

**FCC 47 CFR PART 15 SUBPART C**

**CERTIFICATION TEST REPORT**

*For*

**Product: Automotive Diagnosis Tool**

**MODEL No.: X-431 PADIII**

**FCC ID: XUJPADIII**

**Trademark: N/A**

**REPORT NO: ES190402976W01**

**ISSUE DATE: May 21, 2019**

*Prepared for*

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Launch Industrial Park, North of Wuhe Rd., Banxuegang, Longgang,  
Shenzhen, China**

*Prepared by*

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## 1 TEST RESULT CERTIFICATION

Applicant: Launch Tech Co., Ltd.  
 Launch Industrial Park, North of Wuhe Rd., Banxuegang, Longgang, Shenzhen, China  
  
 Manufacturer: Launch Tech Co., Ltd.  
 Launch Industrial Park, North of Wuhe Rd., Banxuegang, Longgang, Shenzhen, China  
  
 EUT Description: Automotive Diagnosis Tool  
  
 Model Number: X-431 PADIII  
  
 File Number: ES190402976W01

Measurement Procedure Used:

APPLICABLE STANDARDS	
STANDARD	TEST RESULT
FCC 47 CFR Part 2, Subpart J FCC 47 CFR Part 15, Subpart C ANSI C63.10-2013	PASS

The above equipment was tested by EMTEK(SHENZHEN) CO., LTD. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10 (2013) and the energy emitted by the sample EUT tested as described in this report is in compliance with the requirements of FCC Rules Part 2, Part 15.247  
 The test results of this report relate only to the tested sample identified in this report

Date of Test :

April 02, 2019 to May 17, 2019

Prepared by :

*Yaping Shen*

YapingShen /Tester

Reviewer :

*Joe Xia*

Joe Xia/ Supervisor

Approve & Authorized Signer :

*Lisa Wang*

Lisa Wang/Manager



## 2 EUT TECHNICAL DESCRIPTION

This product contains BT, WIFI,GPS and this report only shows the test results for WIFI.

Characteristics	Description
<b>IEEE 802.11 WLAN Mode Supported</b>	<input checked="" type="checkbox"/> 802.11b <input checked="" type="checkbox"/> 802.11g <input checked="" type="checkbox"/> 802.11n(20MHz channel bandwidth) <input checked="" type="checkbox"/> 802.11n(40MHz channel bandwidth)
<b>Data Rate</b>	WIFI: 802.11 b:1,2,5.5,11Mbps; 802.11 g:6,9,12,18,24,36,48,54Mbps; 802.11n(HT20):MCS0-MCS7; 802.11n(HT40):MCS0-MCS7; BT: 1Mbps for GFSK modulation 2Mbps for pi/4-DQPSK modulation 3Mbps for 8DPSK modulation
<b>Modulation</b>	WIFI: DSSS with DBPSK/DQPSK/CCK for 802.11b; OFDM with BPSK/QPSK/16QAM/64QAM for 802.11g/n; BT: GFSK, pi/4-DQPSK, 8DPSK
<b>Operating Frequency Range</b>	WIFI: 2412-2462MHz for 802.11b/g/n(HT20); 2422-2452MHz for 802.11n(HT40); BT:2402-2480MHz GPS receiver: 1575.42MHz
<b>Number of Channels</b>	WIFI: 11 channels for 802.11b/g n(HT20); 7 channels for 802.11b/g n(HT40); BT:79 channels
<b>Transmit Power Max</b>	WIFI: 17.75dBm for 802.11b; 17.20dBm for 802.11g; 17.27dBm for 802.11/n(HT20); 16.22dBm for 802.11/n(HT40); 0.29 dBm for BT
<b>Antenna Type</b>	FPC antenna for BT and WIFI GPS antenna for GPS receiver
<b>Antenna Gain</b>	2 dBi
<b>Power supply</b>	AC 100-240V 50/60Hz from AC adapter DC 3.7V by Lithium battery
<b>Adapter information</b>	Manufacturer: Panfore Input: AC 100-240V 50/60Hz 0.6A Output: DC 5.2V 3.0A
<b>Battery information</b>	15000mHh/3.7V/55.5Wh

### 3 SUMMARY OF TEST RESULT

FCC Part Clause	Test Parameter	Verdict	Remark
15.247(a)(2)	DTS (6dB) Bandwidth	PASS	
15.247(b)(3)	Maximum Peak Conducted Output Power	PASS	
15.247(e)	Maximum Power Spectral Density Level	PASS	
15.247(d)	Unwanted Emission Into Non-Restricted Frequency Bands	PASS	
15.247(d) 15.209	Unwanted Emission Into Restricted Frequency Bands (conducted)	PASS	
15.247(d) 15.209	Radiated Spurious Emission	PASS	
15.207	Conducted Emission Test	PASS	
15.247(b)	Antenna Application	PASS	
	NOTE1:N/A (Not Applicable) NOTE2:According to FCC OET KDB 558074, the report use radiated measurements in the restricted frequency bands. In addition, the radiated test is also performed to ensure the emissions emanating from the device cabinet also comply with the applicable limits.		

#### RELATED SUBMITTAL(S) / GRANT(S):

This submittal(s) (test report) is intended for FCC ID: XUJPADIII filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules.

## 4 TEST METHODOLOGY

### 4.1 GENERAL DESCRIPTION OF APPLIED STANDARDS

According to its specifications, the EUT must comply with the requirements of the following standards:  
 FCC 47 CFR Part 2, Subpart J  
 FCC 47 CFR Part 15, Subpart C  
 FCC KDB 558074 D01 DTS Meas Guidance v05r02

### 4.2 MEASUREMENT EQUIPMENT USED

#### 4.2.1 Conducted Emission Test Equipment

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	DUE CAL.
Test Receiver	Rohde & Schwarz	ESCI	26115-010-0027	May 20, 2018	May 19, 2019
L.I.S.N.	Rohde & Schwarz	ENV216	101161	May 20, 2018	May 19, 2019
50ΩCoaxial Switch	Anritsu	MP59B	6100175589	May 20, 2018	May 19, 2019

#### 4.2.2 For 3m Radiated Emission Measurement 9K-30M (3m chamber 1#)

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	DUE CAL
EMI Test Receiver	Rohde & Schwarz	ESU	1302.6005.26	May 20, 2018	May 19, 2019
Loop Antenna	Schwarzbeck	FMZB 1519	1519-012	May 20, 2018	May 19, 2019
Cable	/	3M SF104-26.5	295838/4	May 20, 2018	May 19, 2019
Cable	/	6M SF104-26.5	295840/4	May 20, 2018	May 19, 2019

#### 4.2.3 For 3m Radiated Emission Measurement 30M-1G (3m chamber 1#)

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	DUE CAL.
EMI Test Receiver	Rohde & Schwarz	ESU	1302.6005.26	May 19, 2018	May 18, 2019
Pre-Amplifier	HP	8447F	2944A07999	May 19, 2018	May 18, 2019
Bilog Antenna	Schwarzbeck	VULB9163	142	May 20, 2018	May 19, 2019
Cable	Schwarzbeck	AK9513	ACRX1	May 20, 2018	May 19, 2019
Cable	Rosenberger	N/A	FP2RX2	May 20, 2018	May 19, 2019
Cable	Schwarzbeck	AK9513	CRPX1	May 20, 2018	May 19, 2019
Cable	Schwarzbeck	AK9513	CRRX2	May 20, 2018	May 19, 2019

4.2.4 For 3m Radiated Emission Measurement 1G-18G (3m chamber 1#)

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	DUE CAL.
EMI Test Receiver	Rohde & Schwarz	ESU	1302.6005.26	May 19, 2018	May 18, 2019
Pre-Amplifier	A.H.	PAM-0126	1415261	May 20, 2018	May 19, 2019
Horn Antenna	Schwarzbeck	BBHA 9120	707	May 20, 2018	May 19, 2019
Cable	H+B	0.5M SF104-26.5	289147/4	May 20, 2018	May 19, 2019
Cable	H+B	3M SF104-26.5	295838/4	May 20, 2018	May 19, 2019
Cable	H+B	6M SF104-26.5	295840/4	May 20, 2018	May 19, 2019

4.2.5 For 3m Radiated Emission Measurement 18G-26.5G (3m chamber 1#)

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	DUE CAL.
EMI Test Receiver	Rohde & Schwarz	ESU	1302.6005.26	May 19, 2018	May 18, 2019
Pre-Amplifier	A.H.	PAM-0126	1415261	May 20, 2018	May 19, 2019
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170399	May 20, 2018	May 19, 2019
Cable	H+B	0.5M SF104-26.5	289147/4	May 20, 2018	May 19, 2019
Cable	H+B	3M SF104-26.5	295838/4	May 20, 2018	May 19, 2019
Cable	H+B	6M SF104-26.5	295840/4	May 20, 2018	May 19, 2019

4.2.6 For 3m Radiated Emission Measurement 26.5G-40G (3m chamber 3#)

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	DUE CAL.
EMI Test Receiver	Rohde & Schwarz	FSV40	132.1-3008K39-100967-AP	May 19, 2018	May 18, 2019
Pre-Amplifier	Lunar EM	LNA26G40-40	J1013131028001	May 19, 2018	May 18, 2019
Horn Antenna	AHS/USA	SAS-573	184	May 20, 2018	May 19, 2019
Cable	A.H	SAC-40G-1	414	May 20, 2018	May 19, 2019
Cable	A.H	SAC-40G-1	413	May 20, 2018	May 19, 2019

4.2.7 Radio Frequency Test Equipment

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	DUE CAL.
Spectrum Analyzer	Agilent	E4407B	88156318	May 20, 2018	May 19, 2019
Signal Analyzer	Agilent	N9010A	My53470879	May 20, 2018	May 19, 2019
Power meter	Anritsu	ML2495A	0824006	May 20, 2018	May 19, 2019
Power sensor	Anritsu	MA2411B	0738172	May 20, 2018	May 19, 2019

**Remark:** Each piece of equipment is scheduled for calibration once a year.

#### 4.3 DESCRIPTION OF TEST MODES

The EUT has been tested under its typical operating condition.

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

Test of channel included the lowest and middle and highest frequency to perform the test, then record on this report.

Those data rates (802.11b:1 Mbps; 802.11g: 6 Mbps; 802.11n(HT20)) were used for all test.

Pre-defined engineering program for regulatory testing used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

Frequency and Channel list for 802.11 b/g/n(HT20):

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	6	2437	11	2462
2	2417	7	2442		
3	2422	8	2447		
4	2427	9	2452		
5	2432	10	2457		

Test Frequency and Channel for 802.11 b/g/n (HT20):

Lowest Frequency		Middle Frequency		Highest Frequency	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	6	2437	11	2462

## 5 FACILITIES AND ACCREDITATIONS

### 5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at  
Bldg 69, Majialong Industry Zone District, Nanshan District, Shenzhen, China  
The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.10 and CISPR Publication 22.

### 5.2 LABORATORY ACCREDITATIONS AND LISTINGS

#### Site Description

- EMC Lab. : Accredited by CNAS, 2016.10.24  
The certificate is valid until 2022.10.28  
The Laboratory has been assessed and proved to be in compliance with CNAS-CL01: 2006(identical to ISO/IEC17025: 2005)  
The Certificate Registration Number is L229
- : Accredited by TUV Rheinland Shenzhen, 2016.5.19  
The Laboratory has been assessed according to the requirements ISO/IEC 17025.
- : Accredited by FCC, August 06, 2018  
The certificate is valid until August 07, 2020  
Designation Number: CN1204  
Test Firm Registration Number: 882943
- : Accredited by Industry Canada, November 09, 2018  
The Conformity Assessment Body Identifier is CN0008.

## 6 TEST SYSTEM UNCERTAINTY

The following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Parameter	Uncertainty
Radio Frequency	$\pm 1 \times 10^{-5}$
Maximum Peak Output Power Test	$\pm 1.0 \text{dB}$
Conducted Emissions Test	$\pm 2.0 \text{dB}$
Radiated Emission Test	$\pm 2.0 \text{dB}$
Power Density	$\pm 2.0 \text{dB}$
Occupied Bandwidth Test	$\pm 1.0 \text{dB}$
Band Edge Test	$\pm 3 \text{dB}$
All emission, radiated	$\pm 3 \text{dB}$
Antenna Port Emission	$\pm 3 \text{dB}$
Temperature	$\pm 0.5^\circ\text{C}$
Humidity	$\pm 3\%$

Measurement Uncertainty for a level of Confidence of 95%

## 7 SETUP OF EQUIPMENT UNDER TEST

### 7.1 RADIO FREQUENCY TEST SETUP 1

The WLAN component's antenna port(s) of the EUT are connected to the measurement instrument per an appropriate attenuator. The EUT is controlled by PC/software to emit the specified signals for the purpose of measurements.



### 7.2 RADIO FREQUENCY TEST SETUP 2

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4 dB according to the standards: ANSI C63.10. The test distance is 3m. The setup is according to the requirements in Section 13.1.4.1 of ANSI C63.10-2013 and CAN/CSA-CEI/IEC CISPR 22.

Below 30MHz:

The EUT is placed on a turntable 0.8 meters above the ground in the chamber, 3 meter away from the antenna (loop antenna). The Antenna should be positioned with its plane vertical at the specified distance from the EUT and rotated about its vertical axis for maximum response at each azimuth about the EUT. The center of the loop shall be 1 m above the ground. For certain applications, the loop antenna plane may also need to be positioned horizontally at the specified distance from the EUT.

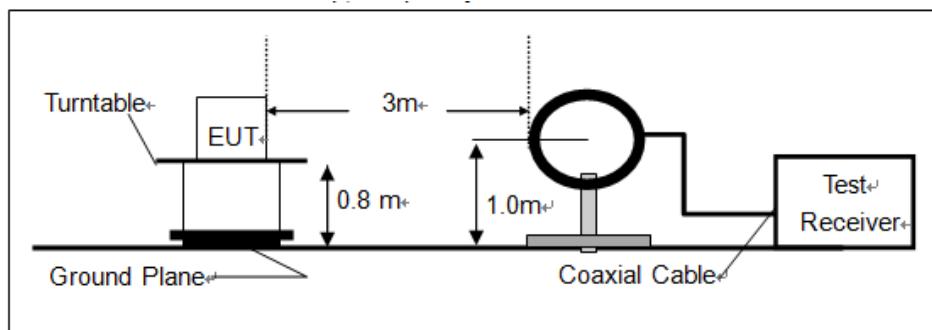
30MHz-1GHz:

The EUT is placed on a turntable 0.8 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H).

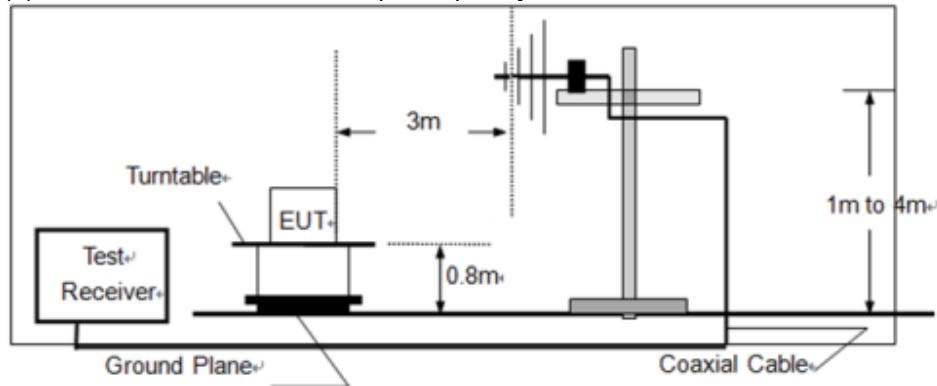
Above 1GHz:

The EUT is placed on a turntable 1.5 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H).

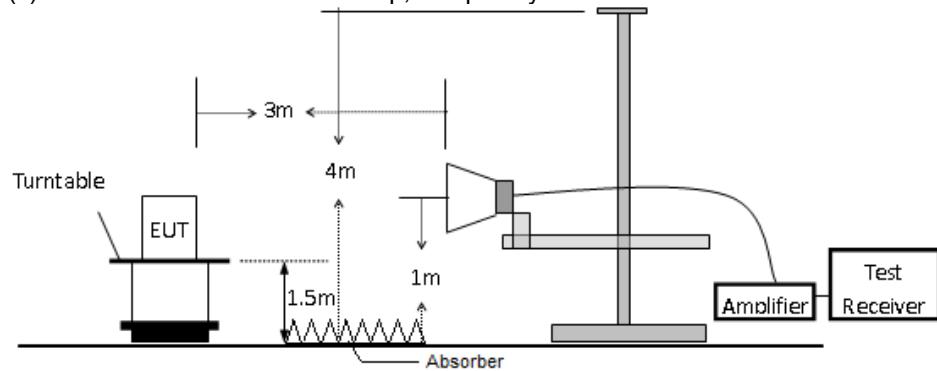
#### (a) Radiated Emission Test Set-Up, Frequency Below 30MHz



(b) Radiated Emission Test Set-Up, Frequency Below 1000MHz



(c) Radiated Emission Test Set-Up, Frequency above 1000MHz

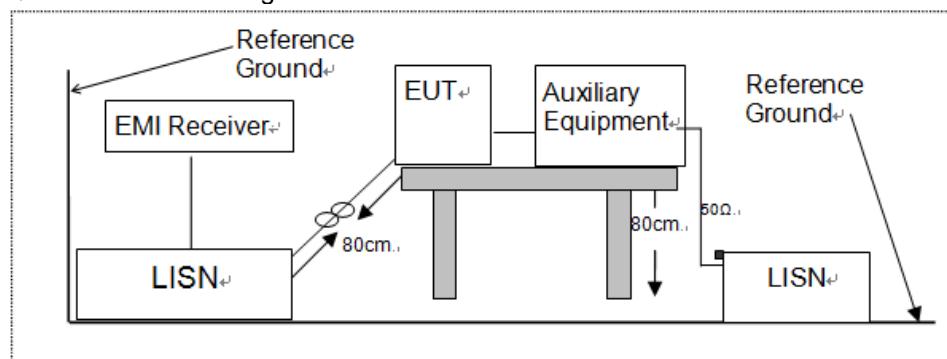


### 7.3 CONDUCTED EMISSION TEST SETUP

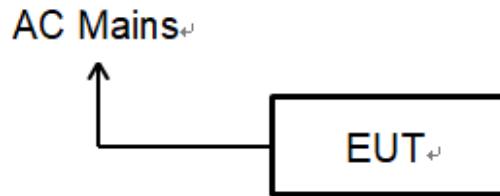
The mains cable of the EUT (maybe per AC/DC Adapter) must be connected to LISN. The LISN shall be placed 0.8 m from the boundary of EUT and bonded to a ground reference plane for LISN mounted on top of the ground reference plane. This distance is between the closest points of the LISN and the EUT. All other units of the EUT and associated equipment shall be at least 0.8m from the LISN.

