REPORT No. : SZ17120021W01

TEST REPORT

APPLICANT	:	ShenZhen Gospell Smarthome Electronic Co., Ltd.
PRODUCT NAME	:	360° VR Camera
MODEL NAME	:	T5600HCA
BRAND NAME	:	N/A
FCC ID	:	TW5T5600HCA
STANDARD(S)	:	47 CFR Part 15 Subpart C
TEST DATE	:	2017-12-06 to 2017-12-22
ISSUE DATE	:	2017-12-25

Tested by: Li Jing Zong

Li Jingzong (Test Engineer)

Approved by: Andy Yeh

Andy Yeh (Technical Director)

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MORLAB

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Change History		
Issue	**Date**	**Reason for change**
1.0	2017-12-25	First edition

1. Technical Information

Note: Provide by applicant.

1.1. Applicant and Manufacturer Information

Applicant:	ShenZhen Gospell Smarthome Electronic Co., Ltd.
Applicant Address:	5Floor/Block 2, Vision (SZ) Park, Hi-Tech Industrial Park, Shenzhen, China
Manufacturer:	ShenZhen Gospell Smarthome Electronic Co., Ltd.
Manufacturer Address:	East of 01st-04st Floor, Block A,No.1 Industrial park, Fenghuanggang, South of No.1 Baotian Road, Xixiang street, Bao'an District, Shenzhen City, Guangdong Province 518126,P.R.China

1.2. Equipment Under Test (EUT) Description

Product Name:	360° VR Camera
Serial No:	(N/A, marked #1 by test site)
Hardware Version:	T5600HCA_M02
Software Version:	E_900.T5600HCA.010.340
Modulation Type:	DSSS, OFDM
Operating 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:	PCB Antenna
Antenna Gain:	3.0dBi

Note 1: The EUT is 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 (MHz) =2412+5*(n-1) (1<=n<=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 (MHz) =2412+5*(n-1) (3<=n<=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).

Note 2: The EUT connected to the serial port of the computer with a serial communication cable, we use the dedicated software to control the EUT continuous transmission.

Note 3: For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.

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 (10-1-15 Edition)	Radio Frequency Devices

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

No.	Section	Description	Test Date	Test Engineer	Result
1	15.203	Antenna Requirement	N/A	N/A	PASS
2	15.247(b)	Peak Output Power	Dec 06, 2017	Li Jingzong	PASS
3	15.247(a)	Bandwidth	Dec 06, 2017	Li Jingzong	PASS
4	15.247(d)	Conducted Spurious Emission and Band Edge	Dec 06, 2017	Li Jingzong	PASS
5	15.247(d)	Restricted Frequency Bands	Dec 18, 2017	Wu Zhognwen	PASS
6	15.207	Conducted Emission	Dec 14, 2017	Wu Zhognwen	PASS
7	15.209, 15.247(d)	Radiated Emission	Dec 22, 2017	Wu Zhognwen	PASS
8	15.247(e)	Power spectral density (PSD)	Dec 06, 2017	Li Jingzong	PASS

Note: The tests of Conducted Emission and Radiated Emission were performed according to the method of measurements prescribed in ANSI C63.10 2013 and KDB558074 D01 v04 (04/05/2017).

1.4. Environmental 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

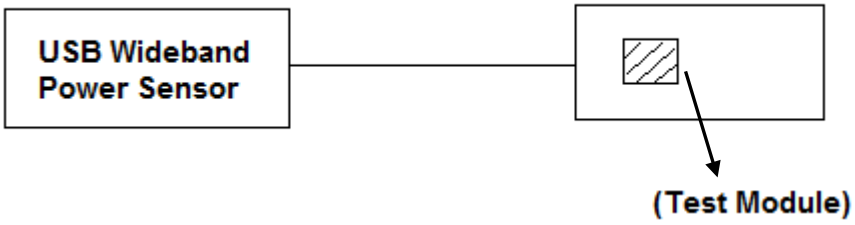
2.2.1. Requirement

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 exceed1 Watt.

2.2.2. Test Description

The measured output power was calculated by the reading of the USB Wideband Power Sensor and calibration.

A. Test Setup:



The EUT (Equipment under the test) which is coupled to the USB Wideband Power Sensor; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading.

B. Equipments List:

Please reference ANNEX A(1.5).

2.2.3. Test Result

2.2.3.1 802.11b Test Mode

Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	W	dBm	W	
1	2412	14.07	0.02553	30	1	PASS
6	2437	14.42	0.02767			PASS
11	2462	14.48	0.02805			PASS

Channel	Frequency (MHz)	Measured Output Average Power		Limit		Verdict
		dBm	W	dBm	W	
1	2412	11.92	0.01556	30	1	PASS
6	2437	12.74	0.01879			PASS
11	2462	12.43	0.01750			PASS

2.2.3.2 802.11g Test mode

Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	W	dBm	W	
1	2412	19.50	0.08913	30	1	PASS
6	2437	19.96	0.09908			PASS
11	2462	20.16	0.10375			PASS

Channel	Frequency (MHz)	Measured Output Average Power		Limit		Verdict
		dBm	W	dBm	W	
1	2412	13.92	0.02466	30	1	PASS
6	2437	13.78	0.02388			PASS
11	2462	14.77	0.02999			PASS

2.2.3.3 802.11n-20MHz Test mode

Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	W	dBm	W	
1	2412	19.94	0.09863	30	1	PASS
6	2437	19.80	0.09550			PASS
11	2462	20.20	0.10471			PASS

Channel	Frequency (MHz)	Measured Output Average Power		Limit		Verdict
		dBm	W	dBm	W	
1	2412	12.99	0.01991	30	1	PASS
6	2437	13.81	0.02404			PASS
11	2462	14.04	0.02535			PASS

2.2.3.4 802.11n-40MHz Test mode

Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	W	dBm	W	
3	2422	19.80	0.09550	30	1	PASS
6	2437	20.13	0.10304			PASS
9	2452	20.09	0.10209			PASS

Channel	Frequency (MHz)	Measured Output Average Power		Limit		Verdict
		dBm	W	dBm	W	
3	2422	13.41	0.02193	30	1	PASS
6	2437	13.64	0.02312			PASS
9	2452	14.21	0.02636			PASS

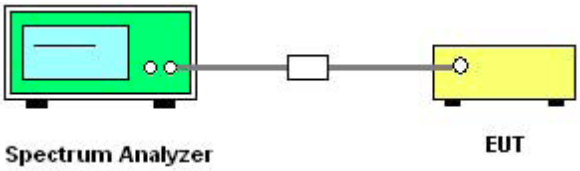
2.3. Bandwidth

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(1.5).

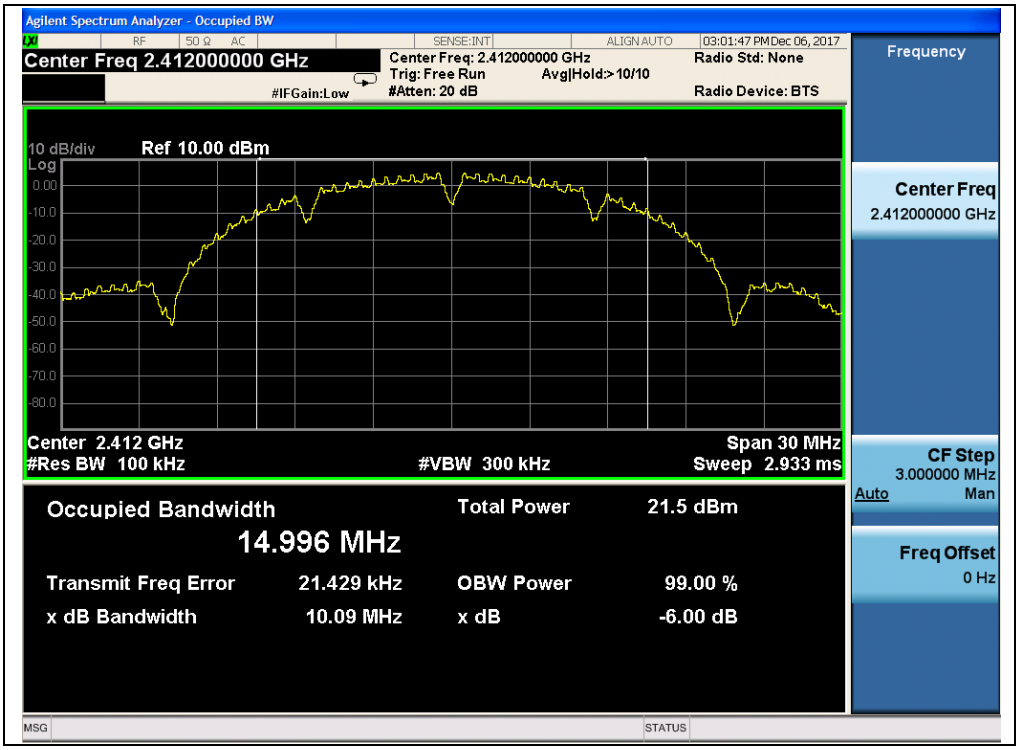
2.3.3. Test Result

2.3.3.1 802.11b Test mode

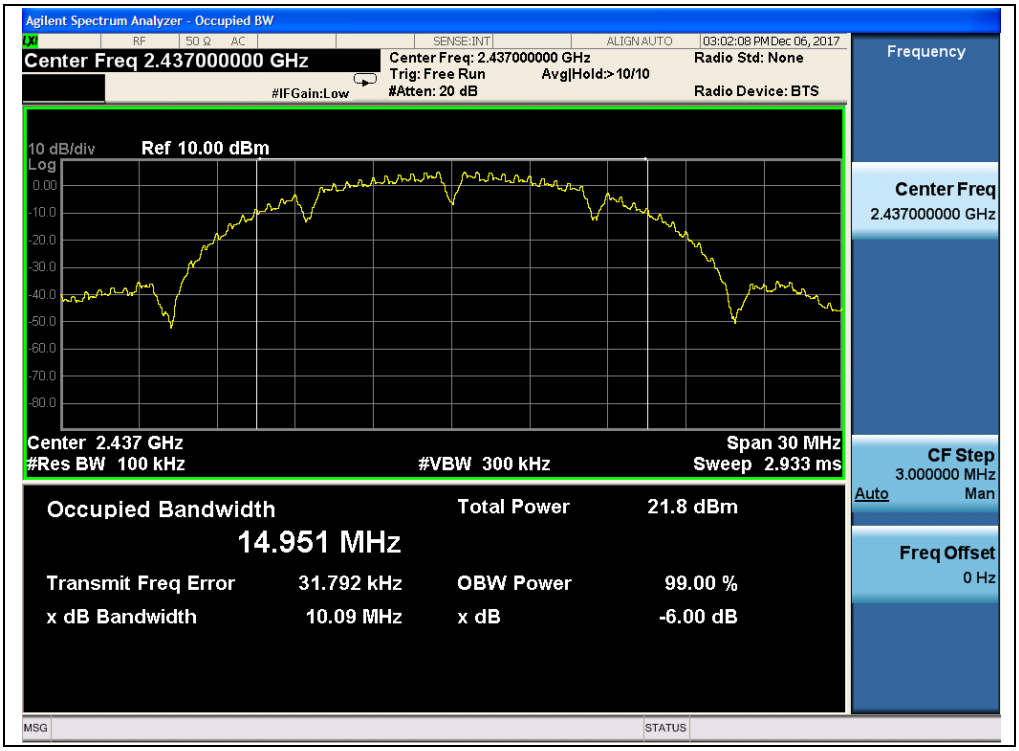
A. Test Verdict:

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limits(kHz)	Result
1	2412	10.09	≥500	PASS
6	2437	10.09	≥500	PASS
11	2462	10.09	≥500	PASS

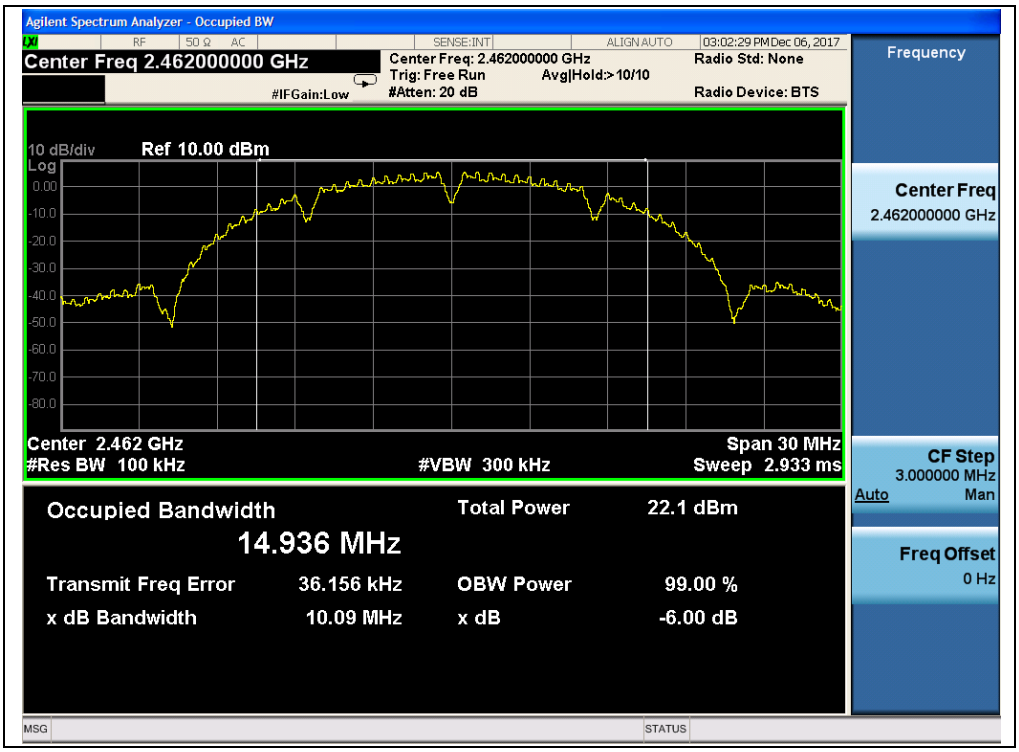
B. Test Plots



(Channel 1: 2412MHz @ 802.11b)



(Channel 6: 2437 MHz @ 802.11b)



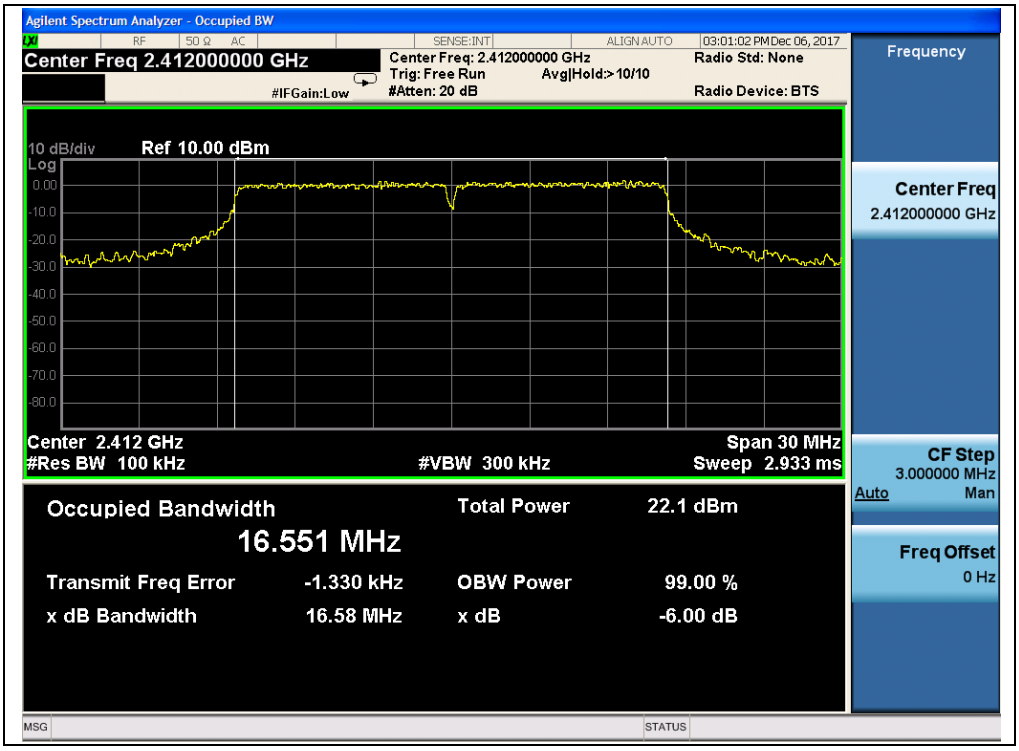
(Channel 11: 2462MHz @ 802.11b)

2.3.3.2 802.11g Test mode

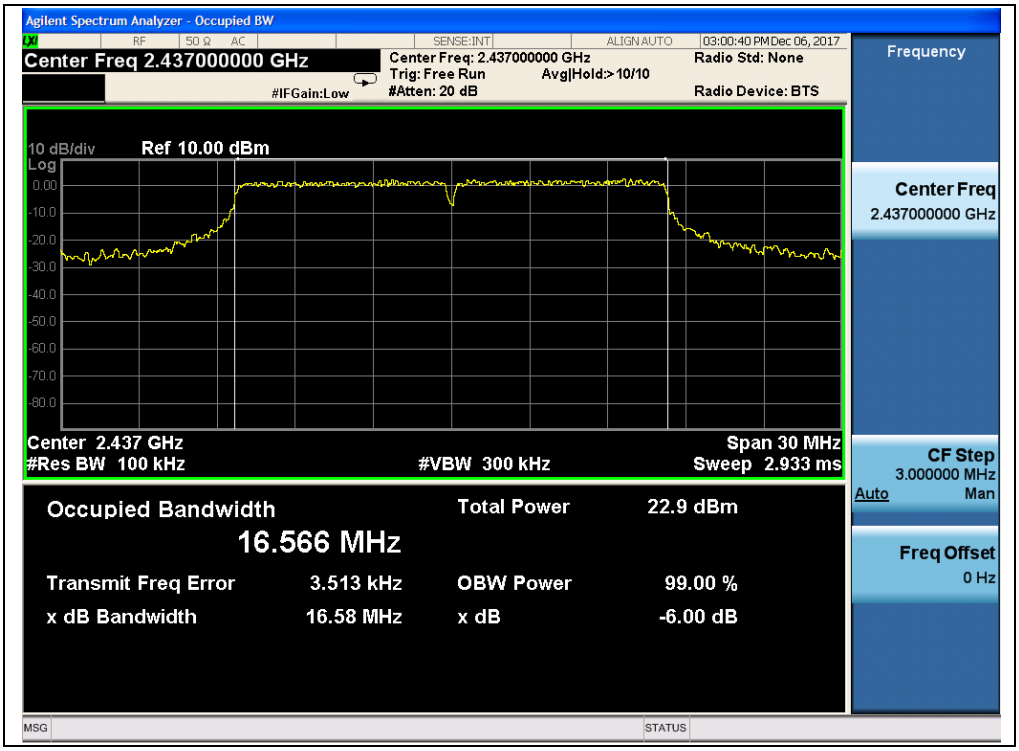
A. Test Verdict:

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limits (kHz)	Result
1	2412	16.58	≥500	PASS
6	2437	16.58	≥500	PASS
11	2462	16.58	≥500	PASS

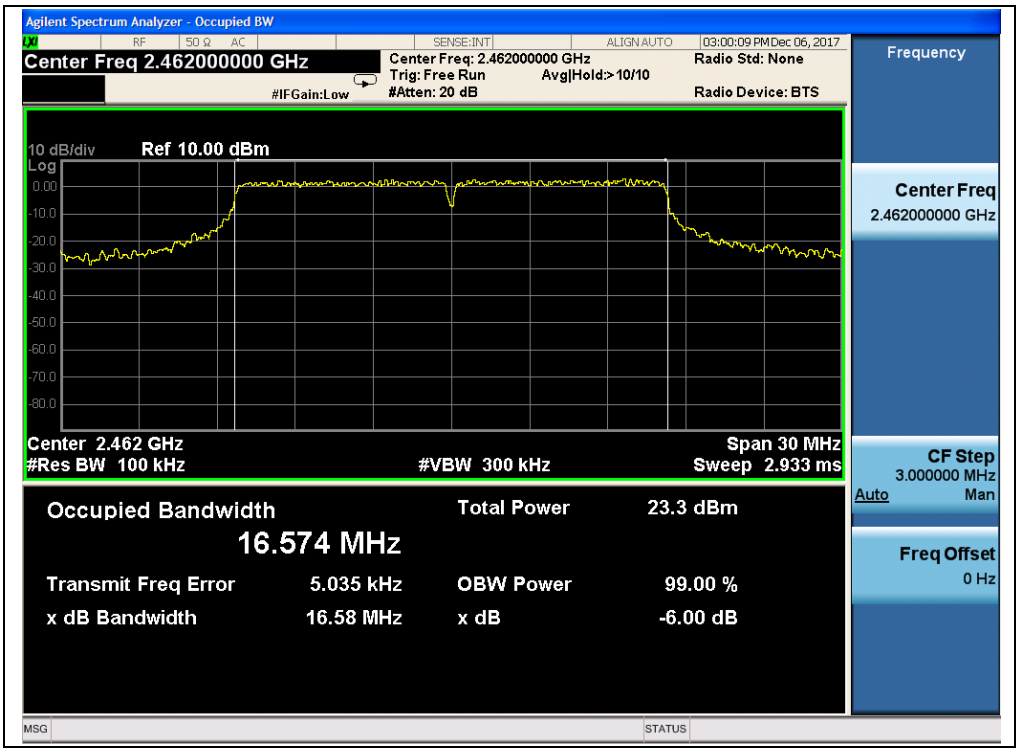
B. Test Plots:



(Channel 1: 2412MHz @ 802.11g)



(Channel 6: 2437MHz @ 802.11g)



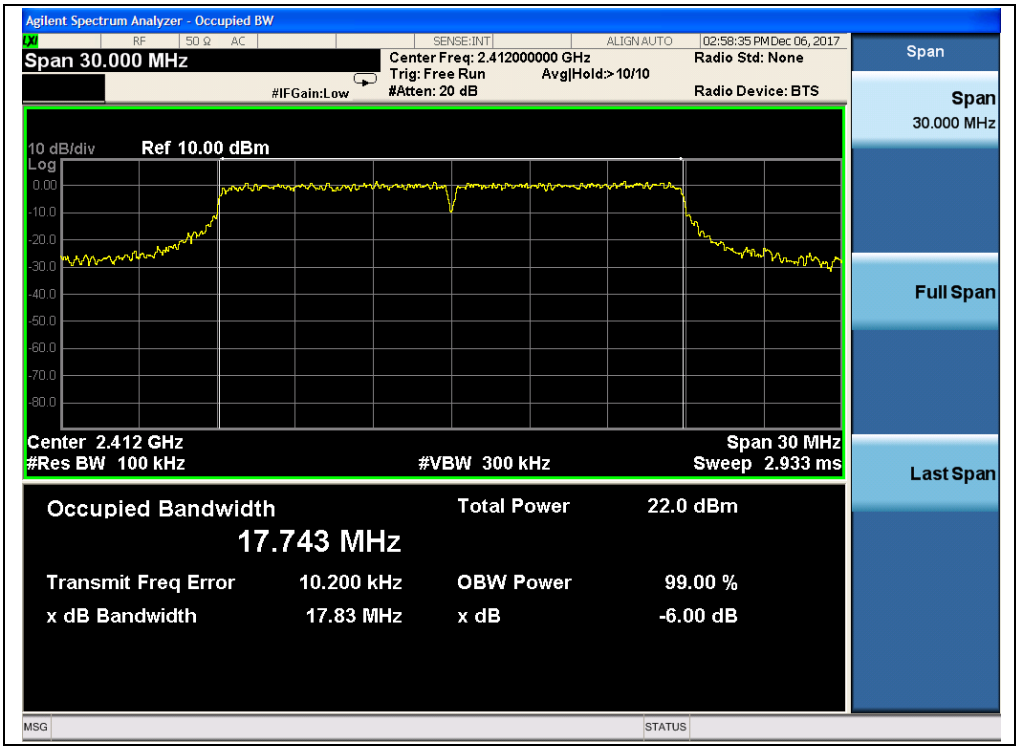
(Channel 11: 2462MHz @ 802.11g)

