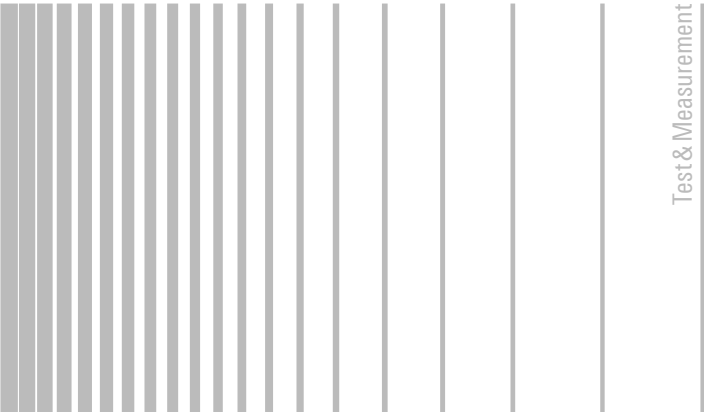


CDMA2000[®]/1xEVDO Measurement Applications Specifications

R&S[®]FSV-K82/-K83
R&S[®]FSV-K84/-K85
R&S[®]FPS-K82/-K83
R&S[®]FPS-K84/-K85



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Definitions

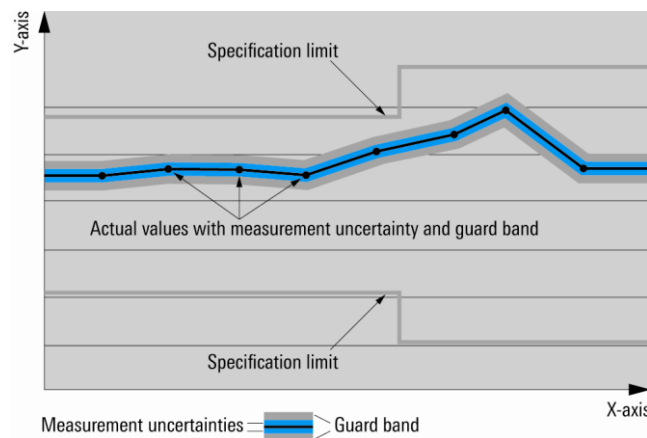
General

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 indicated as follows: "parameter: value".

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

Specifications

The specifications apply to the following measurement applications:

- R&S®FSV-K82 CDMA2000® BS (DL) measurement application
- R&S®FSV-K83 CDMA2000® MS (UL) measurement application
- R&S®FSV-K84 1xEV-DO BS (DL) measurement application
- R&S®FSV-K85 1xEV-DO MS (UL) measurement application
- R&S®FPS-K82 CDMA2000® BS (DL) measurement application
- R&S®FPS-K83 CDMA2000® MS (UL) measurement application
- R&S®FPS-K84 1xEV-DO BS (DL) measurement application
- R&S®FPS-K85 1xEV-DO MS (UL) measurement application

They are based on the R&S®FPS, R&S®FSV and R&S®FSVA signal and spectrum analyzer data sheet specifications and have not been checked separately and 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).

Overview

	R&S®FSV	R&S®FSVA	R&S®FPS
R&S®FSV-K82 (CDMA2000® base station)	●	●	–
R&S®FSV-K83 (CDMA2000® mobile station)	●	●	–
R&S®FSV-K84 (1xEV-DO base station)	●	●	–
R&S®FSV-K85 (1xEV-DO mobile station)	●	●	–
R&S®FPS-K82 (CDMA2000® base station)	–	–	●
R&S®FPS-K83 (CDMA2000® mobile station)	–	–	●
R&S®FPS-K84 (1xEV-DO base station)	–	–	●
R&S®FPS-K85 (1xEV-DO mobile station)	–	–	●

Frequency

Frequency range	RF input	same as for R&S®FSV/R&S®FSVA/R&S®FPS ¹
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Level

Level range	RF input	–40 dBm to +30 dBm ¹
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¹ Restricted IF overload, IF power trigger and auto level functionality depending on carrier frequency and bandwidth at carrier frequencies < 50 MHz.

Signal acquisition

Supported standards	R&S®FSV-K82/R&S®FPS-K82	in line with 3GPP2 C.S0011 Rev. C
	R&S®FSV-K83/R&S®FPS-K83	in line with 3GPP2 C.S0010 Rev. C
	R&S®FSV-K84/R&S®FPS-K84	in line with 3GPP2 C.S0032 Rev. B
	R&S®FSV-K85/R&S®FPS-K85	in line with 3GPP2 C.S0033 Rev. B
Capture length	R&S®FSV-K82/-K83	up to 31360 PCGs
	R&S®FPS-K82/-K83	up to 64000 PCGs
	R&S®FSV-K84	up to 23584 slots
	R&S®FPS-K84	up to 48000 slots
	R&S®FSV-K85	up to 23584 slots
	R&S®FPS-K85	up to 25920 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
	RF measurements	free run, external, IF power ¹ ,

Measurement parameters

Modulation detection	R&S®FSV-K82/R&S®FPS-K82	automatic detection of BPSK, QPSK, 8PSK, 16QAM
	R&S®FSV-K83/R&S®FPS-K83	BPSK
	R&S®FSV-K84/R&S®FPS-K84	automatic detection of BPSK, QPSK, 8PSK, 16QAM
	R&S®FSV-K85/R&S®FPS-K85	automatic detection of BPSK, QPSK, 8PSK, 16QAM, Q2, Q4, B4, Q4Q2, E4E2
Predefined channel table	code domain analyzer	Allows the user to define the complete channel setup of the user signal for the code domain analyzer.
Spectrum emission mask	standard	limits in line with 3GPP2 standard according to chosen band class
	user	Spectrum emission mask measurement is performed according to manual user setting or user-specified XML file.

