



GSM/EDGE Application Firmware FS-K5 for FSP

The solution for easy and fast GSM and EDGE measurements

- GSM/EDGE Push button measurements
- Fast modulation spectrum routine
- Easy to use
- Accurate carrier power measurement



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Characteristics

The application firmware FS-K5 allows to perform the most important GSM and EDGE transmitter measurements on the push of a button:

- Phase/frequency error (GSM)
- Modulation accuracy (EDGE) including 95:th percentile and origin offset suppression
- Carrier power
- Modulation spectrum (± 1.8 MHz)
- Transient spectrum
- Spurious emissions

Only very few parameters have to be set manually, such as carrier frequency, reference level, external attenuator.

The application firmware FS-K5 can be installed in all models of the FSP spectrum analyzer family:

FSP3 9 kHz to 3 GHz	Covers the basic tx frequency range
FSP7 9 kHz to 7 GHz	Adds harmonics measurements possibility
FSP13 9 kHz to 13 GHz	Covers complete spurious emissions frequency range
FSP30 9 kHz to 30 GHz	Adds microwave link frequency ranges

The application firmware can be used in the total frequency range of the basic spectrum analyzer. This covers all GSM bands of interest, such as GSM900, GSM1800, GSM1900, R-GSM, GSM 450

or even IF frequencies used in transmitters and receivers.

Features and benefits

R&D, Development

Ideal development tool with easy to use GSM measurement functions in a cost-effective analyzer. The workhorse for every engineers bench

Low measurement uncertainty for high confidence

- <0.5 dB total level uncertainty and $<0.7^\circ$ phase error for GSM

Standard conforming measurements for performance verification

- phase/frequency error (GSM), modulation accuracy (EDGE) and power versus time measurement with synchronization to the midamble

Designed for speed

- fast modulation spectrum routine for frequency list mode: ± 1.8 MHz/200 bursts in <25 sec

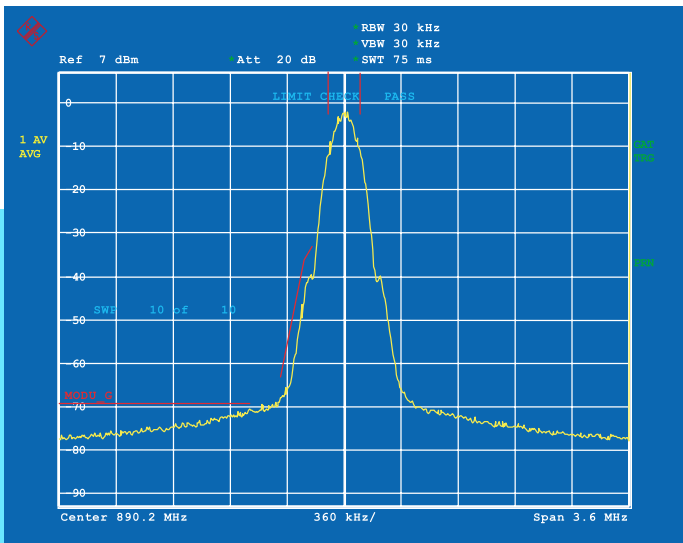
Really portable – anywhere usable

- light weight, <11 kg with FSP3
- comprehensive documentation and storage of results and hard copies on internal HD, print or transfer to a PC when you are back home – even via LAN /Ethernet

