8.3 MAXIMUM POWER SPECTRAL DENSITY

8.3.1 Applicable Standard

According to FCC Part 15.247(e) and KDB 558074 DTS 01 Meas. Guidance v03r05

8.3.2 Conformance Limit

The transmitter power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

8.3.3 Test Configuration

Test according to clause 7.1 radio frequency test setup 1

8.3.4 Test Procedure

This procedure shall be used if maximum peak conducted output power was used to demonstrate compliance
The transmitter output (antenna port) was connected to the spectrum analyzer
Set analyzer center frequency to DTS channel center frequency.
Set the span to 1.5 times the DTS bandwidth.
Set the RBW to: 3 kHz
Set the VBW to: 10 kHz.
Set Detector = peak.
Set Sweep time = auto couple.
Set Trace mode = max hold.
Allow trace to fully stabilize.
Use the peak marker function to determine the maximum amplitude level within the RBW.
Note: If antenna Gain exceeds 6 dBi, then PSD Limit=8-(Gain - 6)

8.3.5 Test Results

Temperature :	28℃	Test Date :	December 15, 2016
Humidity :	65 %	Test By:	King Kong
Antenna:	A		

Operation Mode	Channel Number	Channel Frequency (MHz)	Measurement Level (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
☒802.11b	1	2412	-13.846	8	PASS
	6	2437	-13.955	8	PASS
	11	2462	-14.552	8	PASS
☒802.11g	1	2412	-19.383	8	PASS
	6	2437	-18.768	8	PASS
	11	2462	-19.789	8	PASS
☒802.11n (HT20)	1	2412	-19.269	8	PASS
	6	2437	-18.649	8	PASS
	11	2462	-20.653	8	PASS
☒802.11n (HT40)	3	2422	-22.713	8	PASS
	6	2437	-22.195	8	PASS
	9	2452	-21.703	8	PASS

Temperature :	28℃	Test Date :	April 23, 2016
Humidity :	65 %	Test By:	King Kong
Antenna:	B		

Operation Mode	Channel Number	Channel Frequency (MHz)	Measurement Level (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
☒802.11b	1	2412	-13.920	8	PASS
	6	2437	-14.687	8	PASS
	11	2462	-13.245	8	PASS
☒802.11g	1	2412	-19.647	8	PASS
	6	2437	-19.702	8	PASS
	11	2462	-18.168	8	PASS
☒802.11n (HT20)	1	2412	-18.323	8	PASS
	6	2437	-19.213	8	PASS
	11	2462	-20.135	8	PASS
☒802.11n (HT40)	3	2422	-21.232	8	PASS
	6	2437	-20.861	8	PASS
	9	2452	-22.183	8	PASS

Temperature :	28℃	Test Date :	April 23, 2016
Humidity :	65 %	Test By:	King Kong
Antenna:	A+B		

Operation Mode	Channel Number	Channel Frequency (MHz)	Measurement Level (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
☒802.11n (HT20)	1	2412	-15.76	8	PASS
	6	2437	-15.91	8	PASS
	11	2462	-17.38	8	PASS
☒802.11n (HT40)	3	2422	-18.90	8	PASS
	6	2437	-18.47	8	PASS
	9	2452	-18.93	8	PASS

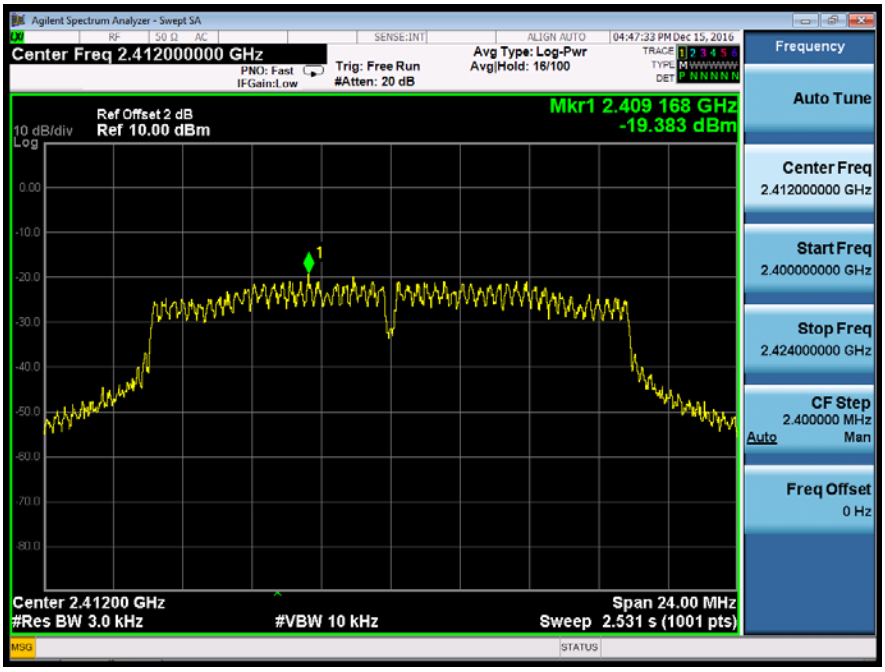
For Antenna A

Test Model	Power Spectral Density 802.11b Channel 1: 2412MHz

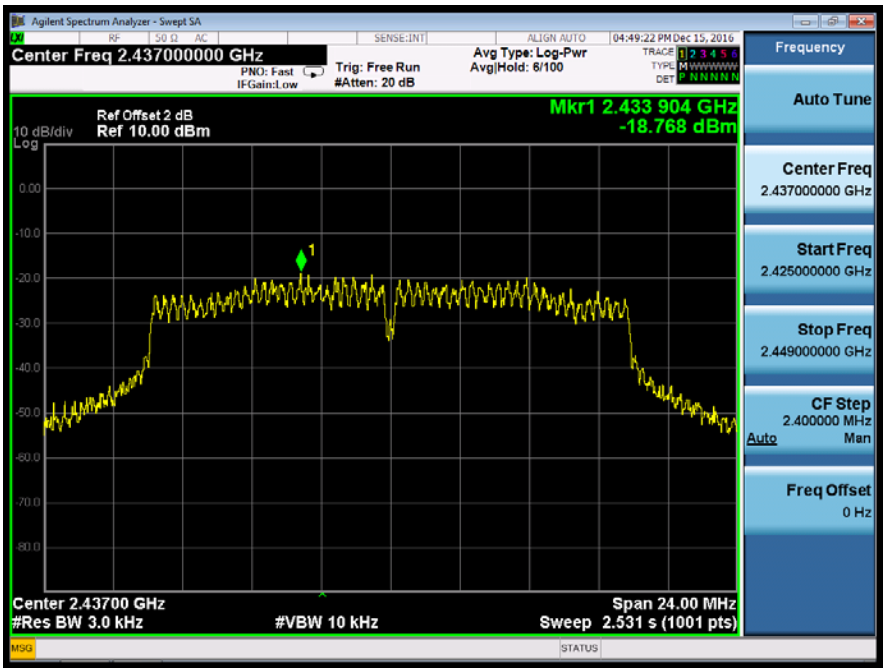
Test Model	Power Spectral Density 802.11b Channel 6: 2437MHz

Test Model	Power Spectral Density 802.11b Channel 11: 2462MHz

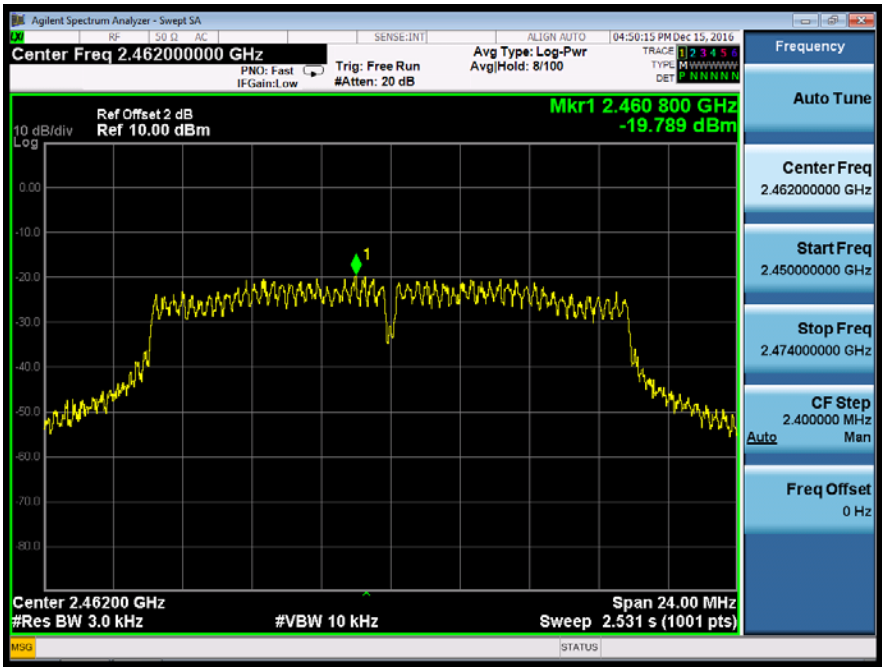
Test Model	Power Spectral Density 802.11g Channel 1: 2412MHz



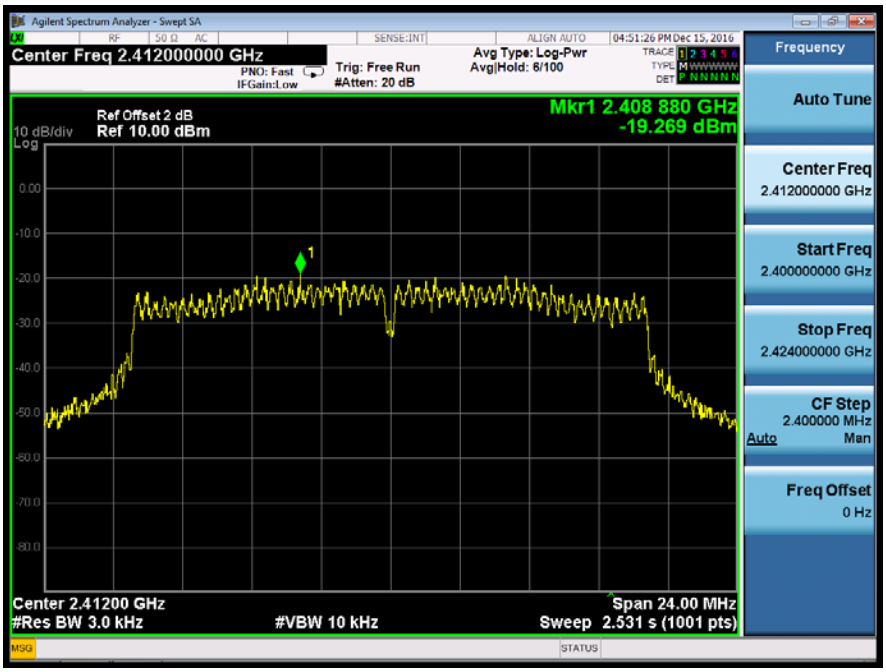
Test Model	Power Spectral Density 802.11g Channel 6: 2437MHz



