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**Chairman of DVB TM-3DTV**

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The background is a dark, deep blue space filled with numerous small, translucent, glowing blue cubes of various sizes. These cubes are scattered throughout the frame, some appearing to float or drift. In the lower right corner, a bright, multi-colored rainbow arc curves upwards, partially obscured by a larger, more prominent glowing blue cube. The overall effect is a sense of depth and digital or technological complexity.

**Draft ETSI TS 101 547 V<1.1.1>**

***Technical Specification***

**Digital Video Broadcasting (DVB);  
Frame Compatible Plano-stereoscopic 3DTV**

# 3D for the home

- **Passive Screens** – a popular choice for commercial environments due to the more cost effective glasses. A wider choice of frames and designs becoming available
- **Active Screens** – a favourite with many PC & TV manufacturers
- **Autostereoscopic** – Quality not there yet however in the short term it will be used for portable hardware...3D Nintendo DS for example

Passive Glasses



Winning in the Cinema

Active

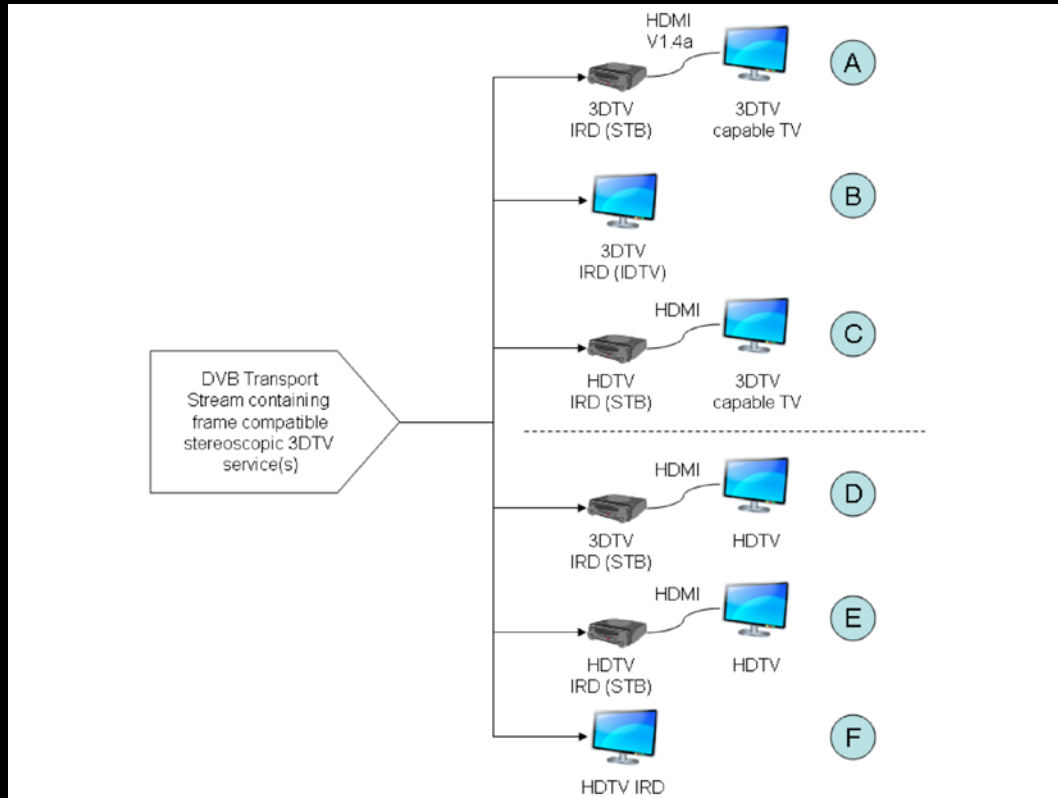


Glasses cost how much...