Ground connections, where required for safety purposes, shall be connected to the reference ground point of the LISN and, where not otherwise provided or specified by the manufacturer, shall be of same length as the mains cable and run parallel to the mains connection at a separation distance of not more than 0.1 m.

According to the requirements in Section 13.1.4.1 of ANSI C63.10-2013 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-Peak and average detector mode.



#### 7.4 BLOCK DIAGRAM CONFIGURATION OF TEST SYSTEM



#### 7.5 SUPPORT EQUIPMENT

Item	Equipment	Mfr/Brand	Model/Type No.	S/N
1.	--	--	--	--

**Notes:**

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

## 8 TEST REQUIREMENTS

### 8.1 DTS(6DB)BANDWIDTH

#### 8.1.1 Applicable Standard

According to FCC Part15.247(a)(2) and KDB558074 DTS 01 Meas. Guidance v05r02

#### 8.1.2 Conformance Limit

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

#### 8.1.3 Test Configuration

Test according to clause 7.1 radio frequency test setup 1

#### 8.1.4 Test Procedure

The EUT was operating in IEEE 802.11b/g/n mode and controlled its channel. Printed out the test result from the spectrum by hard copy function.

The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.

Set to the maximum power setting and enable the EUT transmit continuously

Set RBW = 100 kHz.

Set the video bandwidth (VBW) =300kHz.

Set Span=2 times OBW

Set Detector = Peak.

Set Trace mode = max hold.

Set Sweep = auto couple.

Allow the trace to stabilize.

Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

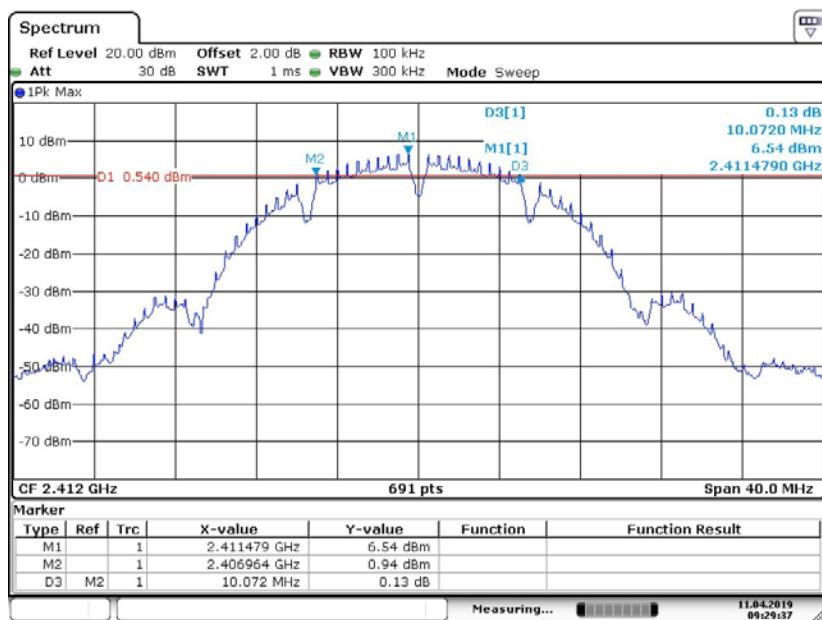
Measure and record the results in the test report.

#### 8.1.5 Test Results

Temperature :	26°C	Test Date :	April 11, 2019
Humidity :	60 %	Test By:	King Kong

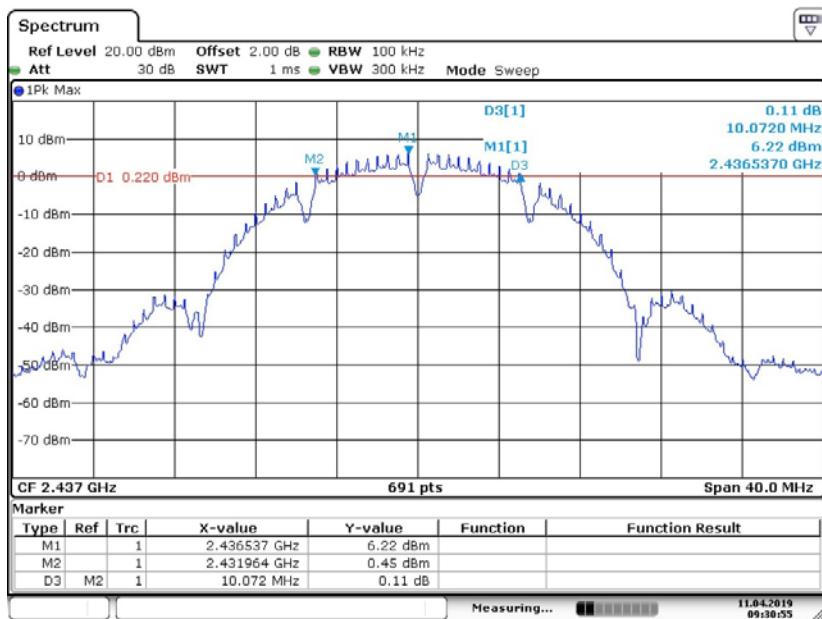
Operation Mode	Channel Number	Channel Frequency (MHz)	Measurement Bandwidth (MHz)	Limit (kHz)	Verdict
802.11b	1	2412	10.072	>500	PASS
	6	2437	10.072	>500	PASS
	11	2462	10.072	>500	PASS
802.11g	1	2412	16.324	>500	PASS
	6	2437	16.324	>500	PASS
	11	2462	16.324	>500	PASS
802.11n (HT20)	1	2412	17.540	>500	PASS
	6	2437	17.540	>500	PASS
	11	2462	17.540	>500	PASS
802.11n (HT40)	3	2422	35.430	>500	PASS
	6	2437	35.540	>500	PASS
	9	2452	35.540	>500	PASS

Test Model | DTS (6dB) Bandwidth  
802.11b  
Channel 1: 2412MHz



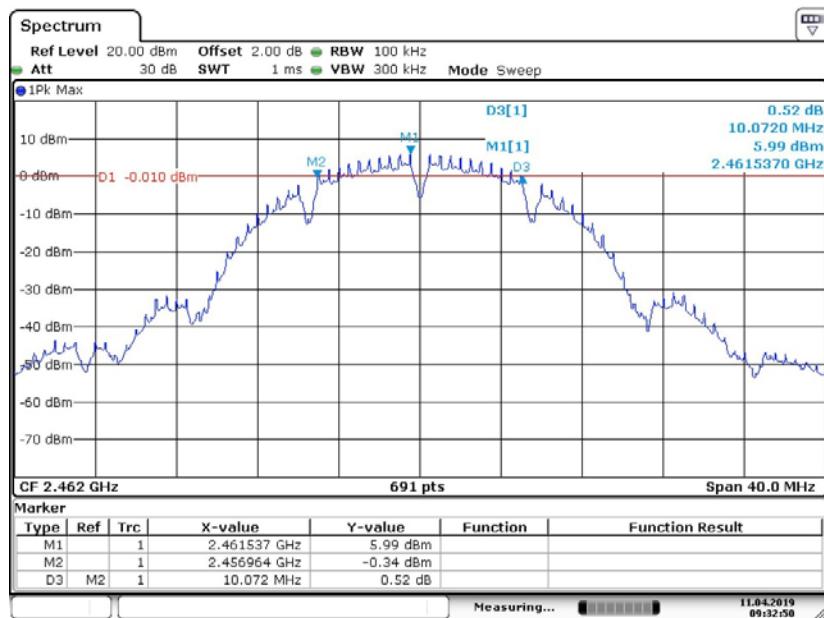
Date: 11.APR.2019 09:29:37

Test Model | DTS (6dB) Bandwidth  
802.11b  
Channel 6: 2437MHz



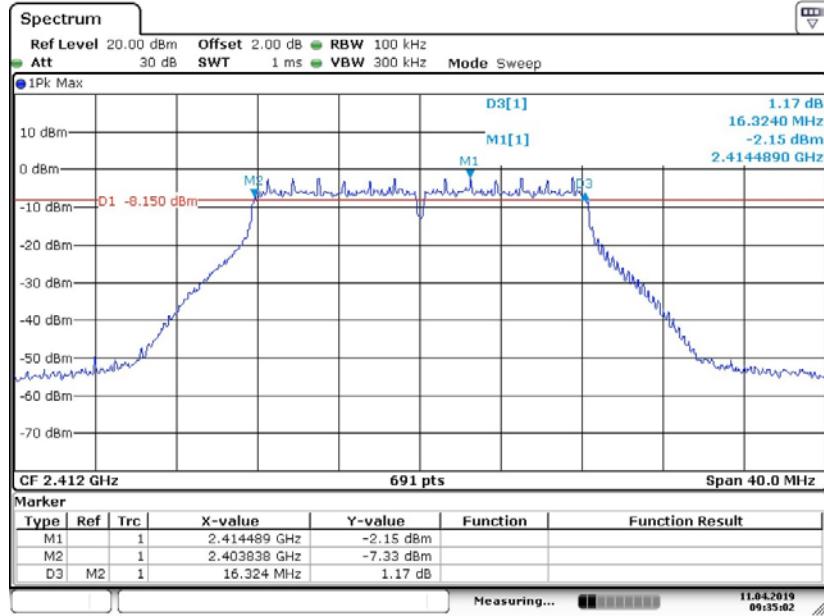
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Test Model | DTS (6dB) Bandwidth  
802.11b  
Channel 11: 2462MHz



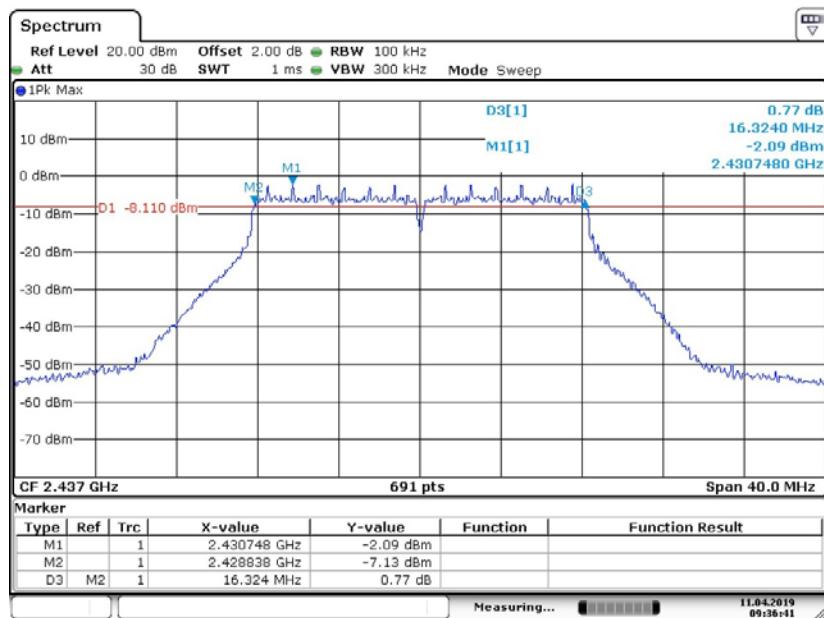
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Test Model | DTS (6dB) Bandwidth  
802.11g  
Channel 1: 2412MHz



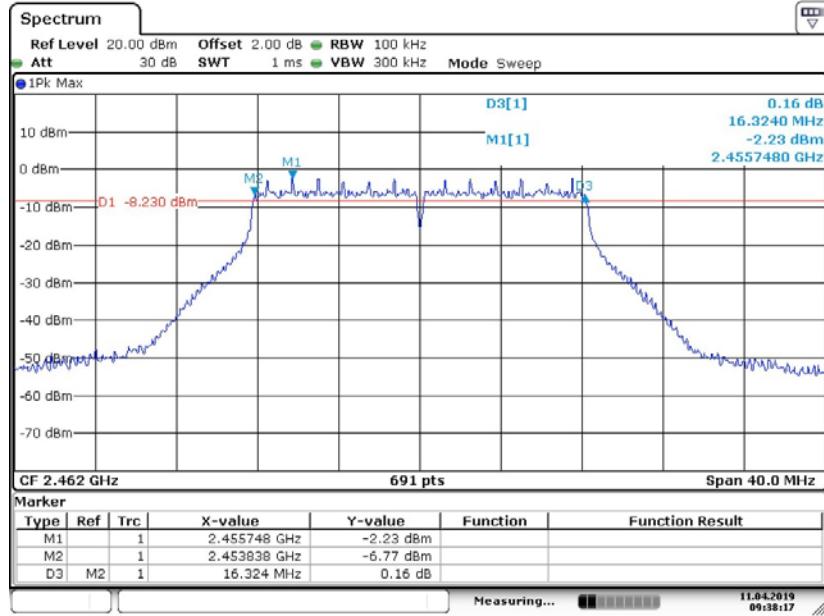
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Test Model | DTS (6dB) Bandwidth  
802.11g  
Channel 6: 2437MHz



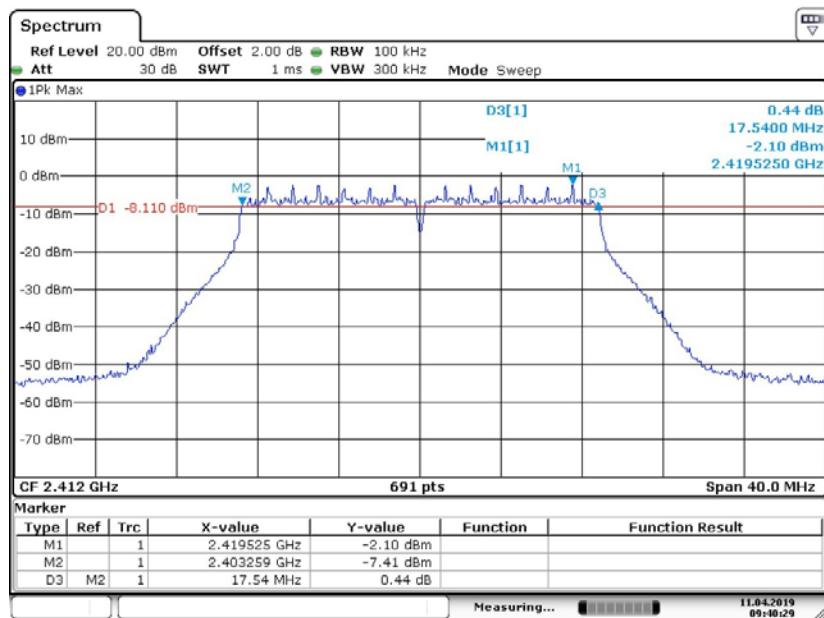
Date: 11.APR.2019 09:36:42

Test Model | DTS (6dB) Bandwidth  
802.11g  
Channel 11: 2462MHz



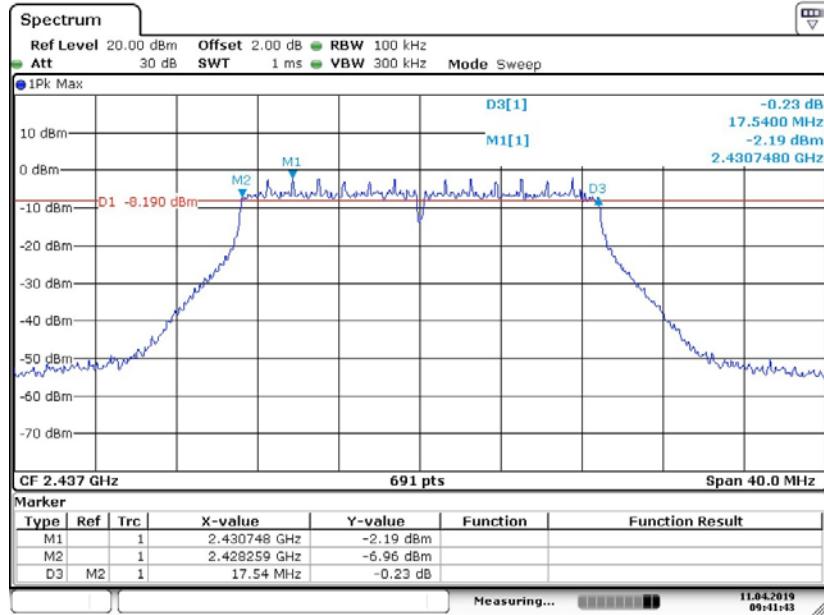
Date: 11.APR.2019 09:38:16

Test Model | DTS (6dB) Bandwidth  
802.11n (HT20)  
Channel 1: 2412MHz



Date: 11.APR.2019 09:40:28

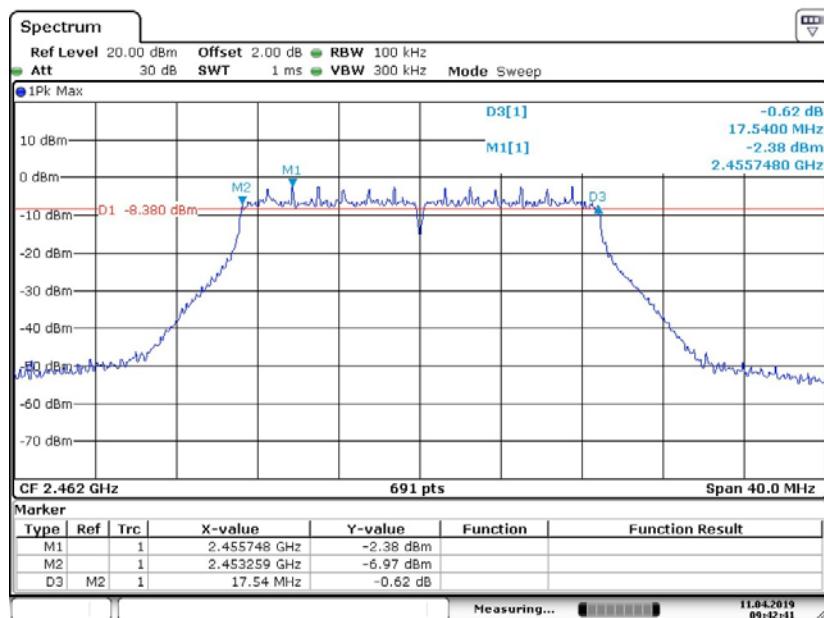
Test Model | DTS (6dB) Bandwidth  
802.11n (HT20)  
Channel 6: 2437MHz