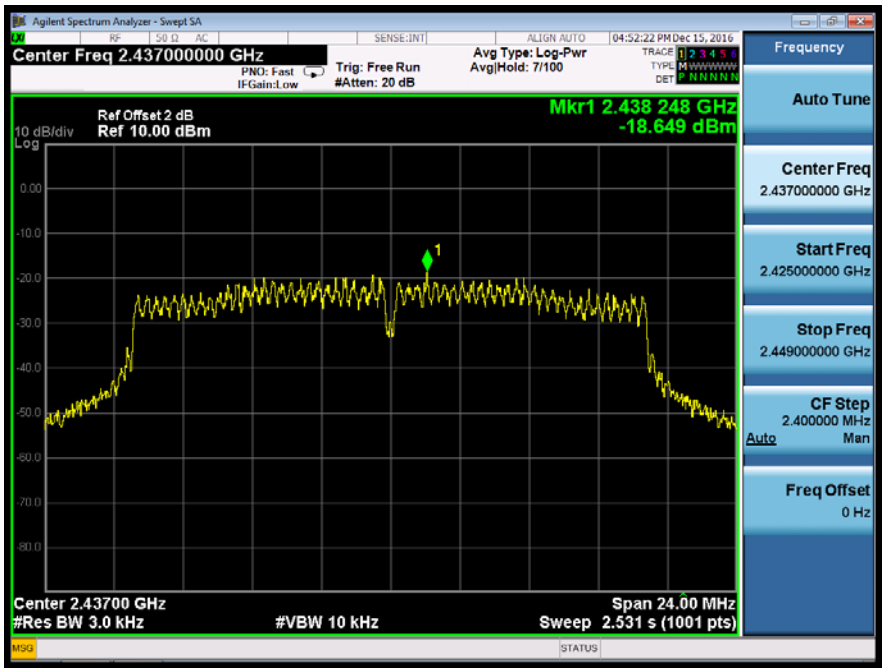
Test Model	Power Spectral Density 802.11g Channel 11: 2462MHz



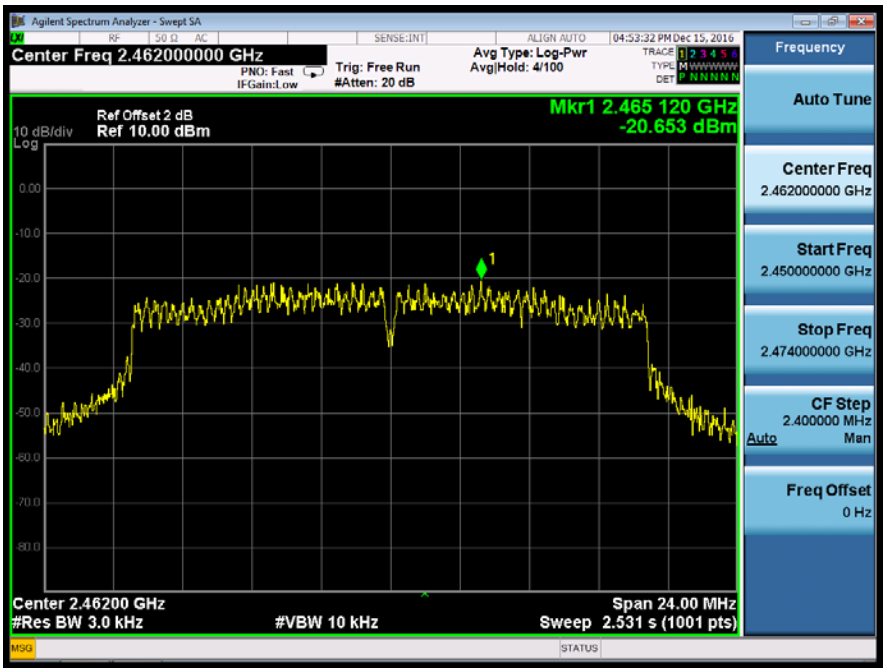
Test Model	Power Spectral Density 802.11n (HT20) Channel 1: 2412MHz



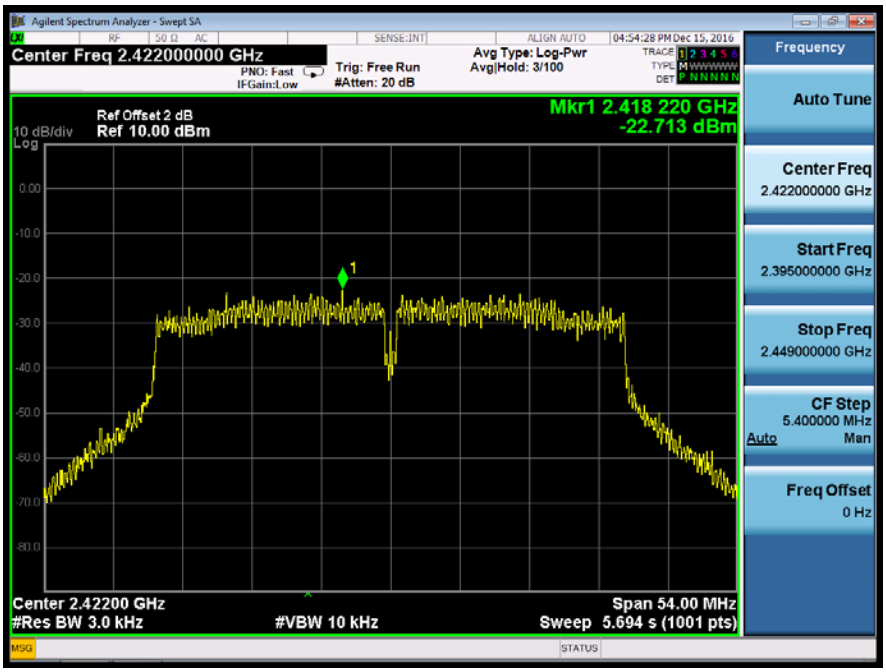
Test Model	Power Spectral Density 802.11n (HT20) Channel 6: 2437MHz



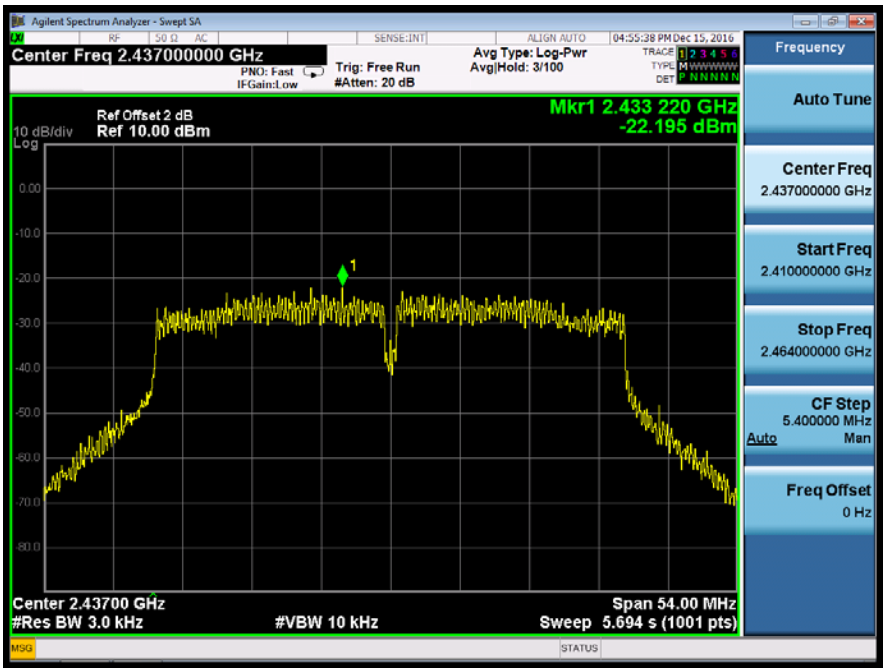
Test Model	Power Spectral Density 802.11n (HT20) Channel 11: 2462MHz



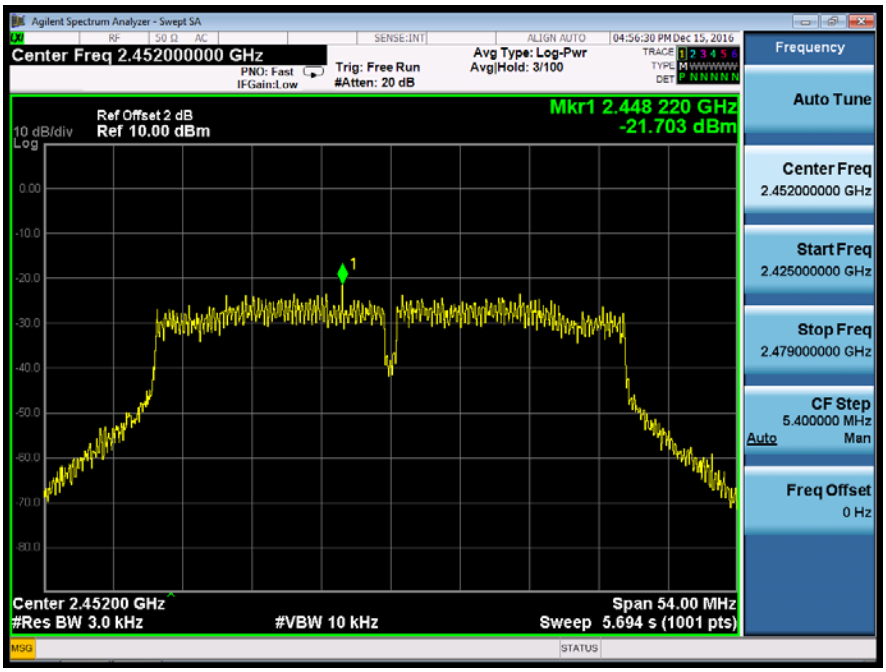
Test Model	Power Spectral Density 802.11n (HT40) Channel 1: 2422MHz



