R&S®AVBrun
Audio/Video/Broadcast
Sequencer Software Tool
Applications

DTG Testing

ROHDE & SCHWARZ

R&S®AVBrun Audio/ Video/Broadcast Sequencer Software Tool

At a glance

Ready-to-use solution for configuring test sequences by remote control. The R&S®AVBrun test suite software, in combination with the R&S®BTC und R&S®VTx test platforms, allows users to organize, manage and execute test sequences for product validation and production testing.

The multistandard R&S®BTC offers a complete DUT environment in a single instrument. As a high-end signal generator, it generates RF signals for all global broadcasting standards, performs transmission simulation and carries out audio and video analyses for the DUTs.

The R&S®VTC/VTE/VTS video testers are used to test video and audio interfaces on consumer electronics equipment.

The R&S®AVBrun automation software meets all requirements for executing remote control test sequences on the R&S®BTC and R&S®VTC/VTE/VTS in R&D, quality assurance, production and service.

The software engine is based on the execution of test DLLs (plug-in assemblies). This architecture allows easy and straightforward configuration of test sequences without requiring specific programming knowledge of how to remotely control the instrument. It also provides full flexibility when configuring parameters and limits for the test items provided in the standard-specific R&S®AVBrun package options.

At the end of the test, an easy-to-read test report containing limits, test results and verdict is generated. The report is available in .csv, .txt, .xml and .pdf format.

Key facts
∎ High operational efficiency
∎ Compact RF testing with the R&S®BTC
∎ Compact testing of HDMI interfaces with the R&S®VTC/R&S®VTE/R&S®VTS
∎ Nonconductive tests
∎ Product precompliance with D-Book, E-Book, NorDig and others

R&S®AVBrun startup screen.

R&S®AVBrun options

R&S®AVBrun
Audio/Video/Broadcast
Sequencer Software Tool
(framework, free download
from Rohde & Schwarz homepage)

R&S®AVBrun D-Book Test Suite
R&S®BTC-KT3310
2114.7987.02

R&S®AVBrun NorDigTest Suite
Subset DVB-T/DVB-T2 RF Test
R&S®BTC-KT3311
2114.7993.02

R&S®AVBrun NorDigTest Suite
Subset Cable
R&S®BTC-KT3325
2114.8019.02

R&S®AVBrun NorDigTest Suite
Subset Satellite
R&S®BTC-KT3326
2114.8025.02

R&S®AVBrun NorDigTest Suite
Subset DVB-T/DVB-T2 General Test
R&S®BTC-KT3327
2114.8077.02

R&S®AVBrun E-Book Test Suite
R&S®BTC-KT3312
2114.8002.02

R&S®AVBrun Thailand Profile
R&S®BTC-KT3332
2114.8102.02

R&S®AVBrun Vietnam Profile
R&S®BTC-KT3333
2114.8119.02

R&S®AVBrun DTMB Terrestrial (China)
R&S®BTC-KT3330
2114.8060.02

R&S®AVBrun A/V Distortion Test
R&S®VT-KT3360
2115.8387.02

R&S®AVBrun MHL CTS Sink Test
R&S®VT-KT3351
2115.8087.02

R&S®AVBrun MHL CTS Source Test
R&S®VT-KT3352
2115.8093.02

R&S®AVBrun HDMI CTS Sink Test
R&S®VT-KT3356
2115.8493.02

R&S®AVBrun HDMI CTS Source Test
R&S®VT-KT3357
2115.8506.02

R&S®AVBrun
Camera Support and Camera Package
(nonconductive measurements)

# Simple and intuitive solution with automated test software

Generally product testing can be performed manually. Running these tests is usually laborious, time-consuming, prone to human errors and very costly. Now users can take advantage of fully automated test software. The integration of R&S®AVBrun helps users reduce testing time, delivers reproducible tests and allows more efficient utilization of resources. R&S®AVBrun test suite software runs on an external PC or laptop, and in combination with the R&S®BTC or R&S®VTx, reduces the complexity of test setups and handling procedures. This one-box solution eliminates the need for a rack of instruments, which maximizes space usage and reduces the time and cost of service and maintenance.

Running tests on DUTs in the certification or service/repair market segment could not be easier. The R&S®BTC or R&S®VTx, in combination with the R&S®AVBrun package, offers several highlights.

❙ Simple test selection
❙ Easy to operate: just follow the instructions on the screen; all tests plans are predefined; there is no need to change parameters
❙ Test results updated on the fly: once the tests are complete, the pass/fail results for the tests are displayed in a complete test report

For the certification/service/repair personnel running the tests, it's really that simple – there are no settings to change, just a sequence of tests to be selected for the DUT. Users simply follow the instructions/prompts from the R&S®AVBrun software.

