

H2B2VS

D3.2.2

Integration Report – Step1

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1 EXECUTIVE SUMMARY

The H2B2VS demonstrators will be developed in order to test and evaluate the whole HEVC hybrid distribution system of H2B2VS project. The integration of all the building blocks will be done in regular steps (~ every 6 months).

The deliverable D3.2.2 Integration Report – Step1 presents the results of the first step of tests described in the deliverable D3.2.1 Integration Plan.

Four demonstrators have been described by the H2B2VS partners:

- The French demonstrator implements end-to-end content delivery through broadcast DVB-T2 network. It will use the DVB-T2 ImaginLab demonstrator from the "Pôle Images & Réseaux". In this demonstrator, the content which is live-captured or stored off-line video, is encoded in HEVC and delivered to the DVB-T2 gateway. The DVB-T2 gateway encapsulates the multiplex into DVB-T2 MI stream, providing signalization, transmission and synchronisation parameters to DVB-T2 modulators. The DVB-T2 MI stream is then transmitted and received by DVB-T2 receivers. The HEVC transport stream is then sent to the HEVC decoder and played in the GPAC player. In the first step, the broadband network will not be implemented.
- The Finnish demonstrator implements end-to-end content delivery through multiple physical channels to devices capable of receiving broadcast (DVB-C) and broadband (ADSL, 3G/4G, WLAN) transmissions. The content is live-captured or stored off-line video that is combined with supplementary value-adding personalized information. This framework allows applications using TV interactively with a feedback channel, mobile devices used as a second screen to a TV, mobile TV and IP-based Over-the-Top (OTT) services over cable networks
- The Spanish demonstrator implements the basic functionality of sending and decoding an HEVC file through satellite DVB-S2 broadcast network. The HEVC encoded video file will be inserted in a carousel type in an MPEG2-TS transport of the satellite Head-End and will be broadcasted over satellite. The broadcasted channel will be received in a Satellite decoder with IP output and will be sent to the GPAC player with the HEVC decoder to play the content. In the first step, the broadband network will not be implemented.
- The Turkish demonstrator implements a broadcast (satellite) and broadband transmission of HEVC encoded video content to STB and mobile terminals. In the first integration step hybrid reception won't be enabled, hence STB will receive broadcast content while mobile terminals receive broadband content.

For each demonstrator, the results of the tests have been given for the following integration phases:

- Pre-integration of components: Integration tests carried out in partners' premises in order to check the interoperability between neighbour components.
- Stand-alone Installation and Test of components: Stand-alone installation of components corresponds to the first "On site" work where each partner shall install and check the behaviour of its own equipment or software.
- First-Integration phase: In this first integration phase, pieces of equipment are tested independently from the networks in order to solve more easily further problems when the equipment will be connected to the Broadcast & Broadband networks. To do the tests, the networks are emulated in a very basic way.
- Second-Integration phase: "On site" final integration where the whole end to end demonstrator is validated and delivered.

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2 DOCUMENT HISTORY AND ABBREVIATIONS

2.1 Document history

Version	Date	Description of the modifications
0.1	20/03/14	1 st draft with Table of content and explanations on the integration methodology
0.2	01/04/14	TVN contribution to Terrestrial French Demonstrator
0.3	10/04/14	Neusoft and TDF contributions
0.4	14/04/14	ALU and Argela contributions
0.6	17/04/14	Argela contributions & review
1.0	18/04/14	Corrections after review

2.2 Abbreviations

ADSL	Asymmetric Digital Subscriber Line
AVC	Advanced Video Coding
CDN	Content Delivery Network
C/N	Carrier to Noise ratio
DASH	Dynamic Adaptive Streaming over HTTP
DSL	Digital Subscriber Line
DVB	Digital Video Broadcasting
DVB-C	Digital Video Broadcasting baseline system for digital cable television
DVB-T2	Digital Video Broadcasting baseline system for terrestrial television T2
ETR	ETSI Technical Report
ETSI	European Telecommunications Standards Institute
FI	First Integration
GPAC	Open Source multimedia framework
HEVC	High Efficiency Video Coding
HLS	HTTP Live Streaming
HPA	High Power Amplifier
HTTP	Hypertext Transfer Protocol
IT	Integration Tests
LNB	Low Noise Block
MFN	Multi-Frequency Network
MI	Modulator Interface
MPD	Media Presentation Description
MPEG	Moving Picture Experts Group
OTT	Over The Top
PI	Pre-Integration
PLP	Physical Layer Pipes
RF	Radio frequency

SFN	Single-Frequency Network
SI	Second Integration
SNMP	Simple Network Management Protocol
STB	Set Top Box
SW	SoftWare
TS	Transport Stream
URL	Uniform Resource Locator
VBR	Variable Bit Rate
WLAN	Wireless Local Area Network
WVGA	Wide Video Graphics Array
YUV	Y : Luma, UV : Chrominance

3 INTRODUCTION

Four demonstrators are planned as depicted by Figure 1.

