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## Transmitter/Retransmitter R&S® SV8000

Air-cooled UHF low-power transmitters for DVB-T/-H and ATSC

- ◆ All DVB-T/-H and ATSC low-power transmitter and DVB-T retransmitter applications in one product family
- ◆ Output power from 12 W to 400 W (DVB-T/-H)
- ◆ Output power from 18 W to 460 W (ATSC)
- ◆ Output frequency range from 470 MHz to 862 MHz
- ◆ Flexible, scalable and upgradeable
- ◆ Highly compact
- ◆ Various standby systems available
- ◆ Power amplifiers based on LDMOS technology
- ◆ Transmitter remote control and monitoring via SNMP and/or HTTP interface



**ROHDE & SCHWARZ**

## At a glance

Rohde & Schwarz offers a complete family of UHF low-power DVB-T/-H and ATSC transmitting equipment to cover the following applications:

- ◆ DVB-T/-H transmitter with standard ASI signal as input
- ◆ ATSC transmitter with SMPTE 310M interface
- ◆ DVB-T retransmitter for rebroadcasting an off-air signal

The family is designed as a flexible and compact system consisting of different modules that can be selected and interconnected in accordance with the required application and output power. The main building blocks are the following:

- ◆ R&S®Sx800 DVB-T/-H or ATSC exciter
- ◆ Amplifiers R&S®VH6xxx with integrated power supply (12 W/18 W to 100 W/130 W DVB/ATSC output power)
- ◆ R&S®NetCCU®800 as an expanded system controller for standby configurations and/or as a network-oriented remote control unit for SNMP and web

Since the exciter stage is equipped with an amplifier control unit, single transmitters up to 100 W DVB-T/-H (130 W ATSC) are available as standalone systems. This means that only two modules, exciter and amplifier, are required in this case. All operation-relevant interfaces are fully integrated into the units. Additional components to be built into a rack are required only for standby systems or if several amplifiers are combined to boost output power. Nineteen-inch racks of 12, 21 and 42 height units are available.

The modular concept and the compactness, which allows several transmitters to be integrated in one rack, ensure maximum flexibility. The various transmitting systems for low-power applications – even the Rohde & Schwarz transposer family – are based on the same amplifier units. Therefore, operation, training and logistics can be considerably facilitated, especially in networks involving a mix of different applications. Moreover, adding amplifiers with higher output power or extra transmitters to an existing rack takes almost no effort.

## TV Exciter R&S®Sx800

Using state-of-the-art technology, the new multistandard TV Exciter R&S®Sx800 is accommodated in housing of only one height unit. It performs full signal processing from the transport stream to the standard-conforming RF output signal. Its flexible concept ensures high safety of investment.

The new TV Exciter R&S®Sx800 contains the following main modules:

- ◆ Input interface
- ◆ Mainboard
- ◆ RF interface
- ◆ Power supply

## Input interface

The input interface is equipped with four ASI inputs (DVB-T/-H) or two 2 × SMPTE 310M and two ASI inputs (ATSC). This makes it a universal input stage – capable of handling all operating modes of the DVB-T/-H and ATSC standards.

The input interface monitors the packet synchronization and the data rate of the input signals. Input data buffers eliminate line-side jitter and wander effects.

For operation in single-frequency networks (SFN), an MIP decoder in line with TS 101191 is included in the signal processing. The decoder enables automatic delay compensation and automatic operating mode detection. Seamless, automatic input signal switching ensures a redundant signal feed.

## Mainboard

The mainboard digitally processes and modulates the signals from the input interface in line with the corresponding standard. Digital signal processing ensures maximum stability and allows easy precorrection.

The signals undergo modulation, applying the appropriate algorithm for DVB-T/-H or ATSC. The resulting digital inphase and quadrature (I and Q) signals are taken to a linear and nonlinear precorrector which ensures 100 % reproducibility of the RF signal.



R&S®Sx800 exciter

## RF interface

The RF interface first converts the digital I and Q signals to analog baseband signals. These are double-converted in a subsequent modulator section to yield the final modulated signal. A synthesizer supplies the frequencies required for upconversion. It can of course be locked to an external reference frequency. The high-quality reference oscillator ensures that the required frequency accuracy for SFNs is maintained even if the external reference fails.

