Technical Information for CE Manufacturers

on Test Signals transmitted on "HD-Test ARD ZDF" - Version 1.0, 17th April 09

1   Introduction

ARD and ZDF are broadcasting a series of test signals for use by CE manufacturers on a temporarily available HDTV Service

Transponder	Astra 19° East, 11.361 GHz, 22 MSym/s, 2/3, DVB-S2, horizontal
Service Name:	HD-Test ARD ZDF
Service Id	11140

The functionality of the tests will be continuously extended over the next months, and will cover areas as video and audio coding formats, teletext and DVB subtitling, synchronisation issues, and dynamic changes of the configuration.

Updated versions of this documentation will become available with further test scenarios. Please check the download URL regularly.

Note: This document only addresses technical information for CE manufacturers. No other information on planned HD services by ARD or ZDF is available through this communication path.

2   Content of the Test Signals

The test signals consists of a continuously repeated loop which is sub-divided into eight phases of each about 24 seconds length. The transitions between individual phases may involve hard switches between audio and video streams as well as dynamically changing PMTs and PIDs, thus leading to visible and intentional artefacts of up to several seconds at the transition points. However, the representation of the test phases itself shall be without artefacts. As an example, figure 1 gives a typical screenshot.

Figure 1: Sample screen shot

A summary of theses phases and their potential use is given in the following paragraphs.

Test phases 4 - 8 represent typical configurations for the planned regular transmissions of HDTV services by ARD and ZDF.

2.1   Video

For most phases, the video signal consists of an HDTV trailer production in the background with the following test patterns in the foreground:

- markers at the corner of the active video in order to identify the overscan applied at the video screen. Five markers are included in steps of 1 % of the picture width and picture height.

- lines in various angles and a zone plate signal in order to roughly evaluate video processing in the receiver and display. The Nyquist frequency of the zone plate signal (i.e. black/white transition within one pixel) is reached at the horizontal and vertical borders of the test area.

- A lip sync test pattern that indicates the time of the audio bursts encoded in the right channels of the audio tracks.

The lip sync test pattern also allows to detect frozen frames during video presentation.

The video encoder is operating in "capped VBR mode" with a maximum bit-rate of 12 Mbit/s.

2.2   Audio

Three audio channels are transmitted in parallel:

- MPEG-1/Layer II: contains a stereo signal with 1 kHz interrupted by 1s of silence on the left channel, and an audio burst of 1.5 kHz and 20 ms length for lip sync tests on the right channel. Bit-rate is adjusted to 192 kbit/s.

- Dolby AC-3, signalled as "German language":   contains a 2.0 signal or a 5.1 signal with 1 kHz interrupted by 1s of 2 kHz on the left channel, and an audio burst of 1.5 kHz and 20 ms length for lip sync tests on the right channel. The bit-rate is adjusted to 256 kbit/s for 2.0 and to 448 kbit/s for 5.1.

- Dolby AC-3, signalled as "Original language":   contains a 2.0 signal or a 5.1 signal with 1 kHz interrupted by 1s 2.5 kHz on the left channel, and an audio burst of 1.5 kHz and 20 ms length for lip sync tests on the right channel. The bit-rate is adjusted to 256 kbit/s for 2.0 and to 448 kbit/s for 5.1.

2.3   Test Phases

2.3.1   Phase 1 (1080i/25 for testing automatic and complete switching to 720p)

The distribution format for HD services of ARD and ZDF is 720p/50. However, the test sequence starts with a phase in 1080i/25 in order to test that the complete receiver infrastructure correctly switches to the 720p/50 mode for the following phases.

The Dolby AC-3 channels operate in 2.0 with a DialNorm level of -31 dB.

Purposes:

- Prepare for tests of automatic video format switching
- Identify overscan for 1080i/25

2.3.2 Phase 2 (720p/50, static GOP structure N24M3)

The video coding format is switched to 720p/50 with a static GOP structure. The Video PID is changed between phases 1 and 2.

The Dolby AC-3 channels operate in 2.0 with a DialNorm level of -31 dB.

Purposes:

- test of automatic video format switching
- identify overscan for 720p/50
- test video decoder with less demanding GOP structure
- test A/V synchronisation with different GOP structures

2.3.3 Phase 3 (720p/50, dynamic and hierarchical GOP structure N96M3)

The video coding format is switched to 720p/50 with a dynamic and hierarchical GOP structure. The Video PID is changed between phases 2 and 3. Due to the long GOP structure, a longer synchronisation time at the start of phase 3 can be expected.

Purposes:

- test video decoder with very demanding GOP structure
- test A/V synchronisation with different GOP structures

2.3.4 Phase 4 (720p/50, dynamic and hierarchical GOP structure N32M3, Dolby 2.0)

The video coding format is switched to 720p/50 with a dynamic and hierarchical GOP structure. The Video PID is changed between phases 3 and 4.

