Resolution	1 Hz
Accuracy	see reference frequency

Reference frequency	
Inaccuracy	$<\pm 1 \cdot 10^{-6}$
Aging (after 30 days of operation)	$1 \cdot 10^{-6}$/year
Temperature effect (0 °C to 55 °C)	$2 \cdot 10^{-6}$
Output for internal ref. frequency	10 MHz
Level (V_{rms} EMF, sinewave)	1 V
Input for external reference	
Frequency	5 MHz or 10 MHz
Permissible frequency drift	$3 \cdot 10^{-6}$
Input level (V_{rms})	0.1 V to 2 V
Input impedance	200 Ω

Spectral purity		
Spurious signals		
Harmonics (up to 5 GHz)		<–30 dBc
Nonharmonics		
CW		<–70 dBc
I/Q modulation		<–56 dBc (ref. to CW)
SSB phase noise		measured at 750 MHz, CW, 1 Hz bandwidth
Offset from carrier	1.1 kHz	–85 dB
	2.2 kHz	–89 dB
	3.4 kHz	–94 dB
	4.5 kHz	–98 dB
	8.9 kHz	–104 dB
	13.4 kHz	–103 dB
	20 kHz	<–108 dB
Spurious FM rms (f = 1 GHz), 0.3 kHz to 3 kHz (ITU-T)		<8 Hz

Level		
Range	CW	–99.9 dBm to +13 dBm
	DVB-C/DVB-S	–99.9 dBm to +4 dBm
	DVB-T	–99.9 dBm to +6 dBm
	ATSC/8VSB	–99.9 dBm to +3 dBm
	J.83B	–99,9 dBm to +2 dBm
with fading		see R&S SFQ-B11
Resolution		0.1 dB
Total level inaccuracy		<±1.5 dB
Frequency response at 0 dBm		<1 dB, typ. <0.5 dB
Output impedance		50 Ω
VSWR		
RF level	13 dBm to 0 dBm	<2
	<0 dBm to –99 dBm	<1.4
RF output		with DC block (max. 50 V DC)
Non-interrupting level setting		15 dB in selectable level range
Overvoltage protection		protection against externally fed RF power

External I/Q input	
(for optional I/Q output/input see page 12)	
Modulation inputs for external feed of I and Q	
Input impedance	50 Ω
VSWR (DC to 30 MHz)	<1.4
Input voltage for full-scale level	$(I^2 + Q^2)^{1/2} = 0.5$ V (1 V EMF, 50 Ω)
Level correction for nominal RF output level	0 dB...40 dB
Connector	BNC female

I/Q modulation[1])	
Modulation frequency response	
DC to 3.5 MHz	
RF = 0.3 MHz to 1000 MHz	<±0.2 dB
RF = 0.3 MHz to 3300 MHz	<±0.3 dB
referred to full-scale level	menu) with fading, see option R&S SFQ-B11
Carrier leakage	
Setting range	0% to 50%
Resolution	0.1%
I/Q amplitude imbalance	
Setting range	–25% to +25%
Resolution	0.1%
Quadrature offset (phase error)	
Setting range	–10° to +10°
Resolution	0.1°

Data input for MPEG2 data stream	
TS PARALLEL input	synchronous parallel (without stuffing), LVDS
Characteristics	meet EN 50083-9
Input impedance	100 Ω
Input level (V_{pp})	100 mV to 2 V
Connector	25-contact female, shielded
Symbol rate (DVB-C, DVB-S)	
Accuracy	
with external MPEG signal	synchronized to external MPEG signal
without external MPEG signal	see optional input interface (R&S SFQ-B6)
ASI (asynchronous serial input, with stuffing)	see optional input interface
SPI (synchronous parallel input, with stuffing)	see optional input interface
SMPTE (synchronous input)	see optional serial input interface

[1]) Valid for a warm-up period of 1 hour and recalibration for an operating time of 4 hours and temperature variations less than 5 degrees.

