



DVD-RW Disc (for SL & DL)

TEST SPECIFICATION

Version 1.41
January 2008

Amendment for DVD-RW Disc (for SL & DL) TS Version 1.4₁ (January 2008)

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

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

Page	Location	Amendment
Page 18	Annex A	<ul style="list-style-type: none">• Class-A Lab information of "Victor Company of Japan, Limited" and "Industrial Technology Research Institute" was updated.

- **Minor amendment (January 2010)**

Page	Location	Amendment
Page 18	Annex A	<ul style="list-style-type: none">• Class-A Lab information of "PIONEER CORPORATION" and "Victor Company of Japan, Limited" were updated.

- **Amendment 1 (January 2012)**

Page	Location	Amendment
Page 18	Annex A	<ul style="list-style-type: none">• "Toshiba Corporation" was deleted from the Class-A Lab list.• The company name "Victor Company of Japan, Limited" was changed to "JVC KENWOOD Corporation".

- **Amendment 2 (June 2012)**

Page	Location	Amendment
Page 18	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

- November 1999
DVD-RW Disc Test Specification Version 1.0 (draft) was approved by Verification Task Force members.
- January 2000
DVD-RW Disc Test Specification Version 1.0 was amended by SG9 decision.
- September 2000
DVD-RW Disc Test Specification Version 1.1(Draft) was distributed to SG9 members.
- October 2000
DVD-RW Disc Test Specification Version 1.1 was approved by VTF.
- September 2002
2x-speed DVD-RW Disc Test Specification Version 1.0 was approved by SC of DVD Forum.
- January 2004
4x-speed DVD-RW Disc Test Specification Version 1.0 was approved by SC of DVD Forum.
- June 2004
DVD-RW Disc Test Specification Version 1.2 was approved by VPC.
The version 1.2 is totally revised version for integrating Test Specification of each recording speed disc, based on the Version 1.2 of DVD-RW Book Part 1.
Accordingly, Test Specifications for 2x-speed DVD-RW Disc and 4x-speed DVD-RW Disc were discontinued.
- November 2004
Version 1.2 to add the test specifications for 6x-speed recording was approved by VTF.
- June 2005
Version 1.3₁ was edited as electronic files and corrected an erroneous value ($0.06 < \text{NWO} < 0.12$) to ($0.08 < \text{NWO} < 0.14$) in **Form 3.2K-3**(2/2).
- February 2006
Version 1.3₂ amended **Form 3.4K-3** (1/2) regarding Jitter and I₁₄/I_{14H} in order to clarify the recording conditions for 6x/2x disc.
- August 24, 2007
DVD-RW Disc (for SL & DL) Test Specification Version 1.4 was approved by TSTF.
The Version 1.4 added Test Specification for DVD-RW Disc for DL based on DVD-RW for Dual Layer Book Part 1: Ver.2.0.
(The Version 1.4 was issued in September 2007.)

- December 17, 2007

The Version 1.4i, to update the test specification regarding Modulated amplitude for DL, was approved by SG9.
(The Version 1.4i was issued in January 2008.)

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1. General

1.1 Scope

The scope of this Test Specification is the testing DVD-RW Disc for compliance with DVD Specifications mentioned in 1.2. Hereinafter, DVD-RW Disc conformed to DVD-RW Book may be called **DVD-RW Disc** or **SL Disc** and DVD-RW Disc conformed to DVD-RW for DL Book may be called **DVD-RW 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-RW 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 Reference

a) DVD Specifications for Re-recordable Disc (DVD-RW):

Part 1: Physical Specifications Version 1.2 and
 Optional Specification 2x-speed DVD-RW Revision 1.0
 Optional Specification 4x-speed DVD-RW Revision 2.0
 Optional Specification 6x-speed DVD-RW Revision 3.0

b) DVD Specifications for Re-recordable Disc for Dual Layer (DVD-RW for DL):

