Vector Signal Generator SMIQ

Digital signals of your choice

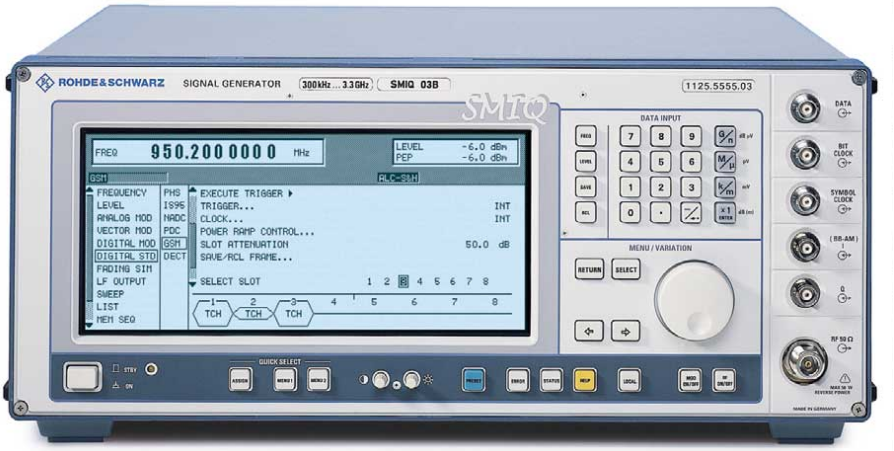

Photo 43304-3

Brief description

The B series of Signal Generator Family SMIQ for analog and digital modulation from Rohde&Schwarz is offering solutions for today and tomorrow. This series particularly takes into account future developments in the field of 3rd-generation digital mobile radio.

The SMIQ family comprises four models which differ in their upper frequency limits. These feature a hitherto unrivalled versatility regarding signal generation and signal quality and are therefore ideal for use in development and type-approval testing.

With their outstanding price/performance ratio, these signal generators are also economically attractive for applications in production. The wide frequency range from 300 kHz to 6.4 GHz covers all main radio bands including their IF ranges.

The high-grade I/Q modulator fitted as standard ensures minimum error vector magnitude and high intermodulation suppression. Using modern digital signal processor (DSP) technology, the versatile concept allows the generation of high-precision digital modulation signals with high bit rates without any limitations on modulation modes or standards.

In addition to digital modulation, the signal generators provide the full range of analog modulation modes as well as simultaneous modulation capability.

Main features

- Frequency range 300 kHz to 2.2 GHz/ 3.3 GHz/4.4 GHz/6.4 GHz
- Analog and digital modulation
- Versatile and broadband generation of digitally modulated signals up to 18 Msymbol/s
- Generation of TDMA, CDMA, W-CDMA and CDMA2000 standard 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
- Optional internal noise generator and distortion simulator
- Optional BER measurement
- Optional arbitrary waveform generator
- Low ACP for IS-95 CDMA and W-CDMA (option)
- Low cost of ownership due to three-year calibration intervals
- Future-oriented platform concept
- Unrivalled price/performance ratio

Characteristics

Digital modulation

Any digital modulation modes (with option SMIQB20)

- Free choice of modulation mode from ASK through to 256QAM
- Any kind of baseband filtering with variable filter parameters
- Symbol rate adjustable up to 18 Msymbol/s
- Realtime coding of internal and external data
- Internal PRBS generators

Convenient burst generation for TDMA standards (with option SMIQB20/ SMIQB11)

- TDMA mobile radio standards provided as standard GSM, GSM-EDGE, DECT, NADC (IS-54C/IS-136), PDC, PHS
- Versatile external synchronization capabilities
- Realtime processing of external and internal data
- Generation of TDMA frames with versatile timeslot configuration
- Continuous PRBS sequences
- Optimization of burst shaping to reduce spectra due to switching
- Realtime processing with external data for BER tests
- Slot-by-slot modulation change for TDMA

