DVD-R Video (VR) Recorder

TEST SPECIFICATION

Version 1.1

December 2005

Amendment for DVD-R Video (VR) Recorder TS Version 1.1 (December 2005)

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

- **Minor amendment (April 27, 2009)**

Page	Location	Amendment
Pages 22 to 23	**Annex A**	• Class-A Lab information of "Industrial Technology Research Institute", "Matsushita Electric Industrial Co., Ltd. (company name)", "PIONEER CORPORATION", "Sony Corporation (addition)" and "Victor Company of Japan, Limited" was updated.
Page 26	**Annex D**	• A note regarding Class-A Lab information was added. • Class-A Lab information of "PIONEER CORPORATION" and "Matsushita Electric Industrial Co., Ltd. (company name)" was updated.

- **Minor amendment (January 2010)**

Page	Location	Amendment
Pages 22 to 23	**Annex A**	• Class-A Lab information of "Panasonic Corporation", "PIONEER CORPORATION" and "Victor Company of Japan, Limited" were updated.
Page 26	**Annex D**	• Class-A Lab information of "PIONEER CORPORATION" and "Panasonic Corporation" were updated.

- **Amendment 1 (January 2012)**

Page	Location	Amendment
Page 22	**Annex A**	• "Toshiba Corporation" was deleted from the Class-A Lab list. • The company name "Victor Company of Japan, Limited" was changed to "JVC KENWOOD Corporation".
Pages 25 to 26	**Annex D**	• The supplier of the DVD File System Verifier for R-VR (TFSV07) was changed from "Toshiba Corporation" to "DVD Format/Logo Licensing Corporation". • DVD Video Recording Utilities (TVRU-01, TVRU-02) and DVD File System Verifier for R-VR (TFSV05) from Toshiba were discontinued.

- **Amendment 2 (June 2012)**

Page	Location	Amendment
Page 22	**Annex A**	• "Industrial Technology Research Institute" was deleted from the Class-A Lab list. • Class-A Lab information of "Sony Corporation" was updated.
Page 26	**Annex D**	• Contact information of "DVD Format/Logo Licensing Corporation" was updated.

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Revision History

- April 2004
  DVD-R Video (VR) Recorder Test Specification Version 0.9 was distributed to SG-8 members.

- June 2004
  DVD-R Video (VR) Recorder Test Specification Version 1.0(Draft) was approved by SG-8 members.

- August 30, 2004
  DVD-R Video (VR) Recorder Test Specification Version 1.0(Draft) was approved by VPC.

- September 2004
  DVD-R Video (VR) Recorder Test Specification Version 1.0(Draft) was approved by SC.

- June 2005
  Version 1.01 was edited as electronic files.

- November 24, 2005
  Version 1.1 was approved by VTF.
  The version 1.1 added Test Specifications for higher speed SL Disc up to 16x-speed and for DL Disc based on DVD-R for DL Book Part 1: Ver. 3.0.
  (The Version 1.1 was issued in December 2005.)

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Forms for DVD Format verification

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1. General

1.1 Scope

The scope of this Test Specification is the testing DVD-R Video (VR) Recorders for compliance with **DVD Specifications listed in 1.2**. The products shall be able to record on DVD-R Disc for General (hereinafter called **SL disc**) and/or DVD-R Disc for Dual Layer (hereinafter called **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 Video (VR) Recorder manufacturers.
The scope of this Test Specification is limited to product's compliance to the DVD Specifications and not to evaluate performance of products.

Note: This product is regarded as an associated product conforming to the plural DVD Specifications (e.g. DVD-R for General Book, DVD-R for DL Book and DVD Video Recording Book). Therefore this Test Specification involves at least two kinds of test group which may link to the verification fee.

1.2 Normative References

DVD Specifications for Recordable Disc for General (DVD-R for General Book)
- Part 1: Physical Specifications Version 2.1
- 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

DVD Specifications for Recordable Disc for Dual Layer (DVD-R for DL Book)
- Part 1: Physical Specifications Version 3.0
- Optional Specifications 4x-speed DVD-R for DL Revision 1.0

DVD Specifications for Recordable Disc for General (DVD-R for General Book)
- Part 2: File System Specifications Version 2.1

DVD Specifications for Recordable Disc for Dual Layer (DVD-R for DL Book)
- Part 2: File System Specifications (Supplemental Information to apply DVD-R for General Information Part 2 to DVD-R for DL disc (Feb. 2005))

DVD Specifications for DVD-RAM/DVD-RW/DVD-R for General Discs
- Part 3: Video Recording Version 1.2

1.3 Scope of Products Covered

A DVD-R Video (VR) Recorder for SL disc for 525/60 TV system

- Class 0 DVD-R Video (VR) Recorder for SL (1x only)
- Class 0 DVD-R Video (VR) Recorder for SL (4x max.)
- Class 0 DVD-R Video (VR) Recorder for SL (6x max.)
- Class 0 DVD-R Video (VR) Recorder for SL (8x max.)
- Class 0 DVD-R Video (VR) Recorder for SL (12x max.)
- Class 0 DVD-R Video (VR) Recorder for SL (16x max.)

B DVD-R Video (VR) Recorder for DL disc for 525/60 TV system

- Class 0 DVD-R Video (VR) Recorder for DL (2x only)
- Class 0 DVD-R Video (VR) Recorder for DL (4x max.)

C DVD-R Video (VR) Recorded Disc Player or function for 525/60 TV system

- DVD-R Video (VR) Recorded Disc Player or function is not treated as the First Production Model. The test specifications for these products are to be used for self test by licensee or Class-B Labs. The test items are **3.2.1.4 (for SL), 3.2.7.4 (for DL) and 3.2.9.1 to 3.2.9.5 (for SL&DL)**.

Notes:

- The Class 0 Recorder for SL (1x only) means that it is adaptable to the DVD-R discs for General having Class 0 and the recording speed is 1x-speed only.
- The Class 0 Recorder for SL (***N***x max.) means that it is adaptable to the DVD-R discs for General having Class 0 and the maximum recording speed for Class 0 disc is ***N***x-speed.
- The Class 0 Recorder for DL (2x only) means that it is adaptable to the DVD-R discs for DL having Class 0 and the recording speed is 2x-speed only.
- The Class 0 Recorder for DL (4x max.) means that it is adaptable to the DVD-R discs for DL having Class 0 and the maximum recording speed for Class 0 disc is 4x-speed.

