TEST REPORT

FROM

SIEMIC, INC.
Accessing global markets

FOR

Applied Wireless ID Group, Inc.

RFID Reader

Model: MPR 3014WF-QB

TO

47 CFR 15.247:2005 & RSS-210 Issue 6:2005

Test Report Serial No.:
SL06090503-AWID-011

This report supersedes None

Remarks:	Equipment complied with the specification	[X]
	Equipment did not comply with the specification	[ ]

This Test Report is Issued Under the Authority of:

.....
Tested by: Kerwinn Corpuz, Test Engineer

.....
Reviewed by: Leslie Bai, Lab Manager

Issue date: 20 September 2006
Manufacturer: Applied Wireless ID Group, Inc.

Registration No. 783147	Registration No. 4842	Lab Code: KR0032	RTA No. D23/16V

NVLAP Lab Code: 200729-0

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Executive Summary

The purpose of this test programme was to demonstrate compliance of the Applied Wireless ID Group, Inc., RFID Reader, model MPR 3014WF-QB against the current 47 CFR 15.247:2005 & RSS-210 Issue 6:2005. The RFID Reader contains MPR-1510R3.2E module. The MPR 3014WF-QB demonstrated compliance with the 47 CFR 15.247:2005 & RSS-210 Issue 6:2005.

Applied Wireless ID Group, Inc. is the applicant and claimed manufacturer of this tested product. For the detailed description of this product, please refer to the MPR 3014WF-QB User Manual.

The equipment under test is a frequency hopping system operating in the 902-928MHz band.

The equipment was tested with five protocols:

1) GEN-2 = EPC Class1 Generation2
2) ISOB = ISO18000-6 Type B
3) Class-1 = EPC Class1
4) Class-0 = EPC Class 0/0+
5) EPC1.19 = EPC V1.19 Rev.2

The equipment was tested with the following antenna:

Snyder Antenna Systems, Inc.; model ANTUHF-PORT-X; 6.5 dBi Patch Antenna

Note: Cable between the Antenna and the Reader will be included when the EUT is marketed. Options of cable lengths to be marketed are 8 ft, 16 ft, and 24 ft.

The test has demonstrated that this unit complies with stipulated standards.

FRONT

BACK

RFID Reader Sample

1 Technical Details

Purpose	Compliance testing of MPR 3014WF-QB with 47 CFR 15.247:2005 & RSS-210 Issue 6:2005
Applicant / Client	Applied Wireless ID Group, Inc. 18300 Sutter Blvd. Morgan Hill, CA 95037
Manufacturer	Applied Wireless ID Group, Inc. 18300 Sutter Blvd. Morgan Hill, CA 95037
Laboratory performing the tests	SIEMIC Labs 2206 Ringwood Avenue San Jose, CA 95131
Test location(s)	SIEMIC Labs 2206 Ringwood Avenue San Jose, CA 95131
Test report reference number	SL06090503-AWID-011
Date EUT received	07 September 2006
Standard applied	47 CFR 15.247:2005 & RSS-210 Issue 6:2005
Dates of test (from – to)	11 September 2006 to 18 September 2006
No of Units:	1
Equipment Category:	DSS
Trade/Product Name:	MPR 3014WF-QB
Type/Model Name/No:	MPR 3014WF-QB
Technical Variants:	None
FCC ID No.	OGSR32EA032
IC ID No.	6449A-R32EA032

2 Tests Required

The product was tested in accordance with the following specifications.
The test results recorded in this Test Report are exclusively referred to the tested sample(s).

Test Standard		Description	Pass / Fail
47 CFR Part 15.247: 2005	RSS 210 Issue6: 2005		
15.203		Antenna Requirement	Pass
15.205	RSS210(A8.5)	Restricted Band of Operation	Pass
15.207(a)	RSSGen(7.2.2)	Conducted Emissions Voltage	Pass
15.247(a)(1)	RSS210(A8.1)	Channel Separation	Pass
15.247(a)(1)	RSS210(A8.1)	Occupied Bandwidth	Pass
15.247(a)(1)	RSS210(A8.1)	Number of Hopping Channels	Pass
15.247(a)(1)	RSS210(A8.1)	Time of Occupancy	Pass
15.247(b)	RSS210(A8.4)	Output Power	Pass
15.247(c)	RSS210(A8.4)	Antenna Gain > 6 dBi	Pass
15.247(d)	RSS210(A8.5)	Conducted Spurious Emissions	Pass
15.209; 15.247(d)	RSS210(A8.5)	Radiated Spurious Emissions	Pass
15.247(e)	RSS210(A8.3)	Power Spectral Density	N/A*
15.247(f)	RSS210(A8.3)	Hybrid System Requirement	N/A*
15.247(g)	RSS210(A8.1)	Hopping Capability	Pass
15.247(h)	RSS210(A8.1)	Hopping Coordination Requirement	Pass
15.247(i)	RSSGen(5.5)	Maximum Permissible Exposure	Pass
	RSSGen(4.8)	Receiver Spurious Emissions	Pass
ANSI C63.4: 2003			

Notes: Deviations to above standards are outlined in specific test sections if applicable.
Cable loss and external attenuation are compensated for in the measurement system when applicable.
** Equipment is a Frequency Hopping System.*

3 Antenna Requirement

Requirement(s): 47 CFR §15.203

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

Antenna requirement must meet at least one of the following:

a) Antenna must be permanently attached to the device.

b) Antenna must use a unique type of connector to attach to the device.

c) Device must be professionally installed. Installer shall be responsible for ensuring that the correct antenna is employed with the device.

The antenna has its own unique type of connector which meets the requirement.

1) AWID, model ANT-915CPD-A; 5.9 dBi Patch Antenna with reversed polarity TNC.
2) Snyder Antenna Systems, Inc.; model ANTUHF-PORT-X; 6.5 dBi Patch Antenna with reversed polarity TNC.

AWID Antenna

Snyder Antenna

4 Measurements, Examinations and Derived Results

4.1 General observations

Equipment serial number(s)		
Module:	Part number:	Serial number:
MPR 3014WF-QB	MPR 3014WF-QB	none

4.2 Test Results

4.2.1 Conducted Emissions Voltage

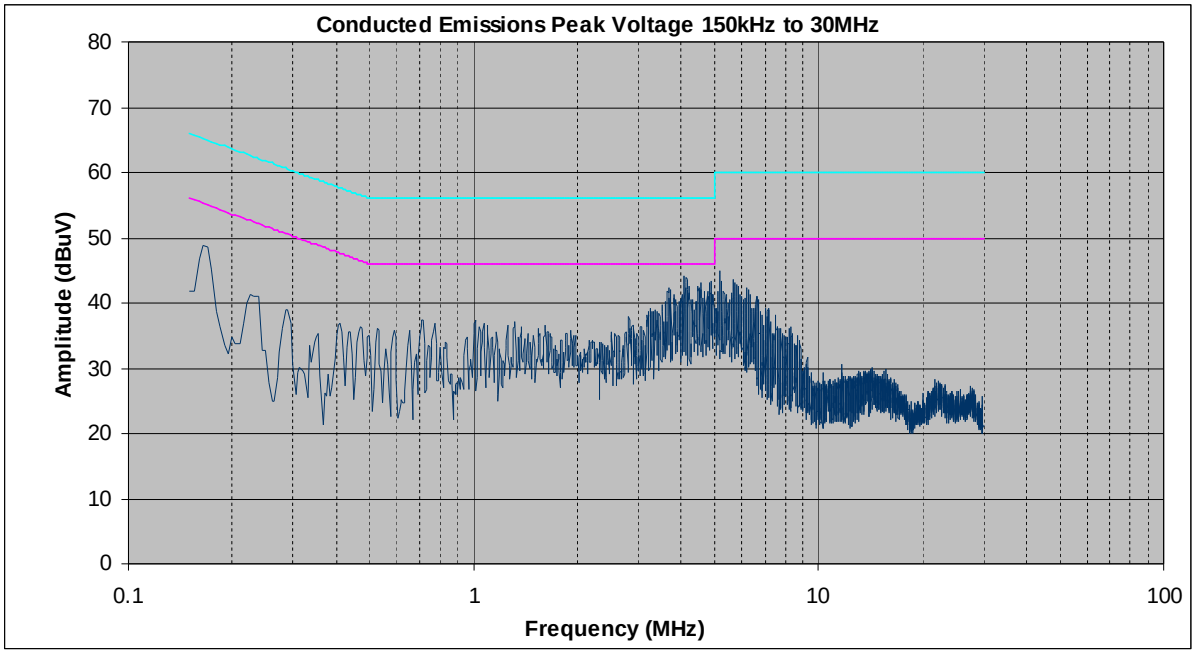
Requirement(s): 47 CFR §15.207 & RSS-Gen Issue 1(7.2.2)

Procedures:

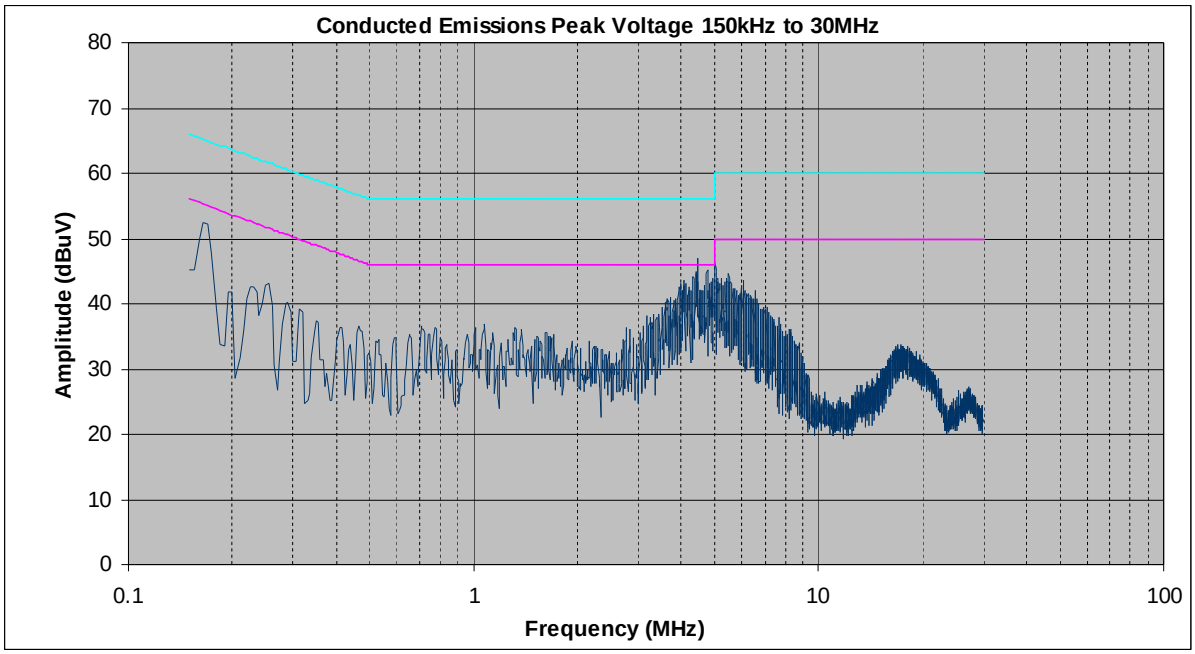
The EUT and supporting equipment were set up in accordance with the requirements of the standard on top of a 1.5m x 1m x 0.8m high, non-metallic table. The power supply for the EUT was fed through a 50Ω/50µH EUT LISN, connected to filtered mains. The RF OUT of the EUT LISN was connected to the EMI test receiver via a low-loss coaxial cable. All other supporting equipment were powered separately from another mains.

The EUT was switched on and allowed to warm up to its normal operating condition. The EUT was set to frequency hopping mode. Preliminary test were made to five protocols with the worse case protocol (EPC C0) reported. A scan was made on the NEUTRAL line over the required frequency range using an EMI test receiver. High peaks, relative to the limit line, were then selected. The EMI test receiver was then tuned to the selected frequencies and the necessary measurements made with a receiver bandwidth setting of 10kHz. Quasi-peak and Average measurements were made. The procedure was then repeated for the PHASE line.

Results: **Note – measurement between Tx and Rx are no different to emissions.**



Neutral Line Plot at 120Vac, 60Hz



Phase Line Plot at 120Vac, 60Hz

LINE	FREQ (MHz)	Corrected Amplitude (dBµV) QP	Limit (dBµV) QP	Margin (dB) QP	Corrected Amplitude (dBµV) AVG	Limit (dBµV) AVG	Margin (dB) AVG
Neutral	3.67	30.3	56	-25.7	27	46	-19
Neutral	4.156	39.5	56	-16.5	36.2	46	-9.8
Neutral	4.565	39	56	-17	35.8	46	-10.2
Phase	0.17	44.6	64.96	-20.36	32.6	54.96	-22.36
Phase	4.475	26	56	-30	22.1	46	-23.9
Phase	4.755	30.2	56	-25.8	27	46	-19

Conducted Emission Table

Note: PK = peak; QP = quasi-peak; AVG = average detector.

Tested By: Kerwinn Corpuz

Date Tested: 12 September 2006

4.2.2 Occupied Bandwidth

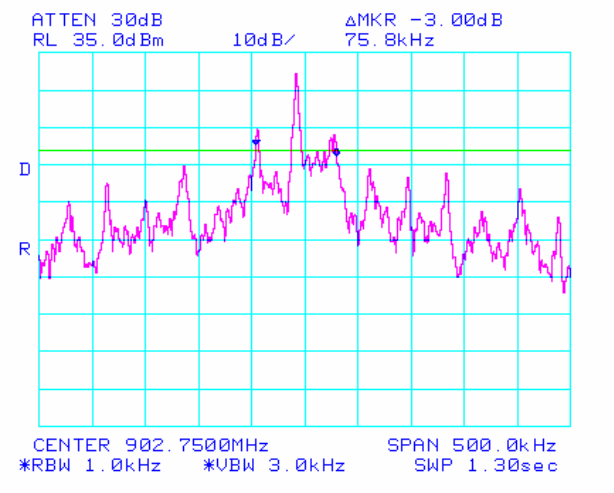
Requirement(s): 47 CFR §15.247(a)(1) & RSS-210 Issue 6(A8.1)

Procedures: The 20dB bandwidths were measured conducted using a spectrum analyzer at low, mid, and hi channels. 20 dB Bandwidth Limit: < 500 kHz.