Test Model	Power Spectral Density 802.11n (HT40) Channel 6: 2437MHz



Test Model	Power Spectral Density 802.11n (HT40) Channel 11: 2452MHz



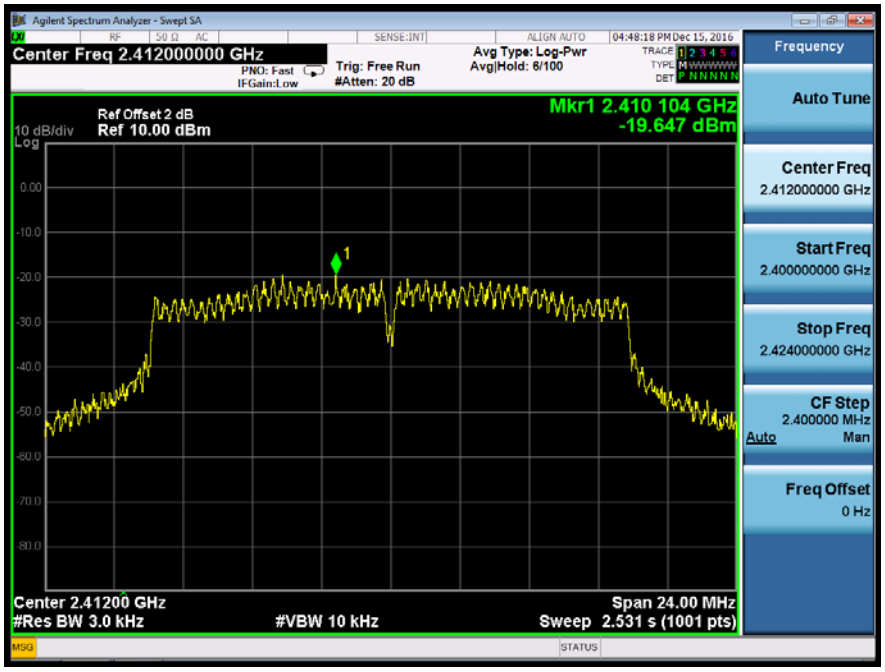
For Antenna B

Test Model	Power Spectral Density 802.11b Channel 1: 2412MHz

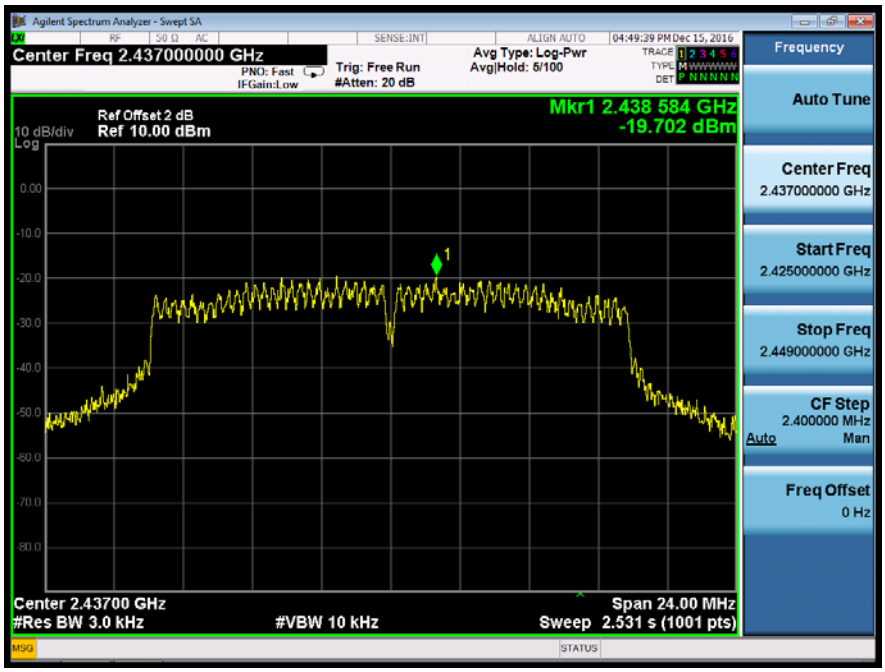
Test Model	Power Spectral Density 802.11b Channel 6: 2437MHz

Test Model	Power Spectral Density 802.11b Channel 11: 2462MHz

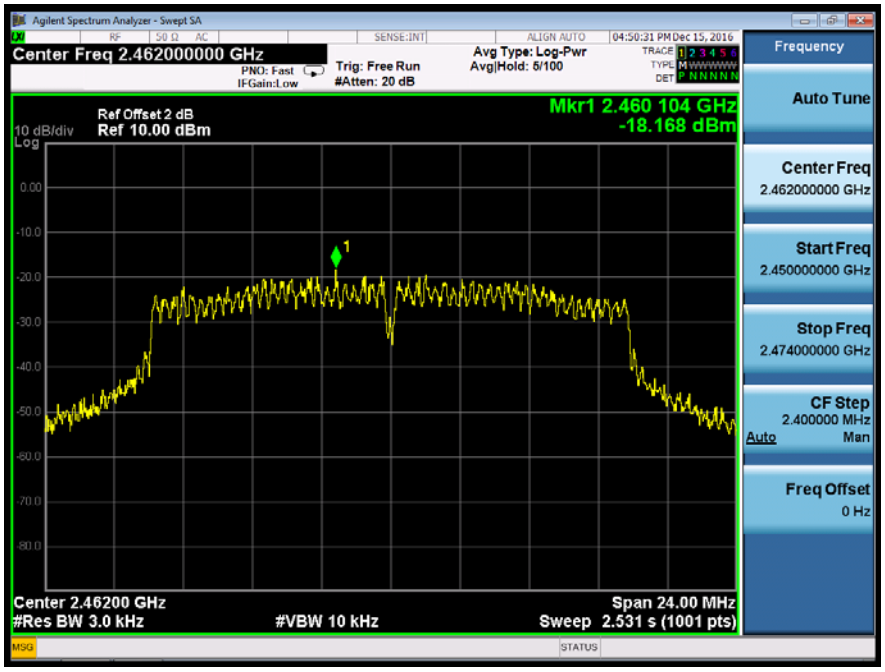
Test Model	Power Spectral Density 802.11g Channel 1: 2412MHz



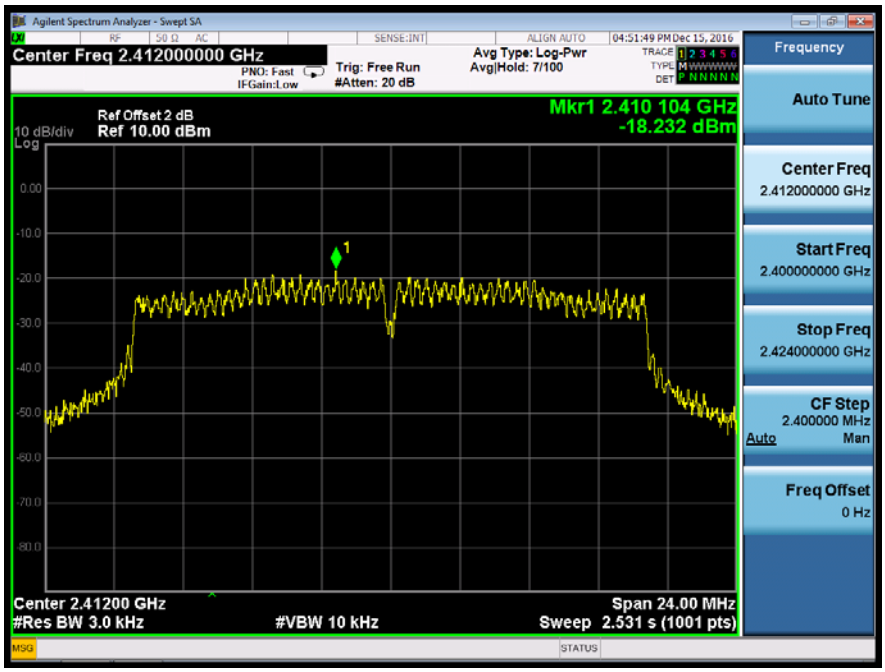
Test Model	Power Spectral Density 802.11g Channel 6: 2437MHz



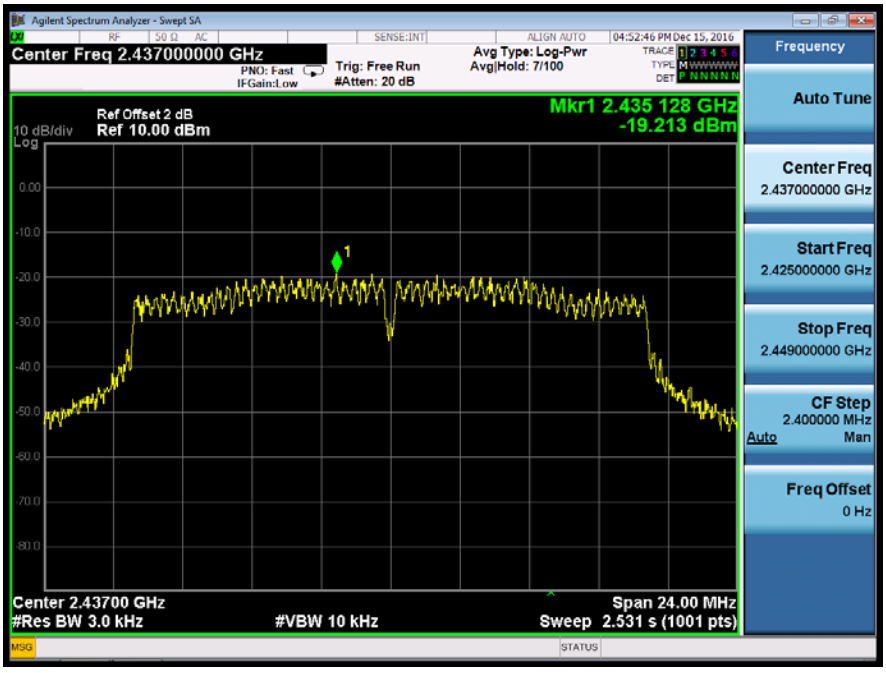
Test Model	Power Spectral Density 802.11g Channel 11: 2462MHz



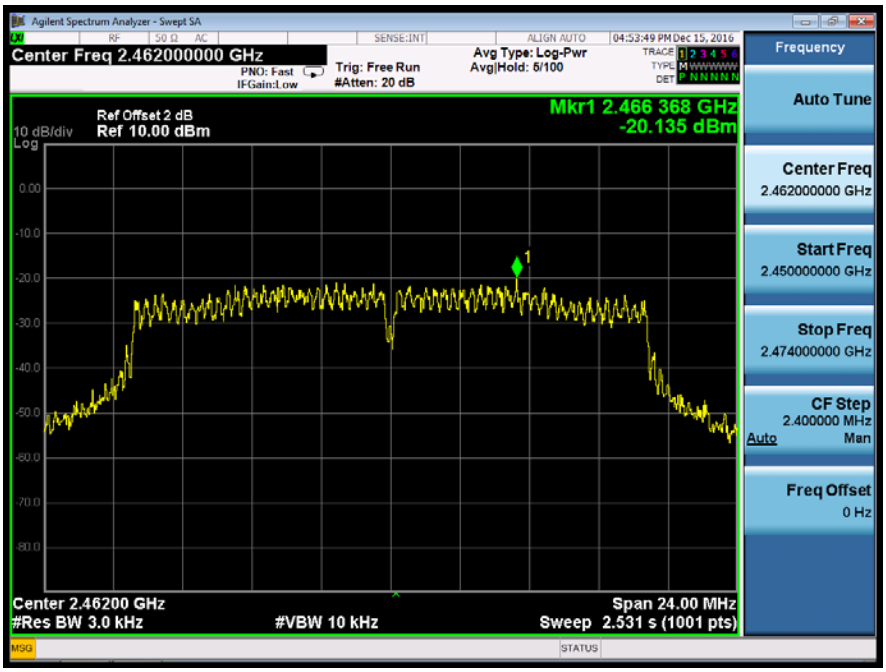
Test Model	Power Spectral Density 802.11n (HT20) Channel 1: 2412MHz



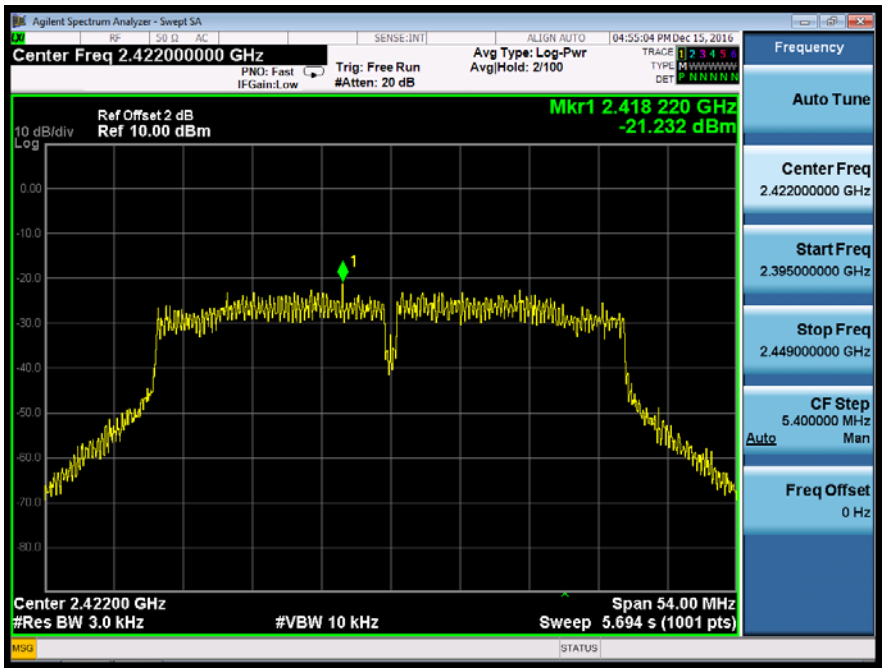
Test Model	Power Spectral Density 802.11n (HT20) Channel 6: 2437MHz