Part 1: Physical Specifications Version 2.0

1.3 Scope of Products Covered

a) Single Layer (SL) Disc

12cm Disc (4.7Gbytes type)	8cm Disc (1.46Gbytes type)
1x-speed DVD-RW Disc (Class 0)	1x-speed DVD-RW Disc (Class 0)
1x-speed DVD-RW Disc (Ver.1.1) (*)	1x-speed DVD-RW Disc (Ver.1.1) (*)
2x/1x-speed DVD-RW Disc (Class 0&1)	2x/1x-speed DVD-RW Disc (Class 0&1)
2x/1x-speed DVD-RW Disc (Ver.1.1) (*)	2x/1x-speed DVD-RW Disc (Ver.1.1) (*)
4x/1x-speed DVD-RW Disc (Class 0&1)	4x/1x-speed DVD-RW Disc (Class 0&1)
6x/1x-speed DVD-RW Disc (Class 0&1)	6x/1x-speed DVD-RW Disc (Class 0&1)
2x-speed DVD-RW Disc (Class 1)	2x-speed DVD-RW Disc (Class 1)
4x/2x-speed DVD-RW Disc (Class 1)	4x/2x-speed DVD-RW Disc (Class 1)
6x/2x-speed DVD-RW Disc (Class 1)	6x/2x-speed DVD-RW Disc (Class 1)

b) Dual Layer (DL) Disc

12cm Disc (8.5Gbytes type)	
2x-speed DVD-RW 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).

*: Ver. 1.1 products mean that they comply with the previous version 1.1 of DVD-RW Book Part 1 and are under production at the start of Logo Program. It is strongly recommended to change so as to comply with the Version 1.2 as soon as possible.

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-RW Disc (SL Disc) and DVD-RW 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 (Example: Company who passed A in **Table 2.1-1** applies to E)
- Additional Class production model (Example: Company who passed A in **Table 2.1-1** applies to C)
- 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
A	1x-speed DVD-RW Disc (Class 0)	0	1x	1x	1x
	1x-speed DVD-RW Disc (Ver.1.1)	(Note 1)	1x	(Note 1)	1x
B	2x/1x-speed DVD-RW Disc (Class 0&1)	0&1	1x	1x & 2x	2x
	2x/1x-speed DVD-RW Disc (Ver.1.1)	(Note 2)	1x	(Note 2)	2x
C	4x/1x-speed DVD-RW Disc (Class 0&1)	0&1	1x	1x & 2x	4x
D	6x/1x-speed DVD-RW Disc (Class 0&1)	0&1	1x	1x & 2x	6x
E	2x-speed DVD-RW Disc (Class 1)	1	2x	2x	2x
F	4x/2x-speed DVD-RW Disc (Class 1)	1	2x	2x	4x
G	6x/2x-speed DVD-RW Disc (Class 1)	1	2x	2x	6x
H	2x-speed DVD-RW Disc for DL (Class 0)	0	2x	2x	2x

Note 1: This product does not define Class, but the Class and the Basic recording speed are regarded as Class 0 and 1x-speed respectively.

Note 2: This product does not define Class, but the Classes and the Basic recording speeds are regarded as Class 0&1 and 1x & 2x-speed respectively.

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 6x-speed DVD-RW Revision 3.x changing to 3.x+1
- Optional Specifications 4x-speed DVD-RW Revision 2.x changing to 2.x+1
- Optional Specifications 2x-speed DVD-RW Revision 1.x changing to 1.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*

