



DVD-R Disc for General & for DL

TEST SPECIFICATION

**Version 2.4
January 2008**

Amendment for DVD-R Disc for General & for DL TS Version 2.4 (January 2008)

The following pages were amended without changing the version number of the TS.

- **Minor amendment (May 20, 2009)**

Page	Location	Amendment
Page 27	Annex A	<ul style="list-style-type: none">• Class-A Lab information of "Industrial Technology Research Institute" was updated.

- **Minor amendment (January 2010)**

Page	Location	Amendment
Page 27	Annex A	<ul style="list-style-type: none">• Class-A Lab information of "PIONEER CORPORATION" and "Hitachi Ltd. (company name)" were updated.

- **Amendment 1 (January 2012)**

Page	Location	Amendment
Page 27	Annex A	<ul style="list-style-type: none">• "Toshiba Corporation" was deleted from the Class-A Lab list.

- **Amendment 2 (June 2012)**

Page	Location	Amendment
Page 27	Annex A	<ul style="list-style-type: none">• "Industrial Technology Research Institute" was deleted from the Class-A Lab list.

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Revision History

- April 2000
DVD-R Disc for General Test Specification version 2.0 (Draft) was distributed to SG-6 members.
- May 2000
DVD-R Disc for General Test Specification version 2.0 (Draft) was approved by Verification Task Force members.
- June 2000
DVD-R Disc for General Test Specification version 2.0 was authorized by Steering Committee members.
- August 24, 2000
To add the test procedure and items for pre-recorded area was approved by SG-6 members.
- April 17, 2002
VTF members approved amendments to clarify the measuring points in radius for 8 cm disc and to add a DVD-R for General Disc (8cm, 1.46Gbytes type) in **1.3 Scope of Products Covered**.
- October 2003
Above amendments and addition of Class-A Labs ITRI and Hitachi were incorporated in Version 2.0₁; the first revision of Version 2.0.
- November 22, 2004
DVD-R Disc for General Test Specification Version 2.1 was approved by VTF.
The version 2.1 is totally revised version for integrating Test Specification of each recording speed disc, based on the Version 2.1 of DVD-R for General Book Part 1.
Accordingly, Test Specifications for 4x-speed DVD-R Disc and 8x-speed DVD-R Disc were discontinued.
- February 25, 2005
DVD-R Disc for General & for DL Test Specification Version 2.2 was approved by VTF.
The version 2.2 added Test Specification for DVD-R Disc for DL based on DVD-R for DL Book Part 1: Ver. 3.0.
- February 21, 2006
DVD-R Disc for General & for DL Test Specification Version 2.3 was approved by VTF.
The Version 2.3 added Test Specification for 6x-speed and 8x-speed DVD-R Disc for DL.
After that, some editorial modifications were done.
(The Version 2.3 was issued in April 2006.)
- January 11, 2008
DVD-R Disc for General & for DL Test Specification Version 2.4 was approved by TSTF.
The Version 2.4 added Test Specification for 10x-speed and 12x-speed DVD-R Disc for DL.

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1. General

1.1 Scope

The scope of this Test Specification is the testing DVD-R Disc for compliance with DVD Specifications mentioned in 1.2. Hereinafter, DVD-R Disc conformed to DVD-R for General Book may be called **DVD-R Disc for General or SL Disc** and DVD-R Disc conformed to DVD-R for DL Book may be called **DVD-R Disc for DL or DL Disc**. The test procedure described herein could be used by Class-A Verification Labs, Class-B Verification Labs and Quality Assurance Departments of DVD-R Disc manufacturers. The scope of this Test Specification is limited to product's compliance to the DVD Specifications and not to evaluate performance of products.

1.2 Normative References

a) DVD Specifications for Recordable Disc for General (DVD-R for General):

Part 1: Physical Specifications Version 2.1 and

Optional Specifications 4x-speed DVD-R Revision 1.0

Optional Specifications 6x-speed DVD-R Revision 2.0

Optional Specifications 8x-speed DVD-R Revision 3.0

Optional Specifications 2x-speed DVD-R Revision 4.0

Optional Specifications 12x-speed DVD-R Revision 5.0

Optional Specifications 16x-speed DVD-R Revision 6.0

b) DVD Specifications for Recordable Disc for Dual Layer (DVD-R for DL):

Part 1: Physical Specifications Version 3.0 and

Optional Specifications 4x-speed DVD-R for DL Revision 1.0

Optional Specifications 6x-speed DVD-R for DL Revision 2.0

Optional Specifications 8x-speed DVD-R for DL Revision 3.0

Optional Specifications 10x-speed DVD-R for DL Revision 4.0

Optional Specifications 12x-speed DVD-R for DL Revision 5.0

1.3 Scope of Products Covered

a) Single Layer (SL) discs

12cm Disc (4.7 Gbytes type)	8cm Disc (1.46 Gbytes type)
1x-speed DVD-R Disc for General (Class 0)	1x-speed DVD-R Disc for General (Class 0)
4x/1x-speed DVD-R Disc for General (Class 0)	4x/1x-speed DVD-R Disc for General (Class 0)
6x/1x-speed DVD-R Disc for General (Class 0)	6x/1x-speed DVD-R Disc for General (Class 0)
8x/1x-speed DVD-R Disc for General (Class 0)	8x/1x-speed DVD-R Disc for General (Class 0)
12x/1x-speed DVD-R Disc for General (Class 0)	
16x/1x-speed DVD-R Disc for General (Class 0)	

b) Dual Layer (DL) discs

12cm Disc (8.54 Gbytes type)	8cm Disc (2.66 Gbytes type)
2x-speed DVD-R Disc for DL (Class 0)	2x-speed DVD-R Disc for DL (Class 0)
4x/2x-speed DVD-R Disc for DL (Class 0)	4x/2x-speed DVD-R Disc for DL (Class 0)
6x/2x-speed DVD-R Disc for DL (Class 0)	6x/2x-speed DVD-R Disc for DL (Class 0)
8x/2x-speed DVD-R Disc for DL (Class 0)	8x/2x-speed DVD-R Disc for DL (Class 0)
10x/2x-speed DVD-R Disc for DL (Class 0)	
12x/2x-speed DVD-R Disc for DL (Class 0)	

Note: "Ax/Bx-speed" means the maximum recording speed is Ax-speed and the minimum recording speed is Bx-speed. It is strongly recommended that a disc should support all other recording speeds already specified between the Basic recording speed (Bx) and the maximum recording speed (Ax).

2. DVD Logo

DVD Format/Logo Licensing Corporation owns the rights to license the DVD Logo. To be able to use the DVD Logo, DVD manufacturer must have:

- License to use the Logo and
- DVD Specification compliance of the product for logo consideration must be validated by the test specifications as defined in this document.

Licensing terms for the DVD Logo are available from the DVD Format/Logo Licensing Corporation.

This chapter describes the mechanism to be used for product compliance testing.

2.1 Definition of Terms Used

First Production Model - The **First Production Model** must be tested and approved by any of the appropriate Class-A Verification Labs (see definition of Class-A Labs below) for compliance with DVD Specifications. Class-A Labs will use the test specifications described in this document for compliance verification.