Specifications DVB/8VSB/J.83B

Input Interface	**option R&S SFQ-B6**
SPI input	synchronous parallel (with stuffing), LVDS
Characteristics	meet EN 50083-9
Input impedance	100 Ω
Input level (V_{PP})	100 mV to 2 V
Connector	25-contact female, shielded
ASI input	asynchronous serial, with stuffing
Characteristics	meet EN 50083-9
Input impedance	75 Ω
Input level (V_{PP})	200 mV to 880 mV
Connector	BNC female
Input signal	270 Mbit
Stuffing bytes	Single-byte and block mode
Input SMPTE 310	synchronous serial (only in conjunction with ATSC Coder 8VSB)
Characteristics	meet SMPTE310M
Input impedance	75 Ω
Input voltage (Vpp)	400 mV to 880 mV
Connector	BNC female
Data rate	19.392658 Mbit/s
Symbol rate (SPI, ASI)	selectable by inserting null PRBS packets (stuffing)
Inaccuracy of internal data clock	$<\pm 1 \cdot 10^{-5}$
External clock	switchable between bit and byte clock
Signal, level	TTL
Input impedance	high-impedance
Connector	BNC female
Internal transport stream	Null transport stream packets with PRBS as payload (PRBS: $2^{23}-1/2^{15}-1$ to ITU-T Rec. O.151)

DVB-T Coder	**option R&S SFQ-B10**
Characteristics	meet EN 300 744
Input	TS PARALLEL; with R&S SFQ-B6: ASI, SPI
Mode	
DATA	MPEG input signal synchronized to input data rate
NULL TS PACKET	null transport stream packets as defined by Measurement Guidelines for DVB Systems
NULL PRBS PACKET	null transport stream packets with PRBS (PRBS: $2^{23}-1/2^{15}-1$ to ITU-T Rec. O.151)
PRBS before convolutional encoder	$2^{23}-1/2^{15}-1$ to ITU-T Rec. O.151
PRBS after convolutional encoder	$2^{23}-1/2^{15}-1$ to ITU-T Rec. O.151
PRBS before mapper	$2^{23}-1/2^{15}-1$ to ITU-T Rec. O.151
Special functions	scrambler, sync- byte inversion, Reed-Solomon, convolutional interleaver, bit interleaver, symbol interleaver, can be switched off
Bandwidth	6 MHz, 7 MHz, 8 MHz (selectable for variable bandwidth from: 5.164 MHz to 7.962 MHz)
Constellation	QPSK, 16QAM, 64QAM
Code rate	$^1/_2$, $^2/_3$, $^3/_4$, $^5/_6$, $^7/_8$
Guard interval	$^1/_4$, $^1/_8$, $^1/_{16}$, $^1/_{32}$, OFF
FFT mode	2K and 8K COFDM
Carrier modification	switching off carriers , carrier groups, modulation for carrier groups
Hierarchical coding	can be retrofitted (see opt. R&S SFQ-B16)

DVB-T/Hierarchical Coding	**option R&S SFQ-B16**
only in conjunction with R&S SFQ-B10	
Characteristics	meet EN 300 744
AUX input	TS PARALLEL or SPI (parallel, with stuffing); selectable
Assignment	to high-priority or low-priority path
Mode	for high-priority and low-priority path
DATA	MPEG input signal
NULL TS PACKET	null transport stream packets as defined by Measurement Guidelines for DVB Systems
NULL PRBS PACKET	null transport stream packets (PRBS: $2^{23}-1/2^{15}-1$ to ITU-T Rec. O.151)
PRBS before convolutional encoder	$2^{23}-1/2^{15}-1$ to ITU-T Rec. O.151
PRBS after convolutional encoder	$2^{23}-1/2^{15}-1$ to ITU-T Rec. O.151
PRBS before mapper	$2^{23}-1/2^{15}-1$ to ITU-T Rec. O.151
Special functions	scrambler, sync byte inversion, Reed-Solomon, convolutional interleaver, bit interleaver, symbol interleaver; can be switched off

