GENERATION OF INTEROPERABILITY PLAN TEST FILES FOR DVB-T2

Abstract – An interoperability plan test has been generated according to the specifications previously presented in Engines project. The plan test configurations had been designed to check the extreme cases in DVB-T2. The main goal of the generated files is to allow interoperability checking of DVB-T2 receivers from different manufactures. Interoperability DVB-T2 test is composed of two groups sets of test: Input Mode A and Input Mode B (M-PLP with static scheduling).

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1 INTEROPERABILITY PLAN TEST

DVB-T2 system allow a large number of configurations. As described in a previous deliverable, a plan test has been designed in order to check the extreme cases for the main configurable parameters.
Document is organized in the following way. A brief explanation of equipment configuration is presented in a diagram block scheme. Then, a reference of the two group of interoperability set of tests, corresponding to 'Input Mode A' and 'Input Mode B' with static scheduling, are indicated. Specific generated files are presented. Finally, a description of tools and equipment used to generate the test files is presented.

1.1 Block Diagram Scheme

Figure 1-1 shows the block diagram used to generate test files interoperable DVB-T2.

DVB-T2 Gateway Manager is a web manager that allows a user to create configurations for DVB-T2 Gateway and remotely control the T2-Gateway via the network. Using this manager, different configurations associated with each interoperability tests have been created to generate test files.

The DVB-T2 Gateway is able to save a file of the output signal corresponding to the T2MI Packets protocol file for to interoperability test.

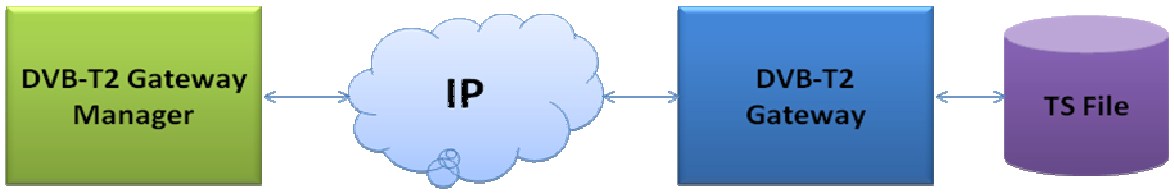

Figure 1-1 Block Diagram Scheme for test file generation

1.2 Input Mode A

Input Mode A configurations form the first group of test. The specific values of parameters for each test configuration can be found in the previous deliverable "Interoperability Plan Test for DVB-T2" for Engines project.

As a reminder, below are the 8 tests defined.

- Test 1 – FFT Size parameter
- Test 2 – Extended Carrier Mode
- Test 3 – Guard Interval
- Test 4 – Frame Length
- Test 5 – Super Frame Length
- Test 6 – Time Interleaving parameters
- Test 7 – Maximum Total Bitrate
- Test 8 – Maximum PLP protection

Table 1-1 lists the files generated for each of the interoperability test.

Test		Test file
Test 1	FFT Size parameter	
Test 1-1	Extreme case 32K	InputModeA_Test1.1.ts
Test 1-2	Extreme case 1K	InputModeA_Test1.2.ts
Test 2	Extended Carrier Mode	
Test 2-1	Extended Carrier Mode used	InputModeA_Test2.1.ts
Test 2-2	Extended Carrier Mode not used	InputModeA_Test2.2.ts
Test 3	Guard Interval	
Test 3-1, 3-2	FFT Size 32K	InputModeA_Test3.2.ts InputModeA_Test3.3.ts
Test 3-3, 3-4	FFT Size 16K	InputModeA_Test3.3.ts InputModeA_Test3.4.ts
Test 3-5, 3-6	FFT Size 8K	InputModeA_Test3.5.ts InputModeA_Test3.6.ts
Test 3-7, 3-8	FFT Size 4K	InputModeA_Test3.7.ts InputModeA_Test3.8.ts
Test 3-9, 3-10	FFT Size 2K	InputModeA_Test3.9.ts InputModeA_Test3.10.ts
Test 3-11, 3-12	FFT Size 1K	InputModeA_Test3.11.ts InputModeA_Test3.12.ts
Test 4	Frame Length	
Test 4-1	Maximum Frame Length	InputModeA_Test4.1.ts
Test 4-2	Minimum Frame Length	InputModeA_Test4.2.ts
Test 5	Super Frame Length	
Test 5-1	Super Frame Length	InputModeA_Test5.1.ts
Test 6	Time Interleaving parameters	

