R&S®SFI100A
WIDEBAND IF VECTOR SIGNAL GENERATOR

Specifications

Specifications
Version 02.01

ROHDE&SCHWARZ
Make ideas real

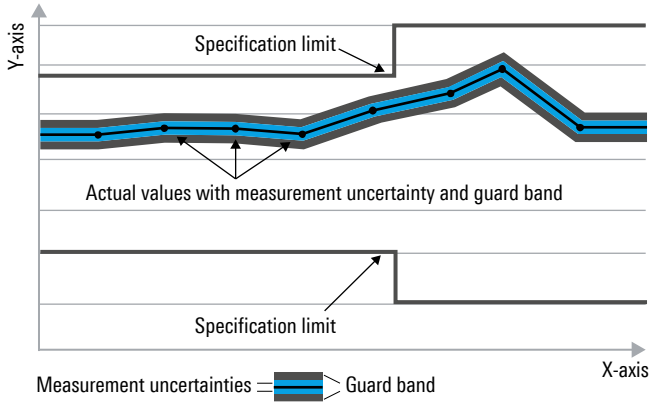
CONTENTS

Definitions

General
Product data applies under the following conditions:

- Three hours of storage at ambient temperature followed by 30 minutes of warm-up operation
- Specified environmental conditions met
- Recommended calibration interval adhered to
- All internal automatic adjustments performed, if applicable

Specifications with limits
Represent warranted product performance by means of a range of values for the specified parameter. These specifications are marked with limiting symbols such as <, ≤, >, ≥, ±, or descriptions such as maximum, limit of, minimum. Compliance is ensured by testing or is derived from the design. Test limits are narrowed by guard bands to take into account measurement uncertainties, drift and aging, if applicable.



Non-traceable specifications with limits (n. trc.)
Represent product performance that is specified and tested as described under “Specifications with limits” above. However, product performance in this case cannot be warranted due to the lack of measuring equipment traceable to national metrology standards. In this case, measurements are referenced to standards used in the Rohde & Schwarz laboratories.

Specifications without limits
Represent warranted product performance for the specified parameter. These specifications are not specially marked and represent values with no or negligible deviations from the given value (e.g. dimensions or resolution of a setting parameter). Compliance is ensured by design.

Typical data (typ.)
Characterizes product performance by means of representative information for the given parameter. When marked with <, > or as a range, it represents the performance met by approximately 80 % of the instruments at production time. Otherwise, it represents the mean value.

Nominal values (nom.)
Characterize product performance by means of a representative value for the given parameter (e.g. nominal impedance). In contrast to typical data, a statistical evaluation does not take place and the parameter is not tested during production.

Measured values (meas.)
Characterize expected product performance by means of measurement results gained from individual samples.

Uncertainties
Represent limits of measurement uncertainty for a given measurand. Uncertainty is defined with a coverage factor of 2 and has been calculated in line with the rules of the Guide to the Expression of Uncertainty in Measurement (GUM), taking into account environmental conditions, aging, wear and tear.

Device settings and GUI parameters are designated with the format “parameter: value”.

Non-traceable specifications with limits, typical data as well as nominal and measured values are not warranted by Rohde & Schwarz.

In line with the 3GPP standard, chip rates are specified in million chips per second (Mcps), whereas bit rates and symbol rates are specified in billion bit per second (Gbps), million bit per second (Mbps), thousand bit per second (kbps), million symbols per second (Msps) or thousand symbols per second (ksps), and sample rates are specified in million samples per second (Msample/s). Gbps, Mcps, Mbps, Msps, kbps, ksps and Msample/s are not SI units.

RF characteristics

Frequency

RF frequency range	with R&S®SFI-B1016 option (mandatory)	11 GHz to 21 GHz
Resolution of setting		0.001 Hz
Resolution of synthesis	11 GHz to 21 GHz	56.8 µHz (nom.)
Settling time	to within < $1 \cdot 10^{-7}$ with GUI update stopped, I/Q optimization mode: fast, measured from command at instrument to frequency settled within specified range, with Ethernet (fast socket) remote control, level setting characteristic: auto	< 5 ms
Phase offset setting		
Range		–999.99° to +999.99°
Resolution		0.001°, < 0.001 (nom.)