2.3.3.3 802.11n-20 Test mode

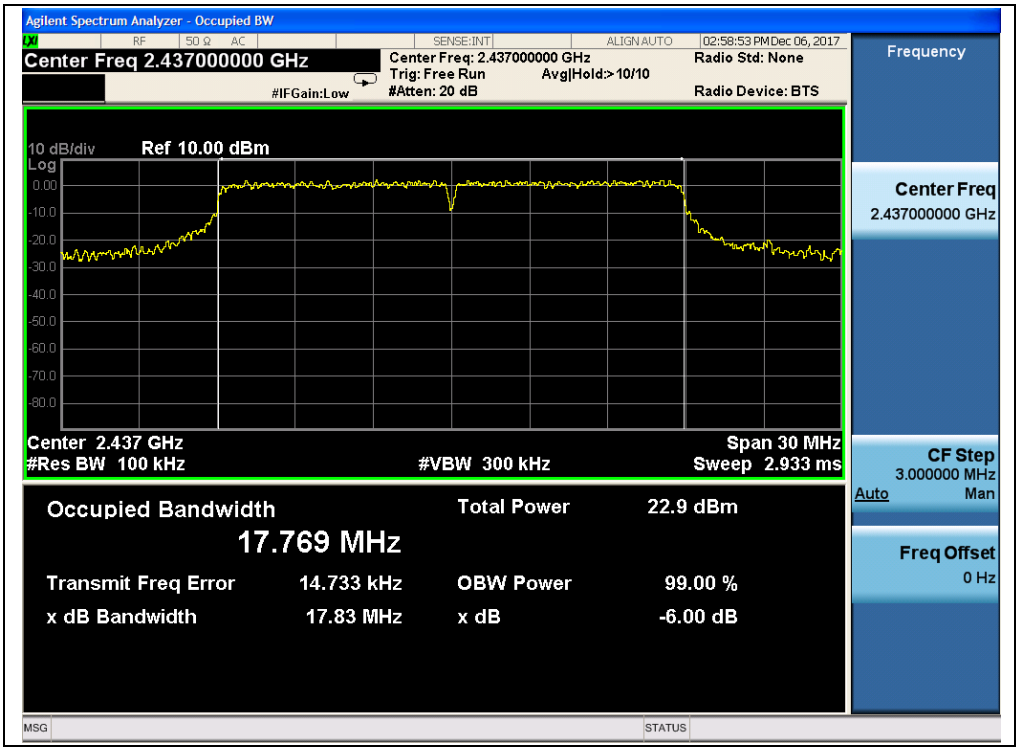
A. Test Verdict:

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limits (kHz)	Result
1	2412	17.83	≥500	PASS
6	2437	17.83	≥500	PASS
11	2462	17.84	≥500	PASS

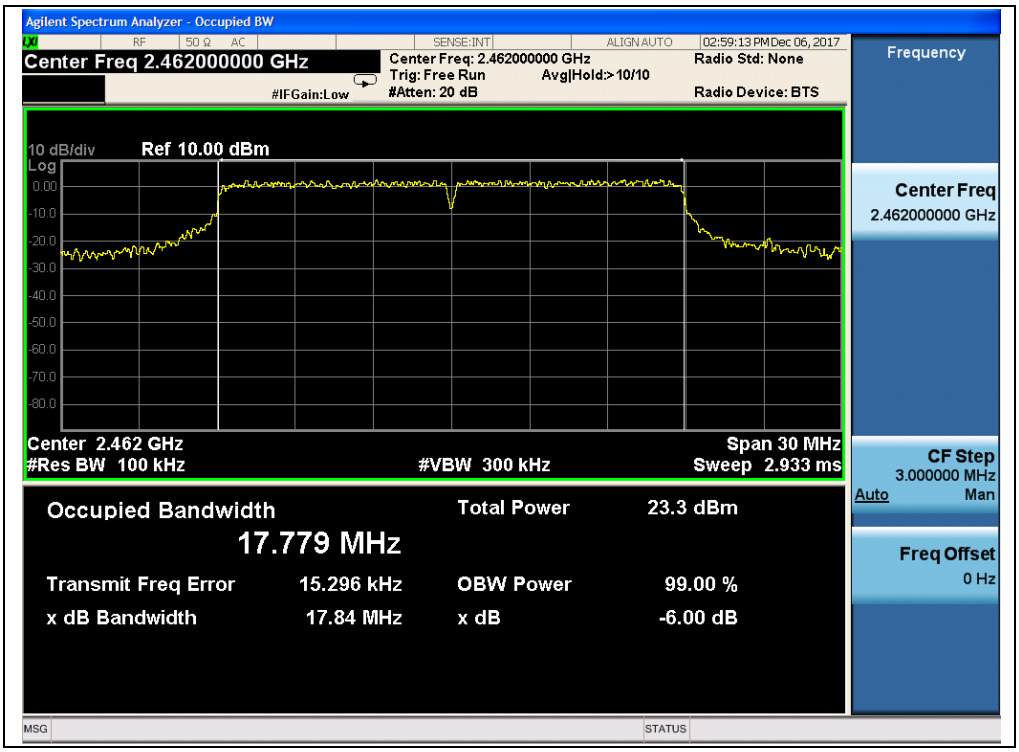
B. Test Plots:



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



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



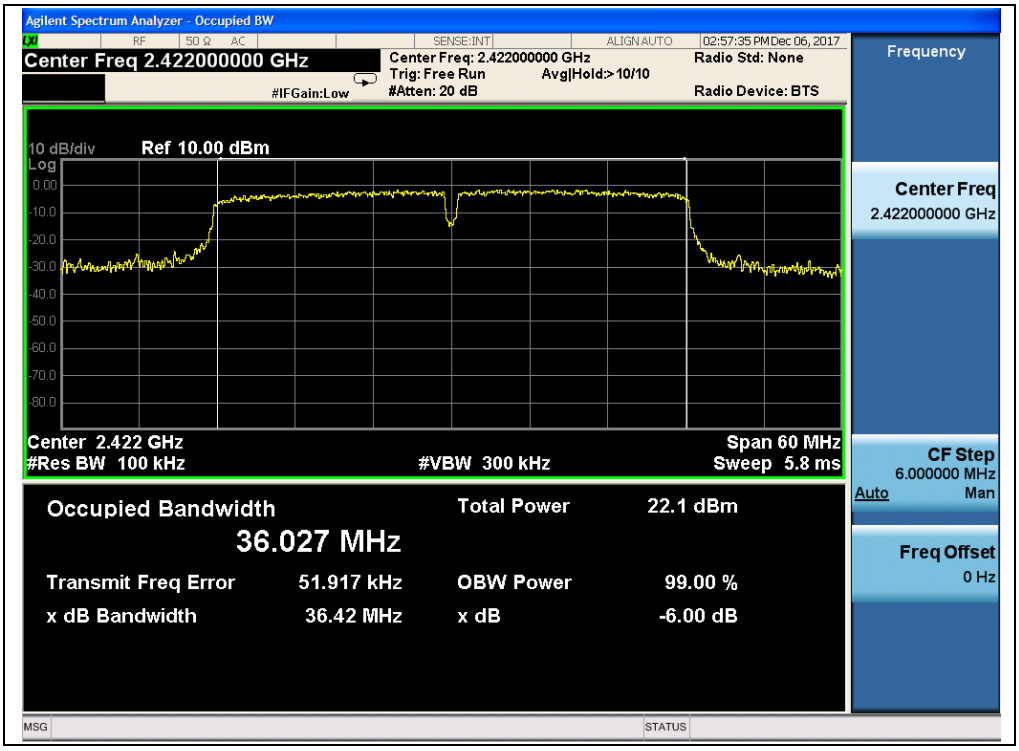
(Channel 11: 2462MHz @ 802.11n-20)

2.3.3.4 802.11n-40 Test mode

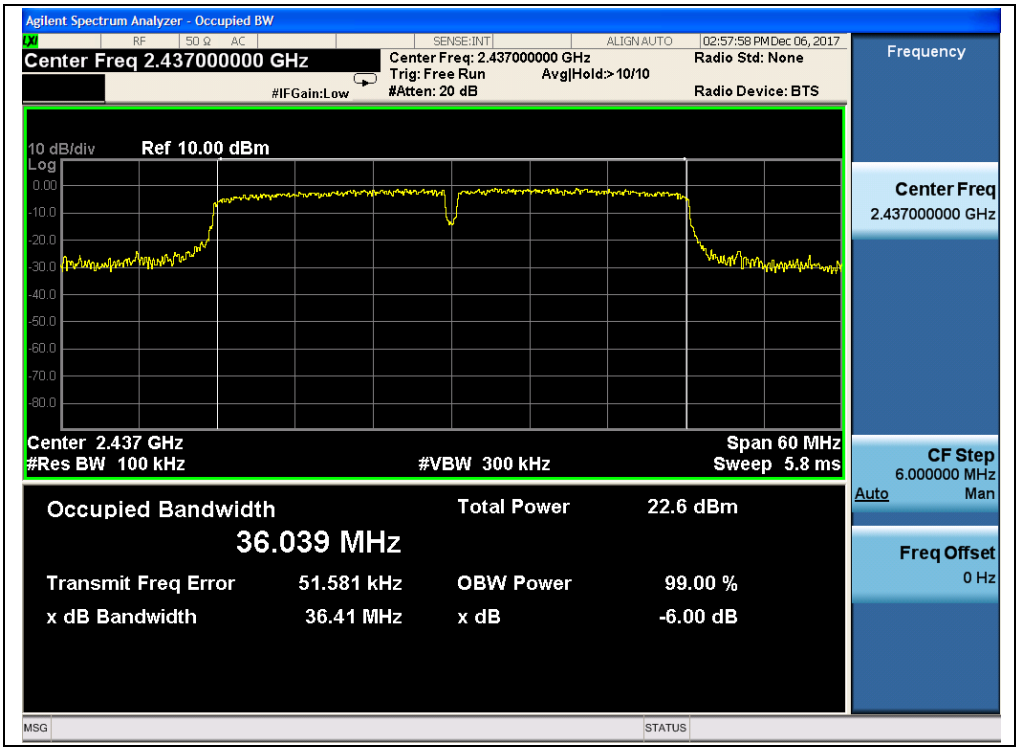
A. Test Verdict:

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limits (kHz)	Result
3	2422	36.42	≥500	PASS
6	2437	36.41	≥500	PASS
9	2452	36.42	≥500	PASS

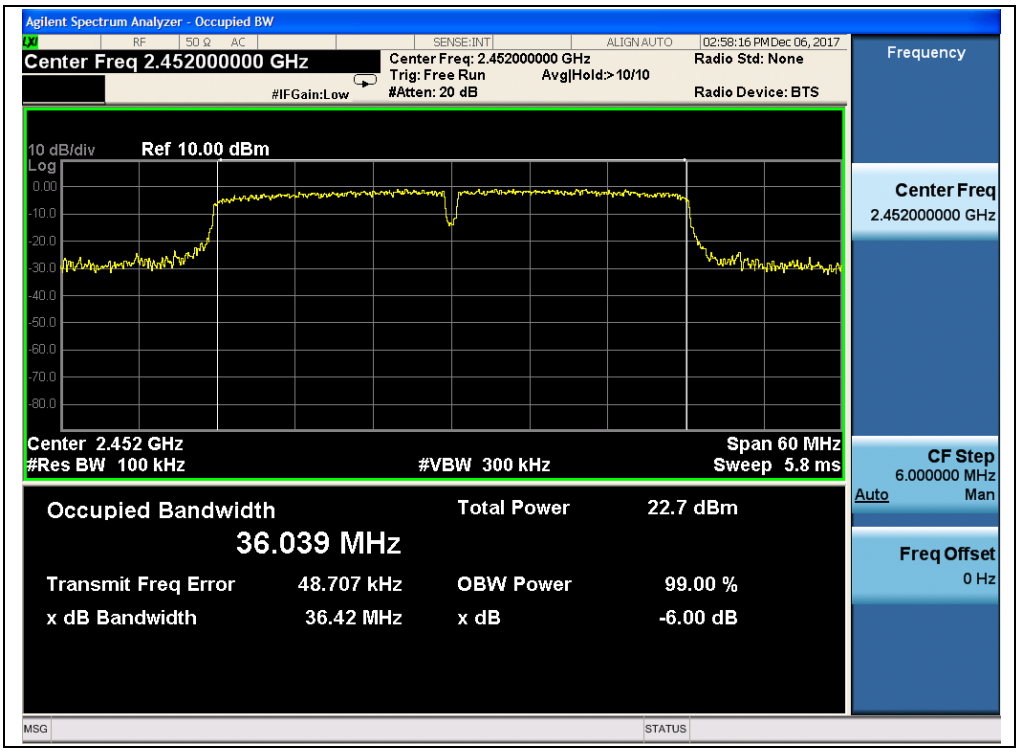
B. Test Plots:



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



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



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

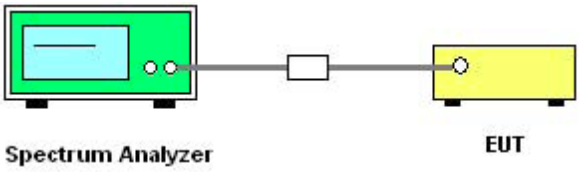
2.4. Conducted Spurious Emissions and Band Edge

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.

B. Equipments List:

Please reference ANNEX A(1.5).

2.4.3. Test Result

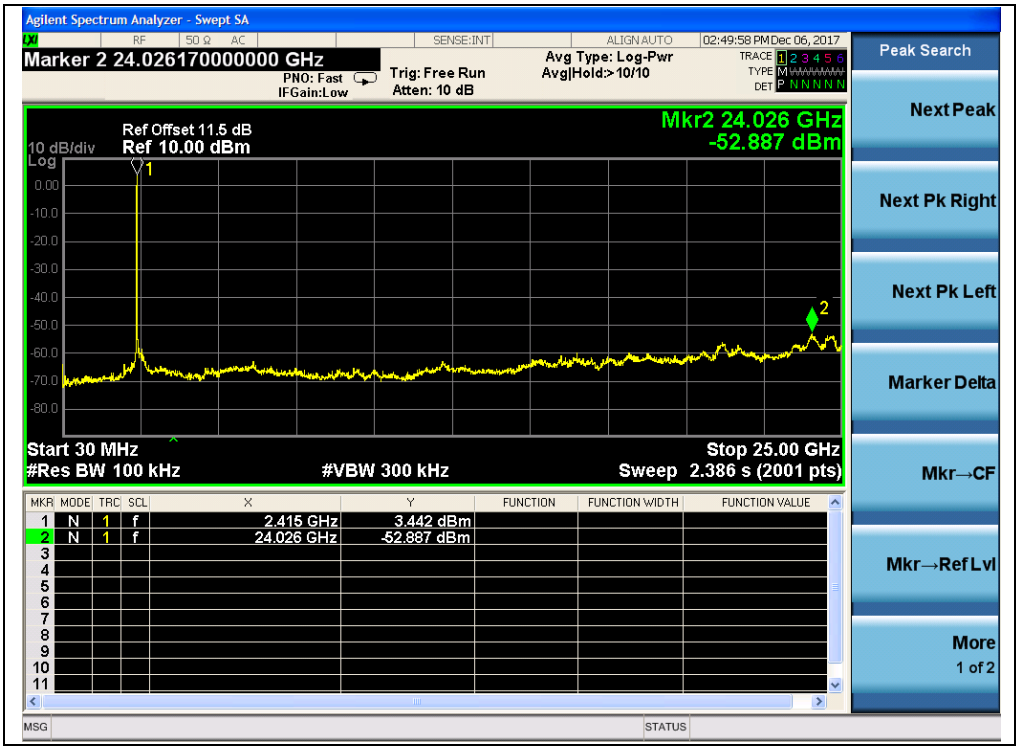
2.4.3.1 802.11b Test mode

A. Test Verdict:

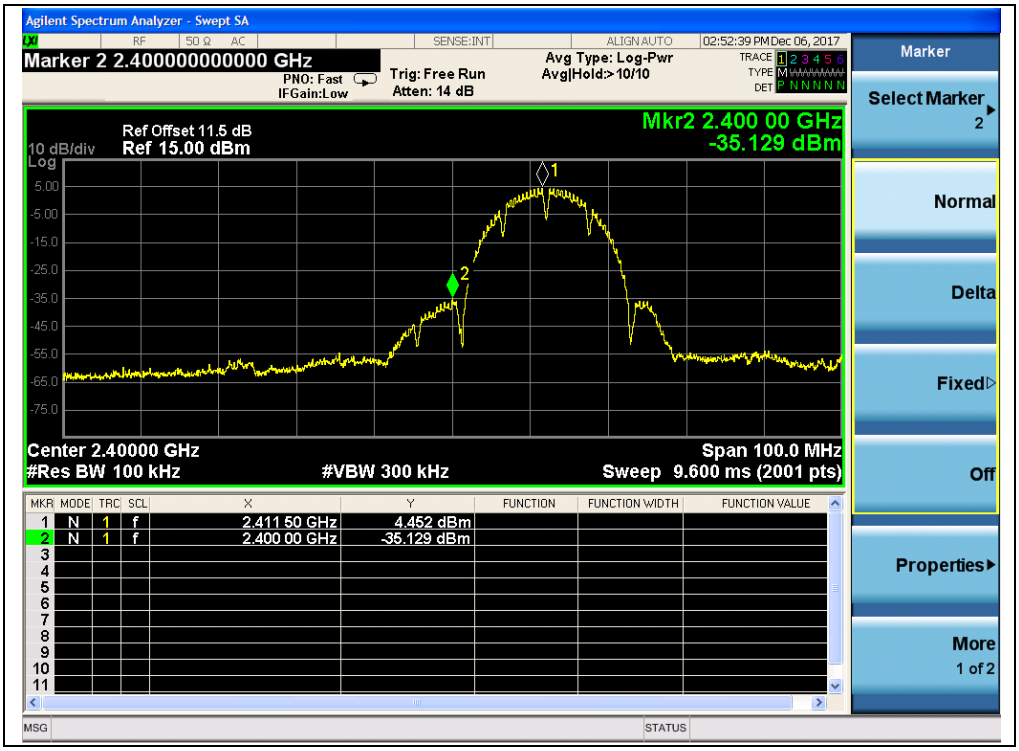
Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
			Carrier Level	Calculated -20dBc Limit	
1	2412	-52.89	3.44	-16.56	PASS
6	2437	-52.81	4.86	-15.14	PASS
11	2462	-53.32	5.09	-14.91	PASS

B. Test Plots:

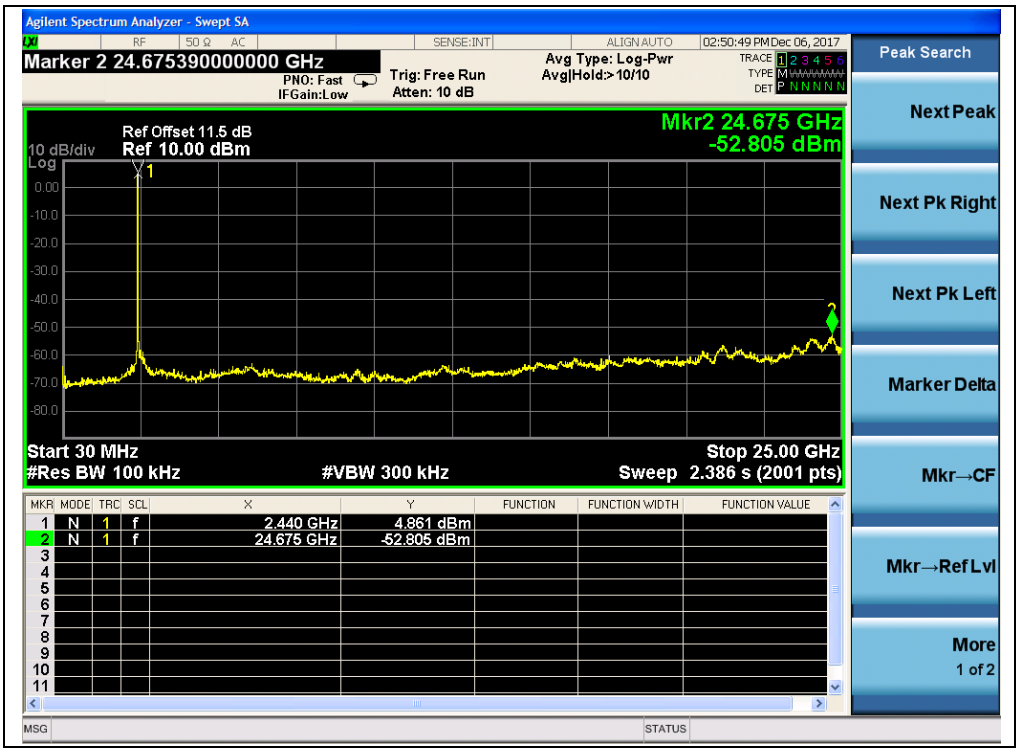
Note: The power of the Module transmitting frequency should be ignored.



