TEST REPORT

Date: 2014-05-27
Report No.: 60.870.14.006.01F

Applicant:	Binatone Electronics International Limited Floor 23, 9 Des Voeux Road West, Sheung Wan, Hong Kong

Description of Samples:	Model name:	Wi-Fi Home Video Camera
	Brand name:	motorola
	Model no.:	FOCUS66-S, FOCUS66-W, FOCUS66-B, SCOUT 66, SCOUT66-S, SCOUT66-W, SCOUT66-B, FOCUS66-S2, FOCUS66-S3, FOCUS66-S4, FOCUS66-W2, FOCUS66-W3, FOCUS66-W4, FOCUS66-B2, FOCUS66-B3, FOCUS66-B4
	FCCID:	VLJ-FOCUS66

Date Samples Received:	2014-04-14
Date Tested:	2014-04-15 to 2014-05-27
Investigation Requested:	FCC Part 15 Subpart C, Section 15.247
Conclusions:	The submitted product <u>COMPLIED</u> with the requirements of Federal Communications Commission [FCC] Rules and Regulations Part 15. The tests were performed in accordance with the standards described above and on Section 2.2 in this Test Report.
Remarks:	---

Checked by: Approved by:-

———————————————   ———————————————
Ray Cheung   Jeff Pong
Project Engineer   Operation Manager
Wireless & Telecom department   Wireless & Telecom department

CONTENT:

5.0   **List of Measurement Equipments**

Appendix A

Photos of Test Setup

Appendix B

External EUT Photos

Appendix C

Internal EUT Photos

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3/F, West Wing, Phase 2, 10 Science Park West Avenue, Shatin, Hong Kong

1.0   General Details

1.1   Test Laboratory

Attestation of Global Compliance SZ Co Ltd.
2/F, Building 2,No.1-No.4,Chaxi Sanwei, Technical Industrial Park,
Gushu, Xixiang, Shenzhen, China.
Registration Number: 259865

Tested By:

John Zhi

1.2   Applicant Details
Applicant

Binatone Electronics International Limited
Floor 23A, 9 Des Voeux Road West, Sheung Wan, Hong
Kong

Manufacturers

Dongguan TaoSen Electronic Technology Co. Ltd.
No.7 Huanguoshan Road, Xinan Community, Changan Town,
Dongguan City, Guangdong, China

1.3   Equipment Under Test [EUT]

Description of EUT

Product Description:	Wi-Fi Home Video Camera
Model No.:	FOCUS66-W
Multi-listing Model:	FOCUS66-S, FOCUS66-B, SCOUT 66, SCOUT66-S, SCOUT66-W, SCOUT66-B, FOCUS66-S2, FOCUS66-S3, FOCUS66-S4, FOCUS66-W2, FOCUS66-W3, FOCUS66-W4, FOCUS66-B2, FOCUS66-B3, FOCUS66-B4
Brand Name:	motorola
FCCID:	VLJ-FOCUS66
Rating:	5VDC, 1000mA Powered by AD/DC Switching Adaptor
Operated Frequency:	2412 – 2462 MHz 2422 – 2452 MHz
No. of Operated Channel:	11 CH / (802.11b/g/n – HT20) ; 9CH / (802.11n – HT40)
Data Rate:	802.11b: 1, 2, 5.5, 11Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48, 54Mbps 802.11n: MCS0-7, up to 150Mbps
Modulation:	DSSS (BPSK, QPSK, CCK) and OFDM (BPSK/QPSK/16-QAM/ 64-QAM)
Accessories and Auxiliary Equipments:	AC/DC power adaptor, ThinkPad Notebook
Antenna Type:	Integral Antenna
Manufacture of Antenna:	Cortec Technology Inc.
Antenna Gain:	1.0dBi
Antenna Model:	---

General Operation of EUT

The Equipment Under Test (EUT) is a WiFi Camera Unit operated at 2.4GHz, which include of an 802.11b/g/n module.

As per Client Declaration, FOCUS66-W & all multi-list models (multi-list model listed on above) have the same technical construction including Software design, RF module, PCB layout, Circuit design, all electrical construction and basic mechanical construction. Only the outlook color and system grouping are different between the models, so we use FOCUS66-W as a representative model to perform all testing.

Description of Test Modes

The EUT has been tested under operating condition. Software used to control the EUT for staying in continuous transmitting and receiving mode is programmed.
IEEE802.11b: Channel 1(2412MHz), Channel 6(2437MHz) and Channel 11(2462MHz) with 1Mbps data rate (worst case) are chosen for the final testing.
IEEE802.11g: Channel 1(2412MHz), Channel 6(2437MHz) and Channel 11(2462MHz) with 6Mbps data rate (the worst case) are chosen for the final testing.
IEEE802.11n – HT20: Channel 1(2412MHz), Channel 6 (2437MHz) and Channel 11 (2462MHz) with MSC0 (worst case) are chosen for the final testing.
IEEE802.11n – HT40: Channel 3(2422MHz), Channel 6 (2437MHz) and Channel 9 (2452MHz) with MSC0 (worst case) are chosen for the final testing.

1.4   Related Submittal(s) Grants

This is a signal application subject to Certificate Authorization.

2.0 Technical Details

2.1 Investigations Requested

Perform ElectroMagnetic Interference measurement in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15 and ANSI C63.4: 2009

2.2 Test Standards and Results Summary Tables

Test Condition	Test Requirement	Test Result Pass	Test Result N/A
Number of Frequency Hopping	Section 15.247 (a1)	☐	☒
6dB Bandwidth Measurement	Section 15.247 (a2)	☒	☐
Power Spectral Density	Section 15.247 (e)	☒	☐
Pseudorandom Hopping Algorithm	Section 15.247 (a1)	☐	☒
Band Edge Measurement	Section 15.247	☒	☐
Maximum Output Power	Section 15.247 (b3)	☒	☐
Out of Band Emission	Section 15.247 (d)	☒	☐
Radiated Emission in Restricted Band	Section 15.247 (d)	☒	☐
Conducted Emission on AC Mains	Section 15.207	☒	☐
RF Exposure	Section 15.247 (i)	☒	☐
Antenna Requirement	Section 15.203	☒ See note 1	☐

Note 1 : The EUT uses a permanently attached antenna, which in accordance to Section 15.203, is considered sufficient to comply with the provisions of this section.

Remark: N/A - Not Applicable

3.0   Test Methodology

3.1   Radiated Emission

The sample was placed 0.8m above the ground plane on a standard emission test site *.   Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.

3.2   Field Strength Calculation

The field strength at 3 m was established by adding the meter reading of the spectrum analyzer to the factors associated with antenna correction factor, cable loss, preamplifiers and filter attenuation.

The equation is expressed as follow:

$$FS = R + System\ Factor$$
$$System\ Factor = AF + CF + FA - PA$$

Where FS = Net Field Strength in dBuV/m at 3 meters.
      R   = Reading of Spectrum Analyzer / Test Receiver in dBuV.
    AF = Antenna Factor in dB.
    CF = Cable Attenuation Factor in dB.
    FA = Filter Attenuation Factor in dB.
    PA = Preamplifier Factor in dB.

FA and PA are only be used for the measuring frequency above 1 GHz.

3.3   Conducted Emissions

The test was performed in accordance with ANSI C63.4: 2003, with the following: initial measurements were performed in peak and average detection modes on the live line of personal computer, any emissions recorded within 30dB of the relevant limit lines were re-measured using quasi-peak and average detection on the live and neutral lines with the worst case recorded in the table of results.

4.0 Test Results

4.1 6 dB Bandwidth Measurement

Test Requirement: FCC part 15 section 15.247 (a2)
Test Date: 2014-05-20
Mode of Operation: Transmitting continuously mode
Detector Function: Max Hold

Result: PASS

Test Setup:

The bandwidth is measured at an amplitude level reduced from the reference level by a specified ratio. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency. Once the reference level is established, the equipment is conditioned with typical modulating signal to produce the worst-case (i.e. the widest) bandwidth.

For 802.11B Mode

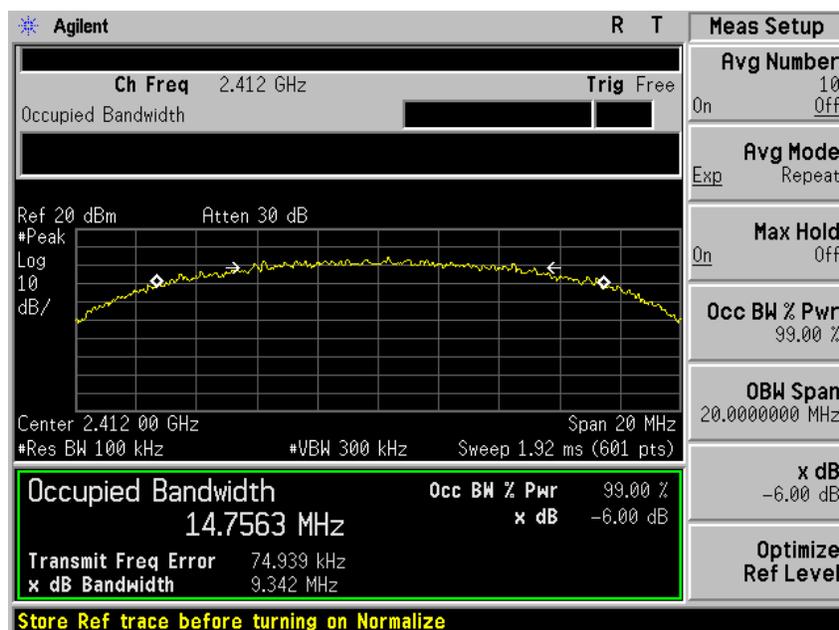| Channel	Measured frequency (MHz)	6dB Bandwidth (MHz)
Lowest	2412	9.342
Middle	2437	9.258
Highest	2462	9.102

This result is used for checking the systems using digital modulation techniques may operate in the 2400–2483.5 MHz.

Limits for 6 dB bandwidth [Section 15.247 (a2)]:
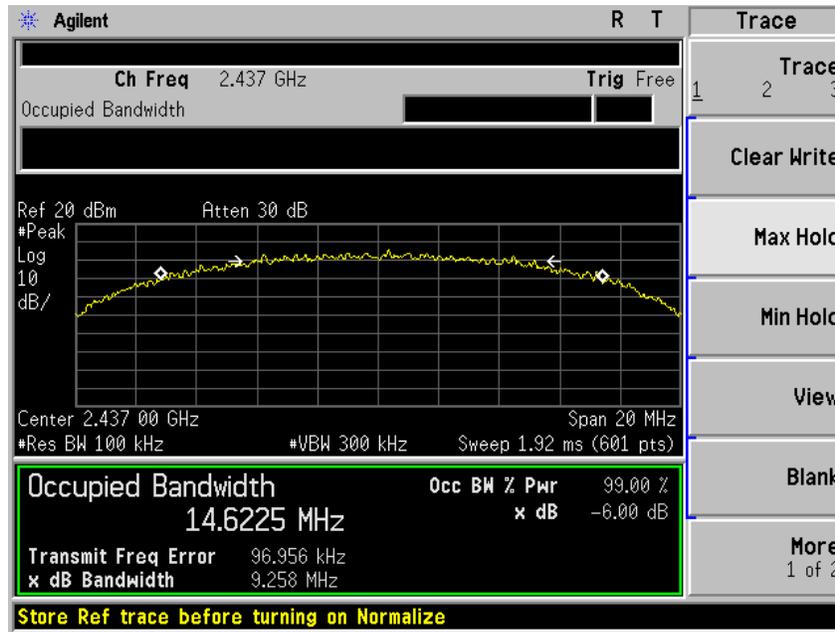The minimum 6 dB bandwidth shall be at least 500 kHz.

For 802.11B Mode
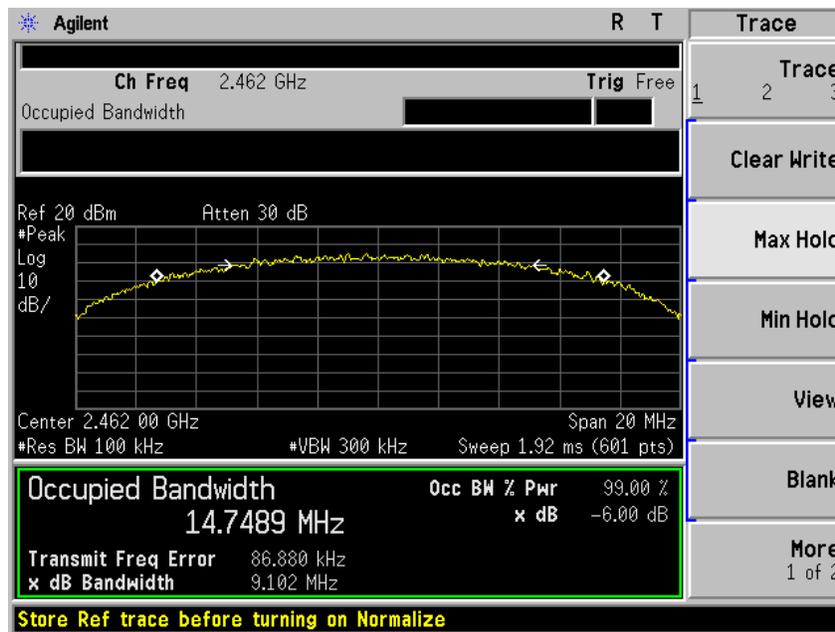**Result data graph shows 6 dB bandwidth, CF = 2.412GHz, BW = 9.342 MHz**

Result data graph shows 6 dB bandwidth, CF = 2.437GHz, BW = 9.258MHz

Result data graph shows 6 dB bandwidth, CF = 2.462GHz, BW = 9.102MHz

For 802.11G Mode

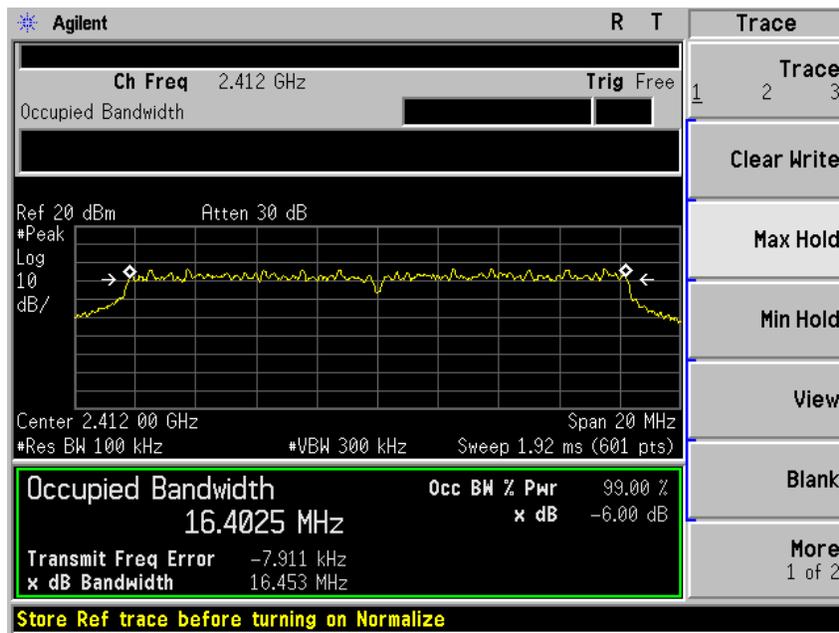| Channel	Measured frequency (MHz)	6dB Bandwidth (MHz)
Lowest	2412	16.453
Middle	2437	16.421
Highest	2462	16.060

This result is used for checking the systems using digital modulation techniques may operate in the 2400–2483.5 MHz.

Limits for 6 dB bandwidth [Section 15.247 (a2)]:
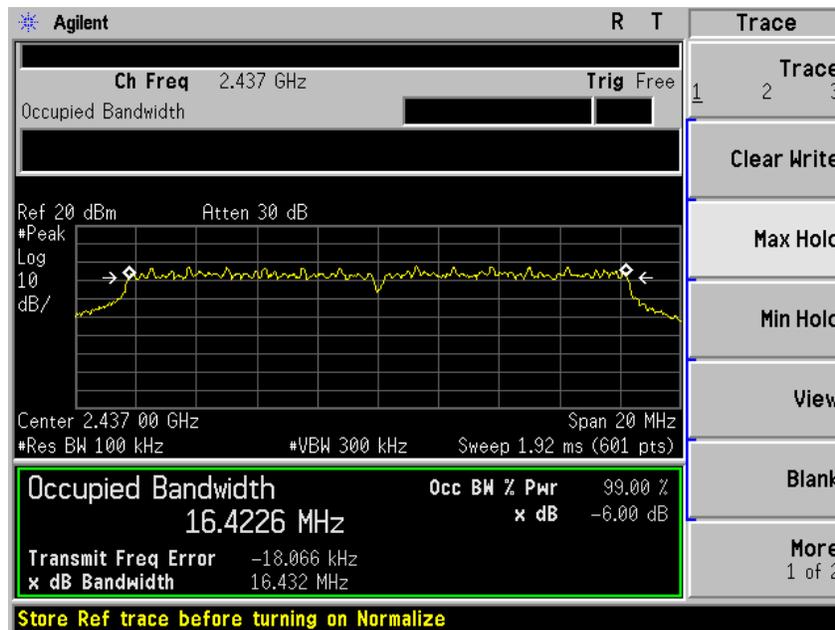The minimum 6 dB bandwidth shall be at least 500 kHz.