Date: 11.APR.2019 09:41:42

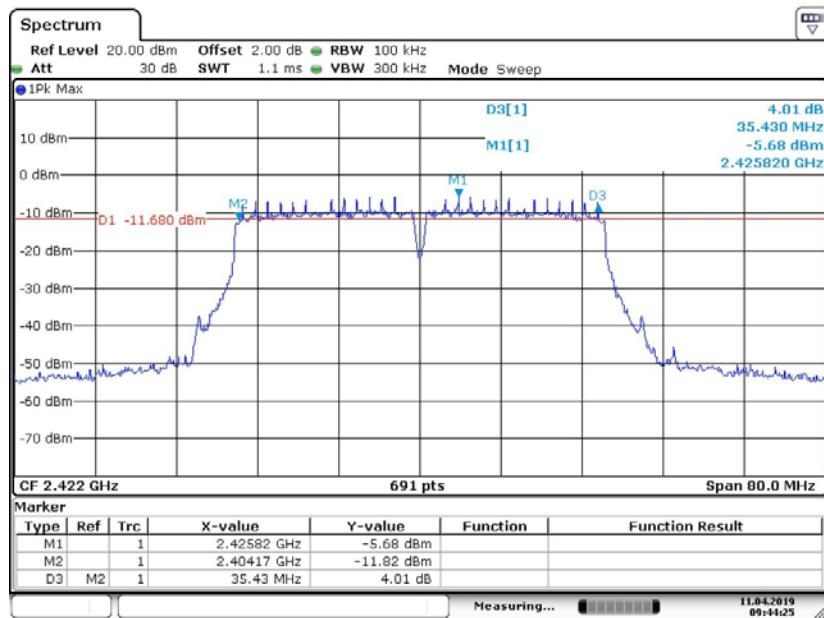
Test Model

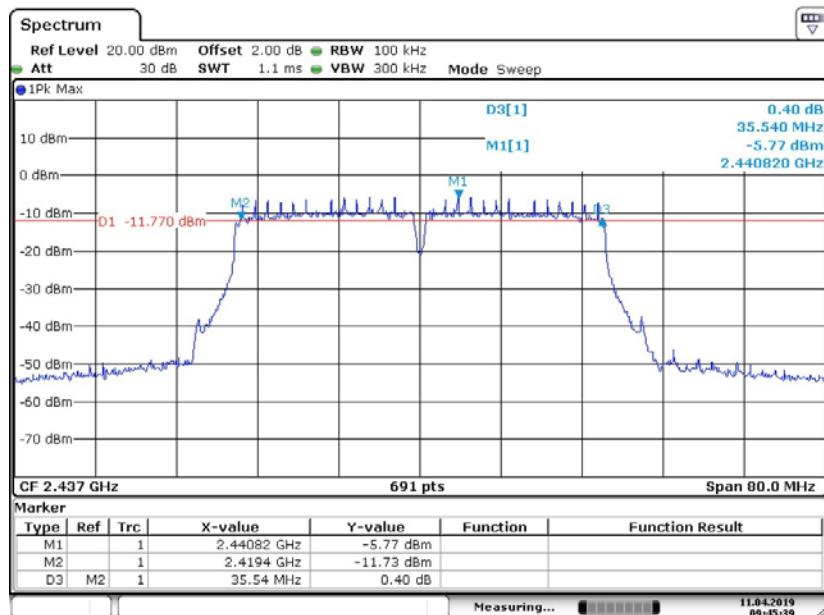
DTS (6dB) Bandwidth  
802.11n (HT20)  
Channel 11: 2462MHz



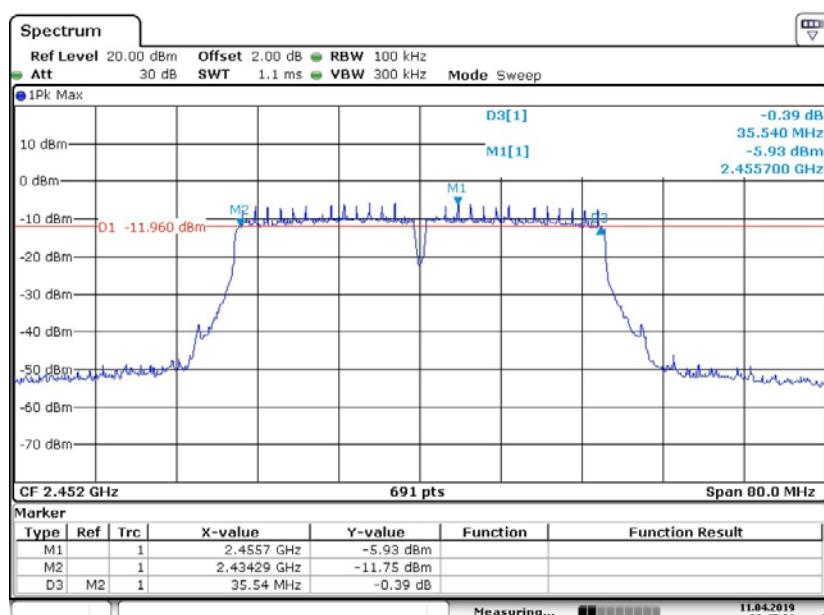
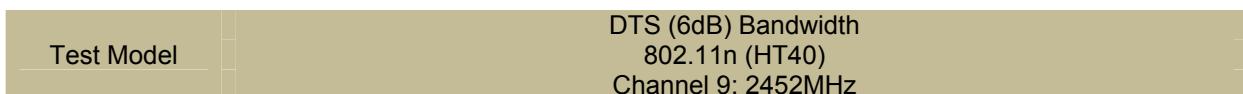
Test Model

DTS (6dB) Bandwidth  
802.11n (HT40)  
Channel 3: 2422MHz





Date: 11.APR.2019 09:45:39



Date: 11.APR.2019 09:47:01

## **8.2 MAXIMUM PEAK CONDUCTED OUTPUT POWER**

### **8.2.1 Applicable Standard**

According to FCC Part15.247(b)(3) and KDB558074 DTS 01 Meas. Guidance v05r02

### **8.2.2 Conformance Limit**

FCC:

The maximum peak conducted output power of the intentional radiator for systems using digital modulation in the 2400 - 2483.5 MHz bands shall not exceed: 1 Watt (30dBm).

IC:

For DTSs employing digital modulation techniques operating in the bands 902-928 MHz and 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1 W. The e.i.r.p. shall not exceed 4 W.

### **8.2.3 Test Configuration**

Test according to clause 7.1 radio frequency test setup 1

### **8.2.4 Test Procedure**

#### **■ According to FCC Part15.247(b)(3)**

The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall utilize a fast-responding diode detector.

The RF output of EUT was connected to the power meter by RF cable and attenuator. The path loss was compensated to the results for each measurement.

Set to the maximum output power setting and enable the EUT transmit continuously.

Measure the conducted output power with cable loss and record the results in the test report.

Measure and record the results in the report.

#### **■ According to FCC Part 15.247(b)(4):**

Conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Note: If antenna Gain exceeds 6 dBi, then Output power Limit=30-(Gain- 6)

### 8.2.5 Test Results

Temperature : 26°C      Test Date : April 11, 2019  
 Humidity : 60 %      Test By: King Kong

Operation Mode	Channel Number	Channel Frequency (MHz)	Measurement Level (dBm)	Limit (dBm)	Verdict
802.11b	1	2412	17.62	30	PASS
	6	2437	<b>17.75</b>	30	PASS
	11	2462	17.45	30	PASS
802.11g	1	2412	17.03	30	PASS
	6	2437	17.20	30	PASS
	11	2462	17.14	30	PASS
802.11n (HT20)	1	2412	17.07	30	PASS
	6	2437	17.27	30	PASS
	11	2462	17.02	30	PASS
802.11n (HT40)	3	2422	16.12	30	PASS
	6	2437	16.22	30	PASS
	9	2452	16.10	30	PASS

### 8.3 MAXIMUM POWER SPECTRAL DENSITY

#### 8.3.1 Applicable Standard

According to FCC Part15.247(e) and KDB558074 DTS 01 Meas. Guidance v05r02

#### 8.3.2 Conformance Limit

The transmitter power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

#### 8.3.3 Test Configuration

Test according to clause 7.1 radio frequency test setup 1

#### 8.3.4 Test Procedure

This procedure shall be used if maximum peak conducted output power was used to demonstrate compliance

The transmitter output (antenna port) was connected to the spectrum analyzer

Set analyzer center frequency to DTS channel center frequency.

Set the span to 1.5 times the DTS bandwidth.

Set the RBW to: 3 kHz

Set the VBW to:10 kHz.

Set Detector = peak.

Set Sweep time = auto couple.

Set Trace mode = max hold.

Allow trace to fully stabilize.

Use the peak marker function to determine the maximum amplitude level within the RBW.

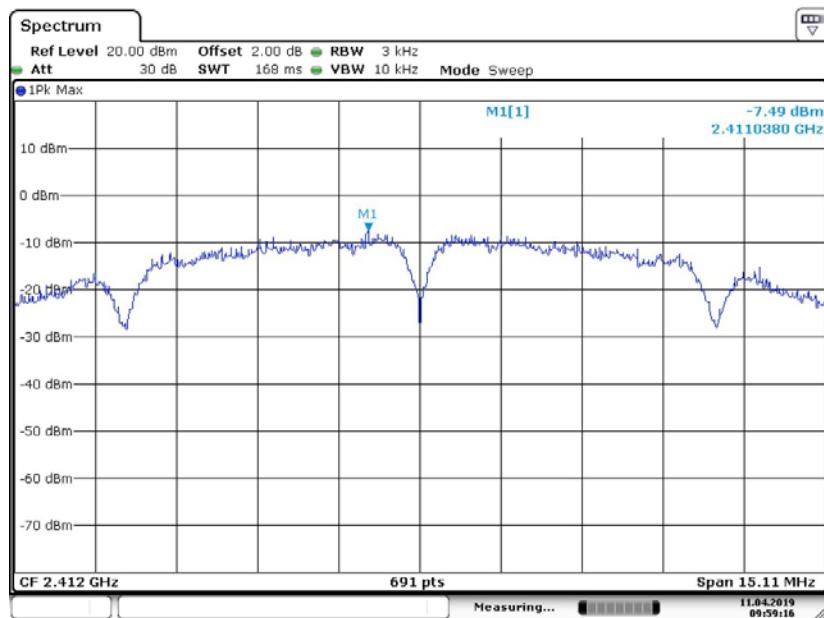
Note: If antenna Gain exceeds 6 dBi, then PSD Limit=8-(Gain- 6)

#### 8.3.5 Test Results

Temperature :	26°C	Test Date :	April 11, 2019
Humidity :	60 %	Test By:	King Kong

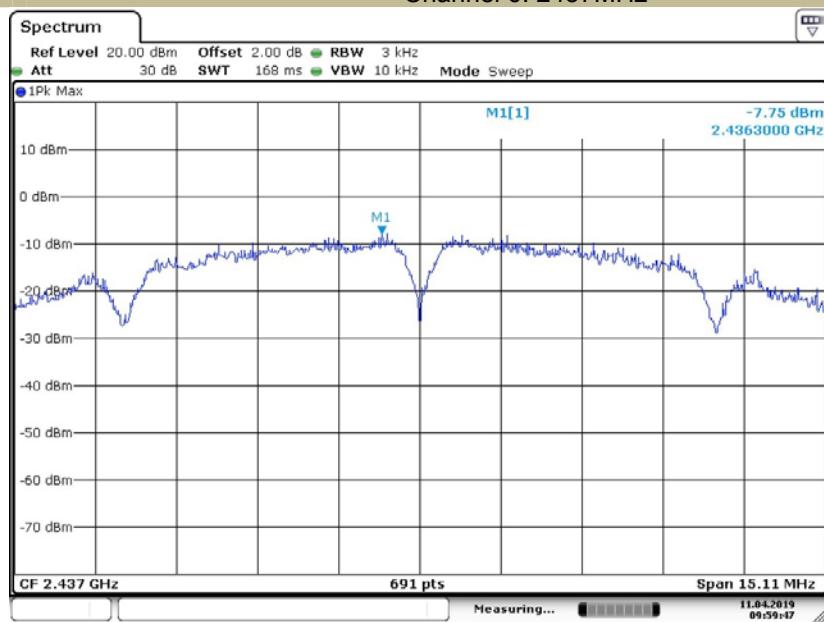
Operation Mode	Channel Number	Channel Frequency (MHz)	Measurement Level (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
802.11b	1	2412	-7.49	8	PASS
	6	2437	-7.75	8	PASS
	11	2462	-8.30	8	PASS
802.11g	1	2412	-15.73	8	PASS
	6	2437	-15.80	8	PASS
	11	2462	-15.56	8	PASS
802.11n (HT20)	1	2412	-17.00	8	PASS
	6	2437	-16.77	8	PASS
	11	2462	-16.71	8	PASS
802.11n (HT40)	3	2422	-20.73	8	PASS
	6	2437	-19.72	8	PASS
	9	2452	-20.29	8	PASS

Test Model | Power Spectral Density  
802.11b  
Channel 1: 2412MHz

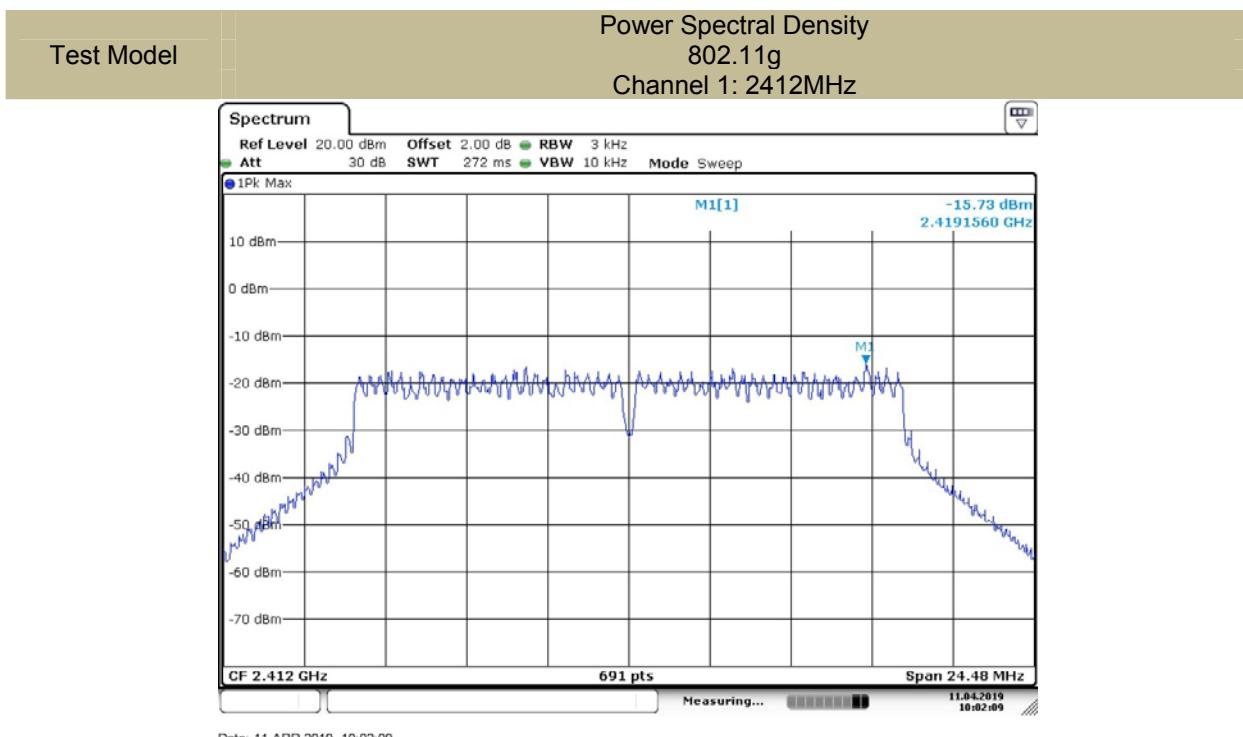
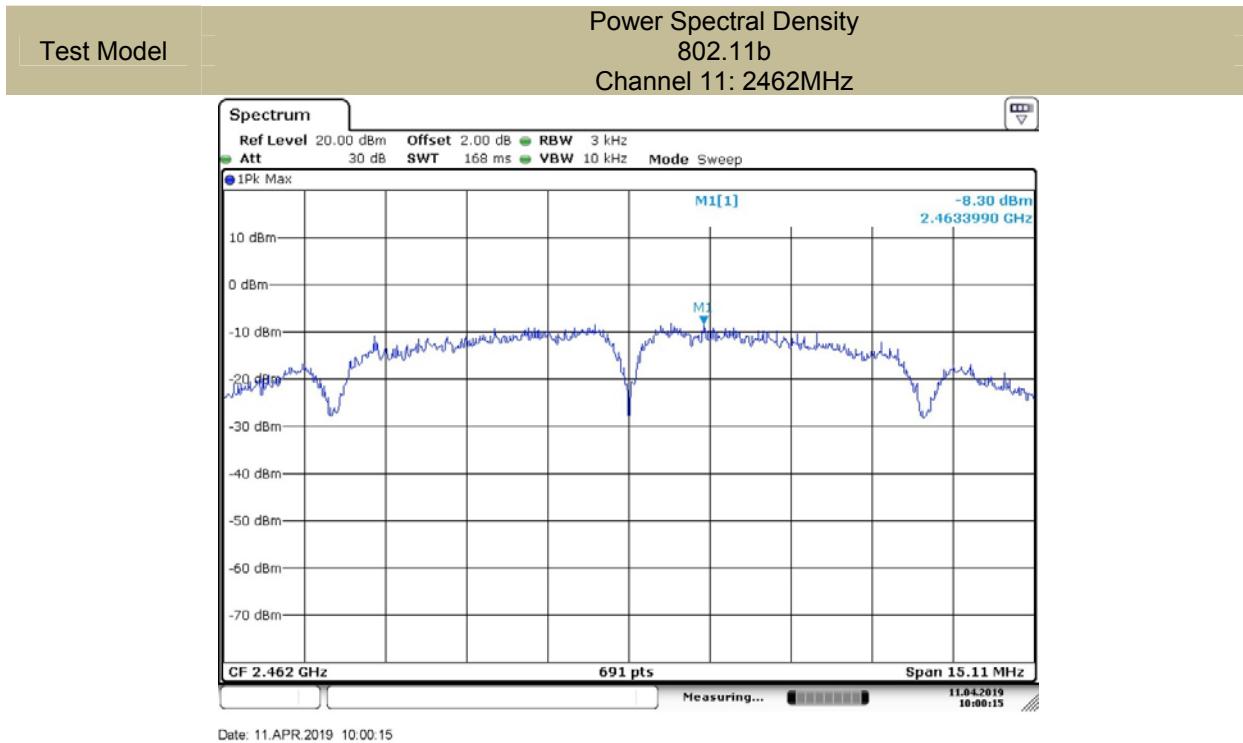


