

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT INTENTIONAL RADIATOR CERTIFICATION

Product Name : ADSL router

Trade Name : ProcurDirect
your global sourcing partner
Model Number : PD1101-K5815
Technical Data : AC 120V, 60Hz
FCC ID : ZNL-PD1101-K5815
Report Number : EESZD05310011-2
Date : September 6, 2011

Standards	Results
<input checked="" type="checkbox"/> 47 CFR FCC Part 15 Subpart C 15.247: 2010	PASS

Prepared for:
TelWorx Communications, LLC
239 welcome center BLVD, Lexington, North Carolina 27295,
United States.

Prepared by:
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CENTRE TESTING INTERNATIONAL

Building C, Hongwei Industrial Zone, Baoan 70 District, Shenzhen

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N/A means not applicable.

1. CERTIFICATION INFORMATION

Applicant & Address: TelWorx Communications, LLC
239 welcome center BLVD, Lexington, North Carolina 27295,
United States.

Manufacturer & Address: Not Applicable

Equipment Authorization: Certification

FCC ID: ZNL-PD1101-K5815

Product Name: ADSL router

Trade Name:

ProcurDirect
your global sourcing partner

Model Name: PD1101-K5815

Serial Number: Not Applicable

Report Number: EESZD05310011-2

Date of Test: May 31, 2011 to September 6, 2011

The above equipment was tested by Centre Testing International for compliance with the requirements set forth in the FCC Rules and Regulations Part 15:2010, Subpart C and the measurement procedure according to ANSI C63.4:2003.

The test results of this report relate only to the tested sample identified in this report.

Prepared by : Gavin Song
Gavin Song

Reviewed by : Louisa Lu
Louisa Lu

Approved by : Jimmy Li
Jimmy Li
Manager



Date : September 6, 2011

2. TEST SUMMARY

No.	Test Item	Rule	Result
1	6dB Bandwidth	15.247(a)(2)	PASS
2	Peak Output Power	15.247(b)(3)	PASS
3	Power Spectral Density	15.247(e)	PASS
4	Bandedge Emission	15.247(d)	PASS
5	Spurious RF Conducted Emission	15.247(d)	PASS
6	Radiated Emission	15.247(d)	PASS
7	Conducted Emission	15.207	PASS
8	Antenna requirements	15.203	PASS (See Notes)

Notes: The EUT uses a Internal integral antenna which in accordance with Section 15.203 is considered sufficient to comply with the provisions of this section.

3. MEASUREMENT UNCERTAINTY

Where relevant, the following test uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Test item	Value (dB)
Conducted disturbance	2.7
Radiated disturbance	4.4

4. PRODUCT INFORMATION

4.1 Product Description

The Equipment Under Test (EUT) is an ADSL router with WiFi function operating at 2.412-2.462GHz, 11 channels selection. The EUT is powered by AC/DC adaptor 100-240VAC 50/60Hz input, 12VDC 1A output.

For more detailed features description, please refer to the user's manual.

4.2 Related Submittal(s) Grants

This is an application for certification of:

DTS- Part 15 Digital Transmission Systems (WiFi transmitter portion)

Remaining portions are subject to the following procedures

Computer peripheral:15B Certification (report no. : EESZD05310011-1).

4.3 WiFi Module information

Item	Description		
	IEEE 802.11b	IEEE 802.11g	IEEE 802.11n
Operating Frequency band	2400 MHz– 2483.5 MHz		
Channel Number	11 2412 MHz / 2417 MHz / 2422 MHz / 2427 MHz / 2432 MHz / 2437 MHz / 2442 MHz / 2447 MHz / 2452 MHz / 2457 MHz / 2462 MHz		
Channel Bandwidth (MHz)	20	20	20
Channel Spacing (MHz)	5	5	5
Modulation	DSSS	OFDM	OFDM
Data Rate (Mbps)	1/2/5.5/11	6/9/12/18/24/36/48/54	6.5/13/19.5/26/39/52/58.5/65
Antenna Type	Undetachable omnidirectional		
Antenna Gain (dBi)	3		

5. SYSTEM TEST CONFIGURATION

5.1 Justification

For emissions testing, the equipment under test (EUT) setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing. During testing, all cables were manipulated to produce worst case emissions. It was powered by 12DC from 100-240V AC input adaptor. Only the worst case data were recorded in this test report.

The signal is maximized through rotation and placement in the three orthogonal axes. The antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters. Radiated emissions are taken at three meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance.

All readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance. Analyzer resolution is 100 kHz or greater for frequencies below 1000 MHz. The resolution is 1 MHz or greater for frequencies above 1000 MHz. The spurious emissions more than 20 dB below the permissible value are not reported.

Radiated emission measurement were performed the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

5.2 EUT Exercising Software

The EUT exercise program ADSL modem used during testing was designed to exercise the various system components in a manner similar to a typical use.

The parameters of test software setting:

During the test, Channel, datarate and power controlling software provided by the applicant was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the application and is going to be fixed on the firmware of the end product.

6. TEST EQUIPMENT LIST

Equipment	Manufacturer	Model Number	Serial Number	Due Date
3M Chamber & Accessory Equipment	ETS-LINDGREN	FACT-3	3510	07/09/2012
Spectrum Analyzer	Agilent	E4440A	MY46185649	03/29/2012
Biconilog Antenna	ETS-LINGREN	3142C	00044562	07/06/2012
Multi device Controller	ETS-LINGREN	2090	00057230	N/A
Horn Antenna	ETS-LINGREN	3117	00057407	07/06/2012
Microwave Preamplifier	CD	PAP-1G18G	2001	07/06/2012
Power Meter	AR	PM2002	312901	07/06/2012
Receiver	R&S	ESCI	100009	07/06/2012
LISN	R&S	ENV216	100098	07/06/2012

7. SUPPORT EQUIPMENT LIST

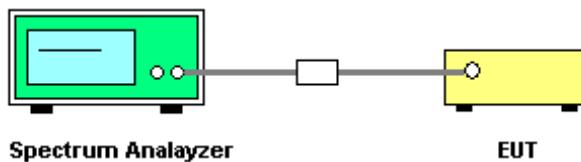
No.	Device Type	Brand	Model	Series No.
1.	Notebook	DELL	Vostro 3400	GYQTVP1
2.	Mouse	L.Selectron	M004	---

8. 6DB BANDWIDTH MEASUREMENT

8.1. LIMITS

Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

8.2. BLOCK DIAGRAM OF TEST SETUP



8.3. TEST PROCEDURE

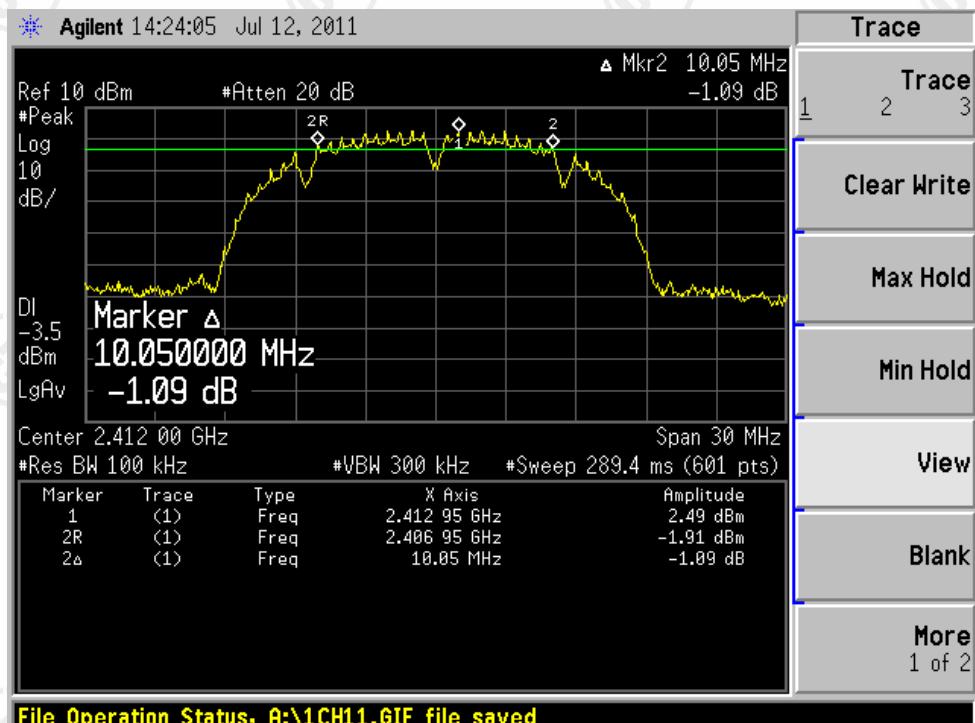
1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. Set spectrum analyzer's RBW and VBW to applicable value with Peak in Max Hold.
3. A PEAK output reading was taken, a DISPLAY line was drawn 6 dB lower than PEAK level.
4. The 6dB bandwidth was determined from where the channel output spectrum intersected the display line.

Note: For more detail measurement procedure or testing method, please reference measurement procedure KDB 558074 document which is published on FCC website.

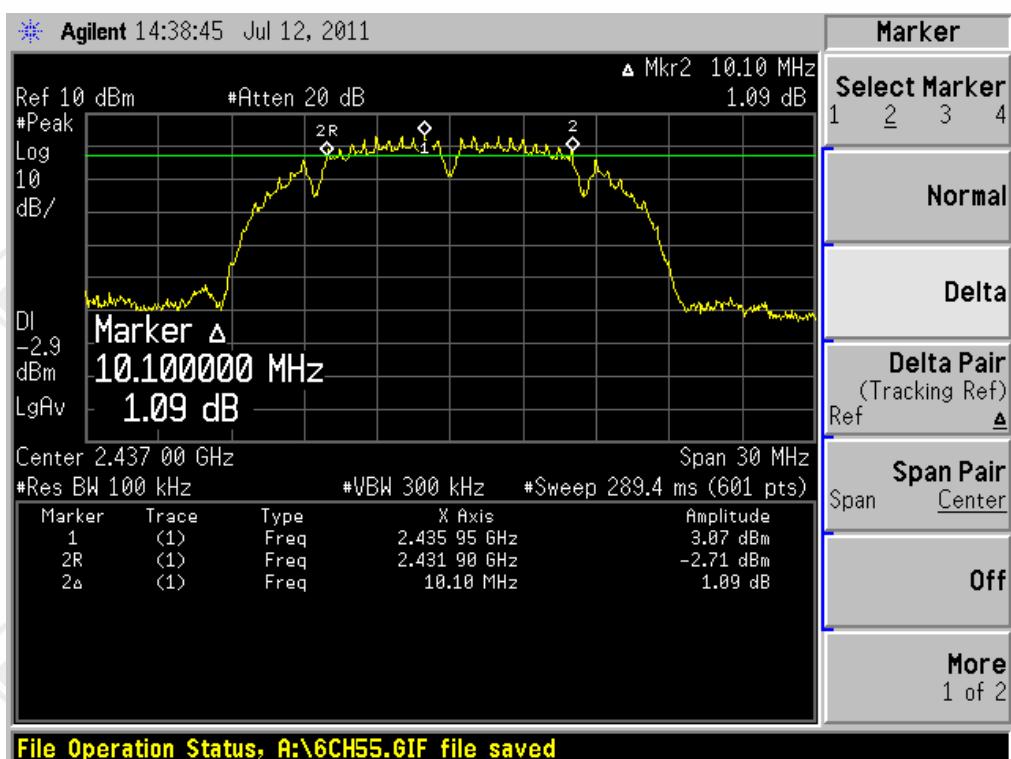
8.4. TEST RESULT

Please see the following plots (worst case).

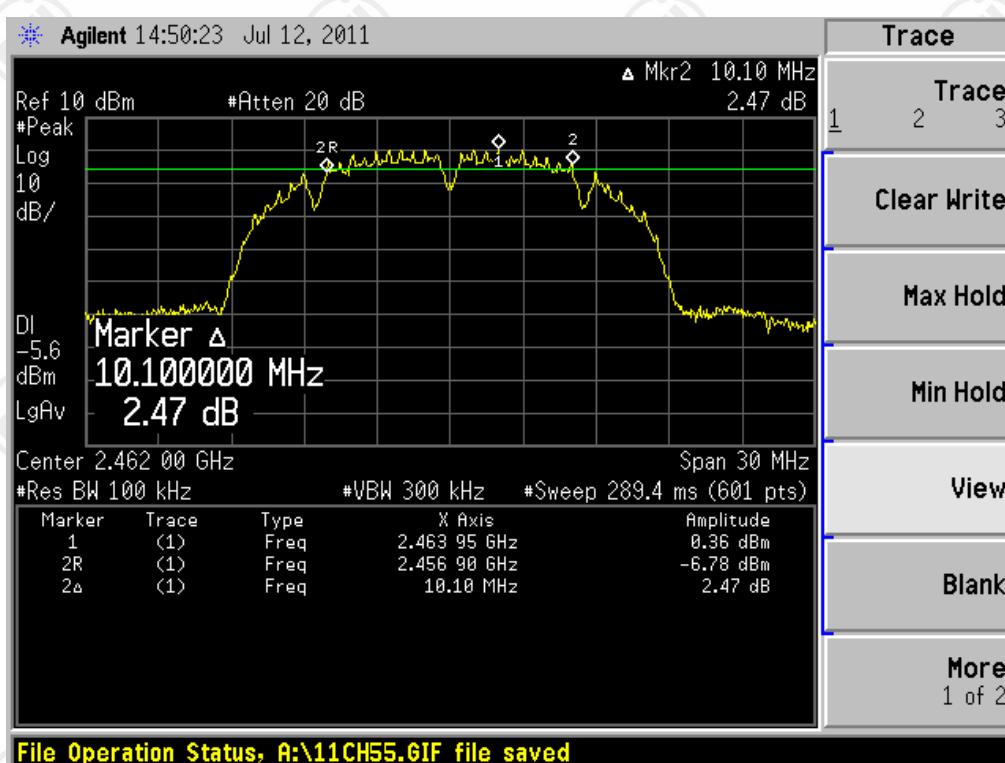
802.11b Mode (11Mbps) :



Low channel

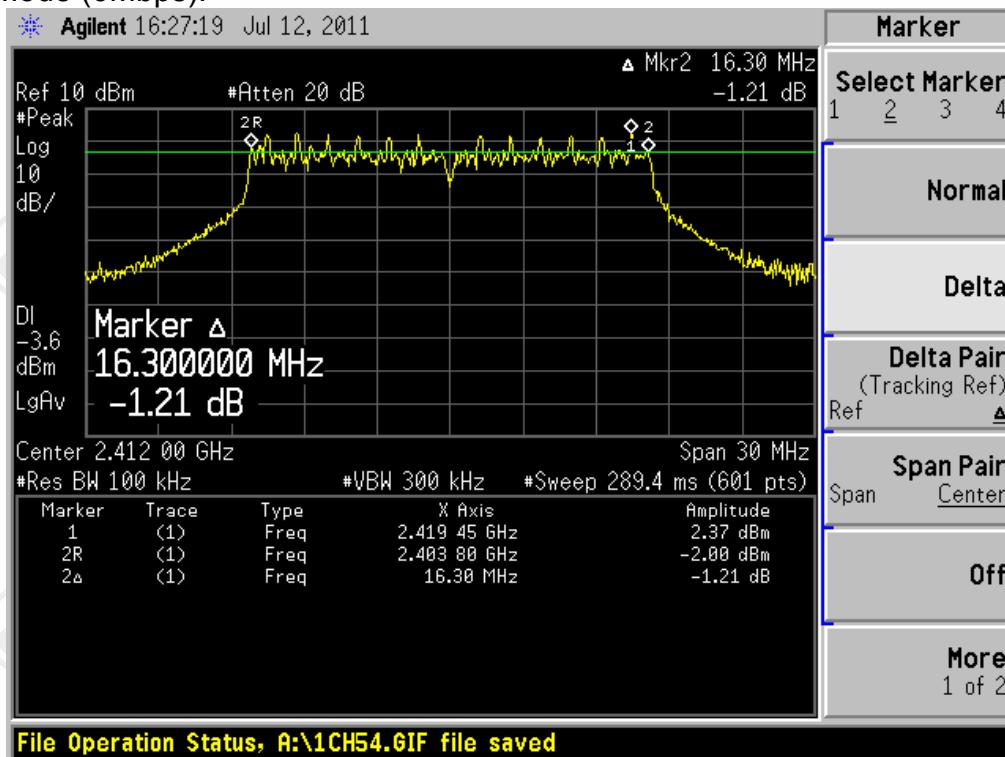


Middle channel

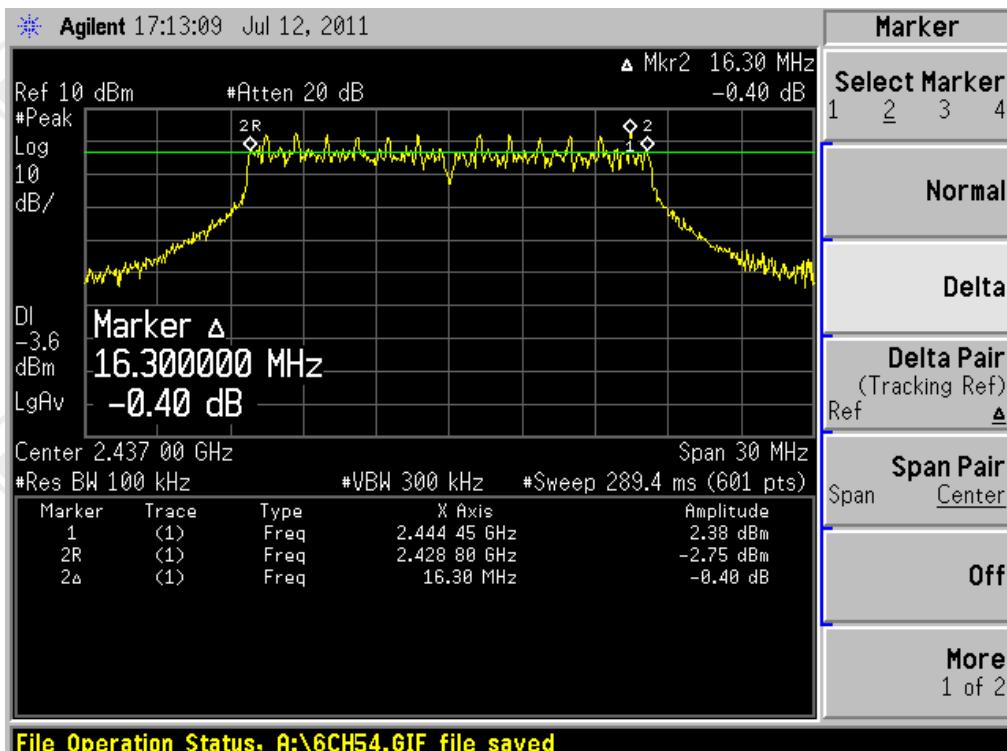


High channel

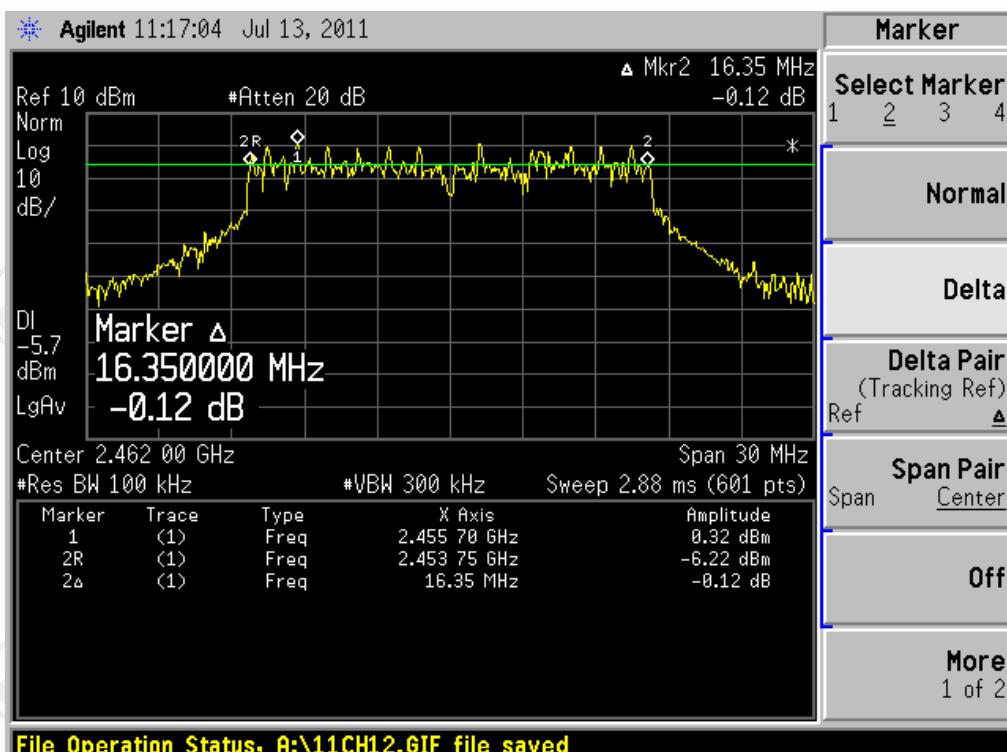
802.11g Mode (6Mbps):



