R&S®FSH Handheld Spectrum Analyzer

R&S®FSH3 100 kHz to 3 GHz R&S®FSH6 100 kHz to 6 GHz R&S®FSH18 10 MHz to 18 GHz



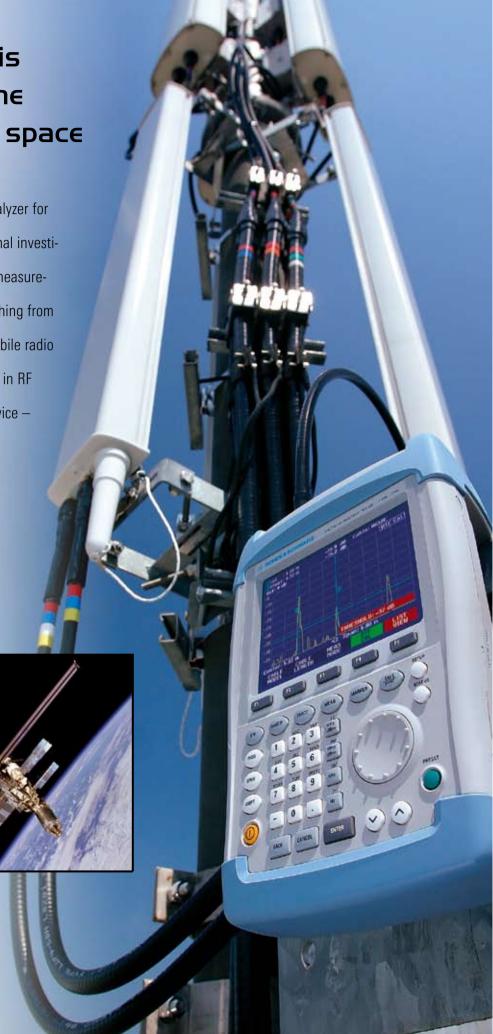
Fourth Edition March 2007



Spectrum analysis anywhere, anytime – on earth and in space

The R&S®FSH is the ideal spectrum analyzer for rapid, high-precision, cost-effective signal investigations. It provides a large number of measurement functions and so can handle anything from the installation or maintenance of a mobile radio base station up to on-site fault location in RF cables as well as development and service — an extensive range of applications.

Due to its excellent characteristics, the R&S®FSH3 is used on board the International Space Station (ISS) for distance-to-fault measurements on RF antenna cables.



Handy, robust, and portabl∈

The R&S®FSH has been designed as a robust, portable spectrum analyzer that can be used in the field.

Trace
Memory Trace
Clear/Write
Max/Min Hold
Average
View
Detectors
- Auto Peak
- Sample
- Max/Min Peak
- RMS

Function keys

Softkey function

Robust edge protection, stable carrying handle

Easy operation

Four hours operating time on battery power

Storage of up to 256 traces and setups

Easy data transfer to PC

High measurement accuracy

Best RF characteristics in its class

-50 -60 -70 -80 -90 -100 -110 Center: 2.2 GHz MANUAL RES BU RES B

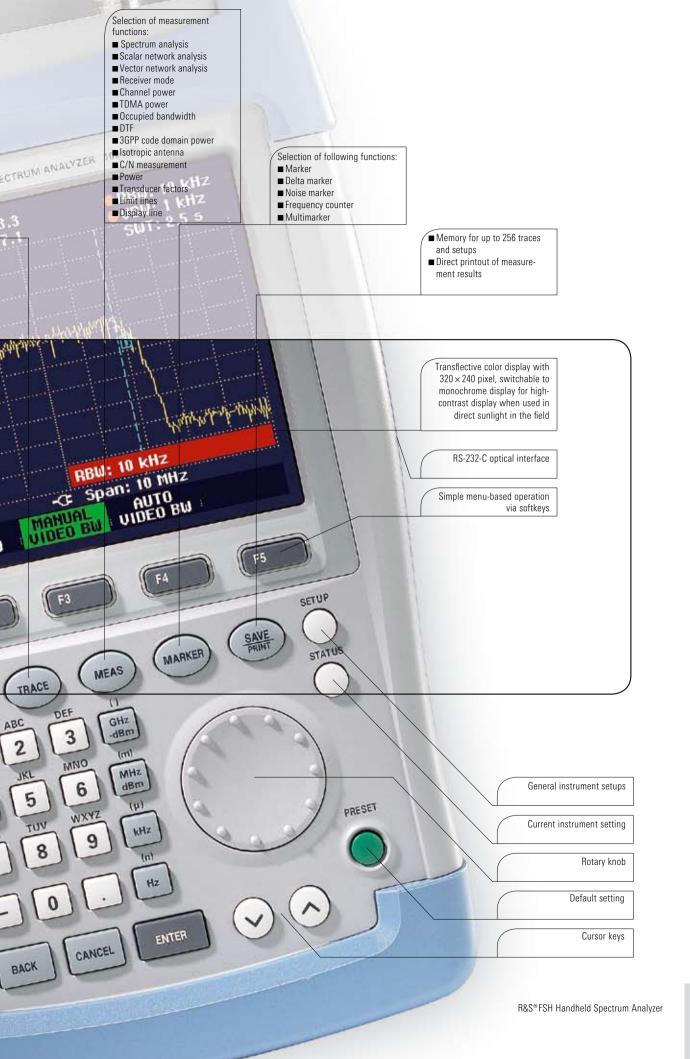
The R&S®FSH can, of course, also be used on the lab bench. The R&S®FSH has an adjustable, fold-out stand to position the instrument to an optimal display viewing angle.



The R&S®FSH and its accessories can be stored and transported in the compact and sturdy aluminum transit case.









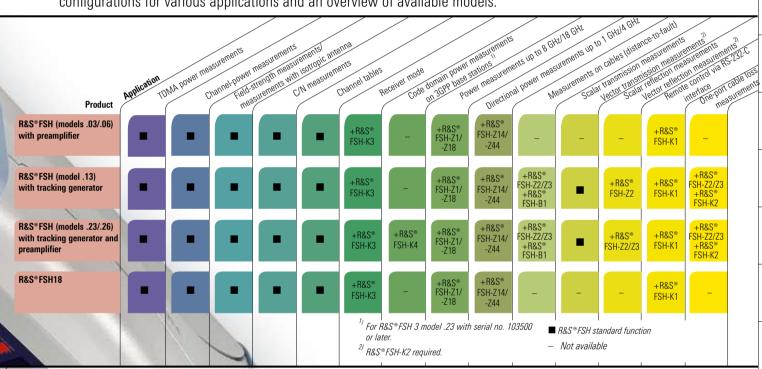
Data in brief

Headphones connector

		R&S°FSH3	R&S®FSH6	R&S*FSH18		
Frequency range		100 kHz to 3 GHz	100 kHz to 6 GHz	10 MHz to 18 GHz		
Resolution bandwidths	1	1 kHz to 1 MHz (model .13) 100 Hz to 1 MHz (models .03 and .23)	100 Hz to 1 MHz			
Video bandwidths		10 Hz to 1 MHz				
Displayed average noise level		typ114 dBm (1 kHz) (model .13) typ135 dBm (100 Hz) (models .03 and .23)	typ. –135 dBm (100 Hz)	typ. –128 dBm (100 Hz)		
TOI		typ. 13 dBm				
SSB phase noise		<-100 dBc (1 Hz) at 100 kHz from carrier				
Detectors		sample, max/min peak, auto peak, RMS				
Level measurement uncertainty		<1.5 dB, typ. 0.5 dB		<1.5 dB to 6 GHz <2.5 dB to 16 GHz <3 dB to 18 GHz		
Reference level		-80 dBm to +20 dBm				
Dimensions		170 mm × 120 mm × 270 mm (6.69 in × 4	.72 in × 10.63 in)			
Weight		2.5 kg (5,52 lb)				