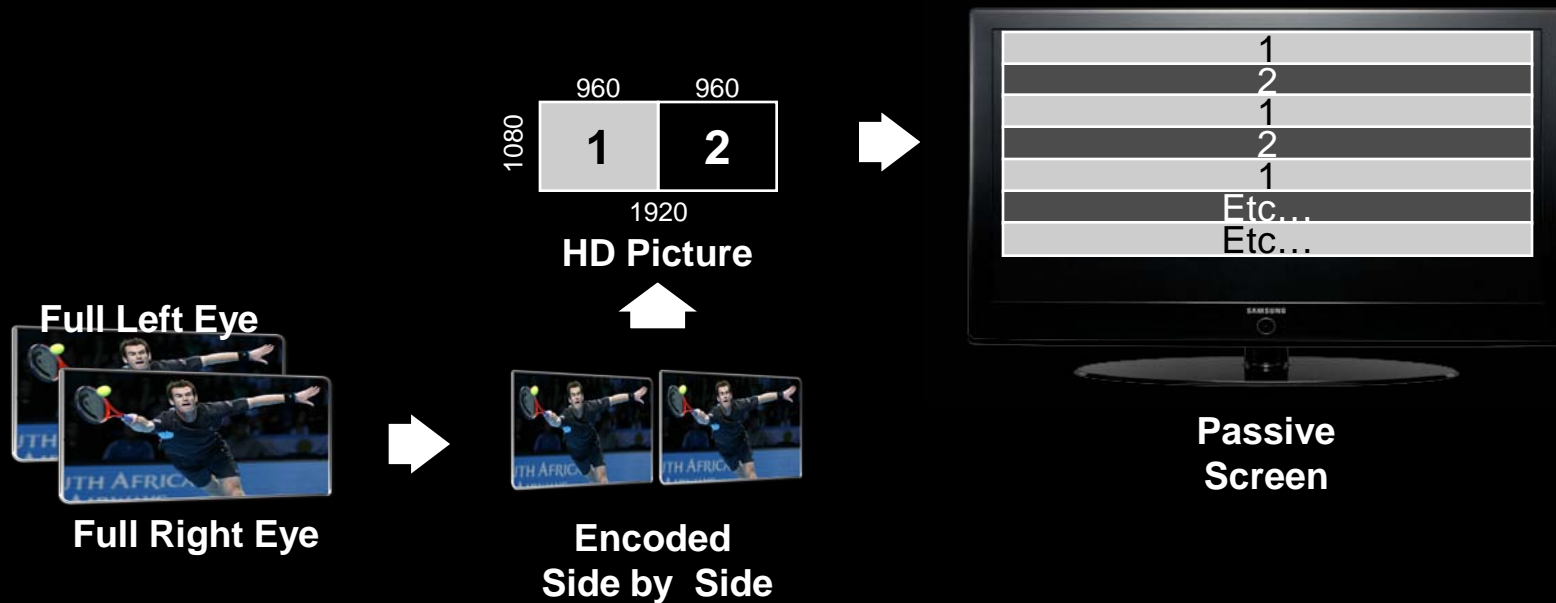
DVB 3DTV is compatible with all the 3D Ready TVs coming to market