Overview of the special characteristics of the TV Exciter R&S®Sx800:

- ◆ Digital signal processing
- ◆ DVB-T, ATSC, optional DVB-H
- ◆ Hierarchical modulation (DVB-T/H)
- ◆ Suitable for single-frequency networks (SFN) and multifrequency networks (MFN)
- ◆ MIP monitoring
- ◆ Automatic/adaptive precorrection (optional)
- ◆ Seamless input switching

## Power amplifiers

The R&S SV8000 family is built on single power amplifier modules of 12/25/50/100 W for DVB-T/H or 18/35/70/130 W for ATSC. All amplifiers are broadband in the 470 MHz to 862 MHz range. Both the power supply and the cooling system are integrated into the amplifiers, thus requiring no peripherals. This enables flexible installation in a standard 19-inch rack or even operation without any rack at all.

The output stages are designed using exclusively LDMOS technology, which ensures high basic linearity and stability of the amplifier characteristic. A built-in protective circuit safeguards the amplifiers against reflection and overheating.



**UHF Amplifier R&S®VH6010A 2: 12 W DVB-T/H / 18 W ATSC**

## Control Unit R&S®NetCCU®800

The R&S®NetCCU®800 is a compact 19-inch rackmount of two height units that is included in the transmitting systems for specific applications.

### Transmitter control unit for standby systems

The R&S®NetCCU®800 contains the transmitter control unit and the automatic switchover unit for exciter standby, passive transmitter standby and (n+1) transmitter standby configurations. In the case of passive standby or (n+1) standby configurations, the R&S®NetCCU®800 controls both exciter switchover and output stage switchover.

### Integration of options

As an option, the R&S®NetCCU®800 can be enhanced by a professional DVB-T receiver. With the receiver option, the R&S®SV8000 series can be used as a retransmitter. The receiver demodulates the off-air signal and provides an error-corrected ASI signal to the exciter.

In addition, an ASI distributor can be integrated into the R&S®NetCCU®800. It is required for exciter standby or passive transmitter standby configurations.



**Control Unit R&S®NetCCU®800**

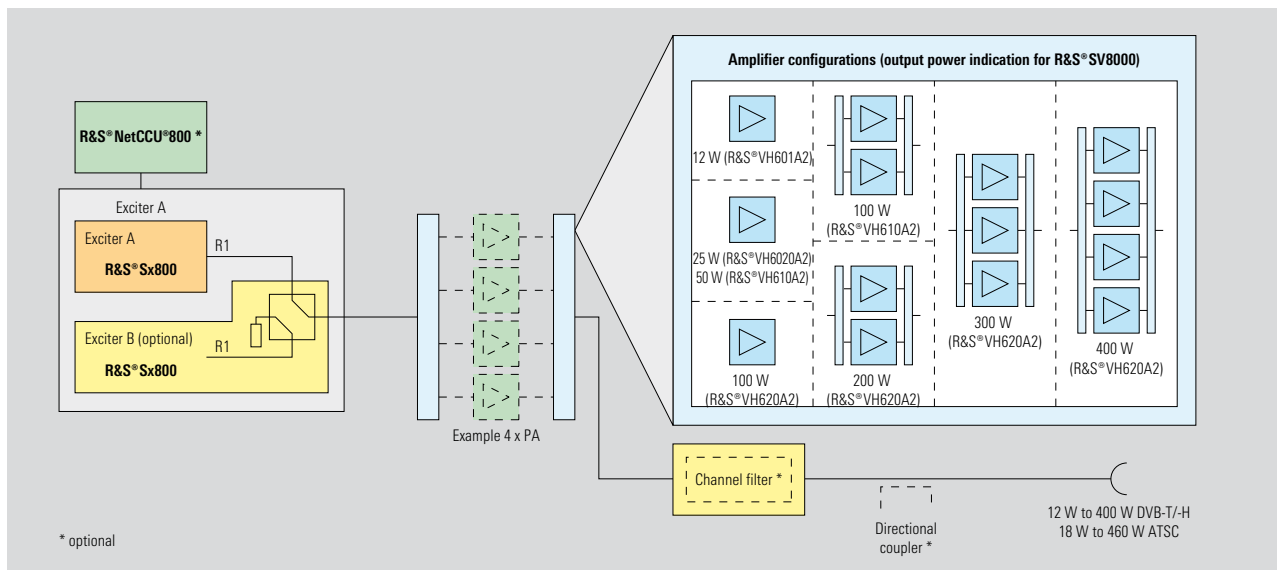
**Remote control interface and local operation via display**

