REPORT No.: SZ15050155W01

FCC RF TEST REPORT

APPLICANT	:	Testo Instruments (Shenzhen) Co., Ltd
PRODUCT NAME	:	testo Saveris 2
MODEL NAME	:	T1
TRADE NAME	:	testo
BRAND NAME	:	testo
FCC ID	:	2ACVD-05722001
STANDARD(S)	:	47 CFR Part 15 Subpart C
ISSUE DATE	:	2015-7-17

SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.

MORLAB GROUP
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road, Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China
Tel: 86-755-36698555 Http://www.morlab.com
Fax: 86-755-36698525 E-mail: service@morlab.cn

DIRECTORY

Change History		
Issue	Date	Reason for change
1.0	2015-7-17	First edition

TEST REPORT DECLARATION

Applicant	Testo Instruments (Shenzhen) Co., Ltd
Applicant Address	Block A, B4 Building, China Merchants Guangming Sci&Tech Park, No.3009 Guan Guang Road, Guangming New District, Shenzhen City
Manufacturer	Testo Instruments (Shenzhen) Co., Ltd
Manufacturer Address	Block A, B4 Building, China Merchants Guangming Sci&Tech Park, No.3009 Guan Guang Road, Guangming New District, Shenzhen City
Product Name	testo Saveris 2
Model Name	T1
Brand Name	testo
HW Version	V1.1
SW Version	V1.42
Test Standards	47 CFR Part 15 Subpart C
Test Date	2014-7-21 to 2015-6-30
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)

1. TECHNICAL INFORMATION

Note: Provide by applicant.

1.1 Applicant Information

Company:	Testo Instruments (Shenzhen) Co., Ltd
Address:	Block A, B4 Building, China Merchants Guangming Sci&Tech Park, No.3009 Guan Guang Road, Guangming New District, Shenzhen City

1.2 Equipment under Test (EUT) Description

Brand Name:	testo
Trade Name:	testo
Model Name:	T1
Frequency Range:	802.11b/g/n-20MHz: 2.412GHz - 2.462GHz
Channel Number:	802.11b/g/n-20MHz: 11
Modulation Type:	DSSS, OFDM
Antenna Type:	PFIA Antenna
Antenna Gain:	-3.4dBi

NOTE:

The EUT is a testo Saveris 2, 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 (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 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	V1.1	V1.42

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	**PASS**
2	15.247(b)	Peak Output Power	Jul 23, 2014	**PASS**
3	15.247(a)	Bandwidth	Jul 23, 2014	**PASS**
4	15.247(d)	Conducted Spurious Emission and Band Edge	Jul 23, 2014	**PASS**
5	15.247(d)	Restricted Frequency Bands	Jun 30, 2015	**PASS**
6	15.207	Conducted Emission	Jul 26, 2014	**PASS**
7	15.209 ,15.247(d)	Radiated Emission	Jun 30, 2015	**PASS**
8	15.247(e)	Power spectral density (PSD)	Jul 23, 2014	**PASS**

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 (06/09/2015).

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 exceed1 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 50Ohm; 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

Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	W	dBm	W	
1	2412	14.12	0.025823	30	1	PASS
6	2437	13.13	0.020559			PASS
11	2462	13.39	0.021827			PASS

2.2.3.2 802.11g Test mode

Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	W	dBm	W	
1	2412	16.44	0.044055	30	1	PASS
6	2437	15.64	0.036644			PASS
11	2462	15.61	0.036392			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	16.82	0.048084	30	1	PASS
6	2437	15.59	0.036224			PASS
11	2462	15.38	0.034514			PASS

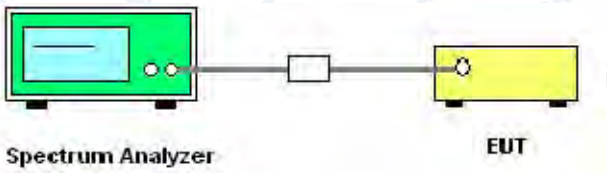
2.3 Bandwidth

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

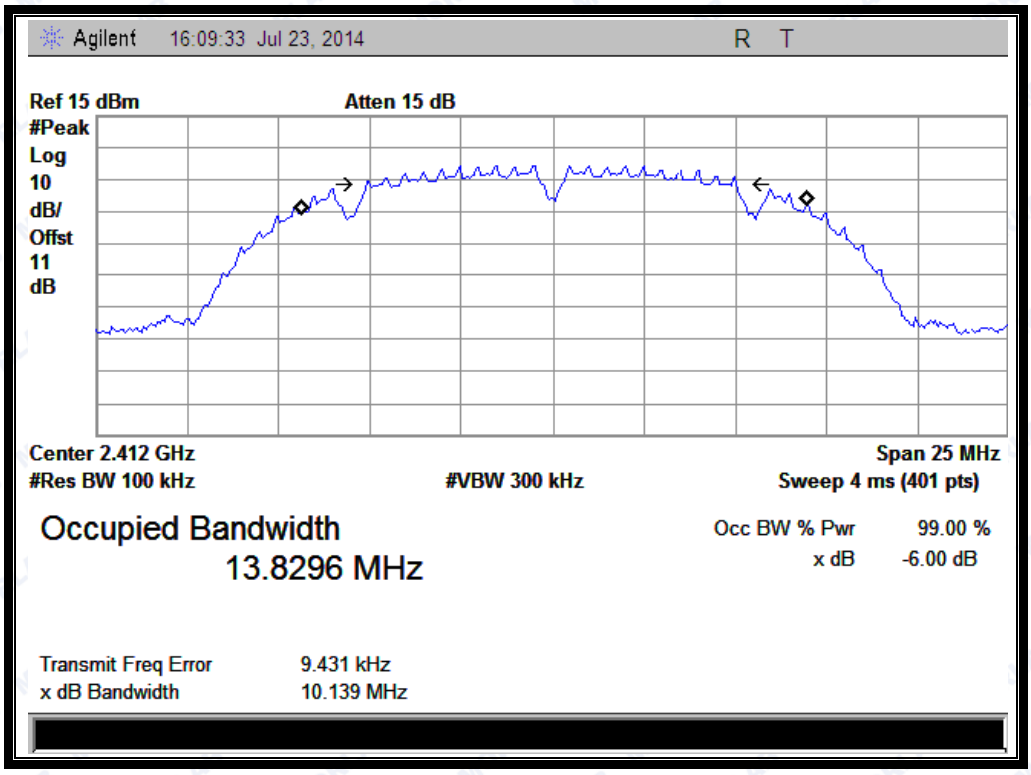
The lowest, middle and highest channels are selected to perform testing to record the 6 dB bandwidth of the Module.

2.3.3.1 802.11b Test mode

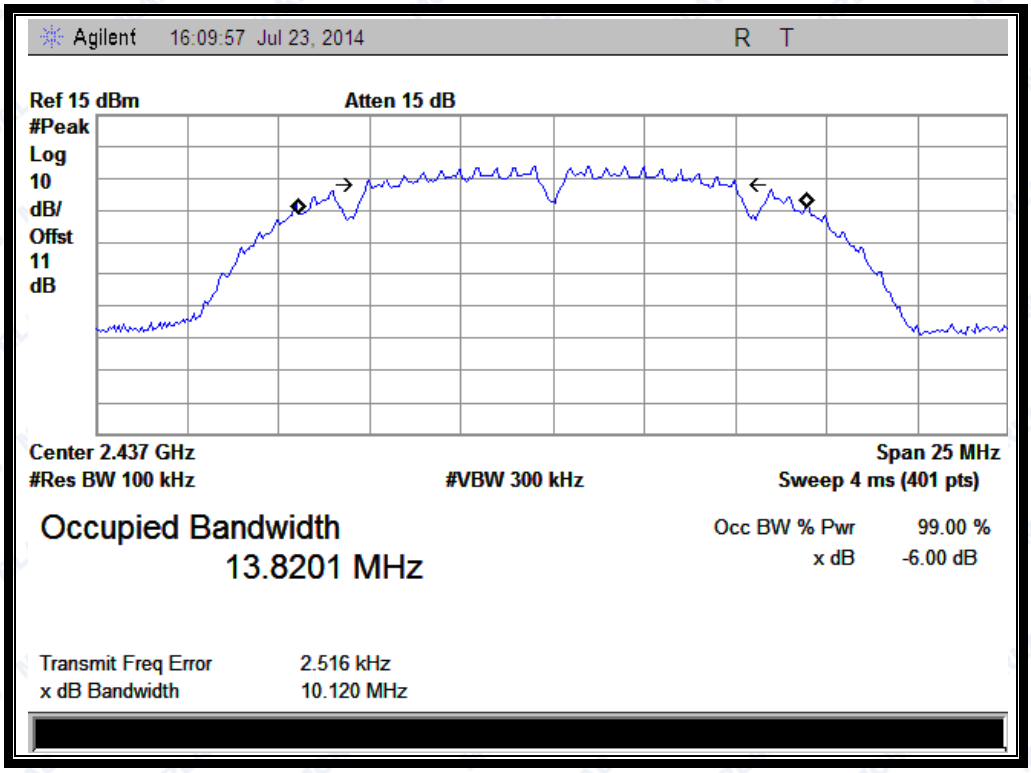
A. Test Verdict:

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limits(kHz)	Result
1	2412	10.139	≥500	PASS
6	2437	10.120	≥500	PASS
11	2462	9.666	≥500	PASS

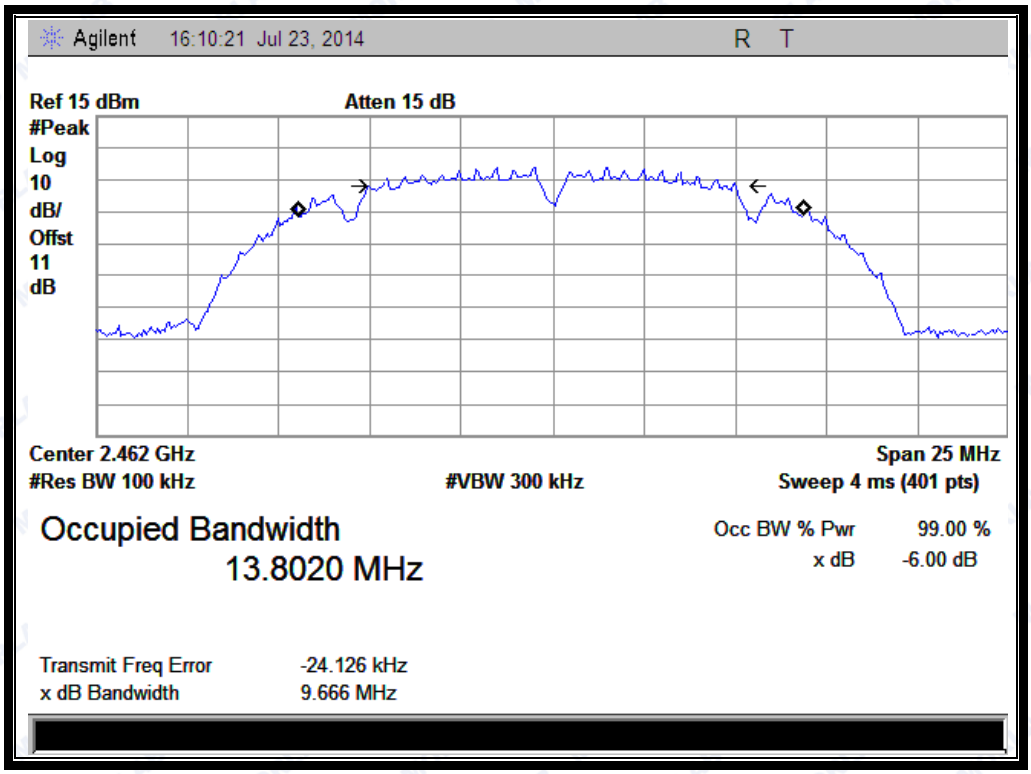
B. Test Plots



(Channel 1: 2412MHz @ 802.11b)



(Channel 6: 2437 MHz @ 802.11b)



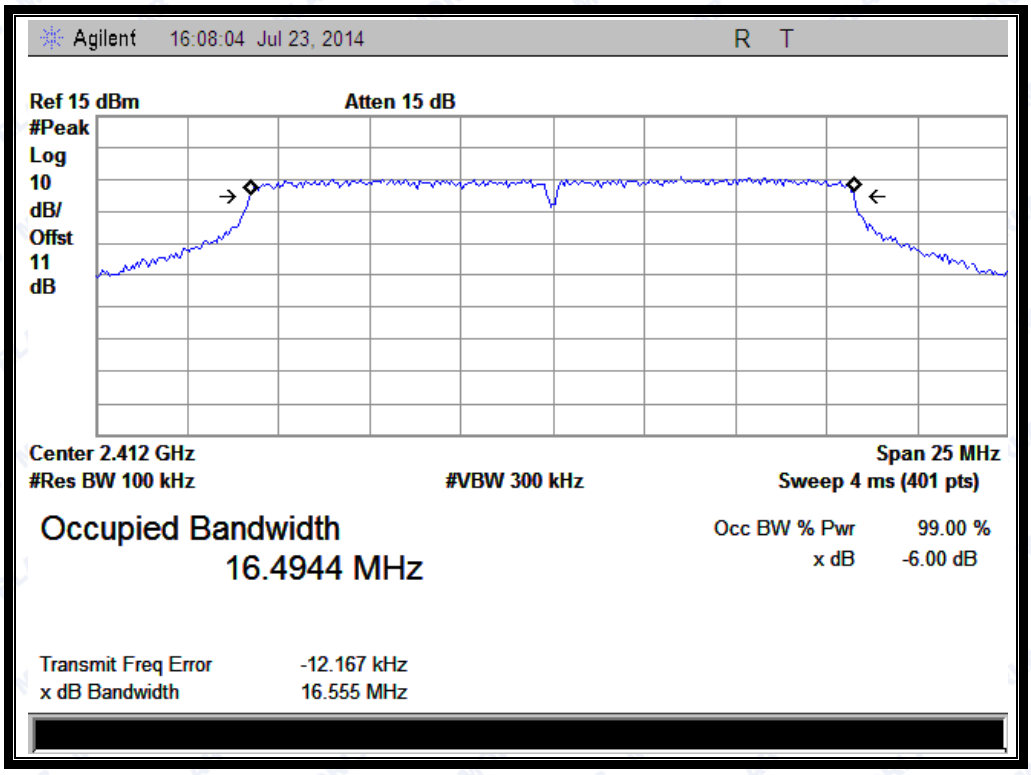
(Channel 11: 2462MHz @ 802.11b)

2.3.3.2 802.11g Test mode

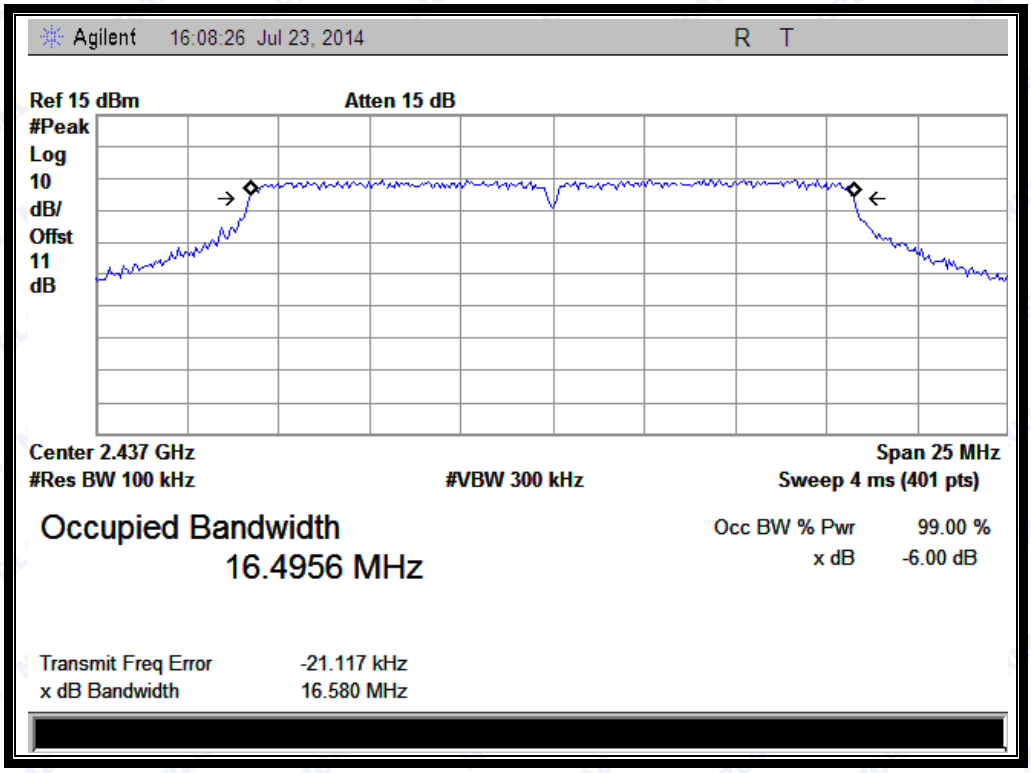
A. Test Verdict:

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limits (kHz)	Result
1	2412	16.555	≥500	PASS
6	2437	16.580	≥500	PASS
11	2462	16.575	≥500	PASS

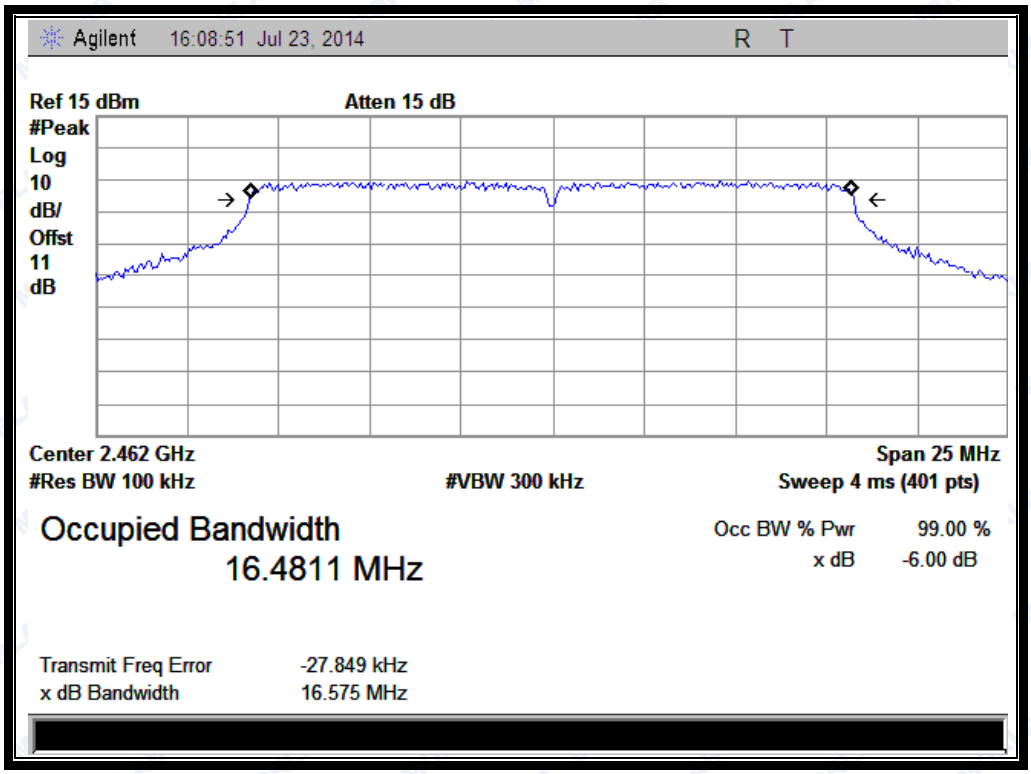
B. Test Plots:



(Channel 1: 2412MHz @ 802.11g)



(Channel 6: 2437MHz @ 802.11g)



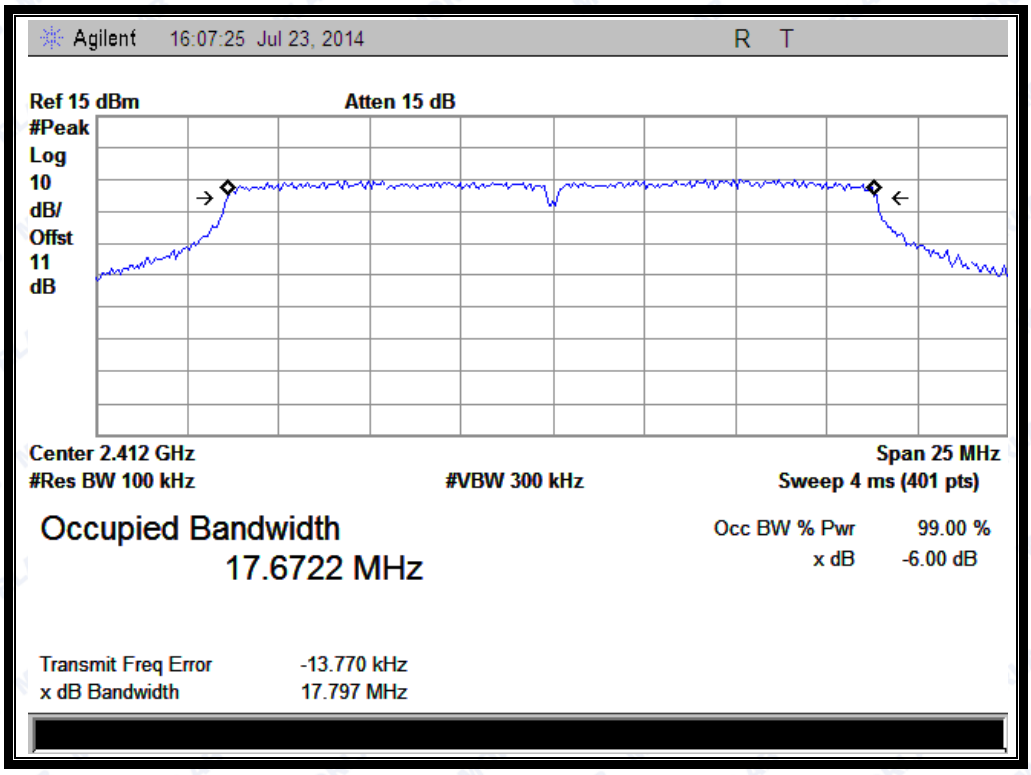
(Channel 11: 2462MHz @ 802.11g)

