TFF-2005
Transmitter Duty Cycle Calculation and Measurements.

The spectrum analyzer's (Agilent 8595E) input was driven by a 2.4 GHz receiving antenna, which was coupled to the transmit antenna of EUT. The spectrum analyzer center frequency was set to EUT's RF channel carrier. The frequency span on the analyzer was set to ZERO SPAN. The transmitter ON time was determined from the resultant time-amplitude display.

Duty Cycle Calculation:

Duty cycle = Maximum ON time in 100 msec/100.

_ For DSSS mode (see plot #3), maximum duty cycle = 2.55 msec/100 msec = **2.55%**

_ For OOK mode (see plot #4), maximum duty cycle = 13 msec/100 msec **= 13%**

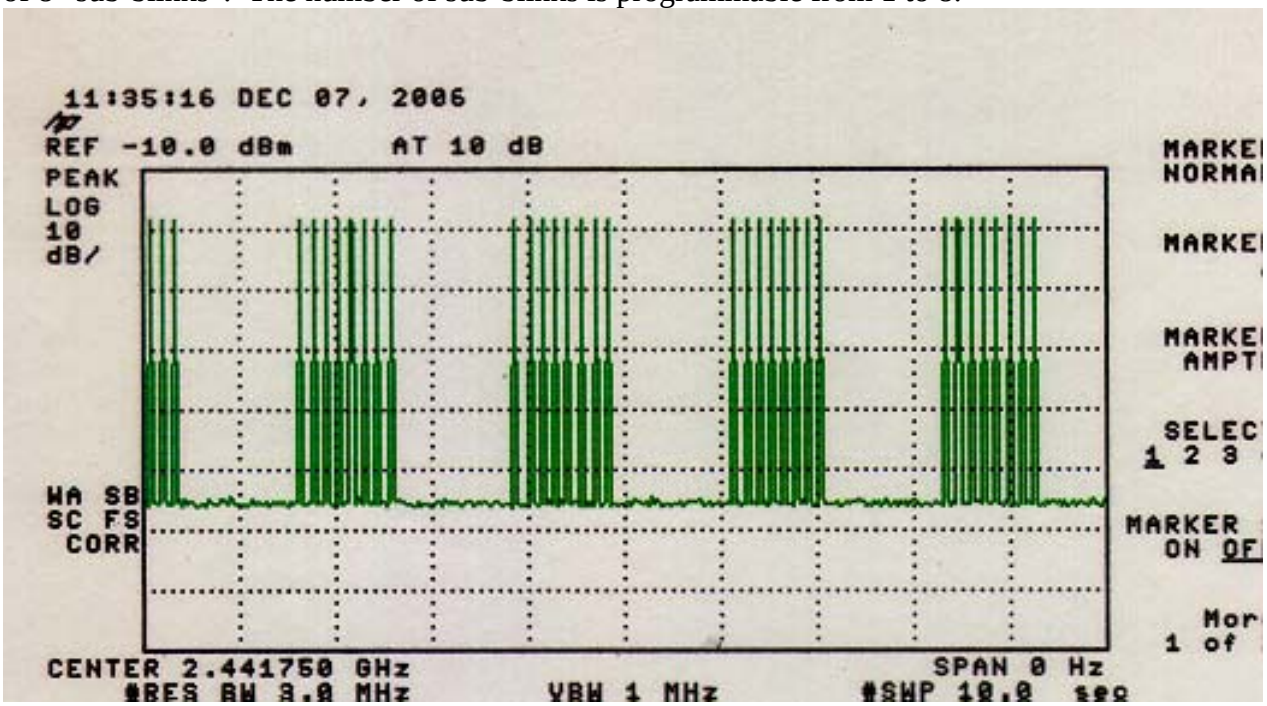
_ For 802.11b mode (see plot #6) with 1 mbps, maximum duty cycle = 9*(0.4 msec)/100 msec = 3.6%

_ For 802.11g mode (see plot #7) with 6 mbps, maximum duty cycle = 9*(0.08msec)/100msec = 0.72%.