Low channel

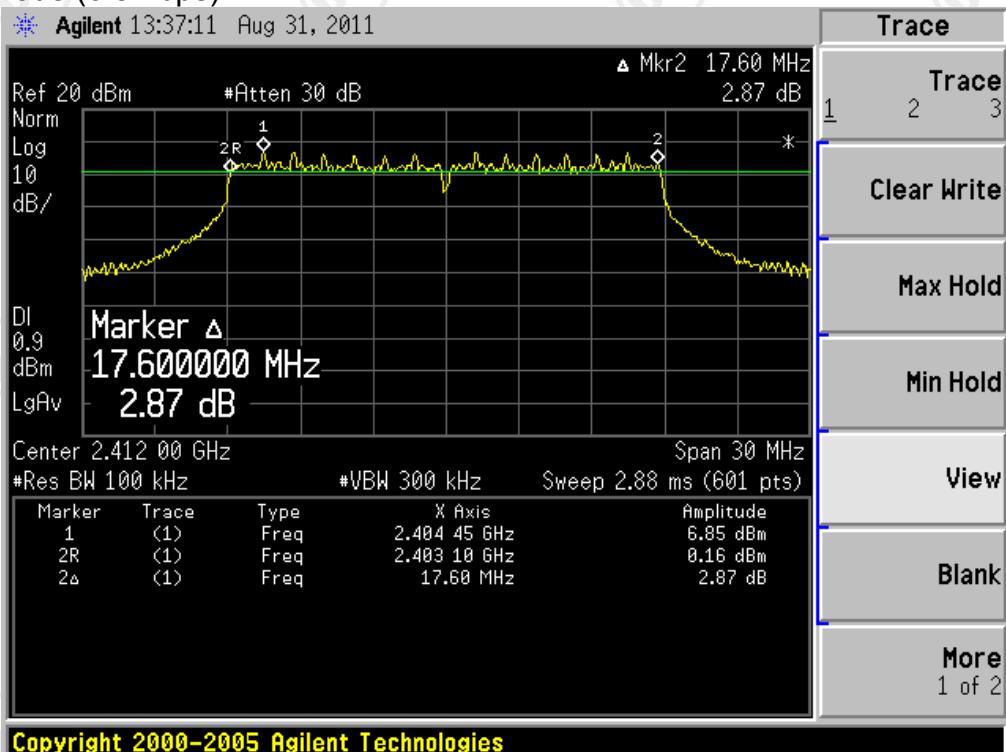


Middle channel

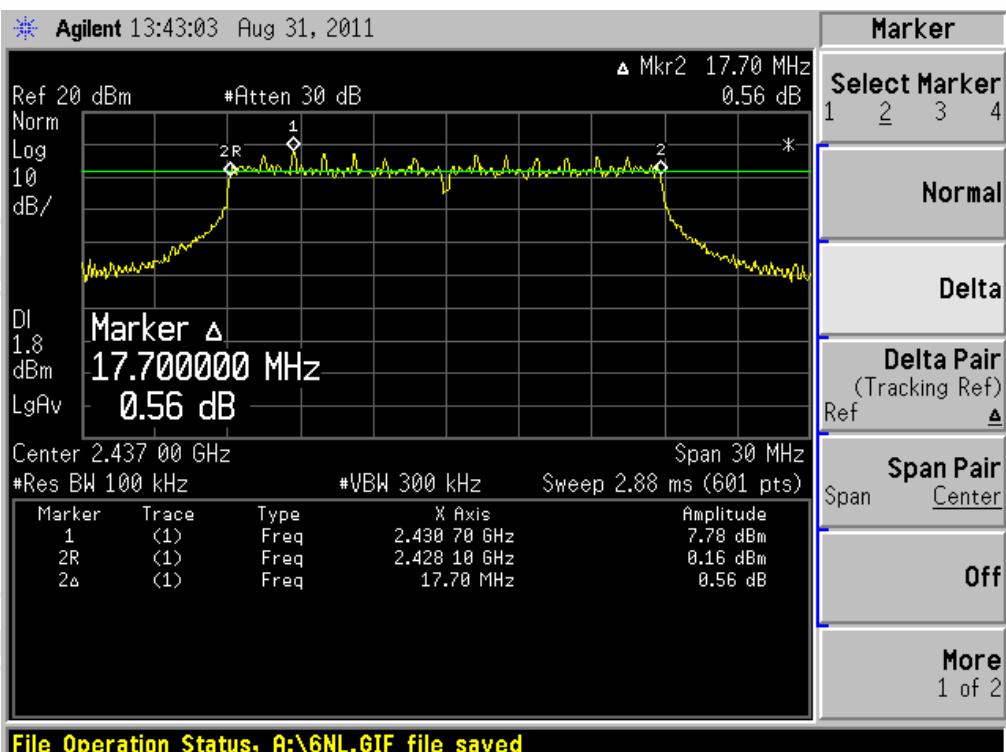


High channel

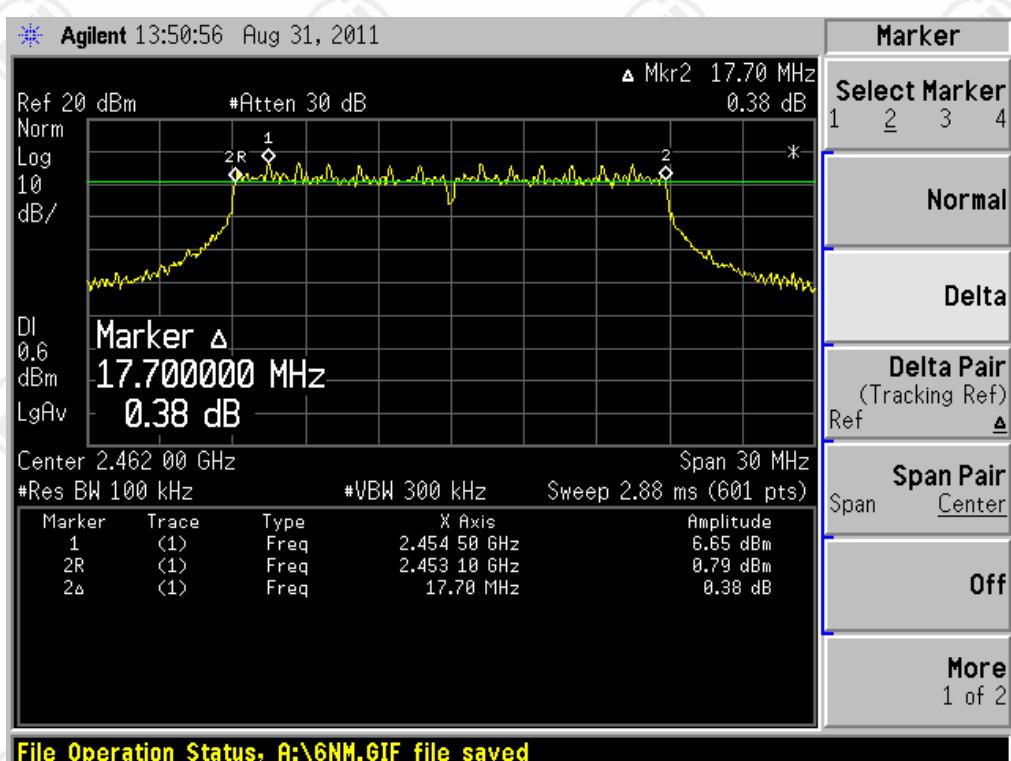
802.11n Mode (6.5Mbps):



Low channel



Middle channel



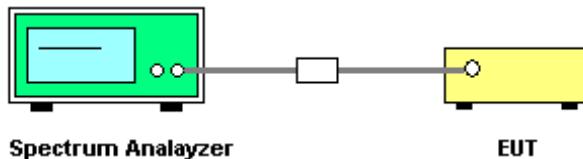
High channel

9. POWER SPECTRAL DENSITY

9.1. LIMITS

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

9.2. BLOCK DIAGRAM OF TEST SETUP



9.3. TEST PROCEDURE

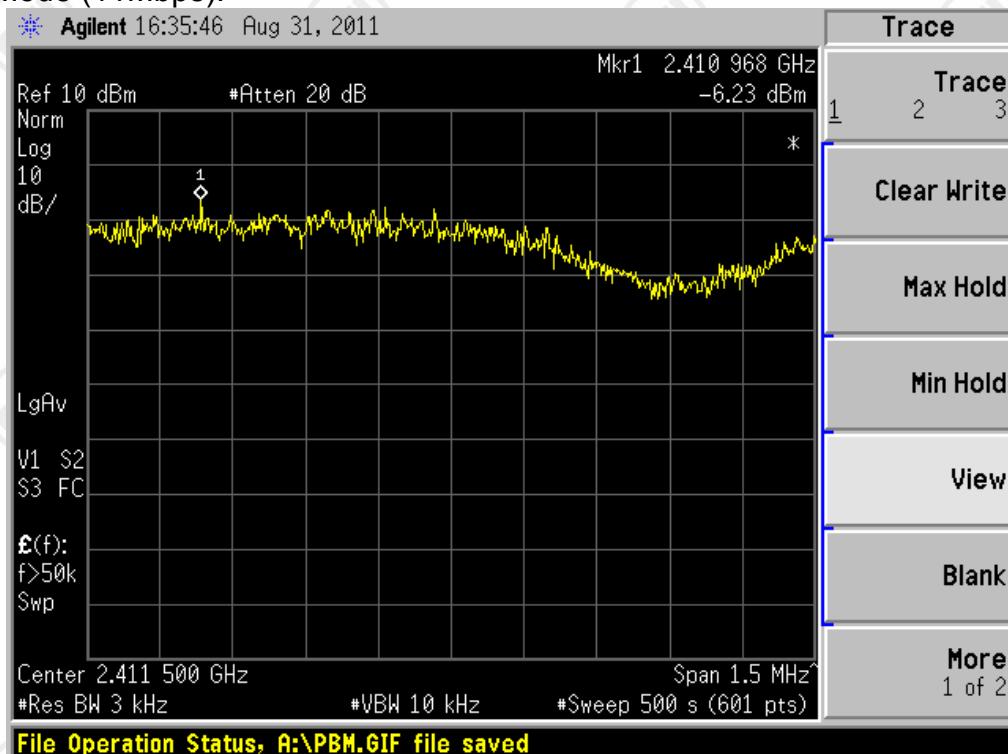
1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. Set spectrum analyzer's RBW and VBW to applicable and set span wide enough to capture the whole plot, record the frequency of the max emission in the plot.
3. Set the frequency as center frequency, and set RBW = 3 kHz, VBW > RBW, sweep= (SPAN/3 kHz) with Peak detector in Max Hold mode.
4. Read the output peak data from the spectrum analyzer directly.

Note: For more detail measurement procedure or testing method, please reference measurement procedure KDB 558074 document which is published on FCC website.

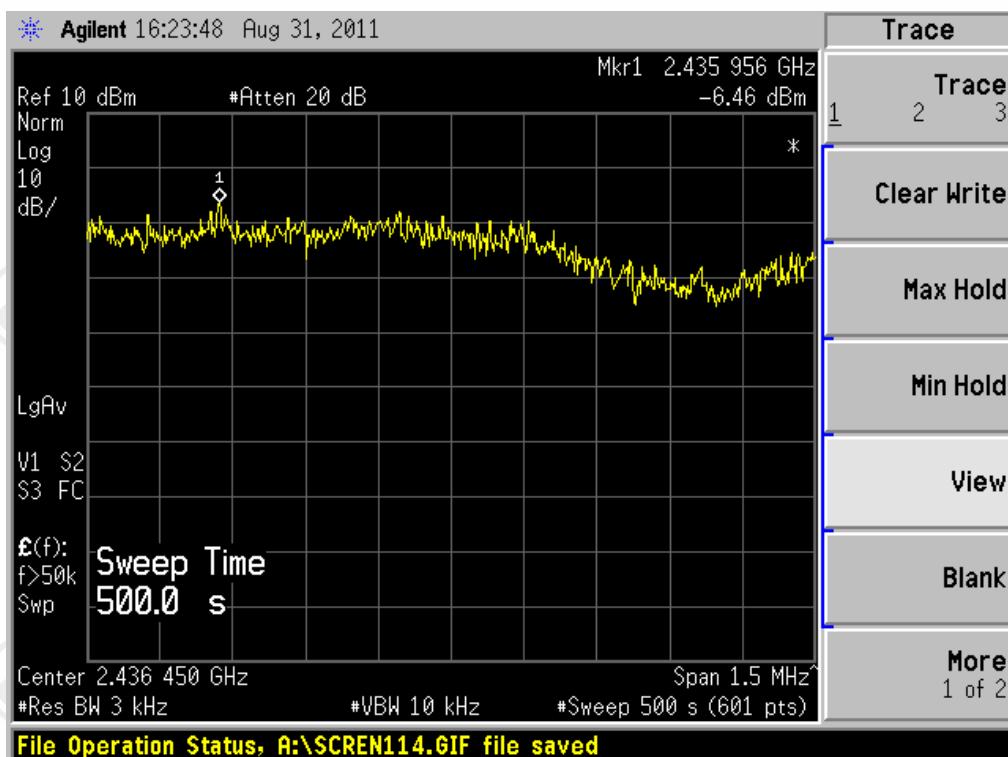
9.4. TEST RESULT

Please see the following plots (worst case).

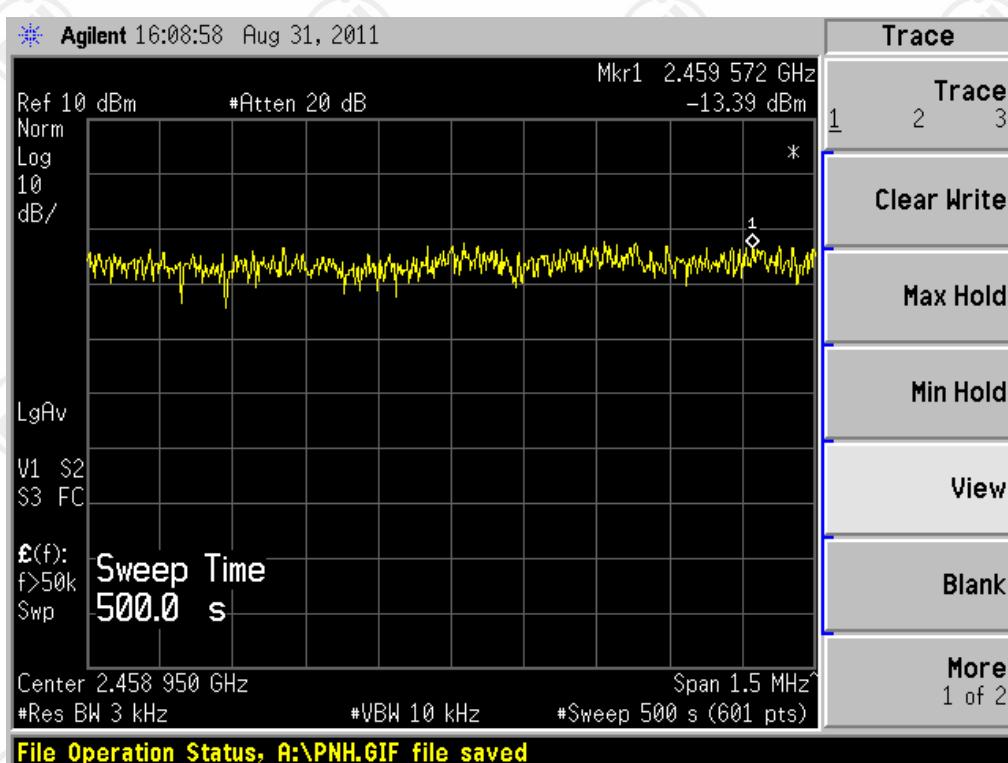
802.11b Mode (11Mbps):



Low channel

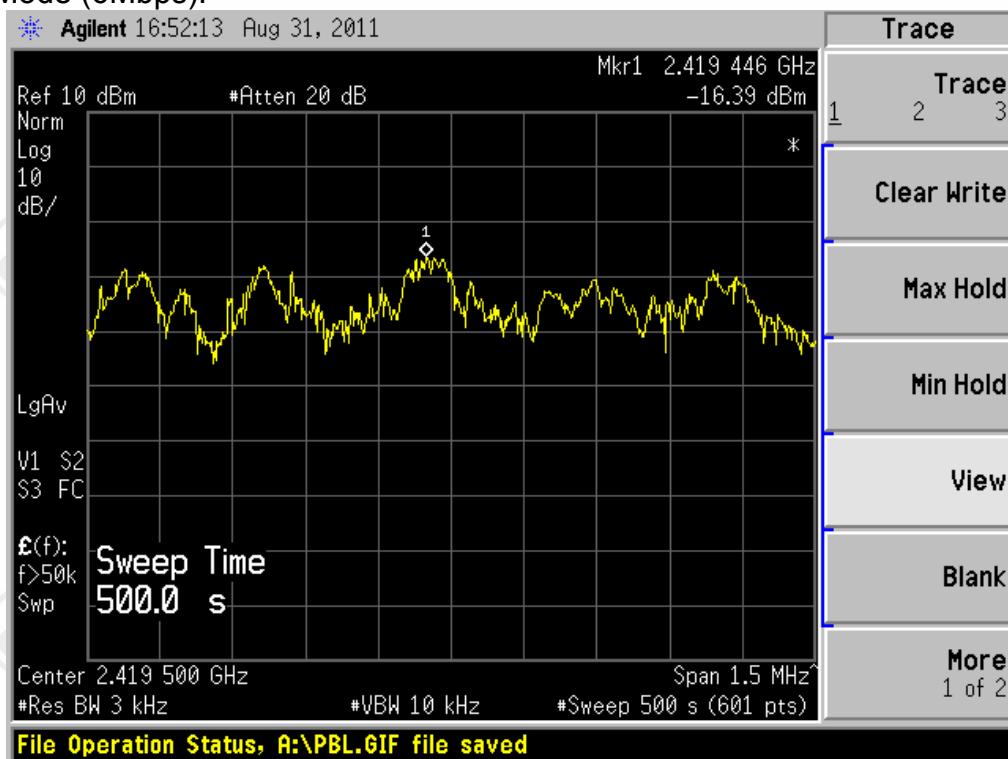


Middle channel

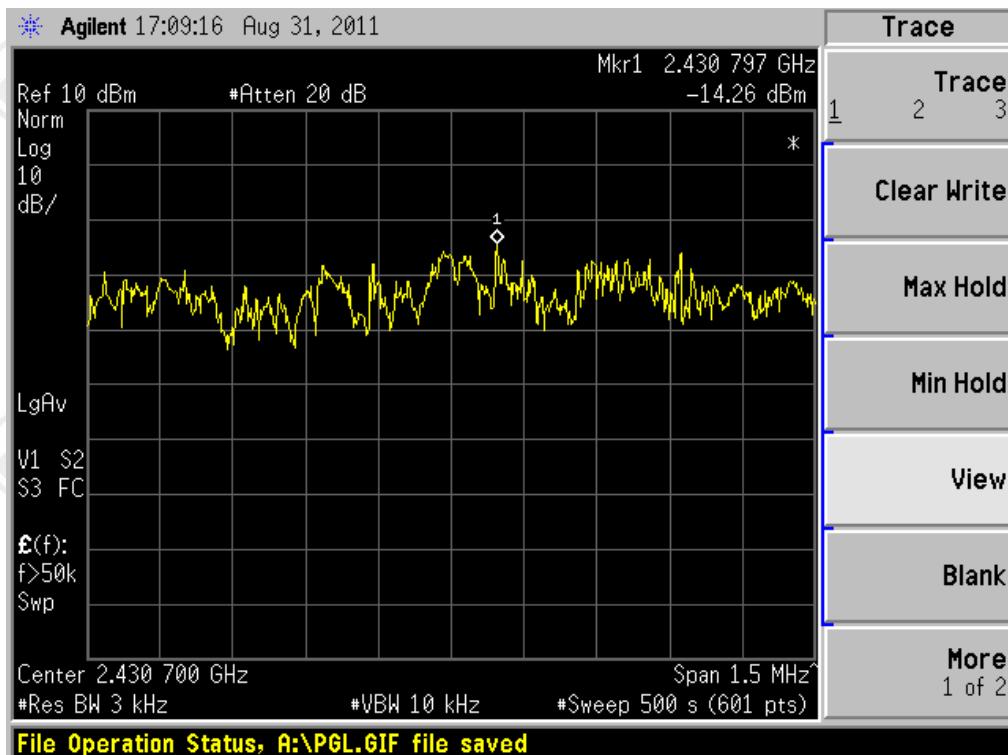


High channel

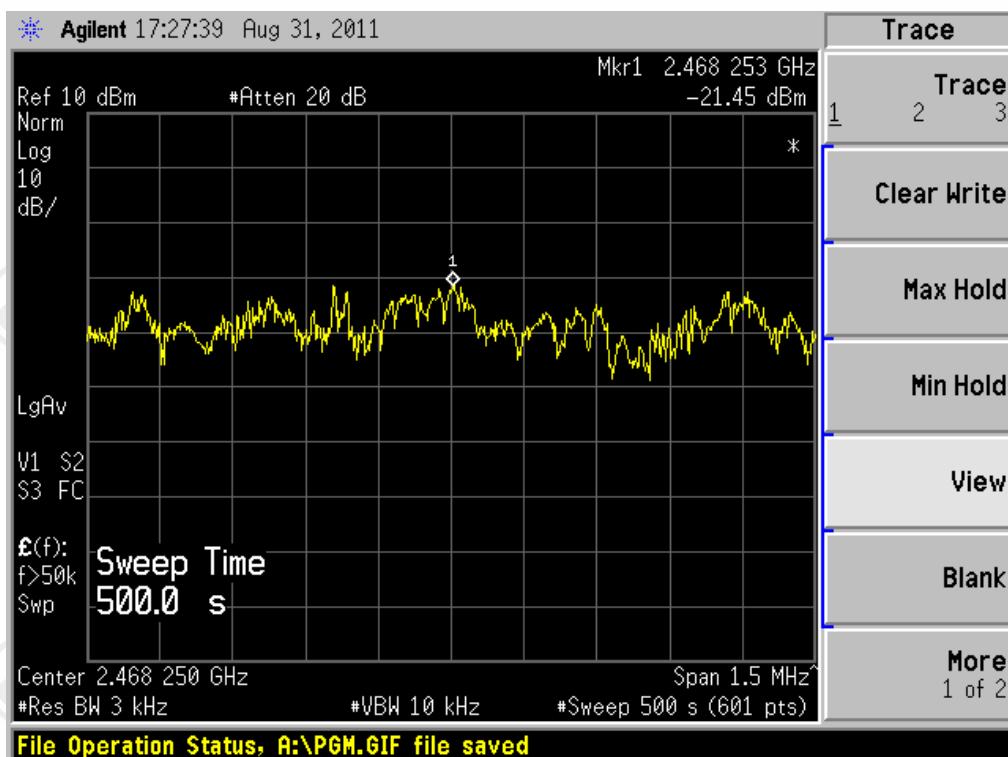
802.11g Mode (6Mbps):



