



**Nemko Test Report:** 2169RUS1rev3

**Applicant:** LXE Inc.  
125 Technology Parkway  
Norcross, GA 30092

**Equipment Under Test:** RX2  
(E.U.T.)

**In Accordance With:** FCC Part 15, Subpart C, 15.247  
Spread Spectrum Transmitters

**Tested By:** Nemko USA Inc.  
802 N. Kealy  
Lewisville, Texas 75057-3136

**TESTED BY:**   
\_\_\_\_\_  
David Light, Senior Wireless Engineer

**DATE** : 21 February 2007

**APPROVED BY:**   
\_\_\_\_\_  
Harry Ward, Verificator

**DATE** : 6<sup>th</sup> March 2007

**Total Number of Pages:** 29



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**Section 1. Summary of Test Results**

Manufacturer: LXE, Inc.

Model No.: RX2

Serial No.: None

General: **All measurements are traceable to national standards.**

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15, Subpart C, Paragraph 15.247 for Frequency Hopping Spread Spectrum devices. Radiated tests were conducted in accordance with ANSI C63.4-2003. Radiated emissions are made on an open area test site.

A description of the test facility is on file with the FCC.

<input checked="" type="checkbox"/>	New Submission	<input checked="" type="checkbox"/>	Production Unit
<input type="checkbox"/>	Class II Permissive Change	<input type="checkbox"/>	Pre-Production Unit

**THIS TEST REPORT RELATES ONLY TO THE ITEM(S) TESTED.**

**THE FOLLOWING DEVIATIONS FROM, ADDITIONS TO, OR EXCLUSIONS FROM THE TEST SPECIFICATIONS HAVE BEEN MADE.**

See "Summary of Test Data".



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**Summary Of Test Data**

<b>NAME OF TEST</b>	<b>PARA. NO.</b>	<b>RESULT</b>
Powerline Conducted Emissions	15.207(a)	NA (1)
Channel Separation	15.247(a)(1)	Not Tested (2)
Time of Occupancy	15.247(a)(1)	Not Tested (2)
20 dB Occupied Bandwidth	15.247(a)(1)	Not Tested (2)
Peak Power Output	15.247(b)	Not Tested (2)
Spurious Emissions (Antenna Conducted)	15.247(d)	Not Tested (2)
Spurious Emissions (Radiated)	15.247(d)	Complies

<b>NAME OF TEST</b>	<b>PARA. NO.</b>	<b>RESULT</b>
Minimum 6 dB Bandwidth	15.247(a)(2)	Not Tested (2)
Maximum Peak Power Output	15.247(b)(3)	Not Tested (2)
Spurious Emissions (Antenna Conducted)	15.247(d)	Not Tested (2)
Spurious Emissions (Restricted Bands)	15.247(d)/15.209(a)	Complies
Peak Power Spectral Density	15.247(e)	Not Tested (2)

**Footnotes:**

- 1) The device is battery powered
- 2) All conducted measurements were previously tested and approved as follows:

**900 MHz RFID Reader:**

FCC ID KDZLXERFID2  
IC Certification 1995A-RFID2000  
in the name of LXE, Inc.

**2400 MHz 802.11b/g:**

FCC ID TWG-SDCCF10G  
IC Certification 6616A-SDCCF10G  
in the name of Summit Data Communications.

The above mentioned radios are being put in a collocated environment therefore radiated testing was performed. Testing was performed with both radios transmitting simultaneously.

**Section 2. Equipment Under Test (E.U.T.)****General Equipment Information**

**Frequency Band:**  902 – 928 MHz (RFID)  
 2400 – 2483.5 MHz (802.11b/g)  
 5725 – 5850 MHz

**Operating Frequency Range(s):** 902.75 – 926.25 MHz (RFID)  
2412 – 2462 MHz

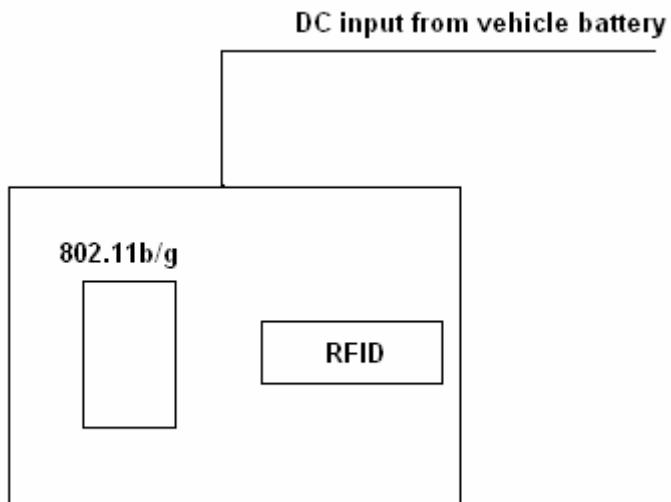
**Number of Hopping Channels:** 50

**Hopping Channel Spacing:** 500 kHz

**User Frequency Adjustment:** Software controlled

**Description of EUT**

Vehicle Mount Terminal with 802.11 and RFID applications for Warehouse Inventory Data Collection. The RFID transmitter transmits using a PCB mounted antenna and the 802.11 radio transmit through one of identical diversity antennas.

**System Diagram**

**Section 3. Spurious Emissions (Radiated)**

NAME OF TEST: Spurious Emissions (Radiated)	PARA. NO.: 15.247(d)
TESTED BY: David Light	DATE: 06 February 2007

**Test Results:** Complies. The worst case emission was 53.8 dB $\mu$ V/m at 2483.5 MHz. This is 0.2 dB below the specification limit of 54 dB $\mu$ V/m.

**Measurement Data:** See attached table.

**Duty Cycle Calculation:**

Duty Cycle correction factor(dB) = 20 log (rf<sub>ON</sub> in ms/100ms)

**Notes:**

- For handheld devices, the EUT was tested on three orthogonal axis'
- The device was tested from 30 MHz to the tenth harmonic of the highest fundamental frequency per 15.33
- The device was tested on three channels per 15.31(l).
- All emissions within 20 dB of the specification limit are reported per 15.31(o).
- Both radios were operating during test.

