

## TEST REPORT

Applicant Name & Address : Guangzhou ECHOM Science&Technology Co., Ltd  
No.29, Kefeng Road, Science City High-Technology Industry Development  
Zone, Guangzhou Science City, Guangzhou, China

### Sample Description

Product : LED TV  
FCC ID : 2AISK-WD70UB4580  
Model No. : WD70UB4580  
Electrical Rating : AC 120V~50/60Hz, 280W

Date Received : 06 June 2016  
Date Test Conducted : 06 June 2016 to 25 July 2016  
Test standards : **47 CFR PART 15 Subpart C: 2014 section 15.247**

Test Result : Pass

Conclusion : The submitted samples complied with the above rules/standards.


Remark : TRF No.: FCC WIFI-a  
Effective date: 01 July 2016

\*\*\*\*\*End of Page\*\*\*\*\*

***Prepared and Checked By:***

***Approved By:***

  
**Paul Pang**  
**Project Engineer**  
**Intertek Guangzhou**

 **Signature**  
**Helen Ma**  
**Team Leader**  
**Intertek Guangzhou**  
**30 July 2016** **Date**

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FCC ID: 2AISK-WD70UB4580  
TRF No.: FCC WIFI-a



Report No.: 160606105GZU-001  
Issued: 2016-07-30

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## 5.0 Test Equipment List

### Radiated Emission

Equipment No.	Equipment	Model	Manufacturer	Cal. Due date (YYYY-MM-DD)	Calibration Interval
EM030-04	3m Semi-Anechoic Chamber	9×6×6 m <sup>3</sup>	ETS•LINDGREN	2017-5-9	1Y
EM031-02	EMI Test Receiver (9 kHz~7 GHz)	R&S ESR7	R&S	2017-6-7	1Y
EM031-03	Signal and Spectrum Analyzer (10 Hz~40 GHz)	R&S FSV40	R&S	2017-6-3	1Y
EM011-04	Loop antenna (9 kHz-30 MHz)	HFH2-Z2	R&S	2017-6-6	1Y
EM061-03	TRILOG Super Broadband test Antenna (30 MHz-1.5 GHz) (TX)	VULB 9161	SCHWARZBECK	2017-6-6	1Y
EM033-01	TRILOG Super Broadband test Antenna(30 MHz-3 GHz) (RX)	VULB 9163	SCHWARZBECK	2016-9-2	1Y
EM033-02	Bouble-Ridged Waveguide Horn Antenna (800 MHz-18 GHz)(RX)	R&S HF907	R&S	2017-6-6	1Y
EM033-03	High Frequency Antenna & preamplifier(18 GHz~26.5 GHz) (RX)	R&S SCU-26	R&S	2017-4-1	1Y
EM033-04	High Frequency Antenna & preamplifier (26 GHz-40 GHz)	R&S SCU-40	R&S	2017-4-1	1Y
EM031-02-01	Coaxial cable(9 kHz-1 GHz)	N/A	R&S	2017-5-30	1Y
EM033-02-02	Coaxial cable(1 GHz-18 GHz)	N/A	R&S	2017-5-30	1Y
EM033-04-02	Coaxial cable(18 GHz~40 GHz)	N/A	R&S	2017-4-1	1Y
EM031-01	Signal Generator (9 kHz~6 GHz)	SMB100A	R&S	2017-6-11	1Y
SZ180-10	Signal Generator (10MHz-40GHz)	68369B	Wiltron	2017-5-23	1Y
EM040-01	Band Reject/Notch Filter	WRHFV	Wainwright	N/A	1Y
EM040-02	Band Reject/Notch Filter	WRCGV	Wainwright	N/A	1Y
EM040-03	Band Reject/Notch Filter	WRCGV	Wainwright	N/A	1Y
EM022-03	2.45 GHz Filter	BRM50702	Micro-Tronics	2017-5-9	1Y
SA016-16	Programmable Temperature & Humidity Test Chamber	MHU-800LJ	TERCHY	2016-10-26	1Y
SA012-74	Digital Multimeter	FLUKE175	FLUKE	2016-10-12	1Y
EM010-01	Regulated DC Power supply	PAB-3003A	GUANHUA	N/A	1Y
SA040-22	Regulated DC Power supply	IT6721	ITECH	2016-9-22	1Y
EM084-06	Audio Analyzer	8903B	HP	2017-3-29	1Y
EM084-07	Modulation Analyzer	8901B	HP	2017-6-5	1Y

### Conducted emission at the mains terminals

Equipment No.	Equipment	Model	Manufacturer	Cal. Due date (YYYY-MM-DD)	Calibration Interval
EM080-05	EMI receiver	ESCI	R&S	2016-7-27	1Y
EM006-05	LISN	ENV216	R&S	2016-9-28	1Y
EM006-06	LISN	ENV216	R&S	2016-9-16	1Y
EM006-06-01	Coaxial cable	/	R&S	2017-4-11	1Y
EM004-04	EMC shield Room	8m×3m×3m	Zhongyu	2017-1-25	1Y

## 1.0 Summary of Test

TEST	TEST REQUIREMENT	TEST METHOD	RESULT
Antenna Requirement	FCC PART 15 C section 15.247 (c) and Section 15.203	FCC PART 15 C section 15.247 (c) and Section 15.203	PASS
6 dB Bandwidth (DTS bandwidth)	FCC PART 15 C section 15.247 (a)(2)	ANSI C63.10: Clause 11.8	PASS
Maximum Peak Conducted Output Power	FCC PART 15 C section 15.247(b)(3)	ANSI C63.10: Clause 11.9.1.2	PASS
Peak Power Spectral Density	FCC PART 15 C section 15.247(e)	ANSI C63.10: Clause 11.10.2	PASS
Out of Band Conducted Emissions	FCC PART 15 C section 15.209 &15.247(d)	ANSI C63.10: Clause 11.11	PASS
Out of Band Radiated Emission	FCC PART 15 C section 15.209 &15.247(d)	ANSI C63.10: Clause 11.11, 6.4, 6.5 and 6.6	N/A
Radiated Emissions in Restricted Bands	FCC PART 15 C section 15.209 &15.247(d)	ANSI C63.10: Clause 11.12.1, 6.4, 6.5 and 6.6	PASS
Band Edges Measurement	FCC PART 15 C section 15.247 (d) &15.205	ANSI C63.10: Clause 11.11 and 11.13	PASS
Conducted Emissions at Mains Terminals	FCC PART 15 C section 15.207	ANSI C63.10: Clause 6.2	PASS

### Remark:

N/A: not applicable. Refer to the relative section for the details.  
EUT: In this whole report EUT means Equipment Under Test.  
Tx: In this whole report Tx (or tx) means Transmitter.  
Rx: In this whole report Rx (or rx) means Receiver.  
RF: In this whole report RF means Radio Frequency.  
ANSI C63.10: the detail version is ANSI C63.10:2013 in the whole report.

## 2.0 General Description

### 2.1 Product Description

Operating Frequency	2412 MHz to 2462 MHz for 802.11b/g/n(HT20) 2422 MHz to 2452 MHz for 802.11n(HT40)																																																																																												
Type of Modulation:	802.11b: DQPSK/DBPSK/DSSS/CCK 802.11g: QPSK/BPSK/16QAM/64QAM/OFDM 802.11n: QPSK/BPSK/16QAM/64QAM/OFDM Remark: The operation of transmission supports MIMO.																																																																																												
Transmit Data Rate:	<p>802.11b :1/2/5.5/11 Mbps 802.11g :6/9/12/18/24/36/48/54 Mbps 802.11n: TX/RX: MCS0-MCS15</p> <table> <tr> <th rowspan="2">MCS</th><th colspan="2">GI=400ns</th><th colspan="2">GI=800ns</th></tr> <tr> <th>20MHz</th><th>40MHz</th><th>20MHz</th><th>40MHz</th></tr> <tr><td>0</td><td>6.5</td><td>13.5</td><td>7.2</td><td>15</td></tr> <tr><td>1</td><td>13</td><td>27</td><td>14.4</td><td>30</td></tr> <tr><td>2</td><td>19.5</td><td>40.5</td><td>21.7</td><td>45</td></tr> <tr><td>3</td><td>26</td><td>54</td><td>28.9</td><td>60</td></tr> <tr><td>4</td><td>39</td><td>81</td><td>43.3</td><td>90</td></tr> <tr><td>5</td><td>52</td><td>108</td><td>57.8</td><td>120</td></tr> <tr><td>6</td><td>58.5</td><td>121.5</td><td>65.0</td><td>135</td></tr> <tr><td>7</td><td>65</td><td>135</td><td>72.2</td><td>150</td></tr> <tr><td>8</td><td>13</td><td>27</td><td>14.444</td><td>30</td></tr> <tr><td>9</td><td>26</td><td>54</td><td>28.889</td><td>60</td></tr> <tr><td>10</td><td>39</td><td>81</td><td>43.333</td><td>90</td></tr> <tr><td>11</td><td>52</td><td>108</td><td>57.778</td><td>120</td></tr> <tr><td>12</td><td>78</td><td>162</td><td>86.667</td><td>180</td></tr> <tr><td>13</td><td>104</td><td>216</td><td>115.555</td><td>240</td></tr> <tr><td>14</td><td>117</td><td>245</td><td>130.000</td><td>170</td></tr> <tr><td>15</td><td>130</td><td>270</td><td>144.444</td><td>300</td></tr> </table>				MCS	GI=400ns		GI=800ns		20MHz	40MHz	20MHz	40MHz	0	6.5	13.5	7.2	15	1	13	27	14.4	30	2	19.5	40.5	21.7	45	3	26	54	28.9	60	4	39	81	43.3	90	5	52	108	57.8	120	6	58.5	121.5	65.0	135	7	65	135	72.2	150	8	13	27	14.444	30	9	26	54	28.889	60	10	39	81	43.333	90	11	52	108	57.778	120	12	78	162	86.667	180	13	104	216	115.555	240	14	117	245	130.000	170	15	130	270	144.444	300
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Number of Channels	11 Channels for 802.11b/g/n(HT20) 7 Channels for 802.11n(HT40)
Channel Separation:	5 MHz
Antenna Type	Two wire antennas that use a unique coupling to the intentional radiator
Antenna gain:	2 dBi for each antenna
Function:	LED TV with 2.4 GHz WIFI
EUT Power Supply:	AC 120V 60 Hz
Power cord:	3.0 m x 2 wires unscreened AC supply cable

EUT channels and frequencies list:

For 802.11b/g/n(HT20): test frequencies are lowest channel 1: 2412 MHz, middle channel 6: 2437 MHz and highest channel 11: 2462 MHz.

For 802.11n(HT40): test frequencies are lowest channel 3: 2422 MHz, middle channel 6: 2437 MHz and highest channel 9: 2452 MHz

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

## 2.2 Related Submittal(s) Grants

This is an application for certification of:

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

Remaining portions are subject to the following procedures:

1. Receiver portion of WIFI: exempt from technical requirement of this Part.
2. The LED TV function: FCC verification.
3. VGA, HDMI function: can be connected to PC, FCC DOC procedure.

## 2.3 Test Methodology

Both AC mains line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.10:2013. Radiated emission measurement was performed in semi-anechoic chamber and conducted emission measurement was performed in shield room. For radiated emission measurement, preliminary scans and final tests were performed in the semi-anechoic chamber to determine the worst case modes. All radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise.

Since the device supports MIMO, KDB 662911 D01 Multiple Transmitter Output v02r01 is followed when test.

## 2.4 Test Facility

All of the tests are performed at:

Intertek Testing Services Shenzhen Ltd. Guangzhou Branch. located at Block E, No.7-2 Guang Dong Software Science Park, Caipin Road, Guangzhou Science City, GETDD

FCC ID: 2AISK-WD70UB4580

TRF No.: FCC WIFI-a

Guangzhou, 510663, China. This test facility and site measurement data have been fully placed on file with the FCC, test firm registration number is 549654.

### 3.0 System Test Configuration

#### 3.1 Justification

For emissions testing, the equipment under test (EUT) setup to transmit continuously to simplify the measurement methodology. During testing, AC power line was manipulated to produce worst case emissions. It was powered by AC 120V/60Hz supply.

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

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

For an intentional radiator, the spectrum shall be investigated from the lowest radio frequency signal generated in the device, without going below 9 kHz, up to at least the frequency shown in the following table:

Frequency range of radiated emission measurements

Lowest frequency generated in the device	Upper frequency range of measurement
9 kHz to below 10 GHz	10th harmonic of highest fundamental frequency or to 40 GHz, whichever is lower.
At or above 10 GHz to below 30 GHz	5th harmonic of highest fundamental frequency or to 100 GHz, whichever is lower.
At or above 30 GHz	5th harmonic of highest fundamental frequency or to 200 GHz, whichever is lower, unless otherwise specified.

Number of fundamental frequencies to be tested in EUT transmit band

Frequency range in which device operates	Number of frequencies	Location in frequency range of operation
1 MHz or less	1	Middle
1 MHz to 10 MHz	2	1 near top and 1 near bottom
More than 10 MHz	3	1 near top, 1 near middle and 1 near bottom



### 3.2 EUT Exercising Software

The test was performed under “Secure CRT” which was provided by manufacture.

### 3.3 Special Accessories

No special accessories used.

### 3.4 Measurement Uncertainty

When determining of the test conclusion, the Measurement Uncertainty of test has been considered.

Uncertainty and Compliance – Unless the standard specifically states that measured values are to be extended by the measurement uncertainty in determining compliance, all compliance determinations are based on the actual measured value.

### 3.5 Equipment Modification

Any modifications installed previous to testing by Guangzhou ECHOM Science&Technology Co., Ltd. will be incorporated in each production model sold / leased in the United States.

No modifications were installed by Intertek Testing Services Shenzhen Ltd. Guangzhou Branch.

### 3.6 Support Equipment List and Description

This product was tested with corresponding accessories as below:

Supplied by Intertek:

Description	Manufacturer	Model No.	SN/Certificate NO
NoteBook	Lenovo	2344-IS4	PB-FR45R

#### 4.0 Measurement Results

##### 4.1 Antenna Requirement:

Standard requirement

15.203 requirement:

For intentional device. According to 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.

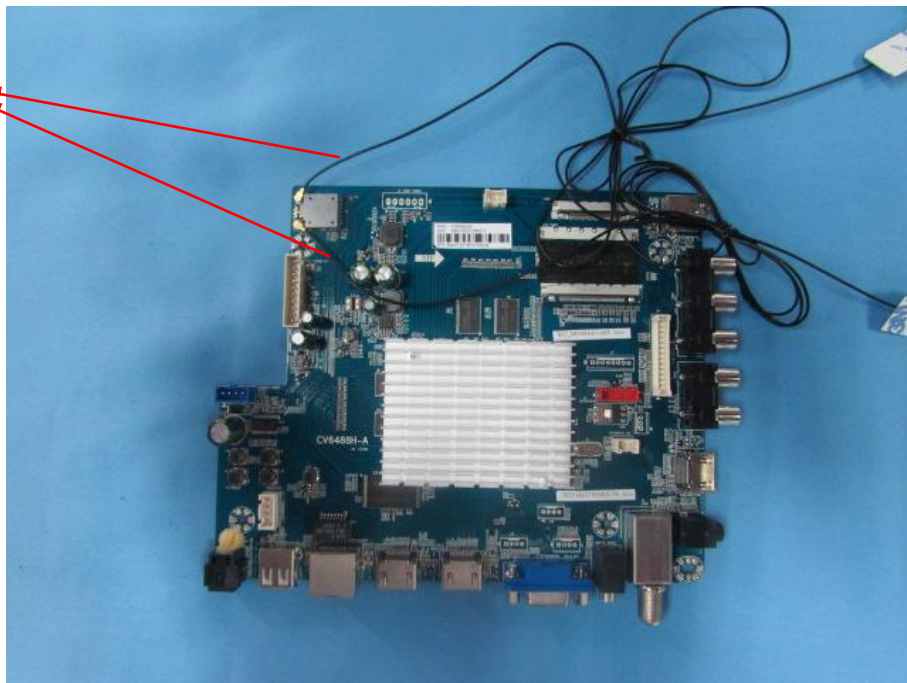
15.247(c) (1)(i) requirement:

(i) Systems operating in the 2400-2483.5 MHz bands that are used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

EUT Antenna

EUT use two dedicated antennas and no consideration of replacement. The best gain of the antenna is 2 dBi for each.

Dual Antenna



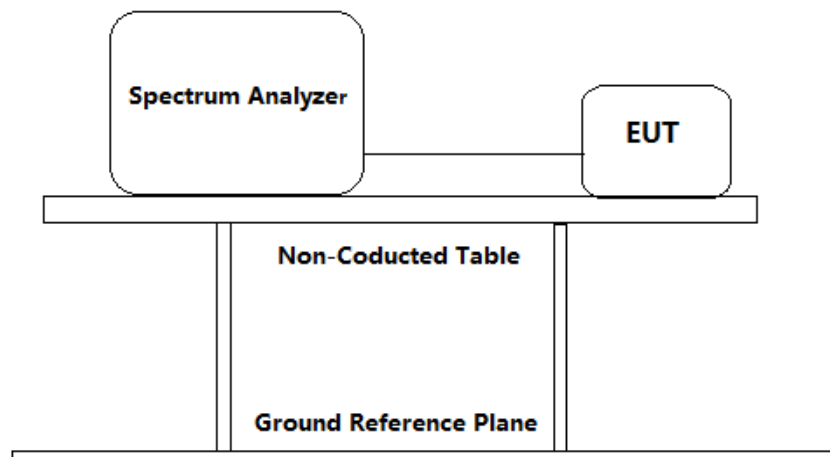
**4.2 6 dB Bandwidth (DTS bandwidth):**

**Test Requirement:** FCC Part 15 C section 15.247  
(a)(2) Systems using digital modulation techniques may operate in the 902-928 MHz, 2400-2483.5MHz, and 5725-5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

**Test Method:** ANSI C63.10: Clause 11.8

**Test Status:** Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture). Following channel(s) was (were) selected for the final test as listed below.

**Test Configuration:**



**Test Procedure:**

1. Remove the antenna from the EUT and then connect a low attention attenuation RF cable (cable loss =2.0 dB) from the antenna port to the spectrum.
2. Set the spectrum analyzer:
  - a) Set RBW = 100 kHz
  - b) Set the VBW  $\geq [3 \times \text{RBW}]$
  - c) Detector = peak.
  - d) Trace mode = max hold.
  - e) Sweep = auto couple
  - f) Allow the trace to stabilize.
  - g) 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.

h)  $\text{Span} = 2 \times \text{BW} \sim 5 \times \text{BW}$

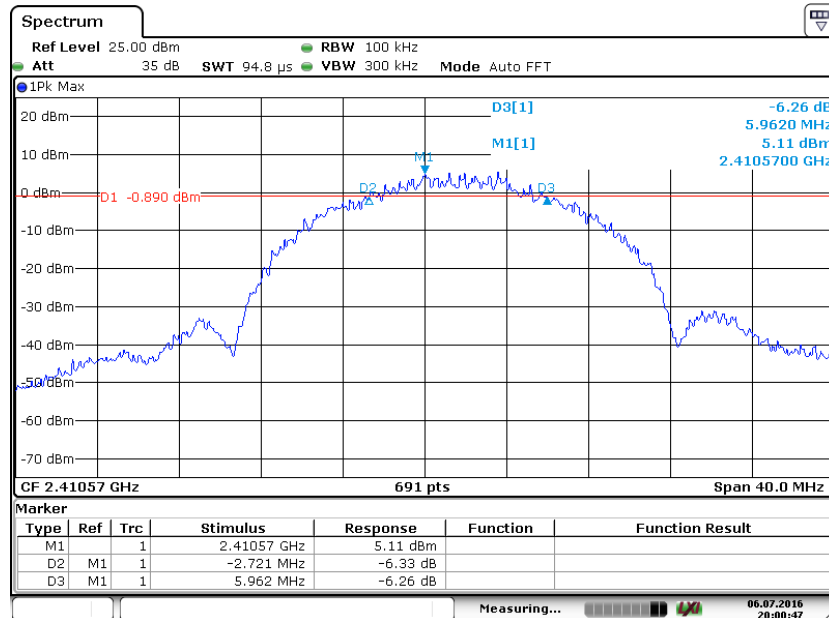
3. Repeat until all the test status is investigated.
4. Report the worst case.

Channel No.	Frequency (MHz)	Mode	Data Rate	Measured 6dB bandwidth (MHz)	Limit	Result
1	2412	802.11b	11 Mbps	8.683	$\geq 500\text{KHz}$	Pass
6	2437		11 Mbps	9.436		Pass
11	2462		11 Mbps	9.494		Pass
1	2412	802.11g	54 Mbps	16.556		Pass
6	2437		54 Mbps	16.556		Pass
11	2462		54 Mbps	16.556		Pass
1	2412	802.11n (HT20)	72.2 Mbps	16.556		Pass
6	2437		72.2 Mbps	16.556		Pass
11	2462		72.2 Mbps	16.556		Pass
3	2422	802.11n (HT40)	150 Mbps	36.490		Pass
6	2437		150 Mbps	36.470		Pass
9	2452		150 Mbps	36.420		Pass

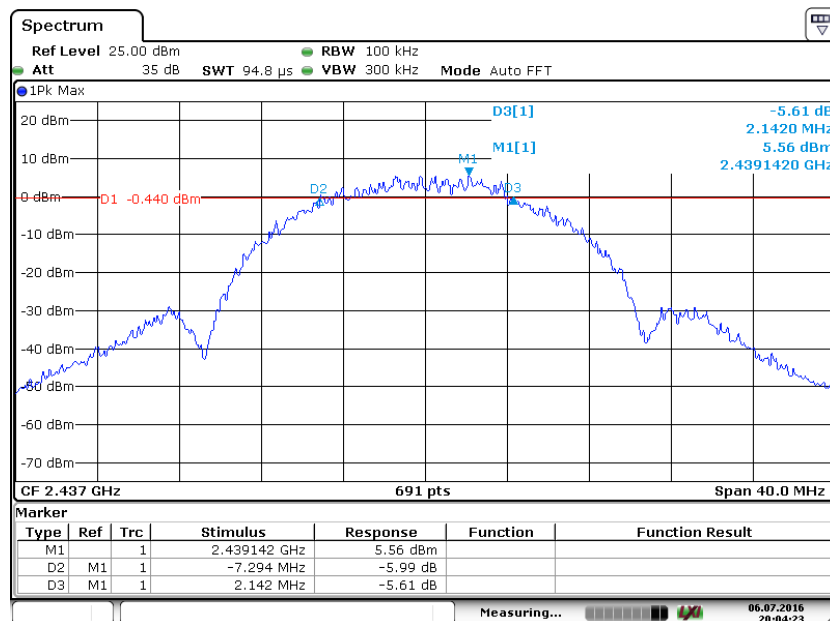
Test result: The unit does meet the FCC requirements.

Result plot as follows:

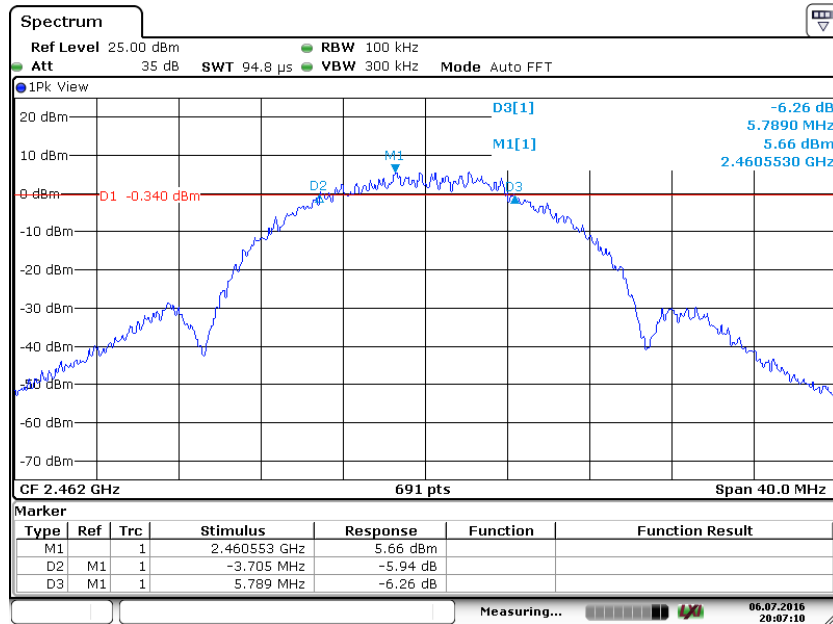
802.11b mode with 11Mbps data rate  
Channel 1: 2.412GHz:



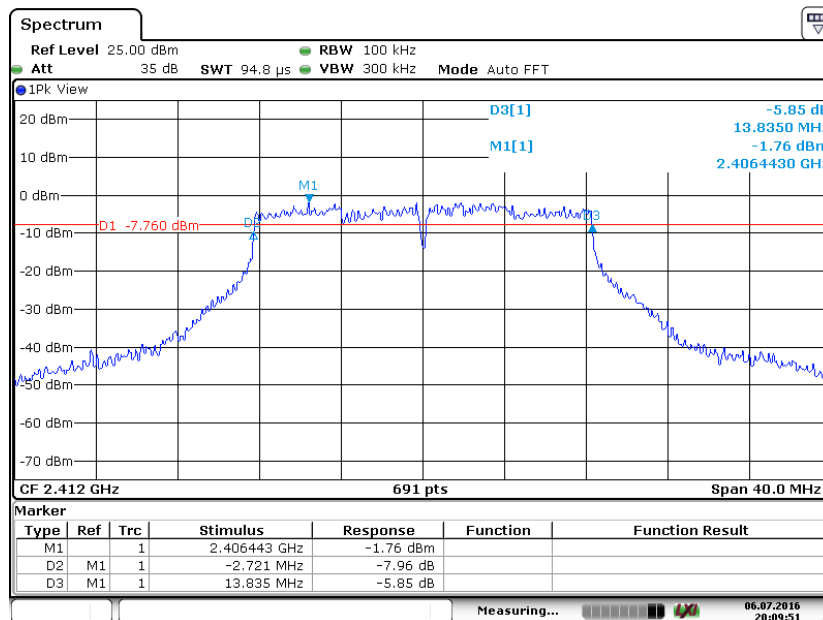
Channel 6: 2.437GHz:



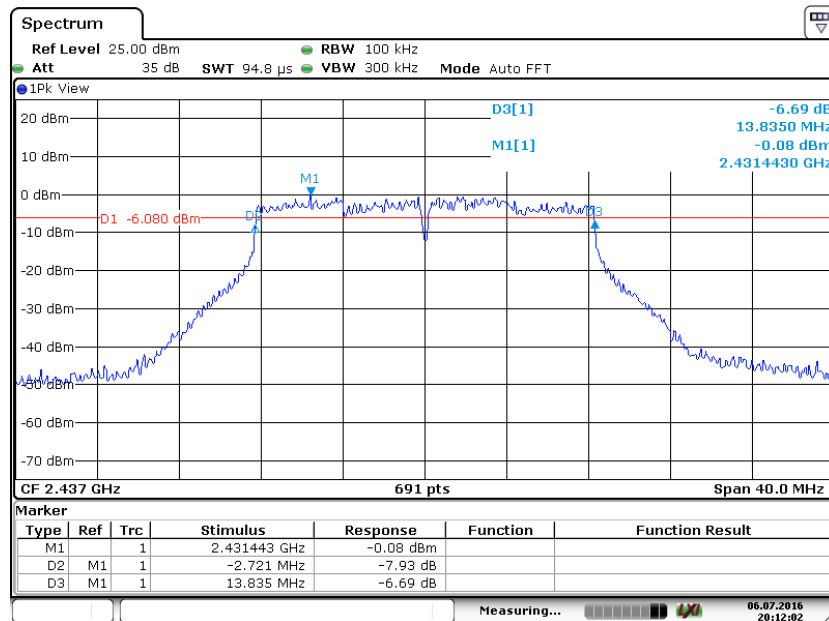
Channel 11: 2.462GHz



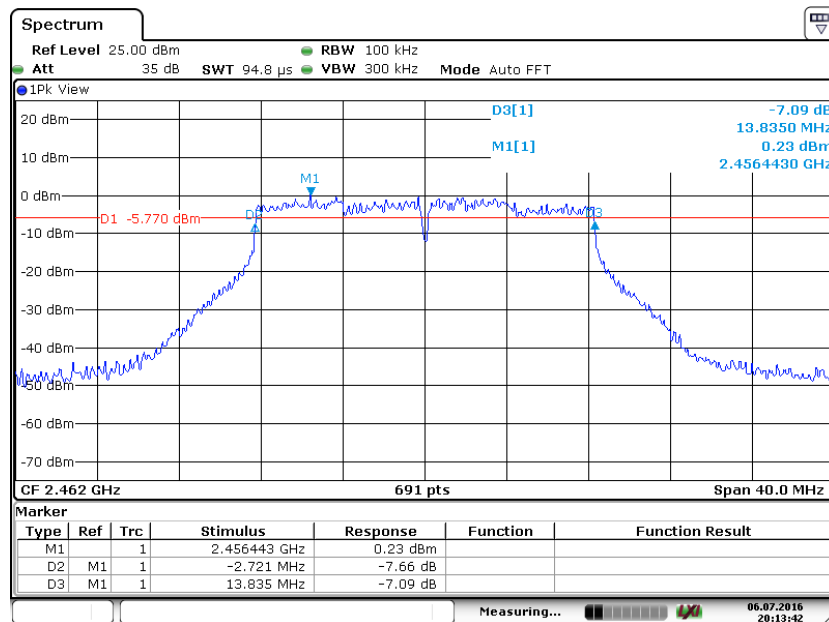
802.11g mode with 54Mbps data rate  
Channel 1: 2.412GHz:



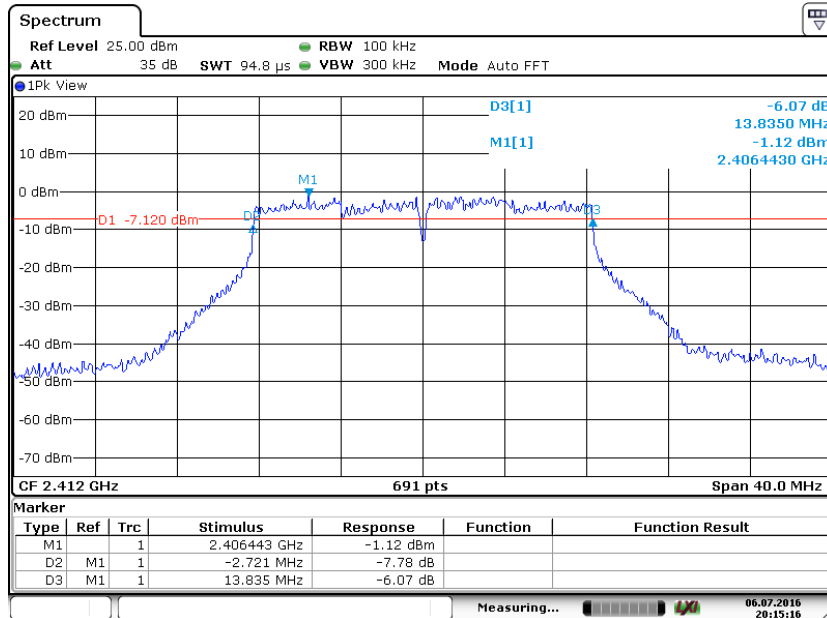
Channel 6: 2.437GHz:



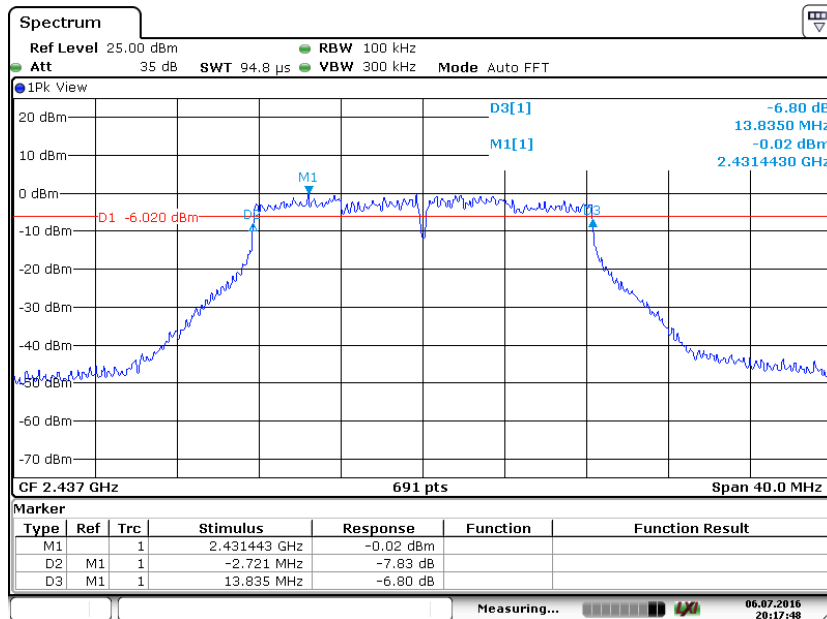
Channel 11: 2.462GHz:



802.11n(HT20) mode with 72.2Mbps data rate  
Channel 1: 2.412GHz:

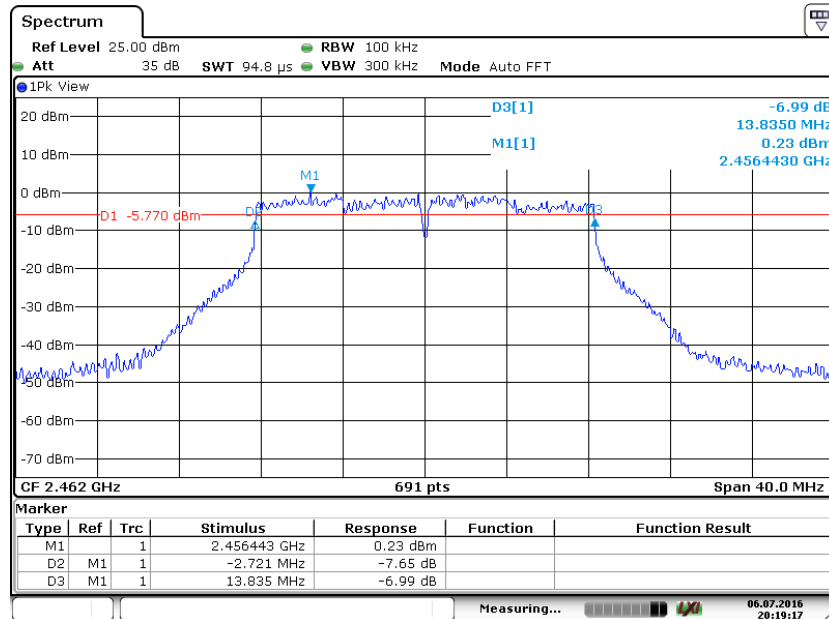


Channel 6: 2.437GHz:



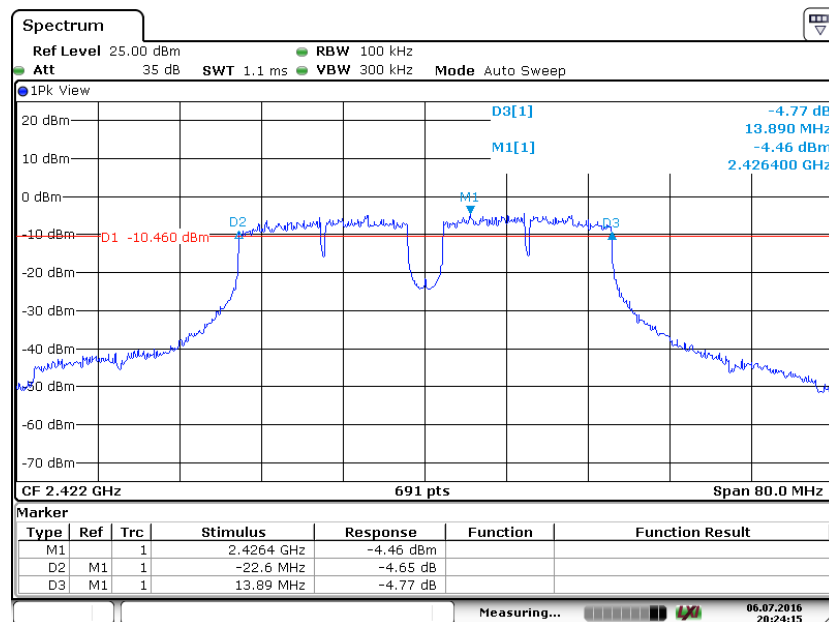


Channel 11: 2.462GHz:



802.11n(HT40) mode with 150Mbps data rate

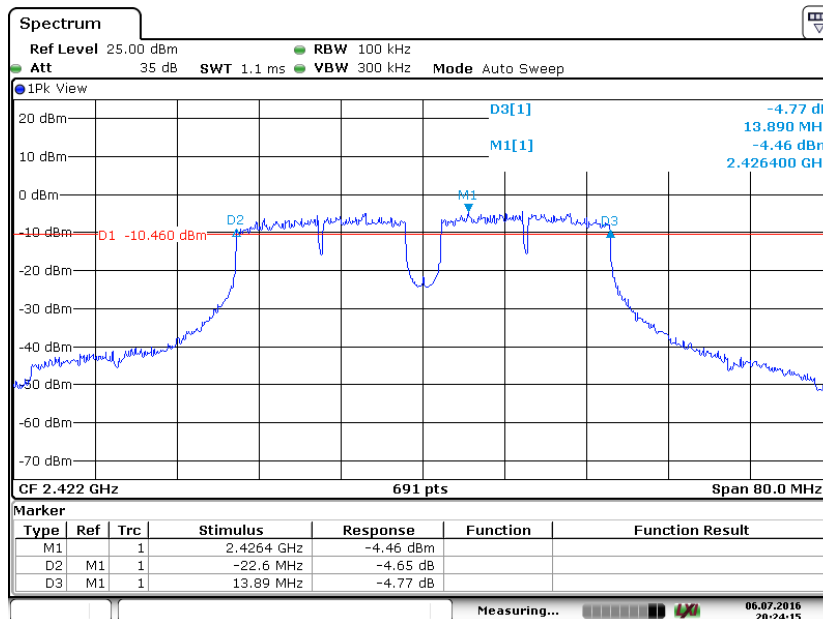
Channel 3: 2.422GHz:



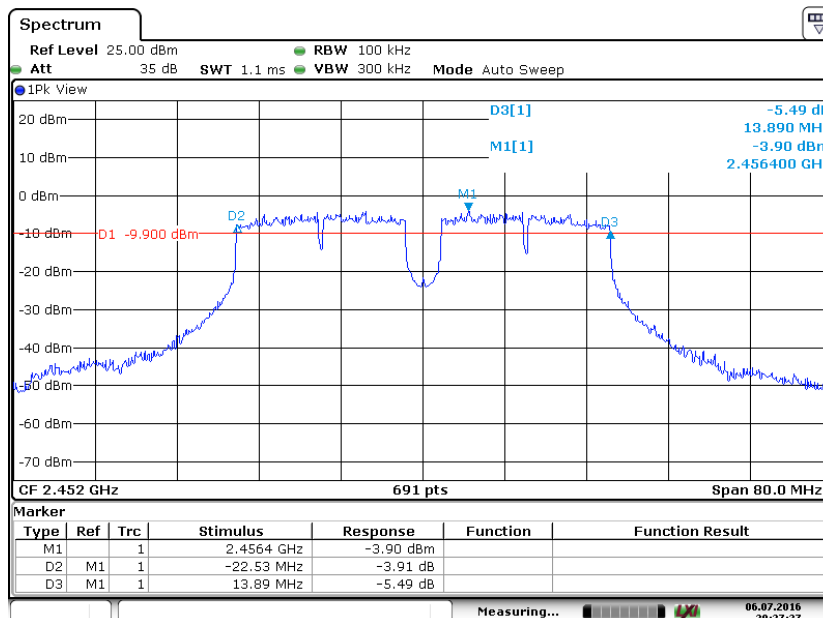


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Channel 6: 2.437GHz:



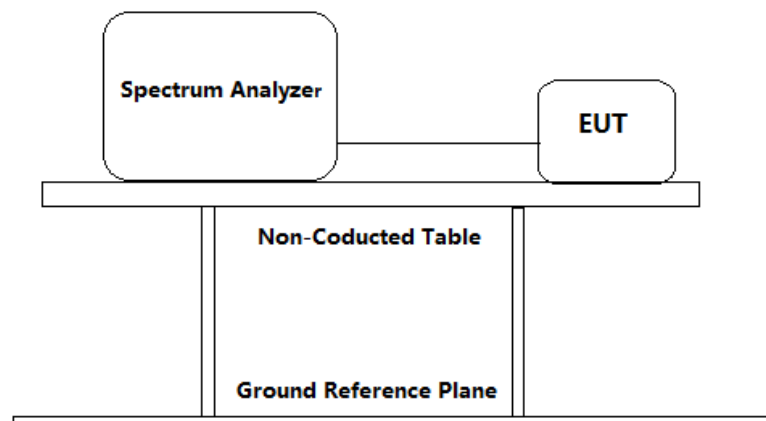
Channel 9: 2.452GHz:



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### 4.3 Maximum Peak Conducted Output Power

Test Requirement:	<p>FCC Part 15 C section 15.247</p> <p>(b)(3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt.</p> <p>Except as shown in paragraph (c) of this section, 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) (1), (b) (2), and (b) (3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.</p>
Test Method:	ANSI C63.10: Clause 11.9.1.2( Integrated band power method)
Test Status:	Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture). Following channel(s) was (were) selected for the final test as listed below.
Test Configuration:	



## Test Procedure:

1. Remove the antenna from the EUT and then connect a low attention attenuation RF cable (cable loss =2.0 dB) from the antenna port to the spectrum.
2. Set the spectrum analyzer:
  - a) Set the RBW = 1 MHz.
  - b) Set the VBW  $\geq [3 \times \text{RBW}]$ .
  - c) Set the span  $\geq [1.5 \times \text{DTS bandwidth}]$ .
  - d) Detector = peak.
  - e) Sweep time = auto couple.
  - f) Trace mode = max hold.
  - g) Allow trace to fully stabilize.
  - h) Use the instrument's band/channel power measurement function with the band limits set equal to the DTS bandwidth edges.
3. Repeat until all the test status is investigated.
4. Report the worst case.



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**Test result:**

Channel No.	Frequency (MHz)	Mode	Data Rate	Antenna Port 1 (dBm)	Antenna Port 2 (dBm)	Total Power (mW)	Total Power (dBm)	Limit (dBm)
1	2412	802.11b	11 Mbps	20.63	22.82	307.04	24.87	1W (30dBm)
6	2437		11 Mbps	20.87	23.71	357.14	25.53	
11	2462		11 Mbps	20.79	23.92	366.55	25.64	
1	2412	802.11g	54 Mbps	22.50	21.87	331.64	25.21	
6	2437		54 Mbps	22.49	22.65	361.50	25.58	
11	2462		54 Mbps	22.42	22.83	366.45	25.64	
1	2412	802.11n (HT20)	72.2 Mbps	22.50	21.31	313.04	24.96	
6	2437		72.2 Mbps	22.53	22.54	358.53	25.55	
11	2462		72.2 Mbps	22.41	22.73	361.68	25.58	
3	2422	802.11n (HT40)	150 Mbps	21.54	22.42	317.14	25.01	
6	2437		150 Mbps	21.52	22.36	314.09	24.97	
9	2452		150 Mbps	21.48	22.45	316.40	25.00	

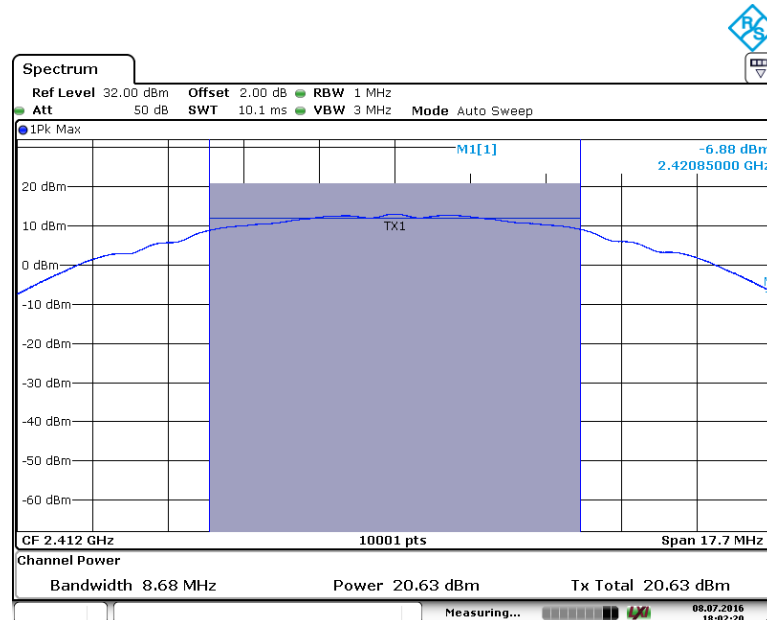
Remark: Level = Read Level + Cable Loss (2 dB).  
The unit does meet the FCC requirements.

