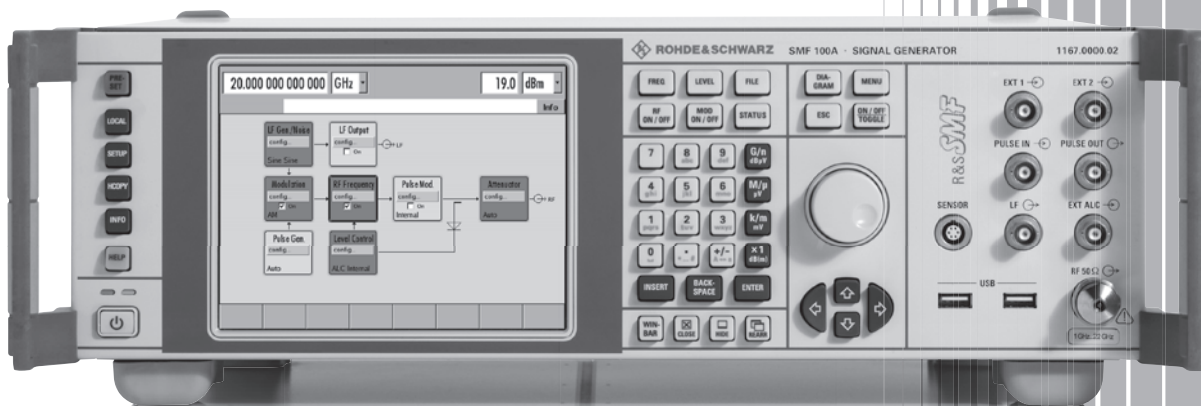




R&S® SMF1 Microwave Signal Generator Specifications



Specifications

Specifications apply under the following conditions: 30 minutes warm-up time at ambient temperature, specified environmental conditions met, calibration cycle adhered to, and all internal automatic adjustments performed. Data without tolerances: typical values only. Data designated "nominal" applies to design parameters and is not tested.

The equipment is designed for reliable operation and transport up to an altitude of 4600 m above sea level.

RF characteristics

Frequency

| | | |
|-----------------------|--|---------------------------------|
| Range | R&S [®] SMF-B122 | 1 GHz to 22 GHz |
| | with R&S [®] SMF-B2 frequency extension option 100 kHz to 1 GHz | 100 kHz to 22 GHz |
| | R&S [®] SMF-B144 | 1 GHz to 43.5 GHz |
| | with R&S [®] SMF-B2 frequency extension option 100 kHz to 1 GHz | 100 kHz to 43.5 GHz |
| Resolution of setting | | 0.001 Hz |
| Setting time | to within $<1 \times 10^{-7}$ for $f \geq 375$ MHz or <150 Hz for $f < 375$ MHz after IEC/IEEE bus delimiter | <4 ms, typ. 2 ms |
| Phase offset | | adjustable in 0.1° steps |

Frequency step sweep

| | | |
|-----------------|---------------------------------|---|
| Operating modes | digital sweep in discrete steps | automatic, step, single sweep, external single, external step, external start/stop, manual or external trigger, linear or logarithmic spacing |
| Sweep range | | full frequency range |
| Step width | linear | full frequency range |
| | logarithmic | 0.01 % to 100 % per step |
| Step time | range | 2 ms to 10 s |
| | resolution | 0.1 ms |

Ramp sweep (R&S[®]SMF-K4 option)

| | | |
|---|---|--|
| Operating modes | analog frequency sweep | automatic, step, single sweep, external single, external step, external start/stop, manual or external trigger |
| Sweep span range | | zero to full frequency range |
| Maximum sweep rate | $100 \text{ kHz} \leq f < 375 \text{ MHz}$ | 175 MHz/ms |
| | $375 \text{ MHz} \leq f < 750 \text{ MHz}$ | 87.5 MHz/ms |
| | $750 \text{ MHz} \leq f < 1.5 \text{ GHz}$ | 175 MHz/ms |
| | $1.5 \text{ GHz} \leq f < 3 \text{ GHz}$ | 350 MHz/ms |
| | $3 \text{ GHz} \leq f < 11 \text{ GHz}$ | 700 MHz/ms |
| | $11 \text{ GHz} \leq f < 21 \text{ GHz}$ | 1400 MHz/ms |
| | with R&S [®] SMF-B122 frequency option | |
| | $21 \text{ GHz} \leq f \leq 22 \text{ GHz}$ | 1400 MHz/ms |
| with R&S [®] SMF-B144 frequency option | | |
| | $21 \text{ GHz} \leq f \leq 43.5 \text{ GHz}$ | 2800 MHz/ms |
| Frequency accuracy | | (0.005 % of span)/(sweep time/s) |
| Sweep time | range | 10 ms to 10 s |
| | resolution | 0.1 ms |
| Frequency markers | number of frequency markers | 10 |
| MARKER output (BNC) | | TTL signal, selectable polarity |
| X-AXIS output (BNC) | output can drive $\geq 1 \text{ k}\Omega$ | sawtooth signal 0 V to 10 V |

Reference frequency

| | | |
|--------------------------------------|--|---|
| Aging | after 30 days of uninterrupted operation | $<1 \times 10^{-8}/\text{day}$, $<1 \times 10^{-6}/\text{year}$ |
| | with R&S [®] SMF-B1 option | $<5 \times 10^{-10}/\text{day}$, $<3 \times 10^{-8}/\text{year}$ |
| Temperature effect | in temperature range 0 °C to +55 °C | $\pm 1 \times 10^{-6}$ |
| | with R&S [®] SMF-B1 option | $\pm 6 \times 10^{-9}$ |
| Warm-up time | to nominal thermostat temperature | ≤ 10 min |
| Output for internal reference signal | frequency (approx. sinewave) | 10 MHz or external input frequency |
| | level | typ. 5 dBm |
| | source impedance | 50 Ω |
| Input for external reference | frequency | 1 MHz to 20 MHz (in steps of 1 MHz) |
| | maximum deviation | 3×10^{-6} |
| | input level, limits | ≥ -6 dBm, ≤ 19 dBm |
| | recommended | 0 dBm to 19 dBm |
| | input impedance | 50 Ω |
| Electronic tuning from input (EFC) | sensitivity | typ. $4 \times 10^{-9}/\text{V}$ to $3 \times 10^{-8}/\text{V}$ |
| | input voltage | -10 V to +10 V |
| | input impedance | typ. 10 k Ω |

Level

| | | |
|---------------|--|---------------------|
| Setting range | without attenuator (R&S [®] SMF-B26/-B27 option) | -20 dBm to +30 dBm |
| | with attenuator (R&S [®] SMF-B26/-B27 option) | -130 dBm to +30 dBm |

The maximum specified level applies in the temperature range from +15 °C to +35 °C. Outside this temperature range, the maximum specified level is typical from 0 °C to +15 °C and typically degrades by less than 2 dB from +35 °C to +55 °C.

| Maximum specified level with the R&S [®] SMF-B122 frequency option (PEP) ¹ | | | | |
|--|---|--|---|--|
| | without R&S [®] SMF-B32 high output power option | | with R&S [®] SMF-B32 high output power option | |
| | without attenuator (R&S [®] SMF-B26 option) | with attenuator (R&S [®] SMF-B26 option) | without attenuator (R&S [®] SMF-B26 option) | with attenuator (R&S [®] SMF-B26 option) |
| 1 GHz \leq f < 11 GHz | +16 dBm | +14 dBm | +25 dBm | +23 dBm |
| 11 GHz \leq f < 21 GHz | +14 dBm | +12 dBm | +23 dBm | +21 dBm |
| 21 GHz \leq f \leq 22 GHz | +12 dBm | +10 dBm | +22 dBm | +20 dBm |

| Maximum specified level with the R&S [®] SMF-B122 and R&S [®] SMF-B2 options (PEP) | | | | |
|--|---|--|---|--|
| | without R&S [®] SMF-B34 high output power option | | with R&S [®] SMF-B34 high output power option | |
| | without attenuator (R&S [®] SMF-B26 option) | with attenuator (R&S [®] SMF-B26 option) | without attenuator (R&S [®] SMF-B26 option) | with attenuator (R&S [®] SMF-B26 option) |
| 100 kHz \leq f < 300 kHz ² | typ. +13 dBm | typ. +13 dBm | typ. +13 dBm | typ. +13 dBm |
| 300 kHz \leq f < 1 GHz ³ | +16 dBm | +15 dBm | +16 dBm | +15 dBm |
| 1 GHz \leq f < 11 GHz | +16 dBm | +14 dBm | +24 dBm | +22 dBm |
| 11 GHz \leq f < 16 GHz | +14 dBm | +12 dBm | +23 dBm | +21 dBm |
| 16 GHz \leq f < 21 GHz | +12 dBm | +10 dBm | +21 dBm | +19 dBm |
| 21 GHz \leq f \leq 22 GHz | typ. +12 dBm | typ. +10 dBm | +20 dBm | +18 dBm |

