Frequency

Frequency range	R&S®FSL3	9 kHz to 3 GHz
	R&S®FSL6	9 kHz to 6 GHz
	R&S®FSL18	9 kHz to 18 GHz (overrange 20 GHz)
Frequency resolution		1 Hz

Reference frequency, internal, nominal		
Aging per year		1×10^{-6}
Temperature drift	0 °C to +50 °C	1×10^{-6}

Reference frequency, internal, nominal	R&S®FSL-B4 OCXO reference frequency option, standard with the R&S®FSL18	
Aging per year		1×10^{-7}
Temperature drift	0 °C to +50 °C	1×10^{-7}

Frequency readout		
Marker resolution		1 Hz
Uncertainty		±(marker frequency × reference uncertainty + 10 % × resolution bandwidth + ½ (span / (sweep points – 1)) + 1 Hz)
Marker tuning frequency step size	default	span / 500
	marker step size = sweep points	span / (sweep points – 1)
Frequency counter resolution		1 Hz
Count uncertainty	S/N > 25 dB	±(frequency × reference uncertainty + ½ (last digit))
Frequency span		0 Hz, 10 Hz to 3/6/20 GHz
Span uncertainty		3 %

Spectral purity SSB phase noise		f = 500 MHz
Carrier offset	1 kHz	typ. –95 dBc (1 Hz)
	10 kHz	< –98 dBc (1 Hz), typ. –103 dBc (1 Hz)
	100 kHz	< –98 dBc (1 Hz), typ. –105 dBc (1 Hz)
	1 MHz	< –115 dBc (1 Hz), typ. –120 dBc (1 Hz)

Sweep time

Sweep time	span = 0 Hz	1 µs to 5 µs in 125 ns steps 5 µs to 16000 s in 5 % steps
	10 Hz ≤ span ≤ 3.2 kHz	2.5 ms to 5 s/Hz × span
	3.2 kHz < span ≤ 1.5 GHz	2.5 ms to 16000 s
	1.5 GHz < span ≤ 3 GHz	5 ms to 16000 s
	span > 3 GHz	10 ms to 16000 s
Uncertainty	span = 0 Hz	nominal 0.1 %
	span ≥ 10 Hz	nominal 3 %

Resolution bandwidths

Sweep filters		
Resolution bandwidths		300 Hz to 10 MHz (–3 dB) in 1/3 sequence
	with R&S®FSL-B7 option	10 Hz to 10 MHz (–3 dB) in 1/3 sequence
	zero span	20 MHz (–3 dB) additionally
Resolution bandwidth uncertainty		nominal < 3 %
Resolution filter shape factor 60 dB : 3 dB		nominal < 5 (Gaussian type filters)

EMI filters		
6 dB bandwidths		9 kHz, 120 kHz, 1 MHz
	with R&S®FSL-B7 option	200 Hz, 9 kHz, 120 kHz, 1 MHz
Bandwidth uncertainty		nominal < 3 %
Shape factor 60 dB : 3 dB		nominal < 6

FFT filters		
3 dB bandwidths		300 Hz to 30 kHz in 1/3 sequence
	with R&S®FSL-B7 option	1 Hz to 30 kHz in 1/3 sequence
Bandwidth uncertainty		nominal 5 %
Shape factor 60 dB : 3 dB		nominal 2.5

Channel filters		
Bandwidths	300; 500 Hz; 1; 1.5; 2; 2.4; 2.7; 3; 3.4; 4; 4.5; 5; 6; 8.5; 9 kHz 10; 12.5; 14; 15; 16; 18 (RRC); 20; 21; 24.3 (RRC); 25; 30; 50; 100; 150; 192; 200; 300; 500 kHz 1; 1.228; 1.28 (RRC); 1.5; 2; 3; 3.84 (RRC); 4.096 (RRC); 5 MHz (RRC = root raised cosine)	
	with R&S®FSL-B7 option	100 Hz, 200 Hz additionally

Video bandwidths	1-pole lowpass RC filters	1 Hz to 10 MHz in 1/3 sequence

Demodulation bandwidth		nominal 28 MHz

Level

Display range		displayed noise floor to +20 dBm

Maximum rated input level R&S®FSL3 and R&S®FSL6		
DC voltage		50 V
CW RF power		30 dBm (= 1 W)
Peak RF power		36 dBm (= 4 W) < 3 s
Max. pulse voltage		150 V
Max. pulse energy	pulse width 10 µs	10 mWs

