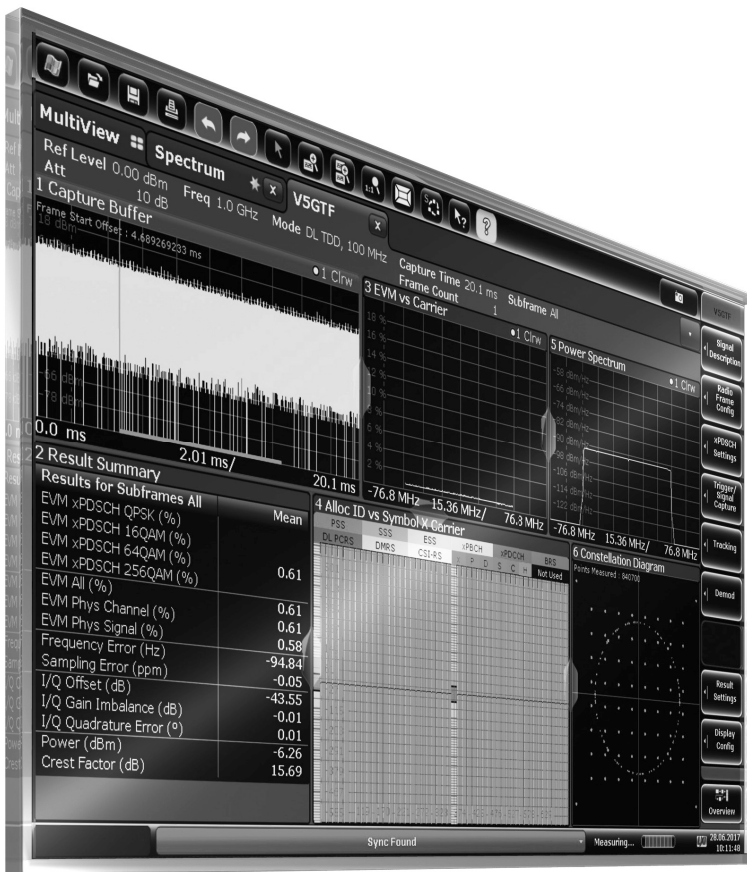


V5GTF Measurement Application Specifications

R&S®FSW-K118
R&S®FSW-K119
R&S®FPS-K118



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Definitions

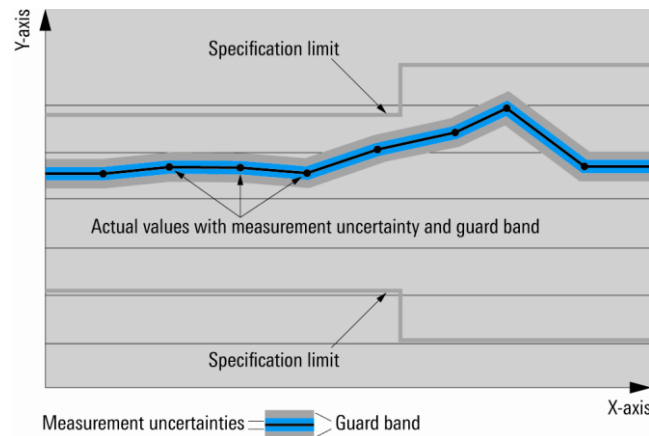
General

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 of the R&S®FSW-K118/R&S®FPS-K118 and R&S®FSW-K119 are based on the specifications of the R&S®FSW and R&S®FPS signal and spectrum analyzer. They 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

Assignment of option numbers to link modes

R&S®FSW-K118, R&S®FPS-K118	V5GTF downlink
R&S®FSW-K119	V5GTF uplink

Supported standard

Supported standard	V5GTF downlink/uplink in line with [1]
Supported physical channels and signals	
R&S®FSW-K118, R&S®FPS-K118	xPDSCH, xPDCCH, xPBCH, ePBCH, PSS, SSS, ESS, BRS, DL PCRS, CSI-RS
R&S®FSW-K119	xPUSCH, UL PCRS

V5GTF analysis

Signal acquisition

Hardware requirements	for measuring 1 component carrier (CC), for measuring 8 CCs consecutively	R&S®FSW-B160, R&S®FPS-B160
	for measuring 8 CCs simultaneously ¹	R&S®FSW-B1200
Capture length		0.4 ms to 50.1 ms
Trigger modes		free run, external

Measurement parameters

Input	RF, file
Number of component carriers	1, 2, 3, 4, 5, 6, 7, 8
Number of frames to be allocated	1
Modulation types	QPSK, 16QAM, 64QAM, 256QAM

¹ Not available for R&S®FPS.