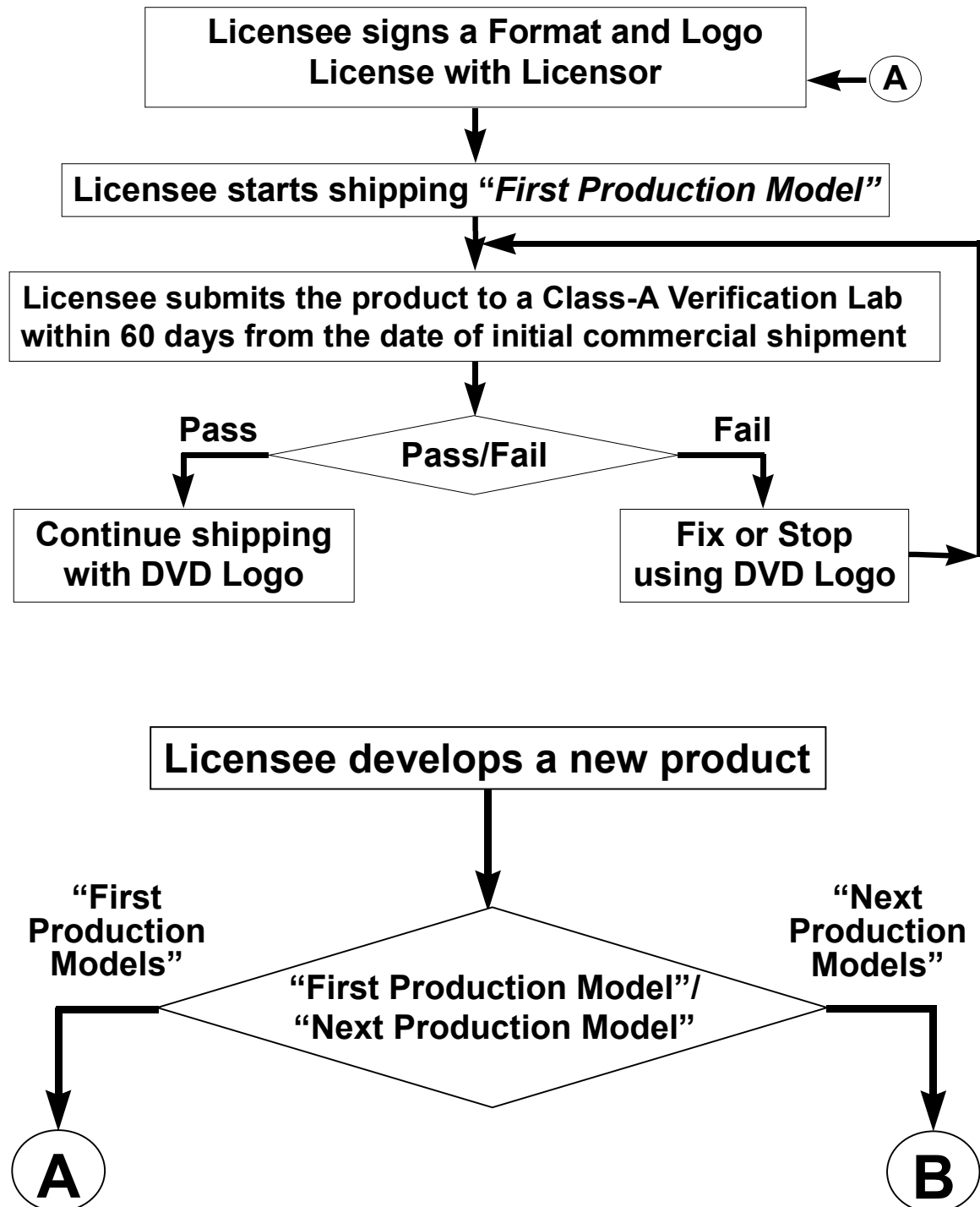
*: If one type disc (e.g. Single Sided/12 cm disc) of these parameter combinations is produced as the first production model, the other type discs (e.g. Single Sided/8 cm, Double Sided/12 cm and Double Sided/8 cm) shall be defined as the next production model.

