5LINX ENTERPRISES, INC.

5LINXGLOBAL WiFi Cellphone

Model: GM100N WM680

Jun 28 2010
Report No.: 1005007-02
(This report supersedes NONE)

Modifications made to the product : None

This Test Report is Issued Under the Authority of:	
Alex wang	Jackson. chen
Alex Wang Compliance Engineer	Jackson Chen Technical Manager

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Test result presented in this test report is applicable to the representative sample only.

RF Test Report

FCC PART 15.247 PART 15.249

SIEMIC, INC.
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Laboratory Introduction

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Accreditations for Conformity Assessment

Country/Region	Accreditation Body	Scope
USA	FCC, A2LA	EMC , RF/Wireless , Telecom
Canada	IC, A2LA, NIST	EMC, RF/Wireless , Telecom
Taiwan	BSMI , NCC , NIST	EMC, RF, Telecom , Safety
Hong Kong	OFTA , NIST	RF/Wireless ,Telecom
Australia	NATA, NIST	EMC, RF, Telecom , Safety
Korea	KCC/RRA, NIST	EMI, EMS, RF , Telecom, Safety
Japan	VCCI, JATE, TELEC, RFT	EMI, RF/Wireless, Telecom
Mexico	NOM, COFETEL, Caniety	Safety, EMC , RF/Wireless, Telecom
Europe	A2LA, NIST	EMC, RF, Telecom , Safety

Accreditations for Product Certifications

Country	Accreditation Body	Scope
USA	FCC TCB, NIST	EMC , RF , Telecom
Canada	IC FCB , NIST	EMC , RF , Telecom
Singapore	iDA, NIST	EMC , RF , Telecom

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1 Executive Summary & EUT information

The purpose of this test programme was to demonstrate compliance of the 5LINX Enterprises, Inc.,5LINXGLOBAL WiFi Cellphone , and model: GM100N WM680 against the current Stipulated Standards. The5LINXGLOBAL WiFi Cellphone has demonstrated compliance with the FCC PART 15.247 ,15.249.

EUT Information

EUT Description	Dual-mode GSM/WiFi cellular phone
Model No	GM100N WM680
Input Power	DC 3.7V(Li-ion Battery)
Classification Per Stipulated Test Standard	802.11.b/g WiFi and Bluetooth product Per FCC PART 15.247 ,15.249

2 TECHNICAL DETAILS

Purpose	Compliance testing of WIFI Module with stipulated standard
Applicant / Client	5LINX Enterprises, Inc. 275 Kenneth Drive, Rochester, NY, 14623, U.S.A.
Manufacturer	W&M Telecommunication Co.,Ltd B-10F,Xinghua Building,Shennan Rd east, Futian district,Shenzhen,China
Laboratory performing the tests	SIEMIC Nanjing (China) Laboratories NO.2-1,Longcang Dadao, Yuhua Economic Development Zone, Nanjing, China Tel:+86(25)86730128/86730129 Fax:+86(25)86730127 Email:info@siemic.com
Test report reference number	1005007-02
Date EUT received	Jun 08 2010
Standard applied	FCC PART 15.247 ,15.249
Dates of test (from – to)	Jun 10~28 2010
No of Units:	#2
Equipment Category:	DTS, DXX
Model :	GM100N WM680
RF Operating Frequency (ies)	WiFi:2412MHz-2462MHz Bluetooth:2402MHz-2480MHz
Modulation :	CCK, OFDM (WLAN) GFSK (BT)
Maximum Output Power	10.0dBm (WLAN)
ID Number	YKMGM100N

3 MODIFICATION

NONE

4 TEST SUMMARY

The product was tested in accordance with the following specifications.
All testing has been performed according to below product classification:

Test Results Summary

Test Standard	Description	Pass / Fail
CFR 47 Part 15		
15.203	Antenna Requirement	Pass
15.205	Restricted Band of Operation	Pass
15.207(a)	Conducted Emissions Voltage	Pass
15.247(a)(1)	Channel Separation	N/A
15.247(a)(1)	Occupied Bandwidth	Pass
15.247(a)(2)	6dB Bandwidth	Pass
15.247(a)(1)	Number of Hopping Channels	N/A
15.247(a)(1)	Time of Occupancy	N/A
15.247(b)	Output Power	Pass
15.247(c)	Antenna Gain > 6 dBi	Pass
15.247(d)	Conducted Spurious Emissions	Pass
15.209; 15.247(d);15.249	Radiated Spurious Emissions	Pass
15.247(e)	Power Spectral Density	Pass
15.247(f)	Hybrid System Requirement	N/A
15.247(g)	Hopping Capability	N/A
15.247(h)	Hopping Coordination Requirement	N/A
15.247(i)	RF Exposure requirement	Pass
ANSI C63.4: 2009 PS: All measurement uncertainties are not taken into consideration for all presented test result.		

5 MEASUREMENTS, EXAMINATION AND DERIVED RESULTS

5.1 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 EUT antenna is permanently attached to the device.

5.2 Conducted Emissions Voltage

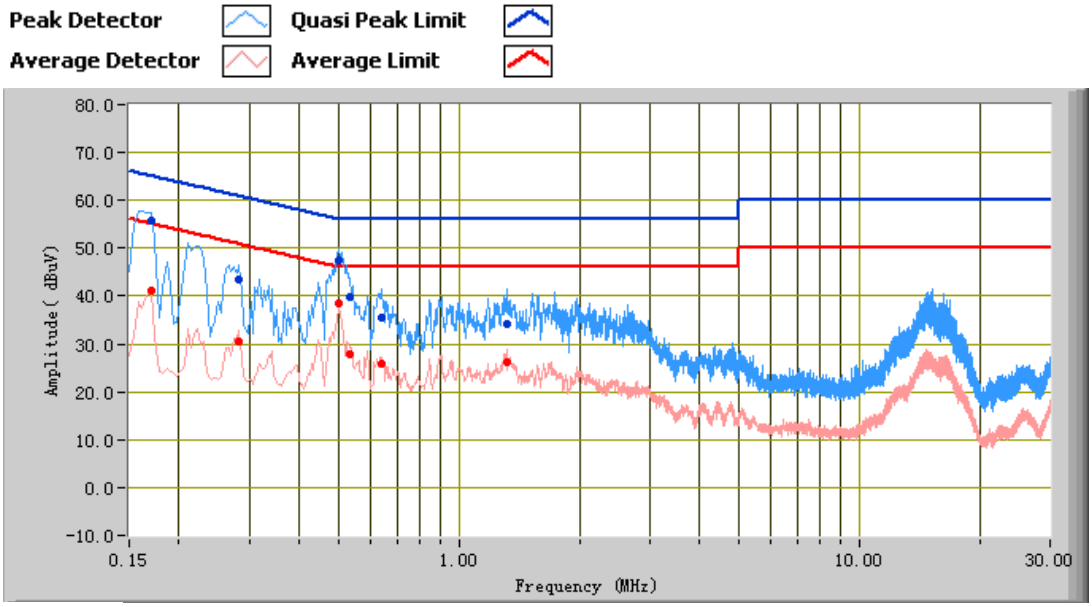
Requirement:

Frequency of emission (MHz)	Conducted limit (dBμV)	
	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.

Procedures:

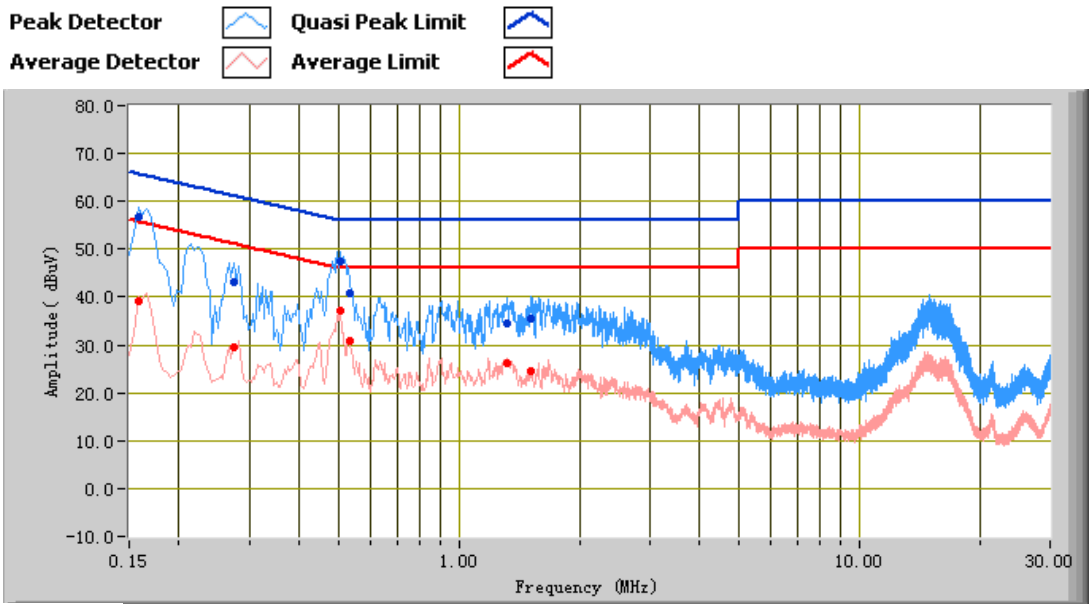
1. All possible modes of operation were investigated. Only the 6 worst case emissions measured, using the correct CISPR and Average detectors, are reported. All other emissions were relatively insignificant.
2. A "-ve" margin indicates a PASS as it refers to the margin present below the limit line at the particular frequency.
3. Conducted Emissions Measurement Uncertainty
   All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2, in the range 9kHz – 30MHz (Average & Quasi-peak) is ±3.5dB.
4. Environmental Conditions
   Temperature 16°C
   Relative Humidity 50%
   Atmospheric Pressure 1019mbar
5. Test date : Jun 10~28 2010
   Tested By : Alex Wang



Test Data

Line

Frequency (MHz)	Quasi Peak (dBuV)	Limit (dBuV)	Margin (dB)	Average (dBuV)	Limit (dBuV)	Margin (dB)	Factors (dB)
0.50	47.29	56.00	-8.71	38.53	46.00	-7.47	10.17
0.17	55.86	65.13	-9.26	41.06	55.13	-14.07	10.36
0.53	39.68	56.00	-16.32	27.92	46.00	-18.08	10.16
0.28	43.53	60.84	-17.32	30.65	50.84	-20.19	10.21
0.64	35.39	56.00	-20.61	25.87	46.00	-20.13	10.14
1.32	34.15	56.00	-21.85	26.25	46.00	-19.75	10.17



Test Data

Neutral

Frequency (MHz)	Quasi Peak (dBuV)	Limit (dBuV)	Margin (dB)	Average (dBuV)	Limit (dBuV)	Margin (dB)	Factors (dB)
0.51	47.38	56.00	-8.62	37.17	46.00	-8.83	10.17
0.16	56.79	65.75	-8.96	39.18	55.75	-16.57	10.38
0.53	40.72	56.00	-15.28	30.72	46.00	-15.28	10.16
0.27	42.97	61.09	-18.11	29.40	51.09	-21.69	10.22
1.52	35.62	56.00	-20.38	24.48	46.00	-21.52	10.18
1.31	34.63	56.00	-21.37	26.13	46.00	-19.87	10.17

5.3 6dB Occupied Bandwidth

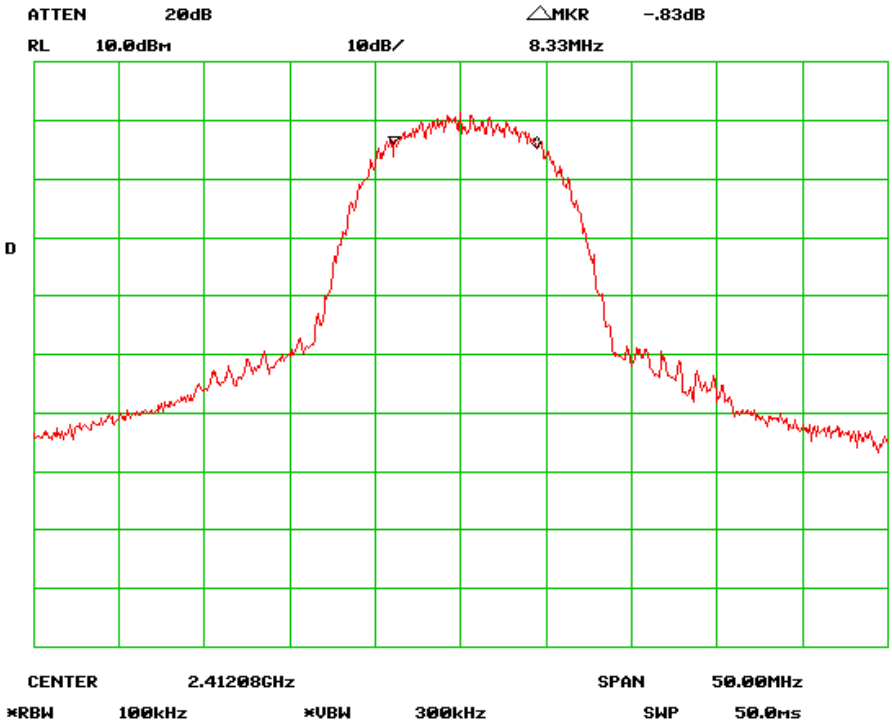
1. Conducted Measurement
   EUT was set for low, mid, high channel with modulated mode and highest RF output power.
   The spectrum analyzer was connected to the antenna terminal.
2. Environmental Conditions
   Temperature 16°C
   Relative Humidity 50%
   Atmospheric Pressure 1019mbar
3. Conducted Emissions Measurement Uncertainty
   All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2, in the range 30MHz – 40GHz is ±1.5dB.
4. Test date : Jun 10~28 2010
   Tested By : Alex Wang

Requirement(s): 47 CFR §15.247(a)(1)

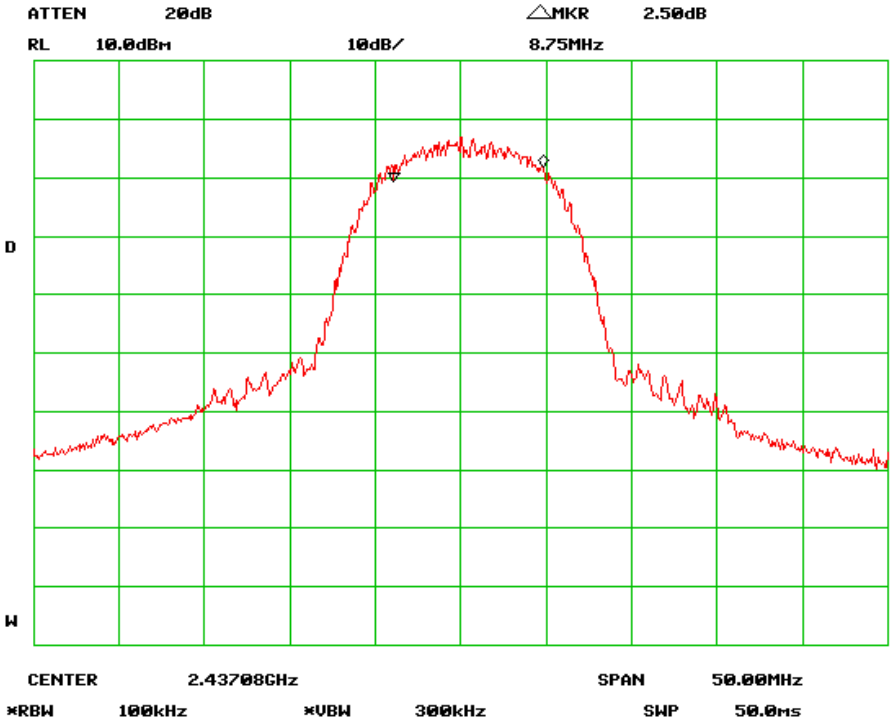
Procedures: The 6dB Bandwidths were measured conducted using a spectrum analyzer at low, mid, and hi channels. 6dB Bandwidth Limit: ＞500kHz.

Protocol	Channel	Channel Frequency (MHz)	6dB Occupied Bandwidth Limit (MHz)	6dB Channel Bandwidth (MHz)
802.11b	Low	2412	0.5	8.33
802.11b	Mid	2437	0.5	8.75
802.11b	High	2462	0.5	8.08
802.11g	Low	2412	0.5	16.67
802.11g	Mid	2437	0.5	16.67
802.11g	High	2462	0.5	16.75

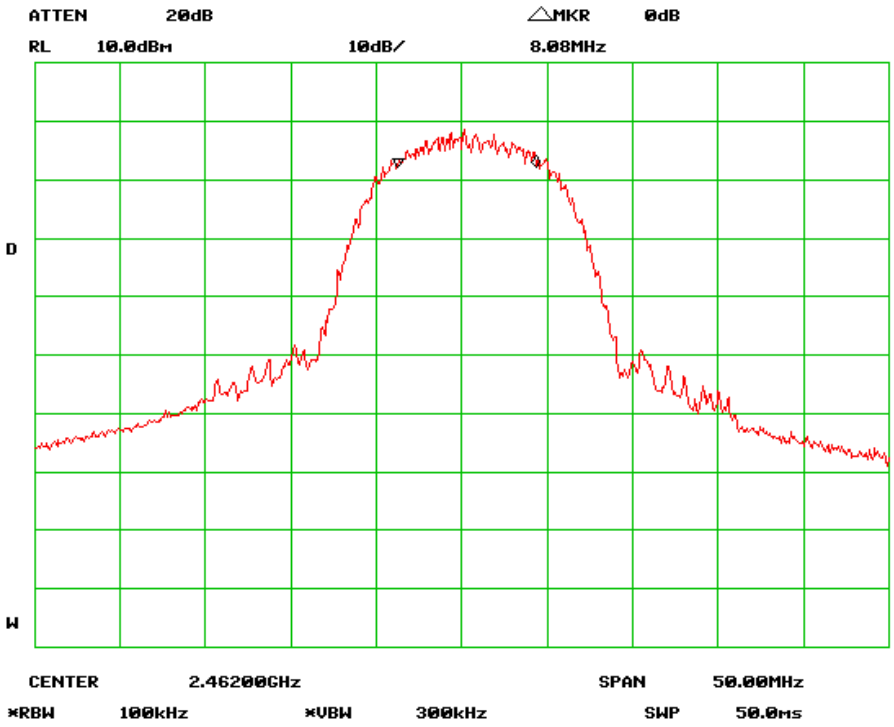
Refer to the attached plots.