Vector Signal Generator SMIQ

Overview of options

Application[1]	Reference Oscillator OCXO	FM/φM Modulator	Data Generator (15 Mbit RAM)	Memory Extension, 32 Mbit	Fading Simulator (6 paths)	2nd Fading Simulator (6 paths)	Noise Generator and Distortion Simulator	Digital Modulation Coder	BER measurement	Digital Standard IS-95 CDMA	Digital Standard W-CDMA (NTT DoCoMo 1.0, ARIB 0.0)	Digital Standard W-CDMA according to 3GPP (FDD)	Low ACP for IS-95 CDMA and W-CDMA	Extended Functions for W-CDMA 3GPP	Arbitrary Waveform Generator	Digital Standard IS-95 CDMA (with ARB SMIQB60)	Digital Standard CDMA2000 (with ARB SMIQB60)
	SM-B1	SM-B5	SMIQB11[2]	SMIQB12	SMIQB14	SMIQB15	SMIQB17	SMIQB20	SMIQB21	SMIQB42[3]	SMIQB43[3]	SMIQB45[3]	SMIQB47	SMIQB48	SMIQB60	SMIQK11	SMIQK12
TDMA																	
To standard	❍		●	❍	❍			●									
Non-standard	❍	❍	●	❍	❍		❍	●	❍								
CDMA IS-95																	
To standard	❍	❍	●	❍	❍		❍	●		●					❍	❍	
W-CDMA																	
To standard	❍	❍	●	❍	❍		❍	●			●	●	●	❍	❍		
CDMA2000																	
To standard	❍	❍	●	❍	❍		❍	●							●		●
Fading																	
					●	❍											
Vector modulation																	
	❍	❍	❍	❍	❍	❍	❍	❍		❍	❍	❍	❍				
Analog modulation (AM, FM, φM)																	
	❍	●															
Fast setting time																	
	❍	❍	❍	❍	❍	❍	❍	❍		❍	❍	❍					

[1] SMIQ02B/03B (SMIQ04B/06B) can be equipped with up to three (two) of the following options: SM-B5, SMIQB14, SMIQB15 or SMIQB17

[2] Option SMIQB20 required

[3] Options SMIQB20 and SMIQB11 required

● = required

❍ = optional

Analog modulation

- Broadband AM with up to 30 MHz modulation frequency
- I/Q modulation with 30 MHz modulation bandwidth (3 dB), 60 MHz RF bandwidth
- Unprecedented vector accuracy and high intermodulation suppression
- Amplitude modulation
- Pulse modulation
- Optional frequency and phase modulation (SM-B5)

RF characteristics

- Wide output frequency range from 300 kHz to 6.4 GHz
- High (up to 16 dBm) and precise output level (<0.5 dB)
- Fast setting time for frequency (<3 ms) and level (<2.5 ms)[1]
- Frequency hopping (500 µs)
- High spectral purity (typ. –130 dBc (1 Hz) at 1 GHz and 20 kHz carrier offset)
- Calibrated RF level in range from –140 dBm to –5 dBm
- RF, AF and level sweep (user-programmable)

Special options

Fading simulation (options SMIQB14 and SMIQB15)

- Fading of internal or external I/Q signals conforming to mobile radio standards
- 6-path simulation can be enhanced to 12-path simulation (2-channel fading also possible with second vector signal generator)
- Rayleigh, Rice and lognormal fading profiles can be selected independently for each path
- Selectable path attenuation and delay
- Simulation of high speeds
- Preprogrammed fading profiles for mobile radio standards GSM, NADC, IS-95 CDMA and TETRA
- Frequency range of basic unit can be fully utilized

Noise generator and distortion simulator (option SMIQB17)

- Simulation of amplitude and phase distortion (AM/AM and AM/φM characteristics)
- Distortion characteristics programmable from up to 30 input values
- Superimposed noise signals (AWGN)
- C/N ratio variable with high resolution over a wide range
- Broad noise bandwidth (10 kHz to 10 MHz)

[1] without switching the mechanical attenuators.

Bit error rate measurements (option SMIQB21)

- Up to 30 MHz clock rate

W-CDMA für 3GPP/FDD (Option SMIQB45)

Software option SMIQB45 supports the generation of downlink and uplink signals in line with the 3GPP standard (FDD mode). As the standardization process is not yet completed, the functionality of this option will continuously be adapted to the relevant standard modifications and expansions (for functionality see specifications).