Simple selection of tests.
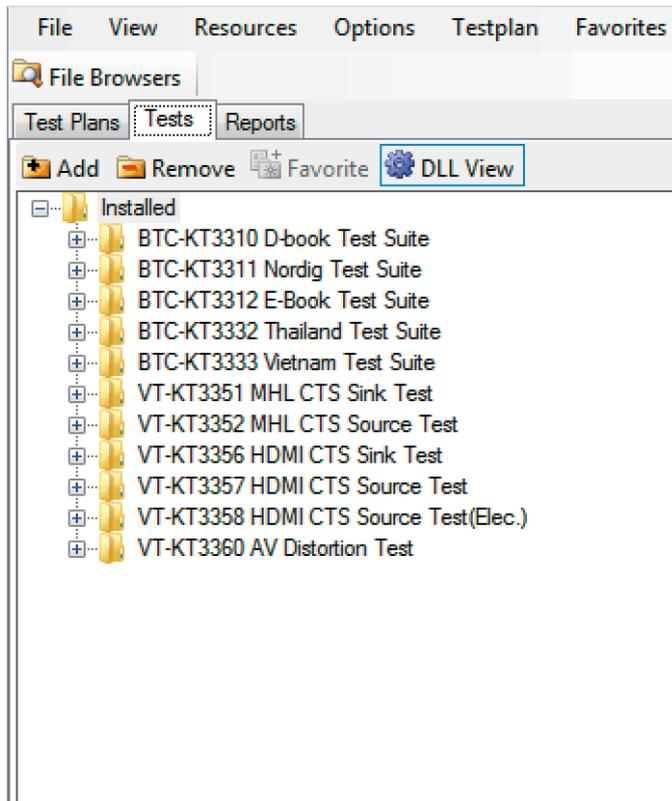
The testing solutions are available in the following R&S®AVBrun options.

R&S®BTC options:
∎ R&S®AVBrun D-Book test suite: R&S®BTC-KT3310
∎ NorDig Test Suites
  ∙ R&S®AVBrun NorDig test suite, subset DVB-T/DVB-T2 RF test: R&S®BTC-KT3311
  ∙ R&S®AVBrun NorDig test suite, subset cable: R&S®BTC-KT3325
  ∙ R&S®AVBrun NorDig test suite, subset satellite: R&S®BTC-KT3326
  ∙ R&S®AVBrun NorDig test suite, subset DVB-T/DVB-T2 general test: R&S®BTC-KT3327
∎ R&S®AVBrun E-Book test suite: R&S®BTC-KT3312
∎ R&S®AVBrun Thailand profile: R&S®BTC-KT3332
∎ R&S®AVBrun Vietnam profile: R&S®BTC-KT3333
∎ R&S®AVBrun DTMB terrestrial (China): R&S®BTC-KT3330
∎ Camera solution
  ∙ R&S®AVBrun camera support: R&S®BTC-KT3329
  ∙ Camera package: R&S®BTC-Z3329 (incl. camera and R&S®AVBrun software extension; automatically added to R&S®AVBrun camera support)

R&S®VT options:
∎ R&S®AVBrun A/V distortion test: R&S®VT-KT3360
∎ R&S®AVBrun MHL CTS sink test: R&S®VT-KT3351
∎ R&S®AVBrun MHL CTS source test: R&S®VT-KT3352
∎ R&S®AVBrun HDMI CTS sink test: R&S®VT-KT3356
∎ R&S®AVBrun HDMI CTS source test: R&S®VT-KT3357

Test results updated on the fly; here a D-Book example.

Back → **Forward** | ▼ Filter ▼ | -> PDF | -> XML | -> CSV | -> TXT | 🖨 Print

Report Info:

Date:	4/15/2013 1:21:30 PM

Testplan:	C:\Program Files\Rohde-Schwarz\AVBrun\1.19.4\Tests\My Tests\Debug\DBook 10_7 Basic RF tests.dll
User:	jang_h
Comment:	AVBrun dll Version : 01.00
Test Executive:	R&S AVBrun 1.19.4
Instrument ID 1:	R&S VTE 1.31.0.0
Options:	

Summary:

Test Start Time:	4/15/2013 1:21:30 PM
Test End Time:	4/15/2013 2:20:59 PM
Total Test Time:	00:59:29
Weighted Test Time:	00:59:29
Test Items Passed:	25
Test Items Failed:	1
Number of Test Items:	26
Errors:	1

Channel list : Ideal
DVB-T Signal : 1
DVB-T2 Signal : No signal
Compensation settings : C:\Users\jang_h\Desktop\DBookTest\Calibration Files\all_Freq_by8MHz.comp
Remote control device : C:\Users\jang_h\Desktop\DBookTest\remocon file\RemoteController.seq

10.7.1
RF sensitivity

Signal Option and Channel number	Offset	Limit	Result	Unit	Status
DVB-T					
SignalOption1					
21 (474MHz)		-79.2	-83.3	dBm	Passed
22 (482MHz)			-83.1	dBm	Passed
23 (490MHz)			-83.5	dBm	Passed
24 (498MHz)			-83.4	dBm	Passed
25 (506MHz)			-83.2	dBm	Passed
26 (514MHz)			-83.2	dBm	Passed
27 (522MHz)			-83.1	dBm	Passed
28 (530MHz)			-83.1	dBm	Passed
29 (538MHz)			-82.7	dBm	Passed

Conformance testing solution for DTG D-Book

The D-Book, a Digital TV Group (DTG) publication, is a recognized and widely used test specification for DVB-T/DVB-T2 receivers. Chapter 10 of this test specification defines a broad range of RF tests. The D-Book defines signal scenarios (an LTE interference signal scenario, for example) and the receive channels for different tests. It also establishes performance targets that vary depending on the specific test and on the configuration (option) of the wanted signal.