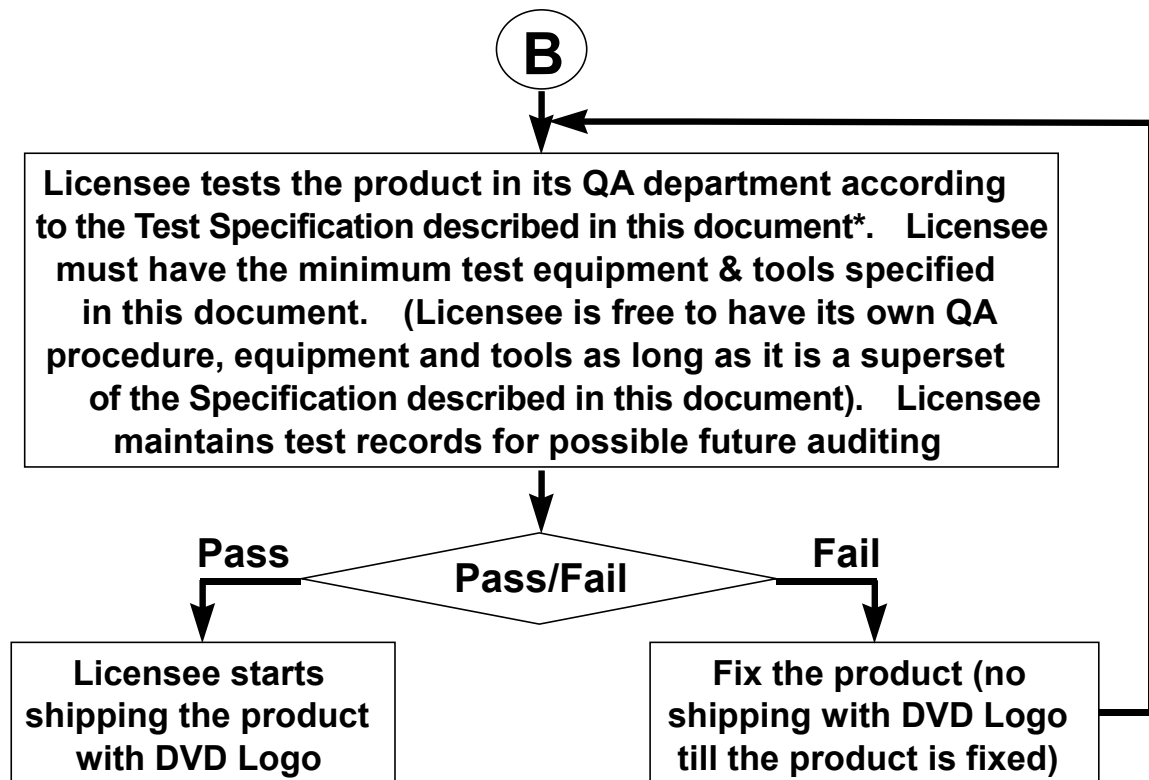
Class-A Verification Labs - Class-A Verification Labs are experts in DVD technology and provide independent expert assessment of Licensee's product compliance with DVD Specifications. Class-A Labs also provide additional services such as interpretation of DVD Specifications, Test Tool development, and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

Class-B Verification Labs - DVD-RW Disc Class-B Verification Labs provide DVD-RW Disc testing strictly according to **DVD-RW Disc (for SL & 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-RW Disc 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.

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

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

Its recording beam condition is defined in 2.2.3.2 of DVD Specifications for Re-recordable Disc Part 1: Ver. 1.2.

- **For 1x-speed recording**, the Basic Write Strategy specified in 2.2.3.8.1 of DVD Specifications for Re-recordable Disc Part 1: Ver. 1.2 shall be used.
- **For 2x-speed recording**, the Basic Write Strategy specified in 2.1.5 of Optional Specifications 2x-speed DVD-RW Revision 1.0 shall be used.
- **For 4x-speed recording**, the Basic Write Strategy specified in 2.1.5 of Optional Specifications 4x-speed DVD-RW Revision 2.0 shall be used.
- **For 6x-speed recording**, the Basic Write Strategy specified in 2.1.5 of Optional Specifications 6x-speed DVD-RW Revision 3.0 shall be used.