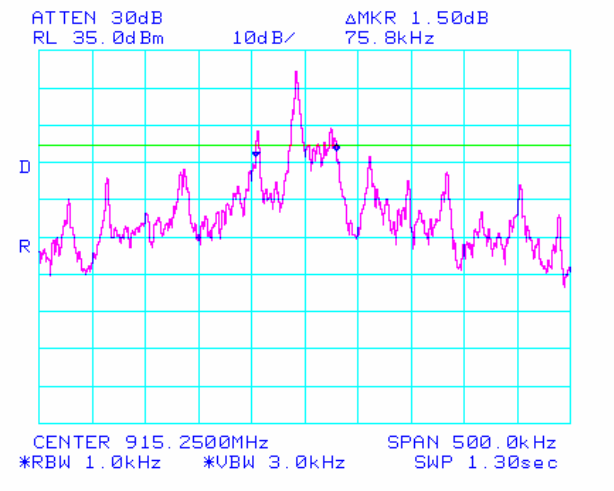
Results:

Plot #	Protocol	Channel	Channel Frequency (MHz)	Occupied Bandwidth	Channel Bandwidth (kHz)
1	GEN-2	Low	902.75	20 dB	75.8
2	GEN-2	Mid	915.25	20 dB	75.8
3	GEN-2	High	927.25	20 dB	75.0
4	ISOB	Low	902.75	20 dB	85.8
5	ISOB	Mid	915.25	20 dB	85.0
6	ISOB	High	927.25	20 dB	85.0
7	CLASS-1	Low	902.75	20 dB	283.3
8	CLASS-1	Mid	915.25	20 dB	284.2
9	CLASS-1	High	927.25	20 dB	283.3
10	CLASS-0	Low	902.75	20 dB	124.2
11	CLASS-0	Mid	915.25	20 dB	124.2
12	CLASS-0	High	927.25	20 dB	118.3
13	EPC1.19	Low	902.75	20 dB	202.5
14	EPC1.19	Mid	915.25	20 dB	201.7
15	EPC1.19	High	927.25	20 dB	202.5

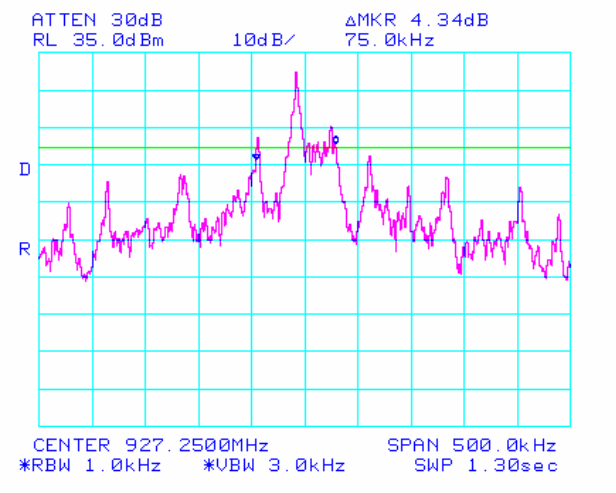
Plot #	Protocol	Channel	Channel Frequency (MHz)	Occupied Bandwidth	Channel Bandwidth (kHz)
A	GEN-2	Low	902.75	99%	269.2
B	GEN-2	Mid	915.25	99%	256.7
C	GEN-2	High	927.25	99%	250.8
D	ISOB	Low	902.75	99%	301.7
E	ISOB	Mid	915.25	99%	300.0
F	ISOB	High	927.25	99%	294.2
G	CLASS-1	Low	902.75	99%	417.5
H	CLASS-1	Mid	915.25	99%	412.5
I	CLASS-1	High	927.25	99%	410.0
J	CLASS-0	Low	902.75	99%	275.8
K	CLASS-0	Mid	915.25	99%	268.3
L	CLASS-0	High	927.25	99%	264.2
M	EPC1.19	Low	902.75	99%	320.8
N	EPC1.19	Mid	915.25	99%	295.8
O	EPC1.19	High	927.25	99%	290.0



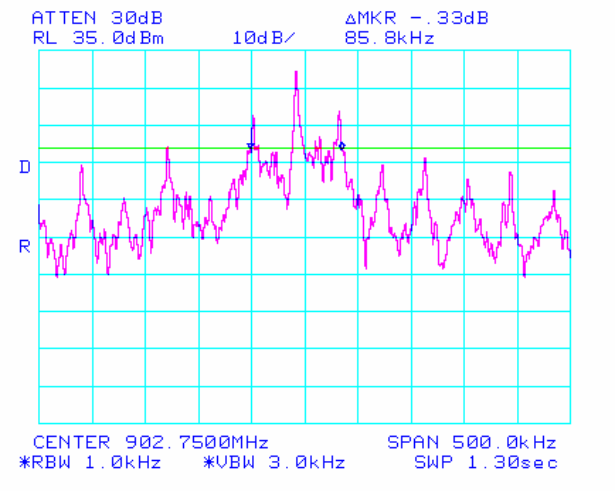
Plot 1: 20dB Bandwidth (Low) with GEN-2 protocol



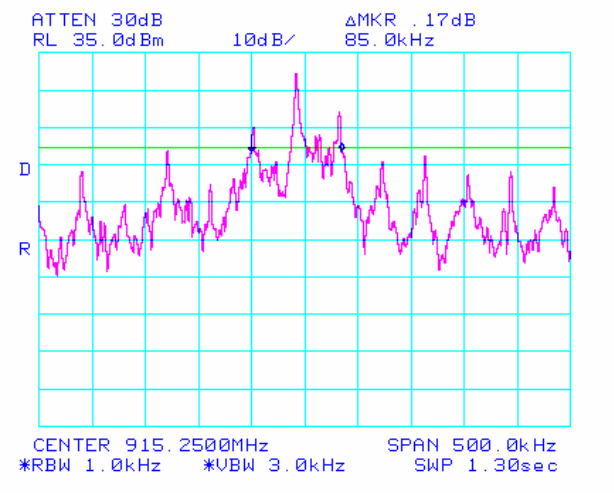
Plot 2: 20dB Bandwidth (Mid) with GEN-2 protocol



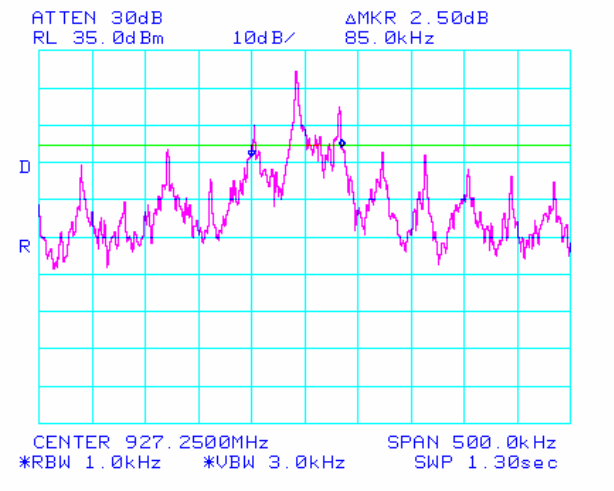
Plot 3: 20dB Bandwidth (High) with GEN-2 protocol



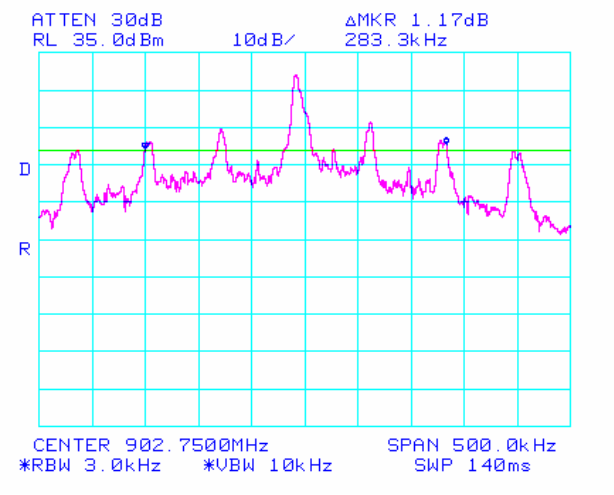
Plot 4: 20dB Bandwidth (Low) with ISOB protocol



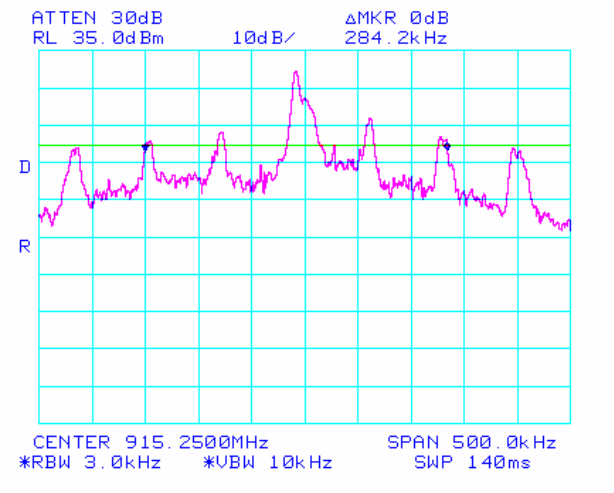
Plot 5: 20dB Bandwidth (Mid) with ISOB protocol



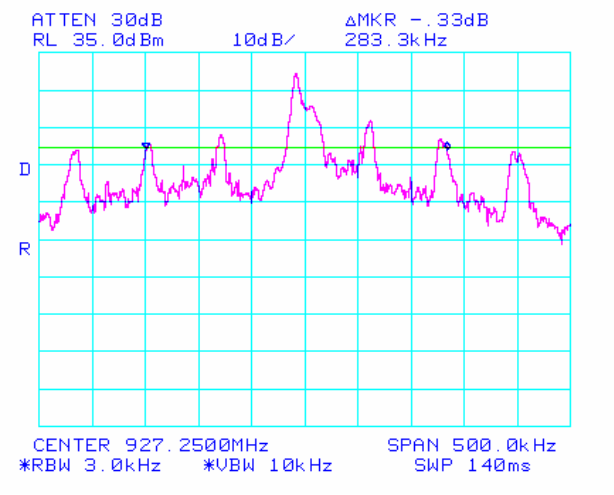
Plot 6: 20dB Bandwidth (High) with ISOB protocol



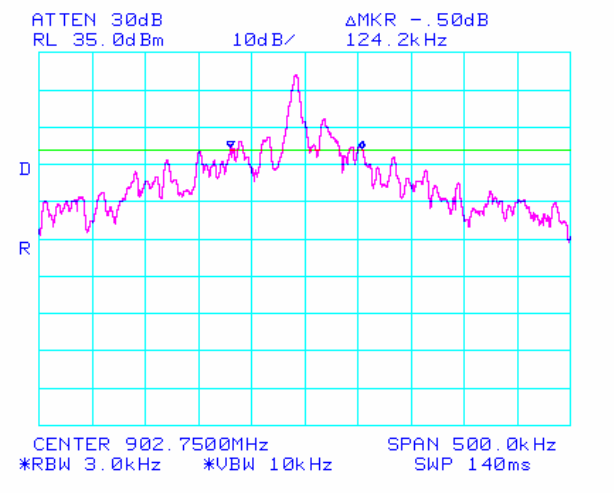
Plot 7: 20dB Bandwidth (Low) with CLASS-1 protocol



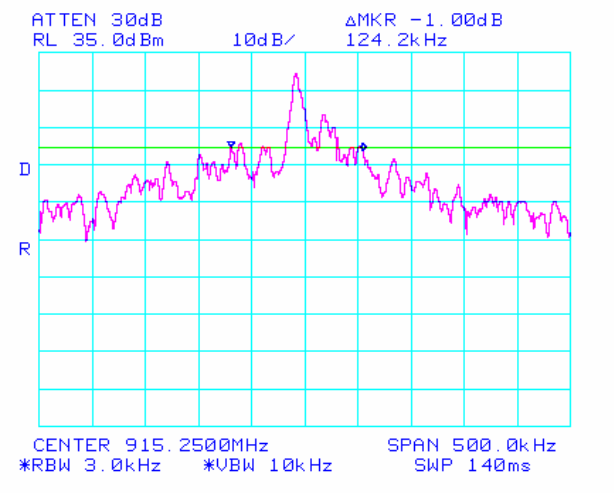
Plot 8: 20dB Bandwidth (Mid) with CLASS-1 protocol



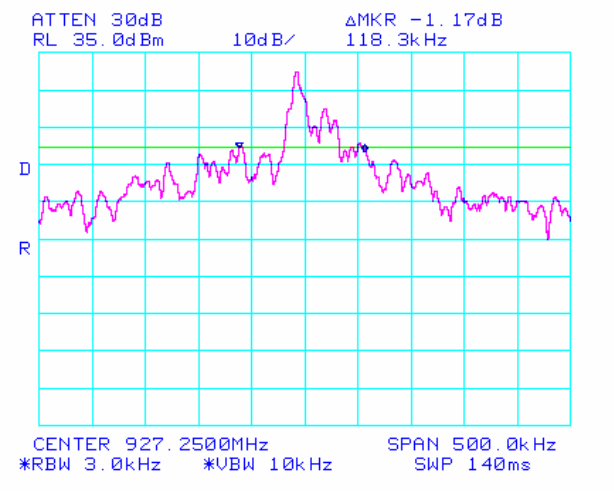
Plot 9: 20dB Bandwidth (High) with CLASS-1 protocol



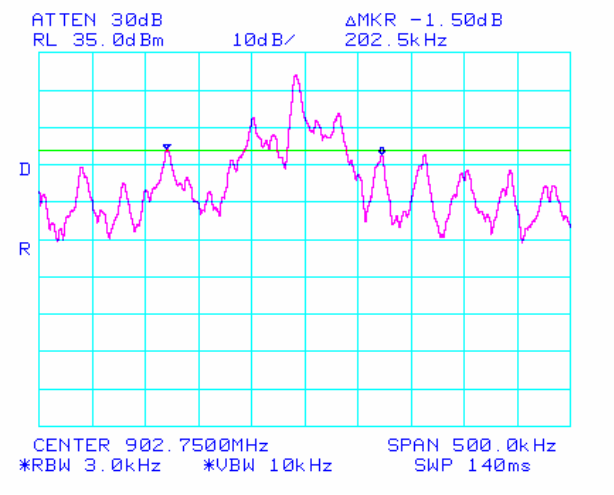
Plot 10: 20dB Bandwidth (Low) with CLASS-0 protocol