Low ACP for IS-95 CDMA and W-CDMA (option SMIQB47)

- Specially designed for 1.2288 Mcps, 4.096 Mcps and 8.192 Mcps as well as 3.840 Mcps according to 3GPP
- Can be used with internal (option SMIQB42/43/45/48) or external CDMA/W-CDMA signals
- Typical W-CDMA adjacent-channel power ratio (5 MHz offset, 3.84 Mcps): –67 dBc (1 DPCH)
- Typical IS-95 CDMA adjacent-channel power ratio (885 kHz offset): –78 dBc (9 code channels)

Enhanced functions for W-CDMA 3GPP (FDD) digital standard (Option SMIQB48)

This option expands the functionality of option SMIQB45 W-CDMA 3GPP. It allows the generation of up to four enhanced channels that can be combined with the standard channels.

- Very long signal sequences and continuous PRBS sequences (eg PN9) often required for BER measurements can be implemented for the channel under test
- Use of externally precoded data or the generation of long power control profiles for the DUT
- Testing the closed-loop power control function of a mobile station
- Receiver and performance tests to TS 25.101, TS 25.104, TS25.14. and TS25.944
- Realistic simulation of W-CDMA scenarios
- Creation and insertion of bit errors into the data of enhanced channels
- Insertion of block errors (BLERs) into the channel-coded data
- Generation of W-CDMA signals of up to 2 minutes repetition rate

Enhanced fading functions for W-CDMA 3GPP (Option SMIQB49)

Option SMIQB49 extends the functionality of fading options SMIQB14/B15 to include W-CDMA 3GPP channel simulation. It adds three new modes to the fading simulator so that all scenarios defined in 3GPP Release 99 can be simulated:

- In fine delay mode, fading simulator resolution is increased to 1 ns with up to four paths being available
- In moving delay mode, two paths are simulated: for one path the delay remains constant, whereas for the other path the delay varies continuously
- In birth-death mode, there are two paths changing delay in steps in accordance with the 3GPP channel model

Digital standard IS-95 (Options SMIQK11 and SMIQB60 (ARB))

In addition to generating IS-95 signals with option SMIQB42, SMIQ in conjunction with SMIQB60 simulates CDMA signals to the North-American standard IS-95A. Option SMIQK11 enables IS-95 functionality under WinIQSIM™.

- Up to eight complete base stations comprising 64 code channels each are available in forward link and up to 16 mobile stations in reverse link
- Channel power can be set independently for all code channels
- Adjacent-channel power can be calculated for 1. and 2. adjacent channel and output as a spectral display
- CCDF trace can be displayed

Digital standard CDMA2000 (Options SMIQK12 and SMIQB60 (ARB))

CDMA signals to the North-American standard IS-2000 can be simulated by means of software option SMIQK12 in conjunction with Arbitrary Waveform Generator SMIQB60. Option SMIQK12 enables CDMA2000 functionality under WinIQSIM™.

The modes 1X direct spread, 3X direct spread and 3X multicarrier (forward link only) are available. In forward link four base stations of max. 91 code channels can be set, in reverse link four mobile stations of max. 13 code channels each.

Arbitrary Waveform Generator SMIQB60

To further enhance the versatility of the modulation coder, a dual-channel arbitrary waveform generator (ARB) with a maximum clock rate of 40 MHz is available as an option. It can store up to 512 ksamples of externally computed I/Q values.

The supplied WinIQSIM™ software allows the calculation of arbitrary modulation signals, for example COFDM, multicarrier and noise, and downloading them

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into SMIQ. Together with a convenient data editor, WinIQSIM™ can calculate any kind of TDMA frame configuration, simulate impairments by superimposed interference signals, etc.

Applications

- Type-approval testing of digital base and mobile stations
- Base-station transmitter test
- Sensitivity measurements on digital receivers
- Selectivity measurements on digital receivers
- Testing of equalizers
- Tolerance tests on digital systems
- Components tests
- Development of new digital communication systems

Specifications in brief

Frequency

Range	SMIQ02B	300 kHz to 2.2 GHz	
	SMIQ03B	300 kHz to 3.3 GHz	
	SMIQ04B	300 kHz to 4.4 GHz	
	SMIQ06B	300 kHz to 6.4 GHz	
Resolution		0.1 Hz	
Reference frequency		Standard	Option SM-B1
Aging (after 30 days operation)		1×10^{-6}/year	$<1 \times 10^{-9}$/day
Temperature effect (0°C to 50°C)		2×10^{-6}	$<5 \times 10^{-8}$

