# DVD-RAM Drive (4.7/1.46 Gbytes)

## TEST SPECIFICATION

**Version 2.4**

**December 2005**

# Amendment for DVD-RAM Drive (4.7/1.46 Gbytes) TS Version 2.4 (December 2005)

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

- **Amendment 1 (February 5, 2007)**

| Page | Location | Amendment |
|---|---|---|
| Page ii | **Table of Content** | Section **7.2** was added, and section **7.1.2** was changed to **7.2.1**. (Error correction of section in the chapter **7**.) |
| Page 31 | **Under 7.1.1** | Section **7.2** was added, and section **7.1.2** was changed to **7.2.1**. (Error correction of section in the chapter **7**.) |
| Page 32 | **Annex A** | Contact information of "Hitachi Ltd." and "SAMSUNG ELECTRONICS CO., LTD." was updated.<br>Contact information of "Sony Corporation" was newly added. |
| Pages 36 to 37 | **Annex D** | Contact information of "Hitachi Ltd." and "SAMSUNG ELECTRONICS CO., LTD." was updated. |

- **Minor amendment (March 26, 2009)**

| Page | Location | Amendment |
|---|---|---|
| Page 32 | **Annex A** | • Class-A Lab information of "Matsushita Electric Industrial Co., Ltd. (company name)", "Industrial Technology Research Institute" and "Sony Corporation" was updated. |
| Pages 36 to 37 | **Annex D** | • A note regarding Class-A Lab information was added.<br>• The company name "Matsushita Electric Industrial Co., Ltd." was changed to "Panasonic Corporation". |

- **Minor amendment (January 2010)**

| Page | Location | Amendment |
|---|---|---|
| Page 32 | **Annex A** | • Class-A Lab information of "Hitachi, Ltd. (company name)", "Panasonic Corporation" and "SAMSUNG ELECTRONICS CO., LTD" were updated. |
| Pages 36 to 37 | **Annex D** | • Class-A Lab information of "Hitachi, Ltd. (company name)", "Panasonic Corporation" and "SAMSUNG ELECTRONICS CO., LTD" were updated. |

- **Amendment 2 (January 2012)**

| Page | Location | Amendment |
|---|---|---|
| Page 32 | **Annex A** | • "Toshiba Corporation" was deleted from the Class-A Lab list. |
| Page 37 | **Annex D** | • DVD-RAM File System Verifier (TFSV01) from Toshiba was discontinued. |

- **Amendment 3 (June 2012)**

| Page | Location | Amendment |
|---|---|---|
| Page 32 | **Annex A** | • "Industrial Technology Research Institute" was deleted from the Class-A Lab list.<br>• Class-A Lab information of "Sony Corporation" and "SAMSUNG ELECTRONICS CO., LTD" were updated. |
| Page 37 | **Annex D** | • Class-A Lab information of "SAMSUNG ELECTRONICS CO., LTD" was updated. |

# Conditions for Publication



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## Revision History

- July 5, 1999
  Based on the request of VTF SG7 meeting held on June 2 in Tokyo, Verification Lab of Matsushita Electric Industrial Co., Ltd. reviewed the DVD-RAM Drive (2.6Gbytes) Test Specification and completed. The first draft of the "DVD-RAM Drive (4.7Gbytes) Test Specification".

- January 23, 2000
  Version 0.9 (Draft) was distributed to the SG7 member companies.

- March 2, 2000
  Version 2.0 (Draft) was distributed to the SG7 member companies.

- March 16, 2000
  SG7 and VTF approved version 2.0.

- May 2000
  Steering Committee members approved version 2.0.

- June 5, 2000
  Test Procedure and tools were added for 8 cm DVD-RAM Drive as a Version 2.1 (Draft) and approved at SG7.

- July 2000
  VTF members approved DVD-RAM Drive Test Specification Version 2.1.

- January 27, 2003
  Version-up 2.2 to add the test tools and test procedure for 3x-speed DVD-RAM Drive was approved by VPC.

- February 18, 2004
  Version-up 2.3 to add the test tools and test procedure for 5x-speed DVD-RAM Drive was approved by VPC.

- June 2005
  Version 2.31 updated Class-A Lab List (SAMSUNG, Toshiba) and was edited as electronic files.

- November 2005
  Version-up 2.4 to introduce Class concept and add the test tools and test procedure for 6x-speed, 8x-speed and 12x-speed DVD-RAM Drive was approved by VTF.
  (The Version 2.4 was issued in December 2005.)

 

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# 1. General

## 1.1 Scope

The scope of this Test Specification is for the purpose of testing DVD-RAM Drive (4.7/1.46 Gbytes) for compliance with DVD Specifications for Rewritable Disc Part 1 Version 2.2, Part 2 Version 2.0, Optional Specifications 3x-speed DVD-RAM Revision 1.0, Optional Specifications 5x-speed DVD-RAM Revision 2.0, Optional Specifications 6x-speed DVD-RAM Revision 3.0, Optional Specifications 8x-speed DVD-RAM Revision 4.0, Optional Specifications 12x-speed DVD-RAM Revision 5.0.

The DVD-RAM Drive (4.7/1.46 Gbytes) is strongly recommended to implement the procedure of Annex DD of DVD Specifications for Rewritable Disc Part 1 Physical Specifications Version 2.2.

The test procedure described herein could be used by Class-A Verification Labs, Class-B Verification Labs and Quality Assurance Departments of DVD-RAM Drive Licensees.
The scope of this Test Specification is limited to product's compliance to DVD Specifications and not to evaluate performance of products.

## 1.2 Normative References

DVD Specifications for Rewritable Disc

- Part 1: Physical Specifications Version 2.2
- Part 2: File System Specification Version 2.0
- Optional Specifications 3x-speed DVD-RAM Revision 1.0
- Optional Specifications 5x-speed DVD-RAM Revision 2.0
- Optional Specifications 6x-speed DVD-RAM Revision 3.0
- Optional Specifications 8x-speed DVD-RAM Revision 4.0
- Optional Specifications 12x-speed DVD-RAM Revision 5.0

## 1.3 Scope of Products Covered (Note*1)

A. 12cm/2x-speed DVD-RAM Drive (Class 0, Note*2)
B. 8cm/2x-speed DVD-RAM Drive (Class 0, Note*2)
C. Integrated system of 12cm/8cm/2x-speed DVD-RAM Disc (Class 0, Note*2)
D. 12cm/3x-speed DVD-RAM Drive (Class 0, Note*2)
E. 8cm/3x-speed DVD-RAM Drive (Class 0, Note*2)
F. Integrated system of 12cm/8cm/3x-speed DVD-RAM Disc (Class 0, Note*2)
G. 12cm/5x-speed DVD-RAM Drive (Class 0, Note*2)
H. 8cm/5x-speed DVD-RAM Drive (Class 0, Note*2)
I. Integrated system of 12cm/8cm/5x-speed DVD-RAM Disc (Class 0, Note*2)
J. 12cm/6x-speed DVD-RAM Drive (Class 0, Note*2)
K. 8cm/6x-speed DVD-RAM Drive (Class 0, Note*2)
L. Integrated system of 12cm/8cm/6x-speed DVD-RAM Disc (Class 0, Note*2)

M. 12cm/6x-speed DVD-RAM Drive (Class 0&1, Note*3)
N. 8cm/6x-speed DVD-RAM Drive (Class 0&1, Note*3)
O. Integrated system of 12cm/8cm/6x-speed DVD-RAM Disc (Class 0&1, Note*3)
P. 12cm/8x-speed DVD-RAM Drive (Class 0&1, Note*3)
Q. 8cm/8x-speed DVD-RAM Drive (Class 0&1, Note*3)
R. Integrated system of 12cm/8cm/8x-speed DVD-RAM Disc (Class 0&1, Note*3)
S. 12cm/12x-speed DVD-RAM Drive (Class 0&1, Note*3)
T. Integrated system of 12cm/12x-speed DVD-RAM Disc (Class 0&1, Note*3)

Notes:

*1: Nx-speed means that the maximum recording speed is Nx. A device that supports Class 1 has to record with 6x-speed in all zones.

Each product has read-only, or read and write functions. The read-only product is categorized into two as follows:

- DVD Multi Drive (Read-Only)
  In this case, the product requires compliance verification from Class-A Verification Lab in accordance with the instructions in the DVD Multi Drive (Read-Only) Test Specification.
- Other DVD Drive with DVD-RAM read-only function
  In this case, the DVD-RAM read-only function of the product does not require compliance verification from Class-A Verification Lab, but must be tested by licensee in its QA department or by a Class-B Verification Lab. (This product can not carry DVD-RAM Logo.)

*2: DVD-RAM Drive (Class 0) means that the Drive is adaptable to the DVD-RAM discs having Class 0.

*3: DVD-RAM Drive (Class 0&1) means that the Drive is adaptable to the DVD-RAM discs having Class 0 and/or Class 1.

# 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***:

- 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 supports additional Class

**Example of First Production Model**

If a licensee ships product models in the following sequence, each model is a First Production Model, because 2x-speed DVD-RAM drive supports Class0 only.

Step 1) 2x-speed DVD-RAM Drive
Step 2) Class 0&1 6x-speed DVD-RAM Drive that is adaptable to the DVD-RAM discs having Class 0 and/or Class 1

***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
- Change to add or reduce supporting disc size (8cm or 12cm)
- 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 firmware related to DVD format

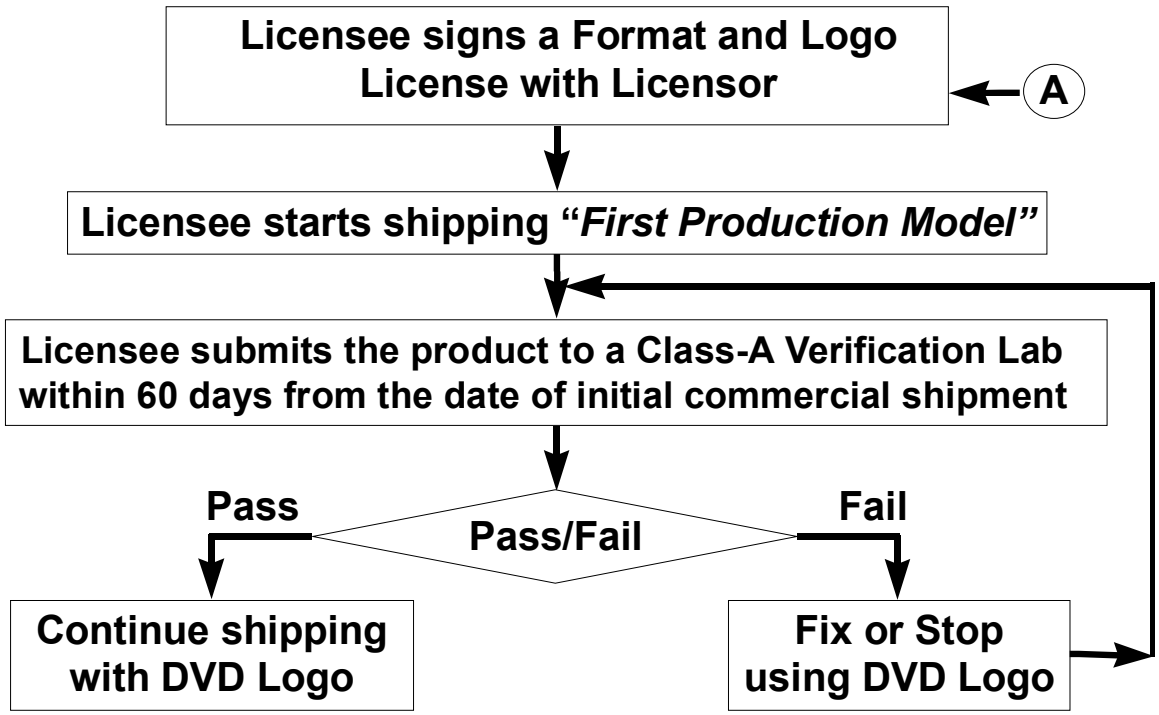
***Class-A Verification Labs -*** Class-A Verification Labs are experts in DVD technology and provide independent expert assessment of Licensee's product compliance with respect to DVD Specifications. Class-A labs also provide additional services such as interpretation of DVD Specifications, Test Tools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