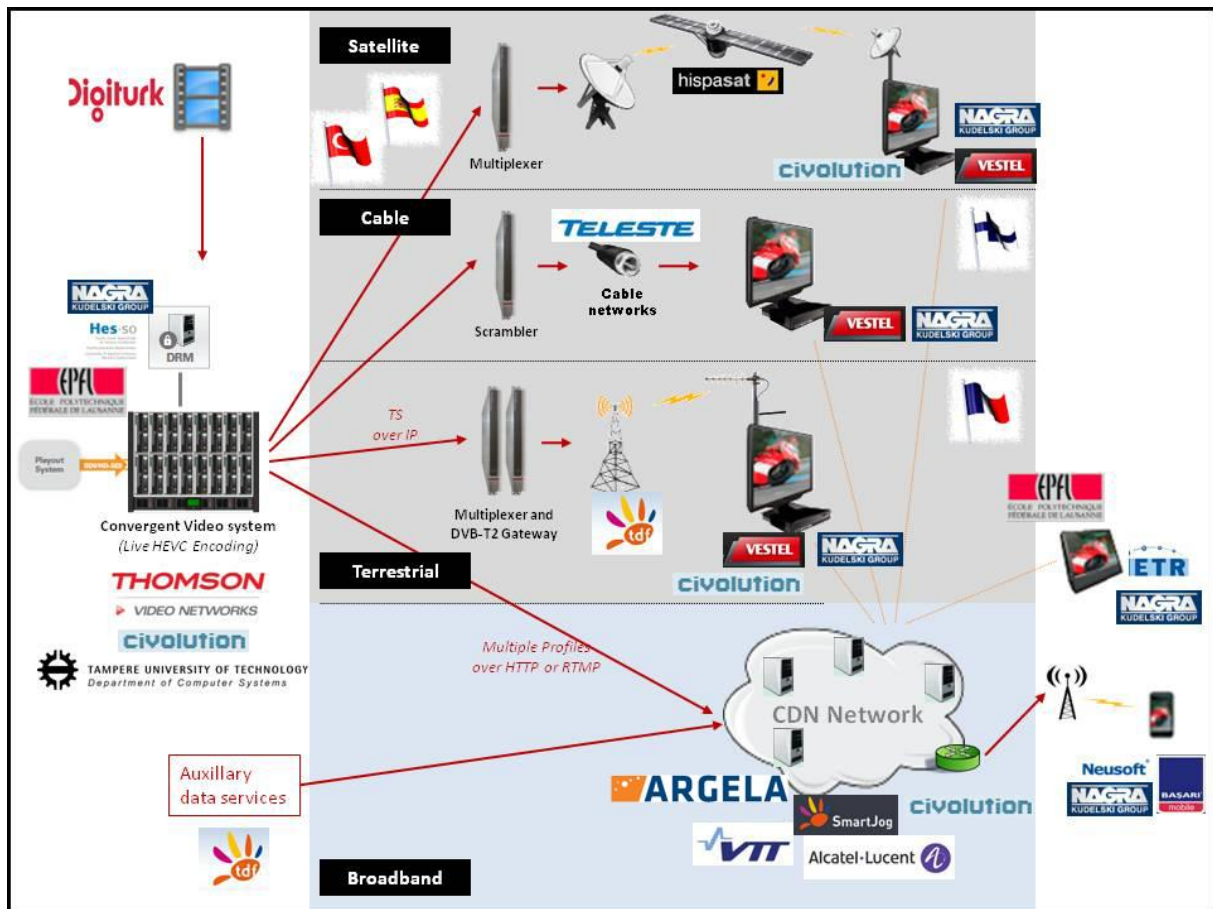


Figure 1 – H2B2VS demonstrators

4 TERRESTRIAL FRENCH DEMONSTRATOR, 1ST INTEGRATION STEP

The 1st step French terrestrial demonstrator is depicted in Figure 2.