Maximum rated input level R&S®FSL18 with RF attenuation ≥ 10 dB		
DC voltage		50 V
CW RF power		30 dBm (= 1 W)
Peak RF power		36 dBm (= 4 W) < 3 s
Max. pulse voltage		100 V
Max. pulse energy	pulse width 10 µs	2 mWs

Maximum rated input level R&S®FSL18 with RF attenuation < 10 dB		
DC voltage		30 V
CW RF power		20 dBm (= 100 mW)
Peak RF power		26 dBm (= 400 mW)
Max. pulse voltage		30 V
Max. pulse energy	pulse width 10 µs	0.2 mWs

Intermodulation R&S®FSL3 and R&S®FSL6		
Third-order intermodulation (TOI)	intermodulation-free dynamic range, level 2 × –20 dBm, reference level –10 dBm	
	f_{in} < 30 MHz	> 54 dBc (TOI +7 dBm, typ. +12 dBm)
	f_{in} ≥ 30 MHz	> 60 dBc (TOI +10 dBm, typ +18 dBm)
Second harmonic intercept (SHI)	f_{in} = 20 MHz to 3 GHz	nominal +35 dBm
1 dB compression of input mixer	0 dB RF attenuation, f > 200 MHz	nominal +5 dBm

Intermodulation R&S®FSL18		
Third-order intermodulation (TOI)	intermodulation-free dynamic range, level 2 × –20 dBm, reference level –10 dBm	
	f_{in} < 50 MHz	> 54 dBc (TOI +7 dBm, typ. +10 dBm)
	50 MHz ≤ f_{in} ≤ 6 GHz	> 60 dBc (TOI +10 dBm, typ +13 dBm)
	f_{in} > 6 GHz	nominal 60 dBc (TOI +10 dBm)
Second harmonic intercept (SHI)	f_{in} = 20 MHz to 9 GHz	nominal +35 dBm
1 dB compression of input mixer	0 dB RF attenuation, f > 200 MHz	nominal +5 dBm

Displayed average noise level R&S®FSL3 and R&S®FSL6		
	0 dB RF attenuation, termination 50 Ω, RBW = 1 kHz, VBW = 1 Hz, sample detector, log scaling, tracking generator OFF, normalized to 1 Hz	
	frequency	preamplifier = OFF
	9 kHz to 1 MHz	< –100 dBm (1 Hz)
	1 MHz to 10 MHz	< –115 dBm (1 Hz)
	10 MHz to 50 MHz	< –130 dBm (1 Hz)
	50 MHz to 3 GHz	< –140 dBm (1 Hz)
	3 GHz to 5 GHz	< –136 dBm (1 Hz)
	5 GHz to 6 GHz	< –130 dBm (1 Hz)
	frequency	preamplifier = ON
	9 kHz to 1 MHz	< –115 dBm (1 Hz)
	1 MHz to 10 MHz	< –130 dBm (1 Hz)
	10 MHz to 50 MHz	< –145 dBm (1 Hz)
	50 MHz to 3 GHz	< –152 dBm (1 Hz)
	3 GHz to 5 GHz	< –146 dBm (1 Hz)
	5 GHz to 6 GHz	< –140 dBm (1 Hz)
	frequency	preamplifier = ON, typical values
	500 MHz	–162 dBm (1 Hz)
	1 GHz	–160 dBm (1 Hz)
	3 GHz	–158 dBm (1 Hz)
	6 GHz	–147 dBm (1 Hz)

Displayed average noise level R&S®FSL18		
	0 dB RF attenuation, termination 50 Ω, RBW = 1 kHz, VBW = 1 Hz, sample detector, log scaling, tracking generator OFF, normalized to 1 Hz	
	frequency	preamplifier = OFF
	9 kHz to 1 MHz	< –100 dBm (1 Hz)
	1 MHz to 10 MHz	< –115 dBm (1 Hz)
	10 MHz to 50 MHz	< –130 dBm (1 Hz)
	50 MHz to 3 GHz	< –140 dBm (1 Hz)
	3 GHz to 12 GHz	< –136 dBm (1 Hz)
	12 GHz to 18 GHz	< –130 dBm (1 Hz)
	18 GHz to 20 GHz	< –123 dBm (1 Hz)
	frequency	preamplifier = ON
	9 kHz to 1 MHz	< –115 dBm (1 Hz)
	1 MHz to 10 MHz	< –130 dBm (1 Hz)
	10 MHz to 50 MHz	< –145 dBm (1 Hz)
	50 MHz to 3 GHz	< –152 dBm (1 Hz)
	3 GHz to 5 GHz	< –149 dBm (1 Hz)
	5 GHz to 6 GHz	< –145 dBm (1 Hz)
	frequency	preamplifier = ON, typical values
	500 MHz	–162 dBm (1 Hz)
	1 GHz	–161 dBm (1 Hz)
	3 GHz	–158 dBm (1 Hz)
	6 GHz	–152 dBm (1 Hz)