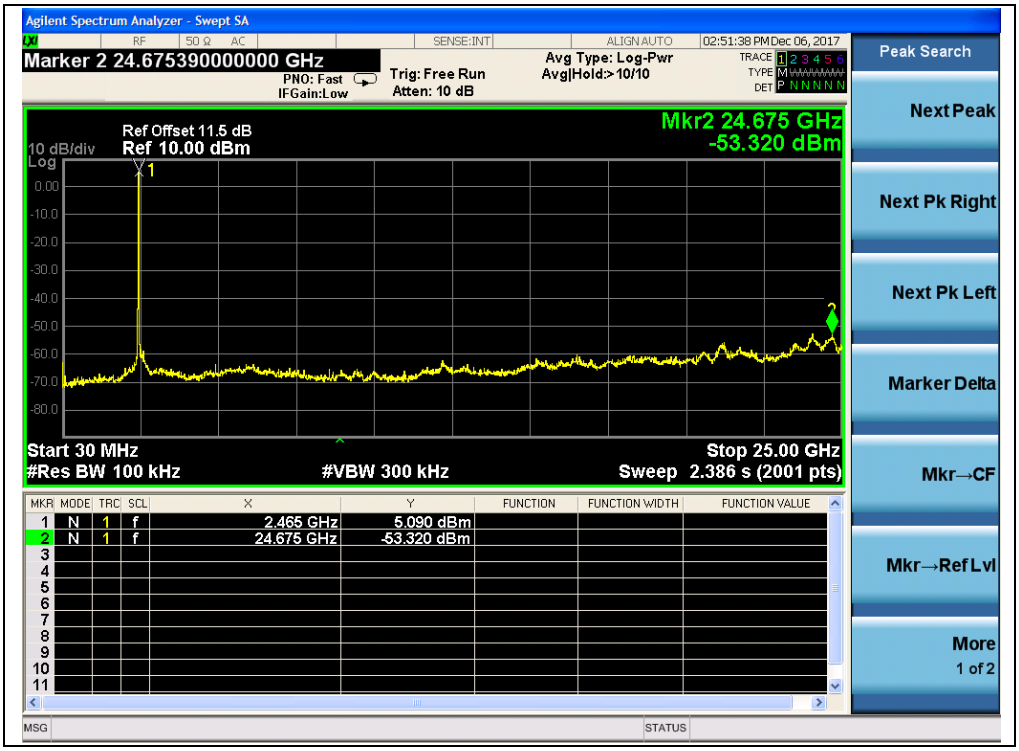
(Channel = 1, 30MHz to 25GHz)



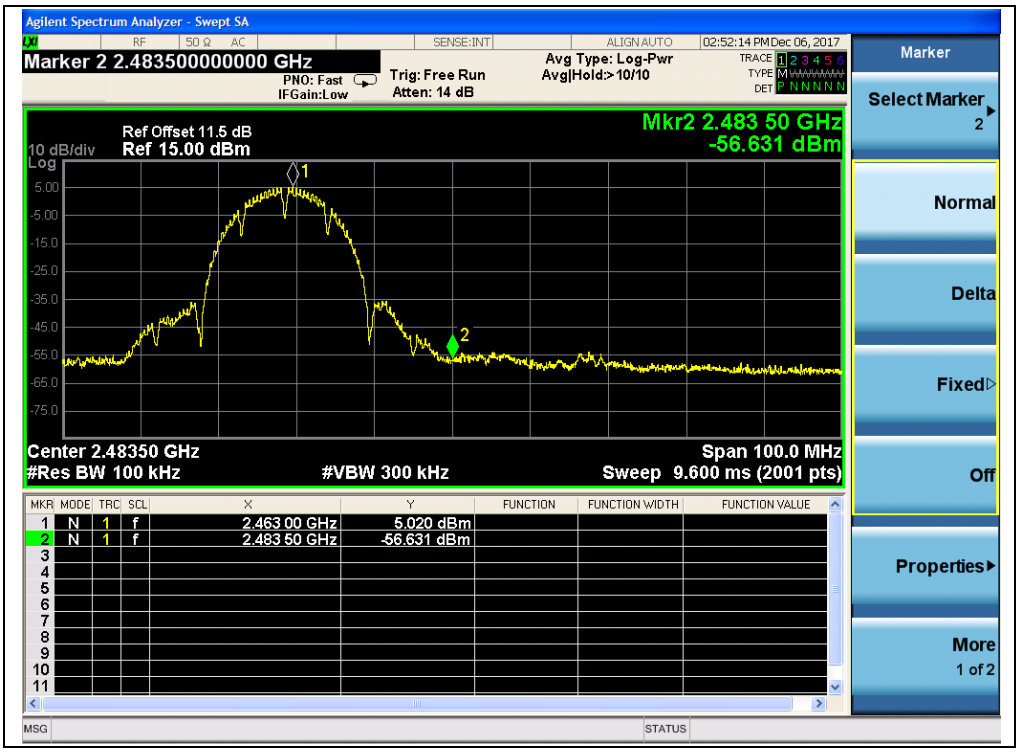
(Band Edge @ Channel = 1)



(Channel = 6, 30MHz to 25GHz)



(Channel = 11, 30MHz to 25GHz)



(Band Edge @ Channel = 11)

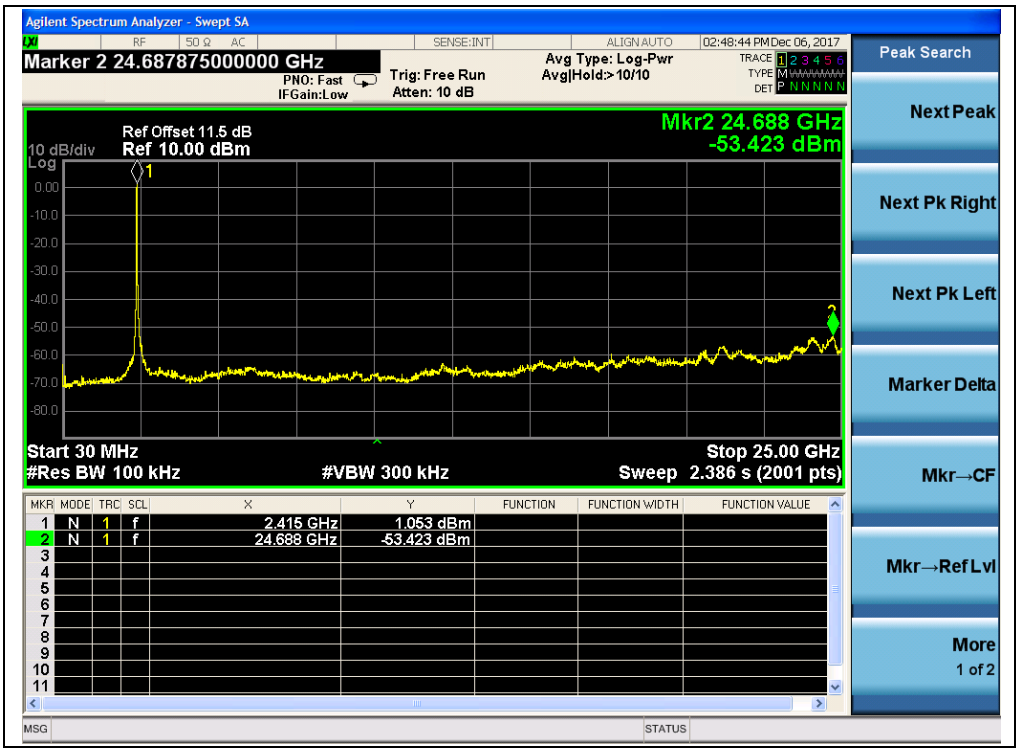
2.4.3.2 802.11g Test mode

A. Test Verdict:

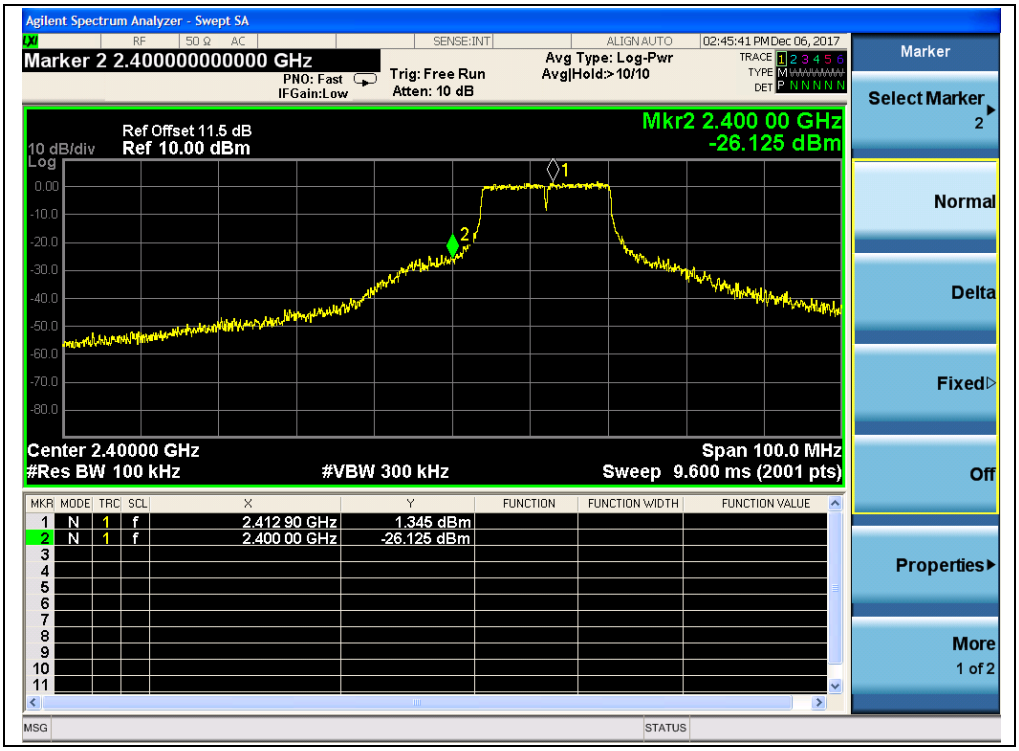
Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
			Carrier Level	Calculated -20dBc Limit	
1	2412	-53.42	1.05	-18.95	PASS
6	2437	-53.03	1.63	-18.37	PASS
11	2462	-56.18	2.00	-18.00	PASS

B. Test Plots:

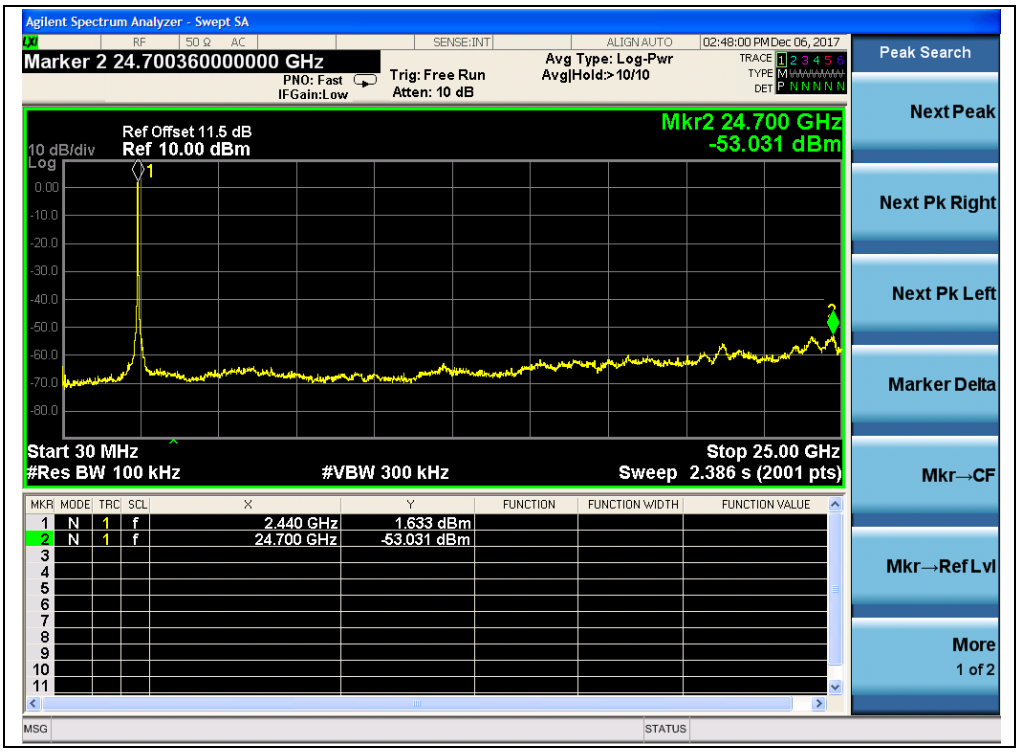
Note: The power of the Module transmitting frequency should be ignored.



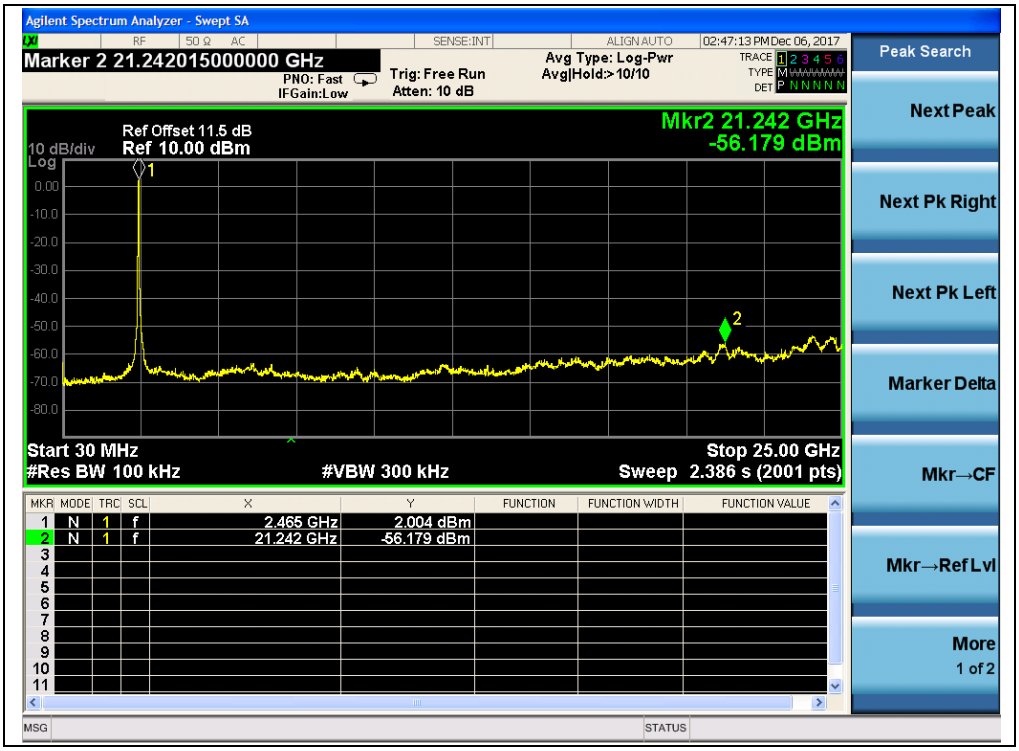
(Channel = 1, 30MHz to 25GHz)



(Band Edge @ Channel = 1)



(Channel = 6, 30MHz to 25GHz)



(Channel = 11, 30MHz to 25GHz)

(Band Edge @ Channel = 11)

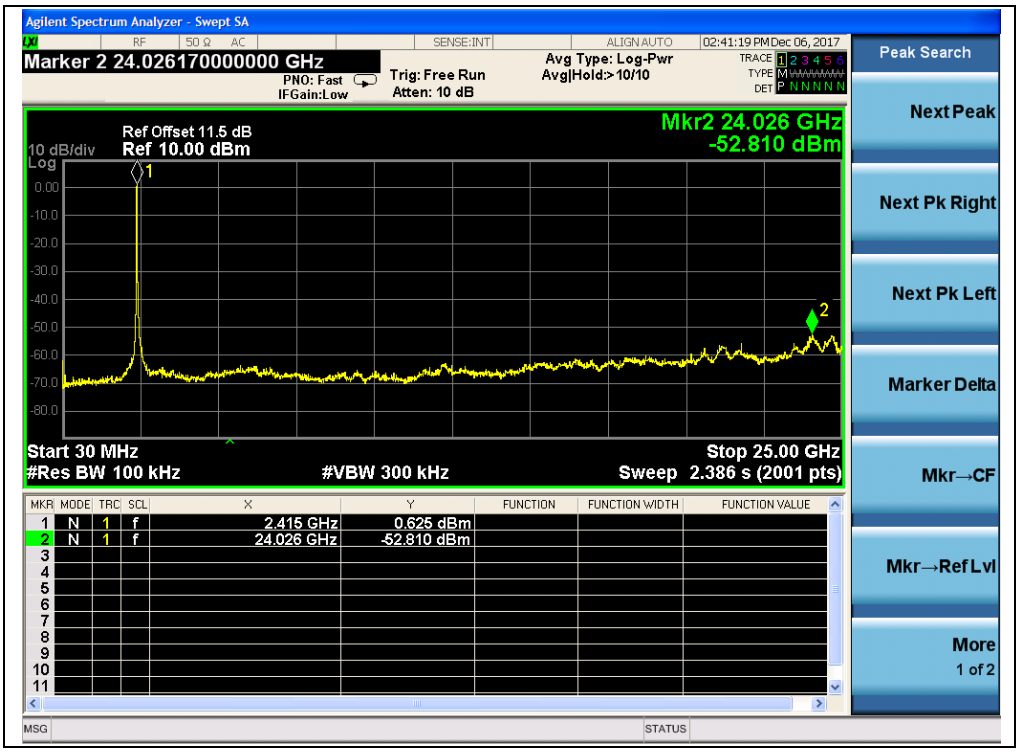
2.4.3.3 802.11n -20MHz Test mode

A. Test Verdict:

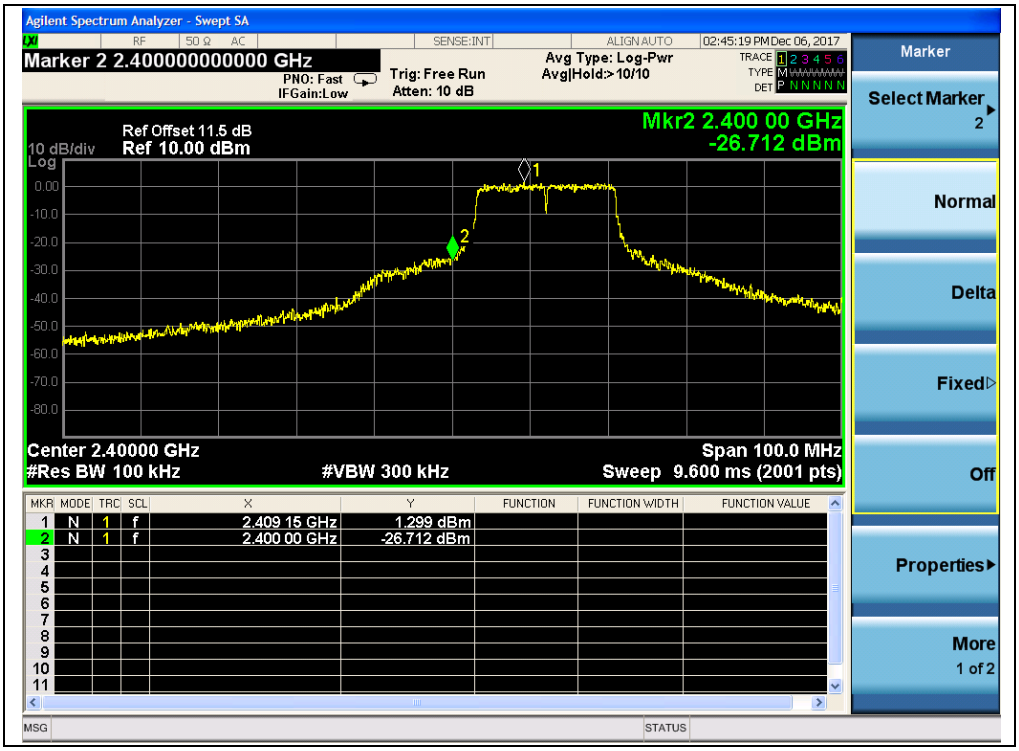
Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
			Carrier Level	Calculated -20dBc Limit	
1	2412	-52.81	0.63	-19.37	PASS
6	2437	-52.65	1.58	-18.42	PASS
11	2462	-52.85	1.68	-18.32	PASS

B. Test Plots:

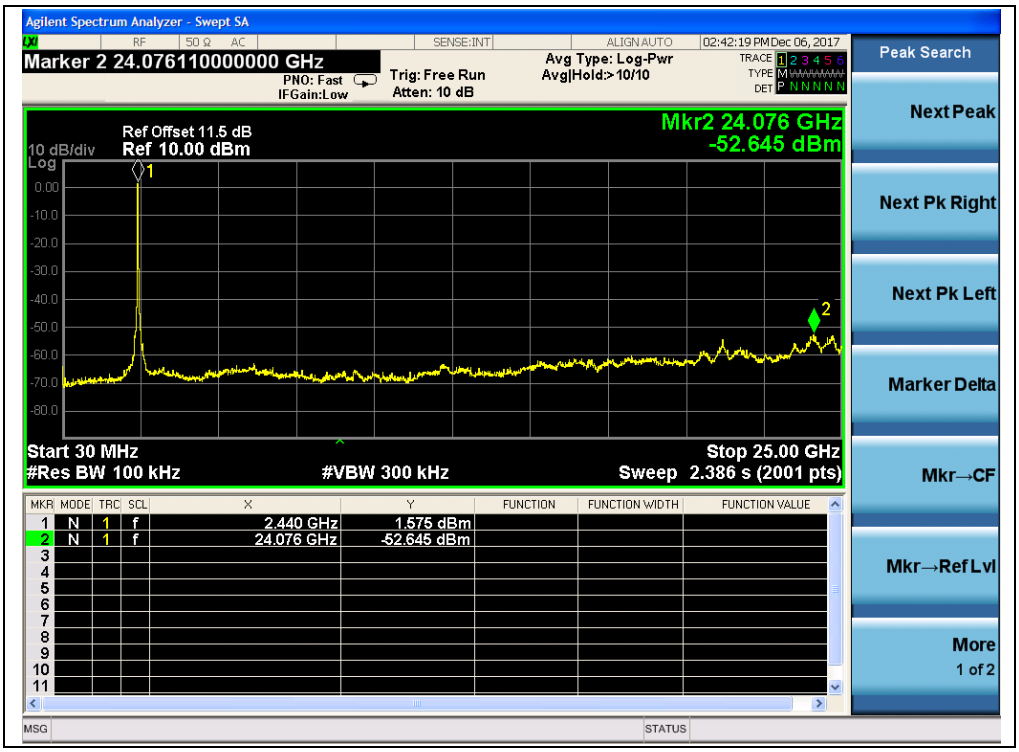
Note: The power of the Module transmitting frequency should be ignored.



