

Four Level FSK – NL6000

The four-level symbols are filtered by a root raised cosine filter with an excess bandwidth factor of 0.7. At a symbol rate of 6000 symbols per second, which translates to 12000 bits per second within narrowband channels, the peak deviation of the resulting waveform is 2.5 KHz.

The NL6000 Radio spectrum occupies 11.25 KHz of spectrum bandwidth, the four level symbols are filtered by a root raised cosine filter. The carrier deviation was set to 2.5 KHz.

Necessary bandwidth forms part of the emission designator used for frequency management purposes and is used as a parameter in spectrum standards, frequency assignments, etc.

Modulation = 11K0F1D (FCC Required Calculation)

Necessary Bandwidth Calculation:

Maximum Modulation (M), kHz = 3
Maximum Deviation (D), kHz = 2.5
Constant Factor (K) = 1
Necessary Bandwidth (BN), kHz = $(2 \times M) + (2 \times D \times K)$
= 11.0

Excessive Bandwidth Factor

Excessive bandwidth factor or the roll-off factor determines the bandwidth of the pulse shape. And is normally the factor "beta" in formula calculations. Note that appropriate values are between 0 and 1.

Raised-cosine filters are popular in wireless communications since they produce a strictly band limited signal. This is desirable since it reduces the interference the modulated signal creates for uses in adjacent channel bands. It allows a communications system to signal at a rate near the *Nyquist* rate for the channel bandwidth without the excessive side lobe filtering which can cause channel distortion and inter-symbol interference (ISI).

Sensitivity of the NL6000 Radio is –115 dbm (.4 uv)

Our receive sensitivity statement includes the minimum value of average received power to achieve 99% reliability of a data transmission on the first attempt and includes the effects of Forward Error Correction, and Interleave within the packet structure including spectral pre-coding. The final result is not directly attributed to only the radio receiver or signal and noise calculations. This value is typically applied in the design and testing of a wireless infrastructure employing NL6000s.