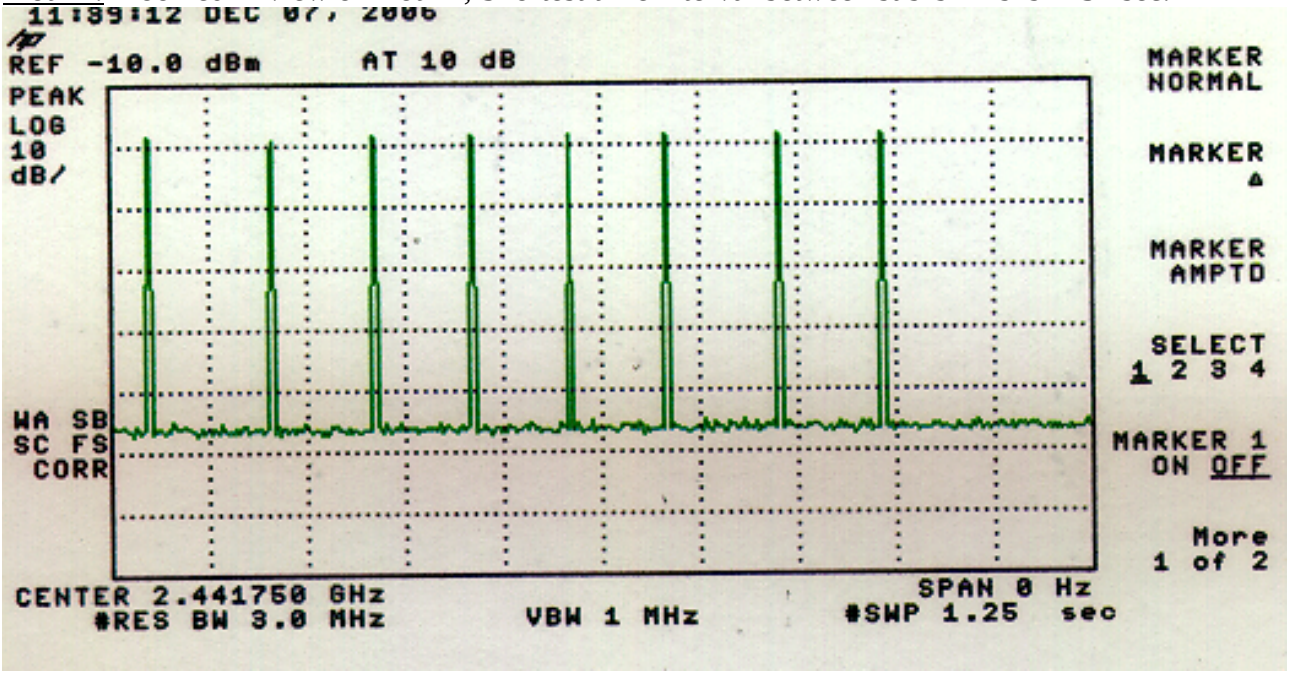
Duty Cycle Measurements:

Please see pages 2-4.

