



Signal Generator R&S® SMA 100A

Specifications

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Key features

Excellent signal quality

- Very low SSB phase noise of typ. -135 dBc (20 kHz carrier offset, $f = 1$ GHz, 1 Hz measurement bandwidth), typ. -140 dBc with the Enhanced Phase Noise Performance option (R&S SMA-B22)
- Wideband noise of typ. -160 dBc (>10 MHz carrier offset, $f = 1$ GHz, 1 Hz measurement bandwidth)
- Nonharmonics of typ. -100 dBc (>10 kHz carrier offset, $f < 1500$ MHz, with the R&S SMA-B22 option)
- High-stability reference oscillator as standard
- Very low phase noise at low frequencies due to internal division of the fundamental frequency range (750 MHz to 1500 MHz) down to 6.6 MHz

Ideal for use in production

- Very short frequency and level setting times of <3 ms across the entire frequency and level range, <450 μ s in the list mode
- Fast hopping mode with flexibly addressable frequency and level pairs, as fast as normal list mode
- Frequency setting time of typ. <10 μ s within a bandwidth of 40 MHz due to direct access to the DDS-based synthesizer (with the R&S SMA-B20 or -B22 option)
- Very high level accuracy and repeatability
- High output power of up to +18 dBm, overrange +28 dBm
- Electronic attenuator with built-in overvoltage protection over entire frequency range
- Minimum space requirements due to compact size (only two height units)

Mil/Aero applications

- Pulse modulator with excellent characteristics (on/off ratio >80 dB, rise/fall time typ. 10 ns)
- Pulse generator integrated as standard
- Optional high-performance pulse generator with minimum pulse width of 20 ns (R&S SMA-K23)
- Optional removable mass storage (compact flash disk, R&S SMA-B80)

All-purpose instrument

- Frequency range of 9 kHz to 3 GHz
- Frequency, level and LF sweeps
- AM, broadband FM/ ϕ M (R&S SMA-B20 or -B22), pulse modulation
- Built-in LF generator up to 1 MHz, optional multifunction generator (R&S SMA-K24) up to 10 MHz
- Optional low-jitter clock synthesizer up to 1.5 GHz (R&S SMA-B29)

Intuitive operating concept

- Color display with 320×240 pixels ($\frac{1}{4}$ VGA)
- Intuitive user interface with graphical display of signal flow (block diagram)
- Context-sensitive online help

Connectors

- Remote control via GPIB or LAN
- USB connectors (e.g. for keyboard, mouse, memory stick)
- Connector for R&S NRP power sensors for precise power measurements

Other features

- Selectable SCPI- or 8662A/63A-compatible IEC/IEEE bus command set
- Control via remote operation tool (e.g. VNC)

Specifications

Specifications apply under the following conditions:

30 minutes warm-up time at ambient temperature, specified environmental conditions met, calibration cycle adhered to, and total calibration performed. Data designated "overrange" or "underrange" and data without tolerance limits is not binding.

RF characteristics

Frequency

Range	R&S SMA-B103/-B103L	9 kHz to 3 GHz
Resolution of setting		0.01 Hz
Resolution of synthesis	standard, fundamental frequency range 750 MHz to 1500 MHz with option R&S SMA-B22	5 μ Hz 0.2 μ Hz
Setting time	to within $<1 \times 10^{-7}$ for $f > 6.6$ MHz or <35 Hz for $f < 6.6$ MHz after IEC/IEEE bus delimiter in ALC OFF MODE S&H after trigger pulse in List mode	<3 ms <5 ms <450 μ s
Phase offset		adjustable in 0.1° steps

Frequency sweep

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

Reference frequency

Aging	after 30 days of uninterrupted operation with option R&S SMA-B22	$<1 \times 10^{-9}$ /day, $<1 \times 10^{-7}$ /year $<5 \times 10^{-10}$ /day, $<3 \times 10^{-8}$ /year
Temperature effect	in temperature range 0 °C to 50 °C with option R&S SMA-B22	$<6 \times 10^{-8}$ $<6 \times 10^{-9}$
Warm-up time	to nominal thermostat temperature	≤ 10 min
Output for internal reference signal	frequency (approx. sinewave) level source impedance	10 MHz or external input frequency typ. 5 dBm 50 Ω
Input for external reference	frequency maximum deviation input level, limits recommended input impedance	5 MHz, 10 MHz or 13 MHz 3×10^{-6} ≥ -6 dBm, ≤ 19 dBm 0 dBm to 19 dBm 50 Ω
Electronic tuning from input (EXT. TUNE)	sensitivity input voltage input impedance with option R&S SMA-B22	typ. 4×10^{-9} /V to 3×10^{-8} /V -10 V to +10 V typ. 10 k Ω typ. 5 k Ω

Level

The R&S SMA100A has three different modes for level setting:

NORMAL MODE: In this mode, the attenuator switches without wear and tear due to the exclusive use of electronic switches. The maximum specified level depends on the installed frequency option (see table below). A typical level overrange up to +20 dBm is available.