# Service Scenarios



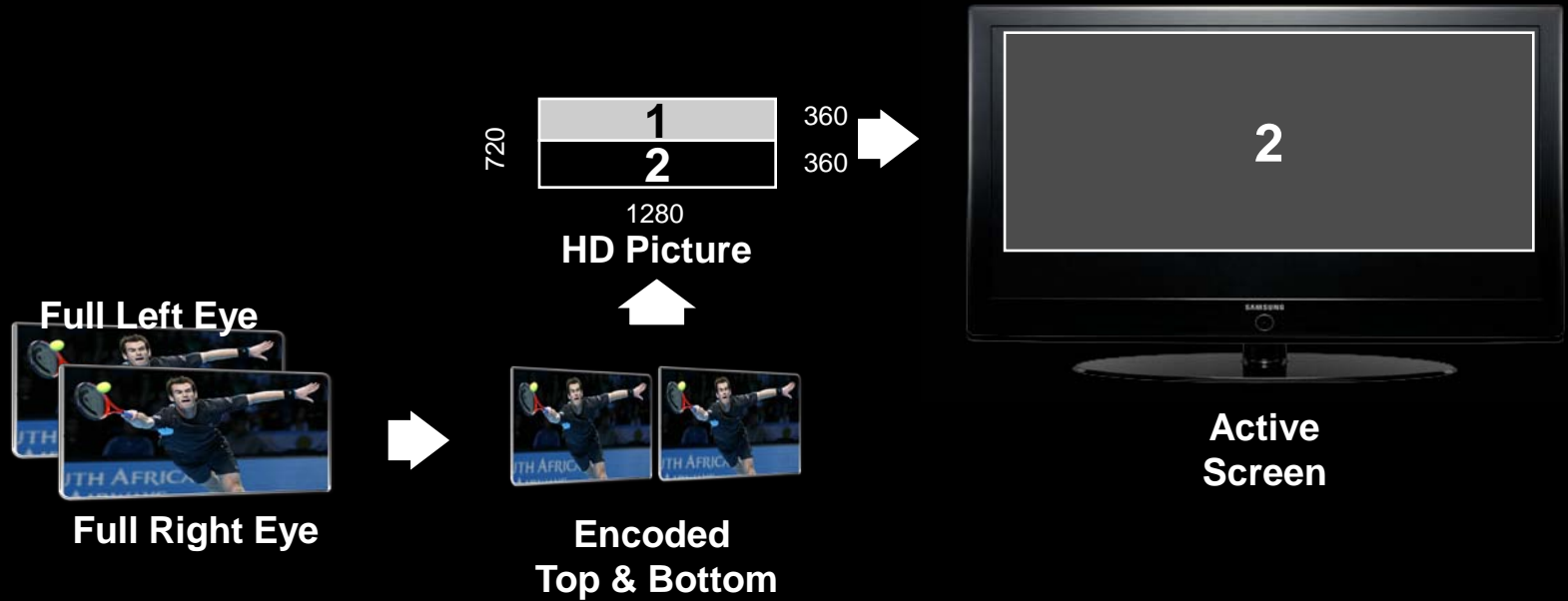
# Keeping it Simple

## DELIVERING SbS 3DTV TO A PASSIVE SCREEN



# Keeping it Simple

## DELIVERING TaB 3DTV TO AN ACTIVE SCREEN



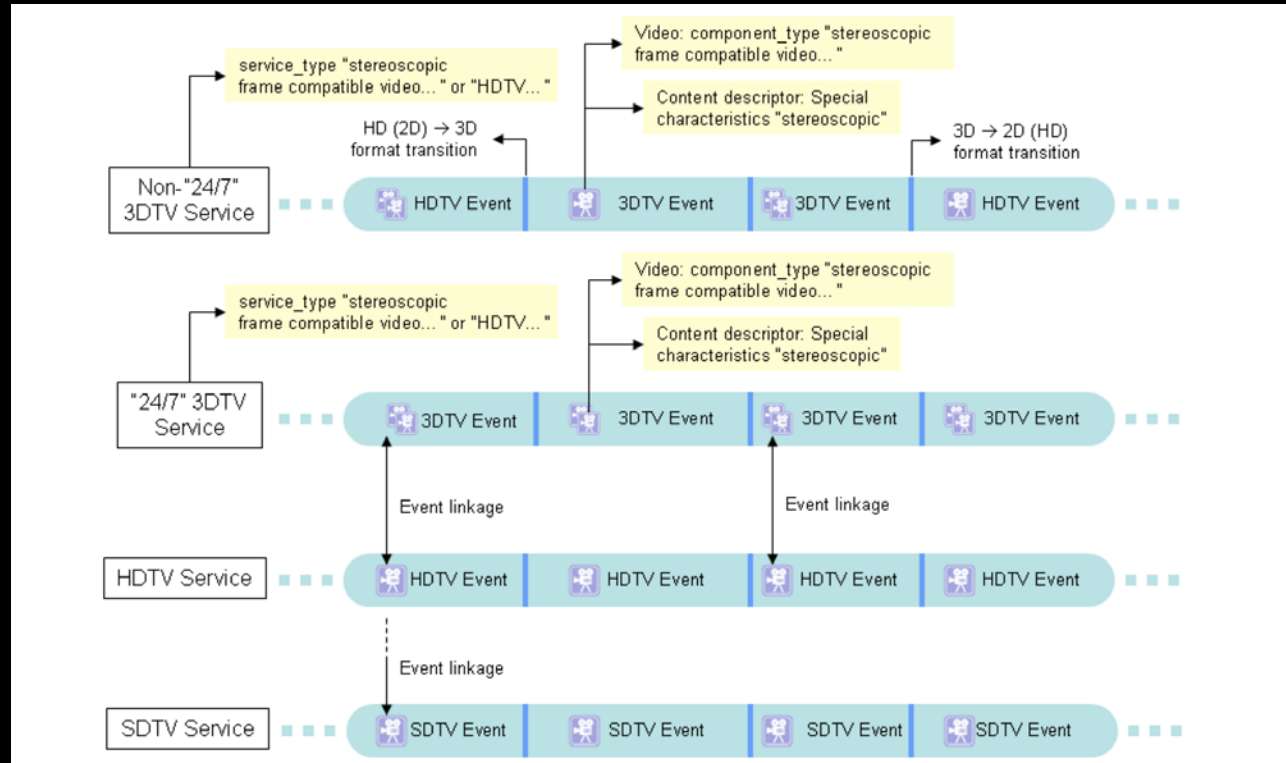
# Everyone, Everywhere

PLATFORM OPERATORS WORLDWIDE ARE NOW LAUNCHING A 3D CHANNEL



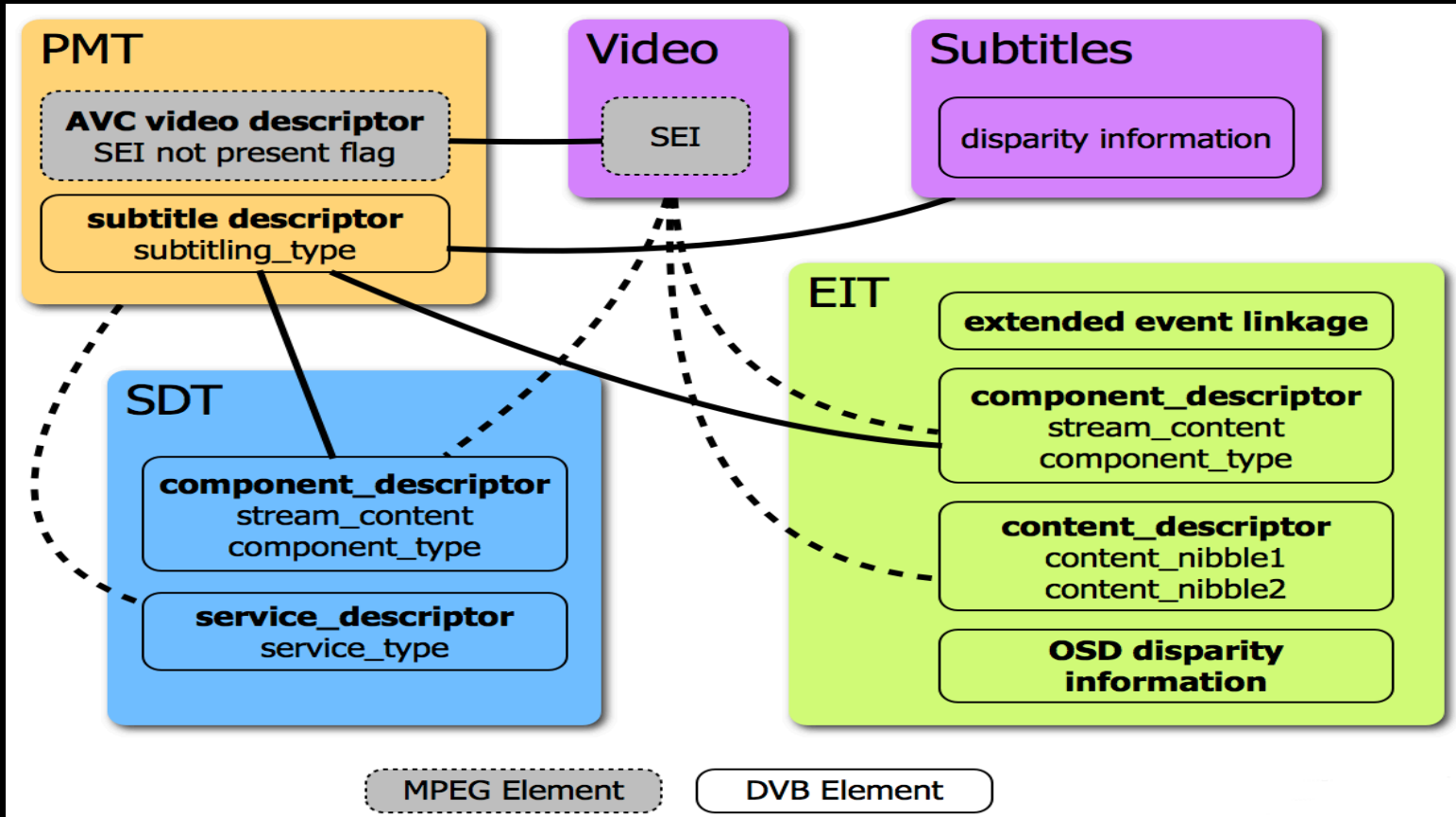


