EMI MEASUREMENT APPLICATION FOR SIGNAL AND SPECTRUM ANALYZERS

Specifications

R&S®FSW-K54
R&S®FSV3-K54
R&S®FPL1-K54
R&S®FSV-K54

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Data Sheet
Version 01.05

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CONTENTS

Definitions **3**

Specifications **4**

Supported base units 4

EMI measurements 4

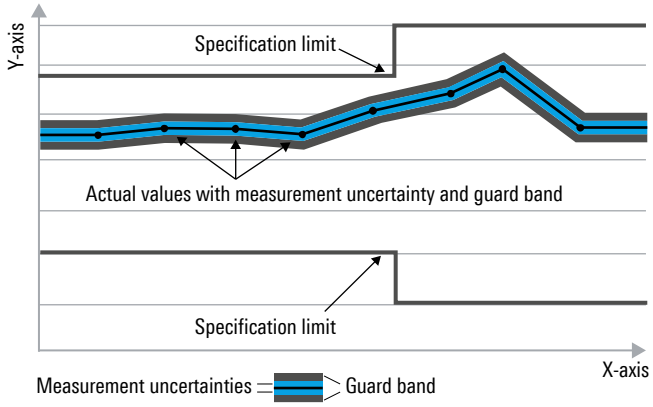
Ordering information **6**

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 <, ≤, >, ≥, ±, 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.



Non-traceable specifications with limits (n. trc.)
Represent product performance that is specified and tested as described under “Specifications with limits” above. However, product performance in this case cannot be warranted due to the lack of measuring equipment traceable to national metrology standards. In this case, measurements are referenced to standards used in the Rohde & Schwarz laboratories.

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”.

Non-traceable specifications with limits, typical data as well as nominal and measured values are not warranted by Rohde & Schwarz.

In line with the 3GPP/3GPP2 standard, chip rates are specified in million chips per second (Mcps), whereas bit rates and symbol rates are specified in billion bits per second (Gbps), million bits per second (Mbps), thousand bits per second (kbps), million symbols per second (Msps) or thousand symbols per second (ksps), and sample rates are specified in million samples per second (Msample/s). Gbps, Mcps, Mbps, Msps, kbps, ksps and Msample/s are not SI units.

Specifications

The specifications of the R&S®Fxx-K54 EMI measurement application are based on the data sheet specifications of the corresponding signal and spectrum analyzer.

Supported base units

Designation	Specification documents
R&S®FSW	PD 5215.6749.22
R&S®FSVA3000	PD 5216.1211.22
R&S®FSV3000	PD 5216.1334.22
R&S®FSVR	PD 5214.3381.22
R&S®FSVA	PD 3607.2790.22
R&S®FSV	PD 3606.7982.22
R&S®FPL1000	PD 5214.6974.22

EMI measurements

Frequency

Frequency axis		
Scaling		linear, logarithmic

Resolution bandwidths

EMI filters		
Bandwidths (–6 dB)		10 Hz, 100 Hz, 200 Hz, 1 kHz, 9 kHz, 10 kHz, 100 kHz, 120 kHz, 1 MHz
Bandwidth uncertainty		< 3 %, nominal
Shape factor 60 dB:6 dB		< 4, nominal

Level

Level display		
Number of traces	selectable, displayed in parallel	1 to 6
Trace detectors		individually selectable for each trace
Standard detectors		maximum peak, minimum peak, auto peak (normal), sample, RMS, average
EMI detectors		quasi-peak, RMS average, CISPR average [1]
Measurement marker detector	configurable detectors for final measurement	maximum peak, average, quasi-peak, RMS average, CISPR average

[1] R&S®FPL1000, R&S®FSV3000, R&S®FSVA3000: EMI detectors are not available in combination with minimum peak, auto peak, sample trace detectors.

EMI measurements

Number of sweep points	range	101 to 200 001
Limit lines		
Predefined limit lines	CISPR/EN, FCC, MIL-STD-461 and DO-160	more than 170 lines
Limit assignment		limit line individually selectable for each trace
Measurement results		
Measurement sequence	pretest	to detect the highest signal levels
	final measurement	to verify the signal level at the frequencies identified in the pretest
Detectors		separately selectable for pretest and final measurement
Pretest		
Detection criteria for peak list	without limit line	signal level
	with limit line	delta of signal level to limit line
Detection sequence		highest to lowest signal level, level delta
Final measurement		
Maximum number of frequencies (markers) supported	across all traces	16
Frequency selection	manual	measurement at marker position
	automatic	auto marker peak search
Result at marker frequency	obtained with final measurement detector	
	default	level measured at marker frequency
	with limit line, additionally	delta of signal level to limit line
Result table	contents	frequency, signal level, delta to limit line, limit check results
Limit check result representation	color coding	
	green	below limit – margin
	yellow	within limit – margin
	red	above limit
AM/FM demodulation during final measurement		
Output		internal speaker, phone jack
Required options	R&S®FSW	none (included in base unit)
	R&S®FSVA3000 and R&S®FSV3000	R&S®FSV3-B3
	R&S®FSVR, R&S®FSVA and R&S®FSV	R&S®FSV-B3
	R&S®FPL1000	R&S®FPL1-B5
Reporting		
Availability	instrument families supporting report generation	R&S®FSW, R&S®FSVA3000 and R&S®FSV3000, R&S®FPL1000
Report elements		spectrum display, marker table, list of measured frequencies
Report file formats		PDF, DOC
LISN control		
Supported LISN models		R&S®ENV216, R&S®ENV432, R&S®ENV4200, R&S®ESH2-Z5, R&S®ESH3-Z5
Required options	R&S®FSW	none (included in base unit)
	R&S®FSVA3000 and R&S®FSV3000	R&S®FSV3-B5
	R&S®FSVR, R&S®FSVA and R&S®FSV	R&S®FSV-B5
	R&S®FPL1000	R&S®FPL1-B5

