

TV Analyzer R&S®FSH3-TV

Universal, portable combination of TV analyzer and spectrum analyzer

Mobile measurement and service technicians place high demands on their measuring instruments. Not only are characteristics like size, weight, reliability and rugged design important – another must is a wide variety of measurement functions, precision and a high dynamic range.

The R&S®FSH3-TV offers all these strengths (FIG 1).

For measurements on TV transmitters or TV cable networks

The TV Analyzer R&S®FSH3-TV combines the measurement capabilities of a TV test receiver with spectrum analyzer capability, despite its extremely small size. Its compact design and low weight make it ideal for portable use in installation, maintenance and servicing of TV transmitters and cable networks. What these fields of application share is working in cramped spaces at changing sites often under adverse climatic conditions.

Since the TV Analyzer R&S®FSH3-TV also has reinforced corners and covered RF connectors, it can withstand occasional rough treatment. A rugged handle and a foldable stand together with a daylight-compatible color display offer you an optimum viewing angle to the analyzer.

The built-in NiMH battery ensuring up to four hours of reliable operation independent of the AC supply supports mobile use of the measuring instrument.



44310/7

FIG 1
The TV Analyzer R&S®FSH3-TV was presented at NAB 2005 where it received three awards. The reason is clear: The innovative instrument can handle a wide variety of applications in the installation, maintenance and servicing of TV transmitters and cable networks.



44310/8

TV specialist

The TV Analyzer R&S®FSH3-TV offers features and options specially tailored to measurement tasks that have to be mastered by TV cable and transmitter network operators. Measurement frequencies, for example, can be set via supplied TV channel tables.

The TV board (FIG 2) integrated into the base unit offers comprehensive TV measurement functions for analyzing and demodulating analog and digital TV signals. FIG 4 provides an overview of the available TV standards.

The R&S®FSH3-TV normally comes with an RF input and N connector (50 Ω). The Matching Pads R&S®RAZ (50/75 Ω) or R&S®FSH-Z38 are provided to ensure the correct characteristic impedance connection to cable network components or TV antenna systems, for example.

If the analyzer is often used in cable networks, it is advisable to work with the new Preselector R&S®FSHTV-Z60 (FIG 3). This preselector, which is connected ahead of the broadband RF input of the R&S®FSH3-TV, improves the usable dynamic range when measurements have to be made at high channel density. The preselector is simply fastened to the RF input of the analyzer and connected to the base unit via the control cable by which it is fed. The RF input of the preselector is a 75 Ω F connector that can be easily exchanged so that the R&S®FSH3-TV can immediately be used again.

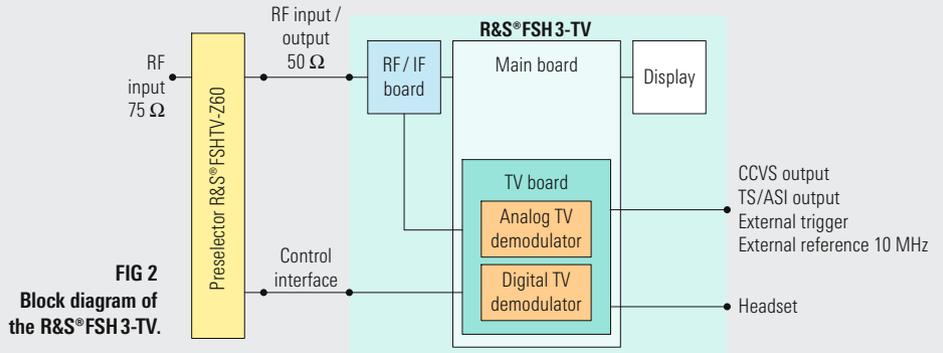


FIG 2
Block diagram of the R&S®FSH3-TV.



FIG 3
Preselector R&S®FSHTV-Z60.

FIG 4
TV standards of the R&S®FSH3-TV.