# Service Scenarios

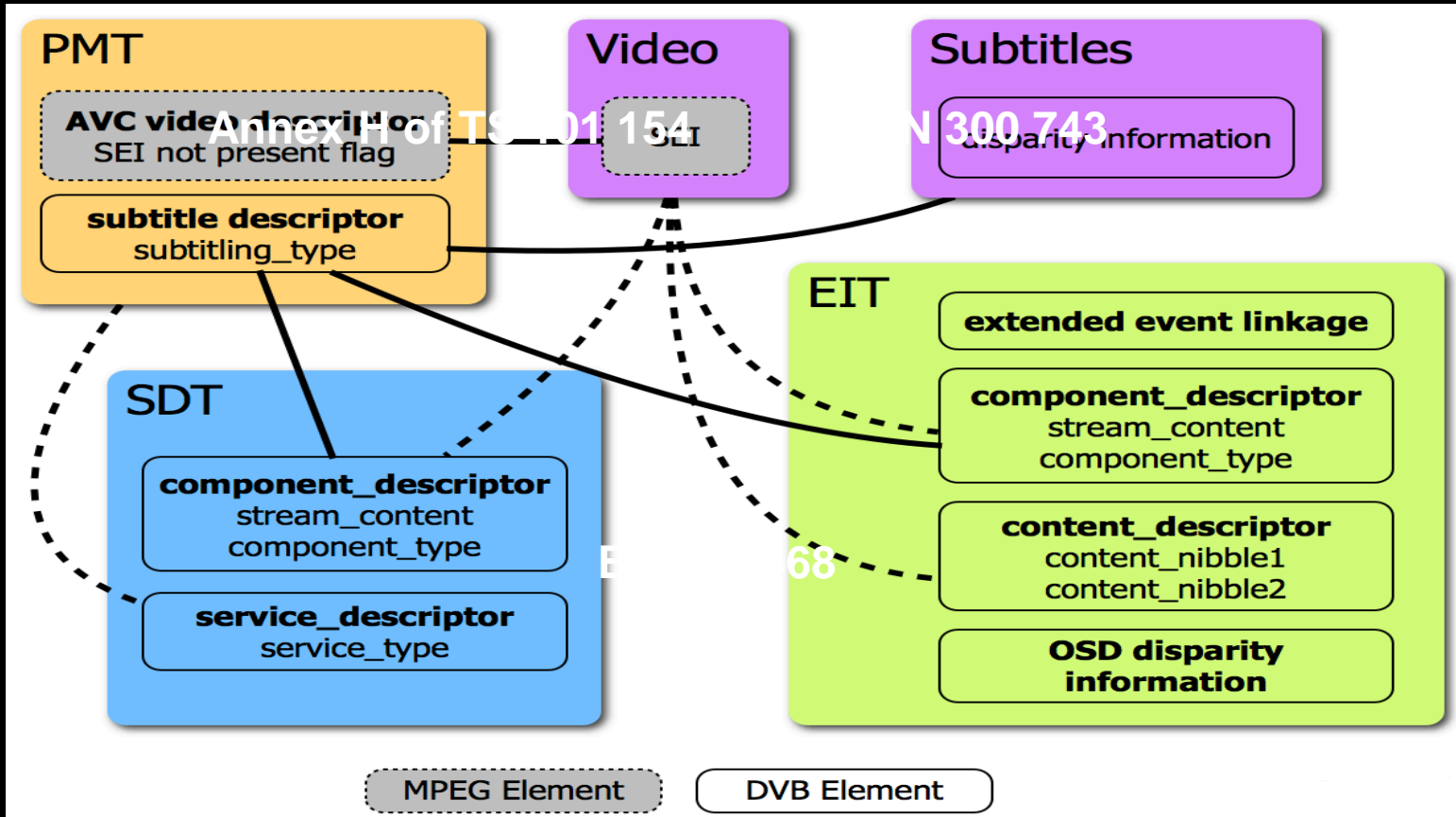




# 3D Signaling Concept



# 3D Signaling Concept



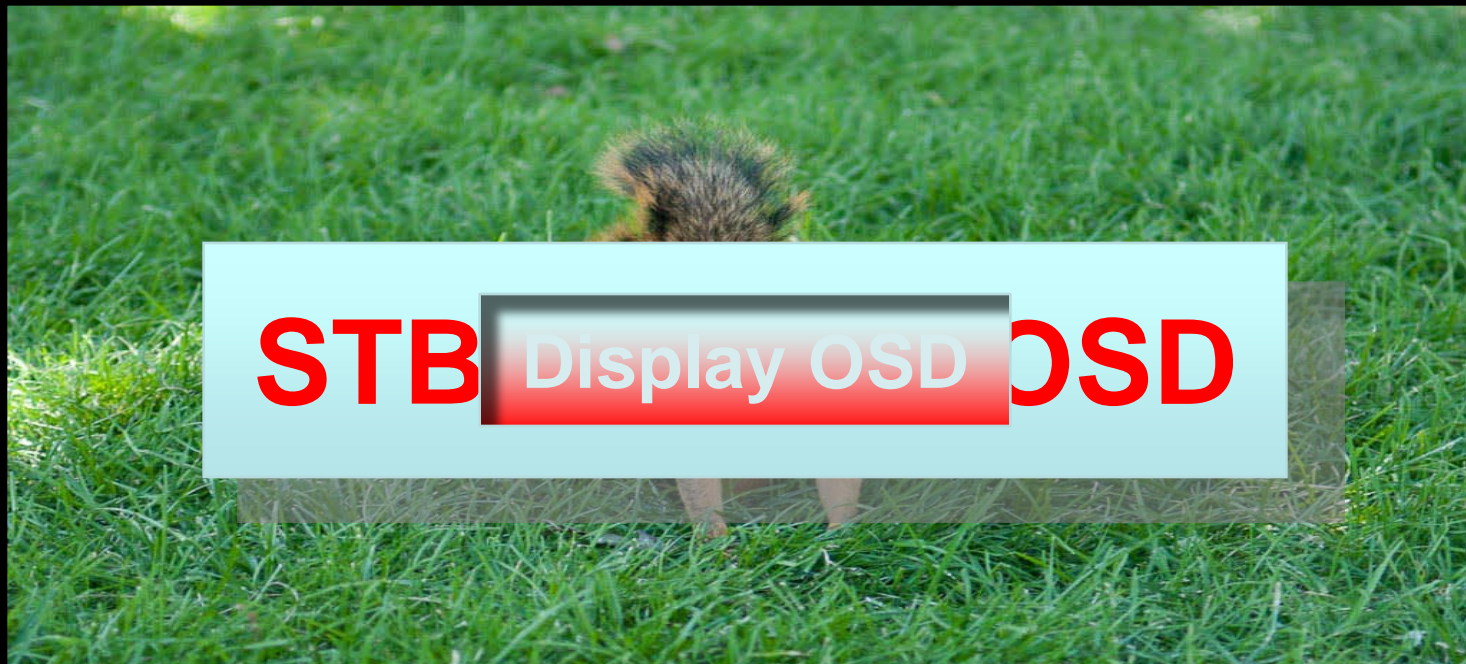
# EN 300 468



# EN 300 468

Service Type  
Component Type  
Content Descriptor  
Linkage Descriptor

# Video Depth Range Descriptor Production Disparity Hint



# Video Depth Range Descriptor Production Disparity Hint





# TS 101 154 Annex H





# Supported 3DTV Formats and Structures

**Table H.1: Frame compatible mandated 3DTV formats/structures**

IRD Class	Output resolution/Format	Frame rate	Frame compatible arrangement type
25 Hz	720p	50 Hz	Top-and-Bottom, Side-by-Side
25 Hz	1080i	25 Hz	Side-by-Side
30 Hz	720p	59,94/60 Hz	Top-and-Bottom, Side-by-Side
30 Hz	1080i	29,97/30 Hz	Side-by-Side
30 Hz	1080p	23,98/24 Hz	Top-and-Bottom, Side-by-Side

