



HD DVD-VR (Video Recording) Product Requirement & Guideline

Version 1.03

August 2007

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- February 2006
The Version 1.0 was issued. Version 1.0 describes HD DVD-VR Format Recorder/Player for HD DVD-RAM, HD DVD-R and HD DVD-R for DL.

- December 2006
The Version 1.0 was updated to Version 1.01 for the following reasons:
 - To add HD DVD-RW and HD DVD-RW for DL, and to update reference version numbers for HD DVD-RAM, HD DVD-R and HD DVD-R for DL (Sections 1.3.1, 1.3.2, 2.2.1, 2.2.2, 2.3.1, 2.3.2, 2.4.1, 2.4.2, 2.5.1 and 2.5.2 were revised.)
 - To update the descriptions for content protection and Interoperable Content (Sections 1.4, 2.2.2, 2.3.2, 2.4.2 and 2.5.2 were revised.)

- July 2007
The Version 1.01 was updated to Version 1.02 for the following reasons:
 - To add HD DVD-VR Format Recorder/Player for DVD writable discs, HD DVD-VR Format Camcorder for HD DVD writable discs and HD DVD-VR Format Camcorder for DVD writable discs (Sections 1.2.2, 1.2.3 and 1.2.4, Chapters 3., 4. and 5. were added. Sections 1.3.1, 1.3.2, 1.5 and 6.1 were revised.)
 - To revise a product category name to HD DVD-VR Format Recorder/Player for HD DVD writable discs (Sections 1.2.1, 2.1, 2.2, 2.3, 2.4, 2.5 and 6.1 were revised.)
 - To update reference version numbers for HD DVD-RW and HD DVD-RW for DL (Sections 1.3.2, 2.2.1, 2.3.1, 2.4.1 and 2.5.1 were revised.)

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The Version 1.02 was updated to Version 1.03 for the following reasons:
 - To add DVD-RW for DL (Sections 1.2, 1.3.1, 1.3.2, 1.5, 3.2.1, 3.2.2, 3.3.1, 3.3.2, 3.4.1, 3.4.2, 3.5.1, 3.5.2, 5.2.1 and 5.2.2 were revised.)

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1. General

1.1 Scope

This document defines the minimum requirements and recommendations for implementation of HD DVD-VR (Video Recording) products* for manufactures from a consumer's point of view and the minimum requirements for a typical HD DVD-VR product*.

HD DVD-VR product shall comply with the requirements described in the "HD DVD-VR (Video Recording) Product Requirement & Guideline".

*: The products which refer to the HD DVD-VR (Video Recording) specifications.

1.2 HD DVD-VR Product Category

HD DVD-VR (Video Recording) Product Requirement & Guideline defined in this document applies to the following product categories.

Note : The products which support one or more DVD writable discs shall be compliant with the Supplemental Information for Part 2: FILE SYSTEM SPECIFICATIONS of the corresponding DVD writable disc(s) which is issued for HD DVD-VR recording.

1.2.1 HD DVD-VR Format Recorder/Player for HD DVD writable discs

- 1) HD DVD-VR Format Video Recorder
- 2) HD DVD-VR Format Stream Recorder
- 3) HD DVD-VR Format Video Player
- 4) HD DVD-VR Format Stream Player

Note: In these product categories, Recorders have the capability of both recording and playback of the contents compliant to HD DVD-VR specifications, while Players do not have the recording capability of the contents compliant to HD DVD-VR specifications. Refer to **2.2** to **2.5** for more details.

1.2.2 HD DVD-VR Format Recorder/Player for DVD writable discs

- 1) HD DVD-VR Format Video Recorder
- 2) HD DVD-VR Format Stream Recorder
- 3) HD DVD-VR Format Video Player
- 4) HD DVD-VR Format Stream Player

Note : In these product categories, Recorders have the capability of both recording and playback of the contents compliant to HD DVD-VR specifications, while Players do not have the recording capability of the contents compliant to HD DVD-VR specifications. Refer to **3.2** to **3.5** for more details.

1.2.3 HD DVD-VR Format Camcorder for HD DVD writable discs

- 1) HD DVD-VR Format Video Camcorder

1.2.4 HD DVD-VR Format Camcorder for DVD writable discs

- 1) HD DVD-VR Format Video Camcorder

1.3 Normative References

HD DVD-VR (Video Recording) product shall comply with relevant specifications listed here.

Notes: In the event of minor updates to the applicable specifications which is defined as a change of second digit or third digit of version number, such as from 1.1 to 1.2, all HD DVD-VR products shall comply with the updated specifications after a reasonable time period, even if this HD DVD-VR (Video Recording) Product Requirement & Guideline is not updated. The latest version of each of the applicable specifications will be informed on the DVD FLLC web site, www.dvdfllc.co.jp.

In the event of major updates to the applicable specifications, which is defined as a change of first digit of version number such as from 1.0 to 2.0, or the creation of a new format, HD DVD-VR products are not required to comply with these updates or the new format until the HD DVD-VR (Video Recording) Product Requirement & Guideline document is updated. Major specification revisions or new format specifications will be informed on the DVD FLLC web site, www.dvdfllc.co.jp.

1.3.1 Physical specifications

- 1) DVD Specifications for High Density Rewritable Disc (HD DVD-RAM)
Part 1: PHYSICAL SPECIFICATIONS Version 1.1
- 2) DVD Specifications for High Density Recordable Disc (HD DVD-R)
Part 1: PHYSICAL SPECIFICATIONS Version 1.1
- 3) DVD Specifications for High Density Recordable Disc for Dual Layer (HD DVD-R for DL)
Part 1: PHYSICAL SPECIFICATIONS Version 2.1
- 4) DVD Specifications for High Density Re-recordable Disc (HD DVD-RW)
Part 1: PHYSICAL SPECIFICATIONS Version 1.1
- 5) DVD Specifications for High Density Re-recordable Disc for Dual Layer (HD DVD-RW for DL)
Part 1: PHYSICAL SPECIFICATIONS Version 2.1
- 6) DVD Specifications for Rewritable Disc (DVD-RAM)
Part 1: PHYSICAL SPECIFICATIONS Version 2.2
- 7) DVD Specifications for Recordable Disc for General (DVD-R for General)
Part 1: PHYSICAL SPECIFICATIONS Version 2.1
- 8) DVD Specifications for Recordable Disc for Dual Layer (DVD-R for DL)
Part 1: PHYSICAL SPECIFICATIONS Version 3.0
- 9) DVD Specifications for Re-recordable Disc (DVD-RW)
Part 1: PHYSICAL SPECIFICATIONS Version 1.2
- 10) DVD Specifications for Re-recordable Disc for Dual Layer (DVD-RW for DL)
Part 1: PHYSICAL SPECIFICATIONS Version 2.0