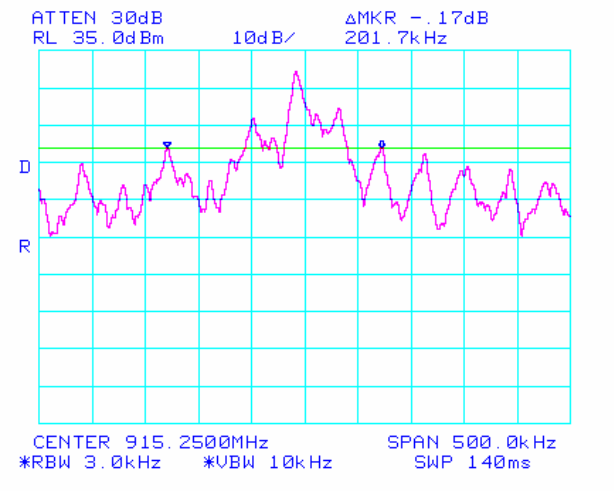
Plot 11: 20dB Bandwidth (Mid) with CLASS-0 protocol



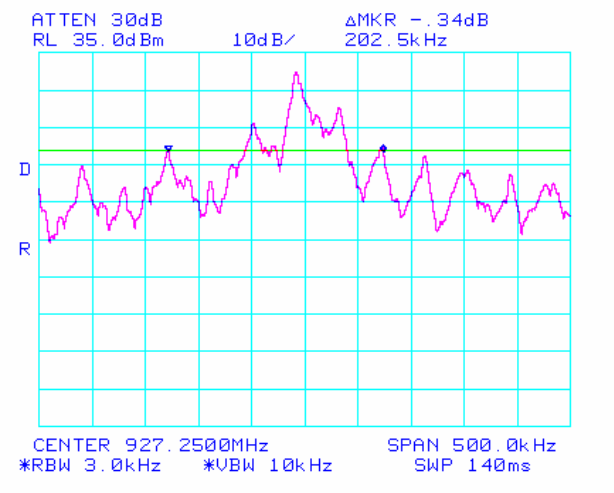
Plot 12: 20dB Bandwidth (High) with CLASS-0 protocol



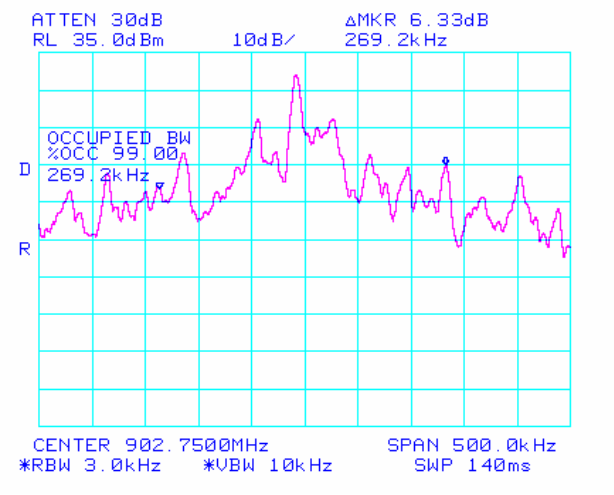
Plot 13: 20dB Bandwidth (Low) with EPC1.19 protocol



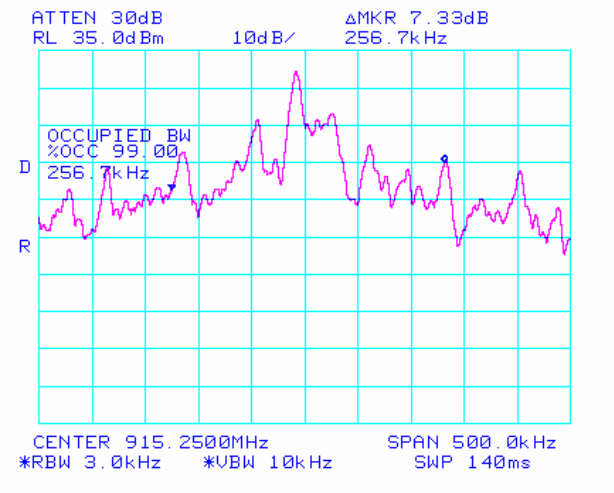
Plot 14: 20dB Bandwidth (Mid) with EPC1.19 protocol



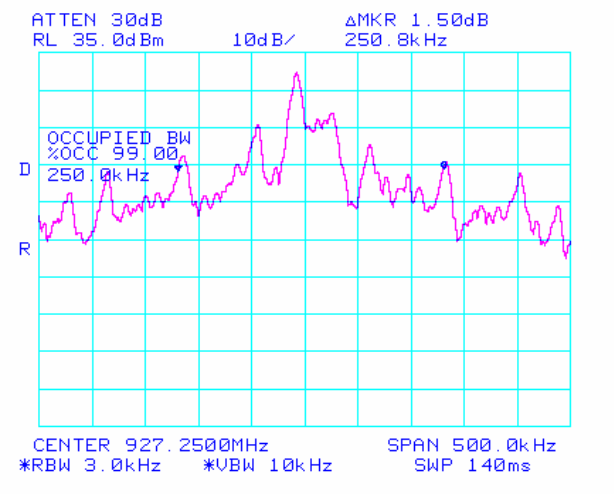
Plot 15: 20dB Bandwidth (High) with EPC1.19 protocol



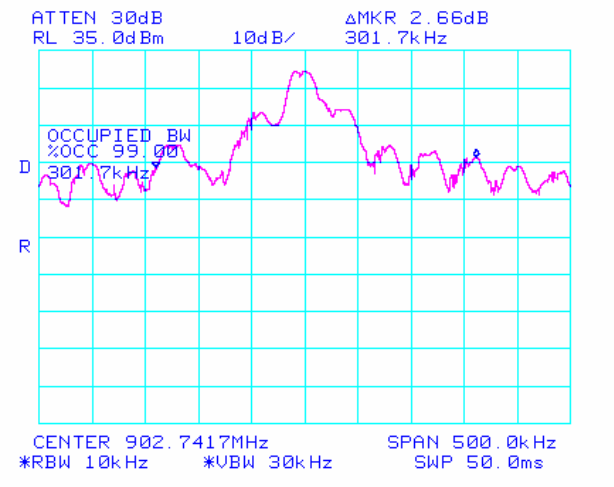
Plot A: 99% Bandwidth (Low) with GEN-2 protocol



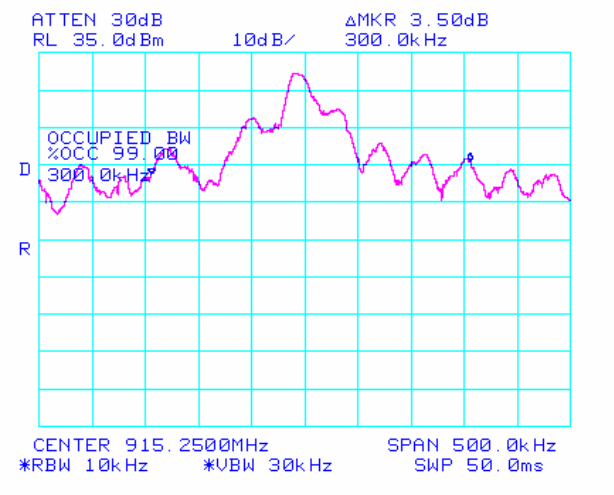
Plot B: 99% Bandwidth (Mid) with GEN-2 protocol



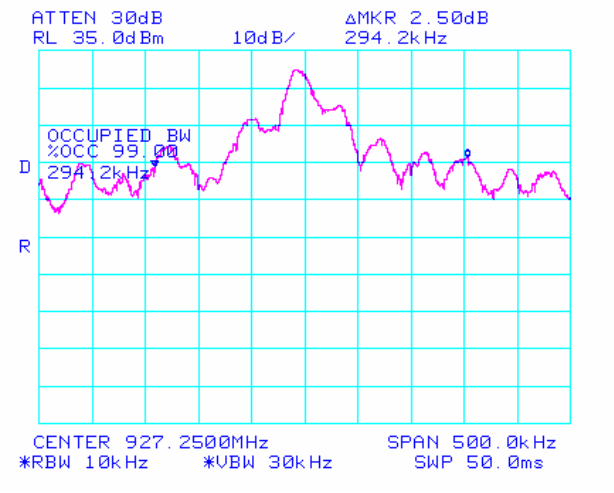
Plot C: 99% Bandwidth (High) with GEN-2 protocol



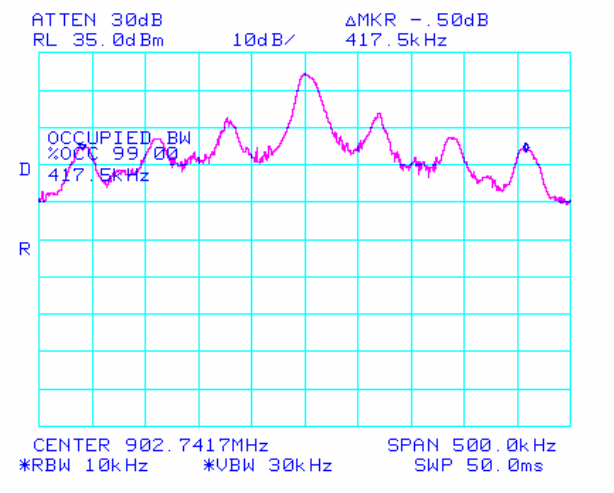
Plot D: 99% Bandwidth (Low) with ISOB protocol



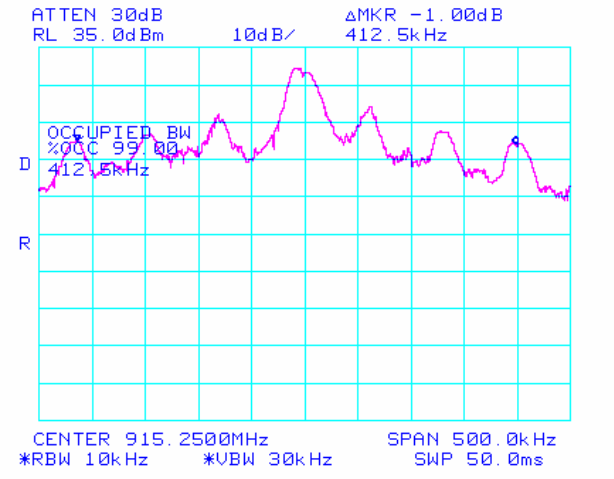
Plot E: 99% Bandwidth (Mid) with ISOB protocol



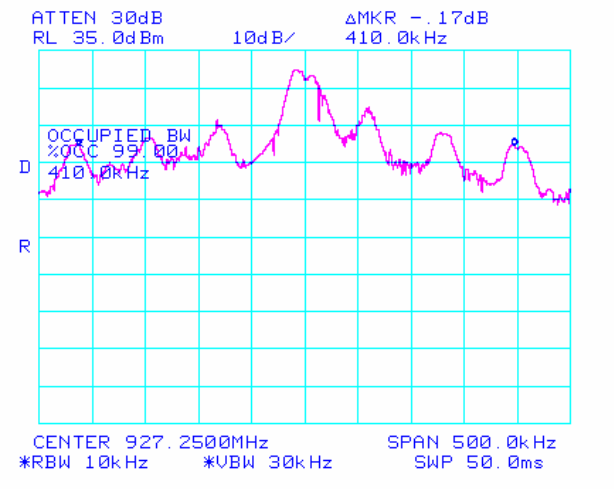
Plot F: 99% Bandwidth (High) with ISOB protocol



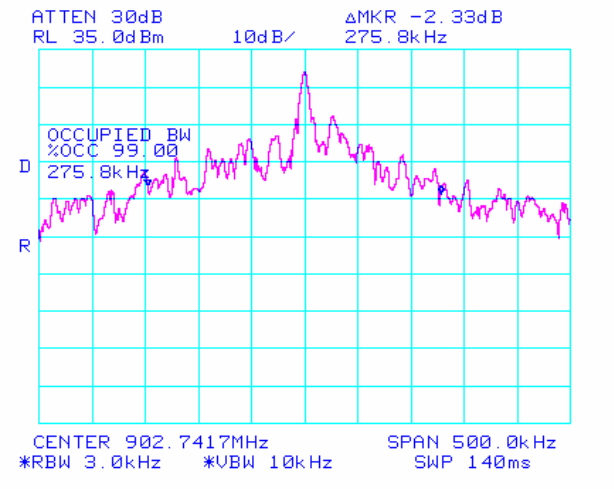
Plot G: 99% Bandwidth (Low) with CLASS-1 protocol



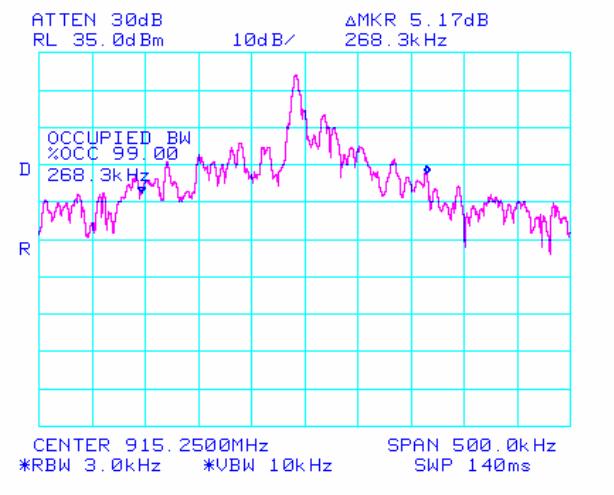
Plot H: 99% Bandwidth (Mid) with CLASS-1 protocol



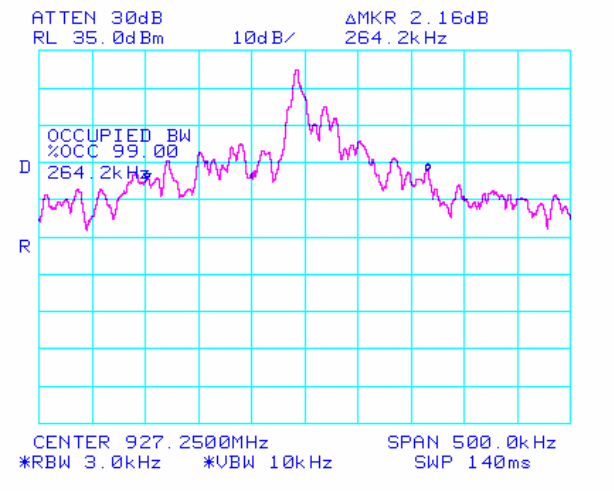
Plot I: 99% Bandwidth (High) with CLASS-1 protocol



