



REPORT No.: SZ20010113W03

TEST REPORT

APPLICANT : Shenzhen Xhorse Electronics Co., Ltd.

PRODUCT NAME : MINI OBD TOOL

MODEL NAME : XDMO

BRAND NAME : Xhorse

FCC ID : 2A14T-XDMO00

STANDARD(S) : 47 CFR Part 15 Subpart C

RECEIPT DATE : 2020-01-13

TEST DATE : 2020-04-15 to 2021-02-25

ISSUE DATE : 2021-05-10

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Change History		
Version	Date	Reason for change
1.0	2021-05-10	First edition



1. Technical Information

Note: Provide by applicant.

1.1. Applicant and Manufacturer Information

Applicant:	Shenzhen Xhorse Electronics Co., Ltd.
Applicant Address:	Floor 28, Block A, Building NO.6, international innovation Valley, Nanshan District, Shenzhen, China
Manufacturer:	Shenzhen Xhorse Electronics Co., Ltd.
Manufacturer Address:	Floor 28, Block A, Building NO.6, international innovation Valley, Nanshan District, Shenzhen, China

1.2. Equipment Under Test (EUT) Description

Product Name:	MINI OBD TOOL	
Serial No.:	(N/A, marked #1 by test site)	
Hardware Version:	V1.2	
Software Version:	V1.1.0	
Modulation Technology:	DSSS, OFDM	
Modulation Type:	Refer to section1.3	
Operating Frequency Range:	802.11b/g/ n (HT20): 2412MHz–2467MHz 802.11n (HT40): 2422MHz–2462MHz	
Antenna Type:	PCB Antenna	
Antenna Gain:	1dBi	
Accessory Information:	Button Battery	
	Brand Name:	N/A
	Model No.:	CR2032
	Serial No.:	(N/A, marked #1 by test site)
	Capacity:	240mAh
	Rated Voltage:	3.0V

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) ^{Note1}
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	12	2467
	6	2437	13	2472
	7	2442		
Test Mode	Channel	Frequency (MHz)	Channel	Frequency (MHz)
802.11n (HT40)	3	2422	8	2447
	4	2427	9	2452
	5	2432	10	2457
	6	2437	11	2462
	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	Apr 15, 2020	Ouyang Feng	PASS	No deviation
3	15.247(b)	Maximum Peak and Average Conducted Output Power	Apr 15, 2020	OuyangFeng	PASS	No deviation
4	15.247(a)	Bandwidth	Feb 25, 2021	Ouyang Feng	PASS	No deviation
5	15.247(d)	Conducted Spurious Emission and Band Edge	Apr 15, 2020	Ouyang Feng	PASS	No deviation
6	15.247(e)	Power Spectral Density	Feb 25, 2021	Ouyang Feng	PASS	No deviation
7	15.207	Conducted Emission	N/A	N/A	N/A ^{Note 1}	N/A
8	15.247(d)	Restricted Frequency Bands	Dec 18, 2020	Peng Xuwei	PASS	No deviation
9	15.209, 15.247(d)	Radiated Emission	May 29, 2020	Li Zihao	PASS	No deviation

Note 1: Measurements to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines.



Note 2: The tests were performed according to the method of measurements prescribed in ANSIC63.10-2013, KDB558074 D01 v05r02.

Note 3: The path loss during the RF test is calibrated to correct the results by the offset setting in the test equipments. The ref offset 11dB contains two parts that cable loss 1dB and Attenuator 10dB.

Note 4: 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 5: 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. 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

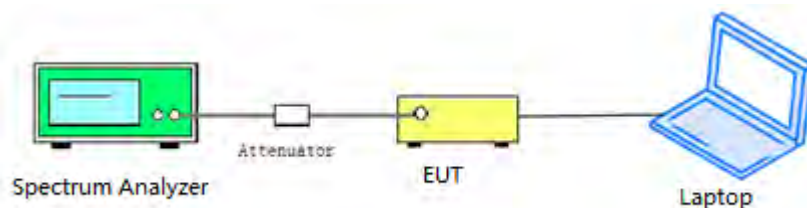
2.2.1. Requirement

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 $\pm 2\%$; 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.

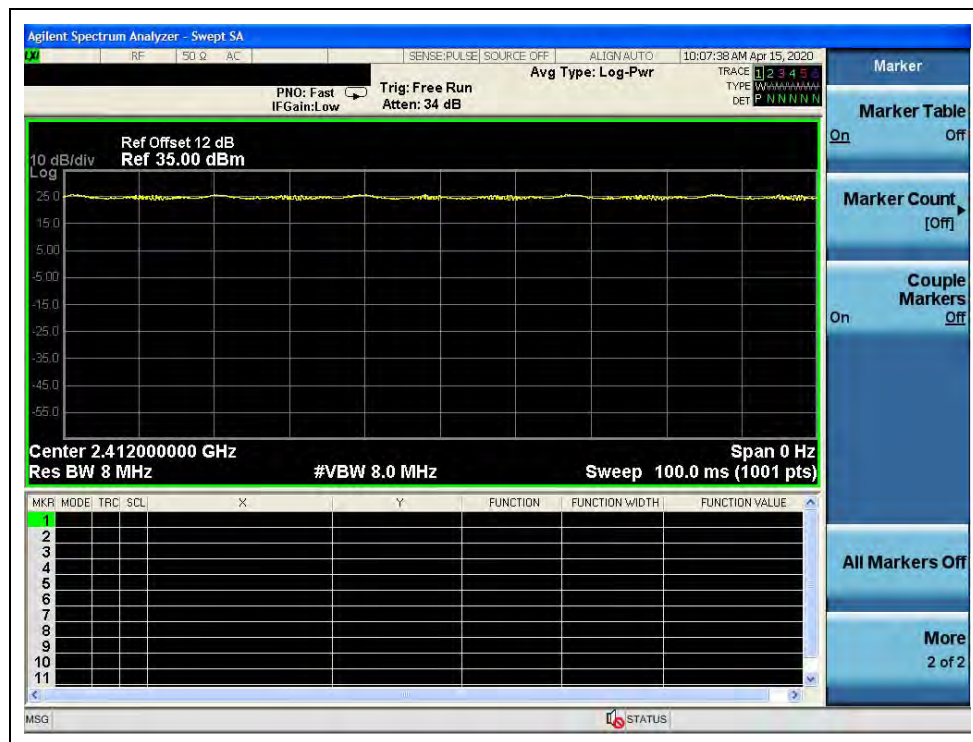


2.2.3. Test Result

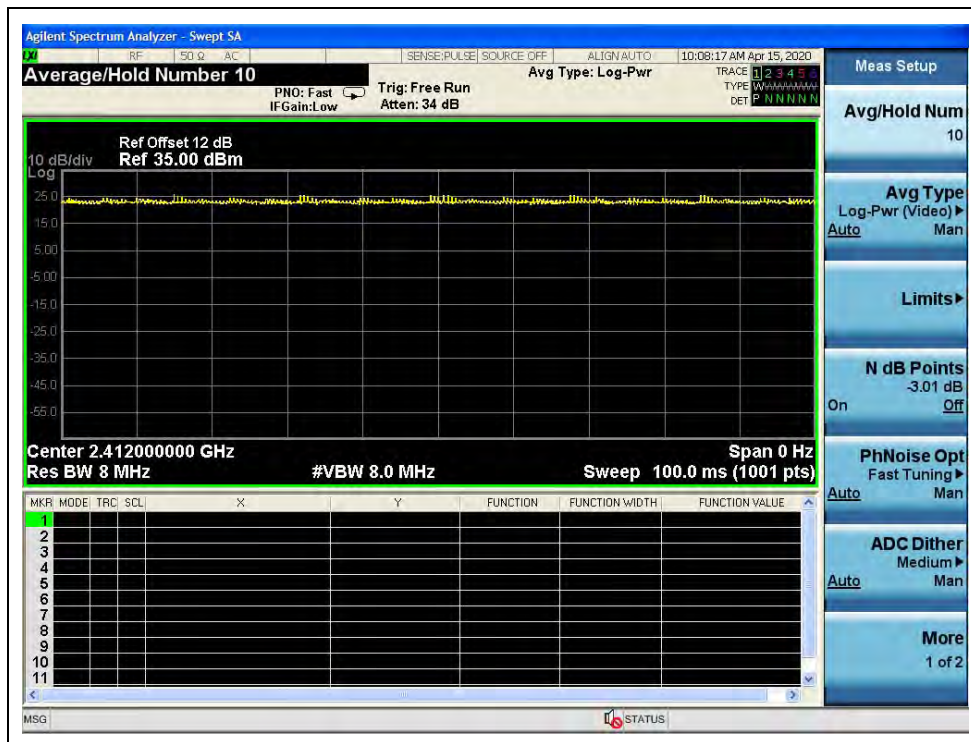
A. Test Verdict:

Test Mode	Duty Cycle (%) (D)	Duty Factor ($10 \cdot \lg[1/D]$)
802.11b	100.00	0.00
802.11g	100.00	0.00
802.11n (HT20)	100.00	0.00
802.11n (HT40)	100.00	0.00

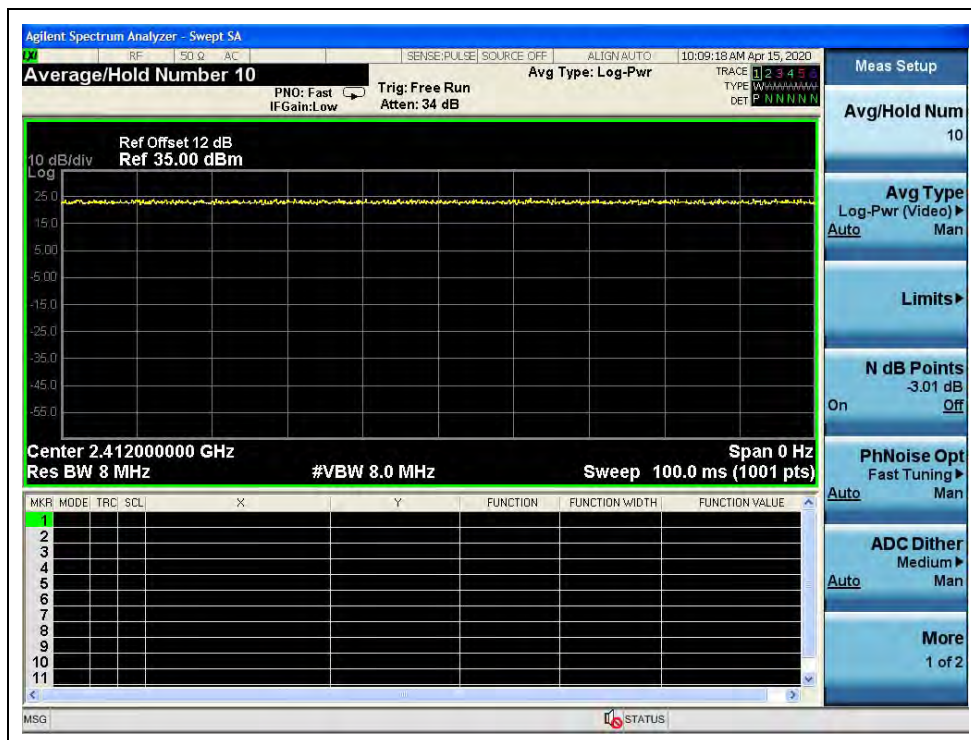
B. Test Plot:



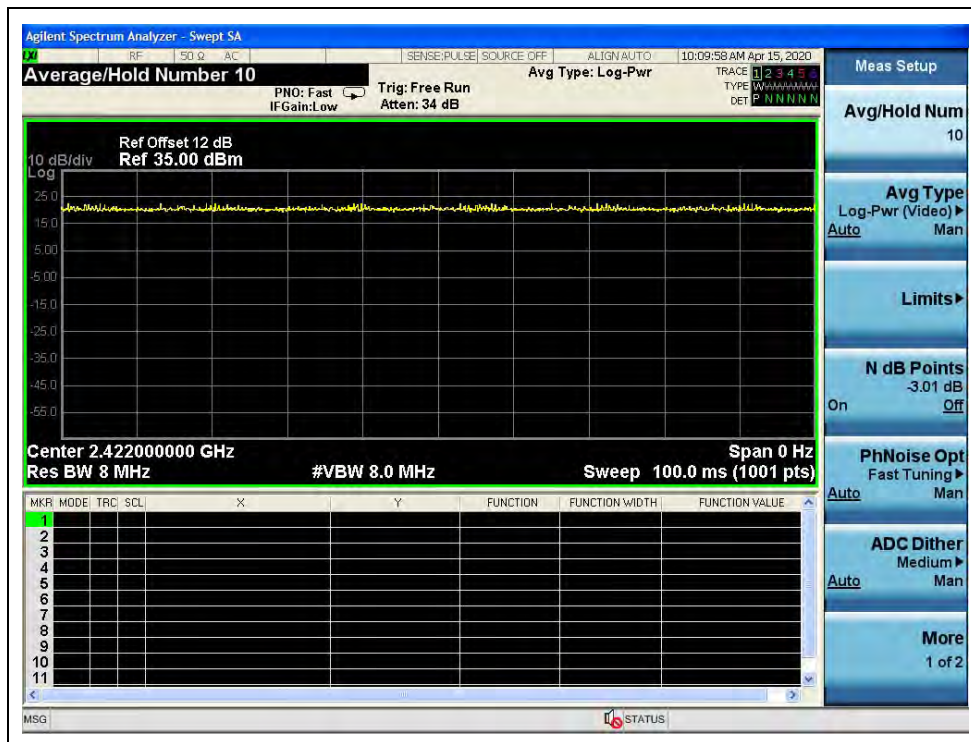
(Channel 1, 802.11b)



(Channel 1, 802.11g)



(Channel 1, 802.11n (HT20))



(Channel 3, 802.11n (HT40))

2.3. Maximum Peak and Average Conducted Output Power

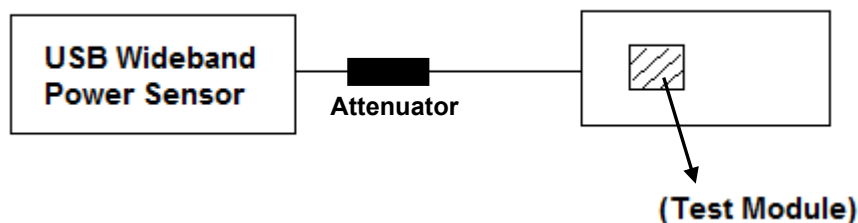
2.3.1. Requirement

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	16.94	0.049	30	1	PASS
7	2442	16.04	0.040			PASS
12	2467	15.97	0.040			PASS

802.11g Mode

Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	W	dBm	W	
1	2412	16.94	0.049	30	1	PASS
7	2442	16.04	0.040			PASS
12	2467	15.97	0.040			PASS

802.11n (HT20) Mode

Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	W	dBm	W	
1	2412	17.37	0.055	30	1	PASS
7	2442	17.30	0.054			PASS
12	2467	17.27	0.053			PASS

802.11n (HT40) Mode

Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	W	dBm	W	
3	2422	16.38	0.043	30	1	PASS
7	2442	16.32	0.043			PASS
11	2462	16.32	0.043			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	13.44	0.00	13.44	0.022	30	1	PASS
7	2442	13.41		13.41	0.022			PASS
12	2467	13.40		13.40	0.022			PASS

802.11g Mode

Channel	Frequency (MHz)	Average Power				Limit		Verdict
		Measured	Duty Factor	Duty Factor Calculated				
		dBm		dBm	W	dBm	W	
1	2412	12.30	0.00	12.30	0.017	30	1	PASS
7	2442	12.21		12.21	0.017			PASS
12	2467	12.32		12.32	0.017			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	12.12	0.00	12.12	0.016	30	1	PASS
7	2442	12.21		12.21	0.017			PASS
12	2467	12.24		12.24	0.017			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	12.34	0.00	12.34	0.017	30	1	PASS
7	2442	12.40		12.40	0.017			PASS
11	2462	12.08		12.08	0.016			PASS

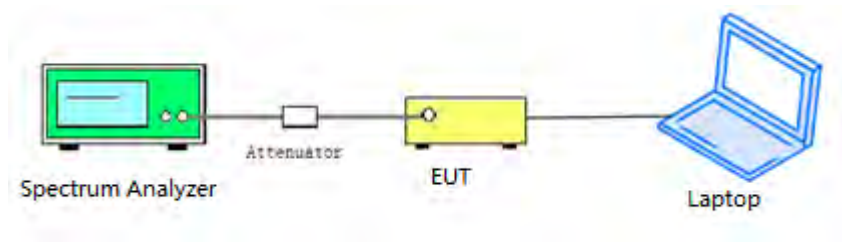
2.4. Bandwidth

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.



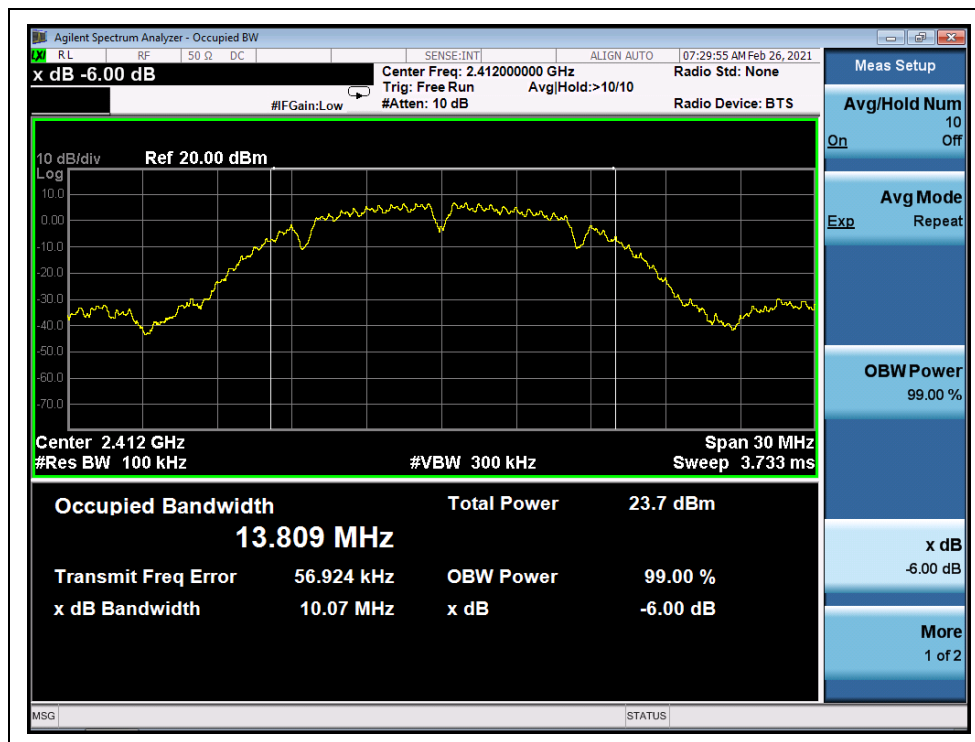
2.4.4. Test Result

802.11b Mode

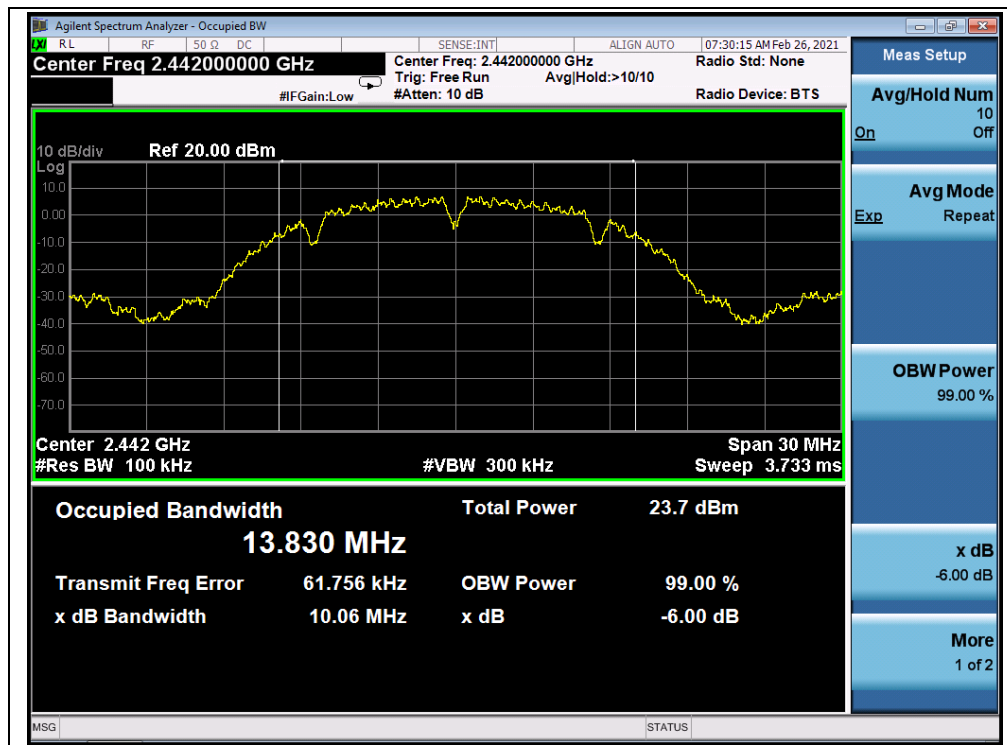
A. Test Verdict:

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limits(kHz)	Result
1	2412	10.07	≥500	PASS
7	2442	10.06	≥500	PASS
12	2467	10.05	≥500	PASS

B. Test Plot:



(Channel 1, 802.11b)



