MFN

SFN

Transmitter/Retransmitter R&S® SV7002
Transposer/Gap Filler R&S® XV7002

UHF low-power DVB-T transmitting equipment

◆ All DVB-T low-power transmitter and rebroadcast applications united in one product family

◆ UHF output frequency range 470 MHz to 862 MHz

◆ Output power 1 W to 420 W

◆ VHF and UHF input frequency range for retransmitter and transposer

◆ MFN and SFN operation

◆ Flexible, scalable and upgradeable

◆ Highly compact

◆ Various standby systems available

◆ Advanced remote monitoring possible

ROHDE&SCHWARZ

120 W Transmitter R&S SV7002 (table-top solution)

At a glance

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

◆ DVB-T transmitter: with standard ASI signal as input
◆ DVB-T retransmitter: for rebroadcasting an off-air signal that is decoded and error-corrected in a DVB-T receiver
◆ DVB-T transposer/gap filler: for re-broadcasting an off-air signal at a different frequency (MFN) or at the same frequency (SFN)

The family is designed as a flexible and compact system consisting of different "boxes" that can be selected and interconnected according to the required application and output power. The principal building blocks are the following:

◆ DVB-T Exciter R&S SV702 (with DVB-T receiver in the case of retransmitter applications)
◆ DVB-T Transposer Driver Stage R&S XV702
◆ Amplifiers R&S VH6xxx with integrated power supply
◆ Splitter and combiner
◆ R&S NetCCU® 700 as an expanded system controller for standby configurations and/or as a network-oriented remote control unit (NetLink software)

Since the exciter/transposer stage is equipped with a simple CCU, the transmitter/transposer without standby is available as a table-top system. 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. Three 19-inch racks of 12, 21 and 42 height units are available.

Being able to set up a large variety of systems and to accommodate several transmitters in a single rack ensures maximum flexibility. The various transmitting systems are based on the same amplifier units and the frontends can be interchanged. Therefore operation and logistics can be considerably facilitated, especially in a DVB-T network involving a mix of different applications. Moreover, adding amplifiers with higher output power or extra transmitters to an existing rack takes almost no effort.

DVB-T Exciter R&S SV702

The DVB-T Exciter R&S SV702 meets the DVB-T (ETS 300744) standard. It comes as a compact 19-inch rackmount of two height units and consists of an encoder, a precorrector and a synthesizer/modulator.

The DVB encoder has two switchable ASI (asynchronous serial interface) inputs with flexible clock processing and data buffering (FIFOs). Two additional inputs are available when optional hierarchical modulation is included in the encoder. For operation in single-frequency networks (SFNs), an SFN adapter integrated in the encoder accepts time reference pulses from an external or, optionally, from an internal GPS receiver.

The precorrector optimally corrects linear (group delay) errors of a power filter which may be used and nonlinear distortions of the power amplifier.

The subsequent modulator generates the RF signal by direct quadrature modulation. The mixer frequency required for modulation is supplied by a synthesizer that can be synchronized to external references or to the internal GPS receiver (option).

For use as a retransmitter, the exciter is enhanced by a professional DVB-T receiver as the frontend that demodulates the off-air signal and provides an ASI signal. The ASI interface can be used to insert local programming.

The exciter and its built-in transmitter control function can be configured either by means of an external PC with a convenient graphical user interface (GUI) or from the high-resolution display of the R&S NetCCU® 700, if available.

DVB-T Transposer Driver Stage R&S XV702

The R&S XV702 is used as an alternative to the DVB-T exciter or DVB-T remodulator and operates as a rebroadcast solution for the following applications:

◆ SFN UHF gap filler
◆ MFN UHF transposer
◆ MFN VHF to UHF transposer

Signal processing is completely performed in an extremely compact 19-inch rackmount of only one height unit. It comprises a downconverter, an IF processing board with IF precorrection and an upconverter. The downconverter is available as a UHF or a VHF version. Down-

The driver and 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.

figurations, the R&S NetCCU® 700 controls both exciter switchover and output stage switchover.

As an option, the R&S NetCCU® 700 can also include an ASI distributor required for exciter standby or passive transmitter standby. The emergency control provided in the unit ensures transmitter operation even if the control unit fails.