Result plot as follows:

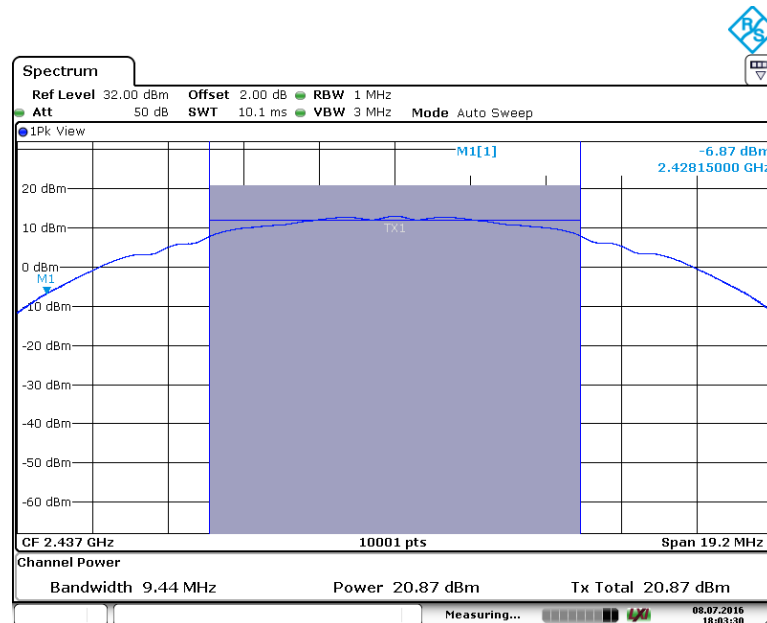
**802.11b mode with 11Mbps data rate**

**Port 1**

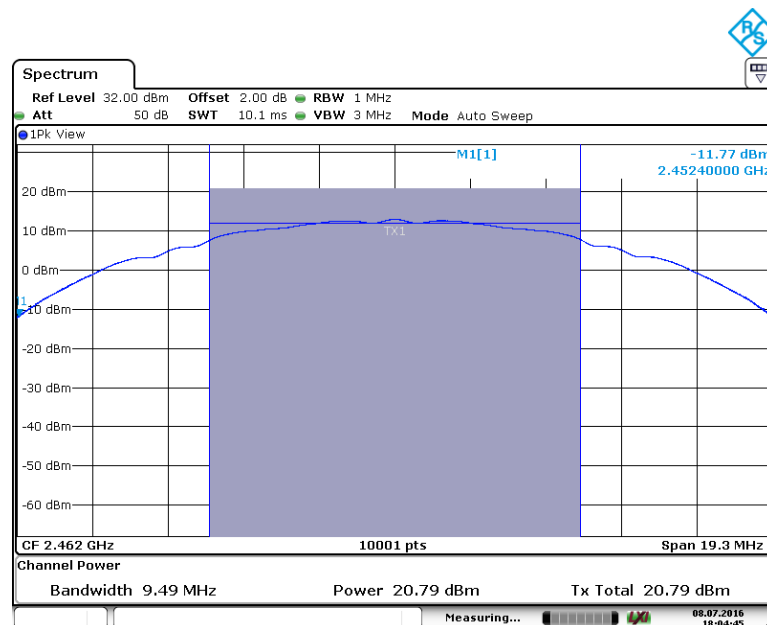
Channel 1: 2.412GHz:



Channel 6: 2.437GHz:

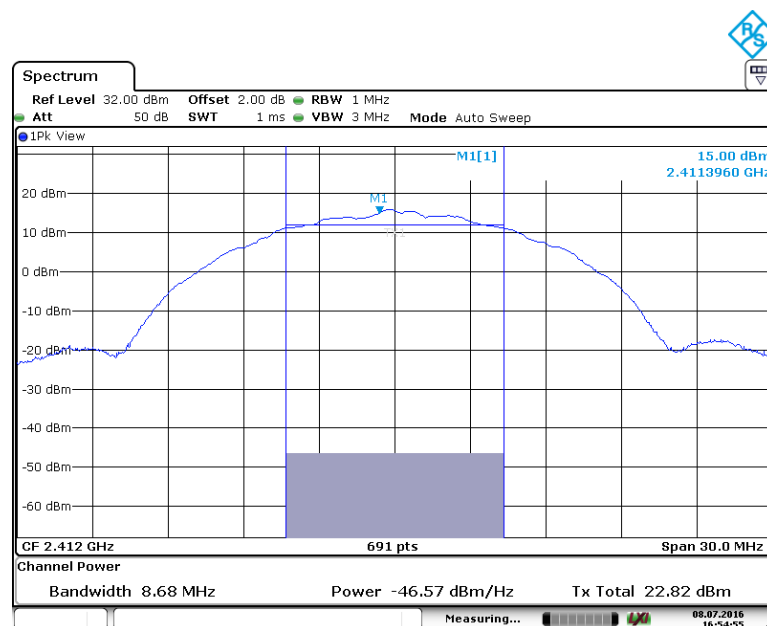


Channel 11: 2.462GHz:

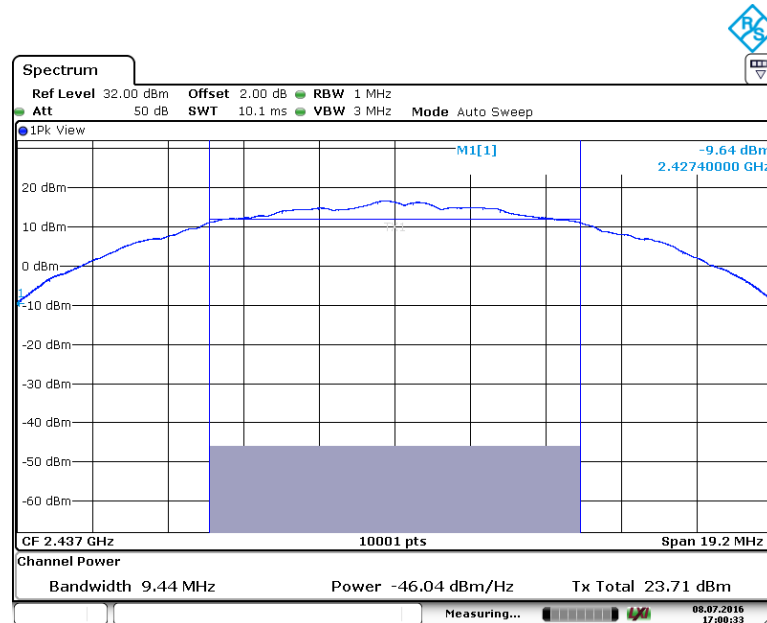


**Port 2**

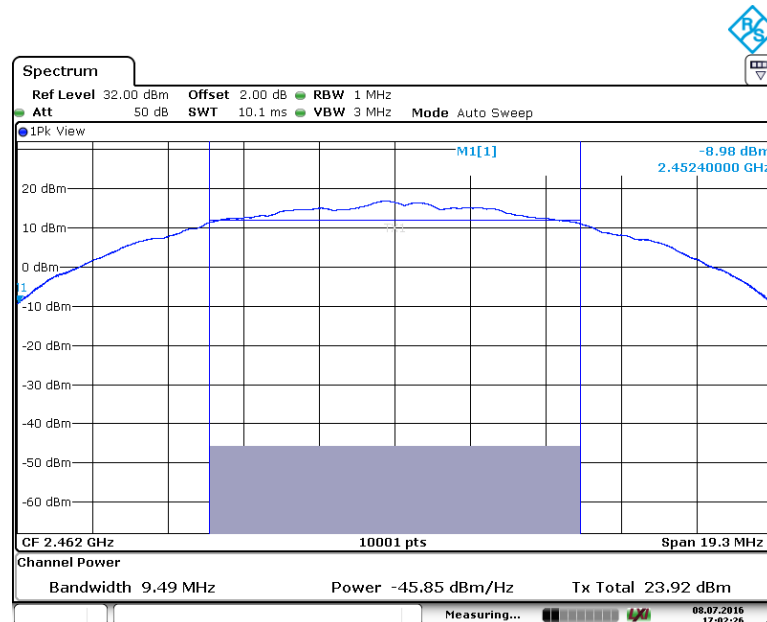
Channel 1: 2.412GHz:



Channel 6: 2.437GHz:



Channel 11: 2.462GHz:

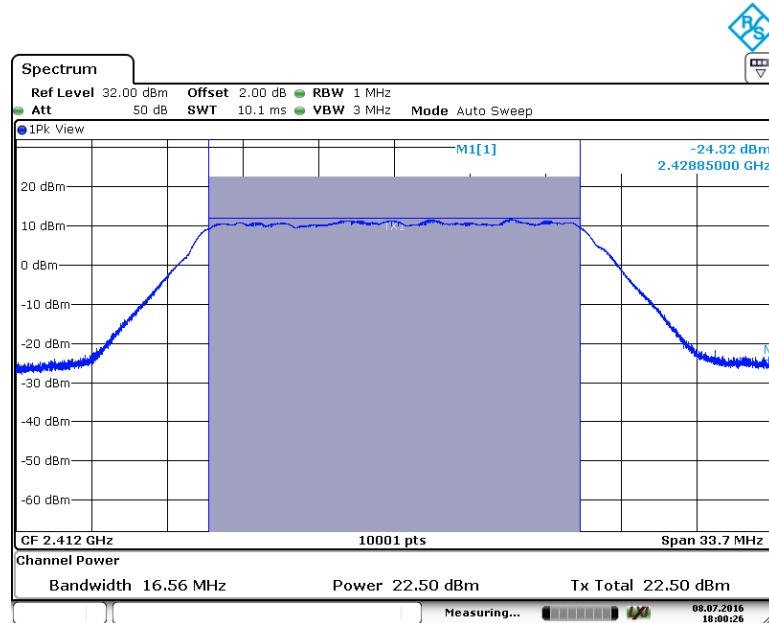




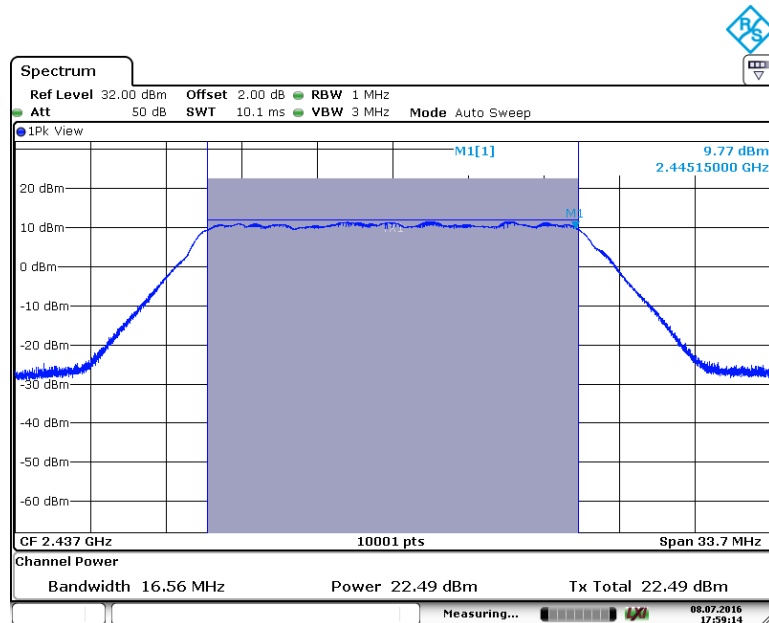
# 802.11g mode with 54Mbps data rate

## Port 1

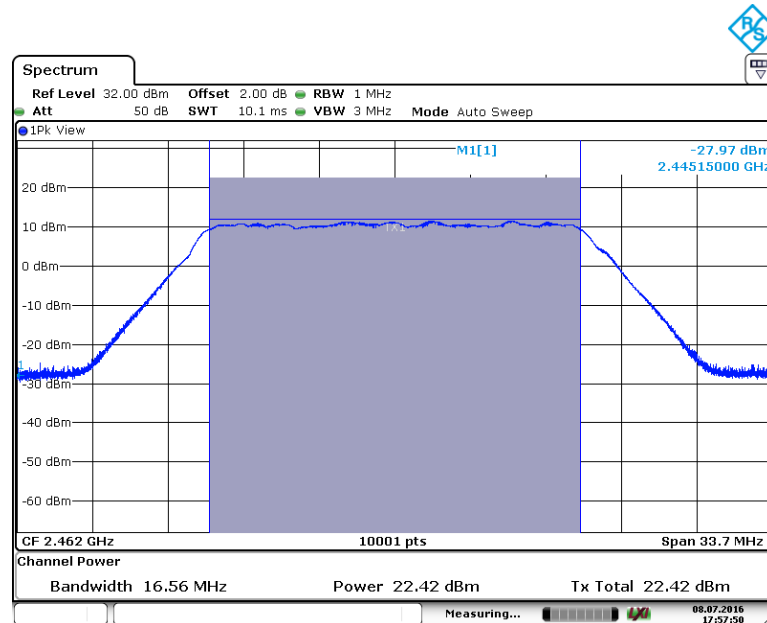
Channel 1: 2.412GHz:



Channel 6: 2.437GHz:

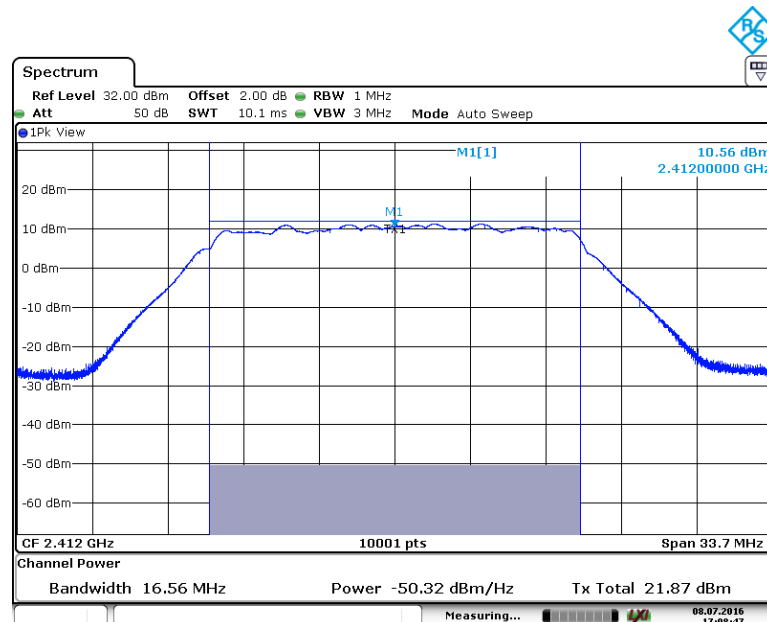


Channel 11: 2.462GHz:

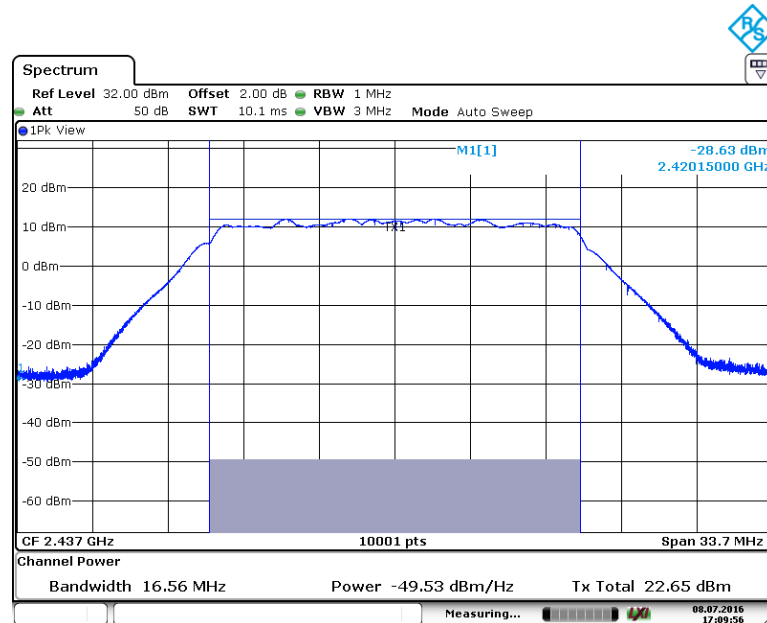


**Port 2**

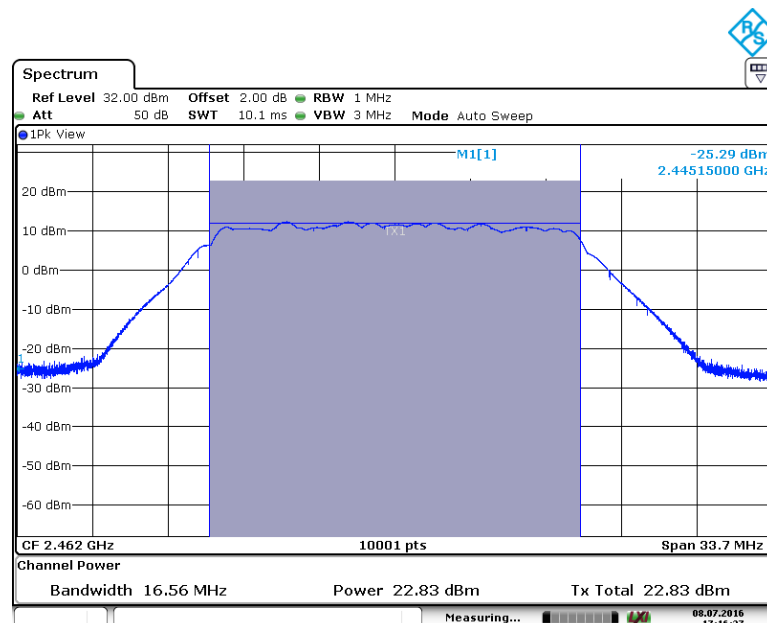
Channel 1: 2.412GHz:



Channel 6: 2.437GHz:



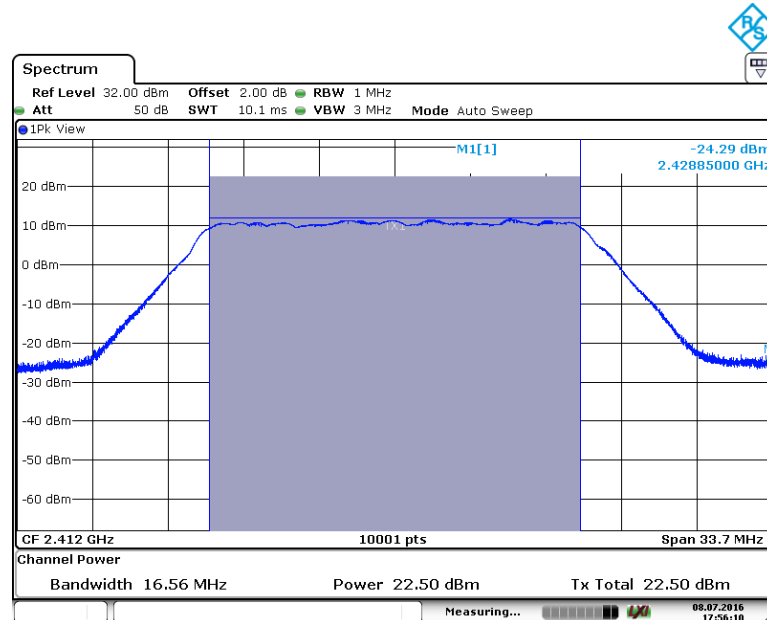
Channel 11: 2.462GHz:



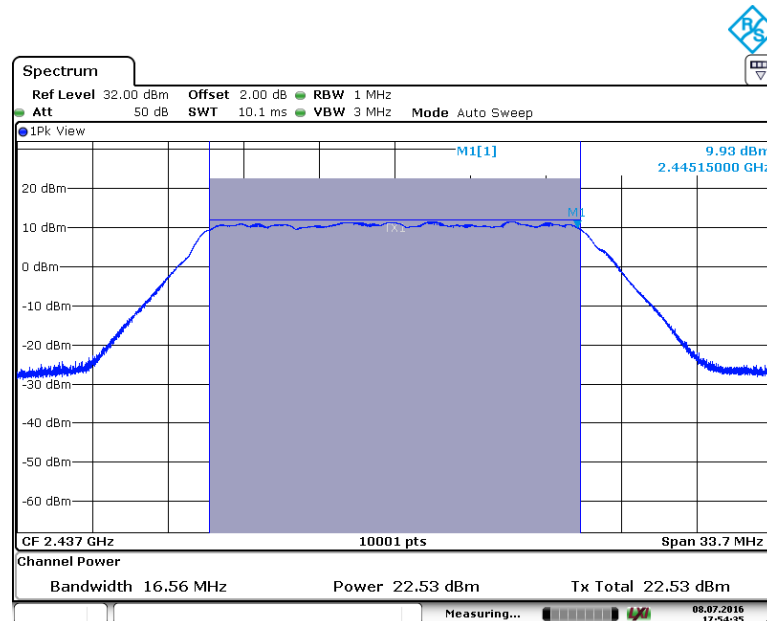
**802.11n(HT20) mode with 72.2Mbps data rate**

**Port 1**

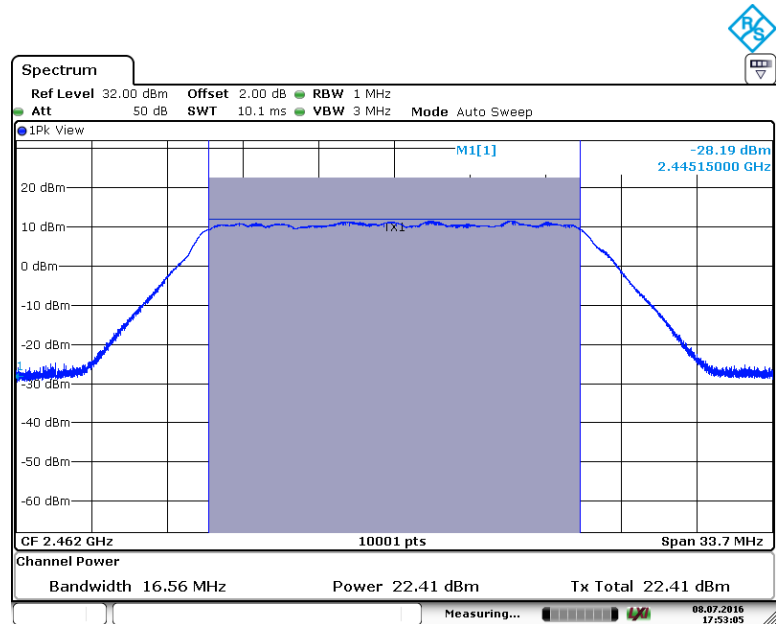
Channel 1: 2.412GHz:



Channel 6: 2.437GHz:

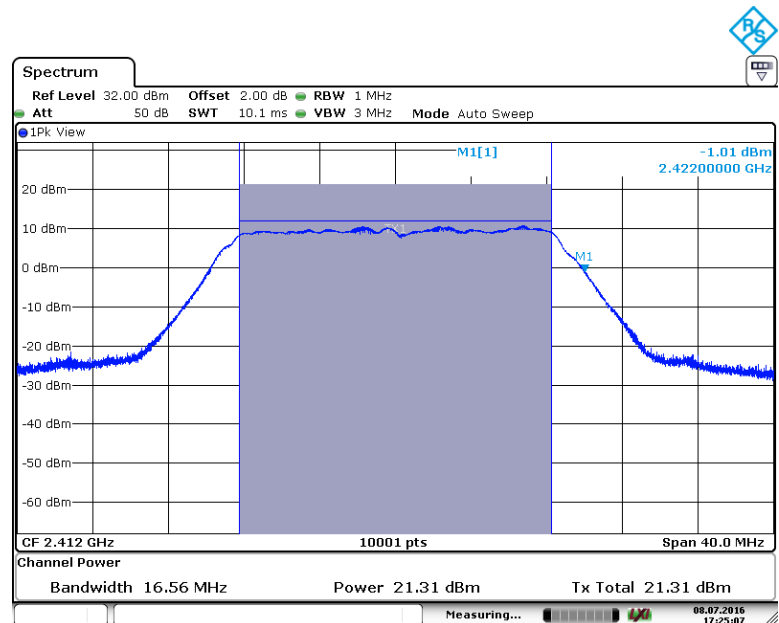


Channel 11: 2.462GHz:

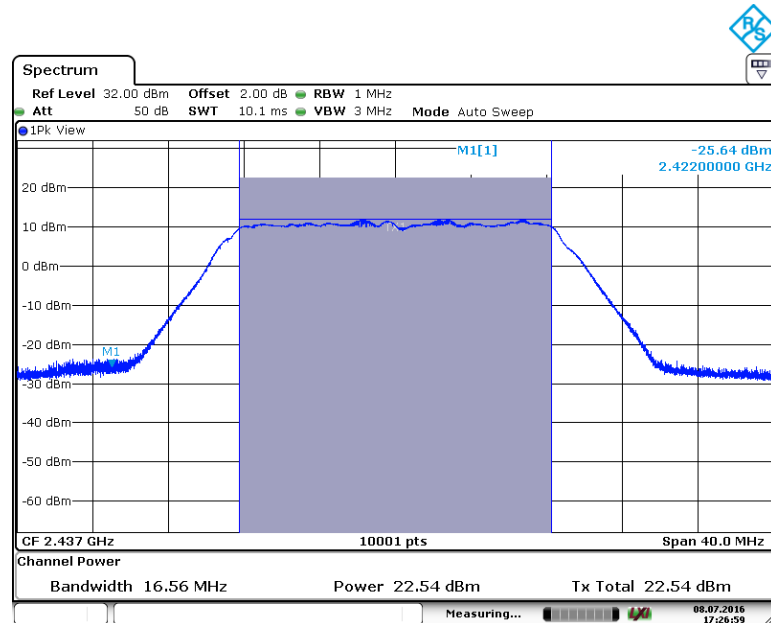


**Port 2**

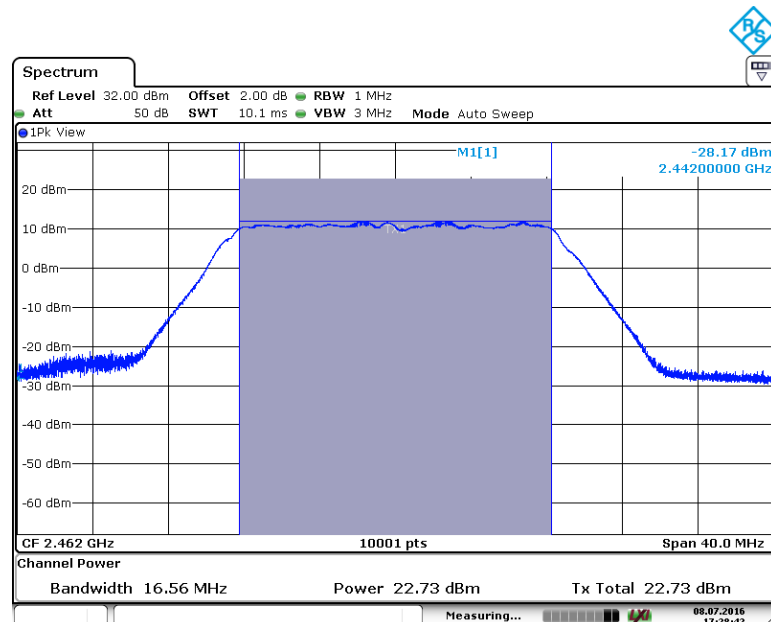
Channel 1: 2.412GHz:



Channel 6: 2.437GHz:



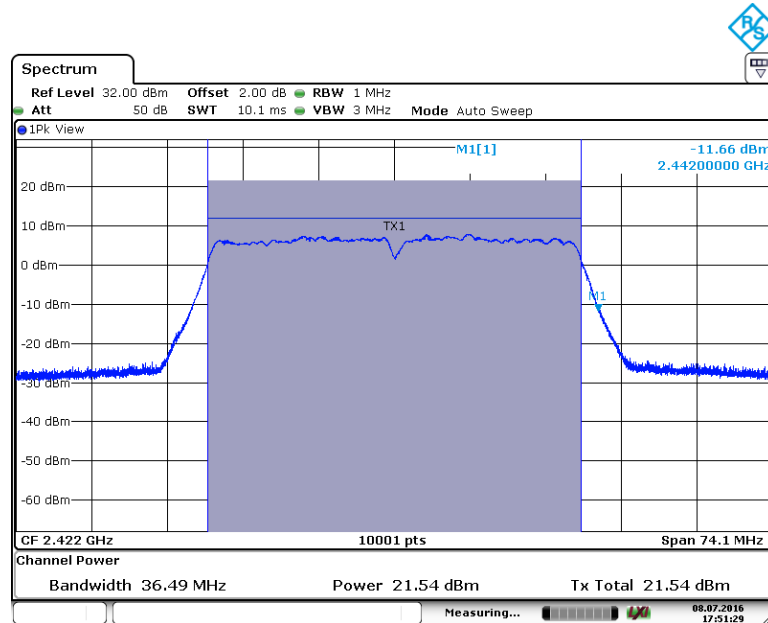
Channel 11: 2.462GHz:



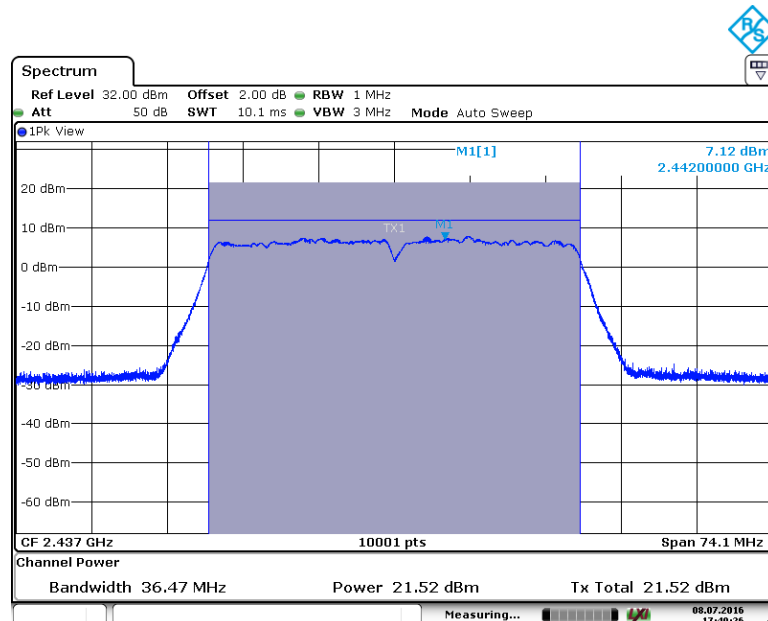
802.11n(HT40) mode with 150Mbps data rate

Port 1

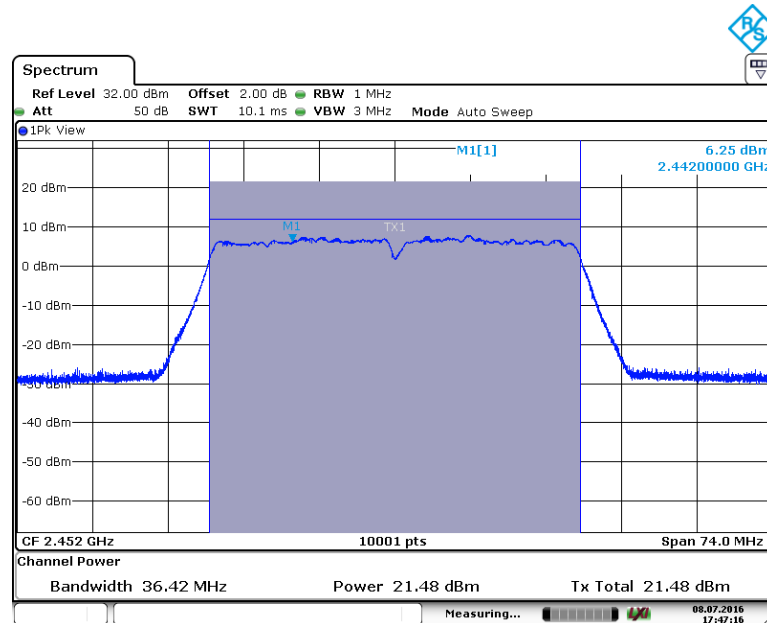
Channel 3: 2.422GHz:



Channel 6: 2.437GHz:

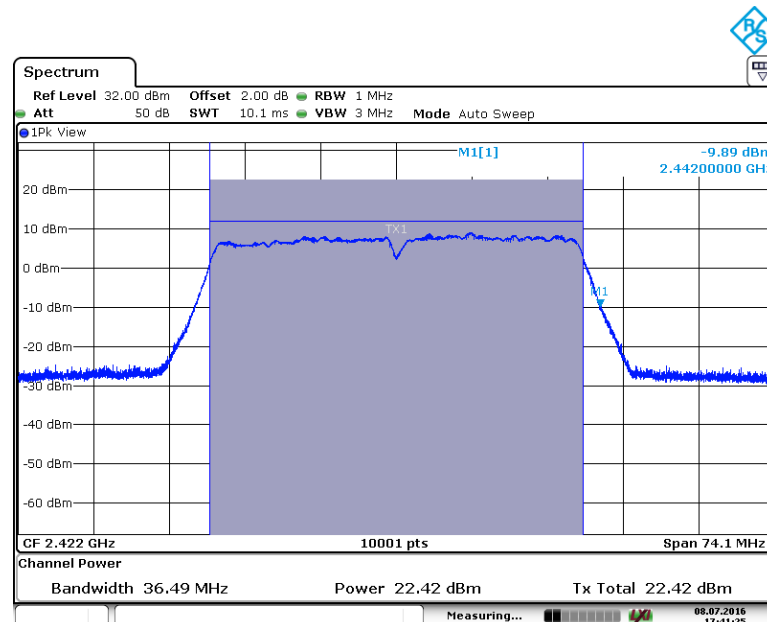


Channel 9: 2.452GHz:



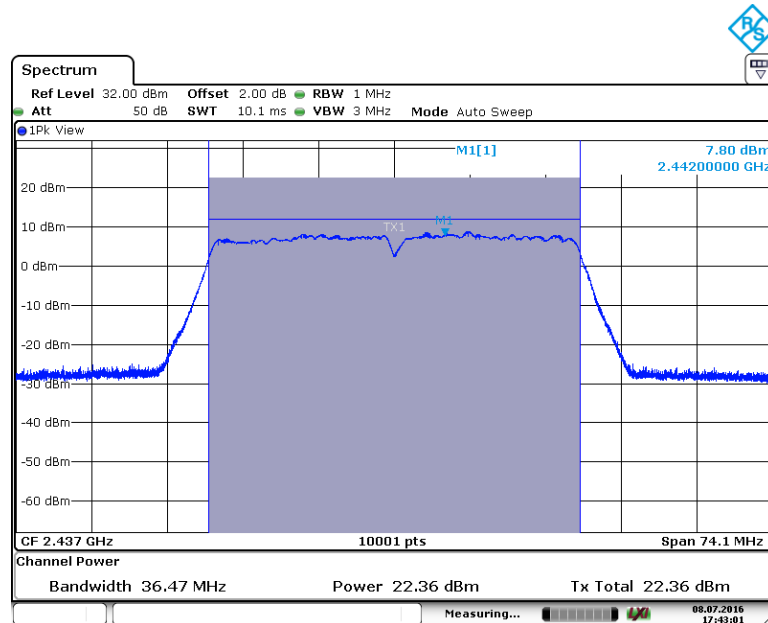
**Port 2**

Channel 3: 2.422GHz:

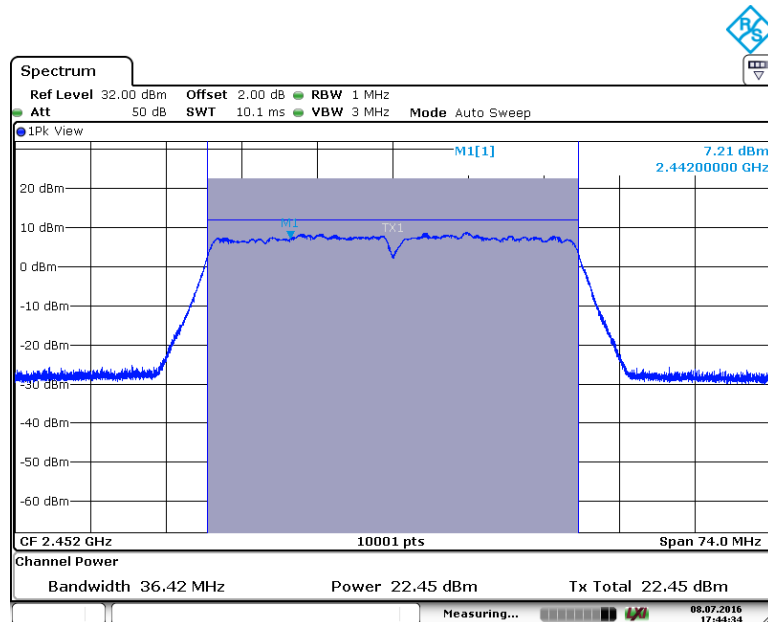




Channel 6: 2.437GHz:

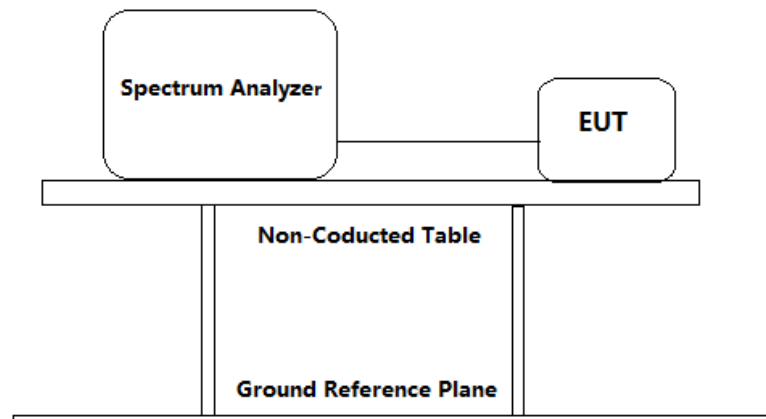


Channel 9: 2.452GHz:



#### 4.4 Peak Power Spectral Density

Test Requirement:	<p>FCC Part 15 C section 15.247</p> <p>(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.</p> <p>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.</p>
Test Method:	ANSI C63.10: Clause 11.10.2
Test Status:	Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture). Following channel(s) was (were) selected for the final test as listed below.
Test Configuration:	



## Test Procedure:

1. Remove the antenna from the EUT and then connect a low attention attenuation RF cable (cable loss =2 dB) from the antenna port to the spectrum analyzer or power meter.
2. Set the spectrum analyzer:
  - a) Set analyzer center frequency to DTS channel center frequency.
  - b) Set the span=  $1.5 \times \text{DTS bandwidth}$ .
  - c) Set the RBW to  $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$ .
  - d) Set the VBW  $\geq [3 \times \text{RBW}]$ .
  - e) Detector = peak.
  - f) Sweep time = auto couple.
  - g) Trace mode = max hold.
  - h) Allow trace to fully stabilize.
  - i) Use the peak marker function to determine the maximum amplitude level within the RBW.
  - j) If measured value exceeds requirement, then reduce RBW (but no less than 3 kHz) and repeat.
3. Measure the Power Spectral Density of the test frequency with special test status.
4. Repeat until all the test status is investigated.
5. Report the worst case.



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Channel No.	Frequency (MHz)	Mode	Data Rate	Antenna Port 1 (dBm/3KHz)	Antenna Port 2 (dBm/3KHz)	Total (mW/3KHz)	Total (dBm/3KHz)	Limit (dBm)
1	2412	802.11b	11 Mbps	-17.79	-23.03	0.02	-16.65	8dBm/ 3 KHz
6	2437		11 Mbps	-22.84	-23.87	0.01	-20.31	
11	2462		11 Mbps	-21.99	-21.73	0.01	-18.85	
1	2412	802.11g	54 Mbps	-17.14	-14.22	0.06	-12.43	
6	2437		54 Mbps	-15.29	-13.56	0.07	-11.33	
11	2462		54 Mbps	-15.79	-15.43	0.06	-12.60	
1	2412	802.11n (HT20)	72.2 Mbps	-16.33	-12.38	0.08	-10.91	
6	2437		72.2 Mbps	-15.55	-13.57	0.07	-11.44	
11	2462		72.2 Mbps	-15.48	-12.79	0.08	-10.92	
3	2422	802.11n (HT40)	150 Mbps	-13.49	-13.21	0.09	-10.34	
6	2437		150 Mbps	-14.82	-14.13	0.07	-11.45	
9	2452		150 Mbps	-13.88	-12.96	0.09	-10.39	

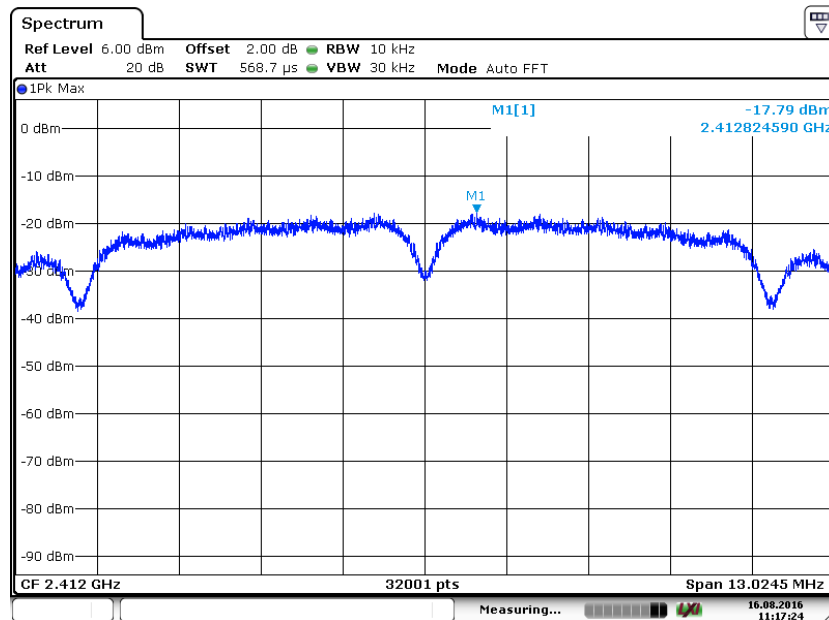
Test result: Level = Read Level + Cable Loss(2dB).  
The unit does meet the FCC requirements.