Test 6-1	Time Interleaving parameters	InputModeA_Test6.1.ts
Test 7	Maximum Total Bitrate	
Test 7-1	Maximum Total Bitrate	InputModeA_Test7.1.ts
Test 8	Maximum PLP protection	
Test 8-1	Maximum PLP protection	InputModeA_Test8.1.ts

Table 1-1 Table of Input Mode A interoperability tests

1.3 Input Mode B

Input Mode B configurations form the second group of test. The specific values of parameters for each test configuration can be found in the previous deliverable "Interoperability Plan Test for DVB-T2" for Engines project.

The test group of Input Mode B are designed for static scheduling. All the configurations contain multiple PLPs without any Common PLP.

The following are the tests defined for Input Mode B:

- Test 1 – FFT Size parameter
- Test 2 – Extended Carrier Mode
- Test 3 – Guard Interval
- Test 4 – Frame Length
- Test 5 – Super Frame Length
- Test 6 – Number of subslices
- Test 7 – Maximum Total Bitrate
- Test 8 – Maximum PLP protection
- Test 9 – Number of PLPs

Table 1-2 lists the files generated for each of the interoperability test.

Test		Test file
Test 1	FFT Size parameter	
Test 1-1	Extreme case 32K	InputModeB_Test1.1.ts
Test 1-2	Extreme case 1K	InputModeB_Test1.2.ts
Test 2	Extended Carrier Mode	
Test 2-1	Extended Carrier Mode used	InputModeB_Test2.1.ts
Test 2-2	Extended Carrier Mode not used	InputModeB_Test2.2.ts
Test 3	Guard Interval	
Test 3-1, 3-2	FFT Size 32K	InputModeB_Test3.2.ts InputModeB_Test3.3.ts
Test 3-3, 3-4	FFT Size 16K	InputModeB_Test3.3.ts InputModeB_Test3.4.ts

Test 3-5, 3-6	FFT Size 8K	InputModeB_Test3.5.ts InputModeB_Test3.6.ts
Test 3-7, 3-8	FFT Size 4K	InputModeB_Test3.7.ts InputModeB_Test3.8.ts
Test 3-9, 3-10	FFT Size 2K	InputModeB_Test3.9.ts InputModeB_Test3.10.ts
Test 3-11, 3-12	FFT Size 1K	InputModeB_Test3.11.ts InputModeB_Test3.12.ts
Test 4	Frame Length	
Test 4-1	Maximum Frame Length	InputModeB_Test4.1.ts
Test 4-2	Minimum Frame Length	InputModeB_Test4.2.ts
Test 5	Super Frame Length	
Test 5-1	Super Frame Length	InputModeB_Test5.1.ts
Test 6	Number of Subslices	
Test 6-1	Long LDPC Blocks	InputModeB_Test6.1.ts
Test 6-2	Long LDPC Blocks	InputModeB_Test6.2.ts
Test 6-3	Long LDPC Blocks	InputModeB_Test6.3.ts
Test 6-4	Short LDPC Blocks	InputModeB_Test6.4.ts
Test 6-5	Short LDPC Blocks	InputModeB_Test6.5.ts
Test 6-6	Short LDPC Blocks	InputModeB_Test6.6.ts
Test 7	Maximum Total Bitrate	
Test 7-1	Maximum Total Bitrate	InputModeB_Test7.1.ts
Test 8	Maximum PLP protection	
Test 8-1	Maximum PLP protection	InputModeB_Test8.1.ts
Test 9	Number of PLPs	
Test 9-1	Number of PLPs	InputModeB_Test9.1.ts

Table 1-2 Table of Input Mode B interoperability tests

2 TOOLS AND EQUIPMENT TO GENERATE TEST FILES

2.1 DVB-T2 Gateway Manager

DVB-T2 Gateway Manager is a web tool to control one or more DVB-T2 Gateways through the network. Figure 2-1 shows a screenshot where a list of DVB-T2 Gateways can be seen. All these equipment can be controlled remotely using the DVB-T2 Gateway Manager.