The following parameters must be used to determine a **First Production Model** for each of DVD-R Disc for General (SL Disc) and DVD-R Disc for DL (DL Disc) independently:

- DVD Specifications Version n.x changing to $n \pm 1.x$
- Initial or the latest production model at the start of Logo Program for each licensee
- Different Class production model
- Additional Class production model
- Production model increased Maximum recording speed
- Production model decreased Maximum recording speed
- Production model decreased Minimum recording speed

Table 2.1-1 : List of Possible Production Model

Class/Recording Speed Possible Production Model	Class	Min. Recording Speed	Basic Recording Speed	Max. Recording Speed
1x-speed DVD-R Disc for General (Class 0)	0	1	1	1
4x/1x-speed DVD-R Disc for General (Class 0)	0	1	1	4
6x/1x-speed DVD-R Disc for General (Class 0)	0	1	1	6
8x/1x-speed DVD-R Disc for General (Class 0)	0	1	1	8
12x/1x-speed DVD-R Disc for General (Class 0)	0	1	1	12
16x/1x-speed DVD-R Disc for General (Class 0)	0	1	1	16
2x-speed DVD-R Disc for DL (Class 0)	0	2	2	2
4x/2x-speed DVD-R Disc for DL (Class 0)	0	2	2	4
6x/2x-speed DVD-R Disc for DL (Class 0)	0	2	2	6
8x/2x-speed DVD-R Disc for DL (Class 0)	0	2	2	8
10x/2x-speed DVD-R Disc for DL (Class 0)	0	2	2	10
12x/2x-speed DVD-R Disc for DL (Class 0)	0	2	2	12

Next Production Model - A **Next Production Model** does not require compliance verification from a Class-A Verification Lab but must be tested by licensee in its QA department for compliance with DVD Specifications. Licensee's QA department must have the test tools required to perform the tests specified in this document and must, at minimum, use the test procedure referred to in this document (licensee is free to have its own QA procedure, equipment and tools as long as it is a superset of the specification described in this document). A Licensee without own QA department can get the product tested by a certified Third Party Class-B Verification Lab (see definition of Class-B Labs below).

The following parameters must be used to determine a **Next Production Model**:

- DVD Specifications Version n.x changing to n.x+1
- Optional Specifications 4x-speed DVD-R Revision 1.x changing to 1.x+1
- Optional Specifications 6x-speed DVD-R Revision 2.x changing to 2.x+1
- Optional Specifications 8x-speed DVD-R Revision 3.x changing to 3.x+1
- Optional Specifications 2x-speed DVD-R Revision 4.x changing to 4.x+1
- Optional Specifications 12x-speed DVD-R Revision 5.x changing to 5.x+1
- Optional Specifications 16x-speed DVD-R Revision 6.x changing to 6.x+1
- Optional Specifications 4x-speed DVD-R for DL Revision 1.x changing to 1.x+1
- Optional Specifications 6x-speed DVD-R for DL Revision 2.x changing to 2.x+1
- Optional Specifications 8x-speed DVD-R for DL Revision 3.x changing to 3.x+1
- Optional Specifications 10x-speed DVD-R for DL Revision 4.x changing to 4.x+1
- Optional Specifications 12x-speed DVD-R for DL Revision 5.x changing to 5.x+1
- Significant changes to the Material and/or Manufacturing process related to DVD format
- Single Sided or Double Sided and 12 cm or 8 cm*

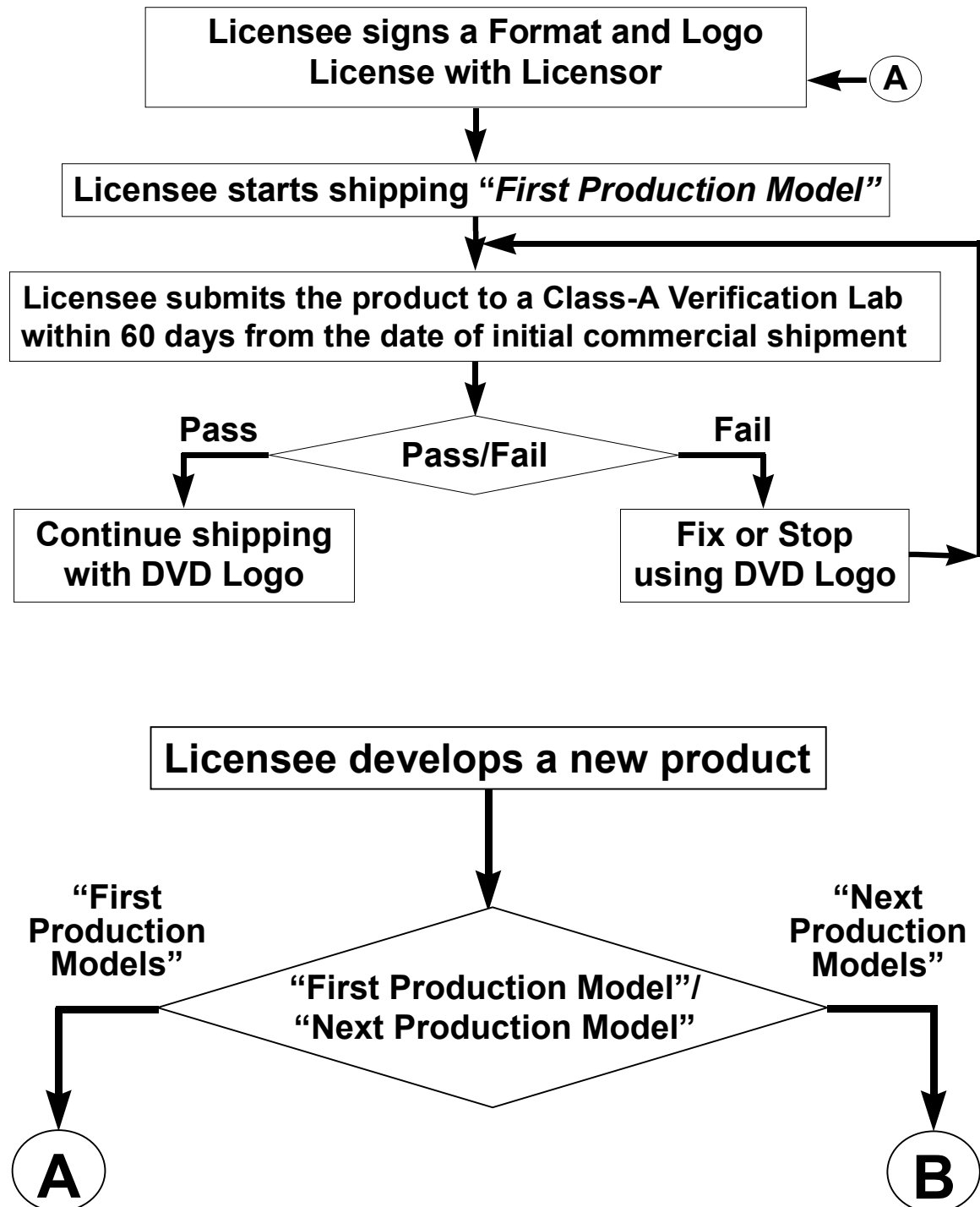
*: If one type disc (e.g. Single Sided/12 cm disc) of these parameter combinations is produced as the First Production Model, the other type discs (e.g. Single Sided/8 cm, Double Sided/12 cm and Double Sided/8 cm) shall be defined as the Next Production Model.