2.3.3.3 802.11n-20 Test mode

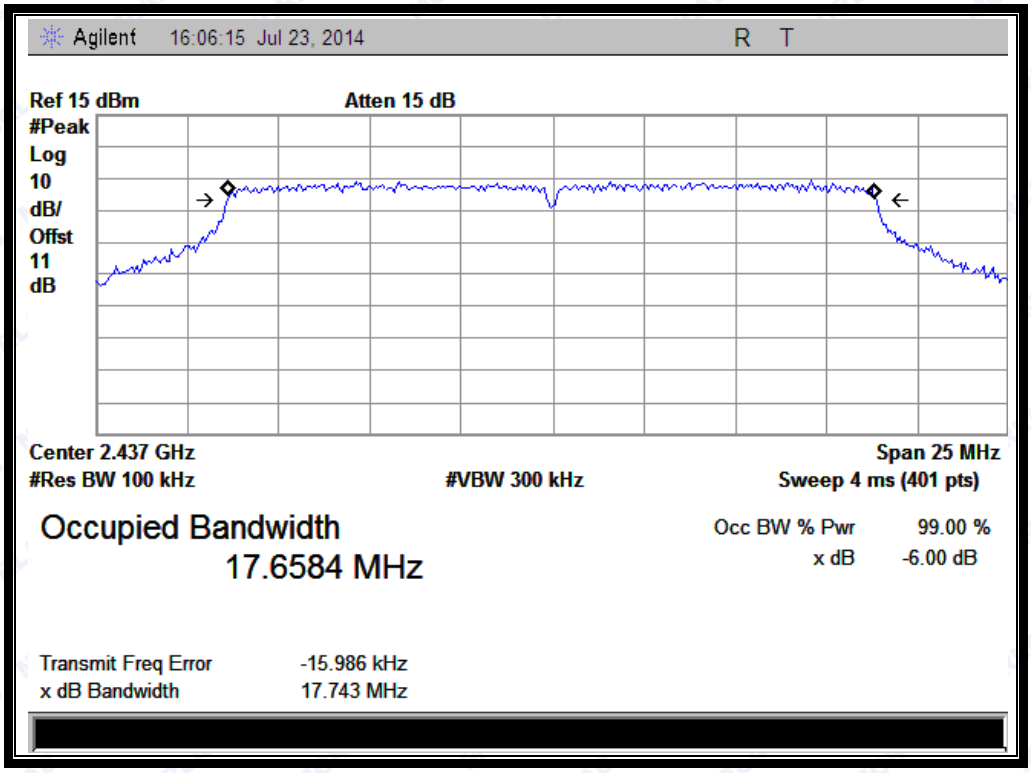
A. Test Verdict:

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limits (kHz)	Result
1	2412	17.797	≥500	PASS
6	2437	17.743	≥500	PASS
11	2462	17.802	≥500	PASS

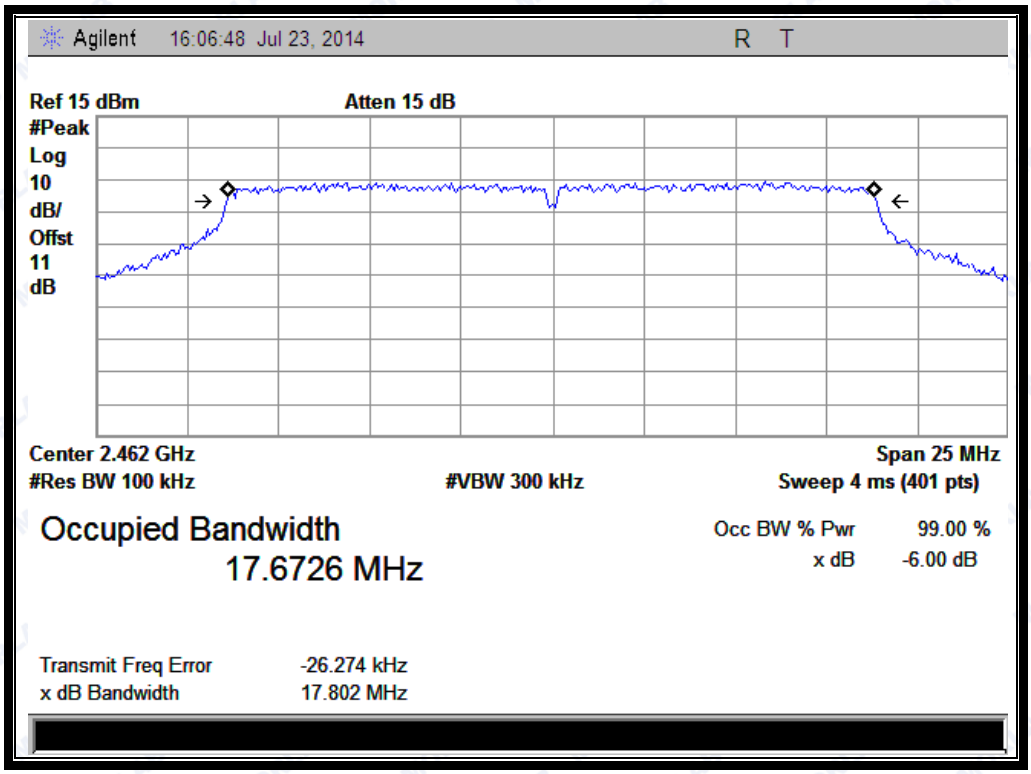
B. Test Plots:



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



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



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

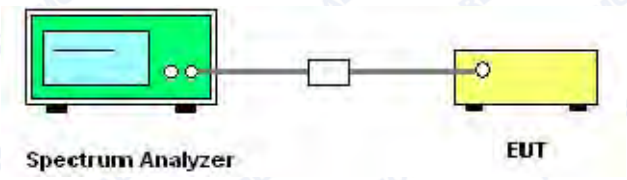
2.4 Conducted Spurious Emissions and Band Edge

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(1.4).

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.

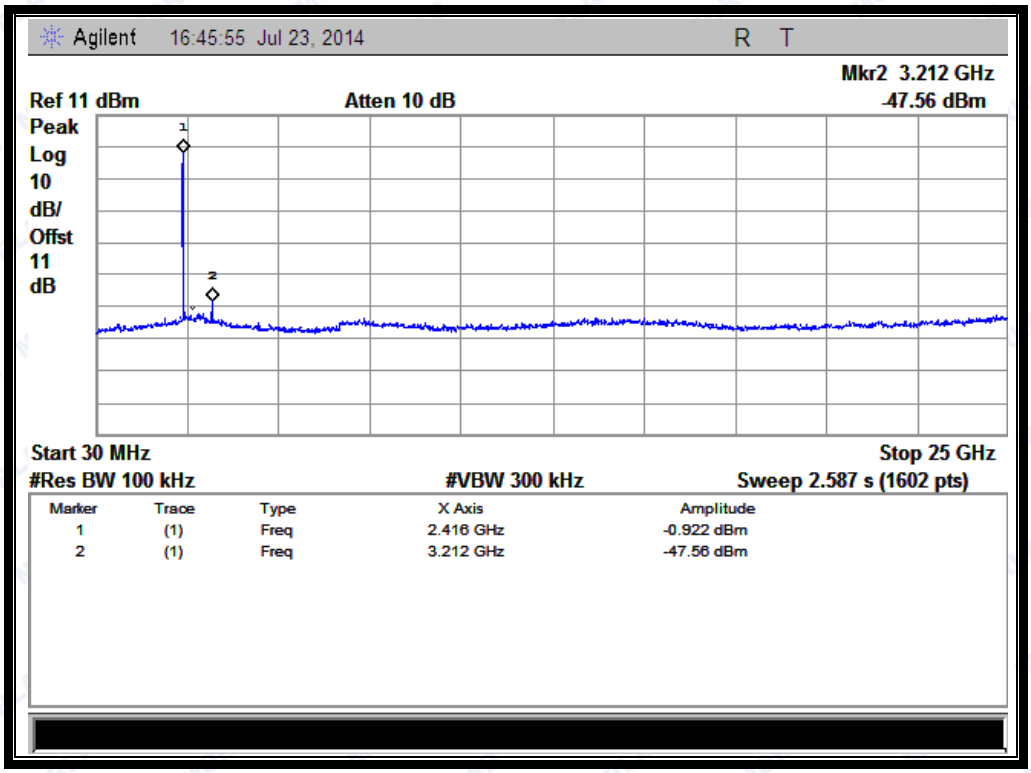
2.4.3.1 802.11b Test mode

A. Test Verdict:

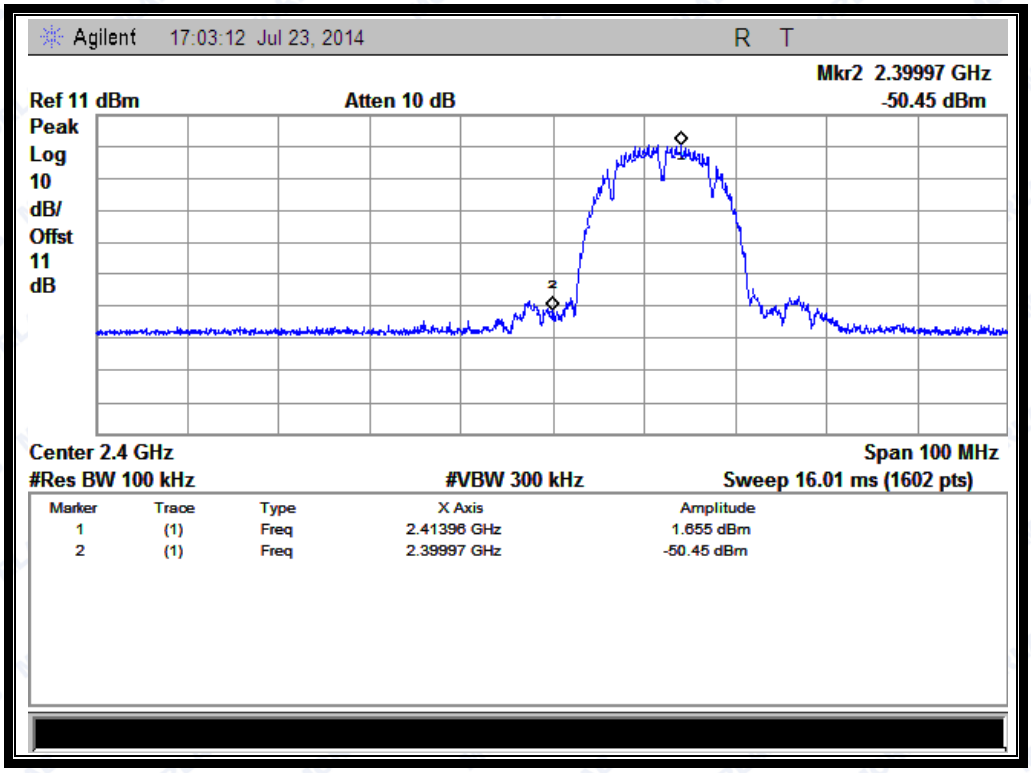
Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
			Carrier Level	Calculated -20dBc Limit	
1	2412	-47.56	-0.922	-20.9	PASS
6	2437	-47.64	-3.498	-23.5	PASS
11	2462	-46.42	-1.827	-21.8	PASS

B. Test Plots:

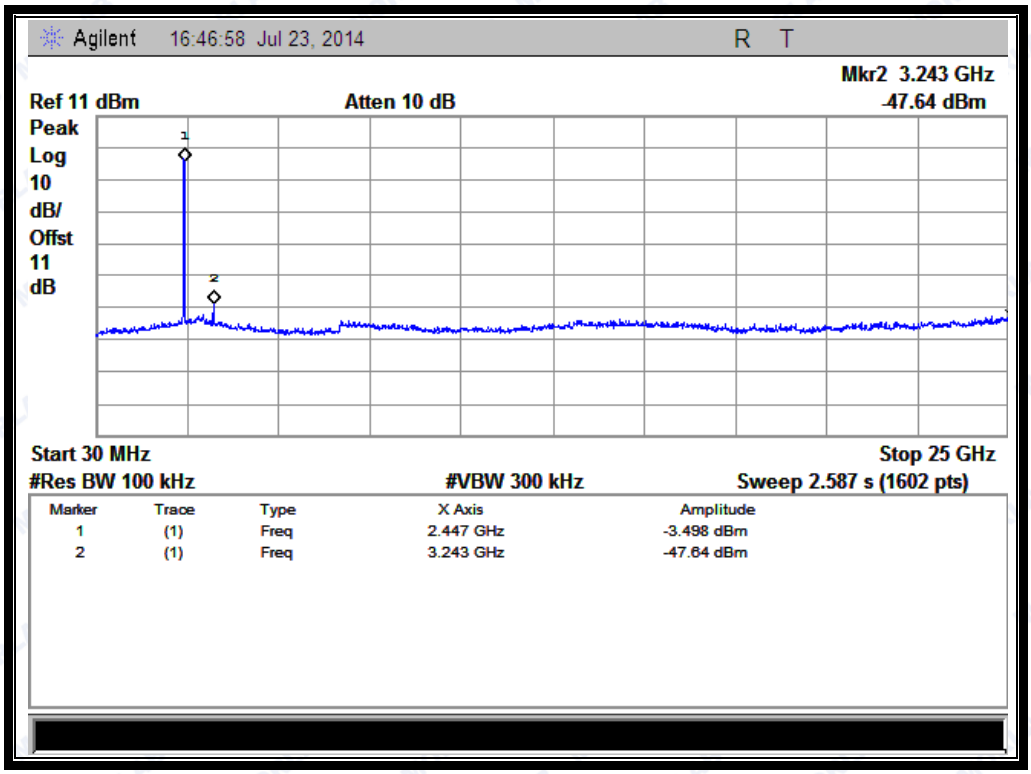
Note: the power of the Module transmitting frequency should be ignored.



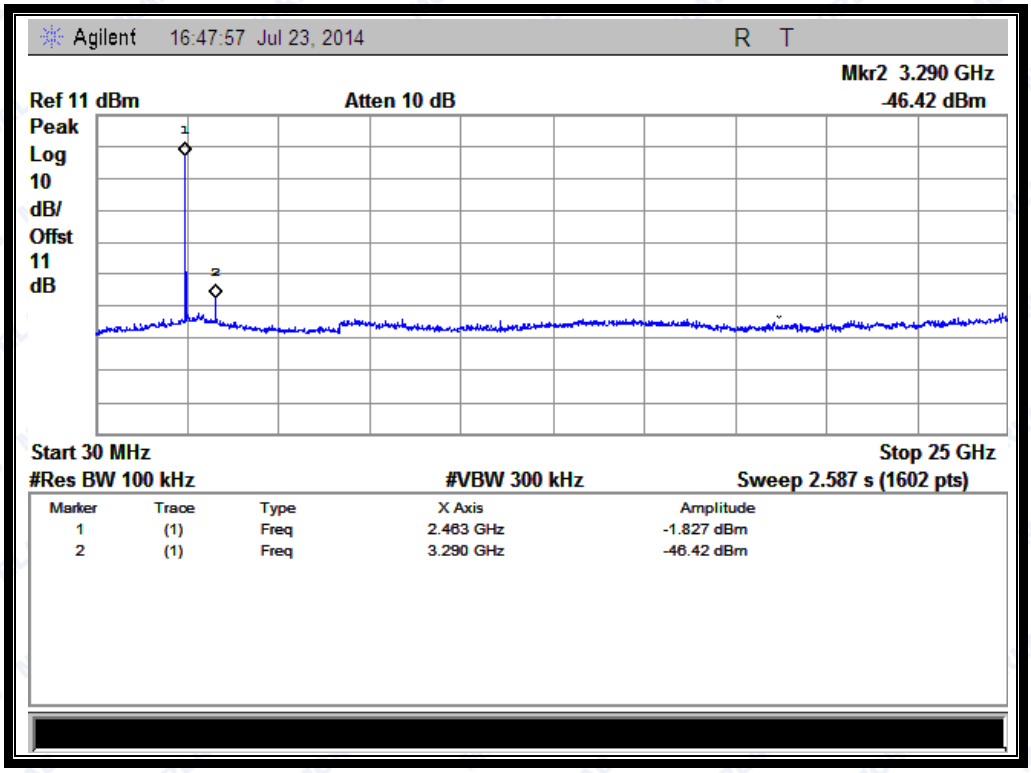
(Channel = 1, 30MHz to 25GHz)



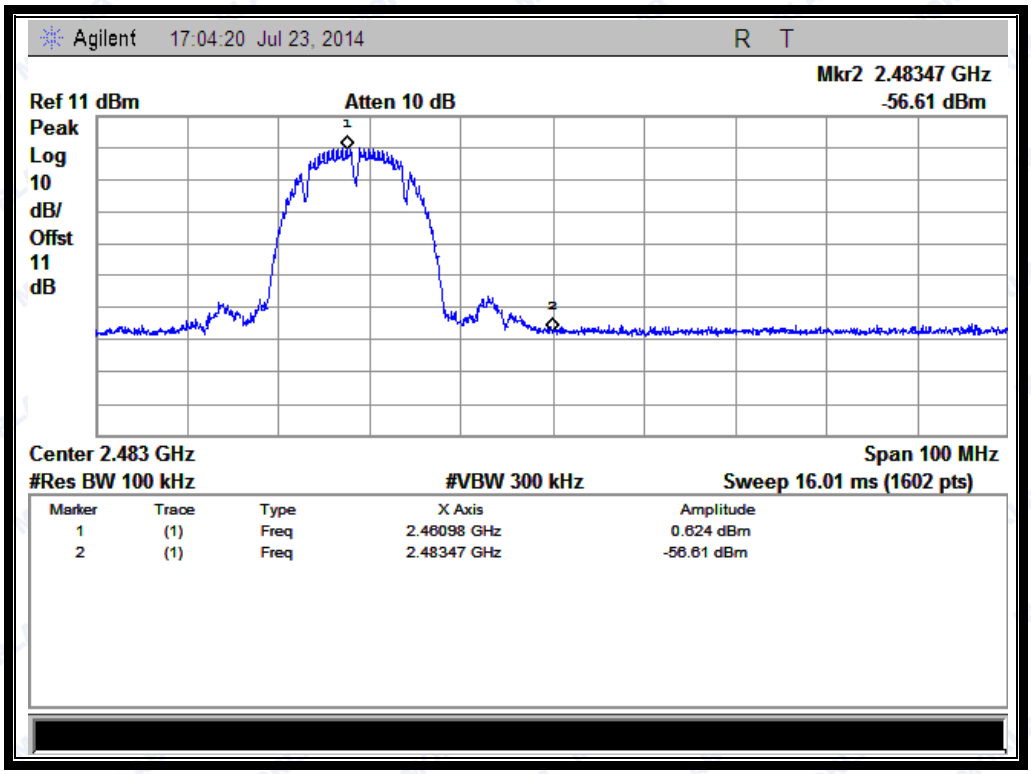
(Band Edge @ Channel = 1)



(Channel = 6, 30MHz to 25GHz)



(Channel = 11, 30MHz to 25GHz)



(Band Edge @ Channel = 11)