# AVC\_video\_descriptor

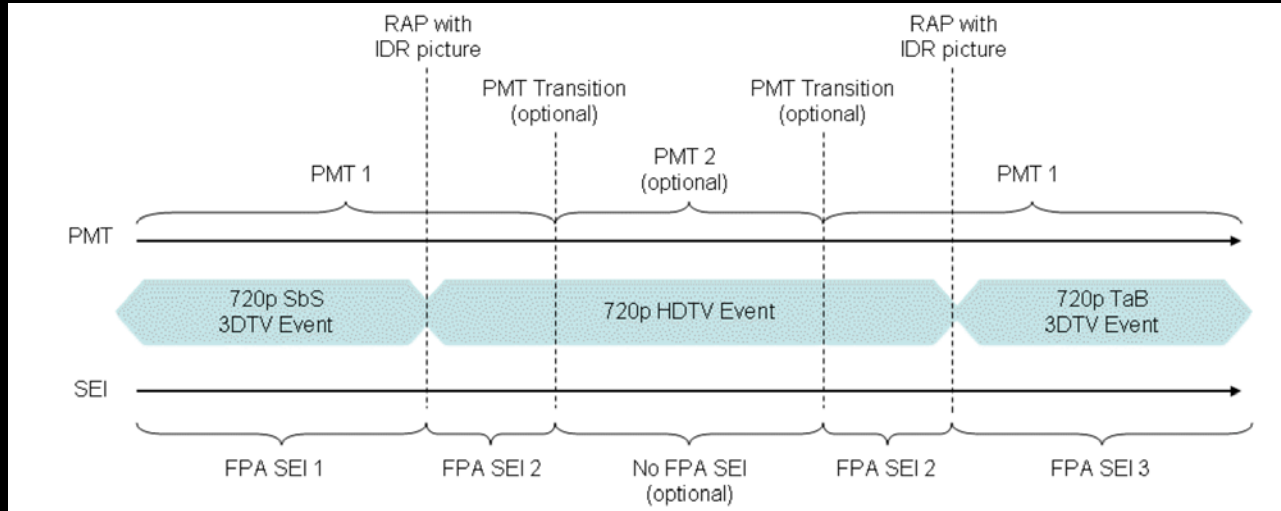
*720p @ 50Hz and 60Hz maybe Side-by-Side (SbS) or Top-and-Bottom (TaB) , 3 or 4*

*1080i @ 25Hz and 30Hz Side-by-Side (SbS), 3 only*

*1080p @ 23,98 / 24 Hz maybe Side-by-Side (SbS) or Top-and-Bottom (TaB) , 3 or 4*

**NOTE 3: The 720p @ 50Hz Side-by-Side format is an optional format for compliance with [HDMI]**

# Generic 3DTV – HDTV Transition



# EN 300 743

## Current DVB delivery of subtitles (EN300 743 v1.3.1)

- uses region-based bit-mapped graphics,
- supports antialiased text, proportional spacing, script and multiple languages etc.,
- supports HD image resolutions (via the DDS) &
- supports multiple regions (typically one per subtitle row)

# EN 300 743

*but*

- regions can't share scan lines &
- there's no means of defining the intended depth.

# EN 300 743



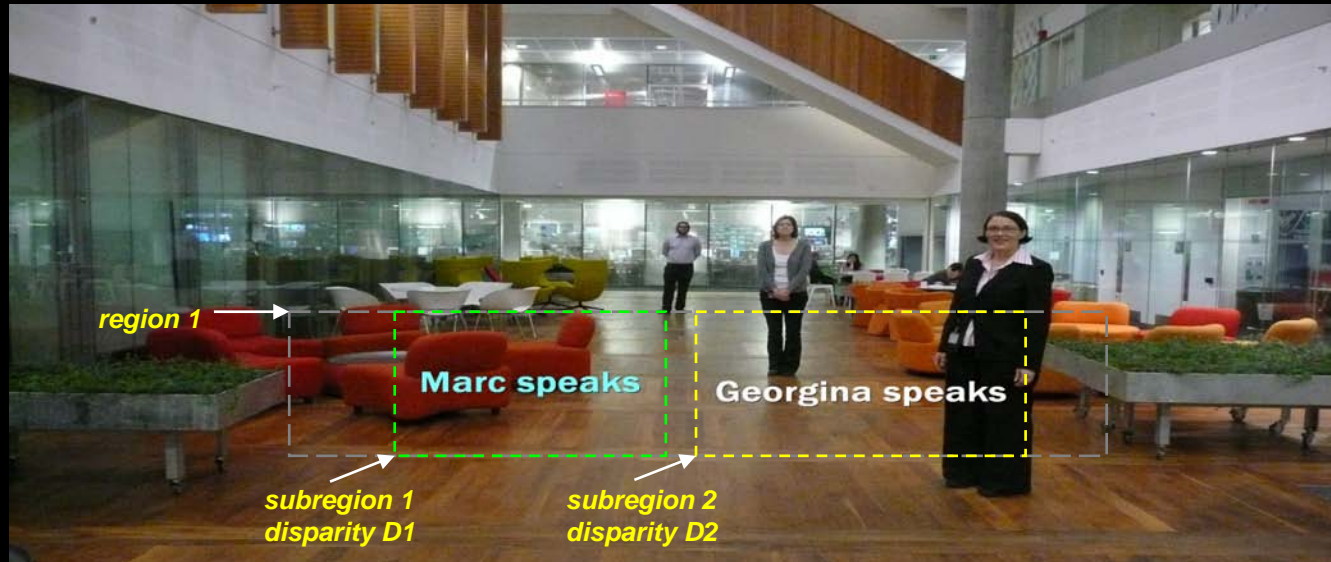
# EN 300 743

**So, we introduced a “subregion” :**

- a subregion is a horizontal division within a declared region
- a subregion has the same height as its associated region
- all objects in a subregion are assigned the same disparity shift value & adjacent subregions can have different disparity shift values.



# EN 300 743



So, what's next.....?

CM 3DTV stuff.....

