

Products: R&S DSIP020, R&S SDB601

Automatic DAB Receiver Test

Test of Sensitivity

Application Note

This application note describes the testing of the sensitivity of DAB receivers according to the European Standard EN 50248 'Characteristics of DAB receivers', using the test set 'Automatic DAB Receiver Test'.



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1 Overview

This application note describes the testing of the sensitivity of DAB receivers according to the European Standard EN 50248 'Characteristics of DAB receivers', using the test set 'Automatic DAB Receiver Test'.

The European Standard EN 50248, chapter 7.3.1, defines the requirement of the sensitivity of DAB receivers as follow:

The sensitivity is the input power expressed in dB(mW) at which the bit error ratio (BER) reaches 10^{-4} . The minimum requirement shall be -81 dB(mW), both for VHF and L-band.

The application note provides an outline of the test set, illustrates how the user has to create the concrete test-case and how the test is performed and managed.

2 Test Environment

The test set 'Automatic DAB Receiver Test' is based on the DAB signal generator R&S DSIP020 and the DAB modulator R&S SDB601.

The R&S DSIP020 is used to generate ETI signals simulating different services and test patterns. The R&S SDB601 acts as RF signal generator feeding the DAB receiver under test.

The system is completed by several additional components such as a fully programmable solid state attenuator and a set of software components including a central control program to perform the automatic test.

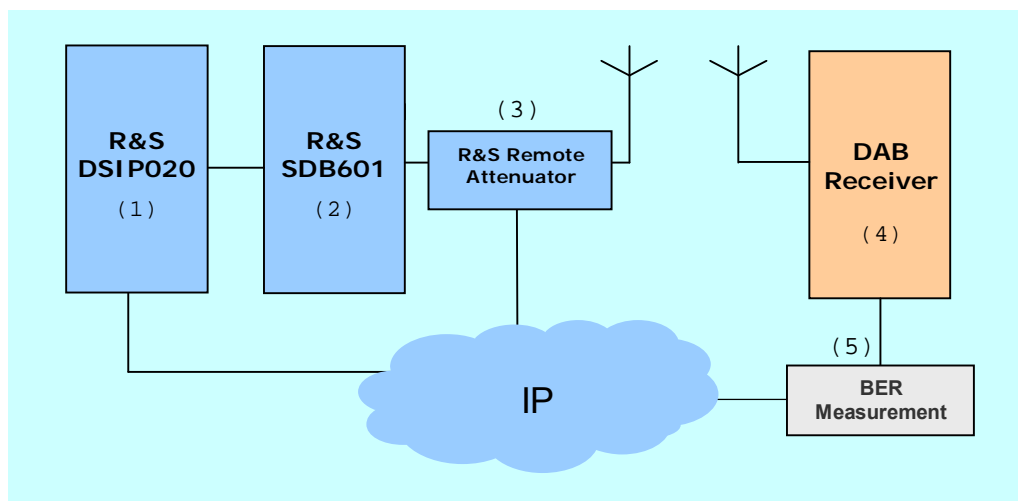


Fig. 2-1: Test Environment Overview

- (1) Digital Sound Broadcast Inserter R&S DSIP020 generates DAB base-band signals
- (2) DAB Modulator R&S SDB601 provides the DAB RF-signal
- (3) R&S Remote Attenuator remotely adjustable device in order to attenuate the signal strength in steps of 1 dB up to 127 dB
- (4) DAB Receiver the DAB receiver device under test
- (5) BER Measurement instrument or device to measure the bit error ratio (BER)

3 Preparation the Test

The instructions for an Automatic DAB Receiver test are provided in a single test-case or by a test-sequence that means a sequentially processed set of single test-cases.

The central software component to process a test is the DAB Test Client application which runs on the R&S DSIP020.

For the creation of test-cases and test-sequences the DAB Test Client provides powerful and intuitive usable tools, the Testcase Editor as well as the Testsequence Editor.