3.1.1.2 DVD-RW measuring system (Playback PU)

The discs tested shall be played back by DVD-RW measuring system (Playback PU). Its reading beam condition is defined in 2.1.3.2 of DVD Specifications for Re-recordable Disc Part 1: Ver. 1.2 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-RW Disc (SL Disc) products described in **1.3 Scope of Products Covered**.

The DVD-RW 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 3.2K-1 to Form 3.6K-5**. Final judgment shall be made by **Form 5K**.

- Test will be carried out according to the nomination of "Class", "Maximum recording speed" and "Minimum recording speed" applied in **Form 2K** (1/2).

Test procedure of each recording speed is described in the following sections **3.2, 3.3, 3.4, 3.5** and **3.6**.

Table 3.1.2-1 shows the relation between "Nomination" 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 F, Test described in sections **3.2, 3.4** and **3.5** shall be carried out.

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

Product type		Recording speed			Section numbers/Recording speed					Samples to be submitted
		Min.	Basic	Max.	3.2	3.3	3.4	3.5	3.6	
					Before	1x	2x	4x	6x	
A	1x-speed SL Disc (Class 0)	1	1	1	✓	✓	---	---	---	10
	1x-speed SL Disc (Ver.1.1)	1	--	1	✓	✓	---	---	---	10
B	2x/1x-speed SL Disc (Class 0&1)	1	1 & 2	2	✓	✓	✓	---	---	10
	2x/1x-speed SL Disc (Ver.1.1)	1	--	2	✓	✓	✓	---	---	10
C	4x/1x-speed SL Disc (Class 0&1)	1	1 & 2	4	✓	✓	✓	✓	---	20
D	6x/1x-speed SL Disc (Class 0&1)	1	1 & 2	6	✓	✓	✓	---	✓	20
E	2x-speed SL Disc (Class 1)	2	2	2	✓	---	✓	---	---	10
F	4x/2x-speed SL Disc (Class 1)	2	2	4	✓	---	✓	✓	---	10
G	6x/2x-speed SL Disc (Class 1)	2	2	6	✓	---	✓	---	✓	10

- 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 in **Form 3.3K-1 to 3.3K-4** and **Form 3.4K-1 to 3.4K-4** are different between the companies passed and not passed the verification of lower recording speed. Except the test of the maximum recording speed, the recording radius is different according to 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
				1x	2x	4x	6x
A	1x-speed SL Disc	0 (or Ver.1.1)	25 mm	✓	---	---	---
			40 mm	✓	---	---	---
			55 mm	✓	---	---	---
B	2x/1x-speed SL Disc	0&1 (or Ver.1.1)	25 mm	✓	✓	---	---
			40 mm	✓	✓	---	---
			55 mm	✓	✓	---	---
C	4x/1x-speed SL Disc	0&1	25 mm	✓	✓	✓	---
			40 mm	✓	✓	✓	---
			55 mm	✓	✓	✓	---
D	6x/1x-speed SL Disc	0&1	25 mm	✓	✓	---	✓
			40 mm	✓	✓	---	✓
			55 mm	✓	✓	---	✓
E	2x-speed SL Disc	1	25 mm	---	✓	---	---
			40 mm	---	✓	---	---
			55 mm	---	✓	---	---
F	4x/2x-speed SL Disc	1	25 mm	---	✓	✓	---
			40 mm	---	✓	✓	---
			55 mm	---	✓	✓	---
G	6x/2x-speed SL Disc	1	25 mm	---	✓	---	✓
			40 mm	---	✓	---	✓
			55 mm	---	✓	---	✓