Low channel

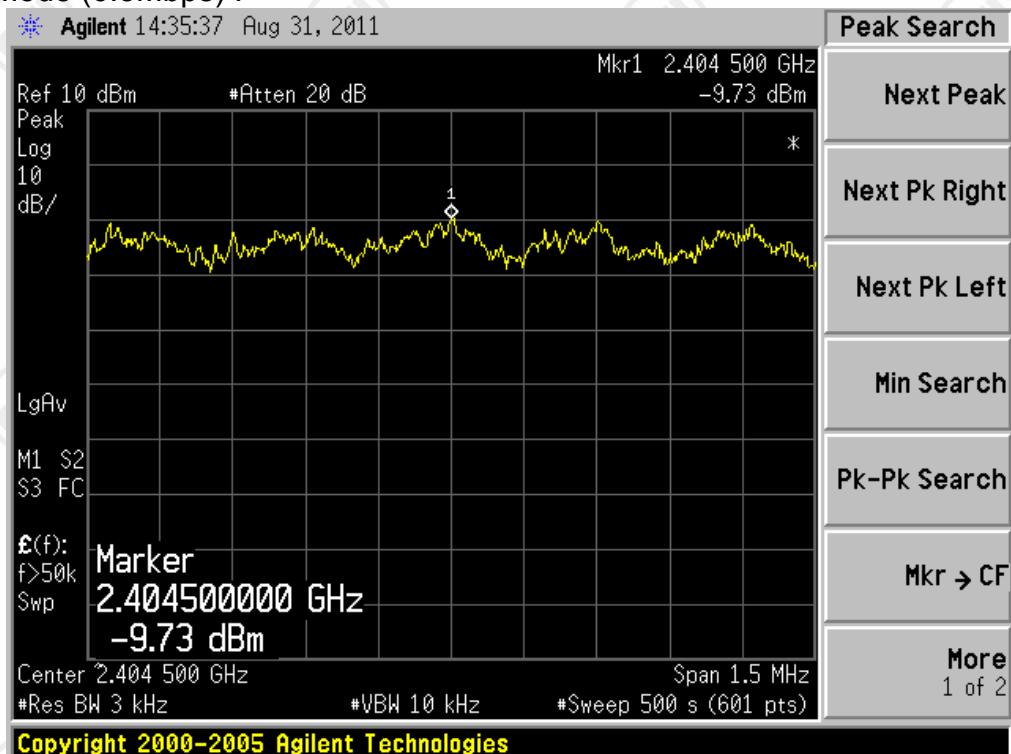


Middle channel

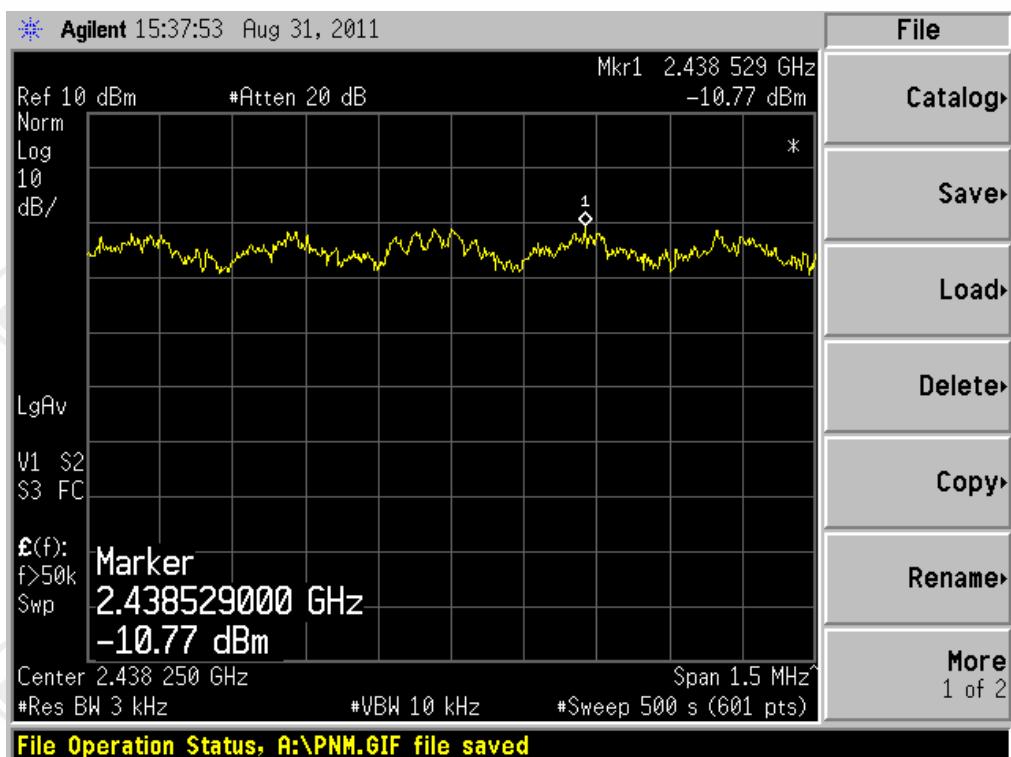


High channel

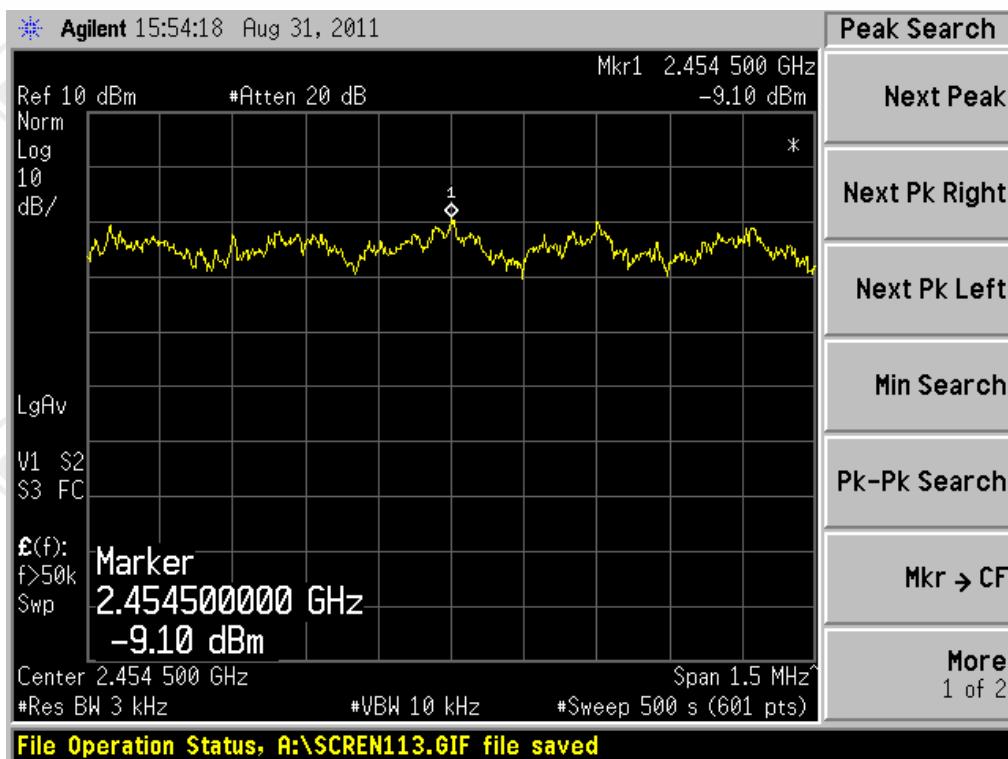
802.11n Mode (6.5Mbps) :



Low channel



Middle channel



High channel

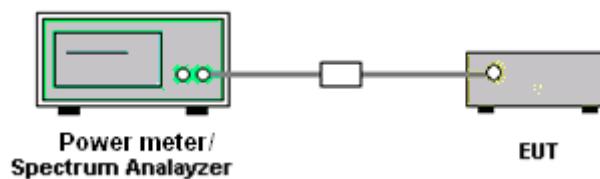
10. MAXIMUM PEAK CONDUCTED OUTPUT POWER MEASUREMENT

10.1. LIMITS

The maximum peak conducted output power of the intentional radiator shall not exceed the following:

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt (30dBm).

10.2. BLOCK DIAGRAM OF TEST SETUP



10.3. TEST PROCEDURE

1. The transmitter output (antenna port) was connected to the power meter.
2. Power was read directly from power meter.

Note: For more detail measurement procedure or testing method, please reference measurement procedure KDB 558074 document which is published on FCC website.

10.4. TEST RESULT

IEEE 802.11b

Frequency (MHz)	Data rate (Mbps)	Output (dBm)	Cable Loss (dBm)	Final Result (dBm)	Limit (dBm)
Low Channel: 2412	1	17.28	0.4	17.68	30
	5.5	17.30	0.4	17.70	30
	11	17.34	0.4	17.74	30
Middle Channel: 2437	1	18.92	0.4	19.32	30
	5.5	18.94	0.4	19.34	30
	11	18.95	0.4	19.35	30
High Channel: 2462	1	16.12	0.4	16.52	30
	5.5	16.16	0.4	16.56	30
	11	16.18	0.4	16.58	30

IEEE 802.11g

Frequency (MHz)	Data rate (Mbps)	Output (dBm)	Cable Loss (dBm)	Final Result (dBm)	Limit (dBm)
Low Channel: 2412	6	18.12	0.4	18.52	30
	18	18.02	0.4	18.42	30
	54	18.08	0.4	18.48	30
Middle Channel: 2437	6	19.94	0.4	20.34	30
	18	19.83	0.4	20.23	30
	54	19.72	0.4	20.12	30
High Channel: 2462	6	16.35	0.4	16.75	30
	18	16.27	0.4	16.67	30
	54	16.23	0.4	16.63	30

IEEE 802.11n

Frequency (MHz)	Data rate (Mbps)	Output (dBm)	Cable Loss (dBm)	Final Result (dBm)	Limit (dBm)
Low Channel: 2412	6.5	21.45	0.4	21.85	30
	26	21.23	0.4	21.63	30
	65	20.86	0.4	21.26	30
Middle Channel: 2437	6.5	21.52	0.4	21.92	30
	26	21.19	0.4	21.59	30
	65	21.27	0.4	21.67	30
High Channel: 2462	6.5	20.59	0.4	20.99	30
	26	21.19	0.4	21.59	30
	65	21.05	0.4	21.45	30

Max output power = 21.92 dBm

For RF Safety, please see RF Exposures Evaluation report.

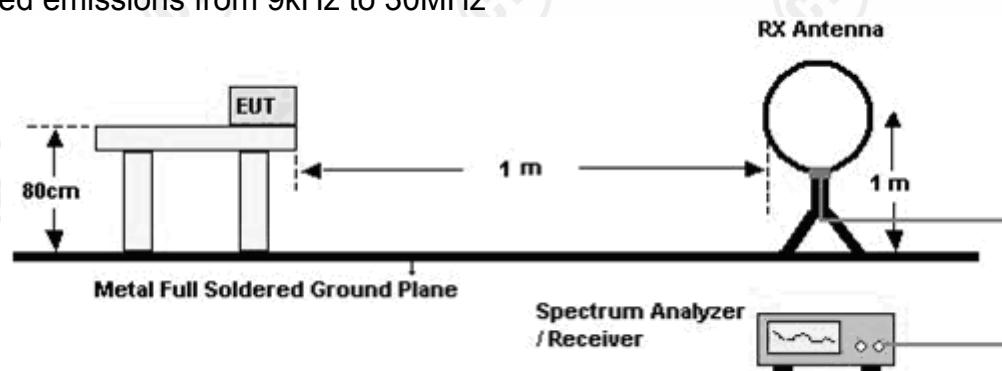
11. BAND EDGE EMISSION MEASUREMENT

11.1. LIMITS

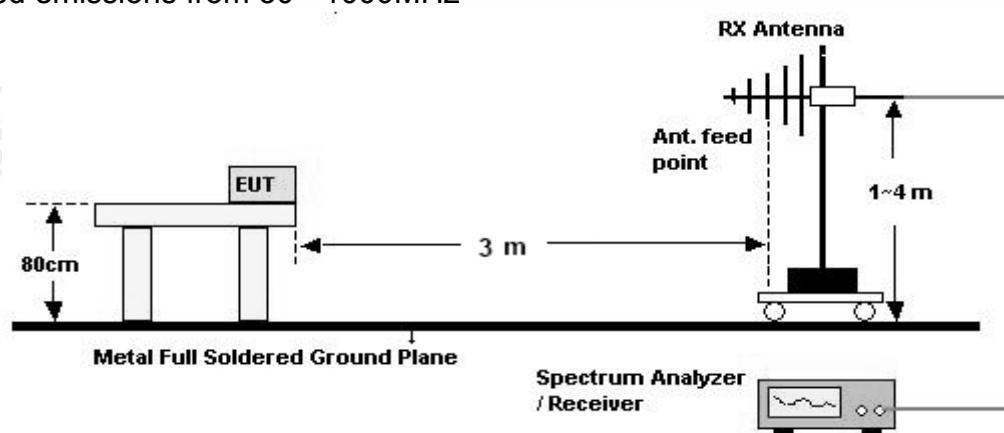
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a).

11.2. BLOCK DIAGRAM OF TEST SETUP

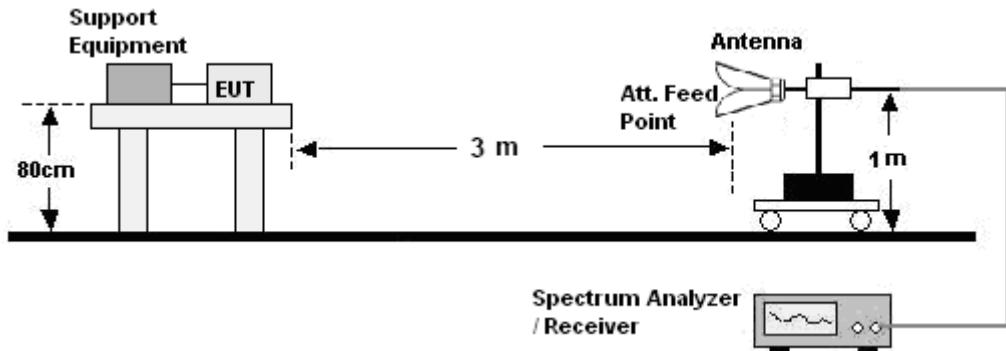
For radiated emissions from 9kHz to 30MHz



For radiated emissions from 30 - 1000MHz



For radiated emissions from 1GHz to 25GHz



11.3. TEST PROCEDURE

Below 30MHz:

- The EUT is placed on a turntable 0.8 meters above the ground in the chamber, 1 meter away from the antenna (loop antenna). The maximum values of the field strength are recorded by adjusting the polarizations of the test antenna and rotating the turntable.
- For each suspected emission, the EUT was arranged to its worst case and then turn table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test frequency analyzer system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

30MHz ~ 1GHz:

- The EUT was placed on the non-conductive turntable 0.8m above the ground at a chamber.
- Set the spectrum analyzer/receiver in Peak detector, Max Hold mode, and 120 kHz RBW. Record the maximum field strength of all the pre-scan process in the full band when the antenna is varied between 1~4 m in both horizontal and vertical, and the turntable is rotated from 0 to 360 degrees.
- For each frequency whose maximum record was higher or close to limit, measure its QP value: vary the antenna's height and rotate the turntable from 0 to 360 degrees to find the height and degree where EUT radiated the maximum emission, then set the test frequency analyzer/receiver to QP Detector and specified bandwidth with Maximum Hold Mode, and record the maximum value.

Above 1GHz:

- The EUT was placed on the non-conductive turntable 0.8m above the ground at a chamber.
- Set the spectrum analyzer/receiver in Peak detector, Max Hold mode, set 1MHz RBW. Record the maximum PK field strength in the full band when the antenna is varied in both horizontal and vertical, and the turntable is rotated from 0 to 360 degrees.

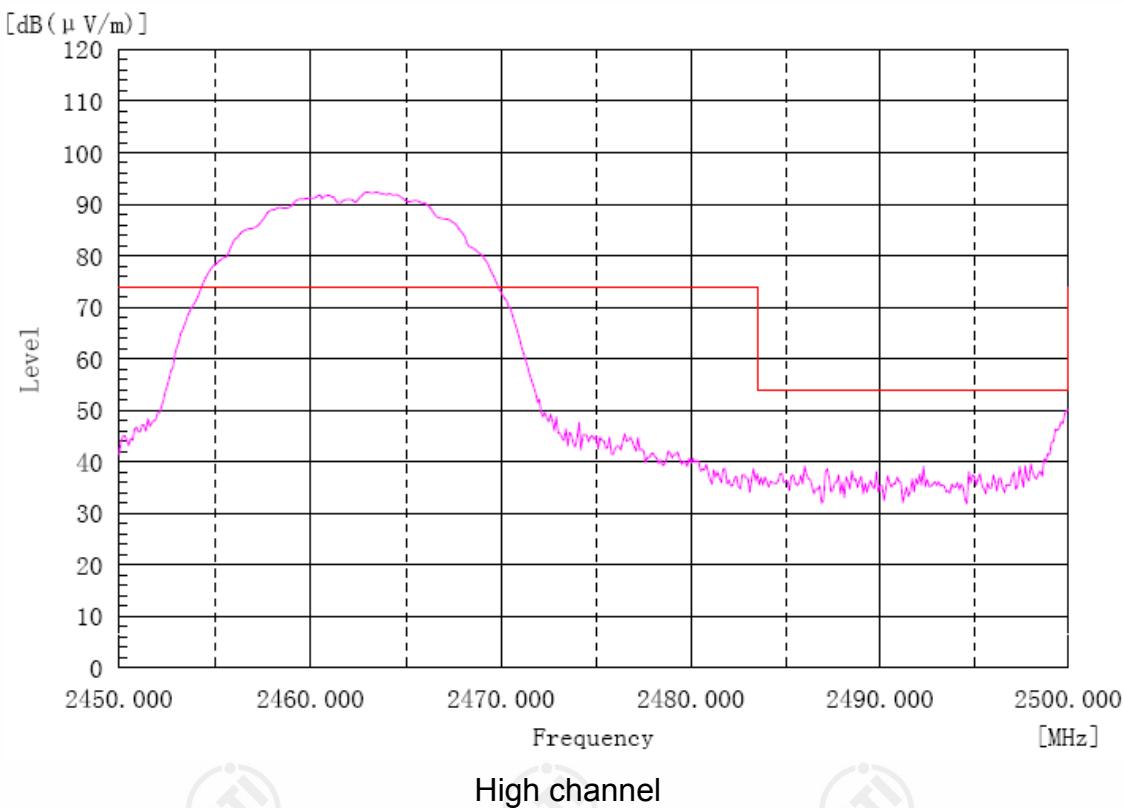
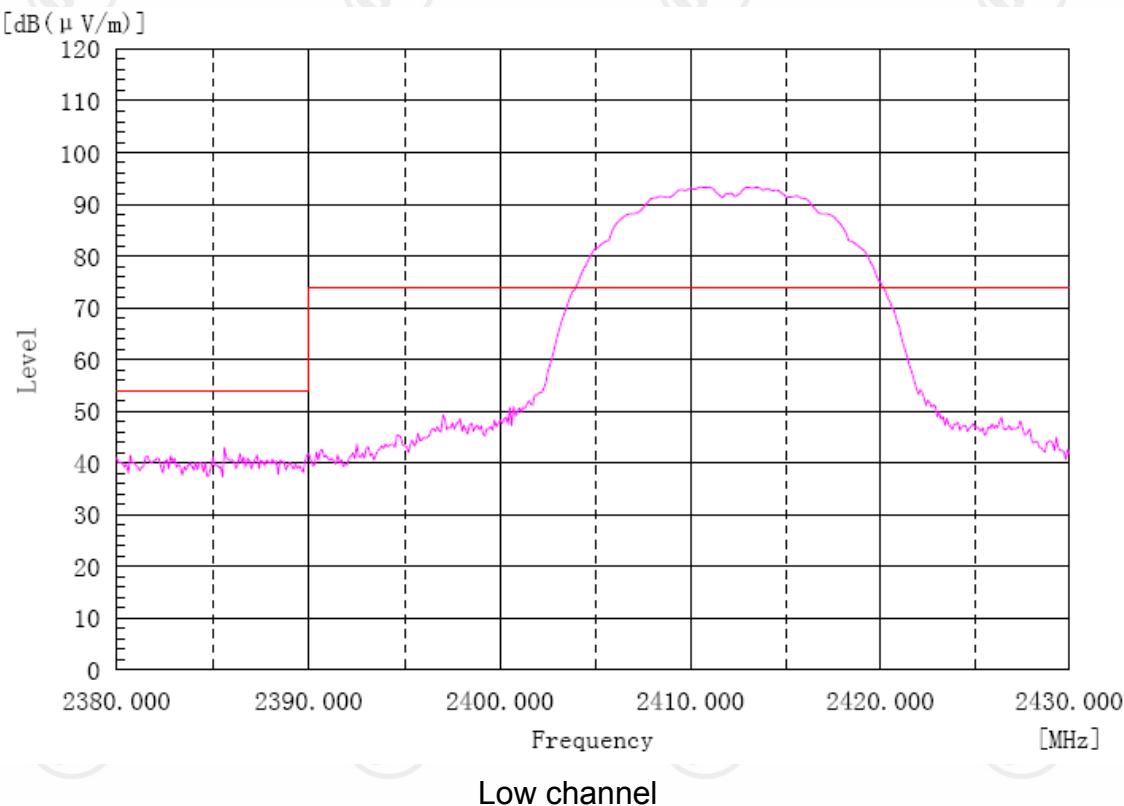
c. For each frequency whose maximum record was higher or close to limit, measure its AV value: rotate the turntable from 0 to 360 degrees to find the degree where EUT radiated the maximum emission, then set the test frequency analyzer/receiver to AV value and specified bandwidth with Maximum Hold Mode, and record the maximum value.

Note: For more detail measurement procedure or testing method, please reference measurement procedure KDB 558074 document which is published on FCC website.

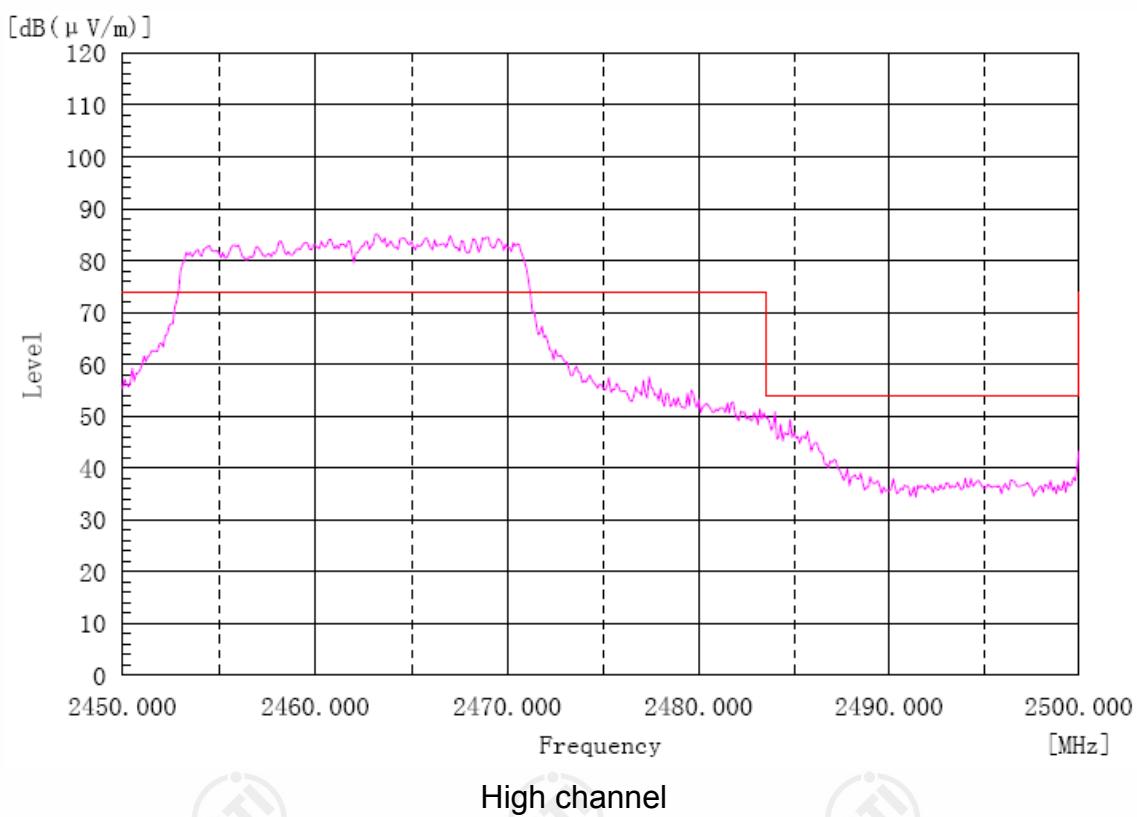
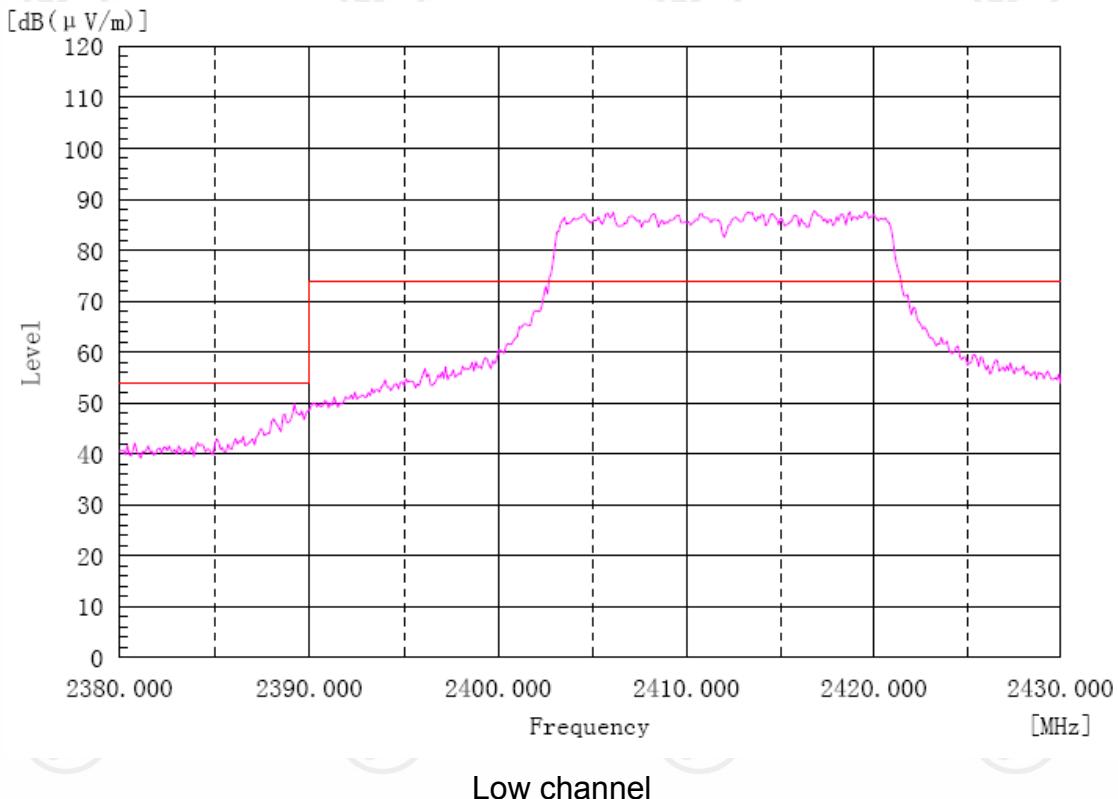
11.4. TEST RESULT

Worst case data attached.---please see the following plots.