Testcase Editor

Information

ID	Author	Version
EN50248_731_1	decontis GmbH	1.0

Shortname
sensitivity test / band III / DAB mode I

Description
set band III; RF=201,072 MHz
set DAB mode I
attenuation -85dB; endless

SDB Settings

DAB Mode I
RF=201,072 MHz
band III
local DAB mode
output signal on

Add Edit Delete

Attenuation Settings

do not change

Start	End	Step	Interval
85 dB	0 dB	0 dB	0 sec.

Note: 0dB <=> 4dBm

ETI File

C:\Data\DAB\ETI_Files\1.bin

Testcase Duration

60 sec. duration endless no duration

OK Cancel

Fig. 3-1: DAB Test Client – Testcase Editor

Test of Sensitivity of DAB receivers

For the test of the sensitivity of DAB receivers according to the European Standard EN 50248 the test-sequence has to provide following single test-cases:

1. test the sensitivity for band III (VHF)
2. test the sensitivity for L-band

Each single test-case has to provide the appropriate instructions which are necessary to set-up the DAB modulator.

In order to create a single test-case, use the Testcase Editor tool from the DAB Test Client and provide the following parameters:

Information

Use this panel to describe the test-case formally. The DAB Test Client uses these data in several dialogs for a comfortable user support.

SDB Settings

This panel contains the list of commands for setting up the DAB modulator. For the definition of a command the Testcase Editor provides a powerful tool, the SDB Command Editor, see figure 3-2.

Attenuation Settings

Use this panel to provide all parameters which are necessary to adjust the Remote Attenuator.

For the concrete test-case the output signal of the DAB modulator must be attenuated at 85dB.

Because the DAB modulator provides the signal strength of 4dBm for 0dB attenuation and the minimum requirement regard EN 50248 is to measure the BER for 81dB attenuation, the whole attenuation must be 85 dB.

Beside the definition of fix attenuation it is also possible to define an altering attenuation that means the attenuation may be changed during the test continuously. For that a range of attenuation, the step width and a time interval may be defined.

ETI-File

Use this panel to define an ETI file which shall be played for the test-case by the ETI Player application.

Duration

Use this panel to define the duration of the test-case.

Beside the fix duration it is also possible to define an endless loop. Test-cases with 'no duration' do only process the list of commands for setting up the DAB modulator and may be used especially for initialization purposes.

