



TEST REPORT

Date: 2014-06-16

Report No.: 60.870.14.009.01F

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

Description of Samples: Model name: Digital Video Baby Monitor (Baby Unit)
Brand name: motorola
Model no.: MBP36HDBU, FCOUS83-W, FOCUS83-S,
FOCUS83-B, SCOUT83, BLINK83-W,
BLINK83-S, BLINK83-B
FCCID: VLJ-BLINK83

Date Samples Received: 2014-05-02

Date Tested: 2014-05-03 to 2014-06-15

Investigation Requested: FCC Part 15 Subpart C, Section 15.247

Conclusions: The submitted product COMPLIED 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
Project Engineer
Wireless & Telecom department

Jeff Pong
Manager
Wireless & Telecom department

**CONTENT:**

Cover	Page 1 of 73
Content	Page 2-3 of 73
<u>1.0</u>	<u>General Details</u>
1.1 Test Laboratory	Page 4 of 73
1.2 Applicant Details	Page 4 of 73
1.3 Equipment Under Test [EUT]	Page 5 of 73
1.4 Related Submittal(s) Grants	Page 5 of 73
<u>2.0</u>	<u>Technical Details</u>
2.1 Investigations Requested	Page 6 of 73
2.2 Test Standards and Results Summary	Page 6 of 73
<u>3.0</u>	<u>Test Methodology</u>
3.1 Radiated Emission	Page 7 of 73
3.2 Field Strength Calculation	Page 7 of 73
3.3 Conducted Emission	Page 7 of 73
<u>4.0</u>	<u>Test Results</u>
4.1 6dB Bandwidth Measurement	Page 9-16 of 73
4.2 Power Spectral Density	Page 17-25 of 73
4.3 Band Edge Measurement	Page 26-28 of 73
4.4 Maximum Output Power	Page 29-38 of 73
4.5 Out of Band Emissions and Emissions in Restricted Bands	Page 39-67 of 73
4.6 Conducted Emission on AC Mains	Page 68-72 of 73



5.0 List of Measurement Equipments

Page 73 of 73

Appendix A

Photos of Test Setup

Appendix B

External EUT Photos

Appendix C

Internal EUT Photos



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:

A handwritten signature in blue ink, appearing to read 'John Zhi', written over a horizontal line.

John Zhi

1.2 Applicant Details **Applicant**

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

Manufacturers

VTech (Dongguan) Telecommunications Limited
VTech Science Park, Xia Ling Bei Management Zone, Liaobu,
Dongguan, Guangdong, China



1.3 Equipment Under Test [EUT]

Description of EUT

Product Description:	Digital Video Baby Monitor (Baby Unit)
Model No.:	MBP36HDBU
Multi-listing Model:	FOCUS83-W, FOCUS83-S, FOCUS83-B, SCOUT83, BLINK83-W, BLINK83-S, BLINK83-B
Brand Name:	motorola
FCCID:	VLJ-BLINK83
Rating:	Ten Pao Adaptor Input 100-240Vac Output: 5 VDC, 1.5A CSEC Adaptor Input: 100-240VAC Output: 5 VDC, 2.0A
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:	CVISION HK Limited
Antenna Gain:	0 dBi
Antenna Model:	---

General Operation of EUT

The Equipment Under Test (EUT) is a Camera of Wireless Monitoring System, which include of a FHSS Module and an 802.11b/g/n module.

As per Client Declaration, MBP36HDBU & 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 MBP36HDBU 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 MCS0 (worst case) are chosen for the final testing.

IEEE802.11n – HT40: Channel 3(2422MHz), Channel 6 (2437MHz) and Channel 9 (2452MHz) with MCS0 (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	N/A
Number of Frequency Hopping	Section 15.247 (a1)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6dB Bandwidth Measurement	Section 15.247 (a2)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Power Spectral Density	Section 15.247 (e)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Pseudorandom Hopping Algorithm	Section 15.247 (a1)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Band Edge Measurement	Section 15.247	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Maximum Output Power	Section 15.247 (b3)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Out of Band Emission	Section 15.247 (d)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Radiated Emission in Restricted Band	Section 15.247 (d)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Conducted Emission on AC Mains	Section 15.207	<input checked="" type="checkbox"/>	<input type="checkbox"/>
RF Exposure	Section 15.247 (i)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Antenna Requirement	Section 15.203	<input checked="" type="checkbox"/> See note 1	<input type="checkbox"/>

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:

$$\begin{aligned} \text{FS} &= \text{R} + \text{System Factor} \\ \text{System Factor} &= \text{AF} + \text{CF} + \text{FA} - \text{PA} \end{aligned}$$

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:	2014-06-10
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	10.52
Middle	2437	9.667
Highest	2462	10.20

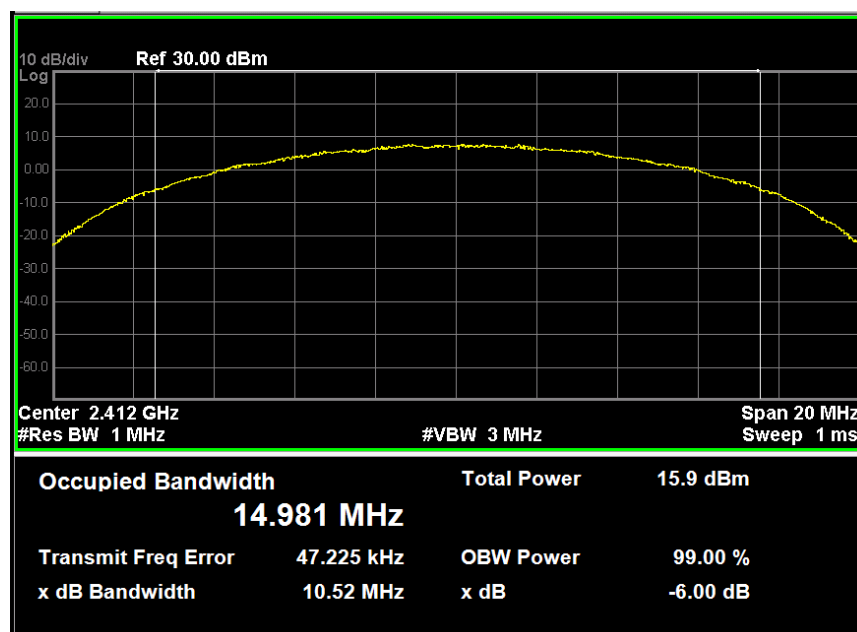
This result is used for checking the systems using digital modulation techniques may operate in the 2400–2483.5 MHz.

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

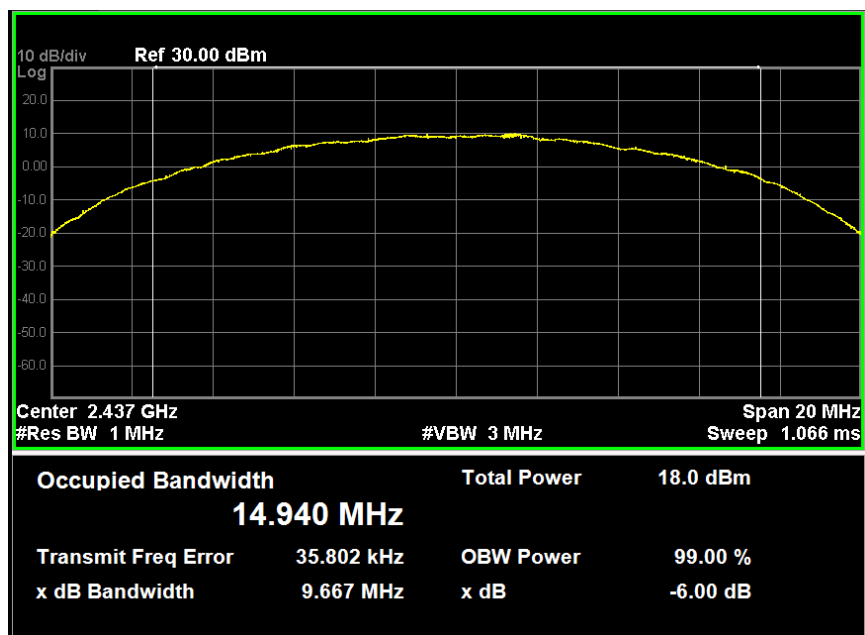
The minimum 6 dB bandwidth shall be at least 500 kHz.

For 802.11b Mode

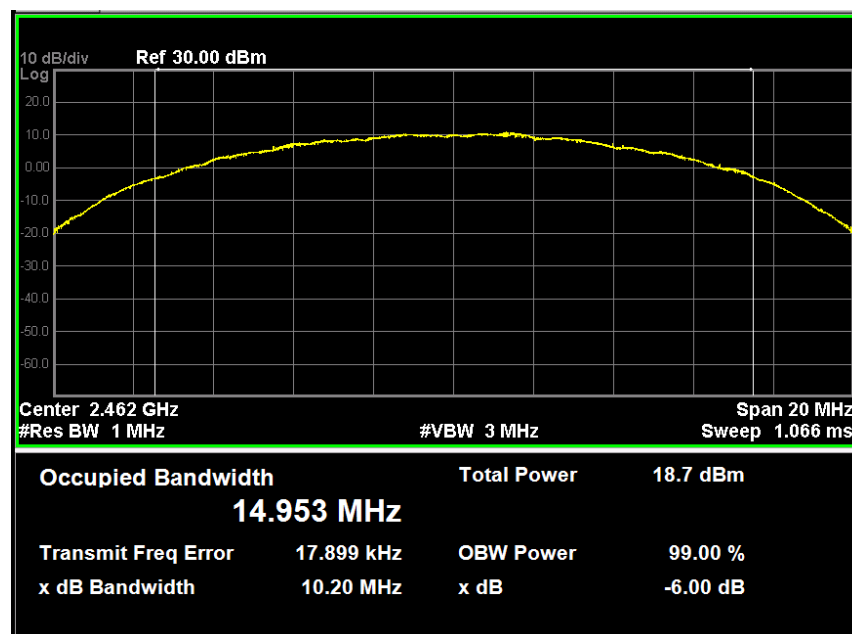
Result data graph shows 6 dB bandwidth, CF = 2.412GHz, BW = 10.52 MHz



Result data graph shows 6 dB bandwidth, CF = 2.437GHz, BW = 9,667MHz



Result data graph shows 6 dB bandwidth, CF = 2.462GHz, BW = 10.20MHz



**For 802.11g Mode**

Channel	Measured frequency (MHz)	6dB Bandwidth (MHz)
Lowest	2412	16.80
Middle	2437	16.73
Highest	2462	16.82

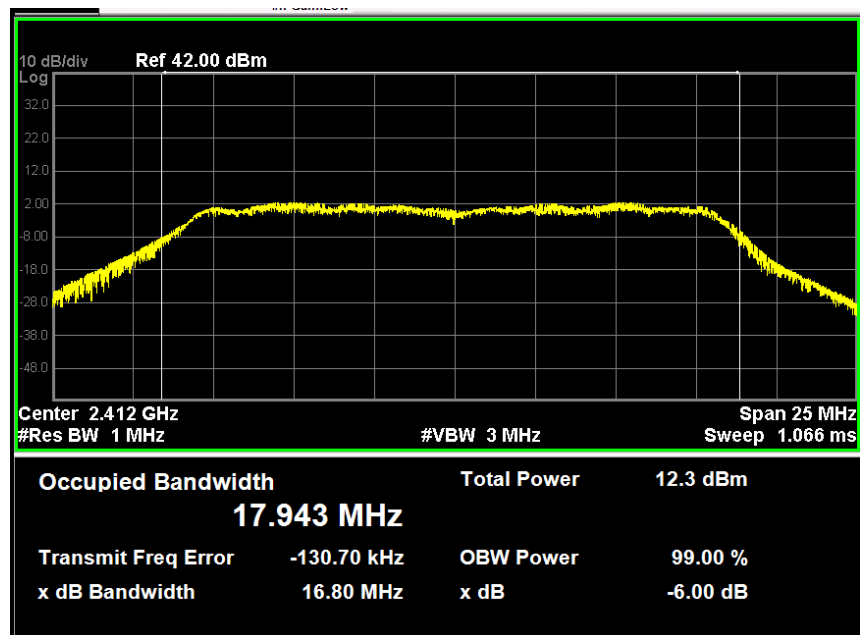
This result is used for checking the systems using digital modulation techniques may operate in the 2400–2483.5 MHz.

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

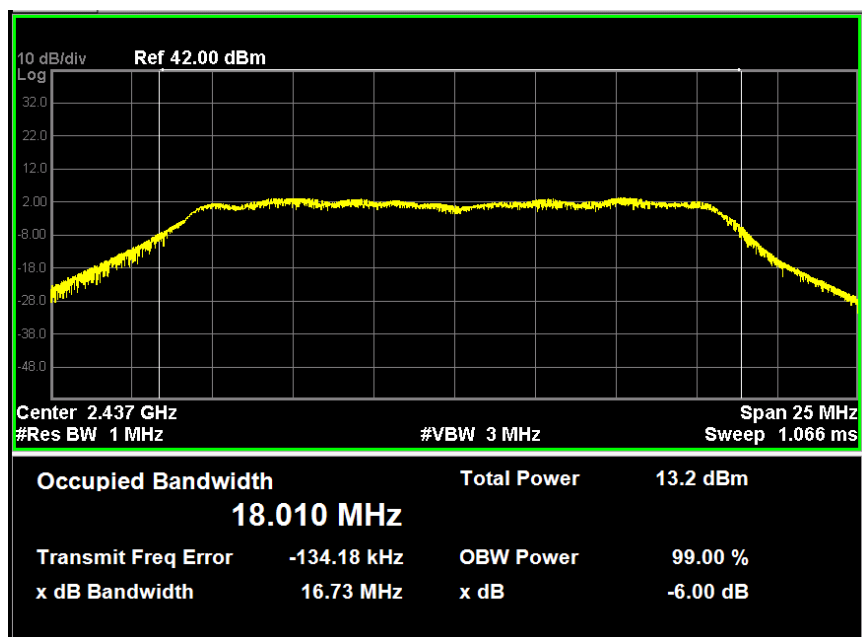
The minimum 6 dB bandwidth shall be at least 500 kHz.

For 802.11g Mode

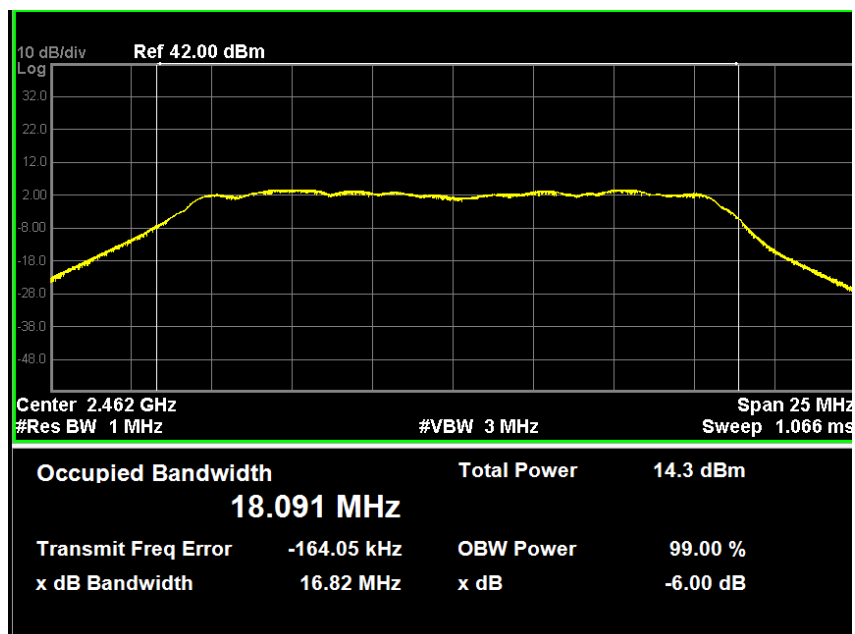
Result data graph shows 6 dB bandwidth, CF = 2.412GHz, BW = 16.80 MHz



Result data graph shows 6 dB bandwidth, CF = 2.437GHz, BW = 16.73MHz



Result data graph shows 6 dB bandwidth, CF = 2.462GHz, BW = 16.82MHz



**For 802.11n – HT20 Mode**

Channel	Measured frequency (MHz)	6dB Bandwidth (MHz)
Lowest	2412	18.04
Middle	2437	18.06
Highest	2462	18.02

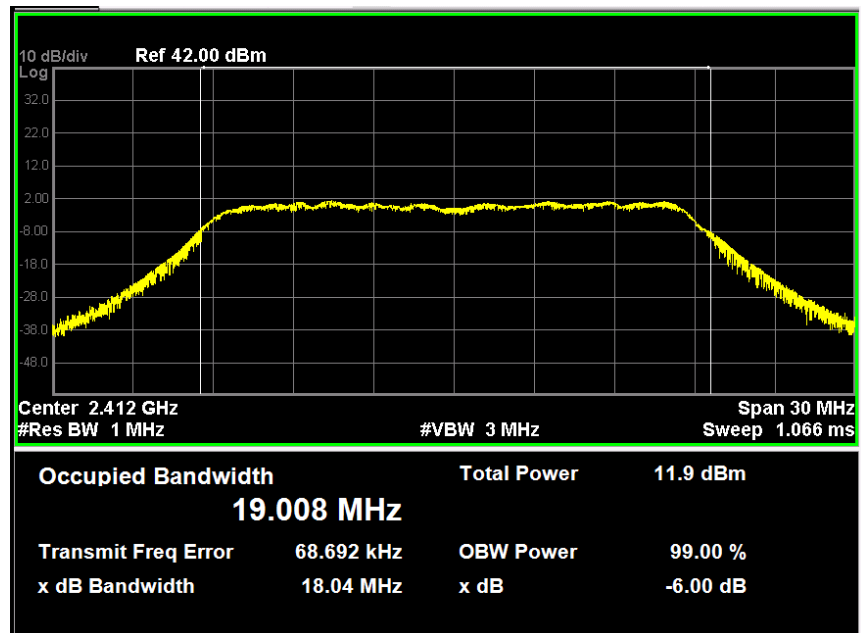
This result is used for checking the systems using digital modulation techniques may operate in the 2400–2483.5 MHz.

