



REPORT No.: SZ20120363W03

TEST REPORT

APPLICANT : Realme Chongqing Mobile
Telecommunications Corp., Ltd.

PRODUCT NAME : Mobile Phone

MODEL NAME : RMX3203

BRAND NAME : realme

FCC ID : 2AUYFRMX3203

STANDARD(S) : 47 CFR Part 15 Subpart C

RECEIPT DATE : 2020-12-30

TEST DATE : 2021-01-08 to 2021-01-13

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MORLAB

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DIRECTORY

1. Technical Information	3
1.1. Applicant and Manufacturer Information	3
1.2. Equipment Under Test (EUT) Description	3
1.3. Modulation Type and Data Rate of EUT	6
1.4. The Channel Number and Frequency	7
1.5. Test Standards and Results	8
1.6. Environmental Conditions	9
2. 47 CFR Part 15C Requirements	10
2.1. Antenna Requirement	10
2.2. Duty Cycle of Test Signal	11
2.3. Maximum Peak and Average Conducted Output Power	15
2.4. Bandwidth	18
2.5. Conducted Spurious Emissions and Band Edge	27
2.6. Power Spectral Density (PSD)	40
2.7. Conducted Emission	49
2.8. Restricted Frequency Bands	53
2.9. Radiated Emission	66
Annex A Test Uncertainty	82
Annex B Testing Laboratory Information	83

Change History		
Version	Date	Reason for change
1.0	2021-02-22	First edition



1. Technical Information

Note: Provide by applicant.

1.1. Applicant and Manufacturer Information

Applicant:	Realme Chongqing Mobile Telecommunications Corp., Ltd.
Applicant Address:	No.178 Yulong Avenue, Yufengshan, Yubei District, Chongqing, China
Manufacturer:	Realme Chongqing Mobile Telecommunications Corp., Ltd.
Manufacturer Address:	No.178 Yulong Avenue, Yufengshan, Yubei District, Chongqing, China

1.2. Equipment Under Test (EUT) Description

Product Name:	Mobile Phone	
Serial No:	(N/A, marked #1 by test site)	
Hardware Version:	11	
Software Version:	realme UI V1.0	
Modulation Technology:	DSSS, OFDM	
Modulation Type:	Refer to section1.3	
Operating Frequency Range:	802.11b/g/ n (HT20): 2412MHz–2462MHz 802.11n (HT40): 2422MHz–2452MHz	
Antenna Type:	PIFA Antenna	
Antenna Gain:	-3.0dBi	
Accessory Information:	Battery 1	
	Brand Name:	realme
	Model No.:	BLP729
	Serial No.:	(N/A, marked #1 by test site)
	Capacity:	4880mAh
	Rated Voltage:	3.87V
	Charge Limit:	4.45V
	Manufacturer:	Sunwoda Electronic Co., Ltd.



Accessory Information:	Battery 2	
	Brand Name:	realme
	Model No.:	BLP729
	Serial No.:	(N/A, marked #1 by test site)
	Capacity:	4880mAh
	Rated Voltage:	3.87V
	Charge Limit:	4.45V
	Manufacturer:	Huizhou Desay Battery Co.,Ltd
	AC Adapter 1	
	Brand Name:	realme
	Model No.:	OP52CAEH
	Serial No.:	(N/A, marked #1 by test site)
	Rated Output:	5.0V $\pm$ 2.0A
	Rated Input:	100-240V $\sim$ 50/60Hz, 0.4A
	Manufacturer:	Dongguan YOHOO Electronic Technology Co., Limited
	AC Adapter 2	
	Brand Name:	realme
	Model No.:	OP52KAEH
	Serial No.:	(N/A, marked #1 by test site)
	Rated Output:	5.0V $\pm$ 2.0A
	Rated Input:	100-240V $\sim$ 50/60Hz, 0.4A
	Manufacturer:	ShenZhen KunXing Technology Co., Ltd
	AC Adapter 3	
	Brand Name:	realme
	Model No.:	OP52JAEH
	Serial No.:	(N/A, marked #1 by test site)
	Rated Output:	5.0V $\pm$ 2.0A
	Rated Input:	100-240V $\sim$ 50/60Hz, 0.4A
	Manufacturer:	Ten Pao Electronics (Huizhou) Co., Ltd.



Accessory Information:	AC Adapter 4	
	Brand Name:	realme
	Model No.:	OP52JAYH
	Serial No.:	(N/A, marked #1 by test site)
	Rated Output:	5.0V $\pm$ 2.0A
	Rated Input:	100-240V $\sim$ 50/60Hz, 0.4A
	Manufacturer:	Ten Pao Industrial Co., Ltd.
	AC Adapter 5	
	Brand Name:	realme
	Model No.:	OP52KAYH
	Serial No.:	(N/A, marked #1 by test site)
	Rated Output:	5.0V $\pm$ 2.0A
	Rated Input:	100-240V $\sim$ 50/60Hz, 0.4A
	Manufacturer:	ShenZhen KunXing Technology Co., Ltd
	AC Adapter 6	
	Brand Name:	realme
	Model No.:	OP52KAUH
	Serial No.:	(N/A, marked #1 by test site)
	Rated Output:	5.0V $\pm$ 2.0A
	Rated Input:	100-240V $\sim$ 50/60Hz, 0.4A
	Manufacturer:	ShenZhen KunXing Technology Co., Ltd
	AC Adapter 7	
	Brand Name:	realme
	Model No.:	OP52JAUH
	Serial No.:	(N/A, marked #1 by test site)
	Rated Output:	5.0V $\pm$ 2.0A
	Rated Input:	100-240V $\sim$ 50/60Hz, 0.4A
	Manufacturer:	Ten Pao Industrial Co., Ltd.

Accessory Information:	AC Adapter 8	
	Brand Name:	realme
	Model No.:	OP52YAUH
	Serial No.:	(N/A, marked #1 by test site)
	Rated Output:	5.0V $\pm$ 2.0A
	Rated Input:	100-240V $\sim$ 50/60Hz, 0.4A
	Manufacturer:	Jiangsu Chenyang Electron CO.,Ltd.

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. Modulation Type and Data Rate of EUT

Modulation technology	Modulation Type	Data Rate (Mbps) <small>Note1</small>
DSSS (802.11b)	DBPSK	1
	DQPSK	2
	CCK	5.5/ 11
OFDM (802.11g)	BPSK	6 / 9
	QPSK	12 / 18
	16QAM	24 / 36
	64QAM	48 / 54
OFDM (802.11n (HT20))	BPSK	6.5
	QPSK	13/19.5
	16QAM	26/39
	64QAM	52/58.5/65
OFDM (802.11n (HT40))	BPSK	13.5
	QPSK	27/40.5
	16QAM	54/81/108
	64QAM	121.5/135

Note1: The worst-case mode (bold face) in all data rates has been determined during the pre-scan, only the test data of the worst-case were recorded in this report.

1.4. 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		
	6	2437		
	7	2442		
Test Mode	Channel	Frequency (MHz)	Channel	Frequency (MHz)
802.11n (HT40)	3	2422	8	2447
	4	2427	9	2452
	5	2432		
	6	2437		
	7	2442		

Note 1: The black bold channels were selected for test.



1.5. 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	Method determination /Remark
1	15.203	Antenna Requirement	N/A	N/A	PASS	No deviation
2	N/A	Duty Cycle Of Test Signal	Jan 11, 2021	Liu Bo	PASS	No deviation
3	15.247(b)	Maximum Peak and Average Conducted Output Power	Jan 11, 2021	Liu Bo	PASS	No deviation
4	15.247(a)	Bandwidth	Jan 11, 2021	Liu Bo	PASS	No deviation
5	15.247(d)	Conducted Spurious Emission and Band Edge	Jan 11, 2021	Liu Bo	PASS	No deviation
6	15.247(e)	Power Spectral Density (PSD)	Jan 11, 2021	Liu Bo	PASS	No deviation
7	15.207	Conducted Emission	Jan 08, 2021	Huang Zhiye	PASS	No deviation
8	15.247(d)	Restricted Frequency Bands	Jan 09, 2021	Lin Jiayong	PASS	No deviation
9	15.209, 15.247(d)	Radiated Emission	Jan 09, 2021	Lin Jiayong	PASS	No deviation

Note 1: The tests were performed according to the method of measurements prescribed in ANSIC63.10-2013, KDB558074 D01 v05r02.

Note 2: 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.

Note 3: Additions to, deviation, or exclusions from the method shall be judged in the "method determination" column of add, deviate or exclude from the specific method shall be explained in the "Remark" of the above table.

Note 4: When the test result is a critical value, we will use the measurement uncertainty give the judgment result based on the 95% risk level.

1.6.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. Test Result: Compliant

Inside of the EUT has a PIFA antenna coupled with the metal shrapnel. Please refer to the EUT internal photos.

2.2. Duty Cycle of Test Signal

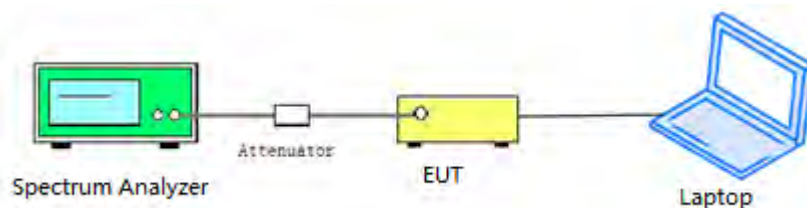
2.2.1. Requirement

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 $\pm 2\%$; otherwise, the duty cycle is considered to be nonconstant.

2.2.2. Test Description

Test Setup:



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

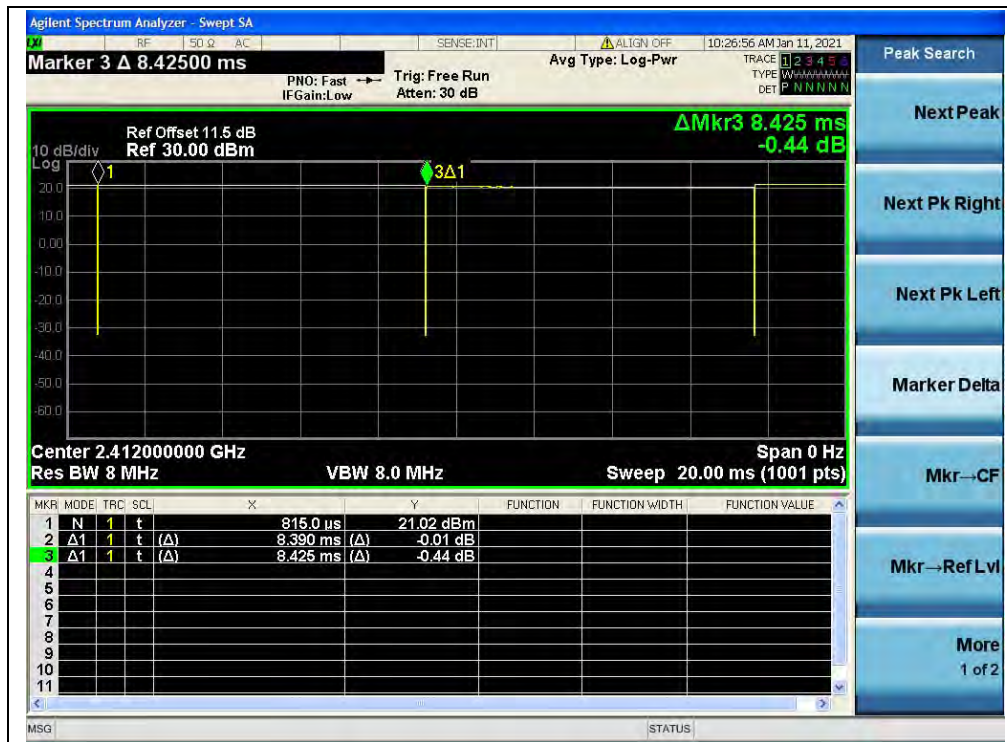


2.2.3. Test Result

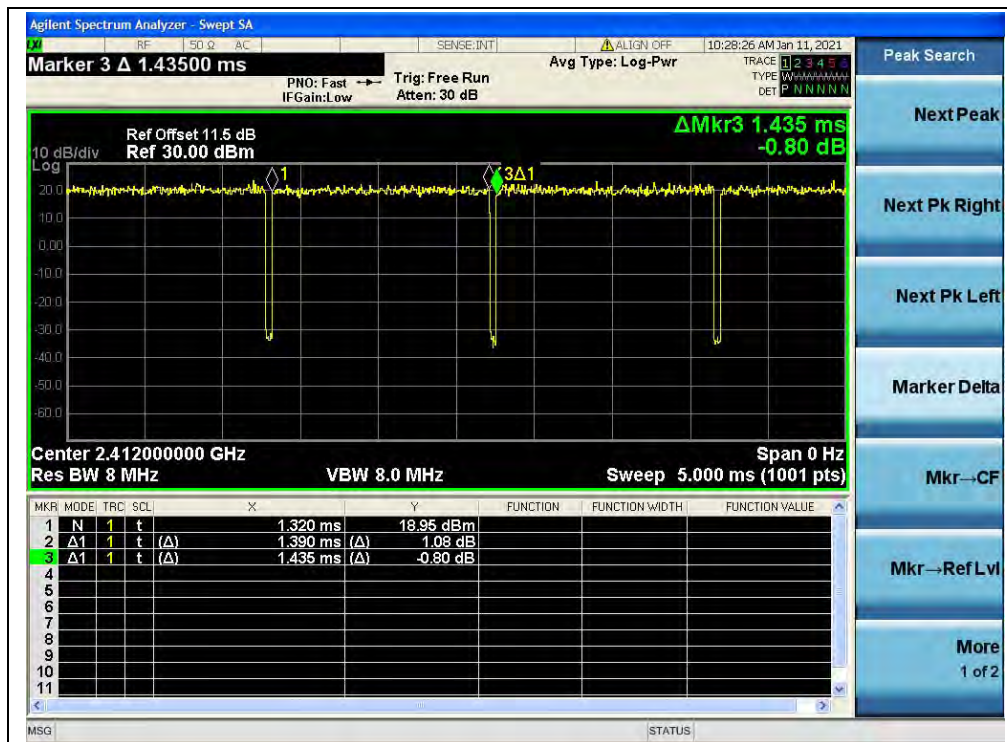
A. Test Verdict:

Test Mode	Duty Cycle (%) (D)	Duty Factor ($10 \cdot \lg[1/D]$)
802.11b	99.58	0.02
802.11g	96.86	0.14
802.11n (HT20)	96.31	0.16
802.11n (HT40)	92.89	0.32

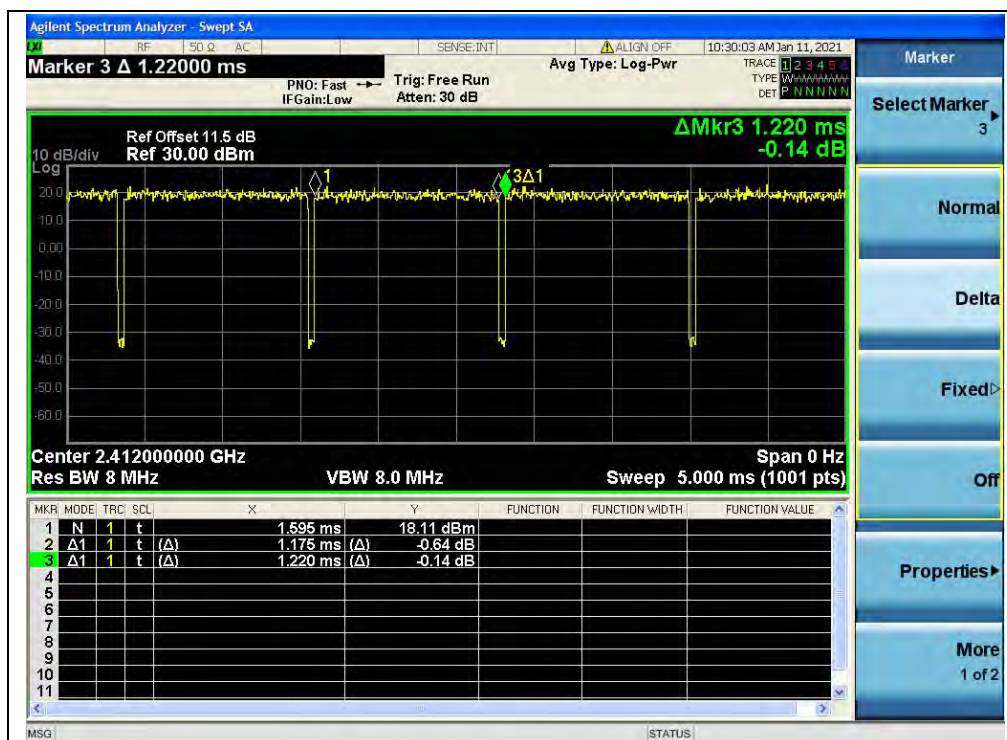
B. Test Plot:



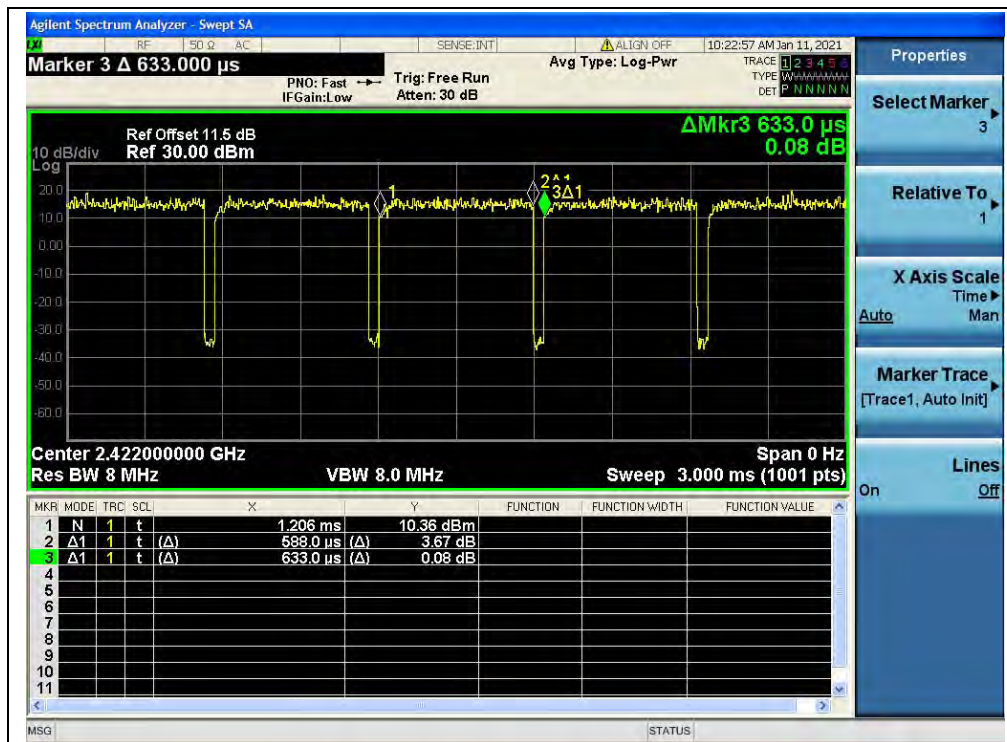
(Channel 1, 802.11b)



(Channel 1, 802.11g)



(Channel 1, 802.11n (HT20))



(Channel 3, 802.11n (HT40))

2.3. Maximum Peak and Average Conducted Output Power

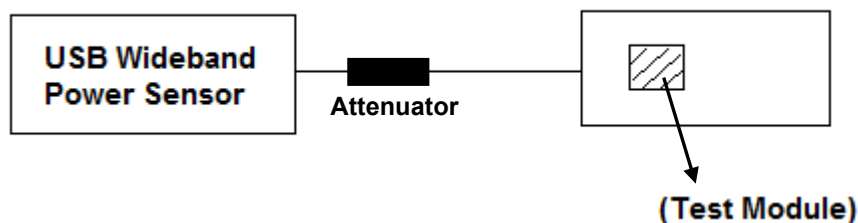
2.3.1. Requirement

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 exceed 1 Watt.