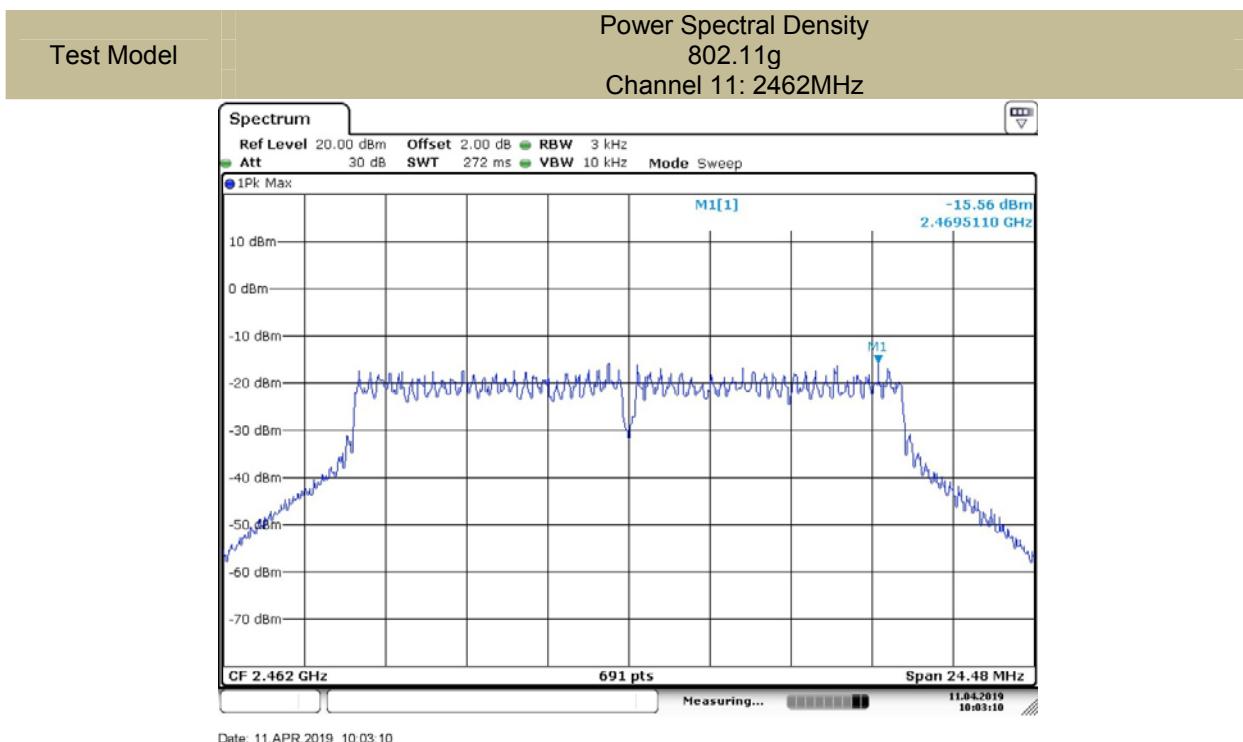
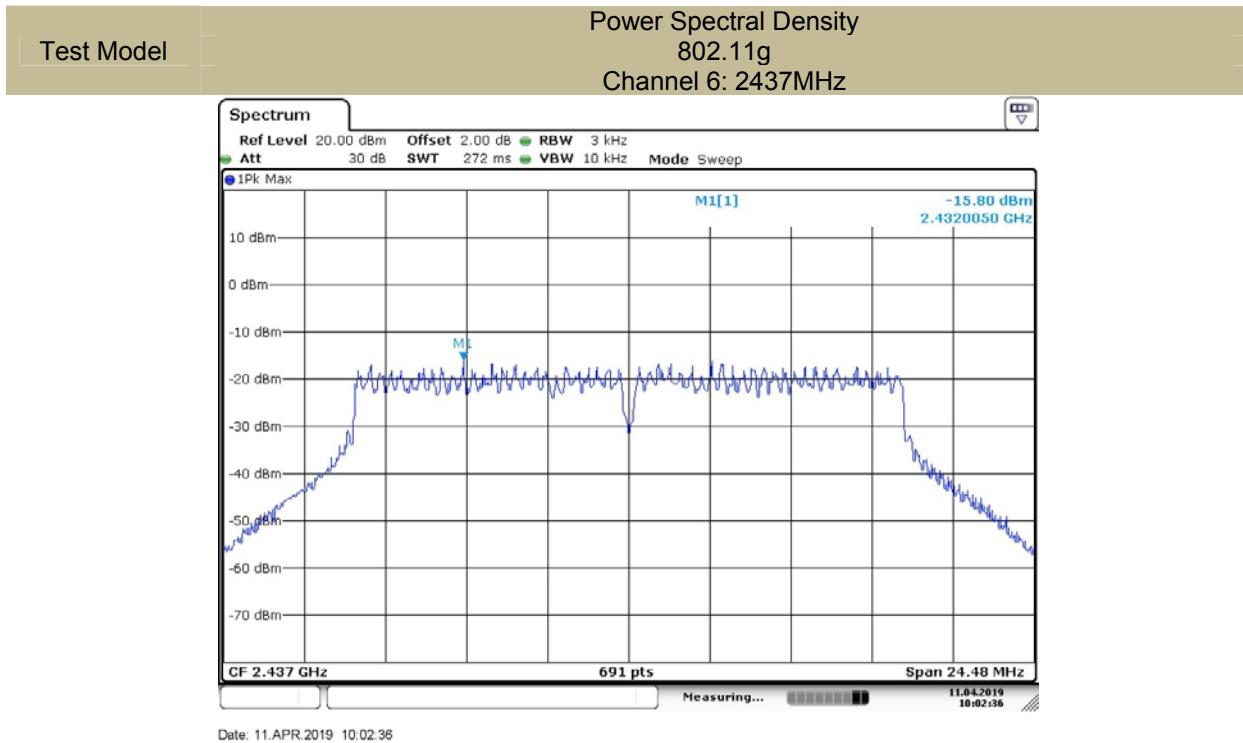
Date: 11.APR.2019 09:59:17

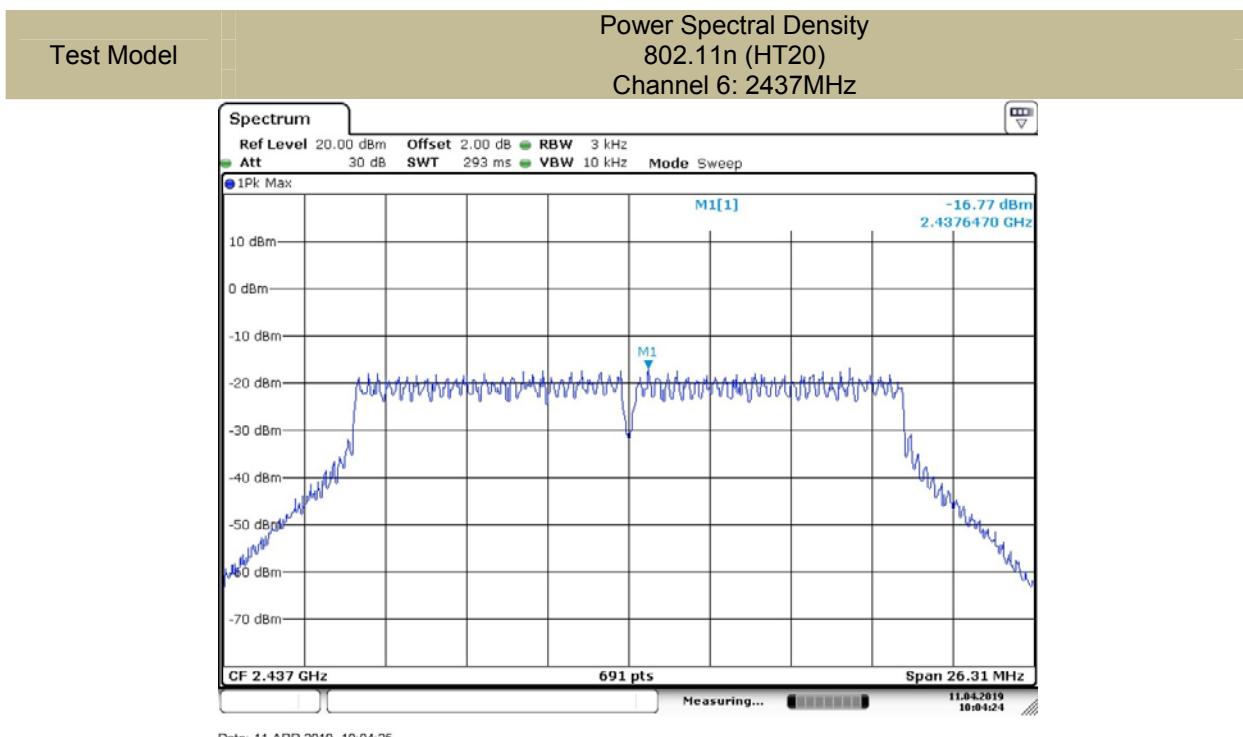
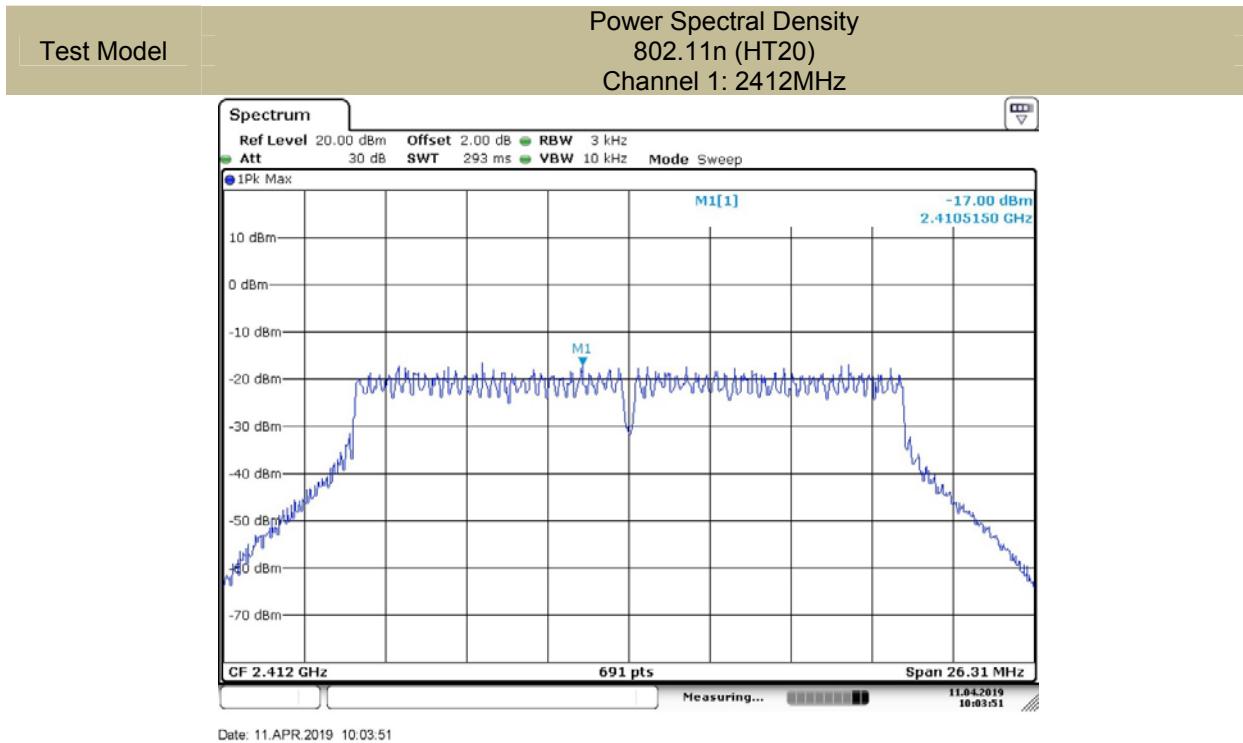
Test Model | Power Spectral Density  
802.11b  
Channel 6: 2437MHz



Date: 11.APR.2019 09:59:47

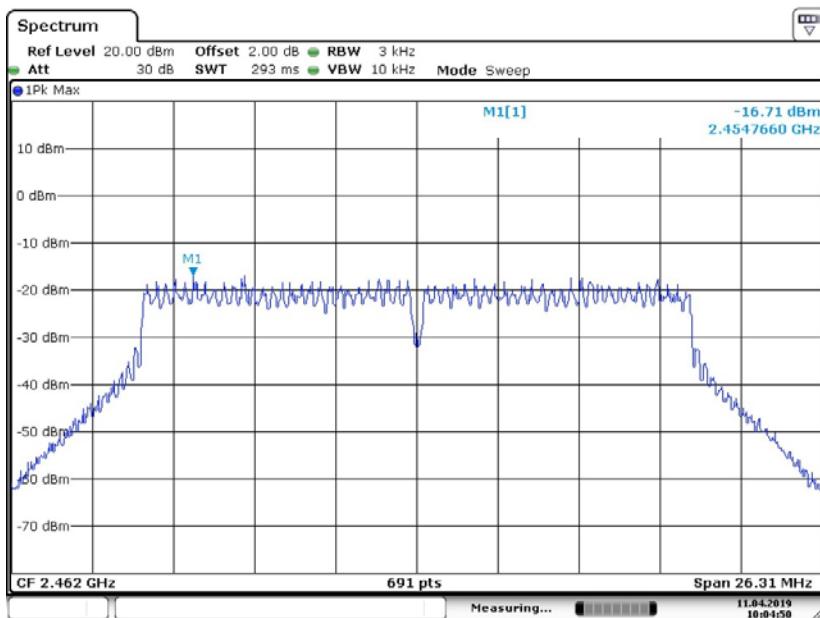






Test Model

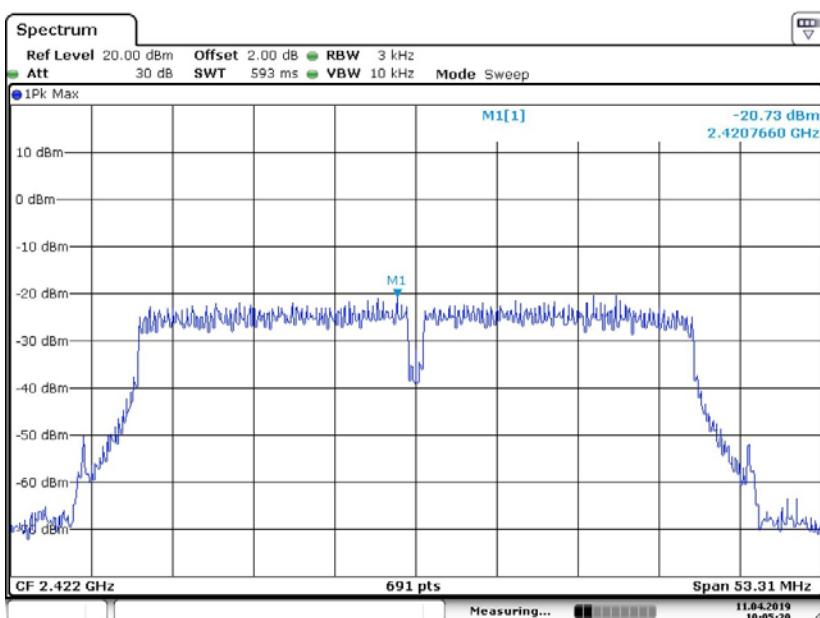
Power Spectral Density  
802.11n (HT20)  
Channel 11: 2462MHz