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:

a. License to use the Logo and
b. 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 the "Recorder for SL disc" and the "Recorder for DL disc" independently:*

- DVD Specifications Version n.x changing to n±1.x
- Initial or the latest production model at the start of Logo Program for each Licensee
- Production model that is adaptable to additional Class disc

Example of first production model

Recorder for SL disc: Class 0 DVD-R Video (VR) Recorder (1x only)
or Class 0 DVD-R Video (VR) Recorder (4x max.)
or Class 0 DVD-R Video (VR) Recorder (6x max.)
or Class 0 DVD-R Video (VR) Recorder (8x max.)
or Class 0 DVD-R Video (VR) Recorder (12x max.)
or Class 0 DVD-R Video (VR) Recorder (16x max.)

and

Recorder for DL disc: Class 0 DVD-R Video (VR) Recorder for DL (2x only)
or Class 0 DVD-R Video (VR) Recorder for DL (4x max.)

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 its 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
- Change to add or reduce applicable recording speed(s) without adding Class (i.e. Basic recording speed)
- Significant changes at Licensees discretion to Pickup head, LSI and/or firmware related to DVD format

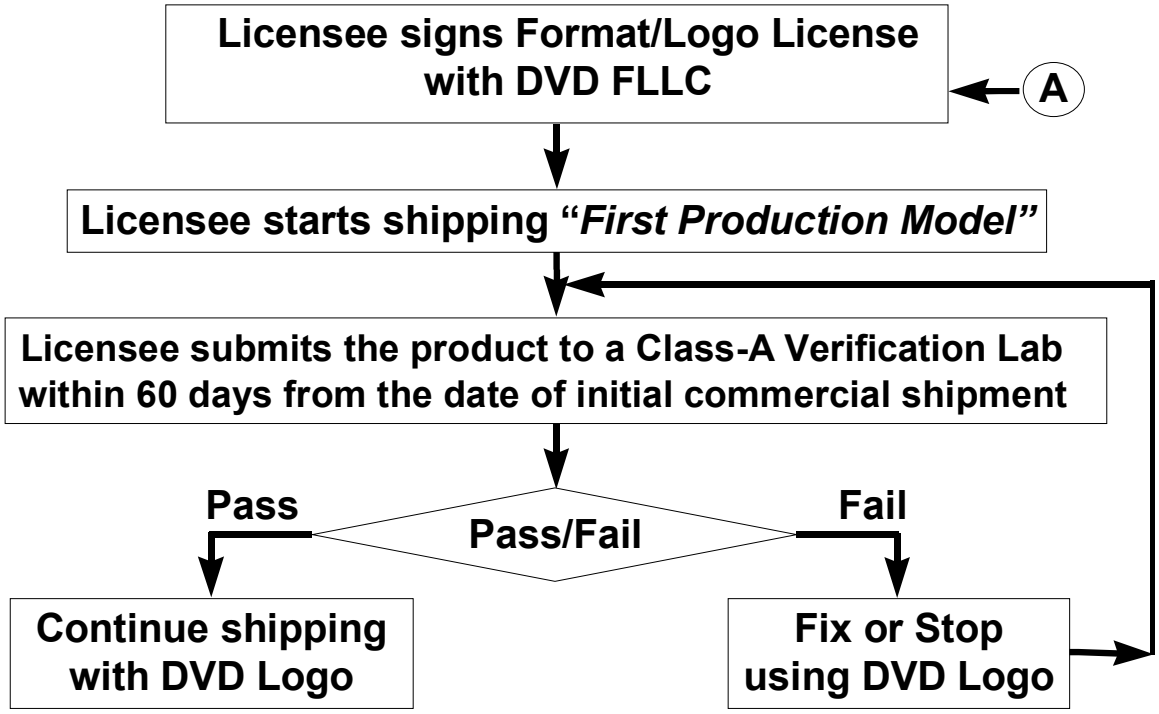
Note: DVD-R Video (VR) Recorded Disc Player or function is not treated as the ***First Production Model***. So these products do not require compliance verification from Class-A Verification Lab, but must be tested by licensee in its QA department for compliance with DVD Specifications or by a Class-B Verification Lab.

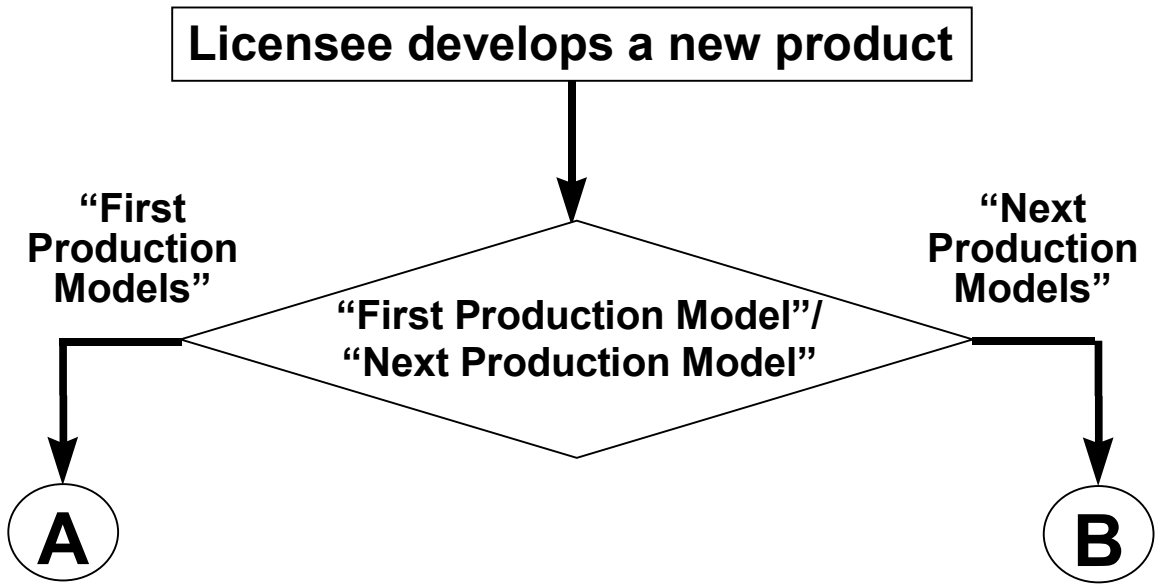
Class-A Verification Labs - Class-A Verification Labs are experts in DVD technology and provide independent expert assessment of Licensee's product compliance with DVD Specifications. Class-A labs also provide additional services such as interpretation of DVD Specifications, Test Tool development, Class-B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