1.3.2 File System specifications

- 1) DVD Specifications for High Density Rewritable Disc (HD DVD-RAM)
Part 2: FILE SYSTEM SPECIFICATIONS Version 1.0
- 2) DVD Specifications for High Density Recordable Disc (HD DVD-R)
Part 2: FILE SYSTEM SPECIFICATIONS Version 1.1
- 3) DVD Specifications for High Density Recordable Disc for Dual Layer (HD DVD-R for DL)
Part 2: FILE SYSTEM SPECIFICATIONS Version 2.0
- 4) DVD Specifications for High Density Re-recordable Disc (HD DVD-RW)
Part 2: FILE SYSTEM SPECIFICATIONS Version 1.0
- 5) DVD Specifications for High Density Re-recordable Disc for Dual Layer (HD DVD-RW for DL)
Part 2: FILE SYSTEM SPECIFICATIONS Version 2.0
- 6) DVD Specifications for Rewritable Disc (DVD-RAM)
Part 2: FILE SYSTEM SPECIFICATIONS Version 2.0
- 7) DVD Specifications for Recordable Disc for General (DVD-R for General)
Part 2: FILE SYSTEM SPECIFICATIONS Version 2.1
- 8) DVD Specifications for Recordable Disc for Dual Layer (DVD-R for DL)
Part 2: FILE SYSTEM SPECIFICATIONS Version 3.0
- 9) DVD Specifications for Re-recordable Disc (DVD-RW)
Part 2: FILE SYSTEM SPECIFICATIONS Version 1.0
- 10) DVD Specifications for Re-recordable Disc for Dual Layer (DVD-RW for DL)
Part 2: FILE SYSTEM SPECIFICATIONS Version 2.0

1.3.3 Application specifications

- 1) DVD Specifications for High Definition VIDEO RECORDING (HD DVD-VR) Version 1.0
- 2) DVD Specifications for High Definition VIDEO (HD DVD-Video) Version 1.1 *

*: *This is listed for the support of creation of Interoperable Content by HD DVD-VR Format Video Recorder.*

1.4 Content Protection

The basic policy of the DVD Forum is to respect copyrights and to enable content protection systems. According to the basic policy stated above, an appropriate content protection system for HD DVD content and media has been adopted as follows.

CP system	Media / Content	Proposer
AACS	HD DVD-VR content using HD DVD-RAM Disc HD DVD-VR content using HD DVD-R Disc HD DVD-VR content using HD DVD-R Disc for DL	AACS*

Note: Other physical media will also be included when related specifications are completed. It is recommended that the manufacturers confirm the latest specifications.

*Contact: AACS license information is available from the AACS LA, LLC, www.aacsla.com.

AACS specification updates will be informed by the DVD Forum or check web site of the DVD Forum or AACS LA, LLC.

Since the content protection system is not a DVD Forum specification, it is not subject to the DVD Forum verification but compliance to the specification is recommended by the DVD Forum.

1.5 Terminology

Video Object (VOB)

Stream data which typically originate in self-encoding. The data structure of VOB complies with MPEG Program Stream (MPEG-PS). VOB data structure is defined as a sequence of packs, which has a fixed size of 2048 bytes.

Stream Object (SOB)

Stream data which typically originate in digital broadcast. Source stream data to be recorded as an SOB consist of MPEG Transport Stream (MPEG-TS) Packets. The data structure of SOB complies with Packet Group format defined in HD DVD-VR specifications.

Type A recording mode for SOB

Recording mode for SOBs, which is dedicated to a specific digital stream application type (e.g. digital broadcast standard). The source stream is a partial transport stream which has one program (e.g. one digital television channel) selected from the original broadcast transport stream. This mode requires analysis of the stream to be recorded. For more details, refer to HD DVD-VR specifications.

Type B recording mode for SOB

Recording mode for SOBs, which realizes the streamer applications. Streamer application means that the source stream is recorded transparently without stream analysis, and the recorded content is typically decoded in external device e.g. set-top box or digital television. For more details, refer to HD DVD-VR specifications.

Digital stream application type

Application type (e.g. digital broadcast standard) to distinguish the content of the MPEG Transport Stream recorded as SOB content.

In the case of Type A recording mode, digital stream application type defined in HD DVD-VR specifications (as of the issuance of Version 1.03 of this Requirement and Guideline) is "Japanese ISDB", "US ATSC and Cable" and "Manufacturer mode". In the case of Type B recording mode, digital stream application type is not available and should be interpreted as "Unspecified", regardless of the content of the stream.

Digital transport stream interface

Digital interface which supports the transparent ("as is") input and/or output of MPEG Transport Stream. The typical examples are IEEE1394 interface and IP (Internet Protocol) interface.

Interoperable Content

Content specified by "DVD Specifications for High Definition VIDEO" and "DVD Specifications for High Definition VIDEO RECORDING".

DVD writable disc

This is a general term of discs, except for HD DVD writable discs, which are able to record the data onto the disc and are defined in DVD Forum. At the time of publication, this document is applicable to the following specifications.

- DVD-R for General
- DVD-R for DL
- DVD-RAM
- DVD-RW
- DVD-RW for DL

HD DVD writable disc

This is a general term of high density discs which are able to record the data onto the disc and are defined in DVD Forum. At the time of publication, this document is applicable to the following specifications.

- HD DVD-R
- HD DVD-R for DL
- HD DVD-RAM
- HD DVD-RW
- HD DVD-RW for DL

1.6 Abbreviations

AACS	Advanced Access Content System
ISDB	Integrated Services Digital Broadcasting
SOB	Stream Object
VOB	Video Object

2. HD DVD-VR Format Recorder/Player for HD DVD writable discs

2.1 General Descriptions

This specification covers four categories as follows:

- 1) HD DVD-VR Format Video Recorder
- 2) HD DVD-VR Format Stream Recorder
- 3) HD DVD-VR Format Video Player
- 4) HD DVD-VR Format Stream Player

Note: Integrated systems of HD DVD-VR Format Recording/Playback functions for HD DVD writable discs (e.g. PC software in combination with appropriate hardware including disc drive) are also covered by these categories.

2.2 Requirements of HD DVD-VR Format Video Recorder

The technical requirements for HD DVD-VR Format Video Recorder are listed as below. Note that "for HD DVD writable discs" is assumed in this section, unless otherwise specified.

2.2.1 Specifications

HD DVD-VR Format Video Recorder shall comply with at least one of the following combinations of specifications:

- 1) DVD Specifications for High Density Rewritable Disc (HD DVD-RAM)
Part 1: PHYSICAL SPECIFICATIONS Version 1.1
Part 2: FILE SYSTEM SPECIFICATIONS Version 1.0
- 2) DVD Specifications for High Density Recordable Disc (HD DVD-R)
Part 1: PHYSICAL SPECIFICATIONS Version 1.1
Part 2: FILE SYSTEM SPECIFICATIONS Version 1.1
- 3) DVD Specifications for High Density Recordable Disc for Dual Layer (HD DVD-R for DL)
Part 1: PHYSICAL SPECIFICATIONS Version 2.1
Part 2: FILE SYSTEM SPECIFICATIONS Version 2.0
- 4) DVD Specifications for High Density Re-recordable Disc (HD DVD-RW)
Part 1: PHYSICAL SPECIFICATIONS Version 1.1
Part 2: FILE SYSTEM SPECIFICATIONS Version 1.0
- 5) DVD Specifications for High Density Re-recordable Disc for Dual Layer (HD DVD-RW of DL)
Part 1: PHYSICAL SPECIFICATIONS Version 2.1
Part 2: FILE SYSTEM SPECIFICATIONS Version 2.0

HD DVD-VR Format Video Recorder shall comply with the following specification:

- 6) DVD Specifications for High Definition VIDEO RECORDING (HD DVD-VR) Version 1.0

2.2.2 Required functions

HD DVD-VR Format Video Recorder ("the recorder" in 2.2.2) shall comply with the following functions:

1) Record functions

1-1) General

The recorder shall have a capability to record the contents described below on at least one of the physical media described in 2.2.1. If the recorder supports 3) in 2.2.1, 2) in 2.2.1 shall also be supported. If the recorder supports 5) in 2.2.1, 4) in 2.2.1 shall also be supported.