For 802.11G Mode
Result data graph shows 6 dB bandwidth, CF = 2.412GHz, BW = 16.453 MHz
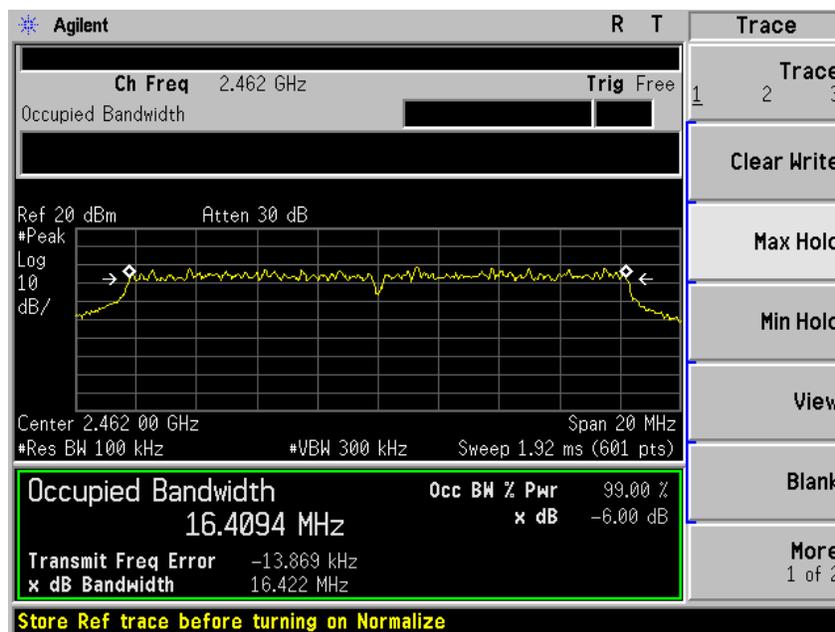
Result data graph shows 6 dB bandwidth, CF = 2.437GHz, BW = 16.432MHz

Result data graph shows 6 dB bandwidth, CF = 2.462GHz, BW = 16.422MHz

For 802.11N – HT20 Mode

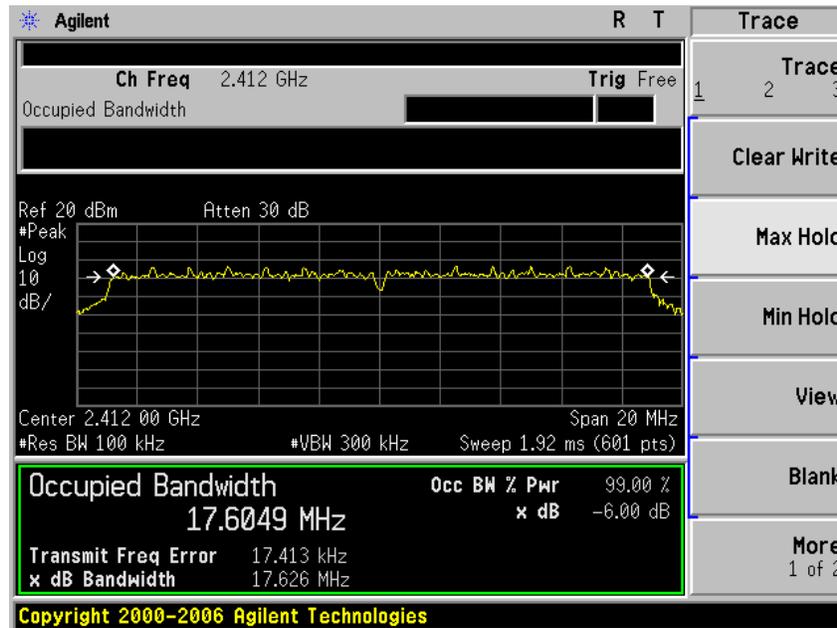| Channel	Measured frequency (MHz)	6dB Bandwidth (MHz)
Lowest	2412	17.626
Middle	2437	17.632
Highest	2462	17.627

This result is used for checking the systems using digital modulation techniques may operate in the 2400–2483.5 MHz.

Limits for 6 dB bandwidth [Section 15.247 (a2)]:

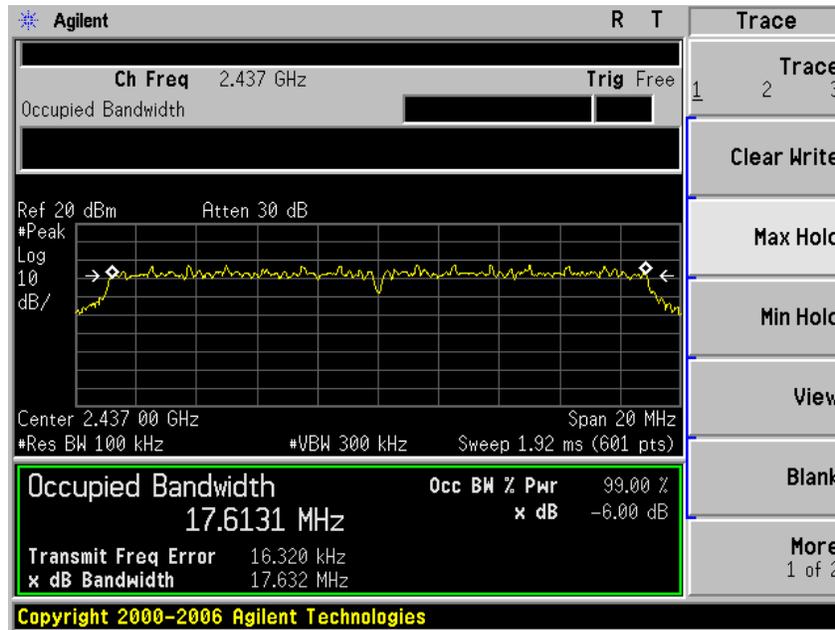The minimum 6 dB bandwidth shall be at least 500 kHz.

For 802.11N – HT20 Mode
Result data graph shows 6 dB bandwidth, CF = 2.412GHz, BW = 17.626 MHz
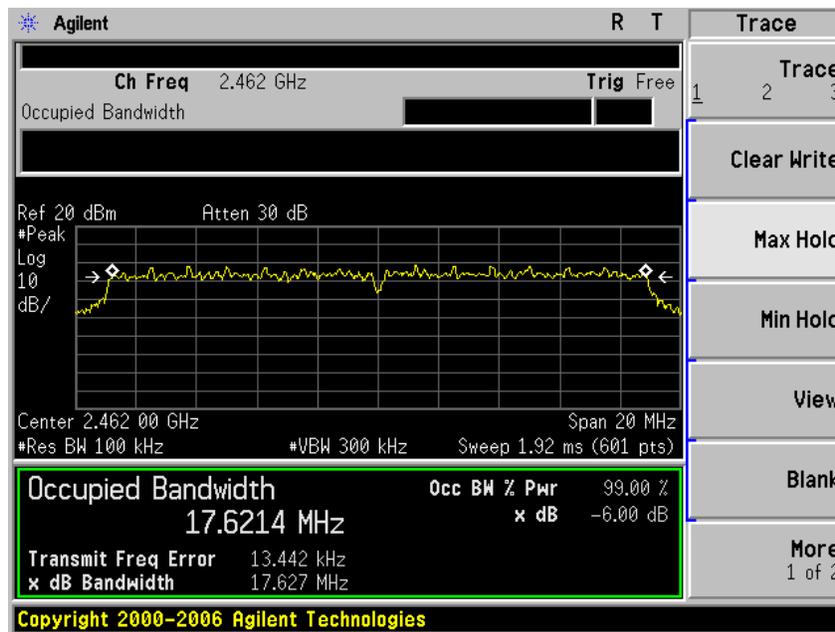
Result data graph shows 6 dB bandwidth, CF = 2.437GHz, BW = 17.632MHz

Result data graph shows 6 dB bandwidth, CF = 2.462GHz, BW = 17.627MHz

For 802.11N – HT40 Mode

| Channel	Measured frequency (MHz)	6dB Bandwidth (MHz)
Lowest	2422	35.203
Middle	2437	35.241
Highest	2452	35.213

This result is used for checking the systems using digital modulation techniques may operate in the 2400–2483.5 MHz.

Limits for 6 dB bandwidth [Section 15.247 (a2)]:

The minimum 6 dB bandwidth shall be at least 500 kHz.

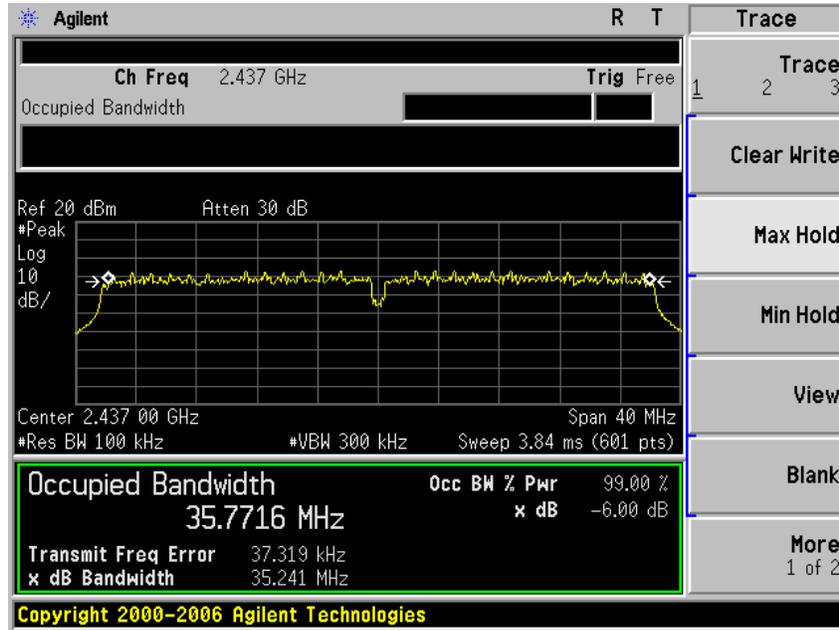**For 802.11N – HT40 Mode**
Result data graph shows 6 dB bandwidth, CF = 2.422GHz, BW = 35.203 MHz
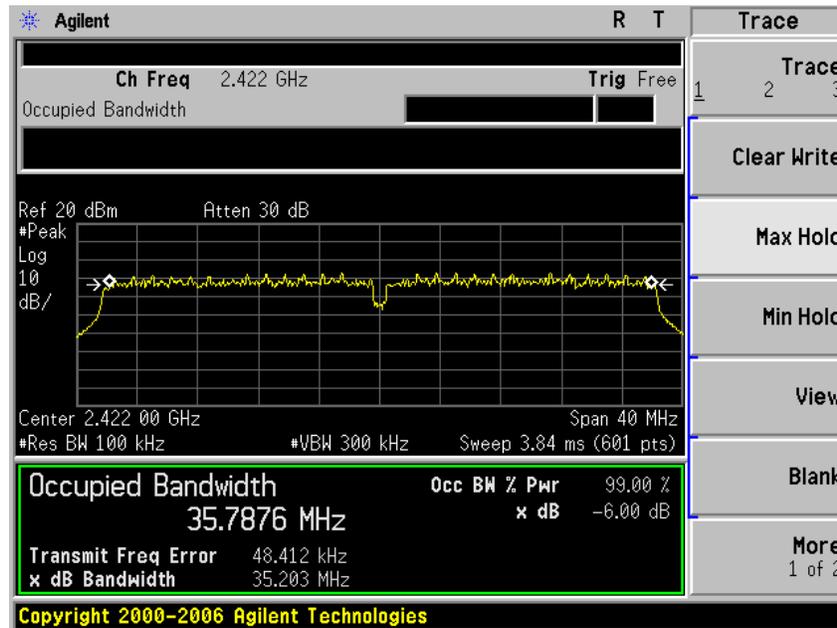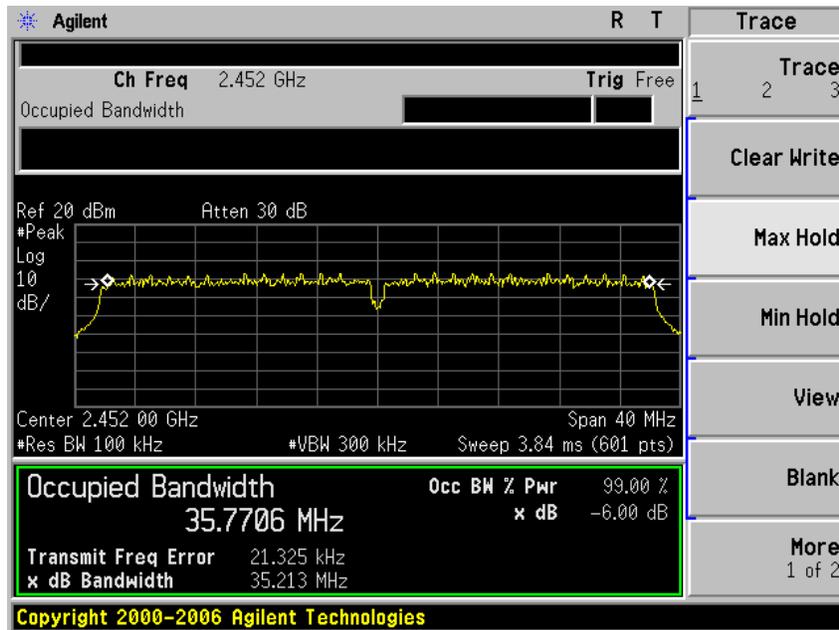
Result data graph shows 6 dB bandwidth, CF = 2.437GHz, BW = 35.241MHz

Result data graph shows 6 dB bandwidth, CF = 2.452GHz, BW = 35.213MHz

4.2   Power Spectral Density

Test Requirement:	FCC part 15 section 15.247 (e)
Test Date:	2014-05-20
Mode of Operation:	Transmitting continuously mode
Detector Function:	Peak

Result : PASS

Measured Result :

Test mode	Test channel	Reading (dBm)	Limit (dBm)
802.11B	Low channel (2412MHz)	-11.35	8
	Middle channel (2437MHz)	-9.32	8
	High channel (2462MHz)	-9.07	8
802.11G	Low channel (2412MHz)	-19.44	8
	Middle channel (2437MHz)	-18.19	8
	High channel (2462MHz)	-18.26	8
802.11N-HT20	Low channel (2412MHz)	-17.19	8
	Middle channel (2437MHz)	-18.42	8
	High channel (2462MHz)	-16.72	8
802.11N-HT40	Low channel (2422MHz)	-19.31	8
	Middle channel (2437MHz)	-19.48	8
	High channel (2452MHz)	-19.59	8

Note: 1. Above testing data has been considered with 0.2dB cable loss which between antenna port and spectrum.

Limits for power spectral density [Section 15.247 (e)]:

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. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

For 802.11B Mode
Result data graph shows Low channel power spectrum density is -11.35dBm
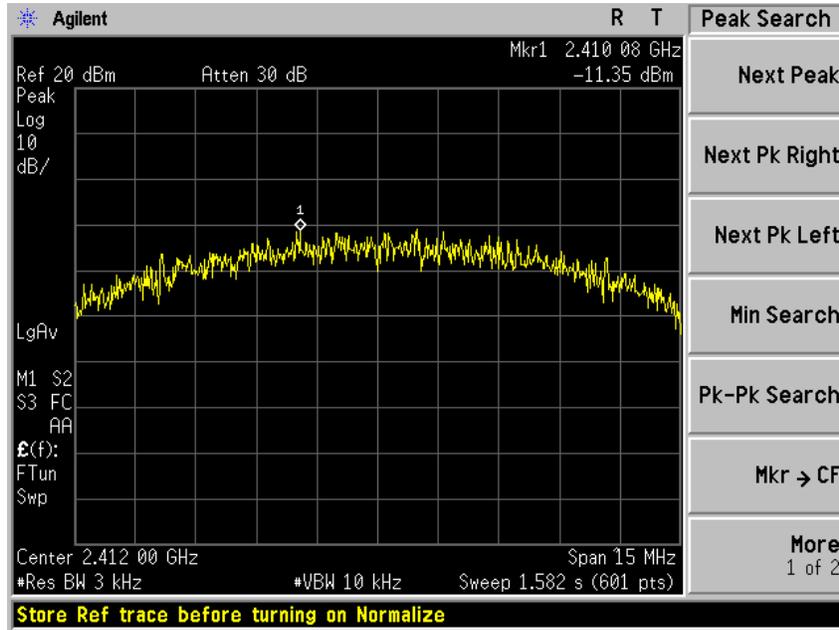
Result data graph shows middle channel power spectrum density is -9.32dBm

Result data graph shows high channel power spectrum density is -9.07dBm

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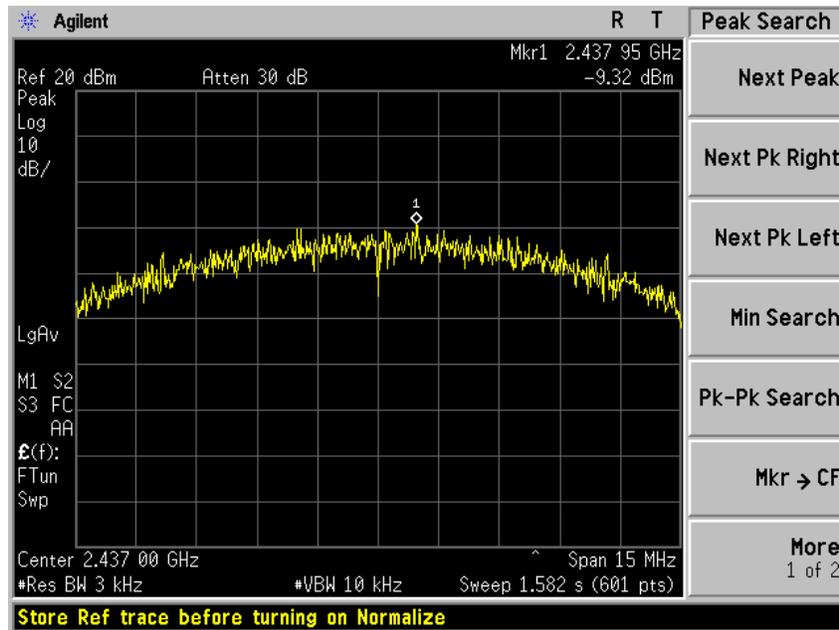3/F, West Wing, Phase 2, 10 Science Park West Avenue, Shatin, Hong Kong

For 802.11G Mode
Result data graph shows Low channel power spectrum density is -19.44Bm

Result data graph shows middle channel power spectrum density is -18.19dBm

Result data graph shows high channel power spectrum density is -18.26dBm

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For 802.11N-HT20 Mode
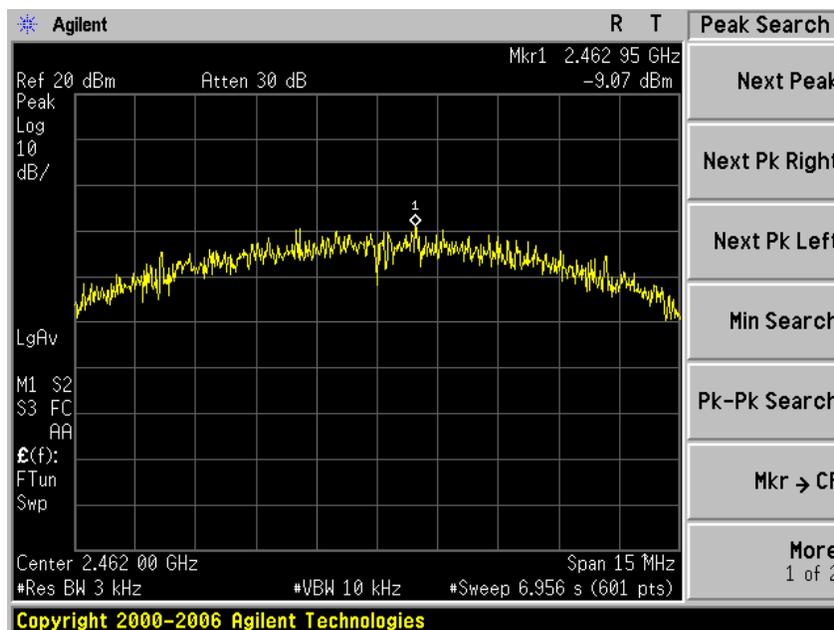**Result data graph shows Low channel power spectrum density is -17.19Bm**

