

# R&S®SFC Compact Modulator and R&S®SFC-U Compact USB Modulator

## Test signals for TV and audio broadcasting – handy and economical



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# R&S®SFC Compact Modulator and R&S®SFC-U USB Compact Modulator

## At a glance

The R&S®SFC compact modulator and the R&S®SFC-U USB compact modulator are economical multistandard signal sources. They support realtime coding for all conventional digital and analog TV and audio broadcasting standards. The R&S®SFC is equipped with a built-in computer, making it ideal for standalone operation. The R&S®SFC-U is a USB device designed for use with a PC.

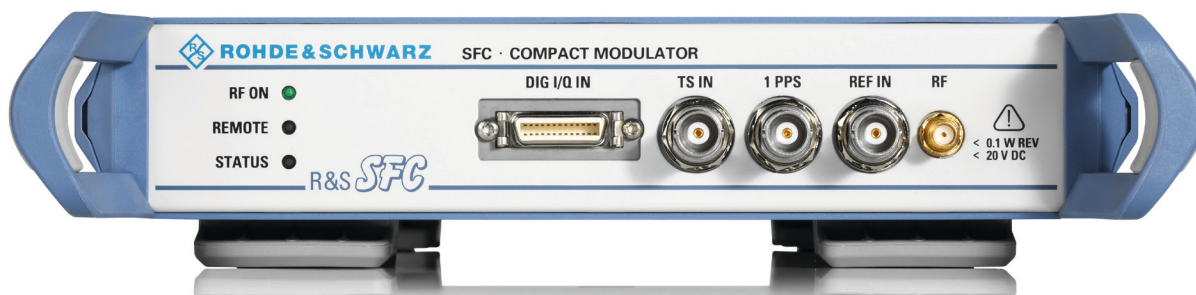
The R&S®SFC and R&S®SFC-U have an extremely compact design. Though small in size, they are full-featured TV and audio broadcasting signal generators with integrated transport stream player, audio/video generator and optional noise source. Even when it comes to signal quality, Rohde&Schwarz makes no compromises in this price class.

The R&S®SFC compact modulator is particularly well-suited for rack installation in production test systems. It is controlled using Remote Desktop via LAN or remotely with SCPI commands. The instrument can also be operated directly with a mouse, keyboard and monitor – with the same tried-and-tested graphical user interface (GUI) as the R&S®SFU and R&S®SFE.

The R&S®SFC-U USB compact modulator offers the same signal generator functions as the R&S®SFC in an even smaller housing, making room on the lab bench for the DUT and other equipment. The R&S®SFC-U is connected to the USB port of a host PC and controlled from the PC. The wide range of functions make the R&S®SFC-U ideal for developing software and hardware for TVs and set-top boxes. In addition, both instruments support the other tried-and-tested functions included in the Rohde&Schwarz professional broadcast signal generators, such as external reference, digital I/Q input, 1PPS input and ASI transport stream input.

### Key facts

- High precision modulator with MER > 40 dB
- VHF and UHF frequency range, optionally up to 3 GHz
- Level range from 0 dBm to -31.5 dBm, optionally to -110 dBm
- Transport stream player and audio/video generator
- AWGN generator



R&S®SFC.

# R&S®SFC Compact Modulator and R&S®SFC-U USB Compact Modulator Benefits and key features

## R&S®SFC: optimized for use in production test systems

- ▮ Compact housing, ideal for rack installation
  - ▮ Compatible with R&S®Central TX System Control
  - ▮ Supports standalone operation and booting without a PC
  - ▮ Low power consumption for reduced operating costs
- ▷ [page 4](#)

## R&S®SFC-U: plug & play test signal generation

- ▮ Handy, easy and flexible
  - ▮ Practical tool for software development
  - ▮ High signal quality for receiver tests
- ▷ [page 5](#)