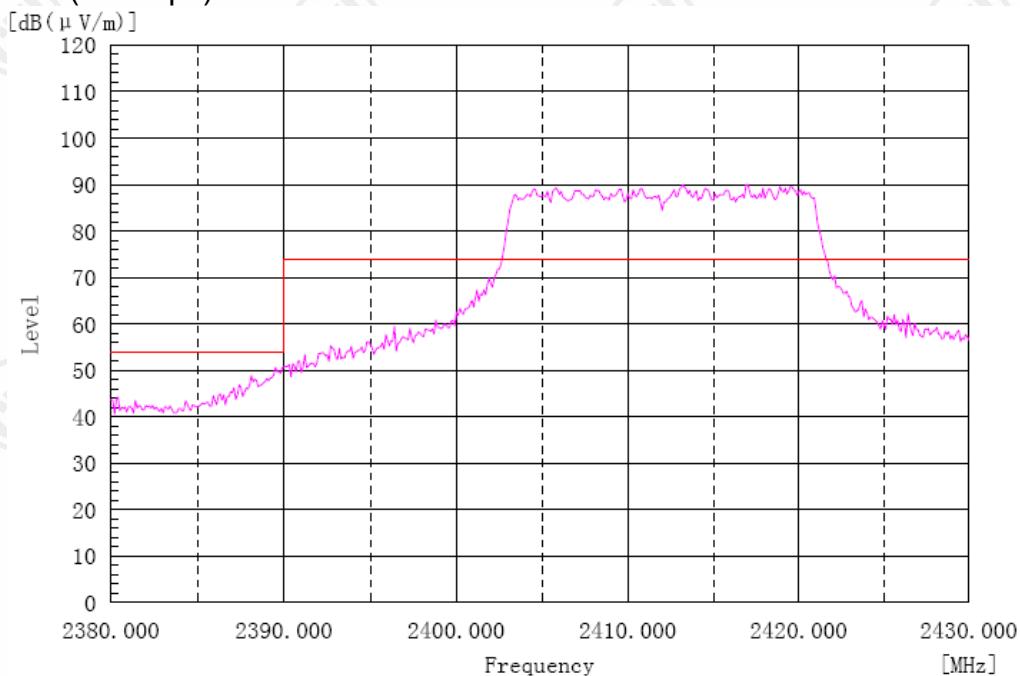
802.11b Mode (11Mbps):



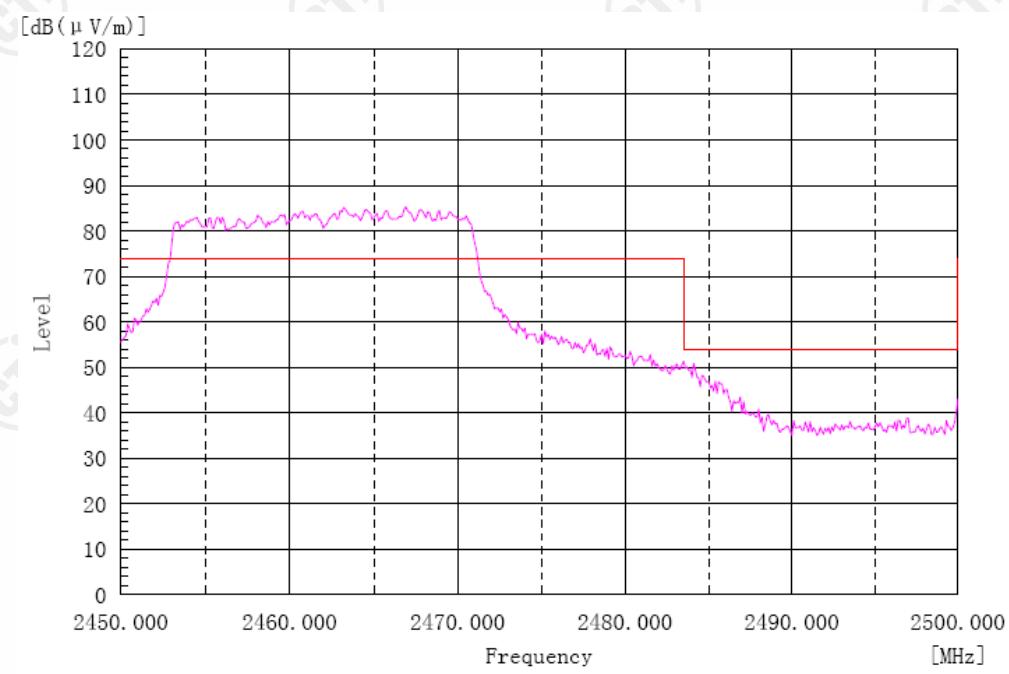
802.11g Mode (6Mbps):



802.11n Mode (6.5Mbps):



Low channel



High channel

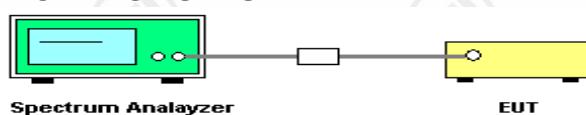
Note: The above plots show that the peak data of the frequencies which out of the operating band are all below the average limit, so the average data of these frequencies are deemed to fulfill the average limits and not reported.

12. SPURIOUS RF CONDUCTED EMISSIONS MEASUREMENT

12.1. LIMITS

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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, provided the transmitter demonstrates compliance with the peak conducted power limits.

12.2. BLOCK DIAGRAM OF TEST SETUP



12.3. TEST PROCEDURE

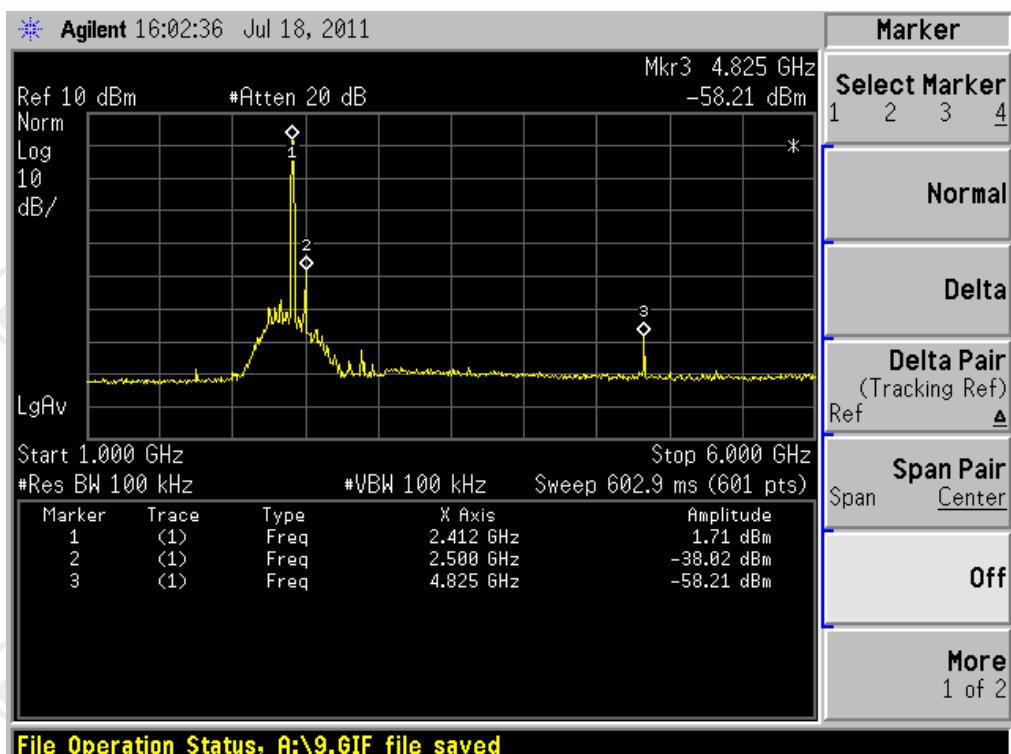
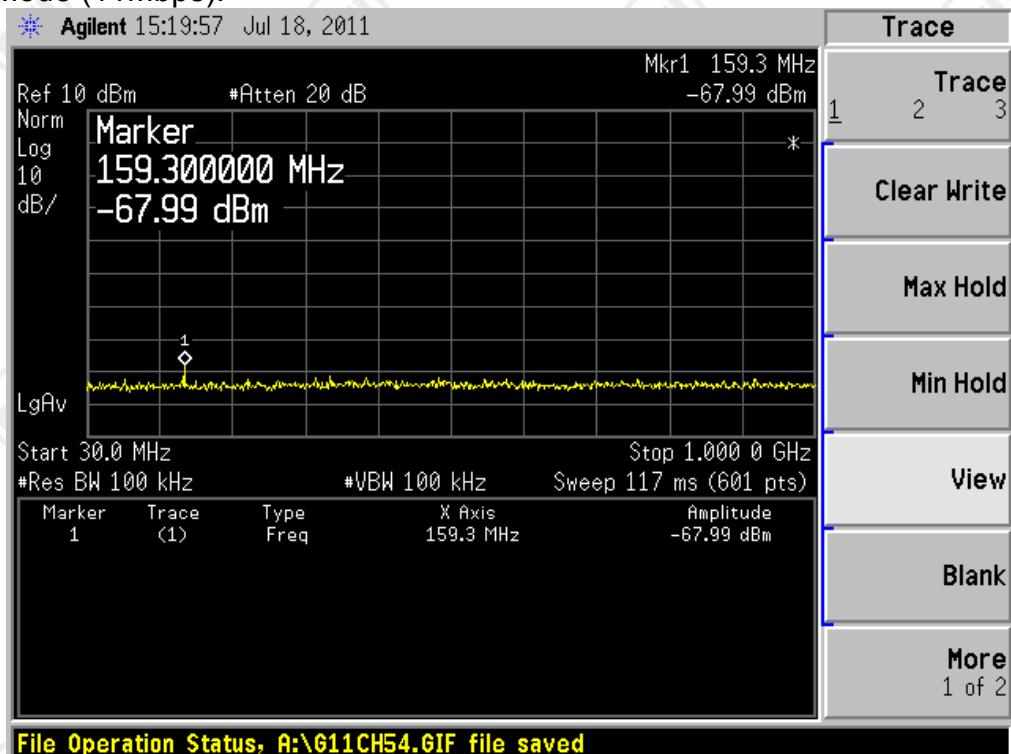
1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. Set spectrum analyzer's RBW and VBW to applicable value with Peak in Max Hold.
3. Record the peak level of the in-band emission and all spurious emissions from the lowest frequency generated in the EUT up through the 10th harmonic.

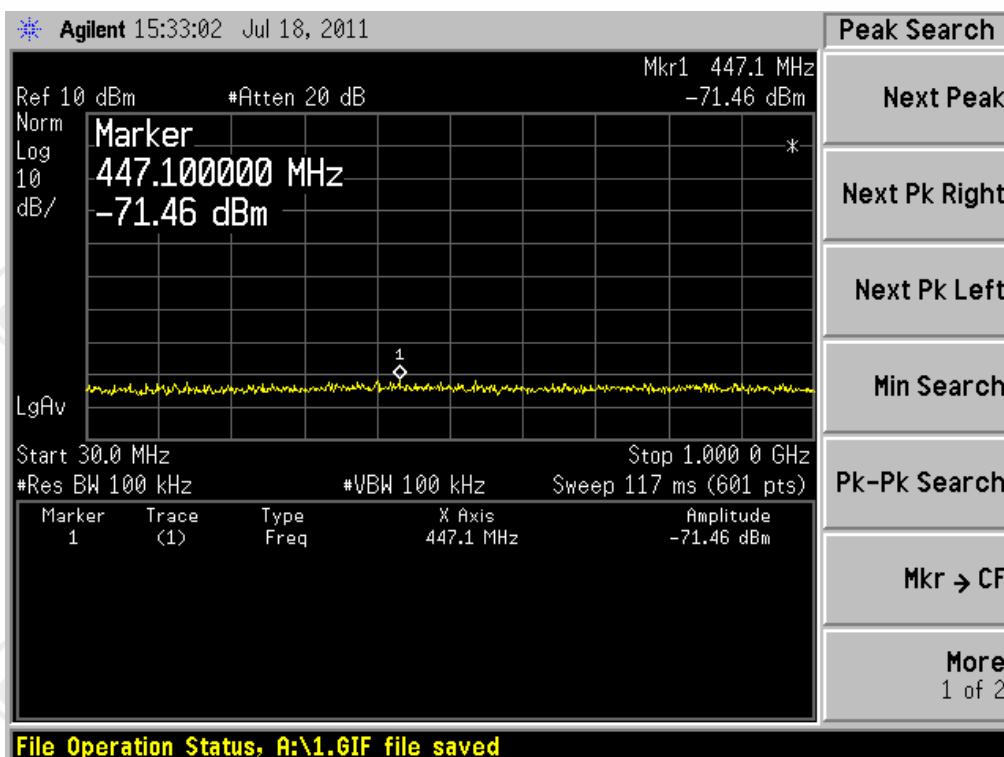
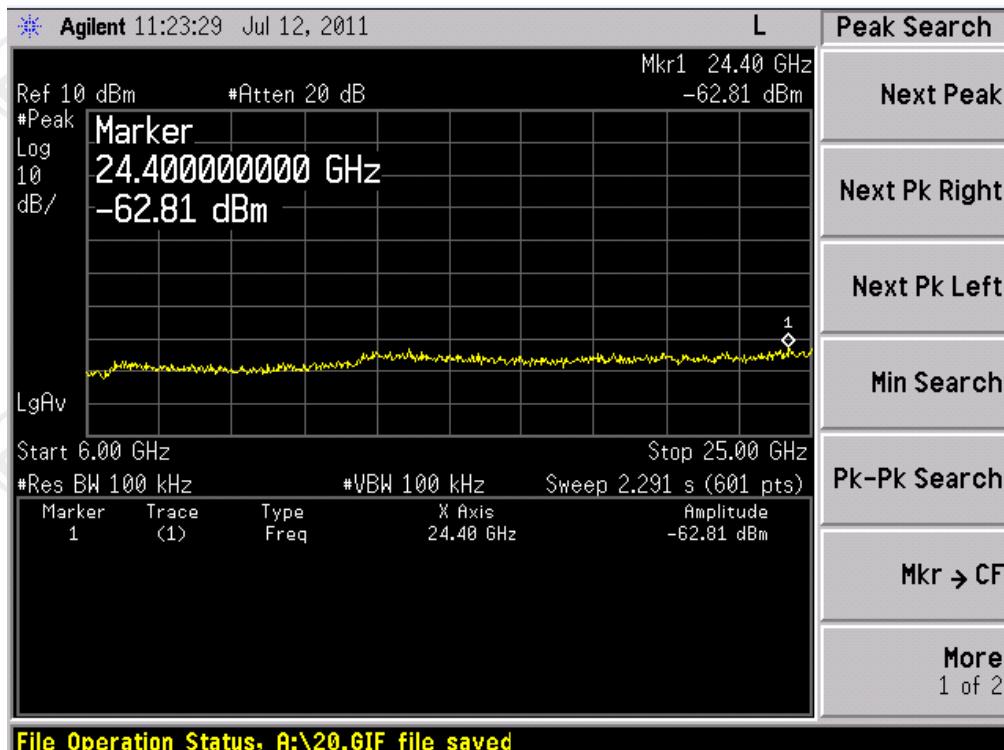
Note: For more detail measurement procedure or testing method, please reference measurement procedure KDB 558074 document which is published on FCC website.

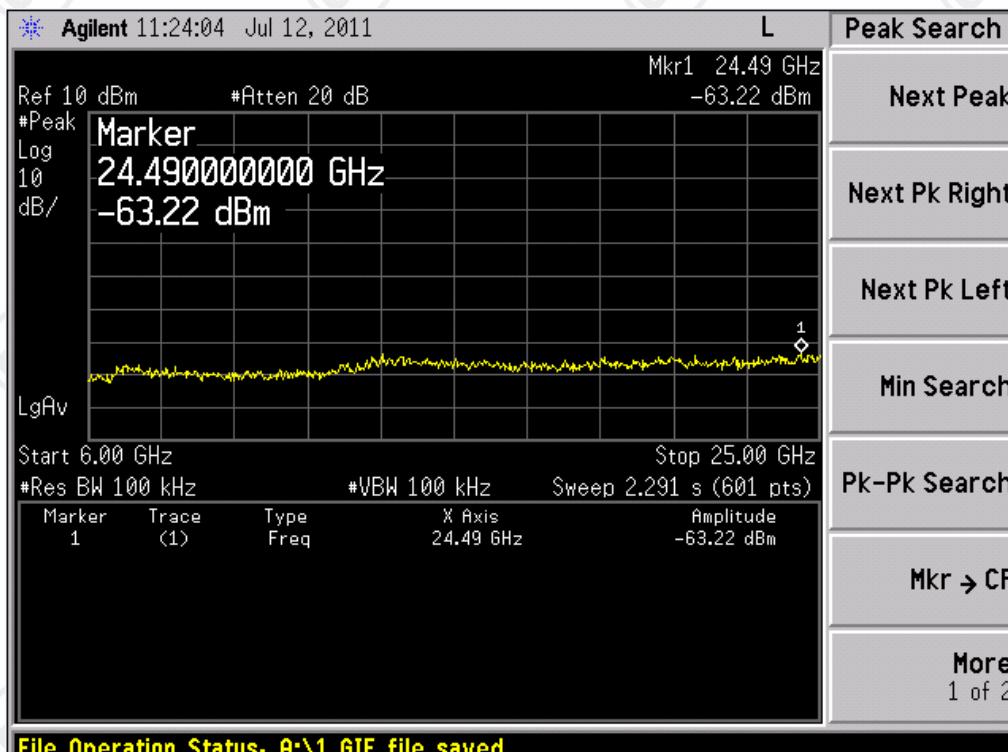
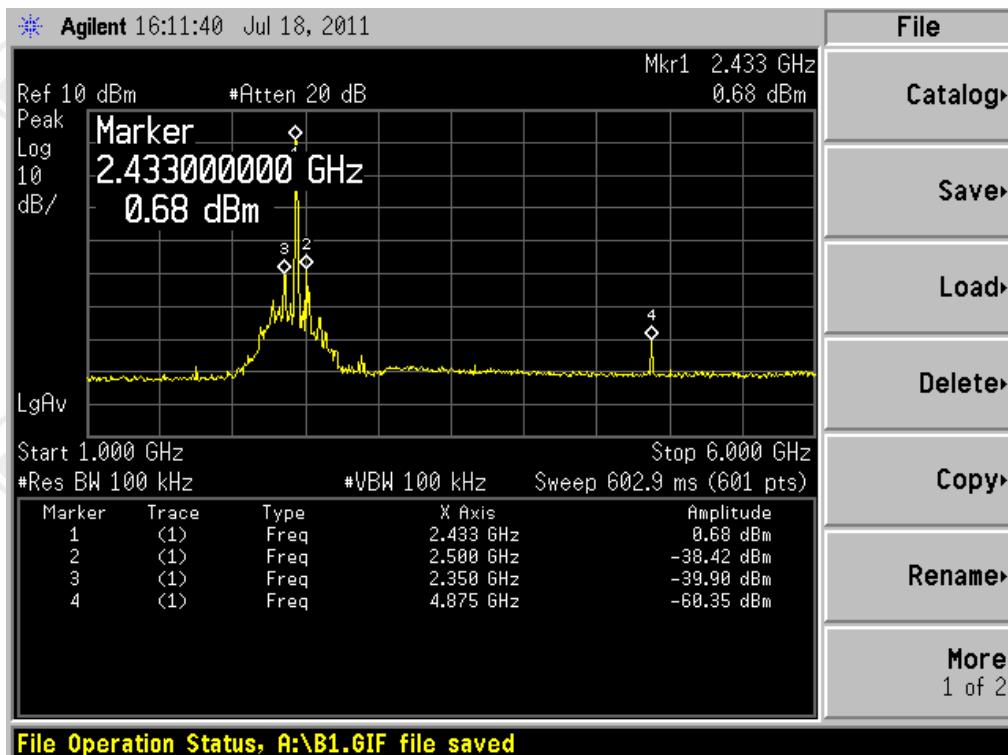
12.4. TEST RESULT

Worst case data---Please see the following plots.