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

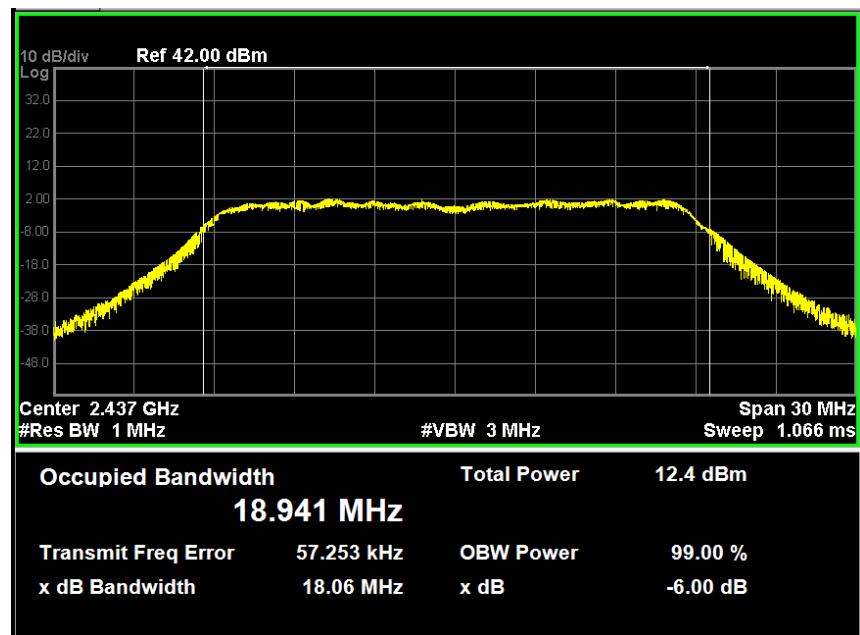
The minimum 6 dB bandwidth shall be at least 500 kHz.

For 802.11n – HT20 Mode

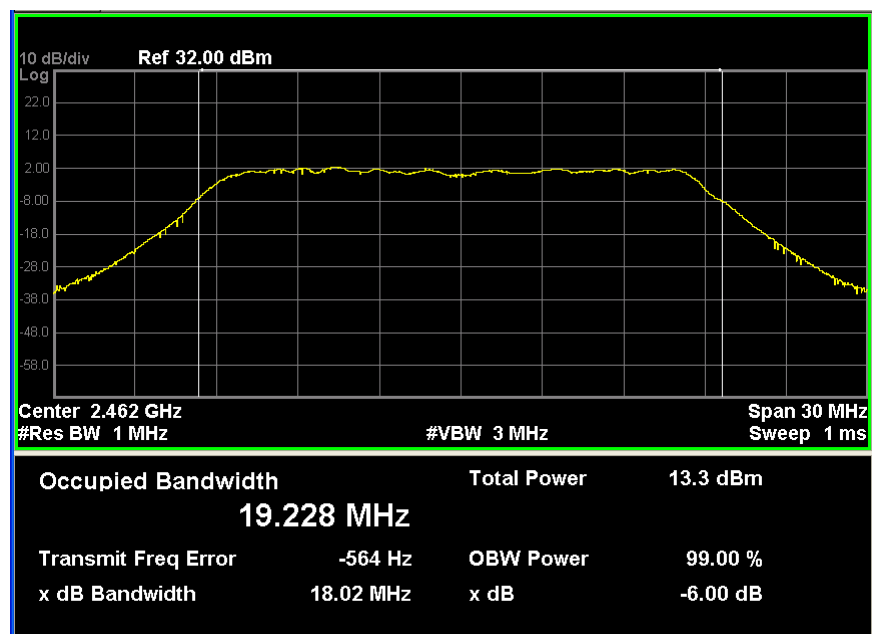
Result data graph shows 6 dB bandwidth, CF = 2.412GHz, BW = 18.04 MHz



Result data graph shows 6 dB bandwidth, CF = 2.437GHz, BW = 18.06MHz



Result data graph shows 6 dB bandwidth, CF = 2.462GHz, BW = 18.02MHz



**For 802.11n – HT40 Mode**

Channel	Measured frequency (MHz)	6dB Bandwidth (MHz)
Lowest	2422	36.04
Middle	2437	36.05
Highest	2452	36.02

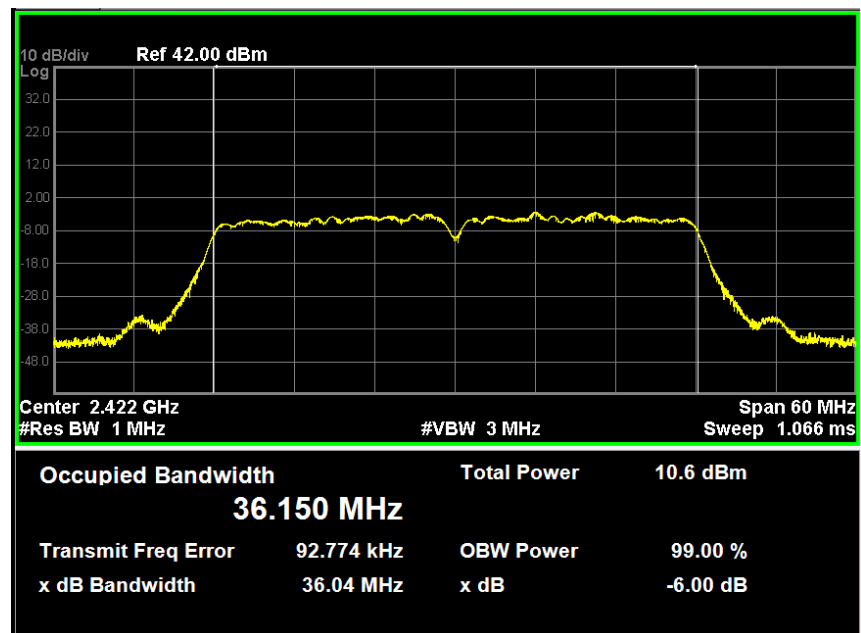
This result is used for checking the systems using digital modulation techniques may operate in the 2400–2483.5 MHz.

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

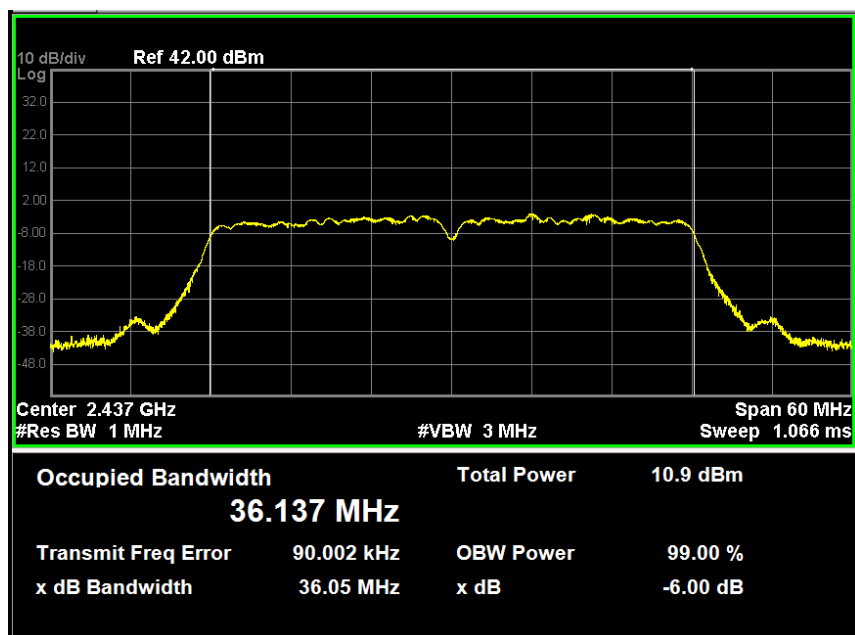
The minimum 6 dB bandwidth shall be at least 500 kHz.

For 802.11n – HT40 Mode

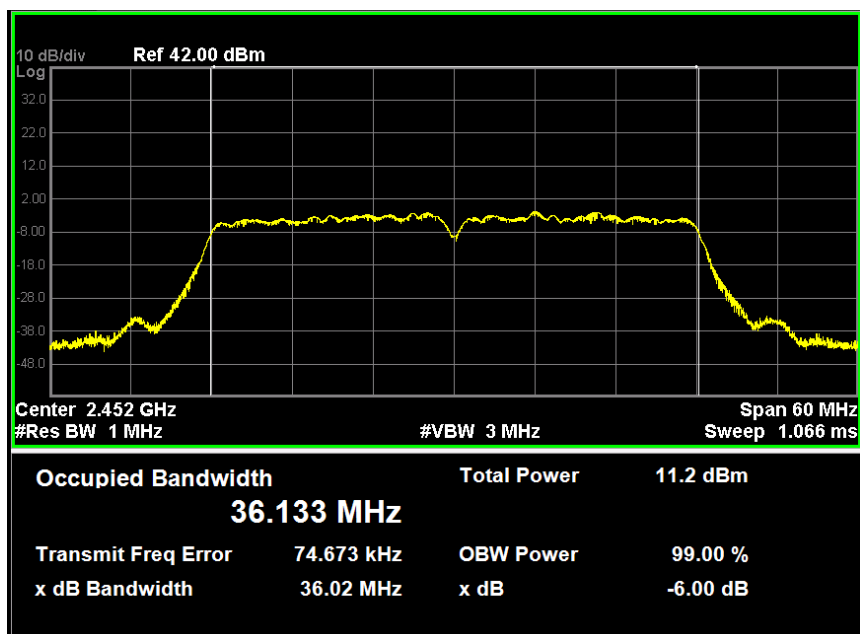
Result data graph shows 6 dB bandwidth, CF = 2.422GHz, BW = 36.04MHz



Result data graph shows 6 dB bandwidth, CF = 2.437GHz, BW = 36.05MHz



Result data graph shows 6 dB bandwidth, CF = 2.452GHz, BW = 36.02MHz





4.2 Power Spectral Density

Test Requirement:	FCC part 15 section 15.247 (e)
Test Date:	2014-06-10
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)	-11.76	8
	Middle channel (2437MHz)	-10.47	8
	High channel (2462MHz)	-10.62	8
802.11g	Low channel (2412MHz)	-21.29	8
	Middle channel (2437MHz)	-20.43	8
	High channel (2462MHz)	-20.25	8
802.11n-HT20	Low channel (2412MHz)	-21.45	8
	Middle channel (2437MHz)	-20.03	8
	High channel (2462MHz)	-19.84	8
802.11n-HT40	Low channel (2422MHz)	-23.90	8
	Middle channel (2437MHz)	-23.37	8
	High channel (2452MHz)	-21.80	8

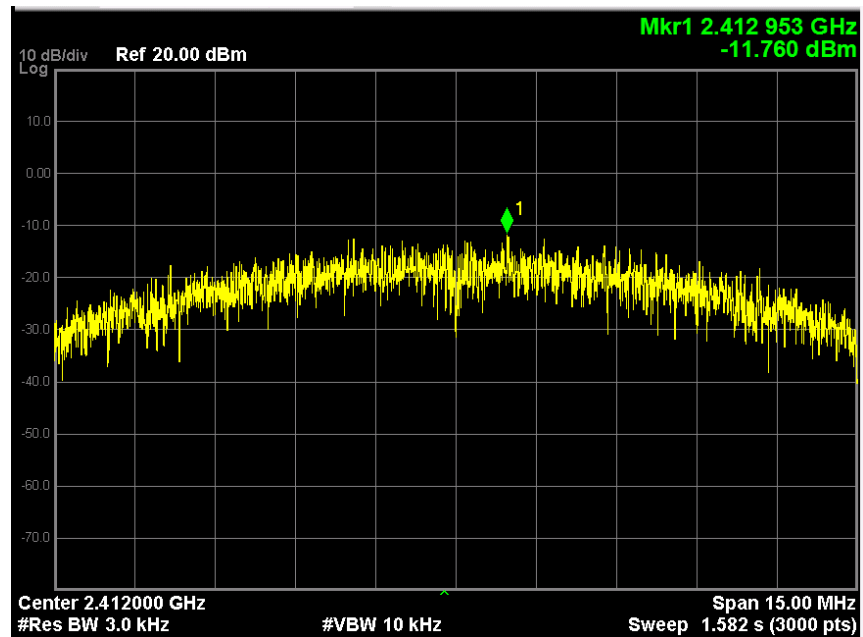
Note: 1. Above testing data has been considered with 0.2dB cable loss which between antenna port and spectrum.

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

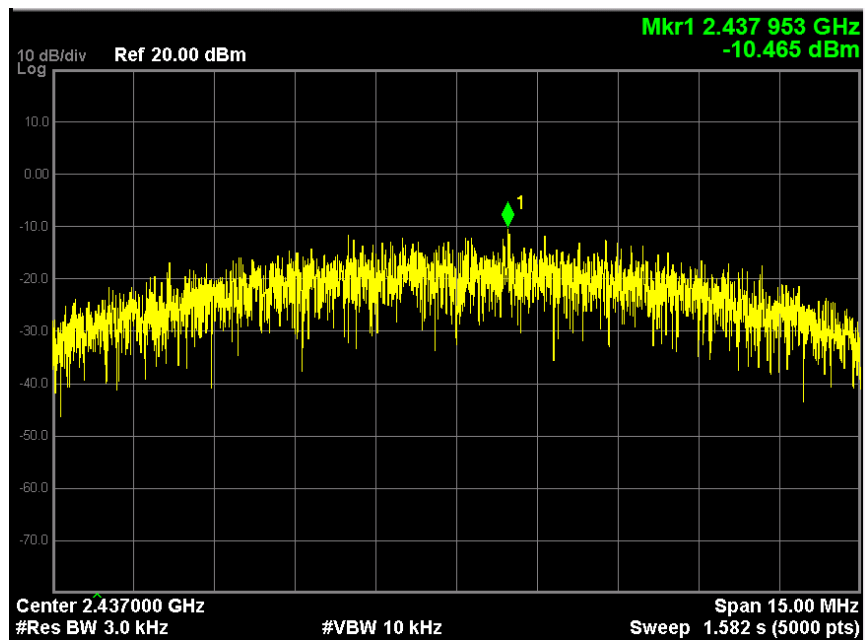
For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of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

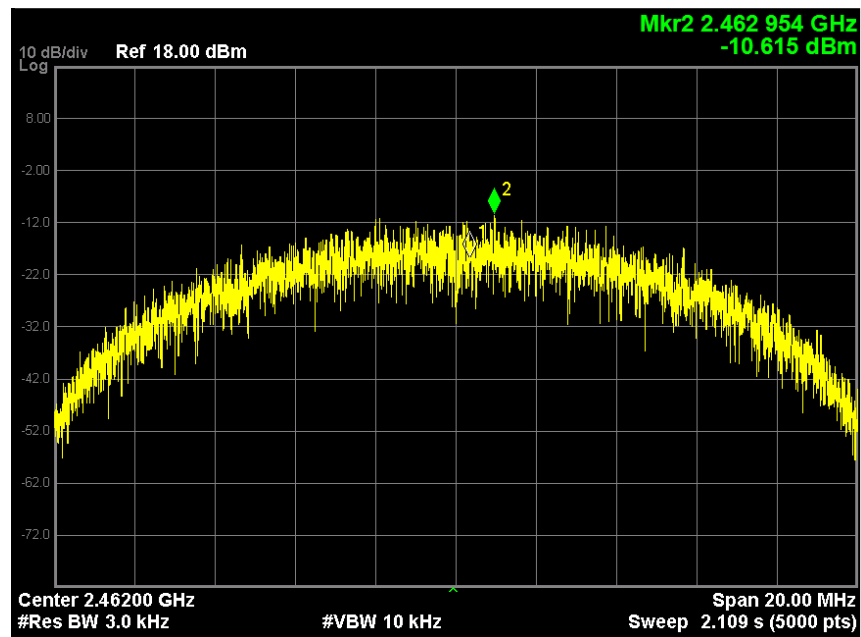
Result data graph shows Low channel power spectrum density is -11.76dBm