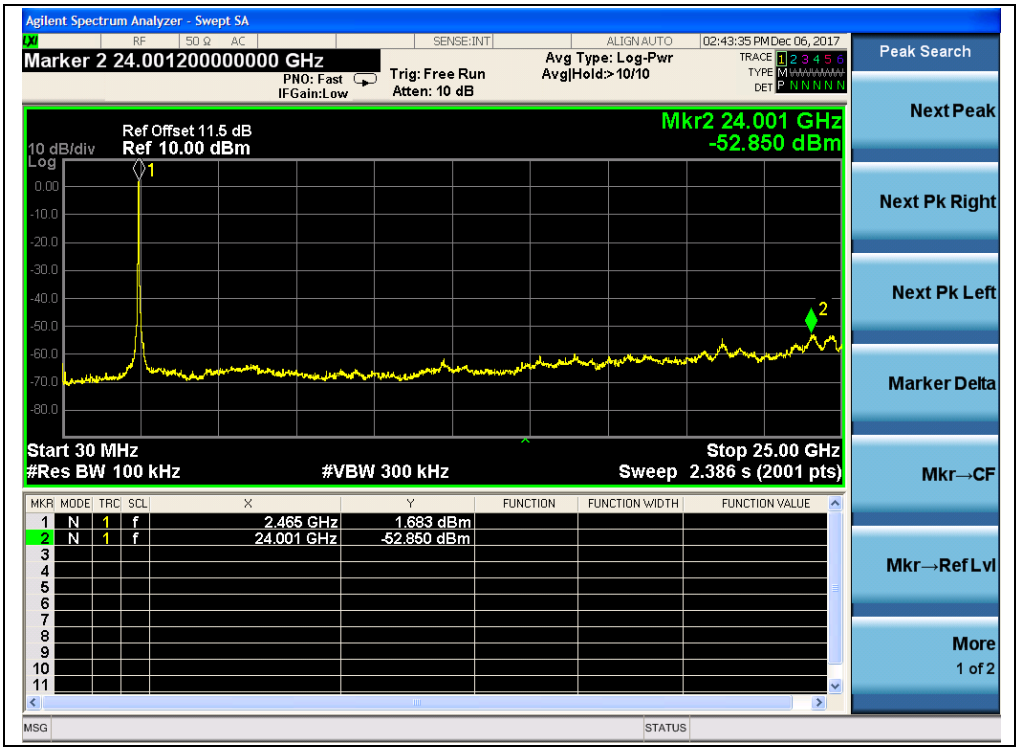
(Channel = 1, 30MHz to 25GHz)



(Band Edge @ Channel = 1)



(Channel = 6, 30MHz to 25GHz)



(Channel = 11, 30MHz to 25GHz)

(Band Edge @ Channel = 11)

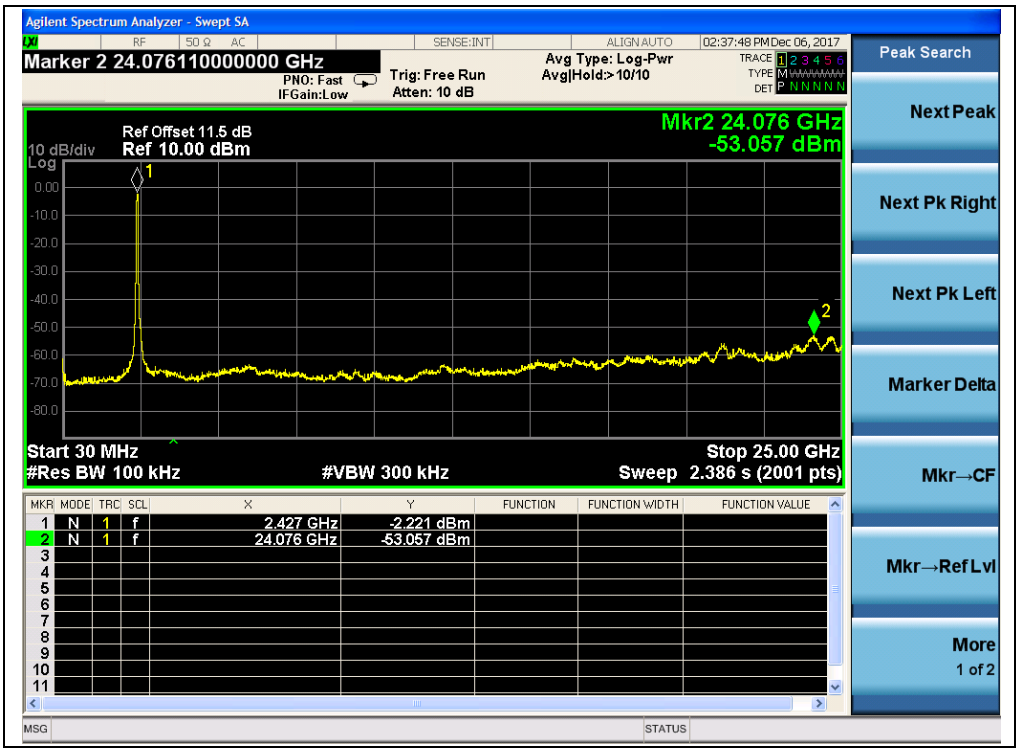
2.4.3.4 802.11n -40MHz Test mode

A. Test Verdict:

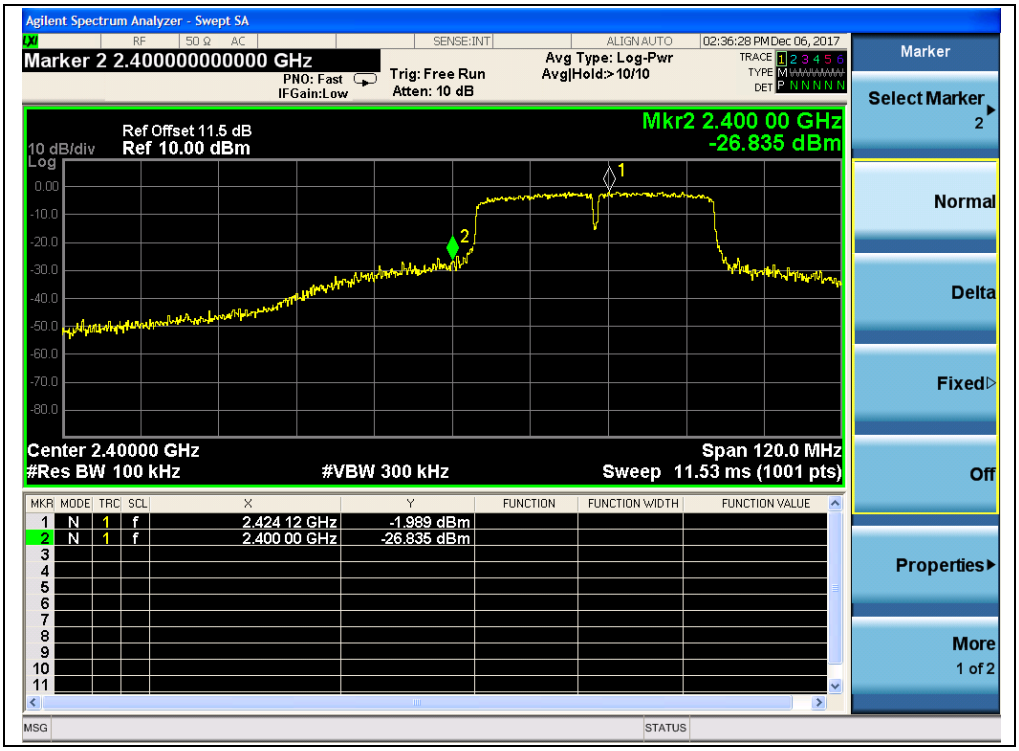
Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
			Carrier Level	Calculated -20dBc Limit	
3	2422	-53.06	-2.22	-22.22	PASS
6	2437	-53.38	-1.89	-21.89	PASS
9	2452	-53.06	-2.05	-22.05	PASS

B. Test Plots:

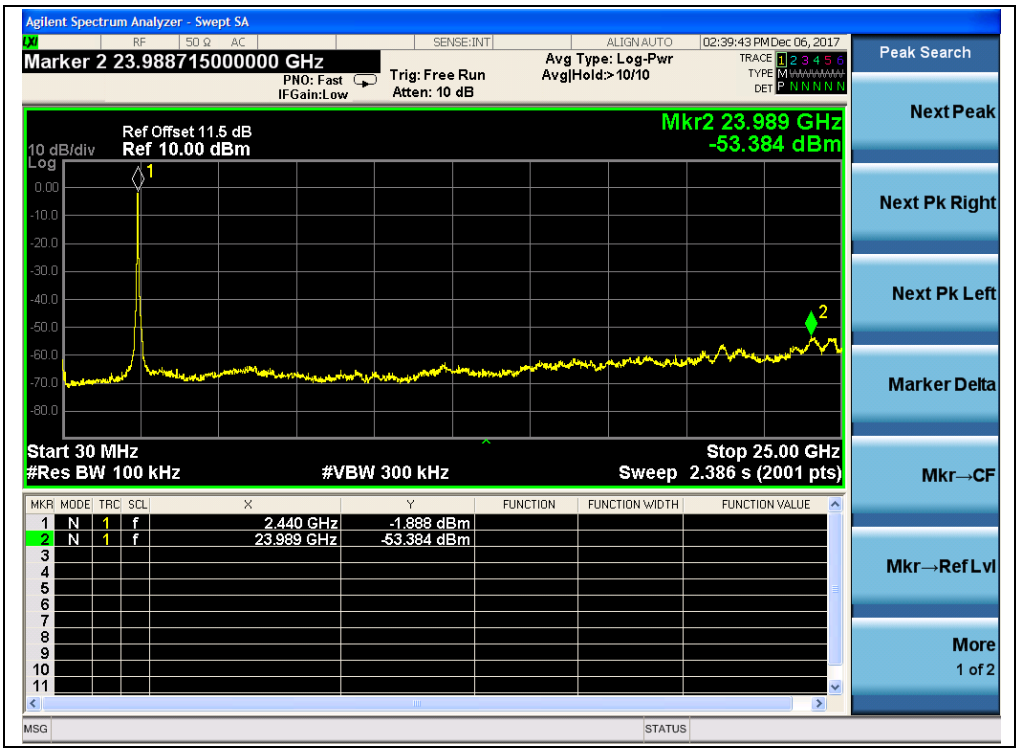
Note: The power of the Module transmitting frequency should be ignored.



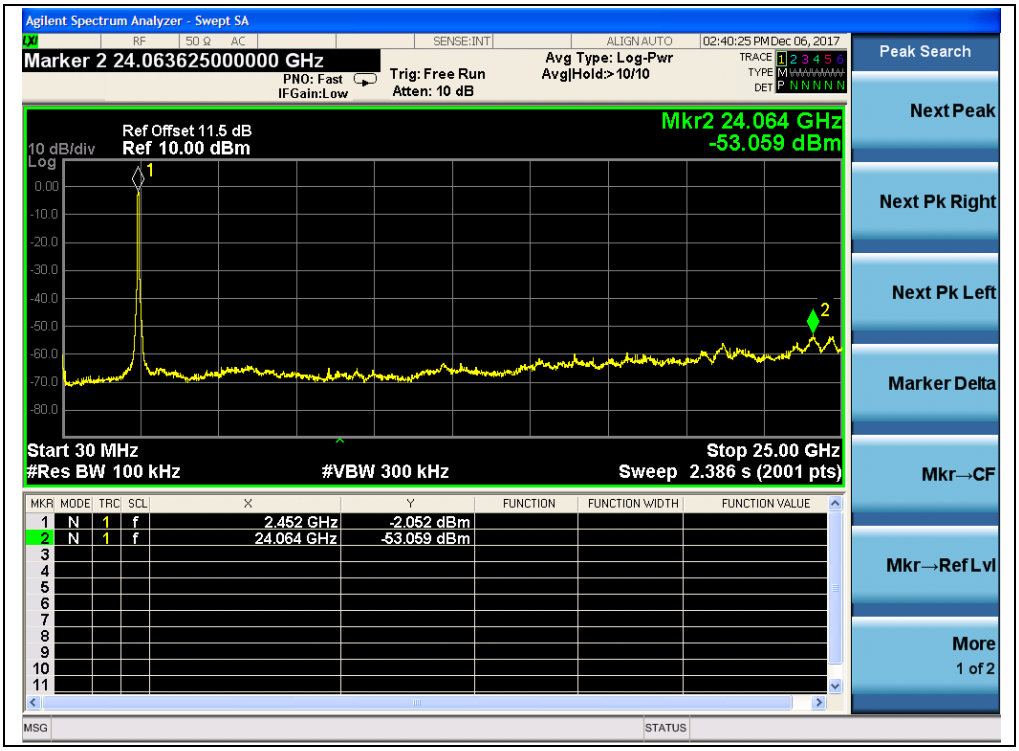
(Channel = 3, 30MHz to 25GHz)



(Band Edge @ Channel = 3)



(Channel = 6, 30MHz to 25GHz)



(Channel = 9, 30MHz to 25GHz)

(Band Edge @ Channel = 9)

2.5. Power spectral density (PSD)

2.5.1. Requirement

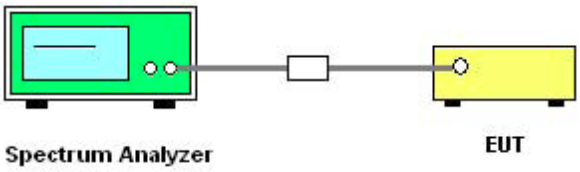
For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of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

The measured power spectral density was calculated by the reading of the spectrum analyzer and calibration. Following is the test procedure for PSD test:
a) Set analyzer center frequency to channel center frequency.
b) Set the span to 30MHz
c) Set the RBW to 3 kHz
d) Set the VBW to 10KHz
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.

B. 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(1.5).

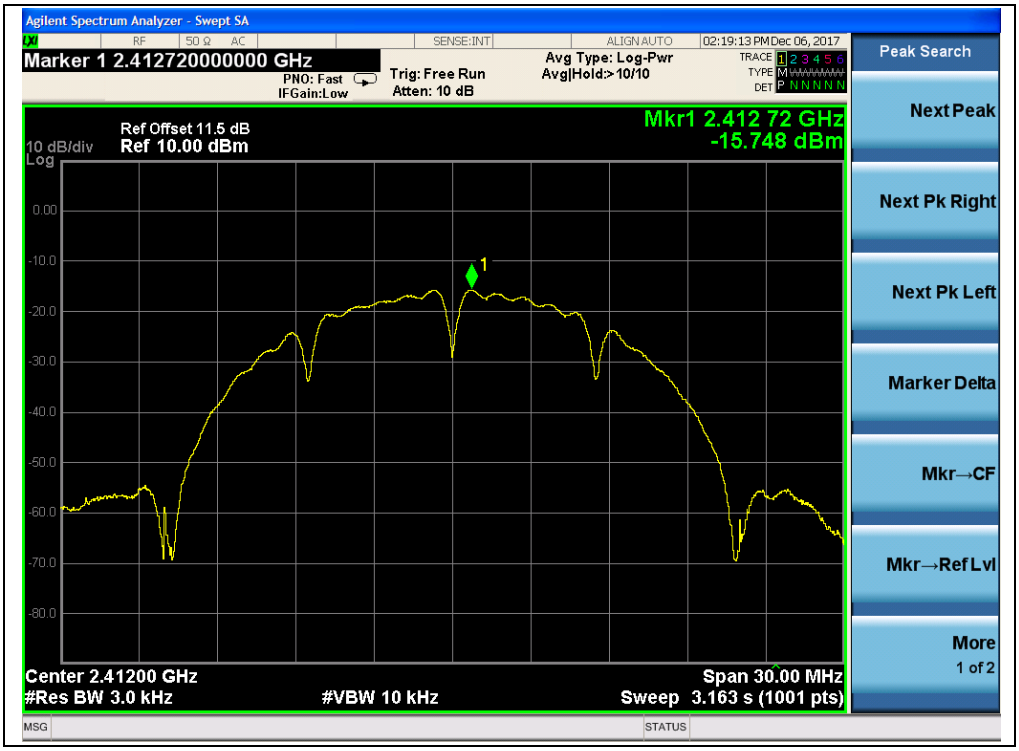
2.5.3. Test Result

2.5.3.1 802.11b Test mode

A. Test Verdict:

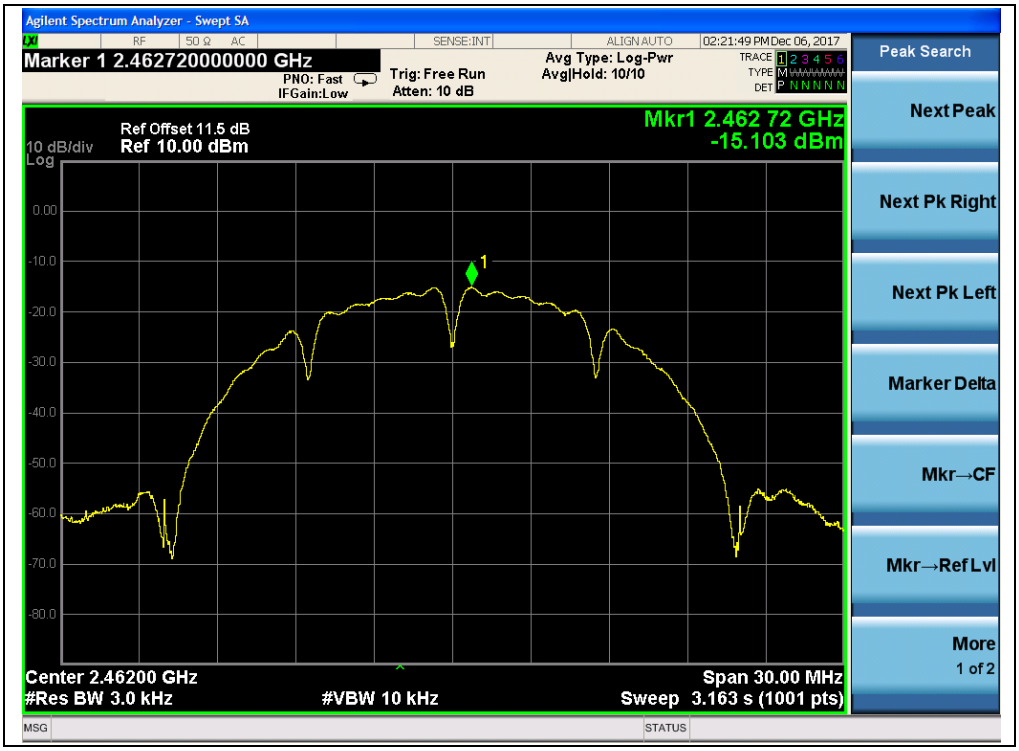
Spectral power density (dBm/3kHz)				
Channel	Frequency (MHz)	Measured PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
1	2412	-15.75	8	PASS
6	2437	-15.42	8	PASS
11	2462	-15.10	8	PASS
Measurement uncertainty: ±1.3dB				

B. Test Plots:



(Channel = 1 @ 802.11b)

(Channel = 6 @ 802.11b)



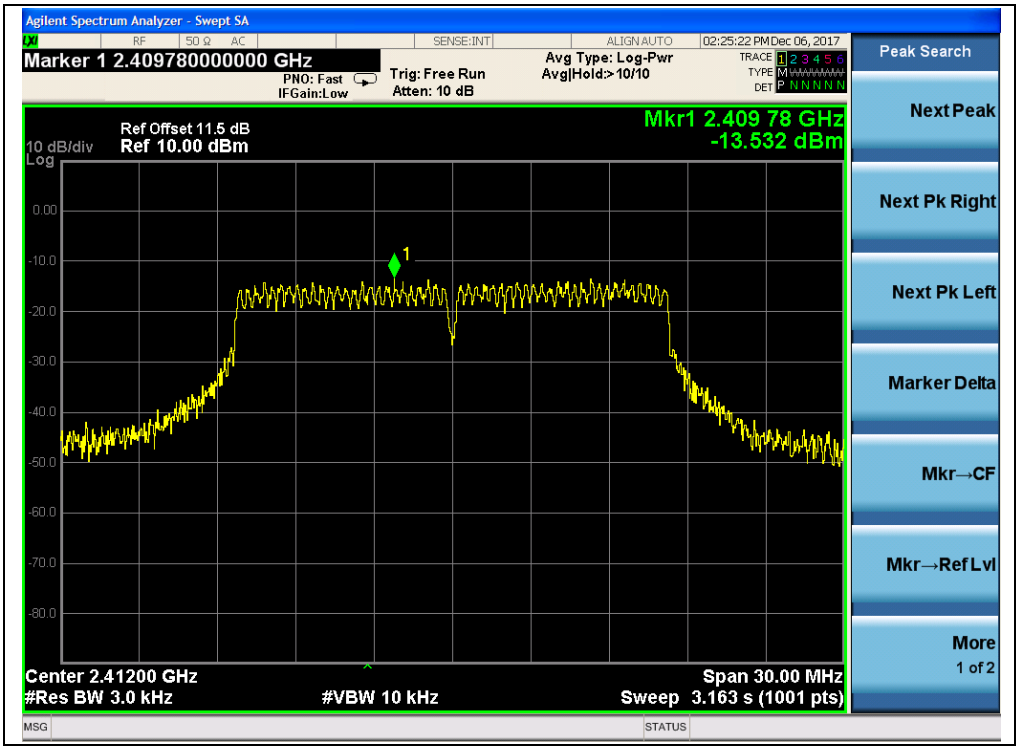
(Channel = 11 @ 802.11b)

2.5.3.2 802.11g Test mode

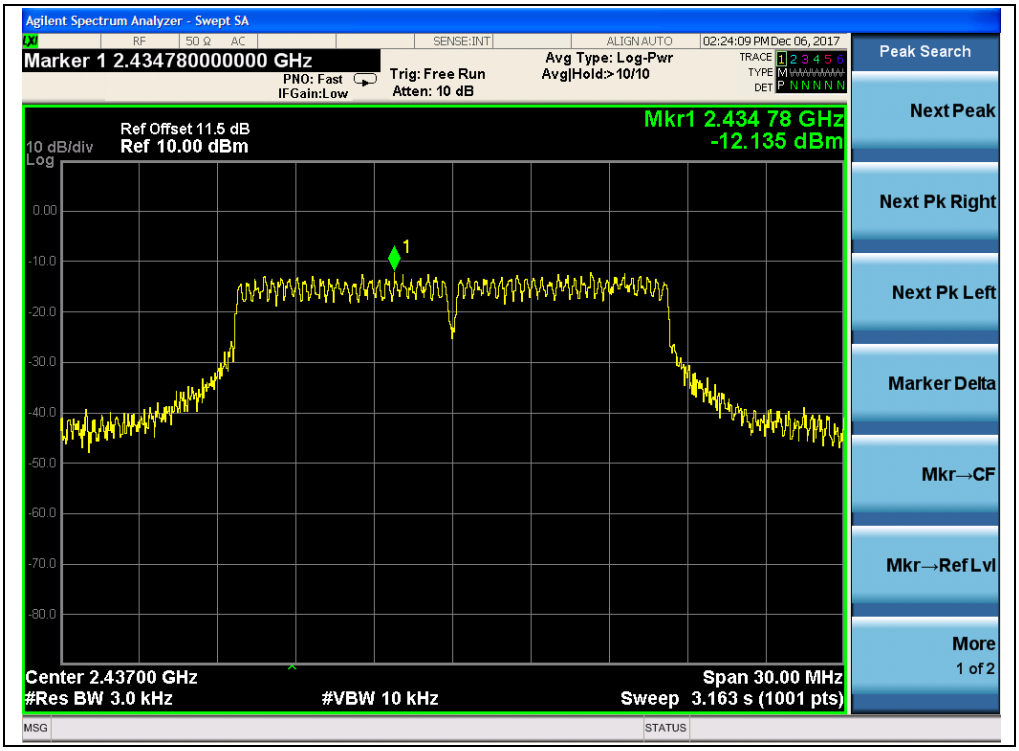
A. Test Verdict:

Spectral power density (dBm/3kHz)				
Channel	Frequency (MHz)	Measured PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
1	2412	-13.53	8	PASS
6	2437	-12.14	8	PASS
11	2462	-11.74	8	PASS
Measurement uncertainty: ±1.3dB				