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
				1x	2x	4x	6x
A	1x-speed SL Disc	0 (or Ver.1.1)	25 mm	✓	---	---	---
			38 mm	✓	---	---	---
B	2x/1x-speed SL Disc	0&1 (or Ver.1.1)	25 mm	✓	✓	---	---
			38 mm	✓	✓	---	---
C	4x/1x-speed SL Disc	0&1	25 mm	✓	✓	✓	---
			38 mm	✓	✓	✓	---
D	6x/1x-speed SL Disc	0&1	25 mm	✓	✓	---	✓
			38 mm	✓	✓	---	✓
E	2x-speed SL Disc	1	25 mm	---	✓	---	---
			38 mm	---	✓	---	---
F	4x/2x-speed SL Disc	1	25 mm	---	✓	✓	---
			38 mm	---	✓	✓	---
G	6x/2x-speed SL Disc	1	25 mm	---	✓	---	✓
			38 mm	---	✓	---	✓

Note :  : Company passed the disc supporting 1x-speed may not measure this radius.

 : Company passed the disc supporting 2x-speed may not measure this radius.

- For the confirmation of required test items, "Check list of Forms for Submission" is prepared in **Form 2K (2/2)**. 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, 2x/1x, 4x/1x, 6x/1x, 2x, 4x/2x and 6x/2x-speed SL Discs. Refer to **Table 3.1.2-1**.

3.2.1 Unrecorded disc specifications

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

3.2.2 Control data zone

- Items described in **Form 3.2K-5 and 3.2K-6** shall be measured by the test tool described on each table.
- Items in **Form 3.2K-7** are described as Informative Annex in DVD Specifications for Re-recordable Disc Part 1: Ver. 1.2 (Annex Y). However, these items shall be measured for the confirmation of consistent tracking in this Test Specification.
- Items described in **Form 3.2K-8** shall be measured using DVD-RW measuring system (Playback PU).

3.2.3 Contents of Pre-pit data block configuration

- Items described in the **Form 3.2K-9** shall be measured using DVD-RW measuring system (Playback PU). It shall be confirmed whether the Sector structure of Unrecorded physical format (refer to 4.2 of DVD Specifications for Re-recordable Disc Part 1: Ver. 1.2) is written properly.

3.2.4 NBCA Code

- Items described in the **Form 3.2K-10** shall be measured using DVD-RW measuring system (Playback PU).

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

The tests described in this section are for 1x, 2x/1x, 4x/1x and 6x/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.
- Basic Write Strategy specified in 2.2.3.8.1 of DVD Specifications for Re-recordable Disc Part 1: Ver. 1.2 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 Operational signals shall be measured after 10 times overwriting in measuring band in radius.

3.3.2 Unrecorded disc specifications

- Items described in **Form 3.3K-1** shall be recorded with 1x-speed using DVD-RW measuring system (Recording PU). And fill in the Form with the recording condition values.
- Items described in **Form 3.3K-2** shall be recorded with 1x-speed and measured with 1x-speed scanning using DVD-RW 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-RW measuring system (Recording PU).
Items described in **Form 3.3K-3 and 3.3K-4** shall be measured by DVD-RW measuring system (Playback PU).
Items described in **Form 3.3K-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 3.3K-5** shall be measured using DVD-RW 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 Re-recordable Disc Part 1: Ver. 1.2) is written properly.

3.4 Test Specification for 2x-speed Recording of SL Disc

The tests described in this section are for 2x/1x, 4x/1x, 6x/1x, 2x, 4x/2x and 6x/2x-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.
- For 2x-speed recording, the Basic Write Strategy specified in 2.1.5 of Optional Specifications 2x-speed DVD-RW 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 Operational signals shall be measured after 10 times overwriting in measuring band in radius.

3.4.2 Unrecorded disc specifications

- Items described in **Form 3.4K-1** shall be recorded with 2x-speed using DVD-RW measuring system (Recording PU). And fill in the Form with the recording condition values.
- Items described in **Form 3.4K-2** shall be recorded with 2x-speed and measured with 1x-speed scanning using DVD-RW measuring system (Recording PU).

