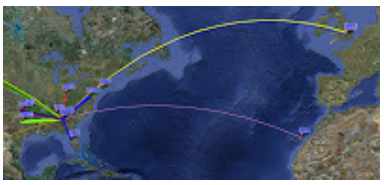
Signal to Noise Ratio - Rainbows in the Dark



In analogue and digital communications, signal-to-noise ratio, often written S/N or SNR, is a measure of signal strength relative to background noise. The ratio is usually measured in decibels (dB). If the **incoming signal strength in microvolts is Vs**, and the **noise level, also in microvolts, is Vn**, then the signal-to-noise ratio, S/N, in decibels is given by the formula;

$$S/N = 20 \log_{10}(Vs/Vn)$$

If Vs = Vn, then S/N = 0. In this situation, the signal normally borders on unreadable, because the noise level severely competes with it. *In digital communications, this will probably cause a reduction in data speed because of frequent errors that require the source (transmitting) computer or terminal to resend some packets of data. If Vs is less than Vn, then S/N is negative. In this type of situation, reliable communication is generally not possible unless steps are taken to increase the signal level and/or decrease the noise level at the destination (receiving) computer or terminal.*

And this was the world we lived in for most of time, but recently (last 40 years) even HAMs can communicate under the noise. As you may know if you have been following my blogs here, I have been smitten by WSPR and chalk up -30db contacts. PRIMER

Here are my findings to date (with the equipment at hand)

Mode Min SNR
CW@20WPM +3db (machine decoded by MFJ-461)
CW@20WPM +1db (machine decoded by fldigi or CWget)
HFpacket (300baud) +1db
RTTY45 -5db
CW@20WPM -7db (other claim like less, like -13db*)
PSK63 -7db
FELDHell -7db
PSK31 -10db
Olivia 64/2000 -13db
Olivia 16/500 -14db
WSPR -30db (*maybe less*)

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