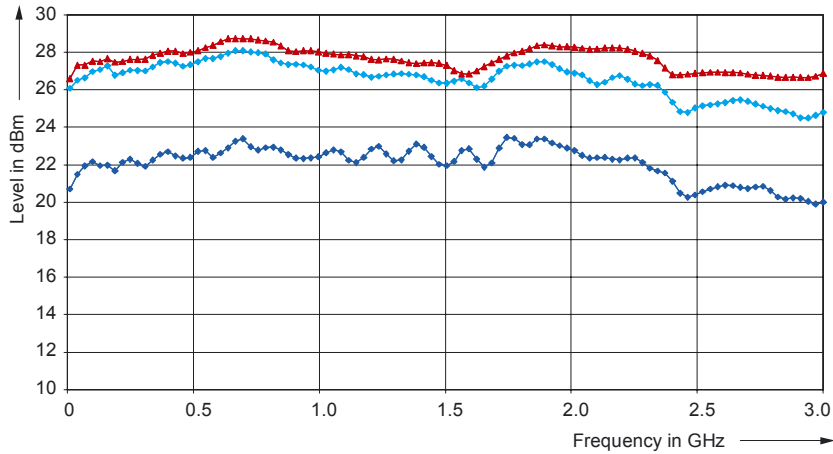
HIGH POWER MODE: In this mode, the electronic attenuator is bypassed with mechanical relays for high output power (up to typ. 28 dBm overrange). The typical minimum level is –11 dBm.

AUTO MODE: In this mode, the mechanical relay bypass is switched automatically if the set level is higher than the specified max. level in the Normal mode. The output level is specified over the full range from –120 dBm up to +18 dBm.

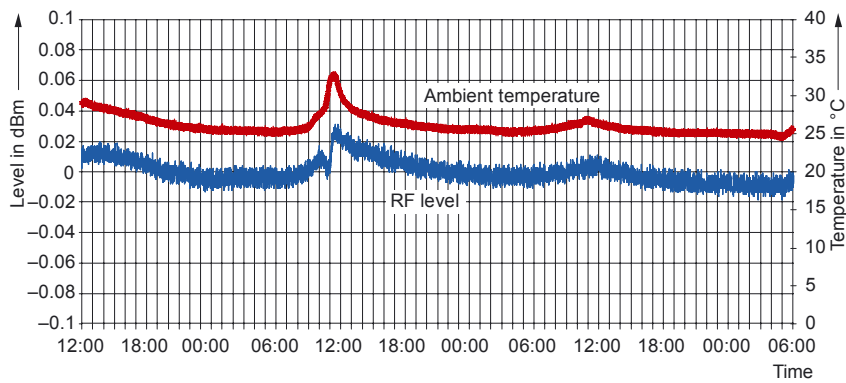
The R&S SMA100A is also available without attenuator (option R&S SMA-B103L).

Setting range	with electronic attenuator (option R&S SMA-B103) without attenuator (option R&S SMA-B103L)	–145 dBm to +30 dBm –20 dBm to +30 dBm
Specified level range with R&S SMA-B103 frequency option	Normal mode 100 kHz < f ≤ 600 kHz f > 600 kHz Auto mode f > 100 kHz	–120 dBm to +11 dBm (PEP) ¹ –120 dBm to +13 dBm (PEP) –120 dBm to +18 dBm (PEP)
Specified level range with R&S SMA-B103L frequency option	Auto mode f > 100 kHz	+12 dBm to +19 dBm (PEP)
Resolution		0.01 dB
Level uncertainty	ALC state on, attenuator mode “auto” temperature range 18 °C to 33 °C 100 kHz < f ≤ 3 GHz	<0.5 dB
Additional uncertainty with ALC OFF, S&H	This mode is needed with pulse modulation after “search once”.	<0.3 dB
Output impedance VSWR in 50 Ω system with R&S SMA-B103 frequency option	Normal mode, ALC state on 6.6 MHz < f ≤ 3 GHz	<1.65, typ. <1.35
	High Power mode, ALC state on 6.6 MHz < f ≤ 3 GHz	<1.75, typ. <1.5
Output impedance VSWR in 50 Ω system with R&S SMA-B103L frequency option	without attenuator, ALC state on 6.6 MHz < f ≤ 3 GHz	<1.65, typ.<1.45
Setting time	after IEC/IEEE bus delimiter, with GUI update stopped, attenuator mode “auto” temperature range 18 °C to 33 °C, to <0.1 dB deviation from final value	<3 ms
	ALC state ON	<5 ms
	ALC state OFF	<450 μs
	in List mode after trigger impulse to <0.3 dB deviation from final value relay switchover in Auto mode	<10 ms
Uninterrupted level setting	with attenuator mode “fixed”; ALC state on setting range	>20 dB
Back-feed (from ≥50 Ω source) with R&S SMA-B103	maximum permissible RF power in output frequency range of RF path for f > 1 MHz	
	1 MHz < f < 1 GHz	50 W
	1 GHz < f < 2 GHz	25 W
	2 GHz < f < 3 GHz	10 W
maximum permissible DC voltage	50 V	
Back-feed (from ≥50 Ω source) with R&S SMA-B103L	maximum permissible RF power in output frequency range of RF path for f > 1 MHz	0.05 W
	maximum permissible DC voltage	5 V

¹ PEP = peak envelope power.