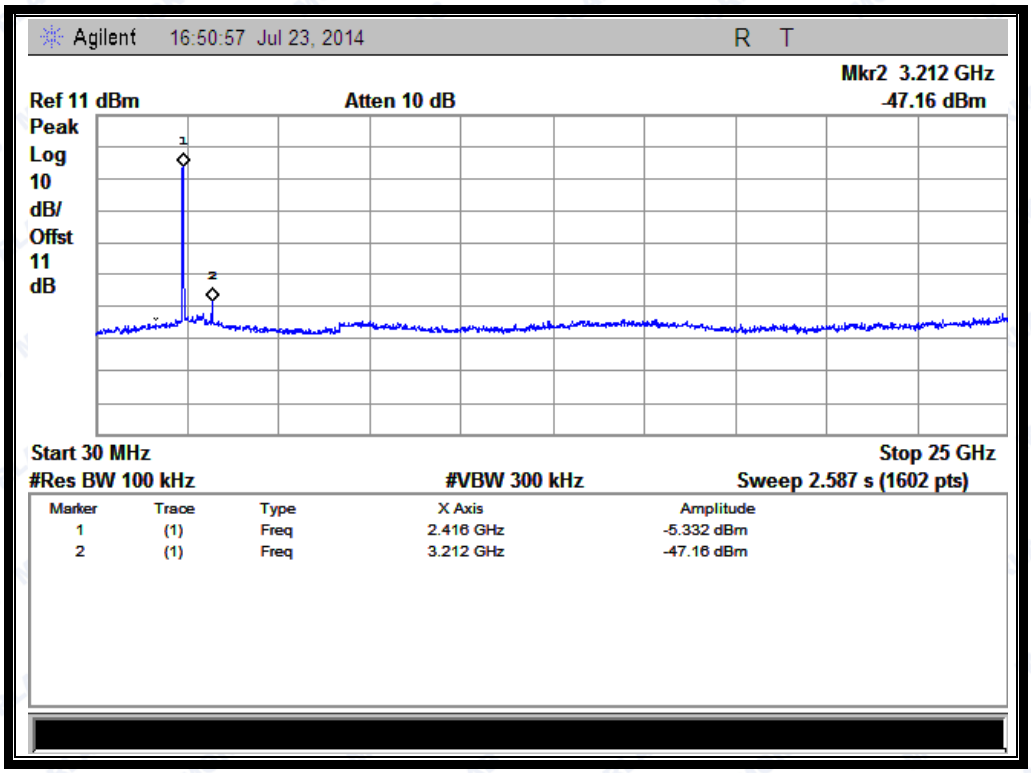
2.4.3.2 802.11g Test mode

A. Test Verdict:

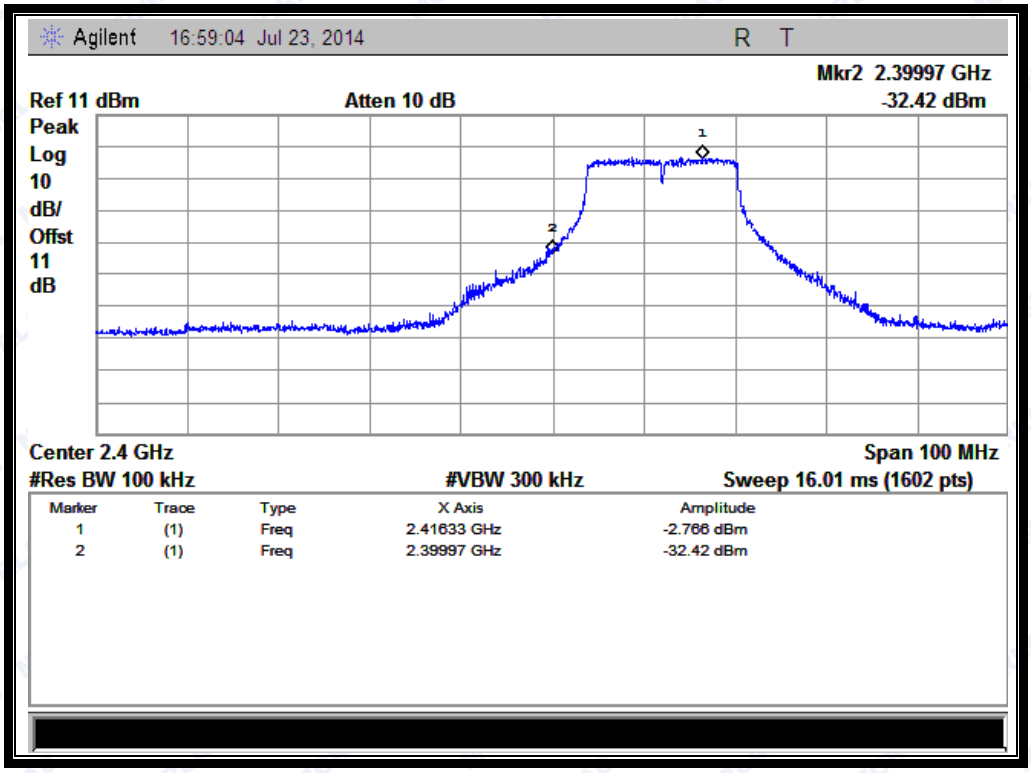
Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
			Carrier Level	Calculated -20dBc Limit	
1	2412	-47.16	-5.332	-25.3	PASS
6	2437	-46.64	-6.324	-26.3	PASS
11	2462	-46.28	-1.827	-21.8	PASS

B. Test Plots:

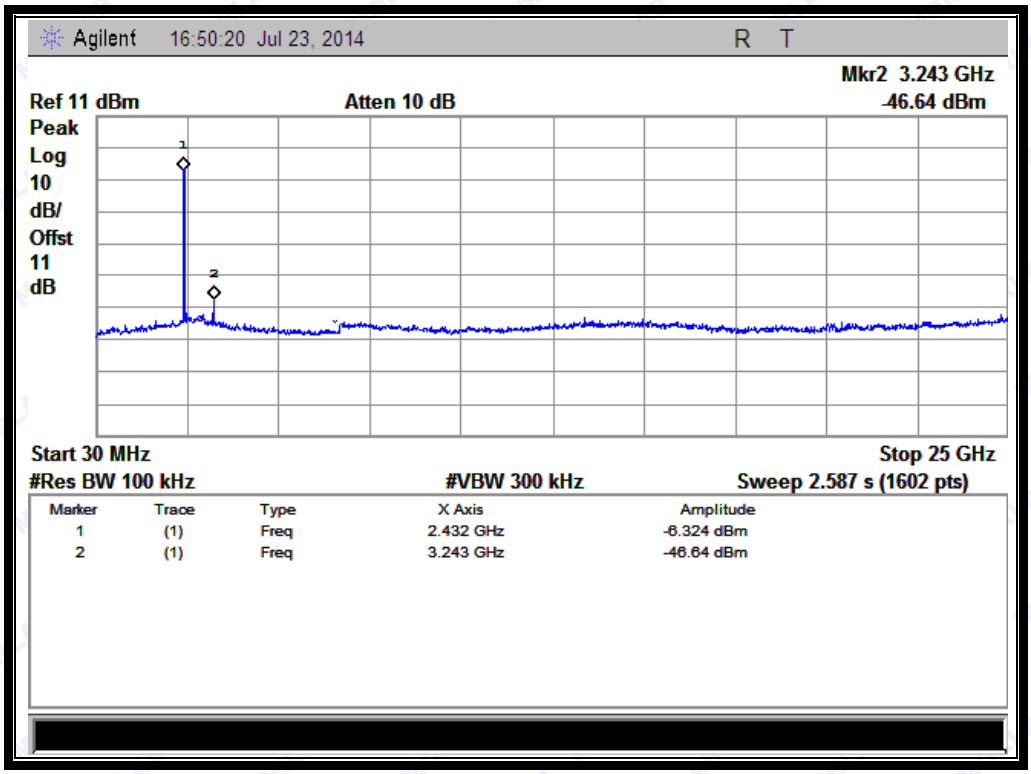
Note: the power of the Module transmitting frequency should be ignored.



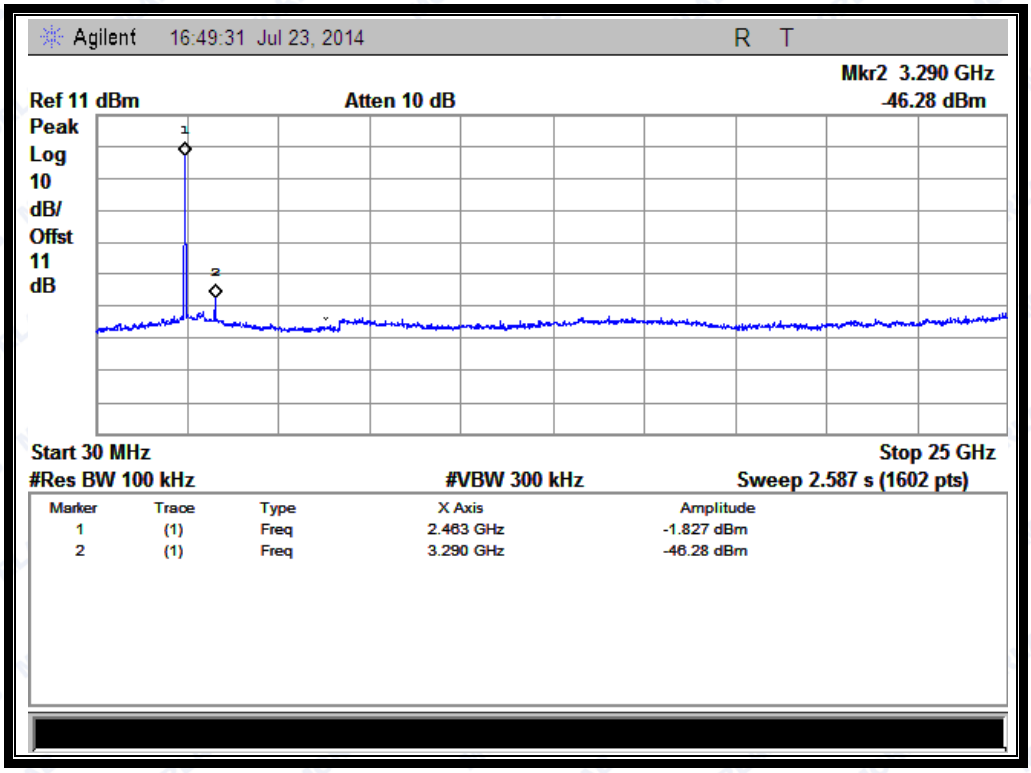
(Channel = 1, 30MHz to 25GHz)



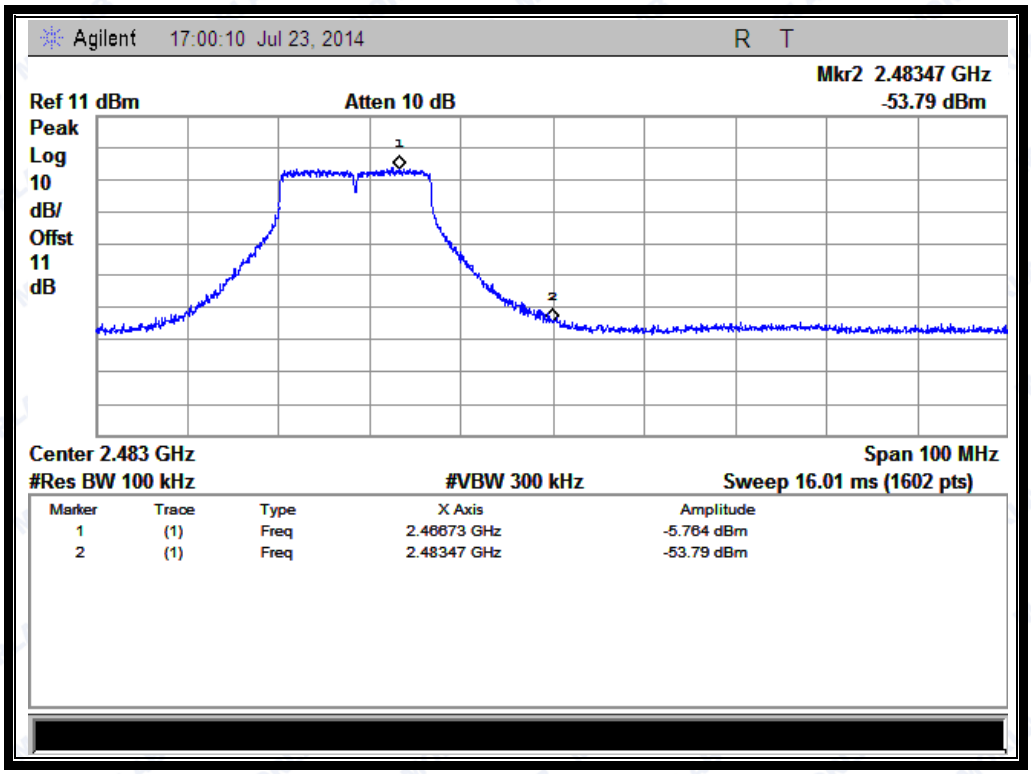
(Band Edge @ Channel = 1)



(Channel = 6, 30MHz to 25GHz)



(Channel = 11, 30MHz to 25GHz)



(Band Edge @ Channel = 11)

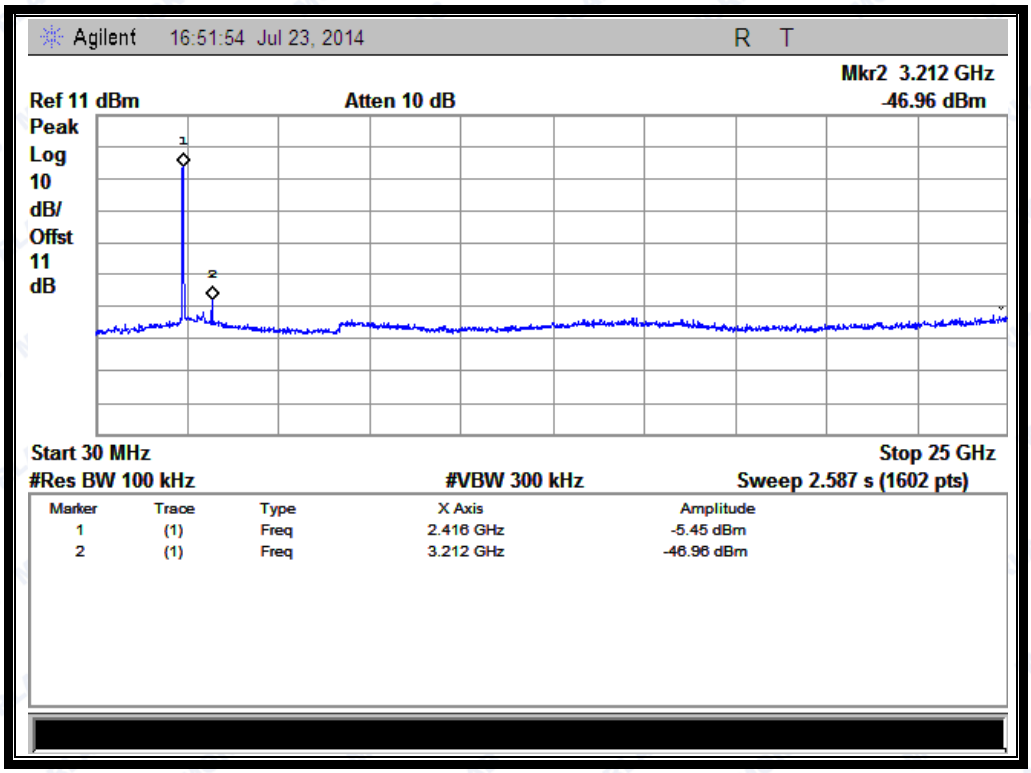
2.4.3.3 802.11n -20MHz Test mode

A. Test Verdict:

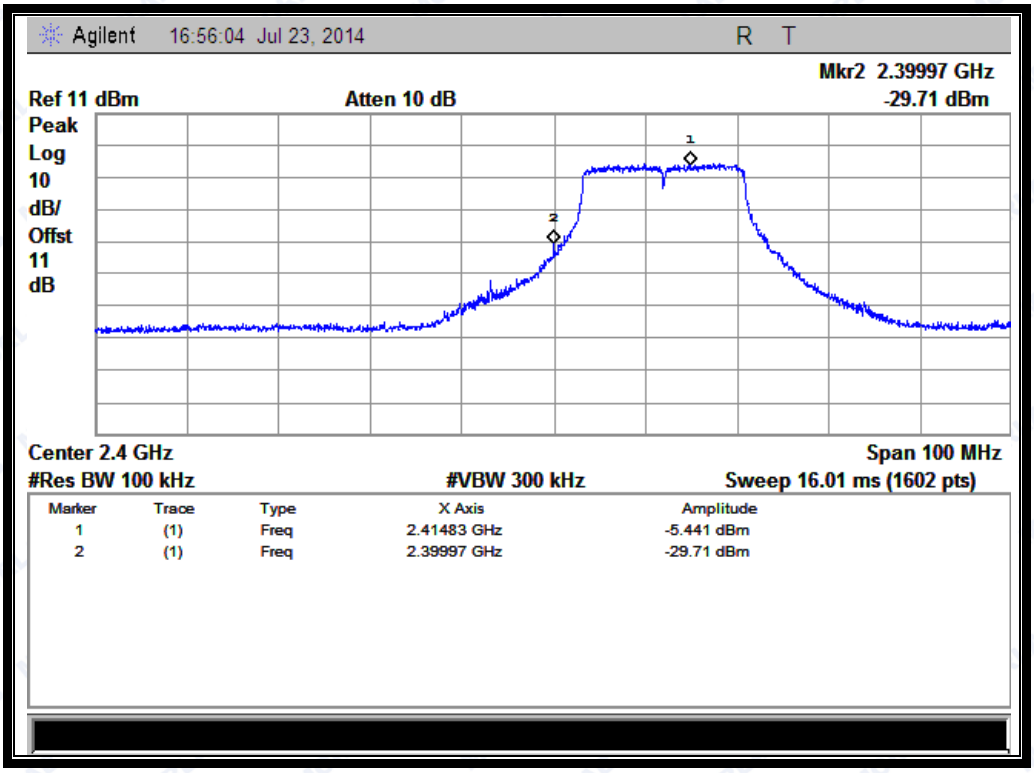
Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
			Carrier Level	Calculated -20dBc Limit	
1	2412	-46.96	-5.45	-25.5	PASS
6	2437	-46.82	-6.155	-26.2	PASS
11	2462	-46.91	-6.172	-26.2	PASS

B. Test Plots:

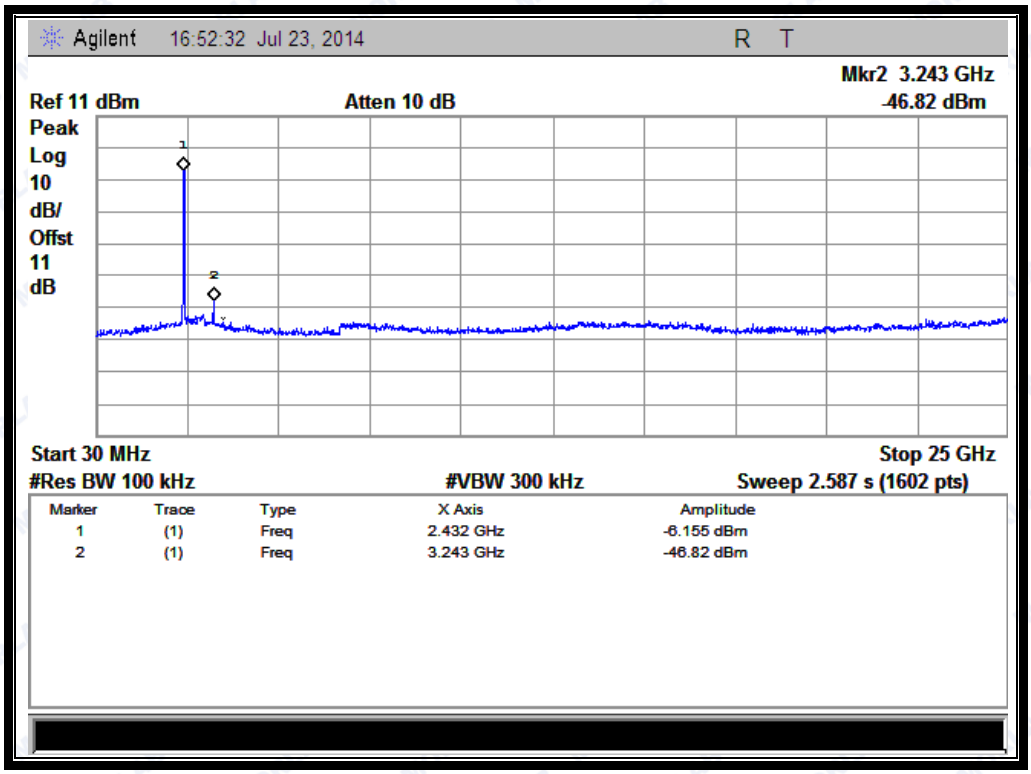
Note: the power of the Module transmitting frequency should be ignored.