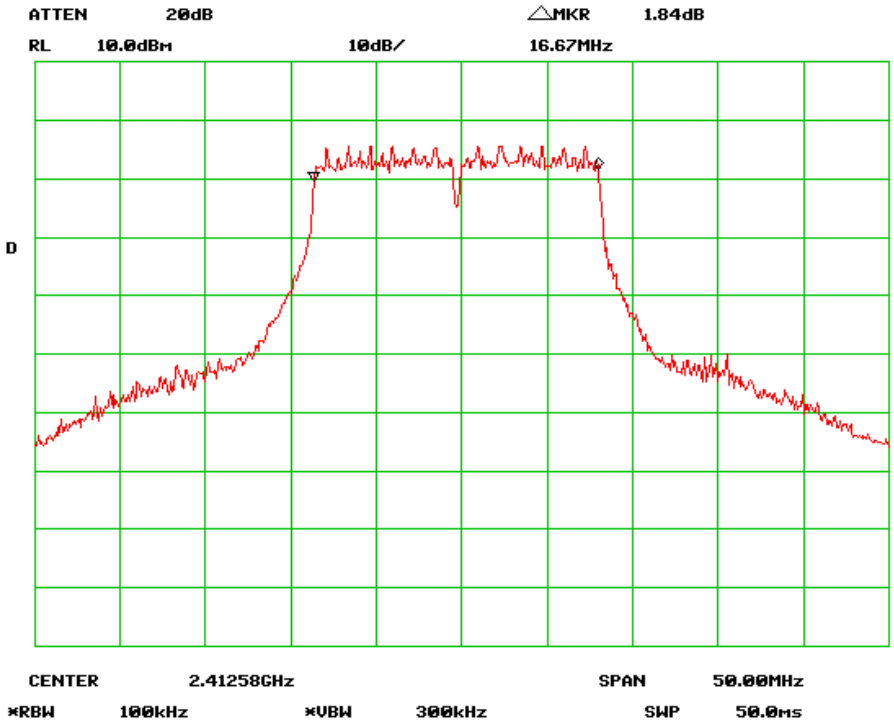
6dB Bandwidth – Low Channel (802.11b)



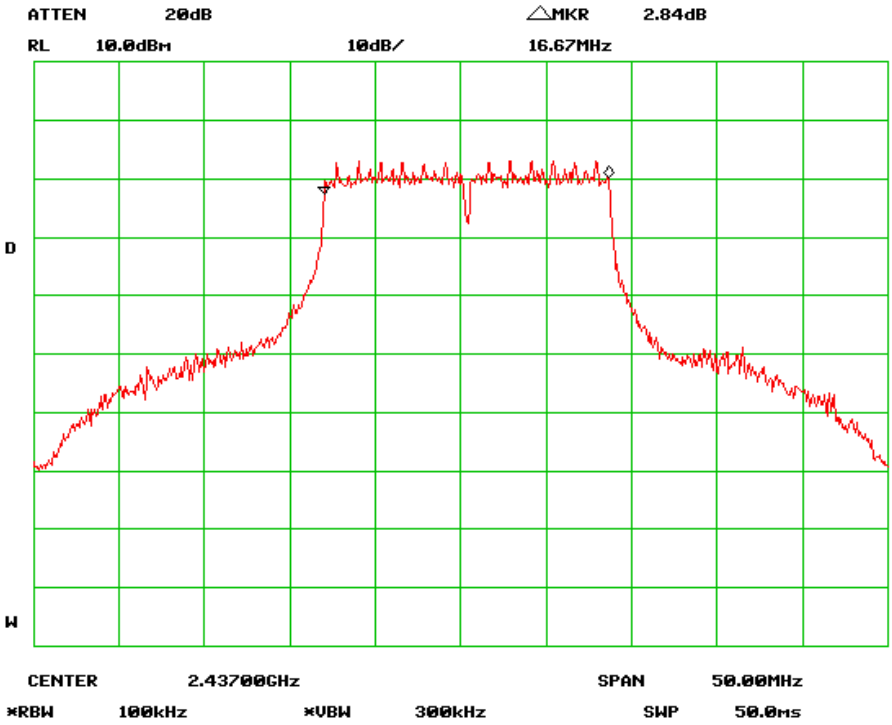
6dB Bandwidth – Mid Channel (802.11b)



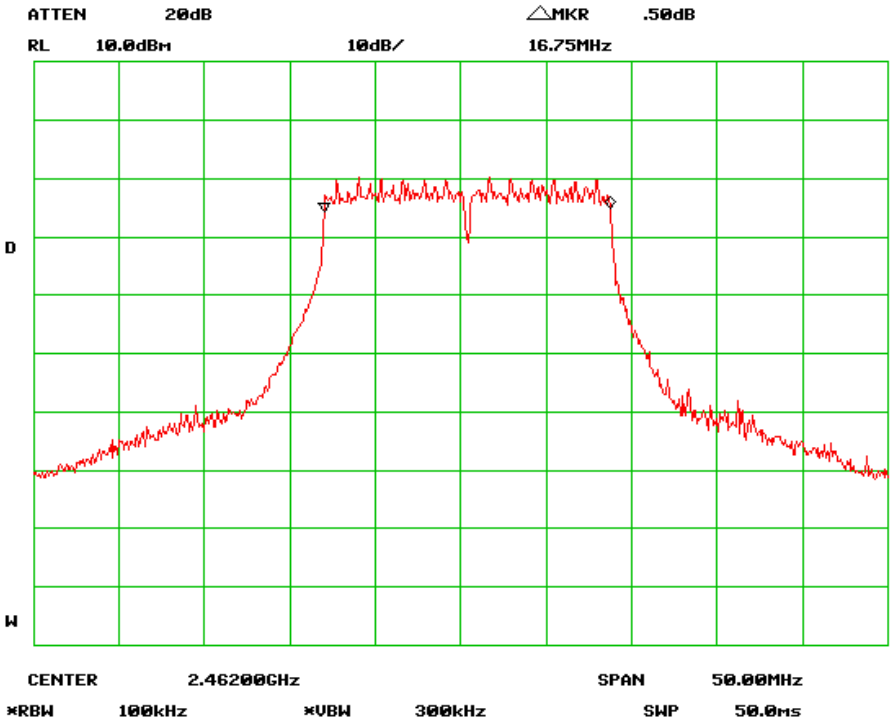
6dB Bandwidth – High Channel (802.11b)



6dB Bandwidth – Low Channel (802.11g)



6dB Bandwidth – Mid Channel (802.11g)



6dB Bandwidth – High Channel (802.11g)

5.4 Power Spectral Density

1. Conducted Measurement
   EUT was set for low, mid, high channel with modulated mode and highest RF output power.
   The spectrum analyzer was connected to the antenna terminal.
2. Environmental Conditions

Temperature	16°C
Relative Humidity	50%
Atmospheric Pressure	1019mbar

3. Conducted Emissions Measurement Uncertainty
   All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2, in the range 30MHz – 40GHz is ±1.5dB.
4. Test date : Jun 10~28 2010
   Tested By : Alex Wang

Requirement(s): 47 CFR §15.247(e)

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3KHz band during any time interval of continuous transmission.

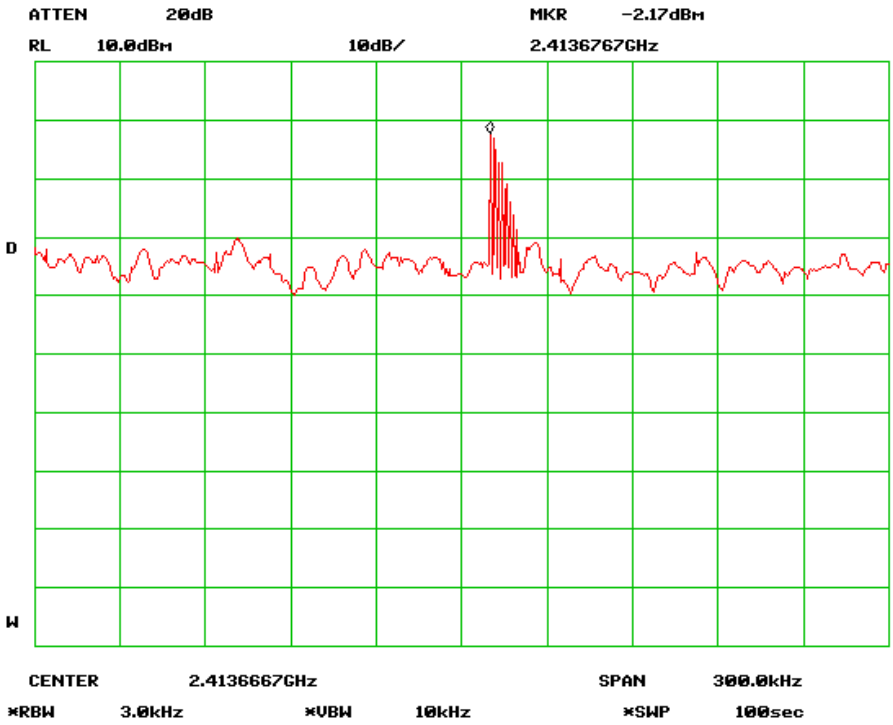
Procedures: The power spectral density measurement was taken conducted using a spectrum analyzer.

RBW=3KHz, VBW>RBW, Sweep time to SPAN/RBW(s).

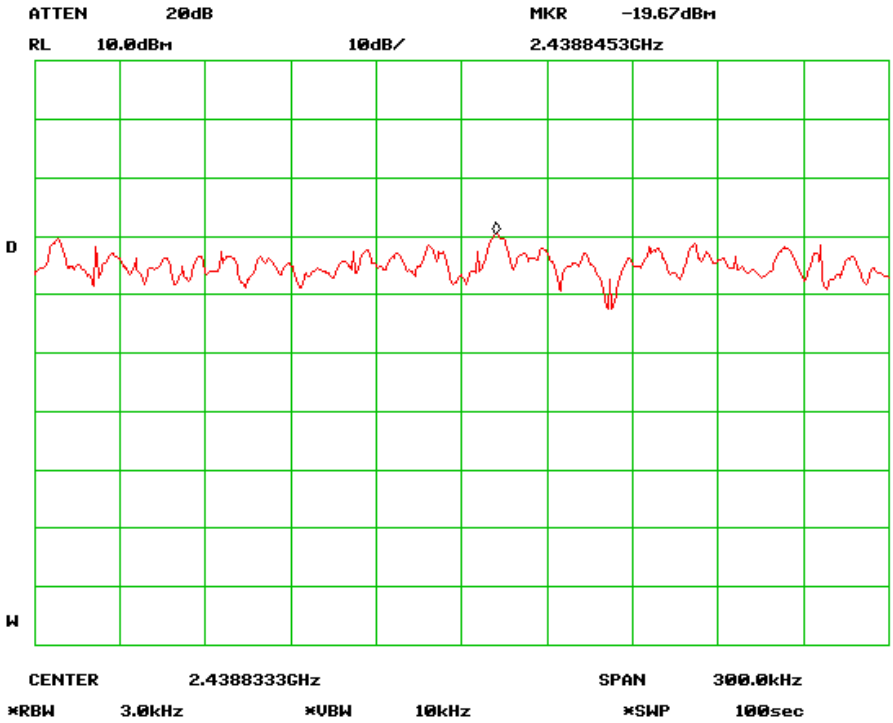
The result:

Protocol	Channel	Channel Frequency (MHz)	Peak Spectral Density Limit (dBm/3KHz)	Peak Spectral Density (dBm/3KHz)
802.11b	Low	2412	8	-2.17
802.11b	Mid	2437	8	-19.67
802.11b	High	2462	8	-19.17
802.11g	Low	2412	8	-23.33
802.11g	Mid	2437	8	-26.00
802.11g	High	2462	8	-23.67

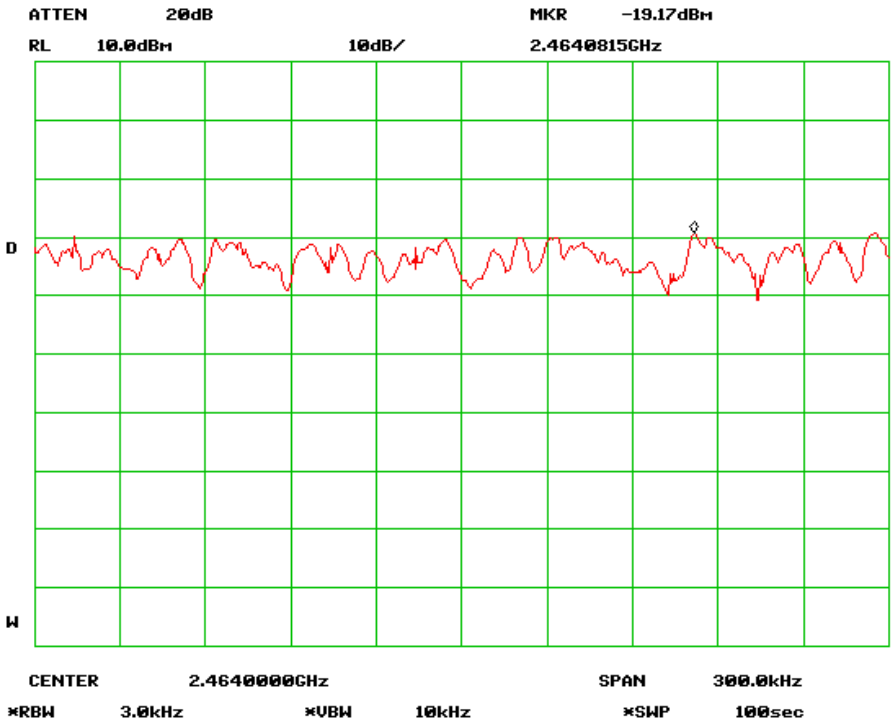
Refer to the attached plots.



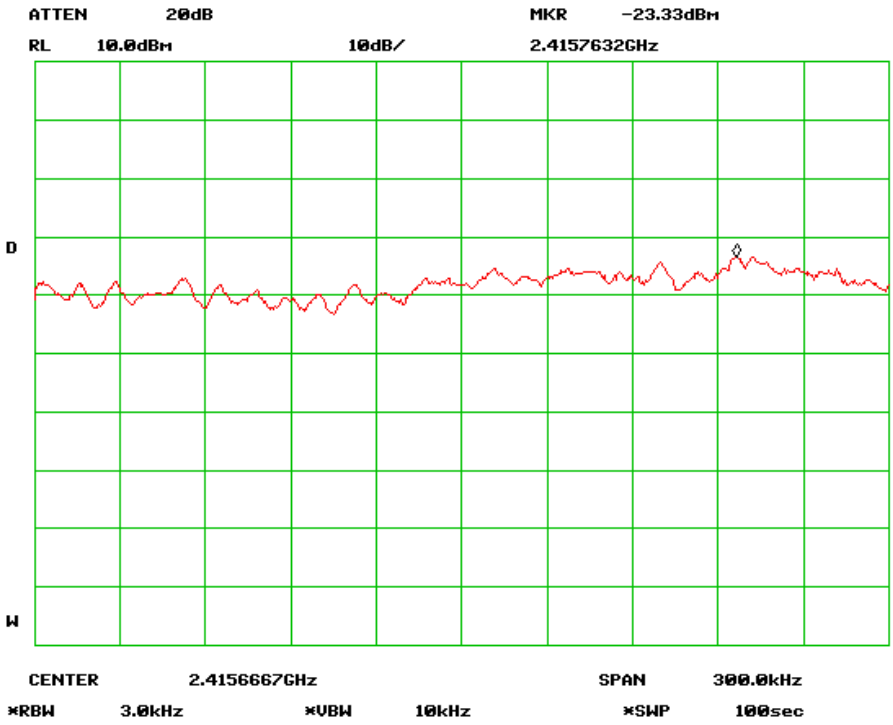
PSD - Low Channel (802.11b)



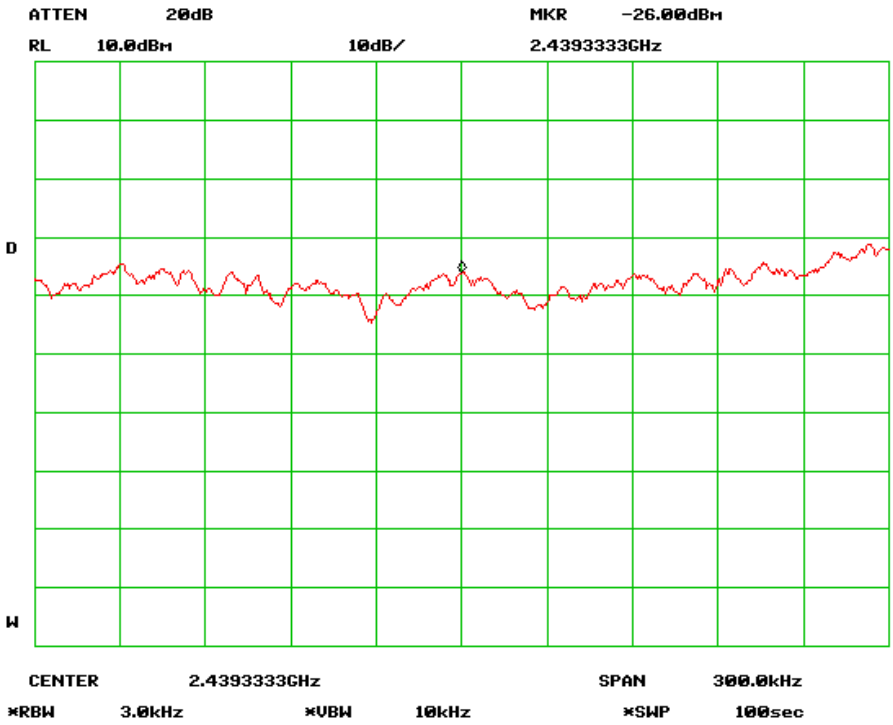
PSD - Mid Channel (802.11b)



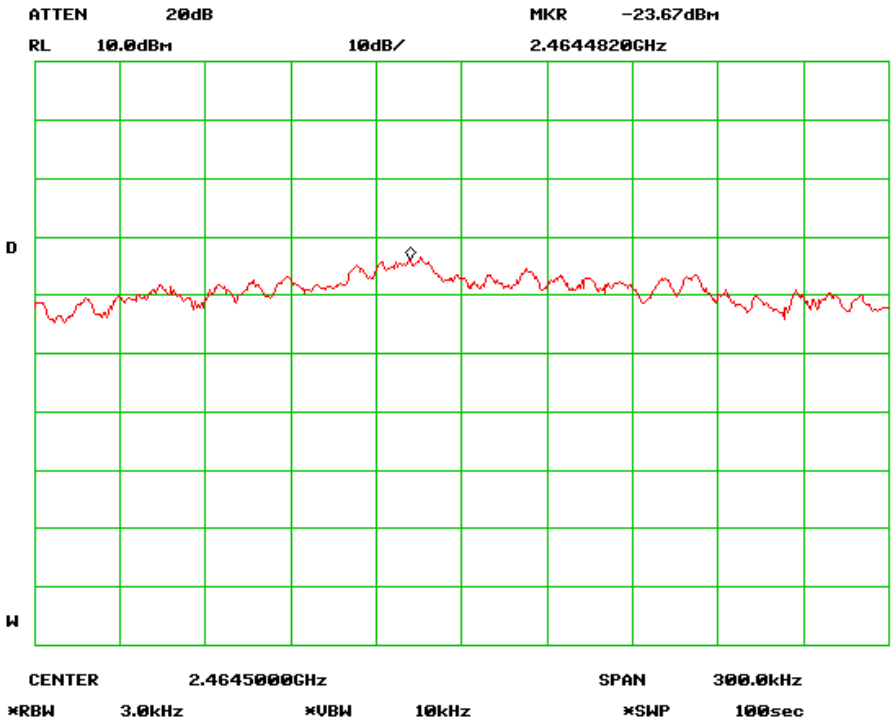
PSD - High Channel (802.11b)



PSD - Low Channel (802.11g)



PSD - Mid Channel (802.11g)



PSD - High Channel (802.11g)

5.5 Peak Output Power

1. Conducted Measurement
   EUT was set for low, mid, high channel with modulated mode and highest RF output power.
   The spectrum analyzer was connected to the antenna terminal.
2. Conducted Emissions Measurement Uncertainty
   All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2, in the range 30MHz – 40GHz is ±1.5dB.
3. Environmental Conditions

Temperature	16°C
Relative Humidity	50%
Atmospheric Pressure	1019mbar

4. Test date : Jun 10~28 2010
   Tested By : Alex Wang

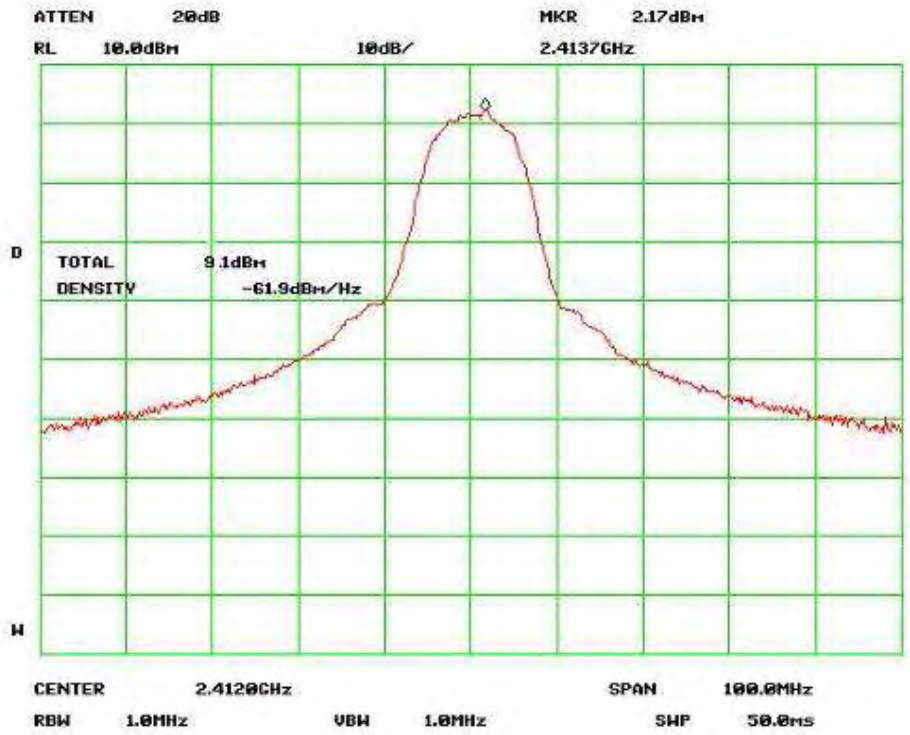
Standard Requirement: 47 CFR §15.247(b)

Procedures: The peak output power was measured conducted using a spectrum analyzer at low, mid, and hi channels. Peak detector was set to measure the power output. The power is converted from watt to dBm, therefore, 1 watt = 30 dBm.