R&S®FSH - options and applications

The R&S®FSH can be used for measurements up to an upper frequency limit of 3 GHz, 6 GHz, and 18 GHz. The 3 GHz and 6 GHz are available with or without internal tracking generator. When the tracking generator is included, the R&S®FSH can be used for distance-to-fault (DTF) measurements, scalar and vector network analysis, and one-port cable loss measurement. Almost all models come standard with an adjustable preamplifier, making them suitable for measuring very small signals. Power sensors are available as accessories for high-precision terminating power measurements up to 8 GHz or 18 GHz as well as for directional power measurements up to 4 GHz. The following tables show possible configurations for various applications and an overview of available models.

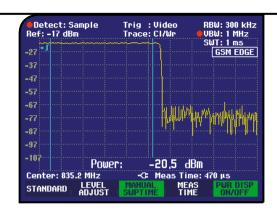


R&S®FSH - models

	Frequency range	Tracking generator	Output power of tracking generator	Preamplifier	Resolution bandwidth
R&S®FSH3 model .03	100 kHz to 3 GHz	-	-	-	100 Hz to 1 MHz
R&S®FSH3 model .13	100 kHz to 3 GHz		-20 dBm	-	1 kHz to 1 MHz
R&S®FSH3 model .23	100 kHz to 3 GHz	•	-20 dBm/0 dBm, selectable	•	100 Hz to 1 MHz
R&S®FSH6 model .06	100 kHz to 6 GHz	-	-	•	100 Hz to 1 MHz
R&S®FSH6 model .26	100 kHz to 6 GHz	•	-10 dBm (f < 3 GHz) -20 dBm (f > 3 GHz)		100 Hz to 1 MHz
R&S®FSH18	10 MHz to 18 GHz	-	-	-	100 Hz to 1 MHz

TDMA power measurements

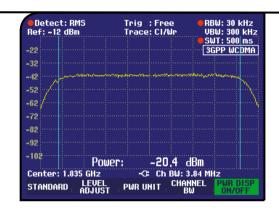
By means of the TDMA POWER function, the R&S®FSH performs time-domain power measurements within a timeslot of TDMA (time division multiple access) methods. All the settings required for the GSM and EDGE standards are predefined on the R&S®FSH to make these measurements easier for the user. In addition, up to five user-definable instrument setups can be loaded into the R&S®FSH using the R&S®FSH View software.



Channel-power measurements

The R&S®FSH determines the power of a definable transmission channel by means of the channel-power measurement function. A channel-power measurement for the digital mobile radio standards 3GPP WCDMA, cdmaOne, and CDMA2000® 1x is performed at a keystroke with all the correct instrument settings. With the R&S®FSHView software, the user can quickly and easily define further standards and load them into the R&S®FSH.

CDMA2000® is a registered trademark of the Telecommunications Industry Association (TIA USA)



Field-strength measurements

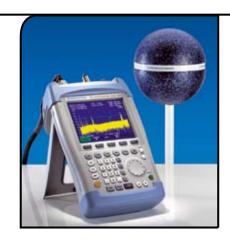
When measuring electric field strength, the R&S®FSH takes into account the specific antenna factors of the connected antenna. Field strength is displayed directly in dBµV/m. If W/m² is selected, the power flux density is calculated and displayed. In addition, frequency-dependent loss or gain of, for example, a cable or an amplifier can be corrected. For quick and easy result analysis, the R&S®FSH provides two user-definable limit lines with automatic limit monitoring.

R&S®FSH with R&S®HE 200 active directional antenna (optional accessory)

Field-strength measurements with isotropic antenna

When used with the R&S®TS-EMF isotropic antenna, the R&S®FSH can determine the direction-independent resultant field strength in the frequency range from 30 MHz to 3 GHz. For measuring the resultant field strength, the antenna has three orthogonal antenna elements. The R&S®FSH successively triggers the three antenna elements and calculates the resultant field strength. The calculation takes into account the antenna factors for each individual antenna element as well as the cable loss of the connecting cable.

R&S®FSH with R&S®TS-EMF isotropic antenna (optional accessory)



C/N measurements

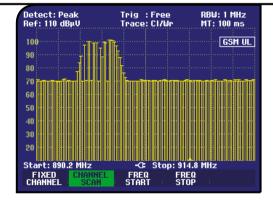
The R&S®FSH offers a carrier/noise (C/N) measurement for determining the ratio of carrier power to noise power or carrier power to noise power density. The R&S®FSH supports three different modes for carrier power measurement. In the CW TX mode, the R&S®FSH determines the power of an unmodulated carrier. In the digital TX mode, it determines the channel power of a reference channel, as is common with digitally modulated carriers (e.g. the DAB, DVB, DVB-T, DVB-H, and J.83/A/B/C standards). Furthermore, the ATSC standard for digital terrestrial television with 8VSB modulation is supported. In the analog TV mode, the R&S®FSH measures the peak power of the vision carrier with amplitude-modulated TV signals.



Channel tables

If preferred, the R&S®FSH can be tuned by channel numbers rather than by entering the frequency. The channel number is displayed instead of the center frequency. Users who are accustomed to channel assignments, which are common in TV and mobile radio applications, can operate the R&S®FSH more easily. The channel tables are generated with the R&S®FSHView software and loaded into the R&S®FSH. The R&S®FSH includes TV channel tables for a number of countries





Receiver mode

When equipped with the R&S®FSH-K3 option, the R&S®FSH can be operated as a receiver for monitoring and precompliance EMC applications. Measurements are performed at a predefined frequency with a user-selectable measurement time. In the scan mode, the R&S®FSH sequentially measures each level at various frequencies defined in a channel table. The channel tables are generated with the R&S®FSHView software and loaded into the R&S®FSH. For a few TV transmitter and mobile radio standards, the tables are predefined. In addition, the CISPR bandwidths 200 Hz, 9 kHz, 120 kHz, and 1 MHz are available for EMI emission measurements. The R&S®FSH offers peak, average, RMS, and quasi-peak detectors.

Power measurements

The R&S®FSH-Z1 and R&S®FSH-Z18 power sensors expand the R&S®FSH to a high-precision RF power meter up to 8 GHz and 18 GHz respectively. As with thermal sensors, the true RMS value of the measured signal is obtained over the entire measurement range of -67 dBm to +23 dBm irrespective of the signal waveform. In particular with modulated signals, additional measurement errors can thus be prevented, and handling becomes easy.

