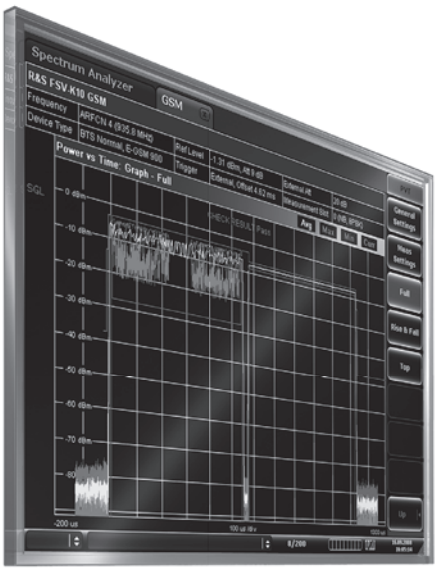
R&S®FSV-K10
GSM/EDGE Analysis
Application Firmware
Specifications



70 Years of Driving Innovation

ROHDE&SCHWARZ

Test & Measurement

Data Sheet | 01.01

The specifications of the R&S®FSV-K10 are based on the specifications of the R&S®FSV spectrum analyzer data sheet.

Specifications apply under the following conditions: 30 minutes warm-up time at ambient temperature, specified environmental conditions met, calibration cycle adhered to, and all internal automatic adjustments performed. "Typical values" are designated with the abbreviation "typ." These values are verified during the final test but are not assured by Rohde & Schwarz. "Nominal values" are design parameters that are not assured by Rohde & Schwarz. These values are verified during product development but are not specifically tested during production. Data without tolerance limits is not binding.

GSM/EDGE measurements

Frequency

Frequency bands		T-GSM 380, T-GSM 410, GSM 450, GSM 480, GSM 710, GSM 750, T-GSM 810, GSM 850, P-GSM 900, E-GSM 900, R-GSM 900, T-GSM 900, DCS 1800, PCS 1900
Frequency range	RF input	
	R&S®FSV3	20 MHz to 3.6 GHz [1]
	R&S®FSV7	20 MHz to 7 GHz [1]
Frequency setting		frequency
		frequency band and ARFCN

Level

Level range	RF input	up to +30 dBm
Level setting		auto level manual configuration (reference level, RF attenuation, preamplifier)

Signal acquisition

Implemented standard versions		3GPP TS 45.004 V7.2.0 (2008-02) 3GPP TS 45.005 V8.1.0 (2008-05) 3GPP TS 45.002 V7.7.0 (2008-05)
Device types		BTS (normal, micro 1 to micro 3, pico)
		MS (normal, small)
Standards		GSM
		EDGE (EGPRS)
Burst types		normal burst (NB)
Modulation formats		GMSK (NB)
		3π/8-8PSK (NB)
Symbol rates		normal (270.83333 ksymbol/s)
Training sequence codes (TSC)		TSC0 to TSC7 (NB)
Time slot lengths		157 symbol/156 symbol/ 156.25 symbol (NB)
Number of slots to analyze		1 burst (PFE [2], MAC [2], EVM [2], MOD [2])
		1 burst to 8 bursts (PvT [2], TRA [2])
Triggering	RF input	free run, power, external

[1] 4 MHz to 20 MHz with restricted functionality (power trigger, auto level, IF overload, dynamic).

[2] PvT: power versus time, PFE: phase and frequency error, MAC: modulation accuracy, EVM: error vector magnitude, MOD: modulation spectrum, TRA: transient spectrum.

Measurements

Measurement	Data displayed	Measurement configurations
Power versus time (PvT [2])	graphical results: minimum; average; maximum; current	1 slot to 8 slots full/raising and falling/top high resolution
Demodulation (PFE [2], MAC [2], EVM [2])	graphical results: minimum; average; maximum; current numerical results: table	modulation accuracy (summary table) EVM versus time phase error versus time magnitude error versus time
Modulation spectrum (MOD [2])	graphical results: current; average numerical results: table	power versus frequency
Transient spectrum (TRA [2])	graphical results: current; maximum numerical results: table	power versus frequency
Limit check	values in line with standard	for PvT [2], MOD [2] & TRA [2]

Measurement uncertainty (nominal)

Demodulation	NOTE	NB, GMSK	NB, 3π/8-8PSK	AUME [3]
EVM [4]	(S/N > 40 dB)			
RMS value, error floor		N/A	<0.5 %	
RMS value, uncertainty		N/A	<0.25 %	
Peak value, error floor		N/A	<1.5 %	
Peak value, uncertainty		N/A	<1 %	
95:th percentile value, error		N/A	<0.5 %	
Phase error [4]	(S/N > 40 dB)			
RMS value, error floor		<0.3°	N/A	1.5°
RMS value, uncertainty		<0.2°	N/A	
Peak value, error floor		<1.5°	N/A	5°
Peak value, uncertainty		<0.7°	N/A	
Frequency error [4]				
Frequency lock range (referenced to RF carrier frequency)		±30 kHz	±17 kHz	N/A
Uncertainty		<5 Hz + Δf_{REF}	<3 Hz + Δf_{REF}	GMSK: 10 Hz [5]
				8PSK: 16 Hz
I/Q origin offset suppression				
Measurement range		N/A	–15 dBc to –50 dBc	N/A