2.3.2. Test Description

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

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 Mode

Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	W	dBm	W	
1	2412	18.32	0.068	30	1	PASS
6	2437	18.15	0.065			PASS
11	2462	18.22	0.066			PASS

802.11g Mode

Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	W	dBm	W	
1	2412	21.22	0.132	30	1	PASS
6	2437	21.15	0.130			PASS
11	2462	21.31	0.135			PASS

802.11n (HT20) Mode

Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	W	dBm	W	
1	2412	22.06	0.161	30	1	PASS
6	2437	22.11	0.163			PASS
11	2462	22.08	0.161			PASS

802.11n (HT40) Mode

Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	W	dBm	W	
3	2422	21.89	0.155	30	1	PASS
6	2437	22.04	0.160			PASS
9	2452	22.07	0.161			PASS

**Maximum Average Conducted Output Power****802.11b Mode**

Channel	Frequency (MHz)	Average Power				Limit		Verdict
		Measured	Duty Factor	Duty factor Calculated				
		dBm		dBm	W	dBm	W	
1	2412	15.23	0.02	15.25	0.033	30	1	PASS
6	2437	15.31		15.33	0.034			PASS
11	2462	15.42		15.44	0.035			PASS

802.11g Mode

Channel	Frequency (MHz)	Average Power				Limit		Verdict
		Measured	Duty Factor	Duty factor Calculated				
		dBm		dBm	W	dBm	W	
1	2412	15.13	0.14	15.27	0.034	30	1	PASS
6	2437	15.21		15.35	0.034			PASS
11	2462	15.26		15.40	0.035			PASS

802.11n (HT20) Mode

Channel	Frequency (MHz)	Average Power				Limit		Verdict
		Measured	Duty Factor	Duty factor Calculated				
		dBm		dBm	W	dBm	W	
1	2412	13.33	0.16	13.49	0.022	30	1	PASS
6	2437	13.56		13.72	0.024			PASS
11	2462	13.41		13.57	0.023			PASS

802.11n (HT40) Mode

Channel	Frequency (MHz)	Average Power				Limit		Verdict
		Measured	Duty Factor	Duty factor Calculated				
		dBm		dBm	W	dBm	W	
3	2422	13.26	0.32	13.58	0.023	30	1	PASS
6	2437	13.44		13.76	0.024			PASS
9	2452	13.41		13.73	0.024			PASS

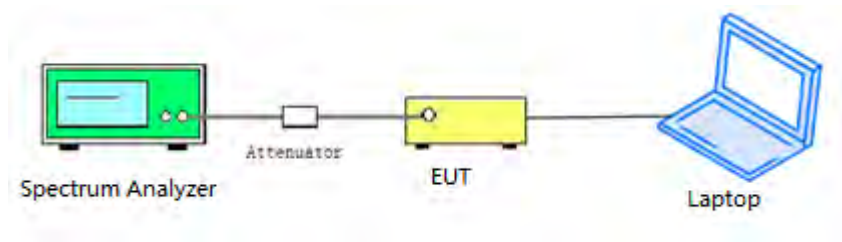
2.4. Bandwidth

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

Test Setup:



The EUT is coupled to the Spectrum Analyzer; the RF load attached to the EUT antenna terminal is 50 Ohm; 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 Mode

A. Test Verdict:

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limits(kHz)	Result
1	2412	7.562	≥500	PASS
6	2437	8.069	≥500	PASS
11	2462	8.515	≥500	PASS

B. Test Plot:



(Channel 1, 802.11b)



(Channel 6, 802.11b)



(Channel 11, 802.11b)



802.11g Mode

A.Test Verdict:

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limits(kHz)	Result
1	2412	15.08	≥500	PASS
6	2437	15.10	≥500	PASS
11	2462	15.75	≥500	PASS

B.Test Plot:



(Channel 1, 802.11g)



(Channel 6, 802.11g)



(Channel 11, 802.11g)



802.11n (HT20) Mode

A.Test Verdict:

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limits(kHz)	Result
1	2412	15.18	≥500	PASS
6	2437	15.10	≥500	PASS
11	2462	16.42	≥500	PASS

B.Test Plot:



(Channel 1, 802.11n (HT20))



(Channel 6, 802.11n (HT20))



(Channel 11, 802.11n (HT20))

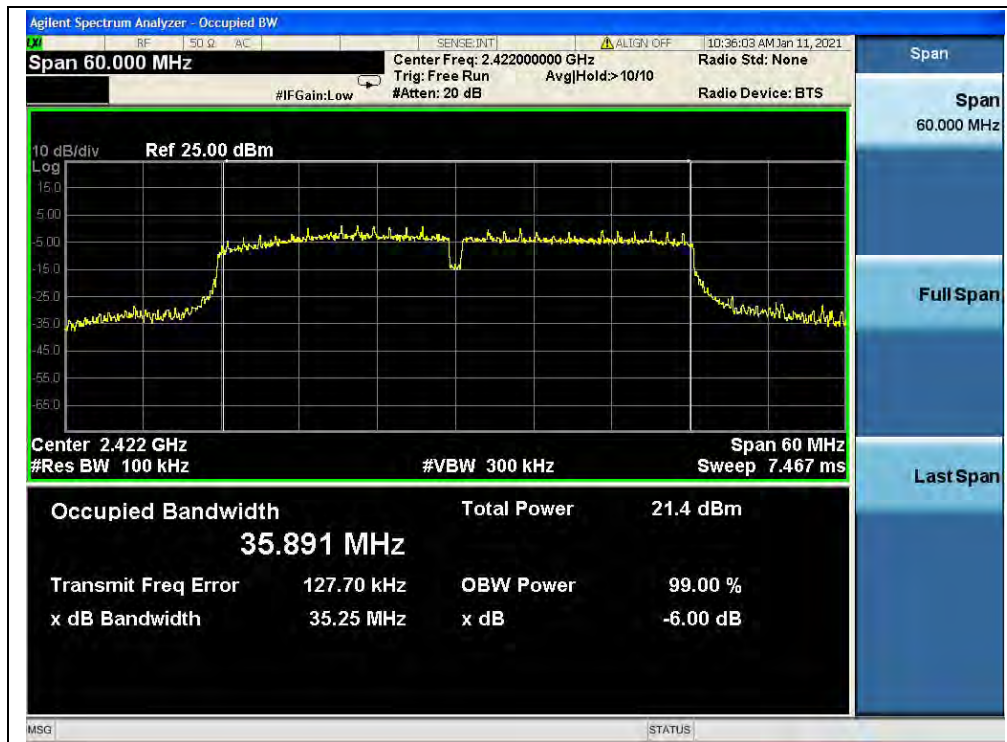


802.11n (HT40) Mode

A.Test Verdict:

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limits(kHz)	Result
3	2422	35.25	≥500	PASS
6	2437	35.01	≥500	PASS
9	2452	35.85	≥500	PASS

B.Test Plot:



(Channel 3, 802.11n (HT40))



(Channel 6, 802.11n (HT40))



(Channel 9, 802.11n (HT40))

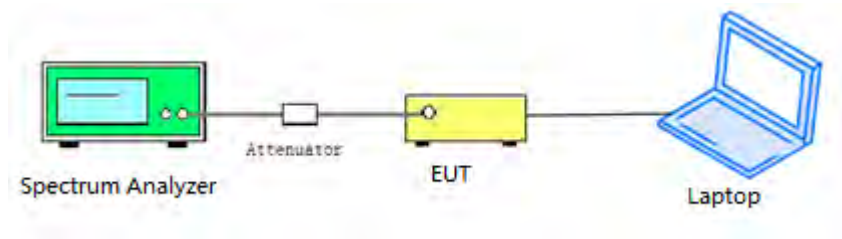
2.5. Conducted Spurious Emissions and Band Edge

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

Test Setup:



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.



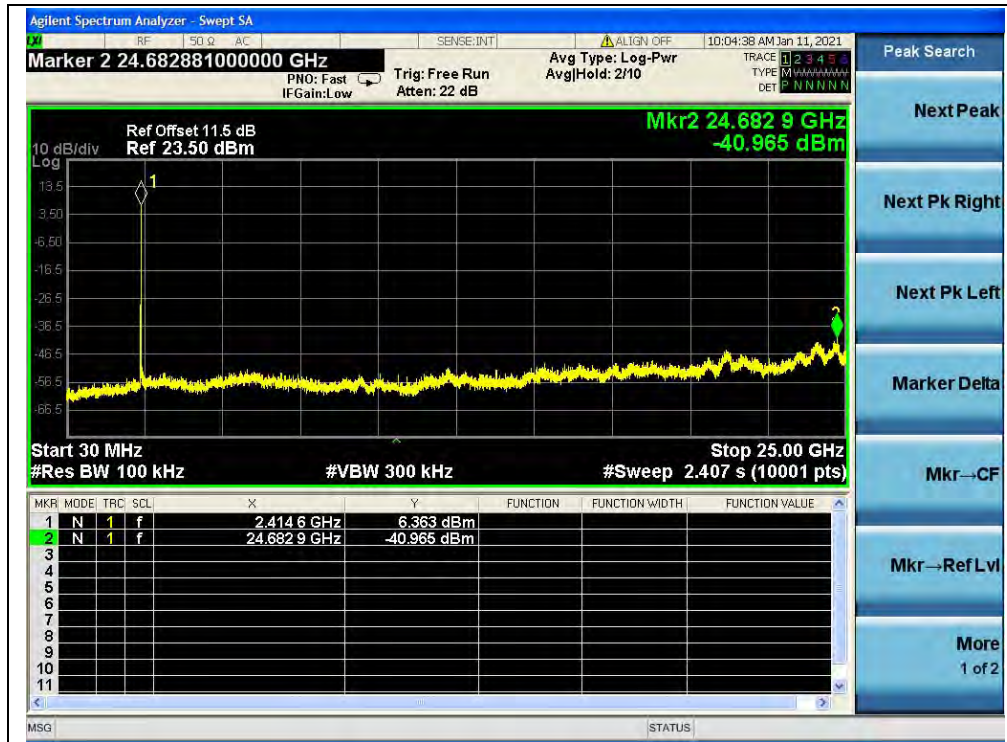
2.5.4. Test Result

802.11b Mode

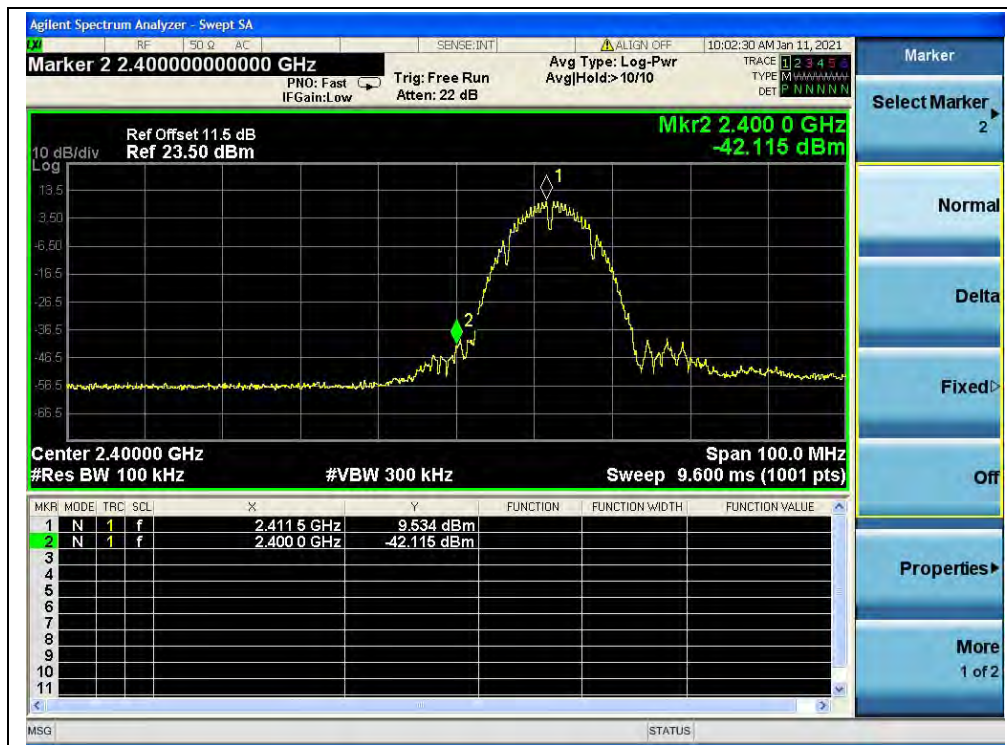
A. Test Verdict:

Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
			Carrier Level	Calculated -20dBc Limit	
1	2412	-40.97	6.36	-13.64	PASS
6	2437	-42.30	6.54	-13.46	PASS
11	2462	-41.65	6.86	-13.14	PASS

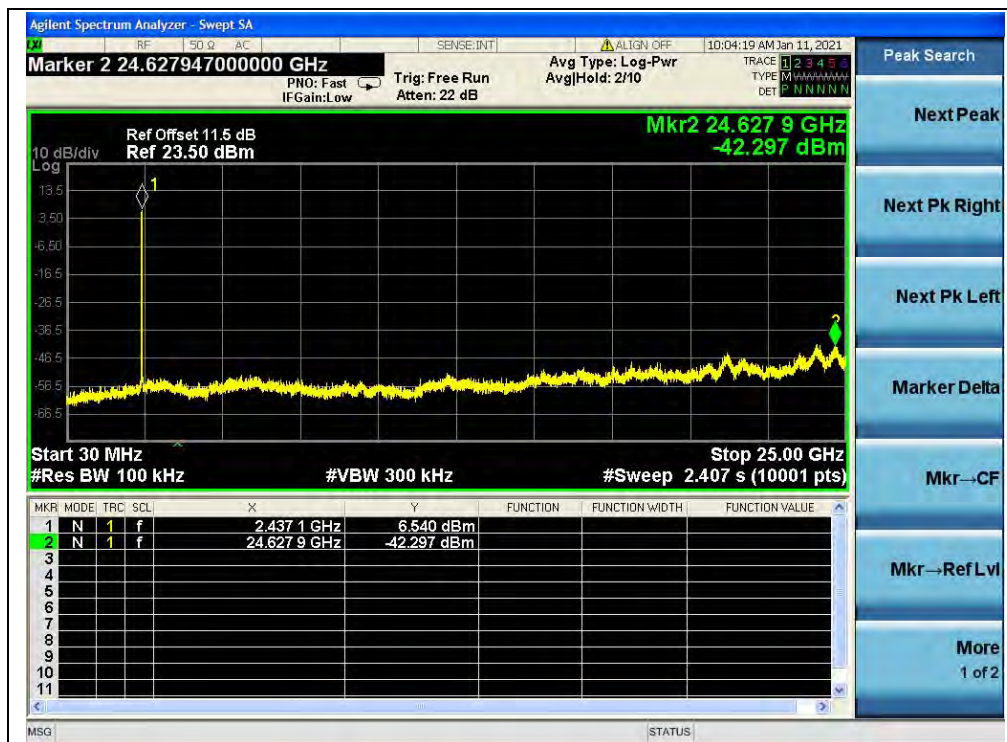
B. Test Plot:



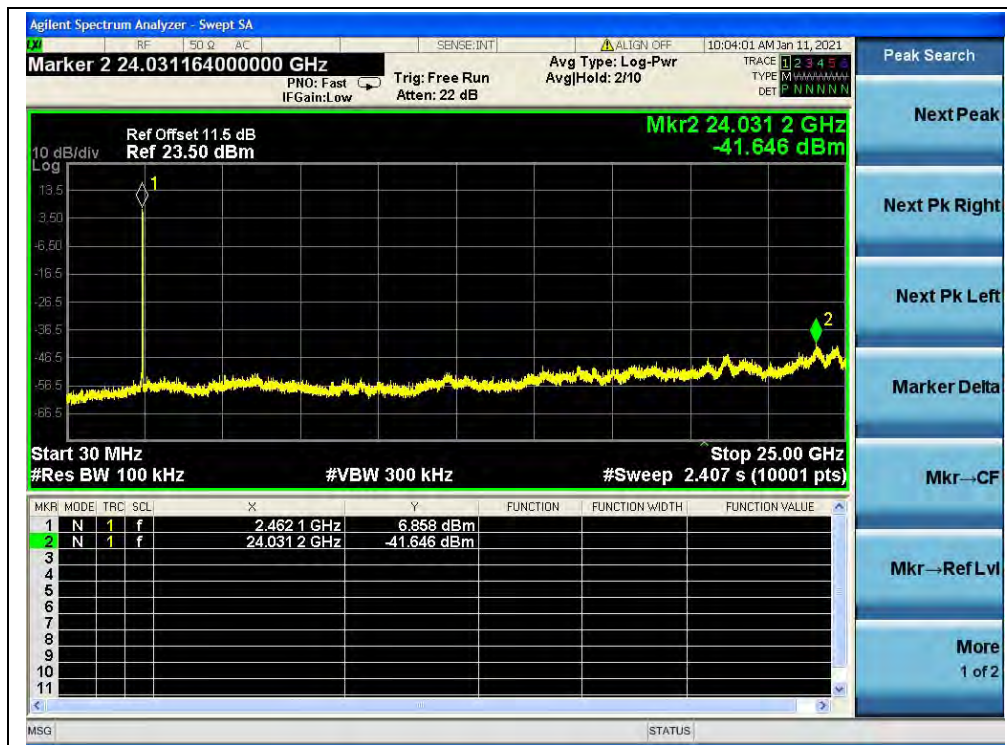
(30MHz to 25GHz, Channel 1, 802.11b)



(Band Edge, Channel 1, 802.11b)



(30MHz to 25GHz, Channel 6, 802.11b)



(30MHz to 25GHz, Channel 11, 802.11b)



(Band Edge, Channel 11, 802.11b)

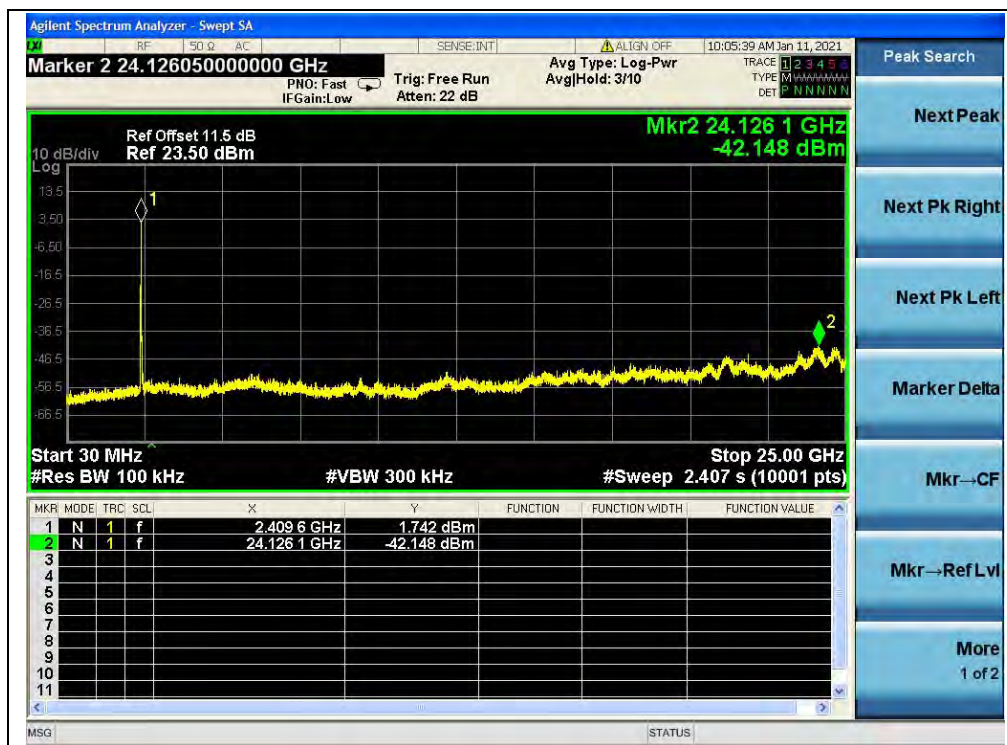


802.11g Mode

A.Test Verdict:

Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
			Carrier Level	Calculated -20dBc Limit	
1	2412	-42.15	1.74	-18.26	PASS
6	2437	-41.00	5.66	-14.34	PASS
11	2462	-42.03	2.03	-17.97	PASS