| Maximum specified level with the R&S [®] SMF-B144 frequency option (PEP) ⁴ | | | | |
|--|---|--|---|--|
| | without R&S [®] SMF-B32 high output power option | | with R&S [®] SMF-B32 high output power option | |
| | without attenuator (R&S [®] SMF-B27 option) | with attenuator (R&S [®] SMF-B27 option) | without attenuator (R&S [®] SMF-B27 option) | with attenuator (R&S [®] SMF-B27 option) |
| 1 GHz \leq f < 11 GHz | +14 dBm | +12 dBm | +25 dBm | +23 dBm |
| 11 GHz \leq f < 16 GHz | +11 dBm | +9 dBm | +22 dBm | +20 dBm |
| 16 GHz \leq f < 21 GHz | +10 dBm | +8 dBm | +19 dBm | +17 dBm |
| 21 GHz \leq f < 36 GHz | +11 dBm | +9 dBm | +16 dBm | +14 dBm |
| 36 GHz \leq f \leq 40 GHz | +11 dBm | +9 dBm | +14 dBm | +12 dBm |
| 40 GHz < f \leq 43.5 GHz | typ. +8 dBm | typ. +6 dBm | typ. +12 dBm | typ. +9 dBm |

¹ With the R&S[®]SMF-B81 rear connectors 22 GHz option, the maximum level is reduced by less than 0.1 dB/GHz.

² With active pulse modulation, the level decreases by 2.5 dB.

³ With active pulse modulation, the level decreases by 5 dB.

⁴ With the R&S[®]SMF-B82 rear connectors 43.5 GHz option, the maximum level is reduced by less than 0.1 dB/GHz.

| Maximum specified level with the R&S®SMF-B144 and R&S®SMF-B2 options (PEP) ⁵ | | | | |
|---|--|---|--|---|
| | without R&S®SMF-B34 high output power option | | with R&S®SMF-B34 high output power option | |
| | without attenuator (R&S®SMF-B27 option) | with attenuator (R&S®SMF-B27 option) | without attenuator (R&S®SMF-B27 option) | with attenuator (R&S®SMF-B27 option) |
| 100 kHz ≤ f < 300 kHz ⁶ | typ. +13 dBm | typ. +13 dBm | typ. +13 dBm | typ. +13 dBm |
| 300 kHz ≤ f < 1 GHz ⁷ | +16 dBm | +15 dBm | +16 dBm | +15 dBm |
| 1 GHz ≤ f < 11 GHz | +14 dBm | +12 dBm | +23 dBm | +21 dBm |
| 11 GHz ≤ f < 16 GHz | +11 dBm | +9 dBm | +19 dBm | +17 dBm |
| 16 GHz ≤ f < 21 GHz | +10 dBm | +8 dBm | +17 dBm | +15 dBm |
| 21 GHz ≤ f < 36 GHz | +11 dBm | +9 dBm | +15 dBm | +13 dBm |
| 36 GHz ≤ f ≤ 40 GHz | +11 dBm | +9 dBm | +14 dBm | +12 dBm |
| 40 GHz < f ≤ 43.5 GHz | typ. +8 dBm | typ. +6 dBm | typ. +11 dBm | typ. +9 dBm |

| | | |
|-------------------------------|---|----------|
| Minimum specified level (PEP) | without attenuator (R&S®SMF-B26/-B27 option) | -20 dBm |
| | with attenuator (R&S®SMF-B26/-B27 option) | -130 dBm |
| Resolution | | 0.01 dB |
| Level uncertainty | in CW mode, ALC state ON, attenuator mode AUTO, temperature range +15 °C to +35 °C, degradation outside this range typ. <0.3 dB | |
| | 100 kHz ≤ f < 50 MHz | |
| | >+10 dBm | <0.6 dB |
| | +10 dBm to >-10 dBm | <0.6 dB |
| | -10 dBm to >-70 dBm | <0.9 dB |
| | -70 dBm to >-90 dBm | <1.0 dB |
| | -90 dBm to -100 dBm | <1.6 dB |
| | 50 MHz ≤ f < 2 GHz | |
| | >+10 dBm | <0.6 dB |
| | +10 dBm to >-10 dBm | <0.6 dB |
| | -10 dBm to >-70 dBm | <0.7 dB |
| | -70 dBm to >-90 dBm | <0.8 dB |
| | -90 dBm to -100 dBm | <1.4 dB |
| | 2 GHz ≤ f < 22 GHz | |
| | >+10 dBm | <0.8 dB |
| | +10 dBm to >-10 dBm | <0.8 dB |
| | -10 dBm to >-70 dBm | <0.9 dB |
| | -70 dBm to >-90 dBm | <1.0 dB |
| | -90 dBm to -100 dBm | <1.7 dB |
| | 22 GHz ≤ f ≤ 40 GHz | |
| | >+10 dBm | <1.0 dB |
| | +10 dBm to >-10 dBm | <1.2 dB |
| | -10 dBm to >-70 dBm | <1.2 dB |
| | -70 dBm to >-90 dBm | <2.0 dB |
| | -90 dBm to -100 dBm | <3.2 dB |
| | 40 GHz < f ≤ 43.5 GHz | |
| | +10 dBm to >-10 dBm | <1.0 dB |
| | -10 dBm to >-70 dBm | <1.5 dB |
| | -70 dBm to >-90 dBm | <2.5 dB |
| | -90 dBm to -100 dBm | <4.2 dB |

⁵ With the R&S®SMF-B82 rear connectors 43.5 GHz option, the maximum level is reduced by less than 0.1 dB/GHz.

⁶ With active pulse modulation, the level decreases by 2.5 dB.

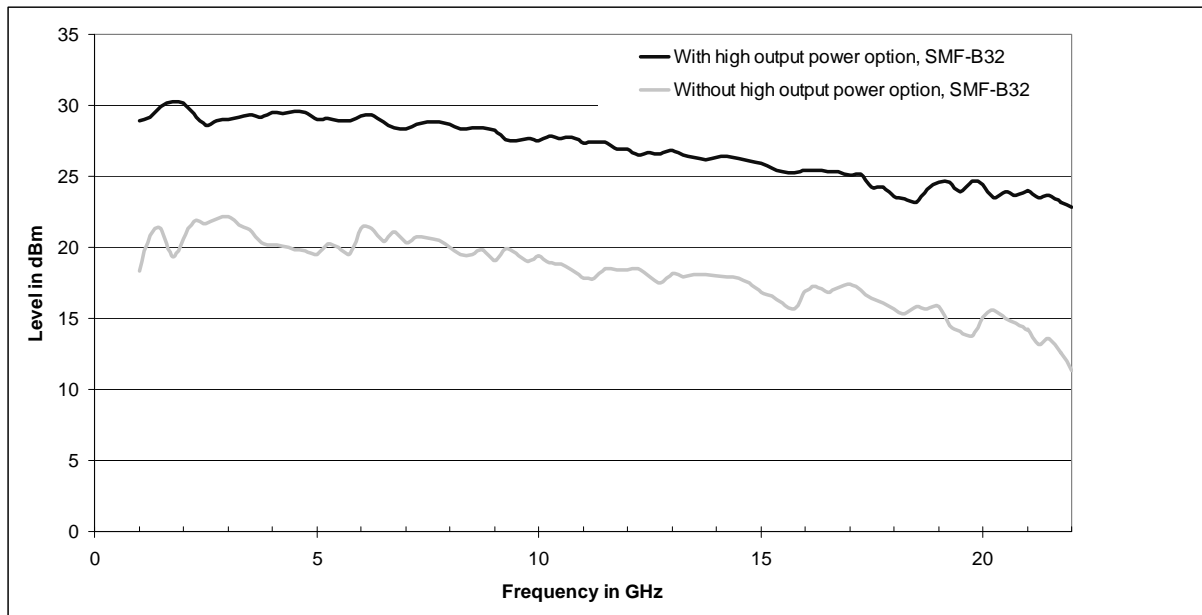
⁷ With active pulse modulation, the level decreases by 5 dB.

| | | |
|---|---|-----------|
| Output impedance VSWR in 50 Ω system | ALC state ON | |
| | 100 kHz \leq f \leq 2 GHz | typ. <1.4 |
| | 2 GHz < f \leq 22 GHz | typ. <1.6 |
| | 22 GHz < f \leq 43.5 GHz | typ. <1.8 |
| Setting time | without attenuator (R&S [®] SMF-B26/-B27 option), after IEC/IEEE bus delimiter | <3 ms |
| | with attenuator (R&S [®] SMF-B26/-B27 option), attenuator mode AUTO | <25 ms |

