

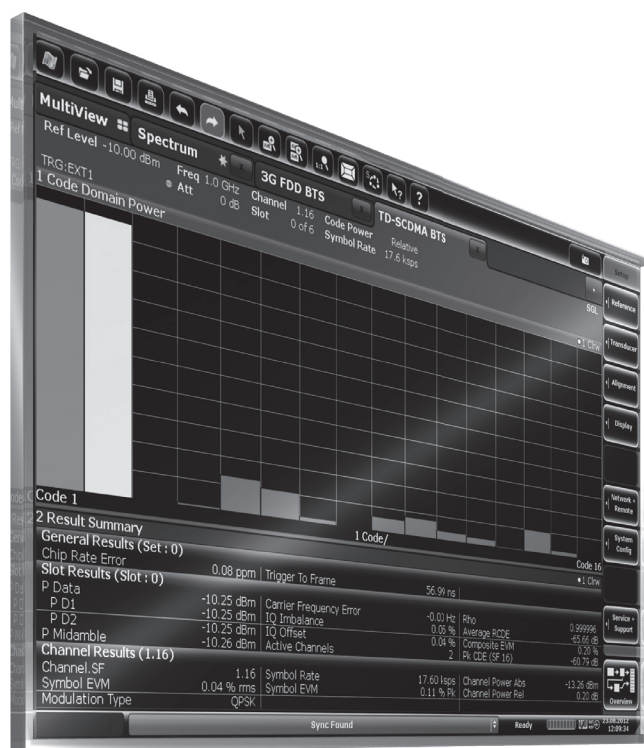
R&S®FSW-K76/-K77

3GPP TD-SCDMA

BS/UE Measurement

Applications

Specifications



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Specifications apply to the:

- R&S®FSW-K76 3GPP TD-SCDMA BS Measurement Application
- R&S®FSW-K77 3GPP TD-SCDMA UE Measurement Application

They are based on the R&S®FSW signal and spectrum analyzer data sheet specifications and have not been checked separately.

They are not verified during instrument calibration. Measurement uncertainties are given as 95 % confidence intervals.

The specified level measurement errors do not take into account systematic errors due to reduced signal to noise ratio (S/N).

Definitions

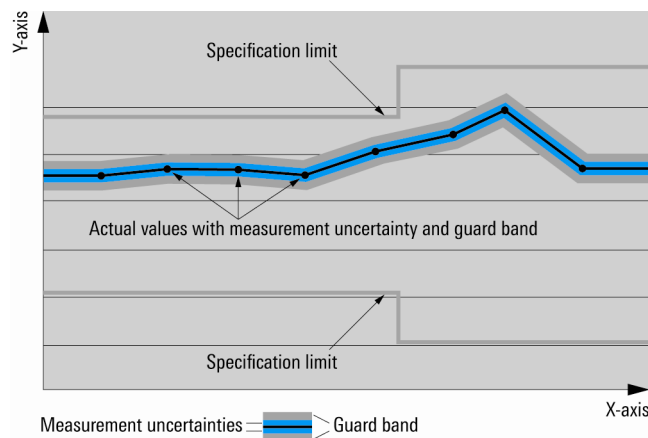
General

Product data applies under the following conditions:

- Three hours storage at ambient temperature followed by 30 minutes warm-up operation
- Specified environmental conditions met
- Recommended calibration interval adhered to
- All internal automatic adjustments performed, if applicable

Specifications with limits

Represent warranted product performance by means of a range of values for the specified parameter. These specifications are marked with limiting symbols such as $<$, \leq , $>$, \geq , \pm , or descriptions such as maximum, limit of, minimum. Compliance is ensured by testing or is derived from the design. Test limits are narrowed by guard bands to take into account measurement uncertainties, drift and aging, if applicable.



Specifications without limits

Represent warranted product performance for the specified parameter. These specifications are not specially marked and represent values with no or negligible deviations from the given value (e.g. dimensions or resolution of a setting parameter). Compliance is ensured by design.

Typical data (typ.)

Characterizes product performance by means of representative information for the given parameter. When marked with $<$, $>$ or as a range, it represents the performance met by approximately 80 % of the instruments at production time. Otherwise, it represents the mean value.

Nominal values (nom.)

Characterize product performance by means of a representative value for the given parameter (e.g. nominal impedance). In contrast to typical data, a statistical evaluation does not take place and the parameter is not tested during production.