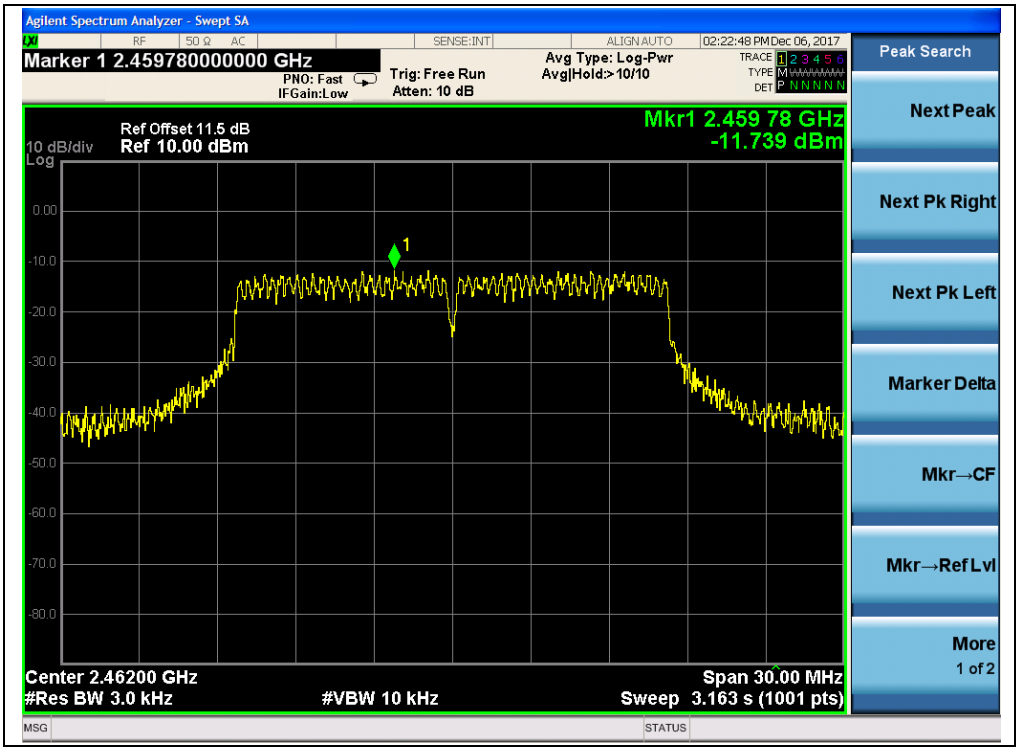
B. Test Plots:



(Channel = 1 @ 802.11g)



(Channel = 6 @ 802.11g)



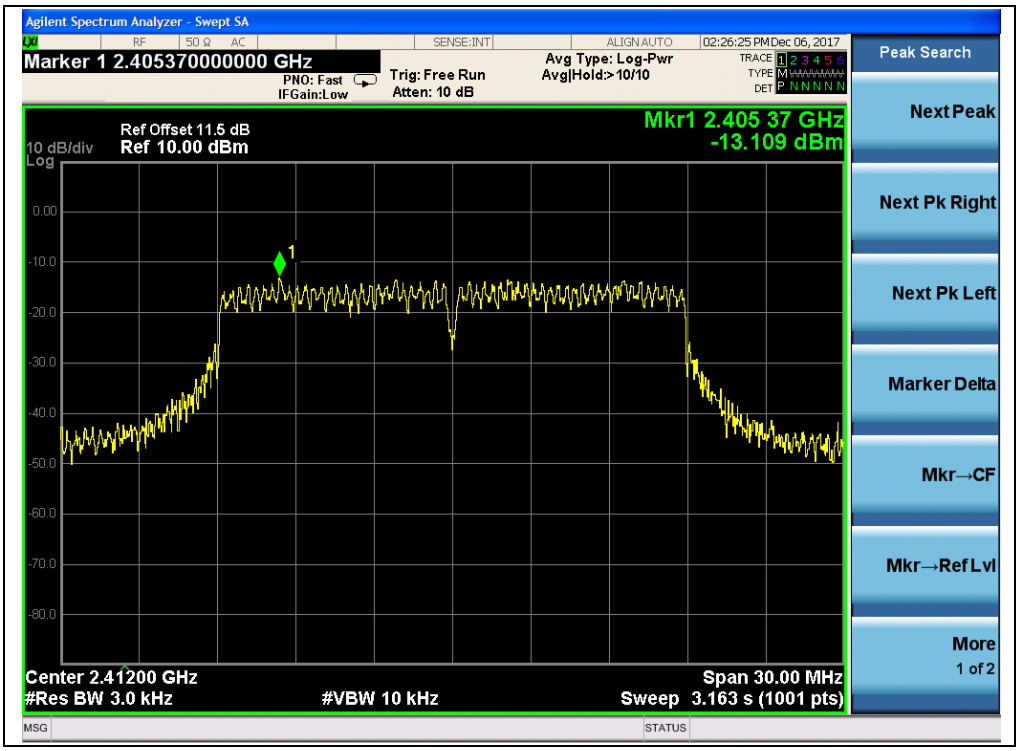
(Channel = 11 @ 802.11g)

2.5.3.3 802.11n-20MHz Test mode

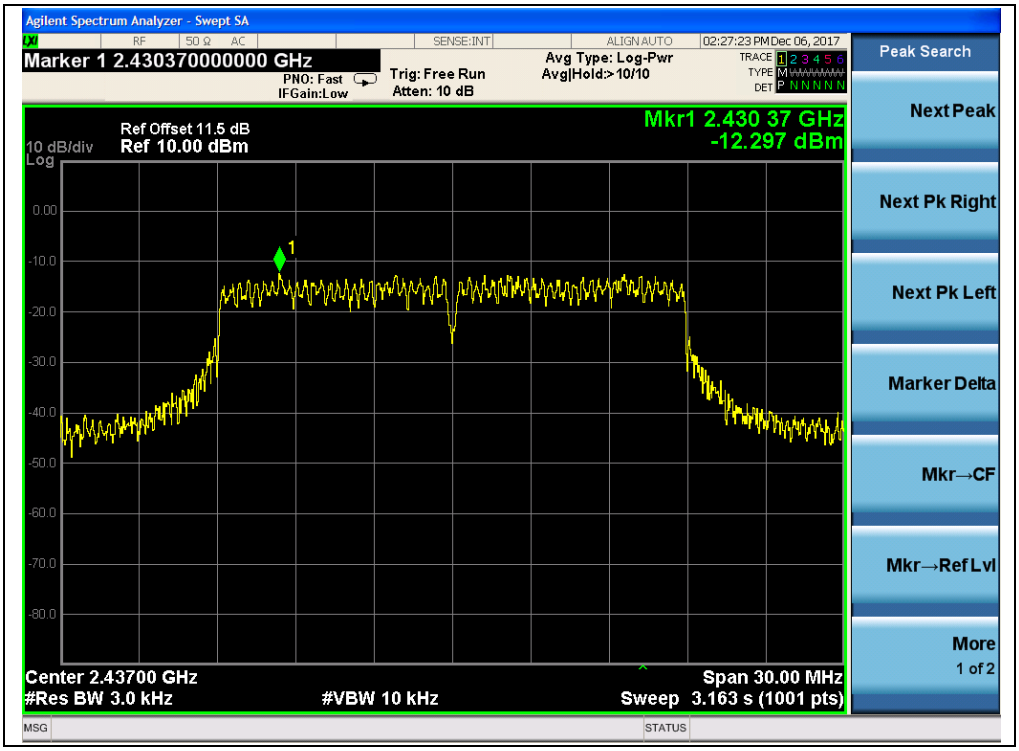
A. Test Verdict:

Spectral power density (dBm/3kHz)				
Channel	Frequency (MHz)	Measured PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
1	2412	-13.11	8	PASS
6	2437	-12.30	8	PASS
11	2462	-11.99	8	PASS
Measurement uncertainty: ±1.3dB				

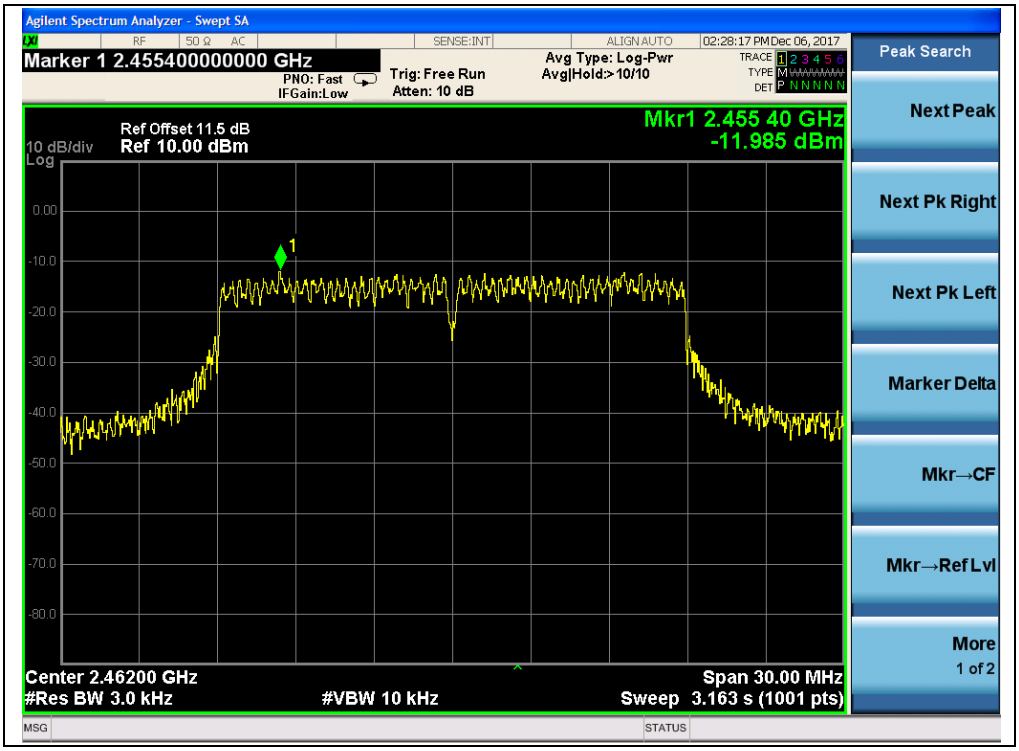
B. Test Plots:



(Channel = 1 @ 802.11n-20MHz)



(Channel = 6 @ 802.11n-20MHz)



(Channel = 11 @ 802.11n-20MHz)

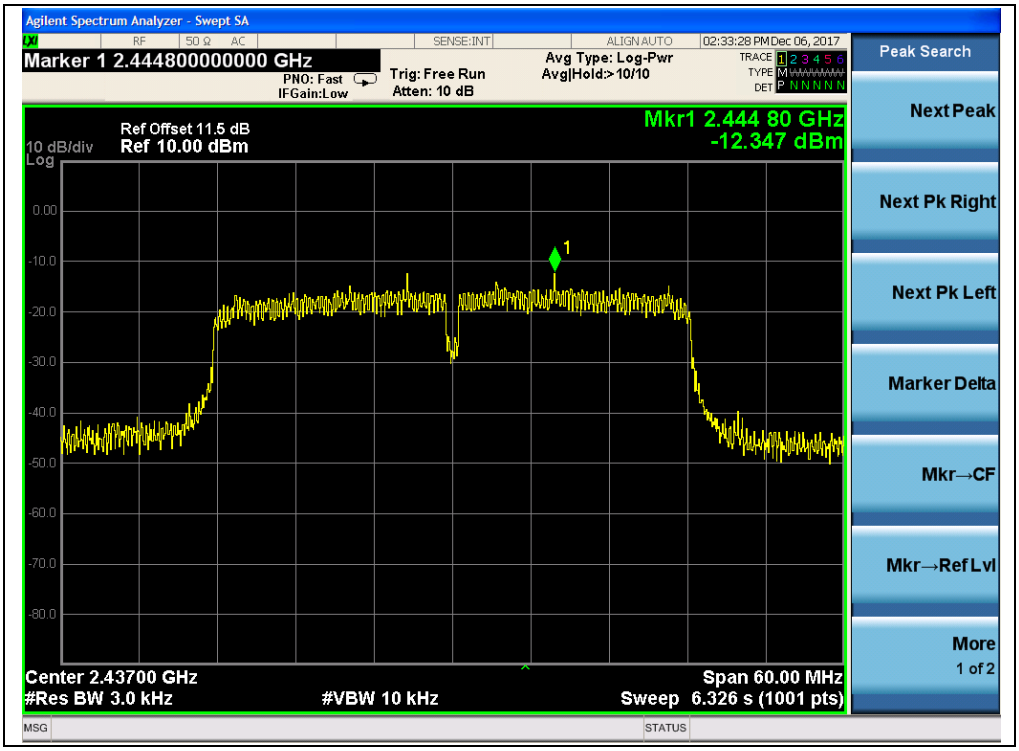
2.5.3.4 802.11n-40MHz Test mode

A. Test Verdict:

Spectral power density (dBm/3kHz)				
Channel	Frequency (MHz)	Measured PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
3	2422	-13.01	8	PASS
6	2437	-12.35	8	PASS
9	2452	-13.11	8	PASS
Measurement uncertainty: ±1.3dB				

B. Test Plots:

(Channel = 3 @ 802.11n-40MHz)



(Channel = 6 @ 802.11n-40MHz)

(Channel = 9 @ 802.11n-40MHz)

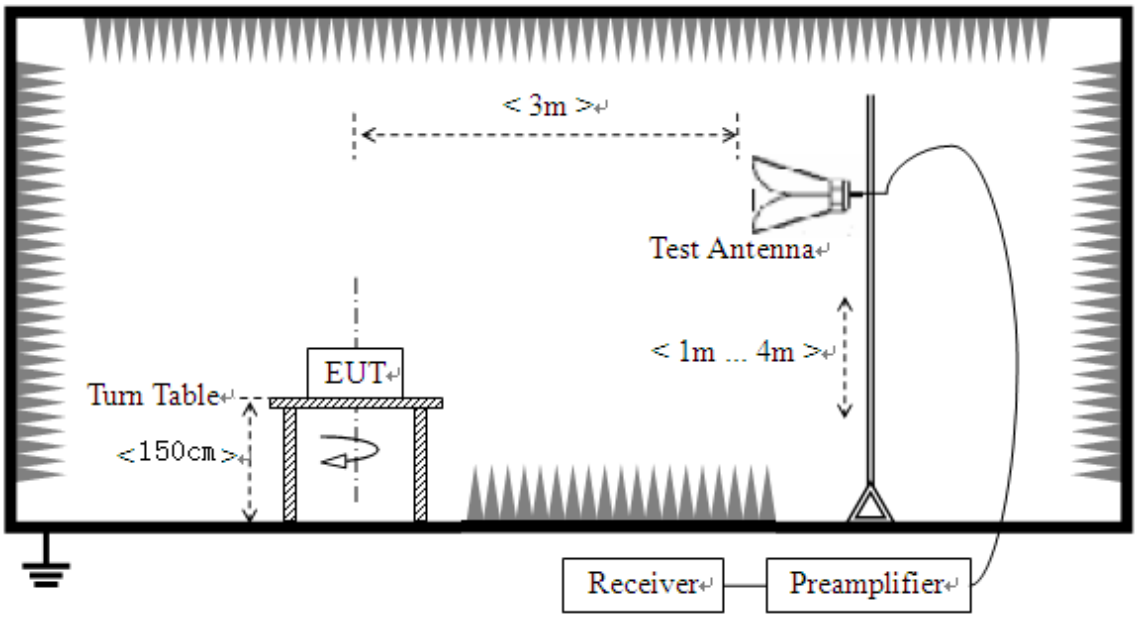
2.6. Restricted Frequency Bands

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 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:

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(1.5).

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 [dBμV/m] $=U_R + A_T + A_{Factor}$ [dB]; $A_T = L_{Cable\ loss}$ [dB]-G_{preamp} [dB]
A_T: Total correction Factor except Antenna
U_R: Receiver Reading
G_{preamp}: Preamplifier Gain
A_{Factor}: Antenna Factor at 3m

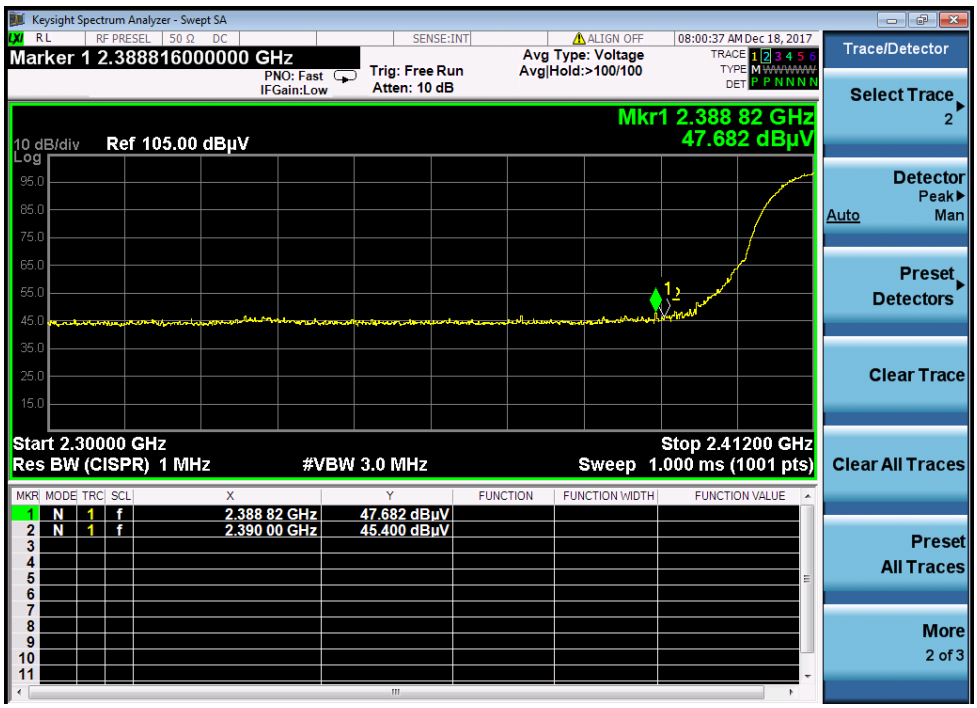
Note: Restricted Frequency Bands were performed when antenna was at vertical and horizontal polarity, and only the worse test condition (vertical) was recorded in this test report.

2.6.3.1 802.11b Test mode

A. Test Verdict:

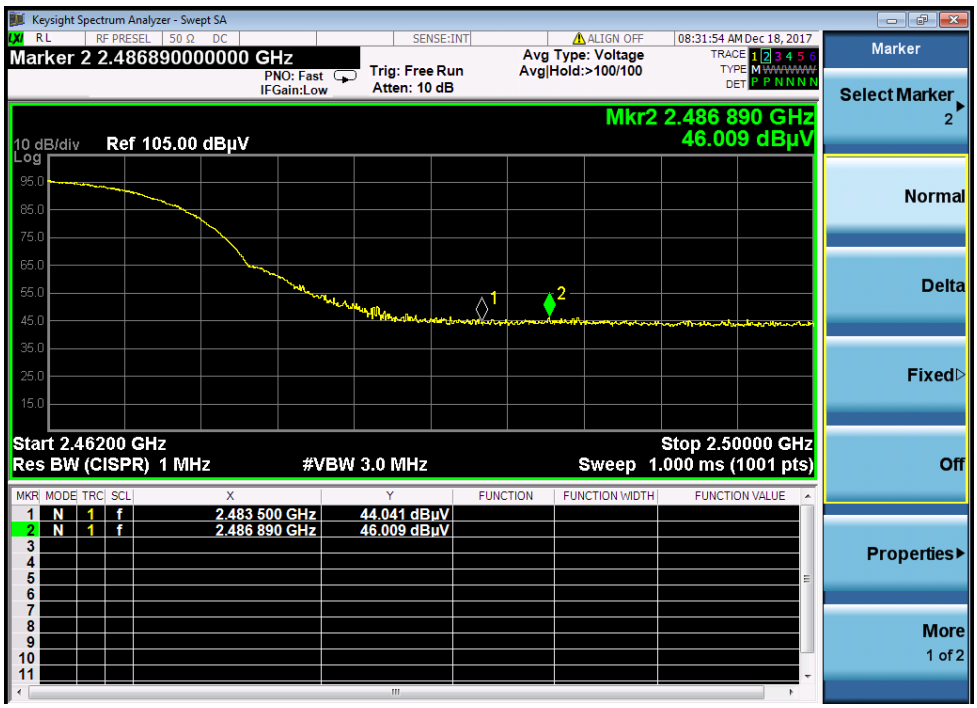
Channel	Frequency (MHz)	Detector PK/ AV	Receiver Reading U_R (dBuV)	A_T (dB)	A_{Factor} (dB@3m)	Max. Emission E (dBμV/m)	Limit (dBμV/m)	Verdict
1	2388.82	PK	47.68	-33.63	32.56	46.61	74	Pass
1	2332.03	AV	34.80	-33.63	32.56	33.73	54	Pass
11	2486.89	PK	46.01	-33.18	32.5	45.33	74	Pass
11	2484.38	AV	33.41	-33.18	32.5	32.73	54	Pass

B. Test Plots:



(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

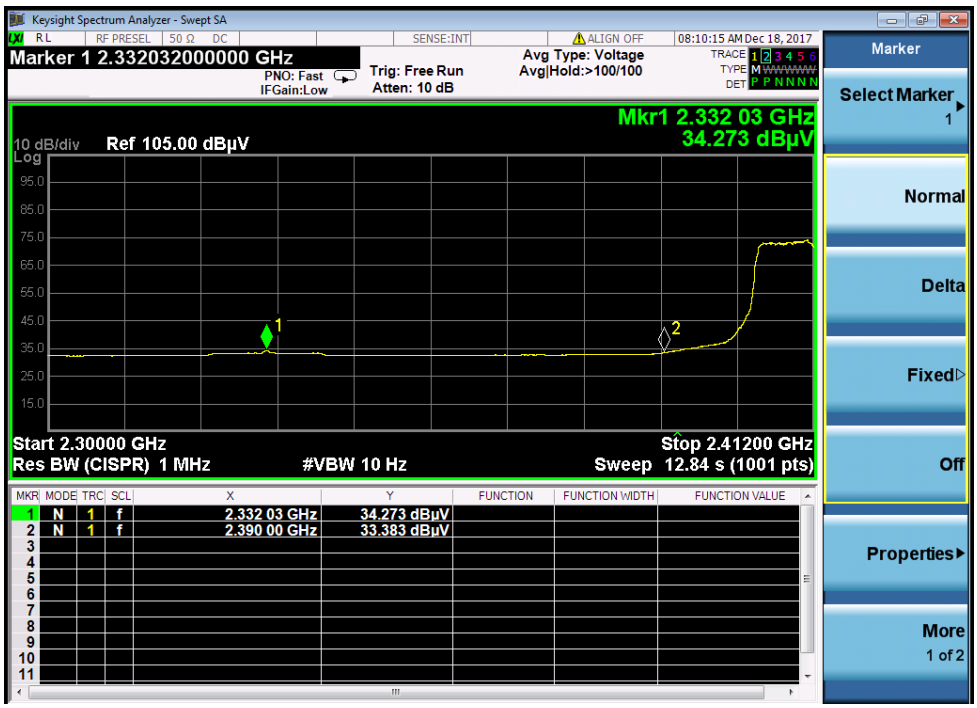
The lowest and highest channels are tested to verify the band edge emissions.

