



Specifications are valid under the following conditions: 15 minutes warm-up time at ambient temperature, specified environmental conditions met and calibration cycle adhered to. Data without tolerances: typical values. Data designated as "nominal": design parameters, i.e. not tested.

| Specification | Condition | R&S FSH3 | R&S FSH6 | R&S FSH18 |
|-------------------------------|--|---------------------------------------|-----------------------|------------------------|
| Frequency | | | | |
| Frequency range | | 100 kHz to 3 GHz | 100 kHz to 6 GHz | 10 MHz to 18 GHz |
| Reference frequency | | | | |
| Aging | | 1 ppm/year | | |
| Temperature drift | 0 °C to 30 °C 30 °C to 50 °C | 2 ppm in addition 2 ppm/10°C | | |
| Frequency counter | | | | |
| Resolution | | 1 Hz | | |
| Frequency span | | 0 Hz, 100 Hz to 3 GHz | 0 Hz, 100 Hz to 6 GHz | 0 Hz, 100 Hz to 18 GHz |
| | 1145.5850.13 | 0 Hz, 1 kHz to 3 GHz | - | - |
| Spectral purity | | | | |
| SSB phase noise | f = 500 MHz, 20 to 30 °C | | | |
| 30 kHz from carrier | | <-85 dBc/(1 Hz) | | <-85 dBc/(1 Hz) |
| 100 kHz from carrier | | < -100 dBc/(1 Hz) | | < -90 dBc/(1 Hz) |
| 1 MHz from carrier | | < -120 dBc/1 Hz) | | < -100 dBc/(1 Hz) |
| Sweep time | span = 0 Hz | 1 ms to 100 s | | |
| | span > 0 Hz | 20 ms to 1000 s, min. 20 ms/600 MHz | | |
| Bandwidths | | | | |
| Resolution bandwidths (-3 dB) | 1145.5850.13 | 1, 3, 10, 30,100, 200, 300 kHz, 1 MHz | | |
| | 1145.5850.03, .23, 1145.5850.06, .26, .18 | In addition 100, 300 Hz | | |
| Tolerance | ≤ 300 kHz | ± 5 %, nominal | | |
| | 1 MHz | ± 10 %, nominal | | |

| Specification | Condition | R&S FSH3 | R&S FSH6 | R&S FSH18 |
|--|---|---|----------|--|
| Resolution bandwidths (-6 dB) | with option R&S FSH-K3 installed | in addition 200 Hz, 9 kHz, 120 kHz, 1 MHz | | |
| Video bandwidths | | 10 Hz to 1 MHz in 1, 3 steps | | |
| Amplitude | | | | |
| Display range | | average noise level displayed to +20 dBm | | |
| Maximum permissible DC voltage at RF input | | 50 V / 80 V ¹⁾ | | 50 V |
| Maximum power | | 20 dBm, 30 dBm (1 W) for max. 3 minutes | | 20 dBm |
| Intermodulation-free dynamic range | third-order IM products, 2 x -20 dBm, reference level = -10 dBm | | | |
| Carrier offset ≤ 2 MHz | | 60 dB (+10 dBm third-order intercept) | | 50 dB (nominal) (+5 dBm third-order intercept) |
| Carrier offset > 2 MHz | | 66 dB (+13 dBm third-order intercept) | | 50 dB (nominal) (+5 dBm third-order intercept) |

¹⁾ 80 V valid as of serial number 100900 (model 1145.5850.03) or 101600 (model 1145.5850.13); models 1145.5850.23, 1145.5850.06 and .26 all serial numbers.

| Specification | Condition | R&S FSH3 | R&S FSH6 | R&S FSH18 |
|--|--|-----------------------------|-----------------------------|-----------------------------|
| Displayed average noise level | average value, resolution bandwidth 1 kHz, video bandwidth 10 Hz, reference level ≤ -30 dBm | | | |
| 10 MHz to 50 MHz | | <-105 dBm, typ. -114 dBm | <-105 dBm, typ. -112 dBm | <-90 dBm, typ. -98 dBm |
| 50 MHz to 3 GHz | | <-105 dBm, typ. -114 dBm | <-105 dBm, typ. -112 dBm | <-110 dBm, typ. -118 dBm |
| 3 GHz to 5 GHz | | - | <-103 dBm, typ. -108 dBm | <-110 dBm, typ. -118 dBm |
| 5 GHz to 6 GHz | | - | <-96 dBm, typ. -102 dBm | <-110 dBm, typ. -118 dBm |
| 6 GHz to 8 GHz | | - | - | <-108 dBm, typ. -113 dBm |
| 8 GHz to 12 GHz | | - | - | <-105 dBm, typ. -113 dBm |
| 12 GHz to 16 GHz | | - | - | <-100 dBm, typ. -108 dBm |
| 16 GHz to 18 GHz | | - | - | <-90 dBm, typ. -102 dBm |
| With preamplifier 10 MHz to 2.5 GHz | only models 1145.5850.03 ²), 1145.5850.23, 1145.5850.06 and 1145.5850.26 | <-120 dBm, typ. -125 dBm | <-120 dBm, typ. -125 dBm | - |
| 2.5 GHz to 3 GHz | | <-115 dBm, typ. -120 dBm | <-115 dBm, typ. -120 dBm | - |
| 3 GHz to 5 GHz | | - | <-115 dBm, typ. -120 dBm | - |
| 5 GHz to 6 GHz | | - | <-105 dBm, typ. -110 dBm | - |

² As of serial number 100900 and firmware version 6.0 or higher.

