



Test Report

Product Name	802.11n, 2.4G 1T1R Wireless LAN USB Module
Model No	WN4608R
FCC ID.	MDZLTRT5370-WL

Applicant	Amtran Technology Co Ltd
Address	17F, No. 268, Lien Chen Rd. Chung Ho City, Taipei County, Taiwan 235

Date of Receipt	Nov. 03, 2011
Issue Date	Nov. 14, 2011
Report No.	11B163R-RFUSP42V01-A
Report Version	V0.1-Draft

The test results relate only to the samples tested.

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This report must not be used to claim product endorsement by NVLAP any agency of the U.S. Government


Test Report Certification

Issue Date: Nov. 14, 2011

Report No.: 11B163R-RFUSP42V01-A



Accredited by NIST (NVLAP)
 NVLAP Lab Code: 200533-0

Product Name	802.11n, 2.4G 1T1R Wireless LAN USB Module	
Applicant	Amtran Technology Co Ltd	
Address	17F, No. 268, Lien Chen Rd. Chung Ho City, Taipei County, Taiwan 235	
Manufacturer	DONG GUAN G-COM COMPUTER CO., LTD	
Model No.	WN4608R	
EUT Rated Voltage	DC 3.3V	
EUT Test Voltage	DC 3.3V	
Trade Name	AmTRAN	
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2010 ANSI C63.4: 2009	 NVLAP Lab Code: 200533-0
Test Result	Complied	

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Attachment 1: EUT Test Photographs

Attachment 2: EUT Detailed Photographs

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	802.11n, 2.4G 1T1R Wireless LAN USB Module
Trade Name	AmTRAN
Model No.	WN4608R
FCC ID.	MDZLTRT5370-WL
Frequency Range	2412-2462MHz for 802.11b/g/n-20BW, 2422-2452MHz for 802.11n-40BW
Number of Channels	802.11b/g/n-20MHz: 11, n-40MHz: 7
Data Speed	802.11b: 1-11Mbps, 802.11g: 6-54Mbps, 802.11n: up to 150Mbps
Type of Modulation	802.11b:DSSS (DBPSK, DQPSK, CCK) 802.11g/n:OFDM (BPSK, QPSK, 16QAM, 64QAM)
Antenna Type	PIFA
Antenna Gain	Refer to the table "Antenna List"
Channel Control	Auto

Antenna List

No.	Manufacturer	Part No.	Peak Gain
1	MAGLAYERS	MSA-3414-25GC4-A1-B160MM-RF	3.97 dBi in 2.4GHz

Note:

1. The antenna of EUT is conforming to FCC 15.203.

802.11b/g/n-20MHz Center Frequency of Each Channel:

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 01:	2412 MHz	Channel 02:	2417 MHz	Channel 03:	2422 MHz	Channel 04:	2427 MHz
Channel 05:	2432 MHz	Channel 06:	2437 MHz	Channel 07:	2442 MHz	Channel 08:	2447 MHz
Channel 09:	2452 MHz	Channel 10:	2457 MHz	Channel 11:	2462 MHz		

802.11n-40MHz Center Frequency of Each Channel:

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 01:	2422 MHz	Channel 02:	2427 MHz	Channel 03:	2432 MHz	Channel 04:	2437 MHz
Channel 05:	2442 MHz	Channel 06:	2447 MHz	Channel 07:	2452 MHz		

Note:

1. The EUT is an 802.11n, 2.4G 1T1R Wireless LAN USB Module.
2. There are two different EUT output power for with metal reflector antenna and without metal reflector antenna, this report for with metal reflector antenna.
3. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
4. Lowest and highest data rates are tested in each mode. Only worst case is shown in the report. (802.11b is 1Mbps 、 802.11g is 6Mbps 、 802.11n(20M-BW) is 7.2Mbps and 、 802.11n(40M-BW) is 15Mbps)
5. These tests are conducted on a sample for the purpose of demonstrating compliance of 802.11b/g/n transmitter with Part 15 Subpart C Paragraph 15.247 of spread spectrum devices.

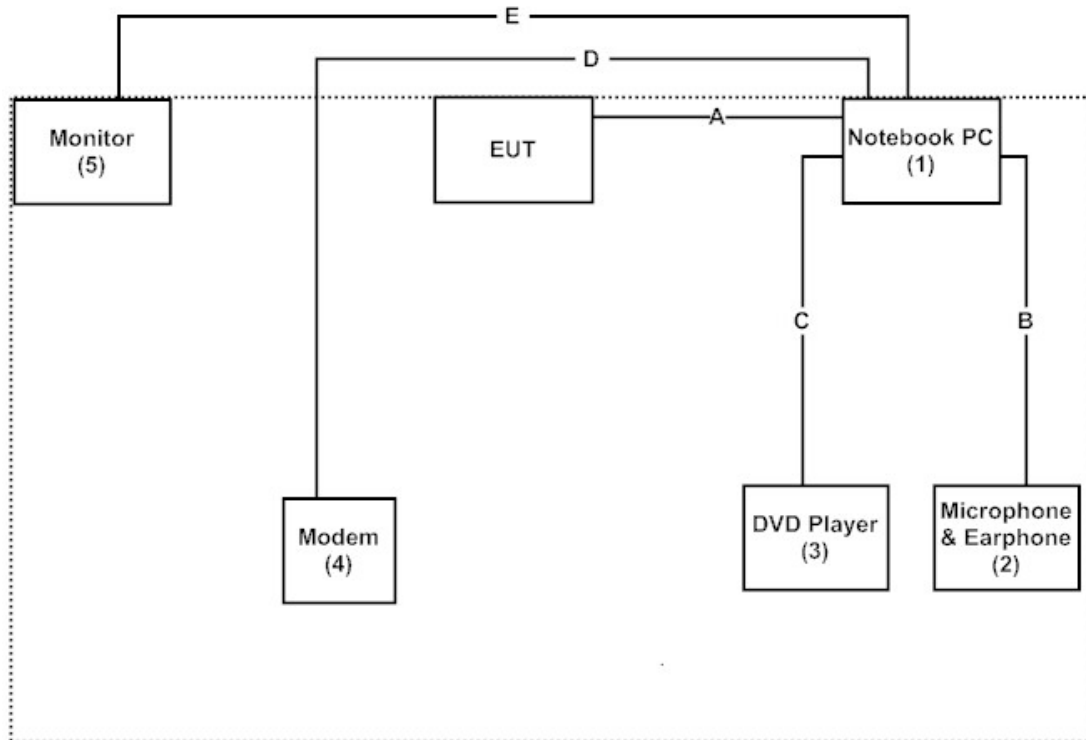
1.3. Tested System Details

For all types of equipment and additional descriptions of all cables, which are used in the tested system (including inserted cards) and listing in below:

Product	Manufacturer	Model No.	Serial No.	Power Cord	
1	Notebook PC	DELL	PPT	N/A	Non-Shielded, 0.8m
2	Microphone & Earphone	PCHOME	N/A	N/A	N/A
3	DVD Player	DELL	PD01S	N/A	N/A
4	Modem	ACEEX	DM-1414	0102027537	Non-Shielded, 1.8m
5	Monitor	LG	W2261VT	907YHZK07373	Non-Shielded, 1.8m

Signal Cable Type	Signal cable Description
A	USB Cable Non-Shielded, 0.2m
B	Microphone & Earphone Cable Non-Shielded, 2.0m
C	USB Cable Non-Shielded, 0.3m
D	Modem Cable Non-Shielded, 1.5m
E	VGA Cable Shielded, 1.6m, with one ferrite core bonded.

1.4. Configuration of Tested System



1.5. EUT Exercise Software

- (1) Setup the EUT as shown on 1.4.
- (2) Execute software (QARt5x7x ver.1.0.4.8) on the Notebook.
- (3) Setup the test mode, the test channel and the data rate.
- (4) Start the continuous transmission.
- (5) Repeat the above procedure (3) to (4).

1.6. Test Facility

Ambient conditions in the laboratory:

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	20-35
Humidity (%RH)	25-75	50-65
Barometric pressure (mbar)	860-1060	950-1000

The related certificate for our laboratories about the test site and management system can be downloaded from

Quietek Corporation's Web Site : <http://www.quietek.com/tw/ctg/cts/accreditations.htm>

The address and introduction of Quietek Corporation's laboratories can be founded in our Web site : <http://www.quietek.com/>

Site Description: File on
 Federal Communications Commission
 FCC Engineering Laboratory
 7435 Oakland Mills Road
 Columbia, MD 21046
 Registration Number: 92195



Accreditation on NVLAP
 NVLAP Lab Code: 200533-0



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FCC Accreditation Number: TW1014



2. Conducted Emission

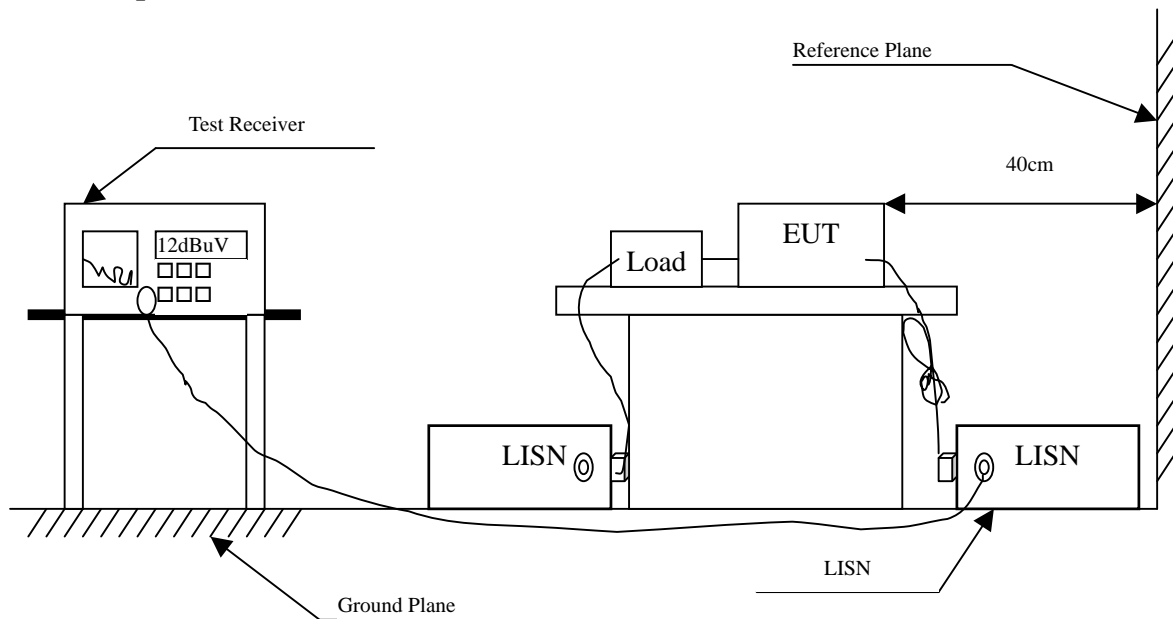
2.1. Test Equipment

The following test equipment are used during the conducted emission test:

Item	Instrument	Manufacturer	Type No./Serial No	Last Cal.	Remark
1	Test Receiver	R & S	ESCS 30/825442/17	May, 2011	
2	L.I.S.N.	R & S	ESH3-Z5/825016/6	May, 2011	EUT
3	L.I.S.N.	Kyoritsu	KNW-407/8-1420-3	May, 2011	Peripherals
4	Pulse Limiter	R & S	ESH3-Z2	May, 2011	
5	No.1 Shielded Room			N/A	

Note: All instruments are calibrated every one year.

2.2. Test Setup



2.3. Limits

FCC Part 15 Subpart C Paragraph 15.207 (dBuV) Limit		
Frequency MHz	Limits	
	QP	AVG
0.15 - 0.50	66-56	56-46
0.50-5.0	56	46
5.0 - 30	60	50

2.4. Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm /50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2009 on conducted measurement.

Conducted emissions were invested over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

2.5. Uncertainty

± 2.26 dB

2.6. Test Result of Conducted Emission

Product : 802.11n, 2.4G 1T1R Wireless LAN USB Module
 Test Item : Conducted Emission Test
 Power Line : Line 1
 Test Mode : Mode 4: Transmit - 802.11n-40BW_15Mbps(2.4G Band) (2437MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV	Margin dB	Limit dBuV
Line 1					
Quasi-Peak					
0.166	9.720	38.340	48.060	-17.483	65.543
0.193	9.701	36.640	46.341	-18.430	64.771
0.287	9.654	31.240	40.894	-21.192	62.086
0.392	9.650	24.400	34.050	-25.036	59.086
0.505	9.650	23.780	33.430	-22.570	56.000
0.732	9.665	23.520	33.185	-22.815	56.000
Average					
0.166	9.720	26.210	35.930	-19.613	55.543
0.193	9.701	17.510	27.211	-27.560	54.771
0.287	9.654	29.840	39.494	-12.592	52.086
0.392	9.650	6.260	15.910	-33.176	49.086
0.505	9.650	9.480	19.130	-26.870	46.000
0.732	9.665	16.390	26.055	-19.945	46.000

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. "■" means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : 802.11n, 2.4G 1T1R Wireless LAN USB Module
 Test Item : Conducted Emission Test
 Power Line : Line 2
 Test Mode : Mode 4: Transmit - 802.11n-40BW_15Mbps(2.4G Band) (2437MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV	Margin dB	Limit dBuV
Line 2					
Quasi-Peak					
0.181	9.709	35.040	44.749	-20.365	65.114
0.216	9.686	38.040	47.726	-16.388	64.114
0.240	9.670	31.620	41.290	-22.139	63.429
0.283	9.656	31.000	40.656	-21.544	62.200
0.345	9.650	26.080	35.730	-24.699	60.429
0.408	9.650	26.880	36.530	-22.099	58.629
Average					
0.181	9.709	21.930	31.639	-23.475	55.114
0.216	9.686	25.350	35.036	-19.078	54.114
0.240	9.670	12.000	21.670	-31.759	53.429
0.283	9.656	29.170	38.826	-13.374	52.200
0.345	9.650	14.910	24.560	-25.869	50.429
0.408	9.650	8.890	18.540	-30.089	48.629

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. "■" means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

3. Peak Power Output

3.1. Test Equipment

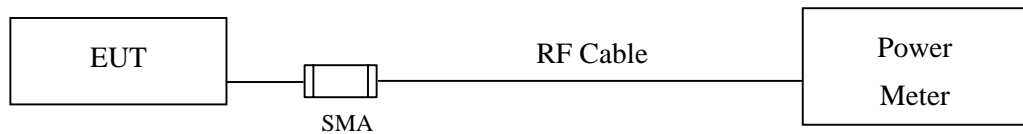
	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Power Meter	Anritsu	ML2495A/6K00003357	May, 2011
X	Power Sensor	Anritsu	MA2411B/0738448	Jun, 2011

Note:

1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
2. The test instruments marked with “X” are used to measure the final test results.