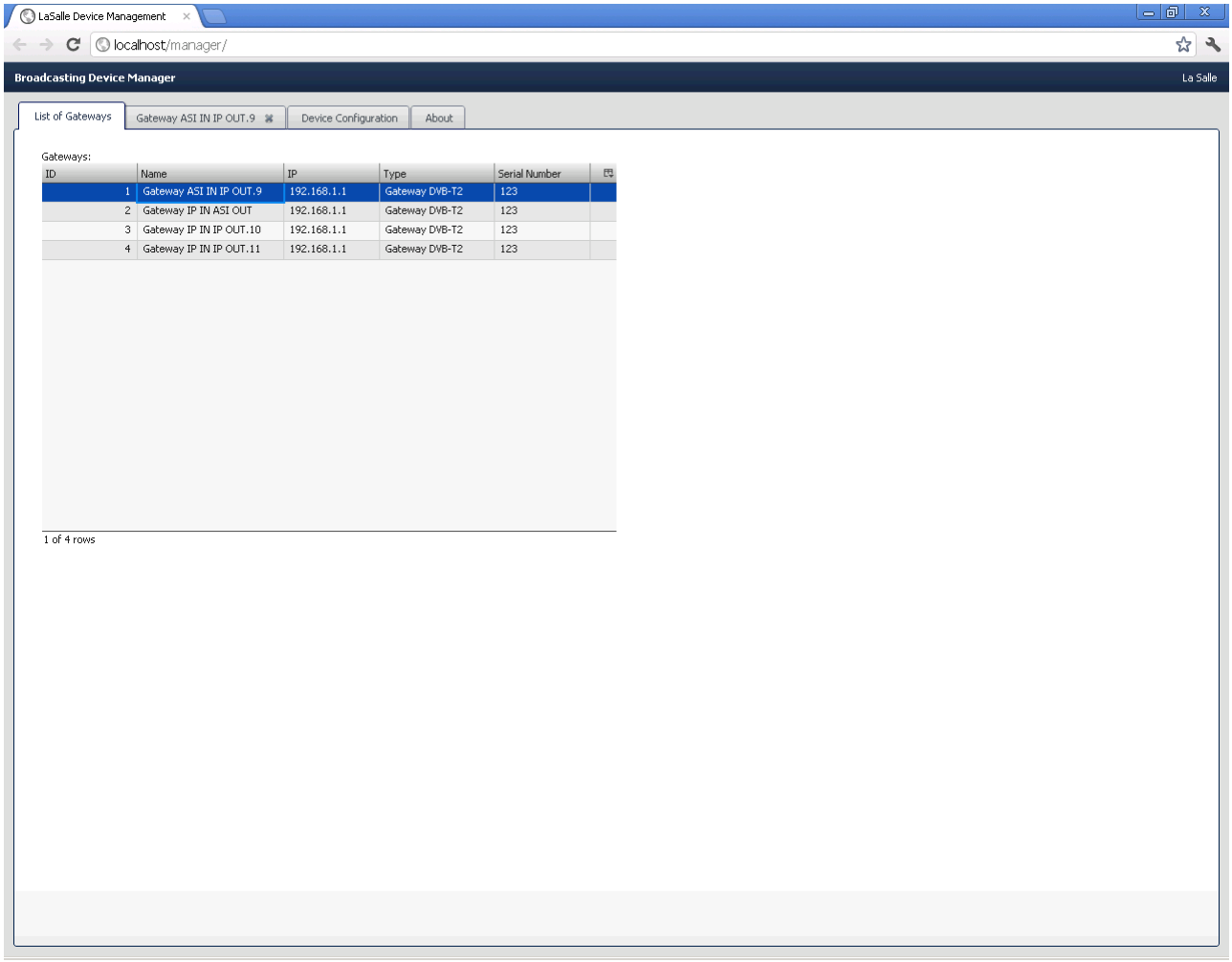

Figure 2-1 DVB-T2 Gateway Manager – List of Gateways

Next, Figure 2-2 shows the Overall configuration parameters, such as the modulation T2 parameters, the frequency or the input type (ASI or IP).