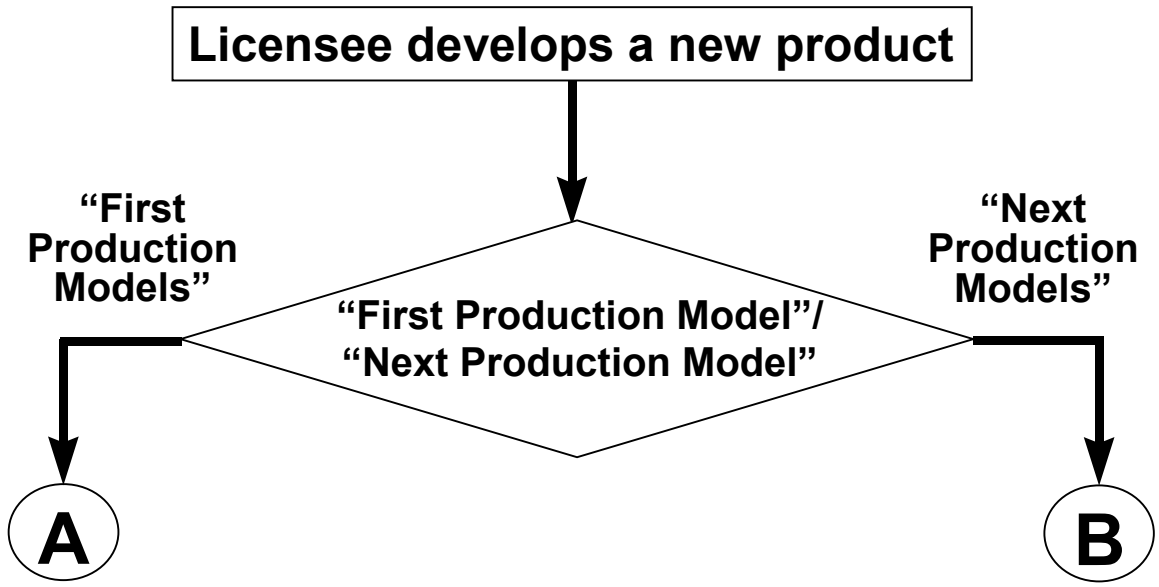
***Class-B Verification Labs -*** DVD-RAM Drive Class-B Verification Labs provide DVD-RAM Drive testing strictly according to the **DVD-RAM Drive Test Specification** as described in this document (They can not interpret specifications).

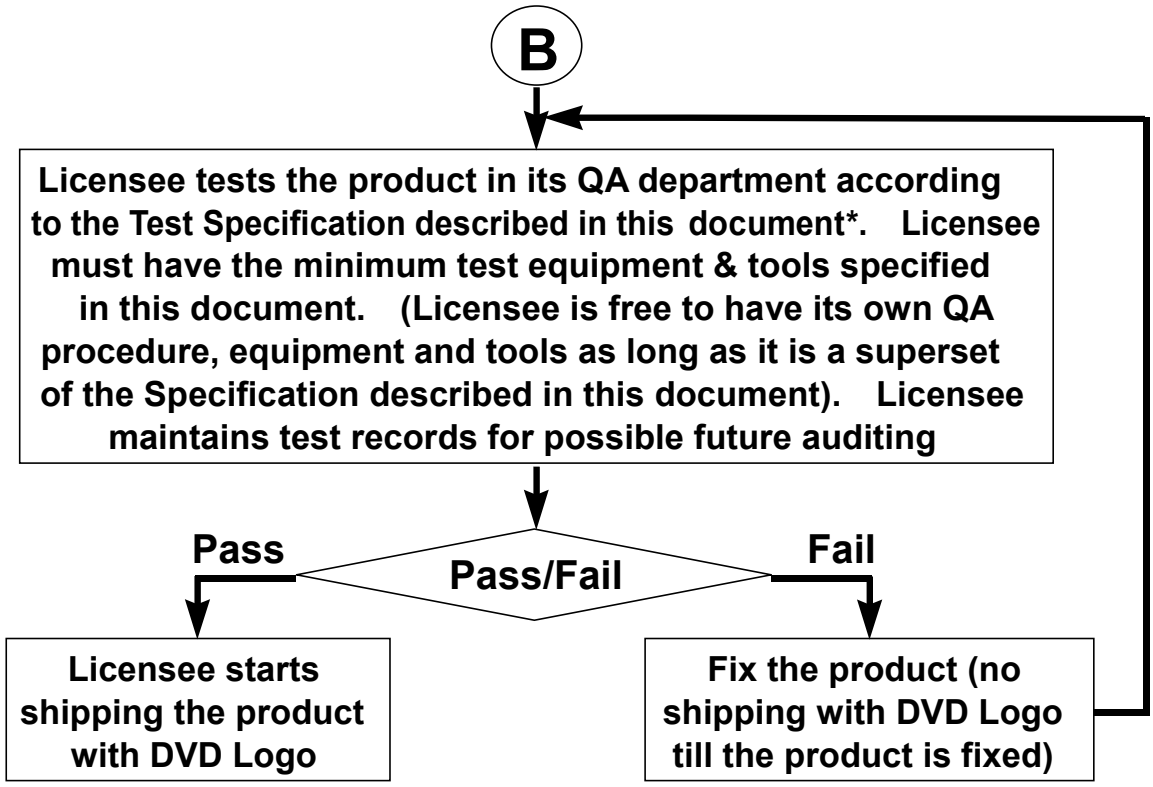
### 2.2 DVD Logo Mechanism

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






*: Licensee without own QA department can get the product tested from a **DVD-RAM Drive Class-B Verification Lab**.

# 3. General procedure of Test

The following sections describe the requirements and test specifications for DVD-RAM Drive products described in **1.3** Scope of Products Covered.
The discs recorded with DVD-RAM Drive have to be in compliance with the physical DVD requirements as indicated in DVD Specifications mentioned in **1.2**.
This shall be confirmed by parameters as mentioned in **Form 3O** to **Form 60O**. Final judgment shall be made by **Form 61O**.

- Test shall be carried out according to the nomination of "Class" and "Maximum recording speed" applied in **Form 2O** (3/3).

Test procedure of general functions is described in the chapter **4** to **5**. Test procedure of each recording speed is described in the chapter **6**. Test procedure of other function is described in the chapter **7**.
**Table 3-1** shows the relation between "Product type" and "Test Item" to be carried out. When "√" is marked in the column of a test item, the test item described in the chapter shall be carried out. For example, in case of Model B1 for 12 cm, Tests described in chapter **4** and 2x to 6x recording speed test in chapter **6** shall be carried out. But, when a Class-A Verification Lab test a Class 0&1 model of an applicant who already passed a Class 0 model from a Class-A Verification Lab, the lab does not carry out the tests described in chapter **4** to **5** and 2x to 5x recording speed test in chapter **6**. The lab checks these test items with the Forms provided by the applicant. Thus the applicant needs to carry out all test items in accordance with **Table 3-1**.

**Table 3-1 : Relation between "Product type" and "Chapter number" or "recording speed" to be carried out**

| Product type | | | | | Chapter & Test Item | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Model | | Recording speed | | | Chapter 4/5*1 | Chapter 6 | | | | | | Chapter 7 |
| | | Class 0 Basic speed | Class 1 Basic speed | Max. speed | General function | 2x recording | 3x recording | 5x recording | 6x recording | 8x recording | 12x recording | Others |
| A0 | Read-only Drive | ---- | ---- | ---- | √*2 | ---- | ---- | ---- | ---- | ---- | ---- | ---- |
| A1 | Class 0 2x-speed Drive | 2x | ---- | 2x | √ | √ | ---- | ---- | ---- | ---- | ---- | ---- |
| A2 | Class 0 3x-speed Drive | 2x | ---- | 3x | √ | √ | √ | ---- | ---- | ---- | ---- | ---- |
| A3 | Class 0 5x-speed Drive | 2x | ---- | 5x | √ | √ | √ | √ | ---- | ---- | ---- | ---- |
| A4*3 | Class 0 6x-speed Drive | 2x | ---- | 6x | √ | √ | √ | √ | √ | ---- | ---- | √ |
| B1 | Class 0&1 6x-speed Drive | 2x | 6x | 6x | √ | √ | √ | √ | √ | ---- | ---- | √ |
| B2 | Class 0&1 8x-speed Drive | 2x | 6x | 8x | √ | √ | √ | √ | √ | √ | ---- | √ |
| B3 | Class 0&1 12x-speed Drive | 2x | 6x | 12x | √ | √ | √ | √ | √ | √ | √ | √ |

Notes:
*1: Test procedure for a drive that supports 12 cm disc is described in chapter **4**, and Test procedure for a drive that supports only 8cm disc is described in chapter **5**.
*2: Without the test items that needs writing function
*3: A4 Drive will be developed in the future.

- An applicant is requested to submit the test samples with the test results, which may be obtained by self-test or verification conducted by Class-B Lab.
- For the confirmation of required test items, "Check list of Forms for Submission" is prepared in **Form 2O** (3/3). Write the check mark in each column according to your situation.
- Applicant who already passed Class 0 drive verification doesn't have to apply Class-A Lab verification regarding 2x, 3x and 5x-speed recording test items. However, all self-verifications are necessary.

Relation between "Nx-speed Drive" and "Check Speed" are decided as **Table 3-2** and **Table 3-3**.