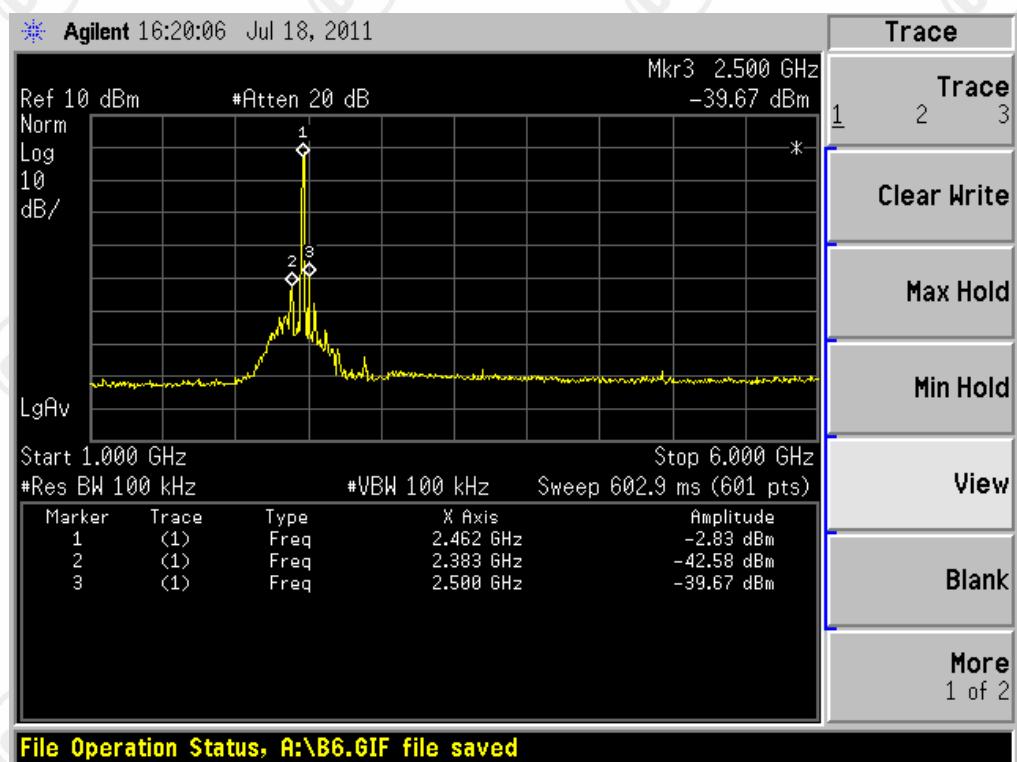
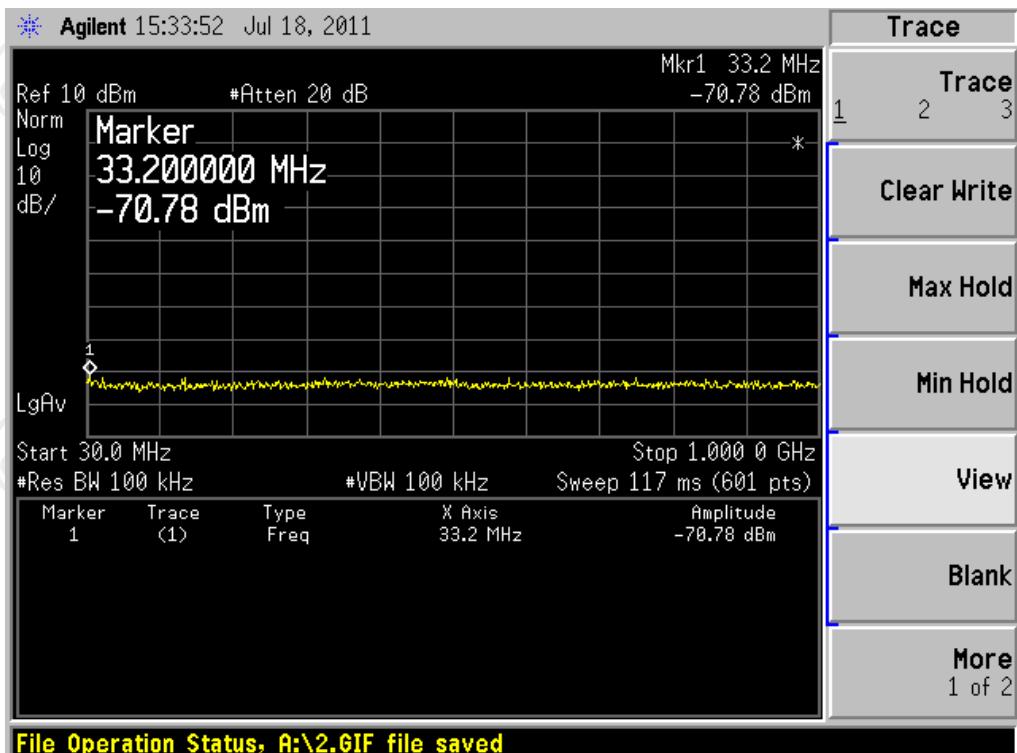
802.11b Mode (11Mbps):

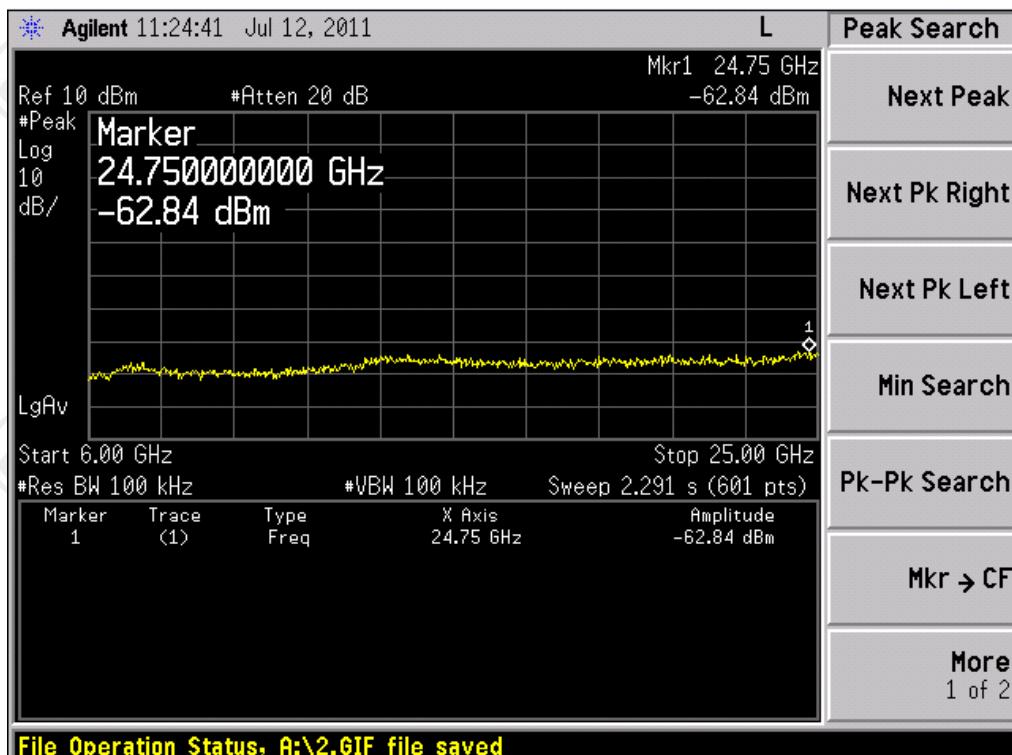




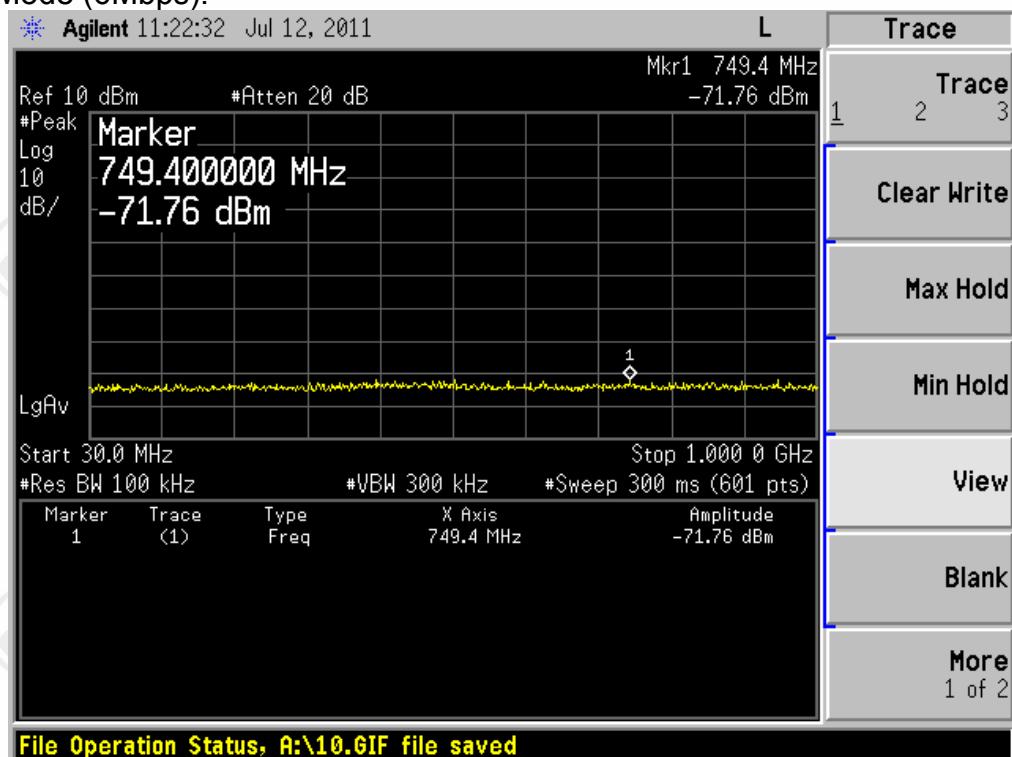


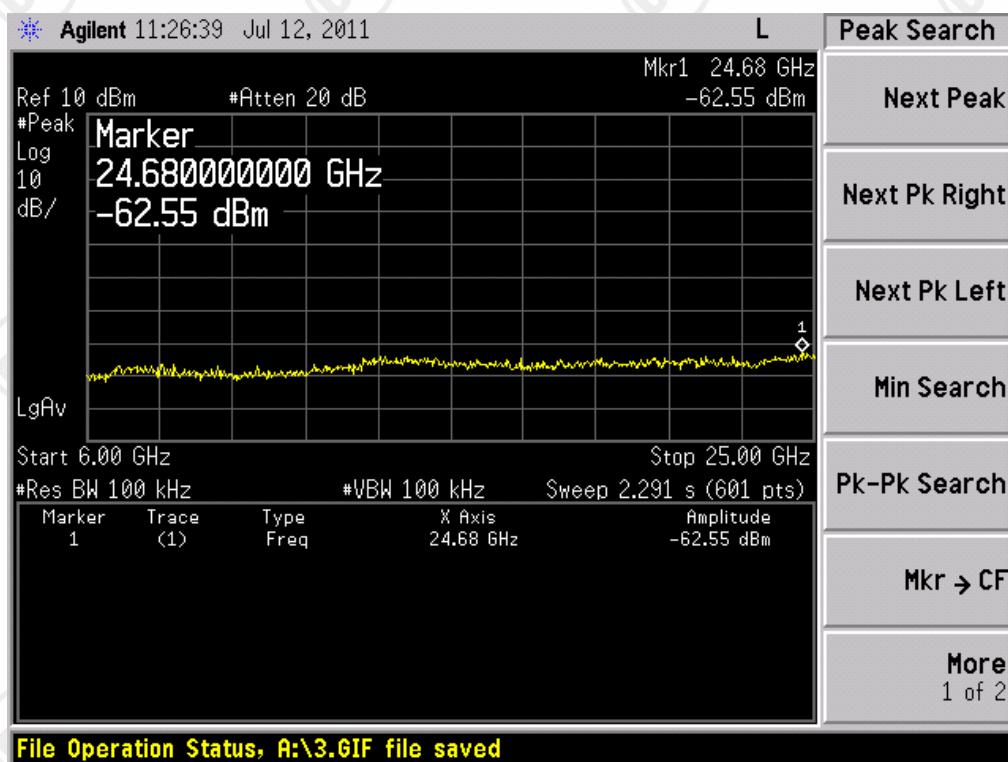
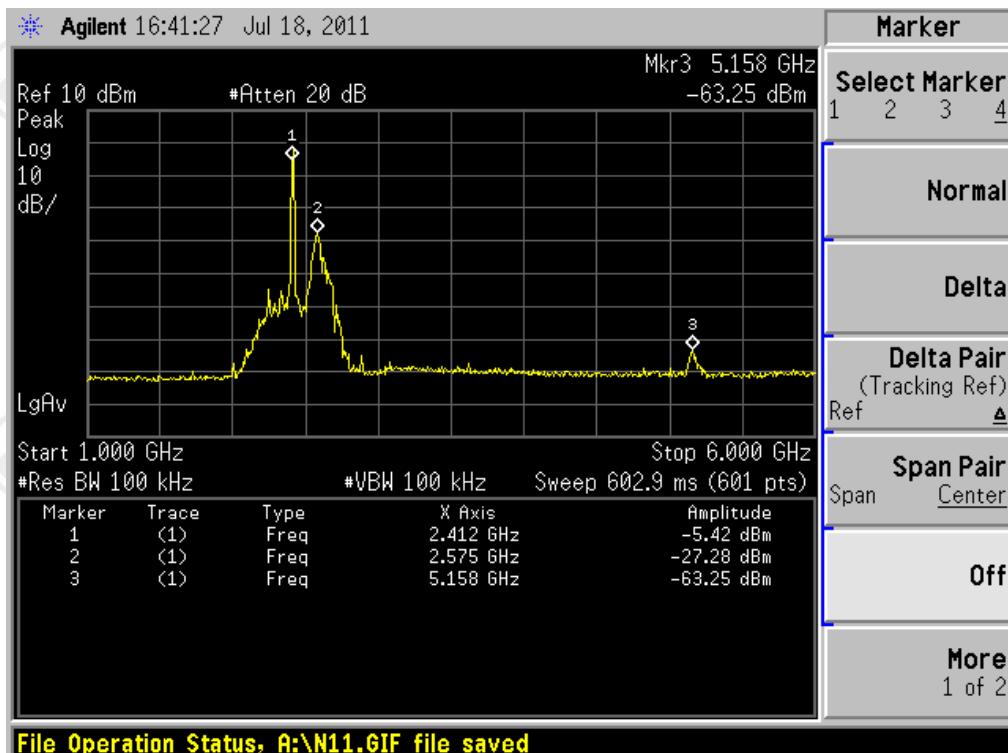
Middle channel



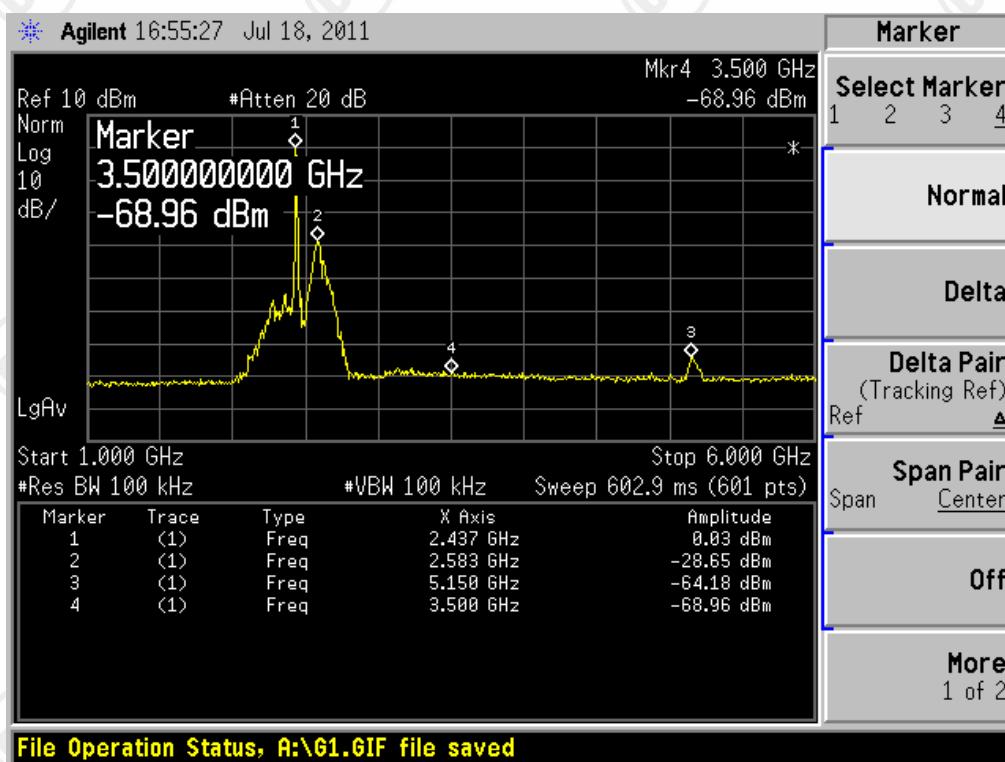
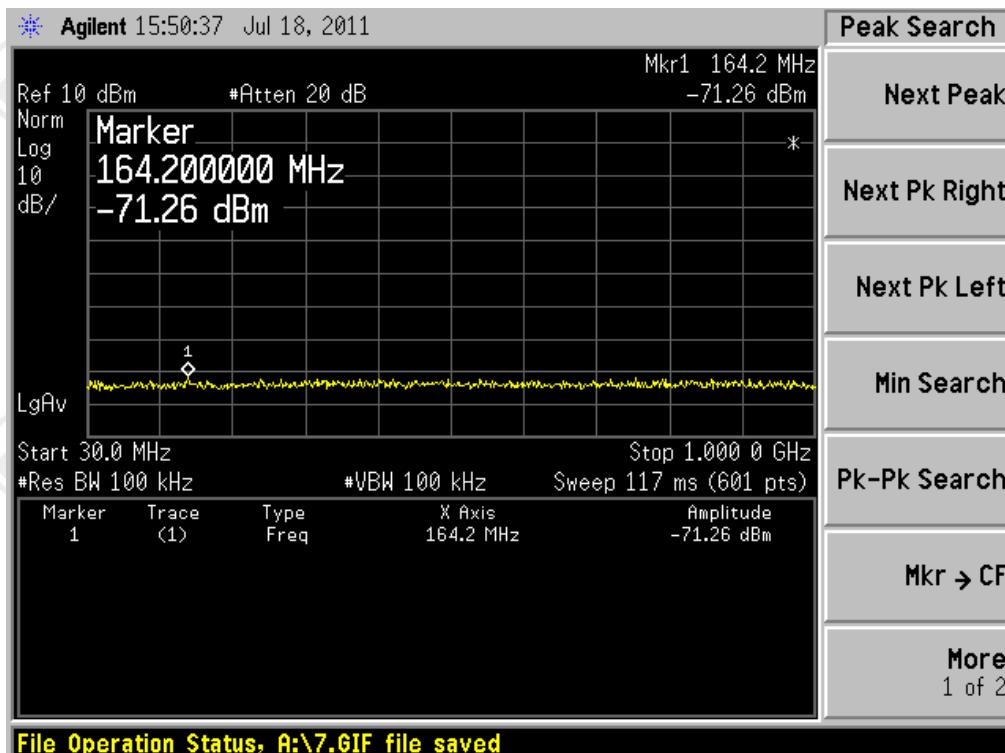


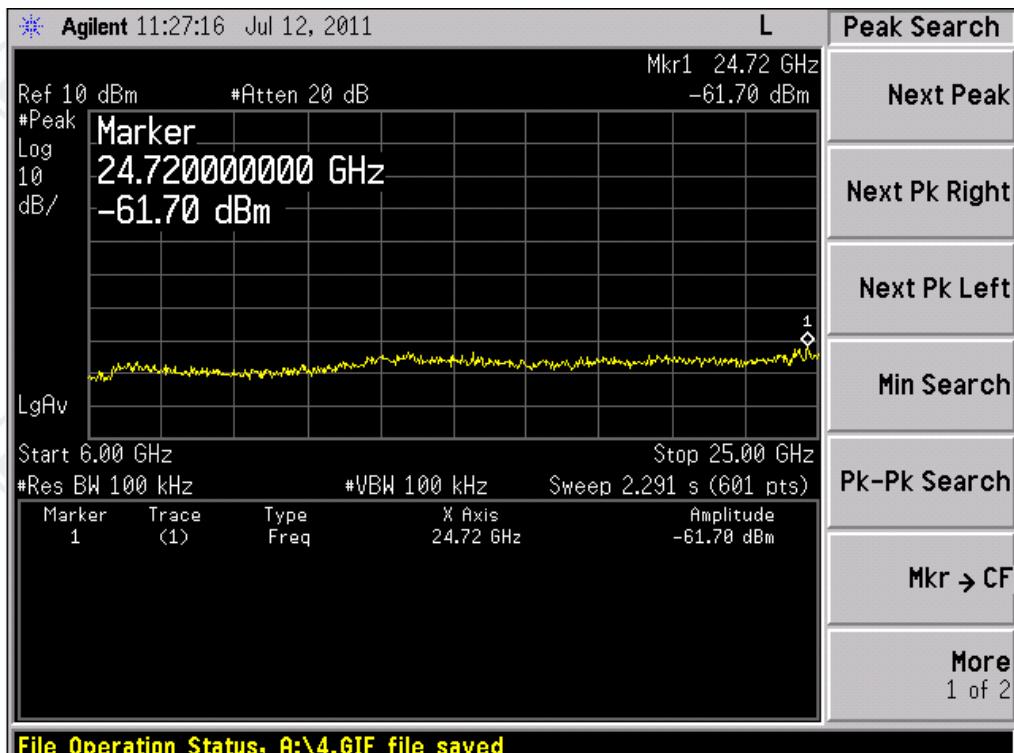
802.11g Mode (6Mbps):



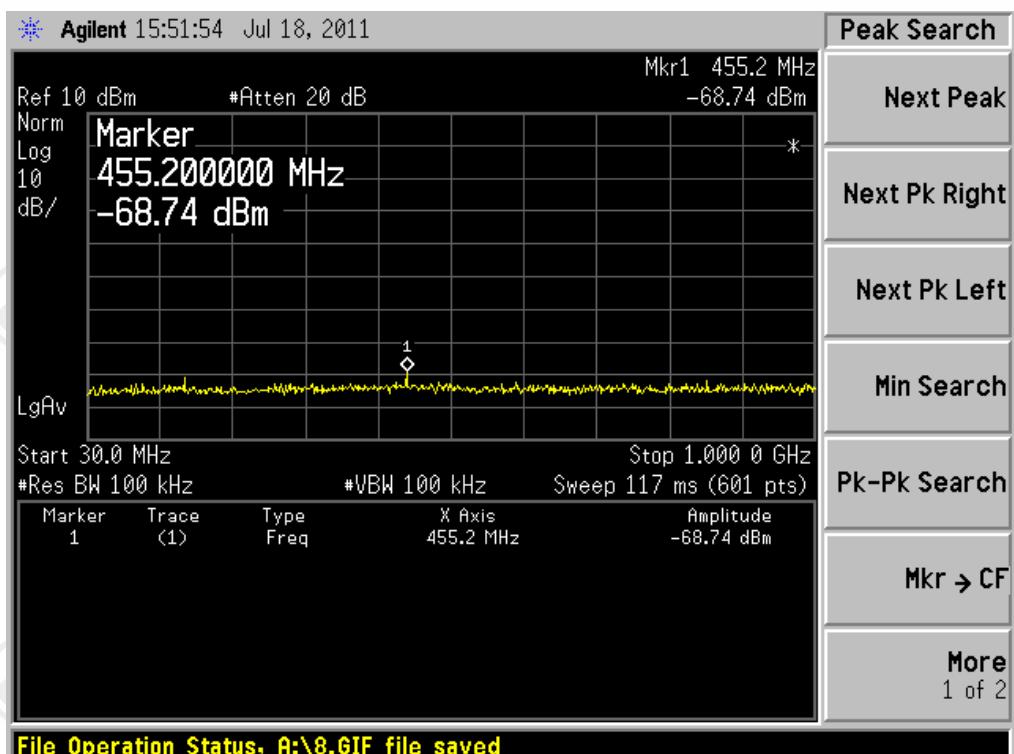


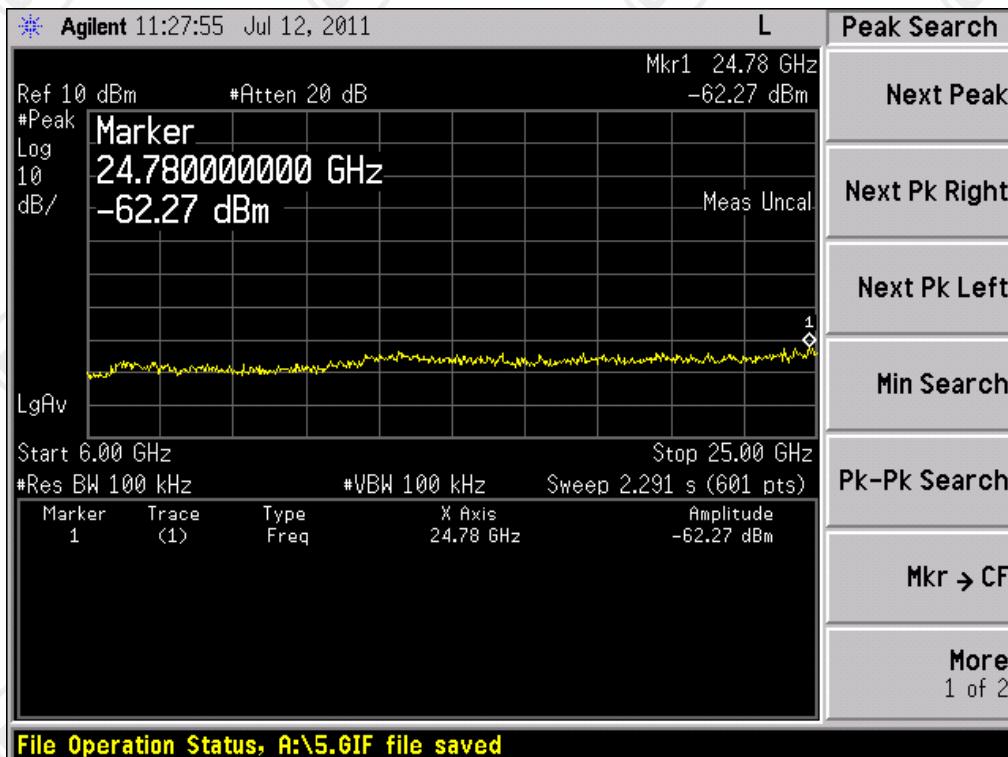
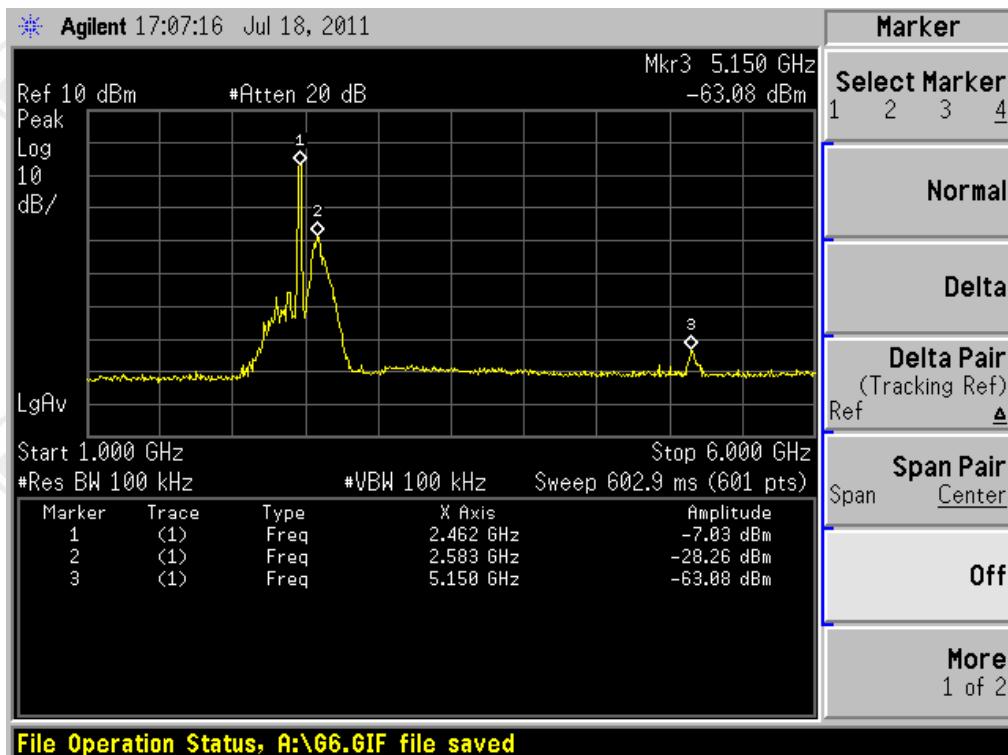
Low channel