Test of Sensitivity of DAB receivers

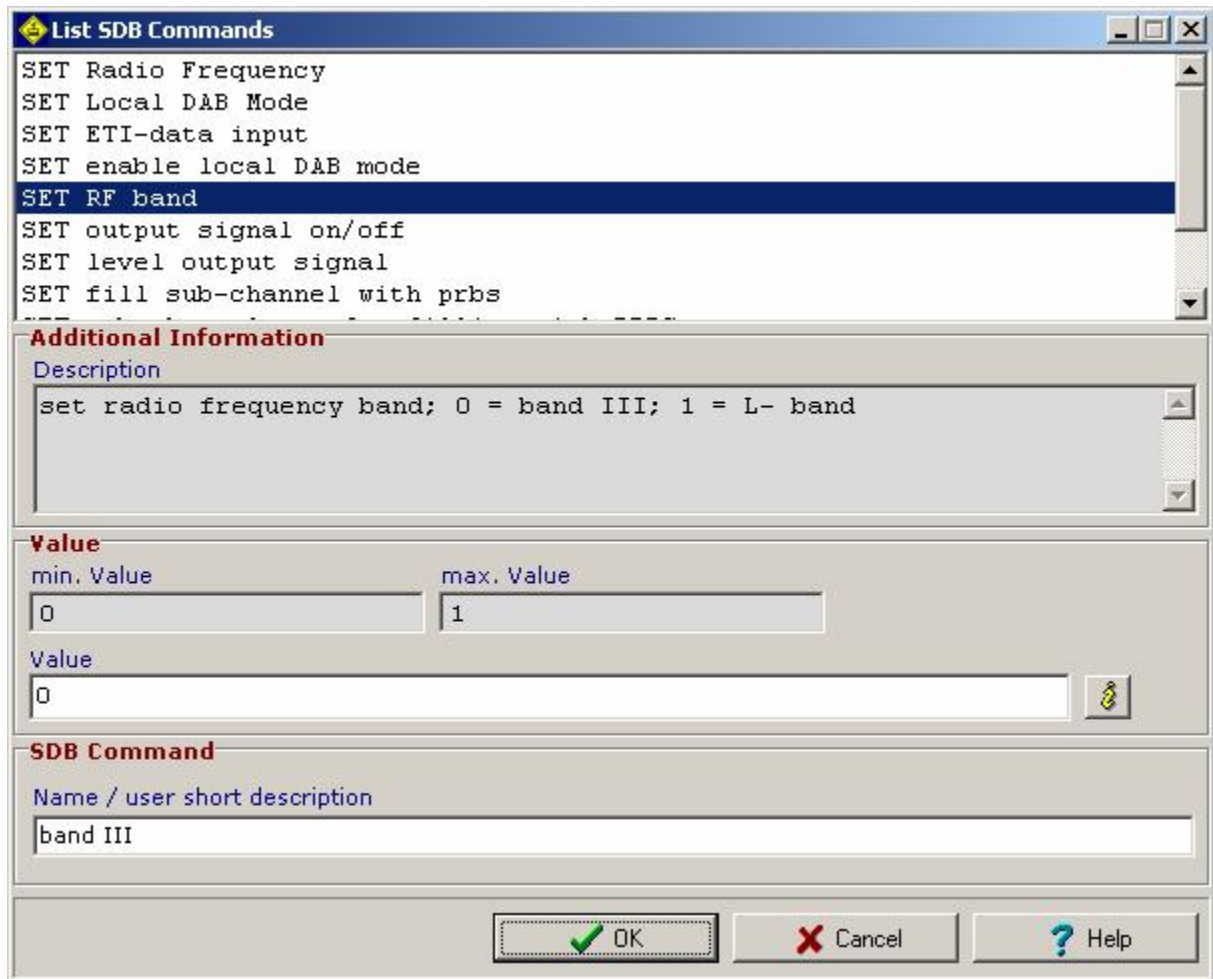


Fig. 3-2: SDB Command Editor

After both test-cases have been created successfully the test-sequence for the sensitivity test may be created.

In order to create a new test-sequence, use the Testsequence Editor tool from the DAB Test Client and provide the following parameters:

Information

Use this panel to describe the test-sequence formally. The DAB Test Client uses these data in several dialogs for a comfortable user support.

Testsequence

This panel contains the list of test-cases which shall be processed within this test-sequence.

Add all test-cases which have been created for the concrete test to this list.

Test of Sensitivity of DAB receivers

ETI-File

Use this panel to define an ETI file that shall be played for the whole test-sequence by the ETI Player application that means other definition provided by single test-cases will be ignored.

Testsequence Editor

Information

ID	Author	Version
EN50248_731_1	decontis GmbH	1.0

Shortname
sensitivity test / band III and L-Band

Description
band III : 201,072 MHz
L-Band : 1461,520 MHz
DAB mode I

Testsequence

running as loop

Loop	Testcase
<input checked="" type="checkbox"/>	sensitivity test / band III / DAB mode I
<input checked="" type="checkbox"/>	sensitivity test / L-band / DAB mode I

Add
Edit
Delete

ETI File

use ETI file for complete test

C:\Data\DAB\ETI_Files\1.bin

OK Cancel

Fig. 3-3: Testsequence Editor

4 Processing the Test

The preconfigured test sequence file EN50248_731_1.xml has to be loaded from the directory “testsequence” of the DAB client program.

The DAB Test Client performs all necessary actions as the starting of additional applications, e.g. the starting of the ETI Player, and the connection establishment to all required remote components, e.g. the connection establishment to the Remote Attenuator.

In case all components are available and connected, the test may be started and processed.

