Nemko Test Report:	6L0783RUS1 rev 1
Applicant:	Sirit, Inc. 1321 Valwood Parkway Carrollton, TX 75006
Equipment Under Test: (E.U.T.)	IDentity MaX Mobile Reader–015
In Accordance With:	**FCC Part 15, Subpart C, 15.247** Frequency Hopping Transmitters
Tested By:	Nemko USA Inc. 802 N. Kealy Lewisville, Texas 75057-3136

TESTED BY: _____ **DATE:** **27 November 2006**

Kevin Rose Wireless Engineer

APPROVED BY: _____ **DATE:** **27 November 2006**

Brian Boyea, Resources Manager

Total Number of Pages: 40

Table of Contents

Section 1. Summary of Test Results

Manufacturer: Sirit, Inc.

Model No.: Identity Max Reader-015

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 is 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.

☒	New Submission	☐	Production Unit
☐	Class II Permissive Change	☒	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. NONE
See " Summary of Test Data".

NVLAP®
LAB CODE: 100426-0

Summary Of Test Data

NAME OF TEST	PARA. NO.	RESULT
Powerline Conducted Emissions	15.207(a)	Complies
Channel Separation	15.247(a)(1)	Complies
Time of Occupancy	15.247(a)(1)	Complies
20 dB Occupied Bandwidth	15.247(a)(1)	Complies
Peak Power Output	15.247(b)	Complies
Spurious Emissions (Antenna Conducted)	15.247(d)	Complies
Spurious Emissions (Radiated)	15.247(d)	Complies

Footnotes:

Section 2. Equipment Under Test (E.U.T.)

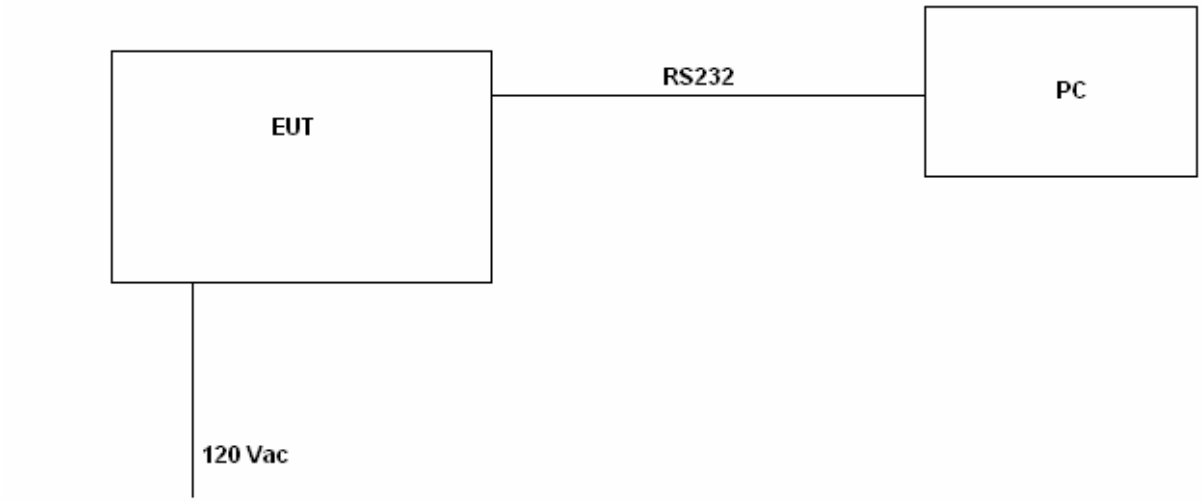
General Equipment Information

Frequency Band:	☒ 902 – 928 MHz ☐ 2400 – 2483.5 MHz ☐ 5725 – 5850 MHz
Operating Frequency Range:	902.793 to 927.293
Number of Channels:	50
Channel Spacing:	500 kHz
User Frequency Adjustment:	Software controlled

Description of EUT

The Sirit Identity Max Desktop Reader is an RFID reader device that transmits and receives in the 900 MHz ISM band.

System Diagram



Section 3. Powerline Conducted Emissions

NAME OF TEST: Powerline Conducted Emissions	PARA. NO.: 15.207(a)
TESTED BY: Kevin Rose	DATE: 27 Nov 2006

Test Results: Complies. The worst case emission was 54.7 dBµV at 0.1926 MHz. This is 9.4 dB below the average specification limit of 63.9 dBµV.