# Phase 2 DVB 3DTV

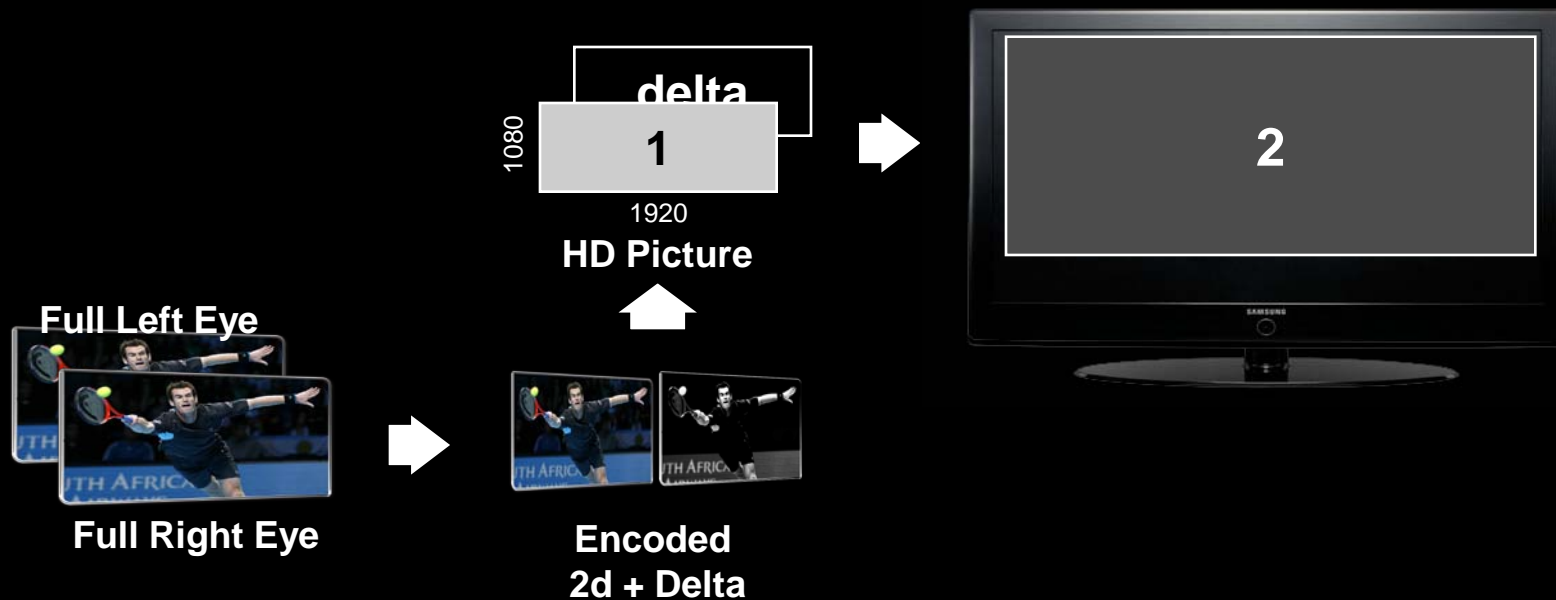
- **Phase 1 and Phase 2 represent two distinct commercial environments, hence two standards.**
- **Main element of Phase 2: An existing HDTV STB is not mandatory – may match needs, amongst others, of broadcasters who do not have an existing population of HDTV STBs that cannot be replaced.**
- **Phase 2 receivers will probably always cope with also Phase 1 broadcasts.**
- **Same displays and HDMI connectors for Phase 1 and Phase 2.**

## Two main options for Phase 2 3DTV

- **Embedded HDTV 2D picture plus a ‘delta’ signal, allows the STB to output L and R HDTV images. Termed ‘Service Compatible’ because 2D STB and 2D displays receive service without need for second channel.**

# Not So Simple

Delivering Service Compatible 3DTV



# MPEG C

**ISO/IEC 23002-3 (MPEG-C) provides a means to pack a depth/disparity map into a video signal. The signal can then be delivered as an Alpha channel in conjunction with the video. The standard was last updated in 2007.**

**Does anyone know of any real world implementations?**

**“This approach appears to be impractical for real-time content (e.g. sports material) due to the difficulty in creating real-time depth maps of any accuracy. Even with hand-crafted non real-time depth maps, the results of MPEG-C that I've seen tended to give a "cardboard cut-out" look and feel, since only 8 bits can be used for the depth information.” Ken McCann**

# MPEG MVC Stereo High Profile

**In 2008, an amendment of the H.264/AVC specification was made to support Multiview Video Coding (MVC). The Amendment made no changes to the lower levels of the H.264/AVC syntax, but some backwards compatible changes were introduced at a higher level, e.g. to specify view dependency. In 2009, MPEG defined the Stereo High Profile, which limited the number of coded views to two, in order to focus on the immediate stereoscopic video applications using a "2D plus difference" approach. Support for interlaced coding tools was included, to increase backwards compatibility with existing 2D content. The Stereo High Profile is used for 3D Blu-ray discs.**