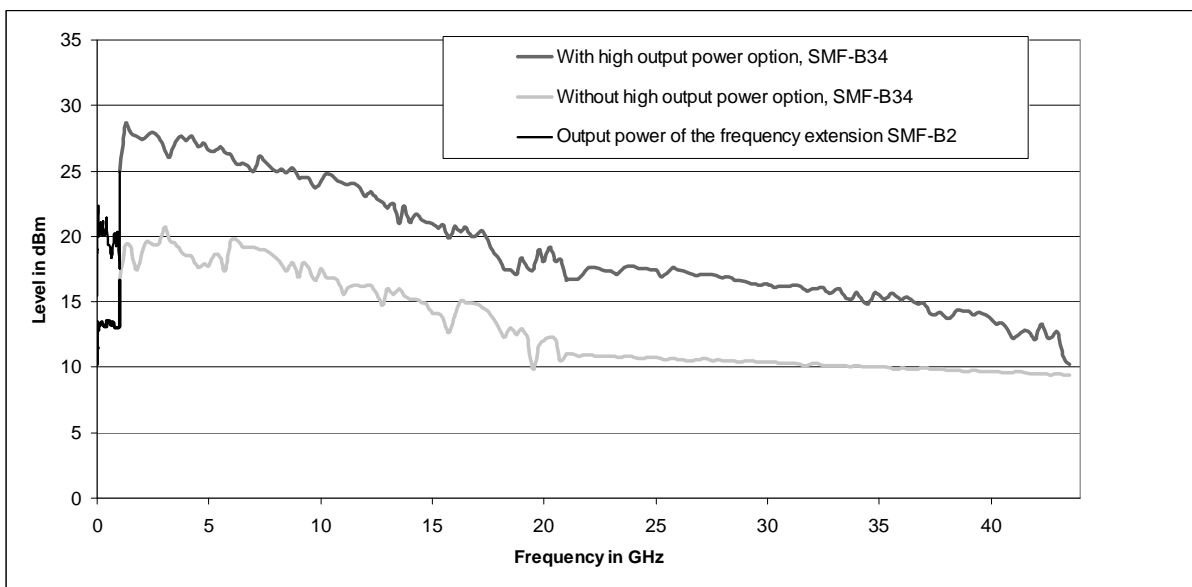
| | | |
|--|--|-------|
| Back-feed (from \geq 50 Ω source) | 1 GHz \leq f \leq 43.5 GHz | |
| | maximum permissible RF power in output | 0.5 W |
| | maximum permissible DC voltage | 0 V |

Level sweep

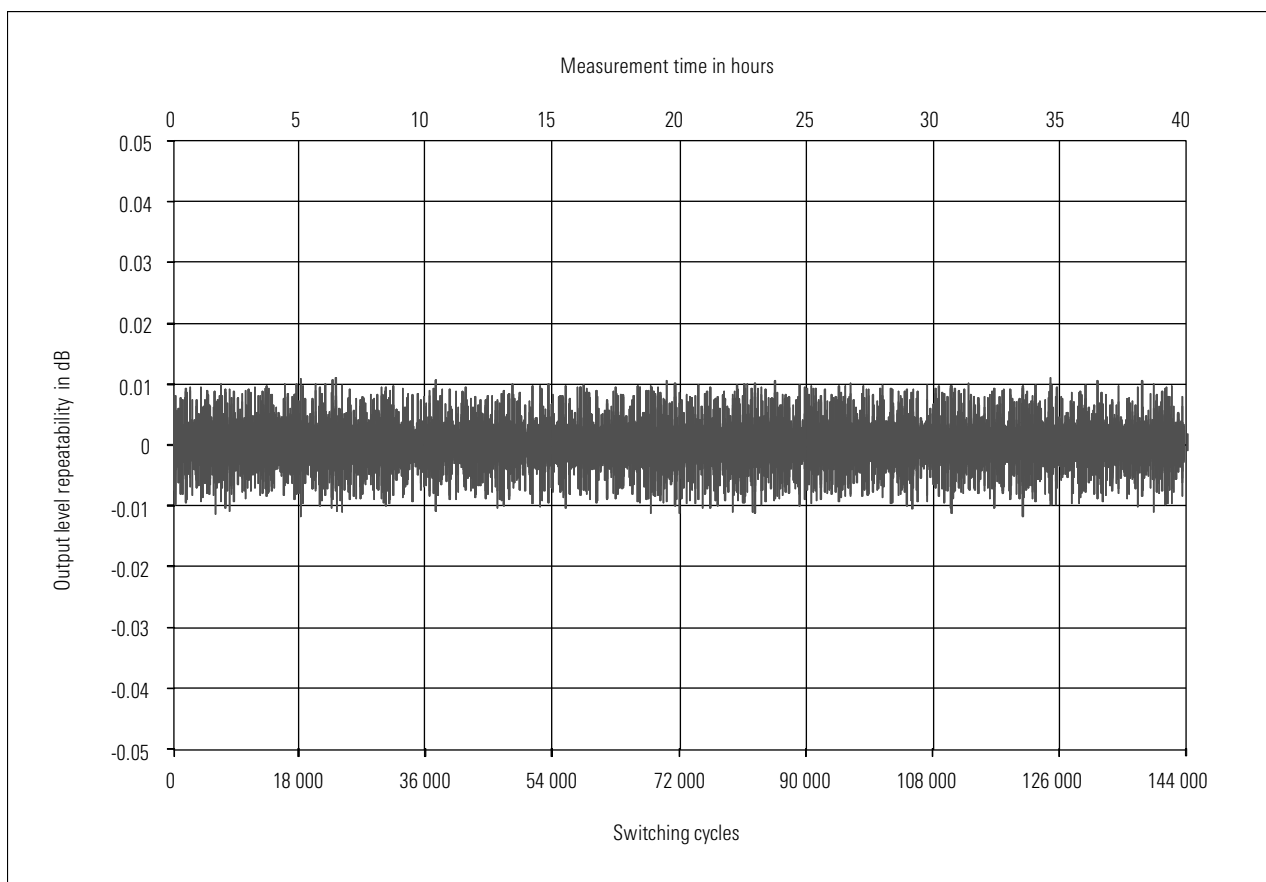
| | | |
|---------------------------------|-----------------|--|
| Digital sweep in discrete steps | operating modes | automatic, step, single sweep, external single, external step, external start/stop, manual or external trigger, linear spacing |
| | sweep range | full level range |
| | step width | 0.01 dB to full level range in dB per step |



Maximum output power with and without the R&S[®]SMF-B32 high output power option in the frequency range 1 GHz to 22 GHz (R&S[®]SMF-B122, in both cases with the R&S[®]SMF-B26 step attenuator option).



Maximum output power with and without the R&S@SMF-B34 high output power option in the frequency range 100 kHz to 43.5 GHz (R&S@SMF-B144 and SMF-B2, with the R&S@SMF-B27 step attenuator option); the lower curve in the frequency range 100 kHz to 1 GHz is with activated pulse modulator of the R&S@SMF-B2 frequency extension.



Level repeatability over time (with random frequency and level changes between measurements).

Spectral purity

| Harmonics ⁸ with R&S [®] SMF-B122 frequency option, level +10 dBm (with R&S [®] SMF-B2: level +6 dBm for $f \geq 1$ GHz) | | |
|---|--|---|
| | without R&S [®] SMF-B32/-B34 high output power option | with R&S [®] SMF-B32/-B34 high output power option |
| $100 \text{ kHz} \leq f < 300 \text{ kHz}$ | typ. $< -25 \text{ dBc}$ | typ. $< -25 \text{ dBc}$ |
| $300 \text{ kHz} \leq f < 10 \text{ MHz}$ | $< -30 \text{ dBc}$ | $< -30 \text{ dBc}$ |
| $10 \text{ MHz} \leq f < 200 \text{ MHz}$ | $< -40 \text{ dBc}$, typ. $< -45 \text{ dBc}$ | $< -40 \text{ dBc}$, typ. $< -45 \text{ dBc}$ |
| $200 \text{ MHz} \leq f < 1 \text{ GHz}$ | $< -50 \text{ dBc}$, typ. $< -55 \text{ dBc}$ | $< -50 \text{ dBc}$, typ. $< -55 \text{ dBc}$ |
| $1 \text{ GHz} \leq f \leq 22 \text{ GHz}$ | $< -50 \text{ dBc}$, typ. $< -55 \text{ dBc}$ | $< -30 \text{ dBc}$ |

