TEST REPORT

APPLICANT	:	GREAT TALENT TECHNOLOGY LIMITED
PRODUCT NAME	:	Android Tablet
MODEL NAME	:	TEL-TE-U5
BRAND NAME	:	UMX
FCC ID	:	2ALZM-TEL-TE-U5
STANDARD(S)	:	47 CFR Part 15 Subpart C
RECEIPT DATE	:	2019-05-07
TEST DATE	:	2019-05-08 to 2019-05-21
ISSUE DATE	:	2019-05-30

Edited by: Zeng Xiaoying (Rapporteur)

Approved by: Peng Huarui (Supervisor)

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

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Change History		
Version	**Date**	**Reason for change**
1.0	2019-05-30	First edition

1. Technical Information

Note: Provide by applicant.

1.1. Applicant and Manufacturer Information

Applicant:	GREAT TALENT TECHNOLOGY LIMITED
Applicant Address:	RM602,T3 Software Park,Nanshan,Shenzhen,China
Manufacturer:	SHENZHEN GIEC DIGITAL CO., LTD
Manufacturer Address:	1st&3rd Building, No.26 Puzai Road, Pingdi, Longgang District, Shenzhen, China

1.2. Equipment Under Test (EUT) Description

Product Name:	Android Tablet	
Serial No:	(N/A, marked #1 by test site)	
Hardware Version:	MQ_MPEG_J10F_02G_V1.0	
Software Version:	GK_MJQ1020-user.20190527	
Equipment type:	WLAN2.4G	
Modulation Type:	DSSS, OFDM	
Operating Frequency Range:	802.11b/g/ n(HT20): 2.412GHz - 2.462GHz 802.11 n(HT40): 2.422GHz - 2.452GHz	
Antenna Type:	FPC Antenna	
Antenna Gain:	2.0 dBi	
Accessory Information:	Battery	
	Brand Name:	ENER LONG
	Model No.:	EL26140156P
	Serial No.:	(N/A, marked #1 by test site)
	Capacity:	6800mAh
	Rated Voltage:	3.7V
	Charge Limit:	4.2 V
	AC Adapter	
	Brand Name:	TEKA
	Model No.:	TEKA012-0502000UK
	Serial No.:	(N/A, marked #1 by test site)
	Rated Input:	5V⎓2A
	Rated Output:	100-240V ～ 50/60Hz 0.35A

Note 1: We use the dedicated software to control the EUT continuous transmission.

Note 2: For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.

1.3. The channel number and frequency

Test Mode	Channel	Frequency (MHz)	Channel	Frequency (MHz)
802.11b/g/ n(HT20)	**1**	**2412**	8	2447
	2	2417	9	2452
	3	2422	10	2457
	4	2427	11	2462
	5	2432	12	2467
	6	2437	**13**	**2472**
	7	**2442**		
Test Mode	**Channel**	**Frequency (MHz)**	**Channel**	**Frequency (MHz)**
n(HT40)	**3**	**2422**	8	2447
	4	2427	9	2452
	5	2432	10	2457
	6	2437	**11**	**2462**
	7	**2442**		

Note1: The Lowest Channel (1), Middle Channel (7) and Highest Channel (13) was selected test for 802.11b/g/n(HT20) mode;

Note2: The Lowest Channel (3), Middle Channel (7) and Highest Channel (11) was selected test for n(HT40) mode;

1.4. Test Standards and Results

The objective of the report is to perform testing according to 47 CFR Part 15 Subpart C for the EUT FCC ID Certification:

No	Identity	Document Title
1	47 CFR Part 15	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	N/A	Duty Cycle Of Test Signal	May 18, 2019	Wang Meng	PASS
3	15.247(b)	Maximum Peak and Average Conducted Output Power	May 18, 2019	Wang Meng	PASS
4	15.247(a)	Bandwidth	May 18, 2019	Wang Meng	PASS
5	15.247(d)	Conducted Spurious Emission and Band Edge	May 18, 2019	Wang Meng	PASS
6	15.247(e)	Power spectral density (PSD)	May 18, 2019	Wang Meng	PASS
7	15.207	Conducted Emission	May 08, 2019	Wu Zhongwen	PASS
8	15.247(d)	Restricted Frequency Bands	May 21, 2019	Wu Zhongwen	PASS
9	15.209, 15.247(d)	Radiated Emission	May 17, 2019	Wu Zhongwen	PASS

Note1: The tests were performed according to the method of measurements prescribed in ANSIC63.10-2013, KDB558074 D01 v05r02 and KDB594280 D01 v02r01.

Note2: The path loss during the RF test is calibrated to correct the results by the offset setting in the test equipments. The ref offset 11.5dB contains two parts that cable loss 1.5dB and Attenuator 10dB.

1.5. 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.

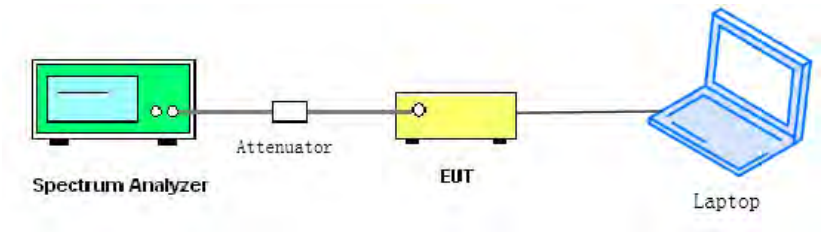
2.2. Duty Cycle Of Test Signal

2.2.1. Requirement

Preferably, all measurements of maximum conducted (average) output power will be performed with the EUT transmitting continuously (i.e., with a duty cycle of greater than or equal to 98%). When continuous operation cannot be realized, then the use of sweep triggering/signal gating techniques can be used to ensure that measurements are made only during transmissions at the maximum power control level. Such sweep triggering/signal gating techniques will require knowledge of the minimum transmission duration (T) over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation. Sweep triggering/signal gating techniques can then be used if the measurement/sweep time of the analyzer can be set such that it does not exceed T at any time that data are being acquired (i.e., no transmitter OFF-time is to be considered).
When continuous transmission cannot be achieved and sweep triggering/signal gating cannot be implemented, alternative procedures are provided that can be used to measure the average power; however, they will require an additional measurement of the transmitter duty cycle (D). Within this subclause, the duty cycle refers to the fraction of time over which the transmitter is ON and is transmitting at its maximum power control level. The duty cycle is considered to be constant if variations are less than ±2%; otherwise, the duty cycle is considered to be nonconstant.

2.2.2. Test Description

A. Test Set:



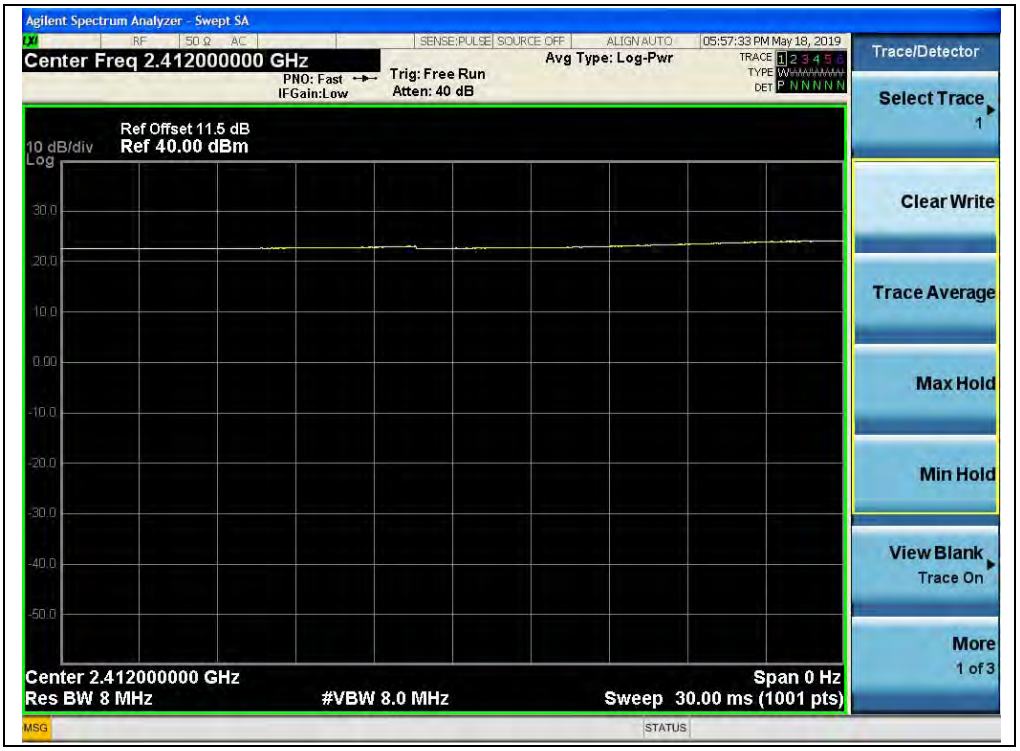
ANSI C63.10 2013 Clause 11.6 was used in order to prove compliance.

2.2.3. Test Result

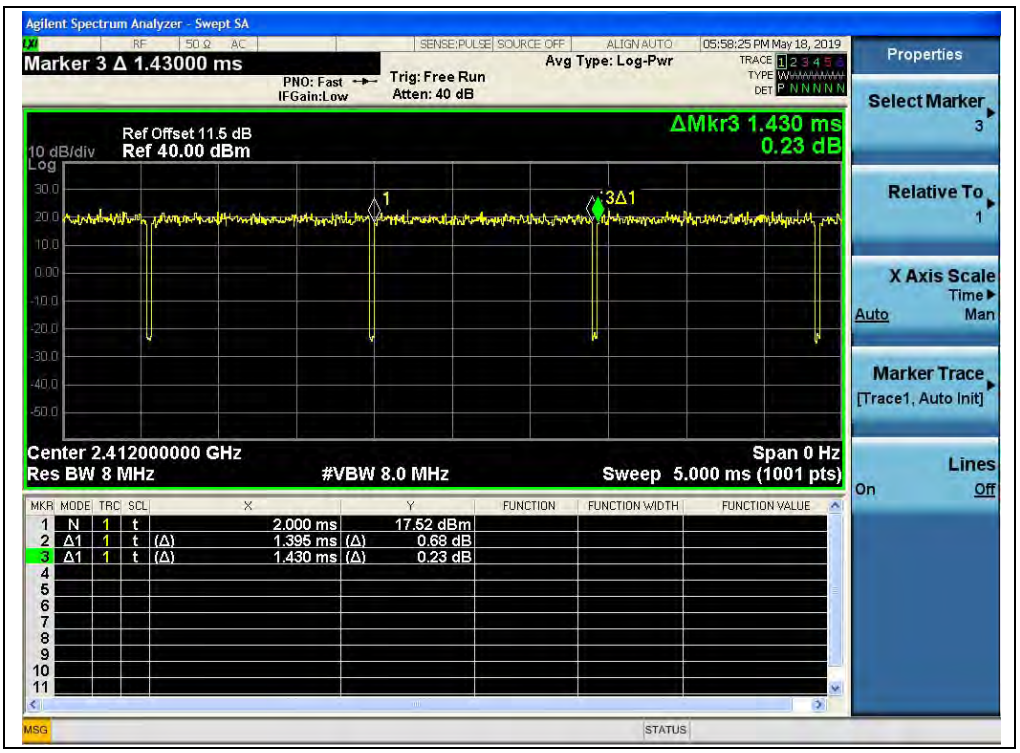
A. Test Verdict:

Test Mode	Duty Cycle (%) (D)	Duty Factor (10*lg[1/D])
802.11b	100.00	0.00
802.11g	97.55	0.11
802.11n(HT20)	97.38	0.12
802.11n(HT40)	95.15	0.22

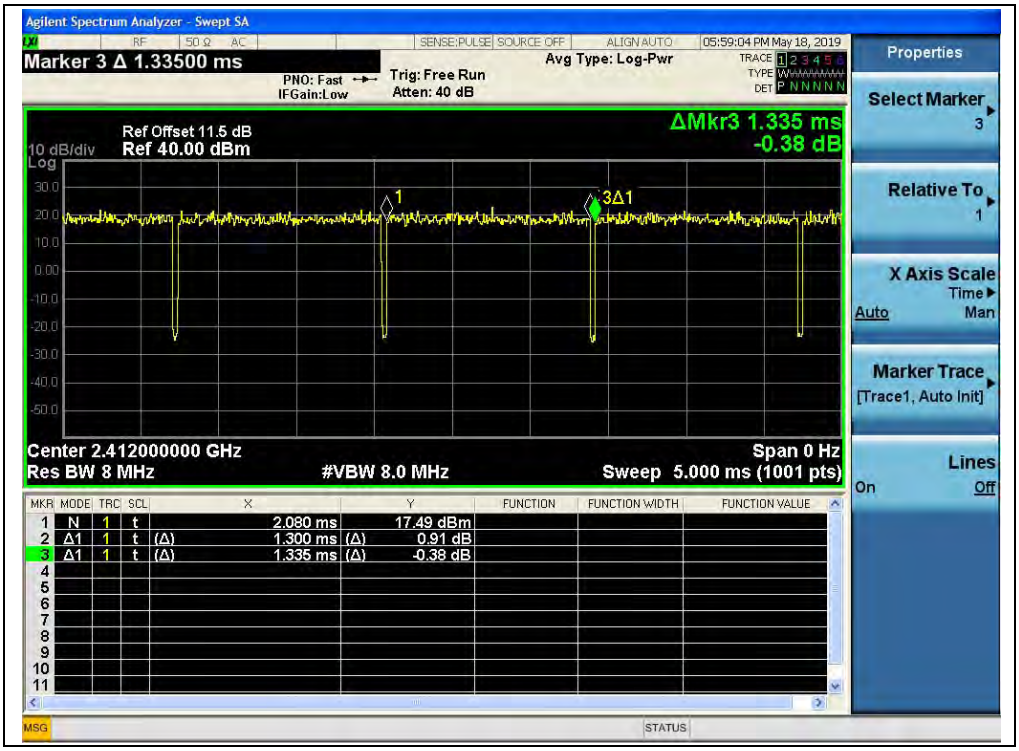
B. Test Plots



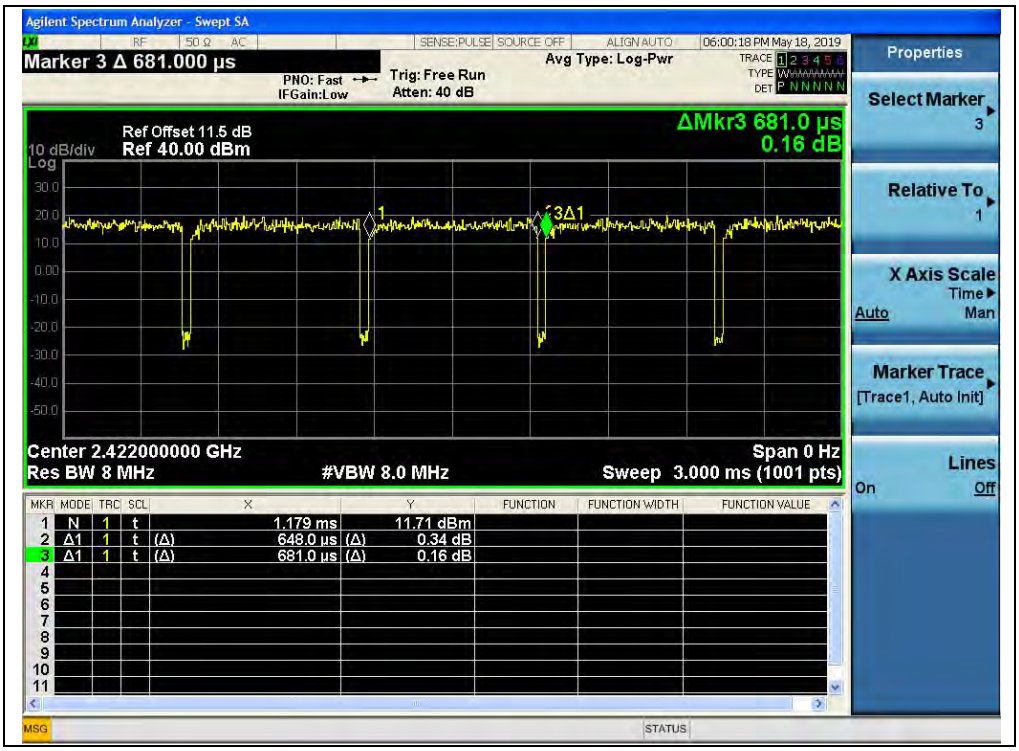
(Channel 1, 2412MHz, 802.11b)



(Channel 1, 2412MHz, 802.11g)



(Channel 1, 2412MHz, 802.11 n(HT20))



(Channel 3, 2422MHz, 802.11 n(HT40))

2.3. Maximum Peak and Average Conducted Output Power

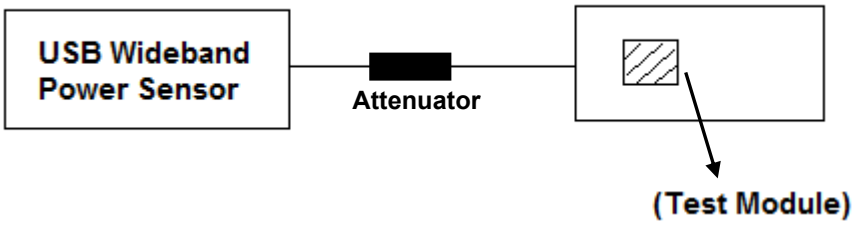
2.3.1. Requirement

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.

2.3.2. 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.