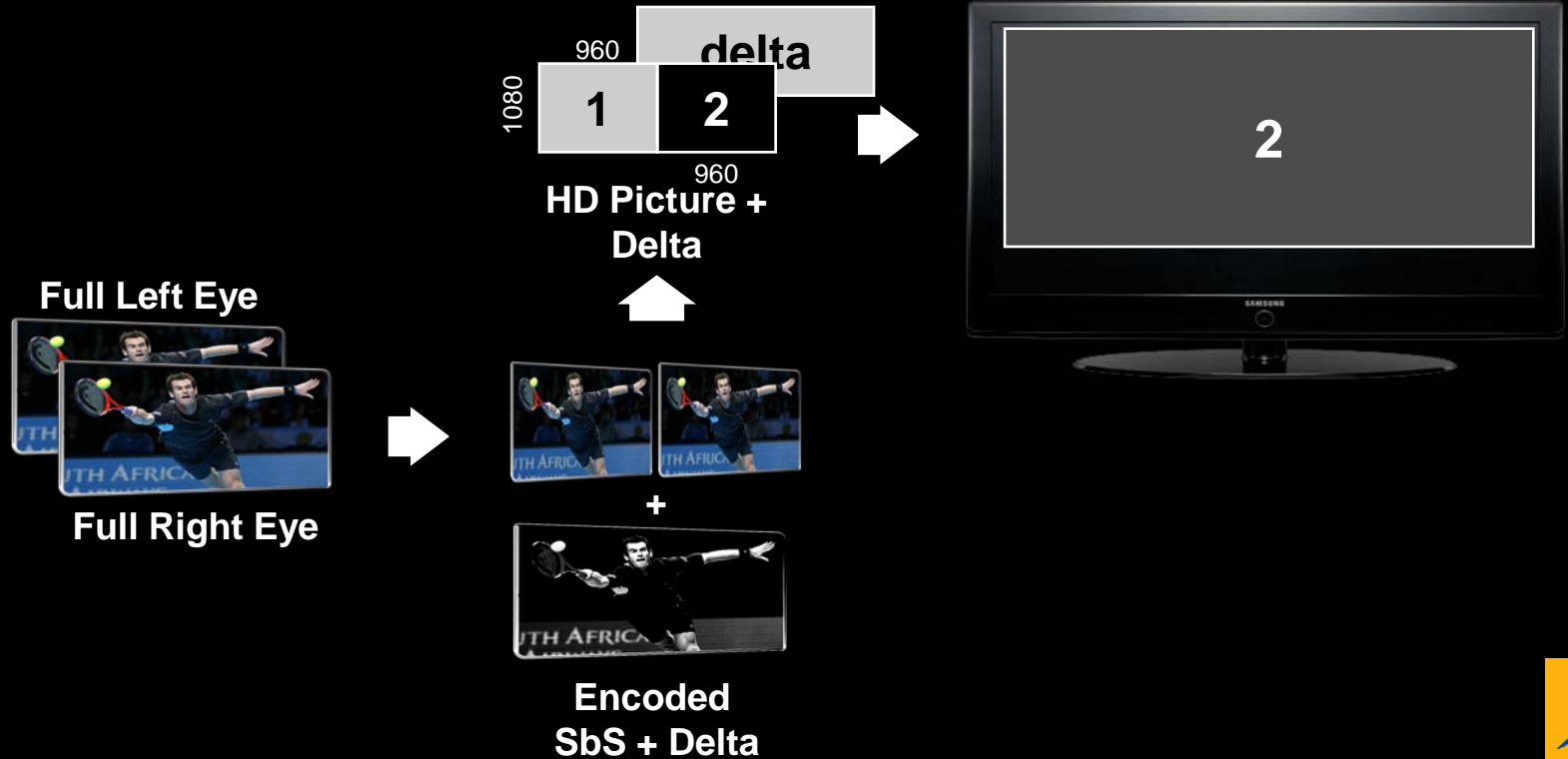


# Two main options for Phase 2 3DTV

- **Embedded 3DTV Phase 1 picture plus a 'delta', allows L and R HDTV images. Termed 'Frame-Compatible (FC) Compatible.**

# Not So Simple

Delivering Frame-Compatible Compatible 3DTV



# MPEG MFC

**An analysis of the results of a Call for Evidence (CfE) for MPEG frame-compatible (MFC) coding is planned for the November MPEG meeting. If evidence is found that there is a significantly better frame-compatible solution than SVC or MVC, then a Call for Proposals (CfP) will be issued. The resultant proposals would probably be evaluated at the April 2012 MPEG meeting. Even if the choice of solution is straightforward, it will be unlikely that the subsequent standardisation process would be complete in less than a year, giving us an MPEG standard that DVB would have to reference around the middle of 2013.**

# MPEG 3DVC

**The Call for Proposals (CfP) for 3D Video Coding (3DVC) technology was finalised in April 2011. 3DVC is intended to both support devices that allow multi-view display (i.e. more than just 2 views) and also enable stereoscopic display devices to cope better with varying display sizes and different viewing preferences. This includes the ability to vary the baseline distance for stereo video and to adjust the depth perception. The evaluation of proposals is planned for the 98th MPEG meeting, in November 2011, with a standard appearing perhaps in early 2014.**

# Phase 3 3DTV ?

- **MPEG HEVC**
- .....  
.....
- ....



# Thank You!



- <http://www.advanced-television.com/index.php/2011/10/03/bbc-backs-3d-tv/>
- <http://www.dvd-intelligence.com/display-article.php?article=1575>





<http://www.sky.com/sky3d>