Available power, attenuator mode "normal" (lower trace) or "high power" (middle trace) and without attenuator (upper trace)



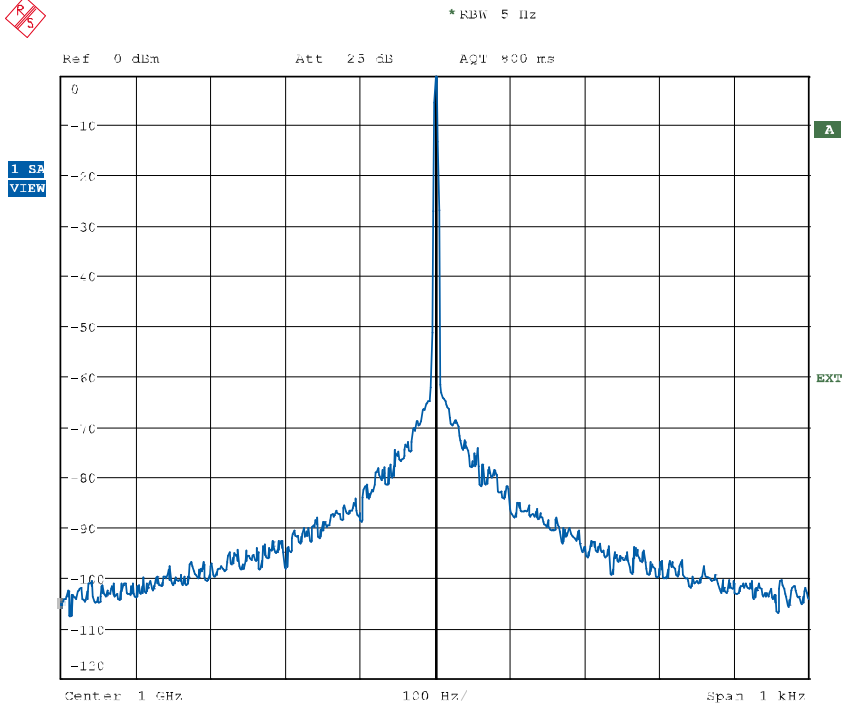
R&S SMA100A level repeatability at 2.1 GHz, 0 dBm, ALC ON

Level sweep

Digital sweep in discrete steps	operating modes sweep range uninterrupted level sweep step width sweeping in Auto mode The switching threshold should not be crossed during sweep. Sweeping is therefore inhibited in this level setting mode.	automatic, single sweep, manual or external trigger, logarithmic full level range 0.1 dB to 30 dB 0.1 dB to 20 dB per step
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Spectral purity

