



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
Report Version	V1.0

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



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-3420-25GC4-A1-B160MM	2.37 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 without 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.

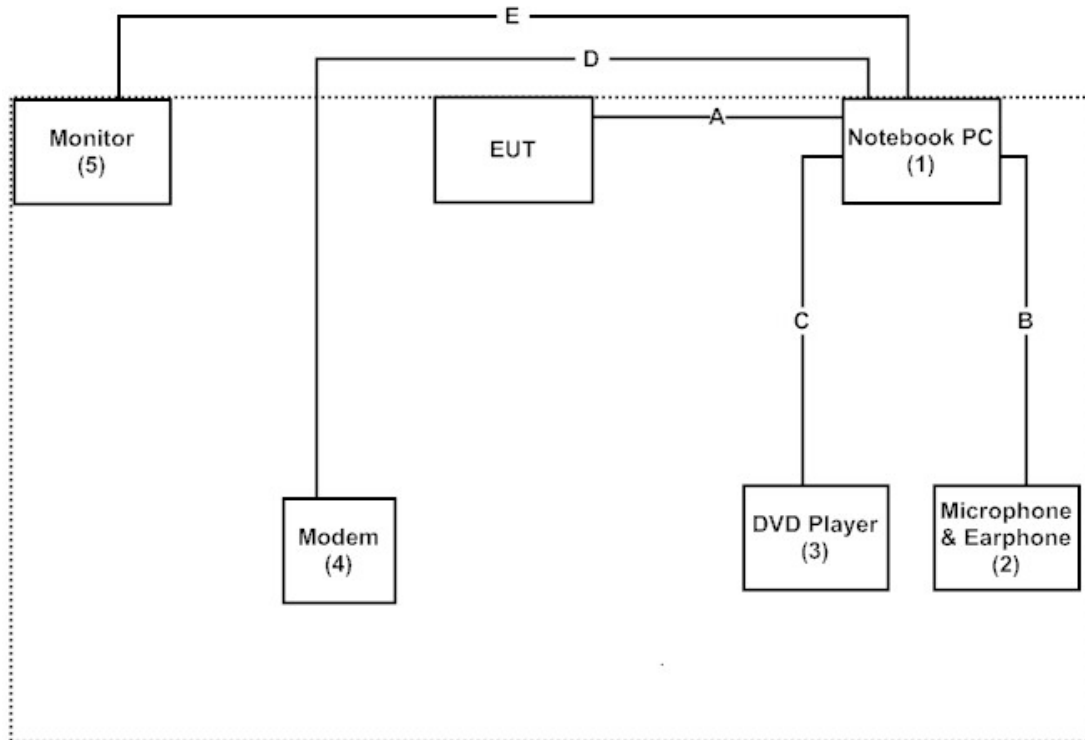
1.3. Tested System Details

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

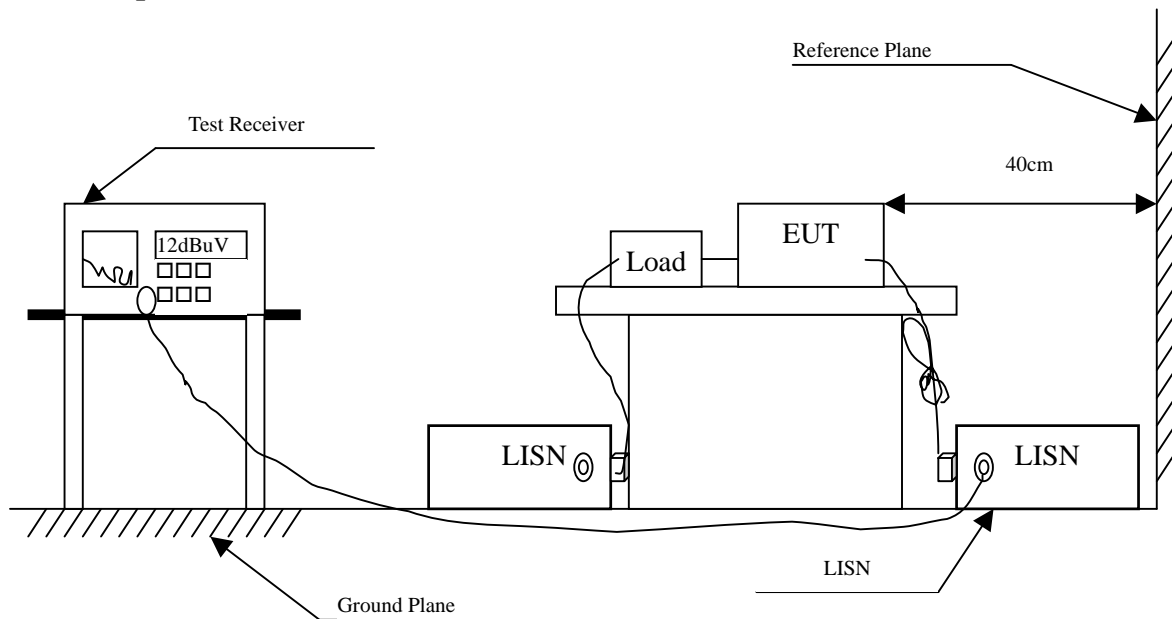
2.1. Test Equipment

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					
0.173	9.714	49.000	58.714	-6.629	65.343
0.228	9.678	44.700	54.378	-9.393	63.771
0.369	9.650	42.820	52.470	-7.273	59.743
0.412	9.650	42.420	52.070	-6.444	58.514
0.728	9.663	36.160	45.823	-10.177	56.000
1.068	9.690	33.580	43.270	-12.730	56.000
Average					
0.173	9.714	33.460	43.174	-12.169	55.343
0.228	9.678	34.110	43.788	-9.983	53.771
0.369	9.650	29.630	39.280	-10.463	49.743
0.412	9.650	28.230	37.880	-10.634	48.514
0.728	9.663	26.480	36.143	-9.857	46.000
1.068	9.690	20.870	30.560	-15.440	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					
0.160	9.723	51.180	60.903	-4.811	65.714
0.177	9.712	51.880	61.592	-3.637	65.229
0.255	9.665	39.220	48.885	-14.115	63.000
0.408	9.650	39.880	49.530	-9.099	58.629
0.603	9.650	36.680	46.330	-9.670	56.000
0.927	9.680	32.420	42.100	-13.900	56.000
Average					
0.160	9.723	37.150	46.873	-8.841	55.714
0.177	9.712	38.430	48.142	-7.087	55.229
0.255	9.665	25.910	35.575	-17.425	53.000
0.408	9.650	23.180	32.830	-15.799	48.629
0.603	9.650	30.190	39.840	-6.160	46.000
0.927	9.680	22.210	31.890	-14.110	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

3. Peak Power Output

3.1. Test Equipment

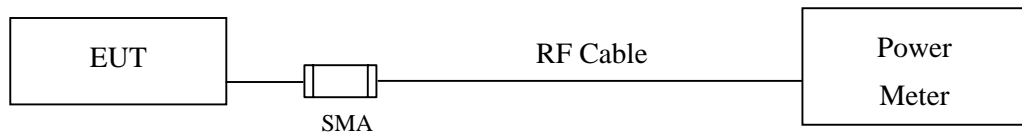
	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Power Meter	Anritsu	ML2495A/6K00003357	May, 2011
X	Power Sensor	Anritsu	MA2411B/0738448	Jun, 2011

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	2	5.5	11	1	
1	2412.00	17.01	--	--	--	19.23	1Watt= 30 dBm
6	2437.00	17.08	17.07	17.05	17.02	19.3	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	14.92	--	--	--	--	--	--	--	24.85	<30dBm	Pass
06	2437	15.27	15.25	15.24	15.22	15.2	15.18	15.16	15.15	25.18	<30dBm	Pass
11	2462	15.02	--	--	--	--	--	--	--	24.98	<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	7.2		
		For different Data Rate (Mbps)											
7.2	14.4	21.7	28.9	43.3	57.8	65	72.2	7.2					
01	2412	14.32	--	--	--	--	--	--	--	24.37	<30dBm	Pass	
06	2437	13.94	13.92	13.91	13.9	13.89	13.87	13.85	13.82	24.14	<30dBm	Pass	
11	2462	14.18	--	--	--	--	--	--	--	24.37	<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)										
		Average Power								Peak Power	Required Limit	Result
		For different Data Rate (Mbps)										
15	30	45	60	90	120	135	150	15				
03	2422	12.15	--	--	--	--	--	--	--	22.41	<30dBm	Pass
06	2437	11.92	11.91	11.9	11.87	11.85	11.83	11.81	11.8	22.48	<30dBm	Pass
09	2452	12.14	--	--	--	--	--	--	--	22.76	<30dBm	Pass

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

4. Radiated Emission

4.1. Test Equipment

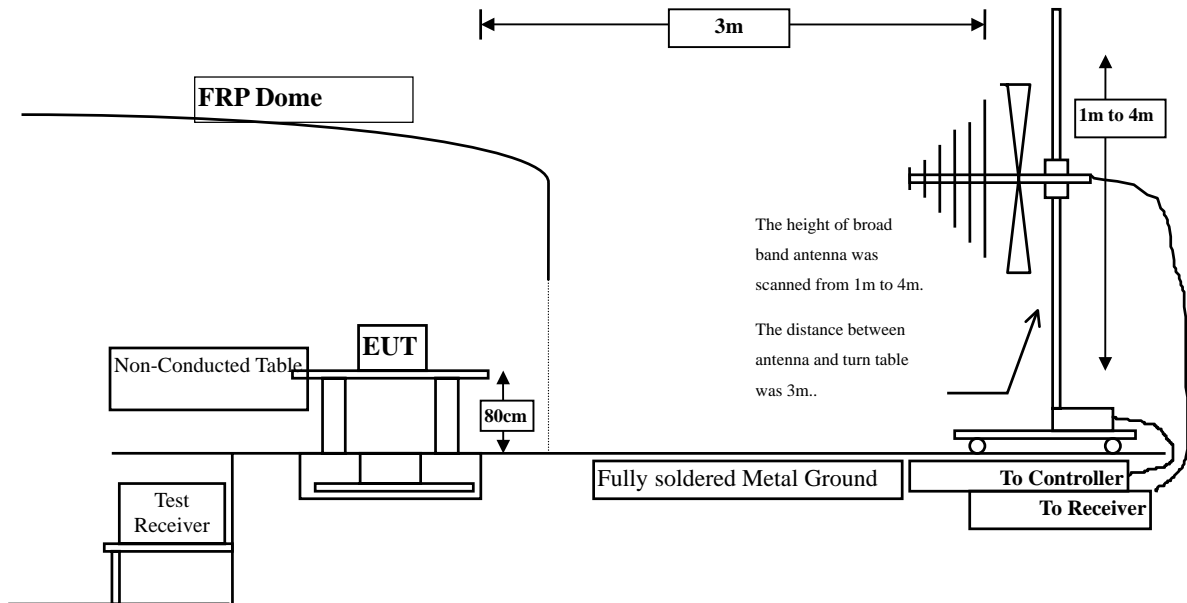
The following test equipment are used during the radiated emission test:

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

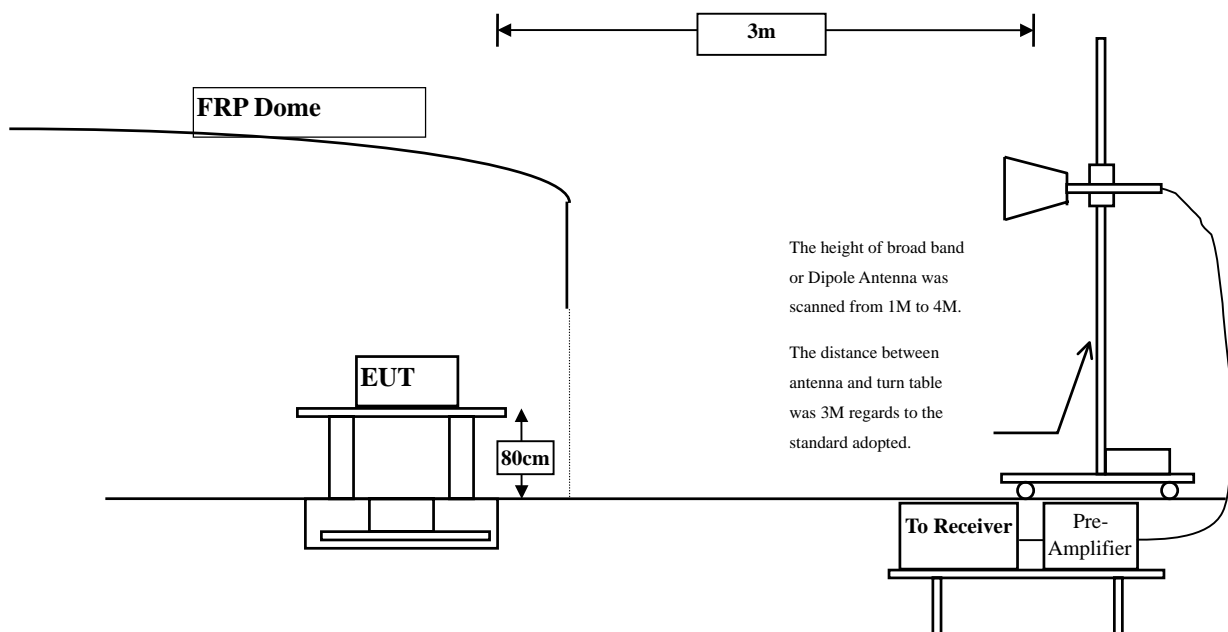
- Note:
1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
 2. The test instruments marked with “X” are used to measure the final test results.

