



REPORT No.: SZ22080397W03

TEST REPORT

APPLICANT : Anker Innovations Limited

PRODUCT NAME : Nebula Capsule 3 Laser

MODEL NAME : D2426

BRAND NAME : NEBULA

FCC ID : 2AOKB-D2426

STANDARD(S) : 47 CFR Part 15 Subpart C

RECEIPT DATE : 2022-09-06

TEST DATE : 2022-09-09 to 2022-10-12

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Change History		
Version	Date	Reason for change
1.0	2022-10-21	First edition



1. Technical Information

Note: Provide by applicant.

1.1. Applicant and Manufacturer Information

Applicant:	Anker Innovations Limited
Applicant Address:	Room 1318-19, Hollywood Plaza, 610 Nathan Road, Mongkok, Kowloon, Hong Kong
Manufacturer:	Anker Innovations Limited
Manufacturer Address:	Room 1318-19, Hollywood Plaza, 610 Nathan Road, Mongkok, Kowloon, Hong Kong

1.2. Equipment Under Test (EUT) Description

Product Name:	Nebula Capsule 3 Laser	
Sample No.:	1#	
Hardware Version:	V0.5	
Software Version:	V11.1.16	
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:	ANT1: 1.90dBi; ANT2: 3.63dBi	
Directional Gain:	6.64dBi _{Note 3}	
Accessory Information:	Battery	
	Brand Name:	N/A
	Model No.:	M3 21700M50LT-3S
	Serial No.:	N/A
	Capacity:	4700mAh
	Rated Voltage:	11.07V
	Charge Limit:	12.6V
	Manufacturer:	Guangdong Pow-Tech New Power Co.,Ltd.



Accessory Information:	AC Adapter	
	Brand Name:	
	Model No.:	PN453I
	Serial No.:	N/A
	Rated Output:	5V=3A, 9V=3A, 12V=3A 15V=3A, 20V=2.25A
	Rated Input:	100-240V~50/60Hz, 1.2A
	Manufacturer:	Shenzhen Xinspower Technology Co., Ltd

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

Note 2: The EUT has two antennas, only 802.11n modulation mode supports a MIMO function.

Note 3: According to KDB 662911 D01, the directional gain = $G_{ANT} + 10\log(N_{ANT})$ dBi, where G_{ANT} is the maximum antenna gain in dBi, N_{ANT} is the number of outputs.

Note 4: For conducted test item Conducted Output Power and Power Spectral Density of each modulation mode, we recorded the test result of two antennas separately, for other conducted test items both of the two antennas were tested separately, we only recorded the worst test result (ANT1) in this report.

Note 5: Radiation test items for all modulation operate at 2Tx mode during the test, only the worst test result(ANT1) was recorded in this report.

Note 6: 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		
	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	Sep. 13, 2022	Zhong Yanshan	PASS	No deviation
3	15.247(b)	Maximum Peak and Average Conducted Output Power	Sep. 13, 2022	Zhong Yanshan	PASS	No deviation
4	15.247(a)	Bandwidth	Sep. 21, 2022	Zhong Yanshan	PASS	No deviation
5	15.247(d)	Conducted Spurious Emission and Band Edge	Sep. 21, 2022	Zhong Yanshan	PASS	No deviation
6	15.247(e)	Power Spectral Density	Sep. 21, 2022	Zhong Yanshan	PASS	No deviation
7	15.207	Conducted Emission	Sep. 14, 2022	Wu Zhaoling	PASS	No deviation
8	15.247(d)	Restricted Frequency Bands	Sep. 19, 2022	Lin Jiayong	PASS	No deviation
9	15.209, 15.247(d)	Radiated Emission	Sep. 13&19, 2022	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% confidence intervals.

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

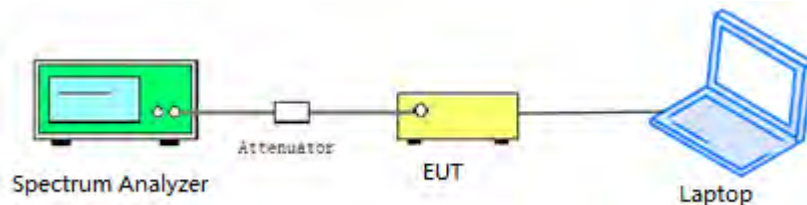
2.2.1. Requirement

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.

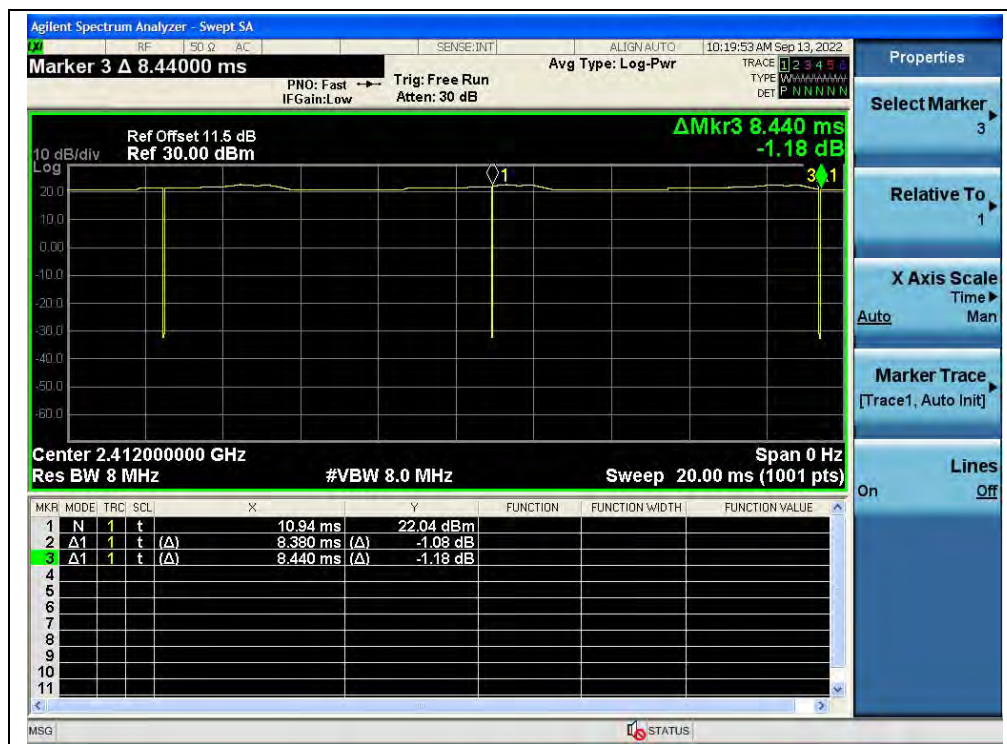


2.2.3. Test Result

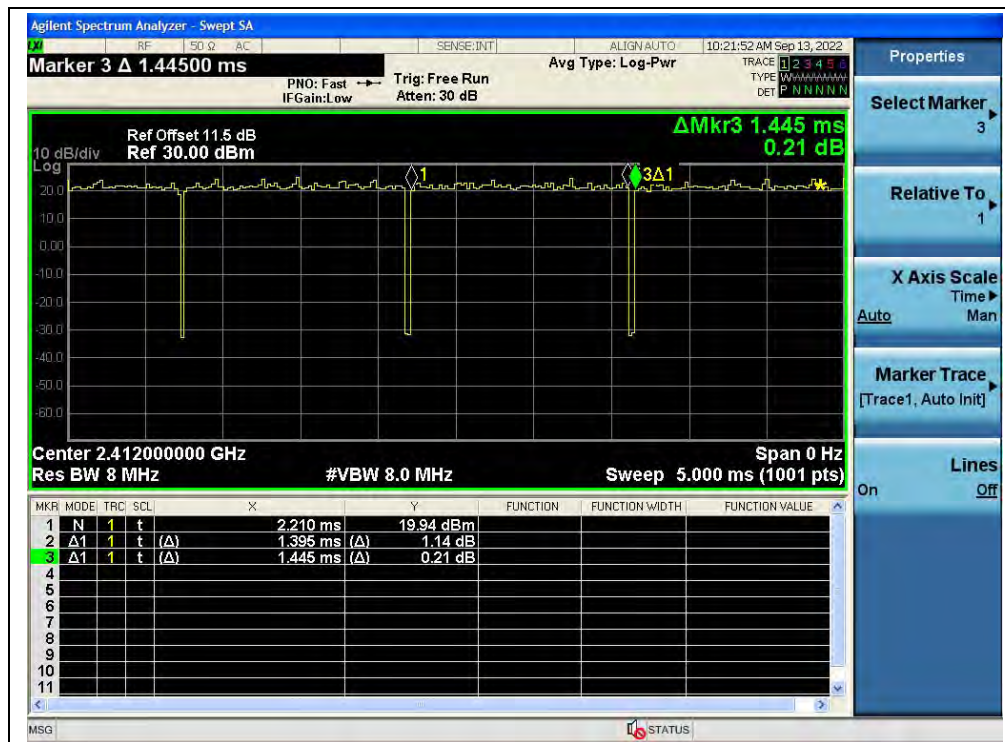
A. Test Verdict:

Test Mode	Duty Cycle (%) (D)	Duty Factor ($10 \cdot \lg[1/D]$)
802.11b	99.29	0.03
802.11g	96.54	0.15
802.11n (HT20)	95.87	0.18
802.11n (HT40)	92.70	0.33

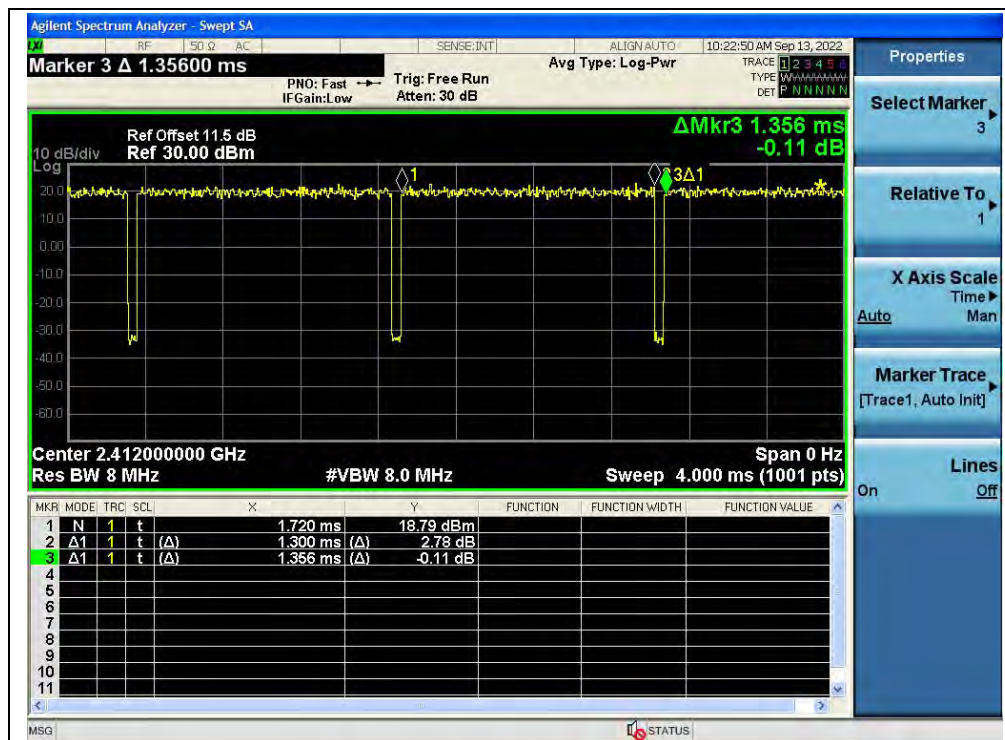
B. Test Plot:



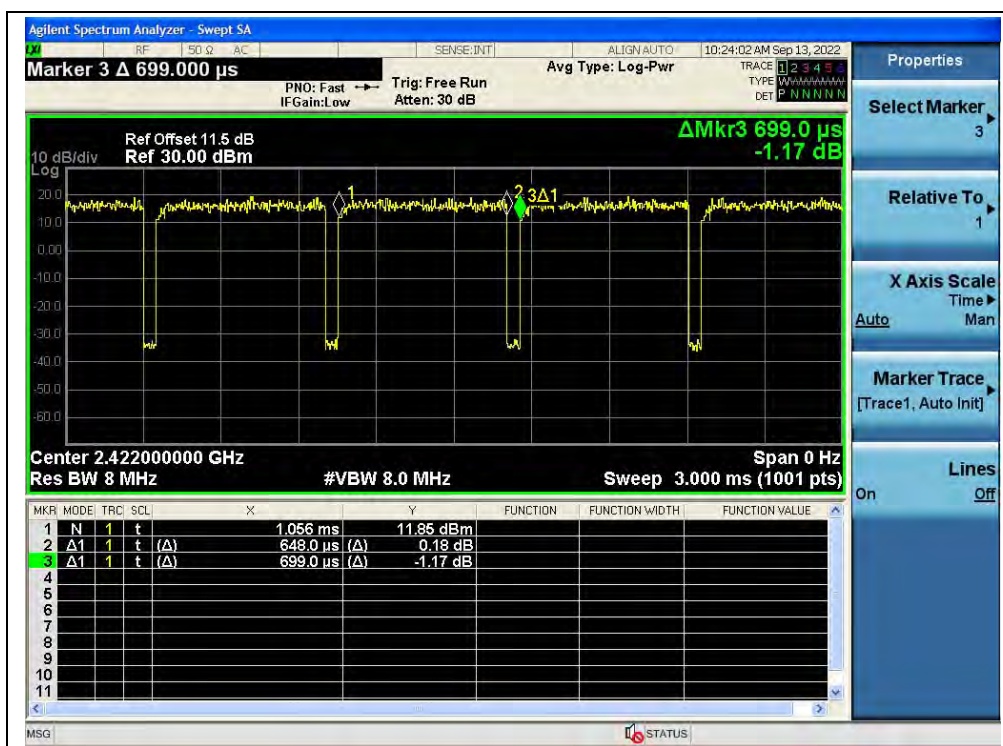
(Channel 1, 802.11b)



(Channel 1, 802.11g)



(Channel 1, 802.11n (HT20))



(Channel 3, 802.11n (HT40))

2.3. Maximum Peak and Average Conducted Output Power

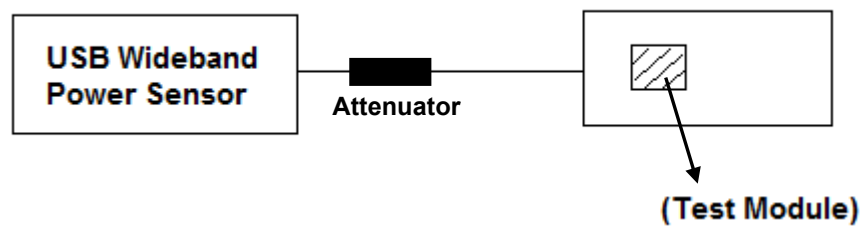
2.3.1. Requirement

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 Peak Power				Limit		Verdict
		ANT1		ANT2		(dBm)		
		dBm	W	dBm	W	dBm	W	
1	2412	19.91	0.098	19.59	0.091	30	1	PASS
6	2437	20.24	0.106	19.78	0.095			PASS
11	2462	19.95	0.099	19.57	0.091			PASS

802.11g Mode

Channel	Frequency (MHz)	Measured Peak Power				Limit (dBm)		Verdict
		ANT1		ANT2		dBm	W	
		dBm	W	dBm	W			
1	2412	24.32	0.270	24.11	0.258	30	1	PASS
6	2437	23.85	0.243	23.82	0.241			PASS
11	2462	24.33	0.271	24.16	0.261			PASS

802.11n(HT20) Mode

Channel	Frequency (MHz)	Measured Peak Power (dBm)		Total Power (dBm)	Total Power (W)	Limit		Verdict
		ANT1	ANT2			dBm	W	
1	2412	23.59	23.39	26.50	0.447	29.36	0.86	PASS
6	2437	23.09	23.16	26.14	0.411			PASS
11	2462	23.78	23.56	26.68	0.466			PASS

Note: Directional gain = $3.63\text{dBi} + 10\log(2) = 6.64\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to $30 - (6.64 - 6) = 29.36\text{dBm}$

802.11n(HT40) Mode

Channel	Frequency (MHz)	Measured Peak Power (dBm)		Total Power (dBm)	Total Power (W)	Limit		Verdict
		ANT1	ANT2			dBm	W	
3	2422	22.16	22.03	25.11	0.324	29.36	0.86	PASS
6	2437	21.98	21.90	24.96	0.313			PASS
9	2452	22.38	22.22	25.31	0.340			PASS

Note: Directional gain = $3.63\text{dBi} + 10\log(2) = 6.64\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to $30 - (6.64 - 6) = 29.36\text{dBm}$

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

Frequency (MHz)	Average Power							Limit		Verdict
	Measured		Duty Factor	Duty Factor Calculated						
	ANT1	ANT2		ANT1		ANT2				
	dBm	dBm		dBm	W	dBm	W	dBm	W	
2412	17.65	17.35	0.03	17.68	0.059	17.38	0.055	30	1	PASS
2437	17.97	17.46		18.00	0.063	17.49	0.056			PASS
2462	17.66	17.18		17.69	0.059	17.21	0.053			PASS

802.11g Mode

Frequency (MHz)	Average Power							Limit		Verdict
	Measured		Duty Factor	Duty Factor Calculated						
	ANT1	ANT2		ANT1		ANT2				
	dBm	dBm		dBm	W	dBm	W	dBm	W	
2412	16.89	16.54	0.15	17.04	0.051	16.69	0.047	30	1	PASS
2437	16.95	16.58		17.10	0.051	16.73	0.047			PASS
2462	16.78	16.53		16.93	0.049	16.68	0.047			PASS

802.11n (HT20) Mode

Frequency (MHz)	Average Power					Limit		Verdict
	Measured		Duty Factor	Total Power with Duty Factor				
	ANT1	ANT2						
	dBm	dBm		dBm	W	dBm	W	
2412	15.84	15.44	0.18	18.81	0.076	29.36	0.86	PASS
2437	15.82	15.43		18.81	0.076			PASS
2462	15.66	15.43		18.75	0.075			PASS

Note: Directional gain = 3.63dBi + 10log(2) = 6.64dBi > 6dBi, so the power limit shall be reduced to 30-(6.64-6) = 29.36dBm

**802.11n (HT40) Mode**

Frequency (MHz)	Average Power					Limit		Verdict
	Measured		Duty Factor	Total Power with Duty Factor				
	ANT1	ANT2						
	dBm	dBm		dBm	W	dBm	W	
2422	15.67	15.26	0.33	18.81	0.076	29.36	0.86	PASS
2437	15.76	15.56		18.98	0.079			PASS
2452	15.65	15.46		18.92	0.078			PASS
Note: Directional gain = 3.63dBi +10log(2) = 6.64dBi>6dBi, so the power limit shall be reduced to 30-(6.64-6) = 29.36dBm								

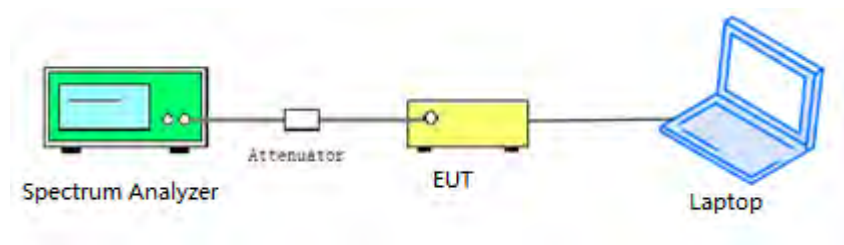
2.4. Bandwidth

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 50Ω; 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	8.096	≥500	PASS
6	2437	8.081	≥500	PASS
11	2462	9.067	≥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	15.12	≥500	PASS
6	2437	15.12	≥500	PASS
11	2462	15.13	≥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	15.13	≥500	PASS
6	2437	15.12	≥500	PASS
11	2462	15.12	≥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	35.12	≥500	PASS
6	2437	35.04	≥500	PASS
9	2452	35.10	≥500	PASS

B. Test Plot:

(Channel 3, 802.11n (HT40))



(Channel 6, 802.11n (HT40))



(Channel 9, 802.11n (HT40))

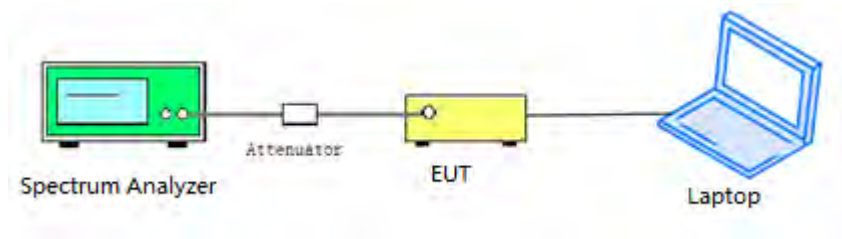
2.5. Conducted Spurious Emissions and Band Edge