**Analyzer Settings:**

< 1000 MHz RBW=VBW=100 kHz  
> 1000 MHz RBW=VBW=1 MHz

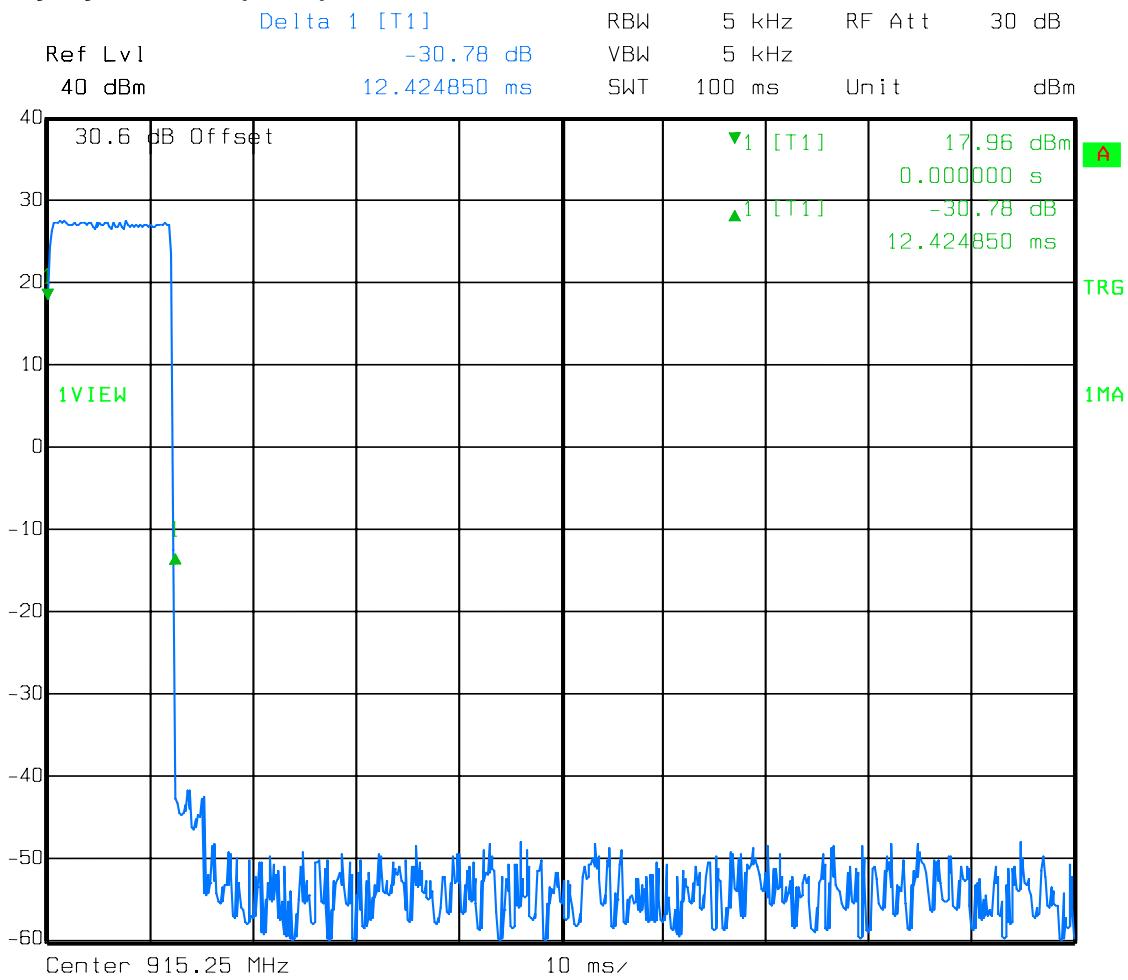
**Equipment Used:** 1464-1484-1485-1016-993-791-760-759

**Measurement Uncertainty:**  +/-3.6 dB

**Temperature:** 20 °C

**Relative Humidity:** 32 %

## Duty Cycle Plots (RFID)



Duty Cycle Correction =  $20 \log (12.42 \text{ mS}/100 \text{ mS}) = -18.1 \text{ dB}$

**Test Data - Radiated Emissions (RFID)**

Low Channel

**Measurement Data:** Reading listed by order taken. **Test Distance: 3 Meters**

#	Freq MHz	Rdng dB $\mu$ V	Cable Duty dB	Cable dB	Pre-A dB	Horn dB	Dist Table	Corr dB $\mu$ V/m	Spec dB $\mu$ V/m	Margin dB	Polar Ant
1	2708.25 Peak	43.8 +0.0	+0.8	+2.8	-32.7	+29.3	+0.0	44.0	54.0	-10.0	Vert
2	3611.00 Peak	43.2 +0.0	+0.8	+2.8	-32.4	+30.3	+0.0	44.7	54.0	-9.3	Vert
3	4513.75 Peak	43.0 +0.0	+1.0	+3.1	-31.6	+32.1	+0.0	47.6	54.0	-6.4	Vert
4	5416.50 Peak	41.5 +0.0	+1.2	+3.5	-31.9	+33.6	+0.0	47.9	54.0	-6.1	Vert
5	6319.25 Peak	43.5 +0.0	+1.3	+3.9	-30.7	+34.9	+0.0	52.9	74.0	-21.1	Vert
6	6319.25 Average	43.5 -18.1	+1.3	+3.9	-30.7	+34.9	+0.0	34.8	54.0	-19.2	Vert
13	2708.50 Peak	61.7 +0.0	+0.8	+2.8	-32.7	+29.3	+0.0	61.9	74.0	-12.1	Horiz
14	2708.50 Average	61.7 -18.1	+0.8	+2.8	-32.7	+29.3	+0.0	43.8	54.0	-10.2	Horiz
15	3611.25 Peak	56.0 +0.0	+0.8	+2.8	-32.4	+30.3	+0.0	57.5	74.0	-16.5	Horiz
16	3611.25 Average	56.0 -18.1	+0.8	+2.8	-32.4	+30.3	+0.0	39.4	54.0	-14.6	Horiz
17	4514.00 Peak	43.2 +0.0	+1.0	+3.1	-31.6	+32.1	+0.0	47.8	54.0	-6.2	Horiz
18	5416.75 Peak	41.8 +0.0	+1.2	+3.5	-31.9	+33.6	+0.0	48.2	54.0	-5.8	Horiz
19	6319.50 Peak	43.5 +0.0	+1.3	+3.9	-30.7	+34.9	+0.0	52.9	74.0	-21.1	Horiz
20	6319.50 Average	43.5 -18.1	+1.3	+3.9	-30.7	+34.9	+0.0	34.8	54.0	-19.2	Horiz