Result data graph shows middle channel power spectrum density is -10.47dBm

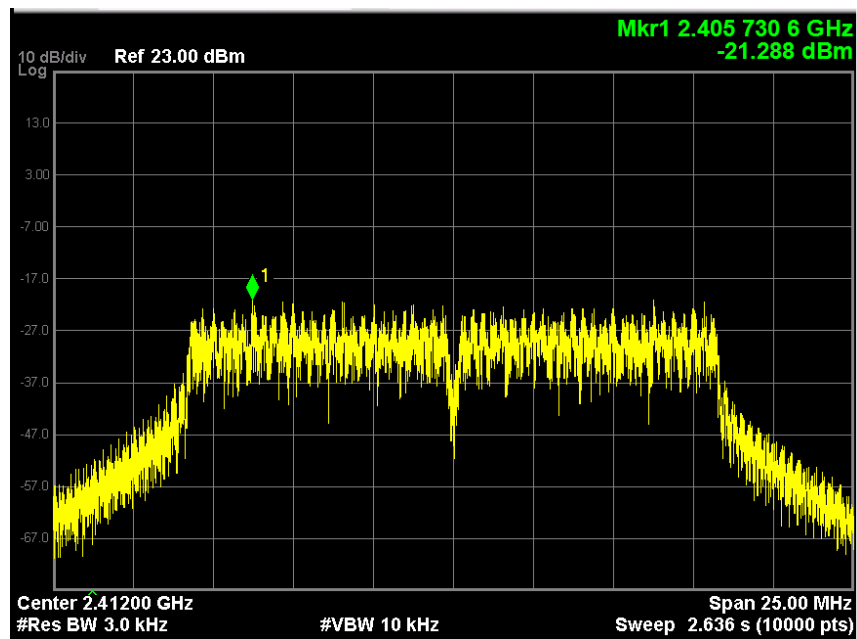


Result data graph shows high channel power spectrum density is -10.62dBm

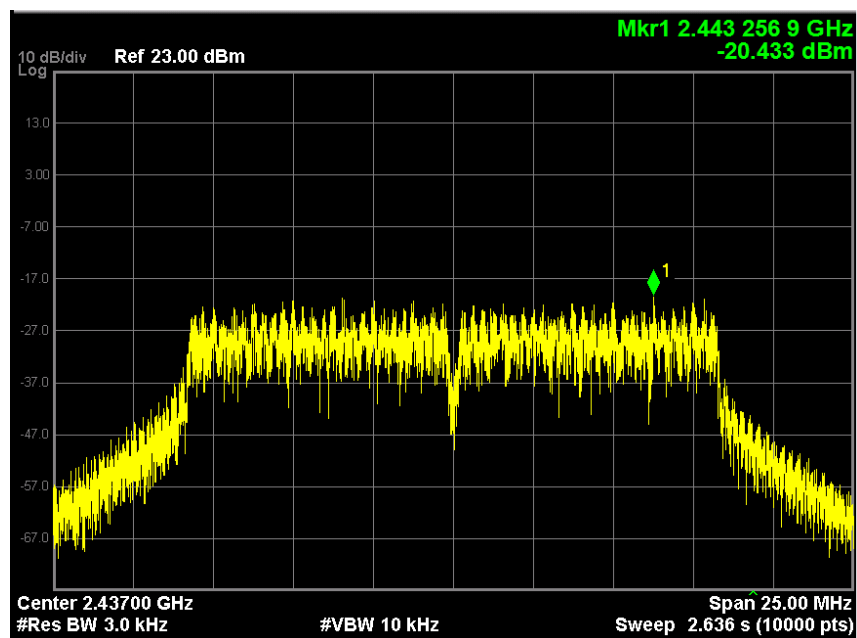


For 802.11g Mode

Result data graph shows Low channel power spectrum density is -21.29Bm

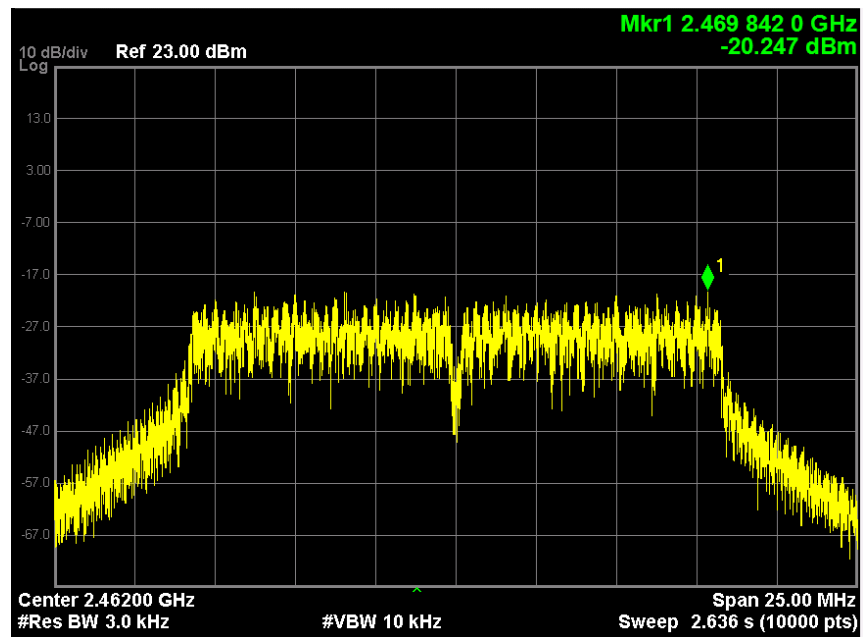


Result data graph shows middle channel power spectrum density is -20.43dBm



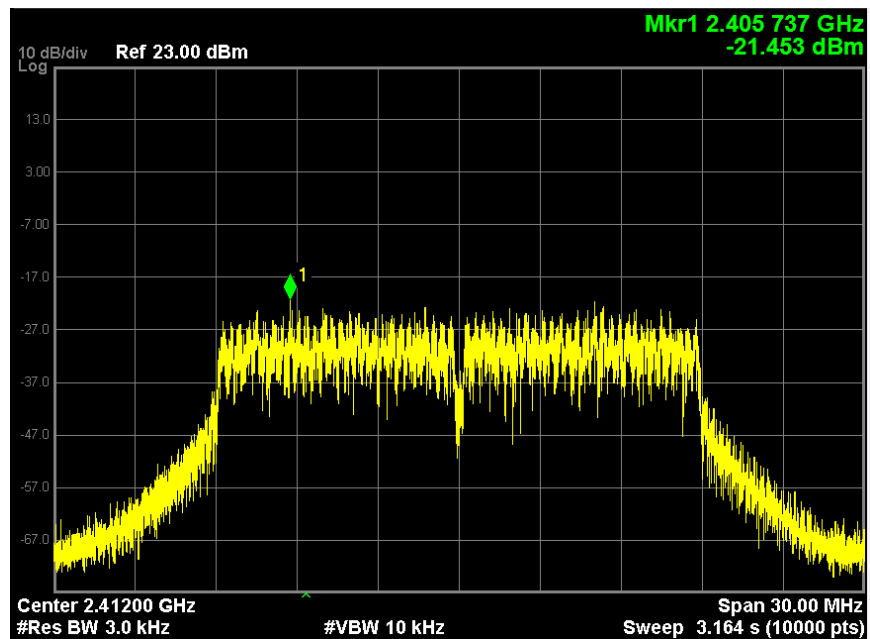


Result data graph shows high channel power spectrum density is -20.25dBm

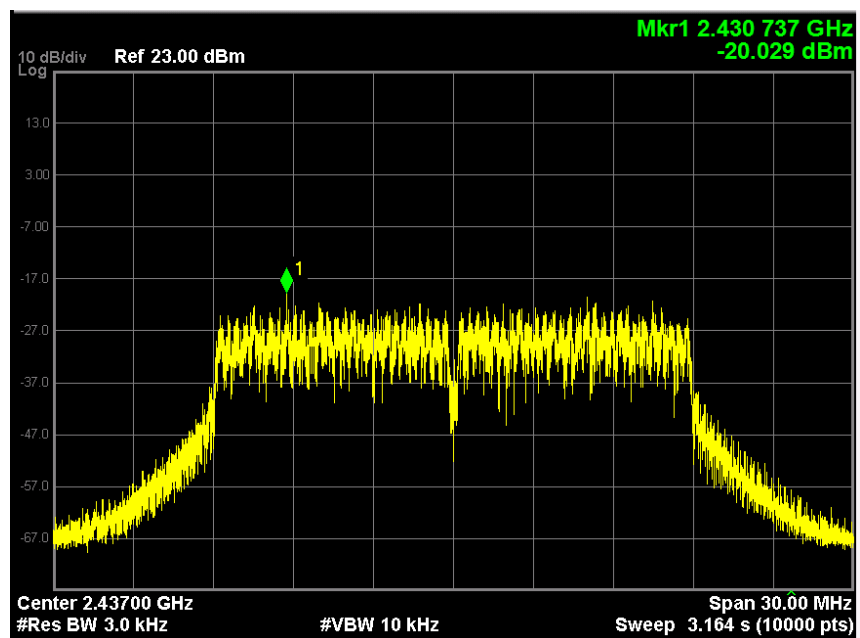


For 802.11n-HT20 Mode

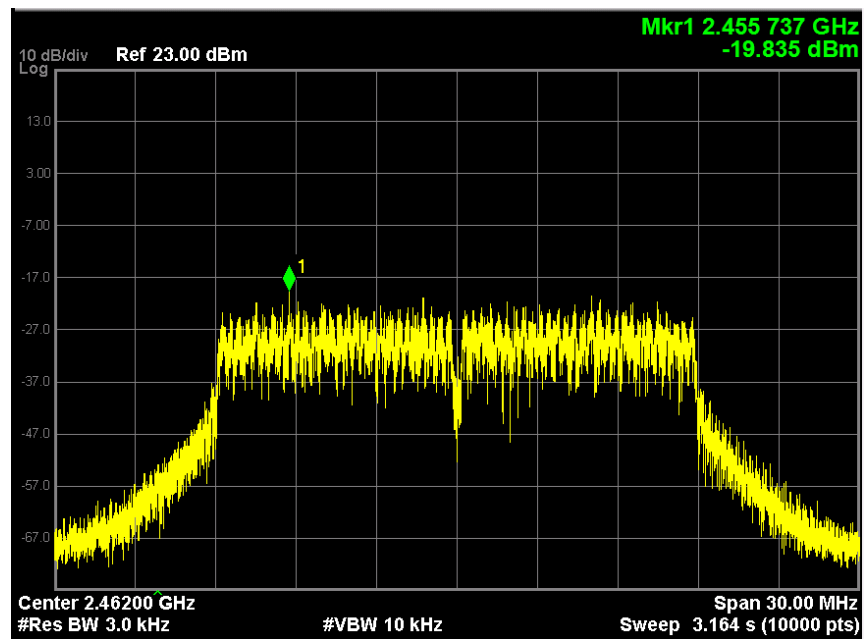
Result data graph shows Low channel power spectrum density is -21.45Bm



Result data graph shows middle channel power spectrum density is -20.03dBm

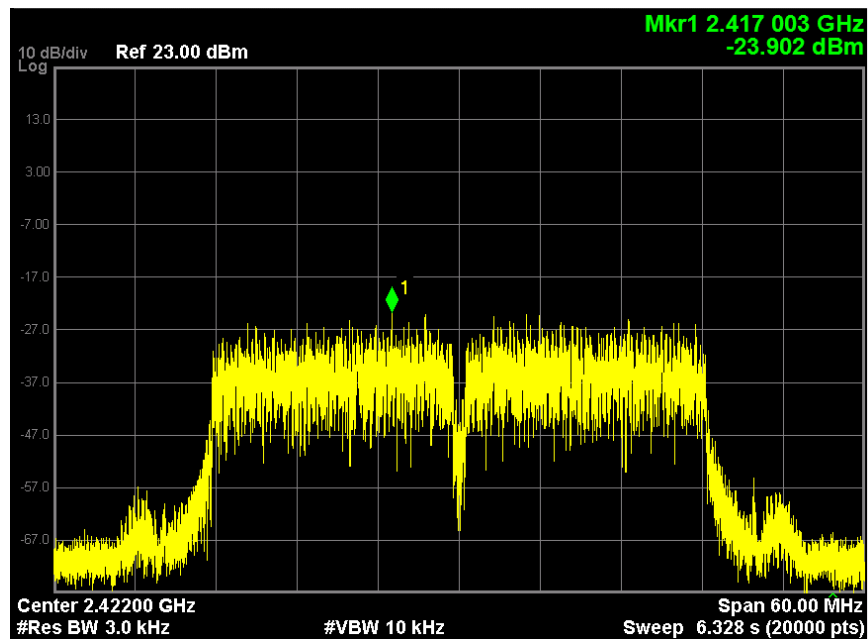


Result data graph shows high channel power spectrum density is -19.84dBm

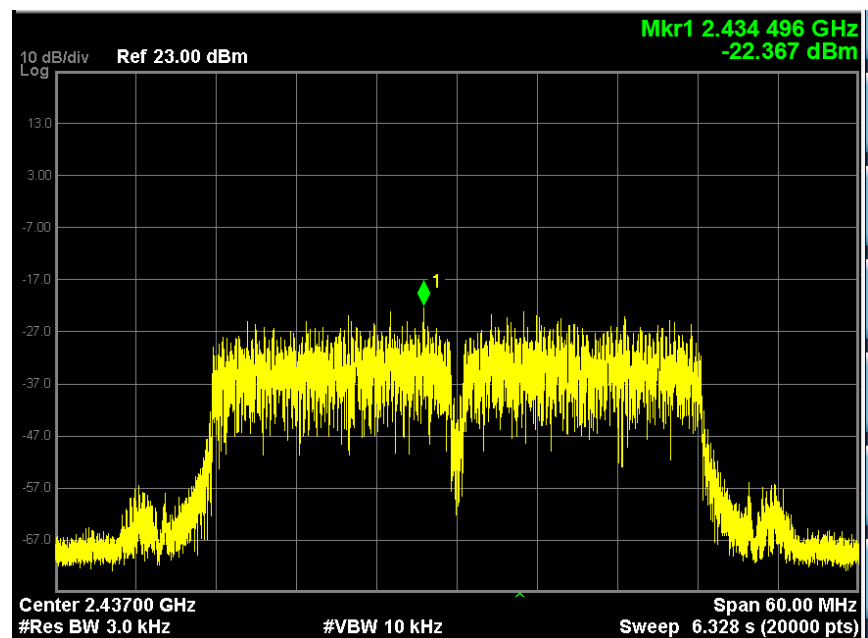


For 802.11n-HT40 Mode

Result data graph shows Low channel power spectrum density is -23.90 dBm

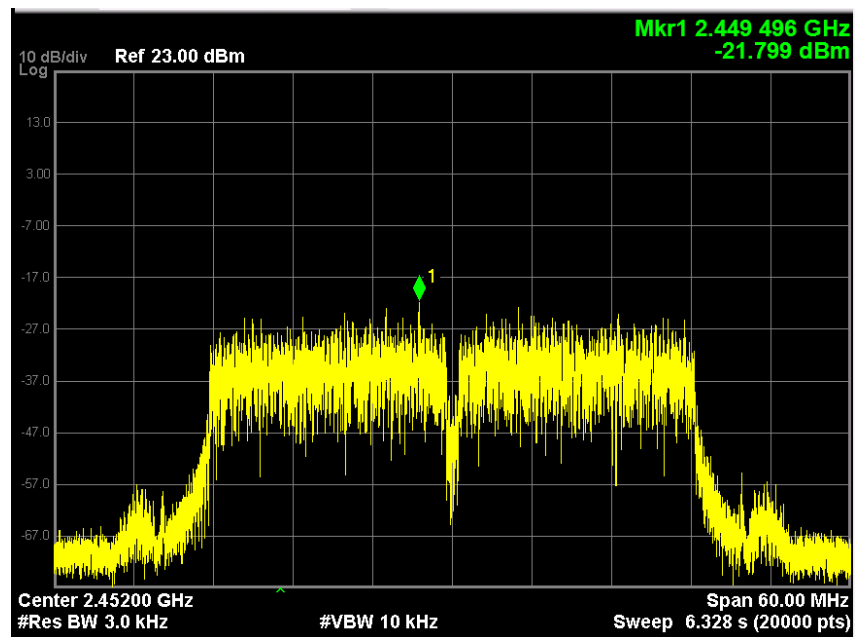


Result data graph shows middle channel power spectrum density is -22.37dBm





Result data graph shows high channel power spectrum density is -21.80dBm



4.3 Band Edge Measurement

Test Requirement:	FCC part 15 section 15.247
Test Date:	2014-06-10
Mode of Operation:	Transmitting continuously mode.
Detector Function:	Max Hold

Result: PASS

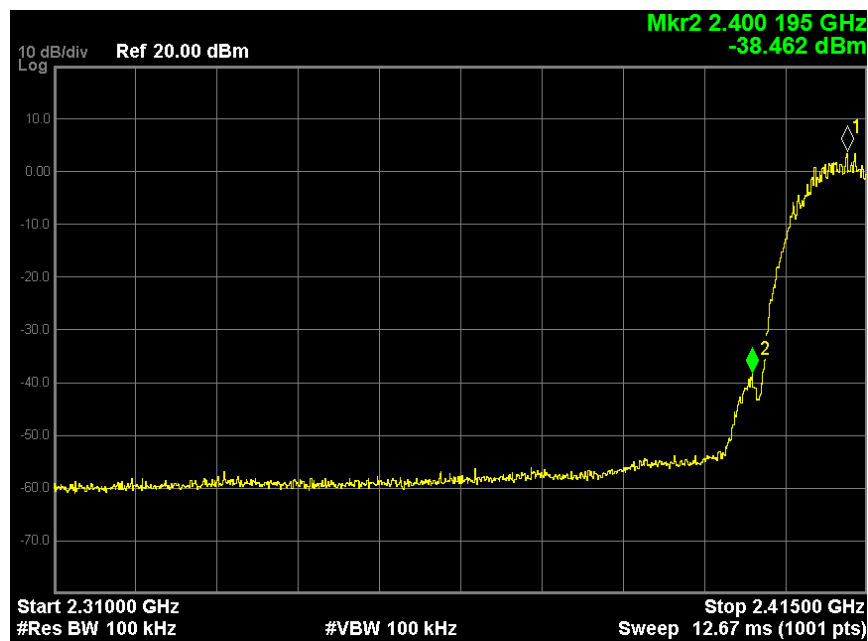
Measured Result :

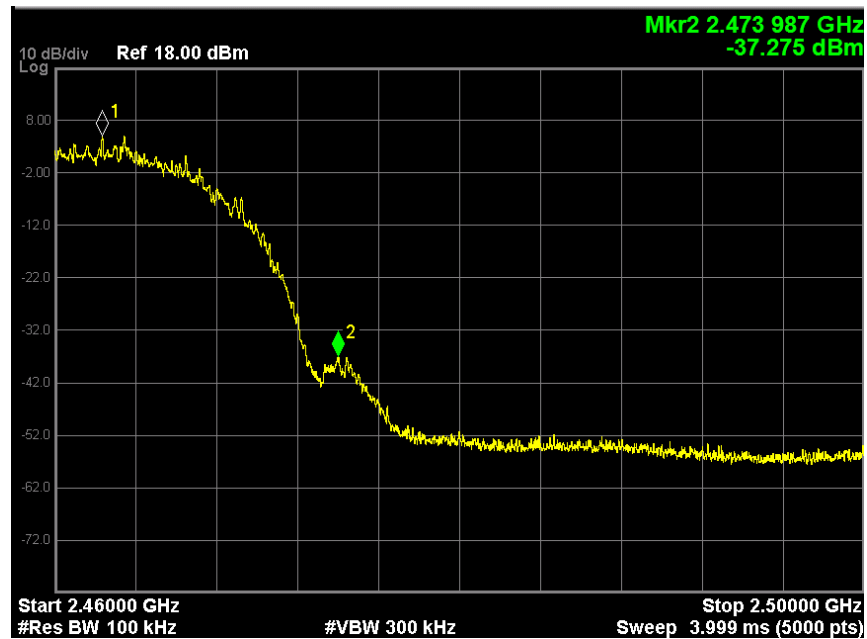
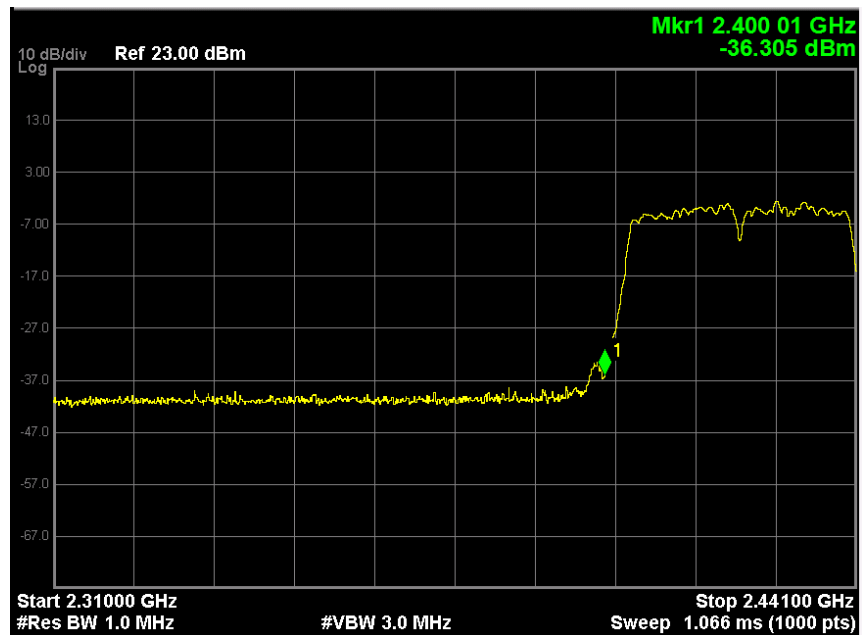
Refer to the figure, it shows the frequency of lower band edge and upper band edge separately.