Test Data: Refer to attached plots

Equipment Used: 1325-1258-1284-674

Measurement Uncertainty: +/- 1.7 dB

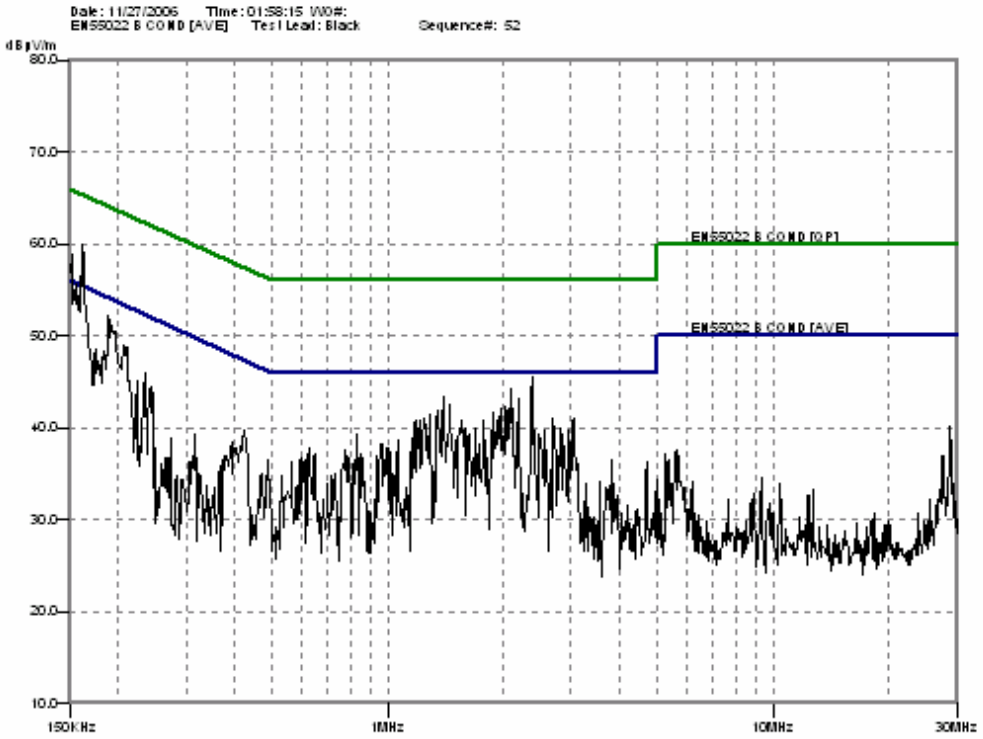
Temperature: 21 °C

Relative Humidity: 35 %

Test Data – Powerline Conducted Emissions

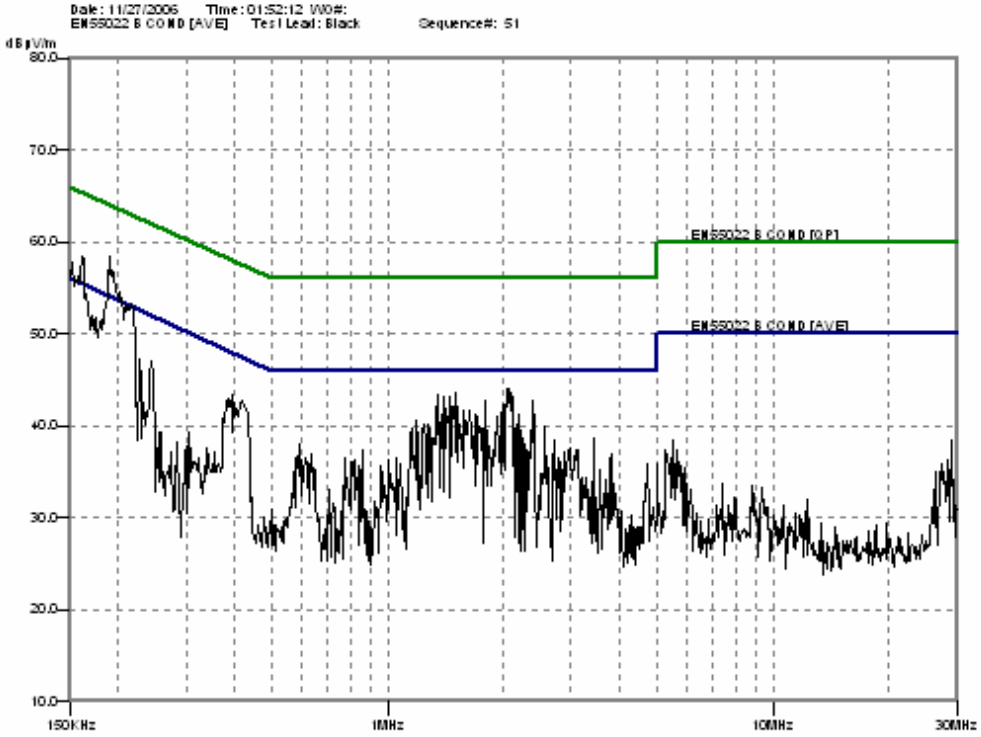
Measurement Data: Reading listed by margin. Test Lead:

#	Freq MHz	Rdng dBµV	1258 dB	1325 dB	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	191.980k QP	45.8	+1.9	+0.1	47.8	64.0	-16.2	White
2	185.720k Ave	30.5	+2.0	+0.1	32.6	54.2	-21.6	White



Measurement Data: Reading listed by margin. Test Lead:

#	Freq MHz	Rdng dBµV	1258 dB	1325 dB	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	192.600k QP	52.5	+1.9	+0.1	54.5	63.9	-9.4	Black
2	194.689k Ave	41.0	+1.9	+0.1	43.0	53.8	-10.8	Black
3	2.036M QP	36.8	+0.3	+0.2	37.3	56.0	-18.7	Black
4	1.996M Ave	20.4	+0.3	+0.2	20.9	46.0	-25.1	Black



Test Setup Photos – Powerline Conducted Emissions

Test Setup Photos – Powerline Conducted Emissions

Section 4. Channel Separation

NAME OF TEST: Channel Separation	PARA. NO.: 15.247(a)(1)
TESTED BY: Kevin Rose	DATE: 27 Nov 2006

Test Results: Complies.

Measurement Data: See 20 dB BW plot
Measured 20 dB bandwidth: 68 kHz Max
Channel Separation: 500 kHz

