NOISEWAVE

The new wave in NOISE

NW-CNG
Precision Eb/No Generators

NW-CNG Series

The NoiseWave NW-CNG instrument improves the speed and accuracy of BER testing by automatically setting precise, stable, SNR (signal-to-noise), CNR (carrier-to-noise), and Eb/No ratios for a user supplied signal. Eb/No generation and measurement for BER (bit error rate) testing is a labor intensive task which is prone to error and inaccuracy. Inaccuracies in Eb/No generation lead to inaccurate and inconsistent BER vs. Eb/No data. This is a problem for the device, modem, receiver, or system manufacturer and for the customer trying to verify performance. The precision, speed, and repeatability of the NW-CNG eliminates this problem and reduces test time. The NW-CNG can be controlled manually for engineering and laboratory testing or remotely via GPIB or Ethernet for automated production testing. This series achieves the highest reliability using NoiseWave's proprietary noise generator, broadband amplifier, and solid state variable attenuator technology. Using NoiseWave's true AWGN noise modules, it achieves a minimum noise crest factor of 18 dB, allowing the user to test very low bit error rates.

Setting Precision C/N Ratios

The substitution calibration method is utilized to accurately set carrier-to-noise ratios within the CNG generator. As a result, the effects of any non-linearity in the power meter are therefore eliminated. This is achieved by the instrument setting the signal and the noise to the exact same power level at the power meter input (See the functional diagram Figure 1). Setting the desired ratio is accomplished by directly offsetting the noise power via calibrated attenuators. Noisewave uses the most accurate and reliable components available so that the primary source of inaccuracies is maintained at a minimum. Noise and power are measured within a very short time frame therefore, thermal drift is negligible. Active components that could affect a long-term drift are common to both the noise and signal path, so the variation in these components will not affect the calibrated ratio. The instruments flat amplitude signal path and linear phase ensures that the preferred signal passes through with minimal distortion.

Taking measurements is as simple as pressing a button since the CNG generator automatically will compensate for parameters like bandwidth, bit rates, and power levels.

Functions, parameters, and operating modes are easily set utilizing the Front Panel of the CNG generator.

There are basically 6 modes of operation:

Eb/No - Bit energy to Noise Power Spectral Density ratio. This mode is used for digitally modulated signals. The unit is connected to a user supplied test signal. The user keys in (or supplies by remote control) the bit rate of the signal, the desired signal output level, and the desired Eb/No ratio. The unit then automatically and rapidly sets the output Eb/No ratio.

C/N - Carrier to Noise Ratio. This mode is used for an analog modulated signal. Similar to above but the user supplies the signal bandwidth and the desired ratio.

C/No - Carrier to Noise Power Spectral Density. Similar to C/N but this ratio is independent of signal bandwidth.

C/I - Carrier to Interference Ratio. This mode is used for testing with CW, co-channel, adjacent channel, or other type of interfering signals. In this mode the user supplies the test signal and an interfering signal. The unit sets the user's desired relative level between the test and interfering signals.

Noise Generator – This mode functions as a Noise Generator. Intended for use as a Broadband AWGN with a user adjustable level.

Power Meter – This mode measures the power level of the test signal.