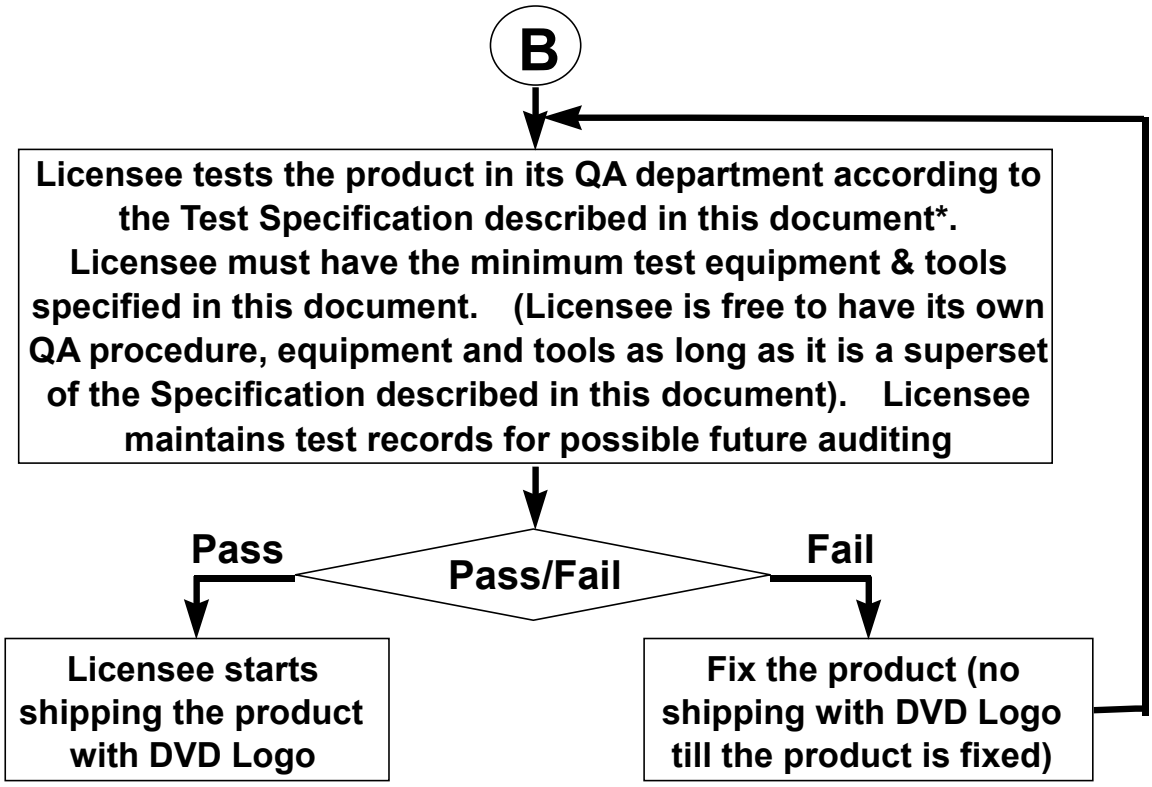
Class-B Verification Labs - DVD-R Video (VR) Recorder Class-B Verification Labs provide DVD-R Video (VR) Recorder testing strictly according to the **DVD-R Video (VR) Recorder Test Specification** (They can not interpret the specifications).

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 Video (VR) Recorder Class-B Verification Lab**.

3. Test Tools and Test Specifications

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

3.1 Test Tools

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

3.1.1 Test Discs

The following test discs are used for this verification activity. As for acquisition, refer to **Annex D**.

(For 525/60 TV system)

- 1x-speed DVD-R for General Standard Blank Test Disc: Type 1 GRBTD-001
- 4x/1x-speed DVD-R for General Standard Blank Test Disc: GRBTD-021
- 8x/1x-speed DVD-R for General Standard Blank Test Disc: GRBTD-031
- 16x/1x-speed DVD-R for General Standard Blank Test Disc: GRBTD-041
- 4x/2x-speed DVD-R for DL Standard Blank Test Disc: GRBTD-001-DL
- Test Stream, User Operation and Jump Performance Disc: VRSTD-R01
- Max. Data Size Disc: VRMTD-R01
- Signal Test Disc for DL: GRSTD-001-DL

3.1.2 Verifiers

To be able to check the discs recorded by DVD-R Video (VR) Recorder, the following verifiers are needed. As for acquisition, refer to **Annex D**.

Verifier for Application Layer is:

- DVD Video Recording Verifier for Application Layer for SL (DVD-VR01RAM) or DVD Video (VR) Recording Verifier for SL (VRFV-001)
- DVD Video (VR) Recording Verifier for DL (VRFV-002)
- DVD Video Recording Utility for SL (TVRU-01) or equivalent tool
- DVD Video Recording Utility for DL and SL (TVRU-02) or equivalent tool

Note: DVD Video Recording Verifier for R is composed of DVD Video Recording Utility (TVRU-01 and/or TVRU-02) or equivalent tool, and DVD Video Recording Verifier for Application Layer for SL (DVD-VR01RAM) or DVD Video (VR) Recording Verifier for SL (VRFV-001) and/or DVD Video (VR) Recording Verifier for DL (VRFV-002).

Verifier for File System is:

- DVD File System Verifier for R-VR for SL (TFSV05)
- DVD File System Verifier for R-VR for DL and SL (TFSV07)

Verifier for Information data in Lead-in and RMA is:

- Information Area Verifier (RMAV-001)

3.1.3 DVD-R measuring system (Playback)

DVD-R measuring system (Playback) shall have functions at least for executing the tests defined in **3.2.1.1 to 3.2.8.3**. Its reading beam condition shall be as defined in 2.1.3.2 of DVD-R for General Book Part 1: Ver. 2.1 and its scanning velocity shall be 3.49 m/s (1x-speed for SL disc). In case of DVD-R for DL, its reading beam condition shall be as defined in 2.1.3.2 of DVD-R for DL Book Part 1: Ver. 3.0 and its scanning velocity shall be 3.84 m/s (1x-speed for DL disc). This system is to be equipped by each Lab and applicant individually.

3.2 Test Specifications

The following sections describe the test procedures required for verification of the DVD products specified in **1.3**.

- **Test procedure**

The discs recorded with DVD-R Video (VR) Recorder have to be in compliance with the physical DVD requirements as indicated in the corresponding DVD Specifications listed in **1.2**. Test will be carried out according to the nomination of "Class" and "Maximum recording speed" applied in **Form 2W**.
Test procedure of each recording speed is described respectively in the following sections from **3.2.1** to **3.2.8**.
Table 3.2-1 and **Table 3.2-2** show the relation between Recorder type and Test Discs to be used.
When "✓" is marked in the column, the test at the measuring points shall be carried out.