Date: 11.APR.2019 10:04:50

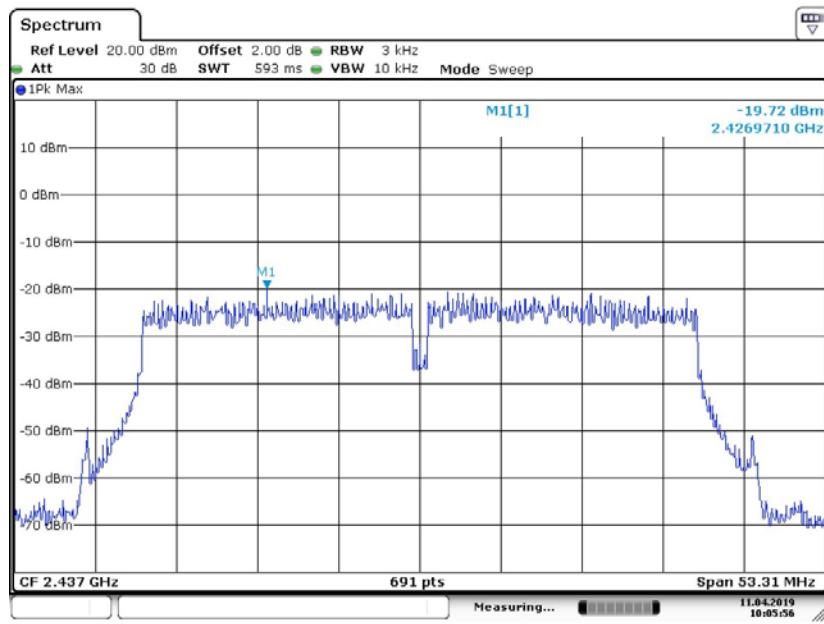
Test Model

Power Spectral Density  
802.11n (HT40)  
Channel 3: 2422MHz



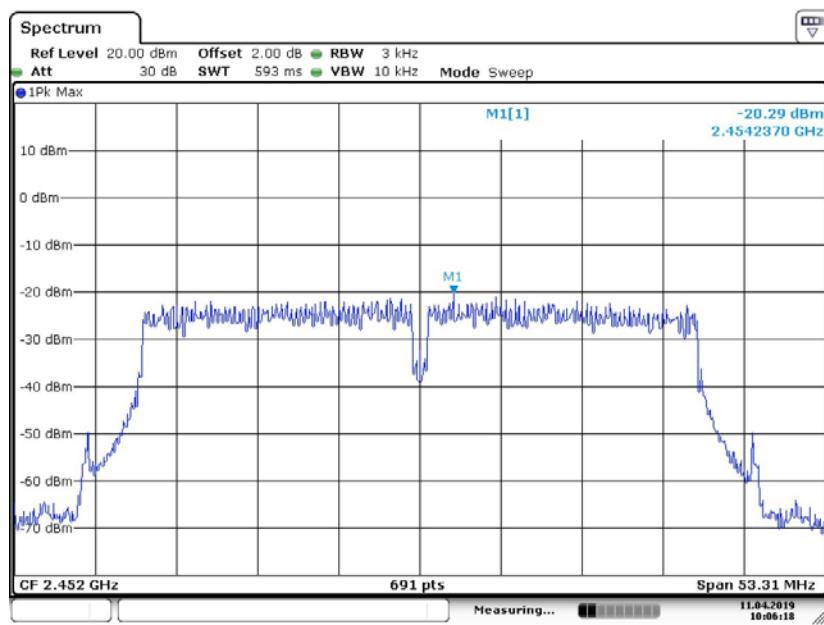
Date: 11.APR.2019 10:05:29

Test Model | Power Spectral Density  
802.11n (HT40)  
Channel 6: 2437MHz



Date: 11.APR.2019 10:05:56

Test Model | Power Spectral Density  
802.11n (HT40)  
Channel 9: 2452MHz



Date: 11.APR.2019 10:06:18

## 8.4 UNWANTED EMISSIONS IN NON-RESTRICTED FREQUENCY BANDS

### 8.4.1 Applicable Standard

According to FCC Part15.247(d) and KDB558074 DTS 01 Meas. Guidance v05r02

### 8.4.2 Conformance Limit

According to FCC Part 15.247(d):

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

### 8.4.3 Test Configuration

Test according to clause 7.1 radio frequency test setup 1

### 8.4.4 Test Procedure

The transmitter output (antenna port) was connected to the spectrum analyzer

#### ■ Reference level measurement

Establish a reference level by using the following procedure:

Set instrument center frequency to DTS channel center frequency.

Set the span to  $\geq 1.5$  times the DTS bandwidth.

Set the RBW = 100 kHz.

Set the VBW  $\geq 3 \times$  RBW.

Set Detector = peak.

Set Sweep time = auto couple.

Set Trace mode = max hold.

Allow trace to fully stabilize.

Use the peak marker function to determine the maximum PSD level.

Note that the channel found to contain the maximum PSD level can be used to establish the reference level.

#### ■ Emission level measurement

Set the center frequency and span to encompass frequency range to be measured.

Set the RBW = 100 kHz.

Set the VBW = 300 kHz.

Set Detector = peak

Sweep time = auto couple.

Trace mode = max hold.

Allow trace to fully stabilize.

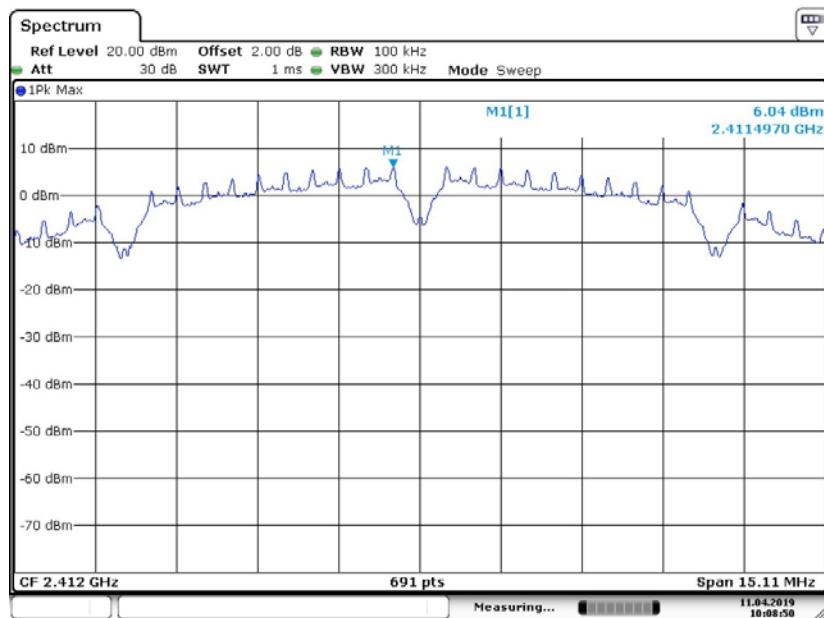
Use the peak marker function to determine the maximum amplitude level.

Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) are attenuated by at least the minimum requirements . Report the three highest emissions relative to the limit.

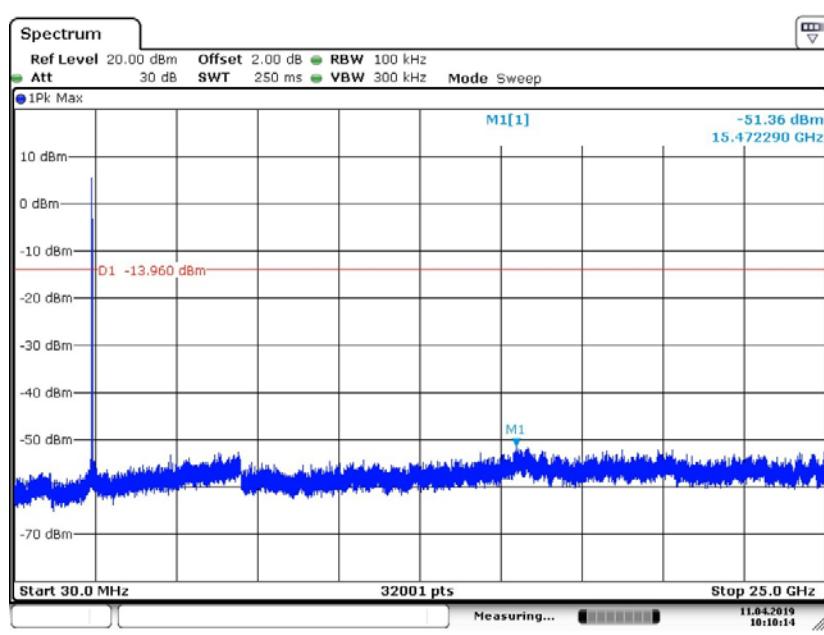
### 8.4.5 Test Results

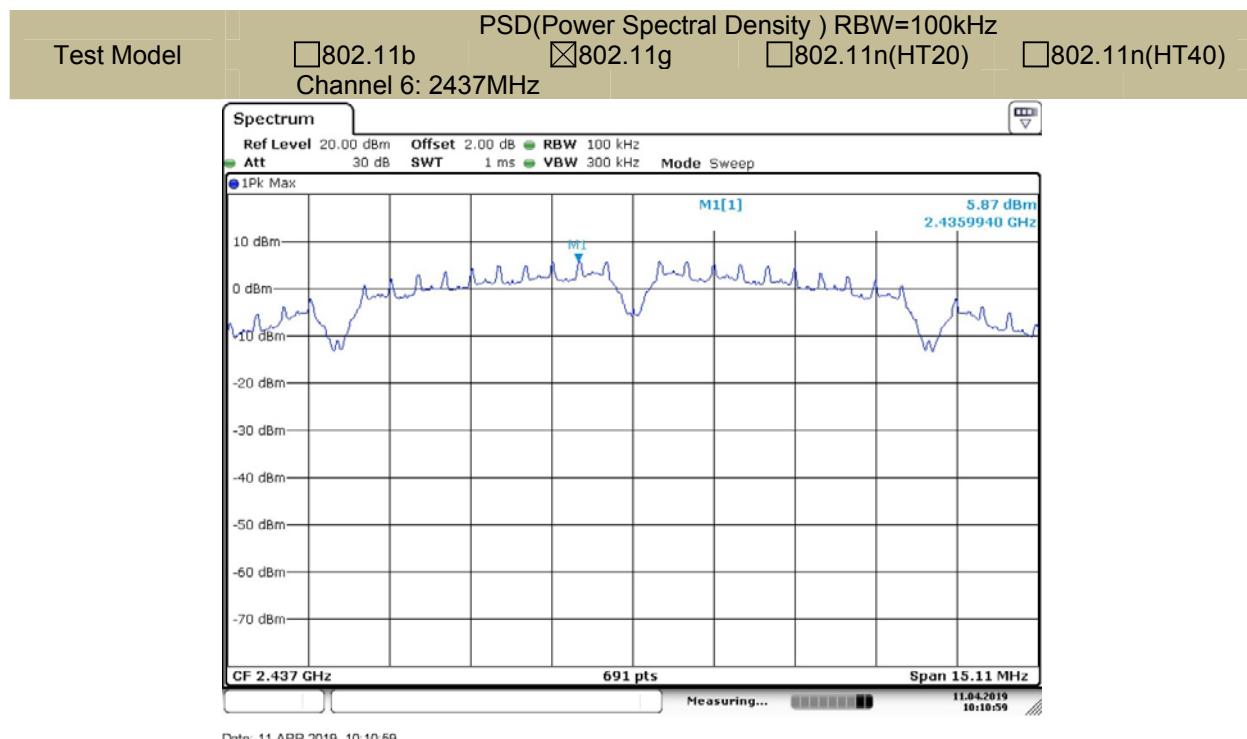
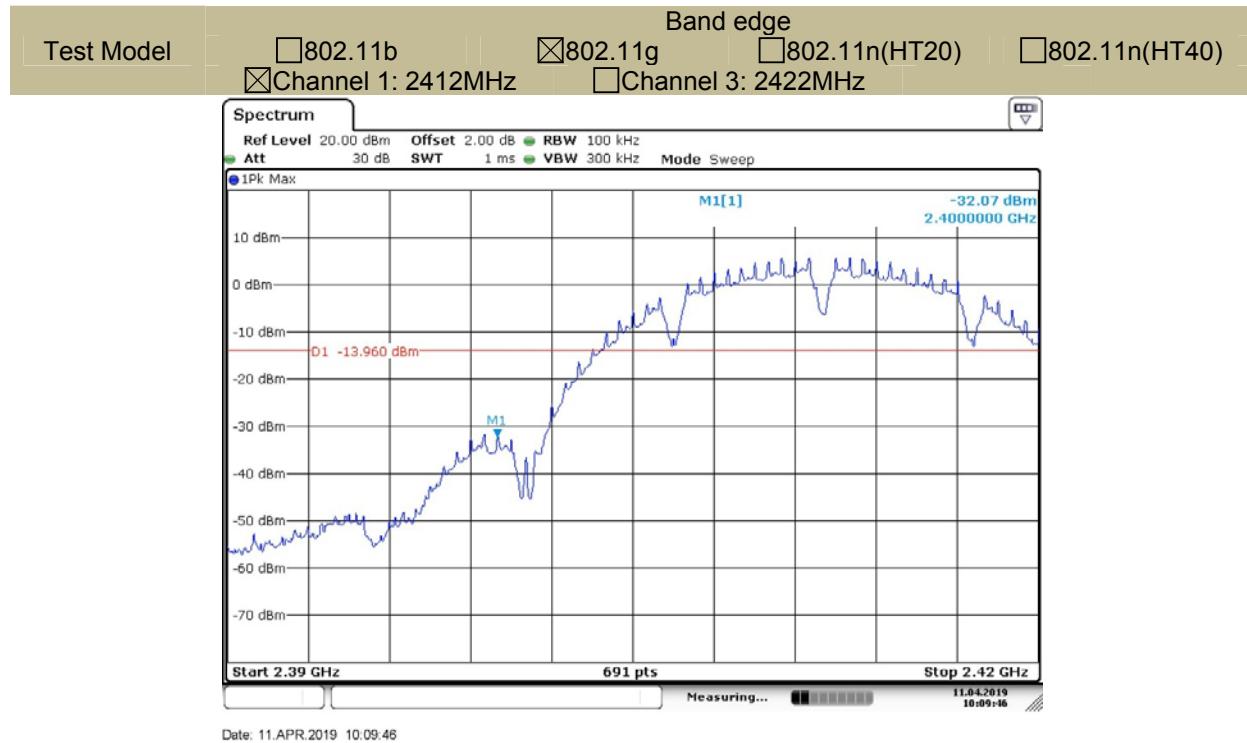
All modes 2.4G 802.11b/g/n have been tested, and the worst result 802.11g recorded was report as below:

Test Model	<input type="checkbox"/> 802.11b	<input checked="" type="checkbox"/> 802.11g	<input type="checkbox"/> 802.11n(HT20)	<input type="checkbox"/> 802.11n(HT40)
	<input checked="" type="checkbox"/> Channel 1: 2412MHz	<input type="checkbox"/> Channel 3: 2422MHz		

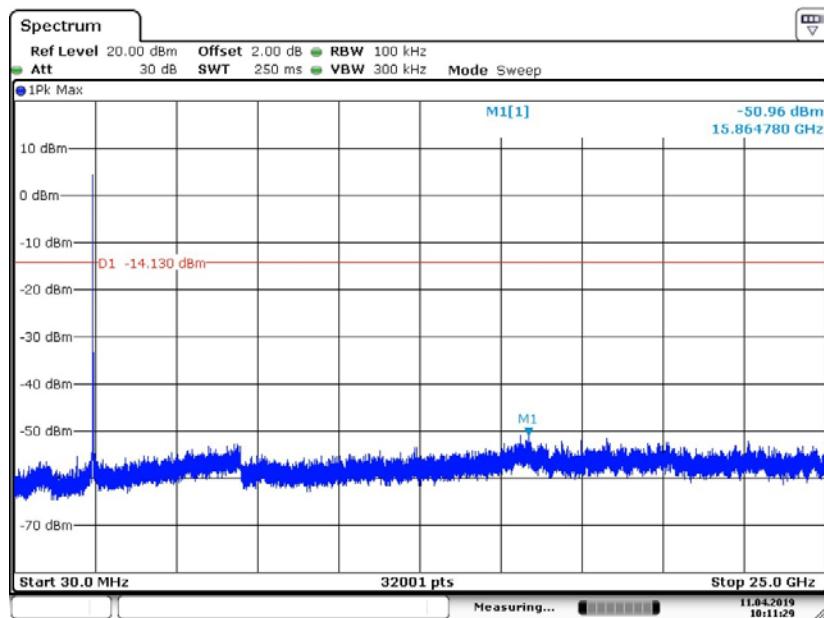


Test Model	Unwanted Emissions in non-restricted frequency bands			
	<input type="checkbox"/> 802.11b	<input checked="" type="checkbox"/> 802.11g	<input type="checkbox"/> 802.11n(HT20)	<input type="checkbox"/> 802.11n(HT40)
	<input checked="" type="checkbox"/> Channel 1: 2412MHz	<input type="checkbox"/> Channel 3: 2422MHz		