3.4.3 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-RW measuring system (Recording PU).
Items described in **Form 3.4K-3 and 3.4K-4** shall be measured by DVD-RW measuring system (Playback PU).
Items described in **Form 3.4K-4** shall be measured only when the nominated maximum recording speed is 2x-speed.

3.4.4 Contents of Pre-pit data block configuration

- Items described in the **Form 3.4K-5** shall be measured using DVD-RW measuring system (Playback PU).
It shall be confirmed whether the structure of Write Strategy field (refer to 3.1.3 of Optional Specifications 2x-speed DVD-RW Revision 1.0) is written properly.

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

The following tests are only for the product of which the nominated maximum recording speed is 4x-speed. 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 Basic Write Strategy specified in 2.1.5 of Optional Specifications 4x-speed DVD-RW Revision 2.0 shall be used.

Servo transfer function specified in 2.1.2 of Optional Specifications 4x-speed DVD-RW 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 Operational signals shall be measured after 10 times overwriting in measuring band in radius.

3.5.2 Unrecorded disc specifications

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

3.5.3 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-RW measuring system (Recording PU).
- Items described in **Form 3.5K-3 and 3.5K-4** shall be measured by DVD-RW measuring system (Playback PU).

3.5.4 Contents of Extended embossed information

- Items described in the **Form 3.5K-5** shall be measured using DVD-RW measuring system (Playback PU). It shall be confirmed whether the structure of Write Strategy code field (refer to 3.1.2.4 of Optional Specifications 4x-speed DVD-RW Revision 2.0) is written properly.

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

The following tests are only for the product of which the nominated maximum recording speed is 6x-speed. 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 Basic Write Strategy specified in 2.1.5 of Optional Specifications 6x-speed DVD-RW Revision 3.0 shall be used.

Servo transfer function specified in 2.1.2 of Optional Specifications 6x-speed DVD-RW 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 Operational signals shall be measured after 10 times overwriting in measuring band in radius.

3.6.2 Unrecorded disc specifications

- Items described in **Form 3.6K-1** shall be recorded with 6x-speed using DVD-RW measuring system (Recording PU). And fill in the Form with the recording condition values.
- Items described in **Form 3.6K-2** shall be recorded with 6x-speed and measured with 1x-speed scanning using DVD-RW 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-RW measuring system (Recording PU).
- Items described in **Form 3.6K-3 and 3.6K-4** shall be measured by DVD-RW measuring system (Playback PU).

3.6.4 Contents of Extended embossed information

- Items described in the **Form 3.6K-5** shall be measured using DVD-RW measuring system (Playback PU). It shall be confirmed whether the structure of Write Strategy code field (refer to 3.1.2.5 of Optional Specifications 6x-speed DVD-RW Revision 3.0) 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.

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

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

Its recording beam condition is defined in 2.2.3.2 of DVD Specifications for Re-recordable Disc for Dual Layer Part 1: Ver. 2.0.

- **For 2x-speed recording**, the Basic Write Strategy specified in 2.2.3.8 of DVD Specifications for Re-recordable Disc for Dual Layer Part 1: Ver. 2.0 shall be used.

4.1.1.2 DVD-RW measuring system (Playback PU)

The discs tested shall be played back by DVD-RW measuring system (Playback PU). Its reading beam condition is defined in 2.1.3.2 of DVD Specifications for Re-recordable Disc for Dual Layer Part 1: Ver. 2.0 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-RW Disc for DL products described in **1.3** Scope of Products Covered.

The DVD-RW Disc for DL 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 4.2K-1 to Form 4.3K-5**. Final judgment shall be made by **Form 5K**.

- Test will be carried out according to the nomination of "Maximum recording speed" and "Minimum recording speed" applied in **Form 2K** (1/2).

Test procedure of each recording speed is described in the following sections **4.2** and **4.3**.

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.