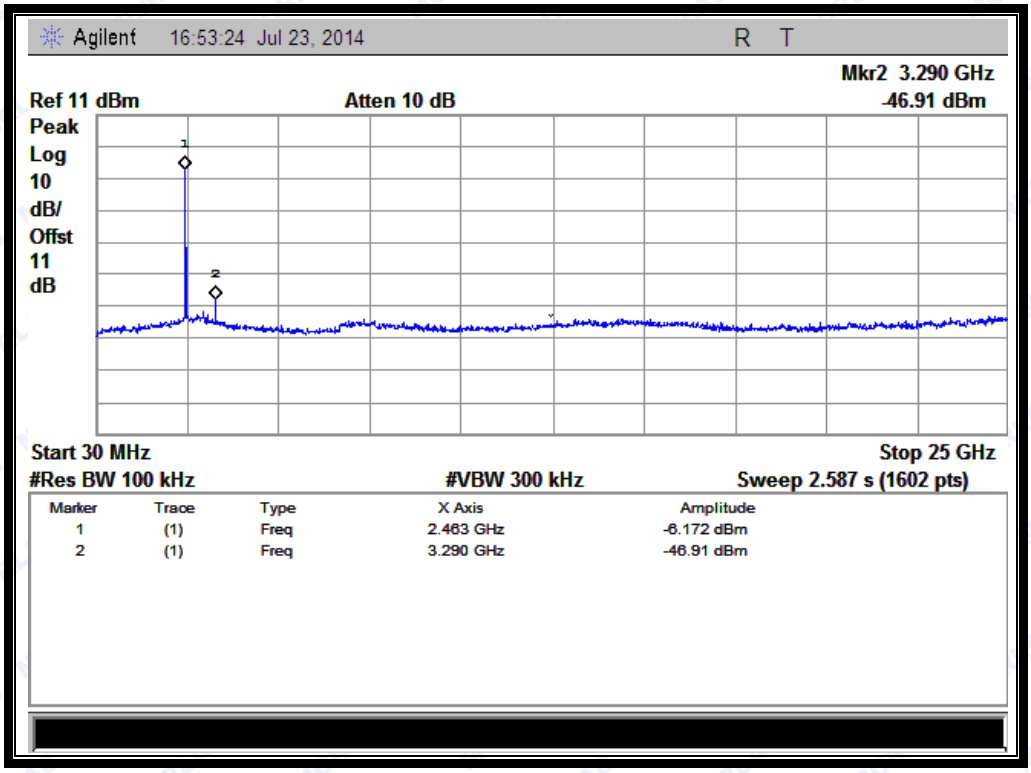
(Channel = 1, 30MHz to 25GHz)



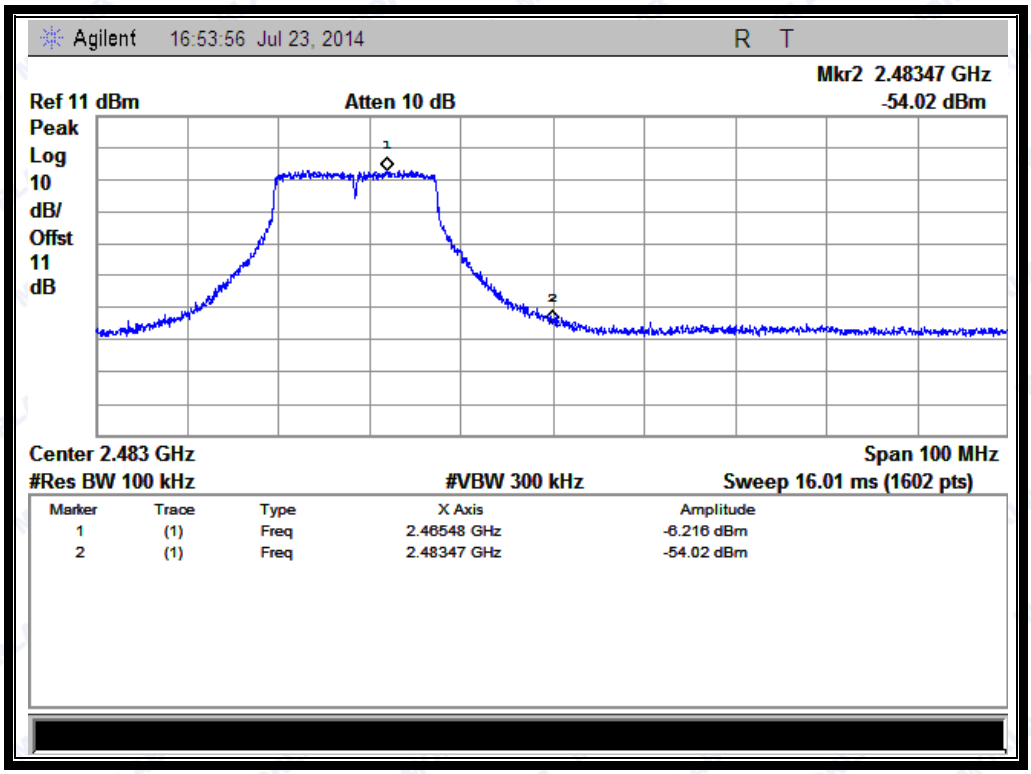
(Band Edge @ Channel = 1)



(Channel = 6, 30MHz to 25GHz)



(Channel = 11, 30MHz to 25GHz)



(Band Edge @ Channel = 11)

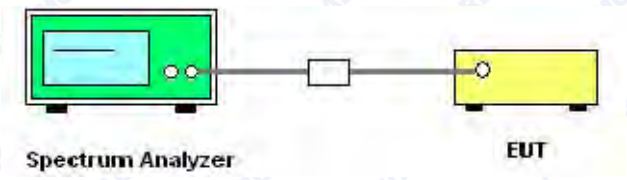
2.5 Power spectral density (PSD)

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.

B. Equipments List:

Please reference ANNEX A(1.4).

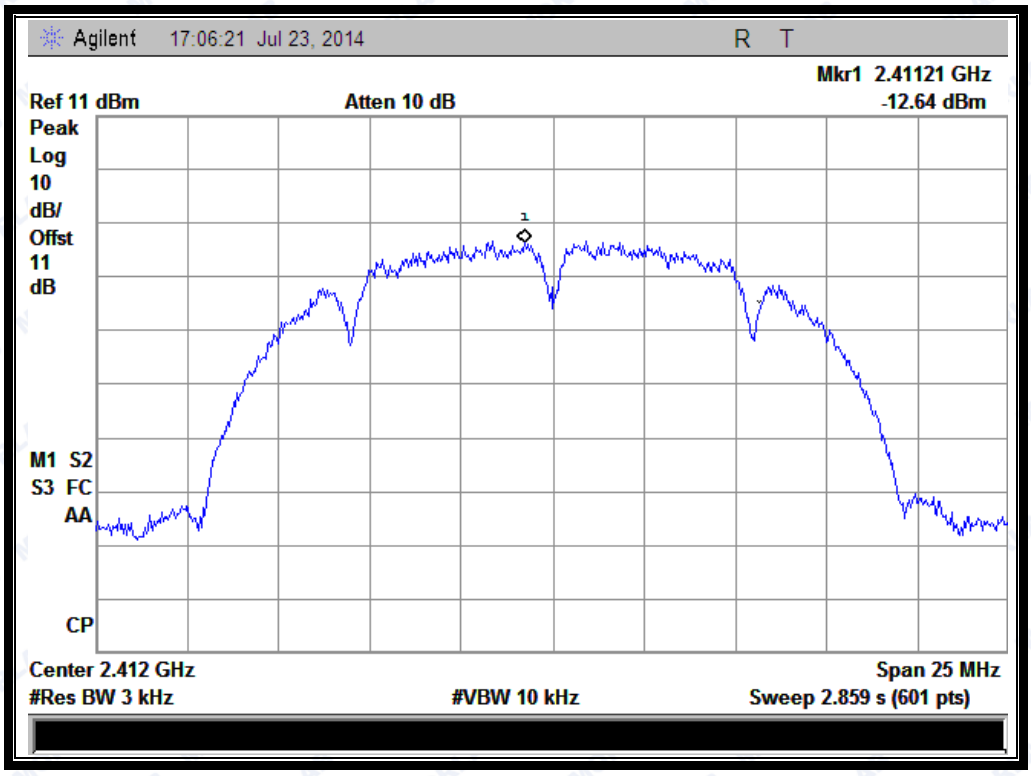
2.5.3 Test Result

2.5.3.1 802.11b Test mode

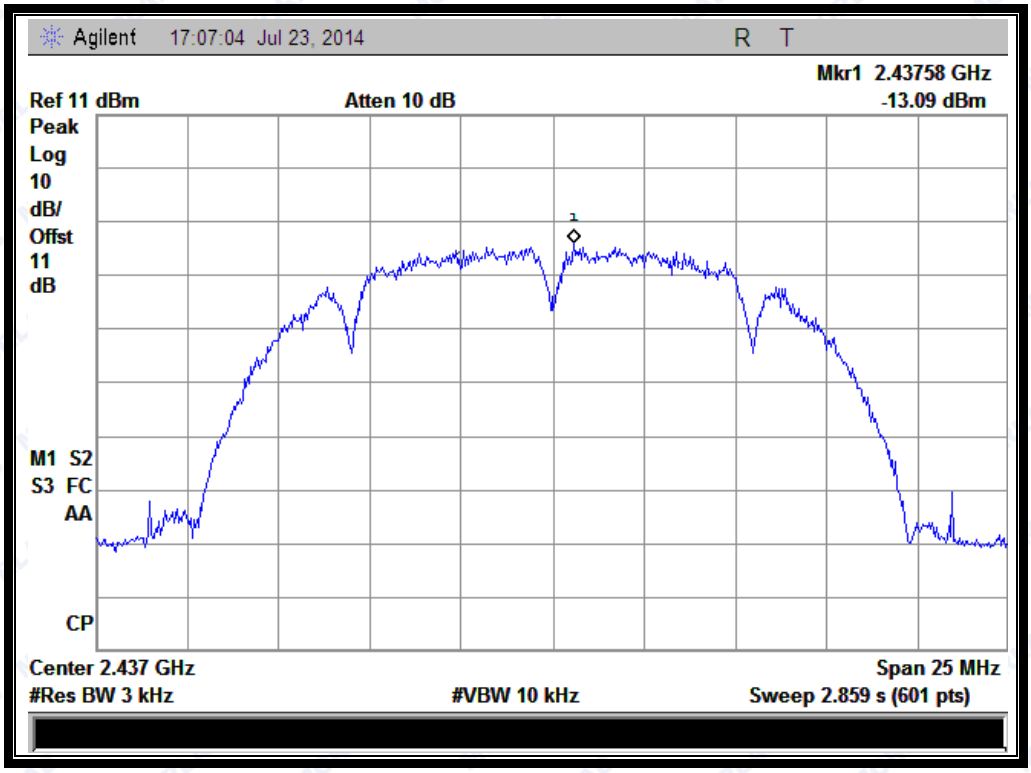
A. Test Verdict:

Spectral power density (dBm/3kHz)				
Channel	Frequency (MHz)	Measured PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
1	2412	-12.64	8	PASS
6	2437	-13.09	8	PASS
11	2462	-13.78	8	PASS
Measurement uncertainty: ±1.3dB				

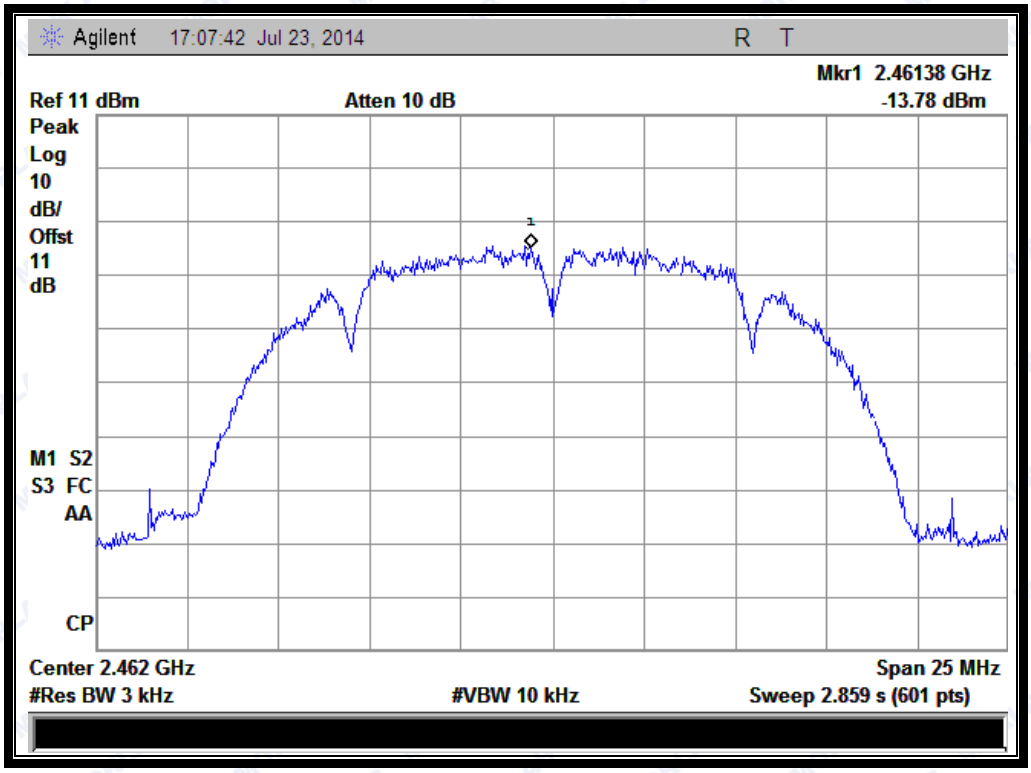
B. Test Plots:



(Channel = 1 @ 802.11b)



(Channel = 6 @ 802.11b)



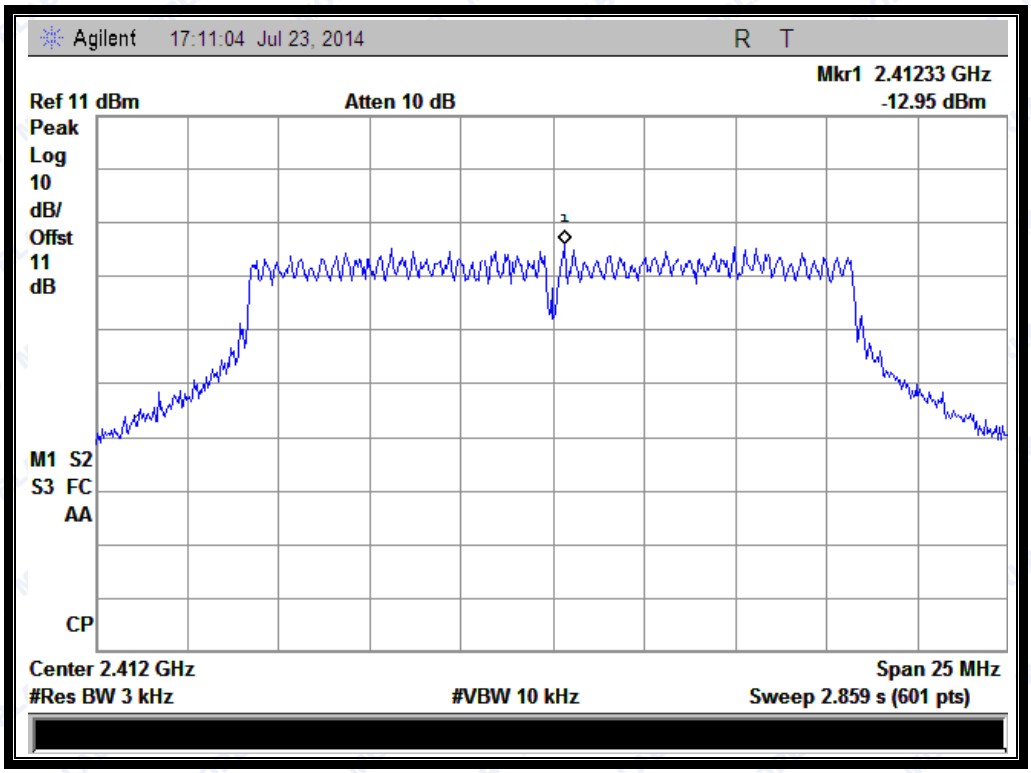
(Channel = 11 @ 802.11b)

2.5.3.2 802.11g Test mode

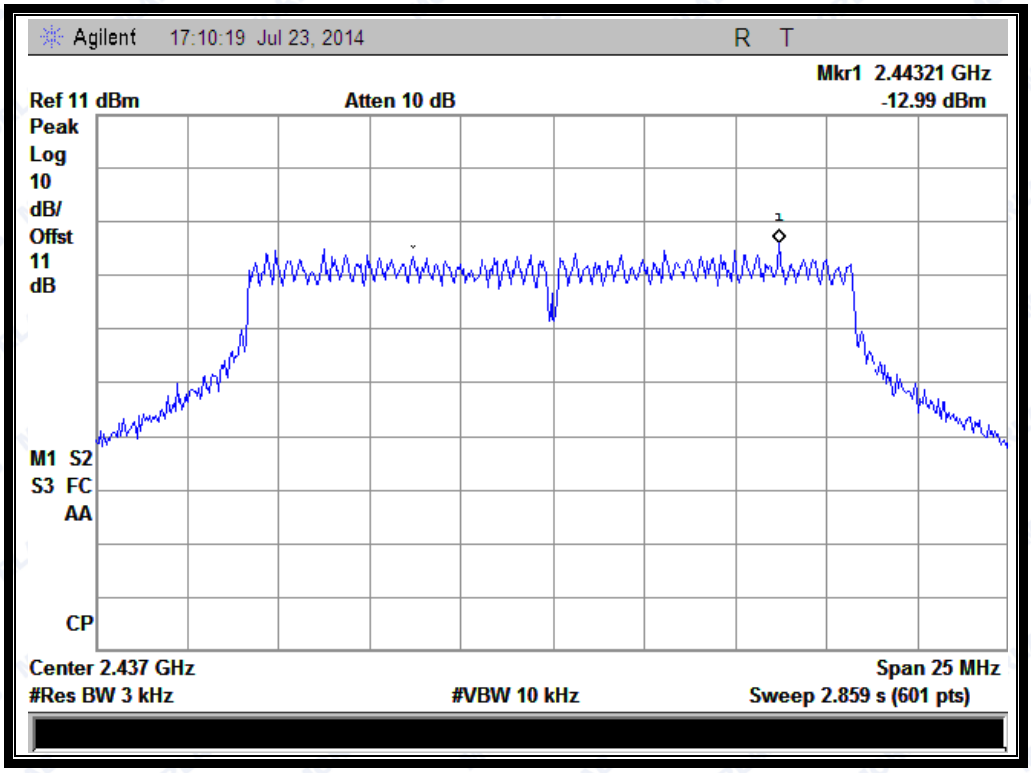
A. Test Verdict:

Spectral power density (dBm/3kHz)				
Channel	Frequency (MHz)	Measured PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
1	2412	-12.95	8	PASS
6	2437	-12.99	8	PASS
11	2462	-13.45	8	PASS
Measurement uncertainty: ±1.3dB				

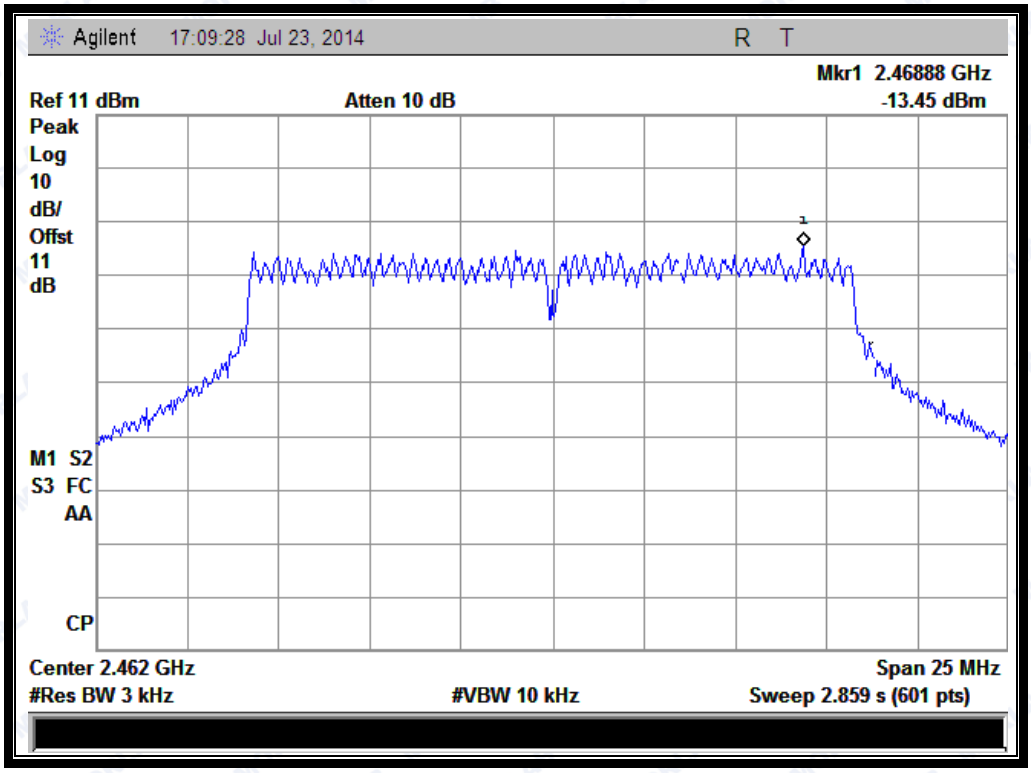
B. Test Plots:



(Channel = 1 @ 802.11g)



(Channel = 6 @ 802.11g)



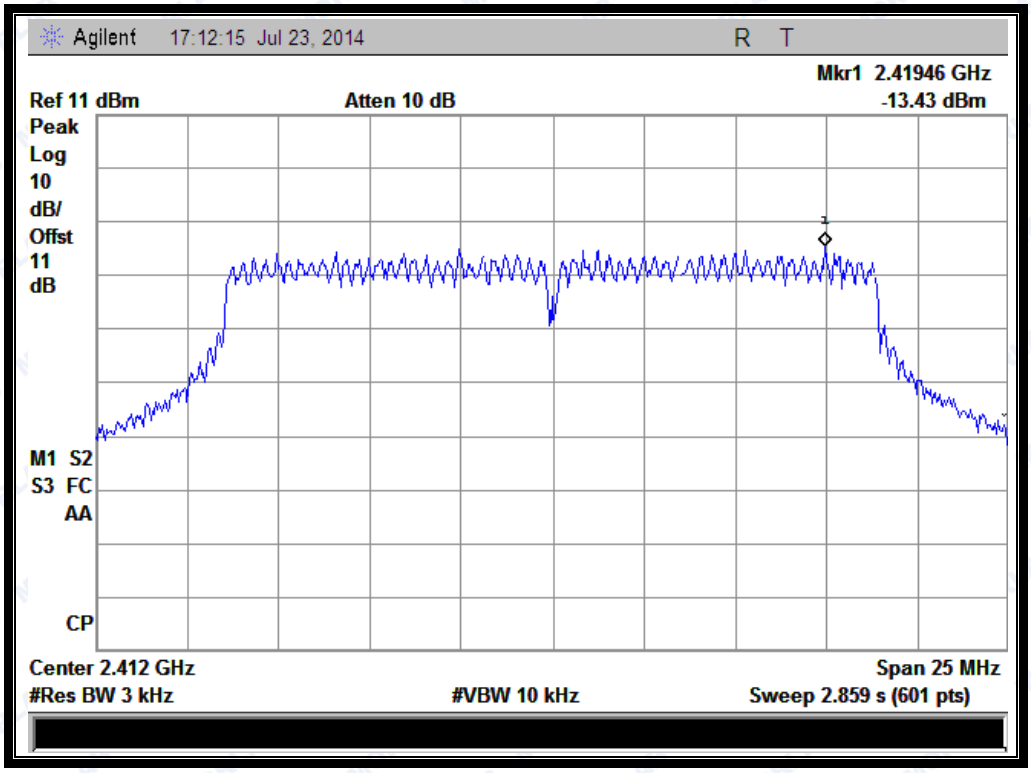
(Channel = 11 @ 802.11g)