| Harmonics ⁸ with R&S [®] SMF-B144 frequency option, level +10 dBm (with R&S [®] SMF-B2: level +6 dBm for $f \geq 1$ GHz) or maximum specified level, whichever is lower | | |
|--|--|---|
| | without R&S [®] SMF-B32/-B34 high output power option | with R&S [®] SMF-B32/-B34 high output power option |
| $100 \text{ kHz} \leq f < 300 \text{ kHz}$ | typ. $< -25 \text{ dBc}$ | typ. $< -25 \text{ dBc}$ |
| $300 \text{ kHz} \leq f < 10 \text{ MHz}$ | $< -30 \text{ dBc}$ | $< -30 \text{ dBc}$ |
| $10 \text{ MHz} \leq f < 200 \text{ MHz}$ | $< -40 \text{ dBc}$, typ. $< -45 \text{ dBc}$ | $< -40 \text{ dBc}$, typ. $< -45 \text{ dBc}$ |
| $200 \text{ MHz} \leq f < 1 \text{ GHz}$ | $< -50 \text{ dBc}$, typ. $< -55 \text{ dBc}$ | $< -50 \text{ dBc}$, typ. $< -55 \text{ dBc}$ |
| $1 \text{ GHz} \leq f < 21 \text{ GHz}$ | $< -50 \text{ dBc}$, typ. $< -55 \text{ dBc}$ | $< -30 \text{ dBc}$ |
| $21 \text{ GHz} \leq f \leq 43.5 \text{ GHz}$ | $< -40 \text{ dBc}$ | $< -40 \text{ dBc}$ |

| Nonharmonics ⁹ | | |
|-----------------------------------|--|--|
| | CW, level +10 dBm or maximum specified level, whichever is lower, carrier offset $> 3 \text{ kHz}$ | |
| | $100 \text{ kHz} \leq f < 300 \text{ kHz}$ | typ. $< -67 \text{ dBc}$ |
| | $300 \text{ kHz} \leq f < 40 \text{ MHz}$ | $< -67 \text{ dBc}$ |
| | $40 \text{ MHz} \leq f < 375 \text{ MHz}$ | $< -55 \text{ dBc}$ |
| | $375 \text{ MHz} \leq f < 1 \text{ GHz}$ | $< -75 \text{ dBc}$ |
| | $1 \text{ GHz} \leq f < 3 \text{ GHz}$ | $< -68 \text{ dBc}$ |
| | $3 \text{ GHz} \leq f < 11 \text{ GHz}$ | $< -62 \text{ dBc}$ |
| | $11 \text{ GHz} \leq f < 21 \text{ GHz}$ | $< -56 \text{ dBc}$ |
| | with R&S [®] SMF-B122 frequency option | |
| | $21 \text{ GHz} \leq f \leq 22 \text{ GHz}$ | $< -56 \text{ dBc}$ |
| | with R&S [®] SMF-B144 frequency option | |
| | $21 \text{ GHz} \leq f \leq 43.5 \text{ GHz}$ | $< -50 \text{ dBc}$ |
| Power-supply-related nonharmonics | $f = 10 \text{ GHz}$ | |
| | 50 Hz to 3 kHz from carrier | $< -50 \text{ dBc}$, typ. -70 dBc |

| Subharmonics ¹⁰ with R&S [®] SMF-B122 frequency option, level +10 dBm | | |
|---|--|---|
| | without R&S [®] SMF-B32/-B34 high output power option | with R&S [®] SMF-B32/-B34 high output power option |
| $f < 11 \text{ GHz}$ | none | none |
| $11 \text{ GHz} \leq f \leq 22 \text{ GHz}$ | $< -55 \text{ dBc}$ | $< -50 \text{ dBc}$ |

| Subharmonics ¹⁰ with R&S [®] SMF-B144 frequency option, level +10 dBm or maximum specified level, whichever is lower | | |
|--|--|---|
| | without R&S [®] SMF-B32/-B34 high output power option | with R&S [®] SMF-B32/-B34 high output power option |
| $f < 11 \text{ GHz}$ | none | none |
| $11 \text{ GHz} \leq f < 36 \text{ GHz}$ | $< -50 \text{ dBc}$ | $< -50 \text{ dBc}$ |
| $36 \text{ GHz} \leq f \leq 43.5 \text{ GHz}$ | $< -30 \text{ dBc}$ | $< -30 \text{ dBc}$ |

| Wideband noise with R&S [®] SMF-B122 frequency option, level +10 dBm, carrier offset $> 10 \text{ MHz}$, measurement bandwidth 1 Hz, CW | | |
|---|--|---|
| | without R&S [®] SMF-B32/-B34 high output power option | with R&S [®] SMF-B32/-B34 high output power option |
| $3 \text{ GHz} \leq f < 11 \text{ GHz}$ | typ. $< -148 \text{ dBc}$ | typ. $< -140 \text{ dBc}$ |
| $11 \text{ GHz} \leq f \leq 22 \text{ GHz}$ | typ. $< -145 \text{ dBc}$ | typ. $< -140 \text{ dBc}$ |

⁸ Specifications are typical for harmonics beyond specified frequency range.

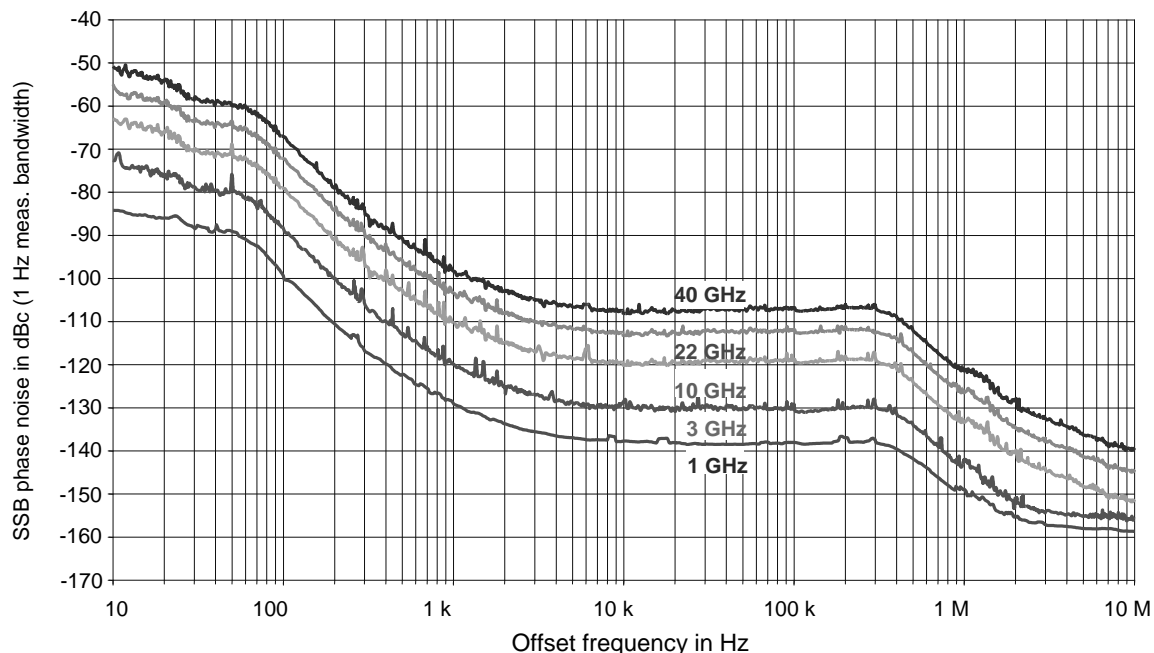
⁹ Specifications are typical for nonharmonics beyond specified frequency range.

¹⁰ Specifications are typical for subharmonics beyond specified frequency range.

| | | |
|---|--|---|
| Wideband noise with R&S [®] SMF-B144 frequency option, level +10 dBm or maximum specified level, whichever is lower, carrier offset > 10 MHz, measurement bandwidth 1 Hz, CW | | |
| | without R&S [®] SMF-B32/-B34 high output power option | with R&S [®] SMF-B32/-B34 high output power option |
| 3 GHz ≤ f < 11 GHz | typ. <-148 dBc | typ. <-140 dBc |
| 11 GHz ≤ f < 21 GHz | typ. <-145 dBc | typ. <-140 dBc |
| 21 GHz ≤ f ≤ 43.5 GHz | typ. <-138 dBc | typ. <-138 dBc |