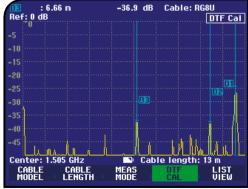


Directional power measurements

The R&S®FSH-Z14 and R&S®FSH-Z44 directional power sensors turn the R&S®FSH into a full-fledged directional power meter with a frequency range of 25 MHz to 1 GHz and 200 MHz to 4 GHz. The R&S®FSH can then simultaneously measure the output power and the matching of transmitter system antennas under operating conditions. The power sensors measure average power up to 120 W and normally eliminate the need for any extra attenuators. They are compatible with the common standards GSM/EDGE, 3GPP WCDMA, cdmaOne, CDMA2000® 1x, DVB-T, and DAB. Additionally, the peak envelope power (PEP) can be determined up to a maximum of 300 W.



R&S®FSH with R&S®FSH-Z44 directional power sensor



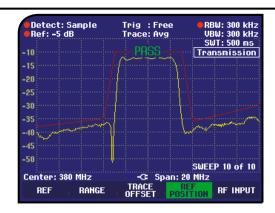
Measurements on cables (distance to fault)

The R&S®FSH-B1 option allows the distance to any faults in an RF cable to be determined rapidly and accurately. Distance-to-fault measurements using the R&S®FSH-Z2/-Z3 VSWR bridge provide an immediate overview of the state of the device under test (return loss and distance, see figure). The marker-zoom function allows detailed analysis of faults with a resolution of up to 1024 pixel.

Only applies to the R&S*FSH with tracking generator and R&S*FSH-B1 (distance-to-fault measurement) and R&S*FSH-Z2/-Z3 (VSWR bridge) options installed

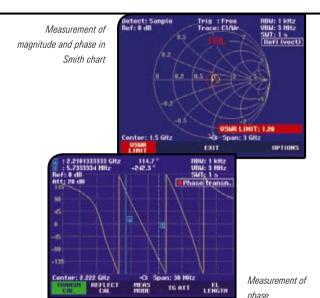
Scalar transmission and reflection measurements with VSWR bridge

The R&S®FSH with built-in tracking generator rapidly determines the transmission characteristics of cables, filters, amplifiers, etc, with a minimum of effort. When equipped with the R&S®FSH-Z2/-Z3 VSWR bridge (10 MHz to 3 GHz/6 GHz), the R&S®FSH can also measure the matching (return loss, reflection coefficient, or VSWR) of an antenna, for example. The bridge is screw-connected directly to the R&S®FSH's RF input and tracking generator output without involving cumbersome, extra cabling. The innovative design of the R&S®FSH-Z3 VSWR bridge with integrated RF bypass switch allows the user to make spectrum and transmission measurements also with the bridge connected. Active components such as amplifiers can be supplied directly via the RF cable by means of the two integrated bias tees.



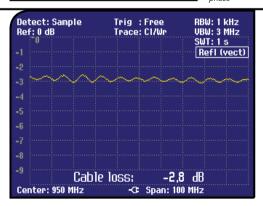


R&S®FSH-Z3 VSWR bridge



Vector transmission and reflection measurements

Compared to scalar transmission and reflection measurements, the R&S®FSH-K2 option offers a significant increase in measurement accuracy and number of measurement functions. In addition to the magnitude of S11 and S21, the phase, group delay, and electrical length of a DUT can be determined. The Smith chart allows simultaneous display of magnitude and phase in order to analyze the matching of an antenna in detail, for example. A user-definable limit line and a zoom function come in handy when evaluating the measurement results. Owing to a wide variety of marker formats, the measured values are displayed in virtually all the conventional formats used in network analysis. The input of a reference impedance permits measurements on DUTs whose impedance is not $50~\Omega$. To increase measurement accuracy, the R&S®FSH performs complex correction of the system errors after calibration.



One-port cable loss measurements

The R&S®FSH with tracking generator and VSWR bridge can determine the cable loss of previously installed long cables without much effort. One end of the cable is connected to the VSWR bridge, and the other end is terminated with a short circuit or simply left open. The calculated cable loss represents the average value within the displayed frequency range. The loss at specific frequencies is determined via markers. The one-port cable loss measurement is only available with the R&S®FSH-K2 option.

3GPP FDD code domain power measurements on base stations

The R&S®FSH-K4 option¹⁾ allows code domain power measurements on a 3GPP base station. It measures the total power and the power of the most important code channels, such as the common pilot channel (CPICH), primary common control physical channel (P-CCPCH), primary synchronization channel (P-SCH), and secondary synchronization channel (S-SCH). Furthermore, the carrier frequency offset and the error vector magnitude (EVM) are measured and displayed. The scrambling code can be determined at the press of a button and used automatically for decoding the code channels. The user can also get a quick overview of adjacent base stations. The R&S®FSH can display up to eight scrambling codes with their CPICH power. The R&S®FSH-K4 option provides automatic level setting for fast and optimal setting of the reference level. In practice, this means very easy operation. To display the code domain power measurement values, only four operating steps are necessary:

- Select the 3GPP CDP function
- Set the center frequency
- Use "Level Adjust" to optimize the level setting
- Start the scrambling code search

For base stations with two antennas, the user can select which antenna the R&S®FSH should synchronize to (antenna diversity).

3GPP BTS (COP
Synchronization Result	SYNC OK
Scrambling Code (prm/sec)	377 / 0
CPICH Slot Number	12
Center Frequency	2.14 GHz
Carrier Frequency Error	-160 Hz
Total Power	-30.8 dBm
CPICH (15 ksps, Code 0)	
Power	-40.8 dBm
Symbol EVM	7.0 % rms
P-CCPCH (15 ksps, Code 1)	
Power	-41.4 dBm
Symbol EVM	6.8 % rms
P-SCH Power	-44.4 dBm
S-SCH Power	-44.9 dBm
LEVEL SCRAME	
ADJUST : CODE	HILL BLO : EUM

¹⁾ Available for the R&S®FSH3 (model .23) with serial number 103500 or later.

Locating EMC weak spots

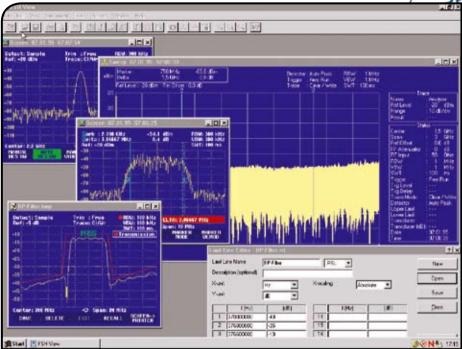
The R&S®HZ-15 near-field probe set is a diagnostic tool for locating EMC weak spots on printed boards, integrated circuits, cables, shieldings, and other trouble spots. The R&S®HZ-15 near-field probe set can handle emission measurements from 30 MHz to 3 GHz. Its sensitivity can be enhanced by adding the R&S®HZ-16 preamplifier, which has a frequency range of up to 3 GHz, a gain of approx. 20 dB, and a noise figure of 4.5 dB. In combination with the R&S®FSH, the preamplifier and near-field probe set are a cost-effective means of analyzing and locating sources of interference during development.



R&S®FSH with near-field probe set and DUT

R&S®FSH View Control Software

The powerful software package for documenting your measurements is supplied with every R&S®FSH.