The R&S®AVBrun test suite software with the R&S®BTC-KT3310 D-Book test suite option is a cost-effective solution for performing all RF tests in versions 1.0 and 3.0 of D-Book 7, part A, chapter 10 with full automation and reproducible results. The software controls the R&S®BTC and the DUT and is run on an external PC.

Despite the D-Book's complexity, all tests can be performed with a single T&M instrument, the R&S®BTC, which greatly simplifies the test setup. The R&S®BTC-KT3310 D-Book test suite can be configured intuitively and quickly. The terms and chapter numbers that are used correspond to the D-Book specifications. This fully automated solution ensures that test time is optimized and that all tests are standard-compliant.

Digital TV Group (DTG) has approved all the test cases running with D-Book test suite (R&S®BTC-KT3310) after qualifying the performance by verifying the test case results.

The R&S®BTC is a one-box solution with generator and analyzer functionality for stimulating and analyzing the DUT. The R&S®BTC generates a precise RF signal that is fed into a DUT. The output of the DUT, either the composite, component or HDMI output, is then fed back to the R&S®BTC for analysis. The test sequence is supported by R&S®AVBrun to automatically perform all required test cases.

One of the most critical tests is manual picture failure point detection. The picture quality tests not only consume a lot of testing time, they are also highly prone to human error and inconsistency due to varying human perception.

The setup consists of a laptop with the R&S®AVBrun software for testing the DUT, R&S®BTC and RedRat infrared sensor to remotely control the DUT and IP power control for power management of the DUT.

To accelerate this process and to reduce the error rate and variance, the R&S®AVBrun test suite software with the A/V distortion analyzer provides users with a detailed evaluation of picture quality by quantifying the visibility of errors or differences between an ideal image and a distorted image. The results are numerically and graphically displayed and are reproducible.

See also the R&S®BTC/R&S®AVBrun application brochure "Fully automated D-Book RF testing of DVB-T/DVB-T2 receivers" that can be downloaded from the Rohde & Schwarz homepage.