2.5.3.3 802.11n-20MHz Test mode

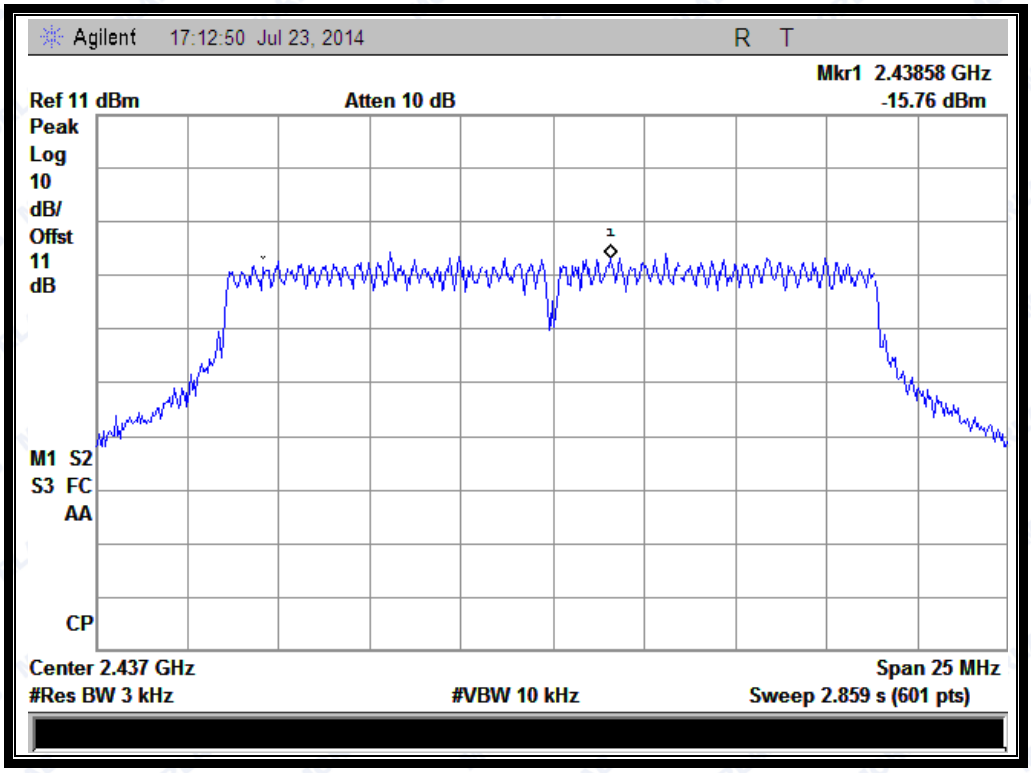
A. Test Verdict:

Spectral power density (dBm/3kHz)				
Channel	Frequency (MHz)	Measured PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
1	2412	-13.43	8	PASS
6	2437	-15.76	8	PASS
11	2462	-14.09	8	PASS
Measurement uncertainty: ±1.3dB				

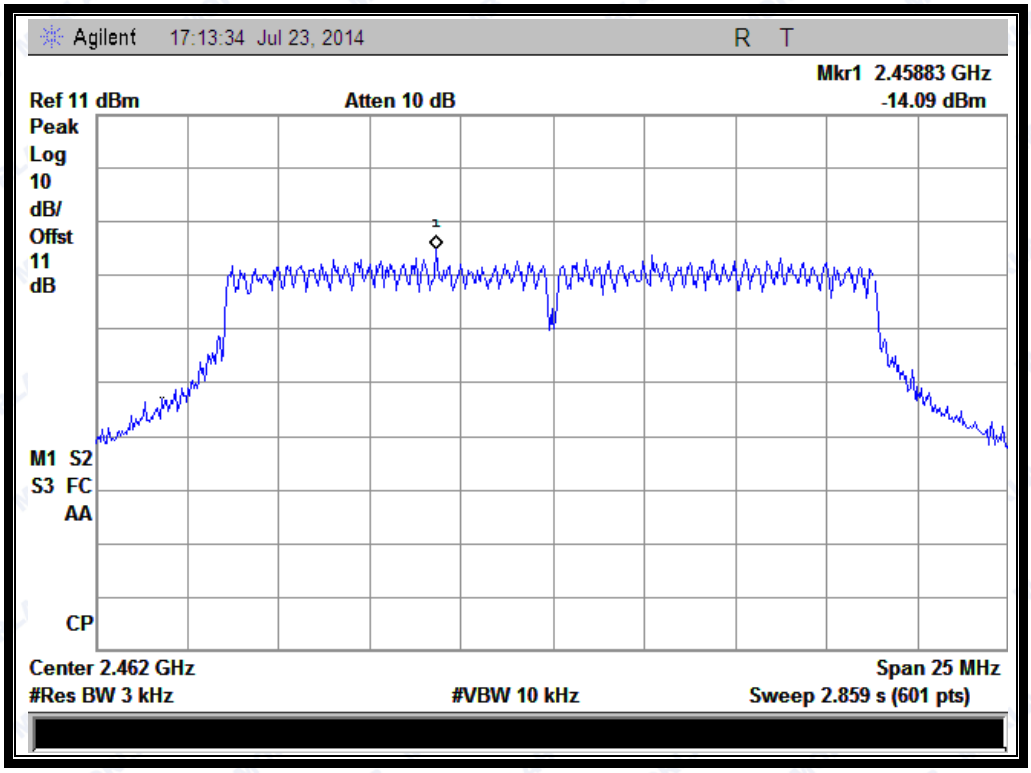
B. Test Plots:



(Channel = 1 @ 802.11n-20MHz)



(Channel = 6 @ 802.11n-20MHz)



(Channel = 11 @ 802.11n-20MHz)

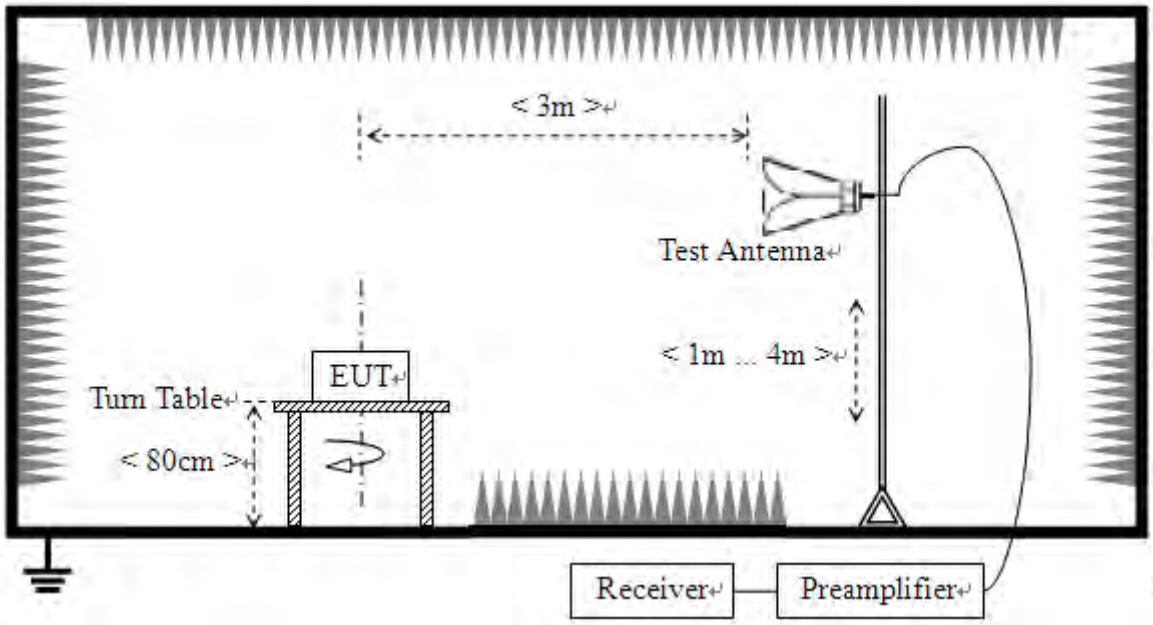
2.6 Restricted Frequency Bands

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

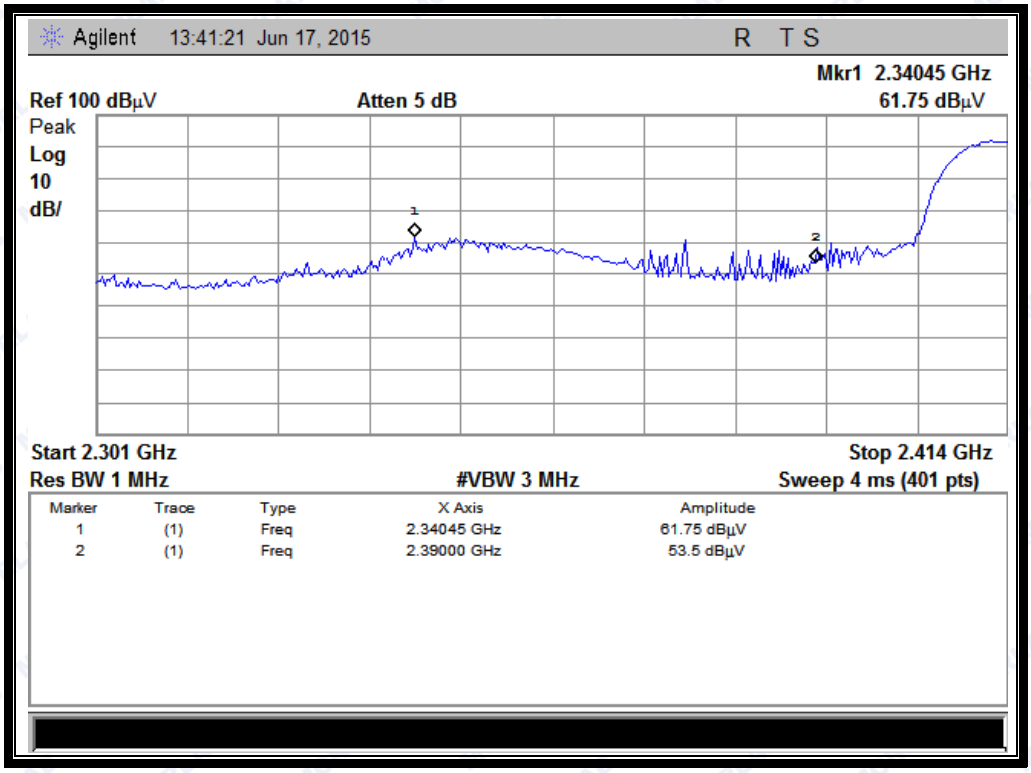
2.6.3.1 802.11b Test mode

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

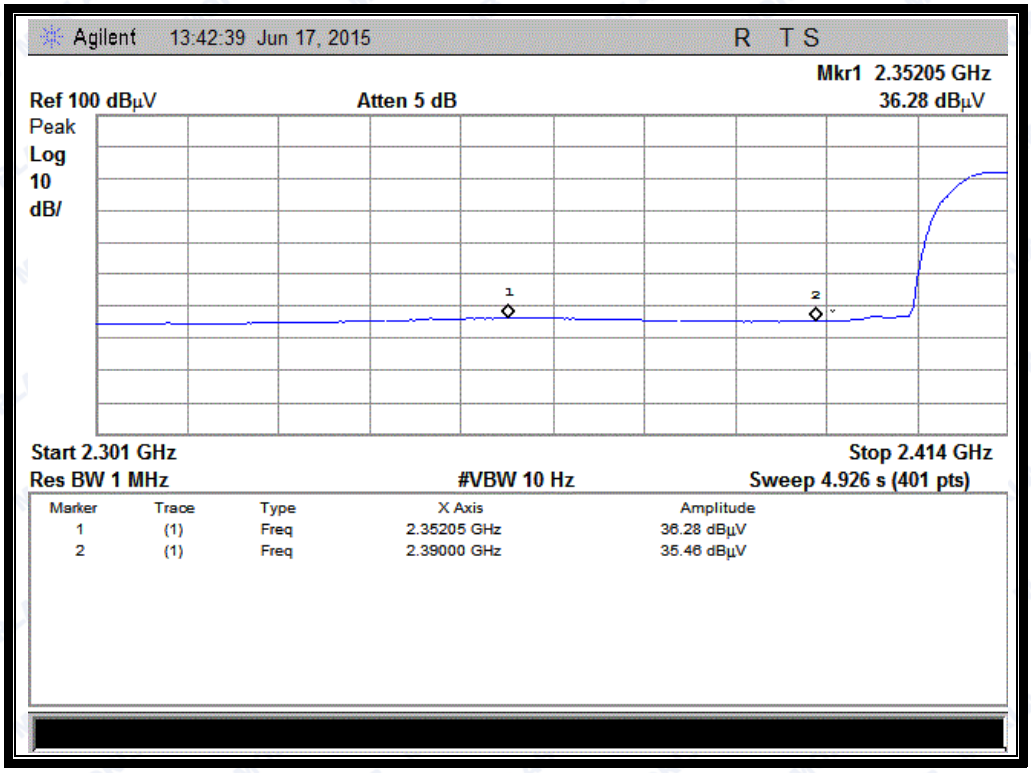
A. Test Verdict:

Channel	Frequency (MHz)	Detector	Receiver Reading U_R (dBuV)	A_T (dB)	A_{Factor} (dB@3m)	Max. Emission E (dBμV/m)	Limit (dBμV/m)	Verdict
		PK/ AV						
1	2340.45	PK	61.75	-33.63	32.56	60.68	74	Pass
1	2352.05	AV	36.28	-33.63	32.56	35.21	54	Pass
11	2484.15	PK	59.25	-33.18	32.5	58.57	74	Pass
11	2488.31	AV	34.89	-33.18	32.5	34.21	54	Pass

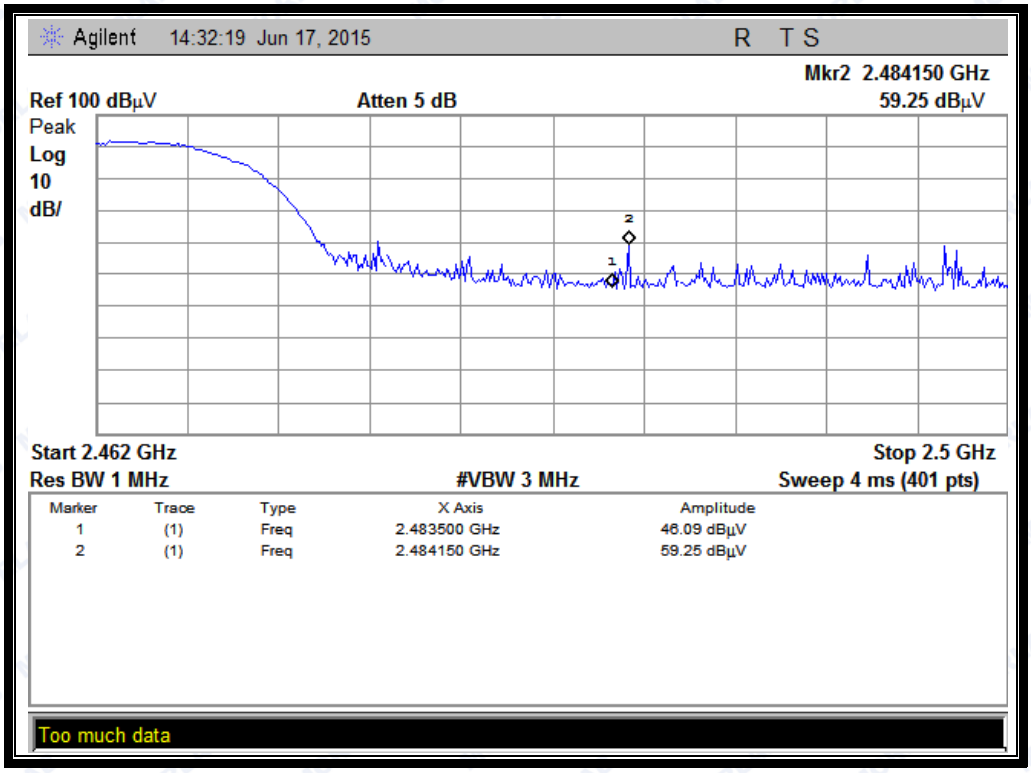
B. Test Plots:



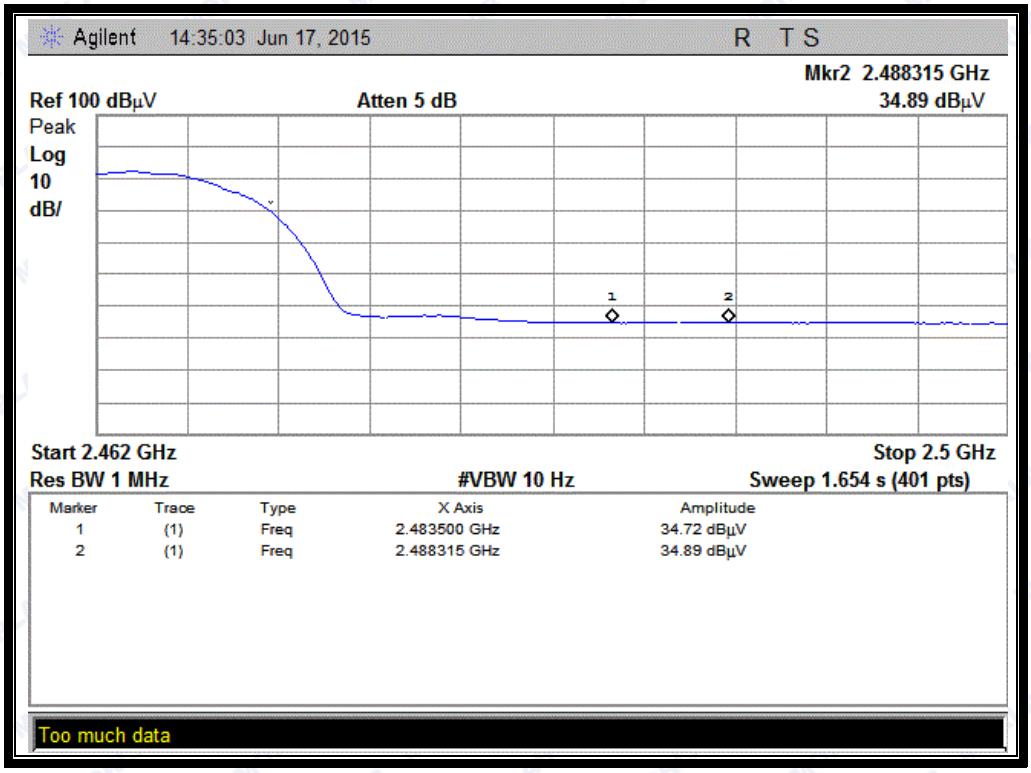
(Plot A1: Channel = 1 PEAK @ 802.11b)