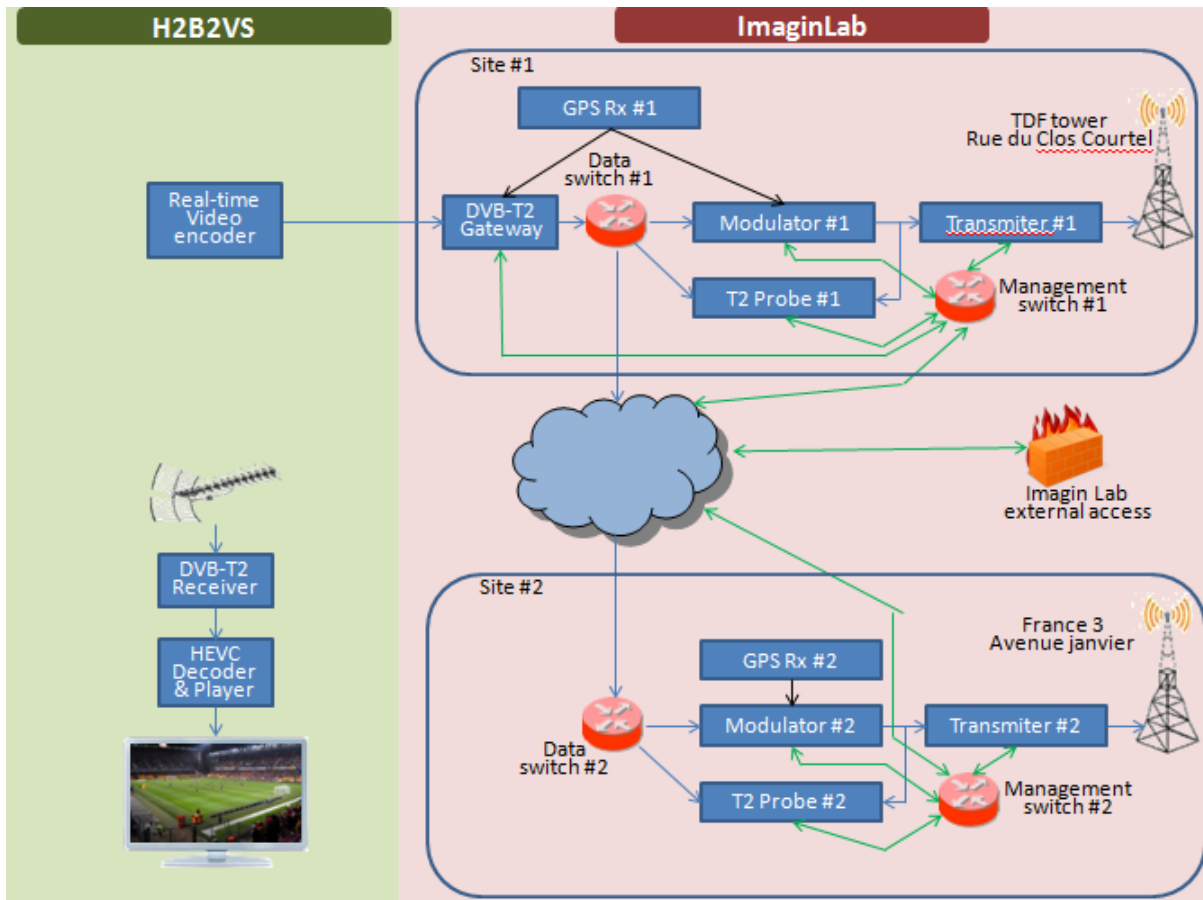


Figure 2 – French terrestrial demonstrator (1st step)

4.1 Terrestrial demonstrator integration phases

4.1.1 Pre-Integration phase

The following table describes all the tests that have been done by partners at their premises.