2.3.3. Test Result

Maximum Peak Conducted Output Power

802.11b Test Mode

Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	W	dBm	W	
1	2412	19.30	0.085	30	1	PASS
7	2442	19.19	0.083			PASS
13	2472	19.28	0.085			PASS

802.11g Test mode

Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	W	dBm	W	
1	2412	24.16	0.261	30	1	PASS
7	2442	24.07	0.255			PASS
13	2472	24.08	0.256			PASS

802.11n(HT20) Test mode

Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	W	dBm	W	
1	2412	24.13	0.259	30	1	PASS
7	2442	24.10	0.257			PASS
13	2472	24.19	0.262			PASS

802.11n(HT40) Test mode

Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	W	dBm	W	
3	2422	24.93	0.311	30	1	PASS
7	2442	24.77	0.300			PASS
11	2462	24.72	0.296			PASS

Maximum Average Conducted Output Power

802.11b Test Mode

Channel	Frequency (MHz)	Average Power			Limit		Verdict
		Measured	Duty factor Calculated				
		dBm	dBm	W	dBm	W	
1	2412	16.16	16.16	0.041	30	1	PASS
7	2442	15.99	15.99	0.040			PASS
13	2472	16.08	16.08	0.041			PASS

802.11g Test mode

Channel	Frequency (MHz)	Average Power			Limit		Verdict
		Measured	Duty factor Calculated				
		dBm	dBm	W	dBm	W	
1	2412	13.98	14.09	0.026	30	1	PASS
7	2442	13.93	14.04	0.025			PASS
13	2472	13.99	14.10	0.026			PASS

802.11n(HT20) Test mode

Channel	Frequency (MHz)	Average Power			Limit		Verdict
		Measured	Duty factor Calculated				
		dBm	dBm	W	dBm	W	
1	2412	13.95	14.07	0.026	30	1	PASS
7	2442	13.97	14.09	0.026			PASS
13	2472	13.99	14.11	0.026			PASS

802.11n(HT40) Test mode

Channel	Frequency (MHz)	Average Power			Limit		Verdict
		Measured	Duty factor Calculated				
		dBm	dBm	W	dBm	W	
3	2422	13.46	13.68	0.023	30	1	PASS
7	2442	13.43	13.65	0.023			PASS
11	2462	13.40	13.62	0.023			PASS

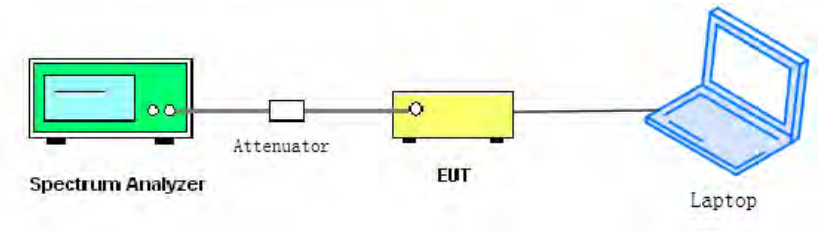
2.4. Bandwidth

2.4.1. 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.

2.4.2. 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.

2.4.3. Test procedure

KDB 558074 Section 8.2 was used in order to prove compliance.

2.4.4. Test Result

802.11b Test mode

A. Test Verdict:

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limits(kHz)	Result
1	2412	9.085	≥500	PASS
7	2442	9.548	≥500	PASS
13	2472	10.01	≥500	PASS

B. Test Plots

(Channel 1, 2412MHz, 802.11b)

(Channel 7, 2442 MHz, 802.11b)

(Channel 13, 2472MHz, 802.11b)

802.11g Test mode

A. Test Verdict:

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limits (kHz)	Result
1	2412	15.32	≥500	PASS
7	2442	15.33	≥500	PASS
13	2472	15.13	≥500	PASS

B. Test Plots:

(Channel 1, 2412MHz, 802.11g)

(Channel 7, 2442MHz, 802.11g)

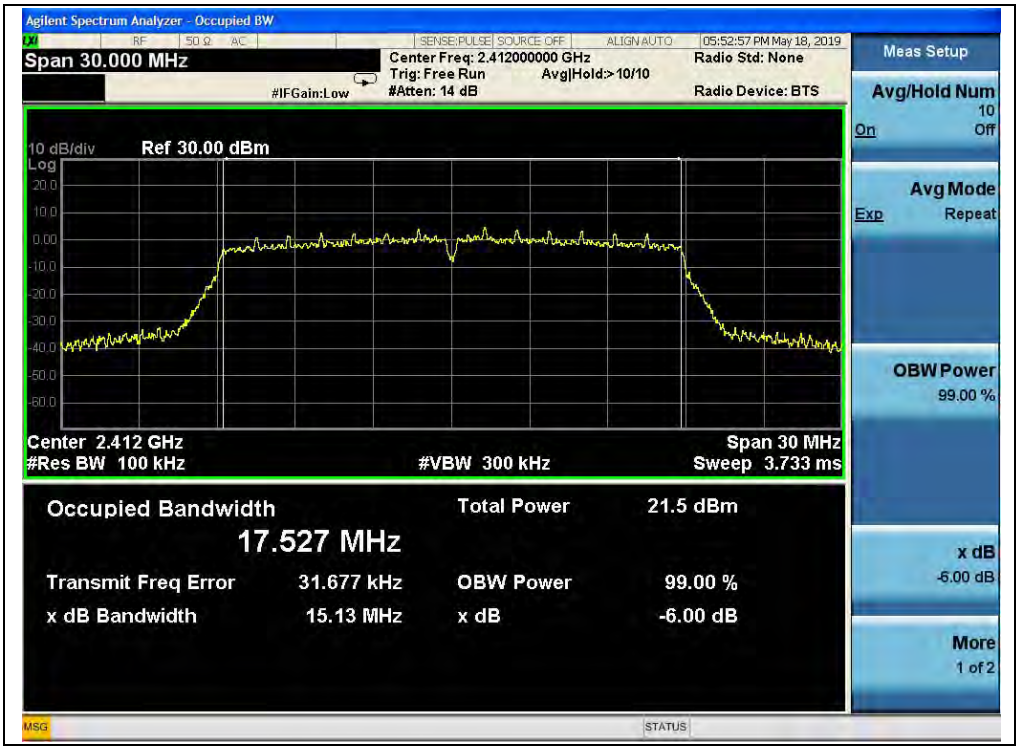
(Channel 13, 2472MHz, 802.11g)

802.11n(HT20) Test mode

A. Test Verdict:

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limits (kHz)	Result
1	2412	15.13	≥500	PASS
7	2442	15.13	≥500	PASS
13	2472	15.13	≥500	PASS

B. Test Plots:



(Channel 1, 2412MHz, 802.11n(HT20))

(Channel 7, 2442MHz, 802.11n(HT20))

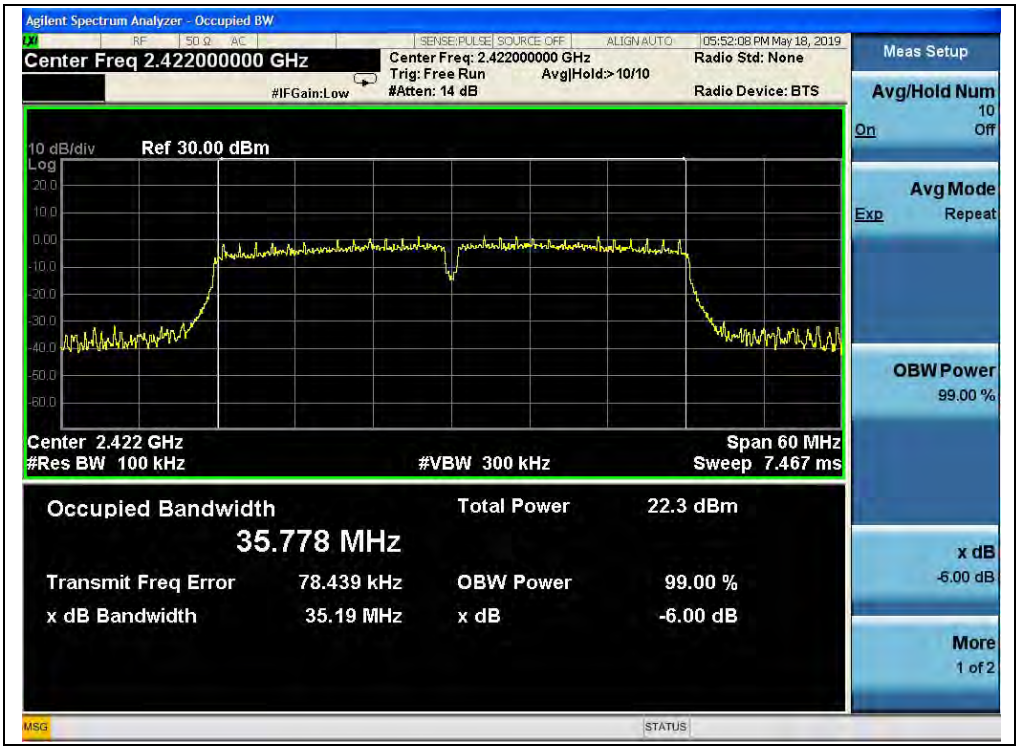
(Channel 13, 2472MHz, 802.11n(HT20))

802.11n(HT40) Test mode

A. Test Verdict:

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limits (kHz)	Result
3	2422	35.19	≥500	PASS
7	2442	35.18	≥500	PASS
11	2462	35.17	≥500	PASS

B. Test Plots:



(Channel 3, 2422Mz, 802.11n(HT40))

(Channel 7, 2442MHz, 802.11n(HT40))

(Channel 11, 2462MHz, 802.11n(HT40))

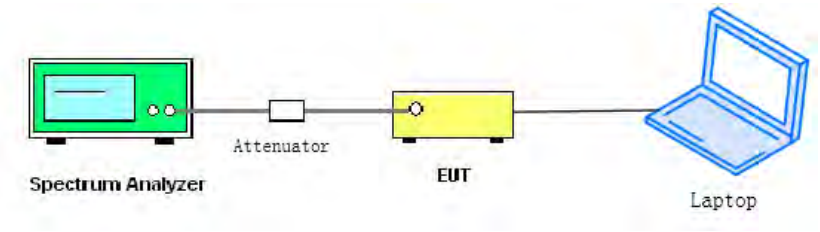
2.5. Conducted Spurious Emissions and Band Edge

2.5.1. 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.

2.5.2. 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.

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.

2.5.3. Test procedure

KDB 558074 Section 8.5 and 8.7 was used in order to prove compliance.

2.5.4. Test Result

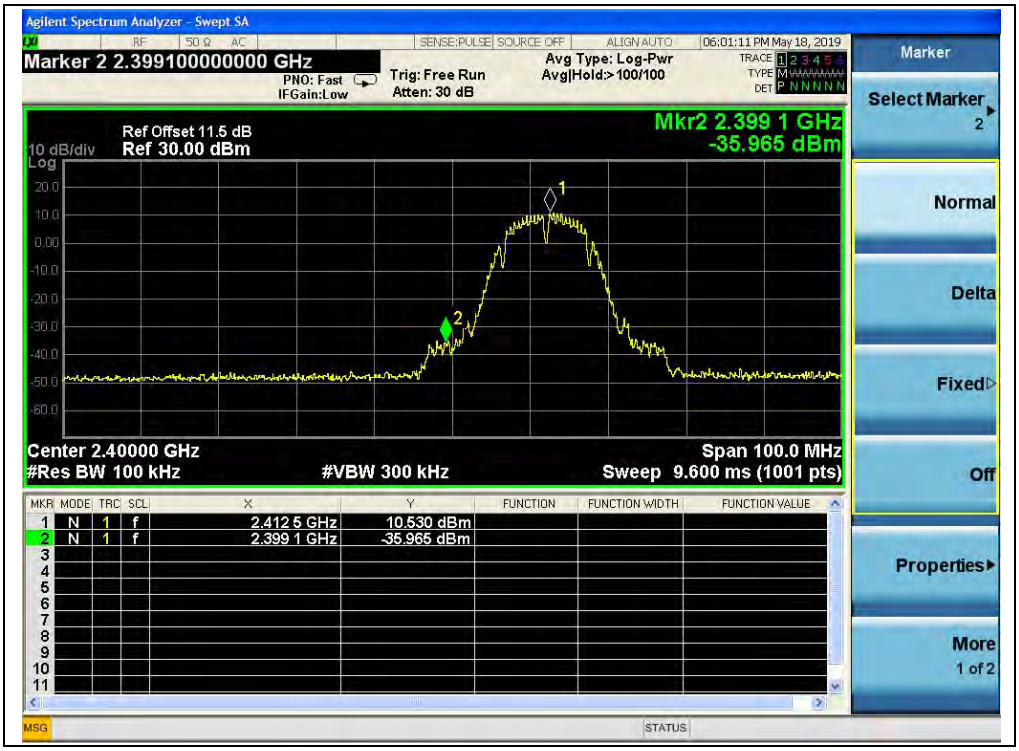
802.11b Test mode

A. Test Verdict:

Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
			Carrier Level	Calculated -20dBc Limit	
1	2412	-32.26	9.44	-10.56	PASS
7	2442	-32.74	10.82	-9.18	PASS
13	2472	-32.80	9.81	-10.19	PASS

B. Test Plots:

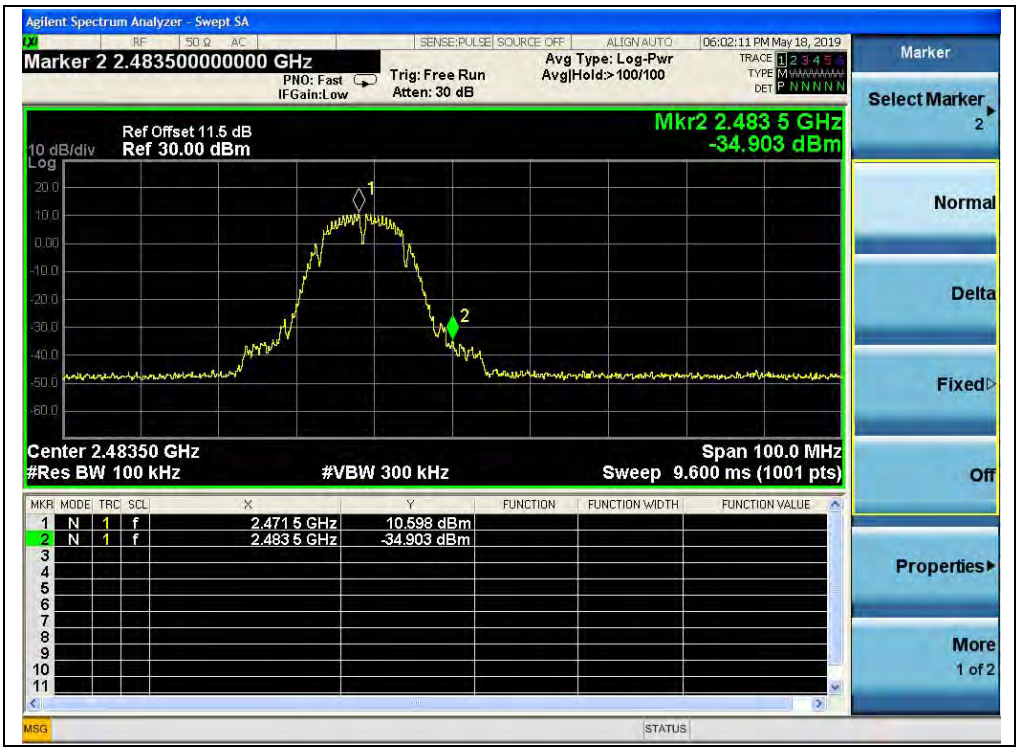
(Channel = 1, 30MHz to 25GHz)



(Band Edge, Channel = 1)

(Channel = 7, 30MHz to 25GHz)

(Channel = 13, 30MHz to 25GHz)



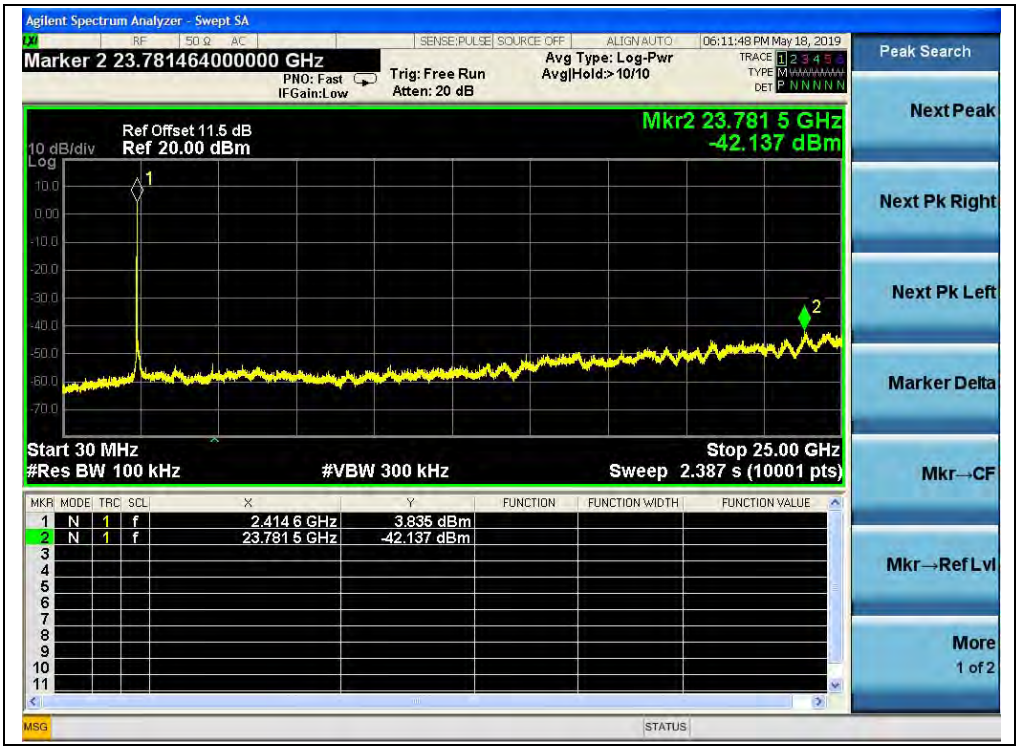
(Band Edge, Channel = 13)

802.11g Test mode

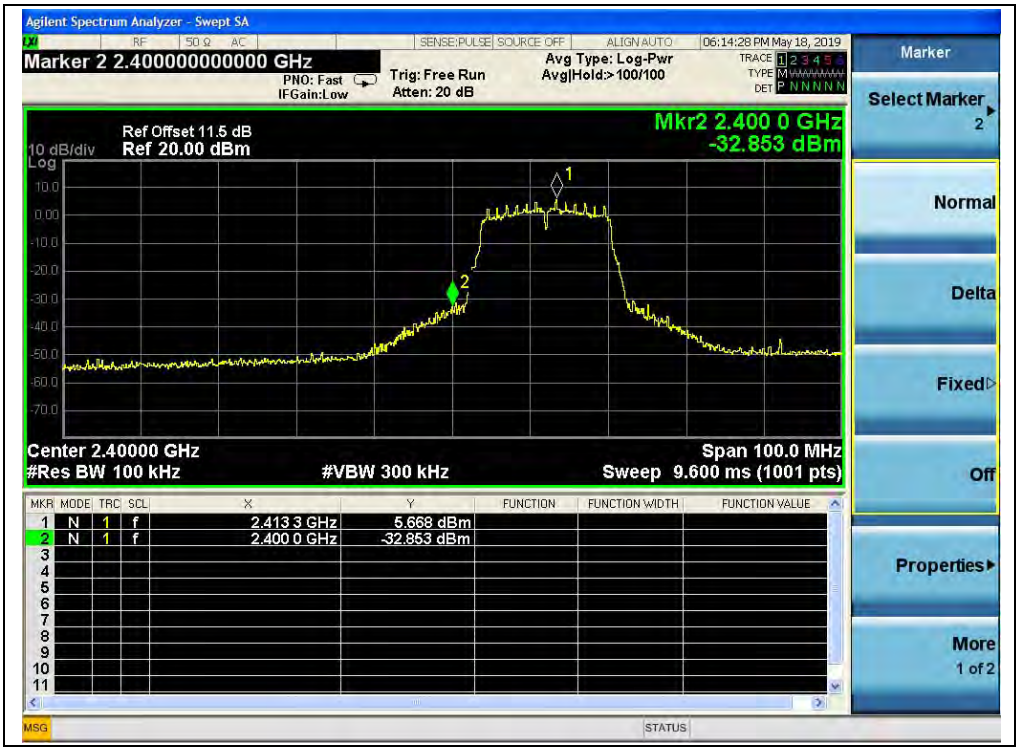
A. Test Verdict:

Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
			Carrier Level	Calculated -20dBc Limit	
1	2412	-42.14	3.84	-16.16	PASS
7	2442	-42.03	3.63	-16.37	PASS
13	2472	-41.90	3.83	-16.17	PASS

B. Test Plots:



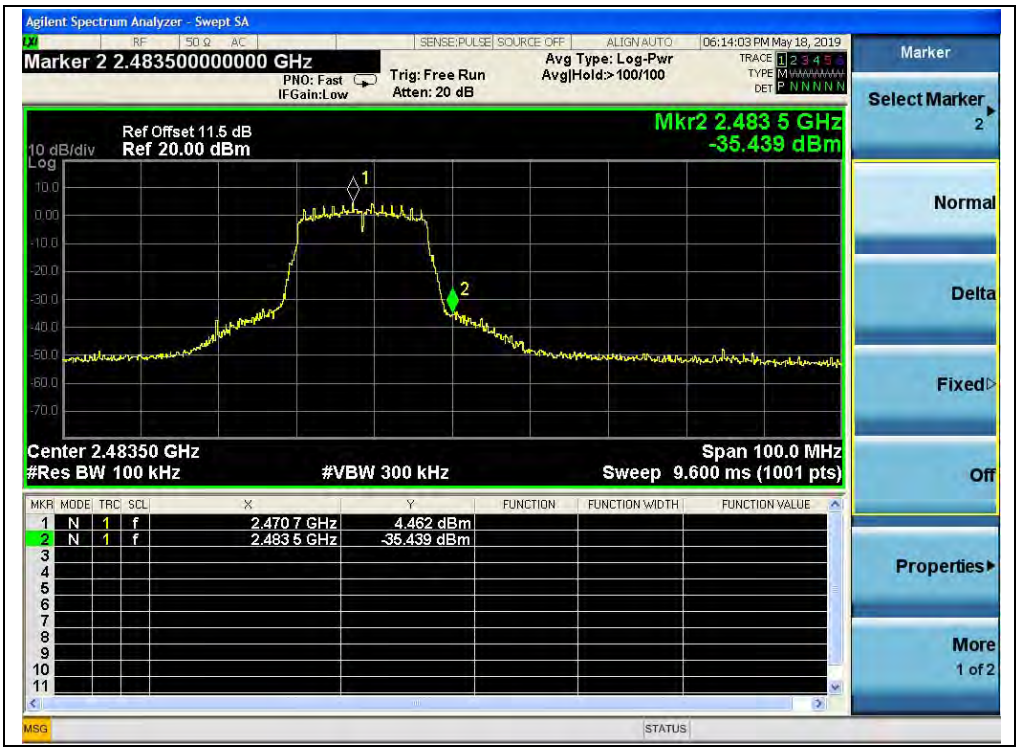
(Channel = 1, 30MHz to 25GHz)



(Band Edge, Channel = 1)

(Channel = 7, 30MHz to 25GHz)

(Channel = 13, 30MHz to 25GHz)



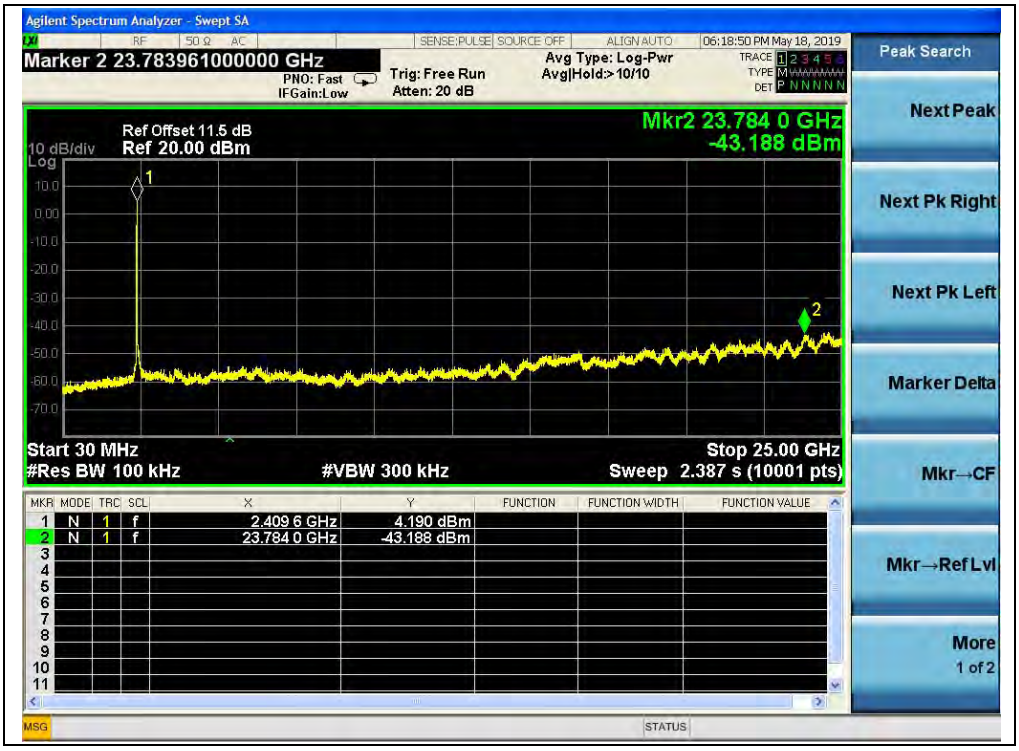
(Band Edge, Channel = 13)

802.11n(HT20) Test mode

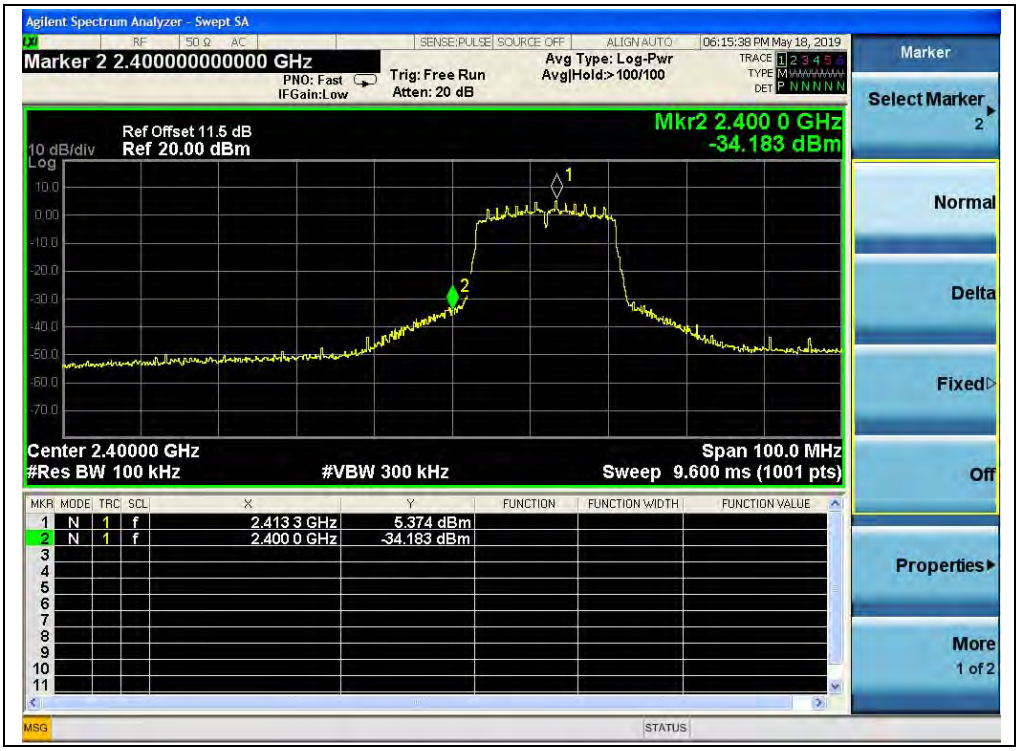
A. Test Verdict:

Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
			Carrier Level	Calculated -20dBc Limit	
1	2412	-43.19	4.19	-15.81	PASS
7	2442	-41.82	6.42	-13.58	PASS
13	2472	-42.50	4.51	-15.49	PASS

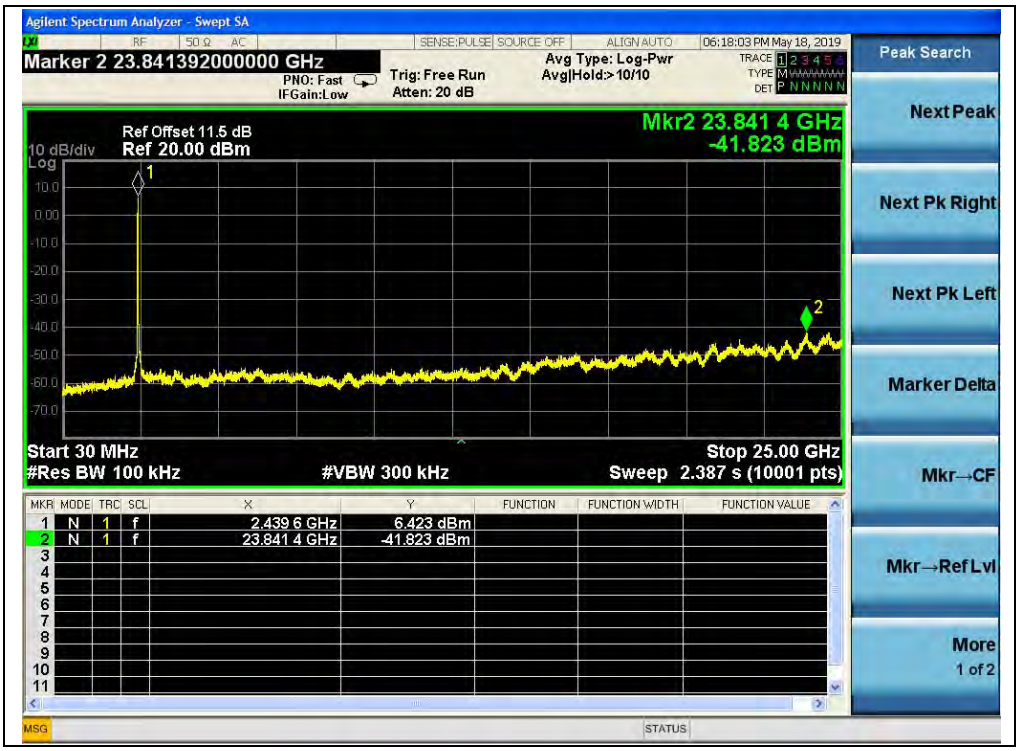
B. Test Plots:



(Channel = 1, 30MHz to 25GHz)

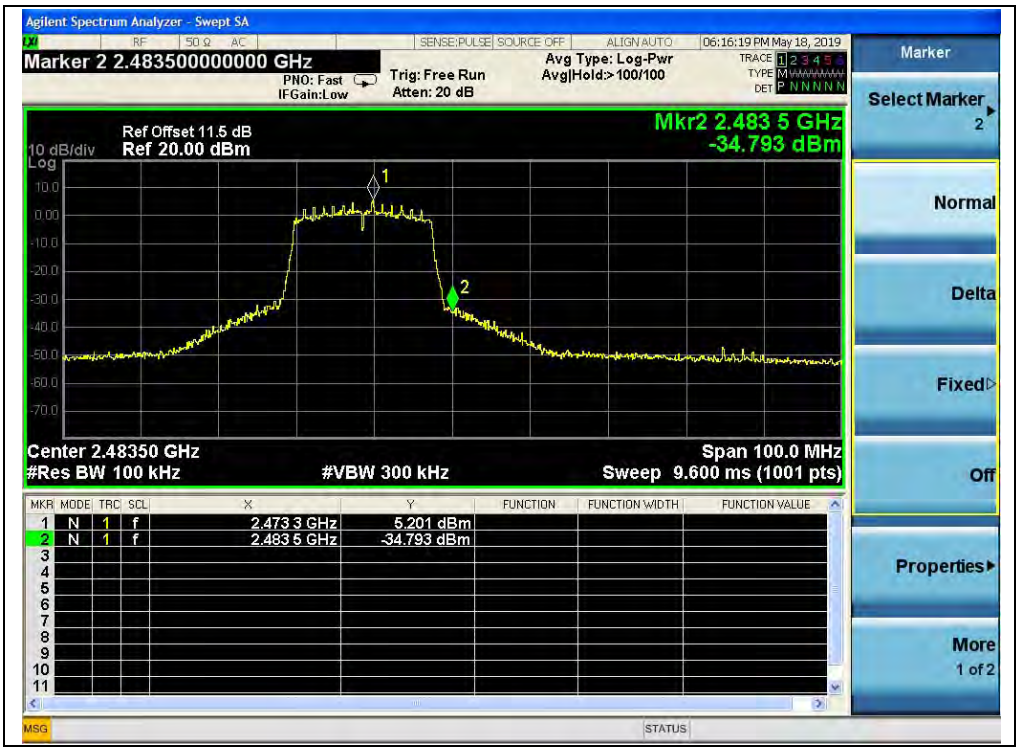


(Band Edge, Channel = 1)



(Channel = 7, 30MHz to 25GHz)

(Channel = 13, 30MHz to 25GHz)



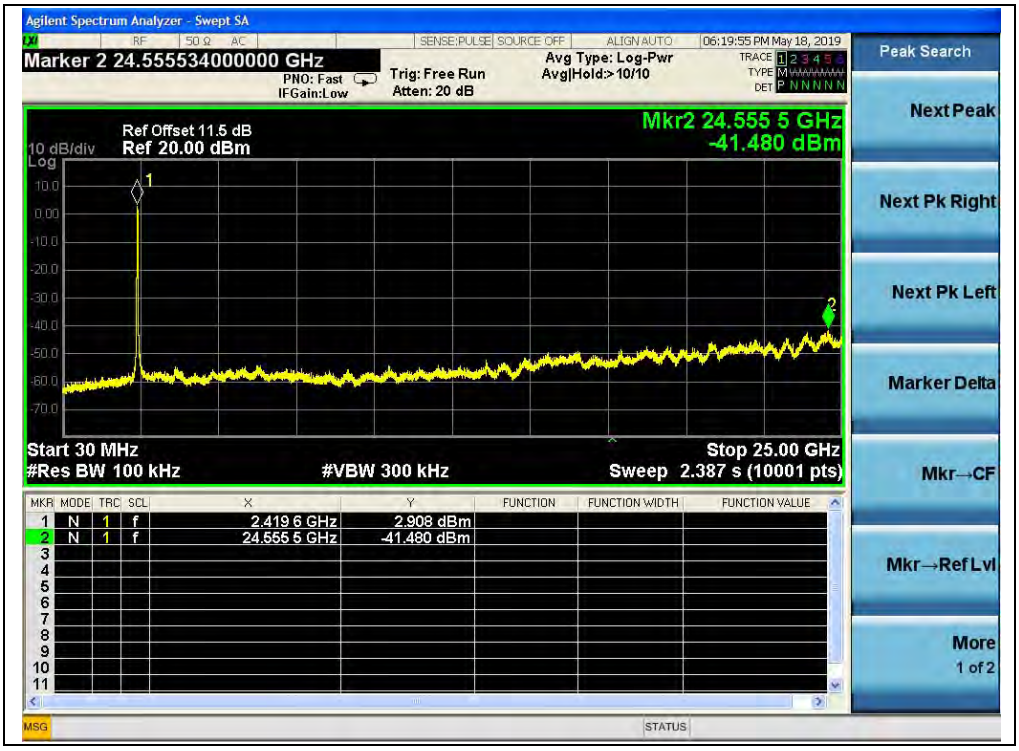
(Band Edge, Channel = 13)

802.11n(HT40) 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	-41.48	2.91	-17.09	PASS
7	2442	-42.59	2.72	-17.28	PASS
11	2462	-42.76	2.58	-17.42	PASS

B. Test Plots:



(Channel = 3, 30MHz to 25GHz)

(Band Edge, Channel = 3)

(Channel = 7, 30MHz to 25GHz)

(Channel = 11, 30MHz to 25GHz)

(Band Edge, Channel = 11)

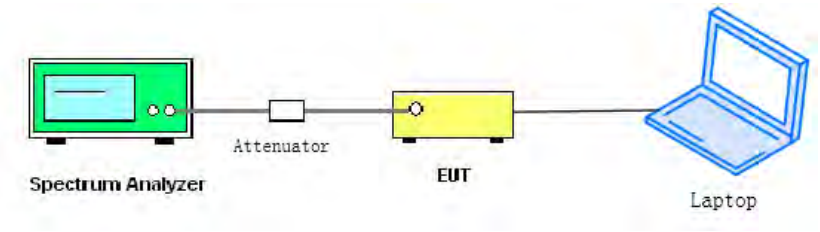
2.6. Power spectral density (PSD)

2.6.1. 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.

2.6.2. 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.

2.6.3. Test procedure

KDB 558074 Section 8.4 was used in order to prove compliance.