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



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



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

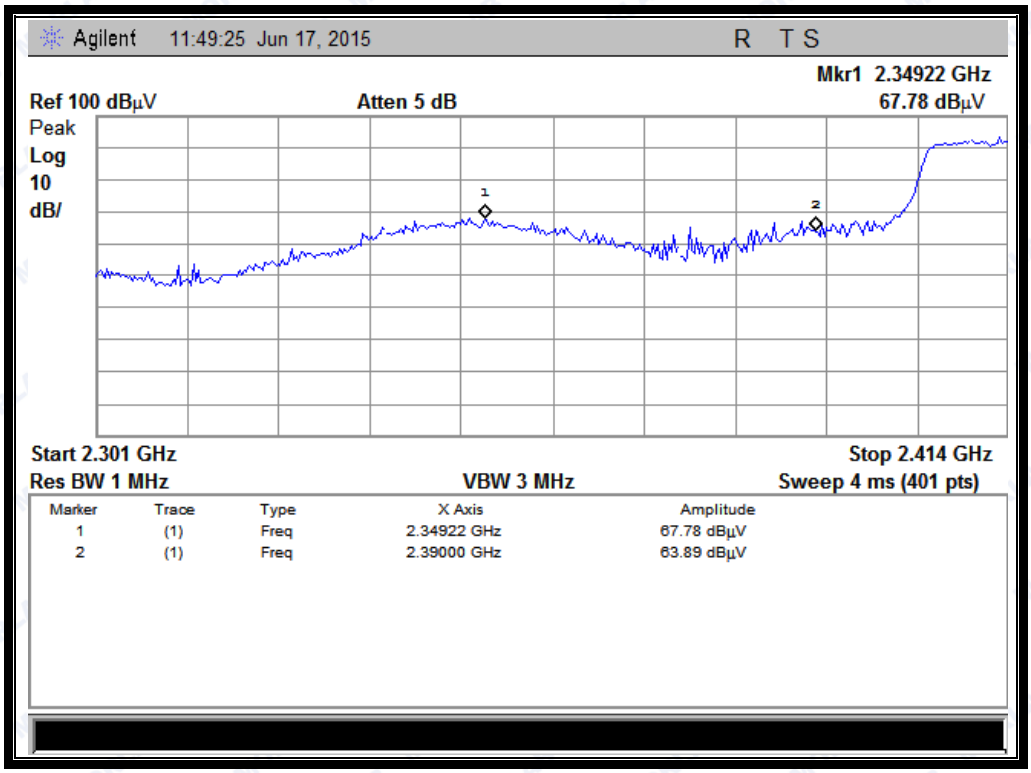
2.6.3.2 802.11g Test mode

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

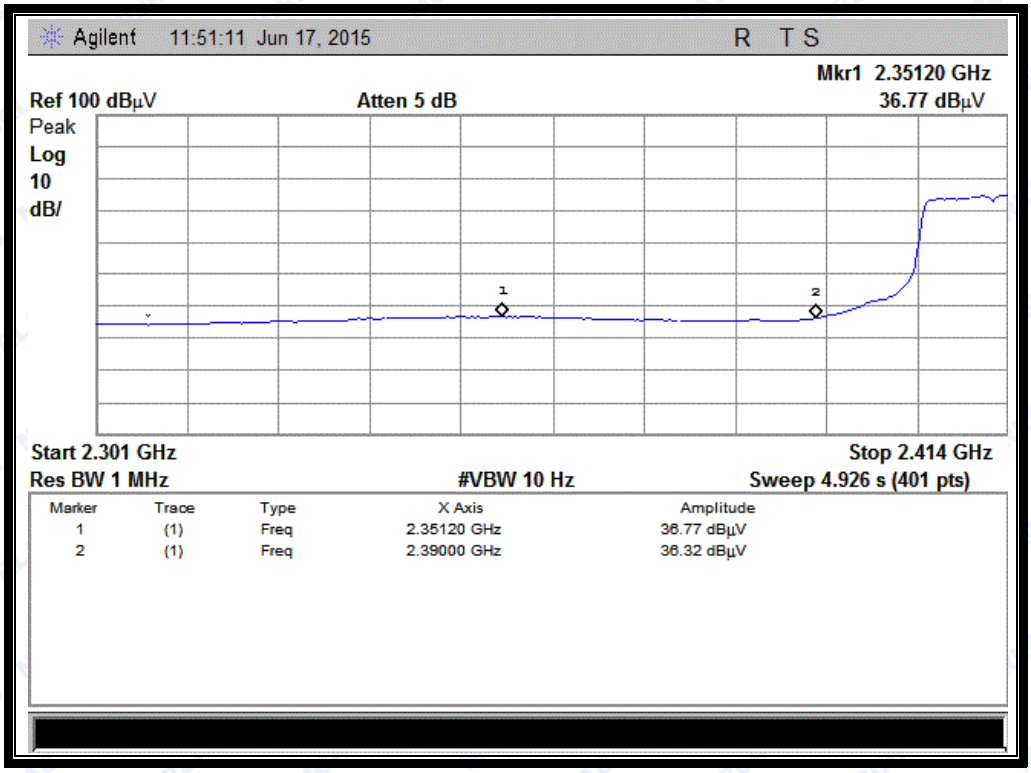
A. Test Verdict:

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	2349.22	PK	67.78	-33.63	32.56	66.71	74	Pass
1	2351.20	AV	36.77	-33.63	32.56	35.7	54	Pass
11	2484.42	PK	59.55	-33.18	32.5	58.87	74	Pass
11	2483.85	AV	36.9	-33.18	32.5	36.22	54	Pass

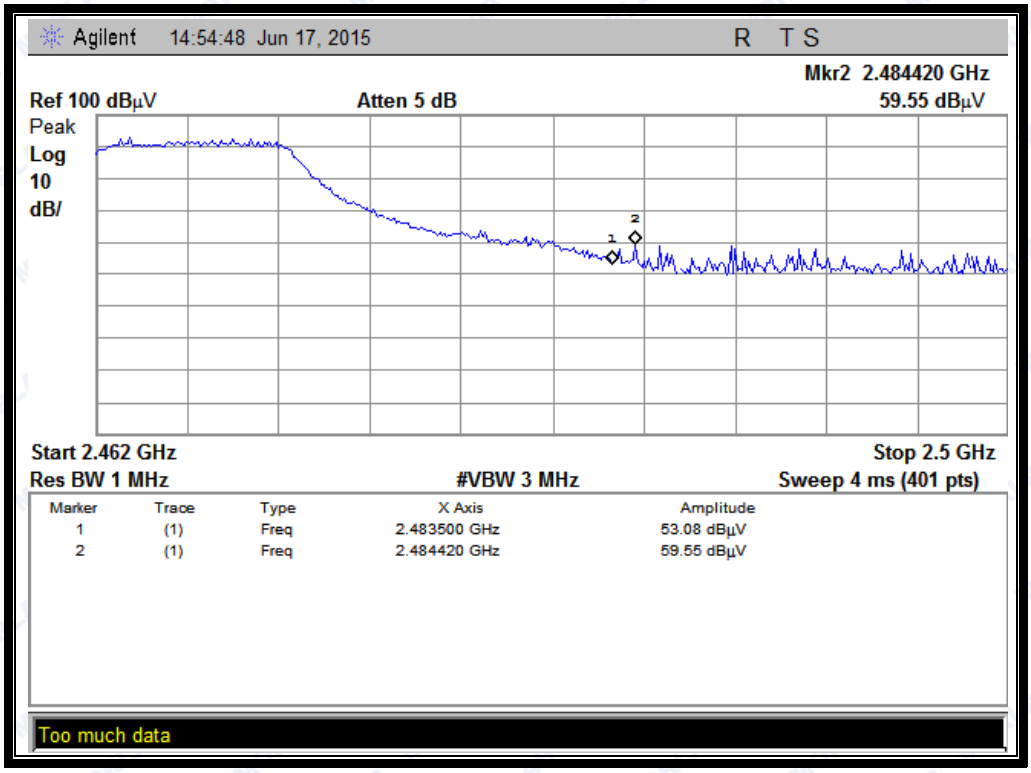
B. Test Plots:



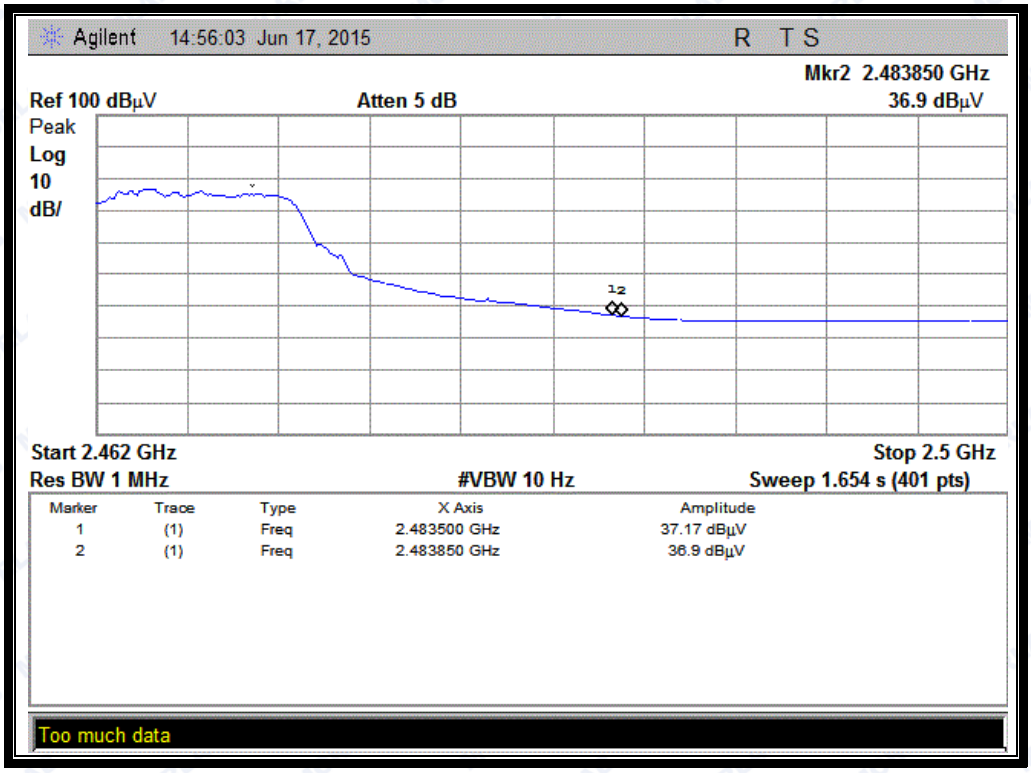
(Plot C1: Channel = 1 PEAK @ 802.11g)



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



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



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

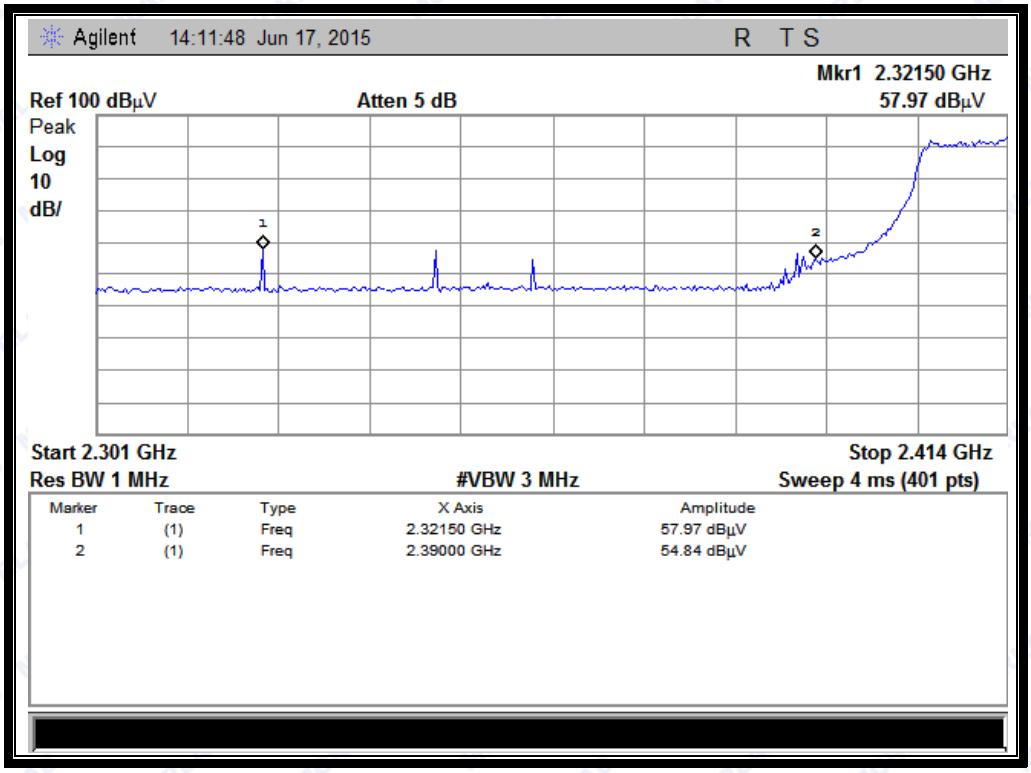
2.6.3.3 802.11n-20MHz Test mode

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

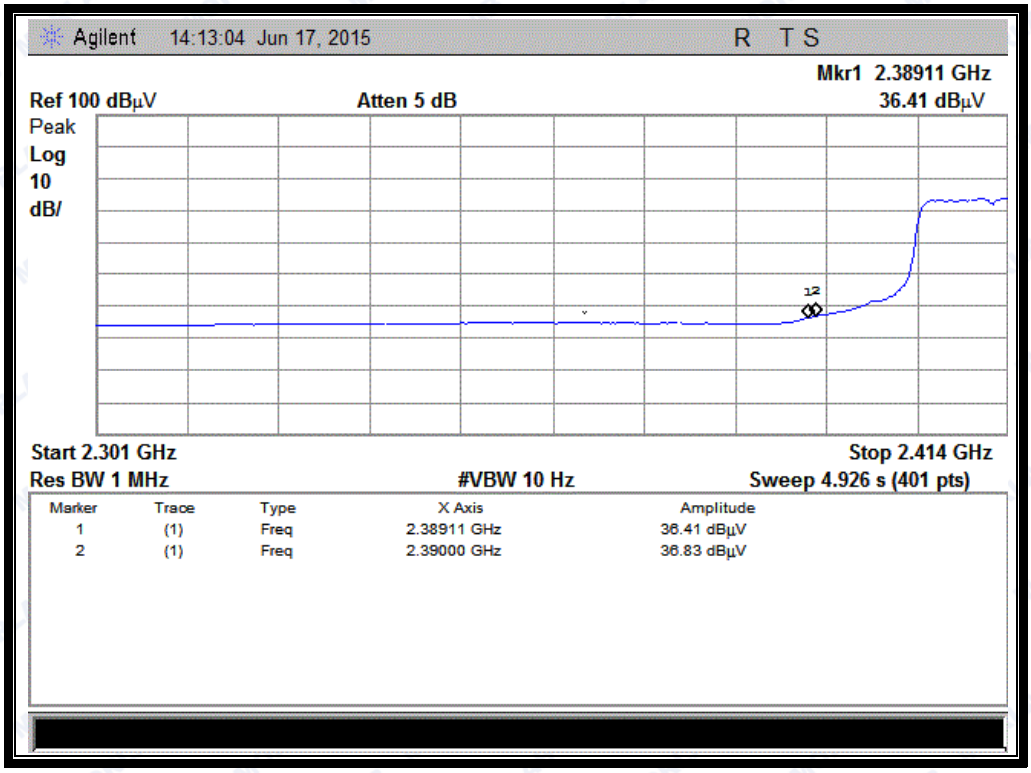
A. Test Verdict:

Channel	Frequency (MHz)	Detector	Receiver Reading U_R (dBuV)	A_T (dB)	A_{Factor} (dB@3m)	Max. Emission E (dBµV/m)	Limit (dBµV/m)	Verdict
		PK/ AV						
1	2321.50	PK	57.97	-33.63	32.56	56.9	74	Pass
1	2389.11	AV	36.41	-33.63	32.56	35.34	54	Pass
11	2483.86	PK	55.00	-33.18	32.5	54.32	74	Pass
11	2483.86	AV	36.71	-33.18	32.5	36.03	54	Pass

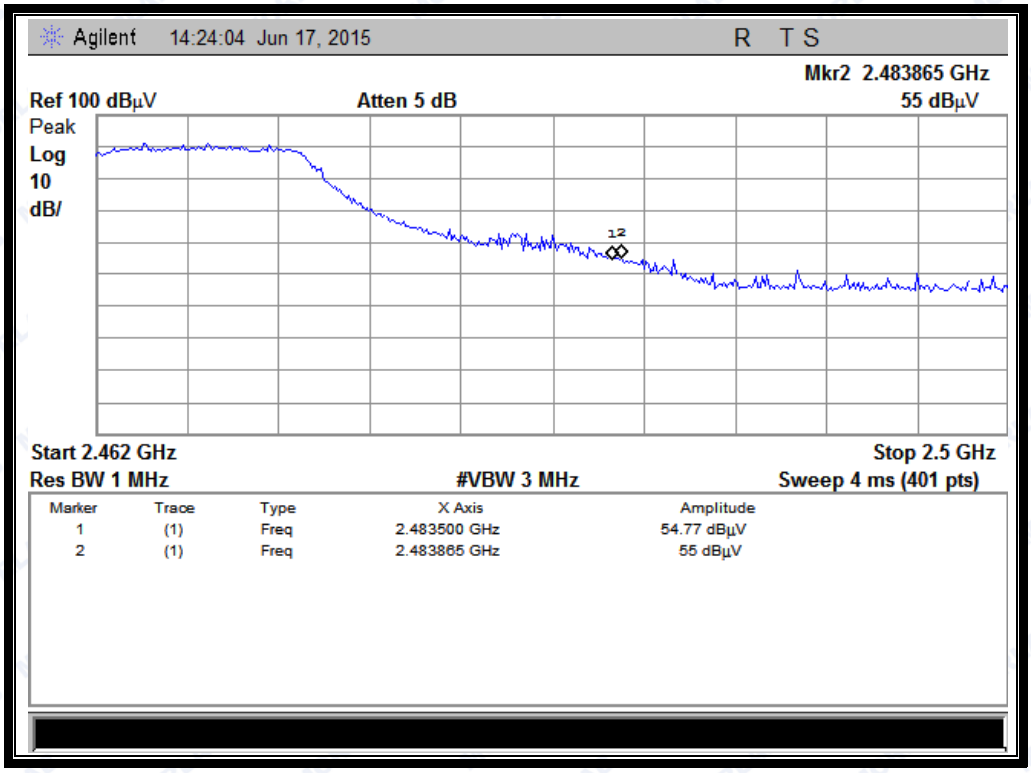
B. Test Plots:



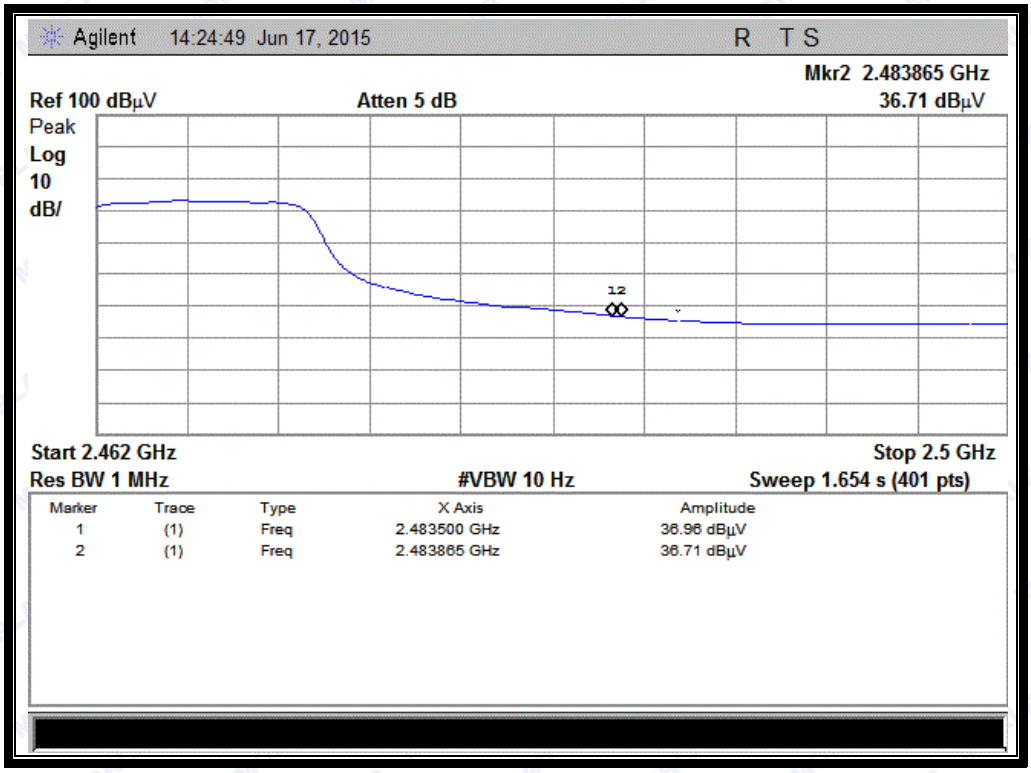
(Plot E1: Channel = 1 PEAK @ 802.11n-20)



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



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



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

2.7 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

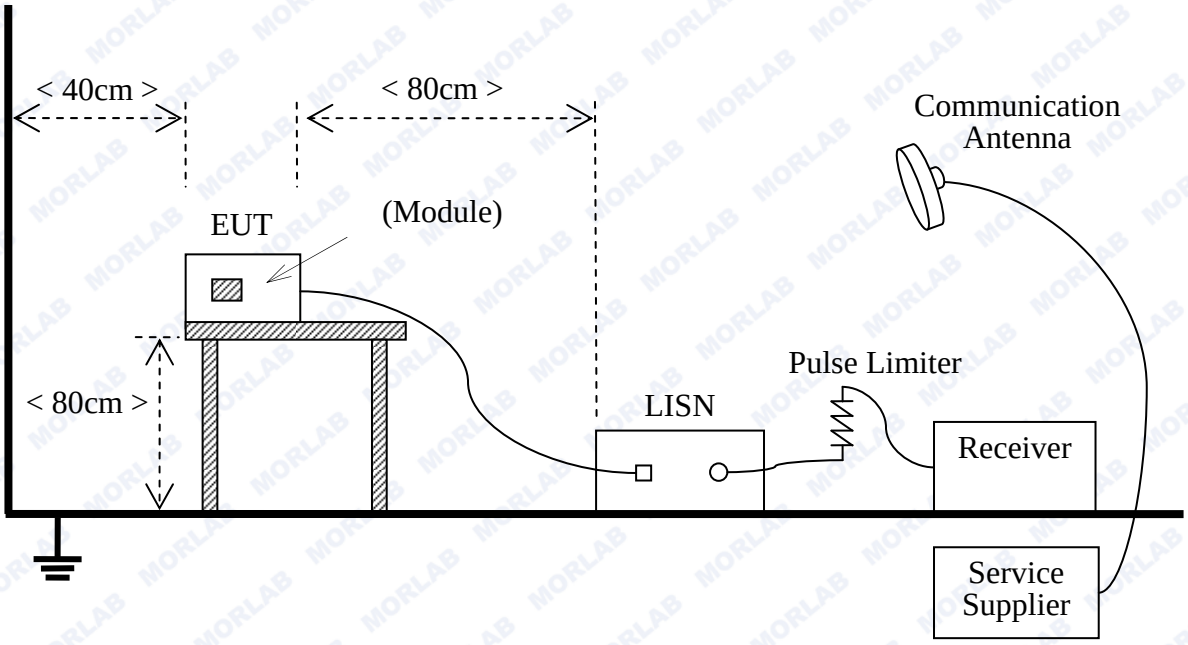
NOTE:

(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 C63.4:2009

B. Equipments List:

Please reference ANNEX A(1.4).