3.2. Test Setup

Conducted Measurement



3.3. Limits

The maximum peak power shall be less 1 Watt.

3.4. Test Procedure

The EUT was tested according to DTS test procedure of Mar. 2005 KDB558074 for compliance to FCC 47CFR 15.247 requirements.

3.5. Uncertainty

± 1.27 dB

3.6. Test Result of Peak Power Output

Product : 802.11n, 2.4G 1T1R Wireless LAN USB Module
 Test Item : Peak Power Output Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps)

Cable loss=0.5dB		Peak Power Output (dBm)					
Channel No.	Frequency (MHz)	Average Power For different Data Rate (Mbps)				Peak Power	Required Limit
		1	2	5.5	11		
1	2412.00	17.01	--	--	--	19.23	1Watt= 30 dBm
6	2437.00	17.08	17.07	17.05	17.02	19.30	1Watt= 30 dBm
11	2462.00	17.02	--	--	--	19.25	1Watt= 30 dBm

Note: Peak Power Output Value =Reading value on peak power meter + cable loss

Product : 802.11n, 2.4G 1T1R Wireless LAN USB Module
 Test Item : Peak Power Output Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11g 6Mbps)

Channel No	Frequency (MHz)	Peak Power Output (dBm)										
		Average Power								Peak Power	Required Limit	Result
		For different Data Rate (Mbps)										
6	9	12	18	24	36	48	54	6				
01	2412	14.05	--	--	--	--	--	--	--	24.14	<30dBm	Pass
06	2437	14.01	13.98	13.94	13.93	13.9	13.85	13.82	13.78	24.27	<30dBm	Pass
11	2462	14.04	--	--	--	--	--	--	--	24.36	<30dBm	Pass

Note: Peak Power Output Value = Reading value on peak power meter + cable loss

Product : 802.11n, 2.4G 1T1R Wireless LAN USB Module
 Test Item : Peak Power Output Data
 Test Site : No.3 OATS
 Test Mode : Mode 3: Transmit - 802.11n-20BW_7.2Mbps(2.4G Band)

Channel No	Frequency (MHz)	Peak Power Output (dBm)										Required Limit	Result
		Average Power									Peak Power		
		For different Data Rate (Mbps)											
7.2	14.4	21.7	28.9	43.3	57.8	65	72.2	7.2					
01	2412	13.85	--	--	--	--	--	--	--	23.92	<30dBm	Pass	
06	2437	13.85	13.82	13.81	13.8	13.77	13.74	13.72	13.69	24.02	<30dBm	Pass	
11	2462	13.7	--	--	--	--	--	--	--	23.92	<30dBm	Pass	

Note: Peak Power Output Value =Reading value on peak power meter + cable loss

Product : 802.11n, 2.4G 1T1R Wireless LAN USB Module
 Test Item : Peak Power Output Data
 Test Site : No.3 OATS
 Test Mode : Mode 4: Transmit - 802.11n-40BW_15Mbps(2.4G Band)

Channel No	Frequency (MHz)	Peak Power Output (dBm)										Required Limit	Result
		Average Power								Peak Power			
		For different Data Rate (Mbps)											
15	30	45	60	90	120	135	150	15					
03	2422	9.94	--	--	--	--	--	--	--	20.73	<30dBm	Pass	
06	2437	10.26	10.23	10.22	10.2	10.18	10.15	10.13	10.11	21.07	<30dBm	Pass	
09	2452	10.03	--	--	--	--	--	--	--	20.81	<30dBm	Pass	

Note: Peak Power Output Value =Reading value on peak power meter + cable loss

4. Radiated Emission

4.1. Test Equipment

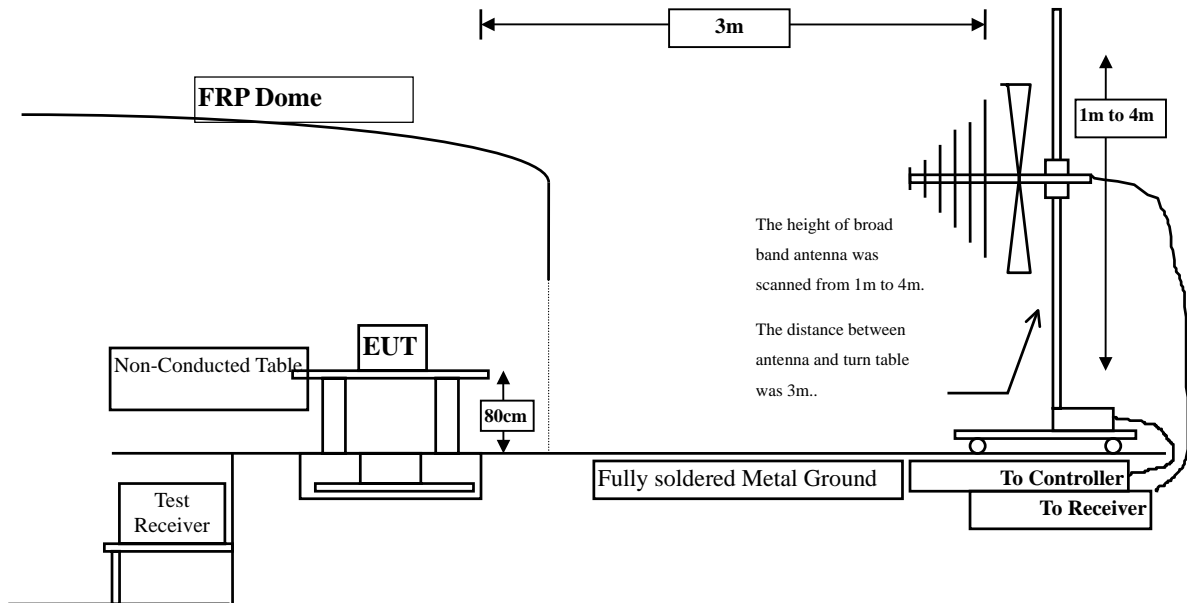
The following test equipment are used during the radiated emission test:

Test Site		Equipment	Manufacturer	Model No./Serial No.	Last Cal.
☒ Site # 3	X	Bilog Antenna	Schaffner Chase	CBL6112B/2673	Sep., 2011
	X	Horn Antenna	Schwarzbeck	BBHA9120D/D305	Sep., 2011
	X	Horn Antenna	Schwarzbeck	BBHA9170/208	Jul., 2011
	X	Pre-Amplifier	Agilent	8447D/2944A09549	Sep., 2011
	X	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2011
	X	Test Receiver	R & S	ESCS 30/ 825442/018	Sep., 2011
	X	Coaxial Cable	Quietek	QTK-CABLE/ CAB5	Feb., 2011
	X	Controller	Quietek	QTK-CONTROLLER/ CTRL3	N/A
	X	Coaxial Switch	Anritsu	MP59B/6200265729	N/A

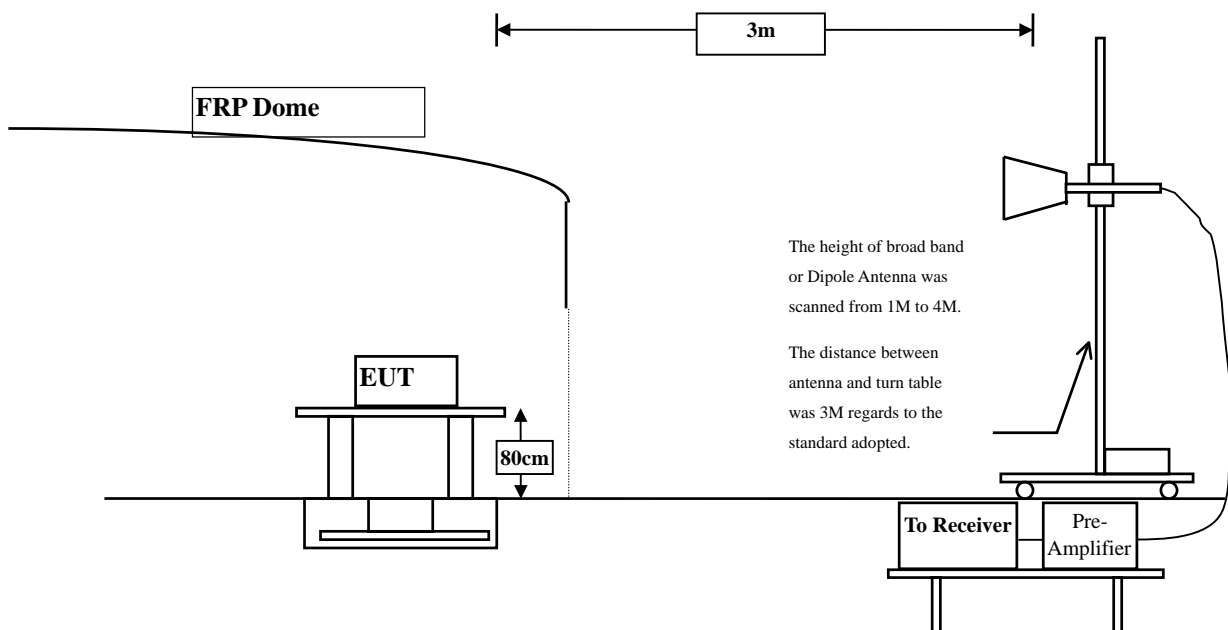
- Note:
1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
 2. The test instruments marked with "X" are used to measure the final test results.

4.2. Test Setup

Radiated Emission Below 1GHz



Radiated Emission Above 1GHz



4.3. Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

FCC Part 15 Subpart C Paragraph 15.209(a) Limits		
Frequency MHz	uV/m @3m	dBuV/m@3m
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

Remarks: E field strength (dBuV/m) = 20 log E field strength (uV/m)

4.4. Test Procedure

The EUT was setup according to ANSI C63.4: 2009 and tested according to DTS test procedure of Mar. 2005 KDB558074 for compliance to FCC 47CFR 15.247 requirements.

The EUT is placed on a turn table which is 0.8 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned between 1 meter and 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.4: 2009 on radiated measurement.

The resolution bandwidth below 1GHz setting on the field strength meter is 120 kHz and above 1GHz is 1MHz.

Radiated emission measurements below 1GHz are made using broadband Bilog antenna and above 1GHz are made using Horn Antennas.

The measurement is divided into the Preliminary Measurement and the Final Measurement.

The suspected frequencies are searched for in Preliminary Measurement with the measurement antenna kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. The antenna is pointed at an angle towards the source of the emission, and the EUT is rotated in both height and polarization to maximize the measured emission. The emission is kept within the illumination area of the 3 dB bandwidth of the antenna.

The worst radiated emission is measured in the Open Area Test Site on the Final Measurement.

The measurement frequency range from 30MHz - 10th Harmonic of fundamental was investigated.

4.5. Uncertainty

± 3.9 dB above 1GHz

± 3.8 dB below 1GHz

4.6. Test Result of Radiated Emission

Product : 802.11n, 2.4G 1T1R Wireless LAN USB Module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2412MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
4824.000	3.261	49.460	52.721	-21.279	74.000
7236.000	10.650	36.580	47.230	-26.770	74.000
9648.000	13.337	36.580	49.916	-24.084	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4824.000	6.421	49.790	56.211	-17.789	74.000
7236.000	11.495	36.510	48.005	-25.995	74.000
9648.000	13.807	37.470	51.276	-22.724	74.000
Average Detector:					
4824.000	6.421	46.390	52.811	-1.189	54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “◆”, means non-restricted bands, limit=fundamental level down 20dBc.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : 802.11n, 2.4G 1T1R Wireless LAN USB Module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2437 MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
4874.000	3.038	50.220	53.257	-20.743	74.000
7311.000	11.795	35.520	47.314	-26.686	74.000
9748.000	12.635	37.000	49.635	-24.365	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4874.000	5.812	50.380	56.191	-17.809	74.000
7311.000	12.630	35.260	47.889	-26.111	74.000
9748.000	13.126	36.520	49.646	-24.354	74.000
Average Detector:					
4874.000	5.812	47.170	52.981	-1.019	54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. "◆", means non-restricted bands, limit=fundamental level down 20dBc.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : 802.11n, 2.4G 1T1R Wireless LAN USB Module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2462 MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
4924.000	2.858	50.890	53.747	-20.253	74.000
7386.000	12.127	35.120	47.248	-26.752	74.000
9848.000	12.852	35.880	48.733	-25.267	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4924.000	5.521	51.290	56.810	-17.190	74.000
7386.000	13.254	35.460	48.714	-25.286	74.000
9848.000	13.367	36.320	49.687	-24.313	74.000
Average Detector:					
4924.000	5.521	47.300	52.820	-1.180	54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : 802.11n, 2.4G 1T1R Wireless LAN USB Module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2412MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
4824.000	3.261	47.340	50.601	-23.399	74.000
7236.000	10.650	36.820	47.470	-26.530	74.000
9648.000	13.337	37.080	50.416	-23.584	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4824.000	6.421	46.720	53.141	-20.859	74.000
7236.000	11.495	36.660	48.155	-25.845	74.000
9648.000	13.807	36.960	50.766	-23.234	74.000
Average Detector:					
--					

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : 802.11n, 2.4G 1T1R Wireless LAN USB Module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2437 MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
4874.000	3.038	46.680	49.717	-24.283	74.000
7311.000	11.795	36.110	47.904	-26.096	74.000
9748.000	12.635	37.310	49.945	-24.055	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4874.000	5.812	48.160	53.971	-20.029	74.000
7311.000	12.630	35.870	48.499	-25.501	74.000
9748.000	13.126	36.400	49.526	-24.474	74.000
Average Detector:					
--					

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : 802.11n, 2.4G 1T1R Wireless LAN USB Module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2462 MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
4924.000	2.858	48.350	51.207	-22.793	74.000
7386.000	12.127	35.390	47.518	-26.482	74.000
9848.000	12.852	36.110	48.963	-25.037	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4924.000	5.521	51.430	56.950	-17.050	74.000
7386.000	13.254	34.710	47.964	-26.036	74.000
9848.000	13.367	36.520	49.887	-24.113	74.000
Average Detector:					
4924.000	5.521	34.280	39.800	-14.200	54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : 802.11n, 2.4G 1T1R Wireless LAN USB Module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 3: Transmit - 802.11n-20BW_7.2Mbps(2.4G Band) (2412MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
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Horizontal
Peak Detector:

4824.000	3.261	47.330	50.591	-23.409	74.000
7236.000	10.650	36.530	47.180	-26.820	74.000
9648.000	13.337	37.150	50.486	-23.514	74.000

Average
Detector:

--

Vertical
Peak Detector:

4824.000	6.421	45.980	52.401	-21.599	74.000
7236.000	11.495	35.870	47.365	-26.635	74.000
9648.000	13.807	36.660	50.466	-23.534	74.000

Average
Detector:

--

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : 802.11n, 2.4G 1T1R Wireless LAN USB Module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 3: Transmit - 802.11n-20BW_7.2Mbps(2.4G Band) (2437 MHz)

Frequency MHz	Correct Factor dB	Reading Level dBUV	Measurement Level dBUV/m	Margin dB	Limit dBUV/m
Horizontal					
Peak Detector:					
4874.000	3.038	49.930	52.967	-21.033	74.000
7311.000	11.795	35.510	47.304	-26.696	74.000
9748.000	12.635	36.250	48.885	-25.115	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4874.000	5.812	49.710	55.521	-18.479	74.000
7311.000	12.630	35.180	47.809	-26.191	74.000
9748.000	13.126	36.730	49.856	-24.144	74.000
Average Detector:					
4874.000	5.812	31.930	37.741	-16.259	54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : 802.11n, 2.4G 1T1R Wireless LAN USB Module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 3: Transmit - 802.11n-20BW_7.2Mbps(2.4G Band) (2462 MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
4924.000	5.521	51.950	57.470	-16.530	74.000
7386.000	13.254	35.210	48.464	-25.536	74.000
9848.000	13.367	36.150	49.517	-24.483	74.000
Average Detector:					
4924.000	5.521	33.250	38.770	-15.230	54.000
Vertical					
Peak Detector:					
4924.000	5.521	50.210	55.730	-18.270	74.000
7386.000	13.254	35.090	48.344	-25.656	74.000
9848.000	13.367	36.170	49.537	-24.463	74.000
Average Detector:					
4924.000	5.521	30.780	36.300	-17.700	54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : 802.11n, 2.4G 1T1R Wireless LAN USB Module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 4: Transmit - 802.11n-40BW_15Mbps(2.4G Band) (2422MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
4844.000	3.171	39.340	42.511	-31.489	74.000
7266.000	11.162	36.080	47.242	-26.758	74.000
9688.000	12.964	36.410	49.375	-24.625	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4844.000	6.178	40.510	46.688	-27.312	74.000
7266.000	11.982	36.610	48.592	-25.408	74.000
9688.000	13.507	36.500	50.008	-23.992	74.000
Average Detector:					
--					

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : 802.11n, 2.4G 1T1R Wireless LAN USB Module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 4: Transmit - 802.11n-40BW_15Mbps(2.4G Band) (2437 MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
4874.000	3.038	40.000	43.037	-30.963	74.000
7311.000	11.795	36.100	47.894	-26.106	74.000
9748.000	12.635	36.700	49.335	-24.665	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4874.000	5.812	42.550	48.361	-25.639	74.000
7311.000	12.630	35.550	48.179	-25.821	74.000
9748.000	13.126	36.450	49.576	-24.424	74.000
Average Detector:					
--					

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : 802.11n, 2.4G 1T1R Wireless LAN USB Module
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 4: Transmit - 802.11n-40BW_15Mbps(2.4G Band) (2452 MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
4904.000	2.914	41.340	44.255	-29.745	74.000
7356.000	11.995	35.560	47.554	-26.446	74.000
9808.000	12.475	36.100	48.575	-25.425	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4904.000	5.530	44.800	50.331	-23.669	74.000
7356.000	13.005	34.930	47.934	-26.066	74.000
9808.000	12.901	36.600	49.501	-24.499	74.000
Average Detector:					
--					

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : 802.11n, 2.4G 1T1R Wireless LAN USB Module
 Test Item : General Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2437 MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
136.700	-10.363	46.572	36.209	-7.291	43.500
276.380	-5.783	43.593	37.810	-8.190	46.000
507.240	0.759	40.194	40.953	-5.047	46.000
666.320	2.031	36.644	38.676	-7.324	46.000
749.740	3.320	29.533	32.853	-13.147	46.000
937.920	6.406	25.089	31.495	-14.505	46.000
Vertical					
57.160	-4.403	37.315	32.912	-7.088	40.000
119.240	-3.541	39.553	36.012	-7.488	43.500
357.860	-3.734	42.109	38.375	-7.625	46.000
507.240	-0.471	40.408	39.937	-6.063	46.000
664.380	-1.918	36.762	34.844	-11.156	46.000
920.460	5.517	27.801	33.318	-12.682	46.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : 802.11n, 2.4G 1T1R Wireless LAN USB Module
 Test Item : General Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2437 MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
167.740	-10.799	49.423	38.624	-4.876	43.500
359.800	-1.680	42.689	41.009	-4.991	46.000
507.240	0.759	40.179	40.938	-5.062	46.000
666.320	2.031	38.948	40.980	-5.020	46.000
840.920	5.191	34.286	39.477	-6.523	46.000
951.500	6.641	33.237	39.878	-6.122	46.000
Vertical					
111.480	-0.954	38.991	38.037	-5.463	43.500
355.920	-3.488	41.580	38.092	-7.908	46.000
664.380	-1.918	38.221	36.303	-9.697	46.000
749.740	2.510	30.866	33.376	-12.624	46.000
840.920	2.961	33.200	36.161	-9.839	46.000
972.840	4.582	36.354	40.936	-13.064	54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : 802.11n, 2.4G 1T1R Wireless LAN USB Module
 Test Item : General Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 3: Transmit - 802.11n-20BW_7.2Mbps(2.4G Band) (2437 MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
134.760	-10.298	48.473	38.175	-5.325	43.500
295.780	-3.655	40.186	36.531	-9.469	46.000
386.960	-1.524	33.094	31.570	-14.430	46.000
507.240	0.759	41.314	42.073	-3.927	46.000
699.300	2.875	39.981	42.856	-3.144	46.000
840.920	5.191	36.780	41.971	-4.029	46.000
Vertical					
107.600	-0.318	38.813	38.495	-5.005	43.500
264.740	-7.681	46.155	38.474	-7.526	46.000
359.800	-3.810	43.108	39.298	-6.702	46.000
509.180	-0.158	32.789	32.631	-13.369	46.000
600.360	-2.833	38.069	35.236	-10.764	46.000
840.920	2.961	38.144	41.105	-4.895	46.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : 802.11n, 2.4G 1T1R Wireless LAN USB Module
 Test Item : General Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 4: Transmit - 802.11n-40BW_15Mbps(2.4G Band) (2437 MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
134.760	-10.298	48.790	38.492	-5.008	43.500
297.720	-3.633	38.835	35.203	-10.797	46.000
507.240	0.759	39.491	40.250	-5.750	46.000
699.300	2.875	37.417	40.292	-5.708	46.000
875.840	5.271	27.531	32.802	-13.198	46.000
949.560	6.695	30.184	36.879	-9.121	46.000
Vertical					
159.980	-6.185	41.072	34.887	-8.613	43.500
264.740	-7.681	46.203	38.522	-7.478	46.000
359.800	-3.810	41.045	37.235	-8.765	46.000
544.100	-0.688	29.947	29.259	-16.741	46.000
666.320	-1.809	34.834	33.026	-12.974	46.000
840.920	2.961	38.224	41.185	-4.815	46.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

5. RF antenna conducted test

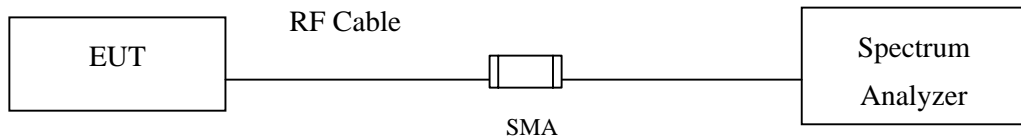
5.1. Test Equipment

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Spectrum Analyzer	R&S	FSP40 / 100170	Jun, 2011
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun, 2011
X	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2011

- Note:
1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
 2. The test instruments marked with “X” are used to measure the final test results.

5.2. Test Setup

RF antenna Conducted Measurement:



5.3. 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 intentional radiator 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, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

5.4. Test Procedure

The EUT was tested according to DTS test procedure of Mar. 2005 KDB558074 for compliance to FCC 47CFR 15.247 requirements.

Set RBW = 100 kHz, Set VBW > RBW, scan up through 10th harmonic.

5.5. Uncertainty

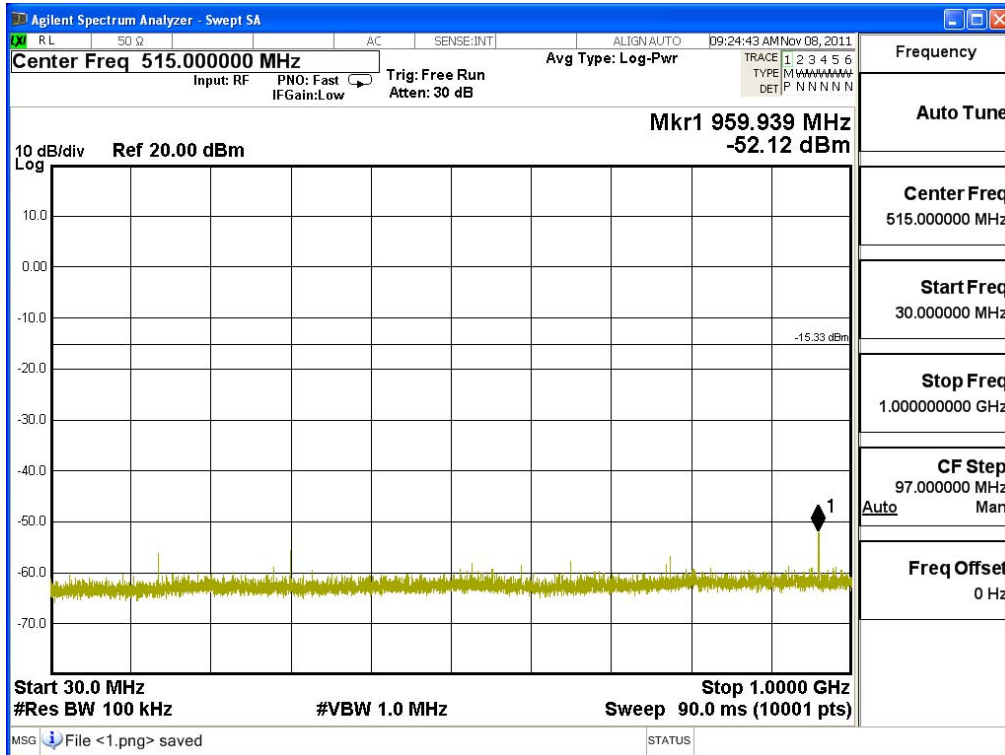
The measurement uncertainty

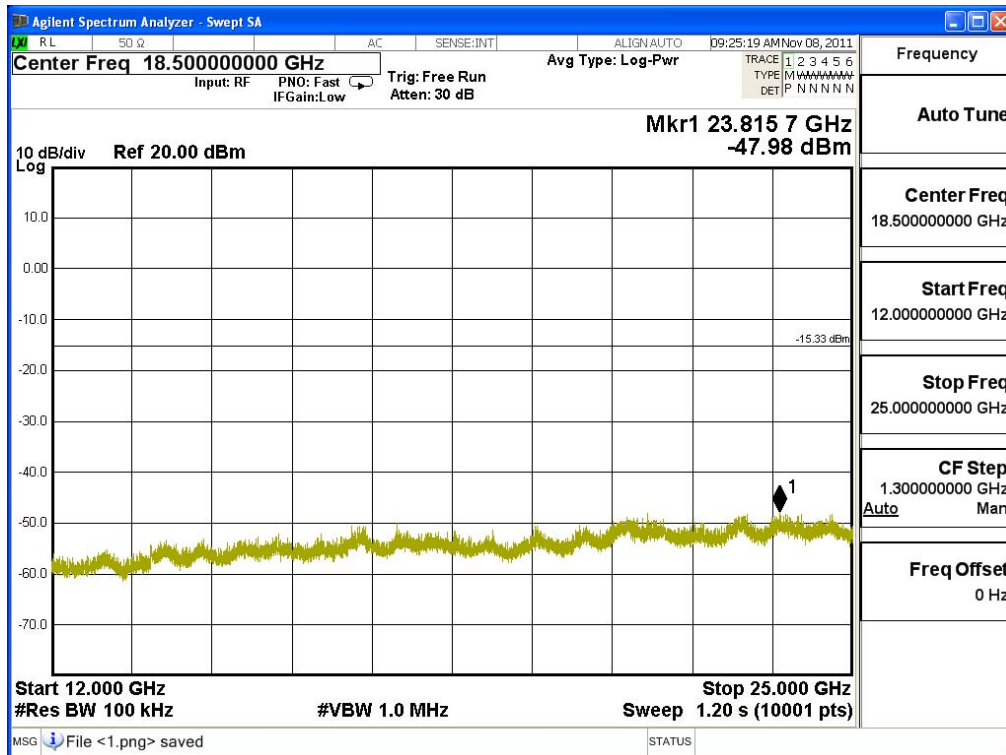
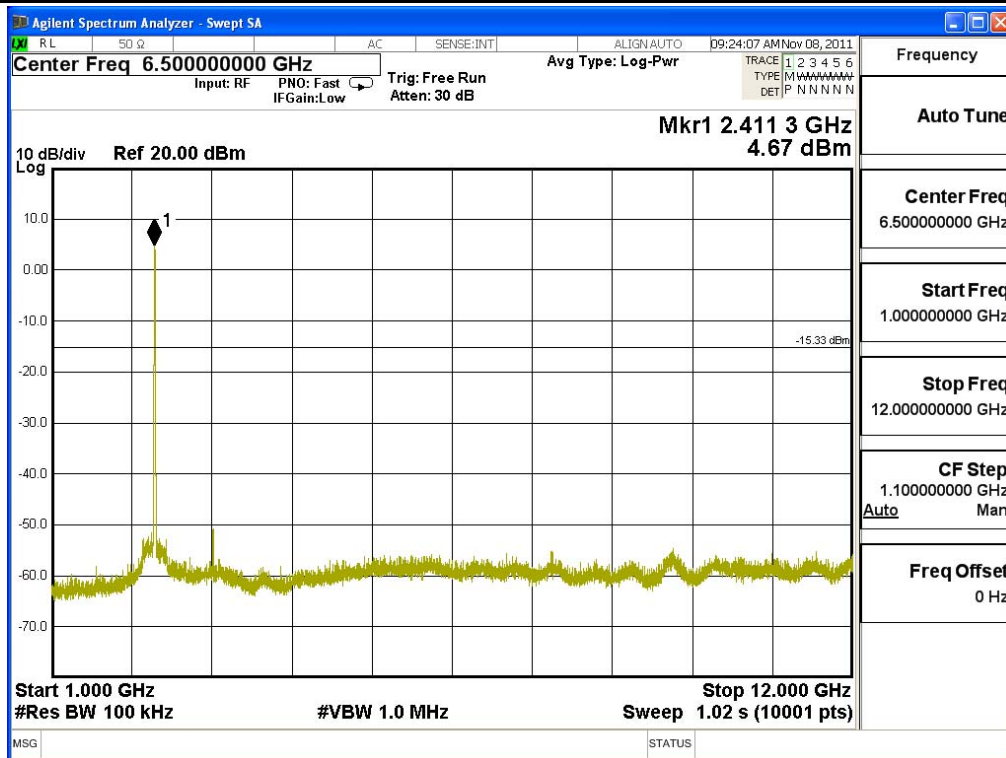
Conducted is defined as $\pm 1.27\text{dB}$