A. Test Verdict:

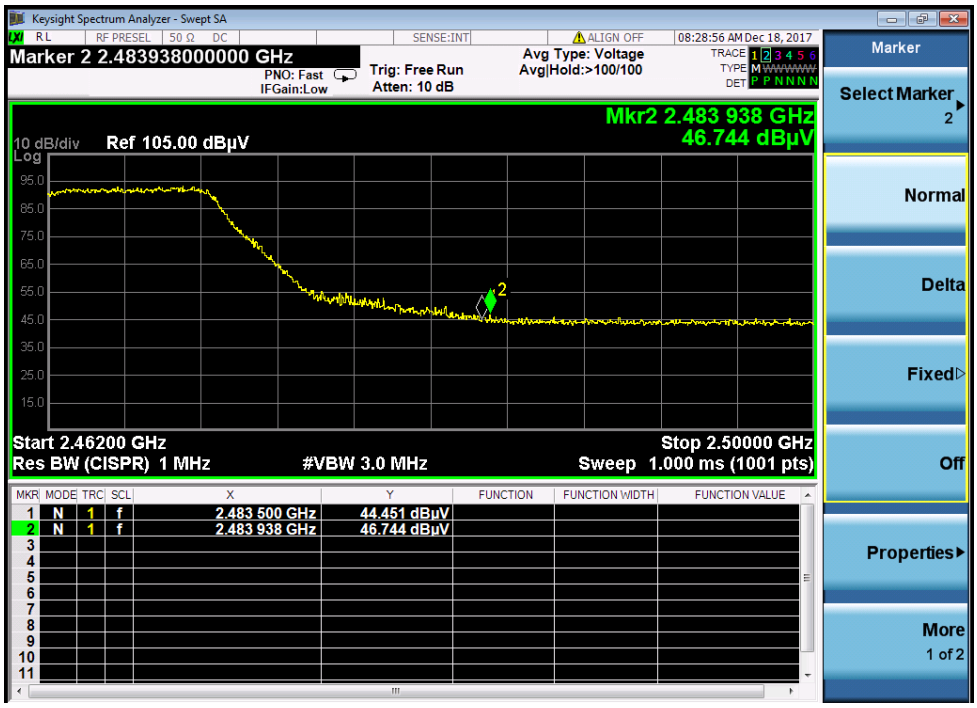
Channel	Frequency (MHz)	Detector PK/ AV	Receiver Reading U_R (dBuV)	A_T (dB)	A_{Factor} (dB@3m)	Max. Emission E (dBμV/m)	Limit (dBμV/m)	Verdict
1	2389.71	PK	51.78	-33.63	32.56	50.71	74	Pass
1	2332.03	AV	34.27	-33.63	32.56	33.20	54	Pass
11	2483.94	PK	46.74	-33.18	32.5	46.06	74	Pass
11	2484.00	AV	32.81	-33.18	32.5	32.13	54	Pass

B. Test Plots:

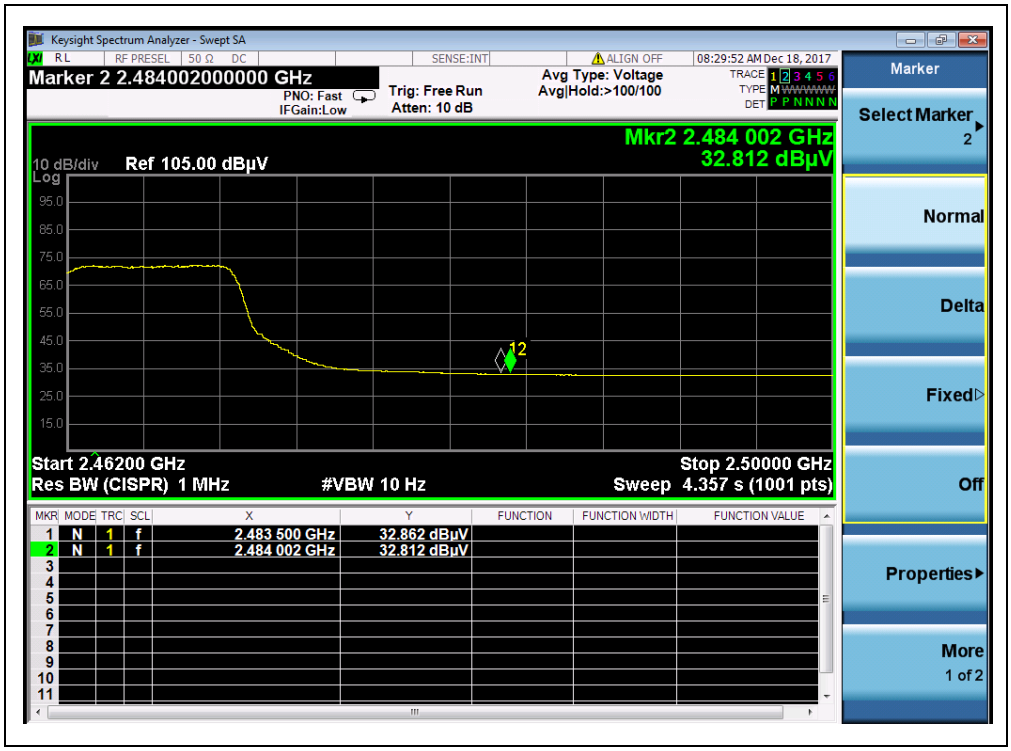
(Plot C1: Channel = 1 PEAK @ 802.11g)



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



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



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

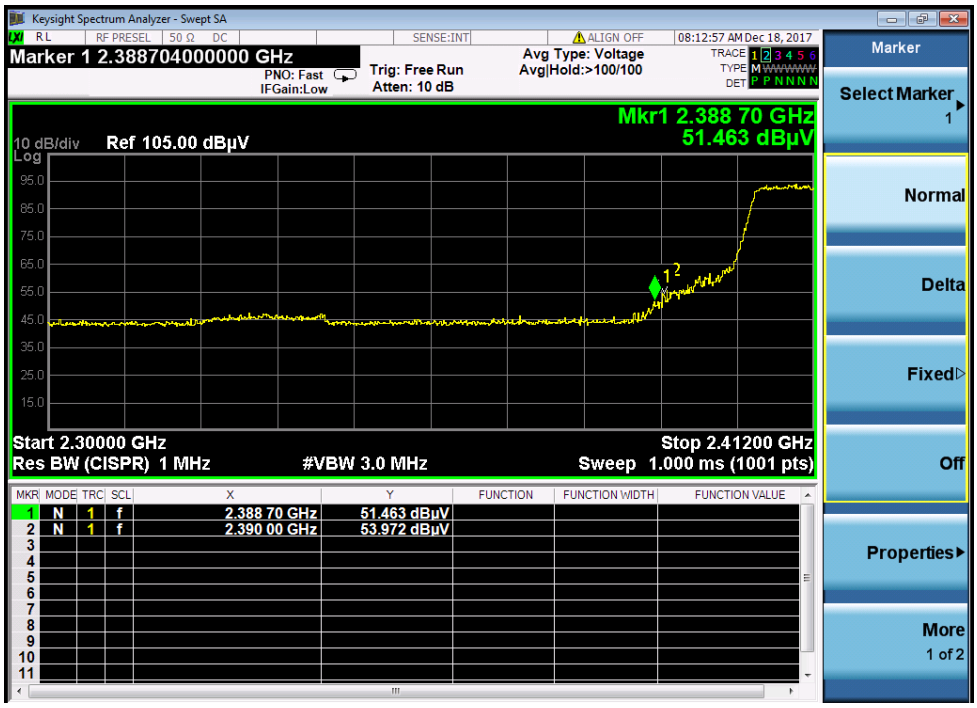
2.6.3.3 802.11n-20MHz Test mode

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

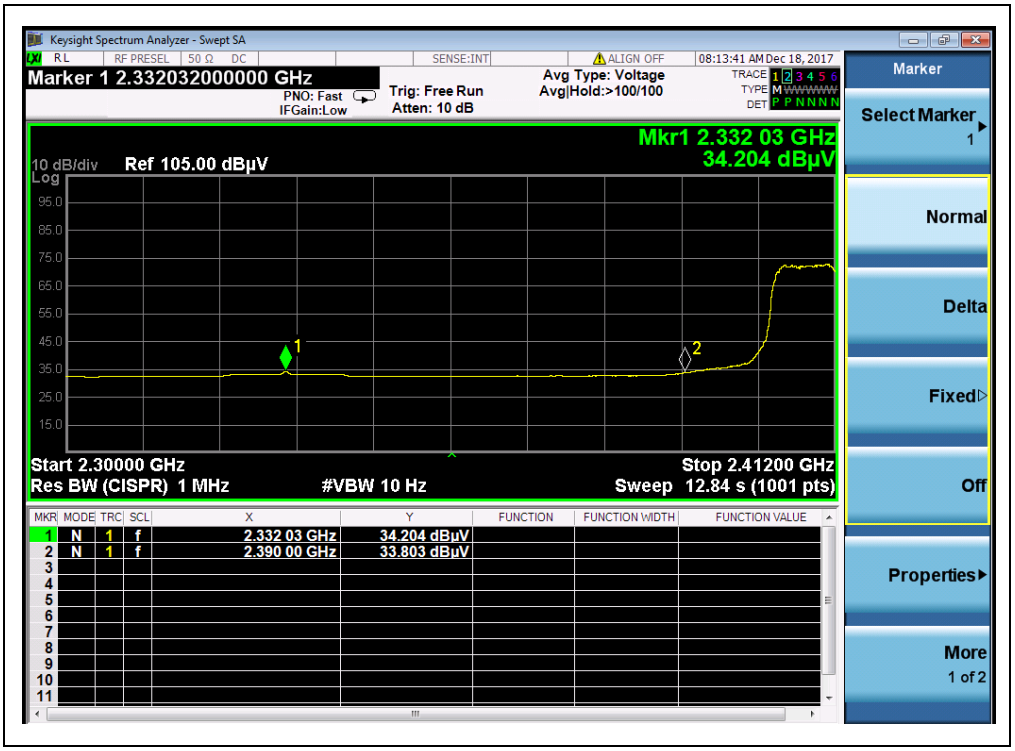
A. Test Verdict:

Channel	Frequency (MHz)	Detector PK/ AV	Receiver Reading U_R (dBuV)	A_T (dB)	A_{Factor} (dB@3m)	Max. Emission E (dBµV/m)	Limit (dBµV/m)	Verdict
1	2388.70	PK	51.46	-33.63	32.56	50.39	74	Pass
1	2332.03	AV	34.20	-33.63	32.56	33.13	54	Pass
11	2486.56	PK	48.49	-33.18	32.5	47.81	74	Pass
11	2484.17	AV	33.18	-33.18	32.5	32.50	54	Pass

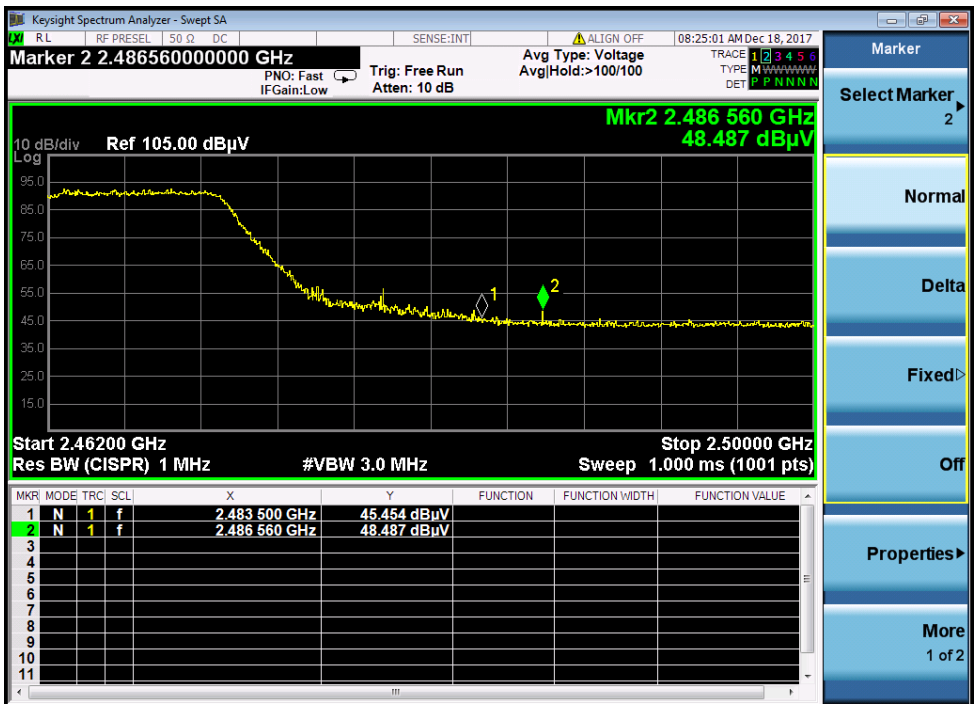
B. Test Plots:



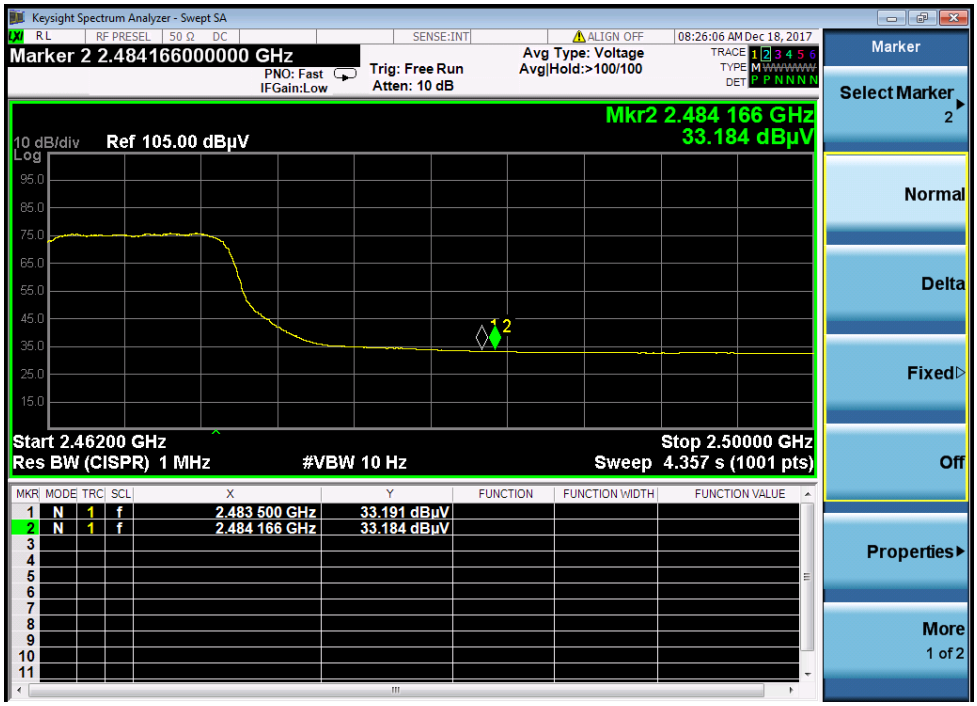
(Plot E1: Channel = 1 PEAK @ 802.11n-20)



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



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



(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 PK/ AV	Receiver Reading U_R (dBuV)	A_T (dB)	A_{Factor} (dB@3m)	Max. Emission E (dBμV/m)	Limit (dBμV/m)	Verdict
3	2385.68	PK	58.90	-33.63	32.56	57.83	74	Pass
3	2385.57	AV	36.00	-33.63	32.56	34.93	54	Pass
9	2485.61	PK	56.82	-33.18	32.5	56.14	74	Pass
9	2484.66	AV	33.75	-33.18	32.5	33.07	54	Pass

B. Test Plots:

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

(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

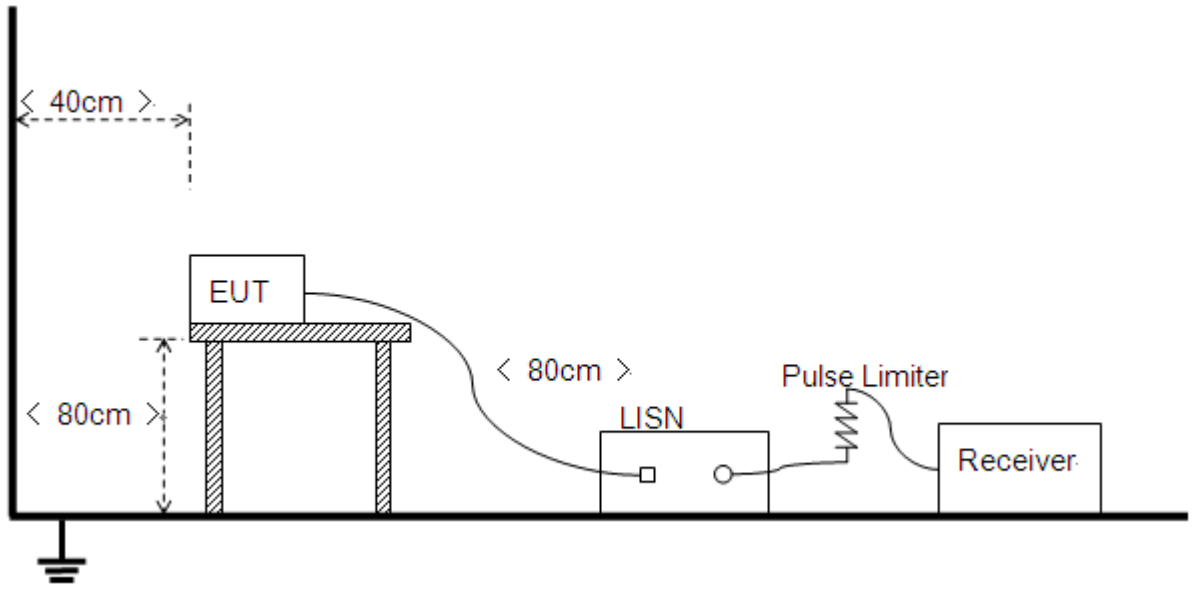
NOTE:

(a) The lower limit shall apply at the band edges.

(b) 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 C63.10 2013.

B. Equipments List:

Please reference ANNEX A(1.5).

2.7.3. Test Result

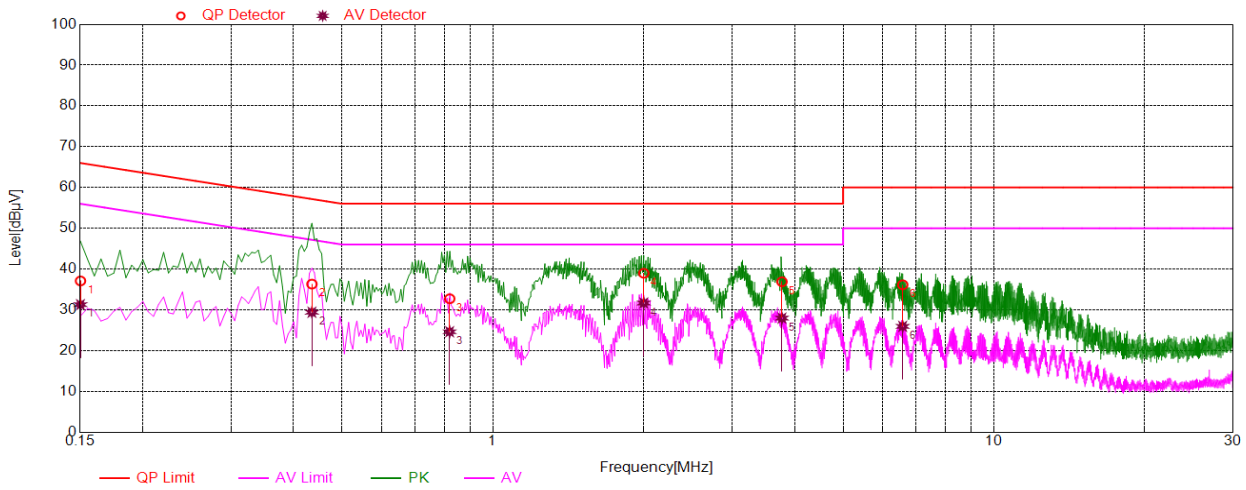
The maximum conducted interference is searched using Peak (PK), if the emission levels more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both L phase and N phase lines of the power mains connected to the EUT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

A. Test setup:

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

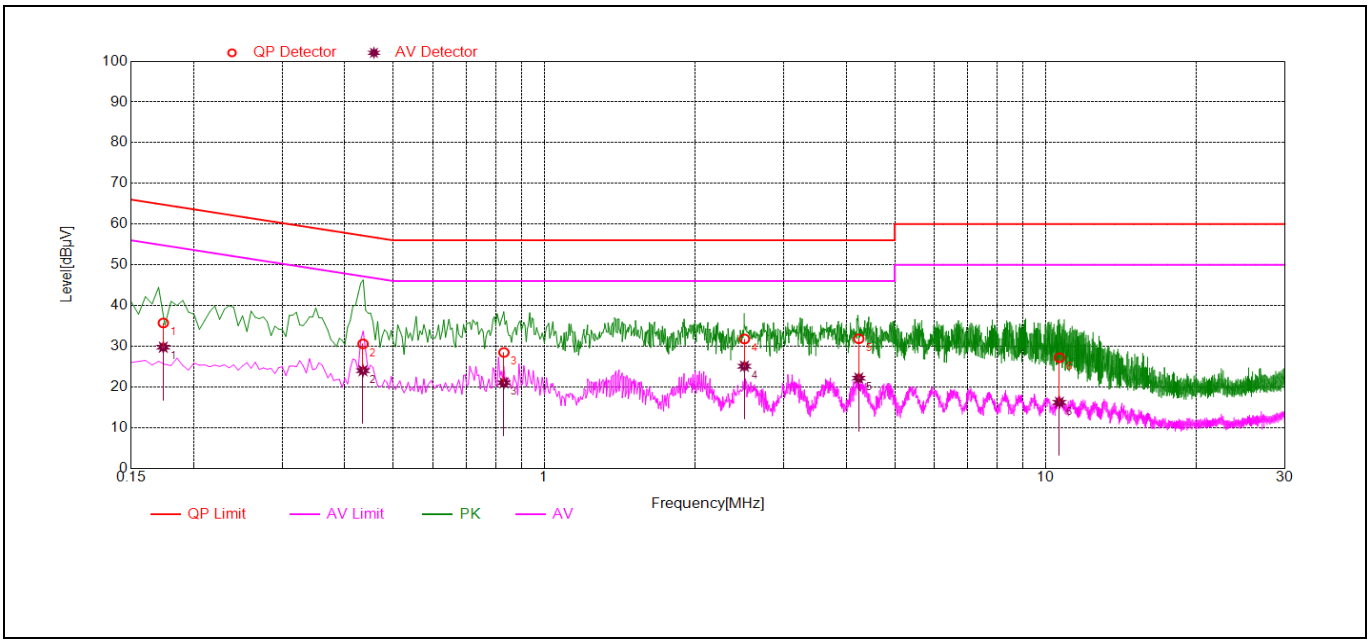
Note: The test voltage is AC 120V/60Hz.