ATSC/8VSB Coder	**option R&S SFQ-B12 (-B8)**
Characteristics	meet ATSC Doc. A/53 (8VSB)
Frequency setting	pilot frequency, center frequency, channel tables
Input data rate	19.392658 Mbit/s
Range	±10% (larger range with option R&S SFQ-B6)
Input	LVDS, with R&S SFQ-B6: ASI, SPI, SMPTE310
Mode	
DATA	MPEG input signal with synchronization to input data rate
NULL TS PACKET	null transport stream packets as defined by Measurement Guidelines for DVB Systems
NULL PRBS PACKET	null transport stream packets (PRBS: $2^{23}-1/2^{15}-1$ to ITU-T Rec. O.151)
SYNC PRBS	sync byte with 187 bytes PRBS payload
PRBS before trellis	$2^{23}-1/2^{15}-1$ to ITU-T Rec. O.151
PRBS after trellis	$2^{23}-1/2^{15}-1$ to ITU-T Rec. O.151
Symbol rate	10.762 Msymb/s
Range	±10%
Bandwidth	6 MHz
Range	±10%
VSB level	8VSB
Pilot	1.25, can be switched off
Range	0 to 5 in steps of 0.125
Pulse filtering (root cosine)	0.115 roll-off
Special functions	randomizer, interleaver; can be switched off
Error simulation	carrier leakage, I/Q imbalance; I/Q phase error, selectable

DVB-C Coder	**option R&S SFQ-B21 (-B22)**
Characteristics	meet EN 300 429
Type of modulation	16QAM, 32QAM, 64QAM, 128QAM, 256QAM
Symbol rates	0.1 MS/s to 8 MS/s (selectable)
Pulse filtering	root cosine roll-off, alpha = 0.15 variable roll-off (0.1 to 0.2)
Energy dispersal	can be switched off
Reed-Solomon coder (204,188, t = 8)	can be switched off
Convolutional interleaver	can be switched off
Mode	
DATA	MPEG2 input signal (without input signal automatic switchover to PRBS with TS PARALLEL, stuffing with ASI, SPI)
NULL TS PACKET	null packets (PID = 1FFF, payload = 0)
NULL PRBS PACKET	null packets (PID = 1FFF, payload = PRBS, 2^{15}-1/2^{23}-1 to ITU-T Rec. 0.151)
PRBS before mapper	2^{15}-1/2^{23}-1 to ITU-T Rec. 0.151

Specifications DVB/8VSB/J.83B (cont'd)

DVB-S/-DSNG Coder	**option R&S SFQ-B23 (-B24)**
Not in conjunction with option R&S SFQ-B6 model 02, R&S SFQ-B6 model 03 recommended	
Characteristics	meet EN 300 421/EN 301 210
Type of modulation	QPSK, 8PSK, 16QAM
Code rate	QPSK: $^1/_2$, $^2/_3$, $^3/_4$, $^5/_6$, $^7/_8$ 8PSK: $^2/_3$, $^5/_6$, $^8/_9$ 16QAM: $^3/_4$, $^7/_8$
Symbol rates	0.1 MS/s to 80 MS/s (selectable)
Pulse filtering	root cosine roll-off, alpha = 0.35 variable roll-off (0.25 to 0.45)
Energy dispersal	can be switched off
Reed-Solomon coder (204,188, t = 8)	can be switched off
Convolutional interleaver	can be switched off
Convolutional encoder	can be switched off
Mode	
DATA	MPEG2 input signal (without input signal automatic switchover to PRBS with TS PARALLEL, stuffing with ASI, SPI)
NULL TS PACKET	null packets (PID = 1FFF, payload = 0)
NULL PRBS PACKET	null packets (PID = 1FFF, payload = PRBS, 2^{15}-1/2^{23}-1 to ITU-T Rec. 0.151)
PRBS before convolutional encoder	2^{15}-1/2^{23}-1 to ITU-T Rec. 0.151

Turbocoding	**option R&S SFQ-B25**
Code rate	QPSK turbo: $^2/_3$, $^3/_4$ 8PSK turbo: $^1/_2$, $^2/_3$, $^3/_4$, $^8/_9$