5.6. Test Result of RF antenna conducted test

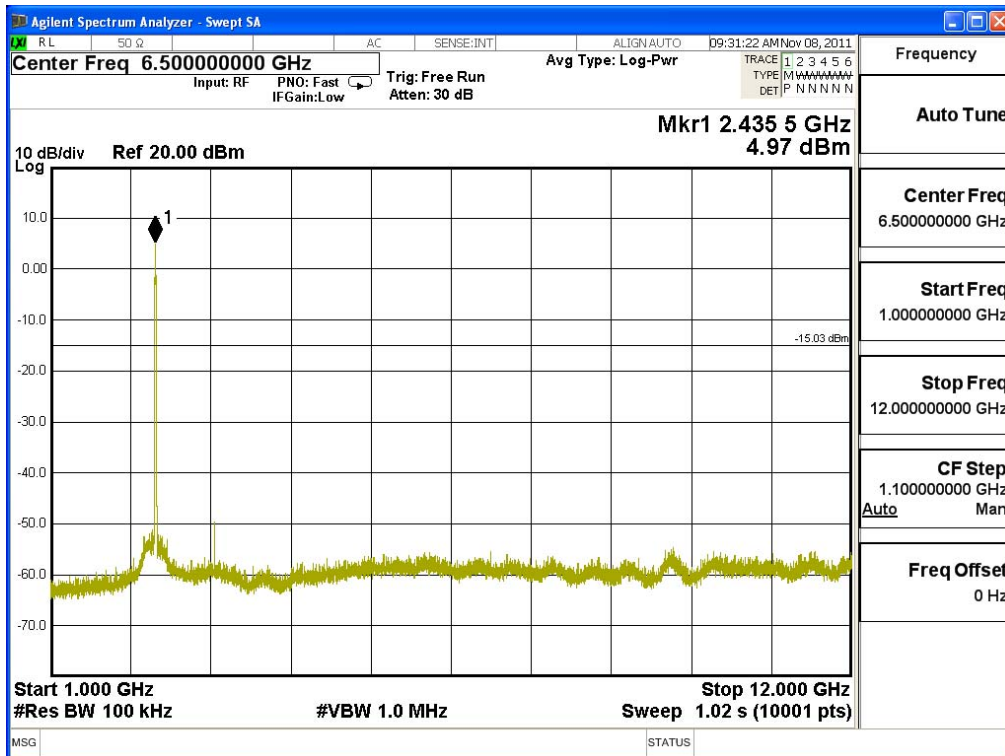
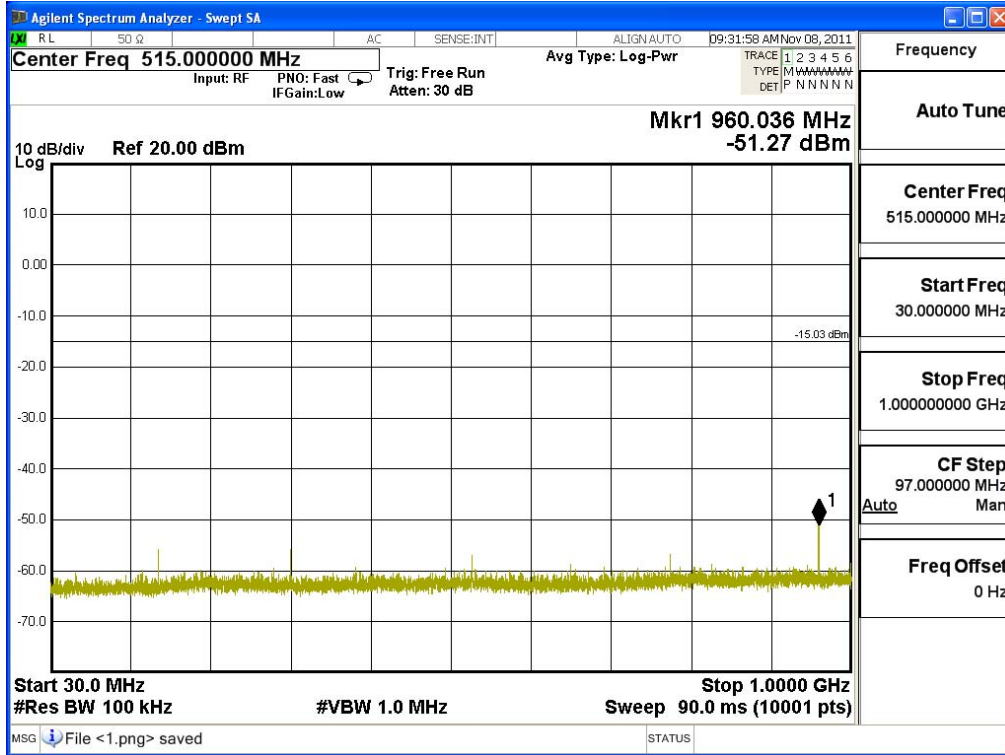
Product : 802.11n, 2.4G 1T1R Wireless LAN USB Module
 Test Item : RF antenna conducted test
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps)

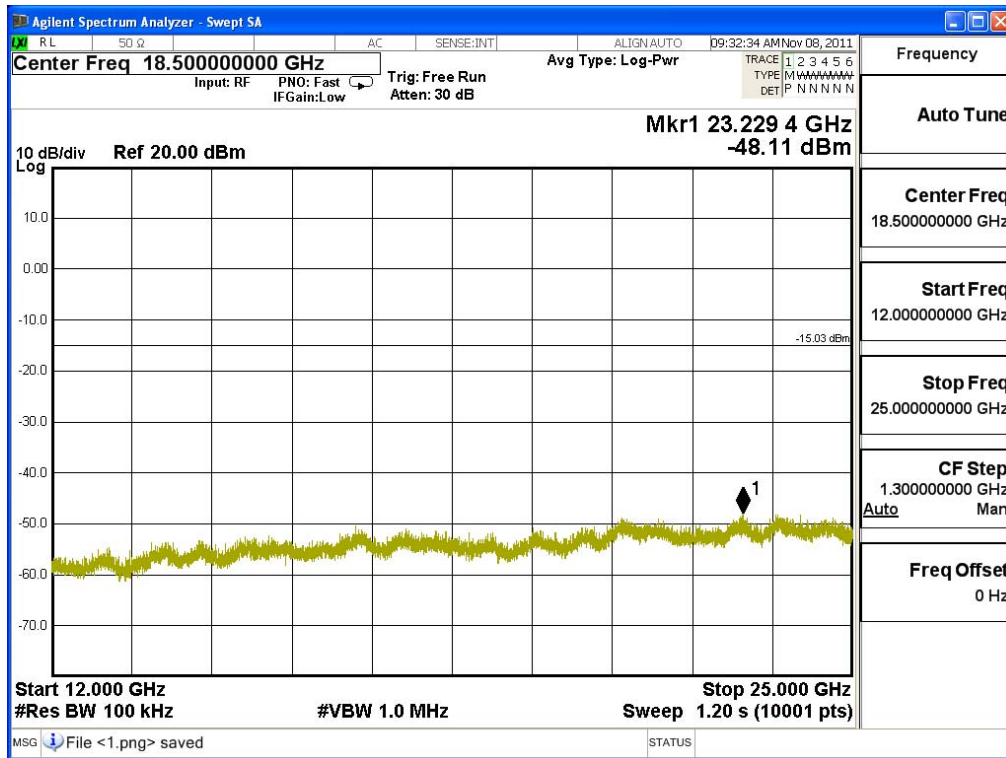
Channel 01 (2412MHz) 30MHz-25GHz



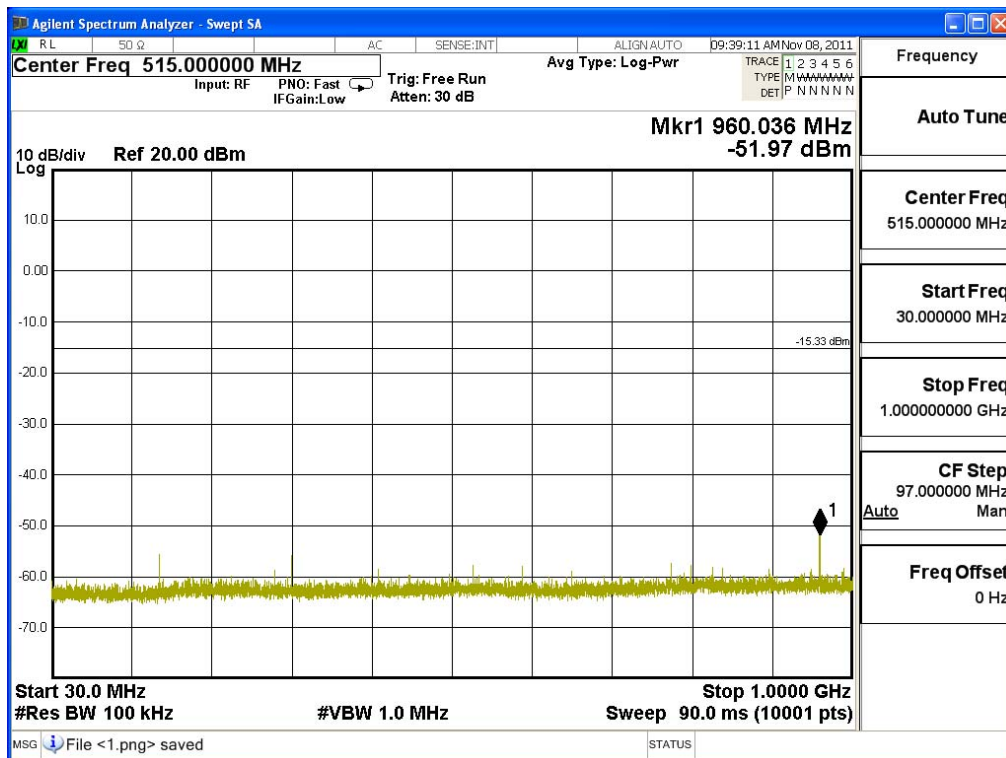


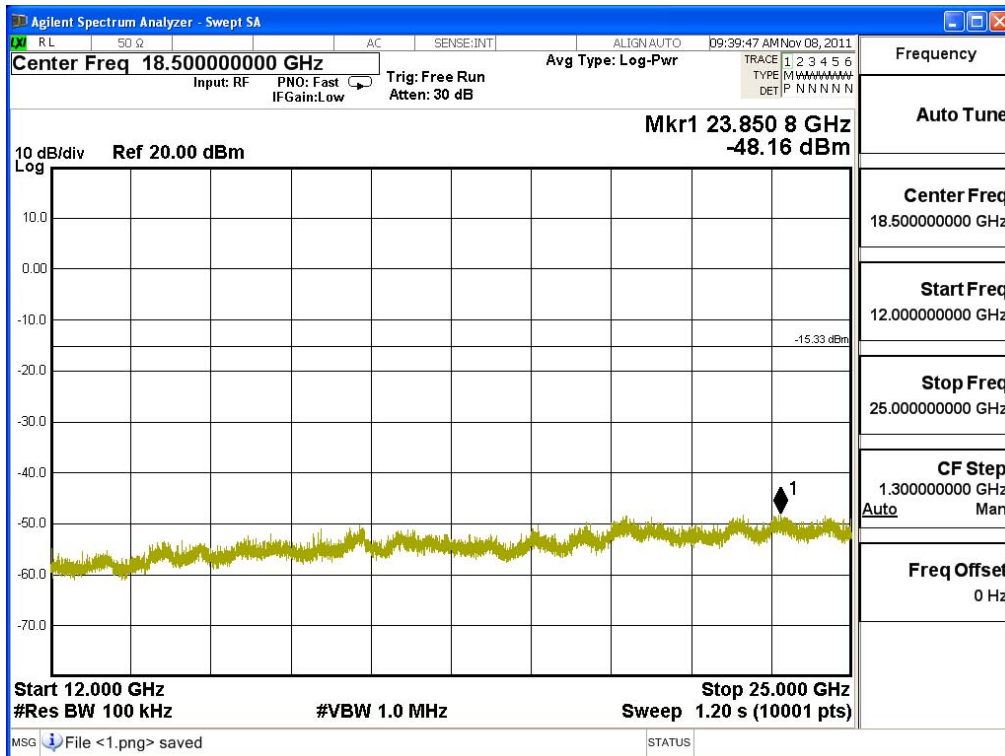
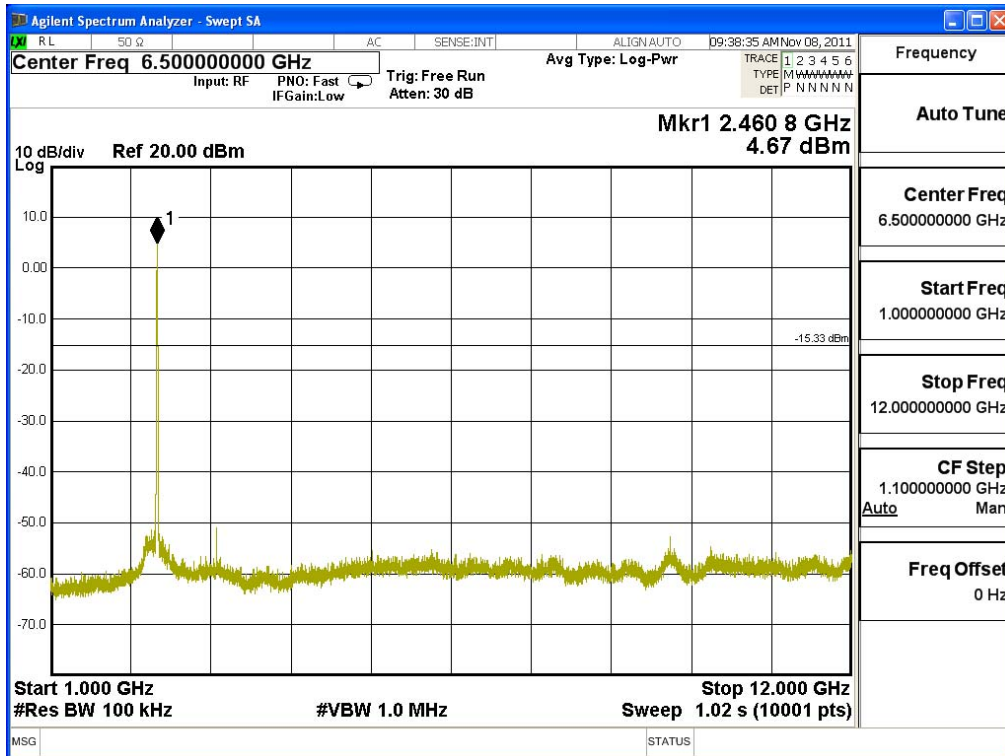
Channel 06 (2437MHz) 30MHz -25GHz