Result diagrams

Result summary	general results	carrier frequency error, chip rate error, trigger to frame
		active channels (R&S®FSV-K82/FPS-K82/FSV-K83/FPS-K83)
		rho overall (R&S®FSV-K84/FPS-K84/FSV-K85/FPS-K85)
		rho pilot/rho MAC/rho data (R&S®FSV-K84/FPS-K84)
		delta RRI/PICH (R&S®FSV-K85/FPS-K85)
	slot/PCG results	total power, pilot power, I/Q imbalance, I/Q offset, max. inactive power, composite EVM
		rho (R&S®FSV-K82/FPS-K82/FSV-K83/FPS-K83/FSV-K84/FPS-K84)
		peak CDE (R&S®FSV-K85/FPS-K85)
		RRI power (R&S®FSV-K85/FPS-K85)
		power pilot/MAC/data/preamble (R&S®FSV-K84/FPS-K84)
		data mod type (R&S®FSV-K84/FPS-K84)
		active channels MAC/data (R&S®FSV-K84/FPS-K84)
		preamble length (R&S®FSV-K84/FPS-K84)
max/min power data (R&S®FSV-K84/FPS-K84)		
channel results (not for R&S®FSV-K84/FPS-K84)		channel power relative/ absolute, symbol EVM, timing offset, phase offset, channel number/channel SF (R&S®FSV-K85/FPS-K85)
	modulation type (R&S®FSV-K82/FPS-K82)	
	mapping (R&S®FSV-K83/FPS-K83)	
	symbol rate (R&S®FSV-K85/FPS-K85)	
	code domain power versus code	
Code domain error power	code domain error power versus code	
Peak code domain error	peak code domain error power versus slot/halfslot/PCG	
Channel table	numeric result table for all channels including the following readings per channel	channel type, channel number, spreading factor, symbol rate, absolute power, relative power, timing offset, phase offset state (not R&S®FSV-K84/FPS-K84)
		mapping (R&S®FSV-K84/FPS-K84/FSV-K85/FPS-K85)
		modulation type (R&S®FSV-K83/FPS-K83/FSV-K84/FPS-K84)
Composite EVM (RMS)	averaged (RMS) EVM of selected frame versus slot	
Composite constellation	constellation diagram for composite signal	
Power versus slot/halfslot/PCG	power versus slot/halfslot/PCGs of selected frame	
Power versus symbol	power of selected channel and slot versus symbol	
Symbol constellation	constellation diagram for selected channel and slot	
Symbol EVM	symbol EVM for selected channel and slot	
Magnitude error vs chip	magnitude error for every chip of selected slot/halfslot/PCG	
Phase error vs chip	phase error for every chip of selected slot/halfslot/PCG	

Symbol magnitude error		magnitude error for every symbol of selected slot/halfslot/PCG
Symbol phase error		phase error for every symbol of selected slot/halfslot/PCG
Bitstream		demodulated bits of selected channel and slot/halfslot/PCG
Power versus chip		power of selected slot/halfslot/PCG versus chip
Composite channel bit stream (R&S®FSV-K85/R&S®FPS-K85 with subtypes 2 and 3 only)		bit stream of composite data channel for Q4Q2 and E4E2 modulated signals
Composite channel EVM (R&S®FSV-K85/R&S®FPS-K85 with subtypes 2 and 3 only)		EVM versus chip of composite data channel for Q4Q2 and E4E2 modulated signals
Composite channel constellation (R&S®FPS-K85 with subtypes 2 and 3 only)		constellation diagram for composite data channel for Q4Q2 and E4E2 modulated signals
Output power		integrated signal power over channel bandwidth
Adjacent channel power, multicarrier adjacent channel power		absolute and relative adjacent channel power
Spectrum emission mask		spectrum mask limit check peak list evaluation
Occupied bandwidth		occupied bandwidth measured in frequency domain
CCDF		CCDF

Measurement specification (nominal)

Specifications apply under the following conditions: temperature range from +20 °C to +30 °C; signal level ≥ -25 dBm; properly adjusted reference level; center frequency between 700 MHz and 2.7 GHz; external reference frequency applied.