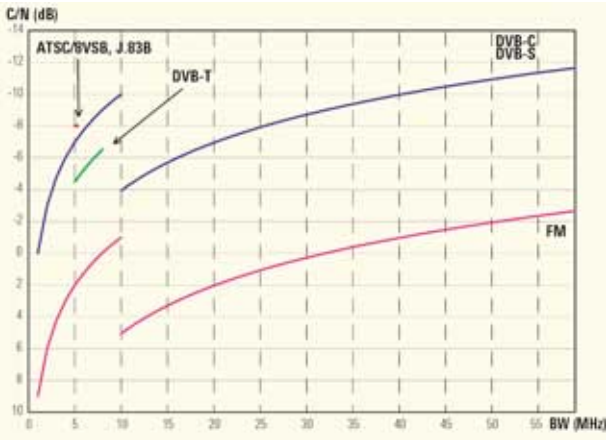
J.83B Coder	**option R&S SFQ-B13 (-B9)**
Only in conjunction with option R&S SFQ-B6	
Characteristics	meets ITU-T J.83B
Input data rate (nominal, range corresponding to symbol rate)	26.970 Mbit/s for 64QAM, 38.8107 Mbit/s for 256QAM
Input	LVDS, ASI, SPI
Mode	
DATA	input signal synchronized to input data rate
NULL TS PACKET	null transport stream packets
NULL PRBS PACKET	null transport stream packets with PRBS (PRBS: 223-1/215-1 to ITU-T Rec. 0.151)
SYNC PRBS	sync byte with 187 byte PRBS payload
PRBS before trellis coding	PRBS: 223-1/215-1 to ITU-T Rec. 0.151
PRBS after trellis coding	PRBS: 223-1/215-1 to ITU-T Rec. 0.151
Symbol rate	5.0569 Msymbol/s for 64QAM, 5.360 Msymbol/s for 256QAM
Range	±10%
Bandwidth	6 MHz
Pulse filtering (root cosine)	0.18 (64-QAM), 0.12 (256-QAM) roll-off
Data interleaver	level 1 and level 2; can be switched off
Special functions	switchable: randomizer, Reed-Solomon coder
Error simulation	selectable: carrier suppression, I/Q imbalance, I/Q phase error

I/Q Output/Input	**option R&S SFQ-B14**
Output	
Output impedance	50 Ω
Output voltage	depending on selected modulation
Connector	BNC female
Input	
Input impedance	50 Ω
VSWR (DC to 30 MHz)	<1.4
Input voltage for full-scale level	$(I^2 + Q^2)^{1/2}$ = 0.5 V (1 V EMF, 50 Ω)
Connector	BNC female

Specifications of transmission simulation

Fading Simulator	**option R&S SFQ-B11**
Model 02	paths 1 to 6 (R&S SFQs delivered before 1999: see R&S SFQ-B18)
Model 04	paths 7 to 12 (only in conjunction with R&S SFQ-B11, model 02)
Reduced maximum RF output level	–5.5 dBm for DVB-T (single-path fading without loss)
RF output power	MULTIPATH: the RF level displayed is the sum of the power levels in the individual paths MAIN: the RF level displayed is the power of the main path
C/N ratio	is maintained if the fading parameters are changed; MULTIPATH : C = total power of all paths MAIN: C = power of main path
RF bandwidth (–3 dB)	>14 MHz
Frequency response up to 5 MHz offset from carrier frequency	<0.6 dB, typ. <0.3 dB
Carrier leakage	typ. 45 dBc
Number of paths with R&S SFQ-B11	
Model 02	6
Model 02 plus model 04	12
Path loss	
Range	0 dB to 50 dB
Resolution	0.1 dB
Inaccuracy (from 0 dB to 20 dB)	<0.3 dB
Path delay	
Range	0 ms to 1600 ms
Resolution	50 ns
Inaccuracy	<5 ns
Constant phase	
Range	0° to +359.9°
Resolution	0.1°
Pure Doppler	
Frequency range	0.1 Hz to 1600 Hz
Speed range	$v_{min} = (0.03 \cdot 10^9\ m/s^2)/f_{RF}$ $v_{max} = (479 \cdot 10^9\ m/s^2)/f_{RF}$
for f_{RF} = 1 GHz	v_{min} = 0.1 km/h, v_{max} = 1724 km/h
Resolution	0.1 km/h, m/s, mph
Inaccuracy	<0.13%
Rayleigh fading	
Pseudo noise interval	>372 h
Deviation from theoretical CPDF[1]) at P_{avg} = 0 dB	
from –20 dB to +10 dB	<1 dB, typ. <0.3 dB
from –30 dB to –20 dB	<2 dB, typ. <0.3 dB
Rice fading	
Power ratio[2])	
Range	–30 dB to +30 dB
Resolution	0.1 dB
Frequency ratio	
Range	–1 to +1
Resolution	0.05
Lognormal fading, Suzuki fading	
Standard deviation	
Range	0 dB to 12 dB
Resolution	1 dB
Local constant	l_{min}: up to 200 m ($l_{min} = (12 \cdot 10^9\ m/s^2)/f_{RF}$)
Fading profile	selectable from a list of predefined profiles; each profile can be modified as required
Reference on frequency change	speed or Doppler frequency can be selected