Measured values (meas.)

Characterize expected product performance by means of measurement results gained from individual samples.

Uncertainties

Represent limits of measurement uncertainty for a given measurand. Uncertainty is defined with a coverage factor of 2 and has been calculated in line with the rules of the Guide to the Expression of Uncertainty in Measurement (GUM), taking into account environmental conditions, aging, wear and tear.

Device settings and GUI parameters are designated with the format "parameter: value".

Typical data as well as nominal and measured values are not warranted by Rohde & Schwarz.

Specifications

Frequency

Frequency range	RF input	same as for R&S®FSW ¹
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Level

Level range	RF input	–60 dBm to +30 dBm ¹
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Signal acquisition

Supported standards		3GPP TDD 1.28 Mcps option release 8
Capture length		up to 283500 slots
Sweep time	spectrum mask, ACLR (adjacent channel leakage power ratio)	max. 16000 s, auto
Sweep count		1 to 32767
Trigger modes	code domain analysis	free run, external, IF power (only R&S®FSW-K77)
	RF measurements	free run, external, IF power ¹ , RF power ¹ , time, power sensor
Time synchronization in code domain analysis	R&S®FSW-K76	based on DwPTS
	R&S®FSW-K77	based on first detected uplink slot

Measurement parameters

Link mode	R&S®FSW-K76	downlink (DL)
	R&S®FSW-K77	uplink (UL)
Scrambling code		0 to 127
Maximum number of users (K_{cell})		2, 4, 6, 8, 10, 12, 14, 16
Phase synchronization	R&S®FSW-K76	P-CCPCH
		midamble of selected slot
	R&S®FSW-K77	code channel of selected slot midamble of selected slot
Channel table search mode		predefined and autosearch. The predefined channel table allows configuring the complete channel setup for the code domain analyzer.
Normalize I/Q offset		on/off
Inactive channel power threshold	channel table auto search	–100 dB to 0 dB relative to total data power
Maximum data modulation	channel table auto search	QPSK, 8PSK, 16QAM, 64QAM
Spectrum emission mask	standard	in line with standard
	user defined	the spectrum emission mask is measured in line with either the manual user setting or a user specified XML file.

¹ Restricted IF overload, IF power trigger and auto level functionality depending on carrier frequency and bandwidth at carrier frequencies < 50 MHz.

Result diagrams

Result summary	general results	chip rate error, trigger to frame
	results for selected slot	data power, midamble power, averaged relative code domain error, number of active channels, carrier frequency error, I/Q imbalance, I/Q offset, p, composite EVM, peak code domain error
	results for selected channel	absolute power, relative power, symbol EVM, data rate, modulation type
Code domain power	clear/write, max. hold, min. hold, average, view	code domain power versus channel (relative to total power and absolute)
Code domain error power	clear/write, max. hold, min. hold, average, view	code domain error power versus channel
Peak code domain error	clear/write, max. hold, min. hold, average, view	peak code domain error power versus slot
Channel power versus slot	clear/write, max. hold, min. hold, average, view	power versus slot for selected channel (relative to total power and absolute)
Channel table	clear/write, max. hold, min. hold, average, view	numeric result table for all midambles and channels including the following readings: channel type, channel number, spreading factor, data rate, modulation type, absolute power, relative power, midamble shift, midamble to data power ratio
Composite EVM	clear/write, max. hold, min. hold, average, view	EVM versus slot
EVM versus symbol	clear/write, max. hold, min. hold, average, view	EVM versus symbol for selected channel and slot
Power versus symbol	clear/write, max. hold, min. hold, average, view	power versus symbol for selected channel and slot
Channel bit stream	clear/write, view	bit stream for selected channel and slot
Channel constellation	clear/write, view	constellation diagram for selected channel and slot
Composite constellation	clear/write, view	constellation diagram for composite signal
Output power	clear/write, max. hold, min. hold, average, view, blank	integrated signal power over channel bandwidth
Adjacent channel power, multicarrier adjacent channel power	clear/write, max. hold, min. hold, average, view, blank	absolute and relative adjacent channel power
Spectrum emission mask	clear/write, max. hold, min. hold, average, view, blank	spectrum mask limit check, peak list evaluation
Occupied bandwidth	clear/write, max. hold, min. hold, average, view, blank	occupied bandwidth measured in frequency domain
Power versus time	clear/write, max. hold, min. hold, average, view, blank	transmit on/off time mask limit check
CCDF	clear/write, view, blank	complementary cumulative distribution function

Measurement specification (nominal)

For 700 MHz < center frequency < 2.7 GHz and with external reference frequency applied. $P_{\text{total}} > -20$ dBm.

