



REPORT No.: SZ15100009W03

# FCC RF TEST REPORT

APPLICANT : TCL Communication Ltd.  
PRODUCT NAME : Mobile WIFI Router  
MODEL NAME : Y859ND  
TRADE NAME : ALCATEL ONETOUCH  
BRAND NAME : ALCATEL ONETOUCH  
FCC ID : 2ACCJB035  
STANDARD(S) : 47 CFR Part 15 Subpart C  
ISSUE DATE : 2015-11-02



**SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.**

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Change History		
Issue	Date	Reason for change
1.0	2015-11-02	First edition



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**TEST REPORT DECLARATION**

Applicant	TCL Communication Ltd.
Applicant Address	5F, C-Tower, No.232, Liangjing Road, Zhangjiang High-tech Park, Pudong, Shanghai, China
Manufacturer	TCL Mobile Communication Co. Ltd. Huizhou
Manufacturer Address	70 Huifeng 4rd., ZhongKai High-Technology Development District, Huizhou, Guangdong, PRC. 516006
Product Name	Mobile WIFI Router
Model Name	Y859ND
Brand Name	ALCATEL ONETOUCH
HW Version	V2.0
SW Version	Y859_00_03.28_17
Test Standards	47 CFR Part 15 Subpart C
Test Date	2015-10-10 to 2015-10-29
Test Result	PASS

Tested by : Zou Jian  
Zou Jian(Test Engineer)

Reviewed by : Qiu Xiaojun  
Qiu Xiaojun(RF Manager)

Approved by : Zeng Dexin  
Zeng Dexin(Chief Engineer)

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## 1. TECHNICAL INFORMATION

Note: Provide by applicant.

### 1.1 Applicant Information

Company:	TCL Communication Ltd.
Address:	5F, C-Tower, No.232, Liangjing Road, Zhangjiang High-tech Park, Pudong, Shanghai, China

### 1.2 Equipment under Test (EUT) Description

Brand Name:	ALCATEL ONETOUCH
Trade Name:	ALCATEL ONETOUCH
Model Name:	Y859ND
Frequency Range:	802.11b/g/n-20MHz: 2.412GHz - 2.462GHz 802.11n-40MHz: 2.422GHz - 2.452GHz
Channel Number:	802.11b/g/n-20MHz: 11 802.11n-40MHz: 7
Modulation Type:	DSSS, OFDM
Antenna Type:	PIFA Antenna
Antenna Gain:	Ant1: 1dBi; Ant2: 1dBi

#### NOTE:

The EUT is a Mobile WIFI Router, it contains WIFI Module operating at 2.4GHz ISM; it supports 802.11b, 802.11g, 802.11n and they are all tested in this report.

For 802.11b/g/n-20MHz (2.4GHz band), the frequencies allocated is  $F \text{ (MHz)} = 2412 + 5 \times (n-1)$  ( $1 \leq n \leq 11$ ). The lowest, middle, highest channel numbers of the EUT used and tested in this report are separately 1 (2412MHz), 6 (2437MHz) and 11 (2462MHz).

For 802.11n-40MHz, the frequencies allocated is  $F \text{ (MHz)} = 2412 + 5 \times (n-1)$  ( $3 \leq n \leq 9$ ). The lowest, middle, highest channel numbers of the EUT used and tested in this report are separately 3 (2422MHz), 6 (2437MHz) and 9 (2452MHz).

The EUT has 2 antennas, the EUT incorporates a MIMO function.

The EUT incorporates a MIMO function. Physically, the EUT provides two completed transmitters and two receivers (2T2R) for 2.4GHz band.

Operation mode TX mode	1TX	2TX
802.11b	ANT1 or ANT2	
802.11g	ANT1 or ANT2	
802.11n(20MHz)		ANT1 & ANT2
802.11n(40MHz)		ANT1 & ANT2



According to KDB 662911 D01, the directional gain =  $G_{ANT} + 10\log(N_{ANT})$  dBi, where  $G_{ANT}$  is the antenna gain in dBi,  $N_{ANT}$  is the number of outputs.

For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.

The antenna connector of EUT is designed with permanent attachment and no consideration of replacement.

### 1.2.1 Identification of all used EUTs

The EUT identity consists of numerical and letter characters, the letter character indicates the test sample, and the following two numerical characters indicate the software version of the test sample.

EUT Identity	Hardware Version	Software Version
A01	V2.0	Y859_00_03.28_17

## 1.3 Test Standards and Results

The objective of the report is to perform testing according to 47 CFR Part 15 Subpart C (Bluetooth, 2.4GHz ISM band radiators) for the EUT FCC ID Certification:

No.	Identity	Document Title
1	47 CFR Part 15 (10-1-13 Edition)	Radio Frequency Devices

Test detailed items/section required by FCC rules and results are as below:

No.	Section	Description	Test Date	Result
1	15.203	Antenna Requirement	N.A	<u>PASS</u>
2	15.247(b)	Peak Output Power	Oct 12, 2015	<u>PASS</u>
3	15.247(a)	Bandwidth	Oct 12, 2015& Oct 10, 2015	<u>PASS</u>
4	15.247(d)	Conducted Spurious Emission and Band Edge	Oct 12, 2015	<u>PASS</u>
5	15.247(d)	Restricted Frequency Bands	Oct 28, 2015	<u>PASS</u>
6	15.207	Conducted Emission	Oct 28, 2015	<u>PASS</u>
7	15.209 ,15.247(d)	Radiated Emission	Oct 28, 2015	<u>PASS</u>
8	15.247(e)	Power spectral density (PSD)	Oct 10, 2015	<u>PASS</u>
9	15.247(i), 1.1307&2.1093	RF exposure evaluation	N.A	<u>PASS</u>

The tests of Conducted Emission and Radiated Emission were performed according to the method of measurements prescribed in ANSI C63.4 2009.

These RF tests were performed according to the method of measurements prescribed in KDB558074 D01 v03r03 (09/06/2015).



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### 1.3.1 Test Environment Conditions

During the measurement, the environmental conditions were within the listed ranges:

Temperature (°C):	15 - 35
Relative Humidity (%):	30 -60
Atmospheric Pressure (kPa):	86-106





## 2. 47 CFR PART 15C REQUIREMENTS

### 2.1 Antenna requirement

#### 2.1.1 Applicable Standard

According to FCC 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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

#### 2.1.2 Result: Compliant

The EUT has a permanently and irreplaceable attached antenna. Please refer to the EUT internal photos.

### 2.2 Peak Output Power

#### 2.2.1 Requirement

According to FCC section 15.247(b)(3), For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: The maximum peak conducted output power of the intentional radiator shall not exceed 1 Watt.

#### 2.2.2 Test Description

KDB 558074 Section 9.1.3 was used in order to prove compliance.

The measured output power was calculated by the reading of the Power Meter and calibration.

#### A. Test Setup:



The EUT (Equipment under the test) which is coupled to the Power Meter; the RF load attached to the EUT antenna terminal is 50 Ohm; the path loss as the factor is calibrated to correct the reading, all test result in power meter.



**B. Equipments List:**

Please reference ANNEX A(1.4).

**2.2.3 Test Result**

The lowest, middle and highest channels are selected to perform testing to verify the conducted RF output peak power of the Module.

**2.2.3.1 802.11b Test Mode**

ANT 1:

Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	W	dBm	W	
1	2412	15.25	0.033497	30	1	PASS
6	2437	15.16	0.032810			PASS
11	2462	13.48	0.022284			PASS

ANT 2:

Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	W	dBm	W	
1	2412	14.45	0.027861	30	1	PASS
6	2437	13.78	0.023878			PASS
11	2462	14	0.025119			PASS

**2.2.3.2 802.11g Test mode**

ANT 1:

Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	W	dBm	W	
1	2412	18.57	0.071945	30	1	PASS
6	2437	17.94	0.06223			PASS
11	2462	17.3	0.053703			PASS

ANT 2:

Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	W	dBm	W	
1	2412	17.55	0.056885	30	1	PASS
6	2437	17.08	0.05105			PASS
11	2462	17.29	0.05358			PASS

**2.2.3.3 802.11n-20MHz Test mode**

ANT 1:

Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	W	dBm	W	
1	2412	17.35	0.054325	30	1	PASS
6	2437	16.8	0.047863			PASS
11	2462	15.89	0.038815			PASS

ANT 2:

Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	W	dBm	W	
1	2412	15.2	0.033113	30	1	PASS
6	2437	14.93	0.031117			PASS
11	2462	15.14	0.032659			PASS

ANT 1+ANT 2:

Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	W	dBm	W	
1	2412	19.42	0.087438	30	1	PASS
6	2437	18.98	0.07898			PASS
11	2462	18.54	0.071474			PASS

**2.2.3.4 802.11n-40MHz Test mode**

ANT 1:

Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	W	dBm	W	
3	2422	14.12	0.025823	30	1	PASS
6	2437	13.62	0.023014			PASS
9	2452	13.04	0.020137			PASS

ANT 2:

Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	W	dBm	W	
3	2422	13.05	0.020184	30	1	PASS
6	2437	13.49	0.022336			PASS
9	2452	13.25	0.021135			PASS





ANT 1+ANT 2:

Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	W	dBm	W	
3	2422	16.63	0.046007	30	1	PASS
6	2437	16.57	0.045350			PASS
9	2452	16.16	0.041272			PASS

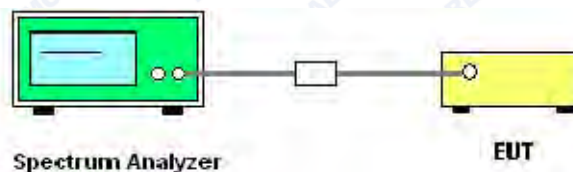
## 2.3 Bandwidth

### 2.3.1 Requirement

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

### 2.3.2 Test Description

#### A. Test Set:



The EUT is coupled to the Spectrum Analyzer; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading.

Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. In order to make an accurate measurement, set the span greater than RBW.

KDB 558074 Section 8.1 Option 1 was used in order to prove compliance.

#### B. Equipments List:

Please reference ANNEX A(1.4).

### 2.3.3 Test Result

The lowest, middle and highest channels are selected to perform testing to record the 6 dB bandwidth of the Module.



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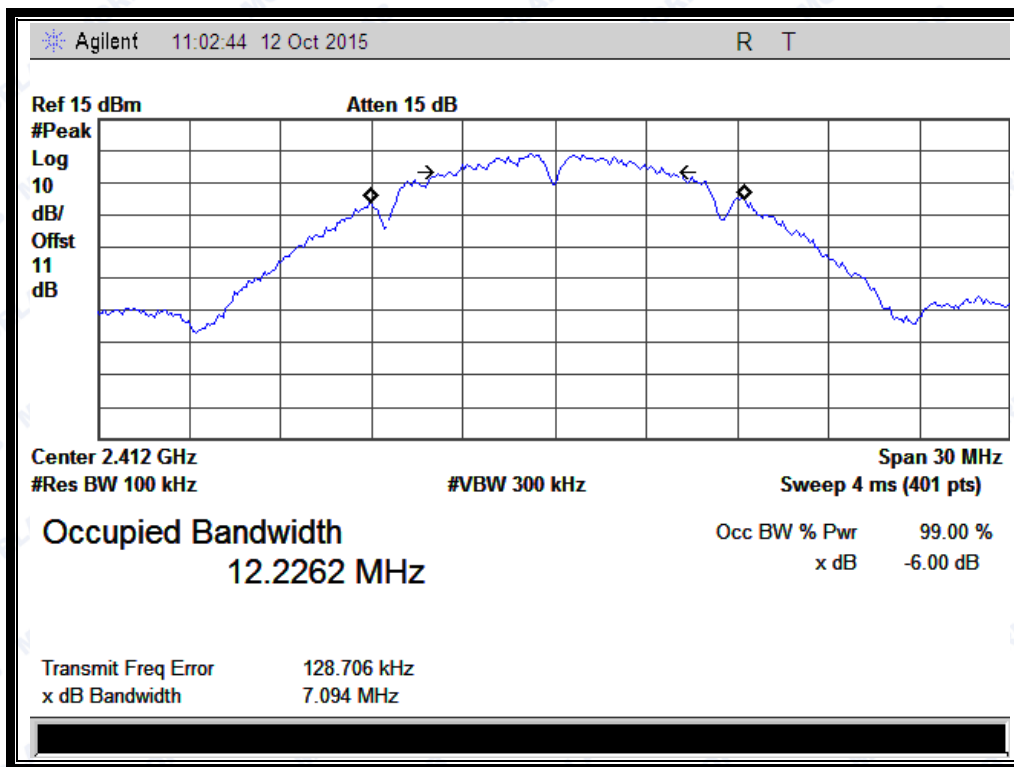
### 2.3.3.1 802.11b Test mode

ANT 1:

#### A. Test Verdict:

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limits(kHz)	Result
1	2412	7.094	≥500	PASS
6	2437	7.132	≥500	PASS
11	2462	7.488	≥500	PASS

#### B. Test Plots

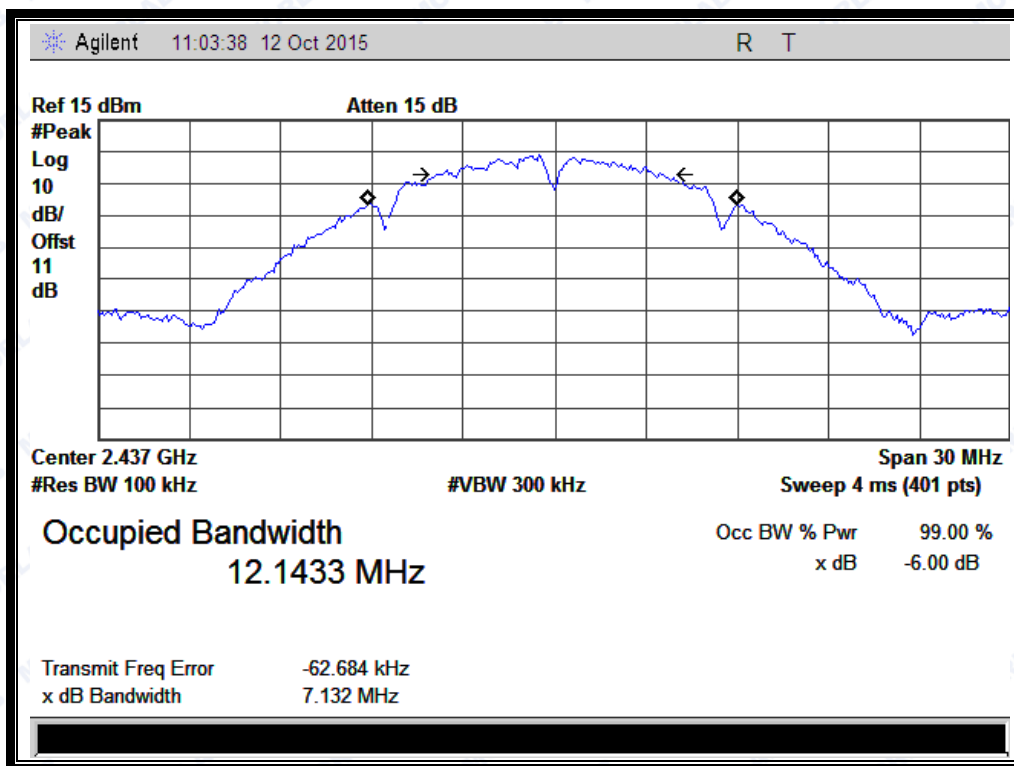


(Channel 1: 2412MHz @ 802.11b)

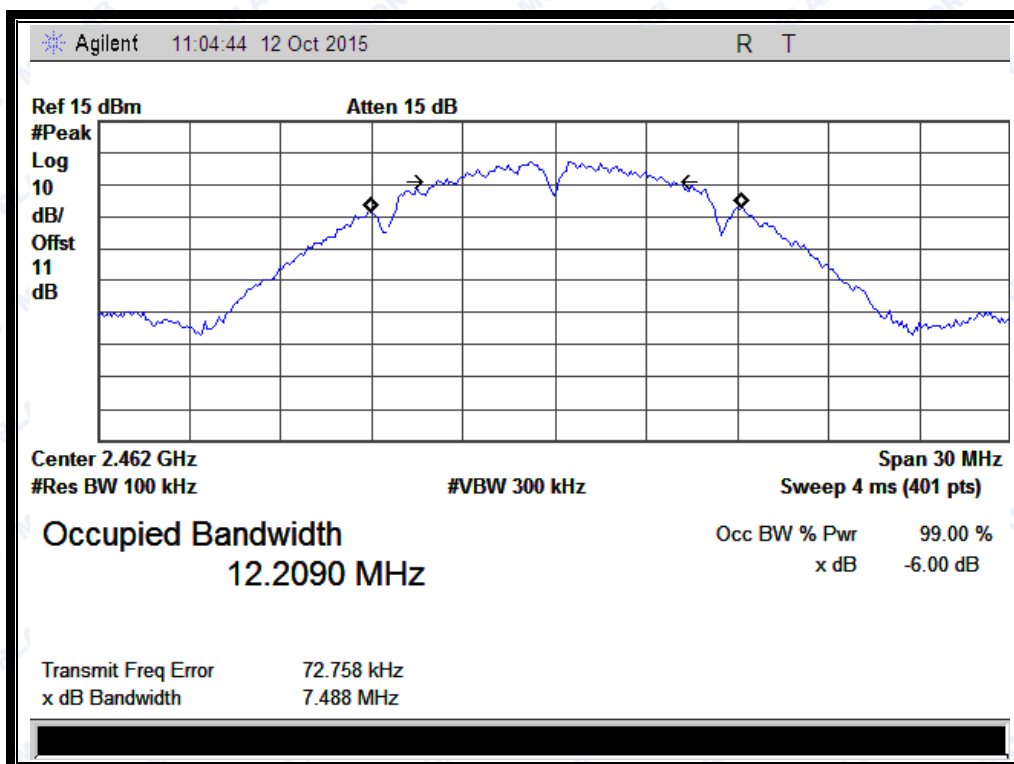




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(Channel 6: 2437 MHz @ 802.11b)



(Channel 11: 2462MHz @ 802.11b)



### A. Test Verdict:

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limits(kHz)	Result
1	2412	7.463	≥500	PASS
6	2437	7.097	≥500	PASS
11	2462	6.640	≥500	PASS

Agilent 16:48:50 10 Oct 2015 R T

Ref 15 dBm Atten 15 dB

#Peak  
Log  
10  
dB/  
Offst  
11  
dB

Center 2.412 GHz Span 30 MHz  
#Res BW 100 kHz #VBW 300 kHz Sweep 6 ms (601 pts)

Occupied Bandwidth 11.4544 MHz

Occ BW % Pwr 99.00 %  
x dB -6.00 dB

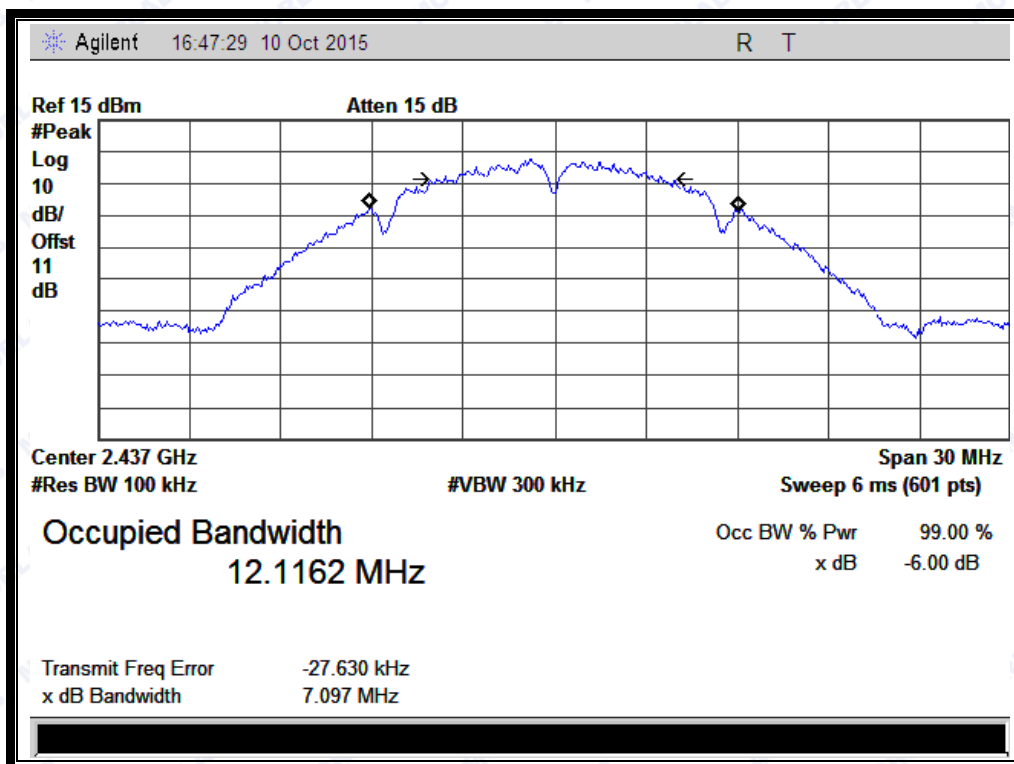
Transmit Freq Error 426.171 kHz  
x dB Bandwidth 7.463 MHz

(Channel 1: 2412MHz @ 802.11b)

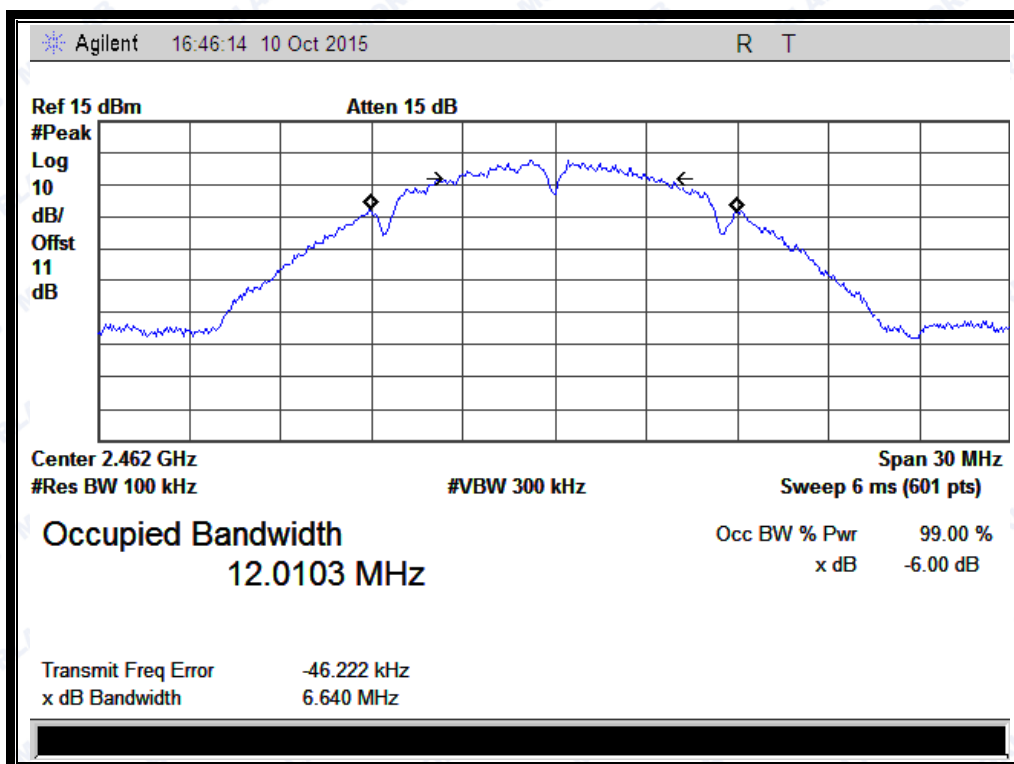




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(Channel 6: 2437 MHz @ 802.11b)



(Channel 11: 2462MHz @ 802.11b)



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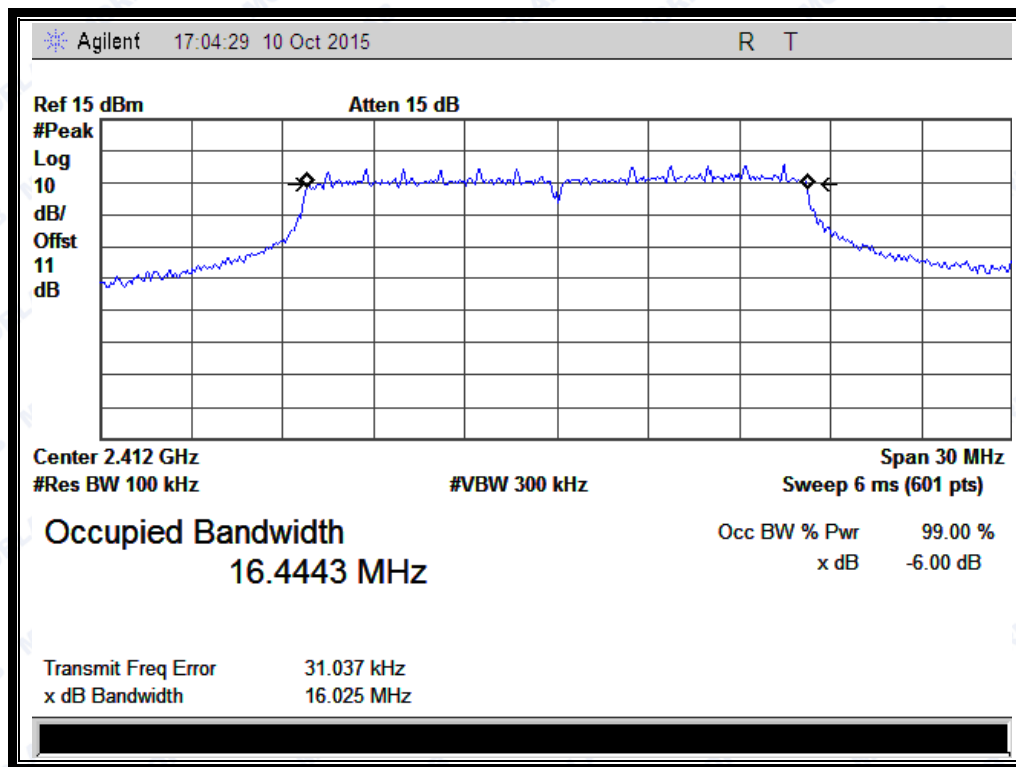
### 2.3.3.2 802.11g Test mode

ANT 1:

#### A. Test Verdict:

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limits (kHz)	Result
1	2412	16.025	≥500	PASS
6	2437	16.056	≥500	PASS
11	2462	16.414	≥500	PASS

#### B. Test Plots:

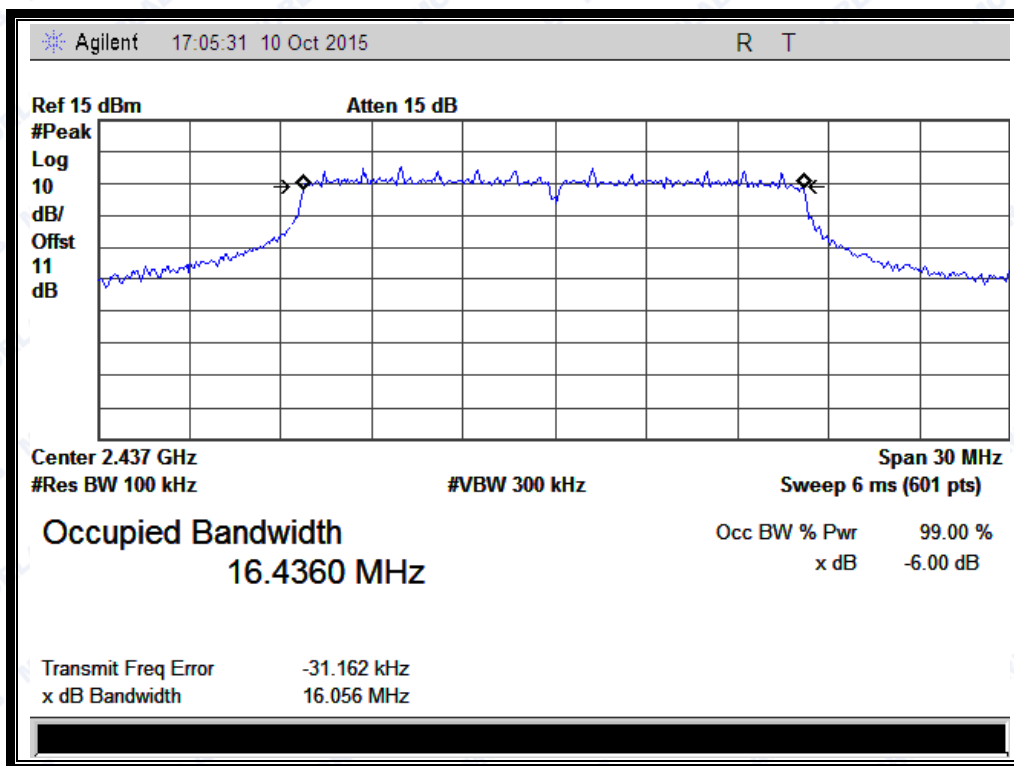


(Channel 1: 2412MHz @ 802.11g)

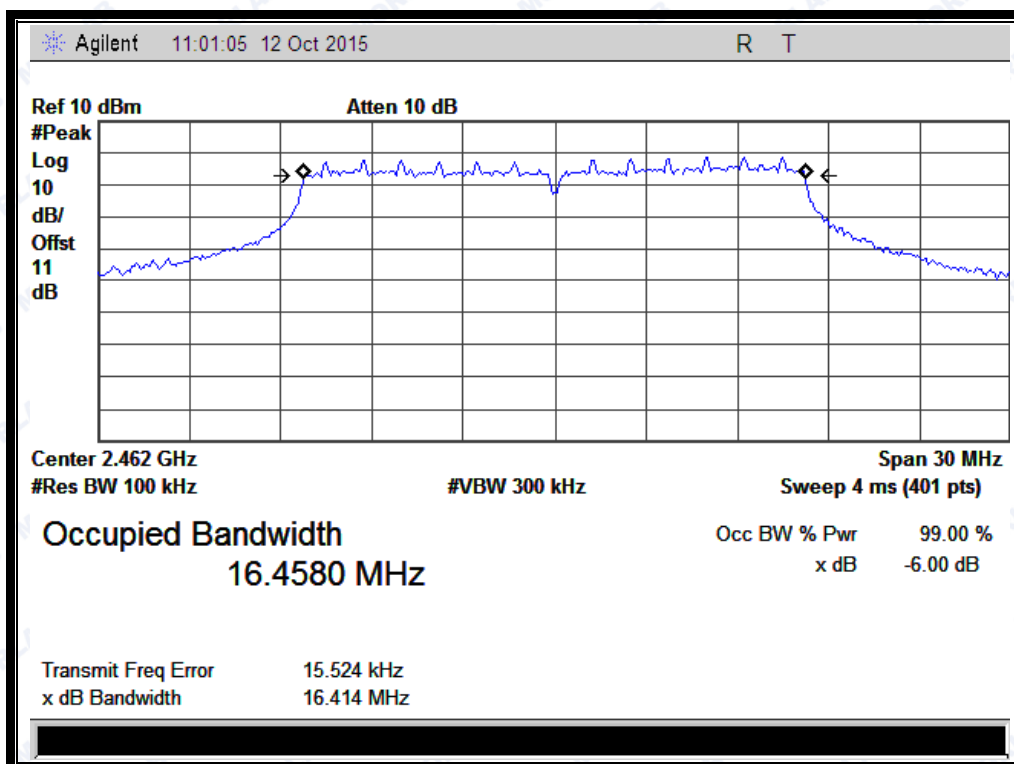




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(Channel 6: 2437MHz @ 802.11g)



(Channel 11: 2462MHz @ 802.11g)



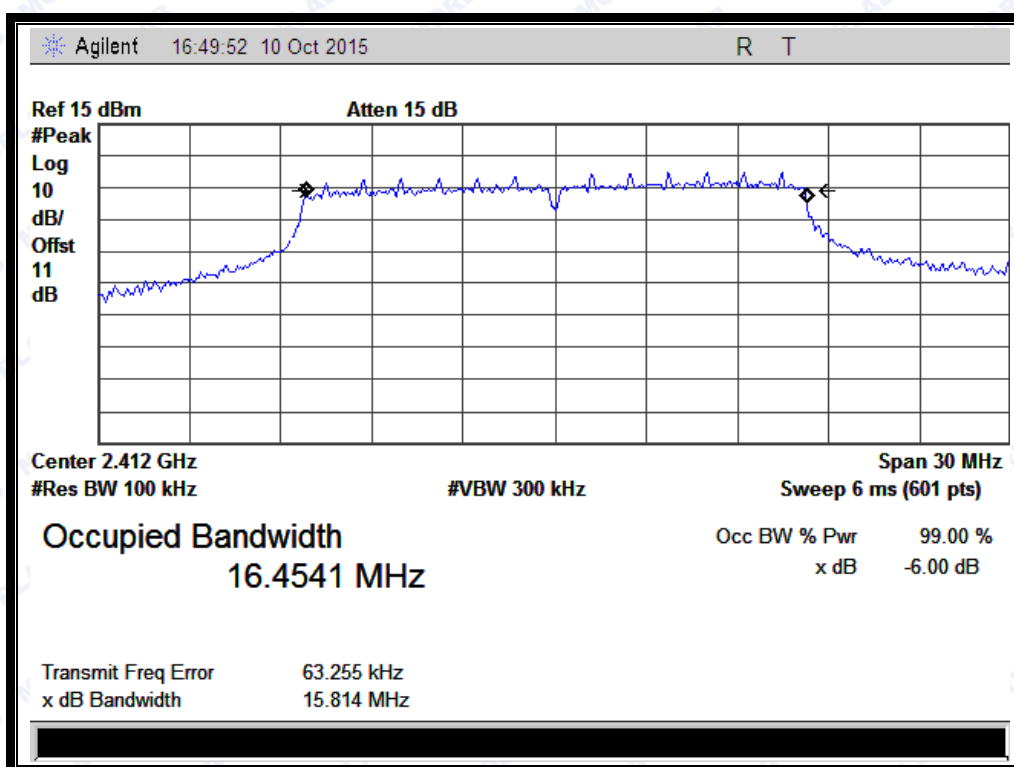
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ANT 2:

**A. Test Verdict:**

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limits(kHz)	Result
1	2412	15.814	≥500	PASS
6	2437	16.441	≥500	PASS
11	2462	16.462	≥500	PASS

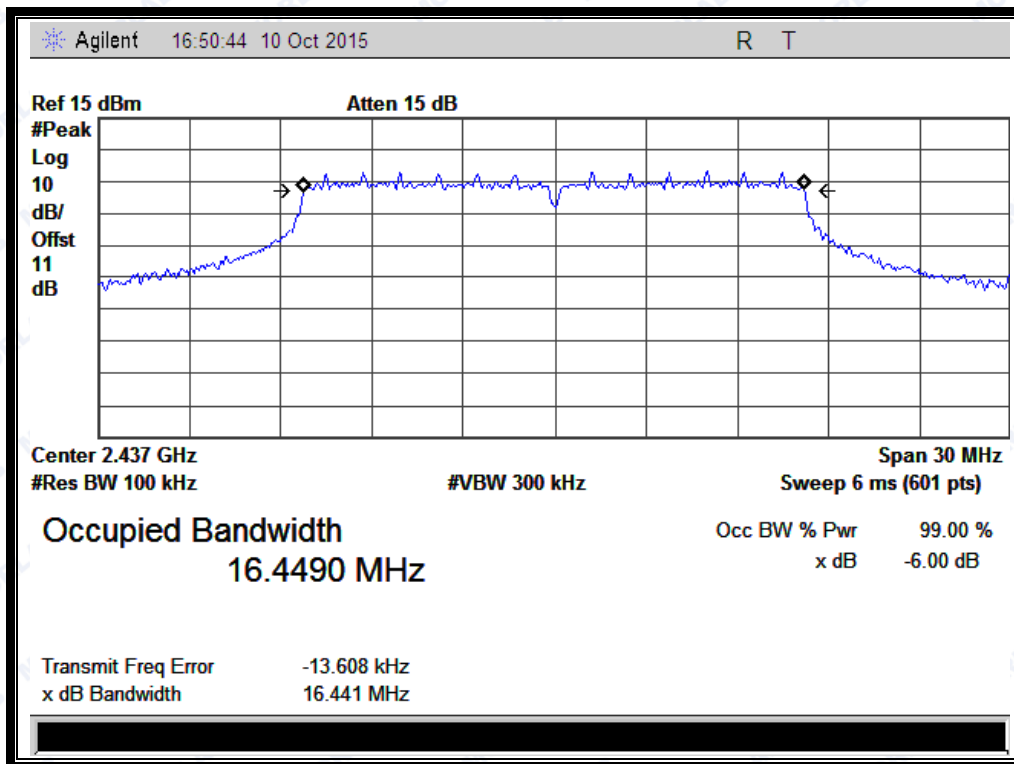
**B. Test Plots**



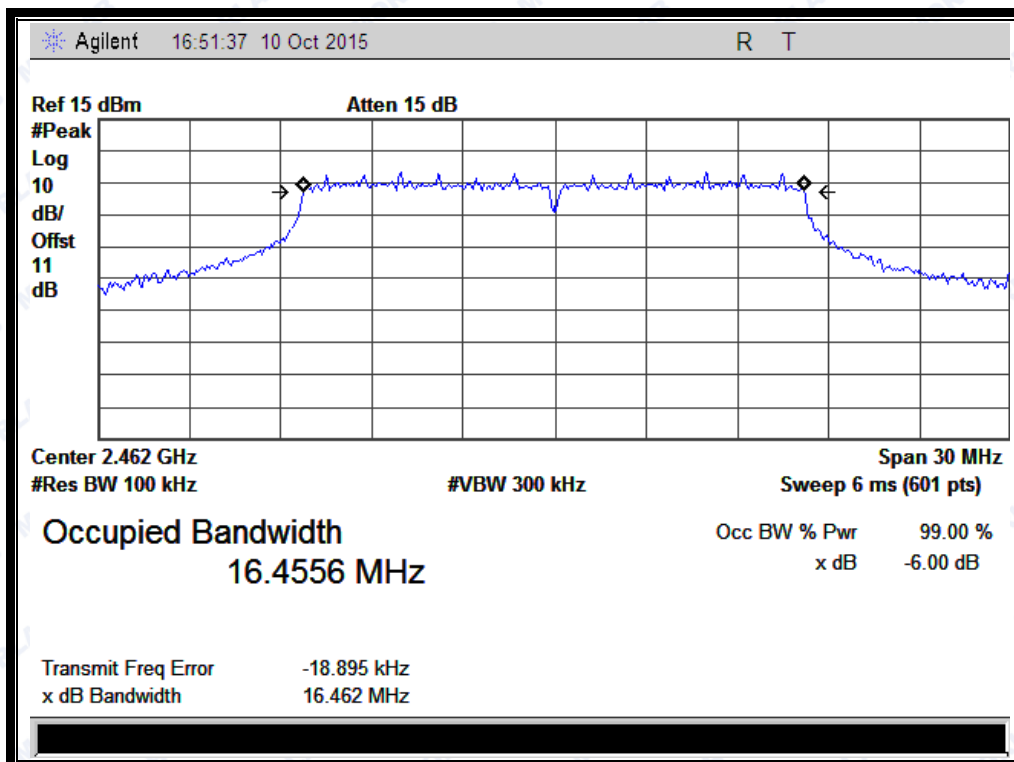
(Channel 1: 2412MHz @ 802.11g)



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(Channel 6: 2437 MHz @ 802.11g)



(Channel 11: 2462MHz @ 802.11g)





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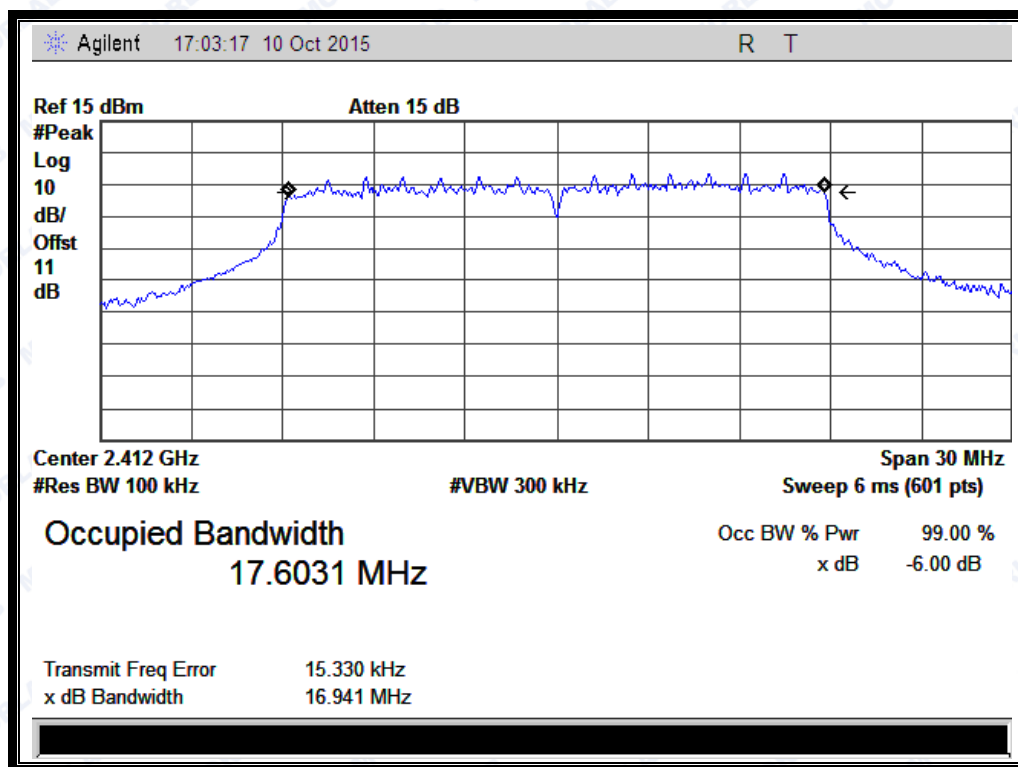
### 2.3.3.3 802.11n-20 Test mode

ANT 1:

#### B. Test Verdict:

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limits (kHz)	Result
1	2412	16.941	≥500	PASS
6	2437	17.008	≥500	PASS
11	2462	17.032	≥500	PASS