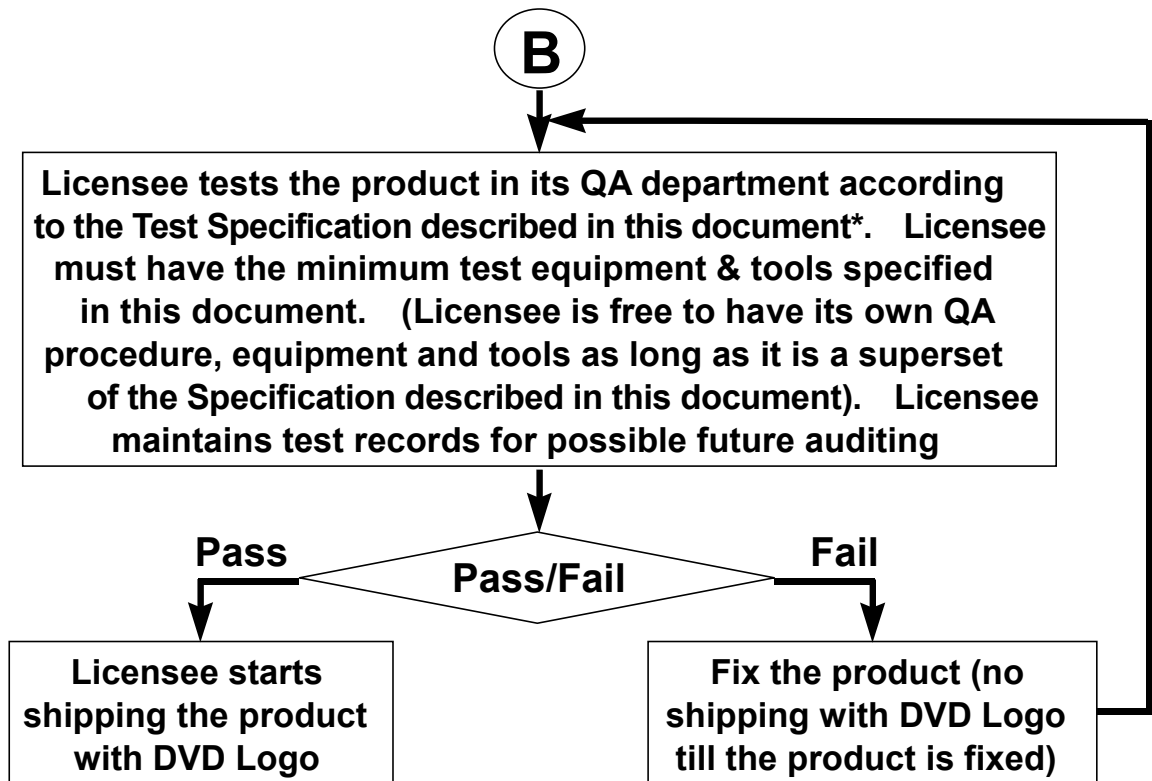
Class-A Verification Labs - Class-A Verification Labs are experts in DVD technology and provide independent expert assessment of Licensee's product compliance with DVD Specifications. Class-A Labs also provide additional services such as interpretation of DVD Specifications, Test Tool development, and Class-B Labs and Licensees auditing, etc.

Class-B Verification Labs - DVD-R Disc Class-B Verification Labs provide DVD-R Disc testing strictly according to **DVD-R Disc for General & for DL Test Specification** (They can not interpret specifications).

2.2 DVD Logo Mechanism

The DVD Logo mechanism is described in the following flow chart:





*: Licensee without own QA department can get the product tested by a **DVD-R Disc for General & for DL Class-B Verification Lab**.

3. Test Tools and Test Specifications for SL Disc

This chapter covers the test specifications and tool requirements for the physical and logical compliance testing.

3.1 General Requirements

3.1.1 Test Tools

The following tools are required to perform the tests specified and shall be available before executing the test procedures.

SL Disc evaluation system consists of mainly 4 parts; **Mechanical test system**, **Optical test system**, **DVD-R measuring system (Recording PU)** and **DVD-R measuring system (Playback PU)**.

These test tools are to be equipped by each Lab and applicant individually for executing the tests specified in this document.

3.1.1.1 DVD-R measuring system (Recording PU)

The discs tested shall be recorded by DVD-R measuring system (Recording PU).

Its recording beam condition is defined in 2.2.3.2 of DVD Specifications for Recordable Disc for General Part 1: Ver. 2.1.

- **For 1x-speed recording (Basic Write Strategy)**, the Basic Write Strategy, specified in 2.2.3.8.1 of DVD Specifications for Recordable Disc for General Part 1: Ver. 2.1, shall be used.
- **For 1x-speed recording (Variation Write Strategy)**, the variation Write Strategy, specified in Annex K of DVD Specifications for Recordable Disc for General Part 1: Ver. 2.1, shall be used.
- **For 4x-speed recording**, the Write Strategy specified in 2.1.5 of Optional Specifications 4x-speed DVD-R Revision 1.0 shall be used.
- **For 6x-speed recording**, the Write Strategy specified in 2.1.5 of Optional Specifications 6x-speed DVD-R Revision 2.0 shall be used.
- **For 8x-speed recording**, the Write Strategy specified in 2.1.5 of Optional Specifications 8x-speed DVD-R Revision 3.0 shall be used.
- **For 12x-speed recording**, the Write Strategy specified in 2.1.5 of Optional Specifications 12x-speed DVD-R Revision 5.0 shall be used.
- **For 16x-speed recording**, the Write Strategy specified in 2.1.5 of Optional Specifications 16x-speed DVD-R Revision 6.0 shall be used.

3.1.1.2 DVD-R measuring system (Playback PU)

The discs tested shall be played back by DVD-R measuring system (Playback PU). Its reading beam condition is defined in 2.1.3.2 of DVD Specifications for Recordable Disc for General Part 1: Ver. 2.1 and its scanning velocity shall be 3.49 m/s (1x-speed).

3.1.2 Test requirements

This section describes the test requirements for DVD-R Disc products described in **1.3 Scope of Products Covered**

a) Single Layer (SL) Discs.

The SL Disc has to be in compliance with the physical DVD requirements as indicated in **1.2 Normative References** a).

This shall be confirmed by parameters as mentioned in **Form 3.2S-1 to Form 3.9S-5**. Final judgment shall be made by **Form 5S**.

- Test shall be carried out according to the nomination of "Maximum recording speed" applied in **Form 2S** (1/3). Test procedure of each recording speed is described in the following sections from **3.2** to **3.9**.

Table 3.1.2-1 shows the relation between "Product type" and "Section number" to be executed. When "✓" is marked in the column of a section, the test in the section shall be carried out.

For example, in case of Model D, Test described in sections **3.2, 3.3, 3.4, 3.5** and **3.7** shall be carried out.


Table 3.1.2-1 : "Product type" and "Section number/Recording speed" to be executed

Product type		Section numbers/Recording speed									Samples to be submitted
		3.2	3.3		3.4	3.5	3.6	3.7	3.8	3.9	
		Before	1x (BWS)	1x (Var WS)	1x (BWS)	4x	6x	8x	12x	16x	
A	1x-speed SL Disc	✓	✓	---	---	---	---	---	---	---	10
B	4x/1x-speed SL Disc	✓	✓	---	---	✓	---	---	---	---	10
C	6x/1x-speed SL Disc	✓	---	✓	✓	✓	✓	---	---	---	20
D	8x/1x-speed SL Disc	✓	---	✓	✓	✓	---	✓	---	---	20
E	12x/1x-speed SL Disc	✓	---	✓	✓	✓	---	✓	✓	---	30
F	16x/1x-speed SL Disc	✓	---	✓	✓	✓	---	✓	---	✓	30

- An applicant is requested to submit the test samples with the test results, which may be obtained by self-verification or verification conducted by Class-B Lab.
- The procedures for the items are different between the companies passed and not passed the verification of Lower speed disc. The recording radius is different according to the each company's history of verification. **Table 3.1.2-2** and **Table 3.1.2-3** show the measuring points for 12 cm disc and 8 cm disc according to the history of company's verification respectively

Table 3.1.2-2 : Measuring points for 12 cm disc according to the history of company's verification

12 cm product type		Measuring points in radius	Section numbers/Recording speed to be executed							
			3.3		3.4	3.5	3.6	3.7	3.8	3.9
			1x (BWS)	1x (Var WS)	1x (BWS)	4x	6x	8x	12x	16x
A	1x-speed SL Disc	25 mm	✓	---	---	---	---	---	---	---
		40 mm	✓	---	---	---	---	---	---	---
		55 mm	✓	---	---	---	---	---	---	---
B	4x/1x-speed SL Disc	25 mm	✓	---	---	✓	---	---	---	---
		40 mm	✓	---	---	✓	---	---	---	---
		55 mm	✓	---	---	✓	---	---	---	---
C	6x/1x-speed SL Disc	25 mm	---	✓	---	✓	✓	---	---	---
		40 mm	---	✓	✓	✓	✓	---	---	---
		55 mm	---	✓	---	✓	✓	---	---	---
D	8x/1x-speed SL Disc	25 mm	---	✓	---	✓	---	---	---	---
		40 mm	---	✓	✓	✓	---	✓	---	---
		55 mm	---	✓	---	✓	---	✓	---	---
E	12x/1x-speed SL Disc	25 mm	---	✓	---	✓	---	---	---	---
		40 mm	---	✓	✓	✓	---	✓	✓	---
		55 mm	---	✓	---	✓	---	✓	✓	---
F	16x/1x-speed SL Disc	25 mm	---	✓	---	✓	---	---	---	---
		40 mm	---	✓	✓	✓	---	✓	---	---
		55 mm	---	✓	---	✓	---	✓	---	✓

Note :  : Company passed 1x-speed or higher speed disc may not measure this radius.