**Test Data - Radiated Emissions (RFID)**

Mid Channel

**Measurement Data:** Reading listed by order taken. **Test Distance: 3 Meters**

#	Freq MHz	Rdng dB $\mu$ V	Cable Duty dB	Cable dB	Pre-A dB	Horn dB	Dist Table	Corr dB $\mu$ V/m	Spec dB $\mu$ V/m	Margin dB	Polar Ant
1	2739.75 Peak	61.2 +0.0	+0.8	+2.9	-32.7	+29.4	+0.0	61.6	74.0	-12.4	Horiz
2	2739.75 Average	61.2 -18.1	+0.8	+2.9	-32.7	+29.4	+0.0	43.5	54.0	-10.5	Horiz
3	3653.00 Peak	53.3 +0.0	+0.8	+2.8	-32.3	+30.4	+0.0	55.0	74.0	-19.0	Horiz
4	3653.00 Average	53.3 -18.1	+0.8	+2.8	-32.3	+30.4	+0.0	36.9	54.0	-17.1	Horiz
5	4566.25 Peak	43.5 +0.0	+1.0	+3.1	-31.8	+32.2	+0.0	48.0	54.0	-6.0	Horiz
6	5479.50 Peak	41.3 +0.0	+1.2	+3.5	-31.9	+33.6	+0.0	47.7	54.0	-6.3	Horiz
7	6392.75 Peak	43.2 +0.0	+1.3	+3.9	-30.9	+35.0	+0.0	52.5	74.0	-21.5	Horiz
8	6392.75 Average	43.2 -18.1	+1.3	+3.9	-30.9	+35.0	+0.0	34.4	54.0	-19.6	Horiz
15	2739.50 Peak	53.5 +0.0	+0.8	+2.9	-32.7	+29.4	+0.0	53.9	74.0	-20.1	Vert
16	2739.50 Average	53.5 -18.1	+0.8	+2.9	-32.7	+29.4	+0.0	35.8	54.0	-18.2	Vert
19	4566.00 Peak	44.3 +0.0	+1.0	+3.1	-31.8	+32.2	+0.0	48.8	54.0	-5.2	Vert
20	5479.25 Peak	42.0 +0.0	+1.2	+3.5	-31.9	+33.6	+0.0	48.4	54.0	-5.6	Vert
21	6392.50 Peak	44.7 +0.0	+1.3	+3.9	-30.9	+35.0	+0.0	54.0	74.0	-20.0	Vert
22	6392.50 Average	44.7 -18.1	+1.3	+3.9	-30.9	+35.0	+0.0	35.9	54.0	-18.1	Vert

**Test Data - Radiated Emissions (RFID)**

High Channel

**Measurement Data:** Reading listed by order taken. **Test Distance: 3 Meters**

#	Freq MHz	Rdng dB $\mu$ V	Duty	Horn	Cable	Cable	Dist Table	Corr dB $\mu$ V/m	Spec dB $\mu$ V/m	Margin dB	Polar Ant
			Pre-A dB	dB	dB	dB					
1	2778.75 Peak	52.2	+0.0 -32.7	+29.4	+0.8	+2.9	+0.0	52.6	74.0	-21.4	Vert
2	2778.75 Average	52.2	-18.1 -32.7	+29.4	+0.8	+2.9	+0.0	34.5	54.0	-19.5	Vert
5	4631.25 Peak	42.8	+0.0 -32.0	+32.5	+1.0	+3.2	+0.0	47.5	54.0	-6.5	Vert
6	5557.50 Peak	42.2	+0.0 -31.8	+33.7	+1.2	+3.5	+0.0	48.8	54.0	-5.2	Vert
7	6483.75 Peak	44.8	+0.0 -31.1	+35.2	+1.3	+4.0	+0.0	54.2	74.0	-19.8	Vert
8	6483.75 Average	44.8	-18.1 -31.1	+35.2	+1.3	+4.0	+0.0	36.1	54.0	-17.9	Vert
15	2778.75 Peak	59.0	+0.0 -32.7	+29.4	+0.8	+2.9	+0.0	59.4	74.0	-14.6	Horiz
16	2778.75 Average	59.0	-18.1 -32.7	+29.4	+0.8	+2.9	+0.0	41.3	54.0	-12.7	Horiz
19	4631.25 Peak	41.8	+0.0 -32.0	+32.5	+1.0	+3.2	+0.0	46.5	54.0	-7.5	Horiz
20	5557.50 Peak	41.2	+0.0 -31.8	+33.7	+1.2	+3.5	+0.0	47.8	54.0	-6.2	Horiz

**Duty Cycle Plots – 802.11b****11MB****Worst case scenario:**

The worst case scenario to cause the largest transmit duty-cycle is the RX2 by itself on an 802.11 RF-network uploading a large file through the RF network.

**Test condition:**

RX2 operating by itself on an 802.11 RF-network uploading a 9MB-file through the RF network.

**Results:**

Figure 1 shows an oscilloscope capture of the current into the radio for 10ms with the radio operating at an 11mb data rate. This 10ms time period is representative of the entire time to transfer the 9MB file.

**Figure 1: 10ms capture of Current into the Radio**

Figure 1 shows that due to the 802.11 protocol, IP protocol, processing and throughput of the RX2 results in a periodic event occurring every 8.82ms.

