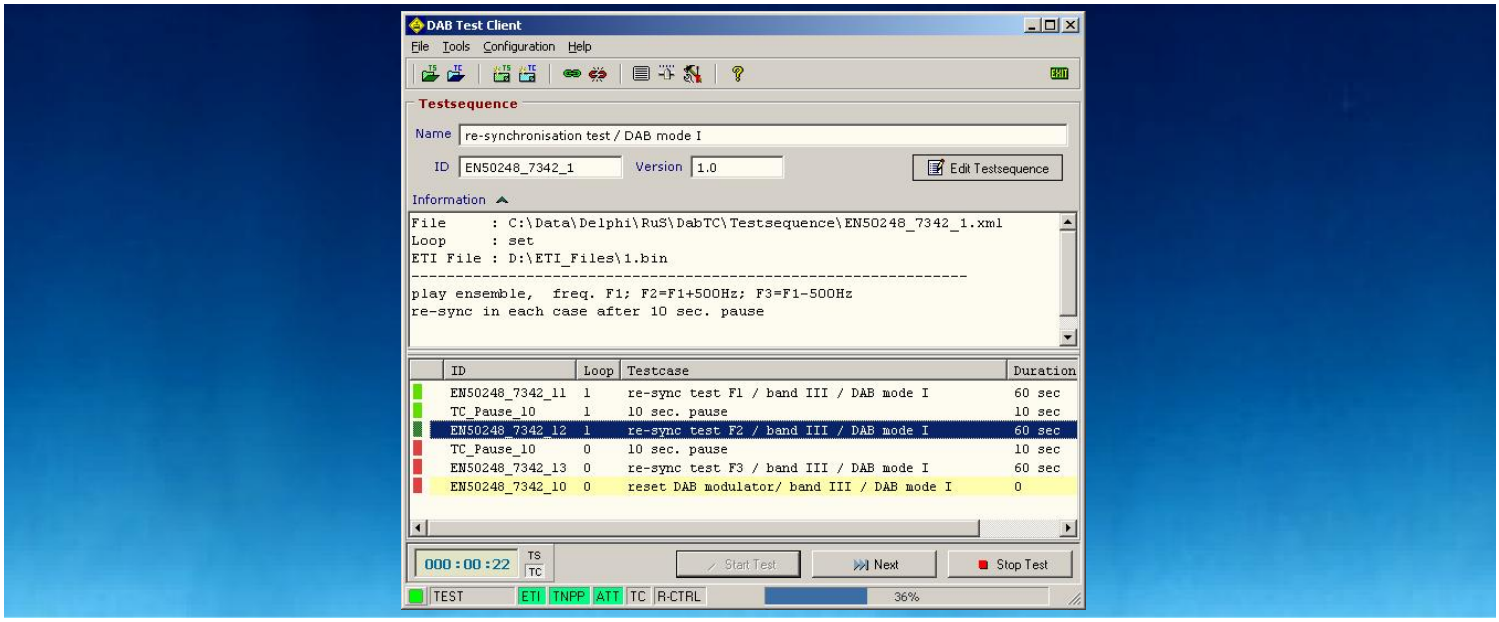

Products: R&S DSIP020, R&S SDB601

Automatic DAB Receiver Test
Test of Re-Synchronisation Capability

Application Note

This application note describes the testing of the re-synchronisation capability of DAB receivers according to the European Standard EN 50248 ‘Characteristics of DAB receivers’, using the test system 'Automatic DAB Receiver Test'.

ROHDE&SCHWARZ

Contents

1 Overview

This application note describes the testing of the re-synchronisation capability of DAB receivers according to the European Standard EN 50248 ‘Characteristics of DAB receivers’, using the test system 'Automatic DAB Receiver Test'.

The European Standard EN 50248, chapter 7.3.4.2., defines the requirement of re-synchronisation of DAB receivers as follow:

The time of audio mute between switching off the received ensemble and re-synchronisation to the same ensemble at an offset frequency is defined as the acquisition time after synchronisation loss. The acquisition time is expressed in milliseconds and presented separately for each supported transmission mode. The minimum requirement should be lower than 3000 ms for a switch-off time grater than 10 s.

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

2 Test Environment

The test system '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.

