

# R&S®FPL1-K41R

## 40 MHz REAL-TIME SPECTRUM MEASUREMENTS

### Specifications



Specifications  
Version 01.00

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# Definitions

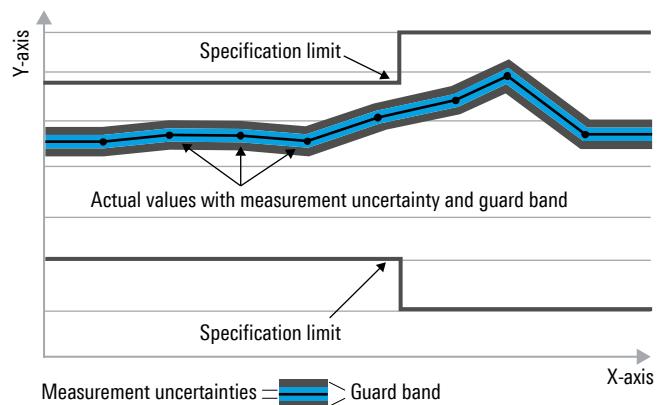
## General

Product data applies under the following conditions:

- Three hours of storage at ambient temperature followed by 30 minutes of 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.



## 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 standard, chip rates are specified in million chips per second (Mcps), whereas bit rates and symbol rates are specified in billion bit per second (Gbps), million bit per second (Mbps), thousand bit 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®FPL1 -K41R 40 MHz real-time spectrum measurements option are based on the specifications of the respective spectrum analyzer, namely the FPL specifications document (PD 5214.6974.22).

## General data

Real-time bandwidth (span)							
Range	standard	1 MHz to 12.8 MHz					
	with R&S®FPL1-B40 option	1 MHz to 40 MHz					
Resolution bandwidths							
Range <sup>1</sup>	standard	312.5 Hz to 4.33 MHz					
	with R&S®FPL1-B40 option	312.5 Hz to 10 MHz					
Sweep time							
Sweep time range		50 $\mu$ s to 1 s <sup>2</sup>					
FFT processing							
Number of sweep (trace) points		205/409/819/1639/3277/6553 <sup>3</sup>					
FFT length		256/512/1024/2048/4096/8192 <sup>4</sup>					
FFT window		Blackman-Harris					
Maximum spectrum (FFT) processing rate		256 000/s (nom.) <sup>5</sup>					
Minimum signal duration for 100 % probability of intercept with full amplitude accuracy (nom.) <sup>6</sup>							
Trace detector = max. peak							
Span	span/RBW ratio						
40 MHz	6.25	50	200	400	800	1600	3200
12.8 MHz	4.2 $\mu$ s	6.3 $\mu$ s	17.3 $\mu$ s	34.6 $\mu$ s	69.2 $\mu$ s	326 $\mu$ s	2.15 ms
1 MHz	15.9 $\mu$ s	99.1 $\mu$ s	388 $\mu$ s	775 $\mu$ s	1.55 ms	3.28 ms	8.07 ms
Number of sweep points	205	205	409	819	1639	3277	6553
FFT length	256	256	512	1024	2048	4096	8192

<sup>1</sup> The minimum and maximum resolution bandwidth is defined with respect to the minimum and maximum span only.

<sup>2</sup> Time period during which individual FFTs contribute to the results of the selected trace detector.

<sup>3</sup> Depends on span/RBW ratio, i.e. more trace points for a larger ratio (higher frequency resolution).

<sup>4</sup> Depends on span/RBW ratio, i.e. larger FFT length for a larger ratio (higher frequency resolution).

<sup>5</sup> For a 256 FFT length

<sup>6</sup> Events lasting shorter than the minimum signal duration specification will result in degraded level accuracy.

## Result display

Result display types with or without active frequency mask trigger or in any combination	<ul style="list-style-type: none"> <li>real-time spectrum</li> <li>persistence spectrum</li> <li>spectrogram</li> </ul>
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<b>Real-time spectrum</b>	
Number of traces	4
Trace detector	<ul style="list-style-type: none"> <li>positive peak</li> <li>negative peak</li> <li>average</li> <li>RMS</li> <li>sample</li> </ul>
Trace functions	<ul style="list-style-type: none"> <li>clear write</li> <li>view</li> <li>blank</li> </ul>
Number of markers	16
Marker readout	frequency, level

<b>Persistence spectrum</b>	
Probability range covered by bitmap colors	<ul style="list-style-type: none"> <li>0 % to 100 % (selectable)</li> <li>truncate</li> </ul>
Color maps	<ul style="list-style-type: none"> <li>hot</li> <li>cold</li> <li>radar</li> <li>grayscale</li> </ul>
Color mapping curve	shape adjustable
Persistence duration	0 s to 8 s
Maximum hold persistence bitmap	in addition to persistence spectrum display
Number of markers	on (selectable intensity), off
Marker readout	16
Trace 1 of real-time spectrum	frequency, level, hit probability
	on, off

<b>Spectrogram</b>	
Level range covered by bitmap colors	0 % to 100 % (selectable)
Color maps	<ul style="list-style-type: none"> <li>hot</li> <li>cold</li> <li>radar</li> <li>grayscale</li> </ul>
Color mapping curve	shape adjustable
History depth	3000 frames
Trace detector	coupled to real-time spectrum
Number of markers	16
Marker readout	frequency, level, time/frame number

## Trigger

<b>Trigger source</b>	<ul style="list-style-type: none"> <li>free run</li> <li>frequency mask</li> </ul>
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<b>Frequency mask trigger</b>	
Trigger conditions	<ul style="list-style-type: none"> <li>enter mask area</li> <li>leave mask area</li> </ul>
Trigger modes	stop on trigger
Trigger mask	
Mask shape generation	<ul style="list-style-type: none"> <li>manual</li> <li>auto set (mask derived from the measured spectrum)</li> </ul>

## Ordering information

### Real-time spectrum measurement application

Designation	Type	Order No.	Remarks
40 MHz real-time spectrum measurements	R&S®FPL1-K41R	1353.6702.02	IPS5 CPU board required (given for devices with serial number > 200000)

### FPL spectrum analyzers

Designation	Type	Order No.	Remarks
<b>Base units</b>			
<b>FPL</b>			
Spectrum analyzer, 5 kHz to 3 GHz	R&S®FPL1003	1304.0004.03	
Spectrum analyzer, 5 kHz to 7.5 GHz	R&S®FPL1007	1304.0004.07	
Spectrum analyzer, 5 kHz to 14 GHz	R&S®FPL1014	1304.0004.14	
Spectrum analyzer, 5 kHz to 26.5 GHz	R&S®FPL1026	1304.0004.26	
Spectrum analyzer, 5 kHz to 44 GHz	R&S®FPL1044	1304.0004.44	
<b>Hardware options</b>			
40 MHz analysis bandwidth	R&S®FPL1-B40	1323.1931.02	user-retrofittable



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