| Specification | Condition | R&S FSH3 | R&S FSH6 | R&S FSH18 |
|--|---|---|--|--|
| Inherent spurious | reference level \leq -20 dBm, f > 30 MHz, RBW \leq 100 kHz, S/N > 10 dB | < -80 dBm | < -80 dBm | < -80 dBm |
| Input related spurious R&S FSH3 / FSH6 Receive frequency Up to 3 GHz 3 GHz to 6 GHz Receive frequency = signal frequency - 2.0156 GHz | mixer level \leq -40 dBm carrier offset > 1 MHz signal frequency 2 GHz to 3.2 GHz | -70 dBc (nominal) 55 dBc (nominal) | -70 dBc (nominal) -64 dBc (nominal) 55 dBc (nominal) | |
| Input related spurious R&S FSH18 Receive frequency: 10 MHz to 14 GHz 14 GHz to 18 GHz Receive frequency = signal frequency - 3.9 GHz signal frequency + 0.6 GHz to + 1 GHz signal frequency - 0.6 GHz to - 1 GHz | mixer level \leq -20 dBm carrier offset > 1 MHz signal frequency: 10 MHz to 7.6 GHz 7.6 GHz to 18 GHz 10 MHz to 2.8 GHz 2.8 GHz to 7.6 GHz 7.6 GHz to 18 GHz signal frequency: 3.9 GHz to 18 GHz 7.4 GHz to 7.7 GHz 7.8 GHz to 8.5 GHz | | | -60 dBc (nominal) -50 dBc (nominal) -50 dBc (nominal) -30 dBc (nominal) -50 dBc (nominal) -40 dBc (nominal) -45 dBc (nominal) -45 dBc (nominal) |
| 2nd harmonic Receive frequency Up to 6 GHz 6 GHz to 9 GHz | mixer level -40 dBm | -60 dBc (nominal) | -60 dBc (nominal) | -60 dBc (nominal) -50 dBc (nominal) |
| Level display | | | | |
| Reference level | | -80 to +20 dBm in steps of 1 dB | | |
| Display range | | 100 dB, 50 dB, 20 dB, 10 dB, linear | | |

| Specification | Condition | R&S FSH3 | R&S FSH6 | R&S FSH18 |
|--|---|---|----------|-----------|
| Display units Logarithmic Linear | | dBm, dB μ V, dBmV with transducer also dB μ V/m and dB μ A/m μ V, mV, V, nW, μ W, mW, W with transducer also V/m, mV/m, μ V/m and W/m ² | | |
| Traces | | 1 trace and 1 memory trace | | |
| Trace mathematics | | A-B and B-A (trace – memory trace and memory trace – trace) | | |
| Detectors | | auto peak, maximum peak, minimum peak, sample, RMS | | |
| | with option R&S FSH-K3 installed | in addition average and quasi-peak | | |
| Level measurement error | at reference level down to -50 dB, 20 °C to 30 °C | | | |
| | 1 MHz to 10 MHz | < 1.5 dB, typ. 0.5 dB | | - |
| | 10 MHz to 20 MHz | < 1.5 dB, typ. 0.5 dB | | < 2 dB |
| | 20 MHz to 6 GHz | < 1.5 dB, typ. 0.5 dB | | < 1.5 dB |
| | 6 GHz to 14 GHz | - | | < 2.5 dB |
| 14 GHz to 18 GHz | - | | < 3.0 dB | |
| Markers | | | | |
| Number of markers or delta markers | | max. 6 | | |
| Marker functions | | peak, next peak, minimum, center = marker frequency, reference level = marker level, all markers to peak | | |
| Marker displays | | normal (level), noise marker, frequency counter (count) | | |
| Trigger | | free-running, video, external | | |
| Audio demodulation | | AM (video voltage without AGC) and FM | | |

| Specification | Condition | R&S FSH3 | R&S FSH6 | R&S FSH18 |
|--|--|---|--|--|
| Inputs | | | | |
| RF input | | N female | | |
| Input impedance | | 50 Ω | | |
| VSWR | 10 MHz to 3 GHz 3 GHz to 6 GHz 6 GHz to 15 GHz 15 GHz to 18 GHz | <1.5 nominal | <1.5 nominal <1.5 nominal | <1.5 nominal <1.5 nominal <2 nominal <3 nominal |
| Trigger/external reference input | | BNC female, selectable | | |
| Trigger voltage | | TTL | | |
| Reference frequency | | 10 MHz | | |
| Required level | from 50 Ω | 10 dBm | | |
| Outputs | | | | |
| AF output | | 3.5 mm mini jack | | |
| Output impedance Open-circuit voltage | | 100 Ω adjustable up to 1.5 V | | |
| Tracking generator | only models 145.5850.13, 1145.5850.23 und 1145.5850.26 | | | |
| Frequency range | | 5 MHz to 3 GHz | 5 MHz to 6 GHz | - |
| Output level | model 1145.5850.13 model 1145.5850.23 model 1145.5850.26 f < 3 GHz f > 3 GHz | -20 dBm (nominal) 0 dBm / -20 dBm, selectable | - 10 dBm (nominal) - 20 dBm (nominal) | - |
| Output impedance | | 50 Ω , nominal | | |
| Interfaces | | | | |
| RS-232-C optical interface | | | | |
| Baud rate | | 1200, 2400, 9600, 19200, 38400, 57600, 115200 baud | | |
| Power sensor | | 7-contact female connector (type Binder 712) | | |