Result data graph shows middle channel power spectrum density is -18.42dBm

Result data graph shows high channel power spectrum density is -16.72dBm
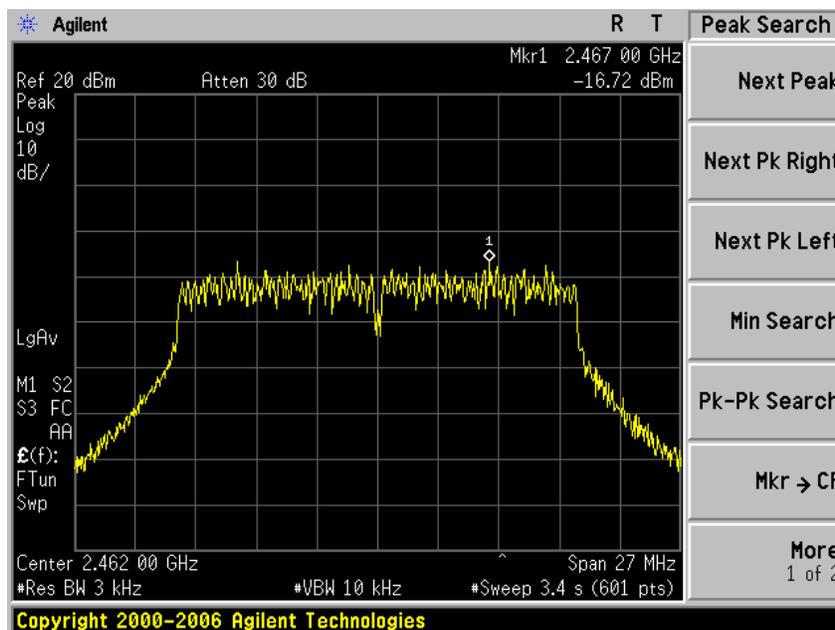
For 802.11N-HT40 Mode
Result data graph shows Low channel power spectrum density is -19.31 dBm
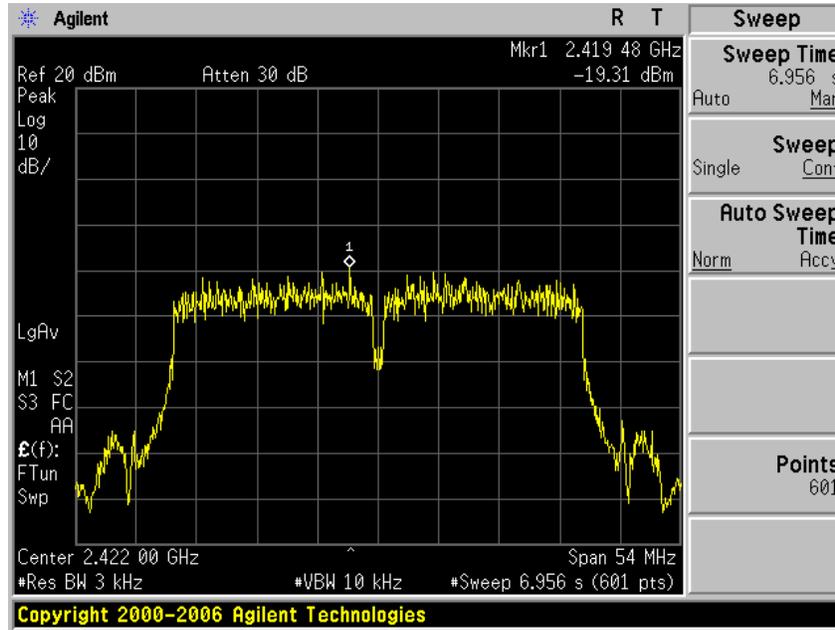
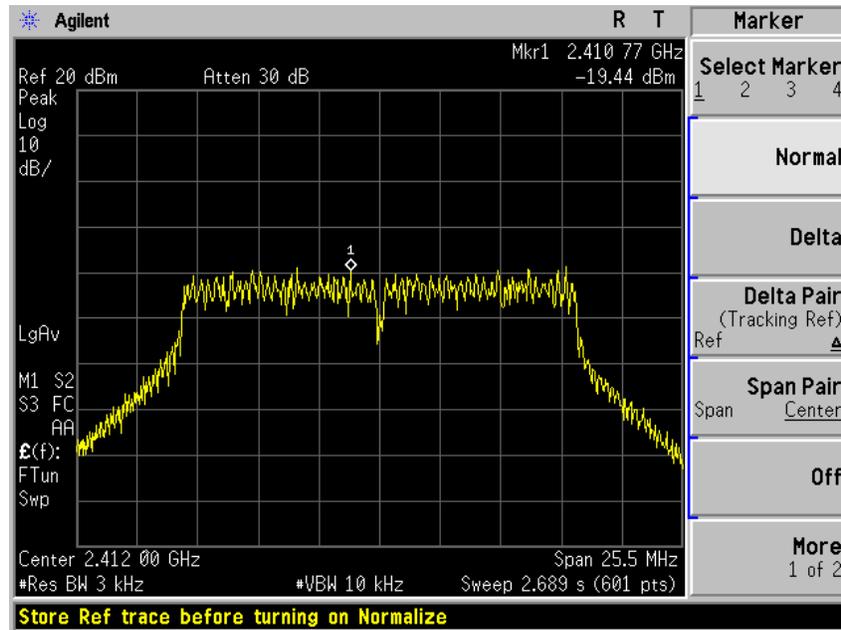**Result data graph shows middle channel power spectrum density is -19.48dBm**

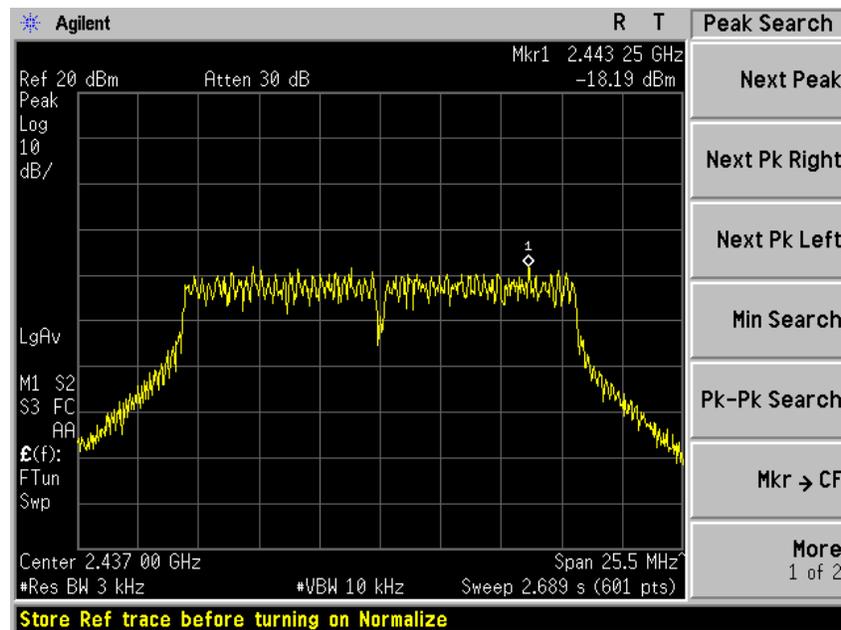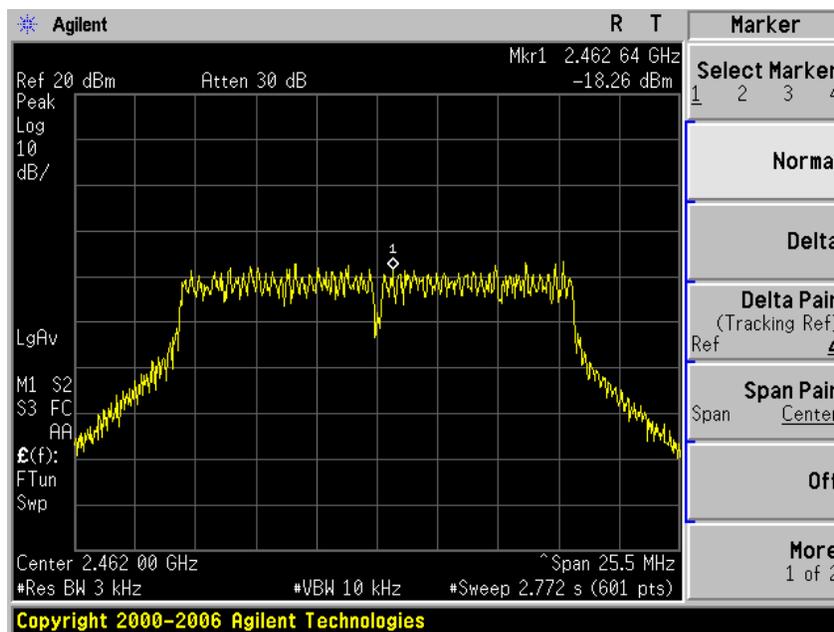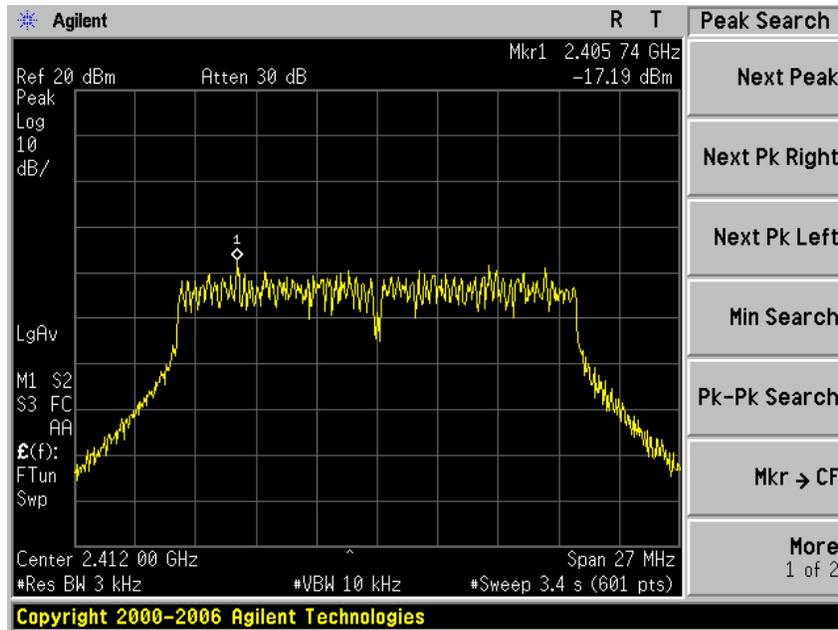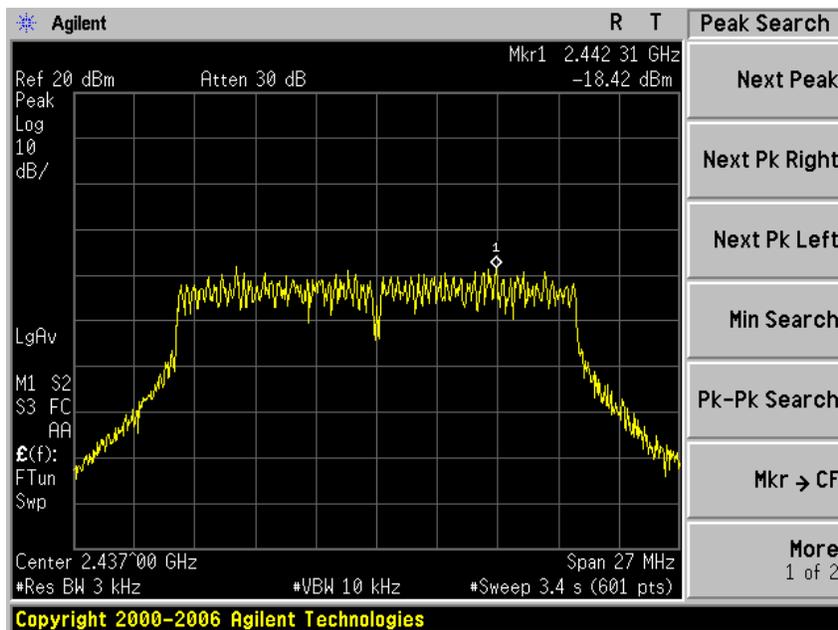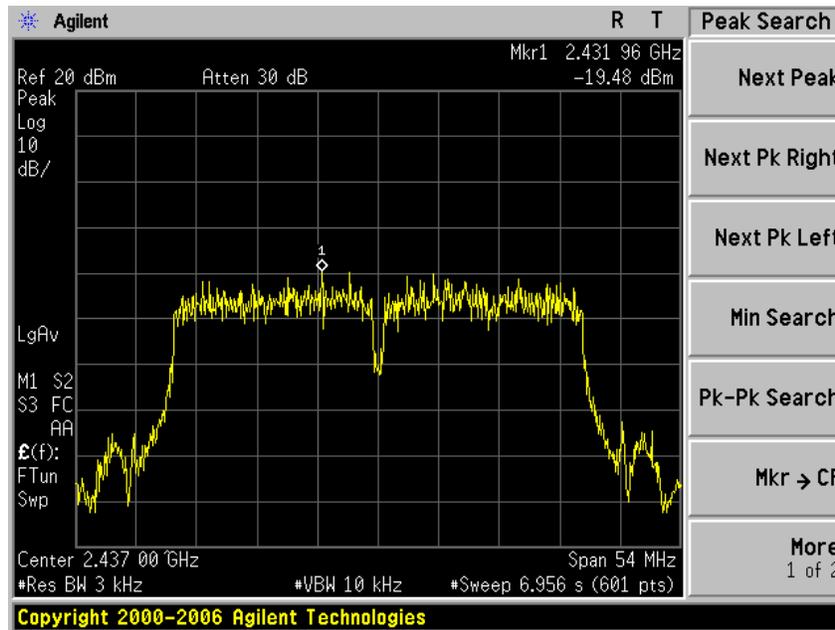**Result data graph shows high channel power spectrum density is -19.59dBm**
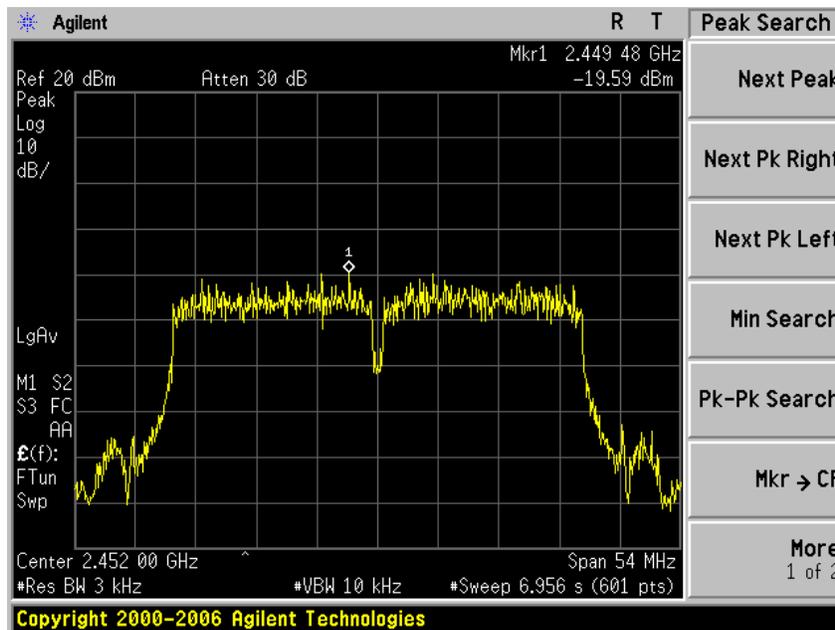
4.3   Band Edge Measurement

Test Requirement: FCC part 15 section 15.247
Test Date: 2014-05-20
Mode of Operation: Transmitting continuously mode.
Detector Function: Max Hold

Result: PASS

Measured Result :

Refer to the figure, it shows the frequency of lower band edge and upper band edge separately.

Limits of Band Edge for Carrier Frequencies Operated within the Bands [Section 15.247]:

The carrier frequencies should operate within 2400-2483.5MHz.