## Multistandard signal generator with realtime coding

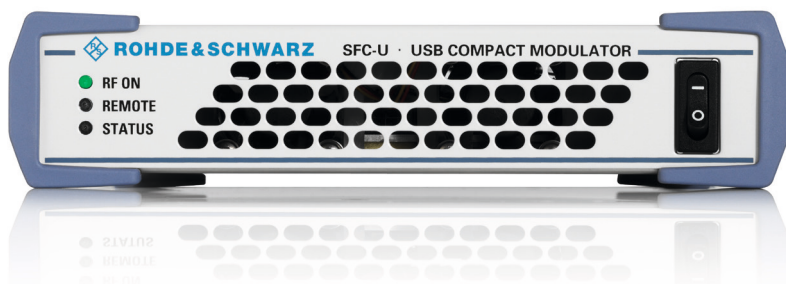
- ▮ Digital and analog standards for cable, satellite and terrestrial TV
  - Terrestrial: DVB-T2, DVB-T, DVB-H, DTMB, CMMB, T-DMB, ISDB-T, ISDB-TB, ATSC/8VSB, ATSC-M/H, MediaFLO™
  - Cable: DVB-C2, DVB-C, J.83/B, ISDB-C
  - Satellite: DVB-S2, DVB-S, DIRECTV
  - Analog TV: B/G, D/K, I, M/N, L
- ▮ Digital and analog audio broadcasting standards
  - DAB, DAB+, ISDB-TSB, FM/RDS
- ▮ Realtime signal generation and coding
- ▮ Additional standards available as software options

## Integrated baseband signal sources

- ▮ Transport stream player
- ▮ Analog audio/video generator
- ▮ Transport stream libraries for digital TV and audio broadcasting standards
- ▮ Test pattern library for analog TV

## Additional functions for professional applications

- ▮ Integrated AWGN generator
- ▮ ASI transport stream input
- ▮ Digital I/Q input
- ▮ 1 pps synchronization
- ▮ 10 MHz reference input



R&S®SFC-U.

# R&S®SFC: optimized for use in production test systems

To comply with the wide range of transmission standards, manufacturers of set-top boxes and TVs require a variety of test signals at different frequencies and with various kinds of content. The signals are delivered by signal generators, which are usually kept in a separate room. A coupling network combines the signals and distributes them to the individual test stations in the factory via cable. Similar concepts are used in the automobile industry to simulate realistic transmitter scenarios. These types of systems are used, for example, to test station scanning and automatic frequency changes on multimedia receivers in vehicles under realistic conditions.

## Compact housing, ideal for rack installation

The R&S®SFC measures only ½ 19" rack width and 1 HU in size, making it the most compact standalone TV and audio broadcasting signal generator on the market. Thanks to its standard dimensions, the R&S®SFC is ideal for rack installation. To ensure air circulation in the rack, no two R&S®SFC may be installed adjacently. However, the instruments can be placed directly on top of each other due to the low heat dissipation. This cuts rack size in half compared to the conventional 19" 1 HU instruments.