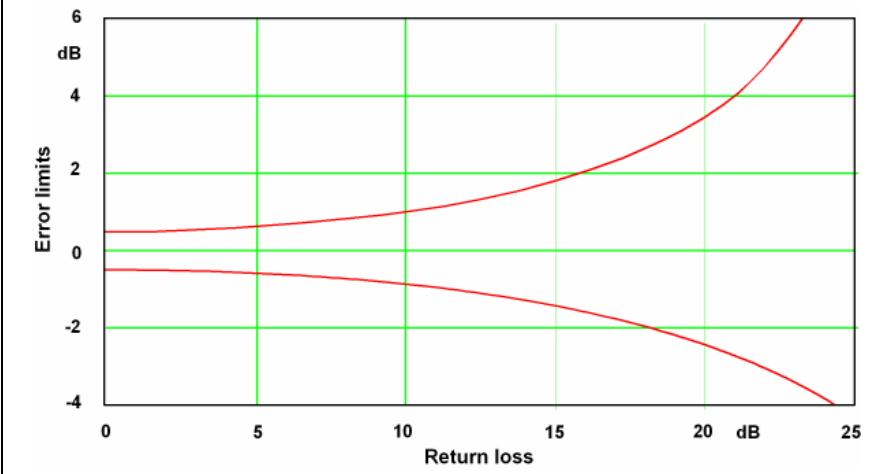
| Accessories | | |
|---|---|---|
| Power Sensors R&S FSH-Z1 and R&S FSH-Z18 | | |
| Frequency range R&S FSH-Z1 | | 10 MHz to 8 GHz |
| R&S FSH-Z18 | | 10 MHz to 18 GHz |
| VSWR | | |
| 10 MHz to 30 MHz | | < 1.15 |
| 30 MHz to 2.4 GHz | | < 1.13 |
| 2.4 GHz to 8 GHz | | < 1.20 |
| 8 GHz to 18 GHz | | <1.25 |
| Maximum input power | average power peak power (<10 μ s, 1% duty cycle) | 400 mW (+26 dBm) 1 W (+30 dBm) |
| Measurement range | | 200 pW to 200 mW (-67 dBm to +23 dBm) |
| Signal weighting | | average power |
| Effect of harmonics Effect of modulation | | <0.5 % (0.02 dB) at harmonic ratio of 20 dB <1.5 % (0.07 dB) for continuous digital modulation |
| Absolute measurement uncertainty | sine signals, no zero offset | |
| 10 MHz to 8 GHz | 15 °C to 35 °C 0 °C to 50 °C | <2.3 % (0.10 dB) <4.2 % (0.18 dB) |
| 8 GHz to 18 GHz | 15 °C to 35 °C 0 °C to 50 °C | <3.5 % (0.15 dB) <5.0 % (0.21 dB) |
| Zero offset after zeroing | | < 110 pW |
| Dimensions | | 48 mm x 31 mm x 170 mm, connecting cable 1.5 m |
| Weight | | < 0.3 kg |

| Directional Power Sensor R&S FSH-Z14 | | |
|---|---|---|
| Frequency range | | 25 MHz to 1 GHz |
| Power measurement range | | 30 mW to 300 W |
| VSWR referenced to 50 Ω | | < 1.06 |
| Power-handling capacity | depending on temperature and matching (see diagram below) | 100 W to 1000 W |
| Insertion loss | | < 0.06 dB |
| Directivity | | > 30 dB |
| Average power | | |
| Power measurement range CW, FM, PM, FSK, GMSK Modulated signals | CF: ratio of peak envelope power to average power | 30 mW to 300 W 30 mW to 300 W / CF |
| Measurement uncertainty 25 MHz to 40 MHz 40 MHz to 1 GHz | sine signal, 18 °C to 28 °C, no zero offset | 4.0 % of measured value (0.17 dB) 3.2 % of measured value (0.14 dB) |
| Zero offset | after zeroing | ± 4 mW |
| Range of typical meas. error with modulation FM, PM, FSK, GMSK AM (80 %) 2 CW carriers with identical power EDGE, TETRA | *) if standard is selected on the R&S FSH | 0 % of measured value (0 dB) ± 3 % of measured value (± 0.13 dB) ± 2 % of measured value (± 0.09 dB) ± 0.5 % of measured value (± 0.02 dB) *) |
| Temperature coefficient 25 MHz to 40 MHz 40 MHz to 1 GHz | | 0.40 %/K (0.017 dB/K) 0.25 %/K (0.011 dB/K) |

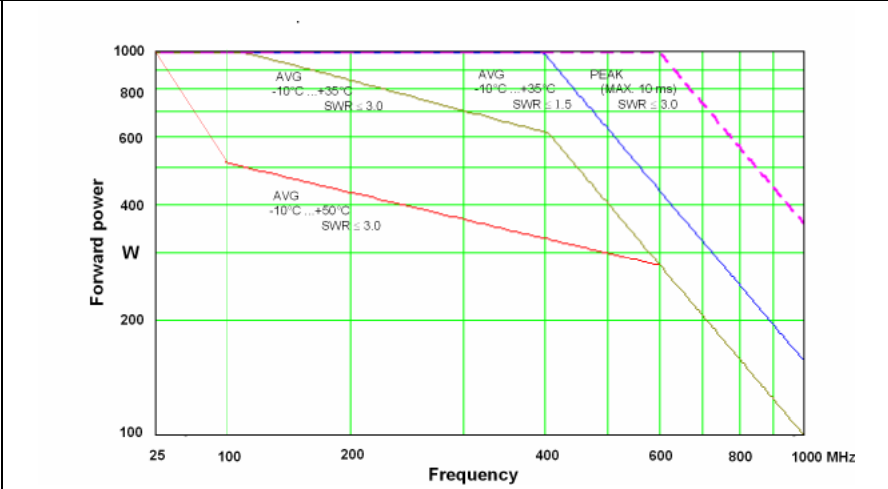
| Directional Power Sensor R&S FSH-Z14 | | |
|--|---|---|
| Max. peak envelope power | | |
| Power measurement range Video bandwidth 4 kHz 200 kHz 600 kHz | | 0.4 W to 300 W 1 W to 300 W 2 W to 300 W |
| Measurement uncertainty | 18°C to 28°C | same as for average power plus effect of peak hold circuit |
| Error limits of peak hold circuit for burst signals Duty cycle ≥ 0.1 and repetition rate ≥ 100 / s 20/s \leq repetition rate < 100 /s 0.001 \leq duty cycle < 0.1 | video bandwidth 4 kHz 200 kHz 600 kHz | $\pm (3\% \text{ of measured value} + 0.05 \text{ W})$ starting from a burst width of 200 μs $\pm (3\% \text{ of measured value} + 0.20 \text{ W})$ starting from a burst width of 4 μs $\pm (7\% \text{ of measured value} + 0.40 \text{ W})$ starting from a burst width of 2 μs plus $\pm (1.6\% \text{ of measured value} + 0.15 \text{ W})$ plus $\pm 0.10 \text{ W}$ |
| Temperature coefficient 25 MHz to 40 MHz 40 MHz to 1 GHz | | 0.50 %/K (0.022 dB/K) 0.35 %/K (0.015 dB/K) |
| Load matching | | |
| Matching measurement range Return loss VSWR | | 0 dB to 23 dB > 1.15 |
| Minimum forward power | specs met from 0.4 W | 0.06 W |