Result data graph shows the frequency of lowest channel.
For 802.11b Low Channel Mode (Worst Case)
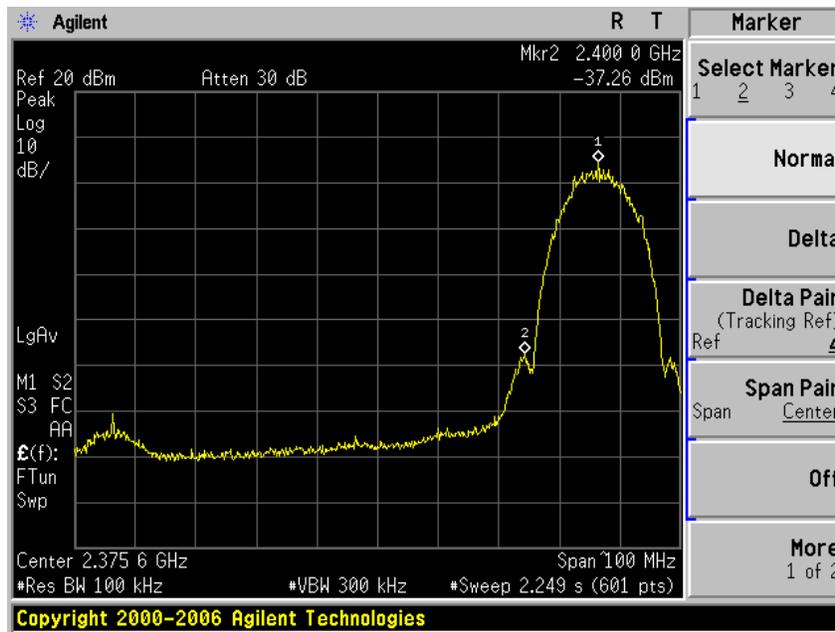
For 802.11b High Channel Mode (Worst Case)
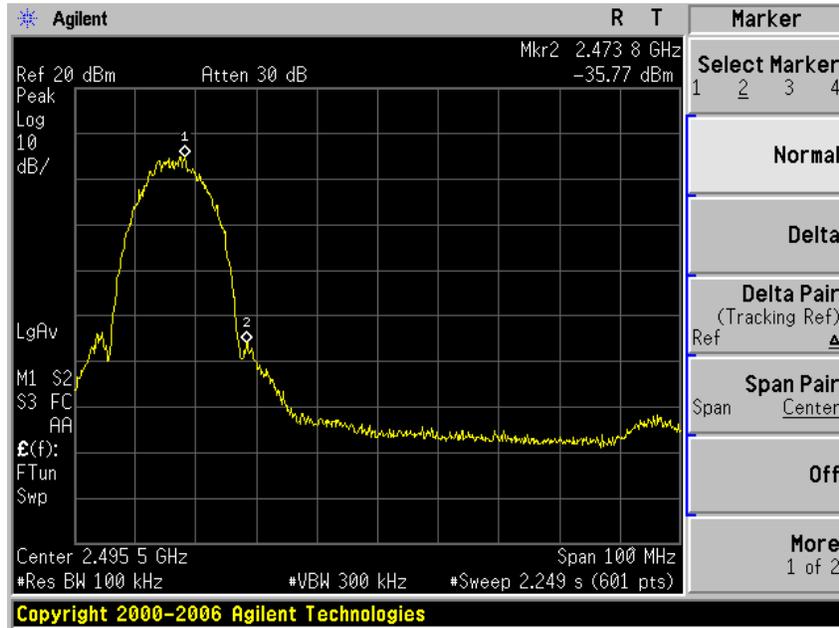
For 802.11N – HT40 Low Channel Mode (Worst Case)

For 802.11N – HT20 High Channel Mode (Worst Case)

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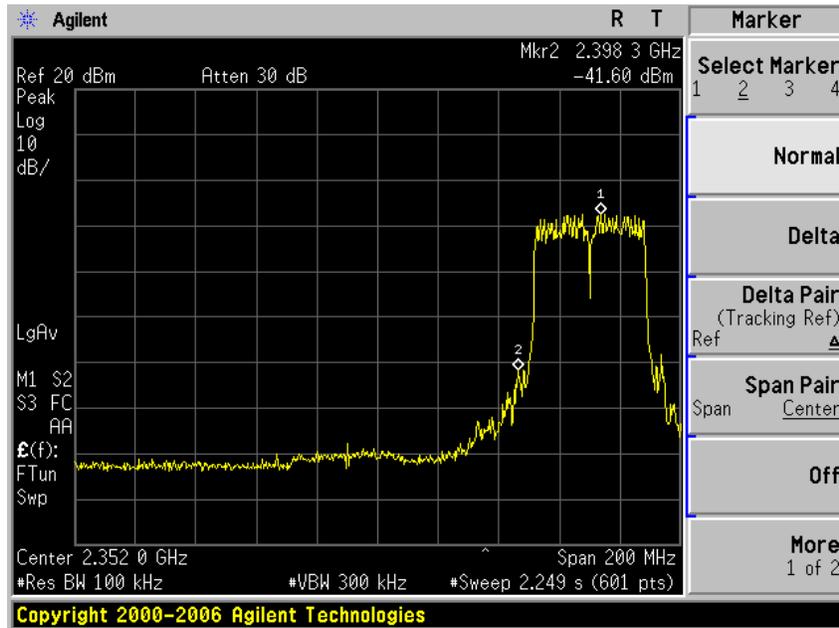
4.4   Maximum Output Power

Test Requirement:	FCC part 15 section 15.247 (b3)
Test Method:	ANSI C63.4:2009
Test Date:	2014-05-20
Mode of Operation:	Transmitting continuously mode
Detector Function:	Peak
Measurement BW:	RBW 1MHz ; VBW 3MHz

Test Procedure :

According to section 15.247(b)-power output of the KDB-558074 (2013), the measurement procedure PK2 was used, the following is the measurement procedure.

1. Set the span ≥ 1.5 x DTS bandwidth (6dB bandwidth).

2. Set RBW = 1 MHz, Set VBW =3 MHz.

3. Detector = peak; sweep time =auto couple.

4. Trace mode = max hold; allow the trace to fully stabilize.

5. Use the instrument's band/channel power measurement function with the band limits set equal to the DTS bandwidth edges (for some instruments, this may require a manual override to select peak detector). If the instrument does not have a band power function, sum the spectrum levels (in linear power units) at intervals equal to the RBW extending across the DTS bandwidth.

Result : PASS

Transmitting Mode: Transmits continuously

Test mode	Frequency MHz	Output Power dBm	Output Power mW	Limit mW
802.11b 1Mbps	2412	12.41	17.42	1000
	2437	13.03	20.09	1000
	2462	13.88	24.43	1000
802.11g 6Mbps	2412	7.51	5.64	1000
	2437	8.13	6.50	1000
	2462	8.98	7.91	1000
802.11n – HT20	2412	7.52	5.65	1000
	2437	7.73	5.93	1000
	2462	8.98	7.91	1000
802.11n – HT40	2422	4.93	3.11	1000
	2437	5.38	3.45	1000
	2452	6.87	4.86	1000

Note: Above testing data is base on the cable loss which between antenna port and spectrum is 0.2dB

Limits for Maximum Output Power [Section 15.247 (b3)]:

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

For 802.11B Mode
Result data graph shows Low channel conducted power = 12.41dBm
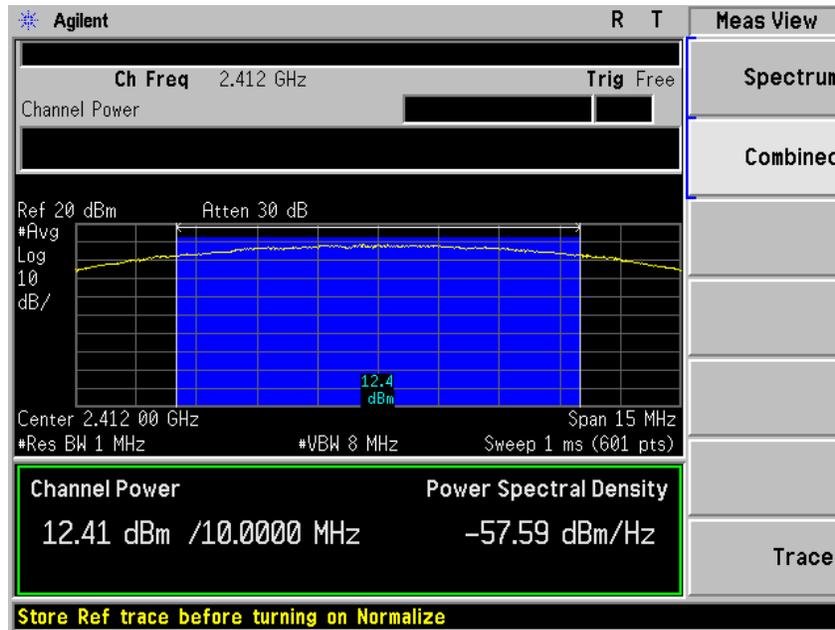
Result data graph shows middle channel conducted power = 13.03dBm
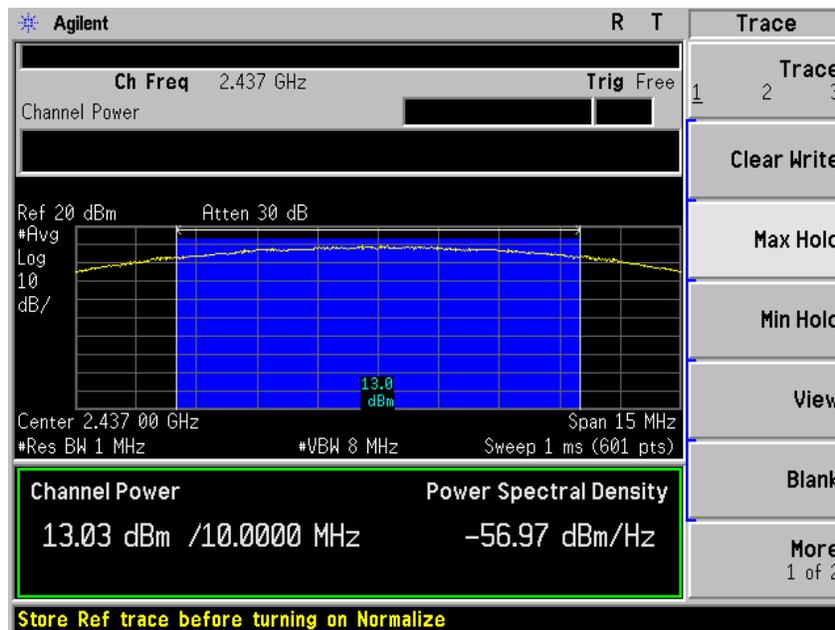
Result data graph shows high channel conducted power = 13.88dBm

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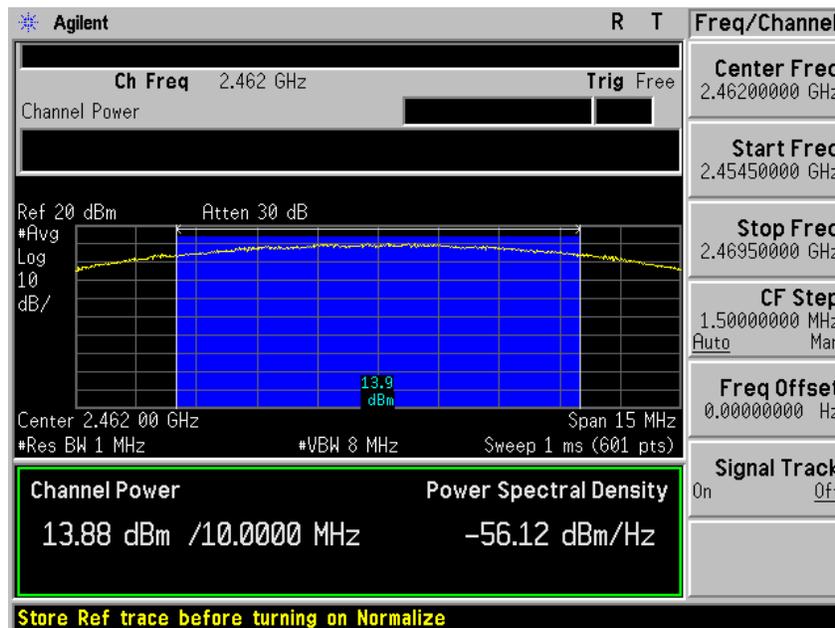
For 802.11G Mode
Result data graph shows Low channel conducted power = 7.51dBm
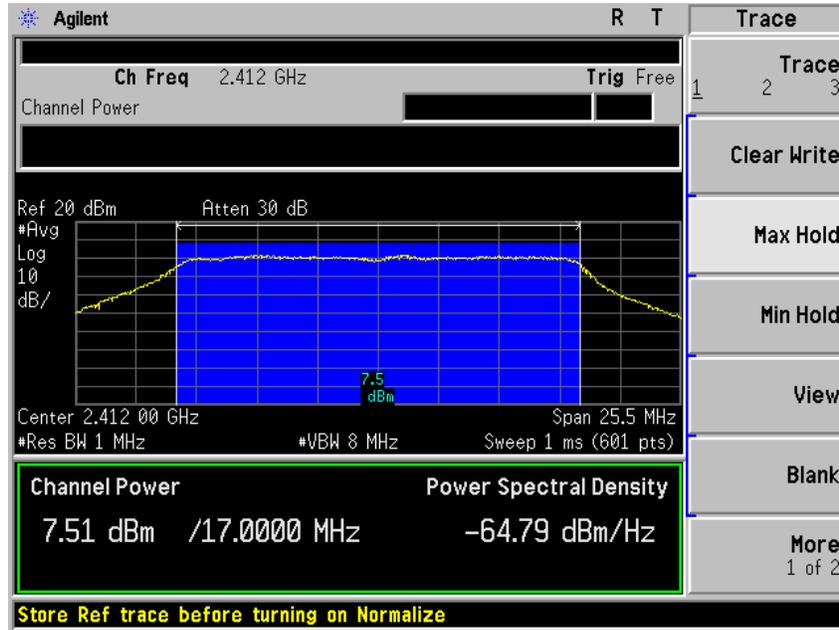
Result data graph shows middle channel conducted power = 8.13dBm
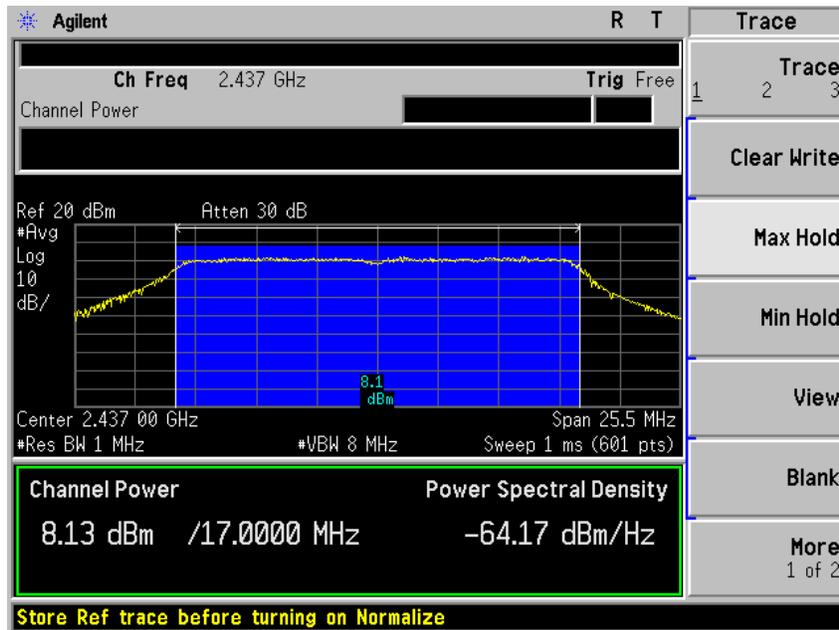
Result data graph shows high channel conducted power = 8.98dBm
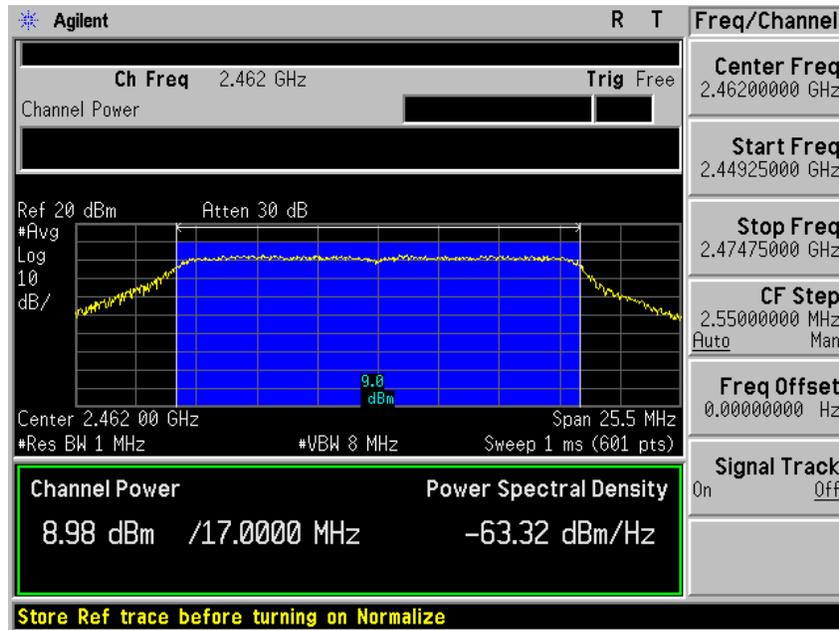
For 802.11N – HT20 Mode
Result data graph shows Low channel conducted power = 7.52dBm
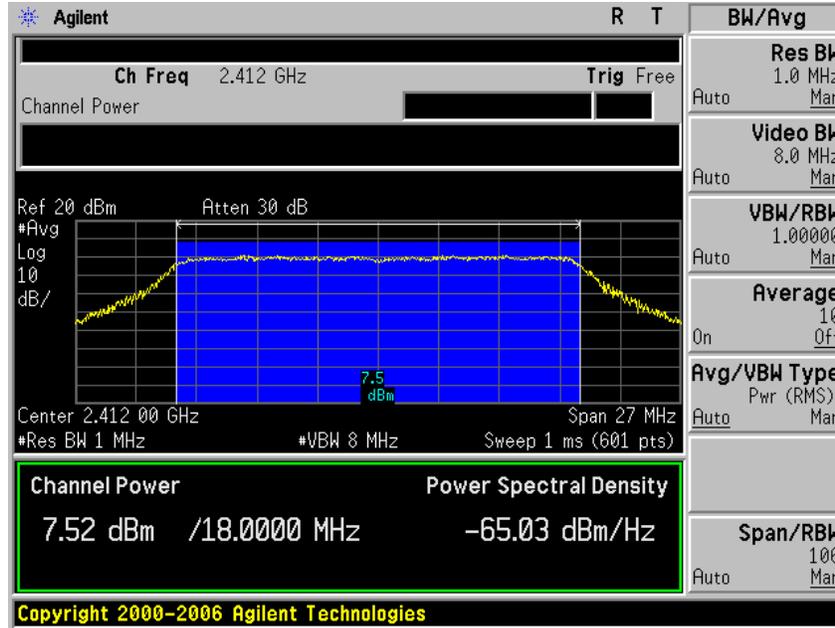
Result data graph shows middle channel conducted power = 7.73dBm