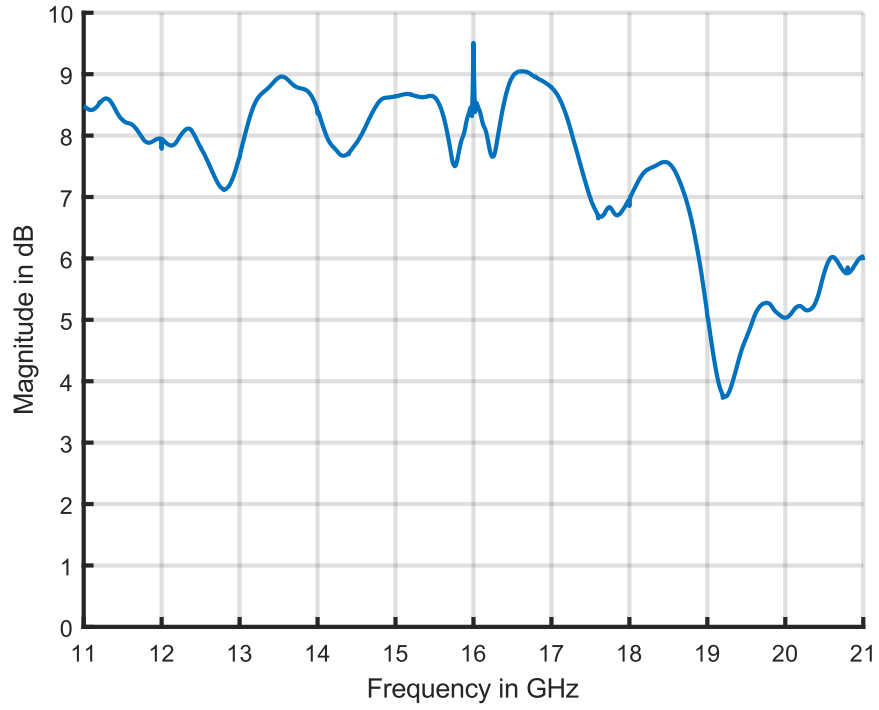
Reference frequency

Frequency error	at time of calibration in production	
	standard or with low phase noise option	< $1 \cdot 10^{-8}$
Aging	after 30 days of uninterrupted operation	
	standard or with low phase noise option	≤ $5 \cdot 10^{-10}$/day, ≤ $3 \cdot 10^{-8}$/year
Temperature effect	in temperature range from 0°C to +45°C	
	standard or with low phase noise option	±$1 \cdot 10^{-8}$
Input for external reference frequency 10 MHz/100 MHz/1 MHz to 250 MHz		
Connector type	REF IN 1 on rear panel	BNC female
Input frequency	standard	10 MHz, 100 MHz
	with R&S®SFI-K704 option	1 MHz to 250 MHz, variable
Input frequency setting resolution		0.1 Hz
Input level range	level limits	0 dBm to 20 dBm
Input impedance		50 Ω (nom.)
Minimum frequency locking range	synchronization bandwidth: wide	±$3 \cdot 10^{-6}$
	synchronization bandwidth: narrow	
	standard or with low phase noise option	±$0.3 \cdot 10^{-6}$
Output reference frequency 10 MHz/100 MHz		
Connector type	REF OUT 1 on rear panel	BNC female
Output frequency	standard (sine wave)	10 MHz, 100 MHz
	instrument set to internal reference (sine wave)	10 MHz, 100 MHz
	instrument set to external reference	applied external reference frequency from REF IN 1
Output level		7 dBm to 15 dBm
Source impedance		50 Ω (nom.)
Input for external reference frequency 640 MHz/1 GHz/8 GHz		
Input connector type	REF IN 2 on rear panel	SMA female
Input frequency	standard	640 MHz, 1 GHz
	with R&S®SFI-K708 option	8 GHz
Input level range	recommended input level for optimum phase noise performance	
	level limit	6 dBm to 20 dBm
Input impedance		50 Ω (nom.)
Minimum frequency locking range		±$3 \cdot 10^{-6}$

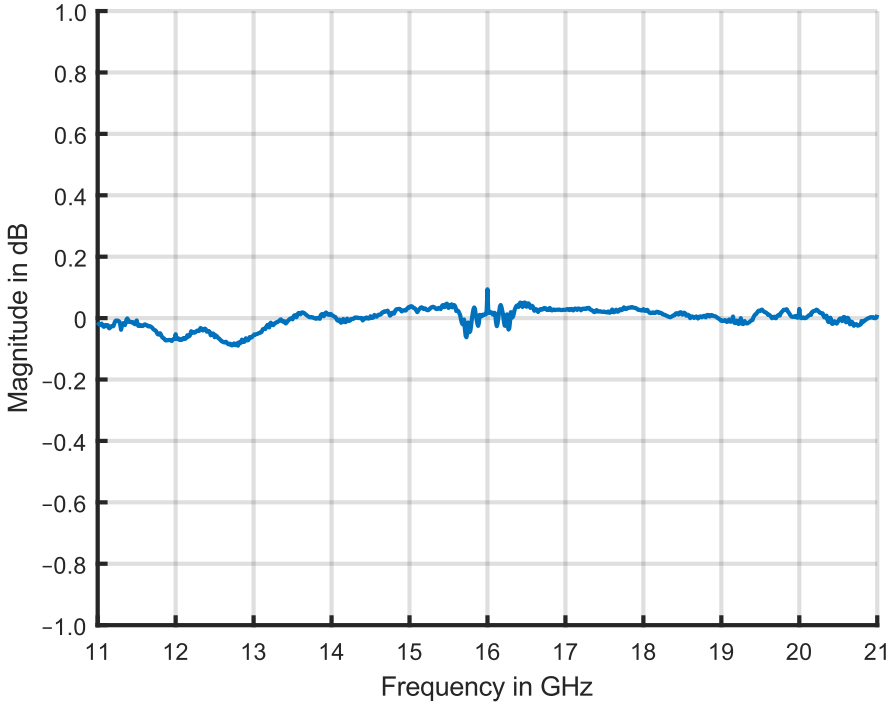
Output reference frequency 1 GHz and 8 GHz		
Connector type	REF OUT 2 on rear panel	SMA female
Output frequency	standard (sine wave)	1 GHz
	with R&S®SFI-K708 option	
	instrument set to internal reference (sine wave)	1 GHz, 8 GHz
	instrument set to external reference	applied external reference frequency from REF IN 2
Output level	output set to 1 GHz or 8 GHz	7 dBm to 15 dBm
	output set to “Signal from REF Input 2”	4 dBm to 22 dBm
Source impedance		50 Ω (nom.)
Output reference frequency 16 GHz		
Connector type	REF OUT 3 on rear panel	SMA female
Output frequency	sine wave	16 GHz
Output level		7 dBm to 13 dBm
Source impedance		50 Ω (nom.)

Level

Setting range		
R&S®SFI-B1016	standard	
	11 GHz ≤ f < 21 GHz	–90 dBm to +10 dBm
Setting resolution		0.01 dB (nom.)
Specified level range	peak envelope power (PEP)	
R&S®SFI-B1016	standard (maximum level is dependent on signal bandwidth and RF frequency)	
	11 GHz < f ≤ 21 GHz	–50 dBm to 0 dBm
Level accuracy	level setting characteristic: auto, temperature range from +18 °C to +33 °C	
	11.0 GHz < f ≤ 15.9 GHz	< 1.0 dB
	15.9 GHz < f ≤ 16.1 GHz	< 2.5 dB
	16.1 GHz < f ≤ 21.0 GHz	< 1.0 dB
Settling time	to < 0.1 dB deviation from final value, with GUI update stopped, temperature range from +18 °C to +33 °C, I/Q optimization mode: fast, measured from command at instrument to frequency settled within specified range, with Ethernet (fast socket) remote control, level setting characteristic: auto	< 5 ms
Interruption-free level range	level setting characteristic: uninterrupted level setting	> 20 dB



Measured maximum available output level over frequency, RF output



Measured level accuracy over frequency, level = 0 dBm, RF output

Reverse power

Reverse power	maximum permissible RF power in output frequency range of RF path, from 50 Ω source	
	1 MHz < f	10 dBm
Maximum permissible DC voltage		20 V