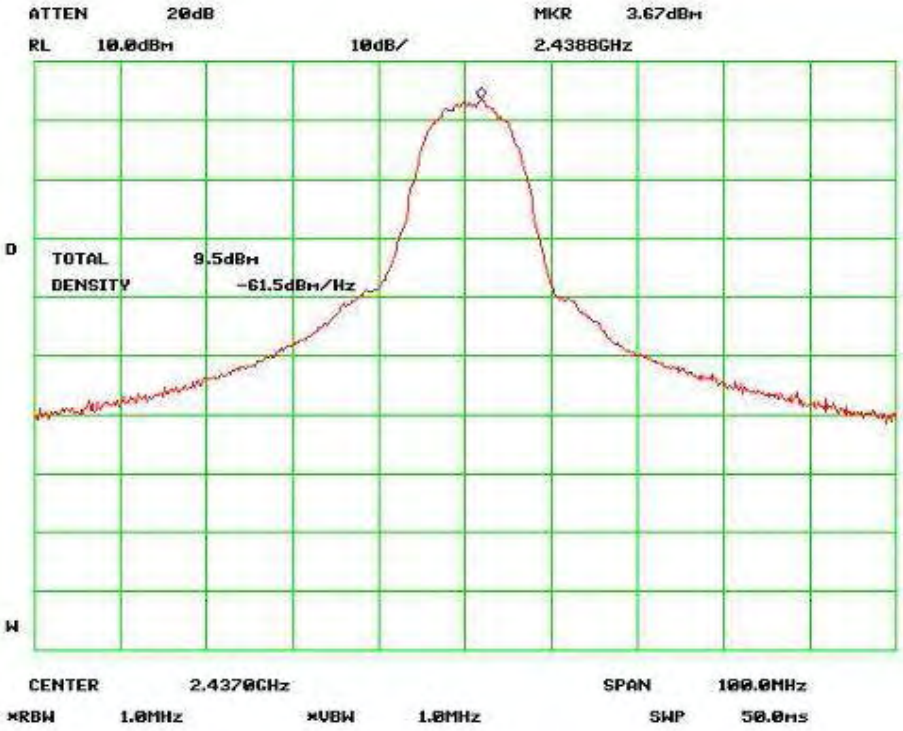
Test Result:

Protocol	Channel	Channel Frequency (MHz)	Peak Output Power Limit (dBm)	Measured Output Power (dBm)
802.11b	Low	2412	30	9.1
802.11b	Mid	2437	30	9.5
802.11b	High	2462	30	10.0
802.11g	Low	2412	30	9.3
802.11g	Mid	2437	30	9.1
802.11g	High	2462	30	9.0

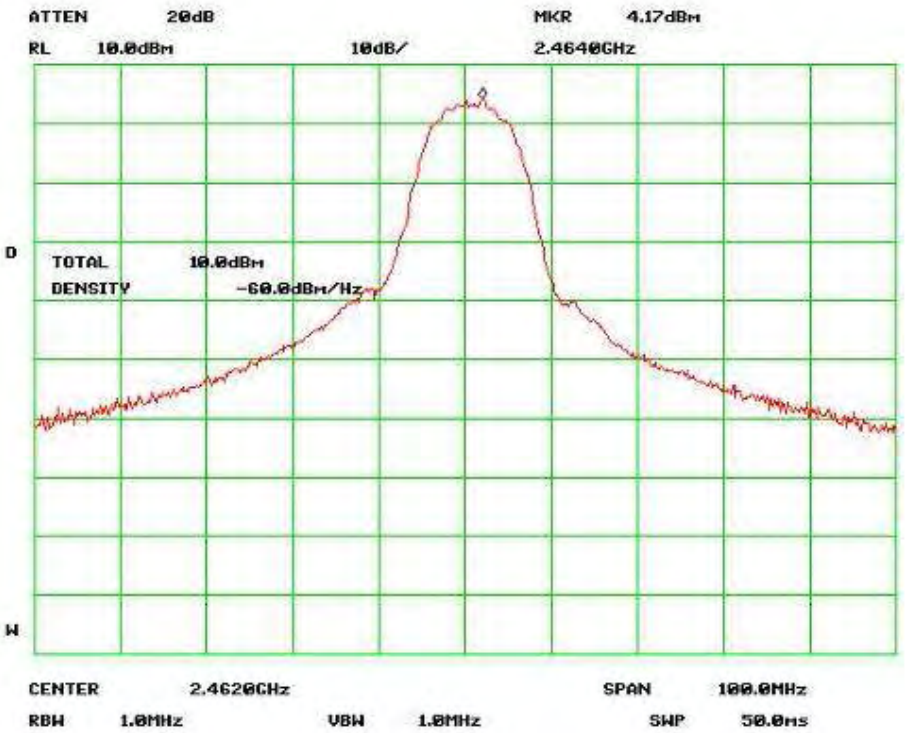
Refer to the attached plots.



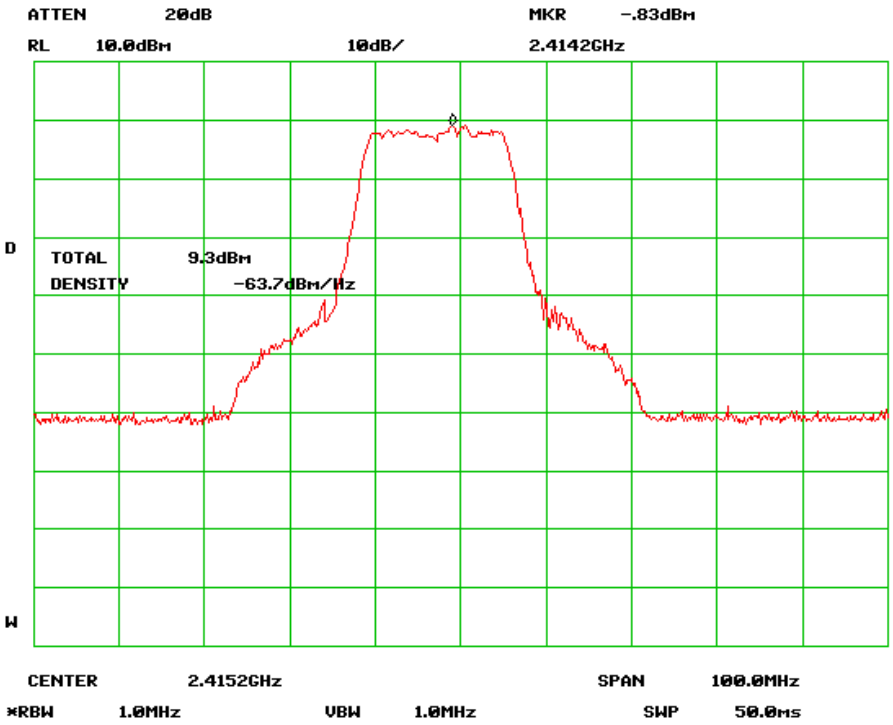
Output Power Low Channel (802.11b)



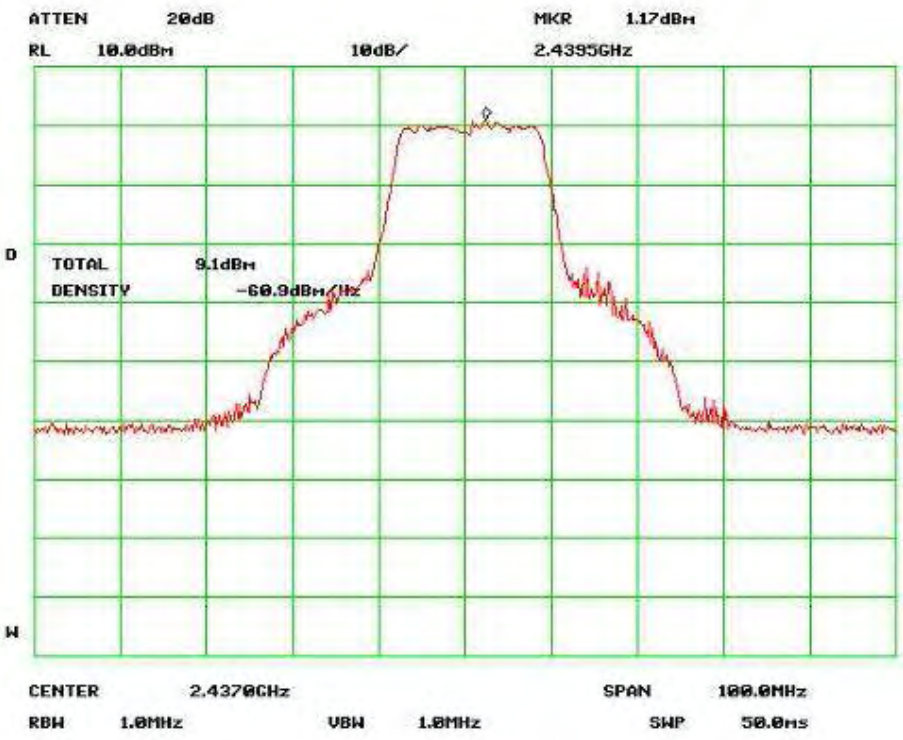
Output Power Mid Channel (802.11b)



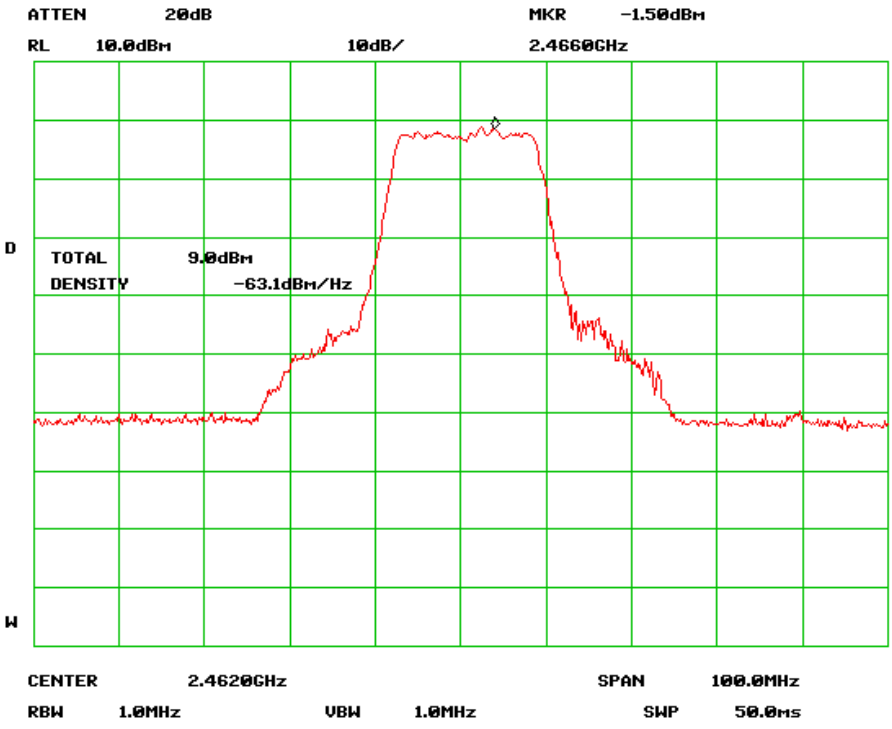
Output Power High Channel (802.11b)



Output Power Low Channel (802.11g)



Output Power Mid Channel (802.11g)



Output Power High Channel (802.11g)

5.6 Antenna Port Emission

1. Conducted Measurement
   EUT was set for low, mid, high channel with modulated mode and highest RF output power.
   The spectrum analyzer was connected to the antenna terminal.
2. Conducted Emissions Measurement Uncertainty
   All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2, in the range 30MHz – 40GHz is ±1.5dB.
3. Environmental Conditions

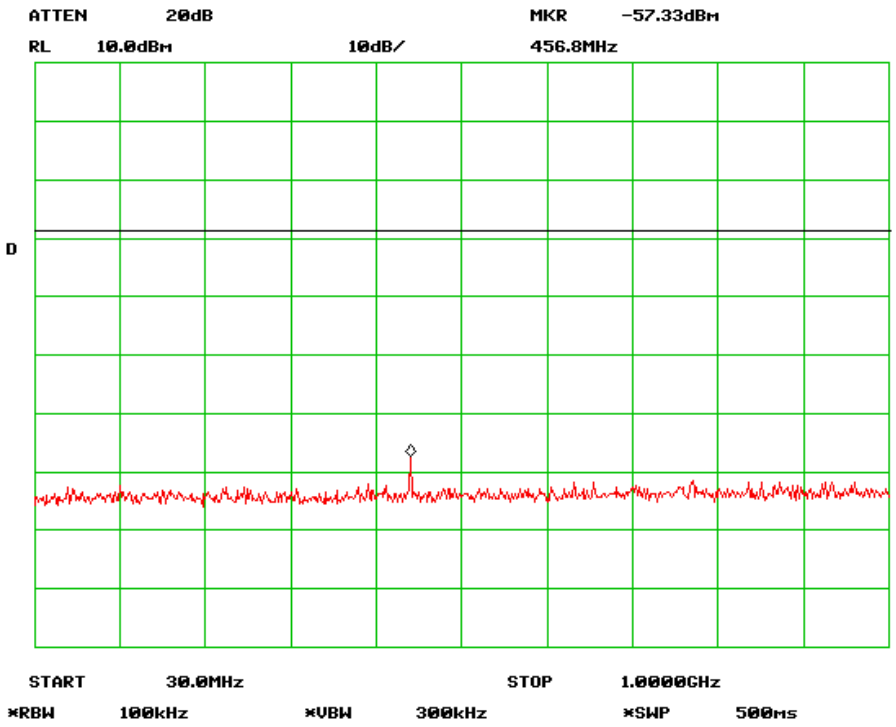
Temperature	16°C
Relative Humidity	50%
Atmospheric Pressure	1019mbar

4. Test date : Jun 10~28 2010
   Tested By : Alex Wang

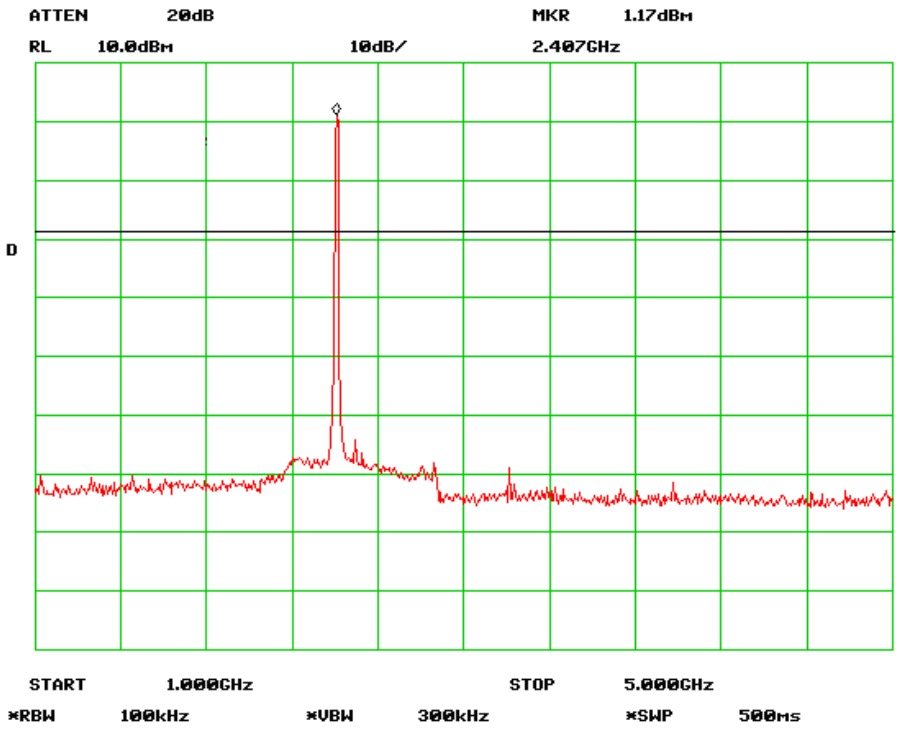
Standard Requirement: Radiated emission limits: In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the modulation products of the spreading sequence, the information sequence and the carrier frequency shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power

Procedures: The conducted spurious emissions were measured conducted using a spectrum analyzer at low, mid, and hi channels. The limit was determined by attenuating 20 dB of the RF peak power output.

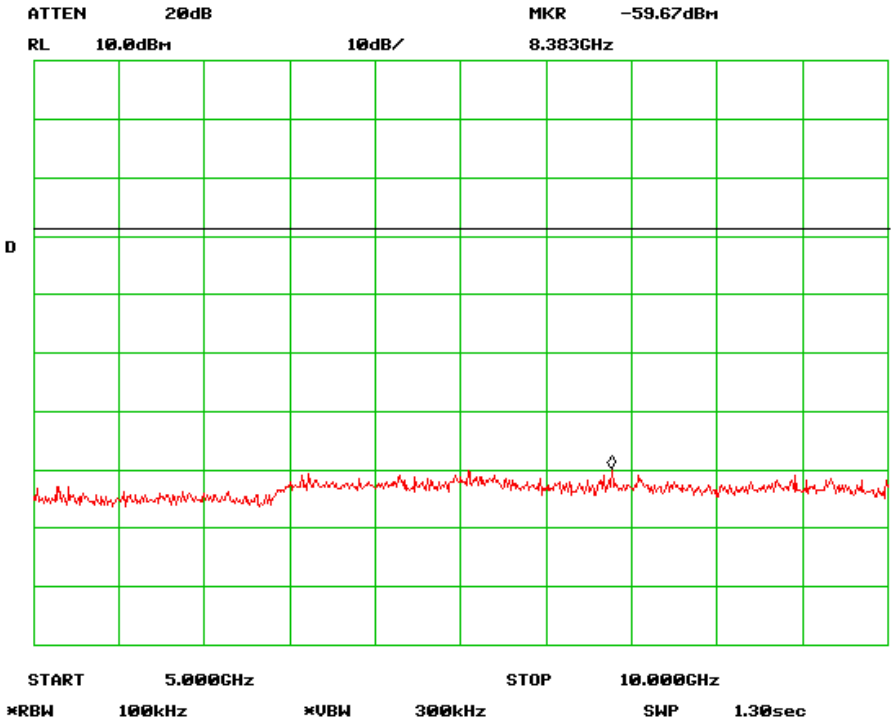
Test Result:



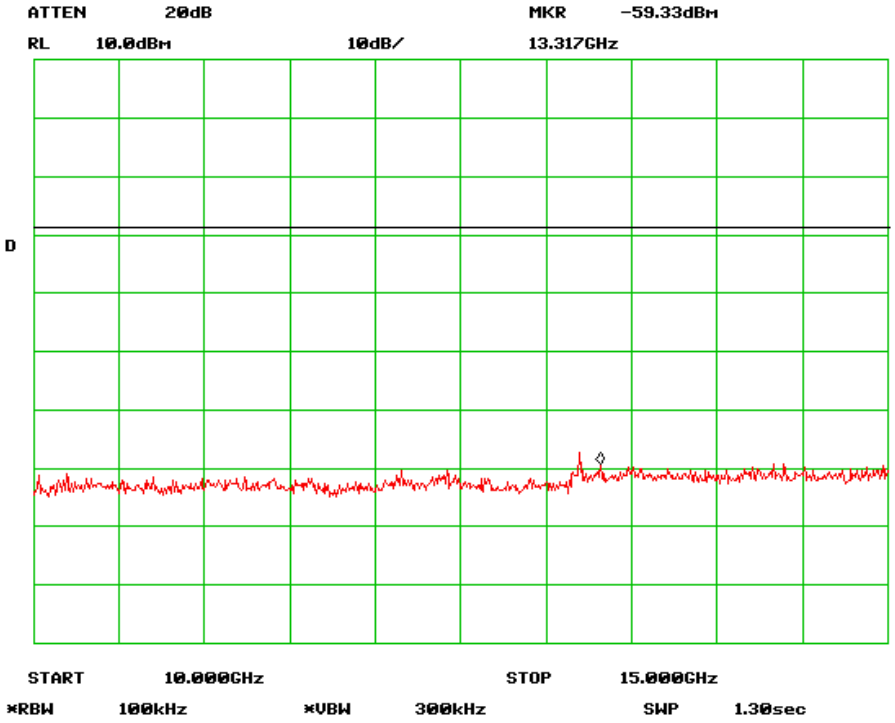
Antenna Port Emission Low Channel -1(802.11b)



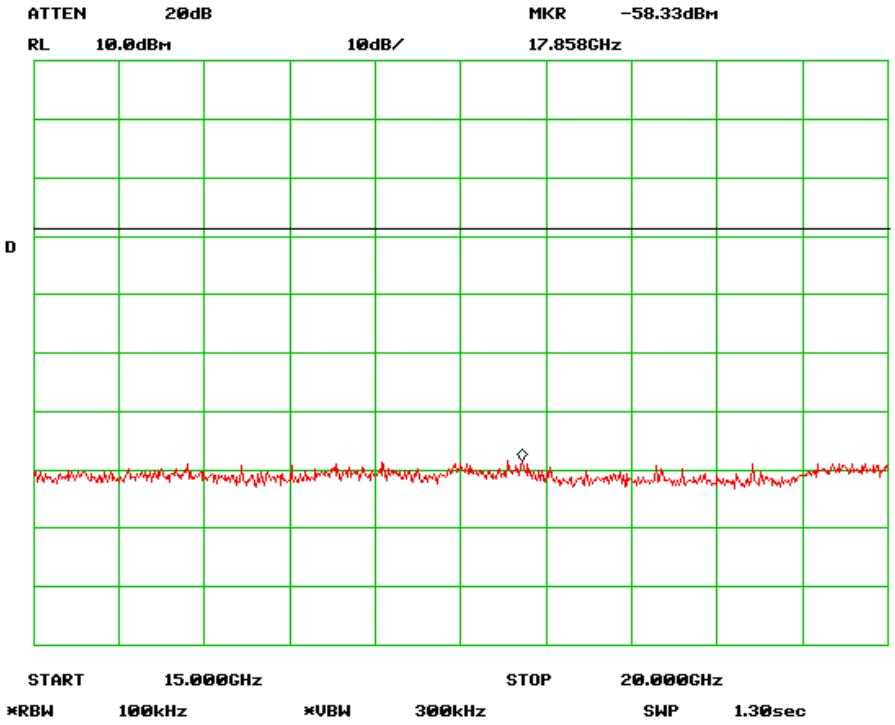
Antenna Port Emission Low Channel -2(802.11b)