Directional Power Sensor R&S FSH-Z14

Error limits for matching measurements



Power-handling capacity



Dimensions 120 mm x 95 mm x 39 mm, connecting cable 1.5 m

Weight 0.65 kg

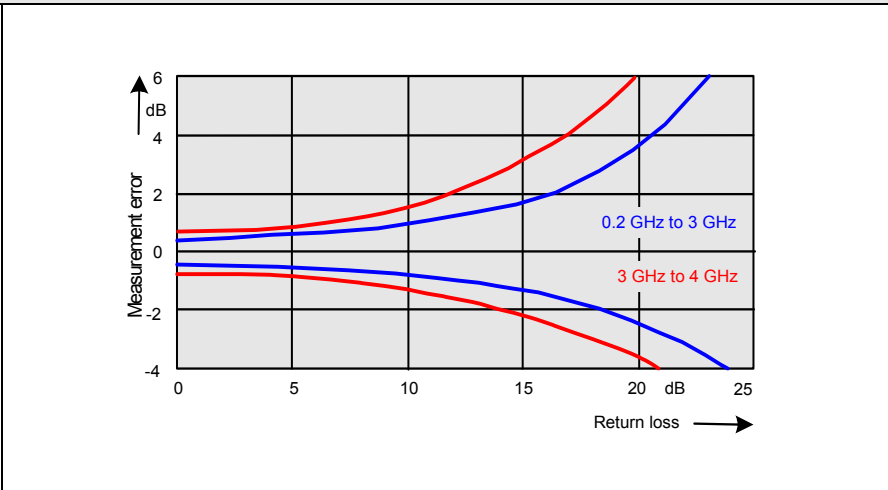
| Directional Power Sensor R&S FSH-Z44 | | |
|---|---|--|
| Frequency range | | 200 MHz to 4 GHz |
| Power measurement range | | 30 mW to 300 W |
| VSWR referenced to 50 Ω 200 MHz to 3 GHz 3 GHz to 4 GHz | | < 1.07 < 1.12 |
| Power-handling capacity | depending on temperature and matching (see diagram below) | 120 W to 1000 W |
| Insertion loss 200 MHz to 1.5 GHz 1.5 GHz to 4 GHz | | < 0.06 dB < 0.09 dB |
| Directivity 200 MHz to 3 GHz 3 GHz to 4 GHz | | > 30 dB > 26 dB |
| Average power | | |
| Power measurement range CW, FM, PM, FSK, GMSK 3GPP W-CDMA, cdmaOne, cdma2000, DAB, DVB-T Other modulated signals | CF: ratio of peak envelope power to average power | 30 mW to 300 W 30 mW to 120 W 30 mW to 300 W / CF |
| Measurement uncertainty 200 MHz to 300 MHz 300 MHz to 4 GHz | sine signal, 18 °C to 28 °C, no zero offset | 4.0 % of measured value (0.17 dB) 3.2 % of measured value (0.14 dB) |

| Directional Power Sensor R&S FSH-Z44 | | |
|--|---|--|
| Zero offset | after zeroing | ± 4 mW |
| Range of typical measurement error with modulation FM, PM, FSK, GMSK AM (80 %) 2 CW carriers with identical power $\pi/4$ -DQPSK EDGE cdmaOne, DAB 3GPP W-CDMA, cdma2000 DVB-T | *) if standard is selected on the R&S FSH | 0 % of measured value (0 dB) ± 3 % of measured value (± 0.13 dB) ± 2 % of measured value (± 0.09 dB) ± 2 % of measured value (± 0.09 dB) ± 0.5 % of measured value (± 0.02 dB) *) ± 1 % of measured value (± 0.04 dB) *) ± 2 % of measured value (± 0.09 dB) *) ± 2 % of measured value (± 0.09 dB) *) |
| Temperature coefficient 200 MHz to 300 MHz 300 MHz to 4 GHz | | 0.40 %/K (0.017 dB/K) 0.25 %/K (0.011 dB/K) |
| Max. peak envelope power | | |
| Power measurement range DAB, DVB-T, cdmaOne, cdma2000, 3GPP W-CDMA Other signals at video bandwidth | | 4 W to 300 W 4 kHz 0.4 W to 300 W 200 kHz 1 W to 300 W 4 MHz 2 W to 300 W |