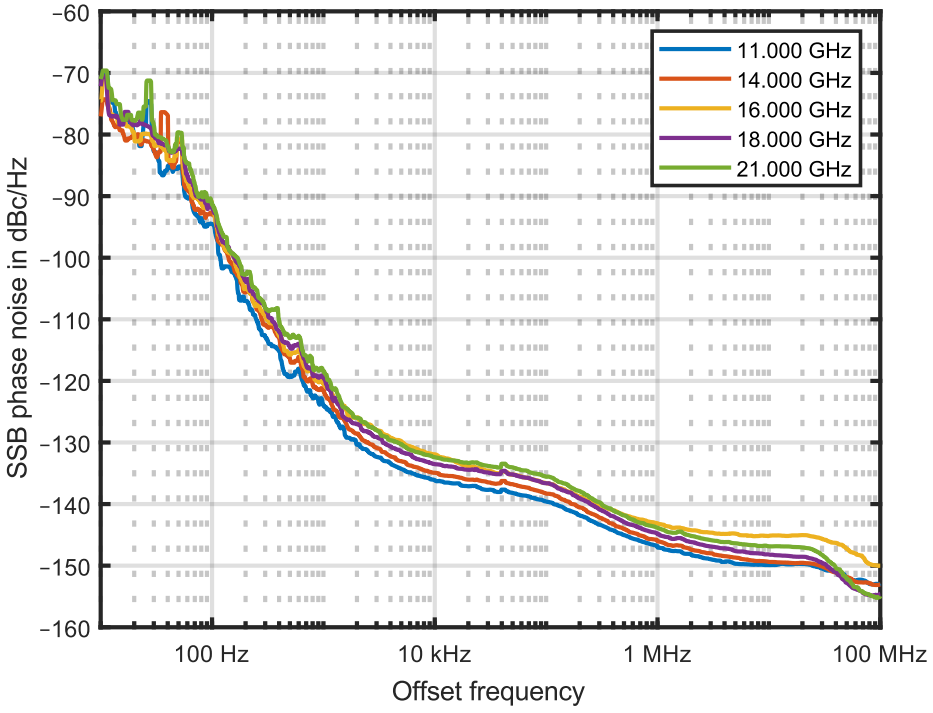
VSWR

Output impedance VSWR in 50 Ω system	plot with measured values over frequency	
	P_{out} ≤ –5 dBm	
	11 GHz < f ≤ 21 GHz	< 2.3 (typ.)
	12 GHz < f ≤ 20 GHz	< 2.1 (typ.)
	P_{out} > –5 dBm	
	11 GHz < f ≤ 21 GHz	< 2.5 (typ.)
	12 GHz < f ≤ 20 GHz	< 2.1 (typ.)

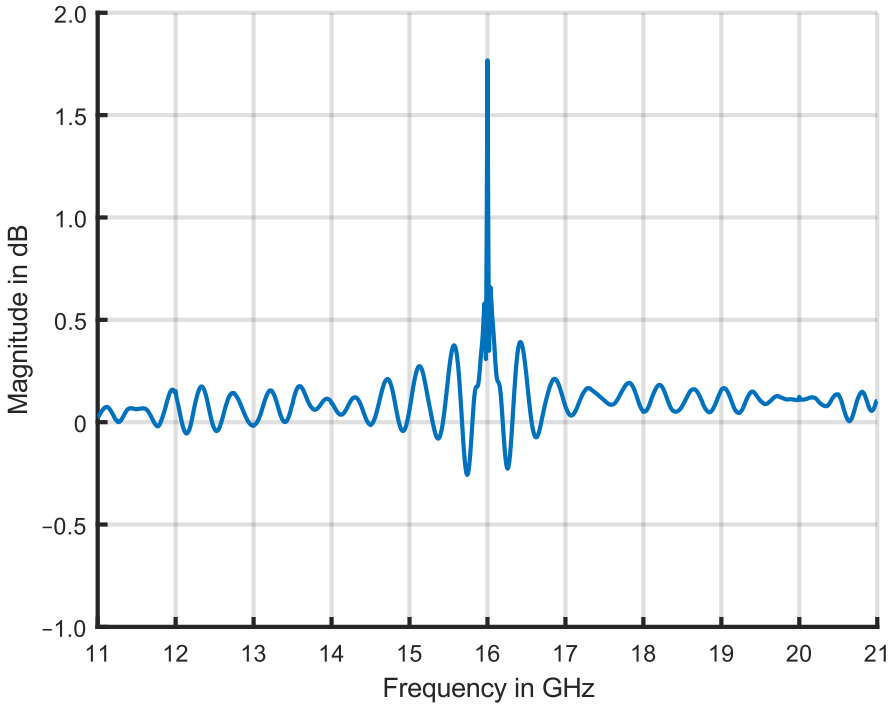
Spectral purity

The RF signal is generated with a fixed 16 GHz LO and an RF modulation bandwidth up to 10 GHz.

Harmonics	CW, level ≤ 0 dBm	
	11 GHz < f ≤ 21 GHz	< –30 dBc
Nonharmonics	CW, level = –10 dBm, > 10 kHz offset from carrier reference frequency internal, excluding 16 GHz	
	11 GHz < f ≤ 21 GHz	< –40 dBc
Wideband noise	CW, level = +0 dBm, carrier offset = 30 MHz, measurement bandwidth = 1 Hz	
	f = 16 GHz	< –139 dBc
SSB phase noise	CW, level = 0 dBm, carrier offset = 20 kHz, measurement bandwidth = 1 Hz	
	f = 11 GHz	< –120 dBc
	f = 16 GHz	< –120 dBc
	f = 21 GHz	< –120 dBc



