pit signal .....</b>	<b>176</b>
<b>Annex N (normative) Construction of Information Zone .....</b>	<b>177</b>
<b>Annex O (normative) Recording order .....</b>	<b>179</b>
<b>Annex P (normative) Clearance in the number of sectors .....</b>	<b>180</b>
<b>Annex Q (normative) Anchor Point Re-mapping .....</b>	<b>182</b>
<b>Annex R (informative) Measurement method of the Space layer thickness in a disk .....</b>	<b>184</b>
<b>Annex S (informative) Transportation .....</b>	<b>185</b>