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	45.700	48.961	-25.039	74.000
7236.000	10.650	36.770	47.420	-26.580	74.000
9648.000	13.337	36.550	49.886	-24.114	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4824.000	6.421	45.340	51.761	-22.239	74.000
7236.000	11.495	36.930	48.425	-25.575	74.000
9648.000	13.807	36.630	50.436	-23.564	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 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	48.410	51.447	-22.553	74.000
7311.000	11.795	36.030	47.824	-26.176	74.000
9748.000	12.635	37.010	49.645	-24.355	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4874.000	5.812	46.780	52.591	-21.409	74.000
7311.000	12.630	35.800	48.429	-25.571	74.000
9748.000	13.126	37.070	50.196	-23.804	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 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	49.940	52.797	-21.203	74.000
7386.000	12.127	35.180	47.308	-26.692	74.000
9848.000	12.852	36.690	49.543	-24.457	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4924.000	5.521	47.380	52.900	-21.100	74.000
7386.000	13.254	35.770	49.024	-24.976	74.000
9848.000	13.367	36.170	49.537	-24.463	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) (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	44.340	47.601	-26.399	74.000
7236.000	10.650	36.280	46.930	-27.070	74.000
9648.000	13.337	36.440	49.776	-24.224	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4824.000	6.421	43.490	49.911	-24.089	74.000
7236.000	11.495	36.100	47.595	-26.405	74.000
9648.000	13.807	36.570	50.376	-23.624	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	48.890	51.927	-22.073	74.000
7311.000	11.795	35.740	47.534	-26.466	74.000
9748.000	12.635	36.760	49.395	-24.605	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4874.000	5.812	46.170	51.981	-22.019	74.000
7311.000	12.630	35.610	48.239	-25.761	74.000
9748.000	13.126	37.250	50.376	-23.624	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	50.060	52.917	-21.083	74.000
7386.000	12.127	35.500	47.628	-26.372	74.000
9848.000	12.852	36.570	49.423	-24.577	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4924.000	5.521	46.450	51.970	-22.030	74.000
7386.000	13.254	36.000	49.254	-24.746	74.000
9848.000	13.367	36.040	49.407	-24.593	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) (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	45.690	48.951	-25.049	74.000
7236.000	10.650	36.100	46.750	-27.250	74.000
9648.000	13.337	36.760	50.096	-23.904	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4824.000	6.421	43.970	50.391	-23.609	74.000
7236.000	11.495	37.510	49.005	-24.995	74.000
9648.000	13.807	36.620	50.426	-23.574	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	47.820	50.857	-23.143	74.000
7311.000	11.795	35.930	47.724	-26.276	74.000
9748.000	12.635	36.970	49.605	-24.395	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4874.000	5.812	45.880	51.691	-22.309	74.000
7311.000	12.630	35.350	47.979	-26.021	74.000
9748.000	13.126	36.410	49.536	-24.464	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) (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	50.570	53.427	-20.573	74.000
7386.000	12.127	35.090	47.218	-26.782	74.000
9848.000	12.852	36.480	49.333	-24.667	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4924.000	5.521	47.100	52.620	-21.380	74.000
7386.000	13.254	35.190	48.444	-25.556	74.000
9848.000	13.367	36.150	49.517	-24.483	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) (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	41.350	44.521	-29.479	74.000
7266.000	11.162	36.120	47.282	-26.718	74.000
9688.000	12.964	37.080	50.045	-23.955	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4844.000	6.178	40.730	46.908	-27.092	74.000
7266.000	11.982	36.200	48.182	-25.818	74.000
9688.000	13.507	36.740	50.248	-23.752	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	43.140	46.177	-27.823	74.000
7311.000	11.795	35.280	47.074	-26.926	74.000
9748.000	12.635	36.280	48.915	-25.085	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4874.000	5.812	42.090	47.901	-26.099	74.000
7311.000	12.630	35.210	47.839	-26.161	74.000
9748.000	13.126	36.560	49.686	-24.314	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	46.300	49.215	-24.785	74.000
7356.000	11.995	35.220	47.214	-26.786	74.000
9808.000	12.475	36.410	48.885	-25.115	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4904.000	5.530	43.890	49.421	-24.579	74.000
7356.000	13.005	35.520	48.524	-25.476	74.000
9808.000	12.901	36.960	49.861	-24.139	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					
150.280	-10.194	45.235	35.041	-8.459	43.500
268.620	-4.942	44.164	39.222	-6.778	46.000
359.800	-1.680	38.749	37.069	-8.931	46.000
507.240	0.759	38.993	39.752	-6.248	46.000
664.380	2.062	36.359	38.421	-7.579	46.000
840.920	5.191	33.670	38.861	-7.139	46.000
Vertical					
107.600	-0.318	37.456	37.138	-6.362	43.500
365.620	-2.179	38.368	36.189	-9.811	46.000
507.240	-0.471	41.353	40.882	-5.118	46.000
664.380	-1.918	36.256	34.338	-11.662	46.000
840.920	2.961	35.288	38.249	-7.751	46.000
996.120	4.019	39.982	44.001	-9.999	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 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					
132.820	-10.230	46.941	36.711	-6.789	43.500
359.800	-1.680	38.170	36.490	-9.510	46.000
507.240	0.759	38.948	39.707	-6.293	46.000
600.360	3.977	37.509	41.486	-4.514	46.000
809.880	5.049	29.528	34.577	-11.423	46.000
879.720	6.115	25.876	31.991	-14.009	46.000
Vertical					
103.720	-0.151	39.406	39.254	-4.246	43.500
359.800	-3.810	41.238	37.428	-8.572	46.000
507.240	-0.471	42.704	42.233	-3.767	46.000
664.380	-1.918	34.688	32.770	-13.230	46.000
840.920	2.961	35.988	38.949	-7.051	46.000
996.120	4.019	38.640	42.659	-11.341	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					
142.520	-10.427	46.733	36.306	-7.194	43.500
359.800	-1.680	44.402	42.722	-3.278	46.000
507.240	0.759	39.983	40.742	-5.258	46.000
664.380	2.062	36.415	38.477	-7.523	46.000
749.740	3.320	29.196	32.516	-13.484	46.000
833.160	5.643	29.021	34.663	-11.337	46.000
Vertical					
101.780	-0.021	38.893	38.871	-4.629	43.500
154.160	-6.221	37.876	31.655	-11.845	43.500
359.800	-3.810	38.698	34.888	-11.112	46.000
507.240	-0.471	41.137	40.666	-5.334	46.000
664.380	-1.918	35.384	33.466	-12.534	46.000
840.920	2.961	37.710	40.671	-5.329	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					
132.820	-10.230	46.609	36.379	-7.121	43.500
260.860	-5.032	46.383	41.351	-4.649	46.000
507.240	0.759	39.327	40.086	-5.914	46.000
608.120	4.384	30.427	34.811	-11.189	46.000
720.640	3.511	36.956	40.467	-5.533	46.000
840.920	5.191	35.879	41.070	-4.930	46.000
Vertical					
107.600	-0.318	37.339	37.021	-6.479	43.500
359.800	-3.810	43.060	39.250	-6.750	46.000
507.240	-0.471	39.624	39.153	-6.847	46.000
693.480	2.168	33.562	35.730	-10.270	46.000
796.300	2.831	29.109	31.940	-14.060	46.000
996.120	4.019	40.789	44.808	-9.192	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.