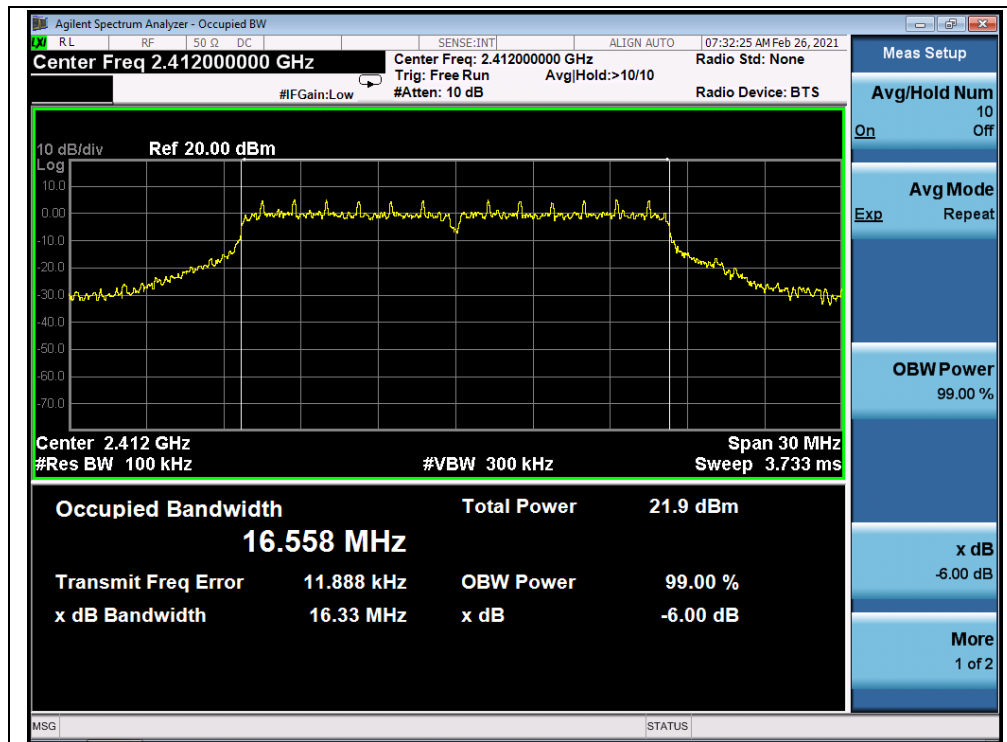
(Channel 7, 802.11b)



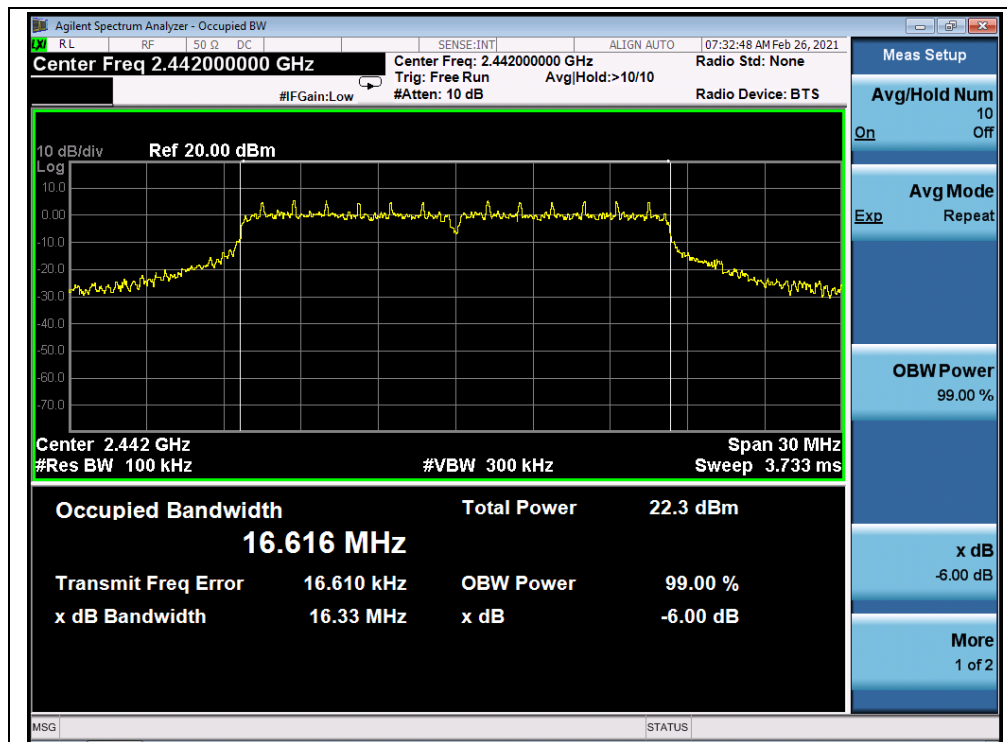
(Channel 12, 802.11b)

**802.11g Mode****A. Test Verdict:**

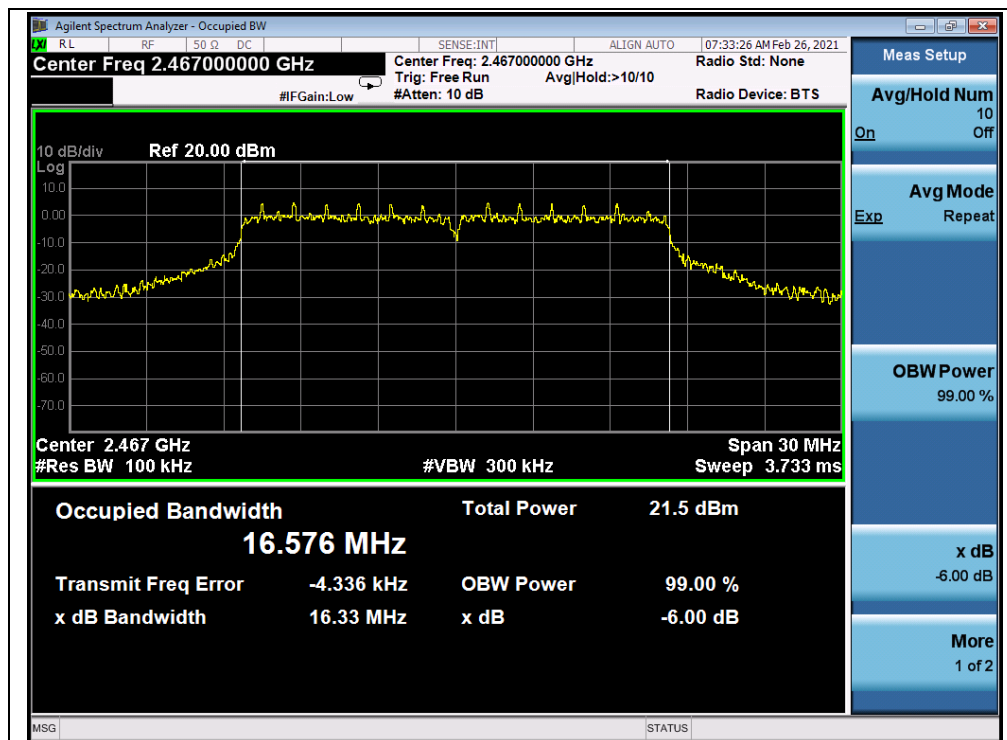
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limits(kHz)	Result
1	2412	16.33	≥500	PASS
7	2442	16.33	≥500	PASS
12	2467	16.33	≥500	PASS

B. Test Plot:

(Channel 1, 802.11g)



(Channel 7, 802.11g)



(Channel 12, 802.11g)

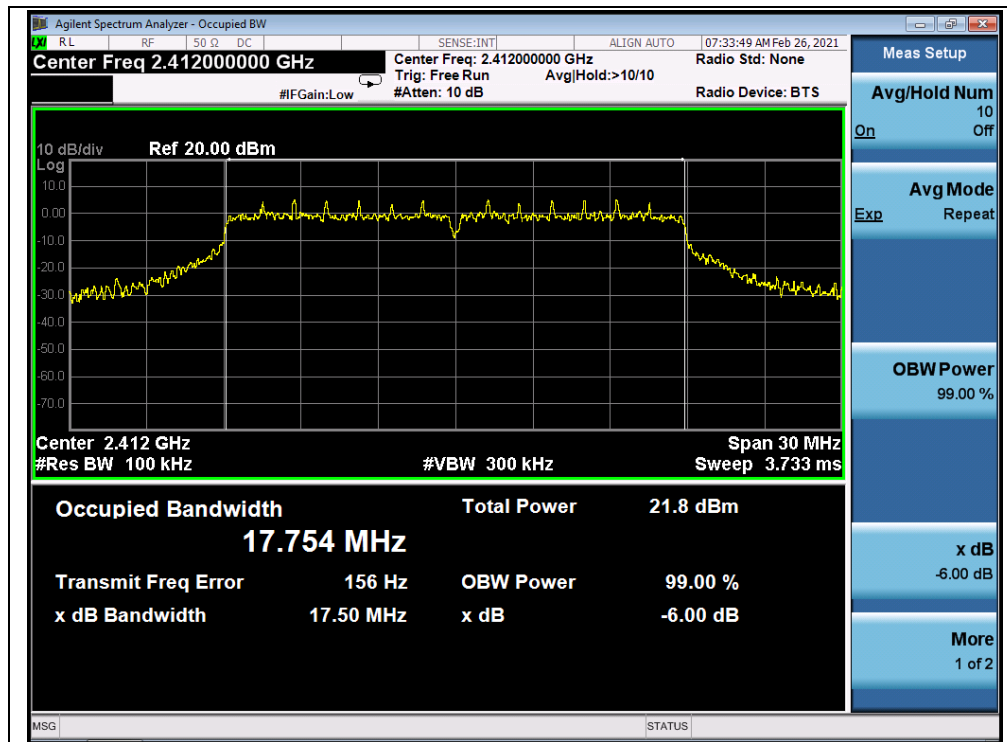


802.11n (HT20) Mode

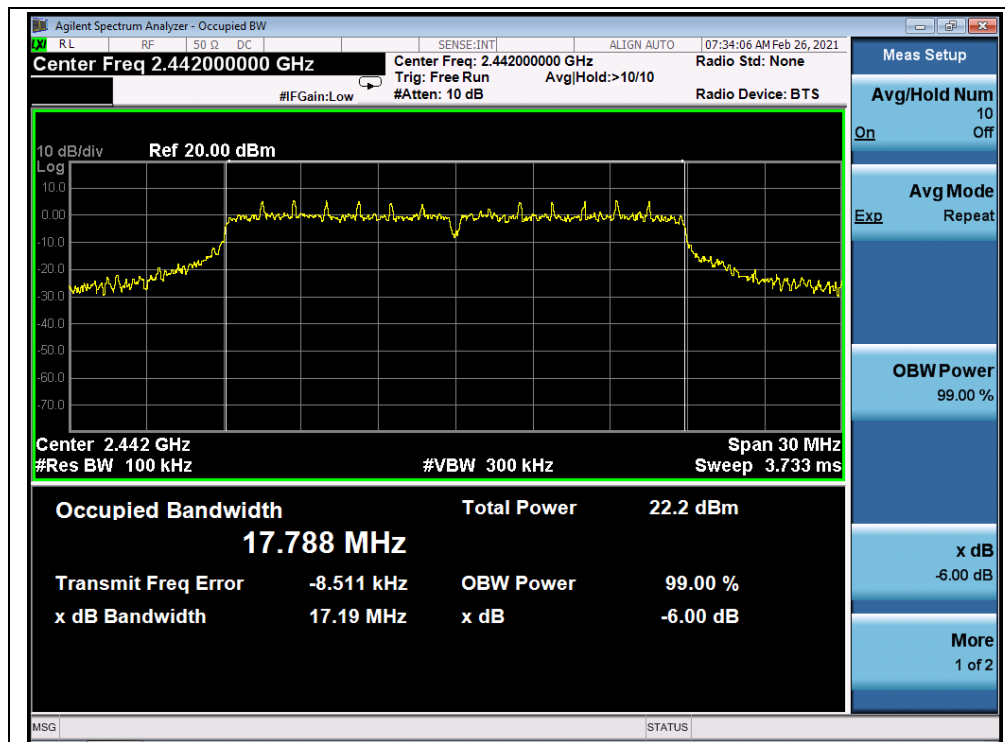
A. Test Verdict:

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limits(kHz)	Result
1	2412	17.50	≥500	PASS
7	2442	17.19	≥500	PASS
12	2467	16.35	≥500	PASS

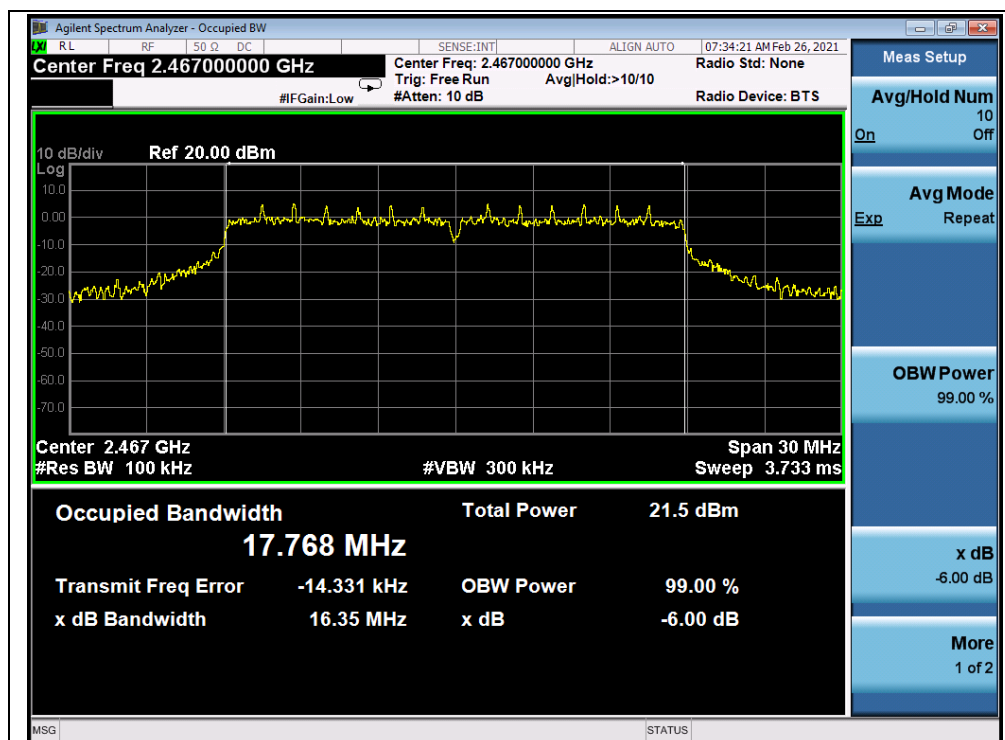
B. Test Plot:



(Channel 1, 802.11n (HT20))



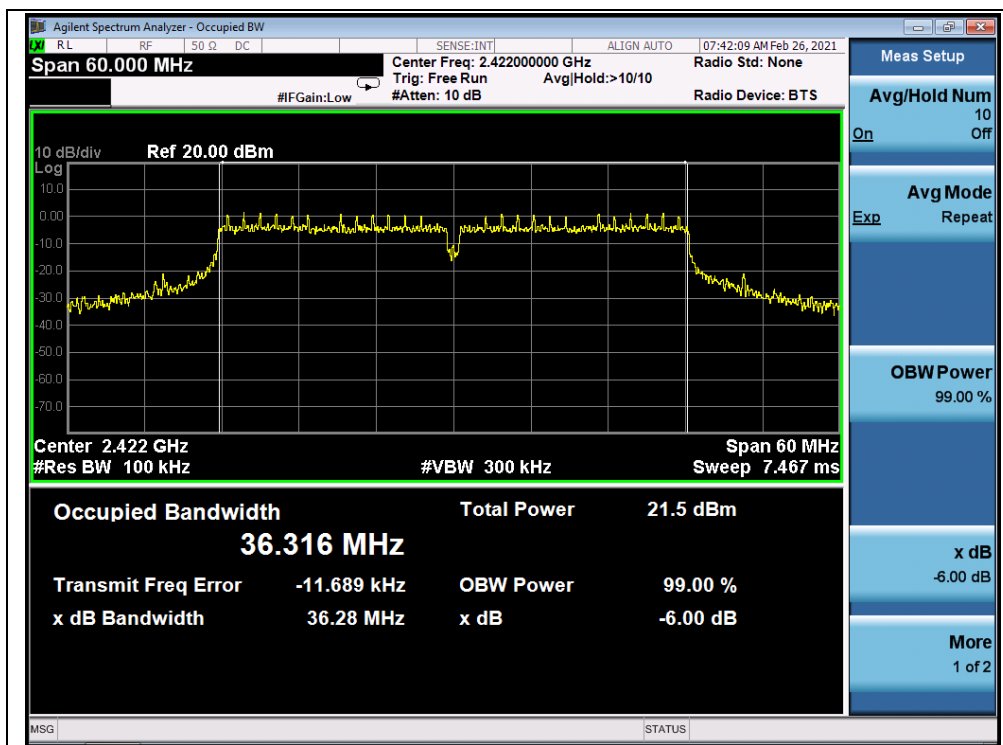
(Channel 7, 802.11n (HT20))



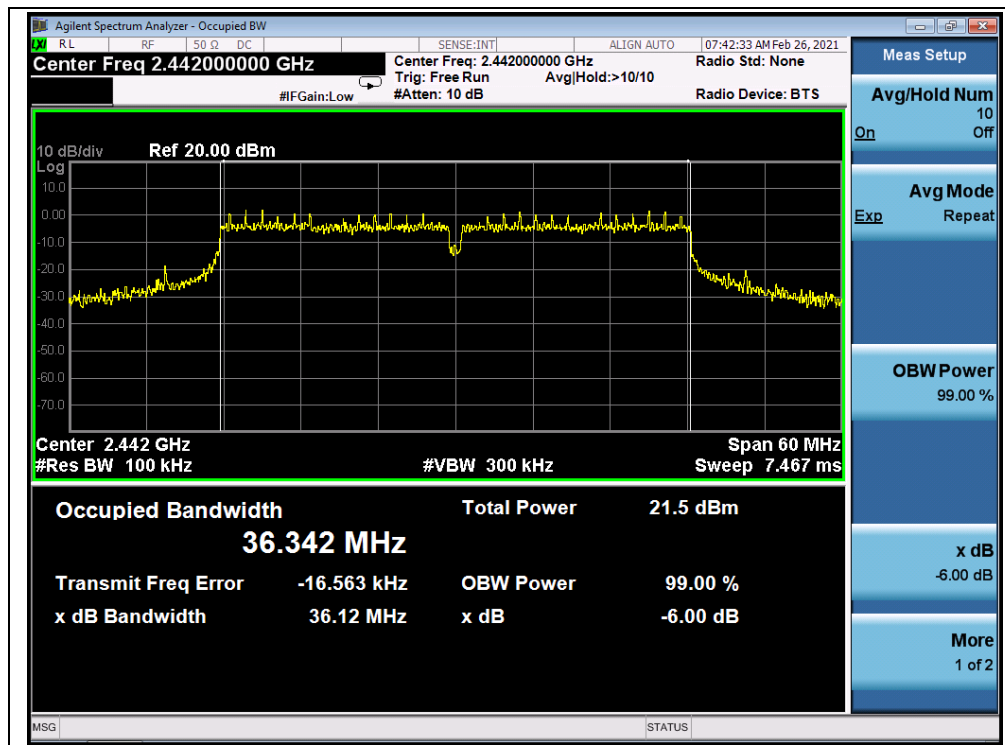
(Channel 12, 802.11n (HT20))

**802.11n (HT40) Mode****A. Test Verdict:**

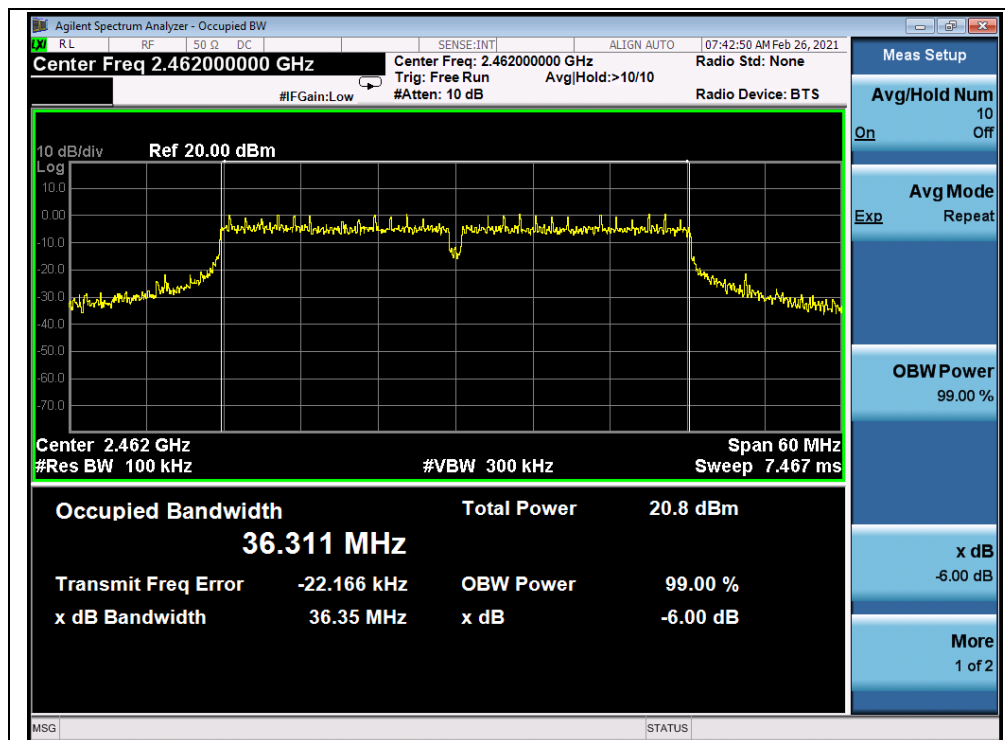
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limits(kHz)	Result
3	2422	36.28	≥500	PASS
7	2442	36.12	≥500	PASS
11	2462	36.35	≥500	PASS

B. Test Plot:

(Channel 3, 802.11n (HT40))



(Channel 7, 802.11n (HT40))



(Channel 11, 802.11n (HT40))

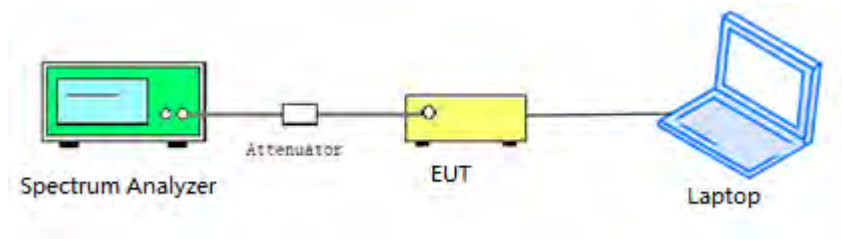
2.5. Conducted Spurious Emissions and Band Edge