2.6.4. Test Result

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	-0.47	8	PASS
7	2442	-4.03	8	PASS
13	2472	-3.61	8	PASS

B. Test Plots:

(Channel = 1, 802.11b)

(Channel = 7, 802.11b)

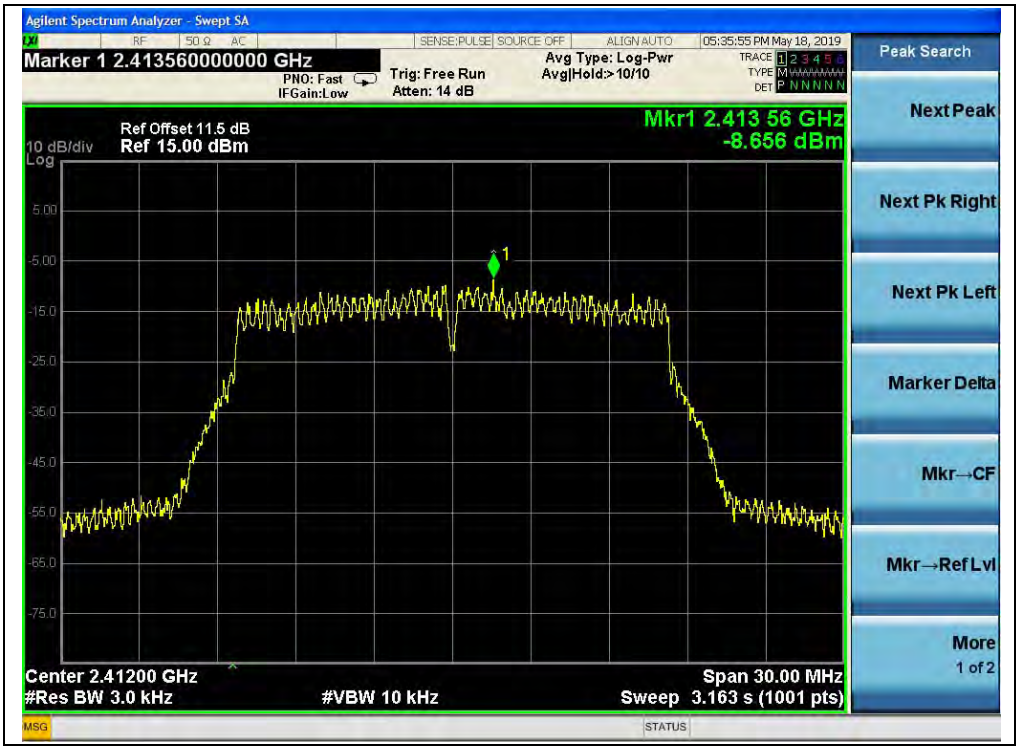
(Channel = 13, 802.11b)

802.11g Test mode

A. Test Verdict:

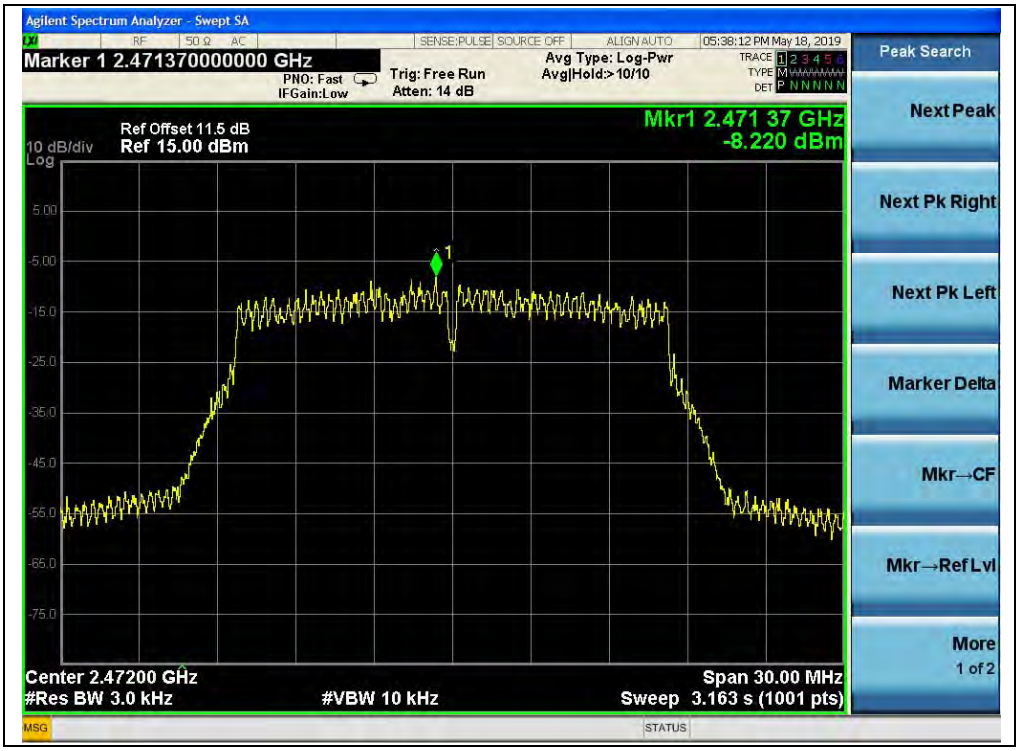
Spectral power density (dBm/3kHz)				
Channel	Frequency (MHz)	Measured PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
1	2412	-8.66	8	PASS
7	2442	-6.56	8	PASS
13	2472	-8.22	8	PASS

B. Test Plots:



(Channel = 1, 802.11g)

(Channel = 7, 802.11g)



(Channel = 13, 802.11g)

802.11n(HT20) Test mode

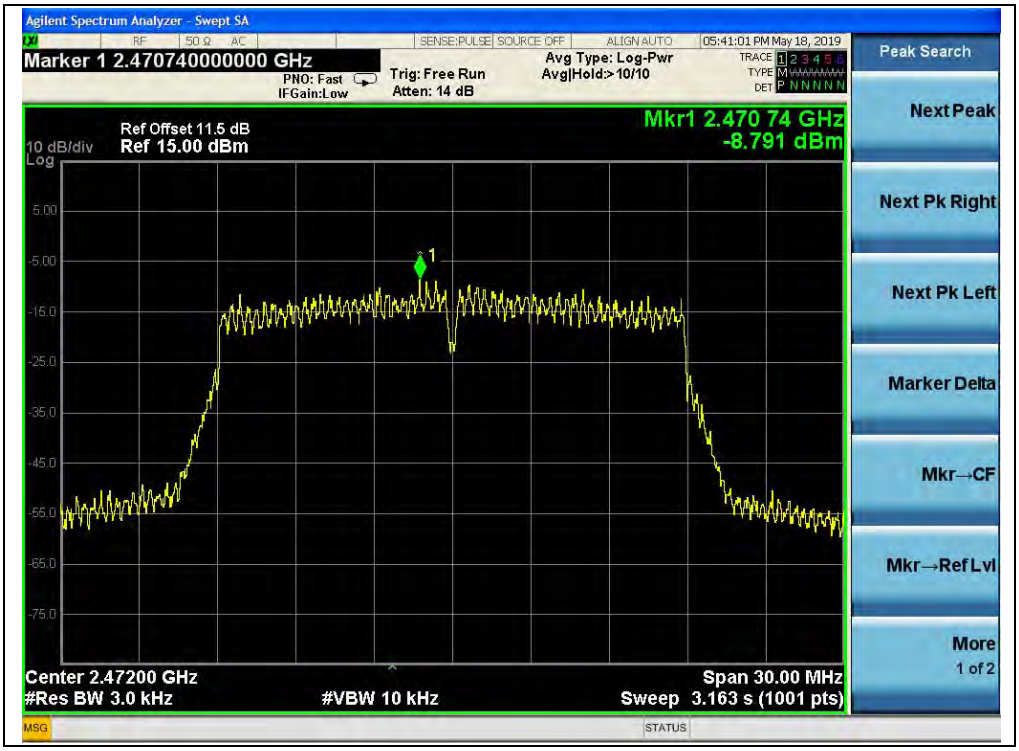
A. Test Verdict:

Spectral power density (dBm/3kHz)				
Channel	Frequency (MHz)	Measured PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
1	2412	-9.47	8	PASS
7	2442	-6.40	8	PASS
13	2472	-8.79	8	PASS

B. Test Plots:

(Channel = 1, 802.11n(HT20))

(Channel = 7, 802.11n(HT20))



(Channel = 13, 802.11n(HT20))

802.11n(HT40) Test mode

A. Test Verdict:

Spectral power density (dBm/3kHz)				
Channel	Frequency (MHz)	Measured PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
3	2422	-10.21	8	PASS
7	2442	-9.84	8	PASS
11	2462	-10.17	8	PASS

B. Test Plots:

(Channel = 3, 802.11n(HT40))

(Channel = 7, 802.11n(HT40))

(Channel = 11, 802.11n(HT40))

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

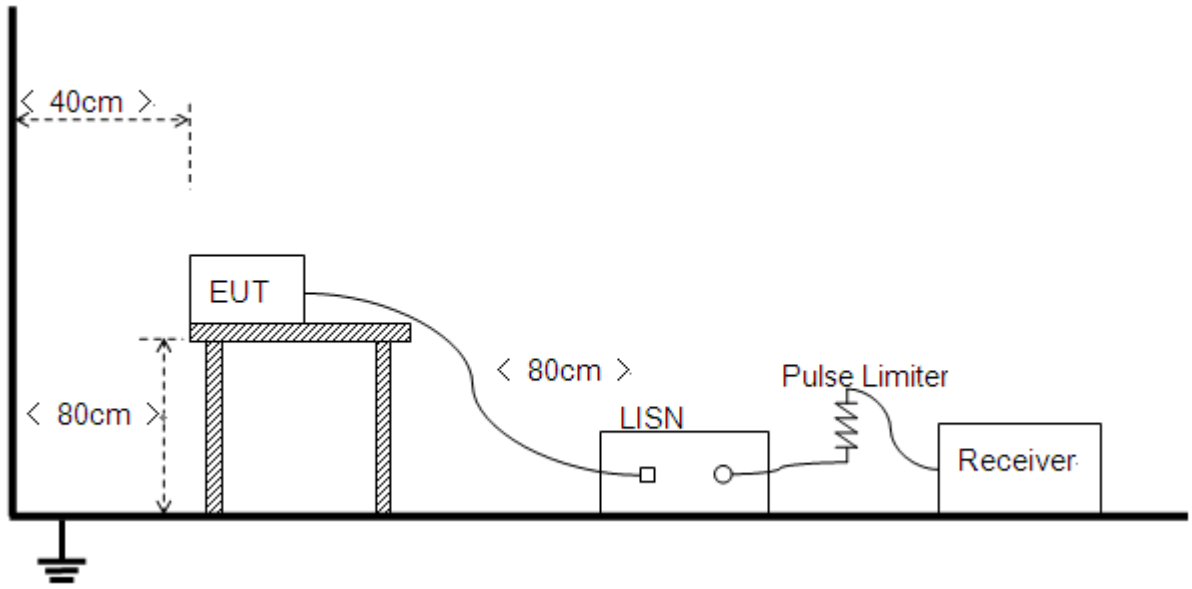
NOTE:

(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.

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: Both of the test voltage AC 120V/60Hz and AC 230V/50Hz were considered and tested respectively, only the results of the worst case AC 120V/60Hz were recorded in this report.

A. Test setup:

Test Mode: EUT+ADAPTER + WIFI TX

Test Voltage: AC 120V/60Hz

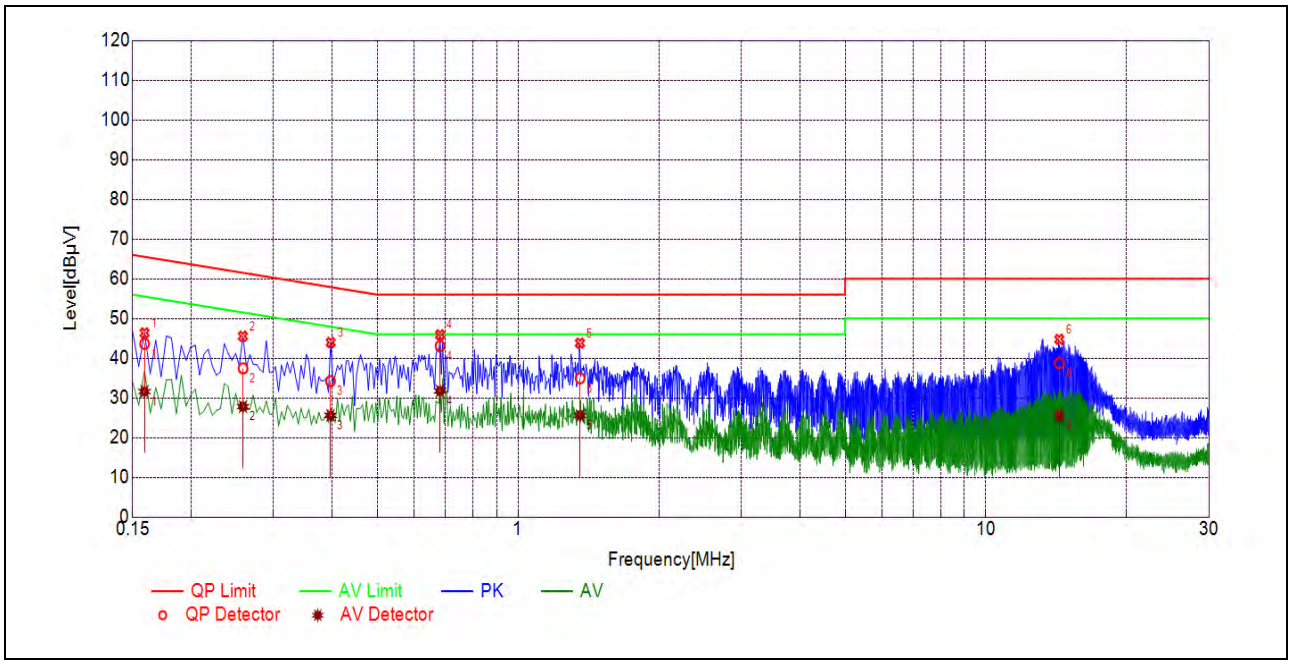
The measurement results are obtained as below:

E [dBμV] $=U_R + L_{Cable\ loss}$ [dB] + A_{Factor}

U_R: Receiver Reading

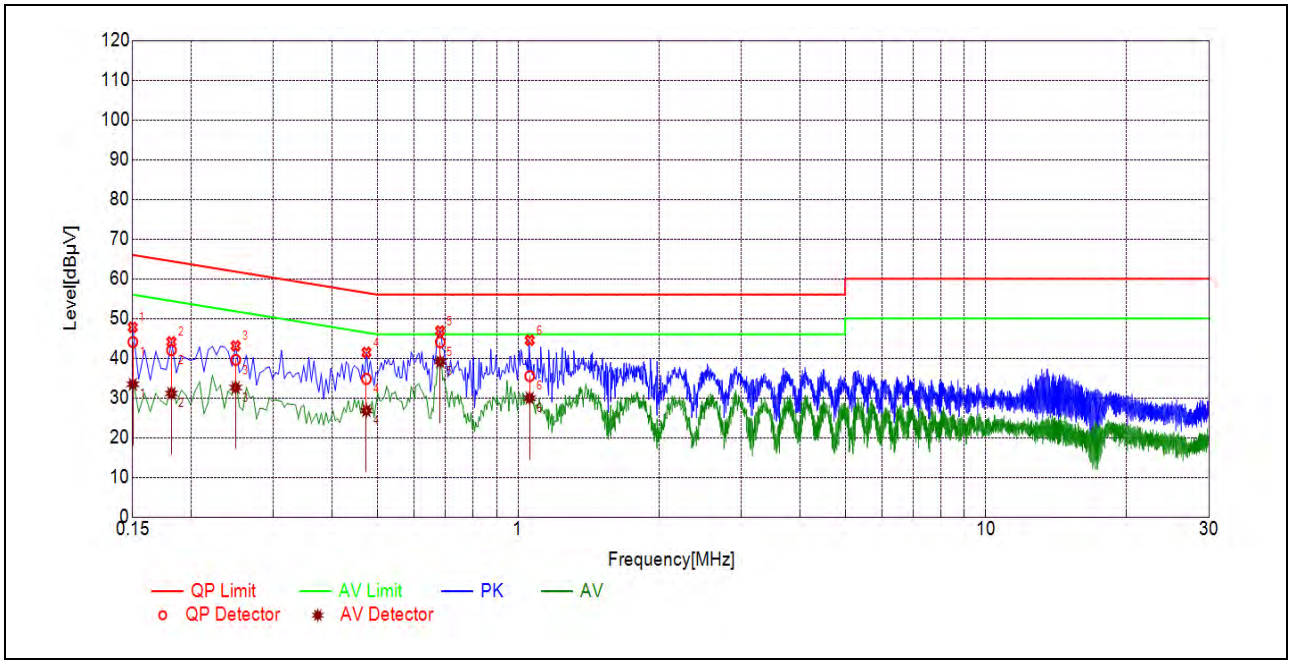
A_{Factor}: Voltage division factor of LISN

B. Test Plots:



(L Phase)

NO.	Fre. (MHz)	Emission Level (dBµV)		Limit (dBµV)		Power-line	Verdict
		Quai-peak	Average	Quai-peak	Average		
1	0.1590	43.63	31.61	65.52	55.52	Line	PASS
2	0.2582	37.43	27.82	61.49	51.49		PASS
3	0.3972	34.21	25.61	57.91	47.91		PASS
4	0.6807	43.07	31.75	56.00	46.00		PASS
5	1.3566	34.95	25.52	56.00	46.00		PASS
6	14.3455	38.74	25.53	60.00	50.00		PASS



(N Phase)

NO.	Fre. (MHz)	Emission Level (dBµV)		Limit (dBµV)		Power-line	Verdict
		Quai-peak	Average	Quai-peak	Average		
1	0.1501	44.07	33.44	66.00	56.00	Neutral	PASS
2	0.1815	42.03	31.14	64.42	54.42		PASS
3	0.2490	39.58	32.59	61.79	51.79		PASS
4	0.4738	34.78	26.80	56.45	46.45		PASS
5	0.6815	44.06	39.11	56.00	46.00		PASS
6	1.0585	35.49	29.98	56.00	46.00		PASS

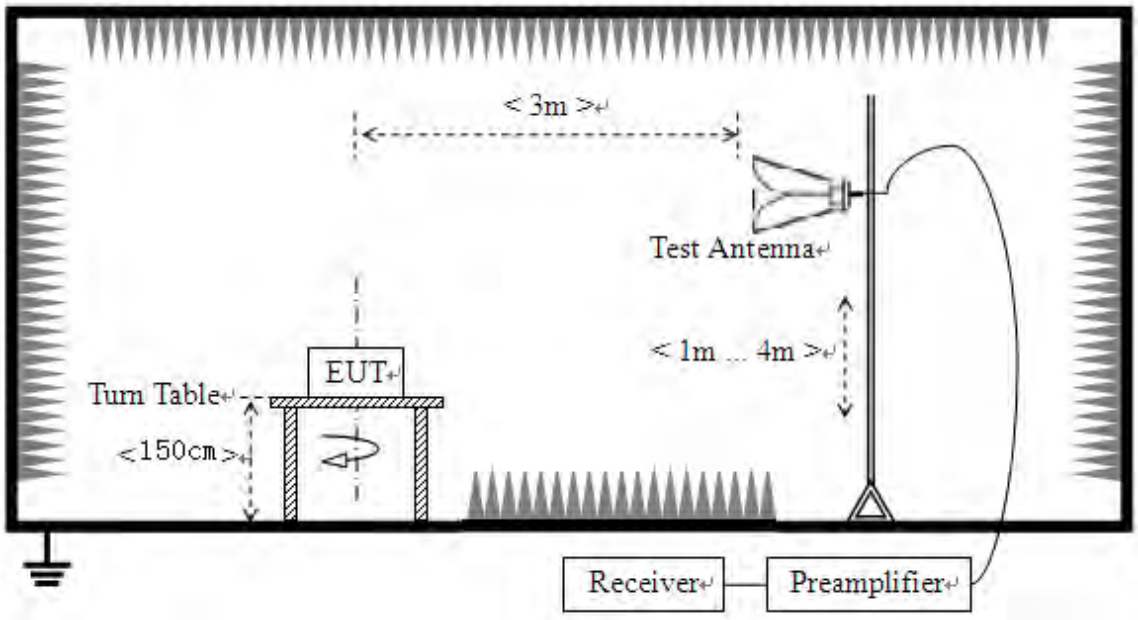
2.8. Restricted Frequency Bands

2.8.1. 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).