Noise Generator	option R&S SFQ-B5
Not in conjunction with R&S SFQ-B2 (is already included)	
Bandwidth	
Receiver bandwidth	0,1 MHz to 80 MHz (selectable)
Actual noise bandwidth	10 MHz/60 MHz
C/N setting	
Variation range	50 dB
Minimum selectable C/N	depending on bandwidth and modulation (see diagram)
Resolution	0,1 dB
C/N error	
Absolute error	<0.3 dB (after calibration), typ. <0.2 dB
RF frequency range	
with noise bandwidth <=10 MHz	≥15 MHz
with noise bandwidth >10 MHz	≥60 MHz



Minimum selectable C/N ratio of Noise Generator R&S SFQ-B5

BER Measurement	option R&S SFQ-B17
only in conjunction with option R&S SFQ-B10	
Characteristics	integrated BER measurement for all digital modulation modes (DVB-C, DVB-S, DVB-T, 8VSB, J.83B)
Input data rate	max. 60 Mbit/s (serial input)
PRBS	2^{23}–1/2^{15}–1 to ITU-T Rec. O.151
Input	
Serial	BER DATA, BER CLOCK, BER ENABLE
Input impedance	75 Ω
Input level	TTL
Connector	BNC female
Clock, data	normal, inverted
Enable	always, active high, active low
BER mode	
PRBS	2^{23}–1/2^{15}–1 to ITU-T Rec. O.151
Parallel	TS PARALLEL AUX
Characteristics	meet EN50083-9
Input impedance	100 Ω
Input level	100 mV to 2 V, LVDS
Connector	25-contact female, shielded
BER mode	
PRBS, PRBS INVERTED	2^{23}–1/2^{15}–1 to ITU-T Rec. O.151
NULL PRBS PACKET	evaluation of standard transport stream; total payload corresponding to PRBS (eg NULL PRBS PACKET of R&S SFQ)
PID FILTER FOR PRBS PACKET	evaluation of null packets (PID=1FFF) of standard TS with payload corresponding to PRBS (e.g. stuffing with R&S SFQ in ASI/SPI mode)

[1]) CPDF = cumulative probability distribution function, level values referred to average output level value.
[2]) Ratio of discrete component to distributed component.

Specifications BB-FM

Broadband FM Modulator	option R&S SFQ-B2
Analog modulation	broadband FM for video and FM/ADR sound subcarrier
Video transmission characteristics	
Type of modulation	frequency modulation (F3)
Standard	PAL, SECAM, NTSC; selectable
Nominal input level (V_{pp})	1 V (75 Ω)
Video frequency deviation	
Setting range	10 MHz to 40 MHz
Resolution	0.1 MHz
Hum suppression with level clamping on	>40 dB
Linear distortion	
Frequency response, 0 MHz to 5 MHz (ref. to 1.5 MHz and 25 MHz (pp) deviation, with preemphasis and lowpass filter)	<±0.5 dB
Group delay, 0 MHz to 4.8 MHz	<±20 ns with lowpass filter
Transients (streaking) mit 200 ns Rise and fall time	<±2%
Energy dispersal signal	
Signal type	25 Hz or 30 Hz triangular signal, coupled to frame frequency (625/525 lines)
Deviation, selectable	0 MHz to 4 MHz, automatically doubled when the video or baseband signal is switched off
Resolution	100 kHz
Nonlinear distortion	
Measurements	with standard video signal and preemphasis and deemphasis switched on
Differential gain at 25 MHz deviation	<1.5%
Differential phase at 25 MHz deviation	<1.5°
Video-frequency S/N ratio, ref. to 22.5 MHz deviation, with preemphasis and deemphasis 100 kHz to 5 MHz	>70 dB rms, weighted to CCIR