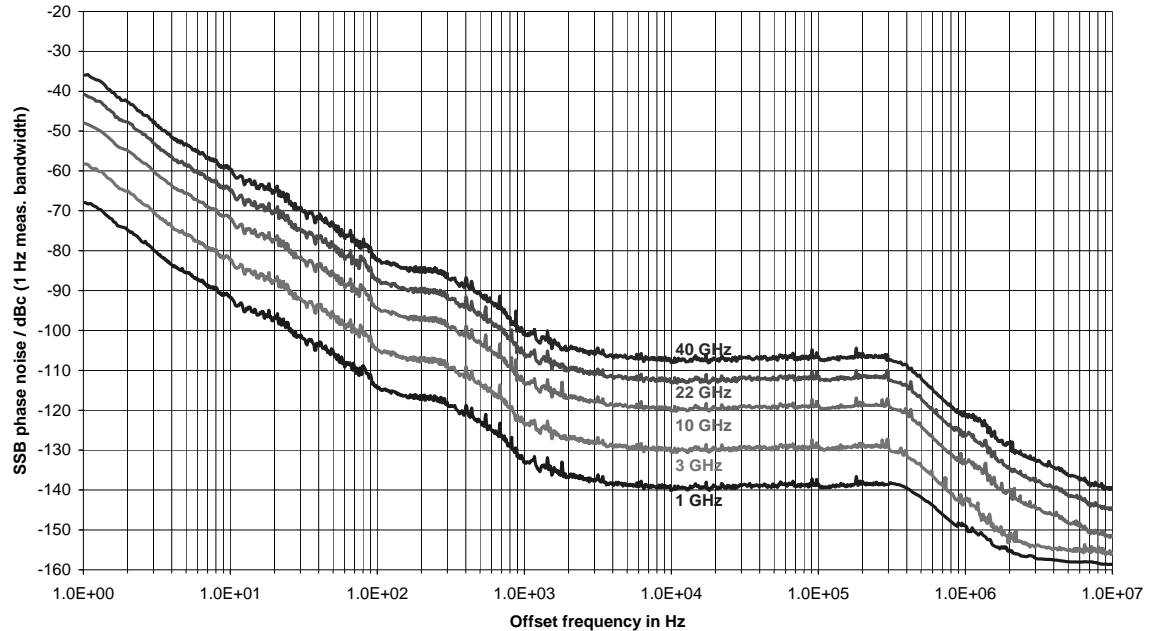
| | | |
|-----------------|---|-----------|
| SSB phase noise | carrier offset 100 Hz, measurement bandwidth 1 Hz, CW | |
| | f = 250 MHz | <-90 dBc |
| | f = 1 GHz | <-95 dBc |
| | f = 2 GHz | <-89 dBc |
| | f = 4 GHz | <-83 dBc |
| | f = 10 GHz | <-75 dBc |
| | f = 20 GHz | <-69 dBc |
| | f = 40 GHz | <-63 dBc |
| | carrier offset 20 kHz, measurement bandwidth 1 Hz, CW | |
| | f = 250 MHz | <-126 dBc |
| | f = 1 GHz | <-132 dBc |
| | f = 2 GHz | <-128 dBc |
| | f = 4 GHz | <-122 dBc |
| | f = 10 GHz | <-115 dBc |
| f = 20 GHz | <-109 dBc | |
| f = 40 GHz | <-103 dBc | |

| Carrier frequency | SSB phase noise with R&S [®] SMF-B1 option, measurement bandwidth 1 Hz, CW | | | | |
|-------------------|---|----------|-----------|-----------|-----------|
| | frequency offset from carrier | | | | |
| | 10 Hz | 100 Hz | 1 kHz | 10 kHz | 100 kHz |
| 250 MHz | <-72 dBc | <-90 dBc | <-115 dBc | <-126 dBc | <-128 dBc |
| 1 GHz | <-77 dBc | <-95 dBc | <-120 dBc | <-132 dBc | <-133 dBc |
| 2 GHz | <-71 dBc | <-89 dBc | <-114 dBc | <-128 dBc | <-127 dBc |
| 4 GHz | <-65 dBc | <-83 dBc | <-108 dBc | <-122 dBc | <-121 dBc |
| 10 GHz | <-57 dBc | <-75 dBc | <-100 dBc | <-115 dBc | <-113 dBc |
| 20 GHz | <-51 dBc | <-69 dBc | <-94 dBc | <-109 dBc | <-107 dBc |
| 40 GHz | <-45 dBc | <-63 dBc | <-88 dBc | <-103 dBc | <-101 dBc |



Single sideband phase noise for various frequencies (each with the R&S[®]SMF-B1 OCXO reference oscillator option).

| Carrier frequency | SSB phase noise with R&S [®] SMF-B22 option, measurement bandwidth 1 Hz, CW | | | | | |
|-------------------|--|----------|-----------|-----------|-----------|-----------|
| | frequency offset from carrier | | | | | |
| | 1 Hz | 10 Hz | 100 Hz | 1 kHz | 10 kHz | 100 kHz |
| 250 MHz | <-52 dBc | <-80 dBc | <-97 dBc | <-116 dBc | <-126 dBc | <-128 dBc |
| 1 GHz | <-57 dBc | <-85 dBc | <-101 dBc | <-121 dBc | <-132 dBc | <-133 dBc |
| 2 GHz | <-51 dBc | <-79 dBc | <-96 dBc | <-115 dBc | <-128 dBc | <-127 dBc |
| 4 GHz | <-45 dBc | <-73 dBc | <-89 dBc | <-109 dBc | <-122 dBc | <-121 dBc |
| 10 GHz | <-37 dBc | <-65 dBc | <-81 dBc | <-101 dBc | <-115 dBc | <-113 dBc |
| 20 GHz | <-31 dBc | <-59 dBc | <-75 dBc | <-95 dBc | <-109 dBc | <-107 dBc |
| 40 GHz | <-25 dBc | <-53 dBc | <-69 dBc | <-89 dBc | <-103 dBc | <-101 dBc |



Single sideband phase noise for various frequencies with the R&S[®]SMF-B22 enhanced phase noise performance option.

LIST mode

| | | |
|---|--|---|
| Frequency and level values can be stored in a list and set in an extremely short amount of time | | |
| Operating modes | | automatic, step, single sweep, external single, external step, manual or external trigger |
| Max. number of stored settings | | 2000 |
| Dwell time | | 0.7 ms to 10 s |
| | resolution | 0.1 ms |
| Setting time | after external trigger | |
| | to within $<1 \times 10^{-6}$ for $f \geq 375$ MHz or <150 Hz for $f < 375$ MHz | typ. <0.75 ms |
| | to within $<1 \times 10^{-6}$ for $f = 3.001$ GHz to $f = 10.999$ GHz | <1.1 ms |

Analog modulation**Possible modulation types**

Amplitude modulation (AM), amplitude shift keying (ASK), logarithmic AM (LOG AM), frequency modulation (FM), frequency shift keying (FSK), phase modulation (ϕ M), phase shift keying (PSK), pulse modulation (PM)

Simultaneous modulation

| | FM | ϕ M | AM | LOG AM | PM | FSK | PSK | ASK |
|------------|----|----------|----|--------|----|-----|-----|-----|
| FM | + | - | + | + | + | - | - | + |
| ϕ M | - | + | + | + | + | - | - | + |
| AM | + | + | + | - | * | + | + | - |
| LOG AM | + | + | - | + | * | + | + | - |
| Pulse mod. | + | + | * | * | | + | + | * |
| FSK | - | - | + | + | + | | - | + |
| PSK | - | - | + | + | + | - | | + |
| ASK | + | + | - | - | * | + | + | |

+ = possible with no restrictions * = possible with restrictions - = not feasible

Amplitude modulation (R&S®SMF-B20 option)

Attenuator mode AUTO

| | | |
|---|--|---|
| Operating modes | | EXT1-AC/EXT1-DC EXT2-AC/EXT2-DC LF1/LF2/noise |
| Modulation depth | At high levels, modulation is clipped when the maximum PEP is reached. | 0 % to 100 % |
| Resolution | | 0.1 % |
| Setting uncertainty | $f_{\text{mod}} = 1$ kHz, $m < 80$ % | $<(5 \text{ \% of reading} + 1 \text{ \%})$ |
| AM distortion ¹¹ | $f_{\text{mod}} = 1$ kHz, $m = 60$ % | |
| | $100 \text{ kHz} \leq f < 1 \text{ MHz}$ | typ. <5 % |
| | $1 \text{ MHz} \leq f < 10 \text{ MHz}$ | <2.5 % |
| | $10 \text{ MHz} \leq f < 1 \text{ GHz}$ | <1 % |
| | $1 \text{ GHz} \leq f \leq 43.5 \text{ GHz}$ | <1.5 % |
| Modulation frequency response ¹¹ | $10 \text{ MHz} \leq f \leq 43.5 \text{ GHz}$, $m = 60$ % | |
| | DC/10 Hz to 20 kHz | <1 dB |
| | DC/10 Hz to 100 kHz | <3 dB |

¹¹ For level up to maximum specified level.