Immunity to interference		
Image frequency	f_{in} – 2 × 48.375 MHz	< –80 dBc, typ. –90 dBc
	f_{in} – 2 × 838.375 MHz	< –60 dBc, typ. –80 dBc
	f_{in} – 2 × 7158.375 MHz	typ. –60 dBc
Intermediate frequency	48.375 MHz, 838.375 MHz, 7158.375 MHz	< –60 dBc, typ. –80 dBc
Spurious response, inherent	f > 30 MHz, without input signal, RF attenuation = 0 dB, RBW ≤ 10 kHz	< –90 dBm
Spurious response	related to local oscillators	
	f ≤ 6 GHz	
	Δf < 100 kHz	typ. –60 dBc
	Δf ≥ 100 kHz	< –60 dBc
	f > 6 GHz	
	Δf < 100 kHz	typ. –48 dBc
	Δf ≥ 100 kHz	< –48 dBc
	f = receive frequency	
Spurious response	related to A/D conversion	typ. < –70 dBc
Spurious response	related to subharmonic of first LO (spur at 7158.375 MHz – 2 × f_{in})	typ. –60 dBc
Spurious response at mixer level < –10 dBm	related to harmonic of first LO (spur at f_{in} – 3579.1875 MHz)	typ. –60 dBc

Level display		
Logarithmic level axis		10 dB to 100 dB
Linear level axis		0 % to 100 %/10 divisions
Number of traces		4
Trace detectors		max peak, min peak, auto peak, sample, RMS, quasi peak, average
Number of measurement points	default value	501
	range	125 to 32001 in steps of about a factor of 2
Trace functions		clear/write, max hold, average, min hold, view
Setting range of reference level	logarithmic level display	–80 dBm to 20 dBm in steps of 2 dB, 5 dB or 10 dB
	linear level display	–80 dBm to 20 dBm, 0 % to 100 %
Units of level axis	logarithmic level display	dBm, dBmV, dBµV, dBµA, dBpW
	linear level display	µV, mV, V, µA, mA, A, pW, nW, µW, mW, W

Level measurement uncertainty		
	95 % confidence level, +20 °C to +30 °C, S/N > 16 dB, 0 dB to –50 dB from reference level	
	10 MHz < f ≤ 3 GHz	< 0.5 dB
	3 GHz < f ≤ 6 GHz	< 0.8 dB
	6 GHz < f ≤ 18 GHz	< 1.2 dB
Absolute uncertainty at 65.83 MHz		< 0.3 dB
Frequency response (+20 °C to +30 °C)	9 kHz ≤ f < 30 kHz	nominal 1.5 dB
	30 kHz ≤ f ≤ 3 GHz	< 0.5 dB, typ. 0.3 dB
	3 GHz < f ≤ 6 GHz	< 0.8 dB, typ. 0.3 dB
	6 GHz < f ≤ 18 GHz	< 1.2 dB, typ. 0.6 dB
	f > 18 GHz	nominal 2 dB
Attenuator uncertainty		< 0.3 dB
Uncertainty of reference level setting		nominal < 0.1 dB

Display nonlinearity		
Logarithmic level display	S/N > 16 dB 0 dB to –50 dB	< 0.2 dB
Bandwidth switching uncertainty	reference: RBW = 10 kHz	nominal < 0.1 dB

Trigger functions

Trigger		
Trigger source		free run, video, external, IF power
External trigger level		TTL level

I/Q data

Interface		LAN
	R&S®FSL-B10	LAN or GPIB
Memory length		max. 512 ksample I and Q
Sample rate		10 kHz to 65.8 MHz
Signal bandwidth	sample rate 65.8 MHz	nominal 28 MHz

Inputs and outputs

RF input R&S®FSL3 and R&S®FSL6		
Impedance		50 Ω
Connector		N female
VSWR	RF attenuation ≥ 10 dB	
	10 MHz ≤ f ≤ 1 GHz	nominal 1.2
	1 GHz < f ≤ 6 GHz	nominal 1.5
Input attenuator		0 dB to 50 dB in 5 dB steps