Measured SSB phase noise, CW mode, RF output



Measured frequency response, level = 0 dBm, RF output

I/Q modulation

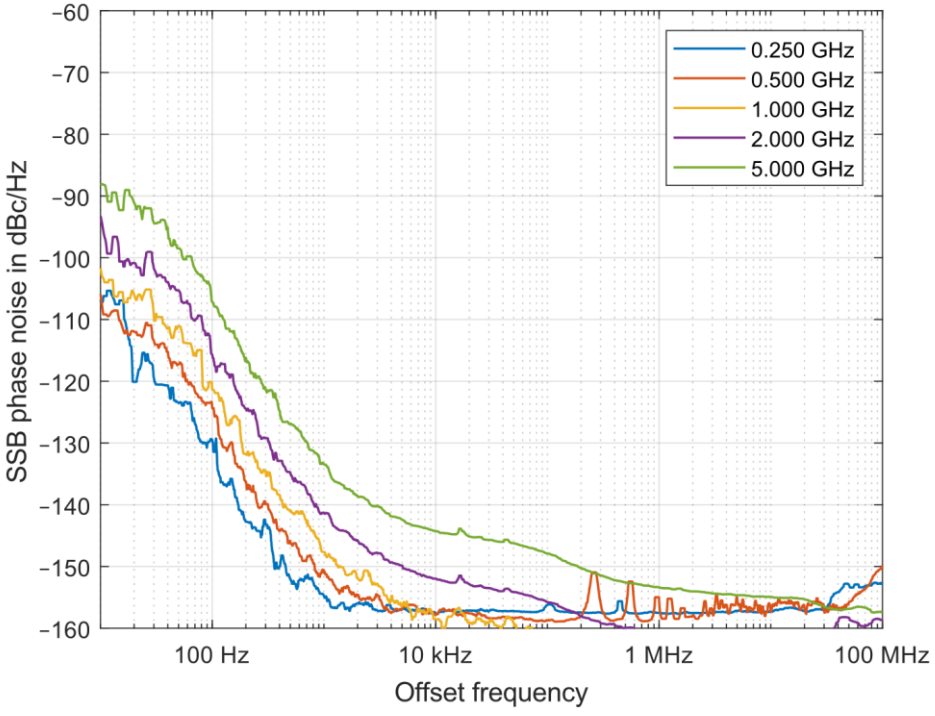
I/Q modulation performance

Operating modes		internal baseband I/Q
RF modulation bandwidth	with R&S®SFI-K510	up to 4 GHz
	with R&S®SFI-K529	up to 8 GHz
	with R&S®SFI-K530	up to 10 GHz
RF frequency response	with optimization mode: high quality table	
	11.0 GHz < f ≤ 15.9 GHz	< 1.4 dB, < 0.5 dB (meas.)
	15.9 GHz < f ≤ 16.1 GHz	< 2.5 dB, < 2.0 dB (meas.)
	16.1 GHz < f ≤ 21.0 GHz	< 1.4 dB, < 0.5 dB (meas.)
Carrier leakage	internal baseband I/Q, referenced to full-scale	< –40 dBc, < –50 dBc (meas.)
Suppression of image sideband	with optimization mode: high quality table up to 10 GHz modulation bandwidth	
	11.0 GHz < f ≤ 12.5 GHz	> 35 dB
	12.5 GHz < f ≤ 15.7 GHz	> 40 dB
	15.7 GHz < f ≤ 16.3 GHz	> 25 dB
	16.3 GHz < f ≤ 19.5 GHz	> 40 dB
	19.5 GHz < f ≤ 21.0 GHz	> 35 dB

Baseband analog characteristics

DAC output

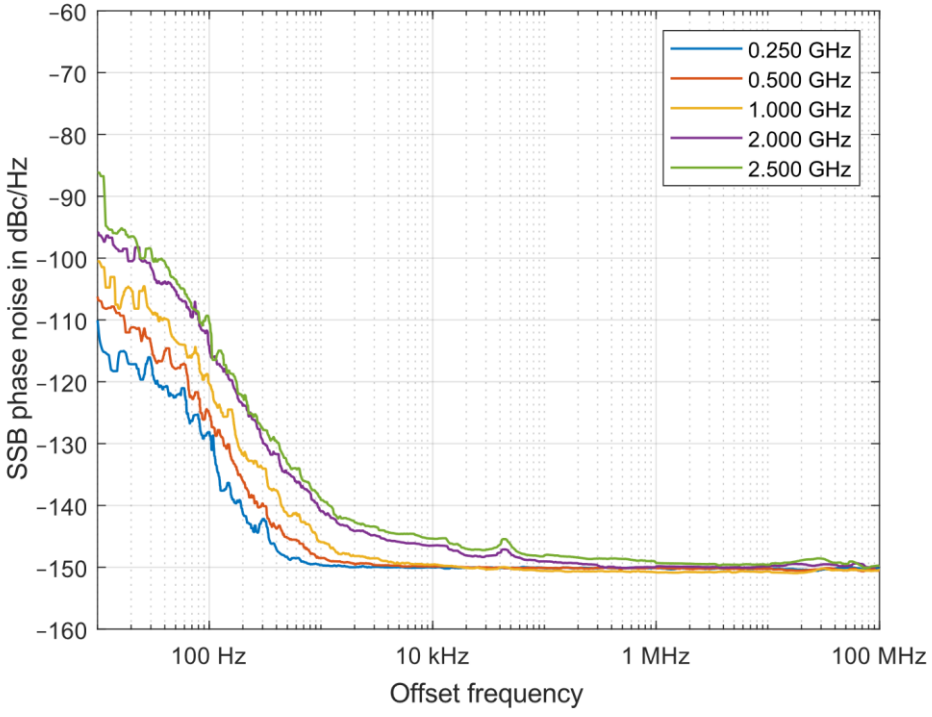
Output impedance		
Differential		100 Ω
Output voltage setting range	EMF	0.0 V to 0.85 V (V_p)
Resolution		1 µV nom.
Maximum output voltage	maximum output voltage depends on signal bandwidth	
	up to 500 MHz	0.85 V
	up to 1000 MHz	> 0.7 V
	up to 5000 MHz	> 0.4 V
Bias voltage	EMF	–350 mV to + 50 mV
Resolution		0.1 mV
Uncertainty		1 % + 15 mV
Offset voltage	EMF	–0.1 V to 0.1 V
Resolution		0.1 mV
Uncertainty		1 % + 2 mV
Frequency range		DC to 5000 MHz
Differential signal balance	at R_L = 50 Ω, output voltage = 0.4 V (V_p)	
Magnitude	up to 1000 MHz	< 0.25 dB
	up to 3700 MHz	< 0.65 dB
	up to 5000 MHz	< 0.9 dB
Frequency response	at R_L = 50 Ω, output voltage = 0.4 V (V_p)	
Magnitude	up to 1000 MHz	< 0.5 dB
	up to 4000 MHz	< 1.0 dB
	up to 5000 MHz	< 1.4 dB
I/Q balance	at R_L = 50 Ω, output voltage = 0.4 V (V_p)	
Magnitude	up to 1000 MHz	< 0.2 dB
	up to 4000 MHz	< 0.4 dB
	up to 5000 MHz	< 0.6 dB
Wideband noise	100 MHz sine wave at 1 MHz offset, output voltage = 0.4 V (V_p)	< –150 dBc (typ.)
SFDR	testsignal 100 MHz sine wave, output voltage = 0.4 V (V_p)	
	up to 5000 MHz	< –60 dBc



Measured SSB phase noise for a sine wave, *unused output terminated by 50 Ω, bias = 0 V, output voltage = 0.5 V*

Differential output

Output impedance		
Differential		100 Ω
Output voltage setting range		
Magnitude	EMF	0.0 V to 2.0 V (V_p)
Resolution		1 µV nom.
Maximum output voltage	maximum output voltage depends on signal bandwidth	
	up to 1000 MHz	2.0 V
	up to 2500 MHz	1.5 V
Bias voltage (single-ended and differential)	EMF	–2 V to +2.0 V
Resolution		0.1 mV
Uncertainty		1 % + 3 mV
Offset voltage	EMF	–0.1 V to 0.1 V
Resolution		0.1 mV
Uncertainty		1 % + 2 mV
Frequency range		DC to 2500 MHz
Differential signal balance	at R_L = 50 Ω, output voltage = 1.0 V (V_p)	
Magnitude	up to 500 MHz	< 0.1 dB
	up to 1000 MHz	< 0.2 dB
	up to 2500 MHz	< 0.8 dB
Frequency response [1]	at R_L = 50 Ω, output voltage = 1.0 V (V_p)	
Magnitude	up to 1000 MHz	< 0.5 dB
	up to 2500 MHz	< 1 dB
I/Q balance	at R_L = 50 Ω, output voltage = 1.0 V (V_p)	
Magnitude	up to 1000 MHz	< 0.2 dB
	up to 2000 MHz	< 0.8 dB
	up to 2500 MHz	< 0.9 dB
Wideband noise	100 MHz sine wave at 1 MHz offset, output voltage = 2 V (V_p)	< –150 dBc (typ.)
SFDR	testsignal 100 MHz sine wave, output voltage = 1.0 V (V_p)	
	up to 2500 MHz	< –55 dBc