 : Company passed 4x-speed or higher speed disc may not measure this radius.

Table 3.1.2-3 : Measuring points for 8 cm disc according to the history of company's verification

8 cm product type		Measuring points in radius	Section numbers/Recording speed to be executed					
			3.3		3.4	3.5	3.6	3.7
			1x (BWS)	1x (Var W/S)	1x (BWS)	4x	6x	8x
A	1x-speed SL Disc	25 mm	✓	---	---	---	---	---
		38 mm	✓	---	---	---	---	---
B	4x/1x-speed SL Disc	25 mm	✓	---	---	✓	---	---
		38 mm	✓	---	---	✓	---	---
C	6x/1x-speed SL Disc	25 mm	---	✓	---	✓	✓	---
		38 mm	---	✓	✓	✓	✓	---
D	8x/1x-speed SL Disc	25 mm	---	✓	---	✓	---	---
		38 mm	---	✓	✓	✓	---	✓

Note :  : Company passed 1x-speed or higher speed disc may not measure this radius.

 : Company passed 4x-speed or higher speed disc may not measure this radius.

- For the confirmation of required test items, "Check list of Forms for Submission" is prepared in **Form 2S** (2/3, 3/3). Write the check mark in each column according to your situation.

3.2 Test Specifications for Before recording of SL Disc

The tests described in this section are for 1x, 4x/1x, 6x/1x, 8x/1x, 12x/1x and 16x/1x-speed SL Discs. Refer to **Table 3.1.2-1**.

3.2.1 Unrecorded disc specifications

- **Mechanical Parameters** described in **Form 3.2S-1** shall be measured using Mechanical test system.
- **Optical parameters** before recording described in **Form 3.2S-2** shall be measured using each Optical test system.
- Items described in **Form 3.2S-3** shall be measured using DVD-R measuring system (Recording PU) with 1x-speed scanning.
- Items described in **Form 3.2S-4** shall be measured using DVD-R measuring system (Recording PU) with nominated maximum recording-speed scanning.

3.2.2 Control data zone

- Items described in **Form 3.2S-5** and **3.2S-6** shall be measured by the test tool described on each table.

3.2.3 Contents of Pre-pit data block configuration

- Items described in the **Form 3.2S-7** shall be measured using DVD-R measuring system (Playback PU).
It shall be confirmed whether the Sector structure of Unrecorded physical format (refer to 4.2.3.4, 4.2.3.5 and 4.2.3.7 of DVD Specifications for Recordable Disc for General Part 1: Ver. 2.1) is written properly.

3.2.4 NBCA Code

- Items described in the **Form 3.2S-8** shall be measured using DVD-R measuring system (Playback PU).

3.3 Test Specification for 1x-speed recording of SL Disc

The tests described in this section are for 1x, 4x/1x, 6x/1x, 8x/1x, 12x/1x and 16x/1x-speed SL Discs. Refer to **Table 3.1.2-1**.

3.3.1 Recording condition for testing

- Random or equivalent signals shall be written in the user area of the disc.
- For the items that the evaluation radius is specified, the writing zones shall be at least 2 mm band in radius including measuring points. The measurement shall be performed around the center of the band.
- Write Strategy for 1x disc and 4x/1x disc:
"Basic Write Strategy (Type 1-3)" specified in 2.2.3.8.1 of DVD Specifications for Recordable Disc for General Part 1: Ver. 2.1 shall be used.
- Write Strategy for 6x/1x disc, 8x/1x disc, 12x/1x disc and 16x/1x disc:
"Write Strategy variation" specified in Annex K of DVD Specifications for Recordable Disc for General Part 1: Ver. 2.1 shall be used.

3.3.2 Unrecorded disc specifications

- Items described in **Form 3.3S-1** shall be recorded with 1x-speed using DVD-R measuring system (Recording PU). And fill in the Form with the recording condition values.
- Items described in **Form 3.3S-2** shall be recorded with 1x-speed and measured with 1x-speed scanning using DVD-R measuring system (Recording PU).

3.3.3 Recorded disc specifications

- The measurement shall be done with 1x-speed scanning velocity for 1x-speed Recorded disc on which random or equivalent signals are recorded in user area using DVD-R measuring system (Recording PU).
Items described in **Form 3.3S-3 and 3.3S-4** shall be measured by DVD-R measuring system (Playback PU).
Items described in **Form 3.3S-4** shall be measured only when the nominated maximum recording speed is 1x-speed.

3.3.4 Contents of Pre-pit data block configuration

- Items described in the **Form 3.3S-5** shall be measured using DVD-R measuring system (Playback PU).
It shall be confirmed whether the structure of Write Strategy code field (refer to 4.2.3.6 of DVD Specifications for Recordable Disc for General Part 1: Ver. 2.1) is written properly.

3.4 Test Specification for 1x-speed recording of SL Disc with Basic Write Strategy Type 1-3

The tests described in this section are for 6x/1x, 8x/1x, 12x/1x and 16x/1x-speed SL Discs.

Refer to **Table 3.1.2-1**.

3.4.1 Recording condition for testing

- Random or equivalent signals shall be written in the user area of the disc.
- Basic Write Strategy (Type 1-3) specified in 2.2.3.8.1 of DVD Specifications for Recordable Disc for General Ver. 2.1 shall be used.
- For the items that the evaluation radius is specified, the writing zones shall be at least 2 mm band in radius including measuring points. The measurement shall be performed around the center of the band.

3.4.2 Unrecorded disc specifications

- Items described in **Form 3.4S-1** shall be recorded with 1x-speed using DVD-R measuring system (Recording PU). And fill in the Form with the recording condition values.

3.4.3 Recorded disc specifications

- The measurement shall be done with 1x-speed scanning velocity for the 1x-speed Recorded disc on which random or equivalent signals are recorded in user area using DVD-R measuring system (Recording PU). Items described in **Form 3.4S-2** shall be measured by DVD-R measuring system (Playback PU).

3.5 Test Specification for 4x-speed recording of SL Disc

The tests described in this section are for 4x/1x, 6x/1x, 8x/1x, 12x/1x and 16x/1x-speed SL Discs, unless otherwise specified. Refer to **Table 3.1.2-1**.

3.5.1 Recording condition for testing

- Random or equivalent signals shall be written in the user area of the disc.
- For 4x-speed recording, the Write Strategy specified in 2.1.5 of Optional Specifications 4x-speed DVD-R Revision 1.0 shall be used.
Servo transfer function specified in 2.1.2 to 2.1.4 of Optional Specifications 4x-speed DVD-R Revision 2.0 shall be used.
- For the items that the evaluation radius is specified, the writing zones shall be at least 2 mm band in radius including measuring points. The measurement shall be performed around the center of the band.

3.5.2 Unrecorded disc specifications

- Items described in **Form 3.5S-1** shall be recorded with 4x-speed using DVD-R measuring system (Recording PU). And fill in the Form with the recording condition values.
- Items described in **Form 3.5S-2** shall be recorded with 4x-speed and measured with 1x-speed scanning using DVD-R measuring system (Recording PU).