Level measurements		All modulations	
Absolute level uncertainty		see R&S®FSV data sheet: “Level measurement uncertainty“	1.0 dB [6]
Relative level uncertainty		see R&S®FSV data sheet: “Level measurement uncertainty“	0.7 dB [7]

Power versus time		All modulations		
Absolute level uncertainty		see R&S®FSV data sheet: “Level measurement uncertainty“		1.0 dB
Dynamic range (PvT filter = 500 kHz)	detector average	>75 dB	>75 dB	
	detector peak hold	>65 dB	>65 dB	

[3] AUME = acceptable uncertainty of measurement equipment (in line with 3GPP TS 51.021 = base station requirements).

[4] Frequency within GSM frequency band, level –50 dBm to +30 dBm, average of 200 bursts, measurement synchronized using training sequence.

[5] GSM 400: 5 Hz.

[6] For static power step 0.

[7] For power steps other than 0.

Spectrum due to modulation and noise		**All modulations**	
Level measurement uncertainty			
Absolute		see R&S®FSV data sheet: "Level measurement uncertainty"	1.0 dB
Relative			
Δf ≤ 0.1 MHz		see R&S®FSV data sheet: "Level – Display nonlinearity" & "I/Q data – Amplitude flatness"	0.5 dB
0.1 MHz ≤ Δf ≤ 1.8 MHz			0.7 dB [8]
Dynamic range at offset frequency	carrier power 30 dBm		
200 kHz [9]	RBW = 30 kHz	>65 dB	N/A
400 kHz [9]	RBW = 30 kHz	>74 dB	N/A
600 kHz	RBW = 30 kHz	>75 dB	N/A
1200 kHz	RBW = 30 kHz	>80 dB	N/A
1800 kHz	RBW = 30 kHz	>82 dB	N/A

Spectrum due to switching transients		**All modulations**	
Level measurement uncertainty			
Absolute		see R&S®FSV data sheet: "Level measurement uncertainty"	1.5 dB
Relative			
0 dBc to 50 dBc		see R&S®FSV data sheet: "Level – Display nonlinearity" & "I/Q data – Amplitude flatness"	0.7 dB
>50 dBc			1.5 dB
Dynamic range at offset frequency	carrier power 30 dBm RBW = 30 kHz, VBW = 100 kHz		
400 kHz		>72 dB	N/A
600 kHz		>75 dB	N/A
1200 kHz		>78 dB	N/A
1800 kHz		>83 dB	N/A

[8] <50 dBc: 0.7 dB; else: 1.5 dB.

[9] Due to the nominal GSM signal bandwidth, the dynamics cannot be measured directly but are computed from phase noise measurements with CW carriers.

Ordering information

Designation	Type	Order No.
GSM/EDGE Application Firmware	R&S®FSV-K10	1310.8055.02
Spectrum Analyzer, 9 kHz to 3.6 GHz	R&S®FSV3	1307.9002.03
Spectrum Analyzer, 9 kHz to 7 GHz	R&S®FSV7	1307.9002.07
Recommended options and extras		
See also specifications for the R&S®FSV spectrum analyzer (PD 5214.0499.22).		

Service you can rely on

- In 70 countries
- Person-to-person
- Customized and flexible
- Quality with a warranty
- No hidden terms

About Rohde&Schwarz

Rohde&Schwarz is an independent group of companies specializing in electronics. It is a leading supplier of solutions in the fields of test and measurement, broadcasting, radiomonitoring and radiolocation, as well as secure communications. Established 75 years ago, Rohde&Schwarz has a global presence and a dedicated service network in over 70 countries. Company headquarters are in Munich, Germany.

Regional contact

Europe, Africa, Middle East
+49 1805 12 42 42* or +49 89 4129 137 74
customersupport@rohde-schwarz.com
North America
1 888 TEST RSA (1 888 837 87 72)
customer.support@rsa.rohde-schwarz.com
Latin America
+1 410 910 79 88
customersupport.la@rohde-schwarz.com
Asia/Pacific
+65 65 13 04 88
customersupport.asia@rohde-schwarz.com

Certified Quality System
ISO 9001
DQS REG. NO 1954 QM

Certified Environmental System
ISO 14001
DQS REG. NO 1954 UM

For product brochure,
see PD 5214.0499.12
and www.rohde-schwarz.com

Rohde&Schwarz GmbH&Co. KG
Mühldorfstraße 15 | 81671 München
Phone +49 89 41 290 | Fax +49 89 41 29 121 64

www.rohde-schwarz.com

PD 5214.0447.22 | Version 01.01 | December 2008 | R&S®FSV-K10
Subject to change

*0.14 €/min within German wireline network; rates may vary in other networks (wireline and mobile) and countries.