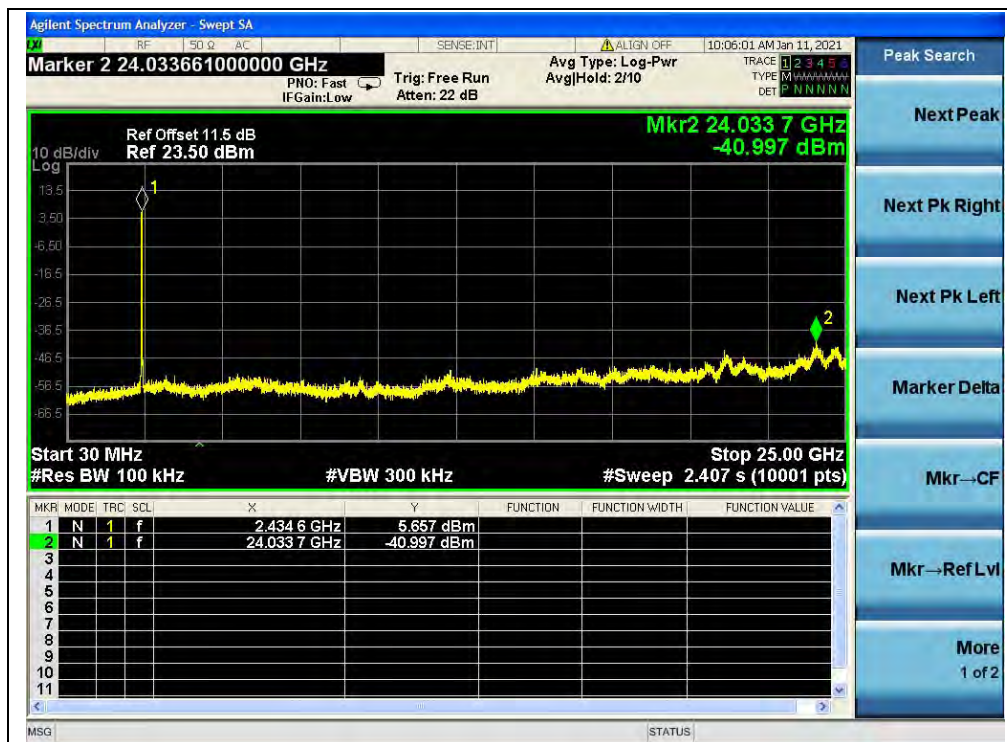
B.Test Plot:



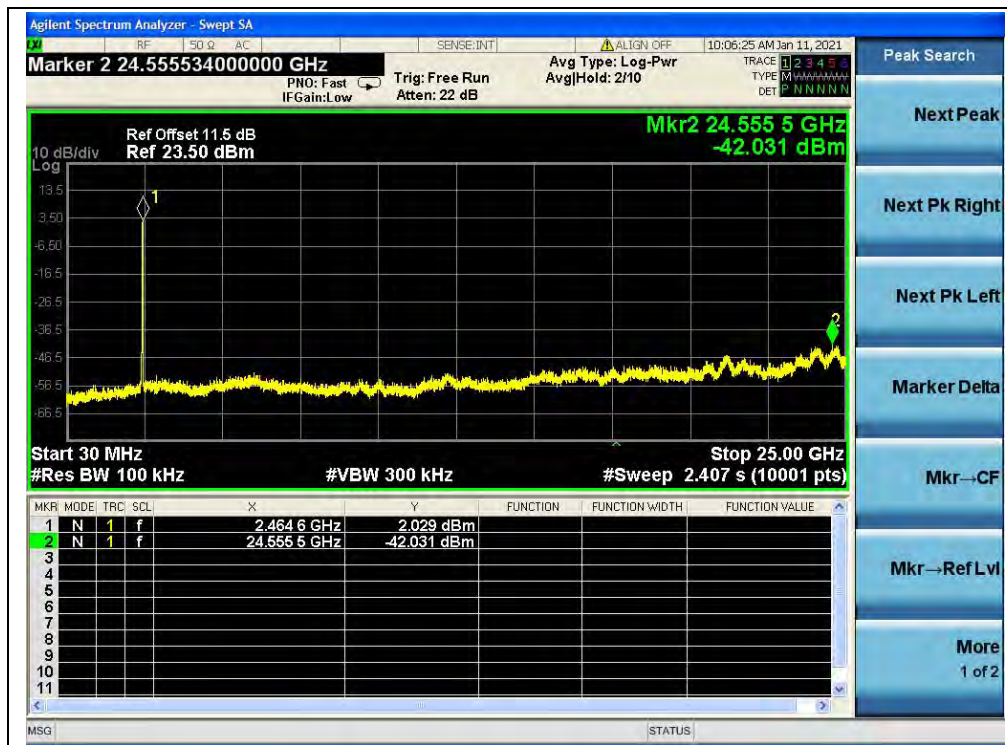
(30MHz to 25GHz, Channel 1, 802.11g)



(Band Edge, Channel 1, 802.11g)



(30MHz to 25GHz, Channel 6, 802.11g)



(30MHz to 25GHz, Channel 11, 802.11g)



(Band Edge, Channel 11, 802.11g)

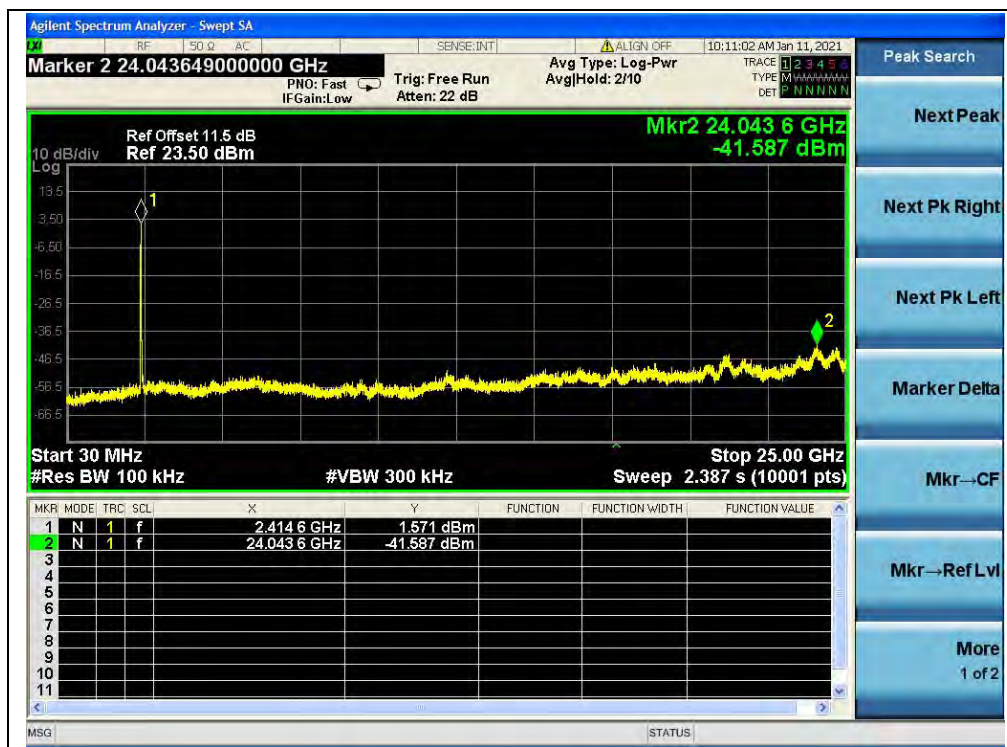


802.11n (HT20) Mode

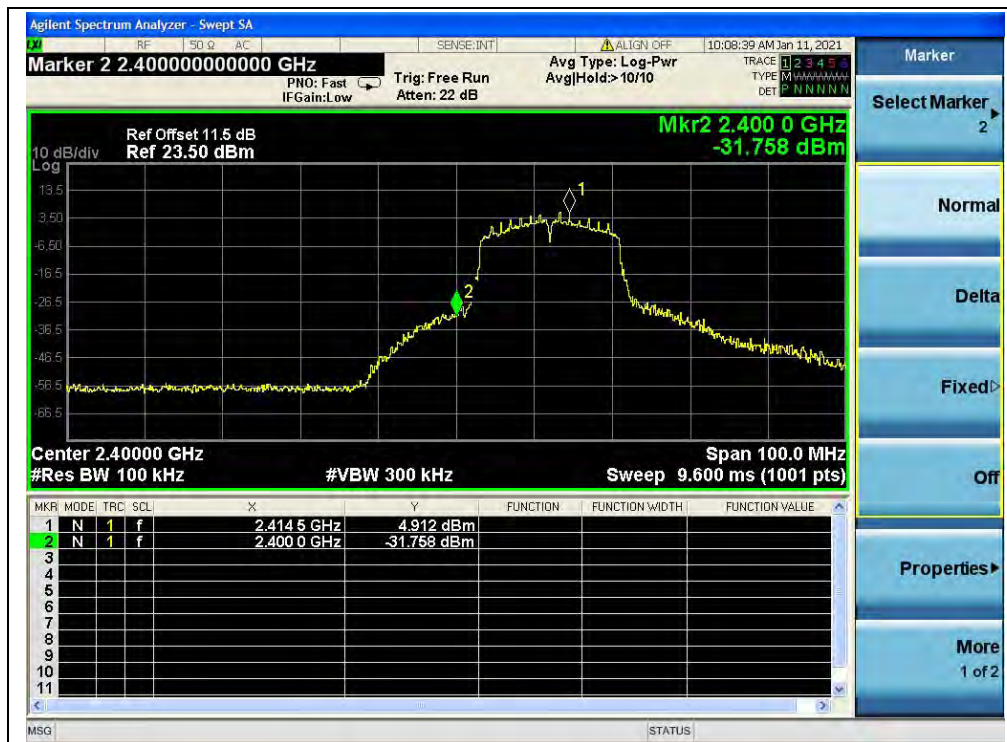
A. Test Verdict:

Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
			Carrier Level	Calculated -20dBc Limit	
1	2412	-41.59	1.57	-18.43	PASS
6	2437	-42.45	1.95	-18.05	PASS
11	2462	-40.63	3.56	-16.44	PASS

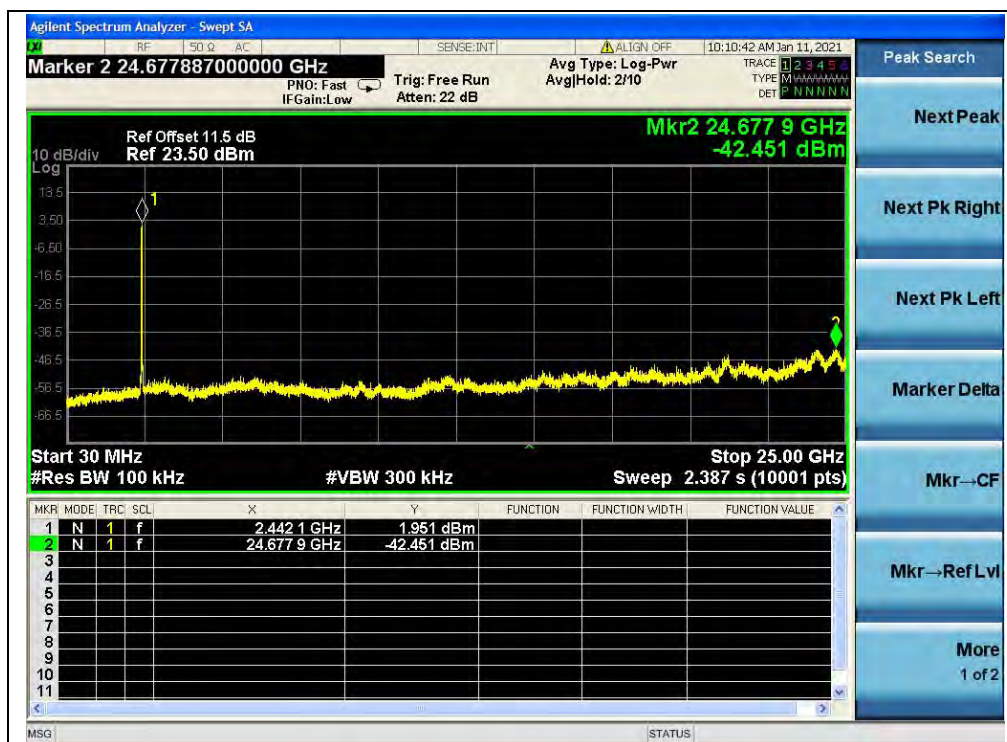
B. Test Plot:



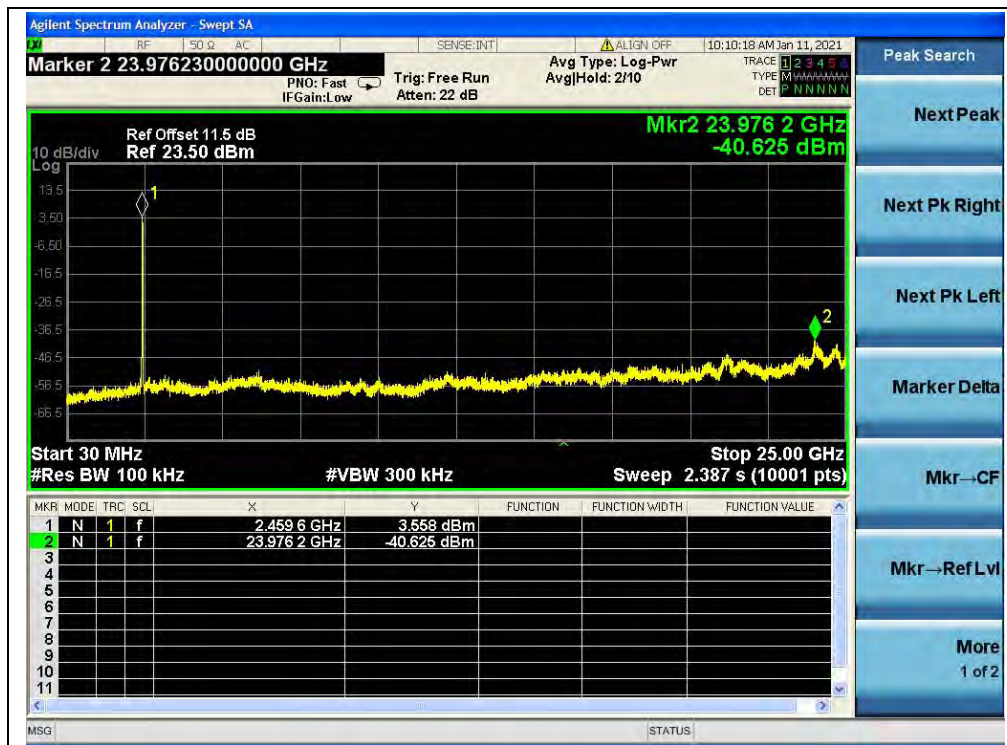
(30MHz to 25GHz, Channel 1, 802.11n (HT20))



(Band Edge, Channel 1, 802.11n (HT20))



(30MHz to 25GHz, Channel 6, 802.11n (HT20))



(30MHz to 25GHz, Channel 11, 802.11n (HT20))



(Band Edge, Channel 11, 802.11n (HT20))

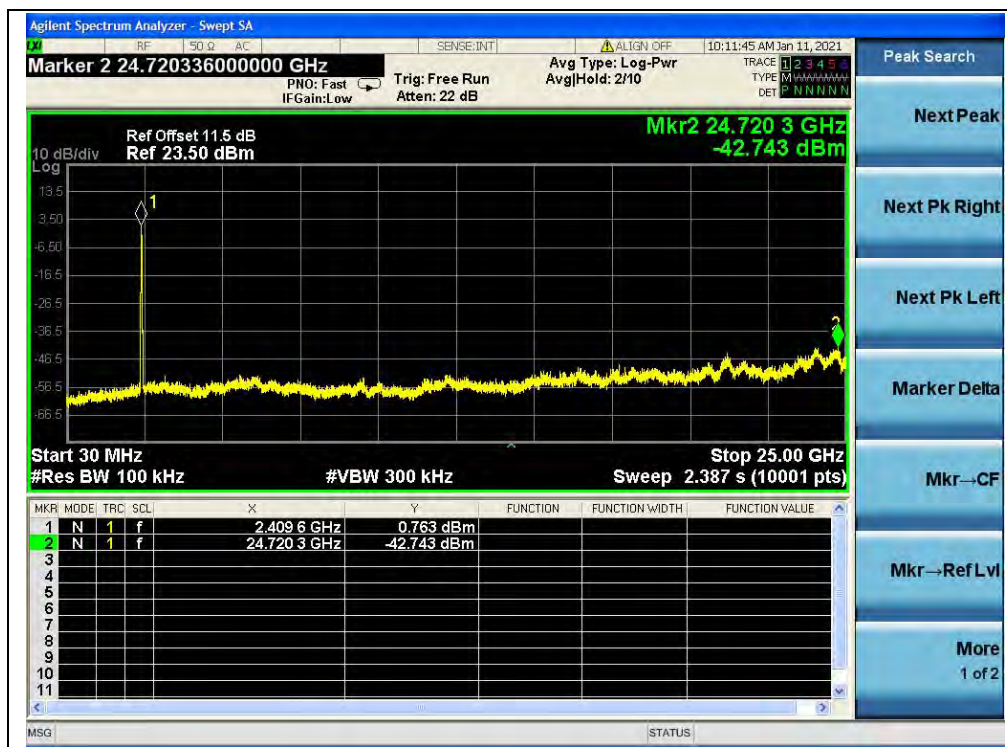


802.11n (HT40) Mode

A.Test Verdict:

Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
			Carrier Level	Calculated -20dBc Limit	
3	2422	-42.74	0.76	-19.24	PASS
6	2437	-41.84	-0.02	-20.02	PASS
9	2452	-41.60	2.35	-17.65	PASS

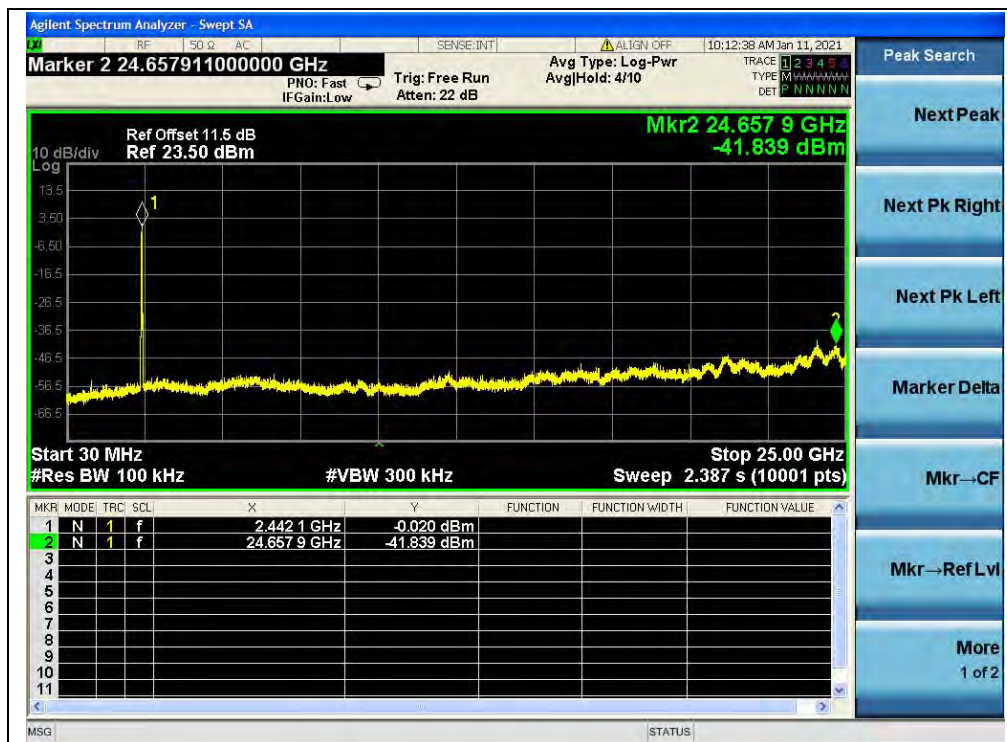
B.Test Plot:



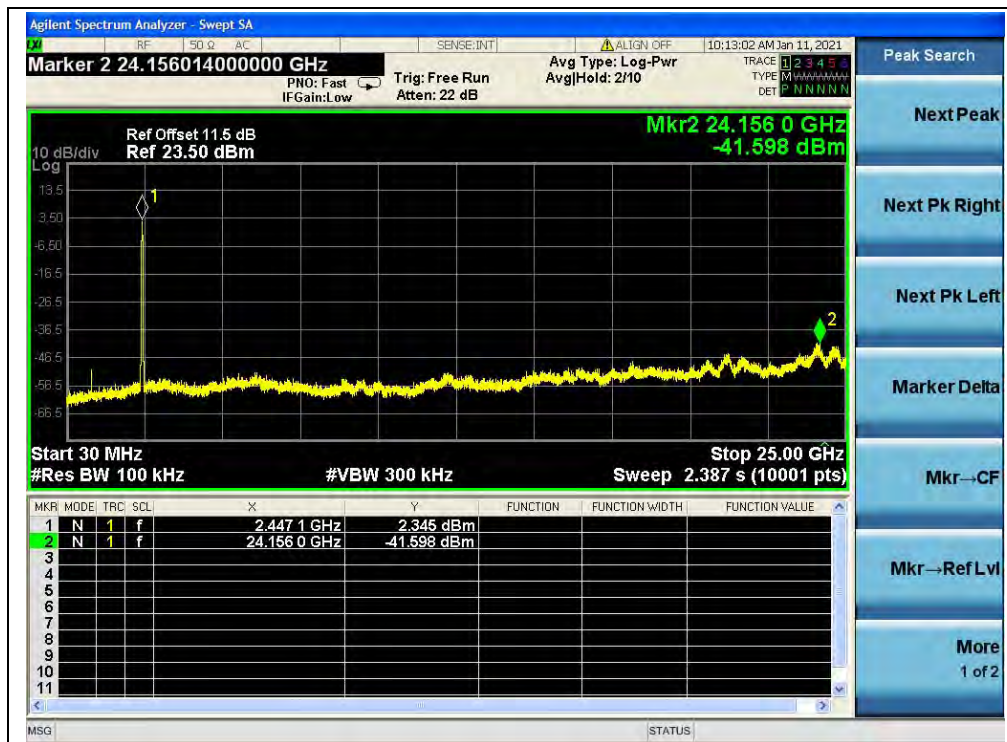
(30MHz to 25GHz, Channel 3, 802.11n (HT40))