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

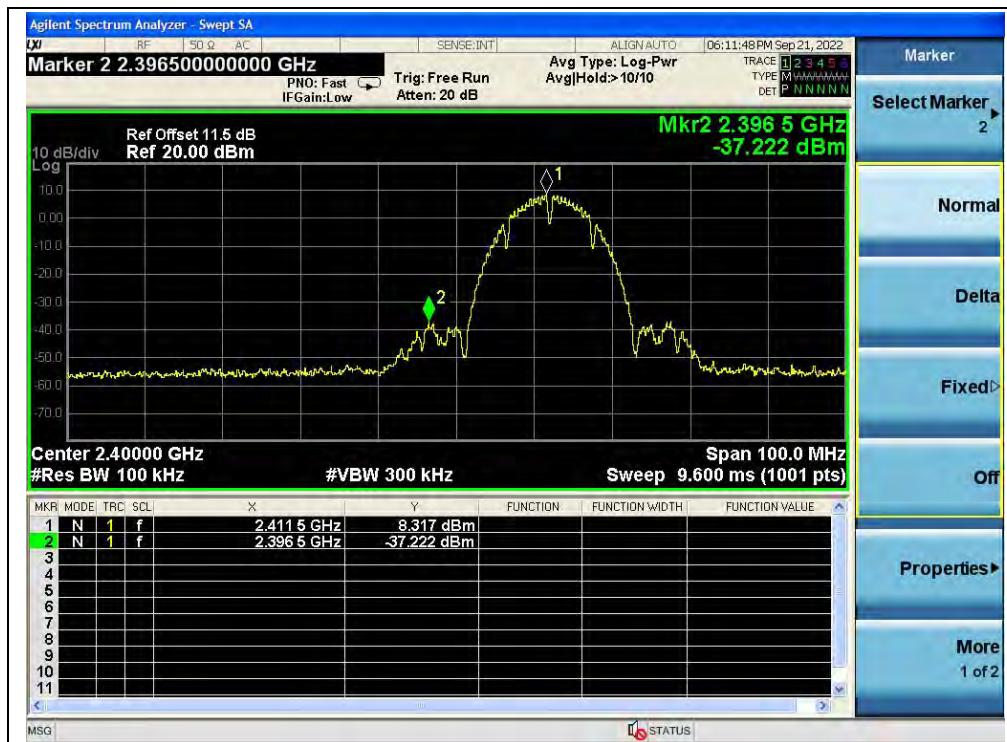
A. Test Verdict:

Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
			Carrier Level	Calculated -20dBc Limit	
1	2412	-39.93	7.32	-12.68	PASS
6	2437	-40.41	8.27	-11.73	PASS
11	2462	-40.10	8.13	-11.87	PASS

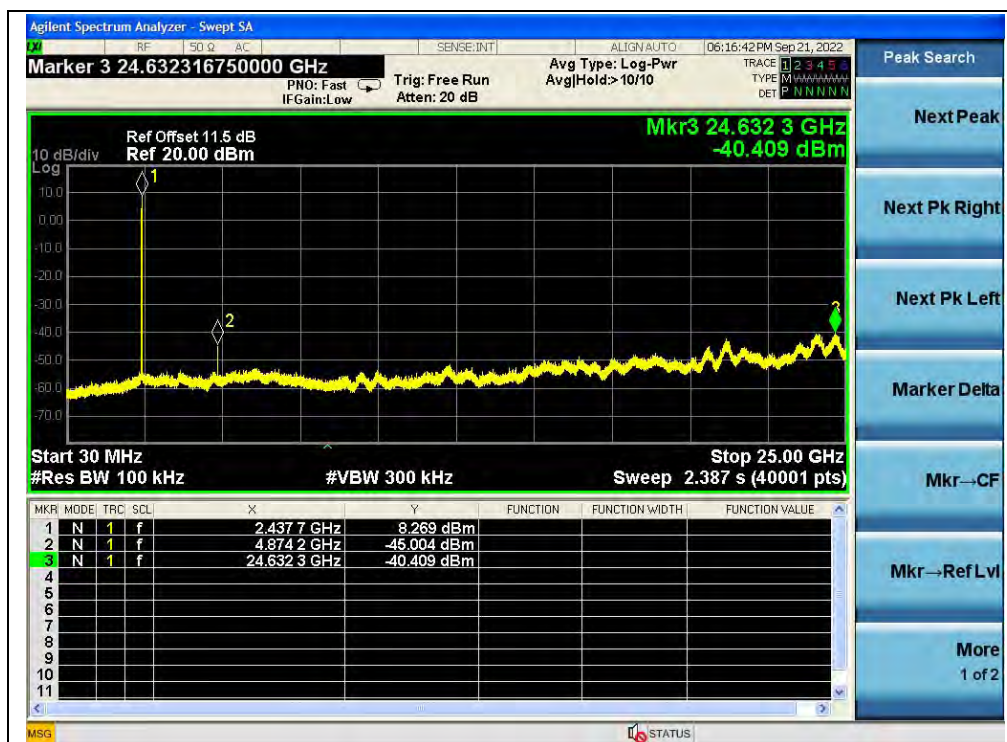
B. Test Plot:



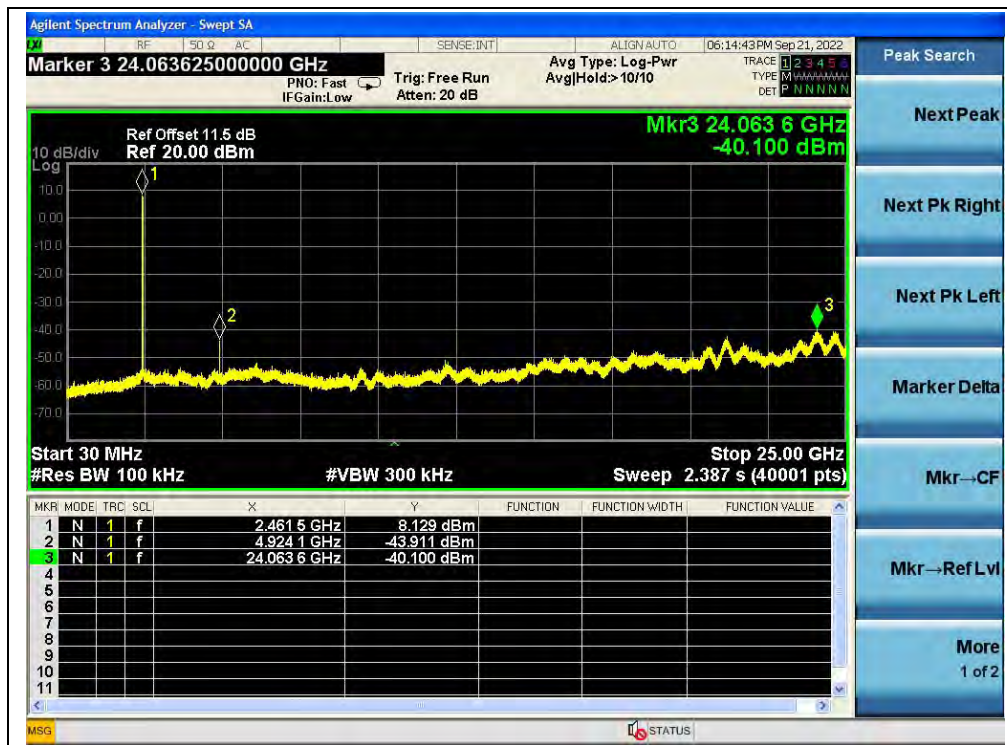
(30MHz to 25GHz, Channel 1, 802.11b)



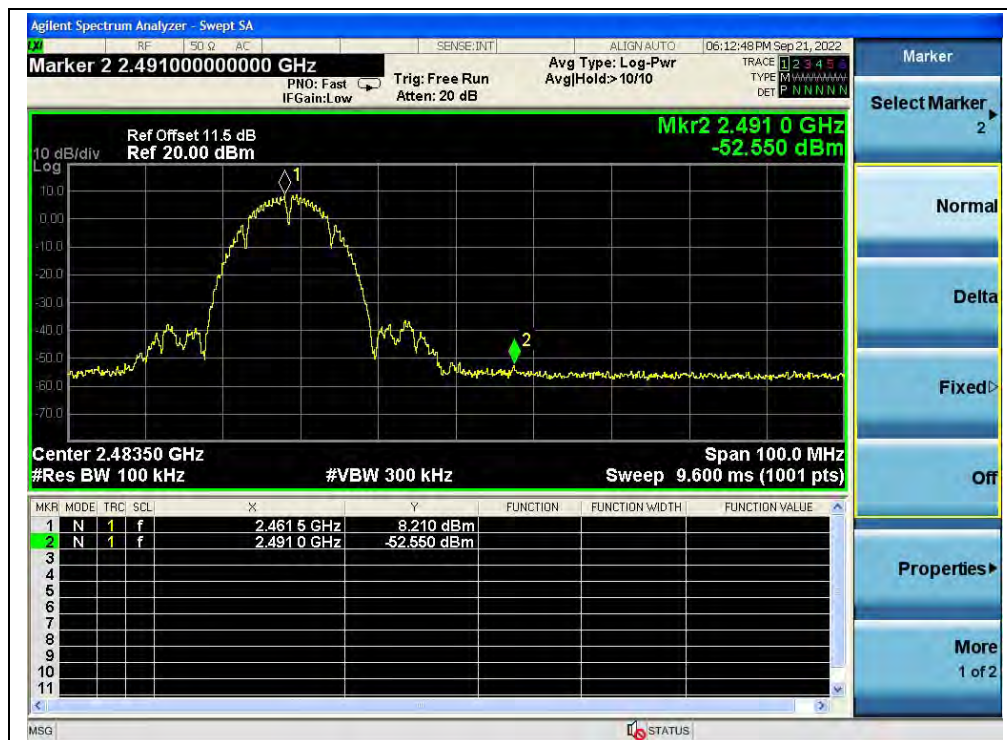
(Band Edge, Channel 1, 802.11b)



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



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



(Band Edge, Channel 11, 802.11b)

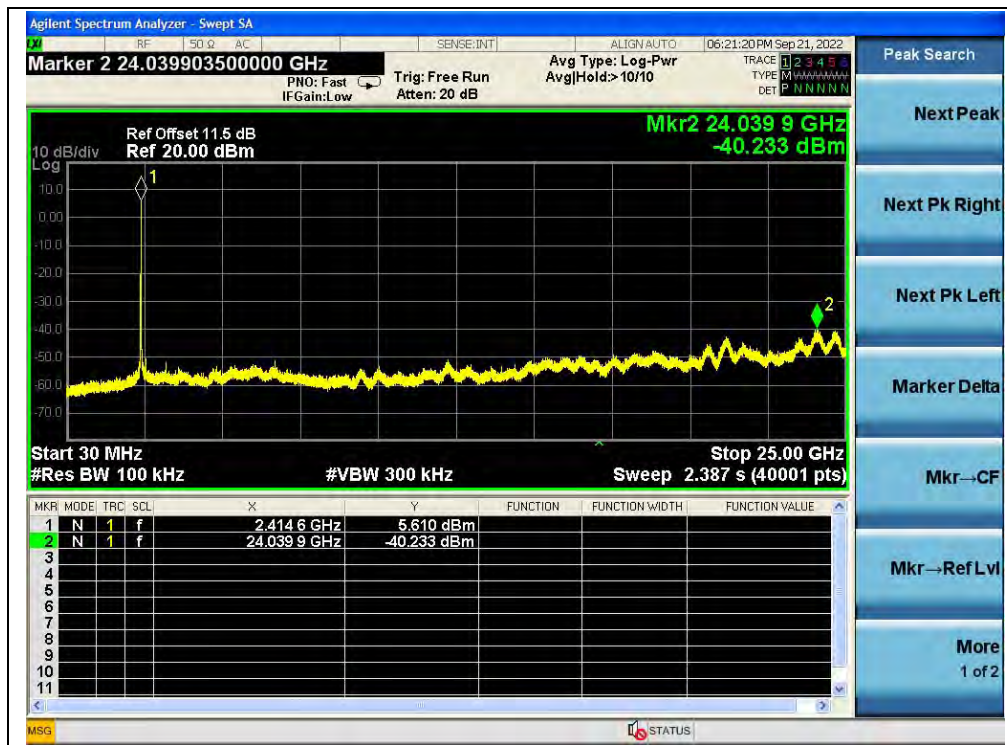


802.11g Mode

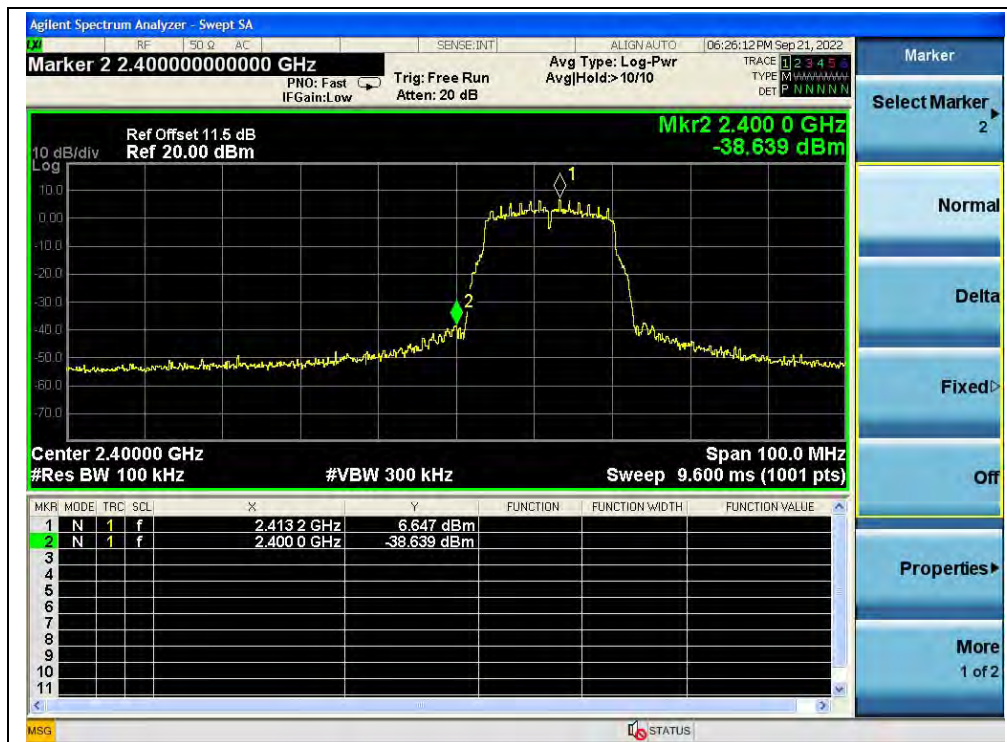
A. Test Verdict:

Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
			Carrier Level	Calculated -20dBc Limit	
1	2412	-40.23	5.61	-14.39	PASS
6	2437	-40.31	6.27	-13.73	PASS
11	2462	-40.90	3.73	-16.27	PASS

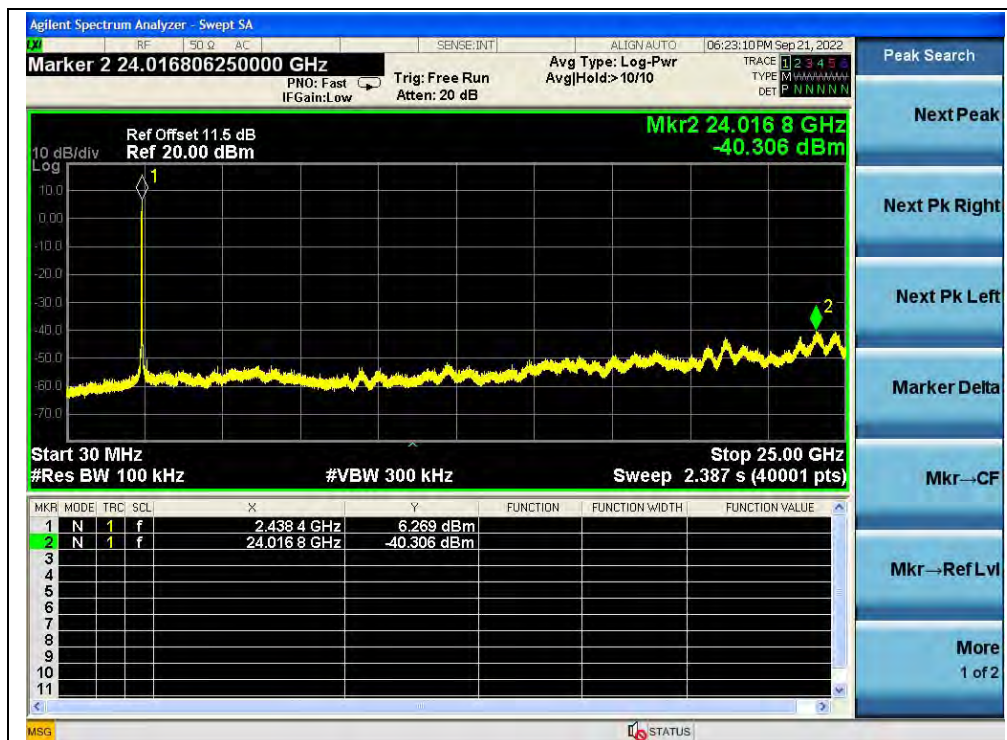
B. Test Plot:



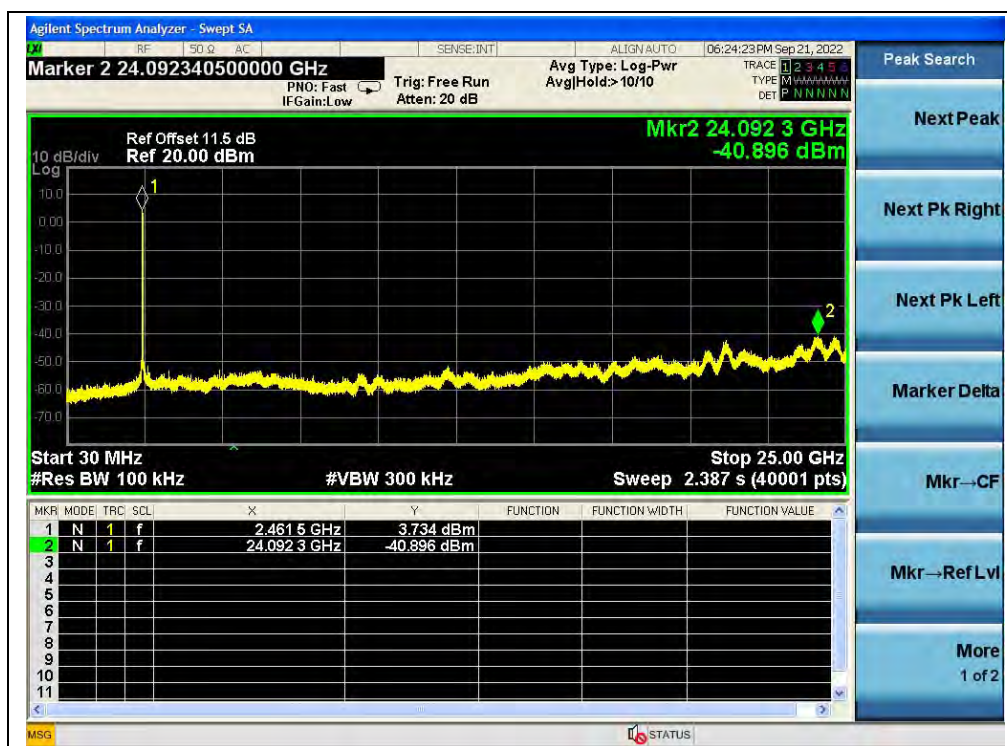
(30MHz to 25GHz, Channel 1, 802.11g)