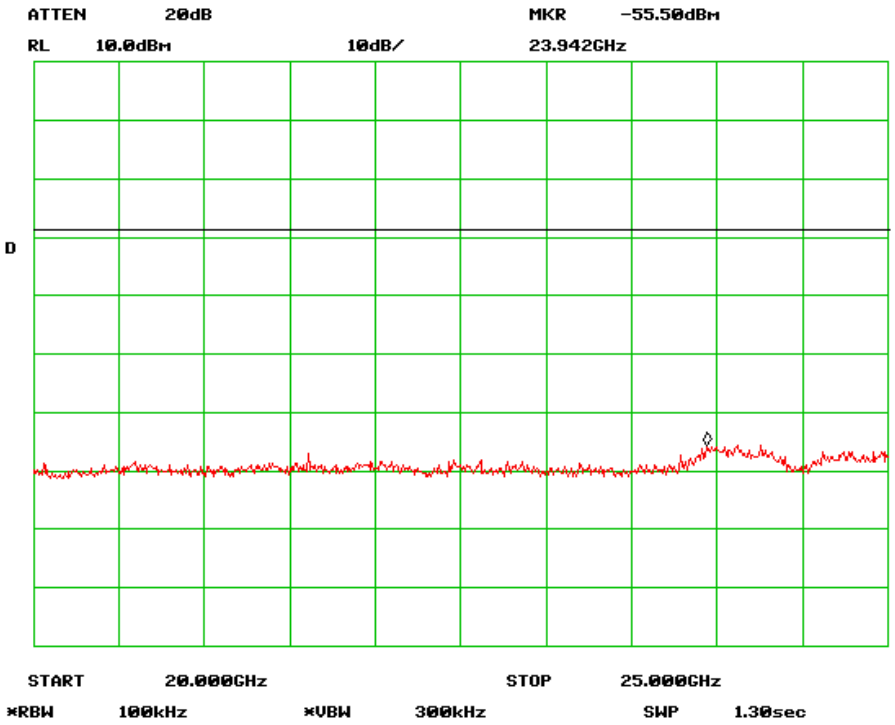
Antenna Port Emission Low Channel -3(802.11b)



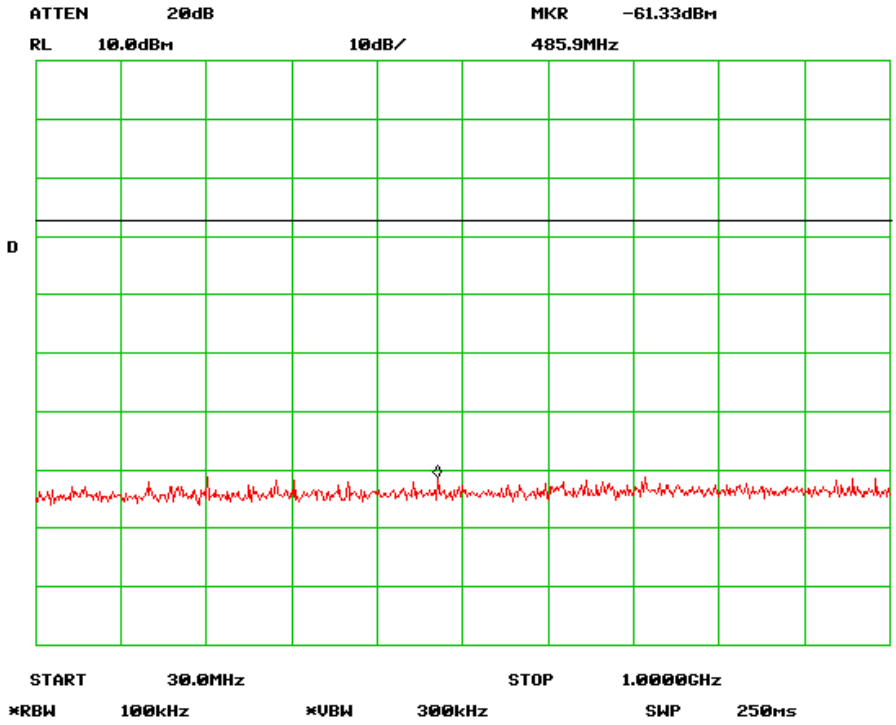
Antenna Port Emission Low Channel -4(802.11b)



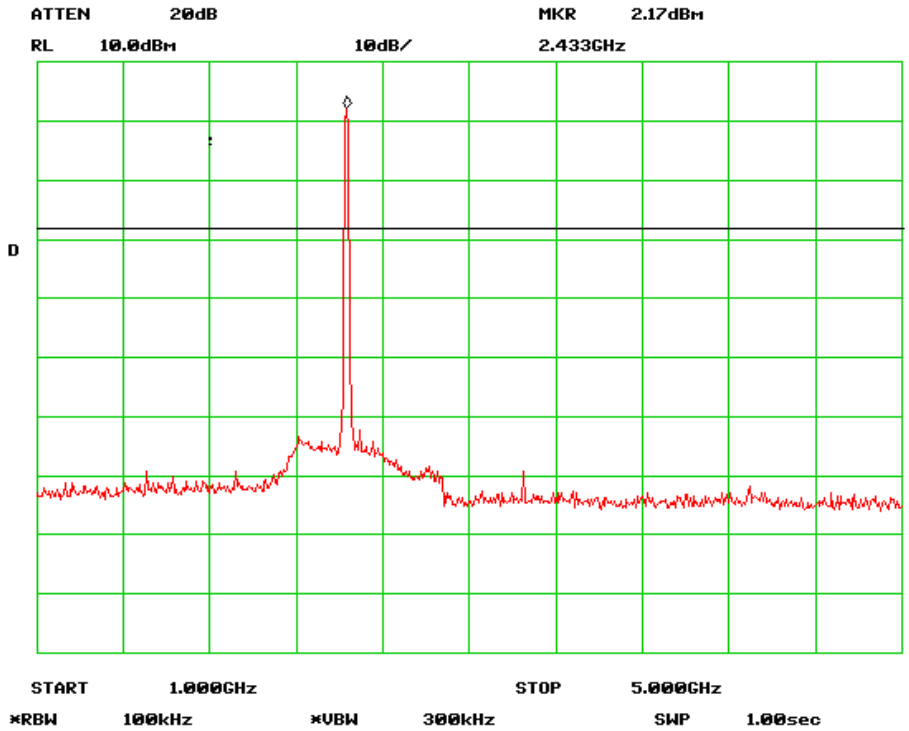
Antenna Port Emission Low Channel -5(802.11b)



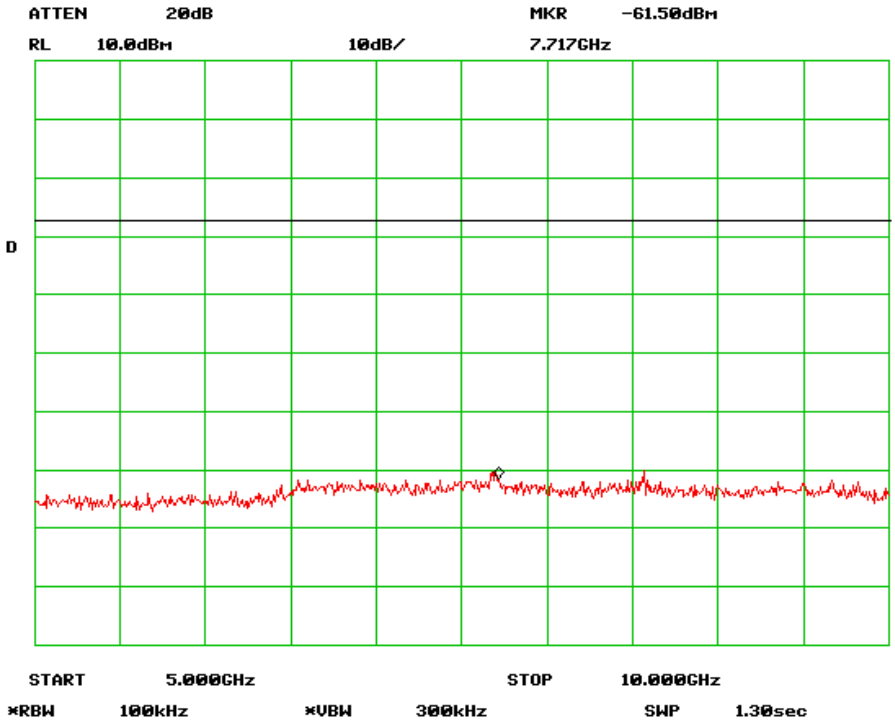
Antenna Port Emission Low Channel -6(802.11b)



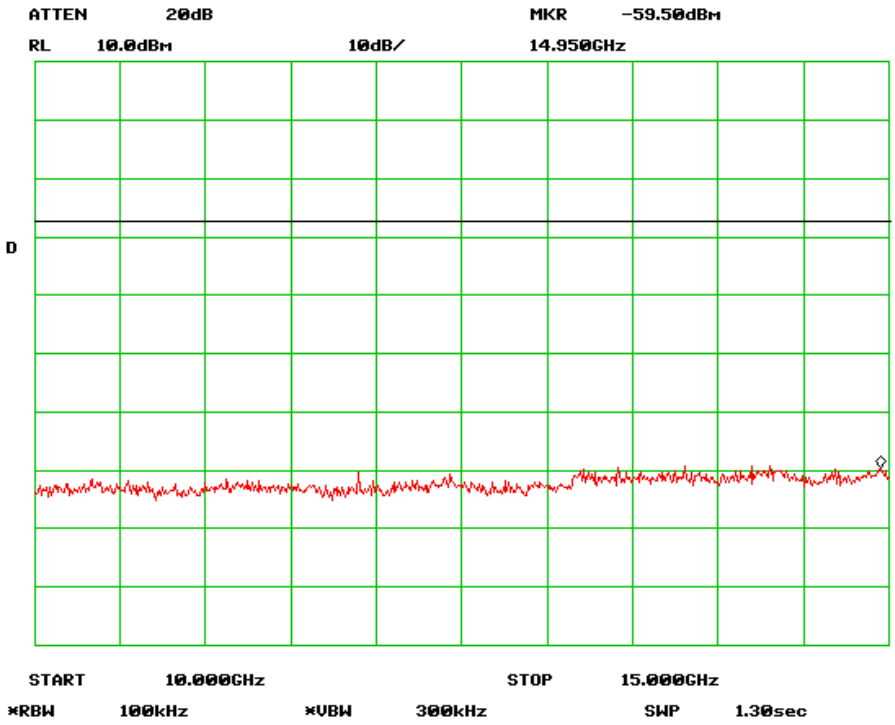
Antenna Port Emission Mid-1 Channel (802.11b)



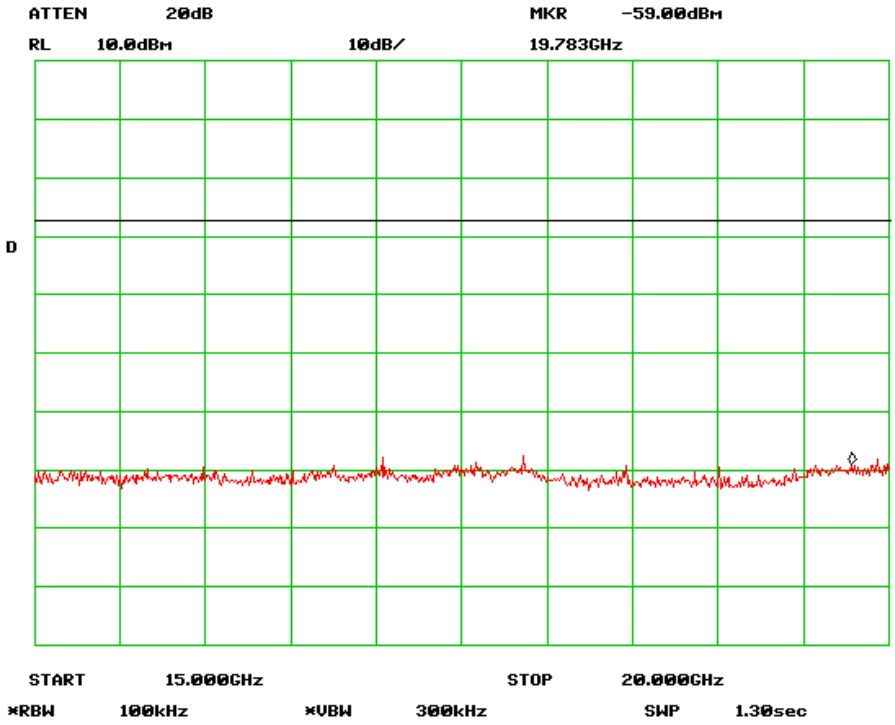
Antenna Port Emission Mid-2 Channel (802.11b)



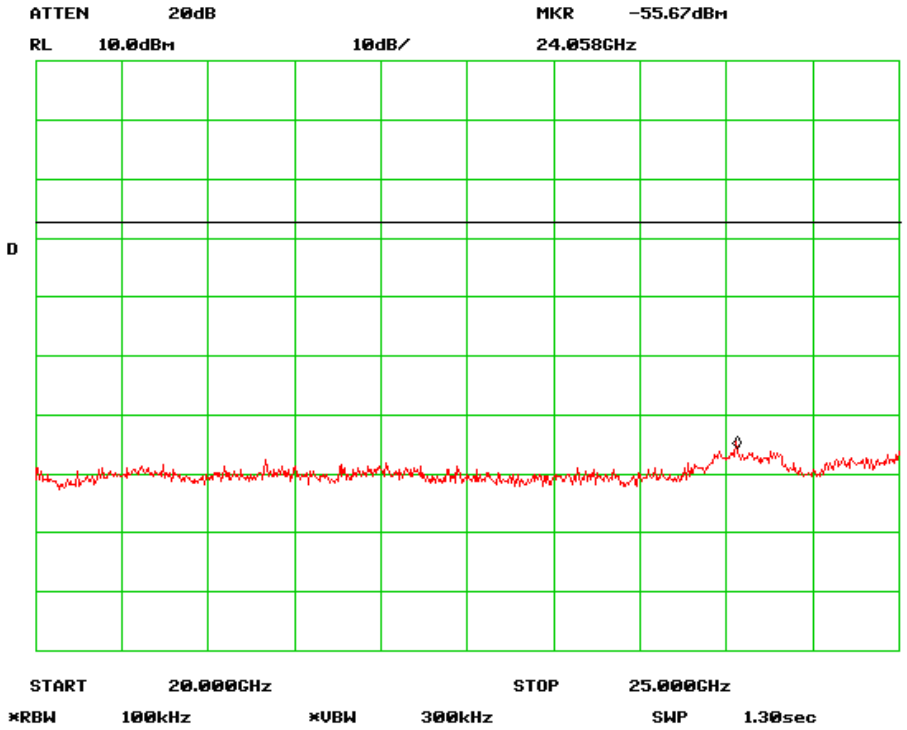
Antenna Port Emission Mid-3 Channel (802.11b)



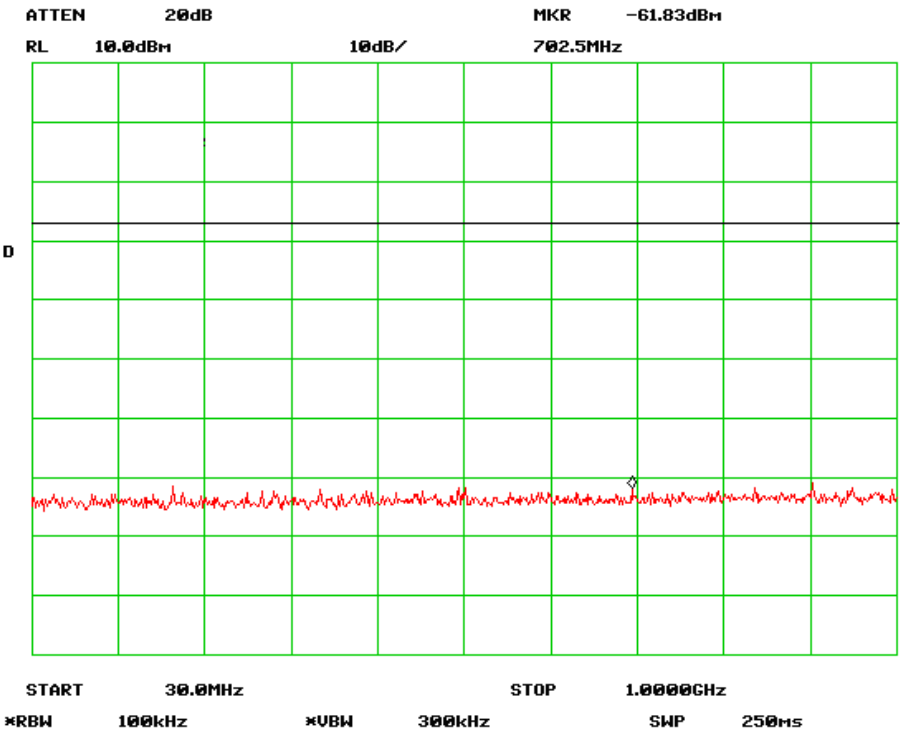
Antenna Port Emission Mid-4 Channel (802.11b)



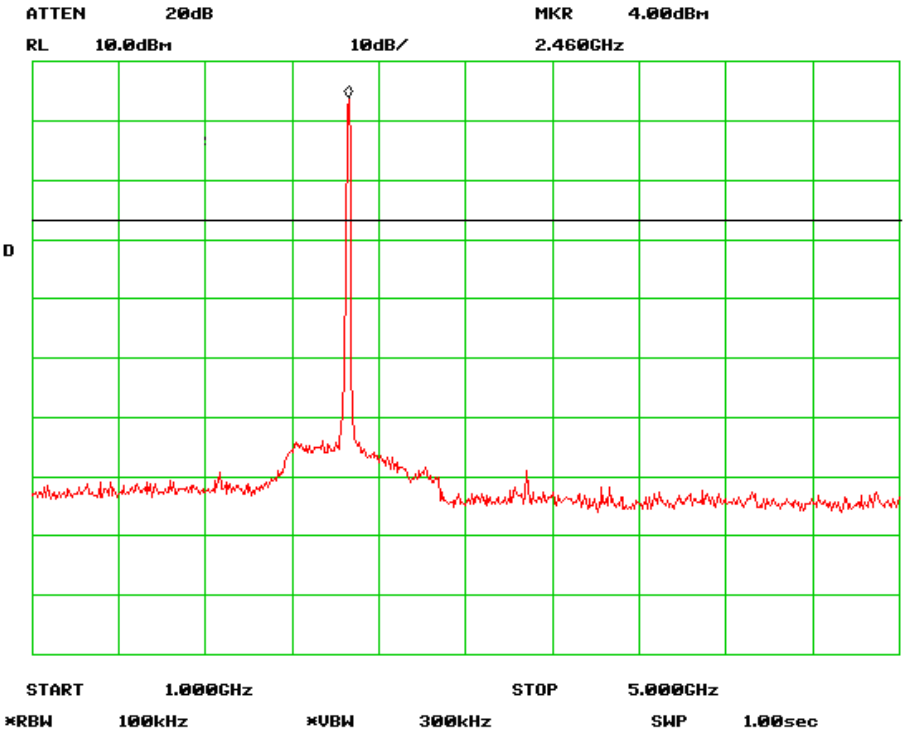
Antenna Port Emission Mid-5 Channel (802.11b)



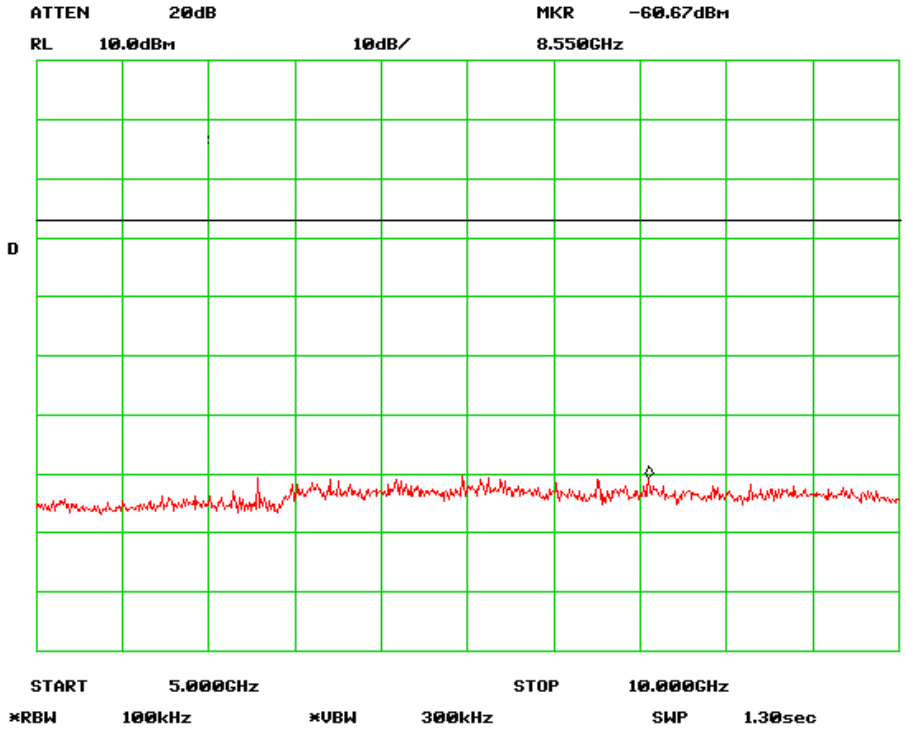
Antenna Port Emission Mid-6 Channel (802.11b)