Test number	Name and Description	Partner in charge of the test	Test result (OK/KO)	Comments
PI-1	<u>Live stream transcoding</u> Input : AVC 576i VBR – Output HEVC : 720 p 25 Player-Decoder GPAC + HEVC analyser	TVN + IETR	OK	
PI-2	<u>Live stream transcoding</u> Input : AVC 1080i50 VBR – Output HEVC : 720 p 25 Player- Decoder GPAC + HEVC analyser	TVN + IETR	OK	
PI-3	<u>4K files encoding – 4K p 25</u> Input : YUV file – Output HEVC : 4K p 25 Player- Decoder GPAC + HEVC analyser	TVN + IETR	OK	
PI-4	<u>HEVC DVB-T2 multiplex</u> Check the T2MI output with an analyser at DVB-T2 gateway output Input : TS over IP with H265 video Output : TS T2MI	TVN	OK	
PI-5	<u>Live stream –Encoding & Multiplexing & Decoding</u> Input : AVC 1080i50 VBR – Output HEVC : 720 p 25 AVC @ 5 – 11 Mbps DVB-T2 multiplex and reception Player- Decoder GPAC + HEVC analyser	TVN + IETR	OK	
PI-6	<u>Offline stream –Encoding & Multiplexing & Decoding</u> Input : YUV file – Output HEVC : 4K DVB-T2 multiplex and reception Player- Decoder GPAC + HEVC analyser	TVN + IETR	OK	
PI-7	<u>RF reception</u>	Site of		

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	Define validation and demonstration room and RF reception quality.	partner		
PI-8	DVB-T2 parameters Verify DVB-T2 parameters is working in lab	TDF	OK	
PI-9	Verify Netproc Remux and DVB-T2 gateway parameters in lab	TVN	OK	
PI-10	Verify with file player that H2B2VS content is interoperable with Remux and DVB-T2 gateway parameters on ImaginLab	TVN	OK	

Table 1. Terrestrial demonstrator - Pre-Integration phase tests

4.1.2 Stand-alone Installation phase

The following table describes all the tests that have been done by partners when they install their equipment on-site.

Test number	Name and Description	Partner in charge of the test	Test result (OK/KO)	Comments
IT-1	4K files encoding – 4K p 25 Input : YUV file – Output HEVC : 720 p 25 Player-Decoder GPAC + HEVC analyser	TVN + IETR	OK	
IT-2	RF reception Verify UHF antenna reception quality on channel 43 or install UHF antenna reception	TDF	OK	
IT-3	DVB-T2 parameters Verify selected DVB-T2 parameters are working on ImaginLab platform.	TDF	OK	
IT-4	MPEG-TS and T2-MI Multiplexes Verify Remux and DVB-T2 gateway parameters on ImaginLab	TDF	OK	

Table 2. Terrestrial demonstrator - Stand-alone Installation phase tests

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4.1.3 First Integration phase

The following table describes all the tests that have been done by partners to check that their equipment is working correctly on-site, independently from the networks.

Test number	Name and Description	Partner in charge of the test	Test result (OK/KO)	Comments
FI-1	<u>Live stream transcoding</u> Input : AVC 576i VBR – Output HEVC : 720 p 25 Player-Decoder GPAC + HEVC analyser	TVN + IETR	OK	
FI-2	<u>Live stream transcoding</u> Input : AVC 1080i50 VBR – Output HEVC : 720 p 25 Player- Decoder GPAC + HEVC analyser	TVN + IETR	OK	
FI-3	<u>4K files encoding – 4K p 25</u> Input : YUV file – Output HEVC : 4K p 25 Player- Decoder GPAC + HEVC analyser	TVN + IETR	OK	
FI-4	<u>HEVC DVB-T2 multiplex</u> Check the T2MI output with an analyser at DVB-T2 gateway output Input : TS over IP with H265 video Output : TS T2MI	TVN	OK	
FI-5	<u>Broadcast emulator chain operable</u> Verify with file player that MPEG Test file content is broadcasted and received correctly through broadcast chain. No ETR 101 290 priority 1 and priority 2 errors in normal conditions.	TDF	OK	
FI-6	<u>Broadcast receiver is OK</u> Verify with file player that H2B2VS Test file content is broadcasted and received correctly through broadcast chain by H2B2VS receiver.	TDF	OK	
FI-7	<u>Baseband functional chain is OK</u> Connect external signal source (Encoder, Streamer...) to	TDF	OK	

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	emulator chain and store the output of re-multiplexer in Baseband signal. Stream the stored baseband signal to receiver on baseband interface (IP?) and check receiver application.			
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Table 3. Terrestrial demonstrator - First Integration phase tests

4.1.4 Second Integration phase

The following table describes all the tests that have been done by partners to check that their equipment is working correctly on-site when connected to the network.