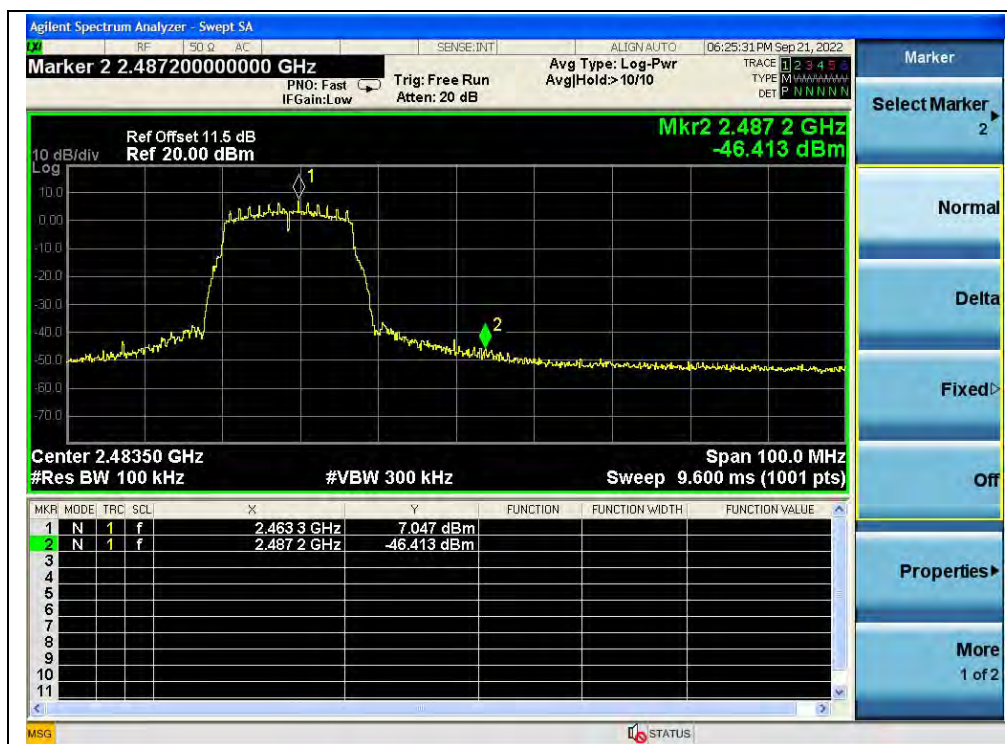
(Band Edge, Channel 1, 802.11g)



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



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



(Band Edge, Channel 11, 802.11g)

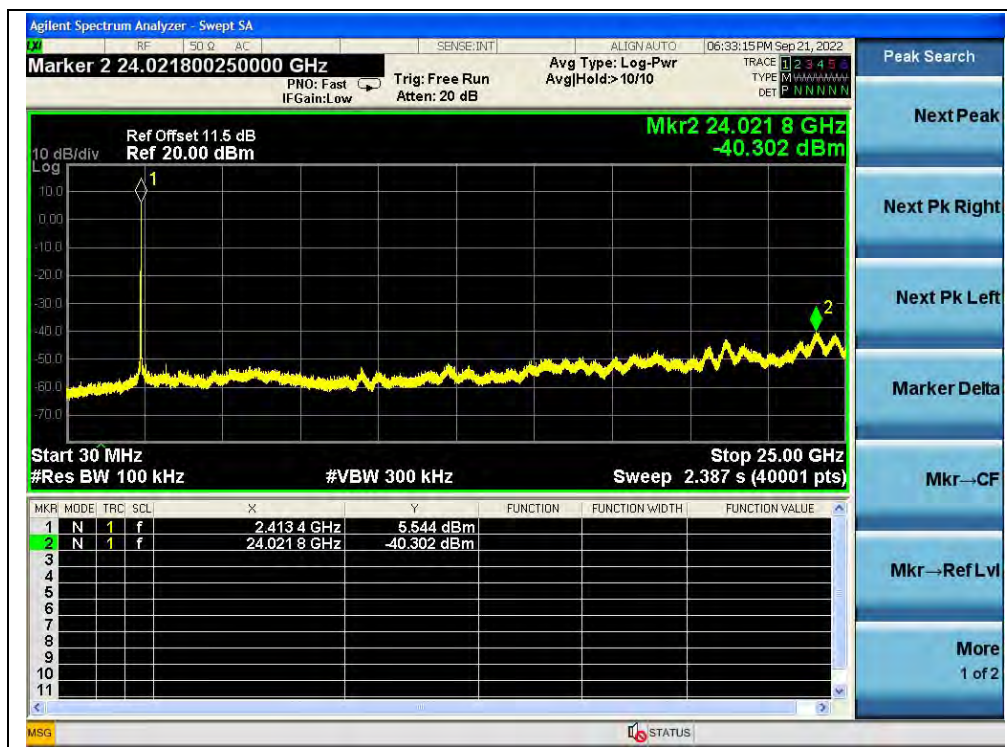


802.11n (HT20) Mode

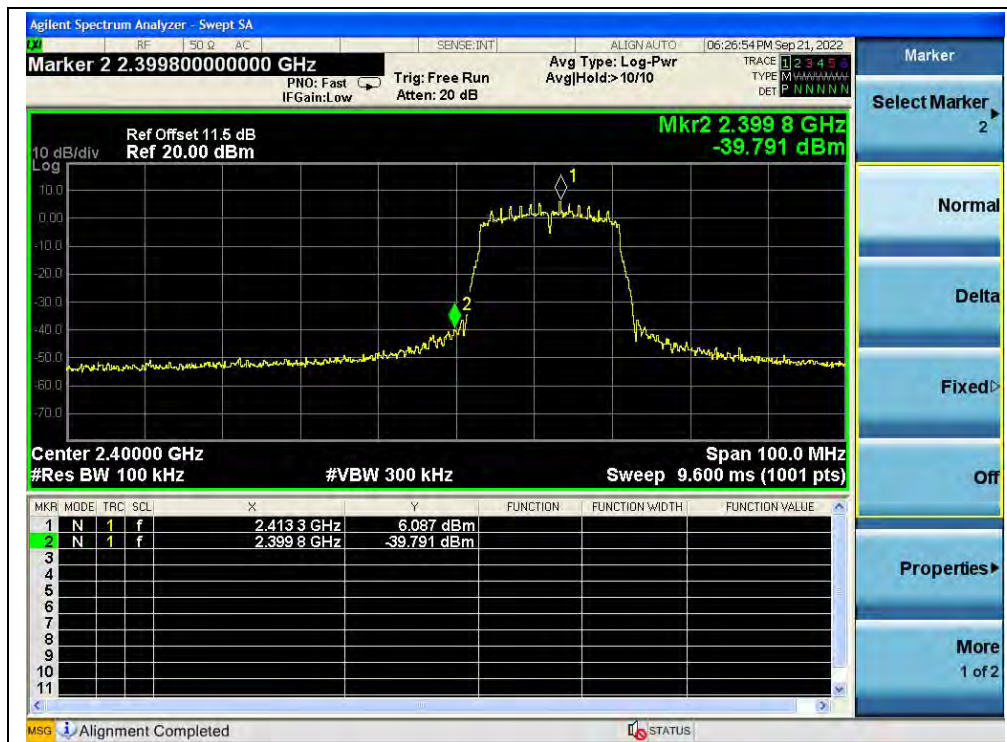
A. Test Verdict:

Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
			Carrier Level	Calculated -20dBc Limit	
1	2412	-40.30	5.54	-14.46	PASS
6	2437	-39.72	5.54	-14.46	PASS
11	2462	-41.02	4.33	-15.67	PASS

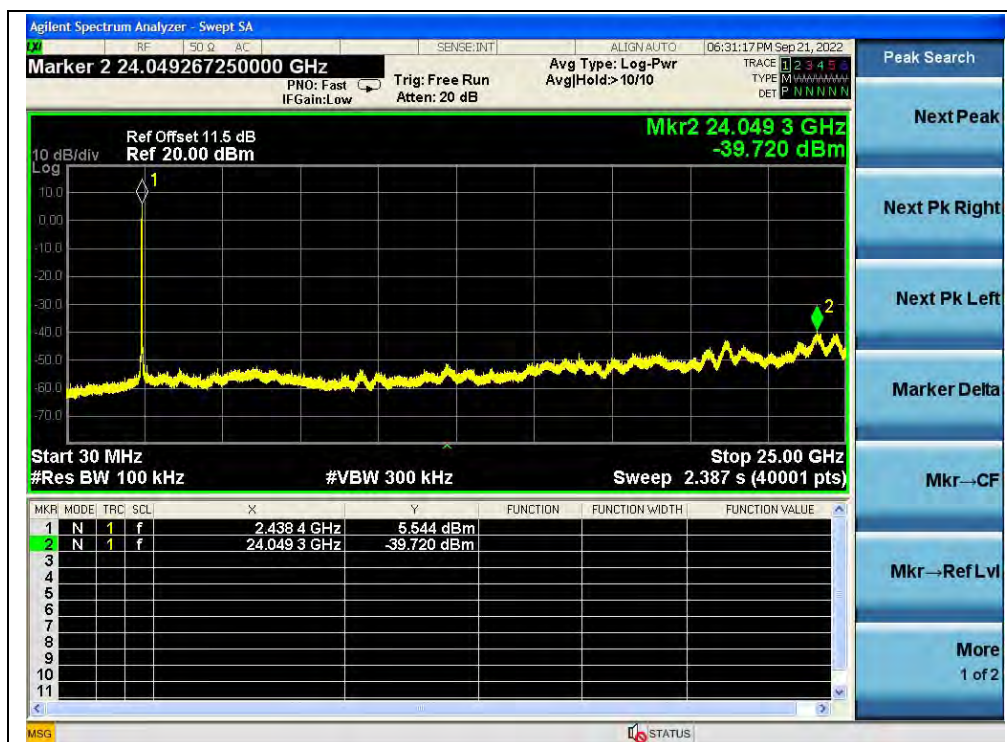
B. Test Plot:



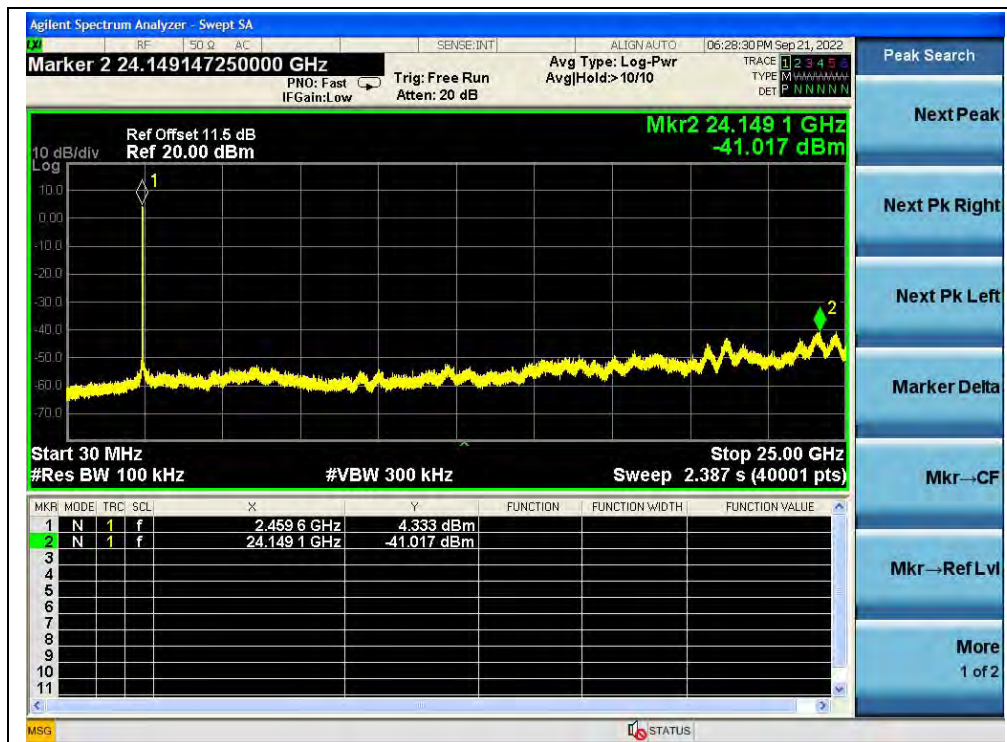
(30MHz to 25GHz, Channel 1, 802.11n (HT20))



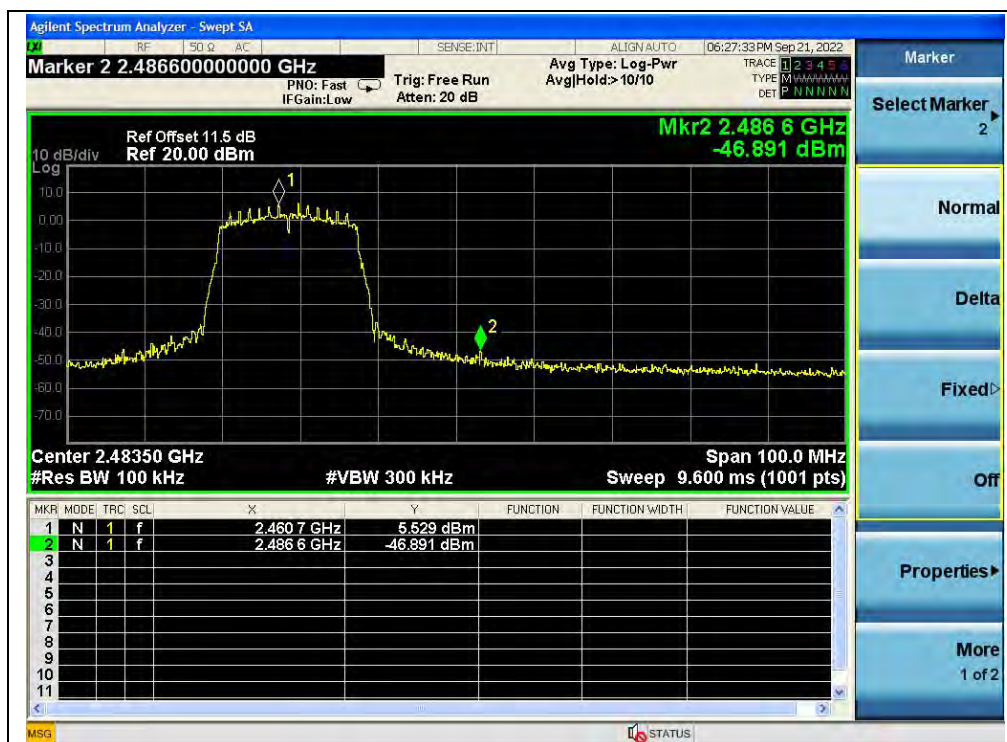
(Band Edge, Channel 1, 802.11n (HT20))



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



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



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

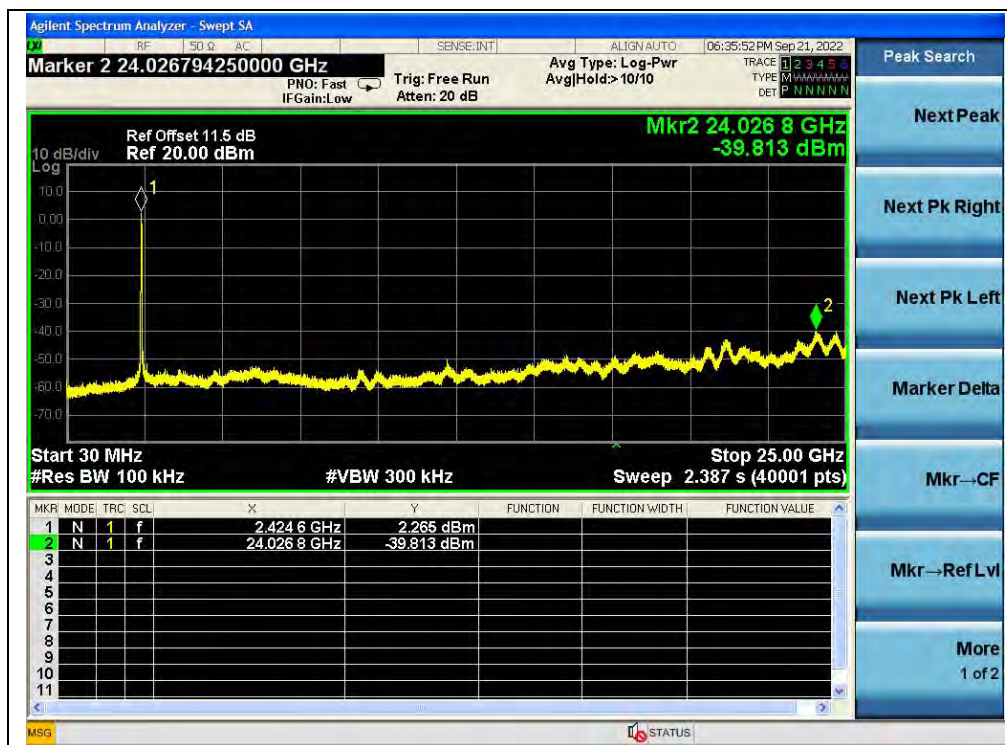


802.11n (HT40) Mode

A. Test Verdict:

Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
			Carrier Level	Calculated -20dBc Limit	
3	2422	-39.81	2.27	-17.73	PASS
6	2437	-40.07	2.80	-17.20	PASS
9	2452	-39.50	2.22	-17.78	PASS

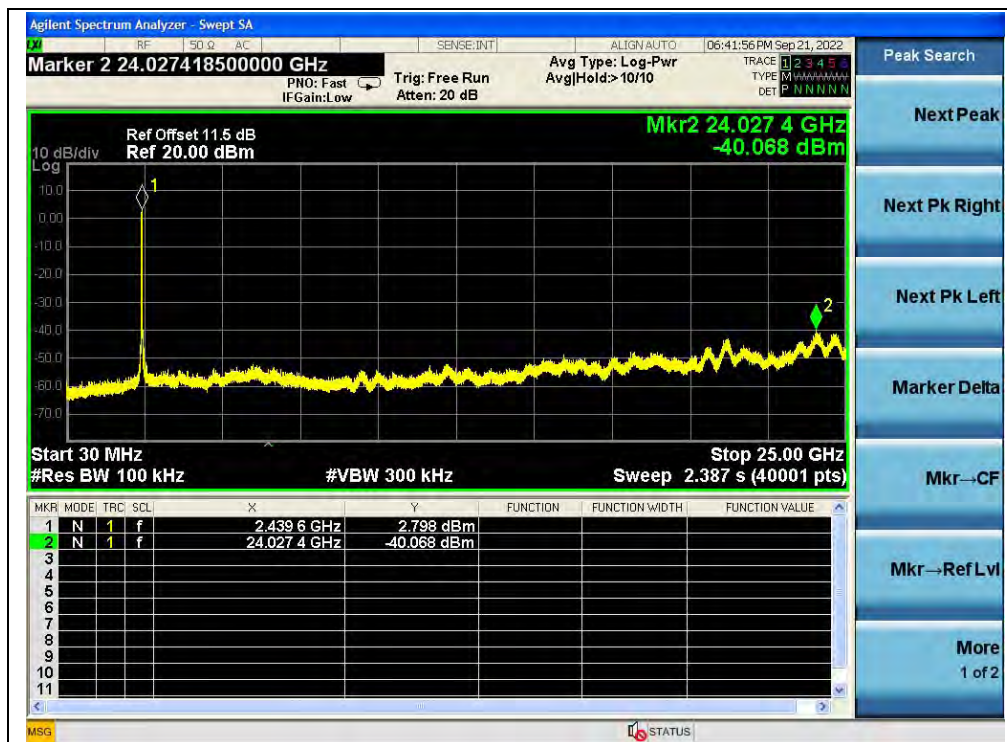
B. Test Plot:



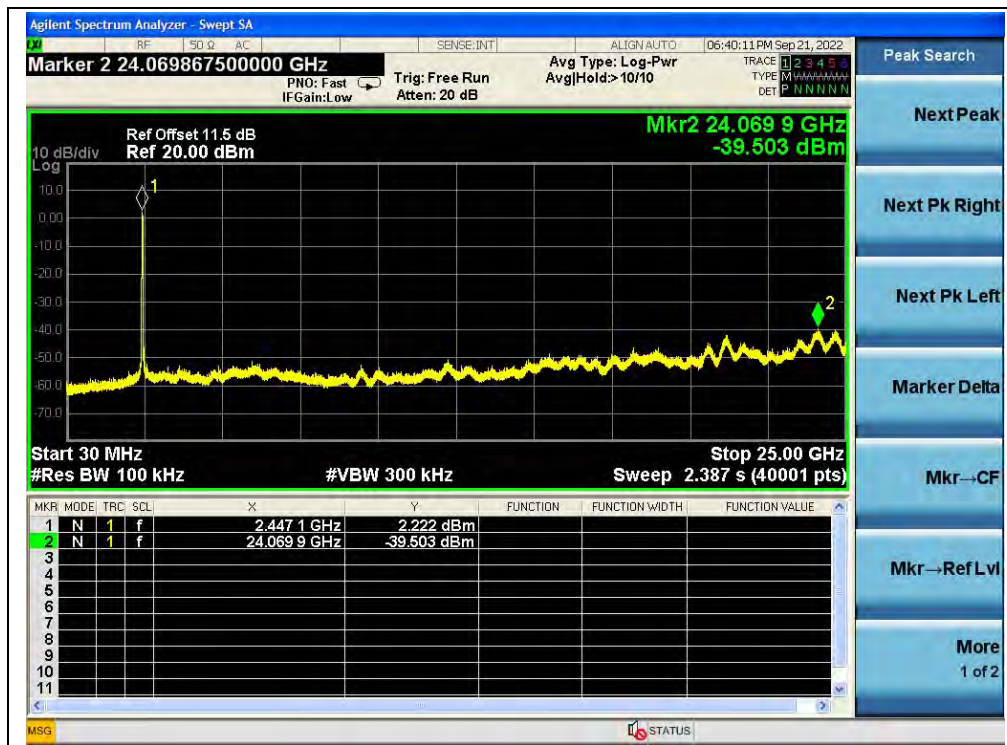
(30MHz to 25GHz, Channel 3, 802.11n HT40))