1-2) VOB

The recorder shall have a capability to record some kind of VOB content specified in DVD Specifications for High Definition VIDEO RECORDING. Especially, the recorder shall have a capability to generate and record VOB content in compliance to at least one mandatory video codec and at least one mandatory audio codec.*

*: The recorder does not need to support all kinds of coding parameters e.g. video resolutions, audio bit rates, etc.

2) Playback functions

2-1) General

The recorder shall have a capability to playback the contents described below on at least one of the physical media described in 2.2.1. If the recorder supports 3) in 2.2.1, 2) in 2.2.1 shall also be supported. If the recorder supports 5) in 2.2.1, 4) in 2.2.1 shall also be supported.

At least, the recorder shall have a capability to playback the content recorded by the same recorder.

2-2) VOB

The recorder shall have a capability to playback VOB content specified in DVD Specifications for High Definition VIDEO RECORDING.

2-3) SOB

The recorder is strongly recommended to have a capability to playback SOB content of at least either of Type A recording mode (at least one digital stream application type) or Type B recording mode. If the recorder has a capability to playback SOB content of Type A recording mode (at least one digital stream application type), the recorder is also strongly recommended to have a capability to playback SOB content of Type B recording mode if the recorder equips digital transport stream interface.

If the recorder has a capability to playback SOB content of Type A recording mode of some digital stream application type, the recorder shall have a capability to decode the SOB content or to output MPEG-TS retrieved from the SOB via digital transport stream interface.

If the recorder has a capability to playback SOB content of Type B recording mode, the recorder shall have a capability to output MPEG-TS retrieved from the SOB via digital transport stream interface.

3) Interoperable Content

The recorder shall have a capability to generate navigation data of Interoperable Content which can be played back by HD DVD-Video players, if any valid VOB compliant to HD DVD-VR specifications exists on the disc.

Note: It is recommended that manufactures of HD DVD-VR Format Video Recorders confirm all of the latest specifications e.g. HD DVD-Video specifications for Interoperable Content.

4) Video output

At least one video output is required except for integrated recorder/display.

5) Audio output

At least one analog 2ch stereo audio output is required.

6) Digital transport stream interface

Digital transport stream interface may be equipped. Especially, at least one digital transport stream interface shall be equipped in the following cases.

- If the recorder has a capability to playback SOB content of Type A recording mode of one or more digital stream application types and if the recorder does not have a capability to decode the SOB content of at least one of those digital stream application type.
- If the recorder has a capability to playback SOB content of Type B recording mode.

7) Content protection

Until now, AACS is the only approved content protection method for HD DVD-VR content on the media described in 1.4. Therefore, it is recommended for HD DVD-VR Format Video Recorder to comply with AACS Specifications.

2. HD DVD-VR Format Recorder/Player for HD DVD writable discs

2.3 Requirements of HD DVD-VR Format Stream Recorder

2.3 Requirements of HD DVD-VR Format Stream Recorder

The technical requirements for HD DVD-VR Format Stream Recorder are listed as below. Note that "for HD DVD writable discs" is assumed in this section, unless otherwise specified.

2.3.1 Specifications

HD DVD-VR Format Stream Recorder shall comply with at least one of the following combinations of specifications:

- 1) DVD Specifications for High Density Rewritable Disc (HD DVD-RAM)
 - Part 1: PHYSICAL SPECIFICATIONS Version 1.1
 - Part 2: FILE SYSTEM SPECIFICATIONS Version 1.0
- 2) DVD Specifications for High Density Recordable Disc (HD DVD-R)
 - Part 1: PHYSICAL SPECIFICATIONS Version 1.1
 - Part 2: FILE SYSTEM SPECIFICATIONS Version 1.1
- 3) DVD Specifications for High Density Recordable Disc for Dual Layer (HD DVD-R for DL)
 - Part 1: PHYSICAL SPECIFICATIONS Version 2.1
 - Part 2: FILE SYSTEM SPECIFICATIONS Version 2.0
- 4) DVD Specifications for High Density Re-recordable Disc (HD DVD-RW)
 - Part 1: PHYSICAL SPECIFICATIONS Version 1.1
 - Part 2: FILE SYSTEM SPECIFICATIONS Version 1.0
- 5) DVD Specifications for High Density Re-recordable Disc for Dual Layer (HD DVD-RW of DL)
 - Part 1: PHYSICAL SPECIFICATIONS Version 2.1
 - Part 2: FILE SYSTEM SPECIFICATIONS Version 2.0

HD DVD-VR Format Stream Recorder shall comply with the following specification:

- 6) DVD Specifications for High Definition VIDEO RECORDING (HD DVD-VR) Version 1.0

2.3.2 Required functions

HD DVD-VR Format Stream Recorder ("the recorder" in 2.3.2) shall comply with the following functions:

1) Record functions

1-1) General

The recorder shall have a capability to record the contents described below on at least one of the physical media described in 2.3.1. If the recorder supports 3) in 2.3.1, 2) in 2.3.1 shall also be supported. If the recorder supports 5) in 2.3.1, 4) in 2.3.1 shall also be supported.

1-2) SOB

The recorder shall have a capability to record some kind of SOB content specified in DVD Specifications for High Definition VIDEO RECORDING. Especially, the recorder shall have a capability to record SOB content of at least either of Type A recording mode (at least one digital stream application type) or Type B recording mode.

2) Playback functions

2-1) General

The recorder shall have a capability to playback the contents described below on at least one of the physical media described in 2.3.1. If the recorder supports 3) in 2.3.1, 2) in 2.3.1 shall also be supported. If the recorder supports 5) in 2.3.1, 4) in 2.3.1 shall also be supported.

At least, the recorder shall have a capability to playback the content recorded by the same recorder.

2-2) SOB

The recorder shall have a capability to playback SOB content of at least either of Type A recording mode (at least one digital stream application type) or Type B recording mode.

If the recorder has a capability to playback SOB content of Type A recording mode (at least one digital stream application type), the recorder is also strongly recommended to have a capability to playback SOB content of Type B recording mode if the recorder equips digital transport stream interface.

If the recorder has a capability to playback SOB content of Type A recording mode of some digital stream application type, the recorder shall have a capability to decode the SOB content or to output MPEG-TS retrieved from the SOB via digital transport stream interface.

If the recorder has a capability to playback SOB content of Type B recording mode, the recorder shall have a capability to output MPEG-TS retrieved from the SOB via digital transport stream interface.

3) Video output

At least one video output is required except for integrated recorder/display, if no digital transport stream interface is equipped.

4) Audio output

At least one analog 2ch stereo audio output is required, if no digital transport stream interface is equipped.

2. HD DVD-VR Format Recorder/Player for HD DVD writable discs

2.3 Requirements of HD DVD-VR Format Stream Recorder

5) Digital transport stream interface

Digital transport stream interface may be equipped. Especially, at least one digital transport stream interface shall be equipped in the following cases.

- If the recorder has a capability to playback SOB content of Type A recording mode of one or more digital stream application type and if the recorder does not have a capability to decode the SOB content of at least one of those digital stream application type.
- If the recorder has a capability to playback SOB content of Type B recording mode.

6) Content protection

Until now, AACS is the only approved content protection method for HD DVD-VR content on the media described in 1.4. Therefore, it is recommended for HD DVD-VR Format Stream Recorder to comply with AACS Specifications.

2.4 Requirements of HD DVD-VR Format Video Player

The technical requirements for HD DVD-VR Format Video Player are listed as below. Note that "for HD DVD writable discs" is assumed in this section, unless otherwise specified.