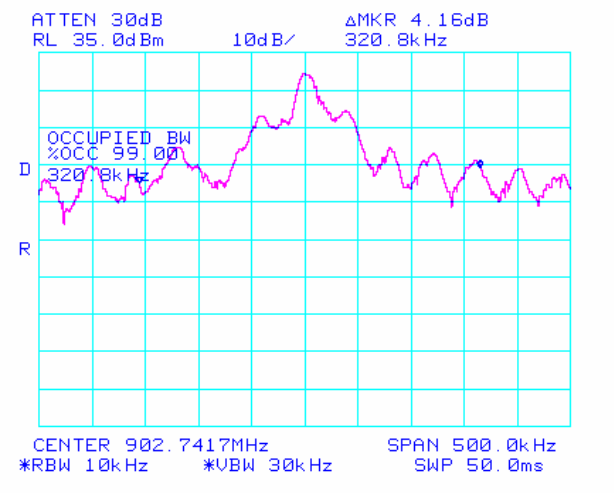
Plot J: 99% Bandwidth (Low) with CLASS-0 protocol



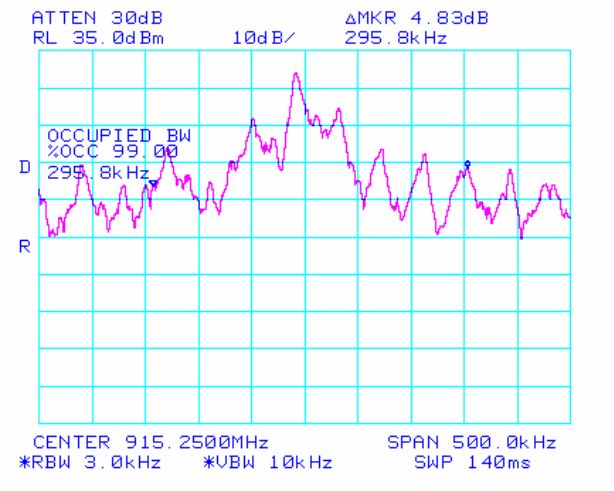
Plot K: 99% Bandwidth (Mid) with CLASS-0 protocol



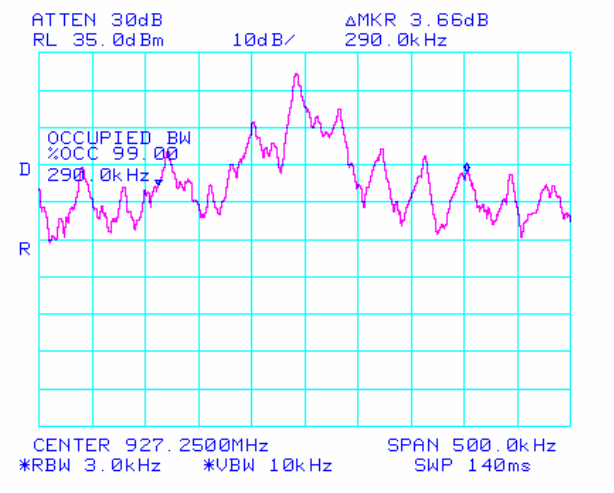
Plot L: 99% Bandwidth (High) with CLASS-0 protocol



Plot M: 99% Bandwidth (Low) with EPC1.19 protocol



Plot N: 99% Bandwidth (Mid) with EPC1.19 protocol



Plot O: 99% Bandwidth (High) with EPC1.19 protocol

Tested By: Kerwinn Corpuz

Date Tested: 11 September 2006

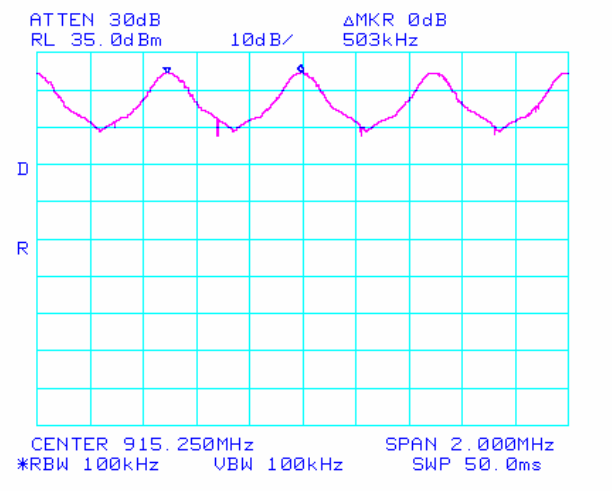
4.2.3 Carrier Frequency Separation

Requirement(s): 47 CFR §15.247(a)(1) & RSS-210 (A8.1)

Procedures: The carrier frequency separation measurement was taken conducted using a spectrum analyzer.

Results:

Plot #	Carrier Frequency Separation (MHz)
16	0.503



Plot 16: Carrier Frequency Separation

Tested By: Kerwinn Corpuz

Date Tested: 11 September 2006

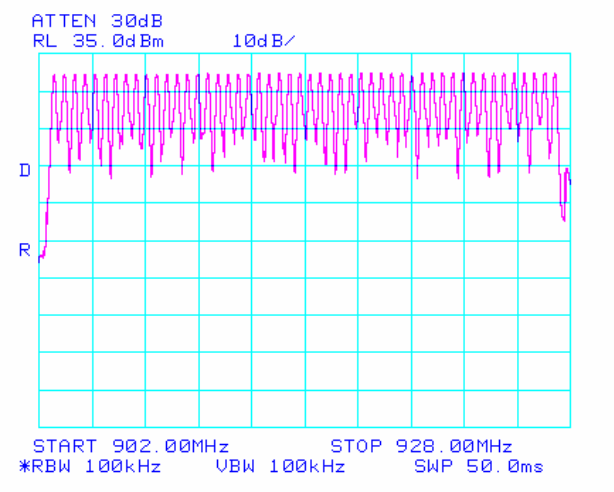
4.2.4 Number of Hopping Channels

Requirement(s): 47 CFR §15.247(a)(1) & RSS-210 (A8.1)

Procedures: The number of hopping channels was measured conducted with a spectrum analyzer.

Results:

Plot #	Number of Hopping Channels
17	50



Plot 17: Number of Hopping Channels

Tested By: Kerwinn Corpuz

Date Tested: 11 September 2006

4.2.5 Time of Occupancy

Requirement(s): 47 CFR §15.247(a)(1) & RSS-210 (A8.1)

The average time of occupancy shall not be greater than 0.4 second within a 20 second period.

Procedures: The time of occupancy was measured conducted with a spectrum analyzer.

Results:

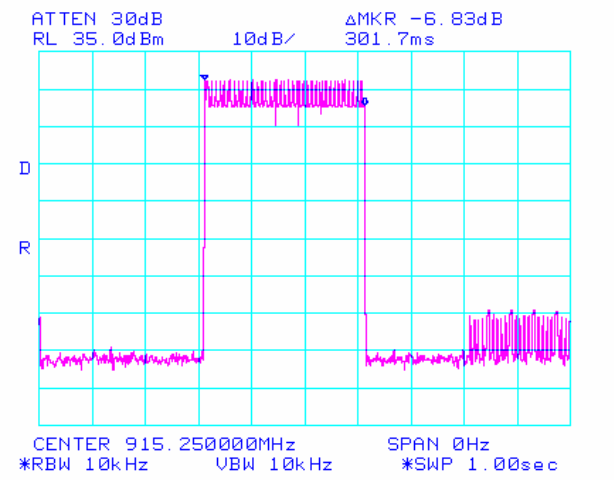
Plot #	Time of Occupancy (sec)
18 to 19	0.3989

Dwell time = 0.3017 sec

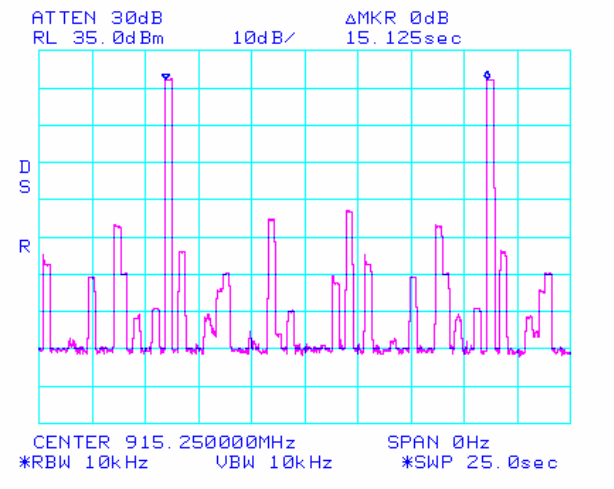
Time between occupancy = 15.125 sec

Time of occupancy = period / time between occupancy * dwell time

Therefore; 20 / 15.125 * 0.3017 = 0.3989 second



Plot 18: Dwell Time (1 of 2)



Plot 19: Time between Occupancy (2 of 2)

Tested By: Kerwinn Corpuz

Date Tested: 11 September 2006

4.2.6 Peak Output Power

Requirement(s): 47 CFR §15.247(b) & RSS-210 (A8.4)

Procedures: The peak output power was measured conducted using a spectrum analyzer at low, mid, and hi channels. Conducted Power Limit = 1 watt (30dBm). EIRP Limit = 4 Watt (36 dBm).

To maintain the output power below the limit, the software output attenuation index was set to 170.

Reference level offset to spectrum analyzer: 20.1 dB (attenuator + cable loss).

Note: Cable between the Antenna and the Reader will be included when the EUT is marketed. Options of cable lengths to be marketed are 8 ft, 16 ft, and 24 ft.

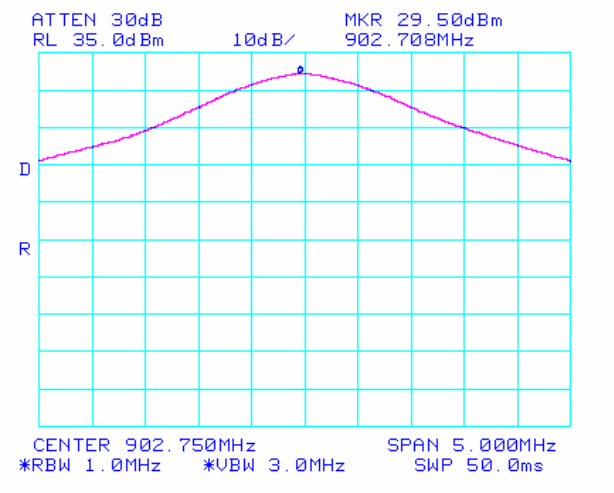
Calibrated cable loss for 8 ft cable at 928 MHz (worse case) = 1.5 dB.

Maximum antenna gain = 6.5 dBi.

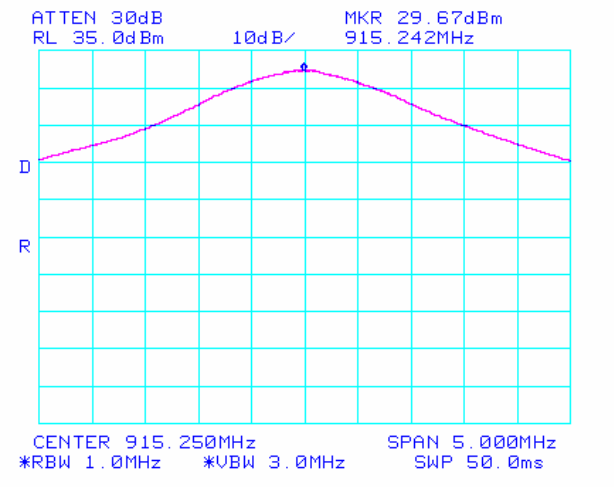
To meet the EIRP limit, the cable loss is subtracted from the antenna gain.

Results:

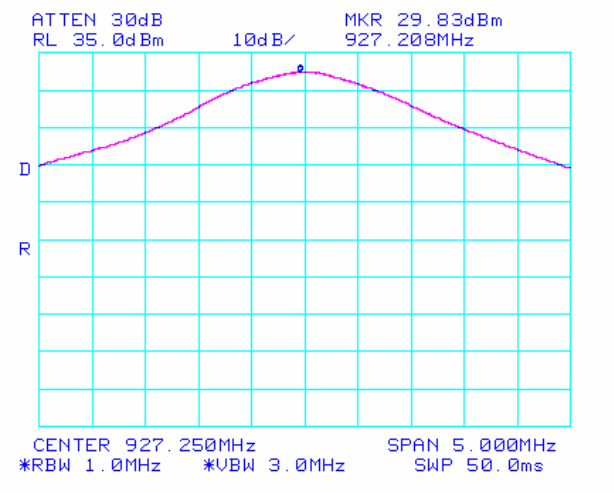
Plot #	Protocol	Channel	Channel Frequency (MHz)	Peak Power (dBm)
20	GEN-2	Low	902.75	29.50
21	GEN-2	Mid	915.25	29.67
22	GEN-2	High	927.25	29.83
23	ISOB	Low	902.75	29.50
24	ISOB	Mid	915.25	29.50
25	ISOB	High	927.25	29.83
26	CLASS-1	Low	902.75	29.17
27	CLASS-1	Mid	915.25	29.50
28	CLASS-1	High	927.25	29.67
29	CLASS-0	Low	902.75	29.17
30	CLASS-0	Mid	915.25	29.50
31	CLASS-0	High	927.25	29.83
32	EPC1.19	Low	902.75	29.17
33	EPC1.19	Mid	915.25	29.50
34	EPC1.19	High	927.25	29.83



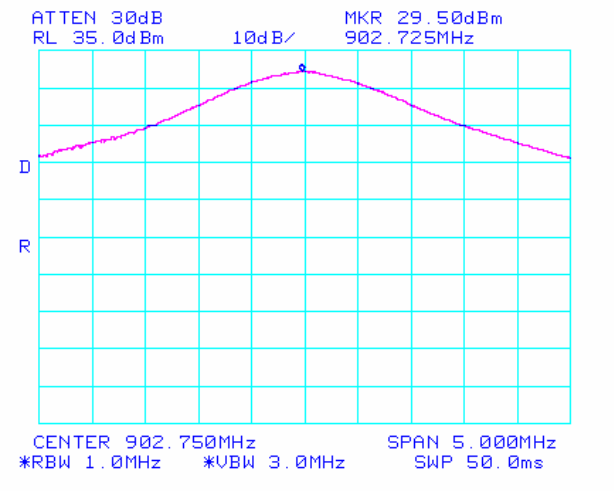
Plot 20: Peak Power (Low) with GEN-2 protocol