Level

Range	SMIQ02B/03B	–144 dBm to +13 dBm (PEP)[1]	
	SMIQ04B/06B	–144 dBm to +10 dBm (PEP)[1]	
Overranging without guarantee of specs		up to16 dBm	
Resolution		0.1 dB or 0.01 dB	
Total level uncertainty >–127 dBm[2] [3]			
f ≤2 GHz		<±1 dB	(typ. <±0.5 dB)
f >2 GHz to 4 GHz		<±1.5 dB	(typ. <±0.9 dB)
f >4 GHz to 6 GHz		<±2 dB	(typ. <±1.2 dB)
f >6 GHz		<±2.5 dB	
Frequency response at 0 dBm[2] [3]			
f ≤3.3 GHz		<1 dB	(typ. <0.3 dB)
f >3.3 GHz		<±1.5 dB	(typ. <±0.5 dB)

Spectral purity[2]

Spurious		
Harmonics at levels ≤10 dBm (SMIQ02B/03B)	<–30 dBc	
Harmonics at levels ≤7 dBm (SMIQ04B/06B)	<–30 dBc	
Broadband noise, carrier offset		
>5 MHz	CW	
f >20 MHz to 450 MHz	<–136 dBc	(typ.–142 dBc)
f >450 MHz to 3040 MHz	<–138 dBc	(typ.–144 dBc)
f >3040 MHz to 3300 MHz	<–136 dBc	(typ.–142 dBc)
f >3300 MHz to 6400 MHz	<–132 dBc	(typ.–138 dBc)
Broadband noise, vector modulation, (f >20 MHz) carrier offset >5 MHz	<–131 dBc	(typ. –137 dBc)

SSB phase noise, carrier offset 20 MHz, 1 Hz bandwidth	CW	Vector modulation (dig. Mod.)
f = 20 MHz to 450 MHz	<–116 dBc	<–119 dBc
f = 1 GHz	<–126 dBc	<–123 dBc
f = 2 GHz	<–120 dBc	<–120 dBc
f = 3 GHz	<–116 dBc	<–116 dBc
f = 6 GHz	<–110 dBc	<–110 dBc

Sweep

RF sweep, AF sweep	digital sweep in discrete steps
Modes	automatic, single shot, manual or external trigger, linear or logarithmic

Modulation

Internal modulation generator

Frequency range	0.1 Hz to 1 MHz
Frequency error	$<1 \times 10^{-4} + 0.012$ Hz
Open-circuit voltage at LF socket	1 mV to 4 V peak
Vector modulation	
Level accuracy with vector modulation, additional error with ALC OFF, relative to CW	<0.3 dB
Modulation inputs I and Q	$\sqrt{I^2 + Q^2}$ = 0.5 V (1 V EMK with
Input voltage for full-scale input	50-Ω Source)
Envelope control	RF level can be controlled with an analog voltage of 0 V to 1 V via the POWER RAMP input
Amplitude modulation[2]	internal, external AC/DC
Modulation depth	0% to 100%
Broadband amplitude modulation	external DC
Input voltage for 100% AM	0.25 V peak
Pulse modulation	external
On/off ratio	>80 dB
Rise/fall time(10/90%)	typ. 30 ns
Pulse repetition frequency	0 Hz to 1 MHz

Frequency modulation	**Option SM-B5**
	int., external AC/DC, two-tone with two modulation channels FM1 and FM2
Max. deviation	0.5/1/2/4 MHz depending on frequency

Phase modulation	**Option SM-B5**
	int., external AC/DC, two-tone with two modulation channels φM1 and φM2
Max. deviation	5/10/20/40 rad depend. on frequency

Digital modulation	**Option SMIQB20**
	internal, external, serial, ext. parallel

Predefined modulation settings

APCO C4FM, APCO CQPSK, CDPD, CT2, DECT, GSM, IRIDIUM, NADC, PDC, PHS, TETRA, TFTS, PWT, ICO BPSK, ICO GMSK, ICO QPSK, GSM EDGE, CDMA IS-95, W-CDMA, QPSK