2.4.1 Specifications

HD DVD-VR Format Video Player shall comply with at least one of the following combinations of specifications:

- 1) DVD Specifications for High Density Rewritable Disc (HD DVD-RAM)
Part 1: PHYSICAL SPECIFICATIONS Version 1.1
Part 2: FILE SYSTEM SPECIFICATIONS Version 1.0
- 2) DVD Specifications for High Density Recordable Disc (HD DVD-R)
Part 1: PHYSICAL SPECIFICATIONS Version 1.1
Part 2: FILE SYSTEM SPECIFICATIONS Version 1.1
- 3) DVD Specifications for High Density Recordable Disc for Dual Layer (HD DVD-R for DL)
Part 1: PHYSICAL SPECIFICATIONS Version 2.1
Part 2: FILE SYSTEM SPECIFICATIONS Version 2.0
- 4) DVD Specifications for High Density Re-recordable Disc (HD DVD-RW)
Part 1: PHYSICAL SPECIFICATIONS Version 1.1
Part 2: FILE SYSTEM SPECIFICATIONS Version 1.0
- 5) DVD Specifications for High Density Re-recordable Disc for Dual Layer (HD DVD-RW of DL)
Part 1: PHYSICAL SPECIFICATIONS Version 2.1
Part 2: FILE SYSTEM SPECIFICATIONS Version 2.0

HD DVD-VR Format Video Player shall comply with the following specification:

- 6) DVD Specifications for High Definition VIDEO RECORDING (HD DVD-VR) Version 1.0

2.4.2 Required functions

HD DVD-VR Format Video Player ("the player" in 2.4.2) shall comply with the following functions:

1) Playback functions

1-1) General

The player shall have a capability to playback the contents described below on at least one of the physical media described in 2.4.1. If the player supports 3) in 2.4.1, 2) in 2.4.1 shall also be supported. If the player supports 5) in 2.4.1, 4) in 2.4.1 shall also be supported.

1-2) VOB

The player shall have a capability to playback VOB content specified in DVD Specifications for High Definition VIDEO RECORDING.

1-3) SOB

The player is strongly recommended to have a capability to playback SOB content of at least either of Type A recording mode (at least one digital stream application type) or Type B recording mode. If the player has a capability to playback SOB content of Type A recording mode (at least one digital stream application type), the player is also strongly recommended to have a capability to playback SOB content of Type B recording mode if the player equips digital transport stream interface. If the player has a capability to playback SOB content of Type A recording mode of some digital stream application type, the player shall have a capability to decode the SOB content or to output MPEG-TS retrieved from the SOB via digital transport stream interface. If the player has a capability to playback SOB content of Type B recording mode, the player shall have a capability to output MPEG-TS retrieved from the SOB via digital transport stream interface.

2) Video output

At least one video output is required except for integrated player/display.

3) Audio output

At least one analog 2ch stereo audio output is required.

4) Digital transport stream interface

Digital transport stream interface may be equipped. Especially, at least one digital transport stream interface shall be equipped in the following cases.

- If the player has a capability to playback SOB content of Type A recording mode of one or more digital stream application types and if the player does not have a capability to decode the SOB content of at least one of those digital stream application type.
- If the player has a capability to playback SOB content of Type B recording mode.

5) Content protection

Until now, AACS is the only approved content protection method for HD DVD-VR content on the media described in 1.4. Therefore, it is recommended for HD DVD-VR Format Video Player to comply with AACS Specifications.

2.5 Requirements of HD DVD-VR Format Stream Player

The technical requirements for HD DVD-VR Format Stream Player are listed as below. Note that "for HD DVD writable discs" is assumed in this section, unless otherwise specified.

2.5.1 Specifications

HD DVD-VR Format Stream Player shall comply with at least one of the following combinations of specifications:

- 1) DVD Specifications for High Density Rewritable Disc (HD DVD-RAM)
Part 1: PHYSICAL SPECIFICATIONS Version 1.1
Part 2: FILE SYSTEM SPECIFICATIONS Version 1.0
- 2) DVD Specifications for High Density Recordable Disc (HD DVD-R)
Part 1: PHYSICAL SPECIFICATIONS Version 1.1
Part 2: FILE SYSTEM SPECIFICATIONS Version 1.1
- 3) DVD Specifications for High Density Recordable Disc for Dual Layer (HD DVD-R for DL)
Part 1: PHYSICAL SPECIFICATIONS Version 2.1
Part 2: FILE SYSTEM SPECIFICATIONS Version 2.0
- 4) DVD Specifications for High Density Re-recordable Disc (HD DVD-RW)
Part 1: PHYSICAL SPECIFICATIONS Version 1.1
Part 2: FILE SYSTEM SPECIFICATIONS Version 1.0
- 5) DVD Specifications for High Density Re-recordable Disc for Dual Layer (HD DVD-RW of DL)
Part 1: PHYSICAL SPECIFICATIONS Version 2.1
Part 2: FILE SYSTEM SPECIFICATIONS Version 2.0

HD DVD-VR Format Stream Player shall comply with the following specification:

- 6) DVD Specifications for High Definition VIDEO RECORDING (HD DVD-VR) Version 1.0

2.5.2 Required functions

HD DVD-VR Format Stream Player ("the player" in 2.5.2) shall comply with the following functions:

1) Playback functions

1-1) General

The player shall have a capability to playback the contents described below on at least one of the physical media described in 2.5.1. If the player supports 3) in 2.5.1, 2) in 2.5.1 shall also be supported. If the player supports 5) in 2.5.1, 4) in 2.5.1 shall also be supported.

1-2) SOB

The player shall have a capability to playback SOB content of at least either of Type A recording mode (at least one digital stream application type) or Type B recording mode.

If the player has a capability to playback SOB content of Type A recording mode (at least one digital stream application type), the player is also strongly recommended to have a capability to playback SOB content of Type B recording mode if the player equips digital transport stream interface.

If the player has a capability to playback SOB content of Type A recording mode of some digital stream application type, the player shall have a capability to decode the SOB content or to output MPEG-TS retrieved from the SOB via digital transport stream interface.

If the player has a capability to playback SOB content of Type B recording mode, the player shall have a capability to output MPEG-TS retrieved from the SOB via digital transport stream interface.

2) Video output

At least one video output is required except for integrated recorder/display, if no digital transport stream interface is equipped.

3) Audio output

At least one analog 2ch stereo audio output is required, if no digital transport stream interface is equipped.

4) Digital transport stream interface

Digital transport stream interface may be equipped. Especially, at least one digital transport stream interface shall be equipped in the following cases.

- If the player has a capability to playback SOB content of Type A recording mode of one or more digital stream application type and if the player does not have a capability to decode the SOB content of at least one of those digital stream application type.
- If the player has a capability to playback SOB content of Type B recording mode.

5) Content protection

Until now, AACS is the only approved content protection method for HD DVD-VR content on the media described in 1.4. Therefore, it is recommended for HD DVD-VR Format Stream Player to comply with AACS Specifications.

3. HD DVD-VR Format Recorder/Player for DVD writable discs

3.1 General Descriptions

This specification covers four categories as follows:

- 1) HD DVD-VR Format Video Recorder
- 2) HD DVD-VR Format Stream Recorder
- 3) HD DVD-VR Format Video Player
- 4) HD DVD-VR Format Stream Player

Note: Integrated systems of HD DVD-VR Format Recording/Playback functions for DVD writable discs (e.g. PC software in combination with appropriate hardware including disc drive) are also covered by these categories.