5. RF antenna conducted test

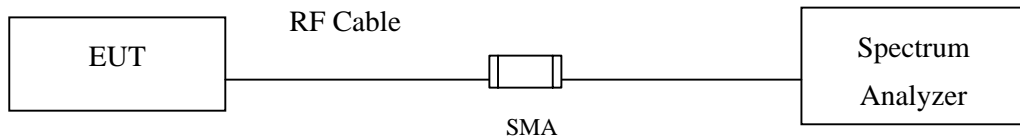
5.1. Test Equipment

	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

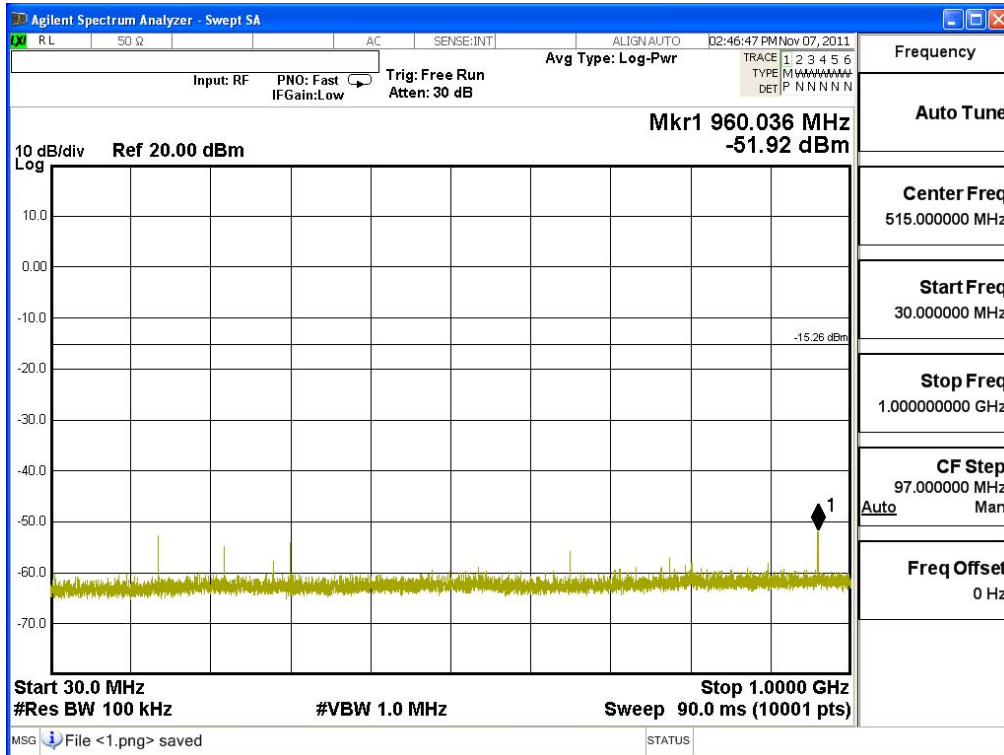
The measurement uncertainty

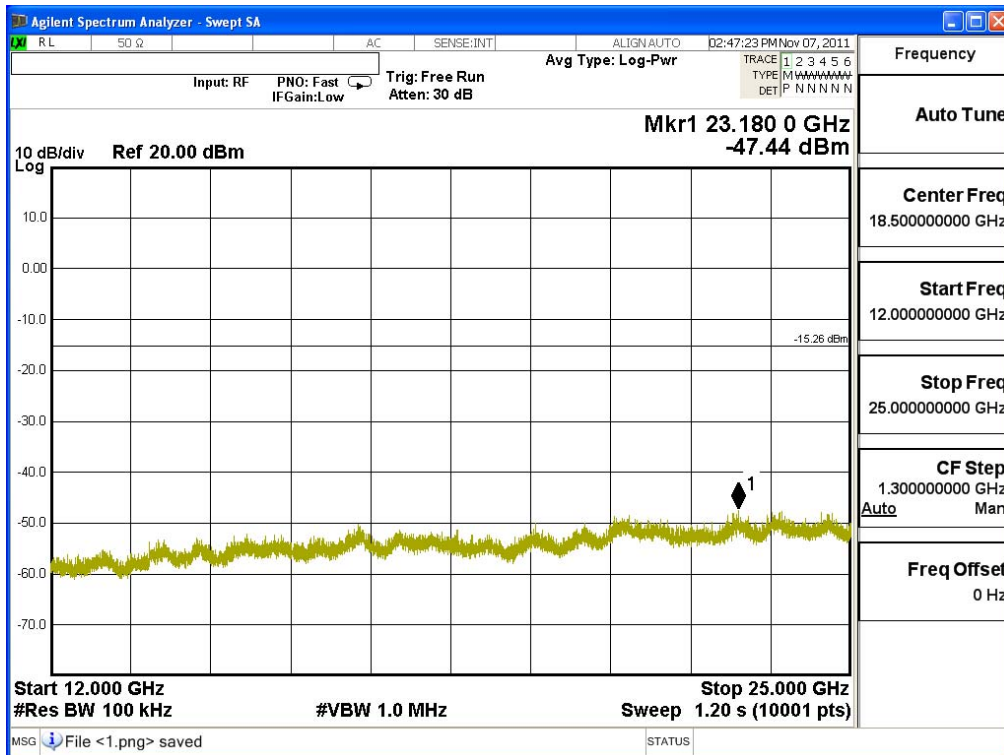
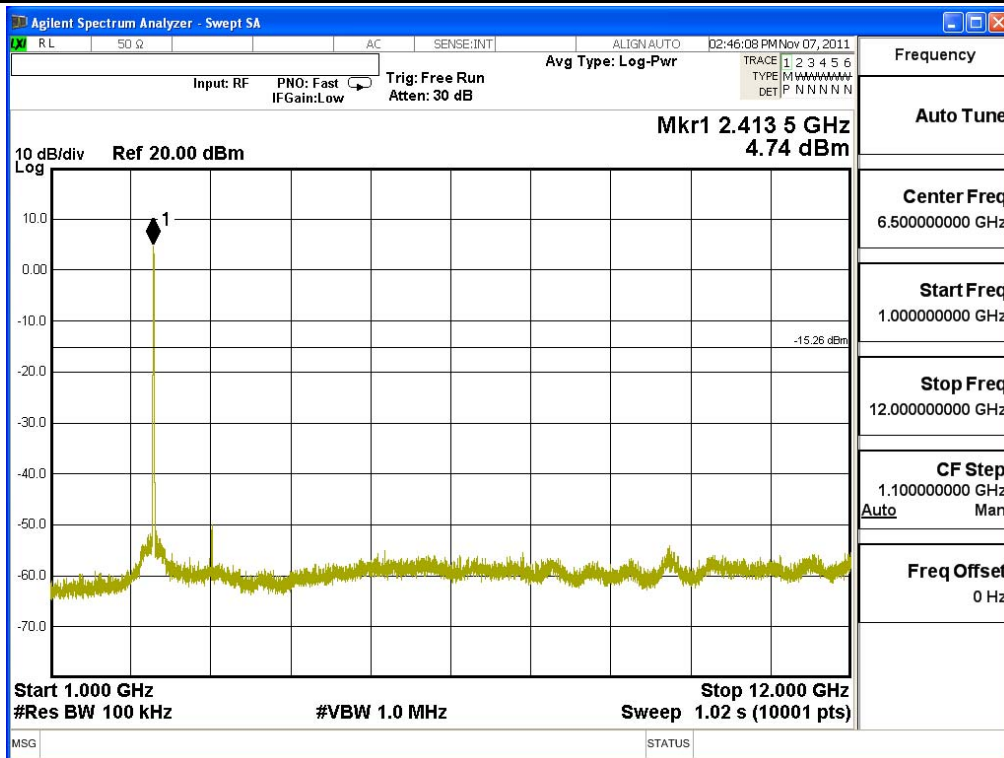
Conducted is defined as $\pm 1.27\text{dB}$

5.6. Test Result of RF antenna conducted test

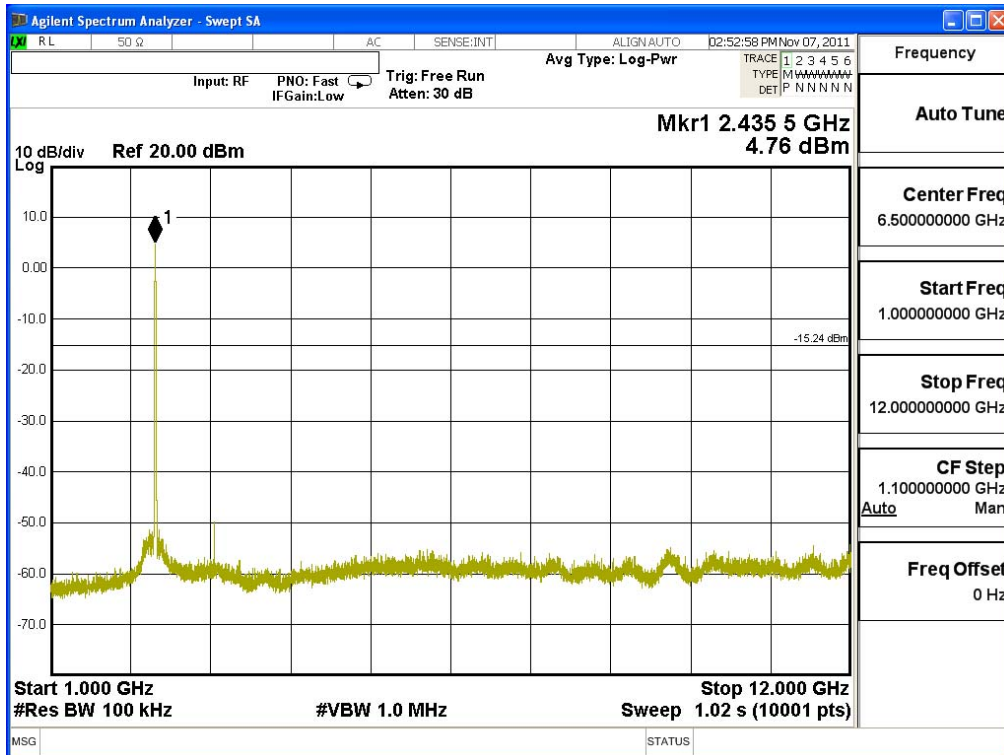
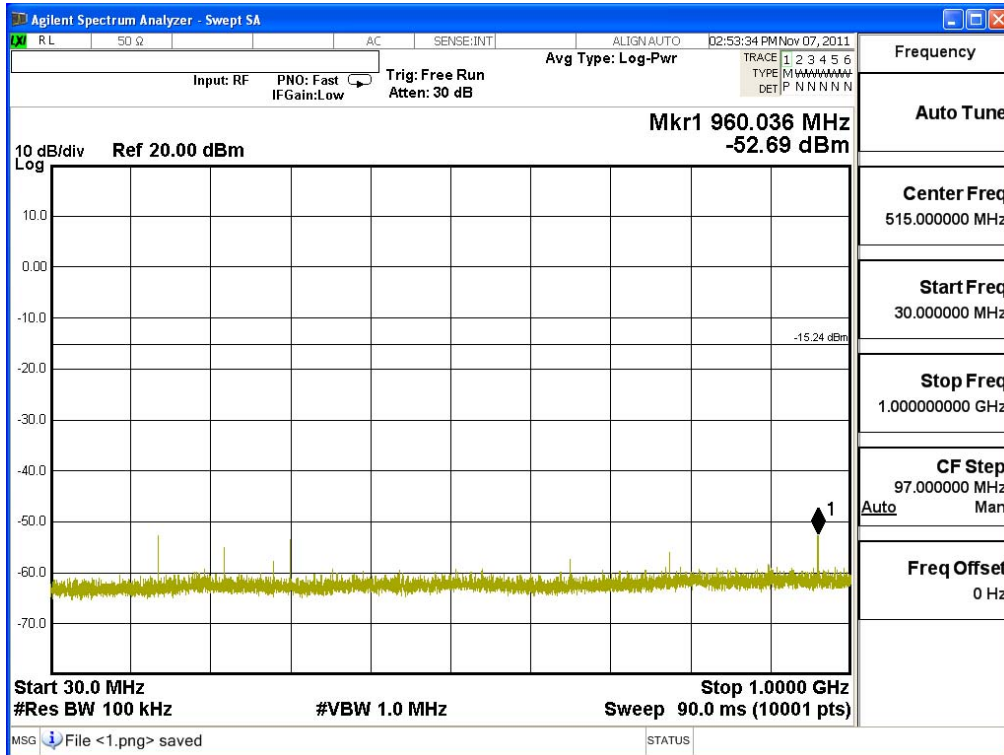
Product : 802.11n, 2.4G 1T1R Wireless LAN USB Module
 Test Item : RF antenna conducted test
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11b 1Mbps)