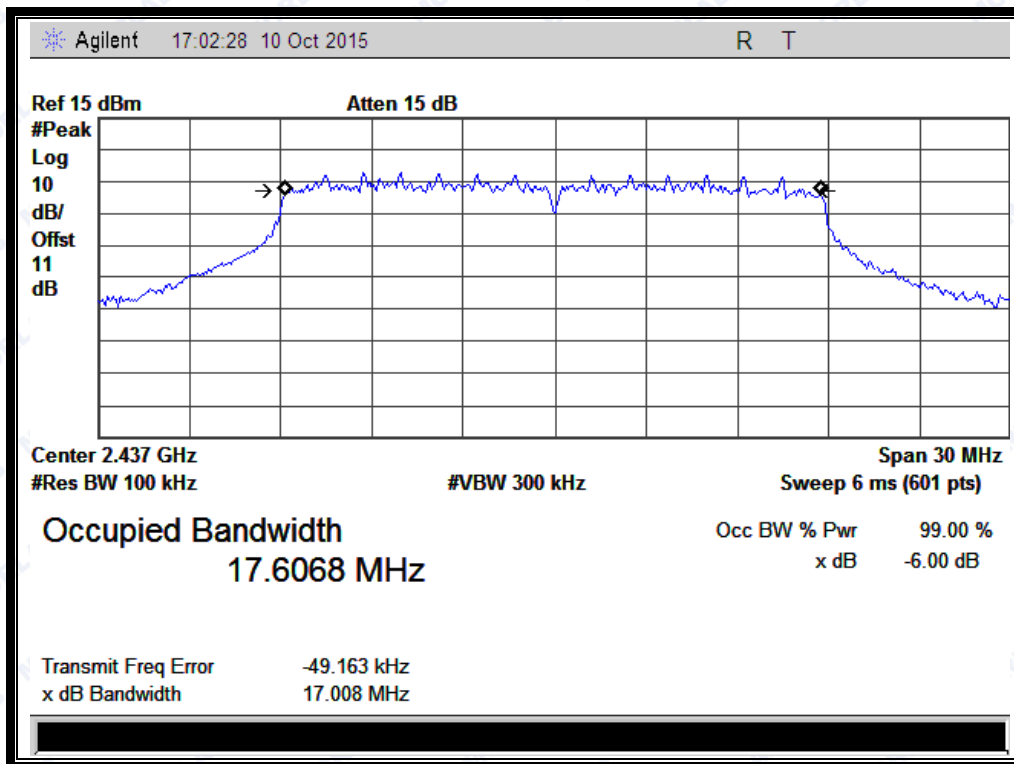
#### B. Test Plots:



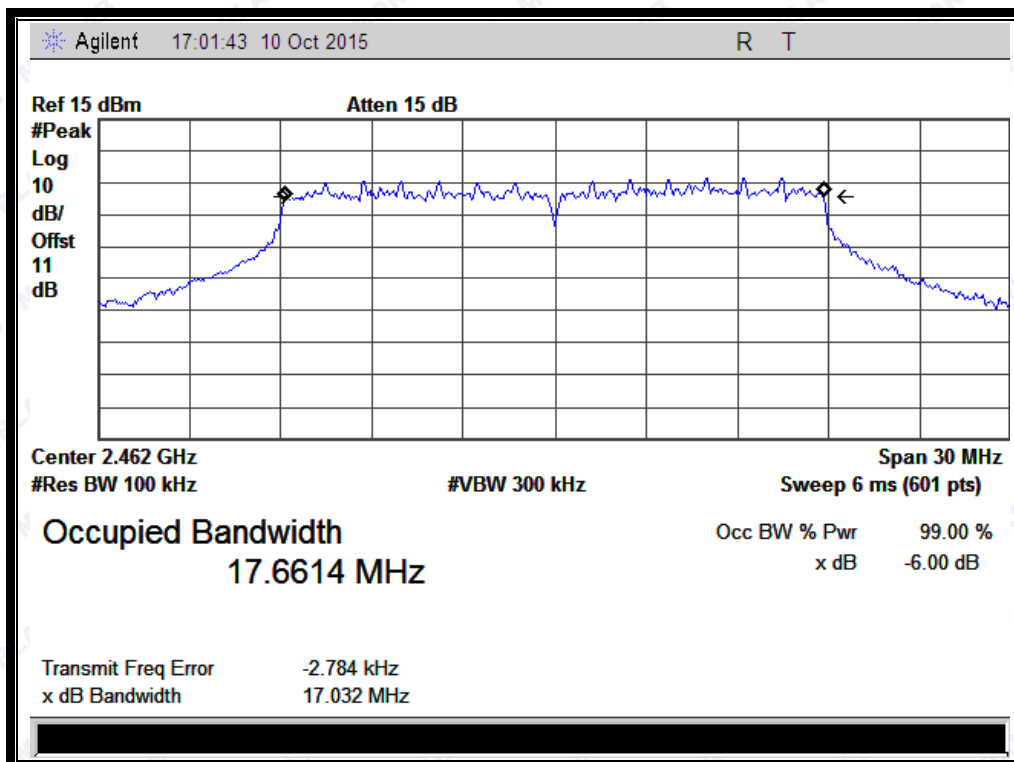
(Channel 1: 2412MHz @ 802.11n-20)



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(Channel 6: 2437MHz @ 802.11n-20)



(Channel 11: 2462MHz @ 802.11n-20)



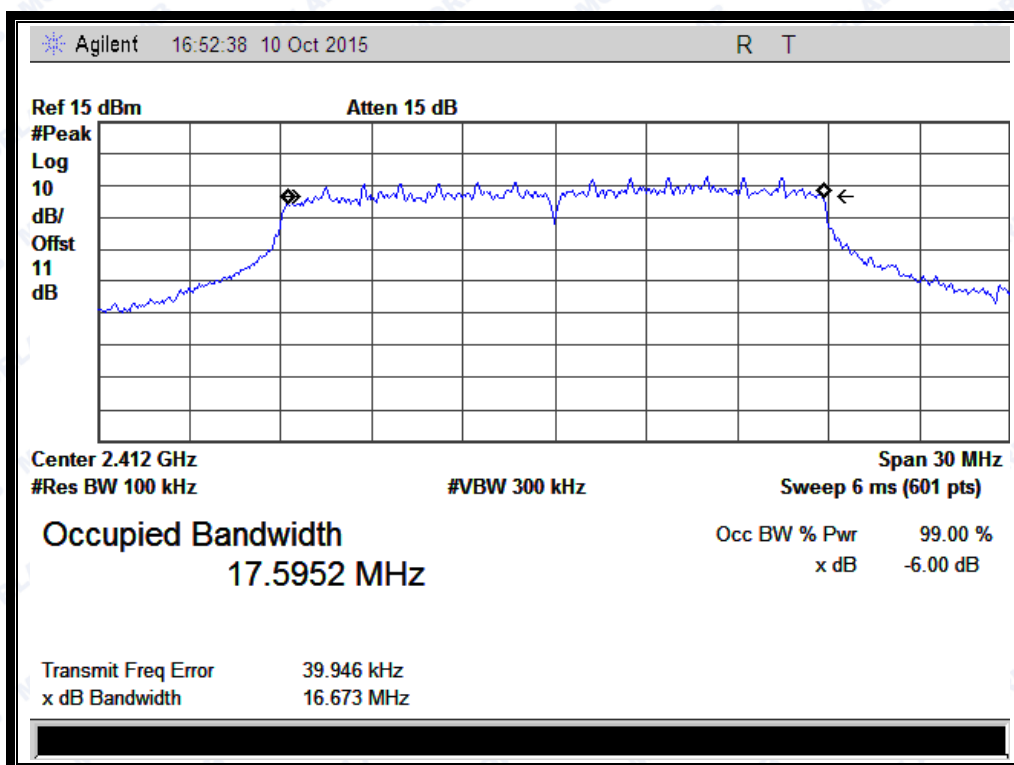
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ANT 2:

**A. Test Verdict:**

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limits(kHz)	Result
1	2412	16.673	≥500	PASS
6	2437	17.621	≥500	PASS
11	2462	17.602	≥500	PASS

**B. Test Plots**

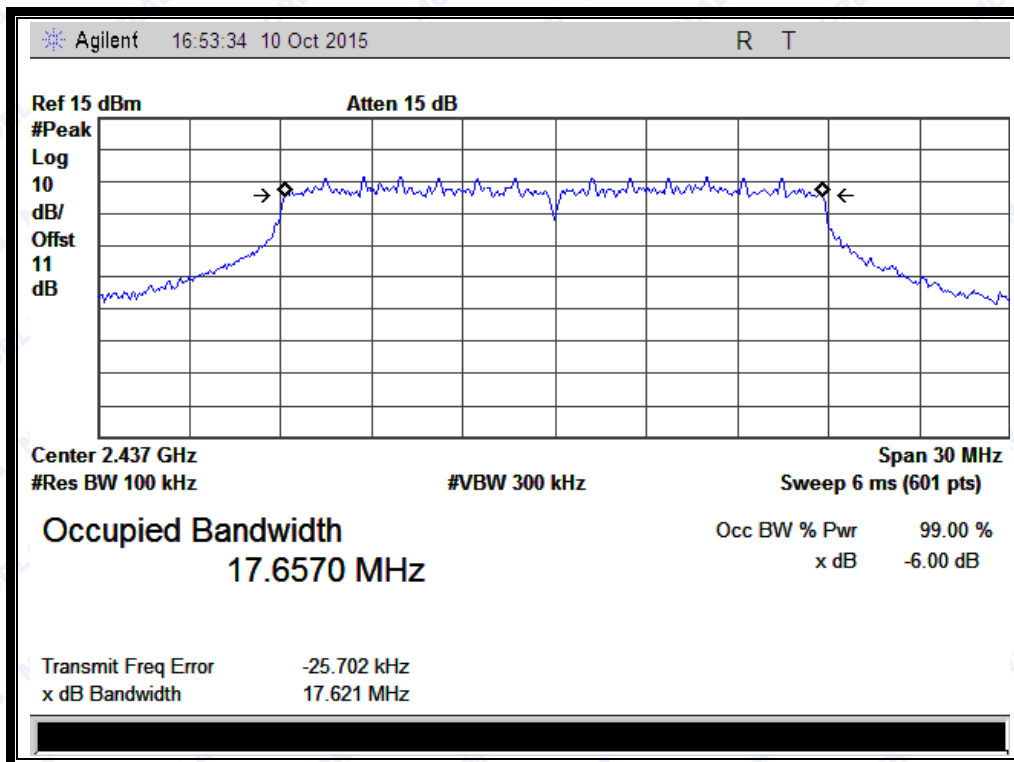


(Channel 1: 2412MHz @ 802.11 n-20)

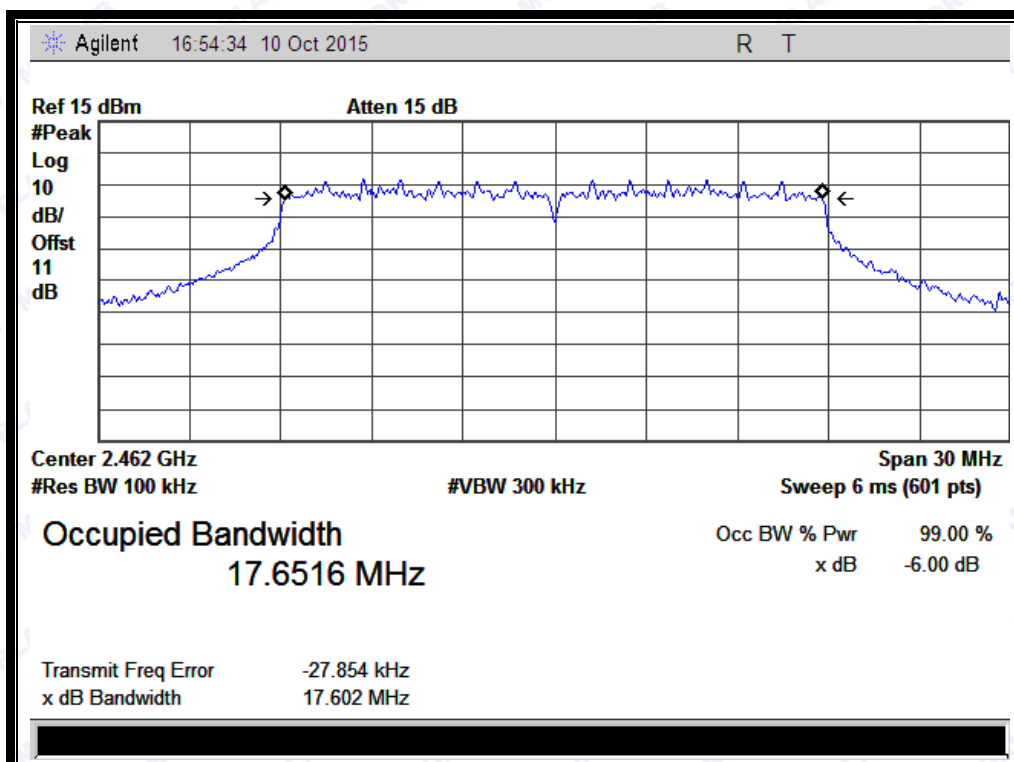




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(Channel 6: 2437 MHz @ 802.11 n-20)



(Channel 11: 2462MHz @ 802.11 n-20)



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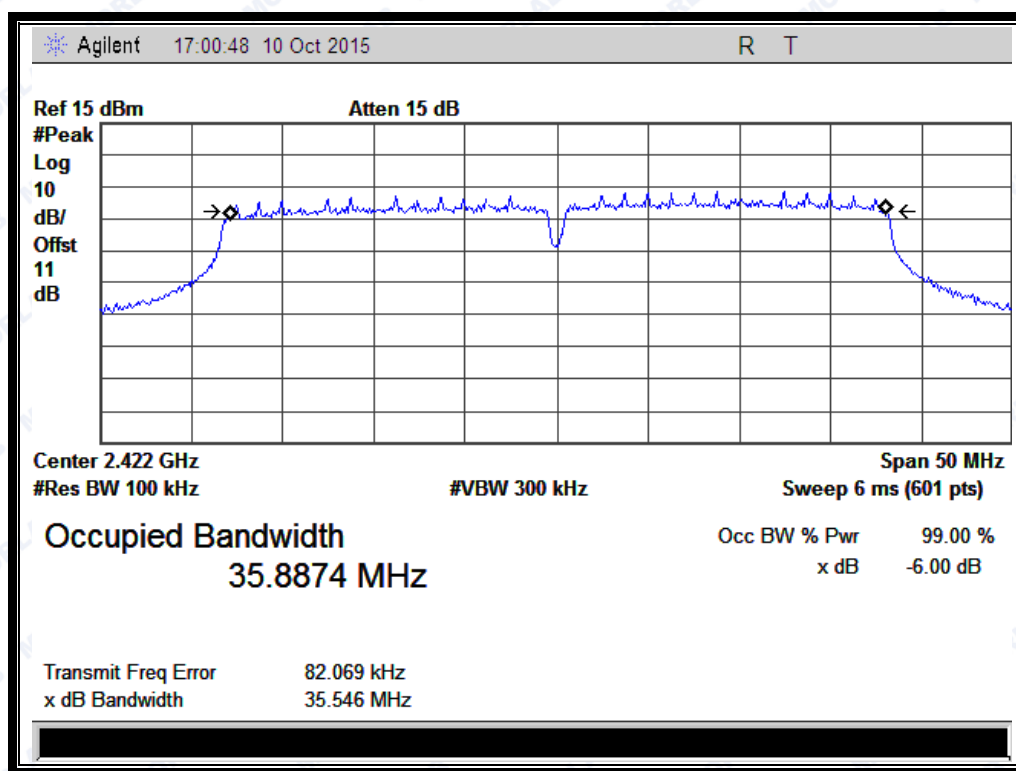
### 2.3.3.4 802.11n-40 Test mode

ANT 1:

#### A. Test Verdict:

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limits (kHz)	Result
3	2422	35.546	≥500	PASS
6	2437	35.653	≥500	PASS
9	2452	36.128	≥500	PASS

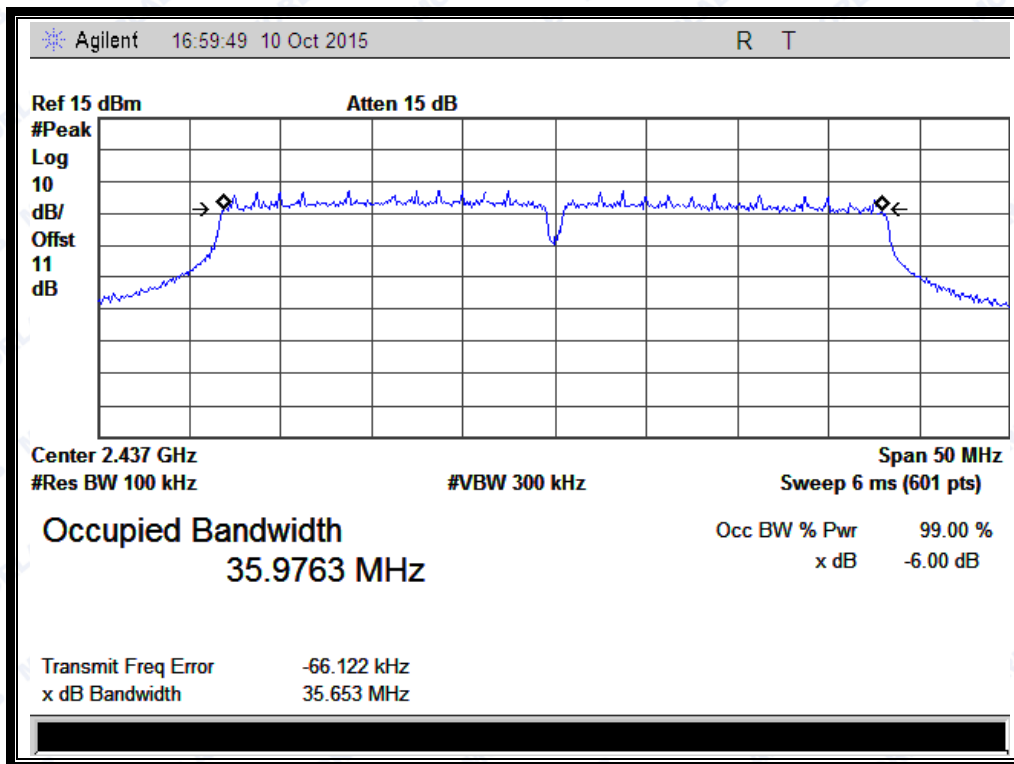
#### B. Test Plots:



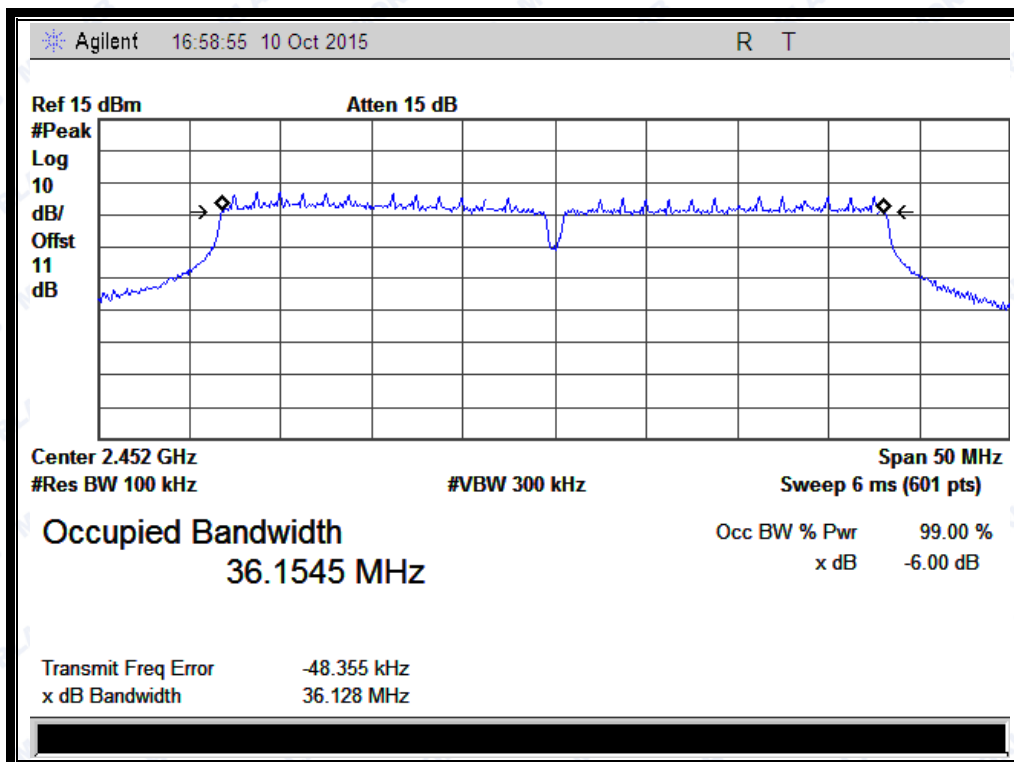
(Channel 3: 2422MHz @ 802.11n-40)



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(Channel 6: 2437MHz @ 802.11n-40)



(Channel 9: 2452MHz @ 802.11n-40)



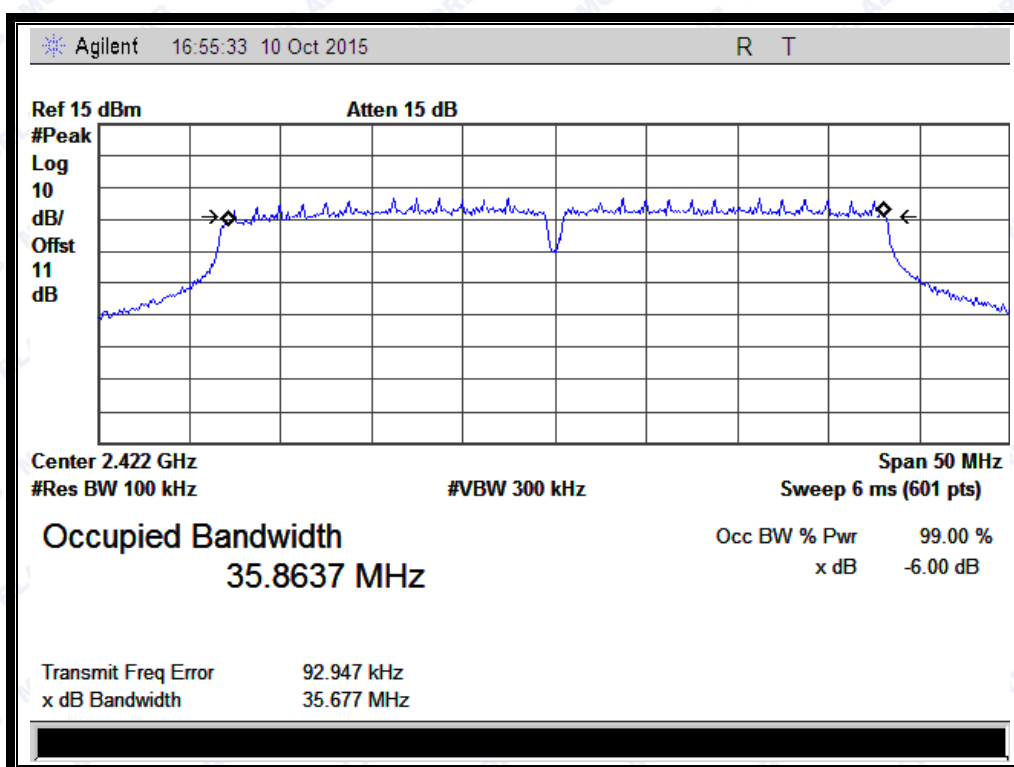


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ANT 2:

**A. Test Verdict:**

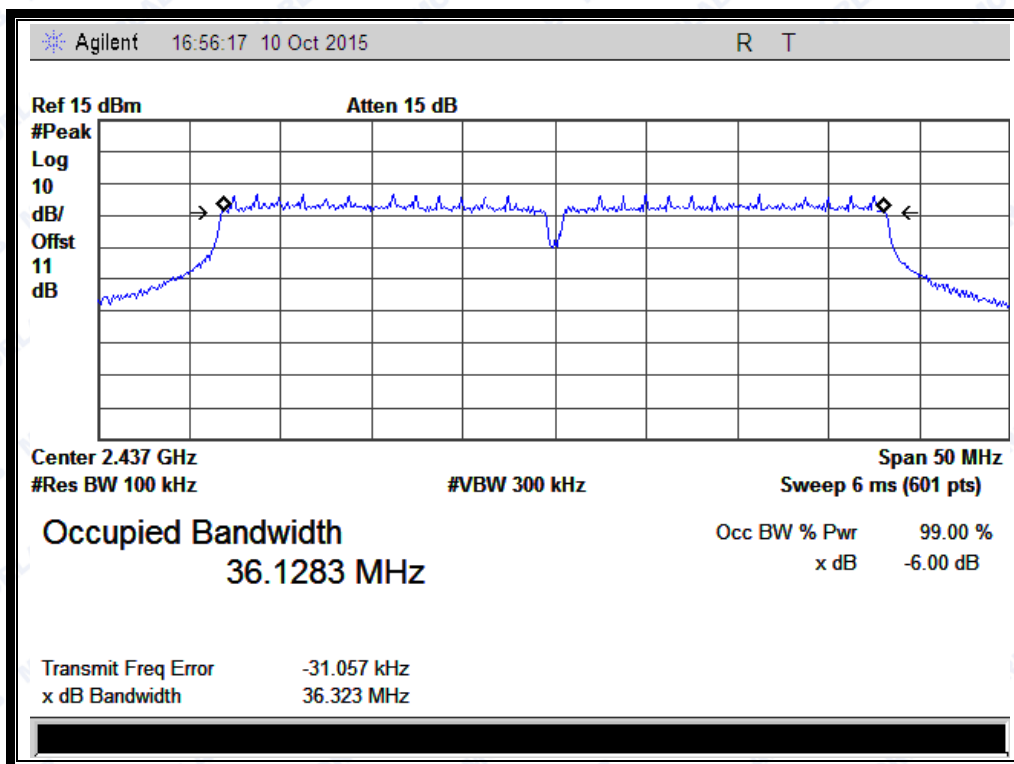
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limits(kHz)	Result
3	2422	35.677	≥500	PASS
6	2437	36.323	≥500	PASS
9	2452	36.119	≥500	PASS

**B. Test Plots**

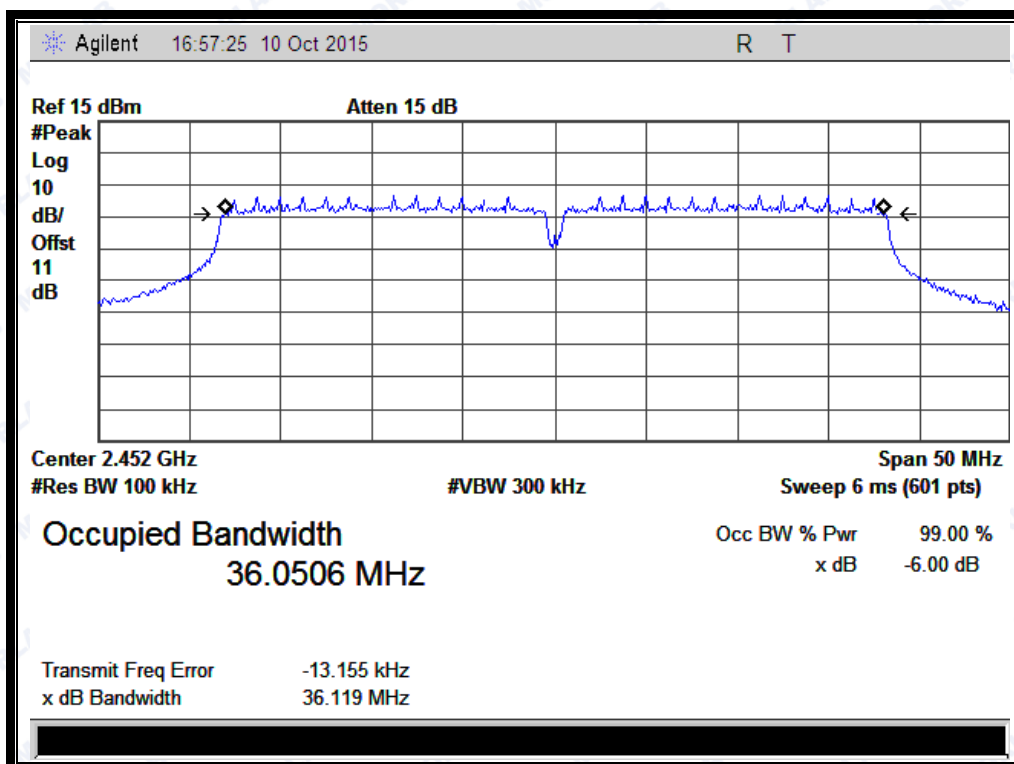
(Channel 1: 2412MHz @ 802.11 n-40)



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(Channel 6: 2437 MHz @ 802.11 n-40)



(Channel 11: 2462MHz @ 802.11 n-40)

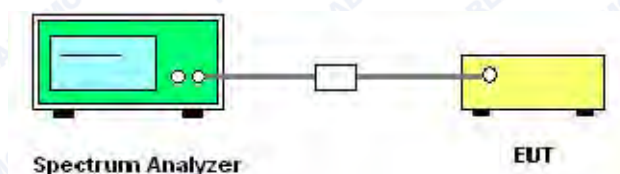
## 2.4 Conducted Spurious Emissions and Band Edge

### 2.4.1 Requirement

According to FCC section 15.247(c), in any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

### 2.4.2 Test Description

#### A. Test Set:



The EUT is coupled to the Spectrum Analyzer; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading.

Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. In order to make an accurate measurement, set the span greater than RBW.

KDB 558074 Section 11.0 was used in order to prove compliance.

#### C. Equipments List:

Please reference ANNEX A(1.4).

### 2.4.3 Test Result

The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the spurious emissions.





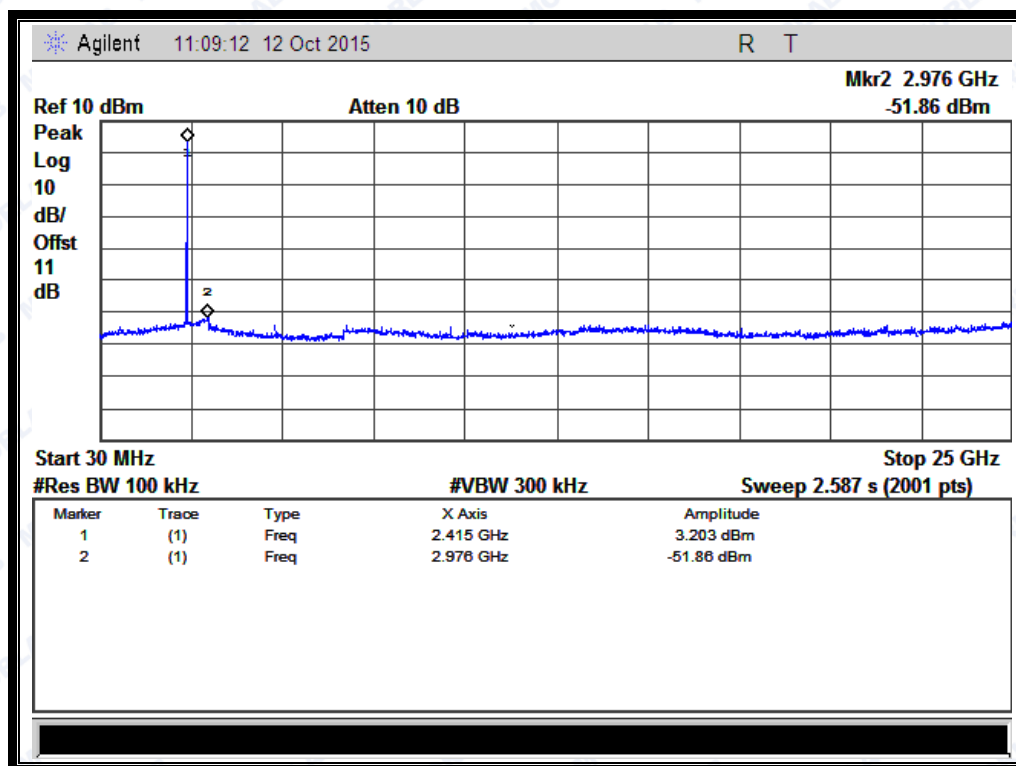
REPORT No.: SZ15100009W03

**2.4.3.1 802.11b Test mode**

ANT 1:

**A. Test Verdict:**

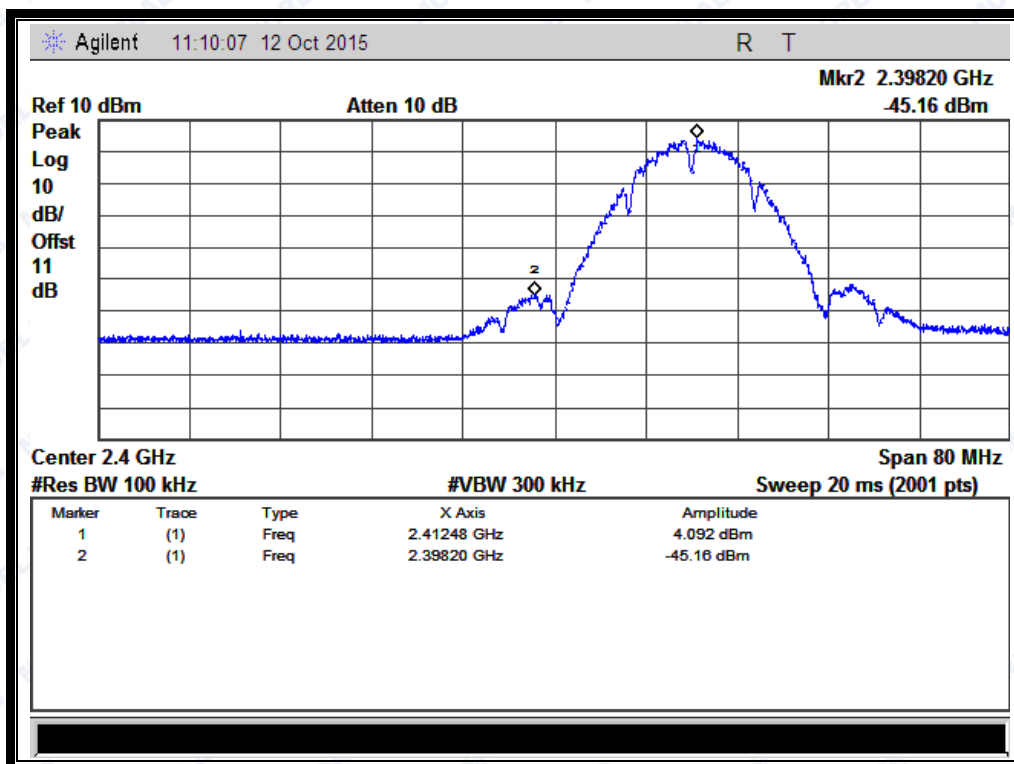
Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
			Carrier Level	Calculated -20dBc Limit	
1	2412	-51.86	3.203	-16.797	PASS
6	2437	-51.39	3.237	-16.763	PASS
11	2462	-50.91	1.455	-18.545	PASS

**B. Test Plots:****Note:** the power of the Module transmitting frequency should be ignored.

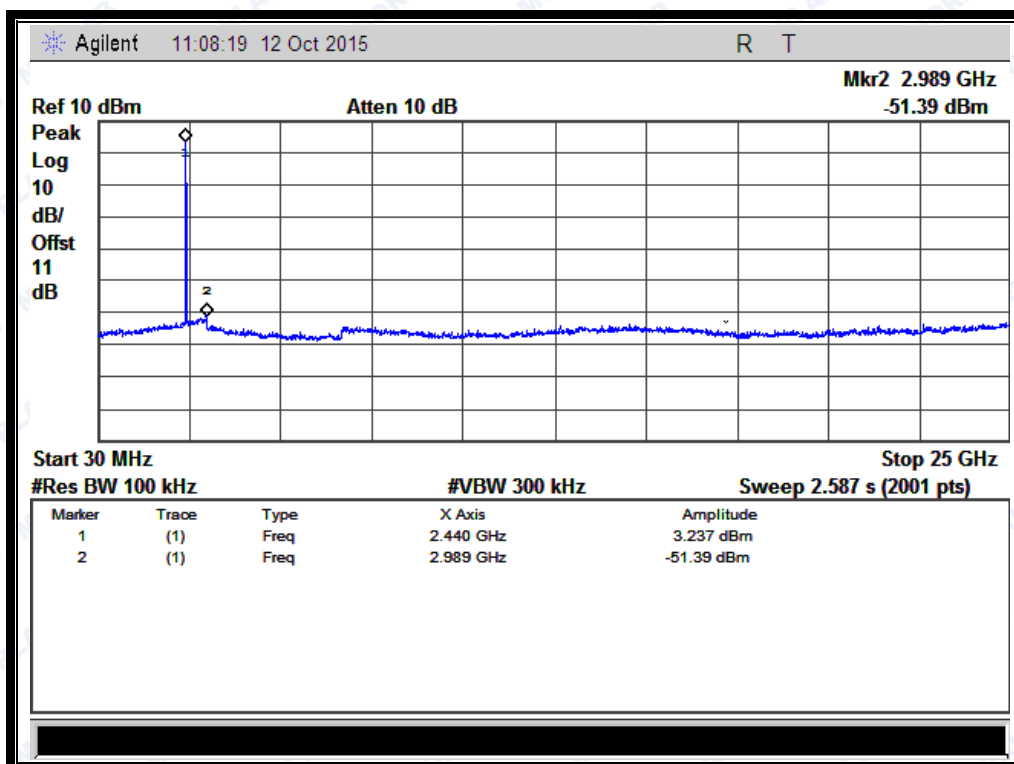
(Channel = 1, 30MHz to 25GHz)



REPORT No.: SZ15100009W03



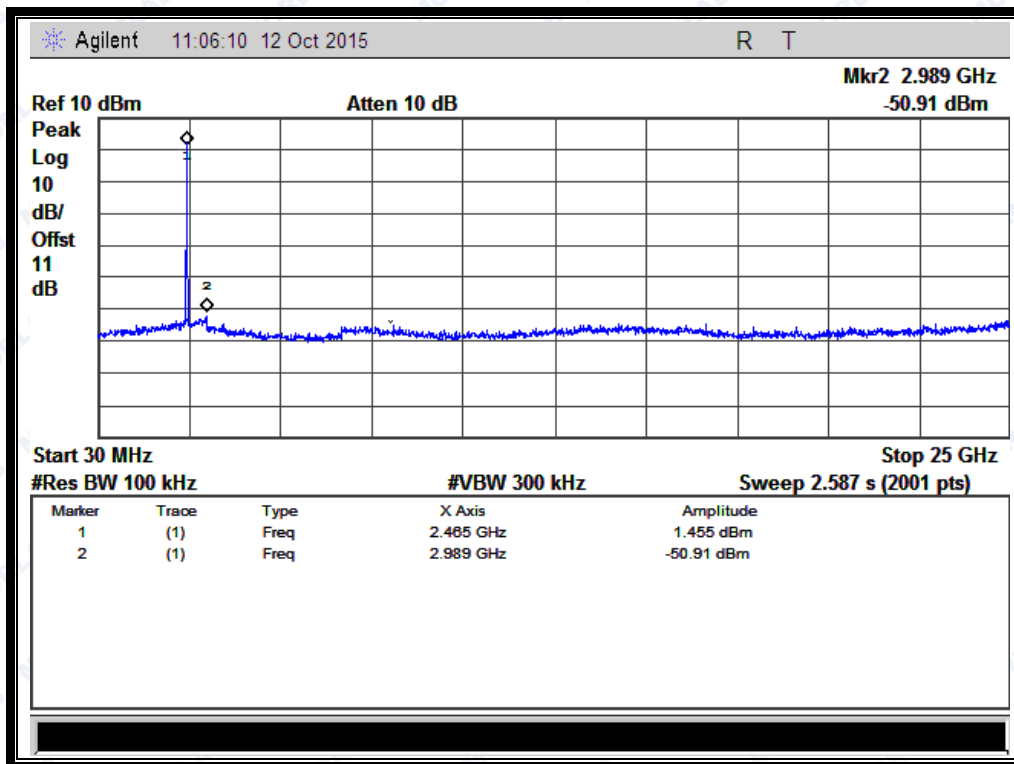
(Band Edge @ Channel = 1)



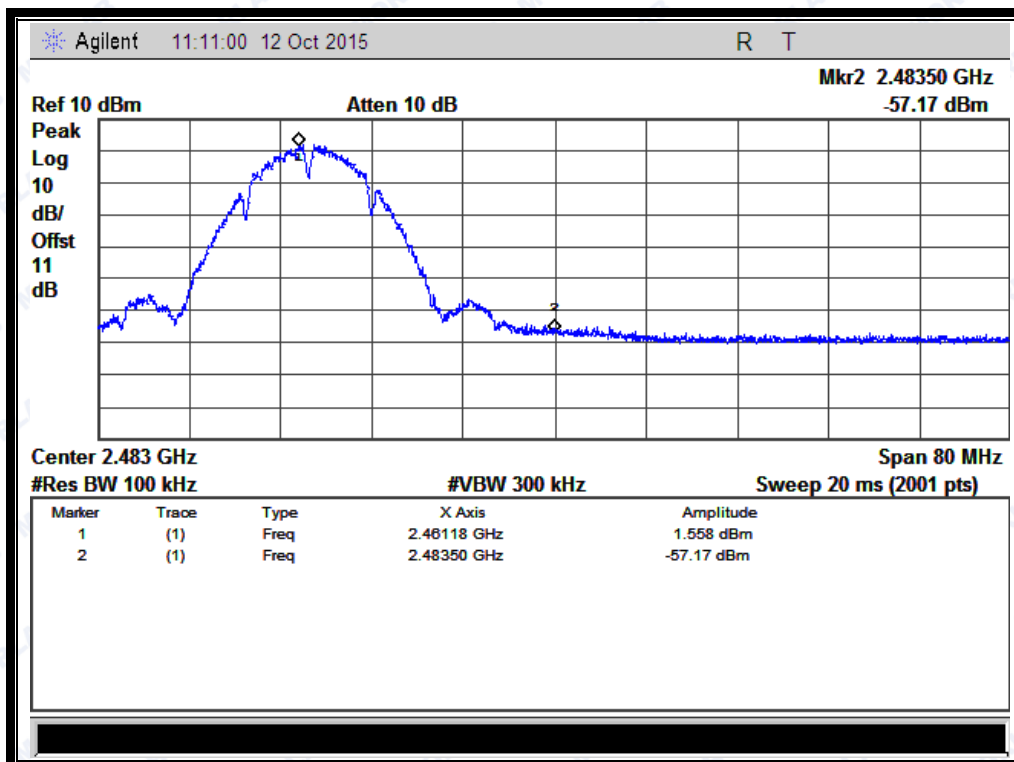
(Channel = 6, 30MHz to 25GHz)



REPORT No.: SZ15100009W03



(Channel = 11, 30MHz to 25GHz)



(Band Edge @ Channel = 11)





REPORT No.: SZ15100009W03

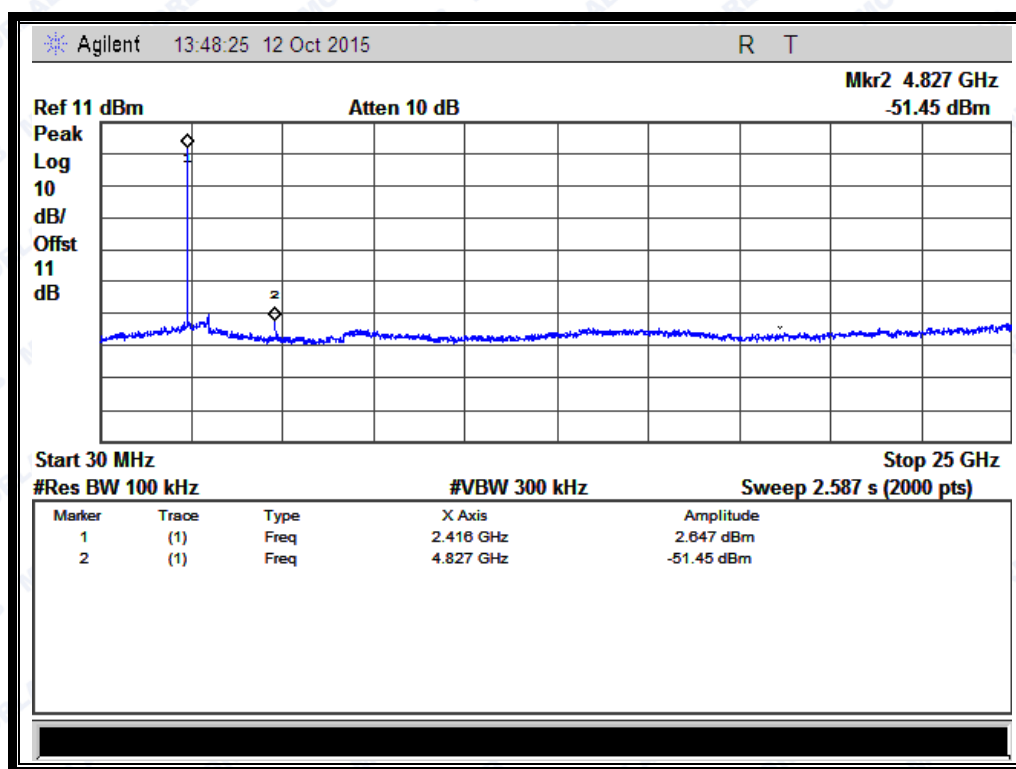
ANT 2:

**A. Test Verdict:**

Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
			Carrier Level	Calculated -20dBc Limit	
1	2412	-51.45	2.647	-17.353	PASS
6	2437	-51.74	2.539	-17.461	PASS
11	2462	-50.82	2.679	-17.321	PASS

**B. Test Plots:**

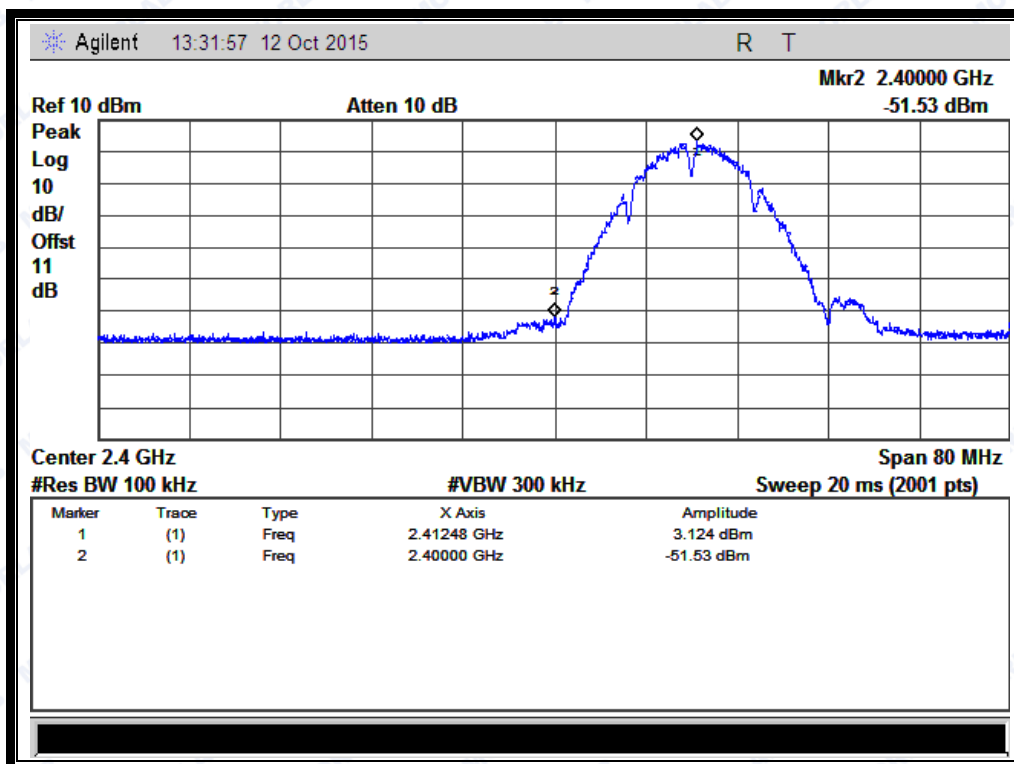
**Note:** the power of the Module transmitting frequency should be ignored.