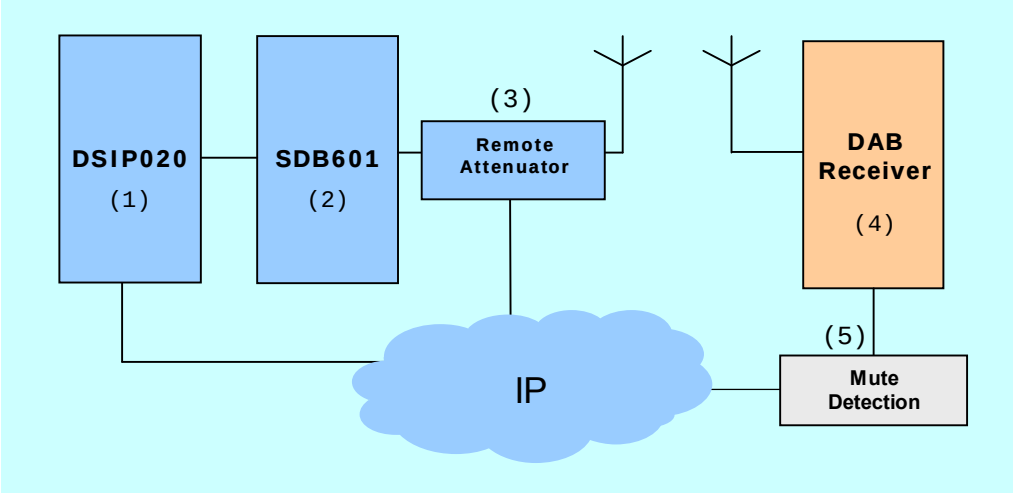

Fig. 2-1: Test Environment Overview

(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) 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) Mute Detection
instrument or device to measure the time of re-synchronisation

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, see figure 3-1, and the Testsequence Editor, see figure 3-3.