Internal PRBS	selectable lengths: 2^9–1, 2^{15}–1, 2^{16}–1, 2^{20}–1, 2^{21}–1 and 2^{23}–1
Envelope control	internal or external
Range of function	1 ksymbol/s to 2.5 Msymbol/s
Modulation modes	ASK, FSK, GMSK, PSK, QAM
ASK, symbol rate	100 symbol/s to 18 Msymbol/s[1]
FSK, modulation modes	2FSK, 4FSK, 4FSK APCO, GFSK
GMSK, bit rate	100 bit/s to 7.5 Mbit/s[1]
PSK, modulation modes	BPSK, QPSK, OQPSK, QPSK (IS-95), OQPSK (IS-95), QPSK (ICO), QPSK (INMARSAT), π/4DQPSK, π/4QPSK, 8PSK, 8PSK EDGE
QAM, modulation modes	16QAM, 32QAM, 64QAM, 256QAM

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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

Max. symbol rate	8.5 Msymbol/s
Operating modes	automatically repeating, single shot, manually or externally triggered

Memory extension **Option SMIQB12**
The data generator memory can be extended to max. 79 Mbit by fitting up to two options SMIQB12.

Memory capacity	32 Mbit

Digital standards **Options SMIQB20 and SMIQB11**

GSM / EDGE	according GSM standard
Frequency	880 to 960 MHz/1710 to 2000 MHz
Modulation	GMSK or 8PSK EDGE (8PSK with 3π/8 Rotation)
DECT	according ETS300175-2 and ETS300176-1
Frequency	1880 MHz to 1900 MHz
Modulation	GFSK (Standard), π/4 DQPSK
NADC	according IS-54 and IS-136
Frequency	824 to 894 MHz/1850 to 2000 MHz
Modulation	π/4 DQPSK
PDC	according RCR STD-27
Frequency	810 to 826 MHz/940 to 956MHz 1429 to 1453 MHz/1477 to 1501 MHz
Modulation	π/4 DQPSK
PHS	according RCR STD-28
Frequency	1895.0 MHz to 1918.1 MHz
Modulation	π/4 DQPSK

Digital standard IS-95 CDMA **Option SMIQB42**
According TIA standard IS-95A and J-STD-008

Frequency	824 to 894 MHz/1850 to 2000 MHz
Modulation	QPSK, OQPSK

Digital standard W-CDMA **Option SMIQB43** [2]

Frequency	1800 MHz to 2200 MHz
Modulation	QPSK, OQPSK

Digital standard W-CDMA 3GPP (FDD) **Option SMIQB45** [3]
according 3GPP standard 3.4.0 (FDD)

3GPP (FDD) Version	optional 3.4.0, according technical specifications 3GPP TS25.211 and TS25.213
Frequency	1800 MHz to 2200 MHz

Simultanous modulation
Any combination is possible with the following exceptions:
– Simultaneous FM and φM
– Simultaneous digital modulation and vector modulation
Pulse modulation cannot be used together with level attenuation function LEV ATT (option SMIQB20)

Options for special applications

Fading simulation **Options SMIQB14, SMIQB15**

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 through simple retrofit
Path attenuation	0 dB to 50 dB
Doppler shift	0 µs to 1600 µs 0.1 Hz to 1600 Hz
Speed range	
$v_{min} = \frac{0,03 \times 10^9 \frac{m}{s^2}}{f_{RF}}$	$v_{max} = \frac{479 \times 10^9 \frac{m}{s^2}}{f_{RF}}$
Rayleigh fading, pseudo noise intervall	>372 h
Rice fading	
Power ratio[4]	–30 dB to +30 dB
Frequency ratio	–1 to +1
Lognormal fading, Suzuki fading	
Standard deviation	0 dB to 12 dB
Correlation	paths 1 to 6 with paths 7 to 12

Enhanced fading functions for W-CDMA 3GPP **Option SMIQB49**
The following data deviate from the specifications for SMIQB14/SMIQB15

Fine delay mode	
Number of paths	2 (with SMIQB14), 4 (with SMIQB14 + SMIQB15)
Profiles	Rayleigh, pure Doppler
Delay, resolution	25 ns to 1637 µs, 1 ns
Moving delay mode	
Number of paths	2
Delay, path 1	0 to 1000 µs (in 50 ns steps)
Delay, path 2	delay path 1 + delay variation (peak-peak) x sin (2pt /variation period)
Delay variation (peak-peak)	150 ns to 50 µs
Variation period	10 s to 500 s
Delay step size	<1 ns
Birth-death mode	
Number of paths	2
Profiles	pure Doppler
Delay	5 µs to 1000 µs
Delay range	5 µs to +5 µs (not variable)
Delay grid	1 µs (not variable)
Hopping dwell	100 ms to 5 s