**Table 3-2 : Relation between "Product type" and "Check speed" to be carried out (12cm Disc)**

| Product type | | Zone | Test Disc (TD) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 2xTD | 3xTD | 5xTD | 6xTD | 8xTD | 12xTD |
| A1 | Class 0 2x-speed Drive | 0, 1 | 2x | | | | | |
| | | 16, 17 | 2x | | | | | |
| | | 33, 34 | 2x | | | | | |
| A2 | Class 0 3x-speed Drive | 0, 1 | 2x | * | | | | |
| | | 16, 17 | 2x | * | | | | |
| | | 33, 34 | 2x | 3x | | | | |
| A3 | Class 0 5x-speed Drive | 0, 1 | 2x | * | * | | | |
| | | 16, 17 | 2x | * | * | | | |
| | | 33, 34 | 2x | 3x | 5x | | | |
| A4 (#) | Class 0 6x-speed Drive | 0, 1 | 2x | * | * | * | | |
| | | 16, 17 | 2x | * | * | * | | |
| | | 33, 34 | 2x | 3x | 5x | 6x | | |
| B1 | Class 0&1 6x-speed Drive | 0, 1 | 2x | * | * | 6x | | |
| | | 16, 17 | 2x | * | * | 6x | | |
| | | 33, 34 | 2x | 3x | 5x | 6x | | |
| B2 | Class 0&1 8x-speed Drive | 0, 1 | 2x | * | * | 6x | * | |
| | | 16, 17 | 2x | * | * | 6x | * | |
| | | 33, 34 | 2x | 3x | 5x | 6x | 8x | |
| B3 | Class 0&1 12x-speed Drive | 0, 1 | 2x | * | * | 6x | * | * |
| | | 16, 17 | 2x | * | * | 6x | * | * |
| | | 33, 34 | 2x | 3x | 5x | 6x | 8x | 12x |

Notes:

2x, 3x, 5x, 6x, 8x, 12x : Recording by designated speed

* : Recording by nominated speed

(#) : A4 Drive will be developed in the future.

**Table 3-3 : Relation between "Product type" and "Check speed" to be carried out (8cm disc)**

| Product type | | Zone | Test Disc (TD) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 2xTD | 3xTD | 5xTD | 6xTD | 8xTD | 12xTD |
| A1 | Class 0 2x-speed Drive | 0, 1 | 2x | | | | | |
| | | 6, 7 | 2x | | | | | |
| | | 12, 13 | 2x | | | | | |
| A2 | Class 0 3x-speed Drive | 0, 1 | 2x | * | | | | |
| | | 6, 7 | 2x | * | | | | |
| | | 12, 13 | 2x | 3x | | | | |
| A3 | Class 0 5x-speed Drive | 0, 1 | 2x | * | * | | | |
| | | 6, 7 | 2x | * | * | | | |
| | | 12, 13 | 2x | 3x | 5x | | | |
| A4 (#) | Class 0 6x-speed Drive | 0, 1 | 2x | * | * | * | | |
| | | 6, 7 | 2x | * | * | * | | |
| | | 12, 13 | 2x | 3x | 5x | 6x | | |
| B1 | Class 0&1 6x-speed Drive | 0, 1 | 2x | * | * | 6x | | |
| | | 6, 7 | 2x | * | * | 6x | | |
| | | 12, 13 | 2x | 3x | 5x | 6x | | |
| B2 | Class 0&1 8x-speed Drive | 0, 1 | 2x | * | * | 6x | * | |
| | | 6, 7 | 2x | * | * | 6x | * | |
| | | 12, 13 | 2x | 3x | 5x | 6x | 8x | |

Notes:

2x, 3x, 5x, 6x, 8x : Recording by designated speed

* : Recording by nominated speed

(#) : A4 Drive will be developed in the future.

# 4. Test Tools and Test Specifications for general functions of DVD-RAM Drive that supports 12 cm disc

This chapter covers the test specifications and tool requirements for physical and logical compliance testing of general functions of DVD-RAM Drive that supports 12 cm disc.

## 4.1 Test Tools

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

### 4.1.1 Test Discs

Various test data are written on the test discs. Some discs are used for testing read capability, defect management and write capability.

The following test discs are used for testing general functions of DVD-RAM Drive.
As for acquisition of test discs, refer to **Annex D**.

- "FFh" Signal and BCA Test Disc : RAM-PT200-B
- DMA Test Disc Type A-1, 2, 3, 4, 5, 6, 7 and 8 : RAM-PT200-1, 2, 3, 4, 5, 6, 7 and 8
- DMA Test Disc Type B-1 and 2 : RAM-HM200-B1 and B2
- DMA Test Disc Type C-1 : RAM-HM200-C
- DMA Test Disc Type C-2 and 4 (These test discs are made from Type C-1 disc on the step of test procedure specified in **4.2.7** and **4.2.8**)

### 4.1.2 DMA Verifier: DVD-SDV100

The DMA Verifier is used for testing DMA structure, DDS structure, PDL structure and SDL structure. The DMA mirror files for the Type C-2, 4 discs are included in the DVD-SDV100.
As for acquisition, refer to **Annex D**.

### 4.1.3 DVD-RAM File System Verifiers: DVD-FV01RAM and TFSV01

The DVD-RAM File System Verifier: DVD-FV01RAM or TFSV01 is used for testing UDF File structure on DVD-RAM disc.
As for acquisition, refer to **Annex D**.

### 4.1.4 Supplemental Test Drive

This is the DVD-RAM Drive identified to be able to read and write properly. This drive shall be prepared by each applicant individually.

### 4.1.5 Modified drive

This is the DVD-RAM Drive modified to be able to dump DMA data and to rewrite DMA with a given data. This drive shall be prepared by each applicant individually.

### 4.2 Test Specifications

The following sections describe the test procedures required for verification of the general functions of DVD-RAM Drive.

#### 4.2.1 Read characteristics

- "FFh" signal in the user area of Zone 0 to 34 of RAM-PT200-B* shall be read by the target DVD-RAM Drive. If the "FFh" signal can be read properly, mark OK in **Form 7O**.

*Note: "FFh" signal in the user area from Zone 0 to 34 of RAM-PT200-B is overwritten with –10 % of Operational Peak power after random signal is written with +5 % of Operational Peak power at Zone 0, 1, 16, 17, 33 and 34.

#### 4.2.2 BCA readability test

To test the readability of BCA data, "FFh" Signal and BCA Test Disc: RAM-PT200-B shall be loaded on the target DVD-RAM Drive. If the BCA data , which are indicated on the test disc, can be identified properly, mark OK in **Form 8O**.

#### 4.2.3 DMA readability test

To test the readability of Defect Management Area, DMA Test Discs Type A described below shall be loaded on the target DVD-RAM Drive. Then, check the readability in accordance with **Form 9O**.

**1) DMA Test Disc Type A-1: RAM-PT200-1**

- Contents: Valid DDS/PDL and SDL do not exist. All DDS/PDLs and SDLs are invalid.

| DMA No. | DDS | PDL | SDL |
|---|---|---|---|
| DMA 1 | Null data | Null data | Null data |
| DMA 2 | Null data | Null data | Null data |
| DMA 3 | Null data | Null data | Null data |
| DMA 4 | Null data | Null data | Null data |

- Test: This Test disc shall be unreadable when it is loaded on the target DVD-RAM Drive.
  If it is unreadable by the target DVD-RAM Drive, mark OK in **Form 9O (Type A-1)**.

**2) DMA Test Disc Type A-2: RAM-PT200-2**

- Contents: One pair of good DDS/PDL and SDL exists. These lists are written in the same DMA. Other DDS/PDLs and SDLs are invalid.

| DMA No. | DDS | PDL | SDL |
|---|---|---|---|
| DMA 1 | Null data | Null data | Null data |
| DMA 2 | Null data | Null data | Null data |
| DMA 3 | Null data | Null data | Null data |
| DMA 4 | In-progress=0,<br>DDS/PDL update counter=06h<br>Other fields are default values | All fields are default values | SDL update counter=0Ah<br>DDS/PDL update-counter=06h<br>Other fields are default values |

- Test: This Test disc shall be readable when it is loaded on the target DVD-RAM Drive.
  If it is readable by the target DVD-RAM Drive, mark OK in **Form 9O (Type A-2)**.

**3) DMA Test Disc Type A-3: RAM-PT200-3**

- Contents: One pair of good DDS/PDL and SDL exist. These lists are written in the different DMA. Other DDS/PDLs and SDLs are invalid.

| DMA No. | DDS | PDL | SDL |
|---|---|---|---|
| DMA 1 | Null data | Null data | SDL update counter=0Ah<br>DDS/PDL update-counter=06h<br>Other fields are default values |
| DMA 2 | Null data | Null data | Null data |
| DMA 3 | Null data | Null data | Null data |
| DMA 4 | In-progress=0<br>DDS/PDL update-counter=06h<br>Other fields are default values | All fields are default values | Null data |

- Test: This Test disc shall be readable when it is loaded on the target DVD-RAM Drive.
  If it is readable by the target DVD-RAM Drive, mark OK in **Form 9O (Type A-3)**.

**4) DMA Test Disc Type A-4: RAM-PT200-4**

- Contents: DDS/PDL update counter values of each DDS/PDL are different each other. DDS/PDL update counter values of each SDL are different each other. The largest DDS/PDL update counter value in each SDL is larger than the largest DDS/PDL update counter value in each DDS/PDL. All the SDL update counter values of each SDL are identical.

| DMA No. | DDS | PDL | SDL |
|---|---|---|---|
| DMA 1 | In-progress=0<br>DDS/PDL update-counter=03h<br>Other fields are default values | All fields are default values | SDL update counter=0Ah<br>DDS/PDL update-counter=07h<br>Other fields are default values |
| DMA 2 | In-progress=0<br>DDS/PDL update-counter=04h<br>Other fields are default values | All fields are default values | SDL update counter=0Ah<br>DDS/PDL update-counter=06h<br>Other fields are default values |
| DMA 3 | In-progress=0<br>DDS/PDL update-counter=05h<br>Other fields are default values | All fields are default values | SDL update counter=0Ah<br>DDS/PDL update-counter=05h<br>Other fields are default values |
| DMA 4 | In-progress=0<br>DDS/PDL update-counter=06h<br>Other fields are default values | All fields are default values | SDL update counter=0Ah<br>DDS/PDL update-counter=04h<br>Other fields are default values |

- Test: This Test disc shall be unreadable when it is loaded on the target DVD-RAM Drive. If it is unreadable by the target DVD-RAM Drive, mark OK in **Form 9O (Type A-4)**.