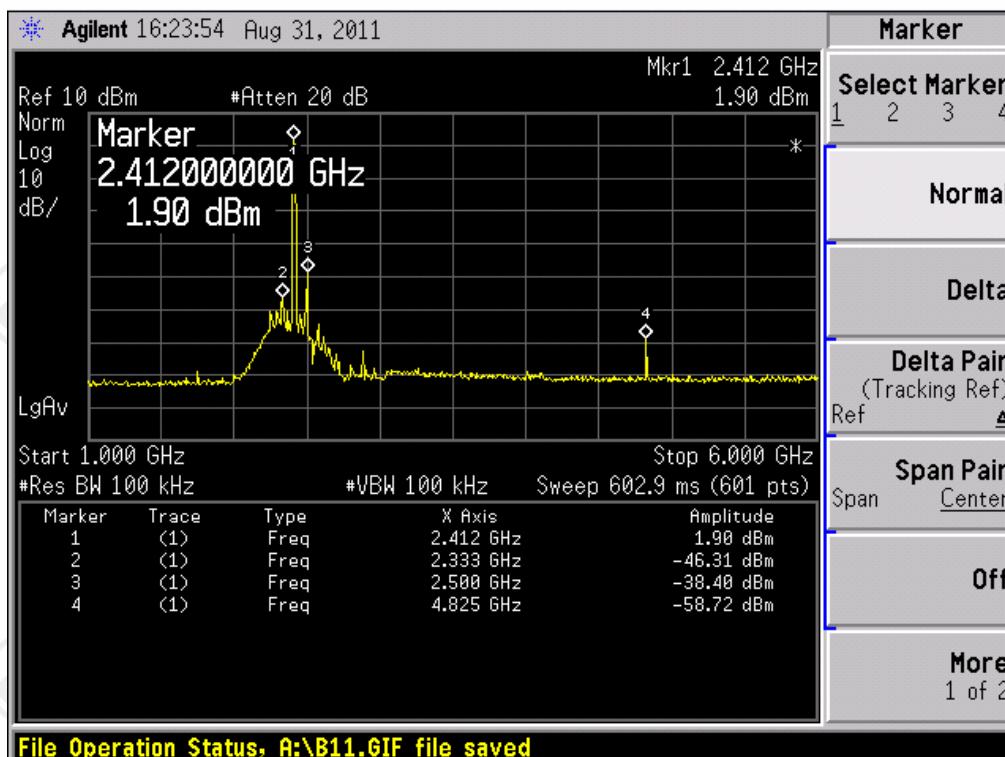
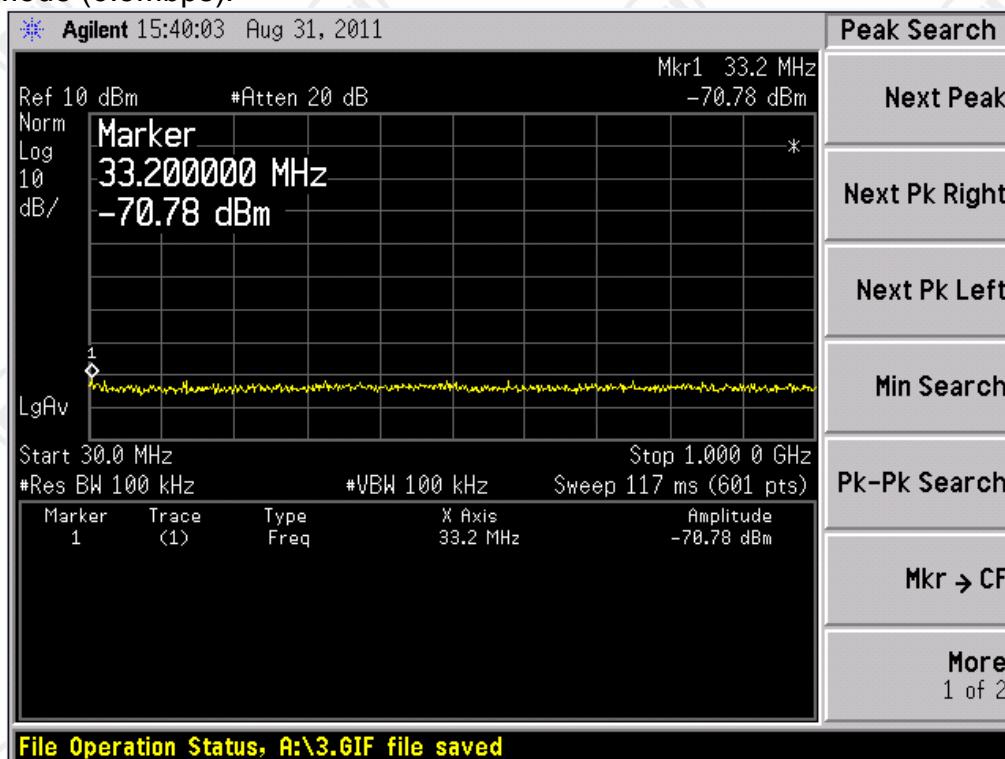
Middle channel

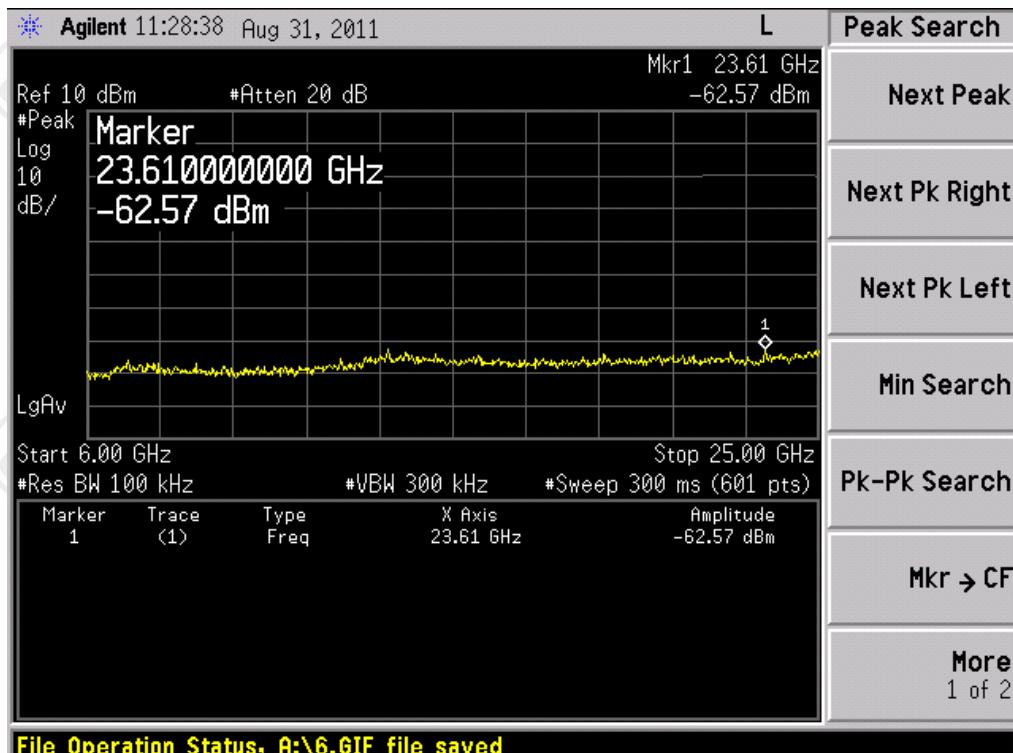




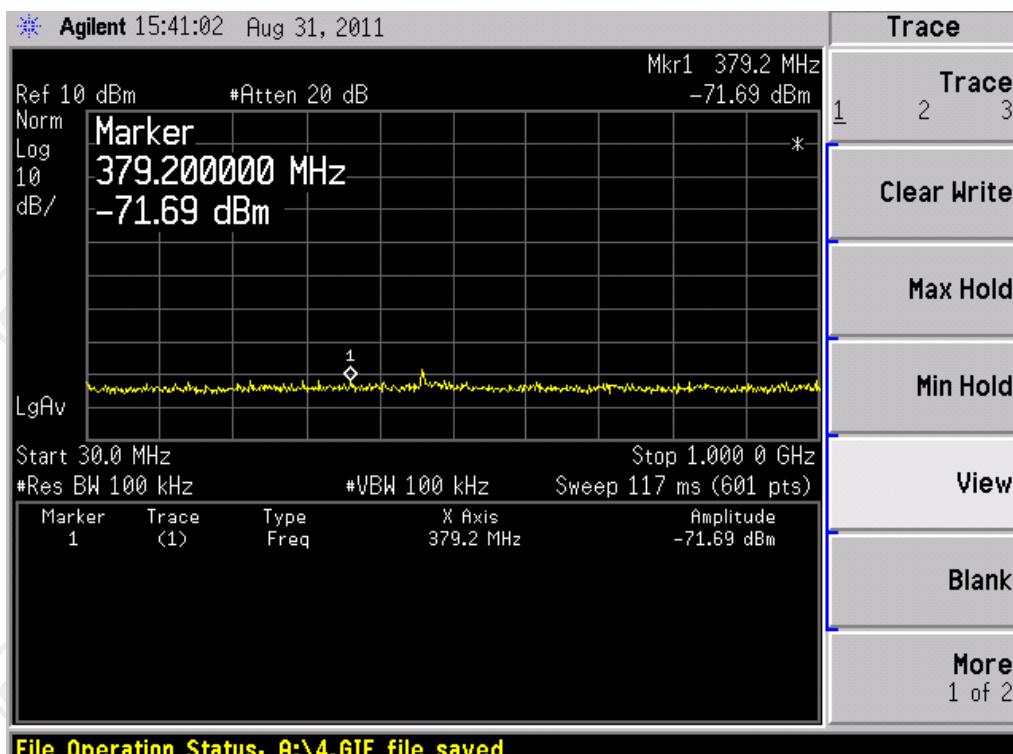
High channel

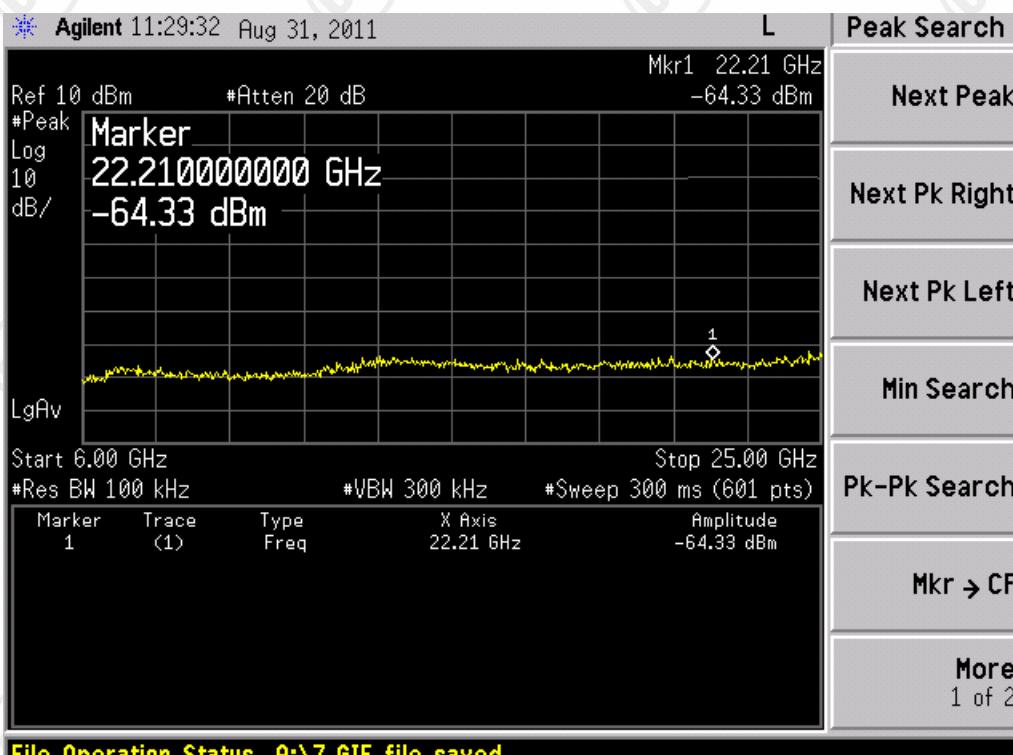
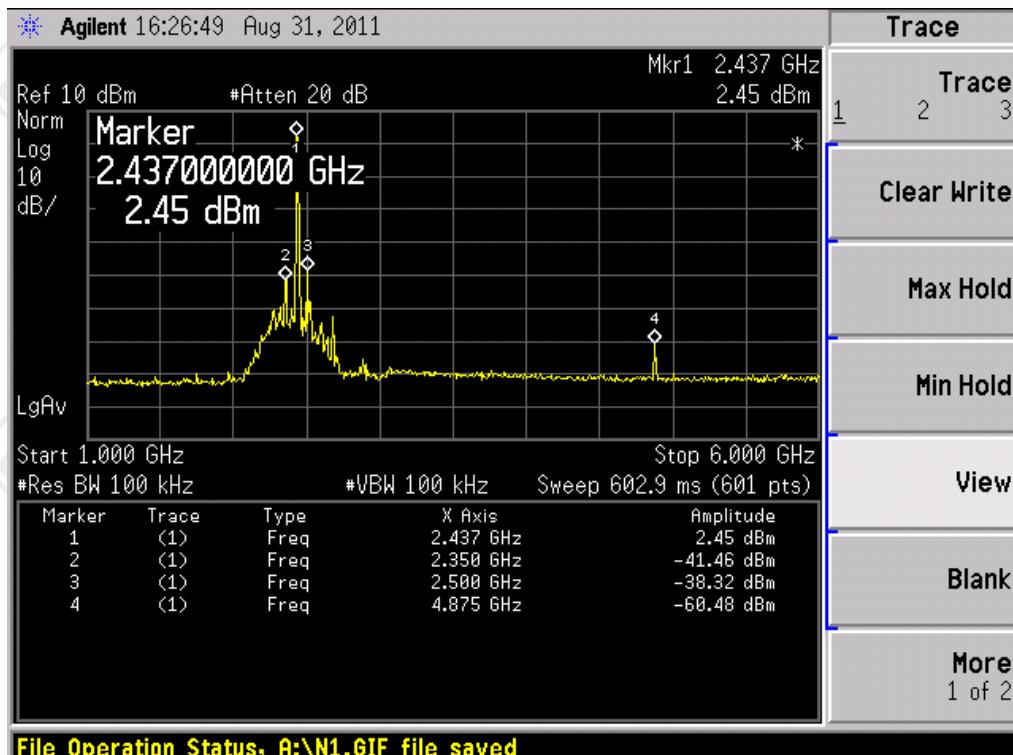
802.11n Mode (6.5Mbps):



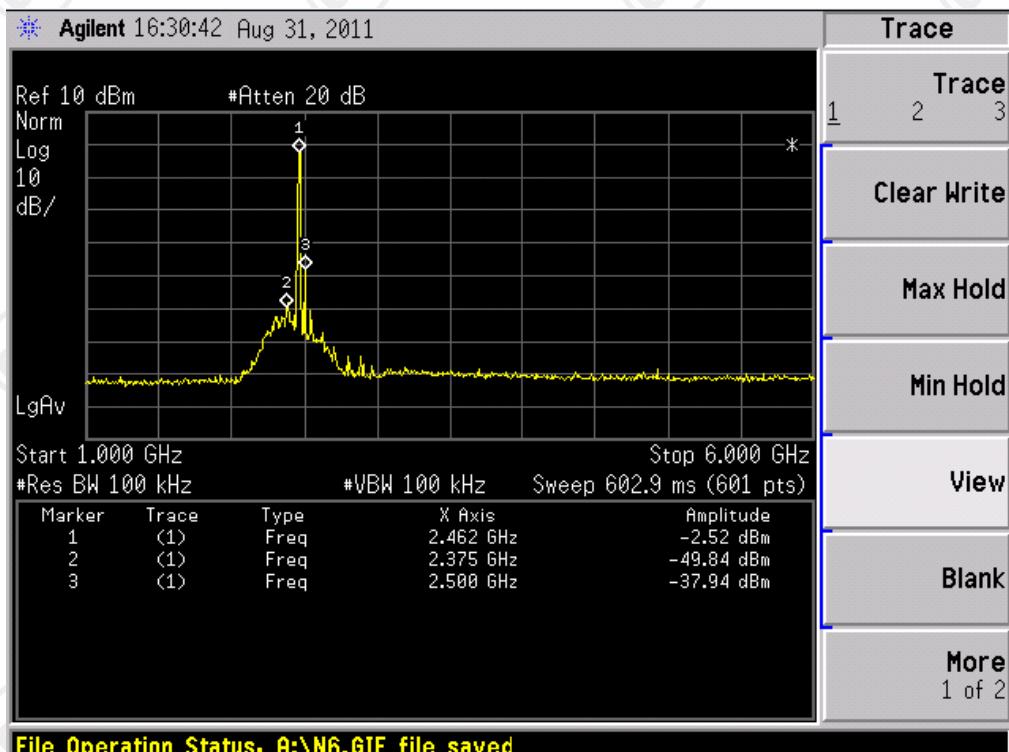
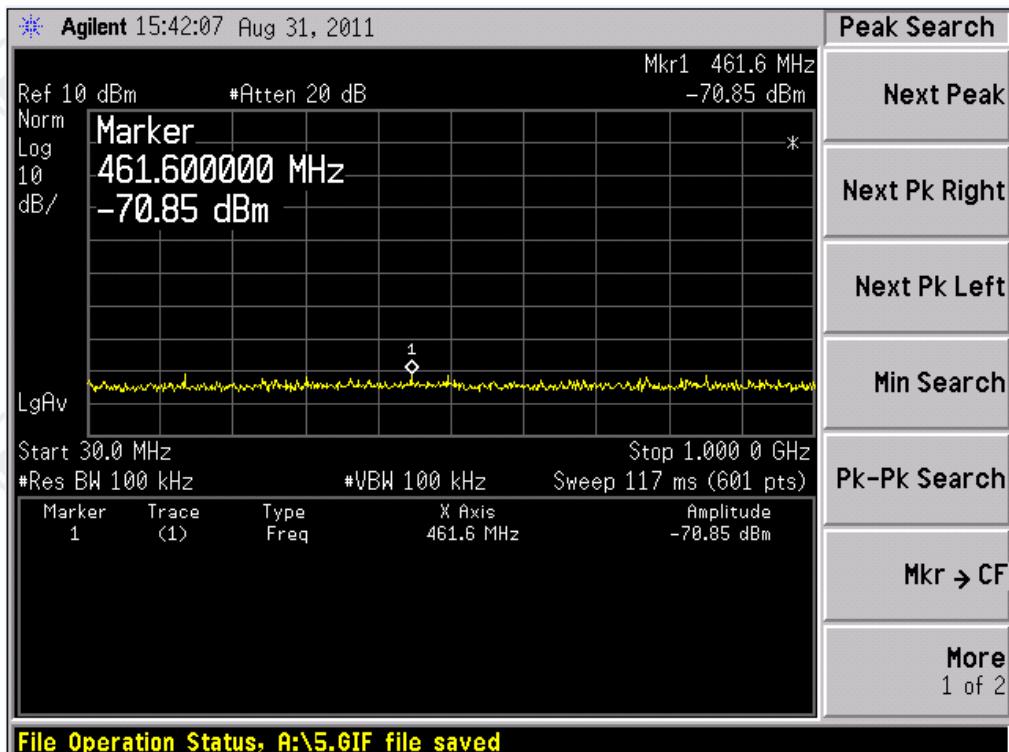


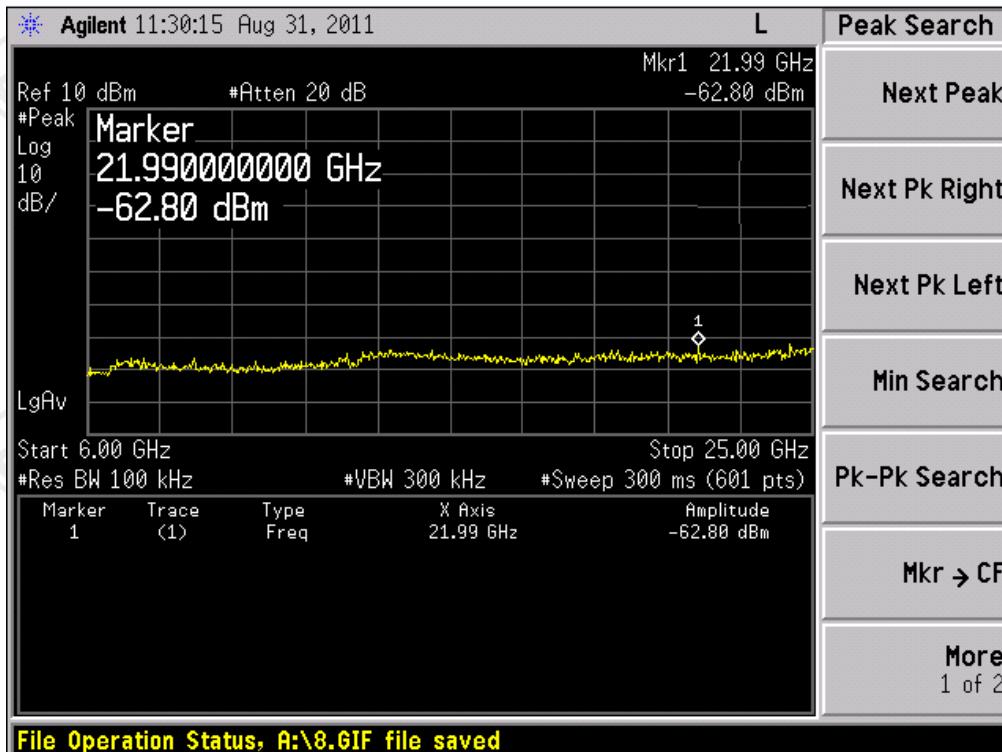
Low channel





Middle channel





13. RADIATED EMISSIONS MEASUREMENT

13.1. LIMITS

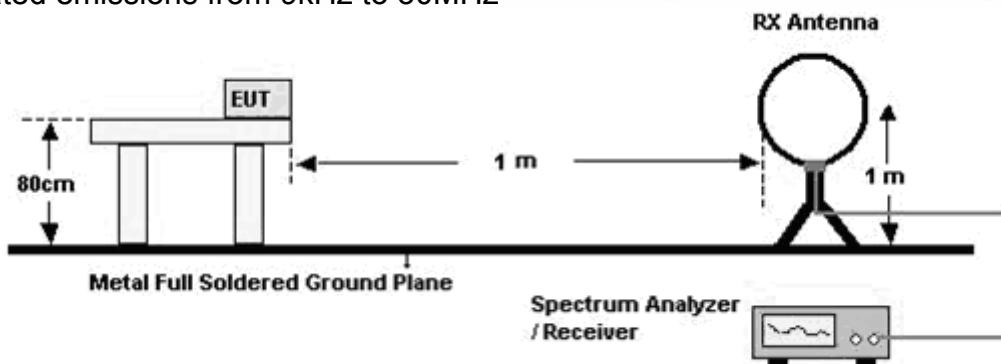
The field strength of any emissions, which appear outside of operating frequency band and restricted band specified on 15.205(a), shall not exceed the general radiated emission limits as below.