2.8.2. 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.

2.8.3. Test procedure

KDB 558074 Section 8.6 and 8.7 was used in order to prove compliance.

2.8.4. 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

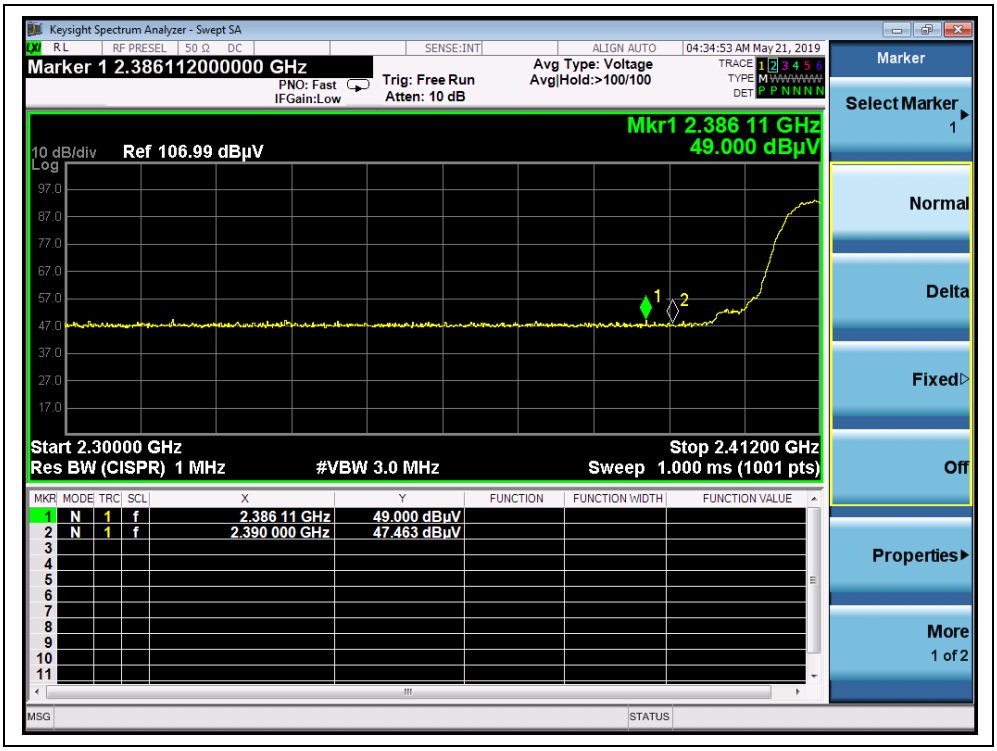
Note: Restricted Frequency Bands were performed when antenna was at vertical and horizontal polarity, and only the worse test condition (vertical) was recorded in this test report.

802.11b Test mode

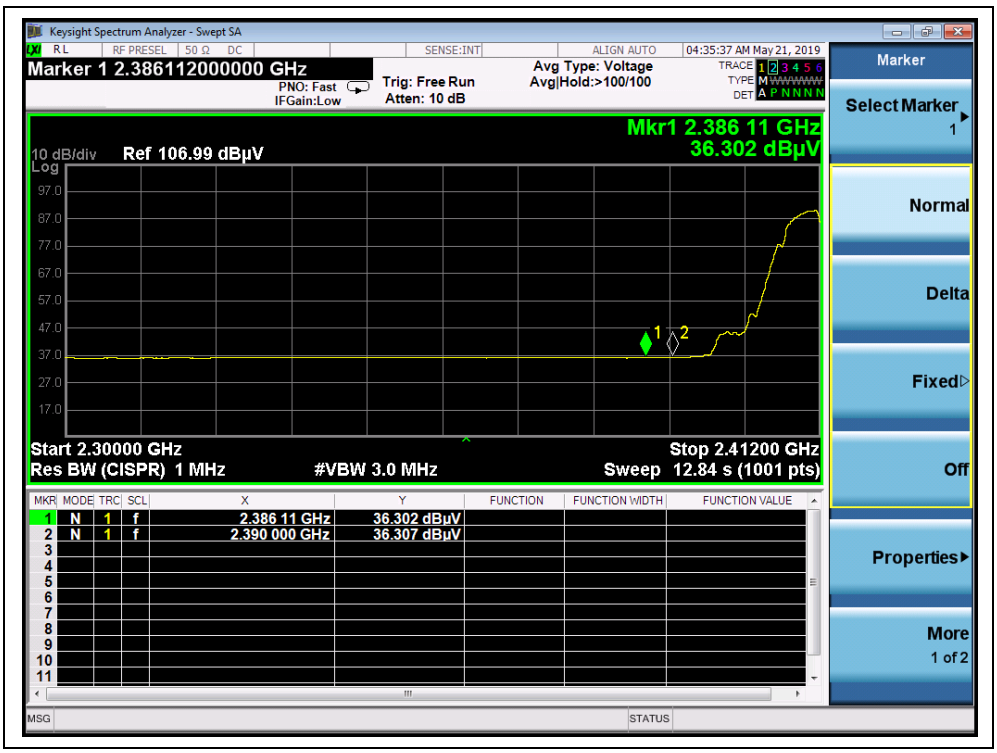
A. Test Verdict:

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	2386.11	PK	49.00	-29.67	32.56	51.89	74	PASS
1	2390.00	AV	36.31	-29.67	32.56	39.20	54	PASS
13	2485.80	PK	52.31	-29.67	32.56	55.20	74	PASS
13	2483.50	AV	45.37	-29.67	32.56	48.26	54	PASS

B. Test Plots:

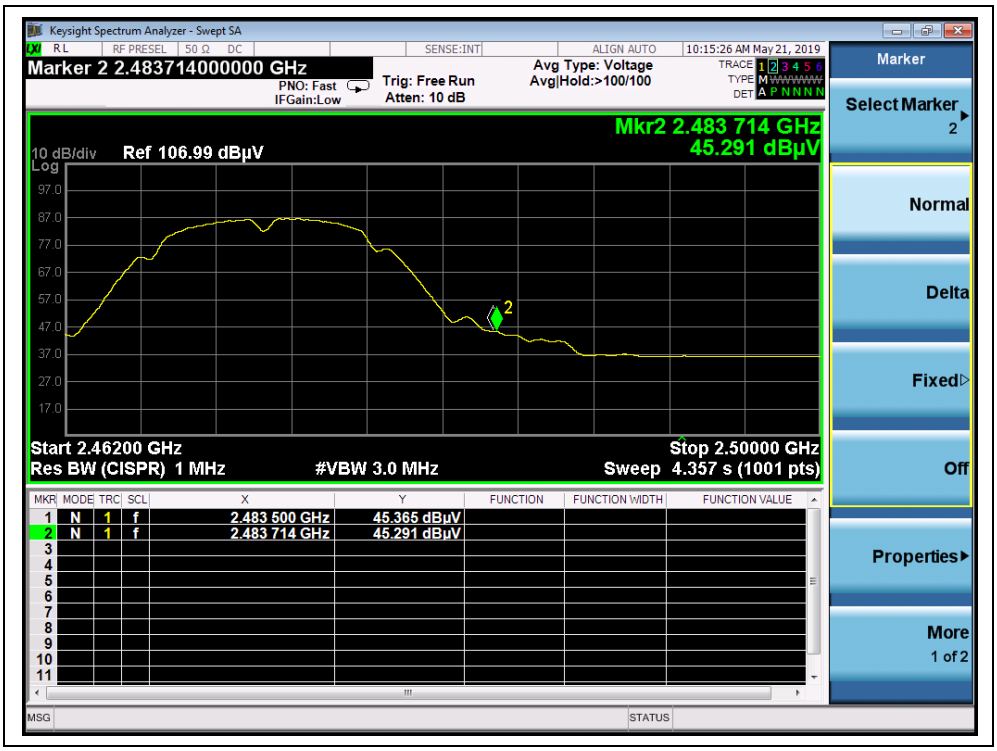


(Channel = 1 PEAK, 802.11b)



(Channel = 1 AVG, 802.11b)

(Channel = 11 PEAK, 802.11b)



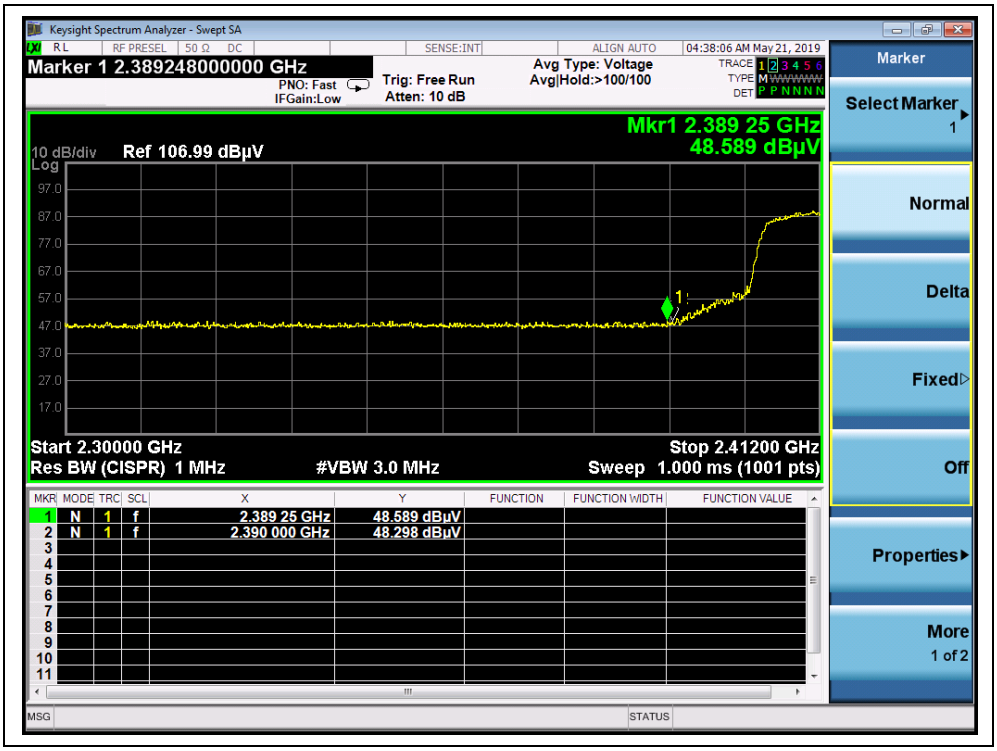
(Channel = 11 AVG, 802.11b)

802.11g Test mode

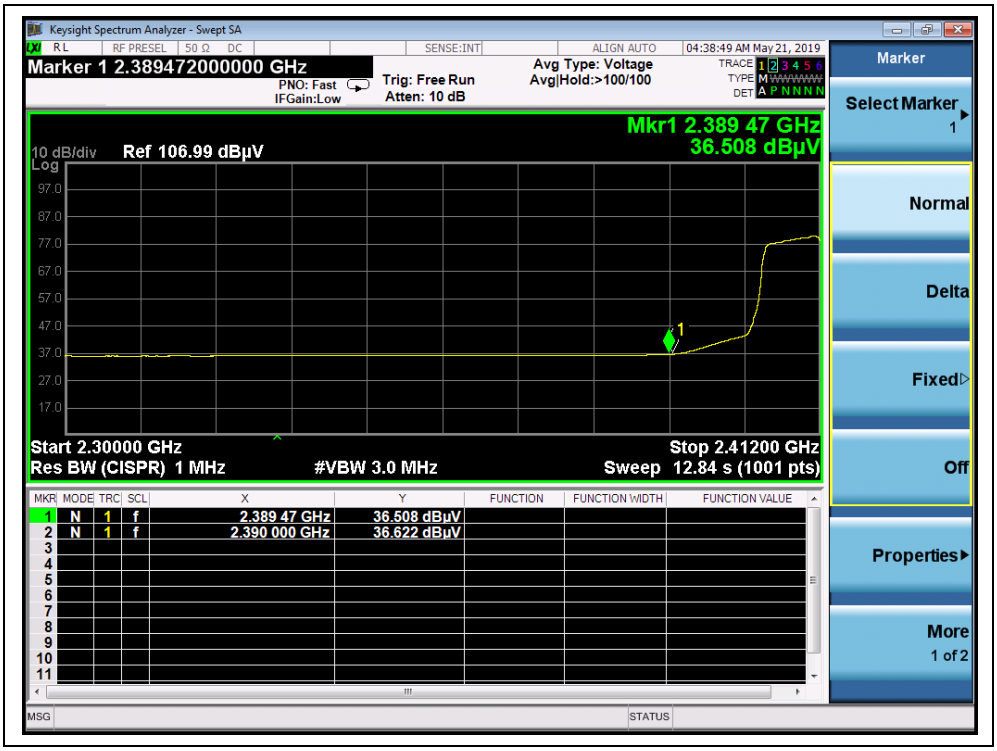
A. Test Verdict:

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	2389.25	PK	48.59	-29.67	32.56	51.48	74	PASS
1	2390.00	AV	36.62	-29.67	32.56	39.51	54	PASS
13	2484.85	PK	64.72	-29.67	32.56	67.61	74	PASS
13	2483.50	AV	42.04	-29.67	32.56	44.93	54	PASS

B. Test Plots:



(Channel = 1 PEAK, 802.11g)



(Channel = 1 AVG, 802.11g)

(Channel = 13 PEAK, 802.11g)

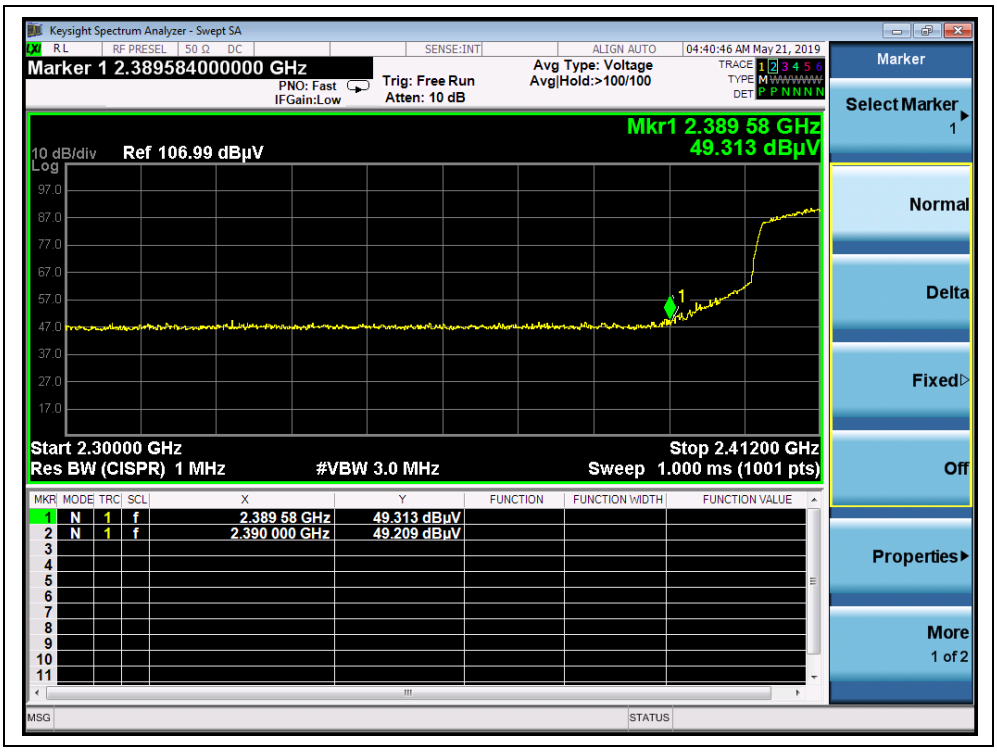
(Channel = 13 AVG, 802.11g)

802.11 n(HT20) Test mode

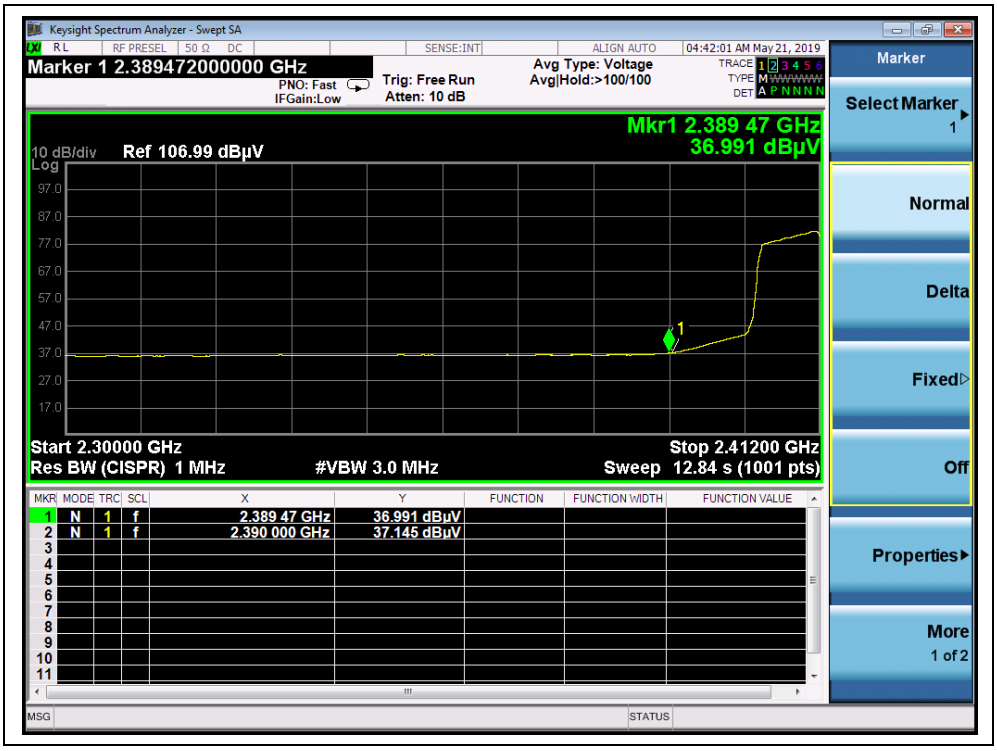
A. Test Verdict:

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	2389.58	PK	49.31	-29.67	32.56	52.20	74	PASS
1	2390.00	AV	37.15	-29.67	32.56	40.04	54	PASS
13	2484.51	PK	64.39	-29.67	32.56	67.28	74	PASS
13	2384.50	AV	42.61	-29.67	32.56	45.50	54	PASS

B. Test Plots:



(Channel = 1 PEAK, 802.11n(HT20))



(Channel = 1 AVG, 802.11n(HT20))

(Channel = 13 PEAK, 802.11n(HT20))

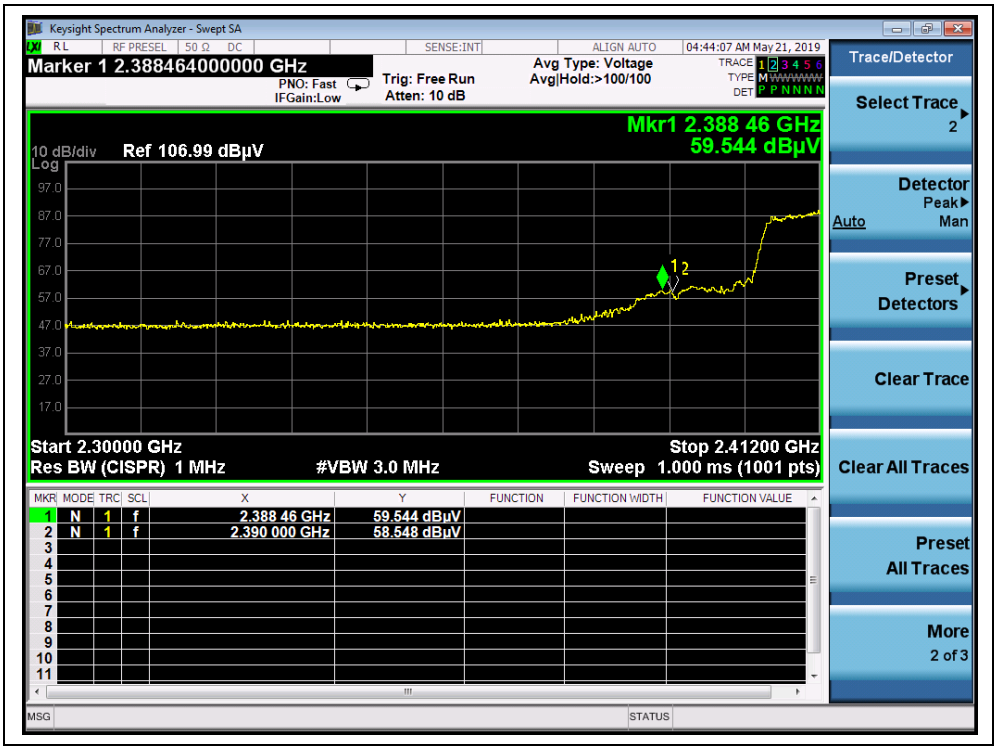
(Channel = 13 AVG, 802.11n(HT20))

802.11n(HT40) Test mode

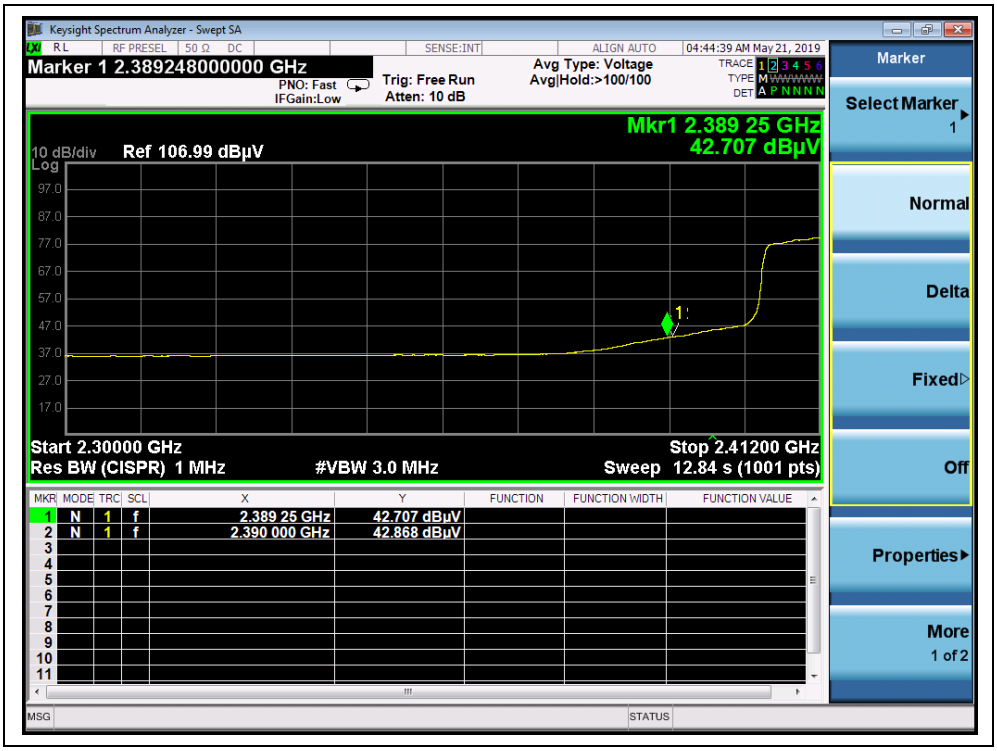
A. Test Verdict:

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
3	2388.46	PK	59.54	-29.67	32.56	62.43	74	PASS
3	2390.00	AV	42.87	-29.67	32.56	45.76	54	PASS
11	2486.55	PK	64.67	-29.67	32.56	67.56	74	PASS
11	2483.50	AV	46.10	-29.67	32.56	48.99	54	PASS

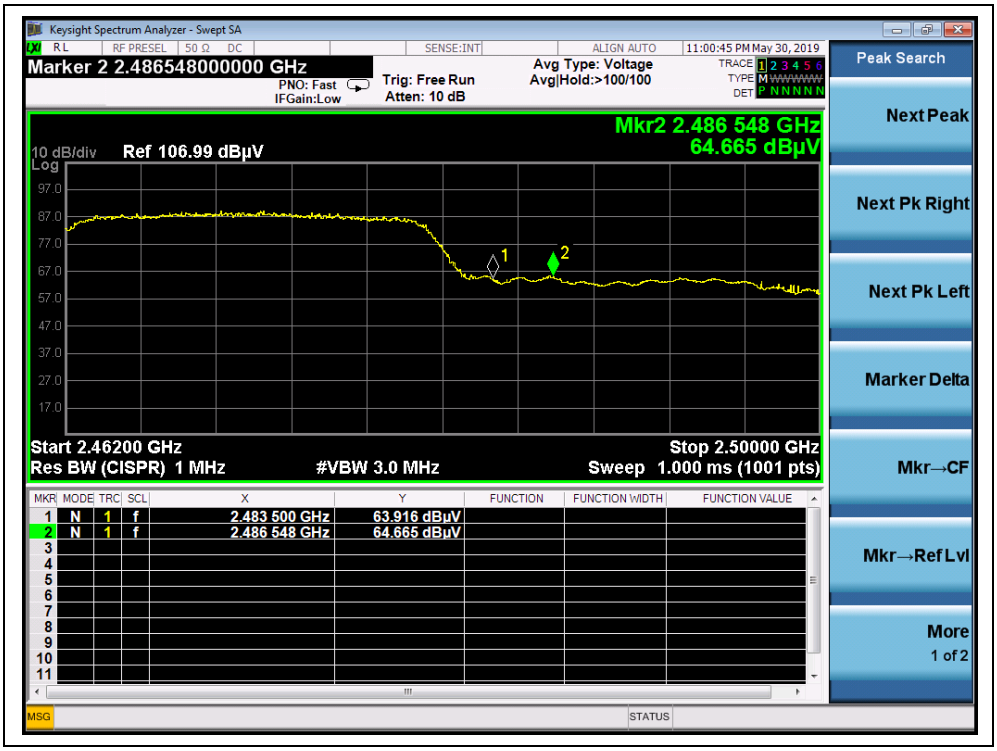
B. Test Plots:



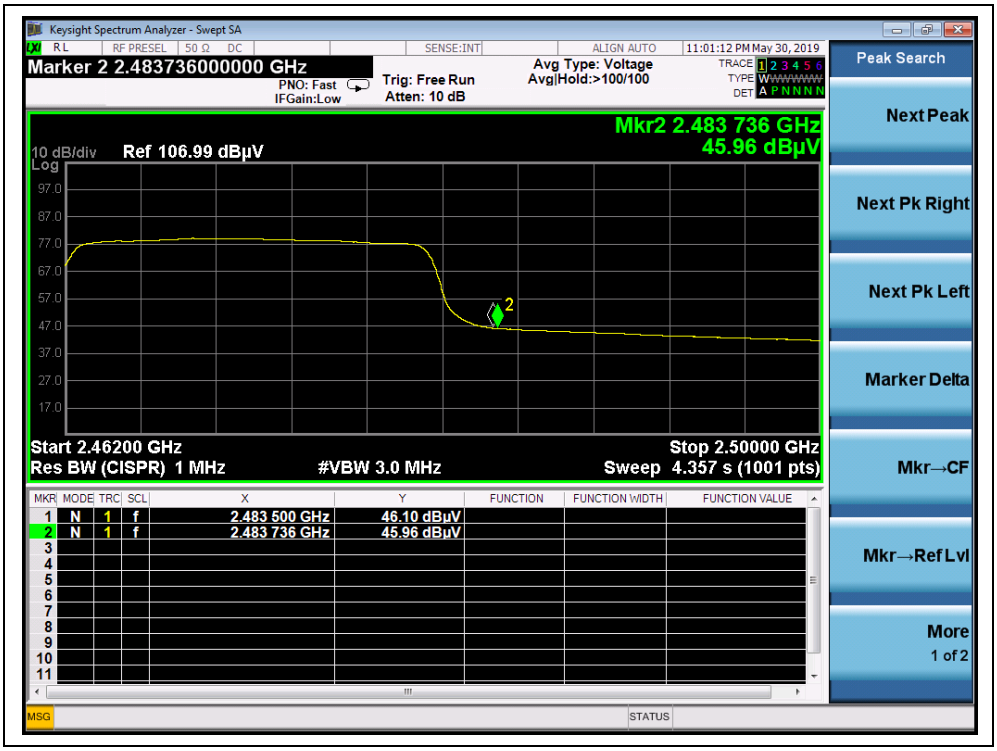
(Channel = 3 PEAK, 802.11n(HT40))



(Channel = 3 AVG, 802.11n(HT40))



(Channel = 11 PEAK, 802.11n(HT40))



(Channel = 11 AVG, 802.11n(HT40))

2.9. Radiated Emission

2.9.1. 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.

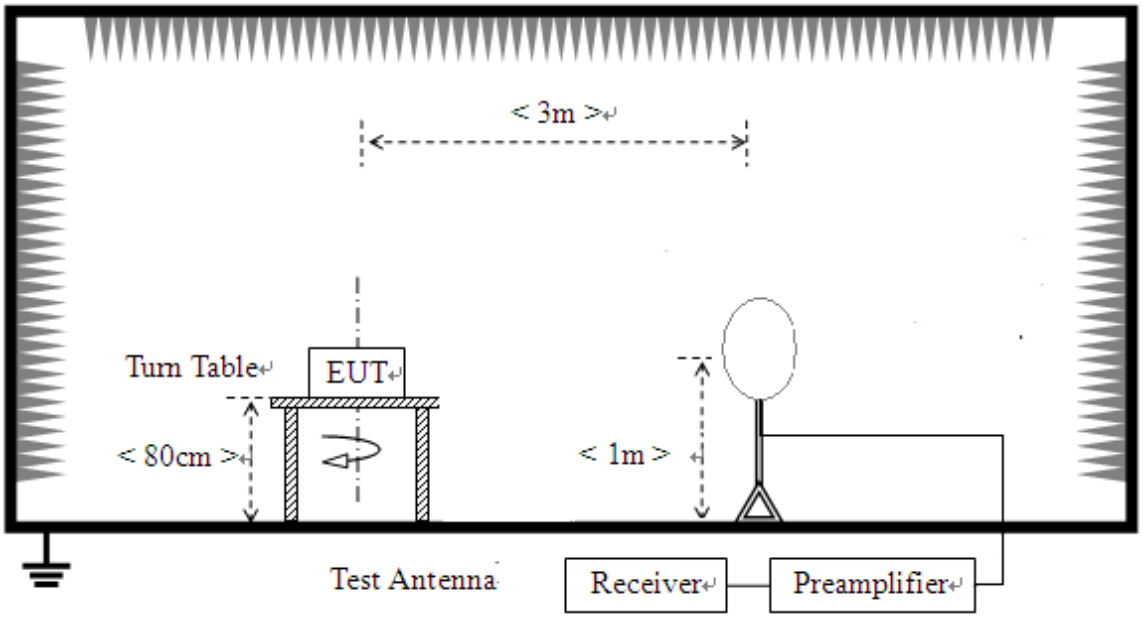
For above 1000MHz, limit field strength of harmonics: 54dBuV/m@3m (AV) and 74dBuV/m@3m (PK)

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)

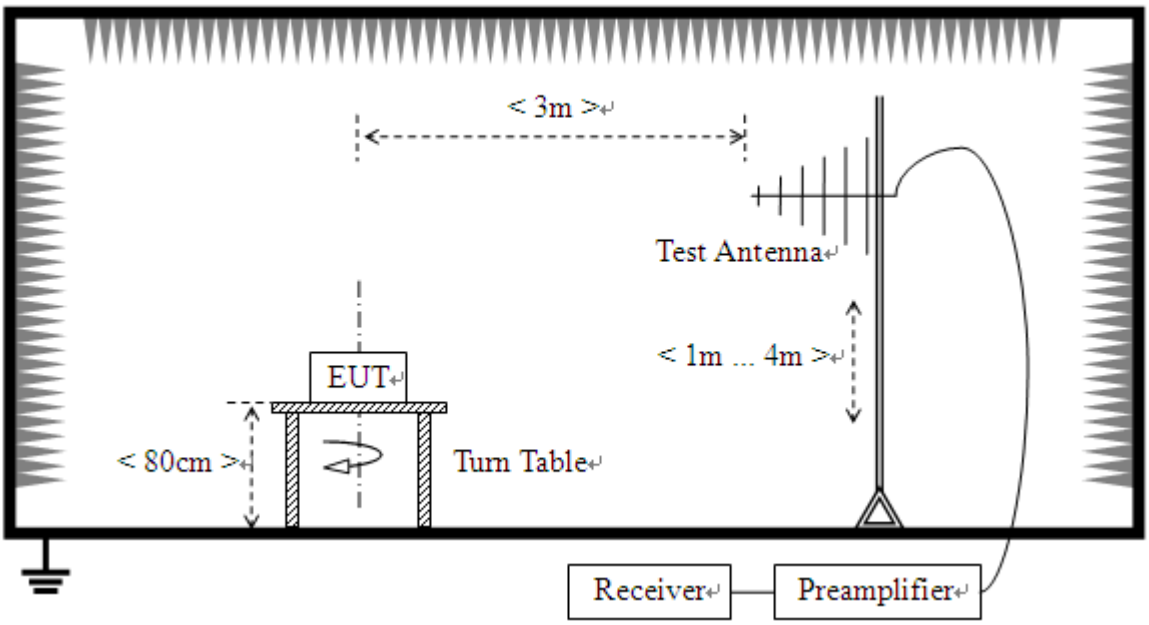
2.9.2. Test Description

A. Test Setup:

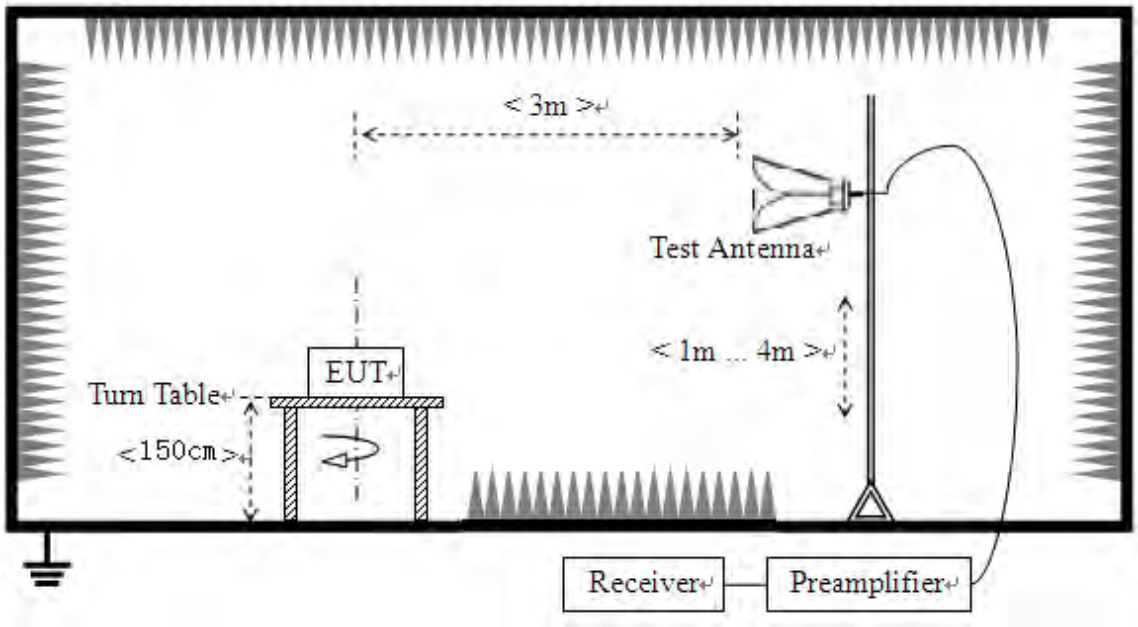
1) For radiated emissions from 9kHz to 30MHz



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.