Features

- Runs under Windows 98/ME/NT/2000/XP
- Rapid and simple transfer of measurement data from the R&S®FSH to a PC and vice versa
- Data export in ASCII or MS Excel format
- Printout of all relevant data via Windows (screenshot of the R&S®FSH display for documentation)
- Graphics data stored in standard formats (.bmp, .pcx, .png, .wmf)
- Permanent and continuous transfer of sweeps to the PC; facilities for subsequent analysis (markers, zoom, etc)
- Storage space for traces and measurement data, as well as for comparisons of current and previous measurements (available space is limited only by the size of the hard disk of the controlling PC)

- Automatic storage of measurement results at selectable intervals
- Generation of cable data with a built-in cable editor; downloading to the R&S®FSH for distance-to-fault measurements (R&S®FSH-B1)
- Editor for generating limit lines, user-definable standards (measurement of occupied bandwidth, channel power, and TDMA power), transducer factors, and correction factors for taking into account external attenuators or amplifiers, as well as channel lists
- Macro function for Word for fast and easy documentation of measurement results
- Connection between PC and R&S®FSH via interferencefree, RS-232-C optical interface

Specifications

Specifications apply 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.

	TRACE			NEN PR
SMEEL		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		
Counter accuracy	S/N > 25 dB	\pm (frequency $ imes$ reference	frequency error)	
Frequency span	model .03/.23, model .06/.26 model .13 model .18	0 Hz, 100 Hz to 3 GHz - 0 Hz, 1 kHz to 3 GHz -	- 0 Hz, 100 Hz to 6 GHz - -	- - - 0 Hz, 100 Hz to 18 GHz
Spectral purity				
SSB phase noise	f = 500 MHz, +20 °C 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)		<-98 dBc (1 Hz)
Sweep time	span = 0 Hz	1 ms to 100 s		
	span > 0 Hz	20 ms to 1000 s, min. 20 r	ms/600 MHz	
Bandwidths				\
Resolution bandwidths (-3 dB)	model .13	1, 3, 10, 30, 100, 200, 300	kHz, 1 MHz	
	model .03/.23, model .06/.26/.18	in addition 100 Hz, 300 Hz		147
Tolerance	≤300 kHz	±5 %, nominal		1, 100
	1 MHz	±10 %, nominal		
Resolution bandwidths (–6 dB)	with R&S®FSH-K3 option installed	in addition 200 Hz, 9 kHz,	120 kHz, 1 MHz	
Video bandwidths		10 Hz to 1 MHz in 1, 3 ste	ps	

		R&S®FSH3	R&S®FSH6	R&S®FSH18
Amplitud∈				
Display range		average noise level displayed	I to 120 dRm	
1 , 0		50 V/80 V 1)	I LU +ZU UDIII	50 V
Maximum permissible DC voltage at RF input			0	
Maximum power		20 dBm, 30 dBm (1 W) for ma		20 dBm
Intermodulation-free dynamic range	third-order IM products, 2×-20 dBm, reference level = -10 dBm at signal offset ≤ 2 MHz at signal offset > 2 MHz	typ. 66 dB (typ. +13 dBm thir 60 dB (nominal, +10 dBm TO 66 dB (nominal, typ. +13 dBn	1)	typ. 54 dBc (typ. +7 dBm TOI) 50 dB (nominal,+5 dBm TOI 50 dB (nominal, +5 dBm TOI
Displayed average noise level 10 MHz to 50 MHz 50 MHz to 3 GHz 3 GHz to 5 GHz 5 GHz to 6 GHz 6 GHz to 8 GHz 8 GHz to 12 GHz 12 GHz to 16 GHz 16 GHz to 18 GHz With preamplifier 10 MHz to 2.5 GHz 2.5 GHz to 3 GHz 3 GHz to 5 GHz 5 GHz to 6 GHz Inherent spurious	resolution bandwidth 1 kHz, video bandwidth 10 Hz, reference level ≤-30 dBm only models .03 [®] , .23, .06 and .26 reference level ≤-20 dBm, f > 30 MHz, RBW ≤ 100 kHz	<-105 dBm, typ114 dBm <-105 dBm, typ114 dBm120 dBm, typ125 dBm <-115 dBm, typ120 dBm	:dbm	<-90 dBm, typ98 dBm <-110 dBm, typ118 dBm <-110 dBm, typ118 dBm <-110 dBm, typ118 dBm <-108 dBm, typ113 dBm <-105 dBm, typ113 dBm <-100 dBm, typ108 dBm <-90 dBm, typ102 dBm
Input related spurious Up to 3 GHz	R&S®FSH3/6: mixer level ≤-40 dBm, carrier offset >1 MHz	-70 dBc (nominal)	-70 dBc (nominal)	
3 GHz to 6 GHz Receive frequency =	for signal frequencies	A	-64 dBc (nominal)	cMa
signal frequency –2.0156 GHz	2 GHz to 3.2 GHz	-55 dBc (nominal)	-55 dBc (nominal)	-171117
Input related spurious 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	R&S®FSH18: mixer level ≤-20 dBm carrier offset >1 MHz 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 2.8 GHz to 18 GHz for signal frequencies 3.9 GHz to 18 GHz 7.4 GHz to 18 GHz 7.8 GHz to 18 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 dBm to +20 dBm in step	s of 1 dB	
Display range		100 dB, 50 dB, 20 dB, 10 dB,	linear	
Display units Logarithmic Linear		dBm, dBμV, dBmV, with tran μV, mV, V, nW, μW, mW, W,	sducer also dBµV/m and dBµ, , with transducer also V/m, m	
Traces		1 trace and 1 memory trace		
Trace mathematics		A-B and B-A (trace – memory	r trace and memory trace — tra	ce)
Detectors		auto peak, maximum peak, m	ninimum peak, sample, RMS	
	with option R&S®FSH-K3 installed	in addition average and quas	i-peak	

 $^{^{1)}}$ 80 V valid as of serial number 100900 (model.03) or 101600 (model.13); model.23, .06, and .26 all serial numbers.

²⁾ As of serial number 101362.

	Land.			
_evel measurement error	reference level to reference	R&S°FSH3 e level –50 dB, +20 °C to +30 °C	R&S®FSH6	R&S®FSH18
Level measurement error		· ·		
	1 MHz to 10 MHz	<1.5 dB, typ. 0.5 dB		
	10 MHz to 20 MHz 20 MHz to 6 GHz	<1.5 dB, typ. 0.5 dB		2 dB
		<1.5 dB, typ. 0.5 dB		<1.5 dB
	6 GHz to 14 GHz	- DFF		<2.5 dB
Markers	14 GHz to 18 GHz	-		<3 dB
Number of markers or delta markers		max. 6		
Marker functions		peak, next peak, minimum, center = marker frequency, reference level = marker leve	el, all markers to peak	
Marker displays		normal (level), noise marker,	frequency counter (count)	
Trigger		free-running, video, external		
Audio demodulation		AM (video voltage without A	GC) and FM	
Inputs				
RF input		N female		
Input impedance		50 Ω		
VSWR	10 MHz to 3 GHz 3 GHz to 6 GHz	<1.5 (nominal) -	<1.5 (nominal) <1.5 (nominal)	<1.5 (nominal) <1.5 (nominal)
	6 GHz to 10 GHz	- []	-	<2 (nominal)
	10 GHz to 18 GHz	-	-	<3 (nominal)
rigger/external reference input		BNC female, selectable		
Trigger voltage		ΠL		
Reference frequency		10 MHz		
Required level	from 50 Ω	10 dBm		
Outputs				
AF output		3.5 mm mini jack		
Output impedance		100 Ω		
Open-circuit voltage		adjustable up to 1.5 V		
racking generator	only models .13, .23, .26			-
Frequency range		5 MHz to 3 GHz	5 MHz to 6 GHz	-
Output level	model .13 model .23 model .26	-20 dBm (nominal) 0 dBm/-20 dBm, selectable	40.40 ()	-
	f < 3 GHz f > 3 GHz		-10 dBm (nominal) -20 dBm (nominal)	
Step attenuator	model .26 ³⁾ model .23 ⁴⁾	20 dB step attenuator adjust	able in 1 dB steps	
Output impedance		50 Ω , nominal		-
nterfaces				
RS-232-C optical interface ⁵⁾				
Baud rate		1200, 2400, 9600, 19200, 384	100, 57600, 115200 baud	
Power sensor		7-contact female connector (