(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))

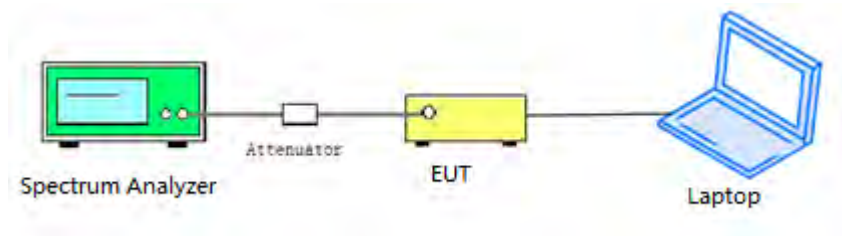
2.6. Power Spectral Density

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
		ANT1	ANT2		
1	2412	7.55	6.93	8	PASS
6	2437	3.65	6.49	8	PASS
11	2462	7.57	7.22	8	PASS

B. Test Plot:



(Channel 1, 802.11b, ANT1)



(Channel 6, 802.11b, ANT1)



(Channel 11, 802.11b, ANT1)



(Channel 1, 802.11b, ANT2)



(Channel 6, 802.11b, ANT2)



(Channel 11, 802.11b, ANT2)



A. Test Verdict:

Channel	Frequency (MHz)	Measured PSD (dBm/3kHz)		Limit (dBm/3kHz)	Verdict
		ANT1	ANT2		
1	2412	-8.58	-8.07	8	PASS
6	2437	-7.80	-8.88	8	PASS
11	2462	-7.59	-8.24	8	PASS

Agilent Spectrum Analyzer - Swept SA

Marker 1 2.41326000000 GHz

PNO: Fast IF Gain: Low Trig: Free Run Atten: 20 dB

Avg Type: Log-Pwr Avg Hold: >10/10

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

Ref Offset 11.5 dB Ref 20.00 dBm

Mkr1 2.413 26 GHz -8.578 dBm

10 dB/div Log

Center 2.41200 GHz Span 30.00 MHz

#Res BW 3.0 kHz #VBW 10 kHz Sweep 3.163 s (1001 pts)

Peak Search

Next Peak

Next Pk Right

Next Pk Left

Marker Delta

Mkr→CF

Mkr→Ref Lvl

More 1 of 2

(Channel 1, 802.11g, ANT1)



(Channel 6, 802.11g, ANT1)



(Channel 11, 802.11g, ANT1)



(Channel 1, 802.11g, ANT2)



(Channel 6, 802.11g, ANT2)



(Channel 11, 802.11g, ANT2)



(Channel 6, 802.11n (HT20), ANT1)



(Channel 11, 802.11n (HT20), ANT1)



(Channel 1, 802.11n (HT20), ANT2)



(Channel 6, 802.11n (HT20), ANT2)



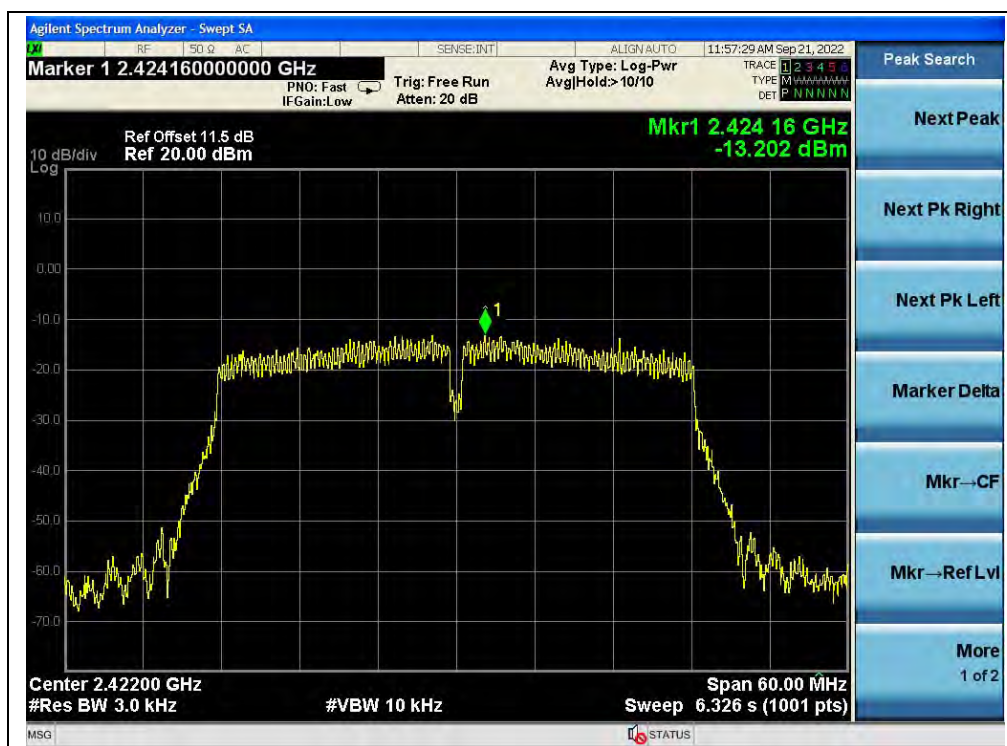
(Channel 11, 802.11n (HT20), ANT2)



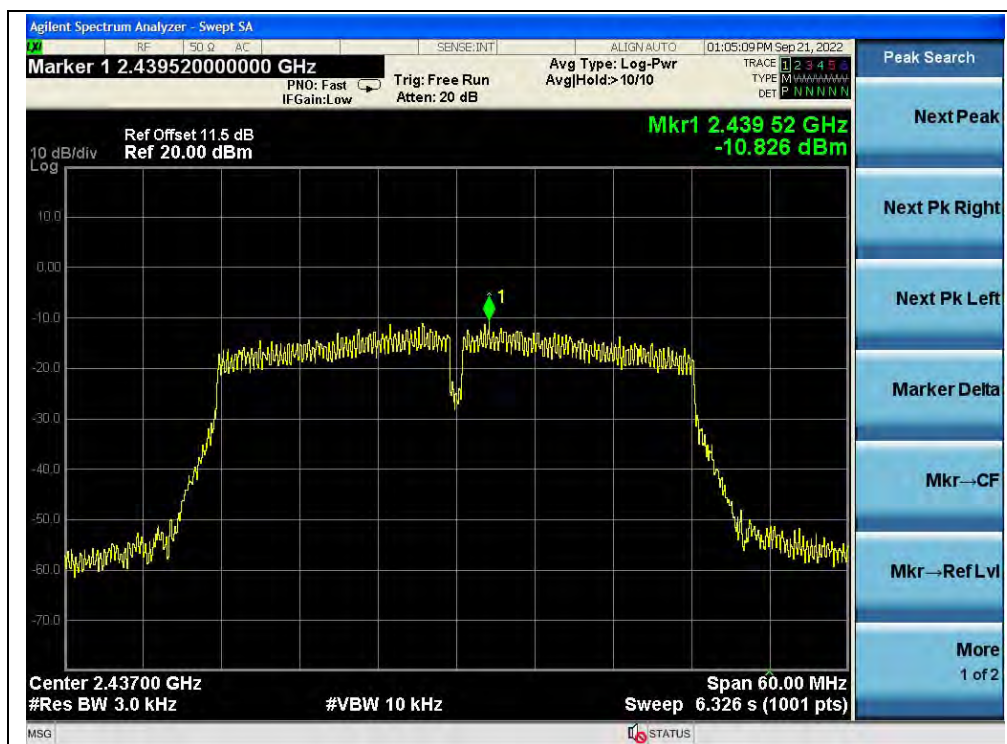
(Channel 6, 802.11n (HT40), ANT1)



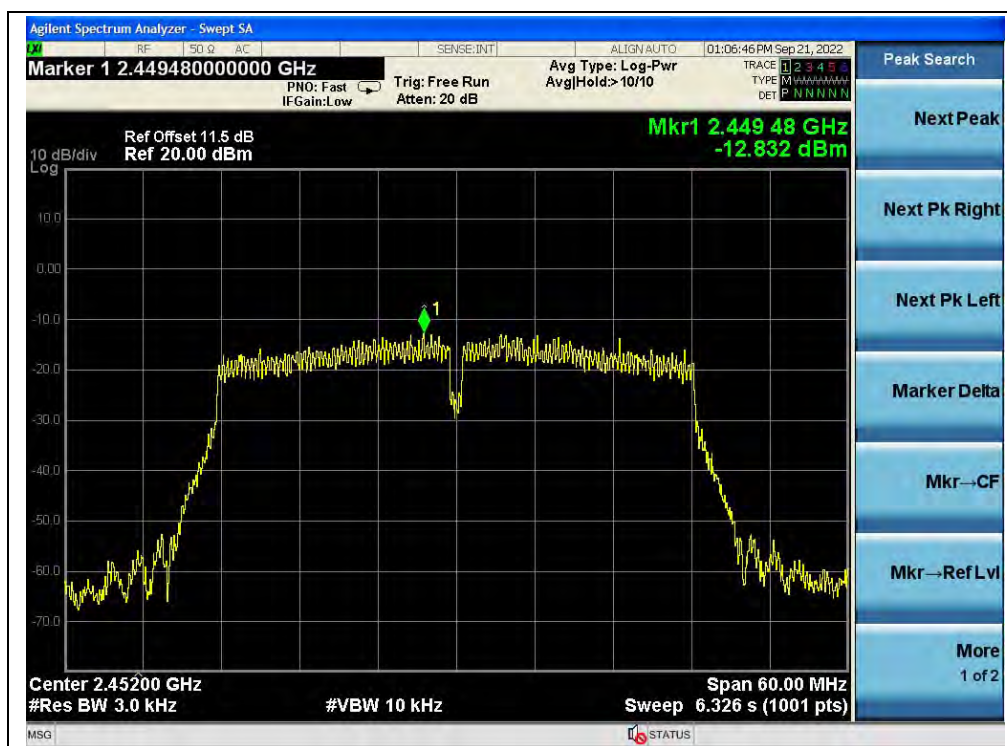
(Channel 9, 802.11n (HT40), ANT1)



(Channel 3, 802.11n (HT40), ANT2)



(Channel 6, 802.11n (HT40), ANT2)



(Channel 9, 802.11n (HT40), ANT2)

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).

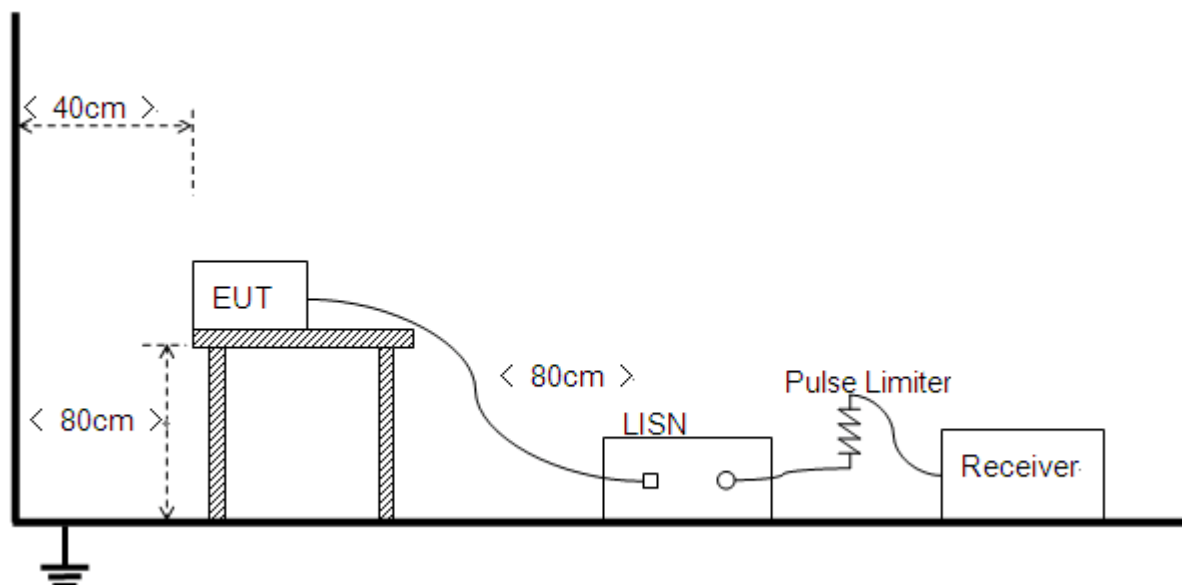
Frequency Range (MHz)	Conducted Limit (dB μ V)	
	Quai-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
5 - 30	60	50

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+Adaptor +WIFI TX

Test Voltage: AC 120V/60Hz

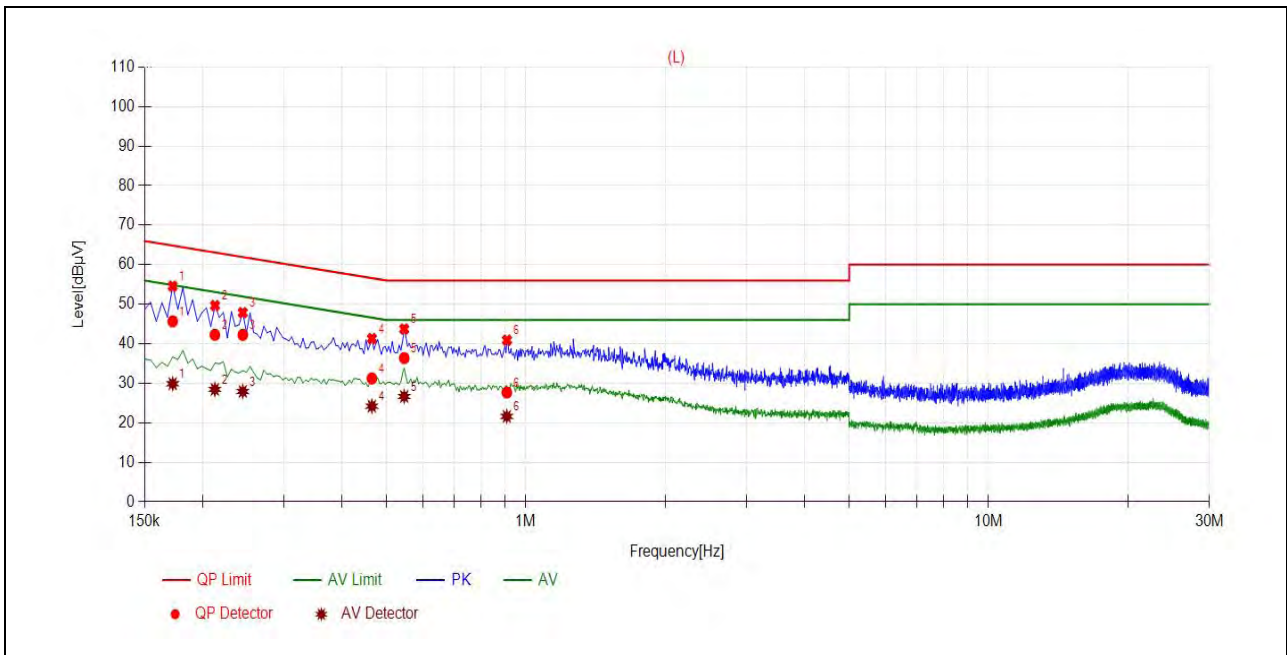
The measurement results are obtained as below:

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

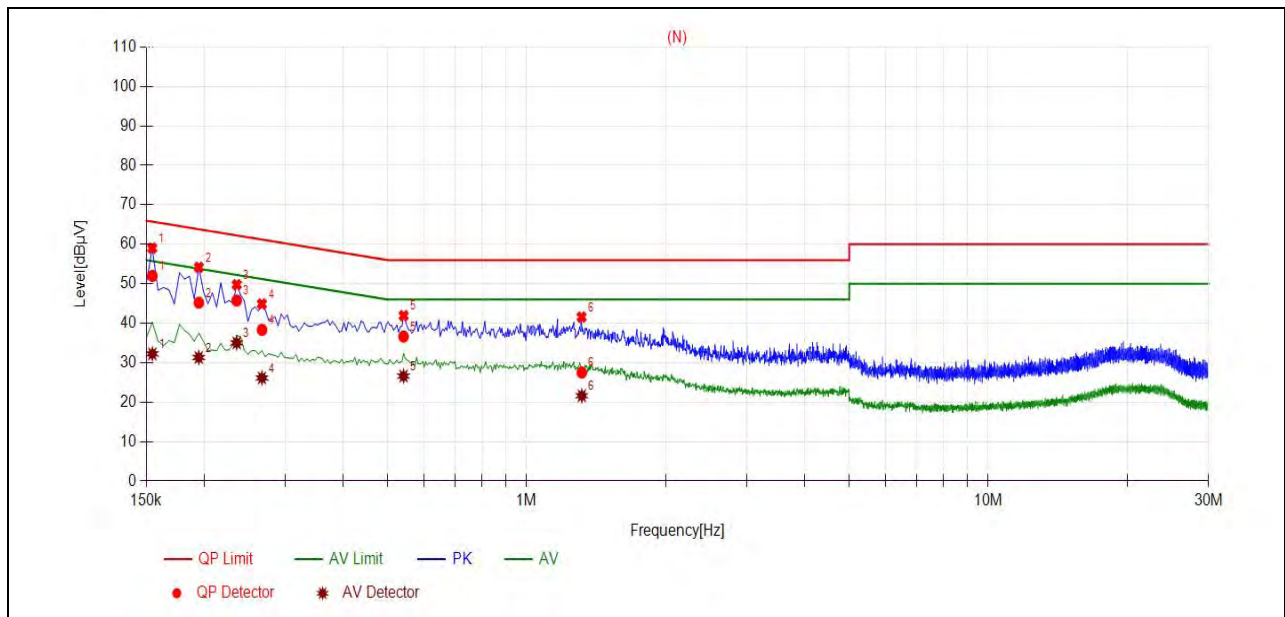
U_R : Receiver Reading

A_{Factor} : Voltage division factor of LISN

B. Test Plot:



No.	Fre. (MHz)	Emission Level (dBμV)		Limit (dBμV)		Power-line	Verdict
		Quai-peak	Average	Quai-peak	Average		
1	0.1725	45.67	29.89	64.84	54.84	Line	PASS
2	0.2128	42.26	28.45	63.10	53.10		PASS
3	0.2445	42.25	27.93	61.94	51.94		PASS
4	0.4648	31.23	24.20	56.61	46.61		PASS
5	0.5459	36.38	26.65	56.00	46.00		PASS
6	0.9097	27.67	21.61	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	0.1546	51.99	32.24	65.75	55.75	Neutral	PASS
2	0.1949	45.20	31.32	63.82	53.82		PASS
3	0.2354	45.76	35.00	62.26	52.26		PASS
4	0.2671	38.33	26.13	61.21	51.21		PASS
5	0.5412	36.63	26.59	56.00	46.00		PASS
6	1.3167	27.51	21.63	56.00	46.00		PASS

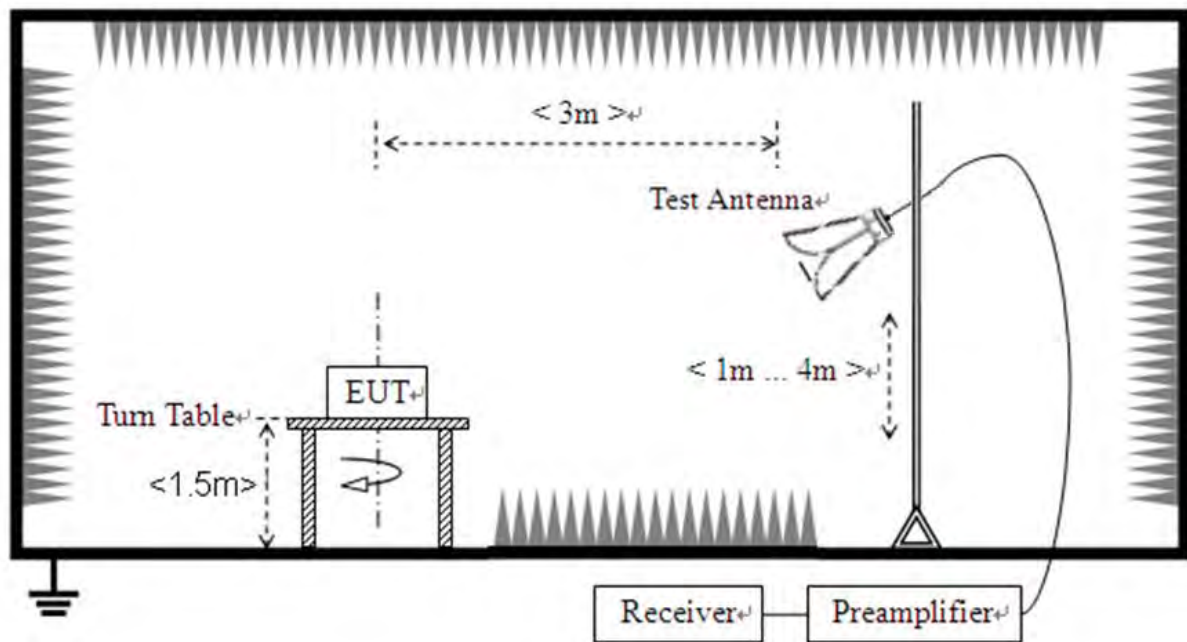
2.8. Restricted Frequency Bands

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.