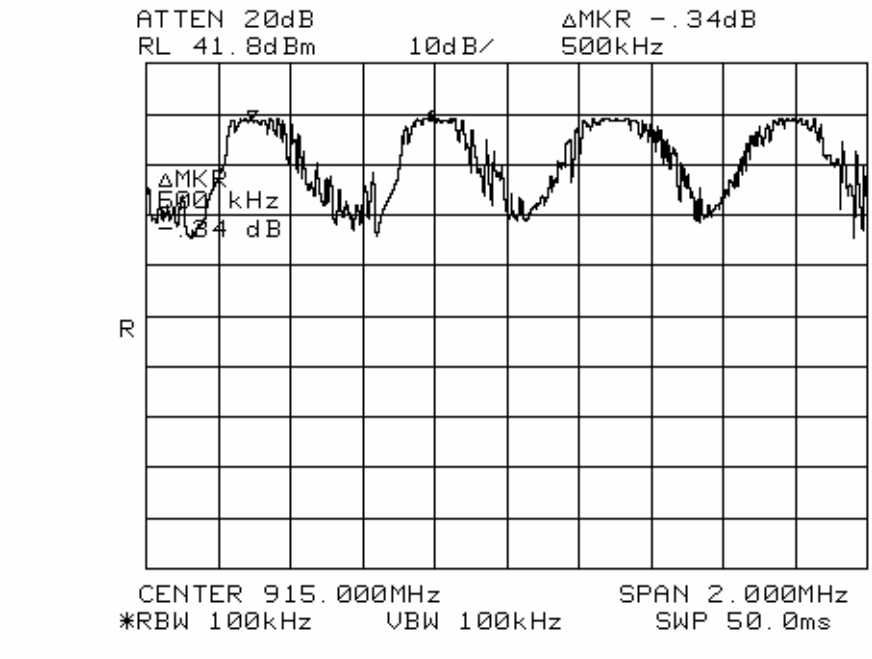
Equipment Used: 1464-1465-1478-1081

Measurement Uncertainty: $1X10^{-7}$ppm

Temperature: 21 °C

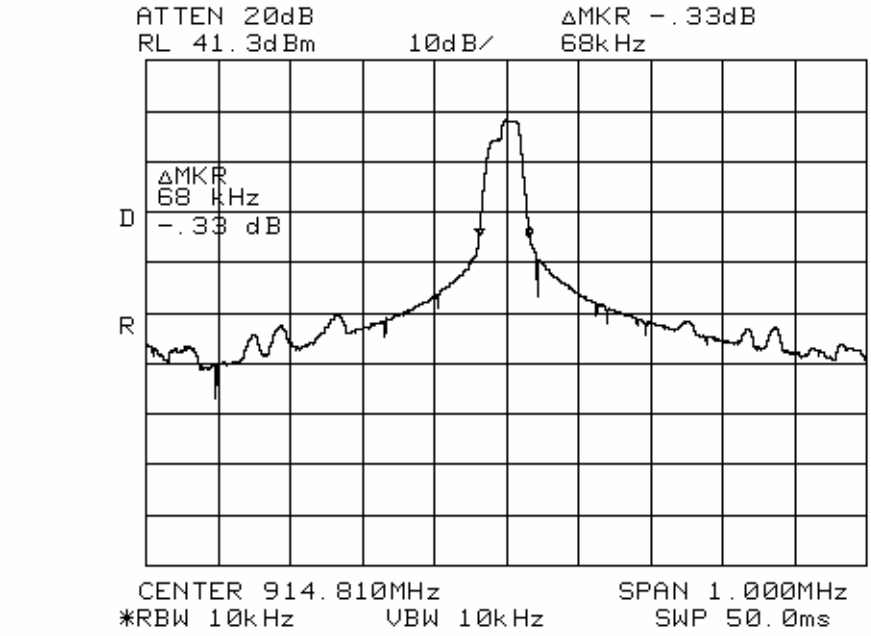
Relative Humidity: 35 %

Test Data – Channel Separation

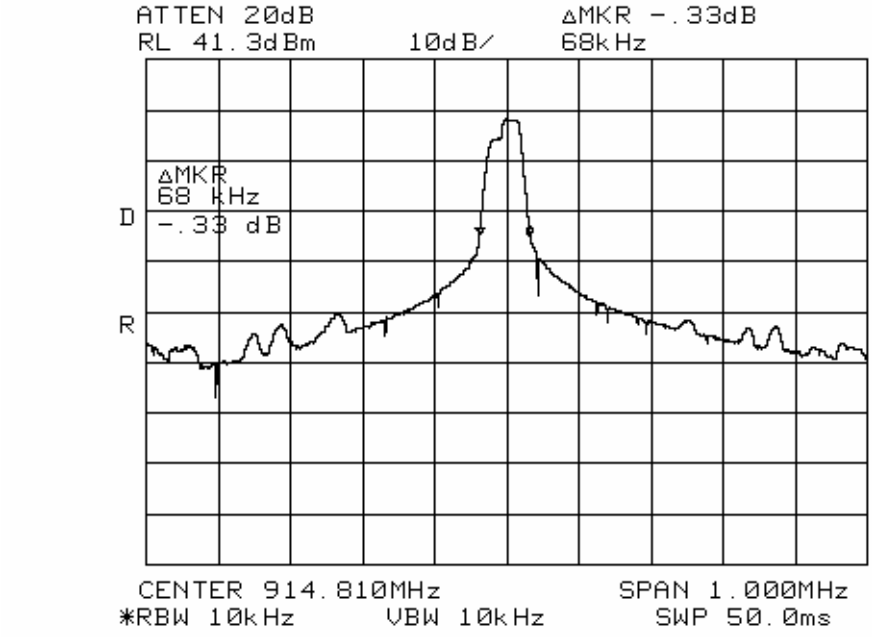


Test Data – 20 dB Bandwidth

Low Channel

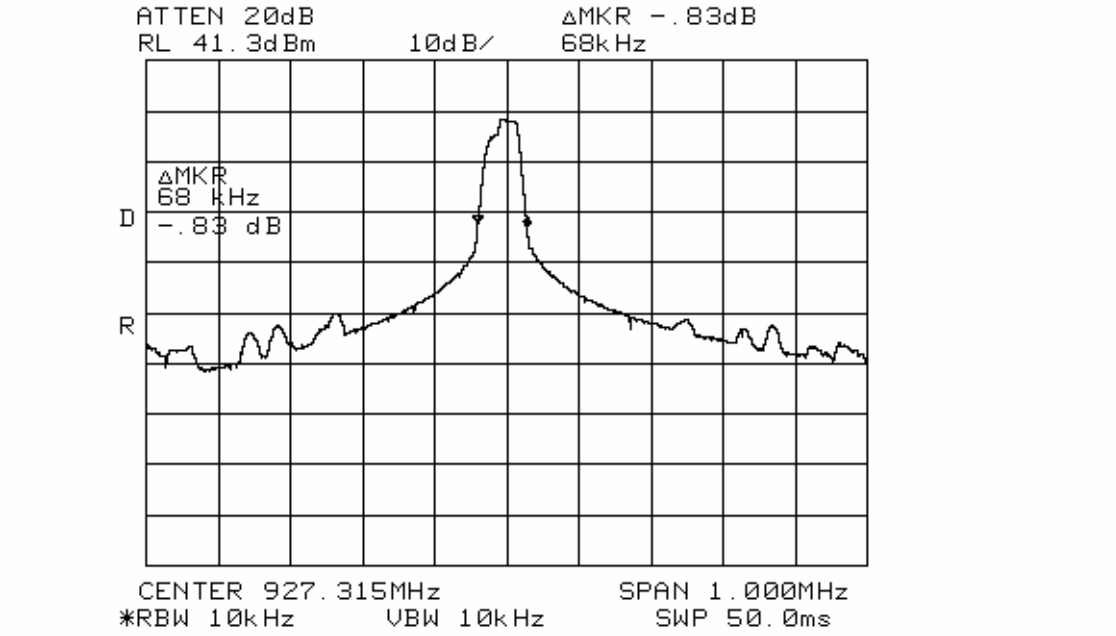


Mid Channel



Test Data – 20 dB Bandwidth

High Channel



Section 5. Time of Occupancy

NAME OF TEST: Time of Occupancy	PARA. NO.: 15.247(a)(1)
TESTED BY: Kevin Rose	DATE: 27 Nov 2006

Test Results: Complies.

Measurement Data:

Maximum Dwell Time On Any Channel:	43.18 mS in 20 seconds
Number of Hopping Channels:	50