**5) DMA Test Disc Type A-5: RAM-PT200-5**

- Contents: DDS/PDL update counter values of each DDS/PDL are different each other. DDS/PDL update counter values of each SDL are different each other. The largest DDS/PDL update counter value in each SDL is smaller than the largest DDS/PDL update counter value in each DDS/PDL. All the SDL update counter values of each SDL are identical.

| DMA No. | DDS | PDL | SDL |
|---|---|---|---|
| DMA 1 | In-progress=0<br>DDS/PDL update-counter=03h<br>Other fields are default values | All fields are default values | SDL update counter=0Ah<br>DDS/PDL update-counter=05h<br>Other fields are default values |
| DMA 2 | In-progress=0<br>DDS/PDL update-counter=04h<br>Other fields are default values | All fields are default values | SDL update counter=0Ah<br>DDS/PDL update-counter=04h<br>Other fields are default values |
| DMA 3 | In-progress=0<br>DDS/PDL update-counter=05h<br>Other fields are default values | All fields are default values | SDL update counter=0Ah<br>DDS/PDL update-counter=03h<br>Other fields are default values |
| DMA 4 | In-progress=0<br>DDS/PDL update-counter=06h<br>Other fields are default values | All fields are default values | SDL update counter=0Ah<br>DDS/PDL update-counter=02h<br>Other fields are default values |

- Test: This Test disc shall be unreadable when it is loaded on the target DVD-RAM Drive. If it is unreadable by the target DVD-RAM Drive, mark OK in **Form 9O (Type A-5)**.

**6) DMA Test Disc Type A-6: RAM-PT200-6**

- Contents: DDS/PDL update counter values of each DDS/PDL are different each other. DDS/PDL update counter values of each SDL are different each other. The largest DDS/PDL update counter value in each SDL is the same as the largest DDS/PDL update counter value in each DDS/PDL. SDL update counter values of each SDL are different each other.

| DMA No. | DDS | PDL | SDL |
|---|---|---|---|
| DMA 1 | In-progress=0<br>DDS/PDL update-counter=03h<br>Other fields are default values | All fields are default values | SDL update counter=0Ah<br>DDS/PDL update-counter=06h<br>Other fields are default values |
| DMA 2 | In-progress=0<br>DDS/PDL update-counter=04h<br>Other fields are default values | All fields are default values | SDL update counter=0Bh<br>DDS/PDL update-counter=05h<br>Other fields are default values |
| DMA 3 | In-progress=0<br>DDS/PDL update-counter=05h<br>Other fields are default values | All fields are default values | SDL update counter=0Ch<br>DDS/PDL update-counter=04h<br>Other fields are default values |
| DMA 4 | In-progress=0<br>DDS/PDL update-counter=06h<br>Other fields are default values | All fields are default values | SDL update counter=0Dh<br>DDS/PDL update-counter=03h<br>Other fields are default values |

- Test: Data from the sectors of Logical Sector Number (hereafter LSN) 0 to 3FFh shall be read by the target DVD-RAM Drive. If the data is the same as from the sector of existing LSN and is repeated at 32-bit intervals, mark OK in **Form 9O (Type A-6)**.

**7) DMA Test Disc Type A-7: RAM-PT200-7**

- Contents: DDS/PDL update counter values of each DDS/PDL are different each other. All DDS/PDL update counter values of SDLs are identical. The largest DDS/PDL update counter value in each DDS/PDL is the same as the DDS/PDL update counter value in SDL. SDL update counter values of each SDL are different each other.

| DMA No. | DDS | PDL | SDL |
|---|---|---|---|
| DMA 1 | In-progress=0<br>DDS/PDL update counter=03h<br>Other fields are default values | All fields are default values | SDL update counter=0Dh<br>DDS/PDL update counter=06h<br>Other fields are default values |
| DMA 2 | In-progress=0<br>DDS/PDL update counter=04h<br>Other fields are default values | All fields are default values | SDL update counter=0Ch<br>DDS/PDL update counter=06h<br>Other fields are default values |
| DMA 3 | In-progress=0<br>DDS/PDL update counter=05h<br>Other fields are default values | All fields are default val ues | SDL update counter=0Bh<br>DDS/PDL update counter=06h<br>Other fields are default values |
| DMA 4 | In-progress=0<br>DDS/PDL update counter=06h<br>Other fields are default values | All fields are default values | SDL update counter=0Ah<br>DDS/PDL update counter=06h<br>Other fields are default values |

- Test: Data from the sectors of LSN 0 to 3FFh shall be read by the target DVD-RAM Drive. If the data is the same as from the sector of existing LSN and is repeated at 32-bit intervals, mark OK in **Form 9O (Type A-7)**.

**8) DMA Test Disc Type A-8: RAM-PT200-8**

- Contents: All DDS/PDL update counter values of DDS/PDLs are identical. All DDS/PDL update counter values of SDLs are identical. All In-progress flags in DDS/PDLs are set to 1. All the SDL update counter values of each SDL are identical.

| DMA No. | DDS | PDL | SDL |
|---|---|---|---|
| DMA 1 | In-progress=1<br>DDS/PDL update counter=06h<br>Other fields are default values | All fields are default values | SDL update counter=0Ah<br>DDS/PDL update counter=06h<br>Other fields are default values |
| DMA 2 | In-progress=1<br>DDS/PDL update counter=06h<br>Other fields are default values | All fields are default values | SDL update counter=0Ah<br>DDS/PDL update counter=06h<br>Other fields are default values |
| DMA 3 | In-progress=1<br>DDS/PDL update counter=06h<br>Other fields are default values | All fields are default values | SDL update counter=0Ah<br>DDS/PDL update counter=06h<br>Other fields are default values |
| DMA 4 | In-progress=1<br>DDS/PDL update counter=06h<br>Other fields are default values | All fields are default values | SDL update counter=0Ah<br>DDS/PDL update counter=06h<br>Other fields are default values |

- Test: This Test disc shall be unreadable when it is loaded on the target DVD-RAM Drive.
  If it is unreadable by the target DVD-RAM Drive, mark OK in **Form 9O (Type A-8)**.

Note: Each DMA default values of Type A are as follows.

| DDS | PDL | SDL |
|---|---|---|
| DDS ID=0A0Ah<br>User certification=1<br>Disc Manufacturer certification=1<br>Number of Groups=01h<br>Number of zones=23h<br>PSN of 1st sector=31000h<br>PSN of last sector=341FFh | PDL ID=01h | SDL ID=02h<br>Start PBA of SSA=00h<br>Total Number of logical sectors=230520h |

### 4.2.4 DMA read procedure test

Verify the slipping replacement algorithm and the linear replacement algorithm described in clause 5.6 Defect management of DVD Specifications for Rewritable Disc Part 1: Version 2.2, using DMA Test Disc Type B-1 and DMA Test Disc Type B-2 that possesses PDL and SDL in DMA.
If the target DVD-RAM Drive can read all data in user data area properly, mark "OK" in **Form 10O**.

- **DMA Test Disc Type B-1: RAM HM200-B1**
  Read area: From LSN 0 to 23051Fh
  Read data: LSN data consisted of 4 bytes repeatedly in each sector
  Supplementary spare area: No use

- **DMA Test Disc Type B-2: RAM HM200-B2**
  Read area: From LSN 0 to 22C51Fh
  Read data: LSN data consisted of 4 bytes repeatedly in each sector
  Supplementary spare area: Use (1024 Blocks)

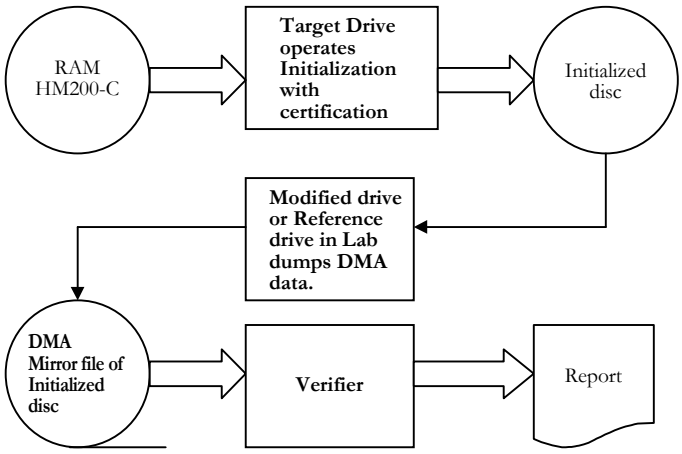
### 4.2.5 DMA contents with disc formatting

Verify DMA contents when the target DVD-RAM Drive operates Initialization and Re-initialization described in clause 5.6 Defect management of DVD Specifications for Rewritable Disc Part 1 Version 2.2 using the test disc RAM HM200-C which possesses defective sector and the DMA Verifier.
However 5 type formatting tests are prepared as follows, the test items marked as optional may not be executed if the target drive doesn't support the format function for the test items.
If no error detected, mark OK in **Form 11O (DMA contents with disc formatting)**.

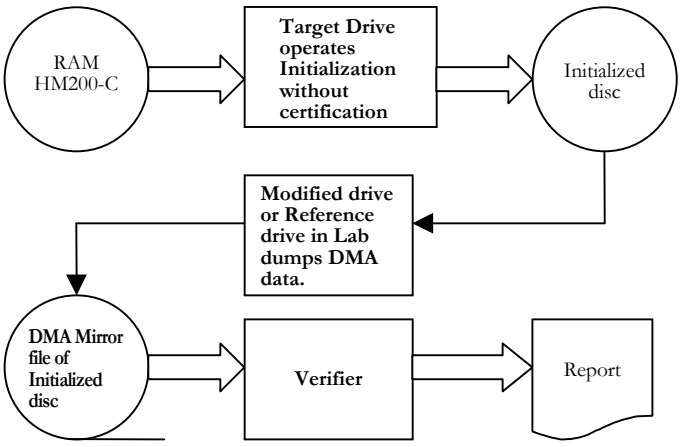
- Initialization with certification
- Initialization without certification
- Re-Initialization with certification
- Re-Initialization with SDL list conversion (optional)
- Re-Initialization with Clearing G2 list and SDL (optional)