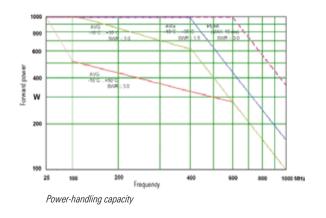
³⁾ As of serial no. 100500.

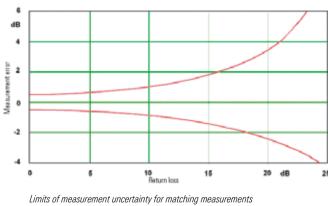
⁴⁾ As of serial no. 102314.

⁵⁾ Standard accessory: optical USB cable.

175	ACE	141-		
		R&S®FSH3	R&S®FSH6	R&S®FSH18
Accessories				
R&S®FSH-Z1 and R&S®FSH-Z18 power se	nsors			
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 30 MHz to 2.4 GHz 2.4 GHz to 8 GHz 8 GHz to 18 GHz		<1.15 <1.13 <1.20 <1.25		
Maximum input power	average power peak power (<10 µs, 1 % duty cycle)	400 mW (+26 dBm) 1 W (+30 dBm)		
Measurement range		200 pW to 200 mW (-6	7 dBm to +23 dBm)	
Signal weighting		average power		
Effect of harmonics Effect of modulation		<0.5 % (0.02 dB) at hard <1.5 % (0.07 dB) for con-	monic ratio of 20 dBc ntinuous digital modulation	
Absolute measurement uncertainty	sine signals, no zero offset			
10 MHz to 8 GHz 8 GHz to 18 GHz	+15 °C to +35 °C 0 °C to +50 °C +15 °C to +35 °C 0 °C to +50 °C	<2.5 % (0.11 dB) <4.5 % (0.19 dB) <3.5 % (0.15 dB) <5.2 % (0.22 dB)		
Zero offset after zeroing		<150 pW		
Dimensions (W \times H \times D)		48 mm × 31 mm × 170	mm (1.89 in ×1.22 in × 6.69 in)	, connecting cable 1.5 m (59.05
Weight		<0.3 kg		
R&S®FSH-Z14 directional power sensor				
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 on page 15)	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 % (0.17 dB) of meas 3.2 % (0.14 dB) of meas		
Zero offset	after zeroing	±4 mW		
Range of typical measurement error with modulation FM, PM, FSK, GMSK AM (80 %) two equal-power CW carriers EDGE, TETRA	if standard is selected on the R&S*FSH	0 % of measured value ±3 % of measured valu ±2 % of measured valu ±0.5 % of measured va	e (±0.13 dB) e (±0.09 dB)	

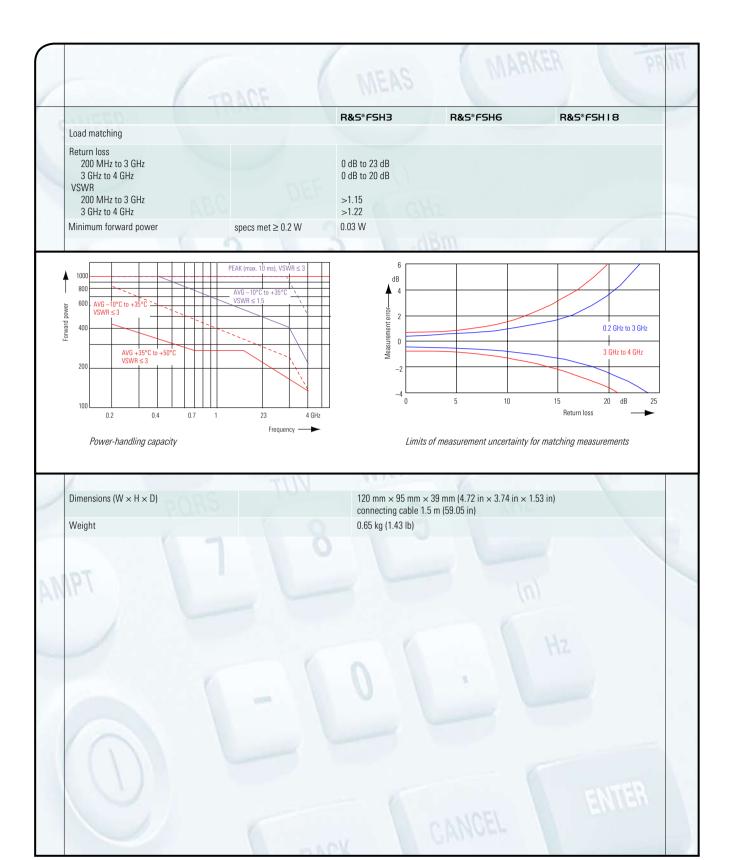
		R&S®FSH3	R&S®FSH6	R&S®FSH18
Temperature coefficient 25 MHz to 40 MHz 40 MHz to 1 GHz		0.40 %/K (0.017 dB/K) 0.25 %/K (0.011 dB/K)		
Peak envelope power				
Power measurement range for video bandwidth 4 kHz 200 kHz 600 kHz		0.4 W to 300 W 1 W to 300 W 2 W to 300 W		
Measurement uncertainty	+18 °C to +28 °C	same as for average pow	ver, plus effect of peak hold	circuit
Accuracy of peak hold circuit for burst signals Duty cycle ≤ 0.1 and repetition rate ≥ 100/s 20/s ≤ repetition rate < 100/s 0.001 ≤ duty cycle < 0.1	video bandwidth 4 kHz 200 kHz 600 kHz	±(3 % of measured value	e + 0.05 W) at burst width > e + 0.20 W) at burst width > e + 0.40 W) at burst width > easured value + 0.15 W)	· 4 μs
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 at ≥ 0.4 W	0.06 W		





Dimensions (W \times H \times D)	120 mm \times 95 mm \times 39 mm (4.72 in \times 3.74 in \times 1.53 in) connecting cable 1.5 m (59.05 in)
Weight	0.65 kg (1.43 lb)

