



## FS-Z60/-Z75/-Z90/-Z110

### Harmonic Mixers for FSE/FSIQ/ESI

Frequency range extension to 110 GHz for Spectrum Analyzers FSEM und FSEK, Signal Analyzers FSIQ.26 and EMI Test Receivers ESI26 and ESI40:

- FS-Z60: 40 GHz to 60 GHz
- FS-Z75: 50 GHz to 75 GHz
- FS-Z90: 60 GHz to 90 GHz
- FS-Z110: 75 GHz to 110 GHz

- ◆ Low conversion loss
- ◆ High 1 dB compression point
- ◆ High LO frequency range
- ◆ No bias requirements
- ◆ Conversion loss data on disk



**ROHDE & SCHWARZ**

# Harmonic Mixers FS-Z60/-Z75/-Z90/-Z110

Harmonic Mixers FS-Z60/-Z75/-Z90/-Z110 extend the frequency range of Spectrum Analyzers FSEM and FSEK, EMI Test Receivers ESI26 and ESI40 and Signal Analyzers FSIQ26.

The mixers are available with standard waveguide flanges to cover the following bands:

- ◆ FS-Z60: 40 GHz to 60 GHz (V band)
- ◆ FS-Z75: 50 GHz to 75 GHz (V band)
- ◆ FS-Z90: 60 GHz to 90 GHz (E band)
- ◆ FS-Z110: 75 GHz to 110 GHz (W band)

Due to their double diode design these mixers feature flat frequency response and require no additional biasing which makes them especially suitable for automated measurements. High accuracy requirements are met when operating the mixers with FSEM/K, FSIQ26, ESI26 or ESI40. Therefore the harmonic mixers are suitable for EMC measurement applications.

For each mixer an individual conversion loss table with 50 frequency points is supplied as a hardcopy and as a file on floppy disk. The data file can be transferred to the hard disk of the measuring instruments mentioned above. Once the file is activated, all additionally required parameters for mixer operation will be set automatically. This makes for extreme ease of operation. For quick reference each mixer is labelled with a look-up table with reduced number of data points.

## Features

### High sensitivity

The low conversion loss and the high LO frequency range enable the user to measure even very low level signals.

### High large-signal immunity

With a typical 1 dB compression point of +6 dBm and low conversion loss the mixers feature a very high dynamic range. Measurements of low level signals are possible even in the presence of high level signals, which considerably facilitates practical use.

### Transparent spectrum display

Due to the high LO frequency (up to 15.2 GHz) and the resultant low order of harmonics used the number of unwanted responses is low. This yields a highly transparent spectrum display. Additionally the unwanted components can be automatically identified and suppressed by FSE/FSIQ/ESI.

### Wide image-free frequency range

When operated with the FSE/FSIQ/ESI the high intermediate frequency of 741.4 MHz results in a wide frequency range without the display of image frequency responses. With low level input signals an image-free frequency range of 1482.8 MHz is obtained. This is sufficient for many applications and allows signal identification without additional measures being required.

Certified Quality System

**ISO 9001**

DQS REG. NO 1954

Certified Environmental System

**ISO 14001**

REG. NO 1954

## Specifications

	FS-Z60	FS-Z75	FS-Z90	FS-Z110
Frequency range	40 GHz to 60 GHz	50 GHz to 75 GHz	60 GHz to 90 GHz	75 GHz to 110 GHz
<b>Level</b>				
Maximum input level (LO level <19 dBm) CW RF CW RF (+40°C to +60°C)		+16 dBm +13 dBm		
1 dB compression		+6 dBm nominal		
Odd-order suppression		typ. 20 dB		
<b>Conversion loss</b>				
Conversion loss (when used with FSE/FSIQ/ESI)	≤25 dB typ. 18 dB	≤34 dB typ. 25 dB	≤37.5 dB typ. 34 dB	≤40 dB typ. 32 dB
Frequency response within any 5 GHz band	<3 dB	<3 dB	<5 dB	<6 dB
Displayed average noise level when used with FSE/FSIQ/ESI (RBW 1 kHz, VBW 100 Hz, 20 averages, trace average)	≤-107dBm typ. -114 dBm	≤-98 dBm typ. -107 dBm	≤-94 dBm typ. -98 dBm	≤-92 dBm typ. -100 dBm
<b>Measurement uncertainty</b>				
Level uncertainty (95% confidence level, when used with FSE/FSIQ/ESI)		<3.0 dB (+25°C) <4.5 dB (+5°C to +40°C)		
Temperature drift (max.) +5°C to +40°C -20°C to +60°C		<1.5 dB <2.5 dB		
<b>Inputs and outputs</b>				
<b>RF input</b>				
Connector	UG-383/U (modified)	UG-385/U	UG-387/U	UG-387/U (modified)
VSWR	<3.5:1, typ. 2.2:1	<3.5:1, typ.2.2:1	<3.6:1, typ.2.5:1	<3:1, typ.2.3:1
<b>LO input / IF output</b>				
Connector	SMA-connector			
<b>LO signal</b>				
Frequency range	9.81 GHz to 15.19 GHz	8.21 GHz to 12.62 GHz	8.21 GHz to 12.62 GHz	9.4 GHz to 14 GHz
Harmonic number	4	6		8
Optimum LO level		+15.5 dBm		+14 dBm
Maximum LO level		+19 dBm		
<b>IF signal</b>				
IF (nom.)	741.4 MHz			
<b>General data</b>				
Nominal temperature range	+5°C to +40°C			
Limit temperature range	-20°C to +60°C			
Storage temperature range	-40°C to +70°C			
Humidity	+40°C at 95% relative humidity (IEC 68-2-3)			
<b>Physical characteristics</b>				
Dimensions in mm (W x H x D)	28.6 x 33.8 x 63.5	20 x 29.5 x 60		28.6 x 33.8 x 63.5
Weight	170 g	150 g		

## Ordering information

Order designation	Type	Order No.
Harmonic Mixer 40 GHz to 60 GHz	FS-Z60	1089.0799.02
Harmonic Mixer 50 GHz to 75 GHz	FS-Z75	1089.0847.02
Harmonic Mixer 60 GHz to 90 GHz	FS-Z90	1089.0899.02
Harmonic Mixer 75 GHz to 110 GHz	FS-Z110	1089.0947.02
Required option for external mixing (for FSEK/M ESI 26/40, FSIQ 26)	FSE-B21	1084.7243.02

### Accessories supplied <sup>1)</sup>

Operating manual, disk with conversion loss data, chart with conversion loss data, carrying case

<sup>1)</sup> Connection cable is supplied with option FSE-B21.



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