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50 W VHF/UHF Power Amplifier R&S[®] VT3050



ROHDE & SCHWARZ



The R&S VT3050 is a member of the R&S M3TR family of multiband tactical radio systems. This power amplifier supports continuous operation across the 30 MHz to 512 MHz band with 50 W transmit power. The R&S VT3050 meets the need for both military voice and data communication in all analog and digital fixed frequency and frequency hopping modes supported by the R&S MR3000U tactical radio. The amplifier is especially designed for high linearity to cope with the requirements of the R&S M3TR's high speed radio modem for 64 kbit/s. Furthermore it supports medium to fast frequency hopping (SECOM V).

Collocation options are available for VHF low (30 MHz to 88 MHz) or UHF (200 MHz to 400 MHz, on request). One of these co-site filter ranges can be installed in the transceiver. The co-site filters are factory-installed. Fully automatic operation (controlled from the host transceiver) and rapid tuning capability make pre-/post-selector operation virtually transparent to the user.

Operational configuration and BITE/fault status reporting are performed via the transceivers. The R&S VT3050 uses rugged tactical packaging and meets the same environmental specifications for temperature, shock, vibration, and submersibility as the rest of the R&S M3TR family components. Operation is fully automatic. Built-in test equipment (BITE) and diagnostic testing are fully integrated into the transceiver system. The VHF/UHF amplifier is mounted separately with an independent shockmount. This provides additional flexibility when installing tactical radio systems into vehicles.

Prepared for multiband operation

An R&S M3TR VHF/UHF system can be easily upgraded to multiband operation. The R&S M3TR's serial control bus allows combinations of transceivers with up to two external amplifiers. By adding an HF Amplifier R&S VK3150 and an appropriate antenna/ATU R&S FK3150, the system can be extended to a frequency range of 1.5 MHz to 512 MHz.

For use with standard VHF and UHF antennas the amplifier features two configurable RF outputs. The frequency that splits the available frequency range of 30 MHz to 512 MHz is user-selectable. Possible settings could be for instance 30 MHz to 108 MHz for the RF_{low} output leaving 108.025 MHz to 512 MHz for the RF_{high} output. If a multiband antenna such as the R&S HV3016 is used, the complete range of 30 MHz to 512 MHz can be routed to one of the outputs.

Interfaces

- ◆ RCB_{in} (radio control bus) to interchange control signals with the associated manpack transceiver
- ◆ RCB_{out} to interchange control signals with the optional associated system components (e.g. HF power amplifier)
- ◆ 2 output RF connectors (N type, antenna output)
- ◆ Connector for DC power input
- ◆ Connector for DC power output for a fan

Modules

The amplifier consists of the following modules:

- ◆ Power amplifier board
- ◆ Harmonic filter
- ◆ Amplifier control unit
- ◆ DC/DC converter
- ◆ Digitally tuned co-site filter (optional)

Specifications

Frequency range	30 MHz to 512 MHz bypass for 1.5 MHz to 30 MHz
Input impedance	50 Ω
Input return loss	14 dB
RF output power at 50 Ω	30 MHz to 512 MHz: 50 W PEP or CW ± 0.8 dB no duty cycle with shockmount at +45°C no duty cycle with blower unit at +55°C
Load mismatch VSWR <2 VSWR <3 VSWR ∞	output power 50 W -1 dB PEP or CW reduced power output power 5 W PEP or CW
VSWR protection	protection up to infinite VSWR, open and short circuit
Adjustable power levels 50 W, 25 W, 10 W, 5 W 2 W, 1 W into 50 Ω	± 0.8 dB ± 1.5 dB
Harmonics suppression	-60 dBc at 30 MHz to 48 MHz, nom. 50 W into 50 Ω -67 dBc at 48 MHz to 512 MHz, nom. 50 W into 50 Ω
Spurious attenuation	> -80 dBc (power amplifier only), nom. 50 W into 50 Ω at amplifier output, $\Delta f > 30$ kHz
Intermodulation distortion (for control with two tones of the same level ($\Delta f = 1$ kHz))	> 36 dB referred to 50 W PEP on a 50 Ω load > 32 dB referred to 50 W PEP on a 50 Ω load at 322 MHz to 512 MHz
Nominal DC input voltage	+19 V to +33 V DC
Current consumption	22 A max. at +19 V DC, 50 W FM, 50 Ω load 15 A max. at +26.5 V DC, 50 W FM, 50 Ω load
TEST CM – continuous monitoring	output RF power (displayed in radio MMI) supply voltages presence overcurrent power amplifier high temperature sensing (warning, reduction output power) output RF forward and reflected high VSWR ($\geq 2:1$) – power reduction overload RX input
BITE PBITE RF protections	power-on BITE to check output power temperature open and short circuit and any value of VSWR overcurrent overvoltage 75 V EMF, at RF output lightning protection by external unit (option)

Temperature range	acc. to MIL-STD-810E method 501.3 and 502.3 Fully specified temperature range Operating temperature range Storage temperature range
Temperature shock	acc. to MIL-STD-810E meth. 503.3, cat. A1
Vibration with shockmount	acc. to MIL-STD-810E method 514.4, cat. 8, ground mobile, 5 Hz to 500 Hz (20 Hz to 350 Hz, 0.02 g ² /Hz 20 Hz to 5 Hz, -6 dB/octave 350 Hz to 500 Hz, -6 dB/octave)
Shock with shockmount	acc. to MIL-STD-810E method 516.4 proc. I, functional shock for ground equipment, crossover frequency 45 Hz, 40 g, 6 ms to 9 ms
EMI	acc. to MIL-STD-461E, class A3 (harmonics, spurious and transmission frequency excluded) CE102, CE106, CS101, CS103, CS104, CS105, CS114, RE102, RS103
Bench handling	acc. to MIL-STD-810E method 516.4, proc. VI
Leakage (immersion)	1 m during 2 h, acc. to MIL-STD-810E method 512.3, proc. I
Humidity	acc. to MIL-STD-810E method 507.3, proc. III
Salt fog	acc. to MIL-STD-810E method 509.3, proc. I
Sand and dust	acc. to MIL-STD-810E method 510.3, proc. I
Low pressure (altitude)	acc. to MIL-STD-810E method 500.3, proc. I + II 5000 m above sea level at $< +35$ °C
Solar radiation	acc. to MIL-STD-810E method 505.3, proc. II
Icing/freezing rain	acc. to MIL-STD-810E method 521.1, proc. I
Fungus	acc. to MIL-STD-810E method 508.4
Mounting position	all positions allowed
MTBF	25000 h
MTTR	> 40 min
Colour	RAL6014 (green), RAL9005 (black) for heat sink
Dimensions (W \times H \times D) Without shockmount	198 mm \times 300 mm \times 140 mm
Weight Without shockmount With shockmount	9.5 kg 11.9 kg

Ordering information

Order designation	Type	Order No.
50 W VHF/UHF Power Amplifier Without co-site filter	R&S® VT3050	6118.5503.03
With co-site filter VHF (30 MHz to 88 MHz)		6118.5503.02
Recommended extras		
Shockmount	R&S® KS3000V	6099.6104.02
Blower Unit	R&S® KL3000V	6118.0101.02
50 W VHF Vehicular Broadband Antenna	R&S® HV3015	6098.8803.02
50 W UHF Vehicular Broadband Antenna	R&S® HV3013	6099.7800.03



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