2.4GHz Signal Golf Processing Gain

The Signal Golf ranging system consists of a hand held unit (Yard Dog) and a target unit (PIN) located on the flagpole in the cup. Distance to the PIN from the Yard Dog is measured by the time difference of the spreading code transmitted by the Yard Dog and echoed back by the PIN. Both PIN and Yard Dog use a sliding correlator to maximize the receive signal strength (RSSI) and thus align the local spreading code.

Processing gain for the Signal Golf system is measured using the CW jamming margin method and is calculated from **Pg = S/N + Mj + Lsys** as per FCC part 15.247e2 where:

Pg = Processing gain

S/N = signal to noise ratio for chosen BER. In the Signal Golf products, the BER is equivalent to a sync pulse. A sync pulse is produced in the PIN and Yard Dog when the RSSI increases by .45 volts, which corresponds to an increase of 14dB of RF signal at the receiver input. Therefore the **S/N** required for proper operation is 14dB.

Mj = Jamming margin and is calculated in the following manner. A CW jamming signal is added to a modulated transmitted signal. A spectrum analyzer with the VBW set to 30KHz is used to measure the jammer to signal (J/S) ratio. The CW jamming signal level is increased until the PIN or Yard Dog does not respond to the received signal (i.e. PIN does not lock and transmit, Yard Dog does not give distance reading). J/S is measured every 50KHz over a band of +/-5MHz from middle of the channel by changing the jamming frequency in 50KHz steps. As per 15.247e2, the lowest 20% of J/S are discarded and the next lowest value of J/S is used for Mj. Mj was measured at 14dB for the Signal Golf Products.

Lsys = system losses, assumed to be no more than 2dB.

Processing gain is then calculated to be 14dB + 14dB + 2dB = 30dB for the PIN and Yard Dog.