Logarithmic amplitude modulation (R&S® SMF-B20 option)

Attenuator mode AUTO

| | | |
|--|-----------------------|---|
| Operating modes | | EXT1-AC/EXT1-DC EXT2-AC/EXT2-DC LF1/LF2/noise |
| Dynamic range | | 30 dB |
| Sensitivity | | -10 dB/V to +10 dB/V |
| Resolution | | 0.01 dB/V |
| Rise/fall time (10 %/90 %) ¹¹ | 10 MHz ≤ f ≤ 43.5 GHz | <10 μs |

Frequency modulation (R&S® SMF-B20 option)

| | | |
|--|--|--|
| Operating modes | | EXT1-AC/EXT1-DC EXT2-AC/EXT2-DC/ LF1/LF2/noise |
| FM multiplier for different frequency ranges | 100 kHz ≤ f < 375 MHz | n = ½ |
| | 375 MHz ≤ f < 750 MHz | n = ⅙ |
| | 750 MHz ≤ f < 1.5 GHz | n = ¼ |
| | 1.5 GHz ≤ f < 3 GHz | n = ½ |
| | 3 GHz ≤ f < 11 GHz | n = 1 |
| | 11 GHz ≤ f < 21 GHz | n = 2 |
| | with R&S® SMF-B122 frequency option | |
| | 21 GHz ≤ f ≤ 22 GHz | n = 2 |
| with R&S® SMF-B144 frequency option | | |
| | 21 GHz ≤ f ≤ 43.5 GHz | n = 4 |
| Maximum deviation | | n x 10 MHz |
| Resolution | | <1 %, min. 10 Hz |
| Setting uncertainty | 10 MHz ≤ f ≤ 43.5 GHz | |
| | f _{mod} = 1 kHz, deviation = 100 kHz | <(3 % of reading + 20 Hz) |
| | f _{mod} = 1 MHz, deviation = 100 kHz | <(10 % of reading + 20 Hz) |
| FM distortion | 10 MHz ≤ f ≤ 43.5 GHz | |
| | f _{mod} ≤ 50 kHz, deviation = 500 kHz | <0.5 % |
| Modulation frequency response | deviation = 100 kHz, DC/10 Hz to 10 MHz | |
| | 10 MHz ≤ f < 1 GHz, DC/10 Hz to 3 MHz | <3 dB |
| | 1 GHz ≤ f ≤ 43.5 GHz, DC/10 Hz to 10 MHz | <3 dB |
| Carrier frequency offset | | <0.2 % of set deviation |

Phase modulation (R&S® SMF-B20 option)

| | | |
|--|---|--|
| Operating modes | | EXT1-AC/EXT1-DC EXT2-AC/EXT2-DC/ LF1/LF2/noise |
| φM multiplier for different frequency ranges | 100 kHz ≤ f < 375 MHz | n = ½ |
| | 375 MHz ≤ f < 750 MHz | n = ⅙ |
| | 750 MHz ≤ f < 1.5 GHz | n = ¼ |
| | 1.5 GHz ≤ f < 3 GHz | n = ½ |
| | 3 GHz ≤ f < 11 GHz | n = 1 |
| | 11 GHz ≤ f < 21 GHz | n = 2 |
| | with R&S® SMF-B122 frequency option | |
| | 21 GHz ≤ f ≤ 22 GHz | n = 2 |
| with R&S® SMF-B144 frequency option | | |
| | 21 GHz ≤ f ≤ 43.5 GHz | n = 4 |
| Maximum deviation | | n x 160 rad |
| Resolution | | <1 % |
| Setting uncertainty | 10 MHz ≤ f ≤ 43.5 GHz | |
| | f _{mod} = 1 kHz, deviation = 80 rad | <5 % |
| | f _{mod} = 10 kHz, deviation = 80 rad | <10 % |
| Distortion | 10 MHz ≤ f ≤ 43.5 GHz | |
| | f _{mod} ≤ 50 kHz, deviation = 80 rad | <0.5 % |
| Modulation frequency response | 10 MHz ≤ f ≤ 43.5 GHz | |
| | DC/10 Hz to 1 MHz | <3 dB |

ASK modulation (R&S® SMF-B20 option)

Attenuator mode AUTO

| | | |
|--|--|---|
| Operating modes | | EXT1 EXT2 pulse generator random (noise generator) |
| Modulation depth | At high levels, modulation is clipped when the maximum PEP is reached. | 0 % to 100 % |
| Resolution | | 0.1 % |
| Data rate | | 0 bit to 200 kbit/s |
| Rise/fall time (10 %/90 %) ¹² | 10 MHz ≤ f ≤ 43.5 GHz | <10 μs |

FSK modulation (R&S® SMF-B20 option)

| | | | |
|---|------------------------------------|---|--|
| Operating modes | | EXT1 EXT2 pulse generator random (noise generator) | |
| FSK multiplier for different frequency ranges | 100 kHz ≤ f < 375 MHz | n = ½ | |
| | 375 MHz ≤ f < 750 MHz | n = ⅙ | |
| | 750 MHz ≤ f < 1.5 GHz | n = ¼ | |
| | 1.5 GHz ≤ f < 3 GHz | n = ½ | |
| | 3 GHz ≤ f < 11 GHz | n = 1 | |
| | 11 GHz ≤ f < 21 GHz | n = 2 | |
| | with R&S®SMF-B122 frequency option | | |
| | 21 GHz ≤ f ≤ 22 GHz | n = 2 | |
| | with R&S®SMF-B144 frequency option | | |
| 21 GHz ≤ f ≤ 43.5 GHz | n = 4 | | |
| Maximum deviation | | n × 10 MHz | |
| Resolution | | <1 %, min. 10 Hz | |
| Data rate | 10 MHz ≤ f ≤ 43.5 GHz | 0 bit/s to 2 Mbit/s | |

PSK modulation (R&S® SMF-B20 option)

| | | | |
|---|------------------------------------|---|--|
| Operating modes | | EXT1 EXT2 pulse generator random (noise generator) | |
| PSK multiplier for different frequency ranges | 100 kHz ≤ f < 375 MHz | n = ½ | |
| | 375 MHz ≤ f < 750 MHz | n = ⅙ | |
| | 750 MHz ≤ f < 1.5 GHz | n = ¼ | |
| | 1.5 GHz ≤ f < 3 GHz | n = ½ | |
| | 3 GHz ≤ f < 11 GHz | n = 1 | |
| | 11 GHz ≤ f < 21 GHz | n = 2 | |
| | with R&S®SMF-B122 frequency option | | |
| | 21 GHz ≤ f ≤ 22 GHz | n = 2 | |
| | with R&S®SMF-B144 frequency option | | |
| 21 GHz ≤ f ≤ 43.5 GHz | n = 4 | | |
| Maximum deviation | | n × 160 rad | |
| Resolution | | <1 % | |
| Data rate | 10 MHz ≤ f ≤ 43.5 GHz | 0 bit/s to 500 kbit/s | |

¹² For level up to maximum specified level.

Narrow pulse modulation (R&S®SMF-K3 option)

| | | |
|----------------------------|---------------------------------|--|
| Operating modes | | external, internal with R&S®SMF-K23 option |
| ON/OFF ratio | | >80 dB |
| Rise/fall time | 10 %/90 % of RF amplitude | |
| | 10 MHz ≤ f < 1 GHz | <20 ns |
| | 1 GHz ≤ f ≤ 43.5 GHz | <10 ns |
| Pulse repetition frequency | | 0 Hz to 10 MHz |
| Minimum pulse width | with ALC state ON | |
| | 10 MHz ≤ f < 1 GHz | 50 ns |
| | 1 GHz ≤ f ≤ 43.5 GHz | 500 ns ¹³ |
| | with ALC state OFF | |
| | 10 MHz ≤ f < 1 GHz | 50 ns |
| | 1 GHz ≤ f ≤ 43.5 GHz | 20 ns |
| Pulse overshoot | | typ. <10 % |
| RF delay | video output pulse to RF pulse | typ. 35 ns |
| Video crosstalk | 10 MHz ≤ f < 1 GHz | <150 mV (peak-to-peak value) |
| | 1 GHz ≤ f < 3 GHz | |
| | without R&S®SMF-B32/-B34 option | <75 mV (peak-to-peak value) |
| | with R&S®SMF-B32/-B34 option | <150 mV (peak-to-peak value) |
| | 3 GHz ≤ f ≤ 43.5 GHz | |
| | without R&S®SMF-B32/-B34 option | <5 mV (peak-to-peak value) |
| | with R&S®SMF-B32/-B34 option | <10 mV (peak-to-peak value) |