❙ R&S®AVBrun D-Book test suite: R&S®BTC-KT3310

The R&S®BTC with R&S®AVBrun test suite software offers users an automated test environment
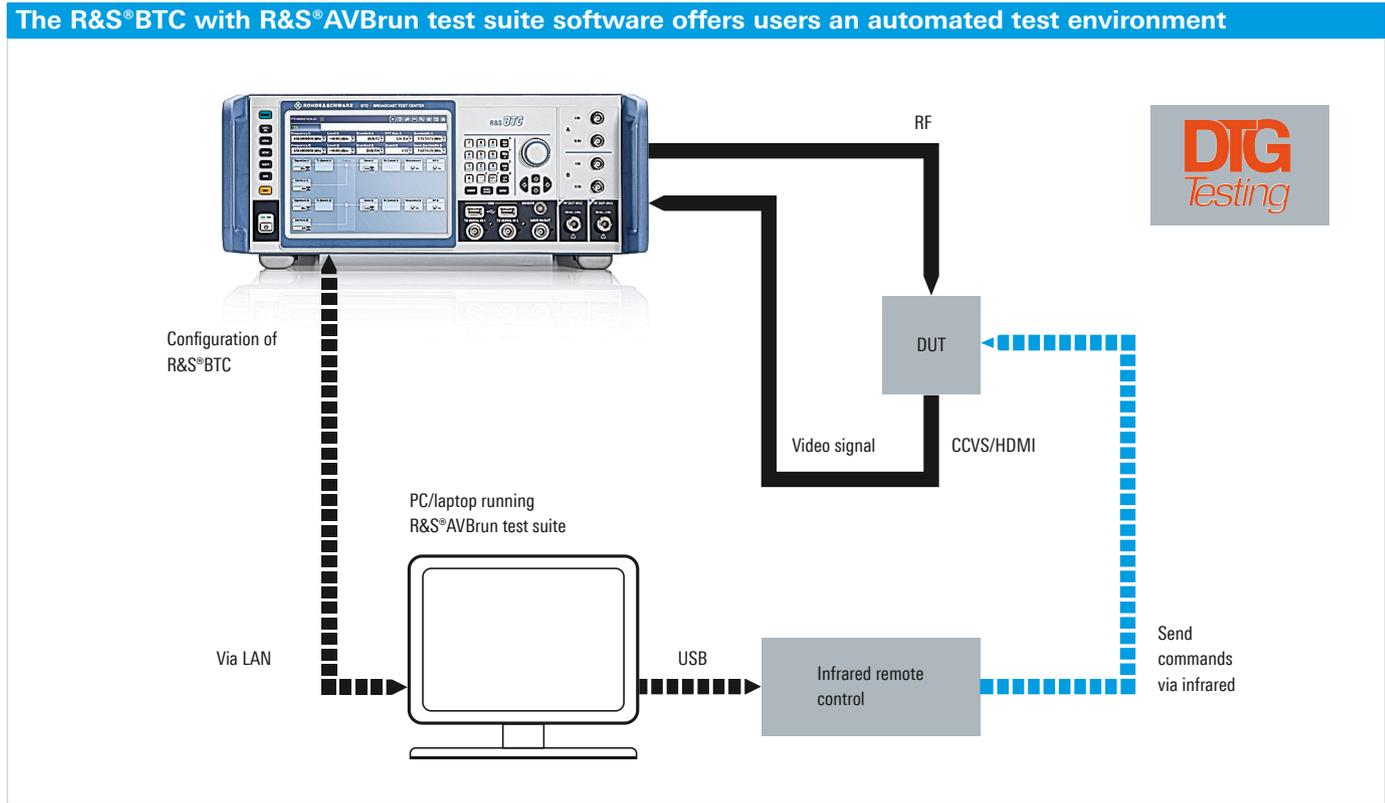
User-interface for test case configuration setting and overview of performance target; here a D-Book example.
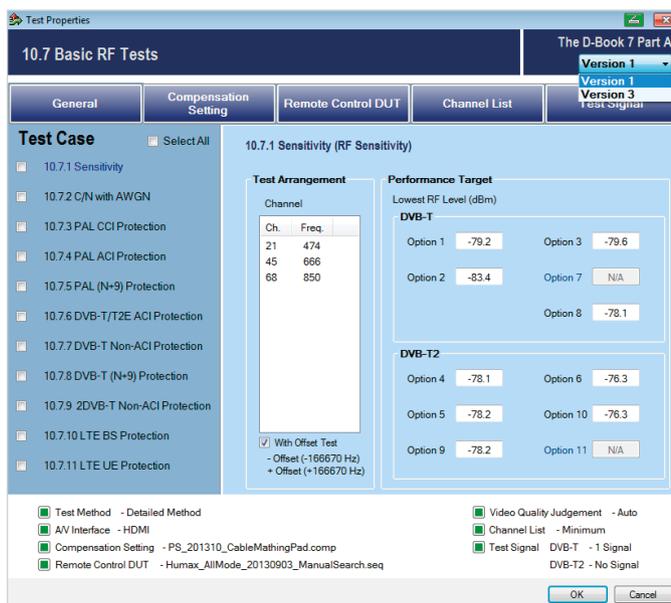
Learn and construct sequences to remotely control DUT.
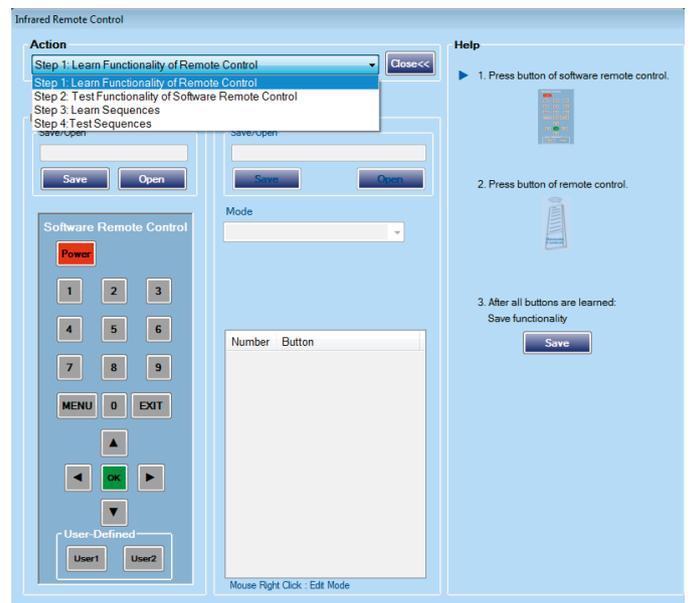
NorDig/E-Book and DTMB testing solution

The NorDig technical specifications were established to ensure that DVB-T/DVB-T2 devices on the market satisfy a common set of minimum requirements, independent of the operator/service provider and transmission media.

The R&S®AVBrun NorDig test suite aims to provide a comprehensive quality examination of the DVB-T/DVB-T2 consumer products according to the NorDig Unified specification, version 2.4.

The specification is covered by subsets:
❙ NorDig test suites
 • R&S®AVBrun NorDig test suite, subset DVB-T/DVB-T2 RF test: R&S®BTC-KT3311
 • R&S®AVBrun NorDig test suite, subset cable: R&S®BTC-KT3325
 • R&S®AVBrun NorDig test suite, subset satellite: R&S®BTC-KT3326
 • R&S®AVBrun NorDig test suite, subset DVB-T/DVB-T2 general test: R&S®BTC-KT3327

The R&S®AVBrun E-Book test suite solution supports the DIGITALEUROPE white paper: Standardized DVB-T2 RF specifications.