Result data graph shows high channel conducted power = 8.98dBm

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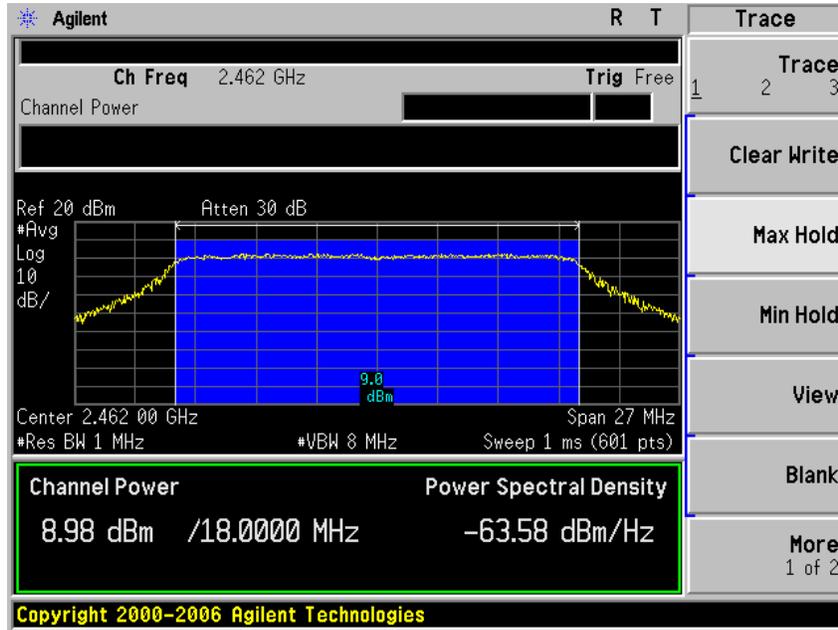
For 802.11N – HT40 Mode
Result data graph shows Low channel conducted power = 4.93dBm
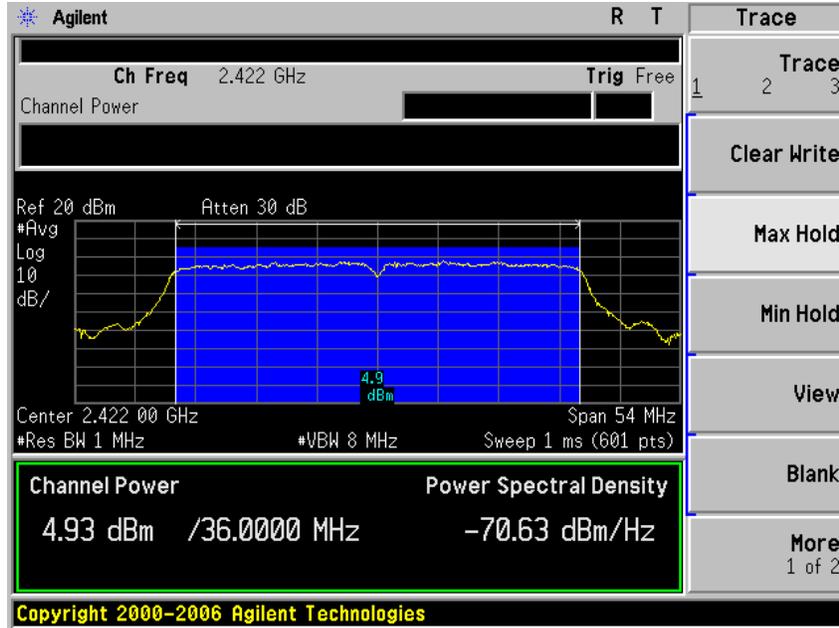
Result data graph shows middle channel conducted power = 5.38dBm
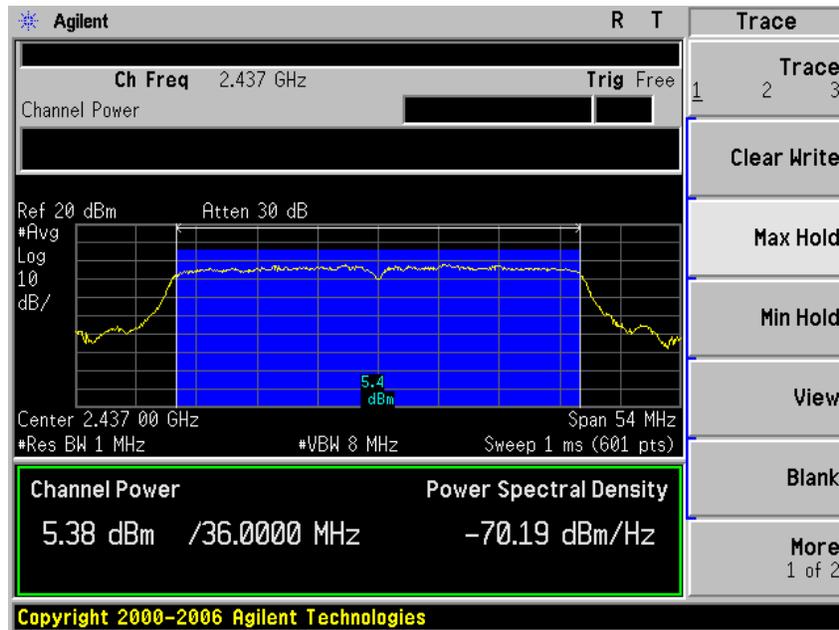
Result data graph shows high channel conducted power = 8.71dBm
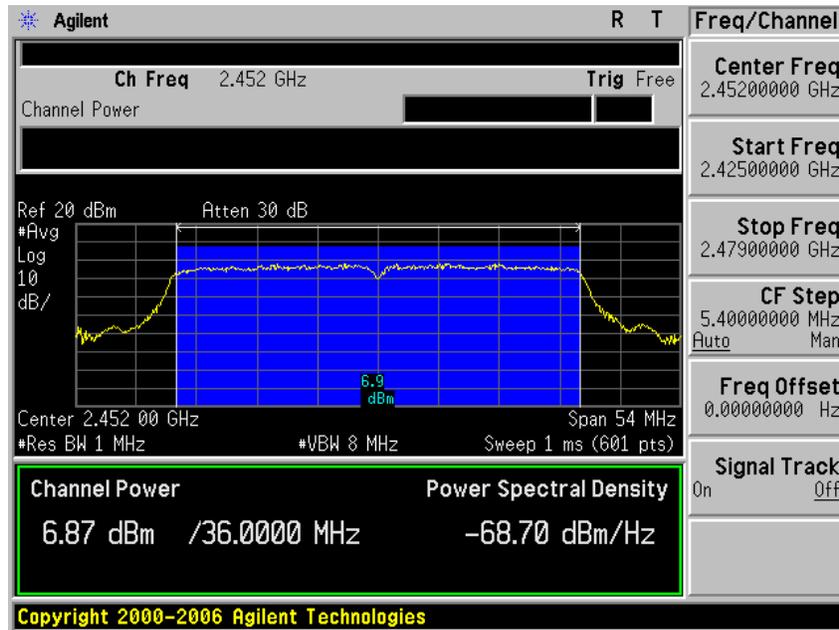
4.5   Out of Band Emissions and Emissions in Restricted Bands

Test Requirement:	FCC part 15 section 15.247 (d)
Test Method:	ANSI C63.4:2009
Test Date:	2014-05-20
Mode of Operation:	Transmitting continuously mode
Detector Function:	Peak
Measurement BW:	RBW 100KHz ; VBW 300KHz

Test Setup:
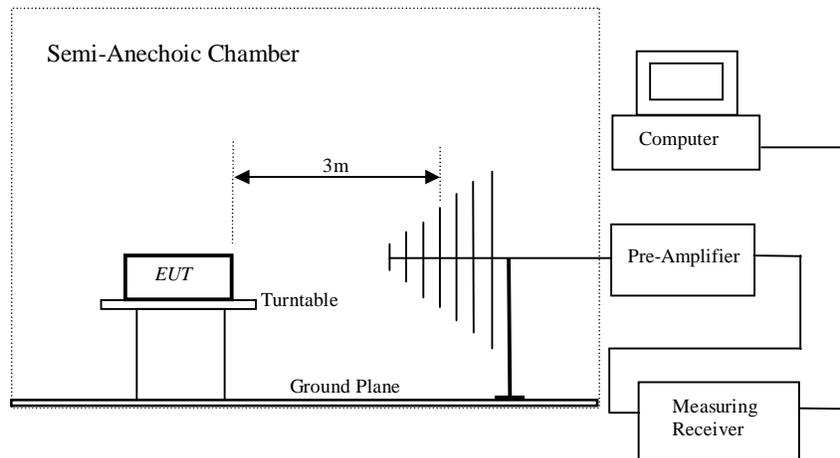
Result : PASS

Out of Frequency Band Emissions:

For out of band emissions that are close to or exceed 20dB attenuation requirement, and emission falls into restricted band, radiated emission was performed in order to show compliance with the general radiated emission requirement.

Result Summary:

Refer to the emission data graph, result shows that the significant emissions detected are with more than 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power.

Limits for Out of Frequency Band Emission [Section 15.247 (d)]:

In any 100kHz 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 100kHz bandwidth within the band that contains the highest level of the desired power. Attenuation below the general limits specified in Section 15.209(a) is not required.

Limit for Radiated Emission Falling in Restricted Bands [Section 15.209]:

Frequency (MHz)	Field Strength [μV/m]	Field Strength [dBμV/m]
30-88	100	40.0
88-216	150	43.5
216-960	200	46.0
Above 960	500	54.0

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.

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

Result : PASS

All Emission and Emissions Fall into Restricted Band were recorded as below:

Below 1GHz emissions
Vertical Polarity
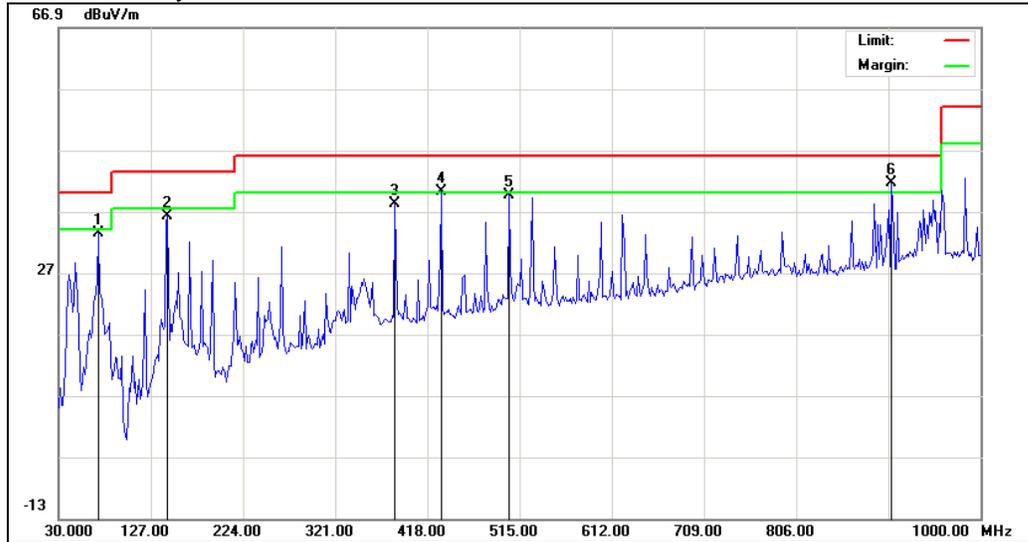
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	72.0333	29.73	3.76	33.49	40.00	-6.51	QP
2	144.7833	20.99	15.23	36.22	43.50	-7.28	QP
3	384.0500	19.20	18.96	38.16	46.00	-7.84	QP
4	432.5500	20.15	20.06	40.21	46.00	-5.79	QP
5	503.6833	18.44	21.23	39.67	46.00	-6.33	QP
6	906.2333	12.73	28.78	41.51	46.00	-4.49	QP

Result : PASS

All Emission and Emissions Fall into Restricted Band were recorded as below:

Below 1GHz emissions
Horizontal Polarity

No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	167.4167	15.77	13.75	29.52	43.50	-13.98	QP
2	264.4167	18.07	14.34	32.41	46.00	-13.59	QP
3	384.0500	18.57	18.96	37.53	46.00	-8.47	QP
4	432.5500	18.24	20.06	38.30	46.00	-7.70	QP
5	527.9333	19.01	21.88	40.89	46.00	-5.11	QP
6	890.0667	12.01	28.35	40.36	46.00	-5.64	QP

Result : PASS

All Emission and Emissions Fall into Restricted Band were recorded as below:

Above 1GHz Emission test data
Vertical Polarity – 802.11b (Low Channel)

No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	1466.667	58.92	-15.39	43.53	74.00	-30.47	peak
3	4125.000	47.17	-4.38	42.79	74.00	-31.21	peak

Remark: Only background noise was measured from 16GHz-26GHz.

Result : PASS

All Emission and Emissions Fall into Restricted Band were recorded as below:

Above 1GHz Emission test data
Hortizontal Polarity -802.11b (Low Channel)

No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	1625.000	57.24	-14.06	43.18	74.00	-30.82	peak
3	4750.000	44.37	-2.45	41.92	74.00	-32.08	peak

Remark: Only background noise was measured from 16GHz-26GHz.

Result : PASS

All Emission and Emissions Fall into Restricted Band were recorded as below:

Above 1GHz Emission test data
Hortizontal Polarity -802.11b (Middle Channel)

No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	1466.667	58.92	-15.39	43.53	74.00	-30.47	peak
3	3700.000	50.17	-6.66	43.51	74.00	-30.49	peak

Remark: Only background noise was measured from 16GHz-26GHz.

Result : PASS

All Emission and Emissions Fall into Restricted Band were recorded as below:
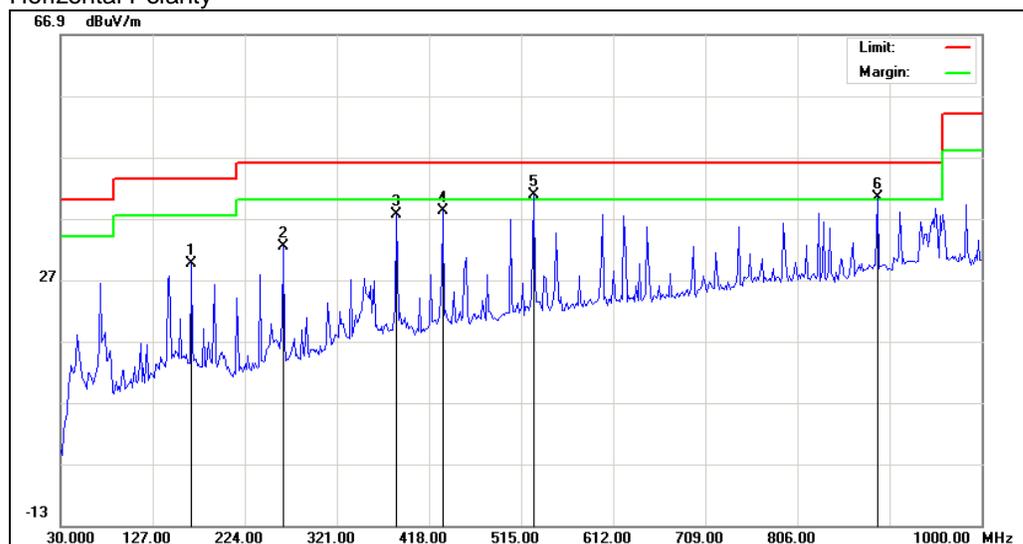
Above 1GHz Emission test data
Horizontal Polarity -802.11b (Middle Channel)

No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	1958.333	53.68	-10.56	43.12	74.00	-30.88	peak
3	5066.667	44.62	-1.80	42.82	74.00	-31.18	peak

Remark: Only background noise was measured from 16GHz-26GHz.

Result : PASS

All Emission and Emissions Fall into Restricted Band were recorded as below:
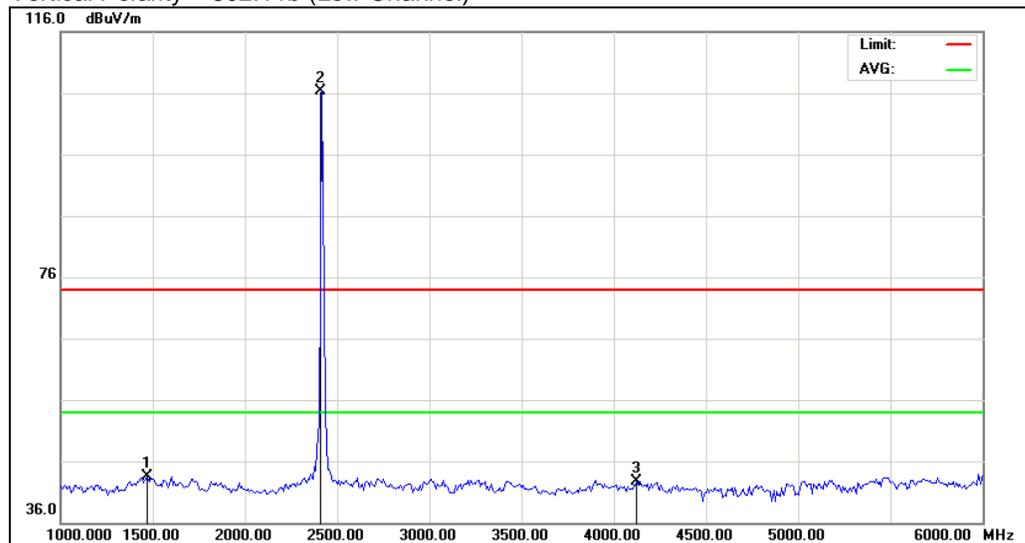
Above 1GHz Emission test data
Vertical Polarity -802.11b (High Channel)

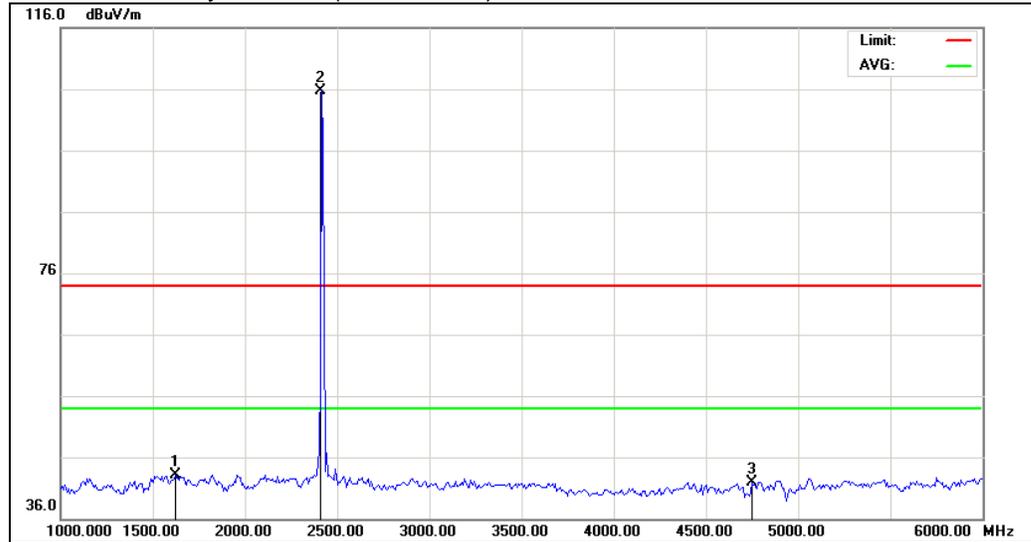| No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	1466.667	58.42	-15.39	43.03	74.00	-30.97	peak
3	4550.000	46.69	-2.98	43.71	74.00	-30.29	peak

Remark: Only background noise was measured from 16GHz-26GHz.

