Телевизионный передатчик SCx8000

R&S®SCx8000 Family of UHF/VHF Transmitters

At a glance

The R&S®SCx8000 family of UHF/VHF transmitters offers compactness and cost-effectiveness unique in its power class. Designed for professional TV and digital audio broadcasting networks, the family features intelligent redundancy concepts for the exciter and the amplifier and allows easy switchover from analog to digital transmission. The transmitters are innovative, robust, failsafe and easy to put into operation. This makes them ideal for use at remote sites and in outdoor applications.

The R&S®SCx8000 transmitter family covers the analog as well as the DVB-T, DVB-T2, DVB-H, ISDB-T, ISDB-T_B, MediaFLO™, ATSC and ATSC Mobile DTV digital TV standards. The transmitters can be switched from analog to digital transmission. When it comes to digital audio broadcasting, the transmitter family supports transmissions in line with DAB, DAB+ and T-DMB specifications.

The R&S®SCx8000 includes broadband precorrection data for each digital standard. With output powers from 200 W to 600 W for digital TV and DAB, the R&S®SCx8000 can be used for expanding existing transmitter networks and filling coverage gaps.

Rolling out or extending a transmitter network may require large numbers of transmitters; nevertheless, costs must be kept to a minimum. Here, the R&S®SCx8000 proves to be the ideal choice: It comes with the high quality that stands for and offers an excellent price/performance ratio. Follow-up costs are just as favorable: Due to its compact design, the R&S®SCx8000 reduces in-frastructure, rental and installation costs. The transmitter's high efficiency ensures low energy costs throughout the product lifecycle.

Availability is the crucial factor for operators of transmit-ter systems. The new backup exciter redundancy concept eliminates the need for a separate transmitter control unit. This lowers costs and increases system availability. Each amplifier comes with two power supplies. This ensures high failsafety, which can be further enhanced by adding a third, optional power supply.

Key facts

- Compact and cost-effective transmitter family offering the high quality that stands for
- New redundancy concepts for economical use of available space
- High efficiency for reduced energy costs
- Set&go function providing system precorrection
- DVB-T2 capability

R&S®SCx8000 transmitter configured as R&S®SCW8601EA with an R&S®VM8601C1 VHF amplifier and an R&S®SX801 exciter. All VHF models have only one amplifier.

R&S®SCx8000 Family of UHF/VHF Transmitters

Benefits and key features

Innovative, compact design

- Transmitters with high power density
- Autonomous cooling concept for flexible use
- New redundancy concepts increase availability and save space

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Efficient, flexible operation

- Low energy costs
- Precorrection for digital standards with set&go function
- Solution for switchover from analog to digital TV
- Operation either hands-on or via web browser
- Excellent sound level

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Continuous coverage

- "Everything from a single source" from means utmost quality
- Additional transmitter redundancy concepts
- Self-monitoring power output stages
- Optimal power supply design

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R&S®SCx8000 transmitter family

Output powers [1]					Height units	
Frequency range	**DVB-T, DVB-T2, DVB-H, ISDB-T, ISDB-T$_B$, MediaFLO™ (RMS)**	**ATSC, ATSC Mobile DTV (RMS)**	**ATV (sync peak)**	**DAB(+), T-DMB (RMS)**	**4**	**7**
UHF						
R&S®SCV8201x	200 W	300 W	500 W		•	
R&S®SCV8301x	300 W	450 W	700 W		•	
R&S®SCV8202x	400 W	600 W	1000 W			•
R&S®SCV8302x	600 W	900 W	1400 W			•
VHF						
R&S®SCW8201x	200 W	200 W	350 W		•	
R&S®SCW8301x	300 W	300 W	550 W		•	
R&S®SCW8401x	400 W	400 W	700 W		•	
R&S®SCW8601x	600 W	600 W	1100 W		•	
R&S®SCA8201x				200 W	•	
R&S®SCA8301x				300 W	•	
R&S®SCA8401x				400 W	•	
R&S®SCA8601x				600 W	•	

[1] Before bandpass filter.

Innovative, compact design

Transmitters with high power density

The use of large-scale integrated (LSI) components that combine various classic transmitter functions results in a highly compact design. The new R&S®SX801 exciter provides signal processing and transmitter control functionality at the same time. It comes with a display on its front panel.

The UHF base amplifier includes the amplifier unit, an exciter switch and a signal splitter. In systems for UHF with two amplifiers, an expansion amplifier with an internal power combiner is added. Both the base and the expansion amplifier come with an integrated cooling system, each featuring two fans. The transmitters for the VHF frequency band require only one amplifier, independent of the output power.

The individual components are combined as necessary for the required output power and application. Due to the large number of options, including a DVB-T/DVB-H receiver that adds retransmitter functionality to the R&S®SCx8000, the transmitter can be tailored to the specific application.

Autonomous cooling concept for flexible use

The compact design and integrated cooling make it easy to install the transmitter in a broadcast station, even into unused spaces in crowded racks. The autonomous cooling concept makes the transmitter ideal also for installation in outdoor racks; offers various solutions for such applications.