Table 3.2-1 : Recorder type, Test recording speeds and Test Discs to be used (for SL disc)

Recorder type	Measuring	Test recording speed/ Test Discs					
Class/	points	1x	4x	6x	8x	12x	16x
Recording speed	R (mm)	GRBTD-001	GRBTD-021	GRBTD-031	GRBTD-031	GRBTD-041	GRBTD-041
Class 0 (1x only)	25	✓					
	40	✓					
	55	✓					
Class 0 (4x max.)	25	✓	✓				
	40	✓	✓				
	55	✓	✓				
Class 0 (6x max.)	25	✓	---	✓			
	40	✓	---	✓			
	55	✓	---	✓			
Class 0 (8x max.)	25	✓	---	---	---		
	40	✓	---	---	✓		
	55	✓	---	---	✓		
Class 0 (12x max.)	25	✓	---	---	---	---	
	40	✓	---	---	---	✓	
	55	✓	---	---	---	✓	
Class 0 (16x max.)	25	✓	---	---	---	---	---
	40	✓	---	---	---	---	---
	55	✓	---	---	---	---	✓

Table 3.2-2 : Recorder type and Test Discs to be used (for DL disc)

Recorder type	Measuring points R (mm)	Test recording speed/ Test Discs			
Class/ Recording speed		2x		4x	
		GRBTD-001-DL		GRBTD-001-DL	
		L0	L1	L0	L1
Class 0 (2x only)	25	✓	✓		
	40	✓	✓		
	55	✓	✓		
Class 0 (4x only)	25	✓	✓	✓	✓
	40	✓	*	*	✓
	55	✓	*	*	✓

*: Licensee submits these data. Class-A Lab will not measure these parameters in general.

- **Forms to be submitted**

An applicant is requested to submit the test sample with the test results, which may be obtained by self-verification or verification conducted by Class-B Lab.

Table 3.2-3 and **Table 3.2-4** show the relation between "Recorder type" and "Form No." to be submitted.

When "✓" is marked in the column for each product of "A-F" and "G-H", the correspondent Forms shall be submitted.

Table 3.2-3 : Recorder type and Forms to be submitted (for SL)

Recorder type			Forms No. to be submitted								
	TV system	Adaptable recording speed	3W, 5W, 6W	4W	7W to 9W	10W to 12W	13W to 15W	16W to 18W	19W to 21W	29W to 35W	38W
A	525/60	1x only	✓	✓						✓	✓
B		4x max.	✓		✓					✓	✓
C		6x max.	✓			✓				✓	✓
D		8x max.	✓				✓			✓	✓
E		12x max.	✓					✓		✓	✓
F		16x max.	✓						✓	✓	✓

Table 3.2-4 : Recorder type and Forms to be submitted (for DL)

Recorder type			Forms No. to be submitted				
	TV system	Adaptable recording speed	22W, 24W, 25W	23W	26W to 28W	29W to 33W and 36W,37W	38W
G	525/60	2x only	✓	✓		✓	✓
H		4x max.	✓		✓	✓	✓

3.2.1 Physical Specification Test for Class 0 Recorder for SL (1x only or higher speeds)

For DVD-R Video (VR) Recorded Disc Player for SL or function, only the test of **3.2.1.4 Reading characteristics** is applied.

3.2.1.1 1x-speed Recording characteristics for SL disc

- 100% Full Color Bar signal shall be written in the user area of a 1x-speed DVD-R for General Standard Blank Test Disc (Type 1 GRBTD-001) by the test DVD-R Video (VR) Recorder.
  Write Strategy variations (refer to Annex K of DVD-R for General Book Part 1 Ver. 2.1) can be used for this recording. For the items that the evaluation radius is specified, the writing zones shall be at least 5 mm band in radius including the measuring points of R = 25 mm, 40 mm and 55 mm.
- Measure the characteristics of the recorded layer using DVD-R measuring system (Playback) or equivalent and enter the measured values in accordance with **Form 3W**.

3.2.1.2 1x-speed Linking characteristics for SL disc

- This test is only for the Recorder for SL (1x only). Other Recorder for SL (≥4x max) need not execute this test as refer to **Table 3.2-3**.
- 100% Full Color Bar signal shall be written in the user area of a 1x-speed DVD-R for General Standard Blank Test Disc (Type 1 GRBTD-001) by the test DVD-R Video (VR) Recorder. And append the same signal according to the linking scheme that is adopted to the DVD-R Video (VR) Recorder.
- Using DVD-R measuring system (Playback), check whether the time difference between "the peak of LPP" and "center of 14T" is smaller than 7T (260ns) in any place of around Linked area.
  If the linking is done properly, mark OK in **Form 4W**.

3.2.1.3 1x-speed Information data in Lead-in and RMA for SL disc

- The 1x-speed DVD-R for General Standard Blank Test Disc recorded in the test of **3.2.1.1** shall be used for this check.
- Using DVD-R measuring system or Information Area Verifier, check the recorded information data in Lead-in and RMA of the recorded 1x-speed Standard Blank Test Disc. The applicant shall fill out each column of **Form 5W**, and Class-A Lab will check them.

3.2.1.4 Reading characteristics for SL disc for 525/60 TV system

DVD-R Video (VR) Recorder shall be able to read a Test Stream, User Operation and Jump Performance Disc (VRSTD-R01). If the three title programs of No.1, No.29 and No.32 in this disc can be read properly, mark OK in **Form 6W**.

3.2.2 Physical Specification Test for Class 0 Recorder for SL (4x max.)

3.2.2.1 4x-speed Recording characteristics for SL disc

- 100% Full Color Bar signal shall be written with 4x-speed* in the user area of a 4x/1x-speed DVD-R for General Standard Blank Test Disc (GRBTD-021) by the DVD-R Video (VR) Recorder.
  Write Strategy variations (refer to 2.1.5, Annex B and C of Optional Specifications 4x-speed DVD-R Rev. 1.0) can be used for this recording.
  For the items that the evaluation radius is specified, the writing zones shall be at least 5 mm band in radius including the measuring points of R = 25 mm, 40 mm and 55 mm.
- Measure the characteristics of the recorded layer with 1x-speed using DVD-R measuring system (Playback) or equivalent and enter the measured values in accordance with **Form 7W**.

*Note: DVD Recorder may automatically select the recording speed according to the type of the inserted disc and the recording speed may not be set by user operation. "Class 0 Recorder for SL (4x max.)" may possibly select 4x-speed recording for all user area or outer radius area of the 4x/1x-speed Blank Test Disc. In such case, describe the condition that the recorder uses 4x-speed in the designated area in **Form 7W**.

3.2.2.2 4x-speed Linking characteristics for SL disc

- This test shall be performed under the condition keeping 4x-speed recording.
- 100% Full Color Bar signal shall be written with 4x-speed in the user area of a 4x/1x-speed DVD-R for General Standard Blank Test Disc (GRBTD-021) by the DVD-R Video (VR) Recorder. And append the same signal according to the linking scheme that is adopted to the DVD-R Video (VR) Recorder.
- Using DVD-R measuring system (Playback), check whether the time difference between "the peak of LPP" and "center of 14T" is smaller than 7T (260ns at 1x-speed) in any place of around Linked area.
  If the linking is done properly, mark OK in **Form 8W**.

3.2.2.3 4x-speed Information data in Lead-in and RMA for SL disc

- The 4x/1x-speed DVD-R for General Standard Blank Test Disc (GRBTD-021) recorded in the test of **3.2.2.1** shall be used for this check.
- Using DVD-R measuring system (Playback) or Information Area Verifier, check the recorded information data in Lead-in and RMA of the recorded 4x/1x-speed Standard Blank Test Disc. The applicant shall fill out each column of **Form 9W**, and Class-A Lab will check them.