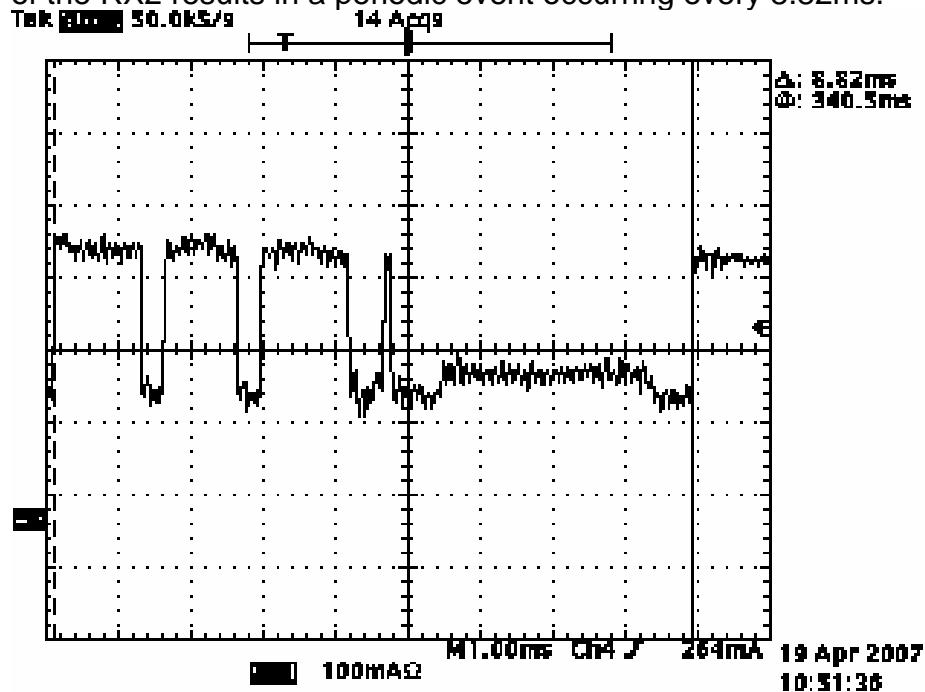
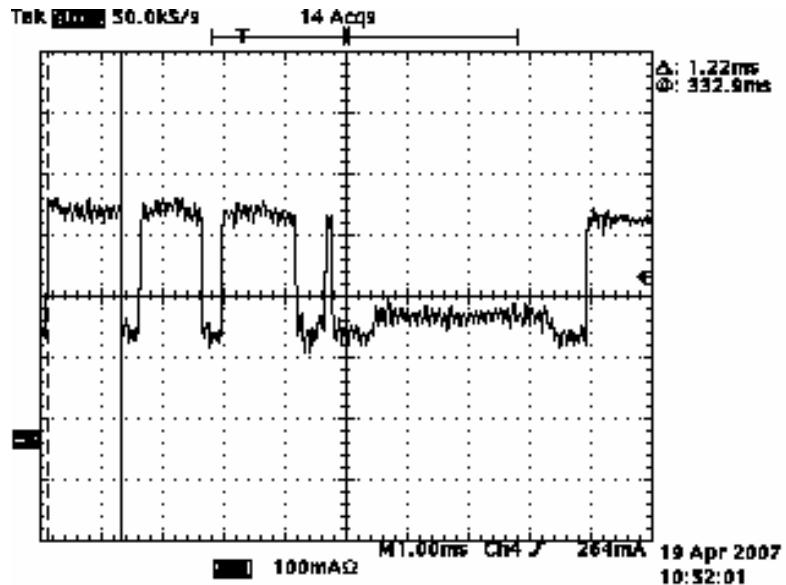
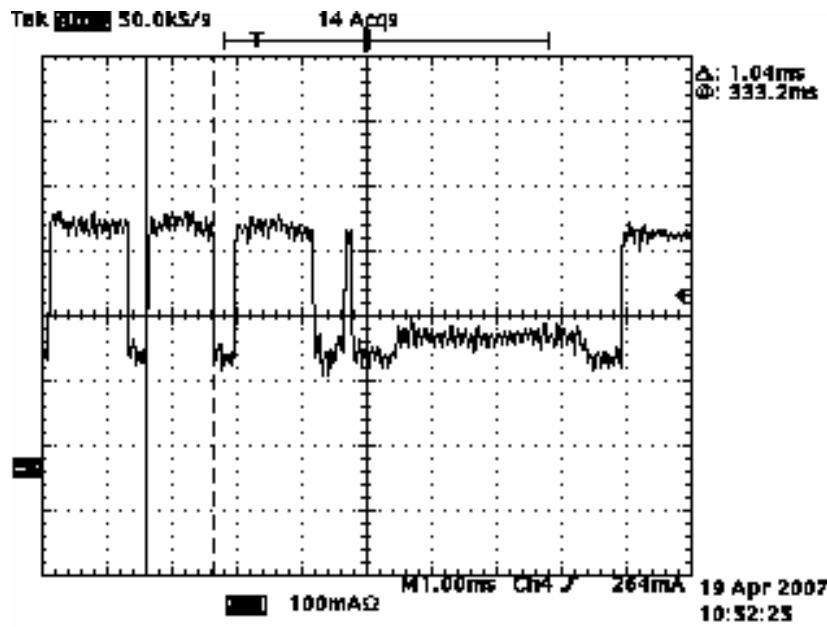
**Figure 1: 10ms capture of Current into the Radio**

Figure 1 shows that due to the 802.11 protocol, IP protocol, processing and throughput of the RX2 results in a periodic event occurring every 8.82ms.

**Duty Cycle Plots – 802.11b****Figure 2: On-time measurement of 1.22ms capture of Current into the Radio****Figure 3: On-time measurement of 1.04ms capture of Current into the Radio**

## Duty Cycle Plots – 802.11b

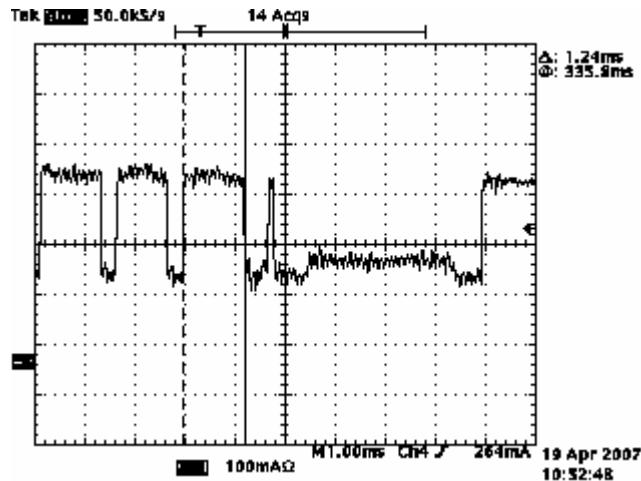


Figure 4: On-time measurement of 1.24ms capture of Current into the Radio

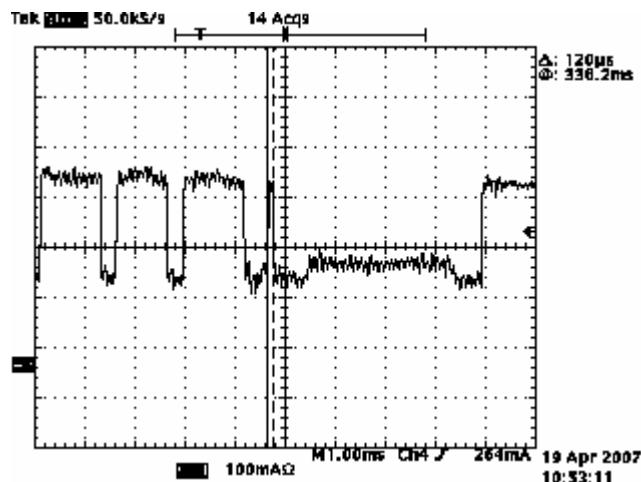


Figure 5: On-time measurement of .120ms capture of Current into the Radio

Figures 2-3-4 and 5 show the accumulative ON-Time of the RX2.  
(1.22ms+1.04ms+1.22ms+.12ms = 3.62ms)

**Conclusion:**

The sum of all 5 Figures demonstrates that due to the periodic nature of this scenario, the worst case transmit duty-cycle are 3.62ms/8.82ms or 41.0%

$$\text{Duty cycle} = 20 \log (41/100) = -7.7 \text{ dB}$$

**Duty Cycle Plots – 802.11g****54MB****Worst case scenario:**

The worst case scenario to cause the largest transmit duty-cycle is the RX2 by itself on an 802.11 RF-network uploading a large file through the RF network.

**Test condition:**

RX2 operating by itself on an 802.11 RF-network uploading a 9MB-file through the RF network.

**Results:**

Figure 2 shows an oscilloscope capture of the current into the radio for 10ms with the radio operating at a 54mb data rate. This 10ms time period is representative of the entire time to transfer the 9 MB file.

**Figure 1: 10ms capture of Current into the Radio**

Figure 1 shows that due to the 802.11 protocol, IP protocol, processing and throughput of the RX2 results in a periodic event occurring every 7.00ms.