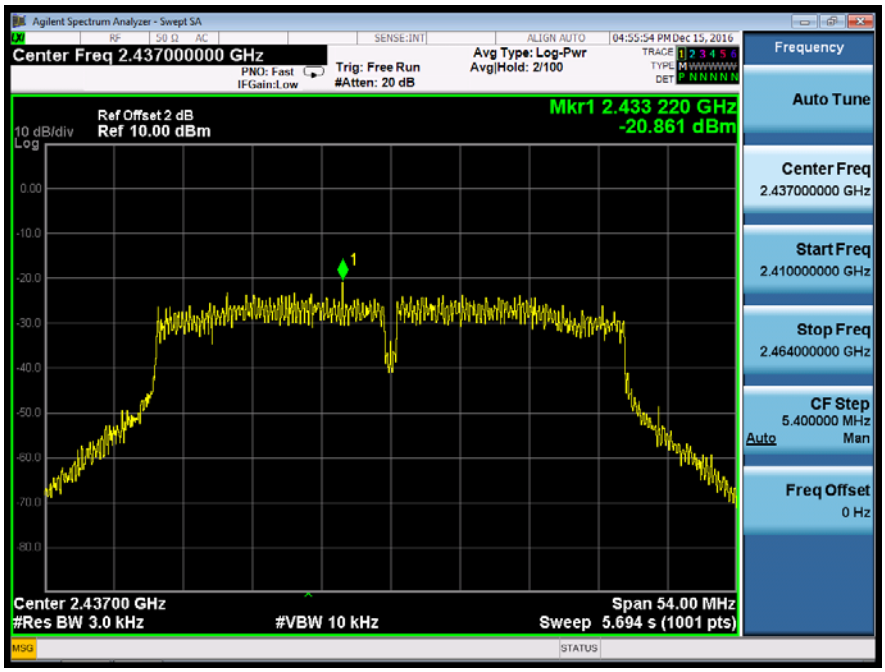
Test Model	Power Spectral Density 802.11n (HT20) Channel 11: 2462MHz



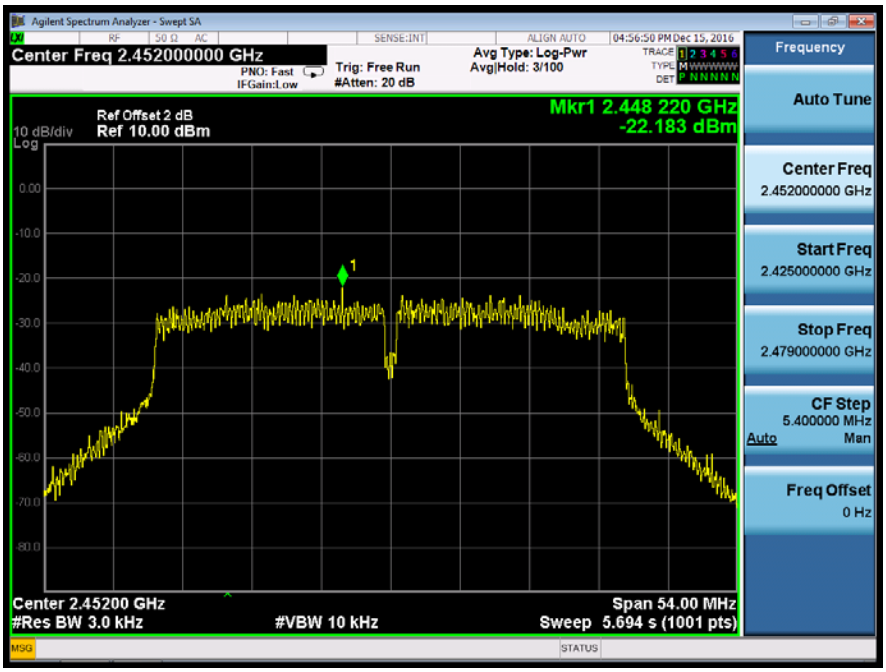
Test Model	Power Spectral Density 802.11n (HT40) Channel 1: 2422MHz



Test Model	Power Spectral Density 802.11n (HT40) Channel 6: 2437MHz



Test Model	Power Spectral Density 802.11n (HT40) Channel 11: 2452MHz



8.4 UNWANTED EMISSIONS IN NON-RESTRICTED FREQUENCY BANDS

8.4.1 Applicable Standard

According to FCC Part 15.247(d) and KDB 558074 DTS 01 Meas. Guidance v03r05

8.4.2 Conformance Limit

According to FCC Part 15.247(d):
In any 100 kHz 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 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

8.4.3 Test Configuration

Test according to clause 7.1 radio frequency test setup 1

8.4.4 Test Procedure

The transmitter output (antenna port) was connected to the spectrum analyzer

- **Reference level measurement**

Establish a reference level by using the following procedure:
Set instrument center frequency to DTS channel center frequency.
Set the span to ≥ 1.5 times the DTS bandwidth.
Set the RBW = 100 kHz.
Set the VBW ≥ 3 x RBW.
Set Detector = peak.
Set Sweep time = auto couple.
Set Trace mode = max hold.
Allow trace to fully stabilize.
Use the peak marker function to determine the maximum PSD level.
Note that the channel found to contain the maximum PSD level can be used to establish the reference level.

- **Emission level measurement**

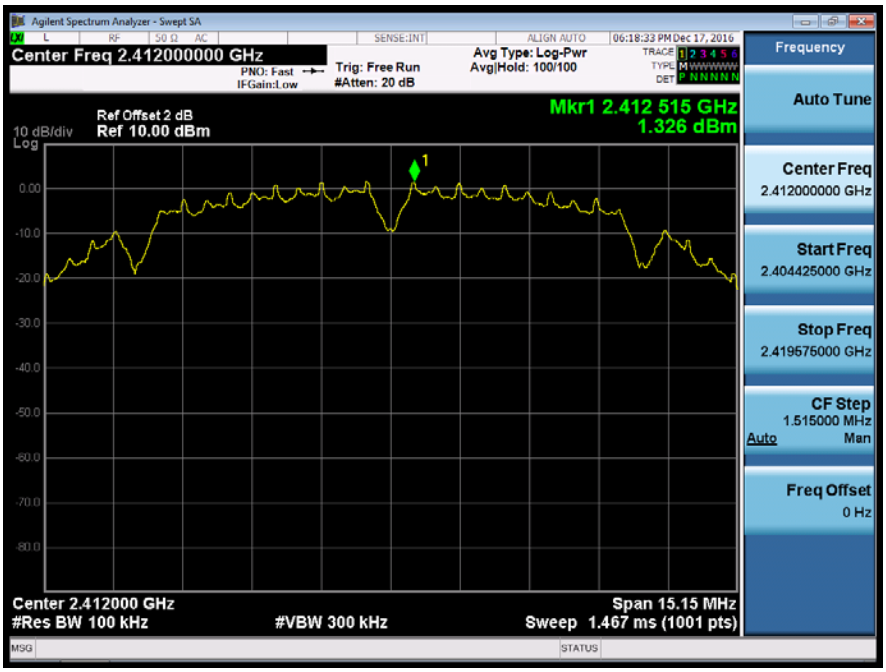
Set the center frequency and span to encompass frequency range to be measured.
Set the RBW = 100 kHz.
Set the VBW =300 kHz.
Set Detector = peak
Sweep time = auto couple.
Trace mode = max hold.
Allow trace to fully stabilize.
Use the peak marker function to determine the maximum amplitude level.
Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) are attenuated by at least the minimum requirements . Report the three highest emissions relative to the limit.

8.4.5 Test Results

All modes 2.4G 802.11b/g/n have been tested, and the worst result 802.11g recorded was report as below:

For Antenna A

Test Model	PSD(Power Spectral Density) RBW=100kHz ☐802.11b ☒802.11g ☐802.11n(HT20) ☐802.11n(HT40) ☒Channel 1: 2412MHz ☐Channel 3: 2422MHz



Test Model	Unwanted Emissions in non-restricted frequency bands ☐802.11b ☒802.11g ☐802.11n(HT20) ☐802.11n(HT40) ☒Channel 1: 2412MHz ☐Channel 3: 2422MHz

Test Model	Band edge ☐802.11b ☒802.11g ☐802.11n(HT20) ☐802.11n(HT40) ☒Channel 1: 2412MHz ☐Channel 3: 2422MHz

Test Model	PSD(Power Spectral Density) RBW=100kHz ☐802.11b ☒802.11g ☐802.11n(HT20) ☐802.11n(HT40) Channel 6: 2437MHz

Test Model	Unwanted Emissions In Non-Restricted Frequency Bands ☐802.11b ☒802.11g ☐802.11n(HT20) ☐802.11n(HT40) Channel 6: 2437MHz

Test Model	PSD(Power Spectral Density) RBW=100kHz ☐802.11b ☒802.11g ☐802.11n(HT20) ☐802.11n(HT40) ☒Channel 11: 2462MHz ☐Channel 9: 2452MHz

Test Model	Unwanted Emissions In Non-Restricted Frequency Bands ☐802.11b ☒802.11g ☐802.11n(HT20) ☐802.11n(HT40) ☒Channel 11: 2462MHz ☐Channel 9: 2452MHz

Test Model	Band edge ☐802.11b ☒802.11g ☐802.11n(HT20) ☐802.11n(HT40) ☒Channel 11: 2462MHz ☐Channel 9: 2452MHz

For Antenna B

Test Model	PSD(Power Spectral Density) RBW=100kHz ☐802.11b ☒802.11g ☐802.11n(HT20) ☐802.11n(HT40) ☒Channel 1: 2412MHz ☐Channel 3: 2422MHz

Test Model	Unwanted Emissions in non-restricted frequency bands ☐802.11b ☒802.11g ☐802.11n(HT20) ☐802.11n(HT40) ☒Channel 1: 2412MHz ☐Channel 3: 2422MHz

Test Model	Band edge ☐802.11b	☒802.11g	☐802.11n(HT20)	☐802.11n(HT40)
	☒Channel 1: 2412MHz		☐Channel 3: 2422MHz	

Test Model	PSD(Power Spectral Density) RBW=100kHz ☐802.11b ☒802.11g ☐802.11n(HT20) ☐802.11n(HT40) Channel 6: 2437MHz

Test Model	Unwanted Emissions In Non-Restricted Frequency Bands ☐802.11b ☒802.11g ☐802.11n(HT20) ☐802.11n(HT40) Channel 6: 2437MHz

Test Model	PSD(Power Spectral Density) RBW=100kHz ☐802.11b ☒802.11g ☐802.11n(HT20) ☐802.11n(HT40) ☒Channel 11: 2462MHz ☐Channel 9: 2452MHz

Test Model	Unwanted Emissions In Non-Restricted Frequency Bands ☐802.11b ☒802.11g ☐802.11n(HT20) ☐802.11n(HT40) ☒Channel 11: 2462MHz ☐Channel 9: 2452MHz

Test Model	Band edge ☐802.11b ☒802.11g ☐802.11n(HT20) ☐802.11n(HT40) ☒Channel 11: 2462MHz ☐Channel 9: 2452MHz

8.5 RADIATED SPURIOUS EMISSION

8.5.1 Applicable Standard

According to FCC Part 15.247(d) and 15.209 and KDB 558074 DTS 01 Meas. Guidance v03r05

8.5.2 Conformance Limit

According to FCC Part 15.247(d): 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) (see §15.205(c)).
According to FCC Part15.205, Restricted bands

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
10.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(2)
13.36-13.41			

According to FCC Part15.205, the level of any transmitter spurious emission in Restricted bands shall not exceed the level of the emission specified in the following table

Restricted Frequency(MHz)	Field Strength (μV/m)	Field Strength (dBμV/m)	Measurement Distance
0.009-0.490	2400/F(KHz)	20 log (uV/m)	300
0.490-1.705	2400/F(KHz)	20 log (uV/m)	30
1.705-30	30	29.5	30
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

Remark :1. Emission level in dBuV/m=20 log (uV/m)
2. Measurement was performed at an antenna to the closed point of EUT distance of meters.
3. Distance extrapolation factor =40log(Specific distance/ test distance)(dB);
Limit line=Specific limits(dBuV) + distance extrapolation factor.
for the frequency ranges below 30 MHz, a narrower RBW is used for these ranges but the measured value should add a RBW correction factor (RBWCF) where RBWCF [dB] =10*lg(100 [kHz]/narrower RBW [kHz]). , the narrower RBW is 1 kHz and RBWCF is 20 dB for the frequency 9 kHz to 150 kHz, and the narrower RBW is 10 kHz and RBWCF is 10 dB for the frequency 150 kHz to 30 MHz.