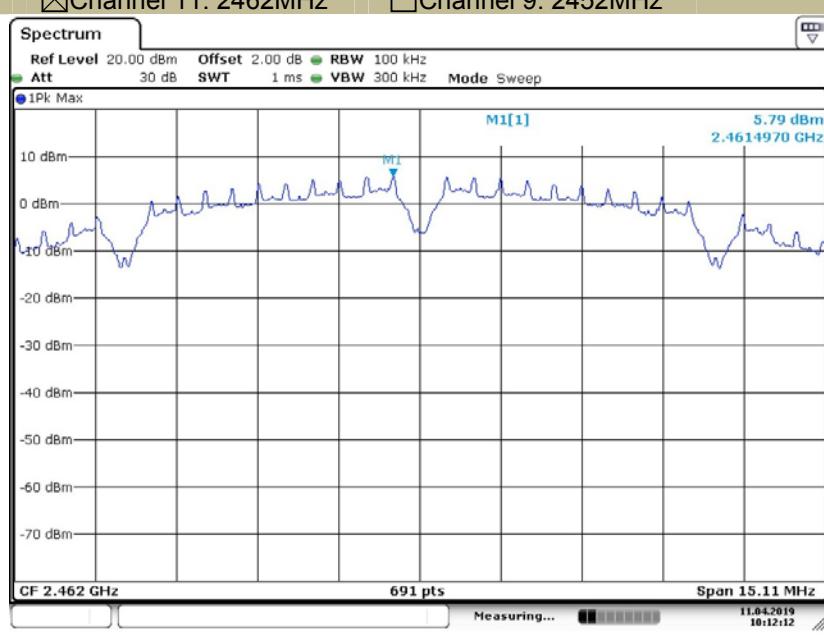


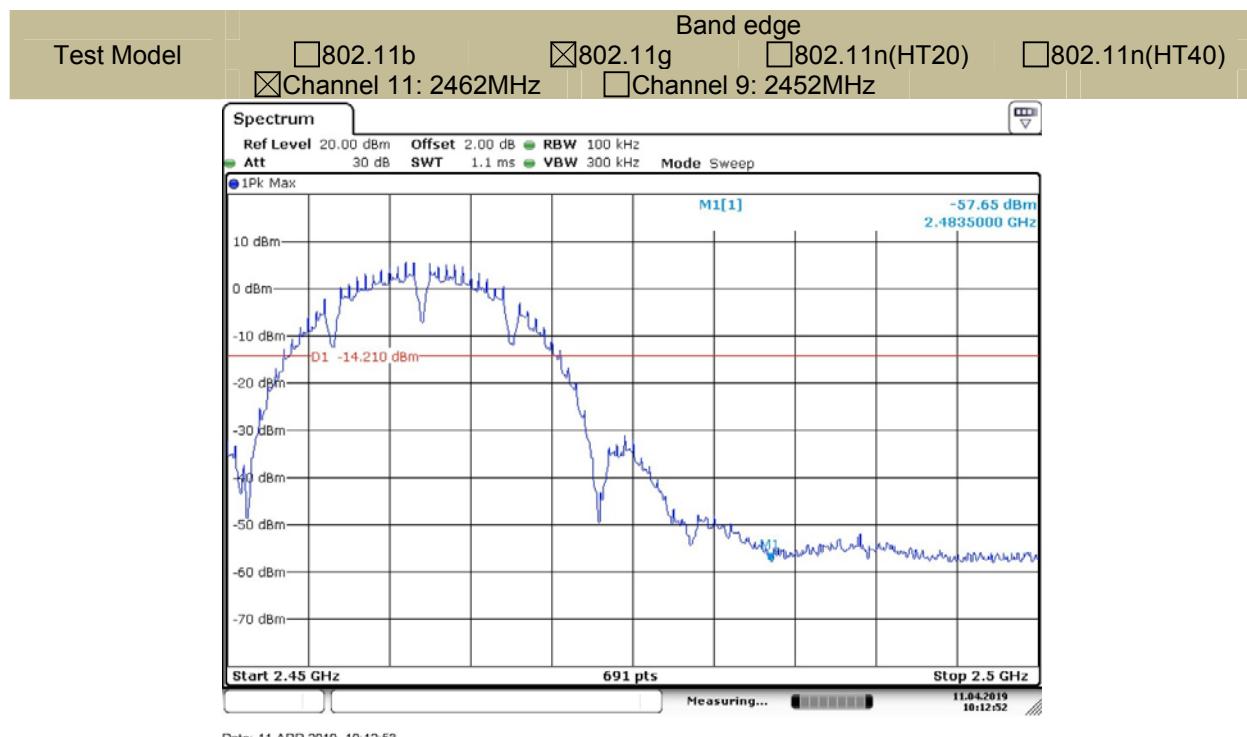
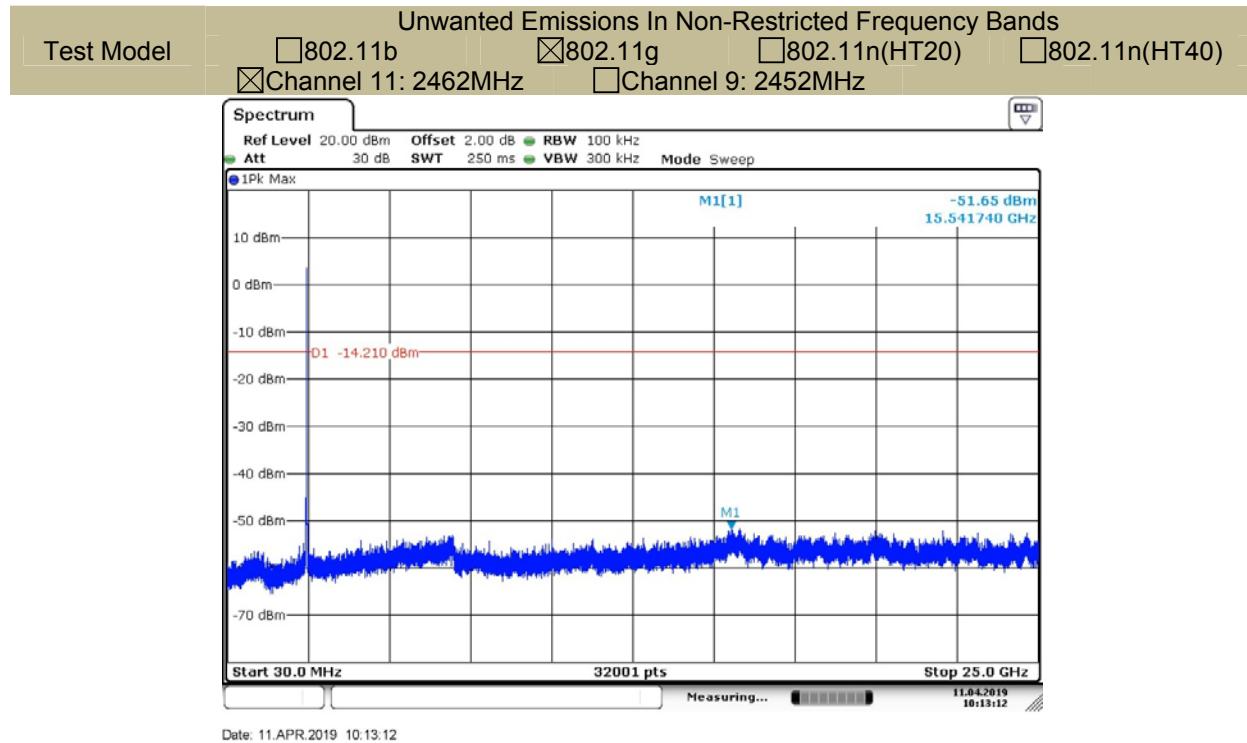


Test Model	<input type="checkbox"/> 802.11b	<input checked="" type="checkbox"/> 802.11g	<input type="checkbox"/> 802.11n(HT20)	<input type="checkbox"/> 802.11n(HT40)
	Channel 6: 2437MHz			



Test Model	<input type="checkbox"/> 802.11b	<input checked="" type="checkbox"/> 802.11g	<input type="checkbox"/> 802.11n(HT20)	<input type="checkbox"/> 802.11n(HT40)
	Channel 11: 2462MHz	Channel 9: 2452MHz		





## 8.5 RADIATED SPURIOUS EMISSION

### 8.5.1 Applicable Standard

According to FCC Part 15.247(d) and 15.209 and KDB558074 DTS 01 Meas. Guidance v05r02

### 8.5.2 Conformance Limit

According to FCC Part 15.247(d): radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).  
According to FCC Part 15.205, Restricted bands

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
10.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(2)
13.36-13.41			

According to FCC Part 15.205, the level of any transmitter spurious emission in Restricted bands shall not exceed the level of the emission specified in the following table

Restricted Frequency(MHz)	Field Strength ( $\mu$ V/m)	Field Strength (dB $\mu$ V/m)	Measurement Distance
0.009-0.490	2400/F(KHz)	20 log ( $\mu$ V/m)	300
0.490-1.705	2400/F(KHz)	20 log ( $\mu$ V/m)	30
1.705-30	30	29.5	30
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

### 8.5.3 Test Configuration

Test according to clause 7.2 radio frequency test setup 2

### 8.5.4 Test Procedure

This test is required for any spurious emission that falls in a Restricted Band, as defined in Section 15.205. It must be performed with the highest gain of each type of antenna proposed for use with the EUT. Use the following spectrum analyzer settings:

The EUT was placed on a turn table which is 0.8m above ground plane.

Maximum procedure was performed on the highest emissions to ensure EUT compliance.

Span = wide enough to fully capture the emission being measured

RBW = 1 MHz for  $f \geq 1$  GHz(1GHz to 25GHz), 100 kHz for  $f < 1$  GHz(30MHz to 1GHz), 200Hz for  $f < 150$  KHz(9KHz to 150KHz), 9KHz for  $f < 30$  MHz(150KHz to 30KHz)

VBW  $\geq$  RBW

Sweep = auto

Detector function = peak

Trace = max hold

Follow the guidelines in ANSI C63.10-2013 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the

measurement antenna height and polarization, etc. A pre-amp and a high pass filter are required for this test, in order to provide the measuring system with sufficient sensitivity. Allow the trace to stabilize. The peak reading of the emission, after being corrected by the antenna factor, cable loss, pre-amp gain, etc., is the peak field strength, which must comply with the limit specified in Section 15.35(b). Submit this data. Now set the VBW to 10 Hz, while maintaining all of the other instrument settings. This peak level, once corrected, must comply with the limit specified in Section 15.209. If the dwell time per channel of the hopping signal is less than 100 ms, then the reading obtained with the 10 Hz VBW may be further adjusted by a "duty cycle correction factor", derived from  $20\log(\text{dwell time}/100 \text{ ms})$ , in an effort to demonstrate compliance with the 15.209 limit. Submit this data.

Repeat above procedures until all frequency measured was complete.

#### 8.5.5 Test Results

##### ■ Spurious Emission below 30MHz(9KHz to 30MHz)

Temperature:	24°C	Test Date:	April 17, 2019
Humidity:	53 %	Test By:	King Kong
Test mode:	TX Mode		

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
		PK	AV	PK	AV	PK	AV
--	--	--	--	--	--	--	--

Note: the amplitude of spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.

Distance extrapolation factor = $40\log(\text{Specific distance}/\text{test distance})(\text{ dB})$ ;

Limit line=Specific limits(dBuV) + distance extrapolation factor

##### ■ Spurious Emission Above 1GHz(1GHz to 25GHz)

All modes 2.4G 802.11b/g/n have been tested, and the worst result 802.11b with ant0 recorded was report as below:

Temperature :	26°C	Test Date :	April 17, 2019
Humidity :	60 %	Test By:	King Kong
Test mode:	802.11b	Frequency:	Channel 1: 2412MHz

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
		PK	AV	PK	AV	PK	AV
1748.000	V	42.67	29.54	74.00	54.00	-31.33	-24.46
12169.00	V	51.20	37.26	74.00	54.00	-22.80	-16.74
17796.00	V	52.83	38.47	74.00	54.00	-21.17	-15.53
--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--
1731.000	H	42.59	30.21	74.00	54.00	-31.41	-23.79
11030.00	H	50.27	37.26	74.00	54.00	-23.73	-16.74
18000.00	H	53.70	39.64	74.00	54.00	-20.30	-14.36

Temperature : 26°C      Test Date : April 17, 2019  
 Humidity : 60 %      Test By: King Kong  
 Test mode: 802.11b      Frequency: Channel 6: 2437MHz

Freq. (MHz)	Ant.Pol.	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
		PK	AV	PK	AV	PK	AV
1663.000	V	43.28	30.35	74.00	54.00	-30.72	-23.65
12611.00	V	50.27	37.25	74.00	54.00	-23.73	-16.75
17864.00	V	53.89	39.23	74.00	54.00	-20.11	-14.77
--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--
1697.000	H	43.40	29.06	74.00	54.00	-30.60	-24.94
11336.00	H	48.95	36.25	74.00	54.00	-25.05	-17.75
18000.00	H	52.25	38.72	74.00	54.00	-21.75	-15.28

Temperature : 26°C      Test Date : April 17, 2019  
 Humidity : 60 %      Test By: King Kong  
 Test mode: 802.11b      Frequency: Channel 11: 2462MHz

Freq. (MHz)	Ant.Pol.	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
		PK	AV	PK	AV	PK	AV
1850.000	V	43.47	30.24	74.00	54.00	-30.53	-23.76
11149.00	V	49.64	36.26	74.00	54.00	-24.36	-17.74
18000.00	V	53.13	39.03	74.00	54.00	-20.87	-14.97
--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--
1799.000	H	43.49	30.25	74.00	54.00	-30.51	-23.75
12645.00	H	51.52	37.26	74.00	54.00	-22.48	-16.74
17881.00	H	52.96	39.07	74.00	54.00	-21.04	-14.93

**Note:** (1) All Readings are Peak Value (VBW=3MHz) and Average Value (VBW=10Hz).  
 (2) Emission Level= Reading Level+Probe Factor +Cable Loss.  
 (3) Data of measurement within this frequency range shown “ -- ” in the table above means  
 the reading of emissions are attenuated more than 20dB below the permissible limits or the  
 field strength is too small to be measured.

■ Spurious Emission in Restricted Band 2310-2390MHz and 2483.5-2500MHz

All modes 2.4G 802.11b/g/n have been tested, and the worst result 802.11b recorded was report as below:

Temperature :	26°C	Test Date :	April 17, 2019
Humidity :	60 %	Test By:	King Kong
Test mode:	802.11b	Frequency:	Channel 1: 2412MHz

Frequency (MHz)	Polarity	PK(dBuV/m) (VBW=3MHz)	Limit 3m (dBuV/m)	Margin (dB)	AV(dBuV/m) (VBW=10Hz)	Limit 3m (dBuV/m)	Margin (dB)
2390.000	H	47.27	74.00	-26.73	32.55	54.00	-21.45
2390.000	V	48.51	74.00	-25.49	33.43	54.00	-20.57

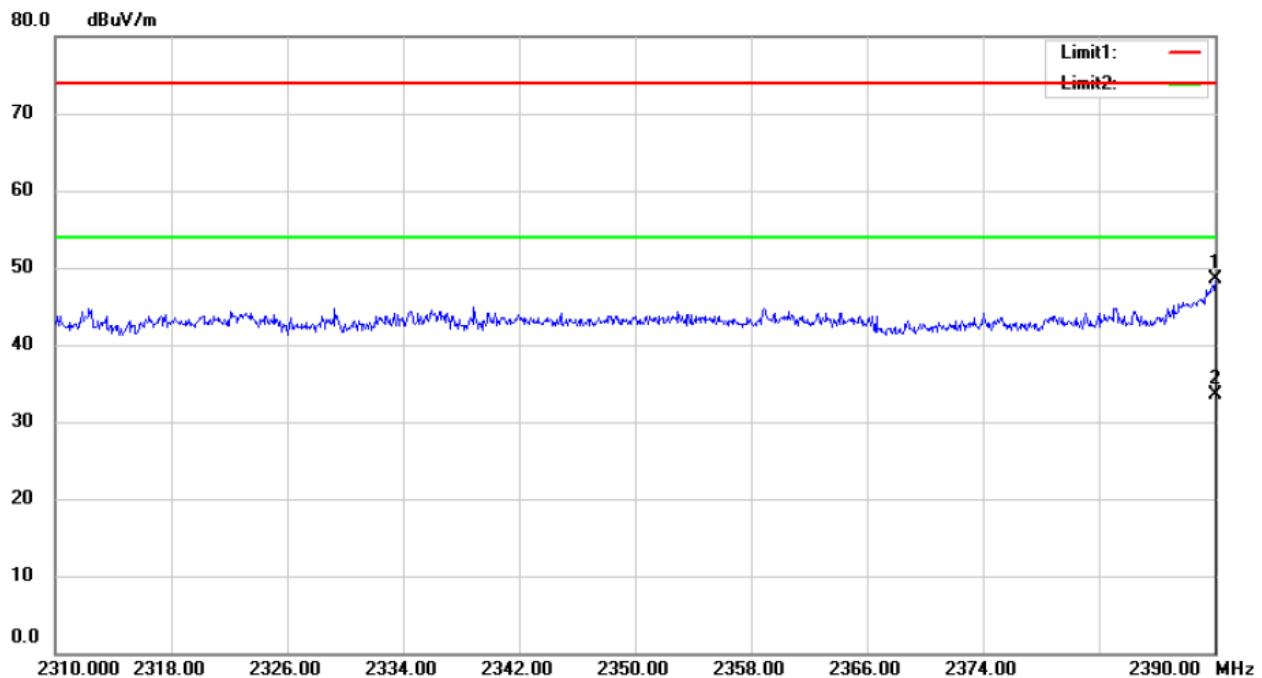
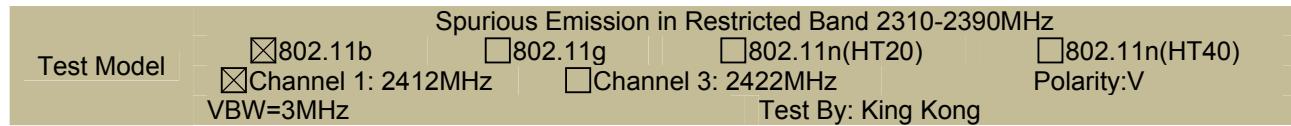
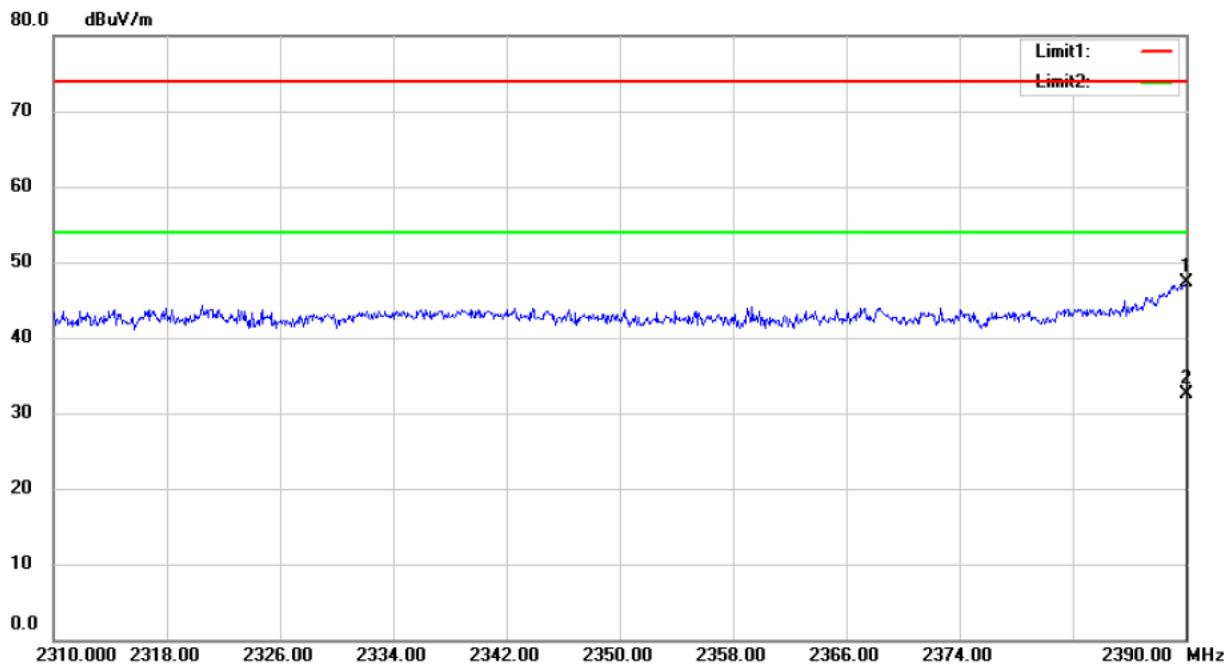
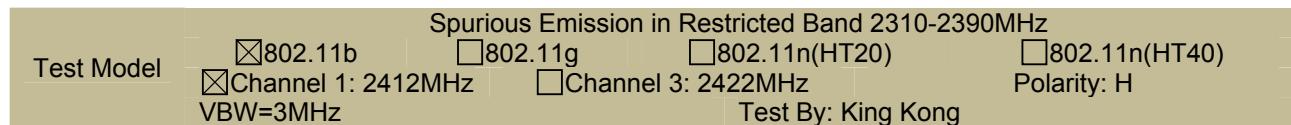
Temperature :	26°C	Test Date :	April 17, 2019
Humidity :	60 %	Test By:	King Kong
Test mode:	802.11b	Frequency:	Channel 11: 2462MHz