Each of these products shall have a capability to playback DVD-Video contents on DVD-ROM, and thereby shall comply with the following specifications:

- 1) DVD Specifications for Read-Only Disc (DVD-ROM)
 - Part 1: PHYSICAL SPECIFICATIONS Version 1.0
 - Part 2: FILE SYSTEM SPECIFICATIONS Version 1.0
 - Part 3: VIDEO SPECIFICATIONS Version 1.1

HD DVD-VR Format Video Recorder and HD DVD-VR Format Stream Recorder (for DVD writable discs) can be further categorized as follows:

- ✧ If the product has a capability to playback HD DVD-Video contents on HD DVD-ROM and 3x-speed DVD-ROM, it belongs to "HD DVD-Video player with HD DVD-Video/VR recording function on red laser DVD writable discs" (which may be abbreviated to "HD DVD player with Hi-def Rec").

In this case, the product shall also comply with the following guideline:

HD DVD-Video Product Requirement and Guideline
(http://www.dvdfllc.co.jp/format/f_guideline.html)

- ✧ If the product does not have a capability to playback HD DVD-Video contents on HD DVD-ROM and 3x-speed DVD-ROM, it belongs to "DVD-Video player with HD DVD-Video/VR recording function on red laser DVD writable discs" (which may be abbreviated to "DVD player with Hi-def Rec").

3.2 Requirements of HD DVD-VR Format Video Recorder

The technical requirements for HD DVD-VR Format Video Recorder are listed as below. Note that "for DVD writable discs" is assumed in this section, unless otherwise specified.

3.2.1 Specifications

HD DVD-VR Format Video Recorder shall comply with at least one of the following combinations of specifications:

- 1) DVD Specifications for Rewritable Disc (DVD-RAM)
 - Part 1: PHYSICAL SPECIFICATIONS Version 2.2
 - Part 2: FILE SYSTEM SPECIFICATIONS Version 2.0
- 2) DVD Specifications for Recordable Disc for General (DVD-R for General)
 - Part 1: PHYSICAL SPECIFICATIONS Version 2.1
 - Part 2: FILE SYSTEM SPECIFICATIONS Version 2.1
- 3) DVD Specifications for Recordable Disc for Dual Layer (DVD-R for DL)
 - Part 1: PHYSICAL SPECIFICATIONS Version 3.0
 - Part 2: FILE SYSTEM SPECIFICATIONS Version 3.0
- 4) DVD Specifications for Re-recordable Disc (DVD-RW)
 - Part 1: PHYSICAL SPECIFICATIONS Version 1.2
 - Part 2: FILE SYSTEM SPECIFICATIONS Version 1.0
- 5) DVD Specifications for Re-recordable Disc for Dual Layer (DVD-RW for DL)
 - Part 1: PHYSICAL SPECIFICATIONS Version 2.0
 - Part 2: FILE SYSTEM SPECIFICATIONS Version 2.0

HD DVD-VR Format Video Recorder shall comply with the following specification:

- 6) DVD Specifications for High Definition VIDEO RECORDING (HD DVD-VR) Version 1.0

Note that further conditions for Physical specifications e.g. required maximum recording speed (Nx-speed) are described in 6).

3.2.2 Required functions

HD DVD-VR Format Video Recorder ("the recorder" in 3.2.2) shall comply with the following functions:

1) Record functions

1-1) General

The recorder shall have a capability to record the contents described below on at least one of the physical media described in 3.2.1. If the recorder supports 3) in 3.2.1, 2) in 3.2.1 shall also be supported. If the recorder supports 5) in 3.2.1, 4) in 3.2.1 shall also be supported.

1-2) VOB

The recorder shall have a capability to record some kind of VOB content specified in DVD Specifications for High Definition VIDEO RECORDING. Especially, the recorder shall have a capability to generate and record VOB content in compliance to at least one mandatory video codec and at least one mandatory audio codec.*

*: The recorder does not need to support all kinds of coding parameters e.g. video resolutions, audio bit rates, etc.

2) Playback functions

2-1) General

The recorder shall have a capability to playback the contents described below on at least one of the physical media described in 3.2.1. If the recorder supports 3) in 3.2.1, 2) in 3.2.1 shall also be supported. If the recorder supports 5) in 3.2.1, 4) in 3.2.1 shall also be supported.

At least, the recorder shall have a capability to playback the content recorded by the same recorder.

The recorder shall have a capability to playback the contents at 3x-speed (i.e. transfer bit rate from disc $V_r = 33.24$ Mbps) or more, from the disc of which the maximum recording speed is 3x or more. If the recorder supports 5) in 3.2.1, the recorder shall have a capability to playback the contents at 3x-speed from DVD-RW for DL.

2-2) VOB

The recorder shall have a capability to playback VOB content specified in DVD Specifications for High Definition VIDEO RECORDING.

2-3) SOB

The recorder is strongly recommended to have a capability to playback SOB content of at least either of Type A recording mode (at least one digital stream application type) or Type B recording mode. If the recorder has a capability to playback SOB content of Type A recording mode (at least one digital stream application type), the recorder is also strongly recommended to have a capability to playback SOB content of Type B recording mode if the recorder equips digital transport stream interface.

If the recorder has a capability to playback SOB content of Type A recording mode of some digital stream application type, the recorder shall have a capability to decode the SOB content or to output MPEG-TS retrieved from the SOB via digital transport stream interface.

If the recorder has a capability to playback SOB content of Type B recording mode, the recorder

3. HD DVD-VR Format Recorder/Player for DVD writable discs

3.2 Requirements of HD DVD-VR Format Video Recorder

shall have a capability to output MPEG-TS retrieved from the SOB via digital transport stream interface.

3) Interoperable Content

The recorder shall have a capability to generate navigation data of Interoperable Content which can be played back by HD DVD-Video players, if any valid VOB compliant to HD DVD-VR specifications exists on the disc.

Note: It is recommended that manufactures of HD DVD-VR Format Video Recorders confirm all of the latest specifications e.g. HD DVD-Video specifications for Interoperable Content.

4) Video output

At least one video output is required except for integrated recorder/display.

5) Audio output

At least one analog 2ch stereo audio output is required.

6) Digital transport stream interface

Digital transport stream interface may be equipped. Especially, at least one digital transport stream interface shall be equipped in the following cases.

- If the recorder has a capability to playback SOB content of Type A recording mode of one or more digital stream application types and if the recorder does not have a capability to decode the SOB content of at least one of those digital stream application type.
- If the recorder has a capability to playback SOB content of Type B recording mode.

7) Content protection

Until now, AACS is the only approved content protection method for HD DVD-VR content on the media described in 1.4. Therefore, it is recommended for HD DVD-VR Format Video Recorder to comply with AACS Specifications.

3.3 Requirements of HD DVD-VR Format Stream Recorder

The technical requirements for HD DVD-VR Format Stream Recorder are listed as below. Note that "for DVD writable discs" is assumed in this section, unless otherwise specified.

3.3.1 Specifications

HD DVD-VR Format Stream Recorder shall comply with at least one of the following combinations of specifications:

- 1) DVD Specifications for Rewritable Disc (DVD-RAM)
 - Part 1: PHYSICAL SPECIFICATIONS Version 2.2
 - Part 2: FILE SYSTEM SPECIFICATIONS Version 2.0
- 2) DVD Specifications for Recordable Disc for General (DVD-R for General)
 - Part 1: PHYSICAL SPECIFICATIONS Version 2.1
 - Part 2: FILE SYSTEM SPECIFICATIONS Version 2.1
- 3) DVD Specifications for Recordable Disc for Dual Layer (DVD-R for DL)
 - Part 1: PHYSICAL SPECIFICATIONS Version 3.0
 - Part 2: FILE SYSTEM SPECIFICATIONS Version 3.0
- 4) DVD Specifications for Re-recordable Disc (DVD-RW)
 - Part 1: PHYSICAL SPECIFICATIONS Version 1.2
 - Part 2: FILE SYSTEM SPECIFICATIONS Version 1.0
- 5) DVD Specifications for Re-recordable Disc for Dual Layer (DVD-RW for DL)
 - Part 1: PHYSICAL SPECIFICATIONS Version 2.0
 - Part 2: FILE SYSTEM SPECIFICATIONS Version 2.0

HD DVD-VR Format Stream Recorder shall comply with the following specification:

- 6) DVD Specifications for High Definition VIDEO RECORDING (HD DVD-VR) Version 1.0

Note that further conditions for Physical specifications e.g. required maximum recording speed (Nx-speed) are described in 6).