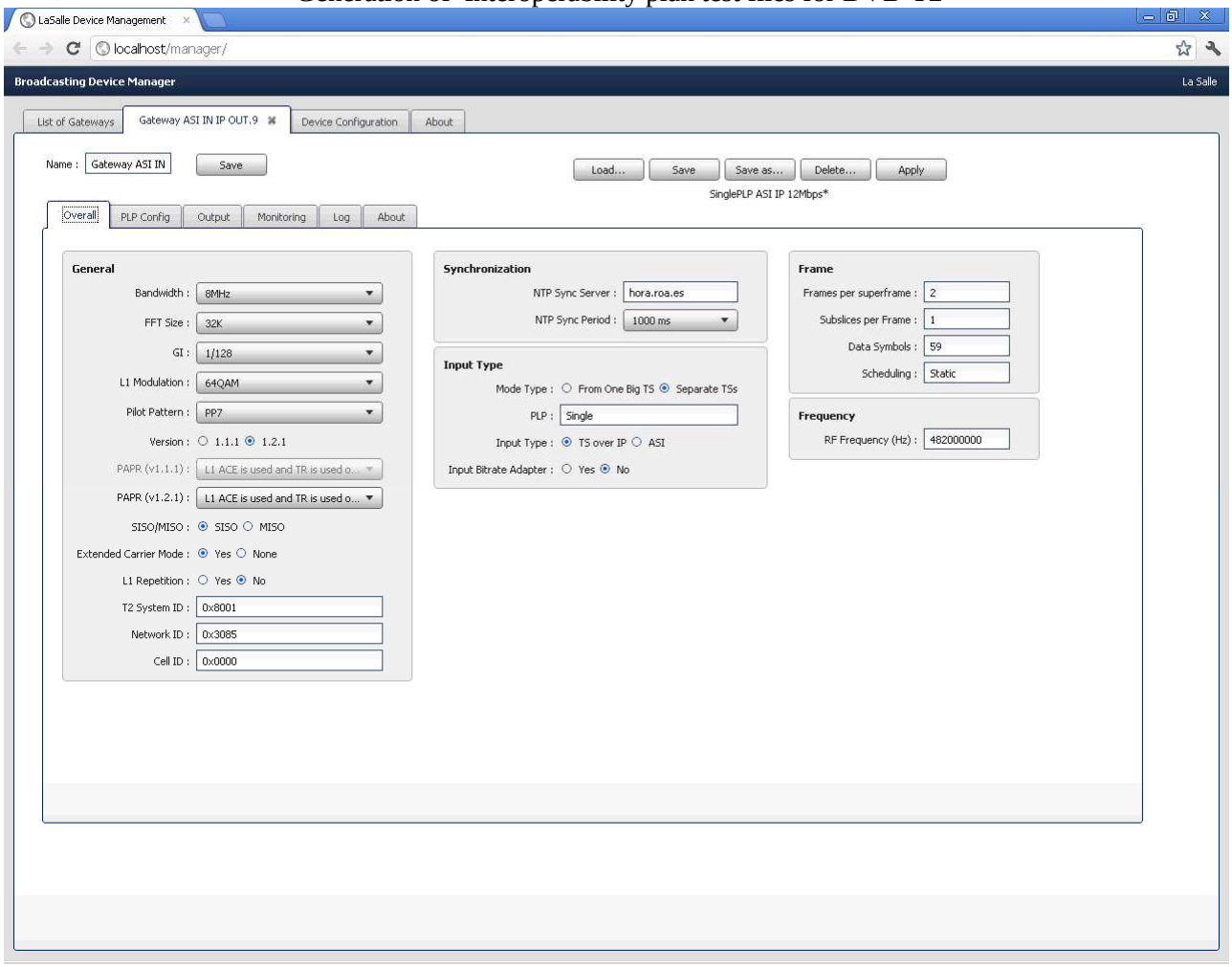

Figure 2-2 DVB-T2 Gateway Manager – Overall Gateway configuration

Figure 2-3 shows the PLP specific parameters.