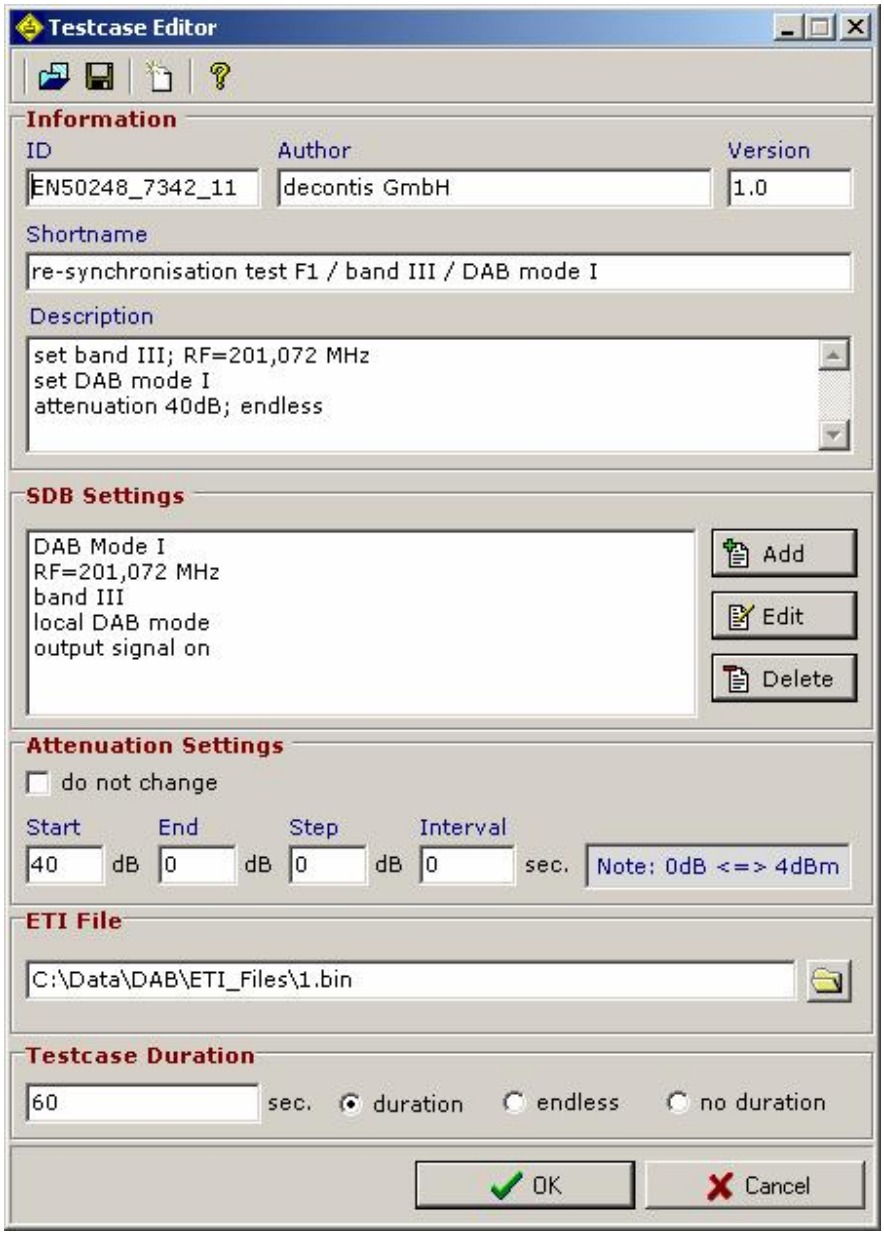

Fig. 3-1: DAB Test Client – Testcase Editor

Test of Re-Synchronisation Capability of DAB receivers

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

1. play an ensemble for frequency f1
2. at least 10 seconds pause with no signal
3. play an ensemble for frequency f1+x
4. at least 10 seconds pause with no signal
5. play an ensemble for frequency f1-x

The frequency offset 'x' is dependent on the selected DAB mode:

DAB mode I : x = 500Hz
DAB mode II : x = 2000Hz
DAB mode III : x = 4000Hz
DAB mode IV : x = 1000Hz

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 there are no special requirements regarding the signal strength so that the Remote Attenuator may be adjusted to provide medium signal strength.

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.