## Compatible with R&S®Central TX System Control

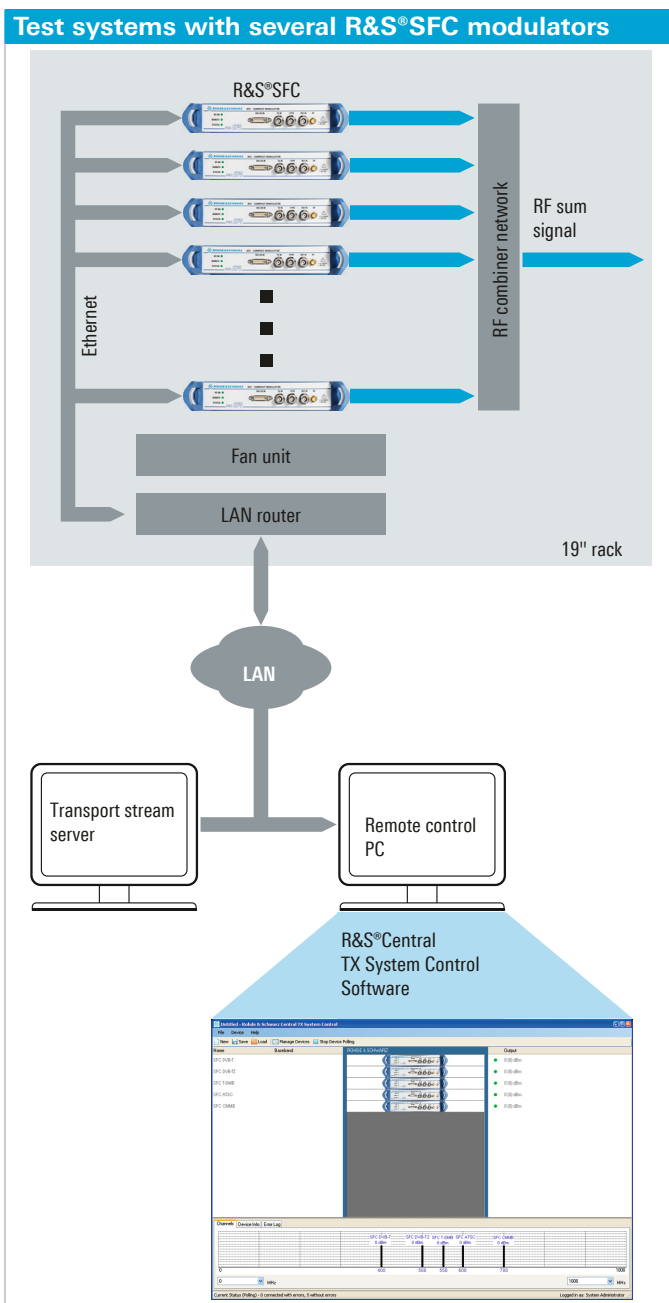
The free R&S®Central TX System Control software has been designed specifically for controlling production test systems configured with multiple R&S®SFC modulators. The software allows users to conveniently control and monitor the generators in a test system via LAN. The software provides a neat graphical display of the system configuration and indicates the current system status.

## Supports standalone operation and booting without a PC

The R&S®SFC is equipped with a built-in computer module that supports standalone operation. This has two advantages: First, the R&S®SFC can be operated using a mouse, keyboard and monitor – no PC is required. Second, the R&S®SFC boots independently, starting with the last saved configuration. This means that a test system starts autonomously and is properly configured after a power failure – an invaluable advantage especially in countries where the power supply is unreliable.

## Low power consumption for reduced operating costs

Test systems used in production run around the clock. The energy consumed by the signal generators and the air-conditioning system for the transmitter room therefore accounts for the majority of a system's operating costs. Over the life of a system, energy costs can exceed equipment purchase costs. The R&S®SFC features an extremely low power consumption of approx. 44 W, which translates into lower operating costs and better protection of the environment.



# R&S®SFC-U: plug & play test signal generation

## Handy, easy and flexible

The R&S®SFC-U is even smaller than the R&S®SFC. It does not require a built-in computer module and its software runs on a host PC connected via USB. This reduces instrument size to a minimum. The plug & play USB connection allows the R&S®SFC-U to be operated from any PC running the R&S®SFC-U software. Getting the system up and running is quick and easy. The R&S®SFC-U is therefore an ideal flexible signal source for presentations and trade fair booths.

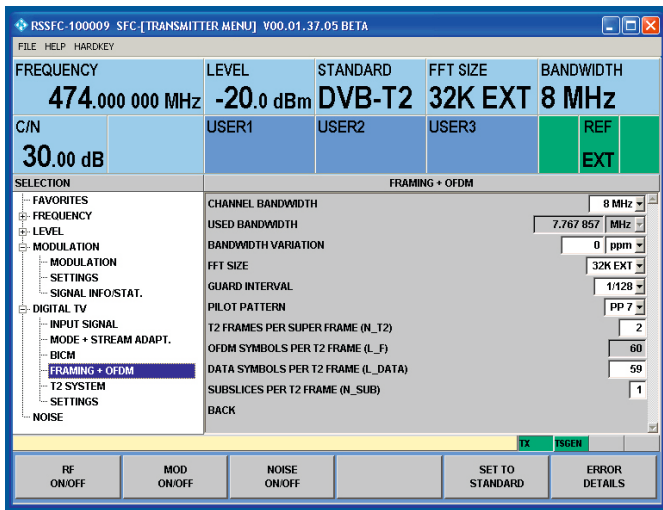
## Practical tool for software development

Today, every lab bench has a PC. Why not use it to generate the test signal for the DUT too? Particularly when it comes to software and firmware development for TV receivers, a standard-compliant stimulus signal is sufficient for the DUT. The signal generator's range of functions is not as important. However, the generator should be easy to install and operate. The R&S®SFC-U complies with all of these requirements, bringing the tried-and-tested, straightforward GUI of the R&S®SFU and R&S®SFE to the PC. If the transport streams required for the tests are stored on the same PC or server within the same network, the entire test signal generation is available on the PC.

