

**Theoretical processing gain and Jammer to Signal ratios (11 Mbps DSSS radio).**

Data rate (Mbps)	Modulation type	Symbol rate (SyR) Symbols/second (Msps)	Spread rate (SpR) Chips/symbol (Mcps)	Processing gain $G_p=10\log(\text{Spr/Syr})$	(S/N) <sub>o</sub> + L <sub>sys</sub> (dB)	Calculated J/S (dB)	Allowed J/S for 10 dB PG, 10dB - (S/N) <sub>o</sub> + L <sub>sys</sub> (dB)
2	DBPSK	1	11	10.4	21.3	-10.9	-11.3
11	CCK	1.375	8	7.6	19.0	-11.4	-9.0

All data as stated above has been provided by Intersil and the datasheet of the HFA3861A DSSS baseband processor.

**HFA3861A**

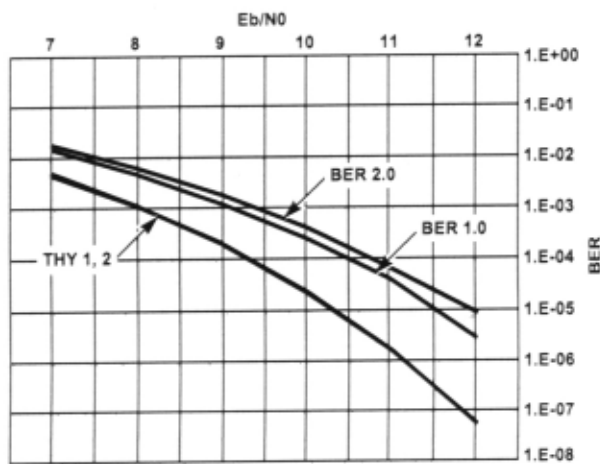


FIGURE 14. BER vs Eb/N0 PERFORMANCE FOR PSK MODES

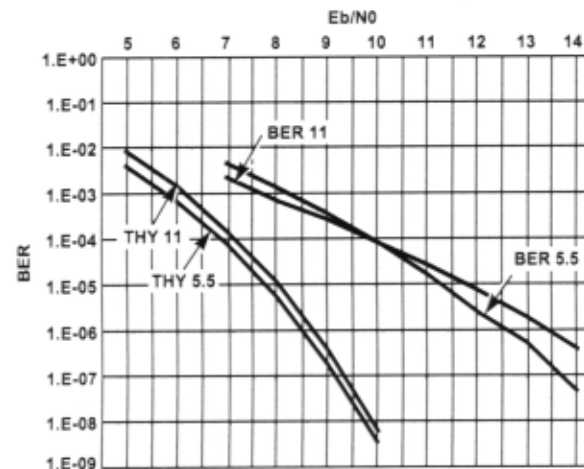


FIGURE 15. BER vs Eb/N0 PERFORMANCE FOR CCK MODES

Figure 1 - Copy of datasheet

Explanation of theoretical processing gain calculations.

**BER = 1.E-5, Data rate = 2 Mbps**

$$G_p = 10\log(\text{Spr/Syr}) = 10\log(11/1) = 10.4$$

$$E_b/N_0 = 10.3 \text{ dB (from figure 1, copy of datasheet of DSSS baseband processor)}$$

$$(S/N)_o = E_s/N_0 = E_b/N_0 + \text{correction factor for 8 bits/symbol} = 10.3 \text{ dB} + 10\log(8) \text{ dB} = 10.3 \text{ dB} + 9 \text{ dB} = 19.3 \text{ dB}$$

$$L_{\text{sys}} = 2 \text{ dB max.}$$

$$G_p = (S/N)_o + M_j + L_{\text{sys}}$$

$$\text{Calculated } M_j = J/S = G_p - (S/N)_o - L_{\text{sys}} = 10.4 \text{ dB} - 19.3 \text{ dB} - 2 \text{ dB} = -10.9 \text{ dB}$$

$$\text{Allowed } J/S \text{ for 10 dB PG} = G_p - (S/N)_o - L_{\text{sys}} = 10 \text{ dB} - (S/N)_o - L_{\text{sys}} = 10 \text{ dB} - 19.3 \text{ dB} - 2 \text{ dB} = -11.3 \text{ dB}$$

**BER = 1.E-5, Data rate = 11 Mbps**

$$G_p = 10\log(\text{Spr/Syr}) = 10\log(8/1.375) = 7.6$$

$$E_b/N_0 = 8 \text{ dB (from figure 1, copy of datasheet of DSSS baseband processor)}$$

$$(S/N)_o = E_s/N_0 = E_b/N_0 + \text{correction factor for 8 bits/symbol} = 8 \text{ dB} + 10\log(8) \text{ dB} = 8 \text{ dB} + 9 \text{ dB} = 17 \text{ dB}$$

$$L_{\text{sys}} = 2 \text{ dB max.}$$

$$G_p = (S/N)_o + M_j + L_{\text{sys}}$$

$$\text{Calculated } M_j = J/S = G_p - (S/N)_o - L_{\text{sys}} = 7.6 \text{ dB} - 17 \text{ dB} - 2 \text{ dB} = -11.4 \text{ dB}$$

$$\text{Allowed } J/S \text{ for 10 dB PG} = G_p - (S/N)_o - L_{\text{sys}} = 10 \text{ dB} - (S/N)_o - L_{\text{sys}} = 10 \text{ dB} - 17 \text{ dB} - 2 \text{ dB} = -9 \text{ dB}$$