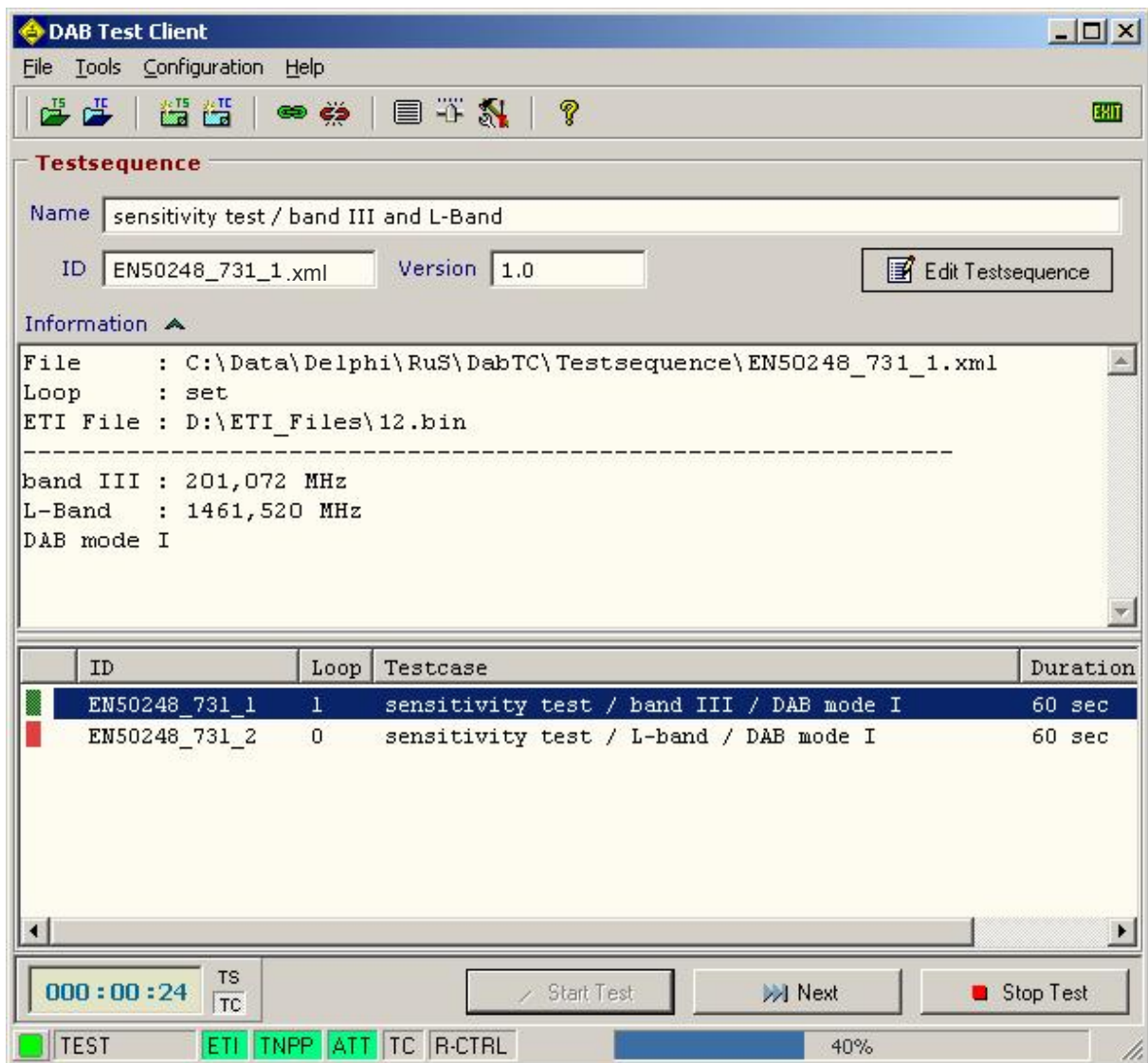


Fig. 4-1: DAB Test Client processes the test-sequence

5 Ordering information

Name of instrument	Order number
R&S DAB Test Set consisting of R&S DSIP020, R&S SDB601 software "DAB Test Client" remote attenuator I/O Card ethernet switch 19" rack, 9 height units plug in module (1 height unit) with 15" LCD monitor, keyboard, mouse	



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