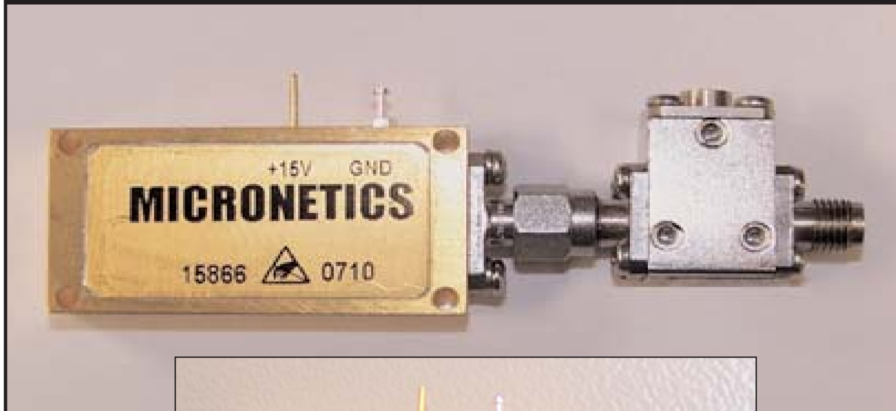
Fullband High ENR Microwave Noise Sources
S, C and X Bands

6.2008



Fullband Output Characteristics For Use in Systems

MODEL	FREQUENCY	RF OUTPUT EXCESS NOISE RATIO (dB)	FLATNESS
RFN55L	1.0 to 2.0 GHz	55(MIN)	2.0 dB P-P
RFN55S	2.0 to 4.0 GHz	55(MIN)	2.0 dB P-P
RFN55C	4.0 to 8.0 GHz	55(MIN)	2.0 dB P-P
RFN55C1	3.95 to 5.85 GHz	55(MIN)	2.0 dB P-P
RFN55C2	5.85 to 8.20 GHz	55(MIN)	2.0 dB P-P
RFN55X	8.0 to 12.4 GHz	55(MIN)	4.0 dB P-P

Waveguide Chart

MODEL	FREQUENCY	WAVEGUIDE
RFN55C1	3.95 to 5.85GHz	WR-187
RFN55C2	5.85 to 8.20GHz	WR-137
RFN55X	8.20 to 12.4GHz	WR-90

Common Applications

Radar Built-in Test/Calibration; where there is significant path loss between the noise source and the receiver. For example, a 30dB coupler can be used to feed the test noise signal into the receiver which minimized noise figure while still allowing 25 dB ENR.

Jamming Systems; these high output devices, when used in conjunction with power amplifiers, offer an efficient means to jam RF/microwave signals.

Antennal Calibration; high output noise can be used for antenna calibration to counter the effects of over-the-air transmission loss.

Description

Micronetics line of fullband noise sources are specially designed for built-in test and calibration where there is significant path loss between the noise source and the device.

This family of high output fullband noise sources with their compact size are specially designed for ease of integration into microwave systems.

With their rugged and stable design, the heart of these noise sources is a small chip and wire hermetic noise module. This is embedded in the housing with a precision launch to the coaxial jack. This design gives is much more stable and rugged than traditional coaxial noise sources which rely on pill packaged diodes and beryllium copper bellow assemblies which are not only are less reliable, but use hazardous materials.

Configurable to your requirements

Micronetics fullband noise sources are based on a coaxial design as the base part. As standard options, noise sources can be ordered with either

- Coaxial Isolator
- Waveguide Output
- Waveguide Isolator

Specifications

- Operating Temp: -40 to +85^{o}C
- Storage Temp: -65 to +125^{o}C
- Supply Voltage: +15V +/- 1.5V
- Current Draw: @ 200 mA (Max)
- Output Impedance: 50 ohm
- Peak Factor: 5:1

MICRONETICS
NOISE PRODUCTS

FULLBAND HIGH ENR MICROWAVE NOISE SOURCES
S, C AND X BANDS

There are several primary uses for employing a noise signal for built-in-test.

1. Using Noise for Built in Test:: These high output moduels are ideal for buidl-in-test wehrer there is a significant path loss between the noise source and the point at which the noise signal is used. For an example an 8-way splitter in an array antenna receiver will allow enough power at the receiver plane at each of the eight receive paths. Another example allows a high directivity coupler to be used (i.e., 30 dB) allowing better receiver noise figure.

2. Noise Temperature (noise figure) or Sensitivity Testing: This test uses the noise source to supply a known excess noise ratio (ENR) to a device under test for a Y-factor measurement. By taking two receiver readings, one with the noise on and one with it off, Y-factor can be determined. By knowing the ENR and Y-factor, one can calculate noise temperature (figure) or sensitivity.

3. Frequency Response: The noise source being broadband can be used as a replacement of a swept source to calculate frequency response of a receiver or other device. By putting in a known spectral signal at the input and taking a reading at the output, one can determine the gain or loss over frequency of the entire system. Noise sources are inherently extremely stable devices. In addition, the circuitry is much simpler than a swept source which increases reliability and lowers cost.

4. Amplitude Reference Source: The noise source can be used as a known reference signal. By switching in the noise source from the live signal, a quick test can be performed to check the health of the chain or calibrate the gain/loss. For this test, noise can be injected into the IF system as well as the RF to test/calibrate the path.

For more information on using noise for built-in-test, read the Feb 2004 Microwave Journal article authored by Patrick Robbins of Micronetics.
http://www.micronetics.com/articles/microwave_journal_02-04.pdf

USEFUL NOISE EQUATIONS

Calculating Y-Factor:
$Y_{Fact} = N_2 / N_1$ *Where N_2 is measured power output with noise source on and N_1 is the measured power output with noise source off.*

Calculating Noise figure from ENR and Y-factor:
NF(dB) = ENR (dB) - 10 log10 (Y_{Fact} -1)

Converting ENR to Noise spectral density (N_0):
0 dB ENR = -174 dBm/Hz

Calculating noise power in a given bandwidth (BW) from noise spectral density:
Power (dBm) = N_0 + 10log(BW)

HOW TO ORDER

RFN55 X -X

Model

L = L band *
S = S band *
C = C band
C1 = C band
C2 = C band
X = X band

Option
0 = Plain
1 = Coax Isolator
2 = Waveguide
3 = Waveguide Isolator

* waveguide not available on S and L models