❙ R&S®AVBrun E-Book test suite: R&S®BTC-KT3312

Digital Terrestrial Multimedia Broadcast (DTMB) is the digital terrestrial television standard adopted in the People's Republic of China. The standard supports mobile digital TV service to mobile devices. It is capable of transmitting HDTV to receivers moving at speeds up to 200 km/h.

The R&S®AVBrun DTMB test suite will verify that the service and functional behavior of the DUT are tested to ensure the prerequisites for interoperability are met.

❙ R&S®AVBrun DTMB terrestrial (China): R&S®BTC-KT3330

ASEAN profile testing solution

ASEAN member countries are pushing towards full digital television across the region.

The conformity scheme for DVB-T2 receivers in Thailand states that DVB-T2 receivers (including the set-top box and integrated digital TV) have to comply with NBTC's DVB-T2 receiver specification. Likewise for Vietnam, manufacturers and importers have to submit the required test reports in line with the VNTA specification.

The R&S®AVBrun test suite for Vietnam, Thailand, Malaysia and Singapore will help customers cover the required test cases. Offering a user-friendly GUI and customized configuration, it helps customers ensure with a degree of confidence that the DUTs are consistent with the specifications.

❙ R&S®AVBrun Thailand profile: R&S®BTC-KT3332
❙ R&S®AVBrun Vietnam profile: R&S®BTC-KT3333
❙ R&S®AVBrun Malaysia profile: R&S®BTC-KT3334
❙ R&S®AVBrun Singapore profile: R&S®BTC-KT3335

Nonconductive video quality detection

With the emergence of integrated digital television (iDTV), TVs will have a built-in digital tuner, eliminating the need for a set-top box for converting those signals for reception on a TV.

The R&S®AVBrun camera test suite package enables perpetual video quality analysis directly from the TV display. The camera solution supplements the existing automatic precompliance verification R&S®AVBrun test suite to provide a complete solution for verifying set-top box and TV performance.

The camera solution consists of the R&S®BTC-KT3329 software option for the R&S®BTC, and the R&S®BTC-Z3329 option, which includes a camera with a controllable zoom objective and control software.

❙ R&S®AVBrun camera support: R&S®BTC-KT3329
❙ Camera package: R&S®BTC-Z3329

Video quality measurement directly from the TV display.

Conformance testing solution for MHL/HDMI CTS sink/source

With the TV industry moving towards UltraHD, HDMI 2.0 provides the required solution for handling higher resolutions and frame rates. UltraHD is described as one of the most exciting things that will happen in terms of TV experience in the next 10 years. With HDMI 2.0, the overall bandwidth has been increased to 18 Gpbs, which makes it possible to display 4K content at 60 frames per second.

Prior to mass producing or distributing any licensed product or component that claims compliance with the HDMI specification; each adopter must test a representative sample for HDMI compliance.

The R&S®VTx, with its many modules and softare options, offers comprehensive solutions that cover sink and source tests for the MHL 1.2; MHL 2.0, HDMI 1.4 and HDMI 2.0 standards. Thanks to the intuitive GUI, tests can be performed in the base units with just a few manual inputs.

R&S®AVBrun MHL and HDMI CTS test solution.

Complete certification can require several hundred individual tests. Here, R&S®AVBrun also offers the right solution. The following options make it possible to automate available CTS tests.

❚ R&S®AVBrun MHL CTS sink: R&S®VT-KT3351
❚ R&S®AVBrun MHL CTS source: R&S®VT-KT3352
❚ R&S®AVBrun HDMI CTS sink: R&S®VT-KT3356
❚ R&S®AVBrun HDMI CTS source: R&S®VT-KT3357

The test sequences are designed to minimize necessary user interaction. The tests are configured by entering the capabilities of the DUT in a capabilities declaration form (CDF). When the test is finished, a test report is generated containing the details of the test result and the important "PASS" or "FAIL" verdict.