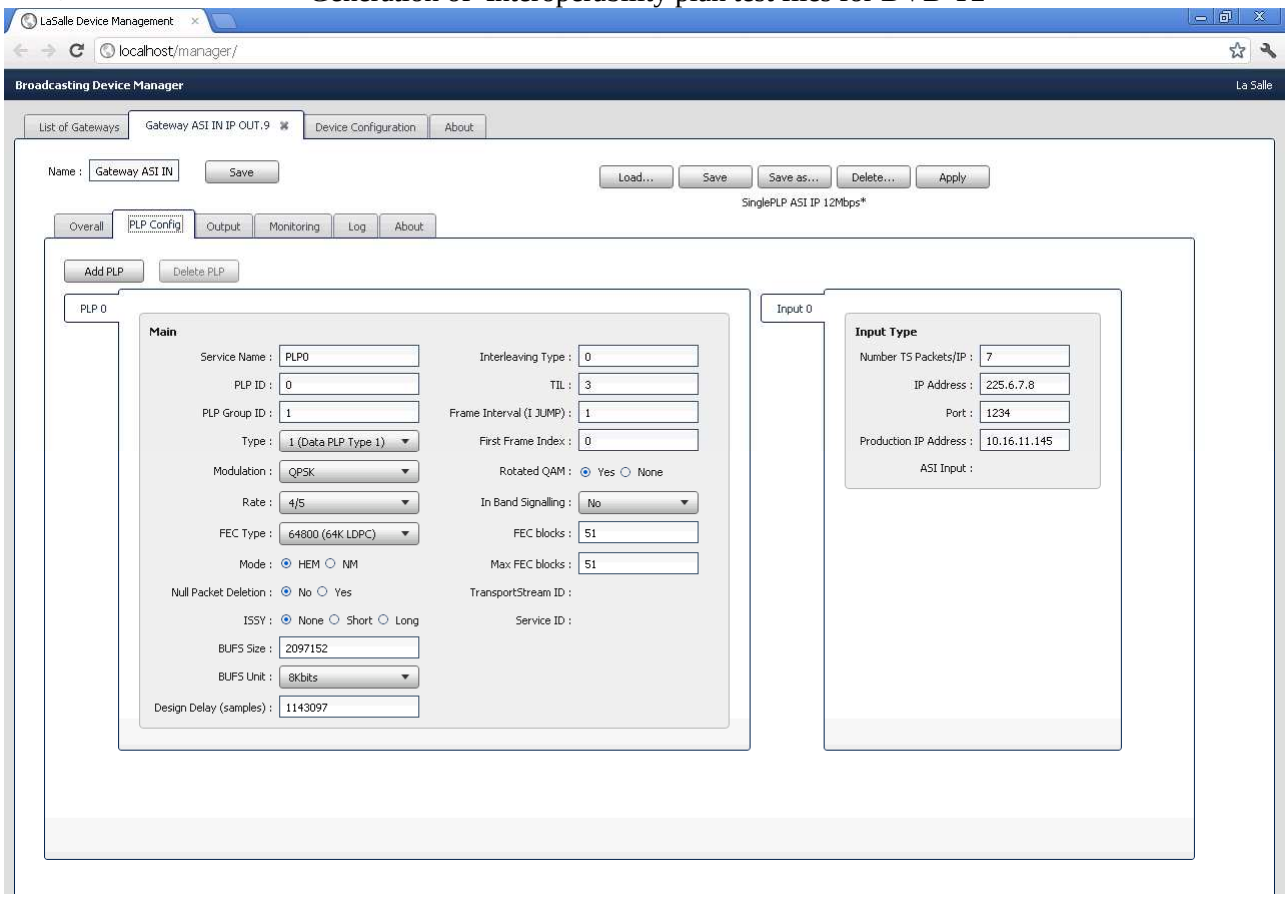

Figure 2-3 DVB-T2 Gateway Manager – PLP configuration

Finally, Figure 2-4 shows the configuration parameters of the output signal of the DVB-T2 Gateway.