Table 4.1.2-2 shows the relation among "Product type", "Measuring points in radius", "Layer" and "Recording speed" to be executed.

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			
					Recording speed			4.2	4.3				
					Min.	Basic	Max.	Before	2x				
H	2x-speed DL Disc (Class 0)				2	2	2	✓	✓				20

- 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.

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

12 cm product type			Measuring points in radius	Recording speed	
				2x-speed	
Class				L0	L1
H	2x-speed DL Disc	0	25 mm	2x	2x
			40 mm	2x	2x
			55 mm	2x	2x

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

4.2 Test Specifications for Before recording of DL Disc

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

4.2.1 Unrecorded disc specifications

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

4.2.2 Control data zone

- Items described in **Form 4.2K-6 and 4.2K-7** shall be measured by the test tool described on each table.
- Items in **Form 4.2K-8** are described as Informative Annex in DVD Specifications for Re-recordable Disc for Dual Layer Part 1: Ver. 2.0 (Annex NN). However, these items shall be measured for the confirmation of consistent tracking in this Test Specification.
- Items described in **Form 4.2K-9** shall be measured using DVD-RW measuring system (Playback PU).

4.2.3 Contents of Pre-pit data block configuration

- Items described in the **Form 4.2K-10** shall be measured using DVD-RW measuring system (Playback PU).
It shall be confirmed whether the Sector structure of Unrecorded physical format (refer to 4.2 of DVD Specifications for Re-recordable Disc for Dual Layer Part 1: Ver. 2.0) is written properly.

4.2.4 NBCA Code

- Items described in the **Form 4.2K-11** shall be measured using DVD-RW measuring system (Playback PU).

4.2.5 Extension of Tracks

- Items described in the **Form 4.2K-12** 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-speed DL Disc. 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 of DVD Specifications for Re-recordable Disc for Dual Layer Part 1: Ver. 2.0 shall be used.
Servo transfer function specified in 2.2.3 of DVD Specifications for Re-recordable Disc for Dual Layer Part 1: Ver. 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 Operational signals shall be measured after 10 times overwriting in measuring band in radius.
- The recording order shall be kept for recording of Layer 1 (refer to Annex GG of DVD Specifications for Re-recordable Disc for Dual Layer Part 1: Ver.2.0).

4.3.2 Unrecorded disc specifications

- Items described in **Form 4.3K-1** shall be recorded with 2x-speed using DVD-RW measuring system (Recording PU). And fill in the Form with the recording condition values.
- Items described in **Form 4.3K-2** shall be recorded with 2x-speed and measured with 1x-speed scanning using DVD-RW 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-RW measuring system (Recording PU).
Items described in **Form 4.3K-3 and 4.3K-4** shall be measured by DVD-RW measuring system (Playback PU).
Items described in **Form 4.3K-4** shall be measured only when the nominated maximum recording speed is 2x-speed.

4.3.4 Contents of Extended embossed information

- Items described in the **Form 4.3K-5** shall be measured using DVD-RW measuring system (Playback PU).
It shall be confirmed whether the structure of Write Strategy code field (refer to 3.4.1.4.1 of DVD Specifications for Re-recordable Disc for Dual Layer Part 1: Ver. 2.0) 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, 2x/1x-speed, 4x/1x-speed, 6x/1x-speed, 2x-speed, 4x/2x-speed, 6x/2x-speed DVD-RW Disc (for SL) and 2x-speed DVD-RW Disc for DL)

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Annex B

Glossary of Terms used

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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 1K** 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 2K (2/2)** 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 the following product samples along with said necessary Forms and the NDA.

In case of 1x or 2x or 2x/1x or 4x/2x or 6x/2x-speed SL Disc, 10 pieces shall be submitted.

In case of 4x/1x or 6x/1x-speed SL Disc, 20 pieces shall be submitted.

In case of 2x-speed DL Disc, 20 pieces shall be submitted.

Test Results

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