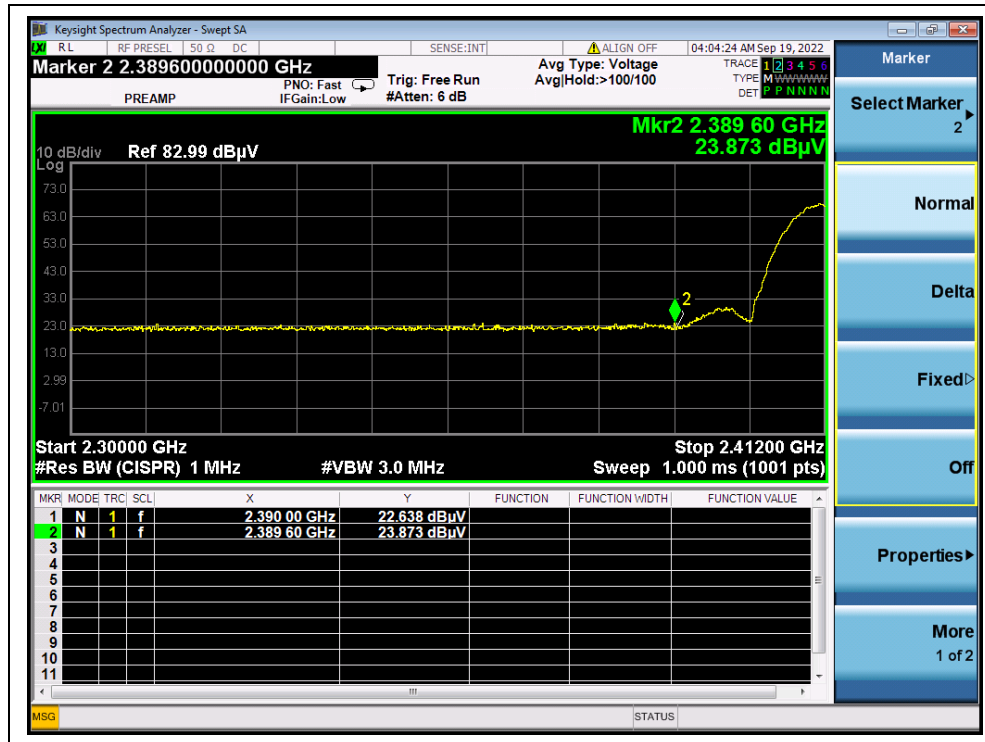
802.11b Mode

A. Test Verdict:

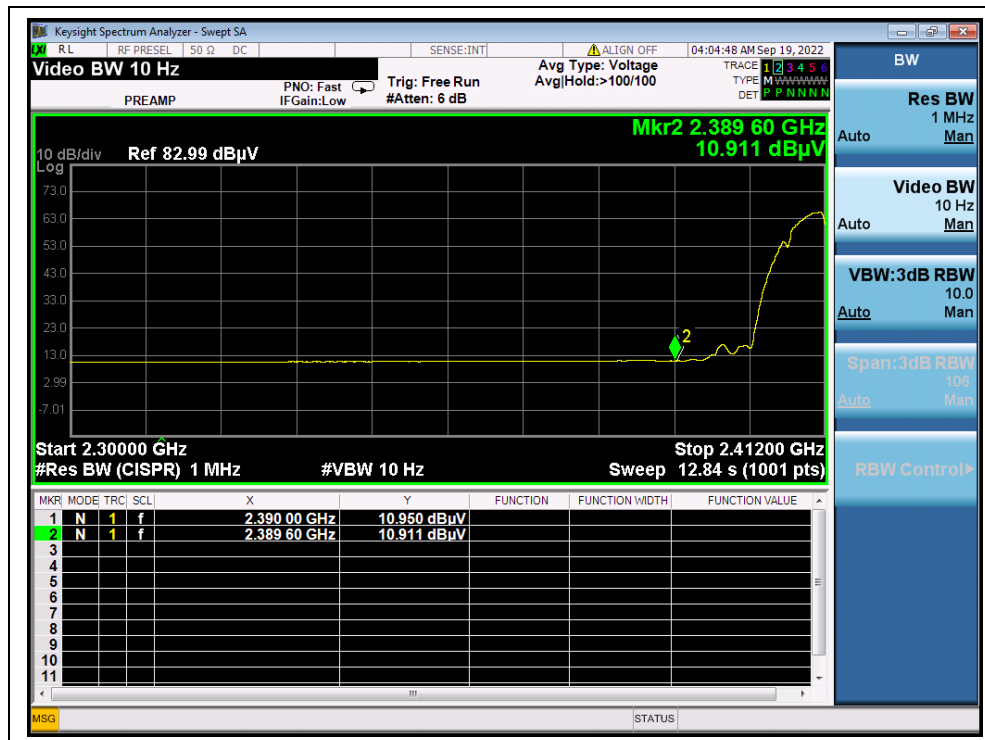
Channel	Frequency (MHz)	Detector	Receiver Reading U_R (dB μ V)	A_T (dB)	A_{Factor} (dB@3m)	Max. Emission E (dB μ V/m)	Limit (dB μ V/m)	Verdict
		PK/ AV						
1	2389.60	PK	23.87	6.74	27.20	57.81	74	PASS
1	2390.00	AV	10.95	6.74	27.20	44.89	54	PASS
11	2485.03	PK	22.20	6.74	27.20	56.14	74	PASS
11	2486.78	AV	10.71	6.74	27.20	44.65	54	PASS



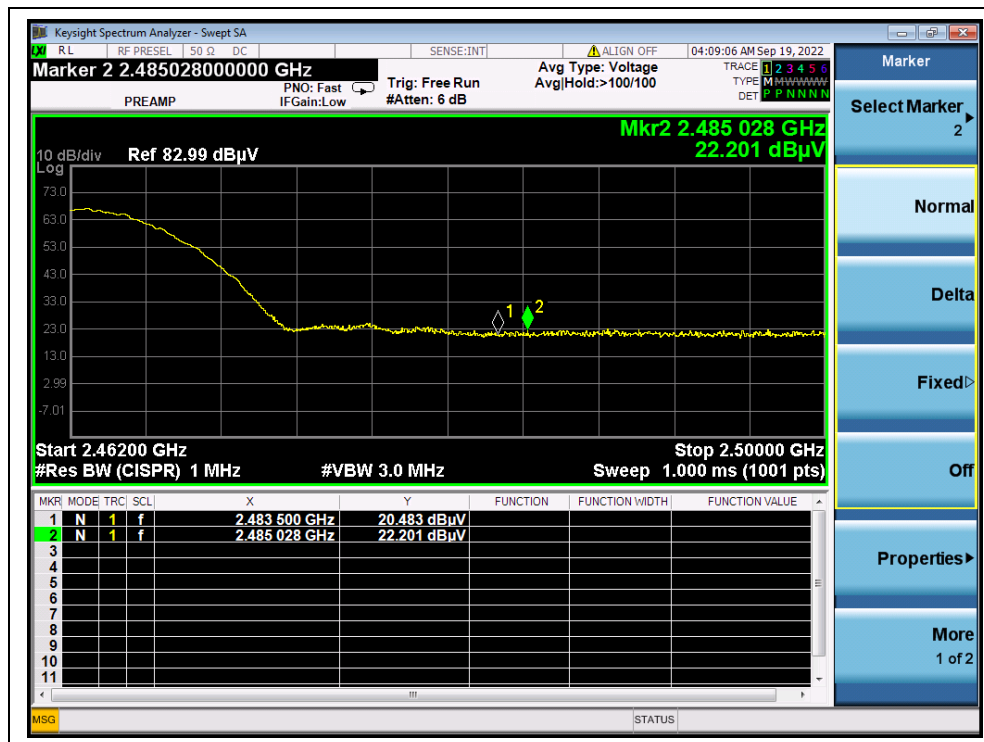
B. Test Plot:



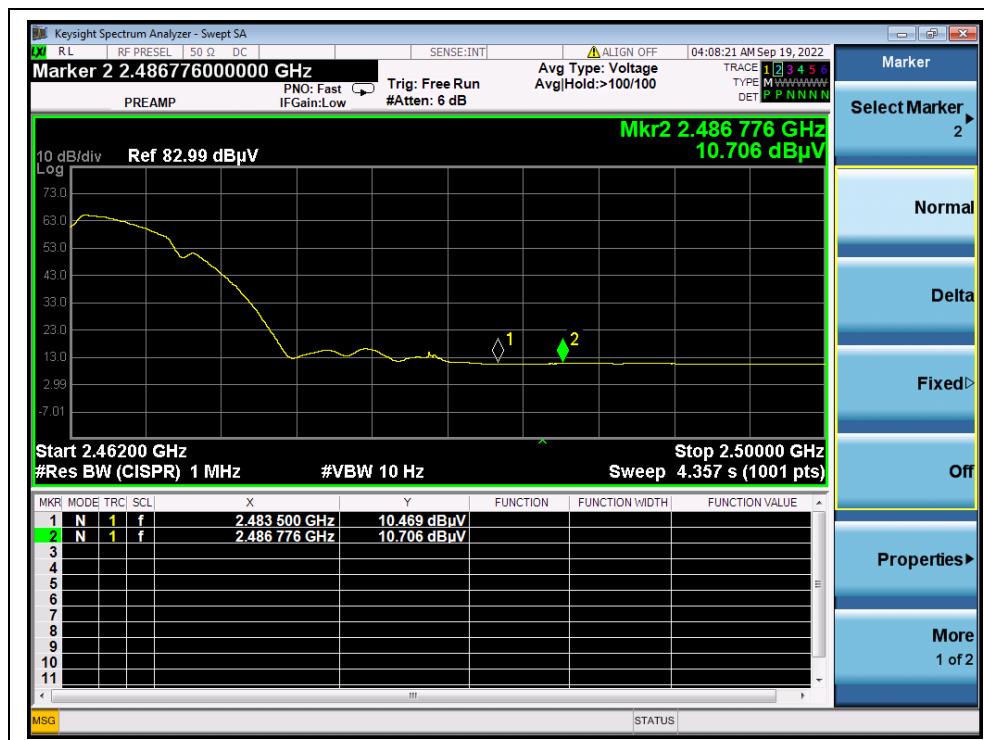
(PEAK, Channel 1, 802.11b)



(AVERAGE, Channel 1, 802.11b)



(PEAK, Channel 11, 802.11b)



(AVERAGE, Channel 11, 802.11b)

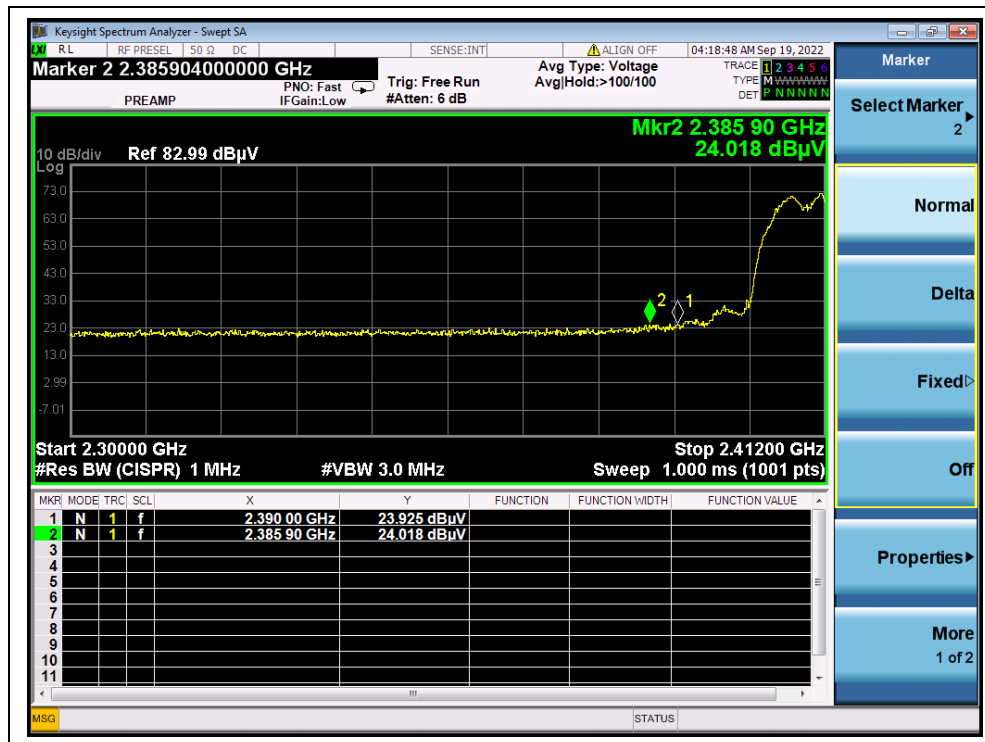


802.11g Mode

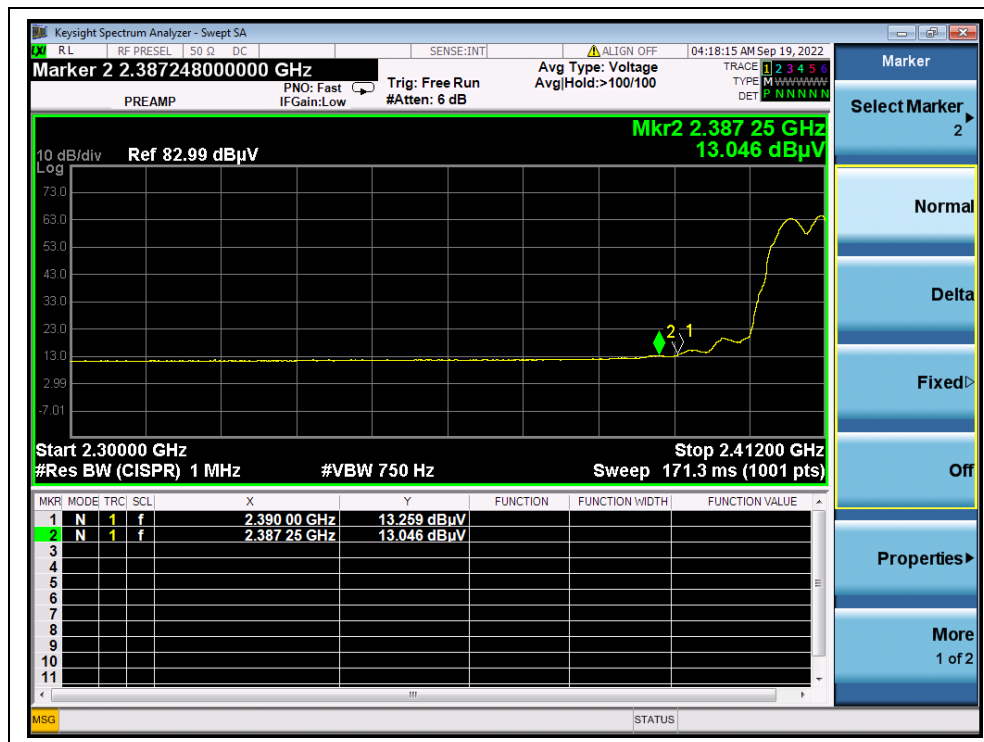
A. Test Verdict:

Channel	Frequency (MHz)	Detector	Receiver Reading U_R (dBμV)	A_T (dB)	A_{Factor} (dB@3m)	Max. Emission E (dBμV/m)	Limit (dBμV/m)	Verdict
		PK/ AV						
1	2385.90	PK	24.02	6.74	27.20	57.96	74	PASS
1	2390.00	AV	13.26	6.74	27.20	47.20	54	PASS
11	2486.40	PK	23.96	6.74	27.20	57.90	74	PASS
11	2483.50	AV	12.75	6.74	27.20	46.69	54	PASS

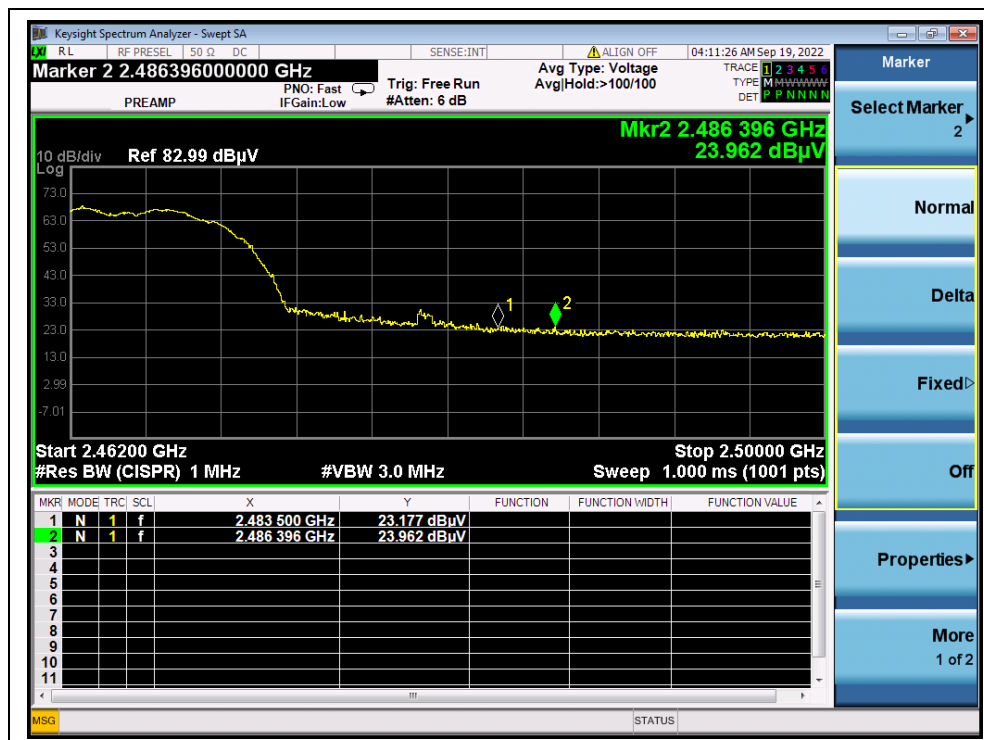
B. Test Plot:



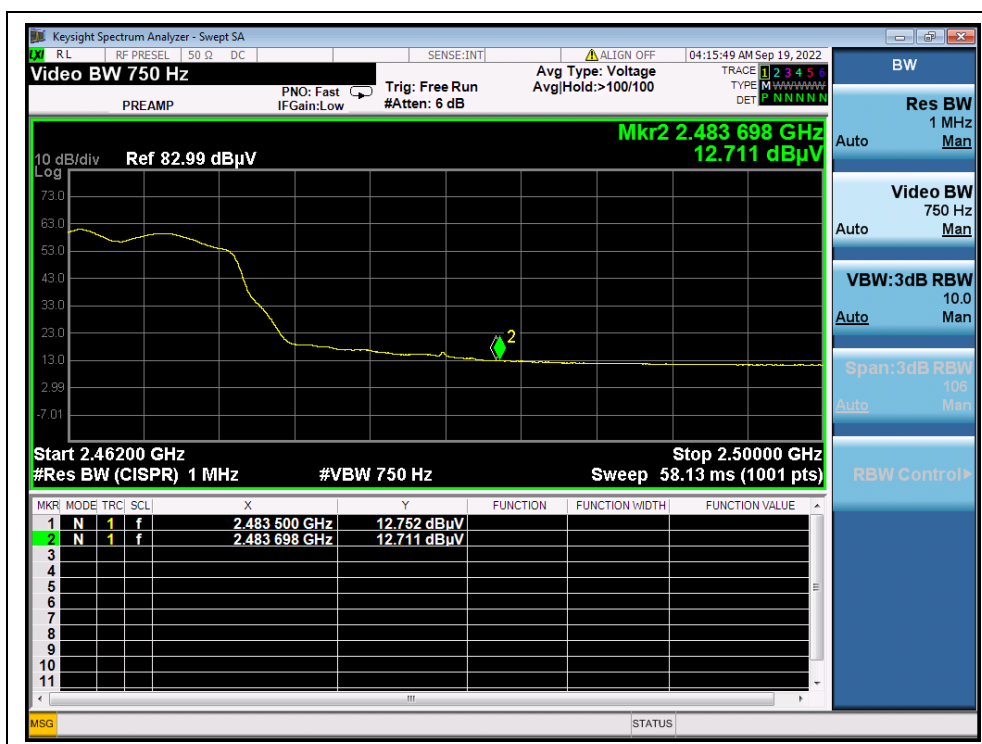
(PEAK, Channel 1, 802.11g)