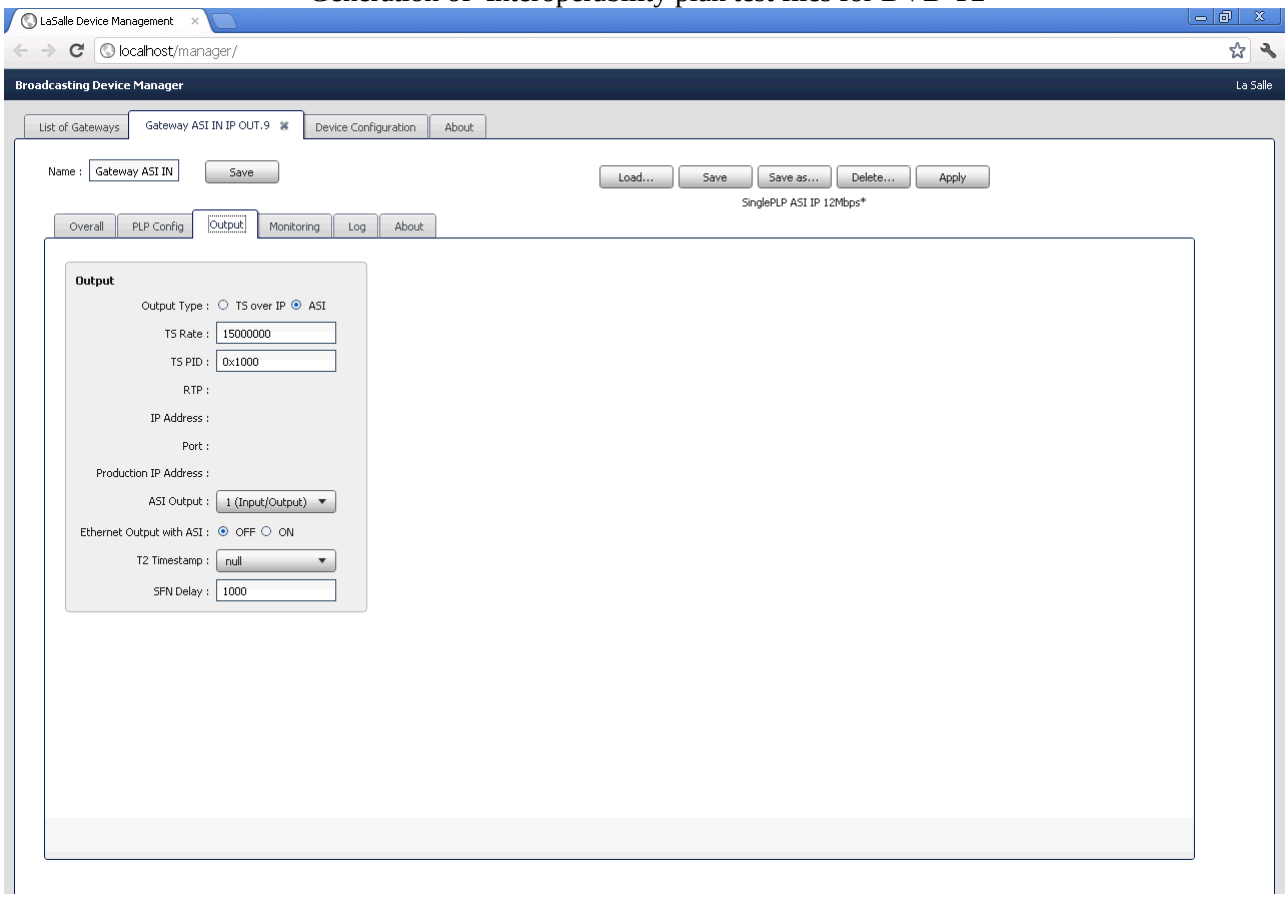

Figure 2-4 DVB-T2 Gateway Manager – Output configuration

DVB-T2 Gateway Manager allows to create and manage different configurations and apply them individually to each of the DVB-T2 Gateway.

2.2 DVB-T2 Gateway

The DVB-T2 Gateway equipment is configured and controlled by the DVB-T2 Gateway Manager. This equipment generates the output signal (T2MI protocol) that is sent to the T2 modulator.
The DVB-T2 Gateway may have two input signal types: IP and ASI. The output signal can also be in IP and ASI. It also has the option of recording the ASI output to a file. This option is the one used to generate the files for interoperability testing.

3 TEST FILES

The test files are available in the La Salle ftp site. For more information, please contact alexl@salle.url.edu.

References

[1] ETSI TR 102 831 v.0.10.04 (2010-03), *"Digital Video Broadcasting (DVB); Implementation guidelines for a second generation digital terrestrial television broadcasting system (DVB-T2)*", DVB (Digital Video Broadcasting)

[2] DVB Document A122, "*Digital Video Broadcasting (DVB); Frame structure channel coding and modulation for a second generation digital terrestrial television broadcasting system (DVB-T2)*", June 2010, DVB (Digital Video Broadcasting)