Noise and distortion simulation **Option SMIQB17**

Distortion simulator	AM/AM and AM/φM distortion of modulation signal
Distortion characteristic	each characteristic programmable by entering up to 30 input values via IEEE/IEC bus or by entering up to five polynomial coefficients
Noise generator (AWGN)	
Distribution density	Gaussian, statistically indep. for I and Q
Crest-Faktor	14 dB
C/N	–30 dB to 30 dB

Bit error rate measurement Option SMIQB21

Pseudo-random bit sequences (PRBS)	2^9-1, 2^{11}-1, 2^{15}-1, 2^{16}-1, 2^{20}-1, 2^{21}-1, 2^{23}-1
Measurement time	selectable through maximum number of data bits or bit errors (max. 2^{31} bits each), continuous measurement
Measurement result	BER in ppm, % or decade values (if selected number of data bits or bit errors is attained) status displays: not synchronized, no clock, no data

Improved adjacent-channel power ratio for W-CDMA and CDMA IS-95 **Option SMIQB47**
Selectable baseband filters to improve ACP values (values see at Digital Standards CDMA/W-CDMA)

Enhanced functions for digital standard W-CDMA 3GPP (FDD) **Option SMIQB48**

3GPP (FDD) version	3.4.0 to 3GPP technical specifications TS25.101, TS25.104, TS25.141, TS25.211 and TS25.213

1) PEP = peak envelope power.

2) Data apply to RF ≥5 MHz unless specified otherwise and for ATTENUATOR MODE NORMAL function.

3) Additional error with ALC OFF <0.3 dB.

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Enhanced Channels
Channels of W-CDMA system in SMIQ that offer enhanced functionality compared with standard channels of option SMIQB45.
Can be used in downlink for max. four DPCHs and in uplink for one DPCCH and max. three DPDCHs. All DPCHs or DPDCHs have the same symbol rate.

Enhanced functions at a glance:
- Sequences of up to 1042 frames
- Data lists for data fields and TPC field
- External power control
- Channel coding
- Bit error insertion
- Block error insertion

Simulation of realistic noise scenarios
- Orthogonal channel noise simulation (OCNS)
- Additional mobile stations

Arbitrary waveform generator	**Option SMIQB60**
Waveform memory, interpolation	
Output memory	
Length of waveform	1 to 524216 in steps of one sample
Resolution	12 bit
Downloading time for 512k I/Q samples	4 s
Nonvolatile memory	
Number of blocks	22 (one waveform occupies at least one block)
Block size	24 from firmware version 5.30
Interpolation	65527
Interpolation bandwidth (-0.1dB)	0.375 x clock rate
Repetitive spectra suppression through analog filter	>70 dB
Clock generation	
Clock rate	1 kHz to 40 MHz
Resolution	0.1 Hz
Clock mode	internal or external
Signal output, channels	2 (I and Q)
Output level (EMF, peak)	
Normal mode	SQRT($I^2 + Q^2$) = 1 V, 50 Ω
Manual mode	–6 dB to 0 dB referred to 1 V, setting range up to +3 dB
Level difference between channels	<0.2% at 1 kHz [1]
DC offset	<–54 dB in normal mode [1]
Frequency response	
Magnitude up to 12 MHz/10 MHz	<1 dB/typ. 0.1 dB
Group delay up to 10 MHz	typ. 1 ns
I/Q imbalance	
Magnitude up to 10 MHz	typ. 0.05 dB
Group delay up to 10 MHz	typ. 0.5 ns
SFDR (sinewave 1 MHz, clock 4 MHz, measurement range up to 12 MHz)	>60 dB
Trigger modes	auto, retrig, armed auto, armed retrig
Trigger source	internal or external
Trigger outputs	2
Delay	0 to 524216 samples
On time	1 to 524215 samples
Off time	1 to 524215 samples
Level	TTL

1) Spectral components exceeding max. IQ bandwidth will be suppressed.