(AVERAGE, Channel 1, 802.11g)



(PEAK, Channel 11, 802.11g)



(AVERAGE, Channel 11, 802.11g)

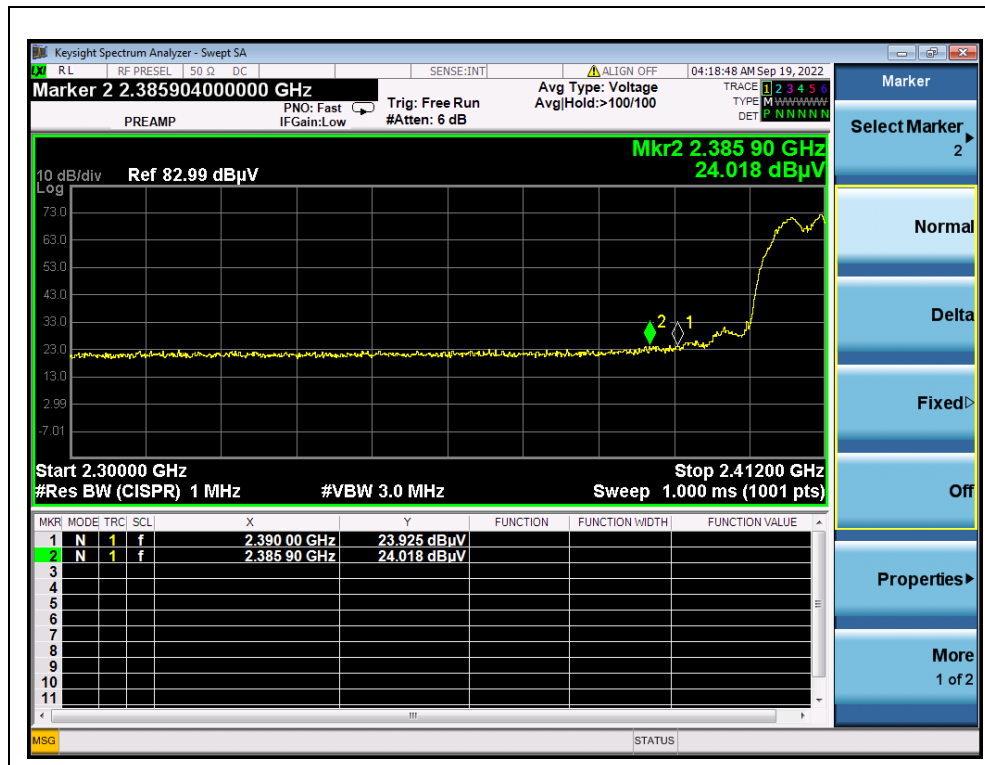


802.11 n (HT20) Mode

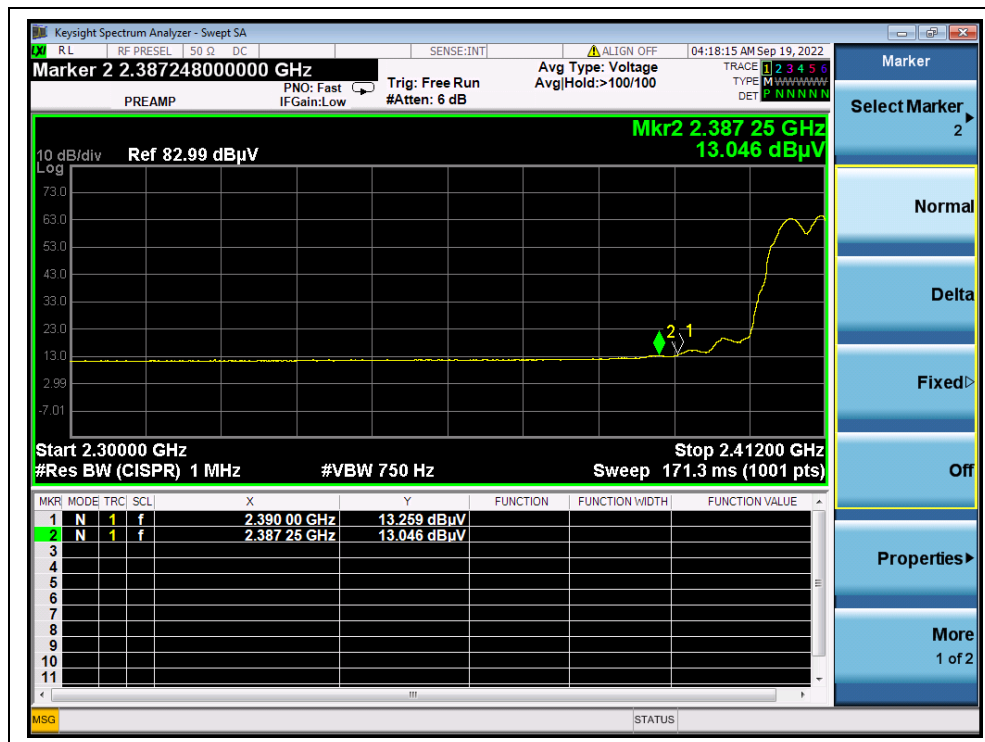
A. Test Verdict:

Channel	Frequency (MHz)	Detector	Receiver Reading U_R (dBμV)	A_T (dB)	A_{Factor} (dB@3m)	Max. Emission E (dBμV/m)	Limit (dBμV/m)	Verdict
		PK/ AV						
1	2390.00	PK	27.05	6.74	27.20	60.99	74	PASS
1	2389.38	AV	15.10	6.74	27.20	49.04	54	PASS
11	2485.75	PK	26.30	6.74	27.20	60.24	74	PASS
11	2483.66	AV	12.41	6.74	27.20	46.35	54	PASS

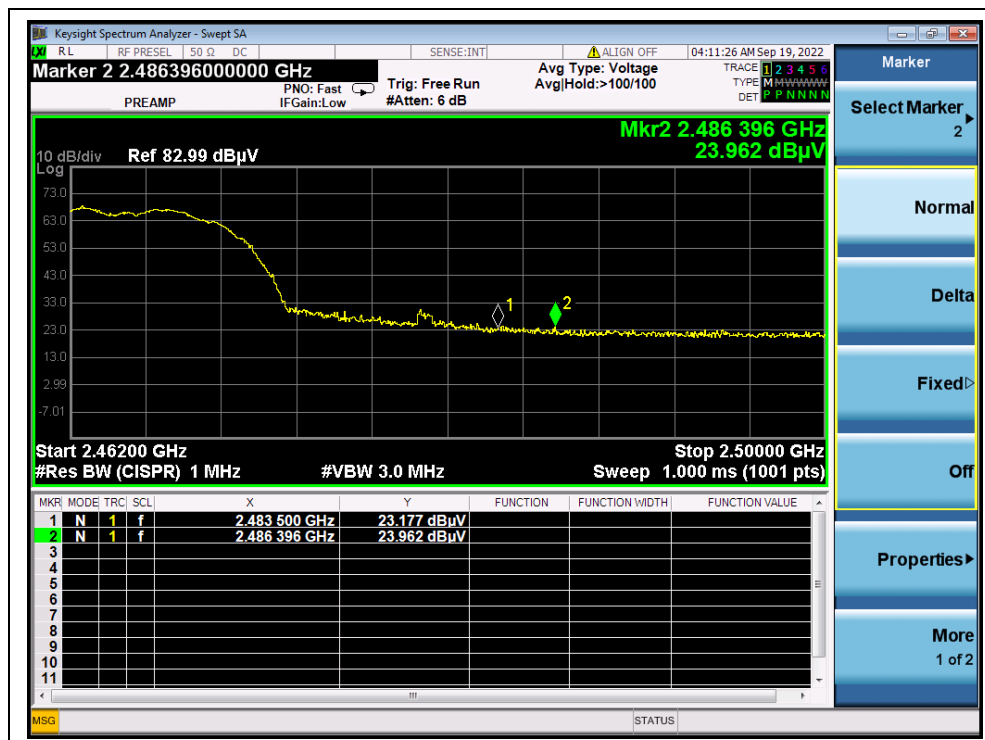
B. Test Plot:



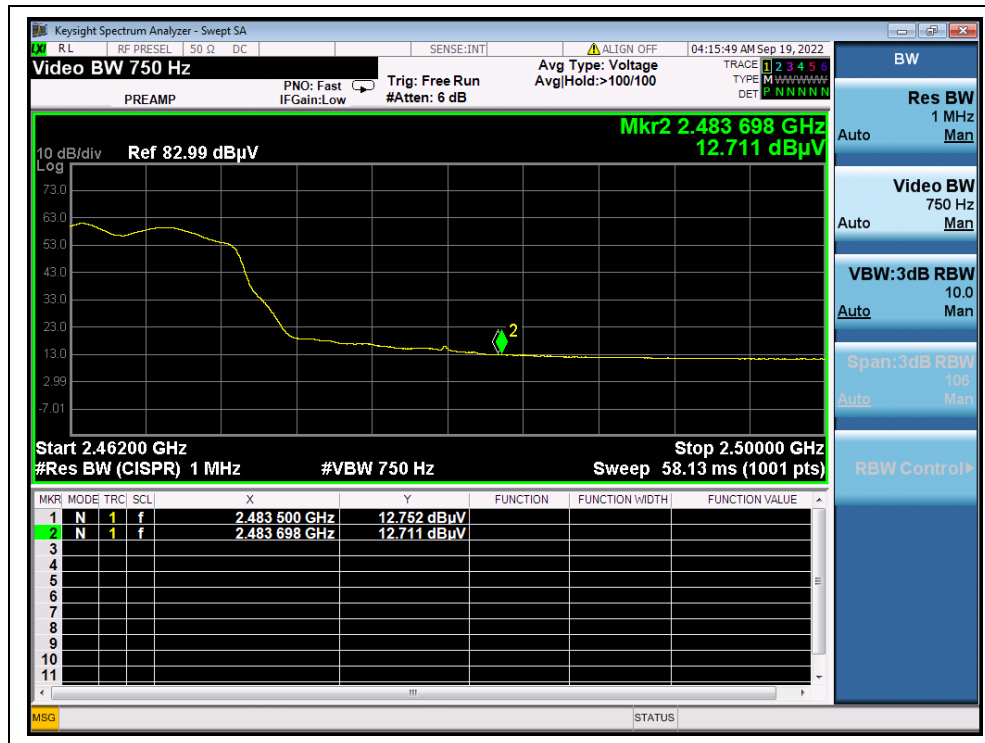
(PEAK, Channel 1, 802.11n (HT20))



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



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



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

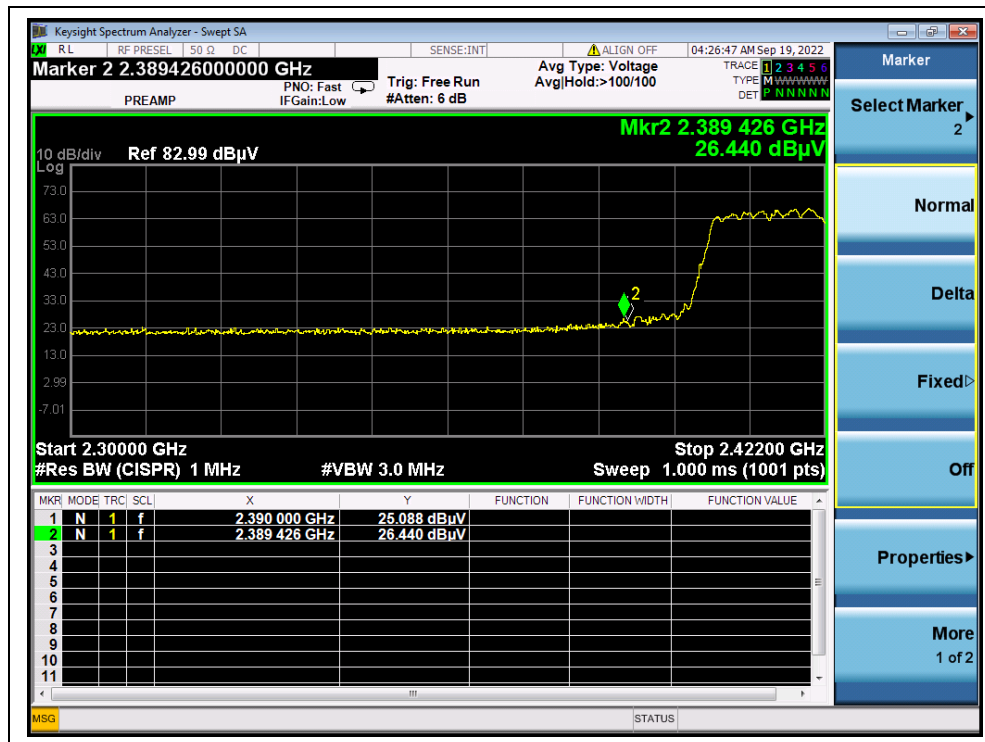


802.11n (HT40) Mode

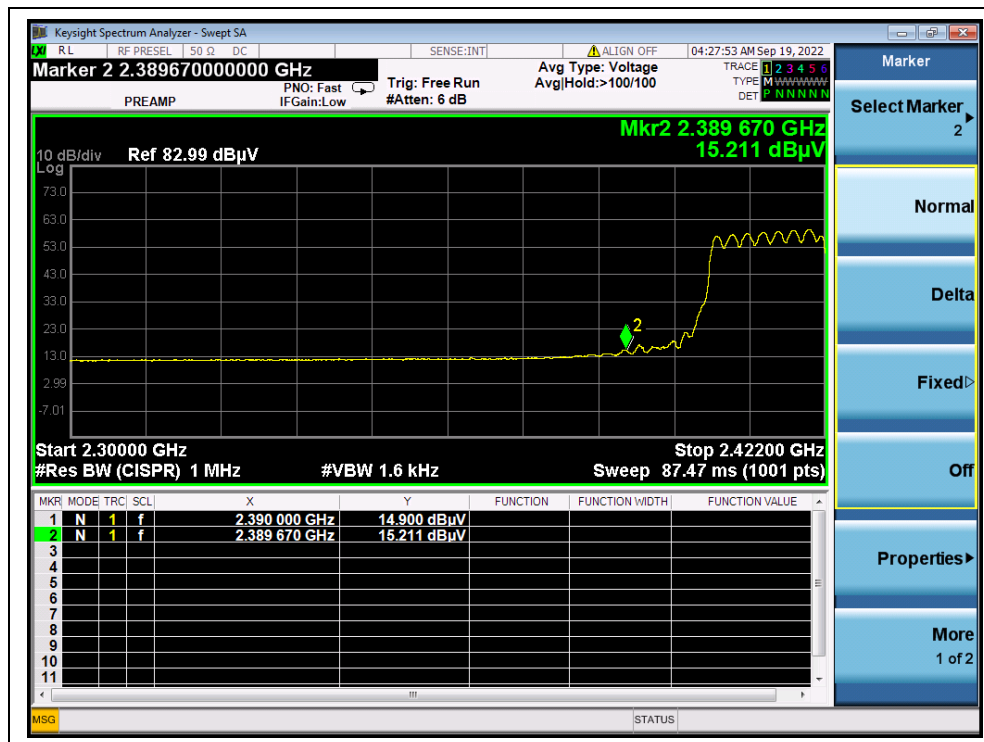
A. Test Verdict:

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	2389.43	PK	26.44	6.74	27.20	60.38	74	PASS
3	2389.67	AV	15.21	6.74	27.20	49.15	54	PASS
9	2484.78	PK	24.77	6.74	27.20	58.71	74	PASS
9	2483.97	AV	13.41	6.74	27.20	47.35	54	PASS

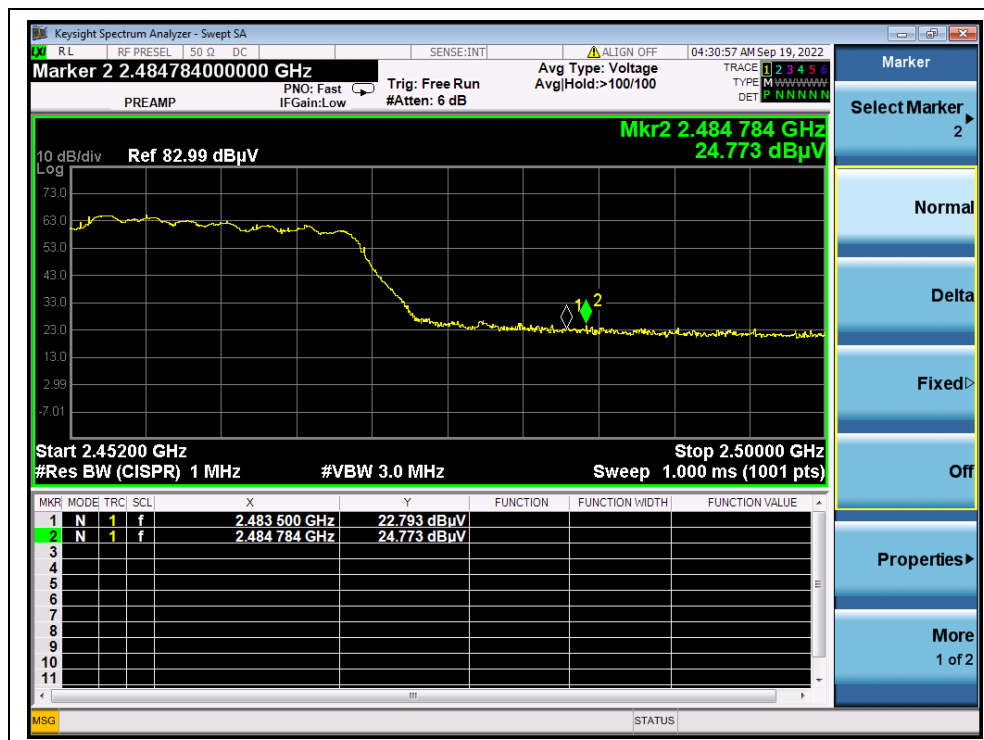
B. Test Plot:



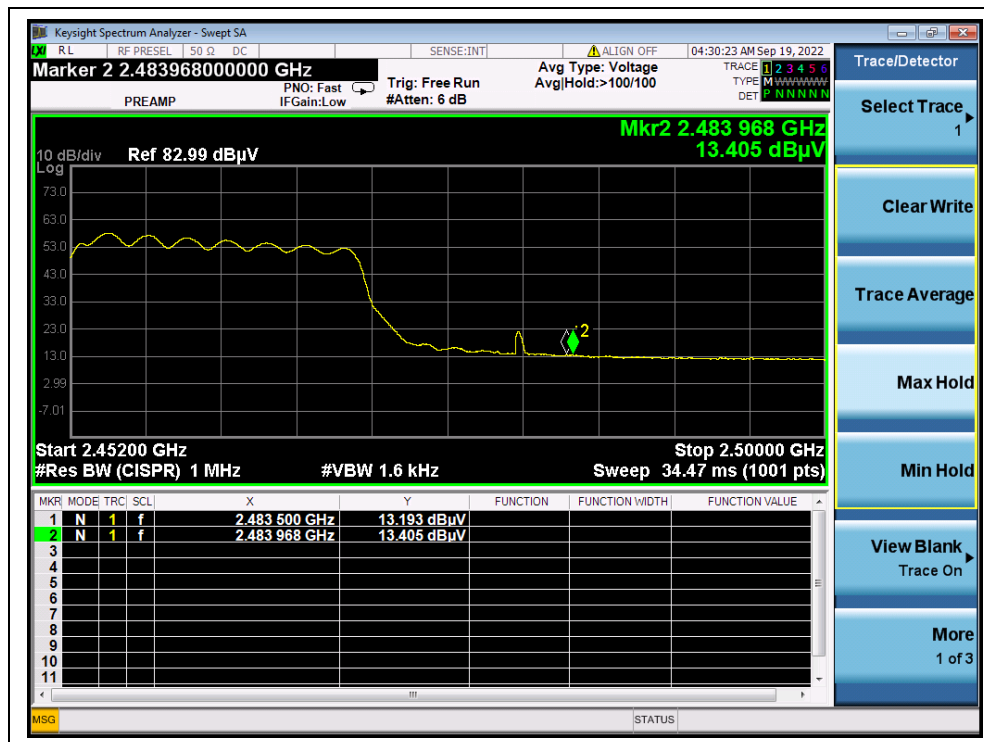
(PEAK, Channel 3, 802.11n (HT40))



(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 ($\mu\text{V}/\text{m}$)	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

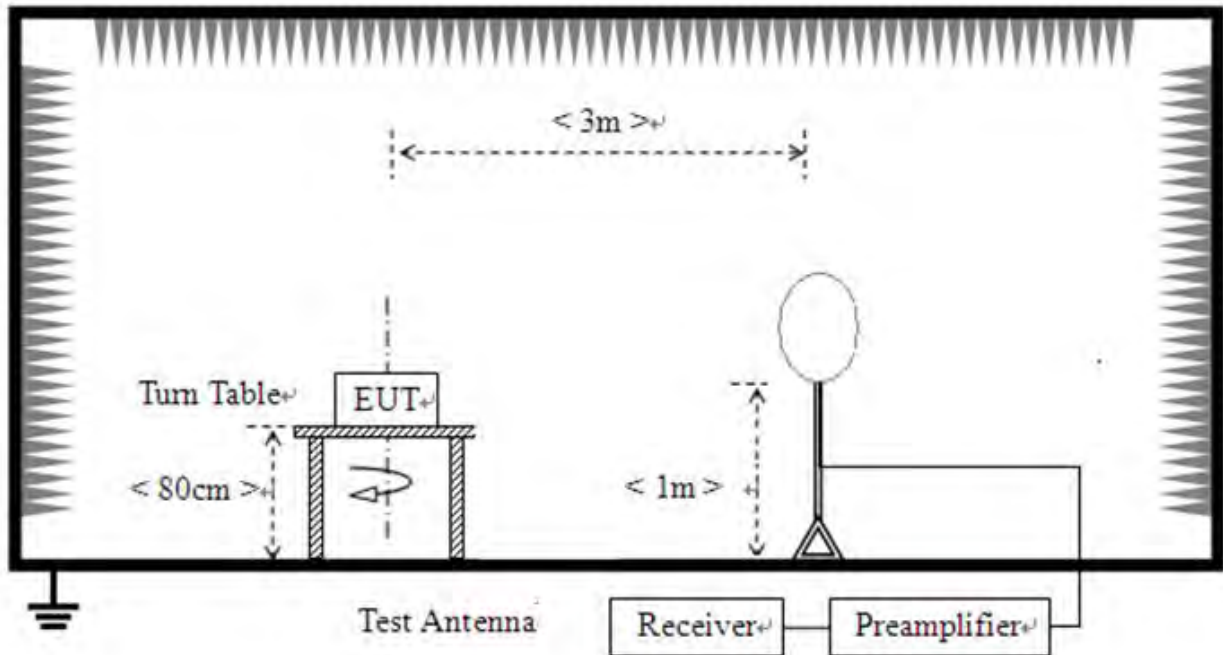
Note1: For above 1000MHz, the emission limit in this paragraph is based on measurement instrumentation employing an average detector, measurement using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit.

