

Signal Generation

Vector Signal Generator SMIQ

SMIQ02/02E: 0.3 to 2.2 GHz

SMIQ03/03E: 0.3 to 3.3 GHz

Digital signals of your choice

SMIQ03 (photo 42807)



Brief description

The Rohde&Schwarz signal generators of the SMIQ family feature both analog and digital modulation to keep pace with the present-day and future

rapid development in the field of digital modulation.

The signal generator family comprises four models which differ in their fre-

quency range and main fields of application.

SMIQ02 and SMIQ03 feature a hitherto unrivalled versatility regarding signal generation and signal quality and are therefore ideal for use in development and type-approval testing.

Applications, options

Application	Required option	SMIQ02E	SMIQ03E	SMIQ02	SMIQ03
Digital modulation					
GFSK	SMIQB10	●	●	●	●
GMSK	SMIQB10	●	●	●	●
$\pi/4$ DQPSK	SMIQB10	●	●	●	●
All other digital modulation modes	SMIQB10	–	–	●	●
Internal data generator incl. 4 Mbit memory	SMIQB11	●	●	●	●
Digital mobile radio standards					
PHS	SMIQB10 + -B11	●	●	●	●
NADC	SMIQB10 + -B11	●	●	●	●
PDC	SMIQB10 + -B11	●	●	●	●
GSM	SMIQB10 + -B11	●	●	●	●
IS-95 CDMA	SMIQB10 + -B11 + -B42	○	○	○	○
Fading simulation					
1 channel/6 paths	SMIQB14	–	–	●	●
1 channel/12 paths	SMIQB14 + -B15	–	–	●	●
2 channels/6 paths each (with second SMIQ)	SMIQB14 + -B15	–	–	●	●

● Included in option ○ Can be retrofitted – Not available

The economy models SMIQ02E and SMIQ03E have especially been designed for the needs in production environments and satisfy the requirement for an economically attractive solution with an outstanding price/performance ratio.

Main features

- Versatile and broadband generation of digitally modulated signals up to 7 Msymbol/s
- Analog and digital modulation capabilities
- Generation of TDMA and CDMA signals to all main mobile radio standards
- Broadband I/Q modulator with outstanding vector accuracy
- Optional internal fading simulator to test specifications of mobile radio standards
- Three-year calibration cycle

Signal Generation

Option/function/software	Designation	SMIQ02E	SMIQ03E	SMIQ02	SMIQ03	Order No.
Frequency range up to 3.3 GHz		○	●	○	●	
Reference Oscillator OCXO	SM-B1	○	○	○	○	1036.7599.02
FM/φM Modulator	SM-B5	●	●	○	○	1036.8489.02
Modulation Coder	SMIQB10	○*	○*	○	○	1085.5009.02
Data Generator (incl. 4 Mbit memory)	SMIQB11	○	○	○	○	1085.4502.02
Memory Extension 8 Mbit	SMIQB12	○	○	○	○	1085.2800.02
Fading Simulator (6 paths)	SMIQB14	–	–	○	○	1085.4002.02
Fading Simulator (with 6 additional paths)	SMIQB15	–	–	○	○	1085.4402.02
IS-95 CDMA (Digital Standard)	SMIQB42	○	○	○	○	1104.7936.02
Fast CPU	SM-B50	–	–	○	○	1104.8410.02
Low ACP for W-CDMA chip rate 4096 MHz		○	○	○	○	1105.0006.02
Rear Connectors	SMIQB19	○	○	○	○	1085.2997.02

● Included in basic model ○ Can be retrofitted – Not available

* Limited functionality

Specifications in brief

Frequency

Range SMIQ02/SMIQ02E	300 kHz to 2.2 GHz
SMIQ03/SMIQ03E	300 kHz to 3.3 GHz
Resolution	0.1 Hz
Reference frequency	Standard
Aging (after 30 days of operation)	1×10 ⁻⁶ /year
Temperature effect (0 to 50°C)	2×10 ⁻⁶
Spectral purity	
Harmonics at level ≤10 dBm	<-30 dBc
SSB phase noise at 1 GHz, carrier offset 20 kHz, 1 Hz bandwidth	CW
SMIQ02/SMIQ03	<-126 dBc
SMIQ02E/SMIQ03E	<-116 dBc
Level	-140 to +13 dBm (PEP) ¹⁾
Resolution	0.1 dB
Total uncertainty for levels	
>-127 dBm: f <2 GHz/f >2 GHz	<±1 dB/<±1.5 dB
Frequency response at 0 dBm	<1 dB, typ. <0.3 dB