Result displays downlink

R&S®FSW-K118, R&S®FPS-K118	
Result summary	EVM xPDSCH QPSK EVM xPDSCH 16QAM EVM xPDSCH 64QAM EVM xPDSCH 256QAM EVM physical channel EVM physical signal EVM all center frequency error sampling error I/Q offset I/Q gain imbalance I/Q quadrature error power crest factor
Power versus time	capture buffer power versus symbol and carrier
EVM	EVM versus carrier EVM versus symbol EVM versus symbol and carrier
Spectrum	power spectrum channel flatness channel group delay
Constellation	constellation diagram
Statistics/miscellaneous	allocation summary list alloc ID versus symbol and carrier

Result displays uplink

R&S®FSW-K119	
Result summary	EVM xPUSCH QPSK EVM xPUSCH 16QAM EVM xPUSCH 64QAM EVM xPUSCH 256QAM EVM physical channel EVM physical signal EVM all center frequency error sampling error I/Q offset I/Q gain imbalance I/Q quadrature error power crest factor
Power versus time	capture buffer power versus symbol and carrier
EVM	EVM versus carrier EVM versus symbol EVM versus symbol and carrier
Spectrum	power spectrum channel flatness channel group delay
Constellation	constellation diagram
Statistics/miscellaneous	allocation summary list alloc ID versus symbol and carrier

Measurement uncertainty (nominal)

Specifications apply under the following conditions: temperature from +20 °C to +30 °C; properly adjusted reference level; external reference frequency applied, R&S®FSW device serial number is larger than 901799

Output power

Output power	R&S®FSW	R&S®FPS
Level uncertainty	same as R&S®FSW (see R&S®FSW total measurement uncertainty)	same as R&S®FPS (see R&S®FPS total measurement uncertainty)

Transmitted signal quality base station

PSS, SSS, ESS, BRS, xPBCH in subframe 0 and 25
 one xPDSCH allocation with 64QAM on all PRBs in subframe 1 to 24 and 26 to 49,
 no xPDCCH, no ePBCH, no BRRS, no CSI-RS, no DL PCRS
 one component carrier
 input = RF

27.5 GHz to 28.4 GHz		Residual EVM
R&S®FSW43 B1200/B2001	level > -10 dBm	< 0.95 % (-40.5 dB)
R&S®FSW43 B320	level > -15 dBm	< 0.85 % (-41.4 dB)
R&S®FPS40	level > -15 dBm	< 1.03 % (-39.8 dB)
38.6 GHz to 40.0 GHz		Residual EVM
R&S®FSW43 B1200/B2001	level > -10 dBm	< 0.91 % (-40.8 dB)
R&S®FSW43 B320	level > -15 dBm	< 0.93 % (-40.6 dB)
R&S®FPS40	level > -10 dBm	< 1.36 % (-37.4 dB)

Transmitted signal quality UE

one xPUSCH allocation with 64QAM on all PRBs in subframe 1 to 24 and 26 to 49
 no xPUCCH, no SRS, no xRACH, no UL PCRS
 one component carrier
 input = RF

27.5 GHz to 28.4 GHz		Residual EVM
R&S®FSW43 B1200/B2001	level > -10 dBm	< 1.03 % (-39.8 dB)
R&S®FSW43 B320	level > -15 dBm	< 0.92 % (-40.8 dB)
38.6 GHz to 40.0 GHz		Residual EVM
R&S®FSW43 B1200/B2001	level > -10 dBm	< 0.94 % (-40.5 dB)
R&S®FSW43 B320	level > -15 dBm	< 0.98 % (-40.1 dB)

References

- [1] V5GTF TS V5G.211 V1.7 (2016-10), Verizon 5G Technical Forum; Air Interface Working Group; Verizon 5th Generation Radio Access; Physical Channels and Modulation (Release 1).

Ordering information

Designation	Type	Order No.
R&S®FSW		
V5GTF Downlink Measurement Application	R&S®FSW-K118	1331.7370.02
V5GTF Uplink Measurement Application	R&S®FSW-K119	1331.8060.02
Signal and Spectrum Analyzer, 2 Hz to 43.5 GHz	R&S®FSW43	1312.8000.43
Signal and Spectrum Analyzer, 2 Hz to 50 GHz	R&S®FSW50	1312.8000.50
Signal and Spectrum Analyzer, 2 Hz to 67 GHz	R&S®FSW67	1312.8000.67
Signal and Spectrum Analyzer, 2 Hz to 85 GHz	R&S®FSW85	1312.8000.85
160 MHz Analysis Bandwidth	R&S®FSW-B160	1325.4850.04
320 MHz Analysis Bandwidth	R&S®FSW-B320	1325.4867.04
512 MHz Analysis Bandwidth	R&S®FSW-B512	1313.4296.04
1.2 GHz Analysis Bandwidth	R&S®FSW-B1200	1331.6400.04
2 GHz Analysis Bandwidth	R&S®FSW-B2001	1331.6916.04
R&S®FPS		
V5GTF Downlink Measurement Application	R&S®FPS-K118	1321.4962.02
Signal and Spectrum Analyzer, 10 Hz to 30 GHz	R&S®FPS30	1319.2008.30
Signal and Spectrum Analyzer, 10 Hz to 40 GHz	R&S®FPS40	1319.2008.40
160 MHz Analysis Bandwidth	R&S®FPS-B160	1321.4285.40
YIG Filter Bypass, for R&S®FPS30	R&S®FPS-B11	1326.5467.30
YIG Filter Bypass, for R&S®FPS40	R&S®FPS-B11	1326.5467.40

Service that adds value

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

Rohde & Schwarz

The Rohde & Schwarz electronics group offers innovative solutions in the following business fields: test and measurement, broadcast and media, secure communications, cybersecurity, monitoring and network testing. 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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V5GTF Measurement Application

Data without tolerance limits is not binding | Subject to change

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