Noise Measurement Software FS-K3

Noise test system with FSE, FSIQ or FSP analyzers

The noise figure and the gain of a DUT can be measured highly accurately with the new Noise Measurement Software FS-K3 and a signal or spectrum analyzer of the FSE, FSIQ or FSP family. The result is a noise test system that is substantially superior to a conventional test setup.

High-grade noise test systems

Spectrum Analyzers FSE and FSP and Signal Analyzers FSIQ from Rohde &Schwarz featuring high sensitivity and level accuracy are – together with switchable and calibrated noise sources – ideal for performing automatic measurements of noise figure and gain. Noise Measurement Software FS-K3 invests these high-grade analyzers with characteristics that are otherwise only obtainable in special-purpose noise test systems. The following parameters can be measured:

- noise figure in dB,
- noise temperature in Kelvin,
- gain in dB.

The software runs on a commercial PC with the Microsoft Windows™ 3.1/95/98/NT operating systems. An IEEE/IEC-625-1 interface is required for measurement. In the case of analyzers including the controller function (FSE-B15) or FSIQ, the application can run in the particular unit without the need for a PC.

Settings for the measurements are performed via the software and can be stored on a data medium. Results can be exported in the form of WMF, DAT or TXT files for further processing by other programs.

Users who already have the predecessor version FSE-K3 will receive a free upgrade and can take advantage of the extended functionality.

Noise figure and gain of mixers

A frequent problem when measuring the noise figure and gain of mixers is that the broadband noise of commercial noise sources is not only converted into the IF at the required input frequency but also at the image frequency. The noise power, additionally converted at the image frequency, causes a measurement error that can vary by proportion.

One way of avoiding this error is to use a filter with which the input noise at the image frequency is strongly suppressed and only the noise component at the desired receive frequency is considered. But often, suitable filters will not be available and first have to be provided. That is why this solution is too time-consuming and inflexible for use in labs.

FS-K3 offers a way around this problem. The difference between receive and image frequency in the conversion losses of a mixer can be entered in the software. A correction factor for the measured noise figure or gain is then calculated as a function of this difference, which will be called image rejection. The FIG illustrates the relationship between the correction factor and image rejection.

To obtain the equivalent noise figure for a sideband, the correction factor for the given suppression has to be added to the measured value. For gain you proceed in a similar way, but subtract the correction factor from the measured value. The suppression can be determined by measuring the conversion loss of the DUT at the receive and image frequency, eg with Network Analyzer ZVR.

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Reader service card 167/08

Correction factor for noise figure and gain at image frequency