Specifications for R&S® FSW-K76

Valid for 10 active DPCH, SF 16, modulation type QPSK.

Code domain power		
Level uncertainty, total power	$P_{\text{total}} > -20$ dBm	< 0.3 dB
Level uncertainty, channel power	$P_{\text{total}} > -20$ dBm, relative	< 0.1 dB
Peak code domain error		
Measurement range	AWGN channel	-62 dB to -25 dB
Residual PCDE		< -62 dB
Composite EVM		
Measurement range	AWGN channel	0.2 % to 20 %
Residual EVM		< 0.2 %
Frequency error		
Measurement range	sync to midamble	±14 kHz
Measurement uncertainty		3 Hz + reference frequency uncertainty (see R&S® FSW frequency uncertainty)
Occupied bandwidth		
Measurement uncertainty	99 % power bandwidth, span 4.8 MHz	< 10 kHz
Spectrum emission mask		
Dynamic range ($P_{\text{total}} > -20$ dBm) ²		> 80 dB
Adjacent channel leakage ratio		
Dynamic range ($P_{\text{total}} > -20$ dBm) ³	with noise correction on	> 79 dB

² The specified dynamic range is the ratio of the channel power to the power at an offset of 815 kHz, measured with 30 kHz integration bandwidth.

³ The specified dynamic range is the ratio of the channel power to the power at an offset of 1.6 MHz, measured with 1.28 MHz integration bandwidth.

Specifications for R&S®FSW-K77

Valid for 1 active DPCH, SF 16 in slot 1, modulation type QPSK

Code domain power		
Level uncertainty, total power	$P_{\text{total}} > -20 \text{ dBm}$	< 0.3 dB
Level uncertainty, channel power	$P_{\text{total}} > -20 \text{ dBm}$, relative	< 0.1 dB

Peak code domain error		
Measurement range	AWGN channel	-58 dB to -25 dB
Residual PCDE		< -58 dB

Composite EVM		
Measurement range	AWGN channel	0.2 % to 20 %
Residual EVM		< 0.2 %

Frequency error		
Measurement range	sync to midamble	$\pm 14 \text{ kHz}$
Measurement uncertainty		3 Hz + reference frequency uncertainty (see R&S®FSW frequency uncertainty)

Occupied bandwidth		
Measurement uncertainty	99 % power bandwidth, span 4.8 MHz	< 14 kHz

Spectrum emission mask		
Dynamic range ($P_{\text{total}} > -20 \text{ dBm}$) ⁴		> 80 dB

Adjacent channel leakage ratio		
Dynamic range ($P_{\text{total}} > -20 \text{ dBm}$) ⁵		> 79 dB

Ordering information

Designation	Type	Order No.
3GPP TD-SCDMA BS Measurement Application	R&S®FSW-K76	1313.1445.02
3GPP TD-SCDMA UE Measurement Application	R&S®FSW-K77	1313.1451.02
Signal and Spectrum Analyzer	R&S®FSW8	1312.8000.08
Signal and Spectrum Analyzer	R&S®FSW26	1312.8000.26
Recommended options and extras		
see the R&S®FSW data sheet (PD 5214.5984.22)		

For product brochure, see PD 5214.5984.12 and www.rohde-schwarz.com

⁴ The specified dynamic range is the ratio of the channel power to the power at an offset of 815 kHz, measured with 30 kHz integration bandwidth.

⁵ The specified dynamic range is the ratio of the channel power to the power at an offset of 1.6 MHz, measured with 1.28 MHz integration bandwidth.

Service you can rely on

- ▮ Worldwide
- ▮ Local and personalized
- ▮ Customized and flexible
- ▮ Uncompromising quality
- ▮ Long-term dependability

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 more than 75 years ago, Rohde & Schwarz has a global presence and a dedicated service network in over 70 countries. Company headquarters are in Munich, Germany.

Environmental commitment

- ▮ Energy-efficient products
- ▮ Continuous improvement in environmental sustainability
- ▮ ISO 14001-certified environmental management system

Certified Quality System
ISO 9001

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