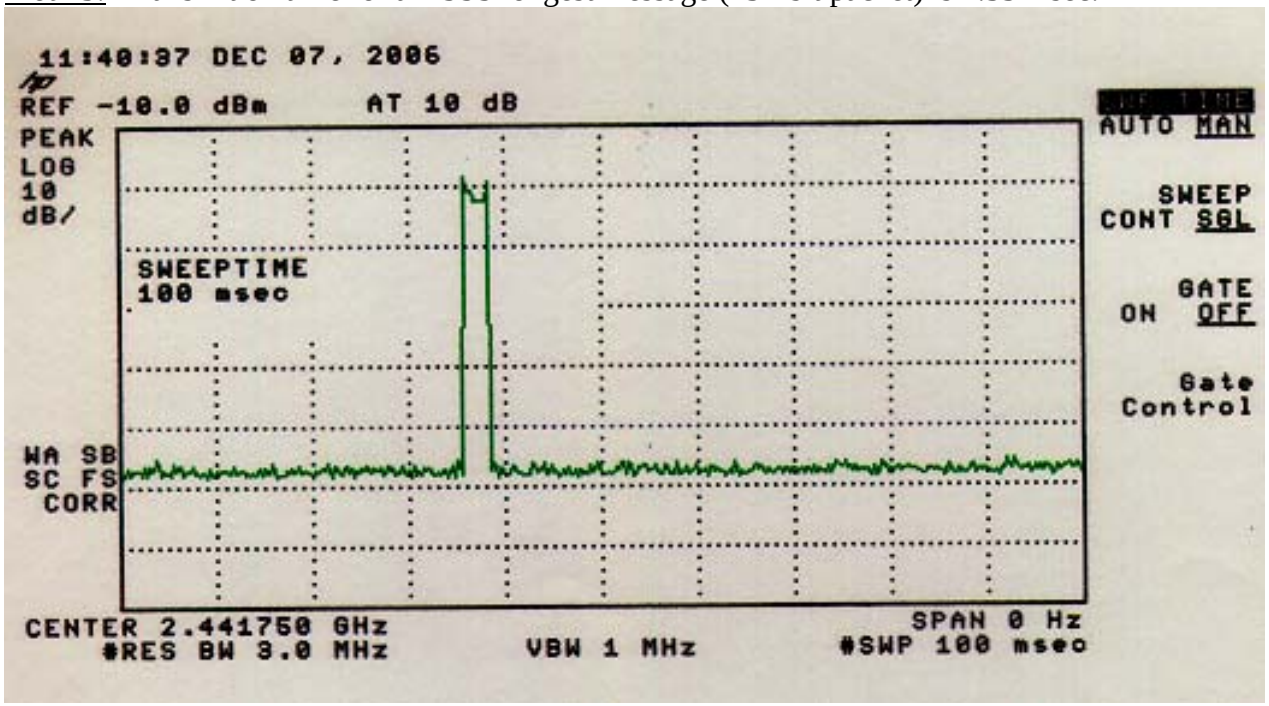
Plot #1: DSSS Transmission at fastest repetition rate of 1.5 seconds. Each transmission consists of 8 "sub-blinks". The number of sub-blinks is programmable from 1 to 8.



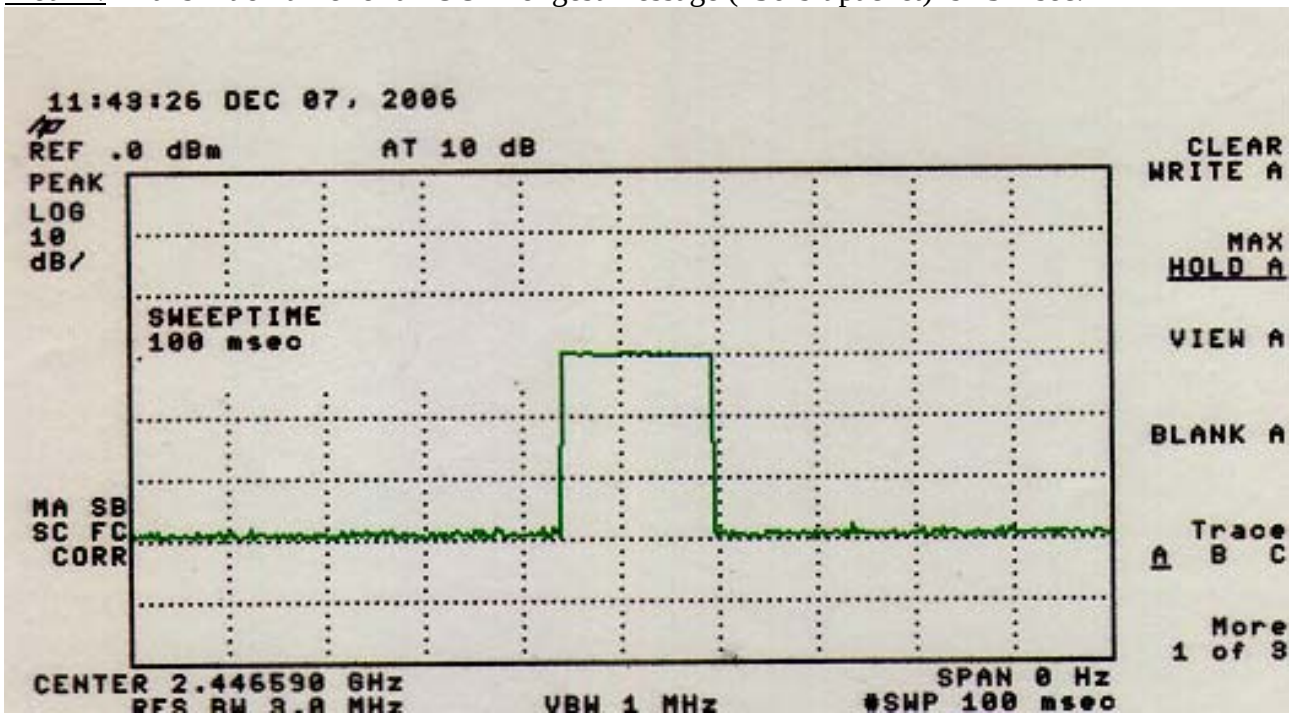
Plot #2: Zoomed in view of Plot #1; Shortest time interval between sub-blinks is 125msec.