2.9.3. Test Result

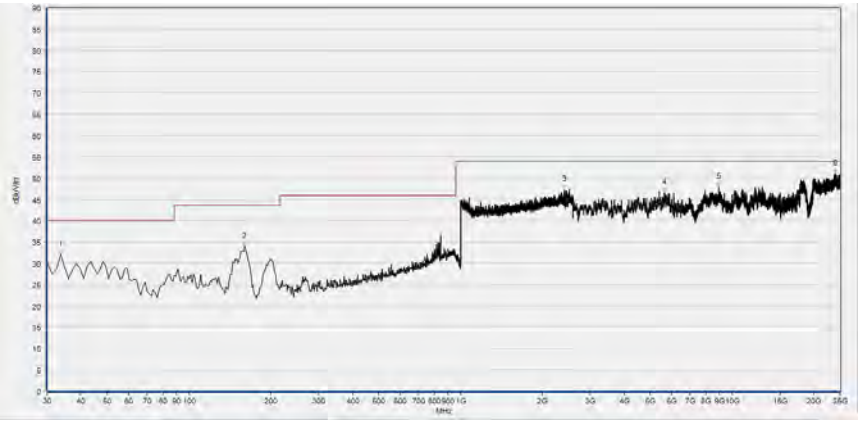
According to ANSI C63.10, because of peak detection will yield amplitudes equal to or greater than amplitudes measured with the quasi-peak (or average) detector, the measurement data from a spectrum analyzer peak detector will represent the worst-case results, if the peak measured value complies with 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.

Note1: 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.
Note2: For the frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit was not recorded.
Note3: For the frequency, which started from 25GHz to 40GHz, was pre-scanned and the result which was 20dB lower than the limit was not recorded.

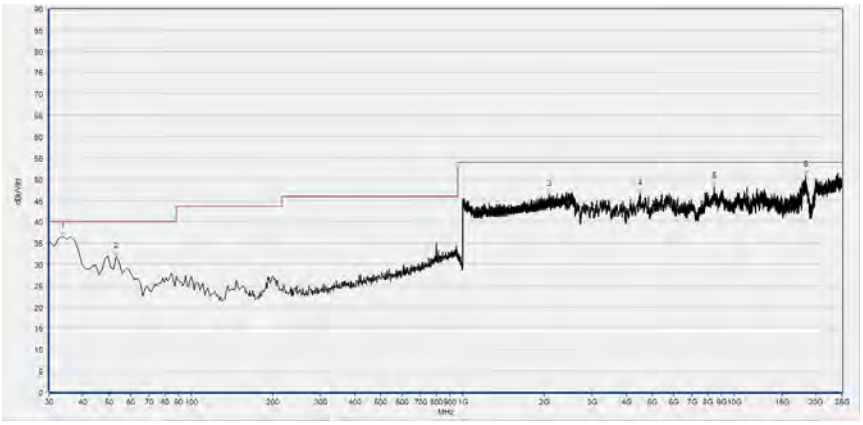
802.11b Test mode

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
33.642	31.96	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
159.900	33.93	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
2407.923	47.21	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
5638.807	46.51	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
8905.728	47.94	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
23892.017	50.93	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

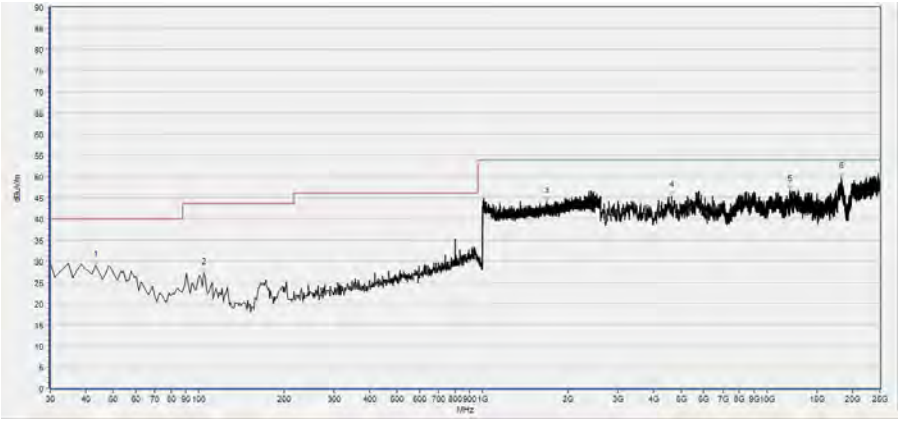
(Antenna Horizontal, 30MHz to 25GHz)



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
33.642	36.69	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
53.066	31.85	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
2085.874	46.42	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
4490.089	46.55	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
8449.500	48.32	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
18380.615	51.02	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

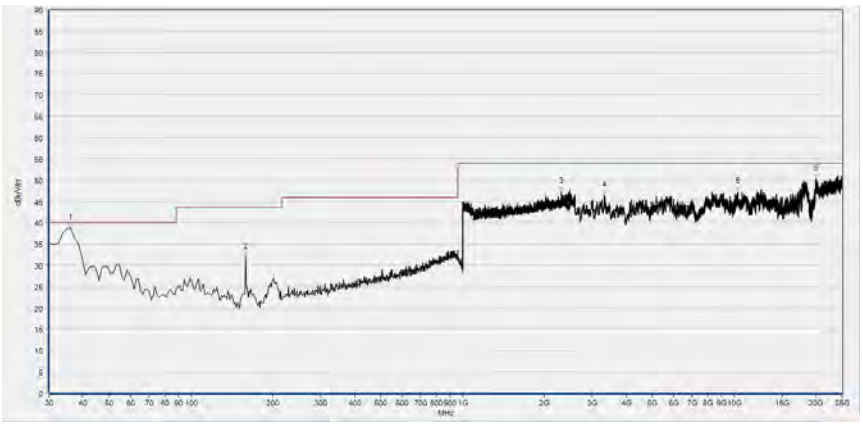
(Antenna Vertical, 30MHz to 25GHz)

Plot for Channel = 7



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
43.354	28.98	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
104.055	27.10	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
1677.391	44.01	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
4612.293	45.36	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
12054.519	46.83	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
18274.704	49.77	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

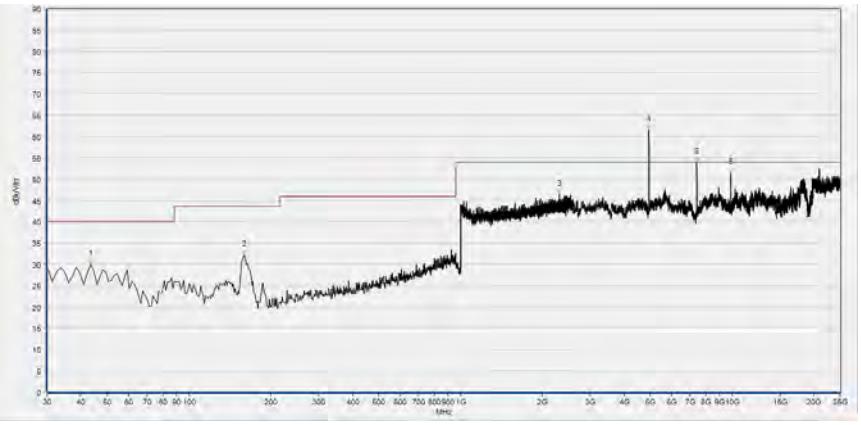
(Antenna Horizontal, 30MHz to 25GHz)



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
36.070	38.67	35.21	N/A	N/A	40.00	N/A	Vertical	PASS
158.686	31.86	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
2309.324	47.33	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
3329.151	46.50	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
10339.589	47.21	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
19977.414	50.28	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

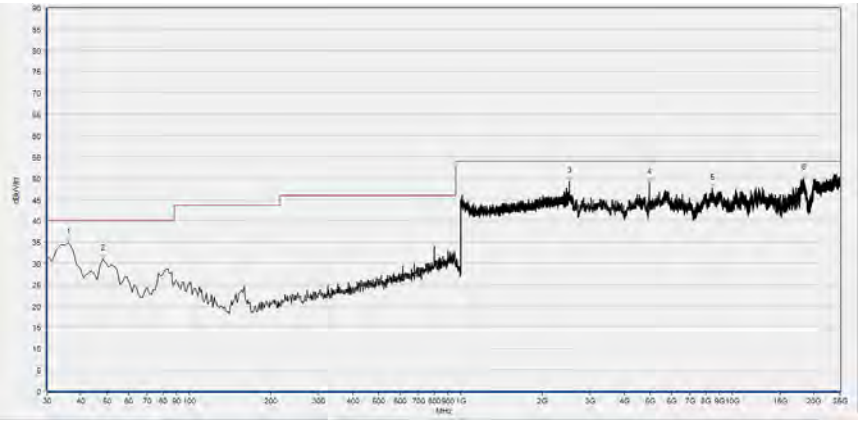
(Antenna Vertical, 30MHz to 25GHz)

Plot for Channel = 13



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
43.354	29.92	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
159.900	32.18	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
2311.885	46.47	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
4944.000	62.43	N/A	50.95	74.00	N/A	54.00	Horizontal	PASS
7415.600	53.98	N/A	42.13	74.00	N/A	54.00	Horizontal	PASS
9887.434	51.47	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

(Antenna Horizontal, 30MHz to 25GHz)

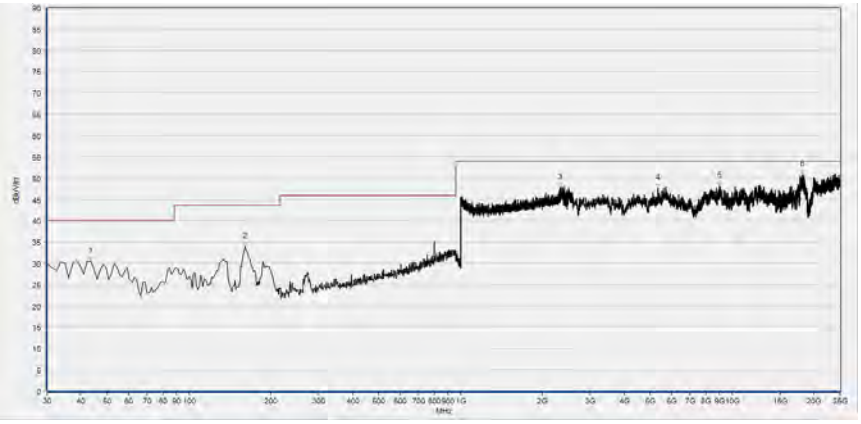


Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
36.070	34.81	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
48.210	30.93	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
2509.724	49.36	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
4954.464	48.93	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
8445.426	47.56	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
18376.541	49.97	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

(Antenna Vertical, 30MHz to 25GHz)

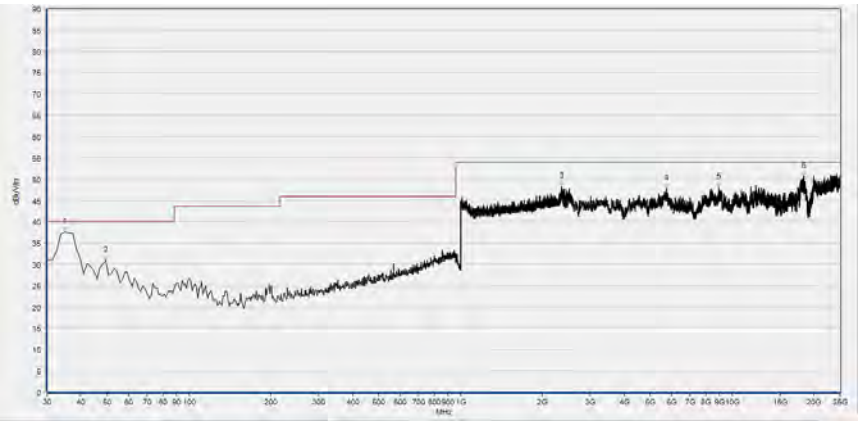
802.11g Test mode

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
43.354	30.55	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
161.114	33.83	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
2329.812	47.70	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
5321.077	47.61	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
8962.757	48.04	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
18099.545	50.74	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

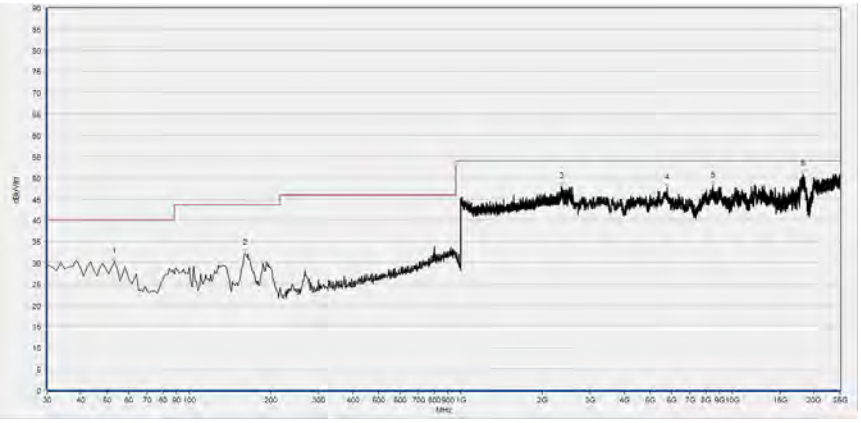
(Antenna Horizontal, 30MHz to 25GHz)



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
34.856	36.51	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
49.424	30.77	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
2357.983	48.31	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
5720.276	47.82	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
8950.536	48.03	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
18299.145	50.61	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

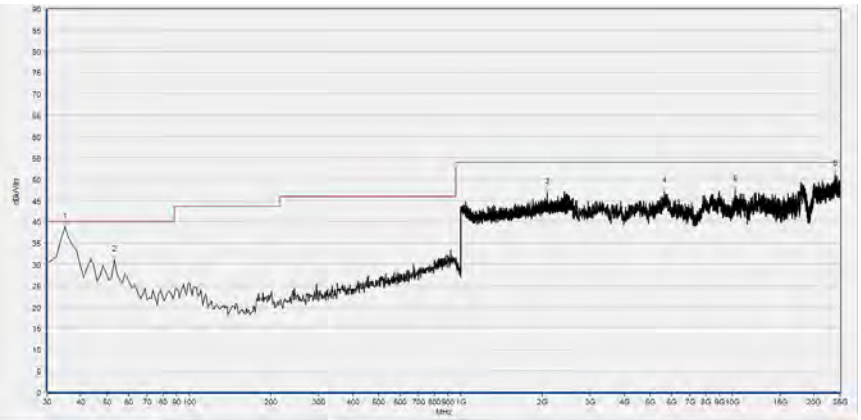
(Antenna Vertical, 30MHz to 25GHz)

Plot for Channel = 7



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
53.066	30.24	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
161.114	32.25	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
2347.739	47.90	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
5761.011	47.59	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
8518.749	48.07	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
18274.704	50.74	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

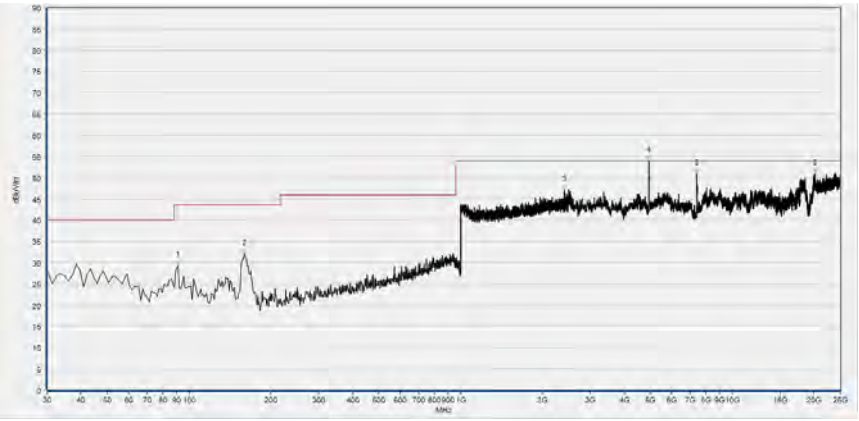
(Antenna Horizontal, 30MHz to 25GHz)



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
34.856	38.74	35.28	N/A	N/A	40.00	N/A	Vertical	PASS
53.066	30.93	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
2089.716	46.86	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
5634.734	47.10	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
10278.487	47.46	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
24014.221	51.08	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

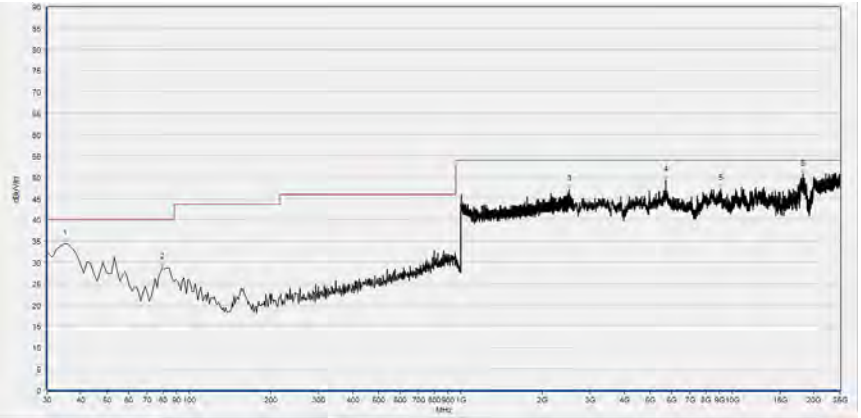
(Antenna Vertical, 30MHz to 25GHz)

Plot for Channel = 13



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
90.701	29.30	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
159.900	32.00	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
2413.045	47.13	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
4942.244	53.91	N/A	45.19	74.00	N/A	54.00	Horizontal	PASS
7418.913	51.01	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
20164.794	50.92	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

(Antenna Horizontal, 30MHz to 25GHz)

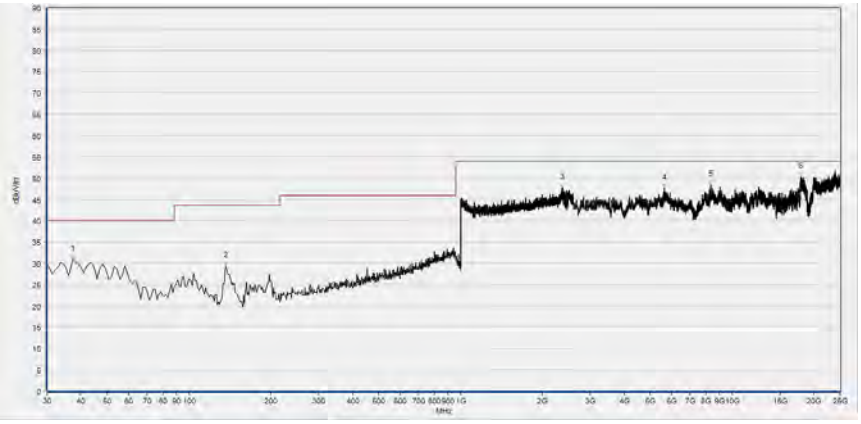


Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
34.856	34.39	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
79.775	28.80	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
2511.004	47.09	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
5687.689	49.31	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
9093.108	47.32	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
18238.043	50.63	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

