Process Gain Measurement of the BLT Radio

Method:

The process gain of the BLT radio was measured according to FCC document 47CFR15.247(e)(1) using the method described below.

Using a power meter, a CCSK transmitter was calibrated to a power of –50dBm measured at the input to the radio. A precision attenuator was the used to reduce this level to –74dBm which is in the middle of the dynamic range of the radio.

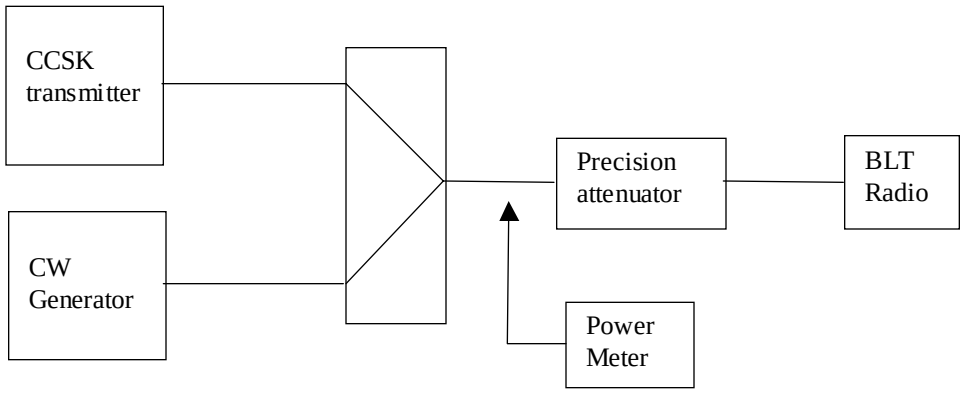
The transmitter was then programmed to transit CCSK packets to the radio every 100ms. The signal power as reported by the radio was –78dBm.

The CCSK transmitter was then turned OFF and replaced with a CW tone generator ("system spreading code turned OFF") similarly calibrated at –50dBm. The precision attenuator was then adjusted until the power reading reported by the radio was –78dBm, the same as the reported signal level for the CCSK transmitter ("System spreading code turned ON").

The difference in attenuator settings between the CCSK signal and the CW signal is the process gain of the radio.

The CW frequency was adjusted across the range 917.03MHz to 917.98MHz and the measurement repeated in order to ensure that there are no spurious effects.

Diagram:



Results:

Input signal level -74dBm (Atten = 24dB)		
CW Frequency	**Attenuator setting**	**Process Gain**
MHz	**dB**	**dB**
917.03	9	15
917.08	9	15
917.13	8	16
917.18	8	16
917.23	8	16
917.28	7	17
917.33	8	16
917.38	7	17
917.43	7	17
917.48	7	17
917.53	7	17
917.58	7	17
917.63	7	17
917.68	6	18
917.73	6	18
917.78	6	18
917.83	6	18
917.88	7	17
917.93	7	17
917.98	7	17

Conclusion:

There are twenty data points collected of which we can discard the worst 20% as allowed in the procedure. The worst remaining result is 16dB, which we will define as the process gain of the receiver.