Modulation

Internal modulation generator	0.1 Hz to 1 MHz, resolution 0.1 Hz
Amplitude modulation	internal, external AC/DC
Modulation depth	0 to 100%
Modulation frequency range	DC to 50 kHz (RF >5 MHz)
Broadband amplitude modulation	external DC
Modulation frequency range	DC to 30 MHz
Vector modulation	external DC
Modulation frequency range	30 MHz [-3 dB]
Envelope control	RF level can be controlled with an analog voltage of 0 to 1 V via the POWER RAMP input

Digital modulation with optional

Modulation Coder SMIQB10

Internal PRBS	int., ext. serial, ext.l parallel selectable lengths: 2 ⁹ -1, 2 ¹⁵ -1, 2 ¹⁶ -1, 2 ²⁰ -1, 2 ²¹ -1 and 2 ²³ -1
Envelope control	external or external
Function range	1 ksymbol/s to 2.5 Msymbol/s
Modulation modes SMIQ02/03	2FSK, 4FSK, GFSK, GMSK, BPSK, QPSK, OQPSK, π/4 DQPSK, π/4 QPSK, 8PSK, 16QAM, 32QAM, 64QAM, 256QAM
Symbol rate FSK, GMSK	1 ksymbol/s to 2.5 Msymbol/s
PSK, QAM	1 ksymbol/s to 7 Msymbol/s
Baseband filter	√cos, cos, Gauss and Bessel
Modulation modes SMIQ02E/03E	GFSK, GMSK, π/4 DQPSK
Symbol rate	1 ksymbol/s to 1.3 Msymbol/s

Data generator (option SMIQB11)

Programmable data memory for modulation data, envelope-control and trigger signals. The data generator can be operated only in conjunction with the optional modulation coder.
Memory capacity 4 Mbit, up to 20 Mbit with SMIQB12

Modes

automatically repeating, single shot, manually or externally triggered

Digital standards with options SMIQB10 and SMIQB11

GSM, NADC, PDC, PHS, CDMA, IS-95

Fading simulation with SMIQ02/SMIQ03 with options SMIQB14, SMIQB15

RF bandwidth [-3 dB]	>14 MHz
Number of paths and channels	
with option SMIQB14	6 paths, 1 channel
with options SMIQB14 and -B15	12 paths, 1 channel, or 6 + 6 paths, 2 channels with second SMIQ
Path attenuation	0 to 50 dB
Path delay	0 to 1600 μs
Doppler shift	0.1 to 1600 Hz

Modulation with SMIQ02/SMIQ03 with option SM-B5

Frequency/phase modulation	internal, external AC/DC, two-tone with two modulation channels
Max. deviation	depending on carrier frequency
FM/φM	500 kHz to 2 MHz/5 to 20 rad
Modulation frequency range FM/φM	DC to 2 MHz/DC to 100 kHz

Modulation with SMIQ02E/SMIQ03E

Frequency/phase modulation	internal, external AC/DC, two-tone with two modulation channels; with PM: bandwidth 2 MHz only for channel 2
Max. deviation	depending on carrier frequency
FM	5 to 20 MHz
φM, bandwidth 100 kHz/2 MHz	50 to 200 rad/2.5 to 10 rad
Modulation frequency range FM	DC to 8 MHz

General data

Remote control	IEC 625 (IEEE 488)
Command set	SCPI 1993.0
Power supply	90 to 132 V/180 to 265 V (autosetting), 47 to 440 Hz (max. 300 VA)
Dimensions (W x H x D)	435 mm x 192 mm x 460 mm
Weight	25 kg when fully equipped

Ordering information

Vector Signal Generator	0.3 to 2.2 GHz	SMIQ02	1084.8004.02
	0.3 to 3.3 GHz	SMIQ03	1084.8004.03
	0.3 to 2.2 GHz	SMIQ02E	1106.1506.02
	0.3 to 3.3 GHz	SMIQ03E	1106.1506.03
	0.3 to 3.3 GHz	SMIQ03A ²⁾	1084.8004.53

Options

see above

Extras

Service Kit	SM-Z3	1085.2500.02
Service Manual SMIQ		1085.2445.24

¹⁾ PEP = peak envelope power.

²⁾ SMIQ03 including Option SM-B50.