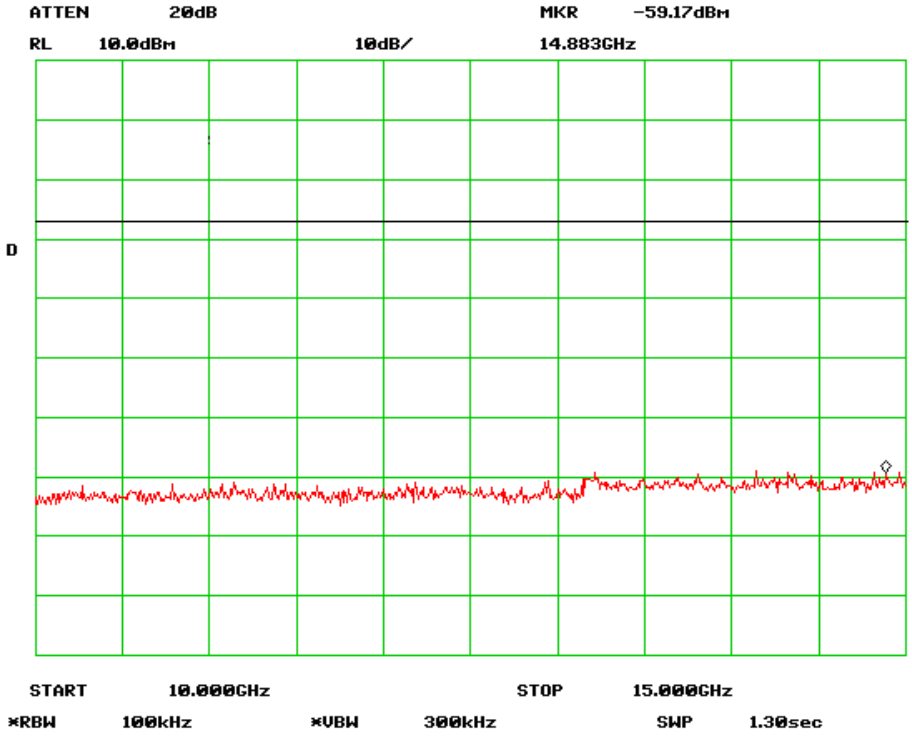
Antenna Port Emission High-1 Channel (802.11b)



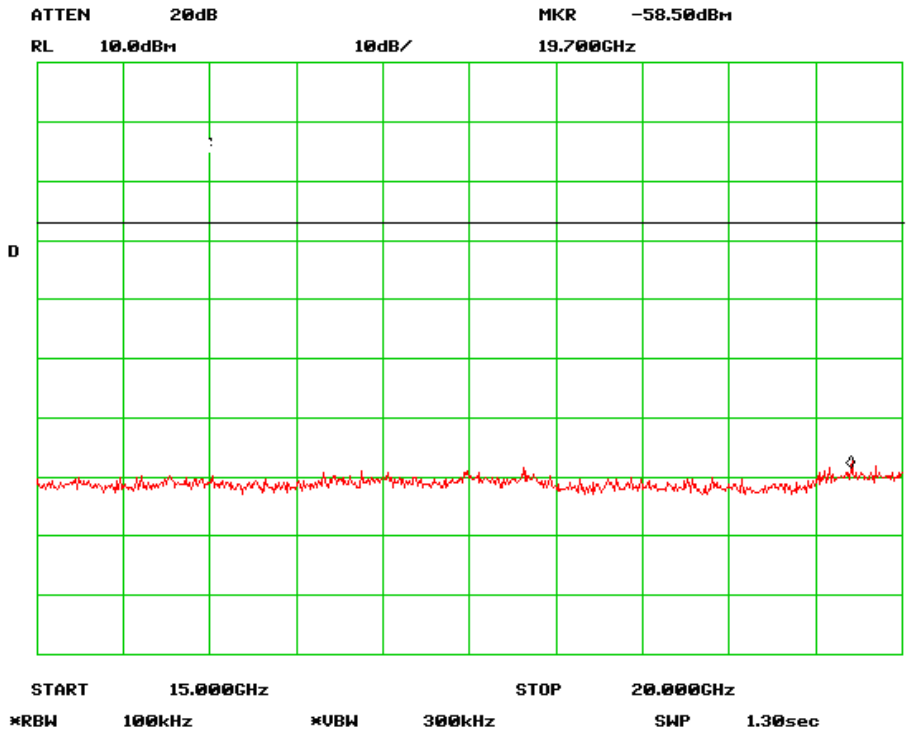
Antenna Port Emission High-2 Channel (802.11b)



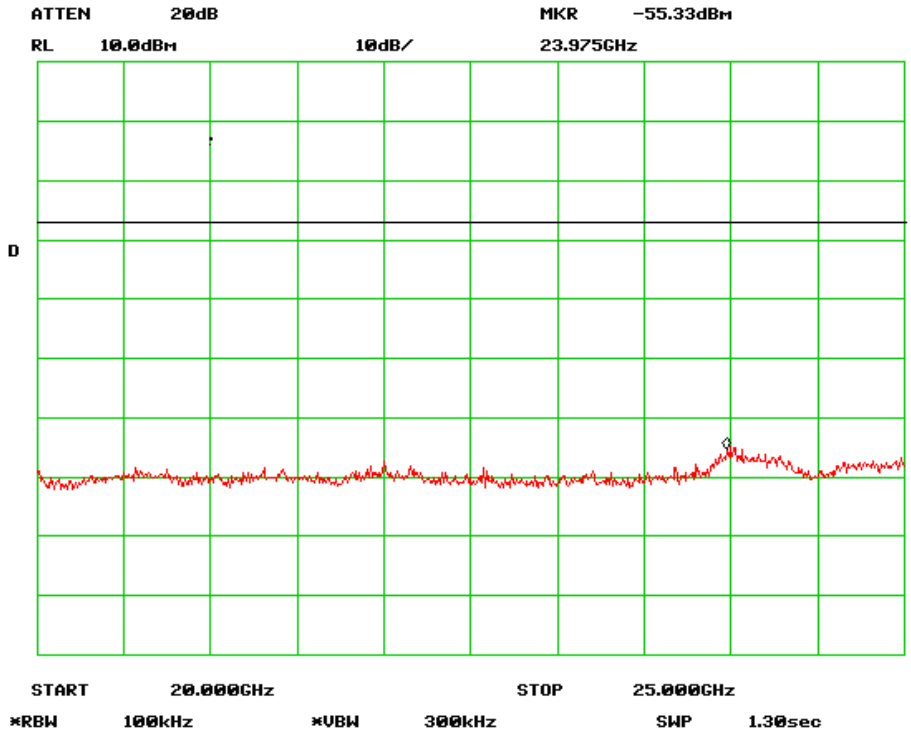
Antenna Port Emission High-3 Channel (802.11b)



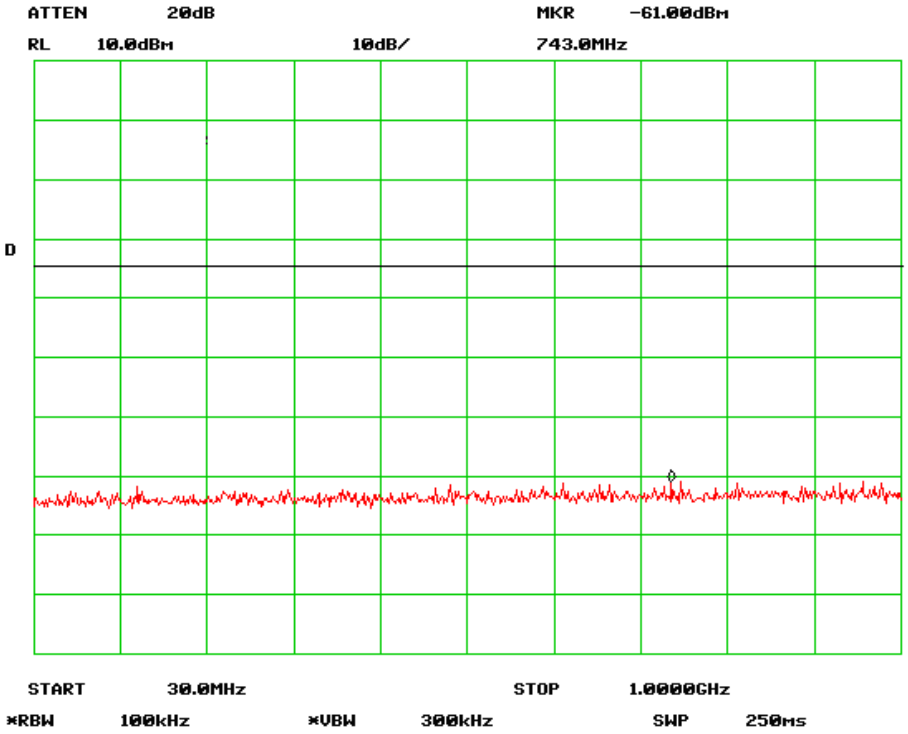
Antenna Port Emission High-4 Channel (802.11b)



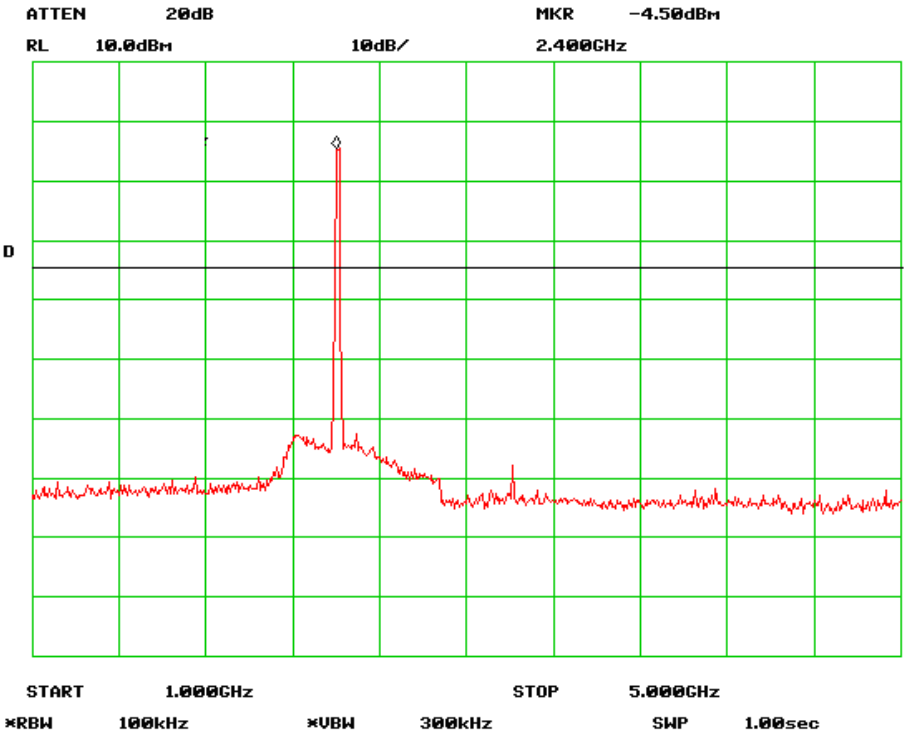
Antenna Port Emission High-5 Channel (802.11b)



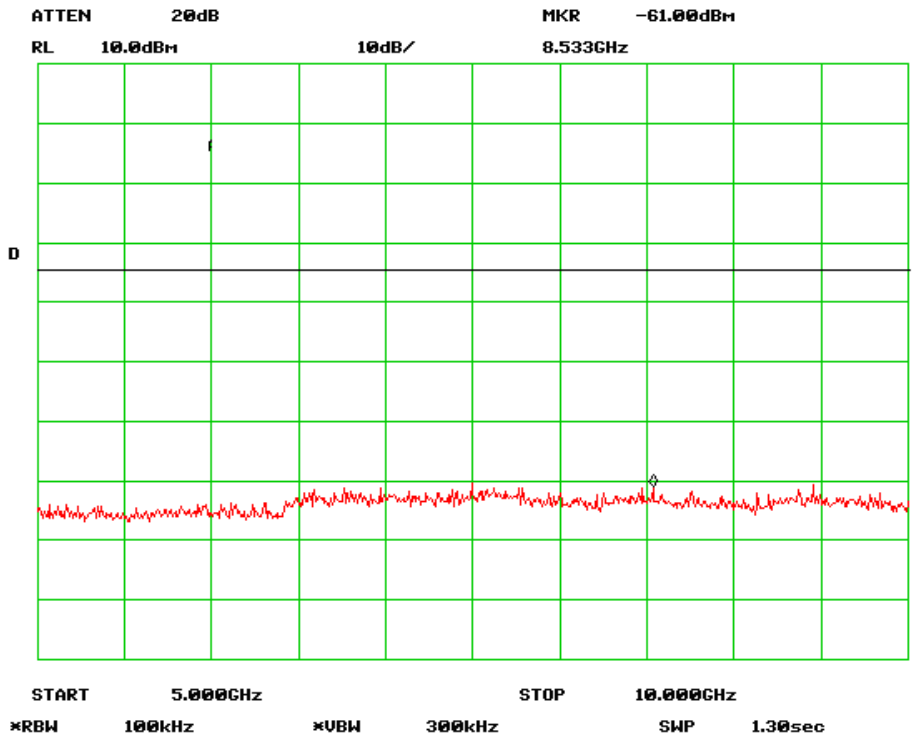
Antenna Port Emission High-6 Channel (802.11b)



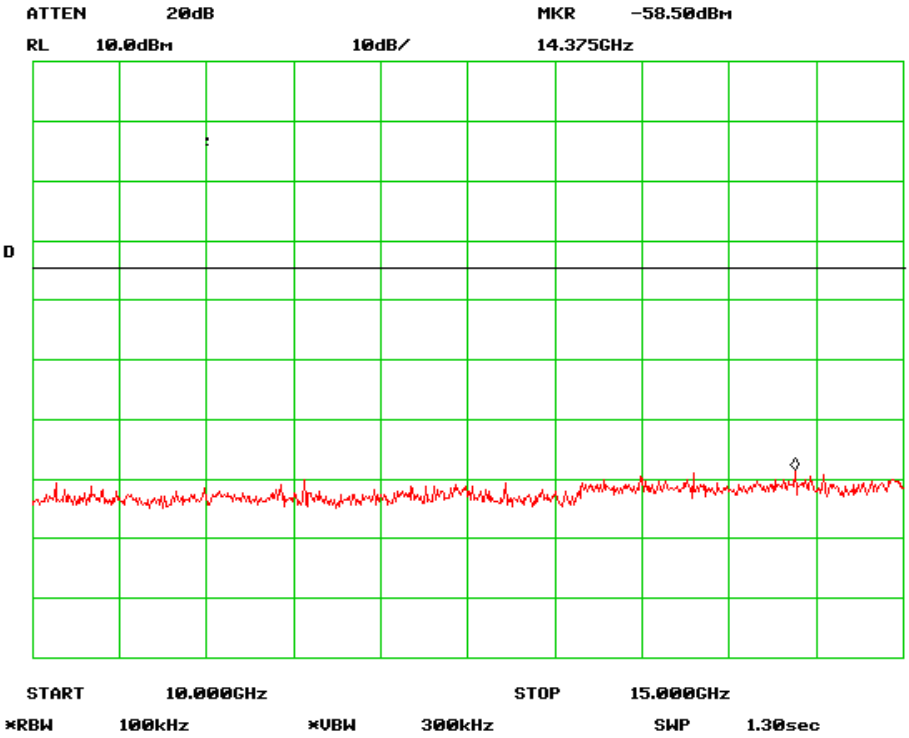
Antenna Port Emission Low-1 Channel (802.11g)



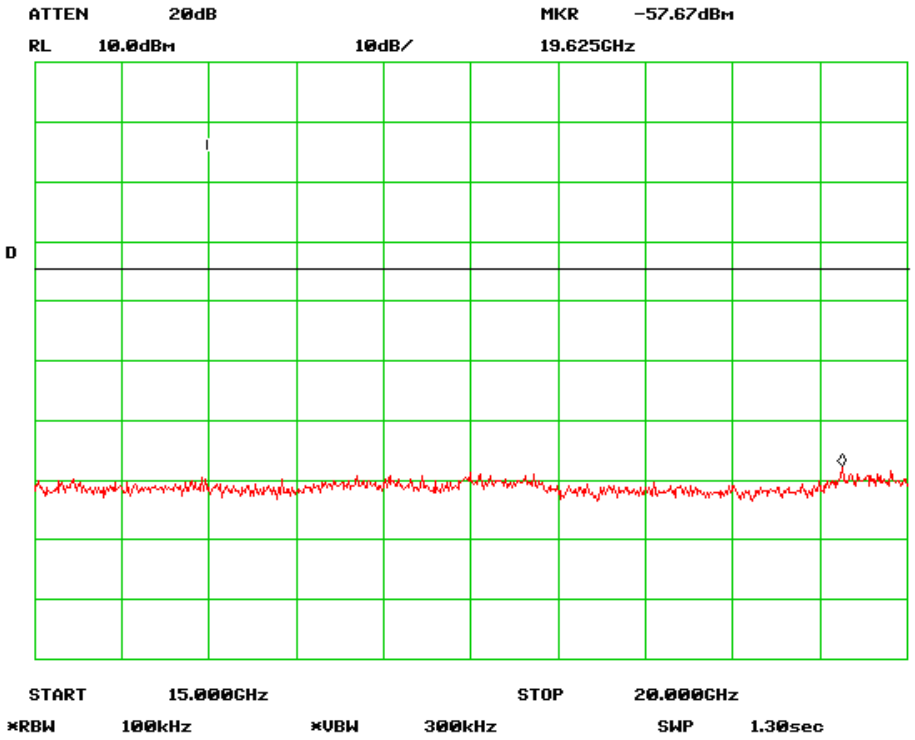
Antenna Port Emission Low-2 Channel (802.11g)



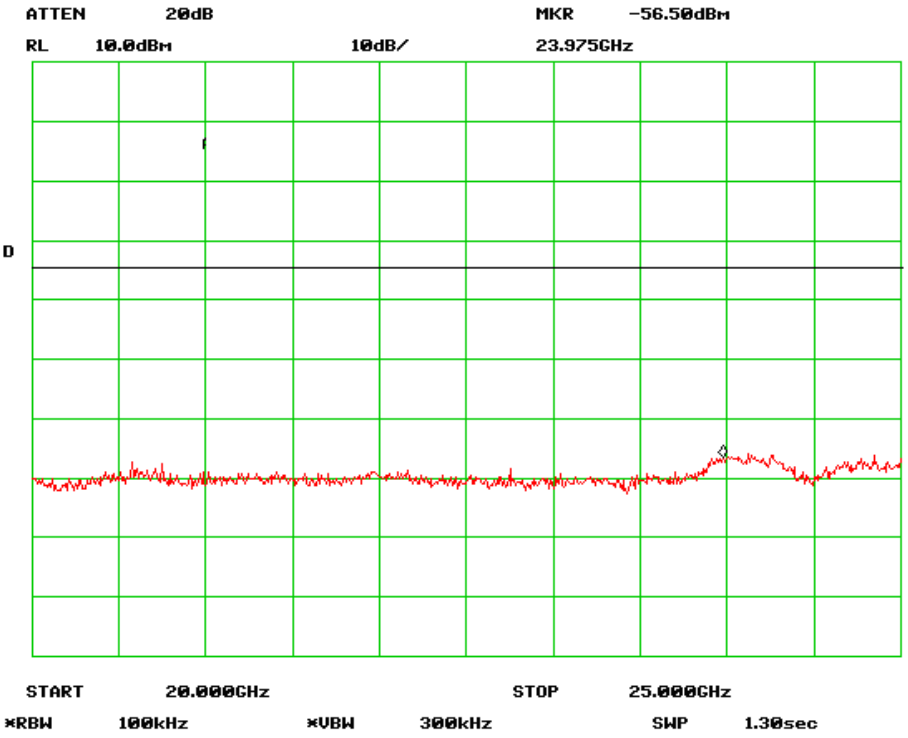
Antenna Port Emission Low-3 Channel (802.11g)



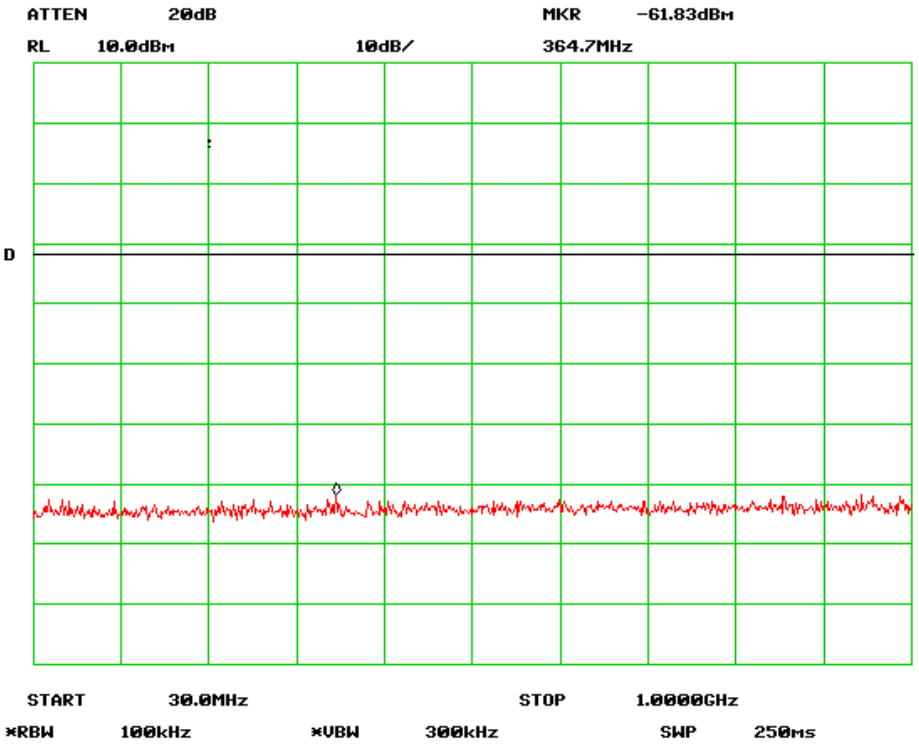
Antenna Port Emission Low-4 Channel (802.11g)