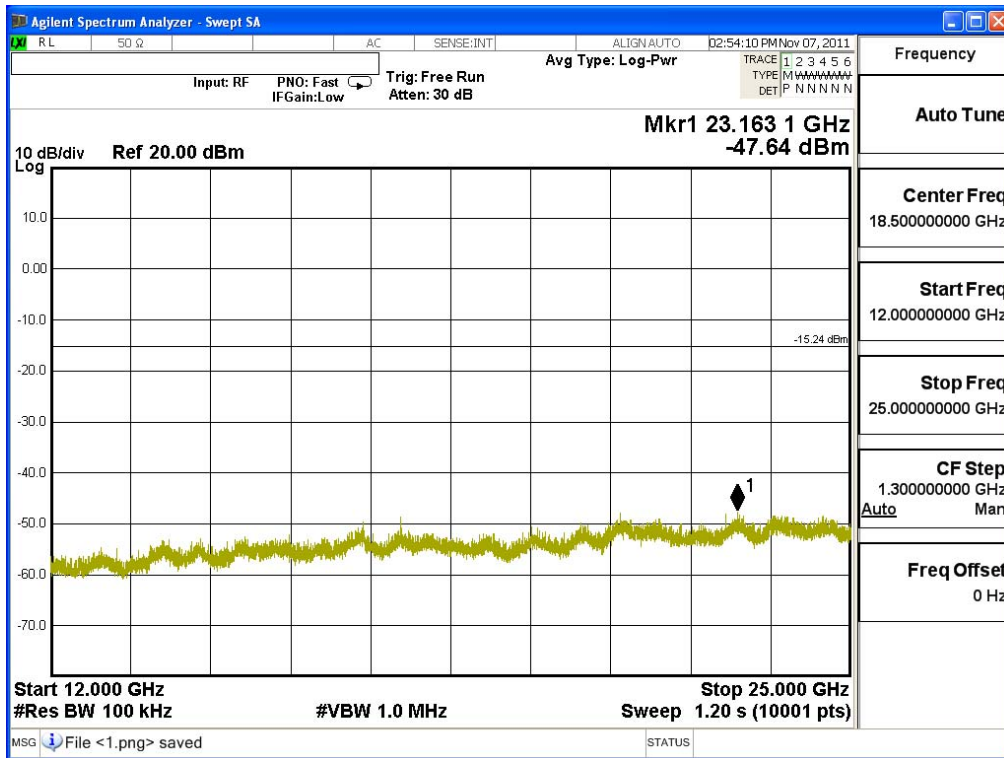
Channel 01 (2412MHz) 30MHz-25GHz



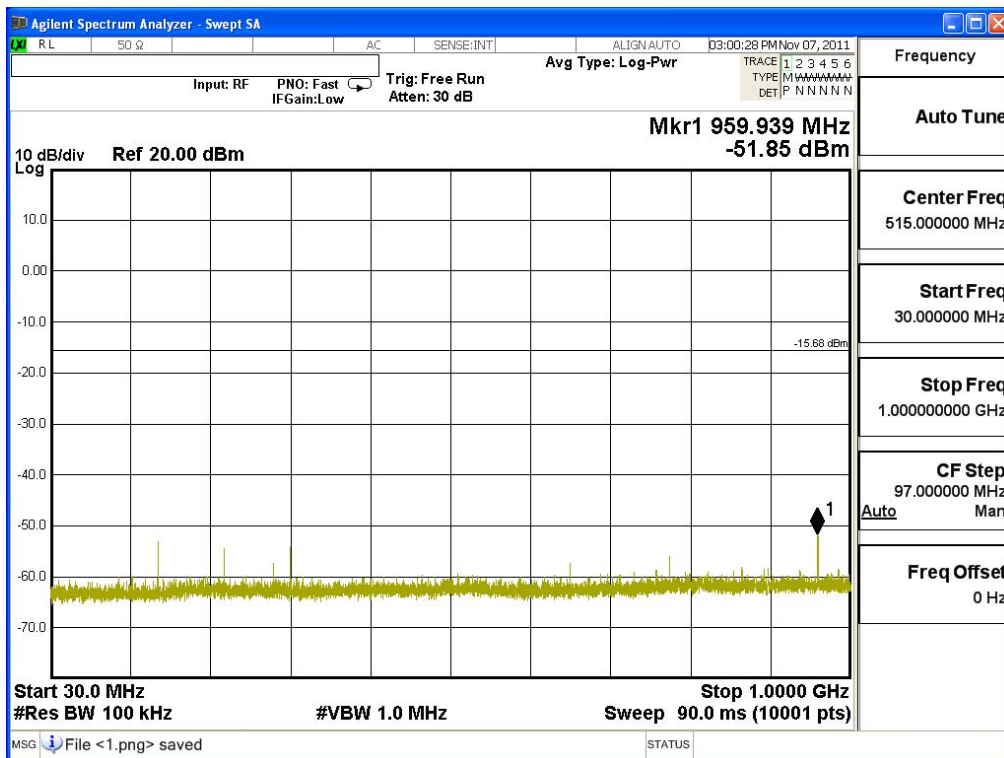


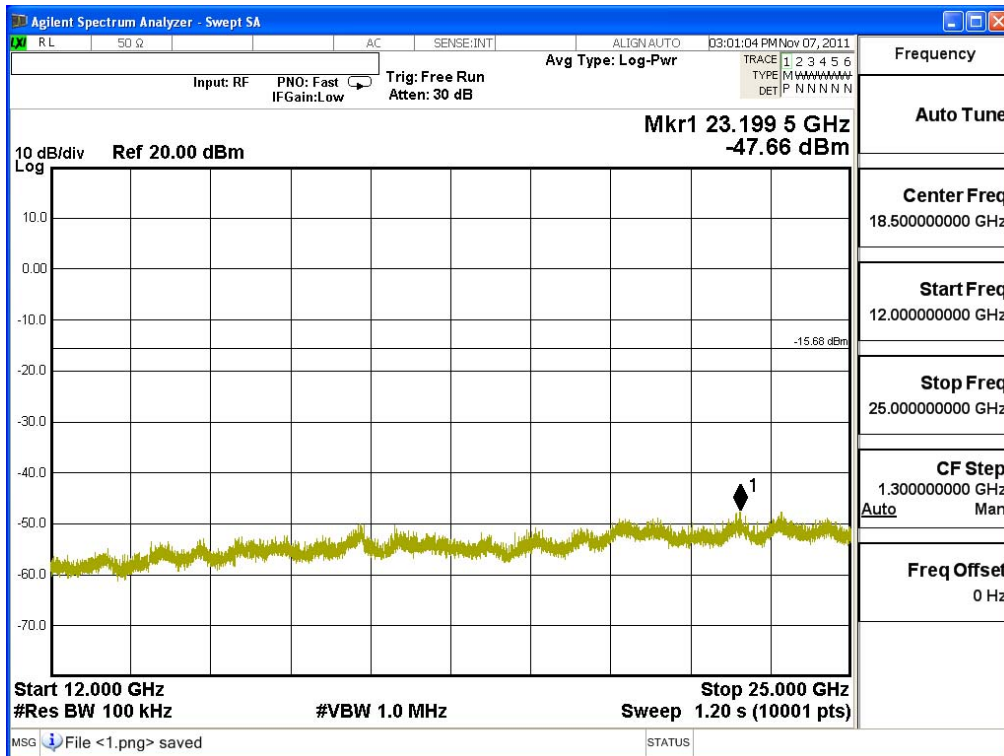
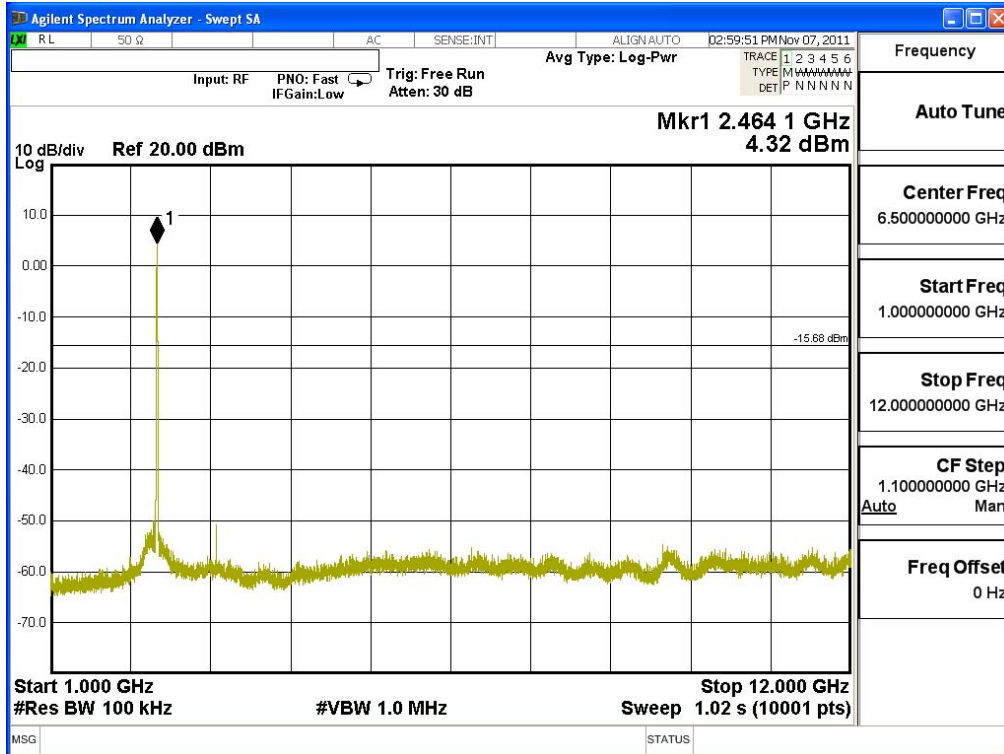
Channel 06 (2437MHz) 30MHz -25GHz





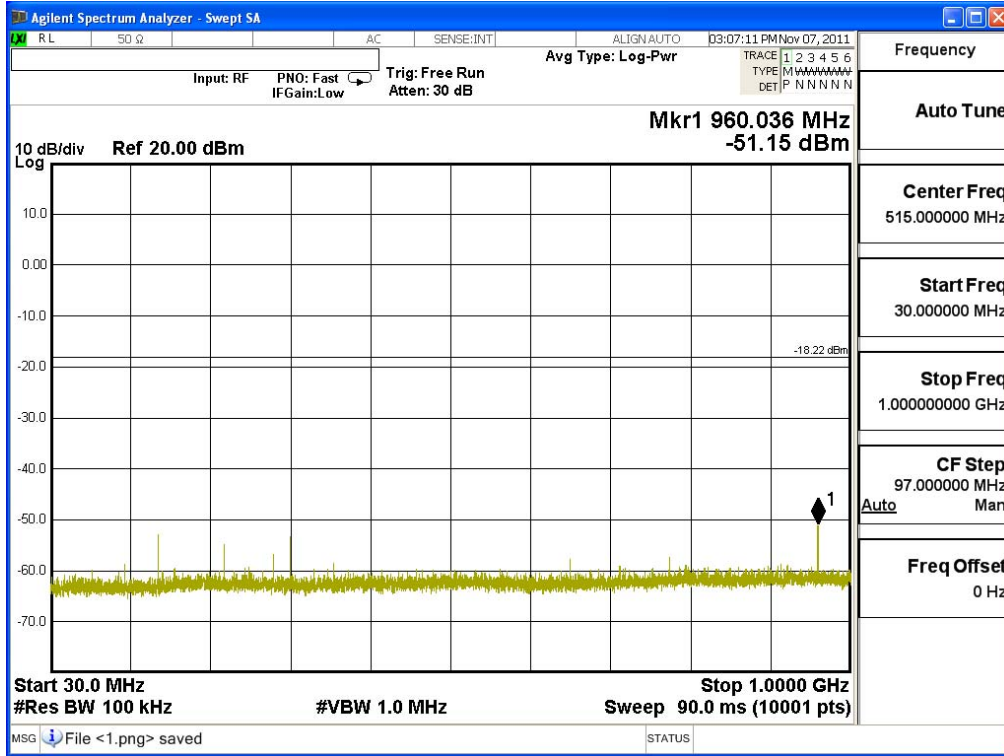
Channel 11 (2462MHz) 30MHz -25GHz

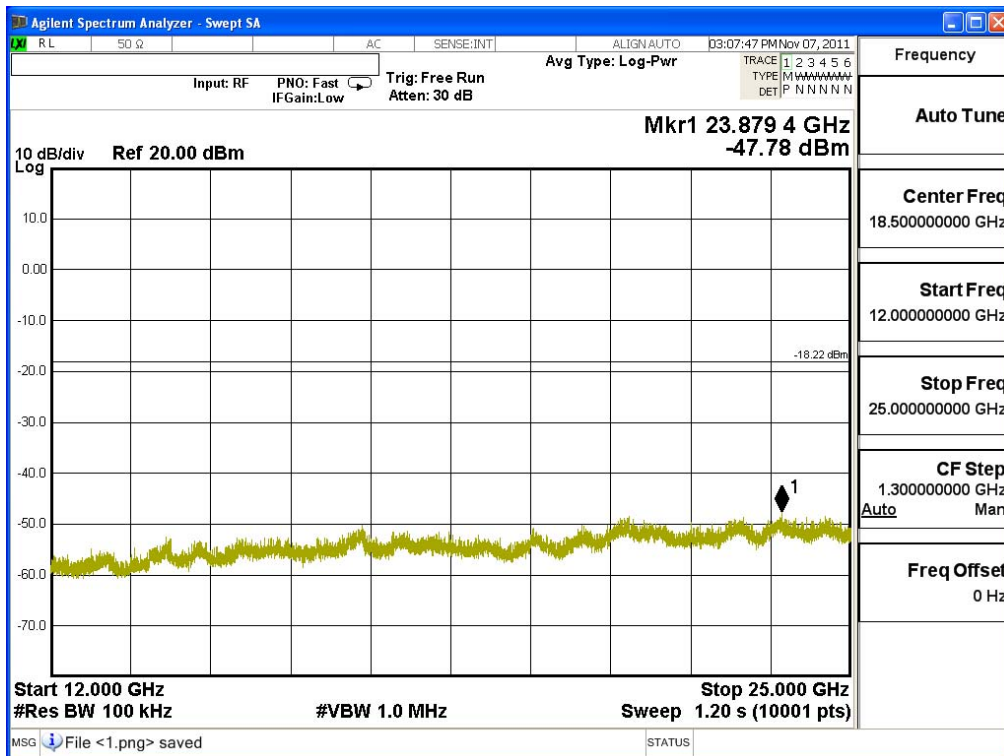
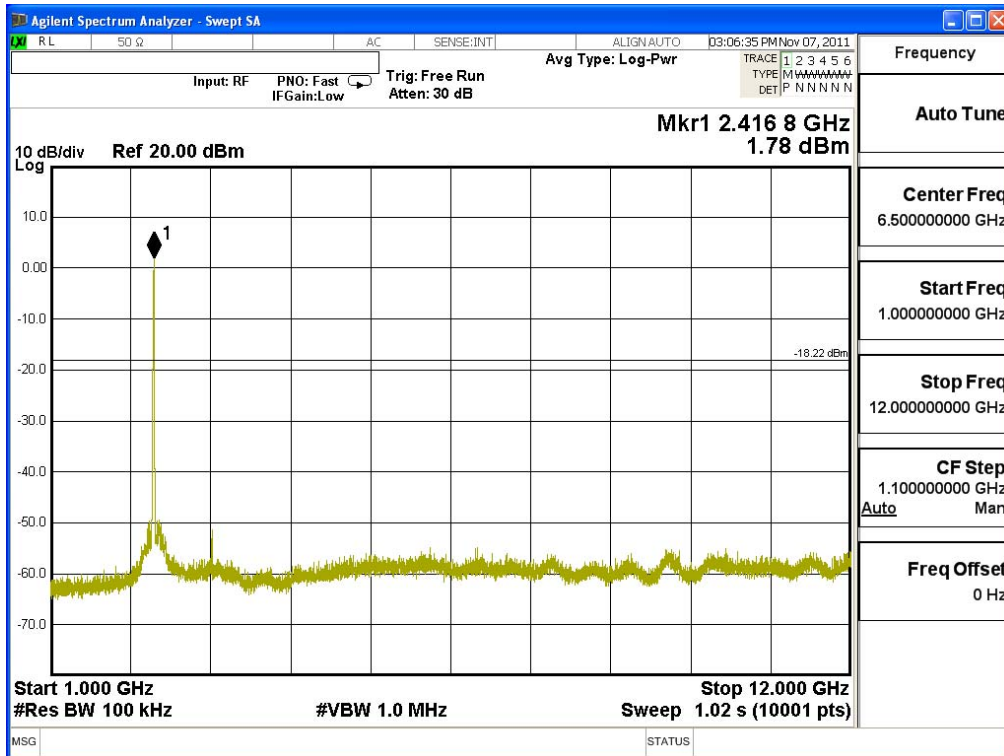