Result plot as follows:

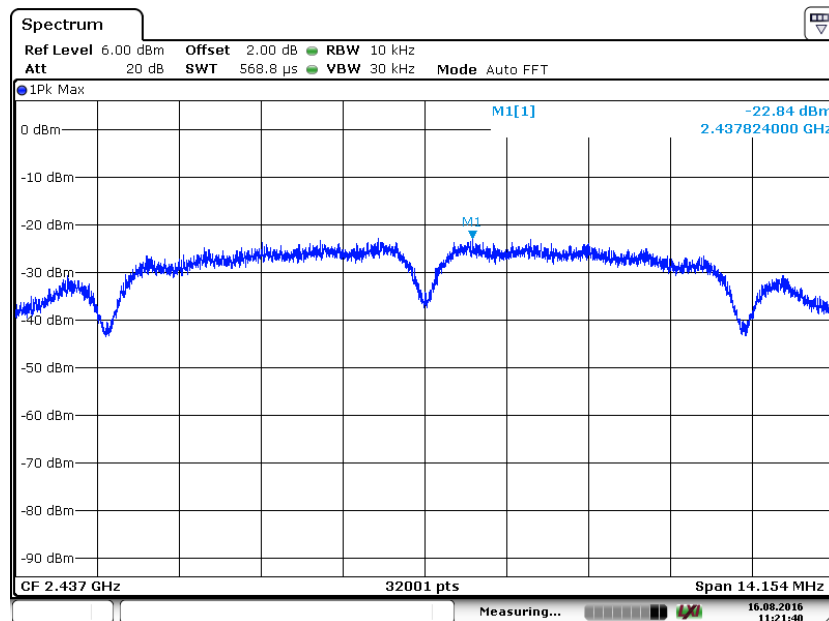
**802.11b mode with 11Mbps data rate**

**Port 1**

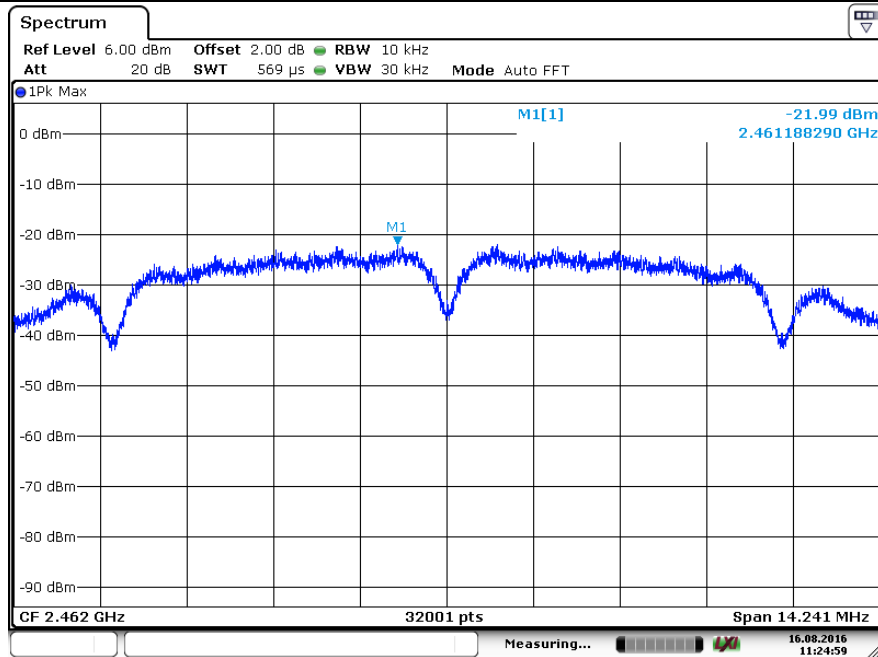
Channel 1: 2.412GHz:



Channel 6: 2.437GHz:

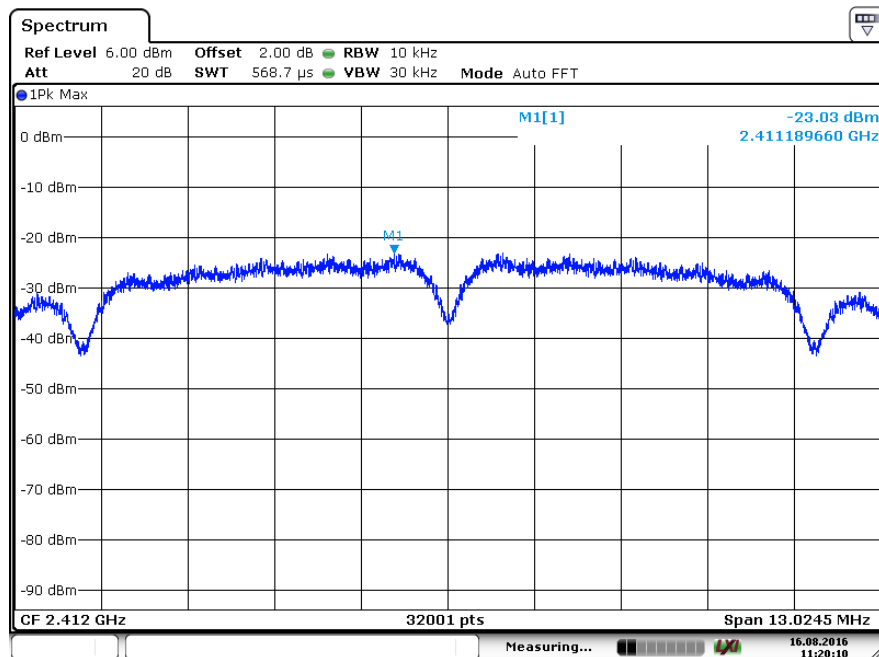


Channel 11: 2.462GHz:

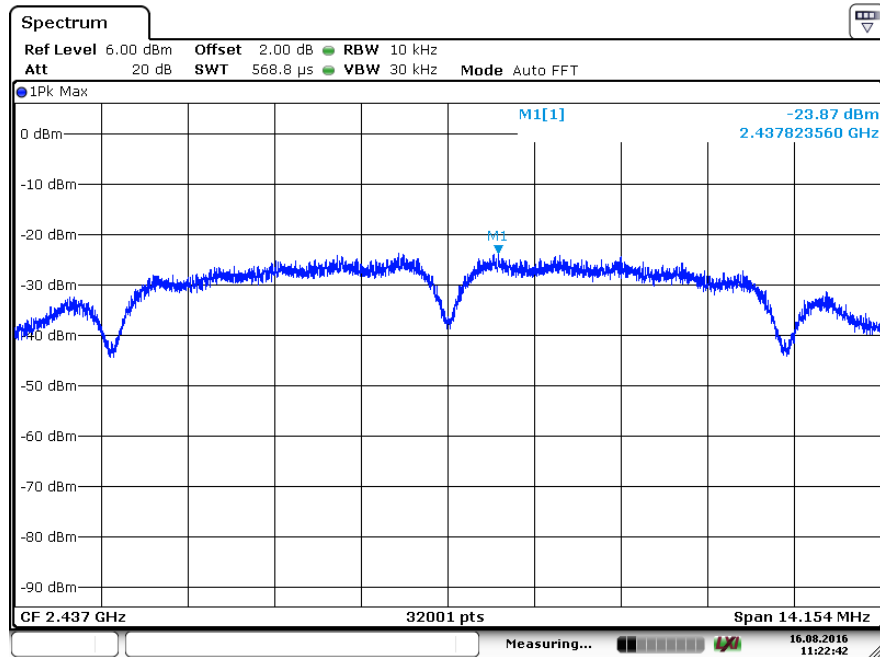


Port 2

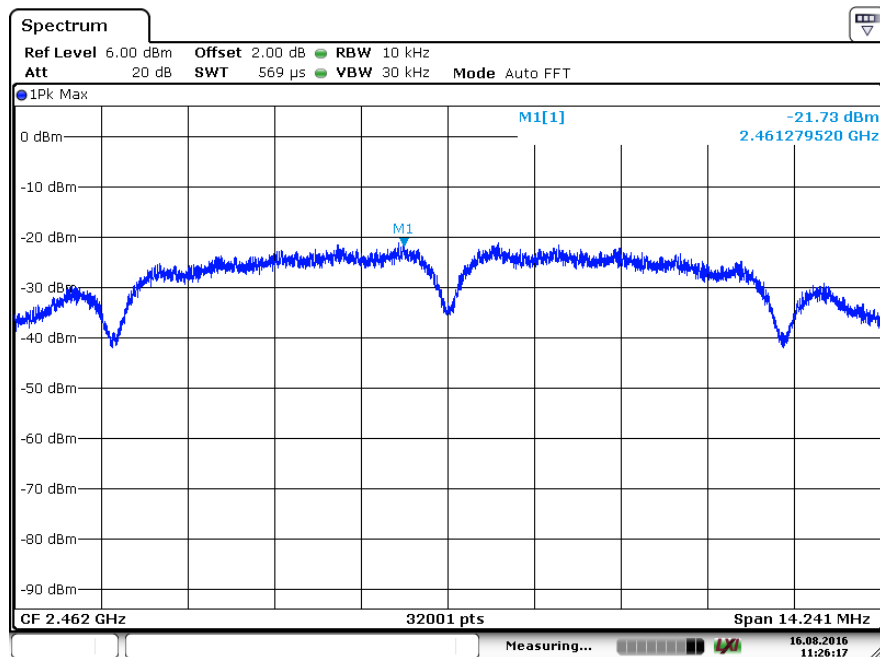
Channel 1: 2.412GHz:



Channel 6: 2.437GHz:

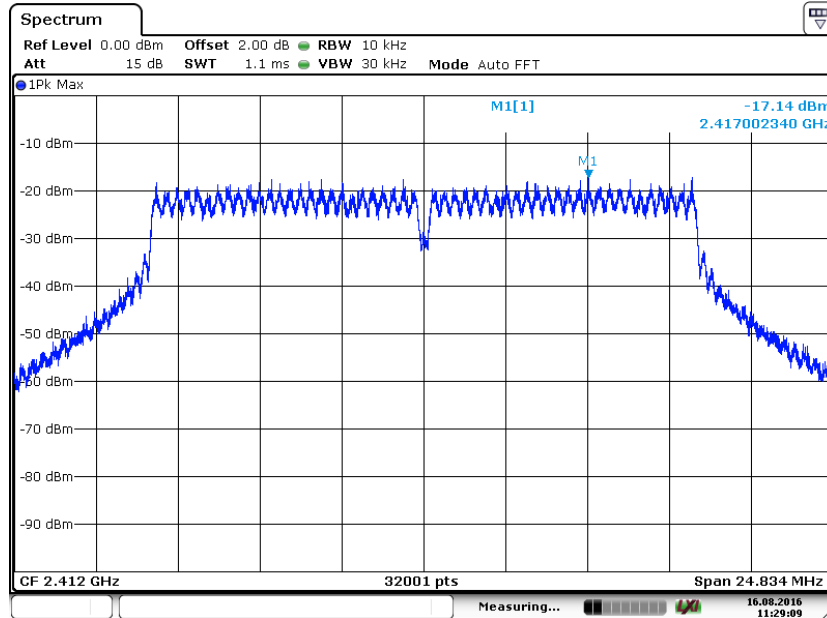


Channel 11: 2.462GHz:

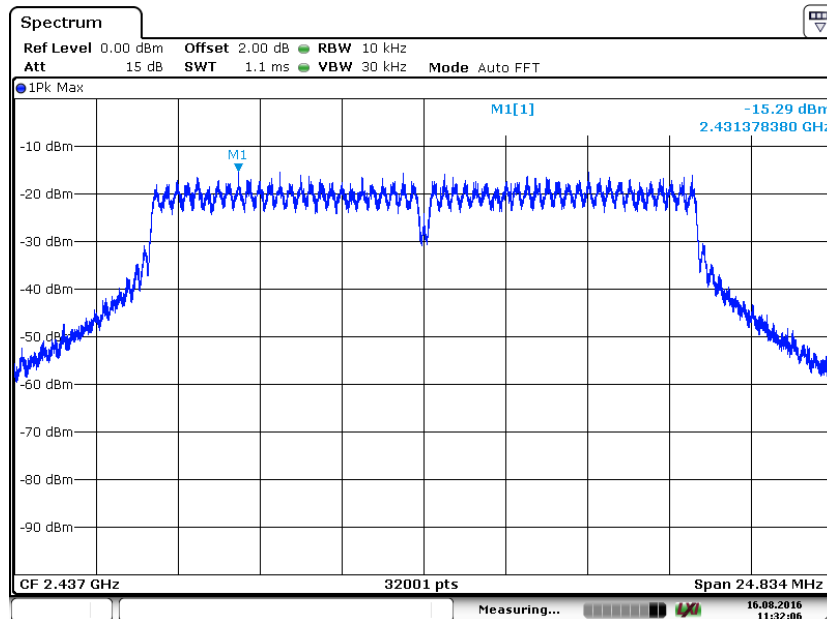


**802.11g mode with 54Mbps data rate**  
**Port 1**

Channel 1: 2.412GHz:

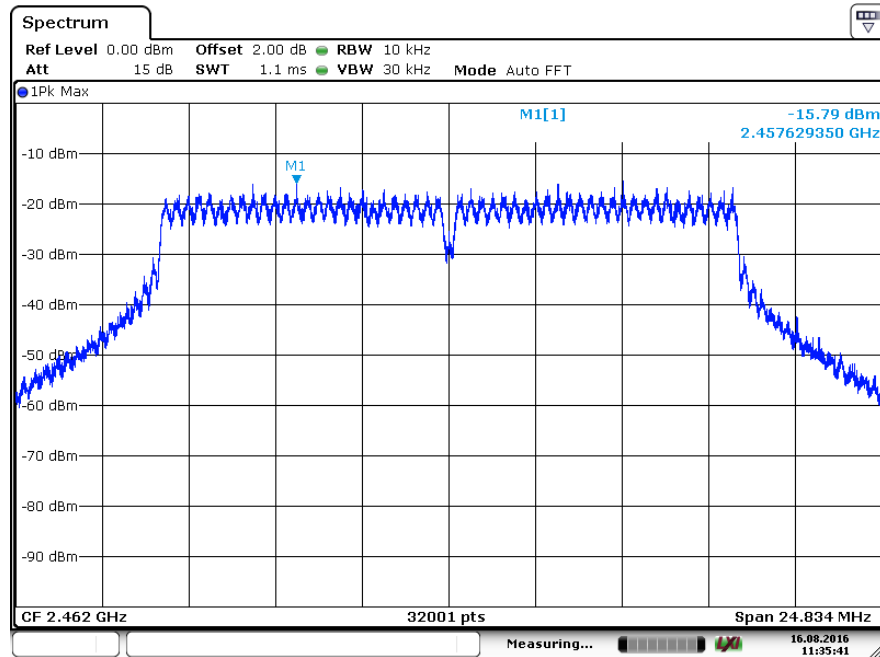


Channel 6: 2.437GHz:



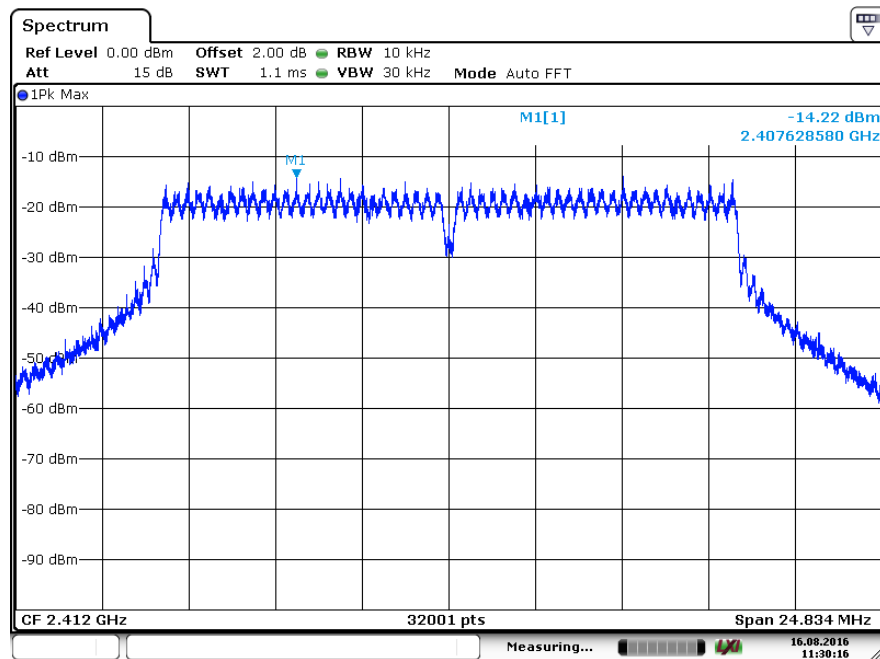


Channel 11: 2.462GHz:

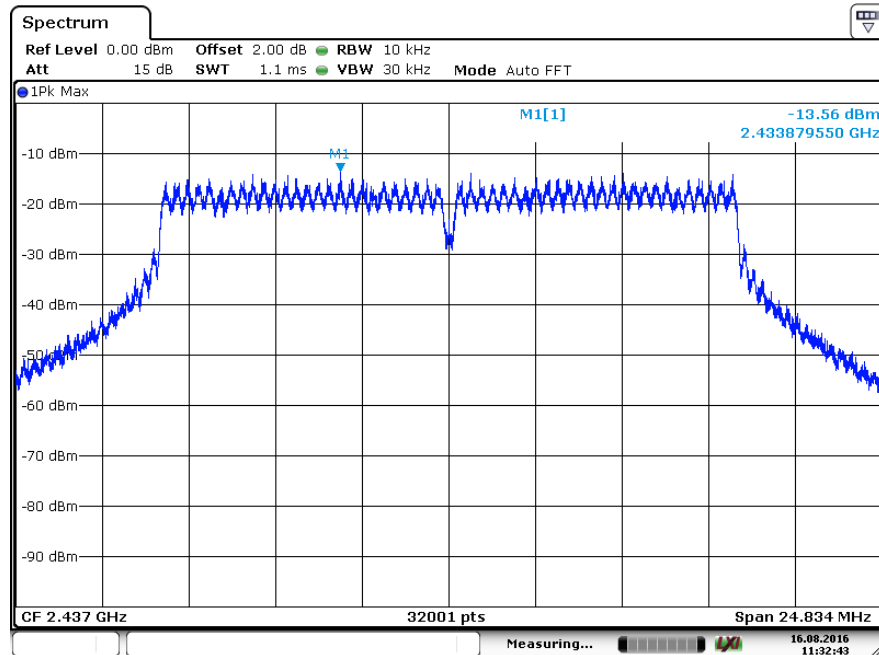


Port 2

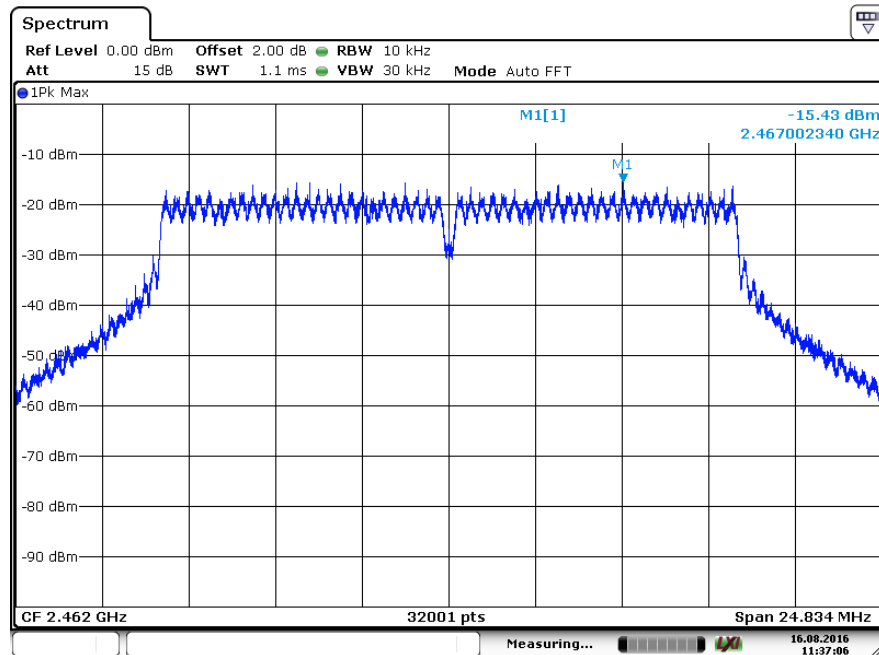
Channel 1: 2.412GHz:



Channel 6: 2.437GHz:



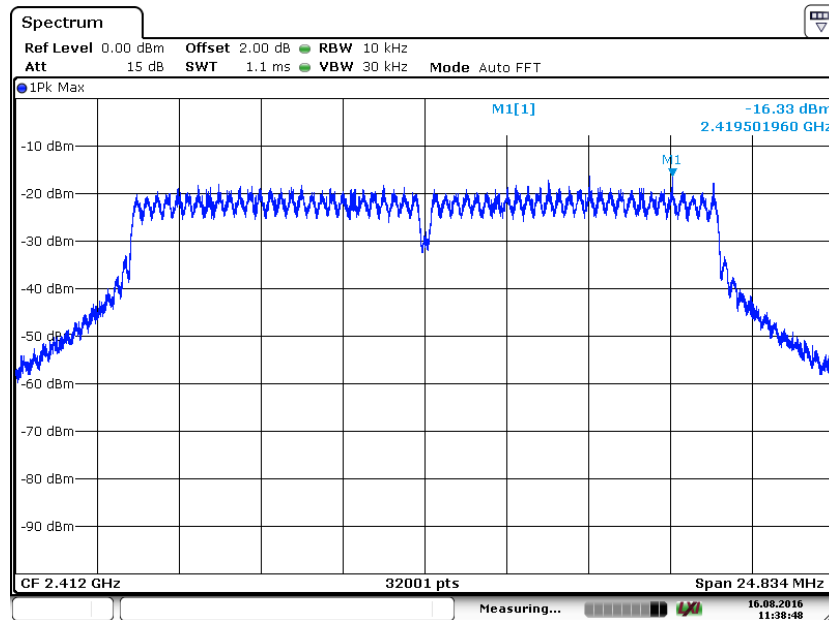
Channel 11: 2.462GHz:



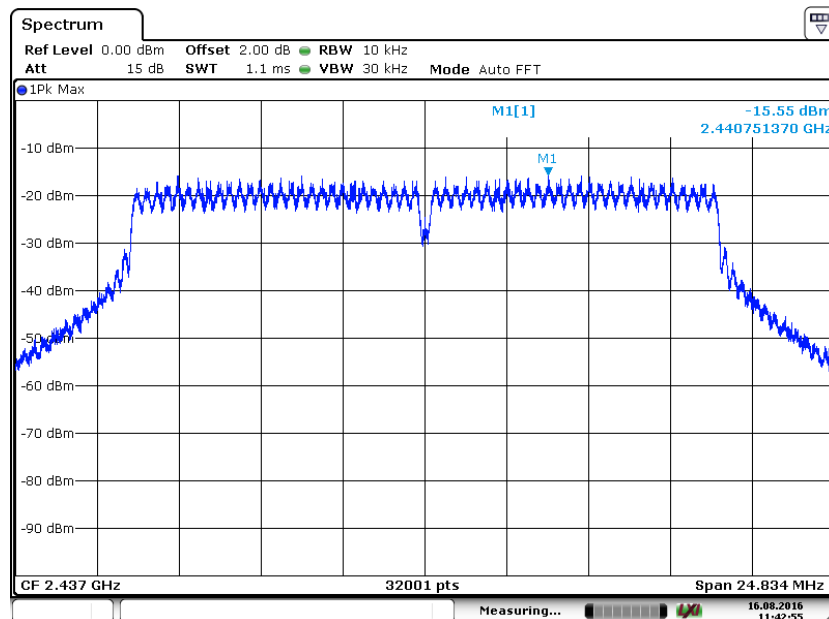
**802.11n(HT20) mode with 72.2Mbps data rate**

**Port 1**

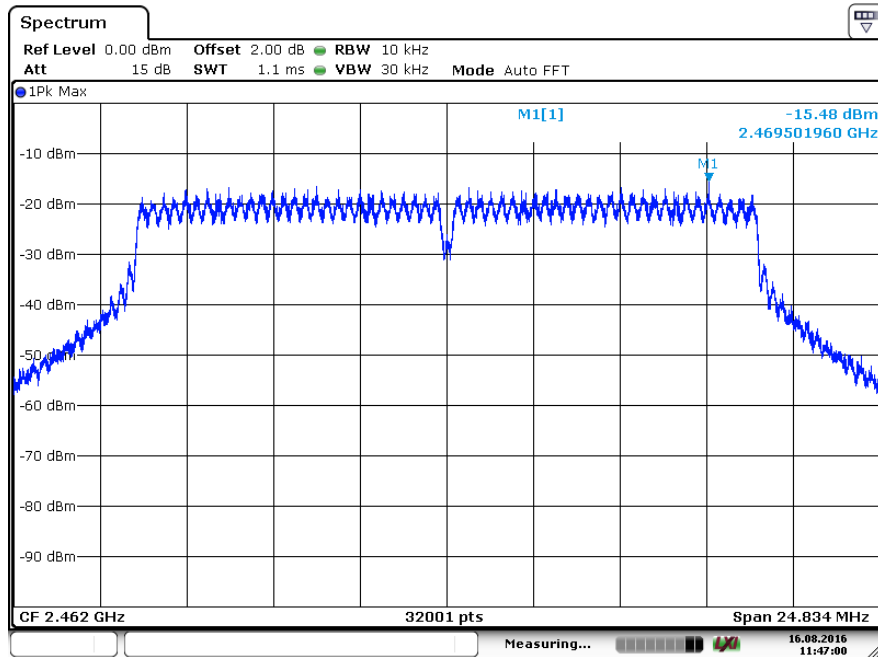
Channel 1: 2.412GHz:



Channel 6: 2.437GHz:

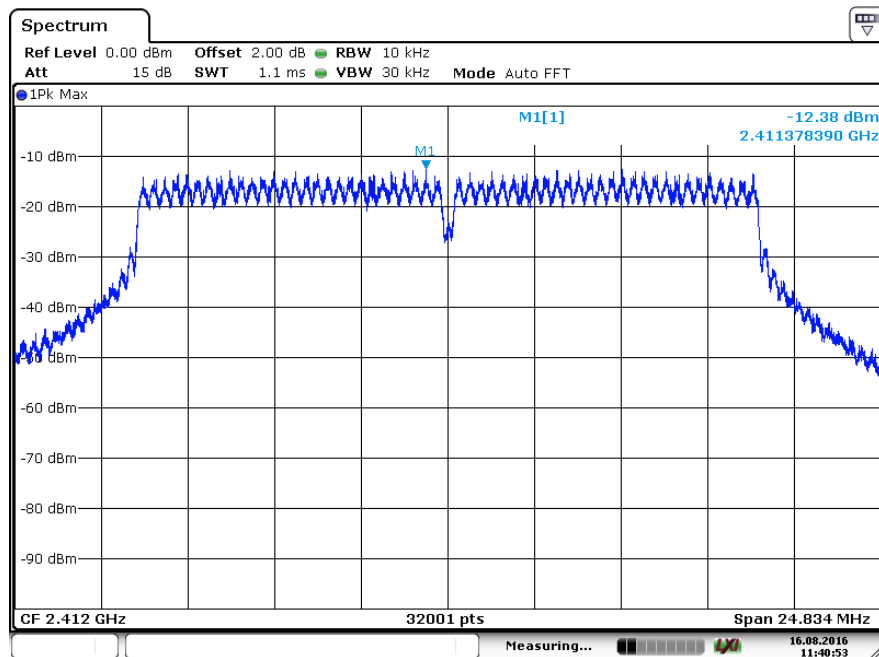


Channel 11: 2.462GHz:

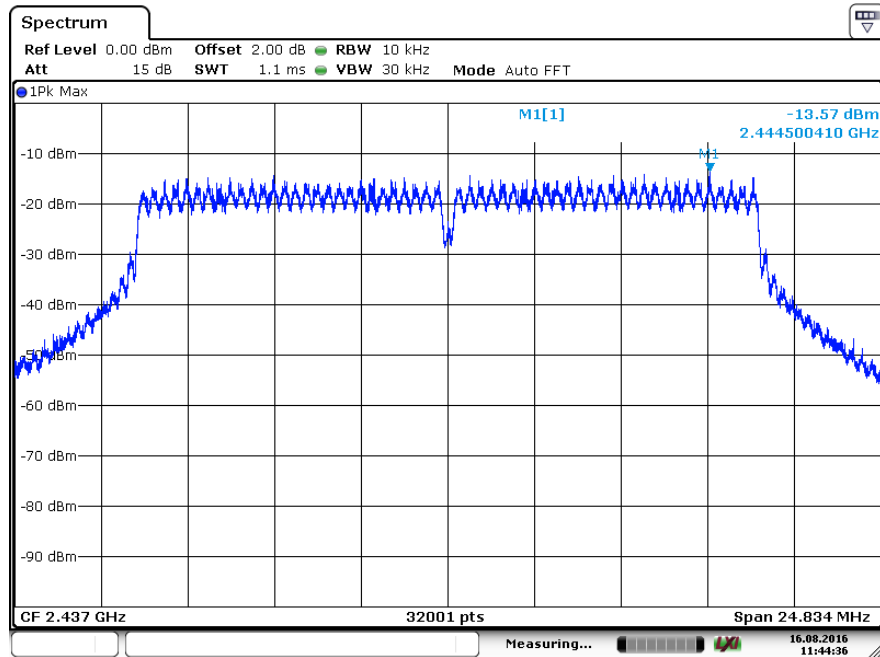


**Port 2**

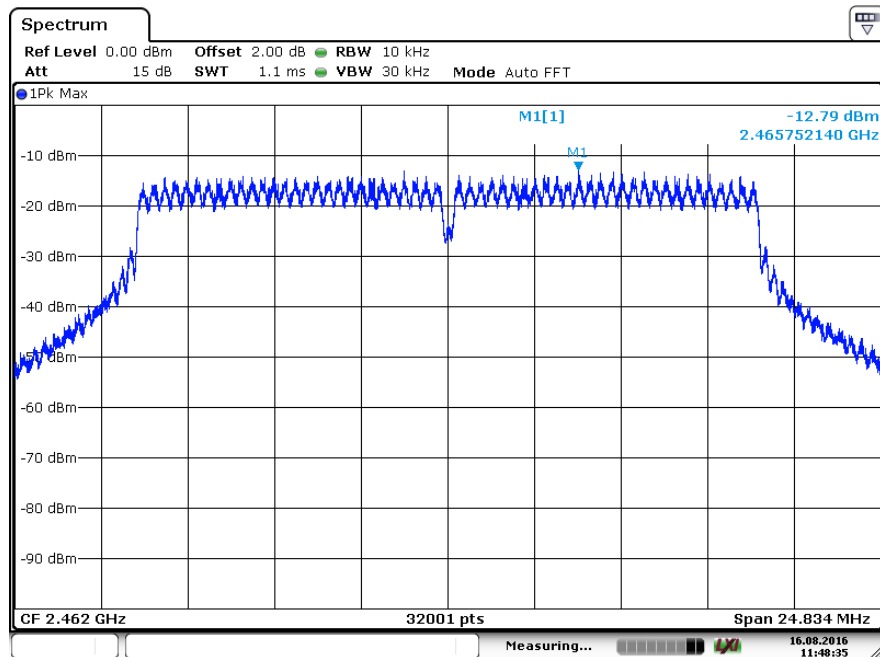
Channel 1: 2.412GHz:



Channel 6: 2.437GHz:



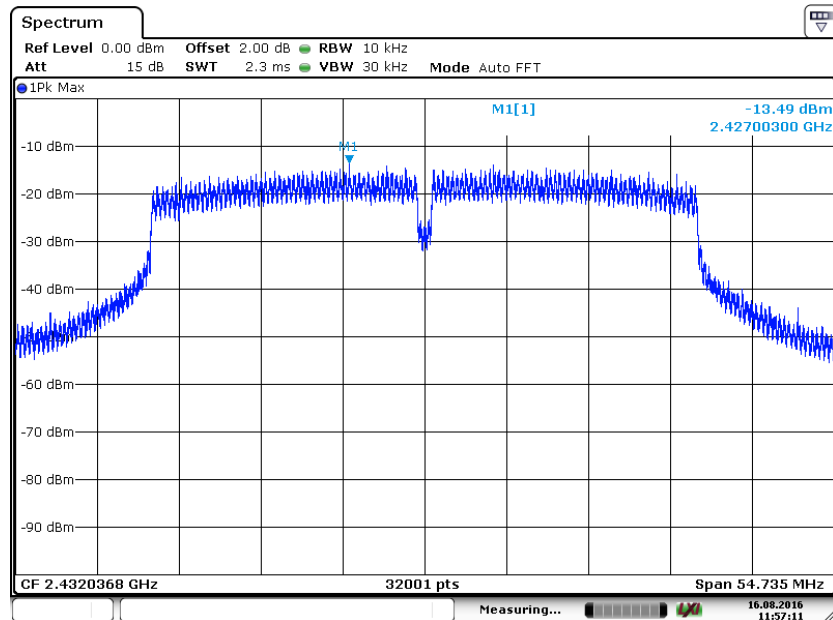
Channel 11: 2.462GHz:



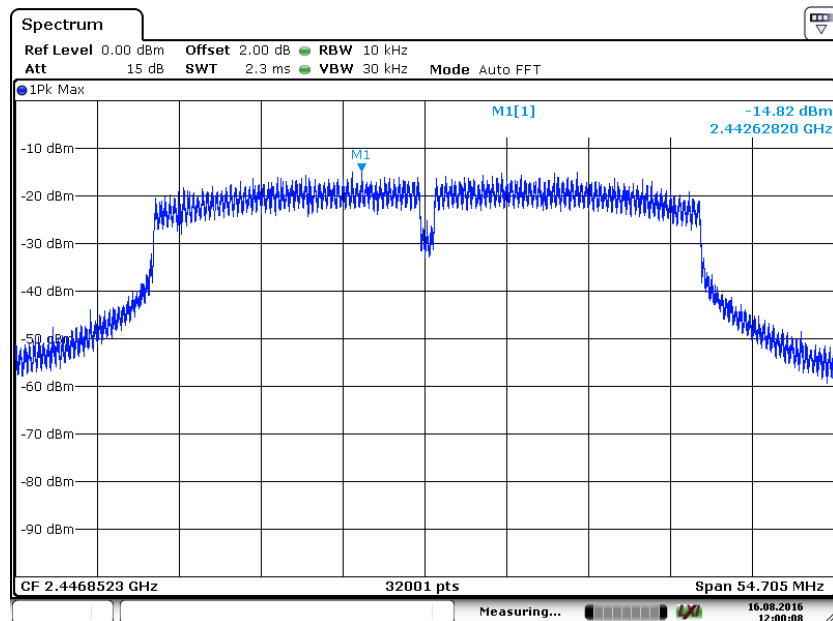
**802.11n(HT40) mode with 150Mbps data rate**

**Port 1**

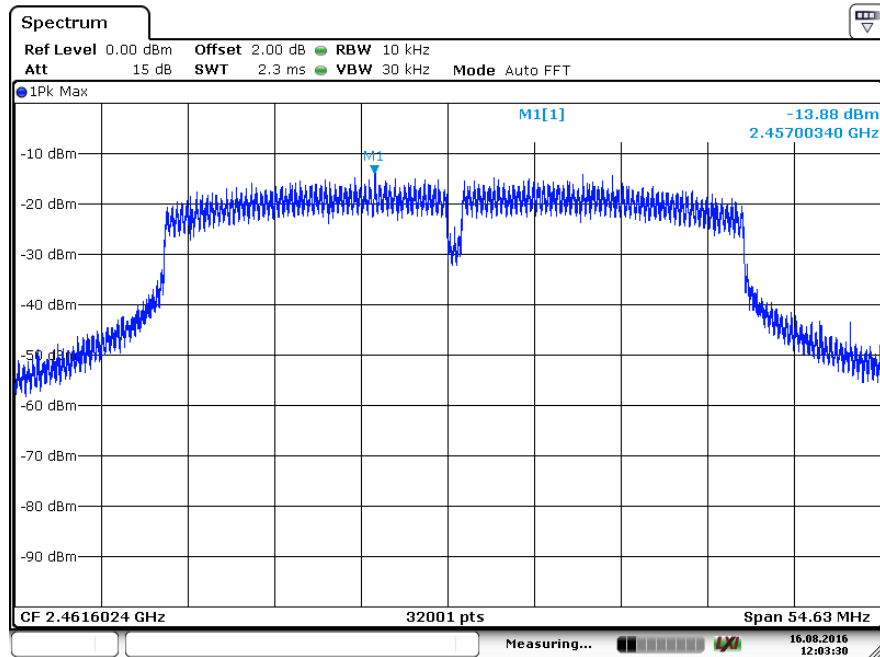
Channel 3: 2.422GHz:



Channel 6: 2.437GHz:

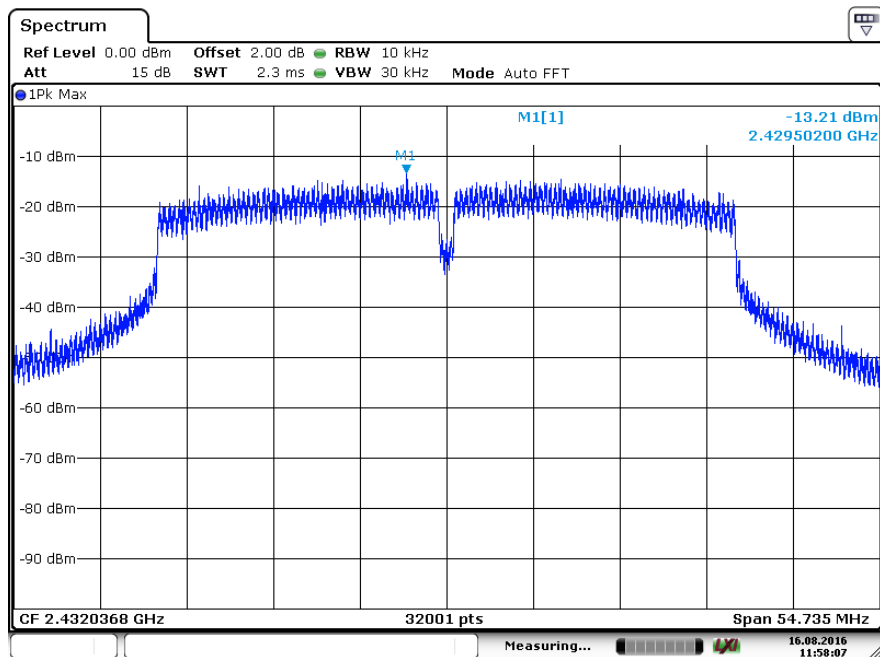


Channel 9: 2.452GHz:

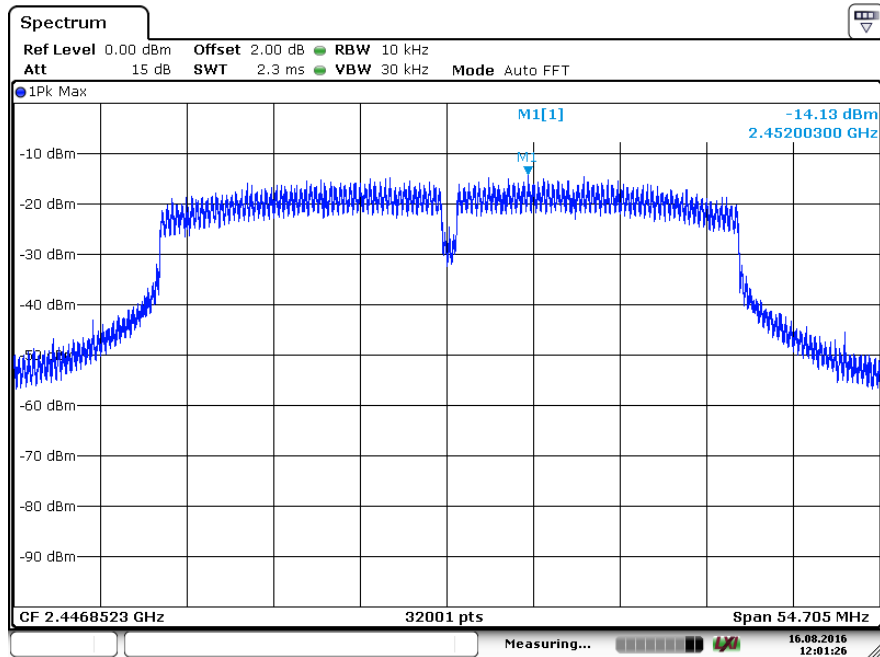


Port 2

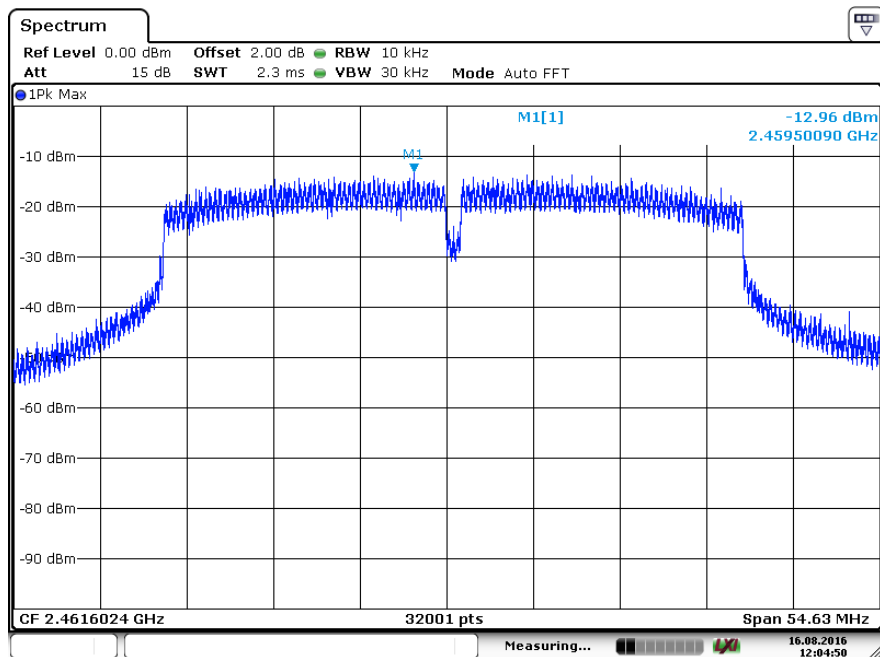
Channel 3: 2.422GHz:



Channel 6: 2.437GHz:



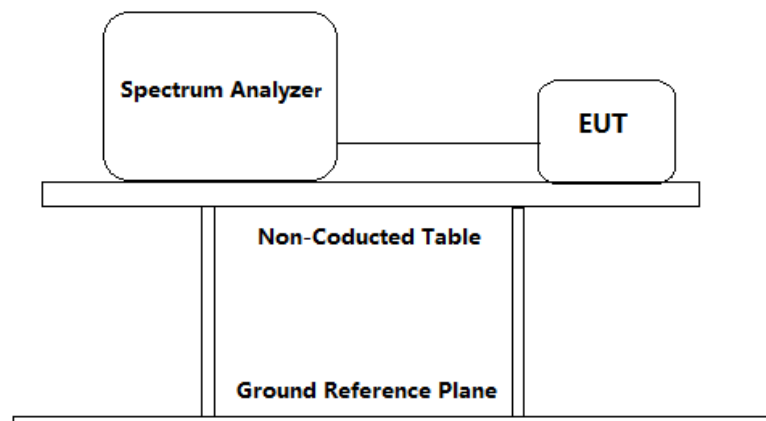
Channel 9: 2.452GHz:





#### 4.5 Out of Band Conducted Emissions

Test Requirement:	FCC Part 15 C section 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.
Test Method:	ANSI C63.10: Clause 11.11
Test Status:	Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture). Following channel(s) was (were) selected for the final test as listed below.
Test Configuration:	



#### Test Procedure:

1. Remove the antenna from the EUT and then connect a low RF cable (cable loss =2dB) from the antenna port to the spectrum analyzer or power meter.
2. Establish a reference level by using the following procedure:
  - a) Set instrument center frequency to DTS channel center frequency.
  - b) Set the span to  $\geq 1.5 \times \text{DTS bandwidth}$ .
  - c) Set the RBW = 100 kHz.
  - d) Set the VBW  $\geq [3 \times \text{RBW}]$ .
  - e) Detector = peak.
  - f) Sweep time = auto couple.

- g) Trace mode = max hold.
- h) Allow trace to fully stabilize.
- i) 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

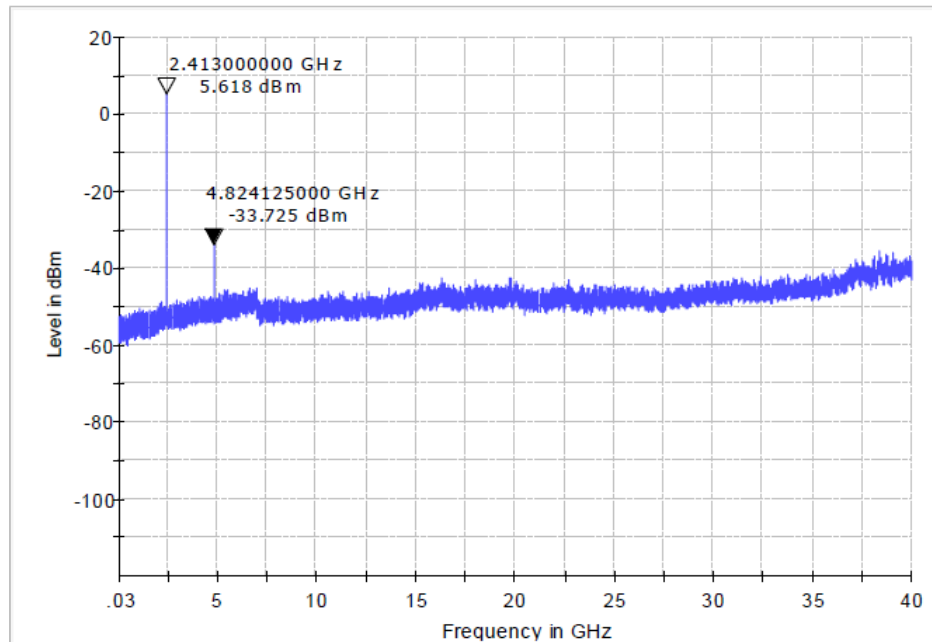
3. Emission level measurement
  - a) Set the center frequency and span to encompass frequency range to be measured.
  - b) Set the RBW = 100 kHz.
  - c) Set the VBW  $\geq [3 \times \text{RBW}]$ .
  - d) Detector = peak.
  - e) Sweep time = auto couple.
  - f) Trace mode = max hold.
  - g) Allow trace to fully stabilize.
  - h) Use the peak marker function to determine the maximum amplitude level.
4. Measure the Conducted unwanted Emissions of the test frequency with special test status.
5. Repeat until all the test status is investigated.
6. Report the worst case.