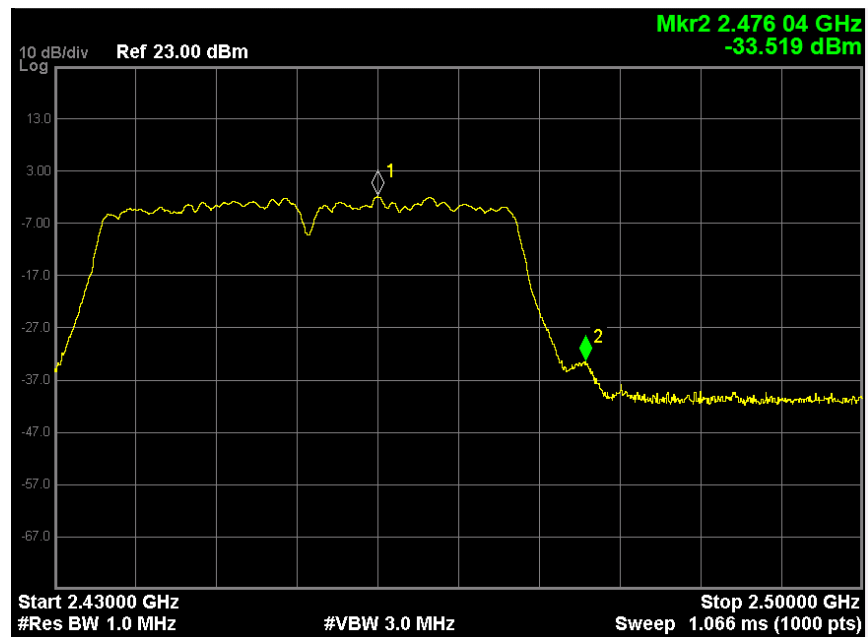
Limits of Band Edge for Carrier Frequencies Operated within the Bands [Section 15.247]:

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 – HT40 High Channel Mode (Worst Case)**



4.4 Maximum Output Power

Test Requirement:	FCC part 15 section 15.247 (b3)
Test Method:	ANSI C63.4:2009
Test Date:	2014-06-10
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 MBP36HDBU, the measurement procedure PK2 was used, the following is the measurement procedure.

1. Set the span $\geq 1.5 \times$ 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	17.33	54.08	1000
	2437	17.77	59.84	1000
	2462	18.42	69.50	1000
802.11g 1Mbps	2412	12.97	19.82	1000
	2437	13.46	22.18	1000
	2462	14.09	25.64	1000
802.11n – HT20	2412	12.36	17.22	1000
	2437	12.85	19.28	1000
	2462	13.42	21.98	1000
802.11n – HT40	2422	10.67	11.67	1000
	2437	11.12	12.94	1000
	2452	11.36	13.68	1000

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

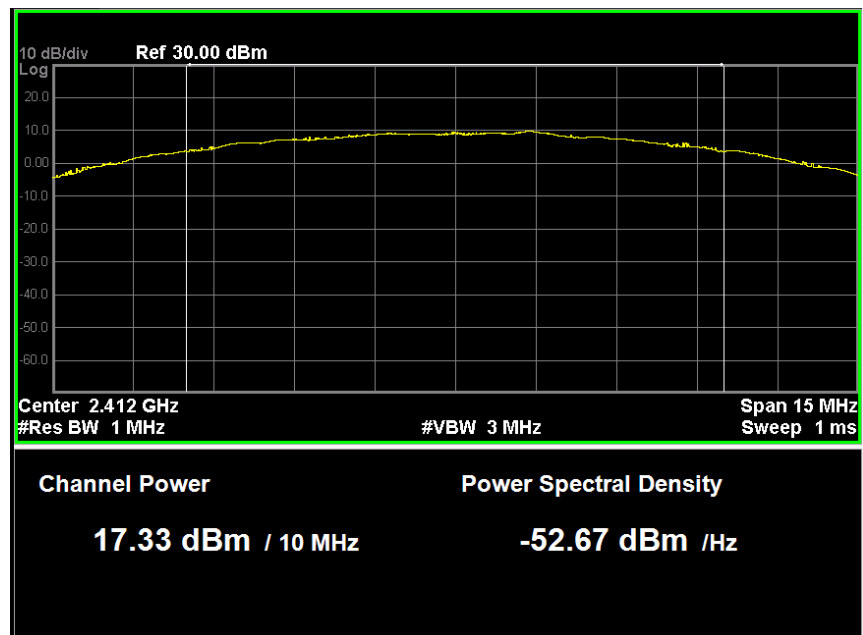
Limits for Maximum Output Power [Section 15.247 (b3)]:

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

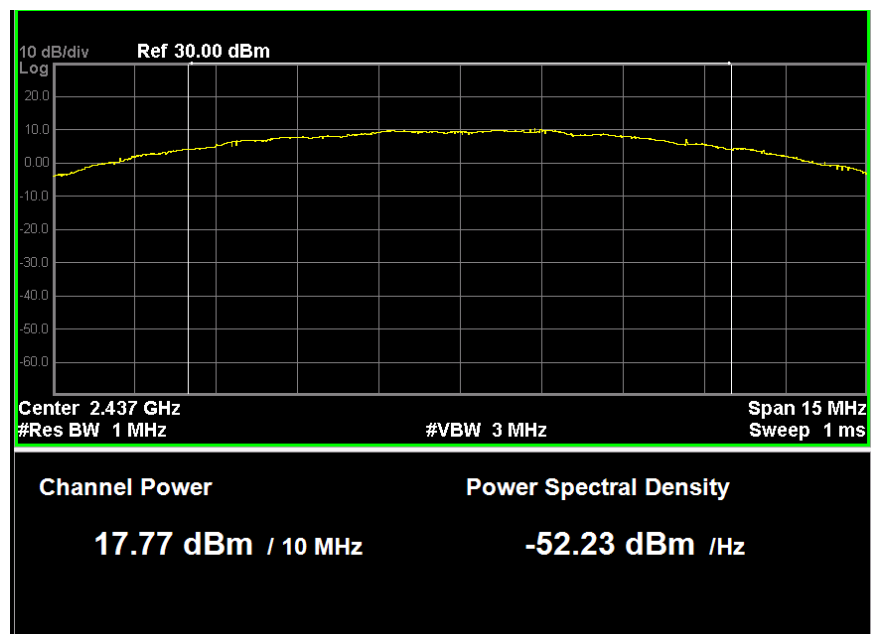


For 802.11b Mode

Result data graph shows Low channel conducted power = 17.33dBm

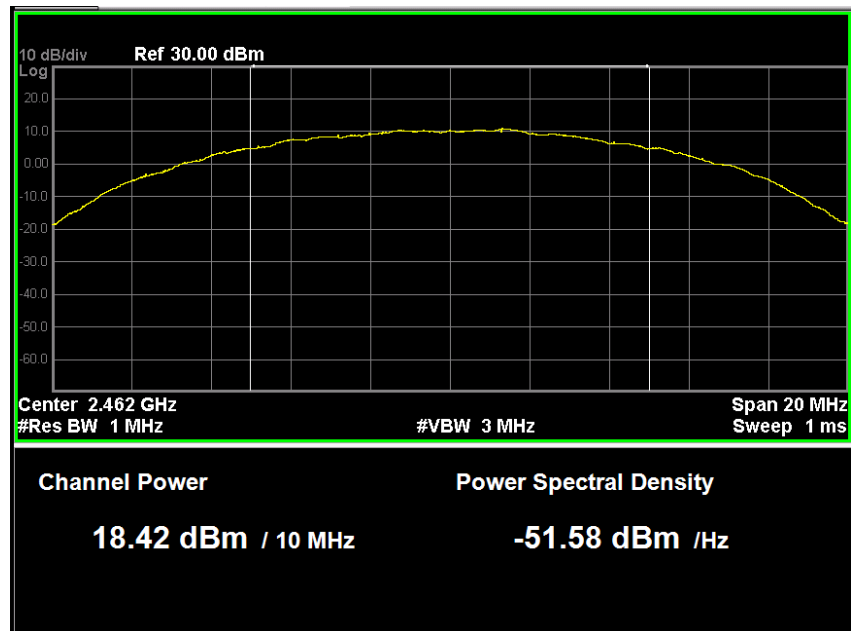


Result data graph shows middle channel conducted power = 17.77dBm





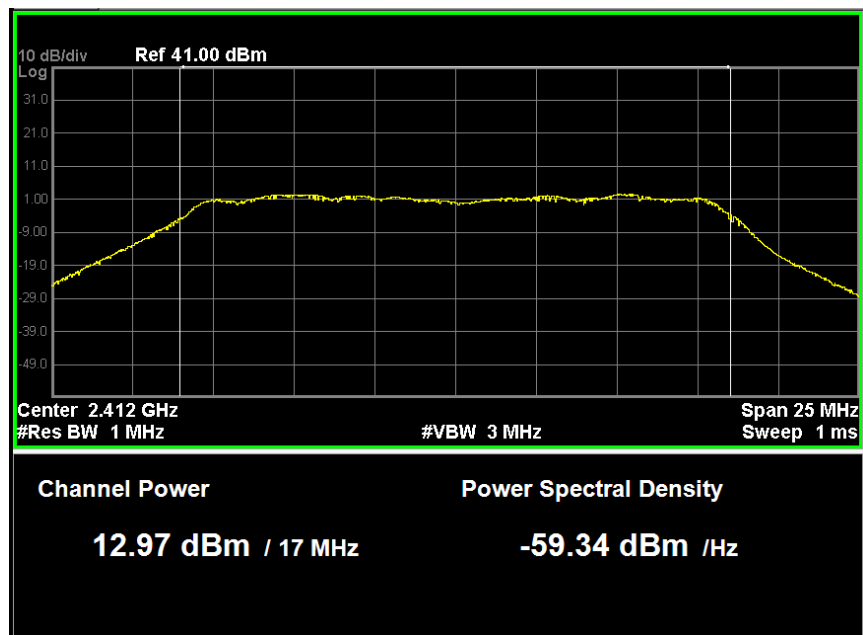
Result data graph shows high channel conducted power = 18.42dBm