Result : PASS

All Emission and Emissions Fall into Restricted Band were recorded as below:

Above 1GHz Emission test data
Horizontal Polarity -802.11b (High Channel)

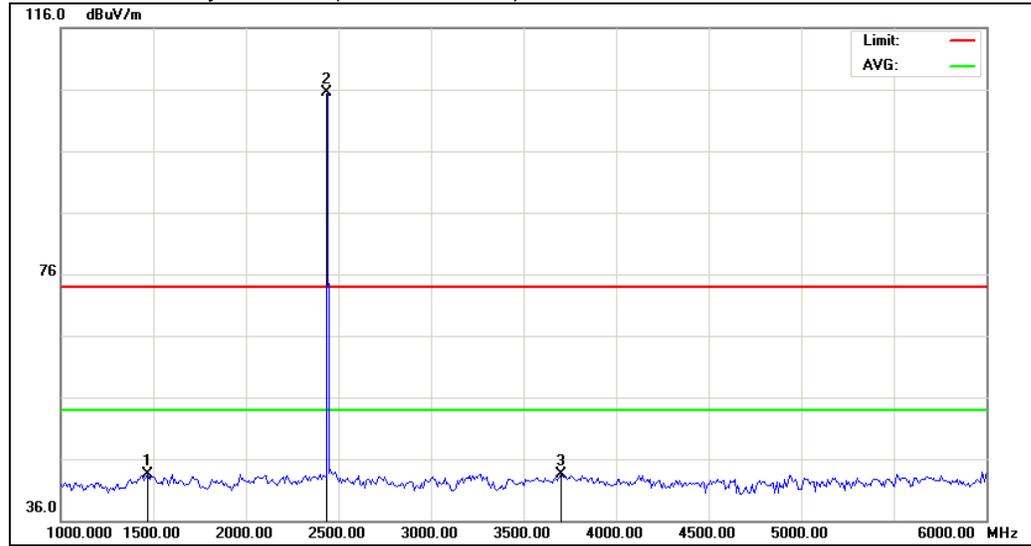| No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	1825.000	55.56	-11.96	43.60	74.00	-30.40	peak
3	4666.667	45.90	-2.67	43.23	74.00	-30.77	peak

Remark: Only background noise was measured from 16GHz-26GHz.

Result : PASS

All Emission and Emissions Fall into Restricted Band were recorded as below:

Above 1GHz Emission test data
Vertical Polarity -802.11g (Low Channel)

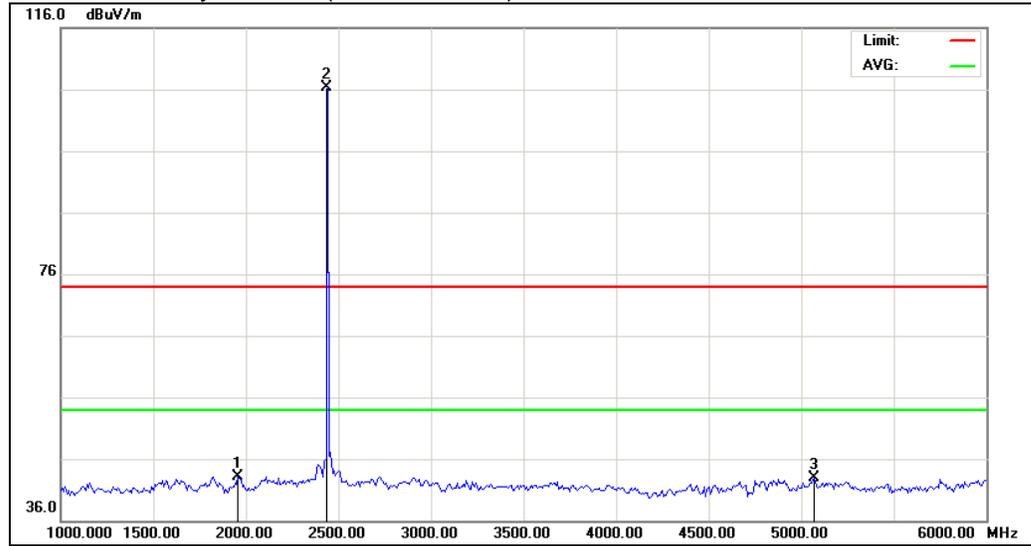| No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	1366.667	58.41	-15.44	42.97	74.00	-31.03	peak
3	3900.000	48.25	-5.43	42.82	74.00	-31.18	peak

Remark: Only background noise was measured from 16GHz-26GHz.

Result : PASS

All Emission and Emissions Fall into Restricted Band were recorded as below:

Above 1GHz Emission test data
Horizontal Polarity -802.11g (Low Channel)

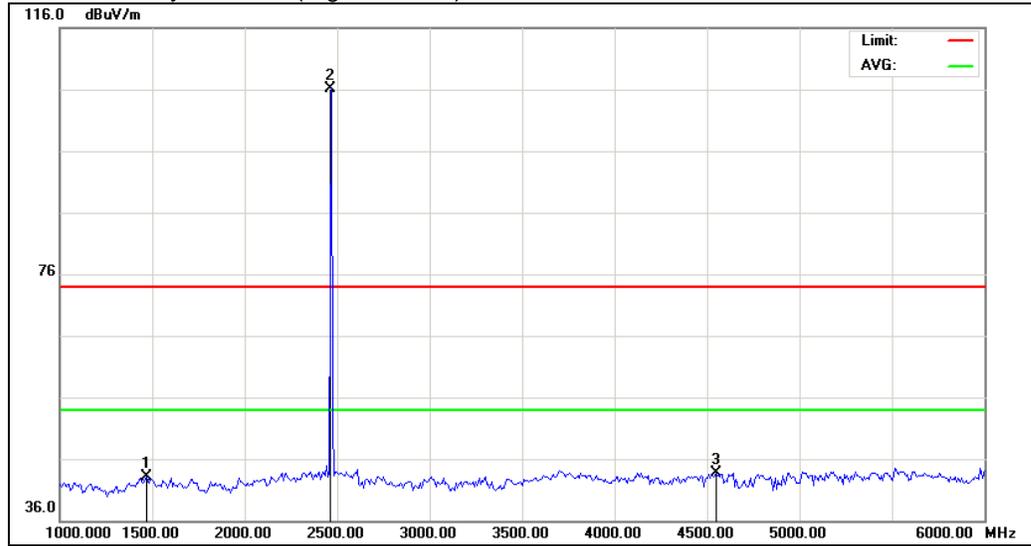| No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	1641.667	56.27	-13.89	42.38	74.00	-31.62	Peak
3	4900.000	44.73	-2.06	42.67	74.00	-31.33	Peak

Remark: Only background noise was measured from 16GHz-26GHz.

.

Result : PASS

All Emission and Emissions Fall into Restricted Band were recorded as below:

Above 1GHz Emission test data
Vertical Polarity -802.11g (Middle Channel)

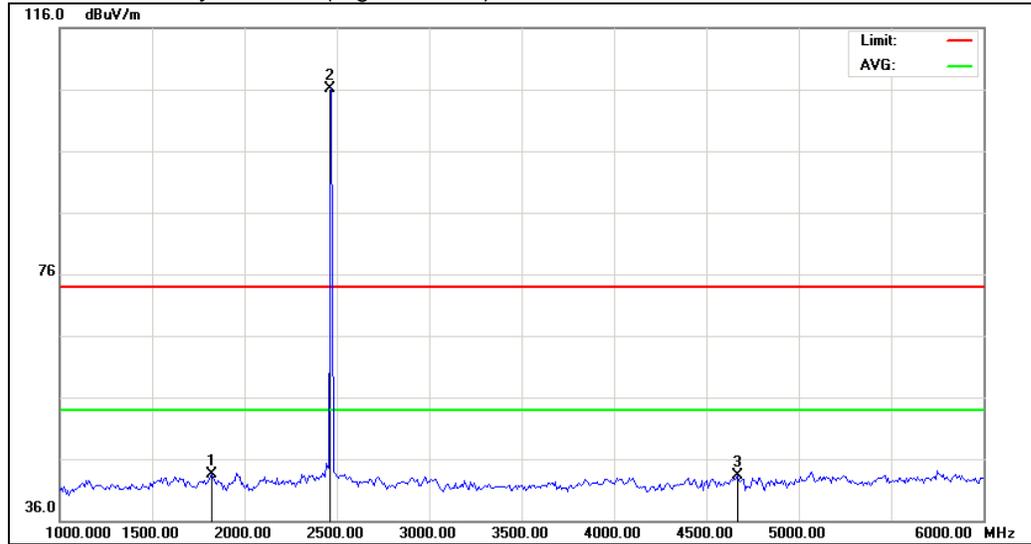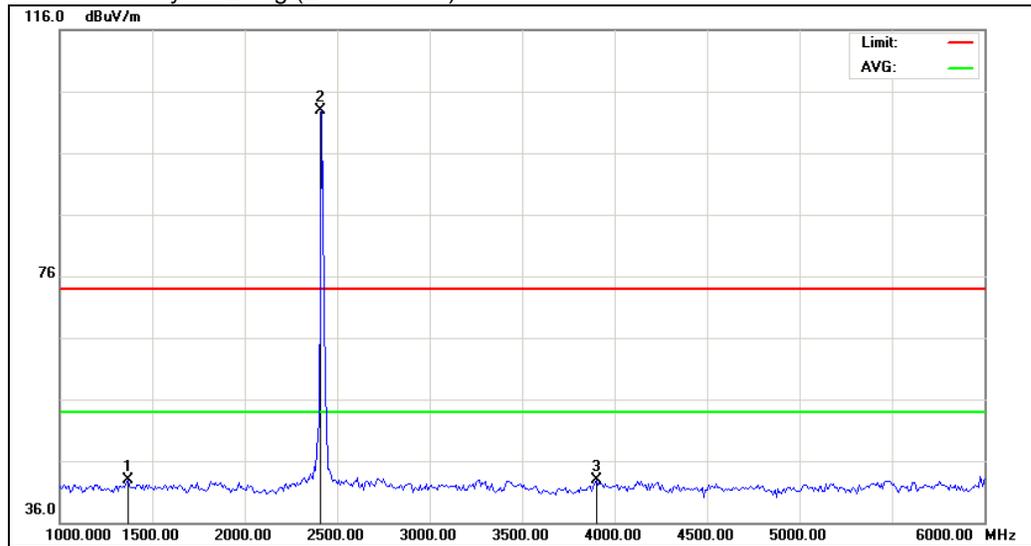| No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	1466.667	58.92	-15.39	43.53	74.00	-30.47	peak
3	4941.667	46.20	-1.95	44.25	74.00	-29.75	peak

Remark: Only background noise was measured from 16GHz-26GHz.

Result : PASS

All Emission and Emissions Fall into Restricted Band were recorded as below:

Above 1GHz Emission test data
Horizontal Polarity -802.11g (Middle Channel)

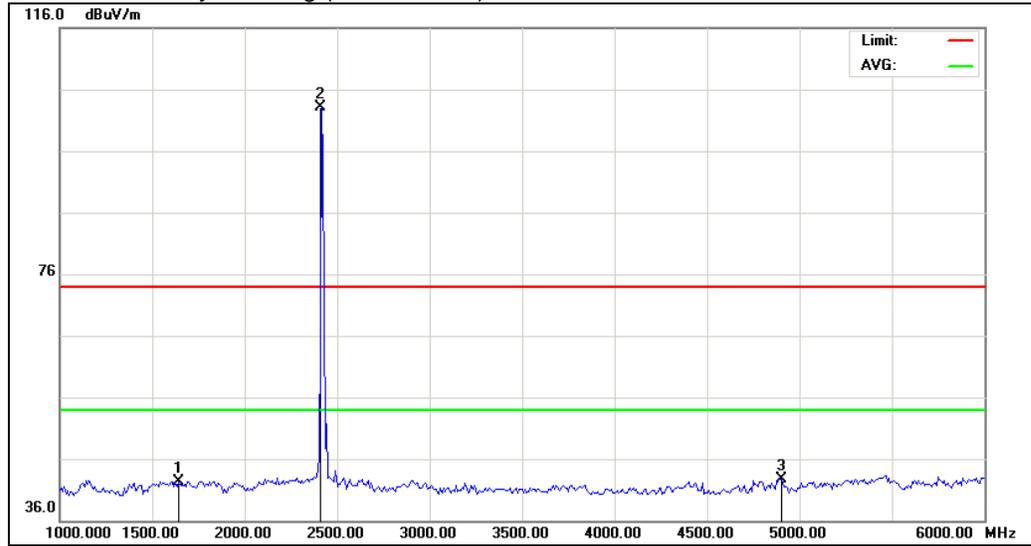| No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	1650.000	57.23	-13.80	43.43	74.00	-30.57	peak
3	3683.333	50.00	-6.76	43.24	74.00	-30.76	peak

Remark: Only background noise was measured from 16GHz-26GHz.

Result : PASS

All Emission and Emissions Fall into Restricted Band were recorded as below:

Above 1GHz Emission test data
Vertical Polarity -802.11g (High Channel)

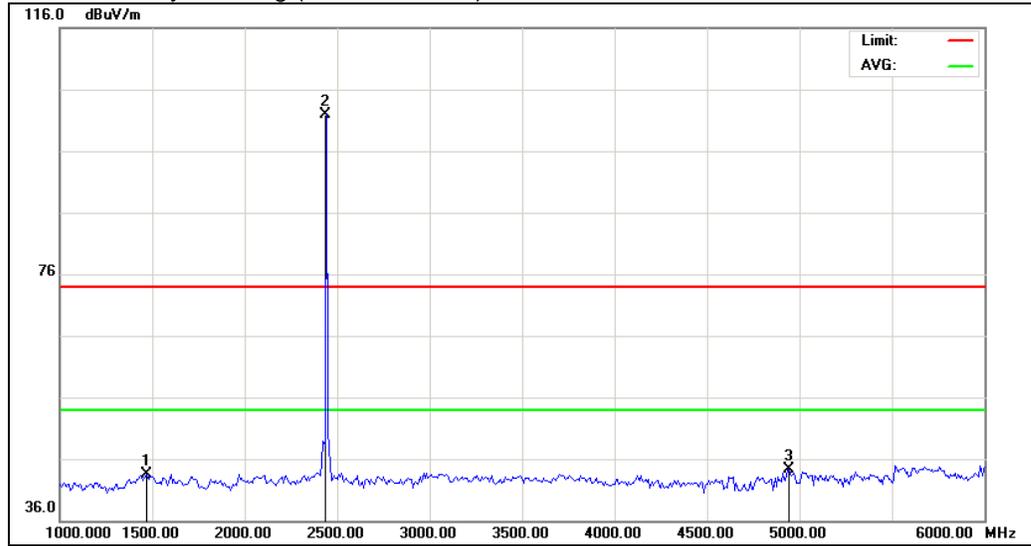| No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	1433.333	59.21	-15.41	43.80	74.00	-30.20	peak
3	4550.000	47.19	-2.98	44.21	74.00	-29.79	peak

Remark: Only background noise was measured from 16GHz-26GHz.

Result : PASS

All Emission and Emissions Fall into Restricted Band were recorded as below:

Above 1GHz Emission test data
Horizontal Polarity -802.11g (High Channel)

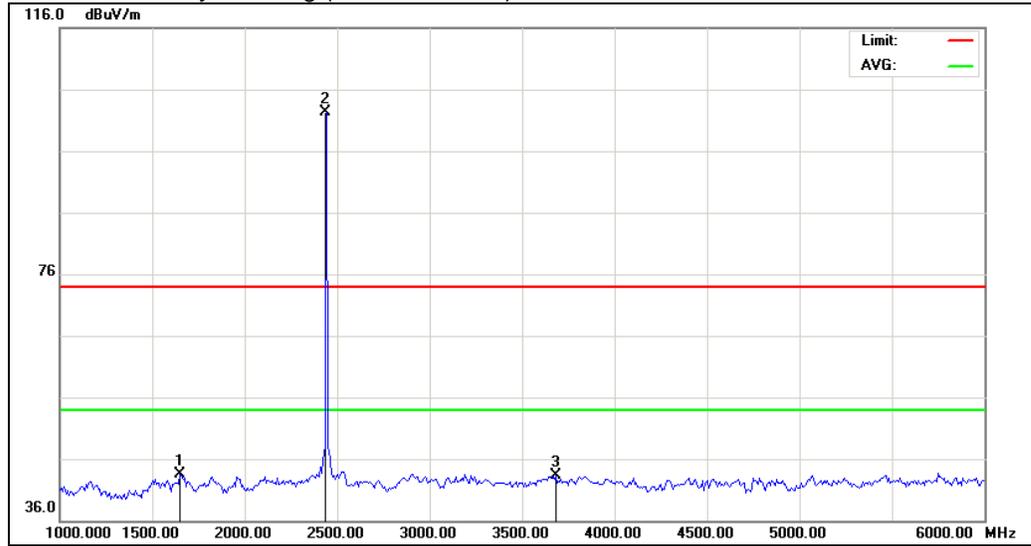| No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	1158.333	59.12	-15.52	43.60	74.00	-30.40	peak
3	4750.000	45.87	-2.45	43.42	74.00	-30.58	peak

Remark: Only background noise was measured from 16GHz-26GHz.

Result : PASS

All Emission and Emissions Fall into Restricted Band were recorded as below:

 Above 1GHz Emission test data
Vertical Polarity -802.11n – HT20(Low Channel)

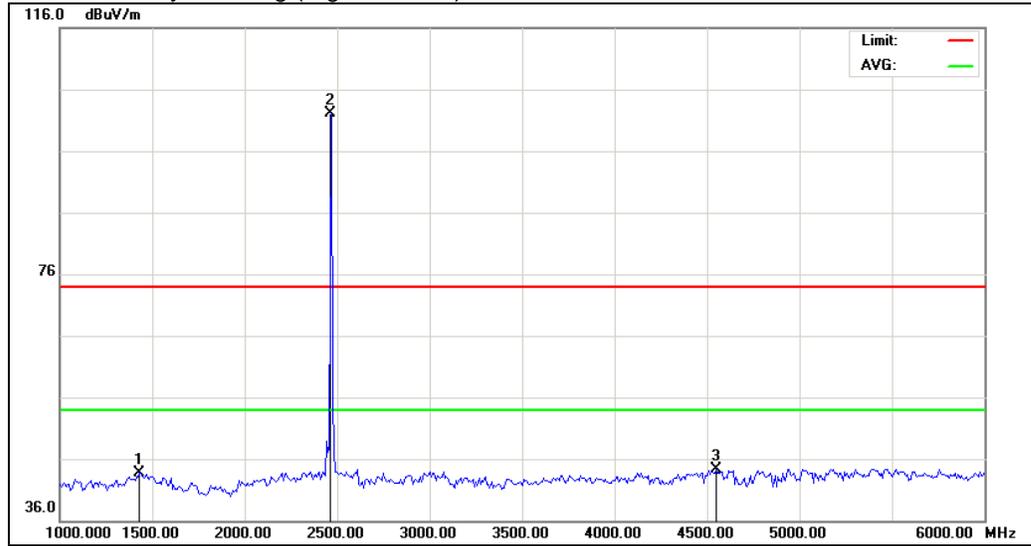| No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	1816.667	54.76	-12.05	42.71	74.00	-31.29	peak
3	3900.000	48.25	-5.43	42.82	74.00	-31.18	peak

Remark: Only background noise was measured from 16GHz-26GHz.