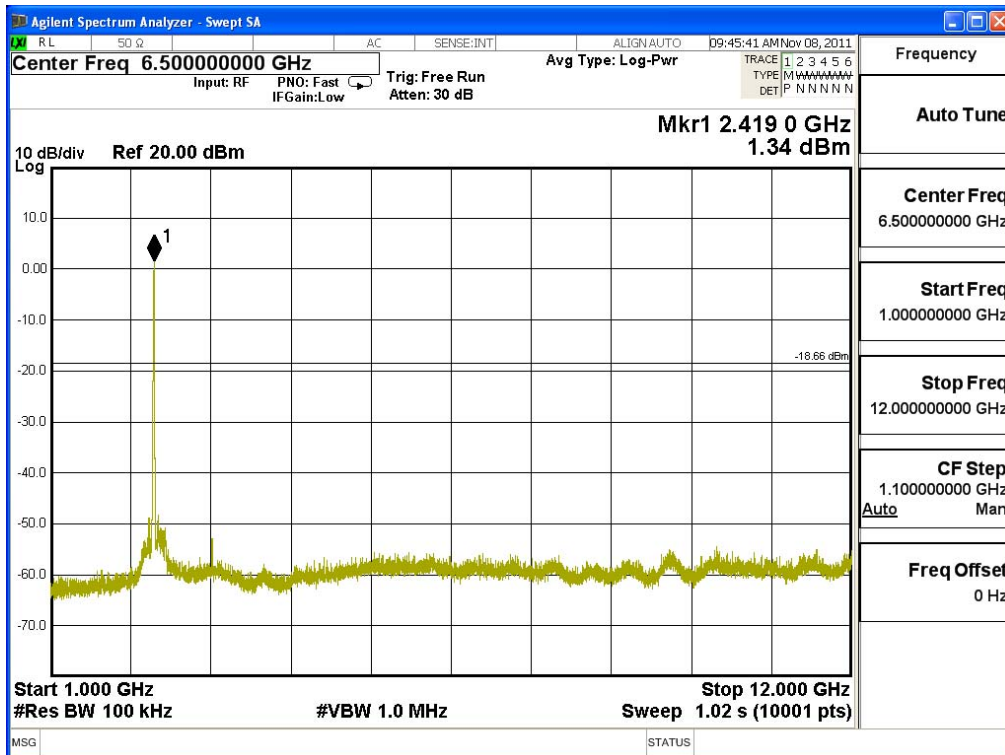
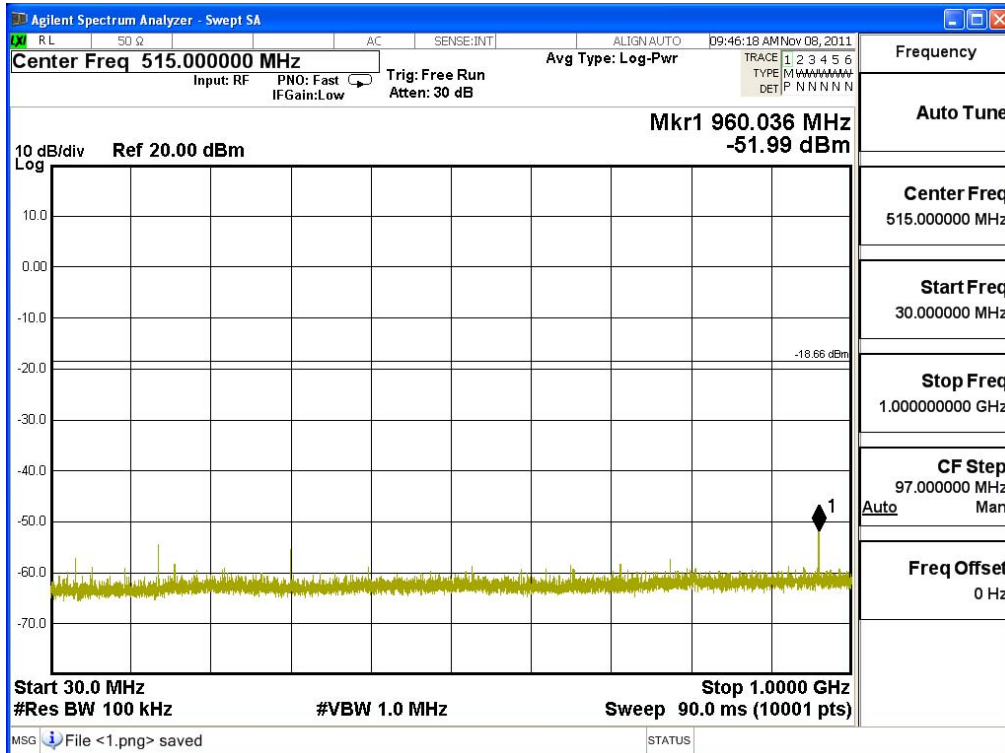
Channel 11 (2462MHz) 30MHz -25GHz

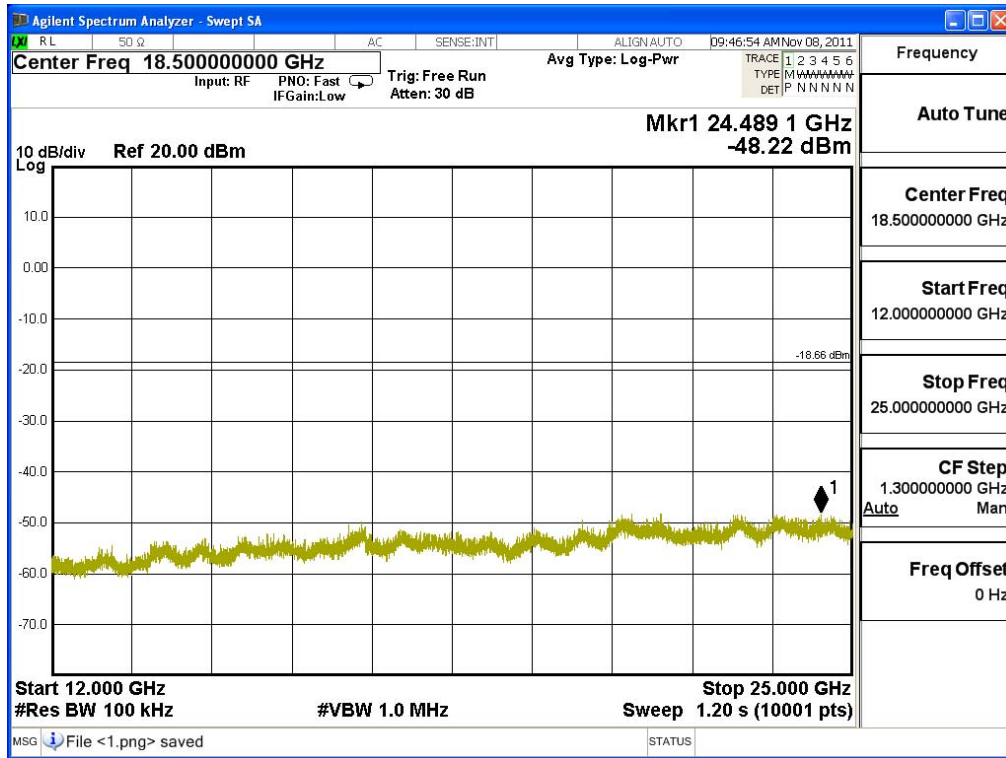




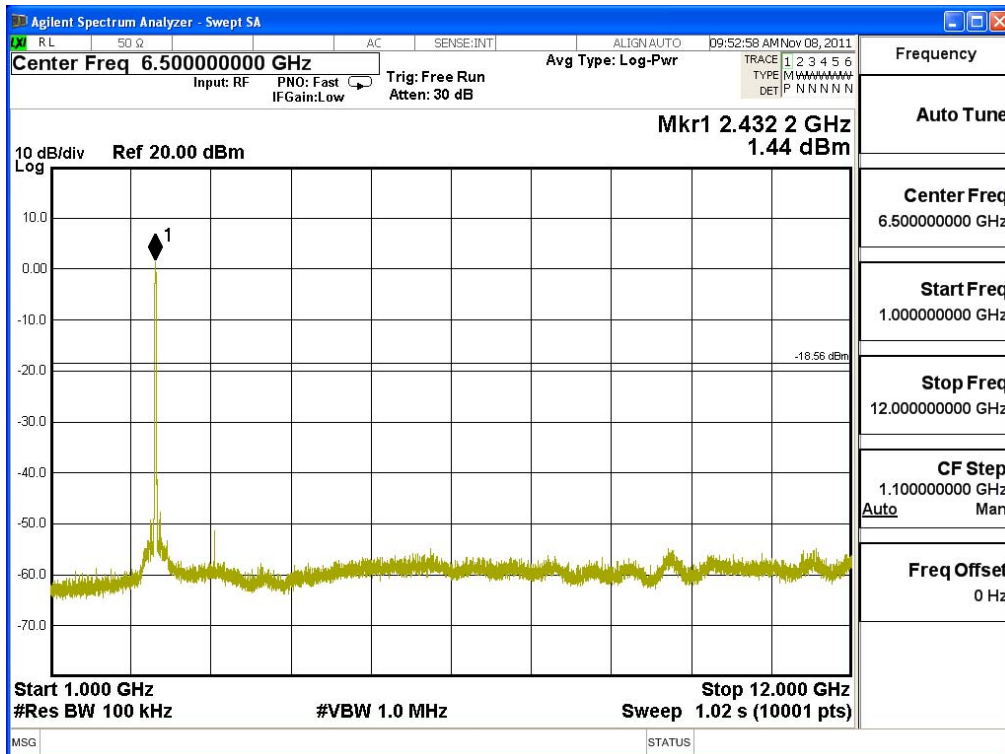
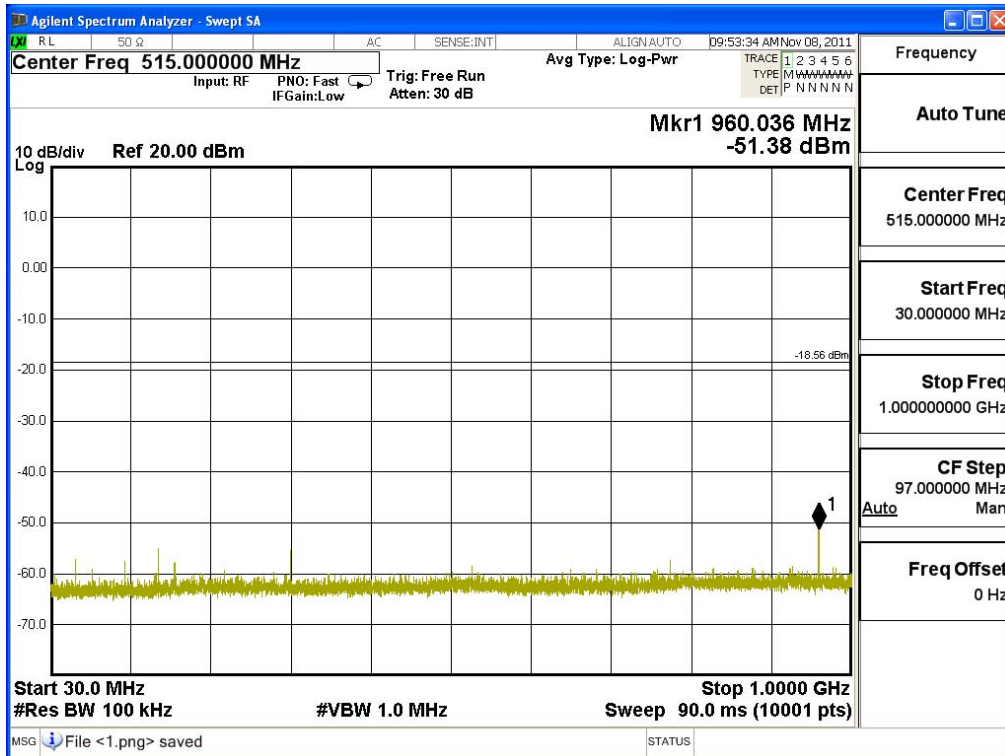
Product : 802.11n, 2.4G 1T1R Wireless LAN USB Module
 Test Item : RF Antenna Conducted Spurious
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11g 6Mbps)