1 1	ACC	R&S*FSH3	R&S®FSH6	R&S*FSH18
R&S®FSH-Z44 directional power sensor		K@S*FSHS	אמס״רטח <i>ס</i>	KØ3°F3HI8
Frequency range		200 MHz to 4 GHz		
Power measurement range		30 mW to 120 W (300 W wit	th unmodulated anyolone	1
· ·		30 111VV to 120 VV (300 VV WII	ur urimoudiated envelope	
VSWR referenced to 50 Ω 200 MHz to 3 GHz 3 GHz to 4 GHz Power-handling capacity	depending on temperature and matching (see diagram on page 17)	<1.07 <1.12 120 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		
Signal weighting		average power		
Measurement uncertainty 200 MHz to 300 MHz 300 MHz to 4 GHz	sine signals, +18 °C to +28 °C, no zero offset	4 % of measured value (0.17 3.2 % of measured value (0.	· ·	
Zero offset	after zeroing	±4 mW		
Range of typical measurement error with modulation FM, PM, FSK, GMSK AM (80 %) cdmaOne, DAB 3GPP WCDMA, CDMA2000® 1x DVB-T π/4-DQPSK	if standard is selected on the R&S®FSH	0 % of measured value (0 dB ±3 % of measured value (±0 ±1 % of measured value (±0 ±2 % of measured value (±0 ±2 % of measured value (±0 ±2 % of measured value (±0	0.13 dB) 0.04 dB) 0.09 dB) 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)		
Peak envelope power				
Power measurement range DAB, DVB-T, cdmaOne, CDMA2000®, 3GPP WCDMA other signals at video bandwidth 4 kHz 200 kHz 4 MHz		4 W to 300 W 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
Accuracy of peak hold circuit for burst signals Duty cycle \geq 0.1 and repetition rate \geq 100/s $20/s \leq \text{repetition rate} < 100/s$ $0.001 \leq \text{duty cycle} < 0.1$ Burst width \geq 0.5 μs Burst width \geq 0.2 μs	video bandwidth 4 kHz 200 kHz 4 MHz	\pm (3 % of measured value + \pm (3 % of measured value + \pm (7 % of measured value + in addition \pm (1.6 % of measure in addition \pm 0.10 W in addition \pm 5 % of measure in addition \pm 10 % of measure in addition \pm 10 % of measure	0.20 W) at burst width ≥4 0.40 W) at burst width ≥1 ured value + 0.15 W) ed value	l µs
Range of typical measurement error of peak hold circuit for cdmaOne, DAB DVB-T, CDMA2000® 1xRTT, 3GPP WCDMA	4 MHz video bandwidth and standard selected on the R&S®FSH	±(5 % of measured value + ±(15 % of measured value +		
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)		



	RAUL	R&S®FSH-Z2	R&S®FSH-Z3
R&S®FSH-Z2/R&S®FSH-Z3 VSWR bridge			
requency range		10 MHz to 3 GHz	10 MHz to 6 GHz
mpedance		50Ω	
/SWR bridge			
Directivity 10 MHz to 30 MHz 30 MHz to 1 GHz 1 GHz to 3 GHz 3 GHz to 6 GHz		typ. 30 dB typ. 30 dB typ. 25 dB	typ. 16 dB >20 dB, typ. 28 dB >20 dB, typ. 28 dB >16 dB, typ. 25 dB
Directivity, corrected 2 MHz to 10 MHz 10 MHz to 3 GHz 3 GHz to 6 GHz	R&S®FSH-K2 option	typ. 40 dB typ. 43 dB —	typ. 40 dB typ. 40 dB typ. 37 dB
Return loss at test port 10 MHz to 50 MHz 50 MHz to 3 GHz 3 GHz to 6 GHz	\	typ. 20 dB typ. 20 dB —	>12 dB, typ. 18 dB >16 dB, typ. 22 dB >16 dB, typ. 22 dB
Return loss at test port, corrected 2 MHz to 3 GHz 3 GHz to 6 GHz	R&S®FSH-K2 option	typ. 35 dB -	typ. 40 dB typ. 37 dB
nsertion loss Test port Bypass		typ. 9 dB –	typ. 9 dB typ. 4 dB
OC bias			
Max. input voltage		-	50 V
Max. input current		-	300 mA, 600 mA ⁶⁾
Type of connector		-	BNC female
Connectors			
Generator input/RF output		N male	
est port		N female	
Control interface		7-contact connector (type Binder)	
Calibration standards		R&S®FSH-Z29/-Z30/-Z31	R&S®FSH-Z28
Short/open		N male	
$0~\Omega$ load		N male	
Impedance		50 Ω	
Return loss DC to 3 GHz 3 GHz to 6 GHz		>43 dB -	>40 dB, typ. 46 dB >37 dB, typ. 43 dB
Power-handling capacity		1 W	1 W
General data			
ower consumption		-	3 mW (nominal)
Dimensions (W \times H \times D)		169 mm × 116 mm × 30 mm 6.65 in × 4.57 in × 1.18 in	149 mm × 144 mm × 45 mm 5.87 in × 5.67 in × 1.77 in
Veight		485 g (1.07 lb)	620 g (1.37 lb)
Distance-to-fault measurement	R&S®FSH-B1 option only v	with R&S®FSH models .13/.23/.26 and	I R&S®FSH-Z2/-Z3 VSWR bridges
Display		301 pixel	
Maximum resolution, distance to fault	maximum zoom	cable length/1023 pixel	
Display range Return loss VSWR Reflection factor (p) milliRHO (mp)		10, 5, 2, 1, 0.1 dB/DIV, linear 1 to 2 and 1 to 6, 1 to 10, 1 to 20 with R8S®FSH-K2 option in addition 0 to 1, 0 to 0.1, 0 to 0.01, 0 to 0.001 0 to 1000, 0 to 100, 0 to 10, 0 to 1	1 to 1.2 und 1 to 1.5
Cable length	depending on cable loss	3 m to max. 1000 m	
Maximum permissible spurious signal	3 5.1 22.2 330	1 dB compression point of 1st mixer IF overload at reference level typ. +8	

⁶⁾ As of serial no. 100500.

		R&S®FSH3	R&S®FSH6	R&S®FSH18	
Transmission measurements (only w	ith R&S®FSH3 models .13, .23 a	and R&S®FSH6 model .26)			
Frequency range		5 MHz to 3 GHz	5 MHz to 6 GHz	-	
Dynamic range 10 MHz to 2.2 GHz	scalar mode vector mode, with	typ. 60 dB	typ. 80 dB	-	
2.2 GHz to 3 GHz	R&S®FSH-K2 option scalar mode vector mode, with	typ. 80 dB typ. 50 dB	typ. 90 dB typ. 70 dB		
3 GHz to 5 GHz	R&S®FSH-K2 option scalar mode vector mode, with	typ. 65 dB -	typ. 85 dB typ. 40 dB		
5 GHz to 6 GHz	R&S®FSH-K2 option scalar mode vector mode, with	- 9	typ. 55 dB typ. 35 dB		
	R&S®FSH-K2 option	-	typ. 50 dB		
Reflection measurements (only with	R&S®FSH3 models .13, or .23, F	R&S®FSH6 model .26, and	R&S®FSH-Z2)		
Frequency range		10 MHz to 3 GHz	10 MHz to 6 GHz	-	
Display range of return loss		10, 20, 50, 100 dB, selec	table	-	
VSWR display range			n also 1 to 1.2 and 1 to 1.5	-	
Reflection factor (ρ) display range		0 to 1, 0 to 0.1, 0 to 0.01		-	
milliRHO (mρ) display range		0 to 1000, 0 to 100, 0 to	10, 0 to 1		
Measurement uncertainty		see diagrams			
Smith chart	only with R&S®FSH-K2 option			-	
Marker format: Reflection Impedance Admittance		$R+jX$, $(R+jX)/Z_0$ $G+jB$, $(G+jB)/Z_0$	nag and phase, real and imag	-	
Reference impedance $Z_{_{0}}$		10 m Ω to 10 k Ω		UTA:	
Zoom function		expansion factor 2, 4, 8		77.10	
Measurably 48		Mesumenent Uncertainty of 88			
Measurement uncertainty with ve	Return Loss DUT / ector measurements		uncertainty with scalar measure	Return Loss DUT / dB	
(R&S®FSH-K2 option)					