Test number	Name and Description	Partner in charge of the test	Test result (OK/KO)	Comments
SI-1	<u>ImaginLab reception is OK</u> Verify with the file player that MPEG Test file content is broadcasted and received correctly through the broadcast chain. No ETR 101 290 priority 1 and priority 2 errors in normal conditions.	TVN + TDF	OK	
SI-2	<u>Baseband functional chain is OK</u> Connect external signal source (Encoder, Streamer...) to the ImaginLab chain and store the output of remultiplexer in Baseband signal. Stream the stored baseband signal to receiver on baseband interface (IP?) and check receiver application.	TVN + TDF	OK	
SI-3	<u>Full H2B2VS-ImaginLab chain is OK</u> Connect external signal source (Encoder, Streamer...) and receiver to the ImaginLab chain (output of modulator) and check if the application is working.	TVN + IETR + TDF	OK	

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SI-4	<u>H2B2VS On-Air signal</u> Connect the receiver chain to the RF antenna demo site and check if the application is OK	TVN + IETR + TDF	OK	
SI-5	<u>Live stream –Encoding & Multiplexing & Decoding</u> Input : AVC 1080i50 VBR – Output HEVC : 720 p 25 AVC @ 5 – 11 Mbps DVB-T2 multiplex and reception Player- Decoder GPAC + HEVC analyser	TVN + IETR + TDF	OK	
SI-6	<u>Offline stream –Encoding & Multiplexing & Decoding</u> Input : YUV file – Output HEVC : 4K DVB-T2 multiplex and reception Player- Decoder GPAC + HEVC analyser	TVN + IETR + TDF	OK	

Table 4. Terrestrial demonstrator - Second Integration phase tests

5 FINNISH CABLE DEMONSTRATOR, 1ST INTEGRATION STEP

The Finnish cable demonstrator is depicted in Figure 3.

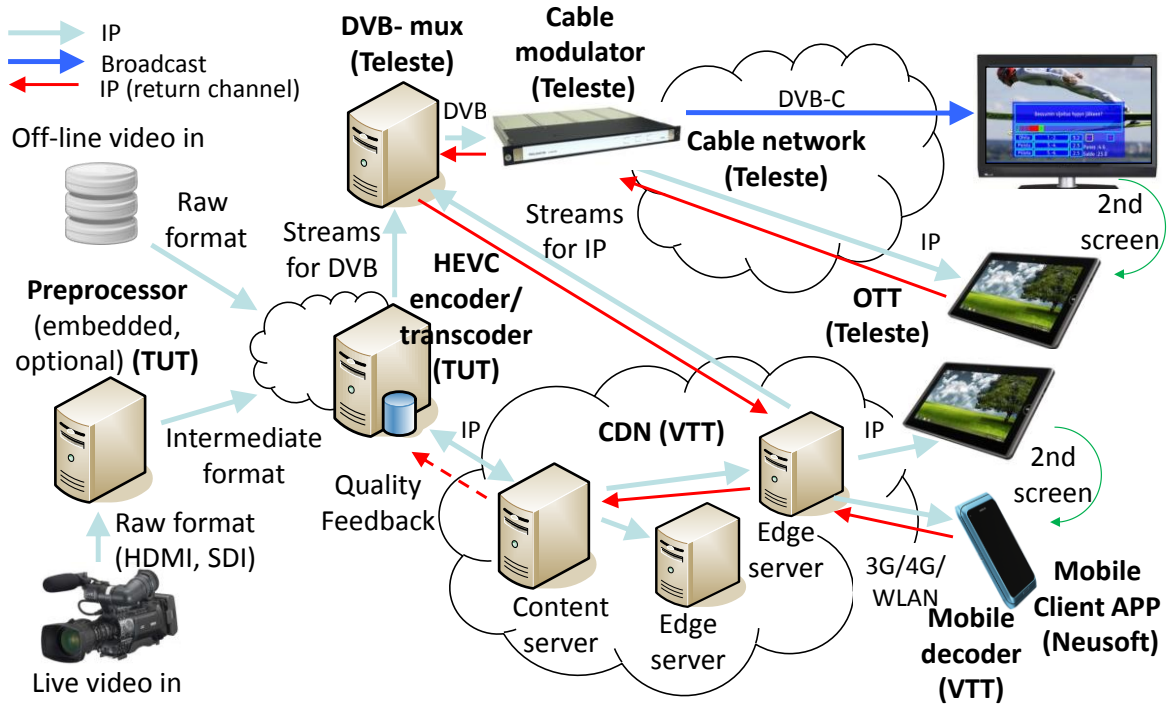


Figure 3 – Finnish cable demonstrator (1st step)

5.1 Cable demonstrator integration phases

5.1.1 Pre-Integration phase

The following table describes all the tests that have been done by partners at their premises.