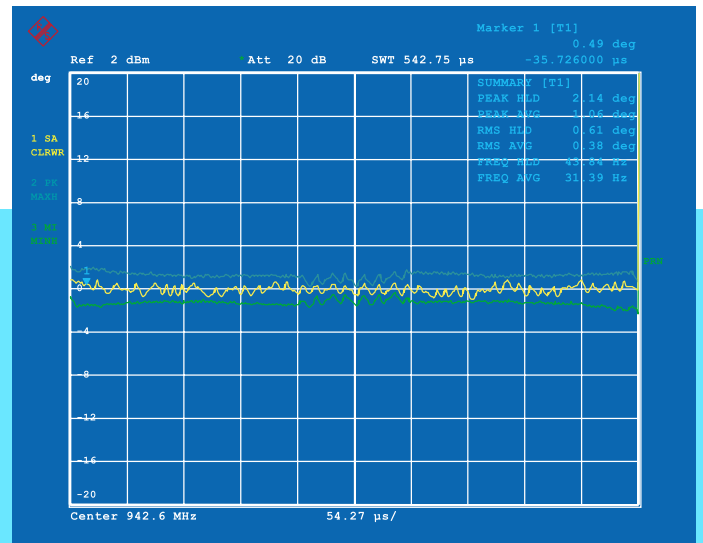
Trigger functions to fit many demands

- Simplified test setup, no trigger from device under test necessary
- IF power trigger for gated measurements



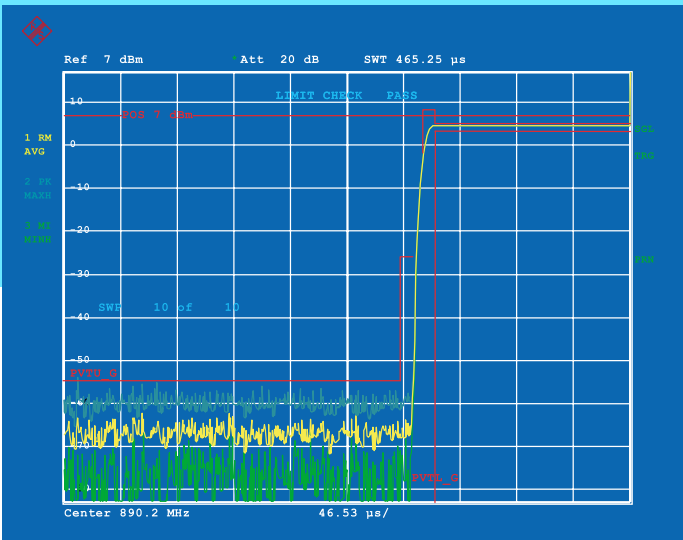


Modulation spectrum measurement in frequency sweep mode



Phase/Frequency error measurement:

Peak as well as average values over 200 bursts are indicated for the RMS phase error and the Peak phase error



Power-versus-time: Details of the burst can be zoomed: rising edge, falling edge, high resolution display of top of the burst

MODULATION SPECTRUM LIST					
Frequency:	890.20000 MHz	Status:	PASSED		
Ext Atten:	0.0 dB	No of Bursts:	200		
Ref Pwr :	-3.55 dBm at RBW: 30 kHz	RBW:	30 kHz	VBW:	30 kHz
Offset [kHz]	Freq [dB]	+Offset [dB]	-Offset [dB]	-Limit [dB]	Status
100	-7.2	0.5	-7.6	0.5	PASSED
200	-36.2	-30.0	-36.5	-30.0	PASSED
250	-39.8	-33.0	-40.1	-33.0	PASSED
400	-66.3	-60.0	-66.3	-60.0	PASSED
600	-69.5	-66.0	-69.4	-66.0	PASSED
800	-69.8	-66.0	-69.4	-66.0	PASSED
1000	-70.0	-66.0	-70.1	-66.0	PASSED
1200	-70.3	-66.0	-70.6	-66.0	PASSED
1400	-71.5	-66.0	-71.0	-66.0	PASSED
1600	-72.0	-66.0	-71.7	-66.0	PASSED
1800	-72.7	-66.0	-72.1	-66.0	PASSED

Modulation spectrum measurement in list mode utilizes a dedicated routine for fast measurements also when averaging over a high number of bursts.

Specifications

Specifications are guaranteed under the following conditions:
 15 minutes warm-up time at ambient temperature, specified environmental conditions met, calibration cycle adhered to, and total calibration performed.
 Data without tolerances: typical values only. Data designated "nominal" apply to design parameters and are not tested.
 The specifications below apply to FSP3, FSP7, FSP13 and FSP30 equipped with FS-K5. They are based on data sheet specifications of Spectrum Analyzers FSP and are not checked separately. Level measurement errors given with a tolerance are measurement uncertainties with a confidence level of 95%. Data without tolerances are typical values.
 The stated level measurement errors do not take into account systematic errors resulting from the reduced S/N ratio.