(Antenna Vertical, 30MHz to 25GHz)

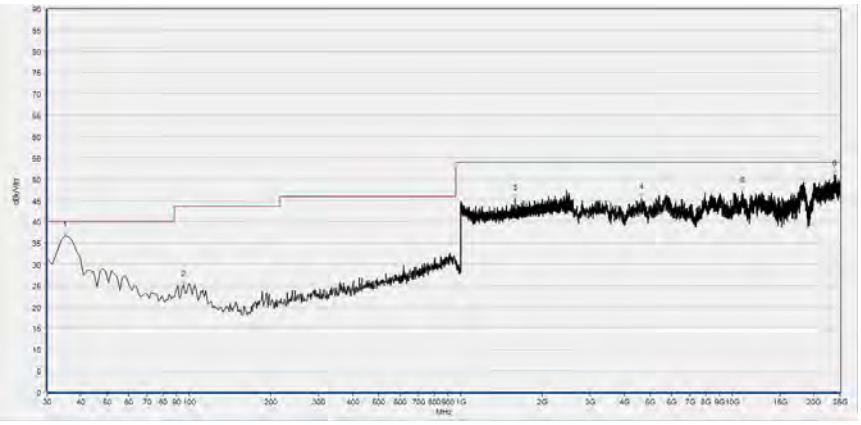
802.11n(HT20) Test mode

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
37.284	30.76	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
136.834	29.28	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
2363.105	47.75	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
5618.440	47.53	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
8363.957	48.35	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
17965.121	50.33	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

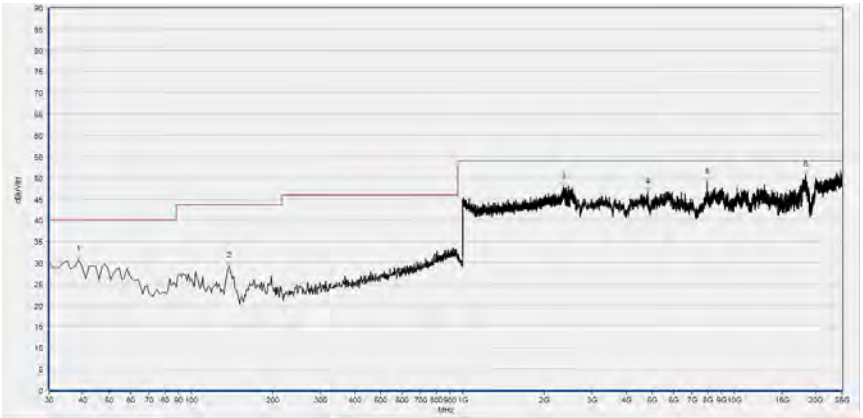
(Antenna Horizontal, 30MHz to 25GHz)



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
34.856	36.73	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
95.557	25.11	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
1584.554	45.36	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
4632.660	45.51	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
10901.728	47.12	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
23806.474	51.04	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

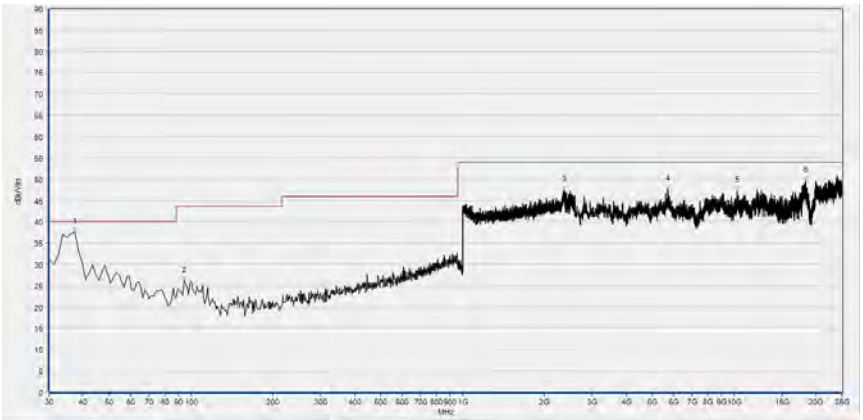
(Antenna Vertical, 30MHz to 25GHz)

Plot for Channel = 7



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
38.498	30.72	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
138.048	29.10	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
2347.739	47.73	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
4820.040	46.54	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
7936.243	48.90	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
18376.541	50.61	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

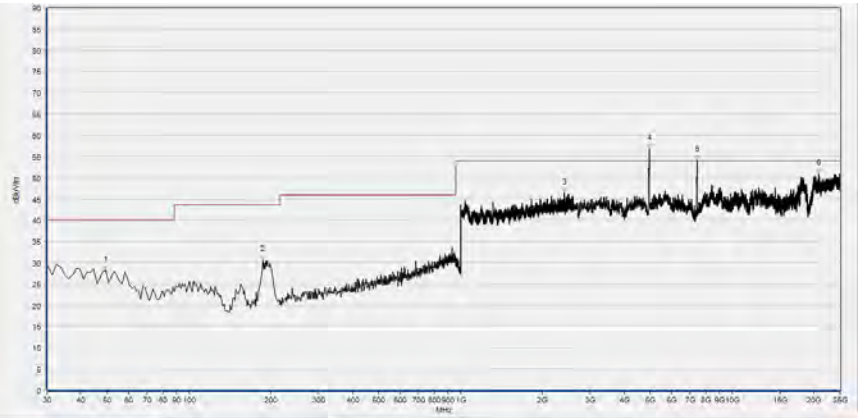
(Antenna Horizontal, 30MHz to 25GHz)



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
37.284	37.61	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
94.343	26.11	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
2363.745	47.35	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
5687.689	47.55	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
10274.414	47.22	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
18364.321	49.58	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

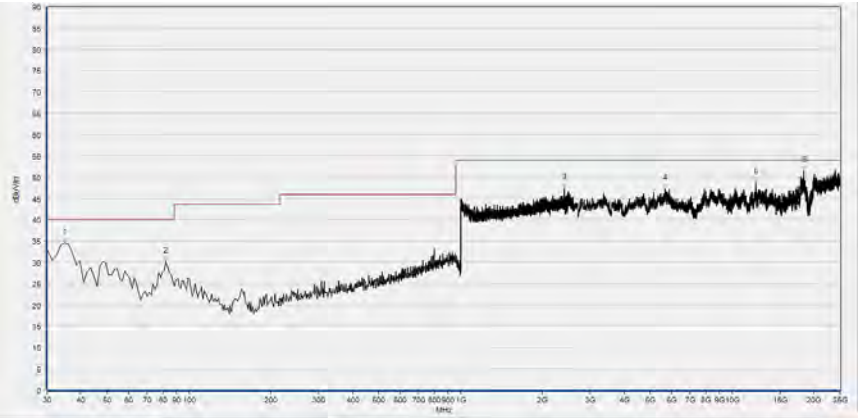
(Antenna Vertical, 30MHz to 25GHz)

Plot for Channel = 13



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
49.424	28.15	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
186.608	30.75	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
2410.484	46.39	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
4950.391	56.79	N/A	43.28	74.00	N/A	54.00	Horizontal	PASS
7422.986	54.08	N/A	40.89	74.00	N/A	54.00	Horizontal	PASS
20898.018	50.91	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

(Antenna Horizontal, 30MHz to 25GHz)

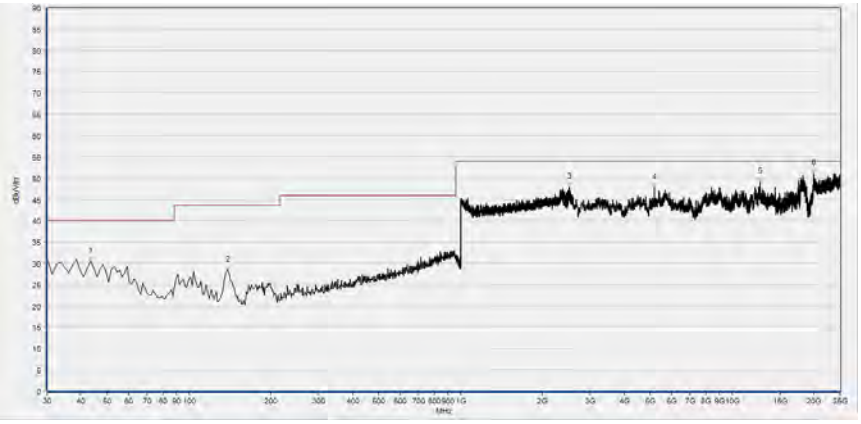


Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
34.856	34.51	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
82.203	30.13	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
2411.765	47.39	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
5679.542	47.20	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
12241.899	48.62	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
18368.394	51.41	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

(Antenna Vertical, 30MHz to 25GHz)

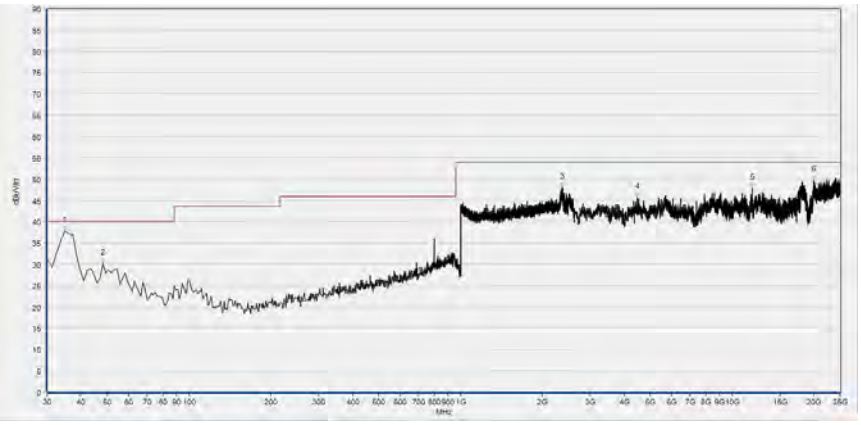
802.11n(HT40) Test mode

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
43.354	30.42	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
139.262	28.37	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
2512.925	47.98	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
5166.285	47.69	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
12661.466	49.16	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
20014.075	51.13	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

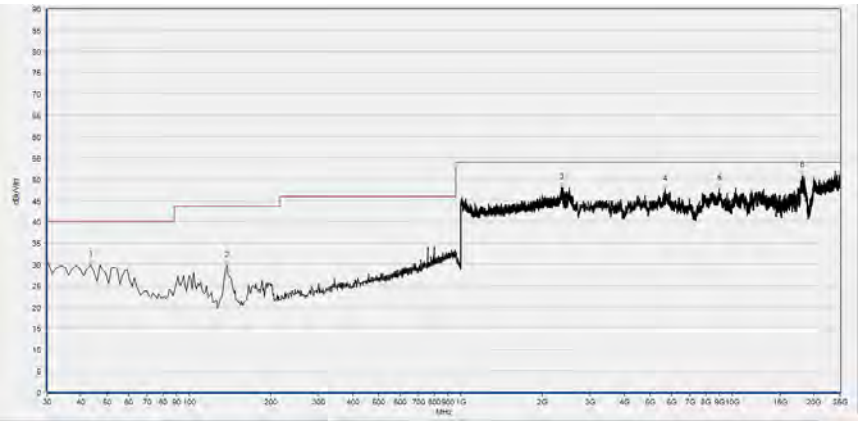
(Antenna Horizontal, 30MHz to 25GHz)



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
34.856	37.92	35.19	N/A	N/A	40.00	N/A	Vertical	PASS
48.210	30.16	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
2363.105	48.14	N/A	N/A	N/A	N/A	N/A	Vertical	PASS
4477.869	45.74	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
11854.919	47.87	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
20026.296	49.76	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

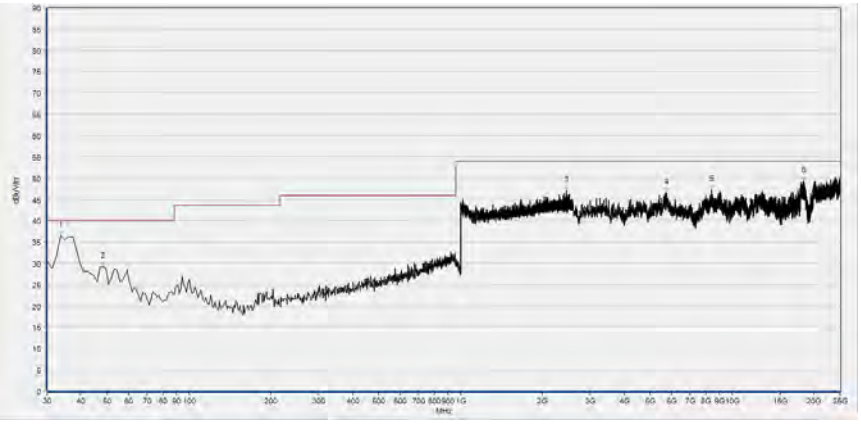
(Antenna Vertical, 30MHz to 25GHz)

Plots for Channel = 7



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
43.354	29.81	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
138.048	29.62	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
2355.422	48.17	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
5679.542	47.60	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
8954.610	47.82	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
18172.868	50.75	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

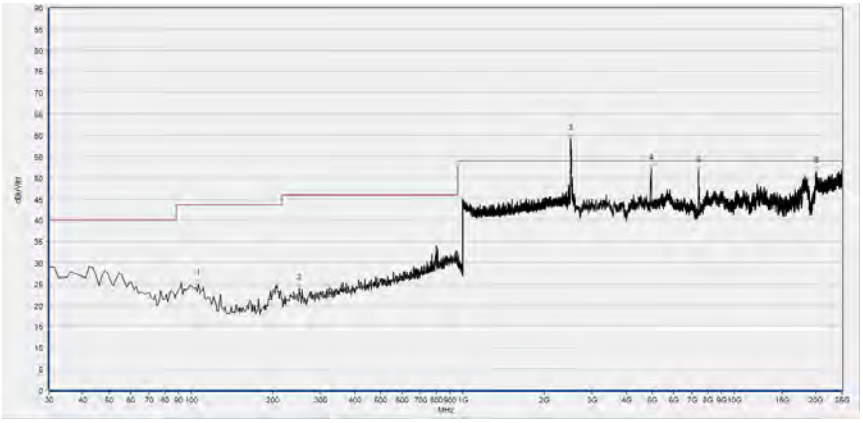
(Antenna Horizontal, 30MHz to 25GHz)



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
33.642	36.54	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
48.210	29.22	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
2452.741	47.03	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
5732.497	46.55	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
8392.471	47.34	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
18376.541	49.36	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

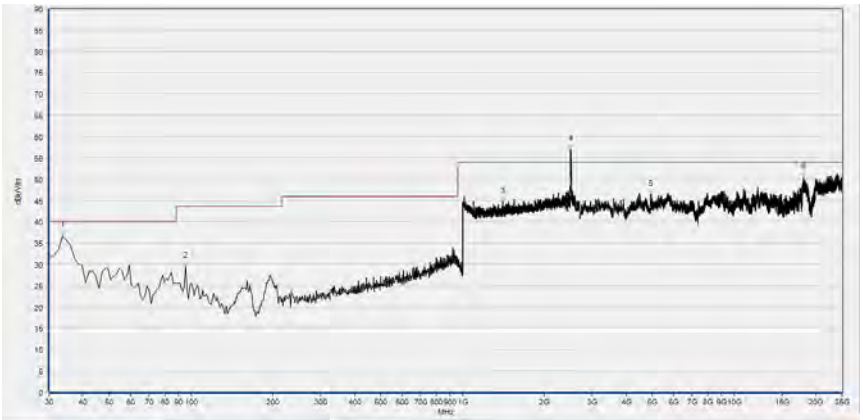
(Antenna Vertical, 30MHz to 25GHz)

Plots 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
106.483	24.93	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
249.737	24.03	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
2502.600	58.48	N/A	41.92	74.00	N/A	54.00	Horizontal	PASS
4946.318	51.74	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
7414.839	51.57	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
20095.545	51.39	N/A	N/A	74.00	N/A	54.00	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
33.642	36.69	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
95.557	29.44	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
1404.002	44.71	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
2500.400	57.65	N/A	37.73	74.00	N/A	54.00	Vertical	PASS
4934.097	46.42	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
18014.003	50.47	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

(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

Laboratory Name:	Shenzhen Morlab Communications Technology Co., Ltd. Morlab Laboratory
Laboratory Address:	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China
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, the test firm registration number is 226174.

4. Test Equipments Utilized

4.1 Conducted Test Equipments

Equipment Name	Serial No.	Type	Manufacturer	Cal. Date	Cal. Due
Attenuator 1	(N/A.)	10dB	Resnet	N/A	N/A
EXA Signal Analzyer	MY53470836	N9010A	Agilent	2019.04.09	2020.04.08
USB Wideband Power Sensor	MY54210011	U2021XA	Agilent	2019.04.16	2020.04.15
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
Computer	T430i	Think Pad	Lenovo	N/A	N/A

4.2 Conducted Emission Test Equipments

Equipment Name	Serial No.	Type	Manufacturer	Cal. Date	Cal. Due
Receiver	MY56400093	N9038A	KEYSIGHT	2019.05.08	2020.05.09
LISN	812744	NSLK 8127	Schwarzbeck	2019.05.08	2020.05.09
Pulse Limiter (20dB)	9391	VTSD 9561-D	Schwarzbeck	2019.05.08	2020.05.09
Coaxial cable(BNC) (30MHz-26GHz)	CB01	EMC01	Morlab	N/A	N/A

4.3 List of Software Used

Description	Manufacturer	Software Version
Test system	Tonscend	V2.6
Power Panel	Agilent	V3.8
MORLAB EMCR V1.2	MORLAB	V 1.0

4.4 Radiated Test Equipments

Equipment Name	Serial No.	Type	Manufacturer	Cal. Date	Cal. Due
Receiver	MY54130016	N9038A	Agilent	2018.08.04	2019.08.03
Test Antenna - Bi-Log	9163-519	VULB 9163	Schwarzbeck	2019.05.08	2020.05.09
Test Antenna - Loop	1519-022	FMZB1519	Schwarzbeck	2019.02.15	2020.02.14
Test Antenna – Horn	01774	BBHA 9120D	Schwarzbeck	2018.08.06	2019.08.05
Test Antenna – Horn	BBHA9170 #774	BBHA9170	Schwarzbeck	2018.08.02	2019.08.01
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	2019.05.08	2020.05.09
18-26.5GHz pre-Amplifier	MA03	TS-PR18	Rohde& Schwarz	2019.05.08	2020.05.09
Notch Filter	N/A	WRCG-2400-2483.5-60SS	Wainwright	2018.12.01	2019.11.30
Anechoic Chamber	N/A	9m*6m*6m	CRT	2017.11.19	2020.11.18

END OF REPORT