R&S®FSH3-TV (as standard)	B, G, H, D/K, N, I, L, M/NTSC, M/PAL
R&S®FSHTV-K21 (option)	DVB-C (J.83/A/C), J.83/B
R&S®FSHTV-K22 (option)	ATSC/8VSB

The most important abbreviations

ATSC/8VSB	Digital terrestrial TV (US standard)
BER	Bit error ratio
C/N	Carrier to noise
CSO	Composite second order
CTB	Composite triple beat
DTV	Digital TV
DVB-C	Digital video broadcast – cable
EVM	Error vector magnitude
MER	Modulation error ratio
TS-ASI	Transport stream – asynchronous serial interface

► Analog TV still widely used

Despite continuing digitization, analog TV is still widely used and is sure to endure. The TV Analyzer R&S®FSH3-TV is ready to meet these requirements, since it offers a variety of analog TV measurements as standard for the most common analog TV standards worldwide.

In the Measurement List mode, the analyzer displays the statuses of the vision and sound carriers and measures the S/N ratio of the video signal (FIG 5). The display optimally adapts to the selected TV standard. In the Video Scope mode, the analyzer demodulates the video signal and displays it on the measurement screen in the time domain (FIG 6). Marker functions allow detailed measurements. In the Measurement List and Video Scope modes, the demodulated video signal for controlling by a TV monitor is available at the BNC multifunction connector. You can listen to the demodulated sound signal by using the headphones supplied.

The Carrier Measurements mode precisely measures the vision and sound carriers. The device settings are adapted to the selected TV standard. Another special feature of the R&S®FSH3-TV is a video line trigger that, in the Vision Modulation mode, allows you to measure modulation depth and residual carrier. The measurement screen conveniently displays the vision carrier power of individual video lines.

Upgradeable for DVB-C and ATSC

You can swiftly and easily upgrade the R&S®FSH3-TV at any time to perform measurements on digital TV signals. The analyzer offers the most important operating parameters of the selected DTV channel at a glance together with parameters such as MER, EVM or BER (FIG 7). The constellation diagram (FIG 8) is important for further analysis of the DTV signal. All parameters and measurement values are displayed in parallel.

The demodulated DTV signal is available at the combined BNC output (here: TS-ASI output) for further processing. You can connect an MPEG-2 transport stream analyzer such as the R&S®DVM 400 from Rohde & Schwarz to make further in-depth measurements.

Also spectrum specialist

To fully detect the characteristics of a TV transmitter or a cable network system, you must have a number of measurement results in the frequency spectrum in addition to the measurement parameters specifying the quality of a modulated TV signal. The R&S®FSH3-TV therefore offers special settings and test routines, e.g. measurements of the shoulder attenuation (FIG 9), C/N, CSO, CTB or HUM.

First a specialist, now an allrounder

An extensive range of optional accessories opens up a variety of options to optimally adapt the R&S®FSH3-TV to the task at hand. Various power and directional power sensors as well as the VSWR Bridge and Power Divider R&S®FSH-Z2 are available. With the measurement bridge and the R&S®FSH-B1 option, you can perform distance-to-fault measurements, for example, and detect poor connection points or damaged cables.

You can also store antenna factors in the R&S®FSH3-TV. With a suitable measurement antenna, e.g. the R&S®HE 200 from Rohde & Schwarz, you can make coverage measurements.

Summary

The TV Analyzer R&S®FSH3-TV is an excellent solution for TV measurement technicians. They can fully rely on a portable, universal and unfailing measuring instrument in installation, maintenance and service. The wide variety of functions from special TV measurements to universal measurements makes the R&S®FSH3-TV a future-proof and efficient investment unrivaled in this compact equipment class.

Werner Dürport



FIG 5 Operating mode ANALOG TV RECEIVER – Measurement List.

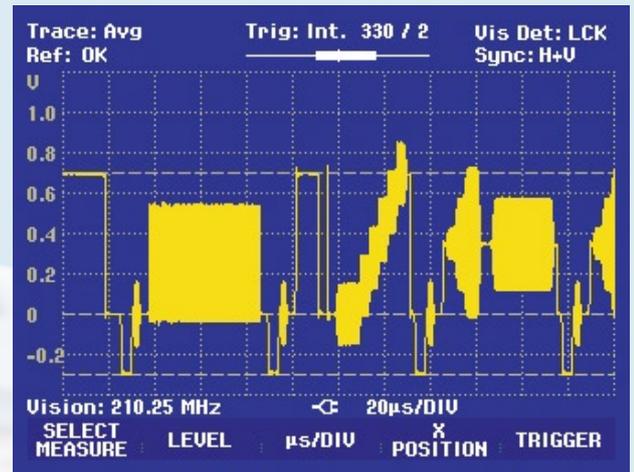


FIG 6 Operating mode ANALOG TV RECEIVER – Video Scope.