**Result plot as follows:**

**802.11b mode with 11Mbps data rate**

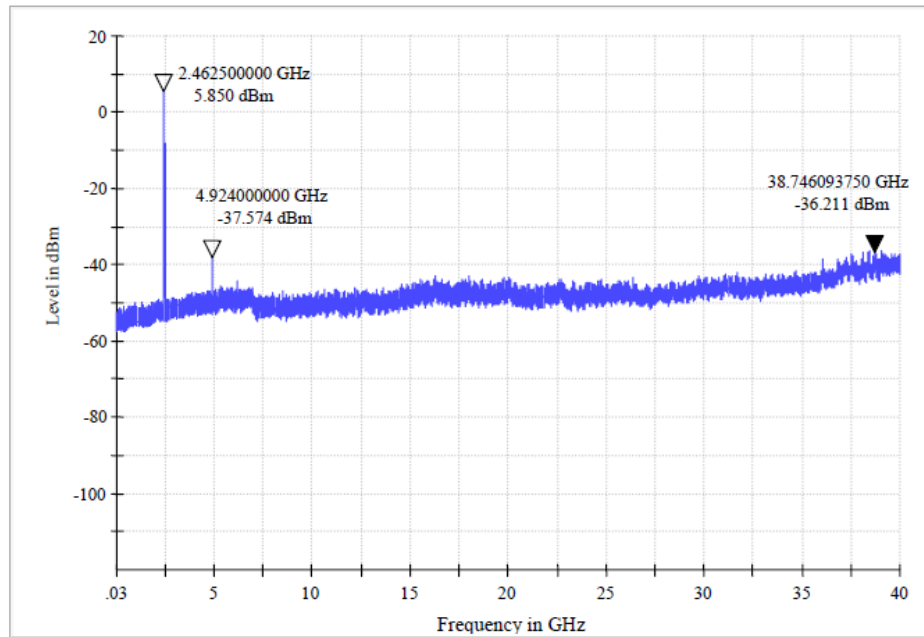
**Port 1**

Channel 1: 2.412GHz:



In any 100kHz bandwidth, the Conducted Spurious Emissions from 30 MHz to 25 GHz were greater than 20dB below the peak emission within the band that contains the highest level of the desired power.

Channel 11:2.462 GHz:

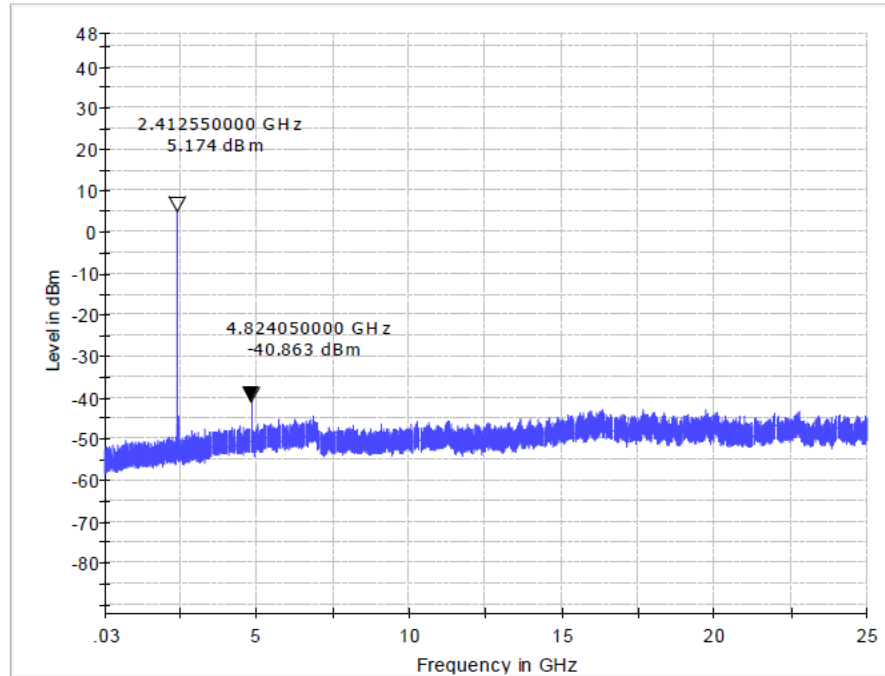


In any 100kHz bandwidth, the Conducted Spurious Emissions from 30 MHz to 25 GHz were greater than 20dB below the peak emission within the band that contains the highest level of the desired power.

**802.11b mode with 11Mbps data rate**

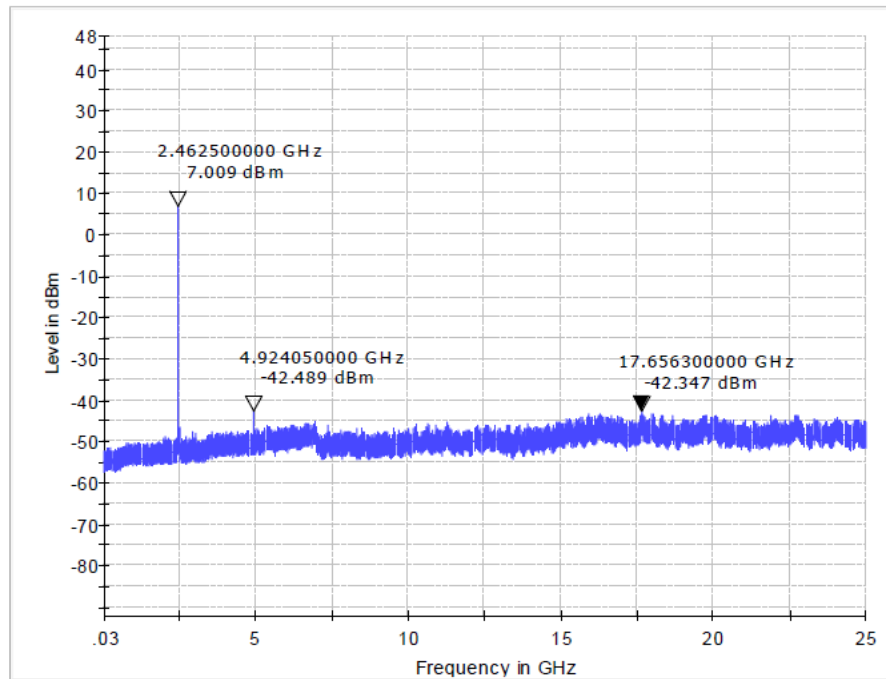
**Port 2**

Channel 1: 2.412GHz:



In any 100kHz bandwidth, the Conducted Spurious Emissions from 30 MHz to 25 GHz were greater than 20dB below the peak emission within the band that contains the highest level of the desired power.

Channel 11:2.462 GHz:

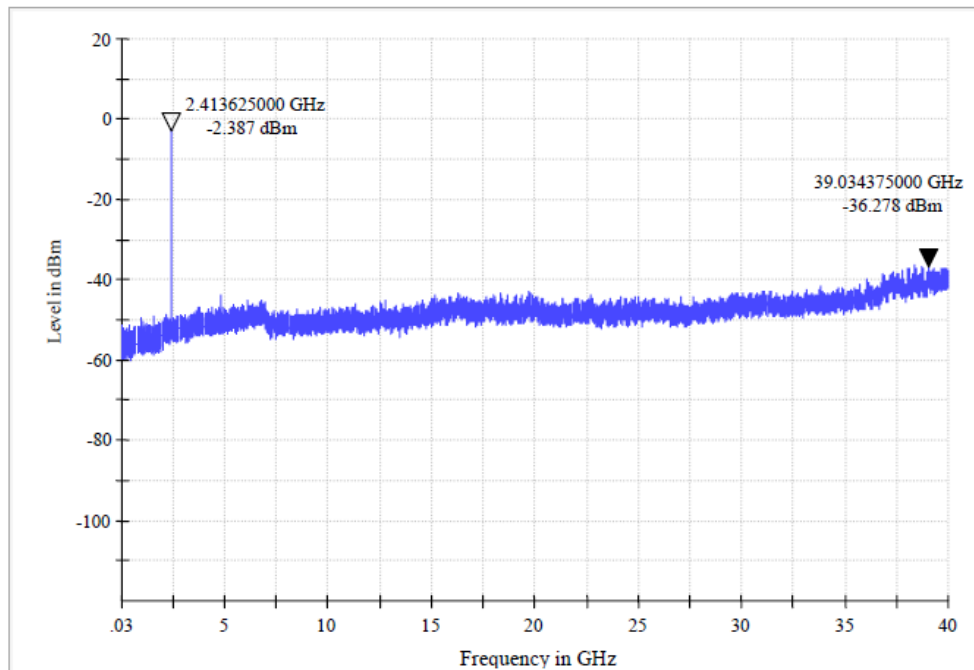


In any 100kHz bandwidth, the Conducted Spurious Emissions from 30 MHz to 25 GHz were greater than 20dB below the peak emission within the band that contains the highest level of the desired power.

**802.11g mode with 54Mbps data rate**

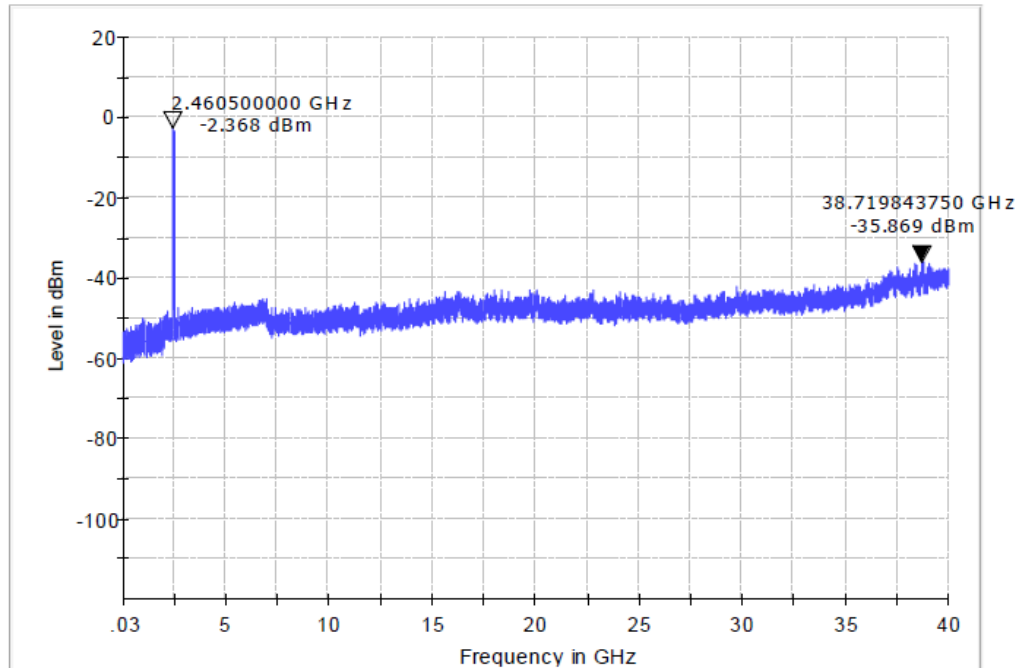
**Port 1**

Channel 1: 2.412GHz:



In any 100kHz bandwidth, the Conducted Spurious Emissions from 30 MHz to 25 GHz were greater than 20dB below the peak emission within the band that contains the highest level of the desired power.

Channel 11:2.462 GHz:

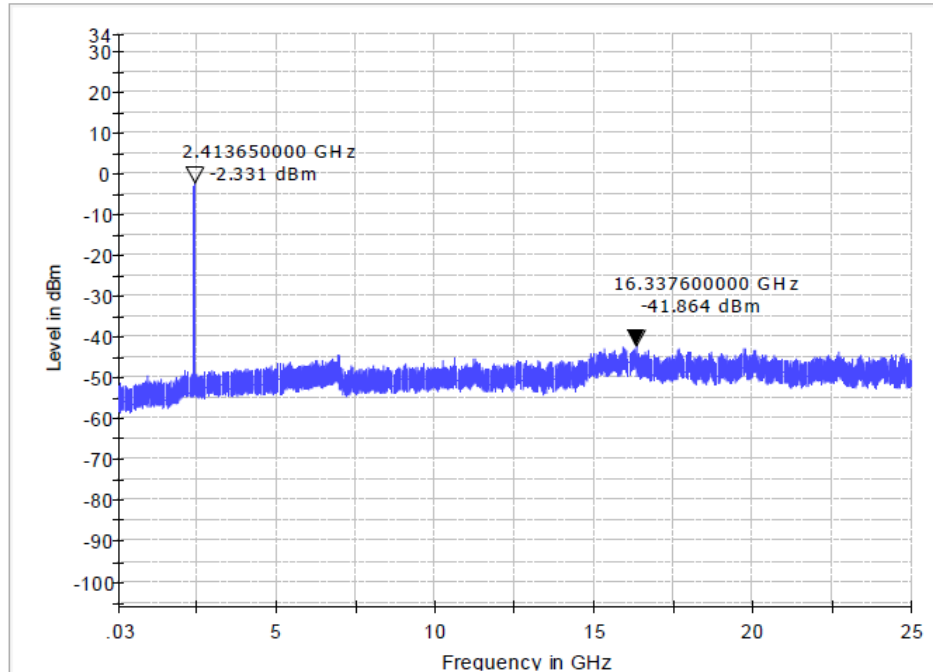


In any 100kHz bandwidth, the Conducted Spurious Emissions from 30 MHz to 25 GHz were greater than 20dB below the peak emission within the band that contains the highest level of the desired power.



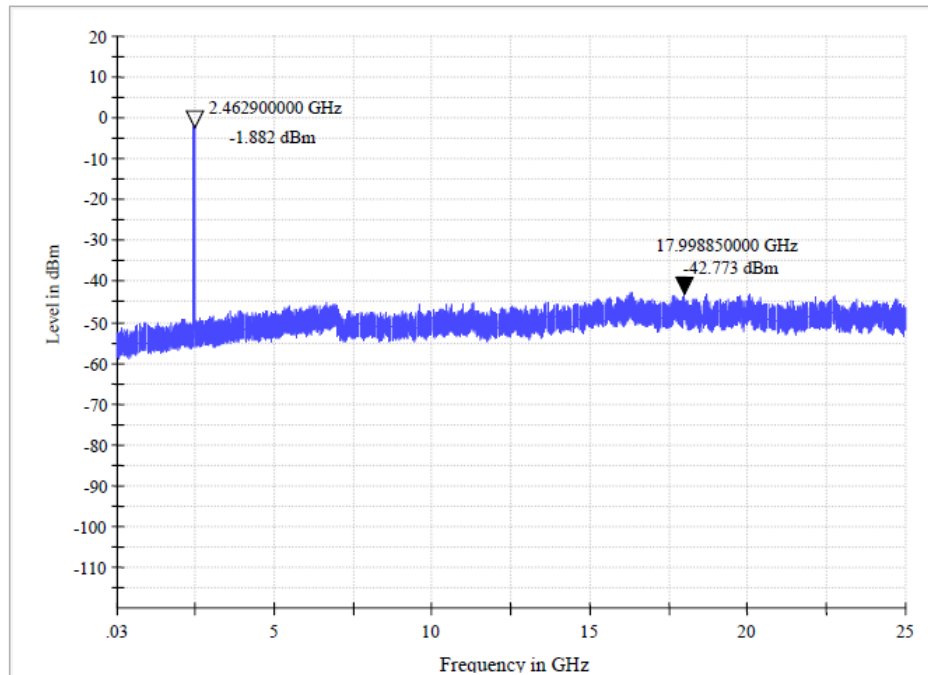
**Port 2**

Channel 1: 2.412GHz:



In any 100kHz bandwidth, the Conducted Spurious Emissions from 30 MHz to 25 GHz were greater than 20dB below the peak emission within the band that contains the highest level of the desired power.

Channel 11:2.462 GHz:

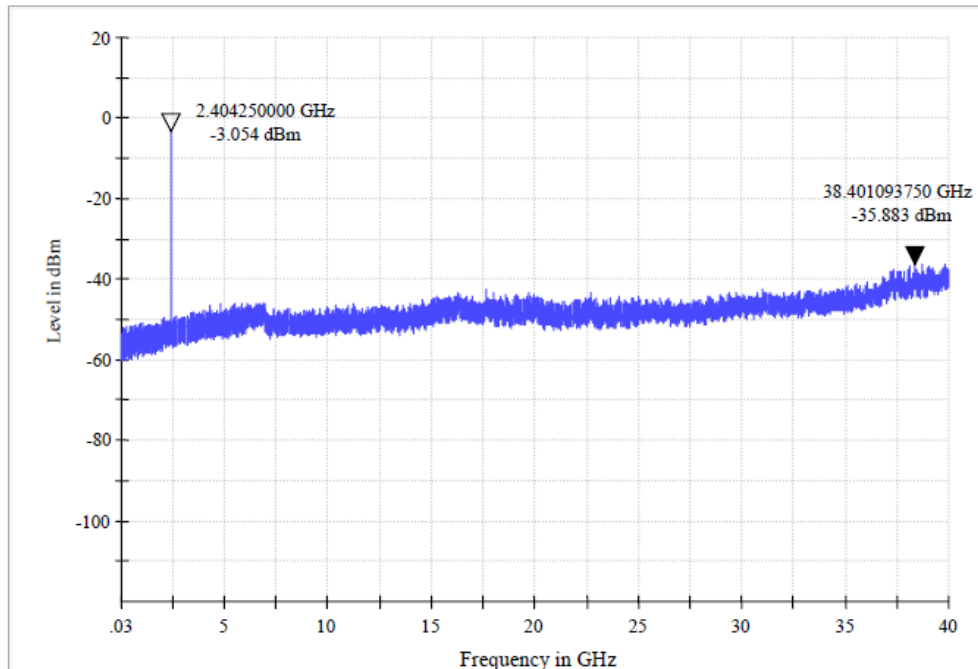


In any 100kHz bandwidth, the Conducted Spurious Emissions from 30 MHz to 25 GHz were greater than 20dB below the peak emission within the band that contains the highest level of the desired power.

**802.11n(HT20) mode with 72.2Mbps data rate**

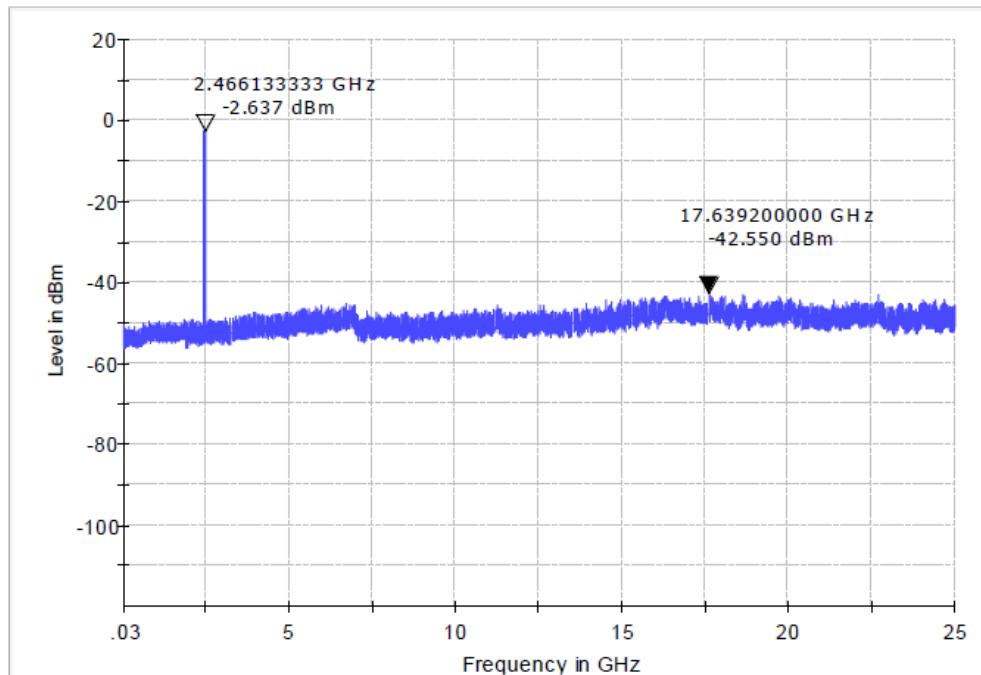
**Port 1**

Channel 1: 2.412GHz:



In any 100kHz bandwidth, the Conducted Spurious Emissions from 30 MHz to 25 GHz were greater than 20dB below the peak emission within the band that contains the highest level of the desired power.

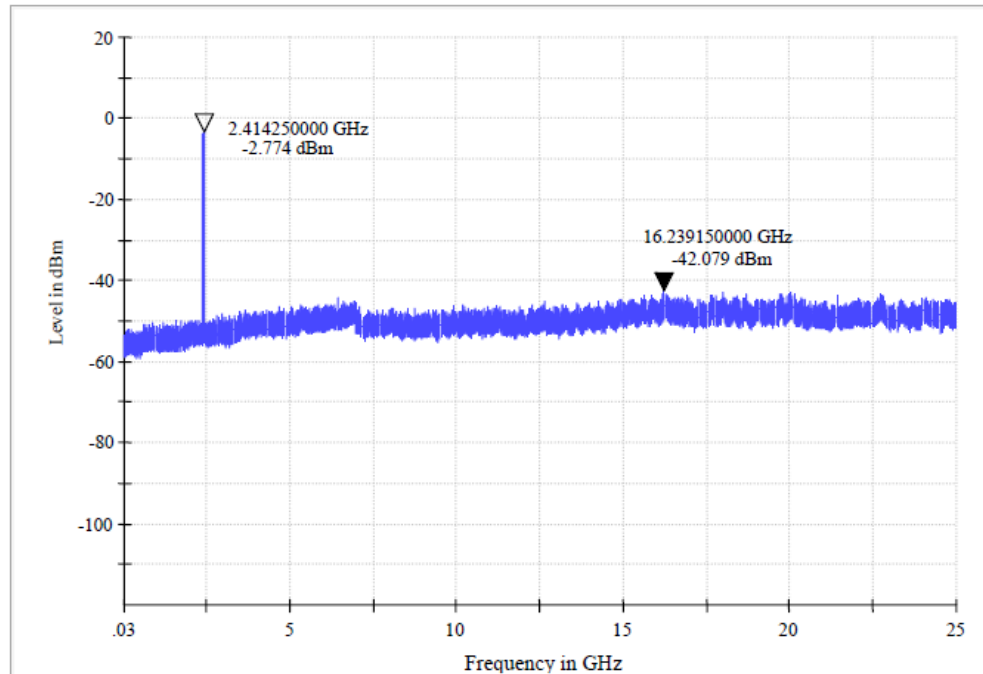
Channel 11:2.462 GHz:



In any 100kHz bandwidth, the Conducted Spurious Emissions from 30 MHz to 25 GHz were greater than 20dB below the peak emission within the band that contains the highest level of the desired power.

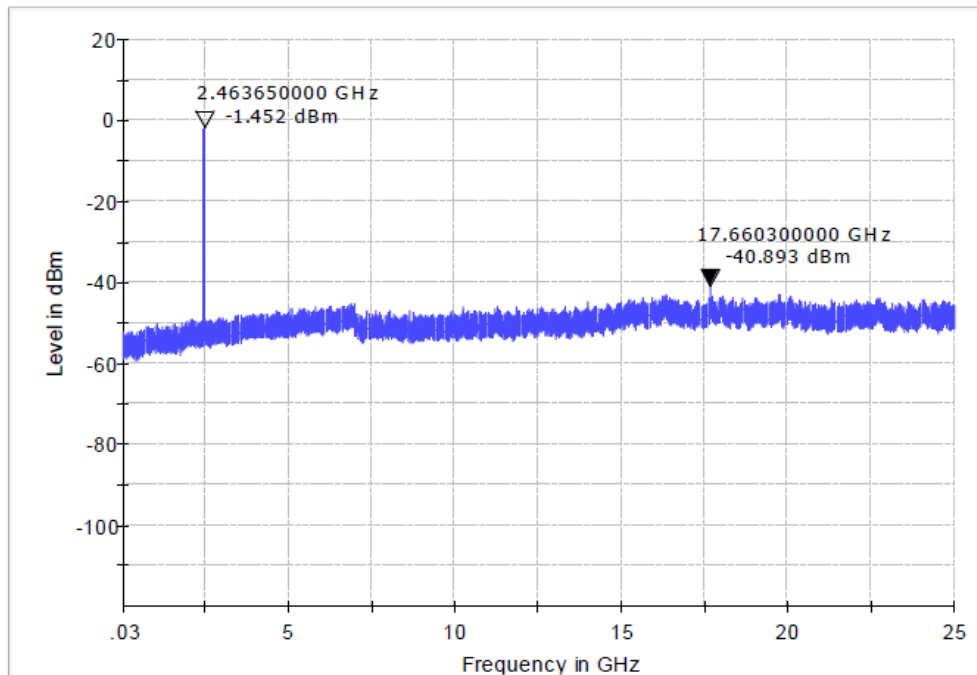
**Port 2**

Channel 1: 2.412GHz:



In any 100kHz bandwidth, the Conducted Spurious Emissions from 30 MHz to 25 GHz were greater than 20dB below the peak emission within the band that contains the highest level of the desired power.

Channel 11: 2.462 GHz:

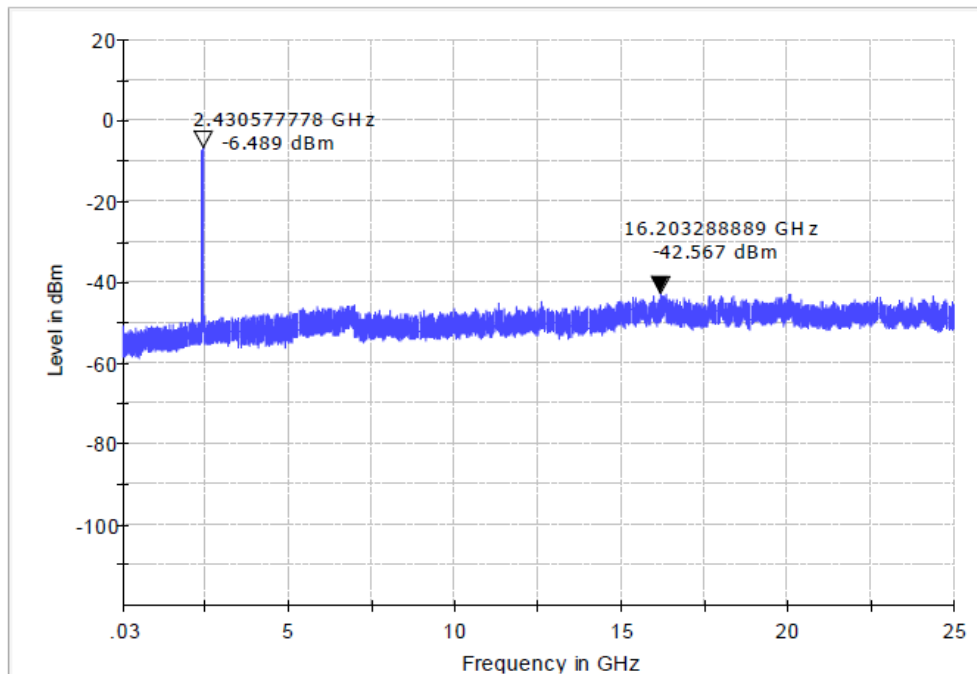


In any 100kHz bandwidth, the Conducted Spurious Emissions from 30 MHz to 25 GHz were greater than 20dB below the peak emission within the band that contains the highest level of the desired power.

**802.11n(HT40) mode with 150Mbps data rate**

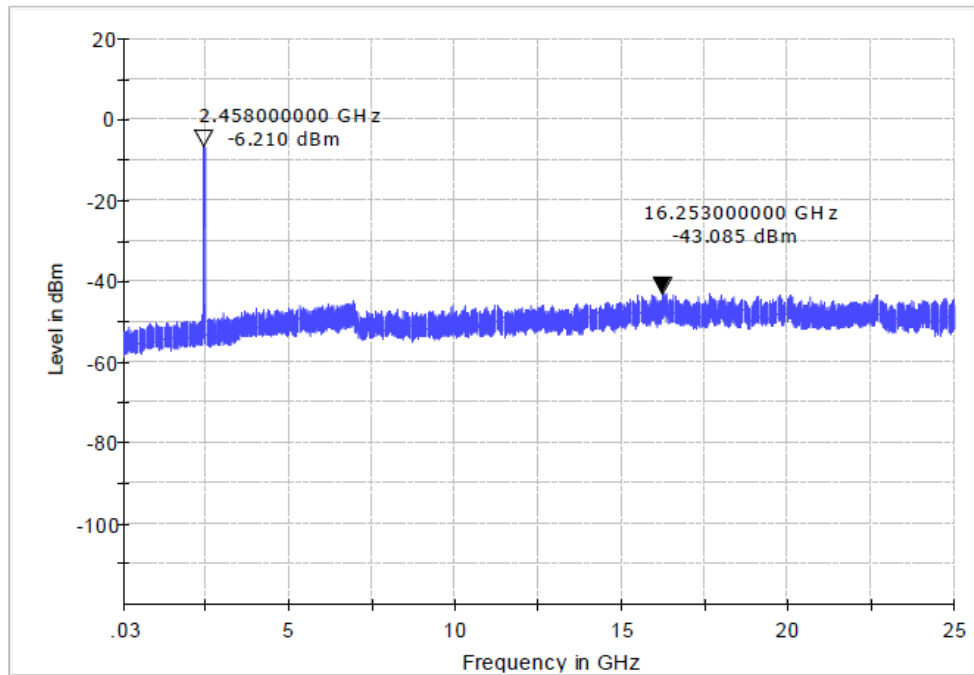
**Port 1**

Channel 3: 2.422GHz:



In any 100kHz bandwidth, the Conducted Spurious Emissions from 30 MHz to 25 GHz were greater than 20dB below the peak emission within the band that contains the highest level of the desired power.

Channel 9: 2.452 GHz:

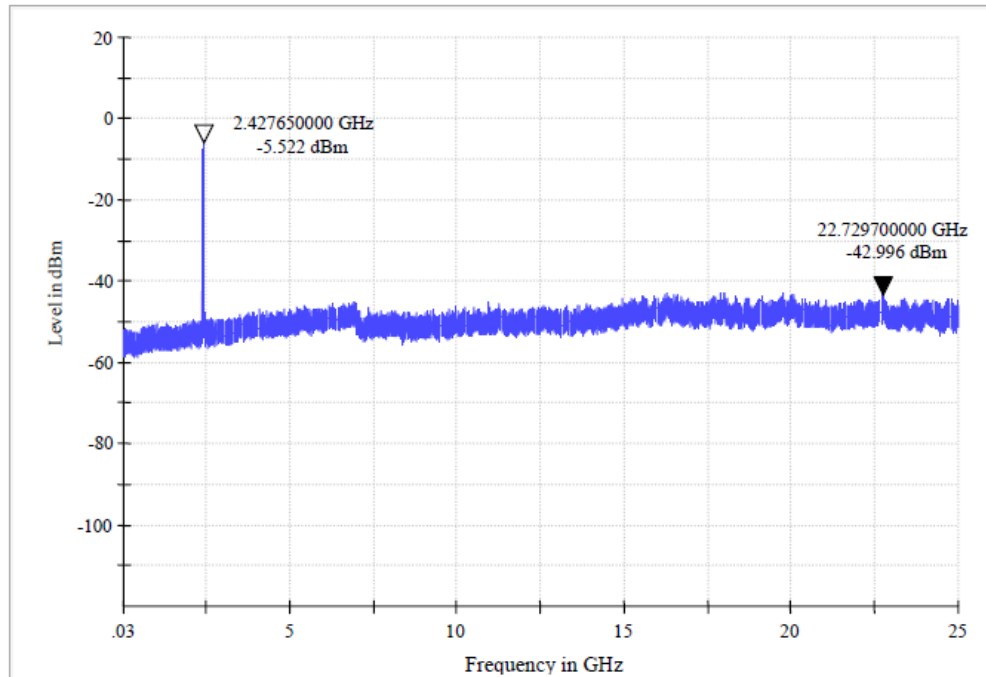


In any 100kHz bandwidth, the Conducted Spurious Emissions from 30 MHz to 25 GHz were greater than 20dB below the peak emission within the band that contains the highest level of the desired power.



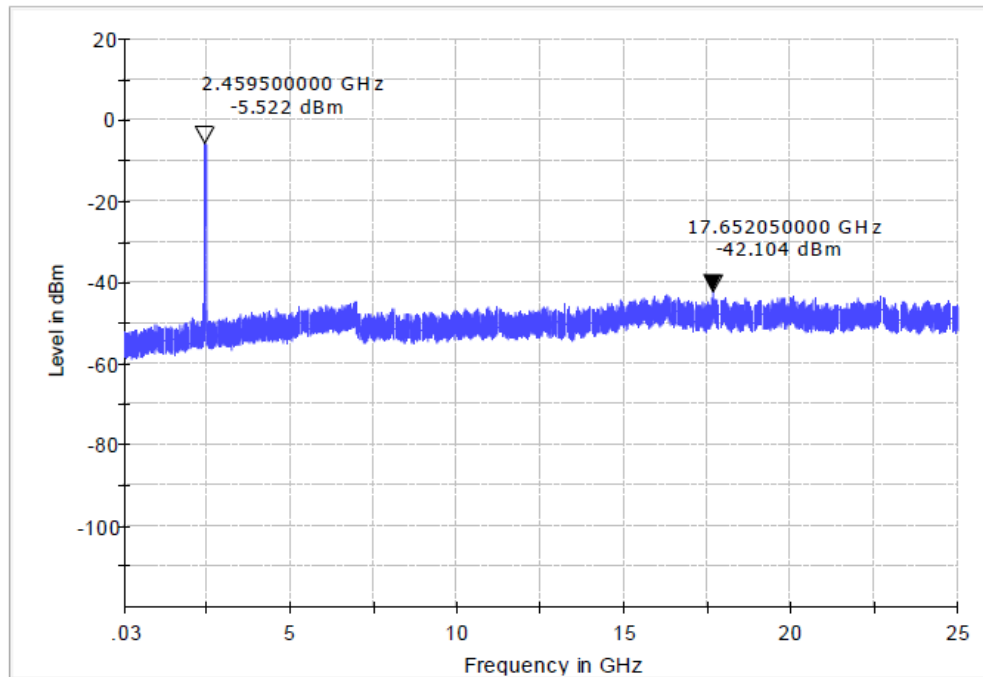
**Port 2**

Channel 3: 2.422GHz:



In any 100kHz bandwidth, the Conducted Spurious Emissions from 30 MHz to 25 GHz were greater than 20dB below the peak emission within the band that contains the highest level of the desired power.

Channel 9: 2.452 GHz:



In any 100kHz bandwidth, the Conducted Spurious Emissions from 30 MHz to 25 GHz were greater than 20dB below the peak emission within the band that contains the highest level of the desired power.



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#### **4.6 Out of Band Radiated Emissions**

For out of band radiated emissions into Non-Restricted Frequency Bands were performed at a 3m separation distance to determine whether these emissions complied with the 20dB attenuation requirement.

- ☒ Not required, since all emissions are more than 20dB below fundamental
- ☐ See attached data sheet

#### 4.7 Radiated Emissions in Restricted Bands

Test Requirement:	FCC Part 15 C section 15.247  (d) In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).
Test Method:	ANSI C63.10: Clause 11.12.1, 6.4, 6.5 and 6.6
Test Status:	Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture). Following channel(s) was (were) selected for the final test as listed below.
Test site:	Measurement Distance: 3m (Semi-Anechoic Chamber)
Limit:	40.0 dB $\mu$ V/m between 30MHz & 88MHz; 43.5 dB $\mu$ V/m between 88MHz & 216MHz; 46.0 dB $\mu$ V/m between 216MHz & 960MHz; 54.0 dB $\mu$ V/m above 960MHz.
Detector:	For Peak and Quasi-Peak value: RBW = 1 MHz for $f \geq 1$ GHz, 200 Hz for 9 kHz to 150 kHz 9 kHz for 150 kHz to 30 MHz 120 kHz for 30 MHz to 1GHz VBW $\geq$ RBW Sweep = auto Detector function = peak for $f \geq 1$ GHz, QP for $f < 1$ GHz Trace = max hold  For AV value: RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz VBW=10 Hz Sweep = auto Trace = max hold

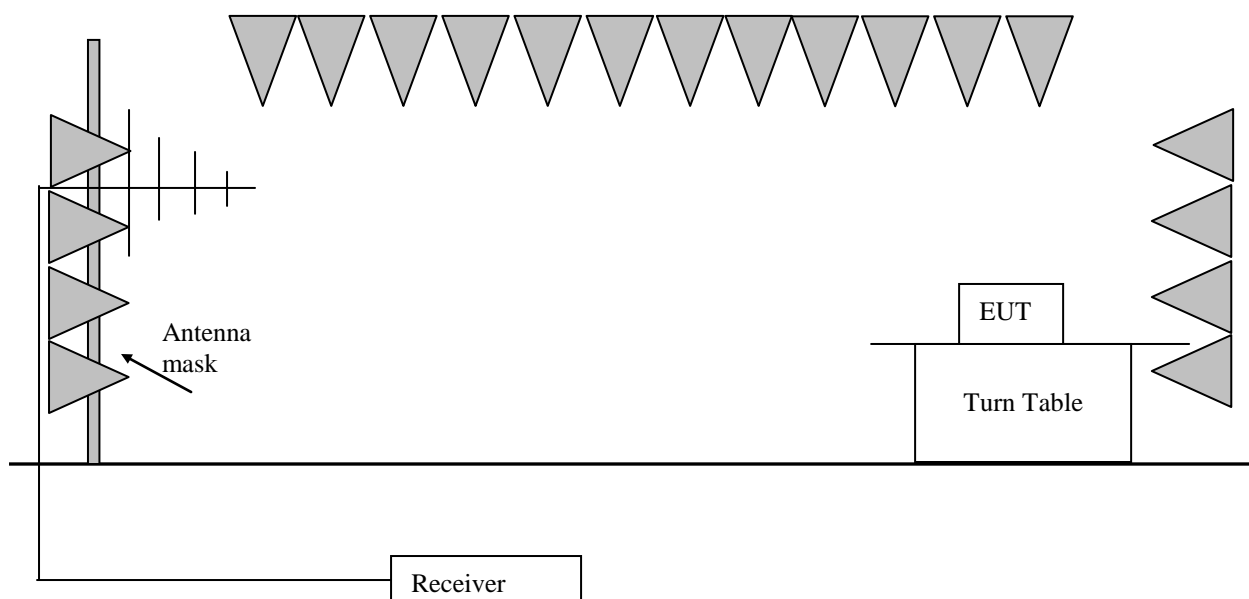
Section 15.205 Restricted bands of operation.

(a) Except as shown in paragraph (d) of this section. Only spurious emissions are permitted in any of the frequency bands listed below:

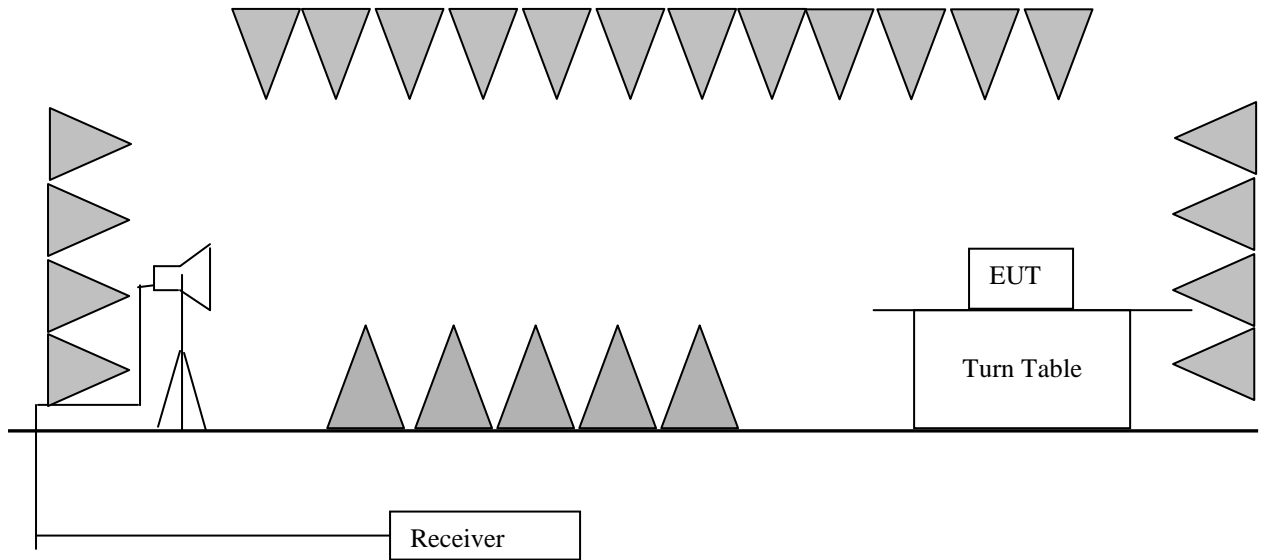
MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
<sup>1</sup> 0.495 - 0.505	16.69475 -	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.69525	960 - 1240	7.25 - 7.75
4.125 - 4.128	16.80425 -	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	16.80475	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	25.5 - 25.67	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	37.5 - 38.25	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	73 - 74.6	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	74.8 - 75.2	2200 - 2300	14.47 - 14.5
8.291 - 8.294	108 - 121.94	2310 - 2390	15.35 - 16.2
8.362 - 8.366	123 - 138	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	149.9 - 150.05	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	156.52475 -	3260 - 3267	23.6 - 24.0
12.29 - 12.293	156.52525	3332 - 3339	31.2 - 31.8
12.51975 -	156.7 - 156.9	3345.8 - 3358	36.43 - 36.5
12.52025	162.0125 - 167.17	3600 - 4400	
12.57675 -	167.72 - 173.2		
12.57725	240 - 285		
13.36 - 13.41	322 - 335.4		

Test Configuration:

1) 30 MHz to 1 GHz emissions:



2) 1 GHz to 40 GHz emissions:



**Test Procedure:**

Test site with RF absorbing material covering the ground plane that met the site validation criterion called out in CISPR 16-1-4:2010 was used to perform radiated emission test above 1 GHz.

The receiver was scanned from 9 kHz to 25 GHz. When an emission was found, the table was rotated to produce the maximum signal strength. An initial pre-scan was performed for in peak detection mode using the receiver. The EUT was measured for both the Horizontal and Vertical polarities and performed a pre-test three orthogonal planes. For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. The worst case emissions were reported.