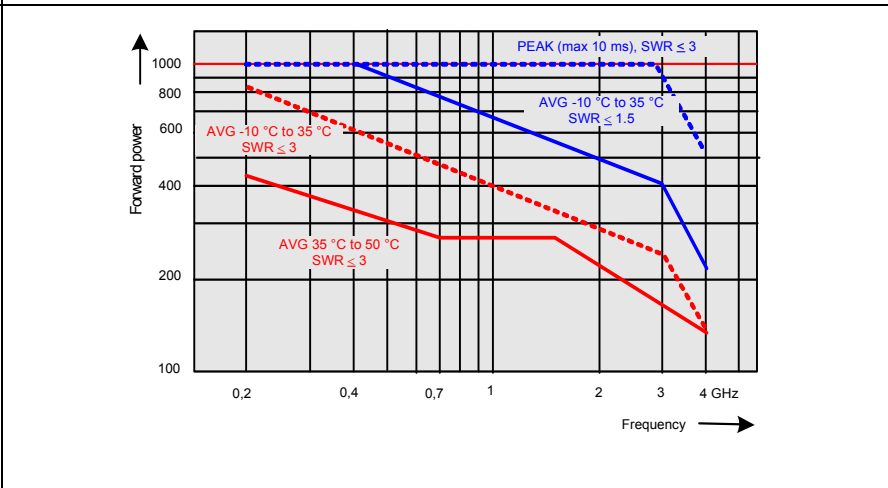
| Directional Power Sensor R&S FSH-Z44 | | |
|---|---|--|
| Measurement uncertainty | 18°C to 28°C | same as for average power plus effect of peak hold circuit |
| Error limits of peak hold circuit for burst signals Duty cycle ≥ 0.1 und repetition rate $\geq 100 / s$ 20/s \leq repetition rate $< 100/s$ 0.001 \leq duty cycle < 0.1 Burst width $\geq 0.5\mu s$ Burst width $\geq 0.2\mu s$ | video bandwidth 4 kHz 200 kHz 4 MHz | $\pm (3 \% \text{ of measured value} + 0.05 \text{ W})$ starting from a burst width of 100 μs $\pm (3 \% \text{ of measured value} + 0.20 \text{ W})$ starting from a burst width of 4 μs $\pm (7 \% \text{ of measured value} + 0.40 \text{ W})$ starting from a burst width of 1 μs plus $\pm (1.6 \% \text{ of measured value} + 0.15 \text{ W})$ plus $\pm 0.10 \text{ W}$ plus $\pm 5 \% \text{ of measured value}$ plus $\pm 10 \% \text{ of measured value}$ |
| Range of typical measurement error of peak hold circuit for cdmaOne, DAB DVB-T, cdma2000, 3GPP W-CDMA | video bandwidth 4 MHz and standard selected on the R&S FSH | $\pm (5\% \text{ of measured value} + 0.4 \text{ W})$ $\pm (15\% \text{ of measured value} + 0.4 \text{ W})$ |
| Temperature coefficient 200 MHz to 300 MHz 300 MHz to 4 GHz | | 0.50 %/K (0.022 dB/K) 0.35 %/K (0.015 dB/K) |
| Load matching | | |
| Matching measurement range Return loss 200 MHz to 3 GHz 3 GHz to 4 GHz VSWR 200 MHz to 3 GHz 3 GHz to 4 GHz | | 0 dB to 23 dB 0 dB to 20 dB > 1.15 > 1.22 |
| Minimum forward power | specs met from 0.2 W | 0.03 W |

Directional Power Sensor R&S FSH-Z44

Error limits for matching measurements



Power-handling capacity



| | |
|------------|--|
| Dimensions | 120 mm x 95 mm x 39 mm, connecting cable 1.5 m |
| Weight | 0.65 kg |

| VSWR Bridge R&S FSH-Z2 / R&S FSH-Z3 | | | |
|--|-------------------|-----------------|---------------------|
| | | R&S FSH-Z2 | R&S FSH-Z3 |
| Frequency range | | 10 MHz to 3 GHz | 10 MHz to 3 GHz |
| Impedance | | 50 Ω | |
| VSWR bridge | | | |
| Directivity | | | |
| 10 MHz to 30 MHz | | typ. 30 dB | typ. 16 dB |
| 30 MHz to 1 GHz | | typ. 30 dB | > 20 dB, typ. 28 dB |
| 1 GHz to 3 GHz | | typ. 25 dB | > 20 dB, typ. 28 dB |
| 3 GHz to 6 GHz | | - | > 16 dB, typ. 25 dB |
| Directivity, corrected | option R&S FSH-K2 | | |
| 2 MHz to 10 MHz | | typ. 40 dB | typ. 40 dB |
| 10 MHz to 3 GHz | | typ. 43 dB | typ. 40 dB |
| 3 GHz to 6 GHz | | - | typ. 37 dB |
| Return loss at test port | | | |
| 10 MHz to 50 MHz | | 20 dB, typ. | > 12 dB, typ. 18 dB |
| 50 MHz to 3 GHz | | 20 dB, typ. | > 16 dB, typ. 22 dB |
| 3 GHz to 6 GHz | | - | > 16 dB, typ. 22 dB |
| Return loss at test port, corrected | option R&S FSH-K2 | | |
| 2 MHz to 3 GHz | | typ. 35 dB | typ. 40 dB |
| 3 GHz to 6 GHz | | - | typ. 37 dB |
| Insertion loss | | | |
| Test port | | typ. 9 dB | typ. 9 dB |
| Bypass | | - | typ. 4 dB |