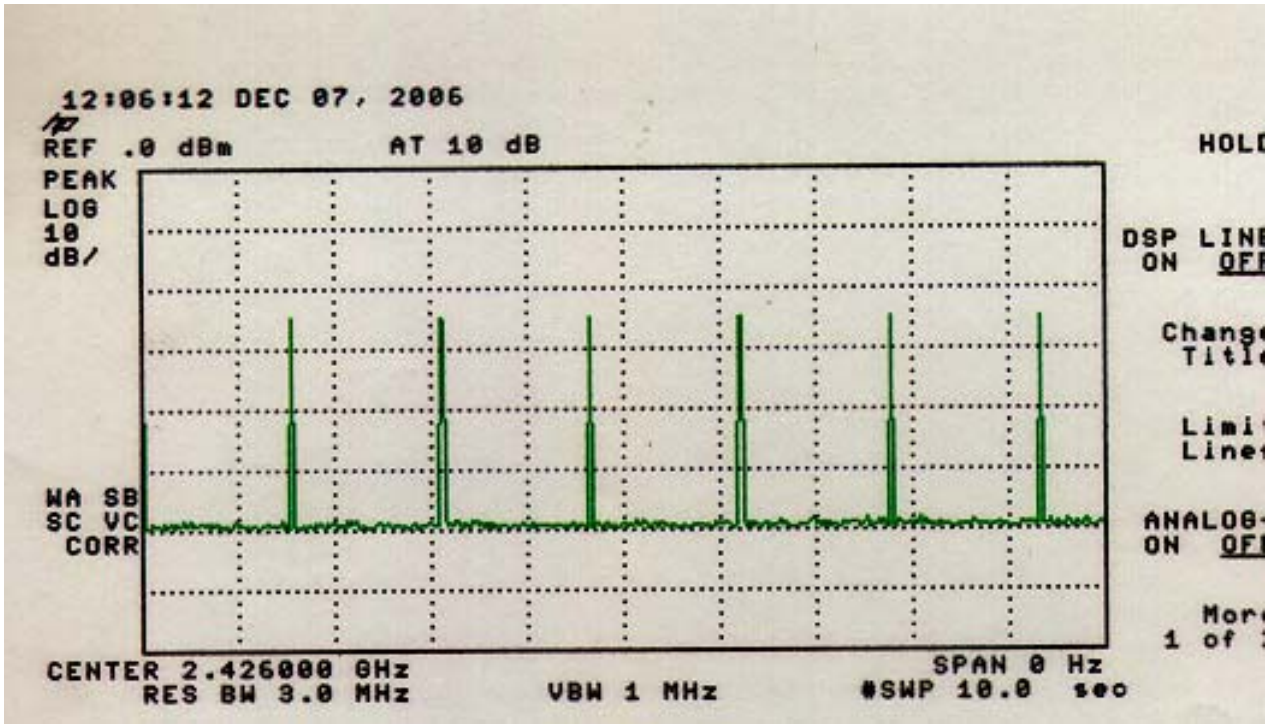
Plot #3: Transmit on time for a DSSS longest message (152-bit packet) is 2.55 msec.