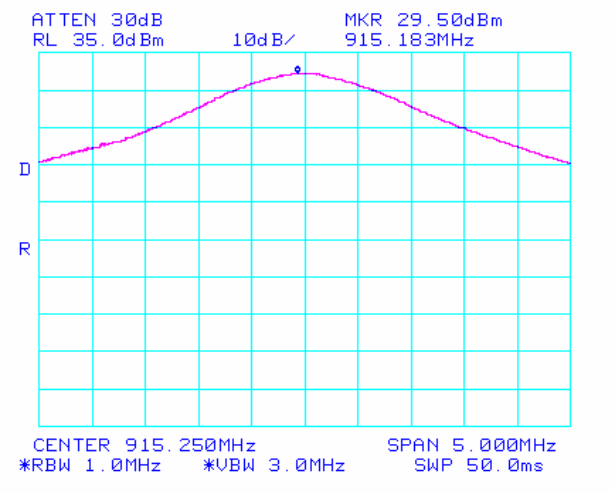
Plot 21: Peak Power (Mid) with GEN-2 protocol



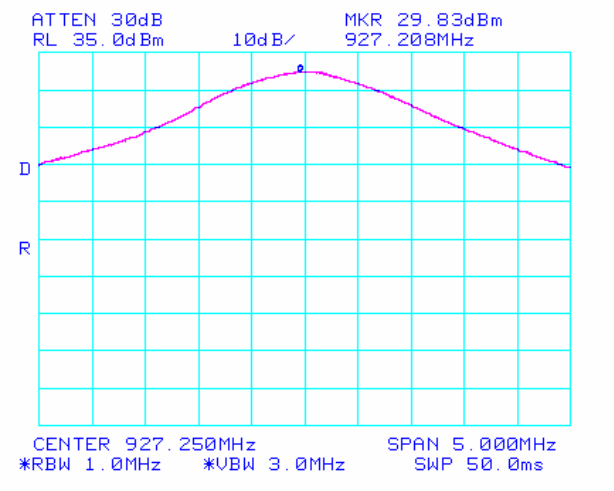
Plot 22: Peak Power (High) with GEN-2 protocol



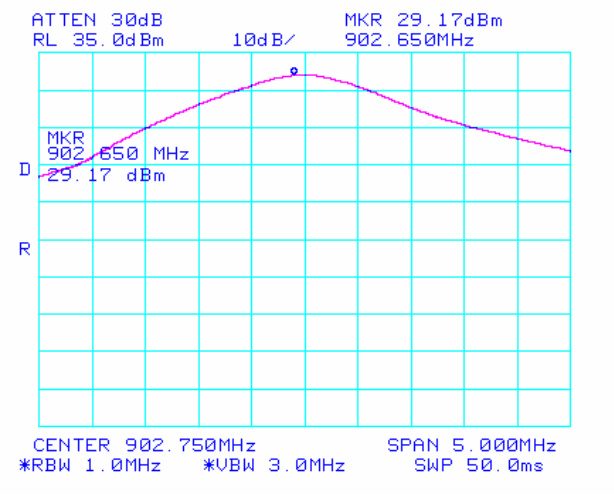
Plot 23: Peak Power (Low) with ISOB protocol



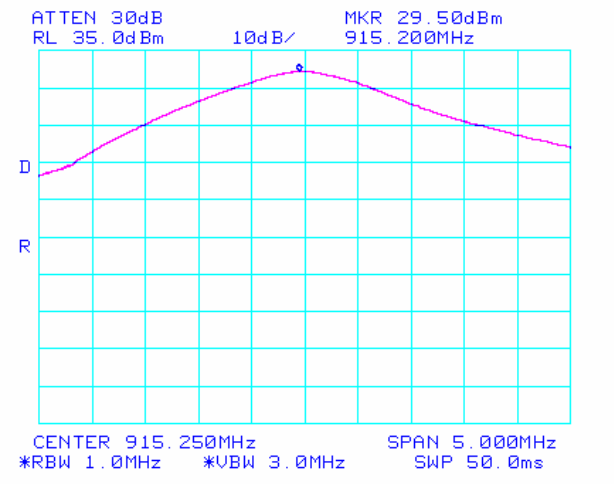
Plot 24: Peak Power (Mid) with ISOB protocol



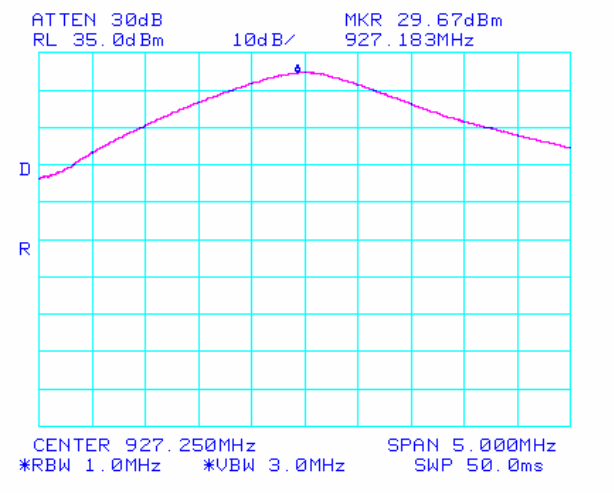
Plot 25: Peak Power (High) with ISOB protocol



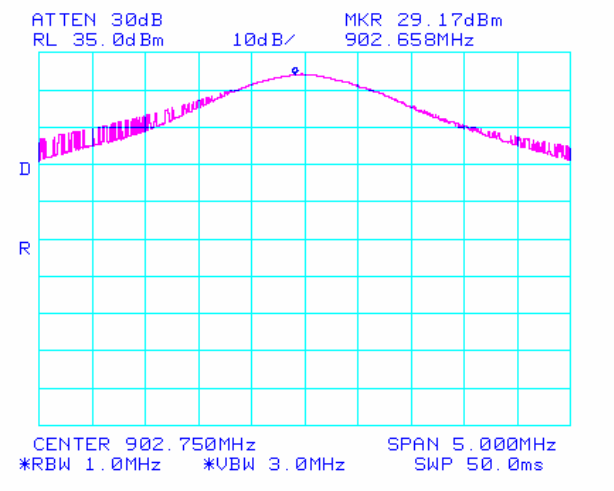
Plot 26: Peak Power (Low) with CLASS-1 protocol



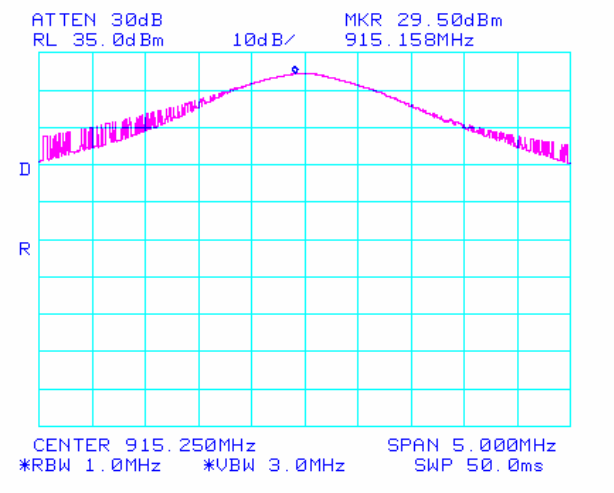
Plot 27: Peak Power (Mid) with CLASS-1 protocol



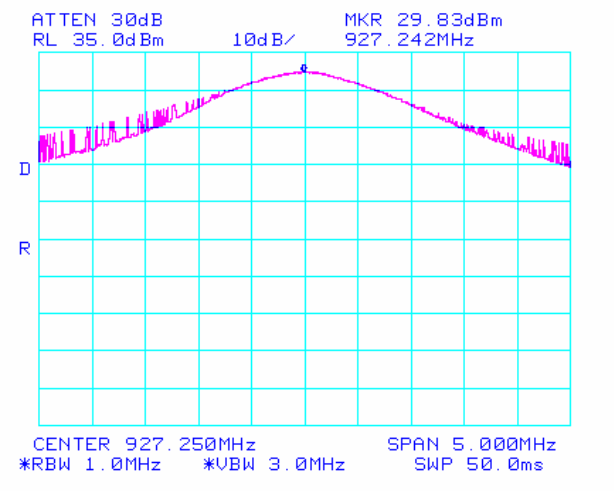
Plot 28: Peak Power (High) with CLASS-1 protocol



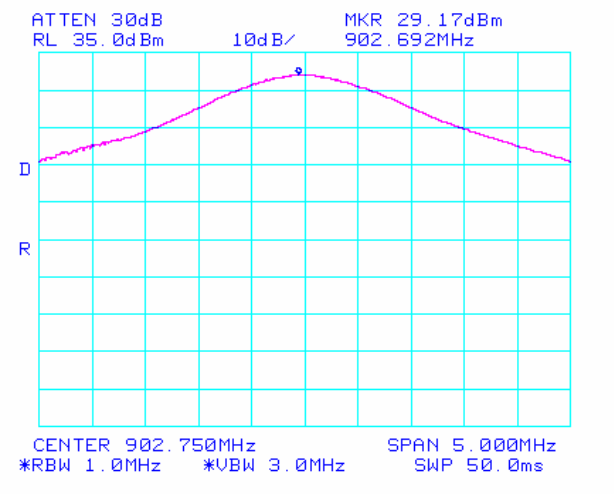
Plot 29: Peak Power (Low) with CLASS-0 protocol



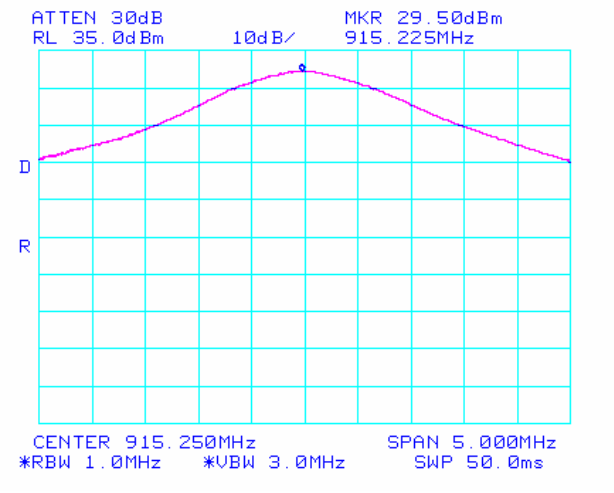
Plot 30: Peak Power (Mid) with CLASS-0 protocol



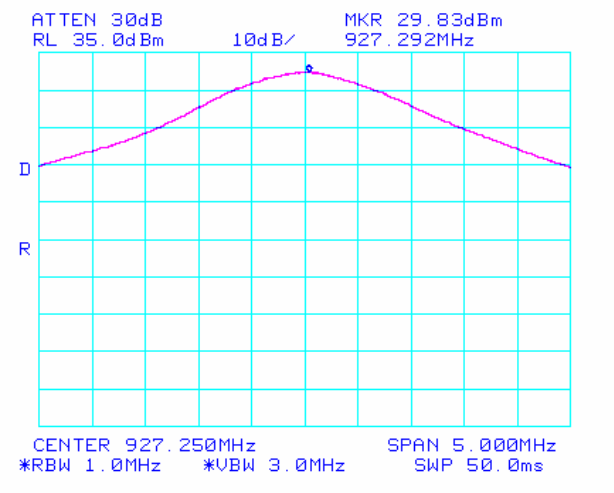
Plot 31: Peak Power (High) with CLASS-0 protocol



Plot 32: Peak Power (Low) with EPC1.19 protocol



Plot 33: Peak Power (Mid) with EPC1.19 protocol



Plot 34: Peak Power (High) with EPC1.19 protocol

Tested By: Kerwinn Corpuz

Date Tested: 11 September 2006

4.2.7 Spurious Emissions at Antenna Terminals

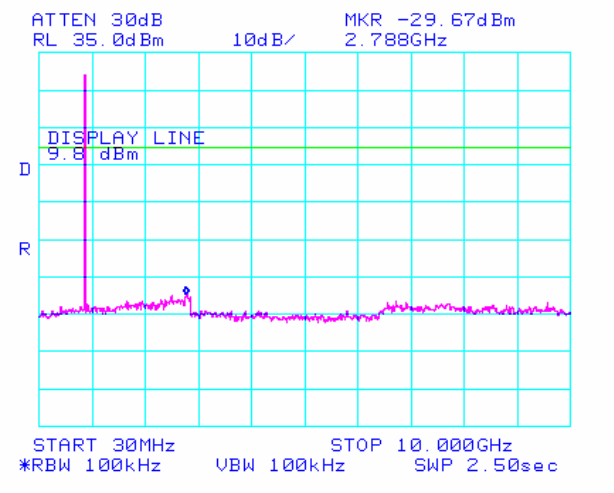
Requirement(s): 47 CFR §15.247(d) & RSS-210 (A8.5)

Procedures: The conducted spurious emissions were measured conducted using a spectrum analyzer at low, mid, and hi channels. The limit is 20 dB attenuated from the peak value of the operating frequency. The spectrum was swept at least 15 times to capture all emissions.

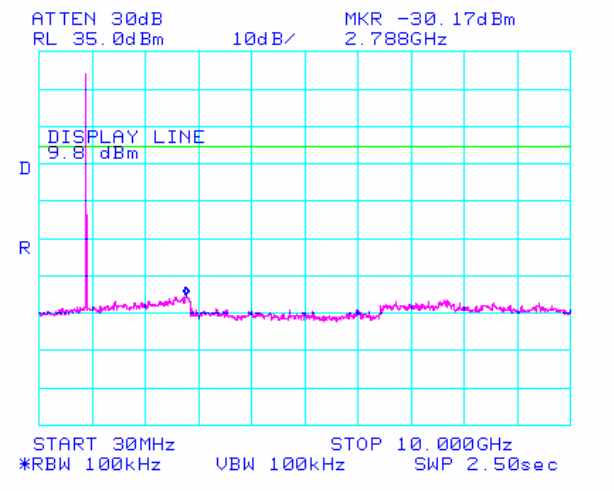
Results:

Plots #	Protocol	Channel	Channel Frequency (MHz)	Pass/Fail
35	GEN-2	Low	902.75	Pass
36	GEN-2	Mid	915.25	Pass
37	GEN-2	High	927.25	Pass
38	ISOB	Low	902.75	Pass
39	ISOB	Mid	915.25	Pass
40	ISOB	High	927.25	Pass
41	CLASS-1	Low	902.75	Pass
42	CLASS-1	Mid	915.25	Pass
43	CLASS-1	High	927.25	Pass
44	CLASS-0	Low	902.75	Pass
45	CLASS-0	Mid	915.25	Pass
46	CLASS-0	High	927.25	Pass
47	EPC1.19	Low	902.75	Pass
48	EPC1.19	Mid	915.25	Pass
49	EPC1.19	High	927.25	Pass

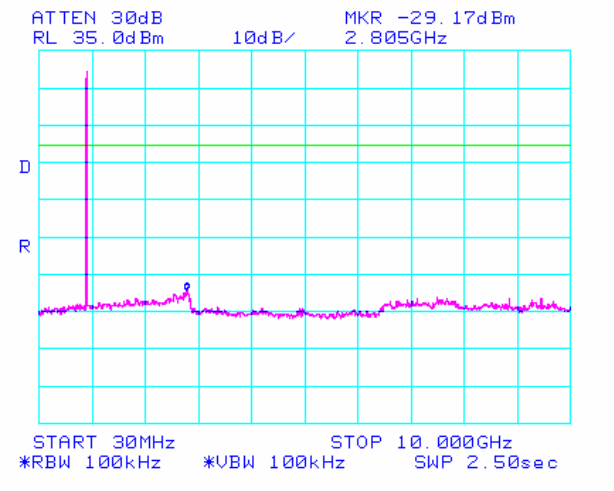
Note: Emission over the limit line in the following plots is the fundamental.