3.3.2 Required functions

HD DVD-VR Format Stream Recorder ("the recorder" in 3.3.2) shall comply with the following functions:

1) Record functions

1-1) General

The recorder shall have a capability to record the contents described below on at least one of the physical media described in 3.3.1. If the recorder supports 3) in 3.3.1, 2) in 3.3.1 shall also be supported. If the recorder supports 5) in 3.3.1, 4) in 3.3.1 shall also be supported.

1-2) SOB

The recorder shall have a capability to record some kind of SOB content specified in DVD Specifications for High Definition VIDEO RECORDING. Especially, the recorder shall have a capability to record SOB content of at least either of Type A recording mode (at least one digital stream application type) or Type B recording mode.

2) Playback functions

2-1) General

The recorder shall have a capability to playback the contents described below on at least one of the physical media described in 3.3.1. If the recorder supports 3) in 3.3.1, 2) in 3.3.1 shall also be supported. If the recorder supports 5) in 3.3.1, 4) in 3.3.1 shall also be supported.

At least, the recorder shall have a capability to playback the content recorded by the same recorder. The recorder shall have a capability to playback the contents at 3x-speed (i.e. transfer bit rate from disc $V_r = 33.24$ Mbps) or more, from the disc of which the maximum recording speed is 3x or more. If the recorder supports 5) in 3.3.1, the recorder shall have a capability to playback the contents at 3x-speed from DVD-RW for DL.

2-2) SOB

The recorder shall have a capability to playback SOB content of at least either of Type A recording mode (at least one digital stream application type) or Type B recording mode.

If the recorder has a capability to playback SOB content of Type A recording mode (at least one digital stream application type), the recorder is also strongly recommended to have a capability to playback SOB content of Type B recording mode if the recorder equips digital transport stream interface.

If the recorder has a capability to playback SOB content of Type A recording mode of some digital stream application type, the recorder shall have a capability to decode the SOB content or to output MPEG-TS retrieved from the SOB via digital transport stream interface.

If the recorder has a capability to playback SOB content of Type B recording mode, the recorder shall have a capability to output MPEG-TS retrieved from the SOB via digital transport stream interface.

3. HD DVD-VR Format Recorder/Player for DVD writable discs

3.3 Requirements of HD DVD-VR Format Stream Recorder

3) Video output

At least one video output is required except for integrated recorder/display, if no digital transport stream interface is equipped.

4) Audio output

At least one analog 2ch stereo audio output is required, if no digital transport stream interface is equipped.

5) Digital transport stream interface

Digital transport stream interface may be equipped. Especially, at least one digital transport stream interface shall be equipped in the following cases.

- If the recorder has a capability to playback SOB content of Type A recording mode of one or more digital stream application type and if the recorder does not have a capability to decode the SOB content of at least one of those digital stream application type.
- If the recorder has a capability to playback SOB content of Type B recording mode.

6) Content protection

Until now, AACS is the only approved content protection method for HD DVD-VR content on the media described in 1.4. Therefore, it is recommended for HD DVD-VR Format Stream Recorder to comply with AACS Specifications.

3.4 Requirements of HD DVD-VR Format Video Player

The technical requirements for HD DVD-VR Format Video Player are listed as below. Note that "for DVD writable discs" is assumed in this section, unless otherwise specified.

3.4.1 Specifications

HD DVD-VR Format Video Player shall comply with at least one of the following combinations of specifications:

- 1) DVD Specifications for Rewritable Disc (DVD-RAM)
Part 1: PHYSICAL SPECIFICATIONS Version 2.2
Part 2: FILE SYSTEM SPECIFICATIONS Version 2.0
- 2) DVD Specifications for Recordable Disc for General (DVD-R for General)
Part 1: PHYSICAL SPECIFICATIONS Version 2.1
Part 2: FILE SYSTEM SPECIFICATIONS Version 2.1
- 3) DVD Specifications for Recordable Disc for Dual Layer (DVD-R for DL)
Part 1: PHYSICAL SPECIFICATIONS Version 3.0
Part 2: FILE SYSTEM SPECIFICATIONS Version 3.0
- 4) DVD Specifications for Re-recordable Disc (DVD-RW)
Part 1: PHYSICAL SPECIFICATIONS Version 1.2
Part 2: FILE SYSTEM SPECIFICATIONS Version 1.0
- 5) DVD Specifications for Re-recordable Disc for Dual Layer (DVD-RW for DL)
Part 1: PHYSICAL SPECIFICATIONS Version 2.0
Part 2: FILE SYSTEM SPECIFICATIONS Version 2.0

HD DVD-VR Format Video Player shall comply with the following specification:

- 6) DVD Specifications for High Definition VIDEO RECORDING (HD DVD-VR) Version 1.0

Note that further conditions for Physical specifications e.g. required maximum recording speed (Nx-speed) are described in 6).

3.4.2 Required functions

HD DVD-VR Format Video Player ("the player" in 3.4.2) shall comply with the following functions:

1) Playback functions

1-1) General

The player shall have a capability to playback the contents described below on at least one of the physical media described in 3.4.1. If the player supports 3) in 3.4.1, 2) in 3.4.1 shall also be supported. If the player supports 5) in 3.4.1, 4) in 3.4.1 shall also be supported.

The player shall have a capability to playback the contents at 3x-speed (i.e. transfer bit rate from disc $V_r = 33.24$ Mbps) or more, from the disc of which the maximum recording speed is 3x or more. If the player supports 5) in 3.4.1, the player shall have a capability to playback the contents at 3x-speed from DVD-RW for DL.

1-2) VOB

The player shall have a capability to playback VOB content specified in DVD Specifications for High Definition VIDEO RECORDING.

1-3) SOB

The player is strongly recommended to have a capability to playback SOB content of at least either of Type A recording mode (at least one digital stream application type) or Type B recording mode.

If the player has a capability to playback SOB content of Type A recording mode (at least one digital stream application type), the player is also strongly recommended to have a capability to playback SOB content of Type B recording mode if the player equips digital transport stream interface.

If the player has a capability to playback SOB content of Type A recording mode of some digital stream application type, the player shall have a capability to decode the SOB content or to output MPEG-TS retrieved from the SOB via digital transport stream interface.

If the player has a capability to playback SOB content of Type B recording mode, the player shall have a capability to output MPEG-TS retrieved from the SOB via digital transport stream interface.

2) Video output

At least one video output is required except for integrated player/display.

3) Audio output

At least one analog 2ch stereo audio output is required.

4) Digital transport stream interface

Digital transport stream interface may be equipped. Especially, at least one digital transport stream interface shall be equipped in the following cases.

- If the player has a capability to playback SOB content of Type A recording mode of one or more digital stream application types and if the player does not have a capability to decode the SOB content of at least one of those digital stream application type.
- If the player has a capability to playback SOB content of Type B recording mode.