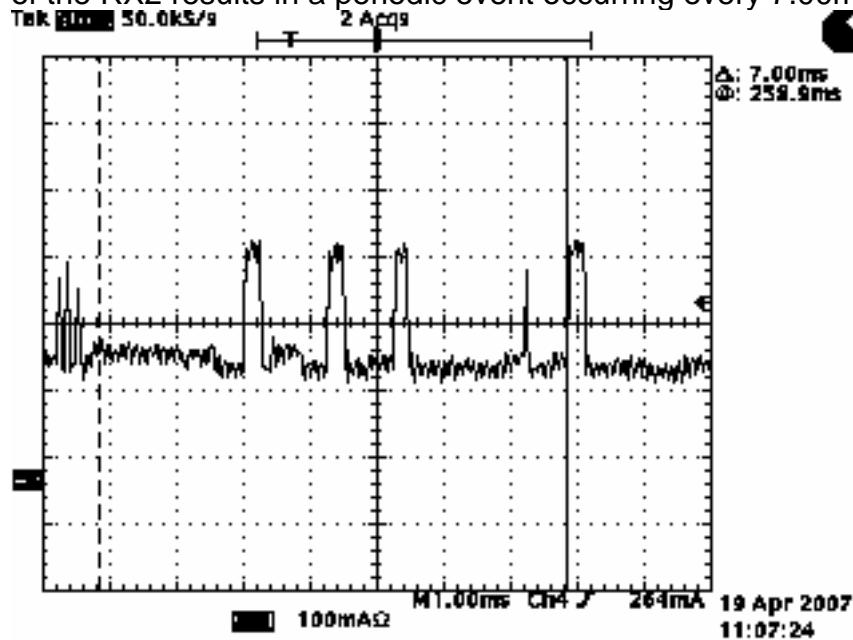
**Figure 1: 10ms capture of Current into the Radio**

Figure 1 shows that due to the 802.11 protocol, IP protocol, processing and throughput of the RX2 results in a periodic event occurring every 7.00ms.

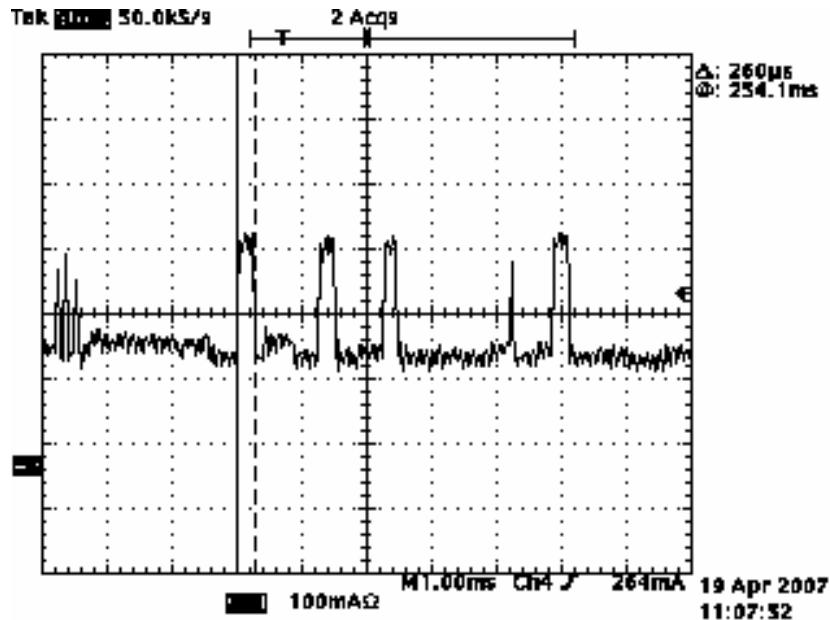
**Duty Cycle Plots – 802.11g**

Figure 2: On-time measurement of .260ms capture of Current into the Radio

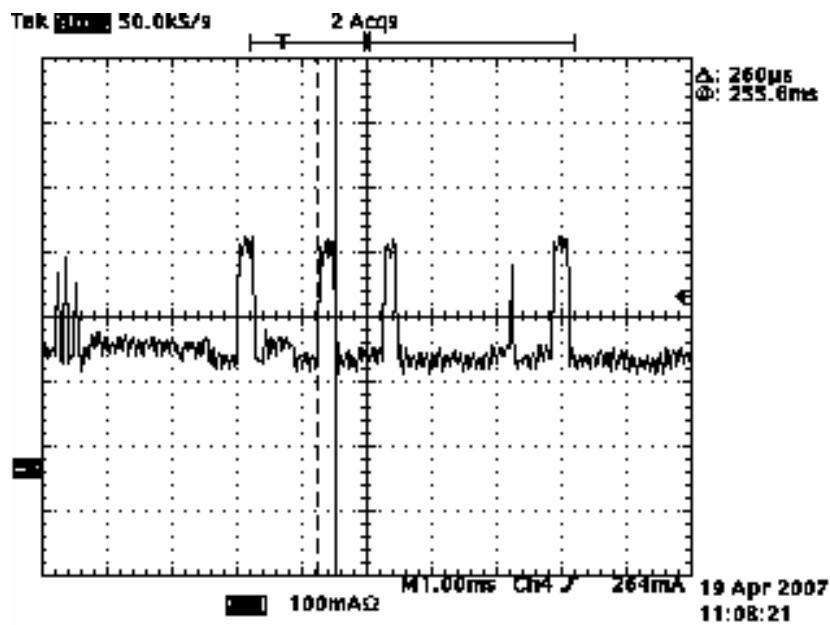
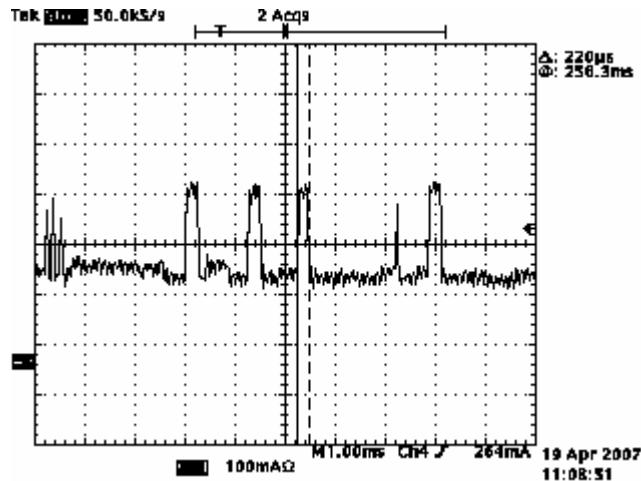
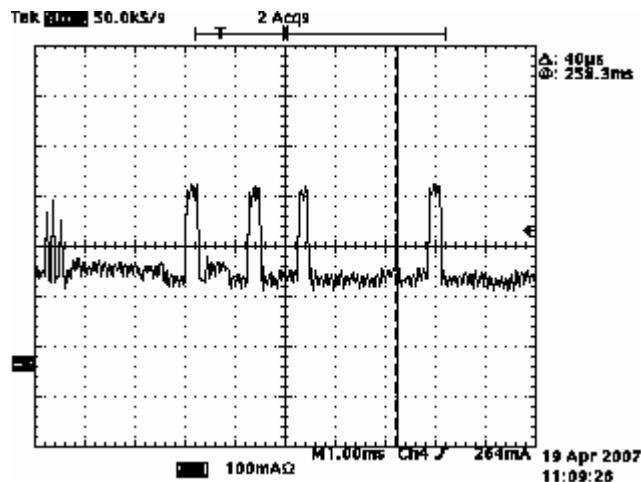


Figure 3: On-time measurement of .260ms capture of Current into the Radio

**Duty Cycle Plots – 802.11g****Figure 4: On-time measurement of .220ms capture of Current into the Radio****Figure 5: On-time measurement of .04ms capture of Current into the Radio**

Figures 2-3-4 and 5 show the accumulative ON-Time of the RX2.