The web server of the Rohde & Schwarz remote control software platform enables direct access to system data through a conventional web browser. No equipment-specific GUI is required.

An SNMP agent is also available and ensures connection to a full-coverage network management system as well as the output of alarms via traps.

With the R&S® NetCCU®800, the customer can comfortably operate the transmitter with the color display and the buttons.

For all applications of the R&S® NetCCU®800, the emergency control ensures that – even if the R&S® NetCCU®800 fails – the transmitter stays in operation.



**Block diagram of an R&S® SV8000 transmitter**

## Specifications common to the R&S®SV8000 family

	R&S®SV8101	R&S®SV8201	R&S®SV8301	R&S®SV8302	R&S®SV8401	R&S®SV8402	R&S®SV8403	R&S®SV8404
Frequency range	470 MHz to 862 MHz							
Power supply	230 V ± 15 %, 47 Hz to 63 Hz							
Max. installation altitude	2000 m above sea level (>2000 m on request)							
Operating temperature range	+1 °C to +45 °C							
Permissible relative humidity	95 %, without condensation							
RF connector	7/16							
<b>Synchronization</b>								
Reference frequency	10 MHz, 0.1 V to 5 V (V <sub>pp</sub> ) or TTL, BNC							
Reference pulse	1 pps (1 Hz, TTL, BNC)							
<b>Local control</b>								
Color display and keys	front-panel operation, optional with the R&S®NetCCU®800							
RJ-45	PC operation via standard web browser							
<b>Remote control</b>								
RJ-45	IEC/IEEE 864-2 via Ethernet, standard							
RJ-45	network management interface (web server and/or SNMP agent), optional							
Bit bus	bus interface, in line with IEC/IEEE 864-2, optional							

## Specifications of the R&S®SV8000 for DVB-T/-H

	R&S®SV8101	R&S®SV8201	R&S®SV8301	R&S®SV8302	R&S®SV8401	R&S®SV8402	R&S®SV8403	R&S®SV8404
Number of amplifiers	1	1	1	2	1	2	3	4
RF output power (rms)	12 W	25 W	50 W	100 W	100 W	200 W	300 W	400 W
Number of height units required in 19-inch rack	3U	4U	4U	7U	4U	7U	10U	13U
Inputs (DVB-T/-H)	4 × ASI (all ASI modes)							
Coding and modulation	in line with EN 300744, EN 302304 (optional)							
Modulation	QPSK, 16QAM or 64QAM							
Guard interval	1/4, 1/8, 1/16 or 1/32 of useful symbol duration							
IFFT mode	2 k and 8 k, 4 k (optional)							
Inner code rate	1/2, 2/3, 3/4, 5/6 or 7/8							
Useful symbol duration	224 μs (2 k) or 896 μs (8 k), 448 μs (4 k, optional)							

## Specifications of the R&S®SV8000 for ATSC

	R&S®SV8101	R&S®SV8201	R&S®SV8301	R&S®SV8302	R&S®SV8401	R&S®SV8402	R&S®SV8403	R&S®SV8404
Number of amplifiers	1	1	1	2	1	2	3	4
RF output power	18 W	35 W	70 W	130 W	130 W	250 W	350 W	460 W
Number of height units required in 19-inch rack	3	4	4	7	4	7	10	13
Inputs (ATSC)	2 × SMPTE 310M + 2 × ASI							
Modulation	8VSB							
Symbol rate	10.76 MHz							
Data rate	19.39 Mbit/s							
Trellis coding	2/3							
Reed-Solomon encoding	207/187/10							



More information at  
[www.rohde-schwarz.com](http://www.rohde-schwarz.com)  
(search term: SV8000)



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