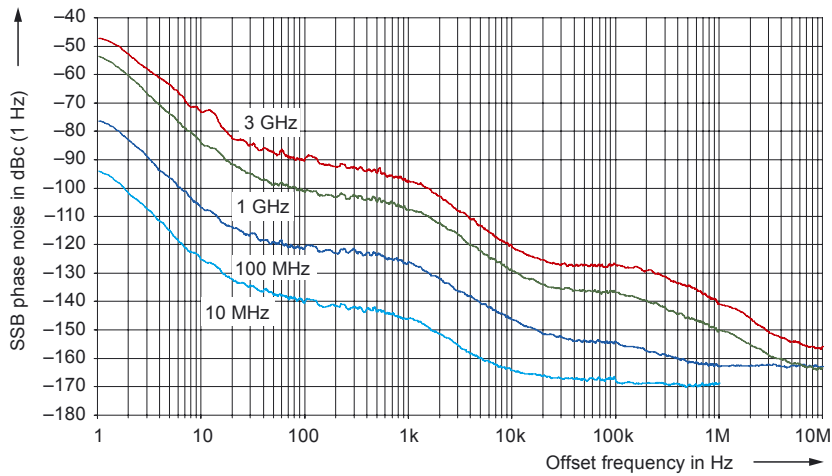
Harmonics	for $f > 1$ MHz max. level, unmodulated for ≤ -30 dBc with R&S SMA-B103 Auto/Normal mode High Power mode with R&S SMA-B103L	10 dBm 14 dBm 15 dBm
Nonharmonics	CW, level > -20 dBm, offset > 10 kHz from carrier $f \leq 1500$ MHz $1500 \text{ MHz} < f \leq 3 \text{ GHz}$ offset > 850 kHz from carrier $f \leq 1500$ MHz $1500 \text{ MHz} < f \leq 3 \text{ GHz}$	≤ -80 dBc ≤ -74 dBc ≤ -86 dBc ≤ -80 dBc
Nonharmonics with option R&S SMA-B22	CW, level > -20 dBm offset > 10 kHz from carrier $f \leq 750$ MHz $750 \text{ MHz} < f \leq 1500 \text{ MHz}$ $1500 \text{ MHz} < f \leq 3 \text{ GHz}$	≤ -96 dBc ≤ -90 dBc ≤ -84 dBc
Subharmonics	$f \leq 1500$ MHz $f > 1500$ MHz	none ≤ -74 dBc
Wideband noise	attenuator mode "auto" for level > 10 dBm with R&S SMA-B103L carrier offset > 10 MHz, measurement bandwidth 1 Hz, CW $9 \text{ kHz} \leq f \leq 6.6 \text{ MHz}$ $6.6 \text{ MHz} < f \leq 750 \text{ MHz}$ $750 \text{ MHz} < f \leq 1500 \text{ MHz}$ $1.5 \text{ GHz} < f \leq 3 \text{ GHz}$	≤ -147 dBc (typ. -150 dBc) ≤ -152 dBc (typ. -156 dBc) ≤ -153 dBc (typ. -160 dBc) ≤ -150 dBc (typ. -155 dBc)
SSB phase noise	carrier offset 20 kHz, measurement bandwidth 1 Hz, CW $f \leq 6.6$ MHz $f = 100$ MHz $f = 1$ GHz $f = 2$ GHz $f = 3$ GHz	≤ -141 dBc (typ. -145 dBc) ≤ -147 dBc (typ. -151 dBc) ≤ -131 dBc (typ. -135 dBc) ≤ -125 dBc (typ. -129 dBc) ≤ -121 dBc (typ. -125 dBc)
SSB phase noise with option R&S SMA-B22	CW, carrier offset 20 kHz, measurement bandwidth 1 Hz $f \leq 6.6$ MHz $f = 100$ MHz $f = 1$ GHz $f = 2$ GHz $f = 3$ GHz	≤ -145 dBc (typ. -148 dBc) ≤ -151 dBc (typ. -154 dBc) ≤ -136 dBc (typ. -140 dBc) ≤ -130 dBc (typ. -134 dBc) ≤ -126 dBc (typ. -130 dBc)



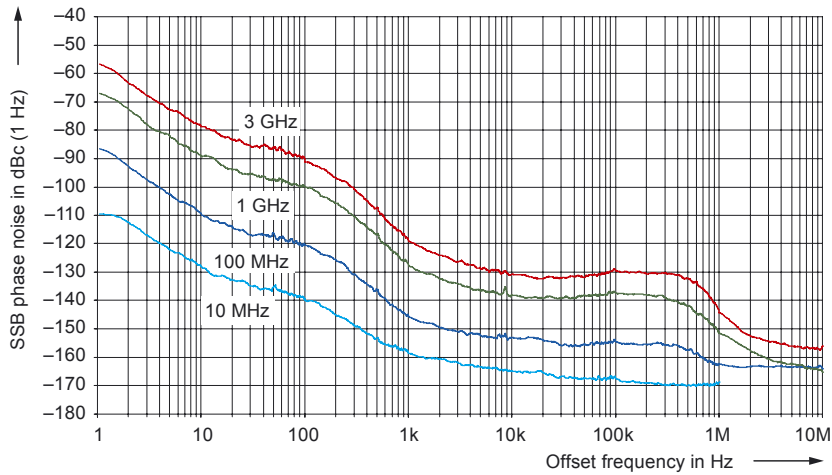
R&S SMA100A with option R&S SMA-B22, spectrum near the carrier, $f = 1$ GHz

Carrier frequency in MHz	typical phase noise in dBc (1 Hz) with option R&S SMA-B22							
	frequency offset from carrier							
	1 Hz	10 Hz	100 Hz	1 kHz	10 kHz	100 kHz	1 MHz	10 MHz
0.1 to 6.6	-83	-107	-120	-143	-151	-152	-155	-
6.6 to 15.625	-100	-124	-134	-150	-158	-162	-162	-162
15.625 to 23.4375	-96	-120	-130	-150	-158	-161	-162	-162
23.4375 to 31.25	-94	-118	-128	-150	-158	-161	-162	-162
31.25 to 46.875	-90	-114	-124	-149	-158	-158	-161	-161
46.875 to 62.5	-88	-112	-122	-149	-158	-158	-160	-160
62.5 to 93.75	-84	-108	-118	-145	-157	-158	-160	-160
93.75 to 125	-82	-106	-116	-143	-154	-156	-160	-160
125 to 187.5	-78	-102	-112	-139	-150	-152	-158	-158
187.5 to 250	-76	-100	-110	-137	-148	-150	-156	-157
250 to 375	-72	-96	-106	-134	-147	-146	-154	-156
375 to 500	-70	-94	-104	-132	-145	-144	-153	-156
500 to 750	-66	-90	-100	-128	-141	-140	-151	-156
750 to 1000	-64	-88	-98	-126	-139	-138	-150	-160
1000 to 1500	-60	-84	-94	-122	-135	-134	-146	-157
1500 to 2000	-58	-82	-92	-120	-133	-132	-144	-155
2000 to 3000	-54	-78	-88	-116	-129	-128	-140	-154