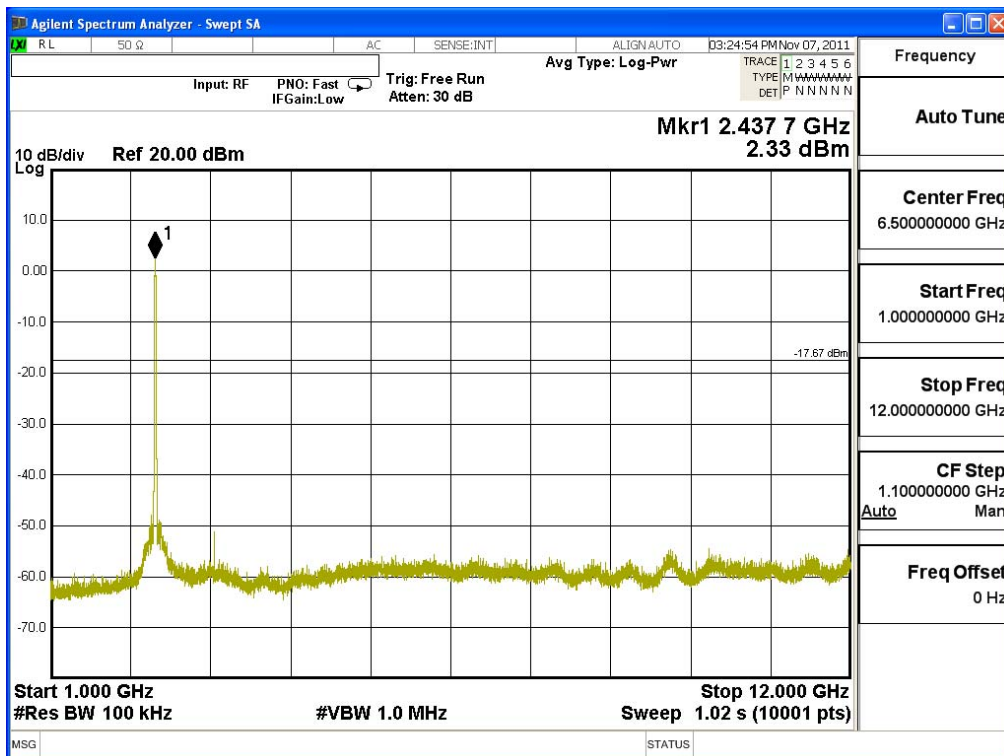
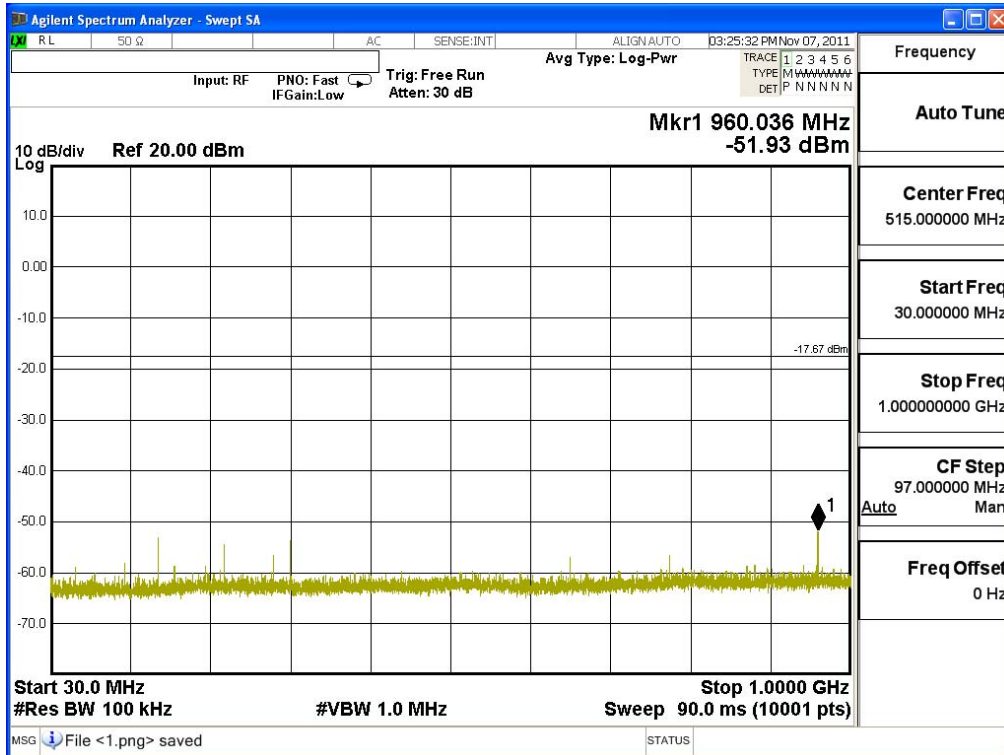
Product : 802.11n, 2.4G 1T1R Wireless LAN USB Module
 Test Item : RF Antenna Conducted Spurious
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11g 6Mbps)

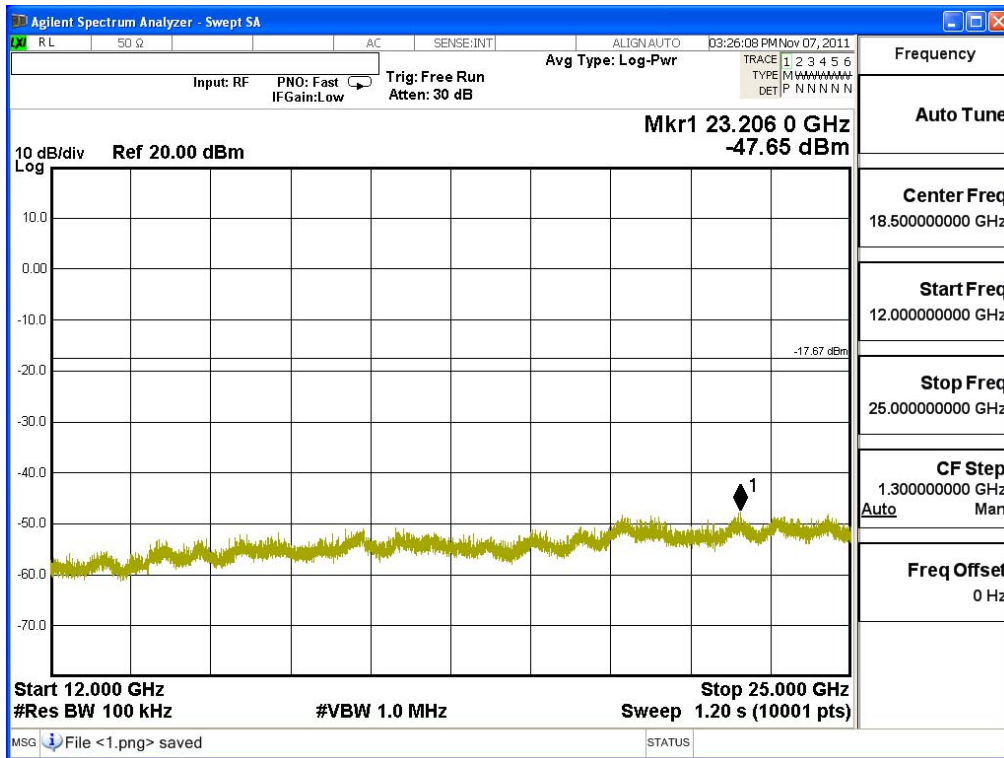
Channel 01 (2412MHz) 30MHz -25GHz



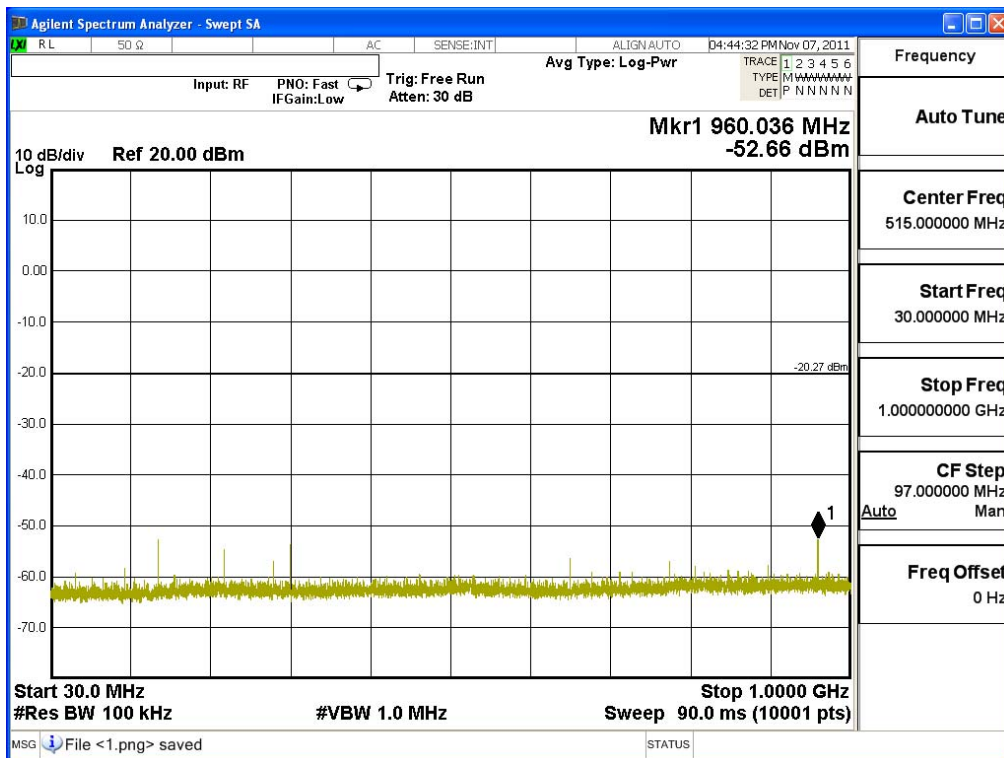


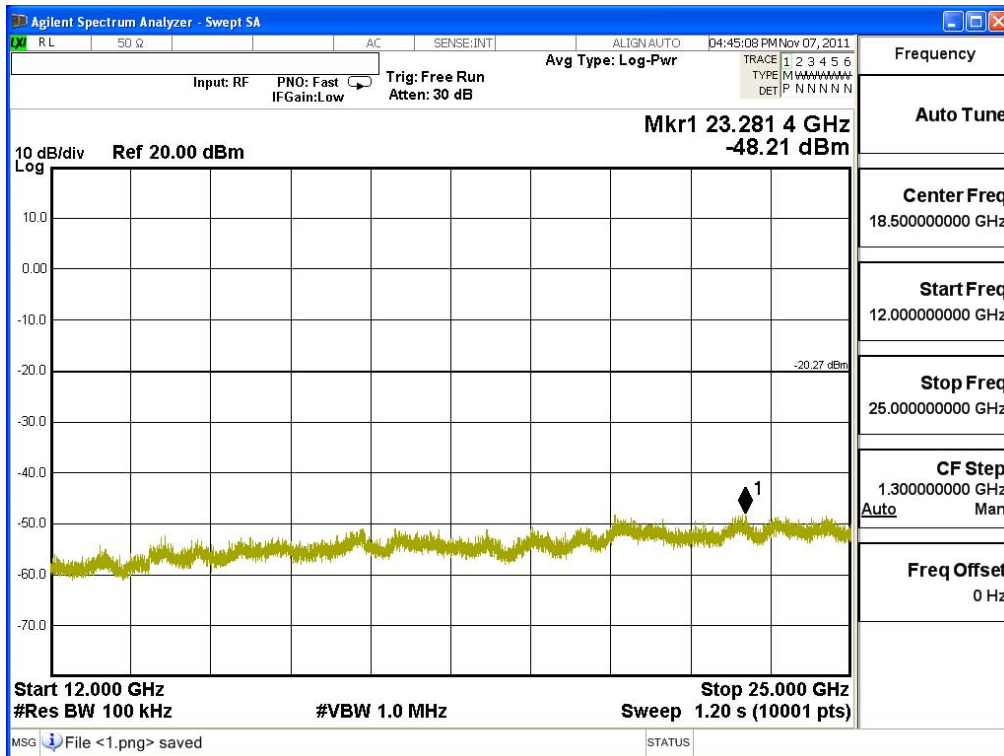
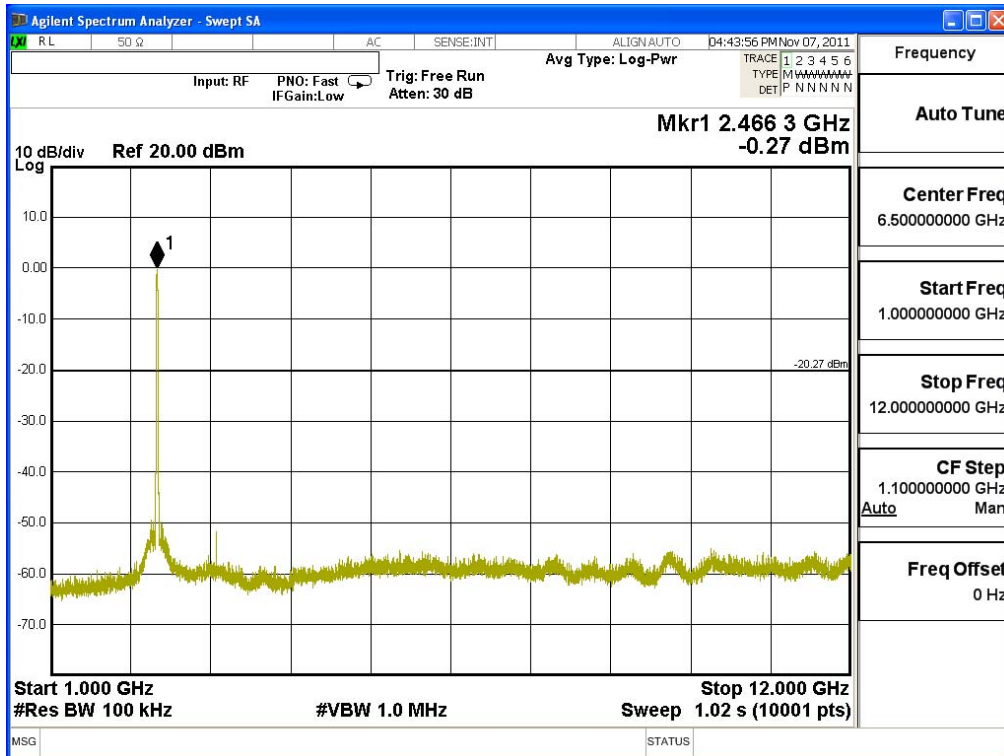
Channel 06 (2437MHz) 30MHz -25GHz