Equipment Used: 1464-1465-1478-1081

Measurement Uncertainty: $1X10^{-7}$ppm

Temperature: 21 °C

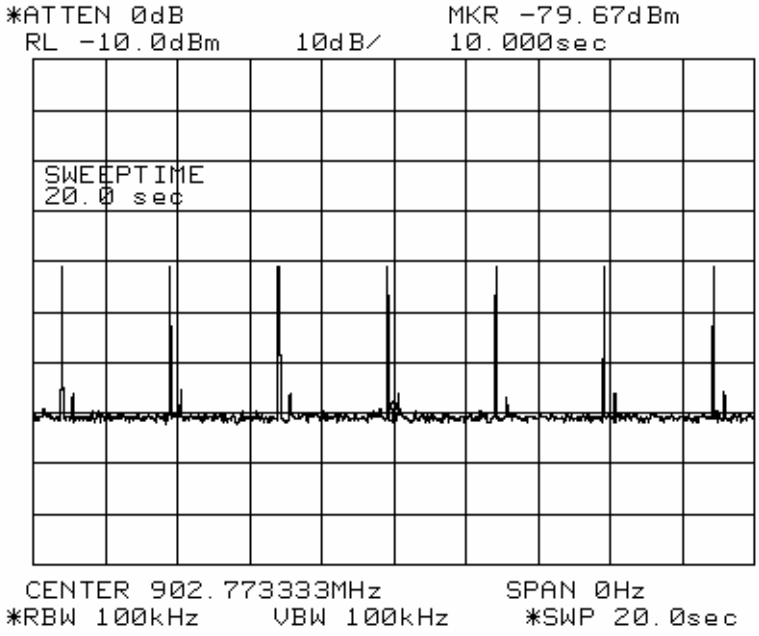
Relative Humidity: 35 %

Test Data – Time of Occupancy

Pulse Width = 6.17 mS

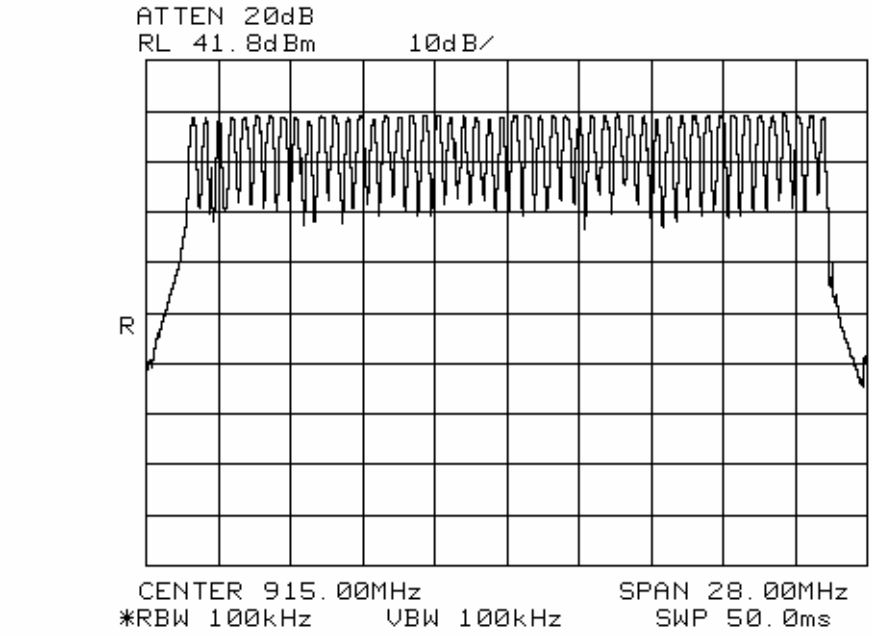
Duty cycle correction = 20 log (6.17/100) = -24.2 dB

Time of Occupancy in 20 seconds = 7 x 6.17 = 43.18mS



Test Data – Time of Occupancy

Number of hopping channels = 50



Section 6. Peak Power Output

NAME OF TEST: Peak Power Output	PARA. NO.: 15.247 (b)
TESTED BY: Kevin Rose	DATE: 27 Nov 2006

Test Results: Complies.

Measurement Data: Detachable antenna? ☐ Yes ☒ No
If yes, state the type of non-standard connector used:

Frequency (MHz)	Peak Power (dBm)	Antenna Type	Gain (dBi)	E.I.R.P. (dBm)	E.I.R.P. (W)
914.7	29.3	Circular polarized	5.27	34.57	2.86
927.3	29.5	Circular polarized	5.27	34.77	3.00
927.3	29.8	Circular polarized	5.27	35.07	3.21
Maximum EIRP (W): 3.16					

RBW=VBW=1 MHz

☒ This device was tested at +/- 15% input power per 15.31(e), with no variation in output power.

☐ For battery powered equipment, the device was tested with a fresh battery per 15.31(e).

☒ The device was tested on three channels per 15.31(l).

☐ This test was performed radiated.

Equipment Used: 1464-1465-1478-1081

Measurement Uncertainty: 1.7 dB

Temperature: 21 °C

Relative Humidity: 35 %

Section 7. Spurious Emissions (Antenna Conducted)

NAME OF TEST: Spurious Emissions (Antenna Conducted)	PARA. NO.: 15.247(d)
TESTED BY: Kevin Rose	DATE: 27 Nov 2006

Test Results: Complies.

Measurement Data: There were no emissions detected within 20 dB of the specification limit of -20 dBc. Bandedge data presented. See attached plots.

Equipment Used: 1464-1465-1478-1081

Measurement Uncertainty: $1X10^{-7}$ppm

Temperature: 21 °C

Relative Humidity: 35 %

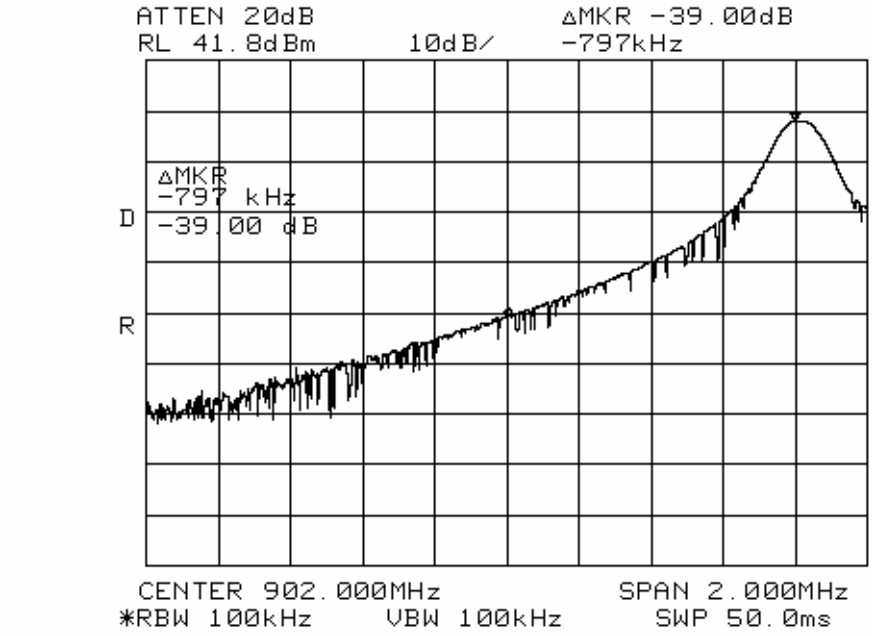
Spectrum Analyzer Settings: RBW=VBW=100 kHz

The device was tested on three channels per 15.31(l).

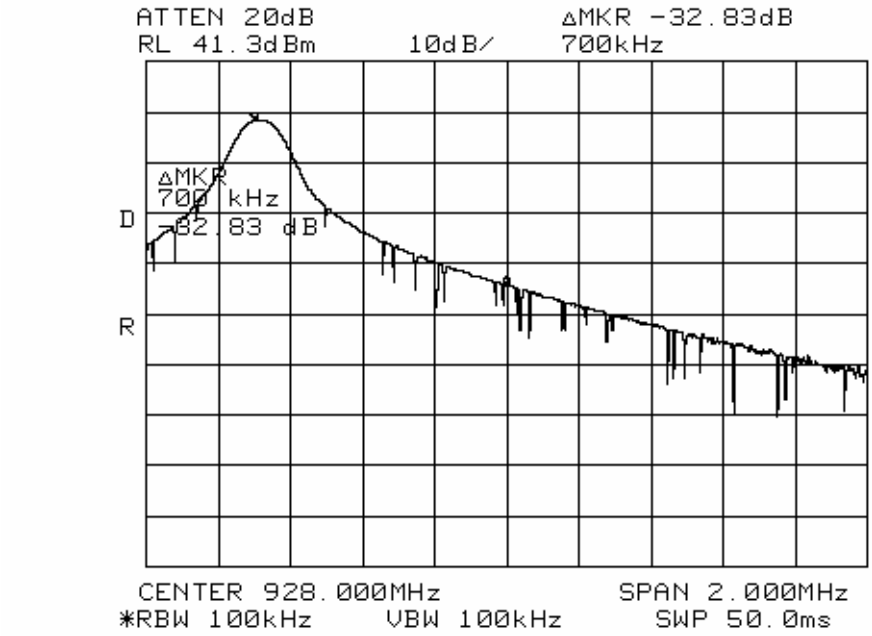
The spectrum was searched from 30 MHz to the 10th harmonic of the highest carrier frequency.