3.2.3 Physical Specification Test for Class 0 Recorder for SL (6x max.)

3.2.3.1 6x-speed Recording characteristics for SL disc

- 100% Full Color Bar signal shall be written with 6x-speed* in the user area of a 8x/1x-speed DVD-R for General Standard Blank Test Disc (GRBTD-031) by the DVD-R Video (VR) Recorder.
  Write Strategy specified in 2.1.5.1 of Optional Specifications 6x-speed DVD-R Rev. 2.0 can be used for this recording.
  For the items that the evaluation radius is specified, the writing zones shall be at least 5 mm band in radius including the measuring points of R = 25 mm, 40 mm and 55 mm.
- Measure the characteristics of the recorded layer with 1x-speed using DVD-R measuring system (Playback) or equivalent and enter the measured values in accordance with **Form 10W**.

*Note: DVD Recorder may automatically select the recording speed according to the type of the inserted disc and the recording speed may not be set by user operation. "Class 0 Recorder for SL (6x max.)" may possibly select 6x-speed recording for all user area or outer radius area of the 8x/1x-speed Blank Test Disc. In such case, describe the condition that the Recorder uses 6x-speed in the designated area in **Form 10W**.

3.2.3.2 6x-speed Linking characteristics for SL disc

- This test shall be performed under the condition keeping 6x-speed recording.
- 100% Full Color Bar signal shall be written with 6x-speed in the user area of a 8x/1x-speed DVD-R for General Standard Blank Test Disc (GRBTD-031) by the DVD-R Video (VR) Recorder. And append the same signal according to the linking scheme that is adopted to the DVD-R Video (VR) Recorder.
- Using DVD-R measuring system (Playback), check whether the time difference between "the peak of LPP" and "center of 14T" is smaller than 7T (260 ns at 1x-speed) in any place of around Linked area.
  If the linking is done properly, mark OK in **Form 11W**.

3.2.3.3 6x-speed Information data in Lead-in and RMA for SL disc

- The 8x/1x-speed DVD-R for General Standard Blank Test Disc (GRBTD-031) recorded in the test of **3.2.3.1** shall be used for this check.
- Using DVD-R measuring system (Playback) or Information Area Verifier, check the recorded information data in Lead in and RMA of the recorded 8x/1x-speed Standard Blank Test Disc. The applicant shall fill out each column of **Form 12W**, and Class-A Lab will check them.

3.2.4 Physical Specification Test for Class 0 Recorder for SL (8x max.)

3.2.4.1 8x-speed Recording characteristics for SL disc

- 100% Full Color Bar signal shall be written with 8x-speed* in the user area of an 8x/1x-speed DVD-R for General Standard Blank Test Disc (GRBTD-031) by the DVD-R Video (VR) Recorder.
  Write Strategy specified in 2.1.5.1 of Optional Specifications 8x-speed DVD-R Rev. 3.0 can be used for this recording.
  For the items that the evaluation radius is specified, the writing zones shall be at least 5 mm band in radius including the measuring points of R = 40 mm and 55 mm.
- Measure the characteristics of the recorded layer with 1x-speed using DVD-R measuring system (Playback) or equivalent and enter the measured values in accordance with **Form 13W**.

*Note: DVD Recorder may automatically select the recording speed according to the type of the inserted disc and the recording speed may not be set by user operation. "Class 0 Recorder for SL (8x max.)" may possibly select 8x-speed recording for all user area or outer radius area of the 8x/1x-speed Blank Test Disc. In such case, describe the condition that the Recorder uses 8x-speed in the designated area in **Form 13W**.

3.2.4.2 8x-speed Linking characteristics for SL disc

- This test shall be performed under the condition keeping 8x-speed recording.
- 100% Full Color Bar signal shall be written with 8x-speed in the user area of an 8x/1x-speed DVD-R for General Standard Blank Test Disc (GRBTD-031) by the DVD-R Video (VR) Recorder. And append the same signal according to the linking scheme that is adopted to the DVD-R Video (VR) Recorder.
- Using DVD-R measuring system (Playback), check whether the time difference between "the peak of LPP" and "center of 14T" is smaller than 7T (260ns at 1x-speed) in any place of around Linked area.
  If the linking is done properly, mark OK in **Form 14W**.

3.2.4.3 8x-speed Information data in Lead-in and RMA for SL disc

- The 8x/1x-speed DVD-R for General Standard Blank Test Disc (GRBTD-031) recorded in the test of **3.2.4.1** shall be used for this check.
- Using DVD-R measuring system (Playback) or Information Area Verifier, check the recorded information data in Lead-in and RMA of the recorded 8x/1x-speed Standard Blank Test Disc. The applicant shall fill out each column of **Form 15W**, and Class-A Lab will check them.

3.2.5 Physical Specification Test for Class 0 Recorder for SL (12x max.)

3.2.5.1 12x-speed Recording characteristics for SL disc

- 100% Full Color Bar signal shall be written with 12x-speed* in the user area of a 16x/1x-speed DVD-R for General Standard Blank Test Disc (GRBTD-041) by the DVD-R Video (VR) Recorder.
  Write Strategy specified in 2.1.5.1 of Optional Specifications 12x-speed DVD-R Rev. 5.0 can be used for this recording.
  For the items that the evaluation radius is specified, the writing zones shall be at least 5 mm band in radius including the measuring points of R = 40 mm and 55 mm.
- Measure the characteristics of the recorded layer with 1x-speed using DVD-R measuring system (Playback) or equivalent and enter the measured values in accordance with **Form 16W**.

*Note: DVD Recorder may automatically select the recording speed according to the type of the inserted disc and the recording speed may not be set by user operation. "Class 0 Recorder for SL (12x max.)" may possibly select 12x-speed recording for all user area or outer radius area of the 16x/1x-speed Blank Test Disc. In such case, describe the condition that the Recorder uses 12x-speed in the designated area in **Form 16W**.

3.2.5.2 12x-speed Linking characteristics for SL disc

- This test shall be performed under the condition keeping 12x-speed recording.
- 100% Full Color Bar signal shall be written with 12x-speed in the user area of a 16x/1x-speed DVD-R for General Blank Test Disc (GRBTD-041) by the DVD-R Video (VR) Recorder. And append the same signal according to the linking scheme that is adopted to the DVD-R Video (VR) Recorder.
- Using DVD-R measuring system (Playback), check whether the time difference between "the peak of LPP" and "center of 14T" is smaller than 7T (260 ns at 1x-speed) in any place of around Linked area.
  If the linking is done properly, mark OK in **Form 17W**.

