



Version
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150 W HF Power Amplifier R&S[®] VK3150



ROHDE & SCHWARZ



The Power Amplifier R&S VK3150 increases the HF output power of the R&S MR3000 manpack radios to 150 W PEP or 100 W average. The R&S VK3150 provides medium-power/medium-range communications links. Typical applications include mobile or base station installations for general-purpose HF SSB voice and data communications.

Continuous coverage is provided over the 1.5 MHz to 30 MHz frequency range. The power amplifier section is of broadband design and fully supports frequency-agile operation modes (automatic link establishment, slow frequency hopping).

When used with the automatic HF Antenna Tuning Unit R&S FK3150, the output of the R&S VK3150 is automatically matched to most rod and whip antennas and requires no special operator procedures.

Built-in self-test features permit operators or maintenance personnel to fully check the transceiver and associated power amplifier performance down to the module level. Fault conditions are displayed on the transceiver's front-panel display.

The RF drive requirements for full 150 W PEP or 100 W average are -2 dBm (± 3 dB) from the associated receiver-transmitter. The manpack R&S MR3000 therefore acts as an exciter for the power amplifier, avoiding the disadvantages of transceiver/booster solutions with respect to unwanted emissions.

The HF power amplifier is mounted separately on an independent shockmount with room for proper air flow. This provides additional flexibility when installing tactical radio systems into vehicles.

The R&S VK3150 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.

Prepared for multiband operation

An R&S M3TR HF 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 a VHF/UHF Power Amplifier R&S VT3050 and an appropriate antenna, the system can be extended to a frequency range of 1.5 MHz to 512 MHz.

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. antenna tuner)
- ◆ Input RF connector for the RF signal from/to the associated manpack
- ◆ Output RF connector (N type, to antenna tuner or broadband antenna)
- ◆ 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
- ◆ MW filter (optional)

Specifications

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| Operating frequency range | 1.5 MHz to 30 MHz transmission 1.5 MHz to 30 MHz bypassed for reception 1.5 MHz to 30 MHz with highpass filter for MW frequency band attenuation (optional) |
| Hops/s | ≤10 at 1.5 MHz to 30 MHz |
| RF input power | −2 dBm ±3 dB operating +13 dBm max. (non-destructive) |
| Input impedance | 50 Ω |
| Input return loss | 14 dB |
| RF output power into 50 Ω | 150 W PEP ±0.5 dB at 1.5 MHz to 30 MHz 100 W CW ±0.5 dB at 1.5 MHz to 30 MHz no duty cycle with shockmount at +45°C no duty cycle with blower unit at +55°C |
| Load mismatch VSWR <2.4 VSWR ∞ | output power 100 W PEP or CW reduced power output power 10 W PEP or CW |
| VSWR protection | protection up to infinite VSWR, open and short circuit |
| Adjustable power levels 150 W, 100 W 75 W, 50 W, 30 W, 20 W, 10 W | ±0.5 dB ±1 dB |
| Harmonics suppression | >45 dB, >60 dB typ. at 100 W into 50 Ω |
| Signal-to-noise ratio | >150 dBc referred to 1 Hz measuring bandwidth, Δf >1 MHz at 100 W |
| Spurious attenuation | >70 dB, 80 dB typ. at 100 W into 50 Ω at amplifier output, Δf >30 kHz |
| Intermodulation distortion (for control with two tones of the same level (Δf = 1 kHz)) | >32 dB referred to PEP, 38 dB typ. at 100 W output power on a 50 Ω load |
| Frequency switching | ≤4.5 ms |
| Receive-to-transmit switching time | ≤4.5 ms to reach at least 90% of rated power after receiving command from RCB |
| Transmit-to-receive switching time | ≤4.5 ms |
| Nominal DC input voltage | +19 V to +33 V DC |
| Current consumption | <28 A max. at 19 V DC <20 A max. at 26.5 V DC <1.5 A RX at 26.5 V DC |
| TEST CM – continuous monitoring | input RF presence output RF value overcurrent high temperature and dissipation control (warning, reduction output power) VSWR >2.3 power reduction |
| BITE ¹⁾ PBITE RF protections | power-on BITE to check output power without radiation open and short circuit and any value of VSWR overvoltage 75 V EMF at power amplifier output lightning protection in external R&S FK3150 |

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| 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 A (harmonics, spurious and transmission frequency excluded) CE102, CE106, CS101, 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 | 28000 h |
| MTTR | <40 min |
| Colour | RAL6014 (green), RAL9005 (black) for heat sink |
| Dimensions (W × H × D) (max.) Without shockmount With shockmount | 203 mm × 303 mm × 143 mm 203 mm × 303 mm × 202 mm |
| Weight (max.) Without shockmount With shockmount | 8.8 kg 11.2 kg |

¹⁾ PBITE and BITE are commanded and their sequence controlled by the R&S M3TR radio.

Ordering information

| Order designation | Type | Order No. |
|---------------------------|--------------|--------------|
| 150 W HF Power Amplifier | R&S® VK3150 | 6118.0301.02 |
| Recommended extras | | |
| Shockmount | R&S® KS3000V | 6099.6104.02 |
| Blower Unit | R&S® KL3000V | 6118.0101.02 |
| HF Antenna Tuning Unit | R&S® FK3150 | 6095.5855.02 |
| HF Vehicular Antenna | R&S® HV3011 | 6099.7600.02 |



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