Test Data – Spurious Emissions at Antenna Terminals

Lower Band Edge



Upper Band Edge



Section 8. Spurious Emissions (Radiated)

NAME OF TEST: Spurious Emissions (Radiated)	PARA. NO.: 15.247(d)
TESTED BY: Kevin Rose	DATE: 27 Nov 2006

Test Results: Complies. The worst case emission.

77	4636.540M	68.0	+1.0	+3.2	+32.1 +0.0	+32.5	+0.0	72.6	74.0	-1.4	Horiz

Measurement Data: See attached table.

Duty Cycle Calculation:

Duty Cycle correction factor (dB) = 20 log (rf_{ON} in ms/100ms)

Duty cycle correction = 20 log (6.17/100) = -24.1 dB

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).

Equipment Used: 1195-759-1514-678-1284-1464-1484-1485-1016-993

Measurement Uncertainty: +/-3.6 dB

Temperature: 21 °C

Relative Humidity: 35 %

Test Data - Radiated Emissions

Low, Mid, and High Channel

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

#	Freq MHz	Rdng dBµV	Cable dB	Cable dB	Pre-A Duty dB	Horn dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	1805.541M	54.2	+0.7	+2.0	+32.0 +0.0	+27.0	+0.0	51.9	74.0	-22.1	Horiz
2	2708.442M	59.0	+0.8	+2.8	+32.7 +0.0	+29.3	+0.0	59.2	74.0	-14.8	Horiz
3	2708.439M	59.0	+0.8	+2.8	+32.7 -24.1	+29.3	+0.0	35.1	54.0	-18.9	Horiz
4	3611.346M	48.0	+0.8	+2.8	+32.4 +0.0	+30.3	+0.0	49.5	74.0	-24.5	Horiz
5	4514.035M	55.5	+1.0	+3.1	+31.6 +0.0	+32.1	+0.0	60.1	74.0	-13.9	Horiz
6	4514.046M	55.5	+1.0	+3.1	+31.6 -24.1	+32.1	+0.0	36.0	54.0	-18.0	Horiz
7	5415.516M	48.8	+1.2	+3.5	+31.9 +0.0	+33.6	+0.0	55.2	74.0	-18.8	Horiz
8	5420.575M	48.8	+1.2	+3.5	+31.9 -24.1	+33.6	+0.0	31.1	54.0	-22.9	Horiz
9	6319.363M	43.8	+1.3	+3.9	+30.7 +0.0	+34.9	+0.0	53.2	74.0	-20.8	Horiz
10	6319.675M	43.8	+1.3	+3.9	+30.7 -24.1	+34.9	+0.0	29.1	54.0	-24.9	Horiz
11	7222.456M	47.8	+1.2	+3.9	+32.1 +0.0	+35.8	+0.0	56.6	74.0	-17.4	Horiz
12	7222.456M	47.8	+1.2	+3.9	+32.1 -24.1	+35.8	+0.0	32.5	54.0	-21.5	Horiz
13	8125.257M	50.0	+1.4	+4.3	+33.6 +0.0	+37.5	+0.0	59.6	74.0	-14.4	Horiz
14	8125.260M	50.0	+1.4	+4.3	+33.6 -24.1	+37.5	+0.0	35.5	54.0	-18.5	Horiz
15	9028.168M	45.0	+1.4	+4.1	+34.6 +0.0	+37.0	+0.0	52.9	74.0	-21.1	Horiz
16	9027.940M	45.0	+1.4	+4.1	+34.6 -24.1	+37.0	+0.0	28.8	54.0	-25.2	Horiz
17	1805.443M	54.0	+0.7	+2.0	+32.0 +0.0	+27.0	+0.0	51.7	74.0	-22.3	Vert
18	1805.813M	54.0	+0.7	+2.0	+32.0 -24.1	+27.0	+0.0	27.6	54.0	-26.4	Vert
19	2708.552M	54.3	+0.8	+2.8	+32.7 +0.0	+29.3	+0.0	54.5	74.0	-19.5	Vert
20	2708.426M	54.3	+0.8	+2.8	+32.7 -24.1	+29.3	+0.0	30.4	54.0	-23.6	Vert
21	3611.252M	45.3	+0.8	+2.8	+32.4 +0.0	+30.3	+0.0	46.8	74.0	-27.2	Vert

22	3611.252M	45.3	+0.8	+2.8	+32.4 -24.1	+30.3	+0.0	22.7	54.0	-31.3	Vert
23	4514.072M	53.5	+1.0	+3.1	+31.6 +0.0	+32.1	+0.0	58.1	74.0	-15.9	Vert
24	4514.033M	53.5	+1.0	+3.1	+31.6 -24.1	+32.1	+0.0	34.0	54.0	-20.0	Vert
25	5416.593M	43.2	+1.2	+3.5	+31.9 +0.0	+33.6	+0.0	49.6	74.0	-24.4	Vert
26	5417.312M	43.2	+1.2	+3.5	+31.9 -24.1	+33.6	+0.0	25.5	54.0	-28.5	Vert
27	6319.769M	44.0	+1.3	+3.9	+30.7 +0.0	+34.9	+0.0	53.4	74.0	-20.6	Vert
28	6319.585M	44.0	+1.3	+3.9	+30.7 -24.1	+34.9	+0.0	29.3	54.0	-24.7	Vert
29	7224.766M	45.2	+1.2	+3.9	+32.1 +0.0	+35.8	+0.0	54.0	74.0	-20.0	Vert
30	7224.766M	45.2	+1.2	+3.9	+32.1 -24.1	+35.8	+0.0	29.9	54.0	-24.1	Vert
31	8125.252M	46.8	+1.4	+4.3	+33.6 +0.0	+37.5	+0.0	56.4	74.0	-17.6	Vert
32	8125.181M	46.8	+1.4	+4.3	+33.6 -24.1	+37.5	+0.0	32.3	54.0	-21.7	Vert
33	9027.334M	43.0	+1.4	+4.1	+34.6 +0.0	+37.0	+0.0	50.9	74.0	-23.1	Vert
34	9027.334M	43.0	+1.4	+4.1	+34.6 -24.1	+37.0	+0.0	26.8	54.0	-27.2	Vert
35	1829.193M	56.2	+0.7	+2.1	+32.1 +0.0	+27.2	+0.0	54.1	74.0	-19.9	Vert
36	1829.203M	56.2	+0.7	+2.1	+32.1 -24.1	+27.2	+0.0	30.0	54.0	-24.0	Vert
37	2744.459M	52.7	+0.8	+2.9	+32.7 +0.0	+29.4	+0.0	53.1	74.0	-20.9	Vert
38	2744.508M	52.7	+0.8	+2.9	+32.7 -24.1	+29.4	+0.0	29.0	54.0	-25.0	Vert
39	3659.371M	45.5	+0.8	+2.8	+32.3 +0.0	+30.5	+0.0	47.3	74.0	-26.7	Vert
40	3659.202M	45.5	+0.8	+2.8	+32.3 -24.1	+30.5	+0.0	23.2	54.0	-30.8	Vert
41	4574.115M	52.5	+1.0	+3.1	+31.8 +0.0	+32.3	+0.0	57.1	74.0	-16.9	Vert
42	4574.042M	52.5	+1.0	+3.1	+31.8 -24.1	+32.3	+0.0	33.0	54.0	-21.0	Vert
43	5488.660M	46.2	+1.2	+3.5	+31.9 +0.0	+33.6	+0.0	52.6	74.0	-21.4	Vert
44	5488.660M	46.2	+1.2	+3.5	+31.9 -24.1	+33.6	+0.0	28.5	54.0	-25.5	Vert
45	6408.597M	43.3	+1.3	+3.9	+30.9 +0.0	+35.1	+0.0	52.7	74.0	-21.3	Vert
46	6403.445M	43.3	+1.3	+3.9	+30.9 -24.1	+35.1	+0.0	28.6	54.0	-25.4	Vert
47	7318.483M	48.0	+1.2	+4.0	+32.3 +0.0	+35.8	+0.0	56.7	74.0	-17.3	Vert

