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.

A source transmitter, with the spreading code turned on, was calibrated, using a power meter, to a level of –50dBm, measured at the input to a precision attenuator in series with the input of the radio. The precision attenuator was then used to reduce this level to the middle of the dynamic range of the radio.

The transmitter was then programmed to transmit CCSK packets to the radio every 100ms. At the radio demodulator, the signal power as reported by the radio was –78dBm.
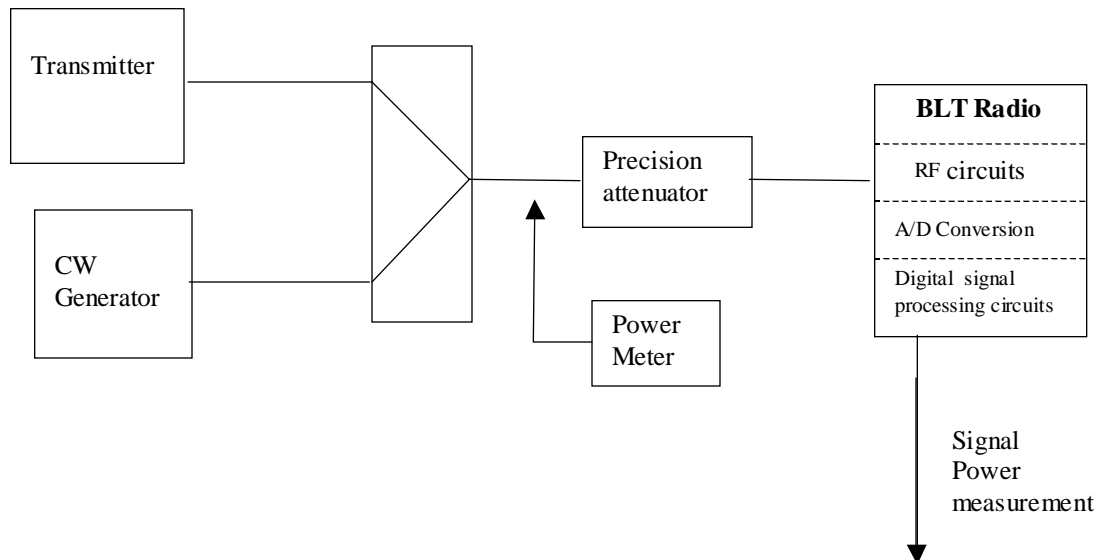
The system spreading code is turned off by replacing the transmitter with a CW tone generator , and the power level adjusted to the same –50dBm at the input to the precision attenuator, using the power meter. The precision attenuator was then adjusted until the power reading reported by the radio was –78dBm, the same as the reported signal level for the system spreading code on.

The difference in attenuator settings between the system spreading code on and the system spreading code off 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.

The set of measurements were then repeated with the transmitter set to send OOK packets.

Diagram:

Results:

Attenuator setting difference, dB

Frequency (MHz)	CCSK	OOK
917 03	15	13
917.08	15	13
917.13	16	13
917.18	16	13
917 23	16	14
917.28	17	14
917.33	16	14
917.38	17	14
917 43	17	14
917.48	17	14
917.53	17	14
917.58	17	15
917 63	17	15
917.68	18	15
917.73	18	15
917.78	18	15
917 83	18	15
917.88	17	15
917.93	17	15
917.98	17	15

Conclusion:

The lowest data point is 13dB, so the processing gain of the receiver is at least 13 dB.