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

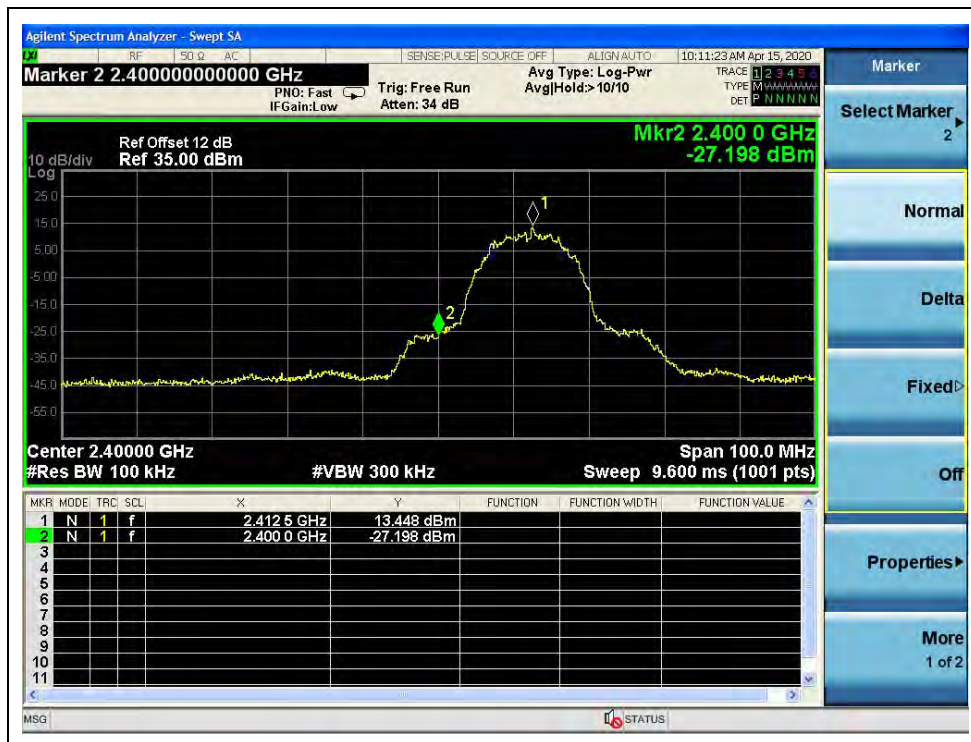
A. Test Verdict:

Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
			Carrier Level	Calculated -20dBc Limit	
1	2412	-28.34	12.16	-7.84	PASS
7	2442	-29.17	10.74	-9.26	PASS
12	2467	-28.87	9.34	-10.66	PASS

B. Test Plot:



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



(Band Edge, Channel 1, 802.11b)



(30MHz to 25GHz, Channel 7, 802.11b)



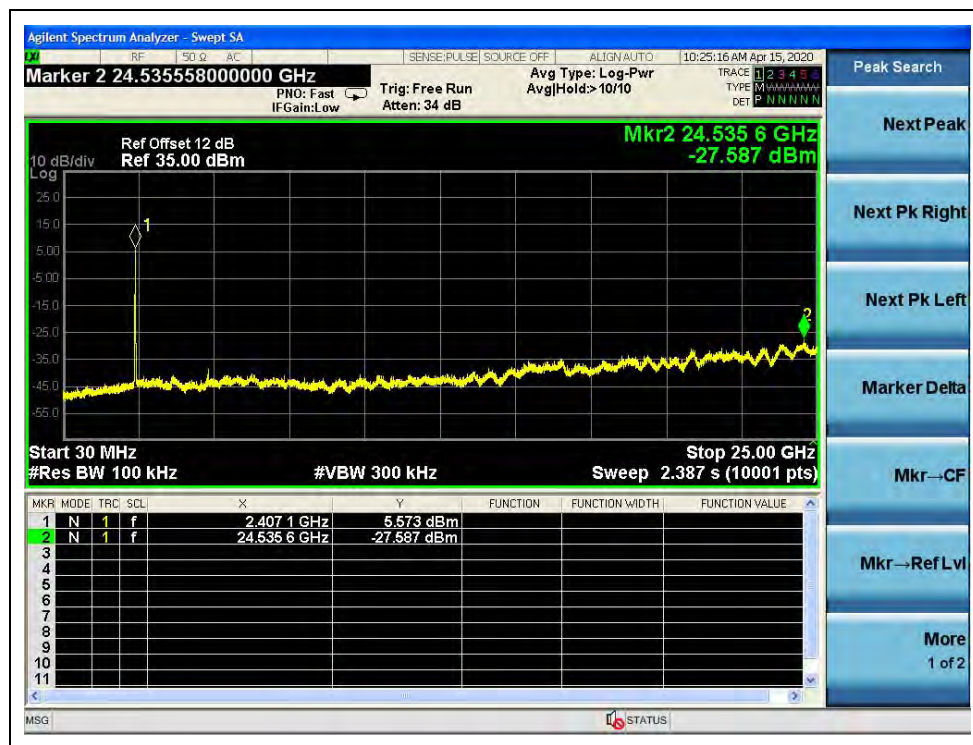
(30MHz to 25GHz, Channel 12, 802.11b)



(Band Edge, Channel 12, 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	-27.59	5.57	-14.43	PASS
7	2442	-28.99	6.24	-13.76	PASS
12	2467	-27.49	4.28	-15.72	PASS

B. Test Plot:

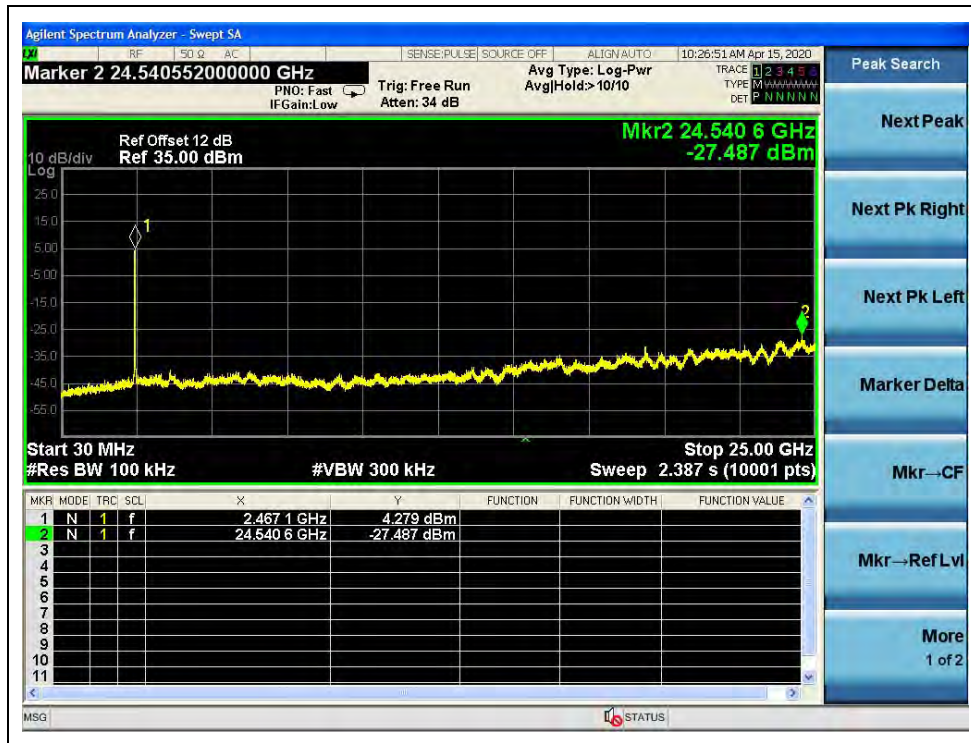
(30MHz to 25GHz, Channel 1, 802.11g)



(Band Edge, Channel 1, 802.11g)



(30MHz to 25GHz, Channel 7, 802.11g)



(30MHz to 25GHz, Channel 12, 802.11g)



(Band Edge, Channel 12, 802.11g)

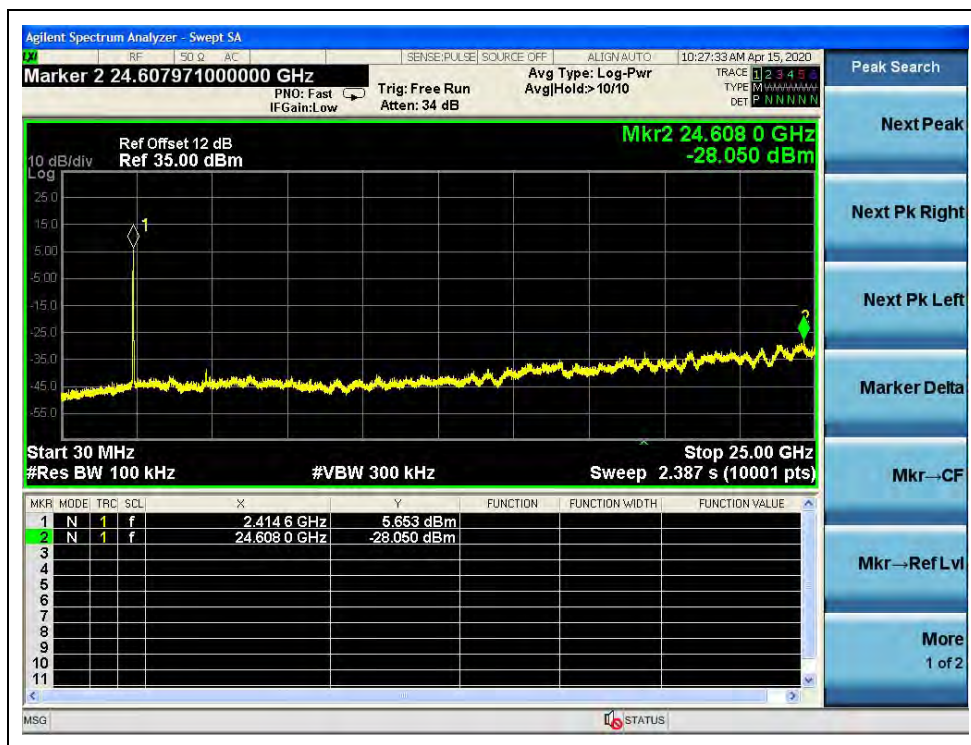


802.11n (HT20) Mode

A. Test Verdict:

Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
			Carrier Level	Calculated -20dBc Limit	
1	2412	-28.05	5.65	-14.35	PASS
7	2442	-28.95	5.27	-14.73	PASS
12	2467	-27.95	4.14	-15.86	PASS

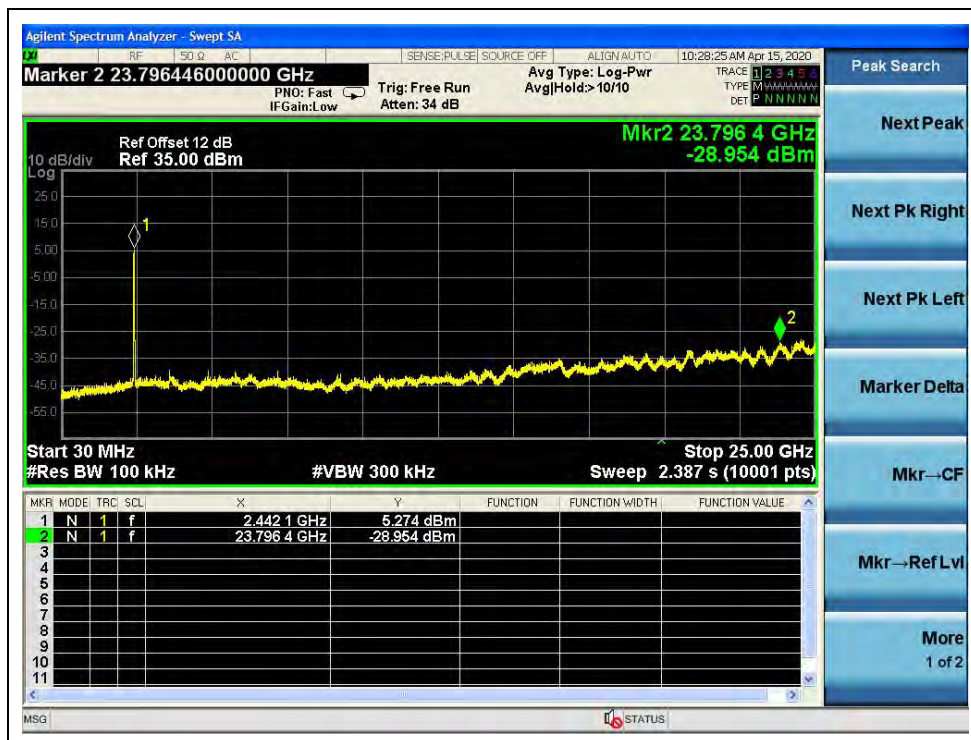
B. Test Plot:



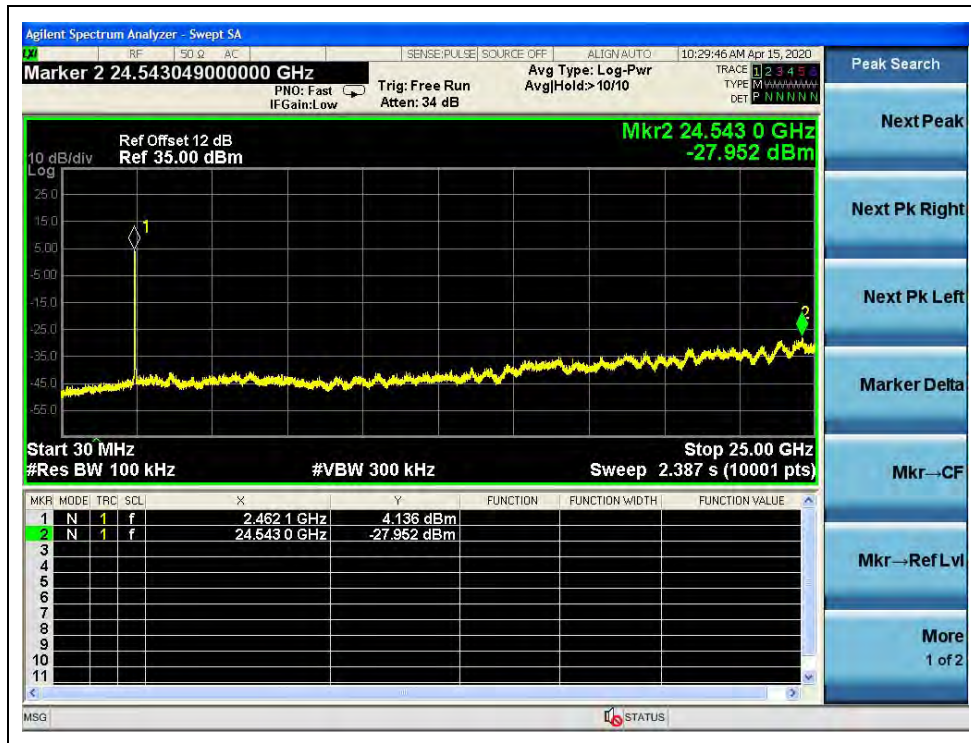
(30MHz to 25GHz, Channel 1, 802.11n (HT20))



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



(30MHz to 25GHz, Channel 7,802.11n (HT20))



(30MHz to 25GHz, Channel 12, 802.11n (HT20))



(Band Edge, Channel 12, 802.11n (HT20))

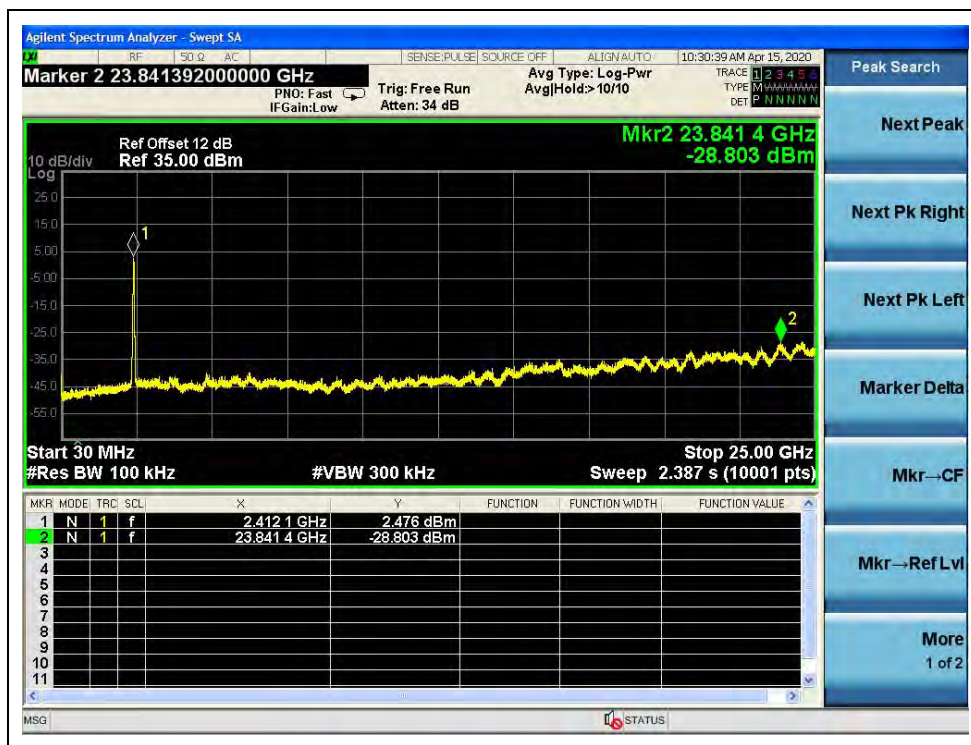


802.11n (HT40) Mode

A. Test Verdict:

Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
			Carrier Level	Calculated -20dBc Limit	
3	2422	-28.80	2.48	-17.52	PASS
7	2442	-28.37	2.48	-17.52	PASS
11	2462	-28.62	5.21	-14.79	PASS

B. Test Plot:



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



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



(30MHz to 25GHz, Channel 7, 802.11n (HT40))



(30MHz to 25GHz, Channel 11, 802.11n (HT40))



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

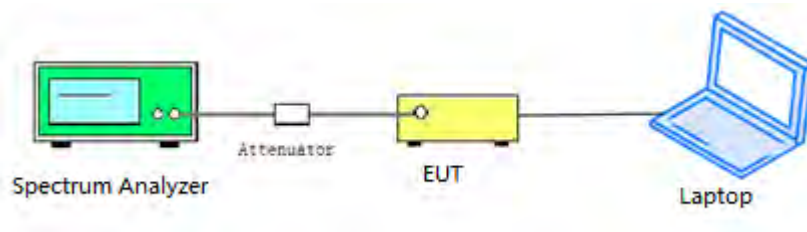
2.6. Power Spectral Density

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.



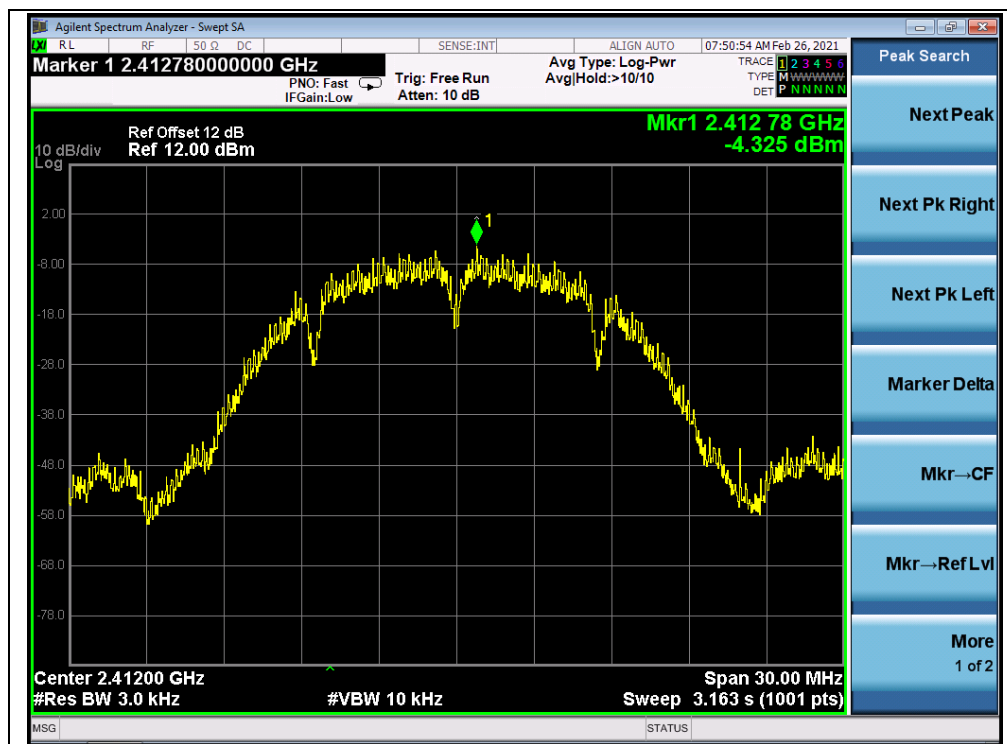
2.6.4. Test Result

802.11b Mode

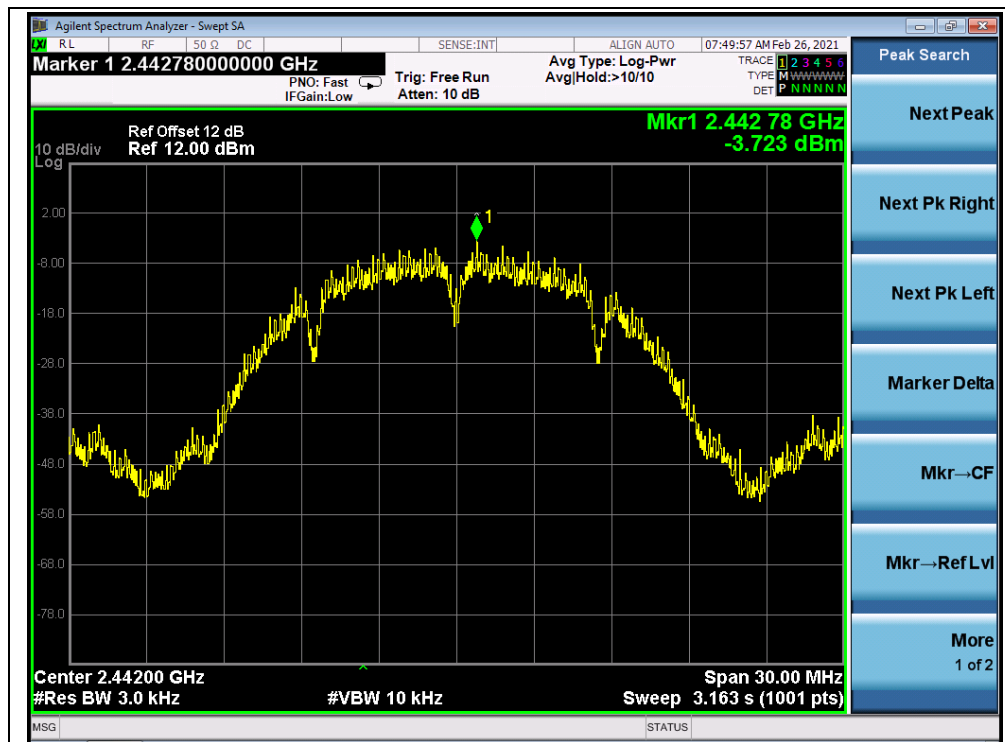
A. Test Verdict:

Channel	Frequency (MHz)	Measured PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
1	2412	-4.33	8	PASS
7	2442	-3.72	8	PASS
12	2467	-4.49	8	PASS

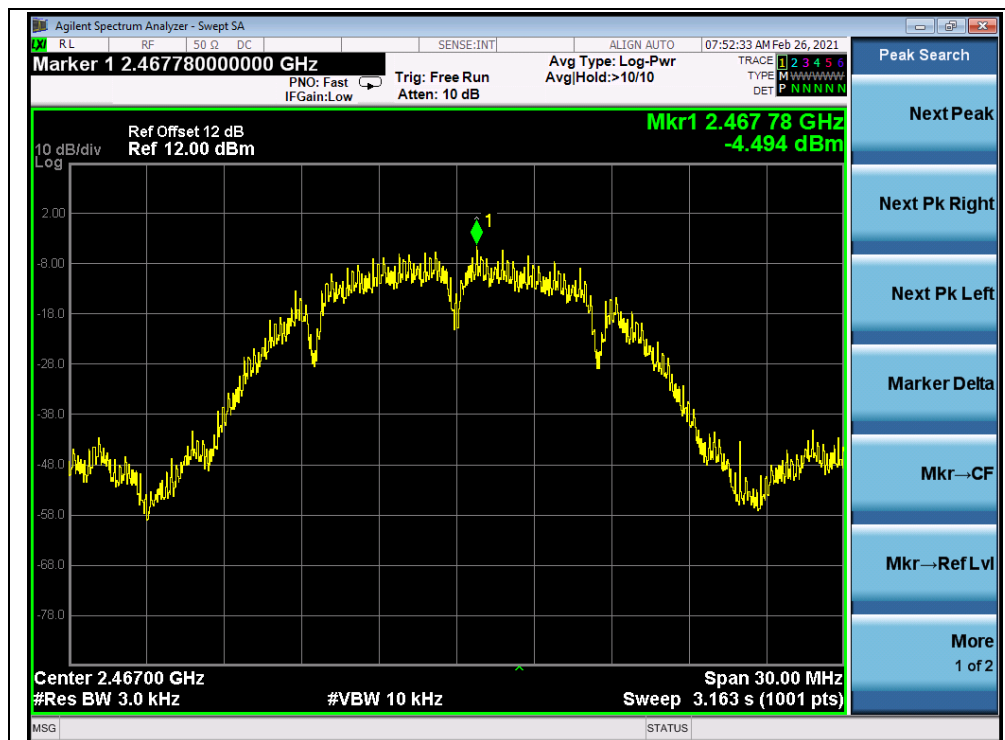
B. Test Plot:



(Channel 1, 802.11b)



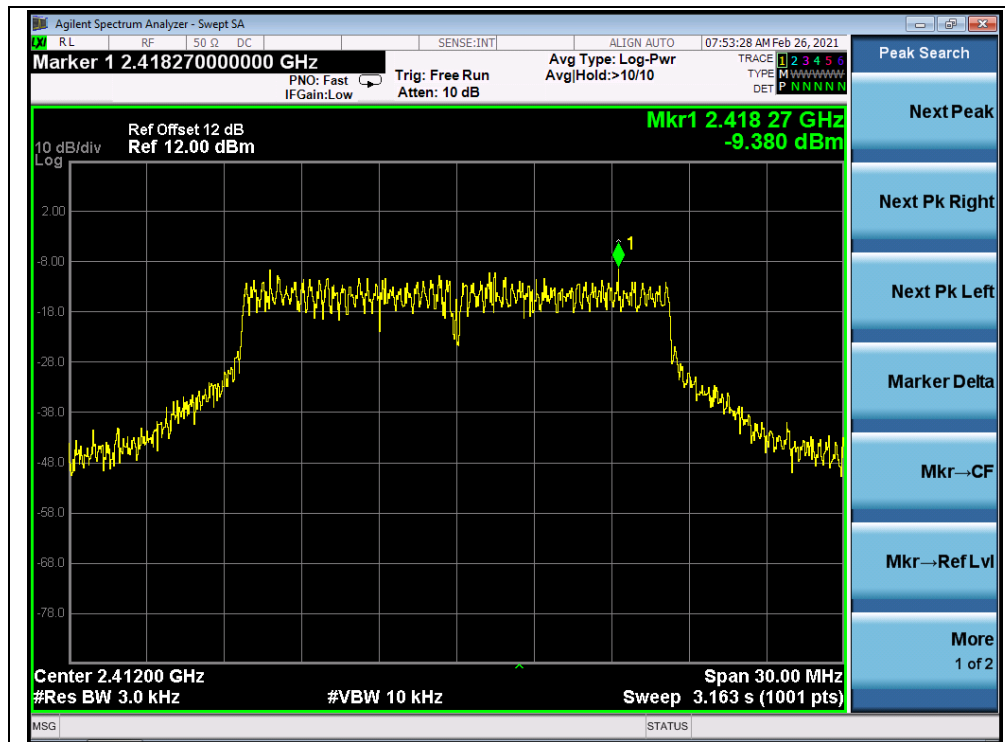
(Channel 7, 802.11b)



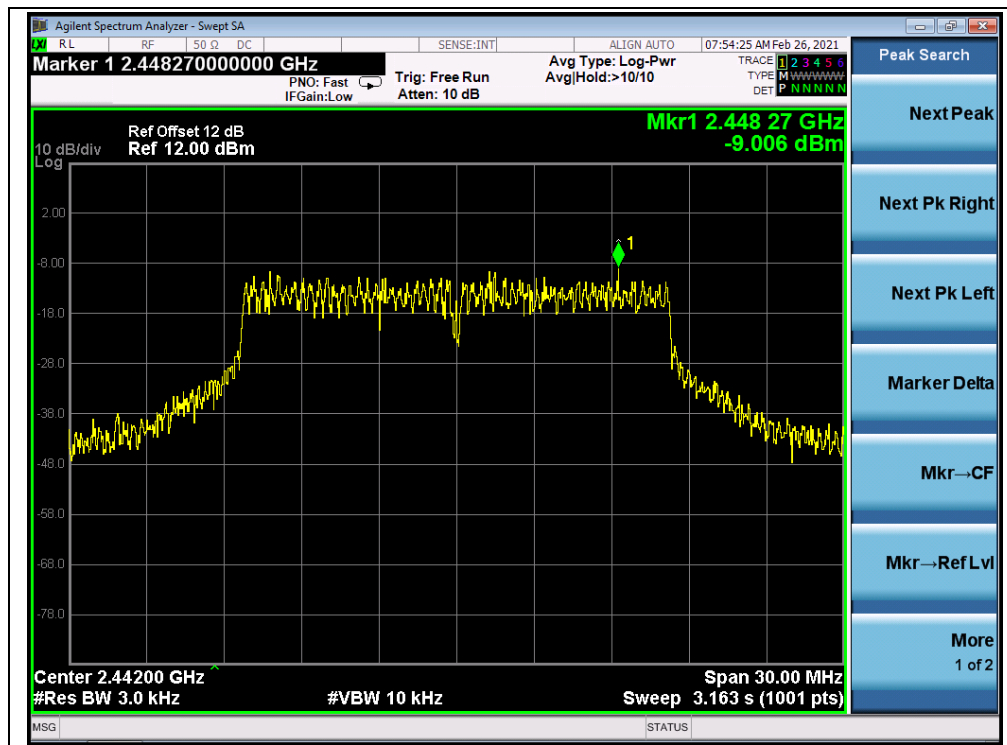
(Channel 12, 802.11b)

**802.11g Mode****A. Test Verdict:**

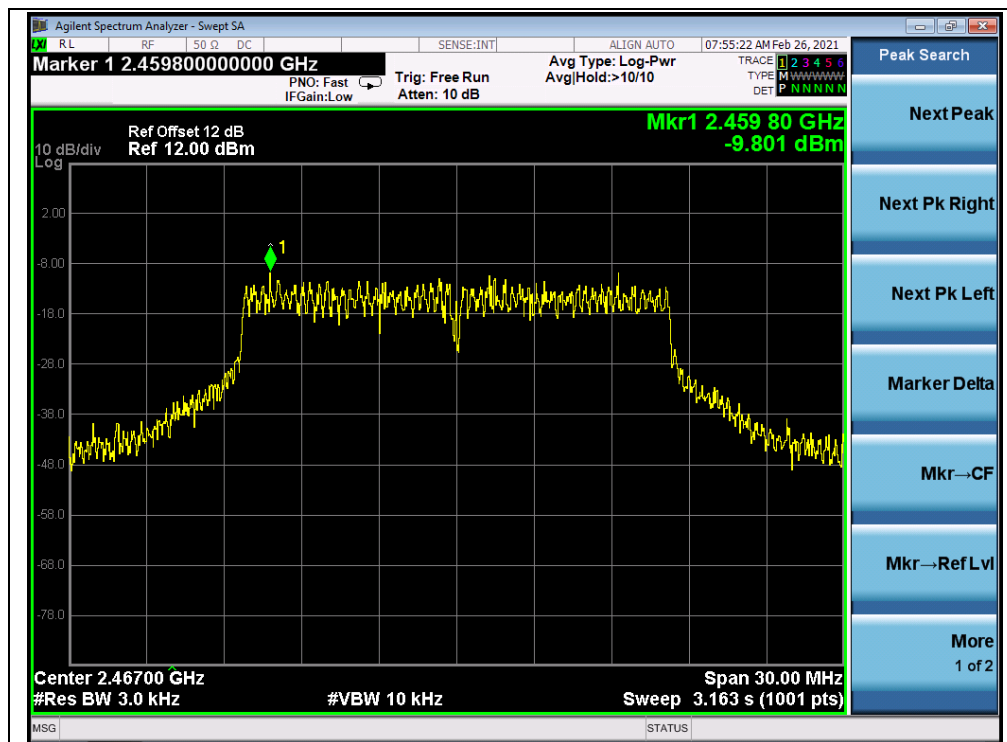
Channel	Frequency (MHz)	Measured PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
1	2412	-9.38	8	PASS
7	2442	-9.01	8	PASS
12	2467	-9.80	8	PASS

B. Test Plot:

(Channel 1, 802.11g)



(Channel 7, 802.11g)



(Channel 12, 802.11g)

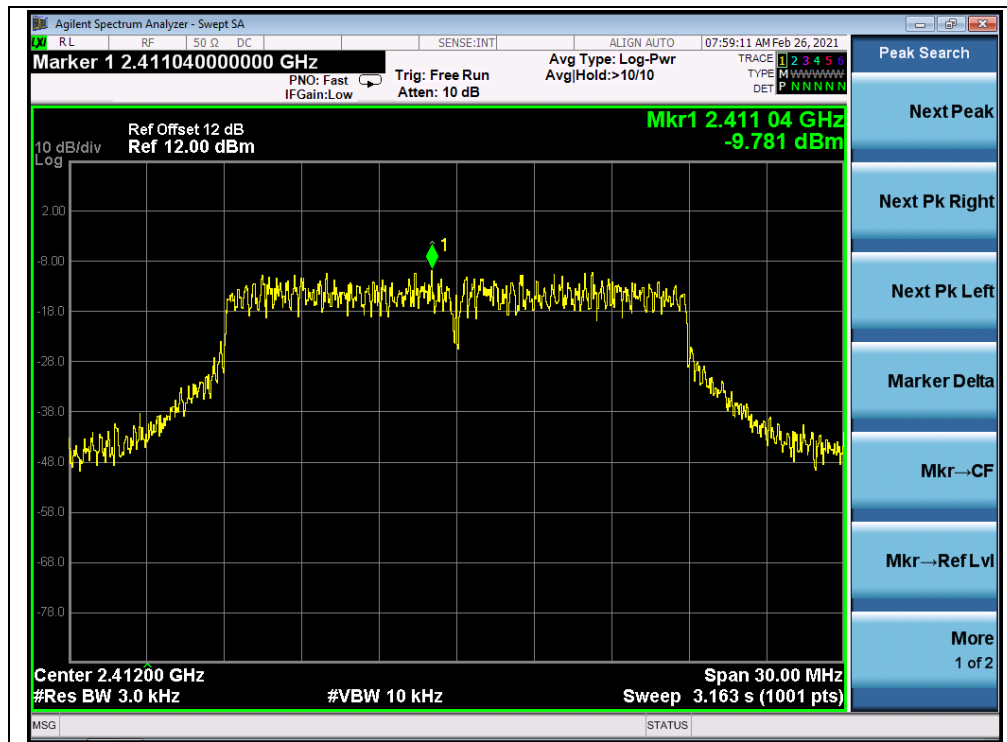


802.11n (HT20) Mode

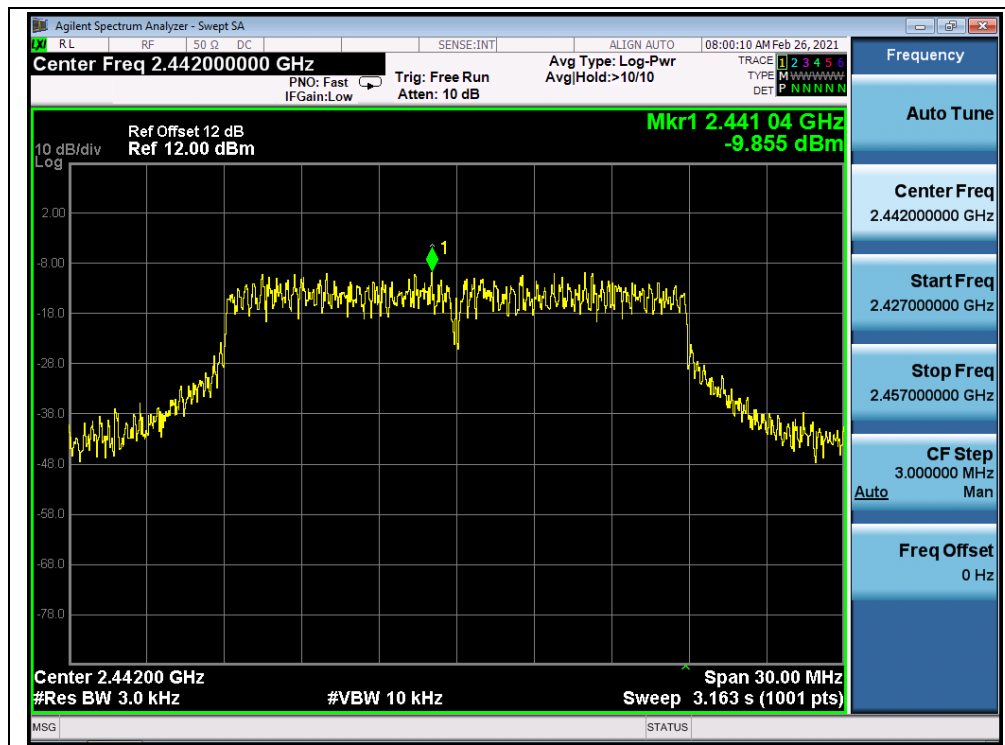
A. Test Verdict:

Channel	Frequency (MHz)	Measured PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
1	2412	-9.78	8	PASS
7	2442	-9.86	8	PASS
12	2467	-10.63	8	PASS

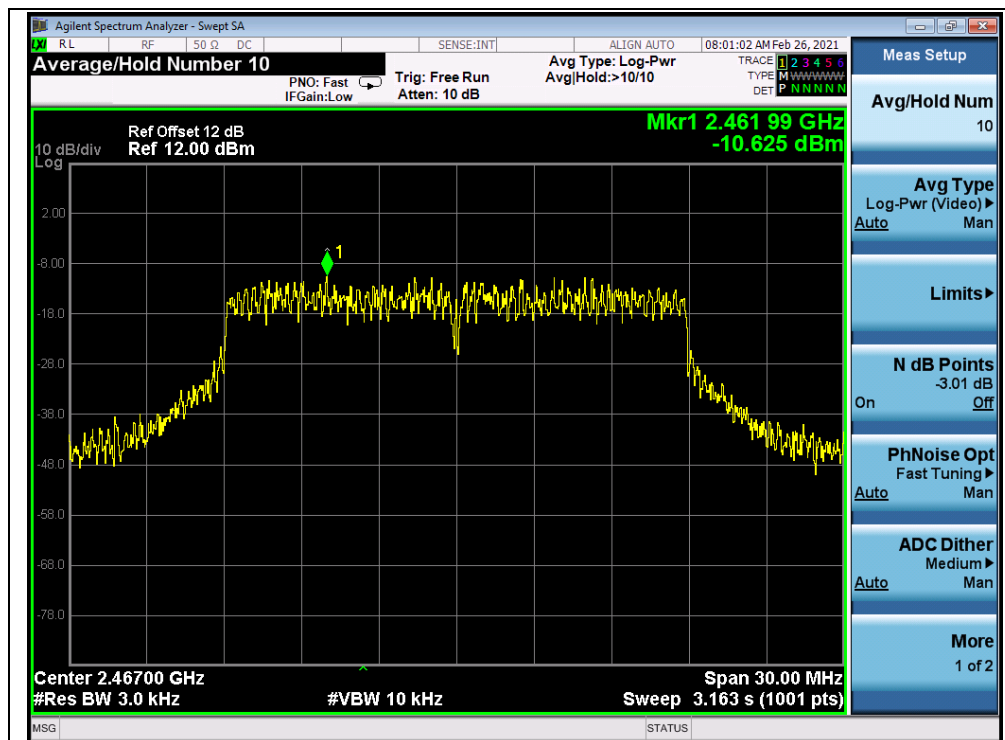
B. Test Plot:



(Channel 1, 802.11n (HT20))



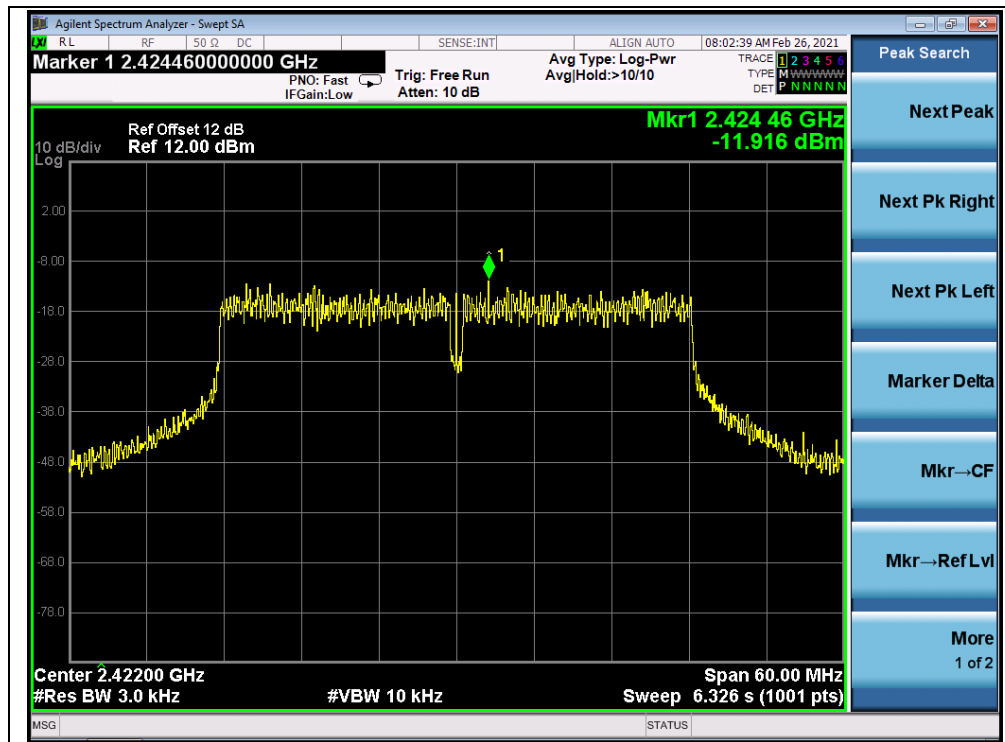
(Channel 7, 802.11n (HT20))



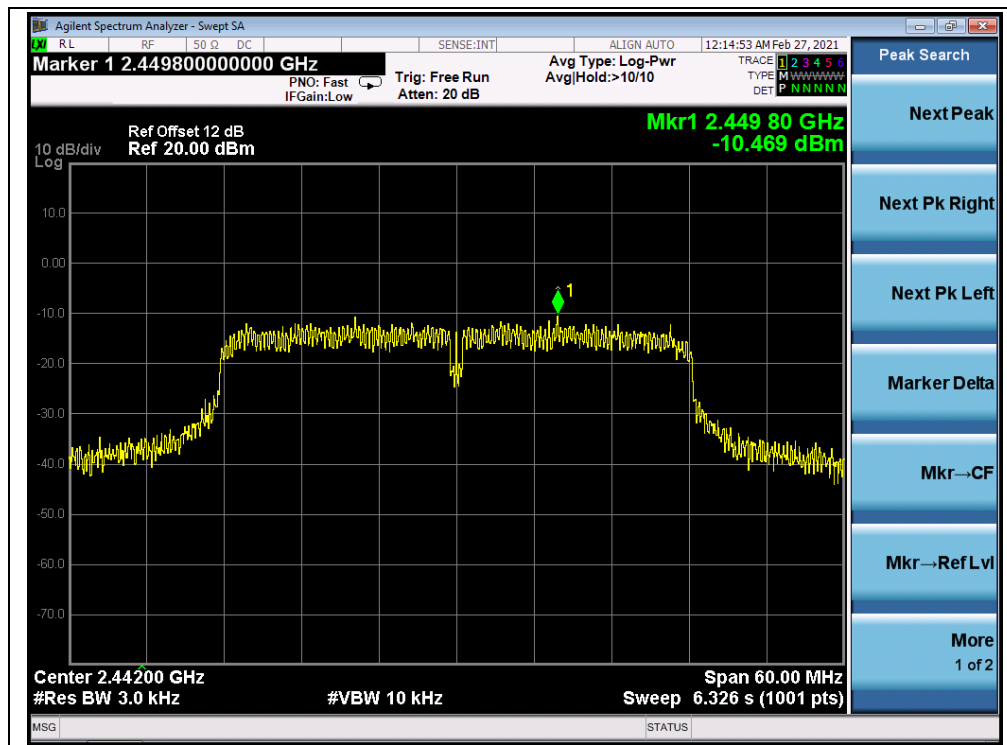
(Channel 12, 802.11n (HT20))