Test number	Name and Description	Partner in charge of the test	Test result (OK/KO)	Comments
PI-1	2nd screen application with static data: Client plays static videos	Neusoft	OK	
PI-2	2nd screen application remote wake-up	Neusoft	OK	

Table 5. Cable demonstrator - Pre-Integration phase tests

5.1.2 Stand-alone Installation phase

The following table describes all the tests that have been done by partners when they install their equipment on-site.

Test number	Name and Description	Partner in charge of the test	Test result (OK/KO)	Comments
IT-1	2nd screen application wake-up from content server	Neusoft	OK	
IT-2	2nd screen application remote wake-up	Neusoft	OK	

Table 6. Cable demonstrator - Stand-alone Installation phase tests

5.1.3 First Integration phase

Emulators can't be used in the Finnish demonstrator. Therefore there is no need to define test cases for this phase

5.1.4 Second Integration phase

The following table describes all the tests to be done by partners to check that their equipment is working correctly on-site when connected to the network.

Test number	Name and Description	Partner in charge of the test	Test result (OK/KO)	Comments
SI-1	2nd screen application with static data: Client plays static videos	Neusoft	OK	
SI-2	2nd screen application remote wake-up	Neusoft	OK	

Table 7. Cable demonstrator - Second Integration phase tests

6 SPANISH SATELLITE DEMONSTRATOR, 1ST INTEGRATION STEP

The 1st step Spanish satellite demonstrator is depicted in Figure 4.

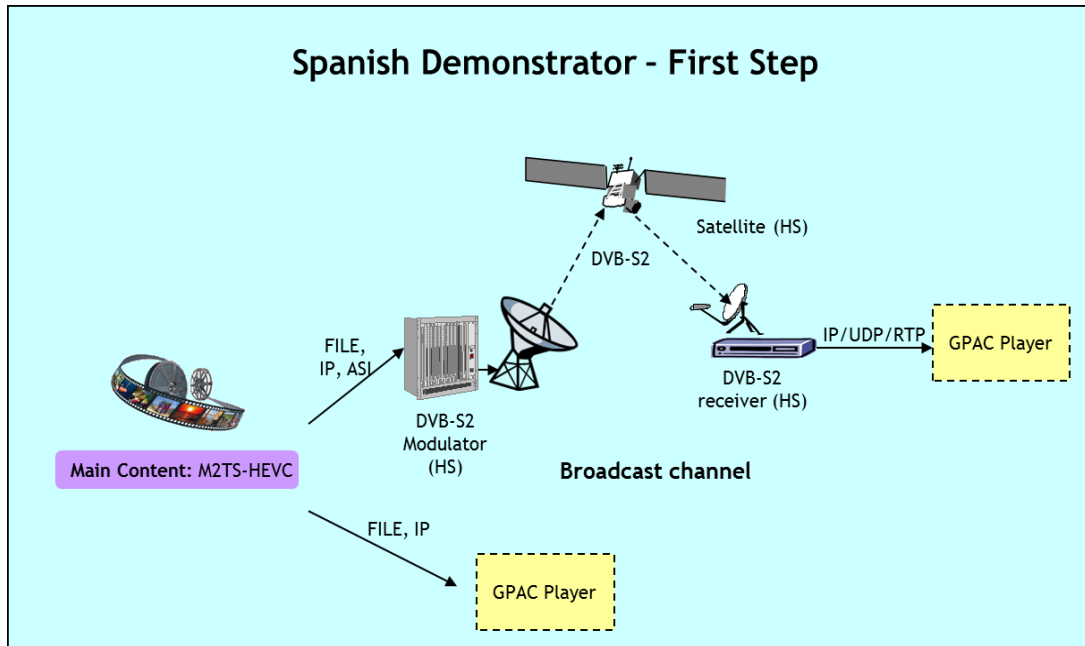


Figure 4 – Spanish satellite demonstrator (1st step)

6.1 Spanish Satellite demonstrator integration phases

6.1.1 Pre-Integration phase

The following table describes all the tests that have been done by partners at their premises.