8.5.3 Test Configuration

Test according to clause 7.2 radio frequency test setup 2

8.5.4 Test Procedure

This test is required for any spurious emission that falls in a Restricted Band, as defined in Section 15.205. It must be performed with the highest gain of each type of antenna proposed for use with the EUT. Use the following spectrum analyzer settings:
For Above 1GHz:
The EUT was placed on a turn table which is 1.5m above ground plane.
Maximum procedure was performed on the highest emissions to ensure EUT compliance.
Span = wide enough to fully capture the emission being measured
RBW = 1 MHz
VBW ≥ RBW
Sweep = auto
Detector function = peak
Trace = max hold
For Below 1GHz:
The EUT was placed on a turn table which is 0.8m above ground plane.
Maximum procedure was performed on the highest emissions to ensure EUT compliance.
Span = wide enough to fully capture the emission being measured
RBW = 100 kHz for
VBW ≥ RBW
Sweep = auto
Detector function = peak
Trace = max hold
For Below 30MHz:
The EUT was placed on a turn table which is 0.8m above ground plane.
Maximum procedure was performed on the highest emissions to ensure EUT compliance.
Span = wide enough to fully capture the emission being measured
RBW = 9kHz
VBW ≥ RBW
Sweep = auto
Detector function = peak
Trace = max hold
For Below 150KHz:
The EUT was placed on a turn table which is 0.8m above ground plane.
Maximum procedure was performed on the highest emissions to ensure EUT compliance.
Span = wide enough to fully capture the emission being measured
RBW = 200Hz
VBW ≥ RBW
Sweep = auto
Detector function = peak
Trace = max hold
Follow the guidelines in ANSI C63.10-2013 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization, etc. A pre-amp and a high pass filter are required for this test, in order to provide the measuring system with sufficient sensitivity. Allow the trace to stabilize. The peak reading of the emission, after being corrected by the antenna factor, cable loss, pre-amp gain, etc., is the peak field strength, which must comply with the limit specified in Section 15.35(b). Submit this data.
Now set the VBW to 10 Hz, while maintaining all of the other instrument settings. This peak level, once corrected, must comply with the limit specified in Section 15.209. If the dwell time per channel of the hopping signal is less than 100 ms, then the reading obtained with the 10 Hz VBW may be further adjusted by a “duty cycle correction factor”, derived from 20log(dwell time/100 ms), in an effort to demonstrate compliance with the 15.209 limit. Submit this data.
Repeat above procedures until all frequency measured was complete.

8.5.5 Test Results

■ Spurious Emission below 30MHz (9KHz to 30MHz)

Temperature:	24℃	Test Date:	December 15, 2016
Humidity:	53 %	Test By:	KK
Test mode:	TX Mode		

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
		PK	AV	PK	AV	PK	AV
--	--	--	--	--	--	--	--

Note: the amplitude of spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.
Distance extrapolation factor =40log(Specific distance/ test distance)(dB);
Limit line=Specific limits(dBuV) + distance extrapolation factor

■ Spurious Emission Above 1GHz (1GHz to 25GHz)

All modes 2.4G 802.11b/g/n have been tested, and the worst result 802.11g recorded was report as below:

Temperature :	28℃	Test Date :	December 15, 2016
Humidity :	65 %	Test By:	King Kong
Test mode:	802.11nHT20	Frequency:	Channel 1: 2412MHz

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
		PK	AV	PK	AV	PK	AV
4590.04	V	44.96	31.3	74.00	54.00	-29.04	-22.7
6426.05	V	46.92	32.26	74.00	54.00	-27.08	-21.74
8650.66	V	50.44	35.06	74.00	54.00	-23.56	-18.94
--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--
3570.07	H	45.19	30.64	74.00	54.00	-28.81	-23.36
5508.1	H	46.03	32.45	74.00	54.00	-27.97	-21.55
7307.57	H	49.92	35.32	74.00	54.00	-24.08	-18.68

Temperature :	28℃	Test Date :	December 15, 2016
Humidity :	65 %	Test By:	King Kong
Test mode:	802.11nHT20	Frequency:	Channel 6: 2437MHz

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
		PK	AV	PK	AV	PK	AV
4760.1	V	45.99	31.75	74.00	54.00	-28.01	-22.25
5522.57	V	47.15	33.52	74.00	54.00	-26.85	-20.48
6629.98	V	48.53	35.04	74.00	54.00	-25.47	-18.96
--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--
4519.49	H	44.57	31.35	74.00	54.00	-29.43	-22.65
6746.54	H	48.73	34.53	74.00	54.00	-25.27	-19.47
9366.98	H	52.76	38.21	74.00	54.00	-21.24	-15.79

Temperature :	28℃	Test Date :	December 15, 2016
Humidity :	65 %	Test By:	King Kong
Test mode:	802.11nHT20	Frequency:	Channel 11: 2462MHz

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
		PK	AV	PK	AV	PK	AV
4706.86	V	44.1	30	74.00	54.00	-29.90	-24.00
7123.39	V	45.95	31.52	74.00	54.00	-28.05	-22.48
10231.87	V	49.15	35.25	74.00	54.00	-24.85	-18.75
--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--
8616.89	H	46.67	31.35	74.00	54.00	-27.33	-22.65
9503.37	H	49.41	34.51	74.00	54.00	-24.59	-19.49
11625.90	H	51.60	38.02	74.00	54.00	-22.40	-15.98

Note: (1) All Readings are Peak Value (VBW=3MHz) and Peak Value (VBW=10Hz).
(2) Emission Level= Reading Level+Probe Factor +Cable Loss.
(3) Data of measurement within this frequency range shown " -- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

■ Spurious Emission in Restricted Band 2310-2390MHz and 2483.5-2500MHz
All modes 2.4G 802.11b/g/n have been tested, and the worst result 802.11g recorded was report as below:

Temperature :	28℃	Test Date :	December 15, 2016
Humidity :	65 %	Test By:	King Kong
Test mode:	802.11g	Frequency:	Channel 3: 2422MHz

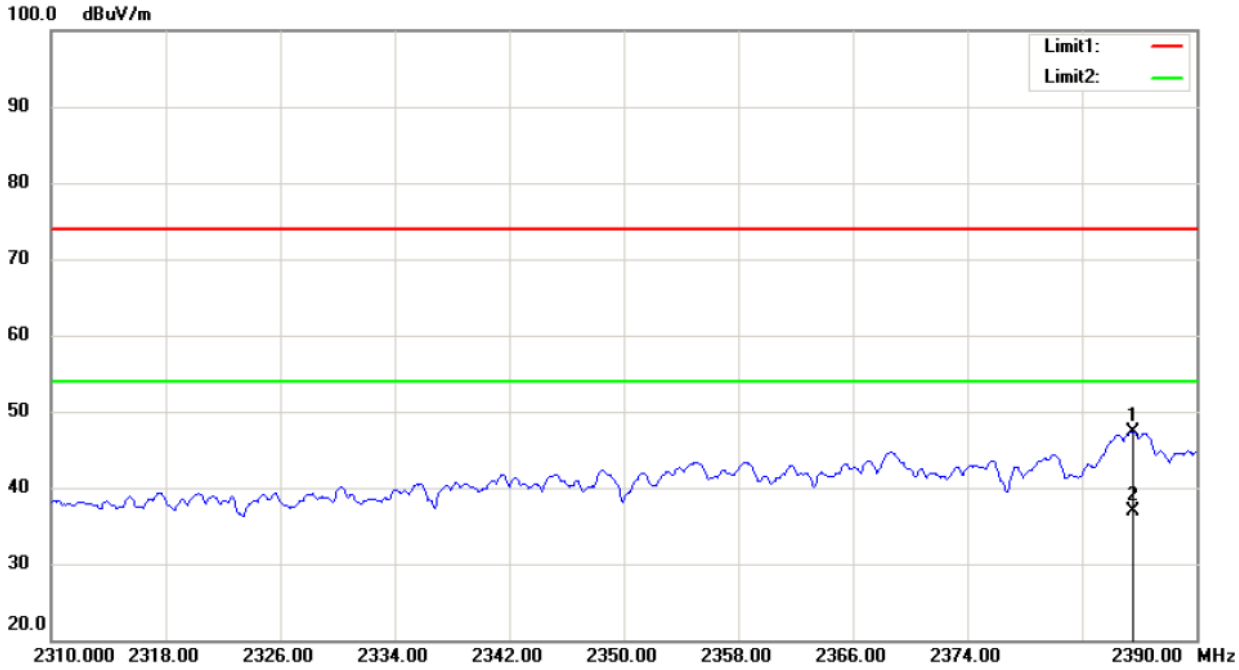
Frequency (MHz)	Polarity	PK(dBuV/m) (VBW=3MHz)	Limit 3m (dBuV/m)	Margin (dB)	AV(dBuV/m) (VBW=10Hz)	Limit 3m (dBuV/m)	Margin (dB)
2384.24	H	44.13	74.00	-29.87	35.20	54.00	-18.80
2385.52	V	47.36	74.00	-26.64	36.90	54.00	-17.10

Temperature :	28℃	Test Date :	December 15, 2016
Humidity :	65 %	Test By:	King Kong
Test mode:	802.11g	Frequency:	Channel 9: 2452MHz