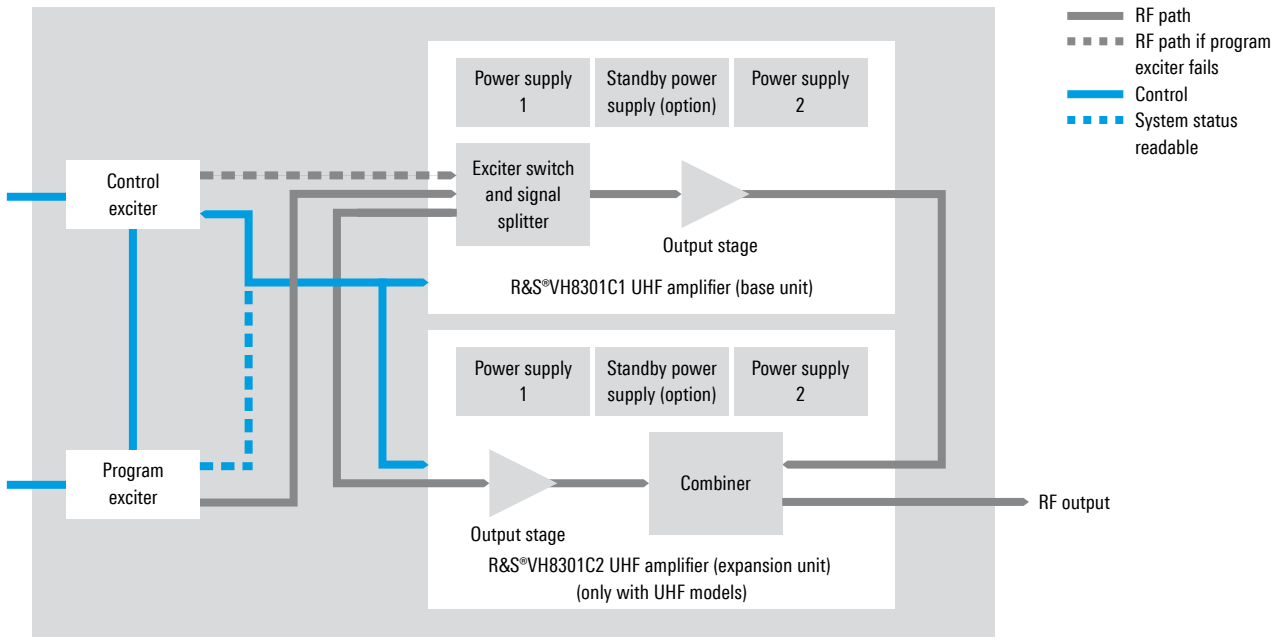
New redundancy concepts increase availability and save space

To create a system that makes the most economical use of available space, the new backup exciter redundancy concept was developed. RF source redundancy is achieved by using only two exciters. A central control unit is not required. The program exciter serves as the RF source and the control exciter as the transmitter control unit. If the program exciter fails, the control exciter automatically takes over RF transmission. If the control exciter fails, the program exciter remains the RF source and the system status can be read via the program exciter's IP address.

An intelligent power supply standby concept provides power supply redundancy for the amplifier. Each amplifier contains two power supplies as standard to maintain interruption-free transmission if one of the power supplies fails. An optional third power supply can be used to further enhance transmission reliability.

The R&S®VM8601C1 VHF amplifier featuring output powers of 600 W for DVB/ATSC/DAB and 1.1 kW for ATV contains three power supplies as a standard solution.

Simplified block diagram of the R&S®SCx8000 with two UHF amplifiers and a control exciter



Efficient, flexible operation

Low energy costs

At an efficiency of up to 22 % for UHF and up to 24 % for VHF, the R&S®SCx8000 features energy costs exceptionally low for a transmitter in this power class. This makes for extremely low cost of ownership throughout the life of the transmitter.

Precorrection for digital standards with set&go function

The transmitter can be put into operation quickly and easily and is convenient to operate. The system amplifiers come ready with broadband precorrection for the specific digital standard on delivery. Manual precorrection is therefore not necessary when the transmitter is put into operation. Each channel can be selected with nominal power or power reduced by up to 6 dB. The automatic set&go function loads the precorrection curve required for the selected frequency and power in the background. In the case of DTV, a modulation error ratio (MER) of at least 33 dB is achieved for the output stage without requiring any time-consuming manual precorrection.

Solutions for switchover from analog to digital TV

The transmitters offer an intelligent concept for network operators planning switchover from analog to digital transmission. If both analog and digital signals are fed, the desired standard can be menu-selected.

Operation either hands-on or via web browser

The exciter has a backlit graphical display and a keypad on the front panel for hands-on operation. Shortcuts enable quick access to frequently used menu items. The operating parameters are indicated by LEDs and displayed in the overview menu.

The R&S®SCx8000 can also be operated locally or remotely from a PC running a standard web browser. In addition, the transmitter can be remotely monitored via an optional SNMP agent.

