1) The calculated processing gain is as follow:

data rate: 62.5KBs

chip rate: 62.5KBs x 16B/B = 1MB/s

modulated transmission BW:1.0MHz (6dB BW, measured)

- $G_p = BW_{transmission}$ / data rate
- G_p = [10 log(16)]dB
- G_p = 12dB

2) The following describe the difficulty in measuring the processing gain per section 15.247 (e), which requires measurement of the processing gain (G_p) through one of the two methods:

§15.247 (e)(1) As measured at the demodulated output of the receiver: the ratio in dB of the signal-to-noise ratio with the system spreading code turned off to the signal-to-noise ratio with the system spreading code turned on.

Two of four modes of system operation entail receiving: 'constant receive' and 'normal operation'.

'Constant receive' mode has the spreading code turned off. 'Normal operation' turns the spreading code on to receive a signal from appropriate transmitter and then transmit reply information. Total time that spreading code is used to modulate LO is ~7ms.

Unable to control on/off mode of spreading code. If the spreading code could be turned on, than we could perform the test mentioned in '(1) above.

§15.247 (e)(2) As measured using the CW jamming margin method: a signal generator is stepped in 50 kHz increments across the passband of the system, recording at each point the generator level required to produce the recommended Bit Error Rate (BER). This level is the jammer level. The output power of the intentional radiator is measured at the same point. The jammer to signal ratio (J/S) is then calculated, discarding the worst 20% of the J/S data points. The lowest remaining J/S ratio is used to calculate the processing gain, as follows: Gp = (S/N) o + Mj + Lsys, where Gp = processing gain of the system, (S/N) o = signal to noise ratio required for the chosen BER, Mj = J/S ratio, and Lsys = system losses. Note that total losses in a system, including intentional radiator and receiver, should be assumed to be no more than 2 dB.

Two of the four modes of system operation entail transmission: 'unmodulated transmission' and 'modulated transmission'. In both cases, we are unable to access a point in the system to inject a baseband information stream. This point exists within the SS1102 chip.

In order to perform the test mentioned in '(2)' above, we would need to:

1. inject a baseband data stream (i.e. from a TTC FIREBERD) into a transmitter (which would add the data to the spreading code)
2. transmit the RF to a receiver
3. set the receiver to a constant receive mode (with the spreading code running constantly)
4. loop the baseband data back to the data stream generator (i.e. FIREBERD) for BER measurement.

Steps '1.' and '3.' are not possible with the current state of the hardware.