The Dolby AC-3 channels operate in 2.0 with a DialNorm level of -31 dB.

Purposes:

- test video decoder with a typical GOP structure for regular HDTV services
- test A/V synchronisation with different GOP structures
- test MPEG-1/L2 and Dolby AC-3 tracks for identical audio level

2.3.5 Phase 5 (720p/50, dynamic and hierarchical GOP structure N32M3, Dolby 5.1)

The video coding format remains as in phase 4. No video PID changes are applied.

The Dolby AC-3 channels are switched to 5.1 with a DialNorm level of -31 dB.

Purposes:

- test A/V synchronisation for Dolby AC-3 in 5.1 mode
- test dynamic change in audio coding format
- test MPEG-1/L2 and Dolby AC-3 tracks for identical audio level

2.3.6 Phase 6 (720p/50, dynamic and hierarchical GOP structure N32M3, Dolby 5.1)

The video coding format remains as in phases 4 and 5. No video PID changes are applied.

The Dolby AC-3 channels remain in 5.1 mode but with a <u>DialNorm level of -27 dB</u>.

<u>Purposes:</u>

- test MPEG-1/L2 and Dolby AC-3 tracks for different audio level (4 dB less in Dolby channels)

2.3.7 Phase 7 (Grey Picture, 720p/50, dynamic hierarchical GOP N32M3, Dolby 5.1)

The video coding format remains as in phases 4..6. No video PID changes are applied. A grey picture with as little as possible content is encoded in order to test the minimum data rate supported by a receiver. However, the lip sync test signal is still contained in order to identify any frozen video frames. The encoded video bit-rate is in the range of only 300 kbit/s.

The Dolby AC-3 channels remain in 5.1 mode but with a <u>DialNorm level of -23 dB</u>.

<u>Purposes:</u>

- test that the video decoder supports bit-rates down to 300 kbit/s without freezing frames
- test MPEG-1/L2 and Dolby AC-3 tracks for different audio level (8 dB less in Dolby channels)

2.3.8 Phase 8 (Still Picture, 720p/50, dynamic hierarchical GOP N32M3, Dolby 5.1)

The video coding format remains as in phases 4..7. No video PID changes are applied. A still picture with content comparable to simple graphics is encoded. The lip sync test signal is still contained in order to identify any frozen video frames. The encoded video bit-rate is in the range of 1 Mbit/s.

The Dolby AC-3 channels remain in 5.1 mode with a DialNorm level of -23 dB.

<u>Purposes:</u>

- test that the video decoder supports still pictures with bit-rates around 1 Mbit/s without freezing frames
- test MPEG-1/L2 and Dolby AC-3 tracks for different audio level (8 dB less in Dolby channels)

Annex A: Graphical summary of test phases

	Phase	1	2	3	4	5	6	7	8
	PID								
Video	6411		720p/50, static GOP N24M3		720p/50, dyn. hier. GOP N32M3	720p/50, dyn. hier. GOP N32M3	720p/50, dyn. hier. GOP N32M3	720p/50, dyn. hier. GOP N32M3 Grey, 300 kbit/s	720p/50, dyn. hier. GOP N32M3 Still, 1 Mbit/s
Video	6410	1080i/25, static GOP N12M3		720p/50, dynamic, hierarchical GOP N96M3					
Audio MPEG 1/L2	6420	Left: 1 kHz/ silence Right: Lip Sync	- " -	- " -	- " -	- " -	- " -	- " -	- " -
Audio AC-3 "German"	6421	Left: 1 kHz/ 2 kHz Right: Lip Sync 2.0, DialNorm -31 dB	- " – 2.0, DialNorm -31 dB	- " – 2.0, DialNorm -31 dB	- " – 2.0, DialNorm -31 dB	- " – 5.1, DialNorm -31 dB	- " – 5.1, DialNorm -27 dB	- " – 2.0, DialNorm -23 dB	- " – 2.0, DialNorm -23 dB
Audio AC-3 "Original"	6422	Left: 1 kHz/ 2.5 kHz Right: Lip Sync 2.0 DialNorm -31 dB	- " – 2.0, DialNorm -31 dB	- " – 2.0, DialNorm -31 dB	- " – 2.0, DialNorm -31 dB	- " – 5.1, DialNorm -31 dB	- " – 5.1, DialNorm -27 dB	- " – 2.0, DialNorm -23 dB	- " – 2.0, DialNorm -23 dB
Switching of dynamic PMT at start of phase		yes	yes	yes	yes	no	no	no	no

Contact and additional information

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Please understand that only requests from manufacturers can be considered.