## High signal quality for receiver tests

The R&S®SFC-U is the latest addition to the Rohde & Schwarz family of TV and audio broadcasting signal generators. Although the instruments differ significantly in their range of functions, they do have one thing in common: high signal quality. The R&S®SFC-U is also setting standards in its class. A level range from -110 dBm to 0 dBm and an MER of more than 40 dB make it ideal for tuner and receiver measurements as well as for testing TV transposers. Its frequency range of up to 3 GHz includes all bands used for audio and TV broadcasting.

User-friendly, simple GUI of the R&S®SFC-U software on PC.



TV test signal generation with the R&S®SFC-U.



# Specifications in brief

Specifications in brief		R&S®SFC and R&S®SFC-U	
<b>RF characteristics</b>			
Frequency range	base unit	30 MHz to 900 MHz	
	with R&S®SFC/SFC-U-K83 option	30 MHz to 3000 MHz	
Frequency setting resolution		1 Hz	
Level setting range	base unit	-31.5 dBm to 0 dBm RMS for DVB-T	
	with R&S®SFC/SFC-U-K84 option	-110 dBm to 0 dBm RMS for DVB-T	
Level setting resolution		0.1 dB	
MER	for OFDM modulation	> 40 dB	
<b>Modulation systems</b>			
Terrestrial TV and mobile TV		DVB-T2 DVB-T, DVB-H DTMB CMMB T-DMB ISDB-T, ISDB-TB, ISDB-T 1 seg. ATSC/8VSB, ATSC-M/H MediaFLO™	
Cable TV		DVB-C2 DVB-C, ISDB-C J.83/B	
Satellite TV		DVB-S2 DVB-S DIRECTV	
Analog TV		B/G, D/K, I, M/N, L	
Digital audio broadcasting		DAB, DAB+ ISDB-TSB	
Analog audio broadcasting		FM mono, FM stereo with RDS	
<b>Additional functionality</b>			
Transport stream player	file format	TRP, T10, ETI, FLO, MFS, PMS, BIN	
Audio/video generator	file format	Rohde & Schwarz proprietary	
AWGN	signal-to-noise ratio (SNR)	-30 dB to +60 dB	
<b>General data</b>			
Operating temperature range		+5°C to +45°C	
		<b>R&amp;S®SFC</b>	<b>R&amp;S®SFC-U</b>
Dimensions	W × H × D (without handles)	229 mm × 54.4 mm × 406 mm (9.02 in × 2.14 in × 15.98 in)	177 mm × 40 mm × 241 mm (6.97 in × 1.57 in × 9.49 in)
Weight		4 kg (8.82 lb)	1.5 kg (3.3 lb) (without power supply unit)
Required PC operating system		-	Windows XP Service Pack 3, 32 bit Windows 7

For data sheet, see 5214.5910.22 and [www.rohde-schwarz.com](http://www.rohde-schwarz.com)

# Ordering information

Designation	Type	Order No.
	<b>R&amp;S®SFC</b>	
Base unit	R&S®SFC	2115.3510.02
Extensions		
Frequency Extension, 30 MHz to 3 GHz	R&S®SFC-K83	2115.5759.02
Electronic Attenuator, 0 dB to +110 dB	R&S®SFC-K84	2115.5736.02
AWGN Noise Generator	R&S®SFC-K40	2115.5794.02
Digital I/Q Input	R&S®SFC-K80	2115.5771.02
Coder Extension Board	R&S®SFC-B15	2115.5836.02

Designation	Type	Order No.
	<b>R&amp;S®SFC-U</b>	
Base unit	R&S®SFC-U	2115.3540.02
Extensions		
Frequency Extension, 30 MHz to 3 GHz	R&S®SFC-U-K83	2115.5742.02
Electronic Attenuator, 0 dB to +110 dB	R&S®SFC-U-K84	2115.5720.02
AWGN Noise Generator	R&S®SFC-U-K40	2115.5788.02
Digital I/Q Input	R&S®SFC-U-K80	2115.5765.02
Coder Extension Board	included in R&S®SFC-U base unit	