3.5.3 Recorded disc specifications

- The measurement shall be done with 1x-speed scanning velocity for the 4x-speed Recorded disc on which random or equivalent signals are recorded in user area using DVD-R measuring system (Recording PU).
- Items described in **Form 3.5S-3 and 3.5S-4** shall be measured by DVD-R measuring system (Playback PU). Items described in **Form 3.5S-4** shall be measured only when the nominated maximum recording speed is 4x-speed.

3.5.4 Contents of Pre-pit data block configuration

- Items described in the **Form 3.5S-5** shall be measured using DVD-R measuring system (Playback PU). It shall be confirmed whether the structure of Write Strategy code field (refer to 3.1.4 of Optional Specifications 4x-speed DVD-R Revision 2.0) is written properly.

3.6 Test Specification for 6x-speed recording of SL Disc

The tests described in this section are only for 6x/1x-speed SL Disc. Refer to **Table 3.1.2-1**.

3.6.1 Recording condition for testing

- Random or equivalent signals shall be written in the user area of the disc.
- For 6x-speed recording, the Write Strategy specified in 2.1.5 of Optional Specifications 6x-speed DVD-R Revision 2.0 shall be used.

Servo transfer function specified in 2.1.2 of Optional Specifications 6x-speed DVD-R Revision 2.0 shall be used.

- For the items that the evaluation radius is specified, the writing zones shall be at least 2 mm band in radius including measuring points. The measurement shall be performed around the center of the band.

3.6.2 Unrecorded disc specifications

- Items described in **Form 3.6S-1** shall be recorded with 6x-speed using DVD-R measuring system (Recording PU). And fill in the Form with the recording condition values.
- Items described in **Form 3.6S-2** shall be recorded with 6x-speed and measured with 1x-speed scanning using DVD-R measuring system (Recording PU).

3.6.3 Recorded disc specifications

- The measurement shall be done with 1x-speed scanning velocity for 6x-speed Recorded disc on which random or equivalent signals are recorded in user area using DVD-R measuring system (Recording PU).
- Items described in **Form 3.6S-3 and 3.6S-4** shall be measured by DVD-R measuring system (Playback PU).

3.6.4 Contents of Extended pre-recorded information

- Items described in the **Form 3.6S-5** shall be measured using DVD-R measuring system (Playback PU). It shall be confirmed whether the structure of Write Strategy code field (refer to 3.1.2.1 of Optional Specifications 6x-speed DVD-R Revision 2.0) is written properly.

3.7 Test Specification for 8x-speed recording of SL Disc

The tests described in this section are for 8x/1x, 12x/1x and 16x/1x-speed SL Discs, unless otherwise specified. Refer to **Table 3.1.2-1**.

3.7.1 Recording condition for testing

- Random or equivalent signals shall be written in the user area of the disc.
- For 8x-speed recording, the Write Strategy specified in 2.1.5 of Optional Specifications 8x-speed DVD-R Revision 3.0 shall be used.
Servo transfer function specified in 2.1.2 of Optional Specifications 8x-speed DVD-R Revision 3.0 shall be used.
- For the items that the evaluation radius is specified, the writing zones shall be at least 2 mm band in radius including measuring points. The measurement shall be performed around the center of the band.

3.7.2 Unrecorded disc specifications

- Items described in **Form 3.7S-1** shall be recorded with 8x-speed using DVD-R measuring system (Recording PU). And fill in the Form with the recording condition values.
- Items described in **Form 3.7S-2** shall be recorded with 8x-speed and measured with 1x-speed scanning using DVD-R measuring system (Recording PU).

3.7.3 Recorded disc specifications

- The measurement shall be done with 1x-speed scanning velocity for 8x-speed Recorded disc on which random or equivalent signals are recorded in user area using DVD-R measuring system (Recording PU).
- Items described in **Form 3.7S-3 and 3.7S-4** shall be measured by DVD-R measuring system (Playback PU).
Items described in **Form 3.7S-4** shall be measured only when the nominated maximum recording speed is 8x-speed.

3.7.4 Contents of Extended pre-recorded information

- Items described in the **Form 3.7S-5** shall be measured using DVD-R measuring system (Playback PU).
It shall be confirmed whether the structure of Write Strategy code field (refer to 3.1.2.1 of Optional Specifications 8x-speed DVD-R Revision 3.0) is written properly.

3.8 Test Specification for 12x-speed recording of SL Disc

The tests described in this section are only for 12x/1x-speed SL Disc. Refer to **Table 3.1.2-1**.

3.8.1 Recording condition for testing

- Random or equivalent signals shall be written in the user area of the disc.
- For 12x-speed recording, the Write Strategy specified in 2.1.5 of Optional Specifications 12x-speed DVD-R Revision 5.0 shall be used.
Servo transfer function specified in 2.1.2 of Optional Specifications 12x-speed DVD-R Revision 5.0 shall be used.
- For the items that the evaluation radius is specified, the writing zones shall be at least 2 mm band in radius including measuring points. The measurement shall be performed around the center of the band.

3.8.2 Unrecorded disc specifications

- Items described in **Form 3.8S-1** shall be recorded with 12x-speed using DVD-R measuring system (Recording PU). And fill in the Form with the recording condition values.
- Items described in **Form 3.8S-2** shall be recorded with 12x-speed and measured with 1x-speed scanning using DVD-R measuring system (Recording PU).

3.8.3 Recorded disc specifications

- The measurement shall be done with 1x-speed scanning velocity for 4x-speed Recorded disc on which random or equivalent signals are recorded in user area using DVD-R measuring system (Recording PU).
- Items described in **Form 3.8S-3 and 3.8S-4** shall be measured by DVD-R measuring system (Playback PU).

3.8.4 Contents of Extended pre-recorded information

- Items described in the **Form 3.8S-5** shall be measured using DVD-R measuring system (Playback PU).
It shall be confirmed whether the structure of Write Strategy code field (refer to 3.1.2.1 of Optional Specifications 12x-speed DVD-R Revision 5.0) is written properly.

3.9 Test Specification for 16x-speed recording of SL Disc

The tests described in this section are only for 16x/1x-speed SL Disc. Refer to **Table 3.1.2-1**.

3.9.1 Recording condition for testing

- Random or equivalent signals shall be written in the user area of the disc.
- For 16x-speed recording, the Write Strategy specified in 2.1.5 of Optional Specifications 16x-speed DVD-R Revision 6.0 shall be used.

Servo transfer function specified in 2.1.2 of Optional Specifications 16x-speed DVD-R Revision 6.0 shall be used.

- For the items that the evaluation radius is specified, the writing zones shall be at least 2 mm band in radius including measuring points. The measurement shall be performed around the center of the band.

3.9.2 Unrecorded disc specifications

- Items described in **Form 3.9S-1** shall be recorded with 16x-speed using DVD-R measuring system (Recording PU). And fill in the Form with the recording condition values.
- Items described in **Form 3.9S-2** shall be recorded with 16x-speed and measured with 1x-speed scanning using DVD-R measuring system (Recording PU).

3.9.3 Recorded disc specifications

- The measurement shall be done with 1x-speed scanning velocity for 16x-speed Recorded disc on which random or equivalent signals are recorded in user area using DVD-R measuring system (Recording PU).
- Items described in **Form 3.9S-3 and 3.9S-4** shall be measured by DVD-R measuring system (Playback PU).

3.9.4 Contents of Extended pre-recorded information

- Items described in the **Form 3.9S-5** shall be measured using DVD-R measuring system (Playback PU).

It shall be confirmed whether the structure of Write Strategy code field (refer to 3.1.2.1 of Optional Specifications 16x-speed DVD-R Revision 6.0) is written properly.

4. Test Tools and Test Specifications for DL Disc

This chapter covers the test specifications and tool requirements for the physical and logical compliance testing.

4.1 General Requirements

4.1.1 Test Tools

The following tools are required to perform the tests specified and shall be available before executing the test procedures.

DL Disc evaluation system consists of mainly 4 parts; **Mechanical test system**, **Optical test system**, **DVD-R measuring system (Recording PU)** and **DVD-R measuring system (Playback PU)**.