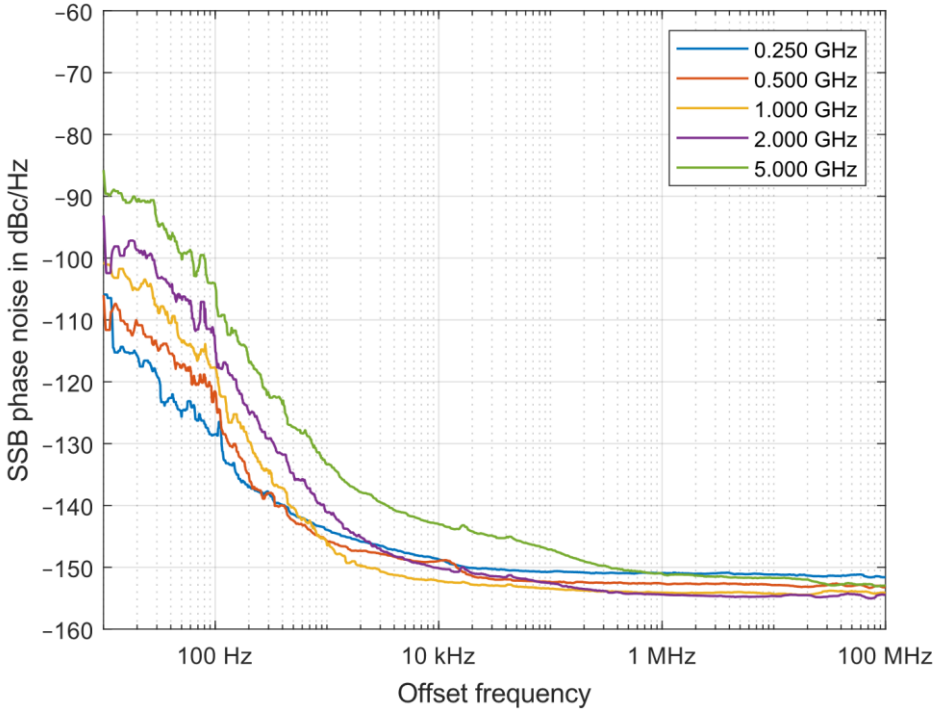


Measured SSB phase noise for a sine wave, unused output terminated by 50 Ω, bias = 0 V

[1] "Optimize internal I/Q impairments for RF output" switched off.

Single-ended output

Output impedance	single-ended	50 Ω
Output voltage setting range		
Magnitude	EMF	0.0 V to 2.1 V (V_p)
Resolution		1 µV nom.
Maximum output voltage	maximum output voltage depends on signal bandwidth	
	up to 500 MHz	< 2.0 V
	up to 1000 MHz	< 1.7 V
	up to 5000 MHz	< 1.0 V
Bias voltage		
Range	EMF	–2.0 V to 2.0 V
Resolution		0.1 mV
Uncertainty		1 % + 2 mV
Frequency range		DC to 5000 MHz
Frequency response [2]	at R_L = 50 Ω, output voltage = 1.0 V (V_p)	
Magnitude	up to 50 MHz	< 2.0 dB
	up to 5000 MHz	< 1.0 dB
I/Q balance	at R_L = 50 Ω, output voltage = 1.0 V (V_p)	
Magnitude	up to 1000 MHz	< 0.5 dB
	up to 5000 MHz	< 0.6 dB
Wideband noise	100 MHz sine wave at 1 MHz offset, output voltage = 2.0 V (V_p)	< –150 dBc (typ.)
SFDR	testsignal 100 MHz sine wave, output voltage = 1.0 V (V_p)	
	up to 5000 MHz	< –50 dBc



Measured SSB phase noise for a sine wave

[2] "Optimize internal I/Q impairments for RF output" switched off.

Baseband characteristics

Internal baseband characteristics

D/A converter		
Data rate		16 GHz
Aliasing filter		
Bandwidth		5 GHz
I/Q impairments (digital baseband)	These impairments are set in the digital baseband section of the R&S®SFI100A. They act on the I/Q signal sent to the I/Q modulator/RF section, as well as on the I/Q signals at the digital I/Q outputs (of the respective path).	
Carrier leakage		
Setting range		–10 % to +10 %
Resolution		0.01 %
I ≠ Q (imbalance)		
Setting range		–1 dB to +1 dB
Resolution		0.01 dB
Quadrature offset		
Setting range		–10° to +10°
Resolution		0.01°

I/Q baseband generator – arbitrary waveform mode

Arbitray wavefom generator		
Sample rate		16 GHz
Sample resolution		16 bit
Waveform length	standard	1 sample to 2 Gsample, in 1 sample steps
	with R&S®SFI-K517 option	1 sample to 8 Gsample, in 1 sample steps
Waveform resampling	all waveforms are internally upsampled to 16 Gsample	
Sample rate	standard	32 kHz to 4.8 GHz
	with R&S®SFI-K529 option	32 kHz to 9.6 GHz
	with R&S®SFI-K530 option	32 kHz to 16.0 GHz
Sample frequency error	depends on sample rate and waveform length	
Bandwidth (RF)	rolloff to –0.1 dB	0.833 · sample rate
Frequency offset		
Setting range	standard	–2 GHz to 2 GHz
	with R&S®SFI-K529 option	–4 GHz to 4 GHz
	with R&S®SFI-K530 option	–5 GHz to 5 GHz
Setting resolution		0.01 Hz
Offset error		< 56.8 µHz (nom.) + relative deviation of reference frequency · frequency offset
Triggering	A trigger event restarts I/Q generation. The I/Q signal is then synchronous with the trigger (with a specific timing jitter).	
Trigger source	event triggered via GUI or remote command	internal
	event triggered by external trigger signal	external
Trigger modes	The signal is generated continuously.	auto
	The signal is generated continuously. A trigger event causes a restart.	retrig
	The signal is started only when a trigger event occurs. Subsequent trigger events are ignored.	armed auto
	The signal is started only when a trigger event occurs. Every subsequent trigger event causes a restart.	armed retrig
	The signal is started only when a trigger event occurs. Signal is generated once.	single
External trigger input		selectable from USER 1, 2
Connector type	USER 1, 2	SMA female
Input level		0 V to 3 V (nom.)
Threshold		settable between 0.1 V and 2.0 V
Input impedance	selectable	1 kΩ or 50 Ω (nom.)
Trigger jitter		± 2.0 ns