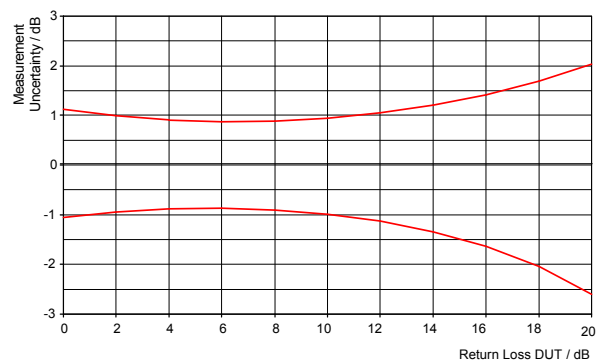
| VSWR Bridge R&S FSH-Z2 / R&S FSH-Z3 | | | |
|--|--|-----------------------------------|------------------------------|
| | | R&S FSH-Z2 | R&S FSH-Z3 |
| DC bias | | - | |
| Max. input voltage | | - | 50 V |
| Max. input current | | - | 300 mA /600 mA ^{*)} |
| Type of connector | | - | BNC female |
| Connectors | | | |
| Generator input/RF output | | N male | |
| Test port | | N female | |
| Control interface | | 7-contact connector (type Binder) | |
| General data | | | |
| Power consumption | | - | 3 mW (nominal) |
| Dimensions (W x H x D) | | 169 mm x 116 mm x 30 mm | 149 mm x 144 mm x 45 mm |
| Weight | | 485 g | 620 g |
| Calibration standards | | R&S FSH-Z29 R&S FSH-Z30/-Z31 | R&S FSH-Z28 |
| Short/open | | N male | |
| 50 Ω load | | N male | |
| Impedance | | 50 Ω | |
| Return loss | | | |
| DC to 3 GHz | | > 43 dB | > 40 dB, typ. 46 dB |
| 3 GHz to 6 GHz | | - | > 37 dB, typ. 43 dB |
| Power-handling capacity | | 1 W | 1 W |

^{*)} as of serial number 100500

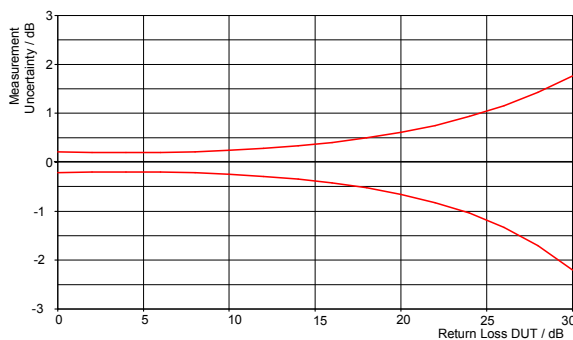
| Distance-to-Fault Measurement R&S FSH-B1 (only with R&S FSH3 models 1145.5850.13, 1145.5850.23 and R&S FSH6 model 1145.5850.26) | | |
|--|-------------------------|--|
| Display | | 301 pixels |
| Maximum resolution, distance to fault | maximum zoom | cable length/1023 pixels |
| Display range Return loss VSWR Reflection coefficient mRho | | 10, 5, 2, 1 dB/div, linear 1 to 2, 1 to 6, 1 to 10 und 1 to 20 with option R&S FSH-K2 in addition 1 to 1.2 and 1 to 1.5 0 to 1, 0 to 0.1, 0 to 0.01, 0 to 0.001 0 to 100, 0 to 100, 0 to 10, 0 to 1 |
| Cable length | depending on cable loss | 0 m to max. 1000 m |
| Maximum permissible spurious signal | | 1st mixer 1 dB compression point typ. +10 dBm IF overload at reference level typ. +8 dB |

| Specification | Condition | R&S FSH3 | R&S FSH6 |
|---|-----------------------------------|---------------------|---------------------|
| Transmission measurements (only with R&S FSH3 models 1145.5850.13, 1145.5850.23 and R&S FSH6 model 1145.5850.26) | | | |
| Frequency range | | 5 MHz bis 3 GHz | 5 MHz bis 6 GHz |
| Dynamic range 10 MHz to 2.2 GHz | scalar mode | typ. 60 dB | typ. 80 dB |
| | vector mode, option R&S FSH-K2 | typ. 80 dB | typ. 90 dB |
| 2.2 to 3 GHz | scalar mode | typ. 50 dB | typ. 70 dB |
| | vector mode, option R&S FSH-K2 | typ. 65 dB | typ. 85 dB |
| 3 to 5 GHz | scalar mode | - | typ. 40 dB |
| | vector mode, option R&S FSH-K2 | - | typ. 55 dB |
| 5 to 6 GHz | scalar mode | - | typ. 35 dB |
| | vector mode, option R&S FSH-K2 | - | typ. 50 dB |

| Specification | Condition | R&S FSH3 | R&S FSH6 |
|---|--------------------------------|--|-----------------|
| Reflection measurements (only with R&S FSH3 model 1145.5850.13 or 1145.5850.23, R&S FSH6 model 1145.5850.26 and R&S FSH-Z2/-Z3) | | | |
| Frequency range | | 10 MHz to 3 GHz | 10 MHz to 3 GHz |
| Display range of return loss | | 10, 20, 50, 100 dB, selectable | |
| VSWR display range | | 1 to 2, 1 to 6, 1 to 10 und 1 to 20, selectable, with option R&S FSH-K2 also 1 to 1.2 and 1 to 1.5 | |
| Display range Reflection coefficient mRho | | 0 to 1, 0 to 0.1, 0 to 0.01, 0 to 0.001 0 to 100, 0 to 100, 0 to 10, 0 to 1 | |
| Smith chart | only with option R&S FSH-K2 | | |
| Marker formats: Reflection | | dB mag and phase lin mag and phase real and imag | |
| Impedance | | R+jX (R+jX)/Z ₀ | |
| Admittance | | G+jB (G+jB)/Z ₀ | |
| Reference impedance Z ₀ | | 10 mΩ to 10 kΩ | |
| Zoom function | | expansion factor 2, 4, 8 | |
| Measurement uncertainty | | see diagrams | |