RF input R&S®FSL18		
Impedance		50 Ω
Connector		N female
VSWR	RF attenuation ≥ 10 dB	
	10 MHz ≤ f ≤ 8 GHz	nominal 1.2
	8 GHz < f ≤ 16 GHz	nominal 1.5
	f > 16 GHz	nominal 2
Input attenuator		0 dB to 40 dB in 5 dB steps

AF output		
Connector		3.5 mm mini jack
Output impedance		< 100 Ω
Open-circuit voltage		up to 1.5 V, adjustable

Tracking generator (models .13, .16 and .28 only)		
Connector		N female, 50 Ω
Output power setting range	R&S®FSL3, R&S®FSL6	–50 dBm to 0 dBm in 1 dB steps
	R&S®FSL18	–30 dBm to 0 dBm in 10 dB steps
Frequency range	R&S®FSL3	1 MHz to 3 GHz
	R&S®FSL6	1 MHz to 6 GHz
	R&S®FSL18	10 MHz to 18 GHz
Dynamic range for isolation measurements	RF attenuation = 0 dB, source power 0 dBm	
	10 MHz to 2 GHz	nominal 80 dB
	2 GHz to f_{max}	nominal 60 dB
Reverse power		
DC voltage		50 V
CW RF power		30 dBm (= 1 W)
Max. pulse voltage		150 V
Max. pulse energy (10 µs)		10 mWs

External reference		
Connector		BNC female, 50 Ω
Input level		0 dBm to +10 dBm
Output level	with R&S®FSL-B4	typ. 0 dBm
Frequency		10 MHz ±5 ppm

External trigger/gate input		
Connector		BNC female, 50 Ω
Input level		TTL compatible

Probe power		+15 V DC, –12.6 V DC and ground, max. 150 mA, nominal

External monitor		
Connector		VGA

General specifications

Remote control		
LAN interface		10/100BaseT, RJ-45
IEC/IEEE bus (GPIB)	R&S®FSL-B10	SCPI 1997.0

Display		
Resolution		640 × 480 pixels
Pixel failure rate		< 2 × 10^{-5}

Mass memory		
Mass memory		flash disk (internal), USB memory stick (not supplied)
Data storage		> 500 instrument settings and traces

Temperature		
	operating temperature range	+0 °C to +50 °C
	permissible temperature range	+0 °C to +55 °C
	storage temperature range	–40 °C to +70 °C
Climatic loading		+25 °C/+40 °C at 85 % relative humidity (IEC 60068-2-30)

Mechanical resistance		
Vibration	sinusoidal	IEC 60068-2-6
	random	IEC 60068-2-64
Shock		40 g shock spectrum, in line with MIL-STD-810E, method 516.4 procedure 1, IEC 60068-2-27

Power supply		
Input voltage range, AC, nominal		100 V to 240 V
AC supply frequency		50 Hz to 400 Hz
Input current, AC		0.9 A to 0.3 A
Input voltage range, DC, nominal	R&S®FSL-B30	10 V to 28 V
Input current, DC	R&S®FSL-B30	8.0 A to 2.2 A
Power consumption		typ. 45 W, max. 65 W with all options
Safety		IEC 61010-1, EN 61010-1, UL 61010B-1, CSA C22.2 No. 1010-1
Test mark		VDE, GS, CSA, CSA-NRTL
EMC		EMC Directive 2004/108/EC including: - IEC/EN 61326 class B (emission) - CISPR 11/EN 55011/group 1 class B (emission) - IEC/EN 61326 Table A.1 (immunity, industrial)
Dimensions (W × H × D)	with handle	408.8 mm × 158.1 mm × 465.3 mm (16.09 in × 6.22 in × 18.32 in)
	without handle	342.3 mm × 158.1 mm × 367.0 mm (13.48 in × 6.22 in × 14.45 in)
Weight	without options	< 7 kg (< 15.43 lb)
	with battery pack	< 8 kg (< 17.64 lb)

Recommended calibration interval		
		1 year
	operation with external reference	2 years