Internal noise generator	
Bandwidth	
Receiver bandwidth	0,1 MHz to 80 MHz (selectable)
Actual noise bandwidth	10 MHz/60 MHz
C/N setting	
Variation range	50 dB
Minimum selectable C/N	depending on bandwidth and modulation (see diagram for R&S SFQ-B5, FM)
Resolution	0.1 dB
C/N error	<1 dB
RF frequency range	
with noise bandwidth ≤10 MHz	≥15 MHz
with noise bandwidth >10 MHz	≥60 MHz

FM Sound Subcarriers	option R&S SFQ-B3
only in conjunction with option R&S SFQ-B2 (included once in R&S SFQ-B2)	
Number of subcarriers per module	2
Frequency range	5 MHz to 9 MHz
Resolution	10 kHz
Frequency deviation of IF carrier caused by FM sound subcarriers	
Setting range (RF deviation)	1 MHz (pp) to 4 MHz (pp)
Resolution	10 kHz
Audio signal input	
Frequency range	30 Hz to 15 kHz
Bandwidth without lowpass filter	100 kHz
Nominal input level	+9 dBm (600 Ω)
Input impedance	>5 kΩ, balanced
Connector	Lemo Triax
Internal modulation generator (DSP)	
Frequency range	30 Hz to 15 kHz
Resolution	100 Hz
Modulation distortion	<0.5%
Audio S/N ratio (ref. to 50 kHz deviation, AC-coupled)	>65 dB, weighted to CCIR
Preemphasis	50 µs, 75 µs, J.17, OFF; selectable

Specifications BB-FM (cont'd)

ADR Sound Subcarriers	**option R&S SFQ-B4**
only in conjunction with option R&S SFQ-B2 (to ADR specifications)	
Number of subcarriers	2
Frequency range	0.1 MHz to 9 MHz
Resolution	10 kHz
Frequency deviation of IF carrier caused by ADR sound subcarriers	
Setting range (RF deviation)	1 MHz (pp) to 4 MHz (pp)
Resolution	10 kHz
Type of modulation	QPSK
Source data	internal, external, PRBS
Source data rate	192 kbit/s
Transmission rate	256 kbit/s
QPSK test	4 selectable test patterns; I/Q reversal
Bit error generator (symbol errors)	10^{-2} to 10^{-6}
External data input	only for one of the two subcarriers
Type	clock (invertible) and data
Level	RS-422
Data rate	192 kbit/s
Internal MUSICAM generator	two generators independent of each other (to ISO/IEC 11172-3 Layer II)
Mode	single, dual, stereo
Ancillary data (ANC)	1 of 4 internal data records can be selected, update from memory card
Audio generator	two for each MUSICAM channel
Frequency range	10 Hz to 20 kHz; 10 Hz steps
Amplitude range	100 dB; 0.1 dB steps
Preemphasis	50/15 µs, OFF

General data

Transmitter tables	5 with 100 entries each, editable or loadable by remote control
Storage of instrument settings	internally and on memory card
Interfaces	IEC-625/IEEE-488 bus, RS-232-C
Rated temperature range	+5 °C to +45 °C
Operating temperature range	0 °C to +50 °C
Storage temperature range	–40 °C to +70 °C
Mechanical resistance	
Vibration, sinusoidal	5 Hz to 150 Hz, max. 2 g at 55 Hz, 55 Hz to 150 Hz, 0.5 g, meets IEC 68-2-6, IEC 1010-1, MIL-T-28800 D class 5
Vibration, random	10 Hz to 300 Hz, 1.2 g (rms)
Shock	40 g shock spectrum, meets MIL-STD 810 C and MIL-T-28800 D classes 3 and 5
Climatic resistance	95% rel. humidity, cyclic test at +25 °C/+40 °C, meets IEC 68-2-30
Electromagnetic compatibility	meets EMC directive of EU (89/336/EEC) and complies with German EMC legislation
Power supply	90 V to 132 V/180 V to 265 V (autoranging), 47 Hz to 440 Hz (170 VA)
Electrical safety	meets EN 61010-1
Dimensions (W x H x D)	435 mm x 192 mm x 460 mm
Weight	approx. 20 kg, depending on options fitted

