ISO/IEC 12862:2011-05 (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 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 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 9
8.1 Environments 9
8.1.1 Test environment 9
8.1.2 Operating environment 9
8.1.3 Storage environment 10
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 14
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 23
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 25
11.5.1 Axial runout 25
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 Data Format 39
15.1 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 59
25.1.7 Extra Border Zone 72
25.2 Middle Zone 72
25.3 Lead-out Zone 73
25.3.1 Structure of Lead-out Zone with Format4 RMD 73
25.3.2 Superficial Extra Border Zone 73

26 General description of the Unrecorded Zone 74
26.1 Layout of the Unrecorded Zone 74
26.2 ECC Block address 75
26.3 ECC Block numbering 75

27 Pre-pit Data format 76
27.1 General description 76
27.2 Pre-pit block structure 78
27.3 Pre-pit data block configuration 80
27.3.1 Relative address 82
27.3.2 ECC Block address data configuration 82
27.3.3 Parity A and Parity B 82
27.3.4 Field ID0 84
27.3.5 Field ID1 85
27.3.6 Field ID2 87
27.3.7 Field ID3 and Field ID4 88
27.3.8 Field ID5 90

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 124

Annex B (normative) Measurement of birefringence 126

Annex C (normative) Measurement of the differential phase tracking error 129

Annex D (normative) Measurement of light reflectance 133

Annex E (normative) Tapered cone for disk clamping 135

Annex F (normative) Measurement of jitter 136

Annex G (normative) 8-to-16 Modulation with RLL (2,10) requirements 139

Annex H (normative) Optimum Power Control 149

Annex I (normative) Measurement of the groove wobble amplitude 151

Annex J (normative) Measurement methods for the operational signals for an unrecorded disk 153

Annex K (normative) NBCA Code 154

Annex L (normative) Border Zone 160

Annex M (normative) Measurement method of the Land Pre-Pit signal 173

Annex N (normative) Construction of Information Zone 174

Annex O (normative) Recording order 176

Annex P (normative) Clearance in the number of sectors 177

Annex Q (normative) Anchor Point Re-mapping 179

Annex R (informative) Measurement method of the Space layer thickness in a disk 181

Annex S (informative) Transportation 182