	7210	1/1/			
		R&S®FSH3	R&S®FSH6	R&S®FSH18	
Phase measurements (transmission	n, reflection) (only with R&S®FSH3	models .13, or .23, R&S®FSH	6 model .26, and R&S®FS	SH-K2)	
Frequency range	with R&S®FSH-Z2/-Z3				
Reflection		10 MHz to 3 GHz	10 MHz to 6 GHz	-	
Transmission		5 MHz to 3 GHz ± 180° (wrap)	5 MHz to 6 GHz		
Display range		0° to 54360° (unwrap)		_	
Group delay measurements (only w	vith R&S®FSH3 models .13 or .23, R		S®FSH-K2)		
Frequency range	with R&S®FSH-Z2/-Z3		- 10.1 NZ,		
Reflection		10 MHz to 3 GHz	10 MHz to 6 GHz	_	
Transmission		5 MHz to 3 GHz	5 MHz to 6 GHz		
Aperture increments		1 to 300			
Display range		10 ns, 20 ns, 50 ns, 100 ns, 2 selectable	00 ns, 500 ns, 1000 ns,		
3GPP FDD code domain power BTS	S/Node B measurement (only with F		nd R&S®FSH3 model .23) ⁷)	
Frequency range		10 MHz to 3 GHz	-	- /	
Carrier frequency uncertainty		(test case 6.3 in line with 3GPP 25.141)	- lml -	- /	
Measurement range		±1 kHz		_	
Measurement uncertainty	SNR > 30 dB	$< 50 \text{ Hz} + \Delta f_{\text{rof}}^{(8)} (\sigma = 20 \text{ Hz})$			
,		161			
Total power	SNR > 30 dB	(test case 6.2.1 in line with 3	urr 25.141)		
Measurement range	frequency > 1 MHz +20 °C to +30 °C	$-60 \text{ dBm} < P_{\text{total}} < 20 \text{ dBm}$	- 1 481	77 -	
Measurement uncertainty	$\begin{array}{l} -40~\text{dBm} < P_{\text{total}} < 20~\text{dBm} \\ P_{\text{REF_LEV}} - 30~\text{dB} < P_{\text{total}} \\ < P_{\text{REF_LEV}} + 3~\text{dB} \end{array}$	±1.5 dB, typ. 0.5 dB	-	- \	
CPICH power	SNR > 30 dB	(test case 6.2.2 in line with 3GPP 25.141)	-	() - \	
Measurement range	-40 dBm < P < 20 dBm	$P_{total} - 20 \text{ dB} < P_{CPICH} < P_{total}$	= \\	_	
Measurement uncertainty	$-P_{\text{total}}$ $-20 \text{ dBm} < P_{\text{CPICH}} <$	±1.5 dB, typ. 0.5 dB			
ivicasurement uncertainty	P _{total} = 20 dBill < 1 _{CPICH} <	±1.5 db, typ. 0.5 db	-	-	
P-CCPCH power	SNR > 30 dB				
Measurement range	$-40 \text{ dBm} < P_{\text{total}} < 20 \text{ dBm}$	$P_{total} - 40 \text{ dB} < P_{PCCPCH} < P_{total}$	-1)\	_	
Measurement uncertainty	$\begin{array}{l} P_{\text{total}} -20 \text{ dBm} < P_{\text{PCCPCH}} \\ < P_{\text{total}} \end{array}$	±1.5 dB, typ. 0.5 dB	-3 /		
PSCH/SSCH power	SNR > 30 dB		-	_	
Measurement range	$-40 \text{ dBm} < P_{\text{total}} < 20 \text{ dBm}$	$P_{total} - 30 \text{ dB} < P_{sch} < P_{total}$	_	-	
Measurement uncertainty	$P_{\text{total}} - 20 \text{ dBm} < P_{\text{PSCH}} < P_{\text{total}}$	total total		100	
· ·	total 20 d Bill PSCH total	db, t/p. 1.0 db		-////	
Symbol EVM		20/ . [\/\\4			
Measurement range	20/ - 5\/\\	$3\% < EVM_{symbol} < 25\%$	_	7	
Measurement uncertainty	$3\% < \text{EVM}_{\text{symbol}} < 10\%$	typ. ±2.5 %	7.0	14-	
Posidual FV/M	$10\% < \text{EVM}_{\text{symbol}} < 20\%$	typ. ±3%	_	7 11/4	
Residual EVM _{symbol}		typ. 3 %	-	-	
3GPP FDD scrambling code detect					
Frequency range	±1 kHz	10 MHz to 30 MHz	-	-	
Single scrambling code detection					
Calculation time		24 s	-	-	
CPICH E _c /I _o		>–18 dB ⁹⁾	-	-	
Multiple scrambling code detection	on				
Max. number of scrambling codes		8	-	-	
Calculation time		57 s	-	- 6	
CPICH E _c /I _o		$>-21 dB^{9}$	-	- \	
CPICH power measurement uncertain	$-40 \text{ dBm} < P_{\text{total}} < 20 \text{ dBm}$	±2,5 dB			

As of serial no. 103500.

As of serial no. 103500.

At $_{ref} =$ uncertainty of reference frequency.

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

	R&S®FSH3	R&S®FSH6	R&S®FSH18
Seneral data			
isplay	transflective 14 cm (5.7	") LC color display	
esolution	320 × 240 pixel		
Memory	CMOS RAM		
ettings and traces	up to 256		
emperature			
Operating temperature range R&S®FSH powered from internal battery R&S®FSH powered from AC power supply	0°C to +50°C 0°C to +40°C		
torage temperature range	-20 °C to +60 °C		
attery charging mode	0°C to +40°C		
limatic conditions			
elative humidity	95 % at +40 °C (IEC 600	68)	
Class of protection	51		
Nechanical resistance			
ibration, sinusoidal	in line with EN 60068-2 5 Hz to 55 Hz: max 2 g, 12 minutes per axis	-1, EN 61010-1 55 Hz to 150 Hz: 0.5 g constant	t,
ibration, random	in line with EN 60068-2	-64, 10 Hz to 500 Hz, 1.9 g, 30 i	minutes per axis
hock	in line with EN 60068-2	-27, 40 g shock spectrum	
FI suppression	in line with EMC directi	ive of EU (89/336/EEC) and Ger	rman EMC legislation
nmunity to radiated interference evel display at 10 V/m (reference level ≤−10 dBm) Input frequency IF Other frequencies	10 V/m <-75 dBm (nominal) <-85 dBm (nominal) < displayed noise level		
Power supply			
C supply	plug-in AC power supp	ly (R&S®FSH-Z33) 100 V AC to	240 V AC, 50 Hz to 60 Hz, 400 mA
xternal DC voltage	15 V to 20 V		
nternal battery	NiMH battery, type Flul	ke BP190 (R&S®FSH-Z32)	
Battery voltage	6 V to 9 V		
Operating time with fullycharged battery	typ. 4 h with tracking g typ. 3 h with tracking g		typ. 3 h
ower consumption	typ. 7 W		
afety	CAN C 22.2 No. 61010-1 UL 61010-1 No. 1010-1		
est mark	VDE, GS, CSA, CSA-NR	TL	
imensions $(W \times H \times D)$	$170 \text{ mm} \times 120 \text{ mm} \times 2$ $6.69 \text{ in} \times 4.72 \text{ in} \times 10.6$		