Test number	Name and Description	Partner in charge of the test	Test result (OK/KO)	Comments
PI-1	<u>Analysis of streams</u> Analyse off-line streams provided by Thomson and TUT with SW analysers to check its basic characteristics. Select most suitable streams.	ALU+UPM	OK	Streams with little camera movement are preferred because of frame rate limitations.
PI-2	<u>Installation of GPAC</u> Installation and configuration of the GPAC player with the HEVC decoder	HS+ALU+UPM	OK	
PI-3	<u>GPAC + HEVC validation</u> Reproduce the files locally using the GPAC player with the HEVC decoder	HS+ALU+UPM	Partially OK	GPAC reproduces HEVC content but is not stable.
PI-4	<u>Play the content from an IP channel</u> Using a video server the file is sent over IP and sent to the GPAC player.	HS+ALU+UPM	Partially OK	GPAC reproduces HEVC content but is not stable.
PI-5	<u>Broadcast the content by Satellite</u> Install the contents in the Satellite headend and configure the up-link in DVB-S2 mode providing the link parameters to other partners	HS	OK	
PI-6	<u>RF Reception</u> Check that the satellite link is OK.	HS	OK	
PI-7	<u>DVB-S2 Parameters</u> Verify that DVB-S2 parameters are correctly set and received.	HS	OK	
PI-8	<u>Play the content from Satellite</u> Using the GPAC player with the HEVC decoder and using	HS+ALU+UPM	Partially OK	GPAC reproduces HEVC content but is not stable.

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	the IP input reproduce the content received from satellite.			
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Table 8. Spanish satellite demonstrator - Pre-Integration phase tests

6.1.2 Stand-alone Installation phase

The following table describes all the tests that have been done by partners when they install their equipment on-site.

Test number	Name and Description	Partner in charge of the test	Test result (OK/KO)	Comments
IT-1	<u>Satellite signal reception</u> Verify the satellite signal availability, strength and quality	HS	OK	
IT-2	<u>DVB-S2 parameters</u> Verify that DVB-S2 parameters are correctly set and received.	HS	OK	
IT-3	<u>GPAC validation</u> Verify GPAC player with the HEVC decoder is working properly by reproducing the content locally.	HS+ALU+UPM	Partially OK	GPAC reproduces HEVC content but is not stable.

Table 9. Spanish satellite demonstrator - Stand-alone Installation phase tests

6.1.3 First Integration phase

The following table describes all the tests that have been done by partners to check that their equipment is working correctly on-site, independently from the networks.

Test number	Name and Description	Partner in charge of the test	Test result (OK/KO)	Comments
FI-1	<u>Satellite link emulator</u> Using a video server the file is sent over IP to the GPAC player.	HS+ALU+UPM	OK	

Table 10. Spanish satellite demonstrator - First Integration phase tests

6.1.4 Second Integration phase

The following table describes all the tests that have been done by partners to check that their equipment is working correctly on-site when connected to the network.

Test number	Name and Description	Partner in charge of the test	Test result (OK/KO)	Comments
SI-1	<u>Satellite signal reception</u> Verify the satellite signal availability, strength and quality	HS	OK	
SI-2	<u>DVB-S2 parameters</u> Verify that DVB-S2 parameters are correctly set and received.	HS	OK	
SI-4	<u>Complete broadcast functionality</u> Using the GPAC player with the HEVC decoder and using the IP input, reproduce the content received from satellite.	HS, UPM, ALU	Partially OK	GPAC reproduces HEVC content but is not stable.

Table 11. Spanish satellite demonstrator - Second Integration phase tests

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7 TURKISH SATELLITE DEMONSTRATOR, 1ST INTEGRATION STEP

The Turkish satellite demonstrator is depicted in Figure 5.