DVB-T Transposer Driver Stage R&S XV702

and upconversion make use of double conversion, ensuring full frequency agility without filter adjustment as well as high selectivity in the adjacent channels.

The R&S XV702 controls an external amplifier using the same interface as the DVB-T Exciter R&S SV702.

Local operation is via the front-panel display and keyboard. An RS-232-C interface and relay contacts are available for remote control.

R&S NetCCU® 700

The R&S NetCCU® 700 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® 700 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 con-

Remote control interface with NetLink

The web server of the NetLink software platform enables direct access to system data through a conventional web browser. NetLink provides all security mechanisms the user may require – from simple authentification through to complete encryption of data traffic according to the SSL (secure socket layer) standard.

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

Integration of third-party components is easy due to the parallel interface option that is also available for the R&S NetCCU® 700.

Power amplifiers

Amplifiers of the power classes 5 W/10 W to 12.5 W/ 0 W to 25 W/50 W to 55 W/ 100 W to 120 W are available as external units for the R&S SV7002 and R&S XV7002 transmitting equipment. Owing to the digital precorrection of the Exciter R&S SV702, the R&S SV7002 transmitter/retransmitter family provides higher output power.

All amplifiers are broadband and operate in the 470 MHz to 862 MHz range. Both the power supply and the complete cooling system are fully 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.

12.5 W DVB-T Transmitter R&S SV7002 with passive exciter/power amplifier and R&S NetCCU® 700

Local operation via display or Ethernet interface

It is not necessary to install any special software on the PC for remote control. Users merely require a web browser since in the case of remote control they will access the transmitter via NetLink. This means that menu guidance via the web browser is identical for transmitter control from a PC and by remote control.

An interesting application of the R&S NetCCU® 700 is "n+0" controlling which means that up to six single transmitters can be local- and remote-controlled from one R&S NetCCU® 700.

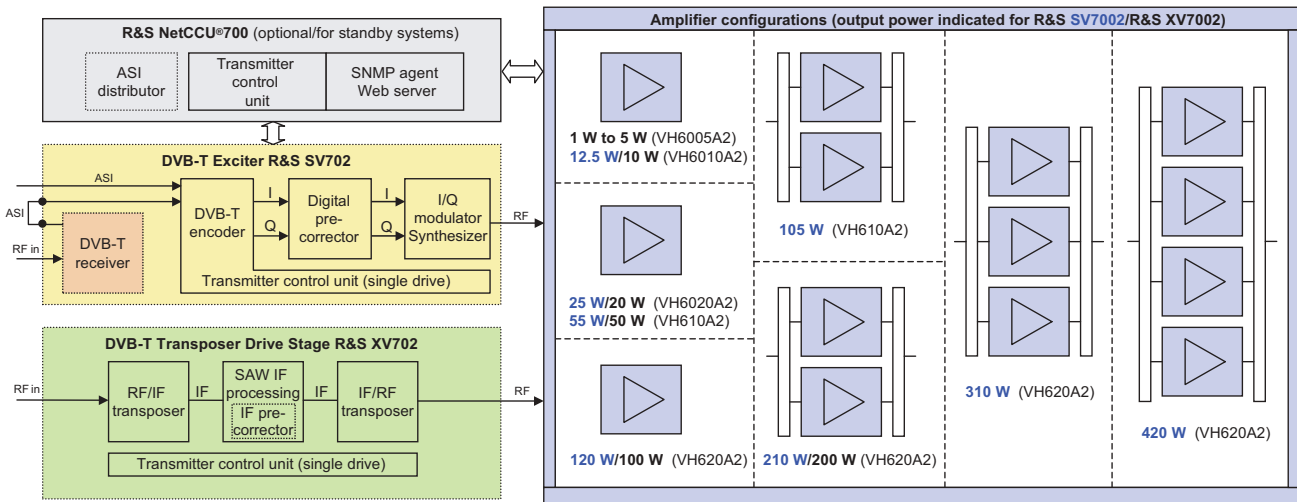### Specifications for the Transmitter/Retransmitter R&S SV7002

RF output power	12.5 W	25 W	55 W	120 W/105 W	210 W	310 W	420 W
Amplifier unit(s)	1 x R&S VH6010A2	1 x R&S VH6020A2	1 x R&S VH610A2	1 x R&S VH620 A2 2 x R&S VH610A2	2 x R&S VH620A2	3 x R&S VH620A2	4 x R&S VH620A2
Number of HU required in 19-inch rack	4*	5	5	5 / 8	8	11	14
RF connectors	N	N	N	N / 7/16	7/16	7/16	7/16

* The Amplifier R&S VH6010A2 of two HU is only half-19-inch wide.