These test tools are to be equipped by each Lab and applicant individually for executing the tests specified in this document.

4.1.1.1 DVD-R measuring system (Recording PU)

The discs tested shall be recorded by DVD-R measuring system (Recording PU).

Its recording beam condition is defined in 2.2.3.2 of DVD Specifications for Recordable Disc for Dual Layer Part 1: Ver. 3.0.

- **For 2x-speed recording**, the Write Strategy specified in 2.2.3.8 of DVD Specifications for Recordable Disc for Dual Layer version 3.0 shall be used.
- **For 4x-speed recording**, the Write Strategy specified in 2.1.5 of Optional Specifications 4x-speed DVD-R for DL Revision 1.0 shall be used.
- **For 6x-speed recording**, the Write Strategy specified in 2.1.5 of Optional Specifications 6x-speed DVD-R for DL Revision 2.0 shall be used.
- **For 8x-speed recording**, the Write Strategy specified in 2.1.5 of Optional Specifications 8x-speed DVD-R for DL Revision 3.0 shall be used.
- **For 10x-speed recording**, the Write Strategy specified in 2.1.5 of Optional Specifications 10x-speed DVD-R for DL Revision 4.0 shall be used.
- **For 12x-speed recording**, the Write Strategy specified in 2.1.5 of Optional Specifications 12x-speed DVD-R for DL Revision 5.0 shall be used.

4.1.1.2 DVD-R measuring system (Playback PU)

The discs tested shall be played back by DVD-R measuring system (Playback PU). Its reading beam condition is defined in 2.1.3.2 of DVD Specifications for Recordable Disc for Dual Layer Part 1: Ver. 3.0 and its scanning velocity shall be 3.84 m/s (1x-speed).

4.1.2 Test requirements

This section describes the test requirements for DVD-R for DL Disc products described in **1.3 Scope of Products Covered b) Dual Layer (DL) Discs**.

The DL Disc has to be in compliance with the physical DVD requirements as indicated in **1.2 Normative References b)**.

This shall be confirmed by parameters as mentioned in **Form 4.2S-1 to Form 4.8S-5**. Final judgment shall be made by **Form 5S**.

- Test shall be carried out according to the nomination of "Maximum recording speed" applied in **Form 2S** (1/3). Test procedure of each recording speed is described in the following sections **4.2** to **4.8**.

Table 4.1.2-1 shows the relation between "Product type" and "Section number" to be executed. When "✓" is marked in the column of a section, the test in the section shall be carried out.

For example, in case of Model H, Test described in sections **4.2**, **4.3** and **4.4** shall be carried out.

Table 4.1.2-1 : "Product type" and "Section number/ Recording speed" to be executed

Product type		Section numbers/Recording speed							Samples to be submitted
		4.2	4.3	4.4	4.5	4.6	4.7	4.8	
		Before	2x	4x	6x	8x	10x	12x	
G	2x-speed DL Disc	✓	✓	-----	-----	-----	-----	-----	20
H	4x/2x-speed DL Disc	✓	✓	✓	-----	-----	-----	-----	20
I	6x/2x-speed DL Disc	✓	✓	✓	✓	-----	-----	-----	30
J	8x/2x-speed DL Disc	✓	✓	✓	✓	✓	-----	-----	30
K	10x/2x-speed DL Disc	✓	✓	✓	✓	✓	✓	-----	30
L	12x/2x-speed DL Disc	✓	✓	✓	✓	✓	✓	✓	30

- An applicant is requested to submit the test samples with the test results, which may be obtained by self-verification or verification conducted by Class-B Lab.
- For the confirmation of required test items, "Check list of Forms for Submission" is prepared in **Form 2S** (2/3, 3/3). Write the check mark in each column according to your situation.

Table 4.1.2-2 : "Product type" and "Recording speed" to be carried out (12cm DL Disc)

Product type		Measuring points in radius	Recording speed											
			2x-speed		4x-speed		6x-speed		8x-speed		10x-speed		12x-speed	
			L0	L1	L0	L1	L0	L1	L0	L1	L0	L1	L0	L1
G	2x-speed DL Disc	25 mm	2x	2x	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
		40 mm	2x	2x	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
		55 mm	2x	2x	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
H	4x/2x-speed DL Disc	25 mm	2x	2x	4x	4x	-----	-----	-----	-----	-----	-----	-----	-----
		40 mm	2x	A	A	4x	-----	-----	-----	-----	-----	-----	-----	-----
		55 mm	2x	A	A	4x	-----	-----	-----	-----	-----	-----	-----	-----
I	6x/2x-speed DL Disc	25 mm	2x	2x	4x	4x	6x	6x	-----	-----	-----	-----	-----	-----
		40 mm	2x	A	A	A	A	6x	-----	-----	-----	-----	-----	-----
		55 mm	2x	A	A	A	A	6x	-----	-----	-----	-----	-----	-----
J	8x/2x-speed DL Disc	25 mm	2x	2x	4x	4x	6x	6x	-----	-----	-----	-----	-----	-----
		40 mm	2x	A	A	A	A	A	A	8x	-----	-----	-----	-----
		55 mm	2x	A	A	A	A	A	A	8x	8x	-----	-----	-----
K	10x/2x-speed DL Disc	25 mm	2x	2x	4x	4x	6x	6x	-----	-----	-----	-----	-----	-----
		40 mm	2x	A	A	A	A	A	A	A	A	10x	-----	-----
		55 mm	2x	A	A	A	A	A	A	A	A	10x	10x	-----
L	12x/2x-speed DL Disc	25 mm	2x	2x	4x	4x	6x	6x	-----	-----	-----	-----	-----	-----
		40 mm	2x	A	A	A	A	A	A	A	A	10x	-----	-----
		55 mm	2x	A	A	A	A	A	A	A	A	A	12x	12x

2x, 4x, 6x, 8x, 10x, 12x : Recording by designated recording speed

----- : No check

A : Applicant submits the data. Lab does not measure but check them.

Table 4.1.2-3 : "Product type" and "Recording speed" to be carried out (8cm DL Disc)

Product type		Measuring points in radius	Recording speed							
			2x-speed		4x-speed		6x-speed		8x-speed	
			L0	L1	L0	L1	L0	L1	L0	L1
G	2x-speed DL Disc	25 mm	2x	2x	-----	-----	-----	-----	-----	-----
		38 mm	2x	2x	-----	-----	-----	-----	-----	-----
H	4x/2x-speed DL Disc	25 mm	2x	2x	4x	4x	-----	-----	-----	-----
		38 mm	2x	A	A	4x	-----	-----	-----	-----
I	6x/2x-speed DL Disc	25 mm	2x	2x	4x	4x	6x	6x	-----	-----
		38 mm	2x	A	A	A	A	6x	-----	-----
J	8x/2x-speed DL Disc	25 mm	2x	2x	4x	4x	6x	6x	-----	-----
		38 mm	2x	A	A	A	A	A	8x	8x

2x, 4x, 6x, 8x : Recording by designated recording speed

----- : No check

A : Applicant submits the data. Lab does not measure but check them.

4.2 Test Specifications for Before recording of DL Disc

The tests described in this section are for 2x, 4x/2x, 6x/2x, 8x/2x, 10x/2x and 12x/2x-speed DL Discs.
Refer to **Table 4.1.2-1**.

4.2.1 Unrecorded disc specifications

- **Mechanical Parameters** described in **Form 4.2S-1** shall be measured using Mechanical test system.
- **Optical parameters** before recording described in **Form 4.2S-2** shall be measured using each Optical test system.
- Items described in **Form 4.2S-3** shall be measured using DVD-R measuring system (Recording PU) with 2x-speed scanning for Recording parameters and with 1x-speed scanning for Operational signals.
- Items described in **Form 4.2S-4** shall be measured using DVD-R measuring system (Recording PU) with nominated maximum recording-speed scanning.
- Items described in **Form 4.2S-5** shall be measured using test tools that are adequate to perform this test.