B. Test Plots:



(Plot A: L Phase)

NO.	Fre. (MHz)	Emission Level (dBµV)		Limit (dBµV)		Power-line	Verdict
		Quai-peak	Average	Quai-peak	Average		
1	0.15	37.08	65.99	65.99	55.99	Line	PASS
2	0.44	36.31	57.16	57.16	47.16		PASS
3	0.82	32.71	56.00	56.00	46.00		PASS
4	2.00	38.96	56.00	56.00	46.00		PASS
5	3.78	36.88	56.00	56.00	46.00		PASS
6	6.58	36.13	60.00	60.00	50.00		PASS



(Plot B: N Phase)

NO.	Fre. (MHz)	Emission Level (dBµV)		Limit (dBµV)		Power-line	Verdict
		Quai-peak	Average	Quai-peak	Average		
1	0.17	35.71	29.75	64.78	54.78	Neutral	PASS
2	0.43	30.56	23.99	57.16	47.16		PASS
3	0.83	28.46	21.01	56.00	46.00		PASS
4	2.51	31.79	25.08	56.00	46.00		PASS
5	4.24	31.82	22.15	56.00	46.00		PASS
6	10.66	27.17	16.19	60.00	50.00		PASS

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 (μV/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.

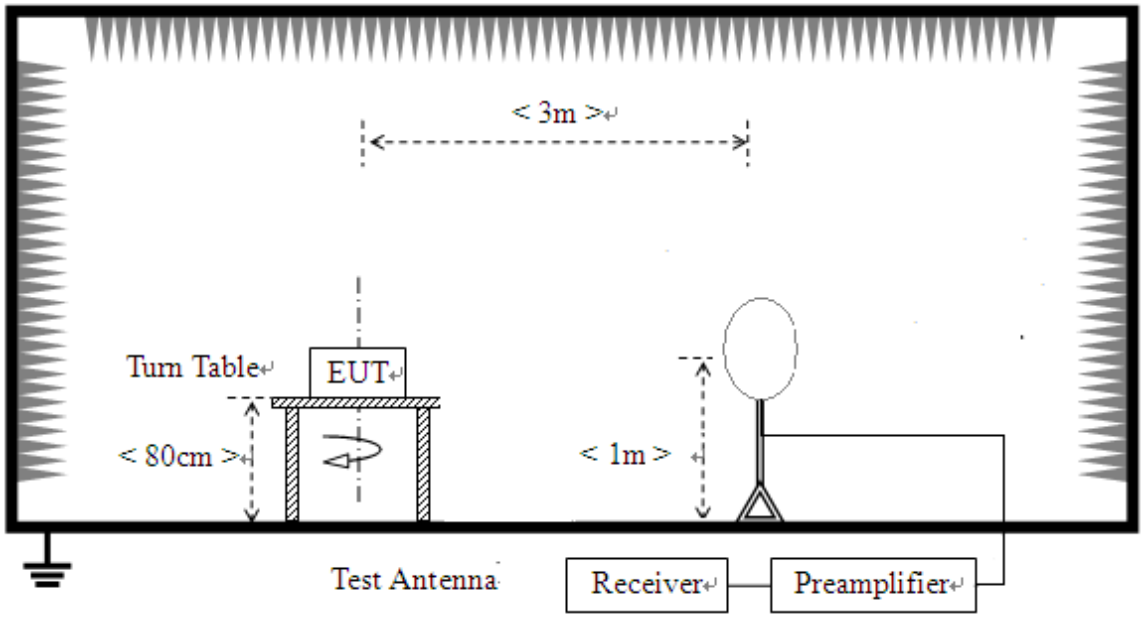
For above 1000MHz, limit field strength of harmonics: 54dBuV/m@3m (AV) and 74dBuV/m@3m (PK)

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)

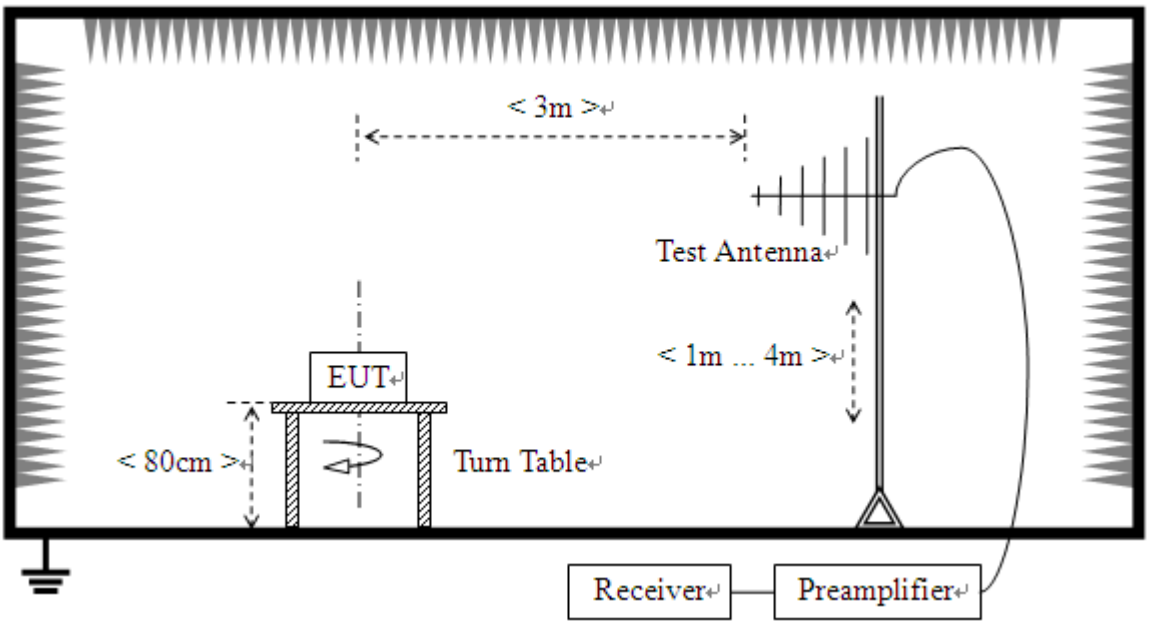
2.8.2. Test Description

A. Test Setup:

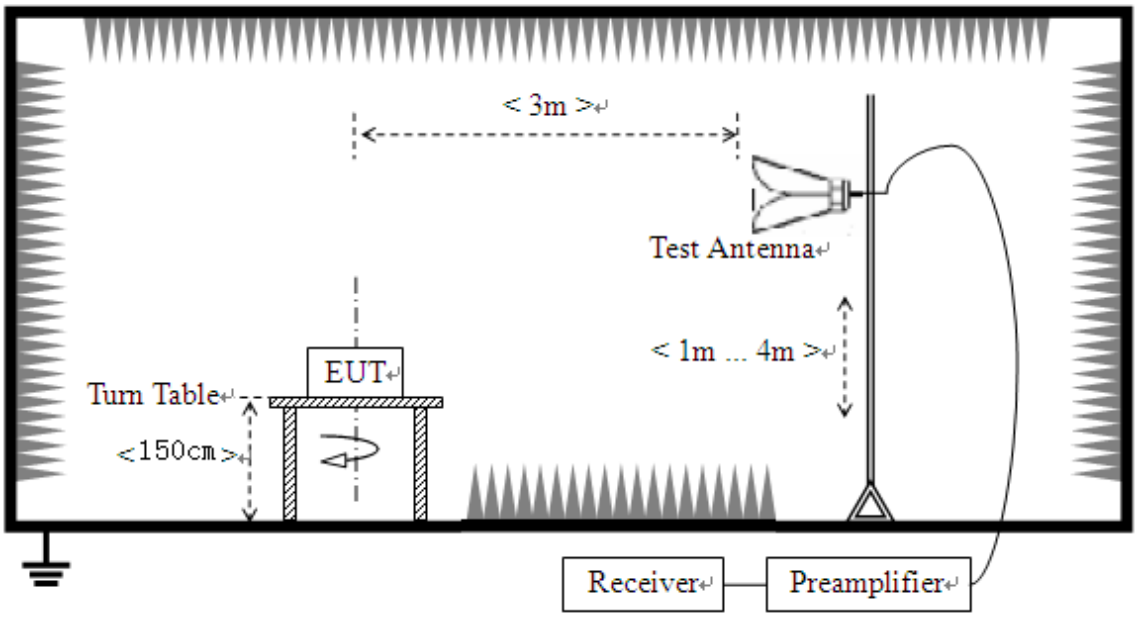
1) For radiated emissions from 9kHz to 30MHz



2) For radiated emissions from 30MHz to1GHz



3) For radiated emissions above 1GHz



The RF absorbing material used on the reference ground plane and on the turntable have a maximum height (thickness) of 30 cm (12 in) and have a minimum-rated attenuation of 20 dB at all frequencies from 1 GHz to 18 GHz. Test site have a minimum area of the ground plane covered with RF absorbing material as specified in Figure 6 of ANSI C63.4: 2014.

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4dB according to the standards: ANSI C63.10 (2013). For radiated emissions below or equal to 1GHz, The EUT was set-up on insulator 80cm above the Ground Plane, For radiated emissions above 1GHz, The EUT was set-up on insulator 150cm above the Ground Plane. The set-up and test methods were according to ANSI C63.10

For the radiated emission test above 1GHz:

Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.

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:

(a) 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.
(b) In the frequency range above 30MHz, Bi-Log Test Antenna (30MHz to 1GHz) and Horn Test Antenna (above 1GHz) are used. Place the test antenna at 3m away from area of the EUT, while keeping the test antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The test antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final test antenna elevation shall be that which maximizes the emissions. The test antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane. The emission levels at both horizontal and vertical polarizations should be tested.

A. Equipments List:

Please reference ANNEX A(1.5).

2.8.3. Test Result

According to ANSI C63.10, 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 [dBμV/m] $= U_R + A_T + A_{Factor}$ [dB]; $A_T = L_{Cable\ loss}$ [dB]$-G_{preamp}$ [dB]

A_T: Total correction Factor except Antenna

U_R: Receiver Reading

G_{preamp}: Preamplifier Gain

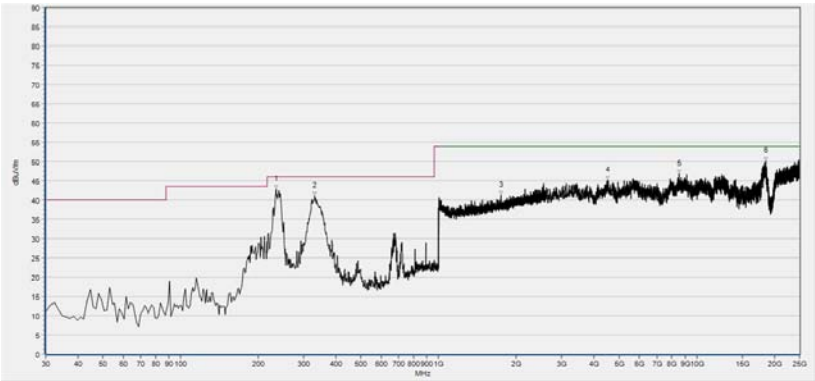
A_{Factor}: Antenna Factor at 3m

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

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.

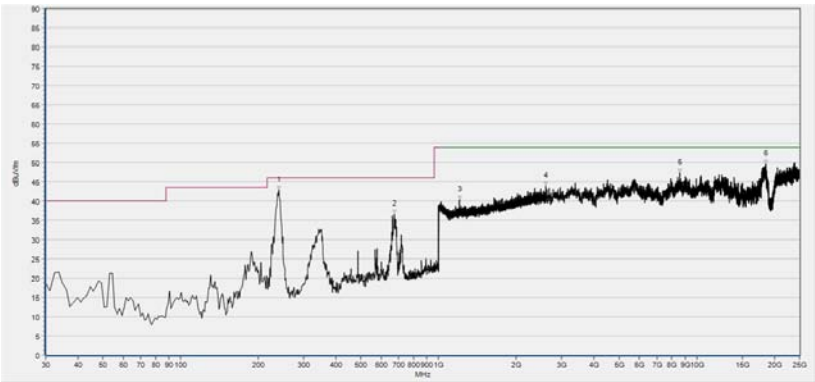
2.8.3.1 802.11b Test mode

Plots for Channel = 1



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
233.955	42.87	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
331.076	41.04	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
1745.898	41.23	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS
4522.677	45.18	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS
8530.969	46.81	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS
18458.011	50.15	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS

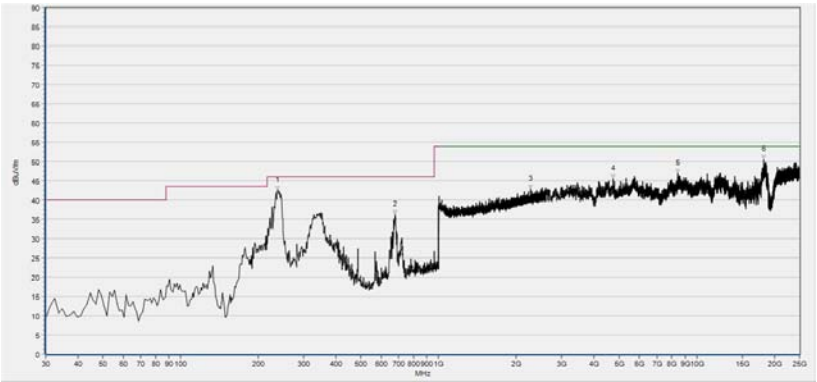
(Antenna Horizontal, 30MHz to 25GHz)



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
240.025	42.90	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
673.429	36.63	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
1202.961	40.34	N/A	N/A	74.0	N/A	54.0	Vertical	PASS
2604.073	43.88	N/A	N/A	74.0	N/A	54.0	Vertical	PASS
8612.439	47.33	N/A	N/A	74.0	N/A	54.0	Vertical	PASS
18462.084	49.71	N/A	N/A	74.0	N/A	54.0	Vertical	PASS

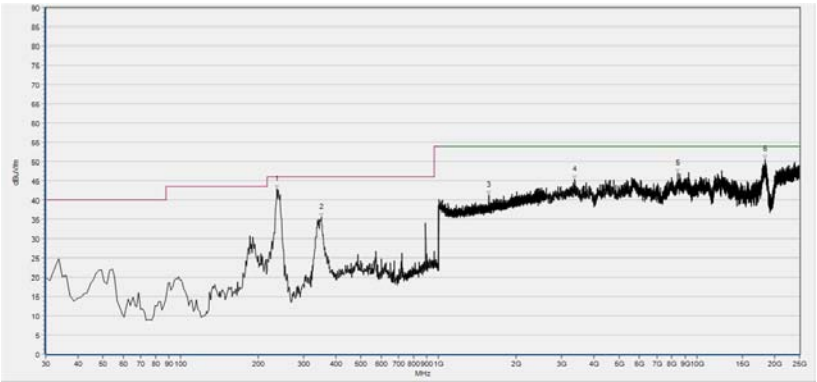
(Antenna Vertical, 30MHz to 25GHz)

Plot for Channel = 6



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
237.597	42.57	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
679.499	36.25	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
2269.628	42.77	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS
4726.350	45.48	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS
8453.573	46.96	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS
18209.529	50.62	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS

(Antenna Horizontal, 30MHz to 25GHz)



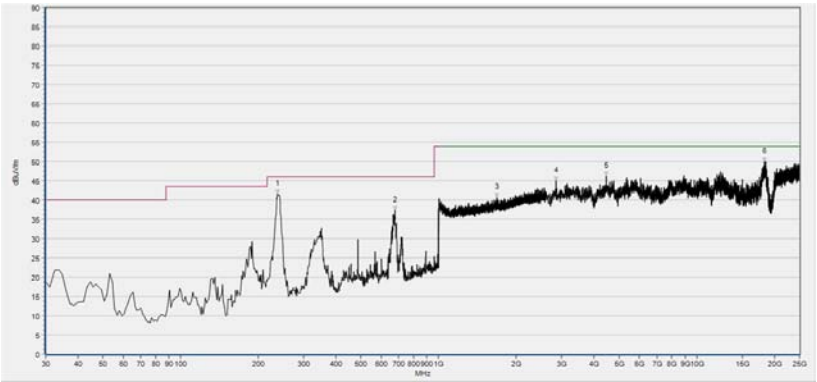
Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
236.383	42.85	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
350.501	35.53	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
1565.346	41.18	N/A	N/A	74.0	N/A	54.0	Vertical	PASS
3369.885	45.34	N/A	N/A	74.0	N/A	54.0	Vertical	PASS
8445.426	46.88	N/A	N/A	74.0	N/A	54.0	Vertical	PASS
18384.688	50.47	N/A	N/A	74.0	N/A	54.0	Vertical	PASS

(Antenna Vertical, 30MHz to 25GHz)

Plot for Channel = 11

Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
243.667	43.09	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
344.431	38.15	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
1268.908	39.56	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS
2799.600	44.75	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS
8620.586	46.43	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS
17993.635	49.95	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS

(Antenna Horizontal, 30MHz to 25GHz)



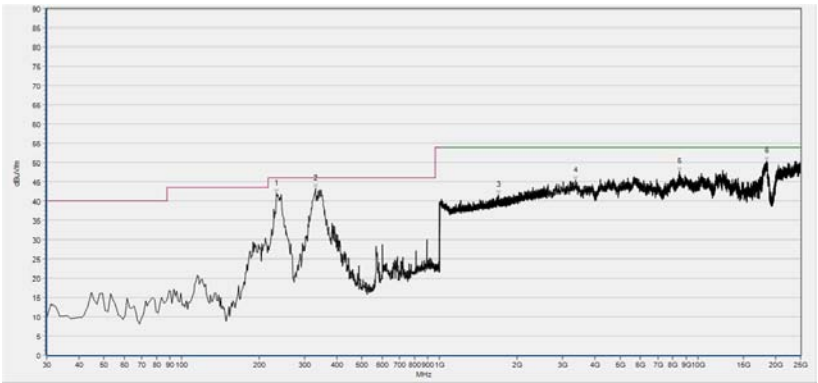
Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
237.597	41.57	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
675.857	37.37	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
1685.074	40.65	N/A	N/A	74.0	N/A	54.0	Vertical	PASS
2848.482	45.07	N/A	N/A	74.0	N/A	54.0	Vertical	PASS
4453.428	46.24	N/A	N/A	74.0	N/A	54.0	Vertical	PASS
18250.264	50.08	N/A	N/A	74.0	N/A	54.0	Vertical	PASS

(Antenna Vertical, 30MHz to 25GHz)

2.8.3.2 802.11g Test mode

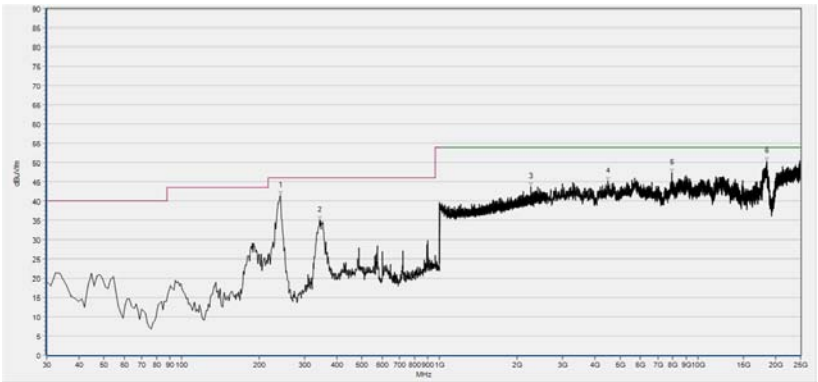
A. Test Plots for the Whole Measurement Frequency Range:

Plots for Channel = 1



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
232.741	41.95	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
329.862	42.17	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
1692.117	41.65	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS
3361.738	45.41	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS
8473.941	47.70	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS
18494.672	50.42	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS

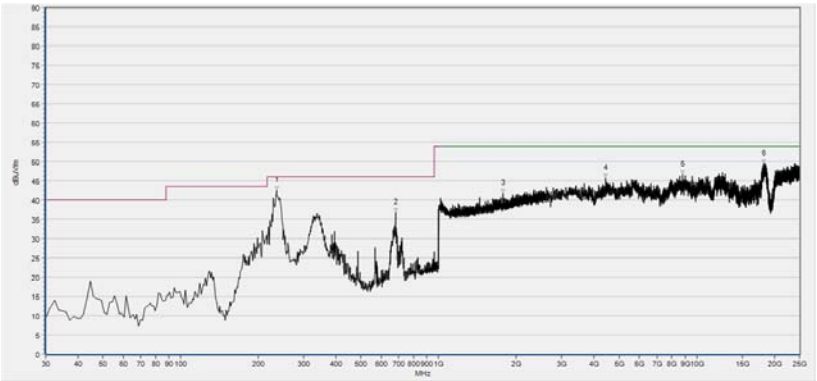
(Antenna Horizontal, 30MHz to 25GHz)



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
241.239	41.51	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
342.003	35.04	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
2256.182	43.78	N/A	N/A	74.0	N/A	54.0	Vertical	PASS
4473.795	45.11	N/A	N/A	74.0	N/A	54.0	Vertical	PASS
7932.169	47.26	N/A	N/A	74.0	N/A	54.0	Vertical	PASS
18531.333	50.41	N/A	N/A	74.0	N/A	54.0	Vertical	PASS

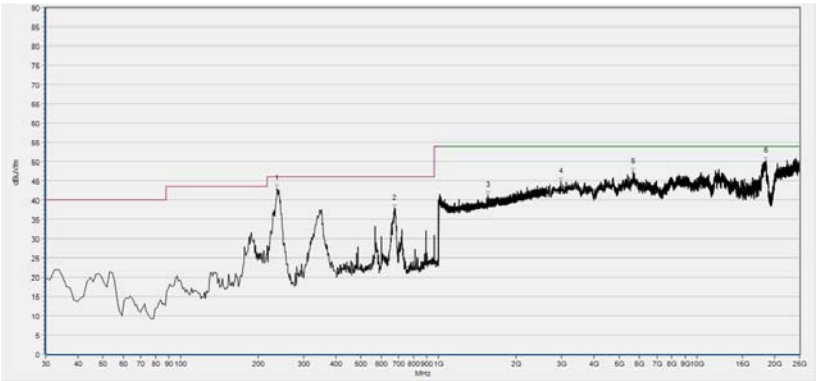
(Antenna Vertical, 30MHz to 25GHz)

Plot for Channel = 6



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
235.169	42.56	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
680.713	36.76	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
1770.228	41.85	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS
4441.207	45.76	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS
8791.671	46.57	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS
18225.823	49.38	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS

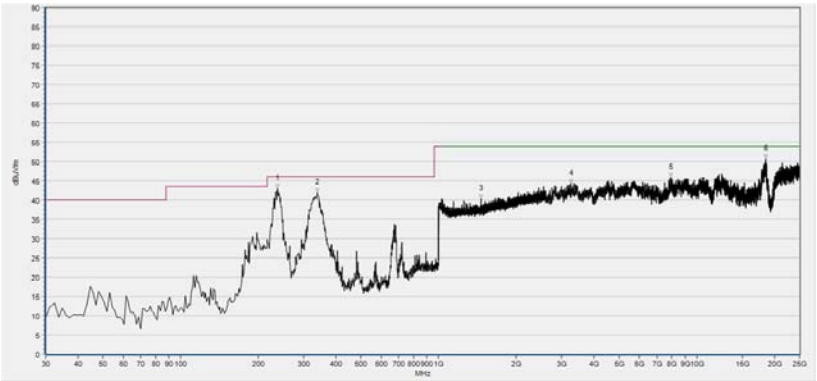
(Antenna Horizontal, 30MHz to 25GHz)