The R&S®VTC with R&S®AVBrun test suite software offers automated source and sink tests
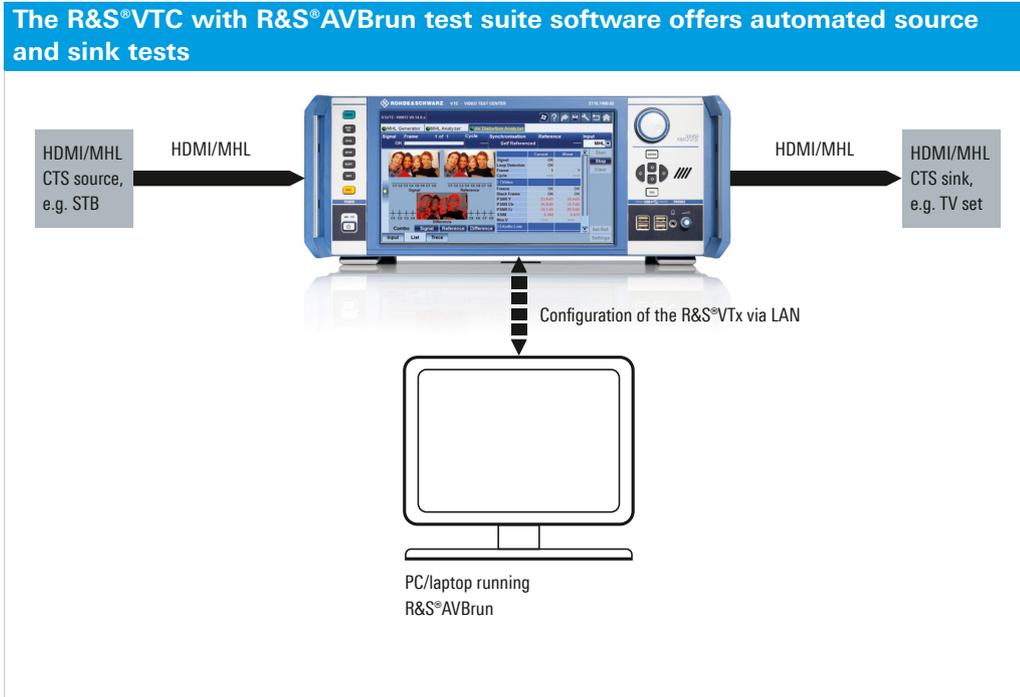
User interface for test case configuration setting; here an HDMI 2.0 6G testing example.

Video distortion analysis

For many applications, correct transmission and playback of audio and video contents is a key quality criteria. The R&S®VT-K2111 A/V distortion analysis option makes it possible to use the R&S®BTC and the R&S®VTx to objectively determine the audio and video quality. The A/V distortion analysis measurement option compares the video and audio output of a device under test (DUT) in realtime with a previously recorded reference. For the reference recording, the same video processing chain and the same A/V material must be used. A/V distortion analysis measures the deviations with respect to a recorded reference (as opposed to absolute A/V quality). Using this recorded reference has the advantage that all video scaling applied to the signal in the video processing chain is excluded from the test. Instead, the DUT performance is evaluated to allow reliable identification of influences related to faulty DUT behavior or other disruptions.

See also:
http://www.rohde-schwarz.com/appnote/7BM87

The R&S®VT-KT3360 A/V distortion test module allows users to automate the tests through simple configuration.

❙ R&S®AVBrun A/V distortion test: R&S®VT-KT3360

R&S®AVBrun user-interface for configuration setting.
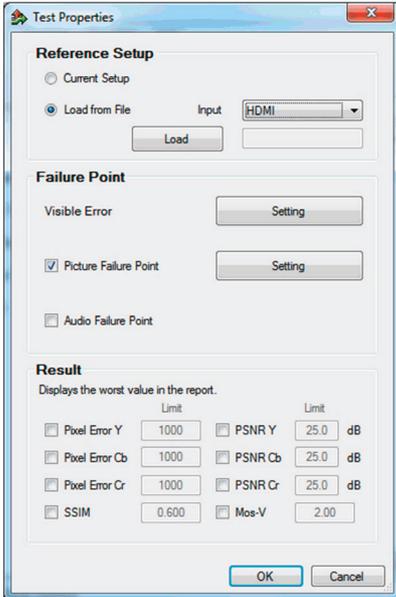
R&S®VT-K2100 A/V distortion analyzer user interface on the R&S®VTC/R&S®VTE.
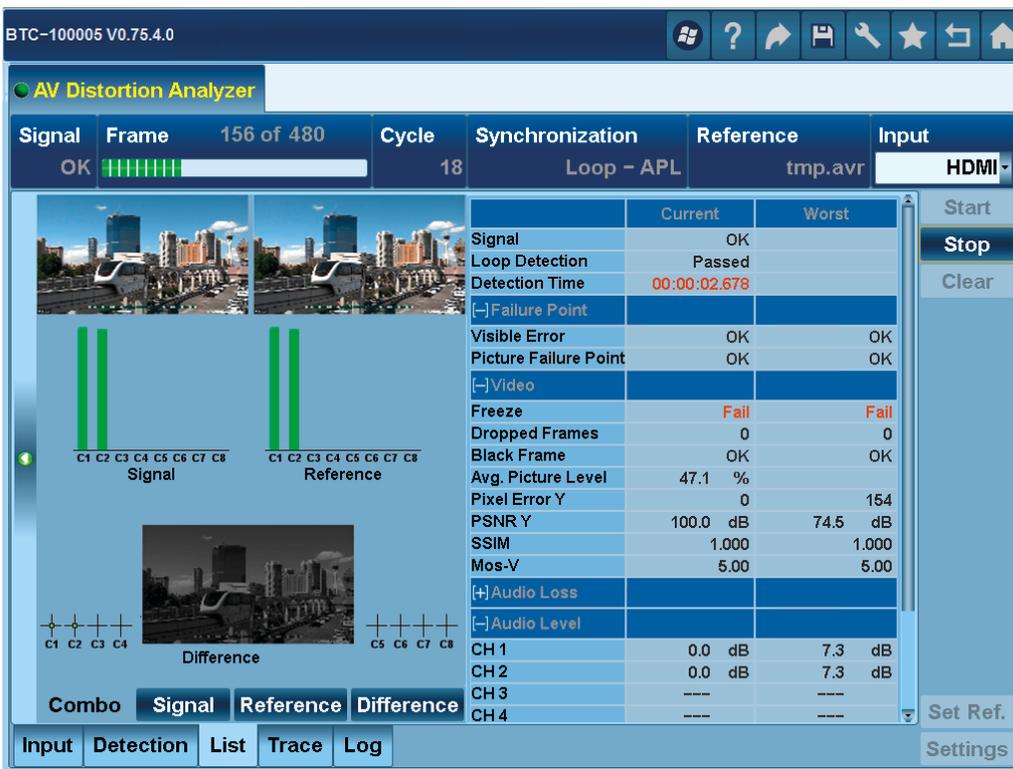
Video analysis and speech quality test solution with the R&S®CMWrun sequencer software tool