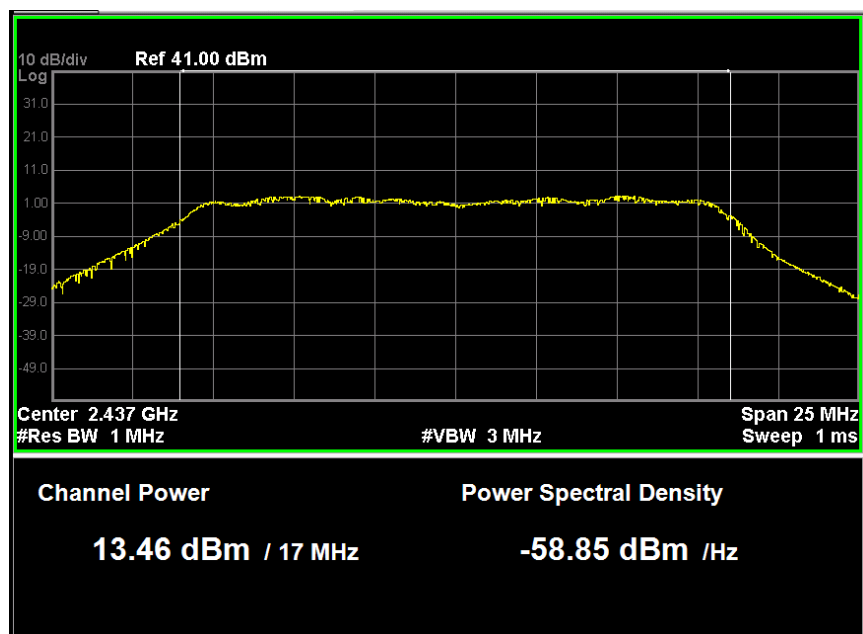


For 802.11g Mode

Result data graph shows Low channel conducted power = 12.97dBm

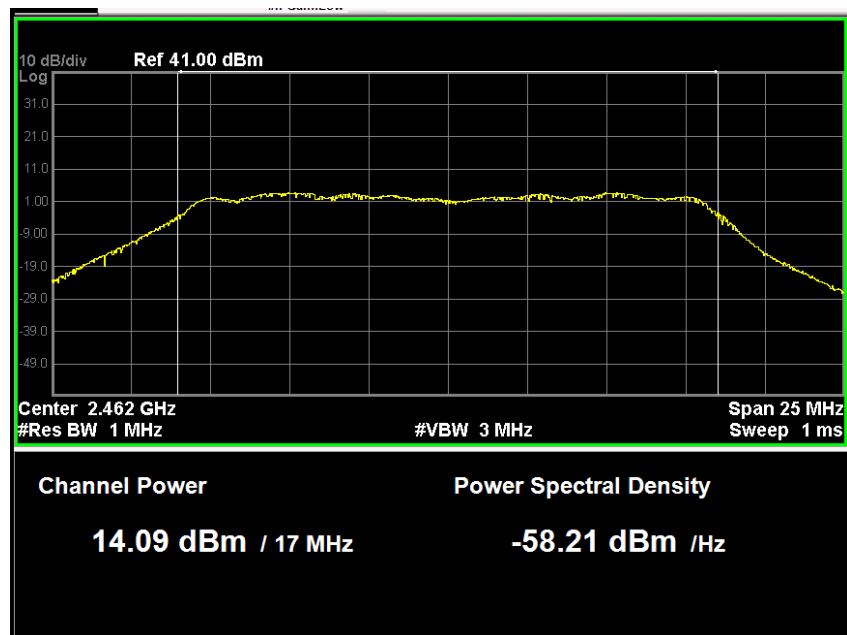


Result data graph shows middle channel conducted power = 13.46dBm



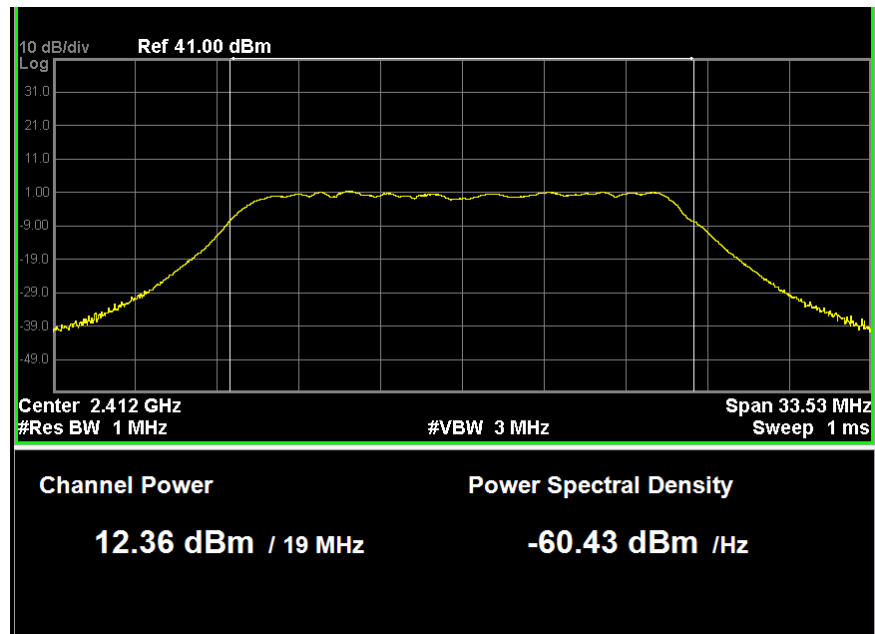


Result data graph shows high channel conducted power = 14.09dBm

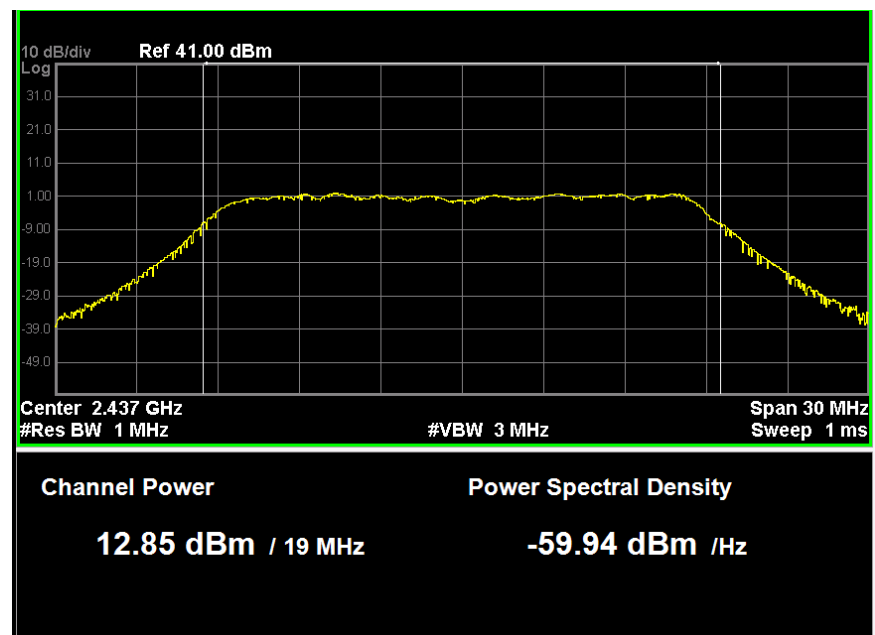


For 802.11n – HT20 Mode

Result data graph shows Low channel conducted power = 12.36dBm

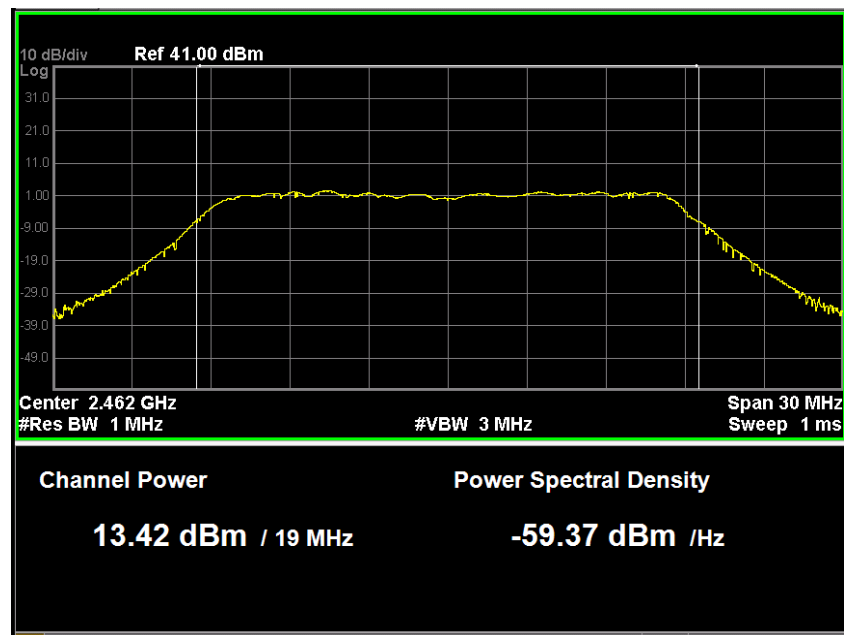


Result data graph shows middle channel conducted power = 12.85dBm



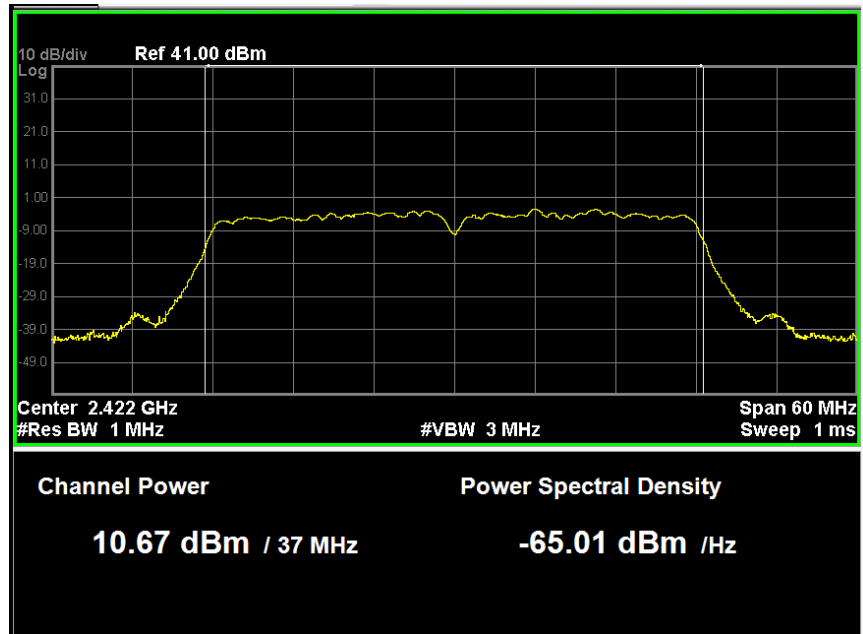


Result data graph shows high channel conducted power = 13.42dBm

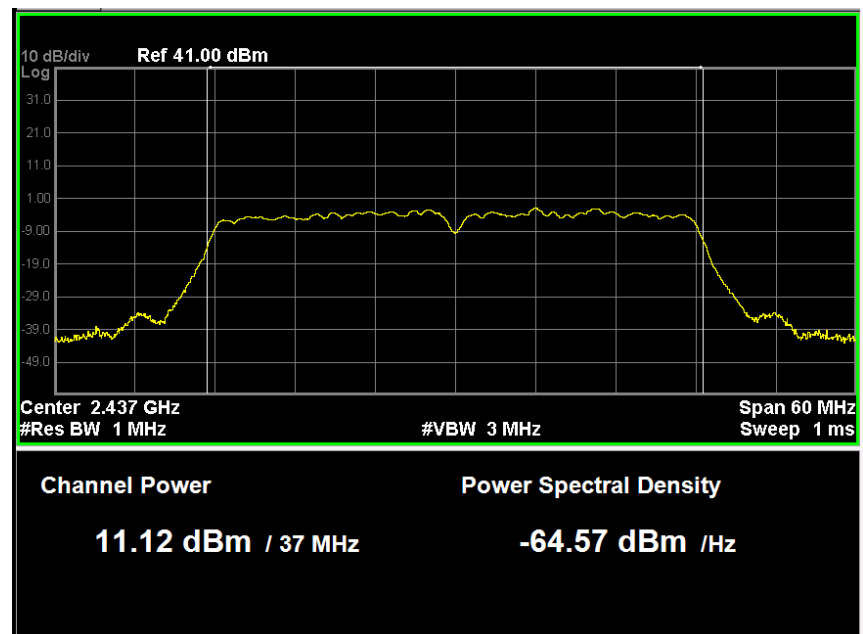


For 802.11n – HT40 Mode

Result data graph shows Low channel conducted power = 10.67dBm

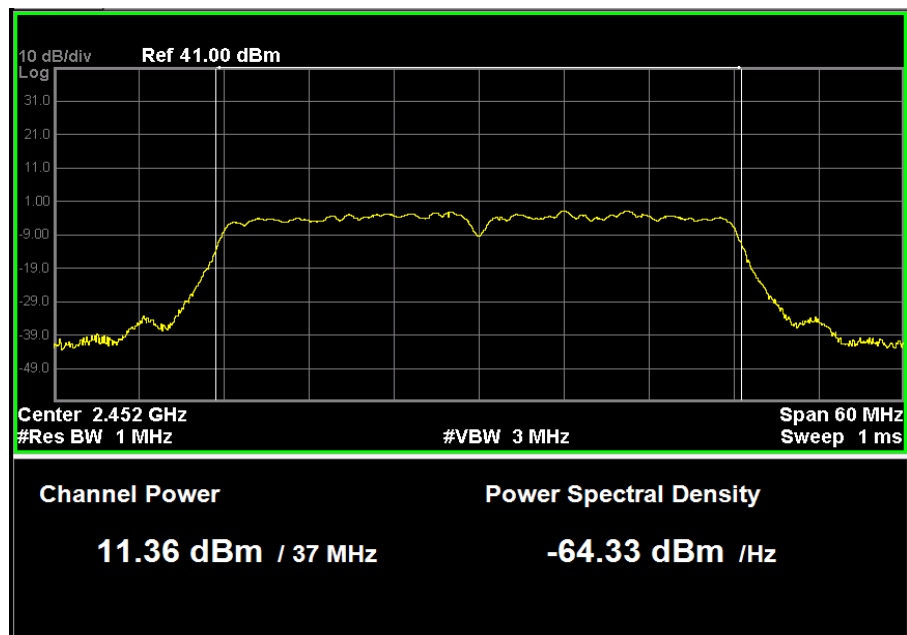


Result data graph shows middle channel conducted power = 11.12dBm





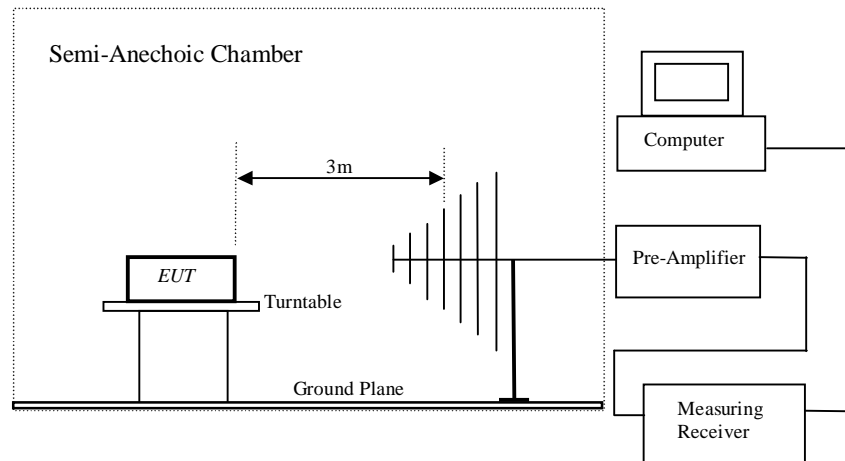
Result data graph shows high channel conducted power = 11.36dBm



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:	2014-06-10
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 [$\mu\text{V/m}$]	Field Strength [dB $\mu\text{V/m}$]
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.



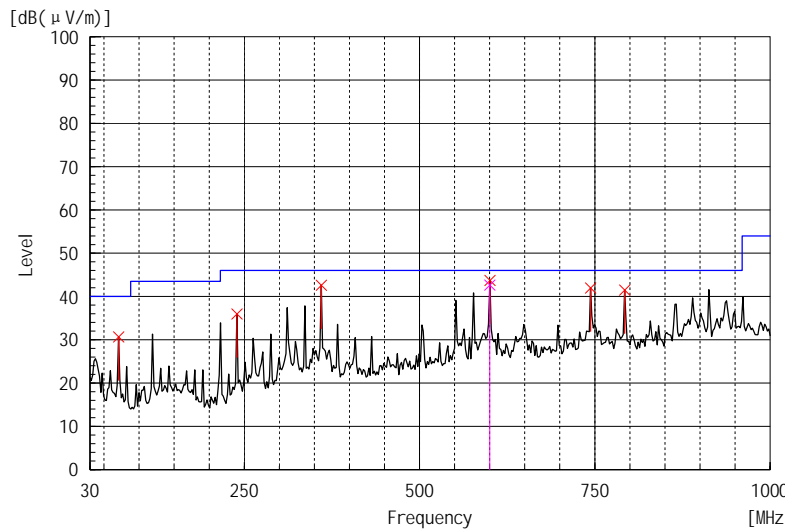
Result : PASS

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

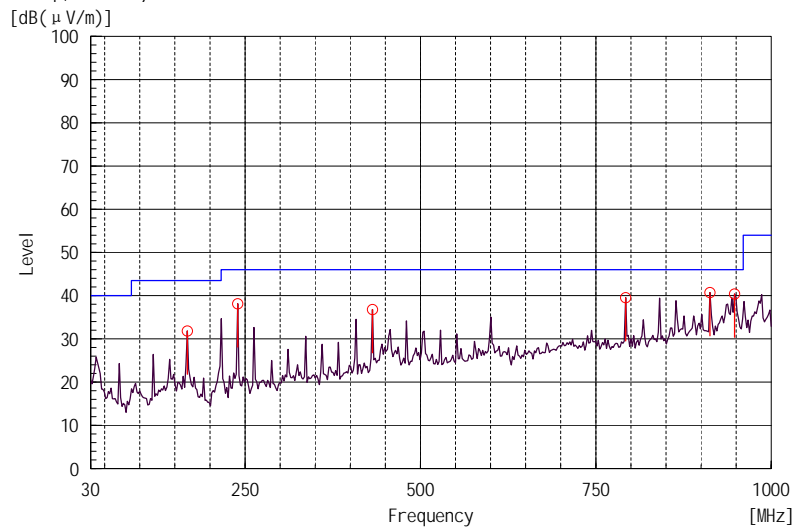
Radiated Emissions							
	Emissions Frequency	E-Field Polarity	Reading	System Factor	Field strength at 3m	Limit	Delta to Limit
	MHz		dBuV/m	dB	dBuV/m	dBuV/m	dBuV/m
Spurious Emissions (Ten Pao)							
QP	70.74	V	20.40	10.30	30.70	40.00	-9.30
QP	239.52	V	22.50	13.50	36.00	46.00	-10.00
QP	359.80	V	25.20	17.40	42.60	46.00	-3.40
QP	600.36	V	20.70	23.00	43.70	46.00	-2.30
QP	743.92	V	16.50	25.50	42.00	46.00	-4.00
QP	792.42	V	15.40	26.10	41.50	46.00	-4.50
QP	167.74	H	16.90	14.90	31.80	43.50	-11.70
QP	239.52	H	24.60	13.50	38.10	46.00	-7.90
QP	431.58	H	17.50	19.30	36.80	46.00	-9.20
QP	792.42	H	13.40	26.10	39.50	46.00	-6.50
QP	912.70	H	13.10	27.60	40.70	46.00	-5.30
QP	947.62	H	11.70	28.70	40.40	46.00	-5.60
Spurious Emissions (CSEC)							
QP	70.74	V	23.80	10.30	34.10	40.00	-5.90
QP	119.24	V	18.00	12.50	30.50	43.50	-13.00
QP	311.30	V	24.50	16.40	40.90	46.00	-5.10
QP	600.36	V	18.60	23.00	41.60	46.00	-4.40
QP	792.42	V	17.50	26.10	43.60	46.00	-2.40
QP	912.70	V	14.40	27.60	42.00	46.00	-4.00
QP	119.24	H	23.90	12.50	36.40	43.50	-7.10
QP	239.52	H	22.30	13.50	35.80	46.00	-10.20
QP	431.58	H	18.20	19.30	37.50	46.00	-8.50
QP	792.42	H	14.80	26.10	40.90	46.00	-5.10
QP	912.70	H	13.80	27.60	41.40	46.00	-4.60
QP	986.42	H	17.90	28.20	46.10	54.00	-7.90

Refer to Figures shows the worst case channel's emission data graph from 30MHz-26GHz.

Calculated measurement uncertainty: $\pm 3.8\text{dB}$

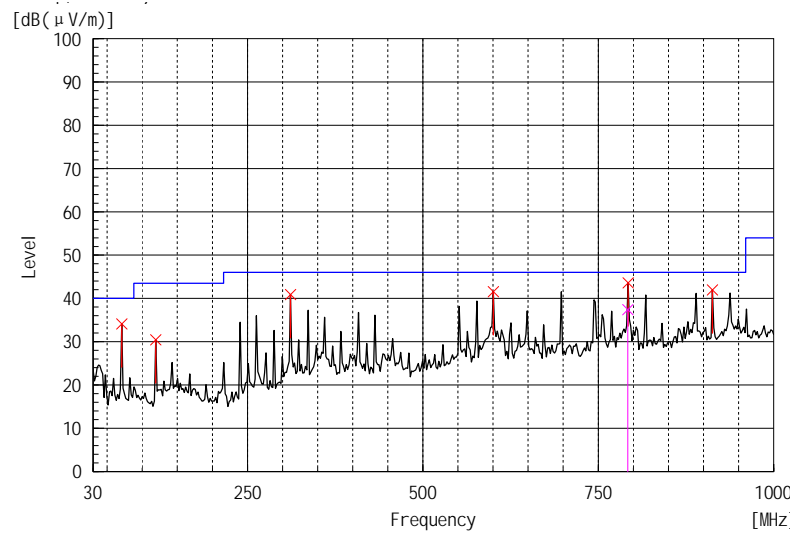
Radiated emission data graph (Vertical polarization, 30MHz-1GHz) (Ten Pao)

Remark: Only background noise was measured from 1GHz-26GHz excluding the operation frequency relational.

Radiated emission data graph (Horizontal polarization, 30MHz-1GHz) (Ten Pao)

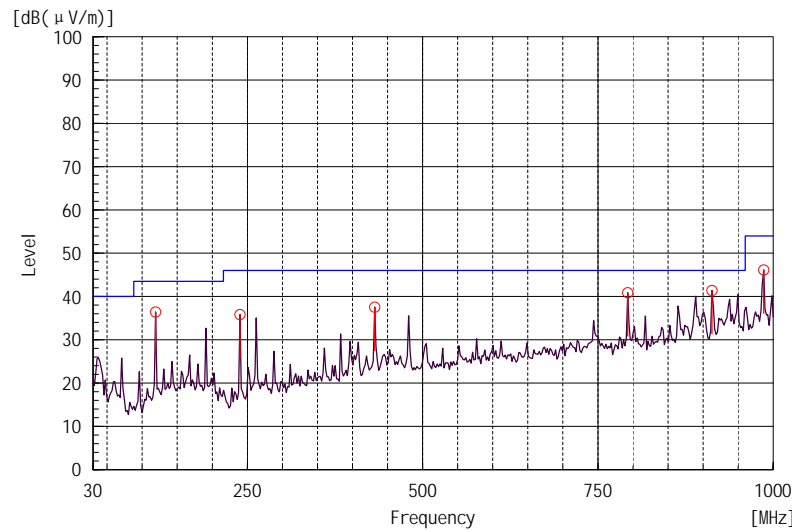
Remark: Only background noise was measured from 1GHz-26GHz excluding the operation frequency relational.

Radiated emission data graph (Vertical polarization, 30MHz-1GHz) (CSEC)



Remark: Only background noise was measured from 1GHz-26GHz excluding the operation frequency relational.

Radiated emission data graph (Horizontal polarization, 30MHz-1GHz) (CSEC)

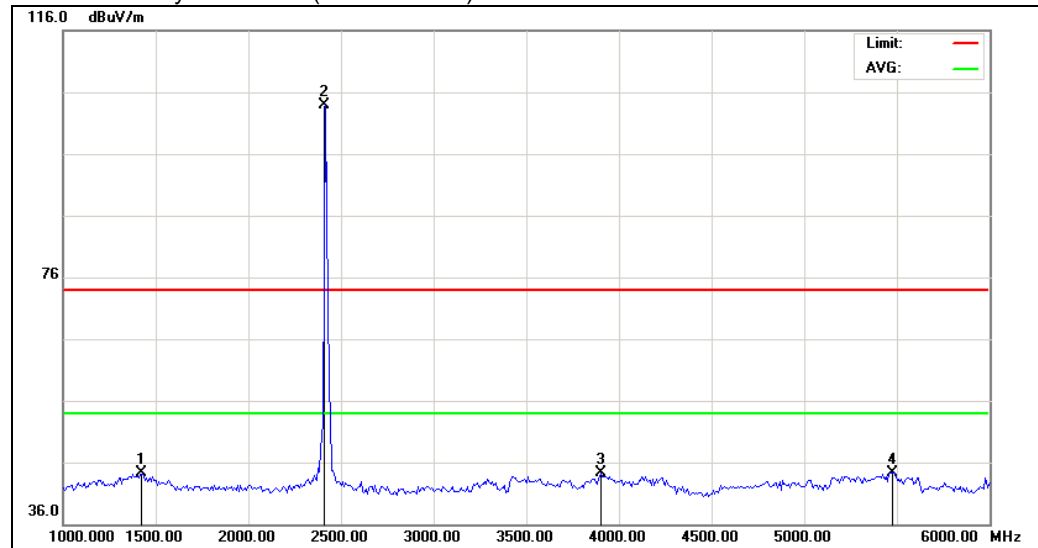


Remark: Only background noise was measured from 1GHz-26GHz excluding the operation frequency relational.