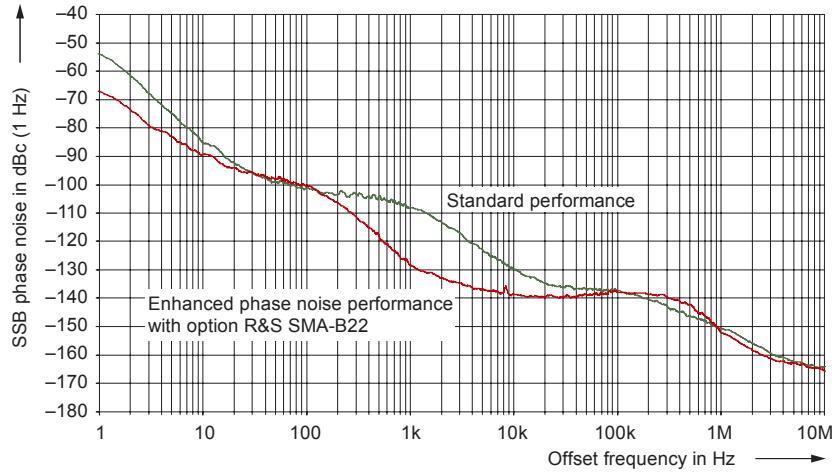
RMS jitter	carrier frequency 1 GHz 155 MHz 622 MHz 2.488 GHz	RMS jitter bandwidth 1 Hz to 10 MHz 100 Hz to 1.5 MHz 1 kHz to 5 MHz 5 kHz to 15 MHz	typ. 430 fs typ. 60 fs typ. 36 fs typ. 22 fs
RMS jitter with option R&S SMA-B22	carrier frequency 1 GHz 155 MHz 622 MHz 2.488 GHz	RMS jitter bandwidth 1 Hz to 10 MHz 100 Hz to 1.5 MHz 1 kHz to 5 MHz 5 kHz to 15 MHz	typ. 135 fs typ. 42 fs typ. 21 fs typ. 19 fs
Residual FM	RMS value at f = 1 GHz 0.3 kHz to 3 kHz, weighted (ITU-T) 0.03 kHz to 23 kHz		<1 Hz <4 Hz
Residual AM	RMS value (0.03 kHz to 20 kHz)		<0.02 %



Typical SSB phase noise with internal reference oscillator (standard instrument)



Typical SSB phase noise with internal reference oscillator (with Enhanced Phase Noise Performance and FM/φM Modulator R&S SMA-B22)



Measured SSB phase noise, $f = 1$ GHz,
comparison of standard performance to performance with option R&S SMA-B22, typical values

List mode

Frequency and level values can be stored in a list and set in an extremely short amount of time.		
Operating modes		automatic, single sweep, manual or external trigger fast hopping with immediate and external trigger
Max. number of stored settings		2000
Dwell time		1 ms to 1 s
Resolution		0.1 ms
Setting time	after external trigger	see frequency and level data

Analog modulation

Possible modulation types

Amplitude modulation, frequency modulation, phase modulation, pulse modulation

Simultaneous modulation

	Amplitude modulation	Frequency modulation	Phase modulation	Pulse modulation
Amplitude modulation		+	+	–
Frequency modulation	+		–	+
Phase modulation	+	–		+
Pulse modulation	–	+	+	

+ = compatible, – = incompatible

Amplitude modulation

For $f \geq 100$ kHz, attenuator mode "auto".