3.2.5.3 12x-speed Information data in Lead-in and RMA for SL disc

- The 16x/1x-speed DVD-R for General Standard Blank Test Disc (GRBTD-041) recorded in the test of **3.2.5.1** shall be used for this check.
- Using DVD-R measuring system (Playback) or Information Area Verifier, check the recorded information data in Lead in and RMA of the recorded 16x/1x-speed Standard Blank Test Disc. The applicant shall fill out each column of **Form 18W**, and Class-A Lab will check them.

3.2.6 Physical Specification Test for Class 0 Recorder for SL (16x max.)

3.2.6.1 16x-speed Recording characteristics for SL disc

- 100% Full Color Bar signal shall be written with 16x-speed* in the user area of a 16x/1x-speed DVD-R for General Standard Blank Test Disc (GRBTD-041) by the DVD-R Video (VR) Recorder.
  Write Strategy specified in 2.1.5.1 of Optional Specifications 16x-speed DVD-R Rev. 6.0 can be used for this recording.
  For the items that the evaluation radius is specified, the writing zones shall be at least 5 mm band in radius including the measuring points of R = 55 mm.
- Measure the characteristics of the recorded layer with 1x-speed using DVD-R measuring system (Playback) or equivalent and enter the measured values in accordance with **Form 19W**.

*Note: DVD Recorder may automatically select the recording speed according to the type of the inserted disc and the recording speed may not be set by user operation. "Class 0 Recorder for SL (16x max.)" may possibly select 16x-speed recording for all user area or outer radius area of the 16x/1x-speed Blank Test Disc. In such case, describe the condition that the Recorder uses 16x-speed in the designated area in **Form 19W**.

3.2.6.2 16x-speed Linking characteristics for SL disc

- This test shall be performed under the condition keeping 16x-speed recording.
- 100% Full Color Bar signal shall be written with 16x-speed in the user area of a 16x/1x-speed DVD-R for General Blank Test Disc (GRBTD-041) by the DVD-R Video (VR) Recorder. And append the same signal according to the linking scheme that is adopted to the DVD-R Video (VR) Recorder.
- Using DVD-R measuring system (Playback), check whether the time difference between "the peak of LPP" and "center of 14T" is smaller than 7T (260 ns at 1x-speed) in any place of around Linked area.
  If the linking is done properly, mark OK in **Form 20W**.

3.2.6.3 16x-speed Information data in Lead-in and RMA for SL disc

- The 16x/1x-speed DVD-R for General Standard Blank Test Disc (GRBTD-041) recorded in the test of **3.2.6.1** shall be used for this check.
- Using DVD-R measuring system (Playback) or Information Area Verifier, check the recorded information data in Lead in and RMA of the recorded 16x/1x-speed Standard Blank Test Disc. The applicant shall fill out each column of **Form 21W**, and Class-A Lab will check them.

3.2.7 Physical Specification Test for Class 0 Recorder for DL (2x only or 4x max.)

For DVD-R Video (VR) Player for DL or function, only the test of **3.2.7.4 Reading characteristics** is applied.

3.2.7.1 2x-speed Recording characteristics for DL disc

- 100% Full Color Bar signal shall be written with 2x-speed* in the user area of a 4x/2x-speed DVD-R for DL Standard Blank Test Disc (GRBTD-001-DL) by the DVD-R Video (VR) Recorder.
  Write Strategy specified in 2.2.3.8 of DVD-R for DL Book Part 1: Ver.3.0 can be used for this recording.
  For the items that the evaluation radius is specified, the writing zones shall be at least 5 mm band in radius including the measuring points of R = 25 mm, 40 mm and 55 mm.
- Measure the characteristics of the recorded layer with 1x-speed (3.84 m/s) using DVD-R measuring system (Playback) or equivalent and enter the measured values in accordance with **Form 22W**.

*Note: DVD Recorder (4x max) may automatically select the recording speed according to the type of the inserted disc and the recording speed may not be set by user operation. "Class 0 Recorder for DL (4x max.)" may possibly select 4x-speed recording for all user area or outer radius area of the 4x/2x-speed Blank Test Disc. In such case, describe the condition that the Recorder uses 2x-speed in the designated area in **Form 22W**.

3.2.7.2 2x-speed Linking characteristics for DL disc

This test is only for the Recorder for DL (2x only). The Recorder for DL (4x max) need not execute this test as refer to **Table 3.2-4**.

- 100% Full Color Bar signal shall be written with 2x-speed in the user area of a 4x/2x-speed DVD-R for DL Blank Test Disc by the DVD-R Video (VR) Recorder. And append the same signal according to the linking scheme that is adopted to the DVD-R Video (VR) Recorder.
- Using DVD-R measuring system (Playback), check whether the time difference between "the peak of LPP" and "center of 14T" is smaller than 7T (260ns at 1x-speed) in any place of around Linked area.
  If the linking is done properly, mark OK in **Form 23W**.

3.2.7.3 2x-speed Information data in Lead-in and RMA for DL disc

- The 4x/2x-speed DVD-R for DL Standard Blank Test Disc (GRBTD-001-DL) recorded in the test of **3.2.7.1** shall be used for this check.
- Using DVD-R measuring system (Playback) or Information Area Verifier, check the recorded information data in Lead in and RMA of the recorded 4x/2x-speed Standard Blank Test Disc. The applicant shall fill out each column of **Form 24W**, and Class-A Lab will check them.

3.2.7.4 Reading characteristics for DL disc for 525/60 TV system

A Signal Test Disc for DL (GRSTD-001-DL) shall be read by the DVD-R Video (VR) Recorder.
If the entire video with music is played back properly, mark OK in **Form 25W**.

3.2.8 Physical Specification Test for Class 0 Recorder for DL (4x max.)

3.2.8.1 4x-speed Recording characteristics for DL disc

- 100% Full Color Bar signal shall be written with 4x-speed* in the user area of a 4x/2x-speed DVD-R for DL Standard Blank Test Disc (GRBTD-001-DL) by the DVD-R Video (VR) Recorder.
  Write Strategy specified in 2.1.5.1 of Optional Specifications 4x-speed DVD-R for DL Rev. 1.0 can be used for this recording.
  For the items that the evaluation radius is specified, the writing zones shall be at least 5 mm band in radius including the measuring points of R = 25 mm, 40 mm and 55 mm.
- Measure the characteristics of the recorded layer with 1x-speed (3.84 m/s) using DVD-R measuring system (Playback) or equivalent and enter the measured values in accordance with **Form 26W**.

*Note: DVD Recorder may automatically select the recording speed according to the type of the inserted disc and the recording speed may not be set by user operation. "Class 0 Recorder for DL (4x max.)" may possibly select 4x-speed recording for all user area or outer radius area of the 4x/2x-speed Blank Test Disc. In such case, describe the condition that the Recorder uses 4x-speed in the designated area in **Form 26W**.