Test procedure

1) Initialization with certification

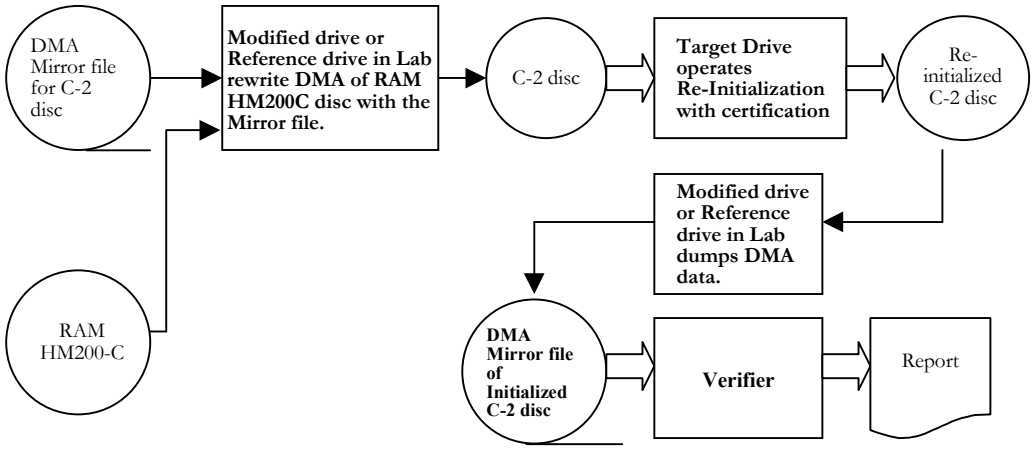



2) Initialization without certification

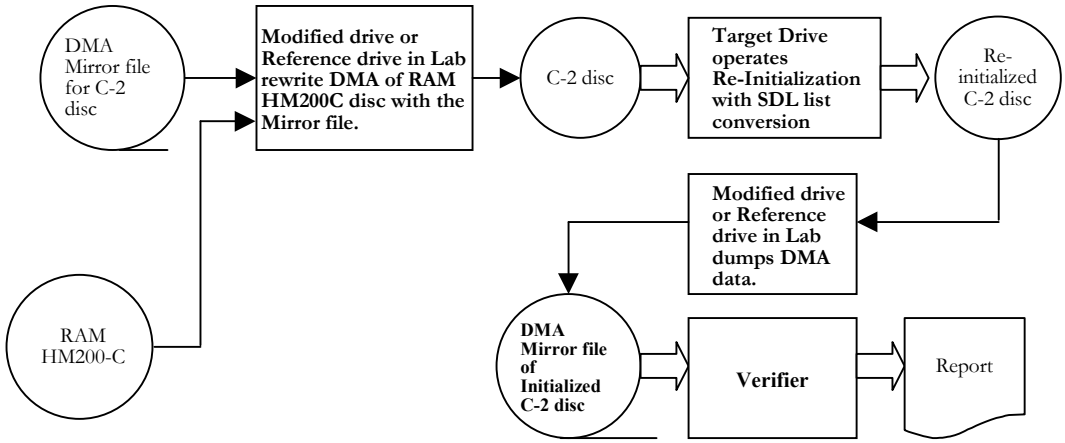


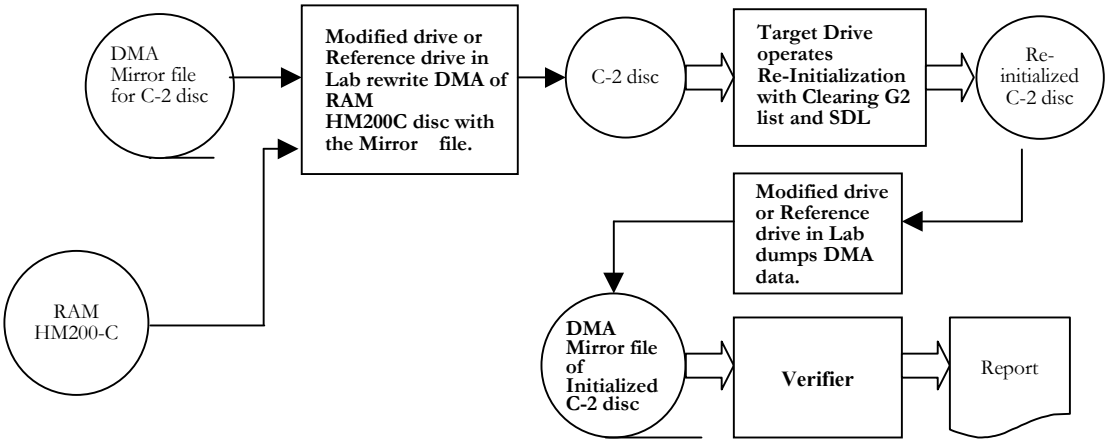
3) Re-initialization with certification




4) Re-initialization with SDL list conversion




5) Re-initialization with Clearing G2 list and SDL



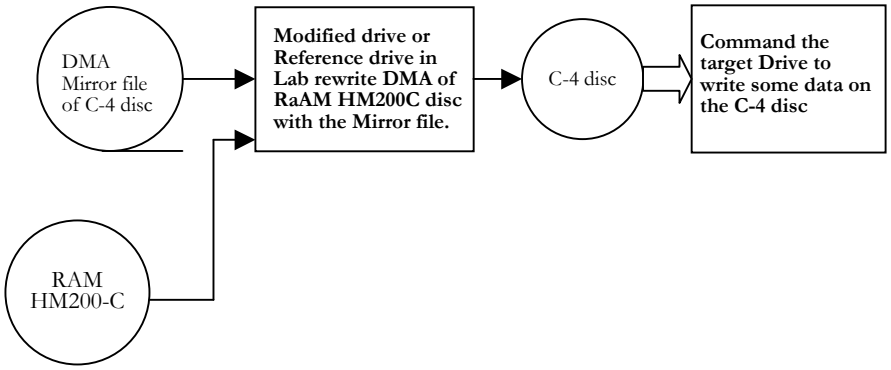

 

### 4.2.6 DMA contents without disc formatting

Check DMA contents by which a drive can recognize the disc valid or invalid, using the test disc RAM HM200-C and the DMA mirror file for C-4 disc included in DMA Verifier. If the target DVD-RAM Drive recognizes C-4 disc invalid and does not write any data on the user area of C-4 disc, mark OK in **Form 11O (DMA contents without disc formatting)**.

- DMA contents of C-4 disc: Start LSN of each zone is intentionally wrong.

Test procedure




### 4.2.7 File System verification

This test verifies logical file system format of DVD-RAM discs, which are formatted on the strength of DVD Specifications for Rewritable Disc Part 2: File System Specification Version 2.0. It also verifies discs according to OSTA UDF Standard Revision 2.0.
The test shall be done in accordance with user's manual of DVD-RAM File System Verifier, DVD-FV01RAM or TFSV01.

(Test Procedure)

- Standard Disc: RAM-PT200-A shall be formatted with UDF2.0 using the target DVD-RAM Drive which is installed on PC.
- The formatted Standard Disc shall be verified in conformity with UDF 2.0 by DVD-RAM File System Verifier.
- Appropriate data shall be written on the Standard Disc: RAM-PT200-A or equivalent test disc using the target DVD-RAM Drive.
- The data which is written in the Standard Disc shall be verified in conformity with UDF 2.0 by DVD-RAM File System Verifier.
- If no error was detected in the above verifications, mark OK in **Form 12O**.

# 5. Test Tools and Test Specifications for general functions of DVD-RAM Drive that supports 8cm disc only

This chapter covers the test specifications and tool requirements for physical and logical compliance testing of general functions of DVD-RAM Drive that supports 8cm disc only.

## 5.1 Test Tools

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

### 5.1.1 Test Discs

Various test data are written on the test discs. Some discs are used for testing read capability, defect management and write capability.

The following test discs are used for testing general functions of 8cm disc DVD-RAM Drive.
As for acquisition of test discs, refer to **Annex D**.

- "FFh" Signal and BCA Test Disc : RAM-HM210-E
- DMA Test Disc Type A-1, 2,3,4,5,6,7 and 8 : RAM-HM210-A1, A2, A3, A4, A5, A6, A7 and A8
- DMA Test Disc Type B-1 and 2 : RAM-HM210-B1 and B2
- DMA Test Disc Type C-5 : RAM-HM210-C
- DMA Test Disc Type C-6, 8 (These test discs are made from Type C-5 disc on the step of test procedure specified in **5.2.7** and **5.2.8**.)

### 5.1.2 DMA Verifier: DVD-SDV100 (Version 1.1 or later)

The DMA Verifier is used for testing DMA structure, DDS structure, PDL structure and SDL structure condition.
The DMA mirror files for the Type C-6, 8 discs are included in the DVD-SDV100 Version 1.1 or later.
As for acquisition, refer to **Annex D**.

### 5.1.3 DVD-RAM File System Verifiers: DVD-FV01RAM and TFSV01

The DVD-RAM File System Verifier: DVD-FV01RAM or TFSV01 is used for testing UDF File structure on DVD-RAM disc. As for acquisition, refer to **Annex D**.

### 5.1.4 Supplemental Test Drive

This is the DVD-RAM Drive identified to be able to read and write properly. This drive shall be prepared by each applicant individually.

### 5.1.5 Modified drive

This is the DVD-RAM Drive modified to be able to dump DMA data and to rewrite DMA with a given data. This drive shall be prepared by each applicant individually.

### 5.2 Test Specifications

The following sections describe the test procedures required for verification of the general functions of 8cm disc DVD-RAM Drive.

#### 5.2.1 Read characteristics

- "FFh" signal in the user area of Zone 0 to 13 of RAM-HM210-E* shall be read by the target DVD-RAM Drive. If the "FFh" signal can be read properly, mark OK in **Form 17O**.

*Note: "FFh" signal in the user area from Zone 0 to 13 of RAM-HM210-E is overwritten with –10% of Operational Peak power after random signal is written with +5% of Operational Peak power at Zone 0, 1, 6, 7, 12 and 13.

#### 5.2.2 BCA readability test

To test the readability of BCA data, "FFh" Signal and BCA Test Disc: RAM-HM210-E shall be loaded on the target DVD-RAM Drive. If the BCA data , which are indicated on the test disc, can be identified properly, mark OK in **Form 18O**.

#### 5.2.3 DMA readability test

To test the readability of Defect Management Area, DMA Test Discs Type A described below shall be loaded on the target DVD-RAM Drive. Then check the readability in accordance with **Form 19O**.

**1) DMA Test Disc Type A-1: RAM-HM210-A1**

- Contents: Valid DDS/PDL and SDL do not exist. All DDS/PDLs and SDLs are invalid.

| DMA No. | DDS | PDL | SDL |
|---|---|---|---|
| DMA 1 | Null data | Null data | Null data |
| DMA 2 | Null data | Null data | Null data |
| DMA 3 | Null data | Null data | Null data |
| DMA 4 | Null data | Null data | Null data |

- Test: This Test disc shall be unreadable when it is loaded on the target DVD-RAM Drive.
  If it is unreadable by the target DVD-RAM Drive, mark OK in **Form 19O (Type A-1)**.

**2) DMA Test Disc Type A-2: RAM-HM210-A2**

- Contents: One pair of good DDS/PDL and SDL exists. These lists are written in the same DMA. Other DDS/PDLs and SDLs are invalid.

| DMA No. | DDS | PDL | SDL |
|---|---|---|---|
| DMA 1 | Null data | Null data | Null data |
| DMA 2 | Null data | Null data | Null data |
| DMA 3 | Null data | Null data | Null data |
| DMA 4 | In-progress=0,<br>DDS/PDL update counter=06h<br>Other fields are default values | All fields are default values | SDL update counter=0Ah<br>DDS/PDL update-counter=06h<br>Other fields are default values |

- Test: This Test disc shall be readable when it is loaded on the target DVD-RAM Drive.
  If it is readable by the target DVD-RAM Drive, mark OK in **Form 19O (Type A-2)**.