Remark: The duty cycle for the sample is more than 98%

Mode	Duty cycle
802.11b	99%
802.11g	99%
802.11n(H20)	99%
802.11n(H40)	99%

**802.11b mode with 11Mbps data rate**

9 kHz~30 MHz Field Strength of Unwanted Emissions for Quasi-Peak Measurement

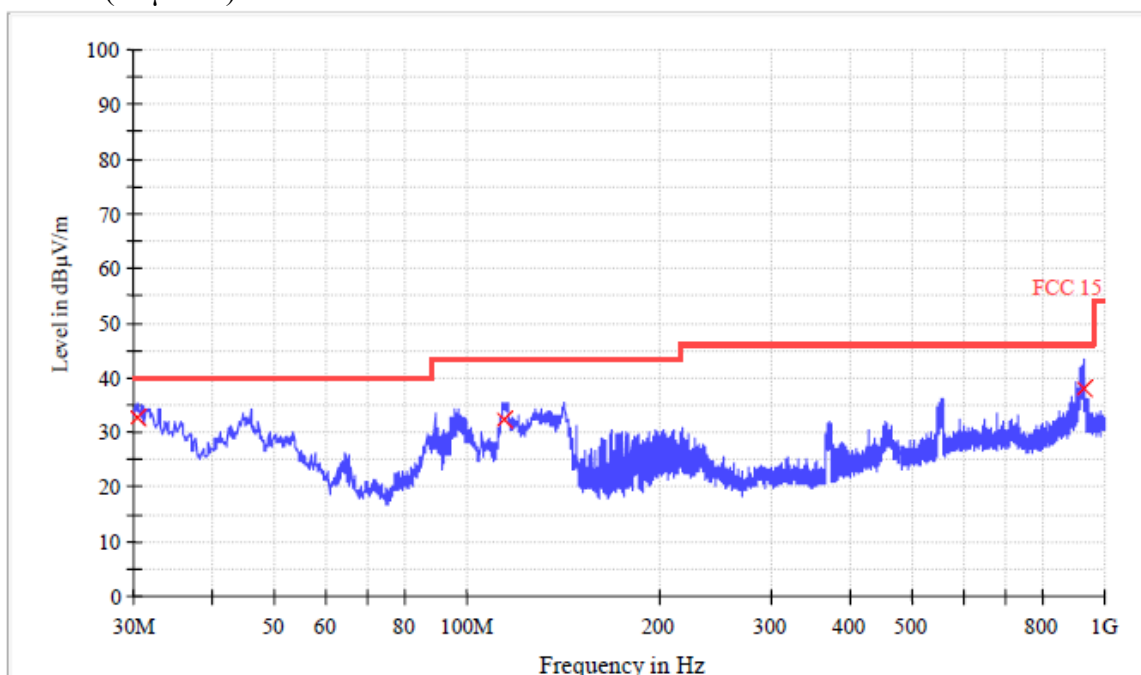
The measurements with active loop antenna were greater than 20dB below the limit, so the test data were not recorded in the test report.

Test at Channel 1 (2.412 GHz) in transmitting status.

30 MHz~1 GHz Spurious Emissions .Quasi-Peak Measurement.

**Vertical:**

Level (dBμV/m)



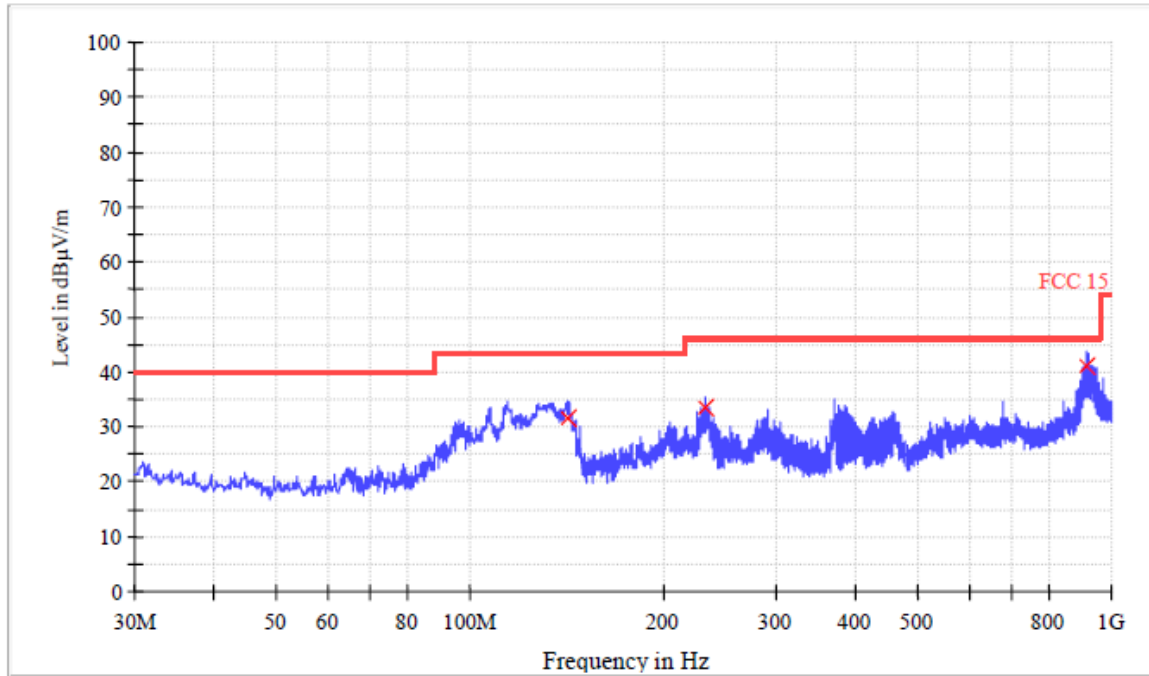
**Quasi-peak measurement**

Frequency (MHz)	Quasi Peak (dBμV/m)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBμV/m)
30.560000	32.7	120.000	V	12.1	7.3	40.0
114.360000	32.5	120.000	V	11.4	11.0	43.5
927.480000	37.9	120.000	V	25.4	8.1	46.0



**Horizontal:**

Level (dB $\mu$ V/m)



**Quasi-peak measurement**

Frequency (MHz)	Quasi Peak (dB $\mu$ V/m)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dB $\mu$ V/m)
142.560000	31.4	120.000	H	8.4	12.1	43.5
233.240000	33.5	120.000	H	11.8	12.5	46.0
914.600000	41.1	120.000	H	25.3	4.9	46.0

1~25 GHz Radiated Emissions.

**PK Measurement:**

Frequency (MHz)	PK Reading Level (dBμV)	Correction factors (dB/m)	PK Emission Level (dBμV/m)	PK Limit (dBμV/m)	Antenna polarization
2093.6	66.142	-9.1	57.042	74	V
4589.2	68.216	-1.0	67.216	74	V
4824.0	68.384	-0.9	67.484	74	V
7440.8	51.711	3.4	55.111	74	V
2217.2	66.574	-8.6	57.974	74	H
4535.2	72.037	-1.0	71.037	74	H
4824.0	67.480	-0.9	66.580	74	H
7390.4	56.384	3.3	59.684	74	H

**AV Measurement:**

Frequency (MHz)	AV Reading Level (dBμV)	Correction factors (dB/m)	AV Emission Level (dBμV/m)	AV Limit (dBμV/m)	Antenna polarization
2093.6	46.600	-9.1	37.500	54	V
4589.2	43.500	-1.0	42.500	54	V
4824.0	54.800	-0.9	53.900	54	V
7440.8	33.600	3.4	37.000	54	V
2217.2	45.900	-8.6	37.300	54	H
4535.2	43.300	-1.0	42.300	54	H
4824.0	54.600	-0.9	53.700	54	H
7390.4	33.800	3.3	37.100	54	H

Remark: When Peak emission level was below AV limit, the AV emission level did not be recorded.



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Band edge in restricted band

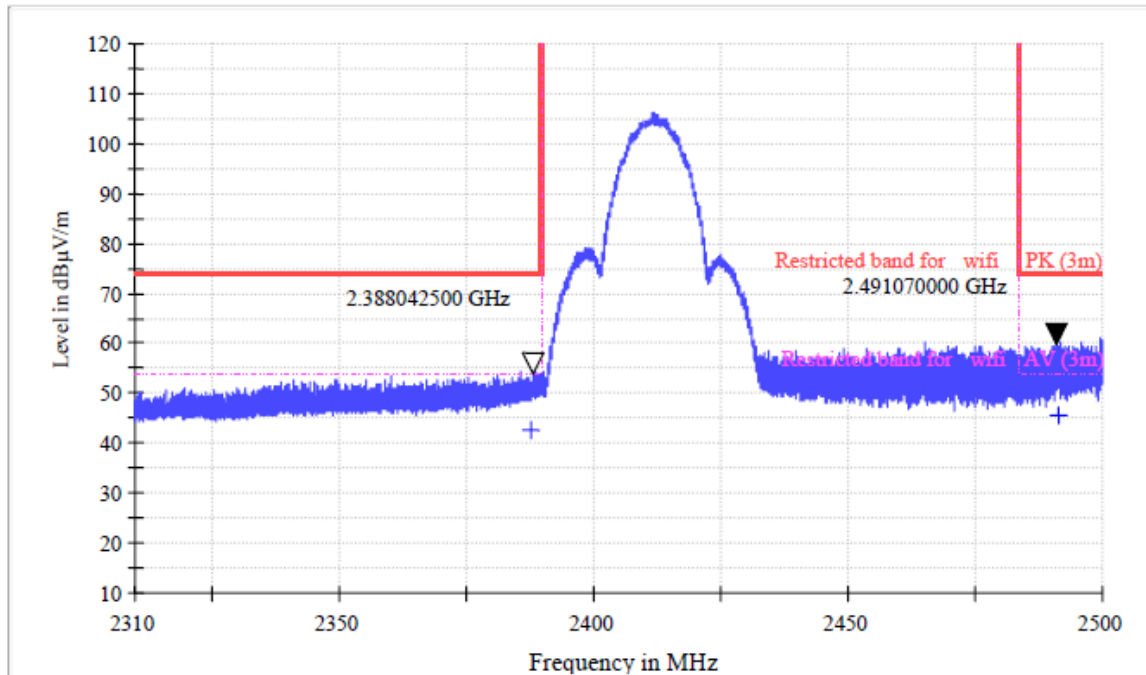
**PK Measurement:**

2358.0	61.955	-8.0	53.955	74	V
2493.2	66.059	-7.4	58.659	74	V
2388.0	62.249	-7.8	54.449	74	H
2491.2	67.502	-7.4	60.102	74	H

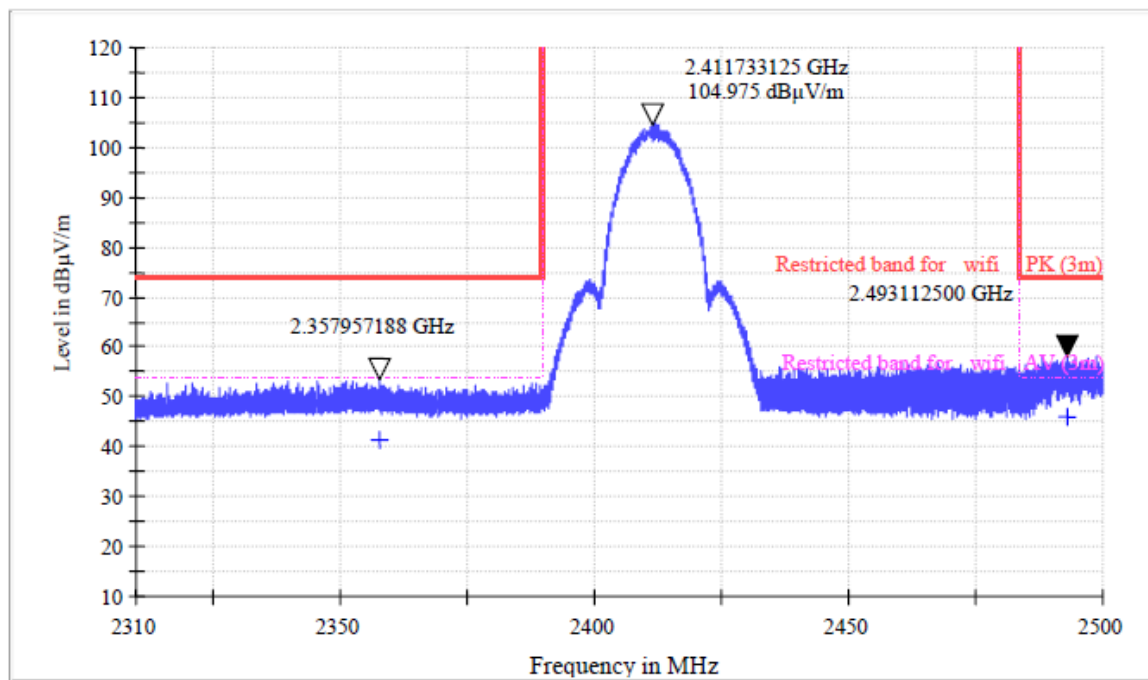
**AV Measurement:**

2358.0	49.400	-8.0	41.400	54	V
2493.2	53.600	-7.4	46.200	54	V
2388.0	50.400	-7.8	42.600	54	H
2491.2	52.800	-7.4	45.400	54	H

**Plots:**  
**Horizontal**



**Vertical**

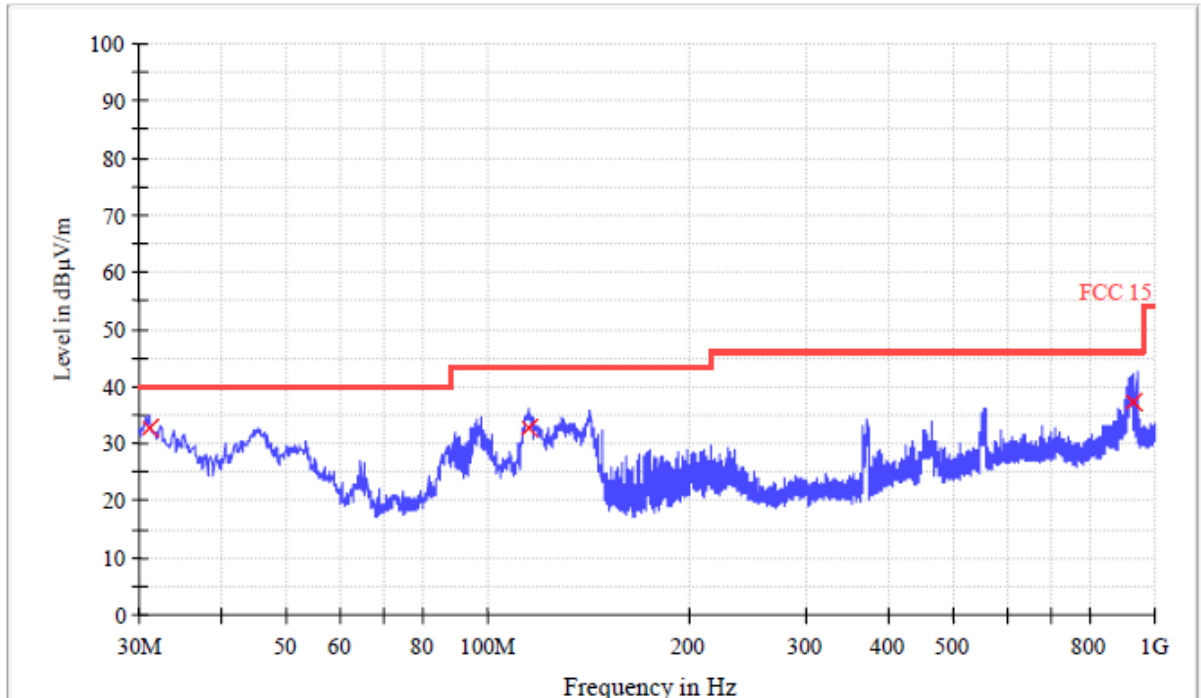


Test at Channel 6 (2.437 GHz) in transmitting status

30 MHz~1 GHz Radiated Emissions .Quasi-Peak Measurement

**Vertical:**

Level (dB $\mu$ V/m)

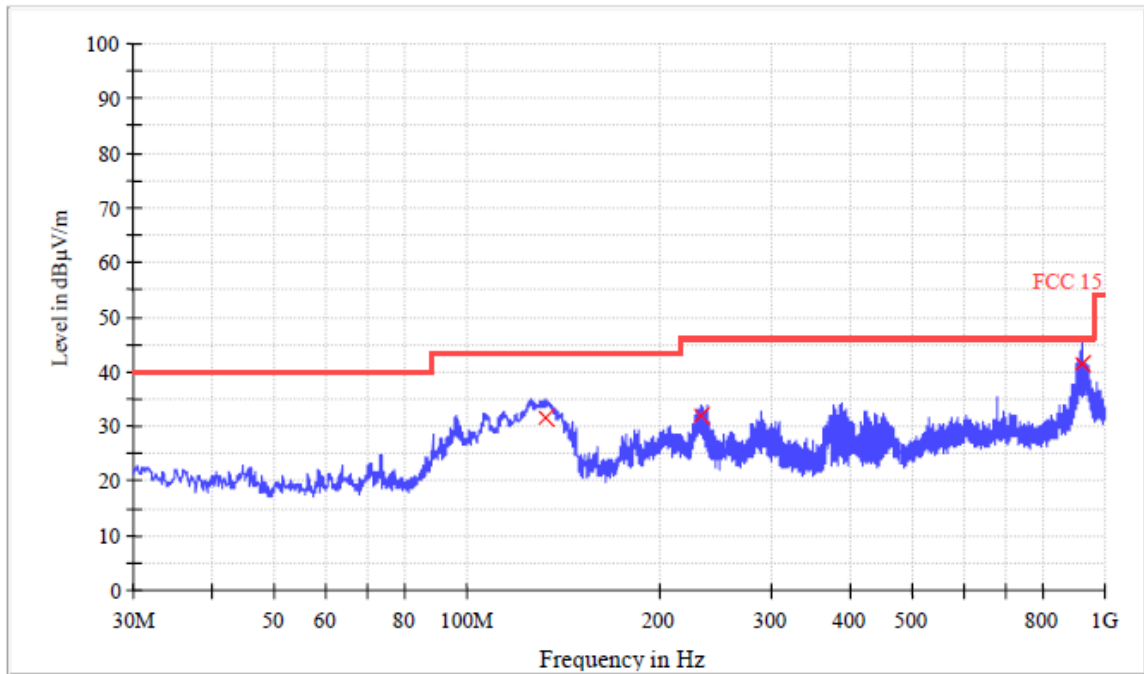


Quasi-peak measurement

Frequency (MHz)	Quasi Peak (dB $\mu$ V/m)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dB $\mu$ V/m)
31.120000	32.8	120.000	V	12.2	7.2	40.0
114.920000	32.7	120.000	V	11.2	10.8	43.5
926.920000	37.4	120.000	V	25.4	8.6	46.0

**Horizontal:**

Level (dB $\mu$ V/m)



Quasi-peak measurement

Frequency (MHz)	Quasi Peak (dB $\mu$ V/m)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dB $\mu$ V/m)
132.760000	31.6	120.000	H	9.0	12.0	43.5
233.240000	31.9	120.000	H	11.8	14.1	46.0
917.760000	41.5	120.000	H	25.3	4.5	46.0

1~25 GHz Radiated Emissions.

**PK Measurement:**

Frequency (MHz)	PK Reading Level (dB $\mu$ V)	Correction factors (dB/m)	PK Emission Level (dB $\mu$ V/m)	PK Limit (dB $\mu$ V/m)	Antenna polarization
2101.2	63.820	-9.1	54.720	74	V
4535.2	67.327	-1.0	66.327	74	V
4874.0	65.936	-0.9	65.036	74	V
2217.2	55.737	-1.0	54.737	74	H
4523.6	73.166	-1.0	72.166	74	H
4874.0	66.191	-0.9	65.291	74	H
7367.2	55.010	3.2	58.210	74	H

**AV Measurement:**

Frequency (MHz)	AV Reading Level (dB $\mu$ V)	Correction factors (dB/m)	AV Emission Level (dB $\mu$ V/m)	AV Limit (dB $\mu$ V/m)	Antenna polarization
2101.2	46.6	-9.1	37.5	54	V
4535.2	42.5	-1.0	41.5	54	V
4874.0	52.9	-0.9	52.0	54	V
2217.2	38.2	-1.0	37.2	54	H
4523.6	42.6	-1.0	41.6	54	H
4874.0	53.2	-0.9	52.3	54	H
7367.2	34.0	3.2	37.2	54	H

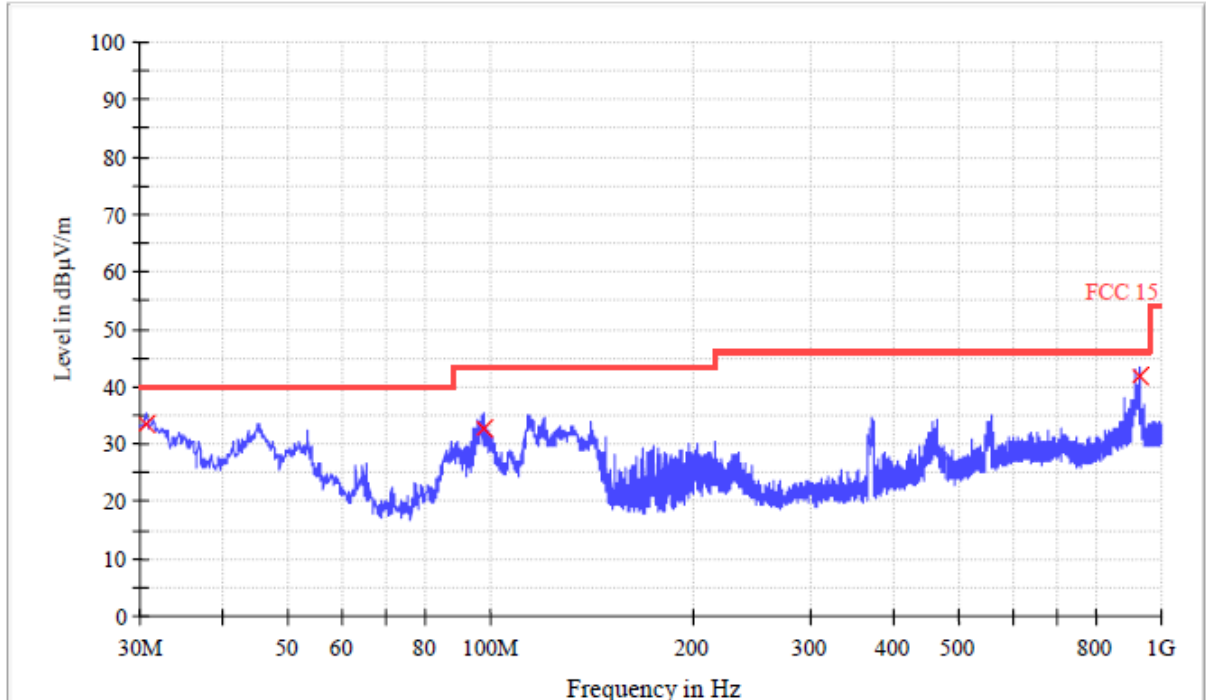
Remark: When Peak emission level was below AV limit, the AV emission level did not be recorded.

Test at Channel 11 (2.462 GHz) in transmitting status

30 MHz~1 GHz Radiated Emissions .Quasi-Peak Measurement

**Vertical:**

Level (dB $\mu$ V/m)



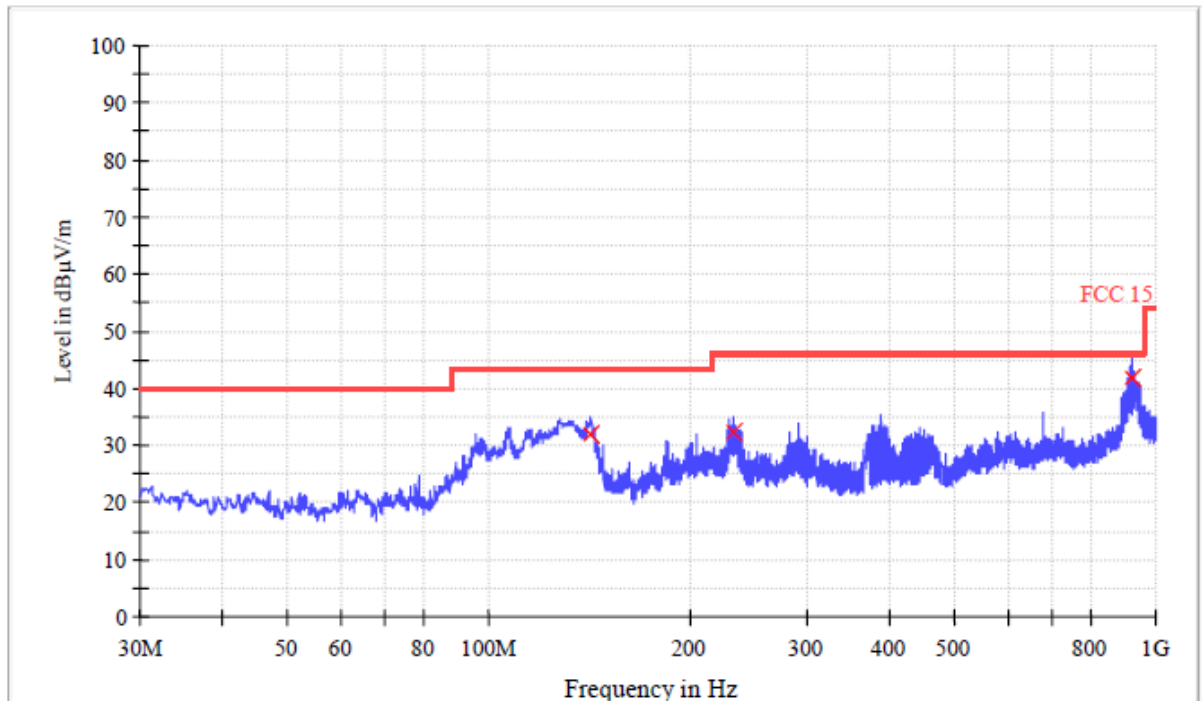
Quasi-peak measurement

Frequency (MHz)	Quasi Peak (dB $\mu$ V/m)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dB $\mu$ V/m)
30.680000	33.3	120.000	V	12.1	6.7	40.0
97.680000	32.5	120.000	V	12.6	11.0	43.5
928.840000	41.8	120.000	V	25.4	4.2	46.0



**Horizontal:**

Level (dB $\mu$ V/m)



Quasi-peak measurement

Frequency (MHz)	Quasi Peak (dB $\mu$ V/m)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dB $\mu$ V/m)
141.680000	31.9	120.000	H	8.5	11.6	43.5
233.240000	32.3	120.000	H	25.3	13.7	46.0
917.760000	41.9	120.000	H	8.5	4.1	46.0

1~25 GHz Radiated Emissions. Peak & Average Measurement

**PK Measurement:**

Frequency (MHz)	PK Reading Level (dB $\mu$ V)	Correction factors (dB/m)	PK Emission Level (dB $\mu$ V/m)	PK Limit (dB $\mu$ V/m)	Antenna polarization
4589.2	67.310	-1.0	66.310	74	V
4921.6	56.181	-0.9	55.281	74	V
7336.4	51.432	3.2	54.632	74	V
2213.2	65.133	-8.6	56.533	74	H
4535.2	72.100	-1.0	71.100	74	H
7386.4	56.733	3.3	60.033	74	H

**AV Measurement:**

Frequency (MHz)	AV Reading Level (dB $\mu$ V)	Correction factors (dB/m)	AV Emission Level (dB $\mu$ V/m)	AV Limit (dB $\mu$ V/m)	Antenna polarization
2483.5	42.1	-1.0	41.1	54	V
2494.2	44.0	-0.9	43.1	54	V
4927.0	36.1	3.2	39.3	54	V
2213.2	45.7	-8.6	37.1	54	H
4535.2	43.3	-1.0	42.3	54	H
7386.4	38.0	3.3	41.3	54	H

Remark: When Peak emission level was below AV limit, the AV emission level did not be recorded.



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Band edge in restricted band

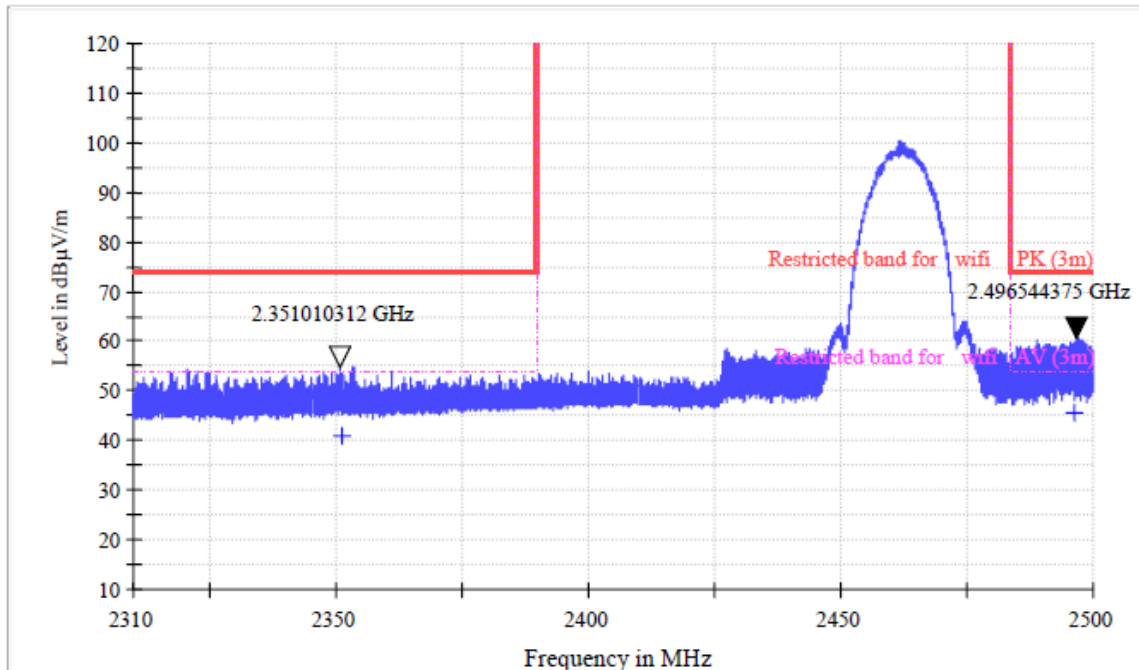
**PK Measurement:**

2352.0	64.402	-8.0	56.402	74	V
2494.8	68.873	-7.4	61.473	74	V
2351.2	63.169	-8.0	55.169	74	H
2496.4	68.253	-7.4	60.853	74	H

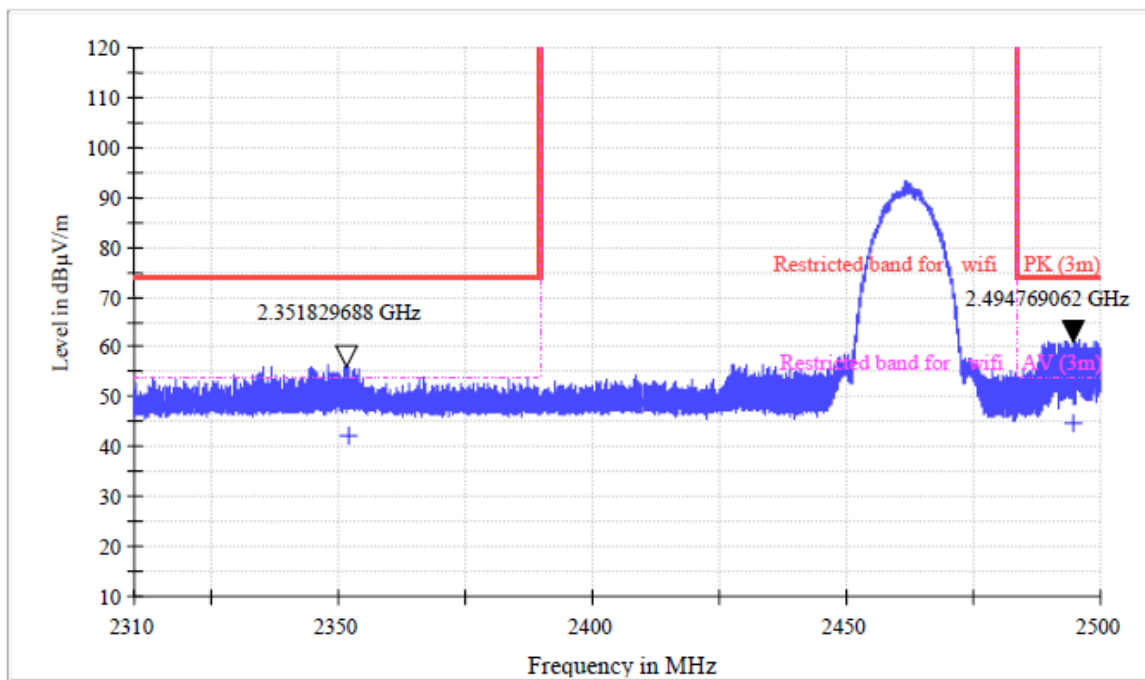
**AV Measurement:**

2352.0	50.2	-8.0	42.2	54	V
2494.8	52.2	-7.4	44.8	54	V
2351.2	48.8	-8.0	40.8	54	H
2496.4	52.8	-7.4	45.4	54	H

**Plots:**  
**Horizontal**



**Vertical**



The basic equation with a sample calculation for field strength is as follows:

Final Test Level = Receiver Reading + Antenna Factor + Cable Loss – Preamplifier Factor.

Correction Factors = Antenna Factor + Cable Loss – Preamplifier Factor.

As shown in Section, for frequencies above 1000 MHz. the above field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

No any other emissions level which are attenuated less than 20dB below the limit.

### 802.11g mode with 54Mbps data rate

9 kHz~30 MHz Field Strength of Unwanted Emissions. Quasi-Peak Measurement

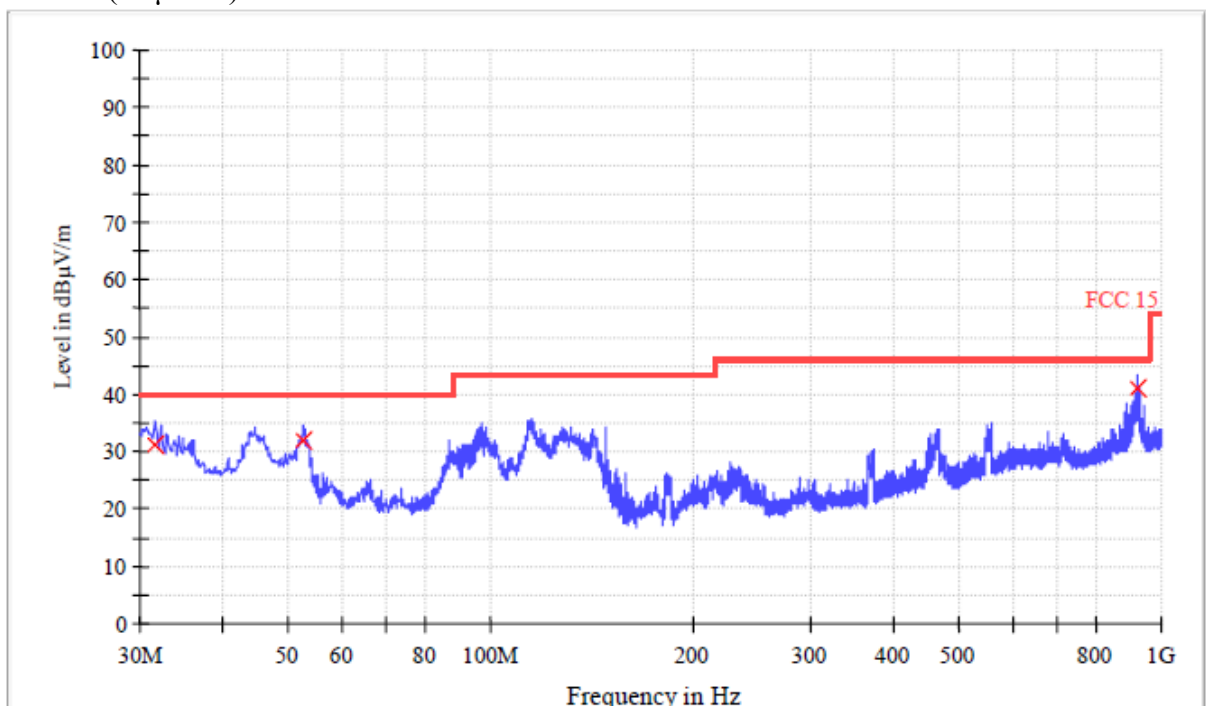
The measurements with active loop antenna were greater than 20dB below the limit, so the test data were not recorded in the test report.

Test at Channel 1 (2.412 GHz) in transmitting status

30 MHz~1 Radiated Emissions .Quasi-Peak Measurement

#### Vertical:

Level (dB $\mu$ V/m)

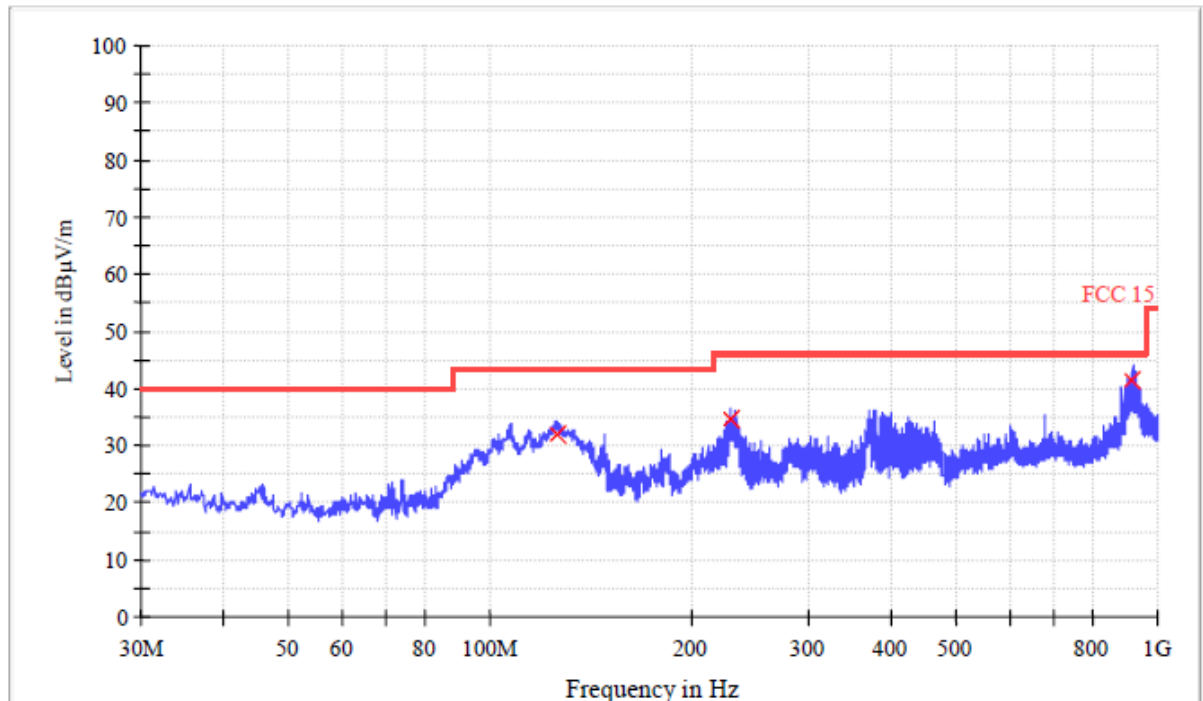


#### Quasi-peak measurement

Frequency (MHz)	Quasi Peak (dB $\mu$ V/m)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dB $\mu$ V/m)
31.680000	31.3	120.000	V	12.4	8.8	40.0
52.560000	31.9	120.000	H	12.6	8.1	40.0
918.680000	40.9	120.000	H	25.3	5.1	46.0

**Horizontal:**

Level (dB $\mu$ V/m)



Quasi-peak measurement

Frequency (MHz)	Quasi Peak (dB $\mu$ V/m)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dB $\mu$ V/m)
126.000000	31.8	120.000	H	9.6	11.7	43.5
229.880000	34.8	120.000	H	11.7	11.2	46.0
917.480000	41.5	120.000	H	25.3	4.5	46.0

1~25 GHz Radiated Emissions. Peak & Average Measurement

**PK Measurement:**

Frequency (MHz)	PK Reading Level (dB $\mu$ V)	Correction factors (dB/m)	PK Emission Level (dB $\mu$ V/m)	PK Limit (dB $\mu$ V/m)	Antenna polarization
1134.8	73.038	-14.3	58.738	74	V
4551.6	70.817	-1.0	69.817	74	V
4819.2	63.652	-0.9	62.752	74	V
7320.0	52.385	3.2	55.585	74	V
2215.2	65.132	-8.6	56.532	74	H
4525.6	72.789	-1.0	71.789	74	H
4818.8	62.664	-0.9	61.764	74	H
7379.6	57.294	3.3	60.594	74	H

**AV Measurement:**

Frequency (MHz)	AV Reading Level (dB $\mu$ V)	Correction factors (dB/m)	AV Emission Level (dB $\mu$ V/m)	AV Limit (dB $\mu$ V/m)	Antenna polarization
1134.8	45.4	-14.3	31.1	54	V
4551.6	40.5	-1.0	39.5	54	V
4819.2	48.5	-0.9	47.6	54	V
7320.0	32.1	3.2	35.3	54	V
2215.2	41.9	-8.6	33.3	54	H
4525.6	42.1	-1.0	41.1	54	H
4818.8	49.6	-0.9	48.7	54	H
7379.6	45.4	3.3	35.6	54	H

Remark: When Peak emission level was below AV limit, the AV emission level did not be recorded.