2) Cannot be fitted together with Digital Standard W-CDMA 3GPP (option SMIQB45).

3) Cannot be fitted together with Digital Standard W-CDMA NTT DoCoMo (option SMIQB43).

4) Ratio of discrete and distributed component.

5) Contrast of LCD lower at higher temperature.

General data

Memory for instrument settings	50 storable settings
List Mode	
Frequency and level values can be stored in a list and set in an extremely short time; permissible level variation: 90 dB	
Max. number of channels	2000
Remote control	IEC 625 (IEEE 488)
Command set	SCPI 1993.0
Power supply	90 V to 265 V (AC), 50 Hz to 400 Hz, autosetting to AC supply, 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

300 kHz to 2.2 GHz	SMIQ02B	1125.5555.02
300 kHz to 3.3 GHz	SMIQ03B	1125.5555.03
300 kHz to 4.4 GHz	SMIQ04B	1125.5555.04
300 kHz to 6.4 GHz	SMIQ06B	1125.5555.06

Accessories supplied power cable, operating manual

Options

Reference Oscillator OCXO	SM-B1	1036.7599.02
FM/φM Modulator	SM-B5	1036.8489.02
Data Generator	SMIQB11	1085.4502.04
Memory Extension, 32 Mbit	SMIQB12	1085.2800.04
Fading Simulator, 6 paths	SMIQB14	1085.4002.02
Second Fading Simulator for 12 paths or 2 channels	SMIQB15	1085.4402.02
Noise Generator and Distortion Simulator	SMIQB17	1104.9000.02
RF and AF Rear Connectors	SMIQB19	1085.2997.02
Modulation Coder	SMIQB20	1125.5190.02
BER Measurement	SMIQB21	1125.5490.02
Digital Standard IS-95 CDMA	SMIQB42	1104.7936.02
Digital Standard W-CDMA acc. to NTT DoCoMo 1.0, ARIB 0.0 standard	SMIQB43	1104.8032.02
Digital Standard W-CDMA according to 3GPP (FDD)	SMIQB45	1104.8232.02
Low ACP for IS-95 CDMA and W-CDMA	SMIQB47	1125.5090.02
Modification Kit for Low ACP (factory-fitted only)	SMIQU47	1125.5149.02
Extended Functions for W-CDMA (3GPP)	SMIQB48	1105.0587.02
Extended Fading Functions for W-CDMA (3GPP)	SMIQB49	1105.1083.02
Arbitrary Waveform Generator incl. WinIQSIM™	SMIQB60	1136.4390.02
TETRA T1 Simulator	SMIQ-K8	1136.4290.02
Digital Standard IS-95 CDMA (software for SMIQB60)	SMIQK11	1105.0287.02
Digital Standard CDMA2000 (software for SMIQB60)	SMIQK12	1105.0435.02
Dig. Standard W-CDMATDD mode (3GPP) (for option SMIQB60)	SMIQK13	1105.1231.02
Digital Standard TD-SCDMA (software for SMIQB60)	SMIQK14	1105.1338.02
OFDM Signal Generation, HIPER LAN/2	SMIQK15	1105.1531.02

Additional hint: SMIQ02B/03B (SMIQ04B/06B) can be equipped with up to three (two) of the following options: SM-B5, SMIQB14, SMIQB15, SMIQB17

Application software

Generation of data and control lists	SMIQ-K1 *)
Bluetooth signals for SMIQ	SMIQ-K5 *)
User mappings and user filters for SMIQ	User Mod *)

*) available on www.rohde-schwarz.com

Extras

19" Adapter	ZZA-94	0396.4905.00
Service Kit	SM-Z3	1085.2500.02
BNC Adapter for rear panel, D type connector PAR DATA	SMIQ-Z5	1104.8555.02
90° Power Splitter	SMIQ-Z9	1104.9580.02
Trolley for Transit Case	ZZK-1	1014.0510.00
Transit Case	ZZK-944	1013.9366.00
Service Manual SMIQ		1085.2445.24

Instrument upgrades

SMIQ02B to SMIQ03B	SMIQU03	1125.5855.03
SMIQ03B to SMIQ04B	SMIQU04	1125.5855.04
SMIQ04B to SMIQ06B	SMIQU06	1125.5855.06