(Band Edge, Channel 3, 802.11n (HT40))



(30MHz to 25GHz, Channel 6, 802.11n (HT40))



(30MHz to 25GHz, Channel 9, 802.11n (HT40))



(Band Edge, Channel 11, 802.11n (HT40))

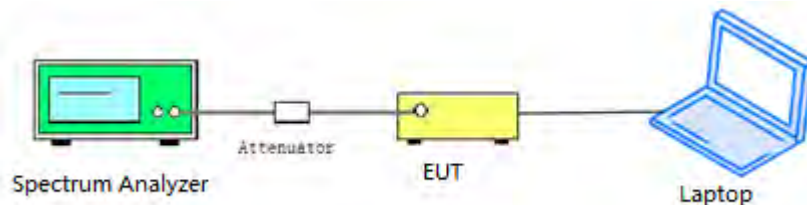
2.6. Power Spectral Density (PSD)

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

Test Setup:



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 Mode

A. Test Verdict:

Spectral power density (dBm/3kHz)				
Channel	Frequency (MHz)	Measured PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
1	2412	-4.62	8	PASS
6	2437	-4.62	8	PASS
11	2462	-4.50	8	PASS

B. Test Plot:



(Channel 1, 802.11b)



(Channel 6, 802.11b)



(Channel 11, 802.11b)



802.11g Mode

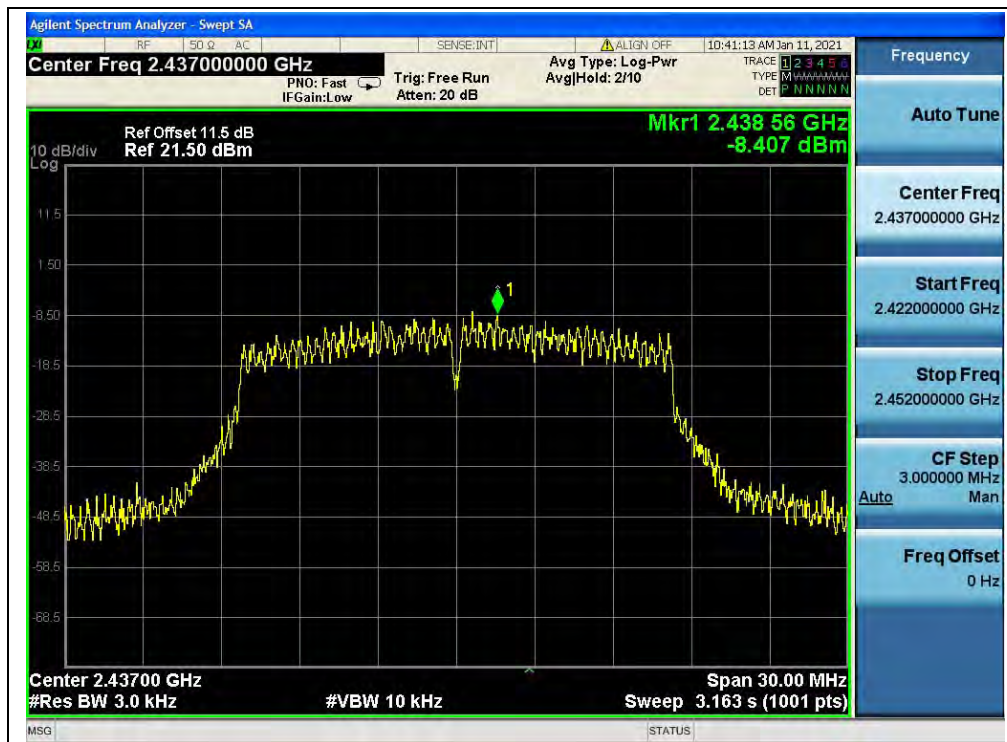
A.Test Verdict:

Spectral power density (dBm/3kHz)				
Channel	Frequency (MHz)	Measured PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
1	2412	-7.88	8	PASS
6	2437	-8.41	8	PASS
11	2462	-7.85	8	PASS

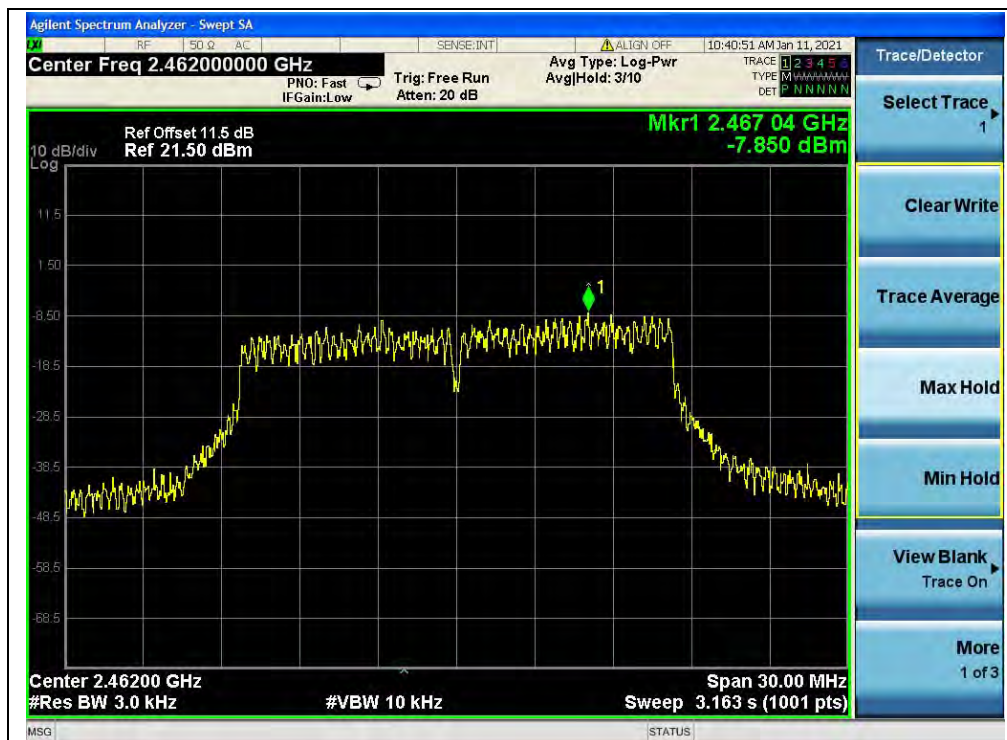
B.Test Plot:



(Channel 1, 802.11g)



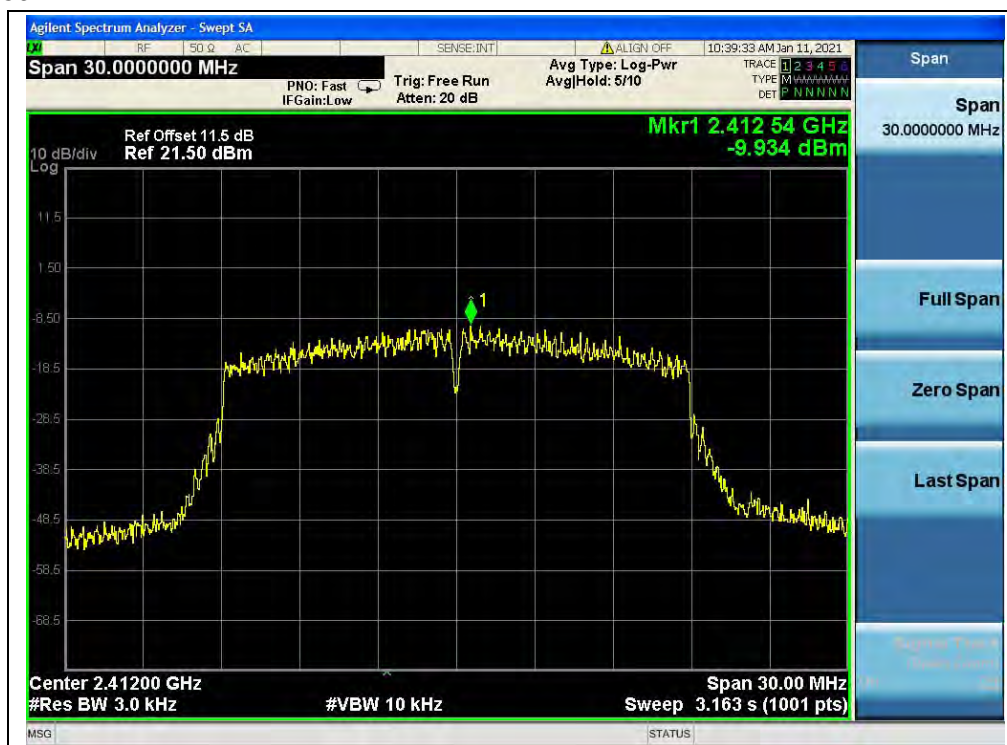
(Channel 6, 802.11g)



(Channel 11, 802.11g)

**802.11n (HT20) Mode****A.Test Verdict:**

Spectral power density (dBm/3kHz)				
Channel	Frequency (MHz)	Measured PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
1	2412	-9.93	8	PASS
6	2437	-9.14	8	PASS
11	2462	-9.15	8	PASS

B.Test Plot:

(Channel 1, 802.11n (HT20))



(Channel 6, 802.11n (HT20))



(Channel 11, 802.11n (HT20))

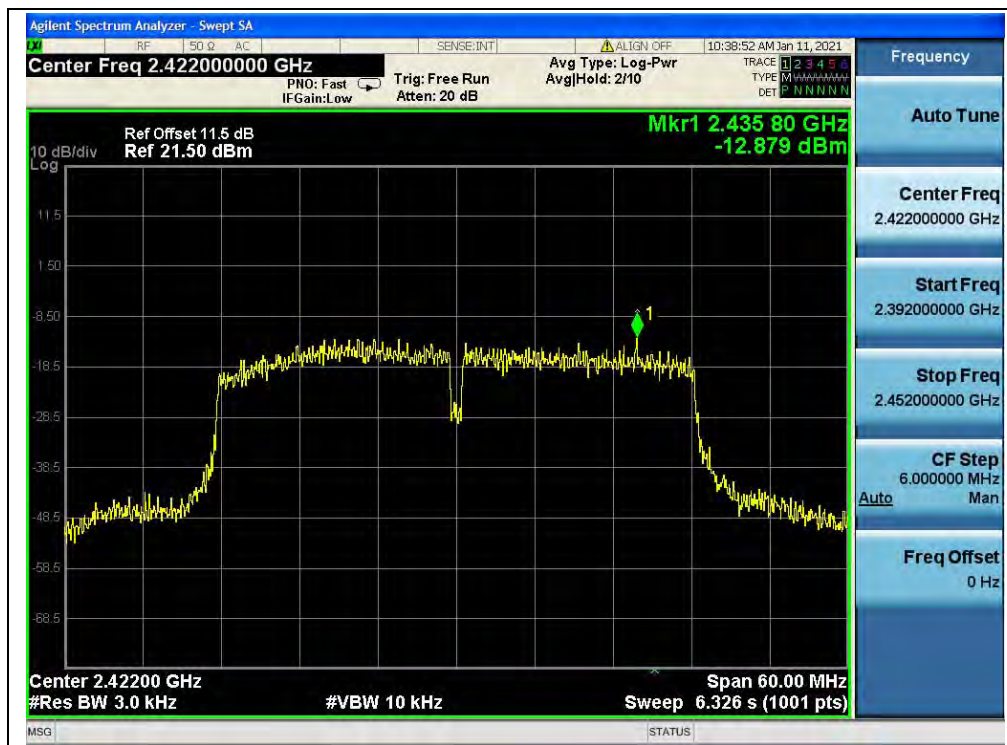


802.11n (HT40) Mode

A.Test Verdict:

Spectral power density (dBm/3kHz)				
Channel	Frequency (MHz)	Measured PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
3	2422	-12.88	8	PASS
6	2437	-12.12	8	PASS
9	2452	-11.63	8	PASS

B.Test Plot:



(Channel 3, 802.11n (HT40))



(Channel 6, 802.11n (HT40))



(Channel 9, 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 50 μ H/50 Ω line impedance stabilization network (LISN).

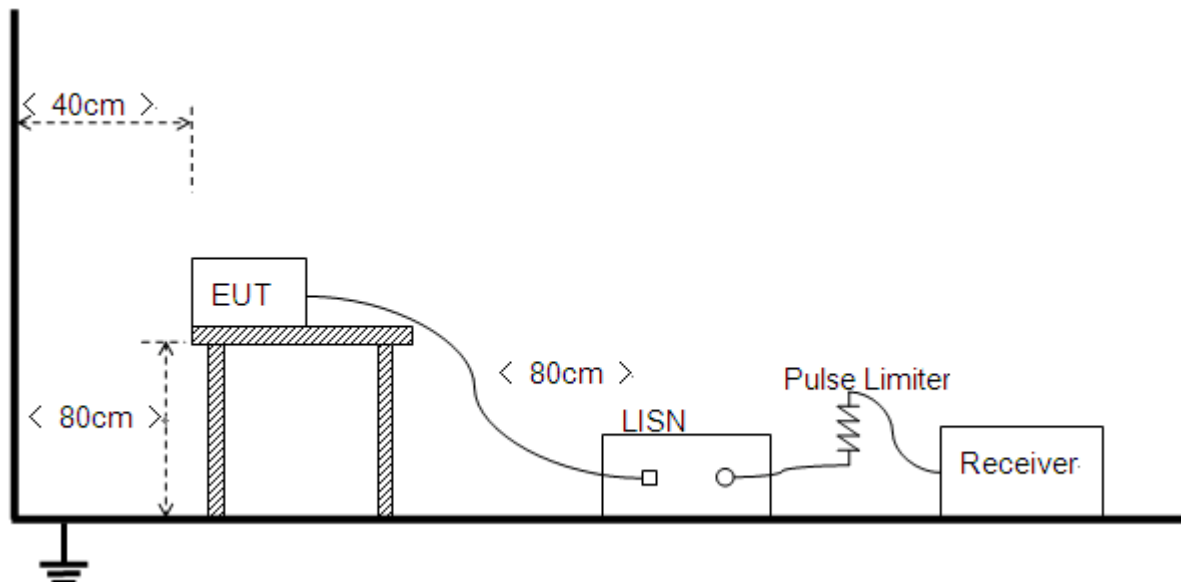
Frequency range (MHz)	Conducted Limit (dB μ V)	
	Quai-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
5 - 30	60	50

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

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. Set RBW=9kHz, VBW=30kHz. 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+EARPHONE+BT TX

Test Voltage: AC 120V/60Hz

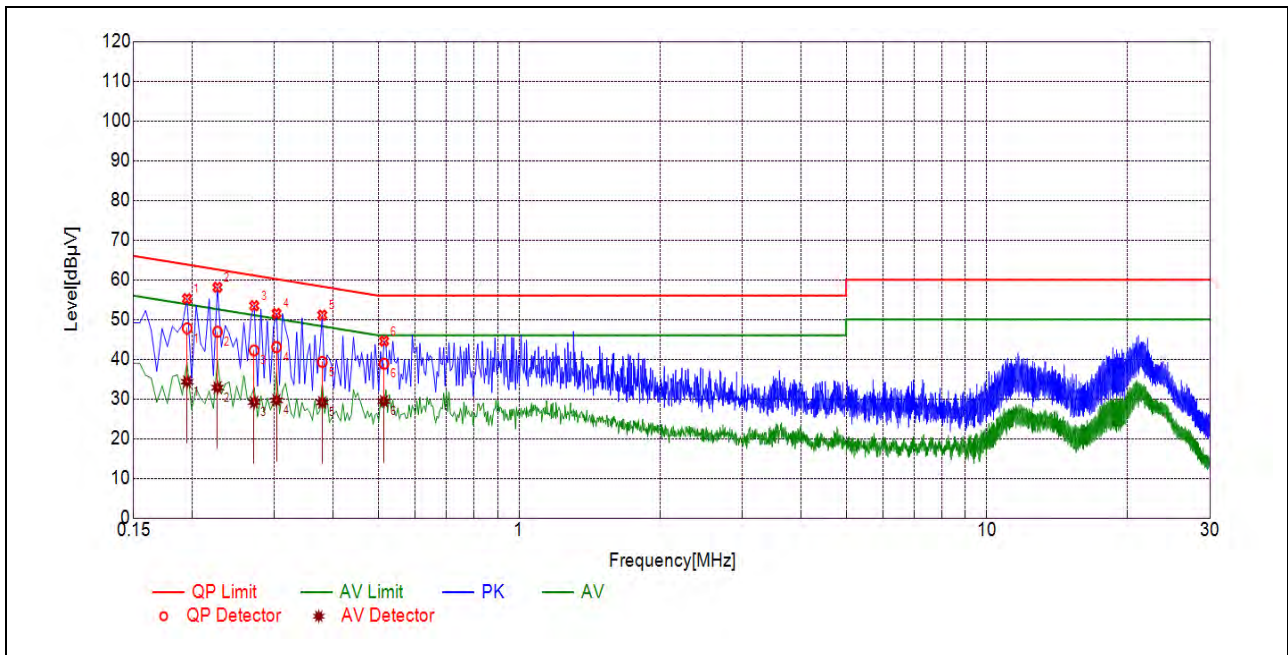
The measurement results are obtained as below:

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

U_R : Receiver Reading

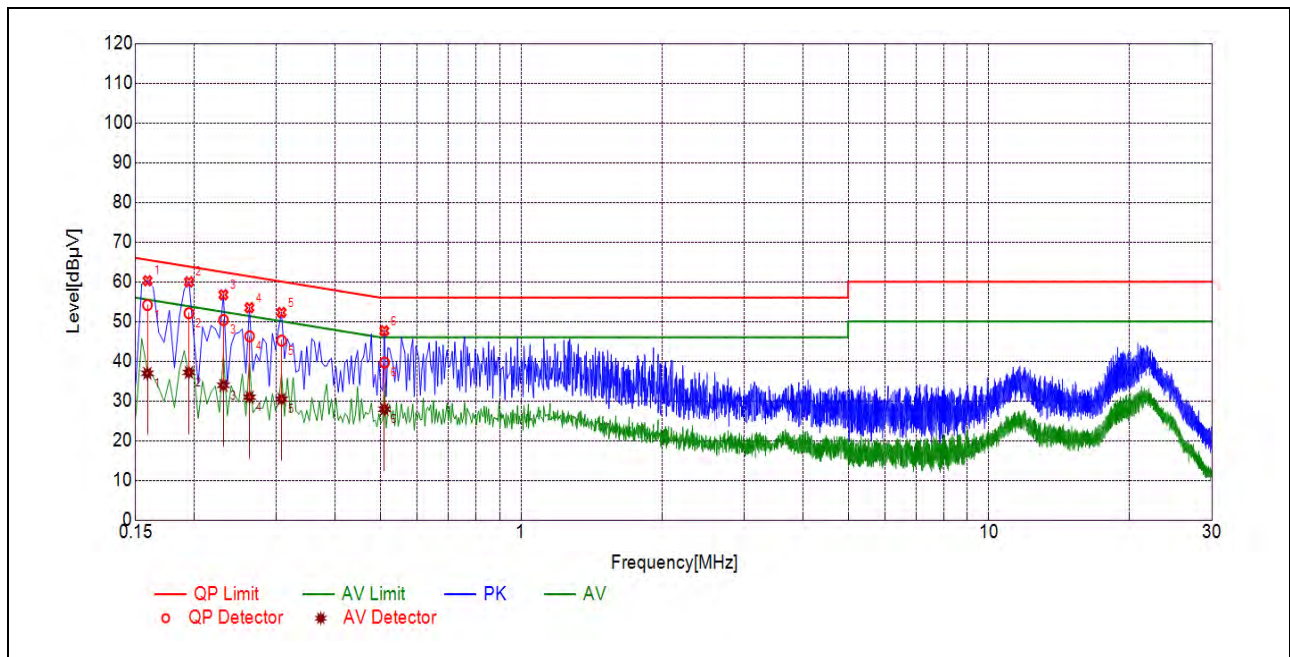
A_{Factor} : Voltage division factor of LISN

B.Test Plot:



(L Phase)

No.	Fre. (MHz)	Emission Level (dBμV)		Limit (dBμV)		Power-line	Verdict
		Quai-peak	Average	Quai-peak	Average		
1	0.1951	47.78	34.34	63.82	53.82	Line	PASS
2	0.2266	46.90	32.86	62.57	52.57		PASS
3	0.2713	42.22	29.17	61.08	51.08		PASS
4	0.3029	43.06	29.65	60.16	50.16		PASS
5	0.3794	39.32	29.12	58.29	48.29		PASS
6	0.5141	38.86	29.41	56.00	46.00		PASS



(N Phase)

No.	Fre. (MHz)	Emission Level (dBμV)		Limit (dBμV)		Power-line	Verdict
		Quai-peak	Average	Quai-peak	Average		
1	0.1589	54.13	36.95	65.52	55.52	Neutral	PASS
2	0.1949	52.09	37.17	63.82	53.82		PASS
3	0.2310	50.37	33.93	62.41	52.41		PASS
4	0.2627	46.26	30.95	61.35	51.35		PASS
5	0.3076	45.18	30.46	60.03	50.03		PASS
6	0.5104	39.68	27.93	56.00	46.00		PASS

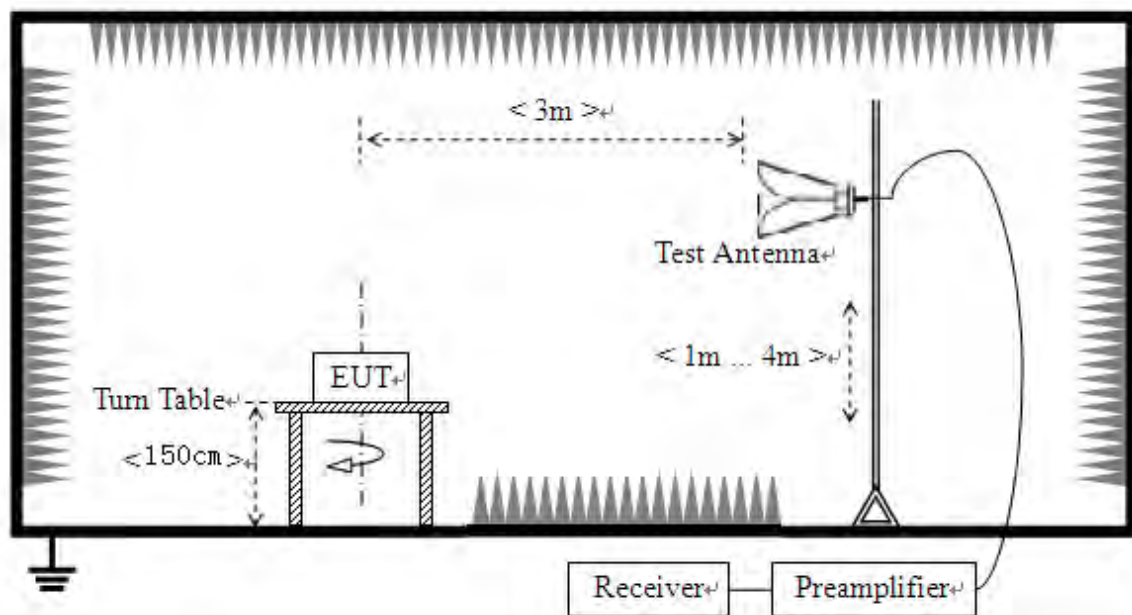
2.8. Restricted Frequency Bands

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

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:

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

A_T : Total correction Factor except Antenna

U_R : Receiver Reading

G_{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 Mode

A. Test Verdict:

Channel	Frequency (MHz)	Detector	Receiver Reading U_R (dB μ V)	A_T (dB)	A_{Factor} (dB@3m)	Max. Emission E (dB μ V/m)	Limit (dB μ V/m)	Verdict
		PK/ AV						
1	2390.00	PK	35.04	6.74	27.20	68.98	74	PASS
1	2390.00	AV	16.43	6.74	27.20	50.37	54	PASS
11	24485.56	PK	24.87	6.74	27.20	58.81	74	PASS
11	2484.87	AV	14.74	6.74	27.20	48.68	54	PASS



Keysight Spectrum Analyzer - Swept SA

RL RF 50 Ω DC SENSE:INT

Marker 1 2.389980800000 GHz

PNO: Fast IF Gain: Low Trig: Free Run #Atten: 10 dB

Avg Type: Voltage Avg/Hold: >100/100

02:15:41 PM Jan 13, 2021

Trace 1 2 3 4 5 6 TYPE M DET P N N N N N

PREAMP

10 dB/div Ref 86.99 dBμV

Log

Mkr1 2.389 981 GHz 34.551 dBμV

Start 2.30000 GHz Stop 2.41200 GHz

#Res BW (CISPR) 1 MHz #VBW 3.0 MHz Sweep 1.000 ms (5001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.389 981 GHz	34.551 dBμV			
2	N	1	f	2.390 000 GHz	35.037 dBμV			
3								
4								
5								
6								
7								
8								
9								
10								
11								

MSG STATUS

Trace/Detector

Select Trace 1

Detector Peak Man

Auto

Preset Detectors

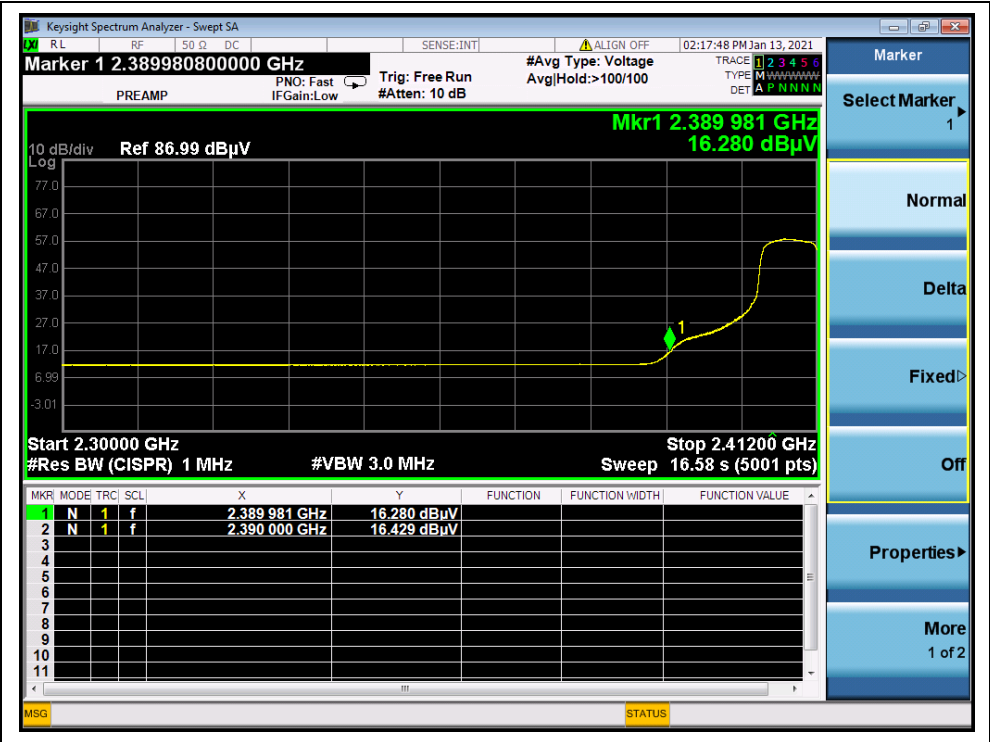
Clear Trace

Clear All Traces

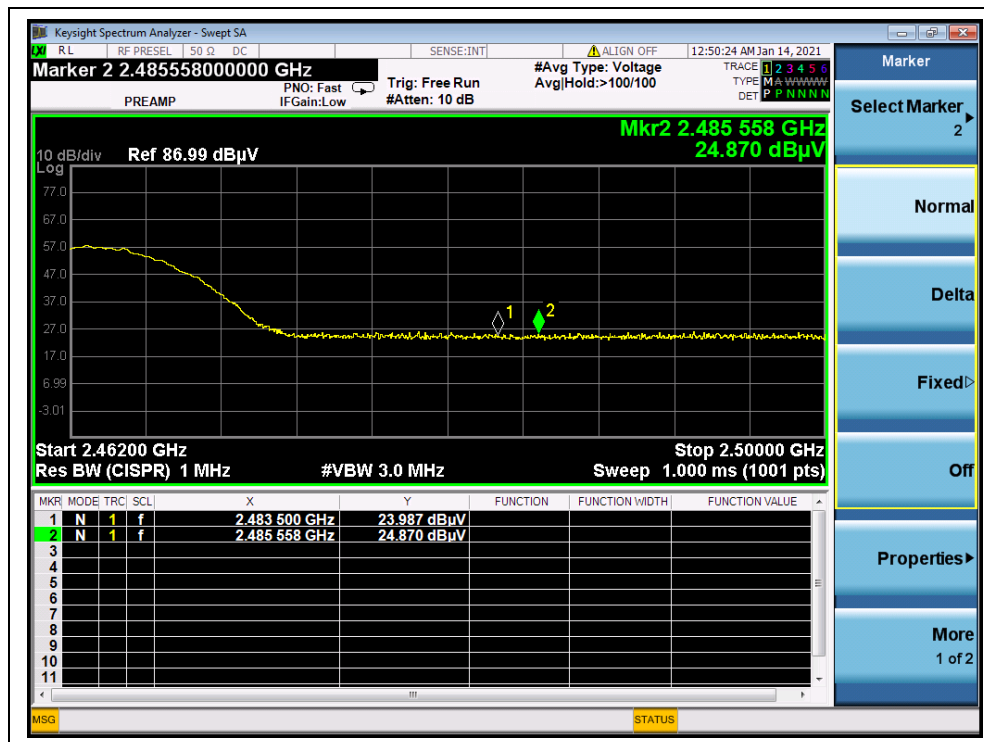
Preset All Traces

More 2 of 3

(PEAK, Channel 1, 802.11b)



(AVERAGE, Channel 1, 802.11b)



(PEAK, Channel 11, 802.11b)



(AVERAGE, Channel 11, 802.11b)

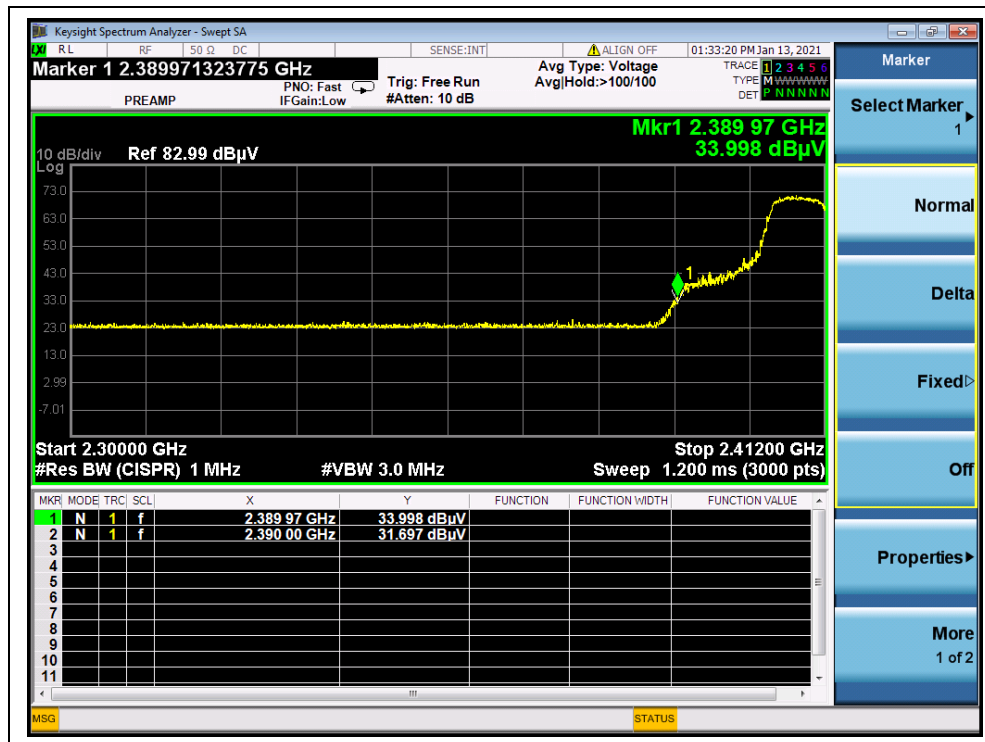


802.11g Mode

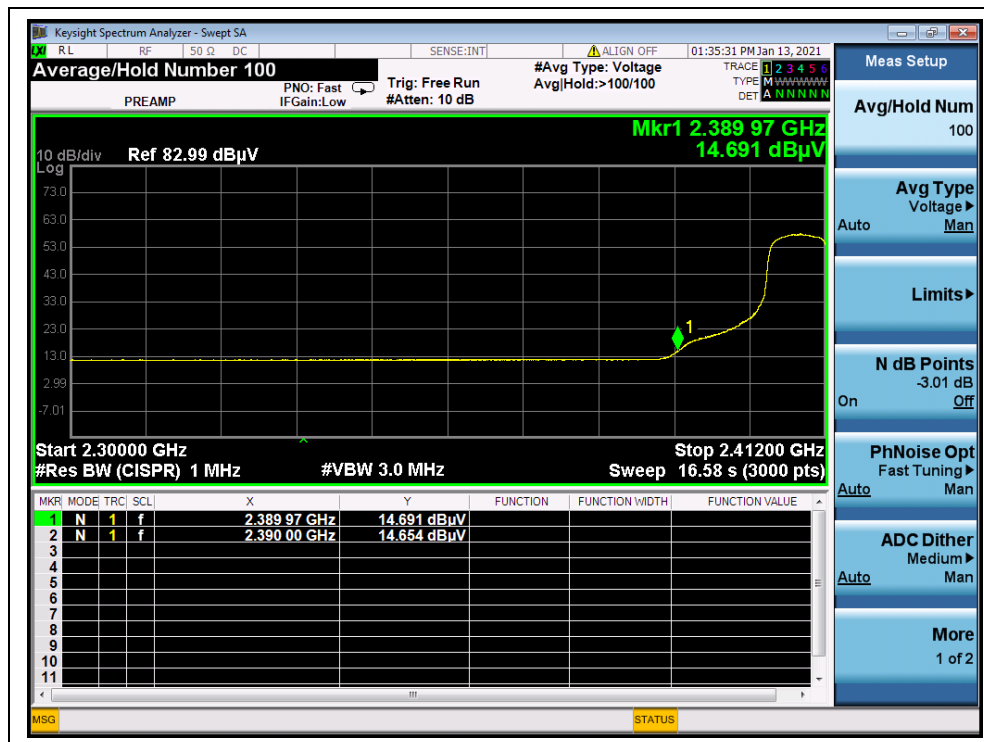
A.Test Verdict:

Channel	Frequency (MHz)	Detector	Receiver Reading U_R (dB μ V)	A_T (dB)	A_{Factor} (dB@3m)	Max. Emission E (dB μ V/m)	Limit (dB μ V/m)	Verdict
		PK/ AV						
1	2389.97	PK	34.00	6.74	27.20	67.94	74	PASS
1	2389.97	AV	14.69	6.74	27.20	48.63	54	PASS
11	2485.18	PK	25.61	6.74	27.20	59.55	74	PASS
11	2483.50	AV	15.50	6.74	27.20	49.44	54	PASS

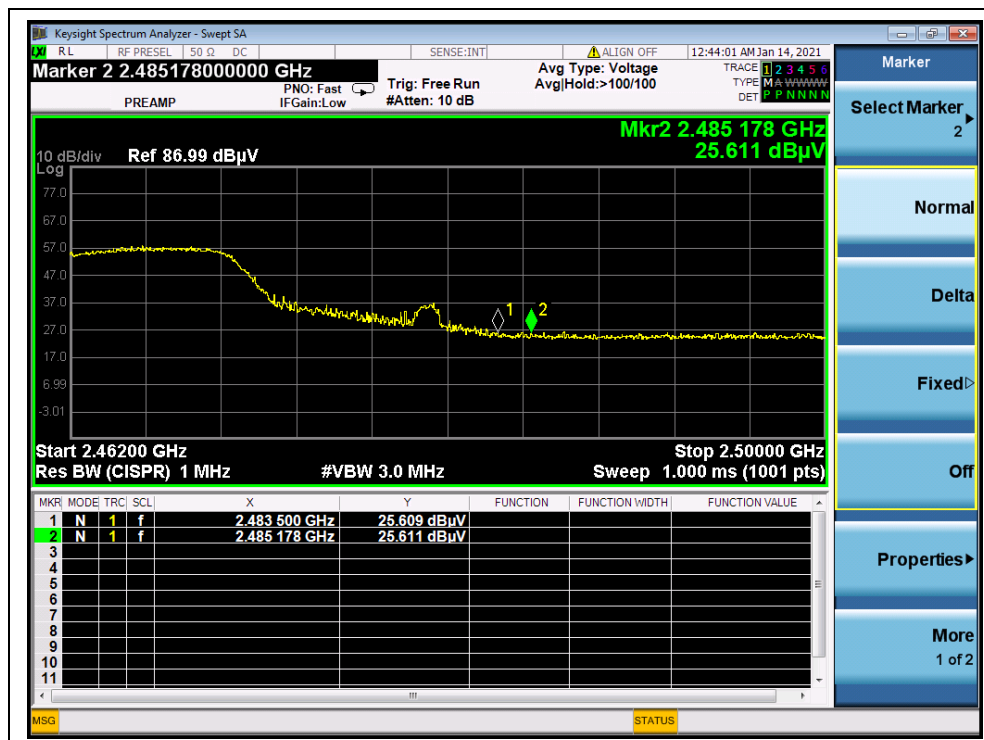
B.Test Plot:



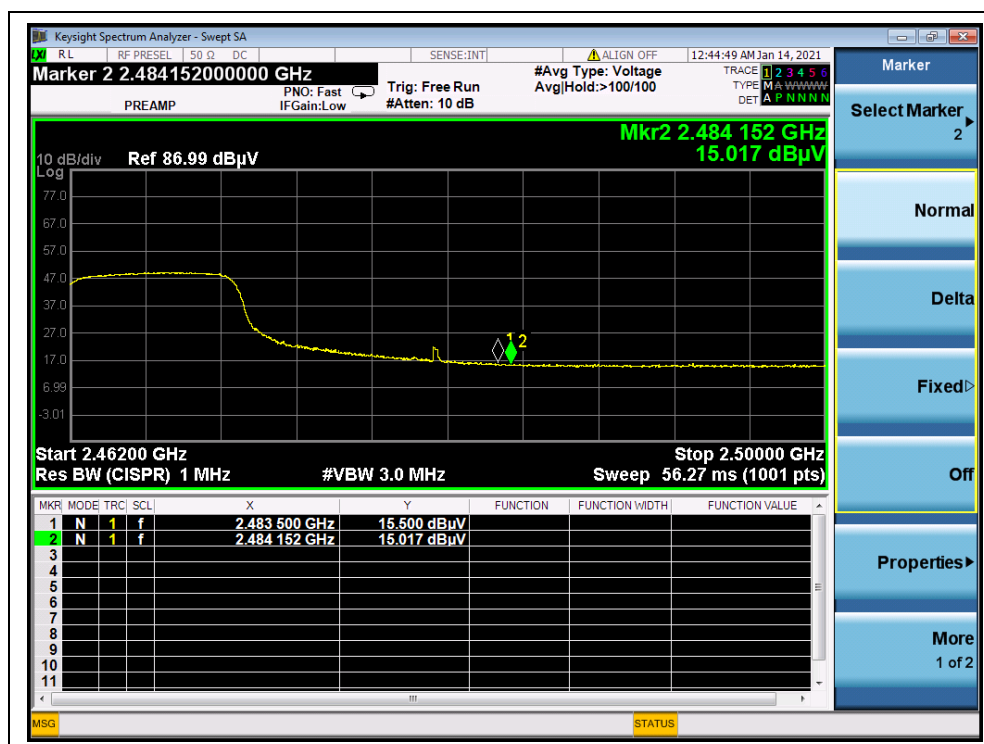
(PEAK, Channel 1, 802.11g)



(AVERAGE, Channel 1, 802.11g)



(PEAK, Channel 11, 802.11g)



(AVERAGE, Channel 11, 802.11g)