3.2.8.2 4x-speed Linking characteristics for DL disc

- This test shall be performed under the condition keeping 4x-speed recording.
- 100% Full Color Bar signal shall be written with 4x-speed in the user area of a 4x/2x-speed DVD-R for DL Blank Test Disc (GRBTD-001-DL) by the DVD-R Video (VR) Recorder. And append the same signal according to the linking scheme that is adopted to the DVD-R Video (VR) Recorder.
- Using DVD-R measuring system (Playback), check whether the time difference between "the peak of LPP" and "center of 14T" is smaller than 7T (260ns at 1x-speed) in any place of around Linked area.
  If the linking is done properly, mark OK in **Form 27W**.

3.2.8.3 4x-speed Information data in Lead-in and RMA for DL disc

- The 4x/2x-speed DVD-R for DL Standard Blank Test Disc (GRBTD-001-DL) recorded in the test of **3.2.8.1** shall be used for this check.
- Using DVD-R measuring system (Playback) or Information Area Verifier, check the recorded information data in Lead in and RMA of the recorded 4x/2x-speed Standard Blank Test Disc. The applicant shall fill out each column of **Form 28W**, and Class-A Lab will check them.

3.2.9 Video Recording Specification Test of DVD-R Video (VR) Recorder for 525/60 TV system

The following sections describe the procedures of logical test required for the DVD-R Video (VR) Recorder for 525/60 TV system. The test items **3.2.9.1 to 3.2.9.5** are applied to Recorder for SL, Recorder for DL and DVD-R Video (VR) Player or function.

3.2.9.1 Stream Test

- Play back the Test Stream Disc (VRSTD-R01) and check the presentation data of Audio, Video, Sub-pictures and general presentation in accordance with **Form 29W**.

3.2.9.2 User Operation

- Play back the Test Stream Disc (VRSTD-R01) and check the Linear Title play, Title search, Chapter search, Sub-picture, Audio selections, Time search and Seamless playback capability in accordance with **Form 30W**.

3.2.9.3 System Function

- Play back the Test Stream Disc (VRSTD-R01) and check the general presentation in accordance with **Form 31W**.

3.2.9.4 Jump Performance

- Play back the Test Stream Disc (VRSTD-R01) and check the presentation data in accordance with **Form 32W**.

3.2.9.5 Maximum Data Size

- Play back the Max. Data Size Disc (VRMTD-R01) and check the Audio, Video, Sub-pictures, Linear Title play, Title search and Chapter search in accordance with **Form 33W**.

3.2.9.6 Recording for SL disc

- Nominate the "Operation Nomination" in **Form 34W** and record arbitrary contents on a DVD-R for General Standard Blank Test Disc or equivalent and play back the presentation data and navigation data and check the recorded disc using DVD Video Recording Verifier for R at some items in accordance with **Form 34W**.
- If the DVD-R Video (VR) Recorder has any operations regarding recording other than the nominated Check Items on **Form 34W**, nominate "Check Items", "Operation Nomination" and "Expected result/Check point" for the operation in blank rows on **Form 34W**. Then, execute the operations on the recorded disc and play back the presentation data and navigation data and check the recorded disc using DVD Video Recording Verifier at some items, which are nominated, in accordance with **Form 34W**.

NOTE: 1) When checking the recorded SL disc using DVD Video Recording Verifier, the video recorded contents on the DVD-R disc are converted into the DVD-RAM disc or DVD-RW disc by using DVD Video Recording Utility for SL (TVRU-01 or TVRU-02). After that, the converted contents regarding application layer are verified by DVD Video Recording Verifier for Application Layer (DVD-VR01RAM) for SL or DVD Video (VR) Recording Verifier for SL (VRFV-001) respectively.

2) All operations regarding recording shall be nominated by the applicant. If blank rows to nominate the operations are insufficient, blank rows shall be made and nominated.
DVD-R Video (VR) Recorder for SL shall be verified in accordance with Operation Nominations in **Form 34W**.

3.2.9.7 Editing for SL disc

Edit the disc recorded in the test of **3.2.9.6** and play back the presentation data and navigation data and check the recorded disc using DVD Video Recording Verifier for R at some items in accordance with **Form 35W**.

NOTE: If the DVD-R Video (VR) Recorder has any operations regarding editing other than the nominated "Check Items" on **Form 35W**, the testing of E39, E40, and E41 shall be done after testing of all operations regarding editing.

- If the DVD-R Video (VR) Recorder has any operations regarding editing other than the nominated "Check Items" on **Form 35W**, nominate "Check Items", "Operation Nomination" and "Expected result/Check point" for the operation in blank rows on **Form 35W**. Then, execute the operation on the recorded disc and play back the presentation data and navigation data and check the recorded disc using Verifier at some items, which are nominated, in accordance with **Form 35W**.

NOTE: 1) When checking the edited SL disc using DVD Video Recording Verifier, the video edited contents on the DVD-R disc are converted into the DVD-RAM disc or DVD-RW disc by using DVD Video Recording Utility for SL (TVRU-01 or TVRU-02). After that, the converted contents regarding application layer are verified by DVD Video Recording Verifier for Application Layer (DVD-VR01RAM) for SL or DVD Video (VR) Recording Verifier for SL (VRFV-001) respectively.

2) All operations regarding editing shall be nominated by applicant. If blank rows to nominate the operations are insufficient, blank rows shall be made and nominated. DVD-R Video (VR) Recorder for SL shall be verified in accordance with Operation Nominations in **Form 35W**.

3.2.9.8 Recording for DL disc

- Nominate the "Operation Nomination" in **Form 36W** and record arbitrary contents on a DVD-R for DL Standard Blank Test Disc or equivalent and play back the presentation data and navigation data and check the recorded disc using DVD Video Recording Verifier for R at some items in accordance with **Form 36W**.
- If the DVD-R Video (VR) Recorder has any operations regarding recording other than the nominated Check Items on **Form 36W**, nominate "Check Items", "Operation Nomination" and "Expected result/Check point" for the operation in blank rows on **Form 36W**. Then, execute the operations on the recorded disc and play back the presentation data and navigation data and check the recorded disc using DVD Video Recording Verifier at some items, which are nominated, in accordance with **Form 36W**.

NOTE: 1) When checking the recorded DL disc using DVD Video Recording Verifier, the video recorded contents on the DVD-R disc are converted into the HDD by using DVD Video Recording Utility for DL (TVRU-02). After that, the converted contents regarding application layer are verified by DVD Video (VR) Recording Verifier for DL (VRFV-002).

2) All operations regarding recording shall be nominated by the applicant. If blank rows to nominate the operations are insufficient, blank rows shall be made and nominated.
DVD-R Video (VR) Recorder for DL shall be verified in accordance with Operation Nominations in **Form 36W**.

3.2.9.9 Editing for DL disc

Edit the disc recorded in the test of **3.2.9.8** and play back the presentation data and navigation data and check the recorded disc using DVD Video Recording Verifier for R at some items in accordance with **Form 37W**.