(.260ms+.260ms+.220ms+.04ms = .78ms)

Conclusion:

The sum of all 5 Figures demonstrates that due to the periodic nature of this scenario, the worst case transmit duty-cycle are .78/7.00ms or 11.0%

$$\text{Duty cycle} = 20 \log (11/100) = -19.2 \text{ dB}$$

**Test Data - Radiated Emissions (802.11b)**

Channel 1 – 11 Mbps

Freq MHz	Rdng dB $\mu$ V	Horn dB	Cable dB	Cable dB	Pre-A dB	Dist Table	Corr dB $\mu$ V/m	Spec dB $\mu$ V/m	Margin dB	Polar Ant
4824.0 Peak	50.3	+33.2 +0.0	+1.0	+3.2	-32.5	+0.0	55.2	74.0	-18.8	Vert
4824.0 Average	50.3	+33.2 -7.7	+1.0	+3.2	-32.5	+0.0	47.5	54.0	-6.5	Vert
7236.0 Average	41.8	+35.8 -7.7	+1.2	+3.9	-32.2	+0.0	42.8	54.0	-11.2	Vert
9648.0 Average	43.7	+37.1 -7.7	+1.1	+4.8	-35.9	+0.0	43.1	54.0	-10.9	Vert
12060.0 Peak	43.5	+39.7 +0.0	+1.8	+5.5	-35.2	+0.0	55.3	74.0	-18.7	Vert
12060.0 Average	43.5	+39.7 -7.7	+1.8	+5.5	-35.2	+0.0	47.6	54.0	-6.4	Vert
14472.0 Peak	38.3	+41.1 +0.0	+1.6	+5.6	-31.5	+0.0	55.1	74.0	-18.9	Vert
14472.0 Average	38.3	+41.1 -7.7	+1.6	+5.6	-31.5	+0.0	47.4	54.0	-6.6	Vert
16884.0 Peak	39.0	+41.3 +0.0	+2.0	+6.3	-33.7	+0.0	54.9	74.0	-19.1	Vert
16884.0 Average	39.0	+41.3 -7.7	+2.0	+6.3	-33.7	+0.0	47.2	54.0	-6.8	Vert
4824.0 Peak	53.8	+33.2 +0.0	+1.0	+3.2	-32.5	+0.0	58.7	74.0	-15.3	Horiz
4824.0 Average	53.8	+33.2 -7.7	+1.0	+3.2	-32.5	+0.0	51.0	54.0	-3.0	Horiz
7236.0 Peak	45.5	+35.8 +0.0	+1.2	+3.9	-32.2	+0.0	54.2	74.0	-19.8	Horiz
7236.0 Average	45.5	+35.8 -7.7	+1.2	+3.9	-32.2	+0.0	46.5	54.0	-7.5	Horiz
9648.0 Average	45.3	+37.1 -7.7	+1.1	+4.8	-35.9	+0.0	44.7	54.0	-9.3	Horiz
12060.0 Average	40.8	+39.7 -7.7	+1.8	+5.5	-35.2	+0.0	44.9	54.0	-9.1	Horiz
14472.0 Average	37.0	+41.1 -7.7	+1.6	+5.6	-31.5	+0.0	46.1	54.0	-7.9	Horiz
16884.0 Peak	38.2	+41.3 +0.0	+2.0	+6.3	-33.7	+0.0	54.1	74.0	-19.9	Horiz
16884.0 Average	38.2	+41.3 -7.7	+2.0	+6.3	-33.7	+0.0	46.4	54.0	-7.6	Horiz

**Test Data - Radiated Emissions (802.11b)**

Channel 6 – 11 Mbps

Freq MHz	Rdng dB $\mu$ V	Horn dB	Cable dB	Cable dB	Pre-A dB	Dist Table	Corr dB $\mu$ V/m	Spec dB $\mu$ V/m	Margin dB	Polar Ant
4873.833 Peak	50.3 +0.0	+33.4 +1.0	+1.0 +3.3	+3.3 -32.6	-32.6 +0.0	+0.0	55.4 47.7	74.0 54.0	-18.6 -6.3	Horiz
4873.833 Average	50.3 -7.7	+33.4 +1.0	+1.0 +3.3	+3.3 -32.6	-32.6 +0.0	+0.0	47.7 44.0	54.0 54.0	-6.3 -10.0	Horiz
7308.000 Average	43.0 -7.7	+35.8 +1.2	+1.2 +4.0	+4.0 -32.3	-32.3 +0.0	+0.0	44.0 42.2	54.0 54.0	-10.0 -11.8	Horiz
9744.000 Average	43.0 -7.7	+37.1 +1.1	+1.1 +4.8	+4.8 -36.1	-36.1 +0.0	+0.0	42.2 42.2	54.0 54.0	-11.8 -18.0	Horiz
12180.000 Peak	43.8 +0.0	+39.8 +1.8	+1.8 +5.5	+5.5 -34.9	-34.9 +0.0	+0.0	56.0 56.0	74.0 74.0	-18.0 -18.0	Horiz
12180.000 Average	43.8 -7.7	+39.8 +1.8	+1.8 +5.5	+5.5 -34.9	-34.9 +0.0	+0.0	48.3 48.3	54.0 54.0	-5.7 -3.1	Horiz
14616.000 Peak	42.2 +0.0	+40.9 +1.5	+1.5 +5.7	+5.7 -31.7	-31.7 +0.0	+0.0	58.6 58.6	74.0 74.0	-15.4 -3.1	Horiz
14616.000 Average	42.2 -7.7	+40.9 +1.5	+1.5 +5.7	+5.7 -31.7	-31.7 +0.0	+0.0	50.9 50.9	54.0 54.0	-3.1 -16.1	Horiz
17052.000 Peak	41.2 +0.0	+41.7 +2.1	+2.1 +6.3	+6.3 -33.4	-33.4 +0.0	+0.0	57.9 57.9	74.0 74.0	-16.1 -18.1	Horiz
17052.000 Average	41.2 -7.7	+41.7 +2.1	+2.1 +6.3	+6.3 -33.4	-33.4 +0.0	+0.0	50.2 50.2	54.0 54.0	-3.8 -11.5	Horiz
4874.000 Average	48.3 -7.7	+33.4 +1.0	+1.0 +3.3	+3.3 -32.6	-32.6 +0.0	+0.0	45.7 45.7	54.0 54.0	-8.3 -11.8	Vert
7308.000 Average	41.5 -7.7	+35.8 +1.2	+1.2 +4.0	+4.0 -32.3	-32.3 +0.0	+0.0	42.5 42.5	54.0 54.0	-11.5 -11.8	Vert
9744.000 Average	43.0 -7.7	+37.1 +1.1	+1.1 +4.8	+4.8 -36.1	-36.1 +0.0	+0.0	42.2 42.2	54.0 54.0	-11.8 -8.0	Vert
12180.000 Average	41.5 -7.7	+39.8 +1.8	+1.8 +5.5	+5.5 -34.9	-34.9 +0.0	+0.0	46.0 46.0	54.0 54.0	-8.0 -14.9	Vert
14616.000 Peak	42.7 +0.0	+40.9 +1.5	+1.5 +5.7	+5.7 -31.7	-31.7 +0.0	+0.0	59.1 59.1	74.0 74.0	-2.6 -18.1	Vert
14616.000 Average	42.7 -7.7	+40.9 +1.5	+1.5 +5.7	+5.7 -31.7	-31.7 +0.0	+0.0	51.4 51.4	54.0 54.0	-2.6 -5.8	Vert
17052.000 Peak	39.2 +0.0	+41.7 +2.1	+2.1 +6.3	+6.3 -33.4	-33.4 +0.0	+0.0	55.9 55.9	74.0 74.0	-18.1 -18.1	Vert
17052.000 Average	39.2 -7.7	+41.7 +2.1	+2.1 +6.3	+6.3 -33.4	-33.4 +0.0	+0.0	48.2 48.2	54.0 54.0	-5.8 -5.8	Vert