Measurement uncertainty with scalar measurements



Measurement uncertainty with vector measurements (option R&S FSH-K2)

| Specification | Condition | R&S FSH3 | R&S FSH6 |
|---|---------------------|---|-----------------------------------|
| Phase measurements (transmission, reflection) (only with R&S FSH3 models 1145.5850.13 or 1145.5850.23, R&S FSH6 1145.5850.26 and R&S FSH-K2) | | | |
| Frequency range Reflection Transmission | with R&S FSH-Z2/-Z3 | 10 MHz to 3 GHz 5 MHz to 3 GHz | 10 MHz to 6 GHz 5 MHz to 6 GHz |
| Display range | | ± 180° (wrap) 0° to 54360° (unwrap) | |
| Group delay measurements (only with R&S FSH3 models 1145.5850.13 or 1145.5850.23, R&S FSH6 1145.5850.26 and R&S FSH-K2) | | | |
| Frequency range Reflection Transmission | with R&S FSH-Z2/-Z3 | 10 MHz to 3 GHz 5 MHz to 3 GHz | 10 MHz to 6 GHz 5 MHz to 6 GHz |
| Aperture increments | | 1 to 300 | |
| Display range | | 10 ns, 20 ns, 50 ns, 100 ns, 200 ns, 500 ns, 1000 ns, selectable | |

| Specification | Condition | R&S FSH3 (only for model 1145.5850.23 as of serial number 103500) |
|--|---|--|
| 3GPP FDD code domain power BTS/Node B measurement (only with R&S FSH-K4 1300.7633.02) | | |
| Frequency range | | 10 MHz to 3 GHz |
| Carrier frequency error Measurement range Measurement uncertainty | S/N > 30 dB | (test case 6.3 in accordance with 3GPP 25.141) ± 1 kHz $< 50 \text{ Hz} + \Delta f_{\text{ref}}^{(1)}$ ($\sigma = 20 \text{ Hz}$) |
| Total power Measurement range Measurement uncertainty | S/N > 30 dB frequency > 1 MHz 20 °C to 30 °C -40 dBm < P _{total} < 20 dBm P _{REF_LEV} -30dB < P _{total} < P _{REF_LEV} +3dB | (test case 6.2.1 in accordance with 3GPP 25.141) -60 dBm < P _{total} < 20 dBm ± 1.5 dB, typ. 0.5 dB |
| CPICH power Measurement range Measurement uncertainty | S/N > 30 dB -40 dBm < P _{total} < 20 dBm - P _{total} -20 dBm < P _{CPICH} < P _{total} | (test case 6.2.2 in accordance with 3GPP 25.141) P _{total} -20 dB < P _{CPICH} < P _{total} ± 1.5 dB, typ. 0.5 dB |
| P-CCPCH power Measurement range Measurement uncertainty | S/N > 30 dB -40 dBm < P _{total} < 20 dBm P _{total} -20 dBm < P _{PCCPCH} < P _{total} | P _{total} -40 dB < P _{PCCPCH} < P _{total} ± 1.5 dB, typ. 0.5 dB |
| PSCH/SSCH power Measurement range Measurement uncertainty | S/N > 30 dB -40 dBm < P _{total} < 20 dBm P _{total} -20 dBm < P _{PSCH} < P _{total} | P _{total} -30 dB < P _{SCH} < P _{total} ± 2.5 dB, typ. 1.5 dB |
| Symbol EVM Measurement range Measurement uncertainty Residual EVM _{symbol} | 3% < EVM _{symbol} < 10% 10% < EVM _{symbol} < 20% | 3% < EVM _{symbol} < 25% $\pm 2.5\%$ typ. $\pm 3.0\%$ typ. 3% typ. |

| Specification | Condition | R&S FSH3 |
|---|---|---|
| 3GPP FDD scrambling code detection | | |
| Frequency range | ± 1 kHz | 10 MHz to 3 GHz |
| Single scrambling code detection Calculation time CPICH E_C / I_0 | | 24 s > -18 dB ²⁾ |
| Multiple scrambling code detection Max. number of scrambling codes Calculation time CPICH E_C / I_0 CPICH power Measurement uncertainty | $-40 \text{ dBm} < P_{\text{total}} < 20 \text{ dBm}$ | 8 57 s > -21 dB ²⁾ $\pm 4.2 \text{ dB}$ |

1) Δf_{ref} = uncertainty of reference frequency source.

2) Probability of detection >50% with test model 1.16 in accordance with 3GPP TS 25.141 test specifications.

General data

| | |
|--|---|
| Display | 14 cm (5.7") LC color display |
| Resolution | 320 x 240 pixels |
| Memory | CMOS RAM |
| Settings and traces | 100 |
| Environmental conditions | |
| Temperature | |
| Operating temperature range | |
| R&S FSH powered from internal battery | 0 °C to 50 °C |
| R&S FSH powered from AC power supply | 0 °C to 40 °C |
| Storage temperature range | -20 °C to +60 °C |
| Battery charging mode | 0 °C to 40 °C |
| Climatic conditions | |
| Relative humidity | 95 % at 40 °C (IEC60068) |
| IP class of protection | |
| | 51 |
| Mechanical resistance | |
| Vibration, sinusoidal | complies with EN 60068-2-1, EN61010-1 5 Hz to 55 Hz: max. 2 g, 55 Hz to 150 Hz: 0.5 g constant, 12 minutes per axis |
| Vibration, random | complies with EN60068-2-64 10 Hz to 500 Hz, 1.9 g, 30 minutes per axis |
| Shock | complies with EN 60068-2-27 40 g shock spectrum |
| RFI suppression | |
| | complies with EMC directive of EU (89/336/EEC) and German EMC legislation |
| Immunity to radiated interference | |
| | 10 V/m |
| Level display at 10 V/m (reference level \leq -10 dBm) | |
| Input frequency | < -75 dBm (nominal) |
| IF | < -85 dBm (nominal) |
| Other frequencies | < displayed noise level |

Power supply

| | |
|---|---|
| AC supply | plug-in AC power supply (R&S FSH-Z33) 100 V AC to 240 V AC, 50 Hz to 60 Hz, 400 mA |
| External DC voltage | 15 V to 20 V |
| Internal battery | NiMH battery (type Fluke BP190, R&S FSH-Z32) |
| Battery voltage | 6 V to 9 V |
| Operating time with fully charged battery | typ. 4 h with tracking generator off, typ. 3 h with tracking generator on, typ. 3 h for R&S FSH18 |
| Battery charging time | 4 h with instrument off |
| Lifetime | 300 to 500 charging cycles |
| Power consumption | typ. 7 W |