R&S SFQ rear view

Ordering information

Order designation

TV Test Transmitter (0.3 MHz to 3300 MHz) for		
DVB-C	R&S SFQ02+ R&S SFQ-B21	2072.5501.02 2072.8912.02
DVB-S/-DSNG	R&S SFQ02+ R&S SFQ-B23	2072.5501.02 2072.5830.02
DVB-T, 2K/8K	R&S SFQ02+ R&S SFQ-B10	2072.5501.02 2072.6166.02
ATSC/8VSB	R&S SFQ02+ R&S SFQ-B12	2072.5501.02 2072.6220.02
ITU-T, J.83B	R&S SFQ02+ R&S SFQ-B13	2072.5501.02 2072.6243.02
Broadband FM	R&S SFQ02+ R&S SFQ-B2	2072.5501.02 2072.6108.02

Options

Please state serial number of unit when submitting new orders for options.		
Input Interface (ASI/SPI input and selectable symbol rate, SMPTE310 input), can be retrofitted	R&S SFQ-B6	2072.7679.03
DVB-T Coder, 2K/8K COFDM Modulator, 6 MHz/7 MHz/8 MHz bandwidth (for R&S SFQ delivered before1999 see R&S SFQ-B18)	R&S SFQ-B10	2072.6166.02
DVB-T/Hierarchical Coding	R&S SFQ-B16	2072.5782.02
ATSC Coder, 8VSB (HW + FW)	R&S SFQ-B12	2072.6220.02
ITU-T/J.83B (FW)	R&S SFQ-B9	2072.6143.02
ITU-T/J.83B Coder (HW + FW)	R&S SFQ-B13	2072.6243.02
ATSC/8VSB (FW)	R&S SFQ-B8	2072.6120.02
DVB-C Coder (HW + FW)	R&S SFQ-B21	2081.8912.02
DVB-C (only FW)	R&S SFQ-B22	2072.5824.02
DVB-S/-DSNG Coder (HW + FW)	R&S SFQ-B23	2072.5830.02
DVB-S/-DSNG (only FW)	R&S SFQ-B24	2072.5847.02
Turbocoding (only FW)	R&S SFQ-B25	2110.0207.02
I/Q Output/Input	R&S SFQ-B14	2072.6266.02
Power Supply Upgrade for R&S SFQ model 10, delivered before 1999; serial number of R&S SFQ must be stated	R&S SFQ-B18	2072.7191.02
Factory-fitting of R&S SFQ-B18 to R&S SFQs delivered before 1999	R&S SFQ-U11	2072.7040.02
Fading Simulator, paths 1 to 6 (for R&S SFQ delivered before 1999 see R&S SFQ-B18)	R&S SFQ-B11	2072.6189.02
Fading Simulator, paths 7 to 12	R&S SFQ-B11	2072.6189.04
Noise Generator, can be retrofitted and calibrated	R&S SFQ-B5	2072.7579.03
BER Measurement	R&S SFQ-B17	2072.7056.02
Broadband FM Modulator for baseband (PAL, SECAM, NTSC) and FM sound (2 subcarriers)	R&S SFQ-B2	2072.6108.02
2 FM Sound Subcarriers 5 MHz to 9 MHz with 2 audio generators and 2 external audio inputs	R&S SFQ-B3	2072.7379.02
2 ADR Sound Subcarriers 0.1 MHz to 9 MHz with 2 MUSICAM generators and 1 external data input	R&S SFQ-B4	2072.7479.02

Recommended extras

Documentation of R&S SFQ calibration values	R&S SFQ-DCV	2082.0490.12
Cable Set for diversity	R&S SFQ-Z5	2081.9158.02
Common Interface TS OUT	R&S SFQ-Z17	2081.9364.02
Service Kit	R&S SFQ-Z1	2072.5960.02
Service Manual (English)		2072.6489.22
Memory Card 10 Mbyte (Flash)		0048.5877.00
19" Adapter (4 HU) for rackmounting	R&S ZZA-94	0396.4905.00
Matching Pads 50 Ω/75 Ω, 0 GHz to 2.7 GHz, N connectors		
matched at both ends, attenuation 5.7 dB, no DC isolation	R&S RAM	0358.5414.02
matched at one end, attenuation 1.7 dB	R&S RAZ	0358.5714.02

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