NOTE: If the DVD-R Video (VR) Recorder has any operations regarding editing other than the nominated "Check Items" on **Form 37W**, the testing of E40, E41, and E42 shall be done after testing of all operations regarding editing.

- If the DVD-R Video (VR) Recorder has any operations regarding editing other than the nominated "Check Items" on **Form 37W**, nominate "Check Items", "Operation Nomination" and "Expected result/Check point" for the operation in blank rows on **Form 37W**. Then, execute the operation on the recorded disc and play back the presentation data and navigation data and check the recorded disc using Verifier at some items, which are nominated, in accordance with **Form 37W**.

NOTE: 1) When checking the edited DL disc using DVD Video Recording Verifier, the video edited contents on the DVD-R disc are converted into the HDD by using DVD Video Recording Utility for DL (TVRU-02). After that, the converted contents regarding application layer are verified by DVD Video (VR) Recording Verifier for DL (VRFV-002).

2) All operations regarding editing shall be nominated by applicant. If blank rows to nominate the operations are insufficient, blank rows shall be made and nominated. DVD-R Video (VR) Recorder for DL shall be verified in accordance with Operation Nominations in **Form 37W**.

3.2.10 File System verification

This test verifies logical file system format of recorded DVD-R discs, which are formatted on the strength of DVD-R for General Book Part 2: File System Specifications Version 2.1 and/or DVD-R for DL Book Part 2 File System Specifications. It also verifies discs according to OSTA UDF Standard Revision 2.0.

3.2.10.1 Test for SL disc

The disc recorded in the test of **3.2.9.6 and 3.2.9.7 (Form 34W and 35W)** shall be checked its file system format. The test for recorded SL disc shall be done in accordance with user's manual of DVD-R VR File System Verifier for SL disc, TFSV05 or TFSV07.

- If no error was detected in the above verifications, mark OK in the column for SL disc of **Form 38W**.

3.2.10.2 Test for DL disc

The disc recorded in the test of **3.2.9.8 and 3.2.9.9 (Form 36W and 37W)** shall be checked its file system format. The test for recorded DL disc shall be done in accordance with user's manual of DVD-R VR File System Verifier for DL disc, TFSV07.

- If no error was detected in the above verifications, mark OK in the column for DL disc of **Form 38W**.

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.

(Recorder for SL disc/ Recorder for DL disc)

JVC KENWOOD Corporation
DVD Verification Lab.
12, 3 Chome, Moriya-cho, Kanagawa-ku, Yokohama, Kanagawa, 221-8528 Japan
Fax: +81-45-450-2425

Panasonic Corporation
Format Verification Laboratory
1-15 Matsuo-cho, Kadoma, Osaka, 571-8504 Japan
Fax: +81-6-6909-5027
E-mail: fvl-info@ml.jp.panasonic.com URL: http://panasonic.co.jp/avc/fvl/en/index.html

PIONEER CORPORATION
Verification Laboratory
1-1 Shin-ogura, Saiwai-ku, Kawasaki-shi, Kanagawa, 212-0031 Japan
Fax: +81-44-580-4027

SHARP CORPORATION
DVD Verification Laboratory
174, Hayakawa-cho, Yaita-city, Tochigi, 329-2193 Japan
Tel: +81-287-44-3749 Fax: +81-287-43-6680

Sony Corporation
Verification Laboratory
2-10-1 Osaki, Shinagawa-ku, Tokyo, 141-8610 Japan
Fax: +81-50-3750-6608

Annex B

Glossary of Terms used

Terms for Recording/Editing Test (used in Form 29W to 37W)

An Original Title : A Program in the Original PGC.

A Play list Title : A Play list which is referring to a UD_PGCI. The UD_PGCI which is referred by the Play list shall exist.

A Movie Title : A Title which includes Cells referring to Movie VOBs.

A Still Title : A Title which includes Cells referring to Still VOGs.

A Hybrid Title : A Title which includes Cells referring to both Movie VOBs and Still VOGs.

An Entry point : An entry point in a cell.

A Book Mark : The Entry point with Primary Text data.

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 1W** 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. Applicant must complete **Form 2W** and **necessary Forms*** to provide self-test results.

- The required Forms for each product of DVD-R Video (VR) Recorder are listed on the **Table 3.2-3** and/or **Table 3.2-4**.

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

Application
Applicant must submit 3 product samples along with said necessary Forms and the NDA.

Test Result
Upon completion of testing, Verification Lab will complete **Form 39W** to inform the applicant and DVD Format/Logo Licensing Corporation of the test results.

Annex D

Test Tool Contact Information

The Contact Information is correct at the time of publication. However, when the Class-A Lab information (marked <>) differs from such information cited in our website www.dvdfllc.co.jp, the List with more current date prevails.*

Test Discs

• 1x-speed DVD-R for General Standard Blank Test Disc: **Type 1; GRBTD-001** • 4x/1x-speed DVD-R for General Standard Blank Test Disc: **GRBTD-021** • 8x/1x-speed DVD-R for General Standard Blank Test Disc: **GRBTD-031** • 16x/1x-speed DVD-R for General Standard Blank Test Disc: **GRBTD-041** • 4x/2x-speed DVD-R for DL Standard Blank Test Disc: **GRBTD-001-DL** • Test Stream, User Operation and Jump Performance Disc: **VRSTD-R01** • Max. Data Size Disc: **VRMTD-R01** • Signal Test Disc for DL: **GRSTD-001-DL**	**PIONEER CORPORATION<*>** Verification Laboratory 1-1 Shin-ogura, Saiwai-ku, Kawasaki-shi, Kanagawa, 212-0031 Japan Fax: +81-44-580-4027

Verifiers

• DVD Video (VR) Recording Verifier for SL: **VRFV-001** • DVD Video (VR) Recording Verifier for DL: **VRFV-002** • Information Area Verifier: **RMAV-001**	**PIONEER CORPORATION<*>**
• DVD Video Recording Verifier for application layer (for SL): **DVD-VR01RAM**	**Panasonic Corporation<*>** Format Verification Laboratory 1-15 Matsuo-cho, Kadoma, Osaka, 571-8504 Japan Fax: +81-6-6909-5027 E-mail: fvl-info@ml.jp.panasonic.com URL: http://panasonic.co.jp/avc/fvl/en/index.html
• DVD Video Recording Utility for SL : **TVRU-01** • DVD Video Recording Utility for DL and SL: **TVRU-02** • DVD File System Verifier for R-VR for SL: **TFSV05**	*Discontinued*

(Continued)

Verifiers

• DVD File System Verifier for R-VR for DL and SL: **TFSV07**	**DVD Format/Logo Licensing Corporation** 2F Shibadaimon Makita Bldg., 2-5-8 Shibadaimon, Minato-ku, Tokyo, 105-0012 Japan Fax: +81-3-5777-2884 E-mail: verification@dvdfllc.co.jp