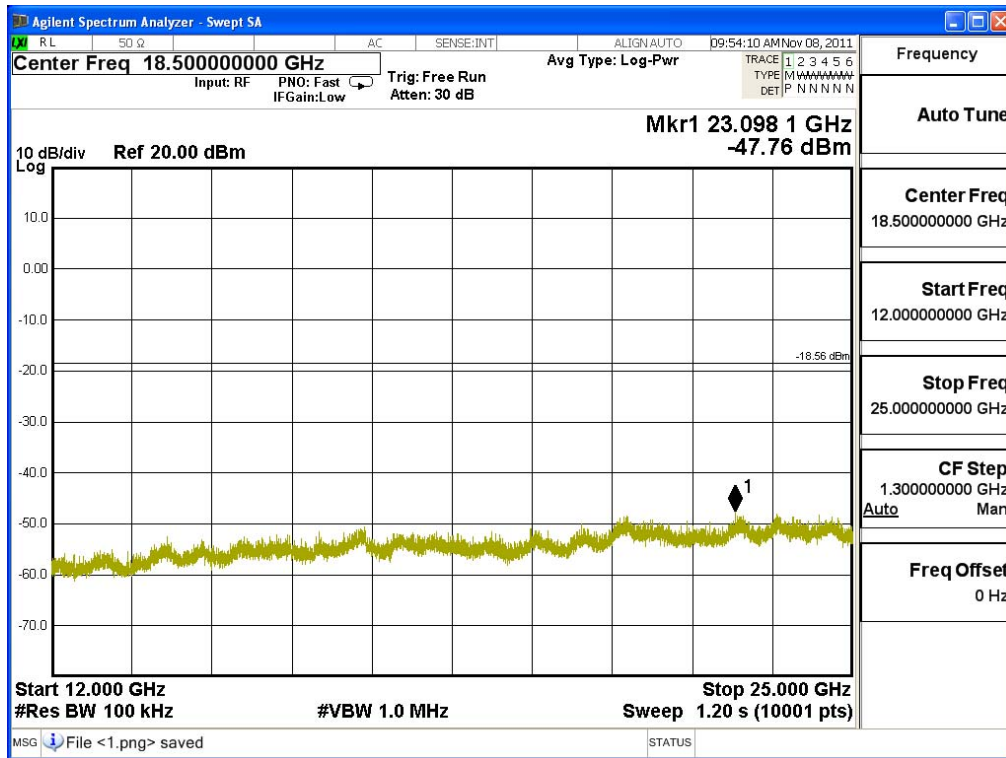
Channel 01 (2412MHz) 30MHz -25GHz



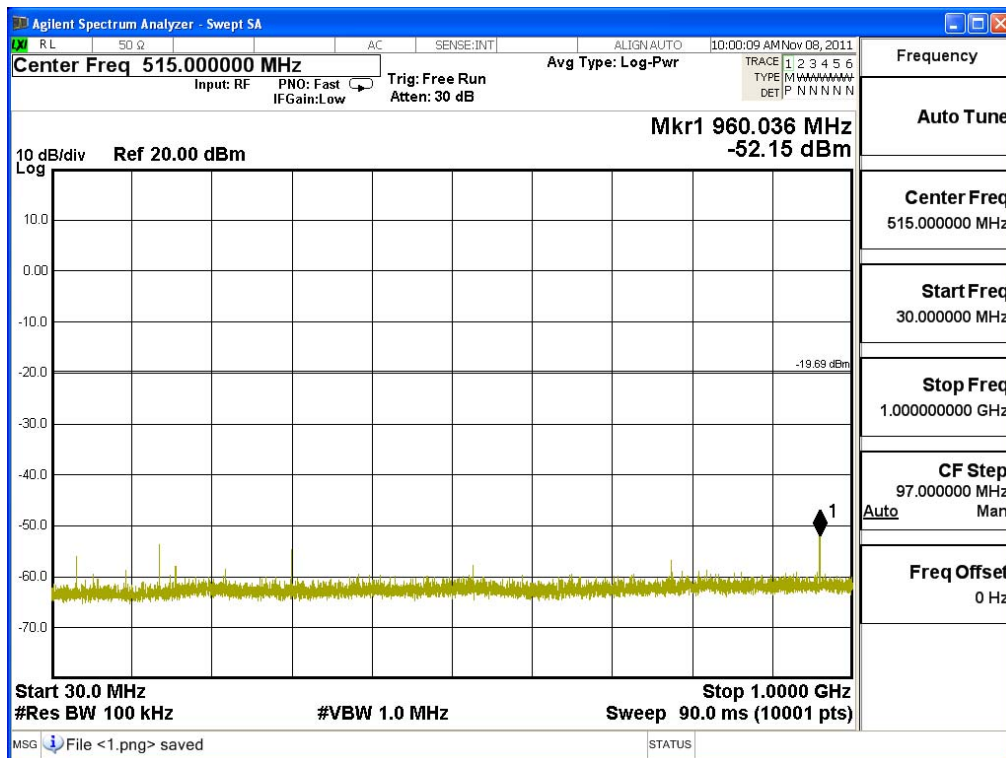


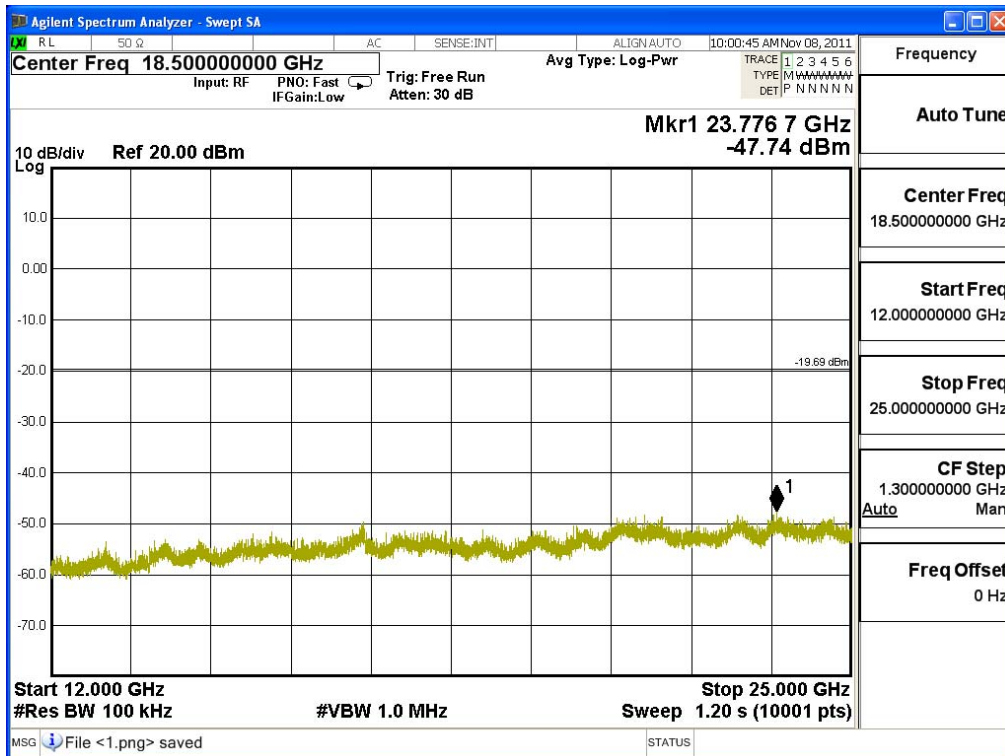
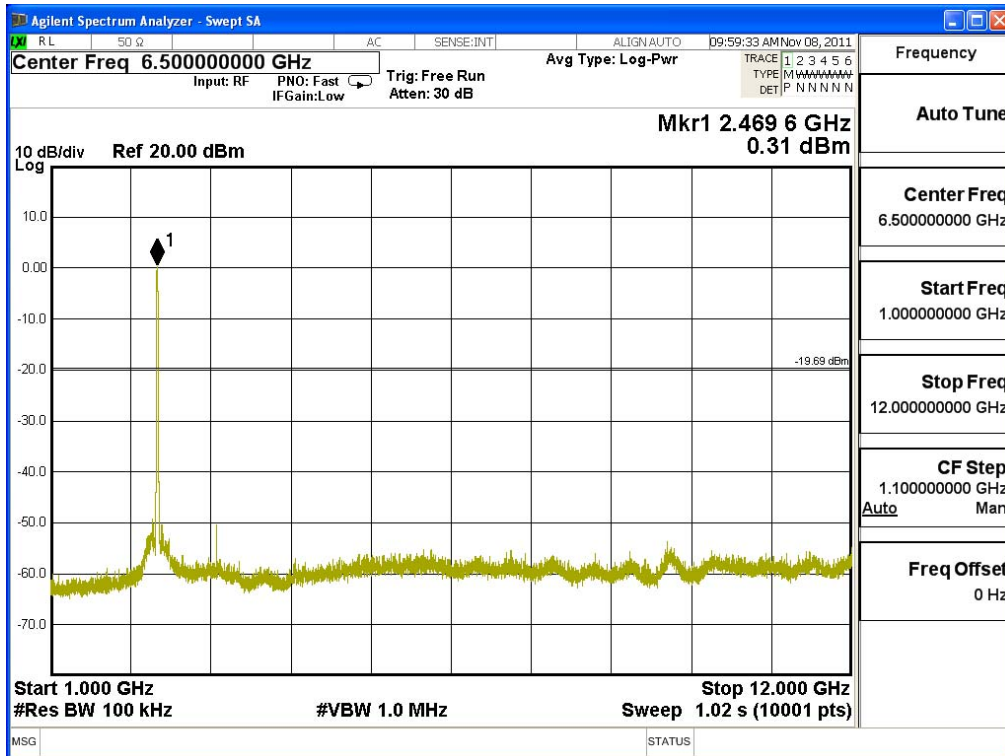
Channel 06 (2437MHz) 30MHz -25GHz





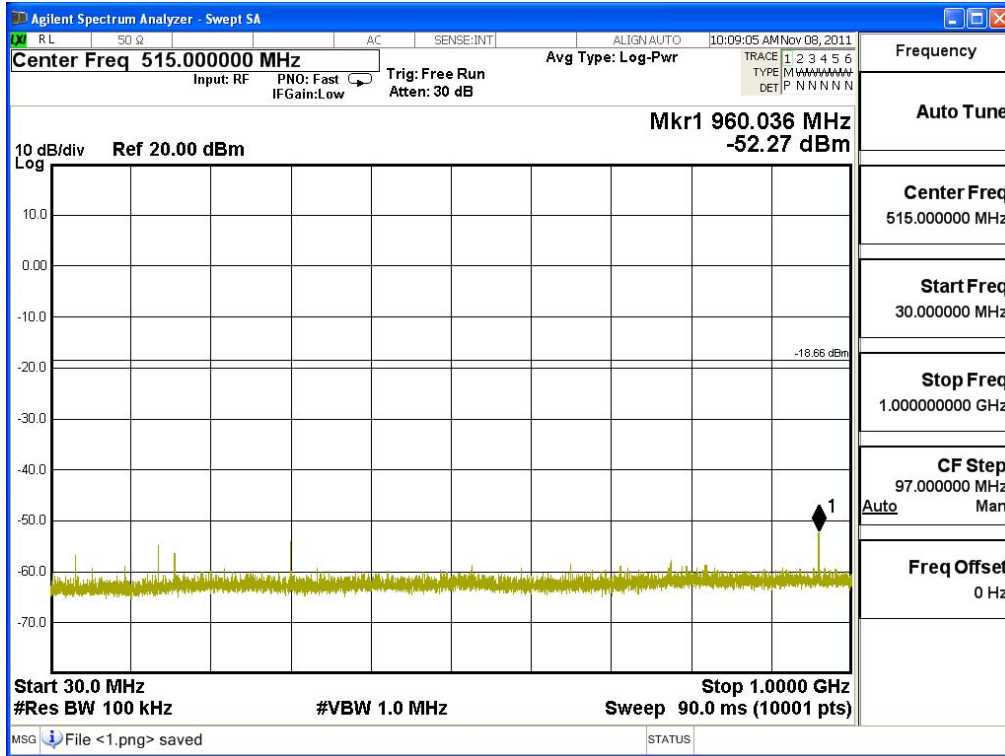
Channel 11 (2462MHz) 30MHz -25GHz

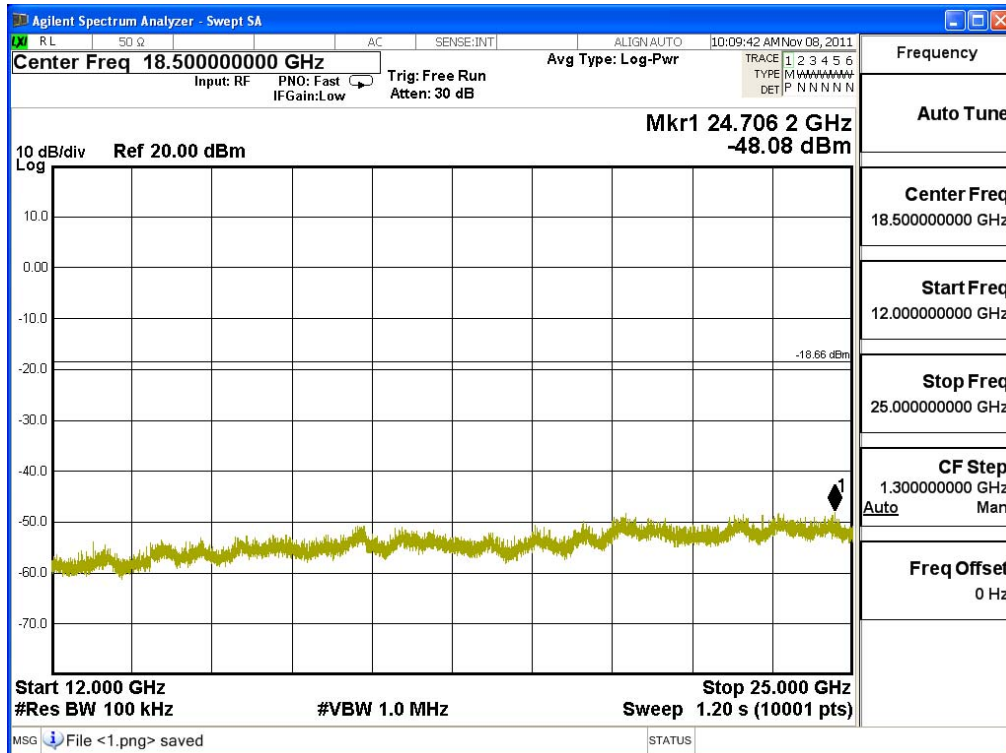
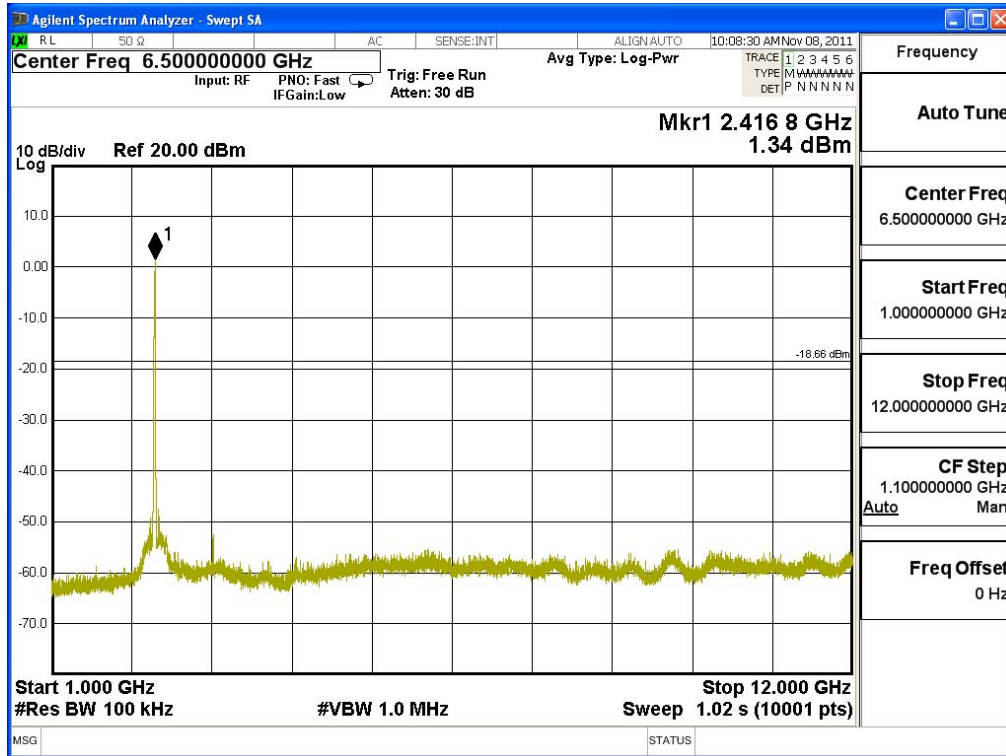