3. HD DVD-VR Format Recorder/Player for DVD writable discs

3.4 Requirements of HD DVD-VR Format Video Player

5) Content protection

Until now, AACS is the only approved content protection method for HD DVD-VR content on the media described in 1.4. Therefore, it is recommended for HD DVD-VR Format Video Player to comply with AACS Specifications.

3.5 Requirements of HD DVD-VR Format Stream Player

The technical requirements for HD DVD-VR Format Stream Player are listed as below. Note that "for DVD writable discs" is assumed in this section, unless otherwise specified.

3.5.1 Specifications

HD DVD-VR Format Stream Player shall comply with at least one of the following combinations of specifications:

- 1) DVD Specifications for Rewritable Disc (DVD-RAM)
Part 1: PHYSICAL SPECIFICATIONS Version 2.2
Part 2: FILE SYSTEM SPECIFICATIONS Version 2.0
- 2) DVD Specifications for Recordable Disc for General (DVD-R for General)
Part 1: PHYSICAL SPECIFICATIONS Version 2.1
Part 2: FILE SYSTEM SPECIFICATIONS Version 2.1
- 3) DVD Specifications for Recordable Disc for Dual Layer (DVD-R for DL)
Part 1: PHYSICAL SPECIFICATIONS Version 3.0
Part 2: FILE SYSTEM SPECIFICATIONS Version 3.0
- 4) DVD Specifications for Re-recordable Disc (DVD-RW)
Part 1: PHYSICAL SPECIFICATIONS Version 1.2
Part 2: FILE SYSTEM SPECIFICATIONS Version 1.0
- 5) DVD Specifications for Re-recordable Disc for Dual Layer (DVD-RW for DL)
Part 1: PHYSICAL SPECIFICATIONS Version 2.0
Part 2: FILE SYSTEM SPECIFICATIONS Version 2.0

HD DVD-VR Format Stream Player shall comply with the following specification:

- 6) DVD Specifications for High Definition VIDEO RECORDING (HD DVD-VR) Version 1.0

Note that further conditions for Physical specifications e.g. required maximum recording speed (Nx-speed) are described in 6).

3.5.2 Required functions

HD DVD-VR Format Stream Player ("the player" in 3.5.2) shall comply with the following functions:

1) Playback functions

1-1) General

The player shall have a capability to playback the contents described below on at least one of the physical media described in 3.5.1. If the player supports 3) in 3.5.1, 2) in 3.5.1 shall also be supported. If the player supports 5) in 3.5.1, 4) in 3.5.1 shall also be supported.

The player shall have a capability to playback the contents at 3x-speed (i.e. transfer bit rate from disc $V_r = 33.24$ Mbps) or more, from the disc of which the maximum recording speed is 3x or more. If the player supports 5) in 3.5.1, the player shall have a capability to playback the contents at 3x-speed from DVD-RW for DL.

1-2) SOB

The player shall have a capability to playback SOB content of at least either of Type A recording mode (at least one digital stream application type) or Type B recording mode.

If the player has a capability to playback SOB content of Type A recording mode (at least one digital stream application type), the player is also strongly recommended to have a capability to playback SOB content of Type B recording mode if the player equips digital transport stream interface.

If the player has a capability to playback SOB content of Type A recording mode of some digital stream application type, the player shall have a capability to decode the SOB content or to output MPEG-TS retrieved from the SOB via digital transport stream interface.

If the player has a capability to playback SOB content of Type B recording mode, the player shall have a capability to output MPEG-TS retrieved from the SOB via digital transport stream interface.

2) Video output

At least one video output is required except for integrated recorder/display, if no digital transport stream interface is equipped.

3) Audio output

At least one analog 2ch stereo audio output is required, if no digital transport stream interface is equipped.

4) Digital transport stream interface

Digital transport stream interface may be equipped. Especially, at least one digital transport stream interface shall be equipped in the following cases.

- If the player has a capability to playback SOB content of Type A recording mode of one or more digital stream application type and if the player does not have a capability to decode the SOB content of at least one of those digital stream application type.
- If the player has a capability to playback SOB content of Type B recording mode.

3. HD DVD-VR Format Recorder/Player for DVD writable discs

3.5 Requirement of HD DVD-VR Format Stream Player

5) Content protection

Until now, AACS is the only approved content protection method for HD DVD-VR content on the media described in 1.4. Therefore, it is recommended for HD DVD-VR Format Stream Player to comply with AACS Specifications.

4. HD DVD-VR Format Camcorder for HD DVD writable discs

4.1 General Descriptions

This specification covers one category as follow:

- 1) HD DVD-VR Format Video Camcorder

4.2 Requirements of HD DVD-VR Format Video Camcorder

The technical requirements for HD DVD-VR Format Video Camcorder are listed as below. Note that "for HD DVD writable discs" is assumed in this section, unless otherwise specified.

4.2.1 Specifications

HD DVD-VR Format Video Camcorder shall comply with at least one of the following combinations of specifications:

- 1) DVD Specifications for High Density Rewritable Disc (HD DVD-RAM)
 - Part 1: PHYSICAL SPECIFICATIONS Version 1.1
 - Part 2: FILE SYSTEM SPECIFICATIONS Version 1.0
- 2) DVD Specifications for High Density Recordable Disc (HD DVD-R)
 - Part 1: PHYSICAL SPECIFICATIONS Version 1.1
 - Part 2: FILE SYSTEM SPECIFICATIONS Version 1.1
- 3) DVD Specifications for High Density Recordable Disc for Dual Layer (HD DVD-R for DL)
 - Part 1: PHYSICAL SPECIFICATIONS Version 2.1
 - Part 2: FILE SYSTEM SPECIFICATIONS Version 2.0
- 4) DVD Specifications for High Density Re-recordable Disc (HD DVD-RW)
 - Part 1: PHYSICAL SPECIFICATIONS Version 1.1
 - Part 2: FILE SYSTEM SPECIFICATIONS Version 1.0
- 5) DVD Specifications for High Density Re-recordable Disc for Dual Layer (HD DVD-RW of DL)
 - Part 1: PHYSICAL SPECIFICATIONS Version 2.1
 - Part 2: FILE SYSTEM SPECIFICATIONS Version 2.0

HD DVD-VR Format Video Camcorder shall comply with the following specification:

- 6) DVD Specifications for High Definition VIDEO RECORDING (HD DVD-VR) Version 1.0

4.2.2 Required functions

HD DVD-VR Format Video Camcorder ("the camcorder" in 4.2.2) shall comply with the following functions:

1) Record functions

1-1) General

The camcorder shall have a capability to record the contents described below on at least one of the physical media described in 4.2.1. If the camcorder supports 3) in 4.2.1, 2) in 4.2.1 shall also be supported. If the camcorder supports 5) in 4.2.1, 4) in 4.2.1 shall also be supported. The camcorder is allowed to support only 8 cm discs.

1-2) VOB

The camcorder shall have a capability to record some kind of VOB content specified in DVD Specifications for High Definition VIDEO RECORDING. Especially, the camcorder shall have a capability to generate and record VOB content in compliance to at least one mandatory video codec and at least one mandatory audio codec.*

*: The camcorder does not need to support all kinds of coding parameters e.g. video resolutions, audio bit rates, etc.

2) Playback functions

2-1) General

The camcorder shall have a capability to playback the contents described below on at least one of the physical media described in 4.2.1. If the camcorder supports 3) in 4.2.1, 2) in 4.2.1 shall also be supported. If the camcorder supports 5) in 4.2.1, 4) in 4.2.1 shall also be supported. The camcorder is allowed to support only 8 cm discs.