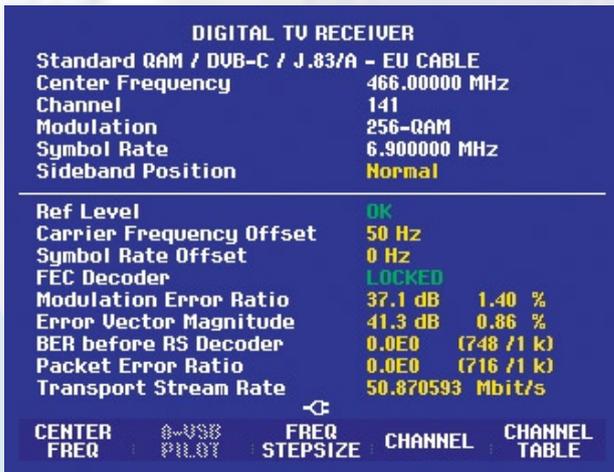


FIG 7 Operating mode DIGITAL TV RECEIVER.



FIG 8 Constellation diagram 256QAM.

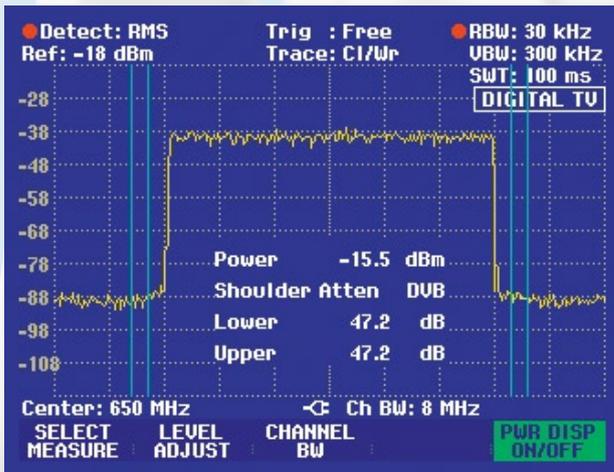


FIG 9 Measurement of shoulder attenuation of DVB-T signal in line with ETSI TR101290.

Condensed data of the R&S®FSH3-TV

Digital TV receiver (option R&S®FSHTV-K21 for QAM, R&S®FSHTV-K22 for 8VSB)	
Modulation methods	4 / 16 / 32 / 64 / 128 / 256QAM, 8VSB
Bandwidths (depending on standard)	6 MHz, 7 MHz and 8 MHz
Symbol rate at QAM / ATSC	2 MHz to 6.999 MHz / 10.762238 MHz
Inherent MER (equalizer ON)	>35 dB
Analog TV receiver	
Standards	B, G, H, D, K, I, L, M, N,
Sound standards	IRT-A2, NICAM , BTSC , EIA-J
Video bandwidths	depending on standard
Inherent S/N video, weighted to CCIR Rec. 567	>50 dB
Spectrum analyzer	
Frequency range	100 kHz to 3 GHz
Resolution bandwidths	100 Hz to 1 MHz
Video bandwidths	10 Hz to 3 MHz
Displayed average noise level	typ. -135 dBm (100 Hz)
TOI	typ. 13 dBm
SSB phase noise	<-100 dBc (1 Hz) at 100 kHz from carrier
Sweep time (span = 0 Hz)	1 ms to 100 s
Detectors	Sample, Max/Min Peak, Auto Peak, RMS
Level measurement uncertainty	<1.5 dB, typ. 0.5 dB
Reference level	-80 dBm to +20 dBm
General data	
Dimensions (W × H × D)	170 mm × 120 mm × 270 mm
Weight	2.7 kg

More information and data sheet at www.rohde-schwarz.com (search term: FSH3-TV)