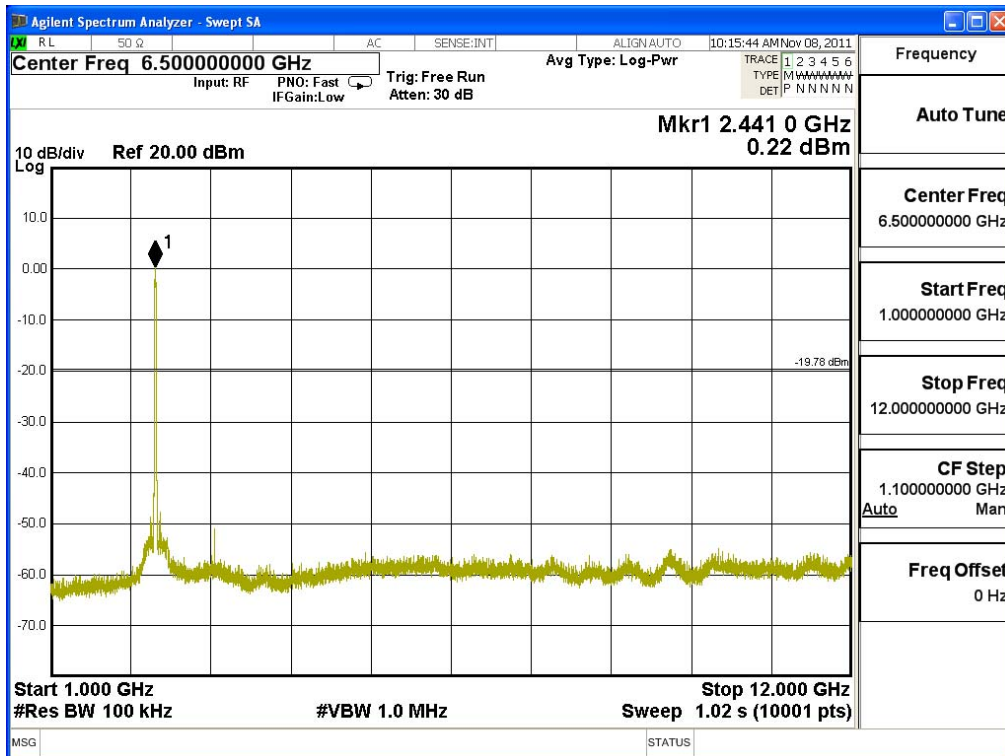
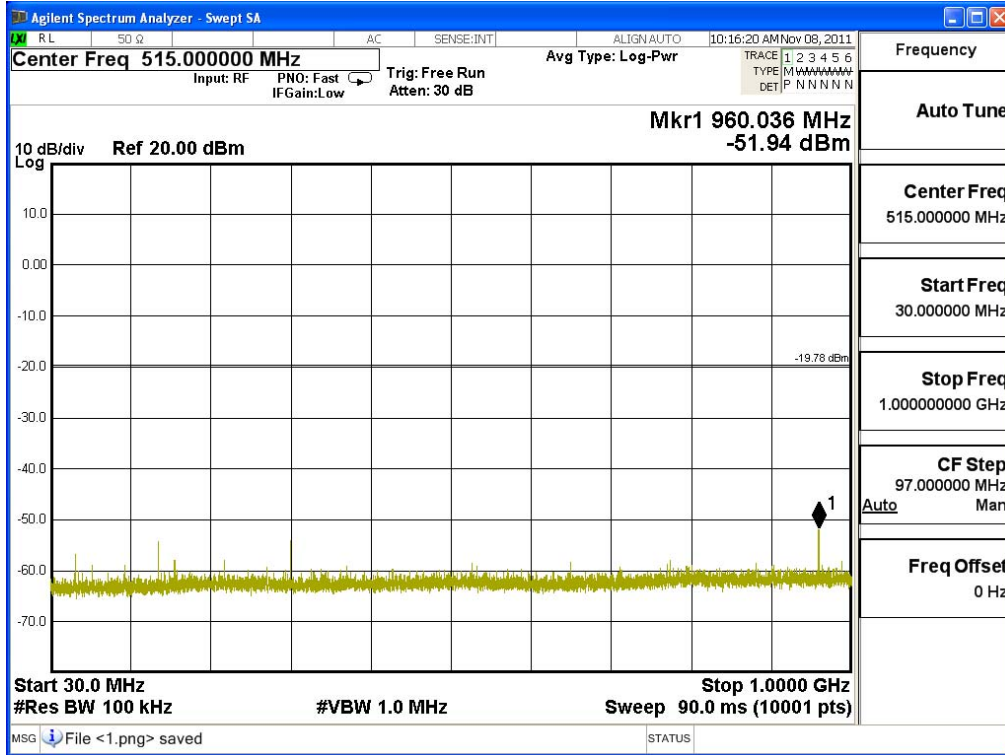
Product : 802.11n, 2.4G 1T1R Wireless LAN USB Module
 Test Item : RF Antenna Conducted Spurious
 Test Site : No.3 OATS
 Test Mode : Mode 3: Transmit - 802.11n-20BW_7.2Mbps(2.4G Band)

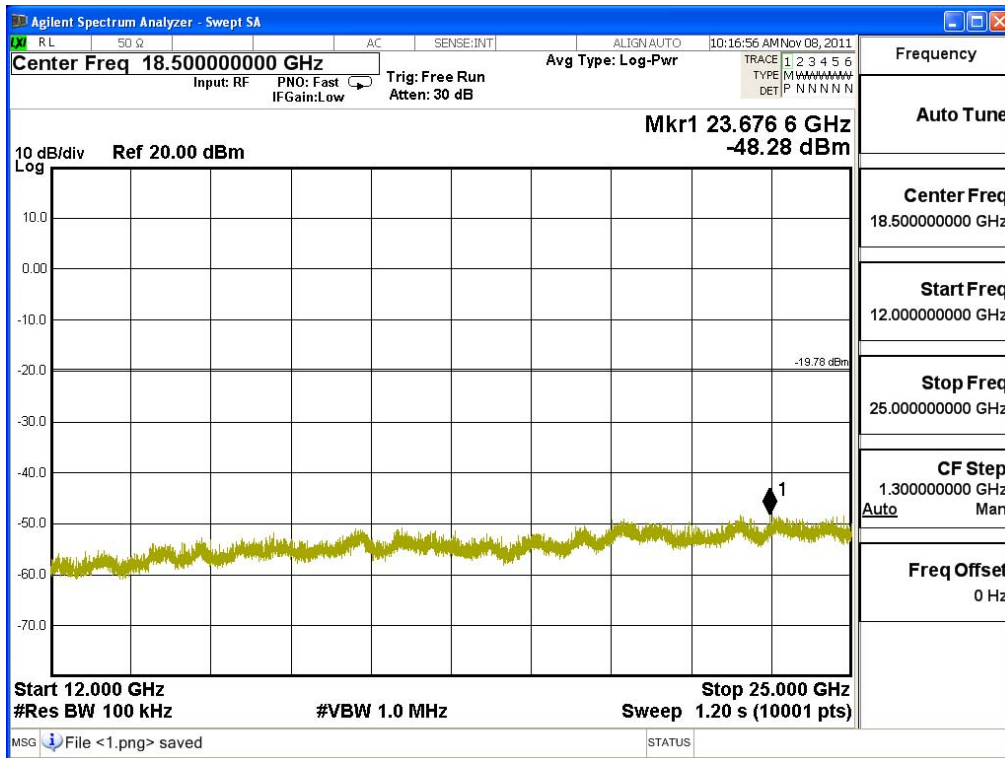
Channel 01 (2412MHz) 30MHz -25GHz



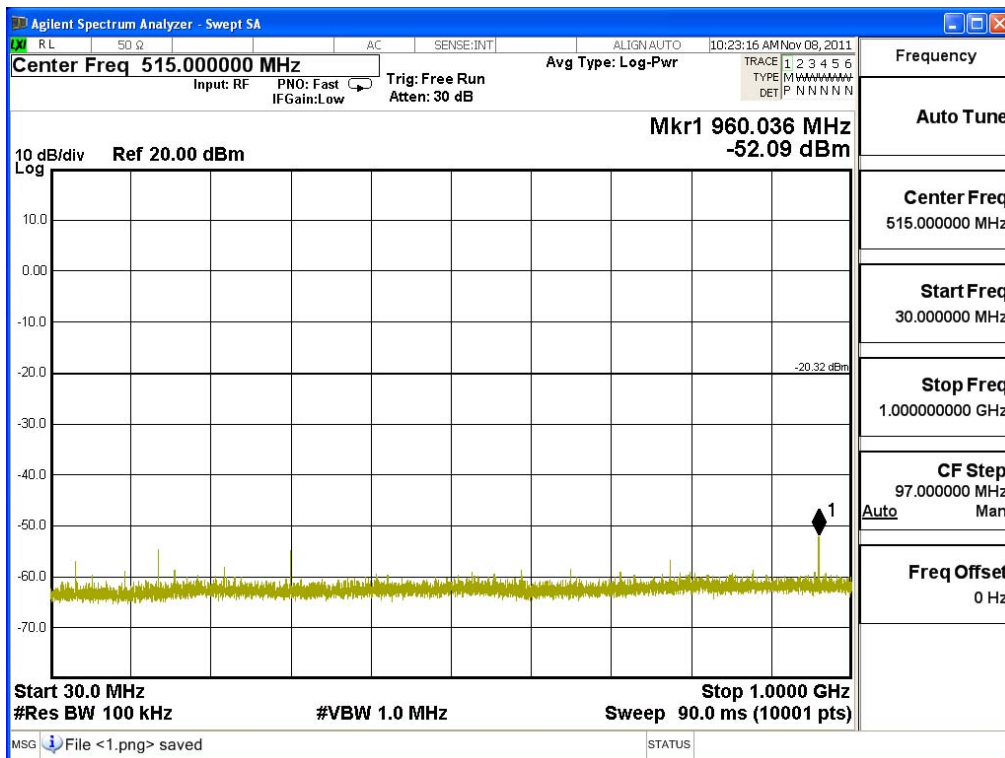


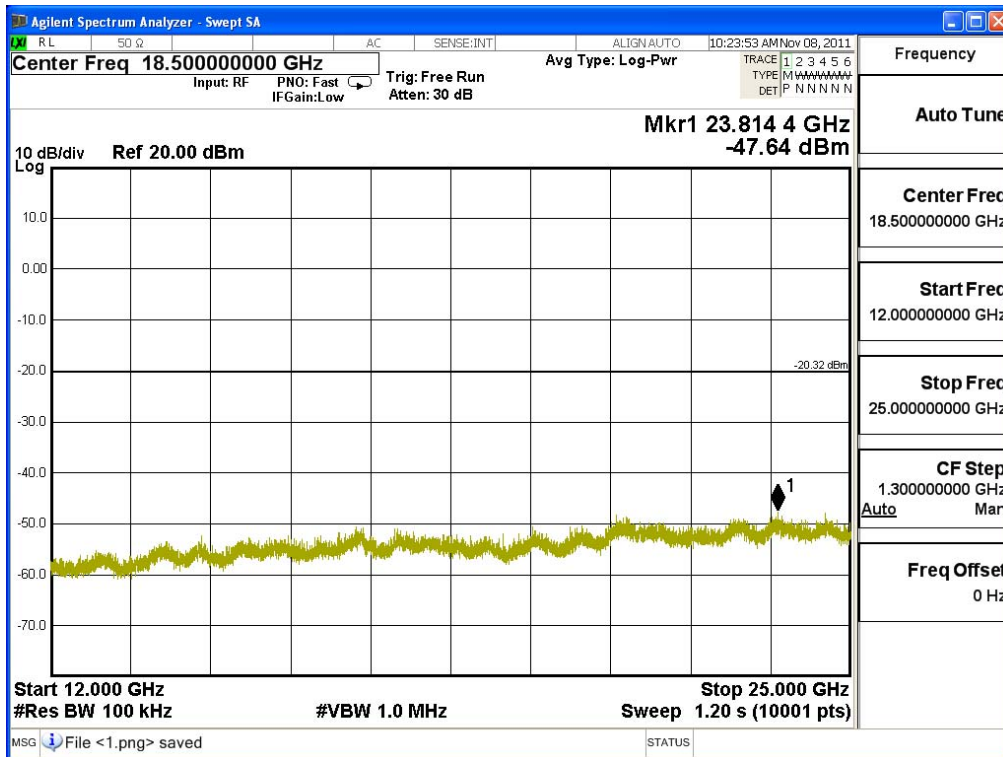
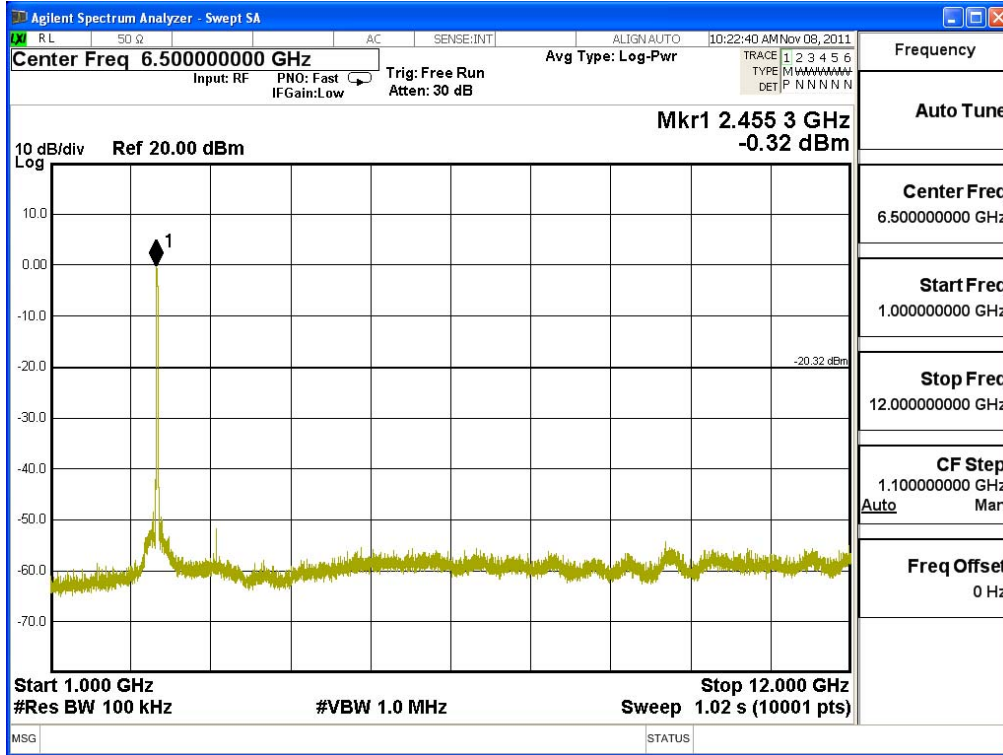
Channel 06 (2437MHz) 30MHz -25GHz