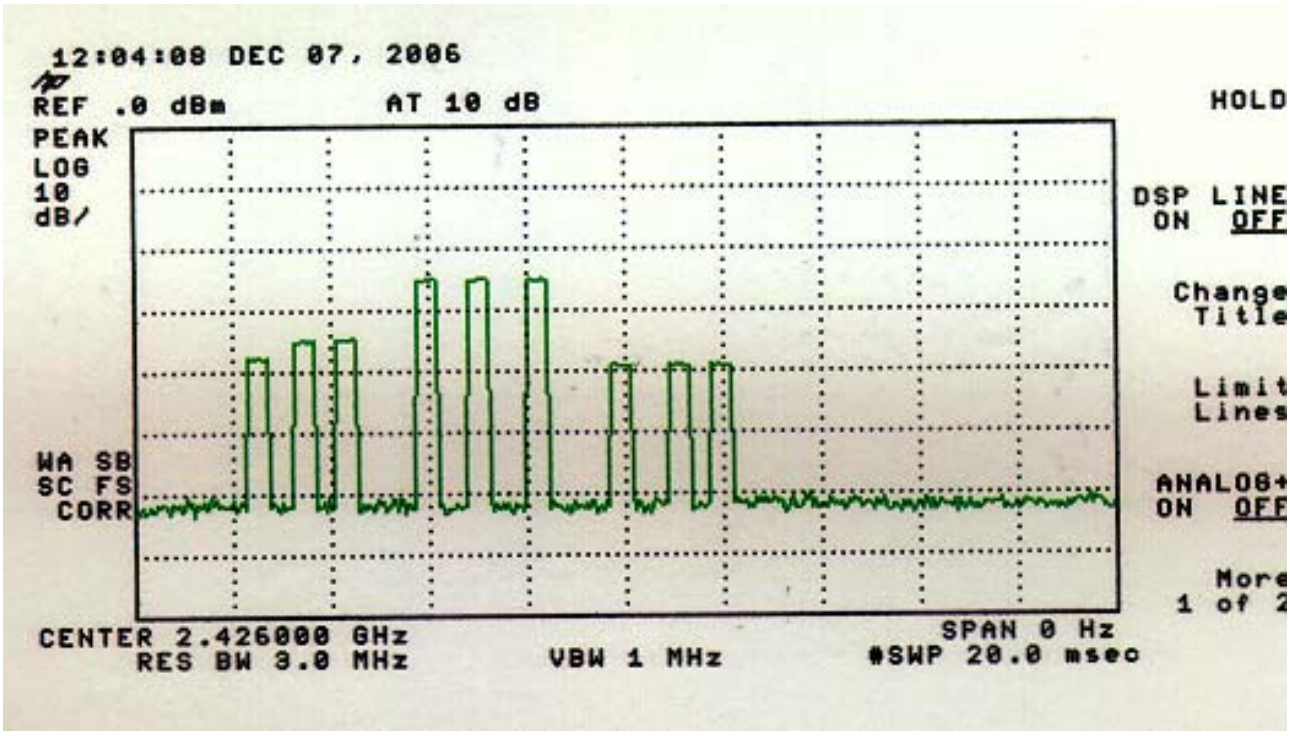
Plot #4: Transmit on time for an OOK longest message (256-bit packet) is 13 msec.



Plot #5: 802.11b (1Mbps) Transmission at fastest repetition rate of 1.5 seconds between "blinks".



Plot #6: Zoomed in view of Plot #5. Each "blink" in Plot #5 consists of 9 "sub-blinks", which are programmable from 1 to 9. Transmit on time for each sub-blink is 400uSec. Shortest time interval between sub-blinks is 400uSec. As shown in this plot, the first 3 sub-blinks were set to channel 5, the next 3 sub-blinks were set to channel 6, and last 3 sub-blinks were set to channel 7. The transmit frequency for each group of 3 sub-blinks is programmable to any 802.11 channel.



Plot #7: Transmit on time for 802.11g (6Mbps) mode.
Similar to 802.11b mode, each 802.11g "blink" consists of maximum 9 "sub-blinks", which are programmable from 1 to 9. Transmit on time for each sub-blinks is 80uSec. Since the duration of all 9 sub-blinks is less than 100 msec, the maximum duty cycle can be calculated as follows:
Duty Cycle = 9*80usec/100msec = 0.72%.