**3) DMA Test Disc Type A-3: RAM-HM210-A3**

- Contents: One pair of good DDS/PDL and SDL exist. These lists are written in the different DMA. Other DDS/PDLs and SDLs are invalid.

| DMA No. | DDS | PDL | SDL |
|---|---|---|---|
| DMA 1 | Null data | Null data | SDL update counter=0Ah<br>DDS/PDL update-counter=06h<br>Other fields are default values |
| DMA 2 | Null data | Null data | Null data |
| DMA 3 | Null data | Null data | Null data |
| DMA 4 | In-progress=0<br>DDS/PDL update-counter=06h<br>Other fields are default values | All fields are default values | Null data |

- Test: This Test disc shall be readable when it is loaded on the target DVD-RAM Drive.
  If it is readable by the target DVD-RAM Drive, mark OK in **Form 19O (Type A-3)**.

**4) DMA Test Disc Type A-4: RAM-HM210-A4**

- Contents: DDS/PDL update counter values of each DDS/PDL are different each other. DDS/PDL update counter values of each SDL are different each other. The largest DDS/PDL update counter value in each SDL is larger than the largest DDS/PDL update counter value in each DDS/PDL. All the SDL update counter values of each SDL are identical.

| DMA No. | DDS | PDL | SDL |
|---|---|---|---|
| DMA 1 | In-progress=0<br>DDS/PDL update-counter=03h<br>Other fields are default values | All fields are default values | SDL update counter=0Ah<br>DDS/PDL update-counter=07h<br>Other fields are default values |
| DMA 2 | In-progress=0<br>DDS/PDL update-counter=04h<br>Other fields are default values | All fields are default values | SDL update counter=0Ah<br>DDS/PDL update-counter=06h<br>Other fields are default values |
| DMA 3 | In-progress=0<br>DDS/PDL update-counter=05h<br>Other fields are default values | All fields are default values | SDL update counter=0Ah<br>DDS/PDL update-counter=05h<br>Other fields are default values |
| DMA 4 | In-progress=0<br>DDS/PDL update-counter=06h<br>Other fields are default values | All fields are default values | SDL update counter=0Ah<br>DDS/PDL update-counter=04h<br>Other fields are default values |

- Test: This Test disc shall be unreadable when it is loaded on the target DVD-RAM Drive.
  If it is unreadable by the target DVD-RAM Drive, mark OK in **Form 19O (Type A-4)**.

**5) DMA Test Disc Type A-5: RAM-HM210-A5**

- Contents: DDS/PDL update counter values of each DDS/PDL are different each other. DDS/PDL update counter values of each SDL are different each other. The largest DDS/PDL update counter value in each SDL is smaller than the largest DDS/PDL update counter value in each DDS/PDL. All the SDL update counter values of each SDL are identical.

| DMA No. | DDS | PDL | SDL |
|---|---|---|---|
| DMA 1 | In-progress=0<br>DDS/PDL update-counter=03h<br>Other fields are default values | All fields are default values | SDL update counter=0Ah<br>DDS/PDL update-counter=05h<br>Other fields are default values |
| DMA 2 | In-progress=0<br>DDS/PDL update-counter=04h<br>Other fields are default values | All fields are default values | SDL update counter=0Ah<br>DDS/PDL update-counter=04h<br>Other fields are default values |
| DMA 3 | In-progress=0<br>DDS/PDL update-counter=05h<br>Other fields are default values | All fields are default values | SDL update counter=0Ah<br>DDS/PDL update-counter=03h<br>Other fields are default values |
| DMA 4 | In-progress=0<br>DDS/PDL update-counter=06h<br>Other fields are default values | All fields are default values | SDL update counter=0Ah<br>DDS/PDL update-counter=02h<br>Other fields are default values |

- Test: This Test disc shall be unreadable when it is loaded on the target DVD-RAM Drive.
  If it is unreadable by the target DVD-RAM Drive, mark OK in **Form 19O (Type A-5)**.

**6) DMA Test Disc Type A-6: RAM-HM210-A6**

- Contents: DDS/PDL update counter values of each DDS/PDL are different each other. DDS/PDL update counter values of each SDL are different each other. The largest DDS/PDL update counter value in each SDL is the same as the largest DDS/PDL update counter value in each DDS/PDL. SDL update counter values of each SDL are different each other.

| DMA No. | DDS | PDL | SDL |
|---|---|---|---|
| DMA 1 | In-progress=0<br>DDS/PDL update-counter=03h<br>Other fields are default values | All fields are default values | SDL update counter=0Ah<br>DDS/PDL update-counter=06h<br>Other fields are default values |
| DMA 2 | In-progress=0<br>DDS/PDL update-counter=04h<br>Other fields are default values | All fields are default values | SDL update counter=0Bh<br>DDS/PDL update-counter=05h<br>Other fields are default values |
| DMA 3 | In-progress=0<br>DDS/PDL update-counter=05h<br>Other fields are default values | All fields are default values | SDL update counter=0Ch<br>DDS/PDL update-counter=04h<br>Other fields are default values |
| DMA 4 | In-progress=0<br>DDS/PDL update-counter=06h<br>Other fields are default values | All fields are default values | SDL update counter=0Dh<br>DDS/PDL update-counter=03h<br>Other fields are default values |

- Test: Data from the sectors of Logical Sector Number (hereafter LSN) 0 to 3FFh shall be read by the target DVD-RAM Drive. If the data is the same as from the sector of existing LSN and is repeated at 32 bit intervals, mark OK in **Form 19O (Type A-6)**.

**7) DMA Test Disc Type A-7: RAM-HM210-A7**

- Contents: DDS/PDL update counter values of each DDS/PDL are different each other. All DDS/PDL update counter values of SDLs are identical. The largest DDS/PDL update counter value in each DDS/PDL is the same as the DDS/PDL update counter value in SDL. SDL update counter values of each SDL are different each other.

| DMA No. | DDS | PDL | SDL |
|---|---|---|---|
| DMA 1 | In-progress=0<br>DDS/PDL update counter=03h<br>Other fields are default values | All fields are default values | SDL update counter=0Dh<br>DDS/PDL update counter=06h<br>Other fields are default values |
| DMA 2 | In-progress=0<br>DDS/PDL update counter=04h<br>Other fields are default values | All fields are default values | SDL update counter=0Ch<br>DDS/PDL update counter=06h<br>Other fields are default values |
| DMA 3 | In-progress=0<br>DDS/PDL update counter=05h<br>Other fields are default values | All fields are default values | SDL update counter=0Bh<br>DDS/PDL update counter=06h<br>Other fields are default values |
| DMA 4 | In-progress=0<br>DDS/PDL update counter=06h<br>Other fields are default values | All fields are default values | SDL update counter=0Ah<br>DDS/PDL update counter=06h<br>Other fields are default values |

- Test: Data from the sectors of LSN 0 to 3FFh shall be read by the target DVD-RAM Drive. If the data is the same as from the sectors of existing LSN and is repeated at 32-bit intervals, mark OK in **Form 19O (Type A-7)**.

**8) DMA Test Disc Type A-8: RAM-HM210-A8**

- Contents: All DDS/PDL update counter values of DDS/PDLs are identical. All DDS/PDL update counter values of SDLs are identical. All In-progress flags in DDS/PDLs are set to 1. All the SDL update counter values of each SDL are identical.

| DMA No. | DDS | PDL | SDL |
|---|---|---|---|
| DMA 1 | In-progress=1<br>DDS/PDL update counter=06h<br>Other fields are default values | All fields are default values | SDL update counter=0Ah<br>DDS/PDL update counter=06h<br>Other fields are default values |
| DMA 2 | In-progress=1<br>DDS/PDL update counter=06h<br>Other fields are default values | All fields are default values | SDL update counter=0Ah<br>DDS/PDL update counter=06h<br>Other fields are default values |
| DMA 3 | In-progress=1<br>DDS/PDL update counter=06h<br>Other fields are default values | All fields are default values | SDL update counter=0Ah<br>DDS/PDL update counter=06h<br>Other fields are default values |
| DMA 4 | In-progress=1<br>DDS/PDL update counter=06h<br>Other fields are default values | All fields are default values | SDL update counter=0Ah<br>DDS/PDL update counter=06h<br>Other fields are default values |

- Test: This Test disc shall be unreadable when it is loaded on the target DVD-RAM Drive.
  If it is unreadable by the target DVD-RAM Drive, mark OK in **Form 19O (Type A-8)**.

Note: Each DMA default values of Type A are as follows.

| DDS | PDL | SDL |
|---|---|---|
| DDS ID=0A0Ah<br>User certification=1<br>Disc Manufacturer certification=1<br>Number of Groups=01h<br>Number of zones=0Eh<br>PSN of 1st sector=31000h<br>PSN of last sector=323FFh | PDL ID=01h | SDL ID=02h<br>Start PBA of SSA=00h<br>Total Number of logical sectors=AE6F0h |

### 5.2.4 DMA read procedure test

Verify the slipping replacement algorithm and the linear replacement algorithm described in clause 5.6 Defect management of DVD Specifications for Rewritable Disc Part 1 Version 2.2, using DMA Test Disc Type B-1 and DMA Test Disc Type B-2 that possesses PDL and SDL in DMA.
If the target DVD-RAM Drive can read all data in user data area properly, mark "OK" in **Form 20O**.

- **DMA Test Disc Type B-1: RAM HM210-B1**
  Read area: From LSN 0 to AE6EFh
  Read data: LSN data consisted of 4 bytes repeatedly in each sector
  Supplementary spare area: No use

- **DMA Test Disc Type B-2: RAM HM210-B2**
  Read area: From LSN 0 to AA6EFh
  Read data: LSN data consisted of 4 byte repeatedly in each sector
  Supplementary spare area: Use (1024 Blocks)

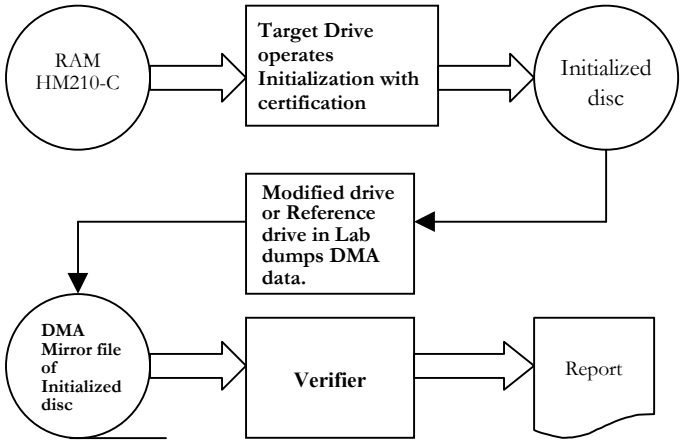
### 5.2.5 DMA contents with disc formatting

Verify DMA contents when the target DVD-RAM Drive operates Initialization and Re-initialization described in clause 5.6 Defect management of DVD Specifications for Rewritable Disc Part1 Version 2.2 using the test disc RAM HM210-C which possesses defective sector and the DMA Verifier.
However 5 type formatting tests are prepared as follows, the test items marked with optional may not be executed if the target drive doesn't support the format function for the test items.
If no error detected, mark OK in **Form 21O (DMA contents with disc formatting)**.

