ABL Minimum Frequency Separation

Per IRIG 106 Appendix A paragraph 4.0 – Frequency Usage Guidance, ABL will need a minimum of 22 MHz separation between transmitting frequencies. This separation is an initial assessment and may be subject to change.

IRIG 106 Appendix A paragraph 4.0 – Frequency Usage Guidance uses the following process.

$$\Delta F_0 = a_s R_S + a_i R_i$$

Where:

- ΔF_0 is the minimum required center frequency separation in MHz
- R_S is the bit rate of desired signal in Mb/s
- R_i is the bit rate of the interfering signal in MB/s
- a_s and a_i are determined by the desired signal type and receiving equipment as listed in Table A-1.

TABLE A-1. COEFFICIENTS FOR MINIMUM FREQUENCY SEPARATION CALCULATION

Modulation Type	a_s	a_i
NRZ PCM/FM	1.0* for receivers with RLC final Intermediate Frequency (IF) filters 0.7 for receivers with Surface Acoustic Wave (SAW) or digital IF filters 0.5 with multi-symbol detectors (or equivalent devices)	1.2
FQPSK-B, FQPSK-JR, SOQPSK-TG	0.45	0.65
ARTM CPM	0.35	0.5

*The minimum frequency separation for typical receivers with Resistor-Inductor-Capacitor (RLC) final IF filters and NRZ-L PCM/FM signals is the larger of 1.5 times the actual IF –3 dB bandwidth and the value calculated using the equation above.

ABL determined the minimum separation frequency based on launch vehicle transmitter performance and the data listed in Table A-1. The below table lists the result.

Element	Symbol	Value	Units	Formula/Remarks
Desired Signal Bitrate	R_s	1.00E+07	bps	bit rate of desired signal in Mb/s
Modulation Separation coef	a_s	1		
Interfering Signal Bitrate	R_i	1.00E+07	bps	bit rate of interfering signal in Mb/s
Modulation Separation coef	a_i	1.2		
Minumum Spacing =	ΔF_0	22	MHz	