Measurement	Specification	Test specification and permissible measurement uncertainty acc to I-ETS 300 609-1
Phase/Frequency error (GMSK Modulation)		
11.10-1 13.1		
Phase error, floor (S/N >40 dB)		
rms	<0.7 °	
peak	<2 °	
Phase error, uncertainty (S/N >40 dB)		
rms	<0.2 °	<1.5 °
peak	<0.7 °	<5 °
Frequency error uncertainty (S/N >40 dB)	<1.5 Hz + error of reference frequency	± 10 Hz
Modulation accuracy (3π/8-8PSK Modulation)		
EVM, residual (S/N >40 dB),		
rms	<0.5%	
peak	<1.5%	
95.th percentile		
resolution	<1.5%	
	0.03%	
Frequency error uncertainty (S/N >40 dB)	<1 Hz + error of reference frequency	
Origin Offset Suppression (S/N >40 dB)		
Measurement range	-20 dBc to -50 dBc	
Mean carrier power		
11.10.1 13.3		
Absolute Level uncertainty (-50 dBm to +30 dBm, 10 MHz to 3 GHz)		
	0.5 dB	1 dB
Relative level uncertainty (from 0 dB to -50 dB from reference level)		
	0.2 dB	0.7 dB
Power versus time		
11.10.1 13.3		
Uncertainty of reference		
	0.5 dB	1 dB
Relative uncertainty		
	0.2 dB	0.7 dB
	(0 dB to -50 dB from reference)	
	0.5 dB	
	(-50 dB to -70 dB from reference)	
Trigger reference uncertainty	¼ bit	¼ bit
Dynamic range (RBW = 300 kHz)		
	85 dB (with trace average)	
	>70 dB (with peak hold)	

Measurement	Specification	Test specification and permissible measurement uncertainty acc to I-ETS 300 609-1
Spectrum due to modulation		
11.10-1 13.4		
Level measurement uncertainty		
Absolute (-50 dBm to +30 dBm, 10 MHz to 3 GHz) relative ¹⁾	<0.5 dB	1 dB
Δf ≤ 0.1 MHz	<0.2 dB	0.5 dB
0.1 MHz < Δf ≤ 1.8 MHz (0 dBc to -70 dBc)	<0.2 dB	0.7 dB
1.8 MHz < Δf ≤ 6 MHz	<0.5 dB	1.5 dB
Δf ≥ 6 MHz	<0.5 dB	2 dB
Dynamic range (carrier power=30 dBm)²⁾		
Frequency offset		
200 kHz	71 dB	
400 kHz	73 dB	
600 kHz	74 dB	
1200 kHz	78 dB	
1800 kHz	80 dB	
1.8 MHz to 6 MHz (RBW = 100 kHz)	75 dB to 81 dB	
>6 MHz (RBW=100 kHz)	81 dB	
Spectrum due to transients		
11.10-1 13.4		
Level meas uncertainty		
absolute (-50 dBm to +30 dBm, 10 MHz to 3 GHz)	<0.5 dB	1.5 dB
relative		
0 dB to 50 dB from reference level	<0.2 dB	0.7 dB
>50 dB from reference level	<0.5 dB	1.5 dB
Dynamic range with 30 dBm mean carrier power		
Frequency offset		
400 kHz	60 dB	
600 kHz	64 dB	
1200 kHz	67 dB	
1800 kHz	70 dB	

- ¹⁾ Does not include the level error due to FSP inherent noise
²⁾ The dynamic range applies to a cw signal at the RF input of the FSP. For GSM signals the dynamic range may be different

Ordering information

Order designation	Type	Order No.
Application Firmware GSM Mobile Station Test for Spectrum Analyzer FSP	FS-K5	1141.1496.02
Recommended Extras and Options¹⁾		
Electronic Attenuator for FSP3 /7, 0 dB to 30 dB, 5-dB steps, 20-dB preamplifier	FSP-B25	1129.7746.02

- ¹⁾ For further options and recommended extras see FSP data sheet (PD 757.5137)



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