Attachment 2:

9/20/1999

Processing Gain Test for Tsunami (Model 31145)

Test Setup:

The processing gain was measured using the CW jamming margin method as described in 15.247(e)(2). The specific test diagram is illustrated below.

All test equipment and the EUT were allowed to warm up for four hours prior to start of test to minimize drift over time. All test equipment had valid calibration. Calibration of carrier and interferer levels was performed several times during testing with no observed changes.

The measurements were performed on the frequency channel centered at 5741 MHz, over a range of ± 12 MHz. The measurements made across the center ± 9 MHz should be used for calculation of Gp since that bandwidth represents the receiver passband.

For the carrier signal, a level approximately 30 dB above threshold was chosen so that thermal noise would not effect the processing gain measurements. The measured threshold of the receive radio was -91 dBm at BER = 1 x 10^{-6}, the signal level of the transmit radio was –60 dBm measured at the input of the receive radio. The measured signal level of this same signal at the output of the Power Combiner and attenuator was –40.0 dBm (Ps). This higher level can be more accurate measured, and, this level was referenced to the receiver input (at –60 dBm). It is the numbers referenced to the receiver input that were used for calculating C/I and GP.

For the jammer signal, 0 dBm at the generator corresponds to – 31.7 dBm (Pj) at the combiner output. As with the signal power measurements, this higher level can be more accurately measured, and this level was referenced to the receiver input (e.g. using –51.7 dBm for a measurement of –31.7 dBm). It is the numbers referenced to the receiver input that were used for calculating C/I and Gp.

Test Equipment:

Signal Generator	Hewlett Packard 83731A
Power Meter	HP435B/8484A
BER Test Set	Fireberd 6000

Explanation of Results:

The following notations are used on the spreadsheet data:

Pg: Power at Generator in dBm (as indicated by generator display).

Pj: Power of interferer: Pg –51.7 dBm at the receiver input (calculated in spreadsheet)

Ps: Power of carrier at the receiver input. (initial calibration)

J/S: Jammer to Signal ratio, Pj-Ps (dB) (calculated in spreadsheet)

Gp: Processing Gain: (S/N)o + J/S + Lsys where:

Lsys = 2 dB
(S/N)o = 13.5 dB for QPSK and BER = 10^{-6} (see curve provided)

therefore: $G_p = 13.5 + 2 + J/S = 15.5 + J/S$ (calculated in spreadsheet)

All measurements meet the minimum receiver value of 10 dB.

Processing Gain Test Equipment Setup