48	7318.483M	48.0	+1.2	+4.0	+32.3 -24.1	+35.8	+0.0	32.6	54.0	-21.4	Vert
49	8233.254M	44.3	+1.3	+4.3	+33.3 +0.0	+37.3	+0.0	53.9	74.0	-20.1	Vert
50	8233.254M	44.3	+1.3	+4.3	+33.3 -24.1	+37.3	+0.0	29.8	54.0	-24.2	Vert
51	9147.988M	44.2	+1.3	+4.3	+34.8 +0.0	+37.0	+0.0	52.0	74.0	-22.0	Vert
52	9147.988M	44.2	+1.3	+4.3	+34.8 -24.1	+37.0	+0.0	27.9	54.0	-26.1	Vert
53	1829.693M	60.2	+0.7	+2.1	+32.1 +0.0	+27.2	+0.0	58.1	74.0	-15.9	Horiz
54	1829.475M	60.2	+0.7	+2.1	+32.1 -24.1	+27.2	+0.0	34.0	54.0	-20.0	Horiz
55	2744.411M	58.3	+0.8	+2.9	+32.7 +0.0	+29.4	+0.0	58.7	74.0	-15.3	Horiz
56	2744.429M	58.3	+0.8	+2.9	+32.7 -24.1	+29.4	+0.0	34.6	54.0	-19.4	Horiz
57	3659.237M	50.3	+0.8	+2.8	+32.3 +0.0	+30.5	+0.0	52.1	74.0	-21.9	Horiz
58	3659.229M	50.3	+0.8	+2.8	+32.3 -24.1	+30.5	+0.0	28.0	54.0	-26.0	Horiz
59	4574.037M	59.5	+1.0	+3.1	+31.8 +0.0	+32.3	+0.0	64.1	74.0	-9.9	Horiz
60	4574.037M	59.5	+1.0	+3.1	+31.8 -24.1	+32.3	+0.0	40.0	54.0	-14.0	Horiz
61	5488.215M	49.0	+1.2	+3.5	+31.9 +0.0	+33.6	+0.0	55.4	74.0	-18.6	Horiz
62	5488.215M	49.0	+1.2	+3.5	+31.9 -24.1	+33.6	+0.0	31.3	54.0	-22.7	Horiz
63	6403.162M	44.5	+1.3	+3.9	+30.9 +0.0	+35.0	+0.0	53.8	74.0	-20.2	Horiz
64	6403.693M	44.5	+1.3	+3.9	+30.9 -24.1	+35.1	+0.0	29.8	54.0	-24.2	Horiz
65	7318.475M	47.8	+1.2	+4.0	+32.3 +0.0	+35.8	+0.0	56.5	74.0	-17.5	Horiz
66	7318.522M	47.8	+1.2	+4.0	+32.3 -24.1	+35.8	+0.0	32.4	54.0	-21.6	Horiz
67	8233.238M	47.8	+1.3	+4.3	+33.3 +0.0	+37.3	+0.0	57.4	74.0	-16.6	Horiz
68	8233.238M	47.8	+1.3	+4.3	+33.3 -24.1	+37.3	+0.0	33.3	54.0	-20.7	Horiz
69	9148.457M	43.5	+1.3	+4.3	+34.8 +0.0	+37.0	+0.0	51.3	74.0	-22.7	Horiz
70	9148.043M	43.5	+1.3	+4.3	+34.8 -24.1	+37.0	+0.0	27.2	54.0	-26.8	Horiz
71	1854.633M	65.2	+0.7	+2.1	+32.1 +0.0	+27.4	+0.0	63.3	74.0	-10.7	Horiz
72	1854.711M	65.2	+0.7	+2.1	+32.1 -24.1	+27.4	+0.0	39.2	54.0	-14.8	Horiz
73	2781.905M	61.3	+0.8	+2.9	+32.7 +0.0	+29.4	+0.0	61.7	74.0	-12.3	Horiz

74	2782.470M	61.3	+0.8	+2.9	+32.7 -24.1	+29.4	+0.0	37.6	54.0	-16.4	Horiz
75	3709.112M	52.7	+0.8	+2.8	+32.2 +0.0	+30.6	+0.0	54.7	74.0	-19.3	Horiz
76	3709.082M	52.7	+0.8	+2.8	+32.2 -24.1	+30.6	+0.0	30.6	54.0	-23.4	Horiz
77	4636.540M	68.0	+1.0	+3.2	+32.1 +0.0	+32.5	+0.0	72.6	74.0	-1.4	Horiz
78	4636.533M	68.0	+1.0	+3.2	+32.1 -24.1	+32.5	+0.0	48.5	54.0	-5.5	Horiz
79	5563.849M	50.0	+1.2	+3.5	+31.8 +0.0	+33.7	+0.0	56.6	74.0	-17.4	Horiz
80	5564.303M	50.0	+1.2	+3.5	+31.8 -24.1	+33.7	+0.0	32.5	54.0	-21.5	Horiz
81	6491.095M	46.8	+1.3	+4.0	+31.1 +0.0	+35.2	+0.0	56.2	74.0	-17.8	Horiz
82	6494.567M	46.8	+1.3	+4.0	+31.1 -24.1	+35.2	+0.0	32.1	54.0	-21.9	Horiz
83	7418.463M	49.2	+1.2	+4.1	+32.5 +0.0	+35.9	+0.0	57.9	74.0	-16.1	Horiz
84	7418.463M	49.2	+1.2	+4.1	+32.5 -24.1	+35.9	+0.0	33.8	54.0	-20.2	Horiz
85	8345.796M	43.8	+1.2	+4.4	+33.5 +0.0	+37.1	+0.0	53.0	74.0	-21.0	Horiz
86	8346.602M	43.8	+1.2	+4.4	+33.6 -24.1	+37.1	+0.0	28.8	54.0	-25.2	Horiz
87	9272.530M	45.3	+1.2	+4.4	+35.1 +0.0	+37.1	+0.0	52.9	74.0	-21.1	Horiz
88	9273.180M	45.3	+1.2	+4.4	+35.1 -24.1	+37.1	+0.0	28.8	54.0	-25.2	Horiz
89	1854.940M	62.2	+0.7	+2.1	+32.1 +0.0	+27.4	+0.0	60.3	74.0	-13.7	Vert
90	1854.612M	62.2	+0.7	+2.1	+32.1 -24.1	+27.4	+0.0	36.2	54.0	-17.8	Vert
91	2782.472M	52.8	+0.8	+2.9	+32.7 +0.0	+29.4	+0.0	53.2	74.0	-20.8	Vert
92	2781.599M	52.8	+0.8	+2.9	+32.7 -24.1	+29.4	+0.0	29.1	54.0	-24.9	Vert
93	3709.323M	44.2	+0.8	+2.8	+32.2 +0.0	+30.6	+0.0	46.2	74.0	-27.8	Vert
94	3709.323M	44.2	+0.8	+2.8	+32.2 -24.1	+30.6	+0.0	22.1	54.0	-31.9	Vert
95	4636.550M	61.2	+1.0	+3.2	+32.1 +0.0	+32.5	+0.0	65.8	74.0	-8.2	Vert
96	4636.531M	61.2	+1.0	+3.2	+32.1 -24.1	+32.5	+0.0	41.7	54.0	-12.3	Vert
97	5564.466M	46.0	+1.2	+3.5	+31.8 +0.0	+33.7	+0.0	52.6	74.0	-21.4	Vert
98	5563.191M	46.0	+1.2	+3.5	+31.8 -24.1	+33.7	+0.0	28.5	54.0	-25.5	Vert
99	6490.728M	45.5	+1.3	+4.0	+31.1 +0.0	+35.2	+0.0	54.9	74.0	-19.1	Vert