Designation	Type	Order No.
Modulation systems for R&S®SFC		
Coder DVB-T2	R&S®SFC-K16	2115.5494.02
Coder DVB-T/DVB-H	R&S®SFC-K1	2115.5271.02
Coder DTMB	R&S®SFC-K12	2115.5459.02
Coder CMMB	R&S®SFC-K15	2115.5471.02
Coder T-DMB/DAB/DAB+	R&S®SFC-K11	2115.5436.02
Coder ISDB-T/ISDB-TB/ISDB-TSB	R&S®SFC-K6	2115.5371.02
Coder ATSC/8VSB	R&S®SFC-K4	2115.5320.02
Coder ATSC-M/H	R&S®SFC-K18	2115.5513.02
Coder MediaFLO™	R&S®SFC-K10	2115.5859.02
Coder DVB-C2	R&S®SFC-K17	2115.5871.02
Coder DVB-C/ISDB-C	R&S®SFC-K2	2115.5294.02
Coder J.83/B	R&S®SFC-K5	2115.5359.02
Coder DVB-S2	R&S®SFC-K8	2115.5394.02
Coder DVB-S/DVB-DSNG	R&S®SFC-K3	2115.5313.02
Coder DIRECTV	R&S®SFC-K9	2115.5413.02
Coder FM/RDS	R&S®SFC-K170	2115.5536.02
Coder ATV Standard B/G	R&S®SFC-K190	2115.5559.02
Coder ATV Standard D/K	R&S®SFC-K191	2115.5571.02
Coder ATV Standard I	R&S®SFC-K192	2115.5594.02
Coder ATV Standard M/N	R&S®SFC-K193	2115.5613.02
Coder ATV Standard L	R&S®SFC-K194	2115.5636.02
Coder ATV Multistandard	R&S®SFC-K195	2115.5659.02

Designation	Type	Order No.
Modulation systems for R&S®SFC-U		
Option Package Terrestrial TV (includes DVB-T, DVB-H, ISDB-T, ISDB-TB, ISDB-TSB, DTMB, CMMB, ATSC/8VSB, ATSC-M/H, MediaFLO™)	R&S®SFC-U-PK1	2115.5888.02
Option Package Cable TV (includes DVB-C, J.83/B, ISDB-C)	R&S®SFC-U-PK2	2115.5894.02
Option Package Satellite TV (includes DVB-S2, DVB-S, DIRECTV, R&S®SFC-U-K83 frequency extension)	R&S®SFC-U-PK3	2115.5907.02
Option Package T2/C2 (includes DVB-T2, DVB-C2)	R&S®SFC-U-PK4	2115.5913.02
Option Package Audio Broadcasting (includes DAB, DAB+, T-DMB, FM/RDS) Note: DAB, DAB+ and T-DMB might require the frequency extension R&S®SFC-K83.	R&S®SFC-U-PK5	2115.5920.02
Option Package Analog TV (includes standards B/G, D/K, I, M/N, L)	R&S®SFC-U-PK6	2115.5936.02

Service options			
	R&S®SFC	R&S®SFC-U	
Extended Warranty, one year	R&S®WE1SFC	R&S®WE1SFC-U	Please contact your local Rohde & Schwarz sales office.
Extended Warranty, two years	R&S®WE2SFC	R&S®WE2SFC-U	
Extended Warranty, three years	R&S®WE3SFC	R&S®WE3SFC-U	
Extended Warranty, four years	R&S®WE4SFC	R&S®WE4SFC-U	
Extended Warranty with Calibration Coverage, one year	R&S®CW1SFC	R&S®CW1SFC-U	
Extended Warranty with Calibration Coverage, two years	R&S®CW2SFC	R&S®CW2SFC-U	
Extended Warranty with Calibration Coverage, three years	R&S®CW3SFC	R&S®CW3SFC-U	
Extended Warranty with Calibration Coverage, four years	R&S®CW4SFC	R&S®CW4SFC-U	



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