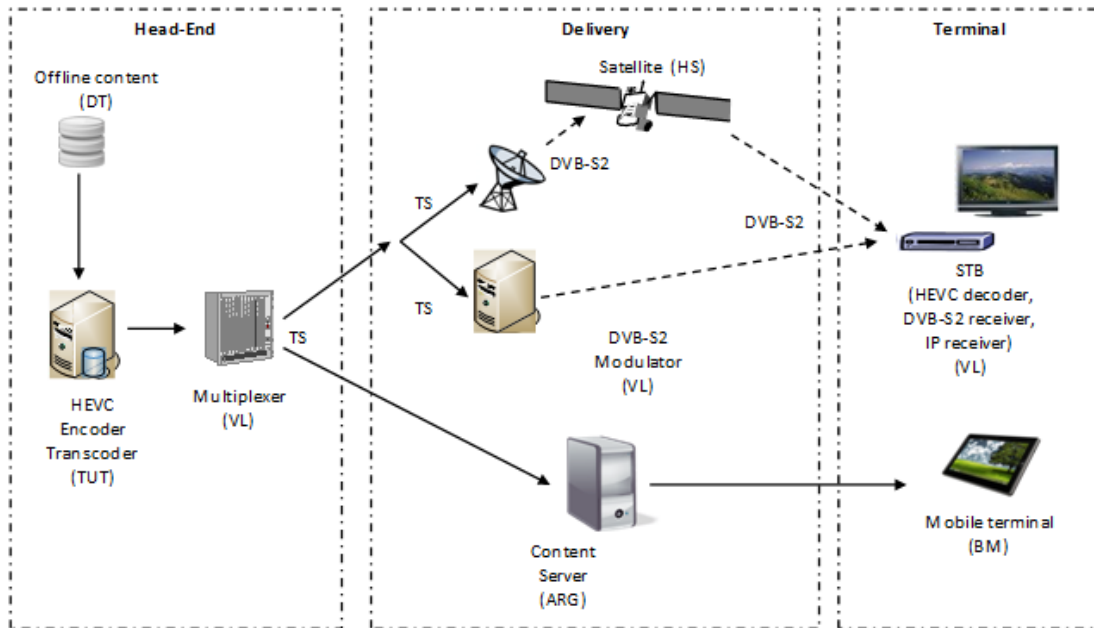


Figure 5 – Turkish satellite demonstrator (1st step)

7.1 Turkish Satellite demonstrator integration phases

7.1.1 Pre-Integration phase

The following table describes all the tests that have been done by partners at their premises.

Test number	Name and Description	Partner in charge of the test	Test result (OK/KO)	Comments
PI-1	2nd screen application wake-up from content server	Basari Mobile	OK	
PI-2	HEVC over broadband network + 2nd screen	Argela, Basari Mobile	OK	
PI-3	HEVC encoding of the off-line video	TUT	OK	
PI-4	HEVC decoding of the off-line video	Vestel, Basari Mobile	OK	
PI-5	Off-line stream HEVC decoding over broadband network	Argela	OK	

Table 12. Turkish satellite demonstrator - Pre-Integration phase tests

7.1.2 Stand-alone Installation phase

The following table describes all the tests that have been done by partners when they install their equipment on-site.

Test number	Name and Description	Partner in charge of the test	Test result (OK/KO)	Comments
IT-1	2nd screen application wake-up from content server	Basari Mobile	OK	
IT-2	HEVC over broadband network + 2nd screen	Argela, Basari	OK	

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		Mobile		
IT-3	HEVC encoding of the off-line video	TUT	OK	
IT-4	HEVC decoding of the off-line video	Vestel	OK	
IT-5	HEVC decoding of the off-line video mobile terminal	Basari Mobile	OK	

Table 13. Turkish satellite demonstrator - Stand-alone Installation phase tests

7.1.3 First Integration phase

The following table describes all the tests that have been done by partners to check that their equipment is working correctly on-site, independently from the networks.

Test number	Name and Description	Partner in charge of the test	Test result (OK/KO)	Comments
FI-1	HEVC encoding of the off-line video	TUT	OK	
FI-2	HEVC decoding of the off-line video	Vestel, Basari Mobile	OK	

Table 14. Turkish satellite demonstrator - First Integration phase tests

7.1.4 Second Integration phase

The following table describes all the tests that have been done by partners to check that their equipment is working correctly on-site when connected to the network.

Test number	Name and Description	Partner in charge of the test	Test result (OK/KO)	Comments
SI-1	2nd screen application wake-up from content server	Basari	OK	

		Mobile		
SI-2	HEVC over broadband network + 2nd screen	Argela, Basari Mobile	OK	
SI-3	HEVC encoding of the off-line video	TUT	OK	
SI-4	HEVC decoding of the off-line video	Vestel	OK	

Table 15. Turkish satellite demonstrator - Second Integration phase tests