**Test Data - Radiated Emissions (802.11b)**

Channel 11 – 11 Mbps

Freq MHz	Rdng dB $\mu$ V	Horn dB	Cable dB	Cable dB	Pre-A dB	Dist Table	Corr dB $\mu$ V/m	Spec dB $\mu$ V/m	Margin dB	Polar Ant
2483.500 Peak	27.8 +0.0	+29.0	+0.8	+2.3	-0.0	+0.0	59.9	74.0	-14.1	Horiz
2483.500 Average	27.8 -7.7	+29.0	+0.8	+2.3	-0.0	+0.0	52.2	54.0	-1.8	Horiz
4924.000 Average	48.0 -7.7	+33.5	+1.0	+3.3	-32.6	+0.0	45.5	54.0	-8.5	Horiz
7386.000 Average	42.8 -7.7	+35.9	+1.2	+4.0	-32.4	+0.0	43.8	54.0	-10.2	Horiz
9848.001 Average	45.7 -7.7	+37.2	+1.1	+5.0	-35.9	+0.0	45.4	54.0	-8.6	Horiz
12310.000 Average	39.0 -7.7	+40.0	+1.8	+5.5	-34.6	+0.0	44.0	54.0	-10.0	Horiz
14772.000 Average	36.2 -7.7	+40.8	+1.5	+5.7	-32.1	+0.0	44.4	54.0	-9.6	Horiz
17234.000 Peak	38.0 +0.0	+42.2	+2.1	+6.5	-32.9	+0.0	55.9	74.0	-18.1	Horiz
17234.000 Average	38.0 -7.7	+42.2	+2.1	+6.5	-32.9	+0.0	48.2	54.0	-5.8	Horiz
2483.500 Peak	29.4 +0.0	+29.0	+0.8	+2.3	-0.0	+0.0	61.5	74.0	-12.5	Vert
2483.500 Average	29.4 -7.7	+29.0	+0.8	+2.3	-0.0	+0.0	53.8	54.0	-0.2	Vert
4924.000 Average	45.7 -7.7	+33.5	+1.0	+3.3	-32.6	+0.0	43.2	54.0	-10.8	Vert
7386.000 Average	41.3 -7.7	+35.9	+1.2	+4.0	-32.4	+0.0	42.3	54.0	-11.7	Vert
9848.001 Average	44.8 -7.7	+37.2	+1.1	+5.0	-35.9	+0.0	44.5	54.0	-9.5	Vert
12310.000 Average	39.8 -7.7	+40.0	+1.8	+5.5	-34.6	+0.0	44.8	54.0	-9.2	Vert
14772.000 Average	37.5 -7.7	+40.8	+1.5	+5.7	-32.1	+0.0	45.7	54.0	-8.3	Vert
17234.000 Peak	37.0 +0.0	+42.2	+2.1	+6.5	-32.9	+0.0	54.9	74.0	-19.1	Vert
17234.000 Average	37.0 -7.7	+42.2	+2.1	+6.5	-32.9	+0.0	47.2	54.0	-6.8	Vert

**Test Data - Radiated Emissions (802.11g)****Channel 1 – 54 Mbps**

MHz	dB $\mu$ V	dB	dB	dB	dB	Table	dB $\mu$ V/m	dB $\mu$ V/m	dB	Ant
14472 Peak	41.0 +0.0	+41.1	+1.6	+5.6	-31.5	+0.0	57.8	74.0	-16.2	Vert
14472 Average	41.0 -19.2	+41.1	+1.6	+5.6	-31.5	+0.0	38.6	54.0	-15.4	Vert
16884 Peak	41.7 +0.0	+41.3	+2.0	+6.3	-33.7	+0.0	57.6	74.0	-16.4	Vert
16884 Average	41.7 -19.2	+41.3	+2.0	+6.3	-33.7	+0.0	38.4	54.0	-15.6	Vert
12060 Peak	42.7 +0.0	+39.7	+1.8	+5.5	-35.2	+0.0	54.5	74.0	-19.5	Horiz
12060 Average	42.7 -19.2	+39.7	+1.8	+5.5	-35.2	+0.0	35.3	54.0	-18.7	Horiz
14472 Peak	40.7 +0.0	+41.1	+1.6	+5.6	-31.5	+0.0	57.5	74.0	-16.5	Horiz
14472 Average	40.7 -19.2	+41.1	+1.6	+5.6	-31.5	+0.0	38.3	54.0	-15.7	Horiz
16884 Peak	41.5 +0.0	+41.3	+2.0	+6.3	-33.7	+0.0	57.4	74.0	-16.6	Horiz
16884 Average	41.5 -19.2	+41.3	+2.0	+6.3	-33.7	+0.0	38.2	54.0	-15.8	Horiz