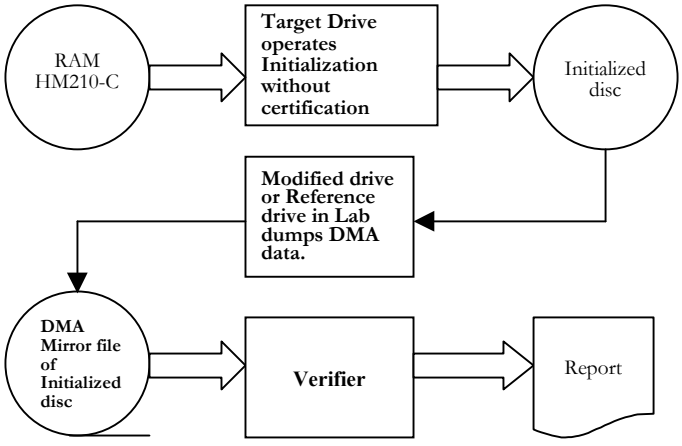
- Initialization with certification
- Initialization without certification
- Re-Initialization with certification
- Re-Initialization with SDL list conversion (optional)
- Re-Initialization with Clearing G2 list and SDL (optional)

Test procedure

1) Initialization with certification

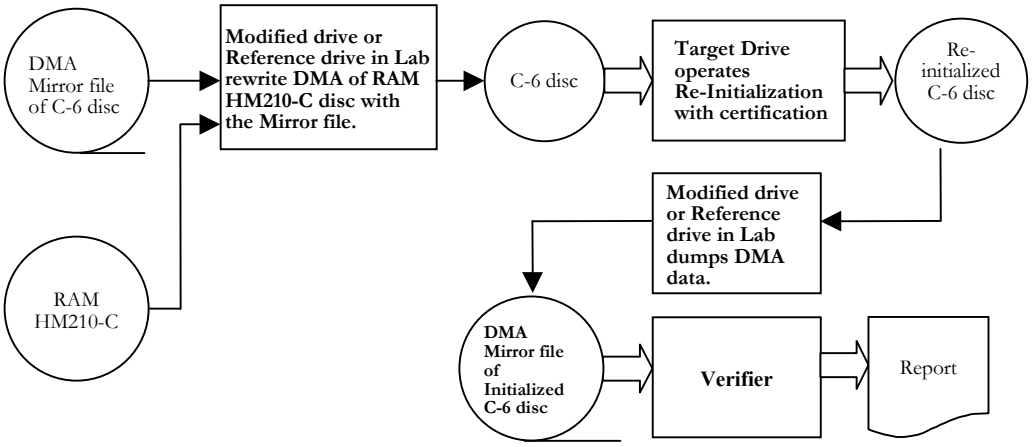



2) Initialization without certification

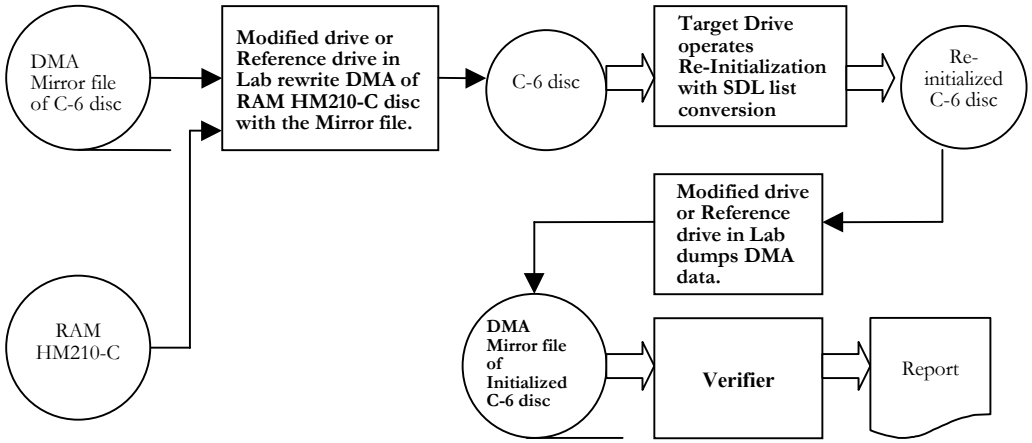


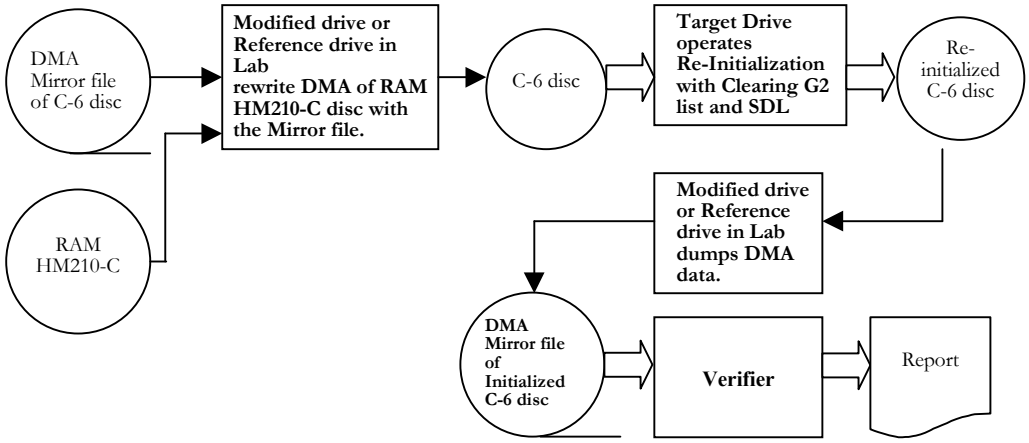
3) Re-initialization with certification




4) Re-initialization with SDL list conversion




5) Re-initialization with Clearing G2 list and SDL



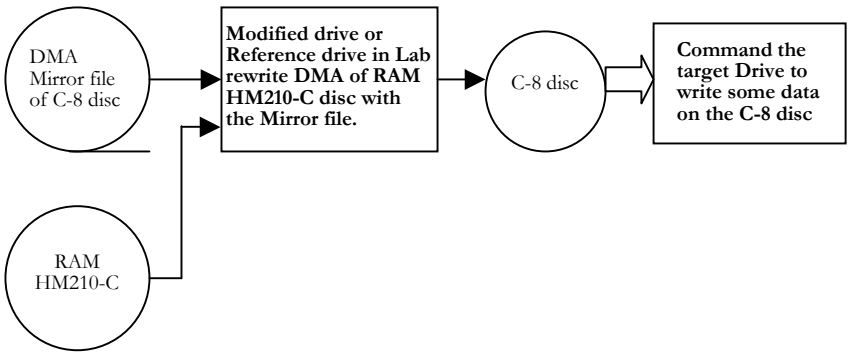

 

### 5.2.6 DMA contents without disc formatting

Check DMA contents by which a drive can recognize the disc valid or invalid, using the test disc RAM HM210-C and DMA mirror file for C-8 disc included in DMA Verifier.
If the target DVD-RAM Drive recognize C-8 disc invalid and does not write any data on the user area of C-4 disc, mark OK in **Form 21O (DMA contents without disc formatting)**.

- DMA contents: Start LSN of each zone is intentionally wrong.

Test procedure




### 5.2.7 File System verification

This test verifies logical file system format of DVD-RAM discs, which are formatted on the strength of DVD Specifications for Rewritable Disc Part 2 File System Specification Version 2.0. It also verifies discs according to OSTA UDF Standard Revision 2.0
The test shall be done in accordance with user's manual of DVD-RAM File System Verifier, DVD-FV01RAM or TFSV01.

(Test Procedure)

- Standard Disc: RAM-HM210 shall be formatted with UDF2.0 using the target DVD-RAM Drive which is installed on PC.
- The formatted Standard Disc shall be verified in conformity with UDF 2.0 by DVD-RAM File System Verifier
- Appropriate data shall be written on the Standard Disc: RAM-HM210 or equivalent test disc using the target DVD-RAM Drive.
- Data which is written in the Standard Disc shall be verified in conformity with UDF 2.0 by DVD-RAM File System Verifier
- If no error was detected in the above verifications, mark OK in **Form 22O**.

# 6. Test Tools and Test Specifications for writing functions of DVD-RAM Drive

This chapter covers the test specifications and tool requirements for writing test of DVD-RAM Drive.

## 6.1 Test Tools

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

### 6.1.1 Test Discs and Forms

**Table 6.1.1-1** shows test discs and Forms used for each writing speed test of DVD-RAM Drive.
For example, for testing 2x-speed writing functions of 12cm DVD-RAM drive, RAM-PT200-A, **Form 3O**, **From 4O**, **Form 5O** and **Form 6O** are used as the Test Disc, **Form I**, **Form II**, **Form III** and **Form IV**, respectively.
As for acquisition of test discs, refer to **Annex D**.

**Table 6.1.1-1 : Test disc and Forms for each writing speed and disc size**

| Speed | Size [cm] | Test Disc | | | |
|---|---|---|---|---|---|
| | | **Form I** | **Form II** | **Form III** | **Form IV** |
| 2x | 12 | RAM-PT200-A | | | |
| | | **Form 3O** | **Form 4O** | **Form 5O** | **Form 6O** |
| | 8 | RAM-HM210 | | | |
| | | **Form 13O** | **Form 14O** | **Form 15O** | **Form 16O** |
| 3x | 12 | RAM-PT300-A | | | |
| | | **Form 23O** | **Form 24O** | **Form 25O** | **Form 26O** |
| | 8 | RAM-HM310 | | | |
| | | **Form 27O** | **Form 28O** | **Form 29O** | **Form 30O** |
| 5x | 12 | RAM-PT500-A or RAM-HM500 | | | |
| | | **Form 31O** | **Form 32O** | **Form 33O** | **Form 34O** |
| | 8 | RAM-HM510 | | | |
| | | **Form 35O** | **Form 36O** | **Form 37O** | **Form 38O** |
| 6x | 12 | RAM-HM600 | | | |
| | | **Form 39O** | **Form 40O** | **Form 41O** | **Form 42O** |
| | 8 | RAM-HM610 | | | |
| | | **Form 43O** | **Form 44O** | **Form 45O** | **Form 46O** |
| 8x | 12 | RAM-HM800 | | | |
| | | **Form 47O** | **Form 48O** | **Form 49O** | **Form 50O** |
| | 8 | RAM-HM810 | | | |
| | | **Form 51O** | **Form 52O** | **Form 53O** | **Form 54O** |
| 12x | 12 | RAM-PT1200-A or RAM-HM1200 | | | |
| | | **Form 55O** | **Form 56O** | **Form 57O** | **Form 58O** |

### 6.1.2 DVD-RAM Disc Evaluation System

This is the system owned by each applicant or Lab, which shall have functions at least for executing the test defined in **6.2.1** Write characteristics and **6.2.2** Overwrite characteristics.

### 6.1.3 Supplemental Test Drive

This is the DVD-RAM Drive identified to be able to read and write properly. This drive shall be prepared by each applicant individually.