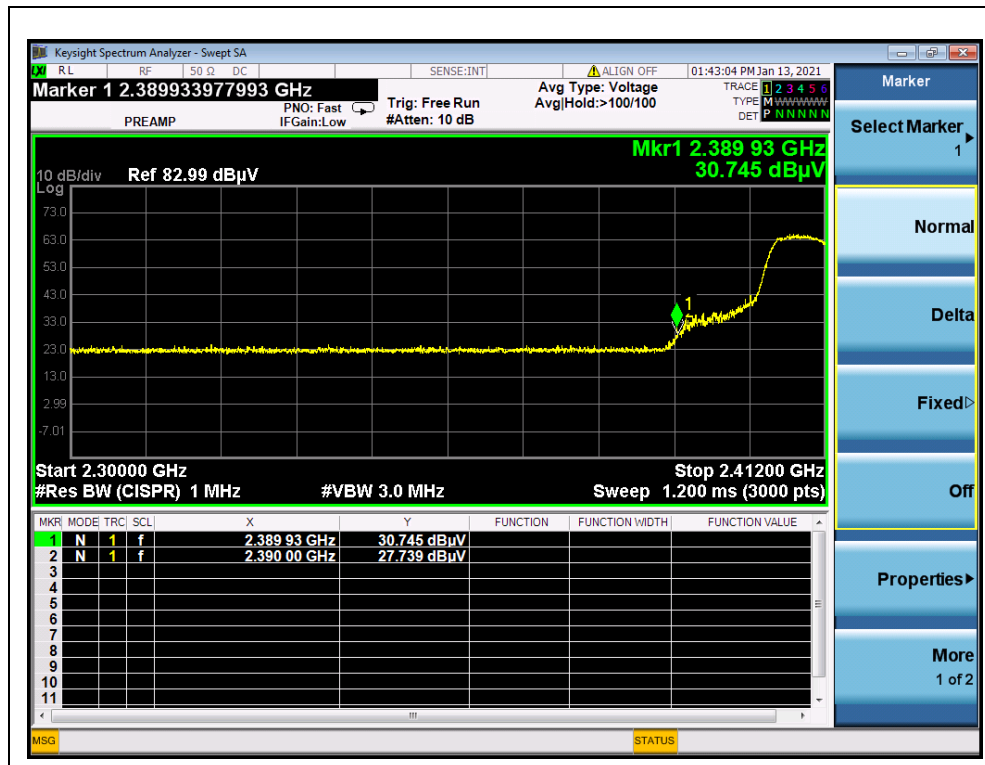


802.11 n (HT20) Mode

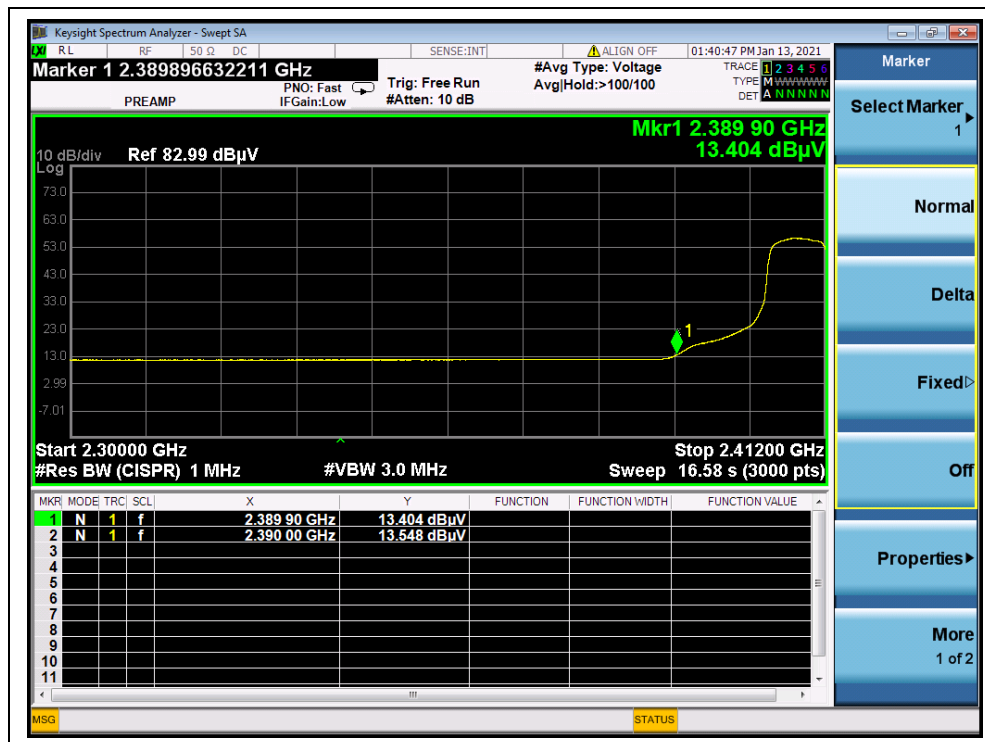
A.Test Verdict:

Channel	Frequency (MHz)	Detector	Receiver Reading U_R (dB μ V)	A_T (dB)	A_{Factor} (dB@3m)	Max. Emission E (dB μ V/m)	Limit (dB μ V/m)	Verdict
		PK/ AV						
1	23899.93	PK	30.75	6.74	27.20	64.69	74	PASS
1	2390.00	AV	13.55	6.74	27.20	47.49	54	PASS
11	2483.77	PK	26.37	6.74	27.20	60.31	74	PASS
11	2483.50	AV	12.84	6.74	27.20	46.78	54	PASS

B.Test Plot:



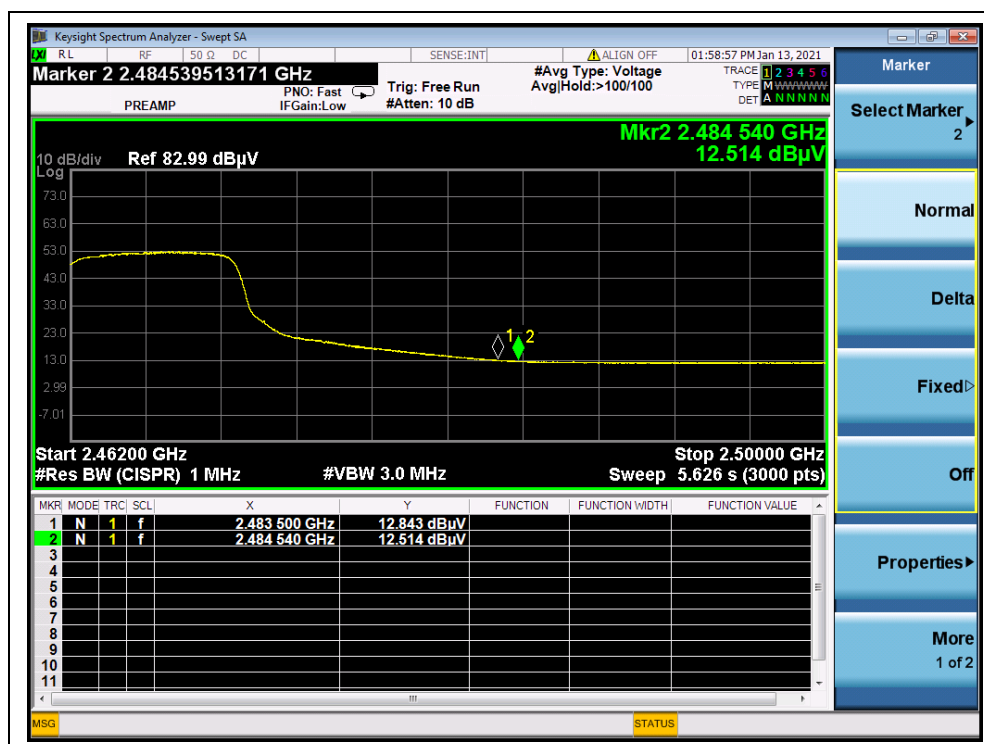
(PEAK, Channel 1, 802.11n (HT20))



(AVERAGE, Channel 1, 802.11n (HT20))



(PEAK, Channel 11, 802.11n (HT20))



(AVERAGE, Channel 11, 802.11n (HT20))

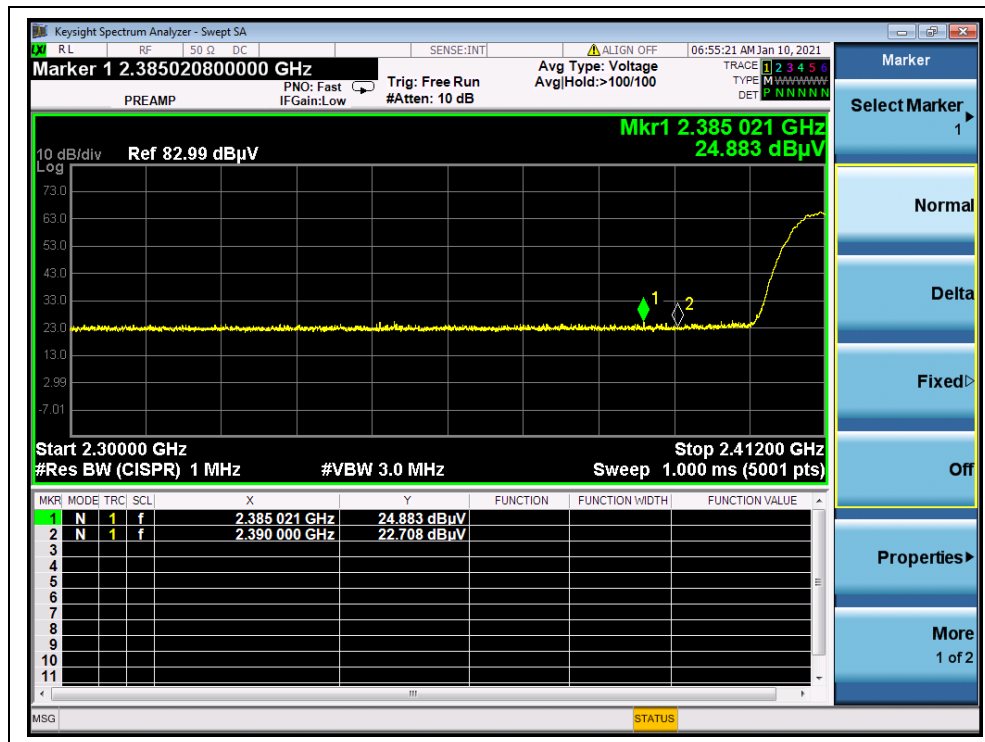


802.11n (HT40) Mode

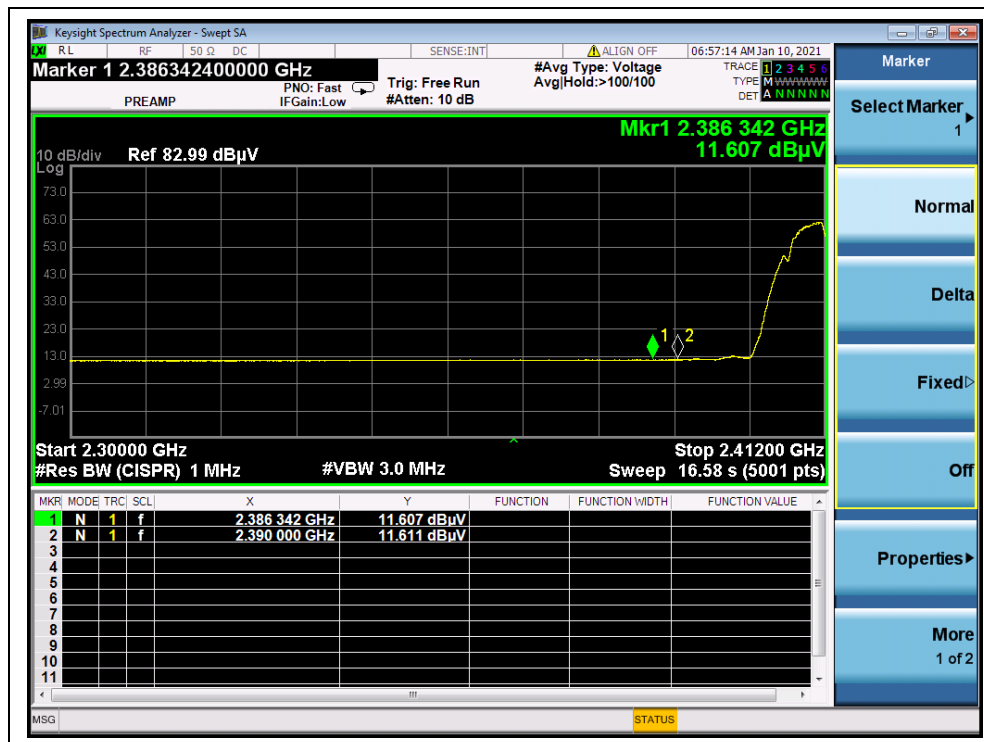
A.Test Verdict:

Channel	Frequency (MHz)	Detector	Receiver Reading U_R (dBμV)	A_T (dB)	A_{Factor} (dB@3m)	Max. Emission E (dBμV/m)	Limit (dBμV/m)	Verdict
		PK/ AV						
3	2385.02	PK	24.88	6.74	27.20	58.82	74	PASS
3	2390.00	AV	11.61	6.74	27.20	45.55	54	PASS
9	2484.15	PK	25.24	6.74	27.20	59.18	74	PASS
9	2484.14	AV	12.99	6.74	27.20	46.93	54	PASS

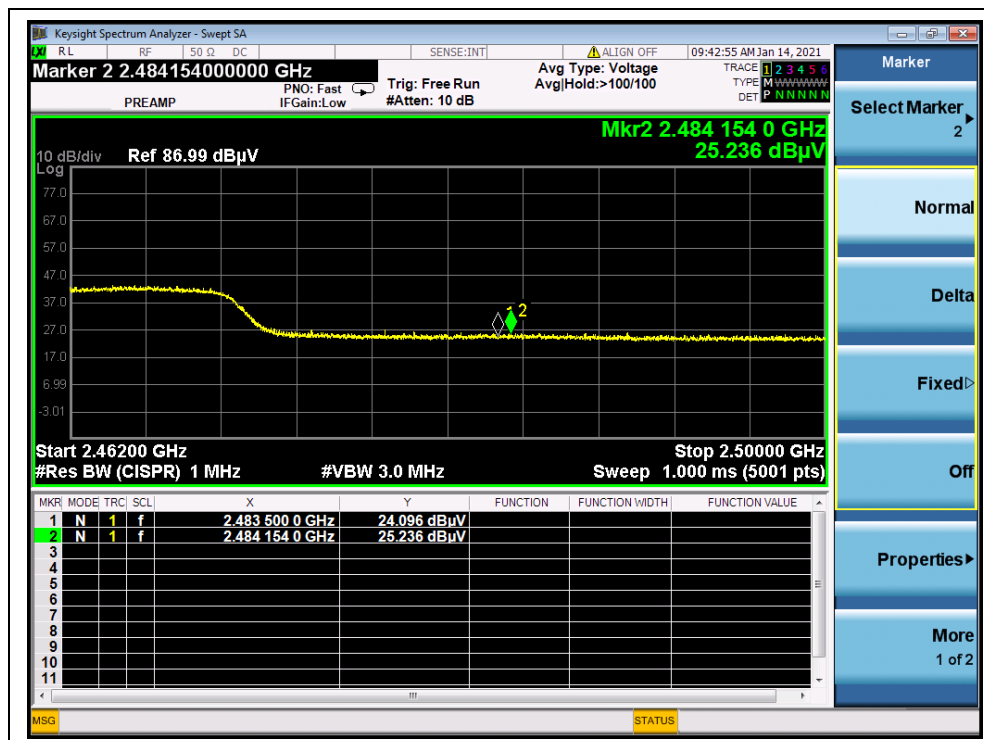
B.Test Plot:



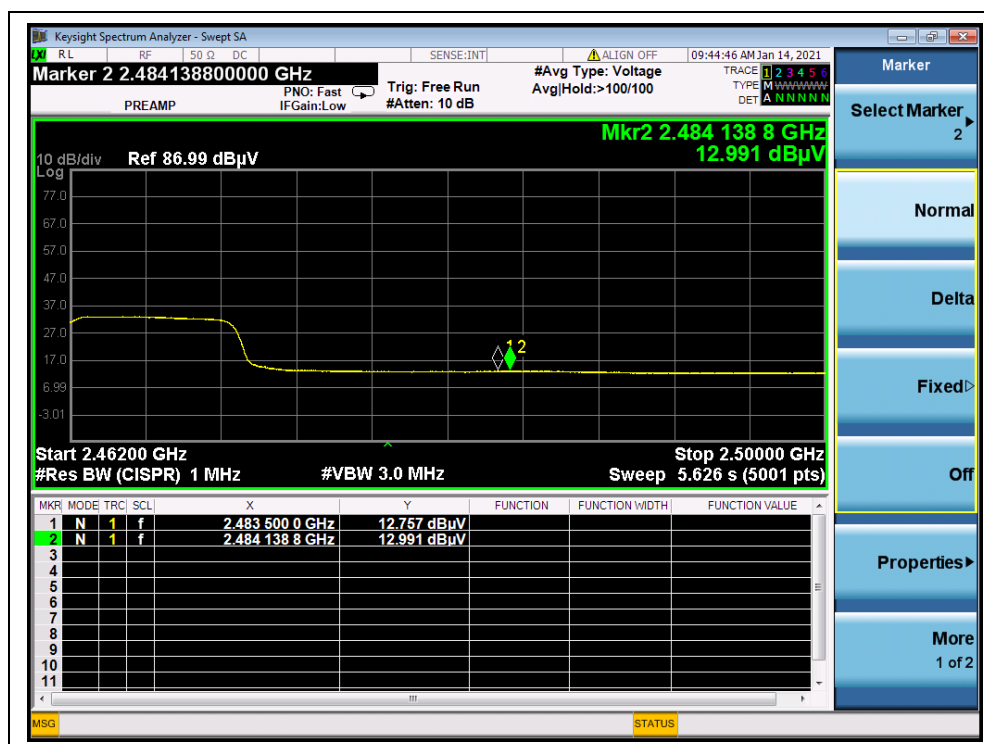
(PEAK, Channel 3, 802.11n (HT40))



(AVERAGE, Channel 3, 802.11n (HT40))



(PEAK, Channel 9, 802.11n (HT40))



(AVERAGE, Channel 9, 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 ($\mu\text{V/m}$)	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

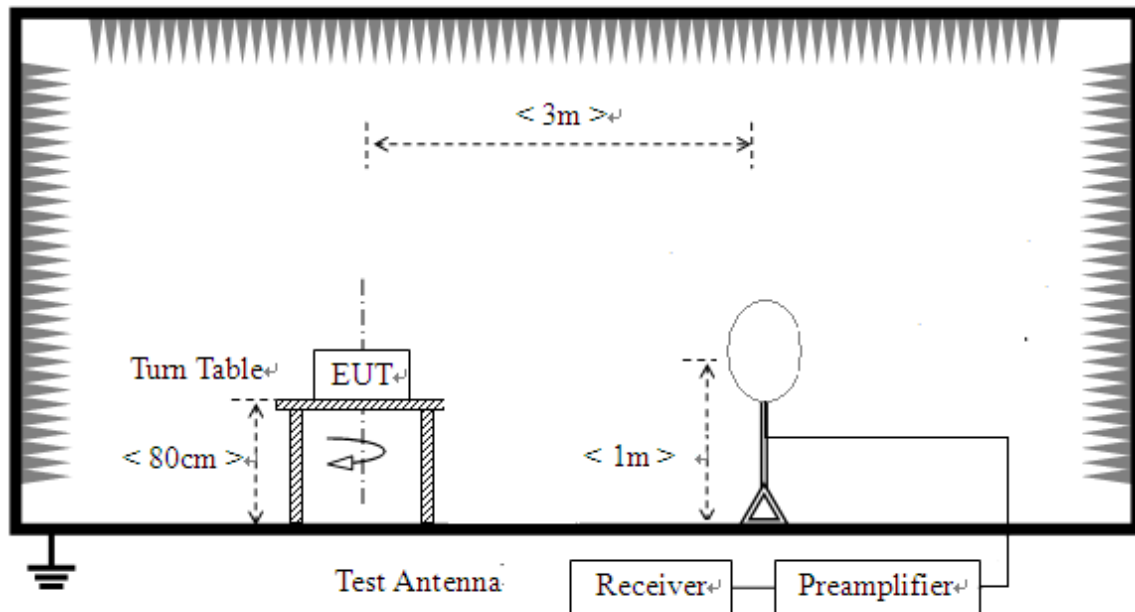
Note1: For above 1000MHz, the emission limit in this paragraph is based on measurement instrumentation employing an average detector, measurement using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit.

Note2: 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).