**Test Data - Radiated Emissions (802.11g)**

Channel 6 – 54 Mbps

Freq MHz	Rdng dB $\mu$ V	Horn dB	Cable dB	Cable dB	Pre-A dB	Dist Table	Corr dB $\mu$ V/m	Spec dB $\mu$ V/m	Margin dB	Polar Ant
12180.0	44.0	+39.8 +0.0	+1.8	+5.5	-34.9	+0.0	56.2	74.0	-17.8	Horiz
12180.0	44.0	+39.8 -19.2	+1.8	+5.5	-34.9	+0.0	37.0	54.0	-17.0	Horiz
14616.0	42.5	+40.9 +0.0	+1.5	+5.7	-31.7	+0.0	58.9	74.0	-15.1	Horiz
14616.0	42.5	+40.9 -19.2	+1.5	+5.7	-31.7	+0.0	39.7	54.0	-14.3	Horiz
17052.0	41.7	+41.7 +0.0	+2.1	+6.3	-33.4	+0.0	58.4	74.0	-15.6	Horiz
17052.0	41.7	+41.7 -19.2	+2.1	+6.3	-33.4	+0.0	39.2	54.0	-14.8	Horiz
12180.0	42.8	+39.8 +0.0	+1.8	+5.5	-34.9	+0.0	55.0	74.0	-19.0	Vert
12180.0	42.8	+39.8 -19.2	+1.8	+5.5	-34.9	+0.0	35.8	54.0	-18.2	Vert
14616.0	41.8	+40.9 +0.0	+1.5	+5.7	-31.7	+0.0	58.2	74.0	-15.8	Vert
14616.0	41.8	+40.9 -19.2	+1.5	+5.7	-31.7	+0.0	39.0	54.0	-15.0	Vert
17052.0	41.5	+41.7 +0.0	+2.1	+6.3	-33.4	+0.0	58.2	74.0	-15.8	Vert
17052.0	41.5	+41.7 -19.2	+2.1	+6.3	-33.4	+0.0	39.0	54.0	-15.0	Vert

**Test Data - Radiated Emissions (802.11g)****Channel 11 – 54 Mbps**

MHz	dB $\mu$ V	dB	dB	dB	dB	Table	dB $\mu$ V/m	dB $\mu$ V/m	dB	Ant
2483.5 Peak	34.7 +0.0	+29.0	+0.8	+2.3	-0.0	+0.0	66.8	74.0	-7.2	Vert
2483.5 Average	34.7 -19.2	+29.0	+0.8	+2.3	-0.0	+0.0	47.6	54.0	-6.4	Vert
12310.0 Peak	43.3 +0.0	+40.0	+1.8	+5.5	-34.6	+0.0	56.0	74.0	-18.0	Vert
12310.0 Average	43.3 -19.2	+40.0	+1.8	+5.5	-34.6	+0.0	36.8	54.0	-17.2	Vert
14772.0 Peak	38.8 +0.0	+40.8	+1.5	+5.7	-32.1	+0.0	54.7	74.0	-19.3	Vert
14772.0 Average	38.8 -19.2	+40.8	+1.5	+5.7	-32.1	+0.0	35.5	54.0	-18.5	Vert
17234.0 Peak	39.5 +0.0	+42.2	+2.1	+6.5	-32.9	+0.0	57.4	74.0	-16.6	Vert
17234.0 Average	39.5 -19.2	+42.2	+2.1	+6.5	-32.9	+0.0	38.2	54.0	-15.8	Vert
2483.5 Peak	32.3 +0.0	+29.0	+0.8	+2.3	-0.0	+0.0	64.4	74.0	-9.6	Horiz
2483.5 Average	32.3 -19.2	+29.0	+0.8	+2.3	-0.0	+0.0	45.2	54.0	-8.8	Horiz
12310.0 Peak	42.3 +0.0	+40.0	+1.8	+5.5	-34.6	+0.0	55.0	74.0	-19.0	Horiz
12310.0 Average	42.3 -19.2	+40.0	+1.8	+5.5	-34.6	+0.0	35.8	54.0	-18.2	Horiz
14772.0 Peak	41.5 +0.0	+40.8	+1.5	+5.7	-32.1	+0.0	57.4	74.0	-16.6	Horiz
14772.0 Average	41.5 -19.2	+40.8	+1.5	+5.7	-32.1	+0.0	38.2	54.0	-15.8	Horiz
17234.0 Peak	42.0 +0.0	+42.2	+2.1	+6.5	-32.9	+0.0	59.9	74.0	-14.1	Horiz
17234.0 Average	42.0 -19.2	+42.2	+2.1	+6.5	-32.9	+0.0	40.7	54.0	-13.3	Horiz

**Test Setup Photos**



**Section 8. Test Equipment List**

Nemko ID	Description	Manufacturer Model Number	Serial Number	Calibration Date	Calibration Due
1464	Spectrum analyzer	Hewlett Packard 8563E	3551A04428	01/24/07	01/24/09
1484	Cable	Storm PR90-010-072	N/A	10/02/06	10/02/07
1485	Cable	Storm PR90-010-216	N/A	10/02/06	10/02/07
993	Horn antenna	A.H. Systems SAS-200/571	XXX	08/01/05	08/02/07
1016	Pre-Amp	HEWLETT PACKARD 8449A	2749A00159	04/20/06	04/20/07
791	PREAMP, 25dB	Nemko USA, Inc. LNA25	398	04/20/06	04/20/07
760	Antenna biconical	Electro Metrics MFC-25	477	01/19/07	01/19/08
759	ANTENNA, LOG PERIODIC	A.H. SYSTEMS SAS-200/510	556	02/13/06	02/13/07

**Nemko USA, Inc.**

*EQUIPMENT: RX2*

FCC PART 15, SUBPART C  
SPREAD SPECTRUM TRANSMITTER  
PROJECT NO.:2169RUS1rev3

## **ANNEX A - TEST DETAILS**

NAME OF TEST: Radiated Spurious Emissions

PARA. NO.: 15.247(d)

**Minimum Standard:** In any 100kHz bandwidth outside the frequency band in which the transmitter is operating, emissions shall be at least 20 dB below the fundamental emission or shall not exceed the following field strength limits:

**Emissions falling in the restricted bands of 15.205 shall not exceed the following field strength limits:**

Frequency (MHz)	Field Strength (μV/m @ 3m)	Field Strength (dB @ 3m)
30 - 88	100	40.0
88 - 216	150	43.5
216 - 960	200	46.0
Above 960	500	54.0

**THE SPECTRUM WAS SEARCHED TO THE 10th HARMONIC**

#### 15.205 Restricted Bands

MHz	MHz	MHz	GHz
0.09-0.11	16.42-16.423	399.9-410	4.5-5.25
0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.125-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2655-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	Above 38.6
13.36-13.41	1718		

Number of channels tested:

Tuning range	Number of channels tested	Channel location in band
1 MHz or less	1	middle
1 to 10 MHz	2	top and bottom
more than 10 MHz	3	top, middle, bottom

**Nemko USA, Inc.**

*EQUIPMENT: RX2*

FCC PART 15, SUBPART C  
SPREAD SPECTRUM TRANSMITTER  
PROJECT NO.:2169RUS1rev3

**ANNEX B - TEST DIAGRAMS**

**Test Site For Radiated Emissions**