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Band edge in restricted band

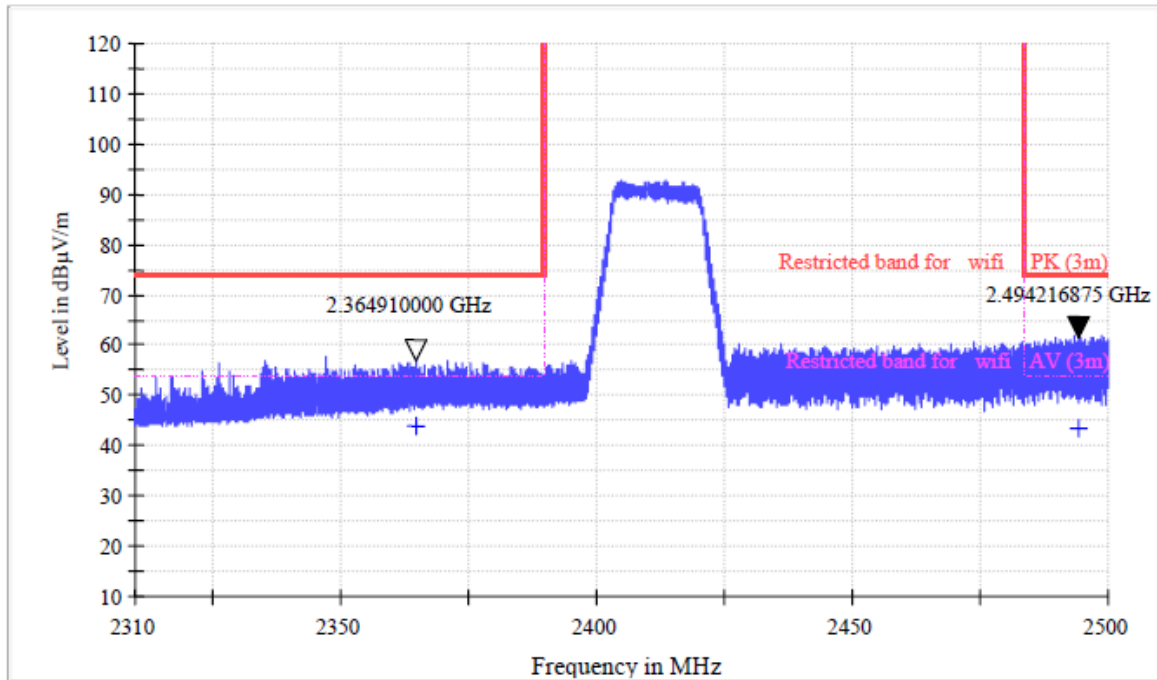
**PK Measurement:**

2355.6	64.152	-8.0	56.152	74	V
2493.2	67.681	-7.4	60.281	74	V
2364.8	65.356	-7.9	57.456	74	H
2494.4	69.162	-7.4	61.762	74	H

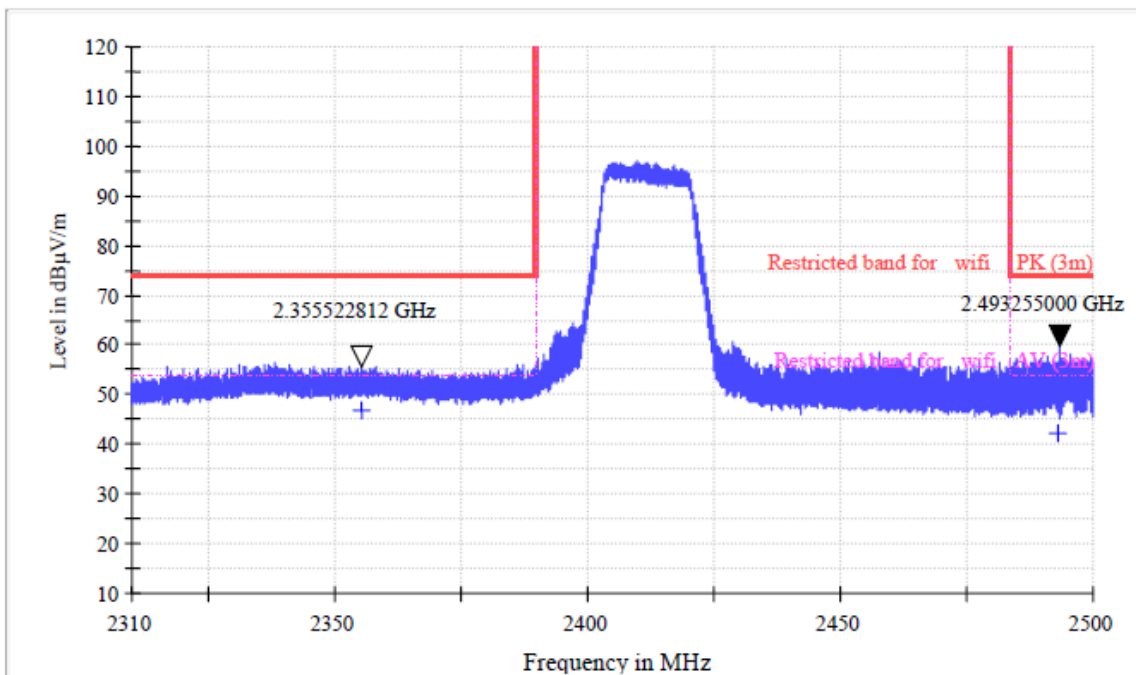
**AV Measurement:**

2355.6	54.7	-8.0	46.7	54	V
2493.2	49.7	-7.4	42.3	54	V
2364.8	51.8	-7.9	43.9	54	H
2494.4	51.0	-7.4	43.6	54	H

**Plots:**  
**Horizontal**



**Vertical**

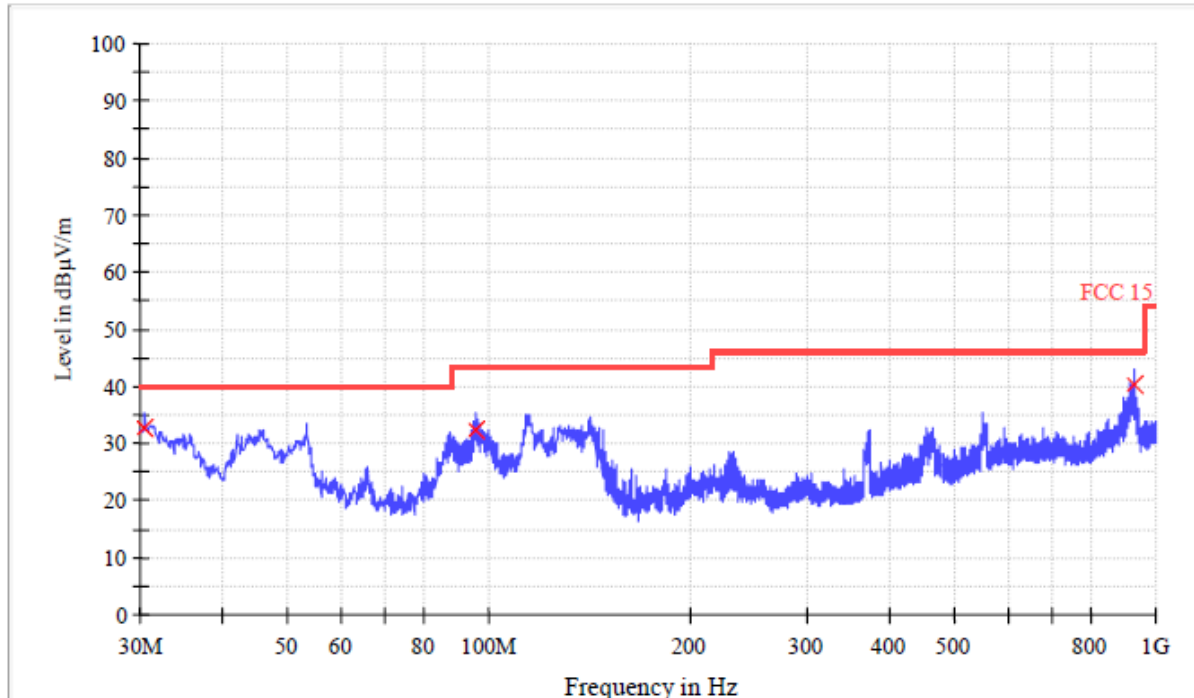


Test at Channel 6 (2.437GHz) in transmitting status

30 MHz~1 GHz Radiated Emissions .Quasi-Peak Measurement

**Vertical:**

Level (dB $\mu$ V/m)

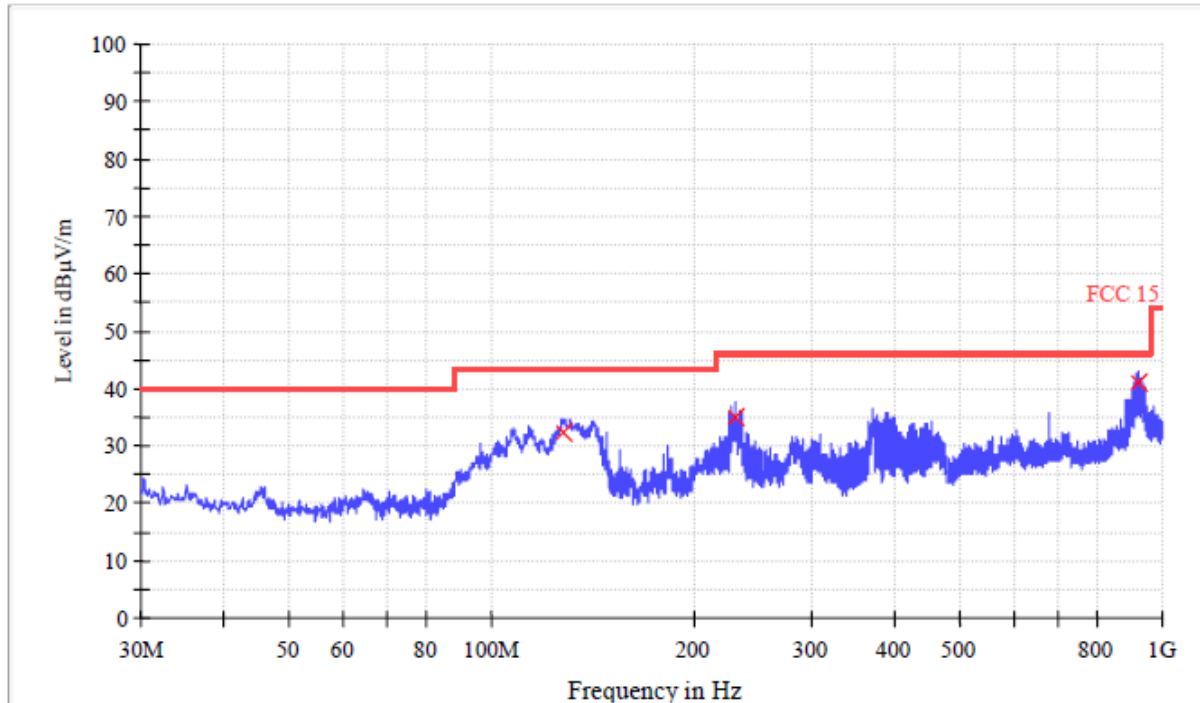


Quasi-peak measurement

Frequency (MHz)	Quasi Peak (dB $\mu$ V/m)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dB $\mu$ V/m)
30.560000	32.7	120.000	V	12.1	7.3	40.0
95.520000	32.2	120.000	V	12.2	11.3	43.5
928.040000	40.4	120.000	V	25.4	5.6	46.0

**Horizontal:**

Level (dB $\mu$ V/m)



Quasi-peak measurement

Frequency (MHz)	Quasi Peak (dB $\mu$ V/m)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dB $\mu$ V/m)
128.360000	32.3	120.000	H	9.3	11.2	43.5
231.560000	35.2	120.000	H	11.7	10.9	46.0
918.120000	41.0	120.000	H	25.3	5.0	46.0

1~25 GHz Radiated Emissions. Peak & Average Measurement

**PK Measurement:**

Frequency (MHz)	PK Reading Level (dB $\mu$ V)	Correction factors (dB/m)	PK Emission Level (dB $\mu$ V/m)	PK Limit (dB $\mu$ V/m)	Antenna polarization
3700.8	62.111	-3.1	59.011	74	V
4530.0	70.345	-1.0	69.345	74	V
4868.4	57.564	-0.9	56.664	74	V
7409.6	51.987	3.3	55.287	74	V
2220.8	66.447	-8.6	57.847	74	H
4535.2	71.758	-1.0	70.758	74	H
4864.4	60.435	-0.9	59.535	74	H
7320.8	56.222	3.2	59.422	74	H

**AV Measurement:**

Frequency (MHz)	AV Reading Level (dB $\mu$ V)	Correction factors (dB/m)	AV Emission Level (dB $\mu$ V/m)	AV Limit (dB $\mu$ V/m)	Antenna polarization
3700.8	38.2	-3.1	35.1	54	V
4530.0	39.8	-1.0	38.8	54	V
4868.4	47.2	-0.9	46.3	54	V
7409.6	32.2	3.3	35.5	54	V
2220.8	40.7	-8.6	32.1	54	H
4535.2	41.1	-1.0	40.1	54	H
4864.4	47.9	-0.9	47.0	54	H
7320.8	31.5	3.2	34.7	54	H

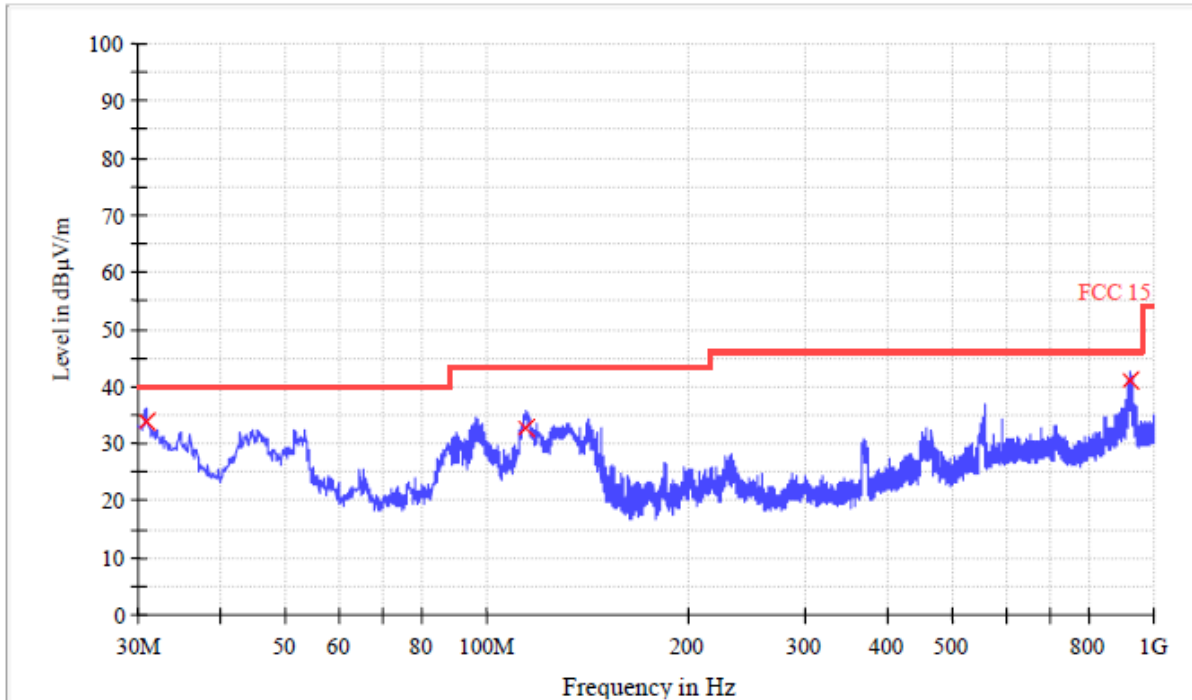
Remark: When Peak emission level was below AV limit, the AV emission level did not be recorded.

Test at Channel 11 (2.462 GHz) in transmitting status

30 MHz~1 GHz Radiated Emissions .Quasi-Peak Measurement

**Vertical:**

Level (dB $\mu$ V/m)

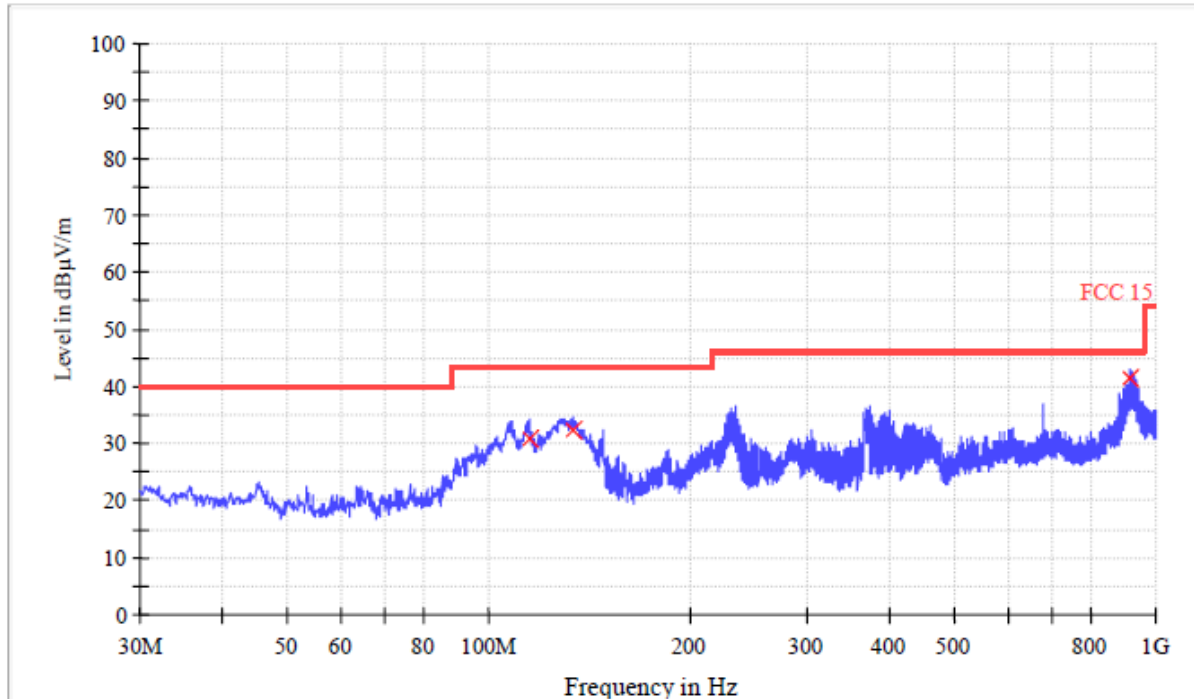


Quasi-peak measurement

Frequency (MHz)	Quasi Peak (dB $\mu$ V/m)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dB $\mu$ V/m)
30.920000	34.0	120.000	V	12.2	6.0	40.0
114.480000	32.5	120.000	V	11.3	11.0	43.5
920.920000	41.2	120.000	V	25.4	4.8	46.0

**Horizontal:**

Level (dB $\mu$ V/m)



Quasi-peak measurement

Frequency (MHz)	Quasi Peak (dB $\mu$ V/m)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dB $\mu$ V/m)
114.920000	30.8	120.000	H	11.2	12.7	43.5
133.560000	32.3	120.000	H	9.0	11.2	43.5
914.160000	41.5	120.000	H	25.3	4.5	46.0

1~25 GHz Radiated Emissions. Peak & Average Measurement

**PK Measurement:**

Frequency (MHz)	PK Reading Level (dB $\mu$ V)	Correction factors (dB/m)	PK Emission Level (dB $\mu$ V/m)	PK Limit (dB $\mu$ V/m)	Antenna polarization
2116.4	65.759	-9.0	56.759	74	V
4624.0	67.950	-1.0	66.950	74	V
4921.6	60.321	-0.9	59.421	74	V
7394.4	51.476	3.3	54.776	74	V
2224.8	65.157	-8.5	56.657	74	H
4539.2	63.788	-1.0	62.788	74	H
4918.4	59.660	-0.9	58.760	74	H
7344.0	56.718	3.2	59.918	74	H

**AV Measurement:**

Frequency (MHz)	AV Reading Level (dB $\mu$ V)	Correction factors (dB/m)	AV Emission Level (dB $\mu$ V/m)	AV Limit (dB $\mu$ V/m)	Antenna polarization
2116.4	41.0	-9.0	32.0	54	V
4624.0	41.5	-1.0	40.5	54	V
4921.6	50.1	-0.9	49.2	54	V
7394.4	31.4	3.3	34.7	54	V
2224.8	43.0	-8.5	34.5	54	H
4539.2	42.3	-1.0	41.3	54	H
4918.4	50.0	-0.9	49.1	54	H
7344.0	33.1	3.2	36.3	54	H

Remark: When Peak emission level was below AV limit, the AV emission level did not be recorded.





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Band edge in restricted band

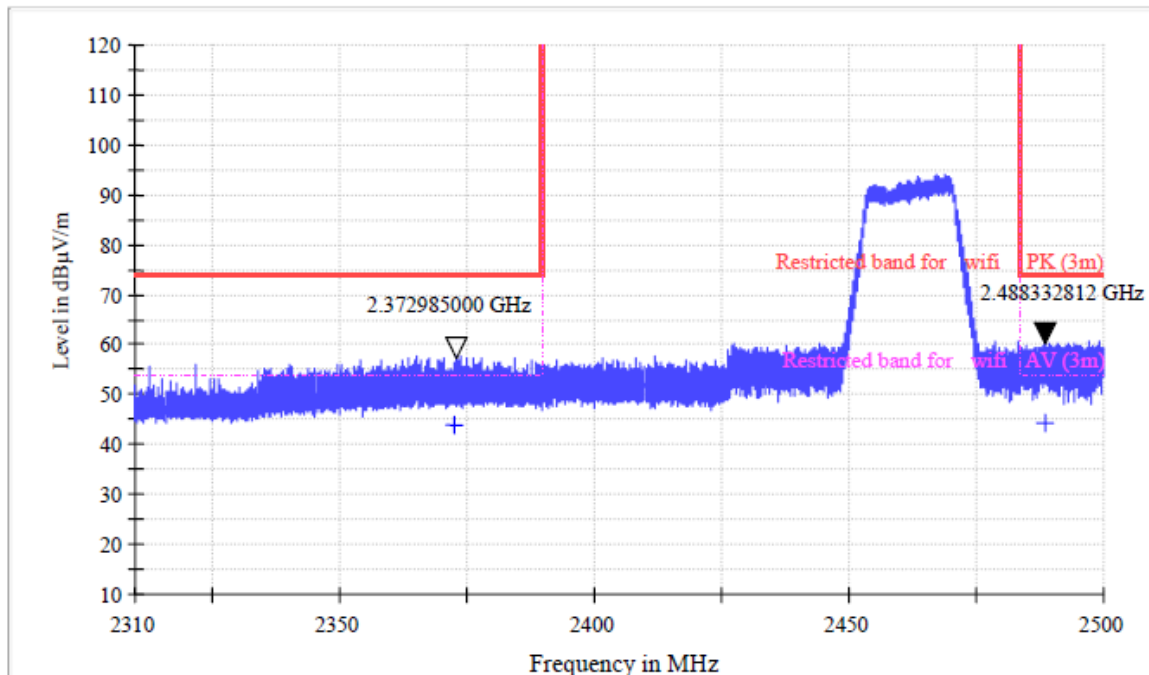
**PK Measurement:**

2338.0	64.993	-8.0	56.993	74	V
2488.8	67.654	-7.4	60.254	74	V
2372.8	65.661	-7.9	57.761	74	H
2488.4	67.906	-7.4	60.506	74	H

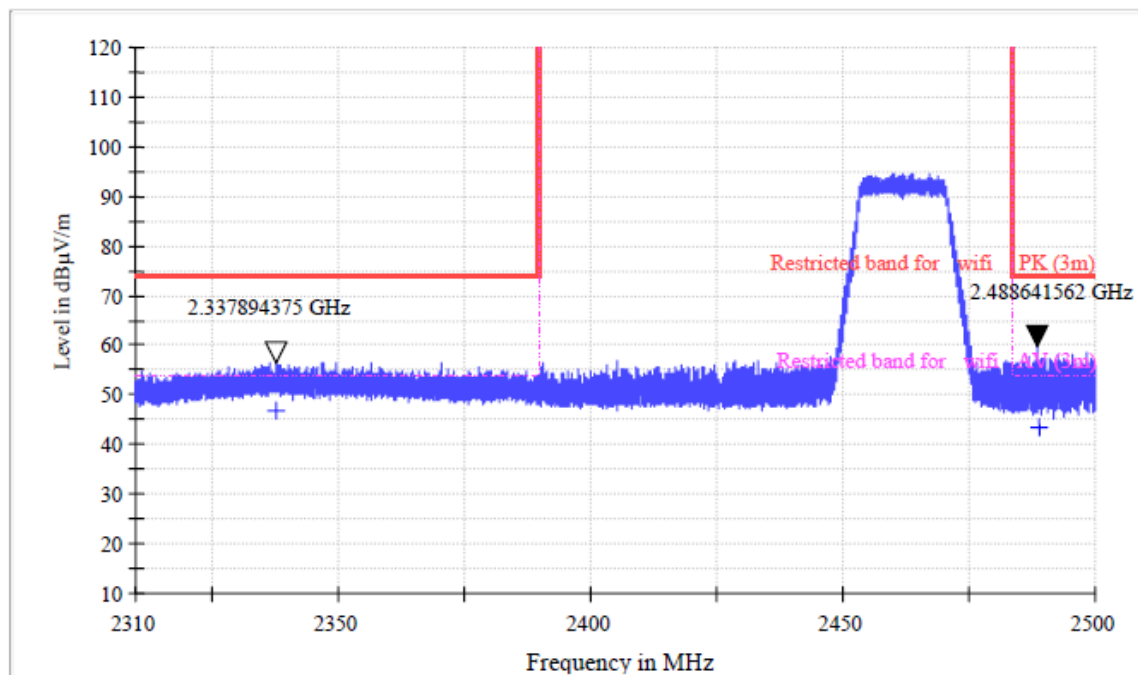
**AV Measurement:**

2338.0	54.8	-8.0	46.8	54	V
2488.8	50.9	-7.4	43.5	54	V
2372.8	51.7	-7.9	43.8	54	H
2488.4	51.6	-7.4	44.2	54	H

**Plots:**  
**Horizontal**



**Vertical**





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The basic equation with a sample calculation is as follows:

Final Test Level = Receiver Reading + Antenna Factor + Cable Loss – Preamplifier Factor.

Correction Factors = Antenna Factor + Cable Loss – Preamplifier Factor.

As shown in Section, for frequencies above 1000 MHz. the above field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

No any other emissions level which are attenuated less than 20dB below the limit.

**802.11n (HT20) mode with 72.2Mbps data rate**

9 kHz~30 MHz Field Strength of Unwanted Emissions. Quasi-Peak Measurement

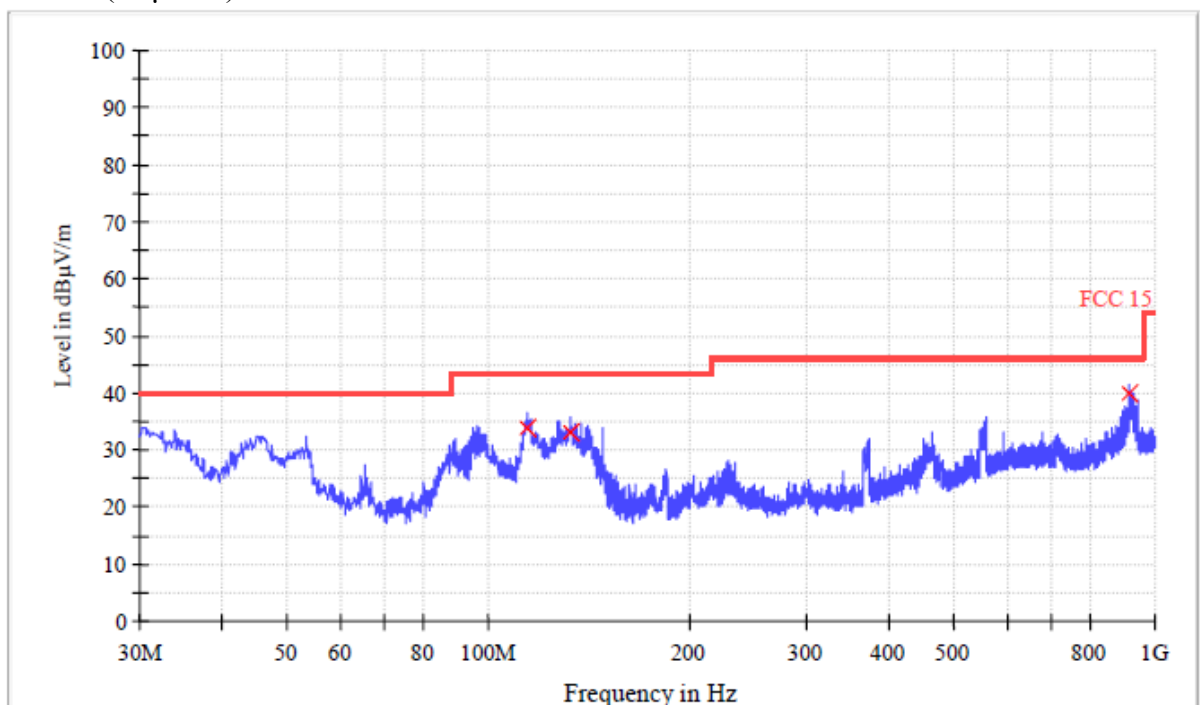
The measurements with active loop antenna were greater than 20dB below the limit, so the test data were not recorded in the test report.

Test at Channel 1 (2.412 GHz) in transmitting status

30 MHz~1 GHz Radiated Emissions .Quasi-Peak Measurement

**Vertical:**

Level (dBμV/m)

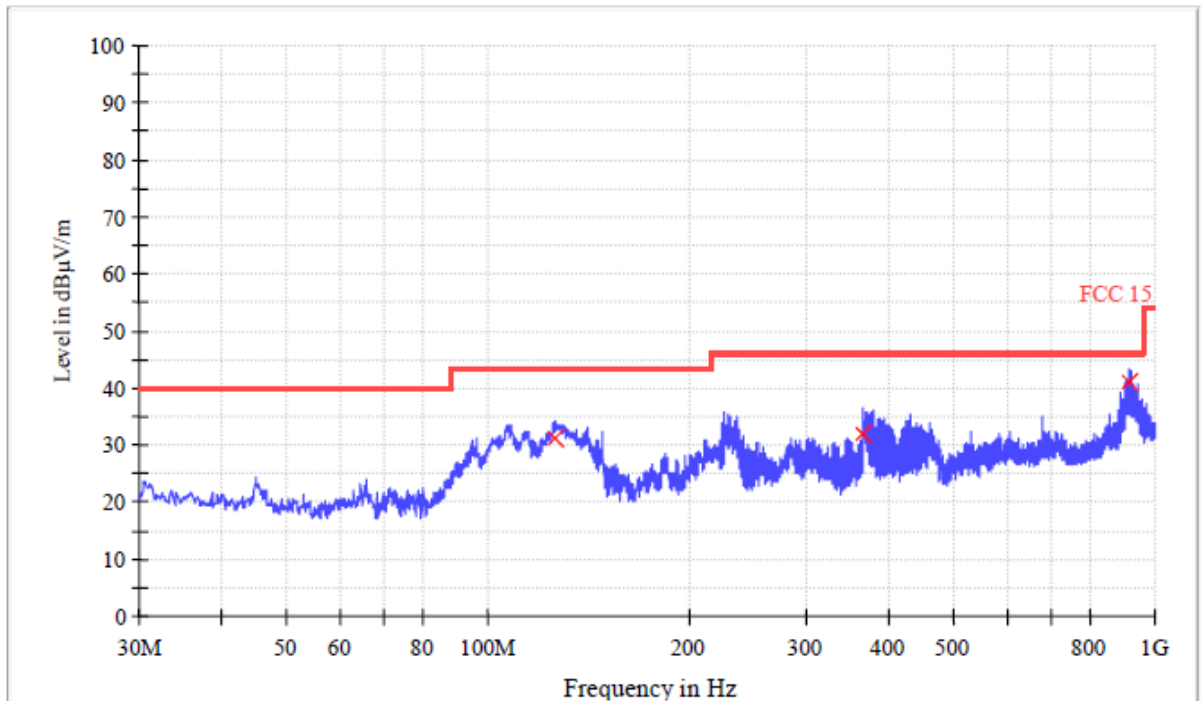


Quasi-peak measurement

Frequency (MHz)	Quasi Peak (dBμV/m)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBμV/m)
114.160000	33.9	120.000	V	11.4	9.6	43.5
132.760000	32.9	120.000	V	9.0	10.6	43.5
912.680000	39.8	120.000	V	25.3	6.2	46.0

**Horizontal:**

Level (dB $\mu$ V/m)



Quasi-peak measurement

Frequency (MHz)	Quasi Peak (dB $\mu$ V/m)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dB $\mu$ V/m)
126.440000	31.1	120.000	H	9.5	12.4	43.5
365.200000	31.9	120.000	H	16.0	14.1	46.0
914.040000	41.3	120.000	H	25.3	4.8	46.0

1~25 GHz Radiated Emissions. Peak & Average Measurement

**PK Measurement:**

Frequency (MHz)	PK Reading Level (dBμV)	Correction factors (dB/m)	PK Emission Level (dBμV/m)	PK Limit (dBμV/m)	Antenna polarization
2823.6	60.037	-6.0	54.037	74	V
4616.4	67.312	-1.0	66.312	74	V
7348.0	51.831	3.2	55.031	74	V
2217.2	63.612	-8.6	55.012	74	H
4523.6	73.138	-1.0	72.138	74	H
7402.0	56.920	3.3	60.220	74	H

**AV Measurement:**

Frequency (MHz)	AV Reading Level (dBμV)	Correction factors (dB/m)	AV Emission Level (dBμV/m)	AV Limit (dBμV/m)	Antenna polarization
2823.6	37.7	-6.0	31.7	54	V
4616.4	44.7	-1.0	43.7	54	V
7348.0	34.3	3.2	37.5	54	V
2217.2	45.7	-8.6	37.1	54	H
4523.6	44.7	-1.0	43.7	54	H
7402.0	34.1	3.3	37.4	54	H

Remark: When Peak emission level was below AV limit, the AV emission level did not be recorded.



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Band edge in restricted band

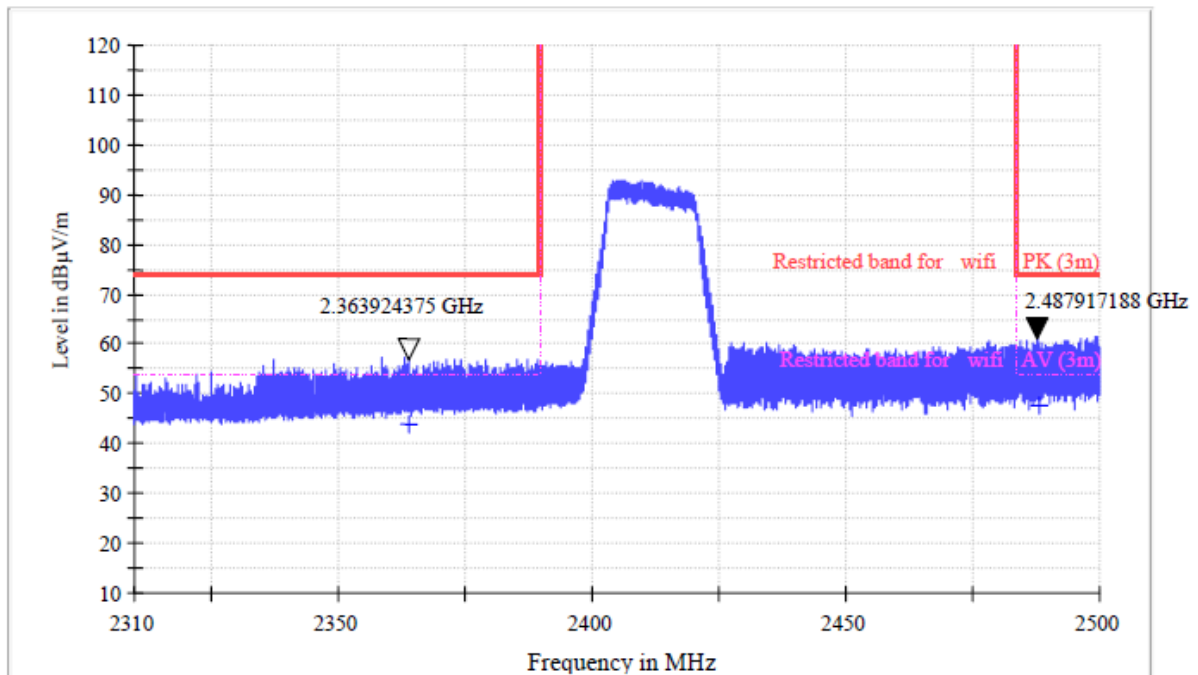
**PK Measurement:**

2375.6	64.397	-7.9	56.497	74	V
2485.2	64.79	-7.4	57.390	74	V
2364.0	65.207	-7.9	57.307	74	H
2488.0	68.692	-7.4	61.292	74	H

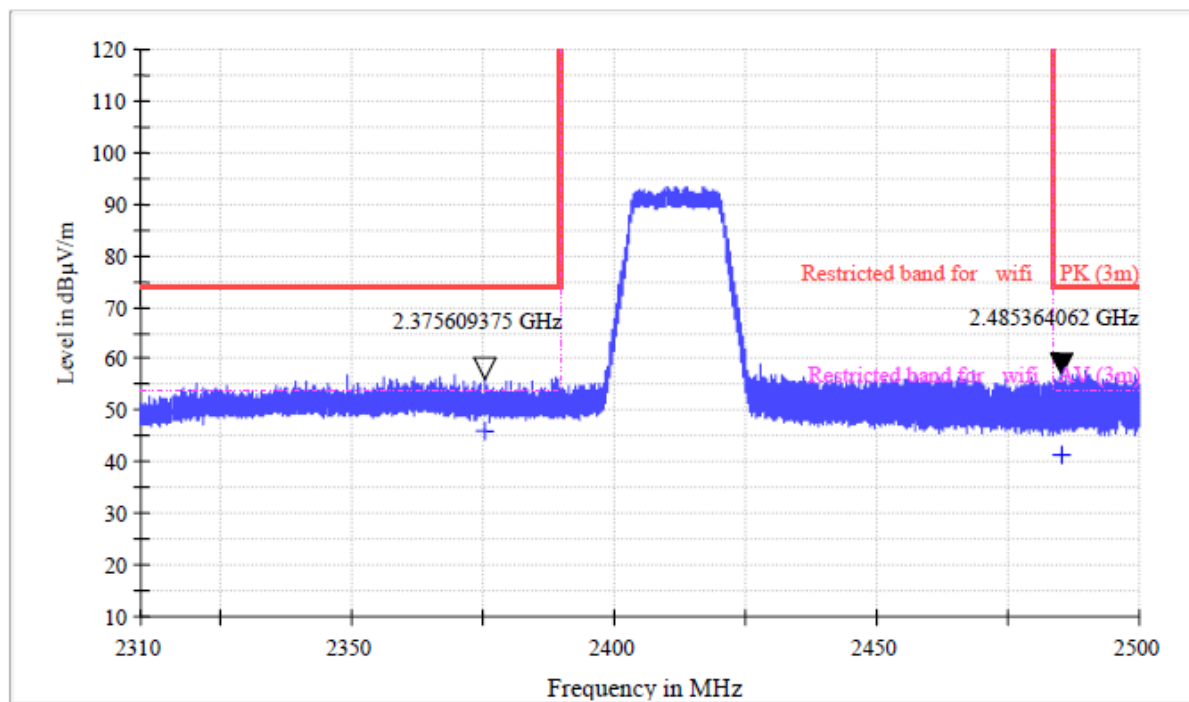
**AV Measurement:**

2375.6	53.9	-7.9	46.0	54	V
2485.2	48.9	-7.4	41.5	54	V
2364.0	51.9	-7.9	44.0	54	H
2488.0	54.9	-7.4	47.5	54	H

**Plots:**  
**Horizontal**



**Vertical**



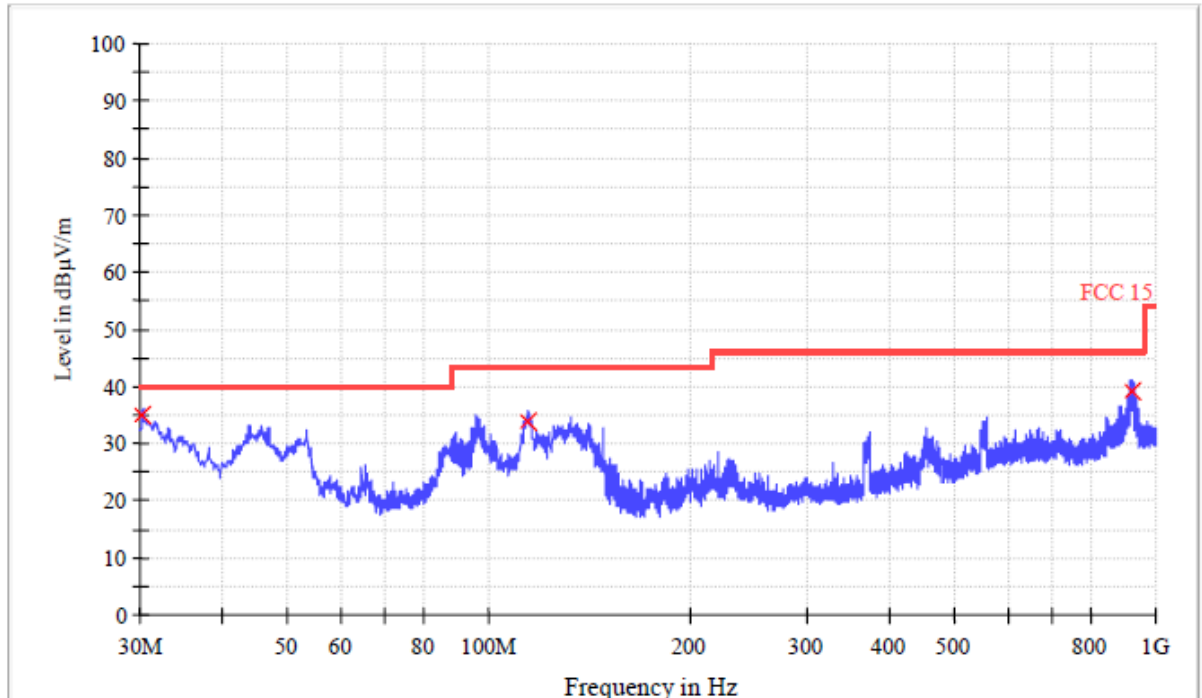


Test at Channel 6 (2.437 GHz) in transmitting status

30 MHz~1 GHz Radiated Emissions .Quasi-Peak Measurement

**Vertical:**

Level (dB $\mu$ V/m)

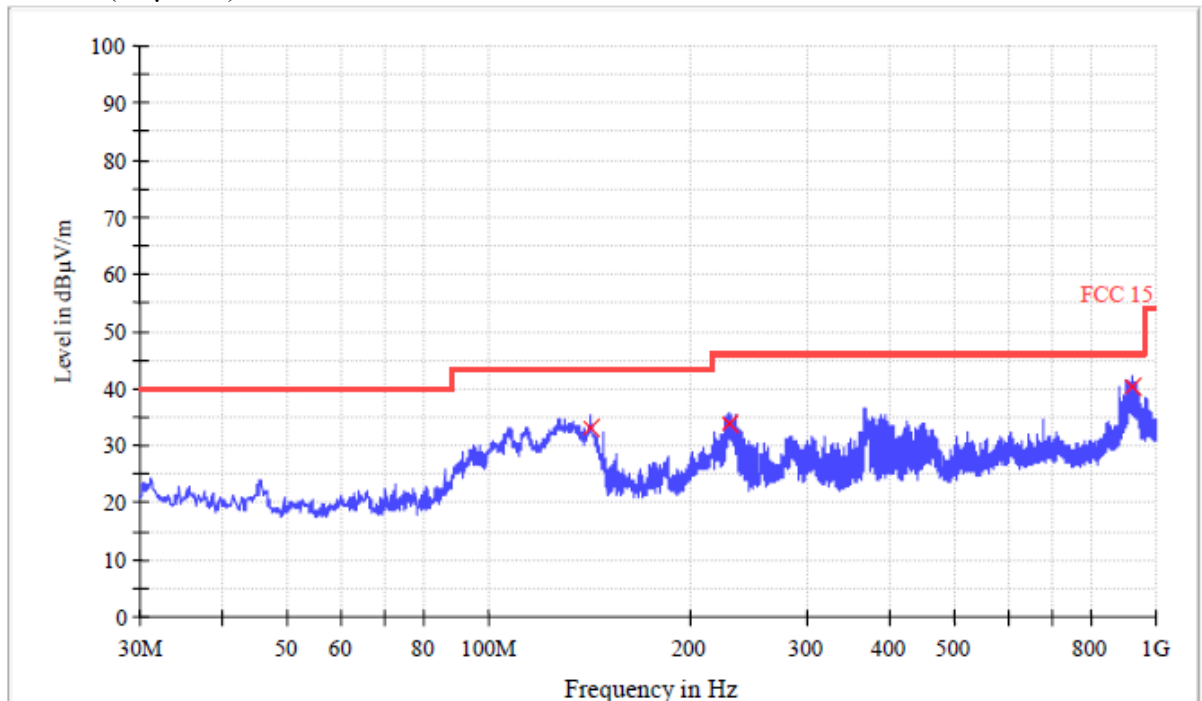


Quasi-peak measurement

Frequency (MHz)	Quasi Peak (dB $\mu$ V/m)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dB $\mu$ V/m)
30.320000	34.8	120.000	V	12.0	5.2	40.0
114.720000	33.7	120.000	V	11.3	9.8	43.5
919.680000	39.1	120.000	V	25.4	6.9	46.0

**Horizontal:**

Level (dB $\mu$ V/m)



Quasi-peak measurement

Frequency (MHz)	Quasi Peak (dB $\mu$ V/m)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dB $\mu$ V/m)
142.440000	33.0	120.000	H	8.5	10.5	43.5
229.760000	33.8	120.000	H	11.7	12.2	46.0
919.480000	40.3	120.000	H	25.4	5.7	46.0

1~25 GHz Radiated Emissions. Peak & Average Measurement

**PK Measurement:**

Frequency (MHz)	PK Reading Level (dBμV)	Correction factors (dB/m)	PK Emission Level (dBμV/m)	PK Limit (dBμV/m)	Antenna polarization
2097.2	65.810	-9.1	56.710	74	V
4597.2	66.320	-1.0	65.320	74	V
7406.0	52.230	3.3	55.530	74	V
2101.2	67.810	-9.1	58.710	74	H
4546.8	72.234	-1.0	71.234	74	H
7417.6	54.532	3.3	57.832	74	H

**AV Measurement:**

Frequency (MHz)	AV Reading Level (dBμV)	Correction factors (dB/m)	AV Emission Level (dBμV/m)	AV Limit (dBμV/m)	Antenna polarization
2097.2	46.7	-9.1	37.6	54	V
4597.2	44.9	-1.0	43.9	54	V
7406.0	35.1	3.3	38.4	54	V
2101.2	44.3	-9.1	35.2	54	H
4546.8	46.6	-1.0	45.6	54	H
7417.6	34.5	3.3	37.8	54	H

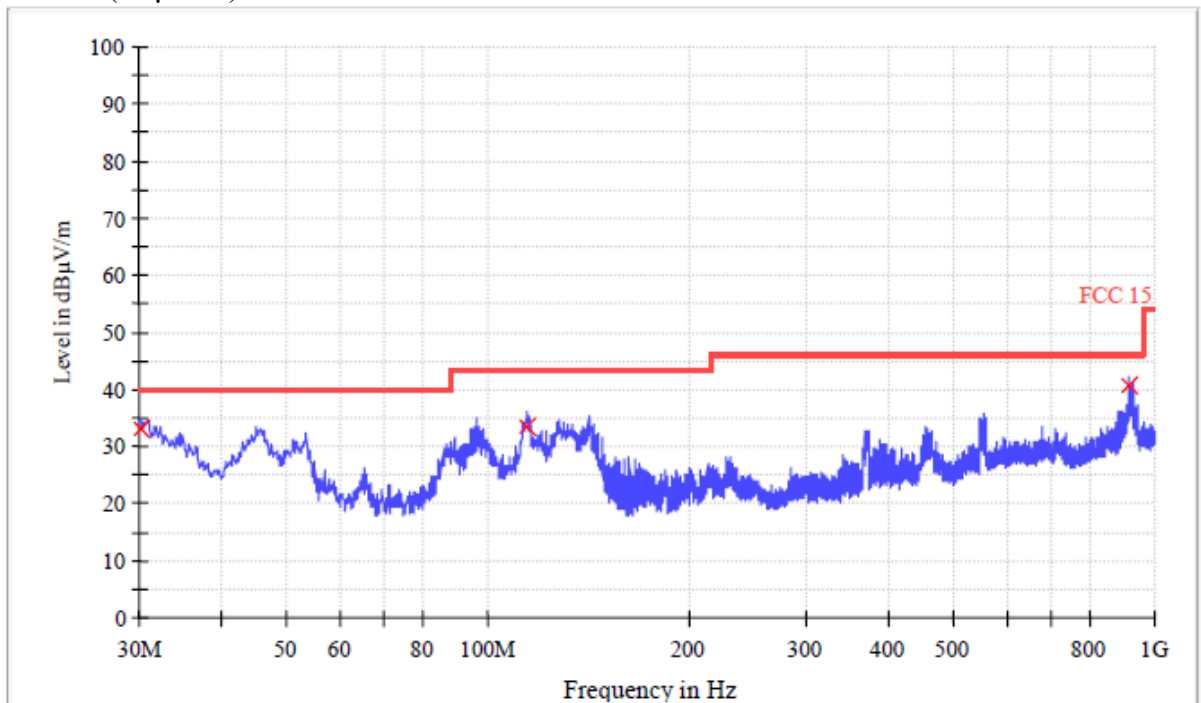
Remark: When Peak emission level was below AV limit, the AV emission level did not be record.