Result : PASS

All Emission and Emissions Fall into Restricted Band were recorded as below:

 Above 1GHz Emission test data
Horizontal Polarity -802.11n – HT20(Low Channel)

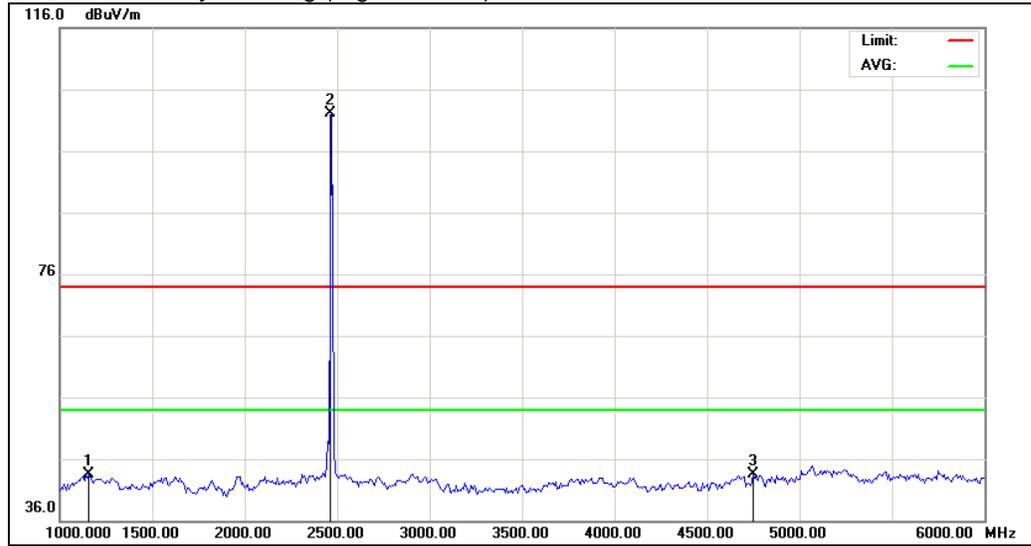| No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	1158.333	57.62	-15.52	42.10	74.00	-31.90	peak
3	4400.000	46.31	-3.45	42.86	74.00	-31.14	peak

Remark: Only background noise was measured from 16GHz-26GHz.

Result : PASS

All Emission and Emissions Fall into Restricted Band were recorded as below:

Above 1GHz Emission test data
Vertical Polarity -802.11n – HT20 (Middle Channel)

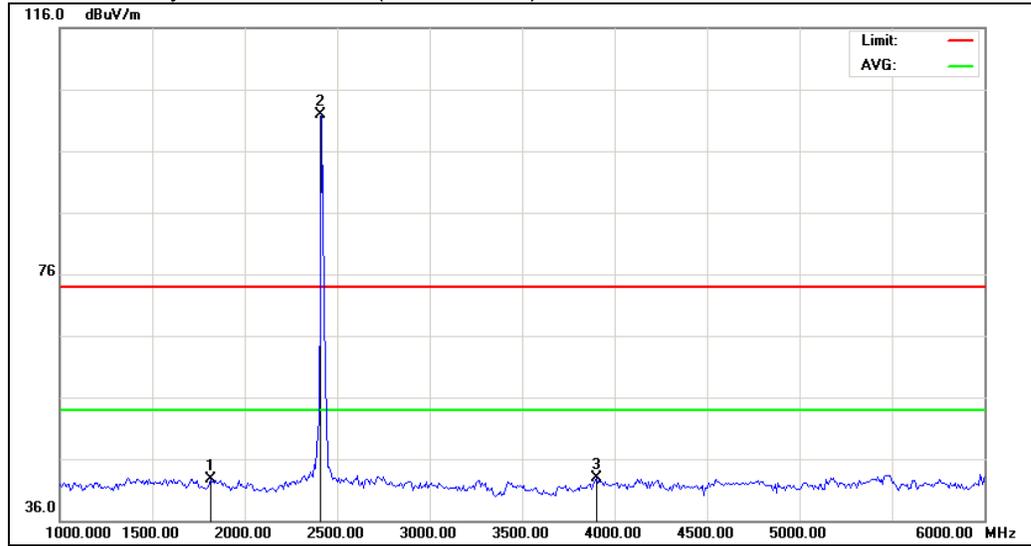| No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	1716.667	56.28	-13.10	43.18	74.00	-30.82	peak
3	4125.000	47.67	-4.38	43.29	74.00	-30.71	peak

Remark: Only background noise was measured from 16GHz-26GHz.

Result : PASS

All Emission and Emissions Fall into Restricted Band were recorded as below:

Above 1GHz Emission test data
Horizontal Polarity -802.11n – HT20(Middle Channel)

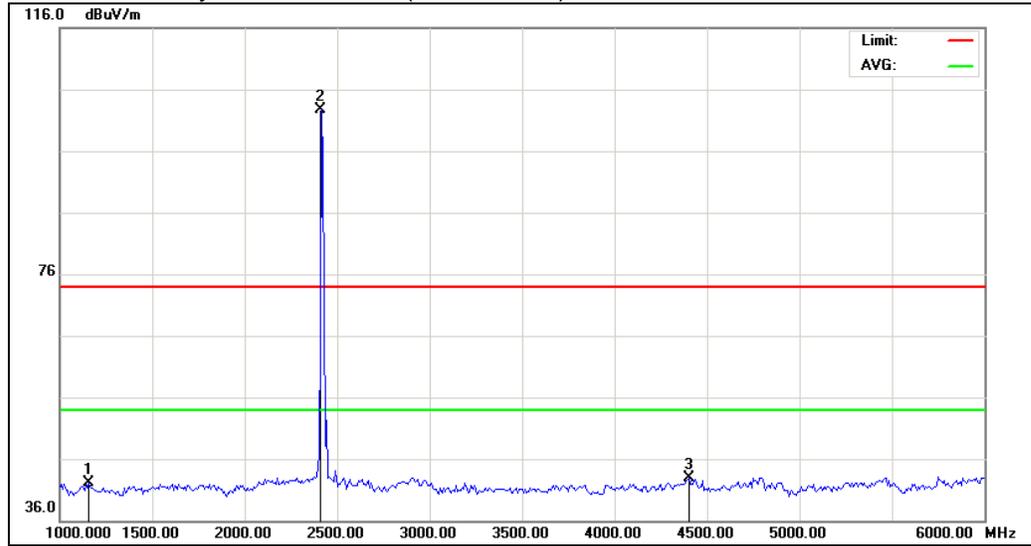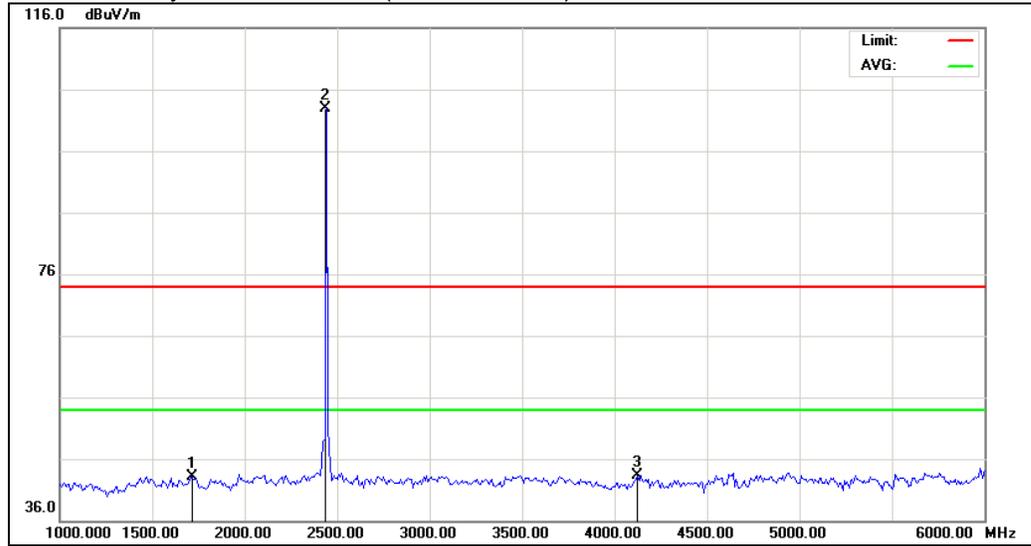| No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	1516.667	58.40	-15.20	43.20	74.00	-30.80	peak
3	4400.000	46.31	-3.45	42.86	74.00	-31.14	peak

Remark: Only background noise was measured from 16GHz-26GHz.

Result : PASS

All Emission and Emissions Fall into Restricted Band were recorded as below:

Above 1GHz Emission test data
Vertical Polarity -802.11n - HT20(High Channel)

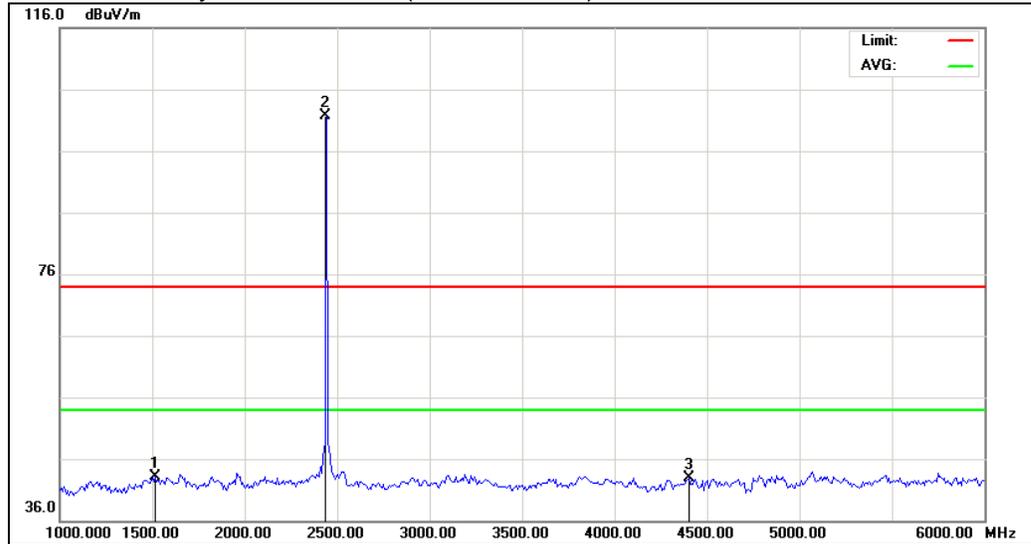| No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	1816.667	55.26	-12.05	43.21	74.00	-30.79	peak
3	4550.000	47.69	-2.98	44.71	74.00	-29.29	peak

Remark: Only background noise was measured from 16GHz-26GHz.

Result : PASS

All Emission and Emissions Fall into Restricted Band were recorded as below:

Above 1GHz Emission test data
Horizontal Polarity -802.11n - HT20 (High Channel)

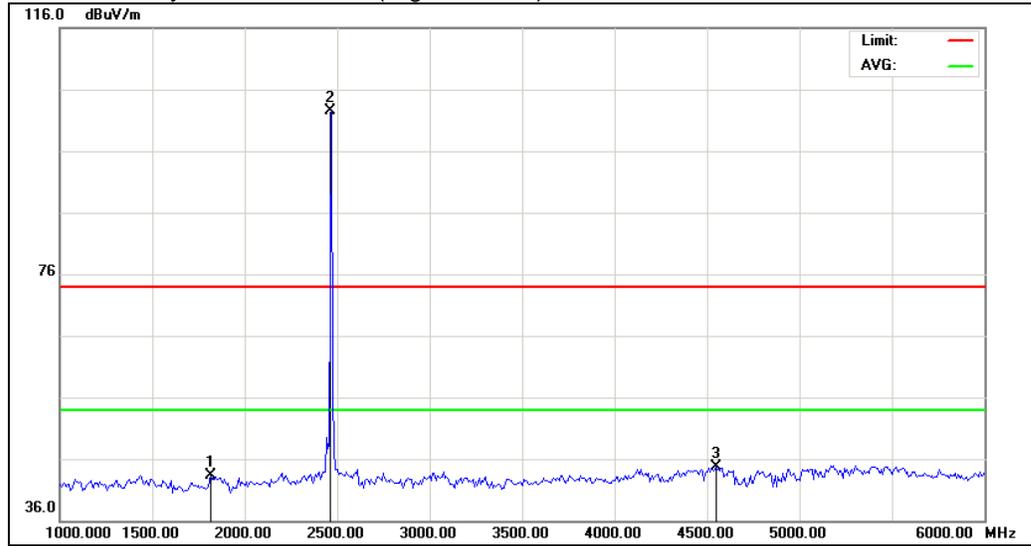| No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	1825.000	55.56	-11.96	43.60	74.00	-30.40	peak
3	3225.000	51.37	-8.15	43.22	74.00	-30.78	peak

Remark: Only background noise was measured from 16GHz-26GHz.

Result : PASS

All Emission and Emissions Fall into Restricted Band were recorded as below:

Above 1GHz Emission test data
Vertical Polarity -802.11n – HT40(Low Channel)

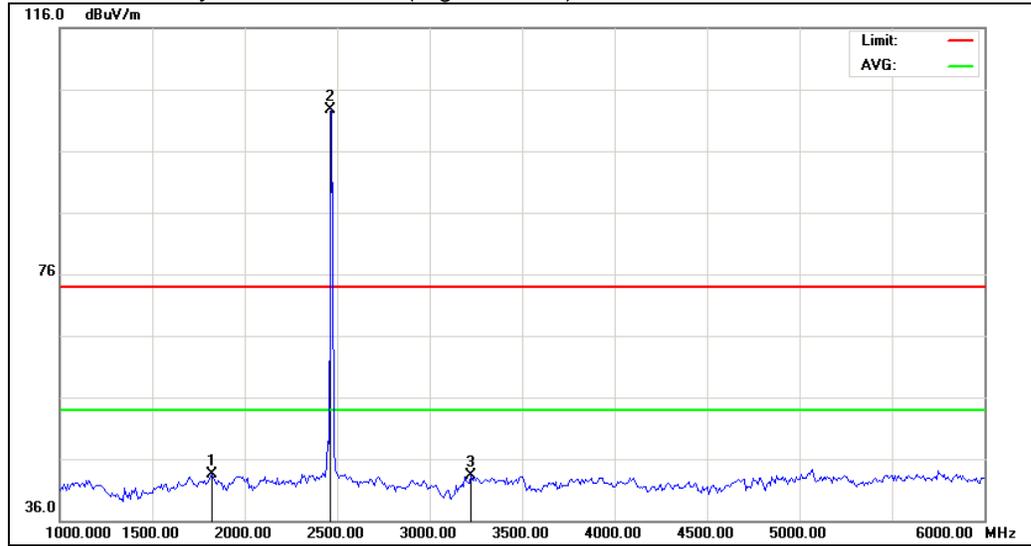| No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	1366.667	57.91	-15.44	42.47	74.00	-31.53	peak
3	4691.667	45.79	-2.61	43.18	74.00	-30.82	peak

Remark: Only background noise was measured from 16GHz-26GHz.

Result : PASS

All Emission and Emissions Fall into Restricted Band were recorded as below:

Above 1GHz Emission test data
Horizontal Polarity -802.11n – HT40(Low Channel)

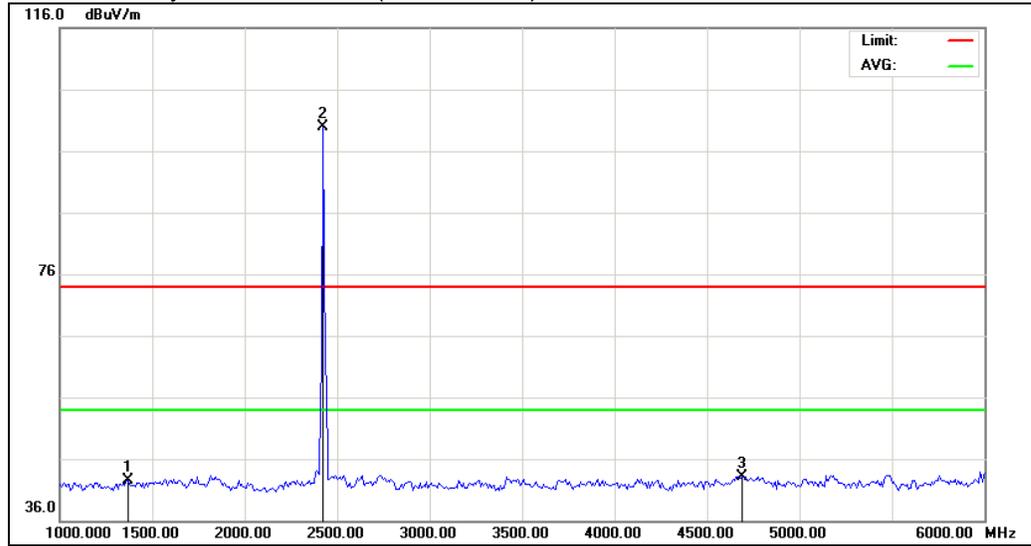| No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	1400.000	57.92	-15.42	42.50	74.00	-31.50	peak
3	4475.000	45.78	-3.19	42.59	74.00	-31.41	peak

Remark: Only background noise was measured from 16GHz-26GHz.

Result : PASS

All Emission and Emissions Fall into Restricted Band were recorded as below:

Above 1GHz Emission test data
Vertical Polarity -802.11n – HT40(Middle Channel)

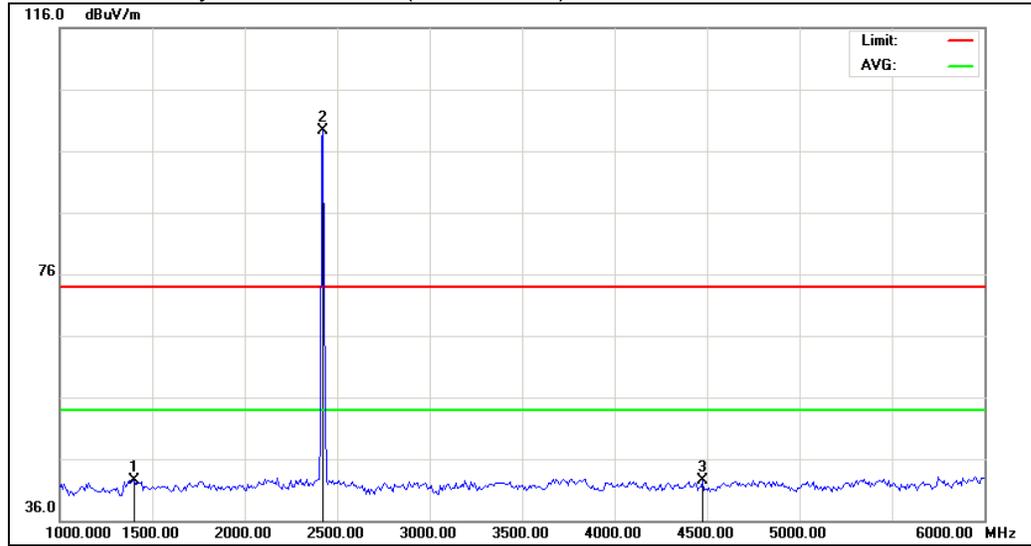| No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	1716.667	56.78	-13.10	43.68	74.00	-30.32	peak
3	4941.667	45.70	-1.95	43.75	74.00	-30.25	peak

Remark: Only background noise was measured from 16GHz-26GHz.