Frequency (MHz)	Field strength (μ V/m)	Distance (m)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

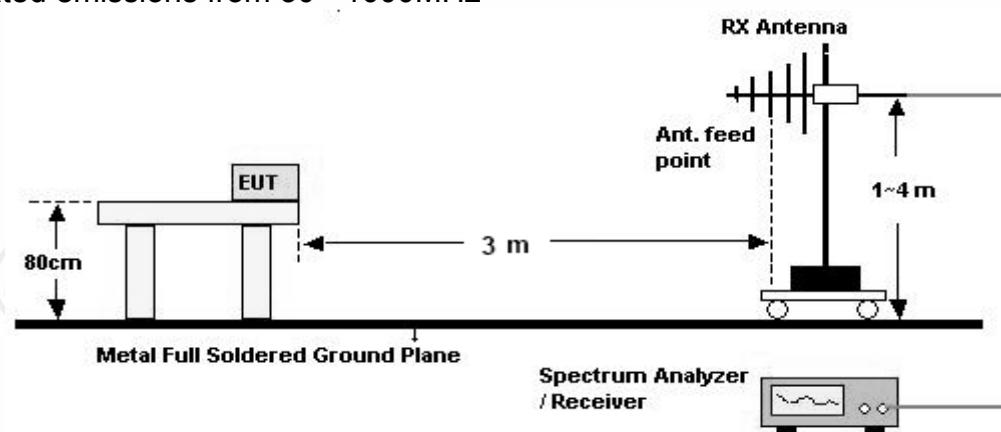
Note: the tighter limit applies at the band edges.

13.2. BLOCK DIAGRAM OF TEST SETUP

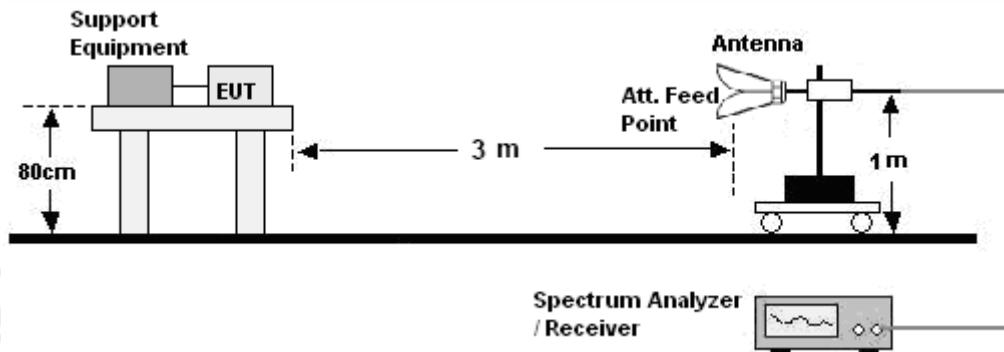
For radiated emissions from 9kHz to 30MHz



For radiated emissions from 30 - 1000MHz



For radiated emissions from 1GHz to 25GHz



13.3. TEST PROCEDURE

Below 30MHz:

- The EUT is placed on a turntable 0.8 meters above the ground in the chamber, 1 meter away from the antenna (loop antenna). The maximum values of the field strength are recorded by adjusting the polarizations of the test antenna and rotating the turntable.
- For each suspected emission, the EUT was arranged to its worst case and then turn table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test frequency analyzer system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

30MHz ~ 1GHz:

- The EUT was placed on the non-conductive turntable 0.8m above the ground at a chamber.
- Set the spectrum analyzer/receiver in Peak detector, Max Hold mode, and 120 kHz RBW. Record the maximum field strength of all the pre-scan process in the full band when the antenna is varied between 1~4 m in both horizontal and vertical, and the turntable is rotated from 0 to 360 degrees.
- For each frequency whose maximum record was higher or close to limit, measure its QP value: vary the antenna's height and rotate the turntable from 0 to 360 degrees to find the height and degree where EUT radiated the maximum emission, then set the test frequency analyzer/receiver to QP Detector and specified bandwidth with Maximum Hold Mode, and record the maximum value.

Above 1GHz:

- The EUT was placed on the non-conductive turntable 0.8m above the ground at a chamber.

b. Set the spectrum analyzer/receiver in Peak detector, Max Hold mode, set 1MHz RBW. Record the maximum PK field strength in the full band when the antenna is varied in both horizontal and vertical, and the turntable is rotated from 0 to 360 degrees.

c. For each frequency whose maximum record was higher or close to limit, measure its AV value: rotate the turntable from 0 to 360 degrees to find the degree where EUT radiated the maximum emission, then set the test frequency analyzer/receiver to AV value and specified bandwidth with Maximum Hold Mode, and record the maximum value.

Note: For more detail measurement procedure or testing method, please reference measurement procedure KDB 558074 document which is published on FCC website.

13.4. TEST RESULT

IEEE 802.11b (Worst case data: 11Mbps data rate)

Frequency (MHZ)	Antenna Polarization (H / V)	Detector (PK / QP / AV)	Reading (dBuV)	Factor (dB)	Final Result (dB μ V/m)	Limit (dB μ V/m)	Result (Pass / Fail)
Low channel (2412MHz)							
143.280	H	QP	23.6	11.6	35.2	43.5	Pass
2412.000	H	PK	100.0	-9.5	91.5	---	Pass
2500.000	H	PK	60.2	-9.4	50.8	54.0	Pass
4812.000	H	PK	44.8	-7.3	37.5	54.0	Pass
200.058	V	QP	14.3	13.0	27.3	43.5	Pass
2412.000	V	PK	103.3	-9.5	93.8	---	Pass
2500.000	V	PK	61.7	-9.4	52.3	54.0	Pass
4364.000	V	PK	42.9	-7.4	35.5	54.0	Pass
Middle channel (2437MHz)							
624.885	H	QP	14.0	23.0	37.0	46.0	Pass
2437.000	H	PK	97.2	-9.5	91.7	---	Pass
3352.000	H	PK	45.8	-8.2	37.6	54.0	Pass
7500.000	H	PK	45	-4.7	37.5	54.0	Pass
640.026	V	QP	15.0	24.2	39.2	46.0	Pass
2437.000	V	PK	105.0	-9.8	95.2	---	Pass
5230.000	V	PK	43.1	-6.9	36.2	54.0	Pass
High channel (2462MHz)							
143.285	H	QP	20.0	11.6	31.6	43.5	Pass
2462.000	H	PK	99.8	-9.5	90.3	---	Pass
2518.000	H	PK	48.2	-9.4	38.8	54.0	Pass
4924.000	H	PK	42.8	-7.3	35.5	54.0	Pass
143.285	V	QP	14.2	11.6	25.8	43.5	Pass

2462.000	V	PK	102.1	-9.5	92.6	---	Pass
4924.000	V	PK	44.1	-7.3	36.8	54.0	Pass
7500.000	V	PK	45.4	-4.7	40.7	54.0	Pass

IEEE 802.11g (Worst case data: 6Mbps data rate)

Frequency (MHZ)	Antenna Polarization (H / V)	Detector (PK / QP / AV)	Reading (dBuV)	Factor (dB)	Final Result (dB μ V/m)	Limit (dB μ V/m)	Result (Pass / Fail)
Low channel (2412MHz)							
59.100	H	QP	25.4	8.4	32.8	40.0	Pass
2412.000	H	PK	95.8	-9.5	86.3	---	Pass
4824.000	H	PK	44.3	-7.3	37.0	54.0	Pass
7220.000	H	PK	41.2	-5.0	36.2	54.0	Pass
298.367	V	QP	15.5	16.8	32.3	46.0	Pass
2412.000	V	PK	98.3	-9.5	88.8	---	Pass
2572.000	V	PK	60.4	-9.3	50.1	54.0	Pass
4824.000	V	PK	46.5	-7.3	39.2	54.0	Pass
Middle channel (2437MHz)							
624.885	H	QP	13.4	23.0	36.4	46.0	Pass
2437.000	H	PK	97.9	-9.5	88.4	---	Pass
7500.000	H	PK	45.0	-4.7	40.3	54.0	Pass
640.026	V	QP	16.4	24.2	40.6	46.0	Pass
2437.000	V	PK	100.8	-9.5	91.3	---	Pass
4874.000	V	PK	46.5	-7.2	39.3	54.0	Pass
7230.000	V	PK	42.2	-4.9	37.3	54.0	Pass
High channel (2462MHz)							
283.000	H	QP	17.1	16.5	33.6	46.0	Pass
2462.000	H	PK	96.1	-9.5	86.6	---	Pass

2590.000	H	PK	54.0	-9.3	43.7	54.0	Pass
4924.000	H	PK	43.5	-7.3	36.2	54.0	Pass
143.285	V	QP	15.7	11.6	26.3	43.5	Pass
2462.000	V	PK	96.7	-9.5	87.2	---	Pass
2590.000	V	PK	54.2	-9.3	43.9	54.0	Pass
4924.000	V	PK	43.9	-7.3	36.6	54.0	Pass

IEEE 802.11n (Worst case data: 6.5Mbps data rate)

Frequency (MHZ)	Antenna Polarization (H / V)	Detector (PK / QP / AV)	Reading (dBuV)	Factor (dB)	Final Result (dB μ V/m)	Limit (dB μ V/m)	Result (Pass / Fail)
Low channel (2412MHz)							
59.028	H	QP	25.2	8.4	32.6	40.0	Pass
2412.000	H	PK	96.6	-9.5	87.1	---	Pass
2578.000	H	PK	60.3	-9.3	51.0	54.0	Pass
4824.000	H	PK	47.0	-7.3	39.7	54.0	Pass
187.050	V	QP	14.8	12.5	27.3	43.5	Pass
2412.000	V	PK	99.5	-9.5	90.0	---	Pass
2578.000	V	PK	61.8	-9.3	52.5	54.0	Pass
4824.000	V	PK	47.3	-7.3	40.0	54.0	Pass
Middle channel (2437MHz)							
143.288	H	QP	25.5	11.6	37.1	43.5	Pass
2437.000	H	PK	97.7	-9.5	88.2	---	Pass
4874.000	H	PK	43.8	-7.2	36.6	54.0	Pass
7300.000	H	PK	43.4	-4.8	38.6	54.0	Pass
199.750	V	QP	16.3	13.0	29.3	43.5	Pass
2437.000	V	PK	100.1	-9.5	90.6	---	Pass
4874.000	V	PK	45.4	-7.2	38.2	54.0	Pass
7311.000	V	PK	42.0	-4.8	37.2	54.0	Pass

High channel (2462MHz)							
143.285	H	QP	20.0	11.6	31.6	43.5	Pass
2462.000	H	PK	94.9	-9.5	85.4	---	Pass
2596.000	H	PK	57.2	-9.3	47.9	54.0	Pass
4924.000	H	PK	47.6	-7.3	40.3	54.0	Pass
257.950	V	QP	10.8	15.0	25.8	46.0	Pass
2462.000	V	PK	96.6	-9.5	87.1	---	Pass
2596.000	V	PK	57.7	-9.3	48.4	54.0	Pass
4924.000	V	PK	48.5	-7.3	41.2	54.0	Pass

Note 1: The above tables show that the frequencies peak data are all below the average limit, so the average data of these frequencies are deemed to fulfill the average limits and not reported.

Note 2: The emissions below 30MHz are not reported for they are much lower than the limits.

Note 3: Below 1GHz: The factor = cable loss+ antenna factor.

For example: The cable loss of 200.058MHz is 2.2dB and the antenna factor is 10.8dB/m. So, the factor=2.2+10.8=13dB.

Above 1GHz: The factor = cable loss+ antenna factor – Pre-amplifier factor.

For example: The cable loss of 2412MHz is 3.8dB, the antenna factor is 32.8dB/m and the pre-amplifier factor is 46.1dB. So, the factor=3.8+32.8-46.1= -9.5dB.

Final Result = Reading + factor.

14. CONDUCTED EMISSION TEST

14.1. Limits

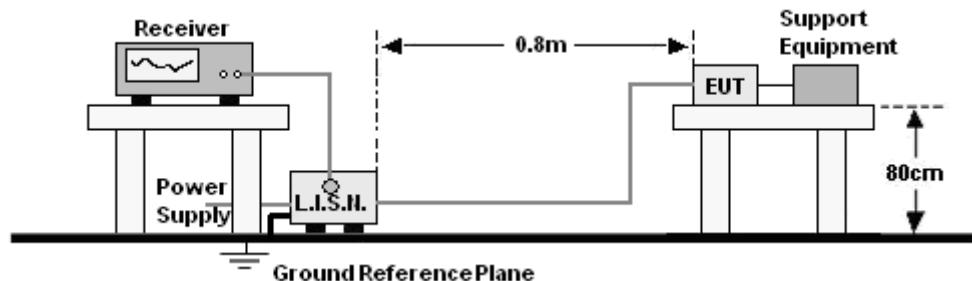
Limits for Class B digital devices

Frequency range (MHz)	Limits dB(µV)	
	Quasi-peak	Average
0,15 to 0,50	66 to 56	56 to 46
0,50 to 5	56	46
5 to 30	60	50

NOTE: 1. The lower limit shall apply at the transition frequencies.

2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 to 0.50 MHz.

14.2. BLOCK DIAGRAM OF TEST SETUP

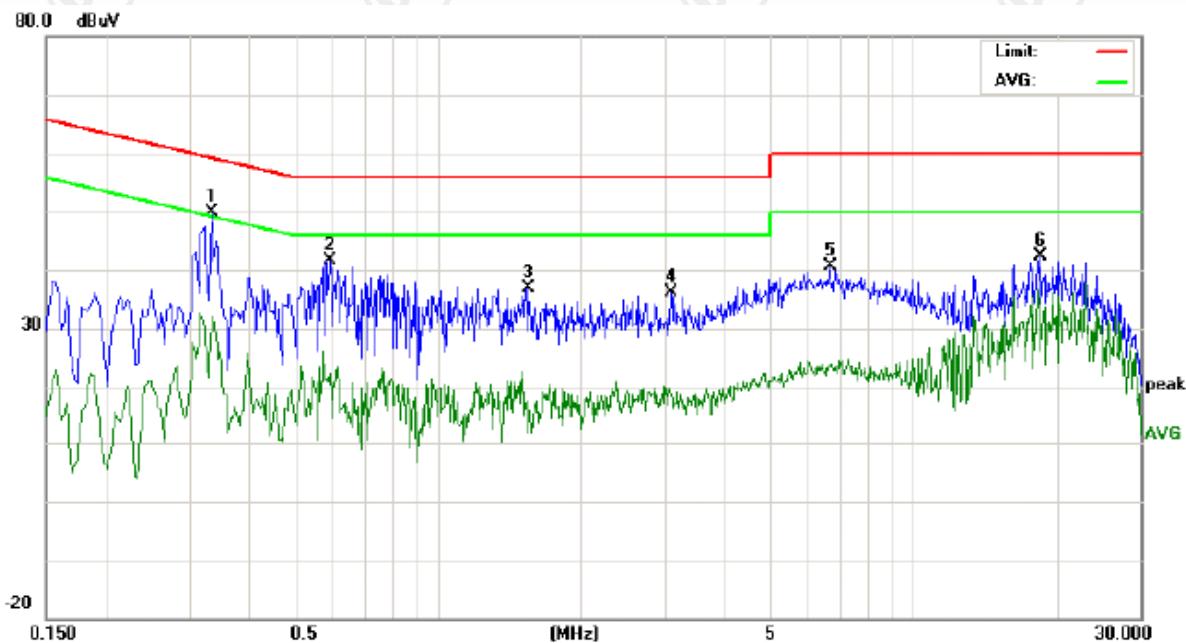


14.3. PROCEDURE OF CONDUCTED EMISSION TEST

- The EUT was placed on a nonconductive table above the horizontal ground reference plane, and 0.4 m from the vertical ground reference plane, and connected to the main through Line Impedance Stability Network (L.I.S.N.).
- The RBW of the receiver was set at 9 kHz in 150 kHz ~ 30MHz with Peak and AVG detector in Max Hold mode. Run the receiver's pre-scan to record the maximum disturbance generated from EUT in all power lines in the full band.
- For each frequency whose maximum record was higher or close to limit, measure its QP and AVG values and record.

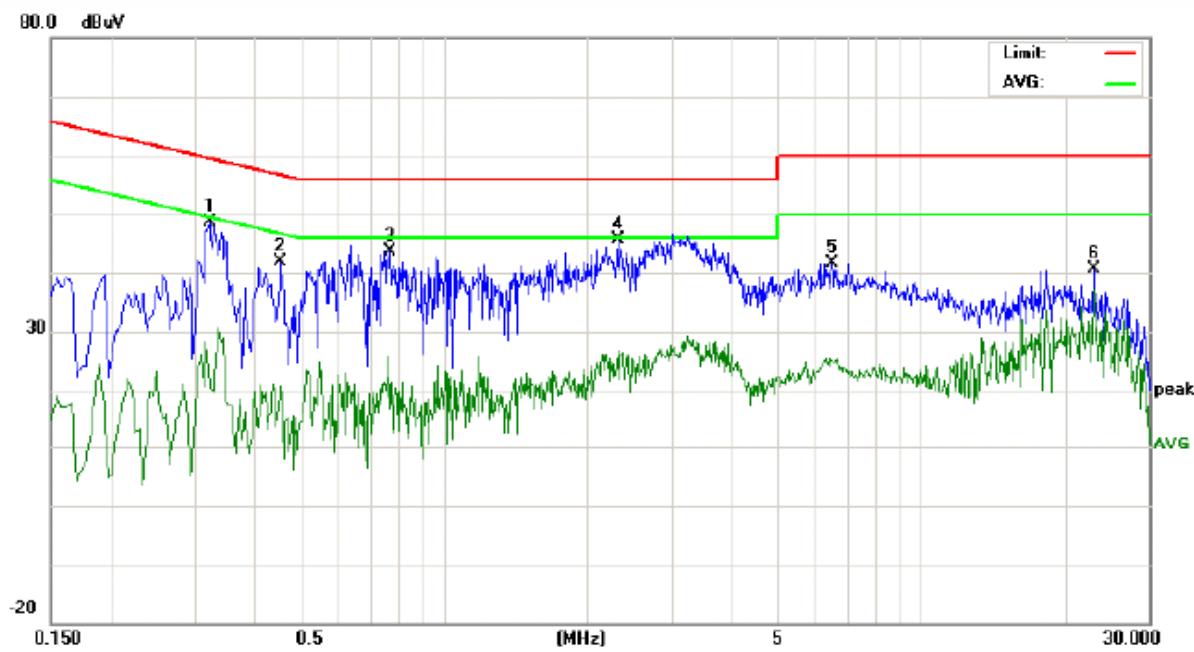
Note: For more detail measurement procedure or testing method, please reference measurement procedure KDB 558074 document which is published on FCC website.

14.4. GRAPHS AND DATA



Site site #1
 Phase: **L1** Temperature: 25
 Limit: FCC Class B Conduction (QP) Power: AC 120V/60Hz Humidity: 56 %
 EUT: ADSL router
 M/N: PD1101-K5815
 Mode: Tx
 Note: 802.11b mode

No.	Freq.	Reading_Level (dBuV)			Correct Factor			Measurement (dBuV)			Limit (dBuV)			Margin (dB)		
		MHz	Peak	QP	Avg	dB	peak	QP	Avg	QP	Avg	QP	Avg	P/F	Comment	
1	0.3339	39.94	31.99	19.67	9.86	49.80	41.85	29.53	59.35	49.35	-17.50	-19.82	P			
2	0.5940	31.65	23.83	7.77	9.94	41.59	33.77	17.71	56.00	46.00	-22.23	-28.29	P			
3	1.5460	27.02	18.84	5.57	9.93	36.95	28.77	15.50	56.00	46.00	-27.23	-30.50	P			
4	3.1060	26.26	16.62	6.43	9.98	36.24	26.60	16.41	56.00	46.00	-29.40	-29.59	P			
5	6.6820	30.39	21.68	10.73	10.13	40.52	31.81	20.86	60.00	50.00	-28.19	-29.14	P			
6	18.4900	32.03	25.83	21.65	10.35	42.38	36.18	32.00	60.00	50.00	-23.82	-18.00	P			



Site site #1

Phase: **N**

Temperature: 25

Limit: FCC Class B Conduction (QP)

Power: AC 120V/60Hz

Humidity: 56 %

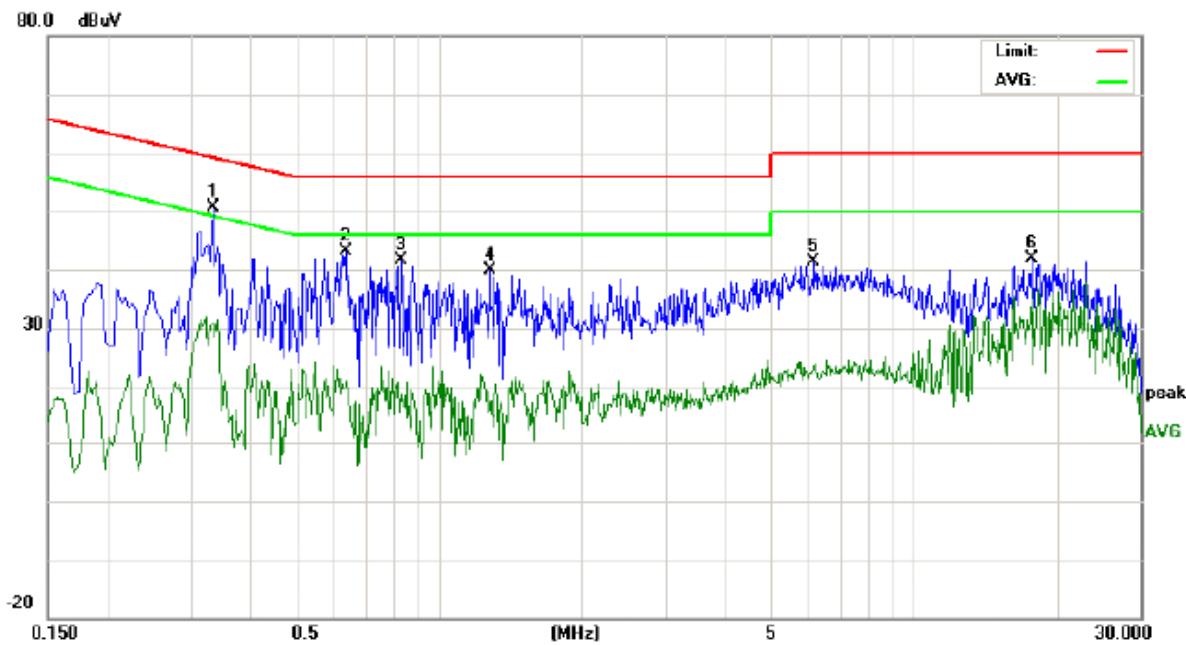
EUT: ADSL router

M/N: PD1101-K5815

Mode: Tx

Note: 802.11b mode

No.	Freq.	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)			Margin (dB)		
		MHz	Peak	QP	Avg	peak	QP	Avg	QP	Avg	QP	Avg	P/F	Comment
1	0.3220	38.75	32.83	16.20	9.86	48.61	42.69	26.06	59.65	49.65	-16.96	-23.59	P	
2	0.4500	31.91	22.74	7.31	9.86	41.77	32.60	17.17	56.87	46.87	-24.27	-29.70	P	
3	0.7740	33.73	25.11	9.97	10.01	43.74	35.12	19.98	56.00	46.00	-20.88	-26.02	P	
4	2.3140	35.62	19.17	4.42	9.96	45.58	29.13	14.38	56.00	46.00	-26.87	-31.62	P	
5	6.4899	31.55	22.24	10.11	10.12	41.67	32.36	20.23	60.00	50.00	-27.64	-29.77	P	
6	23.1299	30.13	28.07	26.46	10.61	40.74	38.68	37.07	60.00	50.00	-21.32	-12.93	P	



