



Products: FSP, FSEx, FSIQ, FSU, FS-K3

Reproducible Noise Figure Measurement Using the Shielded Box ZA-SB10

Application Note

Determining the noise figure of a component can be difficult in unshielded lab environments. Measuring small noise figures (less than 3 dB) and reproducing the results is sometimes not possible. These difficulties are caused by interference effects (electric fields) that can occur in any environment. A suitable remedy is a measurement environment able to shield the Device Under Test (DUT) against all interfering fields in the range up to 3 GHz. When used in conjunction with a spectrum analyzer and Noise Measurement Software FS-K3, the Shielded Box ZA-SB10 provides a complete noise measurement system.



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1 Overview

Determining the noise figure of a component can be difficult in unshielded lab environments. Measuring small noise figures (less than 3 dB) and reproducing the results is sometimes not possible. These difficulties are caused by interference effects (electric fields) that can occur in any environment. A suitable remedy is a measurement environment able to shield the Device Under Test (DUT) against all interfering fields in the range up to 3 GHz. When used in conjunction with a spectrum analyzer and Noise Measurement Software FS-K3, the Shielded Box ZA-SB10 provides a complete noise measurement system.

2 Operating Principle

The shielded box provides a defined environment for measuring the noise figure. The shielded box together with a spectrum analyzer from the FSx, FSEx or FSIQ families, plus the Noise Measurement Software FS-K3 form a shielded test system that enables you to perform reproducible noise measurements.

The box ensures a typical shielding effectiveness of 40 dB to 75 dB (depending on the frequency range).

The noise source for measurements is powered (+28 V DC) via a BNC input at the rear of the box. The spectrum analyzer supplies this voltage directly to the BNC input connector using an RG58 cable. When the noise figure is measured using Noise Measurement Software FS-K3, this voltage is automatically switched on and off. A DC filter placed ahead of the noise source suppresses any interference occurring on the line.

The noise source is connected to the input of the DUT.

An active DUT requiring a power input can be supplied from an external source via a connection with lowpass filters.

The signal to be measured is routed to the output connector of the shielded box via a preamplifier, if required. It is then routed to the FSx (FSEx, FSIQ) for software-controlled noise measurement.

To keep external influences to a minimum, the preamplifier is powered from a lead/gel battery (+12 V/2.2 Ah) contained in the box.

The preamplifier can be switched on or off by means of a switch on the box. The current status is indicated by an LED.

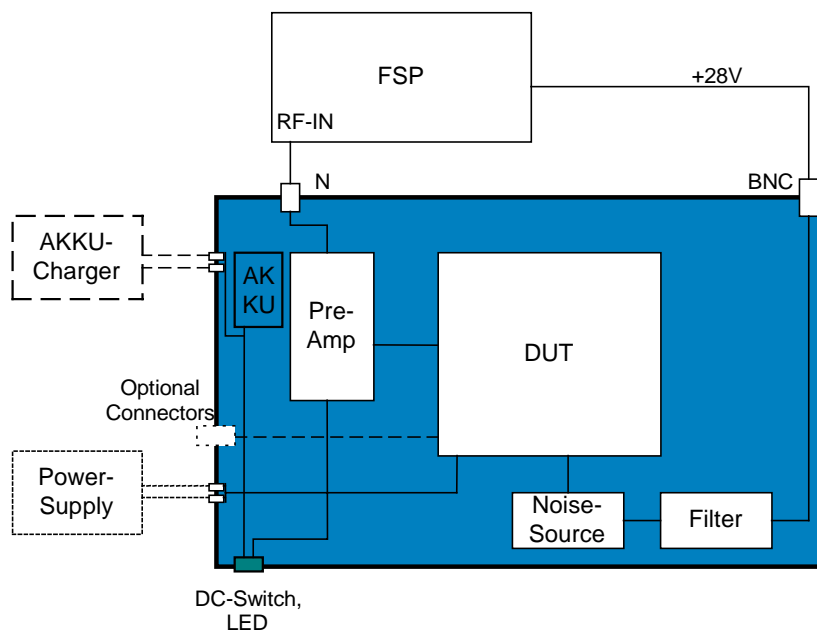
All supply lines connected to the box must be shielded and carefully grounded.

Shielded Box for Noise Figure Measurement

The shielded box has shielding contact strips in the cover to guarantee maximum immunity to radiated interference. The box can be easily closed and opened by means of two snap locks.

3 Test Setup

Hardware Requirements (Example)



4 References

Data sheet for Noise Measurement Software FS-K3, PD757.2380.22

Noise Measurement Software FS-K3, News from Rohde & Schwarz No. 167

5 Additional Information

If you have any comments or suggestions regarding this application note, please contact TM-Applications@rsd.rohde-schwarz.com

6 Ordering Information

Spectrum-Analyzer		
FSP3/7/13/30	9kHz to 3/7/13/30GHz	1093.4495.xx
FSEx 30	9kHz to 3,5/7/26,5/40GHz	--
FSIQ3/7/26,5/40	9kHz to 3,5/7/26,5/40GHz	1119.5005.xx
ESIB7/26,5/40	9kHz to 3,5/7/26,5/40GHz	1088.7490.xx
FSU3/8	20Hz to 3/8GHz	1129.9003.0x
Software		
Noise Measurement Software FS-K3		1057.3028.02
Shielded Box		
Shielded Box ZA-SB10		3560.6673.01



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