Chirped pulses (R&S®SMF-B20 option, in combination with the R&S®SMF-K3 and R&S®SMF-K23 options)

| | | | |
|---|------------------------------------|---------------------------------------|--|
| Chirp bandwidth multiplier for different frequency ranges | 100 kHz ≤ f < 375 MHz | n = ½ | |
| | 375 MHz ≤ f < 750 MHz | n = ¼ | |
| | 750 MHz ≤ f < 1.5 GHz | n = ¼ | |
| | 1.5 GHz ≤ f < 3 GHz | n = ½ | |
| | 3 GHz ≤ f < 11 GHz | n = 1 | |
| | 11 GHz ≤ f < 21 GHz | n = 2 | |
| | with R&S®SMF-B122 frequency option | | |
| | 21 GHz ≤ f ≤ 22 GHz | n = 2 | |
| with R&S®SMF-B144 frequency option | | | |
| | 21 GHz ≤ f ≤ 43.5 GHz | n = 4 | |
| Operating modes | | AUTO, EXTERNAL TRIGGER, EXTERNAL GATE | |
| Chirp direction | | up, down | |
| Maximum bandwidth | | n × 20 MHz | |
| Pulse period | | ≥200 ns | |
| Pulse width | | ≥100 ns | |
| Maximum chirp rate | | n × 10 MHz/μs, nominal | |

Inputs for external modulation signals

| | | |
|--|---|--------------------------------|
| Modulation inputs EXT1 and EXT2 for FM, φM, AM, LOG AM, FSK, PSK and ASK | input voltage for FM, φM and AM (peak value for selected modulation depth or deviation) | 1 V |
| | input voltage range for LOG AM | -6 V to +6 V |
| | input level for FSK, PSK and ASK | TTL-compatible signal |
| | input impedance | 50 Ω, 600 Ω or 100 kΩ |
| | polarity for FSK, PSK and ASK | selectable |
| | modulation input bandwidth for FM, φM, AM and LOG AM | 200 kHz or 10 MHz |
| Modulation input PULSE IN | input level | threshold TTL, 0.5 V or -2.5 V |
| | input impedance | 50 Ω or 10 kΩ |
| | polarity | selectable |

¹³ With attenuator (R&S®SMF-B26/-B27 option), Attenuator mode AUTO.
Without attenuator (R&S®SMF-B26/-B27 option), level ≥ 0 dBm.

Modulation sources

Internal modulation generators (LF generator 1, LF generator 2, noise generator) (R&S®SMF-B20 option)

| | | |
|--------------------|--|---|
| Waveforms | LF generator 1, LF generator 2 | sine, pulse, triangle, trapezoid, user-programmable ramp $\Delta T = 20$ ms |
| | noise generator | noise amplitude distribution: Gaussian, equal |
| Sine | frequency range | 0.1 Hz to 10 MHz |
| | frequency uncertainty | <0.003 Hz + relative deviation of reference frequency |
| | resolution of setting | 0.1 Hz |
| | setting time to within $<1 \times 10^{-7}$, after IEC/IEEE bus delimiter | <3 ms |
| | distortion at $f < 100$ kHz, $R_L > 50 \Omega$, level (V_p) 0.5 V | <0.5 % |
| Pulse | period | 1 μ s to 100 s |
| | width | 1 μ s to 100 s |
| | resolution of setting | 20 μ s |
| Triangle | period | 1 μ s to 100 s |
| | rise time | 1 μ s to 100 s |
| | resolution of setting | 20 ns |
| Trapezoid | period | 1 μ s to 100 s |
| | rise time | 1 μ s to 100 s |
| | high time | 1 μ s to 100 s |
| | fall time | 1 μ s to 100 s |
| | resolution of setting | 20 ns |
| Noise generator | noise amplitude distribution | Gaussian, equal |
| | noise bandwidth | 100 kHz to 10 MHz |
| Frequency response | $f \leq 500$ kHz | <0.5 dB |
| | $f \leq 10$ MHz | <3 dB |
| Output voltage | V_p at LF connector, open circuit voltage | 1 mV to 6 V |
| | EMF resolution | 1 mV |
| | EMF setting accuracy at 1 kHz, level (V_p) 1 V | <11 mV |
| | | 50 Ω |
| Output impedance | | |
| Sweep | digital sweep in discrete steps | |
| | operating modes | automatic, step, single sweep, external single, external step, external start/stop, manual or external trigger, linear or logarithmic spacing |
| | sweep range | full frequency range |
| | step width (lin) | full frequency range |
| | step width (log) | 0.01 % to 100 % per step |

Pulse generator (R&S®SMF-K23 option)

| | | |
|---------------------|---|--|
| Operating modes | | automatic, external trigger, external gate, single pulse, double pulse, delayed pulse (external trigger) |
| Active trigger edge | | positive or negative |
| Pulse period | | 20 ns to 100 s |
| Resolution | | 5 ns |
| Uncertainty | | relative deviation of reference frequency |
| Pulse width | Pulse width of double pulses can be set independently. | 5 ns to 100 s |
| Resolution | | 5 ns |
| Uncertainty | Pulse width of double pulses can be set independently. | relative deviation of reference frequency |
| Pulse delay | | 10 ns to 100 s |
| Resolution | | 5 ns |
| Uncertainty | | relative deviation of reference frequency |

| | | |
|----------------------------|---|---|
| Double-pulse delay | | 10 ns to 100 s |
| Resolution | | 5 ns |
| Uncertainty | | relative deviation of reference frequency |
| External trigger | | |
| Delay | external input pulse to SYNC output pulse | typ. 55 ns |
| Jitter | | <5 ns |
| Generator output PULSE OUT | | LVC signal ($R_L \geq 50 \Omega$) |

Pulse train (R&S® SMF-K27 option)

| | | |
|------------------|---|--|
| Operating mode | additional mode for pulse generator (R&S® SMF-K23 option) to define sequences of pulses | |
| Number of pulses | 2 to 1023 | |
| ON/OFF times | 5 ns to 5 ms | |

Power analysis (R&S® SMF-K28 option)

| | | |
|--|---|--|
| Modes | power vs. frequency (frequency response) power vs. power (power sweep, AM/AM) power vs. time (Trace mode) | |
| General settings | number of points per sweep (= steps) | 10 to 1000 (default: 200) |
| | frequency range | depending on sensor and R&S® SMF frequency options, support of frequency converting DUTs |
| | settable Y-axis range | -80 dBm to + 40 dBm |
| | timing | fast normal |
| | uncertainty of measured power | determined by power sensor used (e.g. <0.1 dB at -40 dBm, Fast mode using the R&S® NRP-Z21) |
| | run mode | single continuous |
| | display modes | small (block diagram still visible, markers not visible) full screen marker (maximum size with markers) full screen (maximum size, markers not visible) |
| | number of traces | 3 (to be used for sensor data or as reference trace) |
| | markers | 4 |
| | save | traces can be stored to file (formats: JPG, BMP, XPM, PNG) and in CSV format |
| resolution of saved graphics | 320 x 240, 640 x 480, 800 x 600 or 1024 x 768 | |
| Power vs. frequency (frequency response) | supported power sensors | R&S® NRP-Z11, R&S® NRP-Z21, R&S® NRP-Z22, R&S® NRP-Z23, R&S® NRP-Z24 R&S® NRP-Z51, R&S® NRP-Z52, R&S® NRP-Z55 R&S® NRP-Z91, R&S® NRP-Z92 required firmware version: V4.01 or later (V4.10 recommended) R&S® NRP-Z81 required firmware version: V1.20 or later |
| | spacing | linear logarithmic |
| | sweep time | depending on timing, steps and sensor, typ. 2 s at 200 steps, Fast mode |

| | | |
|--------------------------------------|--|--|
| Power vs. power (power sweep, AM/AM) | supported power sensors | R&S [®] NRP-Z11, R&S [®] NRP-Z21, R&S [®] NRP-Z22, R&S [®] NRP-Z23, R&S [®] NRP-Z24 R&S [®] NRP-Z51, R&S [®] NRP-Z52, R&S [®] NRP-Z55 R&S [®] NRP-Z91, R&S [®] NRP-Z92 required firmware version: V4.01 or later (V4.10 recommended) R&S [®] NRP-Z81 required firmware version: V1.20 or later |
| | sweep time | depending on timing, steps and sensor, typ. 2 s at 200 steps, Fast mode |
| Power vs. time (Trace mode) | supported power sensors | R&S [®] NRP-Z11, R&S [®] NRP-Z21, R&S [®] NRP-Z22, R&S [®] NRP-Z23, R&S [®] NRP-Z24 required firmware version: V4.10 or later R&S [®] NRP-Z81 required firmware version: V1.20 or later |
| | sweep time | |
| | R&S [®] NRP-Z11, R&S [®] NRP-Z21, R&S [®] NRP-Z22, R&S [®] NRP-Z23, R&S [®] NRP-Z24 | 100 μ s to 300 ms |
| | R&S [®] NRP-Z81 | 100 ns to 1 s |
| | trigger modes | free run auto |
| | trigger level | settable by value, cursor or automatically |
| other trigger parameters | hysteresis, drop-out time, positive or negative trigger offset | |