With the introduction of voice and video over LTE (VoLTE), video telephony applications allow simultaneous transmission of video and audio. Both video and audio functionalities need to be verified during development and quality assurance. Customers are also demanding more audio and video testing capabilities in a single test and measurement solution for complete testing functionality in overlapping applications.

The R&S®VT-K2111 A/V distortion analysis option allows users to assess video quality. Audio quality is evaluated with the help of the perceptual objective listening quality analysis (POLQA) and perceptual evaluation of speech quality (PESQ).

R&S®CMWrun video/audio analysis test solution.

Ordering information

Designation	Type	Order No.
Base software package		
Audio/Video/Broadcast Sequencer Software Tool, free download from Rohde & Schwarz homepage	R&S®AVBrun Test Suite	2116.1192.00
For R&S®AVBrun D-Book, NorDig and E-Book test suites		
Software options for the R&S®BTC		
R&S®AVBrun D-Book Test Suite	R&S®BTC-KT3310	2114.7987.02
R&S®AVBrun NorDig Test Suite	R&S®BTC-KT3311	2114.7993.02
R&S®AVBrun E-book Test Suite [1]	R&S®BTC-KT3312	2114.8002.02
R&S®AVBrun NorDig Test Suite, Subset Cable [1]	R&S®BTC-KT3325	2114.8019.02
R&S®AVBrun NorDig Test Suite, Subset Satellite [1]	R&S®BTC-KT3326	2114.8025.02
R&S®AVBrun NorDig Test Suite, Subset DVB-T/DVB-T2 [1]	R&S®BTC-KT3327	2114.8077.02
R&S®AVBrun Thailand Profile	R&S®BTC-KT3332	2114.8102.02
R&S®AVBrun Vietnam Profile	R&S®BTC-KT3333	2114.8119.02
R&S AVBrun Malaysia Profile [1]	R&S®BTC-KT3334	2114.8125.02
R&S AVBrun Singapore Profile [1]	R&S®BTC-KT3335	2114.8131.02
R&S®AVBrun DTMB Terrestrial China [1]	R&S®BTC-KT3330	2114.8060.02
R&S®AVBrun Camera Support [1], supplement to D-Book/NorDig or E-Book testing	R&S®BTC-KT3329	2114.8090.02
Hardware option (for R&S®AVBrun camera support)		
Camera Package, incl. camera and software extension, automatically added to R&S®AVBrun camera support	R&S®BTC-Z3329	2114.7964.02
R&S®BTC base unit extensions (for D-Book, NorDig and E-Book test suites)		
Broadcast Test Center	R&S®BTC	2114.3000.02
Baseband Generator (path A)	R&S®BTC-B1	2114.3500.02
Baseband Main Module (path A)	R&S®BTC-B11	2114.6500.02
Baseband Main Module (path AB)	R&S®BTC-B12	2114.6600.02
RF Path A, 100 kHz to 3 GHz	R&S®BTC-B3103	2114.3100.02
RF Path B, 100 kHz to 3 GHz	R&S®BTC-B3203	2114.3300.02
Fading Simulator (path A)	R&S®BTC-B1031	2114.3700.02
Fading Simulator (path B)	R&S®BTC-B1032	2114.3800.02
Multimedia Generator Suite	R&S®BTC-K20	included in base unit
Multiprofile Gateway DVB-T2	R&S®BTC-K24	2114.7006.02
Arbitrary Waveform Generator	R&S®BTC-K35	2114.6974.02
DVB-T/DVB-H Coder	R&S®BTC-K501	2114.6980.02
J.83/A/B/C Coder (DVB-C, US Cable, ISDB-C)	R&S®BTC-K502	2114.6997.02
DVB-S/DVB-S2, DSNG Coder	R&S®BTC-K508	2114.7093.02
DVB-T2 Coder	R&S®BTC-K516	2114.7035.02
DVB-C2 Coder	R&S®BTC-K517	2114.7041.02
AWGN after Fading	R&S®BTC-K1040	2114.7070.02
Extended Noise Generator	R&S®BTC-K1043	2114.7235.02
DTV Interferers	R&S®WV-K1114	2116.9964.02
Cable Interferers	R&S®WV-K1116	2116.9970.02
Satellite Interferers	R&S®WV-K1123	2116.9987.02
Analog Signals	R&S®WV-K816	2116.9935.02
Basic Stream Library	R&S®LIB-K70	2116.9558.02
DVB-T2 MI Streams	R&S®LIB-K57	2116.9429.02
HDMI RX 225 MHz Analyzer Module	R&S®VT-B2360	2115.7616.06
HDMI RX 300 MHz Analyzer Module	R&S®VT-B2361	2115.7639.06
Analog A/V RX	R&S®VT-B2370	2115.7600.06
A/V Distortion Test	R&S®VT-KT3360	2115.8387.02
Video Analysis	R&S®VT-K2100	2115.8029.02
Video Measurements	R&S®VT-K2101	2115.8264.02