2.7.3 Test Result

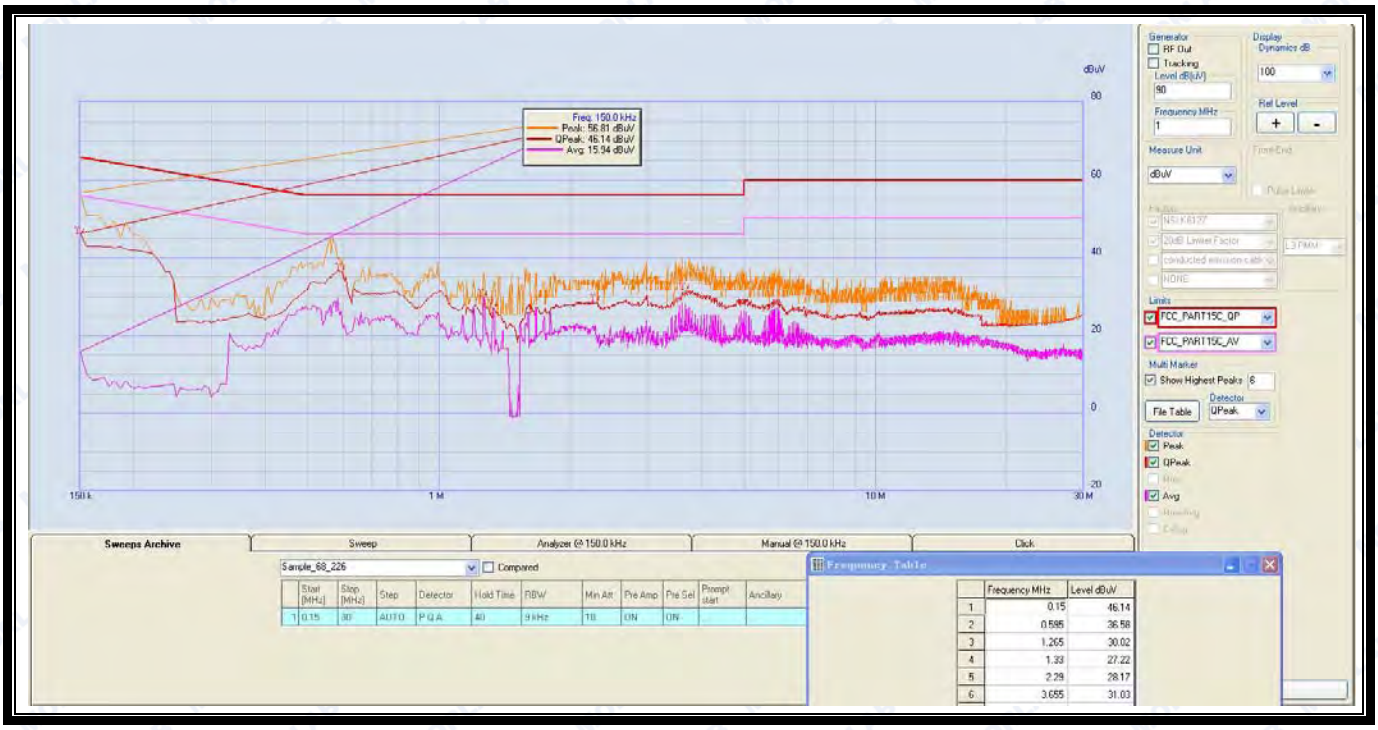
The maximum conducted interference is searched using Peak (PK), if the emission levels more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both L phase and N phase lines of the power mains connected to the EUT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

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

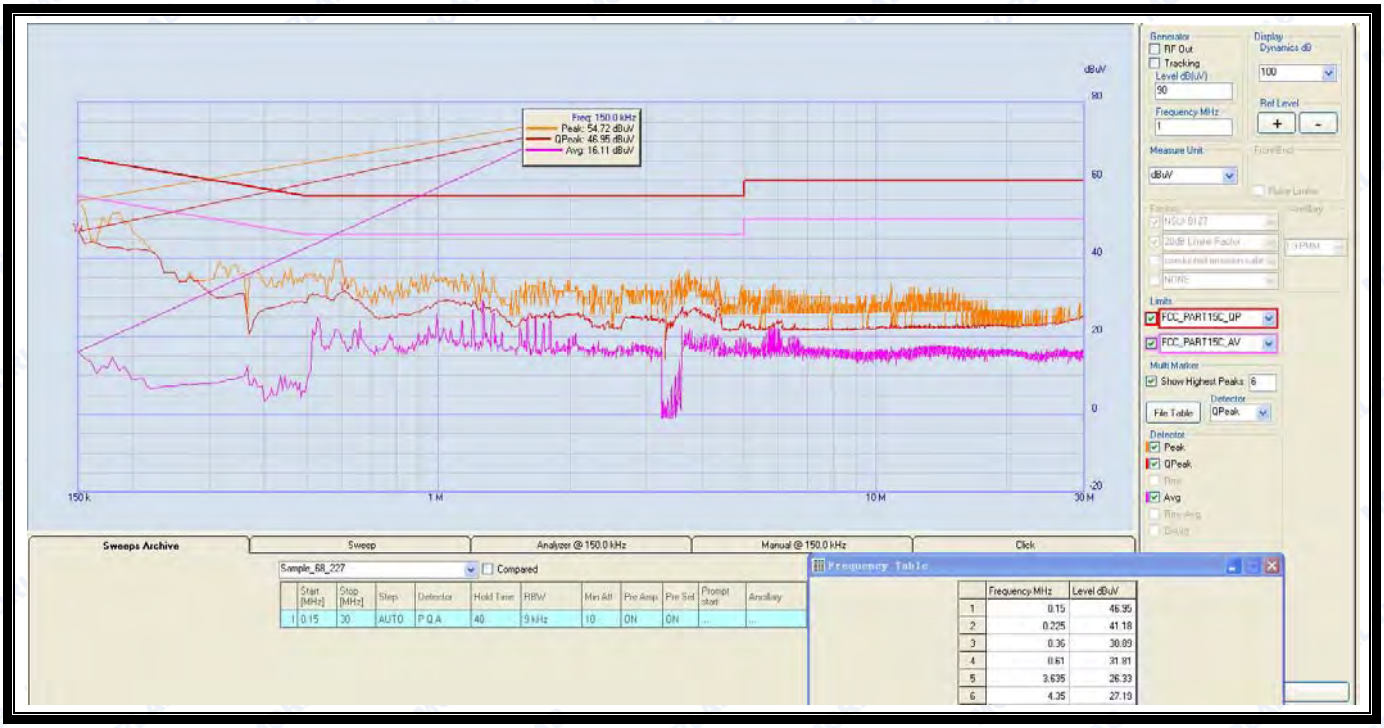
A. Test setup:

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

B. Test Plots:



(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 (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.

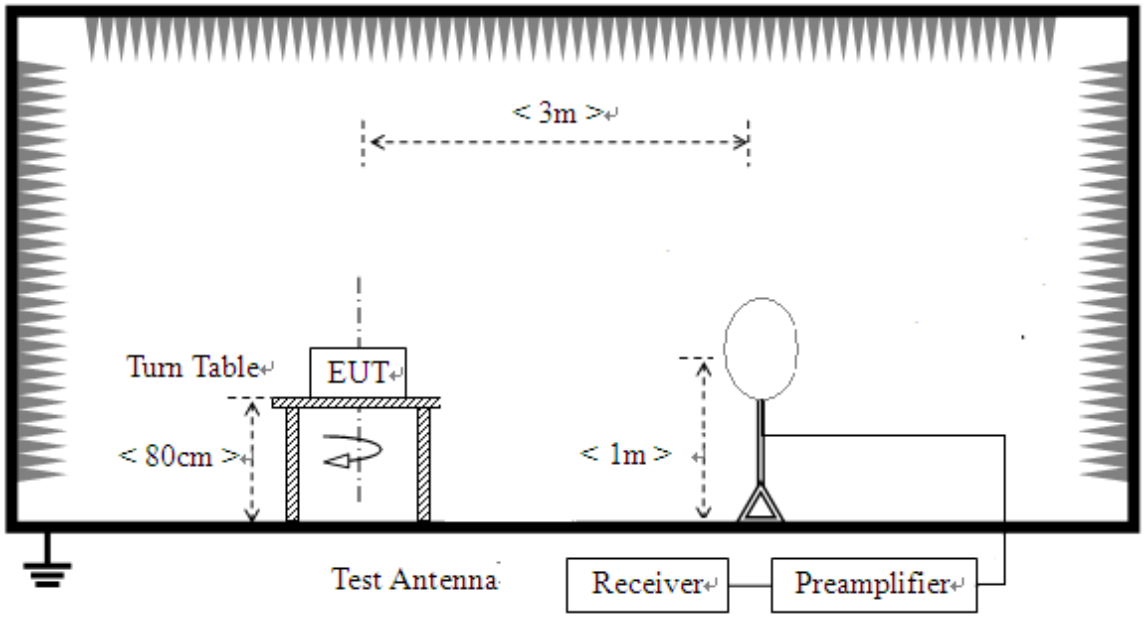
For above 1000MHz, limit field strength of harmonics: 54dBuV/m@3m (AV) and 74dBuV/m@3m (PK)

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)

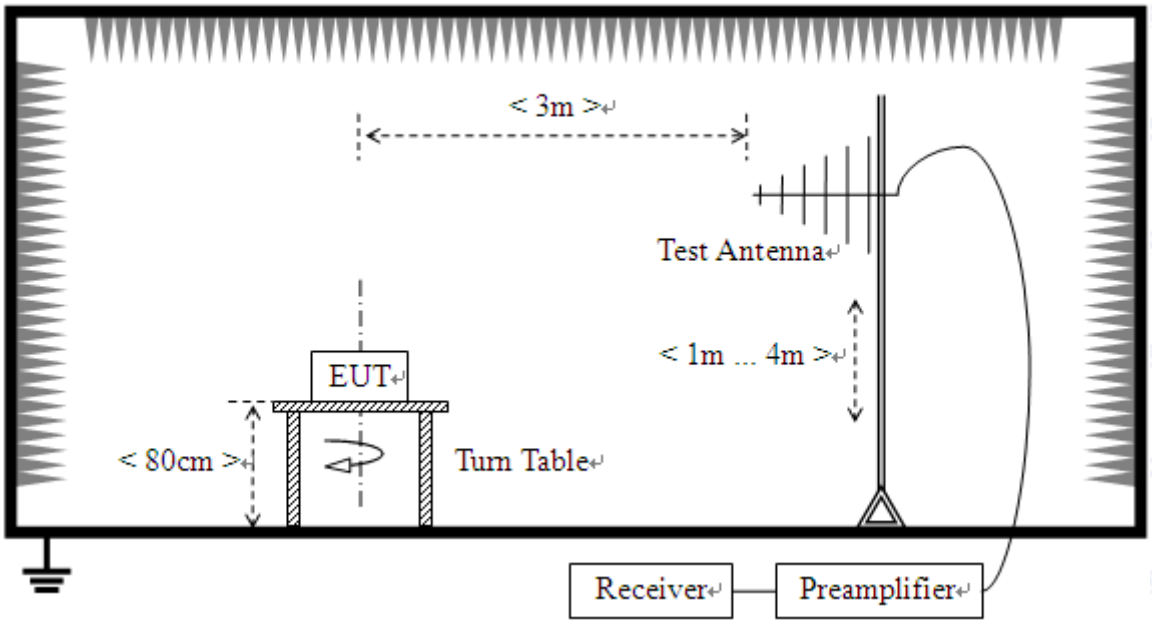
2.8.2 Test Description

A. Test Setup:

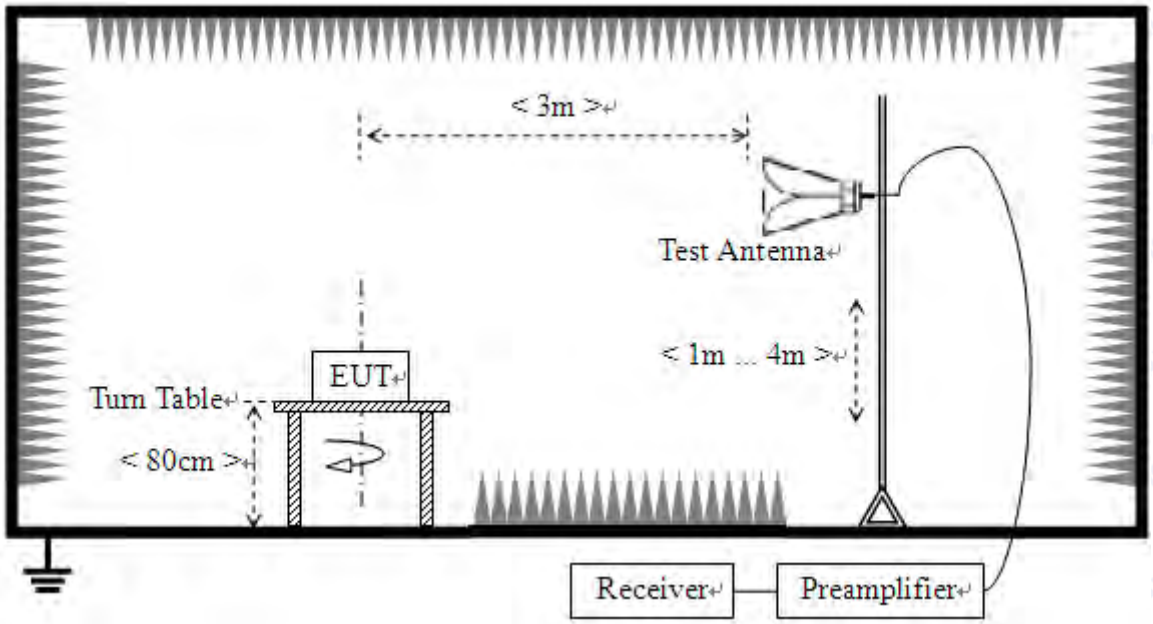
1) For radiated emissions from 9kHz to 30MHz



2) For radiated emissions from 30MHz to1GHz



3) For radiated emissions above 1GHz



The 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:

(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. 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:

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

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.

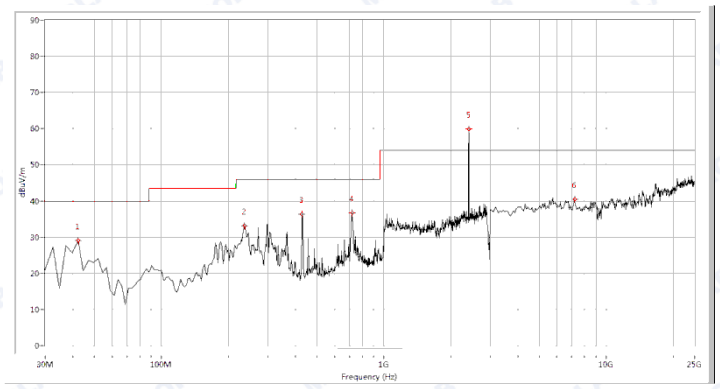
Note: All radiated emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

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

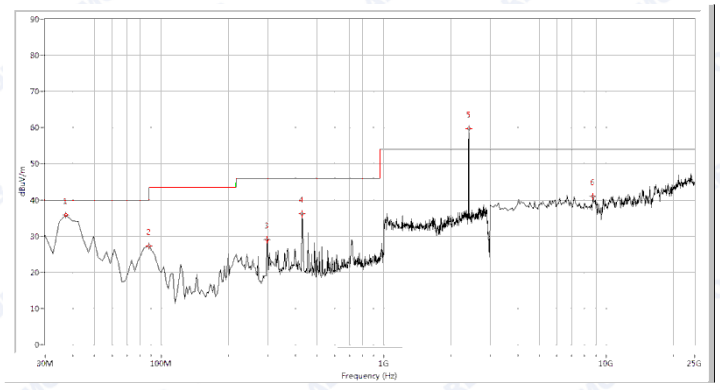
A. Test Plots for the Whole Measurement Frequency Range:

Plots for Channel = 1



Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
42.095	29.07	N.A	N.A	N.A	40.0	N.A	Horizontal	PASS
235.611	33.09	N.A	N.A	N.A	46.0	N.A	Horizontal	PASS
429.127	36.36	N.A	N.A	N.A	46.0	N.A	Horizontal	PASS
719.401	36.77	N.A	N.A	N.A	46.0	N.A	Horizontal	PASS
2412.000	59.80	N.A	N.A	N.A	N.A	N.A	Horizontal	N.A
7224.439	40.37	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS

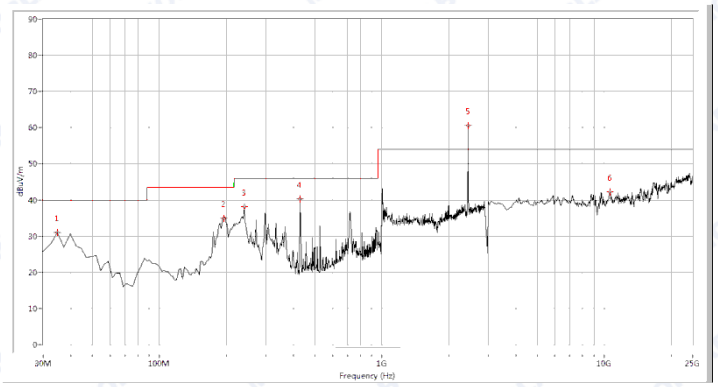
(Antenna Horizontal, 30MHz to 25GHz)



Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
37.257	35.76	N.A	N.A	N.A	40.0	N.A	Vertical	PASS
88.055	27.30	N.A	N.A	N.A	43.5	N.A	Vertical	PASS
298.504	29.06	N.A	N.A	N.A	46.0	N.A	Vertical	PASS
429.127	36.09	N.A	N.A	N.A	46.0	N.A	Vertical	PASS
2412.000	59.78	N.A	N.A	N.A	N.A	N.A	Vertical	N.A
8705.736	41.01	N.A	N.A	74.0	N.A	54.0	Vertical	PASS

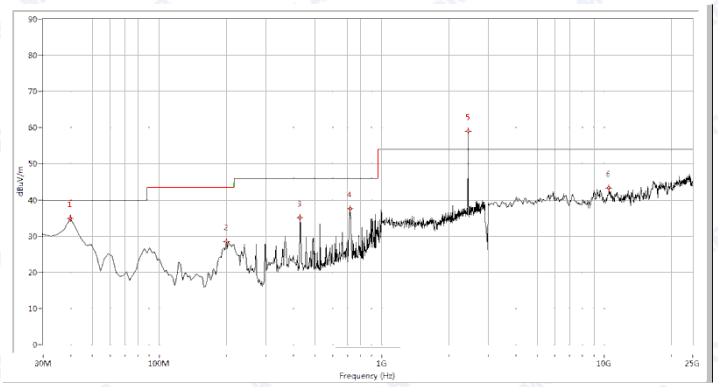
(Antenna Vertical, 30MHz to 25GHz)

Plot for Channel = 6



Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
34.838	30.92	N.A	N.A	N.A	40.0	N.A	Horizontal	PASS
194.489	34.92	N.A	N.A	N.A	43.5	N.A	Horizontal	PASS
240.449	38.19	N.A	N.A	N.A	46.0	N.A	Horizontal	PASS
426.708	40.22	N.A	N.A	N.A	46.0	N.A	Horizontal	PASS
2437.000	60.54	N.A	N.A	N.A	N.A	N.A	Horizontal	N.A
10625.935	42.31	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS

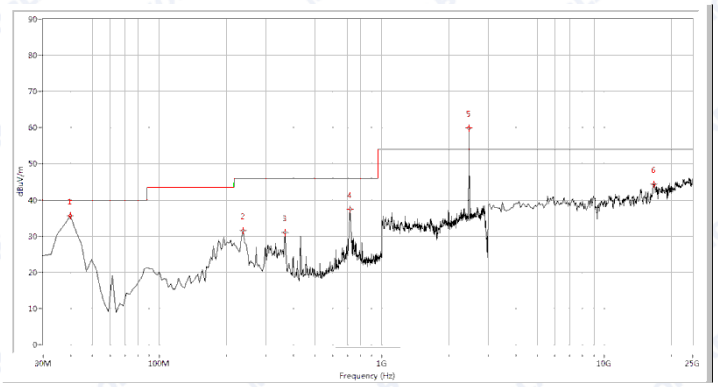
(Antenna Horizontal, 30MHz to 25GHz)