100	6491.371M	45.5	+1.3	+4.0	+31.1 -24.1	+35.2	+0.0	30.8	54.0	-23.2	Vert
101	7418.466M	44.5	+1.2	+4.1	+32.5 +0.0	+35.9	+0.0	53.2	74.0	-20.8	Vert
102	7418.466M	44.5	+1.2	+4.1	+32.5 -24.1	+35.9	+0.0	29.1	54.0	-24.9	Vert
103	8345.564M	45.2	+1.2	+4.4	+33.5 +0.0	+37.1	+0.0	54.4	74.0	-19.6	Vert
104	8346.715M	45.2	+1.2	+4.4	+33.6 -24.1	+37.1	+0.0	30.2	54.0	-23.8	Vert
105	9273.200M	44.5	+1.2	+4.4	+35.1 +0.0	+37.1	+0.0	52.1	74.0	-21.9	Vert
106	9273.200M	44.5	+1.2	+4.4	+35.1 -24.1	+37.1	+0.0	28.0	54.0	-26.0	Vert

Analyzer Settings:

Below 1000 MHz: RBW=VBW=100 kHz
Above 1000 MHz: RBW=VBW=1 MHz

Radiated Photographs

Section 9. Test Equipment List

Nemko ID	Description	Manufacturer Model Number	Serial Number	Calibration Date	Calibration Due
1484	Cable	Storm PR90-010-072	N/A	08/26/05	08/26/06
1485	Cable	Storm PR90-010-216	N/A	08/26/05	08/26/06
993	Horn antenna	A.H. Systems SAS-200/571	XXX	08/01/05	08/02/07
1464	Spectrum analyzer	Hewlett Packard 8563E	3551A04428	01/14/05	01/15/07
1195	ANTENNA,BICONICAL	A.H. SYSTEMS SAS-200/542	235	02/10/06	02/10/07
759	ANTENNA, LOG PERIODIC	A.H. SYSTEMS SAS-200/510	556	02/13/06	02/13/07
1514	CABLE ASSY, LAB 2- B OATS	Nemko USA, Inc. SITE B OATS	N/A	06/08/06	06/08/07
678	PREAMP, 15DB	Nemko USA, Inc. 30MHZ-1.4GHZ	408	09/23/00	N/A
1284	Spectrum analyzer display	Hewlett Packard 8566B	1811A00223	02/16/06	02/16/07
1016	Pre-Amp	HEWLETT PACKARD 8449A	2749A00159	04/20/06	04/20/07
1465	10 db Attenuator DC 8.0 Ghz	Midwest Microwave 292/10db	NONE	CBU	N/A
1478	20db Attenuator DC 18 Ghz	MCL Inc. BW-S20W6	NONE	CBU	N/A
1081	CABLE 2m	Astrolab 32027-2-29094-72TC	N/A	06/15/06	06/15/07
1325	CABLE, .5m	Nemko USA, Inc. RG223	N/A	04/20/06	04/20/07
1258	LISN .15mhz-30mhz	EMCO 0	1305	04/19/06	04/19/07
674	LIMITER	HP 11947A	3107A02200	04/19/06	04/19/07

ANNEX A - TEST DETAILS

NAME OF TEST: Powerline Conducted Emissions PARA. NO.: 15.207(a)

Minimum Standard: §15.207 Conducted limits.

(a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 mH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency of Conducted Emission (MHz)	Limit (dBmV) Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

(b) The limit shown in paragraph (a) of this section shall not apply to carrier current systems operating as intentional radiators on frequencies below 30 MHz. In lieu thereof, these carrier current systems shall be subject to the following standards:

(1) For carrier current systems containing their fundamental emission within the frequency band 535-1705 kHz and intended to be received using a standard AM broadcast receiver: no limit on conducted emissions.

(2) For all other carrier current systems: 1000 mV within the frequency band 535-1705 kHz, as measured using a 50 mH/50 ohms LISN.

(3) Carrier current systems operating below 30 MHz are also subject to the radiated emission limits as provided in §15.205 and §§15.209, 15.221, 15.223, 15.225 or 15.227, as appropriate.

(c) Measurements to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines. Devices that include, or make provision for, the use of battery chargers which permit operating while charging, AC adaptors or battery eliminators or that connect to the AC power lines indirectly, obtaining their power through another device which is connected to the AC power lines, shall be tested to demonstrate compliance with the conducted limits.

NAME OF TEST: Channel Separation	PARA. NO.: 15.247(a)(1)

Minimum Standard:

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

NAME OF TEST: Time of Occupancy	PARA. NO.: 15.247(a)(1)

Minimum Standard:

Frequency Band (MHz)	20 dB Bandwidth	No. of Hopping Channels	Average Time of Occupancy
902 - 928	>250 kHz	50	=<0.4 sec. in 20 sec.
902 – 928	=<250 kHz	25	=<0.4 sec. in 10 sec.
2400 – 2483.5	-----	75	=<0.4 sec. in 0.4 seconds multiplied by the number of hopping channels employed.
5725 – 5850	-----	75	=<0.4 sec. in 30 sec.

Method Of Measurement:

The spectrum analyzer is set as follows:

RBW: 1 MHz
VBW: = RBW
Span: 0 Hz
LOG dB/div.: 10 dB
Sweep: Sufficient to see one hop time sequence.
Trigger: Video

The occupancy time of one hop is measured as above. The average time of occupancy is calculated over the appropriate period of time from above table

Avg. time of occupancy = (period from table/duration of one hop)/no. of channels multiplied by the duration of one hop.

For instance:

If a 2.4 GHz system has a measured hop duration time of 1 msec. and uses 75 channels, then the average time of occupancy would be:

(30 sec./.001 sec.)/75 chan. = 400 x 1 msec. = 400 msec. or 0.4 sec. in 30 sec.