Operating modes		internal, external, internal + external, AC/DC
Modulation depth	At high levels, modulation is clipped when the maximum PEP is reached.	0 % to 100 %
Resolution		0.1 %
Setting uncertainty	$f_{\text{mod}} = 1$ kHz and $m < 80$ %	<(3 % of reading + 1 %)
AM distortion	$f_{\text{mod}} = 1$ kHz $m = 30$ % $m = 80$ %	<1 % <2 %
Modulation frequency response	$m = 60$ %, up to 100 kHz	<3 dB
Incidental ϕM at AM	$m = 30$ %, $f_{\text{mod}} = 1$ kHz, $\pm \text{peak}/2$	<0.1 rad

Frequency modulation (option R&S SMA-B20 or R&S SMA-B22)

FM and ϕM Multiplier for different frequency ranges	$f \leq 46.875$ MHz 46.875 MHz < $f \leq 93.75$ MHz 93.75 MHz < $f \leq 187.5$ MHz 187.5 MHz < $f \leq 375$ MHz 375 MHz < $f \leq 750$ MHz 750 MHz < $f \leq 1500$ MHz 1500 MHz < $f \leq 3$ GHz	$rm = 0.5$ $rm = 0.0625$ $rm = 0.125$ $rm = 0.25$ $rm = 0.5$ $rm = 1$ $rm = 2$
Operating modes		internal, external, internal + external, AC/DC external digital FM mode Normal FM mode Low Noise (with option R&S SMA-B22 only)
Maximum deviation	FM mode Normal FM mode Low Noise	$rm \times 10$ MHz $rm \times 100$ kHz
Resolution		<0.2 % of set deviation, min. $rm \times 1$ Hz
Setting uncertainty	$f_{\text{mod}} = 10$ kHz, deviation \leq half of max. deviation internal external	<(1.5 % of reading + 20 Hz) <(2 % of reading + 20 Hz)
FM distortion	$f_{\text{mod}} = 10$ kHz, deviation = $rm \times 1$ MHz	<0.1 %
Modulation frequency response	FM mode Normal DC/10 Hz to 100 kHz DC/10 Hz to 10 MHz FM mode Low Noise DC/10 Hz to 500 kHz	<0.5 dB <3 dB <3 dB
Synchronous AM	40 kHz deviation, $f_{\text{mod}} = 1$ kHz, $f > 5$ MHz	<0.1 %
Carrier frequency offset with FM DC	after FM offset calibration	<0.2 % of set deviation

Phase modulation (option R&S SMA-B20 or R&S SMA-B22)

Operating modes		internal, external, internal + external, AC/DC external digital φM mode Low Noise (with option R&S SMA-B22 only) φM mode High Deviation φM mode High Bandwidth
Maximum deviation	φM mode Low Noise φM mode High Deviation φM mode High Bandwidth	rm × 0.25 rad rm × 5 rad rm × 1 rad
Resolution		<0.2 % of set deviation, min. rm × 0.3 mrad
Setting uncertainty	f _{mod} = 10 kHz, deviation ≤ half of max. deviation internal external	<(1.5 % of reading + 0.01 rad) <(2 % of reading + 0.01 rad)
Distortion	f _{mod} = 10 kHz, half of max. deviation	<0.2 %, typ. 0.1 %
Modulation frequency response	φM mode High Deviation DC/10 Hz to 500 kHz φM mode High Bandwidth DC/10 Hz to 100 kHz DC/10 Hz to 10 MHz φM mode Low Noise DC/10 Hz to 100 kHz	<1 dB <0.5 dB <3 dB <3 dB

Pulse modulation

Operating modes		external, internal
On/off ratio		>80 dB
Rise/fall time	10 %/90 % of RF amplitude f > 180 MHz	20 ns, typ. 10 ns
Pulse repetition frequency		0 Hz to 10 MHz
Video crosstalk	spectral line of fundamental of 100 kHz squarewave modulation	<-30 dBc
Modulation input PULSE	input level input impedance polarity	threshold 0.8 V >10 kΩ or 50 Ω selectable

Input for external modulation signals

Modulation input AM EXT	input impedance input sensitivity (peak value for set modulation depth or deviation)	>100 kΩ 1 V
Modulation input PULSE	input level input impedance polarity	threshold 0.8 V >10 kΩ or 50 Ω selectable

With option R&S SMA-B20/-B22 (FM/φM)

Modulation input FM/φM EXT	input impedance input sensitivity (peak value for set modulation depth or deviation)	>100 kΩ or 50 Ω 1 V
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Modulation sources

Internal modulation generator

Frequency range		0.1 Hz to 1 MHz
Resolution of setting		0.1 Hz
Frequency accuracy		<0.012 Hz + relative deviation of reference frequency
Frequency response		<0.3 dB
Distortion	f < 100 kHz at $R_L > 50 \Omega$, level (V_{EMF}) < 1 V	<0.1 %
Output voltage	V_p at LF connector, open circuit voltage EMF resolution setting accuracy at 1 kHz	1 mV to 4 V 1 mV <(1 % of reading + 1 mV)
Output impedance		50 Ω
Frequency settling time	to within $<1 \times 10^{-7}$, after IEC/IEEE bus delimiter	<3 ms
Sweep	digital sweep in discrete steps operating modes sweep range step width (lin) step width (log)	automatic, step, single, external single, external step, manual or external trigger, linear or logarithmic spacing full frequency range full frequency range 0.01 % to 100 % per step