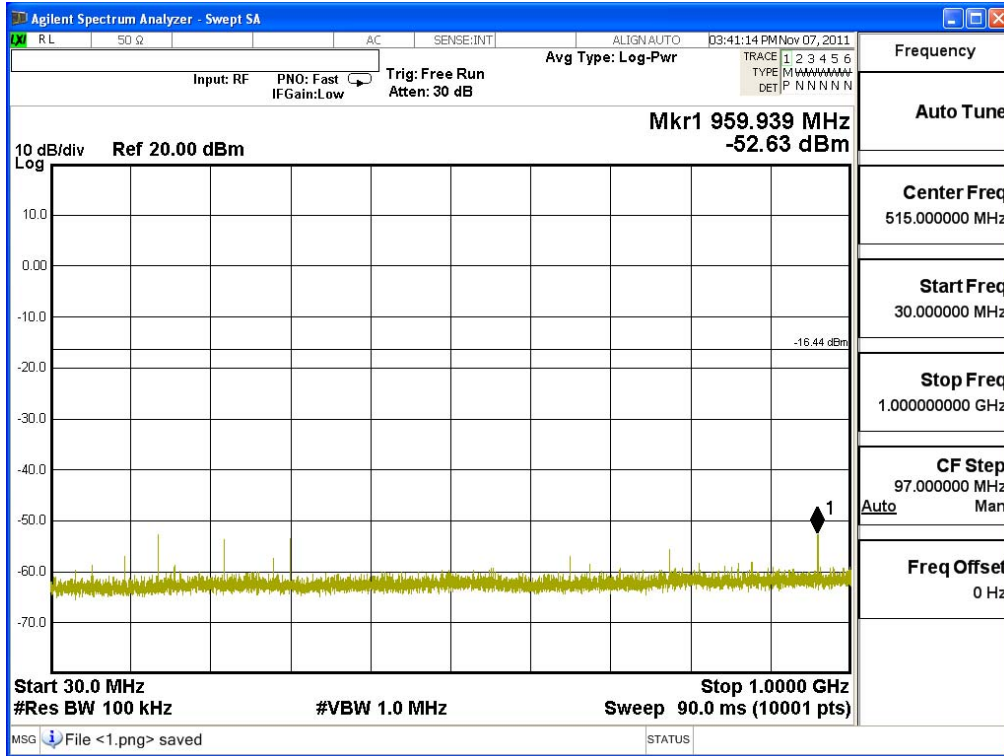
Channel 11 (2462MHz) 30MHz -25GHz

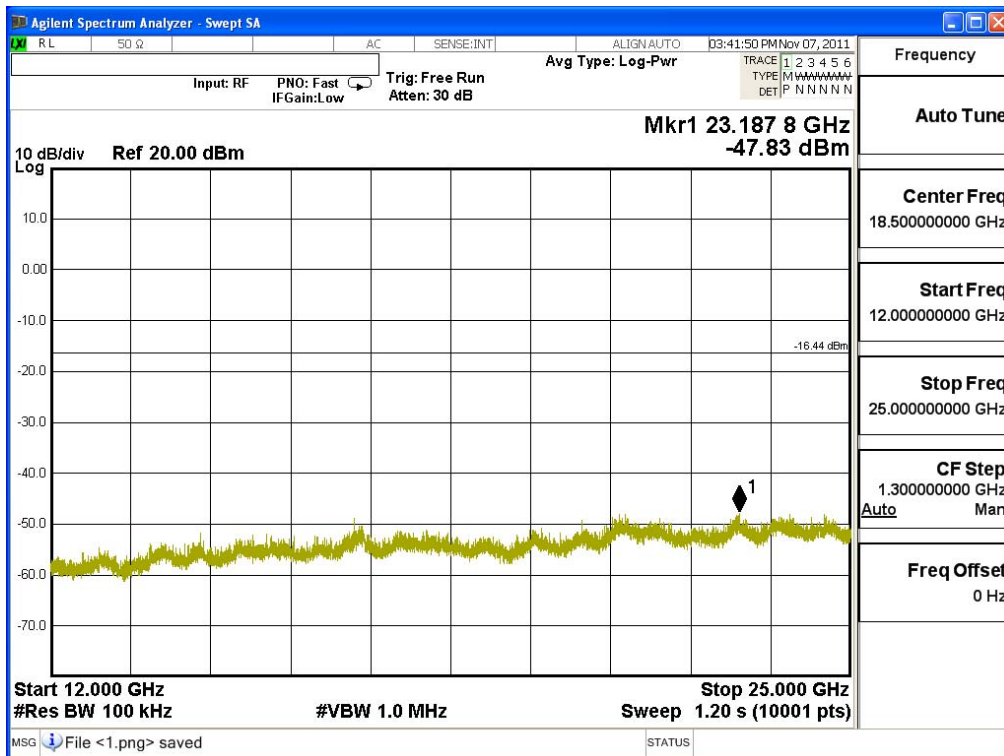
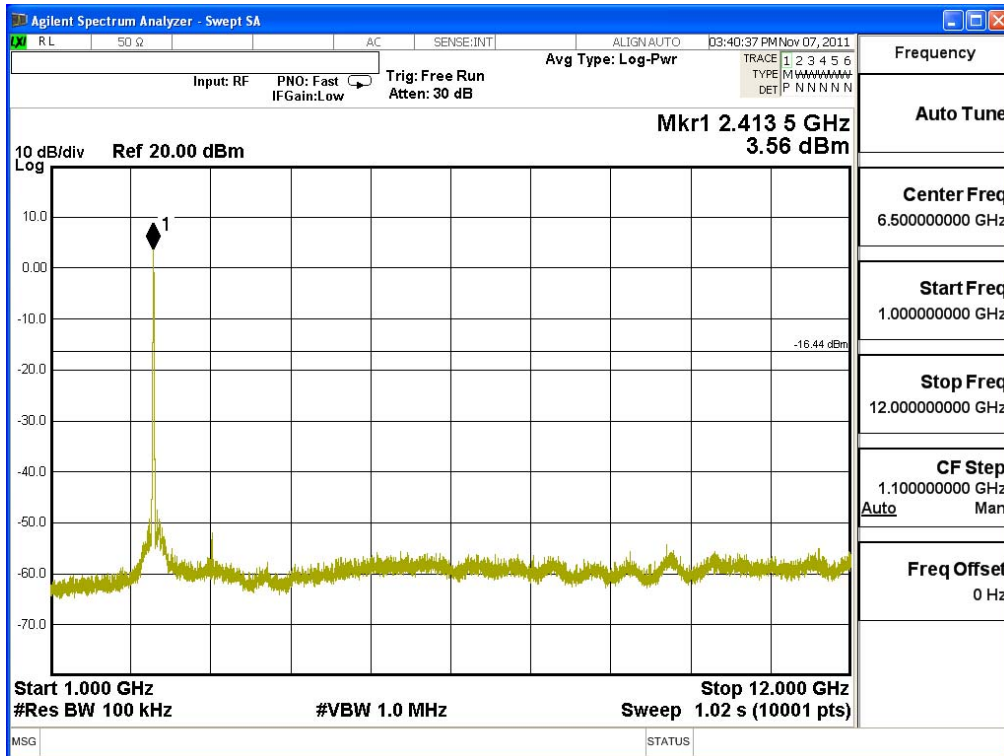




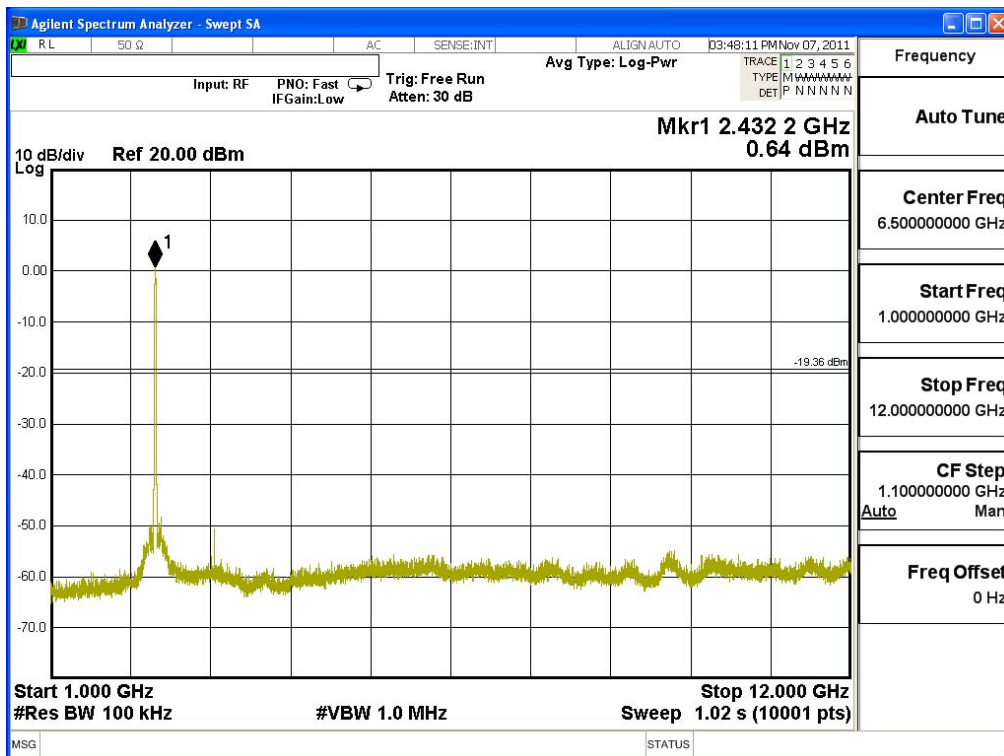
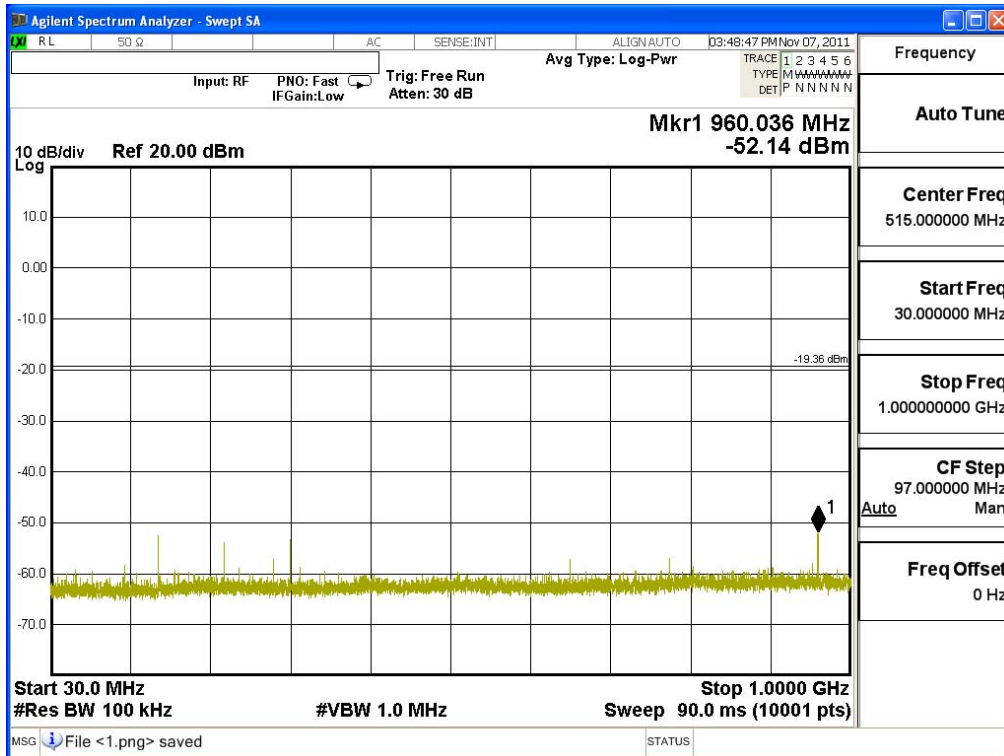
Product : 802.11n, 2.4G 1T1R Wireless LAN USB Module
 Test Item : RF Antenna Conducted Spurious
 Test Site : No.3 OATS
 Test Mode : Mode 3: Transmit - 802.11n-20BW_7.2Mbps(2.4G Band)