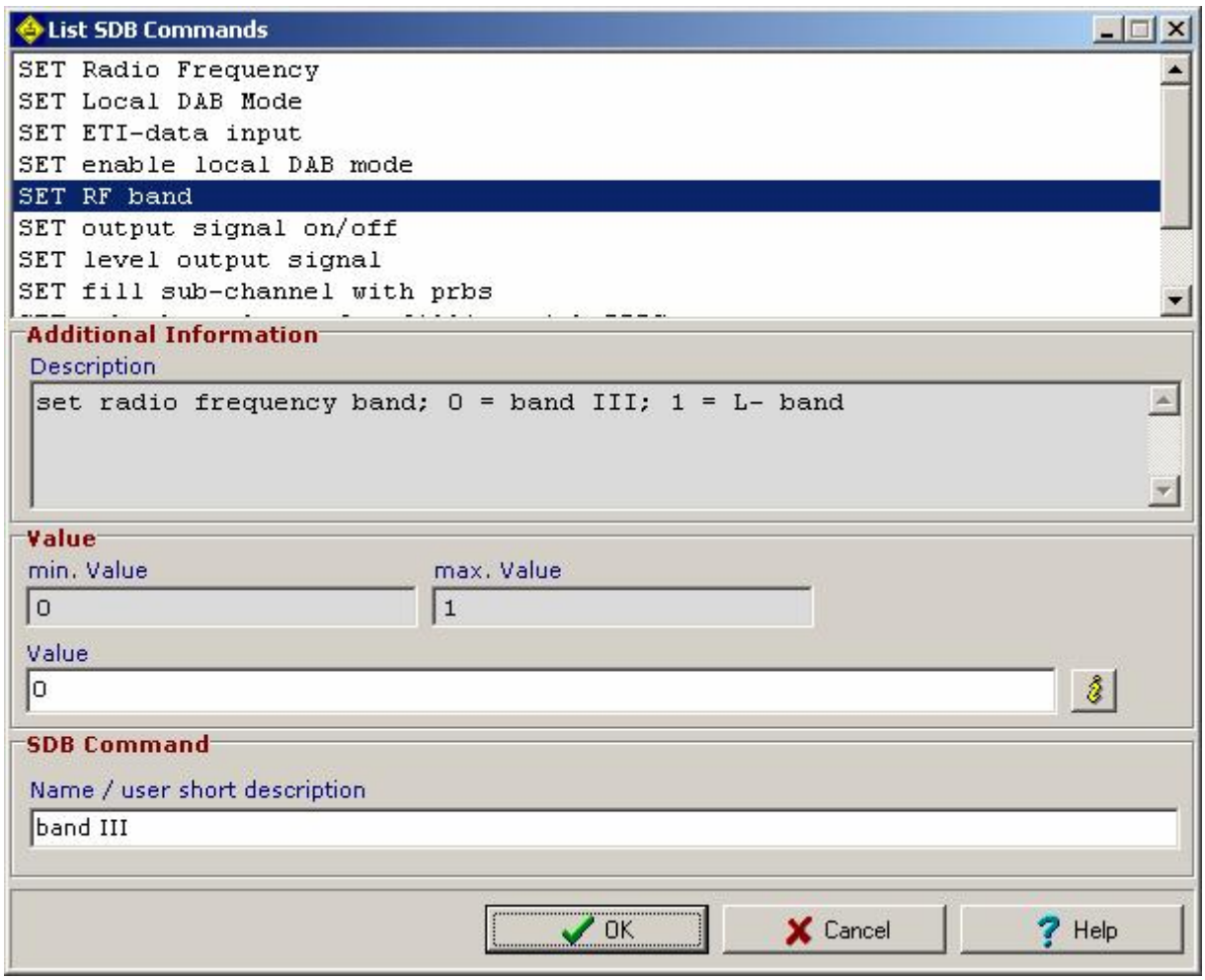

Fig. 3-2: SDB Command Editor

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.

After all test-cases have been created successfully the test-sequence for the test of the re-synchronisation capability of DAB receivers can 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:

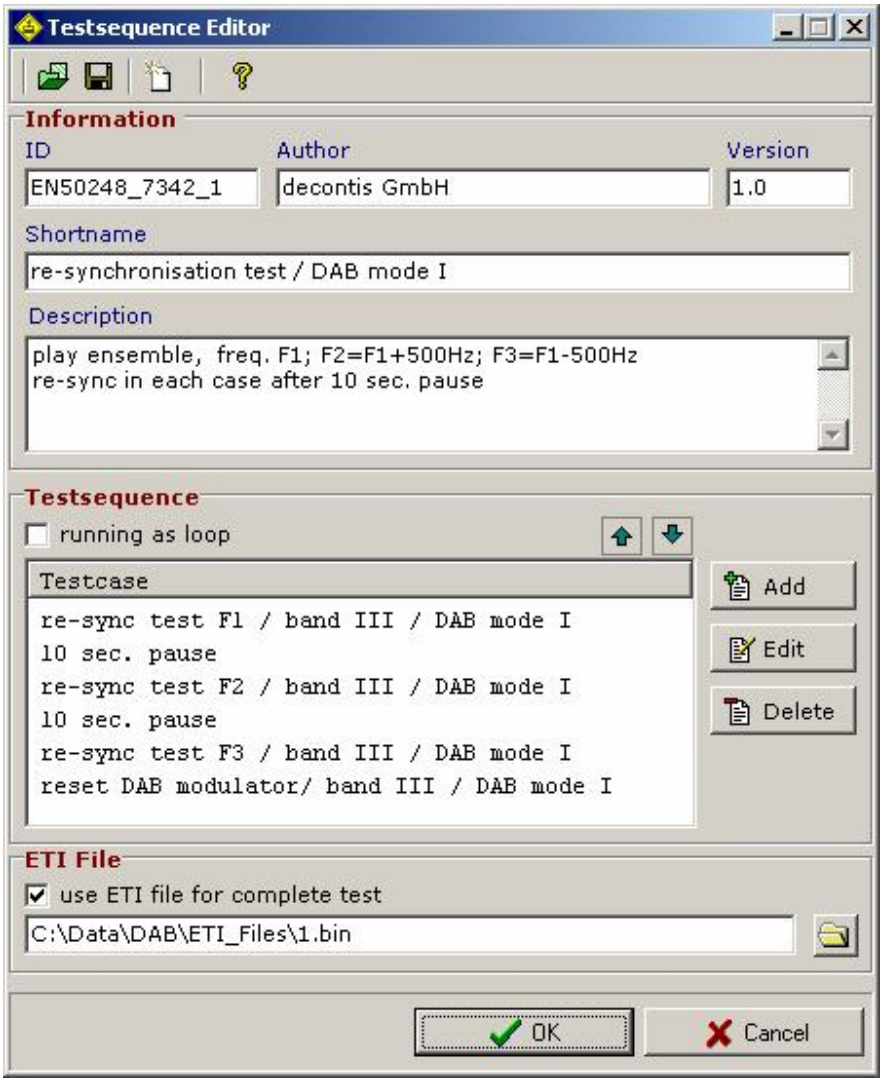

Fig. 3-3: Testsequence Editor

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.