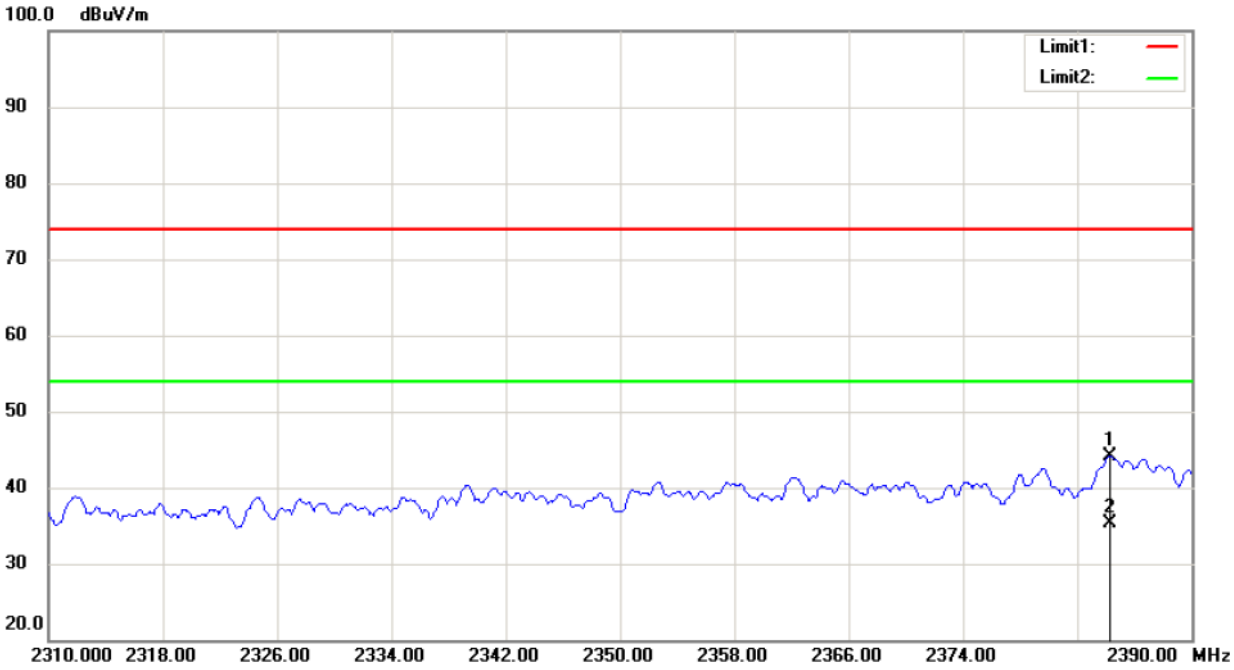
Frequency (MHz)	Polarity	PK(dBuV/m) (VBW=3MHz)	Limit 3m (dBuV/m)	Margin (dB)	AV(dBuV/m) (VBW=10Hz)	Limit 3m (dBuV/m)	Margin (dB)
2483.78	H	50.60	74.00	-23.40	41.00	54.00	-13.00
2484.17	V	51.21	74.00	-22.79	40.70	54.00	-13.30

Note: (1) All Readings are Peak Value (VBW=3MHz) and Peak Value (VBW=10Hz).
(2) Emission Level= Reading Level+Probe Factor +Cable Loss.
(3) Data of measurement within this frequency range shown " -- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

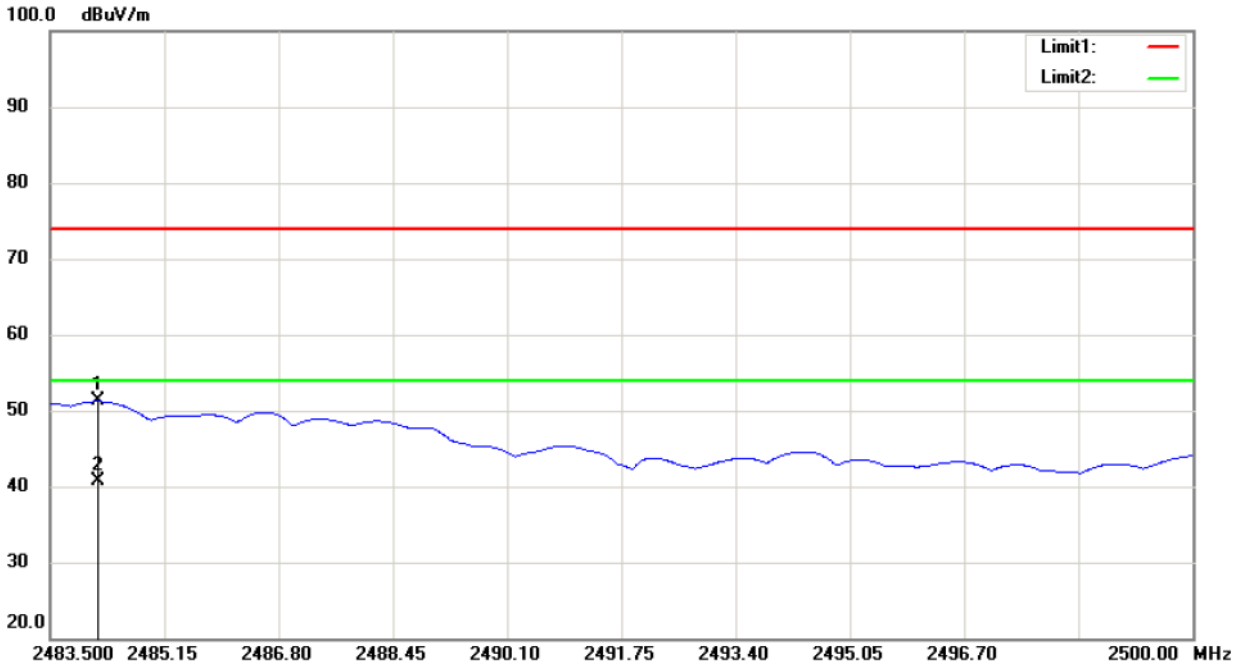
Test Model	Spurious Emission in Restricted Band 2310-2390MHz ☐802.11b ☐802.11g ☒802.11n(HT20) ☐802.11n(HT40) ☒Channel 1: 2412MHz ☐Channel 3: 2422MHz Polarity: V VBW=3MHz Test By: King Kong



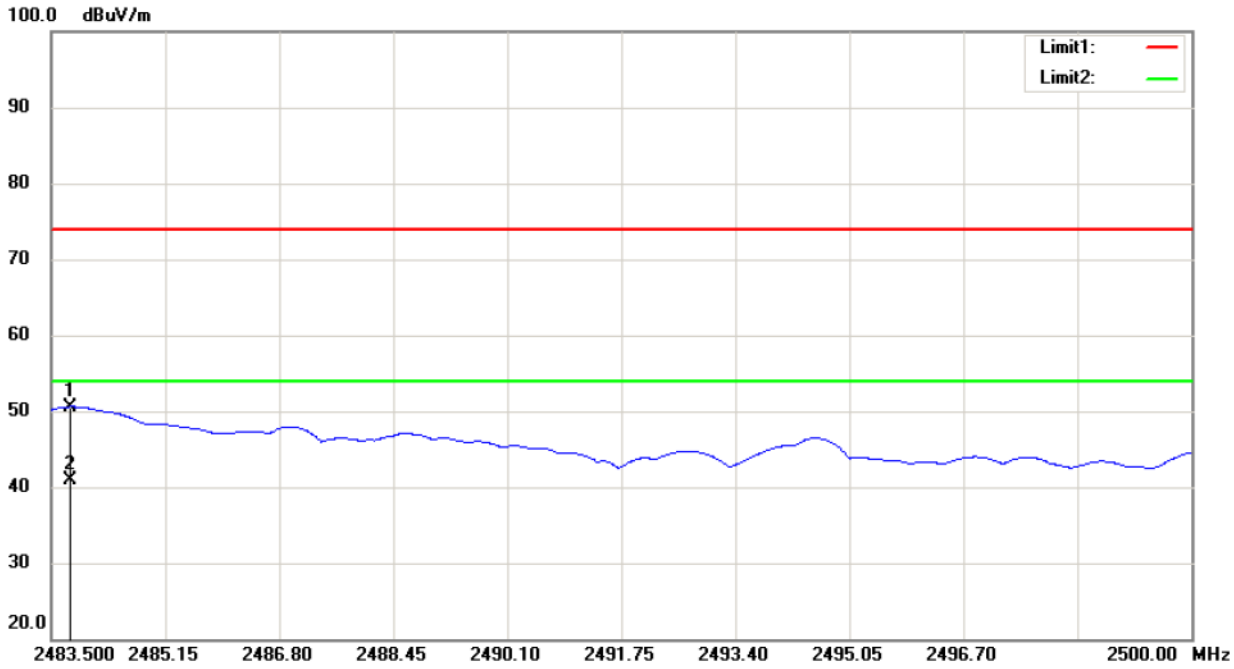
Test Model	Spurious Emission in Restricted Band 2310-2390MHz ☐802.11b ☒802.11g ☐802.11n(HT20) ☐802.11n(HT40) ☒Channel 1: 2412MHz ☐Channel 3: 2422MHz Polarity: H VBW=10Hz Test By: King Kong



Test Model	Spurious Emission in Restricted Band 2483.5-2500MHz ☐802.11b ☒802.11g ☐802.11n(HT20) ☐802.11n(HT40) ☒Channel 11: 2462MHz ☐Channel 9: 2452MHz Polarity: V VBW=3MHz Test By: King Kong

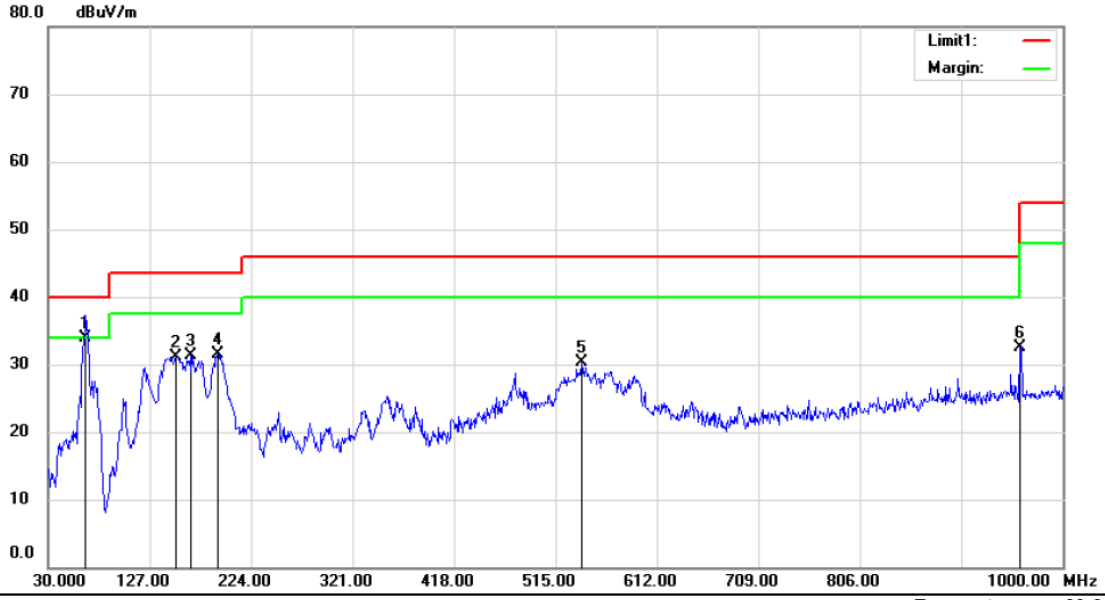


Test Model	Spurious Emission in Restricted Band 2483.5-2500MHz ☐802.11b ☒802.11g ☐802.11n(HT20) ☐802.11n(HT40) ☒Channel 11: 2462MHz ☐Channel 9: 2452MHz Polarity: H VBW=10Hz Test By: King Kong



■ Spurious Emission below 1GHz (30MHz to 1GHz)

All modes 2.4G 802.11b/g/n have been tested, and the worst result 802.11g recorded was report as below:



Site 3m Chamber #2 Polarization: *Horizontal* Temperature: 22 C

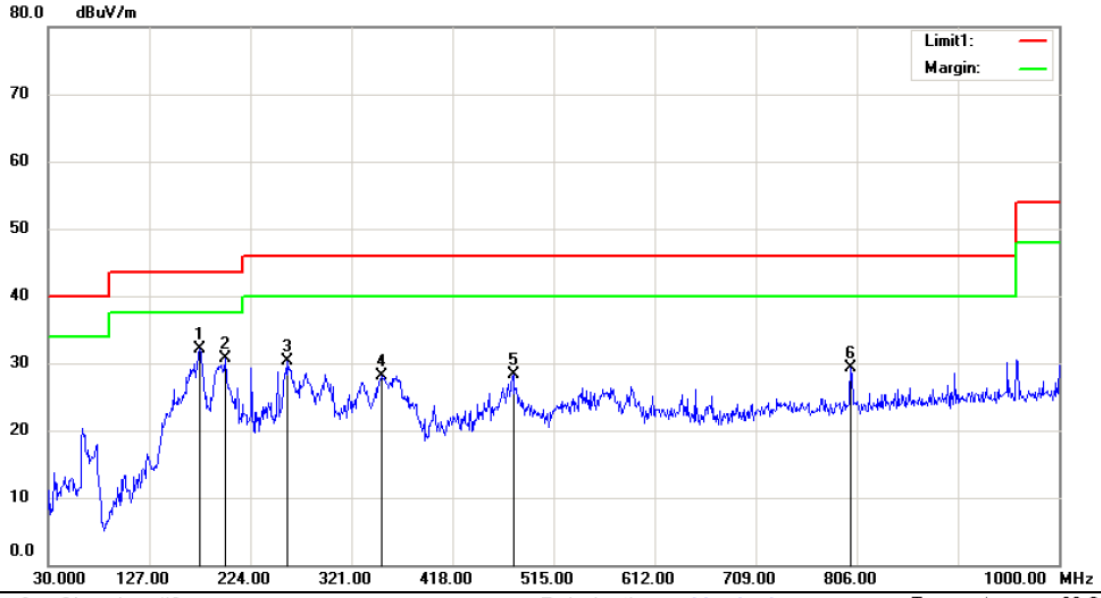
Limit: (RE)FCC PART 15 C Power: AC 120V/60Hz Humidity: 55 %

Mode:Wifi Tx(High Channel)

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	65.8900	50.18	-16.28	33.90	40.00	-6.10	QP			
2		152.2200	49.83	-18.68	31.15	43.50	-12.35	QP			
3		165.8000	48.94	-17.58	31.36	43.50	-12.14	QP			
4		191.9900	47.85	-16.41	31.44	43.50	-12.06	QP			
5		540.2200	36.81	-6.59	30.22	46.00	-15.78	QP			
6		959.2600	32.22	0.23	32.45	46.00	-13.55	QP			

*:Maximum data x:Over limit !:over margin Operator: CSL



Site 3m Chamber #2 Polarization: *Vertical* Temperature: 22 C

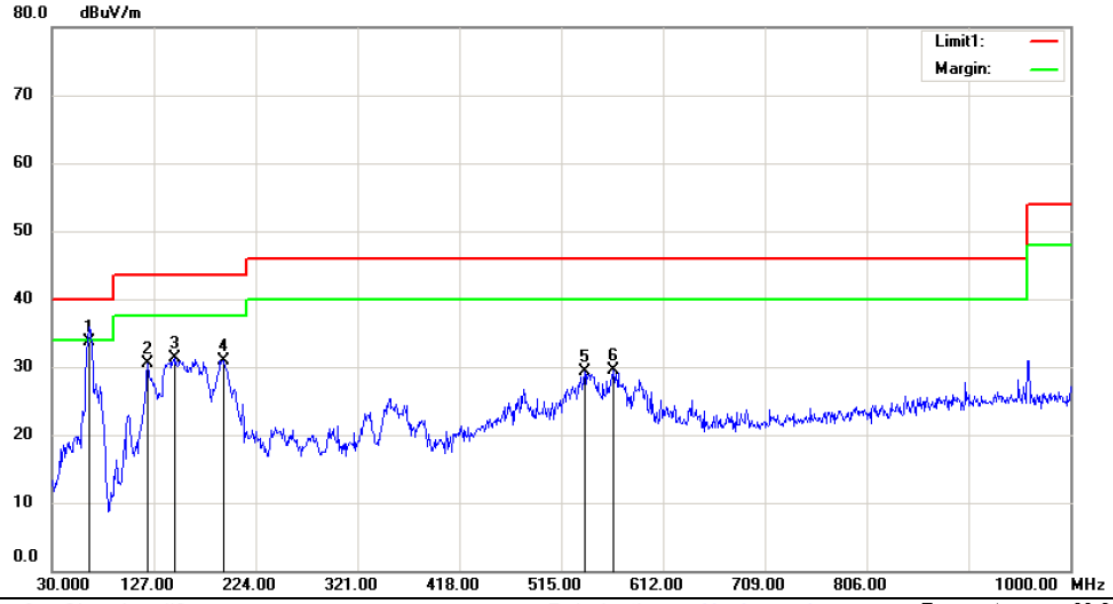
Limit: (RE)FCC PART 15 C Power: AC 120V/60Hz Humidity: 55 %

Mode:Wifi Tx(High Channel)

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	175.5000	49.22	-17.03	32.19	43.50	-11.31	QP			
2		199.7500	46.55	-15.89	30.66	43.50	-12.84	QP			
3		258.9200	43.38	-13.05	30.33	46.00	-15.67	QP			
4		350.1000	38.16	-10.05	28.11	46.00	-17.89	QP			
5		476.2000	36.44	-8.07	28.37	46.00	-17.63	QP			
6		800.1800	31.17	-1.96	29.21	46.00	-16.79	QP			

*:Maximum data x:Over limit !:over margin Operator: CSL



Site 3m Chamber #2 Polarization: ***Horizontal*** Temperature: 22 C

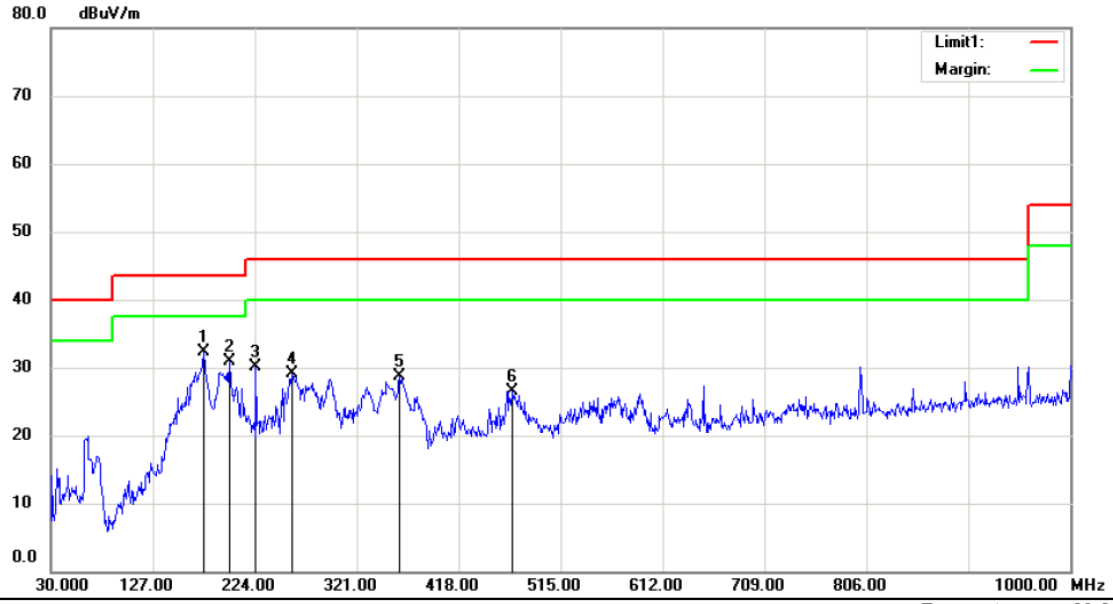
Limit: (RE)FCC PART 15 C Power: AC 120V/60Hz Humidity: 55 %

Mode:Wifi Tx(Middle Channel)

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	64.9200	49.71	-16.01	33.70	40.00	-6.30	QP			
2		121.1800	47.47	-17.05	30.42	43.50	-13.08	QP			
3		147.3700	50.06	-18.80	31.26	43.50	-12.24	QP			
4		193.9300	47.17	-16.28	30.89	43.50	-12.61	QP			
5		537.3100	35.97	-6.65	29.32	46.00	-16.68	QP			
6		564.4700	35.52	-6.04	29.48	46.00	-16.52	QP			

*:Maximum data x:Over limit !:over margin Operator: CSL



Site 3m Chamber #2
Polarization: *Vertical*
Temperature: 22 C

Limit: (RE)FCC PART 15 C
Power: AC 120V/60Hz
Humidity: 55 %

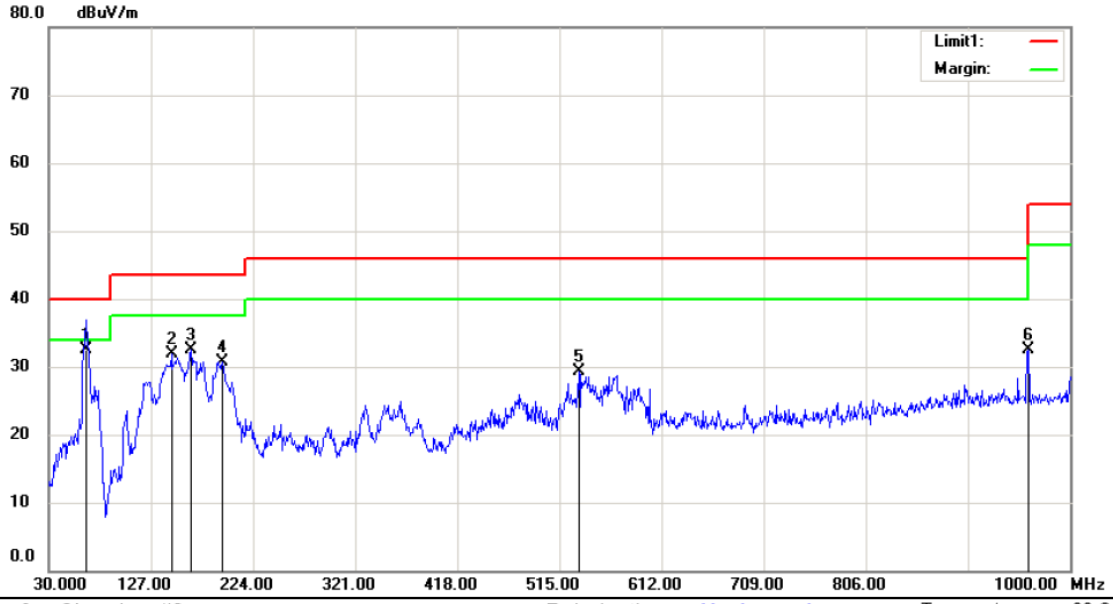
Mode:Wifi Tx(Middle Channel)

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	175.5000	49.27	-17.03	32.24	43.50	-11.26	QP			
2		199.7500	46.76	-15.89	30.87	43.50	-12.63	QP			
3		224.9700	44.41	-14.24	30.17	46.00	-15.83	QP			
4		259.8900	42.13	-12.96	29.17	46.00	-16.83	QP			
5		361.7400	38.54	-9.84	28.70	46.00	-17.30	QP			
6		469.4100	34.76	-8.22	26.54	46.00	-19.46	QP			