NAME OF TEST: Occupied Bandwidth	PARA. NO.: 15.247(a)(1)

Minimum Standard:

Frequency Band (MHz)	Maximum 20 dB Bandwidth
902 - 928	500 kHz
2400 – 2483.5	Not defined
5725 – 5850	1 MHz

Method Of Measurement:

The spectrum analyzer is set as follows:

RBW: At least 1% of span/div.
VBW: >RBW
Span: Sufficient to display 20 dB bandwidth
LOG dB/div.: 10 dB
Sweep: Auto

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

NAME OF TEST: Peak Power Output	PARA. NO.: 15.247(b)

Minimum Standard:

Frequency Band (MHz)	No. of Hopping Channels	Maximum Peak Power Output at Antenna Port
902 - 928	at least 50	1 watt
902 – 928	25 - 49	0.25 watts
2400 – 2483.5	75	1 watt
5725 – 5850	75	1 watt

If transmitting antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Systems operating in the 2400-2483.5 MHz band that are used exclusively for fixed, point to point operation may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum peak output power is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceed 6 dBi.

Systems operating in the 5725 – 5850 MHz band that are used exclusively for fixed, point-to-point operation may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter peak output power.

Direct Measurement Method For Detachable Antennas:
If the antenna is detachable, a peak power meter is used to measure the power output with the transmitter operating into a 50 ohm load. The dBi gain of the antenna(s) employed shall be reported.

Calculation Of EIRP For Integral Antenna:
If the antenna is not detachable from the circuit then the Peak Power Output is derived from the peak radiated field strength of the fundamental emission by using the plane wave relation $GP/4\pi R^2 = E^2/120\pi$ and proceeding as follows:

$$P = \frac{E^2 R^2}{30G} = \frac{E^2 3^2}{30G}$$

where,

P = the equivalent isotropic radiated power in watts
E = the maximum measured field strength in V/m
R = the measurement range (3 meters)
G = the numeric gain of the transmit antenna in relation to an isotropic radiator

The RBW of the spectrum analyzer shall be set to a value greater than the measured 20 dB occupied bandwidth of the E.U.T.

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

NAME OF TEST: Spurious Emissions at Antenna Terminals 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

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Method Of Measurement:

30 MHz - 10th harmonic plot
RBW: 100 kHz
VBW: 300 kHz
Sweep: Auto
Display line: -20 dBc

Lower Band Edge
RBW: At least 1% of span/div.
VBW: >RBW
Span: As necessary to display any spurious at band edge.
Sweep: Auto
Center Frequency: 902 MHz, 2400 MHz, or 5725 MHz
Marker: Peak of fundamental emission
Marker Δ: Peak of highest spurious level below center frequency.

Upper Band Edge
RBW: At least 1% of span/div.
VBW: >RBW
Span: As necessary to display any spurious at band edge.
Sweep: Auto
Center Frequency: 928 MHz, 2483.5 MHz, or 5850 MHz
Marker: Peak of fundamental emission
Marker Δ: Peak of highest spurious level above center frequency.

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

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

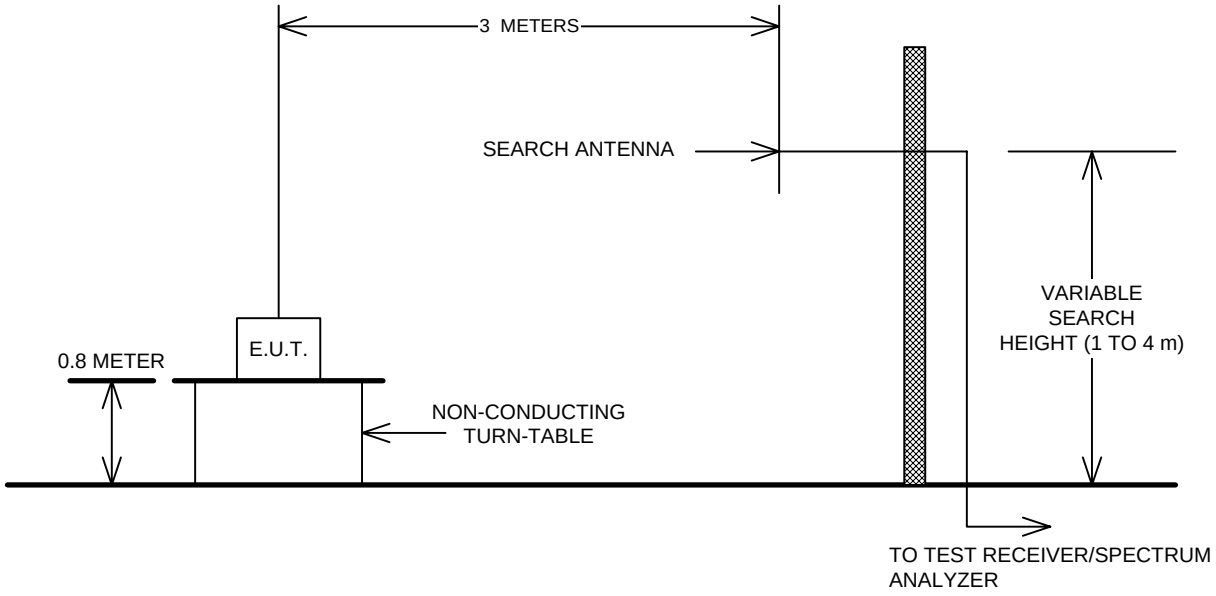
MHz	MHz	MHz	GHz
0.09-0.11	16.42-16.423	399.9-410	4.5-5.25
0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.125-6.218	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:

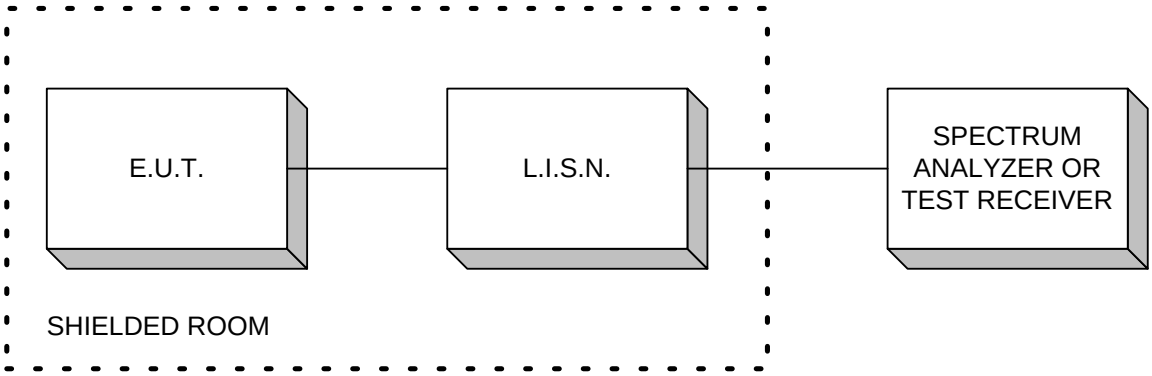
Tuning range	Number of channels tested	Channel location in band
1 MHz or less	1	middle
1 to 10 MHz	2	top and bottom
more than 10 MHz	3	top, middle, bottom

ANNEX B - TEST DIAGRAMS

Test Site For Radiated Emissions



Conducted Emissions



Peak Power at Antenna Terminals