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
39.676	34.99	N.A	N.A	N.A	40.0	N.A	Vertical	PASS
199.327	28.58	N.A	N.A	N.A	43.5	N.A	Vertical	PASS
426.708	35.02	N.A	N.A	N.A	46.0	N.A	Vertical	PASS
719.401	37.64	N.A	N.A	N.A	46.0	N.A	Vertical	PASS
2437.000	58.94	N.A	N.A	N.A	N.A	N.A	Vertical	N.A
10516.209	43.35	N.A	N.A	74.0	N.A	54.0	Vertical	PASS

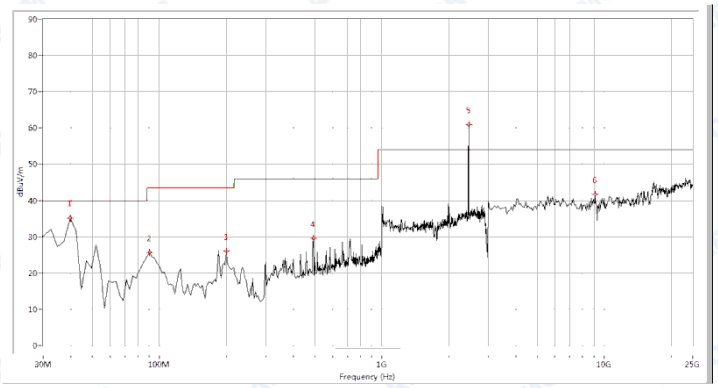
(Antenna Vertical, 30MHz to 25GHz)

Plot for Channel = 11



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
39.676	35.71	N.A	N.A	N.A	40.0	N.A	Horizontal	PASS
238.030	31.57	N.A	N.A	N.A	46.0	N.A	Horizontal	PASS
366.234	30.98	N.A	N.A	N.A	46.0	N.A	Horizontal	PASS
719.401	37.39	N.A	N.A	N.A	46.0	N.A	Horizontal	PASS
2462.000	59.94	N.A	N.A	N.A	N.A	N.A	Horizontal	N.A
16770.574	44.31	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS

(Antenna Horizontal, 30MHz to 25GHz)



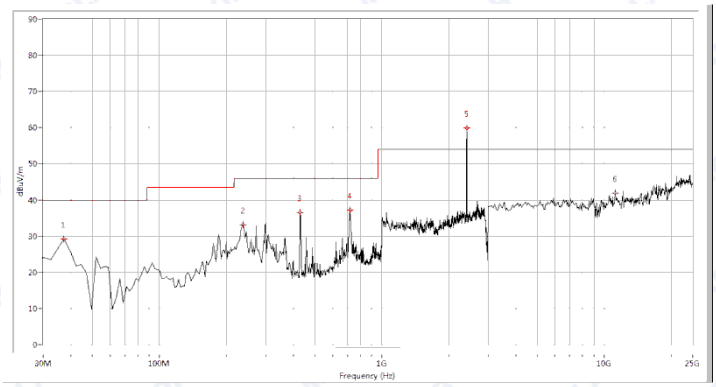
Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
39.676	35.13	N.A	N.A	N.A	40.0	N.A	Vertical	PASS
90.474	25.58	N.A	N.A	N.A	43.5	N.A	Vertical	PASS
199.327	26.06	N.A	N.A	N.A	43.5	N.A	Vertical	PASS
492.020	29.66	N.A	N.A	N.A	46.0	N.A	Vertical	PASS
2462.000	60.87	N.A	N.A	N.A	N.A	N.A	Vertical	N.A
9089.776	41.77	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

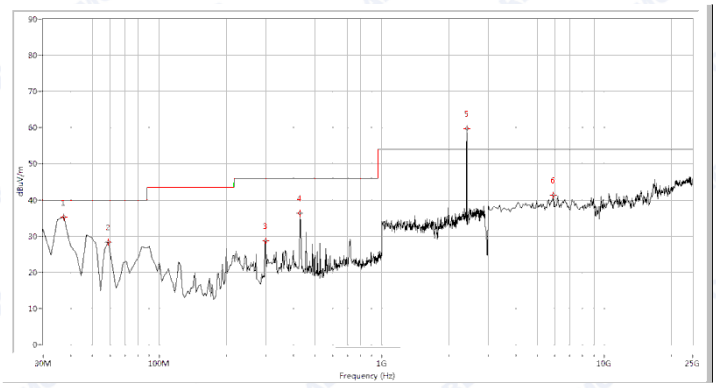
A. Test Plots for the Whole Measurement Frequency Range:

Plots for Channel = 1



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
37.257	29.19	N.A	N.A	N.A	40.0	N.A	Horizontal	PASS
238.030	33.10	N.A	N.A	N.A	46.0	N.A	Horizontal	PASS
426.708	36.49	N.A	N.A	N.A	46.0	N.A	Horizontal	PASS
719.401	37.24	N.A	N.A	N.A	46.0	N.A	Horizontal	PASS
2412.000	59.84	N.A	N.A	N.A	N.A	N.A	Horizontal	N.A
11229.426	41.80	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS

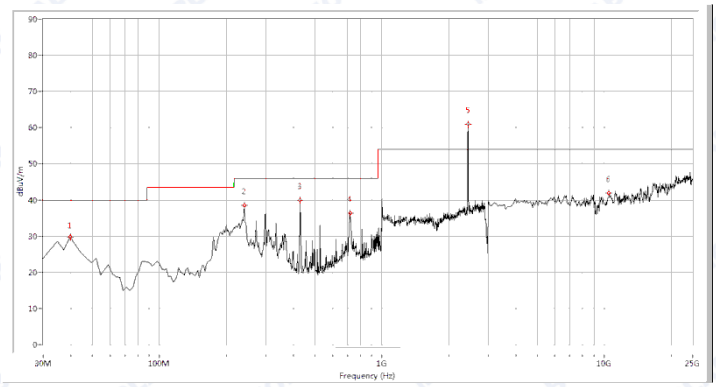
(Antenna Horizontal, 30MHz to 25GHz)



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
37.257	35.36	N.A	N.A	N.A	40.0	N.A	Vertical	PASS
59.027	28.37	N.A	N.A	N.A	40.0	N.A	Vertical	PASS
300.923	28.63	N.A	N.A	N.A	46.0	N.A	Vertical	PASS
426.708	36.39	N.A	N.A	N.A	46.0	N.A	Vertical	PASS
2412.000	59.78	N.A	N.A	N.A	N.A	N.A	Vertical	N.A
5907.731	41.37	N.A	N.A	74.0	N.A	54.0	Vertical	PASS

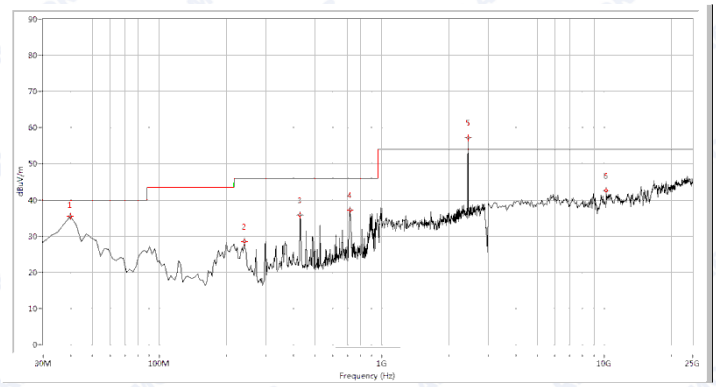
(Antenna Vertical, 30MHz to 25GHz)

Plot for Channel = 6



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
39.676	29.76	N.A	N.A	N.A	40.0	N.A	Horizontal	PASS
240.449	38.42	N.A	N.A	N.A	46.0	N.A	Horizontal	PASS
429.127	39.88	N.A	N.A	N.A	46.0	N.A	Horizontal	PASS
719.401	36.40	N.A	N.A	N.A	46.0	N.A	Horizontal	PASS
2437.000	60.90	N.A	N.A	N.A	N.A	N.A	Horizontal	N.A
10516.209	41.89	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS

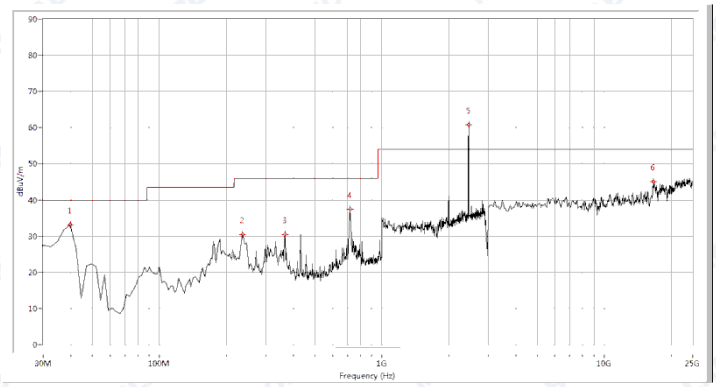
(Antenna Horizontal, 30MHz to 25GHz)



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
39.676	35.49	N.A	N.A	N.A	40.0	N.A	Vertical	PASS
240.449	28.49	N.A	N.A	N.A	46.0	N.A	Vertical	PASS
429.127	35.84	N.A	N.A	N.A	46.0	N.A	Vertical	PASS
719.401	37.21	N.A	N.A	N.A	46.0	N.A	Vertical	PASS
2437.000	57.22	N.A	N.A	N.A	N.A	N.A	Vertical	N.A
10241.895	42.54	N.A	N.A	74.0	N.A	54.0	Vertical	PASS

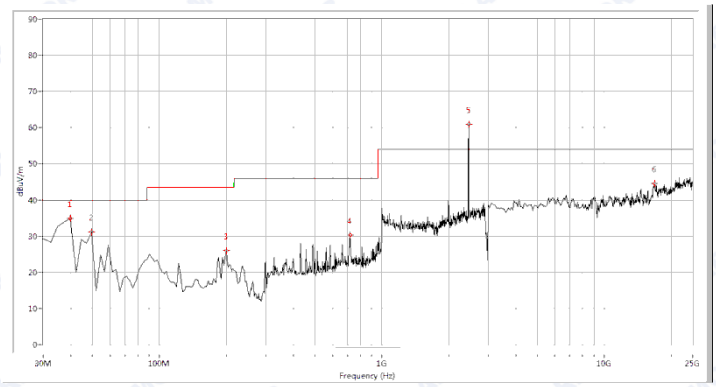
(Antenna Vertical, 30MHz to 25GHz)

Plot for Channel = 11



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
39.676	33.20	N.A	N.A	N.A	40.0	N.A	Horizontal	PASS
235.611	30.47	N.A	N.A	N.A	46.0	N.A	Horizontal	PASS
366.234	30.54	N.A	N.A	N.A	46.0	N.A	Horizontal	PASS
719.401	37.51	N.A	N.A	N.A	46.0	N.A	Horizontal	PASS
2462.000	60.84	N.A	N.A	N.A	N.A	N.A	Horizontal	N.A
16605.985	45.09	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS

(Antenna Horizontal, 30MHz to 25GHz)



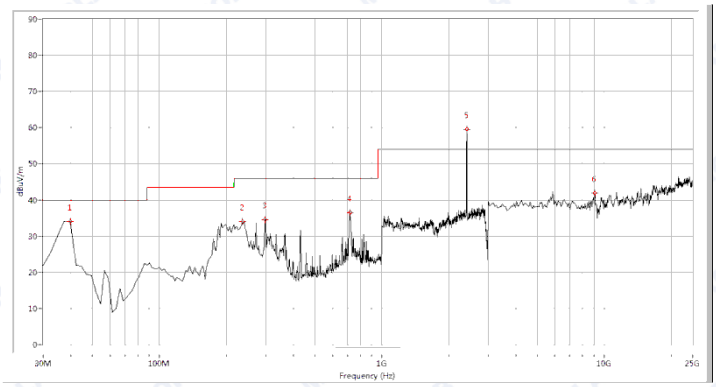
Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
39.676	35.01	N.A	N.A	N.A	40.0	N.A	Vertical	PASS
49.352	31.24	N.A	N.A	N.A	40.0	N.A	Vertical	PASS
199.327	26.05	N.A	N.A	N.A	43.5	N.A	Vertical	PASS
719.401	30.32	N.A	N.A	N.A	46.0	N.A	Vertical	PASS
2462.000	60.87	N.A	N.A	N.A	N.A	N.A	Vertical	N.A
16825.436	44.48	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

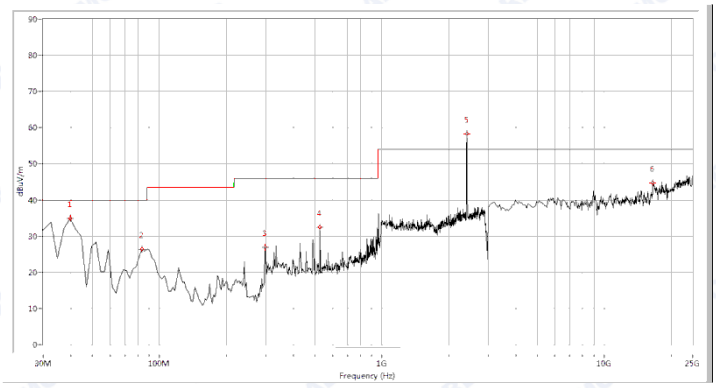
A. Test Plots for the Whole Measurement Frequency Range:

Plots for Channel = 1



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
39.676	33.98	N.A	N.A	N.A	40.0	N.A	Horizontal	PASS
235.611	34.10	N.A	N.A	N.A	46.0	N.A	Horizontal	PASS
298.504	34.63	N.A	N.A	N.A	46.0	N.A	Horizontal	PASS
719.401	36.55	N.A	N.A	N.A	46.0	N.A	Horizontal	PASS
2412.000	59.45	N.A	N.A	N.A	N.A	N.A	Horizontal	N.A
9034.913	41.95	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS

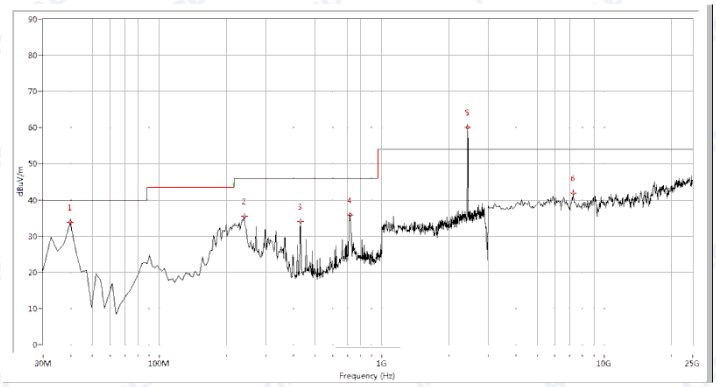
(Antenna Horizontal, 30MHz to 25GHz)



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
39.676	34.99	N.A	N.A	N.A	40.0	N.A	Vertical	PASS
83.217	26.43	N.A	N.A	N.A	40.0	N.A	Vertical	PASS
298.504	26.91	N.A	N.A	N.A	46.0	N.A	Vertical	PASS
528.304	32.51	N.A	N.A	N.A	46.0	N.A	Vertical	PASS
2412.000	58.24	N.A	N.A	N.A	N.A	N.A	Vertical	N.A
16551.122	44.81	N.A	N.A	74.0	N.A	54.0	Vertical	PASS

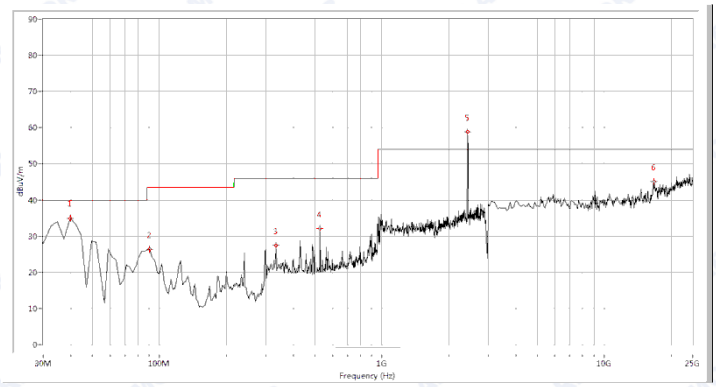
(Antenna Vertical, 30MHz to 25GHz)

Plot for Channel = 6



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
39.676	33.88	N.A	N.A	N.A	40.0	N.A	Horizontal	PASS
240.449	35.44	N.A	N.A	N.A	46.0	N.A	Horizontal	PASS
431.546	34.05	N.A	N.A	N.A	46.0	N.A	Horizontal	PASS
719.401	35.90	N.A	N.A	N.A	46.0	N.A	Horizontal	PASS
2437.000	59.99	N.A	N.A	N.A	N.A	N.A	Horizontal	N.A
7279.302	41.95	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS

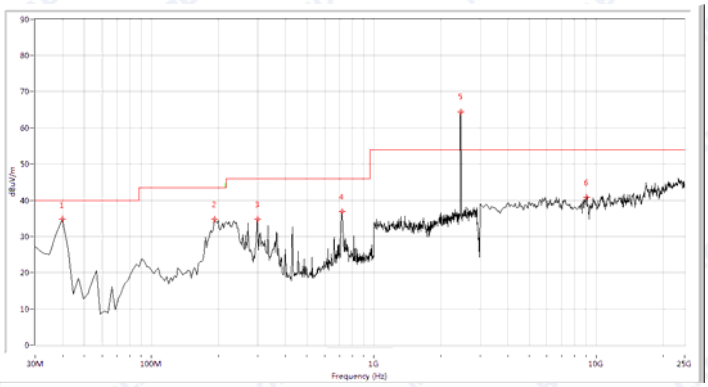
(Antenna Horizontal, 30MHz to 25GHz)



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
39.676	34.88	N.A	N.A	N.A	40.0	N.A	Vertical	PASS
90.474	26.35	N.A	N.A	N.A	43.5	N.A	Vertical	PASS
334.788	27.53	N.A	N.A	N.A	46.0	N.A	Vertical	PASS
528.304	32.08	N.A	N.A	N.A	46.0	N.A	Vertical	PASS
2437.000	58.77	N.A	N.A	N.A	N.A	N.A	Vertical	N.A
16715.711	45.15	N.A	N.A	74.0	N.A	54.0	Vertical	PASS

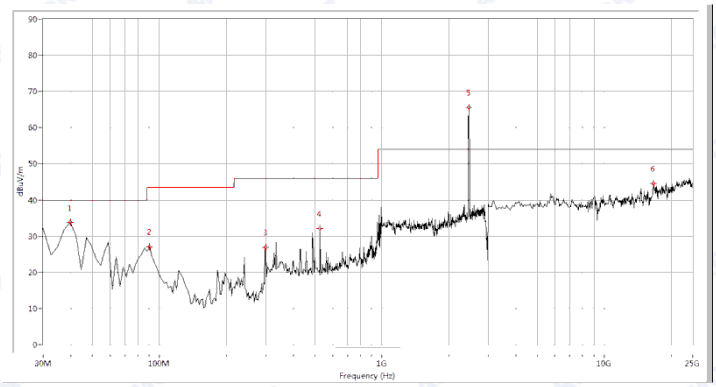
(Antenna Vertical, 30MHz to 25GHz)

Plot for Channel = 11



Fre.(MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
39.676	34.76	N.A	N.A	N.A	40.0	N.A	Horizontal	PASS
192.070	34.68	N.A	N.A	N.A	43.5	N.A	Horizontal	PASS
300.923	34.84	N.A	N.A	N.A	46.0	N.A	Horizontal	PASS
719.401	36.82	N.A	N.A	N.A	46.0	N.A	Horizontal	PASS
2462.000	64.50	N.A	N.A	N.A	N.A	N.A	Horizontal	N.A
9034.913	40.80	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
39.676	33.81	N.A	N.A	N.A	40.0	N.A	Vertical	PASS
90.474	27.11	N.A	N.A	N.A	43.5	N.A	Vertical	PASS
300.923	26.91	N.A	N.A	N.A	46.0	N.A	Vertical	PASS
528.304	32.08	N.A	N.A	N.A	46.0	N.A	Vertical	PASS
2462.000	65.58	N.A	N.A	N.A	N.A	N.A	Vertical	N.A
16605.985	44.62	N.A	N.A	74.0	N.A	54.0	Vertical	PASS

(Antenna Vertical, 30MHz to 25GHz)

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

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.

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	2014.02.26	2014.02.25
2	Power Splitter	NW521	1506A	Weinschel	2014.02.26	2014.02.25
3	Attenuator 1	(n.a.)	10dB	Resnet	2014.02.26	2014.02.25
4	Attenuator 2	(n.a.)	3dB	Resnet	2014.02.26	2014.02.25
5	USB Wideband Power Sensor	MY52280010	U2021XA	Agilent	2014.02.26	2014.02.25
6	EXA Signal Analzyer	MY51440152	N9010A	Agilent	2014.02.26	2014.02.25
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	2014.02.26	2014.02.25
2	LISN	812744	NSLK 8127	Schwarzbeck	2014.02.26	2014.02.25
3	Service Supplier	100448	CMU200	R&S	2014.02.26	2014.02.25
4	Pulse Limiter (20dB)	9391	VTSD 9561-D	Schwarzbeck	2014.02.26	2014.02.25
5	Coaxial cable(BNC)	CB01	EMC01	Morlab	N/A	N/A

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 *****