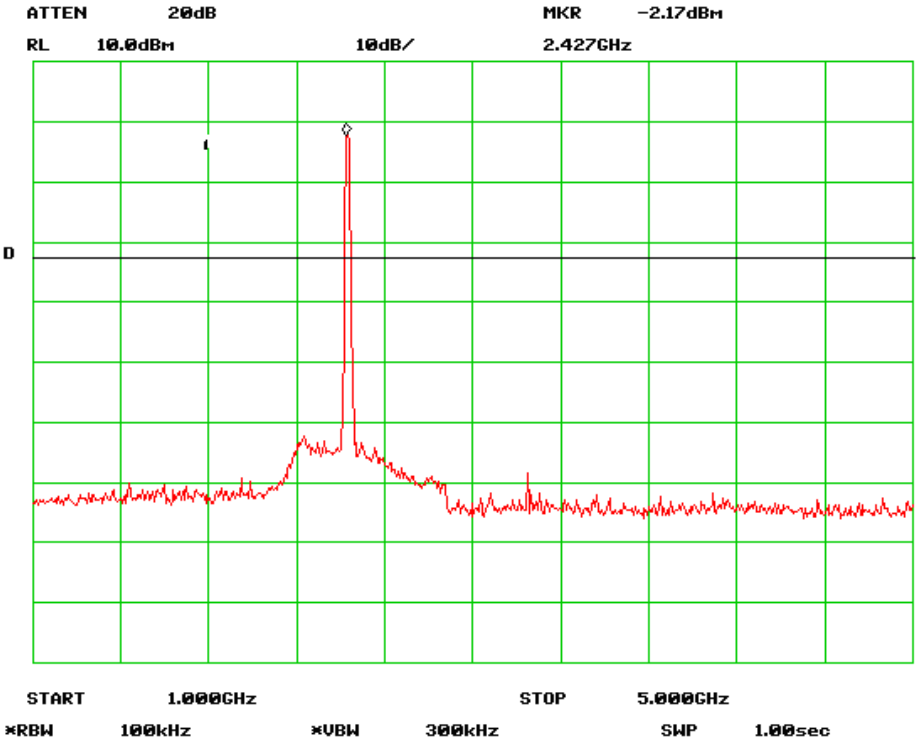
Antenna Port Emission Low-5 Channel (802.11g)



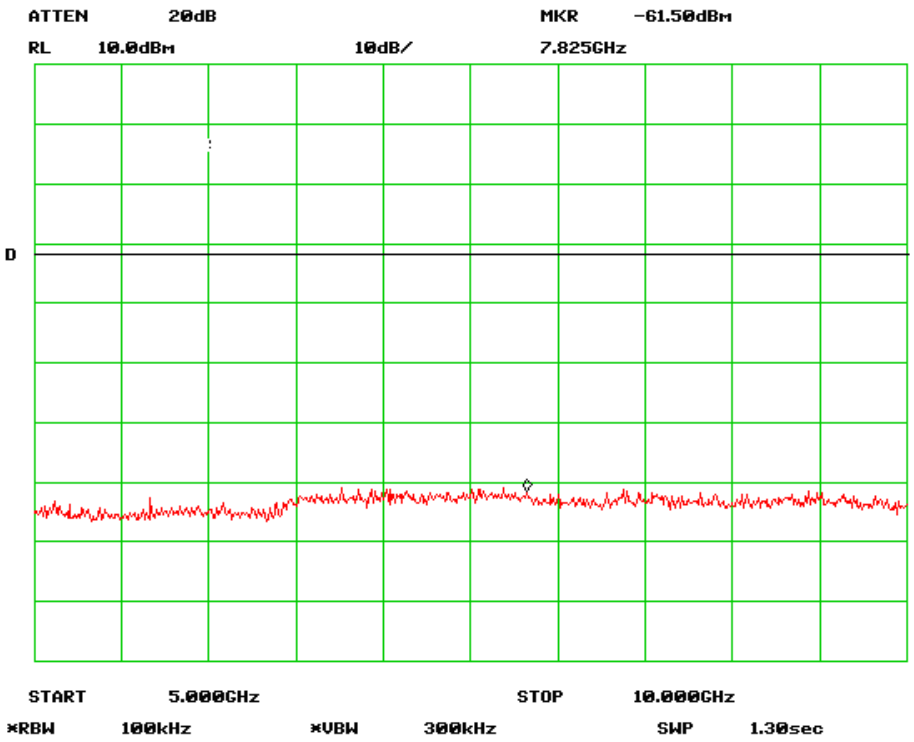
Antenna Port Emission Low-6 Channel (802.11g)



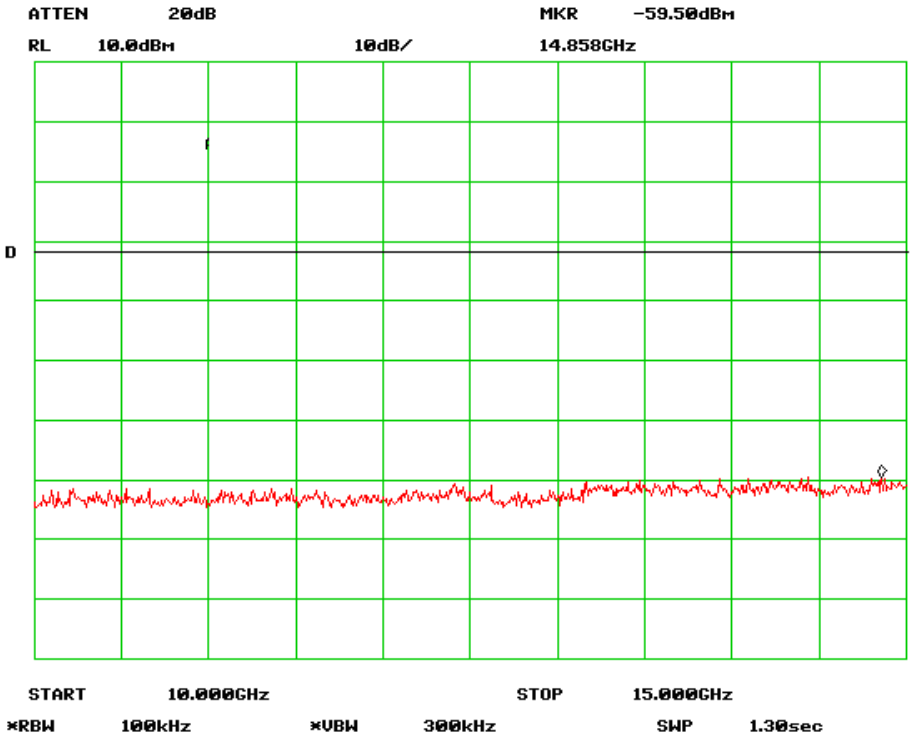
Antenna Port Emission Mid-1 Channel (802.11g)



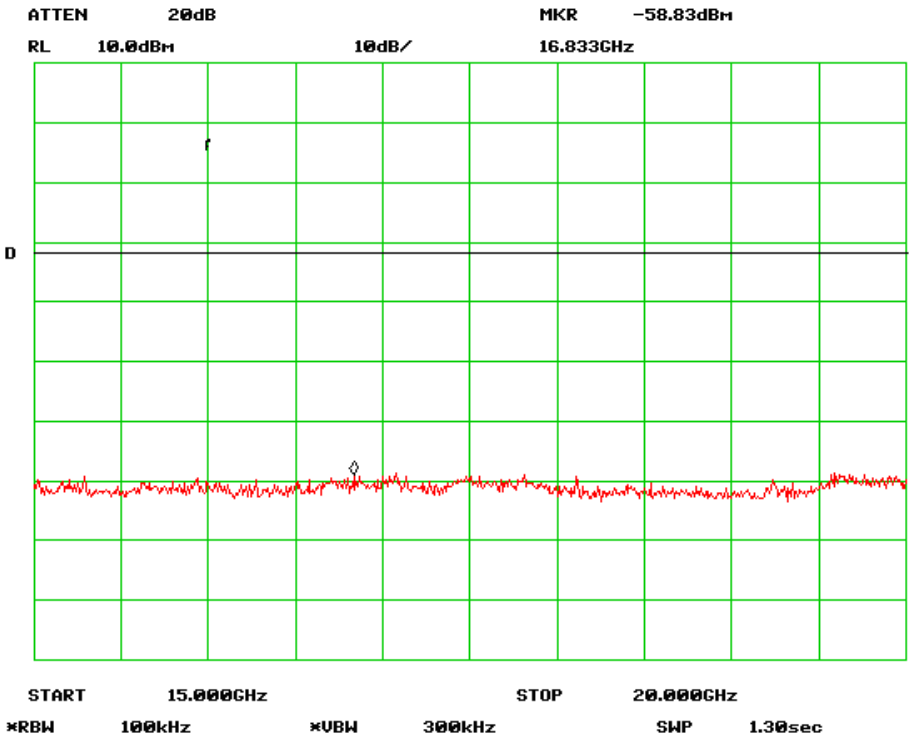
Antenna Port Emission Mid-2 Channel (802.11g)



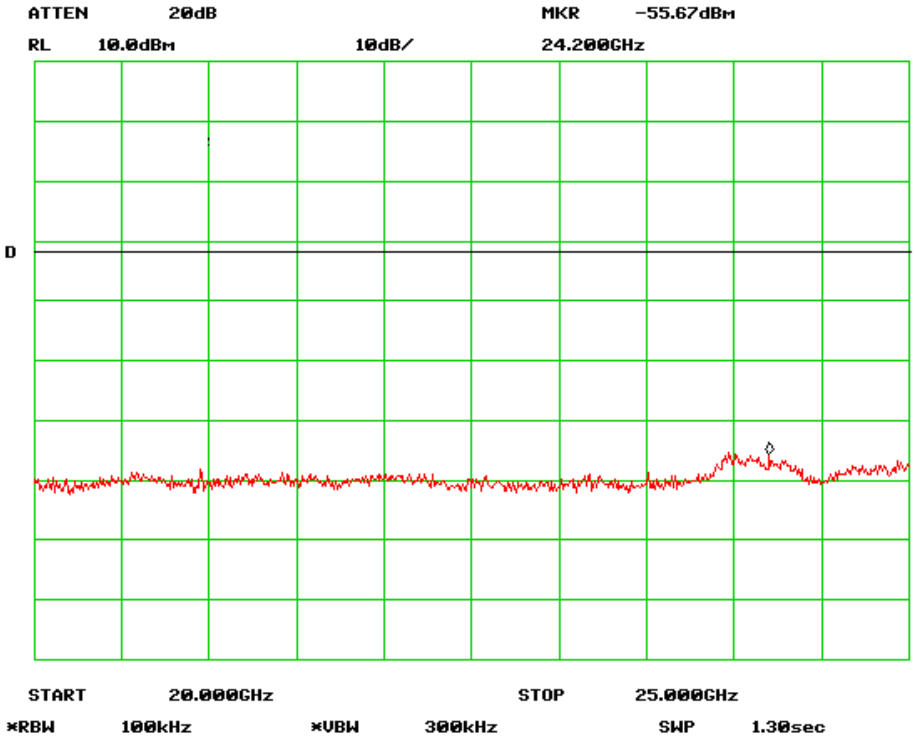
Antenna Port Emission Mid-3 Channel (802.11g)



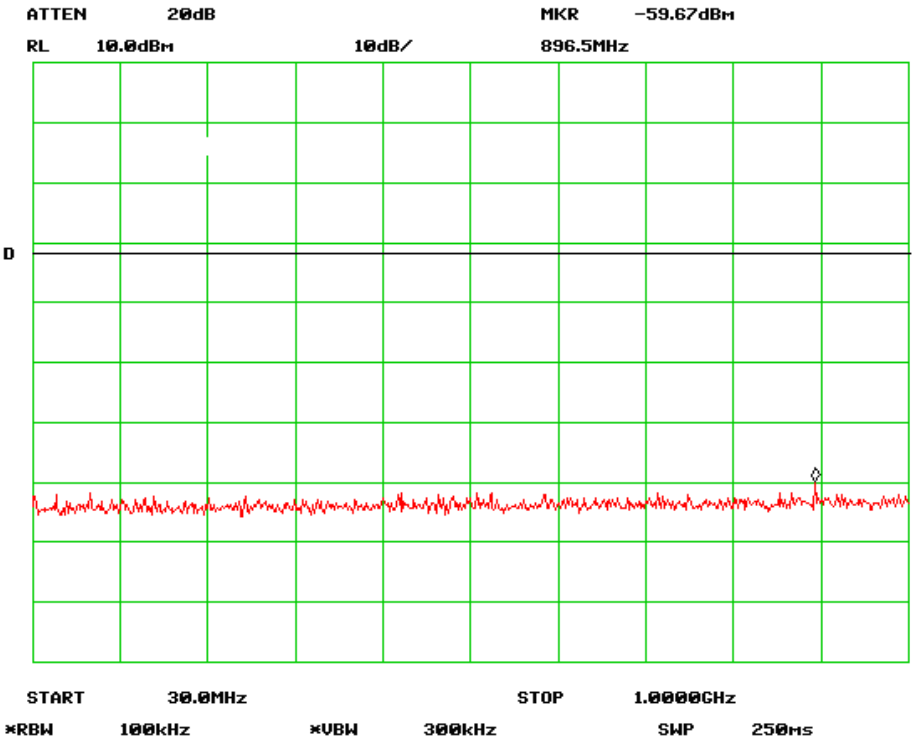
Antenna Port Emission Mid-4 Channel (802.11g)



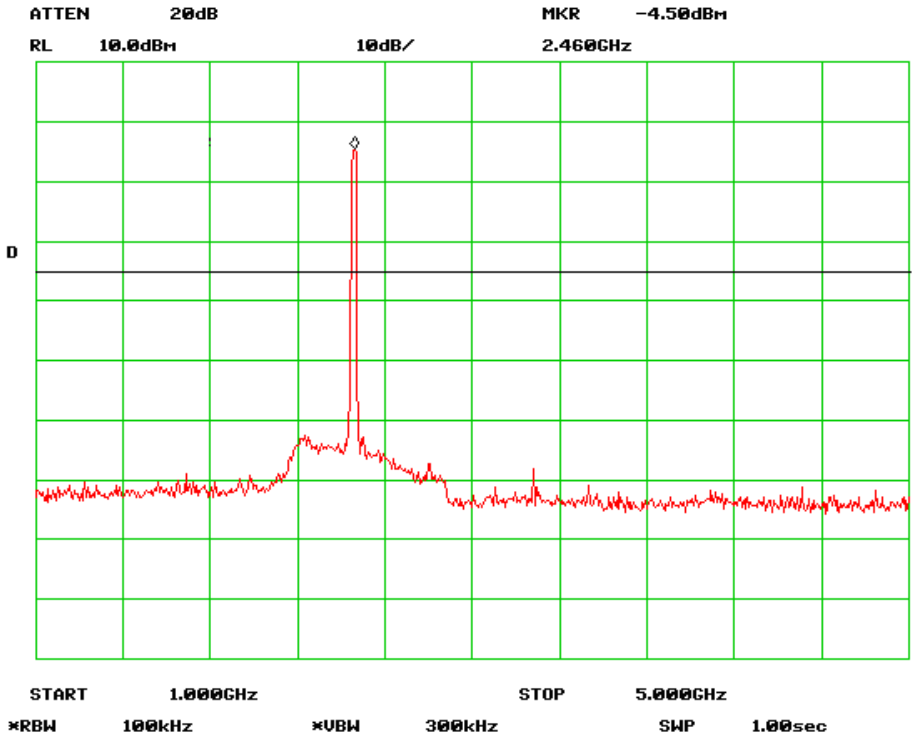
Antenna Port Emission Mid-5 Channel (802.11g)



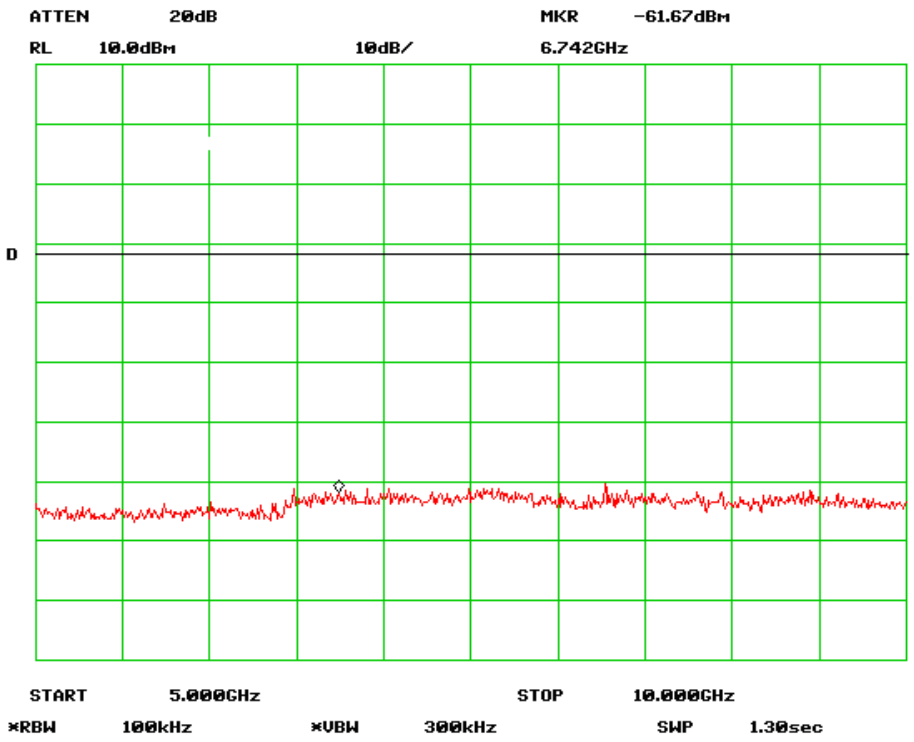
Antenna Port Emission Mid-6 Channel (802.11g)



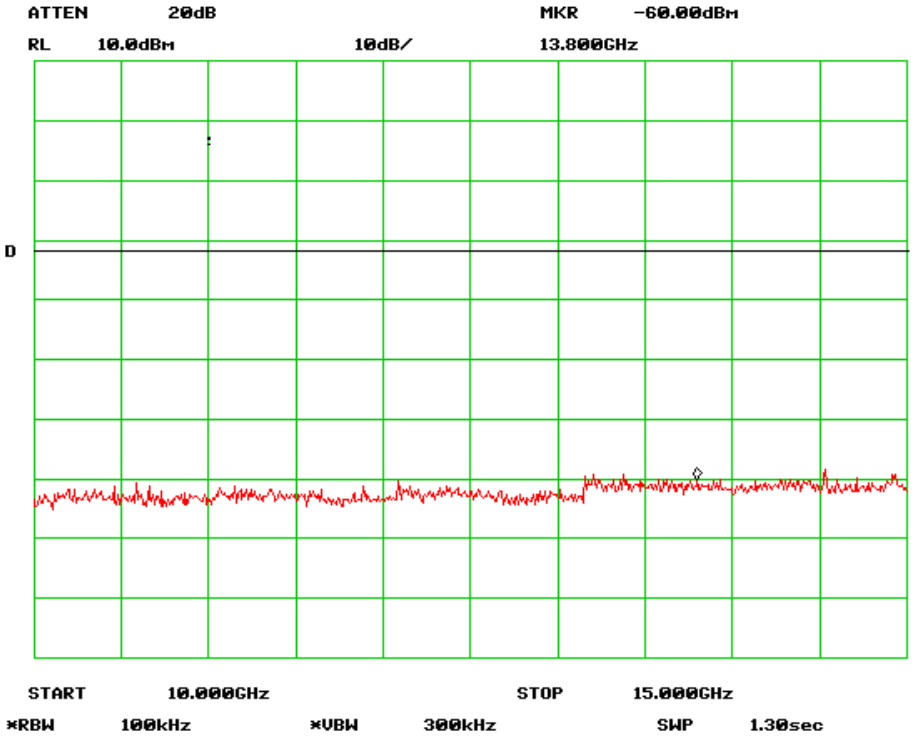
Antenna Port Emission High-1 Channel (802.11g)



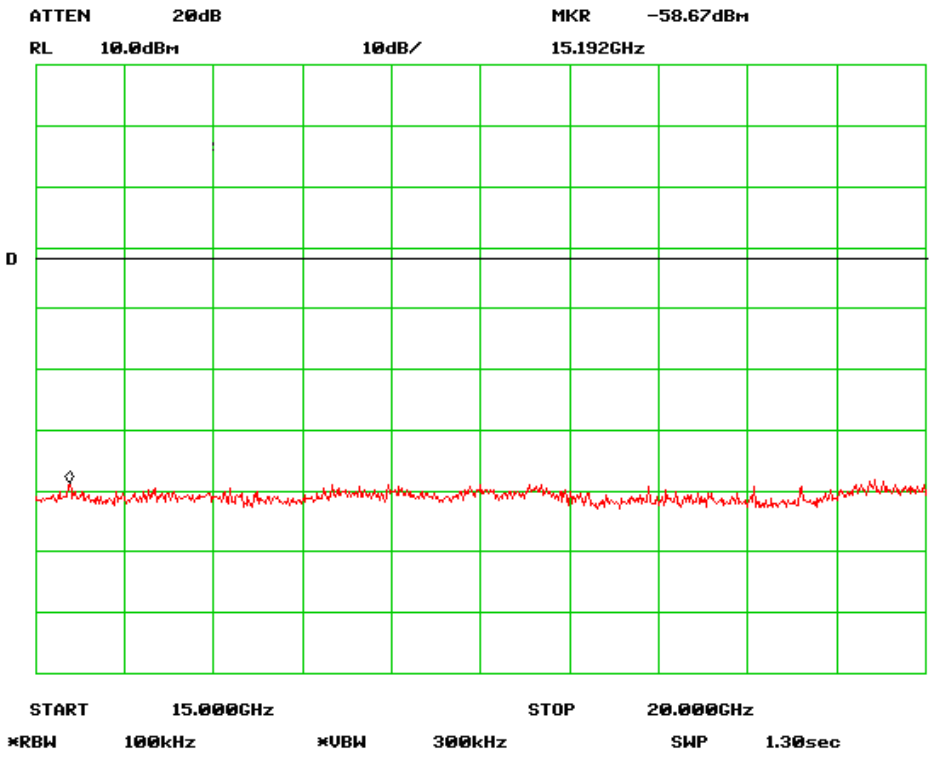
Antenna Port Emission High-2 Channel (802.11g)