Safety

Test mark

complies with EN 61010-1, UL 3111-1,
CSA C22.2 No. 1010-1

VDE, GS, CSA, CSA-NRTL

Dimensions (W x H x D)

170 mm x 120 mm x 270 mm

Weight

2.5 kg

Order No.

| | |
|---|--------------|
| Handheld Spectrum Analyzer R&S FSH3 100 kHz to 3 GHz, with preamplifier | 1145.5850.03 |
| Handheld Spectrum Analyzer R&S FSH3 100 kHz to 3 GHz, with tracking generator | 1145.5850.13 |
| Handheld Spectrum Analyzer R&S FSH3 100 kHz to 3 GHz, with tracking generator and preamplifier | 1145.5850.23 |
| Handheld Spectrum Analyzer R&S FSH6 100 kHz to 6 GHz, with preamplifier | 1145.5850.06 |
| Handheld Spectrum Analyzer R&S FSH6 100 kHz to 6 GHz, with tracking generator and preamplifier | 1145.5850.26 |
| Handheld Spectrum Analyzer R&S FSH18 10 MHz to 18 GHz | 1145.5850.18 |

Power supply**Accessories supplied**

external power supply, battery pack (built-in),
RS-232-C optical cable, headphones, Quick Start manual,
CD-ROM with Control Software R&S FSH View and
documentation

Options

| | Designation | Order No. |
|--|-------------|--------------|
| Distance-to-Fault Measurement for the R&S FSH (includes 1 m cable, R&S FSH-Z2 required) | R&S FSH-B1 | 1145.5750.02 |
| Remote Control via RS-232-C for the R&S FSH | R&S FSH-K1 | 1157.3458.02 |
| Vector Transmission and Reflection Measurements for the R&S FSH | R&S FSH-K2 | 1157.3387.02 |
| Receiver Mode for the R&S FSH | R&S FSH-K3 | 1157.3429.02 |
| 3GPP FDD Code Domain Power BTS/Node B Measurement for the R&S FSH3 model 23 as of serial number 103500 | R&S FSH-K4 | 1300.7633.02 |

Optional accessories

| | Designation | Order No. |
|--|-------------|--------------|
| Power Sensor for the R&S FSH, 10 MHz to 8 GHz | R&S FSH-Z1 | 1155.4505.02 |
| VSWR Bridge and Power Divider for the R&S FSH, 10 MHz to 3 GHz (incl. calibration standards open, short, 50 Ω load) | R&S FSH-Z2 | 1145.5767.02 |
| VSWR Bridge with DC Bias and Bypass Connector for the R&S FSH, 10 MHz to 6 GHz (incl. calibration standards open, short, 50 Ω load) | R&S FSH-Z3 | 1300.7756.02 |

Power supply

Optional accessories

| | Designation | Order No. |
|---|-------------|--------------|
| Directional Power Sensor for the R&S FSH, 25 MHz to 1 GHz | R&S FSH-Z14 | 1120.6001.02 |
| Power Sensor for the R&S FSH, 10 MHz to 18 GHz | R&S FSH-Z18 | 1165.1909.02 |
| Directional Power Sensor for the R&S FSH, 200 MHz to 4 GHz | R&S FSH-Z44 | 1165.2305.02 |
| Matching Pad, 50/75 Ω , 0 Hz to 2700 MHz | RAZ | 0358.5714.02 |
| Spare RF Cable (1 m), connectors N male/N female for R&S FSH-B1 | R&S FSH-Z20 | 1145.5867.02 |
| 12 V Car Adapter for the R&S FSH | R&S FSH-Z21 | 1145.5873.02 |
| Serial/Parallel Converter for the R&S FSH | R&S FSH-Z22 | 1145.5880.02 |
| Carrying Bag for the R&S FSH | R&S FSH-Z25 | 1145.5896.02 |
| Transit Case for the R&S FSH | R&S FSH-Z26 | 1300.7627.00 |
| Spare Combined Short/Open and 50 Ω Load for VSWR and DTF calibration, DC to 6 GHz | R&S FSH-Z28 | 1300.7804.02 |
| Combined Short/Open and 50 Ω Load for VSWR and DTF calibration, DC to 3 GHz | R&S FSH-Z29 | 1300.7504.02 |
| Spare Short/Open Calibration Standard for R&S FSH-Z2 for VSWR calibration, DC to 3 GHz | R&S FSH-Z30 | 1145.5773.02 |
| Spare 50 Ω Load Standard for R&S FSH-Z2 for VSWR and DTF calibration, DC to 3 GHz | R&S FSH-Z31 | 1145.5780.02 |
| Spare Battery Pack for the R&S FSH | R&S FSH-Z32 | 1145.5796.02 |
| Spare AC Power Supply for the R&S FSH | R&S FSH-Z33 | 1145.5809.02 |

Power supply**Optional accessories**

| | Designation | Order No. |
|--|-------------|--------------|
| Spare RS-232-C Optical Cable | R&S FSH-Z34 | 1145.5815.02 |
| Spare CD-ROM with Control Software R&S FSH View and documentation | R&S FSH-Z35 | 1145.5821.02 |
| Spare Headphones | R&S FSH-Z36 | 1145.5838.02 |
| Spare USB Optical Cable | R&S FSH-Z37 | 1300.7733.02 |
| Active Directional Antenna | R&S HE-200 | 4050.3509.02 |
| Portable EMF Measurement System, 30 MHz to 3 GHz, for the Handheld Spectrum Analyzer R&S FSH | R&S TS-EMF | 1158.9295.13 |
| Near-Field Probe Set | R&S HZ-15 | 1147.2736.02 |
| Preamplifier for the R&S HZ-15 | R&S HZ-16 | 1147.2720.02 |