Standard pulse generator

Pulse period Resolution		5 μ s to 85 s 1 μ s
Pulse width Resolution		2 μ s to 1 s 1 μ s
PULSE/VIDEO output		LVTTL signal ($R_L \geq 50 \Omega$)

High-performance pulse generator (option R&S SMA-K23)

Operating modes		automatic, external trigger, external gate mode, single pulse, double pulse, delayed pulse (external trigger)
Active trigger edge		positive or negative
Pulse period Resolution Uncertainty		100 ns to 85 s min. 20 ns < 1×10^{-4}
Pulse width Resolution Uncertainty	Pulse width of double pulses is settable independently.	20 ns to 1 s min. 20 ns <(1 $\times 10^{-4}$ + 3 ns)
Pulse delay Resolution Uncertainty		20 ns to 1 s min. 20 ns <(1 $\times 10^{-4}$ + 3 ns)
Double-pulse spacing Resolution Uncertainty		20 ns to 1 s min. 20 ns <(1 $\times 10^{-4}$ + 3 ns)
Trigger delay		typ. 50 ns
Jitter		<10 ns
PULSE/VIDEO output		LVTTL signal ($R_L \geq 50 \Omega$)

Multifunction generator (option R&S SMA-K24)

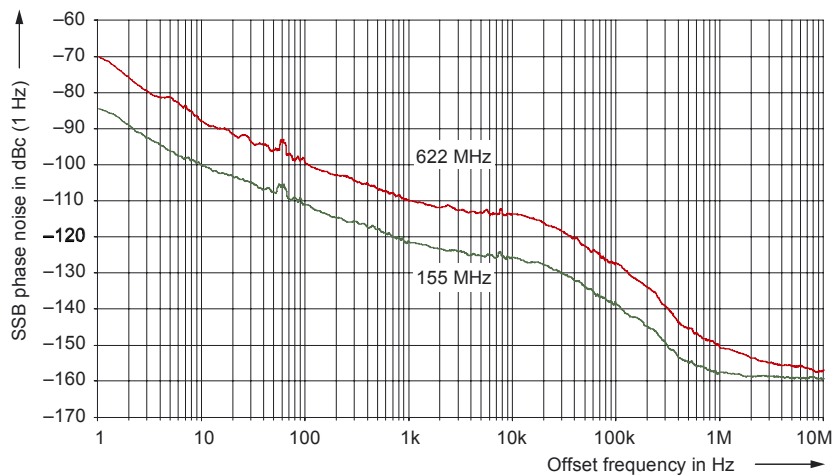
The multifunction generator option (R&S SMA-K24) consists of three function generators that can be set independently. Two of the three signal sources can be added with different weighting. The total voltage is limited by the maximum output voltage.

Waveforms LF generator 1 LF generator 2 Noise generator		sine sine, square, triangle user-programmable ramp $\Delta T = 20$ ns noise amplitude distribution: Gaussian, equal
Frequency range	sine triangle, square noise amplitude distribution noise bandwidth	0.1 Hz to 10 MHz 0.1 Hz to 1 MHz Gaussian, equal 100 kHz to 10 MHz
Resolution of setting	sine, triangle, square ramp: rise, fall, low and high time	0.1 Hz 20 ns
Frequency uncertainty		$<(0.012 \text{ Hz} + \text{relative deviation of reference frequency})$
Frequency response	sine up to 1 MHz up to 10 MHz	<0.3 dB <1 dB
Distortion	$f < 100$ kHz at $R_L > 50 \Omega$, level (V_{EMF}) 1 V	<0.1 %
Output voltage	V_p at LF connector, open circuit voltage EMF resolution setting accuracy at 1 kHz	1 mV to 4 V 1 mV $<(1 \text{ \% of reading} + 1 \text{ mV})$
Output impedance		50 Ω
Frequency settling time	to within $<1 \times 10^{-7}$, after IEC/IEEE bus delimiter	<3 ms
Sweep	digital sweep in discrete steps operating modes sweep range step width (lin) step width (log)	automatic, step, single, external single, external step, manual or external trigger, linear or logarithmic spacing full frequency range full frequency range 0.01 % to 100 % per step

Clock synthesizer (option R&S SMA-B29)

The frequency of the clock synthesizer (option R&S SMA-B29) can be set independently of the RF frequency of the R&S SMA100A. It provides a differential clock signal (AC-coupled, symmetric square) on the rear panel of the R&S SMA100A.