Specifications for the Transposer/Gap Filler R&S XV7002

RF output power	1 W to 5 W	10 W	20 W	50 W	100 W	higher output power on request
Amplifier unit(s)	1 x R&S VH6005A2	1 x R&S VH6010A2	1 x R&S VH6020A2	1 x R&S VH610A2	1 x R&S VH620A2	
Number of HU required in 19-inch rack	3*	3*	4	4	4	
RF connectors	N	N	N	N	N	

*The Amplifiers R&S VH6005A2 / R&S VH6010A2 of two HU are only half-19-inch wide.

System block diagram of the Transmitter/Retransmitter R&S SV7002 and Transposer/Gap Filler R&S XV7002

Specifications

Frequency range	470 MHz to 862 MHz
Power supply voltage	230 V ± 15%
Power supply frequency range	47 Hz to 63 Hz
Max. installation altitude	2000 m above sea level (>2000 m on request)
Operating temperature range	+5 °C to +45 °C
Inputs	
Transmitter R&S SV7002	2 x ASI (4 x ASI in case of hierarchical modulation)
Retransmitter R&S SV7002	DVB-T RF signal 470 MHz to 862 MHz (UHF) 170 MHz to 230 MHz (VHF)
Transposer R&S XV7002	DVB-T RF signal 470 MHz to 862 MHz (UHF) 170 MHz to 230 MHz (VHF) input level range −72 dBm to −37 dBm
Standard	DVB-T
Coding and modulation	according to EN300744
IFFT mode	2k and 8k
Useful symbol period	224 µs (2k) or 896 µs (8k)
Modulation	QPSK, 16QAM or 64QAM
Guard interval	$^1/_4$, $^1/_8$, $^1/_{16}$ or $^1/_{32}$ of useful symbol period
Inner code rate	$^1/_2$, $^2/_3$, $^3/_4$, $^5/_6$ or $^7/_8$
Bandwidth	7 MHz and 8 MHz
Hierarchical coding	on request
Interfaces of Exciter R&S SV702	
RS-232-C	at front panel, operation of transmitter by means of graphical user interface (GUI) from PC, sub-D, female, 9-contact
Amplifier control	at rear panel, sub-D, female, 9-contact
RS-485	for connection to R&S NetCCU®700, sub-D, female, 9-contact
RS-232-C	at rear panel, for remote control of transmitter, sub-D, female, 9-contact (connection of Hayes-compatible modem)
Parallel interface	at rear panel, sub-D, female, 15-contact
GPS RS-232-C	at rear panel, sub-D, female, 9-contact (active when optional GPS receiver is provided)
Interfaces of Transposer Driver Stage R&S XV702	
Amplifier control	at rear panel, sub-D, female, 9-contact
Parallel interface	at rear panel, sub-D, female, 15-contact
SNMP remote	at rear panel, Ethernet 10BaseT
Interfaces of R&S NetCCU® 700	
Ethernet (local)	at front panel, for local operation, RJ-45
Ethernet (remote)	at rear panel, for remote control, RJ-45
RS-485	at rear panel, for exciter control, sub-D, female, 9-contact
Amplifier control	at rear panel, sub-D, female, 9-contact
RS-232-C	at rear panel, for remote control, sub-D, female, 9-contact
Parallel interface (option)	at rear panel, PCI card with configurable I/O (8 or 16 I/O)
ASI (if optional ASI distributor is provided)	at rear panel, 2 x (1 input, 3 outputs)

More information at
www.rohde-schwarz.com
(search term: SV7002 or XV7002)

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