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).

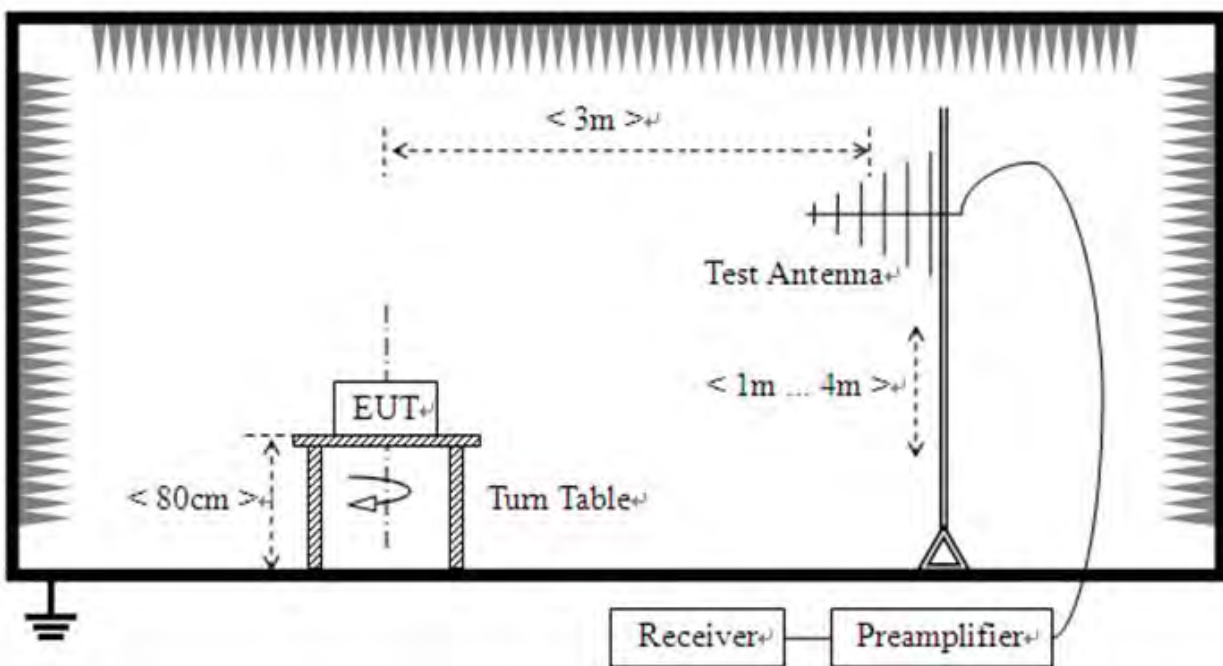
2.9.2. Test Description

Test Setup:

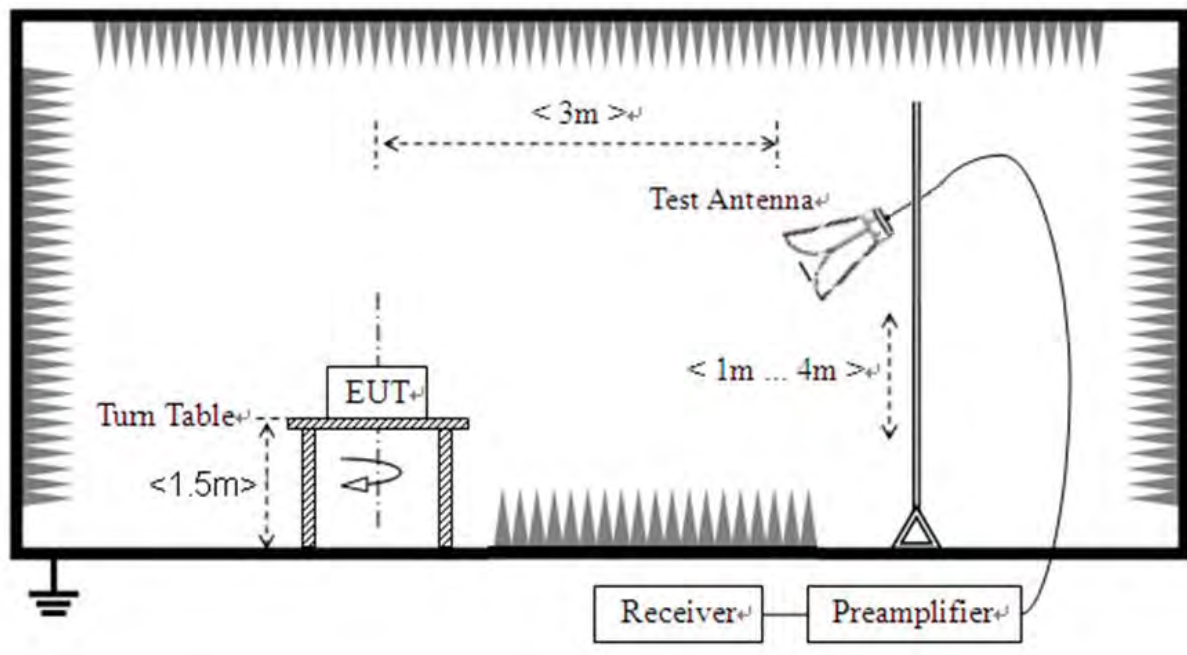
- 1) For radiated emissions from 9kHz to 30MHz



- 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 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. For measurements above 1 GHz, keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response.



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.

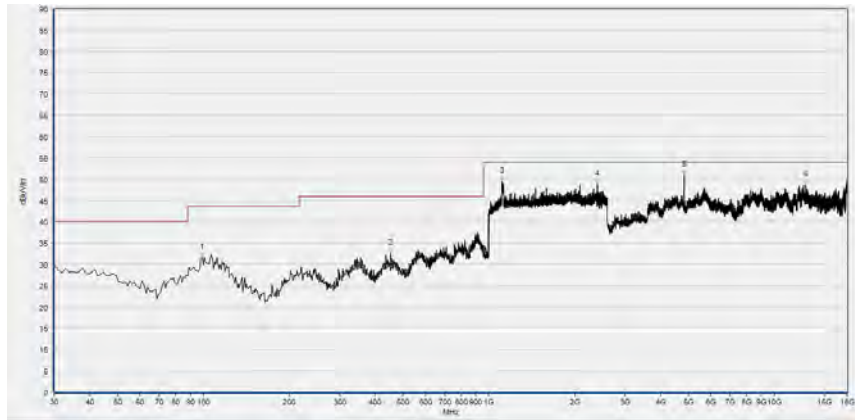
Note2: For the frequency, which started from 9kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit was not recorded.

Note3: For the frequency, which started from 18GHz to 10th harmonic of the highest frequency, was pre-scanned and the result which was 20dB lower than the limit was not recorded.



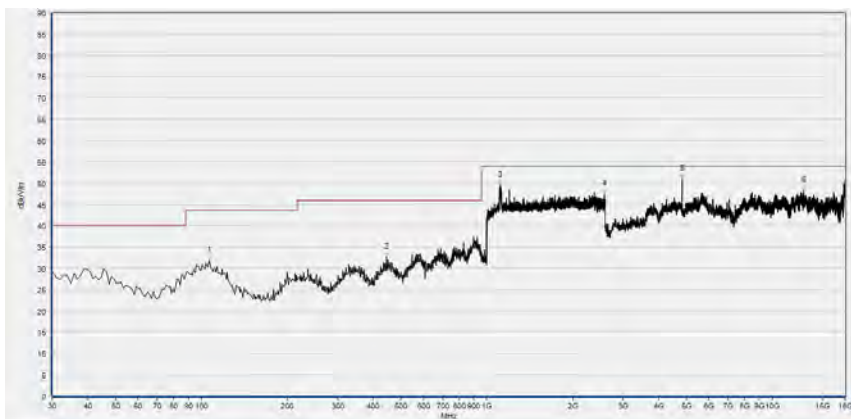
802.11b Mode

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
98.870	31.43	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
453.890	32.54	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
1114.667	49.45	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
2401.600	48.75	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
4823.760	51.15	N/A	48.42	74.00	N/A	54.00	Horizontal	PASS
12890.280	48.63	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

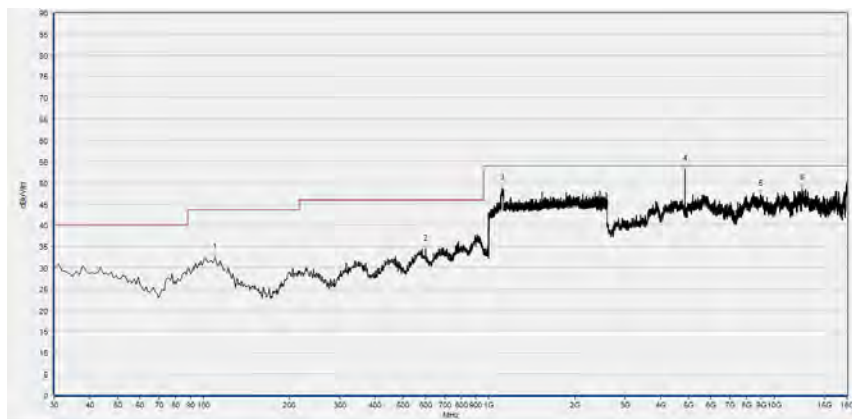
(Antenna Horizontal, 30MHz to 18GHz)



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
106.630	31.77	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
446.130	32.44	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
1113.600	49.47	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
2574.400	47.44	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
4823.760	51.00	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
12905.680	48.26	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

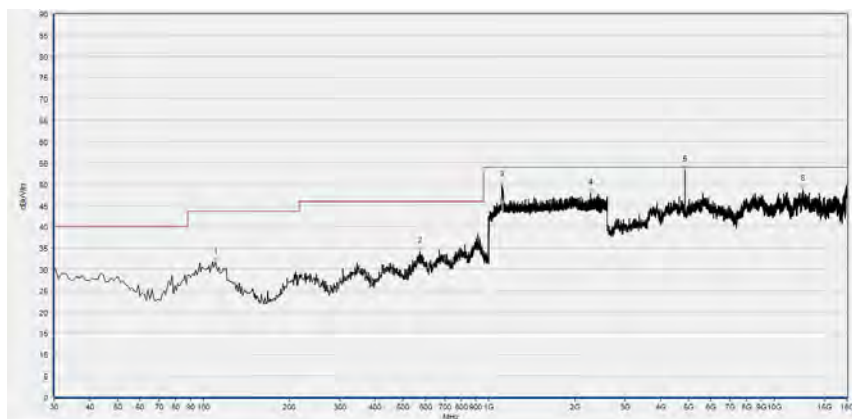
(Antenna Vertical, 30MHz to 18GHz)

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
109.540	32.27	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
601.330	34.30	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
1109.867	48.55	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
4873.040	53.15	N/A	50.89	74.00	N/A	54.00	Horizontal	PASS
8954.040	47.21	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
12536.080	48.58	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
110.510	31.71	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
575.140	34.11	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
1111.467	49.69	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
2275.200	47.86	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
4873.040	53.32	N/A	50.97	74.00	N/A	54.00	Vertical	PASS
12579.200	48.81	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

(Antenna Vertical, 30MHz to 18GHz)

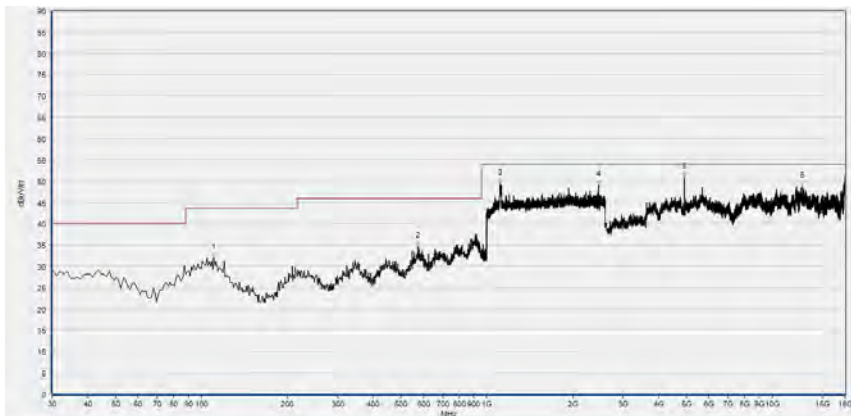


Plot for Channel 11



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
103.720	31.02	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
579.990	34.44	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
1113.067	49.62	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
2466.667	48.55	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
4922.320	54.12	N/A	50.97	74.00	N/A	54.00	Horizontal	PASS
12905.680	48.96	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

(Antenna Horizontal, 30MHz to 18GHz)

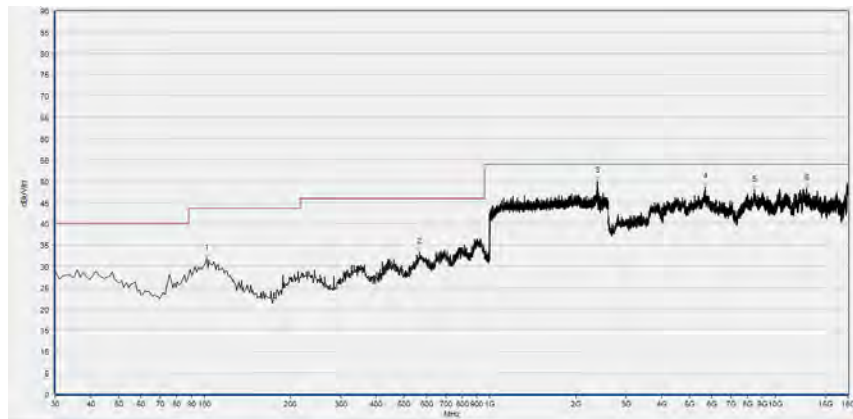


Fre. (MHz)	PK (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
110.510	32.07	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
572.230	34.71	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
1112.000	49.42	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
2458.667	49.07	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
4922.320	50.99	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
12720.880	48.72	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

(Antenna Vertical, 30MHz to 18GHz)

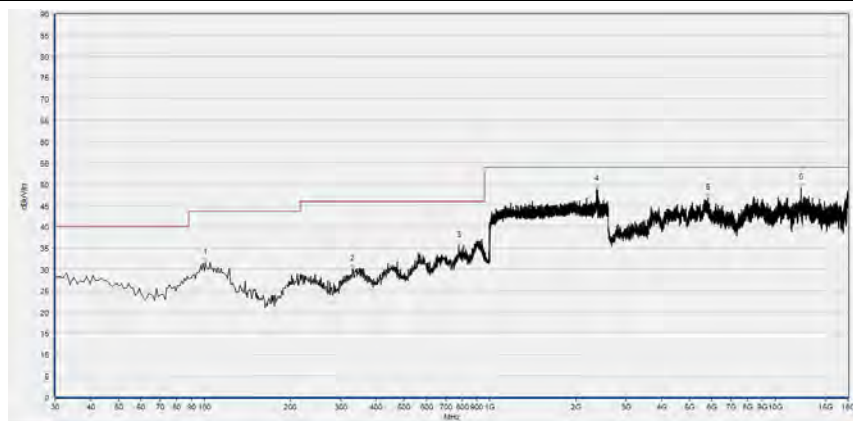
**802.11g Mode**

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
101.780	31.87	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
567.380	33.36	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
2380.267	49.88	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
5683.080	48.68	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
8461.240	48.01	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
12896.440	48.19	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

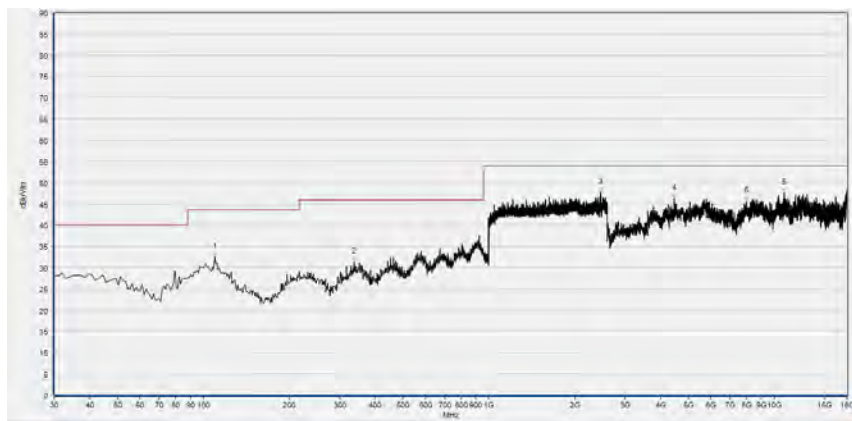
(Antenna Horizontal, 30MHz to 18GHz)



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
100.810	31.56	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
330.700	30.08	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
776.900	35.48	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
2371.733	48.76	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
5827.840	46.73	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
12289.680	49.07	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

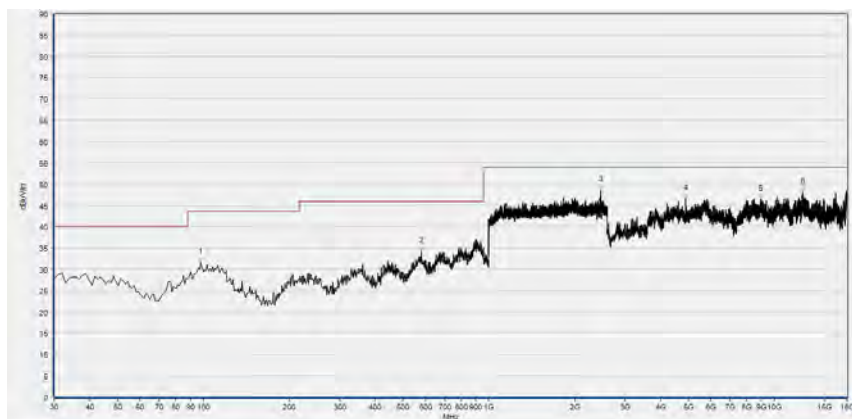
(Antenna Vertical, 30MHz to 18GHz)

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
109.540	32.57	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
337.490	31.28	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
2468.267	47.79	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
4454.160	46.18	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
7974.600	45.60	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
10848.240	47.62	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

(Antenna Horizontal, 30MHz to 18GHz)