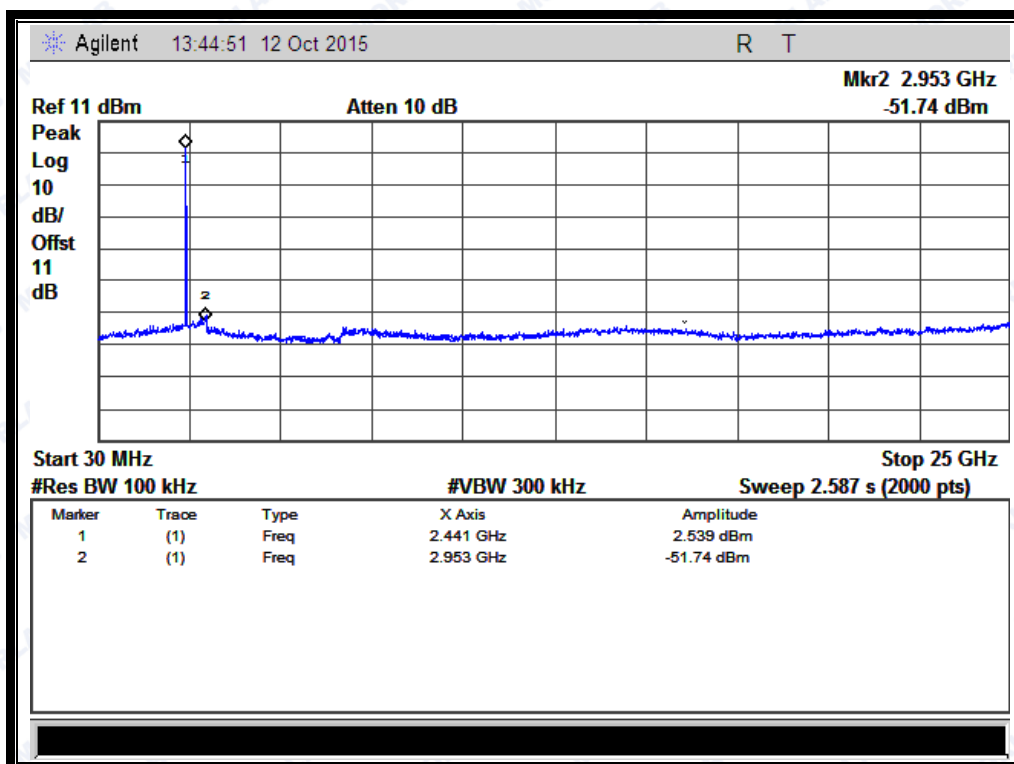
(Channel = 1, 30MHz to 25GHz)



REPORT No.: SZ15100009W03



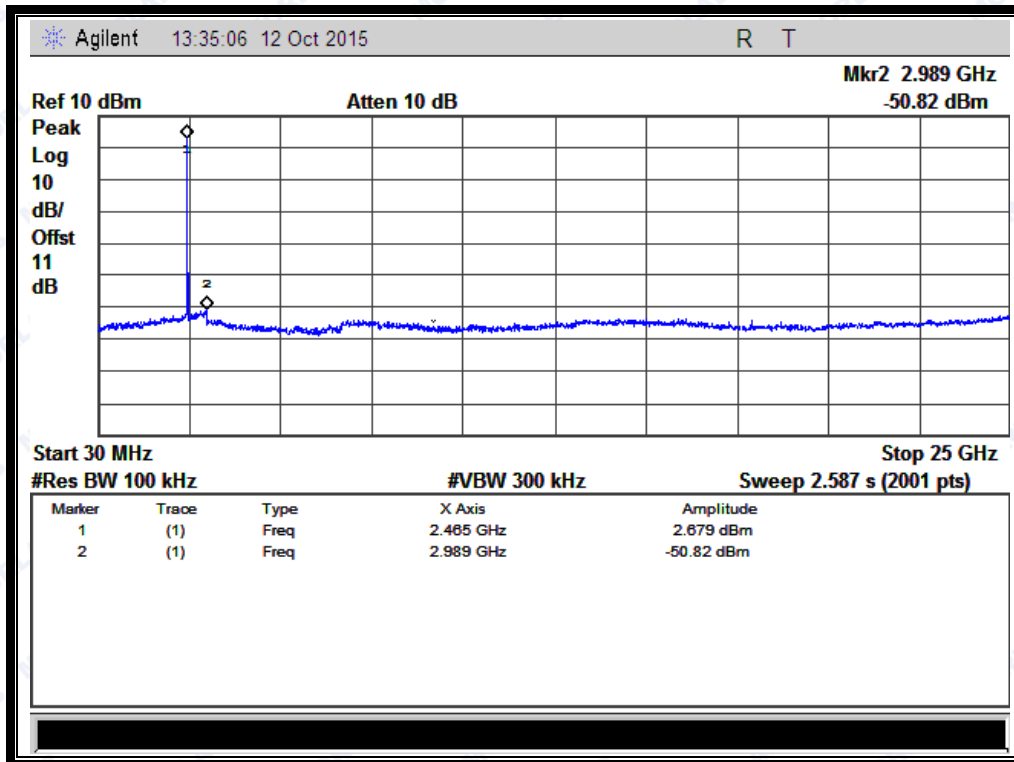
(Band Edge @ Channel = 1)



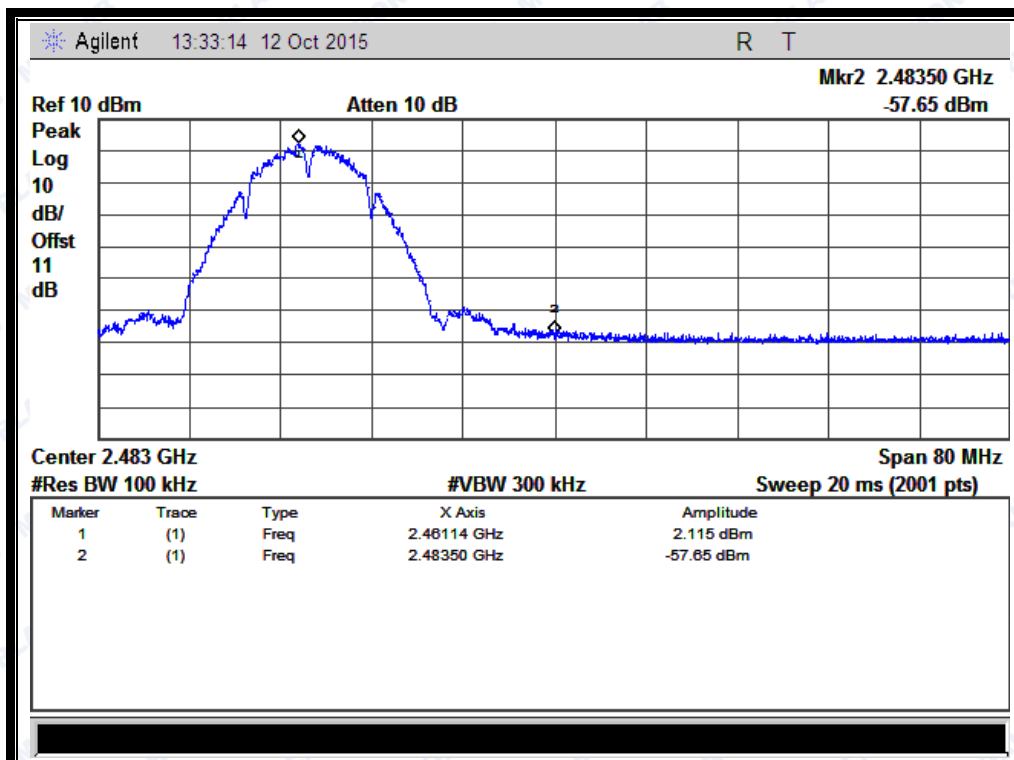
(Channel = 6, 30MHz to 25GHz)



REPORT No.: SZ15100009W03



(Channel = 11, 30MHz to 25GHz)



(Band Edge @ Channel = 11)



REPORT No.: SZ15100009W03

### 2.4.3.2 802.11g Test mode

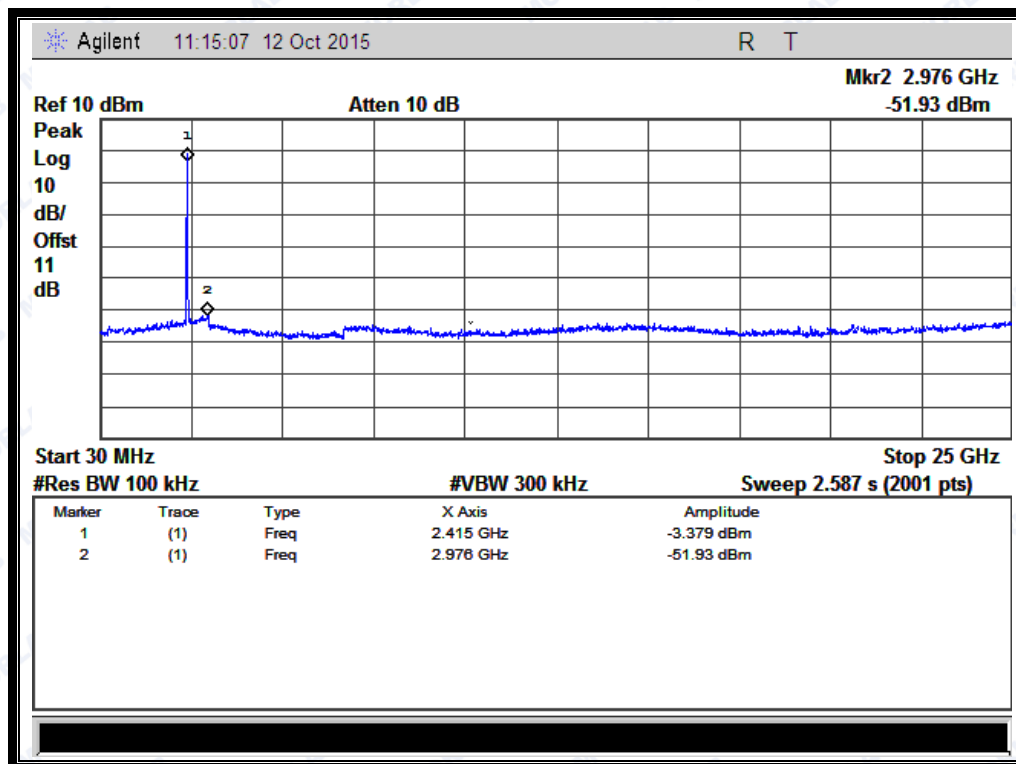
ANT 1:

#### A. Test Verdict:

Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
			Carrier Level	Calculated -20dBc Limit	
1	2412	-51.93	-3.379	-23.379	PASS
6	2437	-51.94	-0.777	-20.777	PASS
11	2462	-51.01	-0.886	-20.886	PASS

#### B. Test Plots:

**Note:** the power of the Module transmitting frequency should be ignored.

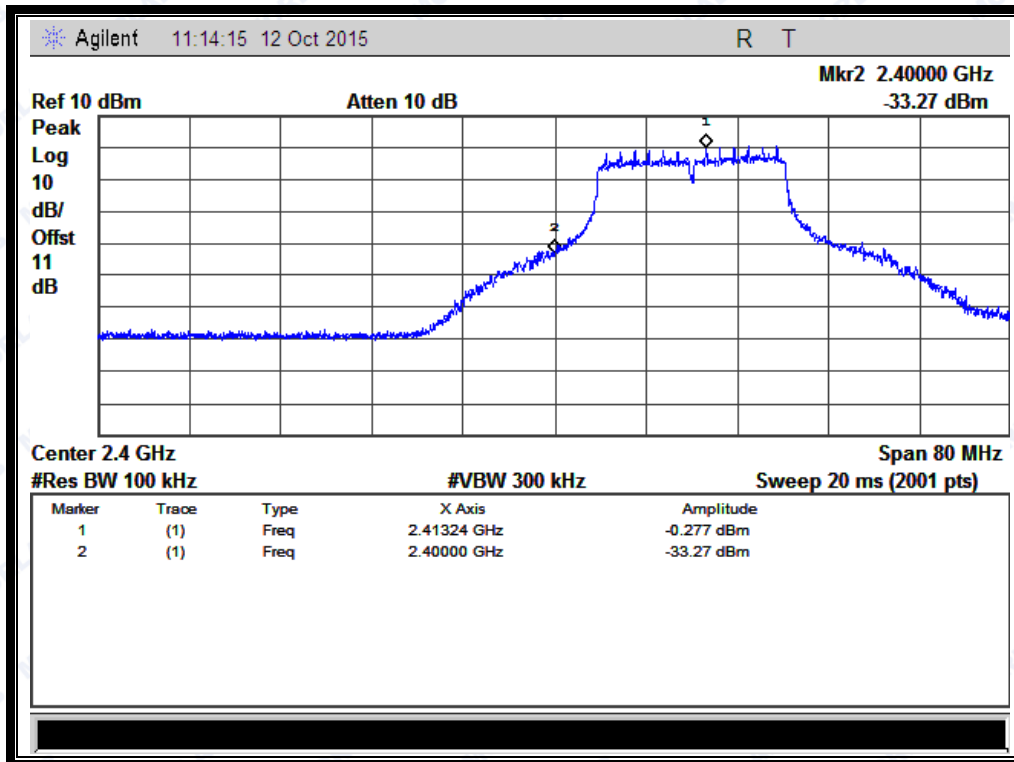


(Channel = 1, 30MHz to 25GHz)

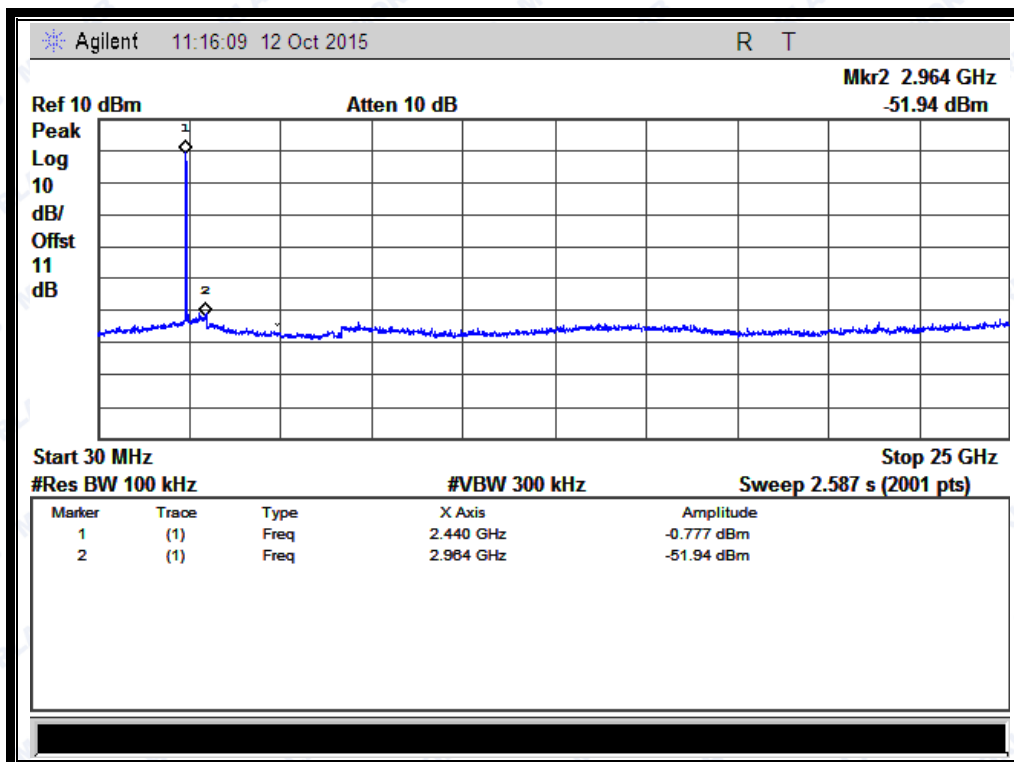




REPORT No.: SZ15100009W03



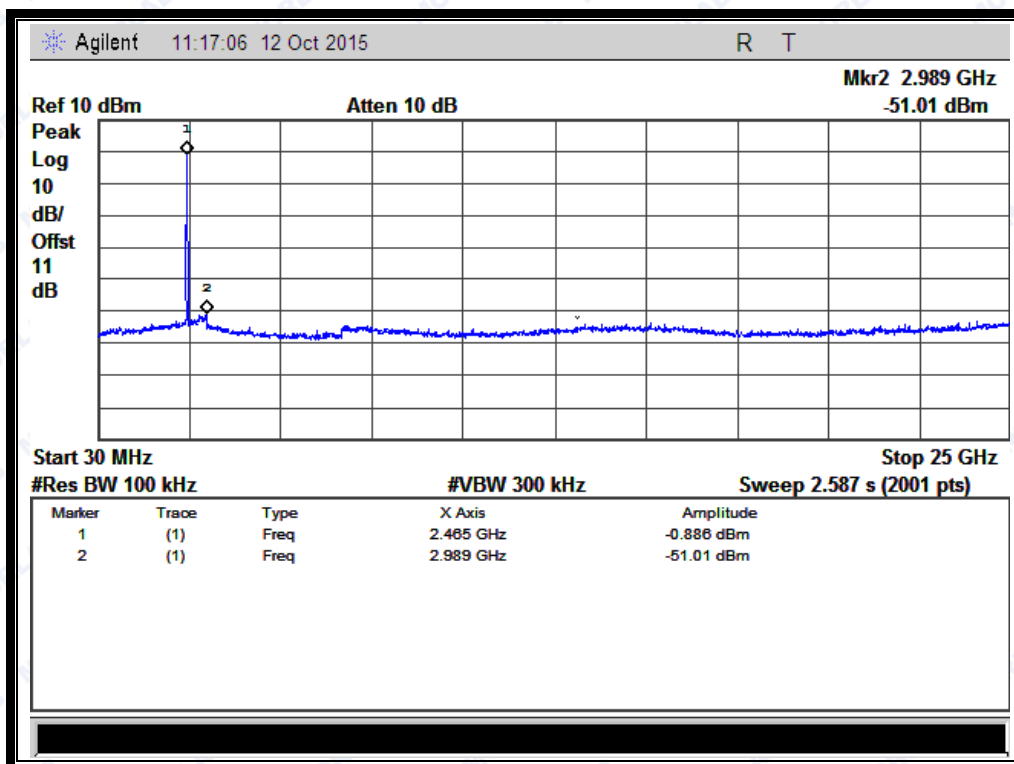
(Band Edge @ Channel = 1)



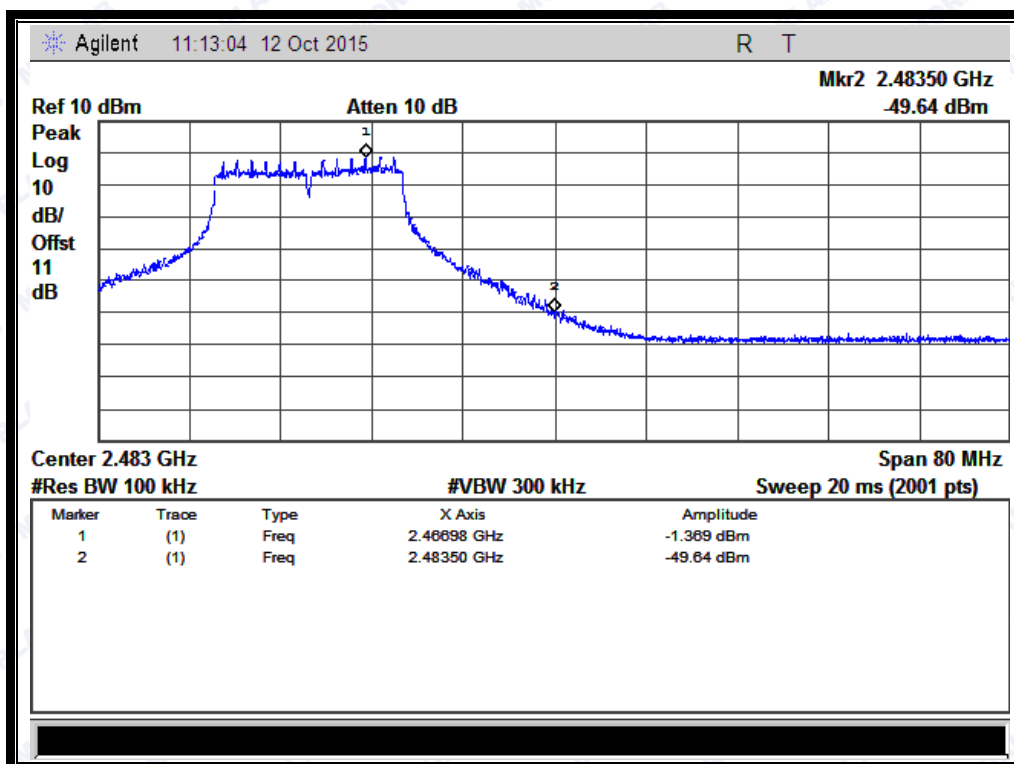
(Channel = 6, 30MHz to 25GHz)



REPORT No.: SZ15100009W03



(Channel = 11, 30MHz to 25GHz)



(Band Edge @ Channel = 11)



REPORT No.: SZ15100009W03

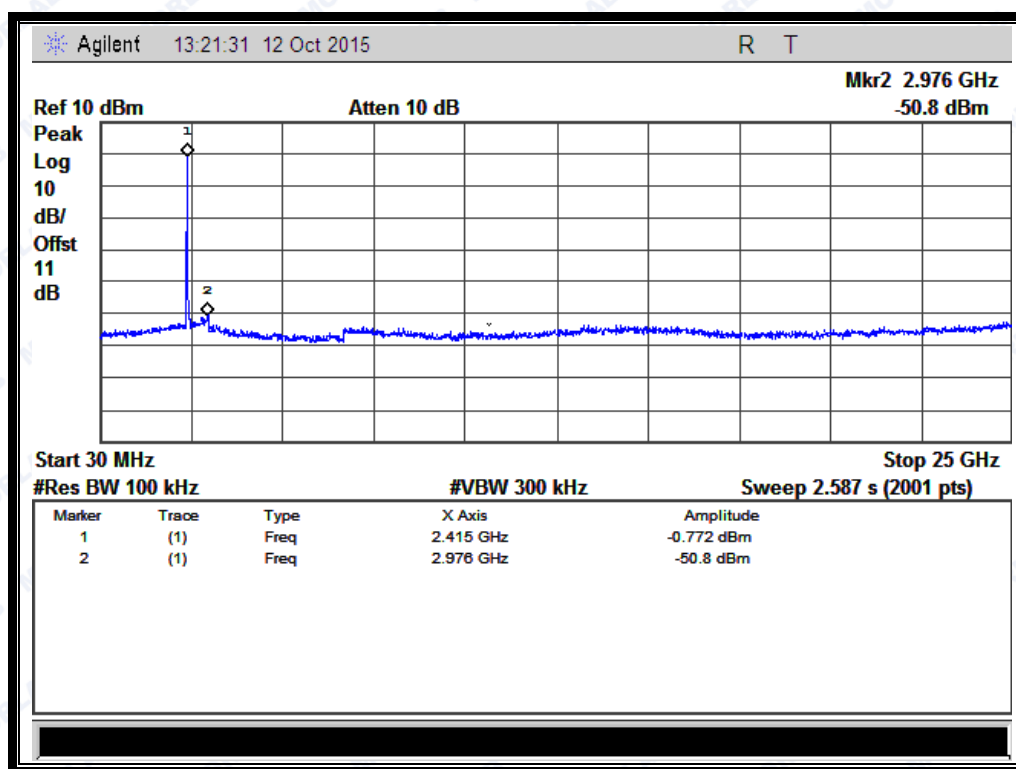
ANT 2:

**A. Test Verdict:**

Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
			Carrier Level	Calculated -20dBc Limit	
1	2412	-50.8	-0.772	-20.772	PASS
6	2437	-51.03	-1.929	-21.929	PASS
11	2462	-50.73	-2.573	-22.573	PASS

**B. Test Plots:**

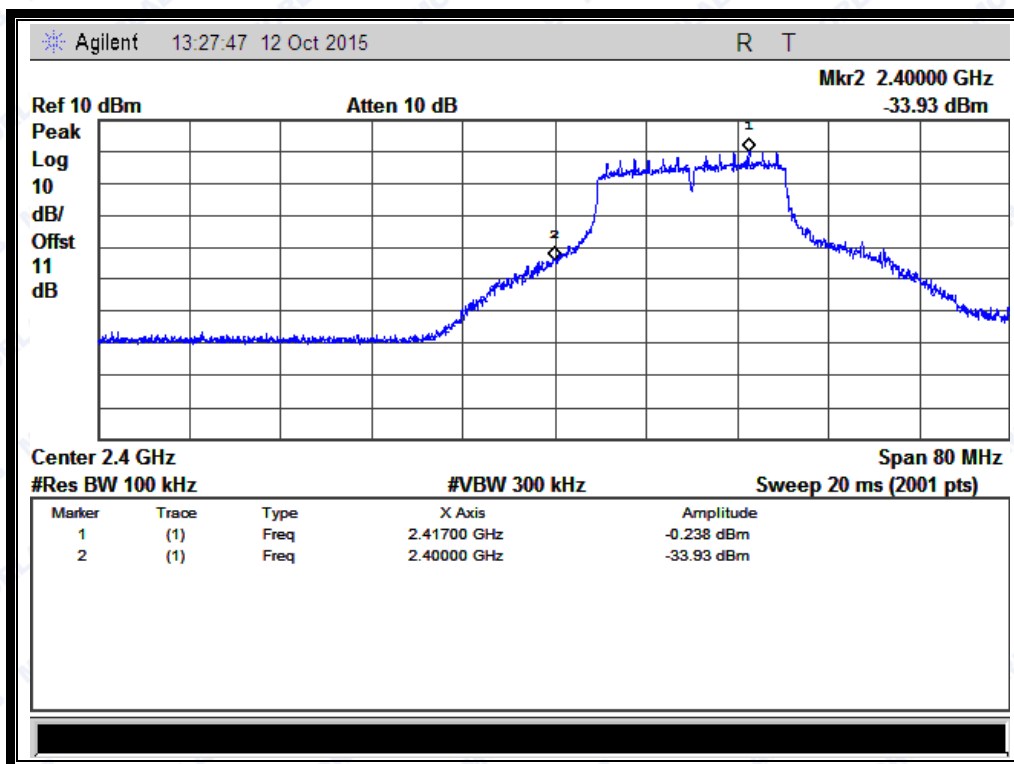
**Note:** the power of the Module transmitting frequency should be ignored.



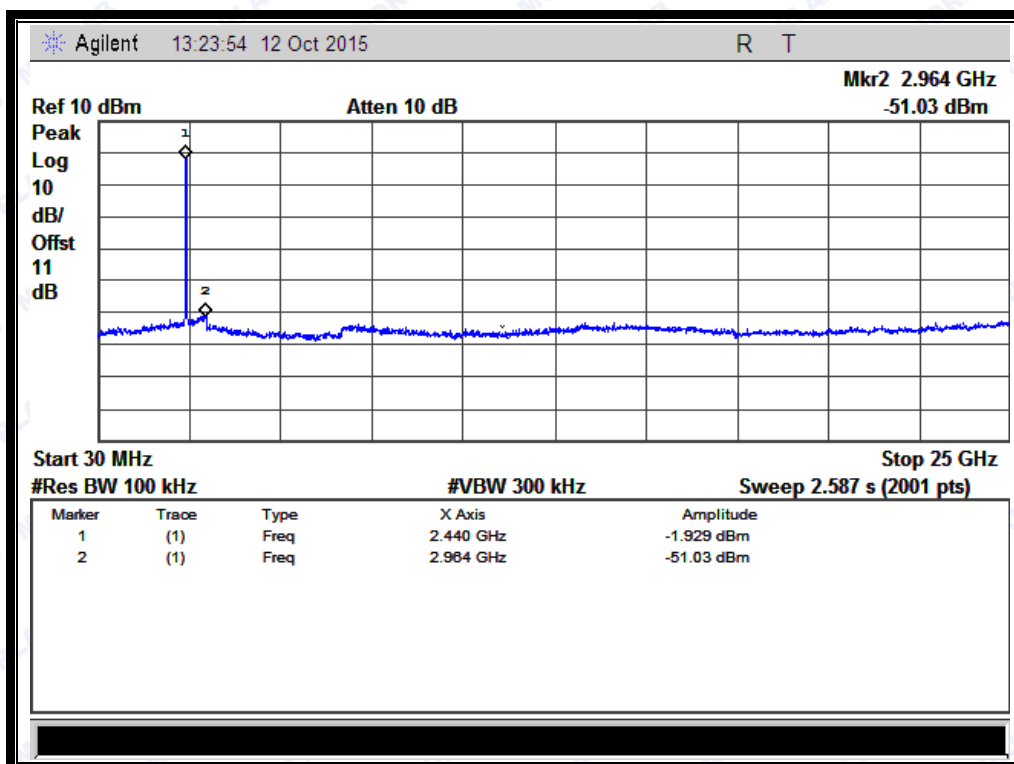
(Channel = 1, 30MHz to 25GHz)



REPORT No.: SZ15100009W03



(Band Edge @ Channel = 1)

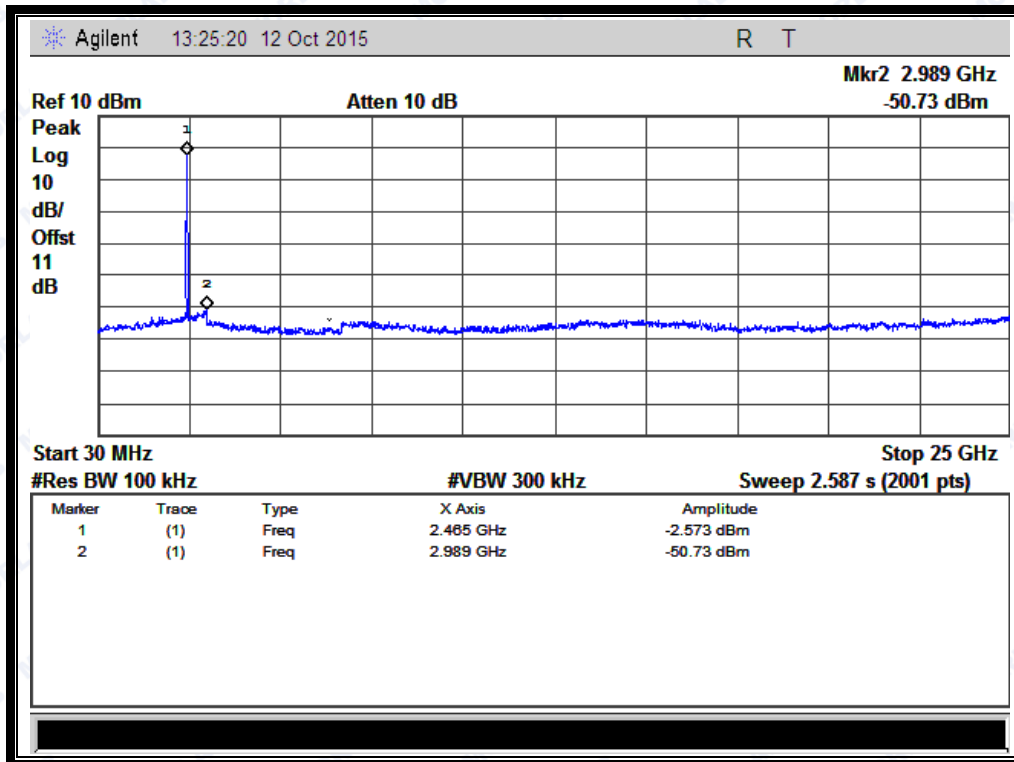


(Channel = 6, 30MHz to 25GHz)

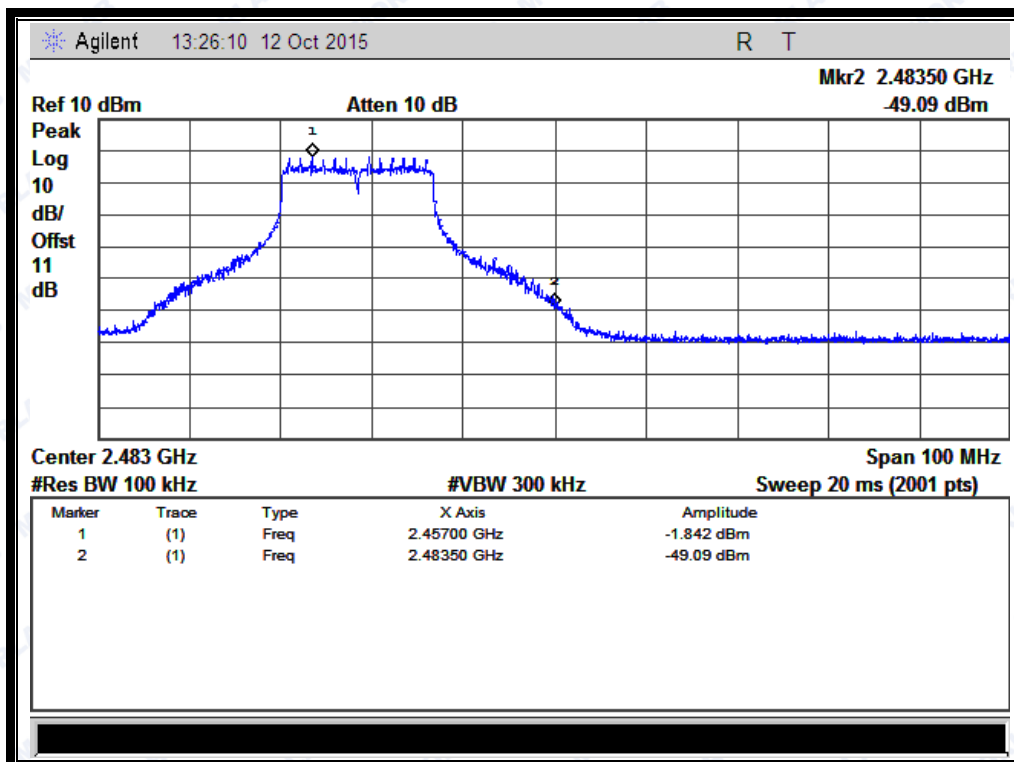




REPORT No.: SZ15100009W03



(Channel = 11, 30MHz to 25GHz)



(Band Edge @ Channel = 11)



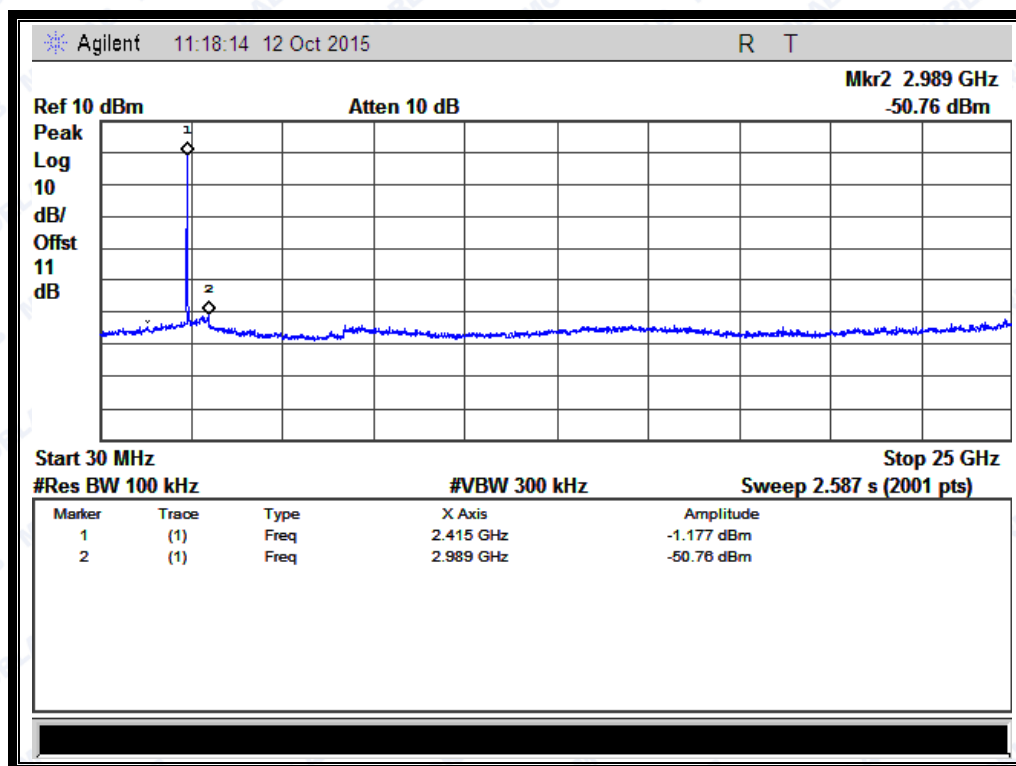
REPORT No.: SZ15100009W03

**2.4.3.3 802.11n -20MHz Test mode**

ANT 1:

**A. Test Verdict:**

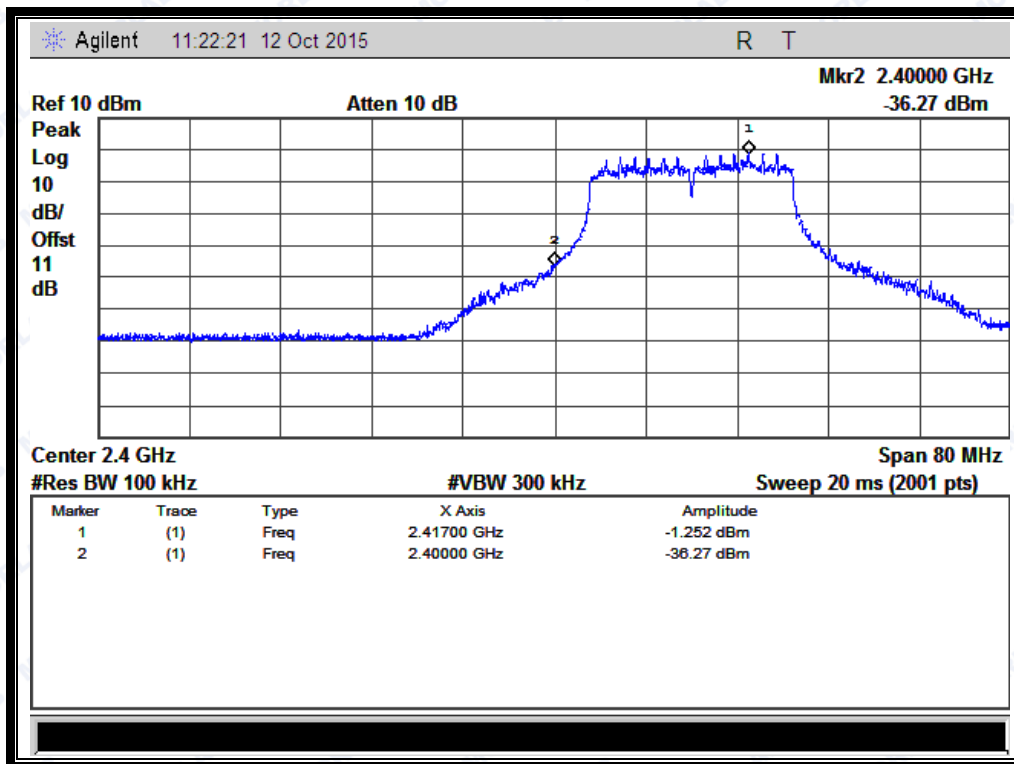
Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
			Carrier Level	Calculated -20dBc Limit	
1	2412	-50.76	-1.177	-21.177	PASS
6	2437	-51.41	-2.037	-22.037	PASS
11	2462	-51.39	-4.043	-24.043	PASS

**B. Test Plots:****Note:** the power of the Module transmitting frequency should be ignored.

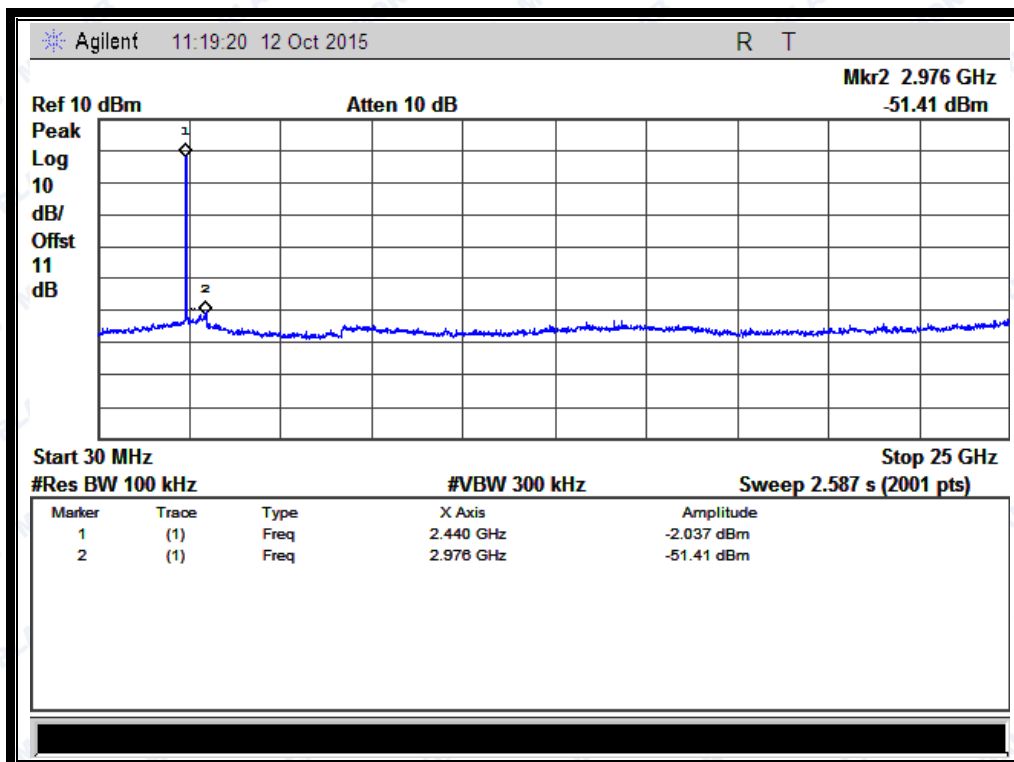
(Channel = 1, 30MHz to 25GHz)



REPORT No.: SZ15100009W03



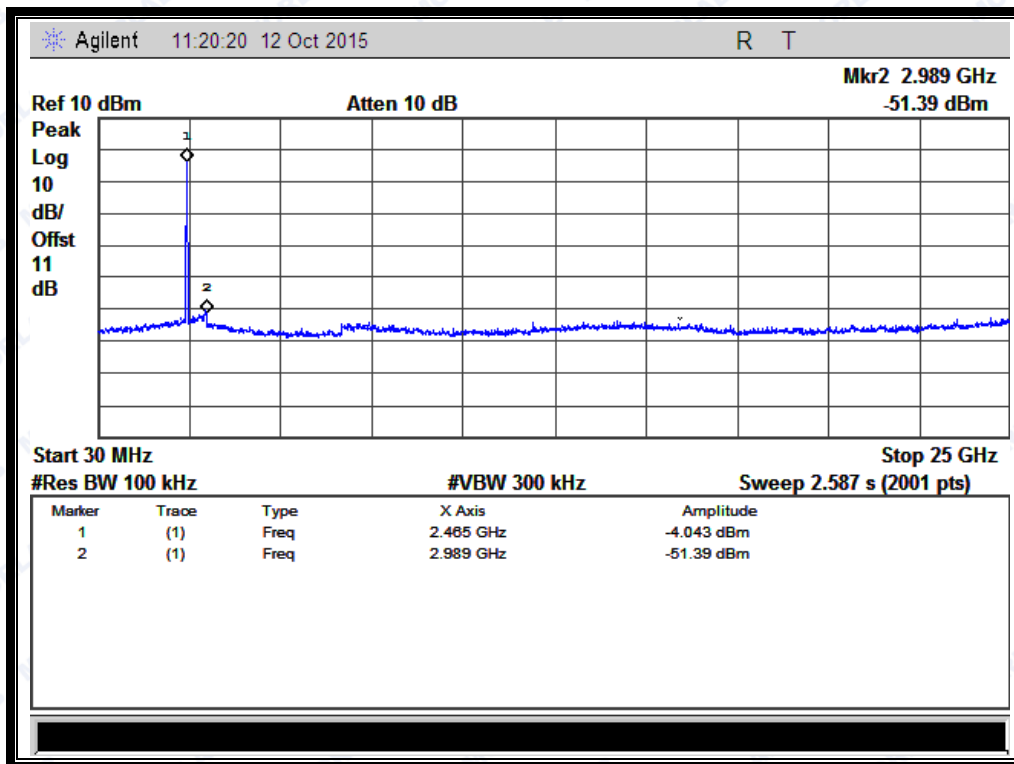
(Band Edge @ Channel = 1)



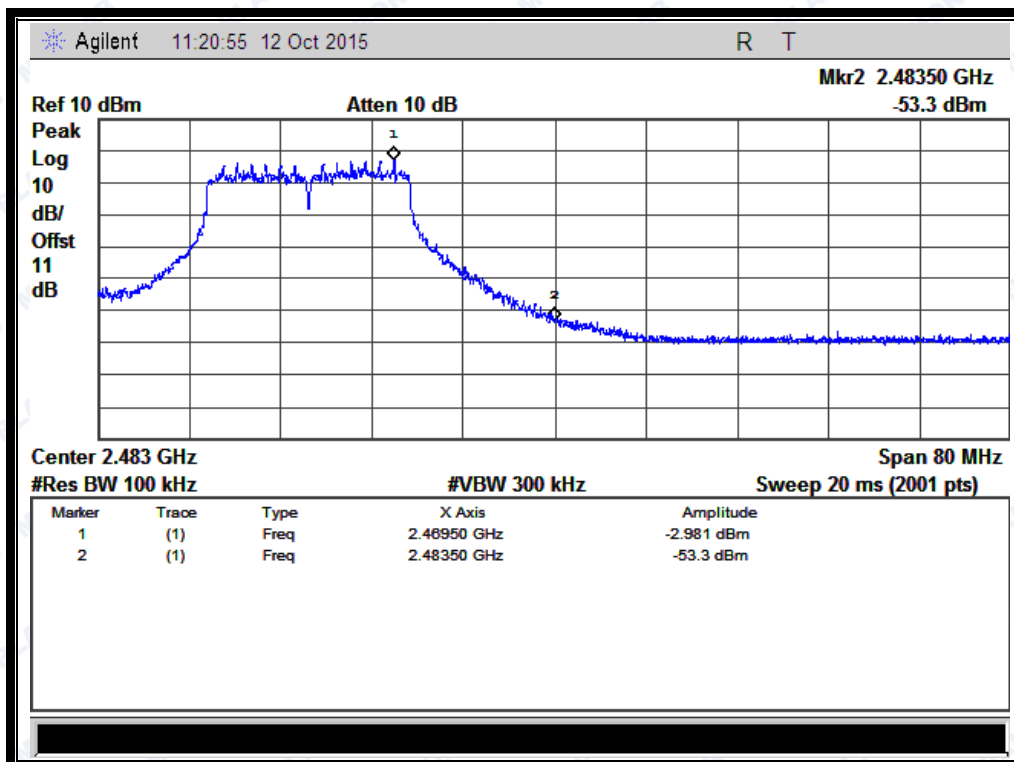
(Channel = 6, 30MHz to 25GHz)



REPORT No.: SZ15100009W03



(Channel = 11, 30MHz to 25GHz)



(Band Edge @ Channel = 11)



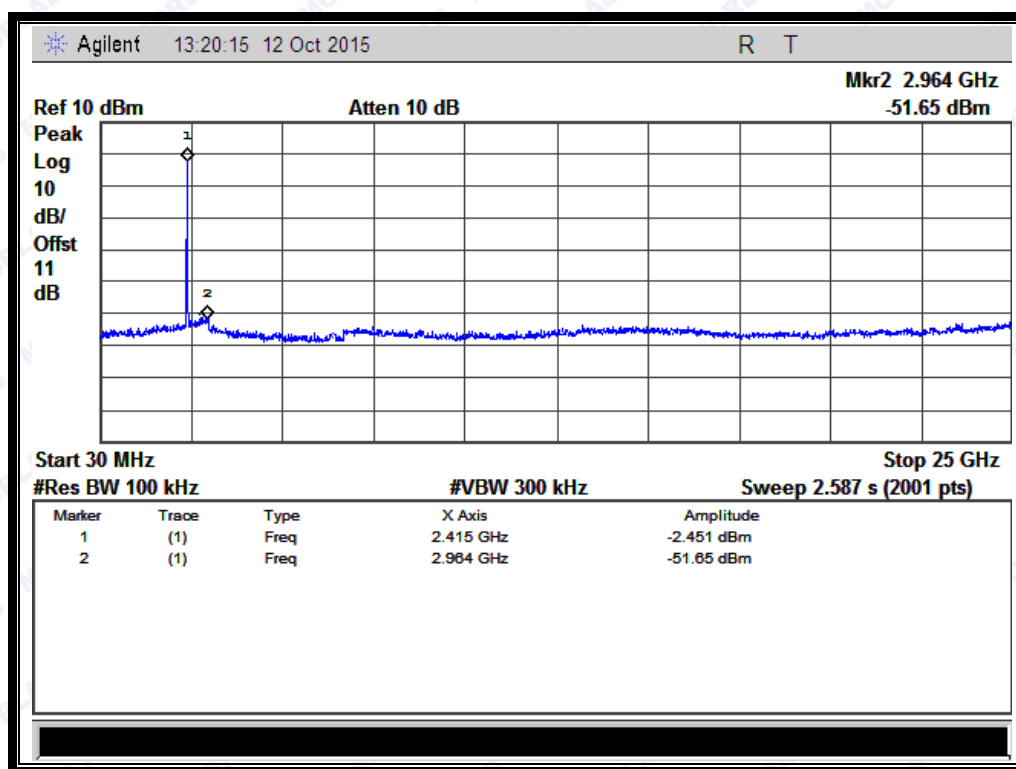


REPORT No.: SZ15100009W03

ANT 2:

**A. Test Verdict:**

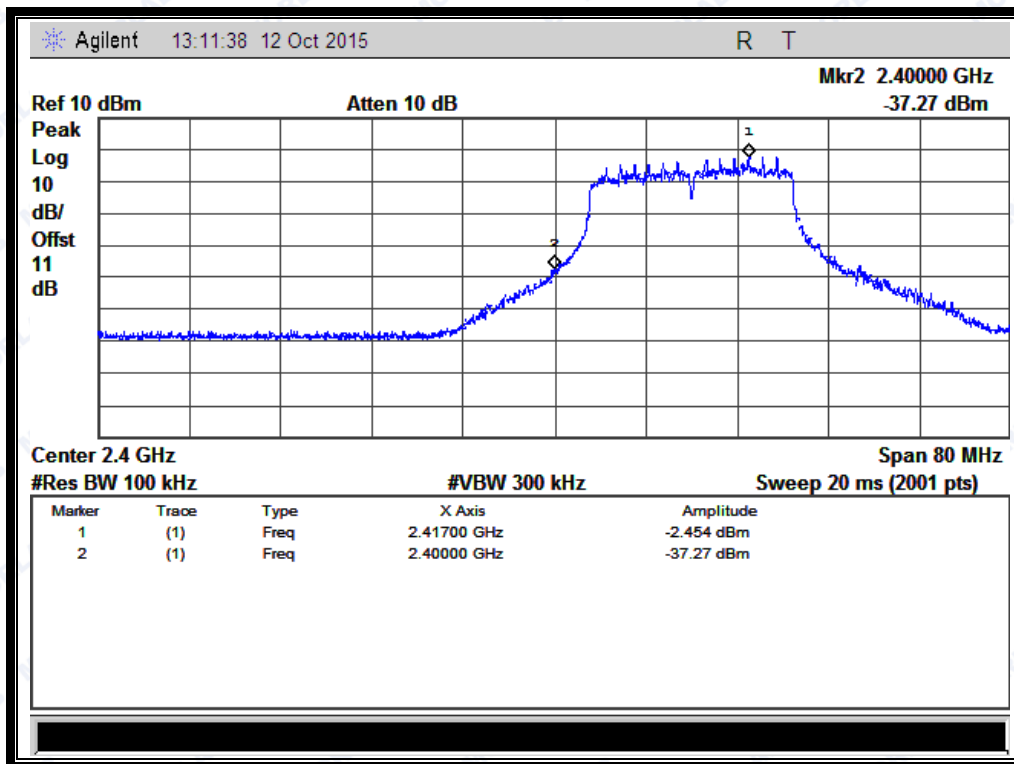
Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
			Carrier Level	Calculated -20dBc Limit	
1	2412	-51.65	-2.451	-22.451	PASS
6	2437	-50.72	-3.51	-23.51	PASS
11	2462	-50.33	-3.153	-23.153	PASS

**B. Test Plots:****Note:** the power of the Module transmitting frequency should be ignored.

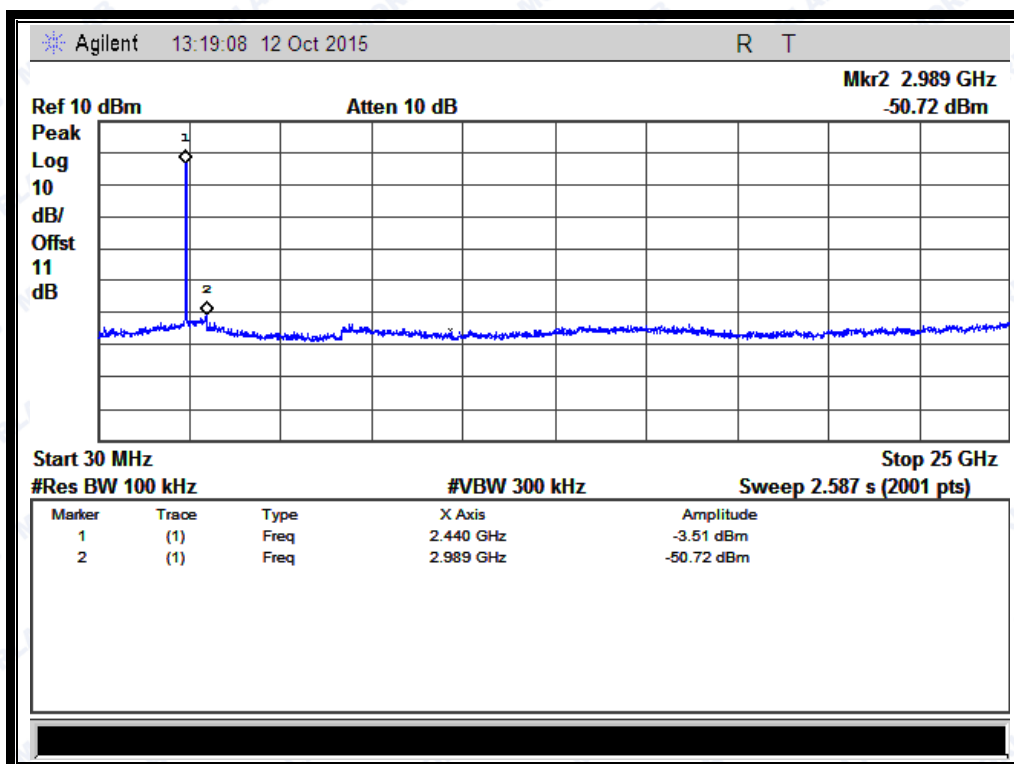
(Channel = 1, 30MHz to 25GHz)



REPORT No.: SZ15100009W03



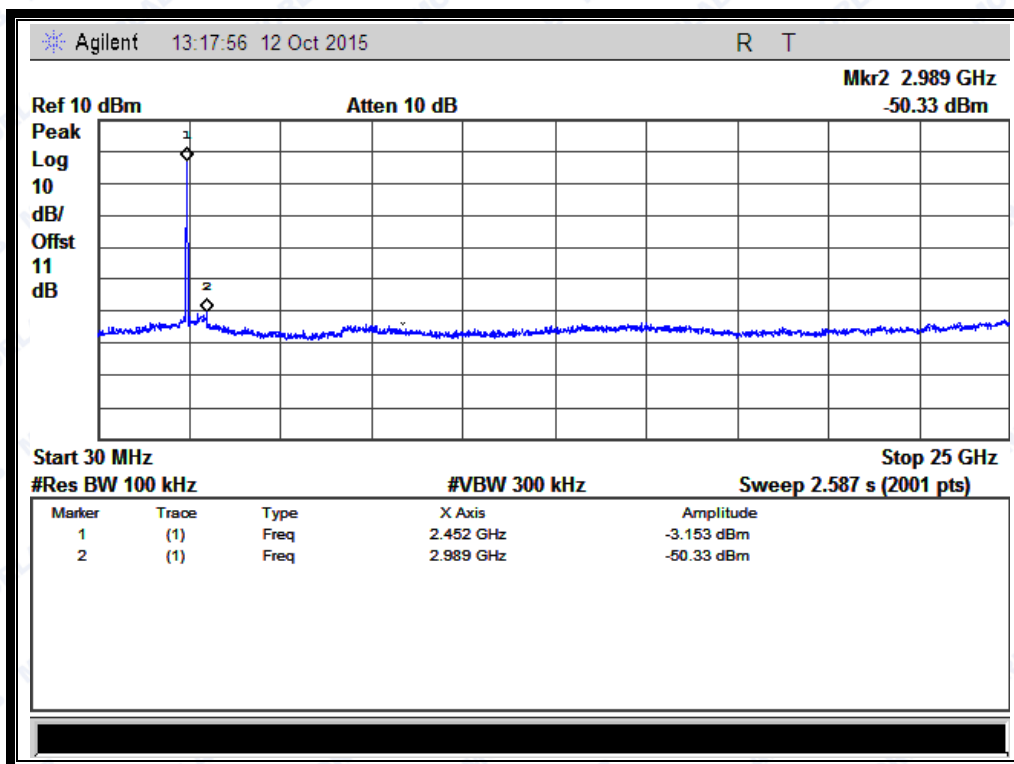
(Band Edge @ Channel = 1)



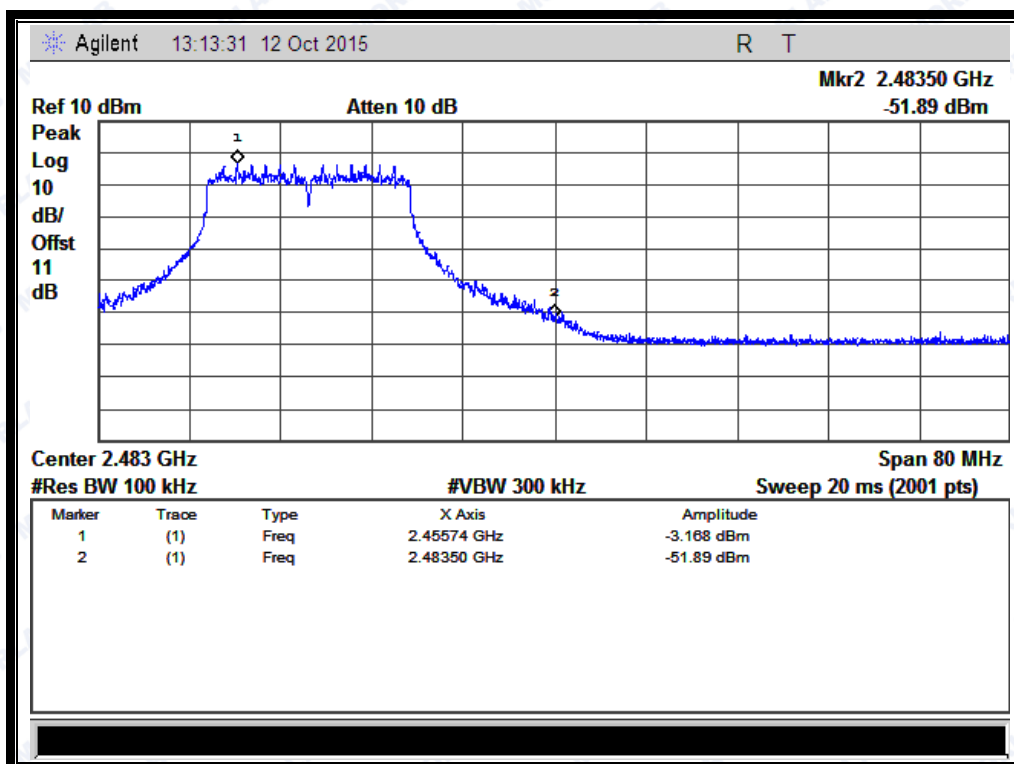
(Channel = 6, 30MHz to 25GHz)



REPORT No.: SZ15100009W03



(Channel = 11, 30MHz to 25GHz)



(Band Edge @ Channel = 11)



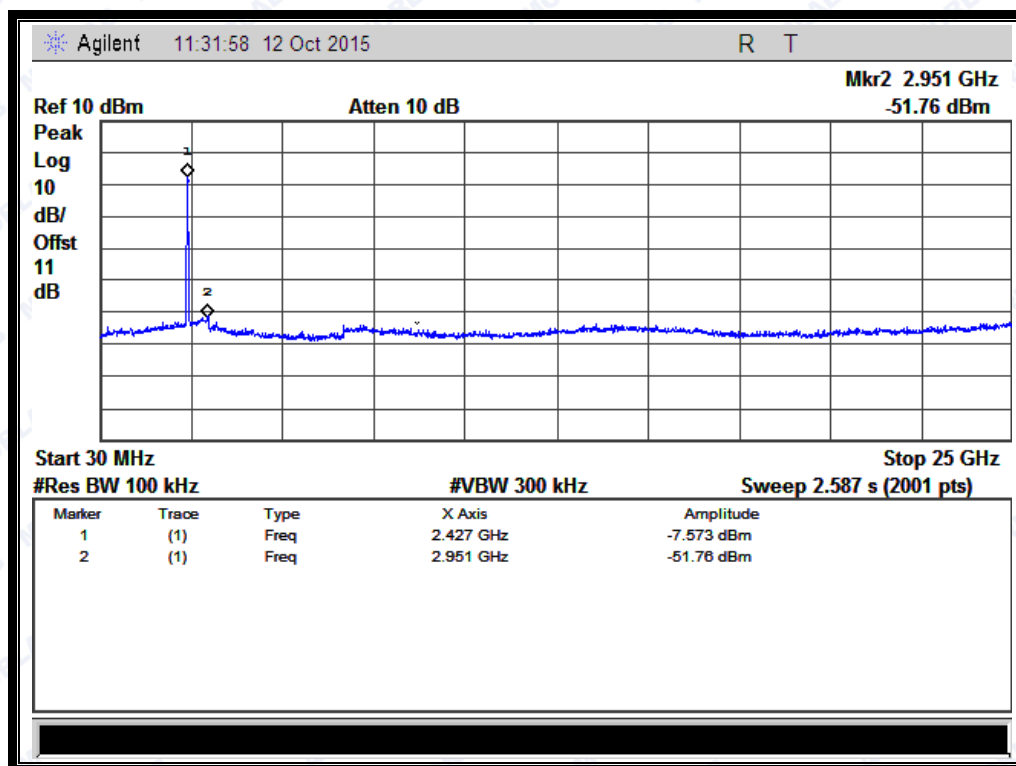
REPORT No.: SZ15100009W03

**2.4.3.4 802.11n -40MHz Test mode**

ANT 1:

**A. Test Verdict:**

Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
			Carrier Level	Calculated -20dBc Limit	
3	2422	-51.76	-7.573	-27.573	PASS
6	2437	-49.57	-8.313	-29.313	PASS
9	2452	-50.78	-10.36	-30.36	PASS

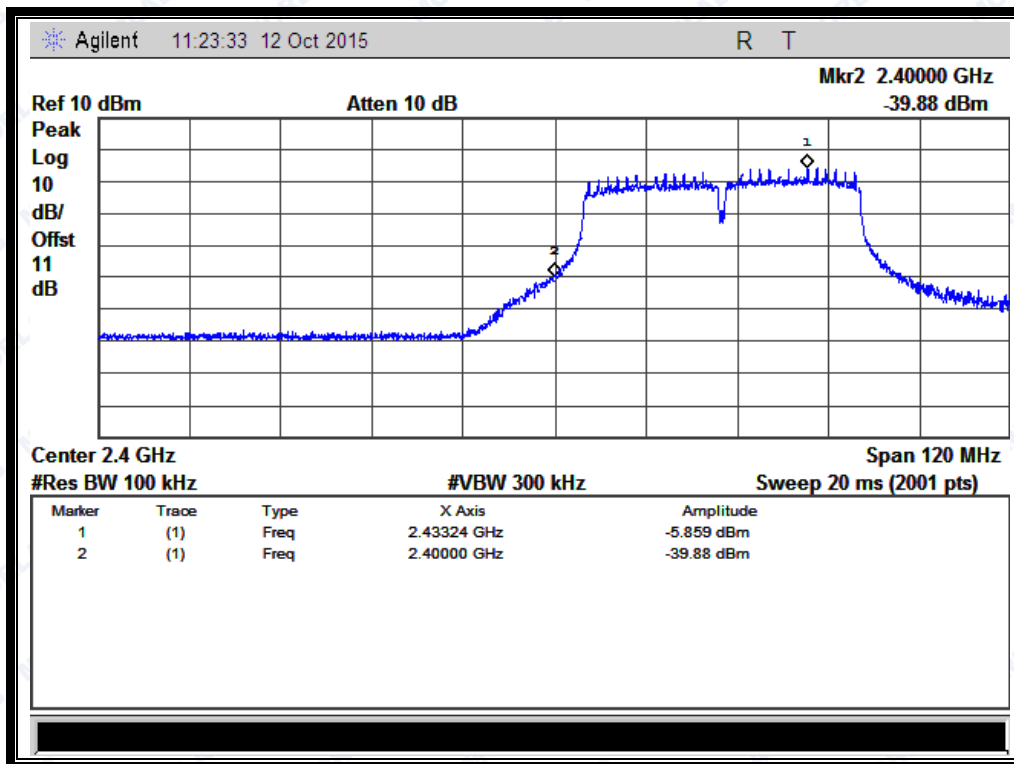
**B. Test Plots:****Note:** the power of the Module transmitting frequency should be ignored.

(Channel = 3, 30MHz to 25GHz)

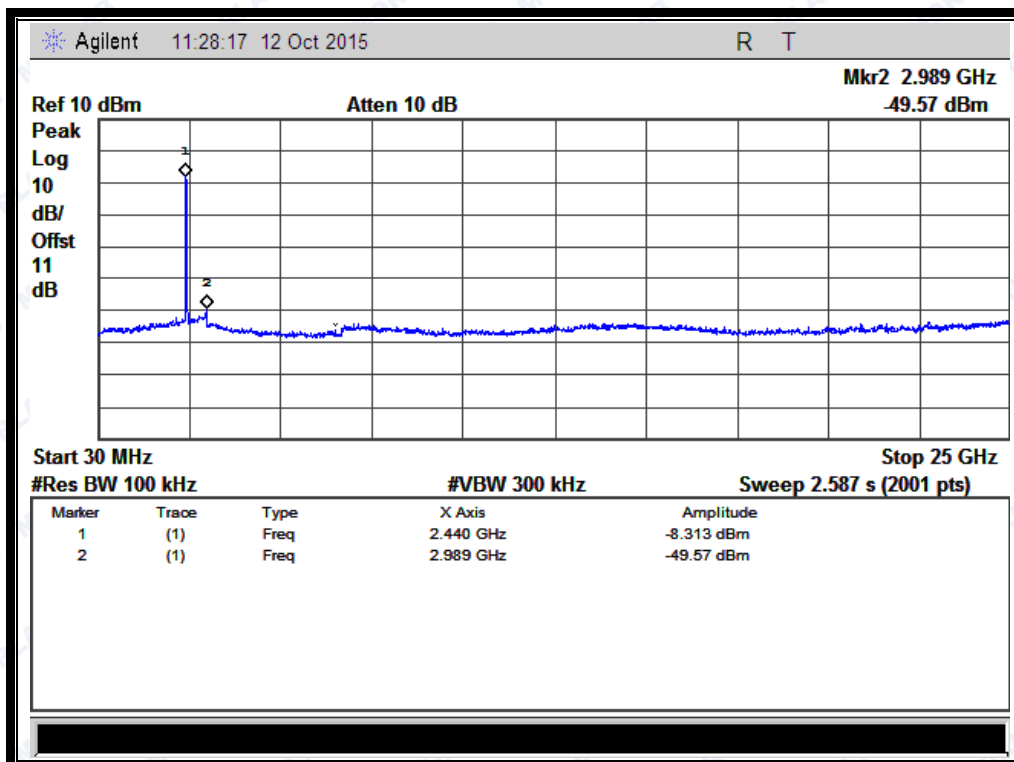




REPORT No.: SZ15100009W03



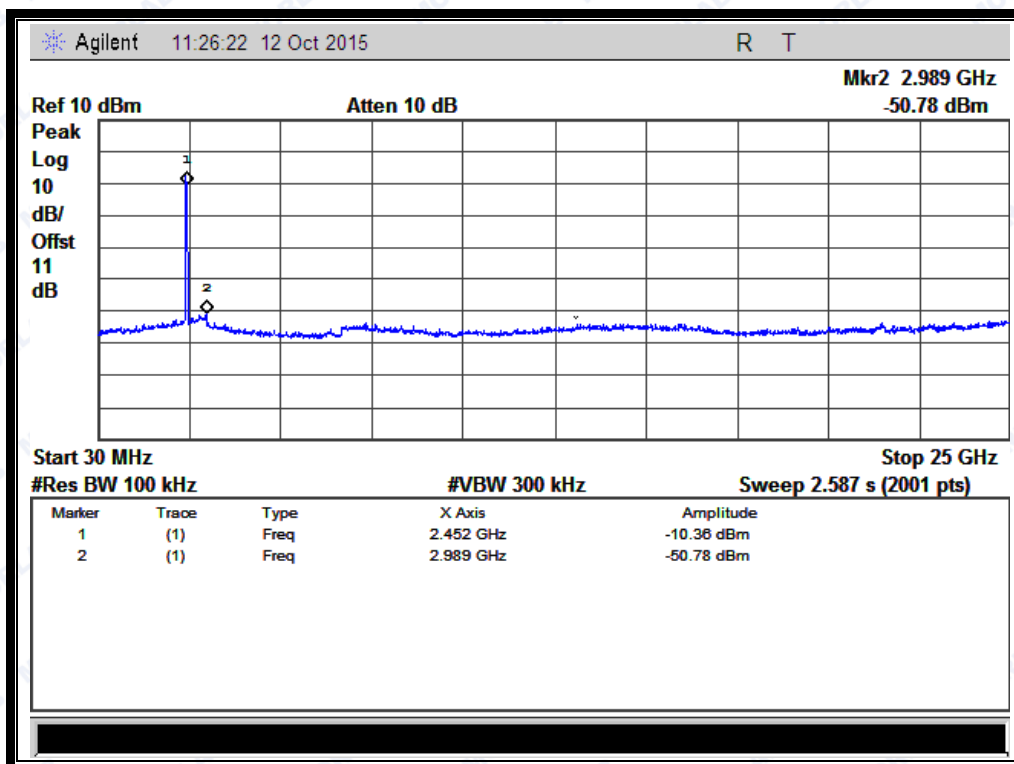
(Band Edge @ Channel = 3)



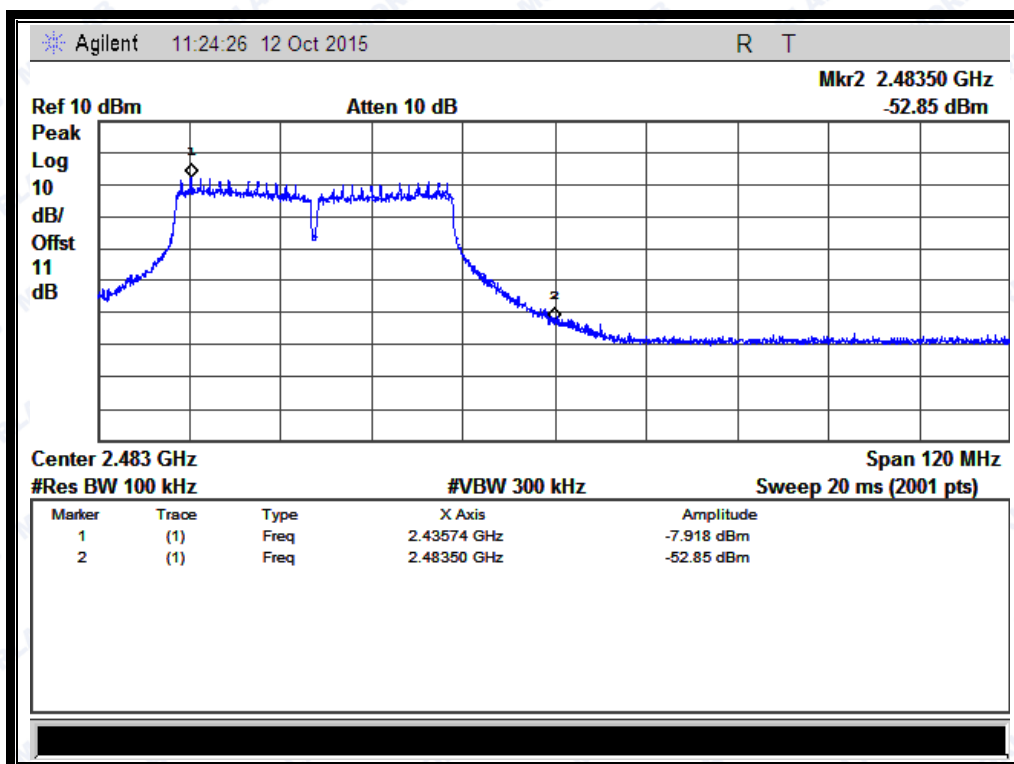
(Channel = 6, 30MHz to 25GHz)



REPORT No.: SZ15100009W03



(Channel = 9, 30MHz to 25GHz)



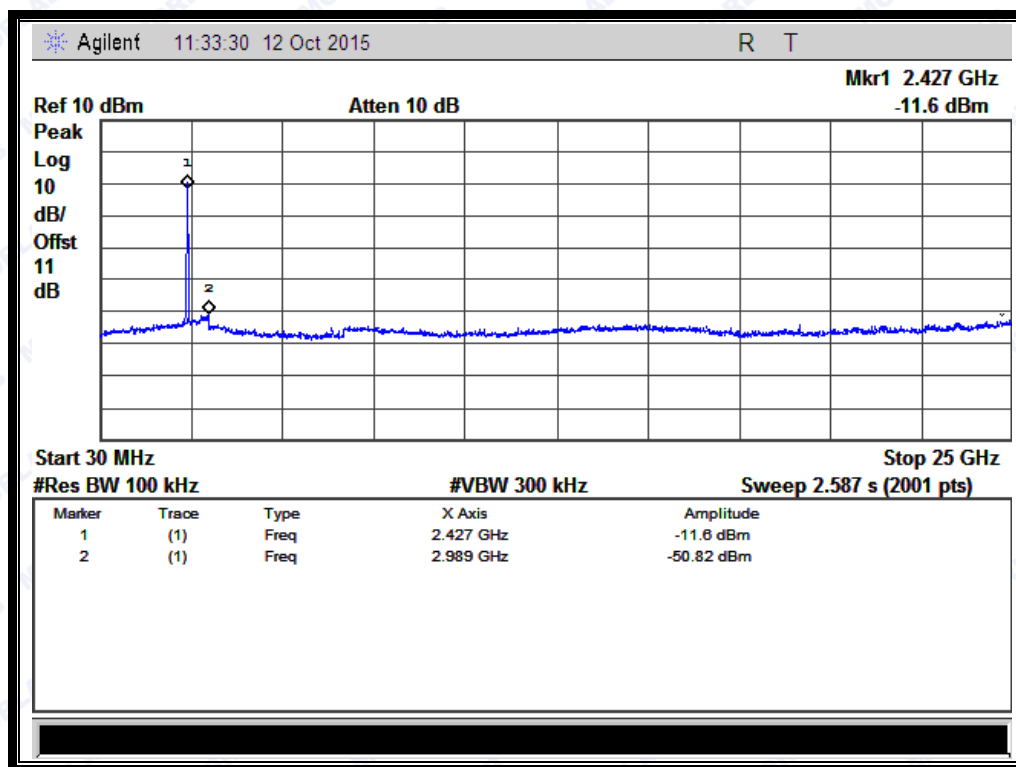
(Band Edge @ Channel = 9)



ANT 2:

**A. Test Verdict:**

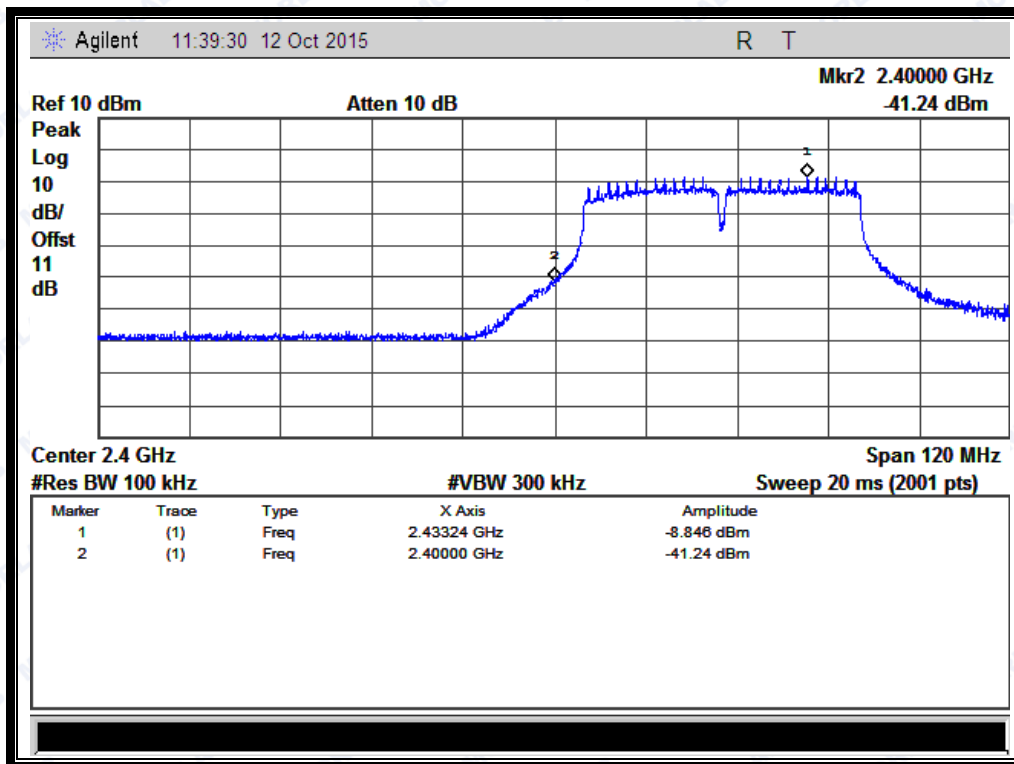
Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
			Carrier Level	Calculated -20dBc Limit	
3	2422	-50.82	-11.6	-31.6	PASS
6	2437	-50.57	-8.762	-29.762	PASS
9	2452	-50.81	-9.487	-29.487	PASS