Test at Channel 11 (2.462 GHz) in transmitting status

30 MHz~1 GHz Radiated Emissions .Quasi-Peak Measurement

**Vertical:**

Level (dB $\mu$ V/m)

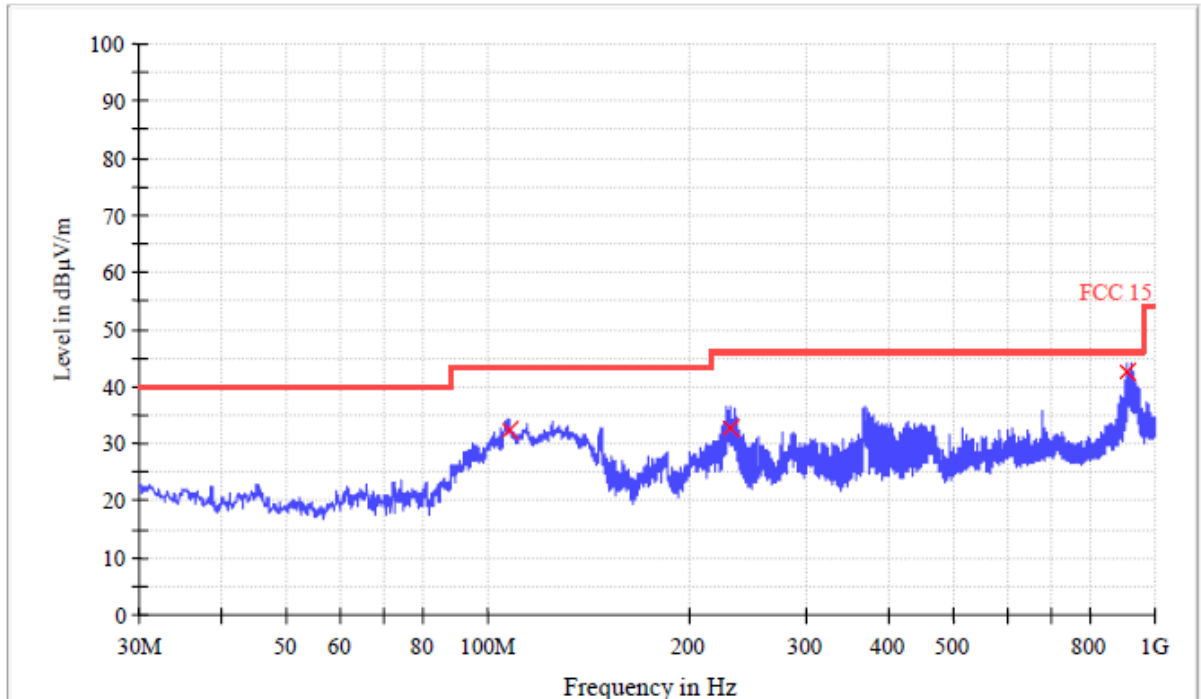


Quasi-peak measurement

Frequency (MHz)	Quasi Peak (dB $\mu$ V/m)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dB $\mu$ V/m)
30.120000	32.9	120.000	V	11.9	7.1	40.0
114.160000	33.5	120.000	V	11.4	10.0	43.5
914.280000	40.6	120.000	V	25.3	5.4	46.0

**Horizontal:**

Level (dB $\mu$ V/m)



Quasi-peak measurement

Frequency (MHz)	Quasi Peak (dB $\mu$ V/m)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dB $\mu$ V/m)
107.360000	32.4	120.000	H	12.4	11.1	43.5
231.440000	32.5	120.000	H	11.7	13.5	46.0
909.320000	42.6	120.000	H	25.3	3.4	46.0

1~25 GHz Radiated Emissions. Peak & Average Measurement

**PK Measurement:**

Frequency (MHz)	PK Reading Level (dB $\mu$ V)	Correction factors (dB/m)	PK Emission Level (dB $\mu$ V/m)	PK Limit (dB $\mu$ V/m)	Antenna polarization
2823.6	60.032	-6.0	54.032	74	V
4577.6	67.312	-1.0	66.312	74	V
7348.0	51.823	3.2	55.023	74	V
2220.8	65.332	-8.6	56.732	74	H
4546.8	71.320	-1.0	70.320	74	H
7332.4	58.112	3.2	61.312	74	H

**AV Measurement:**

Frequency (MHz)	AV Reading Level (dB $\mu$ V)	Correction factors (dB/m)	AV Emission Level (dB $\mu$ V/m)	AV Limit (dB $\mu$ V/m)	Antenna polarization
2823.6	37.6	-6.0	31.6	54	V
4577.6	44.3	-1.0	43.3	54	V
7348.0	39.1	3.2	42.3	54	V
2220.8	46.0	-8.6	37.4	54	H
4546.8	43.4	-1.0	42.4	54	H
7332.4	34.5	3.2	37.7	54	H

Remark: When Peak emission level was below AV limit, the AV emission level did not be record.



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Band edge in restricted band

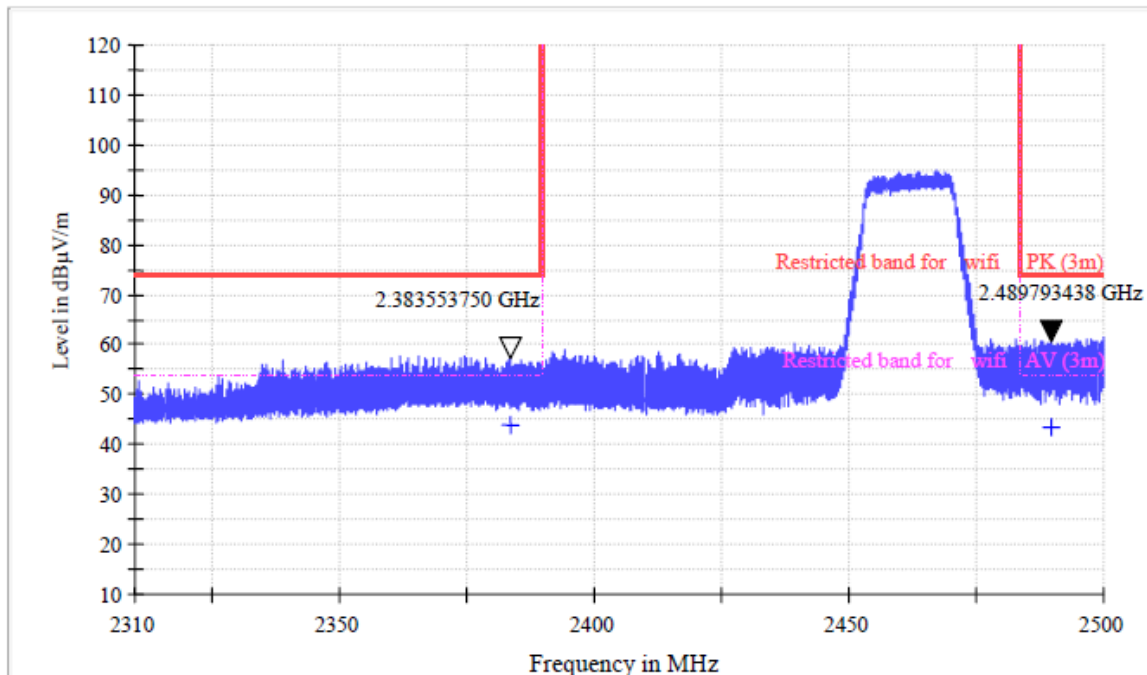
**PK Measurement:**

2358.4	64.31	-7.9	56.41	74	V
2499.6	67.21	-7.3	59.91	74	V
2383.6	65.372	-7.8	57.572	74	H
2489.6	68.592	-7.4	61.192	74	H

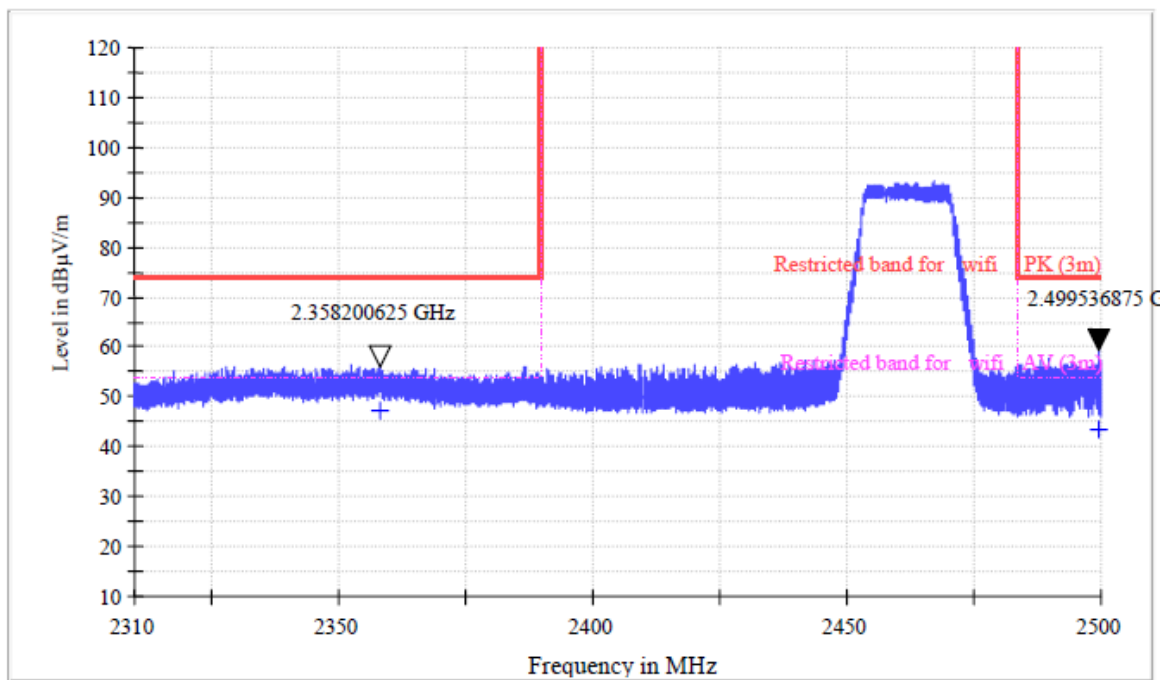
**AV Measurement:**

2358.4	55.2	-7.9	47.3	54	V
2499.6	50.9	-7.3	43.6	54	V
2383.6	51.9	-7.8	44.1	54	H
2489.6	51.0	-7.4	43.6	54	H

**Plots:**  
**Horizontal**



**Vertical**







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The basic equation with a sample calculation is as follows:

Final Test Level = Receiver Reading + Antenna Factor + Cable Loss – Preamplifier Factor.

Correction Factors = Antenna Factor + Cable Loss – Preamplifier Factor.

As shown in Section, for frequencies above 1000 MHz. the above field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

No any other emissions level which are attenuated less than 20dB below the limit.

**802.11n (HT40) mode with 150Mbps data rate**

9 kHz~30 MHz Field Strength of Unwanted Emissions. Quasi-Peak Measurement

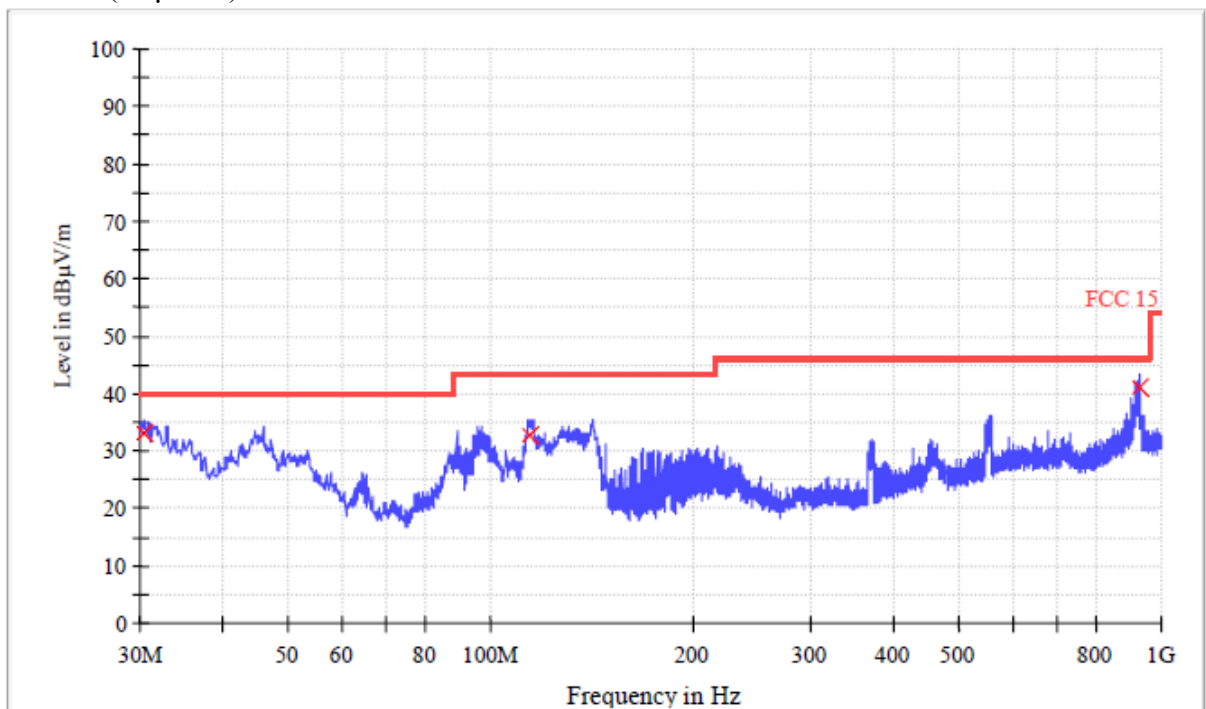
The measurements with active loop antenna were greater than 20dB below the limit, so the test data were not recorded in the test report.

Test at Channel 3 (2.422 GHz) in transmitting status

30 MHz~1 GHz Radiated Emissions .Quasi-Peak Measurement

**Vertical:**

Level (dB $\mu$ V/m)

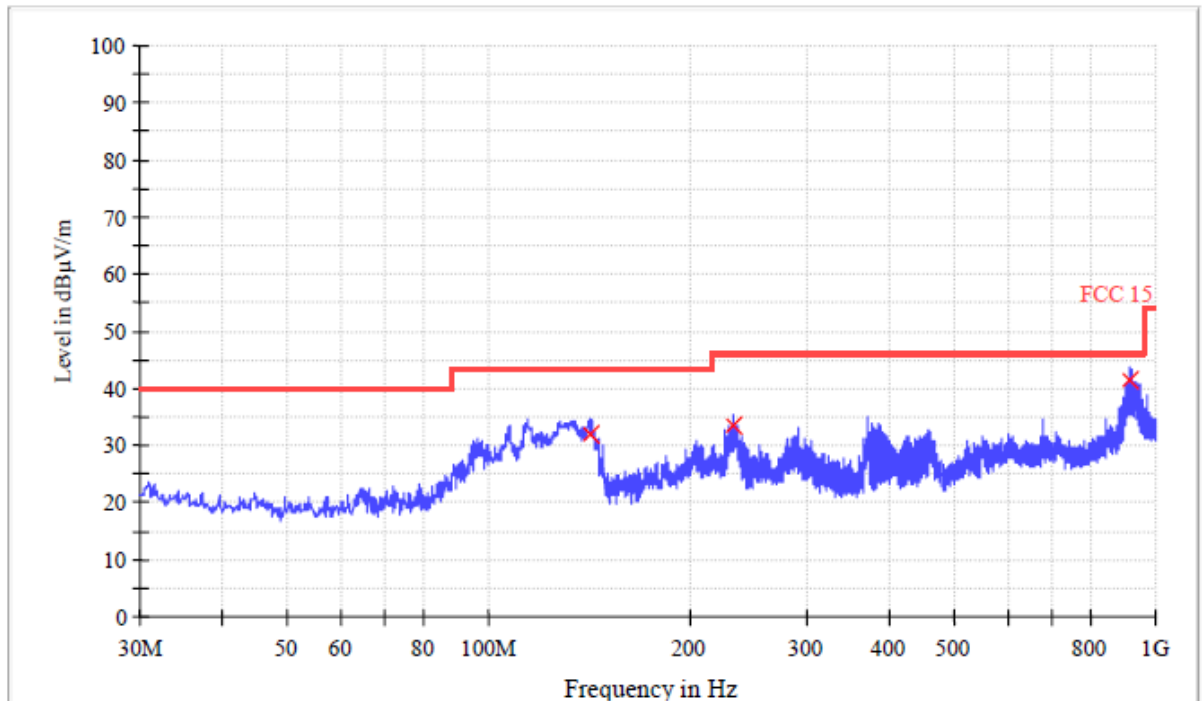


Quasi-peak measurement

Frequency (MHz)	Quasi Peak (dB $\mu$ V/m)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dB $\mu$ V/m)
30.560000	33.2	120.000	V	12.1	6.8	40.0
114.360000	32.8	120.000	V	11.4	10.7	43.5
927.480000	40.9	120.000	V	25.4	5.1	46.0

**Horizontal:**

Level (dB $\mu$ V/m)



Quasi-peak measurement

Frequency (MHz)	Quasi Peak (dB $\mu$ V/m)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dB $\mu$ V/m)
141.880000	31.8	120.000	H	8.5	11.7	43.5
233.240000	33.3	120.000	H	11.8	12.7	46.0
914.600000	41.6	120.000	H	25.3	4.4	46.0

1~25 GHz Radiated Emissions. Peak & Average Measurement

**PK Measurement:**

Frequency (MHz)	PK Reading Level (dB $\mu$ V)	Correction factors (dB/m)	PK Emission Level (dB $\mu$ V/m)	PK Limit (dB $\mu$ V/m)	Antenna polarization
4558.4	68.735	-1.0	67.735	74	V
4848.0	57.113	-0.9	56.213	74	V
7440.8	52.932	3.4	56.332	74	V
2228.8	64.230	-8.5	55.730	74	H
4531.2	71.321	-1.0	70.321	74	H
4836.4	55.531	-0.9	54.631	74	H
7348.0	56.132	3.2	59.332	74	H

**AV Measurement:**

Frequency (MHz)	AV Reading Level (dB $\mu$ V)	Correction factors (dB/m)	AV Emission Level (dB $\mu$ V/m)	AV Limit (dB $\mu$ V/m)	Antenna polarization
4558.4	43.0	-1.0	42.0	54	V
4848.0	44.4	-0.9	43.5	54	V
7440.8	34.2	3.4	37.6	54	V
2228.8	45.1	-8.5	36.6	54	H
4531.2	43.0	-1.0	42.0	54	H
4836.4	44.5	-0.9	43.6	54	H
7348.0	34.5	3.2	37.7	54	H

Remark: When Peak emission level was below AV limit, the AV emission level did not be recorded.

Band edge in restricted band

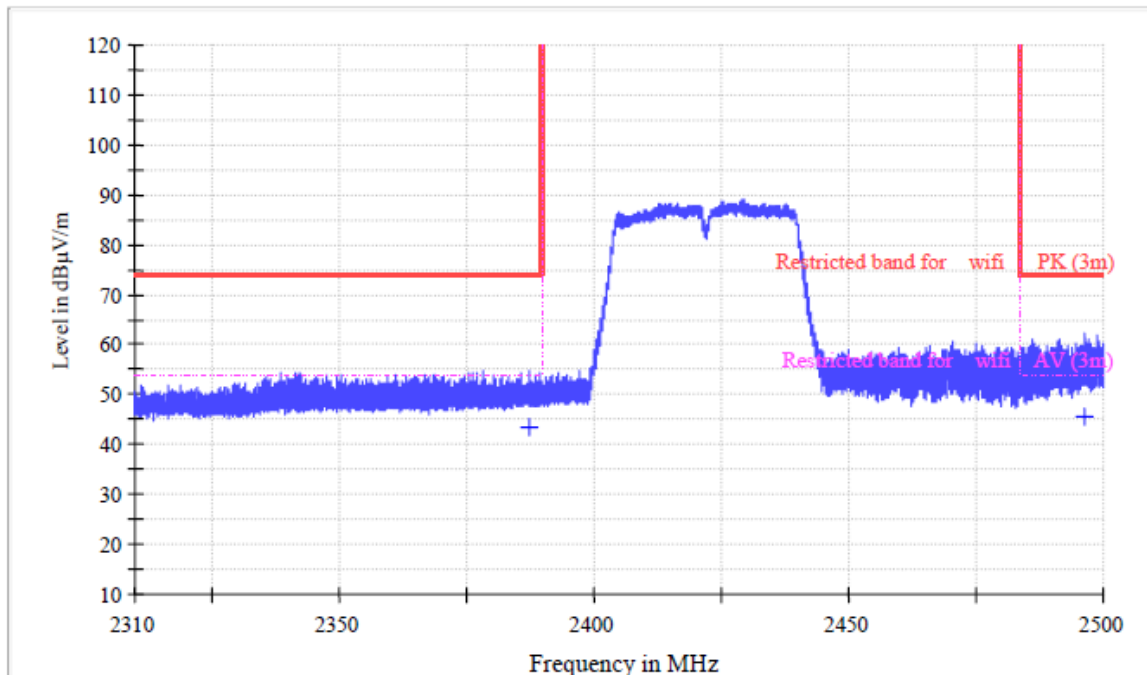
**PK Measurement:**

2373.2	64.756	-7.9	56.856	74	V
2490.4	64.965	-7.4	57.565	74	V
2387.2	62.132	-7.8	54.332	74	H
2496.4	70.621	-7.4	63.221	74	H

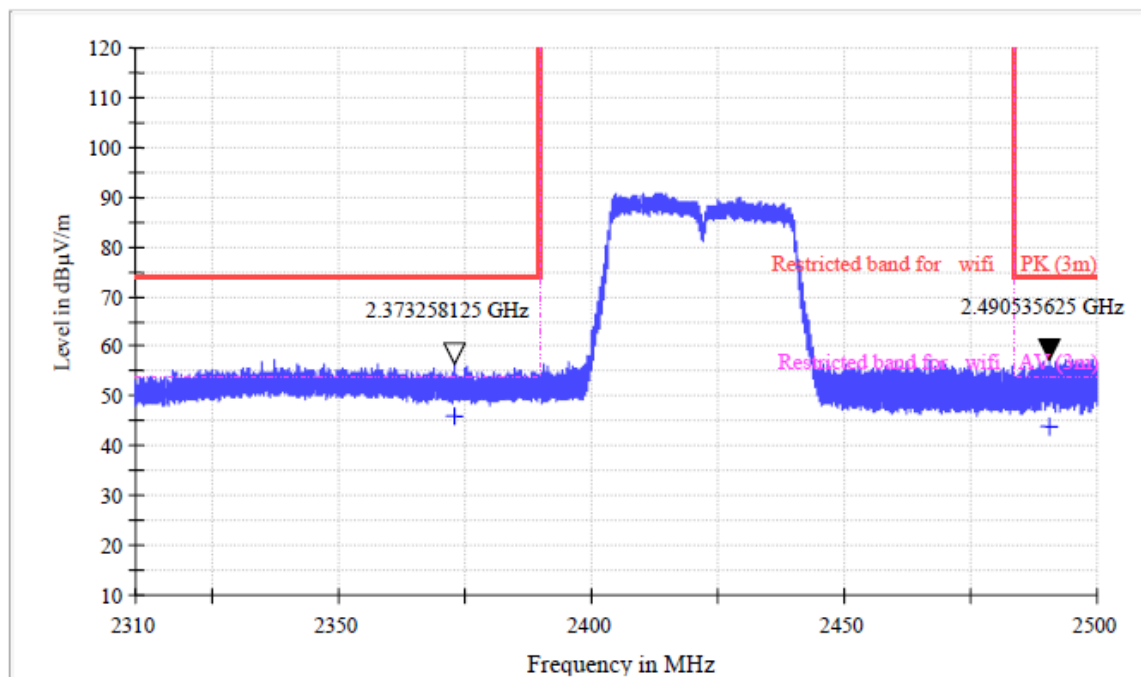
**AV Measurement:**

2373.2	53.8	-7.9	45.9	54	V
2490.4	51.1	-7.4	43.7	54	V
2387.2	51.3	-7.8	43.5	54	H
2496.4	52.8	-7.4	45.4	54	H

**Plots:**  
**Horizontal**



**Vertical**

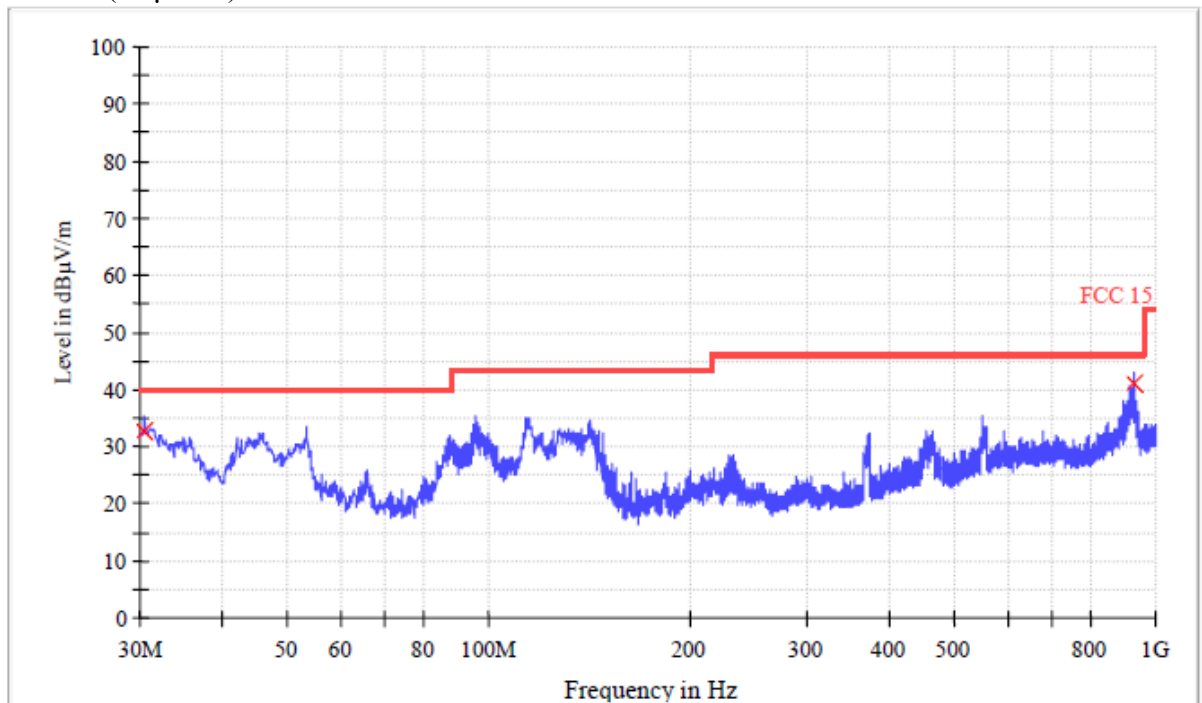


Test at Channel 6 (2.437 GHz) in transmitting status

30 MHz~1 GHz Radiated Emissions .Quasi-Peak Measurement

**Vertical:**

Level (dB $\mu$ V/m)

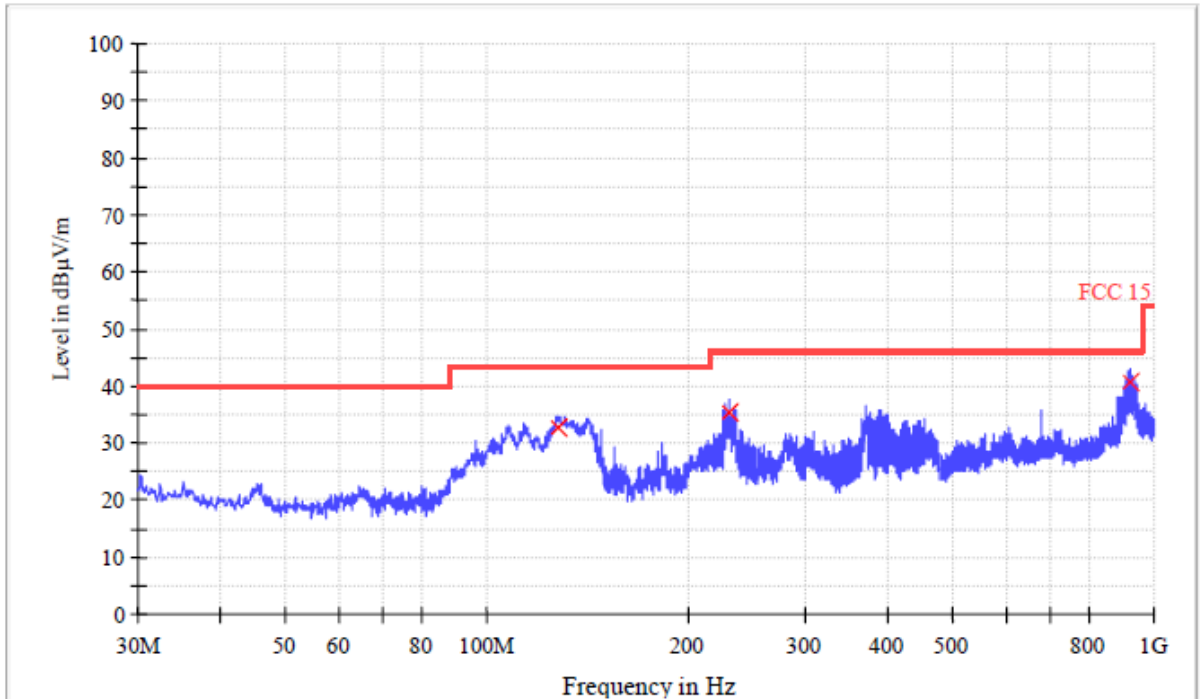


Quasi-peak measurement

Frequency (MHz)	Quasi Peak (dB $\mu$ V/m)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dB $\mu$ V/m)
30.440000	32.6	120.000	V	12.0	7.4	40.0
928.040000	40.9	120.000	V	25.4	5.1	46.0

**Horizontal:**

Level (dB $\mu$ V/m)



Quasi-peak measurement

Frequency (MHz)	Quasi Peak (dB $\mu$ V/m)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dB $\mu$ V/m)
128.360000	32.8	120.000	H	9.3	10.7	43.5
231.560000	35.6	120.000	H	11.7	10.5	46.0
918.120000	40.7	120.000	H	25.3	5.3	46.0



1~25 GHz Radiated Emissions. Peak & Average Measurement

**PK Measurement:**

Frequency (MHz)	PK Reading Level (dB $\mu$ V)	Correction factors (dB/m)	PK Emission Level (dB $\mu$ V/m)	PK Limit (dB $\mu$ V/m)	Antenna polarization
4531.2	69.331	-1.0	68.331	74	V
4867.6	59.270	-0.9	58.370	74	V
7413.6	52.020	3.3	55.320	74	V
2205.6	63.720	-8.6	55.120	74	H
4523.6	73.310	-1.0	72.310	74	H
7386.4	56.031	3.3	59.331	74	H

**AV Measurement:**

Frequency (MHz)	AV Reading Level (dB $\mu$ V)	Correction factors (dB/m)	AV Emission Level (dB $\mu$ V/m)	AV Limit (dB $\mu$ V/m)	Antenna polarization
4531.2	42.9	-1.0	41.9	54	V
4867.6	44.8	-0.9	43.9	54	V
7413.6	34.4	3.3	37.7	54	V
2205.6	45.2	-8.6	36.6	54	H
4523.6	44.4	-1.0	43.4	54	H
7386.4	34.3	3.3	37.6	54	H

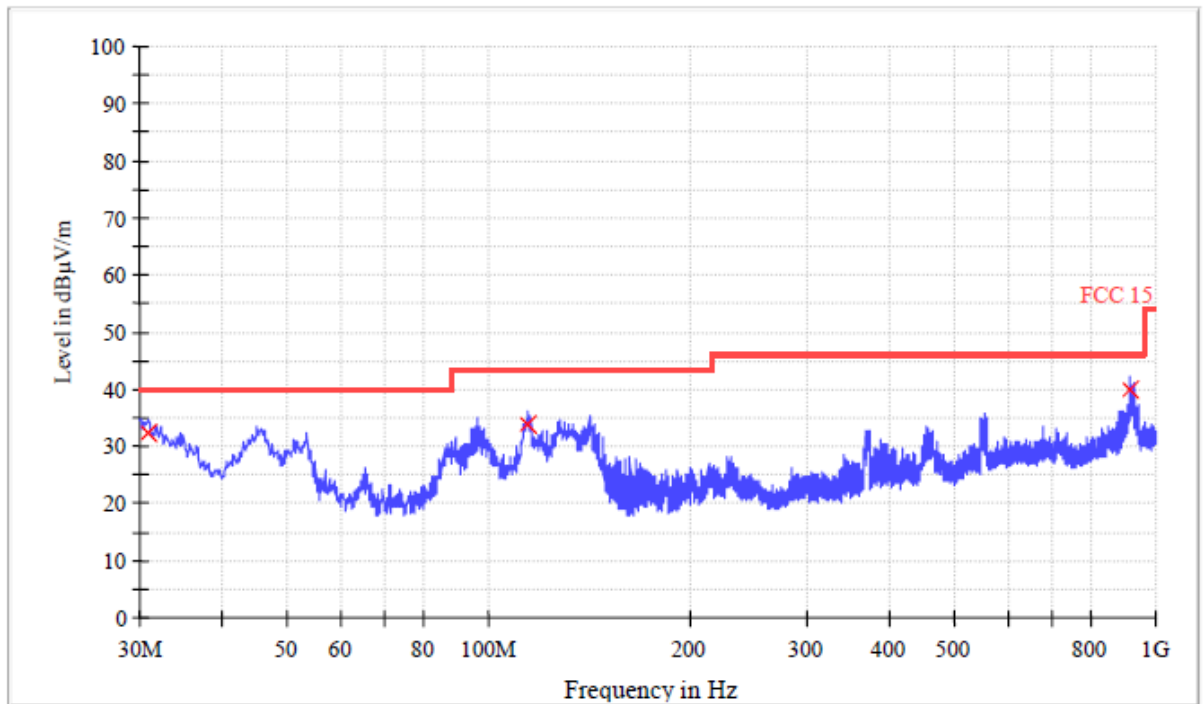
Remark: When Peak emission level was below AV limit, the AV emission level did not be record.

Test at Channel 11 (2.452 GHz) in transmitting status

30 MHz~1 GHz Radiated Emissions .Quasi-Peak Measurement

**Vertical:**

Level (dB $\mu$ V/m)

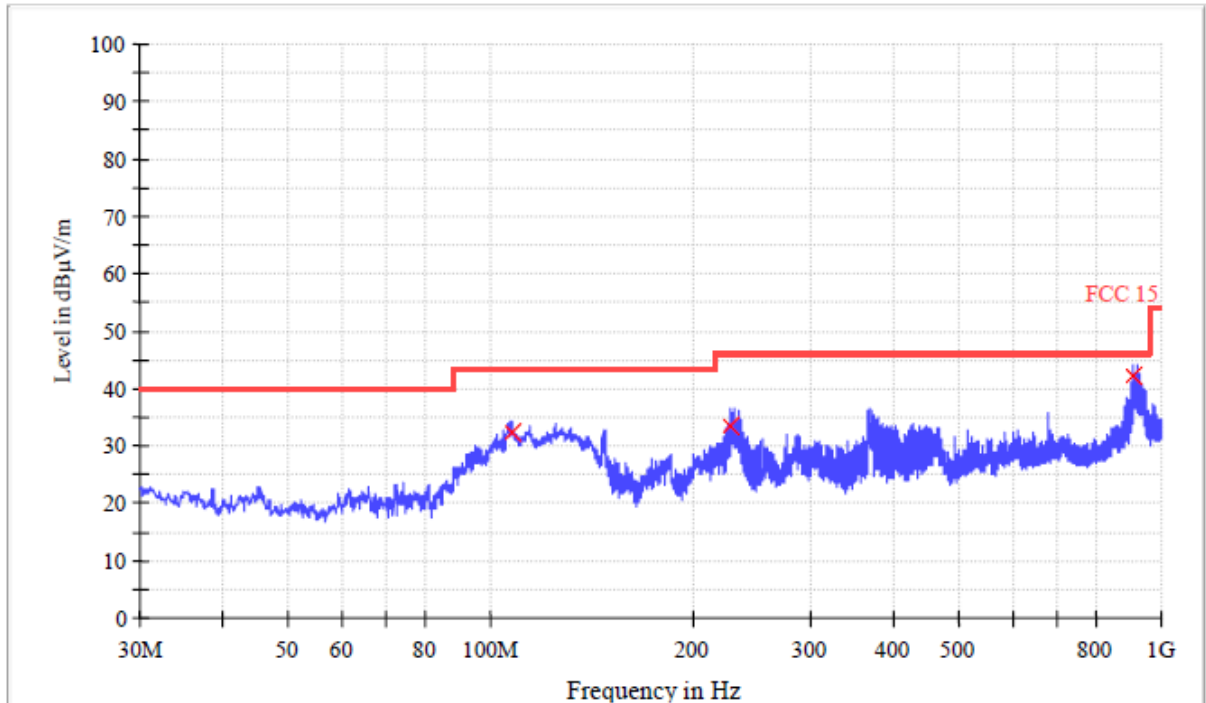


Quasi-peak measurement

Frequency (MHz)	Quasi Peak (dB $\mu$ V/m)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dB $\mu$ V/m)
31.000000	32.4	120.000	H	12.2	7.6	40.0
114.160000	33.8	120.000	V	11.4	9.7	43.5
914.280000	40.0	120.000	V	25.3	6.0	46.0

**Horizontal:**

Level (dB $\mu$ V/m)



Quasi-peak measurement

Frequency (MHz)	Quasi Peak (dB $\mu$ V/m)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dB $\mu$ V/m)
107.360000	32.2	120.000	H	12.4	11.3	43.5
227.960000	33.4	120.000	H	11.6	12.6	46.0
909.320000	42.2	120.000	H	25.3	3.8	46.0

1~25 GHz Radiated Emissions. Peak & Average Measurement

**PK Measurement:**

Frequency (MHz)	PK Reading Level (dB $\mu$ V)	Correction factors (dB/m)	PK Emission Level (dB $\mu$ V/m)	PK Limit (dB $\mu$ V/m)	Antenna polarization
4562.4	60.210	-1.0	59.210	74	V
4898.4	58.631	-0.9	57.731	74	V
7374.8	52.131	3.2	55.331	74	V
2205.6	65.431	-8.6	56.831	74	H
4539.2	72.032	-1.0	71.032	74	H
4898.4	54.922	-0.9	54.022	74	H
7444.4	56.472	3.4	59.872	74	H

**AV Measurement:**

Frequency (MHz)	AV Reading Level (dB $\mu$ V)	Correction factors (dB/m)	AV Emission Level (dB $\mu$ V/m)	AV Limit (dB $\mu$ V/m)	Antenna polarization
4562.4	43.9	-1.0	42.9	54	V
4898.4	44.5	-0.9	43.6	54	V
7374.8	34.3	3.2	37.5	54	V
2205.6	46.3	-8.6	37.7	54	H
4539.2	43.0	-1.0	42.0	54	H
4898.4	44.4	-0.9	43.5	54	H
7444.4	34.1	3.4	37.5	54	H

Remark: When Peak emission level was below AV limit, the AV emission level did not be record.



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Band edge in restricted band

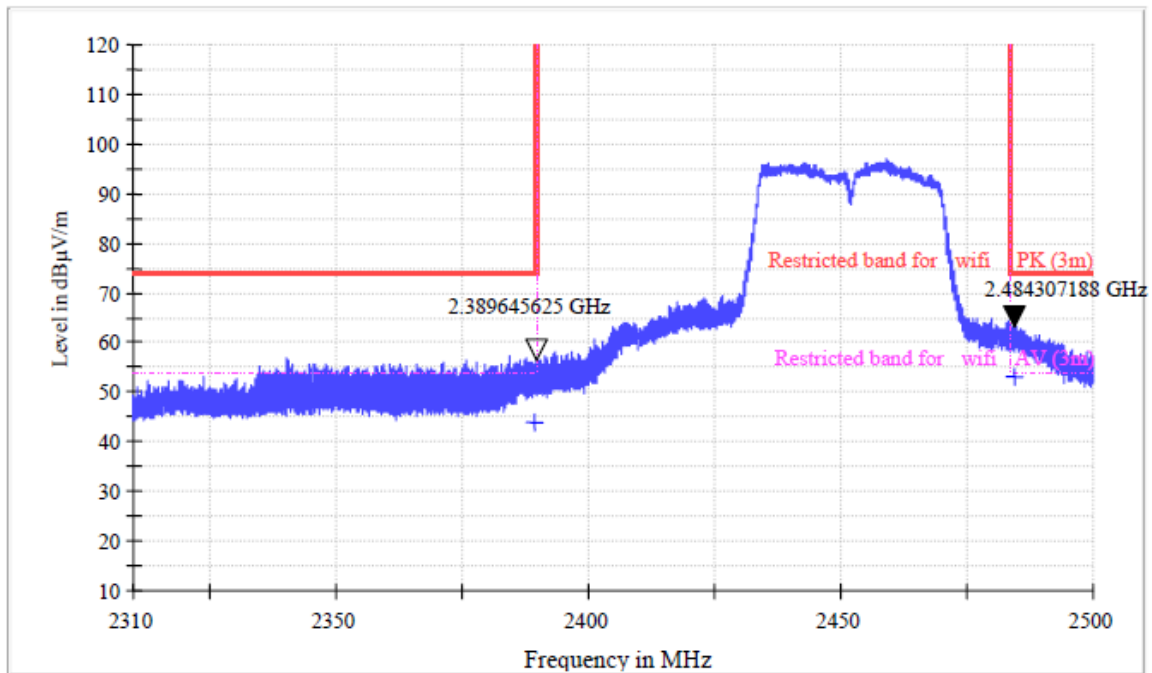
**PK Measurement:**

2383.2	62.377	-7.8	54.577	74	V
2493.6	65.743	-7.4	58.343	74	V
2389.6	64.822	-7.8	57.022	74	H
2484.4	70.803	-7.4	63.403	74	H

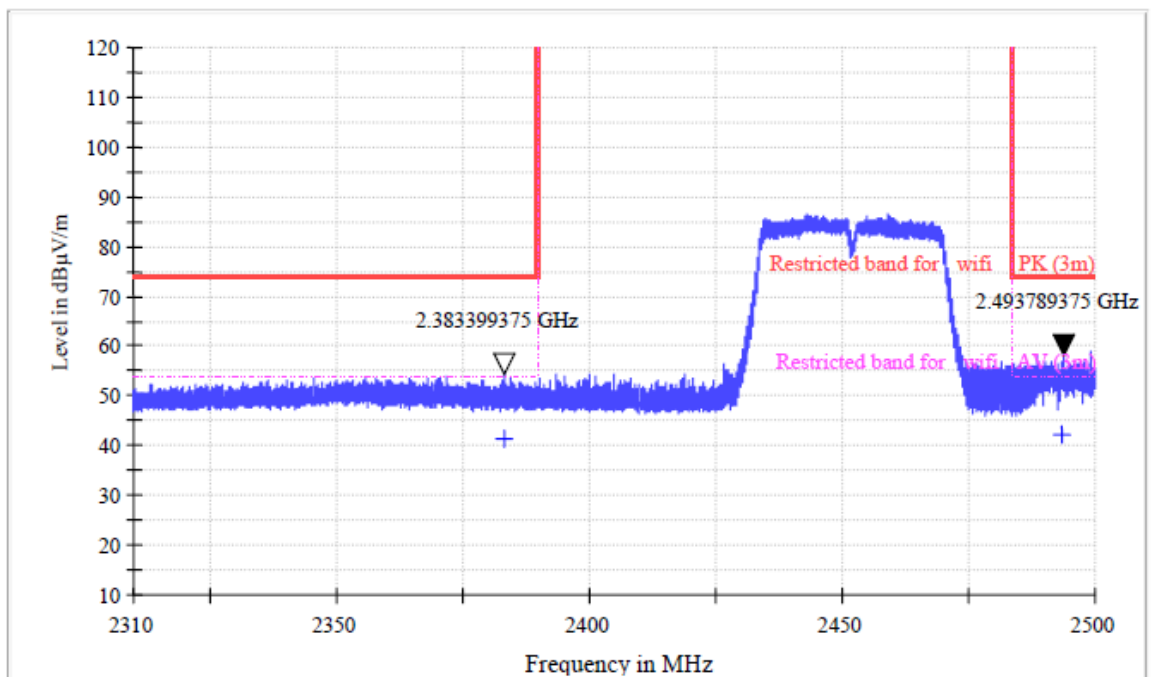
**AV Measurement:**

2383.2	49.1	-7.8	41.3	74	V
2493.6	49.5	-7.4	42.1	74	V
2389.6	51.8	-7.8	44.0	54	H
2484.4	60.6	-7.4	53.2	54	H

**Plots:**  
**Horizontal**



**Vertical**





Report No.: 160606105GZU-001  
Issued: 2016-07-30

The basic equation with a sample calculation for field strength is as follows:

Final Test Level = Receiver Reading + Antenna Factor + Cable Loss – Preamplifier Factor.