## 6.2 Test Specifications

The following sections describe the test procedures required for verification of the writing functions of DVD-RAM Drive.

### 6.2.1 Write characteristics

- "FFh" signal shall be written in the user area of each zone (0 to 34 for 12cm disc or 0 to 13 for 8cm disc) of the Test Disc or equivalent Test Disc by the target DVD-RAM Drive. And measure the characteristic of the Recording layer by DVD-RAM Disc Evaluation System or equivalent system and enter the measured values in accordance with **Form I**.

- "FFh" signal shall be written in the user area of each zone (0 to 34 for 12cm disc or 0 to 13 for 8cm disc) of the Test Disc or equivalent Test Disc by the target DVD-RAM Drive. And "FFh" signal shall be read properly by a Supplemental Test Drive or equivalent Test Drive. If the "FFh" signal can be read properly, mark OK in **Form II**.

### 6.2.2 Overwrite characteristics

- "FFh" signal shall be written in the user area of each Zone 0, 1, 16, 17, 33 and 34 of 12cm Test Disc or each Zone 0, 1, 6, 7, 12 and 13 of 8cm Test Disc or equivalent Test Disc by the target DVD-RAM Drive. Then, random data shall be overwritten by DVD-RAM Disc Evaluation System or equivalent system under the following conditions.

  *(Write power condition for Zone 0, 16 and 33 of 12cm disc or Zone 0, 6 and 12 of 8cm disc)*
  Peak power = Minus 5 % of Operational Peak power (PPO)*
  Bias power = Minus 5 % of Operational Bias power (PBO)*

  *(Write power condition for Zone 1, 17 and 34 of 12cm disc or Zone 1, 7 and 13 of 8cm disc)*
  Peak power = Minus 10 % of Operational Peak power (PPO)*
  Bias power = Minus 10 % of Operational Bias power (PBO)*

  *Note: Operational Peak power and Operational Bias power are the Peak power and Bias power which are specified in Embossed control data zone of the disc respectively.

After above writings, Jitter of the user area of each Zone 0, 1, 16, 17, 33 and 34 of 12cm Test Disc or each Zone 0, 1, 6, 7, 12 and 13 of 8cm Test Disc shall be measured by DVD-RAM Disc Evaluation System or equivalent system and enter the measured values in **Form III**.

- Random data shall be written in the user area of 12cm disc's Zone 0, 1, 16, 17, 33 and 34 or each 8cm disc's Zone 0, 1, 6, 7, 12 and 13 of the Test Disc or equivalent Test Disc by DVD-RAM Disc Evaluation System or equivalent Test Drive under the following conditions and "FFh" signal shall be overwritten by the target DVD-RAM Drive.

  *(Write power condition for Zone 0, 16 and 33 of 12 cm disc or Zone 0, 6 and 12 of 8 cm disc)*
  Peak power = Plus 5 % of Operational Peak power (PPO)
  Bias power = Plus 5 % of Operational Bias power (PBO)

  *(Write power condition for Zone 1, 17 and 34 of 12 cm disc or Zone 1, 7 and 13 of 8cm disc)*
  Peak power = Plus 10 % of Operational Peak power (PPO)
  Bias power = Plus 10 % of Operational Bias power (PBO)

After above writings, "FFh" signal shall be read by the target DVD-RAM Drive. If the "FFh" signal can be read properly, mark OK in **Form IV**.

# 7. Test Tools and Test Specifications for other functions of DVD-RAM Drive

This chapter covers the test specifications and tool requirements for other test of DVD-RAM Drive, which is important item for taking compatibility.

## 7.1 Test Tools

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

### 7.1.1 Test Discs and Forms

The following test discs are used for testing other functions of DVD-RAM Drive.
As for acquisition of test discs, refer to **Annex D**.

- Read Power Erasing Test Disc (for 12 cm DVD-RAM Drive) : RAM-HM600-F
- Read Power Erasing Test Disc (for 8 cm DVD-RAM Drive) : RAM-HM610-F

(These test discs are required for verification of DVD-RAM drive operating more than or equal to 6x-speed.)

## 7.2 Test Specifications

The following sections describe the test procedures required for verification of the other functions of DVD-RAM Drive.

### 7.2.1 Read power erasing (Test item for more than or equal to 6x-speed DVD-RAM drive)

Target drive shall read the same track of RAM-HM600-F or RAM-HM610-F one million times at 6x reading speed under normal operation temperature in Zone 0 and 34 (for 12 cm Drive) or Zone 0 and 13 (for 8 cm Drive). Applicant shall measure the jitter of the same track by DVD-RAM Disc Evaluation System or equivalent system with 2x-speed reading in accordance with **Form 59O** or **Form 60O**. Class-A lab also measures the same track of the Test Disc submitted by applicant.
The jitter value is recommended to be less than 12 %.

# 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.*

**DVD-RAM drive (Class 0) and DVD-RAM drive (Class 0&1)**

- **Hitachi Consumer Electronics Co., Ltd.**
  Format Verification Center
  292, Yoshida-cho, Totsuka-ku, Yokohama-shi, Kanagawa, 244-0817 Japan
  Fax: +81-45-866-5905

- **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-RAM drive (Class 0)**

- **SAMSUNG ELECTRONICS CO., LTD.**
  DVD Verification Laboratory
  VD Division, DM Business
  416, Maetan-3Dong, Yeongtong-Gu, Suwon-City, Gyeonggi-Do, 443-742 Korea
  Tel: +82-31-277-0875 Fax: +82-31-277-3398
  E-mail: bd.tcenter@samsung.com

- **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

DVD-RAM : DVD Rewritable Disc
DVD-ROM : DVD Read Only Disc
DVD-R : DVD Recordable Disc

# 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 1O** to provide preliminary information.

**Self Test**

Applicant must test the product in accordance with this Test Specification prior to submitting it to a Class-A Verification lab. Applicant must complete **Form 2O**, and **necessary Forms*** to provide test results.

*Note: Necessary Forms are shown in the following table. Test speeds for products are shown in **Table 3-1**.

| Test Item | 12cm disc | 8cm disc |
|---|---|---|
| General functions | **Form 7O to 12O** *1 | **Form 17O to 22O** *2 |
| 2x-speed recording | **Form 3O to 6O** | **Form 13O to 16O** |
| 3x-speed recording | **Form 23O to 26O** | **Form 27O to 30O** |
| 5x-speed recording | **Form 31O to 34O** | **Form 35O to 38O** |
| 6x-speed recording | **Form 39O to 42O** | **Form 43O to 46O** |
| 8x-speed recording | **Form 47O to 50O** | **Form 51O to 54O** |
| 12x-speed recording | **Form 55O to 58O** | --- |
| Others | **Form 59O** *3 | **Form 60O** *3 |

Notes:

*1: **Form 11O** and **Form 12O** are not necessary for a read-only drive.

*2: **Form 21O** and **Form 22O** are not necessary for a read-only drive.

*3: **Form 59O** and **Form 60O** are necessary for more than or equal to 6x-speed drive.

Example:

For verification of 12 cm/5x-speed DVD-RAM Drive, **Form 3O to 12O**, **Form 23O to 26O** and **Form 31O to 34O** are necessary.

**Mutual Non Disclosure Agreement (NDA)**

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

**Application**

Applicant must submit 3 product samples along with **Form 2O** and **the necessary Forms**, and the NDA.

**Test Result**

Upon completion of testing, Verification Lab will complete **Form 61O** 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.*

**12cm Test Discs**

| | |
|---|---|
| • Standard Blank Disc<br>(2x-speed/Class 0) **RAM-PT200-A**<br>(3x-speed/Class 0) **RAM-PT300-A**<br>(5x-speed/Class 0) **RAM-PT500-A**<br>(12x-speed/Class 1) **RAM-PT1200-A** | **Panasonic Corporation**<*><br>Format Verification Laboratory<br>1-15, Matsuo-cho, Kadoma, Osaka, 571-8504 Japan<br>Fax: +81-6-6909-5027<br>E-mail: fvl-info@ml.jp.panasonic.com<br>URL: http://panasonic.co.jp/avc/fvl/en/index.html |
| (5x-speed/Class 0) **RAM-HM500**<br>(6x-speed/Class 1) **RAM-HM600**<br>(8x-speed/Class 1) **RAM-HM800**<br>(12x-speed/Class 1) **RAM-HM1200** | **Hitachi Consumer Electronics Co., Ltd.**<*><br>Format Verification Center<br>292, Yoshida-cho, Totsuka-ku, Yokohama,-shi, Kanagawa, 244-0817 Japan<br>Fax: +81-45-866-5905 |
| • FFh Signal & BCA Test Disc<br>**RAM-PT200-B**<br>• DMA Test Disc<br>Type A: **RAM-PT200-1 to -8** | **Panasonic Corporation**<* > |
| Type B: **RAM-HM200-B1, -B2**<br>Type C: **RAM-HM200-C**<br>• Read Power Erasing Test Disc<br>**RAM-HM600-F** | **Hitachi Consumer Electronics Co., Ltd.**<* > |

**8cm Test Discs**

| | |
|---|---|
| • Standard Blank Disc<br>(2x-speed/Class 0) **RAM-HM210**<br>(3x-speed/Class 0) **RAM-HM310**<br>(5x-speed/Class 0) **RAM-HM510**<br>(6x-speed/Class 1) **RAM-HM610**<br>(8x-speed/Class 1) **RAM-HM810**<br>• FFh Signal & BCA Test Disc<br>**RAM-HM210-E**<br>• DMA Test Disc<br>Type A: **RAM-HM210-A1 to -A8**<br>Type B: **RAM-HM210-B1, -B2**<br>Type C: **RAM-HM210-C**<br>• Read Power Erasing Test Disc<br>**RAM-HM610-F** | **Hitachi Consumer Electronics Co., Ltd.**<*><br>Format Verification Center<br>292, Yoshida-cho, Totsuka-ku, Yokohama-shi, Kanagawa, 244-0817 Japan<br>Fax: +81-45-866-5905 |

(Continued)

**Verifiers**

| | |
|---|---|
| • DMA Verifiers<br>**DVD-SDV100** | **SAMSUNG ELECTRONICS CO., LTD.**<*><br>DVD Verification Laboratory<br>VD Division, DM Business<br>416, Maetan-3Dong, Yeongtong-Gu, Suwon-City,<br>Gyeonggi-Do, 443-742 Korea<br>Tel: +82-31-277-0875 Fax: +82-31-277-3398<br>E-mail: bd.tcenter@samsung.com |
| • File System Verifier<br>**DVD-FV01RAM** | **Panasonic Corporation**<*><br>Format Verification Laboratory<br>1-15, Matsuo-cho, Kadoma, Osaka, 571-8504 Japan<br>Fax: +81-6-6909-5027<br>E-mail: fvl-info@ml.jp.panasonic.com<br>URL: http://panasonic.co.jp/avc/fvl/en/index.html |
| **TFSV01** | *Discontinued* |

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