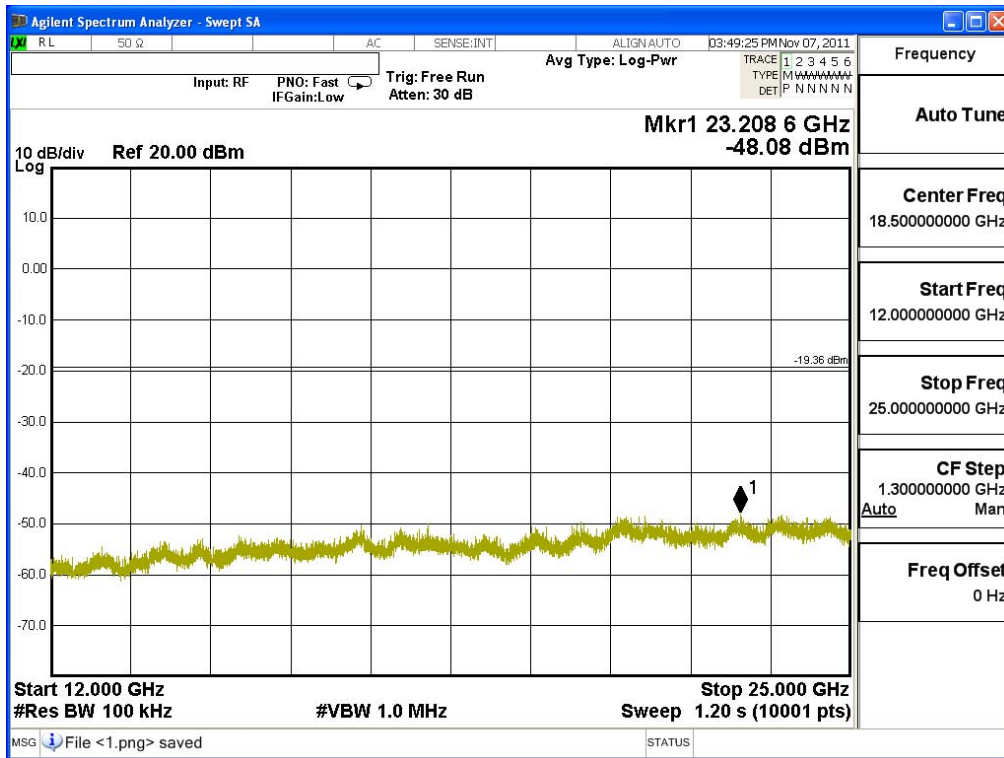
Channel 01 (2412MHz) 30MHz -25GHz



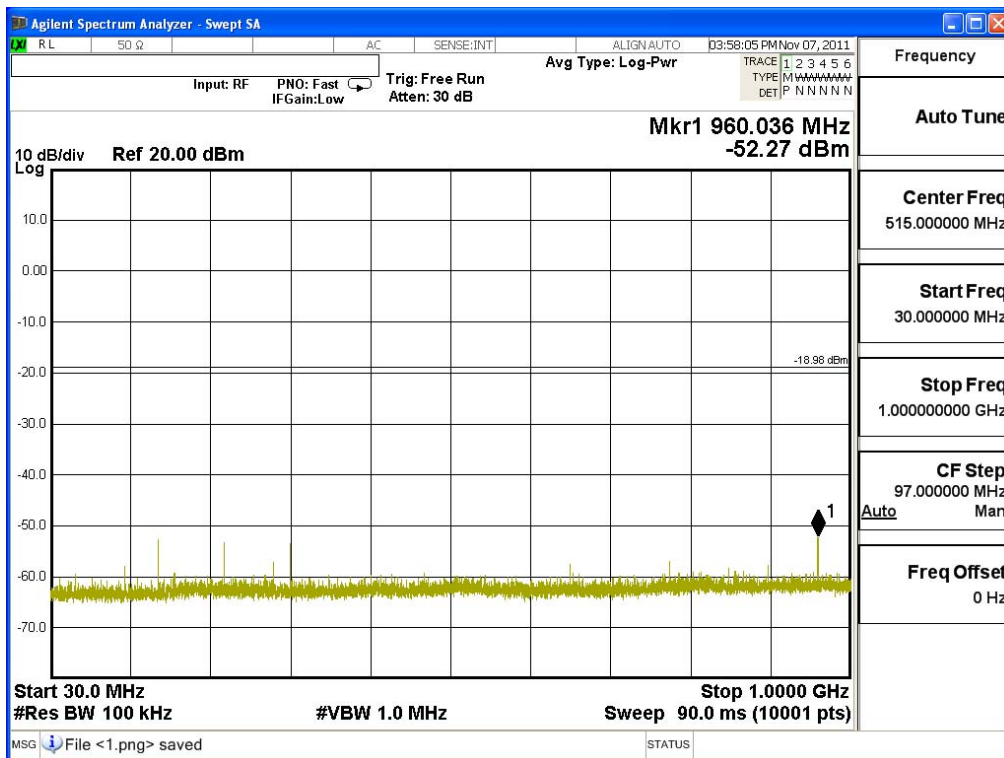


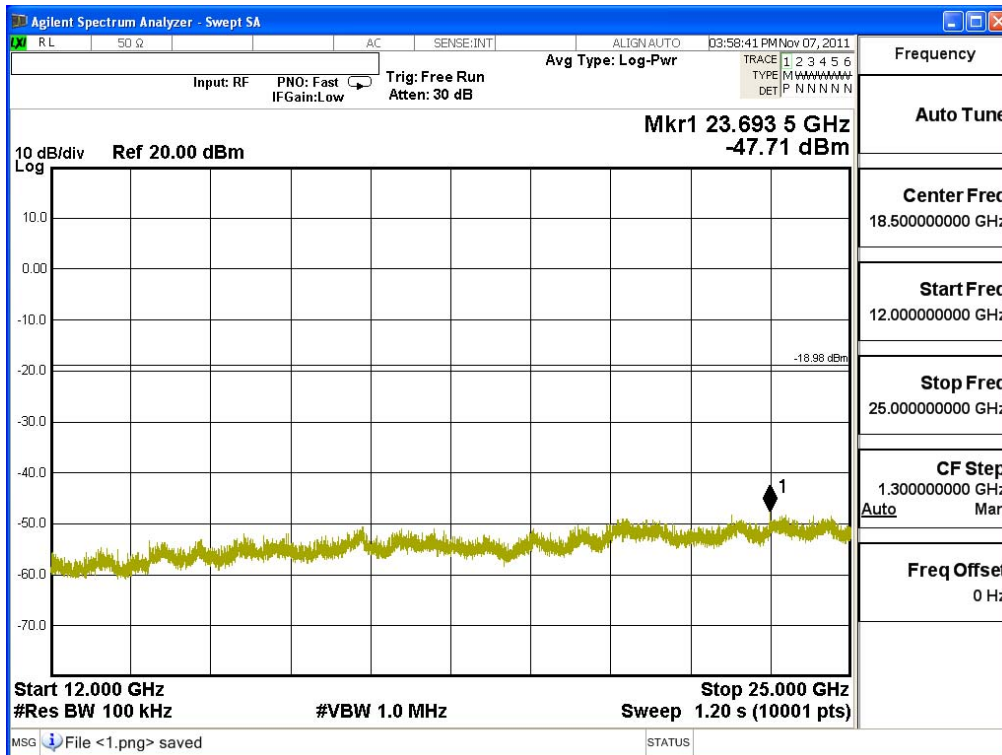
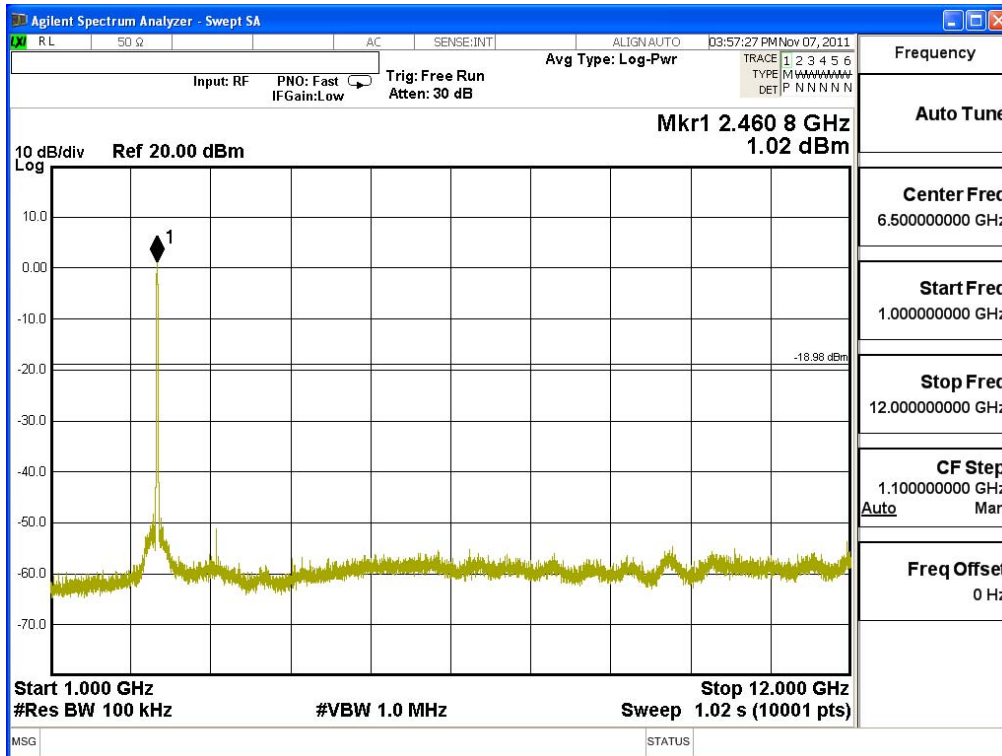
Channel 06 (2437MHz) 30MHz -25GHz