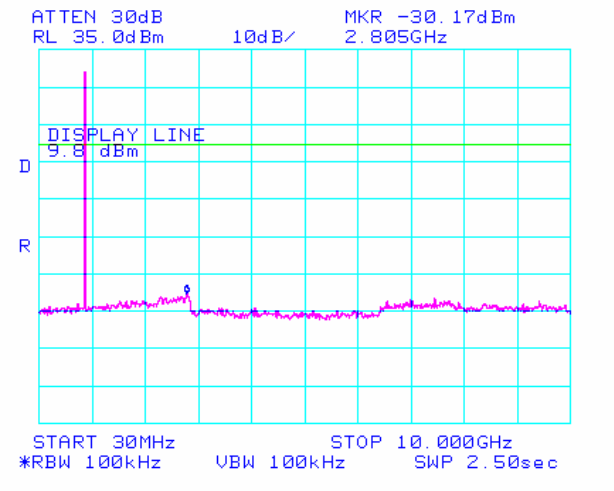
Plot 35: Conducted Spurious Emissions (Low) with GEN-2 protocol



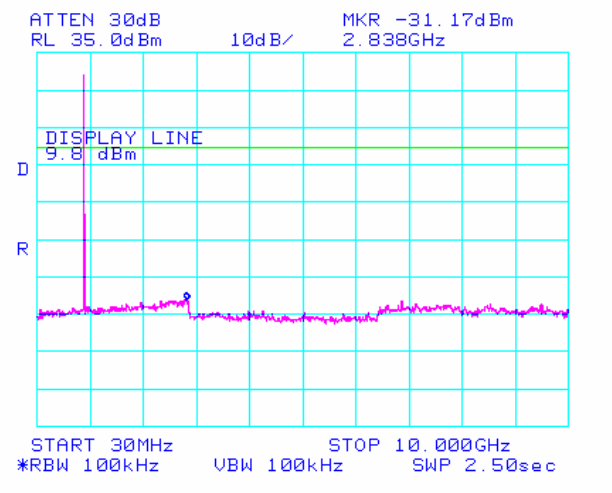
Plot 36: Conducted Spurious Emissions (Mid) with GEN-2 protocol



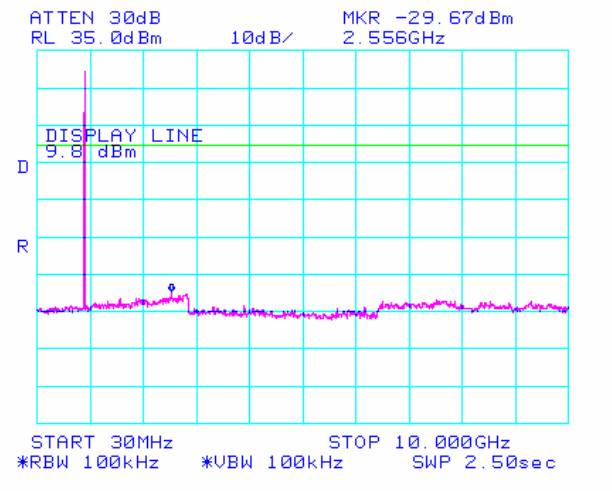
Plot 37: Conducted Spurious Emissions (High) with GEN-2 protocol



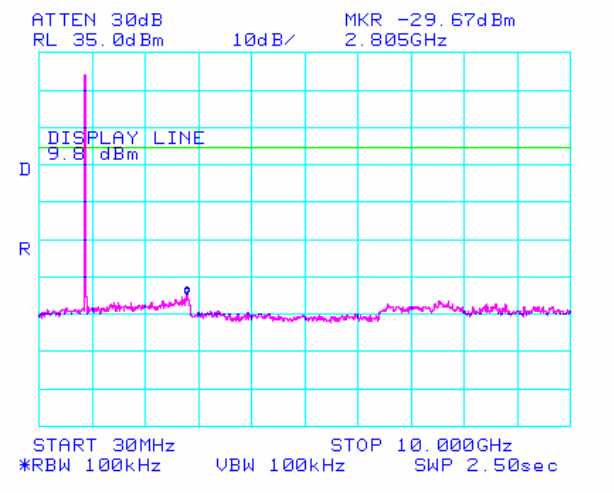
Plot 38: Conducted Spurious Emissions (Low) with ISOB protocol



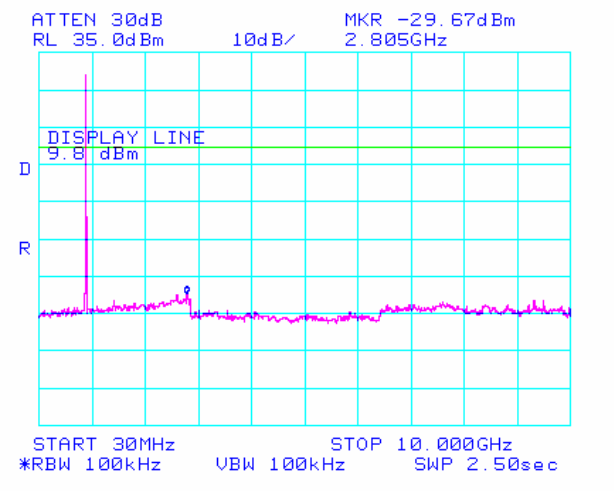
Plot 39: Conducted Spurious Emissions (Mid) with ISOB protocol



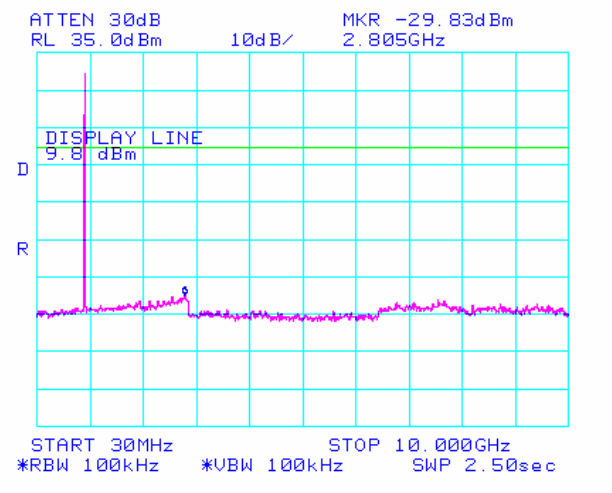
Plot 40: Conducted Spurious Emissions (High) with ISOB protocol



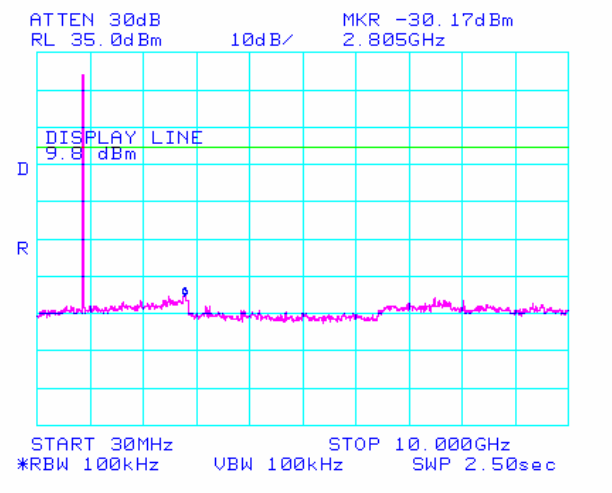
Plot 41: Conducted Spurious Emissions (Low) with CLASS-1 protocol



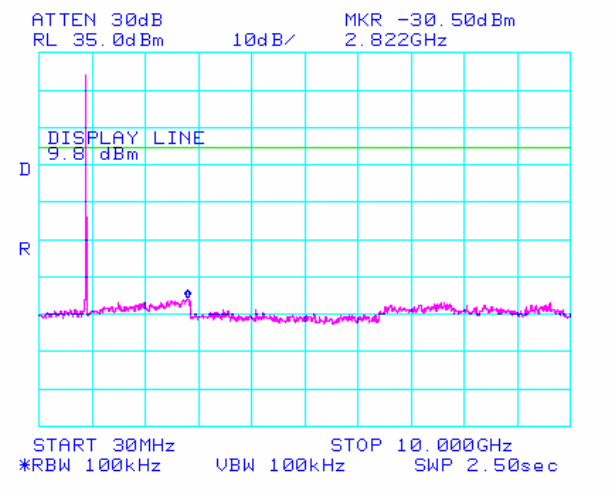
Plot 42: Conducted Spurious Emissions (Mid) with CLASS-1 protocol



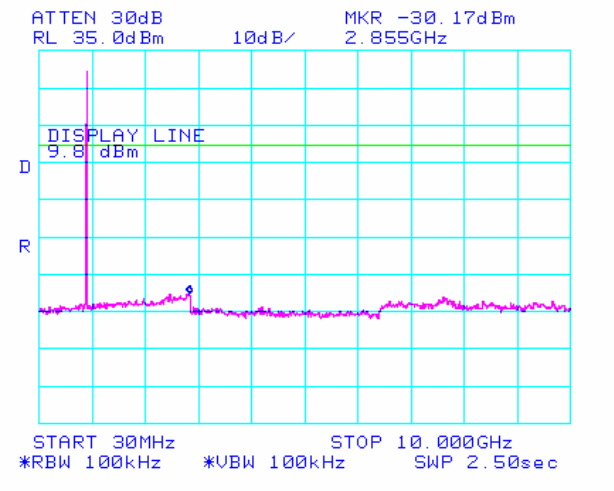
Plot 43: Conducted Spurious Emissions (High) with CLASS-1 protocol



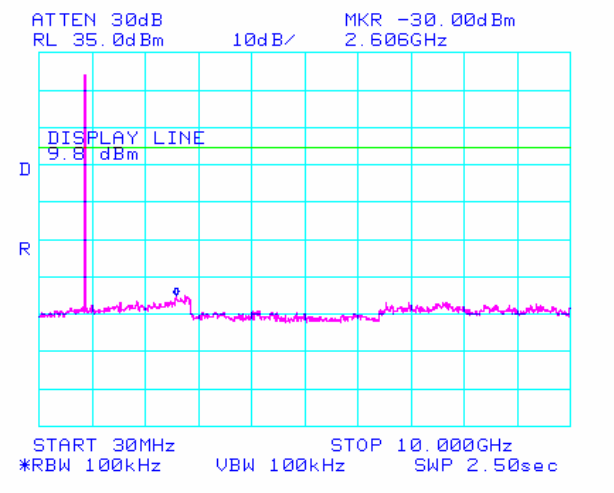
Plot 44: Conducted Spurious Emissions (Low) with CLASS-0 protocol



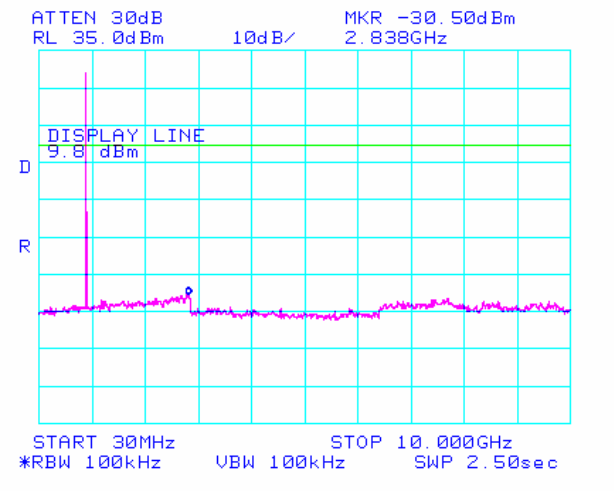
Plot 45: Conducted Spurious Emissions (Mid) with CLASS-0 protocol



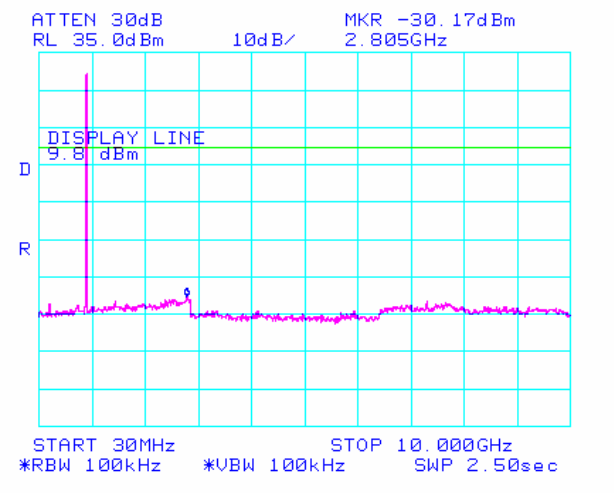
Plot 46: Conducted Spurious Emissions (High) with CLASS-0 protocol



Plot 47: Conducted Spurious Emissions (Low) with EPC1.19 protocol



Plot 48: Conducted Spurious Emissions (Mid) with EPC1.19 protocol



Plot 49: Conducted Spurious Emissions (High) with EPC1.19 protocol

Tested By: Kerwinn Corpuz

Date Tested: 11 September 2006

4.2.8 Radiated Spurious Emissions < 1 GHz

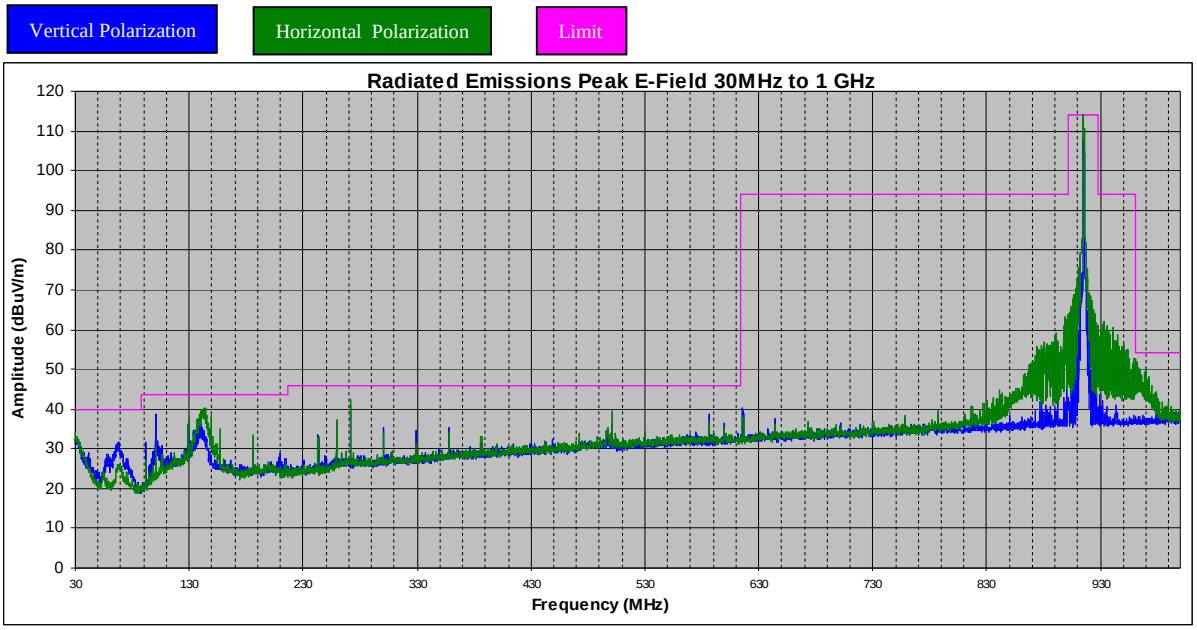
Requirement(s): 47 CFR §15.247(d) & RSS-210 (A8.5)

Procedures: Radiated emissions were measured according to ANSI C63.4. The EUT was set to transmit at the highest output power. The EUT was set to frequency hopping mode. Preliminary test were made to five protocols with the worse case protocol (EPC C0) reported. Note that while hopping or single channel mode, the side skirts of the fundamental is the same emissions.