Designation	Type	Order No.
A/V Distortion Analysis	R&S®VT-K2111	2115.8041.03
Power Measurement	R&S®BTC-K2055	2114.7258.02
Recommended extras		
RedRat3-II Infrared Remote Control Input/Output Device	RedRat3	2114.3375.02
EPC IP Power Control USA	IP POWER CONTROL 9255US	2114.4142.02
EPC IP Power Control Australia	IP POWER CONTROL 9255AU	2114.4159.02
EPC IP Power Control Germany/EU	IP POWER CONTROL 9255GE	2114.4165.02
EPC IP Power Control UK	IP POWER CONTROL 9255UK	2114.4171.02
For R&S®AVBrun HDMI CTS source test and R&S®AVBrun HDMI CTS sink test		
Software options for the R&S®VTx video testers		
R&S®AVBrun HDMI CTS Source Test	R&S®VT-KT3357	2115.8506.02
R&S®AVBrun HDMI CTS Sink Test	R&S®VT-KT3356	2115.8493.02
R&S®VTx base units and extensions		
Video Test Center	R&S®VTC	2115.7400.02
Video Tester	R&S®VTE	2115.7300.02
For R&S®AVBrun HDMI CTS source test		
HDMI CTS RX/TX 600 MHz	R&S®VT-B2362	2115.7700.06
HDMI RX 225 MHz	R&S®VT-B2360	2115.7616.06
HDMI RX 300 MHz	R&S®VT-B2361	2115.7639.06
HDMI CTS Source Test	R&S®VT-K2365	2115.8270.02
For R&S®AVBrun HDMI CTS sink test		
HDMI TX 300 MHz	R&S®VT-B360	2115.7500.06
HDMI Moving Pictures	R&S®VT-K361	2115.7545.02
HDMI User-Defined Timing	R&S®VT-K362	2115.8293.02
HDMI CTS Sink Test	R&S®VT-K365	2115.8312.02
For automated A/V tests in wireless communications applications		
R&S®CMWrun VTX A/V Quality	R&S®CMW-KT105	Please contact your local Rohde & Schwarz sales office.

[1] Coming soon.
[2] For detailed configuration of the R&S®BTC, visit the Rohde & Schwarz website, R&S®BTC product page.

Your local Rohde & Schwarz expert will help you determine the optimum solution for your requirements.
To find your nearest Rohde & Schwarz representative, visit
www.sales.rohde-schwarz.com

About Rohde & Schwarz

The Rohde & Schwarz electronics group offers innovative solutions in the following business fields: test and measurement, broadcast and media, secure communications, cybersecurity, radiomonitoring and radiolocation. Founded more than 80 years ago, this independent company has an extensive sales and service network and is present in more than 70 countries. The electronics group is among the world market leaders in its established business fields. The company is headquartered in Munich, Germany. It also has regional headquarters in Singapore and Columbia, Maryland, USA, to manage its operations in these regions.

Sustainable product design

▪ Environmental compatibility and eco-footprint
▪ Energy efficiency and low emissions
▪ Longevity and optimized total cost of ownership

Certified Quality Management
ISO 9001

Certified Environmental Management
ISO 14001

Rohde & Schwarz GmbH & Co. KG
www.rohde-schwarz.com

Regional contact
▪ Europe, Africa, Middle East | +49 89 4129 12345
customersupport@rohde-schwarz.com
▪ North America | 1 888 TEST RSA (1 888 837 87 72)
customer.support@rsa.rohde-schwarz.com
▪ Latin America | +1 410 910 79 88
customersupport.la@rohde-schwarz.com
▪ Asia Pacific | +65 65 13 04 88
customersupport.asia@rohde-schwarz.com
▪ China | +86 800 810 82 28 | +86 400 650 58 96
customersupport.china@rohde-schwarz.com