General data

Remote control

| | |
|-------------------------|--|
| Systems | IEC/IEEE bus in line with IEC 60625 (IEEE 488) with R&S®SMF-B83 option Ethernet, TCP/IP |
| Command set | SCPI 1999.5 |
| Connector | |
| IEC | 24-contact Amphenol (with R&S®SMF-B83 option) |
| Ethernet | Western |
| USB | with R&S®SMF-B84 option |
| IEC/IEEE bus address | 0 to 30 |
| Interface functions IEC | SH1, AH1, T6, L4, SR1, RL1, PP1, DC1, DT1, C0 |
| LAN interface | 10/100BaseT |

Operating data

| | | |
|--|--|--|
| Power supply | input voltage range | |
| | 50 Hz to 60 Hz, -5 %/+10 % | 100 V to 240 V (AC) ±10 % |
| | 50 Hz to 400 Hz, -5 %/+10 % | 100 V to 120 V (AC) ±10 % |
| | power consumption | 250 VA |
| Power factor correction | | in line with EN 61000-3-2 |
| EMC | | in line with EMC directive of EU (2004/108/EC), applied standard EN 61326 (immunity for industrial environment; class A emissions) ¹⁴ |
| Immunity to interfering field strength | | up to 10 V/m |
| Environmental conditions | operating temperature range | 0 °C to +55 °C in line with EN 60068-2-1, EN 60068-2-2 |
| | maximum operating altitude | 4600 m |
| | storage temperature range | -40 °C to +75 °C |
| | climatic resistance, +40 °C/95 % rel. humidity | in line with EN 60068-2-3 |
| Mechanical resistance | vibration, sinusoidal | 5 Hz to 150 Hz, max. 2 g at 55 Hz, max. 0.5 g at 55 Hz to 150 Hz, in line with EN 60068-2-6 |
| | vibration, random | 10 Hz to 300 Hz, acceleration 1.2 g (rms) in line with EN 60068-2-64 |
| | shock | 40 g shock spectrum, in line with EN 60068-2-27, MIL-STD-810E |
| Electrical safety | | in line with IEC 61010-1, EN 61010-1, CAN/CSA-C22.2 No. 61010-1-04, UL 61010-1 |
| Approvals | | VDE-GS, cCSA _{US} |
| Dimensions | (W × H × D) | 427 mm × 132 mm × 550 mm (16.8 in × 5.2 in × 21.7 in) |
| Weight | when fully equipped | 18 kg (39.7 lb) |
| Recommended calibration interval | | 3 years |

¹⁴ The instrument complies with the emission requirements stipulated by EN 55011 class A. This means that the instrument is suitable for use in industrial environments. In line with EN 61000-6-4, operation in residential, commercial and business areas or in small-size companies is not covered. Thus, the instrument may not be operated in residential, commercial and business areas or in small-size companies, unless additional measures are taken to ensure that EN 61000-6-3 is complied with.

Ordering information

| Designation | Type | Order No. |
|---|-----------------------------|---|
| Microwave Signal Generator ¹⁵ | R&S [®] SMF100A | 1167.0000.02 |
| Including power cable, quick start guide and CD-ROM (with operating and service manual) | | |
| Options | | |
| Frequency Range 1 GHz to 22 GHz ¹⁶ (adapter for 3.5 mm female included) | R&S [®] SMF-B122 | 1167.7004.03 |
| Frequency Range 1 GHz to 43.5 GHz ¹⁶ (adapter for 2.4 mm female + 2.9 mm female included) | R&S [®] SMF-B144 | 1167.7204.03 |
| OCXO Reference Oscillator ^{17,18} | R&S [®] SMF-B1 | 1167.9159.02 |
| Frequency Extension 100 kHz to 1 GHz ¹⁷ | R&S [®] SMF-B2 | 1167.4005.02 |
| AM/FM/φM/LOG AM Modulator ¹⁷ | R&S [®] SMF-B20 | 1167.9594.02 |
| Enhanced Phase Noise Performance ¹⁷ | R&S [®] SMF-B22 | 1415.2204.02 |
| Step Attenuator 100 kHz to 22 GHz ¹⁷ | R&S [®] SMF-B26 | 1167.5553.02 |
| Step Attenuator 100 kHz to 43.5 GHz ¹⁷ | R&S [®] SMF-B27 | 1167.5776.02 |
| High Output Power (not in combination with R&S [®] SMF-B2) ¹⁷ | R&S [®] SMF-B32 | 1415.2304.02 |
| High Output Power (in combination with R&S [®] SMF-B2) ¹⁷ | R&S [®] SMF-B34 | 1415.2404.02 |
| Rear Connectors 22 GHz ¹⁷ | R&S [®] SMF-B81 | 1167.5999.02 |
| Rear Connectors 43.5 GHz ¹⁷ | R&S [®] SMF-B82 | 1167.6208.02 |
| Removable GPIB ¹⁹ | R&S [®] SMF-B83 | 1167.6408.02 |
| Removable USB ¹⁹ | R&S [®] SMF-B84 | 1167.6608.02 |
| Removable Flash Disk ^{17,19} | R&S [®] SMF-B85 | 1167.6808.02 |
| Narrow Pulse Modulation | R&S [®] SMF-K3 | 1167.7804.02 |
| Ramp Sweep | R&S [®] SMF-K4 | 1167.7604.02 |
| Pulse Generator | R&S [®] SMF-K23 | 1167.7704.02 |
| Pulse Train ²⁰ | R&S [®] SMF-K27 | 1415.2004.02 |
| Power Analysis | R&S [®] SMF-K28 | 1415.2104.02 |
| Service options | | |
| Two-Year Calibration Service | R&S [®] CO2SMF100A | Please contact your local sales office. |
| Three-Year Calibration Service | R&S [®] CO3SMF100A | |
| Five-Year Calibration Service | R&S [®] CO5SMF100A | |
| One-Year Repair Service following the warranty period | R&S [®] RO2SMF100A | |
| Two-Year Repair Service following the warranty period | R&S [®] RO3SMF100A | |
| Four-Year Repair Service following the warranty period | R&S [®] RO5SMF100A | |
| Documentation of Calibration Values | R&S [®] DCV-2 | 0240.2193.19 |
| DKD (ISO 17025) Calibration including ISO 9000 calibration (can only be ordered with the device) | R&S [®] SMF22-DKD | 1161.3594.00 |
| | R&S [®] SMF44-DKD | 1161.3620.00 |

¹⁵ The base unit can only be ordered together with an R&S[®]SMF-B122 or R&S[®]SMF-B144 frequency option.

¹⁶ Option fitted by factory.

¹⁷ Option fitted by factory or especially equipped Rohde & Schwarz service department.

¹⁸ Option cannot be installed with an R&S[®]SMF-B22 enhanced phase noise performance option (not required).

¹⁹ Only two of the three R&S[®]SMF-B83/84/85 options can be installed simultaneously.

²⁰ Requires R&S[®]SMF-K23 pulse generator option.

| Recommended extras | | |
|---|-------------|--------------|
| Wideband Power Sensor (for use with R&S®SMF-K28) | R&S®NRP-Z81 | 1137.9009.02 |
| Hardcopy manuals (in English, UK) | | 1167.2319.32 |
| Hardcopy manuals (in English, US) | | 1167.2319.39 |
| Spare Compact Flash Card (R&S®SMF-B85 required) | R&S®SMF-Z10 | 1167.8100.02 |
| 19" Rack Adapter | R&S®ZZA-311 | 1096.3277.00 |
| Keyboard with USB Interface (US character set) | R&S®PSL-Z2 | 1157.6870.04 |
| Mouse with USB Interface, optical | R&S®PSL-Z10 | 1157.7060.03 |
| External USB DVD Drive | R&S®PSP-B6 | 1134.8201.22 |
| Adapters for the R&S®SMF100A with the R&S®SMF-B122 frequency option | | |
| 3.5 mm female | | 1021.0512.00 |
| 3.5 mm male | | 1021.0529.00 |
| N female | | 1021.0535.00 |
| N male | | 1021.0541.00 |
| Adapters for the R&S®SMF100A with the R&S®SMF-B144 frequency option | | |
| 2.4 mm female | | 1088.1627.02 |
| 2.9 mm female | | 1036.4790.00 |
| 2.9 mm male | | 1036.4802.00 |
| N female | | 1036.4777.00 |
| N male | | 1036.4783.00 |

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About Rohde & Schwarz

Rohde & Schwarz is an independent group of companies specializing in electronics. It is a leading supplier of solutions in the fields of test and measurement, broadcasting, radiomonitoring and radiolocation, as well as secure communications. Established 75 years ago, Rohde & Schwarz has a global presence and a dedicated service network in over 70 countries. Company headquarters are in Munich, Germany.

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Certified Quality System
ISO 9001
DQS REG. NO 1954 QM

Certified Environmental System
ISO 14001
DQS REG. NO 1954 UM

For product brochure,
see PD 5213.7660.12
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