**B. Test Plots:****Note:** the power of the Module transmitting frequency should be ignored.

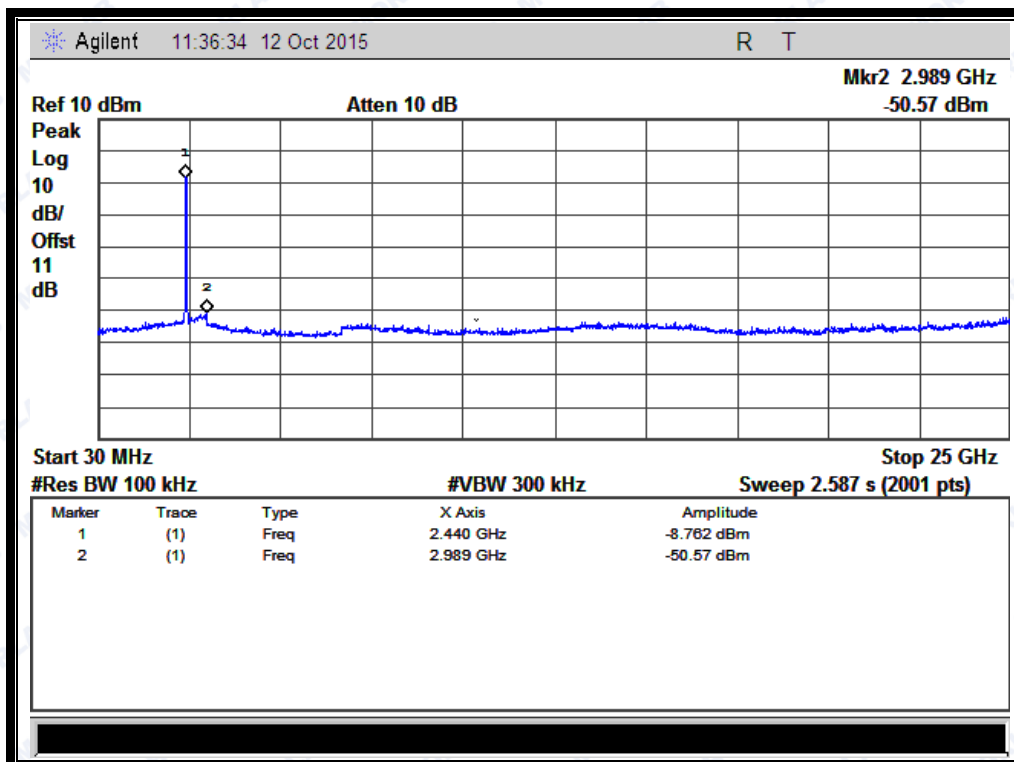
(Channel = 3, 30MHz to 25GHz)



REPORT No.: SZ15100009W03



(Band Edge @ Channel = 3)

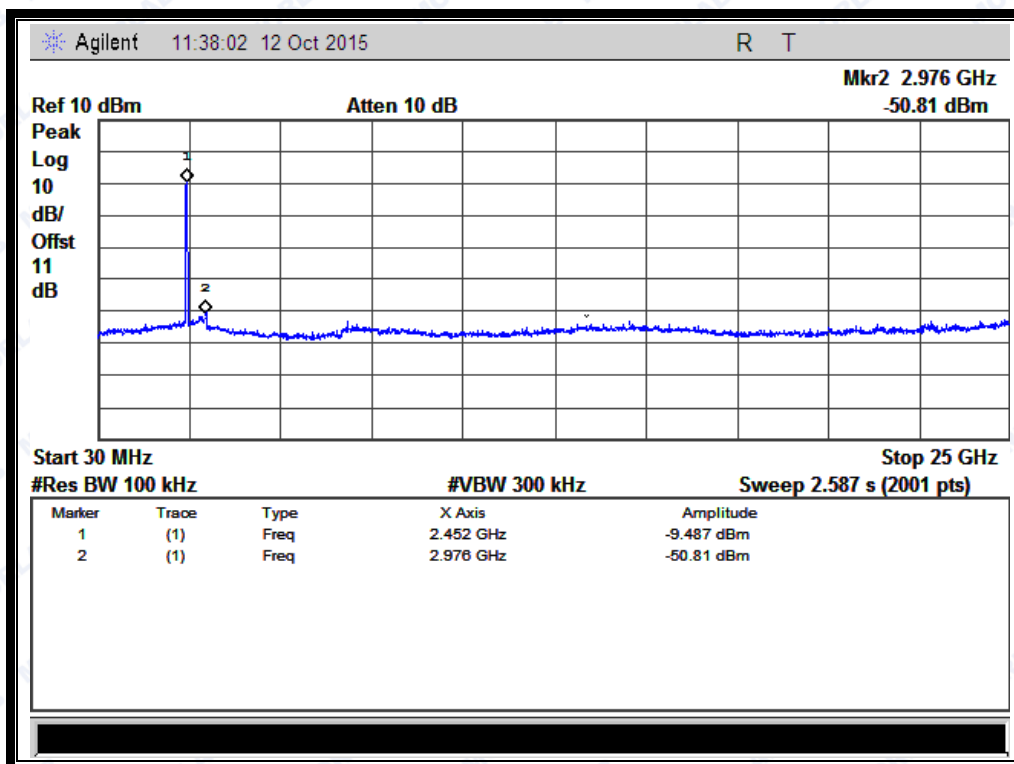


(Channel = 6, 30MHz to 25GHz)

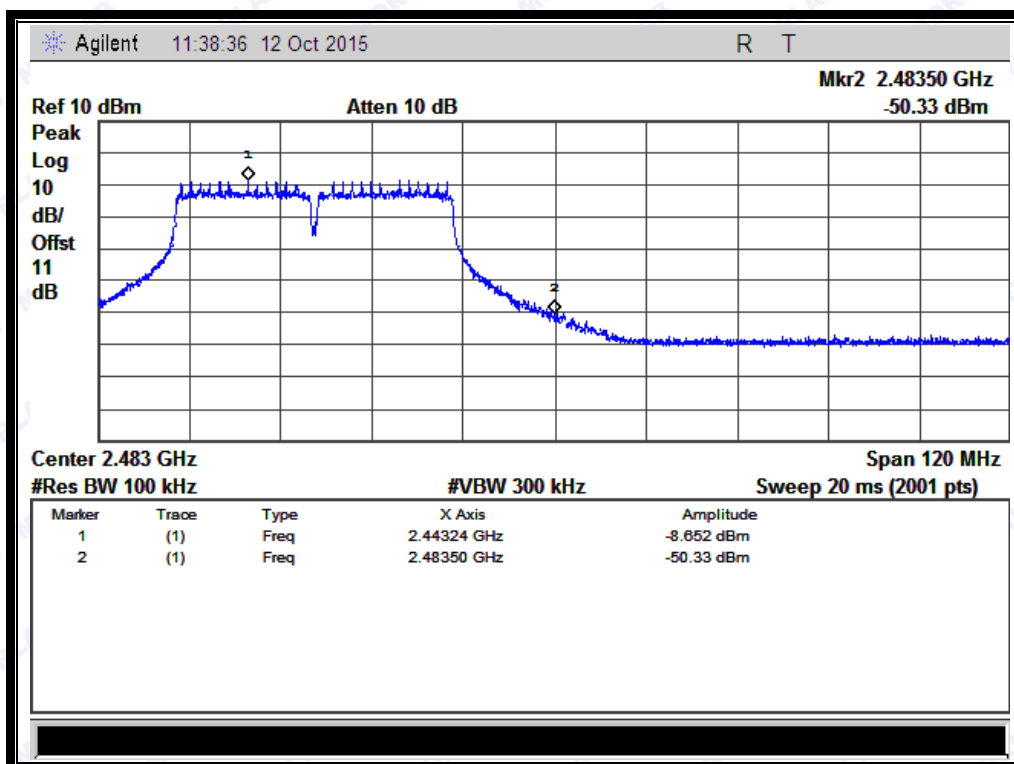




REPORT No.: SZ15100009W03



(Channel = 9, 30MHz to 25GHz)



(Band Edge @ Channel = 9)

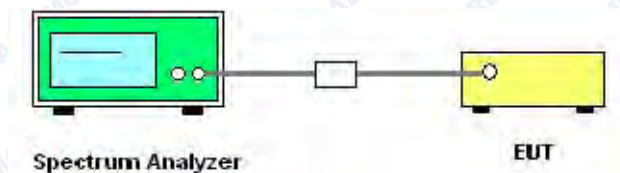
## 2.5 Power spectral density (PSD)

### 2.5.1 Requirement

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

### 2.5.2 Test Description

#### A. Test Set:



The EUT is coupled to the Spectrum Analyzer; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading.

KDB 558074 Section 10.2 was used in order to prove compliance.

#### C. Equipments List:

Please reference ANNEX A(1.4).



REPORT No.: SZ15100009W03

### 2.5.3 Test Result

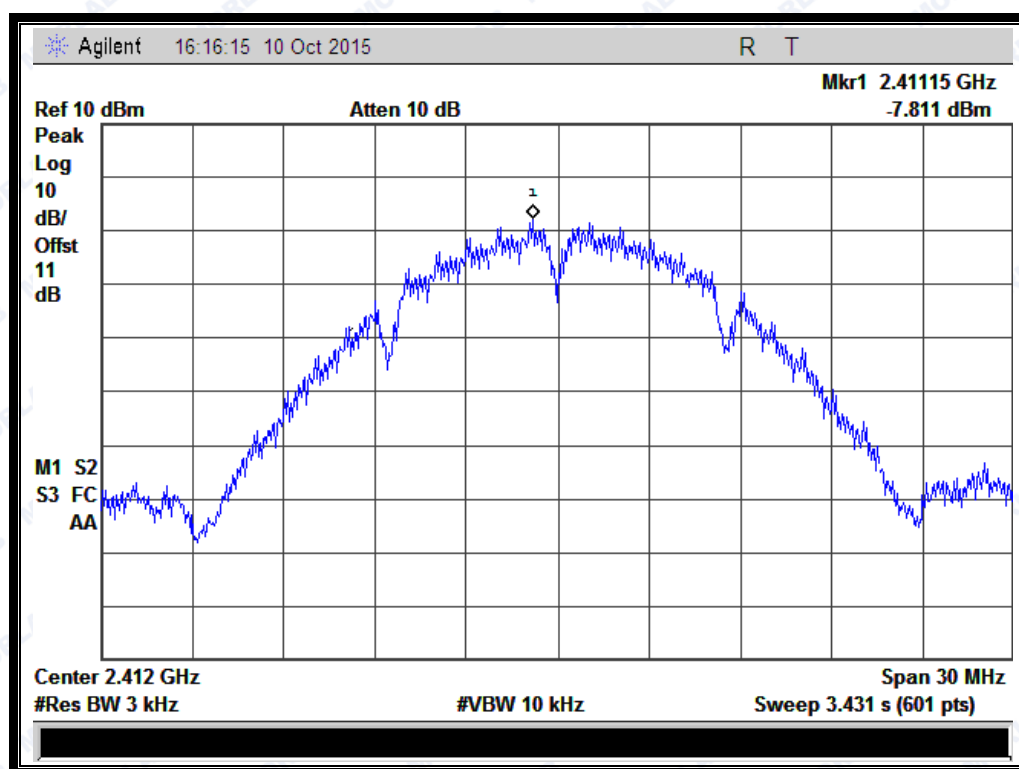
#### 2.5.3.1 802.11b Test mode

ANT 1:

#### A. Test Verdict:

Spectral power density (dBm/3kHz)				
Channel	Frequency (MHz)	Measured PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
1	2412	-7.811	8	PASS
6	2437	-8.319	8	PASS
11	2462	-10.18	8	PASS
Measurement uncertainty: $\pm 1.3$ dB				

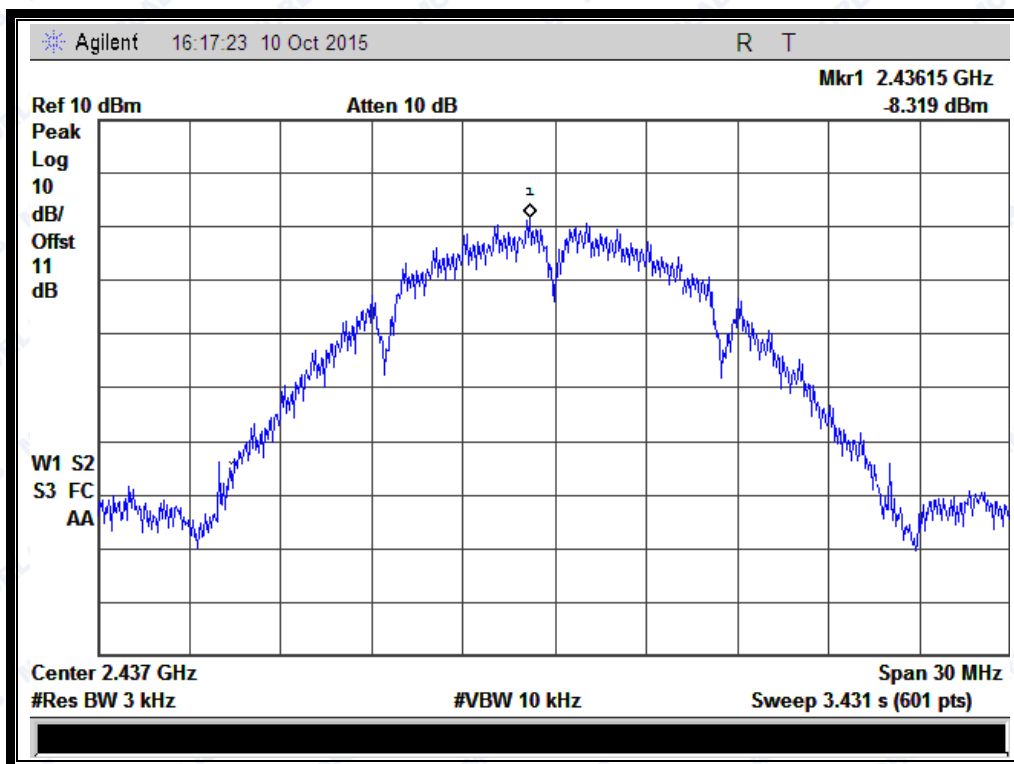
#### B. Test Plots:



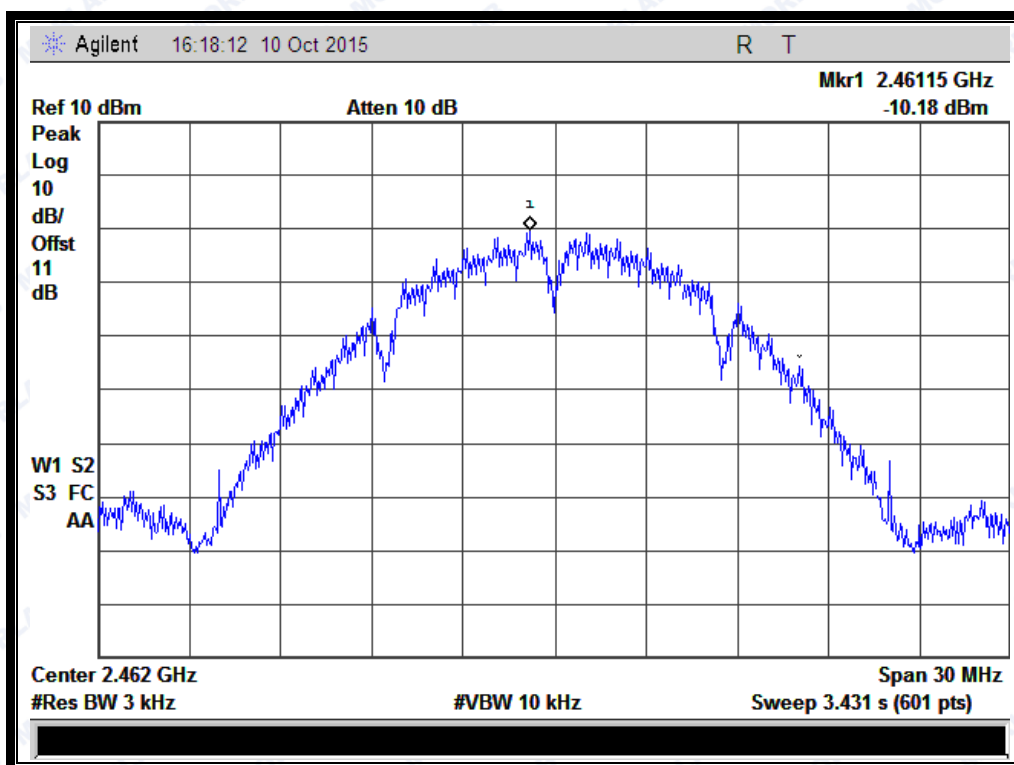
(Channel = 1 @ 802.11b)



REPORT No.: SZ15100009W03



(Channel = 6 @ 802.11b)



(Channel = 11 @ 802.11b)





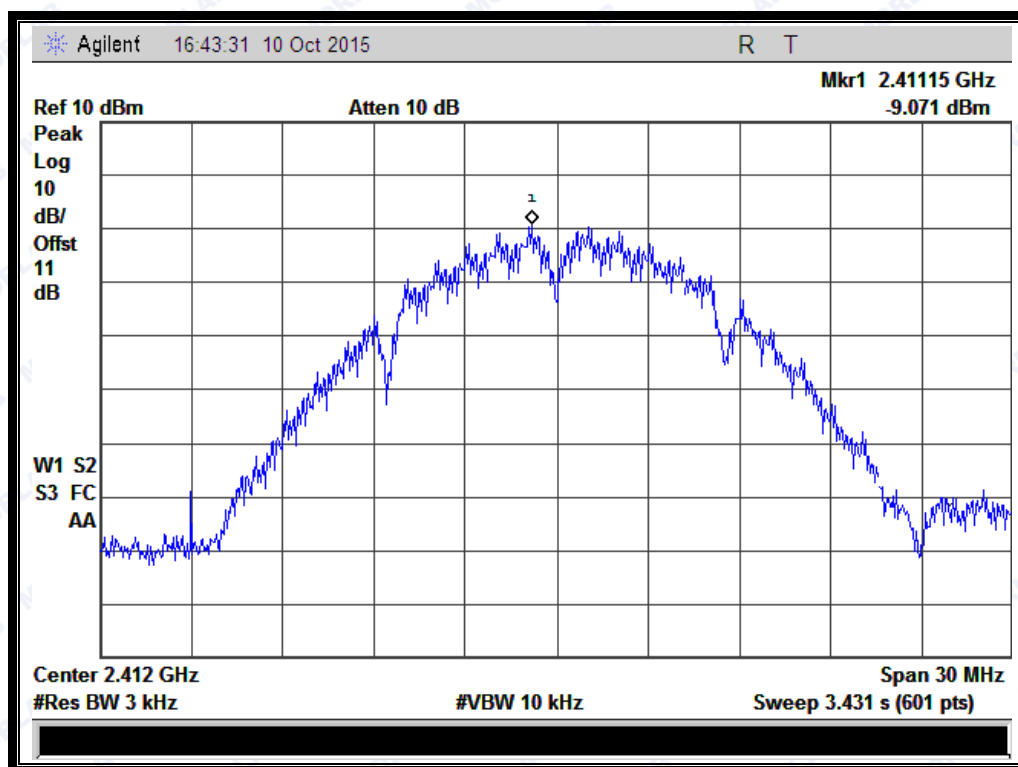
REPORT No.: SZ15100009W03

ANT 2:

**A. Test Verdict:**

Spectral power density (dBm/3kHz)				
Channel	Frequency (MHz)	Measured PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
1	2412	-9.071	8	PASS
6	2437	-9.603	8	PASS
11	2462	-9.364	8	PASS
Measurement uncertainty: $\pm 1.3$ dB				

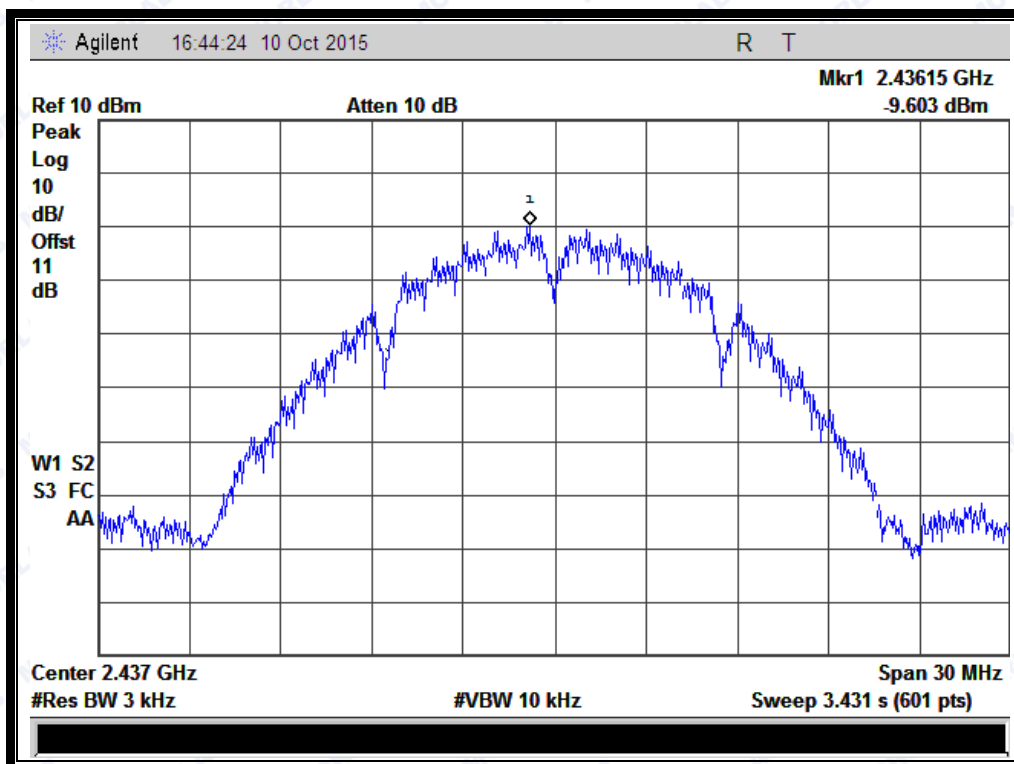
**B. Test Plots:**



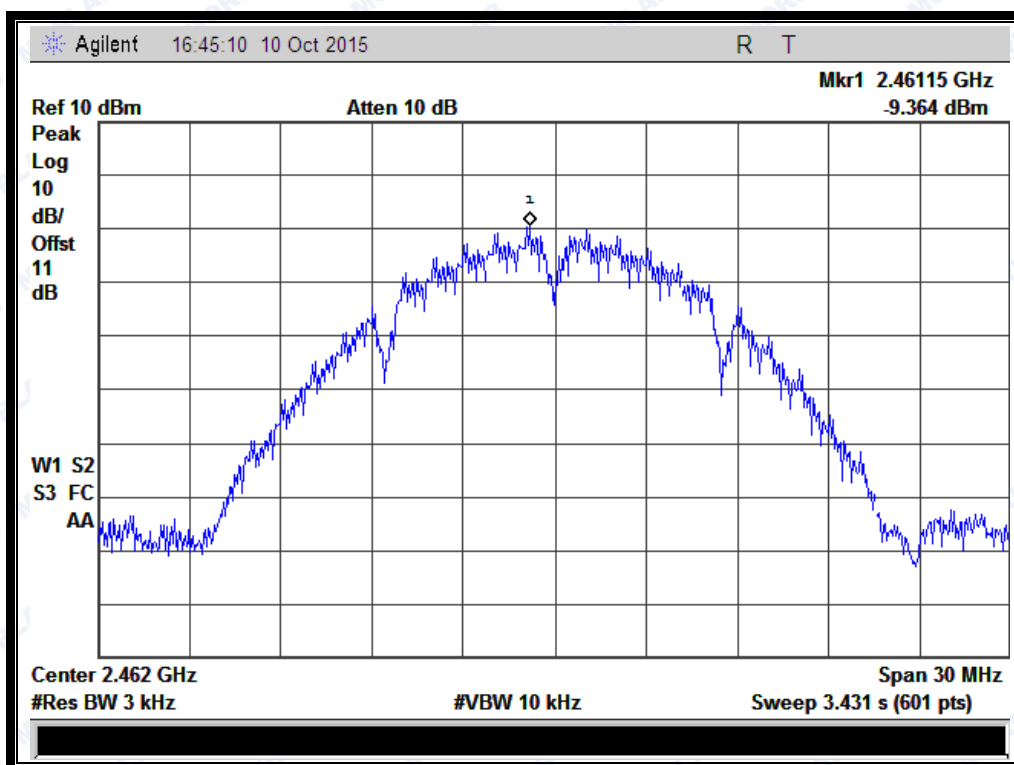
(Channel = 1 @ 802.11b)



REPORT No.: SZ15100009W03



(Channel = 6 @ 802.11b)



(Channel = 11 @ 802.11b)



REPORT No.: SZ15100009W03

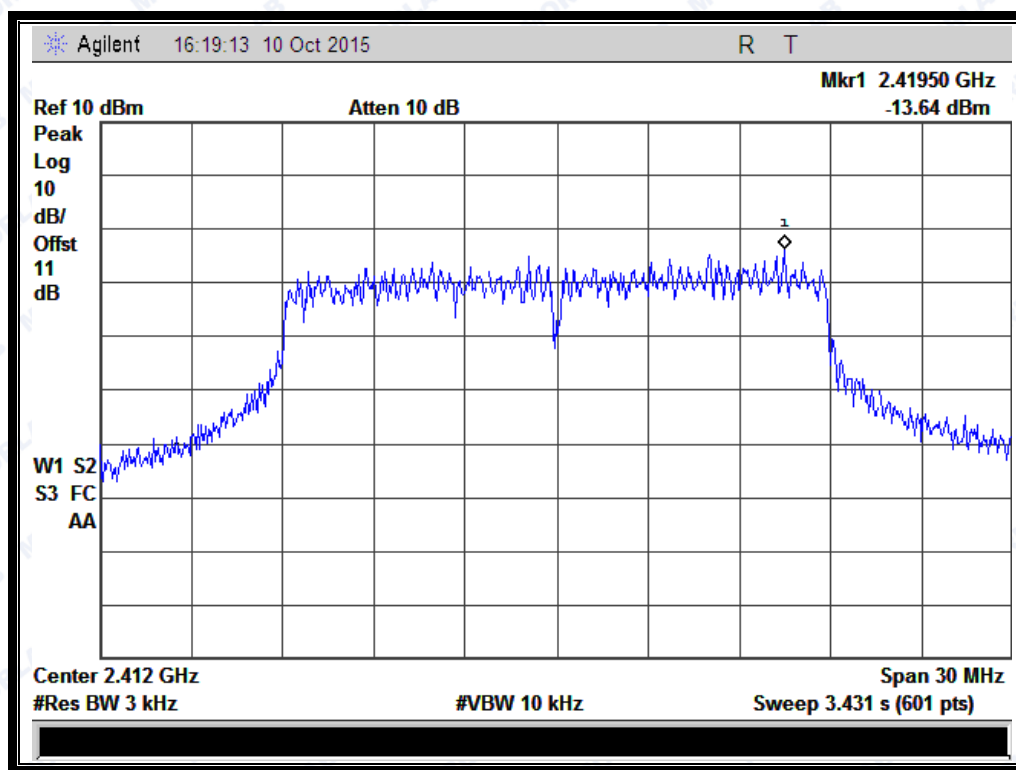
### 2.5.3.2 802.11g Test mode

ANT 1:

#### A. Test Verdict:

Spectral power density (dBm/3kHz)				
Channel	Frequency (MHz)	Measured PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
1	2412	-13.64	8	PASS
6	2437	-15.51	8	PASS
11	2462	-15.38	8	PASS
Measurement uncertainty: $\pm 1.3$ dB				

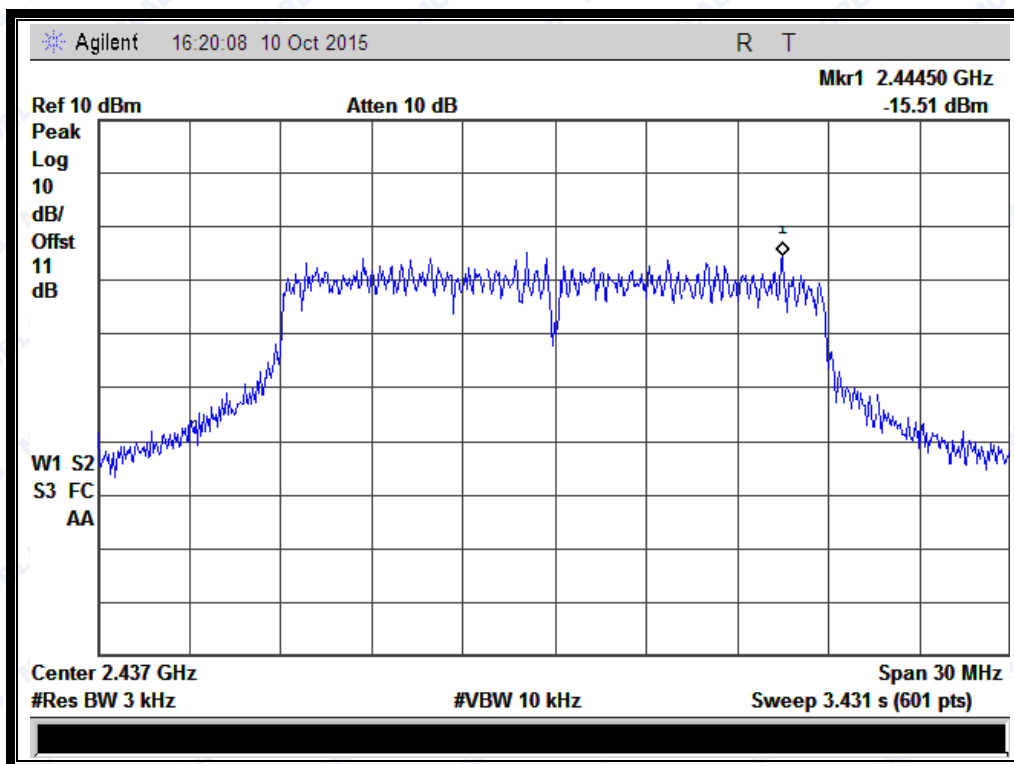
#### B. Test Plots:



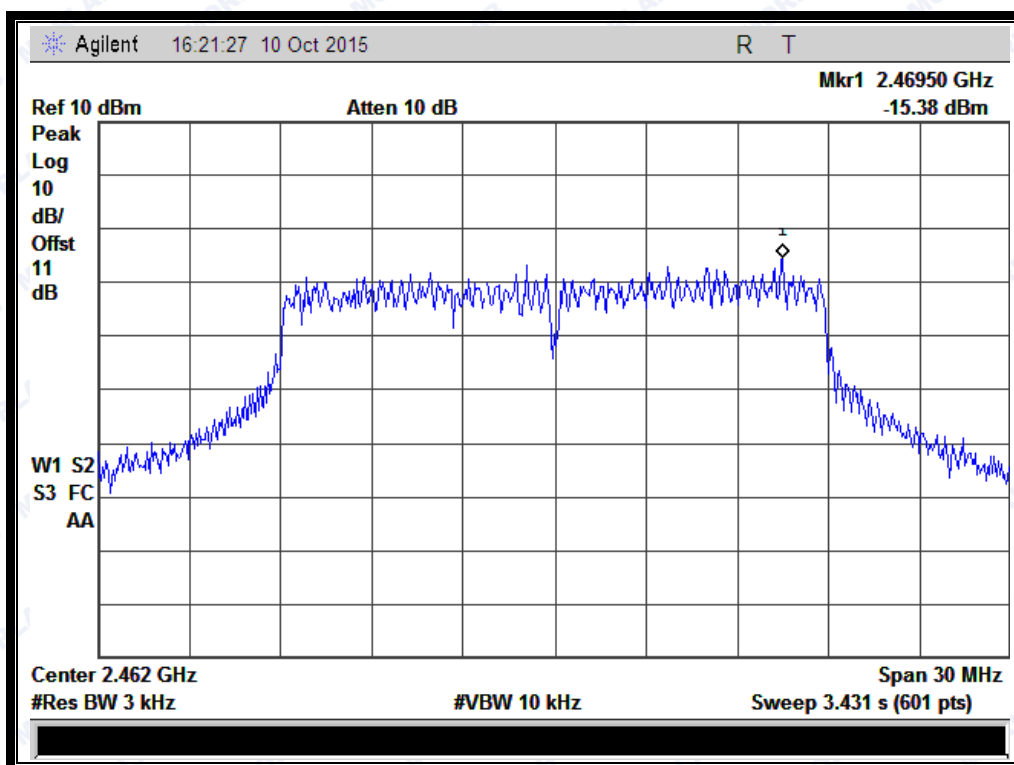
(Channel = 1 @ 802.11g)



REPORT No.: SZ15100009W03



(Channel = 6 @ 802.11g)



(Channel = 11 @ 802.11g)



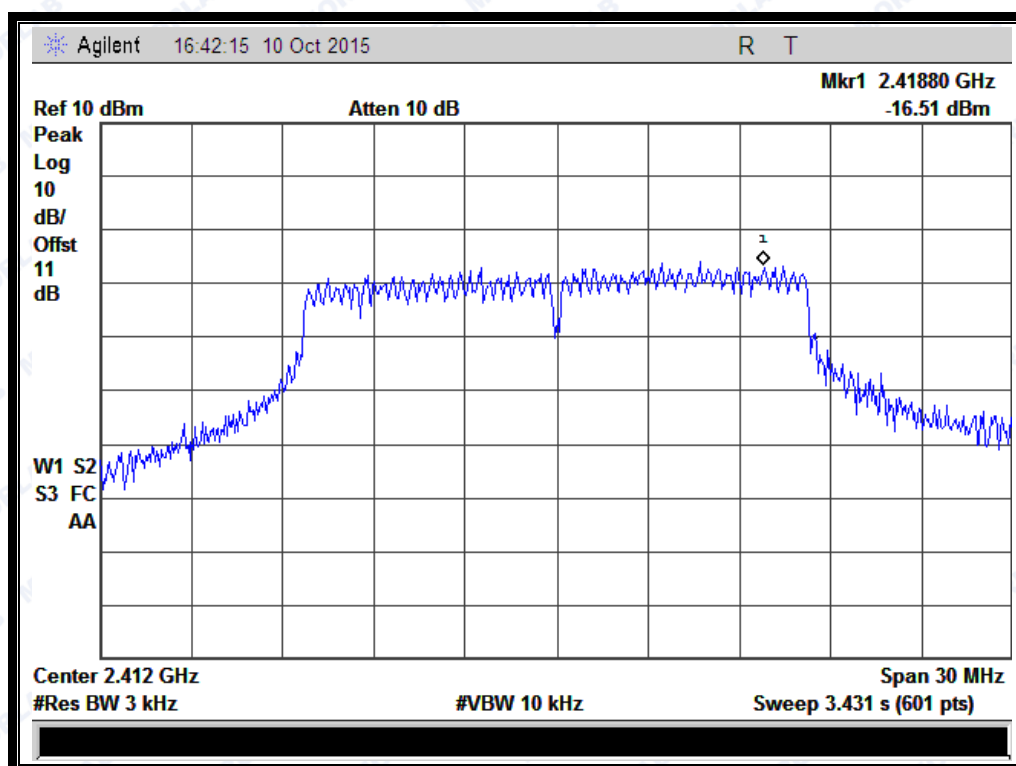


REPORT No.: SZ15100009W03

ANT 2:

**A. Test Verdict:**

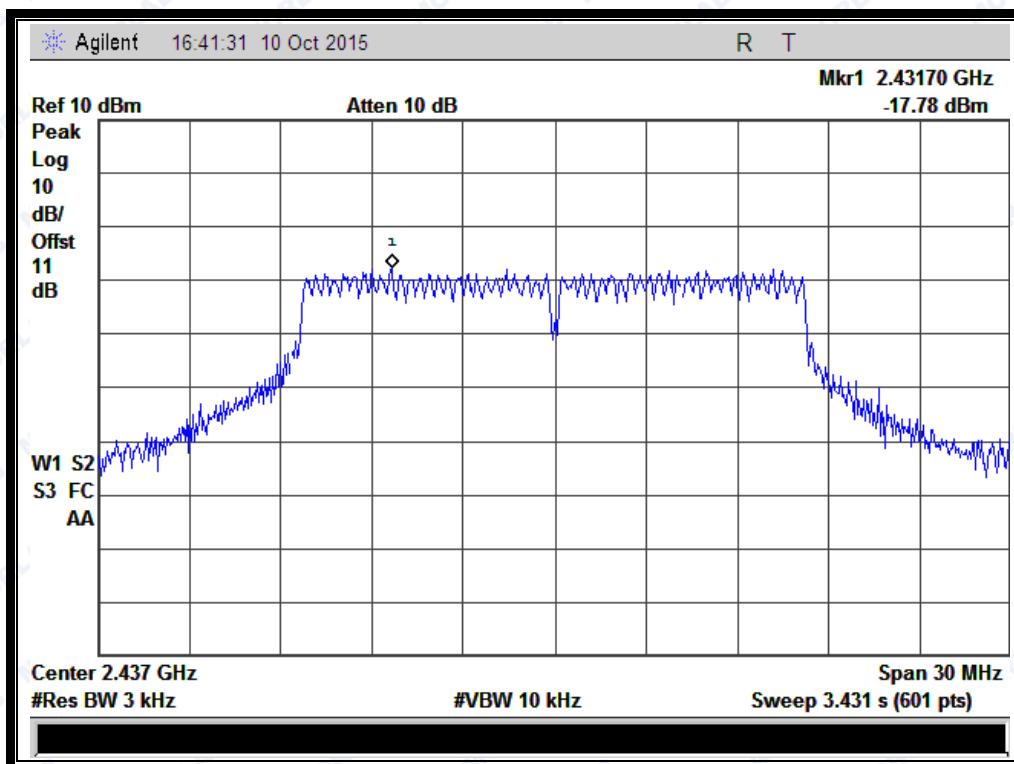
Spectral power density (dBm/3kHz)				
Channel	Frequency (MHz)	Measured PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
1	2412	-16.51	8	PASS
6	2437	-17.78	8	PASS
11	2462	-15.77	8	PASS
Measurement uncertainty: $\pm 1.3$ dB				

**B. Test Plots:**

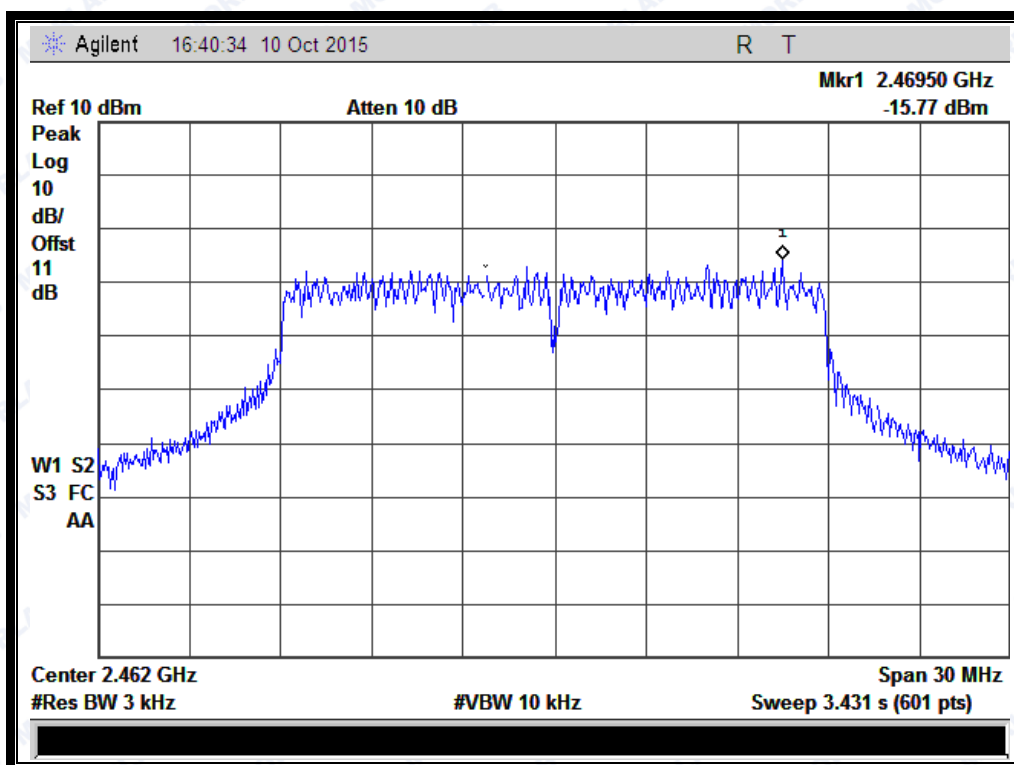
(Channel = 1 @ 802.11g)



REPORT No.: SZ15100009W03



(Channel = 6 @ 802.11g)



(Channel = 11 @ 802.11g)



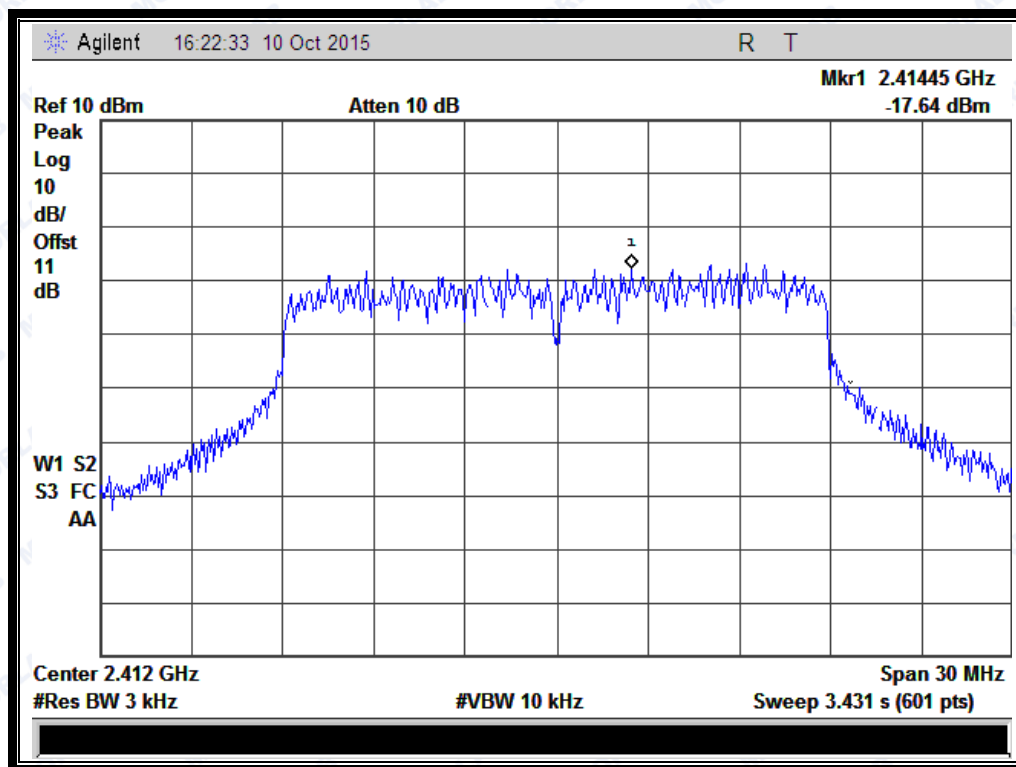
REPORT No.: SZ15100009W03

**2.5.3.3 802.11n-20MHz Test mode**

ANT 1:

**A. Test Verdict:**

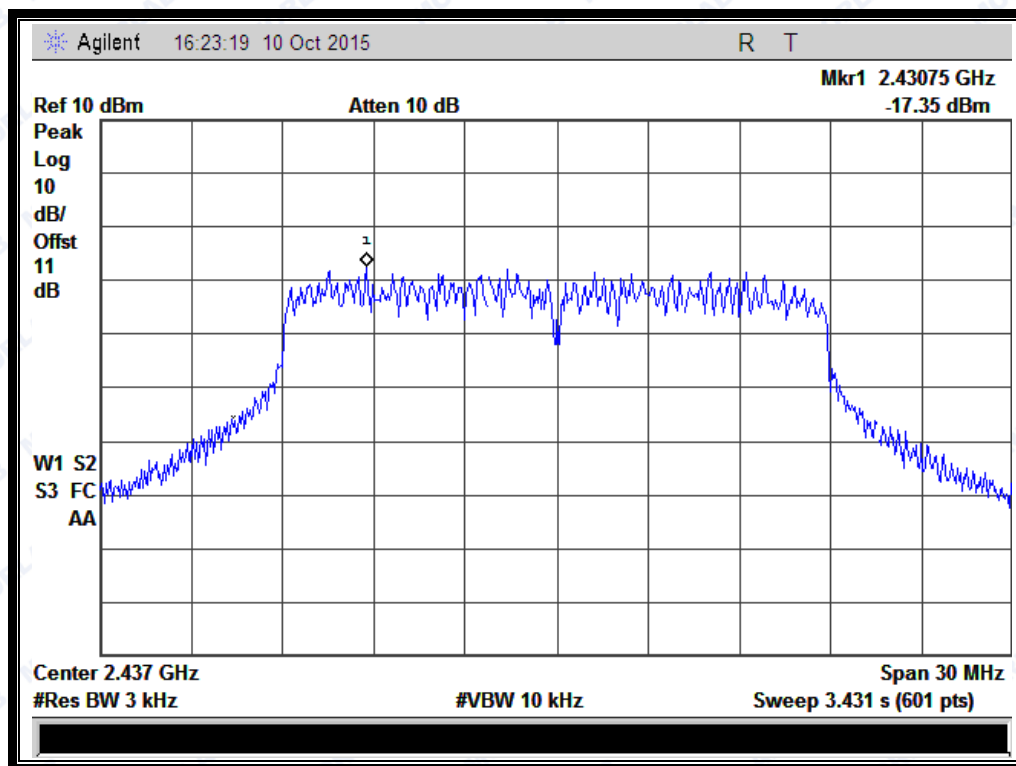
Spectral power density (dBm/3kHz)				
Channel	Frequency (MHz)	Measured PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
1	2412	-17.64	8	PASS
6	2437	-17.35	8	PASS
11	2462	-19.63	8	PASS
Measurement uncertainty: $\pm 1.3$ dB				

**B. Test Plots:**

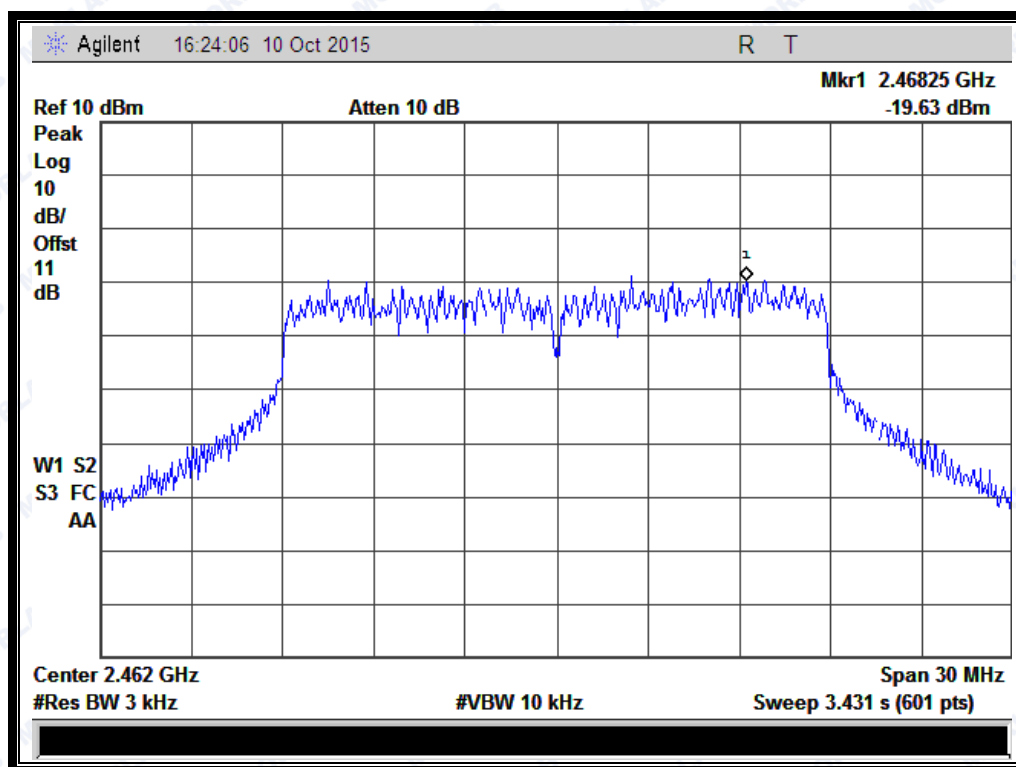
(Channel = 1 @ 802.11n-20MHz)



REPORT No.: SZ15100009W03



(Channel = 6 @ 802.11n-20MHz)



(Channel = 11 @ 802.11n-20MHz)



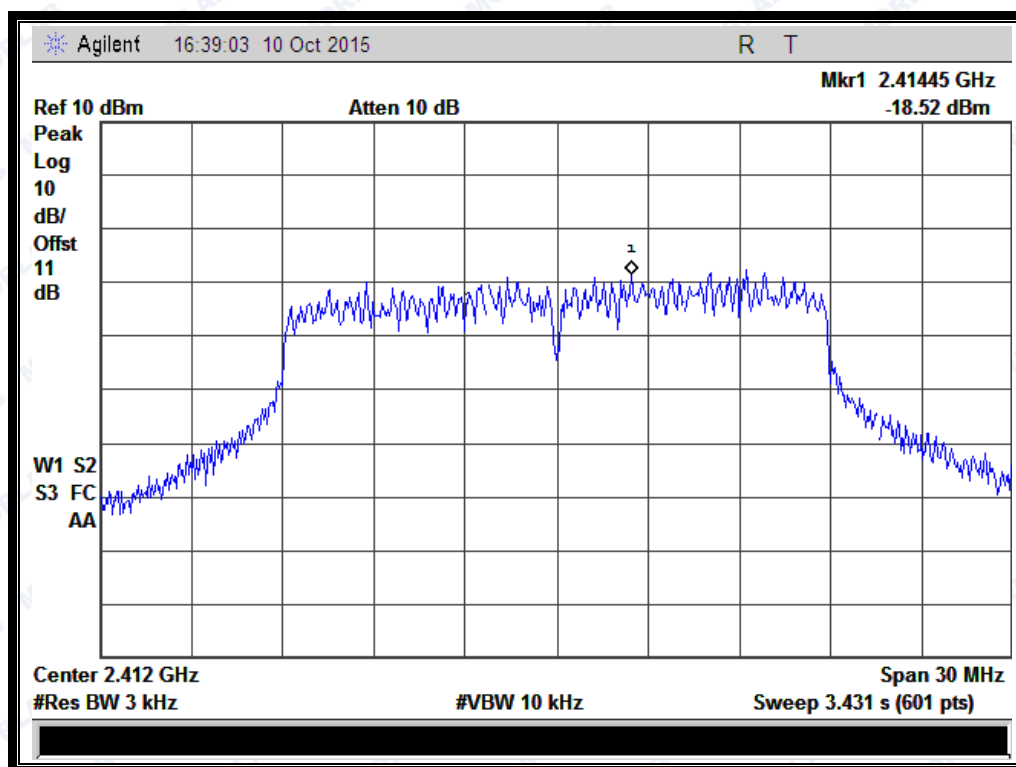


REPORT No.: SZ15100009W03

ANT 2:

**A. Test Verdict:**

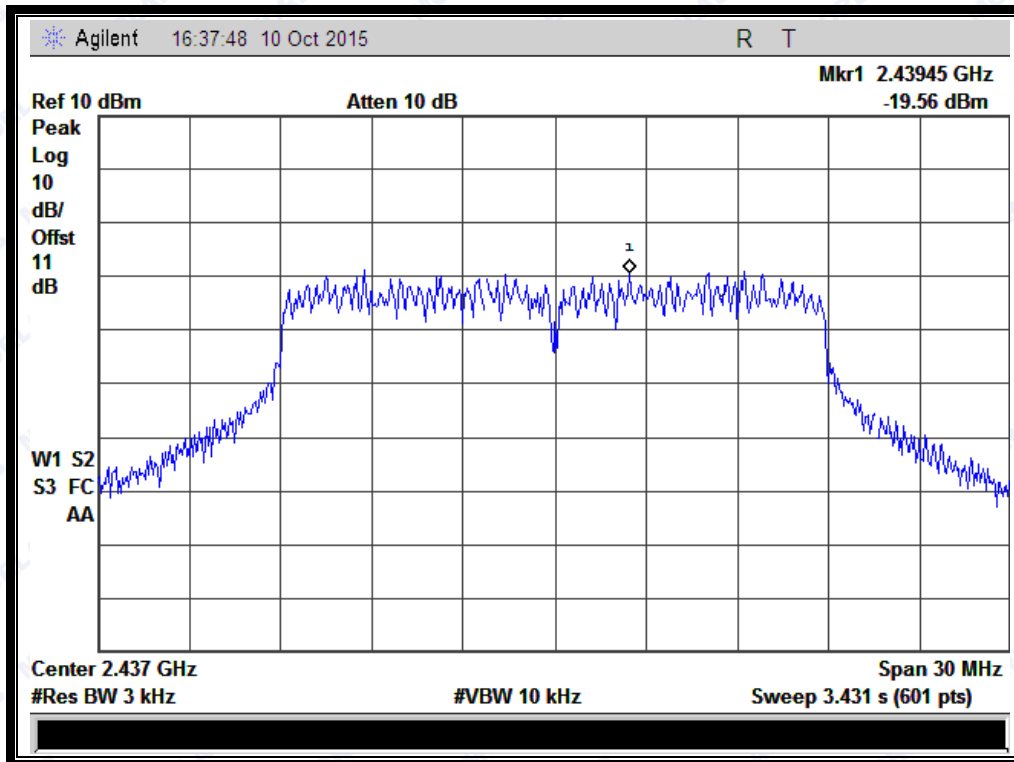
Spectral power density (dBm/3kHz)				
Channel	Frequency (MHz)	Measured PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
1	2412	-18.52	8	PASS
6	2437	-19.56	8	PASS
11	2462	-18.69	8	PASS
Measurement uncertainty: $\pm 1.3$ dB				

**B. Test Plots:**

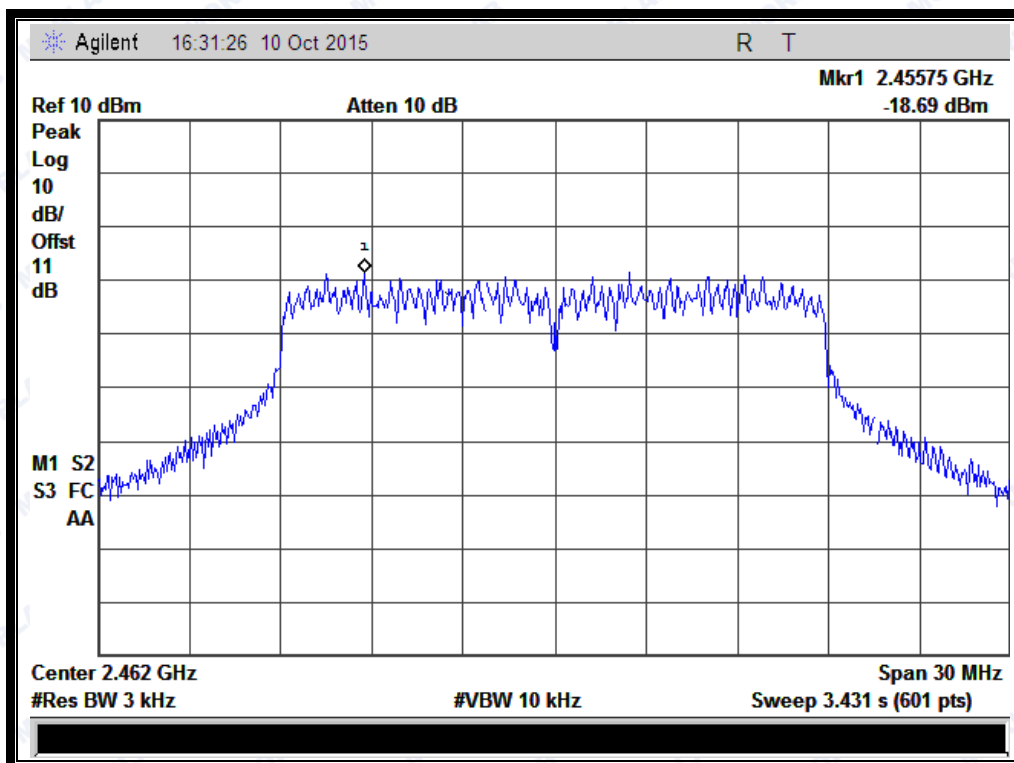
(Channel = 1 @ 802.11n-20MHz)



REPORT No.: SZ15100009W03



(Channel = 6 @ 802.11n-20MHz)



(Channel = 11 @ 802.11n-20MHz)



REPORT No.: SZ15100009W03

Ant 1 + Ant 2:

**A. Test Verdict:**

Spectral power density (dBm/3kHz)				
Channel	Frequency (MHz)	Measured PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
1	2412	-15.05	8	PASS
6	2437	-15.31	8	PASS
11	2462	-16.12	8	PASS
Measurement uncertainty: $\pm 1.3\text{dB}$				

**2.5.3.4 802.11n-40MHz Test mode**

ANT 1:

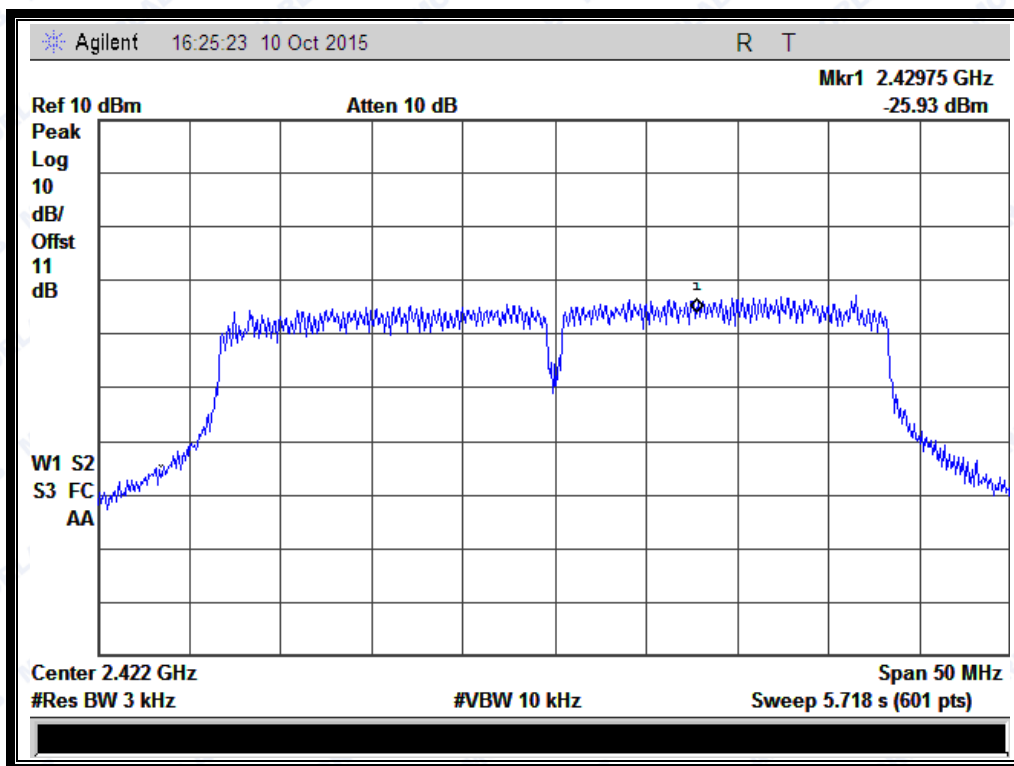
**A. Test Verdict:**

Spectral power density (dBm/3kHz)				
Channel	Frequency (MHz)	Measured PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
3	2422	-25.93	8	PASS
6	2437	-22.74	8	PASS
9	2452	-24.01	8	PASS
Measurement uncertainty: $\pm 1.3\text{dB}$				

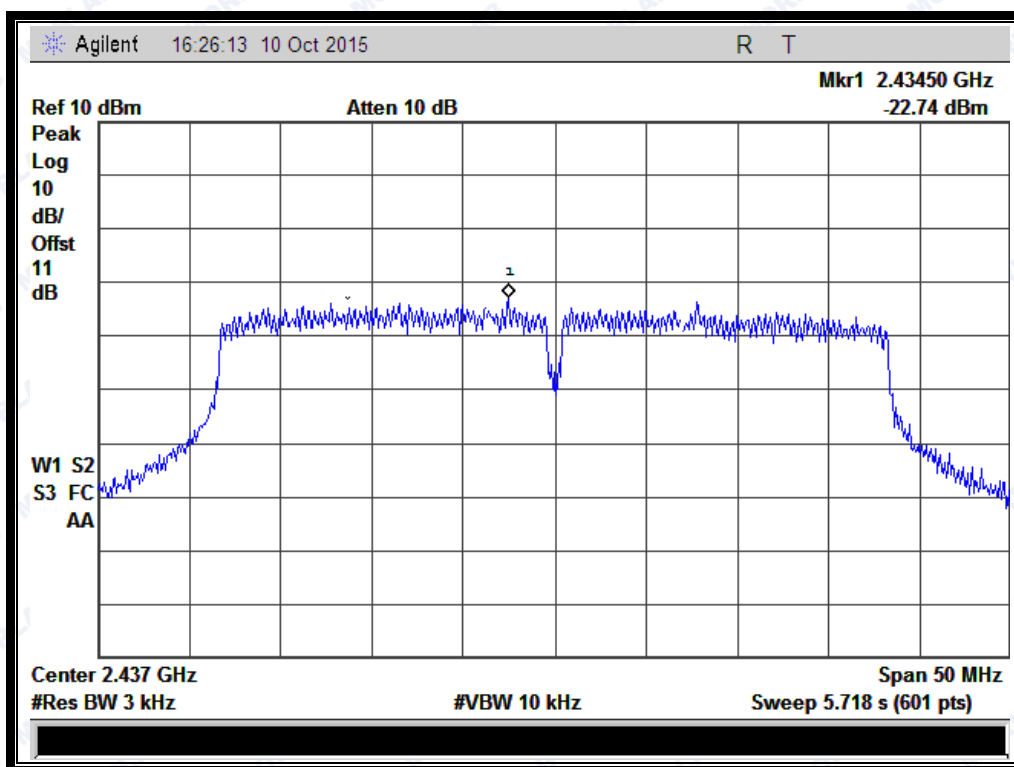
**B. Test Plots:**



REPORT No.: SZ15100009W03



(Channel = 3 @ 802.11n-40MHz)

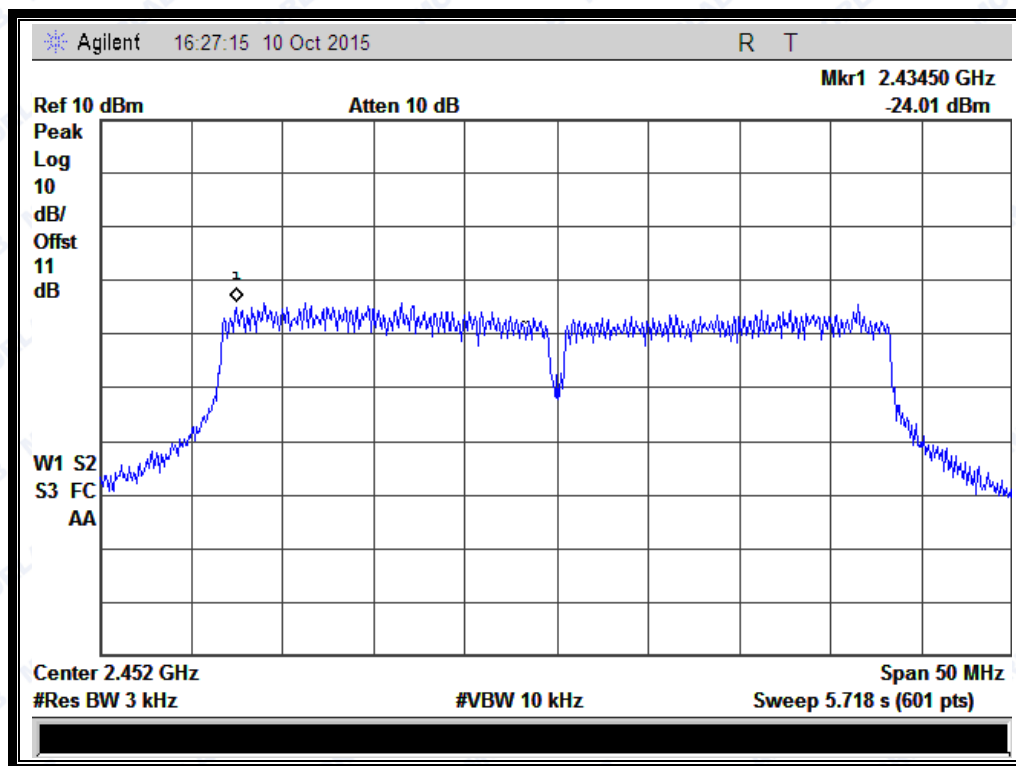


(Channel = 6 @ 802.11n-40MHz)





REPORT No.: SZ15100009W03



(Channel = 9 @ 802.11n-40MHz)

ANT 2:

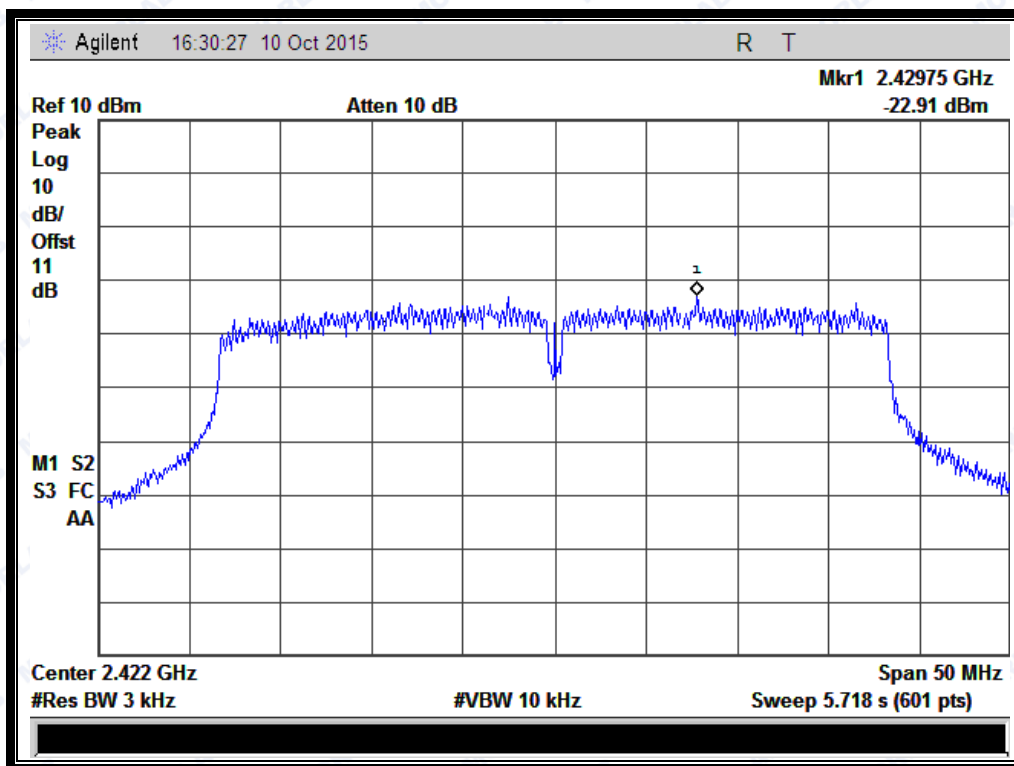
**A. Test Verdict:**

Spectral power density (dBm/3kHz)				
Channel	Frequency (MHz)	Measured PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
3	2422	-22.91	8	PASS
6	2437	-23.85	8	PASS
9	2452	-23.67	8	PASS
Measurement uncertainty: $\pm 1.3$ dB				

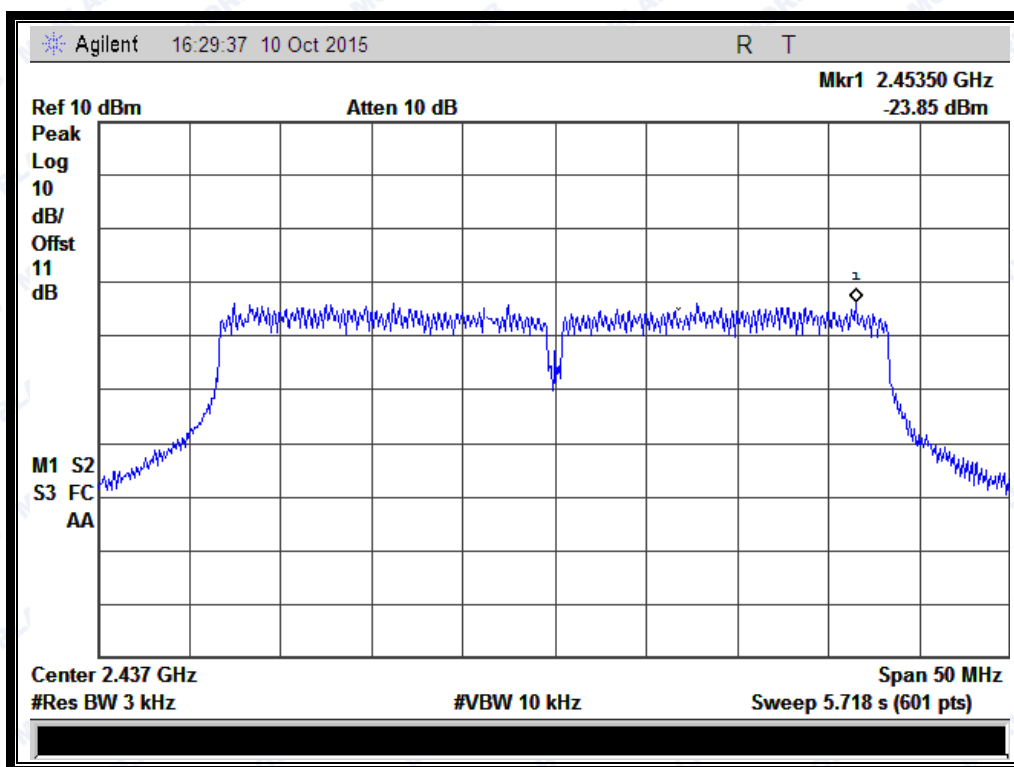
**B. Test Plots:**



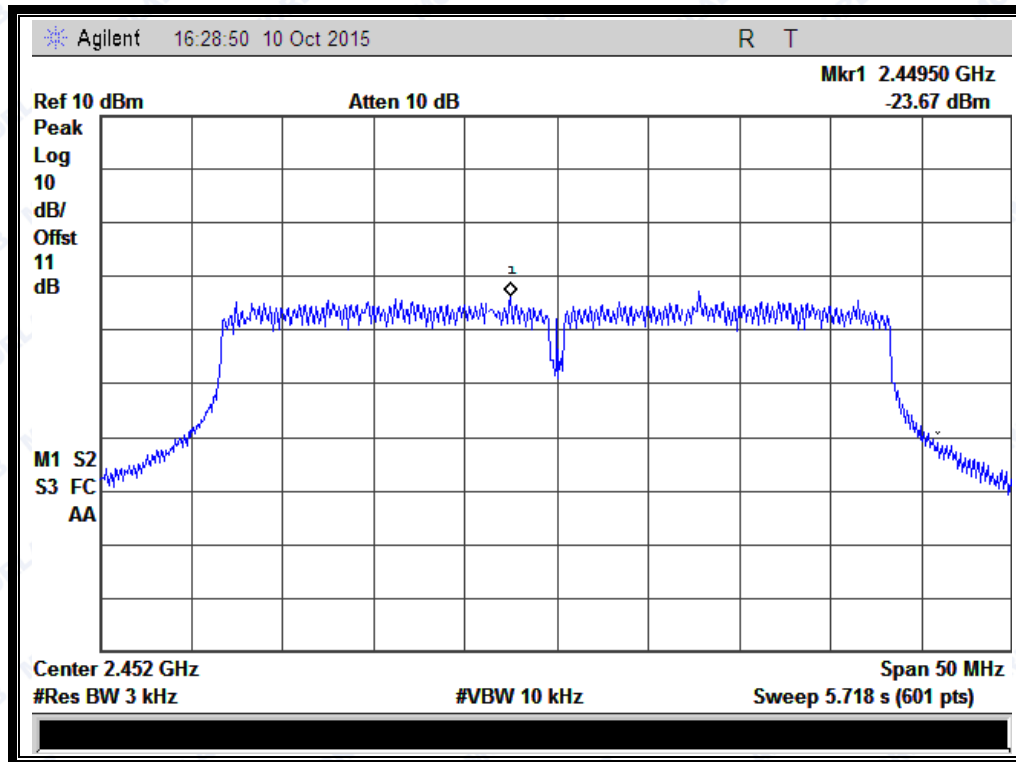
REPORT No.: SZ15100009W03



(Channel = 3 @ 802.11n-40MHz)



(Channel = 6 @ 802.11n-40MHz)



(Channel = 9 @ 802.11n-40MHz)

Ant 1 + Ant 2:

**B. Test Verdict:**

Spectral power density (dBm/3kHz)				
Channel	Frequency (MHz)	Measured PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
3	2422	-21.15	7.27 <sub>Note</sub>	PASS
6	2437	-20.25	7.27 <sub>Note</sub>	PASS
9	2452	-20.83	7.27 <sub>Note</sub>	PASS
Measurement uncertainty: $\pm 1.3$ dB				

## 2.6 Restricted Frequency Bands

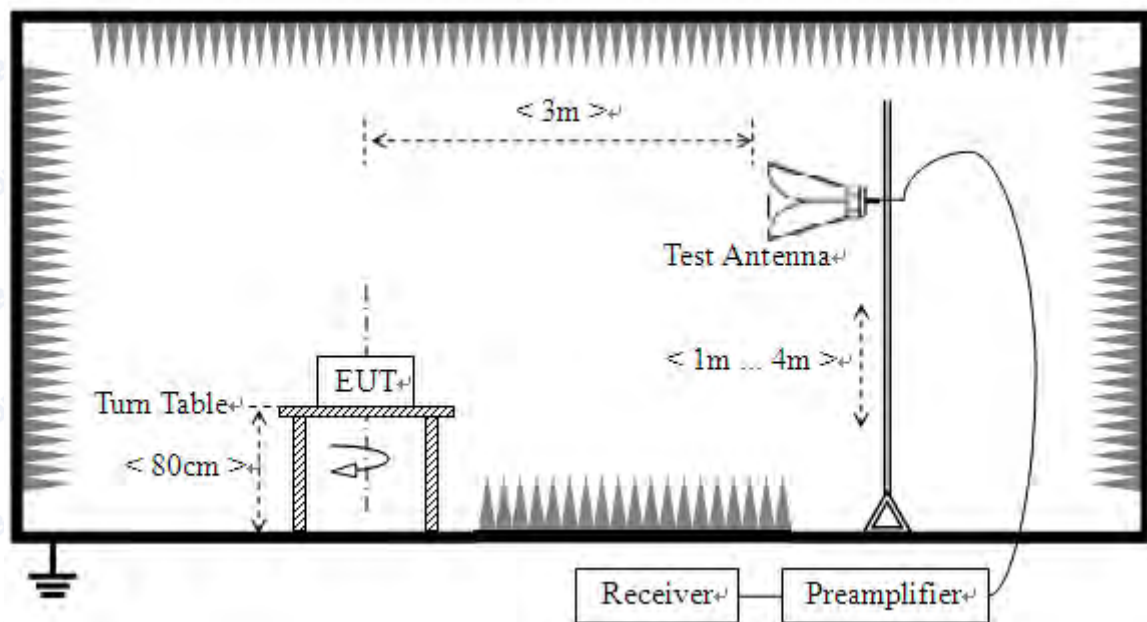
### 2.6.1 Requirement

According to FCC section 15.247(d), in any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the

100kHz bandwidth within the band that contains the highest level of the desired power, In addition, radiated emissions which fall in the restricted bands, as defined in 15.205(a), must also comply with the radiated emission limits specified in 15.209(a).

## 2.6.2 Test Description

### A. Test Setup



The Module is located in a 3m Semi-Anechoic Chamber; the antenna factors, cable loss and so on of the site as factors are calculated to correct the reading.

For the Test Antenna:

Test Antenna is 3m away from the EUT. Test Antenna height is varied from 1m to 4m above the ground to determine the maximum value of the field strength.

KDB 558074 Section 12.1 was used in order to prove compliance.

### B. Equipments List:

Please reference ANNEX A(1.4).

## 2.6.3 Test Result

The lowest and highest channels are tested to verify Restricted Frequency Bands.

The measurement results are obtained as below:

$$E \text{ [dB}\mu\text{V/m]} = U_R + A_T + A_{\text{Factor}} \text{ [dB]}; A_T = L_{\text{Cable loss}} \text{ [dB]} - G_{\text{preamp}} \text{ [dB]}$$





$A_T$ : Total correction Factor except Antenna

$U_R$ : Receiver Reading

$G_{\text{preamp}}$ : Preamplifier Gain

$A_{\text{Factor}}$ : Antenna Factor at 3m

**Note:** Restricted Frequency Bands were performed when antenna was at vertical and horizontal polarity, and only the worse test condition (vertical) was recorded in this test report.

### 2.6.3.1 802.11b Test mode

The lowest and highest channels are tested to verify the band edge emissions.

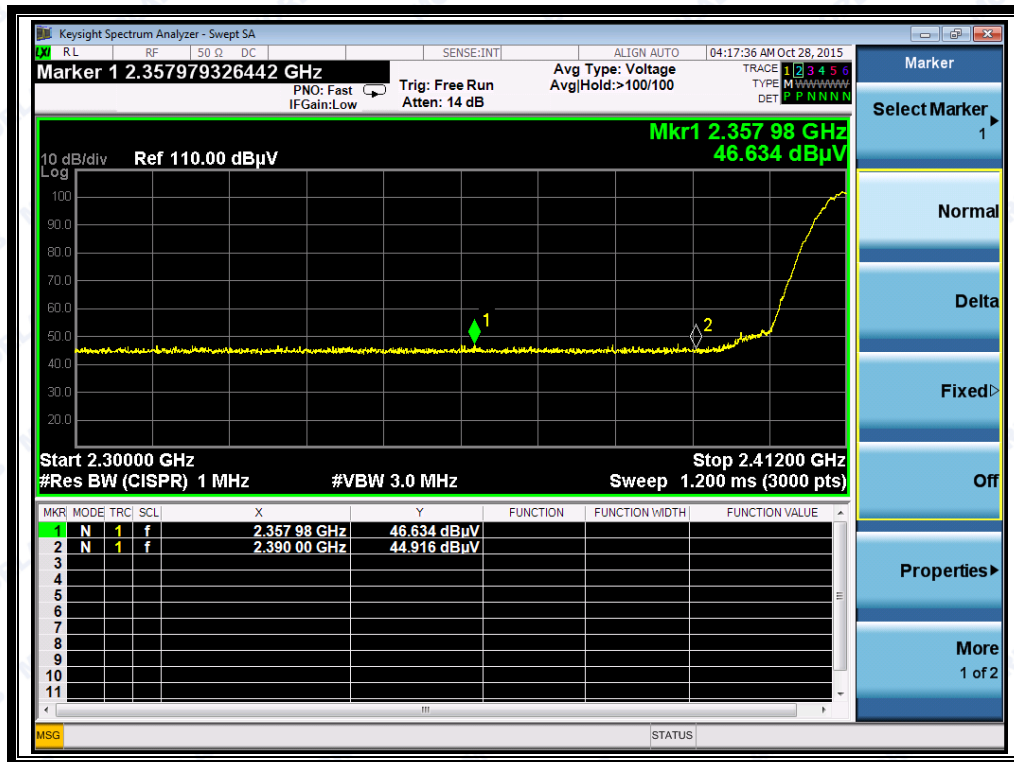
#### A. Test Verdict:

Channel	Frequency (MHz)	Detector	Receiver Reading $U_R$ (dBuV)	$A_T$ (dB)	$A_{\text{Factor}}$ (dB@3m)	Max. Emission E (dBμV/m)	Limit (dBμV/m)	Verdict
		PK/ AV						
1	2357.98	PK	46.63	-33.63	32.56	45.56	74	Pass
1	2361.00	AV	33.94	-33.63	32.56	32.87	54	Pass
11	2488.82	PK	45.06	-33.18	32.5	44.38	74	Pass
11	2488.42	AV	34.41	-33.18	32.5	33.73	54	Pass

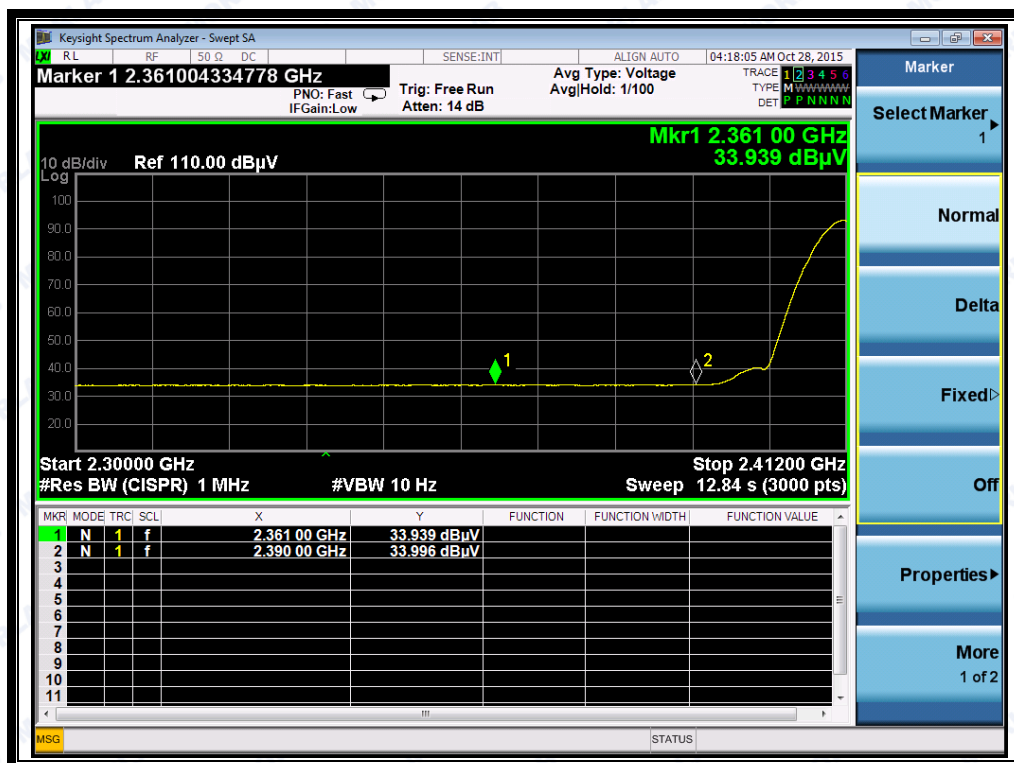
#### B. Test Plots:



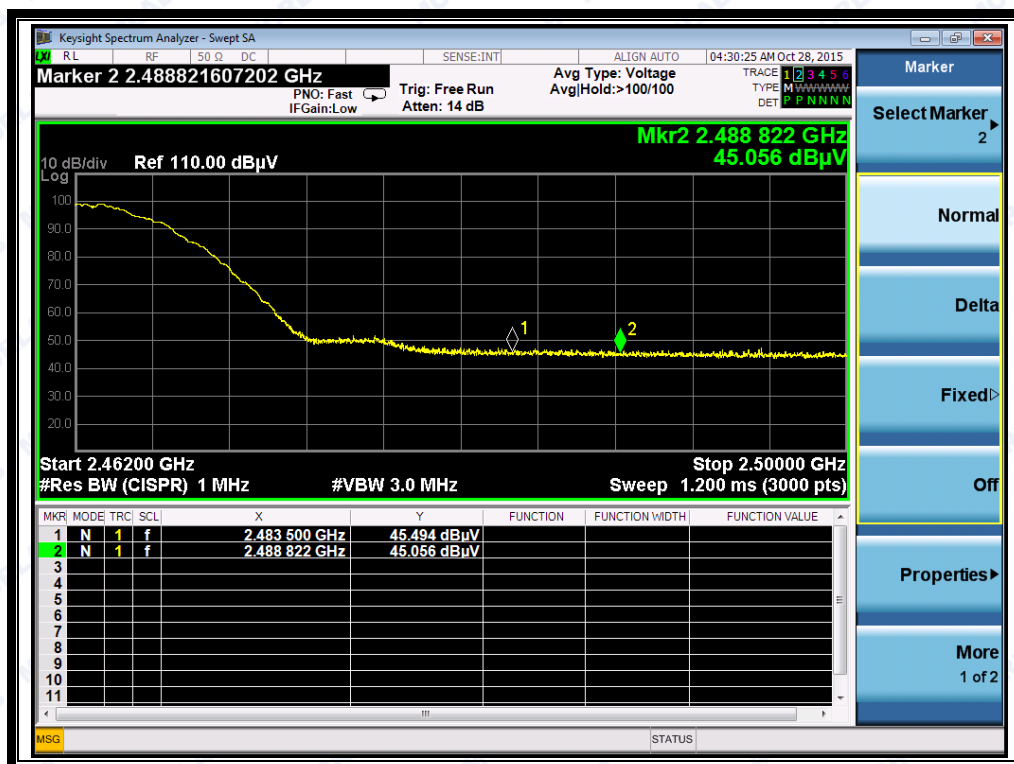
REPORT No.: SZ15100009W03



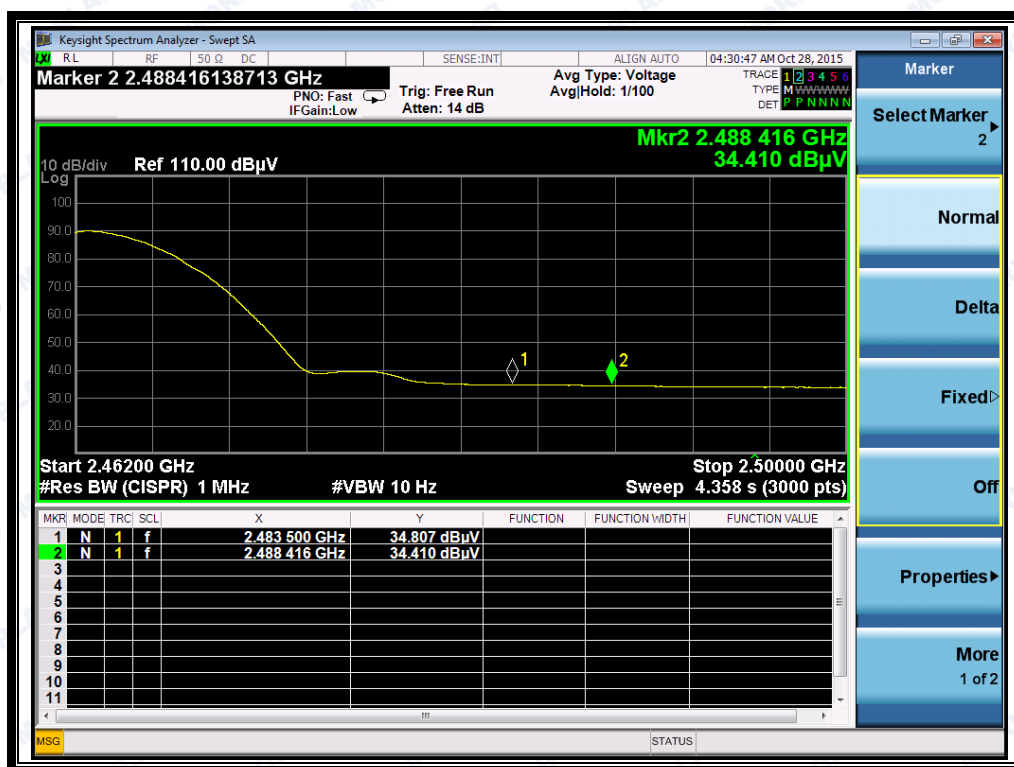
(Plot A1: Channel = 1 PEAK @ 802.11b)



(Plot A2: Channel = 1 AVG @ 802.11b)



(Plot B1: Channel = 11 PEAK @ 802.11b)



(Plot B2: Channel = 11 AVG @ 802.11b)



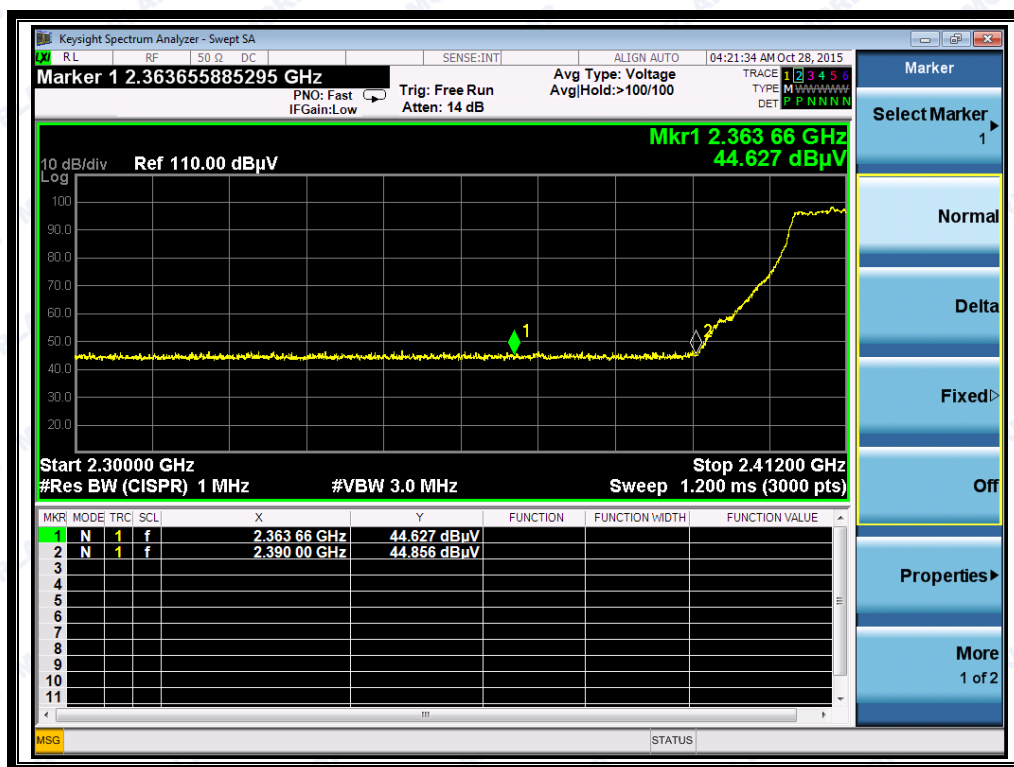
### 2.6.3.2 802.11g Test mode

The lowest and highest channels are tested to verify the band edge emissions.