4.2.2 Control data zone

- Items described in **Form 4.2S-6** and **4.2S-7** shall be measured using DVD-R measuring system (Playback PU).

4.2.3 Contents of Pre-pit data block configuration

- Items described in the **Form 4.2S-8** shall be measured using DVD-R measuring system (Playback PU).
It shall be confirmed whether the Sector structure of Unrecorded physical format (refer to 4.2.3.4, 4.2.3.5 and 4.2.3.7 of DVD Specifications for Recordable Disc for Dual Layer Part 1: Ver. 3.0) is written properly.

4.2.4 NBCA Code

- Items described in the **Form 4.2S-9** shall be measured using DVD-R measuring system (Playback PU).

4.2.5 Extension of Tracks

- Items described in the **Form 4.2S-10** shall be measured using test tools that are adequate to perform this test.

4.3 Test Specification for 2x-speed recording of DL Disc

The tests described in this section are for 2x, 4x/2x, 6x/2x, 8x/2x, 10x/2x and 12x/2x-speed DL Discs, unless otherwise specified. Refer to **Table 4.1.2-1**.

4.3.1 Recording condition for testing

- Random or equivalent signals shall be written in the user area of the disc.
- For 2x-speed recording of L0 and L1, the Write Strategy specified in 2.2.3.8.1 of Specifications DVD-R for DL version 3.0 shall be used.

Servo transfer function specified in 2.2.3 of DVD Specifications for Recordable Disc for Dual Layer Part 1: Ver. 3.0 shall be used.

- For the items that the evaluation radius is specified, the writing zones shall be at least 2 mm band in radius including measuring points. The measurement shall be performed around the center of the band. The recording order shall be kept for recording of Layer 1 (refer to Annex GG of DVD Specifications for Recordable Disc for Dual Layer Part 1: Ver. 3.0).

4.3.2 Unrecorded disc specifications

- Items described in **Form 4.3S-1** shall be recorded with 2x-speed using DVD-R measuring system (Recording PU). And fill in the Form with the recording condition values.
- Items described in **Form 4.3S-2** shall be recorded with 2x-speed and measured with 1x-speed scanning using DVD-R measuring system (Recording PU).

4.3.3 Recorded disc specifications

- The measurement shall be done with 1x-speed scanning velocity for 2x-speed Recorded disc on which random or equivalent signals are recorded in user area using DVD-R measuring system (Recording PU).
- Items described in **Form 4.3S-3 and 4.3S-4** shall be measured by DVD-R measuring system (Playback PU). Items described in **Form 4.3S-4** shall be measured only when the nominated maximum recording speed is 2x-speed.

4.3.4 Contents of Extended pre-recorded information

- Items described in the **Form 4.3S-5** shall be measured using DVD-R measuring system (Playback PU). It shall be confirmed whether the structure of Write Strategy code field (refer to 3.1.4.1.4 of DVD Specifications for Recordable Disc for Dual Layer Ver. 3.0) is written properly.

4.4 Test Specification for 4x-speed recording of DL Disc

The tests described in this section are for 4x/2x, 6x/2x, 8x/2x, 10x/2x and 12x/2x-speed DL Discs, unless otherwise specified. Refer to **Table 4.1.2-1**.

4.4.1 Recording condition for testing

- Random or equivalent signals shall be written in the user area of the disc.
- For 4x-speed recording, the Write Strategy specified in 2.1.5 of Optional Specifications 4x-speed DVD-R for DL Revision 1.0 shall be used.

Servo transfer function specified in 2.1.2 to 2.1.4 of Optional Specifications 4x-speed DVD-R for DL Revision 1.0 shall be used.

- For the items that the evaluation radius is specified, the writing zones shall be at least 2 mm band in radius including measuring points. The measurement shall be performed around the center of the band. The recording order shall be kept for recording of Layer 1 (refer to Annex GG of DVD Specifications for Recordable Disc for Dual Layer Part 1: Ver. 3.0).

4.4.2 Unrecorded disc specifications

- Items described in **Form 4.4S-1** shall be recorded with 4x-speed using DVD-R measuring system (Recording PU). And fill in the Form with the recording condition values.
- Items described in **Form 4.4S-2** shall be recorded with 4x-speed and measured with 1x-speed scanning using DVD-R measuring system (Recording PU).

4.4.3 Recorded disc specifications

- The measurement shall be done with 1x-speed scanning velocity for 4x-speed Recorded disc on which random or equivalent signals are recorded in user area using DVD-R measuring system (Recording PU).
- Items described in **Form 4.4S-3 and 4.4S-4** shall be measured by DVD-R measuring system (Playback PU). Items described in **Form 4.4S-4** shall be measured only when the nominated maximum recording speed is 4x-speed.

4.4.4 Contents of Extended pre-recorded information

- Items described in the **Form 4.4S-5** shall be measured using DVD-R measuring system (Playback PU). It shall be confirmed whether the structure of Write Strategy code field (refer to 3.1.2.1 of Optional Specifications 4x-speed DVD-R for DL Revision 1.0) is written properly.

4.5 Test Specification for 6x-speed recording of DL Disc

The tests described in this section are for 6x/2x , 8x/2x, 10x/2x and 12x/2x-speed DL Discs, unless otherwise specified. Refer to **Table 4.1.2-1**.

4.5.1 Recording condition for testing

- Random or equivalent signals shall be written in the user area of the disc.
- For 6x-speed recording, the Write Strategy specified in 2.1.5 of Optional Specifications 6x-speed DVD-R for DL Revision 2.0 shall be used.

Servo transfer function specified in 2.1.2 to 2.1.4 of Optional Specifications 6x-speed DVD-R for DL Revision 2.0 shall be used.

- For the items that the evaluation radius is specified, the writing zones shall be at least 2 mm band in radius including measuring points. The measurement shall be performed around the center of the band.
The recording order shall be kept for recording of Layer 1 (refer to Annex GG of DVD Specifications for Recordable Disc for Dual Layer Part 1: Ver. 3.0).

4.5.2 Unrecorded disc specifications

- Items described in **Form 4.5S-1** shall be recorded with 6x-speed using DVD-R measuring system (Recording PU). And fill in the Form with the recording condition values.
- Items described in **Form 4.5S-2** shall be recorded with 6x-speed and measured with 1x-speed scanning using DVD-R measuring system (Recording PU).

4.5.3 Recorded disc specifications

- The measurement shall be done with 1x-speed scanning velocity for 6x-speed Recorded disc on which random or equivalent signals are recorded in user area using DVD-R measuring system (Recording PU).
- Items described in **Form 4.5S-3 and 4.5S-4** shall be measured by DVD-R measuring system (Playback PU).
Items described in **Form 4.5S-4** shall be measured only when the nominated maximum recording speed is 6x-speed.

4.5.4 Contents of Extended pre-recorded information

- Items described in the **Form 4.5S-5** shall be measured using DVD-R measuring system (Playback PU).
It shall be confirmed whether the structure of Write Strategy code field (refer to 3.1.2.1 of Optional Specifications 6x-speed DVD-R for DL Revision 2.0) is written properly.

4.6 Test Specification for 8x-speed recording of DL Disc

The tests described in this section are for 8x/2x, 10x/2x and 12x/2x-speed DL Disc, unless otherwise specified. Refer to **Table 4.1.2-1**.

4.6.1 Recording condition for testing

- Random or equivalent signals shall be written in the user area of the disc.
- For 8x-speed recording, the Write Strategy specified in 2.1.5 of Optional Specifications 8x-speed DVD-R for DL Revision 3.0 shall be used.

Servo transfer function specified in 2.1.2 to 2.1.4 of Optional Specifications 8x-speed DVD-R for DL Revision 3.0 shall be used.

- For the items that the evaluation radius is specified, the writing zones shall be at least 2 mm band in radius including measuring points. The measurement shall be performed around the center of the band. The recording order shall be kept for recording of Layer 1 (refer to Annex GG of DVD Specifications for Recordable Disc for Dual Layer Part 1: Ver. 3.0).