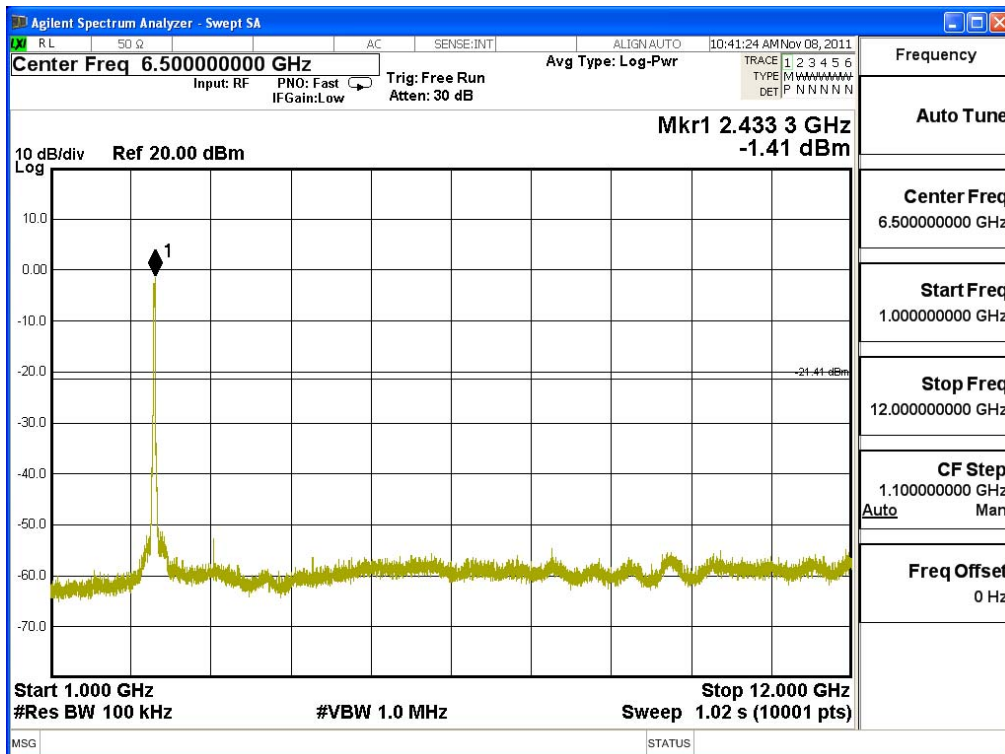
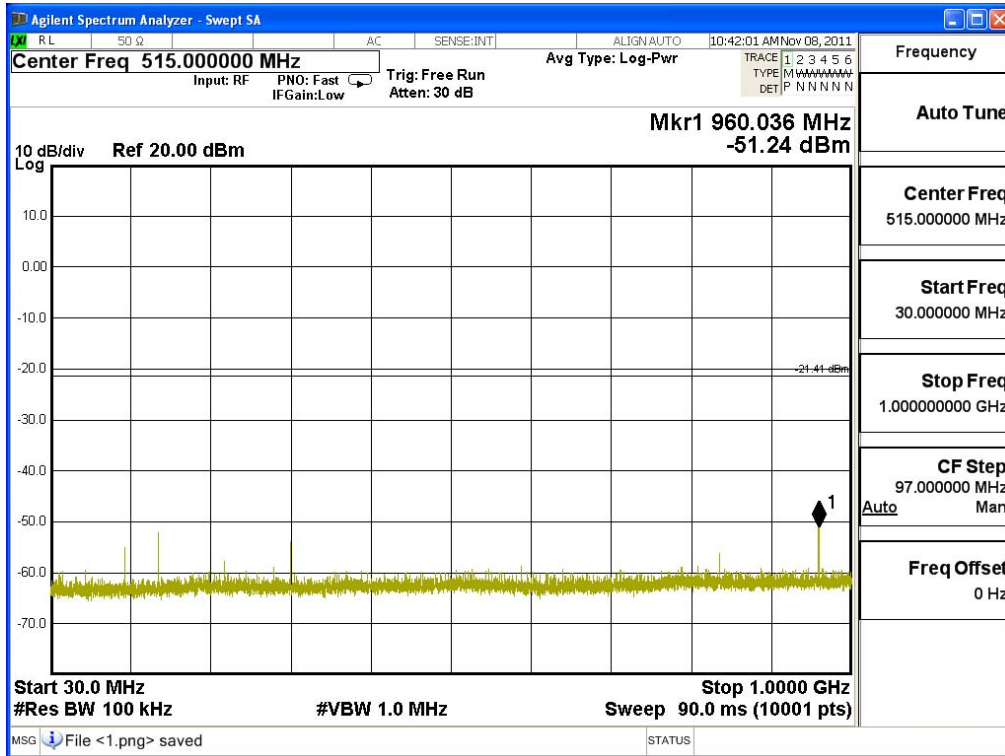
Channel 11 (2462MHz) 30MHz -25GHz

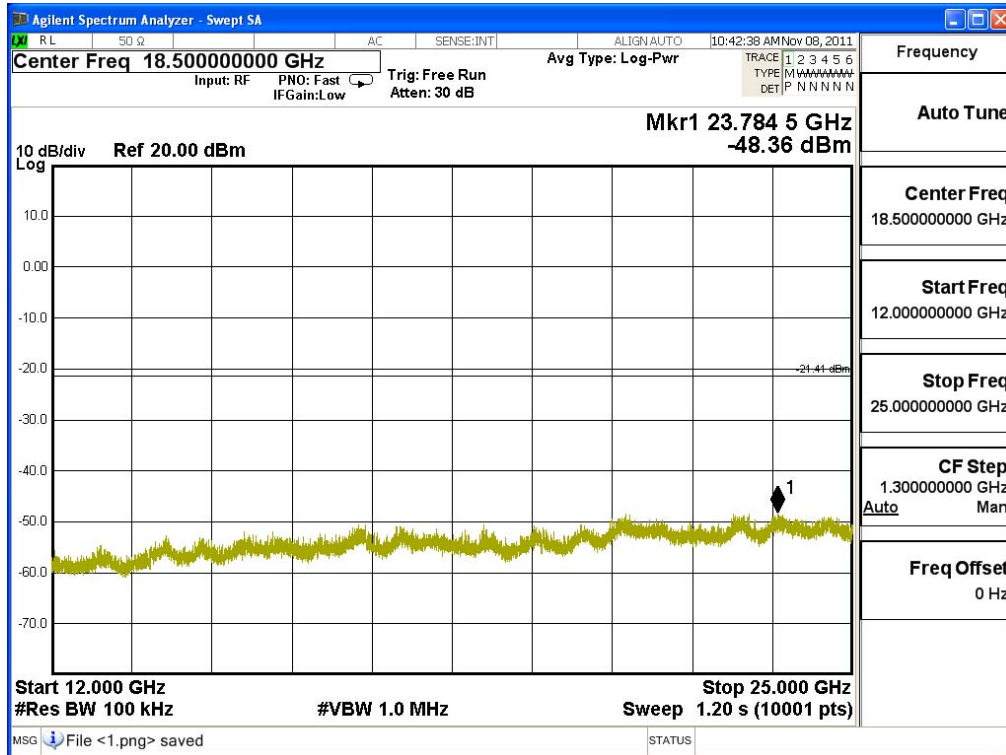




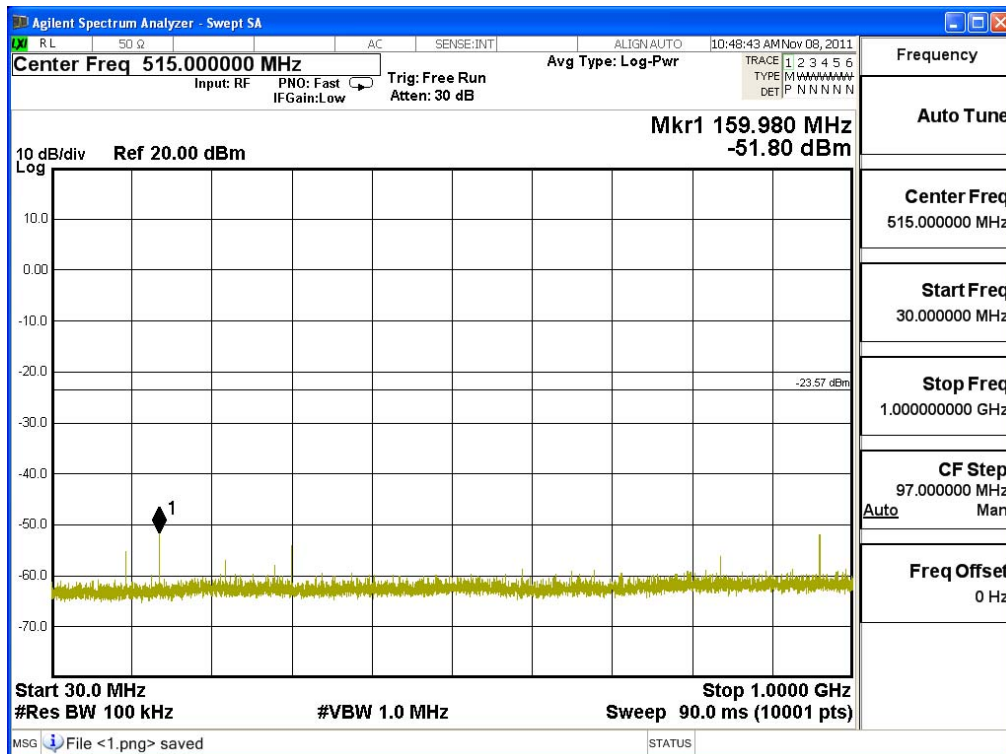
Product : 802.11n, 2.4G 1T1R Wireless LAN USB Module
 Test Item : RF Antenna Conducted Spurious
 Test Site : No.3 OATS
 Test Mode : Mode 4: Transmit - 802.11n-40BW_15Mbps(2.4G Band)

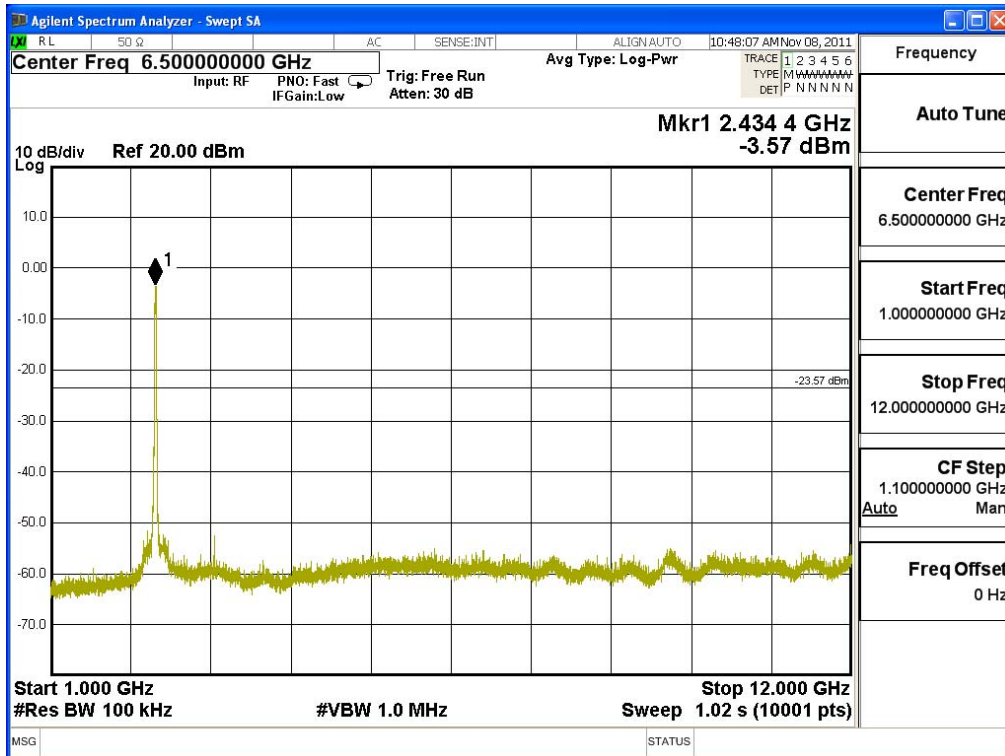
Channel 01 (2422MHz) 30MHz -25GHz





Channel 04 (2437MHz) 30MHz -25GHz





Channel 07 (2452MHz) 30MHz -25GHz