External trigger delay		
Setting range		0 sample to $2.147 \cdot 10^9$ sample
Setting resolution		4 ns
External trigger inhibit		
Setting range		0 sample to (21.47s · sample rate) sample
Setting resolution		4 ns
External trigger pulse width		> 7.5 ns
Marker signals		
Number of marker signals		4
Operating modes		unchanged, restart, pulse, pattern, ratio
Marker outputs		USER 4, 5, 6, 7
Connector type	USER 4, 5, 6, 7	BNC female
Level		LVTTL
Marker delay		
Setting range		0 sample to (waveform length – 1) sample
Setting resolution		1 sample
Marker duration		
Minimum value	sample rate ≤ 16 Gsample/s	1 sample
Multicarrier waveform mode		
Number of carriers		max. 512
Total RF bandwidth	standard	max. 4 GHz
	with R&S®SFI-K529 option	max. 8 GHz
	with R&S®SFI-K530 option	max. 10 GHz
Carrier spacing		
Setting range		depends on number of carriers and signal RF bandwidth
Setting resolution		0.01 Hz
Crest factor modes		maximize, minimize, off
Signal period modes		longest file, shortest file, user (max. 1 s)
Single carrier gain		
Setting range		–80 dB to 0 dB
Setting resolution		0.01 dB
Single carrier start phase		
Setting range		0° to 360°
Setting resolution		0.01°
Single carrier delay		
Setting range		0 s to 1 s
Setting resolution		1 ns

Baseband enhancements

User-defined frequency response correction (R&S®SFI-K544 option)

State		on, off
Scattering parameters		
File format		*.s<n>p (e.g. *.s2p)
Maximum number of points		16384
Number of cascadable datasets		up to 10
Additional frequency response		
File format		*.fres, *.ucor
Number of files		up to 5
Absolute level correction at center frequency	based on S-parameter data	on, off
Minimum compensation bandwidth		250 MHz

Crest factor reduction (R&S®SFI-K548 option)

Crest factor reduction can be applied to any waveform loaded in the arbitrary waveform generator.

State		on, off
Algorithm		clipping and filtering
Desired crest factor delta		–20 dB to 0 dB
Max iterations		1 to 10
Filter mode “simple”		
Signal bandwidth		0 Hz to input file sample rate
Channel spacing		0 Hz to input file sample rate
Filter mode “enhanced”		
Passband frequency		0 Hz to ½ of input file sample rate
Stopband frequency		0 Hz to ½ of input file sample rate
Maximum filter order		21 to 300

Digital modulation systems

The specified data applies together with the parameters of the respective standard. The entire frequency range, the filter parameters and the symbol rates can be set by the user.

Digital standards with R&S®WinIQSIM2

R&S®WinIQSIM2 requires an external PC.

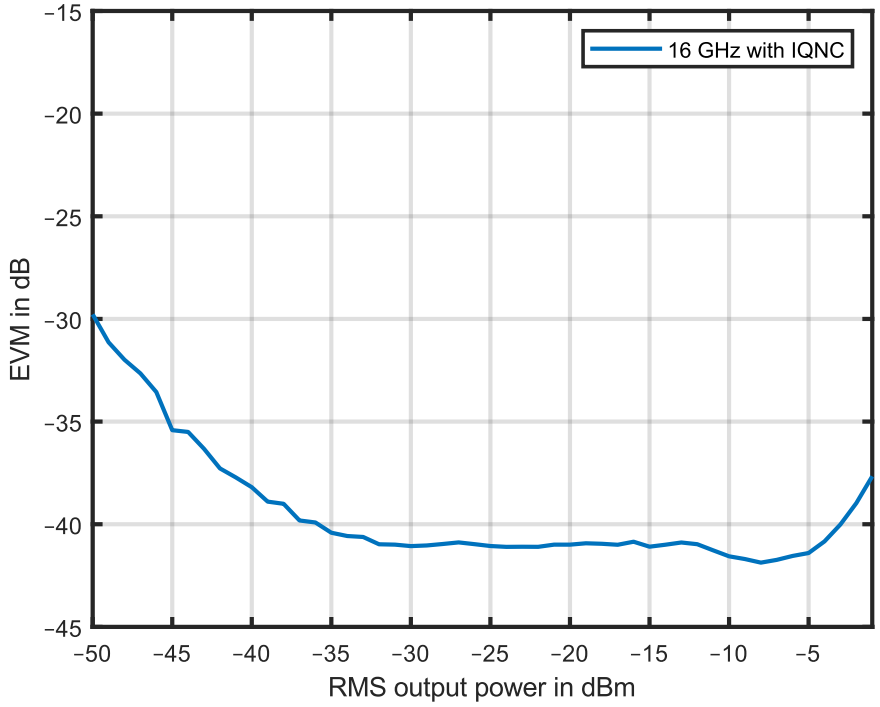
The options are described in the R&S®WinIQSIM2 specifications (PD 5213.7460.22).

Cellular standards	**Option**
5G NR Release 15	R&S®SFI-K444
5G NR Release 16	R&S®SFI-K448
5G NR Release 17/18	R&S®SFI-K471

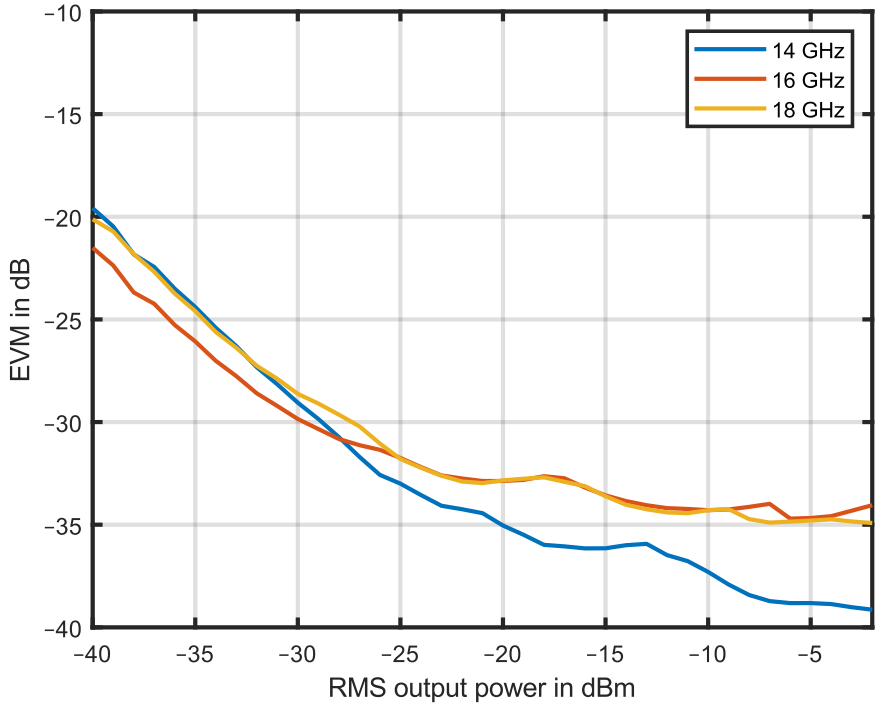
WLAN standards	**Option**
IEEE 802.11ad	R&S®SFI-K441
IEEE 802.11ay	R&S®SFI-K477