Site site #1

Phase: *L1*

Temperature: 25

Limit: FCC Class B Conduction (QP)

Power: AC 120V/60Hz

Humidity: 56 %

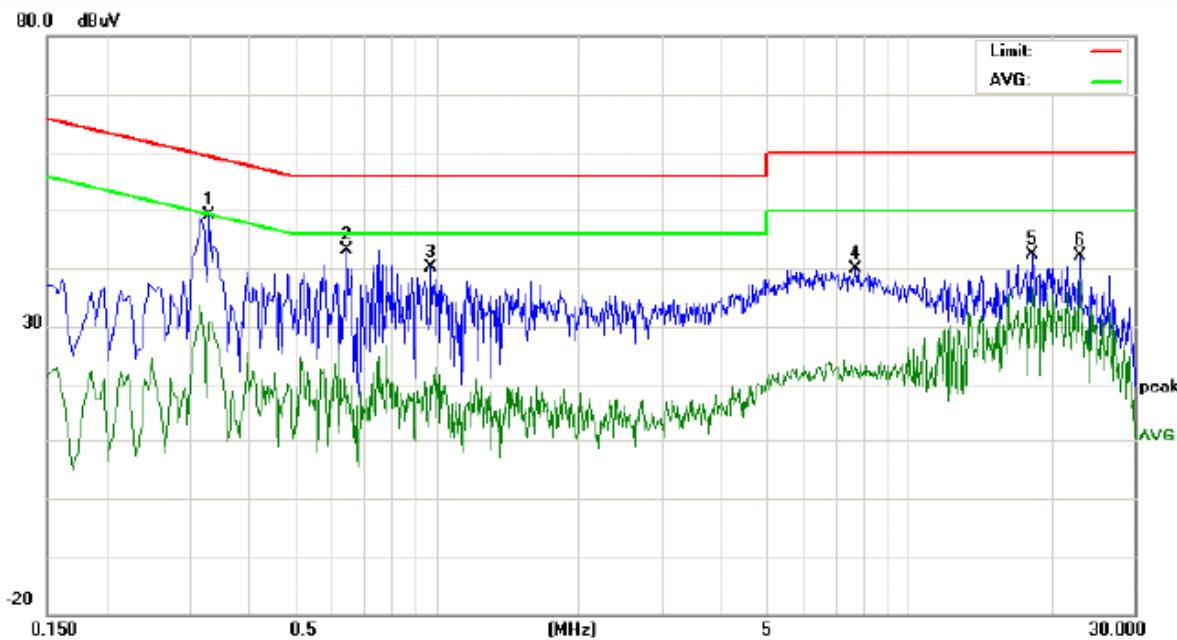
EUT: ADSL router

M/N: PD1101-K5815

Mode: Tx

Note: 802.11g mode

No.	Freq.	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		P/F	Comment
		MHz	Peak	QP	Avg	peak	QP	Avg	QP	Avg	QP	Avg		
1	0.3339	40.71	33.70	20.16	9.86	50.57	43.56	30.02	59.35	49.35	-15.79	-19.33	P	
2	0.6380	33.17	25.18	8.33	9.98	43.15	35.16	18.31	56.00	46.00	-20.84	-27.69	P	
3	0.8340	31.57	23.43	7.36	9.98	41.55	33.41	17.34	56.00	46.00	-22.59	-28.66	P	
4	1.2780	30.02	21.37	7.71	9.92	39.94	31.29	17.63	56.00	46.00	-24.71	-28.37	P	
5	6.1740	31.24	22.66	11.72	10.10	41.34	32.76	21.82	60.00	50.00	-27.24	-28.18	P	
6	17.6940	31.47	28.69	26.09	10.30	41.77	38.99	36.39	60.00	50.00	-21.01	-13.61	P	



Site site #1

Phase: **N**

Temperature: 25

Limit: FCC Class B Conduction (QP)

Power: AC 120V/60Hz

Humidity: 56 %

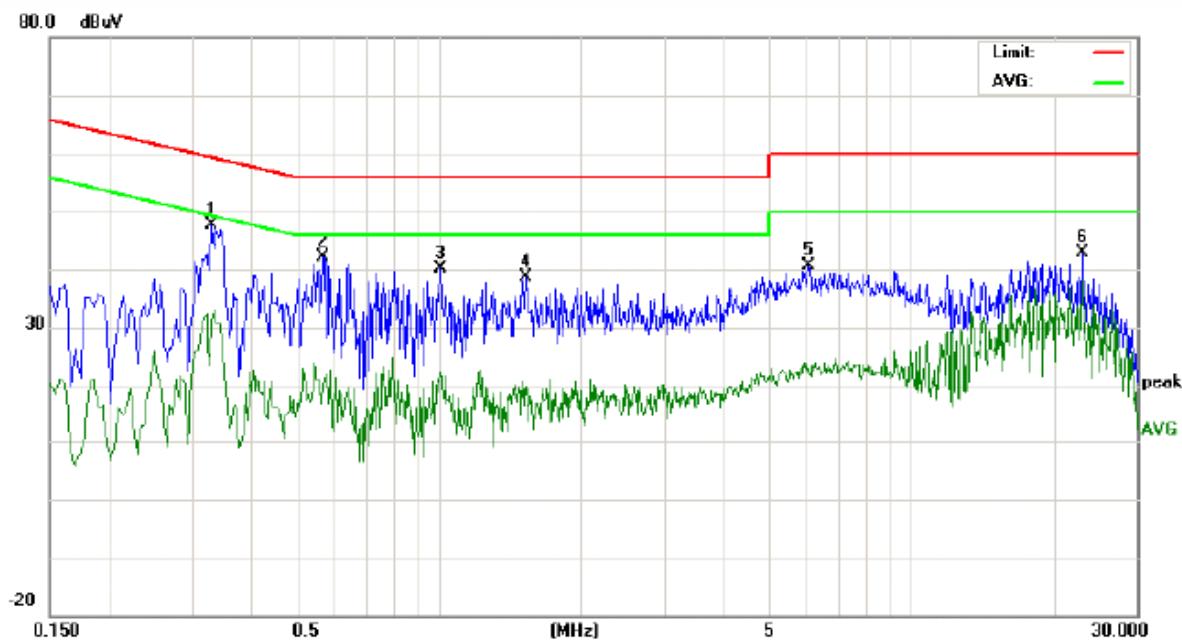
EUT: ADSL router

M/N: PD1101-K5815

Mode: Tx

Note: 802.11g mode

No.	Freq.	Reading_Level (dBuV)			Correct Factor		Measurement (dBuV)			Limit (dBuV)		Margin (dB)		P/F	Comment
		MHz	Peak	QP	Avg	dB	peak	QP	Avg	QP	Avg	QP	Avg		
1	0.3300	39.18	33.51	16.71	9.86	49.04	43.37	26.57	59.45	49.45	-16.08	-22.88	P		
2	0.6460	33.24	25.99	7.87	9.99	43.23	35.98	17.86	56.00	46.00	-20.02	-28.14	P		
3	0.9780	30.23	24.26	9.16	9.92	40.15	34.18	19.08	56.00	46.00	-21.82	-26.92	P		
4	7.7100	29.75	22.84	11.96	10.18	39.93	33.02	22.14	60.00	50.00	-26.98	-27.86	P		
5	18.2420	32.11	28.93	26.36	10.34	42.45	39.27	36.70	60.00	50.00	-20.73	-13.30	P		
6	23.1299	31.39	28.53	26.39	10.61	42.00	39.14	37.00	60.00	50.00	-20.86	-13.00	P		



Site site #1

Phase: *L1*

Temperature: 25

Limit: FCC Class B Conduction (QP)

Power: AC 120V/60Hz

Humidity: 56 %

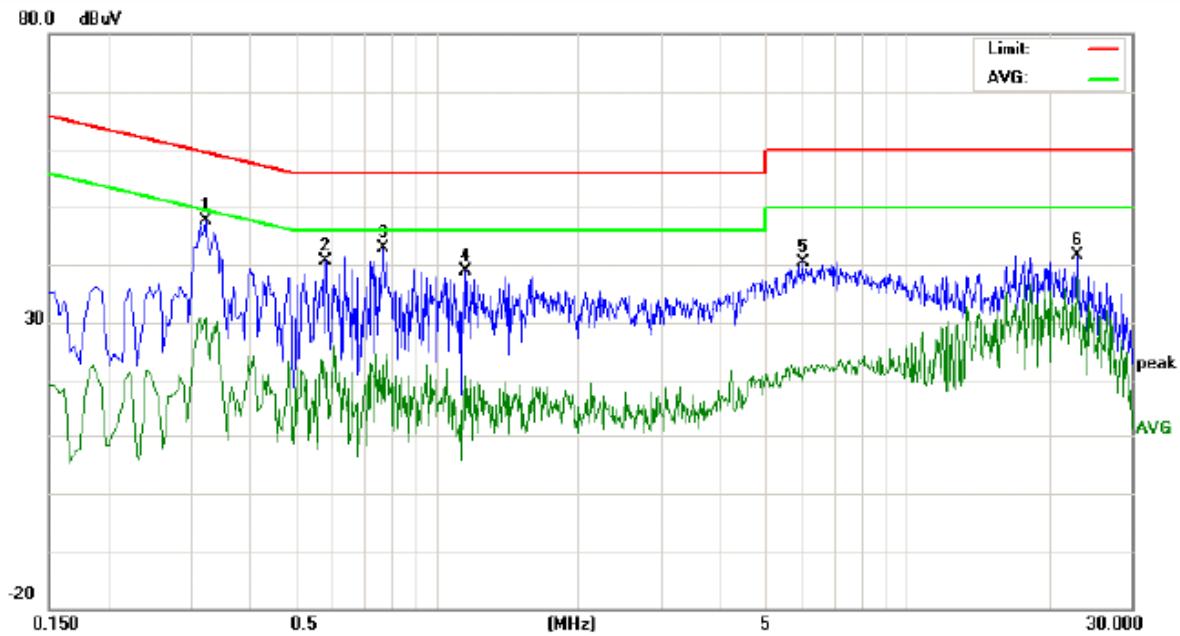
EUT: ADSL router

M/N: PD1101-K5815

Mode: Tx

Note: 802.11n mode

No.	Freq.	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)			Margin (dB)	
		MHz	Peak	QP	Avg	Peak	QP	Avg	QP	Avg	QP	Avg	P/F
1	0.3300	37.73	32.06	17.52	9.86	47.59	41.92	27.38	59.45	49.45	-17.53	-22.07	P
2	0.5700	32.26	24.42	10.08	9.92	42.18	34.34	20.00	56.00	46.00	-21.66	-26.00	P
3	1.0100	30.11	23.21	9.80	9.91	40.02	33.12	19.71	56.00	46.00	-22.88	-26.29	P
4	1.5300	28.58	20.90	6.45	9.93	38.51	30.83	16.38	56.00	46.00	-25.17	-29.62	P
5	6.0580	30.57	22.28	10.98	10.10	40.67	32.38	21.08	60.00	50.00	-27.62	-28.92	P
6	23.1299	32.38	29.68	27.13	10.61	42.99	40.29	37.74	60.00	50.00	-19.71	-12.26	P



Site site #1

Phase: *N*

Temperature: 25

Limit: FCC Class B Conduction (QP)

Power: AC 120V/60Hz

Humidity: 56 %

EUT: ADSL router

M/N: PD1101-K5815

Mode: Tx

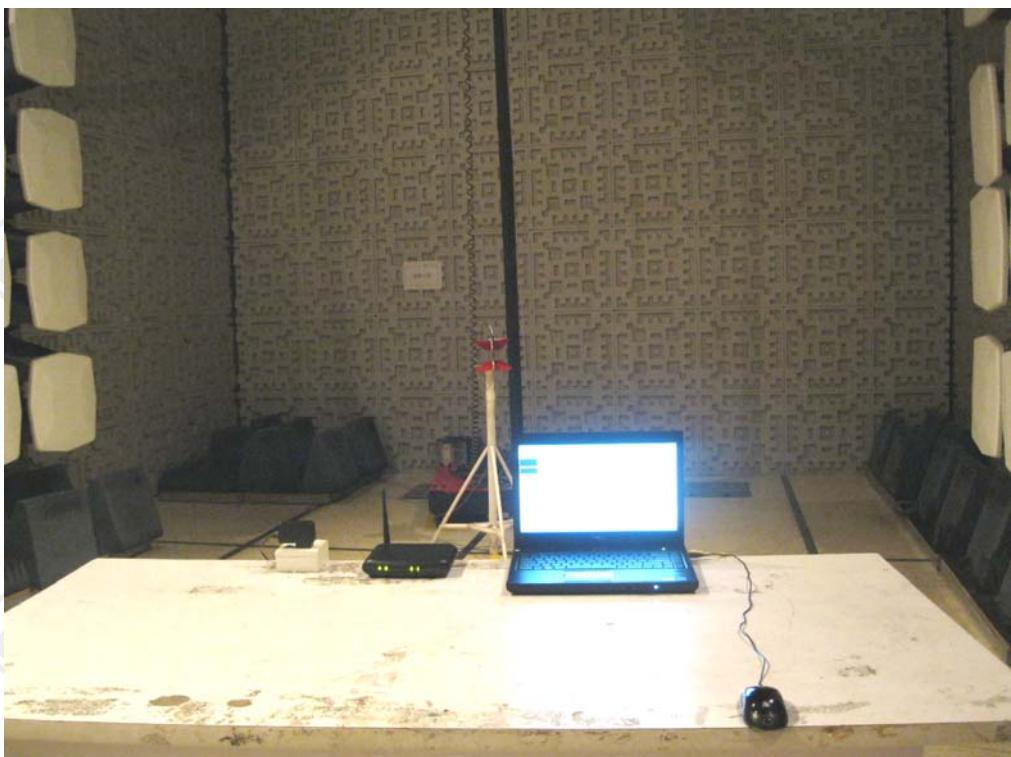
Note: 802.11n mode

No.	Freq.	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)			Margin (dB)		
		MHz	Peak	QP	Avg	peak	QP	Avg	QP	Avg	QP	Avg	P/F	Comment
1	0.3220	37.89	34.04	16.64	9.86	47.75	43.90	26.50	59.65	49.65	-15.75	-23.15	P	
2	0.5820	30.81	25.95	12.14	9.93	40.74	35.88	22.07	56.00	46.00	-20.12	-23.93	P	
3	0.7700	32.83	25.64	10.57	10.01	42.84	35.65	20.58	56.00	46.00	-20.35	-25.42	P	
4	1.1580	28.96	20.76	4.49	9.92	38.88	30.68	14.41	56.00	46.00	-25.32	-31.59	P	
5	6.0100	30.27	22.71	10.64	10.10	40.37	32.81	20.74	60.00	50.00	-27.19	-29.26	P	
6	23.1299	31.14	28.93	26.51	10.61	41.75	39.54	37.12	60.00	50.00	-20.46	-12.88	P	

APPENDIX 1 PHOTOGRAPHS OF TEST SETUP



TEST SETUP OF RADIATED EMISSION (30MHz-1GHz)



TEST SETUP OF RADIATED EMISSION (above 1GHz)



TEST SETUP OF CONDUCTED EMISSION (front view)



TEST SETUP OF CONDUCTED EMISSION (side view)

APPENDIX 2 EXTERNAL PHOTOGRAPHS OF EUT



External View of EUT-1



External View of EUT-2



External View of EUT-3



External View of EUT-4

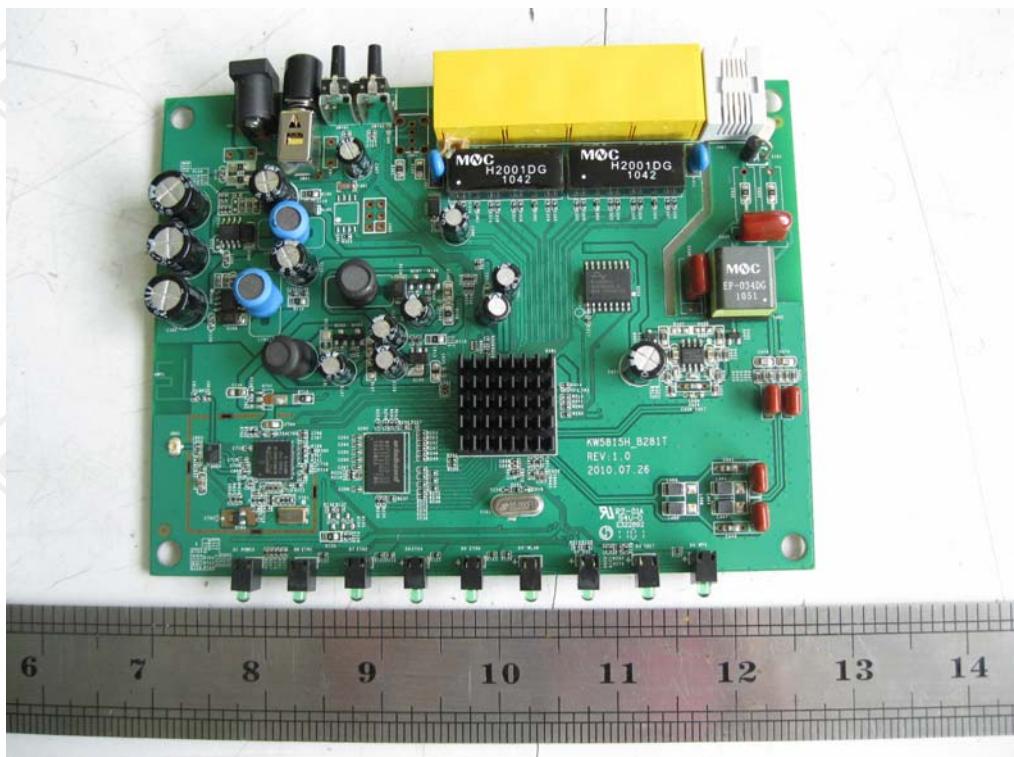
APPENDIX 3 INTERNAL PHOTOGRAPHS OF EUT



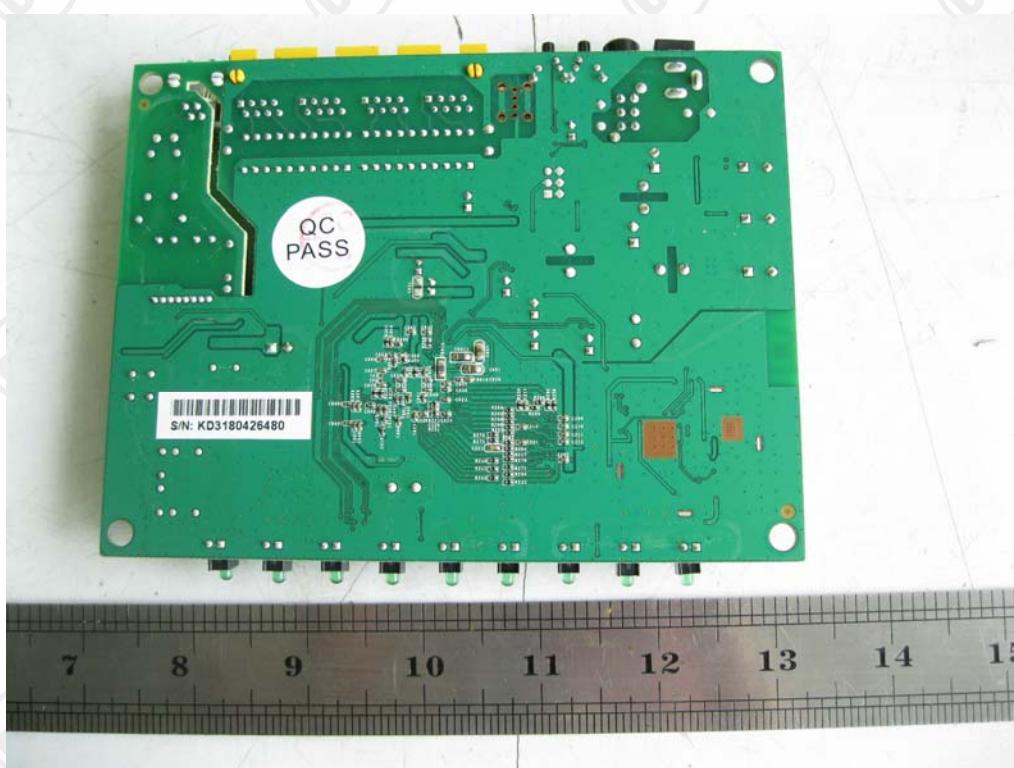
Internal View of EUT-1



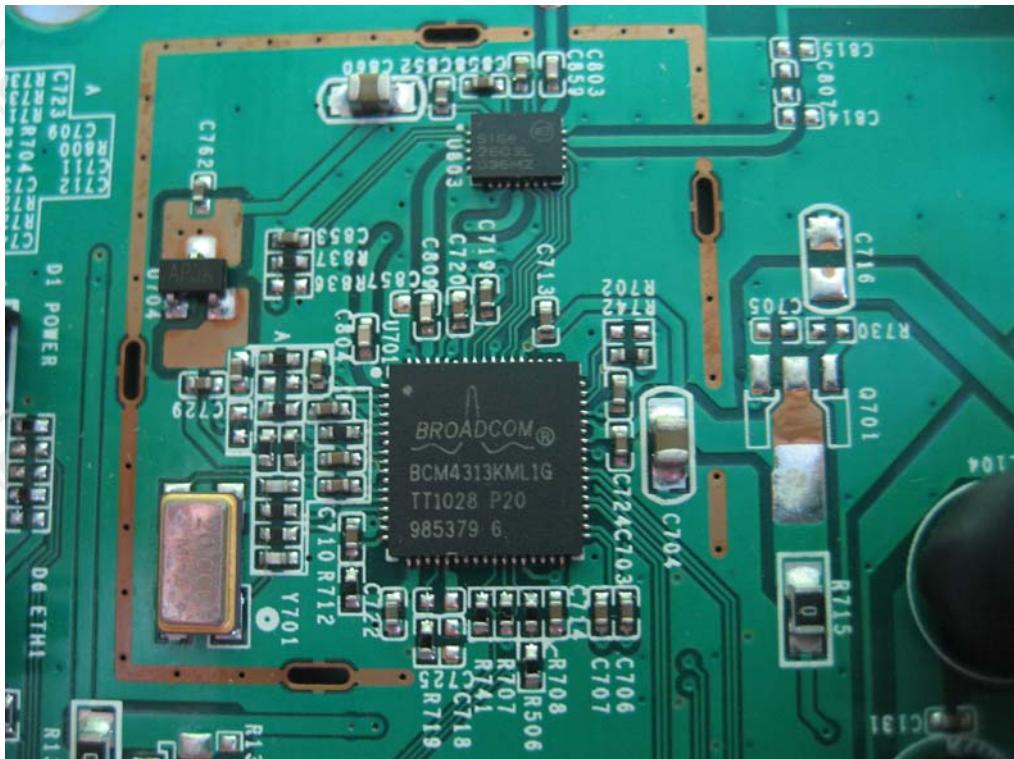
Internal View of EUT-2



Internal View of EUT-3



Internal View of EUT-4



Internal View of EUT-5

----- End of report -----