The limit is converted from microvolts/meter to decibel microvolts/meter.

Sample Calculation: Corrected Amplitude = Raw Amplitude(dBµV/m) + ACF(dB) + Cable Loss(dB)

Results:



Radiated Emissions Plot

Freq (MHz)	Peak Corrected at 3m (dBµV/m)	Limit (dBµV/m)	Delta (dB)	Polarization (V/H)
960.036	52.6	54	-1.4	H
961	52.8	54	-1.2	H
963.72	50.4	54	-3.6	H
969.93	50.5	54	-3.5	H

Radiated Emissions Table

Tested By: Kerwinn Corpuz

Date Tested: 15 September 2006

4.2.9 Radiated Spurious Emissions > 1 GHz

Requirement(s): 47 CFR §15.247(d) & RSS-210 (A8.5)

Procedures: Equipment was setup in a semi-anechoic chamber. For measurements above 1 GHz an average measurement was taken with a 10Hz video bandwidth. Peak measurement was taken with 1 MHz BW. The EUT was tested at low, mid and high with the highest output power. The EUT was tested with five protocols with the worse case protocol (EPC C0) reported. Investigated up to 10th harmonic of the operating frequency.

Sample Calculation:

EUT Field Strength = Raw Amplitude(dBµV/m) – Amplifier Gain(dB) + Antenna Factor(dB) + Cable Loss(dB) + Filter Attenuation(dB, if used)

Results:

f_o = 0.90275 GHz (Low)

Frequency	Azimuth	Detector	Antenna Polarization	Antenna Height	Raw Amplitude @ 3m	Pre Amp	ACF	Cable Loss	Corrected Amplitude @ 3m	Limit @3m	Delta
(GHz)	(degrees)	(Pk/Avg)	(V/H)	(m)	(dBuV/m)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
1.8055	135	Pk	H	1.1	55.6	32.01	27.84	2.01	53.44	74	-20.56
1.8055	135	Avg	H	1.1	49.8	32.01	27.84	2.01	47.64	54	-6.36
1.8055	170	Pk	V	1.1	62.1	32.01	27.49	2.01	59.59	74	-14.41
1.8055	170	Avg	V	1.1	54.7	32.01	27.49	2.01	52.19	54	**-1.81**
2.70825	185	Pk	H	1.1	54.4	32.18	30.55	2.51	55.27	74	-18.73
2.70825	185	Avg	H	1.1	49.2	32.18	30.55	2.51	50.07	54	-3.93
2.70825	175	Pk	V	1.1	56.3	32.18	30.06	2.51	56.69	74	-17.31
2.70825	175	Avg	V	1.1	52.8	32.18	30.06	2.51	53.19	54	**-0.81**
3.611	-	-	H	-	-	-	-	-	-	-	-
3.611	155	Avg	V	1.1	55.6	32.37	31.91	2.99	58.13	74	-15.87
3.611	155	Pk	V	1.1	47.8	32.37	31.91	2.99	50.33	54	-3.67
4.51375	-	-	H	-	-	-	-	-	-	-	-
4.51375	180	Pk	V	1.1	53.3	32.49	32.81	3.32	56.93	74	-17.07
4.51375	180	Avg	V	1.1	45.1	32.49	32.81	3.32	48.73	54	-5.27

Note: 3.611 GHz, 4.51375 GHz (horizontal polarization), and emissions after 5th harmonic measured noise floor.

f_o = 0.91525 GHz (Mid)

Frequency	Azimuth	Detector	Antenna Polarization	Antenna Height	Raw Amplitude @ 3m	Pre Amp	ACF	Cable Loss	Corrected Amplitude @ 3m	Limit @3m	Delta
(GHz)	(degrees)	(Pk/Avg)	(V/H)	(m)	(dBuV/m)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
1.8305	10	Pk	H	1.1	54.6	32.02	27.97	2.02	52.57	74	-21.43
1.8305	10	Avg	H	1.1	48.4	32.02	27.97	2.02	46.37	54	-7.63
1.8305	175	Pk	V	1.1	62.9	32.02	27.60	2.02	60.50	74	-13.50
1.8305	175	Avg	V	1.1	55.7	32.02	27.60	2.02	53.30	54	**-0.70**
2.74575	180	Pk	H	1.1	52.6	32.21	30.70	2.53	53.62	74	-20.38
2.74575	180	Avg	H	1.1	46.8	32.21	30.70	2.53	47.82	54	-6.18
2.74575	170	Pk	V	1.1	56.2	32.21	30.26	2.53	56.79	74	-17.21
2.74575	170	Avg	V	1.1	51	32.21	30.26	2.53	51.59	54	-2.41
3.661	-	-	H	-	-	-	-	-	-	-	-
3.661	170	Avg	V	1.1	55.4	32.37	32.03	3.01	58.07	74	-15.93
3.661	170	Pk	V	1.1	49	32.37	32.03	3.01	51.67	54	-2.33
4.57625	-	-	H	-	-	-	-	-	-	-	-
4.57625	200	Pk	V	1.1	50.5	32.50	32.88	3.34	54.22	74	-19.78
4.57625	200	Avg	V	1.1	43.2	32.50	32.88	3.34	46.92	54	-7.08

Note: 3.661 GHz, 4.57625 GHz (horizontal polarization), and emissions after 5th harmonic measured noise floor.

f_o = 0.92725 GHz (High)

Frequency	Azimuth	Detector	Antenna Polarization	Antenna Height	Raw Amplitude @ 3m	Pre Amp	ACF	Cable Loss	Corrected Amplitude @ 3m	Limit @3m	Delta
(GHz)	(degrees)	(Pk/Avg)	(V/H)	(m)	(dBuV/m)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
1.8545	0	Pk	H	1.1	57	32.02	28.09	2.03	55.10	74	-18.90
1.8545	0	Avg	H	1.1	49.5	32.02	28.09	2.03	47.60	54	-6.40
1.8545	180	Pk	V	1.1	59.9	32.02	27.69	2.03	57.60	74	-16.40
1.8545	180	Avg	V	1.1	52.5	32.02	27.69	2.03	50.20	54	-3.80
2.78175	70	Pk	H	1.1	48.5	32.23	30.84	2.56	49.67	74	-24.33
2.78175	70	Avg	H	1.1	40.4	32.23	30.84	2.56	41.57	54	-12.43
2.78175	170	Pk	V	1.1	50	32.23	30.46	2.56	50.79	74	-23.21
2.78175	170	Avg	V	1.1	45	32.23	30.46	2.56	45.79	54	-8.21
3.709	-	-	H	-	-	-	-	-	-	-	-
3.709	178	Avg	V	1.1	50.7	32.37	32.16	3.04	53.52	74	-20.48
3.709	178	Pk	V	1.1	46	32.37	32.16	3.04	48.82	54	-5.18
4.63625	-	-	H	-	-	-	-	-	-	-	-
4.63625	173	Pk	V	1.1	51.3	32.51	32.97	3.37	55.13	74	-18.87
4.63625	173	Avg	V	1.1	44.5	32.51	32.97	3.37	48.33	54	-5.67

Note: 3.709 GHz, 4.63625 GHz (horizontal polarization), and emissions after 5th harmonic measured noise floor.

Tested By: Kerwinn Corpuz

Date Tested: 13 September 2006

4.2.10 Radiated Emissions – Band Edge

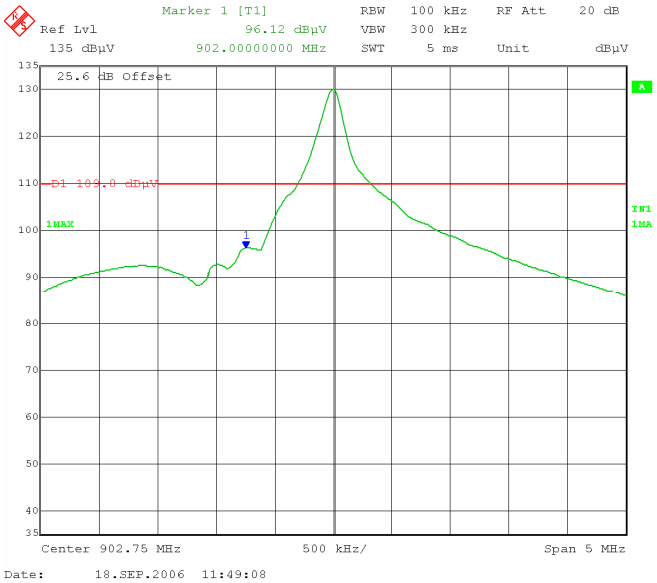
Requirement(s): 47 CFR §15.247(d) & RSS-210 (A8.5)

Procedures: Radiated emissions were measured according to ANSI C63.4. Equipment was tested with six protocols at low and high channel. An offset was set to spectrum analyzer with 25.6 dB. The limit is 20 dB attenuated from the peak value of the operating frequency.

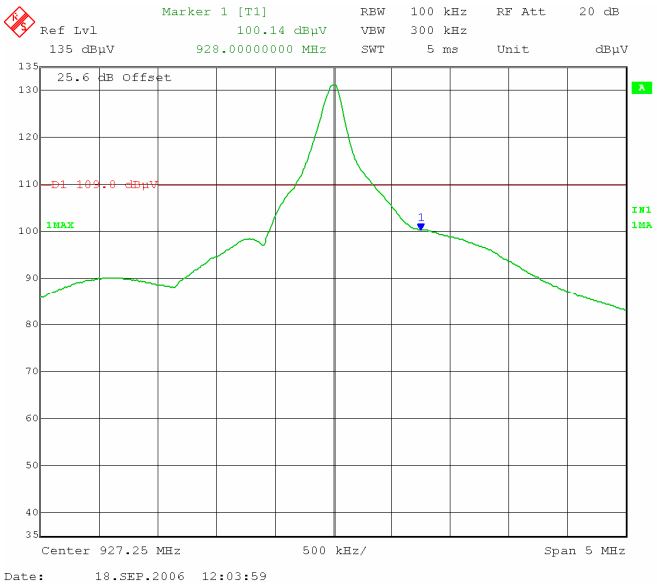
Sample Calculation:
EUT Field Strength = Raw Amplitude(dBµV/m) + Antenna Factor(dB) + Cable Loss(dB)

Results: Note: Worse case emissions at horizontal polarization by 10 dB.

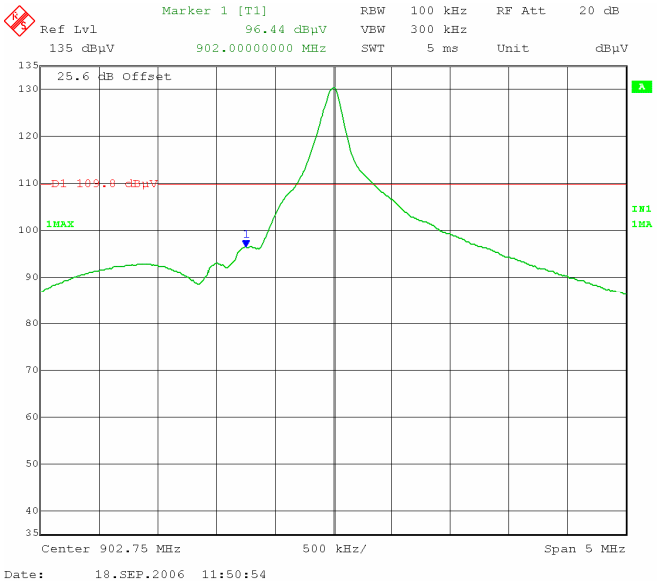
Plot #	Freq (MHz)	Peak Corrected at 3m (dBµV/m)	Limit (dBµV/m)	Delta (dB)	Polarization (V/H)	Protocol
50	902	96.12	109.8	-13.68	H	GEN-2
51	928	100.14	109.8	-9.66	H	GEN-2
52	902	96.44	109.8	-13.36	H	ISOB
53	928	100.24	109.8	-9.56	H	ISOB
54	902	102.37	109.8	-7.43	H	CLASS-1
55	928	103.13	109.8	-6.67	H	CLASS-1
56	902	102.01	109.8	-7.79	H	CLASS-0
57	928	101.94	109.8	-7.86	H	CLASS-0
58	902	96.24	109.8	-13.56	H	EPC1.19
59	928	100.07	109.8	-9.73	H	EPC1.19



