

## Necessary Bandwidth

Calculations are based on worst case alternating 10101010 data.

$$BaudRate(BR) = 1200$$

$$Tone1 = 1300Hz$$

$$Tone2 = 2100Hz$$

$$\begin{aligned} DeviationAudio(D_A) &= (Tone2 - Tone1) \div 2 \\ &= (2100 - 1300) \div 2 \\ &= 400Hz \end{aligned}$$

$$\begin{aligned} FrequencyCenterAudio(F_{CA}) &= ((Tone2 - Tone1) \div 2) + Tone1 \\ &= ((2100 - 1300) \div 2) + 1300 \\ &= 1700Hz \end{aligned}$$

$$\begin{aligned} BandWidthNecessaryAudio(BW_{NA}) &= 2(D_A + BR) \\ &= 2(400 + 1200) \\ &= 3200Hz \end{aligned}$$

$$\begin{aligned} HighestModulatingTone &= F_{CA} + BW_{NA} \div 2 \\ &= 1700 + (3200 \div 2) \\ &= 3300Hz \end{aligned}$$

$$DeviationRadioFrequency(D_{RF}) = 2000Hz$$

$$ModulationHighestTone(M_{HT}) = 3300Hz$$

$$\begin{aligned} BandWidthNecessaryRadioFrequency(BW_{NRF}) &= 2(M_{HT} + D_{RF}) \Rightarrow \text{Carson's rule} \\ &= 2(3300Hz + 2000Hz) \\ &= 10600Hz \end{aligned}$$

$$\text{Requested Emission Designator} = 10K6F2D$$