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)



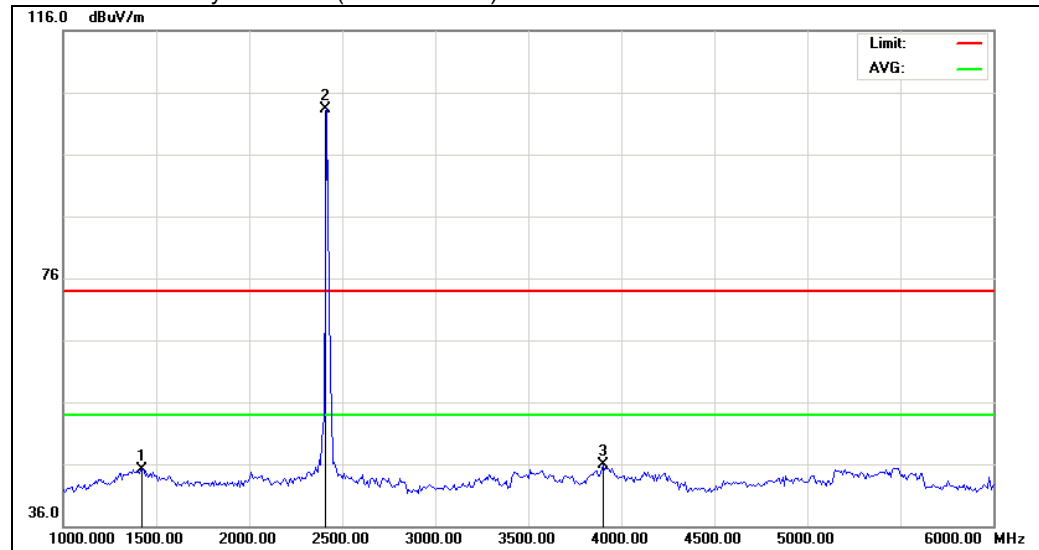
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1425.000	59.61	-15.41	44.20	74.00	-29.80	peak
3	3900.000	49.75	-5.43	44.32	74.00	-29.68	peak

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 (Low Channel)



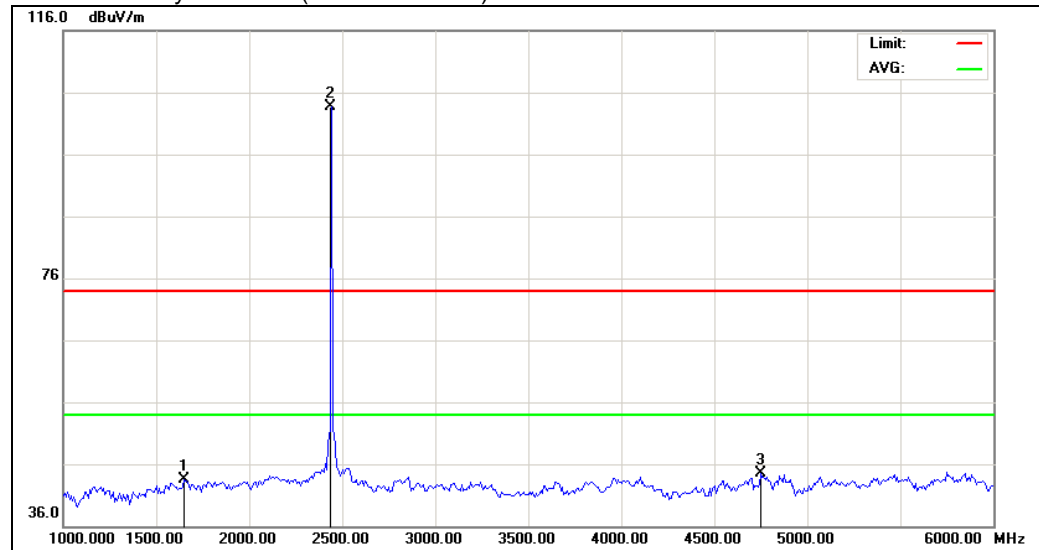
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1425.000	60.61	-15.41	45.20	74.00	-28.80	peak
3	3900.000	51.25	-5.43	45.82	74.00	-28.18	peak

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 (Middle Channel)



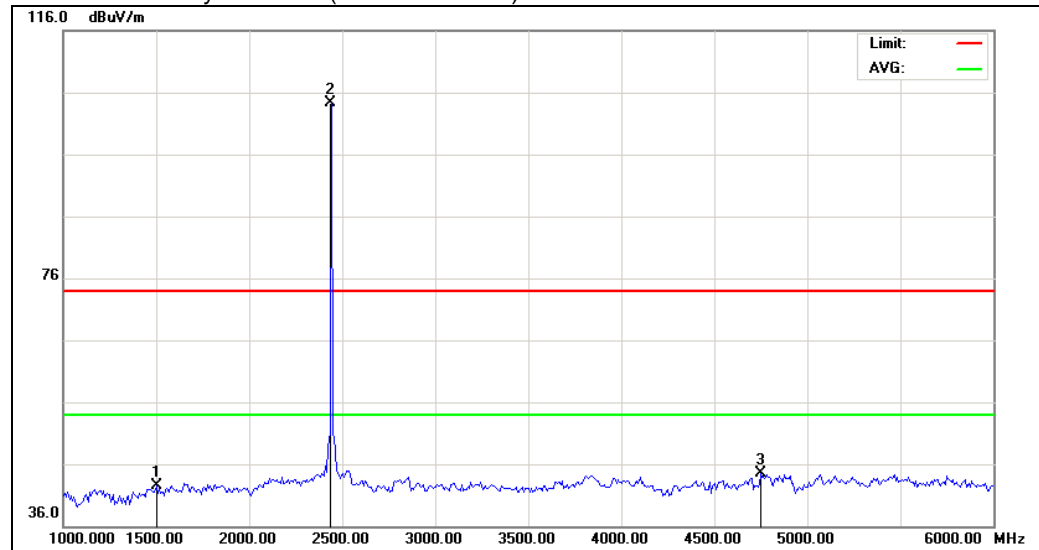
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1650.000	58.92	-13.80	43.43	74.00	-30.57	peak
3	4750.000	46.87	-2.45	44.42	74.00	-29.58	peak

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
Horizontal Polarity -802.11b (Middle Channel)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1500.000	57.81	-15.38	42.43	74.00	-31.57	peak
3	4750.000	46.87	-2.45	44.42	74.00	-29.58	peak

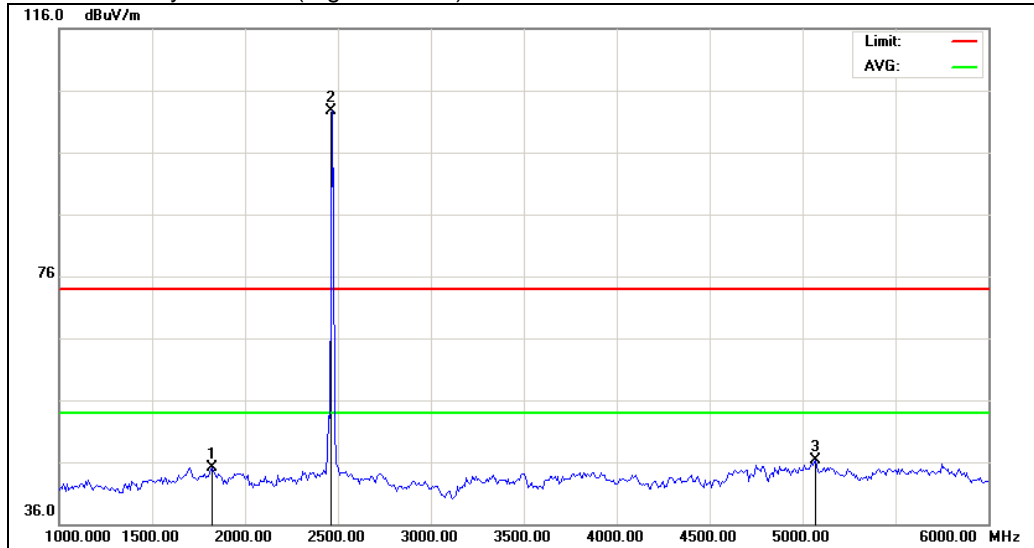
Remark: Only background noise was measured from 16GHz-26GHz.

Result : PASS

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

Above 1GHz Emission test data

Vertical Polarity -802.11b (High Channel)



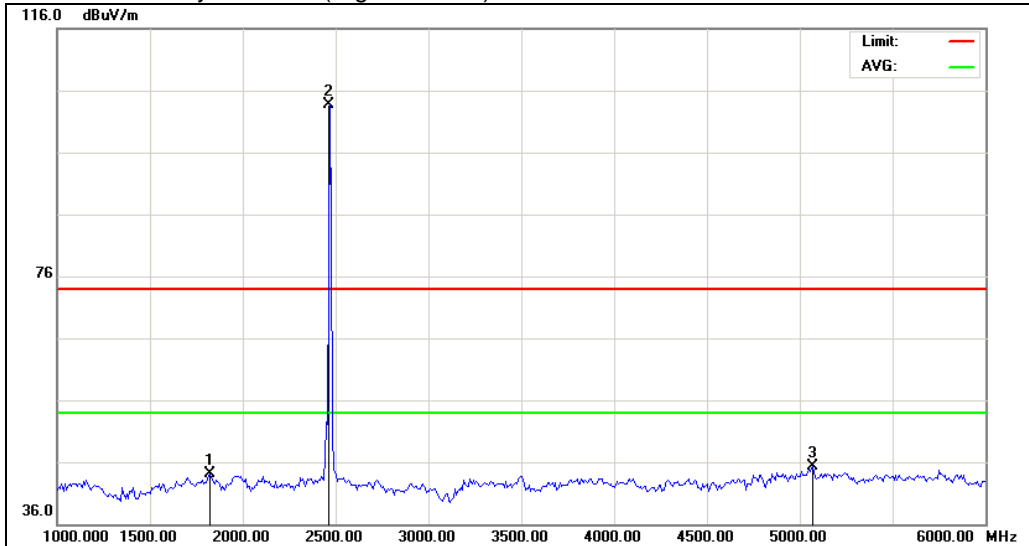
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1825.000	57.06	-11.96	45.10	74.00	-28.90	peak
3	4550.000	46.69	-2.98	43.71	74.00	-30.29	peak

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 (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1825.000	55.56	-11.96	44.10	74.00	-29.90	peak
3	5066.667	47.12	.180	45.32	74.00	-28.68	peak

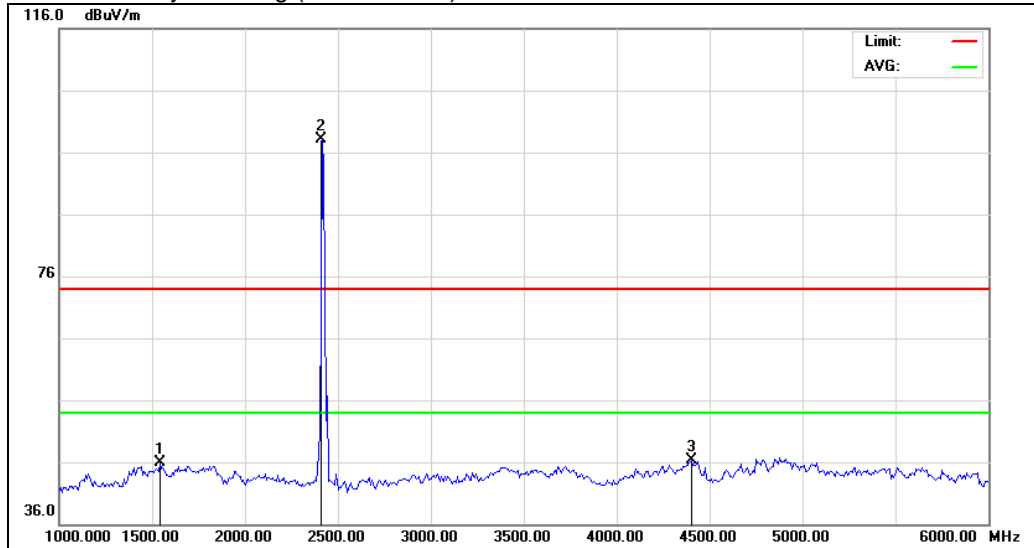
Remark: Only background noise was measured from 16GHz-26GHz.

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 (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1541.667	60.77	-14.94	45.83	74.00	-28.17	peak
3	4400.000	49.81	-3.45	46.36	74.00	-27.64	peak

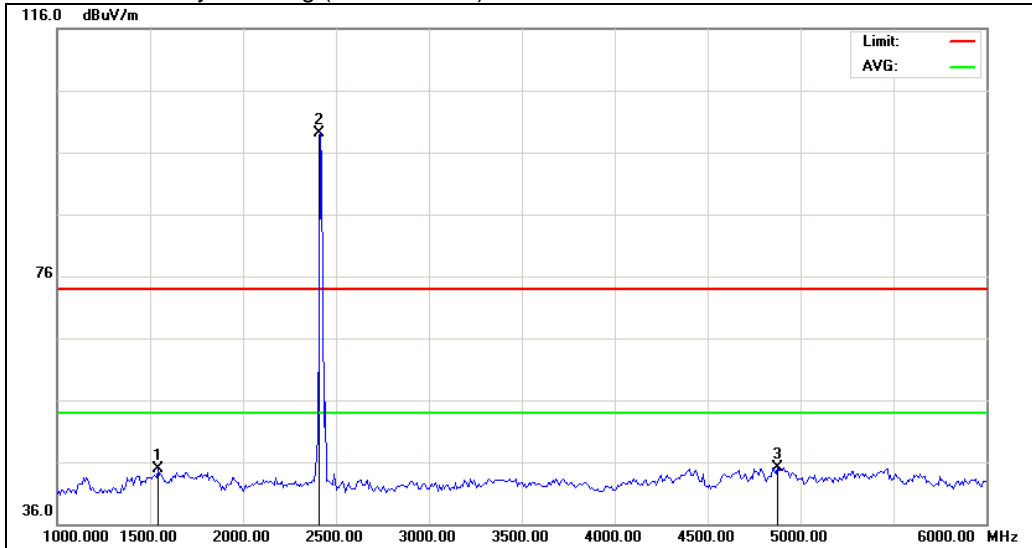
Remark: Only background noise was measured from 16GHz-26GHz.

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 (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1541.667	59.77	-14.94	44.83	74.00	-29.17	Peak
3	4875.000	47.33	-2.13	45.20	74.00	-28.80	Peak

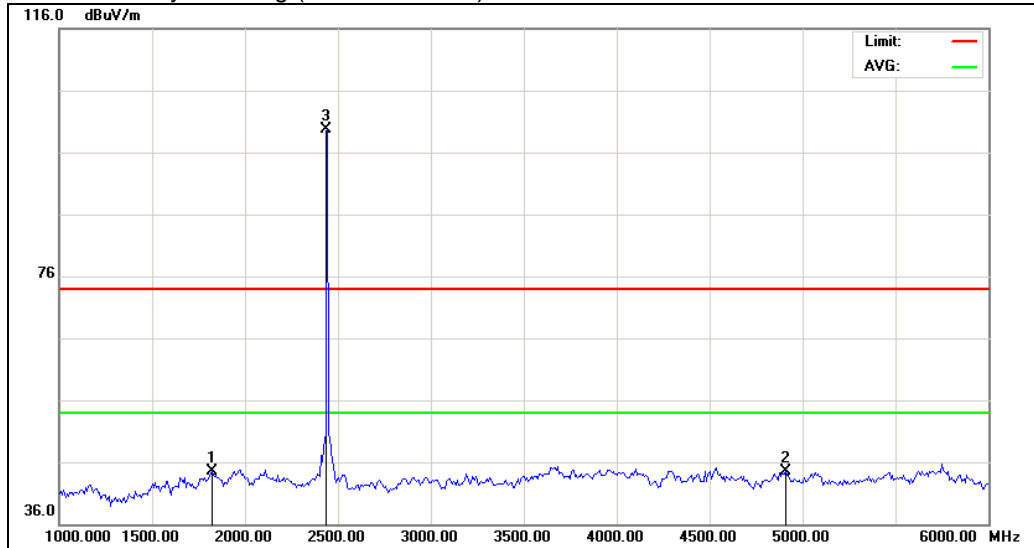
Remark: Only background noise was measured from 16GHz-26GHz.

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)



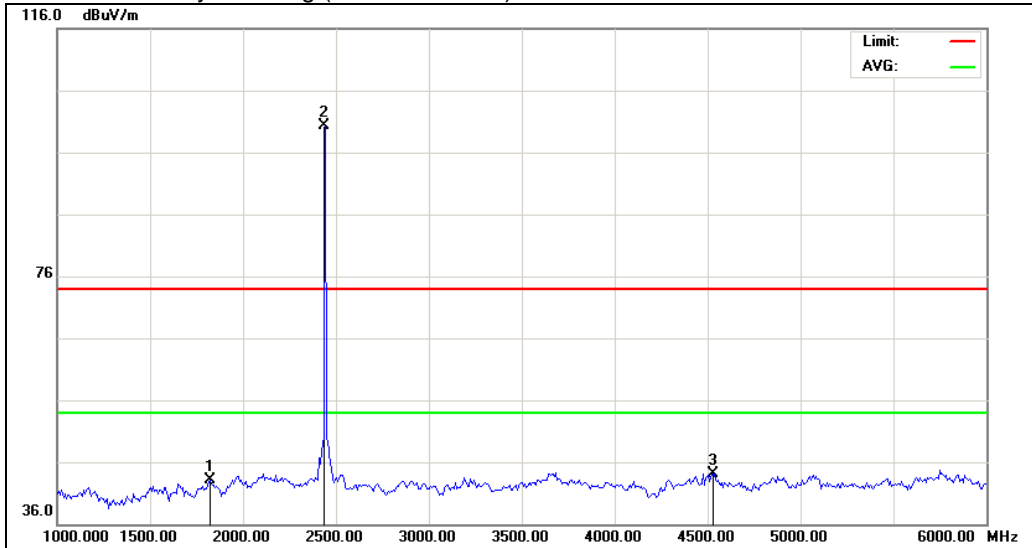
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1825.000	56.56	-11.96	44.60	74.00	-29.40	peak
3	4908.333	46.58	-2.04	44.54	74.00	-29.46	peak

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)



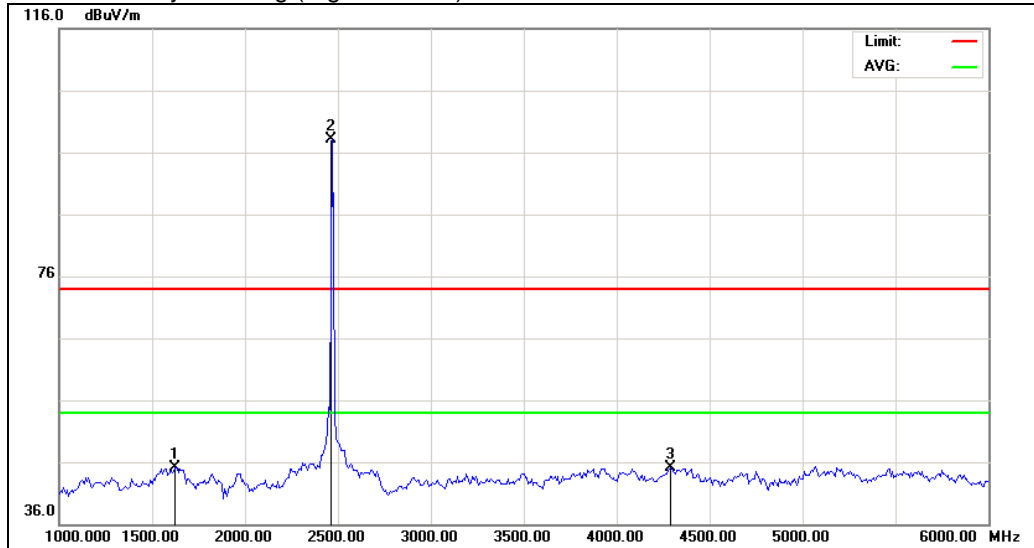
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1825.000	55.06	-11.96	43.10	74.00	-30.90	peak
3	4533.333	47.15	-3.02	44.13	74.00	-29.87	peak