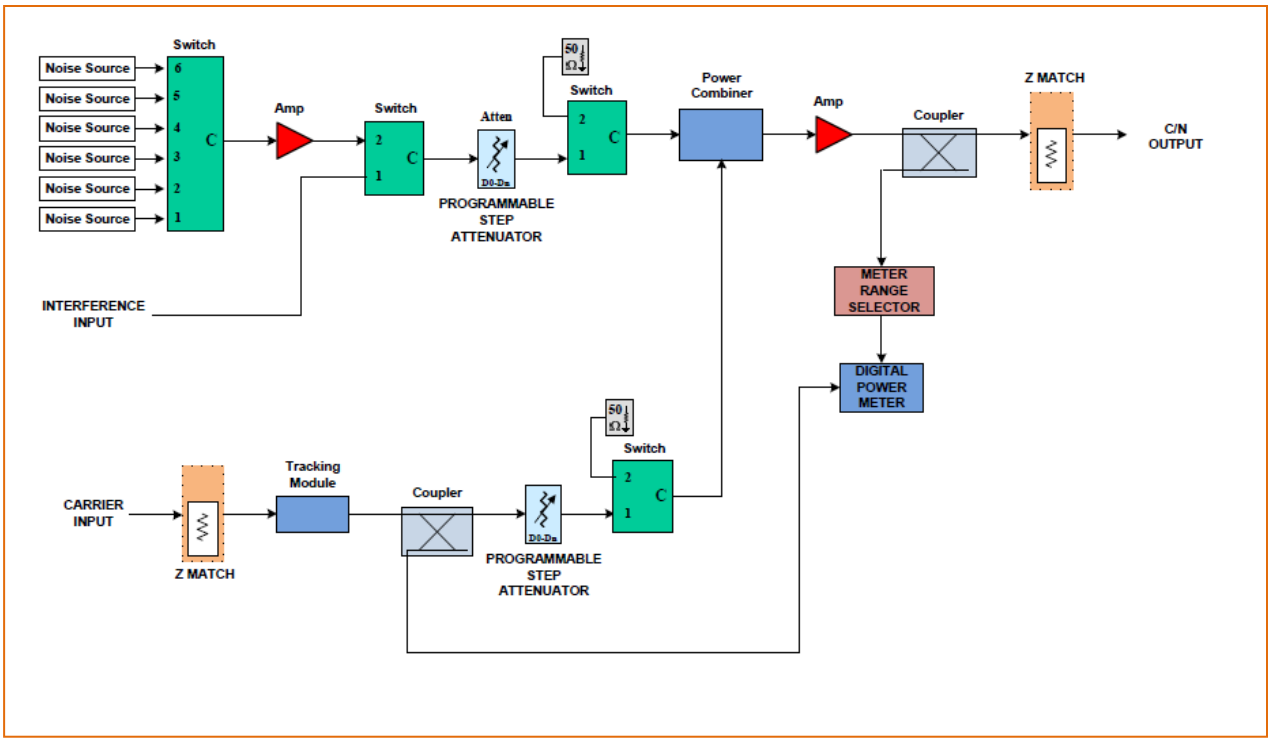

Figure 1 Functional Block diagram

Features of the NW-CNG series:

- ***Built in Precision Noise Generator*** that allows simple mode selection and entry of desired noise density. The internal noise source provides the selected signal.

- ***Built in True RMS Power Meter*** that is custom designed and optimized to cover the frequency range of a particular instrument. It can precisely measure signals and Gaussian Noise with crest factors up to 18 dB and uses various averaging methods to ensure the most accurate readings. Measurements are obtained through couplers which allow the signal to pass through to the output connector regardless of meter circuitry.

- ***Latest Advanced Digital Signal Processing*** for superior measurement accuracy.

- ***Ease of use*** by means of a user friendly front panel keypad and 4x20 VFD display that provides constant feedback on the instrument state and settings.

- ***Easily controlled remotely*** through the standard rear panel Ethernet TCP/IP, and optional GPIB interfaces.

- ***Accuracy of 0.2 dB RSS*** is obtained by a special dynamic power meter that measures both the noise and the signal which allows the instrument to set the desired ration to within +/-0.2 dB.

- ***Rugged standardized design and construction*** allows for less maintenance, lower service cost, and increased accuracy and reliability.

- ***Custom configurations*** to meet your specific needs and applications such as: SATCOM, CDMA, WCDMA, TDMA, CableTv, IS-95, NASA TDRSS, UMTS, GPRS L-band modems, Intelsat, Milstar, Inmarsat, HDTV, and general purpose.

- ***Optional Tracking Feature*** that acts as an automated gain control (AGC) device to monitor unstable input signal sources to allow for accurate long-term testing at a specified Eb/No ratio. Correction for signal drift is up to 0.2 dB resolution. The Carrier output level is kept constant and, therefore, so is the Eb/No ratio.

- ***Competitive Pricing and Quality Service*** commitment as always from Noisewave.

The NW-CNG is easy to operate and install in the test set up. Below is a functional block diagram (Figure 2) of the NW-CNG in a typical BER test application.