Result : PASS

All Emission and Emissions Fall into Restricted Band were recorded as below:

Above 1GHz Emission test data
Horizontal Polarity -802.11n – HT40(Middle Channel)

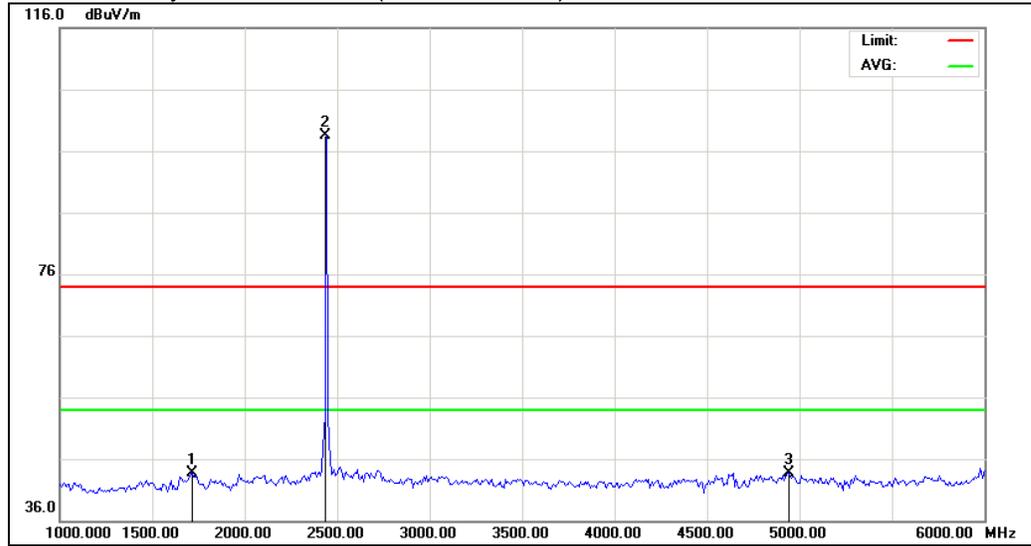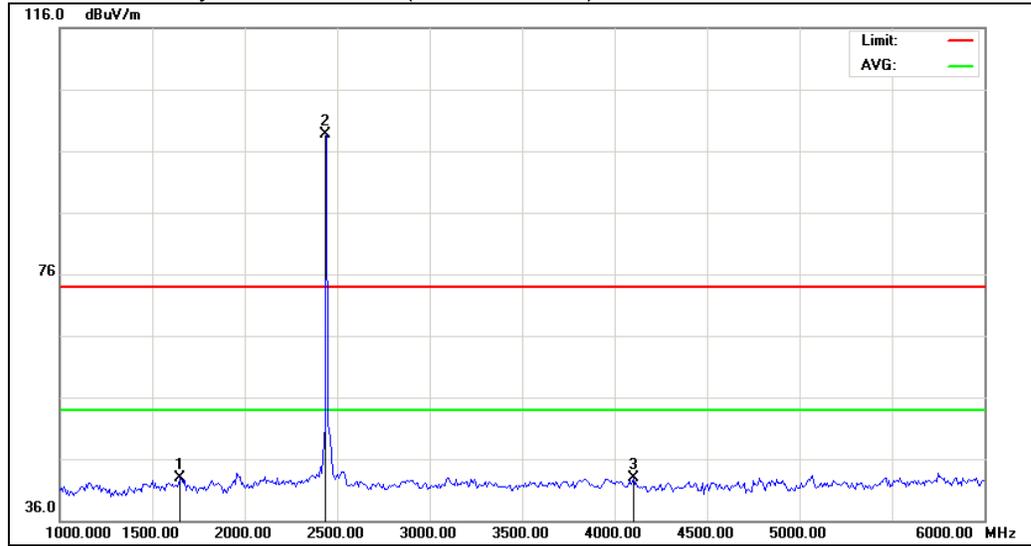| No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	1650.000	56.73	-13.80	42.93	74.00	-31.07	peak
3	4100.000	47.36	-4.47	42.89	74.00	-31.11	peak

Remark: Only background noise was measured from 16GHz-26GHz.

Result : PASS

All Emission and Emissions Fall into Restricted Band were recorded as below:

Above 1GHz Emission test data
Vertical Polarity -802.11n – HT40(High Channel)

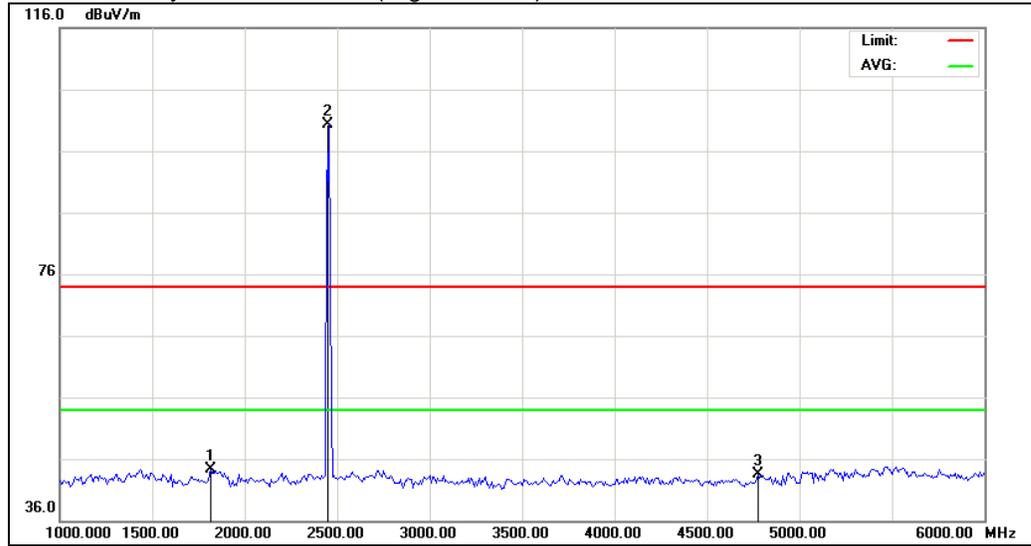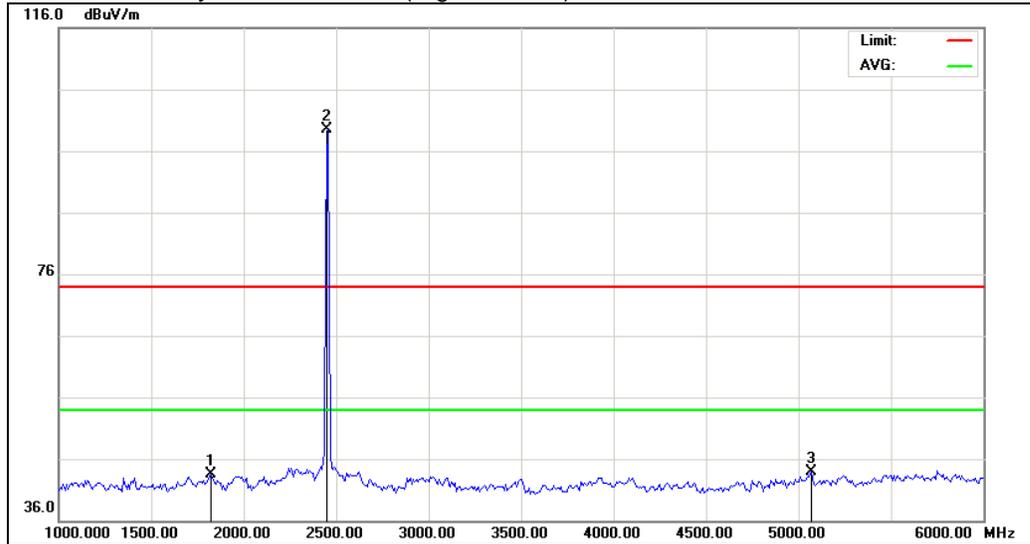| No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	1816.667	56.26	-12.05	44.21	74.00	-29.79	peak
3	4775.000	45.94	-2.39	43.55	74.00	-30.45	peak

Remark: Only background noise was measured from 16GHz-26GHz.

Result : PASS

All Emission and Emissions Fall into Restricted Band were recorded as below:

Above 1GHz Emission test data
Horizontal Polarity -802.11n – HT40(High Channel)

No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	1825.000	55.56	-11.96	43.60	74.00	-30.40	peak
3	5066.667	45.62	-1.80	43.82	74.00	-30.18	peak

Remark: Only background noise was measured from 16GHz-26GHz.

Result Summary:

1) Communication mode: All other emissions are more than 20dB below FCC part 15.209 limits.
2) No further spurious emissions found between 30 MHz and lowest internal used/generated frequency and from 30MHz to 1GHz.
3) Test data is base on the worst case highest channel's emission data graph from 30MHz-26GHz.

Remarks:

1. " * " Radiated emissions which fall in the restricted bands as defined in Section 15.205(a).

2. Emission level with more than 20dB below the FCC required limit is not mentioned in table.

3. Delta to Limit = Field strength (dBμV/m) – Limit (dBμV/m).

4. Calculated measurement uncertainty: 9kHz -30MHz: 2.58dB.hehe
                                       30MHz -1GHz: 2.58dB.
                                       1GHz -18GHz: 2.58dB.

4.6   Conducted Emissions (0.15MHz to 30MHz)

Test Requirement:	FCC part 15 Section 15.207 Class B
Test Method:	ANSI C63.4:2009
Test Date:	2014-05-20
Mode of Operation:	Transmitting continuously mode
Detector Function:	CISPR Quasi Peak
Measurement BW:	100 kHz
Worst Case Channel:	Highest Channel

Results : PASS

Test Setup:
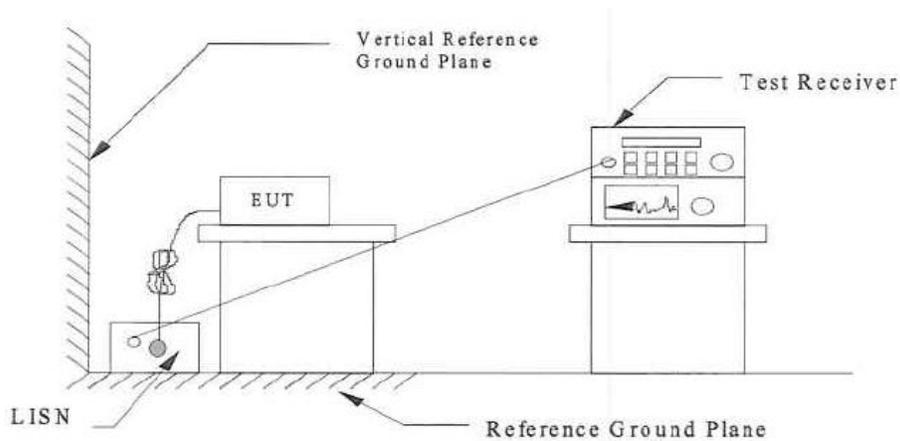
Limits for Conducted Emission [Section 15.207]:

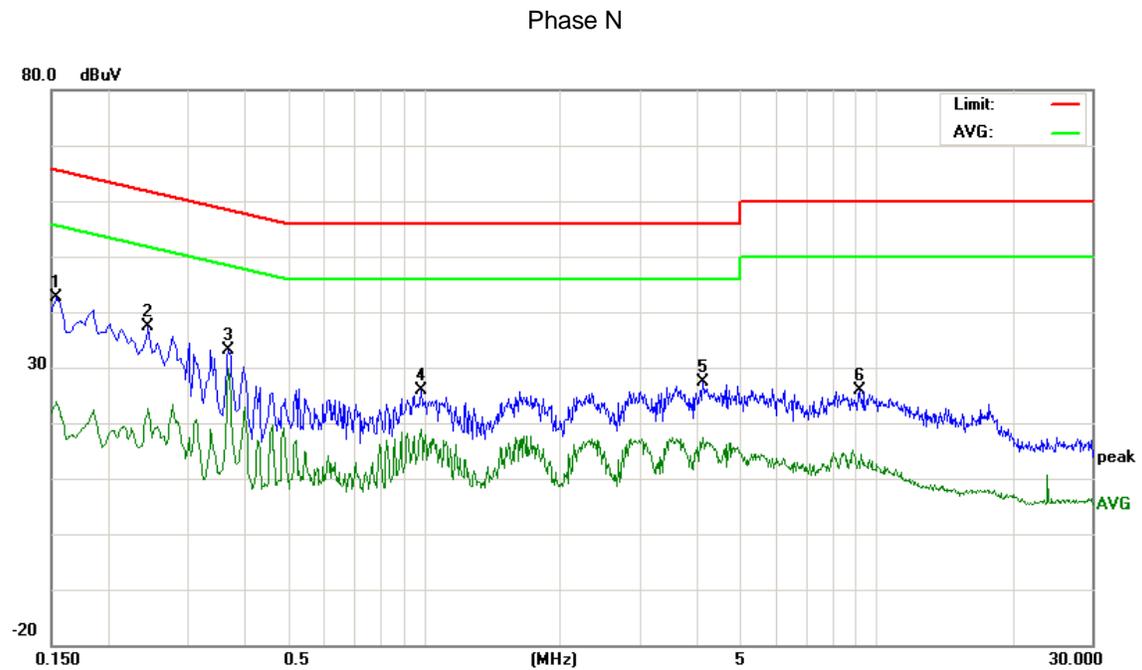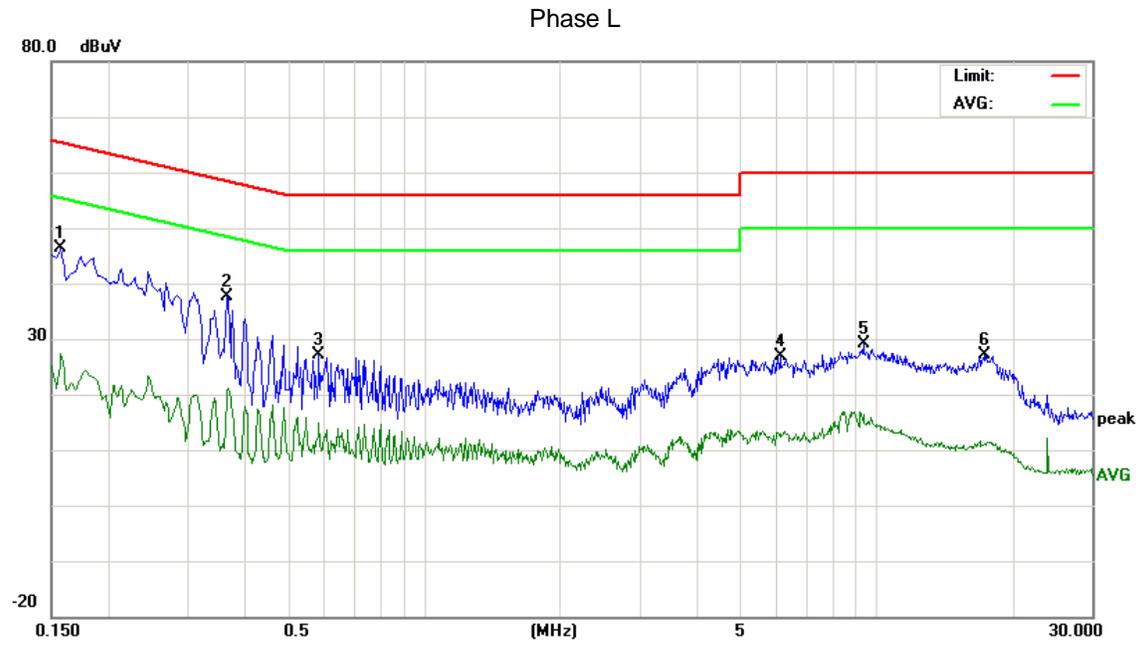| Frequency Range [MHz]	Quasi-Peak Limit [dBμV]	Average Limit [dBμV]
0.15-0.5	66 to 56*	56 to 46*
0.5-5.0	56	46
5.0-30.0	60	50

* Decreases with the logarithm of the frequency.

Remarks:
Calculated measurement uncertainty: ±1.54dB

Result data graph shows the conducted emission (Line and Neutral).

Phase L

Phase N

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Result data table shows the conducted emission (Line and Neutral).

Frequency (MHz)	Detector (QP/AV)	Phase	Result (dBμV)	Limit (dBμV)	Margin
0.158	QP	L	46.33	65.56	-19.23
0.366	QP	L	37.58	58.59	-21.01
0.586	QP	L	27.10	56.00	-28.90
6.142	QP	L	26.77	60.00	-33.23
9.366	QP	L	29.08	60.00	-30.92
17.362	QP	L	27.24	60.00	-32.76
0.154	QP	N	42.64	65.78	-23.14
0.246	QP	N	37.46	61.89	-24.43
0.370	QP	N	33.18	58.50	-25.32
0.986	QP	N	25.79	56.00	-30.21
4.142	QP	N	27.44	56.00	-28.56
9.198	QP	N	25.81	60.00	-34.19

5.0   List of Measurement Equipment

Radiated Emission

Description	Manufacturer	Model no.	Serial no.	CAL due
N/A	3m Semi- Anechoic Chamber	9.0(L)*6.0(W)* 6.0(H)	N/A	Jul. 16 2014
Agilent	Spectrum Analyzer	E4440A	US41421290	Jul. 16 2014
R&S	EMI Test Receiver	ESCI	100694	Jul. 16 2014
A.H.	Wideband Antenna	SAS-521-4	26	Jul. 16 2014
EMCO	Antenna	3142C	60447	Jul. 16 2014
EM	Horn Antenna	EM-AH-10180	67	Jul. 16 2014
EM	Power Amplifier	EM30180	0607030	Jul. 16 2014
MF	Position Controller	MF-7802	MF780208138	N/A

Line Conducted

Description	Manufacturer	Model no.	Serial no.	CAL due
N/A	Shielding Room	7.(L)x4(W)x3(H)	N/A	Jul. 16 2014
R&S	EMI Test Receiver	ESCI	100694	Jul. 16 2014
R&S	LISN	ESH3-Z5	8389791009	Jul. 16 2014

N/A   Not Applicable or Not Available