TBMR-110M

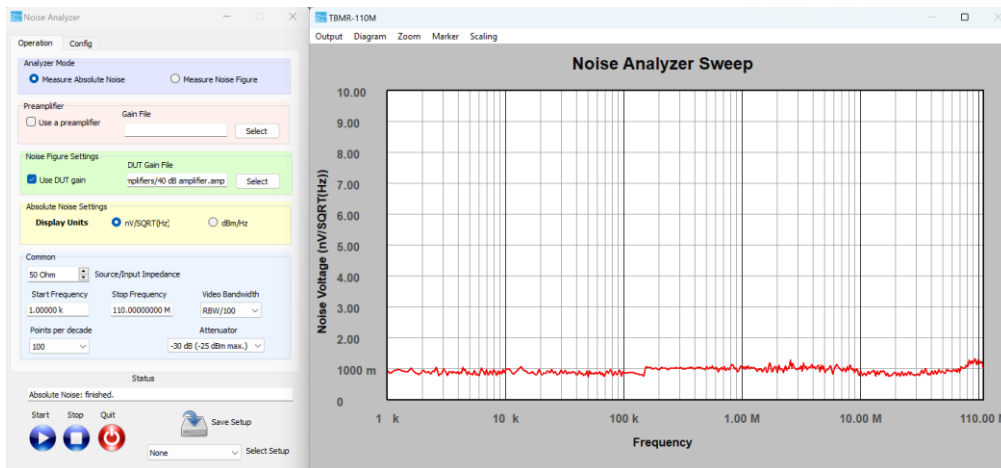## Noise Analyzer Flyer

SW Rev.1.4.3

Noise Analyzer application

The noise-analyzer application allows the user to measure the absolute noise power/voltage over a frequency range of 1 Hz to 110 MHz as well as the noise figure of any two-port device in the same frequency range. The mode of operation is selected in the "Analyzer-Mode" section. Choosing a different mode will automatically change diagram axis descriptions accordingly.

When evaluating the noise characteristics of low noise unity gain followers or amplifiers with a gain of less than 6dB, utilizing a preamplifier such as the Tekbox TBLNA-110M will increase measurement accuracy. When utilizing an LNA in the noise measurement setup, the gain-over-frequency characteristics of the amplifier must be loaded first. This file will either be supplied with the LNA or can be measured using the Tracking Generator application; just ensure that the gain data cover the entire frequency range of the intended noise measurement.

The "Noise Figure Settings" allows you to load the gain characteristics of the device under test (DUT). This gain file is necessary for noise figure or absolute noise measurements that refer to the DUT input. When the absolute noise measurement refers to the DUT output, no gain file is necessary. If the DUT gain is unknown, it can be measured using the Tracking Analyzer App.

In the "Absolute Noise Settings" section, you can choose to display RMS noise voltage in terms of V/√Hz or noise power dBm/Hz. The "Common" section covers settings for the source impedance, start and stop frequencies, video bandwidth, points per decade, and attenuator settings.

The Video Bandwidth is specified proportional to the analyzer's automatically adjusted resolution bandwidth (RBW). The smaller the fraction, the smoother the noise figure, but at the expense of increased measuring time. For optimal noise sensitivity, the attenuator should always be set to the lowest practical value. Points per decade allows you to change the number of data points for each frequency decade. The status field displays the current segment measurement time. Please take note that only the measurement time is displayed. The total time will be much longer because it will include both measurement and data transfer time.

The noise figure NF in [dB] is based on measuring the output power noise density P_{NOUTD} in [dBm/Hz] and applying the formula below. In order to compensate for the receiver´s noise, a reference measurement without amplifier is done first.

$$NF = P_{NDOUT} + 174 \text{ dBm/Hz} - GAIN$$
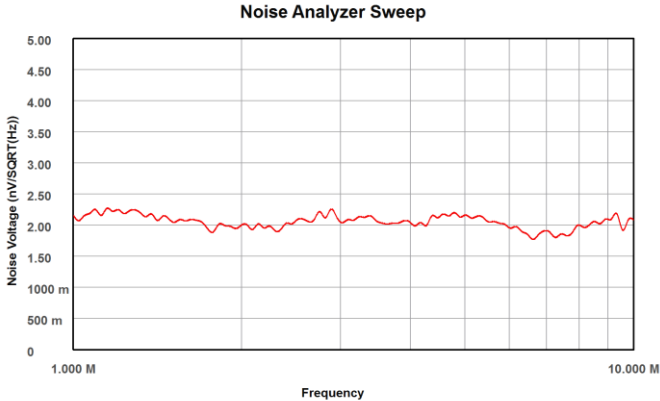
Example of an absolute noise measurement of an amplifier. VBW = RBW/1000
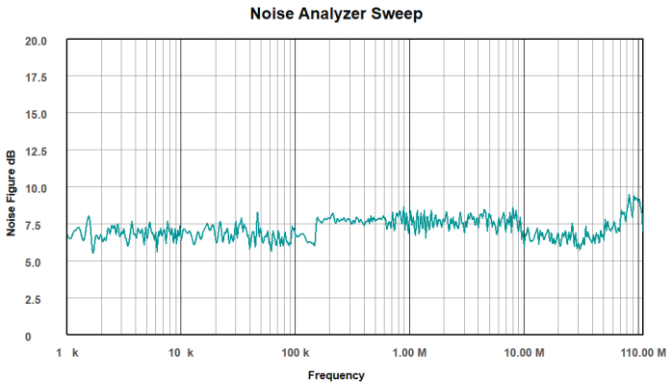
Example of an amplifier noise figure measurement

Version	Date	Application software version	Changes
V1.0	17.1.2025	V1.4.3	Initial document

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