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.

4 Processing the Test

The preconfigured test sequence file EN50248_7342_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. to the Remote Attenuator.

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

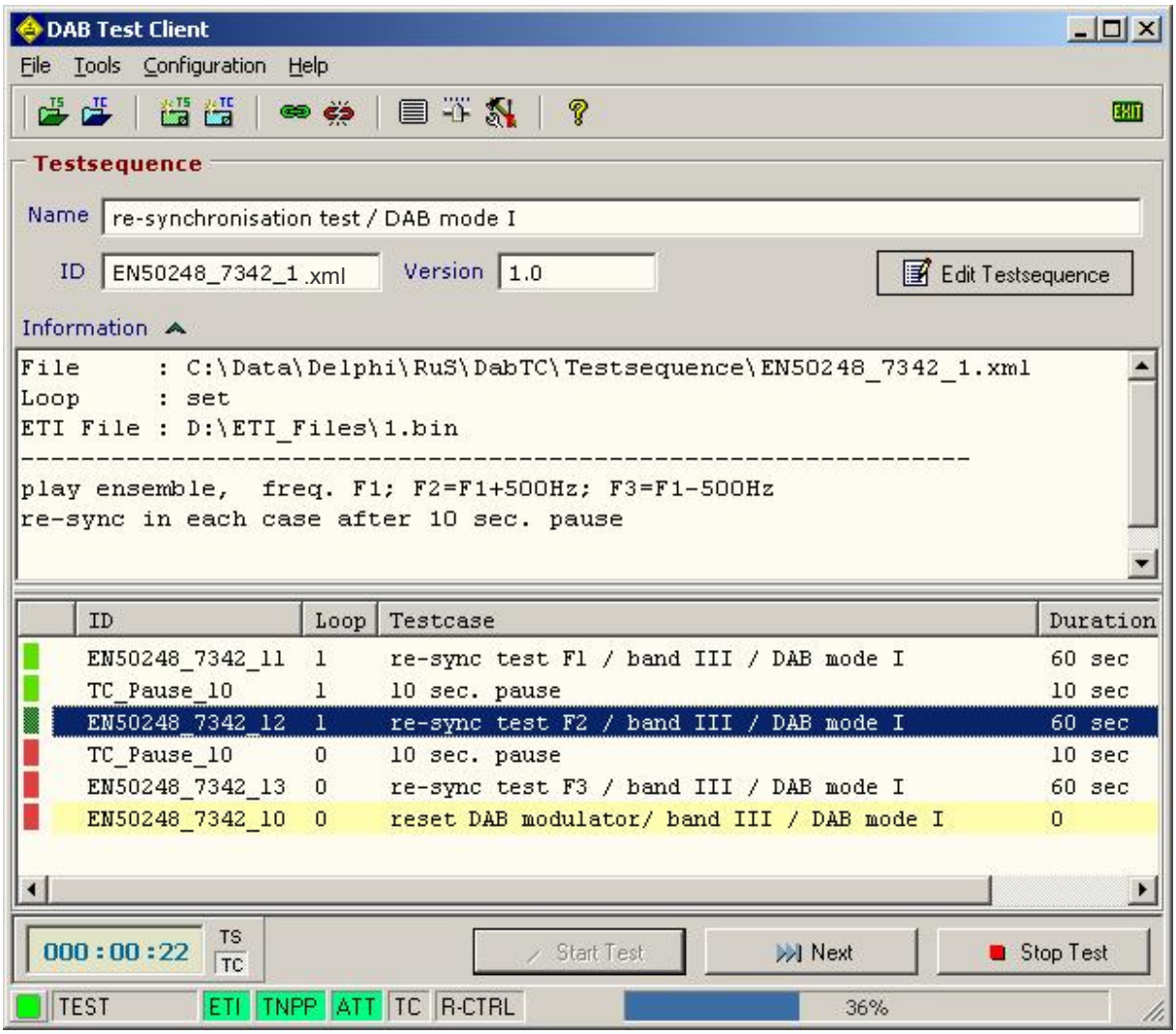

Fig. 4-1: DAB Test Client processes the test-sequence

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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