Ordering information

Designation	Type	Order No.
Spectrum Analyzer, 9 kHz to 3 GHz	R&S®FSL3	1300.2502.03
Spectrum Analyzer, 9 kHz to 3 GHz, with tracking generator	R&S®FSL3	1300.2502.13
Spectrum Analyzer, 9 kHz to 6 GHz	R&S®FSL6	1300.2502.06
Spectrum Analyzer, 9 kHz to 6 GHz, with tracking generator	R&S®FSL6	1300.2502.16
Spectrum Analyzer, 9 kHz to 18 GHz	R&S®FSL18	1300.2502.18
Spectrum Analyzer, 9 kHz to 18 GHz, with tracking generator	R&S®FSL18	1300.2502.28
TV Analyzer, 500 kHz to 3 GHz, with tracking generator	R&S®ETL	2112.0004.13
Accessories supplied		
Power cable, quick start guide and CD-ROM (with operating manual and service manual)		
Recommended extras		
Printed manual (includes operating manual and service manual)		1300.3338.32

Options

Designation	Type	Order No.	Retrofittable	Remarks
Options				
OCXO Reference Frequency	R&S®FSL-B4	1300.6008.02	yes	standard with the R&S®FSL18
Additional Interfaces	R&S®FSL-B5	1300.6108.02	yes	video out, IF out, noise source control, AUX port, R&S®NRP-Zxx power sensor
TV Trigger	R&S®FSL-B6	1300.5901.02	yes	
Narrow Resolution Filters	R&S®FSL-B7	1300.5601.02	yes	
Gated Sweep	R&S®FSL-B8	1300.5701.02	yes	
GPIB Interface	R&S®FSL-B10	1300.6208.02	yes	
RF Preamplifier (3/6 GHz)	R&S®FSL-B22	1300.5953.02	yes	
DC Power Supply	R&S®FSL-B30	1300.6308.02	yes	
NiMH Battery Pack 4.5 Ah	R&S®FSL-B31	1300.6408.02	yes	requires R&S®FSL-B30
Li-Ion Battery Pack 10 Ah with Battery Charger	R&S®ETL-B235	2112.0262.02	yes	requires R&S®FSL-B30
Firmware/Software				
AM/FM/φM Measurement Demodulator	R&S®FSL-K7	1301.9246.02		
Bluetooth® TX Measurements (1.1 and 2.0 + EDR)	R&S®FSL-K8	1301.9398.02		
Power Sensor Support	R&S®FSL-K9	1301.9530.02		requires R&S®FSL-B5 or R&S®NRP-Z3/4
Spectrogram Measurements	R&S®FSL-K14	1302.0913.02		
Cable TV and TV Measurements	R&S®FSL-K20	1301.9675.02		
Application Firmware for Noise Figure and Gain Measurements	R&S®FSL-K30	1301.9817.02		requires R&S®FSL-B5 and preamplifier
3GPP FDD BTS Application Firmware	R&S®FSL-K72	1302.0620.02		
CDMA2000® Base Station Analysis	R&S FSL-K82	1308.7803.02		
1xEV-DO Base Station Measurement	R&S FSL-K84	1302.0159.02		
WLAN IEEE 802.11a/b/g/j Application Firmware	R&S®FSL-K91	1302.0094.02		
Upgrade of R&S®FSL-K91 to IEEE 802.11n	R&S®FSL-K91n	1308.7903.02		
WiMAX™ IEEE 802.16 OFDM Application Firmware	R&S®FSL-K92	1302.0236.02		
WiMAX™ IEEE 802.16 OFDM/OFDMA Application Firmware	R&S®FSL-K93	1302.0736.02		
Upgrade from R&S®FSL-K92 to R&S®FSL-K93	R&S®FSL-K92U	1302.0307.02		

Recommended extras

Designation	Type	Order No.
19'' Rackmount Adapter	R&S®ZZA-S334	1109.4487.00
Soft Carrying Bag	R&S®FSL-Z3	1300.5401.00
Protective Hard Cover	R&S®EVS-Z6	5201.7760.00
Additional Charger Unit	R&S®FSL-Z4	1300.5430.02
Matching Pad 75 Ω, L section	R&S®RAM	0358.5414.02
Matching Pad 75 Ω, series resistor 25 Ω	R&S®RAZ	0358.5714.02
Matching Pad 75 Ω, L section, N to BNC	R&S®FSH-Z38	1300.7740.02
SWR Bridge, 5 MHz to 3 GHz	R&S®ZRB2	0373.9017.52
SWR Bridge, 40 kHz to 4 GHz	R&S®ZRC	1039.9492.52
SWR Bridge, 10 MHz to 3 GHz (incl. Open, Short, Load calibration standards)	R&S®FSH-Z2	1145.5767.02