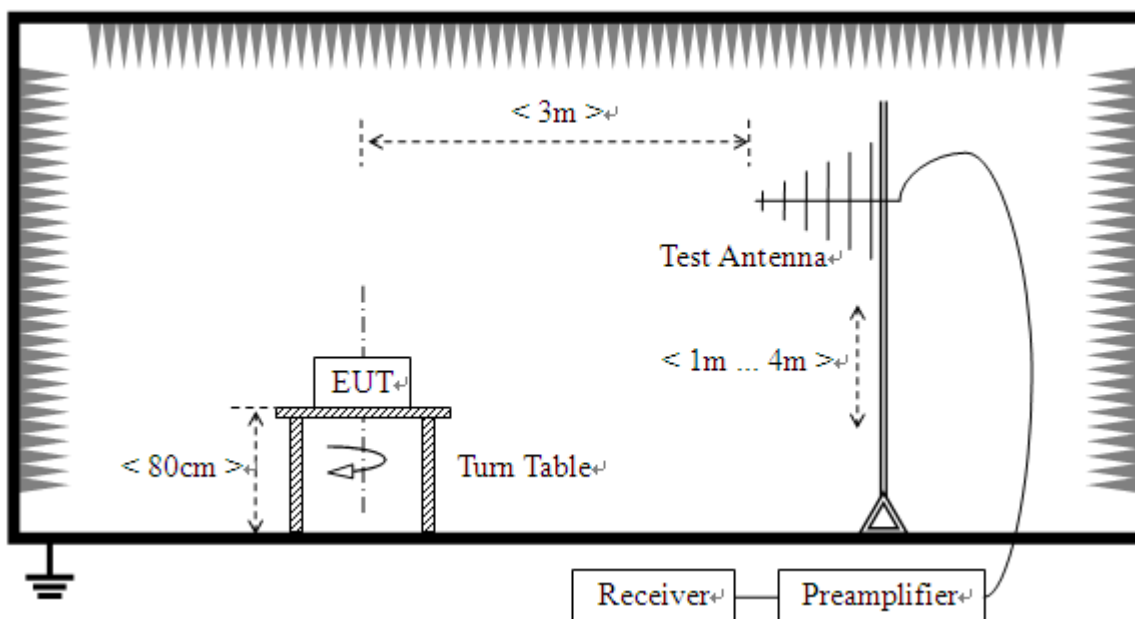
2.9.2. Test Description

Test Setup:

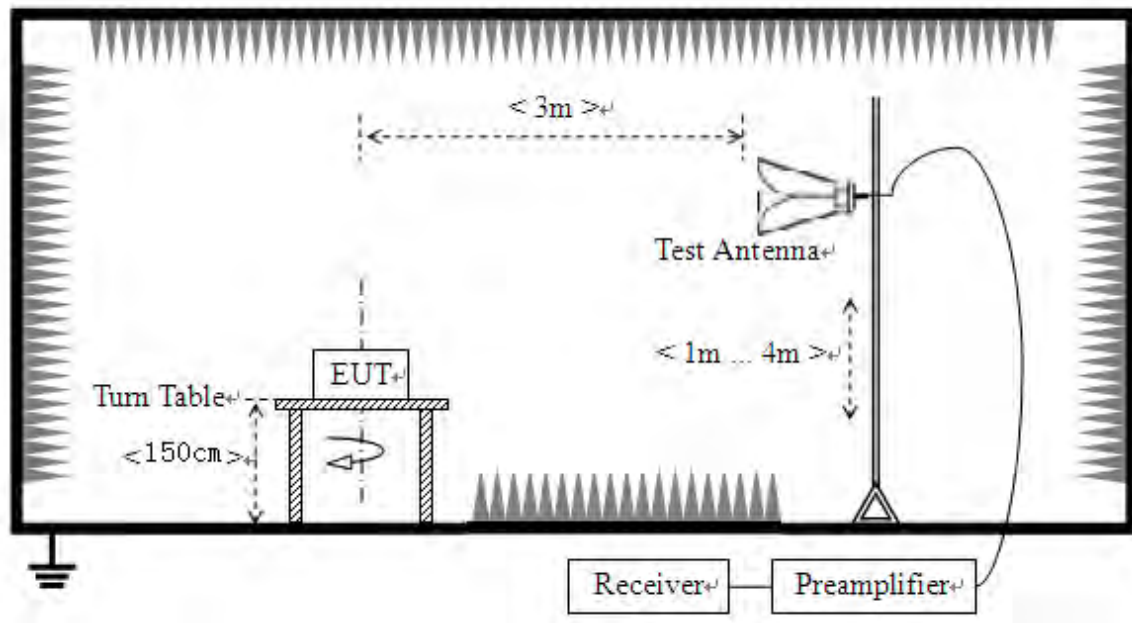
- 1) For radiated emissions from 9kHz to 30MHz



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



3) For radiated emissions above 1GHz



The EUT is placed on a non-conducting table 80 cm above the ground plane for measurement below 1GHz; 1.5 m above the ground plane for measurement above 1GHz. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.10. The EUT is set to transmit in a continuous mode.

For measurements below 30MHz, the emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9kHz-90 kHz, 110kHz-490 kHz. Radiated emission limits in these two bands are based on measurements employing an average detector.

For measurements below 1GHz the resolution bandwidth is set to 100kHz for peak detection measurements or 120kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1GHz the resolution bandwidth is set to 1MHz, the video band width is set to 3MHz for peak measurements and as applicable for average measurements.

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.



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 (or average) limit, it is unnecessary to perform an quasi-peak measurement (or average).

The measurement results are obtained as below:

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

A_T : Total correction Factor except Antenna

U_R : Receiver Reading

G_{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.

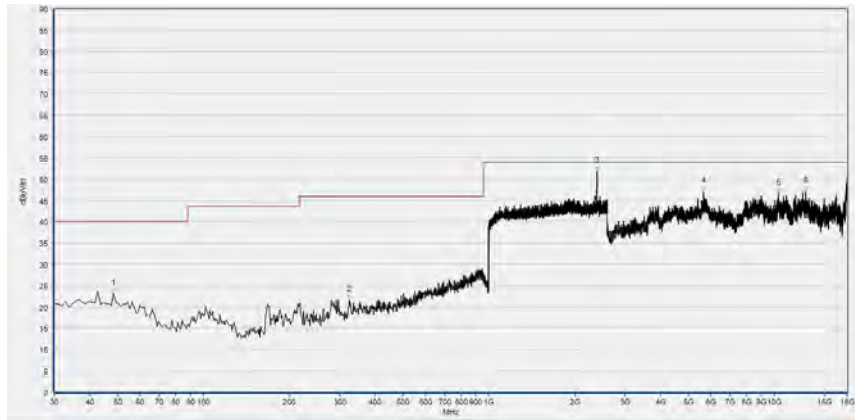
Note2: For the frequency, which started from 9kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit was not recorded.

Note3: For the frequency, which started from 18GHz to 40GHz, was pre-scanned and the result which was 20dB lower than the limit was not recorded.



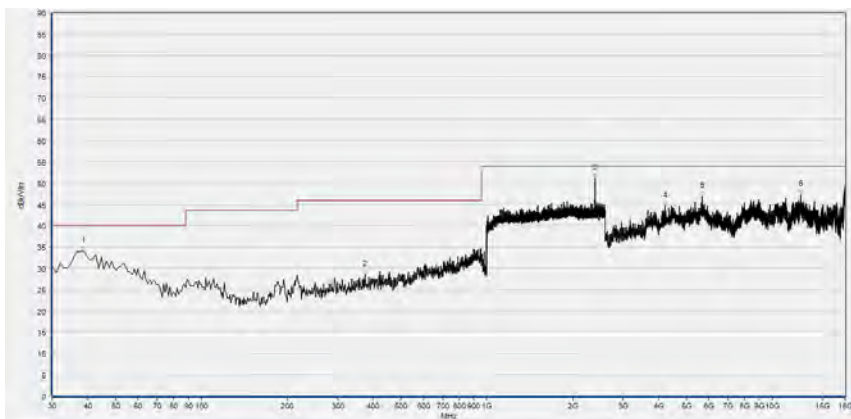
802.11b Mode

Plot 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
48.430	23.21	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
324.880	21.64	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
2391.467	51.77	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
5661.520	47.10	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
10346.200	46.60	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
12902.600	47.06	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

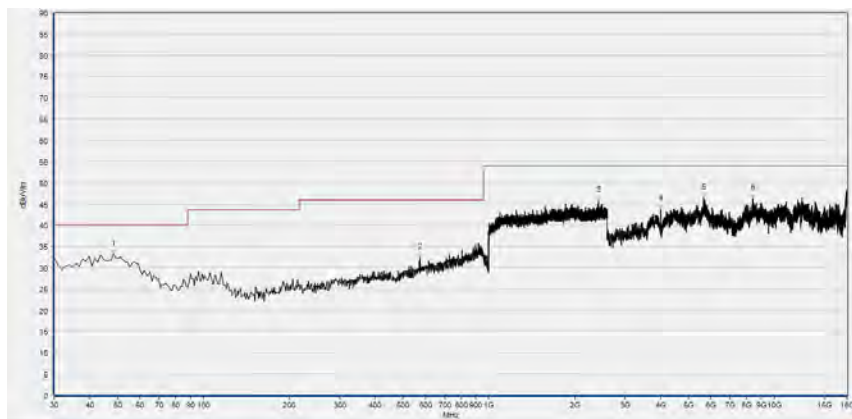
(Antenna Horizontal, 30MHz to 18GHz)



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
38.730	34.03	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
375.320	28.57	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
2390.400	51.06	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
4220.080	44.65	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
5692.320	46.92	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
12557.640	47.29	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

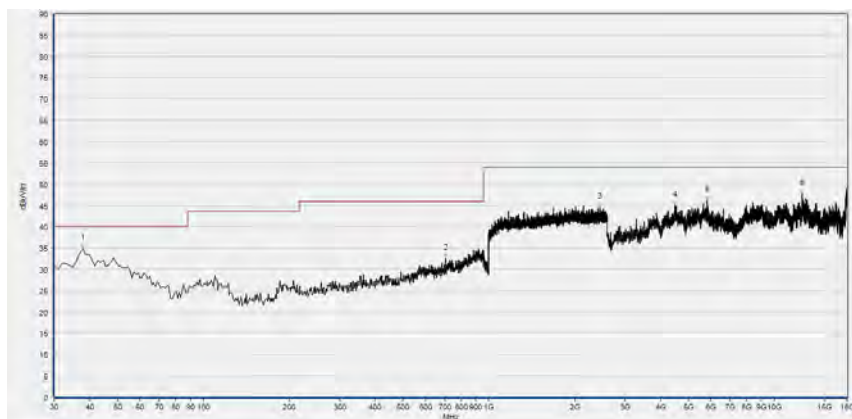
(Antenna Vertical, 30MHz to 18GHz)

Plot for Channel 6



Fre. (MHz)	PK (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
48.430	33.10	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
575.140	32.41	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
2418.133	45.79	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
4004.480	43.75	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
5667.680	46.42	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
8424.280	46.21	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

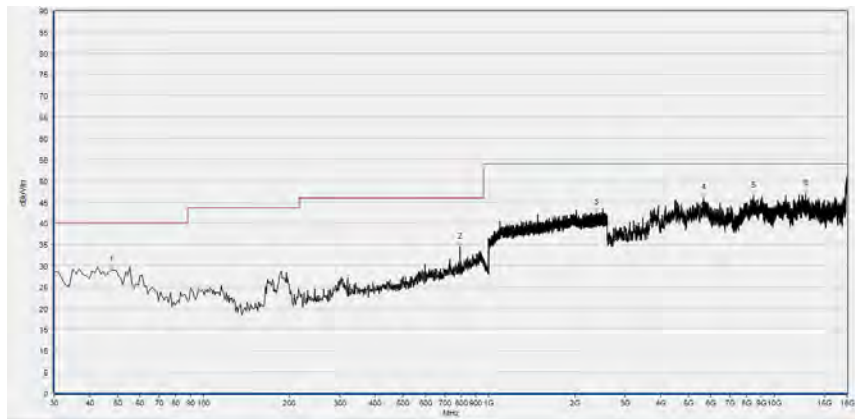
(Antenna Horizontal, 30MHz to 18GHz)



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
37.760	34.90	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
705.120	32.56	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
2450.133	44.51	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
4475.720	45.09	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
5830.920	46.24	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
12545.320	47.77	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

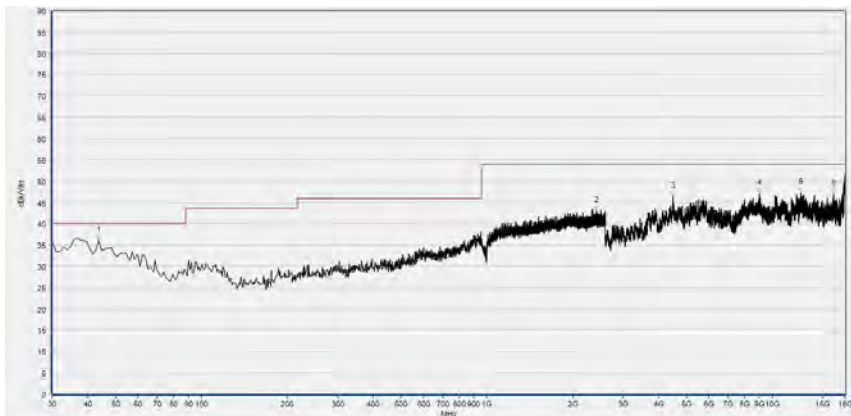
(Antenna Vertical, 30MHz to 18GHz)

Plot for Channel 11



Fre. (MHz)	PK (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
47.460	28.93	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
793.390	34.32	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
2379.200	42.35	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
5643.040	45.87	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
8445.840	46.38	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
12884.120	46.92	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

(Antenna Horizontal, 30MHz to 18GHz)

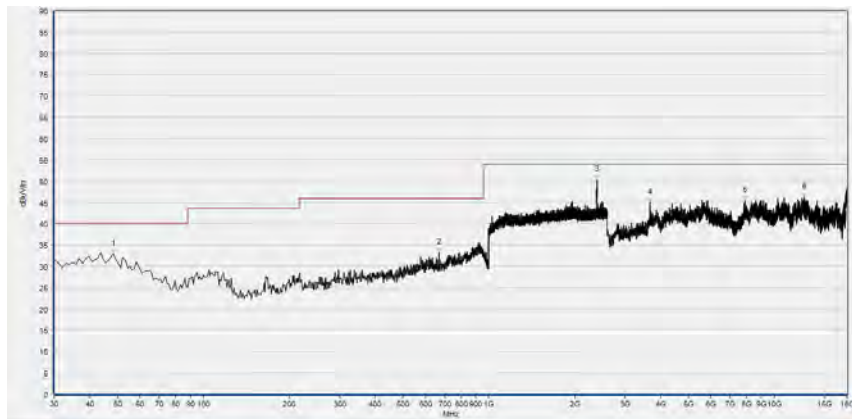


Fre. (MHz)	PK (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
43.580	35.97	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
2429.333	43.02	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
4484.960	46.38	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
8991.000	47.06	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
12622.320	47.23	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
16395.320	46.94	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

(Antenna Vertical, 30MHz to 18GHz)

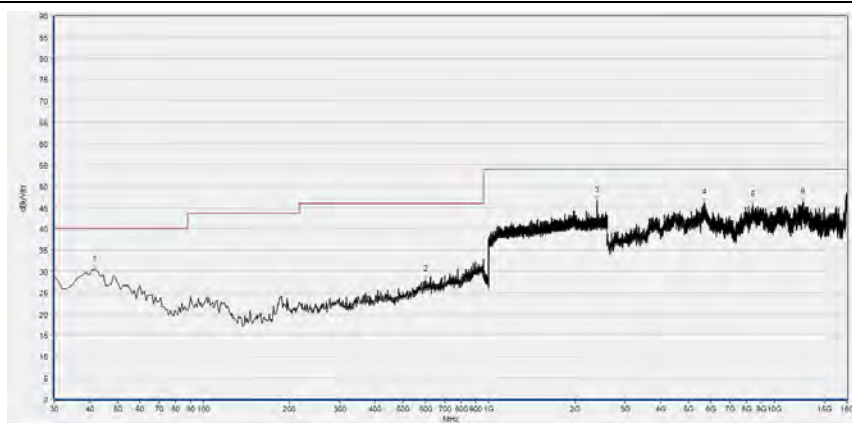
**802.11g Mode**

Plot 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
48.430	32.81	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
668.260	33.25	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
2390.400	50.28	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
3668.760	44.91	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
7894.520	45.37	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
12720.880	46.23	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

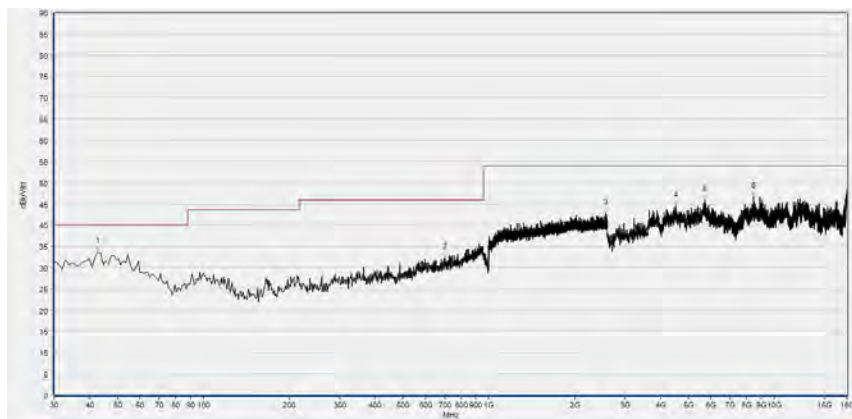
(Antenna Horizontal, 30MHz to 18GHz)



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
41.640	30.41	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
599.390	28.02	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
2390.933	46.68	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
5670.760	46.03	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
8408.880	45.52	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
12597.680	46.20	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

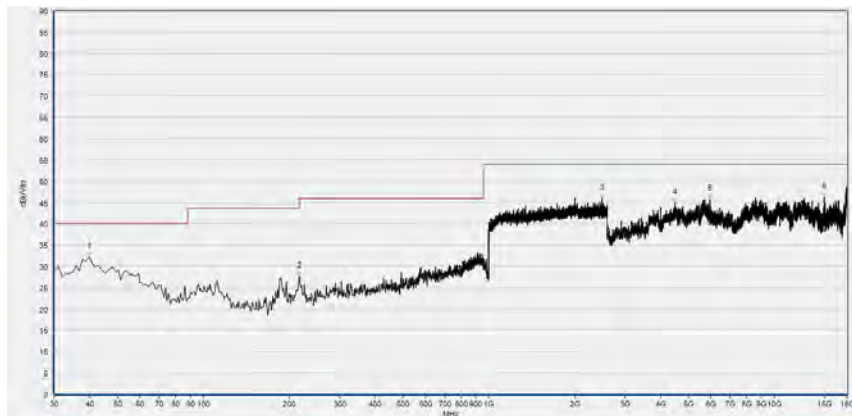
(Antenna Vertical, 30MHz to 18GHz)

Plot for Channel 6



Fre. (MHz)	PK (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
42.610	33.73	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
703.180	32.31	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
2570.133	42.91	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
4525.000	44.56	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
5710.800	45.91	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
8448.920	46.83	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

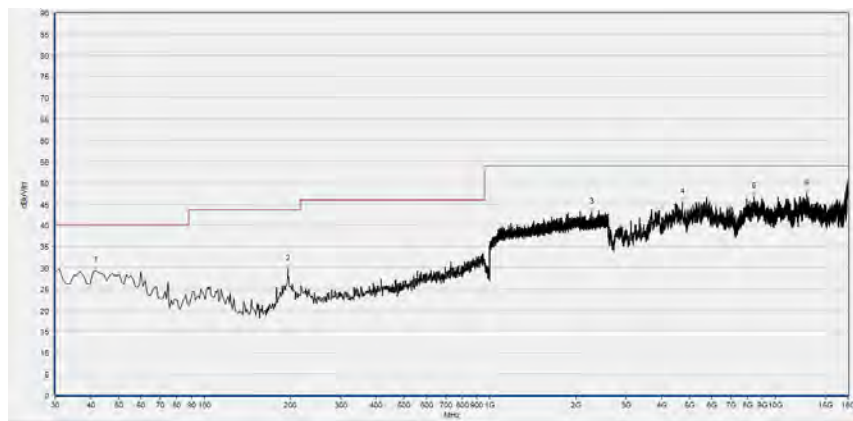
(Antenna Horizontal, 30MHz to 18GHz)



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
39.700	32.14	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
216.240	27.61	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
2488.533	45.84	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
4488.040	44.96	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
5960.280	45.80	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
14963.120	46.27	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