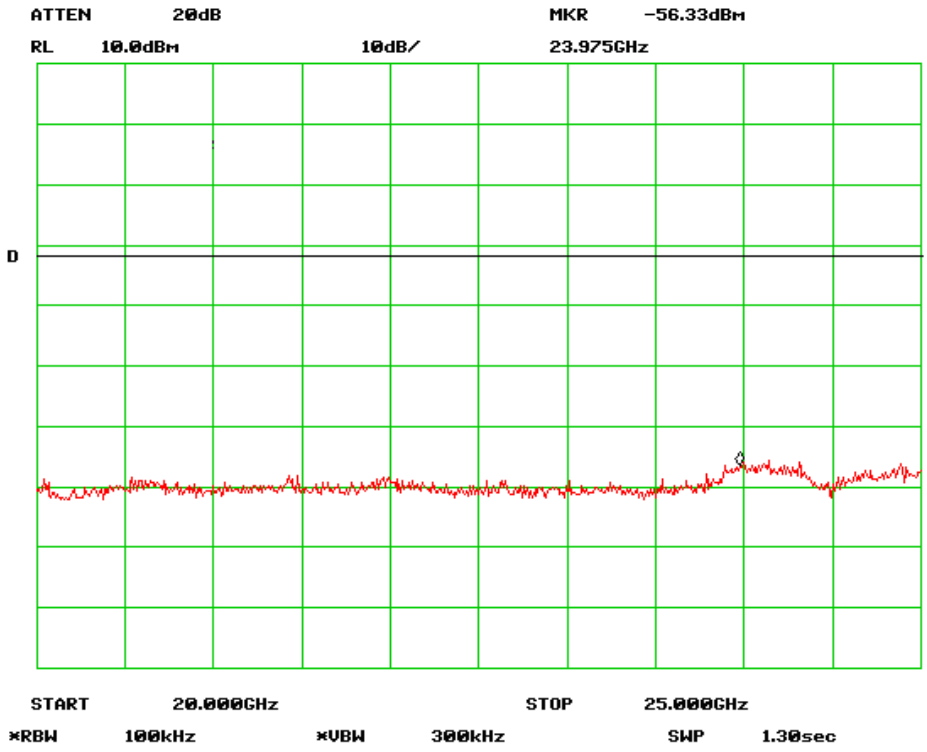
Antenna Port Emission High-3 Channel (802.11g)



Antenna Port Emission High-4 Channel (802.11g)



Antenna Port Emission High-5 Channel (802.11g)



Antenna Port Emission High-6 Channel (802.11g)

5.7 Radiated Spurious Emission < 1GHz

1. All possible modes of operation were investigated. Only the 6 worst case emissions measured, using the correct CISPR detectors, are reported. All other emissions were relatively insignificant.
2. A "-ve" margin indicates a PASS as it refers to the margin present below the limit line at the particular frequency.
3. Radiated Emissions Measurement Uncertainty
   All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2, in the range 30MHz – 1GHz & 1GHz above (3m & 10m) is +/-6dB.
4. Environmental Conditions

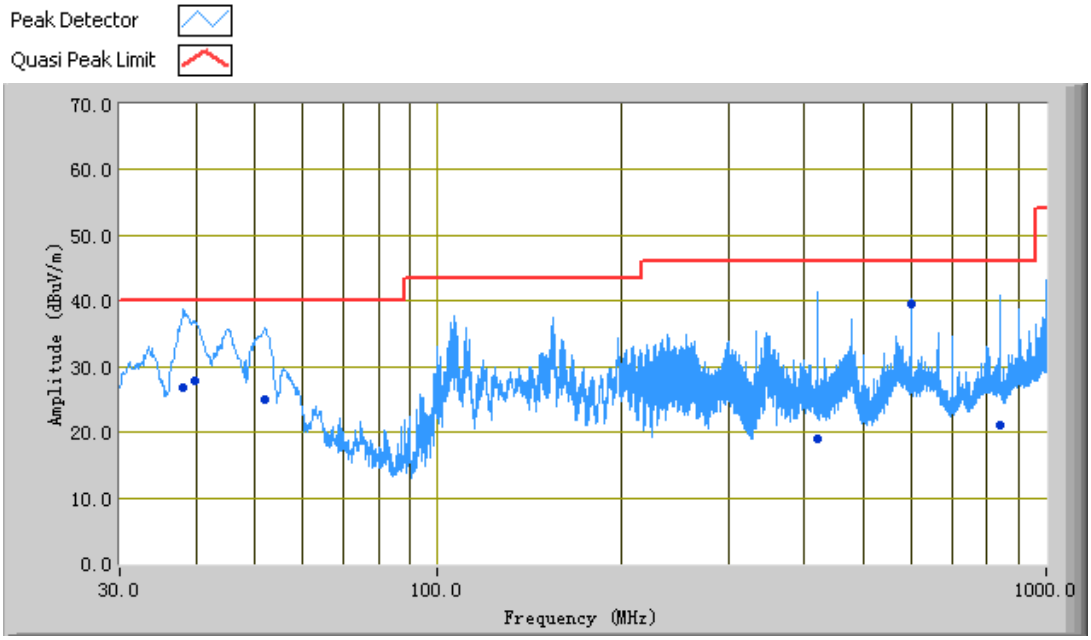
Temperature	16°C
Relative Humidity	50%
Atmospheric Pressure	1019mbar

5. Test date : Jun 10~28 2010
   Tested By : Alex Wang

Standard Requirement: The emissions from the Low-power radio-frequency devices shall not exceed the field strength levels specified in the following table and the level of any unwanted emissions shall not exceed the level of the fundamental emission. The tighter limit applies at the band edges.

Test Result:

Radiated Emission Plot



Test Data

Frequency (MHz)	Quasi Peak (dBuV/m)	Azimuth	Polarity(H/V)	Height (cm)	Factors (dB)	Limit (dBuV/m)	Margin (dB)
38.23	26.74	79.00	V	99.00	-28.85	40.00	-13.26
39.91	27.77	0.00	V	119.00	-30.13	40.00	-12.23
51.92	24.86	340.00	V	130.00	-36.60	40.00	-15.14
420.06	18.99	359.00	V	130.00	-29.26	46.00	-27.01
839.99	21.13	232.00	V	99.00	-19.68	46.00	-24.87
600.03	39.64	178.00	H	192.00	-25.02	46.00	-6.36

5.8 Radiated Spurious Emissions > 1GHz (WIFI)

1. All possible modes of operation were investigated. Only the 6 worst case emissions measured, using the correct CISPR detectors, are reported. All other emissions were relatively insignificant.
2. A "-ve" margin indicates a PASS as it refers to the margin present below the limit line at the particular frequency.
3. Radiated Emissions Measurement Uncertainty
   All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2, in the range 30MHz – 1GHz & 1GHz above (3m & 10m) is +/-6dB.
4. Environmental Conditions

Temperature	16°C
Relative Humidity	50%
Atmospheric Pressure	1019mbar

5. Test date : Jun 10~28 2010
   Tested By : Alex Wang

Standard Requirement: The emissions from the Low-power radio-frequency devices shall not exceed the field strength levels specified in the following table and the level of any unwanted emissions shall not exceed the level of the fundamental emission. The tighter limit applies at the band edges.

Test Result:

Mode: 802.11b

@ 2412MHz @ 3 Meter

Frequency	Direction	Height	Polar	Cable loss	Amplifier	Corrected Reading	15.247/15.209	15.247/15.209	
GHz	Degree	Meter	H / V	(dB)	(dB)	(dBuV/m)	Limit (dBuV/m)	Margin	Comments
4.824	9.00	1.07	v	5.15	55.00	55.4	74.00	-18.6	Peak
4.824	12.00	1.10	h	5.15	55.00	51.8	74.00	-22.2	Peak
4.824	9.00	1.07	v	5.15	55.00	42.6	54.00	-11.4	Ave
4.824	12.00	1.10	h	5.15	55.00	40.6	54.00	-13.4	Ave
7.236	5.30	1.12	v	7.23	55.00	65.6	74.00	-8.4	Peak
7.236	6.11	1.15	h	7.23	55.00	63.7	74.00	-10.3	Peak
7.236	5.30	1.12	v	7.23	55.00	49.5	54.00	-4.5	Ave
7.236	6.11	1.15	h	7.23	55.00	47.9	54.00	-6.1	Ave
9.678	31.0	1.26	v	8.56	55.00	55.1	74.00	-18.9	Peak
9.678	3.0	1.34	h	8.56	55.00	54.3	74.00	-19.7	Peak
9.678	31.0	1.26	v	8.56	55.00	44.3	54.00	-9.7	Ave
9.678	3.0	1.34	h	8.56	55.00	43.2	54.00	-10.8	Ave
12.06	0	1.06	v	11.03	55.00	51.1	74.00	-22.9	Peak
12.06	12.0	1.24	h	11.03	55.00	50.7	74.00	-23.3	Peak
12.06	0	1.06	v	11.03	55.00	42.2	54.00	-11.8	Ave
12.06	12.0	1.24	h	11.03	55.00	40.6	54.00	-13.4	Ave

Emission was scanned up to 25GHz.

@ 2437MHz @ 3Meter

Frequency	Direction	Height	Polar	Cable loss	Amplifier	Corrected Reading	15.247/15.209	15.247/15.209	
GHz	Degree	Meter	H / V	(dB)	(dB)	(dBuV/m)	Limit (dBuV/m)	Margin	Comments
4.874	31.00	1.10	v	5.16	55.00	56.5	74.00	-17.6	Peak
4.874	25.00	1.00	h	5.16	55.00	53.1	74.00	-20.9	Peak
4.874	31.00	1.10	v	5.16	55.00	44.9	54.00	-9.1	Ave
4.874	25.00	1.00	h	5.16	55.00	43.6	54.00	-10.4	Ave
7.311	13.00	1.20	v	7.31	55.00	68.1	74.00	-5.9	Peak
7.311	4.00	1.03	h	7.31	55.00	66.4	74.00	-7.6	Peak
7.311	13.00	1.20	v	7.31	55.00	50.5	54.00	-3.5	Ave
7.311	4.00	1.03	h	7.31	55.00	50.1	54.00	-3.9	Ave
9.748	22.0	1.30	v	8.66	55.00	57.6	74.00	-16.4	Peak
9.748	7.0	1.00	h	8.66	55.00	56.0	74.00	-18.0	Peak
9.748	22.0	1.30	v	8.66	55.00	44.3	54.00	-9.7	Ave
9.748	7.0	1.00	h	8.66	55.00	45.2	54.00	-8.8	Ave
12.185	0	1.20	v	11.22	55.00	52.0	74.00	-22.0	Peak
12.185	0	1.08	h	11.22	55.00	51.4	74.00	-22.6	Peak
12.185	0	1.20	v	11.22	55.00	43.1	54.00	-10.9	Ave
12.185	0	1.08	h	11.22	55.00	40.7	54.00	-13.3	Ave

Emission was scanned up to 25GHz.

@ 2462MHz @ 3Meter

Frequency	Direction	Height	Polar	Cable loss	Amplifier	Corrected Reading	15.247/15.209	15.247/15.209	
GHz	Degree	Meter	H / V	(dB)	(dB)	(dBuV/m)	Limit (dBuV/m)	Margin	Comments
4.924	15.00	1.07	v	5.17	55.00	54.3	74.00	-19.7	Peak
4.924	25.00	1.10	h	5.17	55.00	53.1	74.00	-20.9	Peak
4.924	15.00	1.07	v	5.17	55.00	44.5	54.00	-9.5	Ave
4.924	25.00	1.10	h	5.17	55.00	42.6	54.00	-11.4	Ave
7.386	0	1.20	v	7.36	55.00	66.4	74.00	-7.6	Peak
7.386	3.00	1.00	h	7.36	55.00	64.4	74.00	-9.6	Peak
7.386	0	1.20	v	7.36	55.00	48.9	54.00	-5.1	Ave
7.386	3.00	1.00	h	7.36	55.00	48.2	54.00	-5.8	Ave
9.848	6.00	1.10	v	8.74	55.00	55.3	74.00	-18.7	Peak
9.848	21.00	1.08	h	8.74	55.00	54.8	74.00	-19.2	Peak
9.848	6.00	1.10	v	8.74	55.00	43.3	54.00	-10.7	Ave
9.848	21.00	1.08	h	8.74	55.00	45.2	54.00	-8.8	Ave
12.31	4.00	1.34	v	11.39	55.00	51.0	74.00	-23.0	Peak
12.31	9.00	1.27	h	11.39	55.00	50.5	74.00	-23.5	Peak
12.31	4.00	1.34	v	11.39	55.00	42.7	54.00	-11.3	Ave
12.31	9.00	1.27	h	11.39	55.00	40.3	54.00	-13.7	Ave

Emission was scanned up to 25GHz.

Mode: 802.11g

@ 2412MHz @ 3 Meter

Frequency	Direction	Height	Polar	Cable loss	Amplifier	Corrected Reading	15.247/15.209	15.247/15.209	
GHz	Degree	Meter	H / V	(dB)	(dB)	(dBuV/m)	Limit (dBuV/m)	Margin	Comments
4.824	9.00	1.07	v	5.15	55.00	54.7	74.00	-19.3	Peak
4.824	12.00	1.10	h	5.15	55.00	51.6	74.00	-22.4	Peak
4.824	9.00	1.07	v	5.15	55.00	41.4	54.00	-12.6	Ave
4.824	12.00	1.10	h	5.15	55.00	40.0	54.00	-14.0	Ave
7.236	5.30	1.12	v	7.23	55.00	64.2	74.00	-9.8	Peak
7.236	6.11	1.15	h	7.23	55.00	62.8	74.00	-11.2	Peak
7.236	5.30	1.12	v	7.23	55.00	48.1	54.00	-5.9	Ave
7.236	6.11	1.15	h	7.23	55.00	47.4	54.00	-6.6	Ave
9.678	31.0	1.26	v	8.56	55.00	54.6	74.00	-19.4	Peak
9.678	3.0	1.34	h	8.56	55.00	53.5	74.00	-20.5	Peak
9.678	31.0	1.26	v	8.56	55.00	42.8	54.00	-11.2	Ave
9.678	3.0	1.34	h	8.56	55.00	41.9	54.00	-12.1	Ave
12.06	0	1.06	v	11.03	55.00	50.9	74.00	-23.1	Peak
12.06	12.0	1.24	h	11.03	55.00	49.7	74.00	-24.3	Peak
12.06	0	1.06	v	11.03	55.00	41.8	54.00	-12.2	Ave
12.06	12.0	1.24	h	11.03	55.00	40.4	54.00	-13.6	Ave

Emission was scanned up to 25GHz.

@ 2437MHz @ 3Meter

Frequency	Direction	Height	Polar	Cable loss	Amplifier	Corrected Reading	15.247/15.209	15.247/15.209	
GHz	Degree	Meter	H / V	(dB)	(dB)	(dBuV/m)	Limit (dBuV/m)	Margin	Comments
4.874	31.00	1.10	v	5.16	55.00	54.6	74.00	-19.4	Peak
4.874	25.00	1.00	h	5.16	55.00	52.2	74.00	-21.8	Peak
4.874	31.00	1.10	v	5.16	55.00	43.5	54.00	-10.5	Ave
4.874	25.00	1.00	h	5.16	55.00	42.6	54.00	-11.4	Ave
7.311	13.00	1.20	v	7.31	55.00	64.7	74.00	-9.3	Peak
7.311	4.00	1.03	h	7.31	55.00	63.1	74.00	-10.9	Peak
7.311	13.00	1.20	v	7.31	55.00	48.2	54.00	-5.8	Ave
7.311	4.00	1.03	h	7.31	55.00	47.6	54.00	-6.4	Ave
9.748	22.0	1.30	v	8.66	55.00	55.1	74.00	-18.9	Peak
9.748	7.0	1.00	h	8.66	55.00	53.2	74.00	-20.8	Peak
9.748	22.0	1.30	v	8.66	55.00	41.3	54.00	-12.7	Ave
9.748	7.0	1.00	h	8.66	55.00	43.6	54.00	-10.4	Ave
12.185	0	1.20	v	11.22	55.00	50.5	74.00	-23.5	Peak
12.185	0	1.08	h	11.22	55.00	50.9	74.00	-23.1	Peak
12.185	0	1.20	v	11.22	55.00	42.1	54.00	-11.9	Ave
12.185	0	1.08	h	11.22	55.00	40.8	54.00	-13.2	Ave

Emission was scanned up to 25GHz.

@ 2462MHz @ 3Meter

Frequency	Direction	Height	Polar	Cable loss	Amplifier	Corrected Reading	15.247/15.209	15.247/15.209	
GHz	Degree	Meter	H / V	(dB)	(dB)	(dBuV/m)	Limit (dBuV/m)	Margin	Comments
4.924	15.00	1.07	v	5.17	55.00	51.9	74.00	-22.1	Peak
4.924	25.00	1.10	h	5.17	55.00	52.8	74.00	-21.2	Peak
4.924	15.00	1.07	v	5.17	55.00	45.6	54.00	-8.4	Ave
4.924	25.00	1.10	h	5.17	55.00	43.1	54.00	-10.9	Ave
7.386	0	1.20	v	7.36	55.00	63.6	74.00	-10.4	Peak
7.386	3.00	1.00	h	7.36	55.00	62.0	74.00	-12.0	Peak
7.386	0	1.20	v	7.36	55.00	47.7	54.00	-6.3	Ave
7.386	3.00	1.00	h	7.36	55.00	46.4	54.00	-7.6	Ave
9.848	6.00	1.10	v	8.74	55.00	54.3	74.00	-19.7	Peak
9.848	21.00	1.08	h	8.74	55.00	52.8	74.00	-21.2	Peak
9.848	6.00	1.10	v	8.74	55.00	41.5	54.00	-12.5	Ave
9.848	21.00	1.08	h	8.74	55.00	43.1	54.00	-10.9	Ave
12.31	4.00	1.34	v	11.39	55.00	50.3	74.00	-23.7	Peak
12.31	9.00	1.27	h	11.39	55.00	49.6	74.00	-24.4	Peak
12.31	4.00	1.34	v	11.39	55.00	42.7	54.00	-11.3	Ave
12.31	9.00	1.27	h	11.39	55.00	41.7	54.00	-12.3	Ave

Emission was scanned up to 25GHz.