4.6.2 Unrecorded disc specifications

- Items described in **Form 4.6S-1** shall be recorded with 8x-speed using DVD-R measuring system (Recording PU). And fill in the Form with the recording condition values.
- Items described in **Form 4.6S-2** shall be recorded with 8x-speed and measured with 1x-speed scanning using DVD-R measuring system (Recording PU).

4.6.3 Recorded disc specifications

- The measurement shall be done with 1x-speed scanning velocity for 8x-speed Recorded disc on which random or equivalent signals are recorded in user area using DVD-R measuring system (Recording PU).
- Items described in **Form 4.6S-3 and 4.6S-4** shall be measured by DVD-R measuring system (Playback PU). Items described in **Form 4.6S-4** shall be measured only when the nominated maximum recording speed is 8x-speed.

4.6.4 Contents of Extended pre-recorded information

- Items described in the **Form 4.6S-5** shall be measured using DVD-R measuring system (Playback PU). It shall be confirmed whether the structure of Write Strategy code field (refer to 3.1.2.1 of Optional Specifications 8x-speed DVD-R for DL Revision 3.0) is written properly.

4.7 Test Specification for 10x-speed recording of DL Disc

The tests described in this section are for 10x/2x and 12x/2x-speed DL Disc, unless otherwise specified.
Refer to **Table 4.1.2-1**.

4.7.1 Recording condition for testing

- Random or equivalent signals shall be written in the user area of the disc.
- For 10x-speed recording, the Write Strategy specified in 2.1.5 of Optional Specifications 10x-speed DVD-R for DL Revision 4.0 shall be used.
Servo transfer function specified in 2.1.2 to 2.1.4 of Optional Specifications 10x-speed DVD-R for DL Revision 4.0 shall be used.
- For the items that the evaluation radius is specified, the writing zones shall be at least 2 mm band in radius including measuring points. The measurement shall be performed around the center of the band.
The recording order shall be kept for recording of Layer 1 (refer to Annex GG of DVD Specifications for Recordable Disc for Dual Layer Part 1: Ver. 3.0).

4.7.2 Unrecorded disc specifications

- Items described in **Form 4.7S-1** shall be recorded with 10x-speed using DVD-R measuring system (Recording PU). And fill in the Form with the recording condition values.
- Items described in **Form 4.7S-2** shall be recorded with 10x-speed and measured with 1x-speed scanning using DVD-R measuring system (Recording PU).

4.7.3 Recorded disc specifications

- The measurement shall be done with 1x-speed scanning velocity for 10x-speed Recorded disc on which random or equivalent signals are recorded in user area using DVD-R measuring system (Recording PU).
- Items described in **Form 4.7S-3 and 4.7S-4** shall be measured by DVD-R measuring system (Playback PU).
Items described in **Form 4.7S-4** shall be measured only when the nominated maximum recording speed is 10x-speed.

4.7.4 Contents of Extended pre-recorded information

- Items described in the **Form 4.7S-5** shall be measured using DVD-R measuring system (Playback PU).
It shall be confirmed whether the structure of Write Strategy code field (refer to 3.1.2.1 of Optional Specifications 10x-speed DVD-R for DL Revision 4.0) is written properly.

4.8 Test Specification for 12x-speed recording of DL Disc

The tests described in this section are only for 12x/2x-speed DL Disc. Refer to **Table 4.1.2-1**.

4.8.1 Recording condition for testing

- Random or equivalent signals shall be written in the user area of the disc.
- For 12x-speed recording, the Write Strategy specified in 2.1.5 of Optional Specifications 12x-speed DVD-R for DL Revision 5.0 shall be used.
Servo transfer function specified in 2.1.2 to 2.1.4 of Optional Specifications 12x-speed DVD-R for DL Revision 5.0 shall be used.
- For the items that the evaluation radius is specified, the writing zones shall be at least 2 mm band in radius including measuring points. The measurement shall be performed around the center of the band.
The recording order shall be kept for recording of Layer 1 (refer to Annex GG of DVD Specifications for Recordable Disc for Dual Layer Part 1: Ver. 3.0).

4.8.2 Unrecorded disc specifications

- Items described in **Form 4.8S-1** shall be recorded with 12x-speed using DVD-R measuring system (Recording PU). And fill in the Form with the recording condition values.
- Items described in **Form 4.8S-2** shall be recorded with 12x-speed and measured with 1x-speed scanning using DVD-R measuring system (Recording PU).

4.8.3 Recorded disc specifications

- The measurement shall be done with 1x-speed scanning velocity for 12x-speed Recorded disc on which random or equivalent signals are recorded in user area using DVD-R measuring system (Recording PU).
- Items described in **Form 4.8S-3 and 4.8S-4** shall be measured by DVD-R measuring system (Playback PU).

4.8.4 Contents of Extended pre-recorded information

- Items described in the **Form 4.8S-5** shall be measured using DVD-R measuring system (Playback PU).
It shall be confirmed whether the structure of Write Strategy code field (refer to 3.1.2.1 of Optional Specifications 12x-speed DVD-R for DL Revision 5.0) is written properly.

Annex A

List of Class-A Verification Labs

This List is correct at the time of publication. However, when the Class-A Lab information contained here differs from such information cited in our website www.dvdfllc.co.jp, the List with more current date prevails. Also, please refer to the website for the latest Verification Service of each Class-A Lab.

(1x-speed, 4x/1x-speed, 6x/1x-speed, 8x/1x-speed, 12x/1x-speed, 16x/1x-speed DVD-R Disc for General and 2x-speed, 4x/2x-speed, 6x/2x-speed, 8x/2x-speed, 10x/2x-speed, 12x/2x-speed, DVD-R Disc for DL)

PIONEER CORPORATION

Verification Laboratory

1-1 Shin-ogura, Saiwai-ku, Kawasaki-shi, Kanagawa, 212-0031 Japan

Fax: +81-44-580-4027

(1x-speed, 4x/1x-speed, 6x/1x-speed, 8x/1x-speed, 12x/1x-speed, 16x/1x-speed DVD-R Disc for General and 2x-speed, 4x/2x-speed DVD-R Disc for DL)

Hitachi Consumer Electronics Co., Ltd.

Format Verification Center

292 Yoshida-cho, Totsuka-ku, Yokohama-shi, Kanagawa, 244-0817 Japan

Fax: +81-45-866-5905

Annex B

Glossary of Terms used

(May be defined)

Annex C

Procedure for Class-A Verification Lab Product Submission

The procedure for submitting a product to a Class-A Verification Lab is as follows:

Preliminary Application

Applicant must complete **Form 1S** to provide preliminary information.

Self Test

Applicant must test the product in accordance with this Test Specification prior to submitting samples to a Class-A Verification Lab. The applicant must complete the **necessary Forms** according to the list of **Form 2S** (2/3, 3/3) to provide test results.

Mutual Non-Disclosure Agreement (NDA)

Applicant, in order to maintain the confidentiality of the applicant's product and Verification Lab's information, must sign a Mutual Non-Disclosure Agreement.

Application

Applicant must submit following product samples along with said necessary Forms and the NDA.

In case of 1x or 4x/1x speed DVD-R Disc for General, 10 pieces shall be submitted.

In case of 6x/1x or 8x/1x speed DVD-R Disc for General, 20 pieces shall be submitted.

In case of 12x/1x or 16x/1x speed DVD-R Disc for General, 30 pieces shall be submitted.

In case of 2x or 4x/2x speed DVD-R Disc for DL, 20 pieces shall be submitted.

In case of 6x/2x, 8x/2x, 10x/2x or 12x/2x speed DVD-R Disc for DL, 30 pieces shall be submitted.

Test Results

Upon completion of testing, Verification Lab will complete **Form 6S** to inform the applicant and DVD Format/Logo Licensing Corporation of the test results.

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