Ordering information

Listed here: ordering information of the -K54 option and recommended extensions for EMI measurement applications. For ordering information of the signal and spectrum analyzer base units, see the data sheet of the base unit.

Designation	Type	Order No.
R&S®FSW signal and spectrum analyzer		
EMI measurement application	R&S®FSW-K54	1313.1400.02
Recommended extras		
CISPR calibration (ex factory only)	R&S®FSW-K54CAL	1331.5932.02
RF preamplifier	R&S®FSW-B24	1313.0832.13/.26/.43/.49/.51/ .66/.67
External generator control	R&S®FSW-B10	1313.1622.02
R&S®FSVA3000 and R&S®FSV3000 signal and spectrum analyzers		
EMI measurement application	R&S®FSV3-K54	1330.5068.02
Recommended extras		
CISPR calibration (ex factory only)	R&S®FSV3-K54C	1346.3624.02
Additional interfaces for LISN control	R&S®FSV3-B5	1330.3820.02
AM/FM demodulation audio output; includes speaker, jack for headphones and volume control	R&S®FSV3-B3	1330.3765.02
RF preamplifier	R&S®FSV3-B24	1330.4049.07/.13/.30/.44
Control of external signal generators via LAN, for use as tracking generator	R&S®FSV3-B10	1330.3859.02
R&S®FSVR signal and spectrum analyzer		
EMI measurement application	R&S®FSV-K54	1310.0425.02
Recommended extras		
Additional interfaces for LISN control	R&S®FSV-B5	1310.9539.02
AM/FM demodulation audio output; includes speaker, jack for headphones and volume control	R&S®FSV-B3	1310.9516.02
RF preamplifier (up to 7.5 GHz)	R&S®FSV-B22	1310.9600.02
RF preamplifier (above 7.5 GHz)	R&S®FSV-B24	1310.9616.13/.30/.40
R&S®FSVA and R&S®FSV signal and spectrum analyzer		
EMI measurement application	R&S®FSV-K54	1310.0425.02
Recommended extras		
CISPR calibration	R&S®FSV-K54CAL	1329.0237.02
Additional interfaces for LISN control	R&S®FSV-B5	1310.9539.02
AM/FM demodulation audio output; includes speaker, jack for headphones and volume control	R&S®FSV-B3	1310.9516.02
RF preamplifier (up to 7.5 GHz)	R&S®FSV-B22	1310.9600.02
RF preamplifier (above 7.5 GHz)	R&S®FSV-B24	1310.9616.13/.30/.40
Tracking generator	R&S®FSV-B9	1310.9545.02
DC power supply	R&S®FSV-B30	1329.0243.02
Lithium-ion battery pack	R&S®FSV-B32	1321.3750.04
R&S®FPL1000 signal and spectrum analyzer		
EMI measurement application	R&S®FPL1-K54	1323.1783.02
Recommended extras		
Additional interfaces for LISN control and AF output	R&S®FPL1-B5	1323.1883.02
RF preamplifier (up to 3 GHz / 7.5 GHz)	R&S®FPL1-B22	1323.1719.02
RF preamplifier (up to 14 GHz)	R&S®FPL1-B22	1323.1702.02
RF preamplifier (up to 26.5 GHz)	R&S®FPL1-B22	1323.1777.02
Internal generator	R&S®FPL1-B9	1323.1925.03/.07
DC power supply	R&S®FPL1-B30	1323.1877.02
Lithium-ion battery pack	R&S®FPL1-B31	1323.1725.02
System software [2]		
Essential EMI test software	R&S®ELEMI-E	5601.0030.02
License dongle	R&S®EMCPC	5601.0018.02
Cables for control of Rohde & Schwarz LISNs		
Control cable, R&S®FSW/FSVA3000/FSV3000/FSVR/FSVA/FSV to R&S®ENV216/ENV432/ENV4200		
Length: 3 m	R&S®EZ-29	1326.6470.03
Length: 10 m	R&S®EZ-29	1326.6470.10
Control cable, R&S®FPL1000 to R&S®ENV216/ENV432/ENV4200		
Length: 3 m	R&S®EZ-21	1107.2087.03
Length: 10 m	R&S®EZ-21	1107.2087.10

[2] Supports R&S®FSW, R&S®FSVA3000, R&S®FSV3000, R&S®FSV and R&S®FPL1000.

Service that adds value

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- ▶ Longevity and optimized total cost of ownership

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ISO 9001

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ISO 14001

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EMI Measurement Application for Signal and Spectrum Analyzers
Data without tolerance limits is not binding | Subject to change

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