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)



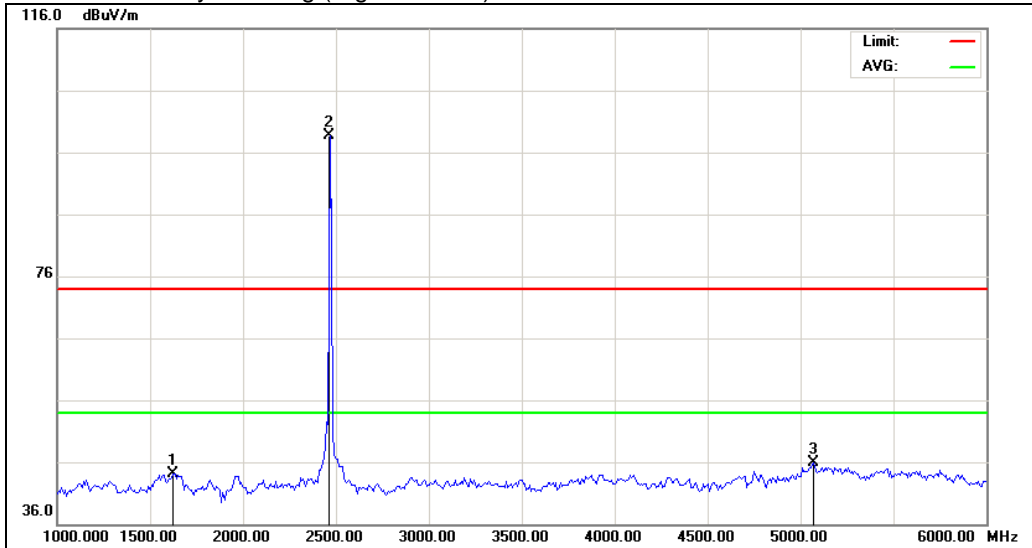
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1625.000	59.24	-14.06	45.18	74.00	-28.82	peak
3	4291.667	48.91	-3.82	45.09	74.00	-28.91	peak

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 (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1625.000	58.24	-14.06	44.18	74.00	-29.82	peak
3	5066.667	47.62	-1.80	45.82	74.00	-28.18	peak

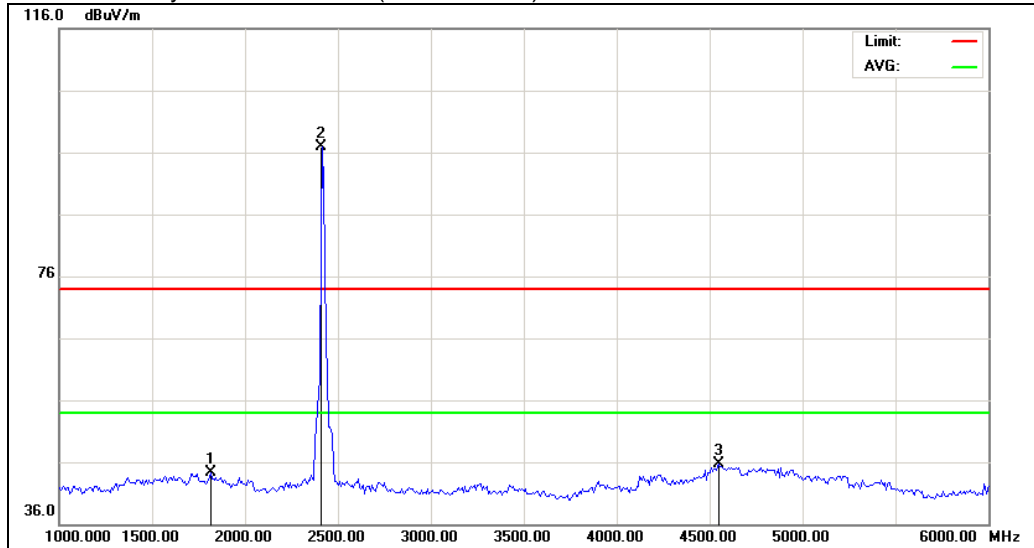
Remark: Only background noise was measured from 16GHz-26GHz.

Result : PASS

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

Above 1GHz Emission test data

Vertical Polarity -802.11n – HT20(Low Channel)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1816.667	56.26	-12.05	44.21	74.00	-29.79	peak
3	4550.000	48.69	-2.98	45.71	74.00	-28.29	peak

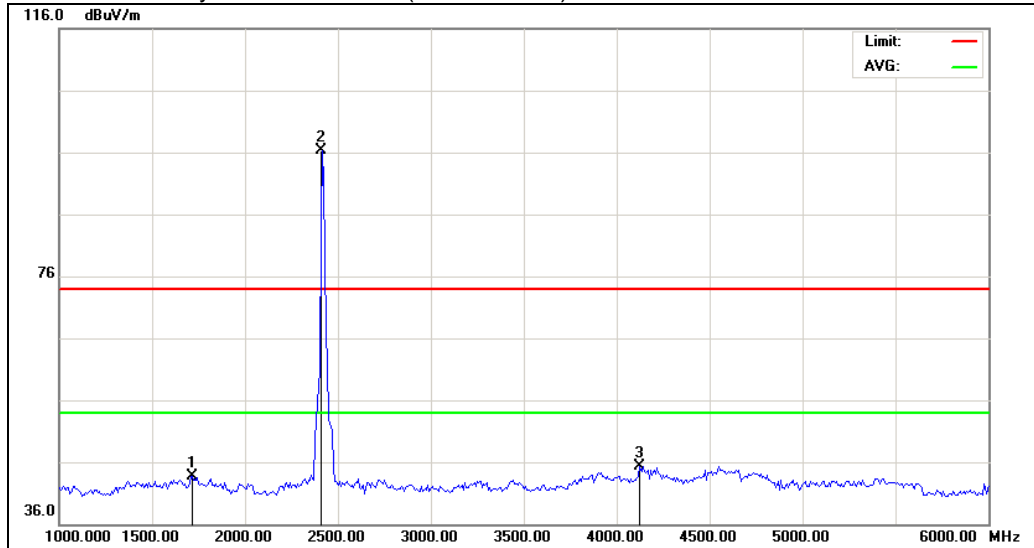
Remark: Only background noise was measured from 16GHz-26GHz.

Result : PASS

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

Above 1GHz Emission test data

Horizontal Polarity -802.11n – HT20(Low Channel)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1716.667	56.78	-13.10	43.68	74.00	-30.32	peak
3	4125.000	49.67	-4.38	45.29	74.00	-28.71	peak

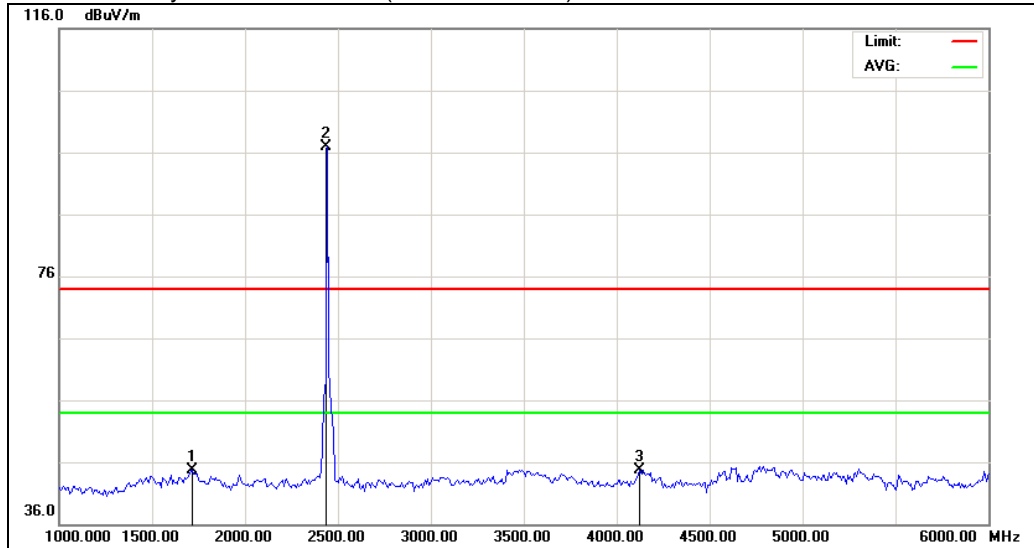
Remark: Only background noise was measured from 16GHz-26GHz.

Result : PASS

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

Above 1GHz Emission test data

Vertical Polarity -802.11n – HT20 (Middle Channel)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1716.667	57.78	-13.10	44.68	74.00	-29.32	peak
3	4125.000	49.17	-4.38	44.79	74.00	-29.21	peak

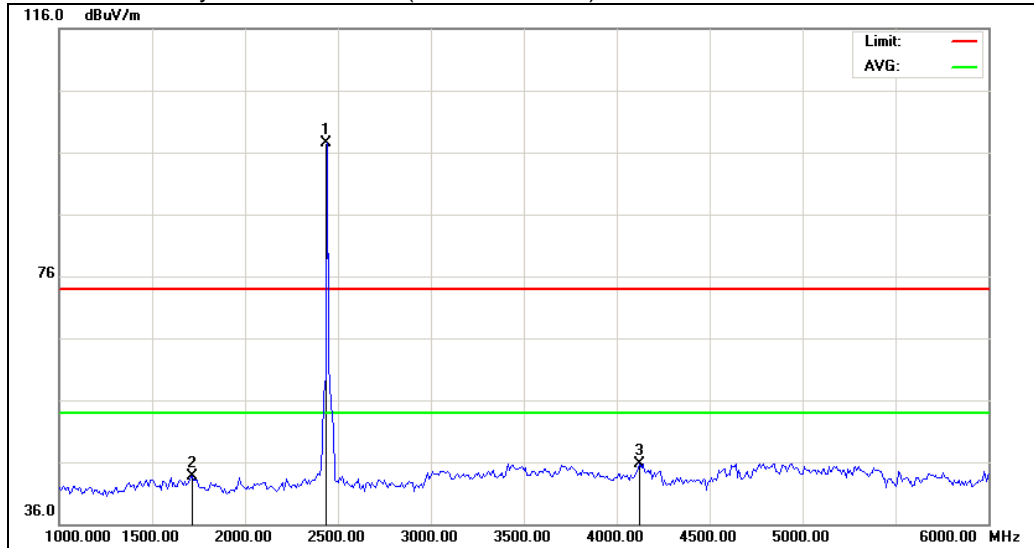
Remark: Only background noise was measured from 16GHz-26GHz.

Result : PASS

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

Above 1GHz Emission test data

Horizontal Polarity -802.11n – HT20(Middle Channel)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1716.667	56.78	-13.10	43.68	74.00	-30.32	peak
3	4125.000	50.17	-4.38	45.79	74.00	-28.21	peak

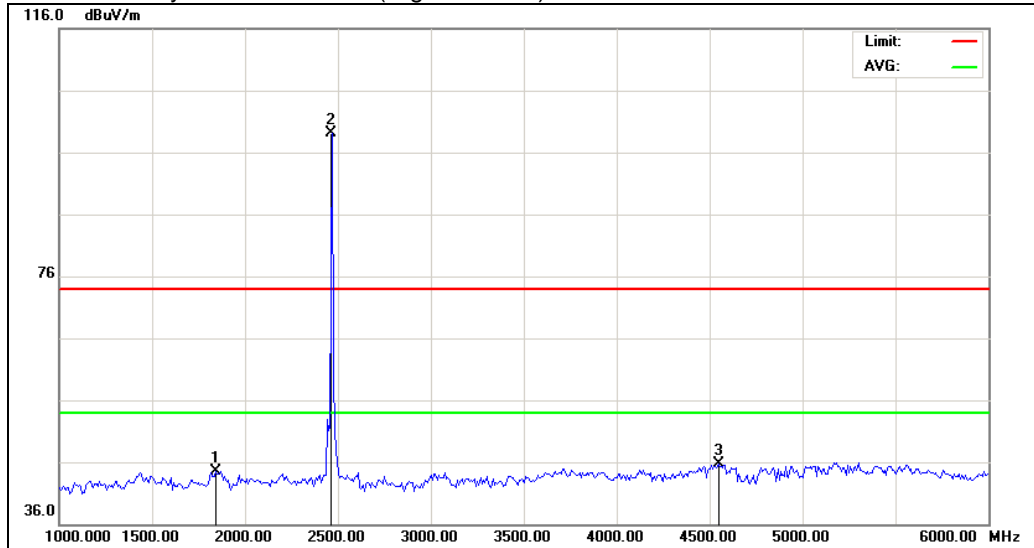
Remark: Only background noise was measured from 16GHz-26GHz.

Result : PASS

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

Above 1GHz Emission test data

Vertical Polarity -802.11n - HT20(High Channel)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1841.667	56.35	-11.79	44.56	74.00	-29.44	peak
3	4550.000	48.69	-2.98	45.71	74.00	-28.29	peak

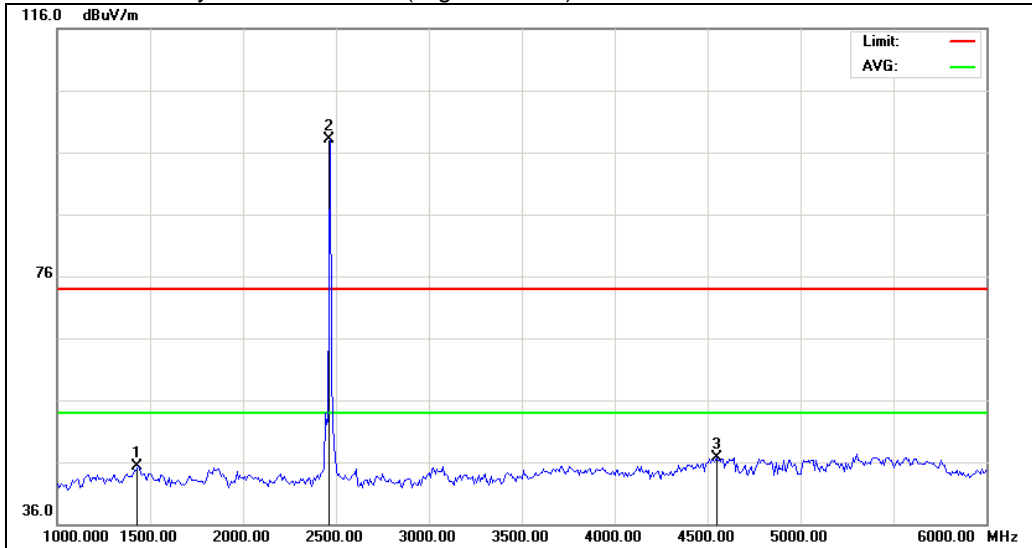
Remark: Only background noise was measured from 16GHz-26GHz.

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 (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1433.333	60.71	-15.41	45.30	74.00	-28.70	peak
3	4550.000	49.69	-2.98	46.71	74.00	-27.29	peak

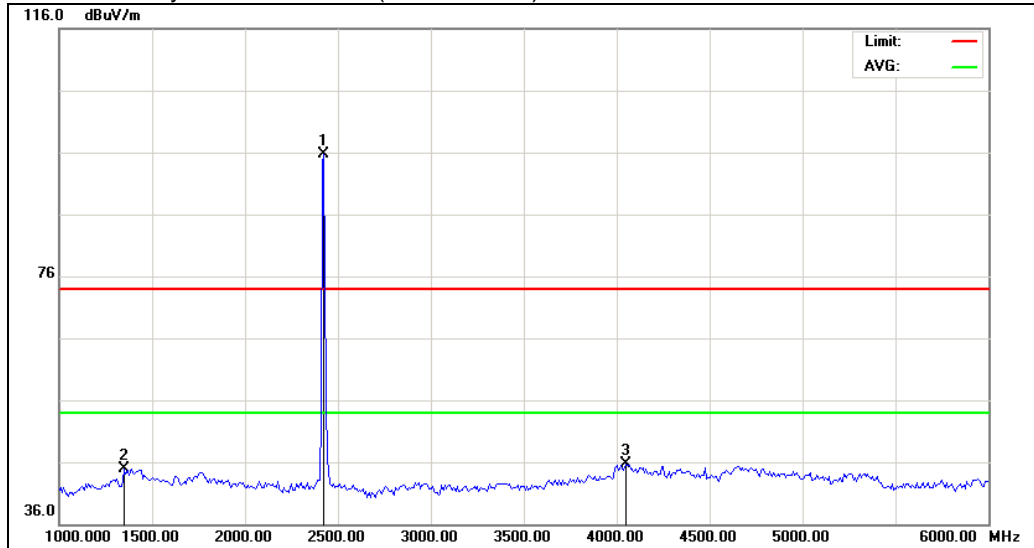
Remark: Only background noise was measured from 16GHz-26GHz.

Result : PASS

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

Above 1GHz Emission test data

Vertical Polarity -802.11n – HT40(Low Channel)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1350.000	60.30	-15.44	44.86	74.00	-29.14	peak
3	4050.000	50.25	-4.64	45.61	74.00	-28.39	peak

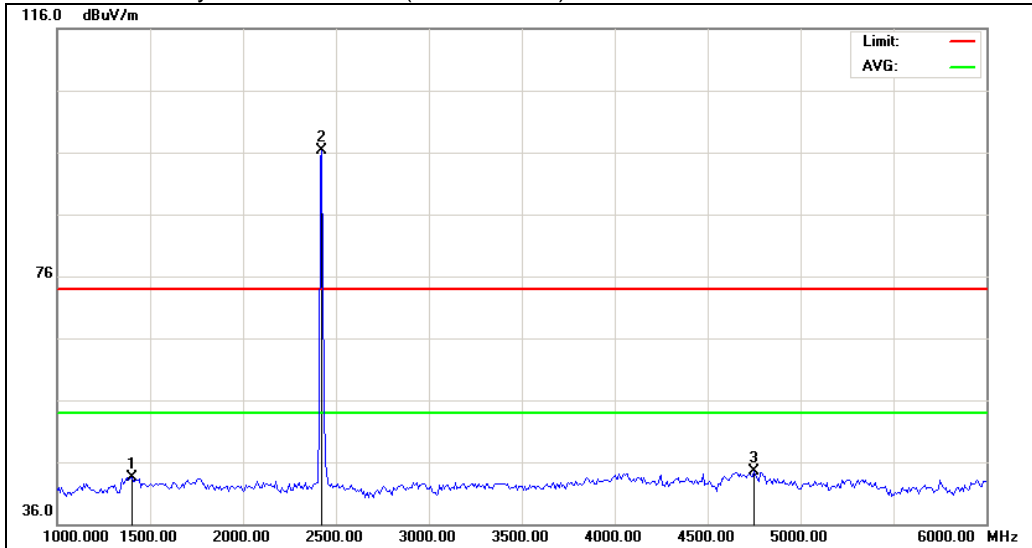
Remark: Only background noise was measured from 16GHz-26GHz.