R&S®FSV-K82/-K83/-K84/-K85 and R&S®FPS-K82/-K83/-K84/-K85

Code domain power		
Level uncertainty, absolute	see R&S®FSV/ R&S®FSVA/ R&S®FPS level uncertainty	
Level uncertainty, relative	$P_{\text{total}} > -20$ dBm	< 0.1 dB

Composite EVM		
Measurement range		0.5 % to 25 %
Inherent EVM		< 1 %
Measurement uncertainty	composite EVM < 10 %	< 0.6 %
	composite EVM > 10 %	< 1.0 %

Adjacent channel leakage ratio		
Dynamic range ($P_{\text{total}} > -20$ dBm) ²	noise correction off (nominal)	> 81.4 dB
	noise correction off (average result of 100 sweeps)	> 83.1 dB
	noise correction on (nominal)	> 82.0 dB
	noise correction on (average result of 100 sweeps)	> 86.0 dB

Spectrum emission mask		
Dynamic range ²	$P_{\text{total}} > -20$ dBm	> 81.4 dB

Trigger to frame		
Measurement range		± 500 μ s
Uncertainty	relative	< 210 ns

R&S®FSV-K82/-K83/-K85 and R&S®FPS-K82/-K83/-K85

Frequency error		
Lock range		± 1 kHz
Measurement uncertainty		< 2 Hz + Δf_{ref}

Peak code domain error power		
Measurement range		0 dB to -55 dB
Inherent PkCDEP		< -55 dB
Measurement uncertainty	$P_{\text{total}} > -20$ dBm	< 1 dB

R&S®FSV-K84 and R&S®FPS-K84

Frequency error		
Measurement range		± 8 kHz
Measurement uncertainty		< 2 Hz + Δf_{ref}

Peak code domain error power		
Measurement range		0 dB to -50 dB
Inherent PkCDEP		-50 dB
Measurement uncertainty	$P_{\text{total}} > -20$ dBm	< 1 dB

² The specified dynamic range is the ratio of the channel power to the power at an offset of 750 kHz, measured with 30 kHz integration bandwidth.

Ordering information

Designation	Type	Order No.
CDMA2000® BS (DL) Measurement Application	R&S®FSV-K82	1310.8703.02
CDMA2000® MS (UL) Measurement Application	R&S®FSV-K83	1310.8755.02
1xEV-DO BS (DL) Measurement Application	R&S®FSV-K84	1310.8803.02
1xEV-DO MS (UL) Measurement Application	R&S®FSV-K85	1310.8778.02
CDMA2000® BS Measurement Application	R&S®FPS-K82	1321.4156.02
CDMA2000® MS Measurement Application	R&S®FPS-K83	1321.4162.02
1xEV-DO BS Measurement Application	R&S®FPS-K84	1321.4179.02
1xEV-DO MS Measurement Application	R&S®FPS-K85	1321.4185.02
R&S®FSV		
Signal and Spectrum Analyzer	R&S®FSV4	1321.3008.04
Signal and Spectrum Analyzer	R&S®FSV7	1321.3008.07
Signal and Spectrum Analyzer	R&S®FSV13	1321.3008.13
Signal and Spectrum Analyzer	R&S®FSV30	1321.3008.30
Signal and Spectrum Analyzer ³	R&S®FSV40	1321.3008.39
Signal and Spectrum Analyzer	R&S®FSV40	1321.3008.40
R&S®FSVA		
Signal and Spectrum Analyzer	R&S®FSVA4	1321.3008.05
Signal and Spectrum Analyzer	R&S®FSVA7	1321.3008.08
Signal and Spectrum Analyzer	R&S®FSVA13	1321.3008.14
Signal and Spectrum Analyzer	R&S®FSVA30	1321.3008.31
Signal and Spectrum Analyzer ³	R&S®FSVA40	1321.3008.41
R&S®FPS		
Signal and Spectrum Analyzer	R&S®FPS4	1319.2008.04
Signal and Spectrum Analyzer	R&S®FPS7	1319.2008.07
Signal and Spectrum Analyzer	R&S®FPS13	1319.2008.13
Signal and Spectrum Analyzer	R&S®FPS30	1319.2008.30
Signal and Spectrum Analyzer	R&S®FPS40	1319.2008.40
Recommended options and extras		
see specifications for the R&S®FSV signal and spectrum analyzer (PD 3606.7982.22), the R&S®FSVA signal and spectrum analyzer (PD 3607.2790.22) or the R&S®FPS signal and spectrum analyzer (PD 3606.9433.22).		

For R&S®FSV/FSVA product brochure, see PD 3607.4129.12,
for R&S®FPS product brochure, see PD 3606.9433.12
and www.rohde-schwarz.com

³ Max. bandwidth 10 MHz.

Service that adds value

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- | Customized and flexible
- | Uncompromising quality
- | Long-term dependability

About Rohde & Schwarz

The Rohde & Schwarz electronics group offers innovative solutions in the following business fields: test and measurement, broadcast and media, secure communications, cybersecurity, radiomonitoring and radiolocation. Founded more than 80 years ago, the independent company which is headquartered in Munich, Germany, has an extensive sales and service network with locations in more than 70 countries.

Sustainable product design

- | Environmental compatibility and eco-footprint
- | Energy efficiency and low emissions
- | Longevity and optimized total cost of ownership

Certified Quality Management

ISO 9001

Certified Environmental Management

ISO 14001

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CDMA2000®/1xEVDO Measurement Applications

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