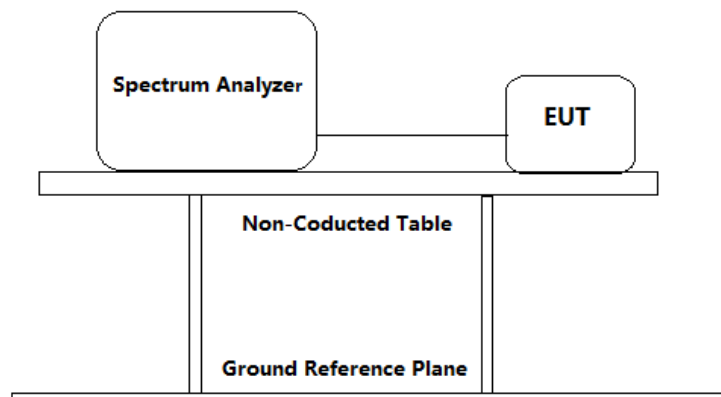
Correction Factors = Antenna Factor + Cable Loss – Preamplifier Factor.

As shown in Section, for frequencies above 1000 MHz. the above field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

No any other emissions level which are attenuated less than 20dB below the limit.

#### 4.8 Band Edges Requirement

Test Requirement:	FCC Part 15 C section 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.
Frequency Band:	2400 MHz to 2483.5 MHz
Test Method:	ANSI C63.10: Clause 11.11 and 11.13
Test Status:	Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture). Following channel(s) was (were) selected for the final test as listed below.
Test Configuration:	For Band Edges Emission in Radiated mode, Please refer to clause 4.7



Test Procedure:	For Band Edges Emission in Radiated mode, Please refer to clause 4.7
-----------------	--

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum analyzer.
  - a) Set instrument center frequency to the frequency of the emission to be measured (must be within 2 MHz of the authorized band edge).
  - b) Set the center frequency and span to encompass frequency range to be measured.
  - c) RBW = 100 kHz.
  - d) VBW  $\geq [3 \times \text{RBW}]$ .



- e) Detector = peak.
  - f) Sweep time = auto.
  - g) Trace mode = max hold.
  - h) Allow sweep to continue until the trace stabilizes (required measurement time may increase for low-duty-cycle applications).
  - i) For radiated Band-edge emissions within a restricted band and within 2 MHz of an authorized band edge, integration method is considered.
2. Repeat until all the test status is investigated.
  3. Report the worst case.



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**Test result with plots as follows:**

**For conduct mode:**

The band edges was measured and recorded Result:

The Lower Edges attenuated more than 20dB.

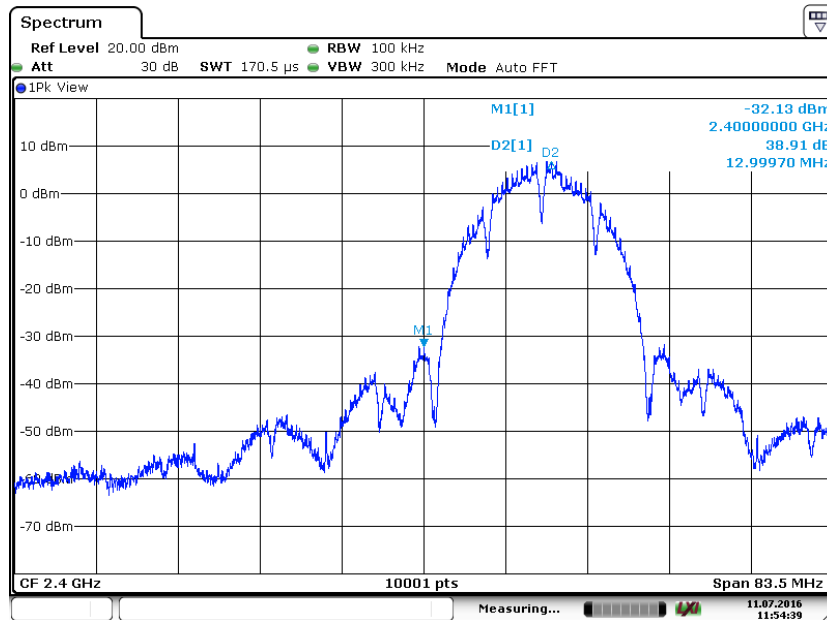
The Upper Edges attenuated more than 20dB.

Result plots as follows:

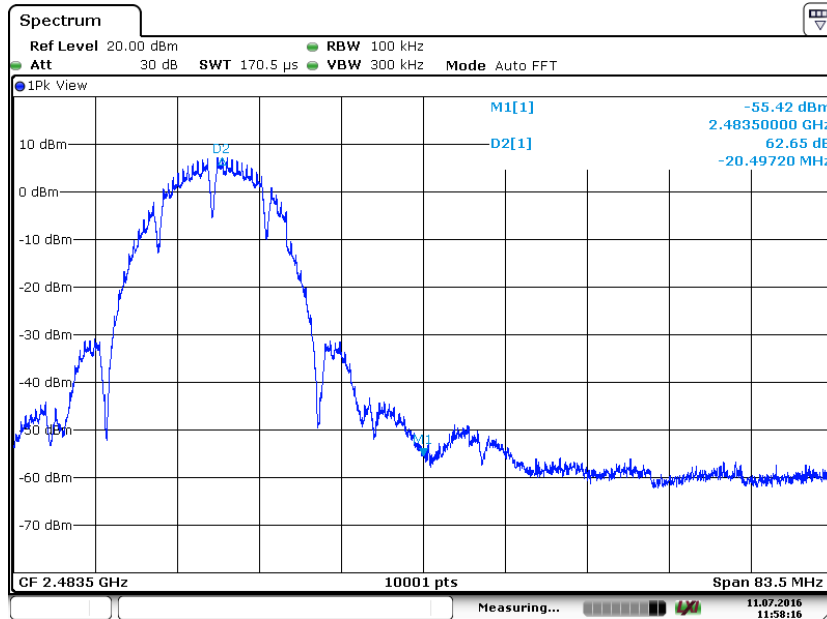
802.11b mode with 11 Mbps data rate

Port 1

Channel1: 2.412 GHz

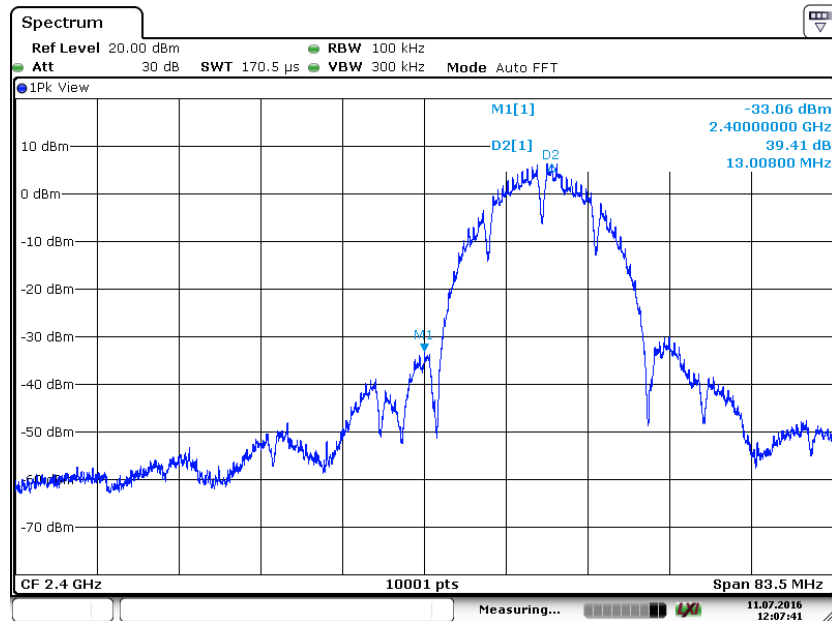


Channel 11: 2.462 GHz

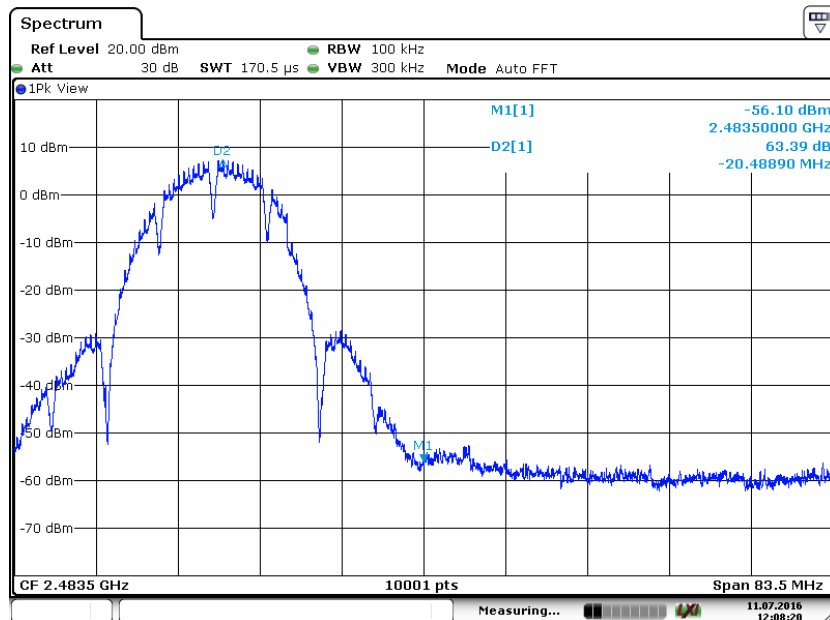


**Port 2**

Channel1: 2.412 GHz



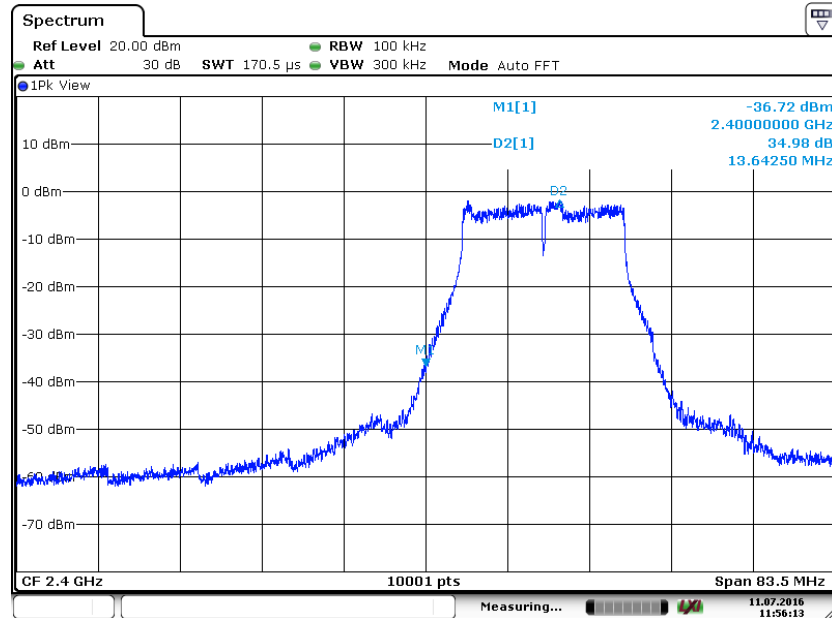
Channel 11: 2.462 GHz



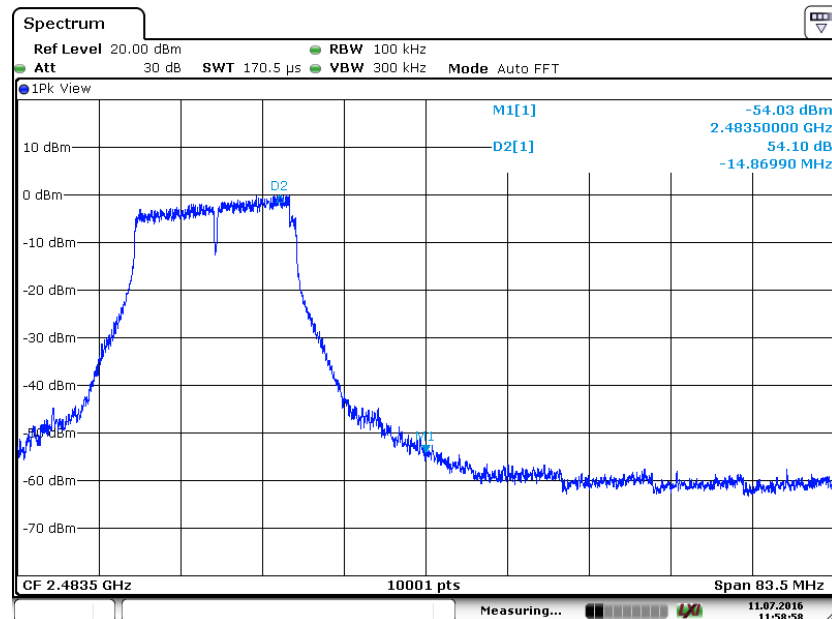
802.11g mode with 54 Mbps data rate

Port 1

Channel1: 2.412 GHz

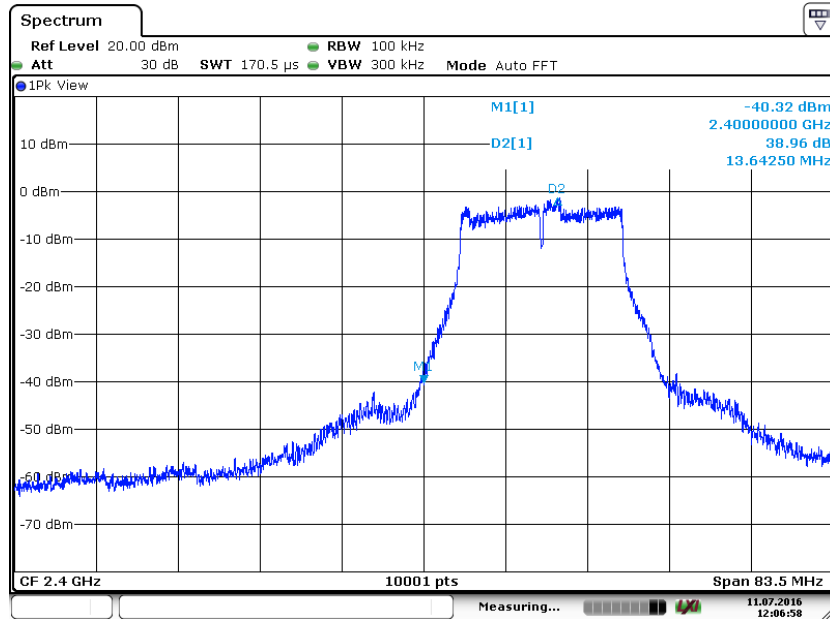


Channel 11: 2.462 GHz

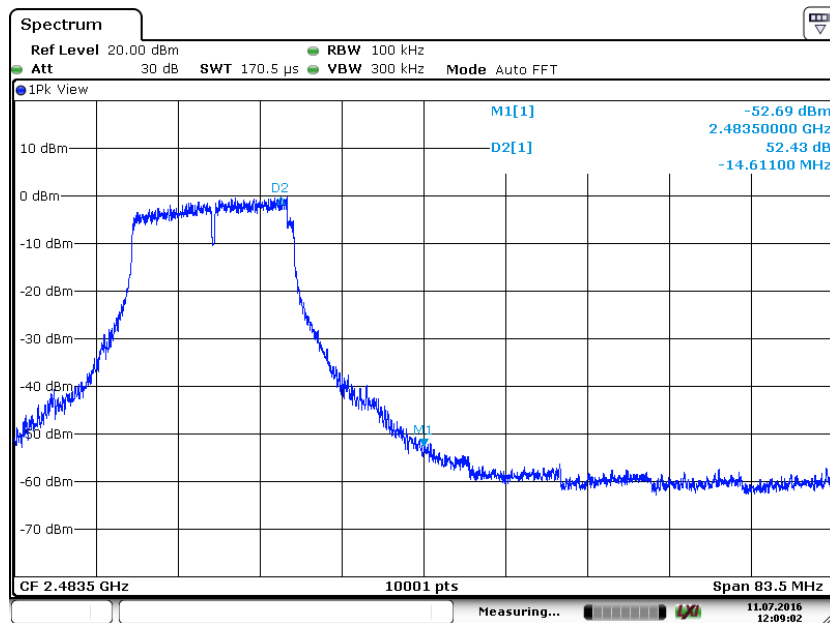


**Port 2**

Channel1: 2.412 GHz



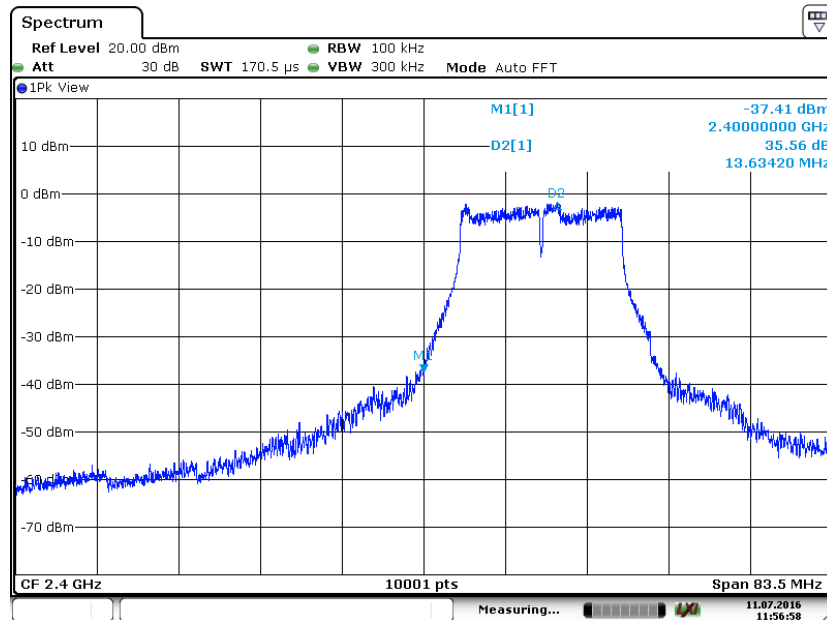
Channel 11: 2.462 GHz



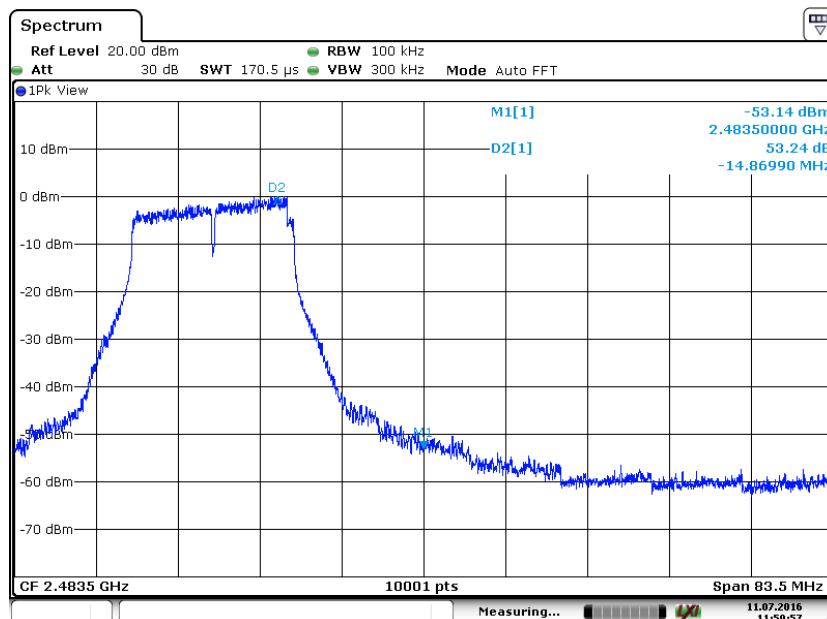
# 802.11n(HT20) mode with 72.2Mbps data rate

## Port 1

Channel1: 2.412 GHz

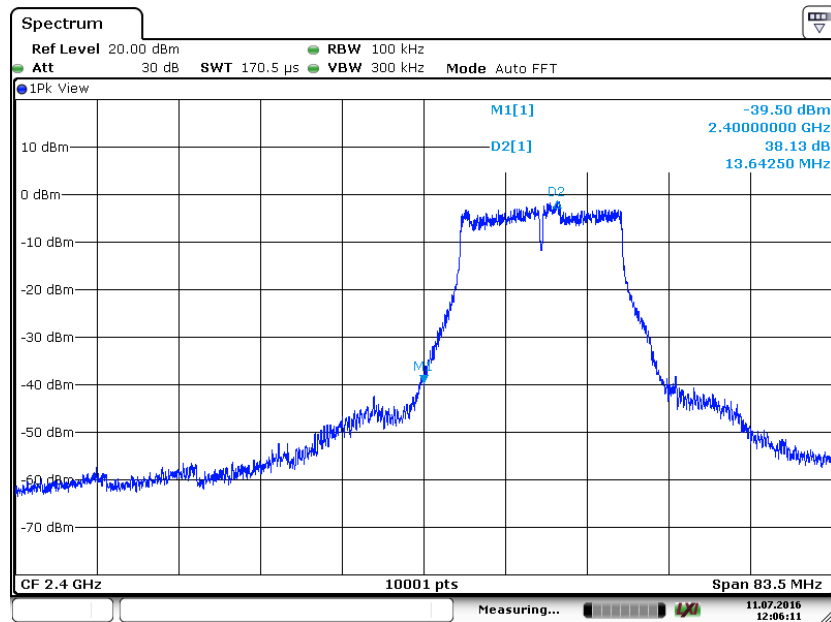


Channel 11: 2.462 GHz

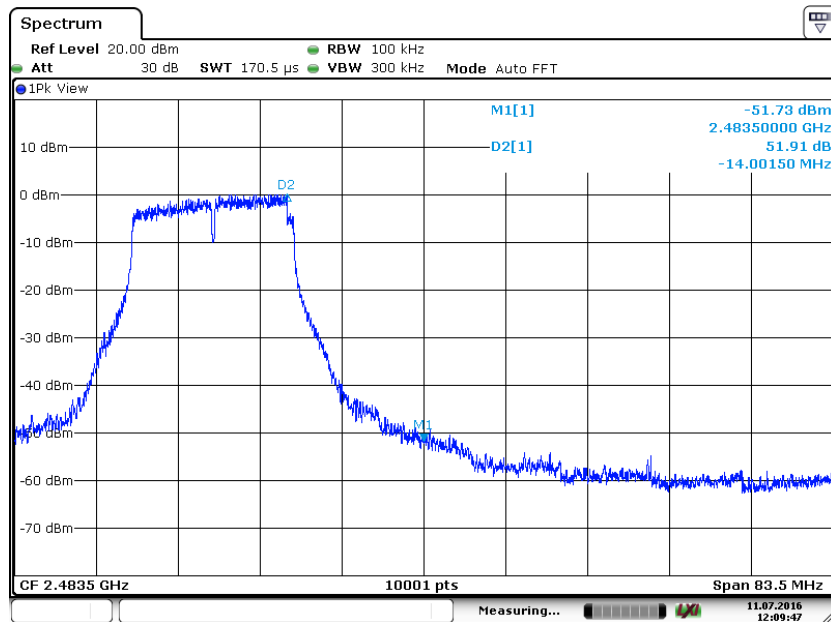


**Port 2**

Channel1: 2.412 GHz



Channel 11: 2.462 GHz

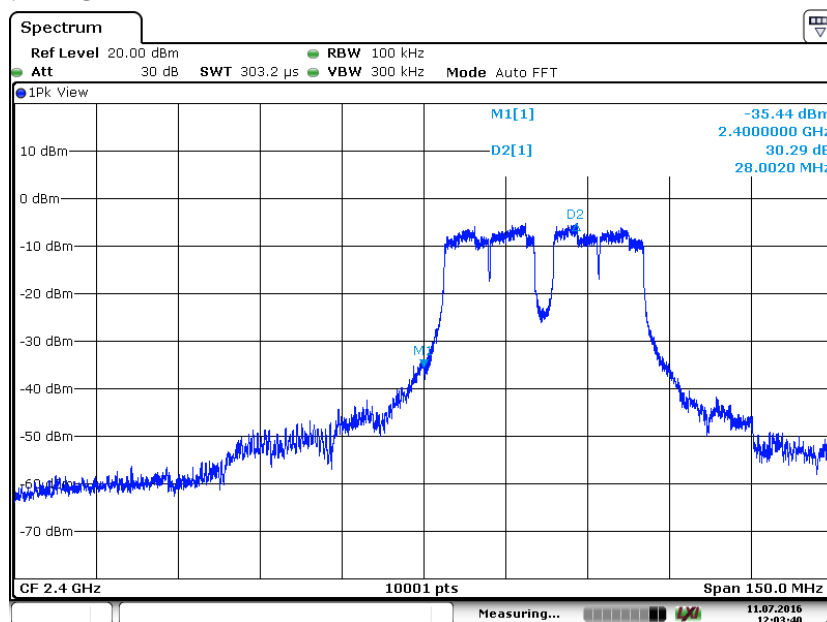




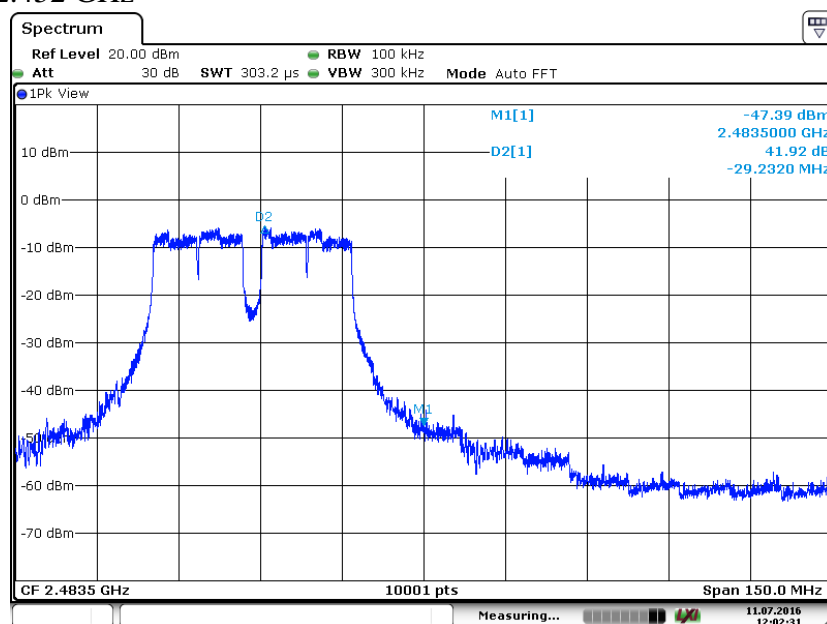
# 802.11n(HT40) mode with 150Mbps data rate

## Port 1

Channel 3: 2.422 GHz

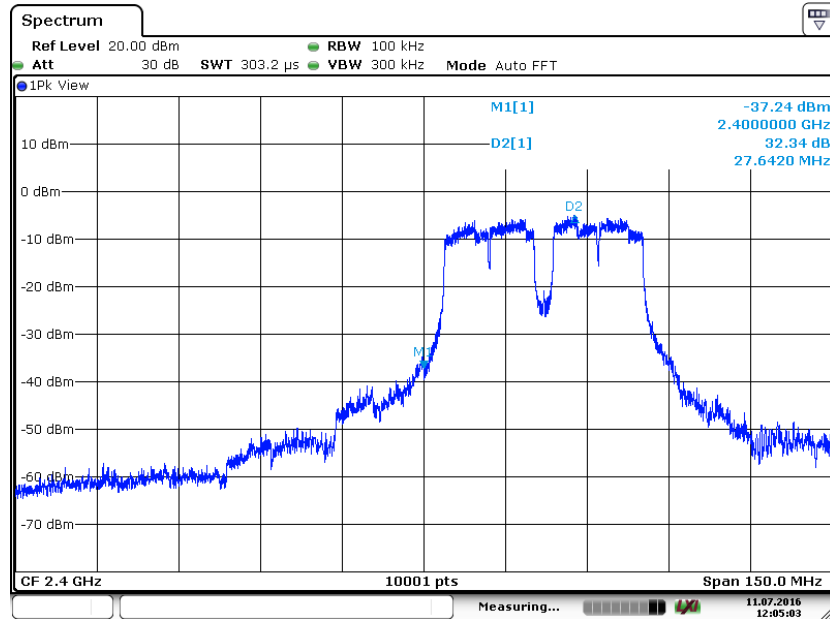


Channel 9: 2.452 GHz

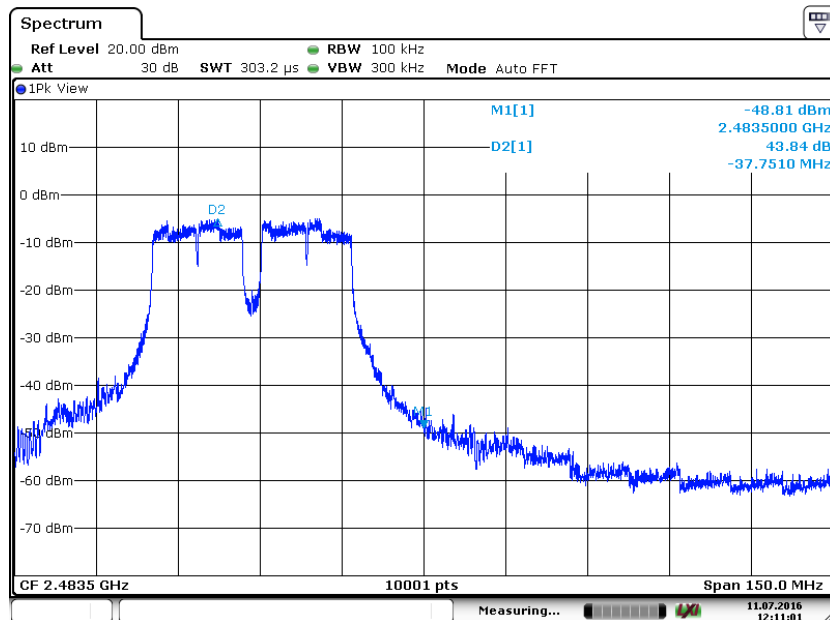


**Port 2**

Channel 3: 2.422 GHz

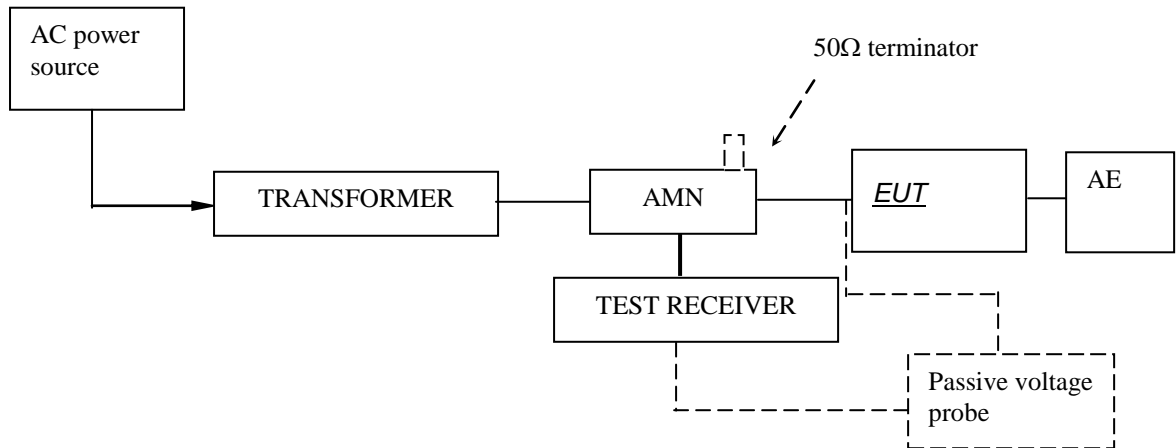


Channel 9: 2.452 GHz



#### 4.9 Conducted Emission Test

Test Configuration:



#### Test Setup and Procedure

Test was performed according to ANSI C63.10 Clause 6.2. The EUT was set to achieve the maximum emission level. The mains terminal disturbance voltage was measured with the EUT in a shielded room. The EUT was connected to AC power source through an Artificial Mains Network which provides a 50Ω linear impedance Artificial hand is used if appropriate (for handheld apparatus). The load/control terminal disturbance voltage was measured with passive voltage probe if appropriate.

The table-top EUT was placed on a 0.8m high non-metallic table above earthed ground plane (Ground Reference Plane). And for floor standing EUT, was placed on a 0.1m high non-metallic supported on GRP. The EUT keeps a distance of at least 0.8m from any other of the metallic surface. The Artificial Mains Network is situated at a distance of 0.8m from the EUT.

During the test, mains lead of EUT excess 0.8m was folded back and forth parallel to the lead so as to form a horizontal bundle with a length between 0.3m and 0.4m.

The bandwidth of test receiver was set at 9 kHz. The frequency range from 150 kHz to 30MHz was checked.

### Test Data

At main terminal: Pass

Tested Wire: Live

Operation Mode: transmitting mode

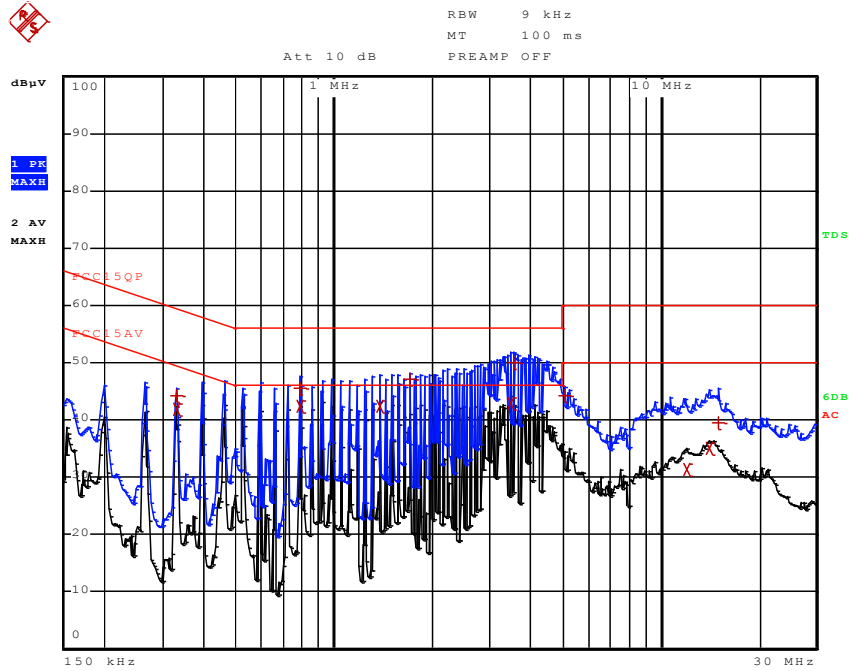
EDIT PEAK LIST (Final Measurement Results)				
Trace1:	FCC15QP			
Trace2:	FCC15AV			
Trace3:	---			
TRACE	FREQUENCY	LEVEL dBμV		DELTA LIMIT dB
2 Average	3.486 MHz	42.94	L1	-3.05
2 Average	790 kHz	42.38	L1	-3.61
2 Average	1.382 MHz	42.33	L1	-3.66
1 Quasi Peak	3.554 MHz	50.00	L1	-5.99
2 Average	330 kHz	41.80	L1	-7.64
1 Quasi Peak	1.71 MHz	46.98	L1	-9.01
1 Quasi Peak	790 kHz	45.41	L1	-10.58
2 Average	14.142 MHz	34.98	L1	-15.01
1 Quasi Peak	330 kHz	44.32	L1	-15.13
1 Quasi Peak	5.13 MHz	44.23	L1	-15.77
2 Average	12.03 MHz	31.30	L1	-18.69
1 Quasi Peak	14.998 MHz	39.63	L1	-20.36

Tested Wire: Neutral

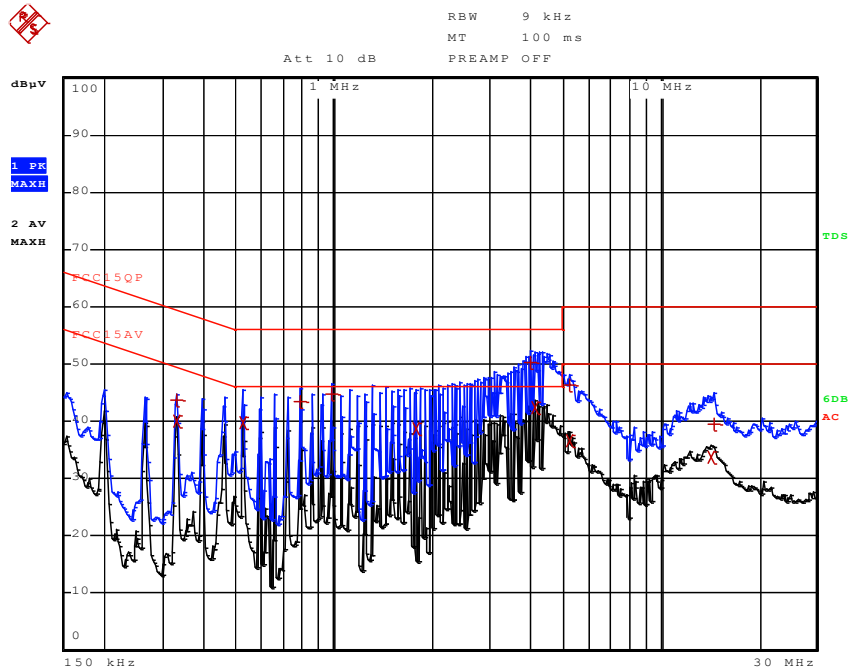
Operation Mode: transmitting mode

EDIT PEAK LIST (Final Measurement Results)				
Trace1:	FCC15QP			
Trace2:	FCC15AV			
Trace3:	---			
TRACE	FREQUENCY	LEVEL dBμV		DELTA LIMIT dB
2 Average	4.142 MHz	42.34	L1	-3.65
1 Quasi Peak	4.014 MHz	50.15	L1	-5.84
2 Average	526 kHz	39.76	L1	-6.23
2 Average	1.778 MHz	38.80	L1	-7.19
2 Average	330 kHz	39.91	L1	-9.53
1 Quasi Peak	986 kHz	44.79	L1	-11.20
1 Quasi Peak	790 kHz	43.50	L1	-12.49
2 Average	5.262 MHz	36.63	L1	-13.36
1 Quasi Peak	5.262 MHz	46.25	L1	-13.74
1 Quasi Peak	330 kHz	43.63	L1	-15.81
2 Average	14.342 MHz	33.76	L1	-16.23
1 Quasi Peak	14.602 MHz	39.38	L1	-20.61

# Emission Curve Tested Wire: Live



## Tested Wire: Neutral



## 5.0 Test Equipment List

### Radiated Emission

Equipment No.	Equipment	Model	Manufacturer	Cal. Due date (YYYY-MM-DD)	Calibration Interval
EM030-04	3m Semi-Anechoic Chamber	9×6×6 m <sup>3</sup>	ETS•LINDGRE N	2017/5/9	1Y
EM031-02	EMI Test Receiver (9 kHz~7 GHz)	R&S ESR7	R&S	2017/6/7	1Y
EM031-03	Signal and Spectrum Analyzer (10 Hz~40 GHz)	R&S FSV40	R&S	2017/6/3	1Y
EM011-04	Loop antenna (9 kHz-30 MHz)	HFH2-Z2	R&S	2017/6/6	1Y
EM061-03	TRILOG Super Broadband test Antenna (30 MHz-1.5 GHz) (TX)	VULB 9161	SCHWARZBECK	2017/6/6	1Y
EM033-01	TRILOG Super Broadband test Antenna(30 MHz-3 GHz) (RX)	VULB 9163	SCHWARZBECK	2016/9/2	1Y
EM033-02	Bouble-Ridged Waveguide Horn Antenna (800 MHz-18 GHz)(RX)	R&S HF907	R&S	2017/6/6	1Y
EM033-03	High Frequency Antenna & preamplifier(18 GHz~26.5 GHz) (RX)	R&S SCU-26	R&S	2017/4/1	1Y
EM033-04	High Frequency Antenna & preamplifier (26 GHz-40 GHz)	R&S SCU-40	R&S	2017/4/1	1Y
EM031-02-01	Coaxial cable(9 kHz-1 GHz)	N/A	R&S	2017/5/30	1Y
EM033-02-02	Coaxial cable(1 GHz-18 GHz)	N/A	R&S	2017/5/30	1Y
EM033-04-02	Coaxial cable(18 GHz~40 GHz)	N/A	R&S	2017/4/1	1Y
EM031-01	Signal Generator (9 kHz~6 GHz)	SMB100A	R&S	2017/6/11	1Y
SZ180-10	Signal Generator (10MHz-40GHz)	68369B	Wiltron	2017/5/23	1Y
EM040-01	Band Reject/Notch Filter	WRHFV	Wainwright	N/A	1Y
EM040-02	Band Reject/Notch Filter	WRCGV	Wainwright	N/A	1Y
EM040-03	Band Reject/Notch Filter	WRCGV	Wainwright	N/A	1Y
EM022-03	2.45 GHz Filter	BRM50702	Micro-Tronics	2017/5/9	1Y
SA016-16	Programmable Temperature & Humidity Test Chamber	MHU-800LJ	TERCHY	2016/10/26	1Y
SA012-74	Digital Multimeter	FLUKE175	FLUKE	2016/10/12	1Y
EM010-01	Regulated DC Power supply	PAB-3003A	GUANHUA	N/A	1Y
SA040-22	Regulated DC Power supply	IT6721	ITECH	2016/9/22	1Y
EM084-06	Audio Analyzer	8903B	HP	2017/3/29	1Y
EM084-07	Modulation Analyzer	8901B	HP	2017/6/5	1Y

### Conducted emission at the mains terminals

Equipment No.	Equipment	Model	Manufacturer	Cal. Due date (YYYY-MM-DD)	Calibration Interval
EM080-05	EMI receiver	ESCI	R&S	2016/7/27	1Y
EM006-05	LISN	ENV216	R&S	2016/9/28	1Y
EM006-06	LISN	ENV216	R&S	2016/9/16	1Y
EM006-06-01	Coaxial cable	/	R&S	2017/4/11	1Y
EM004-04	EMC shield Room	8m×3m×3m	Zhongyu	2017/1/25	1Y