At least, the camcorder shall have a capability to playback the content recorded by the same camcorder. The contents recorded by other recorders or camcorders may not be played back and may be ignored (e.g. skipped) by the camcorder.

2-2) VOB

The camcorder is not required to playback VOB content specified in DVD Specifications for High Definition VIDEO RECORDING, except the VOB content recorded by the same camcorder.

2-3) SOB

The camcorder is not required to have a capability to playback SOB content of Type A recording mode nor Type B recording mode.

3) Interoperable Content

The camcorder shall have a capability to generate navigation data of Interoperable Content which can be played back by HD DVD-Video players, if any valid VOB compliant to HD DVD-VR specifications exists on the disc.

Note: It is recommended that manufactures of HD DVD-VR Format Video Camcorders confirm all of the latest specifications e.g. HD DVD-Video specifications for Interoperable Content.

4. HD DVD-VR Format Camcorder for HD DVD writable discs

4.2 Requirements of HD DVD-VR Format Video Camcorder

4) Video output

At least one video output is required.

5) Audio output

At least one 2ch stereo audio output is required.

6) Video source

Only integrated video camera is allowed.

7) Content protection

Generally, compliance to content protection system is not required, if the camcorder handles only the contents from video camera.

The following is applied when the camcorder handles any copyright protected content.

Until now, AACS is the only approved content protection method for HD DVD-VR content on the media described in 1.4. Therefore, it is recommended for HD DVD-VR Format Video Camcorder to comply with AACS Specifications.

5. HD DVD-VR Format Camcorder for DVD writable discs

5.1 General Descriptions

This specification covers one category as follows:

- 1) HD DVD-VR Format Video Camcorder

5.2 Requirements of HD DVD-VR Format Video Camcorder

The technical requirements for HD DVD-VR Format Video Camcorder are listed as below. Note that "for DVD writable discs" is assumed in this section, unless otherwise specified.

5.2.1 Specifications

HD DVD-VR Format Video Camcorder shall comply with at least one of the following combinations of specifications:

- 1) DVD Specifications for Rewritable Disc (DVD-RAM)
Part 1: PHYSICAL SPECIFICATIONS Version 2.2
Part 2: FILE SYSTEM SPECIFICATIONS Version 2.0
- 2) DVD Specifications for Recordable Disc for General (DVD-R for General)
Part 1: PHYSICAL SPECIFICATIONS Version 2.1
Part 2: FILE SYSTEM SPECIFICATIONS Version 2.1
- 3) DVD Specifications for Recordable Disc for Dual Layer (DVD-R for DL)
Part 1: PHYSICAL SPECIFICATIONS Version 3.0
Part 2: FILE SYSTEM SPECIFICATIONS Version 3.0
- 4) DVD Specifications for Re-recordable Disc (DVD-RW)
Part 1: PHYSICAL SPECIFICATIONS Version 1.2
Part 2: FILE SYSTEM SPECIFICATIONS Version 1.0
- 5) DVD Specifications for Re-recordable Disc for Dual Layer (DVD-RW for DL)
Part 1: PHYSICAL SPECIFICATIONS Version 2.0
Part 2: FILE SYSTEM SPECIFICATIONS Version 2.0

HD DVD-VR Format Video Camcorder shall comply with the following specification:

- 6) DVD Specifications for High Definition VIDEO RECORDING (HD DVD-VR) Version 1.0

Note that further conditions for Physical specifications e.g. required maximum recording speed (Nx-speed) are described in 6).

5.2.2 Required functions

HD DVD-VR Format Video Camcorder ("the camcorder" in 5.2.2) shall comply with the following functions:

1) Record functions

1-1) General

The camcorder shall have a capability to record the contents described below on at least one of the physical media described in 5.2.1. If the camcorder supports 3) in 5.2.1, 2) in 5.2.1 shall also be supported. If the camcorder supports 5) in 5.2.1, 4) in 5.2.1 shall also be supported. The camcorder is allowed to support only 8 cm discs.

1-2) VOB

The camcorder shall have a capability to record some kind of VOB content specified in DVD Specifications for High Definition VIDEO RECORDING. Especially, the camcorder shall have a capability to generate and record VOB content in compliance to at least one mandatory video codec and at least one mandatory audio codec.*

*: The camcorder does not need to support all kinds of coding parameters e.g. video resolutions, audio bit rates, etc.

2) Playback functions

2-1) General

The camcorder shall have a capability to playback the contents described below on at least one of the physical media described in 5.2.1. If the camcorder supports 3) in 5.2.1, 2) in 5.2.1 shall also be supported. If the camcorder supports 5) in 5.2.1, 4) in 5.2.1 shall also be supported. The camcorder is allowed to support only 8 cm discs.

At least, the camcorder shall have a capability to playback the content recorded by the same camcorder. As long as this condition is satisfied, the camcorder may not have a capability to playback the contents at 3x-speed (i.e. transfer bit rate from disc $V_r = 33.24$ Mbps) or more, from the disc of which the maximum recording speed is 3x or more (or from DVD-RW for DL). The contents recorded by other recorders or camcorders may not be played back and may be ignored (e.g. skipped) by the camcorder.

2-2) VOB

The camcorder is not required to playback VOB content specified in DVD Specifications for High Definition VIDEO RECORDING, except the VOB content recorded by the same camcorder.

2-3) SOB

The camcorder is not required to have a capability to playback SOB content of Type A recording mode nor Type B recording mode.

3) Interoperable Content

The camcorder shall have a capability to generate navigation data of Interoperable Content which can be played back by HD DVD-Video players, if any valid VOB compliant to HD DVD-VR

5. HD DVD-VR Format Camcorder for DVD writable discs

5.2 Requirements of HD DVD-VR Format Video Camcorder

specifications exists on the disc.

Note: It is recommended that manufactures of HD DVD-VR Format Video Camcorders confirm all of the latest specifications e.g. HD DVD-Video specifications for Interoperable Content.

4) Video output

At least one video output is required.

5) Audio output

At least one 2ch stereo audio output is required.

6) Video source

Only integrated video camera is allowed.

7) Content protection

Generally, compliance to content protection system is not required, if the camcorder handles only the contents from video camera.

The following is applied when the camcorder handles any copyright protected content.

Until now, AACSS is the only approved content protection method for HD DVD-VR content on the media described in 1.4. Therefore, it is recommended for HD DVD-VR Format Video Camcorder to comply with AACSS Specifications.

6. Additional Description for products other than related specifications (Informative)

6.1 Logo on HD DVD-VR Products

Logo on HD DVD-VR Format Recorder/Player for HD DVD writable discs: Refer to DVD Logo Manual.

Logo on HD DVD-VR Format Recorder/Player for DVD writable discs: Refer to DVD Logo Manual.

Logo on HD DVD-VR Format Camcorder for HD DVD writable discs: Refer to DVD Logo Manual.

Logo on HD DVD-VR Format Camcorder for DVD writable discs: Refer to DVD Logo Manual.

Note: Please refer to the latest DVD Logo Manual to be issued by DVD FLLC.

The following Technical Coordination Group members of the DVD Forum participated in making this requirement & guideline.

IBM Corporation

LG Electronics Inc.

Microsoft Corporation

NEC Corporation

SANYO Electric Co., Ltd.

Thomson

Toshiba Corporation

Victor Company of Japan, Limited

Walt Disney Pictures and Television

Warner Bros. Entertainment Inc.

HD DVD-VR (Video Recording) Product Requirement & Guideline:

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Version 1.01 — December 2006

Version 1.02 — July 2007

Version 1.03 — August 2007