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
236.383	42.98	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
674.643	37.79	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
1549.980	41.17	N/A	N/A	74.0	N/A	54.0	Vertical	PASS
2978.833	44.88	N/A	N/A	74.0	N/A	54.0	Vertical	PASS
5655.101	47.26	N/A	N/A	74.0	N/A	54.0	Vertical	PASS
18555.774	50.16	N/A	N/A	74.0	N/A	54.0	Vertical	PASS

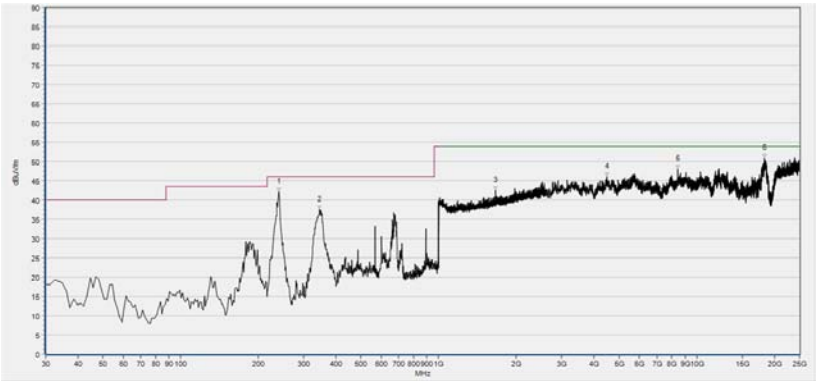
(Antenna Vertical, 30MHz to 25GHz)

Plot for Channel = 11



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
237.597	43.02	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
338.360	41.90	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
1459.064	40.34	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS
3251.755	44.37	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS
7952.537	45.89	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS
18474.304	50.67	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS

(Antenna Horizontal, 30MHz to 25GHz)



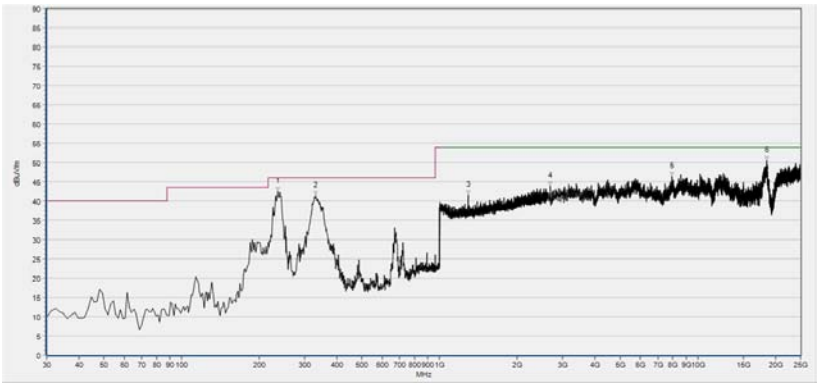
Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
240.025	42.22	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
345.645	37.41	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
1656.903	42.47	N/A	N/A	74.0	N/A	54.0	Vertical	PASS
4473.795	46.06	N/A	N/A	74.0	N/A	54.0	Vertical	PASS
8425.059	47.96	N/A	N/A	74.0	N/A	54.0	Vertical	PASS
18282.851	50.97	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

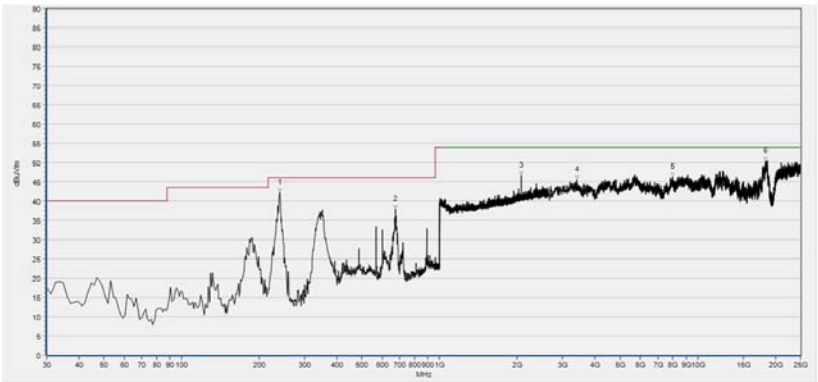
B. Test Plots for the Whole Measurement Frequency Range:

Plots for Channel = 1



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
235.169	42.43	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
331.076	41.36	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
1286.835	41.57	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS
2685.543	43.99	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS
7915.876	46.37	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS
18527.260	50.48	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS

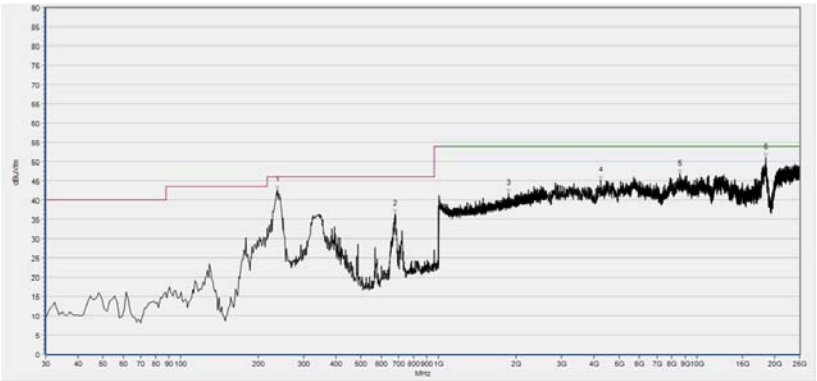
(Antenna Horizontal, 30MHz to 25GHz)



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
240.025	42.19	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
674.643	37.88	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
2065.386	46.56	N/A	N/A	74.0	N/A	54.0	Vertical	PASS
3398.400	45.46	N/A	N/A	74.0	N/A	54.0	Vertical	PASS
7989.198	46.24	N/A	N/A	74.0	N/A	54.0	Vertical	PASS
18290.998	50.37	N/A	N/A	74.0	N/A	54.0	Vertical	PASS

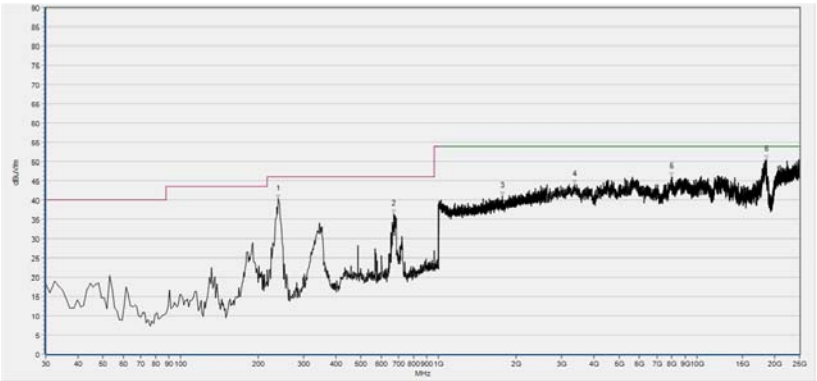
(Antenna Vertical, 30MHz to 25GHz)

Plot for Channel = 6



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
237.597	42.72	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
677.071	36.51	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
1868.187	41.79	N/A	N/A	74.0	N/A	74.0	Horizontal	PASS
4237.534	45.18	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS
8620.586	46.78	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS
18543.553	51.08	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS

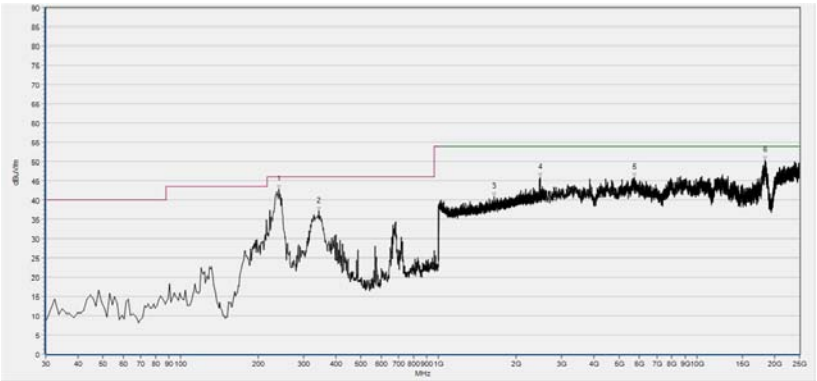
(Antenna Horizontal, 30MHz to 25GHz)



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
238.811	40.43	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
671.001	36.48	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
1765.106	41.10	N/A	N/A	74.0	N/A	54.0	Vertical	PASS
3357.665	44.11	N/A	N/A	74.0	N/A	54.0	Vertical	PASS
7985.125	46.11	N/A	N/A	74.0	N/A	54.0	Vertical	PASS
18572.068	50.57	N/A	N/A	74.0	N/A	54.0	Vertical	PASS

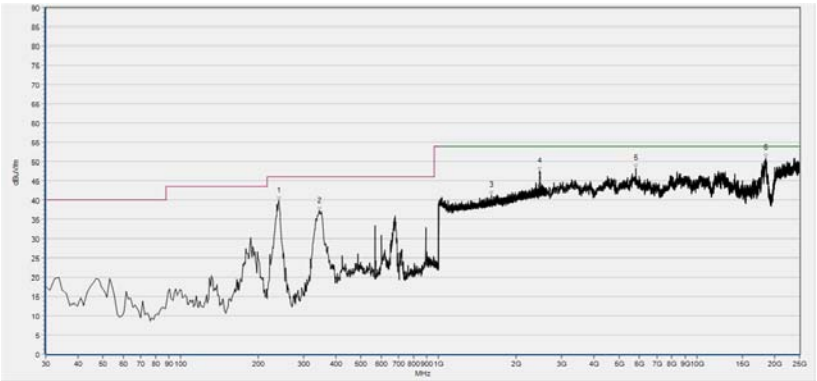
(Antenna Vertical, 30MHz to 25GHz)

Plot for Channel = 11



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
240.025	43.07	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
343.217	37.19	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
1644.098	40.96	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS
2466.827	45.96	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS
5744.717	45.94	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS
18343.953	50.30	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS

(Antenna Horizontal, 30MHz to 25GHz)

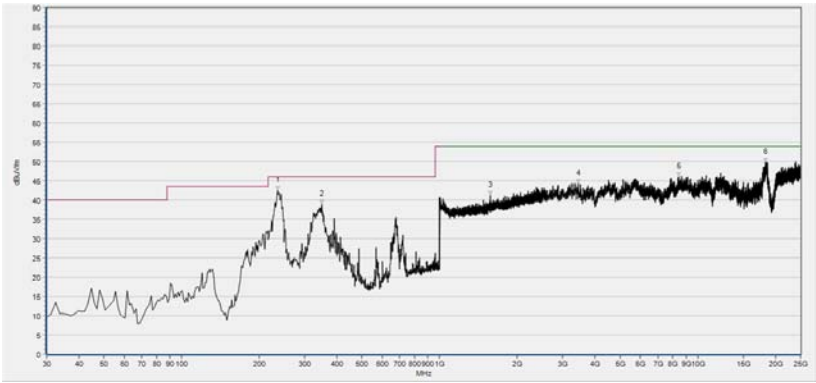


Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
240.025	39.74	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
345.645	37.18	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
1596.078	41.29	N/A	N/A	74.0	N/A	54.0	Vertical	PASS
2464.266	47.43	N/A	N/A	74.0	N/A	54.0	Vertical	PASS
5818.040	48.17	N/A	N/A	74.0	N/A	54.0	Vertical	PASS
18531.333	50.92	N/A	N/A	74.0	N/A	54.0	Vertical	PASS

(Antenna Vertical, 30MHz to 25GHz)

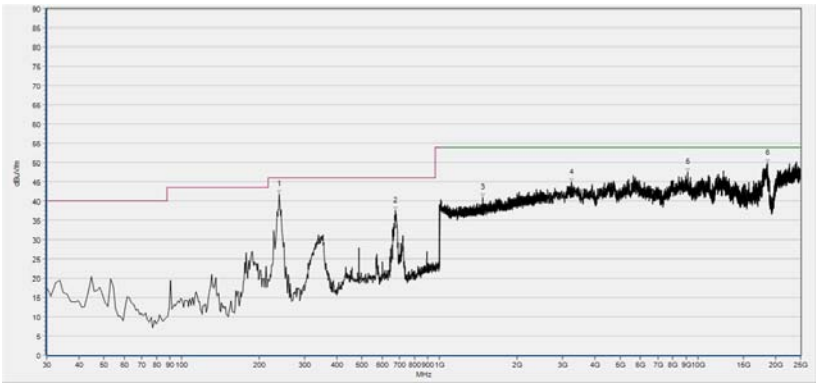
2.8.3.4 802.11n-40MHz Test mode

Plots for Channel = 3



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
235.169	42.49	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
349.287	38.87	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
1573.029	41.29	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS
3443.208	44.27	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS
8425.059	46.05	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS
18295.072	49.90	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS

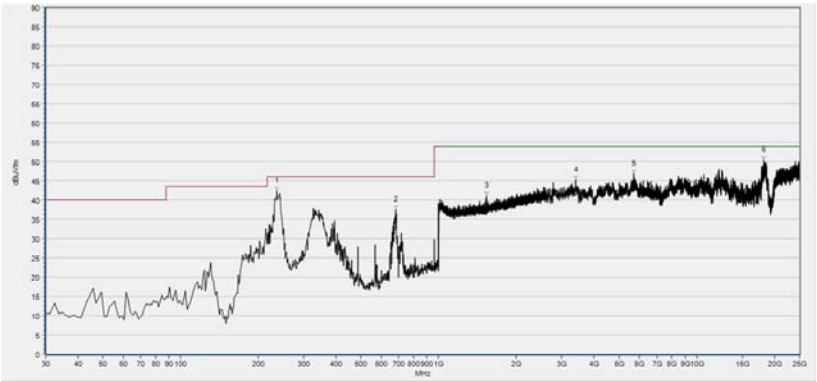
(Plot A.2: Antenna Horizontal, 30MHz to 25GHz)



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
238.811	41.84	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
674.643	37.58	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
1468.667	40.95	N/A	N/A	74.0	N/A	54.0	Vertical	PASS
3243.608	44.82	N/A	N/A	74.0	N/A	54.0	Vertical	PASS
9158.283	47.48	N/A	N/A	74.0	N/A	54.0	Vertical	PASS
18576.141	49.87	N/A	N/A	74.0	N/A	54.0	Vertical	PASS

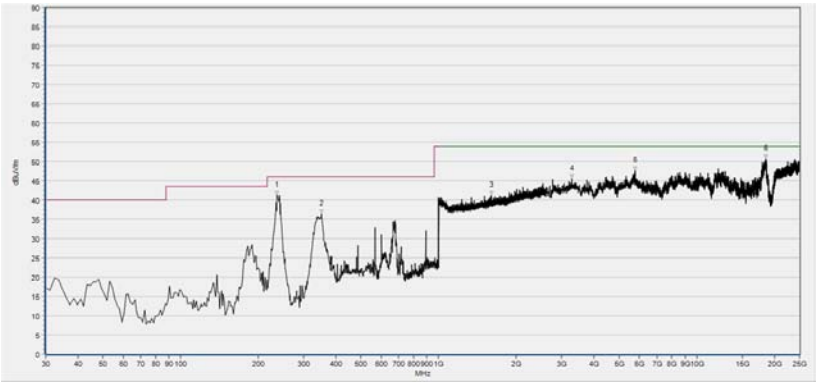
(Plot A.3: Antenna Vertical, 30MHz to 25GHz)

Plots for Channel = 6



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
236.383	42.24	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
680.713	37.53	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
1532.053	41.10	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS
3394.326	45.12	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS
5687.689	46.87	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS
18168.794	50.44	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS

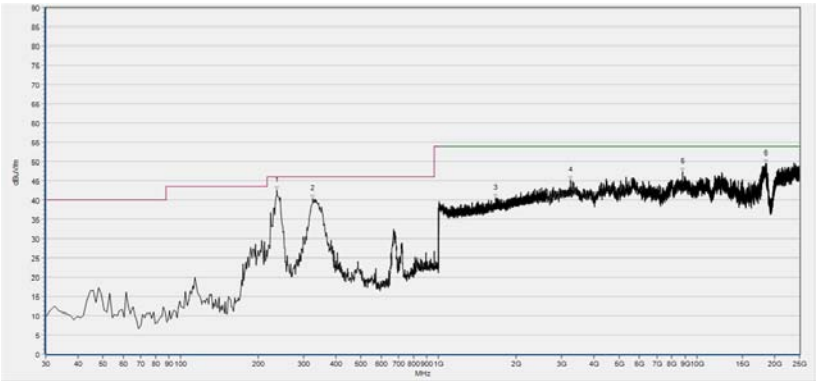
(Plot B.2: Antenna Horizontal, 30MHz to 25GHz)



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
236.383	41.30	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
350.501	36.44	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
1599.920	41.21	N/A	N/A	74.0	N/A	54.0	Vertical	PASS
3280.269	45.61	N/A	N/A	74.0	N/A	54.0	Vertical	PASS
5765.085	47.69	N/A	N/A	74.0	N/A	54.0	Vertical	PASS
18474.304	50.75	N/A	N/A	74.0	N/A	54.0	Vertical	PASS

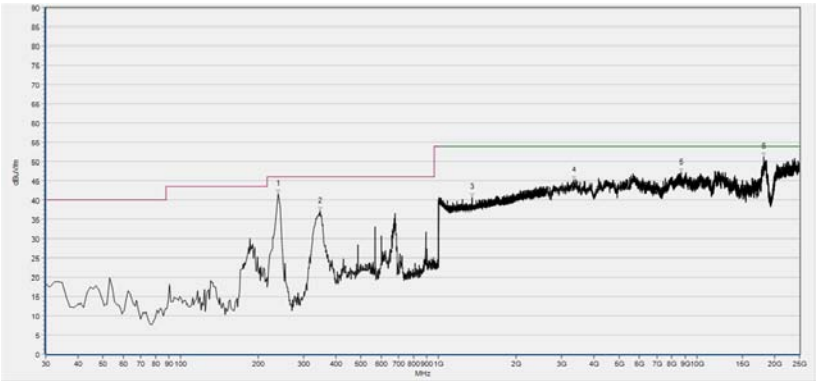
(Plot B.3: Antenna Vertical, 30MHz to 25GHz)

Plots for Channel = 9



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
236.383	42.54	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
325.006	40.28	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
1663.946	40.62	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS
3243.608	45.16	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS
8795.745	47.26	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS
18466.157	49.52	N/A	N/A	74.0	N/A	54.0	Horizontal	PASS

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



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
238.811	41.53	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
348.073	37.10	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
1349.580	40.73	N/A	N/A	74.0	N/A	54.0	Vertical	PASS
3341.371	45.16	N/A	N/A	74.0	N/A	54.0	Vertical	PASS
8677.614	47.11	N/A	N/A	74.0	N/A	54.0	Vertical	PASS
18217.676	51.31	N/A	N/A	74.0	N/A	54.0	Vertical	PASS

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

Annex A Test Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for test performed on the EUT as specified in CISPR 16-1-2:

Test items	Uncertainty
Peak Output Power	±2.22dB
Power spectral density (PSD)	±2.22dB
Bandwidth	±5%
Conducted Spurious Emission	±2.77 dB
Restricted Frequency Bands	±5%
Radiated Emission	±2.95dB
Conducted Emission	±2.44dB

This uncertainty represent an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2

Annex B Testing Laboratory Information

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

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

3. Facilities and Accreditations

All measurement facilities used to collect the measurement data are located at FL.3, 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 C63.10-2013 and CISPR Publication 22; the FCC designation number is CN1192.

4. Test Equipments Utilized

4.1 Conducted Test Equipments

Equipment Name	Serial No.	Type	Manufacturer	Cal. Date	Cal. Due
Power Splitter	NW521	1506A	Weinschel	2017.05.24	2018.05.23
Attenuator 1	(N/A.)	10dB	Resnet	2017.05.24	2018.05.23
Attenuator 2	(N/A.)	3dB	Resnet	2017.05.24	2018.05.23
EXA Signal Analzyer	MY53470836	N9010A	Agilent	2017.12.03	2018.12.02
USB Wideband Power Sensor	MY54210011	U2021XA	Agilent	2017.05.24	2018.05.23
RF cable (30MHz-26GHz)	CB01	RF01	Morlab	N/A	N/A
Coaxial cable	CB02	RF02	Morlab	N/A	N/A
SMA connector	CN01	RF03	HUBER-SUHNER	N/A	N/A

4.2 Conducted Emission Test Equipments

Equipment Name	Serial No.	Type	Manufacturer	Cal. Date	Cal. Due
Receiver	MY56400093	N9038A	KEYSIGHT	2017.07.13	2018.07.12
LISN	812744	NSLK 8127	Schwarzbeck	2017.05.17	2018.05.16
Pulse Limiter (20dB)	9391	VTSD 9561-D	Schwarzbeck	2017.05.17	2018.05.16
Coaxial cable(BNC) (30MHz-26GHz)	CB01	EMC01	Morlab	N/A	N/A

4.3Auxiliary Test Equipment

Equipment Name	Model No.	Brand Name	Manufacturer	Cal.Date	Cal.Due Date
Computer	T430i	Think Pad	Lenovo	N/A	N/A

4.4 Radiated Test Equipments

Equipment Name	Serial No.	Type	Manufacturer	Cal. Date	Cal.Due Date
Receiver	MY54130016	N9038A	Agilent	2017.05.17	2018.05.16
Test Antenna - Bi-Log	9163-519	VULB 9163	Schwarzbeck	2017.05.14	2018.05.13
Test Antenna - Horn	9170C-531	BBHA9170	Schwarzbeck	2017.09.13	2018.09.12
Test Antenna - Loop	1519-022	FMZB1519	Schwarzbeck	2017.03.07	2018.03.06
Test Antenna - Horn	01774	BBHA 9120D	Schwarzbeck	2017.09.13	2018.09.12
Coaxial cable (N male) (9KHz-30MHz)	CB04	EMC04	Morlab	N/A	N/A
Coaxial cable (N male) (30MHz-26GHz)	CB02	EMC02	Morlab	N/A	N/A
Coaxial cable(N male) (30MHz-26GHz)	CB03	EMC03	Morlab	N/A	N/A
1-18GHz pre-Amplifier	MA02	TS-PR18	Rohde& Schwarz	2017.05.17	2018.05.16
18-26.5GHz pre-Amplifier	MA03	TS-PR18	Rohde& Schwarz	2017.05.17	2018.05.16
Anechoic Chamber	N/A	9m*6m*6m	CRT	2017.11.19	2020.11.18

END OF REPORT