**802.11n (HT40) Mode****A. Test Verdict:**

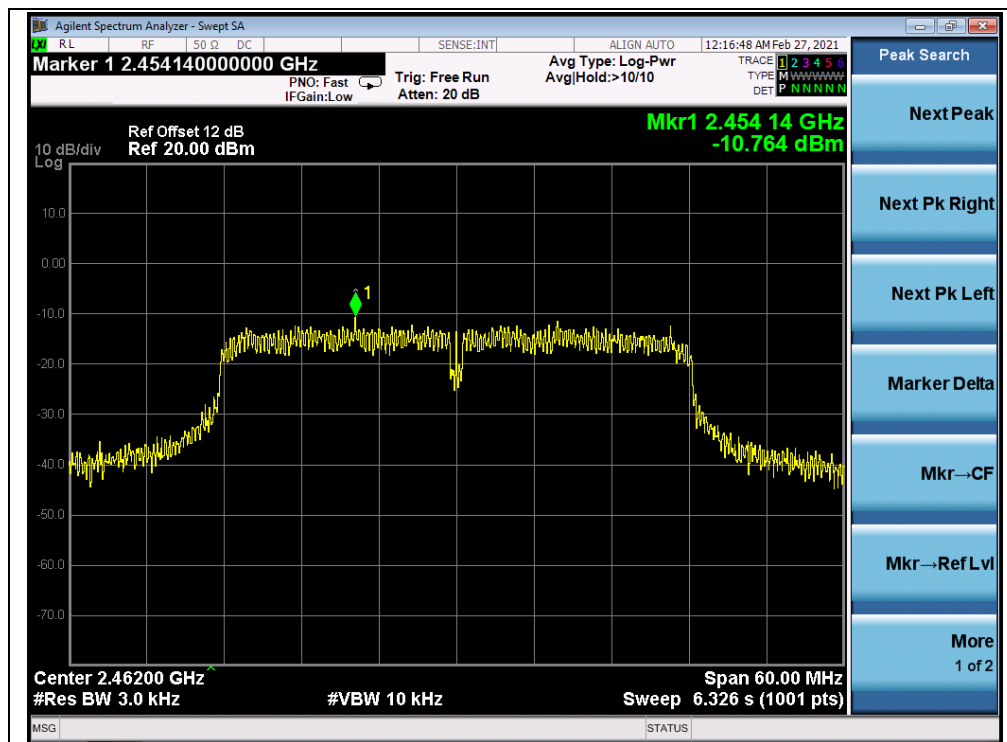
Channel	Frequency (MHz)	Measured PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
3	2422	-11.92	8	PASS
7	2442	-10.47	8	PASS
11	2462	-10.76	8	PASS

B. Test Plot:

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

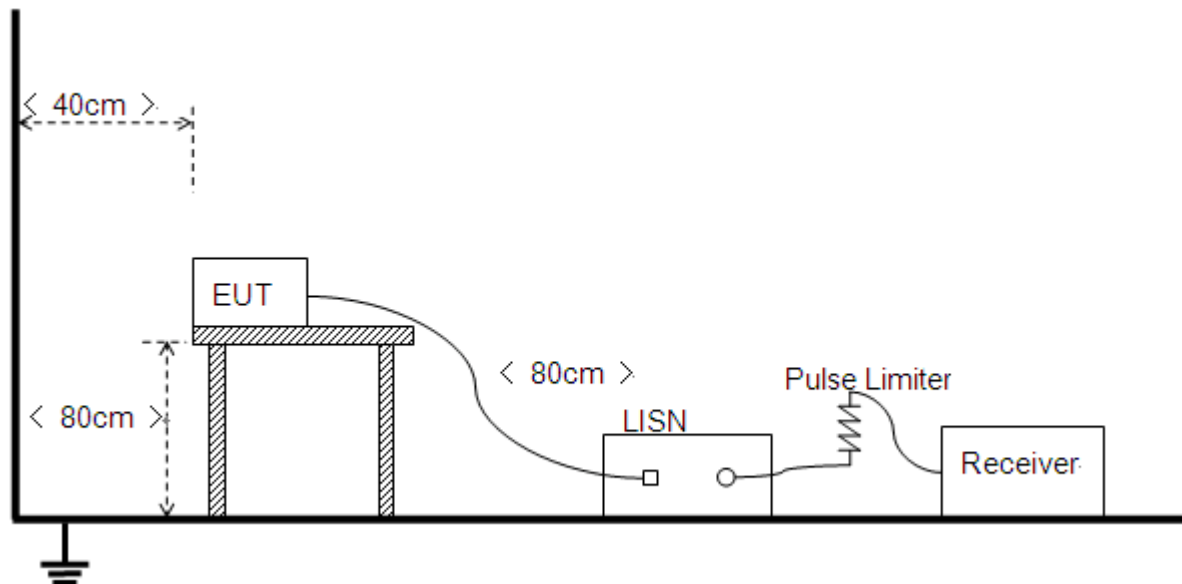
Frequency Range (MHz)	Conducted Limit (dB μ V)	
	Quai-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
5 - 30	60	50

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.



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2.7.3. Test Result

Note: This test case does not apply this kind of EUT.

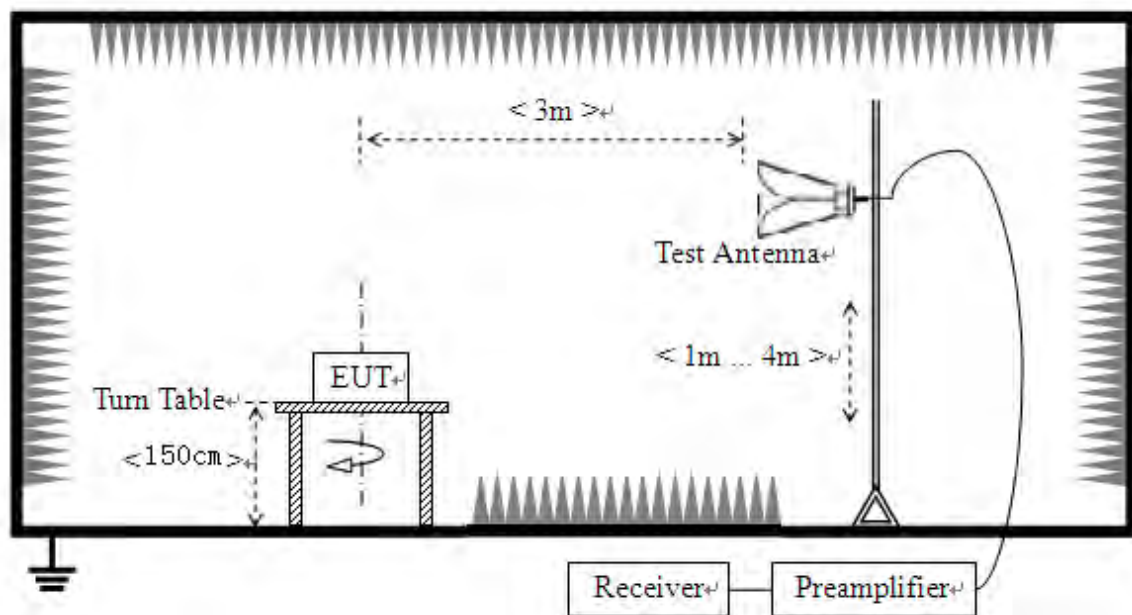
2.8. Restricted Frequency Bands

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.

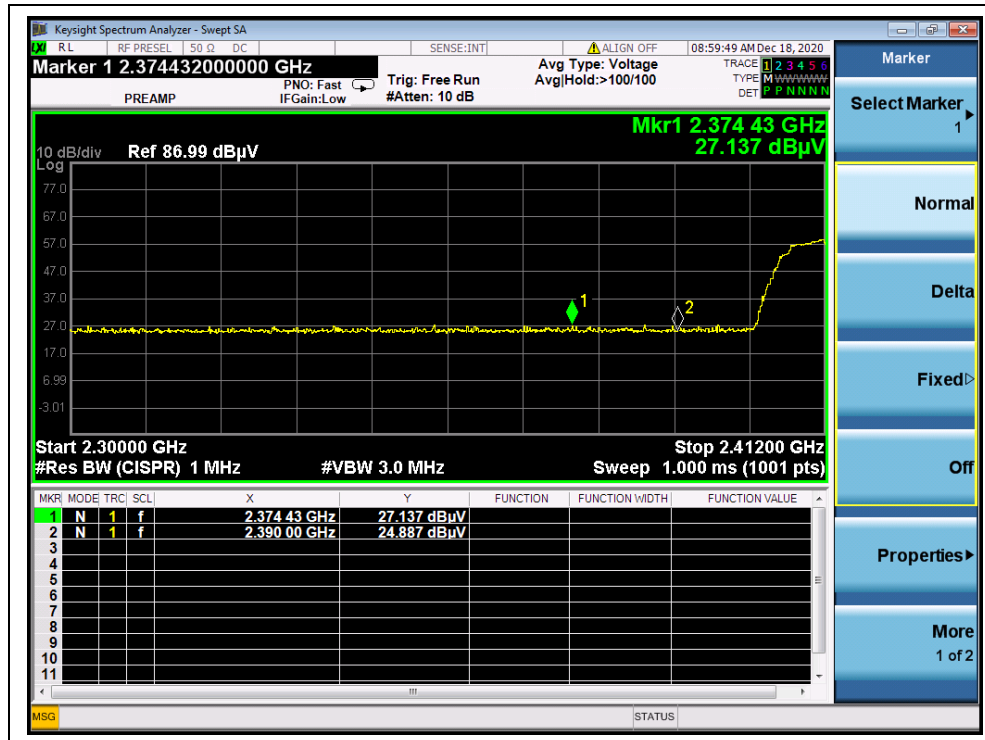
802.11b Mode

A. Test Verdict:

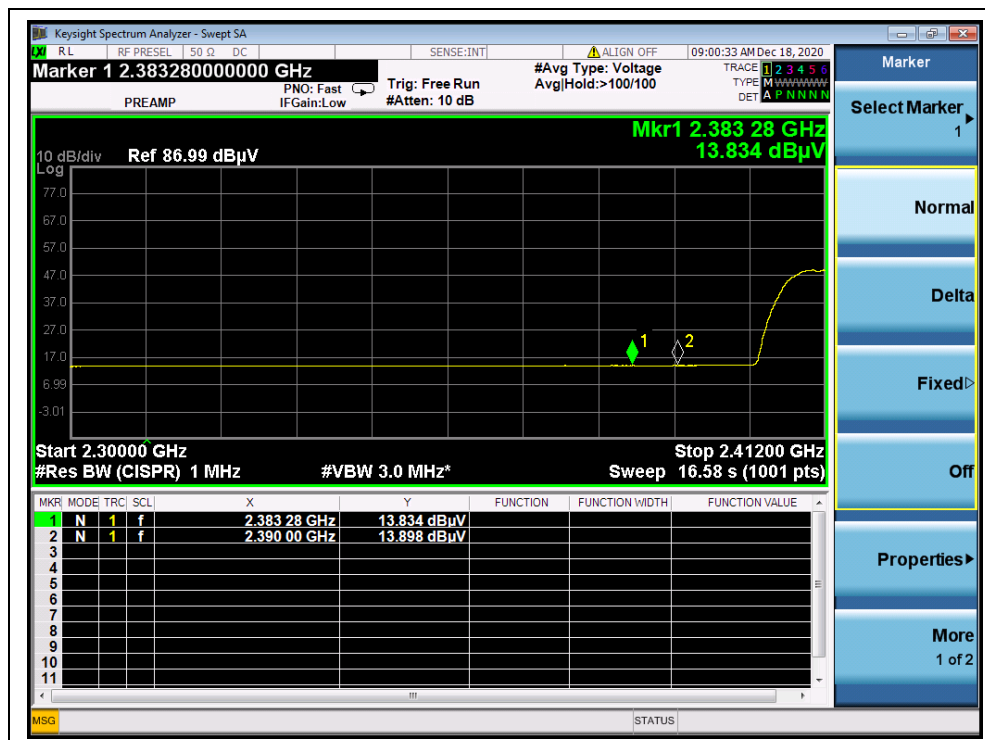
Channel	Frequency (MHz)	Detector	Receiver Reading U_R (dB μ V)	A_T (dB)	A_{Factor} (dB@3m)	Max. Emission E (dB μ V/m)	Limit (dB μ V/m)	Verdict
		PK/ AV						
1	2374.43	PK	27.14	6.74	27.20	61.08	74	PASS
1	2390.00	AV	13.90	6.74	27.20	47.84	54	PASS
12	2489.57	PK	26.25	6.74	27.20	60.19	74	PASS
12	2484.36	AV	13.71	6.74	27.20	47.65	54	PASS



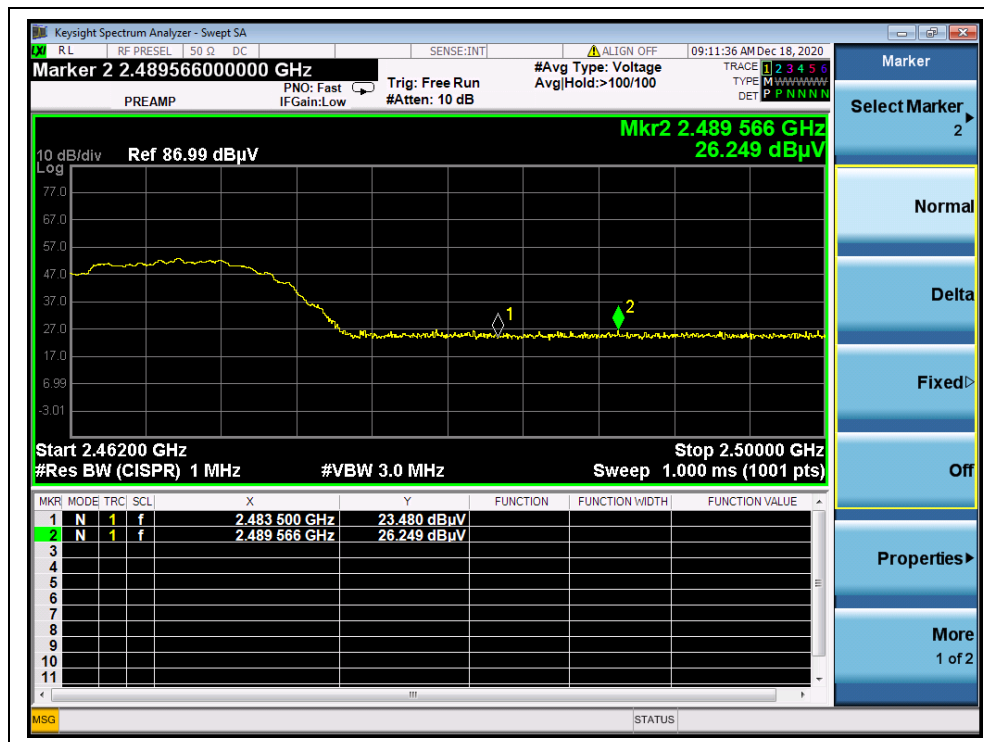
B. Test Plot:



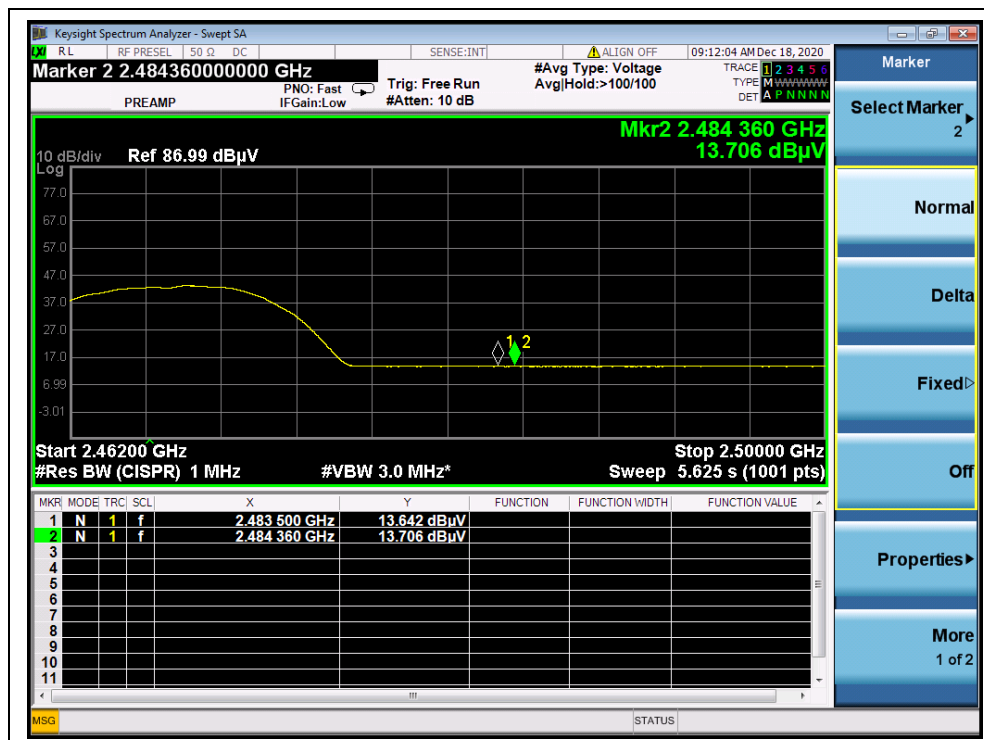
(PEAK, Channel 1, 802.11b)



(AVERAGE, Channel 1, 802.11b)



(PEAK, Channel 12, 802.11b)



(AVERAGE, Channel 12, 802.11b)

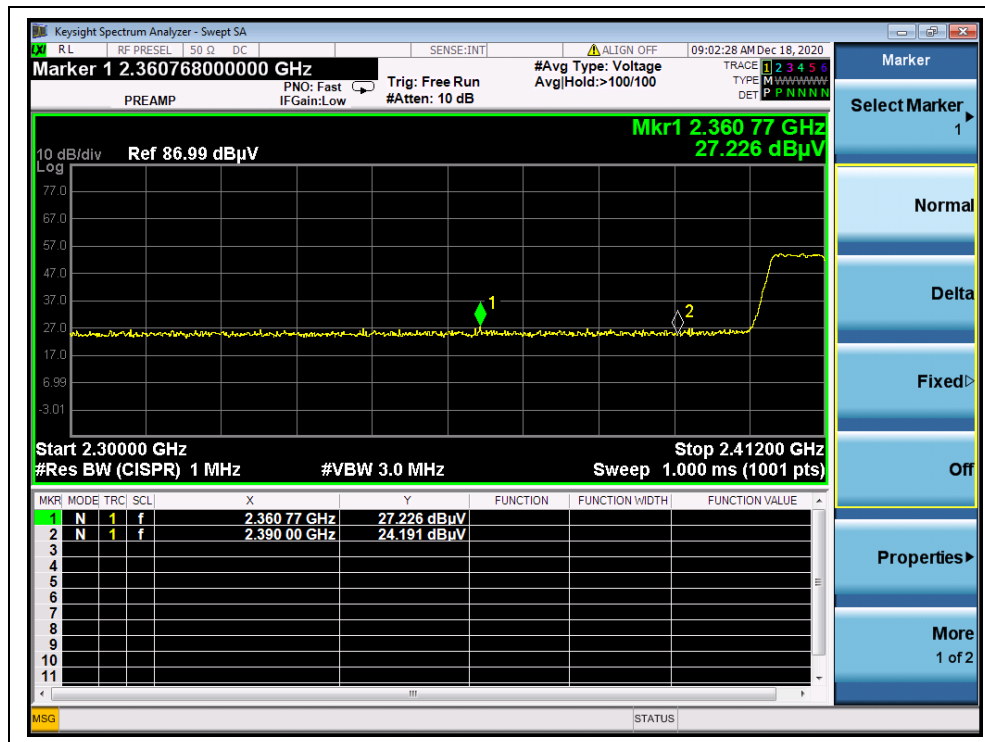


802.11g Mode

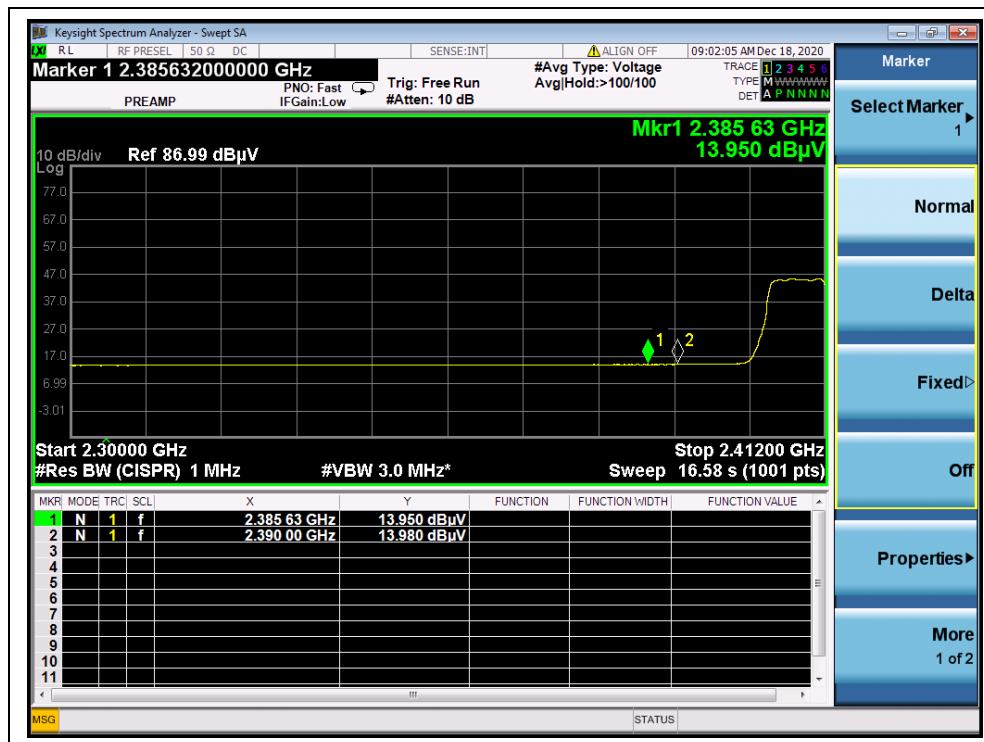
A. Test Verdict:

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	2360.77	PK	27.23	6.74	27.20	61.17	74	PASS
1	2390.00	AV	13.98	6.74	27.20	47.92	54	PASS
12	2484.78	PK	26.24	6.74	27.20	60.18	74	PASS
12	2483.50	AV	13.75	6.74	27.20	47.69	54	PASS

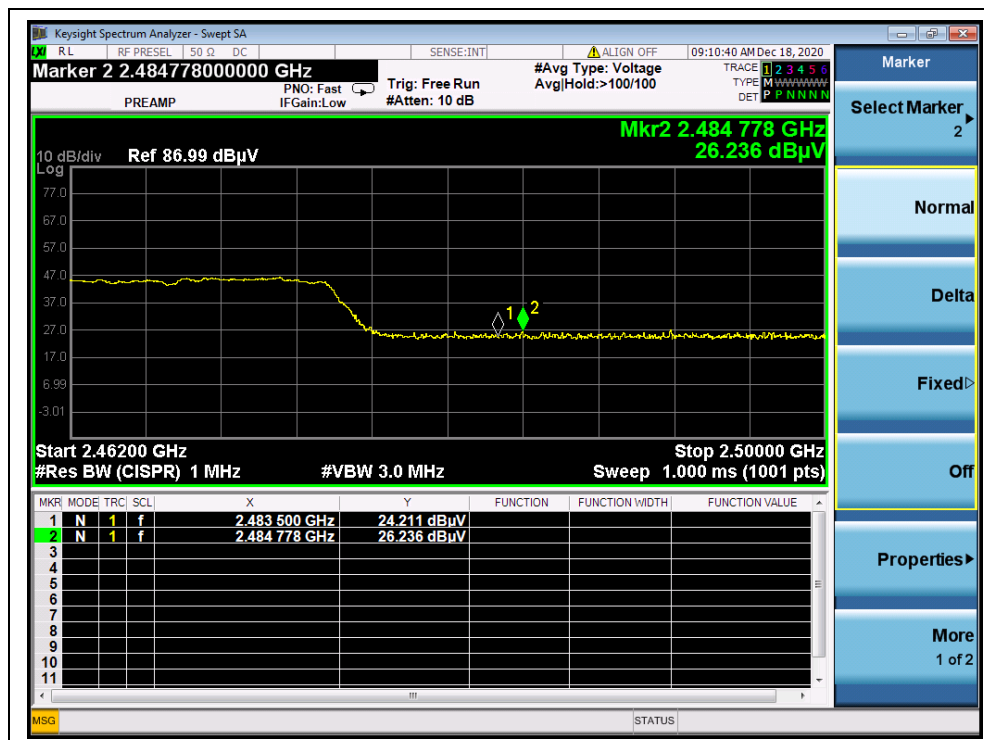
B. Test Plot:



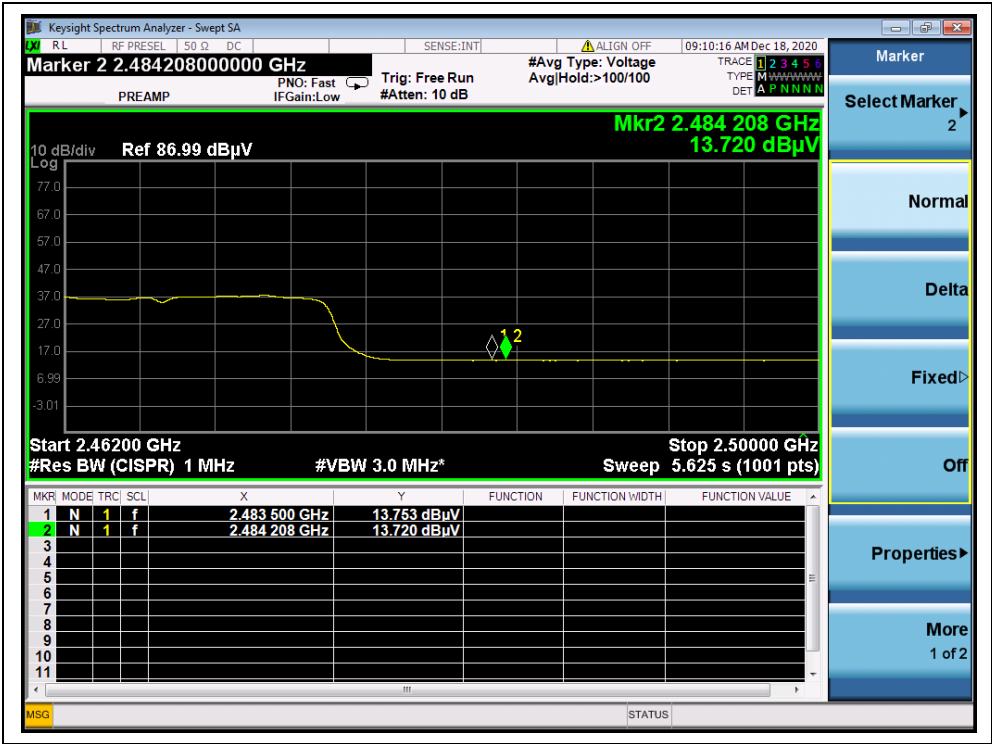
(PEAK, Channel 1, 802.11g)



(AVERAGE, Channel 1, 802.11g)



(PEAK, Channel 12, 802.11g)



(AVERAGE, Channel 12, 802.11g)

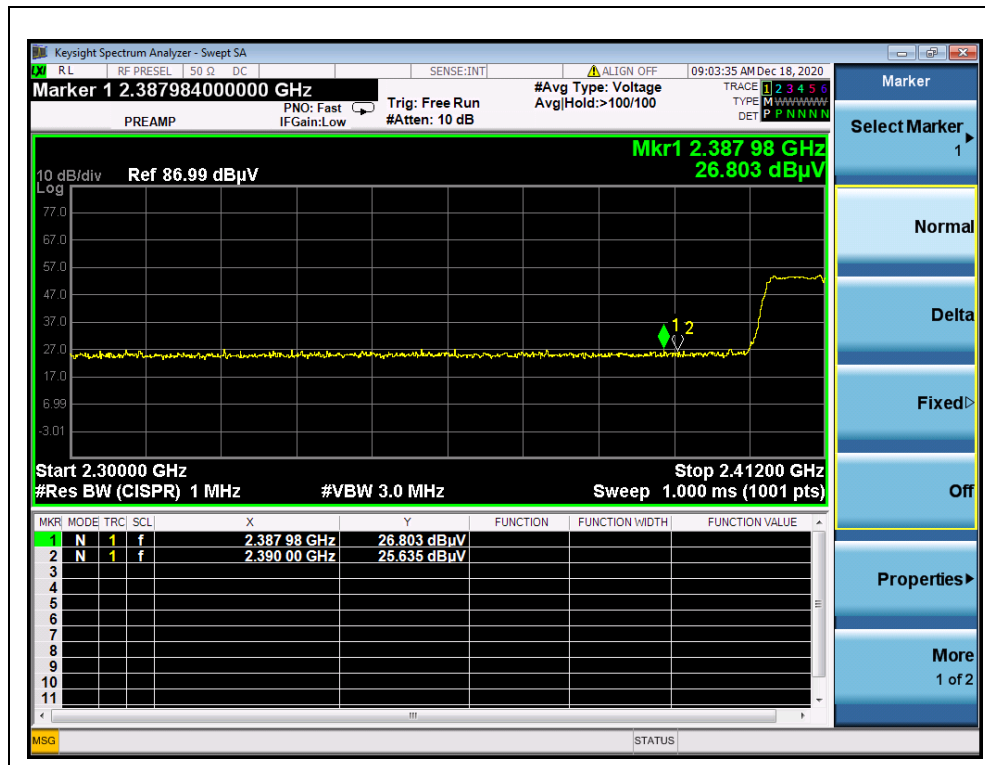


802.11 n (HT20) Mode

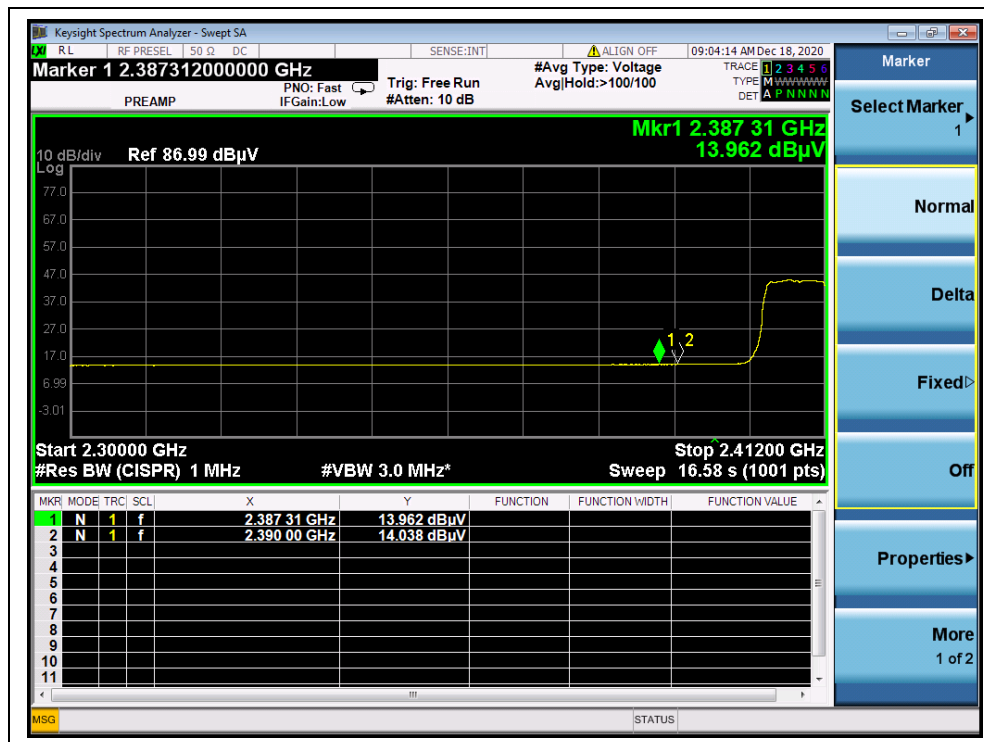
A. Test Verdict:

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						
1	2387.98	PK	26.80	6.74	27.20	60.74	74	PASS
1	2390.00	AV	14.04	6.74	27.20	47.98	54	PASS
12	2485.58	PK	26.15	6.74	27.20	60.09	74	PASS
12	2484.32	AV	13.73	6.74	27.20	47.67	54	PASS

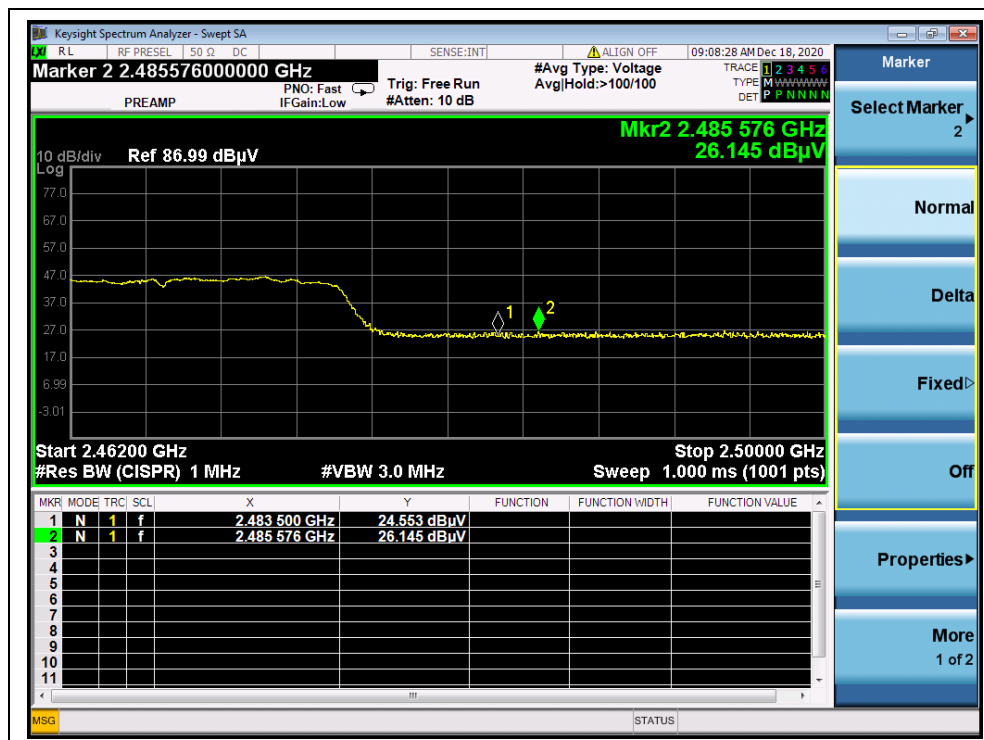
B. Test Plot:



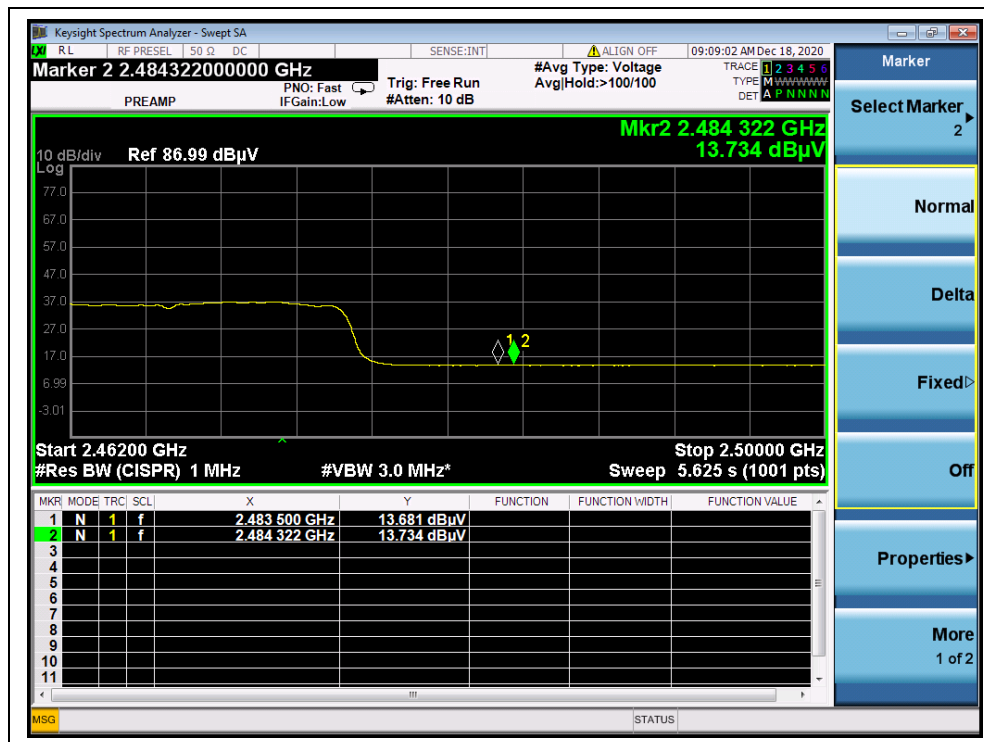
(PEAK, Channel 1, 802.11n (HT20))



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



(PEAK, Channel 12, 802.11n (HT20))



(AVERAGE, Channel 12, 802.11n (HT20))

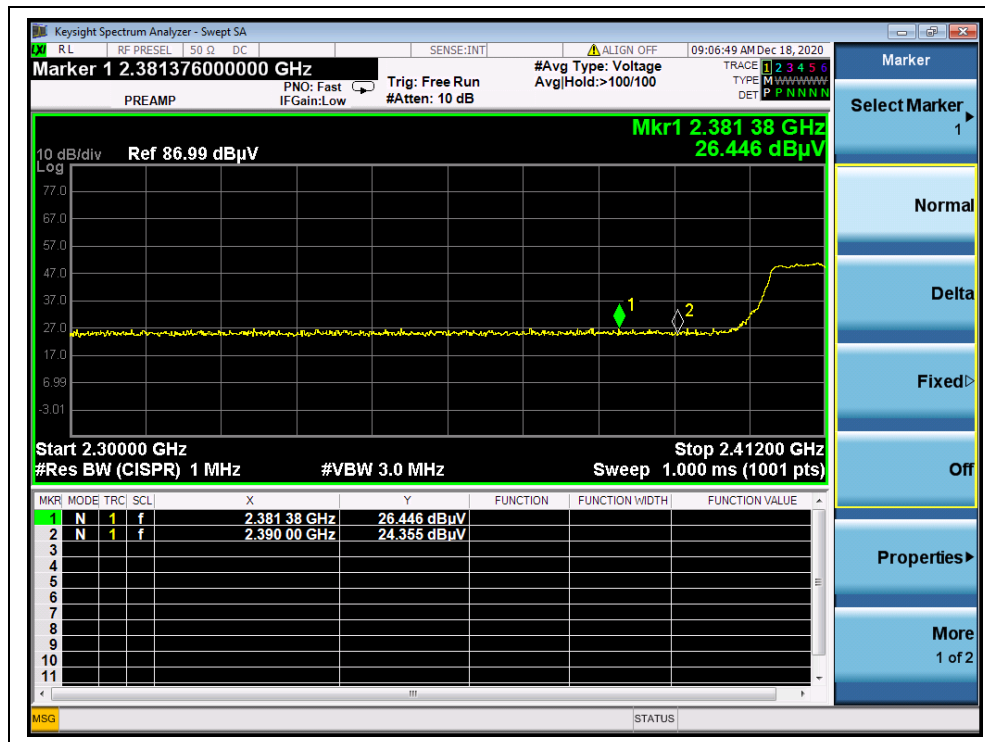


802.11n (HT40) Mode

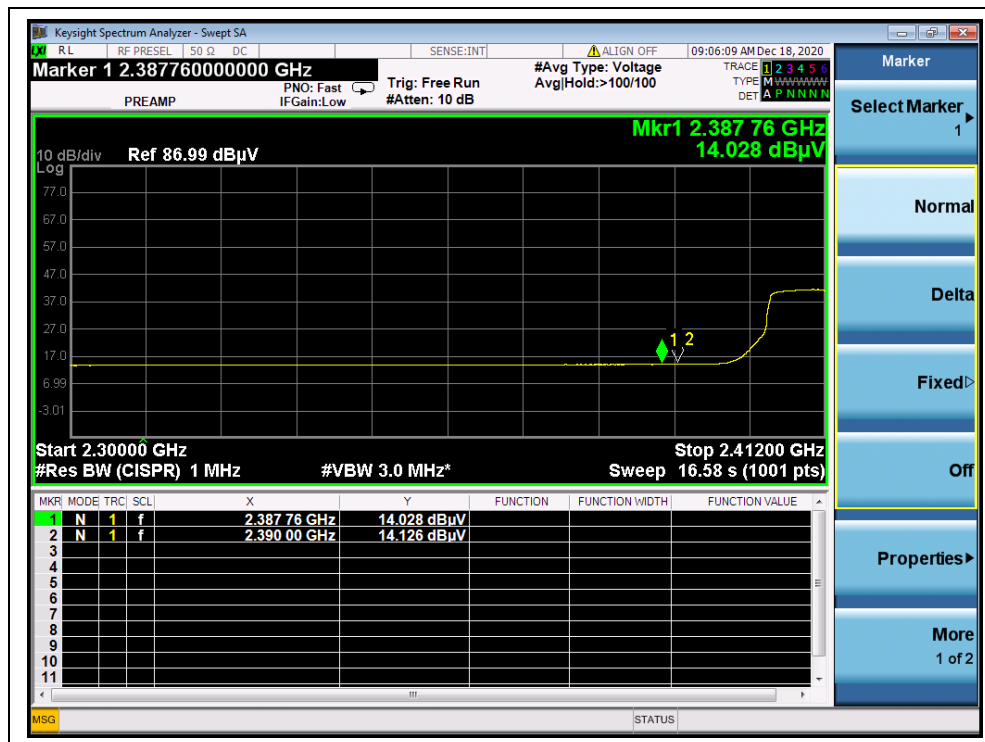
A. Test Verdict:

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	2381.38	PK	26.45	6.74	27.20	60.39	74	PASS
3	2390.00	AV	14.13	6.74	27.20	48.07	54	PASS
11	2483.50	PK	28.29	6.74	27.20	62.23	74	PASS
11	2483.50	AV	16.50	6.74	27.20	50.44	54	PASS

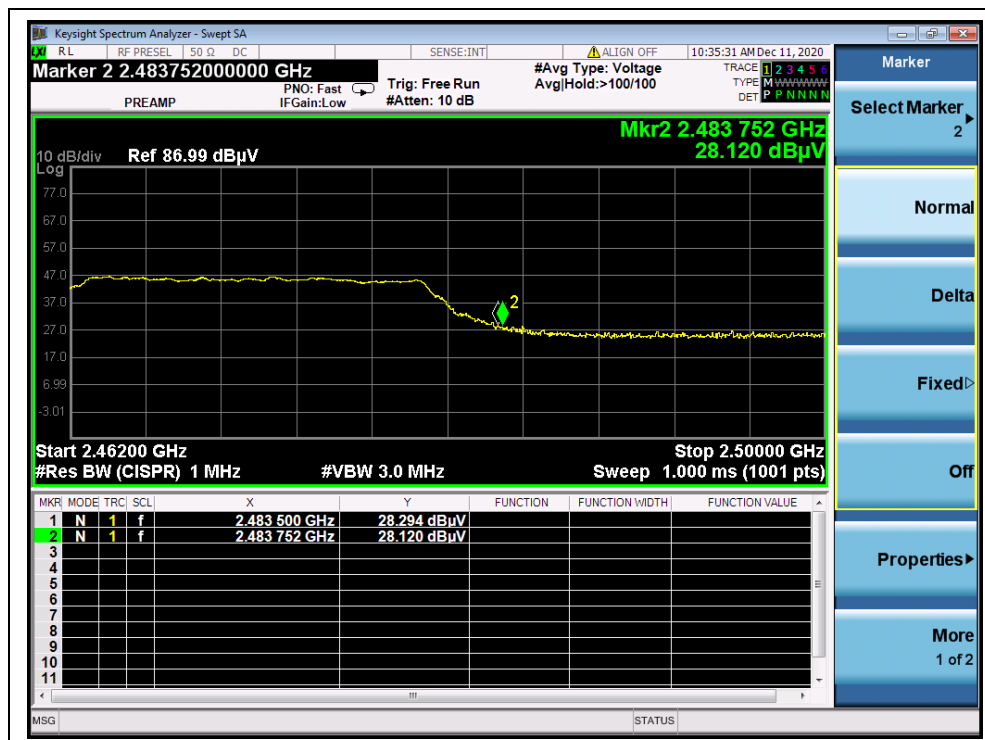
B. Test Plot:



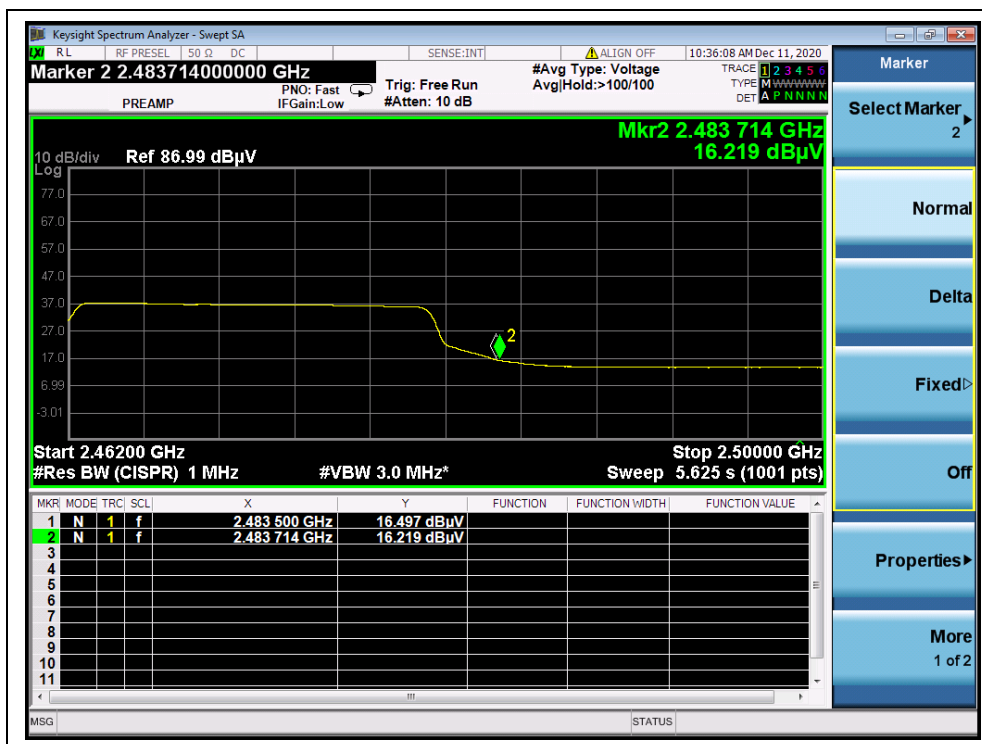
(PEAK, Channel 3, 802.11n (HT40))



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



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



(AVERAGE, Channel 11, 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

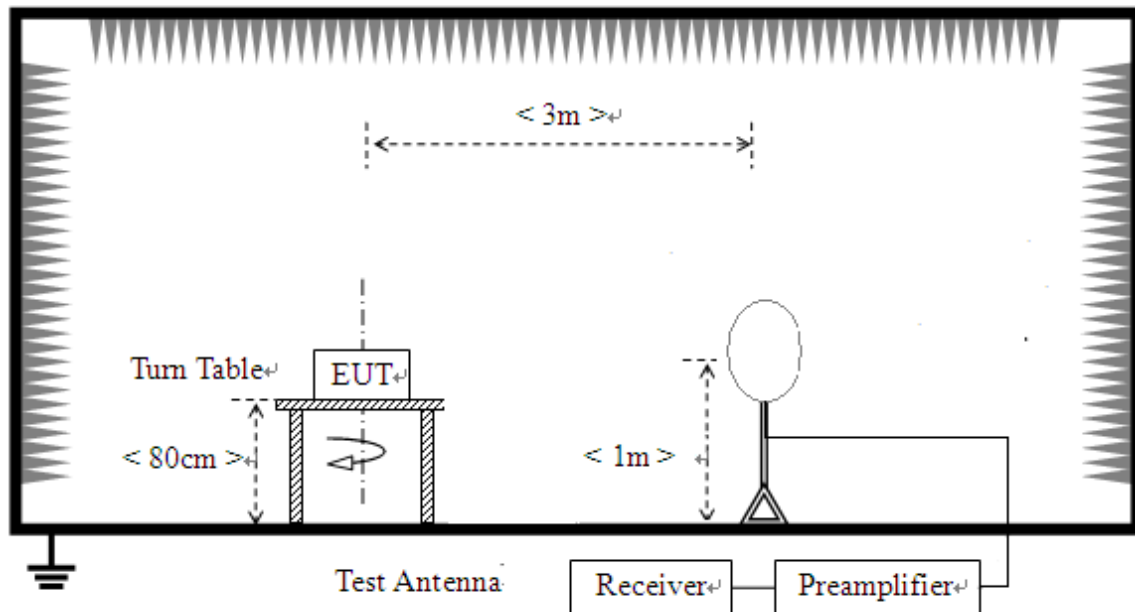
Note1: For above 1000MHz, the emission limit in this paragraph is based on measurement instrumentation employing an average detector, measurement using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit.

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).

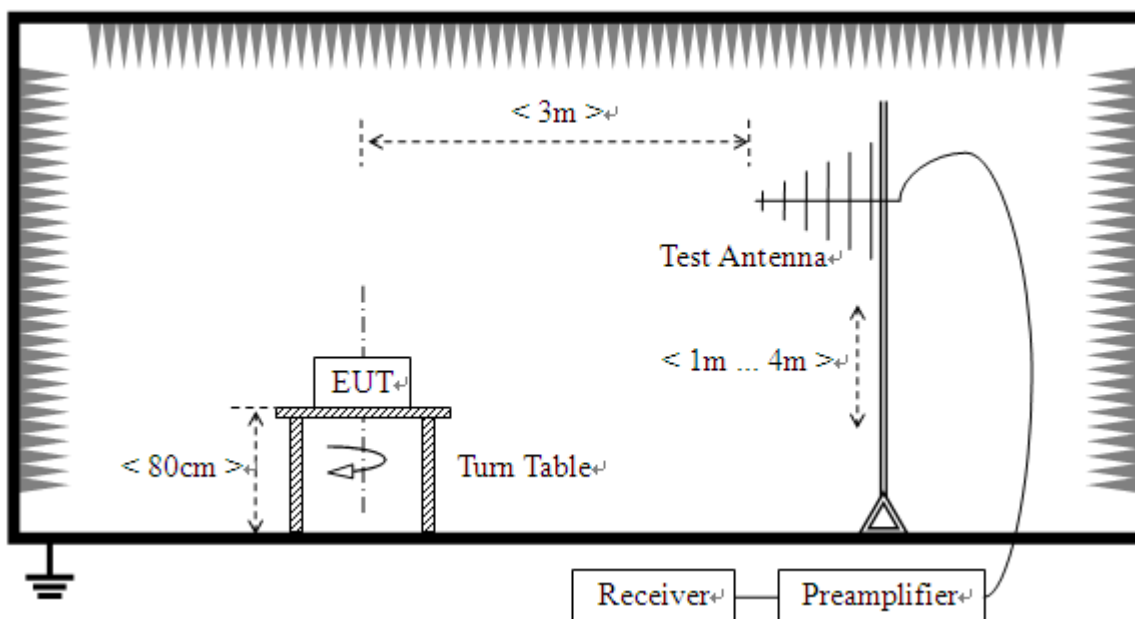
2.9.2. Test Description

Test Setup:

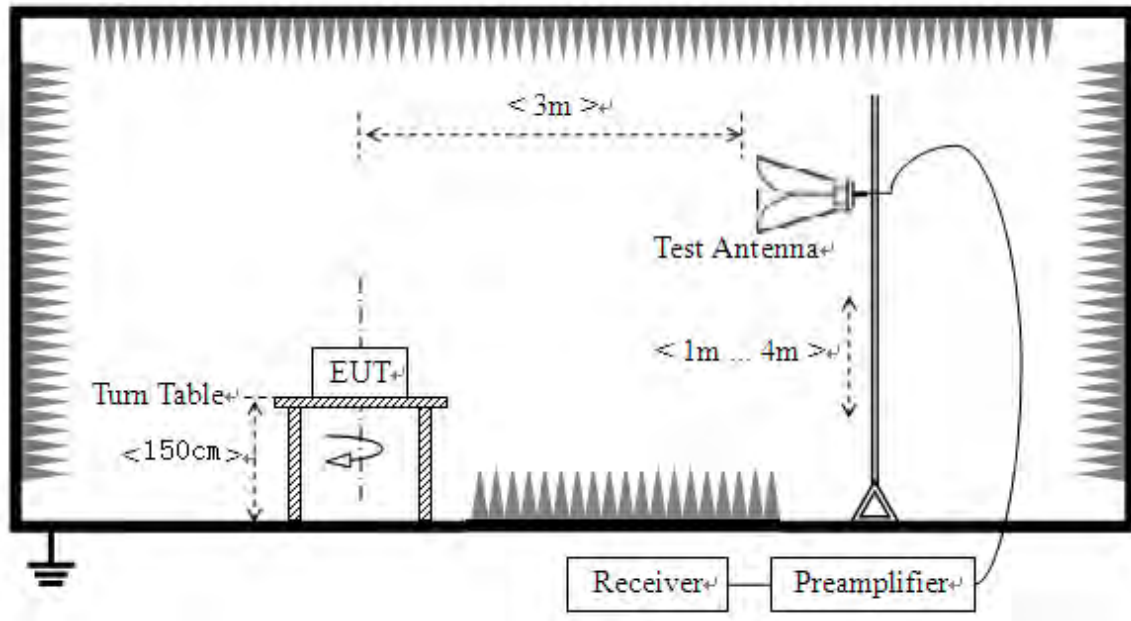
- 1) For radiated emissions from 9kHz to 30MHz



- 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 3meters. 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.

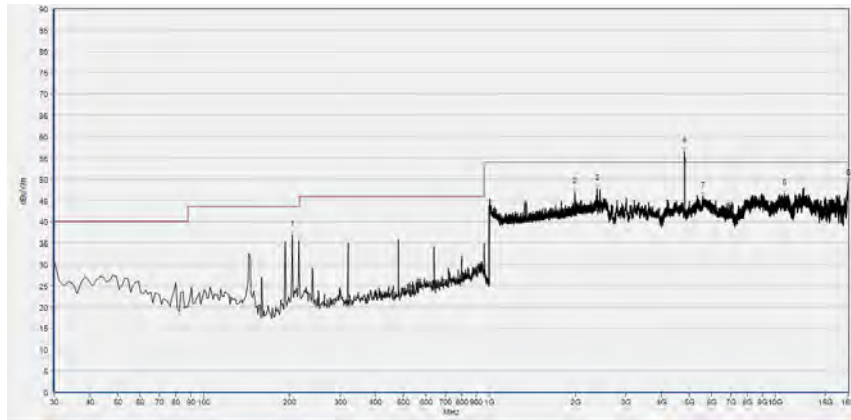
Note2: For the frequency, which started from 9kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit was not recorded.

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.



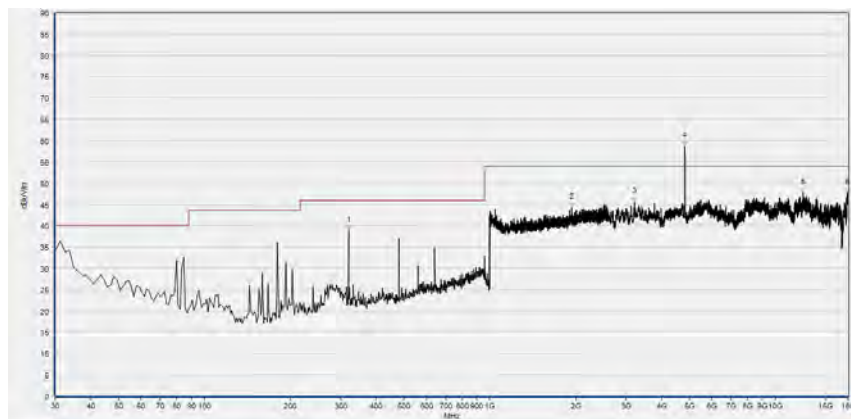
802.11b Test mode

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
204.819	36.95	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
1996.879	46.93	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
2385.514	47.74	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
4823.604	56.50	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
10757.883	46.55	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
17963.593	48.99	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

(Antenna Horizontal, 30MHz to 18GHz)

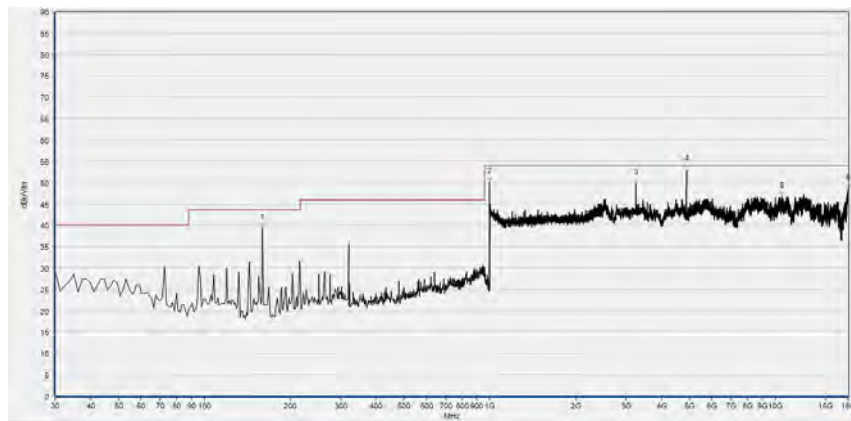


Fre. (MHz)	PK (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
320.150	38.87	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
1930.932	44.20	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
3216.112	45.61	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
4823.604	58.74	N/A	51.74	74.00	N/A	54.00	Vertical	PASS
12525.005	47.76	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
17915.985	47.76	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

(Antenna Vertical, 30MHz to 18GHz)

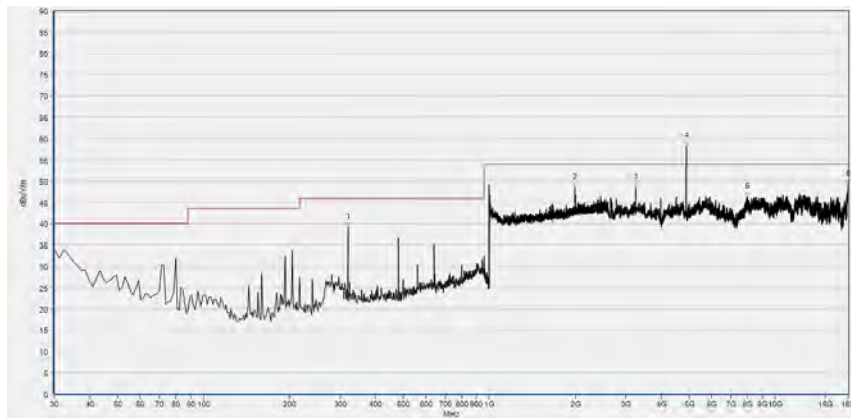


Plot for Channel 7



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
159.900	39.45	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
1000.000	25.29	N/A	N/A	N/A	54.00	N/A	Horizontal	PASS
3255.319	49.79	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
4882.415	53.01	N/A	46.40	74.00	N/A	54.00	Horizontal	PASS
10528.241	46.70	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
17957.992	48.60	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

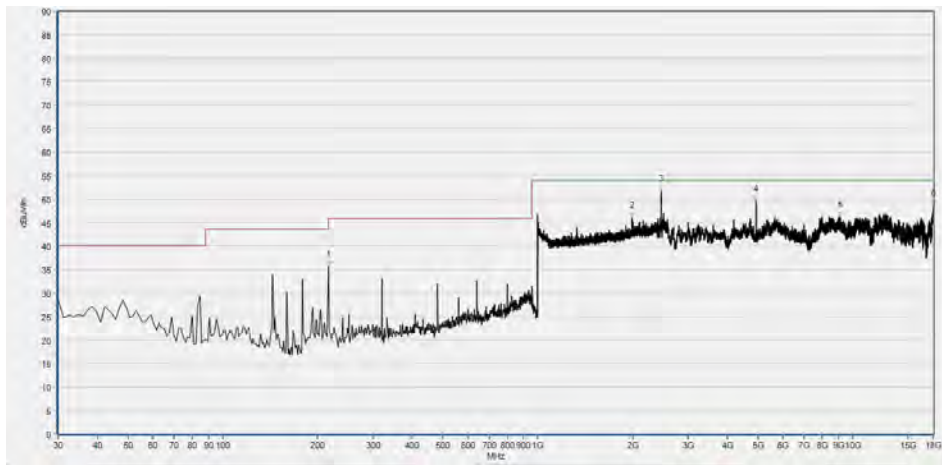
(Antenna Horizontal, 30MHz to 18GHz)



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
320.150	39.14	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
1996.238	48.36	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
3255.319	48.46	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
4885.215	58.21	N/A	51.44	74.00	N/A	54.00	Vertical	PASS
8004.983	46.20	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
17955.192	49.27	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

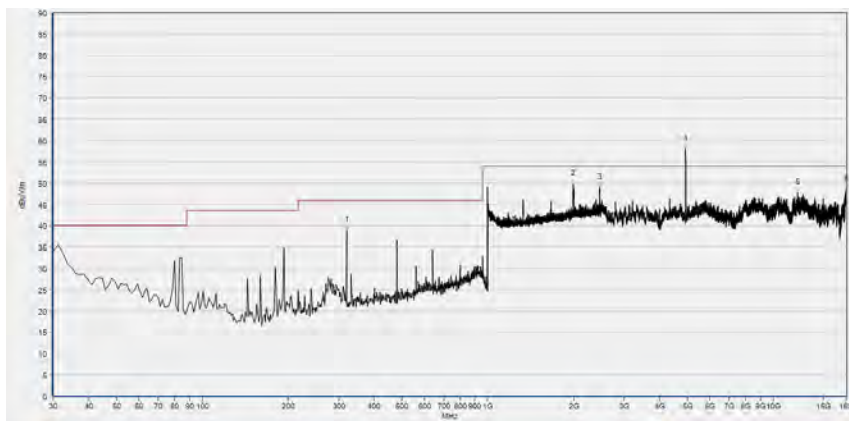
(Antenna Vertical, 30MHz to 18GHz)

Plot for Channel 12



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
216.959	35.71	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
1991.116	46.17	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
2465.546	51.73	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
4932.824	49.58	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
9108.383	46.18	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
17997.199	48.68	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

(Antenna Horizontal, 30MHz to 18GHz)



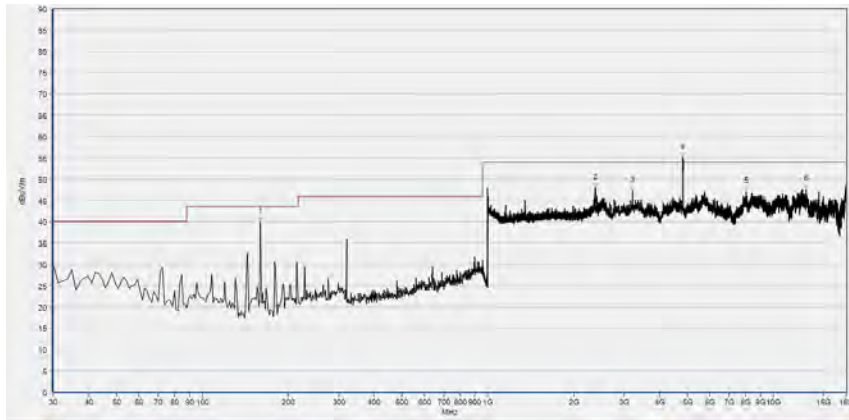
Fre. (MHz)	PK (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
320.150	38.94	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
1994.318	49.76	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
2463.625	48.93	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
4932.824	58.05	N/A	51.98	74.00	N/A	54.00	Vertical	PASS
12138.534	47.74	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
17980.396	48.29	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

(Antenna Vertical, 30MHz to 18GHz)



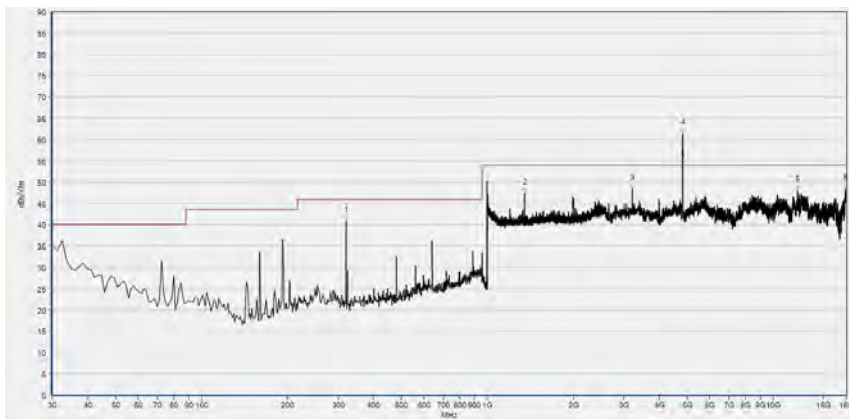
802.11g Test mode

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
159.900	39.86	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
2379.752	47.88	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
3216.112	47.28	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
4823.604	55.05	N/A	46.77	74.00	N/A	54.00	Horizontal	PASS
8024.586	47.08	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
13015.094	47.61	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

(Antenna Horizontal, 30MHz to 18GHz)

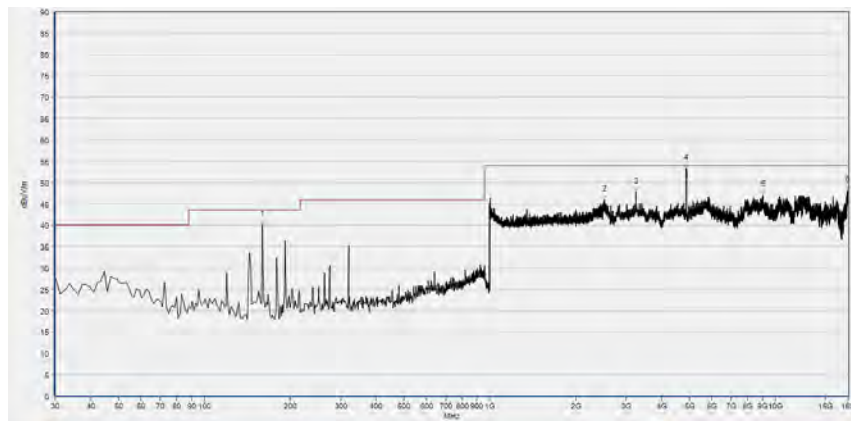


Fre. (MHz)	PK (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
320.150	40.82	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
1350.220	47.44	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
3216.112	48.43	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
4826.405	61.57	N/A	52.02	74.00	N/A	54.00	Vertical	PASS
12141.335	48.02	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
17921.586	48.19	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