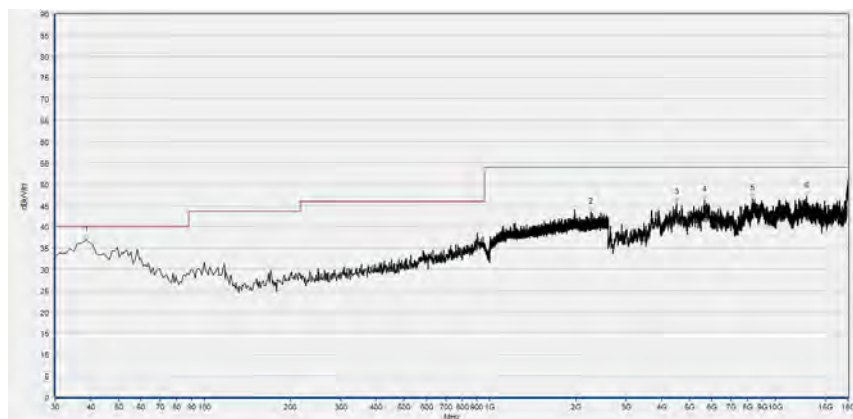
(Antenna Vertical, 30MHz to 18GHz)

Plot for Channel 11



Fre. (MHz)	PK (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
41.640	29.35	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
195.870	29.75	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
2276.267	43.10	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
4731.360	45.37	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
8408.880	46.71	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
12896.440	47.35	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

(Antenna Horizontal, 30MHz to 18GHz)

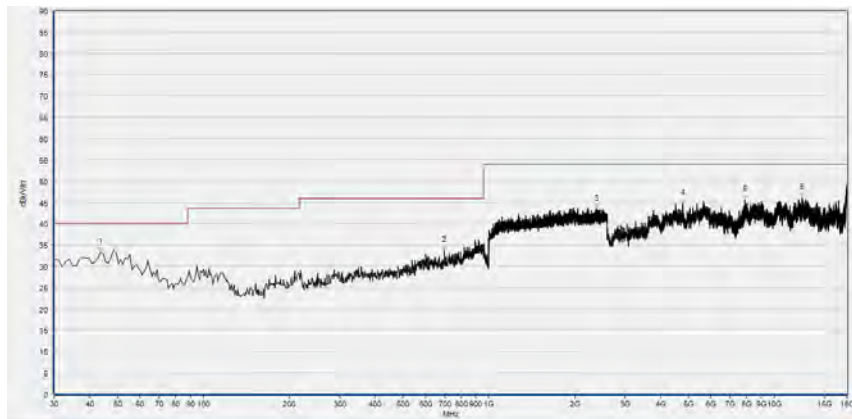


Fre. (MHz)	PK (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
38.730	36.92	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
2266.133	43.45	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
4506.520	45.66	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
5655.360	46.19	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
8307.240	46.61	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
12893.360	47.01	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

(Antenna Vertical, 30MHz to 18GHz)

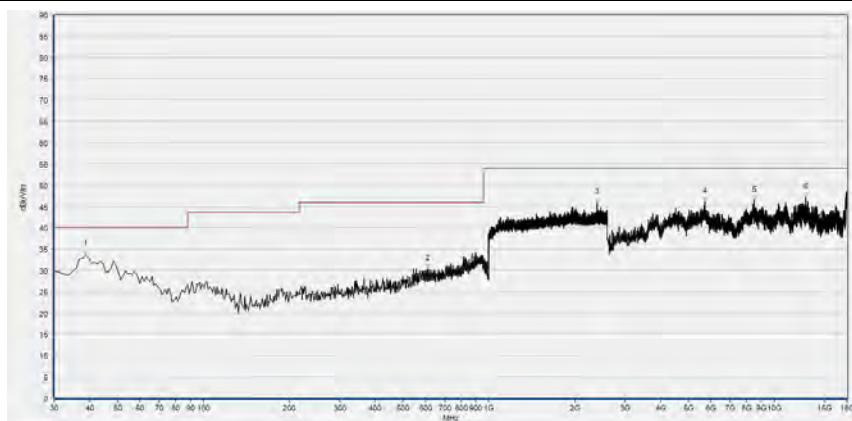
**802.11n (HT20) Mode**

Plot 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
43.580	33.36	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
699.300	33.70	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
2379.200	43.41	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
4780.640	44.83	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
7882.200	45.52	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
12523.760	46.01	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

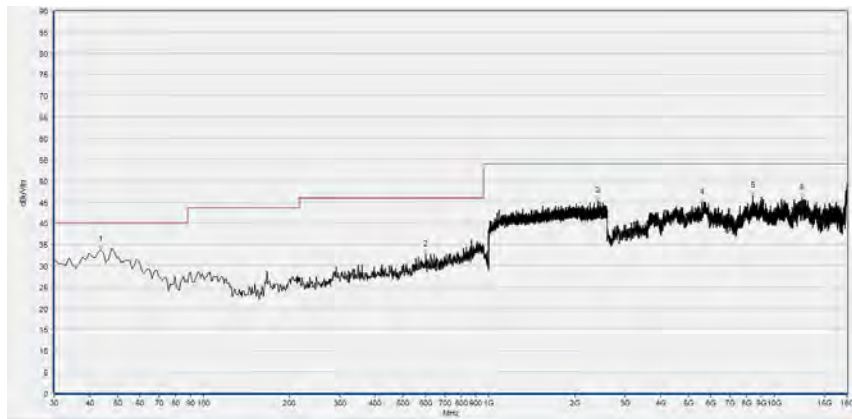
(Antenna Horizontal, 30MHz to 18GHz)



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
38.730	33.75	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
610.060	30.40	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
2390.400	45.87	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
5729.280	46.11	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
8522.840	46.36	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
12893.360	47.09	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

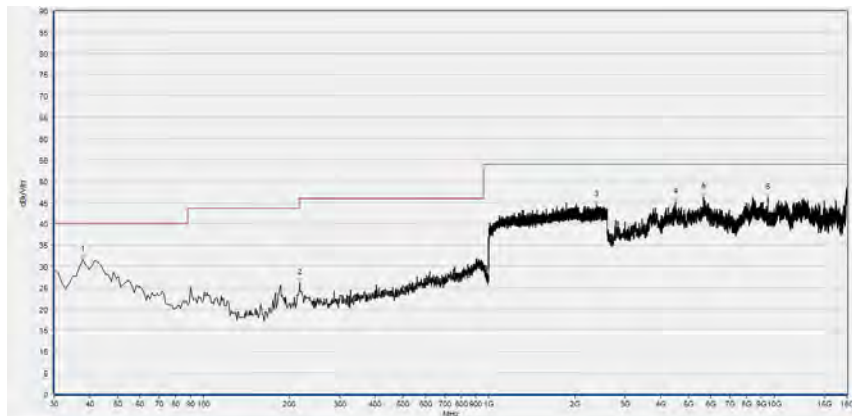
(Antenna Vertical, 30MHz to 18GHz)

Plot for Channel 6



Fre. (MHz)	PK (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
43.580	33.64	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
602.300	32.48	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
2409.600	45.26	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
5581.440	44.73	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
8430.440	46.49	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
12489.880	45.87	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

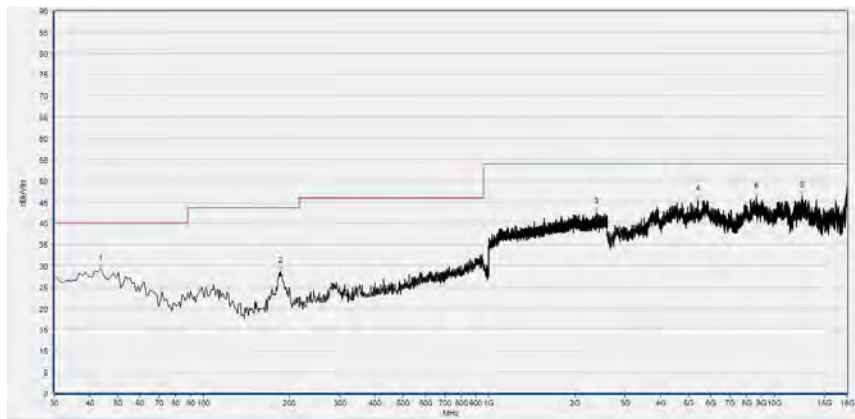
(Antenna Horizontal, 30MHz to 18GHz)



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
37.760	31.58	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
217.210	26.14	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
2385.067	44.36	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
4509.600	45.16	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
5639.960	46.25	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
9508.440	46.03	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

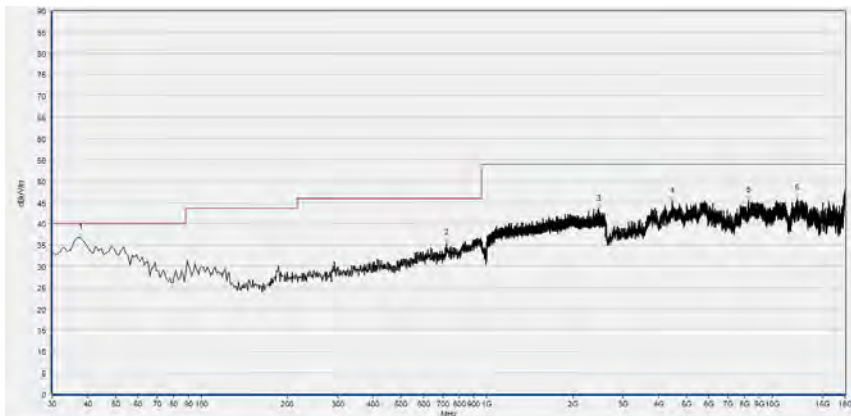
(Antenna Vertical, 30MHz to 18GHz)

Plot for Channel 11



Fre. (MHz)	PK (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
43.580	29.20	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
186.170	28.74	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
2374.400	42.59	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
5393.560	45.58	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
8642.960	46.25	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
12554.560	46.46	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

(Antenna Horizontal, 30MHz to 18GHz)

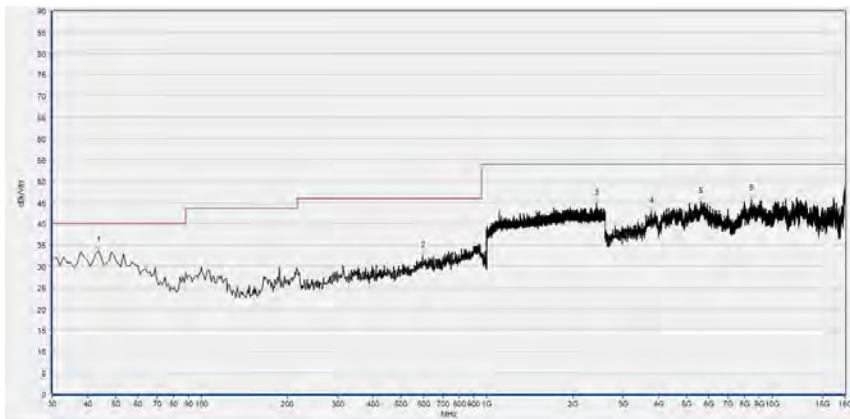


Fre. (MHz)	PK (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
37.760	36.71	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
721.610	35.43	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
2467.200	43.34	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
4451.080	45.24	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
8257.960	45.35	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
12225.000	45.96	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

(Antenna Vertical, 30MHz to 18GHz)

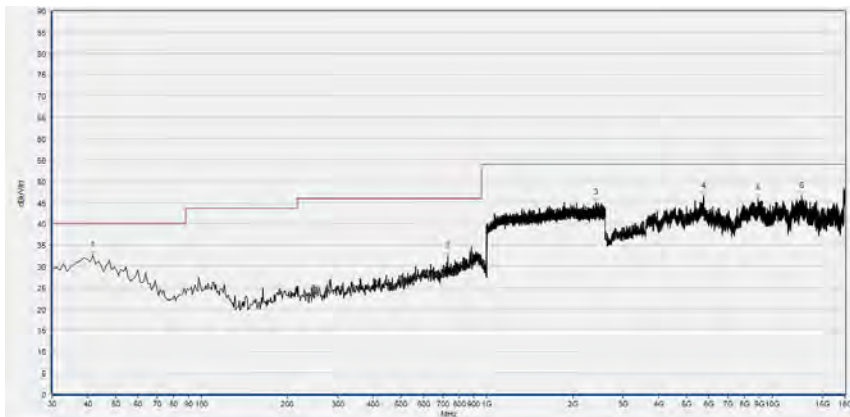
**802.11n (HT40) Mode**

Plot 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
43.580	33.70	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
595.510	32.28	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
2422.400	44.69	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
3773.480	42.88	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
5609.160	45.24	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
8452.000	45.69	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

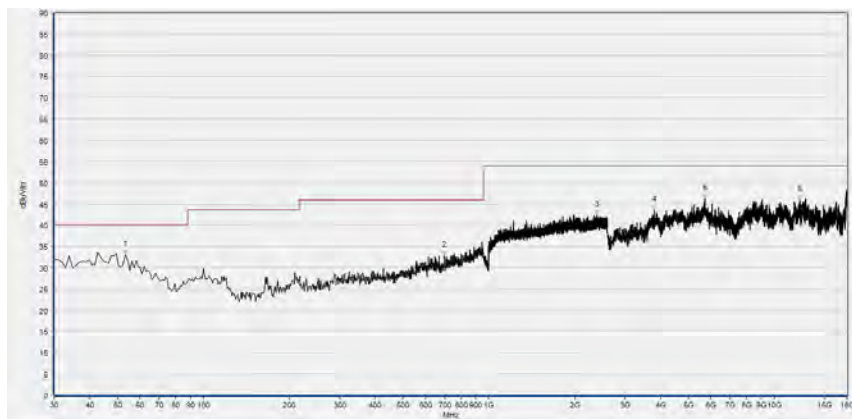
(Antenna Horizontal, 30MHz to 18GHz)



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
41.640	32.52	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
731.310	32.27	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
2411.733	44.90	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
5753.920	46.48	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
8917.080	45.99	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
12680.840	46.44	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

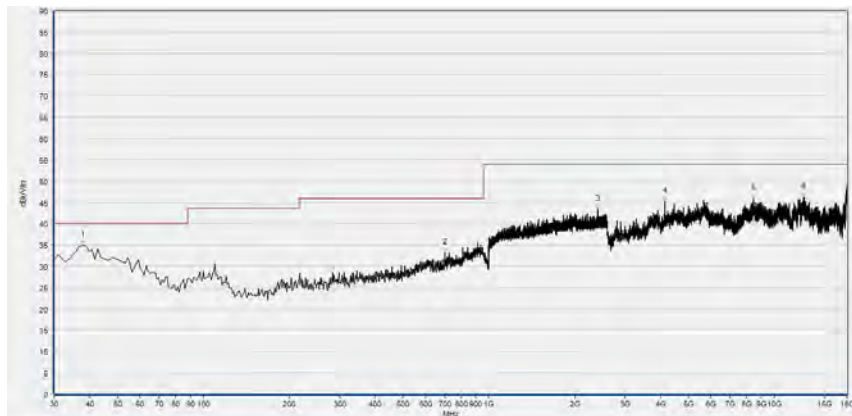
(Antenna Vertical, 30MHz to 18GHz)

Plot for Channel 6



Fre. (MHz)	PK (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
53.280	33.08	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
699.300	32.86	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
2390.400	42.36	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
3801.200	43.50	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
5713.880	46.26	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
12302.000	45.91	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

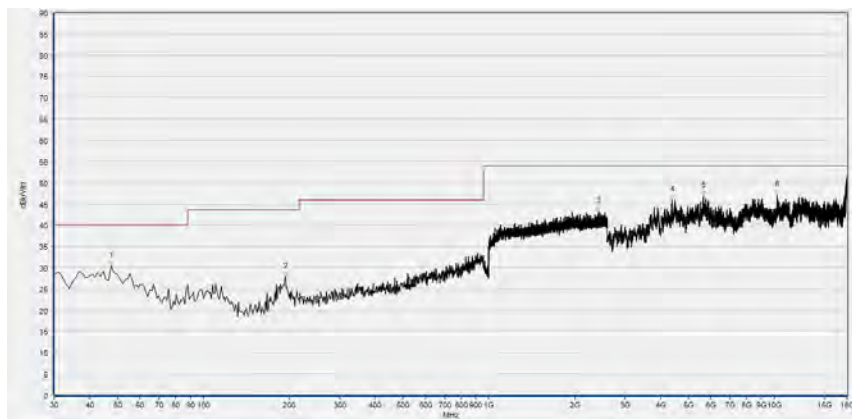
(Antenna Horizontal, 30MHz to 18GHz)



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
37.760	34.81	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
701.240	33.15	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
2406.400	43.46	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
4143.080	45.24	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
8448.920	45.90	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
12637.720	46.26	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

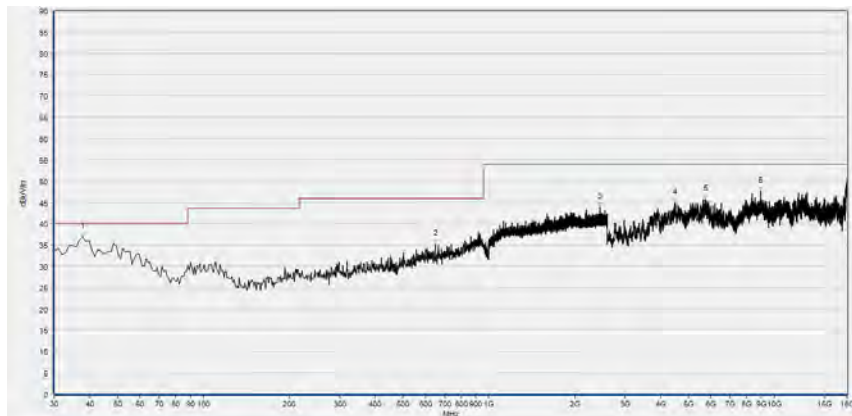
(Antenna Vertical, 30MHz to 18GHz)

Plot for Channel 9



Fre. (MHz)	PK (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
47.460	30.51	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
193.930	27.80	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
2416.533	43.18	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
4389.480	46.00	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
5636.880	46.86	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
10213.760	47.14	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

(Antenna Horizontal, 30MHz to 18GHz)



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
37.760	36.80	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
649.830	35.12	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
2454.400	43.83	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
4478.800	44.85	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
5738.520	45.71	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
8972.520	47.53	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

(Antenna Vertical, 30MHz to 18GHz)

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	$\pm 2.22\text{dB}$
Power spectral density (PSD)	$\pm 2.22\text{dB}$
Bandwidth	$\pm 5\%$
Conducted Spurious Emission	$\pm 2.77\text{dB}$
Restricted Frequency Bands	$\pm 5\%$
Radiated Emission	$\pm 2.95\text{dB}$
Conducted Emission	$\pm 2.44\text{dB}$

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	Due Date
Attenuator 1	(N/A.)	10dB	Resent	N/A	N/A
EXA Signal Analyzer	MY53470836	N9010A	Agilent	2020.04.01	2021.03.31
USB Wideband Power Sensor	MY54210011	U2021XA	Agilent	2020.04.01	2021.03.31
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	Due Date
Receiver	MY56400093	N9038A	KEYSIGHT	2020.03.26	2021.03.25
LISN	812744	NSLK 8127	Schwarzbeck	2020.03.26	2021.03.25
Pulse Limiter (10dB)	VTSD 9561 F-B #206	VTSD 9561-F	Schwarzbeck	2020.07.24	2021.07.23
Coaxial cable(BNC) (30MHz-26GHz)	CB01	EMC01	Morlab	N/A	N/A

4.3 List of Software Used

Description	Manufacturer	Software Version
Test system	Townsend	V2.6
Power Panel	Agilent	V3.8
MORLAB EMCR V1.2	MORLAB	V1.0
TS+ -[JS32-CE]	Tonscend	V2.5.0.0

**4.4 Radiated Test Equipments**

Equipment Name	Serial No.	Type	Manufacturer	Cal. Date	Due Date
Receiver	MY54130016	N9038A	Agilent	2020.07.21	2021.07.20
Test Antenna - Bi-Log	9163-519	VULB 9163	Schwarzbeck	2019.05.24	2022.05.23
Test Antenna - Loop	1519-022	FMZB1519	Schwarzbeck	2019.02.14	2022.02.13
Test Antenna – Horn	01774	BBHA 9120D	Schwarzbeck	2019.07.26	2022.07.25
Test Antenna – Horn	BBHA9170 #774	BBHA9170	Schwarzbeck	2019.07.26	2022.07.25
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
Coaxial cable (N male) (30MHz-40GHz)	CB05	EMC05	Morlab	N/A	N/A
1-18GHz pre-Amplifier	61171/61172	S020180L32 03	Tonscend	2020.07.21	2021.07.20
18-26.5GHz pre-Amplifier	46732	S10M100L38 02	Tonscend	2020.07.21	2021.07.20
26-40GHz pre-Amplifier	56774	S40M400L40 02	Tonscend	2020.07.21	2021.07.20
Notch Filter	N/A	WRCG-2400-2483.5-60SS	Wainwright	2020.07.21	2021.07.20
Anechoic Chamber	N/A	9m*6m*6m	CRT	2020.01.06	2023.01.05

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