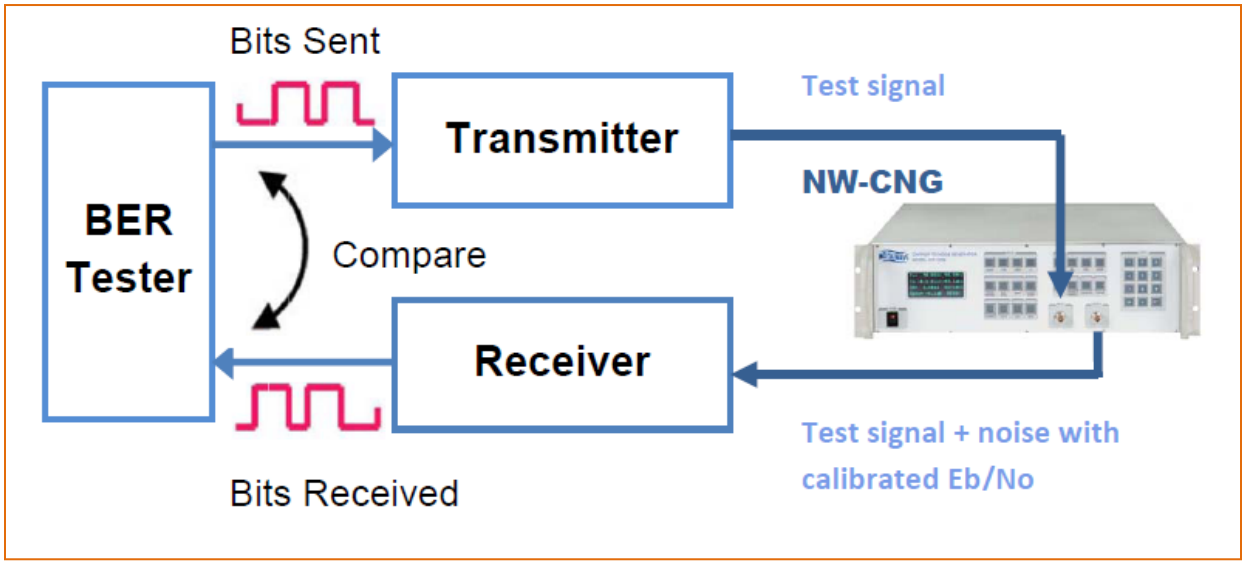

Figure 2 Typical BER Test Application

Ordering Information:

Model Number	Frequency Range	Applications
NW-50M-CNG	5 to 90 MHz	Satellite Modem testing, Wireless and Broadband testing
NW-70-CNG	50 to 90 MHz	IF Testing, Broadcast
NW-IF1-CNG	50 to 90 MHZ 100 to 180 MHz	SATCOM, Intelsat, Aeronautical
NW-IBS/IDR-CNG	50 to 90 MHz 68 to 72 MHz 100 to 180 MHz	SATCOM, Intelsat, Aeronautical
NW70/140-CNG	50 to 180 MHz	Satellite Modem testing, Wireless and Broadband testing
NW-CATV-CNG	50 to 890 MHz	Cable TV, HDTV
NW-1550-CNG	950 to 2150 MHz	Satellite IF Loopback Testing, L-Band Modems, Mobile Satellite
NW-1850-CNG	1710 to 1990 MHz	CDMA, GSM, 3G and 4G Mobile Telecom
NW-2050-CNG	1900 to 2200 MHz	PCS, Wideband CDMA, 4G Mobile Telecom
NW-S-CNG	2200 to 2700 MHz	Satellite testing, Satellite Modem testing, Wireless and Broadband testing
NW-2442-CNG	2400 to 2484 MHz	ISM, Bluetooth, 802.11b Wireless LAN
NW-5500-CNG	5000 to 6000 MHz	802.11a Wireless LAN
NW-20000-CNG	18 to 22 GHz	Fixed Satellite

Custom units are available upon request, please contact Noisewave for details.

Specifications:

Noise Output	
Power:	-55 dBm to +5 dBm
Flatness:	+/- 0.2 dB for 40 MHz BW +/- 0.3 dB for 80 MHz BW +/- 0.4 dB for 200 MHz BW +/- 0.5 dB for > 200 MHz BW
Noise Power resolution:	0.1 dB
Attenuation Range:	60 dB (0.1 dB steps)
Crest factor:	18 dB minimum
Carrier Path	
Signal Path Input Power:	-55 dBm to +5 dBm
Signal Path Output Power Range:	-55 dBm to +5 dBm
Maximum No Damage Input:	+22 dBm
Nominal gain:	+/- 1.0 dB
Gain resolution:	0.1 dB
Gain flatness:	+/- 0.2 dB for 70 MHz +/- 20 MHz +/- 0.3 dB for 140 MHz +/- 40 MHz +/- 0.4 dB for all other frequencies
Group delay:	+/- 0.20 ns per 40 MHz bandwidth
Signal tracking range:	+/- 4 dB minimum
Measurement	
C/N ratio accuracy:	+/- 0.2 dB RSS
Power meter range:	-55 dBm to +5 dBm
Averaging rate:	Programmable
Absolute accuracy:	+/- 0.5 dB
Control and interface	
Local interface:	Front panel keypad & display
Remote interface:	IEEE-488.2, Ethernet,
General Specifications	
Operating Modes:	C/N, C/No, Eb/No, C/I ,Noise Generator, Power Meter
Warranty:	3 years
Connector:	N female
Impedance:	50 Ohm
Interferer input level:	-4 dBm +/- 2 dB
AC Input Voltage:	85 to 264 VAC auto ranging
AC Input Frequency:	47-63 Hz
Power Consumption:	2 Amps Maximum
Operating temperature:	-25°C to +65°C
Storage Temperature:	-65°C to +125°C
Size:	17.0” W x 5.25” H x 20.0” D or lesser depth, rack mountable

Common Available Options:	
Option 75	75 ohm impedance instead of 50 ohm
Option AGC	Automatic Gain Control. The AGC can maintain a precise stable ratio for an input signal which is varying in power. This option is often used for testing with signals received from a satellite or broadcast.

All specifications are subject to change without notice.

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