*:Maximum data x:Over limit !:over margin

Operator: CSL



Site 3m Chamber #2 Polarization: ***Horizontal*** Temperature: 22 C

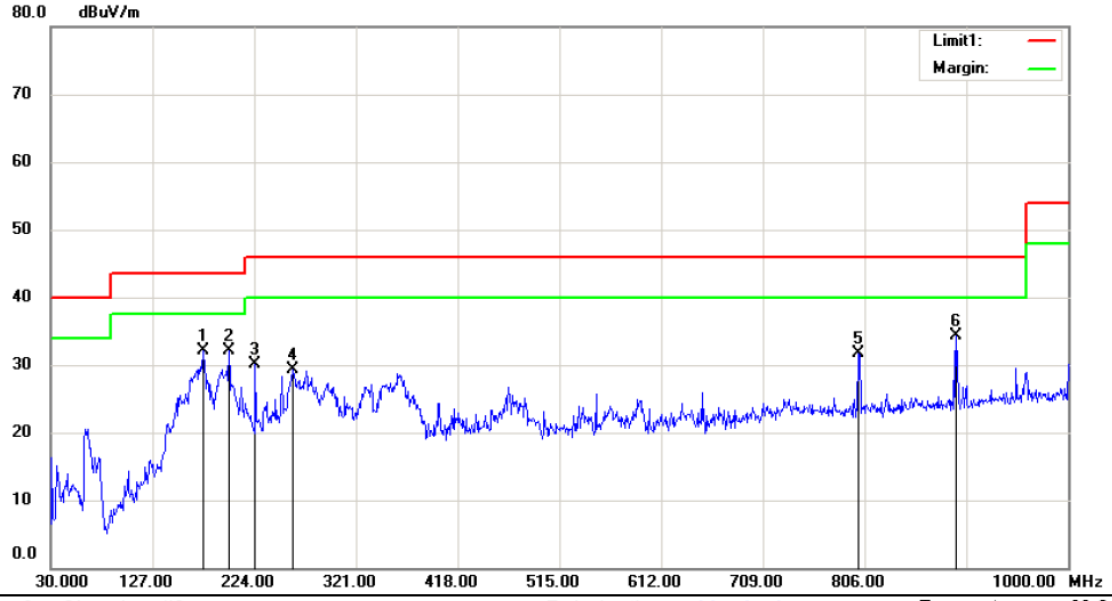
Limit: (RE)FCC PART 15 C Power: AC 120V/60Hz Humidity: 55 %

Mode:Wifi Tx(Low Channel)

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	64.9200	48.51	-16.01	32.50	40.00	-7.50	QP			
2		146.4000	50.71	-18.80	31.91	43.50	-11.59	QP			
3		164.8300	50.26	-17.71	32.55	43.50	-10.95	QP			
4		194.9000	46.96	-16.22	30.74	43.50	-12.76	QP			
5		533.4300	36.12	-6.74	29.38	46.00	-16.62	QP			
6		960.2300	32.25	0.24	32.49	54.00	-21.51	QP			

*:Maximum data x:Over limit !:over margin Operator: CSL



Site 3m Chamber #2 Polarization: *Vertical* Temperature: 22 C

Limit: (RE)FCC PART 15 C Power: AC 120V/60Hz Humidity: 55 %

Mode:Wifi Tx(Low Channel)

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	175.5000	49.20	-17.03	32.17	43.50	-11.33	QP			
2		199.7500	47.97	-15.89	32.08	43.50	-11.42	QP			
3		224.9700	44.28	-14.24	30.04	46.00	-15.96	QP			
4		260.8600	42.24	-12.91	29.33	46.00	-16.67	QP			
5		800.1800	33.60	-1.96	31.64	46.00	-14.36	QP			
6		893.3000	35.02	-0.64	34.38	46.00	-11.62	QP			

*:Maximum data x:Over limit !:over margin Operator: CSL

8.6 CONDUCTED EMISSIONS TEST

8.6.1 Applicable Standard

According to FCC Part 15.207(a)

8.6.2 Conformance Limit

Conducted Emission Limit		
Frequency(MHz)	Quasi-peak	Average
0.15-0.5	66-56	56-46
0.5-5.0	56	46
5.0-30.0	60	50
Note: 1. The lower limit shall apply at the transition frequencies 2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.		

8.6.3 Test Configuration

Test according to clause 7.3 conducted emission test setup

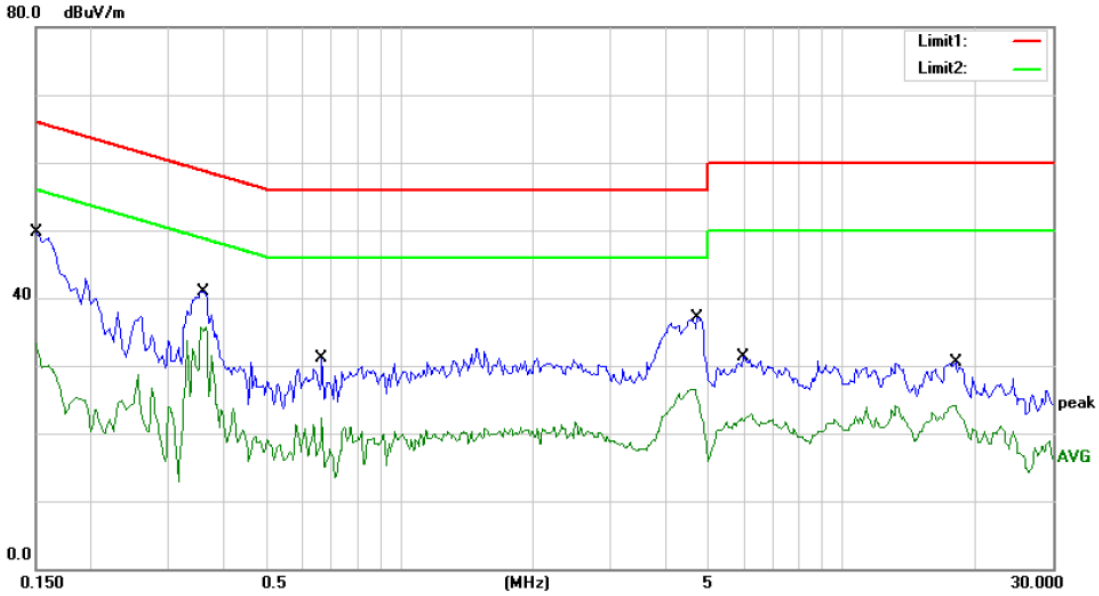
8.6.4 Test Procedure

The EUT was placed on a table which is 0.8m above ground plane.
Maximum procedure was performed on the highest emissions to ensure EUT compliance.
Repeat above procedures until all frequency measured were complete.

8.6.5 Test Results

Pass

All mode and the voltage 120V and 240V have been tested, and show the worst result(WIFI +BT ON) as bellow.



Site Conduction #1 Phase: *L1* Temperature: 22

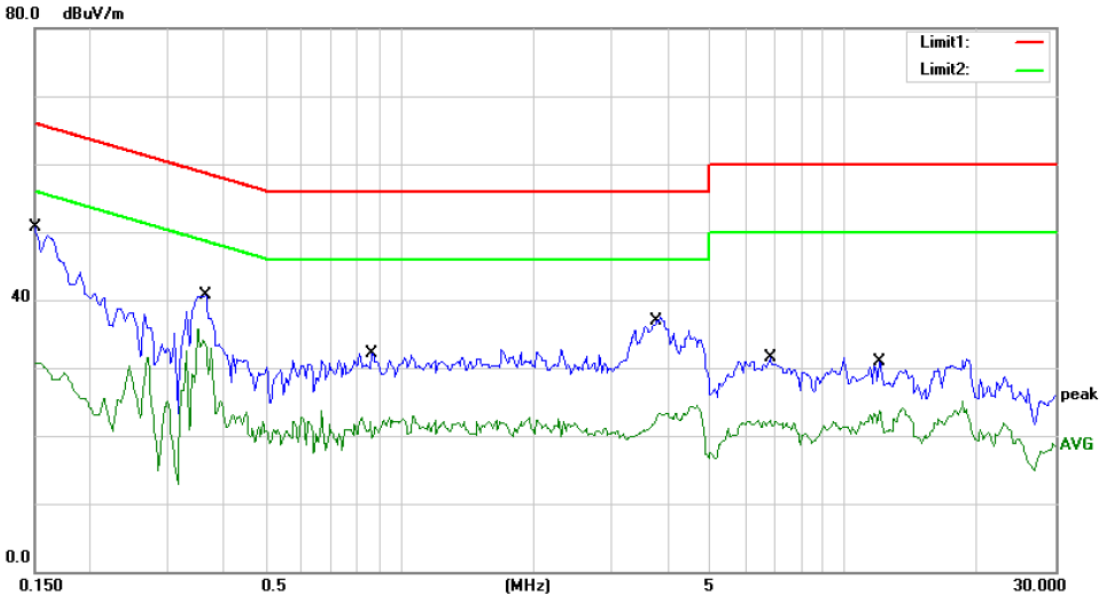
Limit: (CE)FCC PART 15 C Power: AC 120V/60Hz Humidity: 55 %

Mode: WIFI+BT ON

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		0.1500	49.74	0.00	49.74	66.00	-16.26	QP	
2		0.1500	33.28	0.00	33.28	56.00	-22.72	AVG	
3		0.3600	41.00	0.00	41.00	58.73	-17.73	QP	
4	*	0.3600	35.61	0.00	35.61	48.73	-13.12	AVG	
5		0.6650	31.10	0.00	31.10	56.00	-24.90	QP	
6		0.6650	22.33	0.00	22.33	46.00	-23.67	AVG	
7		4.7100	37.02	0.00	37.02	56.00	-18.98	QP	
8		4.7100	25.80	0.00	25.80	46.00	-20.20	AVG	
9		5.9900	31.22	0.00	31.22	60.00	-28.78	QP	
10		5.9900	22.98	0.00	22.98	50.00	-27.02	AVG	
11		18.0500	30.46	0.00	30.46	60.00	-29.54	QP	
12		18.0500	24.11	0.00	24.11	50.00	-25.89	AVG	

*:Maximum data x:Over limit !:over margin Comment: Factor build in receiver. Operator: Stan



Site Conduction #1 Phase: N Temperature: 22
Limit: (CE)FCC PART 15 C Power: AC 120V/60Hz Humidity: 55 %
Mode: WIFI+BT ON
Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		0.1500	50.78	0.00	50.78	66.00	-15.22	QP	
2		0.1500	30.71	0.00	30.71	56.00	-25.29	AVG	
3		0.3650	40.62	0.00	40.62	58.61	-17.99	QP	
4	*	0.3650	35.77	0.00	35.77	48.61	-12.84	AVG	
5		0.8650	32.15	0.00	32.15	56.00	-23.85	QP	
6		0.8650	22.65	0.00	22.65	46.00	-23.35	AVG	
7		3.7850	36.90	0.00	36.90	56.00	-19.10	QP	
8		3.7850	24.58	0.00	24.58	46.00	-21.42	AVG	
9		6.8200	31.48	0.00	31.48	60.00	-28.52	QP	
10		6.8200	22.30	0.00	22.30	50.00	-27.70	AVG	
11		12.0500	31.49	0.00	31.49	60.00	-28.51	QP	
12		12.0500	23.68	0.00	23.68	50.00	-26.32	AVG	

*:Maximum data x:Over limit !:over margin Comment: Factor build in receiver. Operator: Stan

8.7 ANTENNA APPLICATION

8.7.1 Antenna Requirement

Standard	Requirement
FCC CRF Part 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. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

For intentional device, according to FCC 47 CFR Section 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. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

8.7.2 Result

PASS.

The EUT has a FPC antenna for BT, the max gain is 2.57 dBi;
The EUT has two FPC antenna for WIFI 2.4 Band, the max gain is 2.57 dBi;
The EUT has two FPC antenna: for WIFI 5G Band I, the max gain is 3.01 dBi;
for WIFI 5G Band II, the max gain is 3.11 dBi;
for WIFI 5G Band III, the max gain is 3.34 dBi;

Note: ☒ Antenna use a permanently attached antenna which is not replaceable.
☐ Not using a standard antenna jack or electrical connector for antenna replacement
☐ The antenna has to be professionally installed (please provide method of installation)

which in accordance to section 15.203, please refer to the internal photos.