Frequency (MHz)	Polarity	PK(dBuV/m) (VBW=3MHz)	Limit 3m (dBuV/m)	Margin (dB)	AV(dBuV/m) (VBW=10Hz)	Limit 3m (dBuV/m)	Margin (dB)
2483.582	H	47.93	74.00	-26.07	32.54	54.00	-21.46
2483.500	V	47.95	74.00	-26.05	31.25	54.00	-22.75

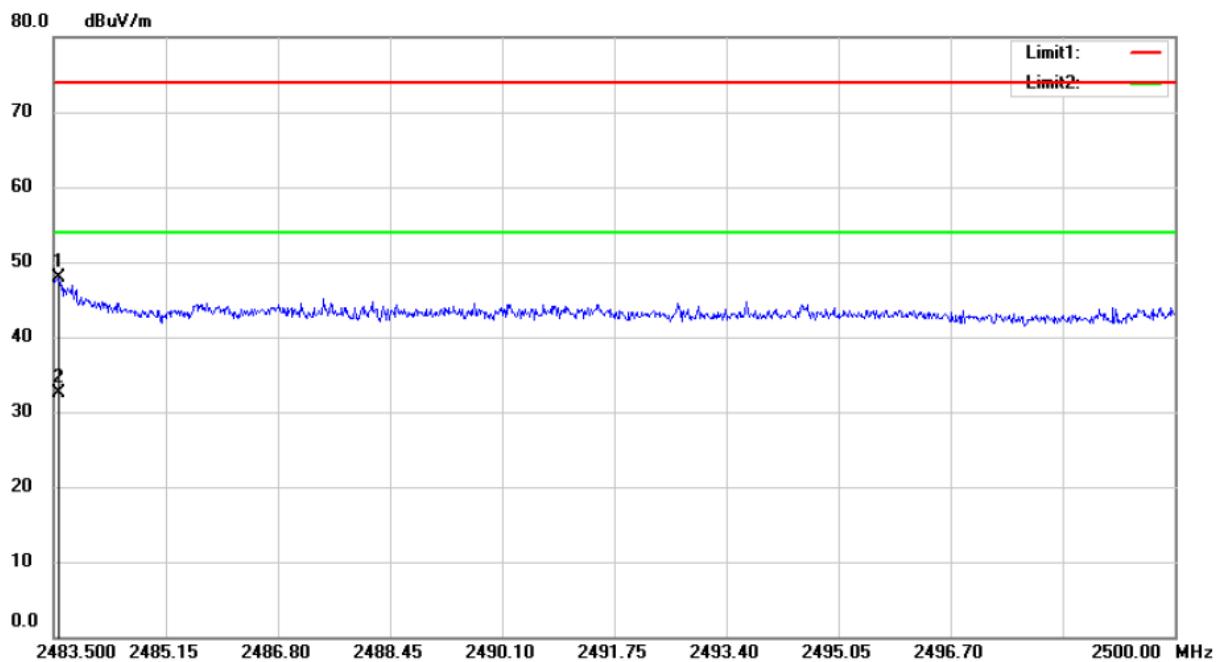
**Note:** (1) All Readings are Peak Value (VBW=3MHz) and Average Value (VBW=10Hz).

(2) Emission Level= Reading Level+Probe Factor +Cable Loss.

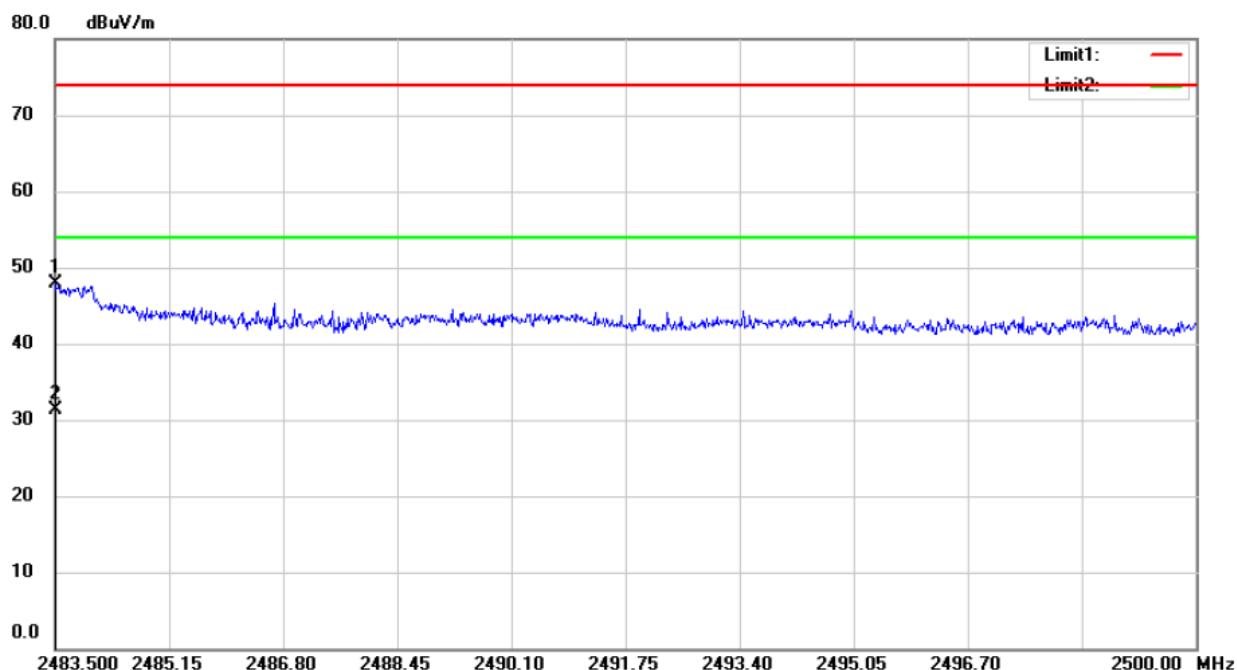
(3) Data of measurement within this frequency range shown “ -- ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.



Test Model	Spurious Emission in Restricted Band 2483.5-2500MHz			
	<input checked="" type="checkbox"/> 802.11b	<input type="checkbox"/> 802.11g	<input type="checkbox"/> 802.11n(HT20)	<input type="checkbox"/> 802.11n(HT40)
	<input checked="" type="checkbox"/> Channel 11: 2462MHz	<input type="checkbox"/> Channel 9: 2452MHz		Polarity: H
VBW=3MHz	Test By: King Kong			

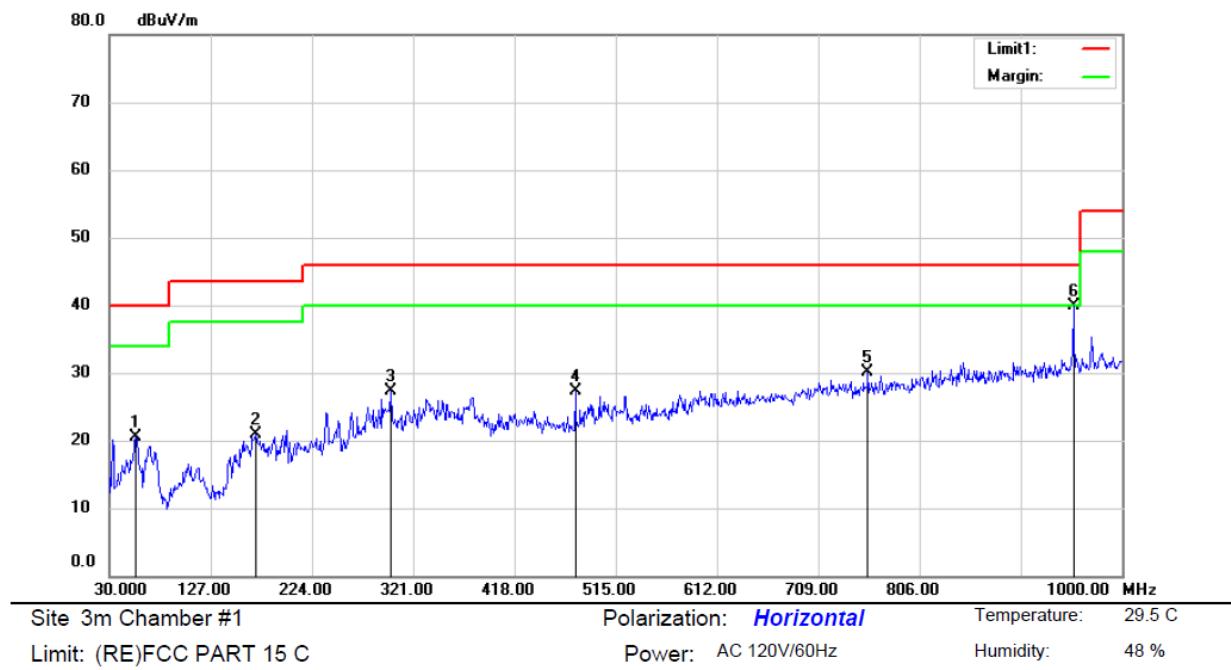


Test Model	Spurious Emission in Restricted Band 2483.5-2500MHz			
	<input checked="" type="checkbox"/> 802.11b	<input type="checkbox"/> 802.11g	<input type="checkbox"/> 802.11n(HT20)	<input type="checkbox"/> 802.11n(HT40)
	<input checked="" type="checkbox"/> Channel 11: 2462MHz	<input type="checkbox"/> Channel 9: 2452MHz		Polarity: V
	VBW=3MHz			
	Test By: King Kong			



■ Spurious Emission below 1GHz (30MHz to 1GHz)

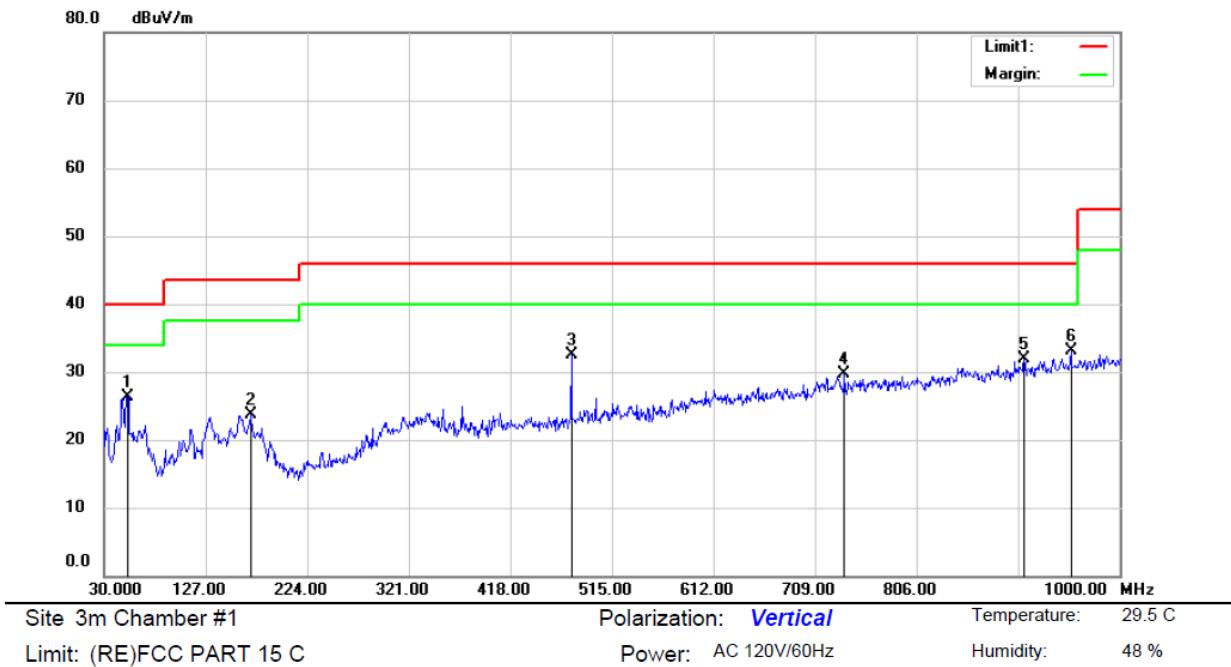
All modes 2.4G 802.11b/g/n have been tested, and the worst result recorded was report as below:



Mode: WIFI2.4G TX2412MHz

Note:

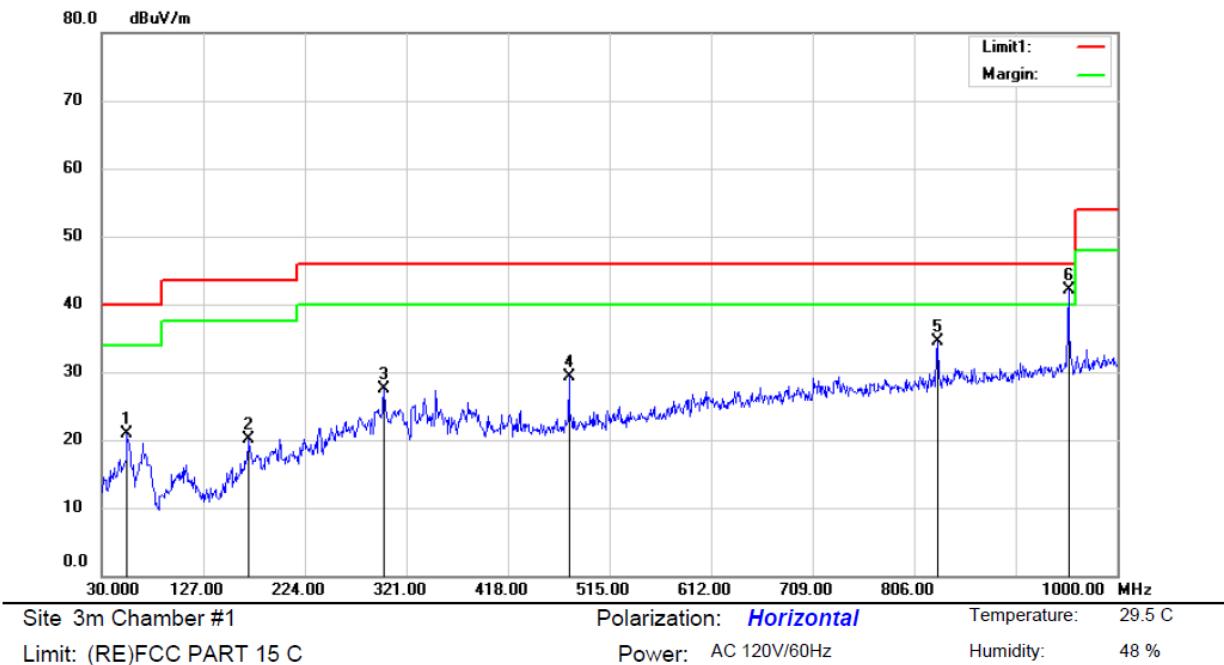
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Antenna Height cm	Table Degree	Comment
1		56.0687	32.42	-11.89	20.53	40.00	-19.47	QP			
2		170.7712	35.22	-14.27	20.95	43.50	-22.55	QP			
3		300.0237	35.58	-8.30	27.28	46.00	-18.72	QP			
4		476.9275	32.46	-5.08	27.38	46.00	-18.62	QP			
5		757.2575	30.11	-0.09	30.02	46.00	-15.98	QP			
6	*	954.0462	36.88	3.05	39.93	46.00	-6.07	QP			



Mode: WIFI2.4G TX2412MHz

Note:

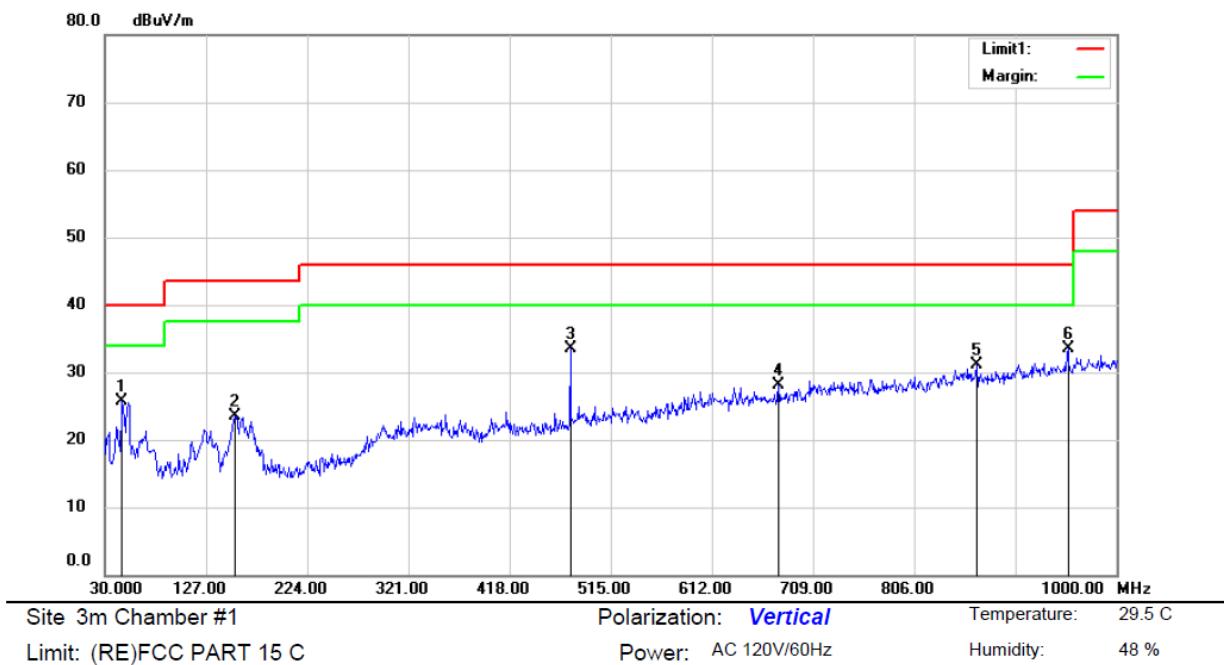
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Antenna Height cm		Table Degree	
								Detector	Table Degree	Comment	
1		53.1587	37.63	-11.28	26.35	40.00	-13.65	QP			
2		170.2862	37.92	-14.31	23.61	43.50	-19.89	QP			
3		477.0487	37.67	-5.08	32.59	46.00	-13.41	QP			
4		737.4937	30.16	-0.40	29.76	46.00	-16.24	QP			
5		909.0625	29.65	2.28	31.93	46.00	-14.07	QP			
6 *		954.0462	30.06	3.05	33.11	46.00	-12.89	QP			



Mode: WIFI2.4G TX2437MHz

Note:

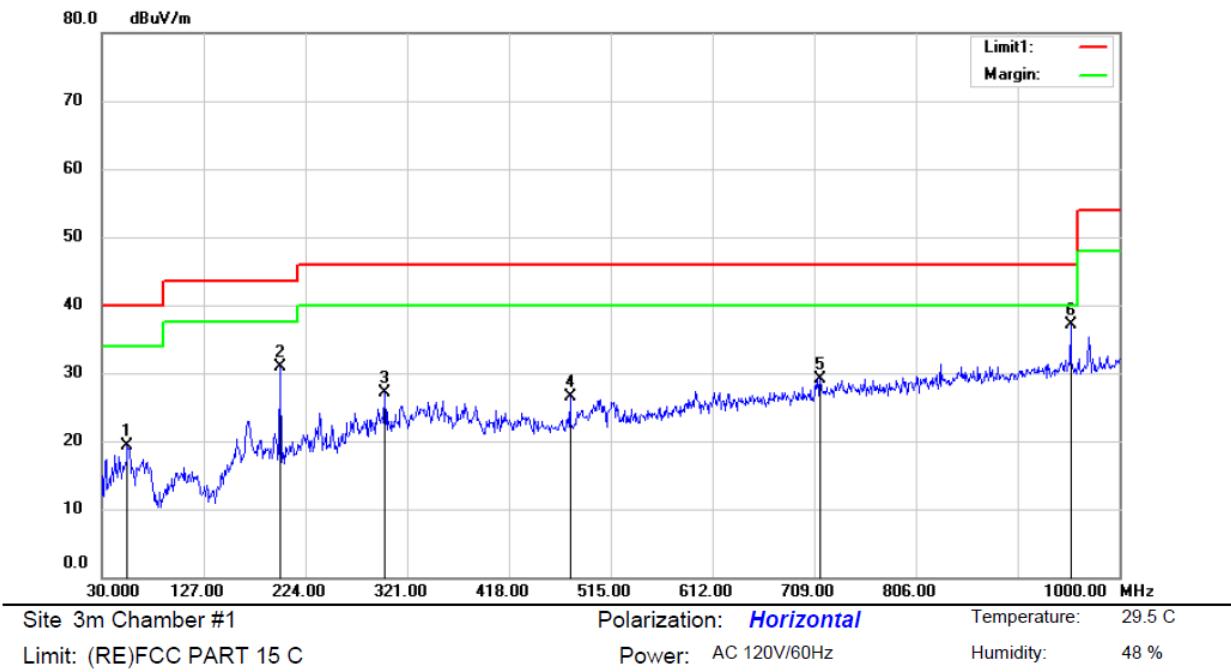
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Antenna Height cm		Table Degree	
								Detector	cm	degree	Comment
1		54.9774	32.50	-11.62	20.88	40.00	-19.12	QP			
2		171.1350	34.33	-14.25	20.08	43.50	-23.42	QP			
3		300.0237	35.78	-8.30	27.48	46.00	-18.52	QP			
4		476.9275	34.30	-5.08	29.22	46.00	-16.78	QP			
5		828.3100	33.99	0.55	34.54	46.00	-11.46	QP			
6	*	954.0461	39.04	3.05	42.09	46.00	-3.91	QP			



Mode: WIFI2.4G TX2437MHz

Note:

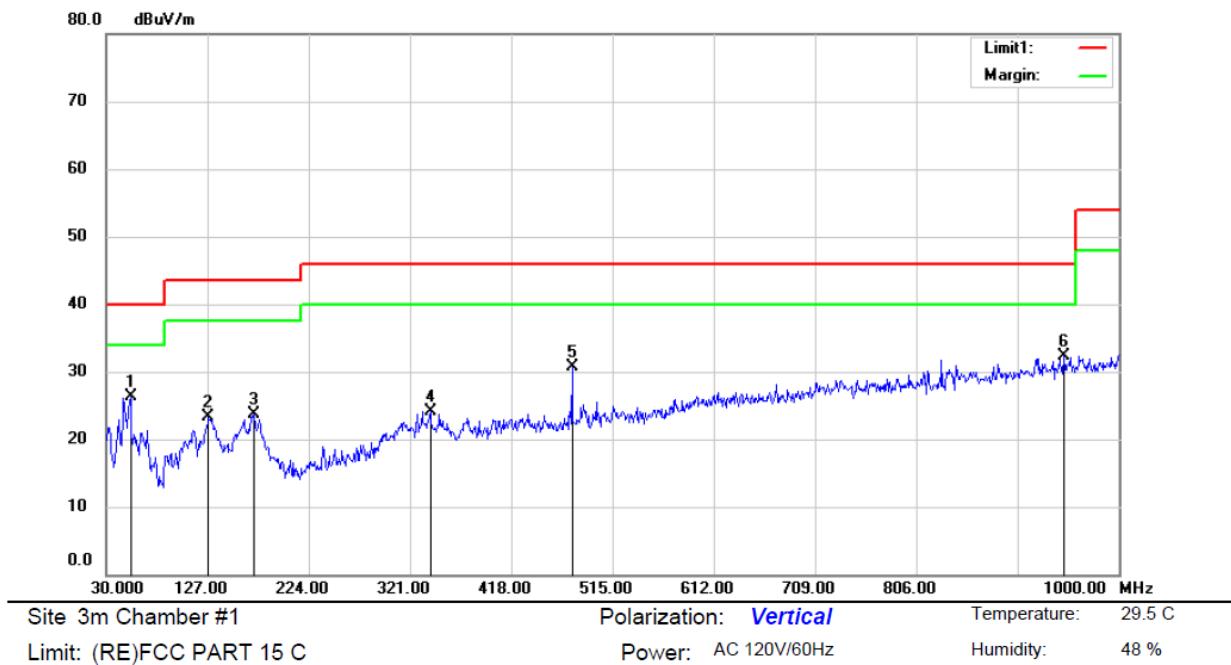
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Antenna Detector	Height cm	Table degree	Comment
1		47.3387	36.95	-11.21	25.74	40.00	-14.26	QP			
2		154.4025	38.65	-15.10	23.55	43.50	-19.95	QP			
3	*	477.0487	38.50	-5.08	33.42	46.00	-12.58	QP			
4		676.5050	29.56	-1.36	28.20	46.00	-17.80	QP			
5		866.1400	29.87	1.33	31.20	46.00	-14.80	QP			
6		954.0462	30.37	3.05	33.42	46.00	-12.58	QP			



Mode: WIFI2.4G TX2462MHz

Note:

No.	Mk.	Freq. MHz	Reading	Correct	Measure-	Limit	Over	Antenna Height cm	Table Degree	Comment
			Level dBuV	Factor dB	ment dBuV/m					
1		54.8562	30.89	-11.60	19.29	40.00	-20.71	QP		
2		199.9924	42.26	-11.44	30.82	43.50	-12.68	QP		
3		300.0237	35.35	-8.30	27.05	46.00	-18.95	QP		
4		477.0487	31.54	-5.08	26.46	46.00	-19.54	QP		
5		715.5475	29.96	-0.79	29.17	46.00	-16.83	QP		
6 *		954.0462	34.09	3.05	37.14	46.00	-8.86	QP		



Mode: WIFI2.4G TX2462MHz

Note:

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Antenna Detector	Table Height cm	Table Degree degree	Comment
1	*	53.2800	37.67	-11.30	26.37	40.00	-13.63	QP			
2		128.4550	38.52	-15.27	23.25	43.50	-20.25	QP			
3		171.7412	37.89	-14.21	23.68	43.50	-19.82	QP			
4		340.6424	31.10	-7.04	24.06	46.00	-21.94	QP			
5		476.9275	35.74	-5.08	30.66	46.00	-15.34	QP			
6		947.9837	29.35	2.91	32.26	46.00	-13.74	QP			

## 8.6 CONDUCTED EMISSIONS TEST

### 8.6.1 Applicable Standard

According to FCC Part 15.207(a)

### 8.6.2 Conformance Limit

Conducted Emission Limit		
Frequency(MHz)	Quasi-peak	Average
0.15-0.5	66-56	56-46
0.5-5.0	56	46
5.0-30.0	60	50

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

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

### 8.6.3 Test Configuration

Test according to clause 7.3 conducted emission test setup

### 8.6.4 Test Procedure

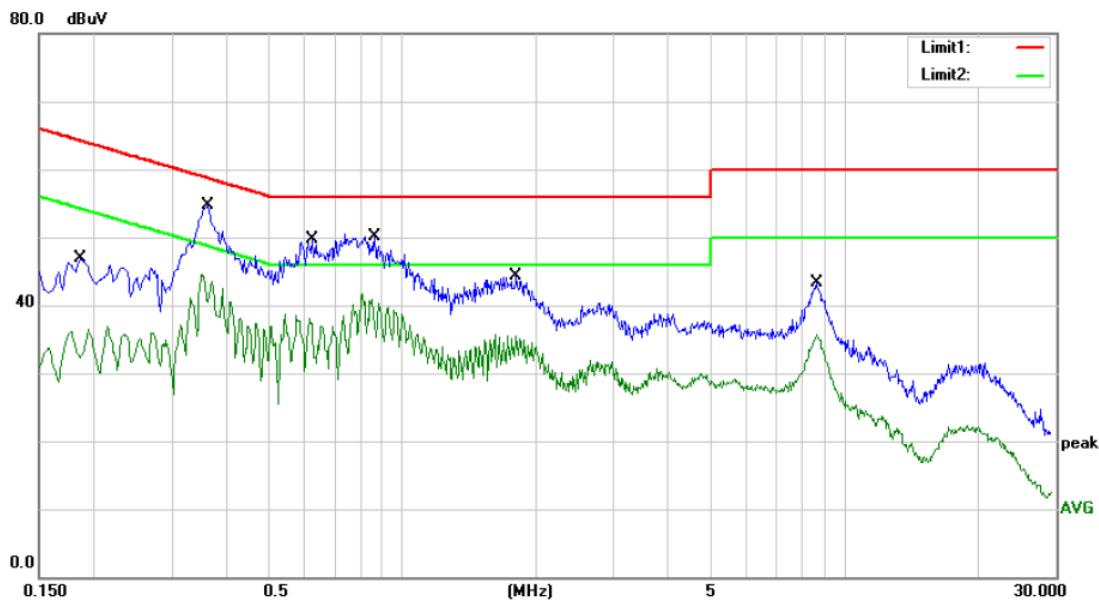
The EUT was placed on a table which is 0.8m above ground plane.

Maximum procedure was performed on the highest emissions to ensure EUT compliance.

Repeat above procedures until all frequency measured were complete.

### 8.6.5 Test Results

Pass



Site Conduction #1

Phase: **L1**

Temperature: 24.9

Limit: (CE)FCC PART 15.207

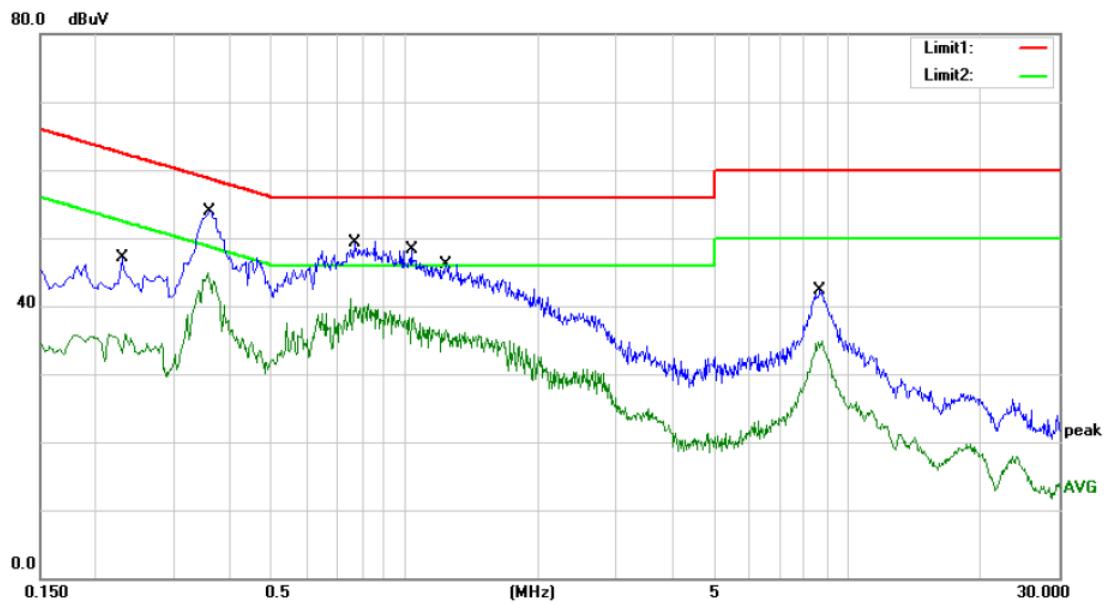
Power: AC 120V/60Hz

Humidity: 54 %

Mode: WIFI+BT ON

Note:

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Over	
								Detector	Comment
1		0.1860	37.34	9.55	46.89	64.21	-17.32	QP	
2		0.1860	27.38	9.55	36.93	54.21	-17.28	AVG	
3 *		0.3620	45.09	9.56	54.65	58.68	-4.03	QP	
4		0.3620	34.88	9.56	44.44	48.68	-4.24	AVG	
5		0.6220	40.22	9.57	49.79	56.00	-6.21	QP	
6		0.6220	32.08	9.57	41.65	46.00	-4.35	AVG	
7		0.8660	40.55	9.59	50.14	56.00	-5.86	QP	
8		0.8660	26.12	9.59	35.71	46.00	-10.29	AVG	
9		1.8020	34.69	9.60	44.29	56.00	-11.71	QP	
10		1.8020	26.09	9.60	35.69	46.00	-10.31	AVG	
11		8.6180	33.56	9.75	43.31	60.00	-16.69	QP	
12		8.6500	25.94	9.75	35.69	50.00	-14.31	AVG	



Site Conduction #1

Limit: (CE)FCC PART 15.207

Phase: **N**

Power: AC 120V/60Hz

Temperature: 24.9

Humidity: 54 %

Mode: WIFI+BT ON

Note:

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dB	Over Detector	Comment
1		0.2300	37.49	9.55	47.04	62.45	-15.41	QP
2		0.2300	26.30	9.55	35.85	52.45	-16.60	AVG
3		0.3620	44.28	9.56	53.84	58.68	-4.84	QP
4	*	0.3620	35.32	9.56	44.88	48.68	-3.80	AVG
5		0.7700	39.66	9.58	49.24	56.00	-6.76	QP
6		0.7700	31.57	9.58	41.15	46.00	-4.85	AVG
7		1.0340	38.69	9.59	48.28	56.00	-7.72	QP
8		1.0340	29.17	9.59	38.76	46.00	-7.24	AVG
9		1.2380	36.53	9.59	46.12	56.00	-9.88	QP
10		1.2380	26.51	9.59	36.10	46.00	-9.90	AVG
11		8.6460	32.48	9.75	42.23	60.00	-17.77	QP
12		8.6460	25.08	9.75	34.83	50.00	-15.17	AVG

## 8.7 ANTENNA APPLICATION

### 8.7.1 Antenna Requirement

Standard	Requirement
FCC CRF Part15.203	An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

### 8.7.2 Result

PASS.

The EUT has 1 antenna: a FPC Antenna for WIFI and BT, the gain is 2 dBi;

- Note:
- Antenna use a permanently attached antenna which is not replaceable.
  - Not using a standard antenna jack or electrical connector for antenna replacement
  - The antenna has to be professionally installed (please provide method of installation)

which in accordance to section 15.203, please refer to the internal photos.