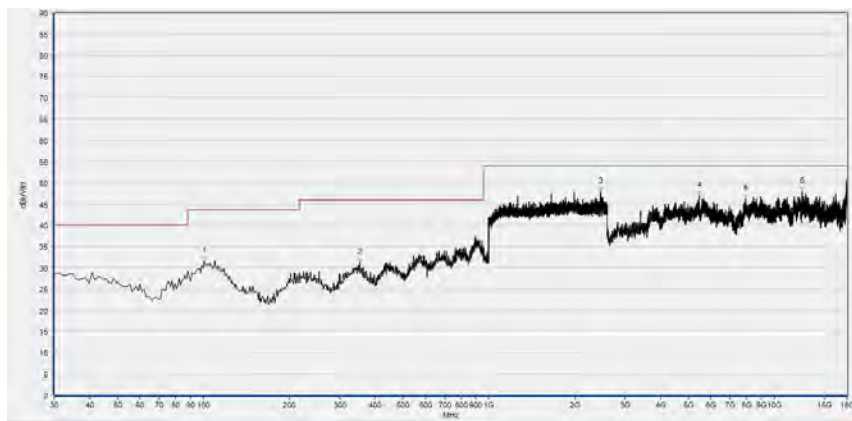


Fre. (MHz)	PK (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
97.900	31.72	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
580.960	34.21	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
2461.333	48.53	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
4894.600	46.53	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
8941.720	46.40	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
12585.360	48.06	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

(Antenna Vertical, 30MHz to 18GHz)

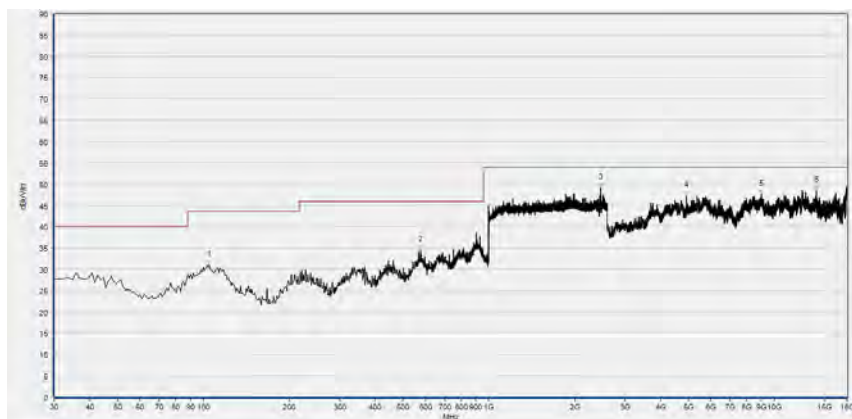


Plot for Channel 11



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
100.810	31.55	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
353.010	31.23	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
2460.800	47.95	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
5464.400	46.86	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
7949.960	46.30	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
12505.280	47.93	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

(Antenna Horizontal, 30MHz to 18GHz)



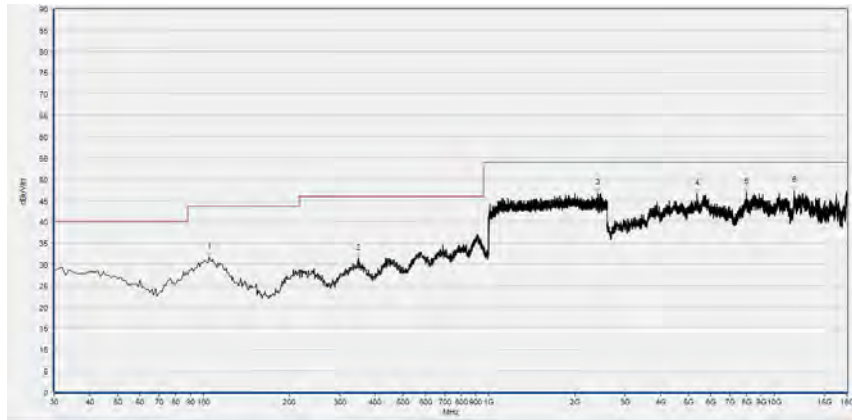
Fre. (MHz)	PK (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
104.690	31.06	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
576.110	34.47	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
2460.800	49.12	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
4919.240	47.25	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
9024.880	47.57	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
14076.080	48.44	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

(Antenna Vertical, 30MHz to 18GHz)



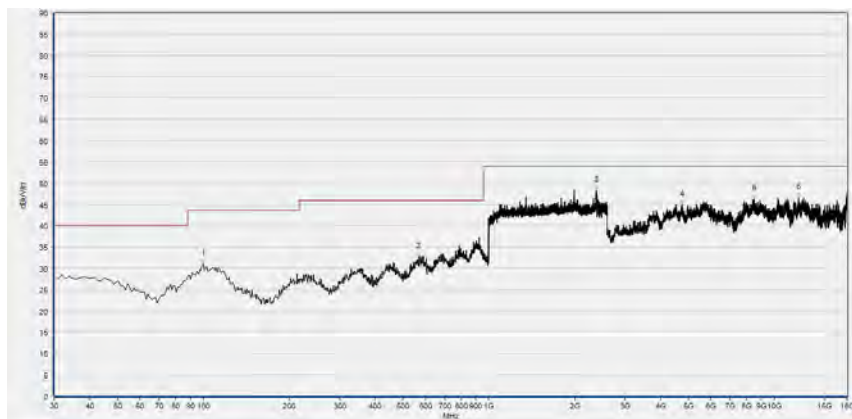
802.11n (HT20) Mode

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
104.690	31.61	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
349.130	31.30	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
2410.133	46.73	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
5365.840	46.55	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
7996.160	46.93	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
11741.440	47.20	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

(Antenna Horizontal, 30MHz to 18GHz)

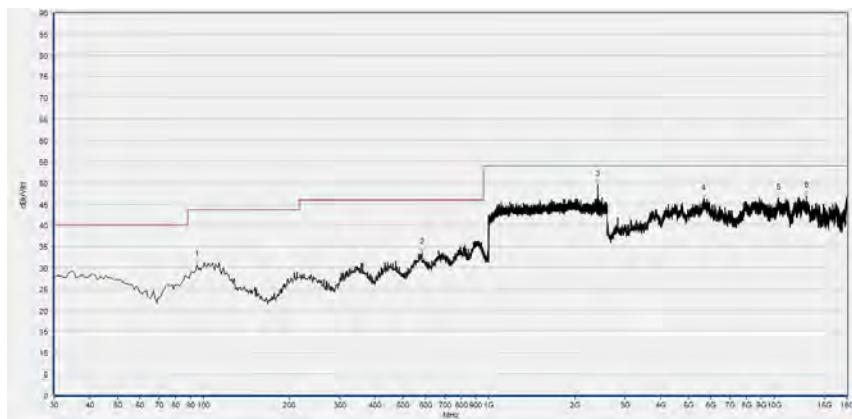


Fre. (MHz)	PK (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
99.840	31.04	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
568.350	32.61	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
2374.400	48.22	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
4752.920	44.97	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
8492.040	46.33	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
12188.040	46.52	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

(Antenna Vertical, 30MHz to 18GHz)

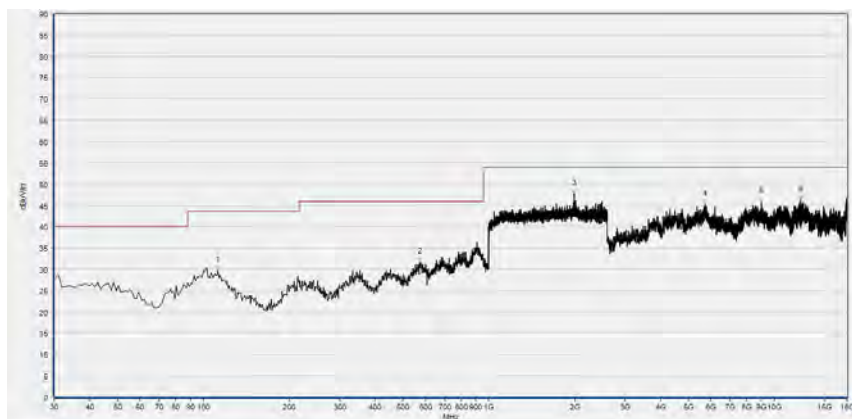


Plot for Channel 6



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
94.990	30.68	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
582.900	33.44	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
2411.200	49.65	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
5649.200	46.23	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
10346.200	46.47	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
12958.040	47.00	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

(Antenna Horizontal, 30MHz to 18GHz)

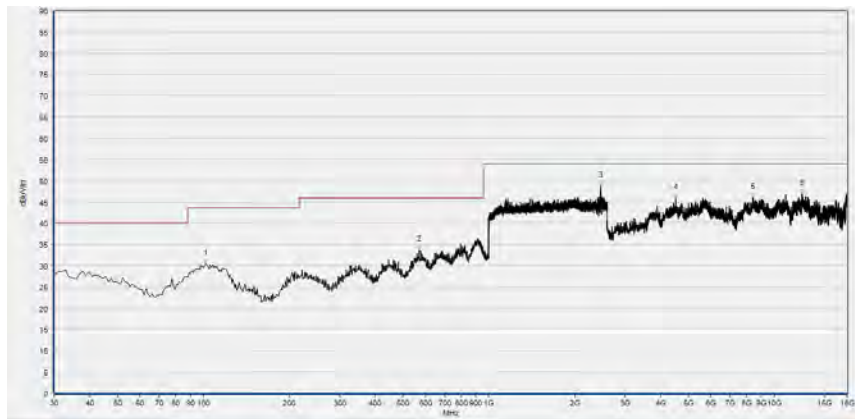


Fre. (MHz)	PK (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
112.450	29.63	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
575.140	31.62	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
1991.467	47.79	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
5716.960	45.23	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
9034.120	45.93	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
12342.040	46.23	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

(Antenna Vertical, 30MHz to 18GHz)

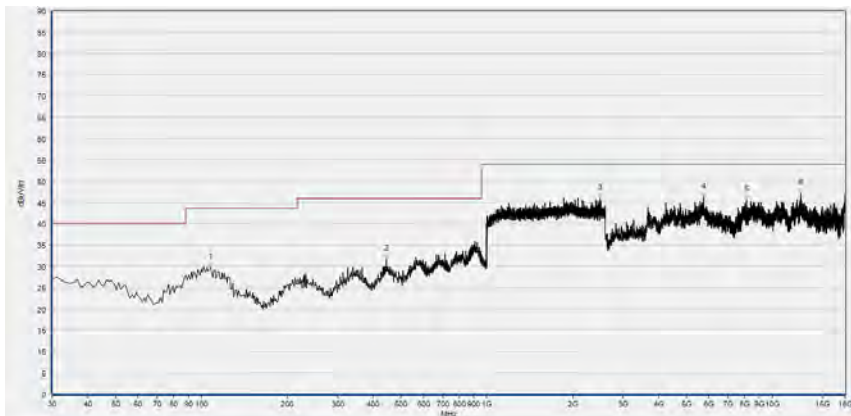


Plot for Channel 11



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
101.780	30.43	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
569.320	33.66	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
2466.133	48.85	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
4518.840	45.95	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
8430.440	46.05	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
12489.880	46.86	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

(Antenna Horizontal, 30MHz to 18GHz)

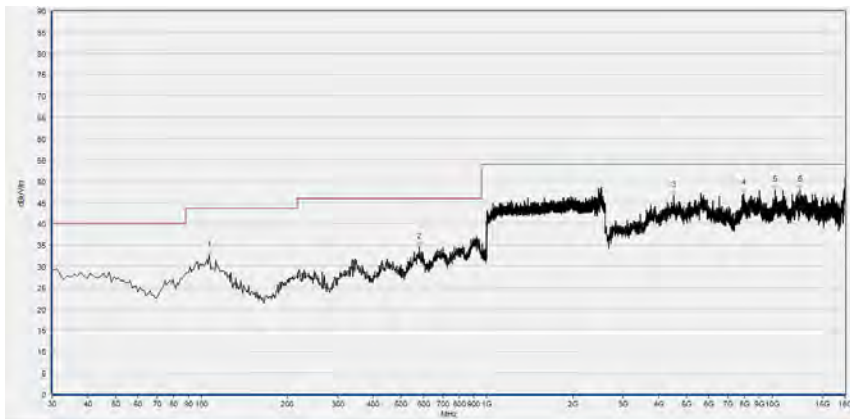


Fre. (MHz)	PK (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
107.600	29.67	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
444.190	31.61	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
2497.600	45.92	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
5760.080	46.25	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
8137.840	45.67	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
12563.800	47.14	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

(Antenna Vertical, 30MHz to 18GHz)

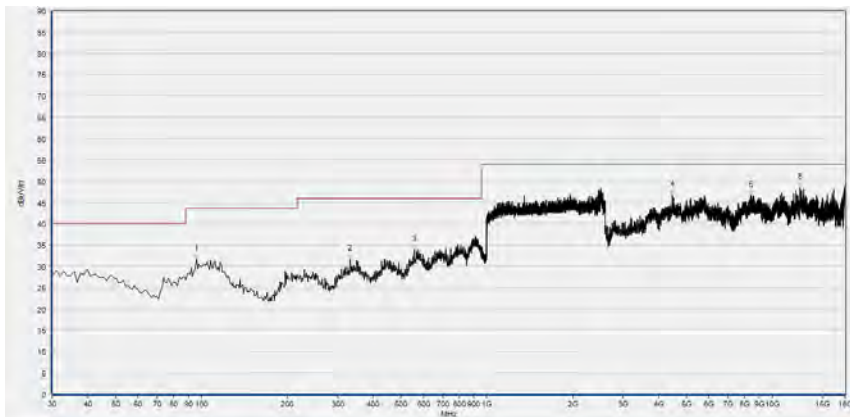
**802.11n (HT40) Mode**

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
106.630	32.44	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
579.990	34.47	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
4525.000	46.61	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
7959.200	47.10	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
10235.320	47.86	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
12508.360	47.88	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

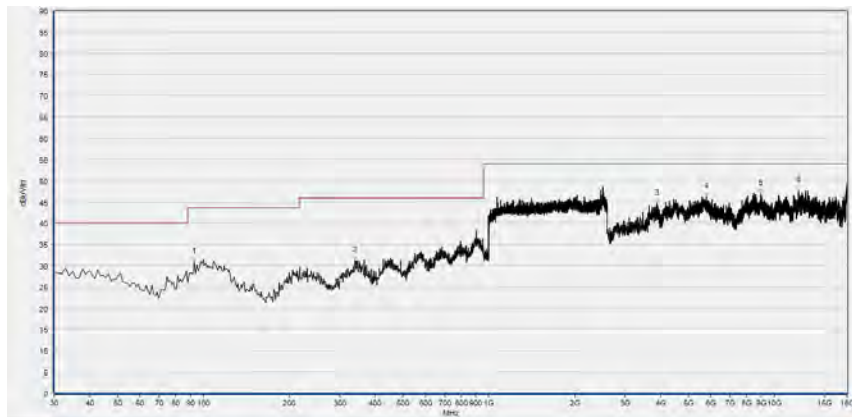
(Antenna Horizontal, 30MHz to 18GHz)



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
95.960	31.61	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
332.640	31.67	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
557.680	33.85	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
4472.640	46.72	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
8411.960	46.63	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
12517.600	48.36	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

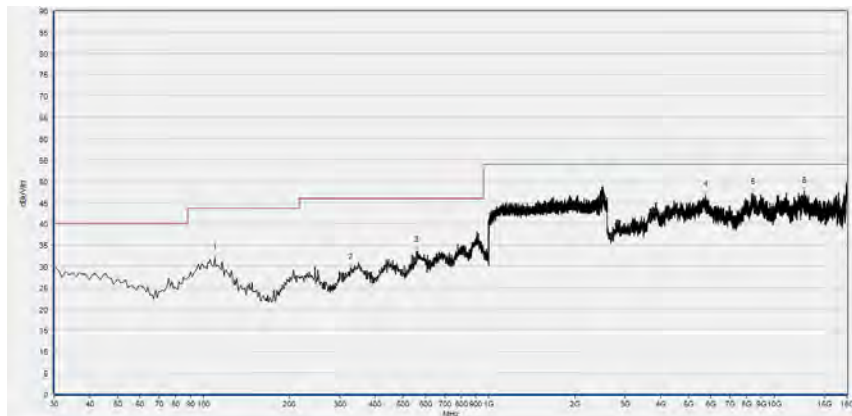
(Antenna Vertical, 30MHz to 18GHz)

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
93.050	30.88	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
340.400	31.19	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
3884.360	44.59	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
5793.960	46.32	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
8975.600	46.87	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
12172.640	47.79	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

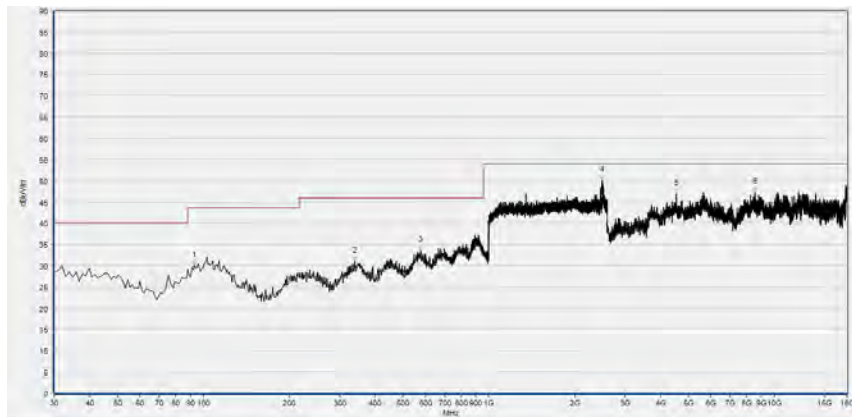
(Antenna Horizontal, 30MHz to 18GHz)



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
109.540	32.00	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
327.790	29.74	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
556.710	33.74	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
5757.000	46.70	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
8433.520	47.29	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
12733.200	47.61	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

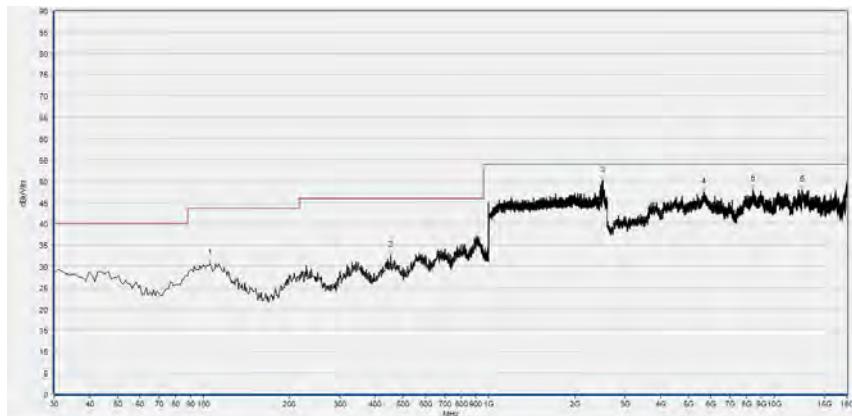
(Antenna Vertical, 30MHz to 18GHz)

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
93.050	29.95	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
339.430	31.04	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
576.110	33.59	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
2500.267	50.18	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
4543.480	46.96	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
8538.240	47.30	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
105.660	30.67	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
453.890	32.51	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
2500.800	50.07	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
5661.520	47.42	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
8427.360	48.06	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
12548.400	47.87	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.
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.
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	2022.03.01	2023.02.28
USB Wideband Power Sensor	MY54180008	U2021XA	Agilent	2021.10.21	2022.10.20
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	2022.03.03	2023.03.02
LISN	812744	NSLK 8127	Schwarzbeck	2022.03.03	2023.03.02
Pulse Limiter (10dB)	VTSD 9561 F-B #206	VTSD 9561-F	Schwarzbeck	2022.07.06	2023.07.05
Coaxial Cable(BNC) (30MHz-26GHz)	CB01	EMC01	Morlab	N/A	N/A

4.3 List of Software Used

Description	Manufacturer	Software Version
Test System	Tonscend	V2.5.77.0418
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	2022.07.06	2023.07.05
Test Antenna - Bi-Log	9163-519	VULB 9163	Schwarzbeck	2022.05.25	2025.05.24
Test Antenna - Loop	1519-022	FMZB1519	Schwarzbeck	2022.02.11	2025.02.10
Test Antenna – Horn	01774	BBHA 9120D	Schwarzbeck	2022.07.13	2025.07.12
Test Antenna – Horn	BBHA9170#773	BBHA 9170	Schwarzbeck	2022.07.14	2025.07.13
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	S020180L3203	Tonscend	2022.07.08	2023.07.07
18-26.5GHz pre-Amplifier	46732	S10M100L3802	Tonscend	2022.07.08	2023.07.07
26-40GHz pre-Amplifier	56774	S40M400L4002	Tonscend	2022.07.08	2023.07.07
Notch Filter	N/A	WRCG-2400-2483.5-60SS	Wainwright	2022.07.08	2023.07.07
Anechoic Chamber	N/A	9m*6m*6m	CRT	2020.01.06	2023.01.05

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