Frequency range		100 kHz to 1.5 GHz
Resolution of setting		0.01 Hz
Resolution of synthesis		<100 μ Hz
Frequency setting time	to within $<1 \times 10^{-7}$, after IEC/IEEE bus delimiter	< 30 ms
Output voltage CLK SYN CLK SYN_N	into 50 Ω ; peak to peak; f = 10 MHz	typ. 0.5 V
Frequency response	100 kHz to 1.5 GHz	typ. 4 dB
Back-feed (from $\geq 50 \Omega$ source)	maximum permissible RF power in output frequency range of CLKSYN path for f > 1 MHz maximum permissible DC voltage	0.05 W 3 V
Spectral purity		
Nonharmonics	>10 kHz offset from carrier f \leq 325 MHz 325 MHz < f \leq 650 MHz 650 MHz < f \leq 1300 MHz 1300 MHz < f \leq 1500 MHz	<-82 dBc <-76 dBc <-70 dBc <-64 dBc
Wideband noise	carrier offset >10 MHz; measurement bandwidth 1 Hz	typ. <-154 dBc
SSB phase noise	carrier offset 20 kHz, measurement bandwidth 1 Hz f = 100 MHz f = 250 MHz f = 500 MHz f = 1000 MHz	<-125 dBc typ. -131 dBc <-115 dBc typ. -121 dBc <-111 dBc typ. -117 dBc <-105 dBc typ. -111 dBc
RMS jitter with option R&S SMA-B22	carrier frequency RMS jitter bandwidth 100 MHz 1 Hz to 10 MHz 155 MHz 100 Hz to 1.5 MHz 622 MHz 1 kHz to 5 MHz	typ. 220 fs typ. 160 fs typ. 140 fs



Clock synthesizer (option R&S SMA-B29): SSB phase noise measured with option R&S SMA-B22, typical values

General data

Remote control

Systems	IEC/IEEE bus, IEC 60625 (IEEE 488) Ethernet USB TCP/IP
Command set	SCPI 1999.5 or 8662/3A compatible
Connector IEC Ethernet USB	24-contact Amphenol Western USB
IEC/IEEE bus address	0 to 30
Interface functions IEC	SH1, AH1, T6, L4, SR1, RL1, PP1, DC1, DT1, C0
LAN interface	10/100BaseT

Operating data

Power supply	input voltage range, AC, nominal	100 V to 240 V (AC) $\pm 10\%$
	AC supply frequency	50 Hz to 400 Hz, $-5\%/+10\%$
	power consumption	250 VA
Power factor correction		meets EN 61000-3-2
EMC		meets EN 55011 class B, EN 61326
Immunity to interfering field strength		up to 10 V/m
Environmental conditions	operating temperature range	0 °C to 55 °C meets EN 60068-2-1, EN 60068-2-2
	storage temperature range	-40 °C to +70 °C
	climatic resistance, +40 °C/95 % rel. humidity	meets EN 60068-2-3
Mechanical resistance	vibration, sinusoidal	5 Hz to 150 Hz, max. 2 g at 55 Hz, max. 0.5 g at 55 Hz to 150 Hz, meets EN 60068-2-6
	vibration, random	10 Hz to 300 Hz, acceleration 1.2 g (rms) meets EN 60068-2-64
	shock	40 g shock spectrum. meets EN 60068-2-27, MIL-STD-810E
Electrical safety		meets IEC 61010-1, EN 61010-1, CAN/CSA-C22.2 No. 61010-1-04, UL 61010-1
Approvals		VDE-GS, cCSA _{US}
Dimensions (W × H × D)		427 mm × 88 mm × 450 mm
Weight	when fully equipped	10 kg
Recommended calibration interval		3 years

Ordering information

Designation	Type	Order No.
Signal Generator ²	R&S SMA100A	1400.0000.02
Including power cable, Quick Start Guide and CD-ROM (with operating and service manual)		
Options		
RF Path		
9 kHz to 3 GHz with electronic attenuator	R&S SMA-B103	1405.0209.02
9 kHz to 3 GHz without attenuator	R&S SMA-B103L	1405.0609.02
FM/φM Modulator	R&S SMA-B20	1405.1605.02
Enhanced Phase Noise Performance and FM/φM Modulator	R&S SMA-B22	1405.1805.02
Clock Synthesizer	R&S SMA-B29	1400.2503.02
Removable Mass Storage (compact flash disk)	R&S SMA-B80	1405.2001.02
Rear Connectors	R&S SMA-B81	1405.2401.02
High-Performance Pulse Generator	R&S SMA-K23	1405.2801.02
Multifunction Generator	R&S SMA-K24	1405.2901.02
Recommended extras		
Hardcopy manuals (in English, UK)		1400.0075.32
Hardcopy manuals (in English, US)		1400.0075.39
19" Rack Adapter	R&S ZZA-211	1096.3260.00
Keyboard with USB Interface (US characteristic set)	R&S PSL-Z2	1157.6870.04
Mouse with USB Interface, optical	R&S PSL-Z10	1157.7060.03
External USB DVD Drive	R&S PSP-B6	1134.8201.22

² The base unit must be ordered together with an R&S SMA-B103/-B103L frequency option.



For product brochure, see PD 5213.6412.12
and www.rohde-schwarz.com
(search term: SMA 100A)



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