Accessories and ordering information

Designation Handheld Spectrum Analyzer, 100 kHz to 3 GHz, with preamplifier Rass* Handheld Spectrum Analyzer, 100 kHz to 3 GHz, with tracking generator Rass* Handheld Spectrum Analyzer, 100 kHz to 3 GHz, with tracking generator and preamplifier Rass* Handheld Spectrum Analyzer, 100 kHz to 6 GHz, with preamplifier Rass* Handheld Spectrum Analyzer, 100 kHz to 6 GHz, with preamplifier Rass* Handheld Spectrum Analyzer, 100 kHz to 6 GHz, with tracking generator and preamplifier Rass* Handheld Spectrum Analyzer, 10 MHz to 18 GHz Accessories supplied External power supply, battery pack (built-in), USB optical cable, headphones, Quick Start manual, CD-ROM with Rass*FSHView Control Software and documentation Options Designation Type Distance-to-Fault Measurement (includes 1 m cable, Rass*FSH-Z2 required) Rass* Remote Control via RS-232-C Vector Transmission and Reflection Measurements Receiver Mode 3GPP FDD Code Domain Power BTS/Node B Measurement for Rass*FSH3 model .23 Rass*	FSH3 1145.585 FSH3 1145.585 FSH6 1145.585 FSH6 1145.585 FSH18 1145.585
Handheld Spectrum Analyzer, 100 kHz to 3 GHz, with tracking generator Handheld Spectrum Analyzer, 100 kHz to 3 GHz, with tracking generator and preamplifier R8S° Handheld Spectrum Analyzer, 100 kHz to 6 GHz, with preamplifier Handheld Spectrum Analyzer, 100 kHz to 6 GHz, with tracking generator and preamplifier Handheld Spectrum Analyzer, 100 kHz to 6 GHz, with tracking generator and preamplifier Handheld Spectrum Analyzer, 10 MHz to 18 GHz Accessories supplied External power supply, battery pack (built-in), USB optical cable, headphones, Quick Start manual, CD-ROM with R8S°FSHView Control Software and documentation Options Designation Type Distance-to-Fault Measurement (includes 1 m cable, R8S°FSH-Z2 required) R8S° Remote Control via RS-232-C R8S° Vector Transmission and Reflection Measurements R8S° Receiver Mode	FSH3 1145.585 FSH3 1145.585 FSH6 1145.585 FSH6 1145.585 FSH18 1145.585
Handheld Spectrum Analyzer, 100 kHz to 3 GHz, with tracking generator and preamplifier R8S® Handheld Spectrum Analyzer, 100 kHz to 6 GHz, with preamplifier R8S® Handheld Spectrum Analyzer, 100 kHz to 6 GHz, with tracking generator and preamplifier R8S® Handheld Spectrum Analyzer, 10 MHz to 18 GHz Accessories supplied External power supply, battery pack (built-in), USB optical cable, headphones, Quick Start manual, CD-ROM with R8S®FSHView Control Software and documentation Options Designation Type Distance-to-Fault Measurement (includes 1 m cable, R8S®FSH-Z2 required) R8S® Remote Control via RS-232-C Vector Transmission and Reflection Measurements R8S® Receiver Mode	FSH3 1145.585 FSH6 1145.585 FSH6 1145.585 FSH18 1145.585
Handheld Spectrum Analyzer, 100 kHz to 6 GHz, with preamplifier R8S* Handheld Spectrum Analyzer, 100 kHz to 6 GHz, with tracking generator and preamplifier R8S* Handheld Spectrum Analyzer, 10 MHz to 18 GHz Accessories supplied External power supply, battery pack (built-in), USB optical cable, headphones, Quick Start manual, CD-ROM with R8S*FSHView Control Software and documentation Options Designation Type Distance-to-Fault Measurement (includes 1 m cable, R8S*FSH-Z2 required) Remote Control via RS-232-C Vector Transmission and Reflection Measurements R8S* Receiver Mode	FSH6 1145.585 FSH6 1145.585 FSH18 1145.585
Handheld Spectrum Analyzer, 100 kHz to 6 GHz, with tracking generator and preamplifier Handheld Spectrum Analyzer, 10 MHz to 18 GHz Accessories supplied External power supply, battery pack (built-in), USB optical cable, headphones, Quick Start manual, CD-ROM with R&S*FSHView Control Software and documentation Options Designation Type Distance-to-Fault Measurement (includes 1 m cable, R&S*FSH-Z2 required) Remote Control via RS-232-C Vector Transmission and Reflection Measurements R&S* Receiver Mode	FSH6 1145.585 FSH18 1145.585
Handheld Spectrum Analyzer, 10 MHz to 18 GHz Accessories supplied External power supply, battery pack (built-in), USB optical cable, headphones, Quick Start manual, CD-ROM with R&S®FSHView Control Software and documentation Options Designation Type Distance-to-Fault Measurement (includes 1 m cable, R&S®FSH-Z2 required) Remote Control via RS-232-C Vector Transmission and Reflection Measurements R&S® Receiver Mode	FSH18 1145.585
Accessories supplied External power supply, battery pack (built-in), USB optical cable, headphones, Quick Start manual, CD-ROM with R&S*FSHView Control Software and documentation Options Designation Distance-to-Fault Measurement (includes 1 m cable, R&S*FSH-Z2 required) Remote Control via RS-232-C Vector Transmission and Reflection Measurements R&S* Receiver Mode	
External power supply, battery pack (built-in), USB optical cable, headphones, Quick Start manual, CD-ROM with R&S*FSHView Control Software and documentation Options Designation Type Distance-to-Fault Measurement (includes 1 m cable, R&S*FSH-Z2 required) Remote Control via RS-232-C Vector Transmission and Reflection Measurements R&S* Receiver Mode	/
DesignationTypeDistance-to-Fault Measurement (includes 1 m cable, R&S*FSH-Z2 required)R&S*Remote Control via RS-232-CR&S*Vector Transmission and Reflection MeasurementsR&S*Receiver ModeR&S*	/ /
Distance-to-Fault Measurement (includes 1 m cable, R&S*FSH-Z2 required) Remote Control via RS-232-C Vector Transmission and Reflection Measurements Receiver Mode R&S*	
Remote Control via RS-232-C Vector Transmission and Reflection Measurements Receiver Mode R8S®	Order No
Vector Transmission and Reflection Measurements R&S® Receiver Mode R&S®	
Receiver Mode R&S®	
A NITT	
3GPP FDD Code Domain Power RTS/Node R Measurement for R&S®FSH3 model 23 R&S®	

 $^{^{10)}}$ For R&S $^{\circ}$ FSH3 model .23 only, as of serial no. 103500.

Accessories and ordering information