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 (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1400.000	58.92	-15.42	43.50	74.00	-30.50	peak
3	4750.000	46.87	-2.45	44.42	74.00	-29.58	peak

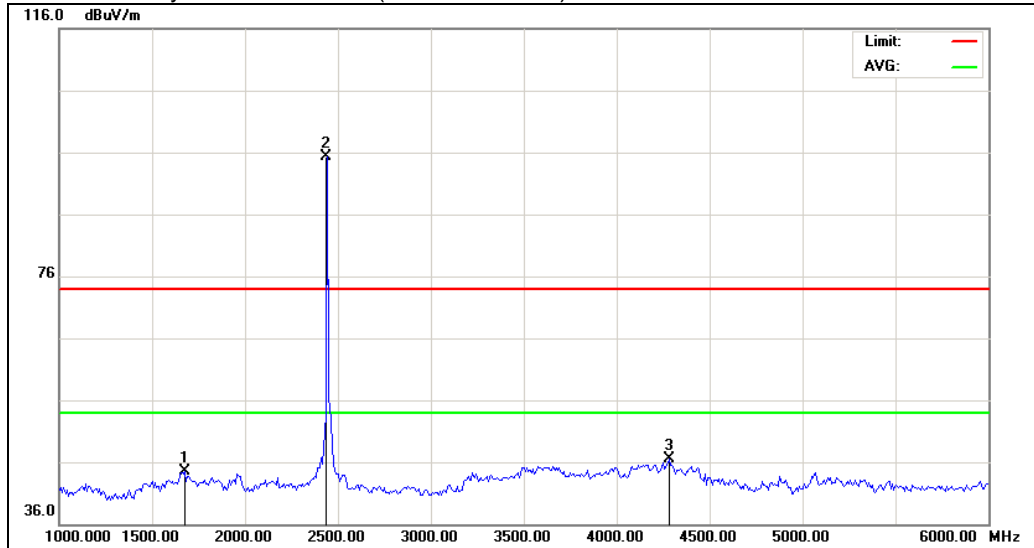
Remark: Only background noise was measured from 16GHz-26GHz.

Result : PASS

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

Above 1GHz Emission test data

Vertical Polarity -802.11n – HT40(Middle Channel)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1675.000	57.96	-13.54	44.42	74.00	-29.58	peak
3	4283.333	50.31	-3.85	46.46	74.00	-27.54	peak

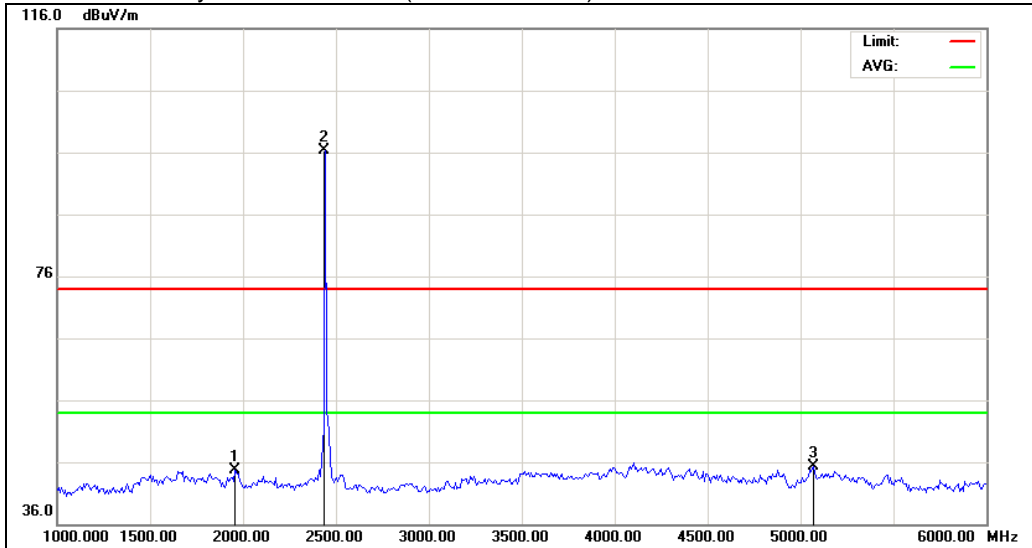
Remark: Only background noise was measured from 16GHz-26GHz.

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 (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1958.333	55.18	-10.56	44.62	74.00	-29.38	peak
3	5066.667	47.12	-1.80	45.32	74.00	-28.68	peak

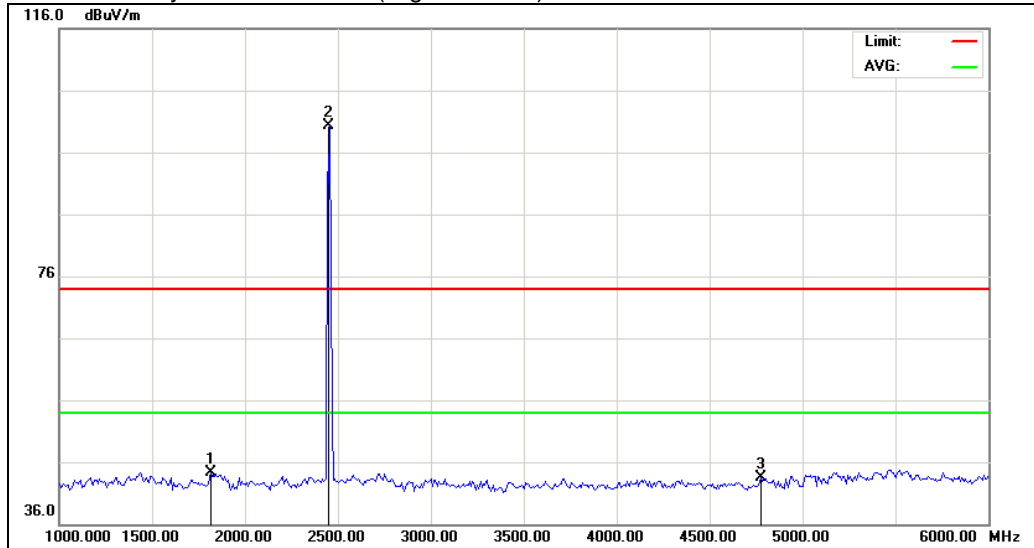
Remark: Only background noise was measured from 16GHz-26GHz.

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)



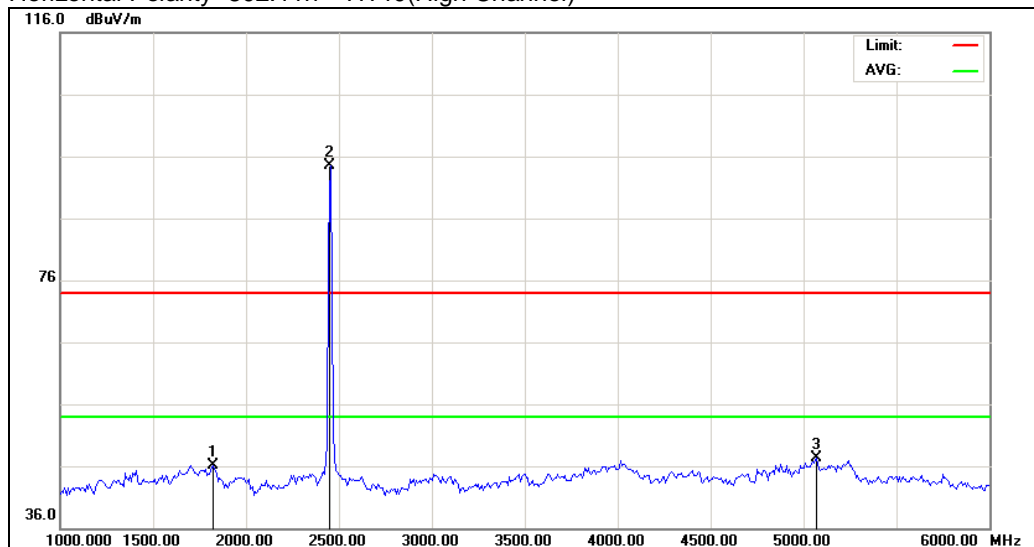
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1816.667	56.26	-12.05	44.21	74.00	-29.79	peak
3	4775.000	45.94	-2.39	43.55	74.00	-30.45	peak

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 (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1825.000	58.06	-11.96	46.10	74.00	-27.90	peak
3	5066.667	49.12	-1.80	47.32	74.00	-26.68	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:

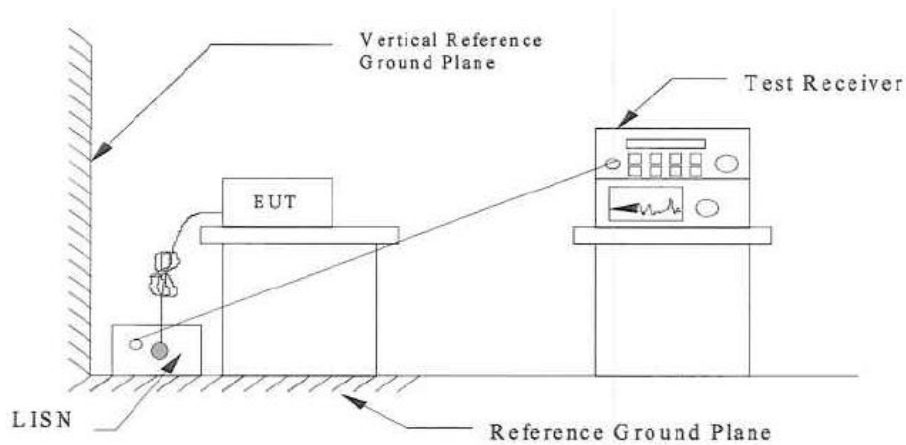
1. " * " Radiated emissions which fall in the restricted bands as defined in Section 15.205(a).
2. Emission level with more than 20dB below the FCC required limit is not mentioned in table.
3. Delta to Limit = Field strength (dBμV/m) – Limit (dBμV/m).
4. Calculated measurement uncertainty: 9kHz -30MHz: 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:	2014-06-10
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]:

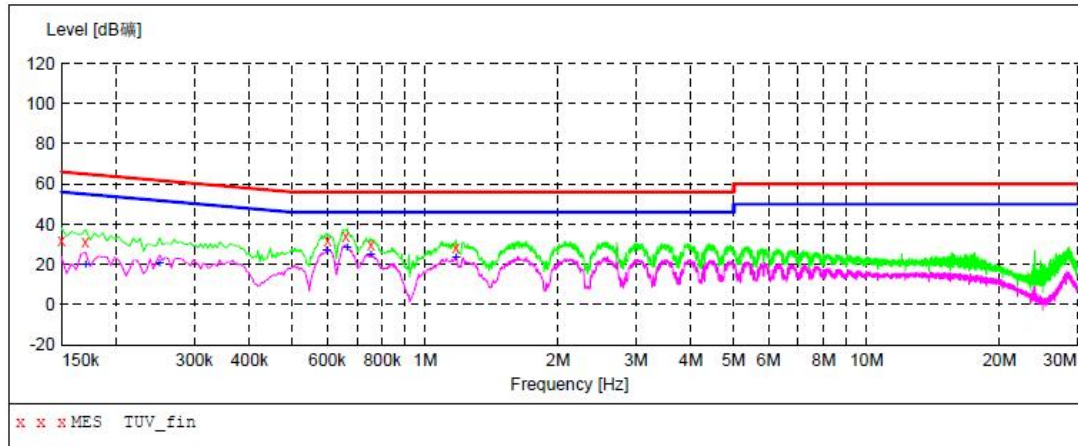
Frequency Range [MHz]	Quasi-Peak Limit [dB μ V]	Average Limit [dB μ V]
0.15-0.5	66 to 56*	56 to 46*
0.5-5.0	56	46
5.0-30.0	60	50

* Decreases with the logarithm of the frequency.

Remarks:

Calculated measurement uncertainty: ± 1.54 dB

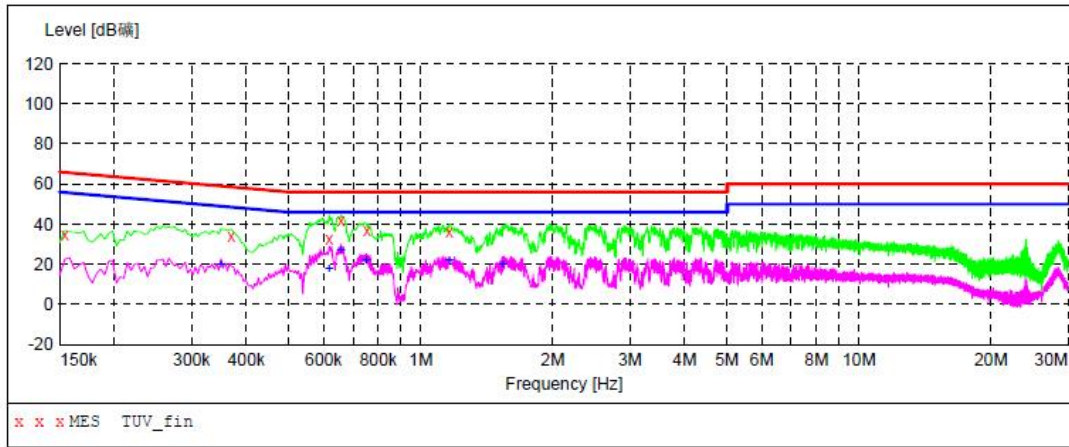
Result data graph shows the conducted emission (Live) (Ten Pao).



Refer to the following table for the result details:

Conducted Emission					
Frequency (MHz)	Detector (QP/AV)	Phase	Result (dBμV)	Limit (dBμV)	Margin
0.150	QP	L	32.20	66.00	-33.80
0.170	QP	L	31.40	65.00	-33.60
0.602	QP	L	32.20	56.00	-23.80
0.662	QP	L	34.30	56.00	-21.70
0.754	QP	L	30.00	56.00	-26.00
1.174	QP	L	28.50	56.00	-27.50

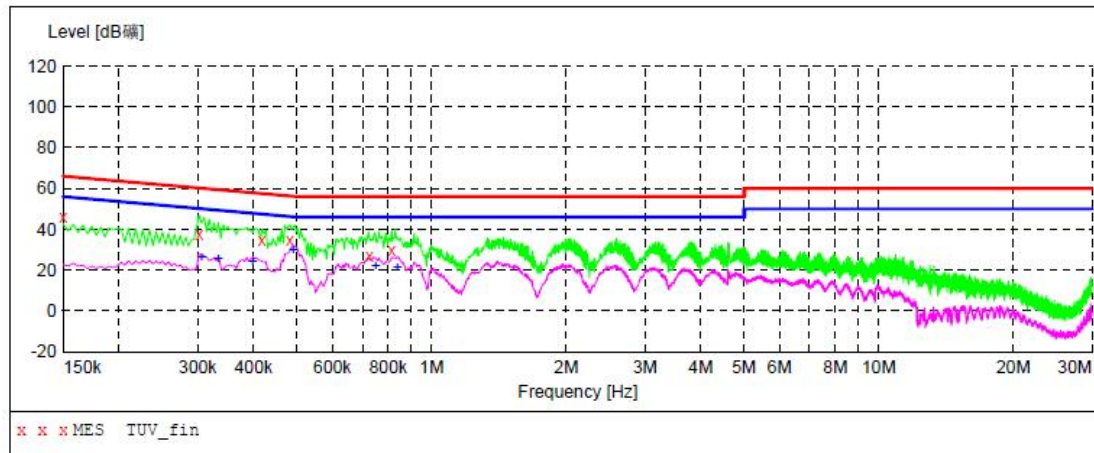
Result data graph shows the conducted emission (Neutral) (Ten Pao).



Refer to the following table for the result details:

Conducted Emission					
Frequency (MHz)	Detector (QP/AV)	Phase	Result (dBμV)	Limit (dBμV)	Margin
0.154	QP	N	34.50	66.00	-31.50
0.370	QP	N	34.00	69.00	-35.00
0.618	QP	N	32.90	56.00	-23.10
0.658	QP	N	41.80	56.00	-14.20
0.754	QP	N	36.70	56.00	-19.30
1.162	QP	N	36.00	56.00	-20.00

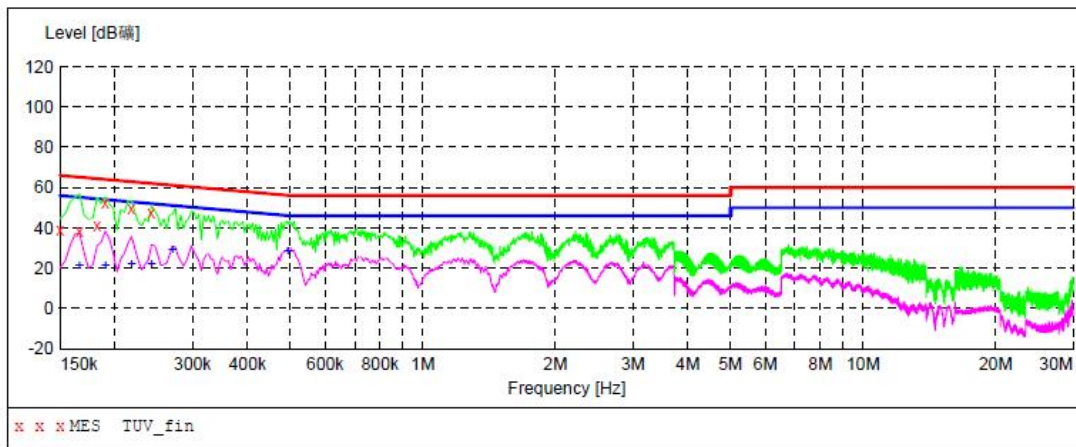
Result data graph shows the conducted emission (Live) (CSEC).



Refer to the following table for the result details:

Conducted Emission					
Frequency (MHz)	Detector (QP/AV)	Phase	Result (dBμV)	Limit (dBμV)	Margin
0.150	QP	L	46.30	66.00	-19.70
0.302	QP	L	37.50	60.00	-22.50
0.418	QP	L	34.70	58.00	-23.30
0.482	QP	L	34.60	56.00	-21.40
0.726	QP	L	27.00	56.00	-29.00
0.814	QP	L	30.10	56.00	-25.90

Result data graph shows the conducted emission (Neutral) (CSEC).



Refer to the following table for the result details:

Conducted Emission					
Frequency (MHz)	Detector (QP/AV)	Phase	Result (dBμV)	Limit (dBμV)	Margin
0.150	QP	N	38.90	66.00	-27.10
0.166	QP	N	38.30	65.00	-26.70
0.182	QP	N	41.20	64.00	-22.80
0.190	QP	N	52.40	64.00	-11.60
0.218	QP	N	49.60	63.00	-13.40
0.242	QP	N	47.50	62.00	-14.50



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