Other standards and modulation systems	**Option**
Multicarrier CW signal generation	R&S®SFI-K261
OFDM signal generation	R&S®SFI-K414
Custom digital modulation	R&S®SFI-K499

Signal performance for digital standards and modulation systems



Measured EVM of a 2 GHz 5G NR signal using the R&S®FSW signal and spectrum analyzer with the R&S®FSW-K575 I/Q noise cancellation option



Measured EVM of a 4.32 GHz IEEE 802.11ay signal using the R&S®FSW signal and spectrum analyzer

Custom digital modulation (with R&S®SFI-K499 option)

Types of modulation		
ASK		
Modulation index		0 % to 100 %
Setting resolution		0.1 %
FSK		2FSK to 64FSK, MSK
Deviation		1 Hz to 15 · f_{sym}
Maximum		40 MHz
Setting resolution		0.1 Hz
Variable FSK		4FSK, 8FSK, 16FSK
Deviations		–15 · f_{sym} to +15 · f_{sym}
Maximum		40 MHz
Setting resolution		0.1 Hz
PSK		BPSK, QPSK, QPSK 45° offset, QPSK EDGE, AQPSK, OQPSK, π/4-QPSK, π/2-DBPSK, π/4-DQPSK, π/8-D8PSK, 8PSK, 8PSK EDGE
QAM		16QAM, 32QAM, 64QAM, 128QAM, 256QAM, 1024QAM, 4096QAM, π/4-16QAM, –π/4-32QAM (for EDGE+)
APSK		16APSK, 32APSK
Gamma/gamma1	16APSK	3.15 (DVB-S2 2/3), 2.85 (DVB-S2 3/4), 2.75 (DVB-S2 4/5), 2.70 (DVB-S2 5/6), 2.60 (DVB-S2 8/9), 2.57 (DVB-S2 9/10)
	32APSK	2.84 (DVB-S2 3/4), 2.72 (DVB-S2 4/5), 2.64 (DVB-S2 5/6), 2.54 (DVB-S2 8/9), 2.53 (DVB-S2 9/10)
Symbol rate		
Setting range	with R&S®SFI-K510 option	
	ASK, PSK, APSK and QAM	12.5 Hz to 1440 MHz
	FSK	12.5 Hz to 1440 MHz
	with R&S®SFI-K529 option	
	ASK, PSK, APSK and QAM	12.5 Hz to 2880 MHz
	FSK	12.5 Hz to 2880 MHz
	with R&S®SFI-K530 option	
	ASK, PSK, APSK and QAM	12.5 Hz to 3600 MHz
	FSK	12.5 Hz to 3600 MHz
Setting resolution		0.001 Hz
Baseband filter		
Filter types		cosine, root cosine, Gaussian, cdmaOne, cdmaOne + equalizer, cdmaOne 705 kHz, cdmaOne 705 kHz + equalizer, CDMA2000® 3x, APCO25 C4FM, EDGE narrow pulse, EDGE wide pulse rectangular, split phase, EUTRA/LTE
Filter parameter		
Setting range	cosine, root cosine (filter parameter α)	0.05 to 1.00
	Gaussian (filter parameter B × T)	0.15 to 2.50
	split phase (filter parameter B × T)	0.15 to 2.50
Setting resolution		0.01
Coding	Not all coding methods can be used with every type of modulation.	off, differential, differential + Gray, Gray, NADC, PDC, PHS, TETRA, APCO25 (PSK), APCO25 (8PSK), PWT, TFTS, VDL, APCO25 (FSK), ICO, CDMA2000®, WCDMA
Data sources		PRBS: 9, 11, 15, 16, 20, 21, 23, All 0, All 1, pattern (length: 1 bit to 64 bit), data lists
Predefined settings	modulation, filter, symbol rate and coding (if available) in line with standard	
Standards		APCO, Bluetooth®, DECT, ETC, GSM, GSM EDGE, NADC, PDC, PHS, TETRA, WCDMA 3GPP, TD-SCDMA, CDMA2000® forward link, CDMA2000® reverse link, WorldSpace, CW in baseband

Remote control

Interfaces/systems	standard	Ethernet/LAN 10/100/1000BASE-T
Command set		SCPI 1999.5 or compatible command sets
Ethernet/LAN protocols and services		• VISA VXI-11 (remote control) • Telnet/Raw Ethernet (remote control) • VNC (remote operation with web browser) • FTP (file transfer protocol) • SMB (mapping parts of the instrument to a host file system)
Ethernet/LAN addressing		DHCP, static; support of ZeroConf and M-DNS to facilitate direct connection to a system controller

Connectors

Front panel connectors

RF Out	IF/RF output 50 Ω	type K, 2.92 mm, female
LO In	local oscillator input 50 Ω	type K, 2.92 mm, female
I, $\overline{\text{I}}$ (DAC)	I modulation output signal (differential direct DAC)	SMA, female
Q, $\overline{\overline{\text{Q}}}$ (DAC)	Q modulation output signal (differential direct DAC)	SMA, female
I, $\overline{\text{I}}$ (Diff)	I modulation output signal (differential amplifier)	SMA, female
Q, $\overline{\text{Q}}$ (Diff)	Q modulation output signal (differential amplifier)	SMA, female
I (Single)	I modulation output signal (single-ended)	SMA, female
Q (Single)	Q modulation output signal (single-ended)	SMA, female
User 1, User 2	user-configurable inputs or outputs, e.g. as trigger input or output	SMA, female
User 3, $\overline{\text{User 3}}$	differential user-configurable output, e.g. as trigger output	SMA, female
Sync In	for future use	DisplayPort
Sync Out	for future use	DisplayPort
USB	• USB 2.0 (high speed) connector for external USB devices • mouse and keyboard for enhanced operation • R&S®NRPx power sensors (with R&S®NRP-Z4 or R&S®NRP-ZKU adapter cable) for external power measurements and level adjustment of instrument • memory stick for software update and data exchange	
	connector type	USB type A