In broadcasting networks containing a large number of devices, efficient and reliable configuration management is important. The R&S®SCx8000 transmitters can be configured via the Internet from a central station. Device and system settings can also be easily saved and transferred from one transmitter to another.

Excellent sound level

The transmitter family stands out for exceptionally silent operation. Its sound level is typically below 60 dBA, depending on the configuration.

Typical start menu for operation via the web browser.

Continuous coverage

"Everything from a single source" from means utmost quality

At , the entire value added chain lies in one hand. This is the ideal prerequisite for long-term, trouble-free operation of transmitter systems, since products meet the most stringent quality requirements. The transmitters were developed with market requirements in mind right from the start. manufactures its products at its own plants. This ensures short-term, reliable product delivery independently of external suppliers. An extensive T&M product portfolio and worldwide service and support round out the benefits that come with the R&S®SCx8000 family of transmitters – true to the motto: "Everything from a single source".

Additional transmitter redundancy concepts

In addition to the innovative backup exciter concept, also offers the established solutions featuring the R&S®NetCCU800 as the control unit for 1+1 and N+1 redundancy systems, which provide additional features in particular with respect to operating ease.

Self-monitoring power output stages

As is customary for , all power amplifiers of the R&S®SCx8000 family of transmitters are equipped with protective circuits. This prevents the transmitters and their transistors from being damaged by overtemperature or high reflected powers, for example.

Optimal power supply design

The use of high-quality single-phase wide-range power supplies allows the transmitter to be operated on all conventional single-phase voltages. Voltage fluctuations can thus be compensated, eliminating the need for extra transformers.

Options	
DVB-T/DVB-H receiver	for operating the transmitter as a retransmitter (for DVB-T/DVB-H only)
GPS receiver	integrated receiver for GPS reference signals
GPS antenna and cable	accessories for GPS receiver
SNMP agent	remote monitoring and control via standardized network management systems (NMS)
Parallel remote control interface	floating contacts for messages and commands
Analog-to-digital switchover	for simple switchover from analog to digital transmission
Air filters	available for amplifier and exciter
Racks and installation kits for racks	available in different sizes and configurations
Power distribution	available in different configurations
Dummy loads	
Bandpass filters	available for UHF and VHF

Ordering information

Typical configuration of a UHF transmitter for DVB-T, 600 W RMS

Designation	Type	Order No.
R&S®SCV8302E Low-Power Transmitter, UHF (470 MHz to 862 MHz), without rack, single-phase AC, 600 W RMS DVB-T output power		
Exciter, 1 HU, base unit	R&S®SX801	2104.4504K02
UHF Amplifier, DVB-T, 300 W RMS, base unit	R&S®VH8301C1	2104.8000K02
UHF Amplifier, DVB-T, 300 W RMS, expansion unit	R&S®VH8301C2	2104.8000K02

Specifications

Specifications		
Frequency range	UHF (band IV/V)	470 MHz to 862 MHz
	VHF (band III)	170 MHz to 255 MHz
Available standards	analog TV	B/G, D/K, M, M1, N, I, I1
	digital TV	DVB-T, DVB-T2, DVB-H, ISDB-T, ISDB-T_B, MediaFLO™, ATSC, ATSC Mobile DTV
	digital audio broadcasting	DAB, DAB+, T-DMB
Power supply	AC	100 V to 240 V ± 10%, 47 Hz to 63 Hz
Synchronization		
Reference frequency		10 MHz, –5 dBm to +20 dBm or LVT, BNC
Reference pulse		1 pps (1 Hz, TTL, BNC)
Operation		
Display, keypad and status LEDs		local operation and display, 200 × 48 pixel color display
Ethernet interface, RJ-45		convenient local or remote control via standard web browser
Parallel remote control interface	optional	floating contacts for messages and commands
Environmental conditions		
Max. installation height		2000 m above sea level (> 2000 m on request)
Operating temperature range		+1 °C to +45 °C
Relative humidity (max.)		95 %, non-condensing
Electromagnetic immunity		
To fast transients/bursts in line with IEC 61000-4-4		< 2 kV (power feed), < 1 kV (signal inputs)
To surges in line with IEC 61000-4-5		symmetrical < 1 kV (e.g. L1-L2, L-N), unsymmetrical < 2 kV (e.g. L-PE, N-PE)
If a higher electromagnetic immunity is required for transmitter operation, appropriate protective measures must be taken. offers appropriate options for overvoltage and lightning protection.		
RF output	R&S®SCV8x01x	N
	R&S®SCV8x02x, R&S®SCA8x01x, R&S®SCW8x01x	7/16
Dimensions (W × H × D)	R&S®SCV8x01Ex, R&S®SCW8x01Ex, R&S®SCA8x01Ex	483 mm (19") × 4 HU × 550 mm (19 in × 4 HU × 21.7 in)
	R&S®SCV8x02Ex	483 mm (19") × 7 HU × 550 mm (19 in × 7 HU × 21.7 in)

Important: To comply with the applicable standards and limit values for the suppression of out-of-band emissions (and in the case of digital standards, also for maintaining the required shoulder distance), the transmitter may only be operated with suitable filters at the RF output.