#### A. Test Verdict:

Channel	Frequency (MHz)	Detector	Receiver Reading $U_R$ (dBuV)	$A_T$ (dB)	$A_{Factor}$ (dB@3m)	Max. Emission $E$ (dBuV/m)	Limit (dBuV/m)	Verdict
		PK/ AV						
1	2363.66	PK	44.63	-33.63	32.56	43.56	74	Pass
1	2366.98	AV	33.97	-33.63	32.56	32.90	54	Pass
11	2484.03	PK	51.62	-33.18	32.5	50.94	74	Pass
11	2483.92	AV	38.26	-33.18	32.5	37.58	54	Pass

#### B. Test Plots:

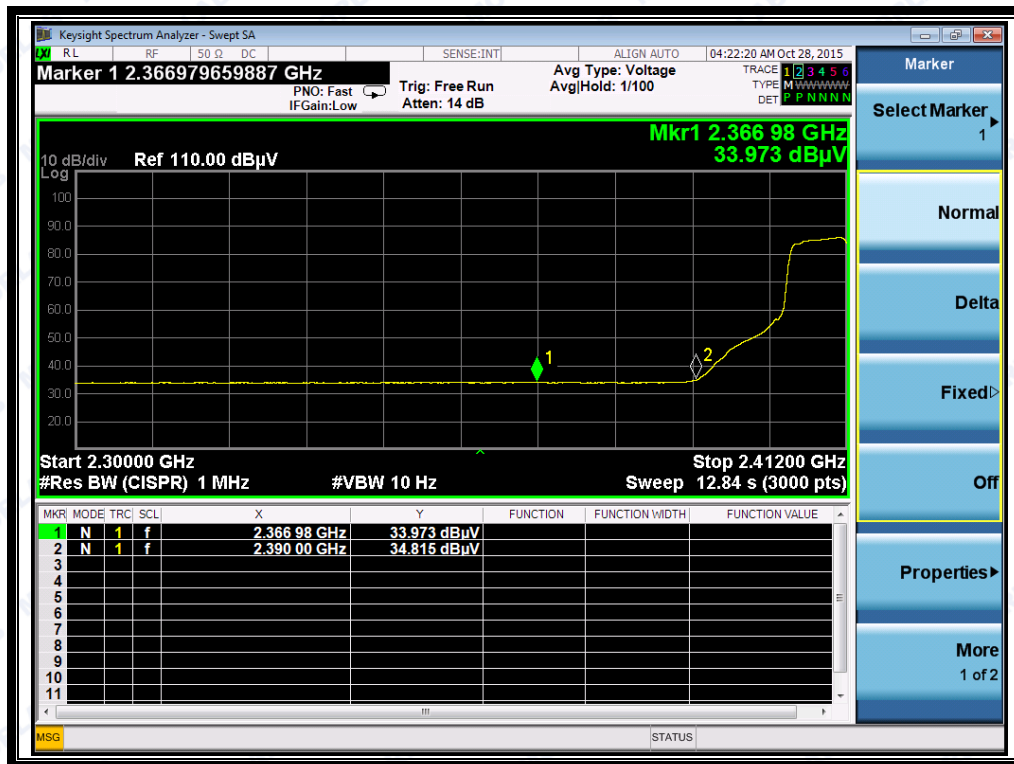




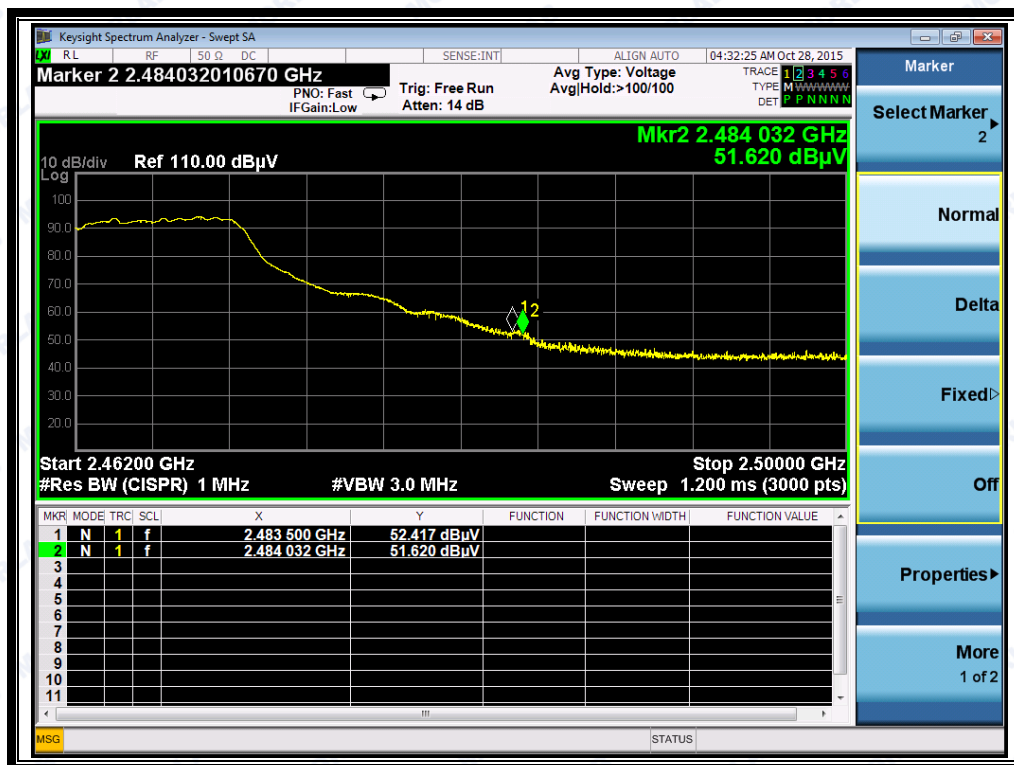


REPORT No.: SZ15100009W03

(Plot C1: Channel = 1 PEAK @ 802.11g)



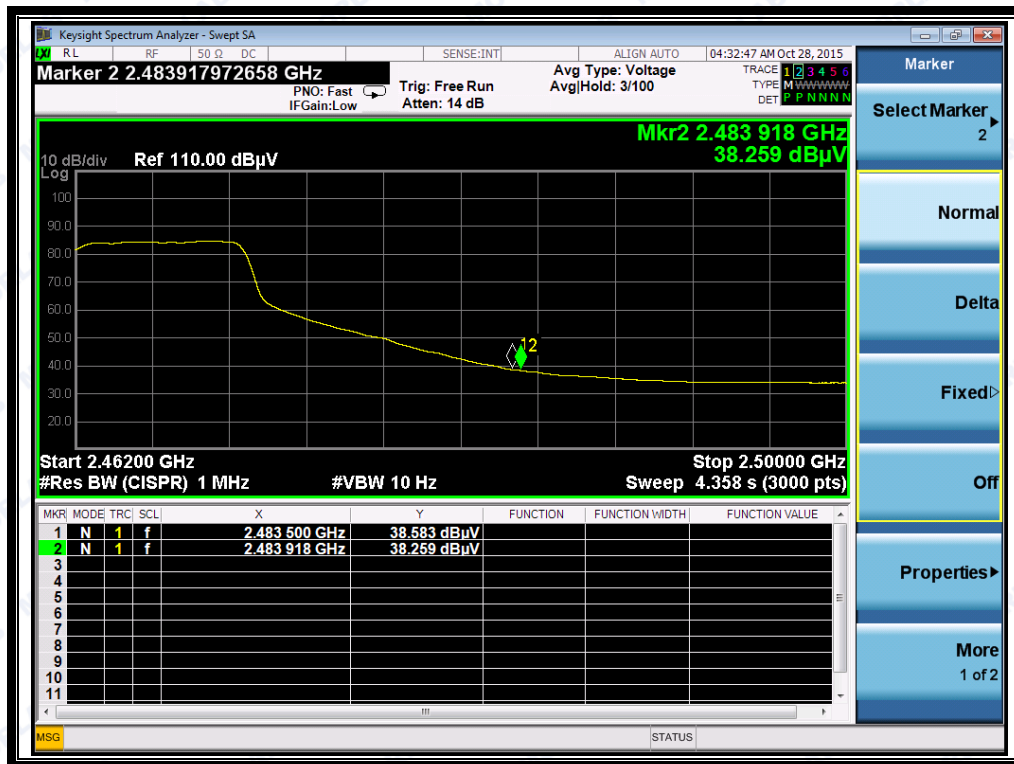
(Plot C2: Channel = 1 AVG @ 802.11g)





REPORT No.: SZ15100009W03

(Plot D1: Channel = 11 PEAK @ 802.11g)



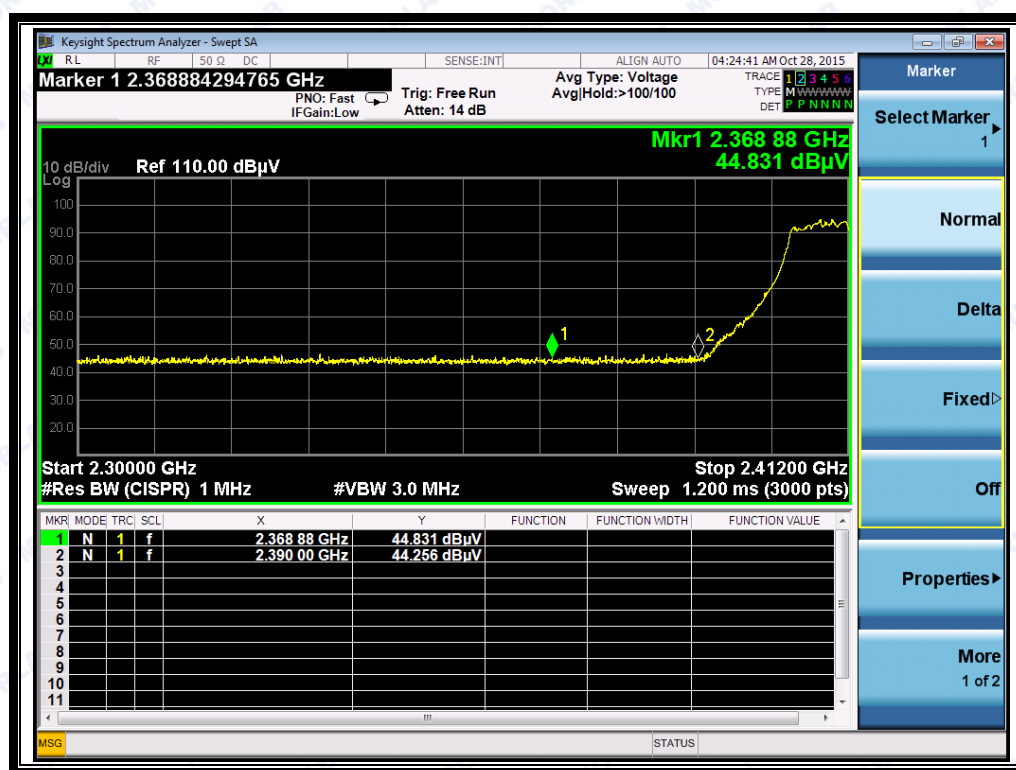
(Plot D2: Channel = 11 AVG @ 802.11g)

**2.6.3.3 802.11n-20MHz Test mode**

The lowest and highest channels are tested to verify the band edge emissions.

**A. Test Verdict:**

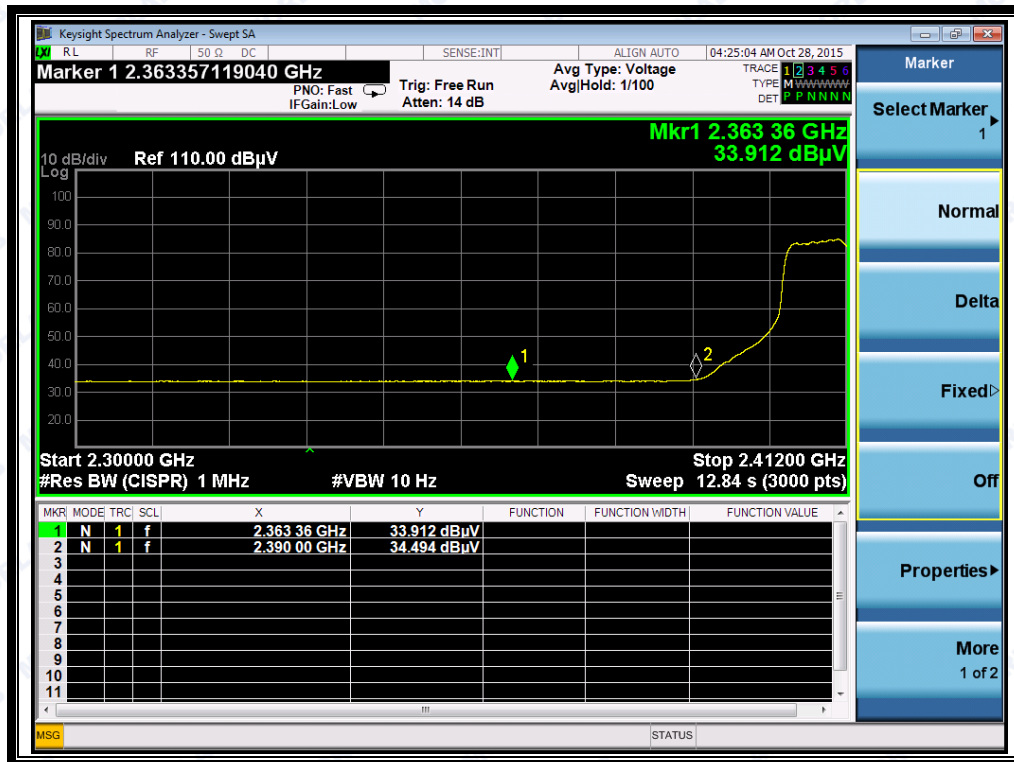
Channel	Frequency (MHz)	Detector	Receiver Reading $U_R$ (dBuV)	$A_T$ (dB)	$A_{Factor}$ (dB@3m)	Max. Emission $E$ (dBuV/m)	Limit (dBuV/m)	Verdict
		PK/ AV						
1	2368.88	PK	44.83	-33.63	32.56	43.76	74	Pass
1	2363.36	AV	33.91	-33.63	32.56	32.84	54	Pass
11	2483.89	PK	49.67	-33.18	32.5	48.99	74	Pass
11	2484.26	AV	36.03	-33.18	32.5	35.35	54	Pass

**B. Test Plots:**

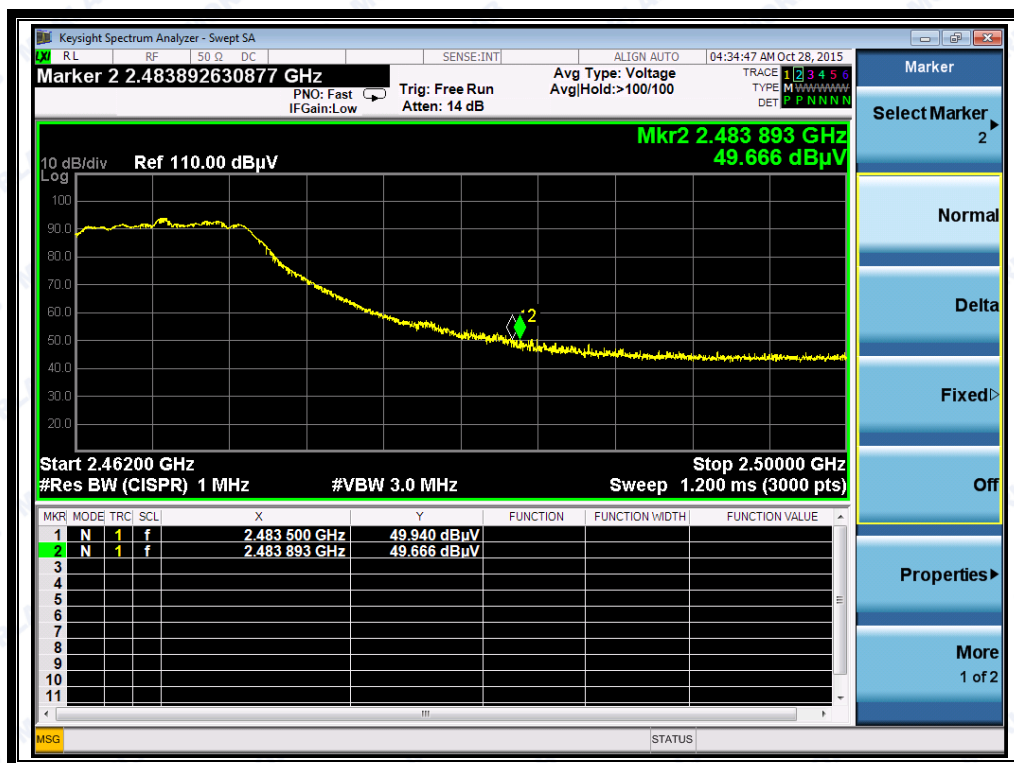
(Plot E1: Channel = 1 PEAK @ 802.11n-20)



REPORT No.: SZ15100009W03



(Plot E2: Channel = 1 AVG @ 802.11n-20)

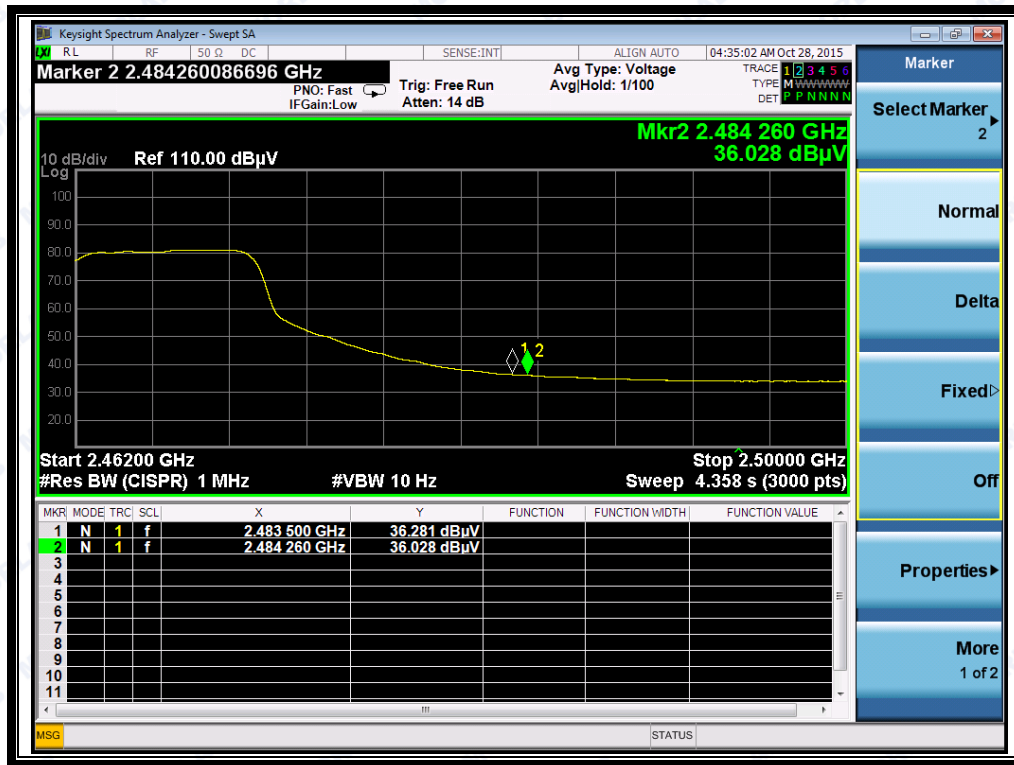


(Plot F1: Channel = 11 PEAK @ 802.11n-20)





REPORT No.: SZ15100009W03



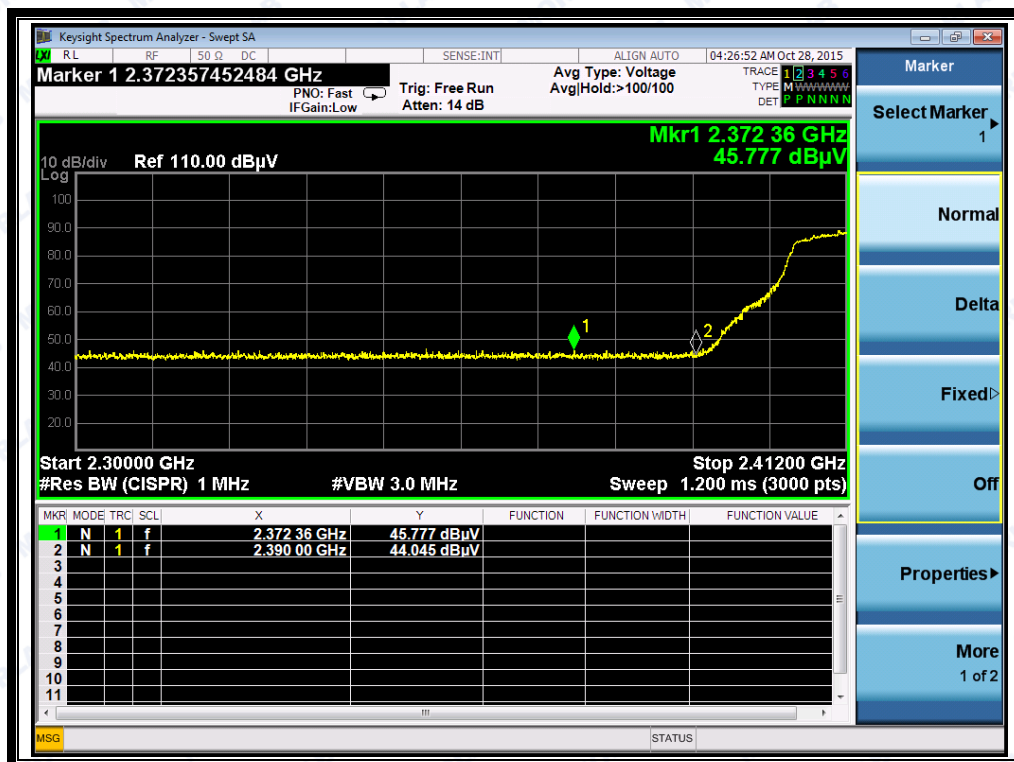
(Plot F2: Channel = 11 AVG @ 802.11n-20)

**2.6.3.4 802.11n-40MHz Test mode**

The lowest and highest channels are tested to verify the band edge emissions.

**A. Test Verdict:**

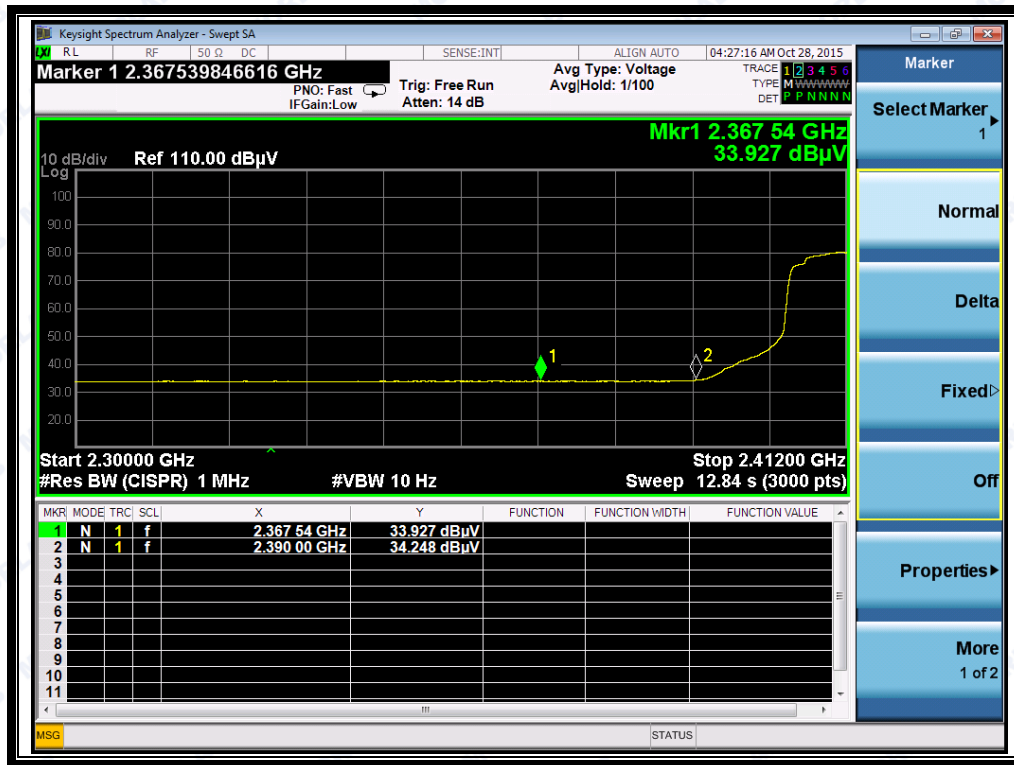
Channel	Frequency (MHz)	Detector	Receiver Reading $U_R$ (dBuV)	$A_T$ (dB)	$A_{Factor}$ (dB@3m)	Max. Emission $E$ (dBuV/m)	Limit (dBuV/m)	Verdict
		PK/ AV						
3	2372.36	PK	45.78	-33.63	32.56	44.71	74	Pass
3	2367.54	AV	33.93	-33.63	32.56	32.86	54	Pass
9	2484.01	PK	50.19	-33.18	32.5	49.51	74	Pass
9	2484.44	AV	36.96	-33.18	32.5	36.28	54	Pass

**B. Test Plots:**

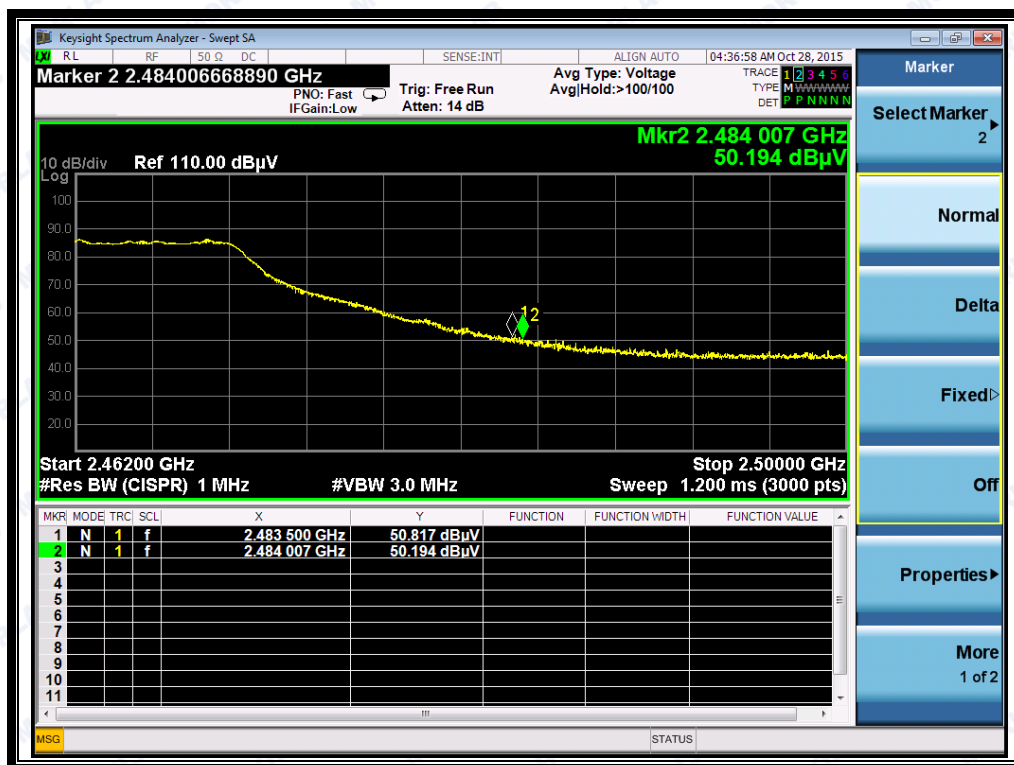
(Plot E1: Channel = 3 PEAK @ 802.11n-40)



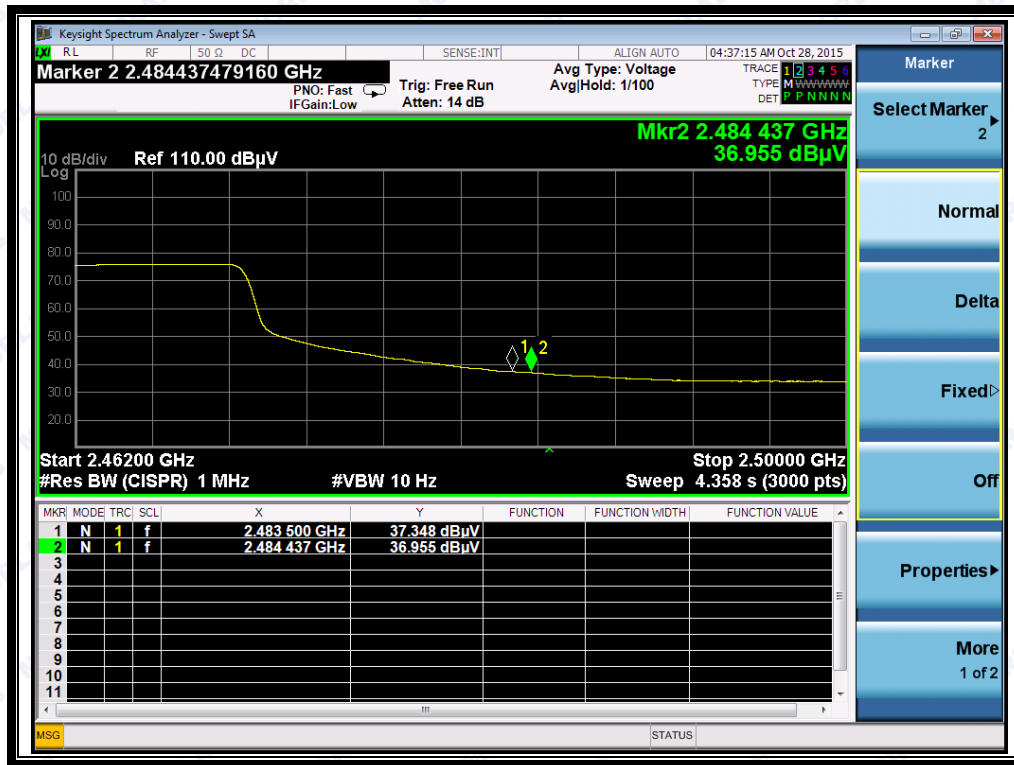
REPORT No.: SZ15100009W03



(Plot E2: Channel = 3 AVG @ 802.11n-40)



(Plot F1: Channel = 9 PEAK @ 802.11n-40)



(Plot F2: Channel = 9 AVG @ 802.11n-40)

## 2.7 Conducted Emission

### 2.7.1 Requirement

According to FCC section 15.207, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency within the band 150kHz to 30MHz shall not exceed the limits in the following table, as measured using a 50μH/50Ω line impedance stabilization network (LISN).

Frequency range (MHz)	Conducted Limit (dBμV)	
	Quai-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
5 - 30	60	50

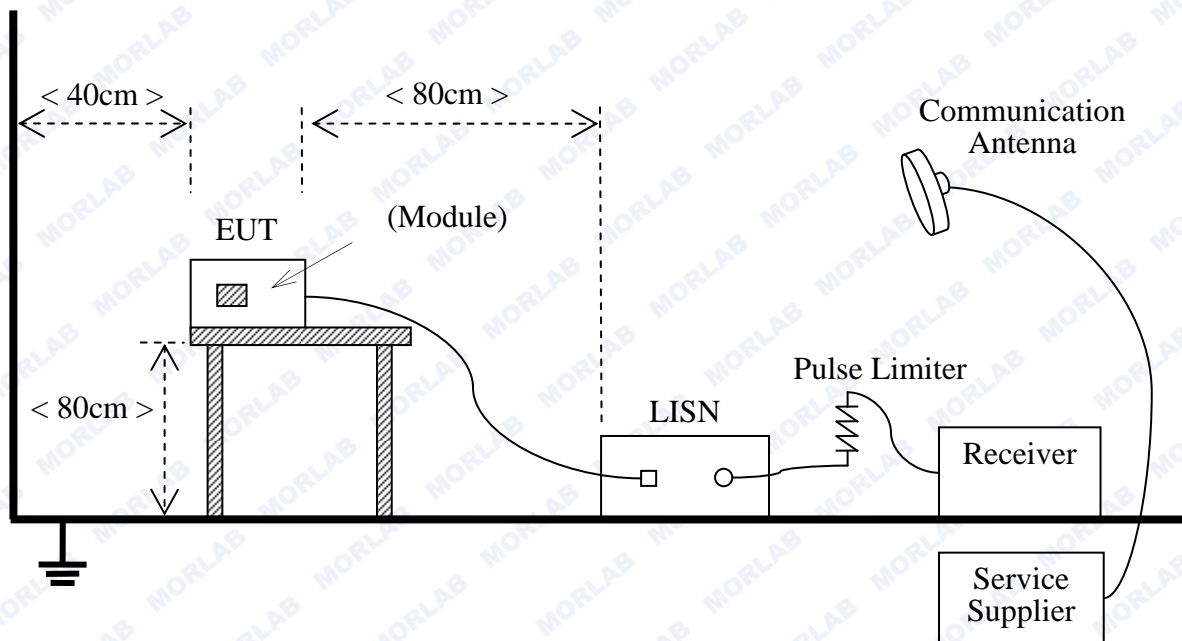
#### NOTE:

- The lower limit shall apply at the band edges.
- The limit decreases linearly with the logarithm of the frequency in the range 0.15 - 0.50MHz.



## 2.7.2 Test Description

### A. Test Setup:



The Table-top EUT was placed upon a non-metallic table 0.8m above the horizontal metal reference ground plane. EUT was connected to LISN and LISN was connected to reference Ground Plane. EUT was 80cm from LISN. The set-up and test methods were according to ANSI C63.4:2009

### B. Equipments List:

Please reference ANNEX A(1.4).

## 2.7.3 Test Result

The maximum conducted interference is searched using Peak (PK), if the emission levels more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both L phase and N phase lines of the power mains connected to the EUT are performed. Refer to recorded points and plots below.

Note: All test modes are performed, only the worst case is recorded in this report.

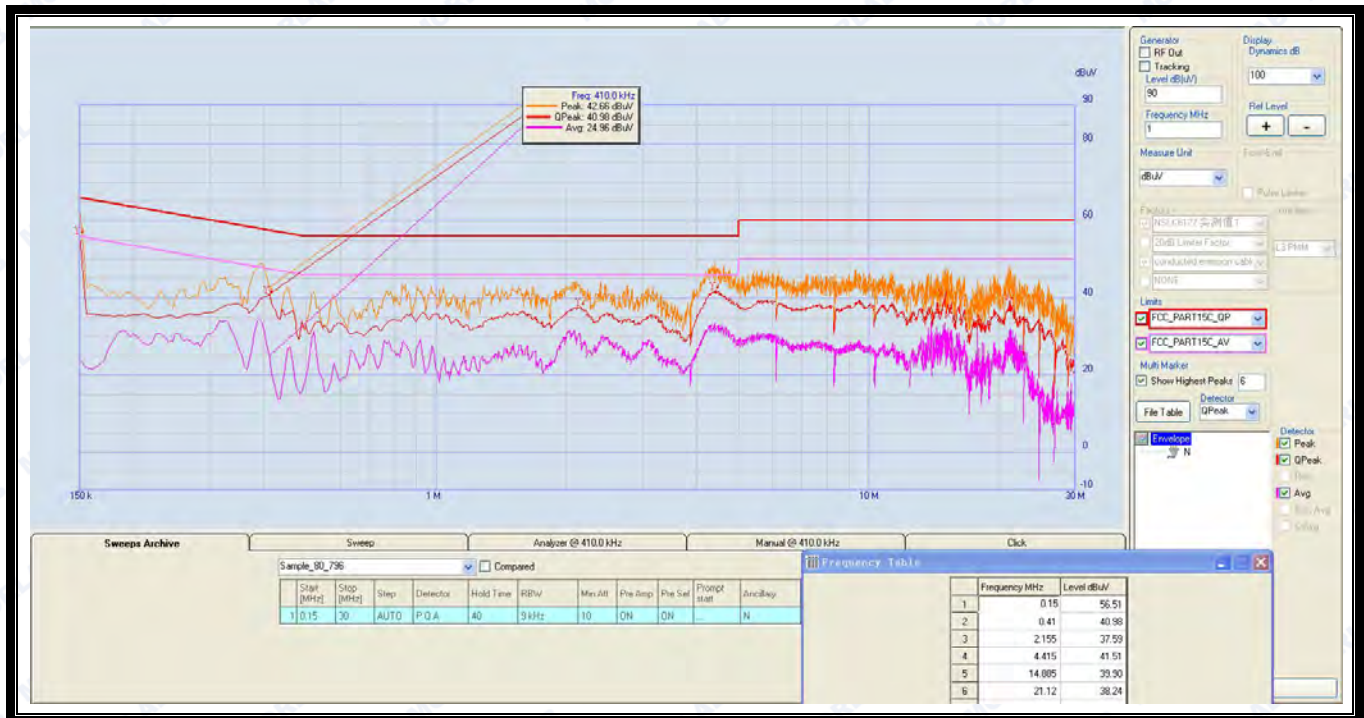
### A. Test setup:

The EUT configuration of the emission tests is EUT + Link.