Rear panel connectors

Ref. In 1	reference frequency input (10 MHz, 100 MHz, 1 MHz to 250 MHz)	BNC, female
Ref. In 2	reference frequency input (640 MHz, 1 GHz, 8 GHz)	SMA, female
Ref. Out 1	reference frequency output (10 MHz, 100 MHz, 1 MHz to 250 MHz, Ref. In 1 loop through)	BNC, female
Ref. Out 2	reference frequency output (1 GHz, 8 GHz, Ref. In 2 loop through)	SMA, female
Ref. Out 3	reference frequency output 16 GHz	SMA, female
User 4	baseband marker 4 output	BNC, female
User 5	baseband marker 3 output	BNC, female
User 6	baseband marker 2 output	BNC, female
User 7	baseband marker 1 output	BNC, female
X1, X2, X3, X4	for future use	BNC, female
IP Data 1, IP Data 2	for future use	SFP+
Dig IQ HS 1, Dig IQ HS 2 Dig IQ HS 3, Dig IQ HS 4	high-speed digital cross-link interface	QSFP+/QSFP 28, female
USB (2 connectors)	• USB 3.1 (super speed) connector for external USB devices • mouse and keyboard for enhanced operation • R&S®NRPx power sensors (with R&S®NRP-Z4 or R&S®NRP-ZKU adapter cable) for external power measurements and level adjustment of instrument • memory stick for software update and data exchange	
	connector type	USB type A
LAN	provides remote control functionality and other services, see section Remote control	RJ-45
DisplayPort		for external monitor

General data

Environmental conditions		
Temperature	operating temperature range	+5 °C to +40 °C
	storage temperature range	–40 °C to +60 °C temperature gradient < 5 K/h
Damp heat		+25 °C/+40 °C, 95 % rel. humidity, cyclic, in line with EN 60068-2-3
Altitude	operating	up to 4600 m (15000 ft)
	transport	up to 4600 m (15000 ft)
Degree of protection (IP code)		IP20, in line with EN 60529
Mechanical resistance		
Vibration	sinusoidal	5 Hz to 55 Hz, 0.15 mm amplitude const., 55 Hz to 150 Hz, 0.5 g const., in line with EN 60068-2-6
	random	8 Hz to 500 Hz, acceleration 1.2 g RMS, in line with EN 60068-2-64
Shock		40 g shock spectrum, in line with MIL-STD-810E, method no. 516.4, procedure I
Power rating		
Power connector		in line with IEC/EN 60320-1/C14
Rated voltage		100 V to 240 V AC (± 10 %)
Rated frequency		50 Hz to 60 Hz
Rated current		4.0 A to 1.8 A
Rated power	when fully equipped	400 W (meas.)
	standby	< 2 W
Fuse		in line with IEC 60127-2/5
		T6.3H, 250 V
Product conformity		
Electromagnetic compatibility	EU: in line with EMC Directive 2014/30EC	applied harmonized standards: • EN 61326-1 (for use in industrial environment) • EN 61326-2-1 • EN 55011 (class A) • EN 61000-3-2 • EN 61000-3-3
	Korea: KC registration	KC registration number:
Electrical safety	EU: in line with Low Voltage Directive 2014/35/EU, UK: in line with Electrical Equipment (Safety) Regulations 2016 (S.I. 2016/1101)	applied harmonized standard: EN 61010-1
	USA	UL 61010-1
	Canada	CAN/CSA-C22.2 No. 61010-1
International safety approvals	VDE – Association for Electrical, Electronic and Information Technologies	VDE certificate according to IEC 61010-1 number of certificate: 40056623
	CSA – Canadian Standards Association	$_{C}$CSA$_{US}$ mark certificate: 80136217
Restriction of the use of hazardous substances in electrical and electronic equipment	EU: in line with RoHS Directive 2011/65/EC	applied harmonized standard: EN IEC 63000
Operation mode		permanent
Calibration interval	when operated 40 h/week in the full range of the specified environmental conditions	3 years
Dimensions	W × H × D	445 mm × 85 mm × 412 mm (17.52 in × 3.35 in × 16.22 in) (19", 2 HU)
Weight		11 kg (24.25 lb)
Display		5" color display with capacitive touch functionality
Resolution		800 × 480 pixel
Non-volatile memory	standard	M.2 SSD SATA, 512 Gbyte

Ordering information

R&S®SFI-Bxxx = hardware option
R&S®SFI-Kxxx = software/keycode option

Designation	Type	Order No.
Vector signal generator [3], including baseband generator with ARB (2 Gsample, 4 GHz RF bandwidth), power cable, cross-link cables and quick start guide	R&S®SFI100A	1444.4001.02
Options		
Frequency options		
IF frequency 16 GHz	R&S®SFI-B1016	1444.3892.02
RF options		
100 MHz, 640 MHz, 1 GHz ultra-low noise RF IN/OUT (comes with basic configuration)	R&S®SFI-K703	1444.3405.02
Flexible reference input (1 MHz to 250 MHz)	R&S®SFI-K704	1444.3357.02
8 GHz ultra-low noise reference input/output	R&S®SFI-K708	1444.3363.02
Baseband options		
Analog I/Q outputs (single-ended/differential)	R&S®SFI-K17	1444.3286.02
ARB memory 2 Gsample, 4 GHz RF bandwidth (comes with basic configuration)	R&S®SFI-K510	1444.3257.02
ARB memory extension to 8 Gsample	R&S®SFI-K517	1444.3270.02
Baseband extension to 8 GHz RF bandwidth	R&S®SFI-K529	1444.3263.02
Baseband extension to 10 GHz RF bandwidth	R&S®SFI-K530	1444.3434.02
Baseband enhancements		
User-defined frequency response correction	R&S®SFI-K544	1444.3292.02
Crest factor reduction	R&S®SFI-K548	1444.3305.02
Frontend connectivity		
External frontend control	R&S®SFI-K553	1444.3311.02
Digital standards using R&S®WinIQSIM2 [4]		
Multicarrier CW signal generation	R&S®SFI-K261	1444.3334.02
OFDM signal generation	R&S®SFI-K414	1444.3328.02
IEEE 802.11ad	R&S®SFI-K441	1444.3411.02
5G NR Release 15	R&S®SFI-K444	1444.3370.02
5G NR Release 16	R&S®SFI-K448	1444.3386.02
5G NR Release 17/18	R&S®SFI-K471	1444.3392.02
IEEE 802.11ay	R&S®SFI-K477	1444.3428.02
Custom digital modulation	R&S®SFI-K499	1444.3340.02
Accessories		
Spare 100G QSFP cable set 0.5 m	R&S®SFI-Z2	1444.3911.02
Recommended extras		
Documentation of calibration values	R&S®DCV-2	0240.2193.18
R&S®SFI100A accredited calibration	R&S®ACASFI100A	3598.9534.03

[3] The base unit can only be ordered with an R&S®SFI-B1016 frequency option.

[4] R&S®WinIQSIM2 requires an external PC.

Warranty and service

Warranty		
Base unit		1 year
All other items		1 year
Service options		
	Service plans	**On demand**
Calibration	up to five years [5]	pay per calibration
Warranty and repair	up to five years [5]	standard price repair
Contact your Rohde & Schwarz sales office for further details.		

[5] For extended periods, contact your Rohde & Schwarz sales office.

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PD 3685.0134.22 | Version 02.01 | June 2024 (jr)
R&S®SFI100A Wideband IF Vector Signal Generator
Data without tolerance limits is not binding | Subject to change