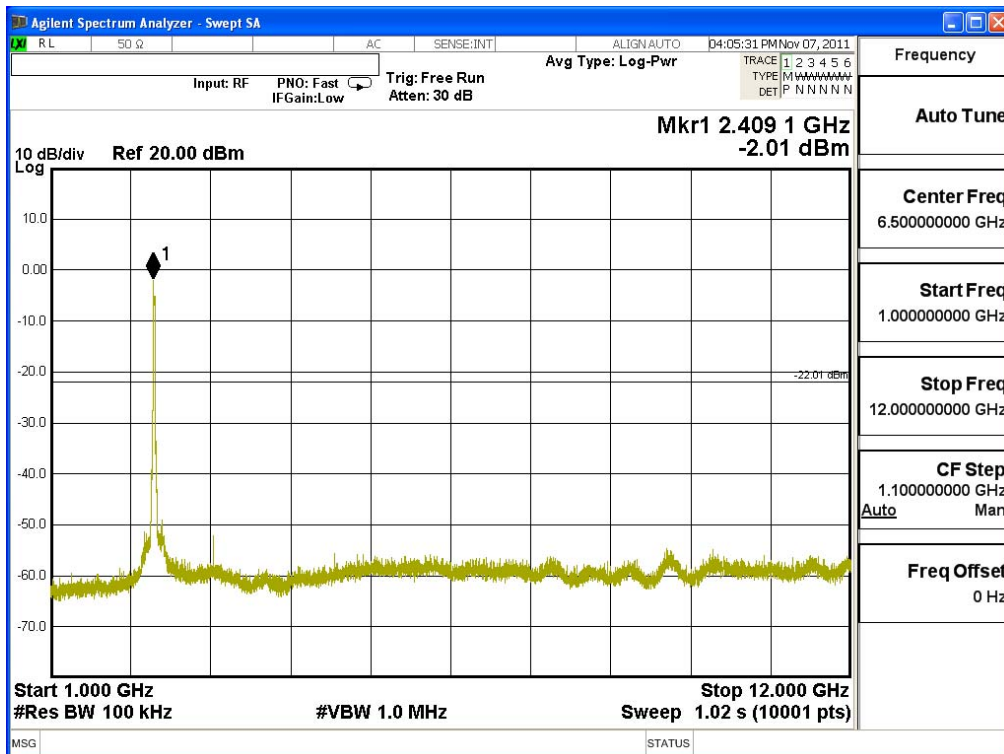
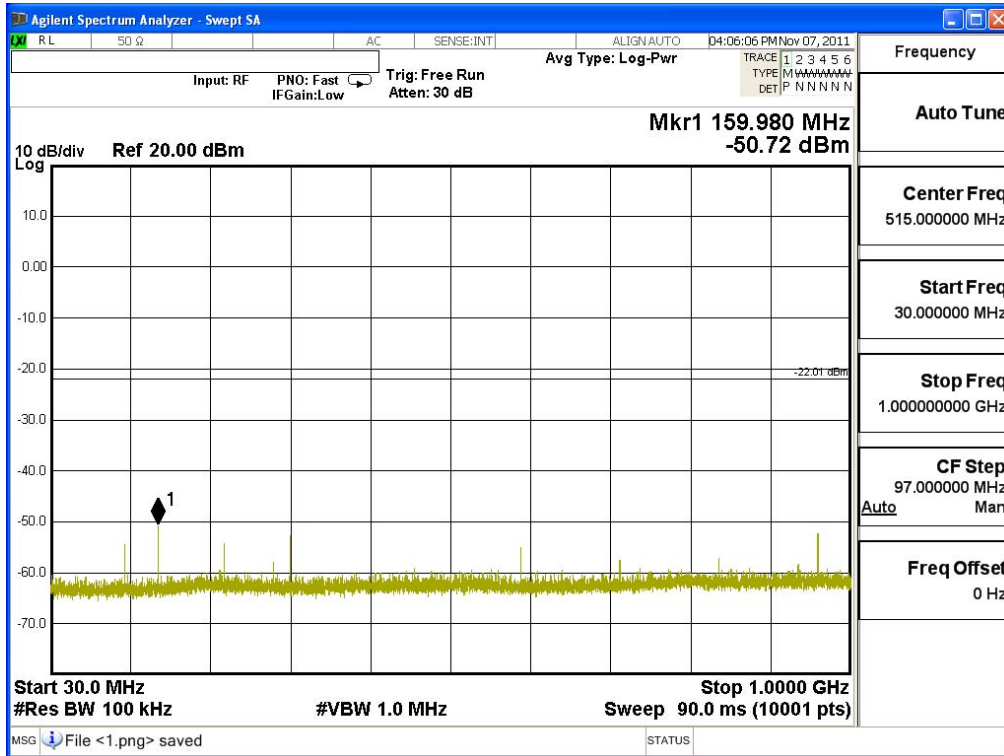
Channel 11 (2462MHz) 30MHz -25GHz

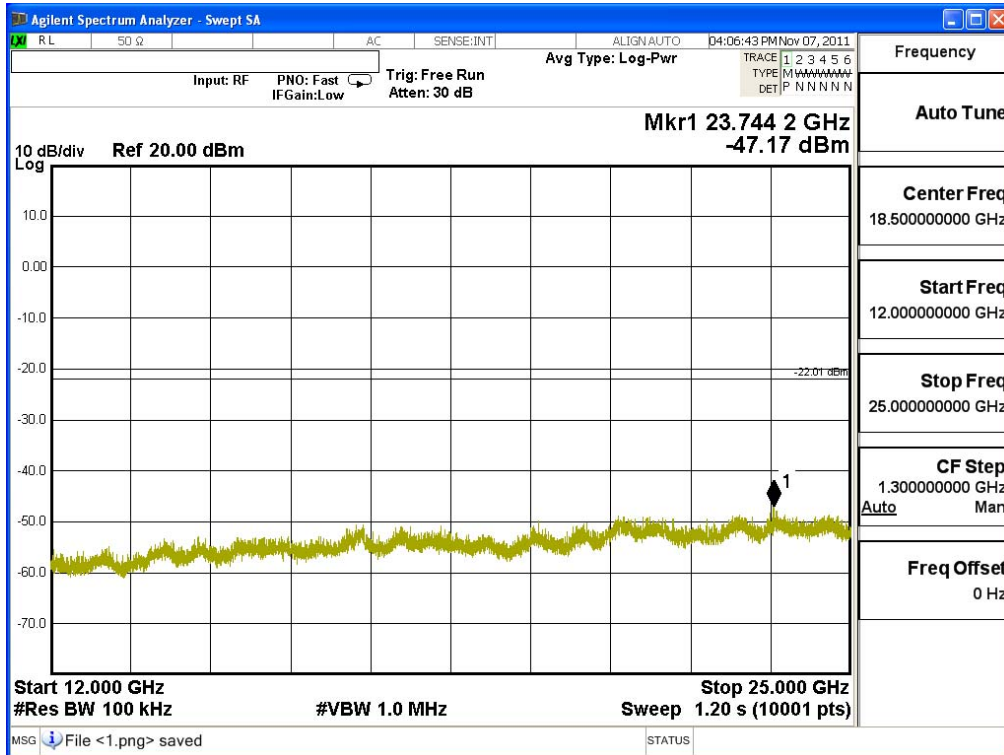




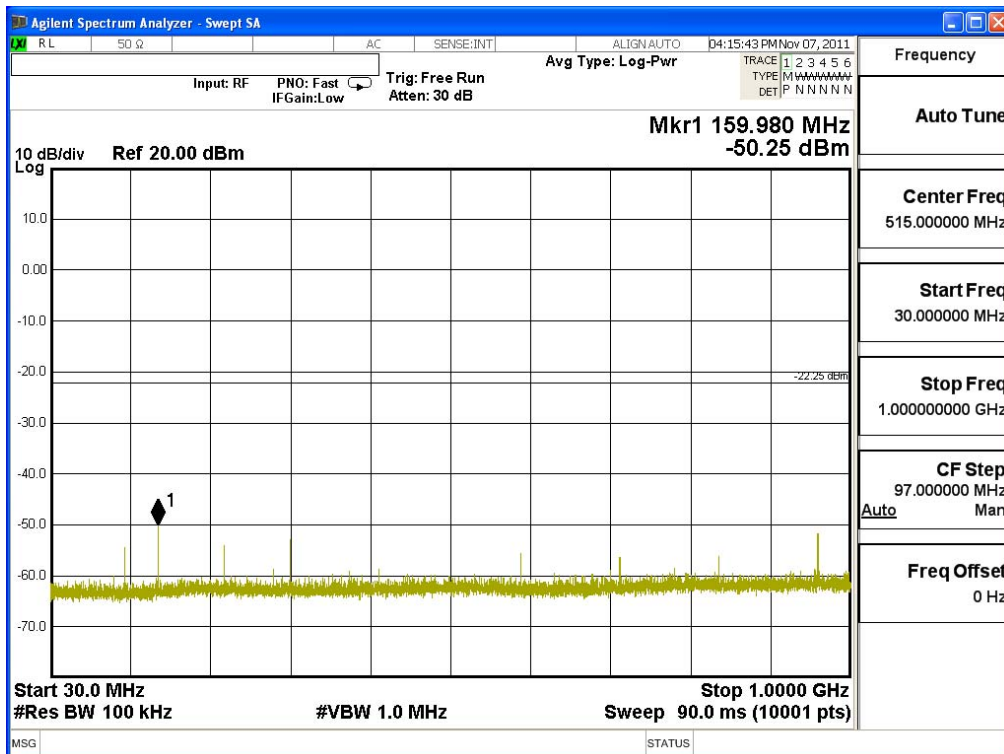
Product : 802.11n, 2.4G 1T1R Wireless LAN USB Module
 Test Item : RF Antenna Conducted Spurious
 Test Site : No.3 OATS
 Test Mode : Mode 4: Transmit - 802.11n-40BW_15Mbps(2.4G Band)

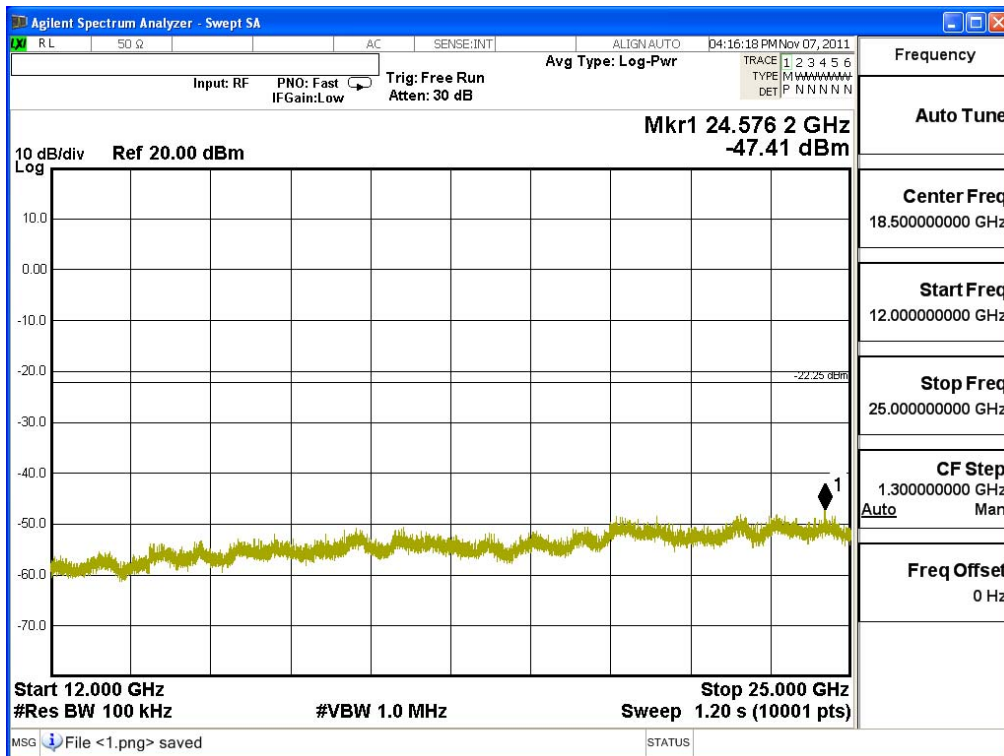
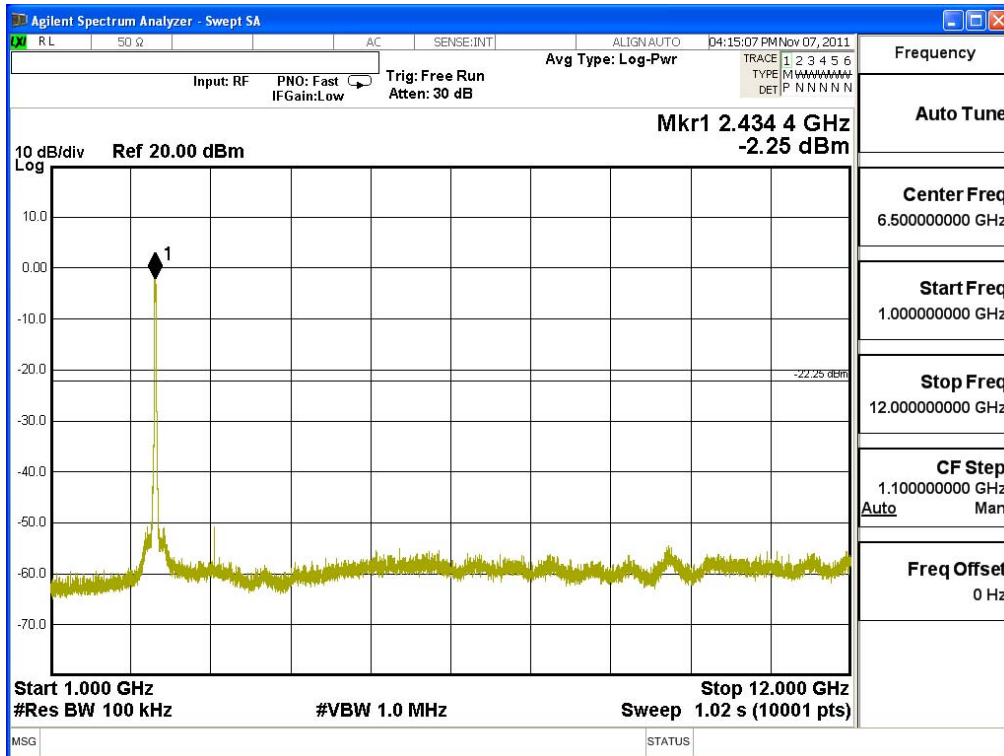
Channel 01 (2422MHz) 30MHz -25GHz





Channel 04 (2437MHz) 30MHz -25GHz





Channel 07 (2452MHz) 30MHz -25GHz