(Antenna Vertical, 30MHz to 18GHz)

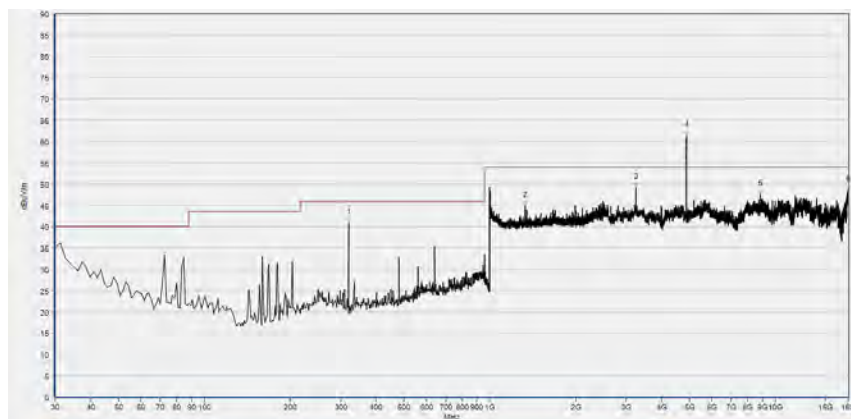


Plot for Channel 7



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
159.900	40.02	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
2519.328	45.91	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
3255.319	47.82	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
4884.600	53.34	N/A	43.76	74.00	N/A	54.00	Horizontal	PASS
9046.772	47.08	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
17904.783	48.06	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

(Antenna Horizontal, 30MHz to 18GHz)

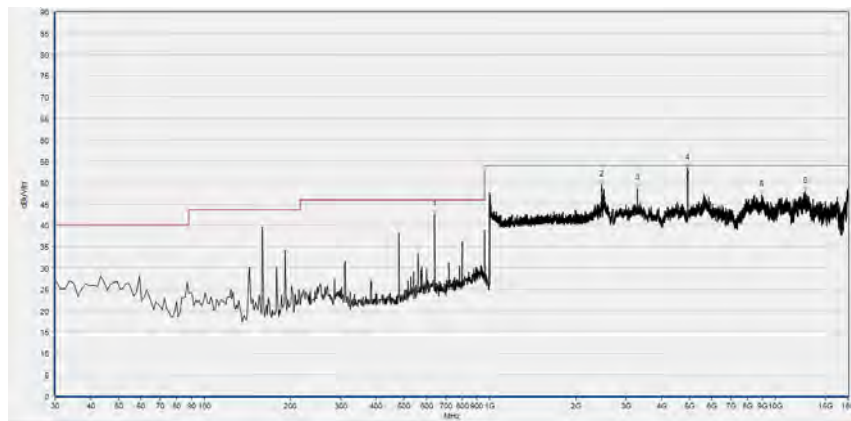


Fre. (MHz)	PK (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
320.150	40.85	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
1330.372	44.84	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
3255.319	49.32	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
4882.415	61.29	N/A	52.43	74.00	N/A	54.00	Vertical	PASS
8881.542	47.64	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
17977.596	48.58	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

(Antenna Vertical, 30MHz to 18GHz)

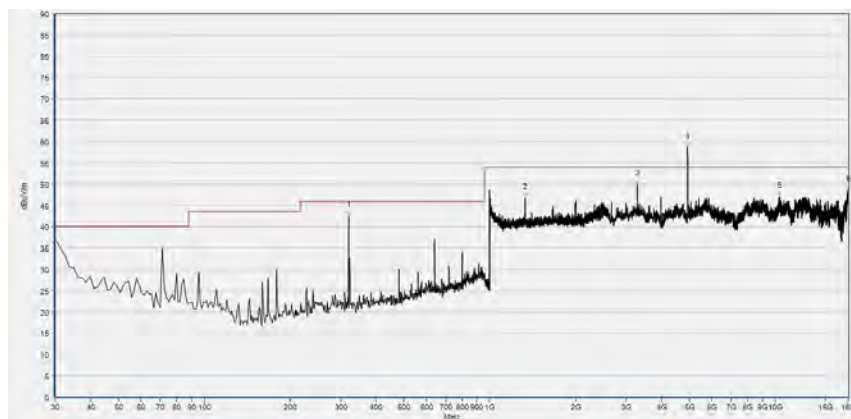


Plot for Channel 12



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
639.437	42.53	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
2462.985	49.38	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
3288.925	48.62	N/A	N/A	74.00	N/A	54.00	Horizontal	PAS
4935.625	53.22	N/A	52.41	74.00	N/A	54.00	Horizontal	PASS
8979.560	47.14	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
12740.644	47.88	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

(Antenna Horizontal, 30MHz to 18GHz)



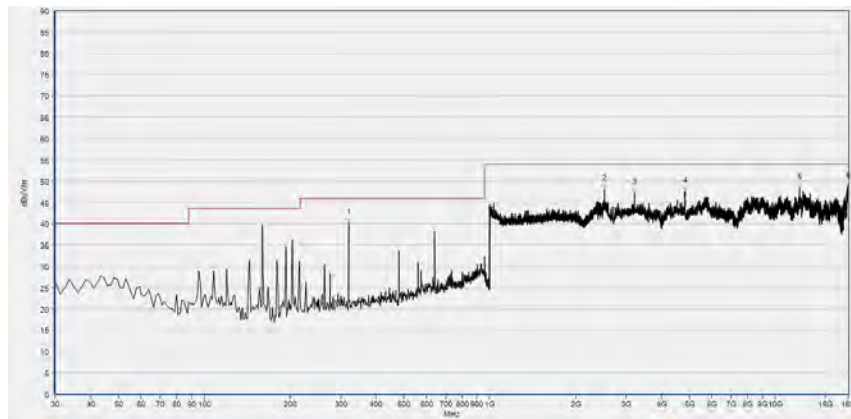
Fre. (MHz)	PK (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
320.150	42.57	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
1331.012	46.75	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
3288.925	50.01	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
4932.824	58.61	N/A	49.43	74.00	N/A	54.00	Vertical	PASS
10351.809	47.03	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
17957.992	48.65	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

(Antenna Vertical, 30MHz to 18GHz)



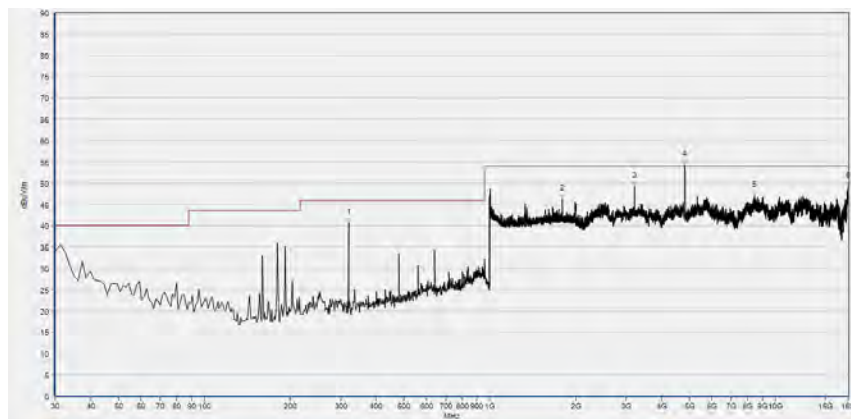
802.11n (HT20) Test mode

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
320.150	40.22	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
2524.450	48.11	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
3216.112	47.28	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
4829.205	47.54	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
12149.736	48.44	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
17952.391	48.75	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

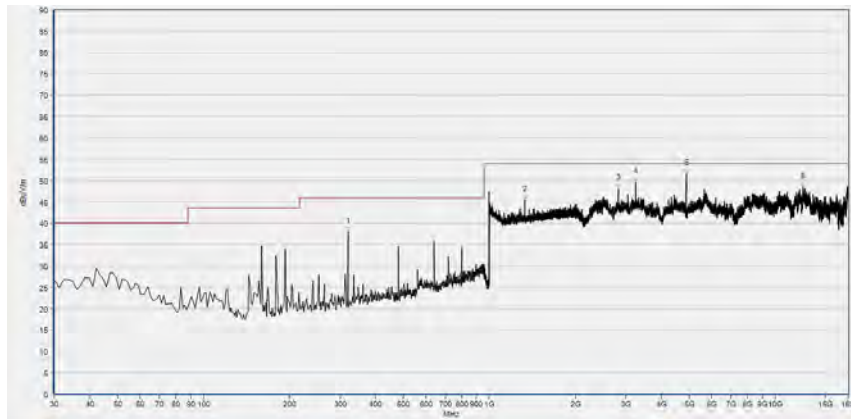
(Antenna Horizontal, 30MHz to 18GHz)



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
320.150	40.79	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
1795.838	46.18	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
3216.112	49.21	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
4821.900	54.34	N/A	40.68	74.00	N/A	54.00	Vertical	PASS
8453.064	47.07	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
17969.194	49.30	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

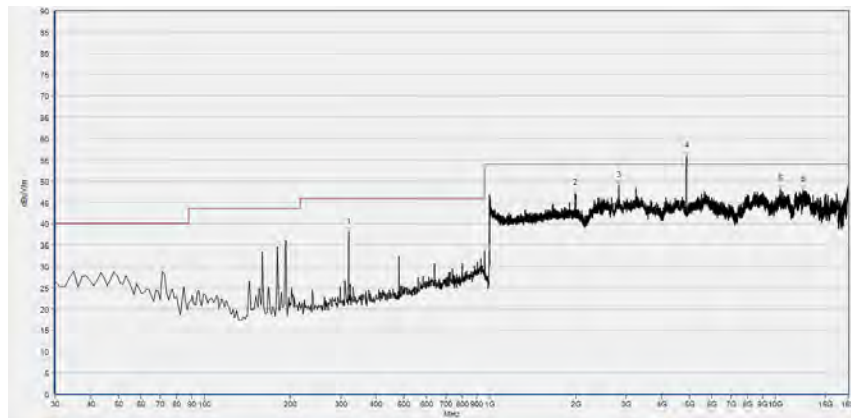
(Antenna Vertical, 30MHz to 18GHz)

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
320.150	38.10	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
1331.653	45.44	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
2824.041	48.15	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
3255.319	49.59	N/A	33.53	74.00	N/A	54.00	Horizontal	PASS
4877.300	52.34	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
12491.398	48.36	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

(Antenna Horizontal, 30MHz to 18GHz)

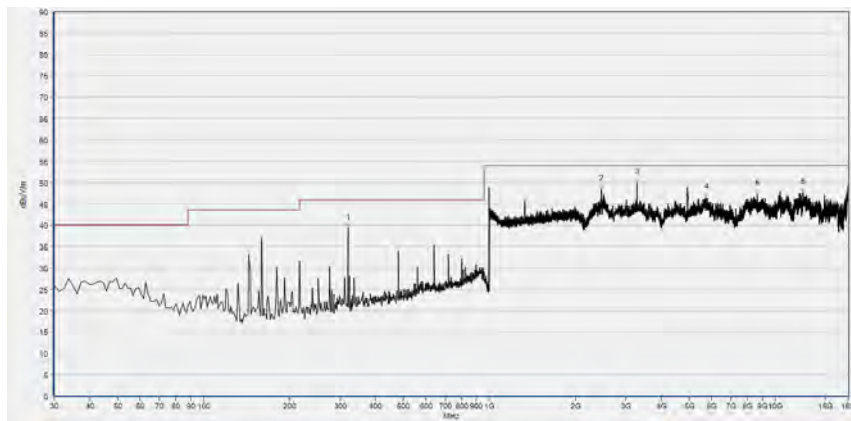


Fre. (MHz)	PK (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Ante na	Verdict
320.150	38.04	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
1996.238	47.15	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
2826.841	48.88	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
4886.500	55.83	N/A	45.18	74.00	N/A	54.00	Vertical	PASS
10393.817	48.13	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
12513.803	48.00	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

(Antenna Vertical, 30MHz to 18GHz)

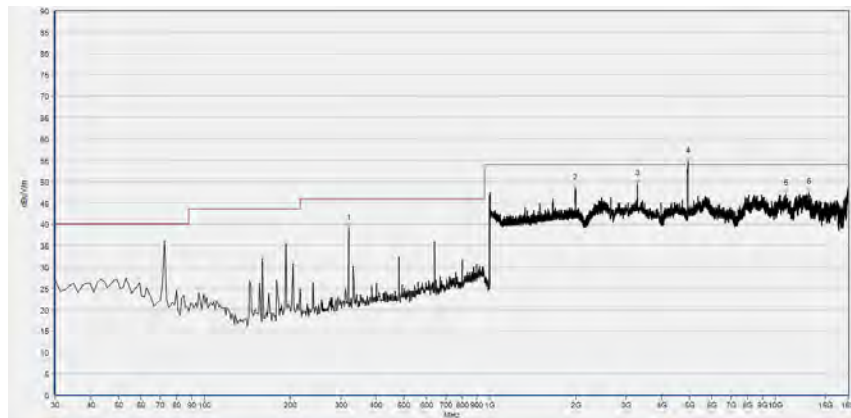


Plot for Channel 12



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
320.150	39.39	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
2462.345	48.36	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
3288.925	49.93	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
5747.772	46.41	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
8637.898	47.18	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
12511.002	47.63	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

(Antenna Horizontal, 30MHz to 18GHz)

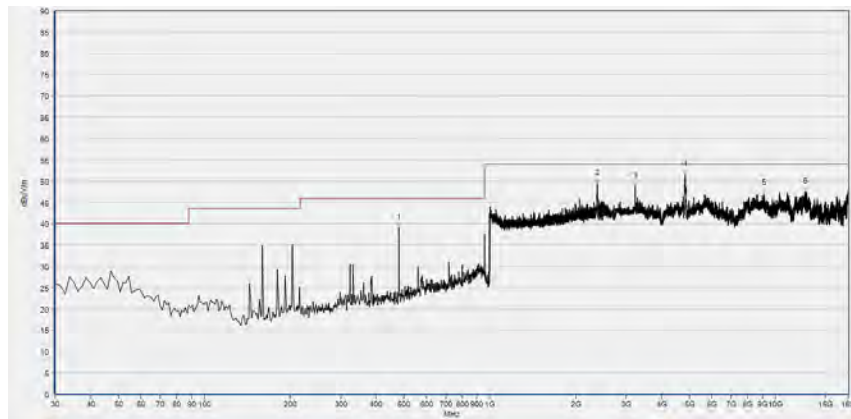


Fre. (MHz)	PK (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
320.150	39.00	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
1996.238	48.47	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
3288.925	49.42	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
4938.700	54.31	N/A	42.92	74.00	N/A	54.00	Vertical	PASS
10914.712	47.04	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
13093.508	47.39	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

(Antenna Vertical, 30MHz to 18GHz)

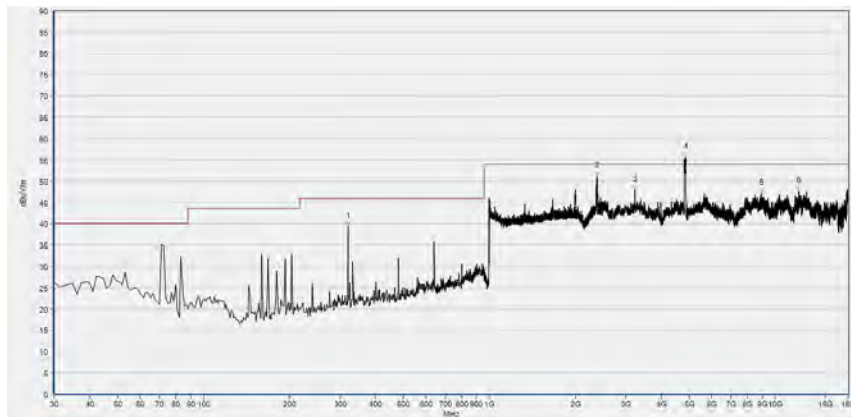
**802.11n(HT40) Test mode**

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
480.401	39.07	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
2381.673	49.40	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
3230.115	48.71	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
4837.607	51.50	N/A	44.61	74.00	N/A	54.00	Horizontal	PASS
9116.785	47.10	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
12760.247	47.43	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

(Antenna Horizontal, 30MHz to 18GHz)

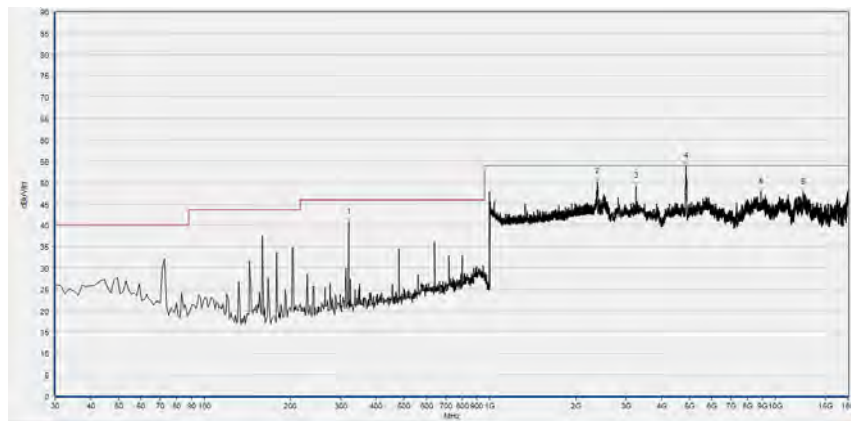


Fre. (MHz)	PK (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
320.150	39.46	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
2384.234	51.18	N/A	46.24	74.00	N/A	54.00	Vertical	PASS
3230.115	47.91	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
4851.609	55.63	N/A	47.66	74.00	N/A	54.00	Vertical	ASS
8962.757	47.16	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
12118.931	47.61	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

(Antenna Vertical, 30MHz to 18GHz)

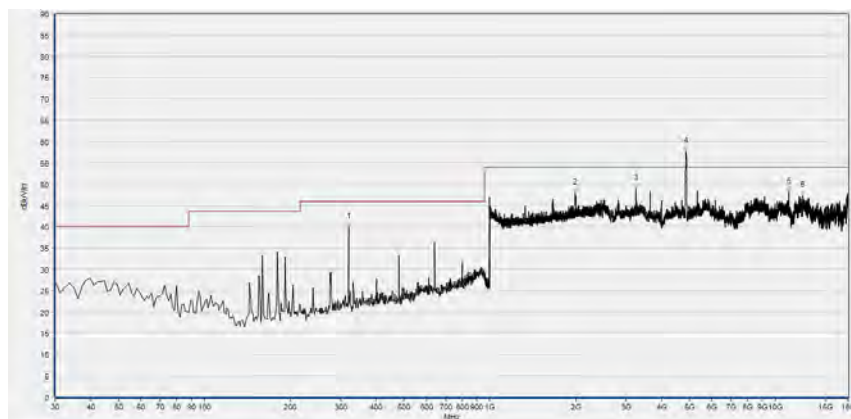


Plot for Channel 7



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
320.150	40.65	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
2387.435	50.14	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
3249.718	49.04	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
4874.013	53.85	N/A	45.11	74.00	N/A	54.00	Horizontal	PASS
8923.550	47.69	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
12499.800	47.57	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

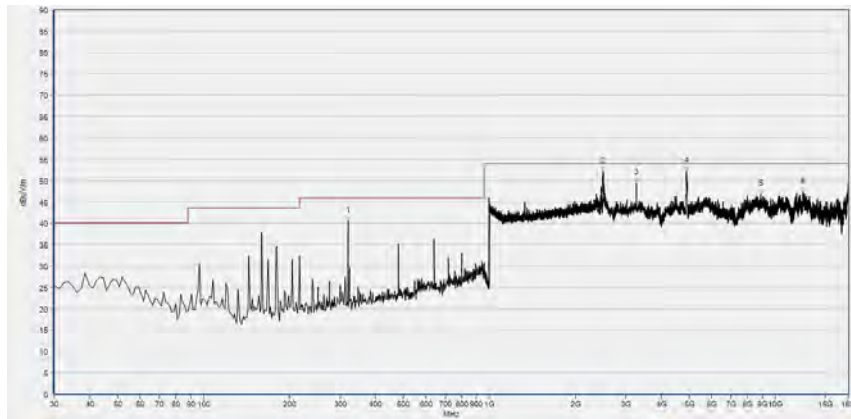
(Antenna Horizontal, 30MHz to 18GHz)



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
320.150	39.94	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
1994.318	47.90	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
3249.718	48.99	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
4865.612	57.67	N/A	50.69	74.00	N/A	54.00	Vertical	PASS
11127.550	48.14	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
12482.997	47.19	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

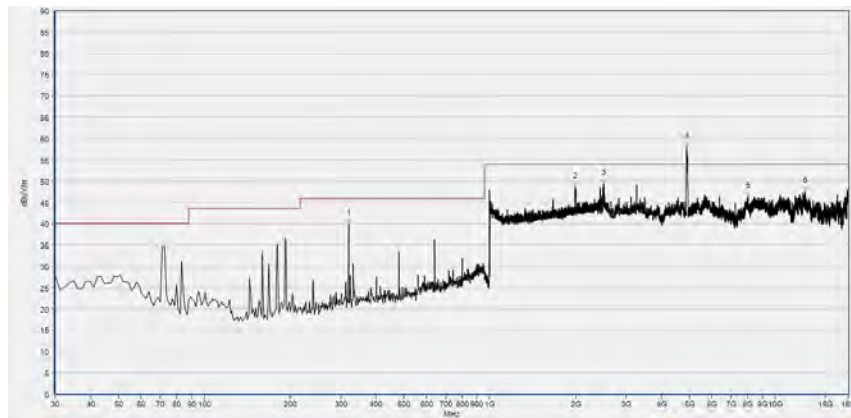
(Antenna Vertical, 30MHz to 18GHz)

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)	Anten a	Verdict
320.150	40.52	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
2500.120	52.07	N/A	43.42	74.00	N/A	54.00	Horizontal	PASS
3269.322	49.44	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
4904.819	52.08	N/A	44.15	74.00	N/A	54.00	Horizontal	PASS
8909.547	46.76	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
12494.199	47.20	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
320.150	39.82	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
1995.598	48.56	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
2503.962	49.39	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
4904.819	57.99	N/A	50.20	74.00	N/A	54.00	Vertical	PASS
8052.591	46.42	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
12732.242	47.55	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	$\pm 2.22\text{dB}$
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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