BandEdge Test Result (802.11b)

Frequency (GHz)	Reading (dBuV/m)	Direction (degree)	Height (m)	Polarity (H/V)	Antenna Loss (dB)	Cable Loss (dB)	Amplifier (dB)	Corrected Reading (dBuV/m)	15.247/15.209 Limit @ 3m (dBuV/m)	Margin (dBuV/m)	Detector (pk/avg)
2.400	73.33	0.00	100.00	H	27.50	2.50	32.04	71.29	74.00	-2.72	Peak
2.400	55.25	0.00	100.00	H	27.50	2.50	32.04	53.21	54.00	-0.79	Ave
2.400	75.60	171.00	100.00	V	27.50	2.50	32.04	73.56	74.00	-0.44	Peak
2.400	54.90	171.00	100.00	V	27.50	2.50	32.04	52.86	54.00	-1.14	Ave
2.483.5	62.01	7.00	100.00	H	27.50	2.50	32.04	59.97	74.00	-14.03	Peak
2.483.5	48.58	7.00	100.00	H	27.50	2.50	32.04	46.54	54.00	-7.46	Ave
2.483.5	73.94	169.00	112.00	V	27.50	2.50	32.04	71.90	74.00	-2.10	Peak
2.483.5	54.86	169.00	112.00	V	27.50	2.50	32.04	52.82	54.00	-1.18	Ave

BandEdge Test Result (802.11G)

Frequency (GHz)	Reading (dBuV/m)	Direction (degree)	Height (m)	Polarity (H/V)	Antenna Loss (dB)	Cable Loss (dB)	Amplifier (dB)	Corrected Reading (dBuV/m)	15.247/15.209 Limit @ 3m (dBuV/m)	Margin (dBuV/m)	Detector (pk/avg)
2.400	73.07	359.00	127.00	H	27.50	2.50	32.04	71.03	74.00	-2.97	Peak
2.400	55.40	359.00	127.00	H	27.50	2.50	32.04	53.36	54.00	-0.64	Ave
2.400	70.09	352.00	103.00	V	27.50	2.50	32.04	68.05	74.00	-5.95	Peak
2.400	53.57	352.00	103.00	V	27.50	2.50	32.04	51.53	54.00	-2.47	Ave
2.483.5	73.61	357.00	141.00	H	27.50	2.50	32.04	71.57	74.00	-2.43	Peak
2.483.5	55.50	357.00	141.00	H	27.50	2.50	32.04	53.46	54.00	-0.54	Ave
2.483.5	61.64	133.00	100.00	V	27.50	2.50	32.04	59.60	74.00	-14.40	Peak
2.483.5	48.65	133.00	100.00	V	27.50	2.50	32.04	46.61	54.00	-7.39	Ave

5.9 Radiated Spurious Emissions > 1GHz (Bluetooth)

1. All possible modes of operation were investigated. Only the 6 worst case emissions measured, using the correct CISPR detectors, are reported. All other emissions were relatively insignificant.
2. A "-ve" margin indicates a PASS as it refers to the margin present below the limit line at the particular frequency.
3. Radiated Emissions Measurement Uncertainty
   All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2, in the range 30MHz – 1GHz & 1GHz above (3m & 10m) is +/-6dB.
4. Environmental Conditions

Temperature	16°C
Relative Humidity	50%
Atmospheric Pressure	1019mbar

5. Test date : Jun 10~28 2010
   Tested By : Alex Wang

Standard Requirement: Part 15.249

Test Result:

Fundamental

Low channel

Frequency	Direction	Height	Polar	Cable loss	Amplifier	Corrected Reading		
GHz	Degree	Meter	H / V	(dB)	(dB)	(dBuV/m)	Limit (dBuV/m)	Margin
2.402	111.00	1.37	v	5.15	55.00	80.61	94.00	-13.39
2.402	113.00	2.10	h	5.15	55.00	82.11	94.00	-11.89

Middle channel

Frequency	Direction	Height	Polar	Cable loss	Amplifier	Corrected Reading		
GHz	Degree	Meter	H / V	(dB)	(dB)	(dBuV/m)	Limit (dBuV/m)	Margin
2.441	109.00	1.50	v	5.15	55.00	76.66	94.00	-17.34
2.441	106.00	2.10	h	5.15	55.00	81.52	94.00	-12.48

High channel

Frequency	Direction	Height	Polar	Cable loss	Amplifier	Corrected Reading		
GHz	Degree	Meter	H / V	(dB)	(dB)	(dBuV/m)	Limit (dBuV/m)	Margin
2.480	120.00	1.50	v	5.15	55.00	78.59	94.00	-15.41
2.480	133.00	2.30	h	5.15	55.00	80.32	94.00	-13.68

- **Peak value is lower than Average limit , so averaging measure was not measured.**

@ 2402MHz @ 3 Meter

Frequency	Direction	Height	Polar	Cable loss	Amplifier	Corrected Reading	15.247/15.209	15.247/15.209	
GHz	Degree	Meter	H / V	(dB)	(dB)	(dBuV/m)	Limit (dBuV/m)	Margin	Comments
4.804	9.00	1.07	v	5.15	55.00	54.7	74.00	-19.3	Peak
4.804	12.00	1.10	h	5.15	55.00	51.6	74.00	-22.4	Peak
4.804	9.00	1.07	v	5.15	55.00	41.4	54.00	-12.6	Ave
4.804	12.00	1.10	h	5.15	55.00	40.0	54.00	-14.0	Ave
7.206	5.30	1.12	v	7.23	55.00	64.2	74.00	-9.8	Peak
7.206	6.11	1.15	h	7.23	55.00	62.8	74.00	-11.2	Peak
7.206	5.30	1.12	v	7.23	55.00	48.1	54.00	-5.9	Ave
7.206	6.11	1.15	h	7.23	55.00	47.4	54.00	-6.6	Ave

Emission was scanned up to 25GHz.

@ 2441MHz @ 3Meter

Frequency	Direction	Height	Polar	Cable loss	Amplifier	Corrected Reading	15.247/15.209	15.247/15.209	
GHz	Degree	Meter	H / V	(dB)	(dB)	(dBuV/m)	Limit (dBuV/m)	Margin	Comments
4.882	31.00	1.10	v	5.16	55.00	53.5	74.00	-20.5	Peak
4.882	25.00	1.00	h	5.16	55.00	52.0	74.00	-22.0	Peak
4.882	31.00	1.10	v	5.16	55.00	44.9	54.00	-9.1	Ave
4.882	25.00	1.00	h	5.16	55.00	43.1	54.00	-10.9	Ave
7.323	13.00	1.20	v	7.31	55.00	65.6	74.00	-8.4	Peak
7.323	4.00	1.03	h	7.31	55.00	63.4	74.00	-10.6	Peak
7.323	13.00	1.20	v	7.31	55.00	49.6	54.00	-4.4	Ave
7.323	4.00	1.03	h	7.31	55.00	48.3	54.00	-5.7	Ave

Emission was scanned up to 25GHz.

@ 2480MHz @ 3Meter

Frequency	Direction	Height	Polar	Cable loss	Amplifier	Corrected Reading	15.247/15.209	15.247/15.209	
GHz	Degree	Meter	H / V	(dB)	(dB)	(dBuV/m)	Limit (dBuV/m)	Margin	Comments
4.960	15.00	1.07	v	5.17	55.00	55.8	74.00	-18.2	Peak
4.960	25.00	1.10	h	5.17	55.00	54.3	74.00	-19.7	Peak
4.960	15.00	1.07	v	5.17	55.00	46.4	54.00	-7.6	Ave
4.960	25.00	1.10	h	5.17	55.00	44.3	54.00	-9.7	Ave
7.440	0	1.20	v	7.36	55.00	64.8	74.00	-9.2	Peak
7.440	3.00	1.00	h	7.36	55.00	63.1	74.00	-10.9	Peak
7.440	0	1.20	v	7.36	55.00	48.2	54.00	-5.8	Ave
7.440	3.00	1.00	h	7.36	55.00	47.0	54.00	-7.0	Ave

Emission was scanned up to 25GHz.

Annex A. TEST INSTRUMENT & METHOD

Annex A.i. TEST INSTRUMENTATION & GENERAL PROCEDURES

Instrument	Manufacturer	Model	CAL Due Date
Spectrum Analyzer	HP	8564 E	2011.04.26
EMI Receiver	Rohde & Schwarz	ESPI 3	2011.02.19
Antenna (30MHz~2GHz)	Sunol Sciences	JB1	2010.10.04
Horn Antenna (1~18GHz)	A-INFOMW	JXTXLB-10180	2010.11.18
Horn Antenna (1~18GHz)	N/A	N/A	2011.10.04
Pre-Amplifier(0.01 ~ 1.3GHz)	HP	8447F	2011.04.24
Pre-Amplifier(0.1 ~ 18GHz)	MITEQ	AMF-7D-00101800-30-10P	2011.03.05
Horn Antenna (18~40GHz)	Com Power	AH-840	2011.05.21
Microwave Pre-Amp (18~40GHz)	Com Power	PA-840	2011.05.21
CHASE LISN	Chase	MN2050B	05/18/2011

Annex A.ii. CONDUCTED EMISSIONS TEST DESCRIPTION

Test Set-up

1. 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, as shown in Annex B.

2. The power supply for the EUT was fed through a 50Ω/50μH EUT LISN, connected to filtered mains.

3. The RF OUT of the EUT LISN was connected to the EMI test receiver via a low-loss coaxial cable.

4. All other supporting equipments were powered separately from another main supply.

Test Method

1. The EUT was switched on and allowed to warm up to its normal operating condition.

2. A scan was made on the NEUTRAL line (for AC mains) or Earth line (for DC power) over the required frequency range using an EMI test receiver.

3. High peaks, relative to the limit line, were then selected.

4. The EMI test receiver was then tuned to the selected frequencies and the necessary measurements made with a receiver bandwidth setting of 10 KHz. For FCC tests, only Quasi-peak measurements were made; while for CISPR/EN tests, both Quasi-peak and Average measurements were made.

5. Steps 2 to 4 were then repeated for the LIVE line (for AC mains) or DC line (for DC power).

Sample Calculation Example

At 20 MHz limit = 250 μV = 47.96 dBμV

Transducer factor of LISN, pulse limiter & cable loss at 20 MHz = 11.20 dB

Q-P reading obtained directly from EMI Receiver = 40.00 dBμV
(Calibrated for system losses)

Therefore, Q-P margin = 47.96 – 40.00 = 7.96 i.e. **7.96 dB below limit**

Annex A. iii RADIATED EMISSIONS TEST DESCRIPTION

EUT Characterisation

EUT characterisation, over the frequency range from 30MHz to 10th Harmonic , was done in order to minimise radiated emissions testing time while still maintaining high confidence in the test results.

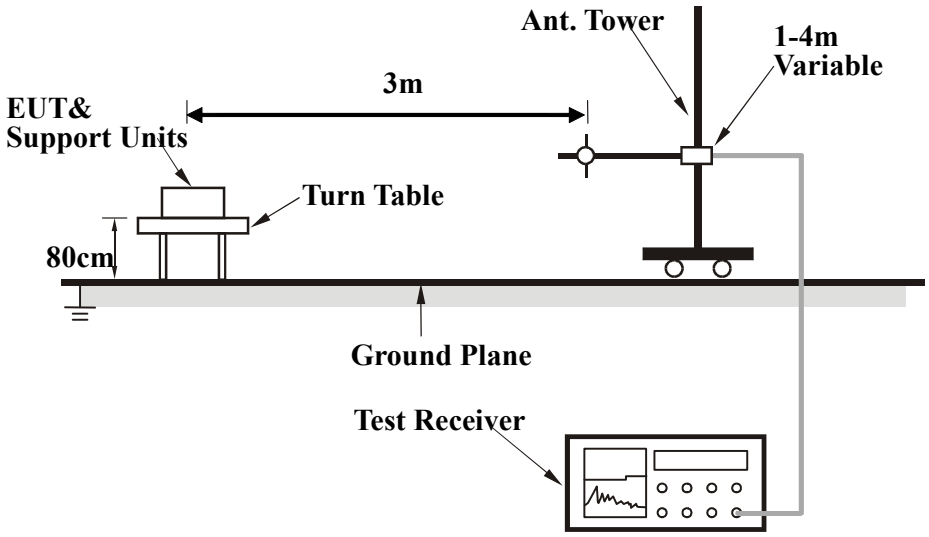
The EUT was placed in the chamber, at a height of about 0.8m on a turntable. Its radiated emissions frequency profile was observed, using a spectrum analyzer /receiver with the appropriate broadband antenna placed 3m away from the EUT. Radiated emissions from the EUT were maximised by rotating the turntable manually, changing the antenna polarisation and manipulating the EUT cables while observing the frequency profile on the spectrum analyzer / receiver. Frequency points at which maximum emissions occurred, clock frequencies and operating frequencies were then noted for the formal radiated emissions test at the Open Area Test Site (OATS).

Test Set-up

1. The EUT and supporting equipment were set up in accordance with the requirements of the standard on top of a 1.5m X 1.0m X 0.8m high, non-metallic table.

2. The filtered power supply for the EUT and supporting equipment were tapped from the appropriate power sockets located on the turntable.

3. The relevant broadband antenna was set at the required test distance away from the EUT and supporting equipment boundary.



Test Method

The following procedure was performed to determine the maximum emission axis of EUT:
1. With the receiving antenna is H polarization, rotate the EUT in turns with three orthogonal axes to determine the axis of maximum emission.
2. With the receiving antenna is V polarization, rotate the EUT in turns with three orthogonal axes to determine the axis of maximum emission.
3. Compare the results derived from above two steps. So, the axis of maximum emission from EUT was determined and the configuration was used to perform the final measurement.

Final Radiated Emission Measurement
1. Setup the configuration according to figure 1. Turn on EUT and make sure that it is in normal function.

2. For emission frequencies measured below 1 GHz, a pre-scan is performed in a shielded chamber to determine the accurate frequencies of higher emissions will be checked on a open test site. As the same purpose, for emission frequencies measured above 1 GHz, a pre-scan also be performed with a 1 meter measuring distance before final test.

3. For emission frequencies measured below and above 1 GHz, set the spectrum analyzer on a 100 kHz and 1 MHz resolution bandwidth respectively for each frequency measured in step 2.

4. The search antenna is to be raised and lowered over a range from 1 to 4 meters in horizontally polarized orientation. Position the highness when the highest value is indicated on spectrum analyzer, then change the orientation of EUT on test table over a range from 0 ◦ to 360 ◦ with a speed as slow as possible, and keep the azimuth that highest emission is indicated on the spectrum analyzer. Vary the antenna position again and record the highest value as a final reading.

5. Repeat step 4 until all frequencies need to be measured were complete.

6. Repeat step 5 with search antenna in vertical polarized orientations.

During the radiated emission test, the Spectrum Analyzer was set with the following configurations:

Frequency Band (MHz)	Function	Resolution bandwidth	Video Bandwidth
30 to 1000	Peak	100 kHz	100 kHz
Above 1000	Peak	1 MHz	1 MHz
	Average	1 MHz	10 Hz

Sample Calculation Example

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. For the limit is employed average value, therefore the peak value can be transferred to average value by subtracting the duty factor. The basic equation with a sample calculation is as follows:

Peak = Reading + Corrected Factor

where
Corr. Factor = Antenna Factor + Cable Factor - Amplifier Gain (if any)
And the average value is

Average = Peak Value + Duty Factor or
Set RBW = 1MHz, VBW = 10Hz.

Note :
If the measured frequencies are fall in the restricted frequency band, the limit employed must be quasi peak value when frequencies are below or equal to 1 GHz. And the measuring instrument is set to quasi peak detector function.

Annex B. EUT AND TEST SETUP PHOTOGRAPHS

Annex B.i. Photograph : EUT Photo

See separate attachment

Annex B.ii Photograph 4: Test Setup Photo

See separate attachment

Annex C. TEST SETUP AND SUPPORTING EQUIPMENT

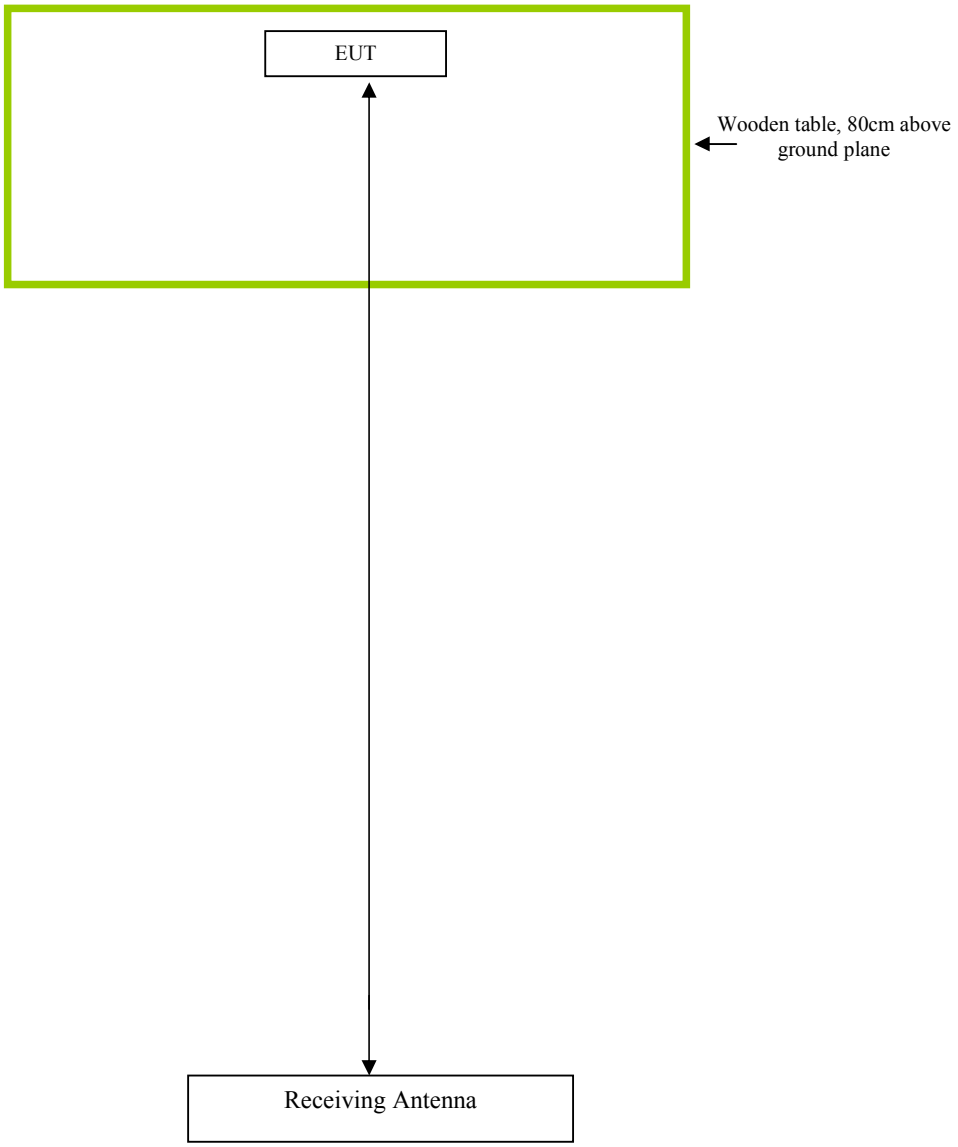
EUT TEST CONDITIONS

Annex C. i. SUPPORTING EQUIPMENT DESCRIPTION

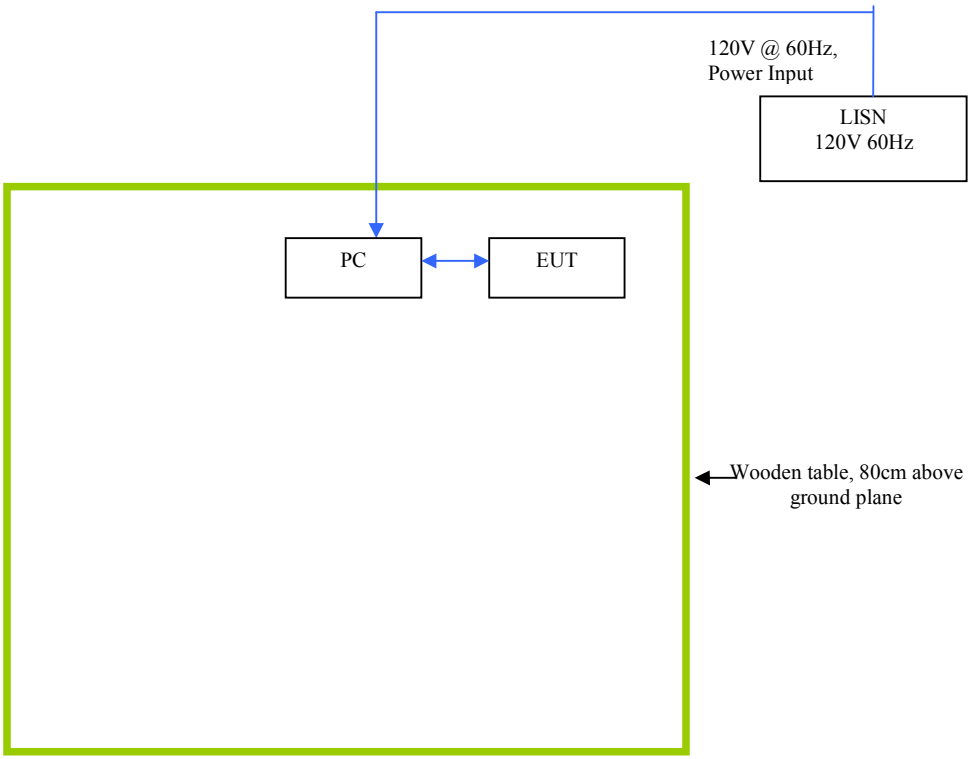
The following is a description of supporting equipment and details of cables used with the EUT.

Equipment Description (Including Brand Name)	Model & Serial Number	Cable Description (List Length, Type & Purpose)
PC	Gateway	1.5m shield cable

Block Configuration Diagram for Radiated Emission



Block Configuration Diagram for Conducted Emission



Annex C.ii. EUT OPERATING CONDITIONS

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

Test	Description Of Operation
Emissions	The EUT was continuously transmitting to stimulate the worst case.

Annex D. USER MANUAL / BLOCK DIAGRAM / SCHEMATICS / PART LIST

Please see attachment

Annex E. SIEMIC ACCREDITATION CERTIFICATES

SIEMIC ACCREDITATION DETAILS: FCC Registration NO:986914

FEDERAL COMMUNICATIONS COMMISSION
Laboratory Division
7435 Oakland Mills Road
Columbia, MD 21046

April 25, 2008

Registration Number: 986914

SIEMIC Nanjing (China) Laboratories
2-1 Longcang Avenue,
Yuhua Economic and Technology Development Park,
Nanjing, 210039
China

Attention: Leslie Bai

Re: Measurement facility located at 2-1 Longcang Avenue, Nanjing, China
Anechoic chamber (3 meters) and 3&10 meter OATS
Date of Listing: April 25, 2008

Dear Sir or Madam:

Your request for registration of the subject measurement facility has been reviewed and found to be in compliance with the requirements of Section 2.948 of the FCC rules. The information has, therefore, been placed on file and the name of your organization added to the list of facilities whose measurement data will be accepted in conjunction with applications for Certification under Parts 15 or 18 of the Commission's Rules. Please note that the file must be updated for any changes made to the facility and the registration must be renewed at least every three years.

Measurement facilities that have indicated that they are available to the public to perform measurement services on a fee basis may be found on the FCC website www.fcc.gov under E-Filing, OET Equipment Authorization Electronic Filing, Test Firms.

Sincerely,

Katie Hawkins
Electronics Engineer