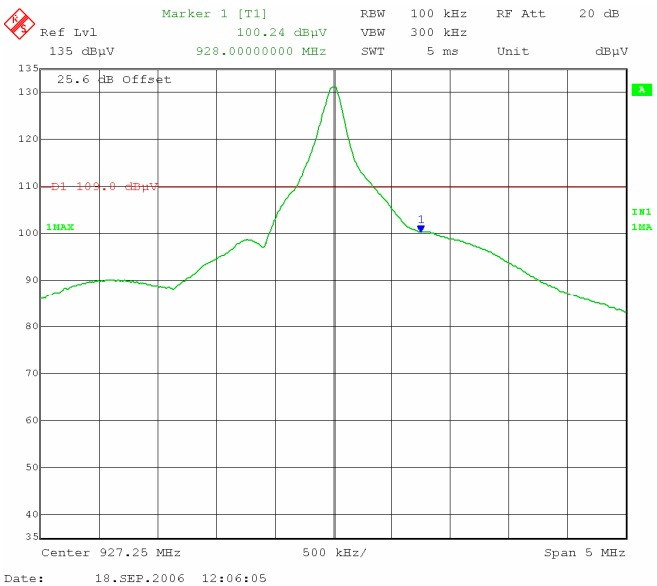
Plot 50: Lower Edge (Horizontal) with GEN-2 protocol



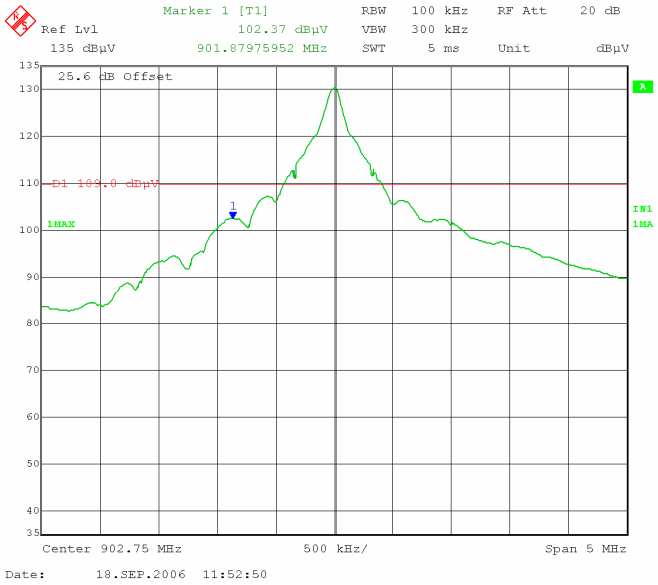
Plot 51: Upper Edge (Horizontal) with GEN-2 protocol



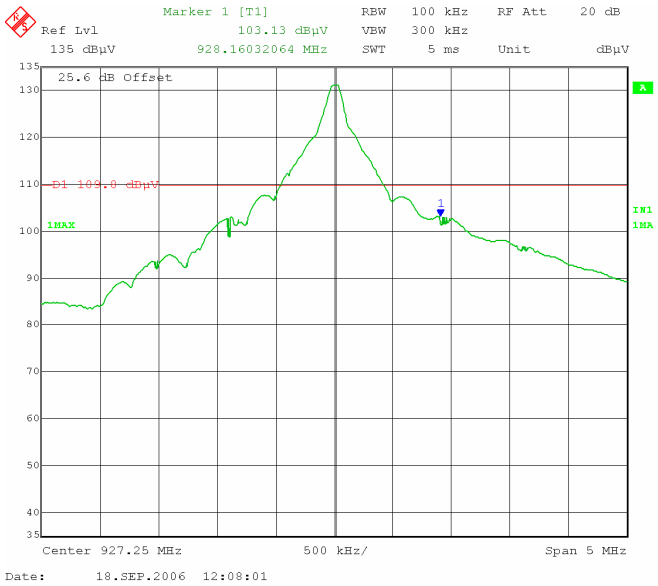
Plot 52: Lower Edge (Horizontal) with ISOB protocol



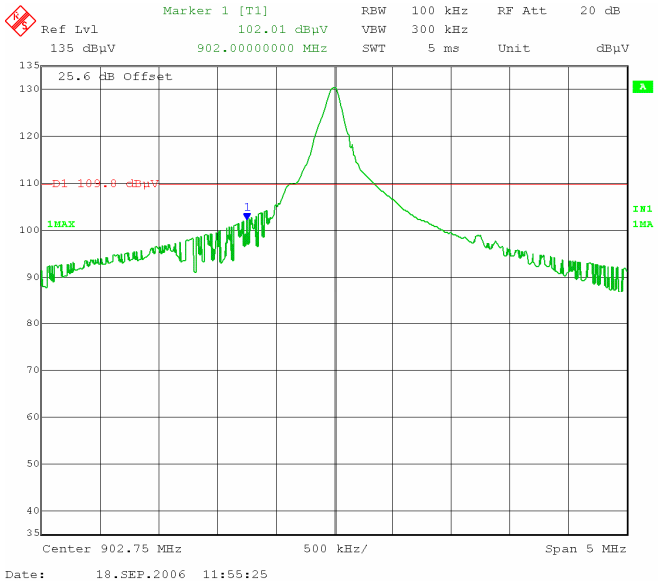
Plot 53: Upper Edge (Horizontal) with ISOB protocol



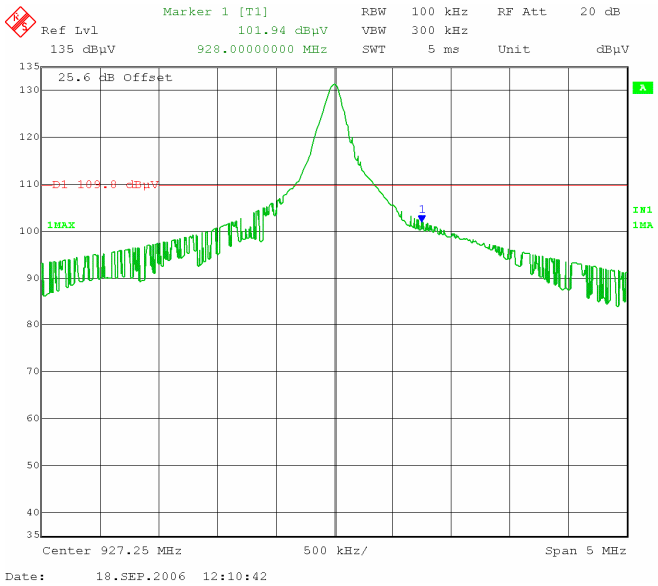
Plot 54: Lower Edge (Horizontal) with CLASS-1 protocol



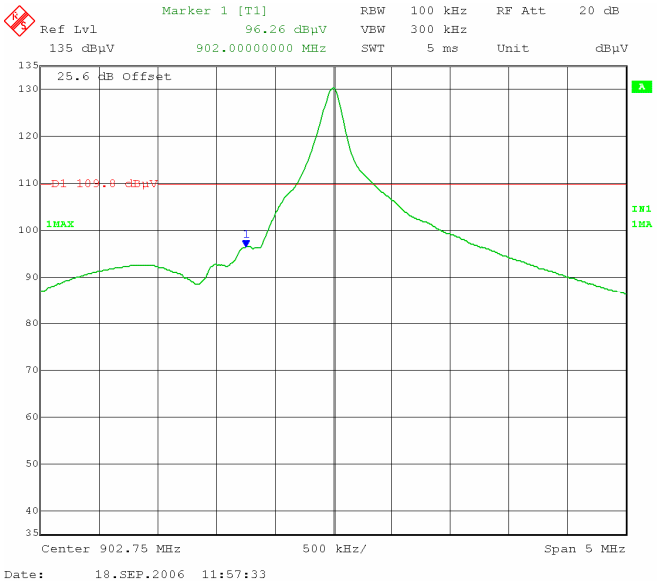
Plot 55: Upper Edge (Horizontal) with CLASS-1 protocol



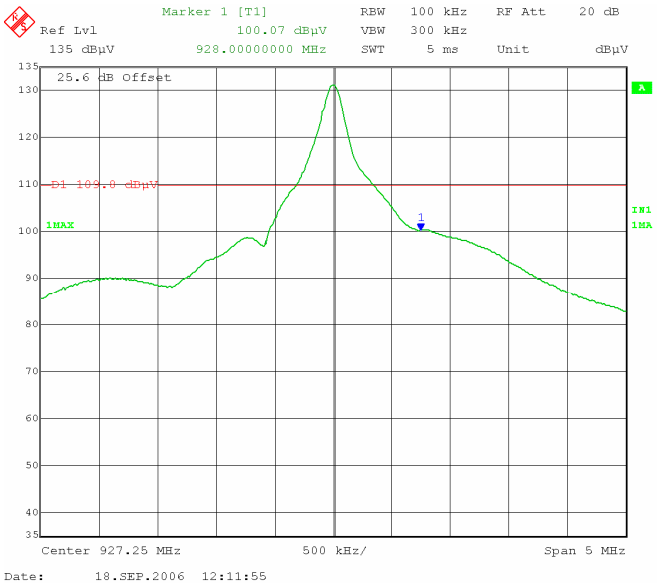
Plot 56: Lower Edge (Horizontal) with CLASS-0 protocol



Plot 57: Upper Edge (Horizontal) with CLASS-0 protocol



Plot 58: Lower Edge (Horizontal) with EPC1.19 protocol



Plot 59: Upper Edge (Horizontal) with EPC1.19 protocol

Tested By: Kerwinn Corpuz

Date Tested: 18 September 2006

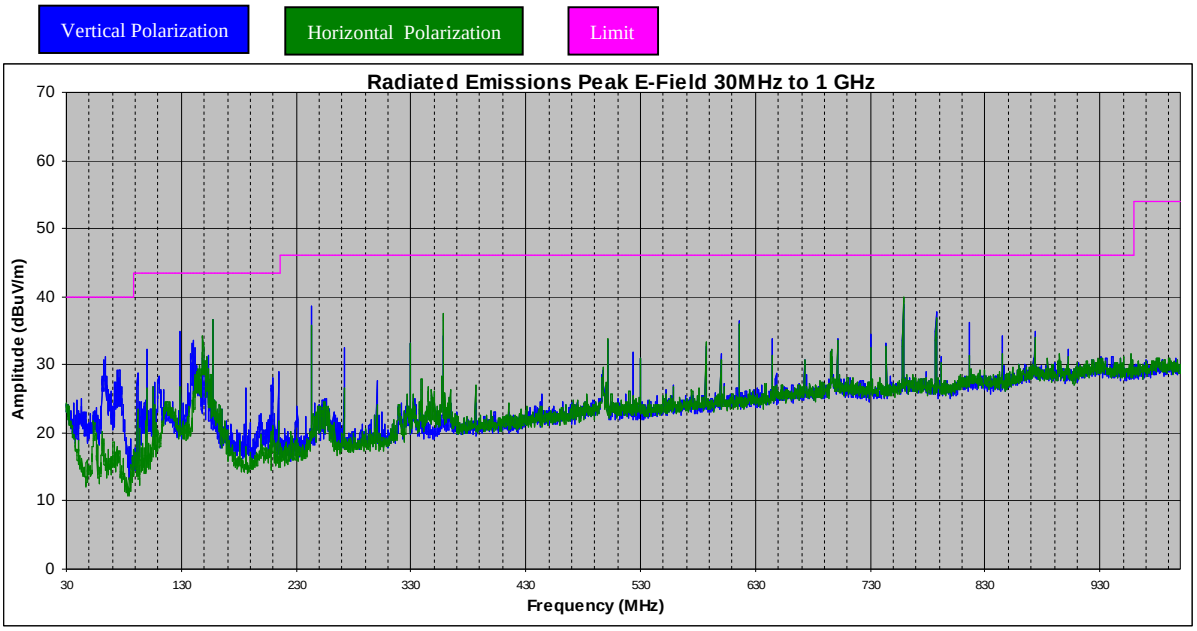
4.2.11 Receiver Spurious Emissions

Requirement(s): RSS-GEN (4.8)

Procedures: Radiated emissions were measured according to RSS-GEN. Measurement was taken with spectrum analyzer.

Sample Calculation: Corrected Amplitude = Raw Amplitude(dBµV/m) + ACF(dB) + Cable Loss(dB)

Results:



Radiated Emissions Plot

Freq (MHz)	Peak Corrected at 3m (dBµV/m)	Limit (dBµV/m)	Delta (dB)
157.56	36.76	43.5	-6.74
243.21	38.58	46.0	-7.42
357.76	37.60	46.0	-8.40
758.57	40.0	46.0	-6.00
787.18	37.83	46.0	-8.17

Radiated Emissions Data

Tested By: Kerwinn Corpuz

Date Tested: 15 September 2006

5 TEST INSTRUMENTATION

5.1 TEST INSTRUMENTATION

Instrument	Manufacturer	Model	CAL Due Date
Spectrum Analyzer	HP	8568B	04/26/2007
Quasi-Peak Adapter	HP	85650A	04/26/2007
RF Pre-Selector	HP	85685A	04/26/2007
Spectrum Analyzer	HP	8564E	12/29/2006
EMI Receiver	Rohde&Schwarz	ESIB 40	02/07/2007
Power Meter	HP	437B	04/26/2007
Power Sensor	HP	8485A	04/26/2007
Antenna	Emco	3115	08/17/2007
Antenna	Emco	3115	See Note
Signal Generator	Wiltron	68169B	04/26/2007
Chamber	Lingren	3m	08/21/2007
Pre-Amplifier	HP	8449	05/01/2007
DMM	Fluke	73III	07/04/2007
Variac	KRM	AEEC-2090	See Note
Environment Chamber	TestEquity	1007H	10/27/2006
DMM	Fluke	51II	See Note
900 MHz Notch Filter	AWID	N/A	See Note
4GHz High Pass Filter	LORCH Microwave	4HPD-X4000-3R	See Note

Note: Functional Verification

APPENDIX A: EUT TEST CONDITIONS

The following is the description of supporting equipment and details of cables used with the EUT.

Equipment Description (Including Brand Name)	Cable Description
AWID MPR 3014WF-QB	1. Power cord 2. MMCX to reversed polarity TNC cable

EUT Description	:	RFID Reader Module
Model No	:	MPR 3014WF-QB
Serial No	:	none

The following is the description of how the EUT is exercised during testing.

Test	Description Of Operation
	The EUT was controlled via PC to enter test modes necessary to complete the testing.

APPENDIX B: EXTERNAL PHOTOS

See Attachment

APPENDIX C: CIRCUIT/BLOCK DIAGRAMS

See Attachment

APPENDIX D: INTERNAL PHOTOS

See Attachment

APPENDIX E: PRODUCT DESCRIPTION

Detail description of this product is shown in the User's Guide.

APPENDIX F: FCC LABEL LOCATION

See Attachment

APPENDIX G: USER MANUAL

See Attachment

END OF REPORT