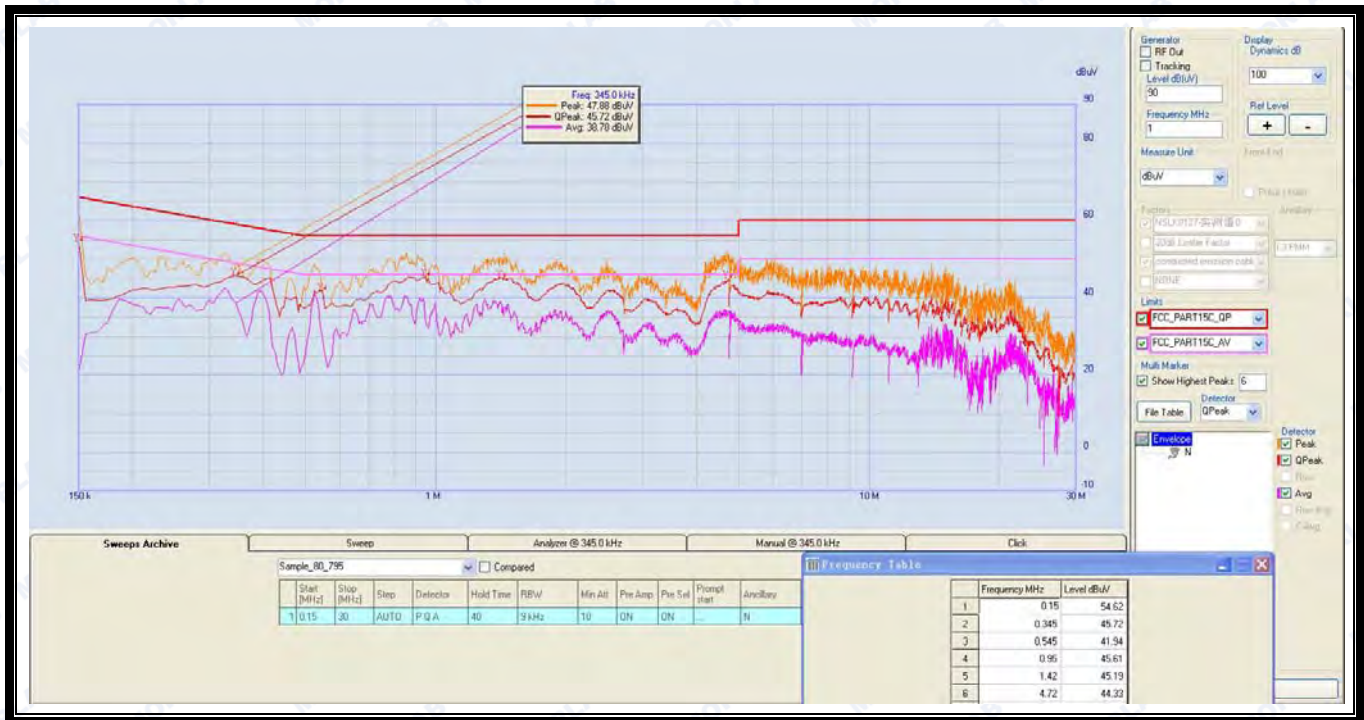
### B. Test Plots:



REPORT No.: SZ15100009W03



(Plot A: L Phase)



(Plot B: N Phase)





## 2.8 Radiated Emission

### 2.8.1 Requirement

According to FCC section 15.247(d), radiated emission outside the frequency band attenuation below the general limits specified in FCC section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in FCC section 15.205(a), must also comply with the radiated emission limits specified in FCC section 15.209(a).

According to FCC section 15.209 (a), except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength ( $\mu\text{V}/\text{m}$ )	Measurement Distance (m)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

Note:

For Above 1000MHz, the emission limit in this paragraph is based on measurement instrumentation employing an average detector, measurement using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit.

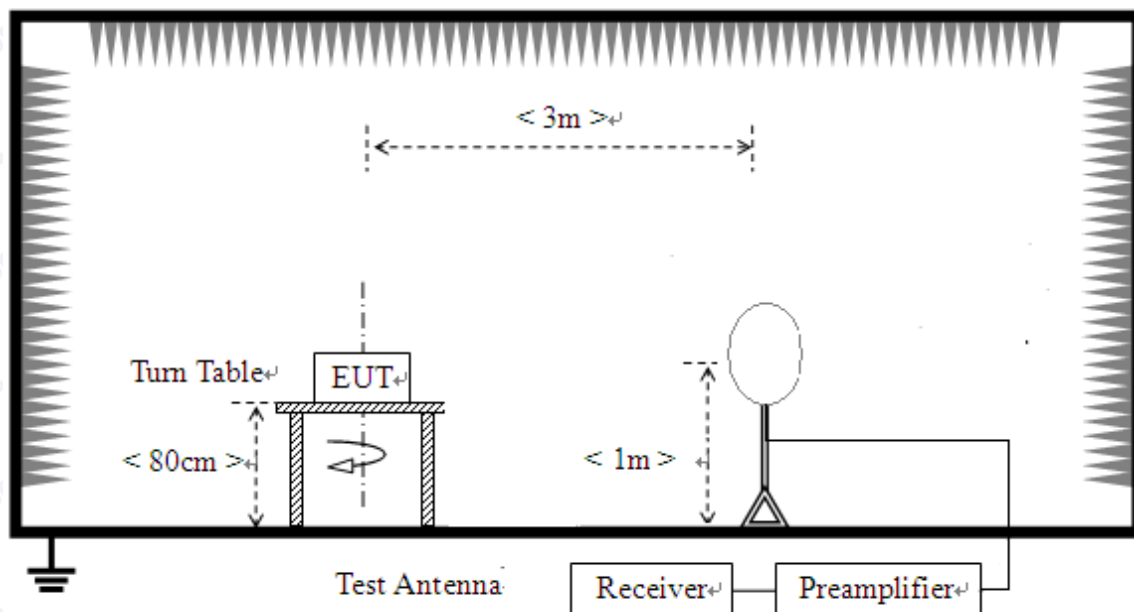
For above 1000MHz, limit field strength of harmonics: 54dBuV/m@3m (AV) and 74dBuV/m@3m (PK)

In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), also should comply with the radiated emission limits specified in Section 15.209(a)(above table)

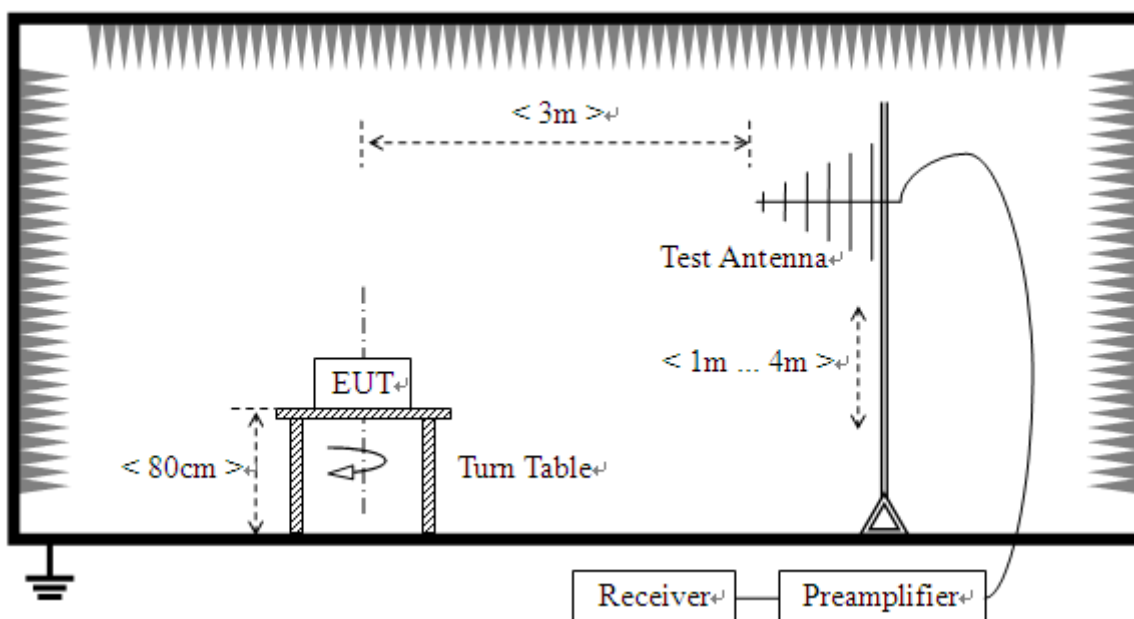
## 2.8.2 Test Description

### A. Test Setup:

- 1) For radiated emissions from 9kHz to 30MHz

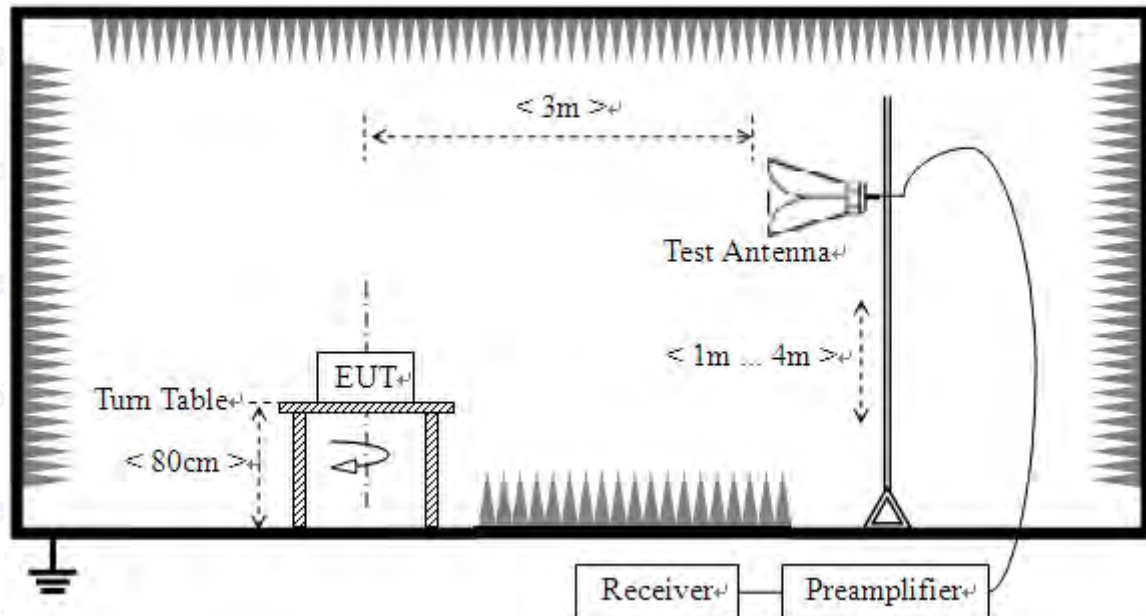


- 2) For radiated emissions from 30MHz to 1GHz





### 3) For radiated emissions above 1GHz



The test site semi-anechoic chamber has met the requirement of NSA tolerance 4dB according to the standards: ANSI C63.4 (2009). The EUT was set-up on insulator 80cm above the Ground Plane. The set-up and test methods were according to ANSI C63.4.

The EUT is located in a 3m Semi-Anechoic Chamber; the antenna factors, cable loss and so on of the site as factors are calculated to correct the reading

For the Test Antenna:

- In the frequency range of 9kHz to 30MHz, magnetic field is measured with Loop Test Antenna. The Test Antenna is positioned with its plane vertical at 1m distance from the EUT. The center of the Loop Test Antenna is 1m above the ground. During the measurement the Loop Test Antenna rotates about its vertical axis for maximum response at each azimuth about the EUT.
- In the frequency range above 30MHz, Bi-Log Test Antenna (30MHz to 1GHz) and Horn Test Antenna (above 1GHz) are used. Test Antenna is 3m away from the EUT. Test Antenna height is varied from 1m to 4m above the ground to determine the maximum value of the field strength. The emission levels at both horizontal and vertical polarizations should be tested.

### B. Equipments List:

Please reference ANNEX A(1.4).



### 2.8.3 Test Result

According to ANSI C63.4 selection 4.2.2, because of peak detection will yield amplitudes equal to or greater than amplitudes measured with the quasi-peak (or average) detector, the measurement data from a spectrum analyzer peak detector will represent the worst-case results, if the peak measured value complies with the quasi-peak limit, it is unnecessary to perform an quasi-peak measurement.

The measurement results are obtained as below:

$$E \text{ [dB}\mu\text{V/m]} = U_R + A_T + A_{\text{Factor}} \text{ [dB]}; A_T = L_{\text{Cable loss}} \text{ [dB]} - G_{\text{preamp}} \text{ [dB]}$$

$A_T$ : Total correction Factor except Antenna

$U_R$ : Receiver Reading

$G_{\text{preamp}}$ : Preamplifier Gain

$A_{\text{Factor}}$ : Antenna Factor at 3m

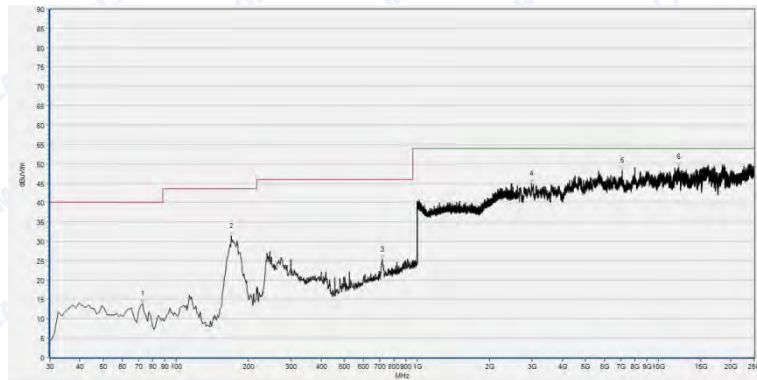
During the test, the total correction Factor  $A_T$  and  $A_{\text{Factor}}$  were built in test software.

**Note:** All radiated emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

The low frequency, which started from 9KHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

**2.8.3.1 802.11b Test mode****A. Test Plots for the Whole Measurement Frequency Range:**

Plots for Channel = 1



Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
72.491	13.83	N.A	N.A	N.A	40.00	N.A	Horizontal	PASS
169.612	31.26	N.A	N.A	N.A	43.50	N.A	Horizontal	PASS
717.134	25.34	N.A	N.A	N.A	46.00	N.A	Horizontal	PASS
2986.979	44.94	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS
7072.668	48.33	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS
12188.943	49.19	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS

(Antenna Horizontal, 30MHz to 25GHz)



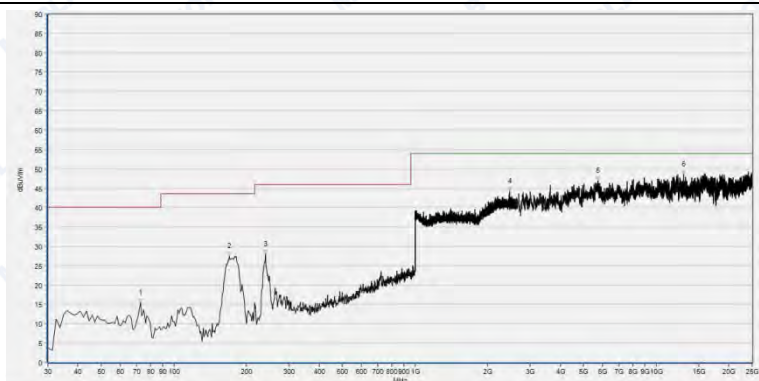
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
84.631	19.28	N.A	N.A	N.A	40.00	N.A	Vertical	PASS
170.826	18.59	N.A	N.A	N.A	43.50	N.A	Vertical	PASS
532.603	25.90	N.A	N.A	N.A	46.00	N.A	Vertical	PASS
2461.064	46.26	N.A	N.A	74.0	N.A	54.0	Vertical	PASS
5598.072	46.88	N.A	N.A	74.0	N.A	54.0	Vertical	PASS
12914.021	48.97	N.A	N.A	74.0	N.A	54.0	Vertical	PASS

(Antenna Vertical, 30MHz to 25GHz)





Plot for Channel = 6



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
72.491	15.34	N.A	N.A	N.A	40.00	N.A	Horizontal	PASS
169.612	27.48	N.A	N.A	N.A	43.50	N.A	Horizontal	PASS
240.025	28.06	N.A	N.A	N.A	46.00	N.A	Horizontal	PASS
2462.985	44.18	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS
5724.350	46.98	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS
12979.196	48.57	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS

(Antenna Horizontal, 30MHz to 25GHz)



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
76.133	17.55	N.A	N.A	N.A	40.00	N.A	Vertical	PASS
182.966	14.53	N.A	N.A	N.A	43.50	N.A	Vertical	PASS
407.559	22.92	N.A	N.A	N.A	46.00	N.A	Vertical	PASS
2183.834	42.89	N.A	N.A	74.0	N.A	54.0	Vertical	PASS
5651.027	47.20	N.A	N.A	74.0	N.A	54.0	Vertical	PASS
12673.686	49.34	N.A	N.A	74.0	N.A	54.0	Vertical	PASS

(Antenna Vertical, 30MHz to 25GHz)





Plot for Channel = 11



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
74.919	14.06	N.A	N.A	N.A	40.00	N.A	Horizontal	PASS
172.040	23.25	N.A	N.A	N.A	43.50	N.A	Horizontal	PASS
713.492	25.78	N.A	N.A	N.A	46.00	N.A	Horizontal	PASS
2354.142	43.92	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS
5740.644	47.11	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS
8958.683	48.81	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS

(Antenna Horizontal, 30MHz to 25GHz)

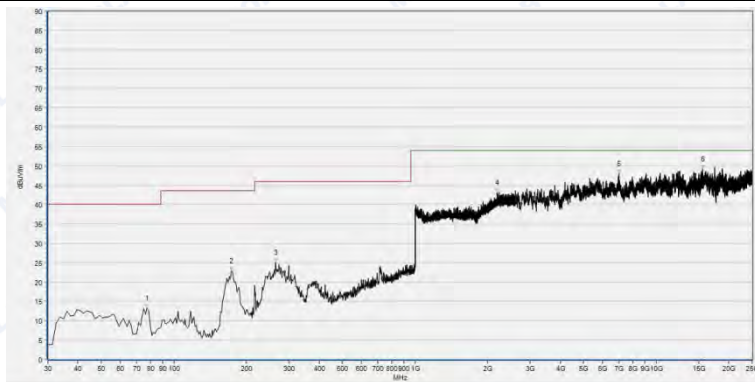


Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
76.133	17.75	N.A	N.A	N.A	40.00	N.A	Vertical	PASS
180.538	15.55	N.A	N.A	N.A	43.50	N.A	Vertical	PASS
407.559	24.38	N.A	N.A	N.A	46.00	N.A	Vertical	PASS
3333.224	44.73	N.A	N.A	74.0	N.A	54.0	Vertical	PASS
5761.011	47.25	N.A	N.A	74.0	N.A	54.0	Vertical	PASS
12131.915	48.43	N.A	N.A	74.0	N.A	54.0	Vertical	PASS

(Antenna Vertical, 30MHz to 25GHz)

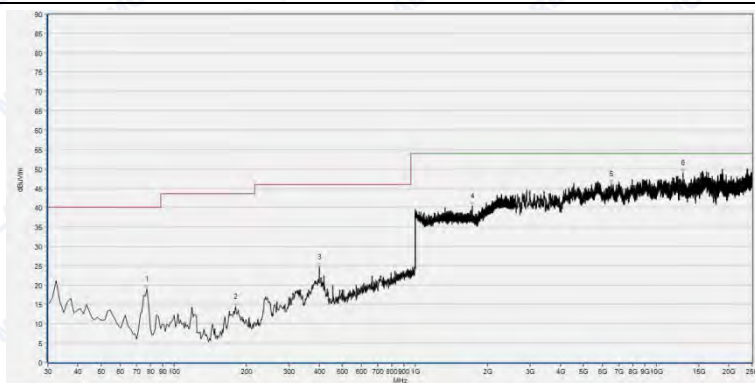


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**2.8.3.2 802.11g Test mode****A. Test Plots for the Whole Measurement Frequency Range:**Plots for Channel = 1

Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
77.347	13.28	N.A	N.A	N.A	40.00	N.A	Horizontal	PASS
173.254	22.72	N.A	N.A	N.A	43.50	N.A	Horizontal	PASS
264.305	24.95	N.A	N.A	N.A	46.00	N.A	Horizontal	PASS
2193.437	43.07	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS
7015.639	47.99	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS
15610.656	49.07	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS

(Antenna Horizontal, 30MHz to 25GHz)



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
77.347	18.96	N.A	N.A	N.A	40.00	N.A	Vertical	PASS
180.538	14.38	N.A	N.A	N.A	43.50	N.A	Vertical	PASS
400.275	24.65	N.A	N.A	N.A	46.00	N.A	Vertical	PASS
1727.331	40.37	N.A	N.A	74.0	N.A	54.0	Vertical	PASS
6522.750	46.02	N.A	N.A	74.0	N.A	54.0	Vertical	PASS
12893.653	49.00	N.A	N.A	74.0	N.A	54.0	Vertical	PASS

(Antenna Vertical, 30MHz to 25GHz)



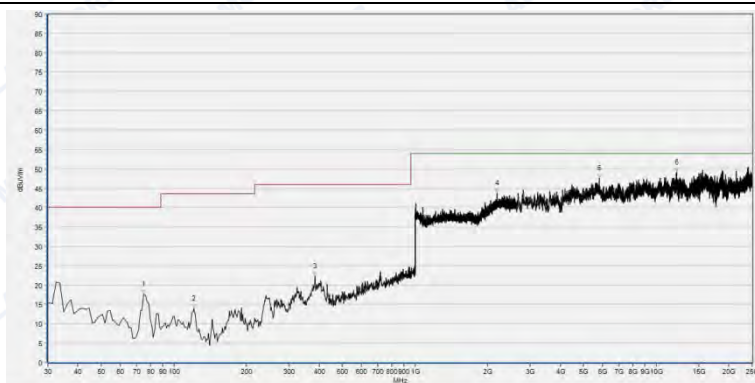
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Plot for Channel = 6



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
74.919	12.44	N.A	N.A	N.A	40.00	N.A	Horizontal	PASS
174.468	22.52	N.A	N.A	N.A	43.50	N.A	Horizontal	PASS
274.018	25.72	N.A	N.A	N.A	46.00	N.A	Horizontal	PASS
2685.543	44.21	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS
5577.705	46.09	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS
10286.634	48.19	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS

(Antenna Horizontal, 30MHz to 25GHz)



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
74.919	17.53	N.A	N.A	N.A	40.00	N.A	Vertical	PASS
121.051	13.88	N.A	N.A	N.A	43.50	N.A	Vertical	PASS
384.493	22.34	N.A	N.A	N.A	46.00	N.A	Vertical	PASS
2190.876	43.72	N.A	N.A	74.0	N.A	54.0	Vertical	PASS
5793.599	47.56	N.A	N.A	74.0	N.A	54.0	Vertical	PASS
12180.797	49.04	N.A	N.A	74.0	N.A	54.0	Vertical	PASS

(Antenna Vertical, 30MHz to 25GHz)





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Plot for Channel = 11



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
169.612	24.81	N.A	N.A	N.A	43.50	N.A	Horizontal	PASS
275.232	25.92	N.A	N.A	N.A	46.00	N.A	Horizontal	PASS
390.563	21.56	N.A	N.A	N.A	46.00	N.A	Horizontal	PASS
3137.698	46.71	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS
5646.954	47.82	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS
12518.894	49.96	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS

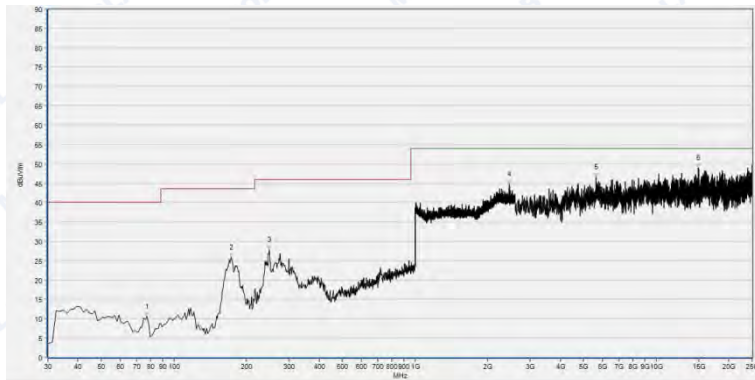
(Antenna Horizontal, 30MHz to 25GHz)



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
74.919	17.04	N.A	N.A	N.A	40.00	N.A	Vertical	PASS
238.811	18.80	N.A	N.A	N.A	46.00	N.A	Vertical	PASS
407.559	20.50	N.A	N.A	N.A	46.00	N.A	Vertical	PASS
2568.627	43.74	N.A	N.A	74.0	N.A	54.0	Vertical	PASS
3874.995	45.75	N.A	N.A	74.0	N.A	54.0	Vertical	PASS
12123.768	49.09	N.A	N.A	74.0	N.A	54.0	Vertical	PASS

(Antenna Vertical, 30MHz to 25GHz)



**2.8.3.3 802.11n-20MHz Test mode****A. Test Plots for the Whole Measurement Frequency Range:**Plots for Channel = 1

Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
77.347	10.60	N.A	N.A	N.A	40.00	N.A	Horizontal	PASS
173.254	25.84	N.A	N.A	N.A	43.50	N.A	Horizontal	PASS
248.523	27.84	N.A	N.A	N.A	46.00	N.A	Horizontal	PASS
2461.705	44.73	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS
5626.587	46.60	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS
14897.800	48.89	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS

(Antenna Horizontal, 30MHz to 25GHz)



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
77.347	16.79	N.A	N.A	N.A	40.00	N.A	Vertical	PASS
237.597	16.85	N.A	N.A	N.A	46.00	N.A	Vertical	PASS
715.920	22.84	N.A	N.A	N.A	46.00	N.A	Vertical	PASS
2461.705	44.72	N.A	N.A	74.0	N.A	54.0	Vertical	PASS
4477.869	46.83	N.A	N.A	74.0	N.A	54.0	Vertical	PASS
8966.830	47.52	N.A	N.A	74.0	N.A	54.0	Vertical	PASS

(Antenna Vertical, 30MHz to 25GHz)



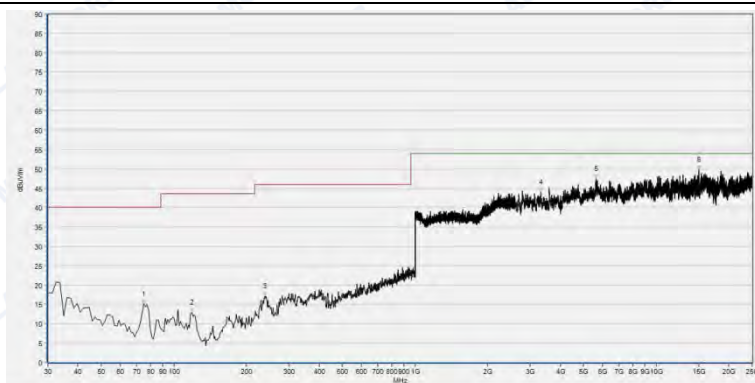
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Plot for Channel = 6



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
114.981	13.39	N.A	N.A	N.A	43.50	N.A	Horizontal	PASS
172.040	27.74	N.A	N.A	N.A	43.50	N.A	Horizontal	PASS
264.305	26.24	N.A	N.A	N.A	46.00	N.A	Horizontal	PASS
2815.894	44.77	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS
6543.117	46.44	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS
15626.950	50.31	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS

(Antenna Horizontal, 30MHz to 25GHz)



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
74.919	15.02	N.A	N.A	N.A	40.00	N.A	Vertical	PASS
118.623	12.84	N.A	N.A	N.A	43.50	N.A	Vertical	PASS
238.811	17.10	N.A	N.A	N.A	46.00	N.A	Vertical	PASS
3329.151	43.97	N.A	N.A	74.0	N.A	54.0	Vertical	PASS
5642.881	47.36	N.A	N.A	74.0	N.A	54.0	Vertical	PASS
14999.636	49.74	N.A	N.A	74.0	N.A	54.0	Vertical	PASS

(Antenna Vertical, 30MHz to 25GHz)



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Plot for Channel = 11



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
114.981	14.67	N.A	N.A	N.A	43.50	N.A	Horizontal	PASS
169.612	27.91	N.A	N.A	N.A	43.50	N.A	Horizontal	PASS
238.811	25.14	N.A	N.A	N.A	46.00	N.A	Horizontal	PASS
2669.249	45.34	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS
9019.785	49.29	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS
14103.473	49.86	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS

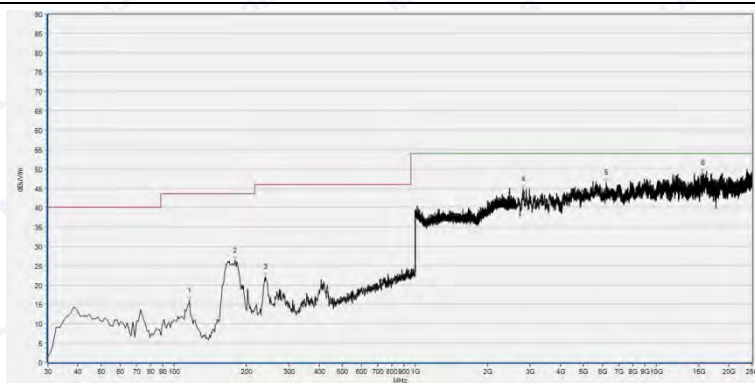
(Antenna Horizontal, 30MHz to 25GHz)



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
122.265	14.21	N.A	N.A	N.A	43.50	N.A	Vertical	PASS
238.811	20.04	N.A	N.A	N.A	46.00	N.A	Vertical	PASS
480.401	19.59	N.A	N.A	N.A	46.00	N.A	Vertical	PASS
4192.726	46.30	N.A	N.A	74.0	N.A	54.0	Vertical	PASS
7981.051	47.50	N.A	N.A	74.0	N.A	54.0	Vertical	PASS
15618.803	49.20	N.A	N.A	74.0	N.A	54.0	Vertical	PASS

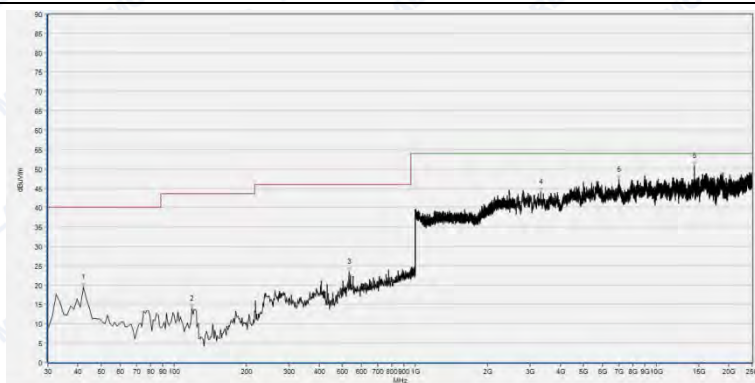
(Antenna Vertical, 30MHz to 25GHz)



**2.8.3.4 802.11n-40MHz Test mode****A. Test Plots for the Whole Measurement Frequency Range:**Plots for Channel = 3

Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
116.195	15.90	N.A	N.A	N.A	43.50	N.A	Horizontal	PASS
179.324	26.33	N.A	N.A	N.A	43.50	N.A	Horizontal	PASS
240.025	22.07	N.A	N.A	N.A	46.00	N.A	Horizontal	PASS
2807.747	44.77	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS
6221.313	46.40	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS
15606.583	48.96	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS

(Plot A.2: Antenna Horizontal, 30MHz to 25GHz)



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
42.140	19.39	N.A	N.A	N.A	40.00	N.A	Vertical	PASS
118.623	13.99	N.A	N.A	N.A	43.50	N.A	Vertical	PASS
532.603	23.38	N.A	N.A	N.A	46.00	N.A	Vertical	PASS
3316.930	44.14	N.A	N.A	74.0	N.A	54.0	Vertical	PASS
6999.345	47.23	N.A	N.A	74.0	N.A	54.0	Vertical	PASS
14433.424	50.83	N.A	N.A	74.0	N.A	54.0	Vertical	PASS

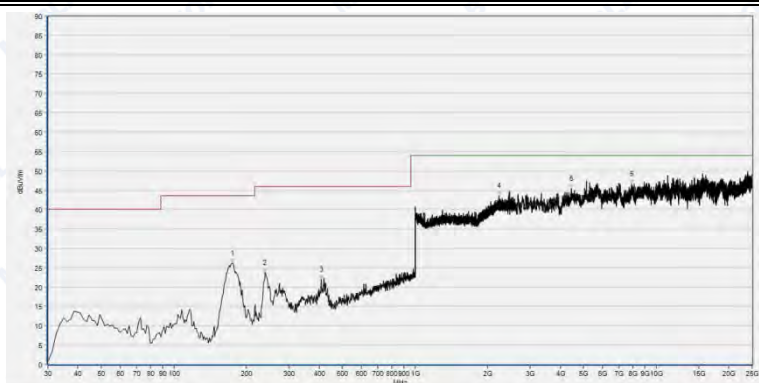
(Plot A.3: Antenna Vertical, 30MHz to 25GHz)





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# Plots for Channel = 6



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
174.468	26.10	N.A	N.A	N.A	43.50	N.A	Horizontal	PASS
238.811	23.66	N.A	N.A	N.A	46.00	N.A	Horizontal	PASS
407.559	21.97	N.A	N.A	N.A	46.00	N.A	Horizontal	PASS
2233.774	43.57	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS
4457.501	45.44	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS
7928.096	46.54	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS

(Plot B.2: Antenna Horizontal, 30MHz to 25GHz)

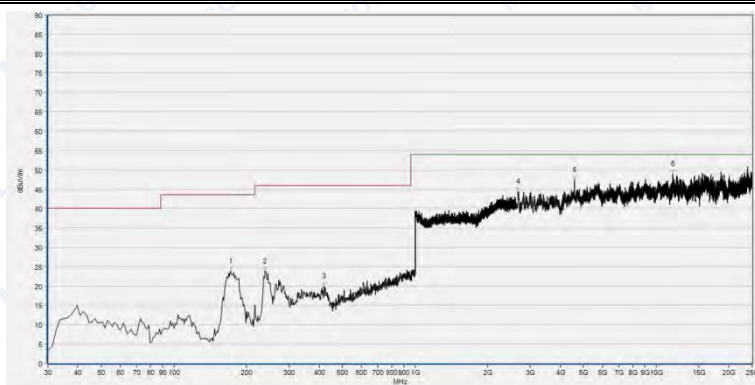


Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
104.055	15.84	N.A	N.A	N.A	43.50	N.A	Vertical	PASS
176.896	15.43	N.A	N.A	N.A	43.50	N.A	Vertical	PASS
241.239	18.25	N.A	N.A	N.A	46.00	N.A	Vertical	PASS
2462.345	44.87	N.A	N.A	74.0	N.A	54.0	Vertical	PASS
5630.660	46.86	N.A	N.A	74.0	N.A	54.0	Vertical	PASS
11899.727	48.16	N.A	N.A	74.0	N.A	54.0	Vertical	PASS

(Plot B.3: Antenna Vertical, 30MHz to 25GHz)

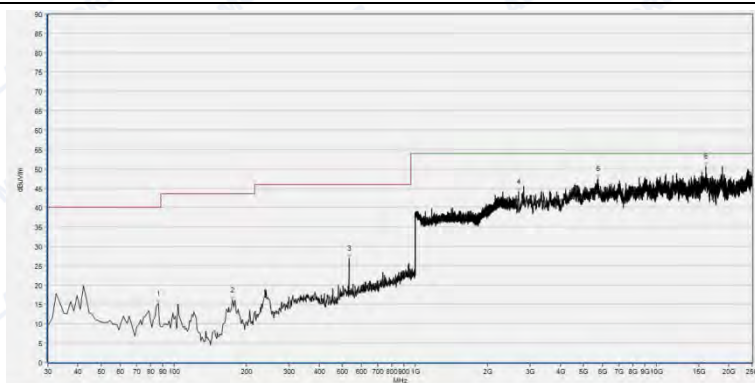


Plots for Channel = 9



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
172.040	23.76	N.A	N.A	N.A	43.50	N.A	Horizontal	PASS
238.811	23.88	N.A	N.A	N.A	46.00	N.A	Horizontal	PASS
419.700	19.94	N.A	N.A	N.A	46.00	N.A	Horizontal	PASS
2673.322	44.40	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS
4583.779	47.36	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS
11749.009	48.99	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS

(Plot C.2: Antenna Horizontal, 30MHz to 25GHz)



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
85.845	15.23	N.A	N.A	N.A	40.00	N.A	Vertical	PASS
174.468	16.13	N.A	N.A	N.A	43.50	N.A	Vertical	PASS
532.603	26.80	N.A	N.A	N.A	46.00	N.A	Vertical	PASS
2685.543	44.04	N.A	N.A	74.0	N.A	54.0	Vertical	PASS
5748.791	47.39	N.A	N.A	74.0	N.A	54.0	Vertical	PASS
16058.738	50.65	N.A	N.A	74.0	N.A	54.0	Vertical	PASS

(Plot C.3: Antenna Vertical, 30MHz to 25GHz)



## **2.9 RF exposure evaluation**

### **2.9.1 Requirement**

According to § 1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of Commission's guideline.

### **2.9.2 Result**

Please refer to SAR report.





## ANNEX A GENERAL INFORMATION

### 1.1 Identification of the Responsible Testing Laboratory

Company Name:	Shenzhen Morlab Communications Technology Co., Ltd.
Department:	Morlab Laboratory
Address:	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China
Responsible Test Lab Manager:	Mr. Su Feng
Telephone:	+86 755 36698555
Facsimile:	+86 755 36698525

### 1.2 Identification of the Responsible Testing Location

Name:	Shenzhen Morlab Communications Technology Co., Ltd. Morlab Laboratory
Address:	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China

### 1.3 Facilities and Accreditations

Shenzhen Morlab Communications Technology Co., Ltd. Morlab Laboratory is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L3572.

All measurement facilities used to collect the measurement data are located at FL.1, Building A, FeiYang Science Park, Block 67, BaoAn District, Shenzhen, 518101 P. R. China. The test site is constructed in conformance with the requirements of ANSI C63.10 2009, ANSI C63.4 2009 and CISPR Publication 22; the FCC registration number is 695796.





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## 1.4 Test Equipments Utilized

### 1.4.1 Conducted Test Equipments

#### Conducted Test Equipment

No.	Equipment Name	Serial No.	Type	Manufacturer	Cal. Date	Cal. Due
1	Spectrum Analyzer	MY45101810	E4407B	Agilent	2015.02.26	2016.02.25
2	Power Splitter	NW521	1506A	Weinschel	2015.02.26	2016.02.25
3	Attenuator 1	(n.a.)	10dB	Resnet	2015.02.26	2016.02.25
4	Attenuator 2	(n.a.)	3dB	Resnet	2015.02.26	2016.02.25
5	USB Wideband Power Sensor	MY52280010	U2021XA	Agilent	2015.02.26	2016.02.25
6	EXA Signal Analyzer	MY51440152	N9010A	Agilent	2015.02.26	2016.02.25
7	RF cable	CB01	RF01	Morlab	N/A	N/A
8	Coaxial cable	CB02	RF02	Morlab	N/A	N/A
9	SMA connector	CN01	RF03	HUBER-SUHNER	N/A	N/A

### 1.4.2 Conducted Emission Test Equipments

#### Conducted Emission Test Equipments

No.	Equipment Name	Serial No.	Type	Manufacturer	Cal. Date	Cal. Due
1	Receiver	US44210471	E7405A	Agilent	2015.02.26	2016.02.25
2	LISN	812744	NSLK 8127	Schwarzbeck	2015.02.26	2016.02.25
3	Service Supplier	100448	CMU200	R&S	2015.02.26	2016.02.25
4	Pulse Limiter (20dB)	9391	VTSD 9561-D	Schwarzbeck	2015.02.26	2016.02.25
5	Coaxial cable(BNC)	CB01	EMC01	Morlab	N/A	N/A



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### 1.4.3 Radiated Test Equipments

Radiated Test Equipments						
No.	Equipment Name	Serial No.	Type	Manufacturer	Cal. Date	Cal.Due Date
1	System Simulator	100448	CMU200	R&S	2015.02.26	2016.02.25
2	Receiver	US44210471	E7405A	Agilent	2015.02.26	2016.02.25
3	Test Antenna - Bi-Log	9163-274	9m*6m*6m	Albatross	2015.02.26	2016.02.25
4	Test Antenna - Horn	9120D-963	VULB 9163	Schwarzbeck	2015.02.26	2016.02.25
5	Test Antenna - Horn	71688	BBHA 9120D	Schwarzbeck	2015.02.26	2016.02.25
6	Test Antenna - Loop	1519-022	HL050S7	R&S	2015.02.26	2016.02.25
7	Reject Filter	(n.a.)	BRM50702	Micro-Tronics	2015.02.26	2016.02.25
8	Coaxial cable (N male)	CB02	EMC02	Morlab	N/A	N/A
9	Coaxial cable (N male)	CB03	EMC03	Morlab	N/A	N/A

### 1.4.4 Climate Chamber

Climate Chamber						
No.	Equipment Name	Serial No.	Type	Manufacturer	Cal.Date	Cal.Due Date
1	Climate Chamber	2004012	HL4003T	Yinhe	2015.02.26	2016.02.25

### 1.4.5 Vibration Table

Vibration Table						
No.	Equipment Name	Serial No.	Type	Manufacturer	Cal.Date	Cal.Due Date
1	Vibration Table	N/A	ACT2000-S015L	CMI-COM	2015.02.26	2016.02.25

### 1.4.6 Anechoic Chamber

Anechoic Chamber						
No.	Equipment Name	Serial No.	Type	Manufacturer	Cal.Date	Cal.Due Date
1	Anechoic Chamber	N/A	9m*6m*6m	Albatross	2015.02.26	2016.02.25

\*\*\*\*\* END OF REPORT \*\*\*\*\*