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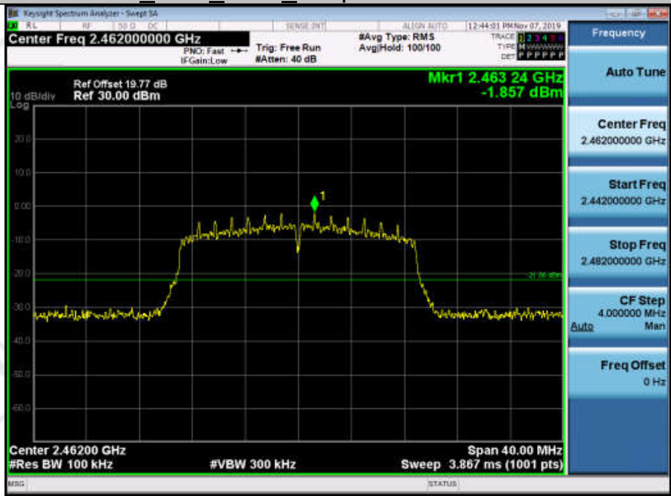
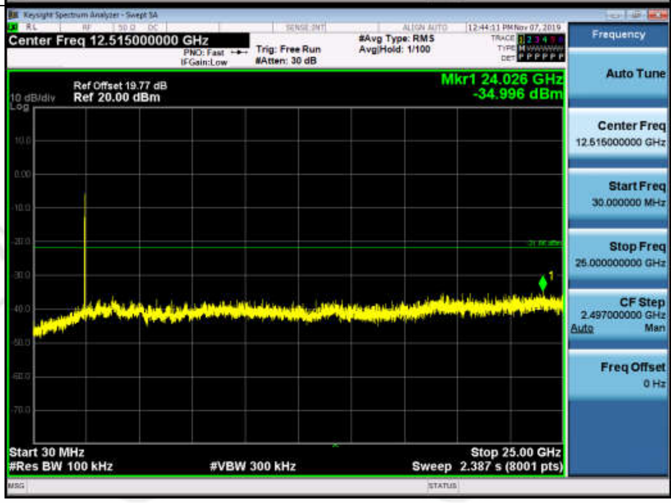
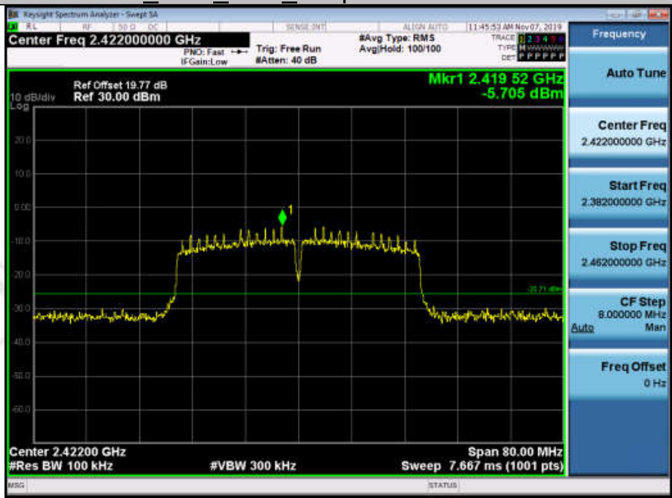
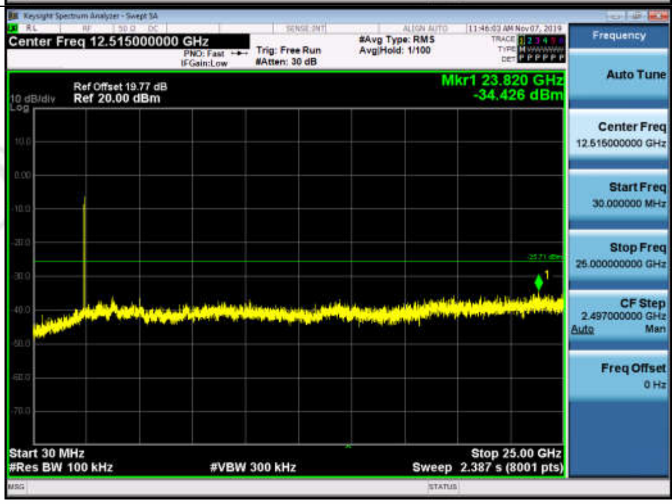
Pref/11N20SISO/HCH		
Puw/11N20SISO/HCH		

11N40SISO_Ant1_LCH_Graphs		
Pref/11N40SISO/LCH		
Puw/11N40SISO/LCH		

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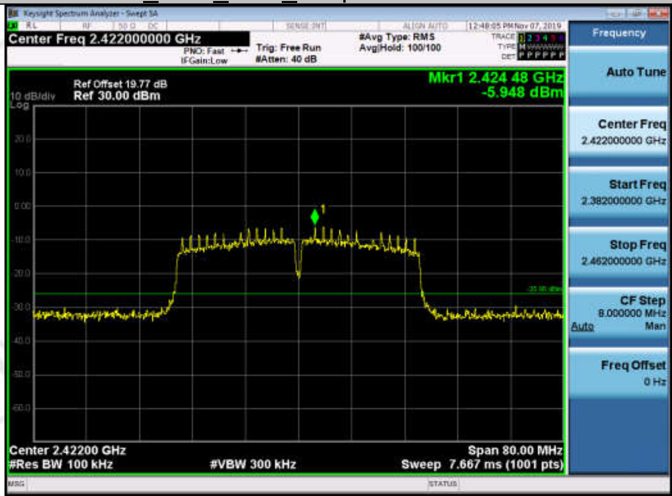
<tr><td>Pref/11N40SISO/LCH</td><td>
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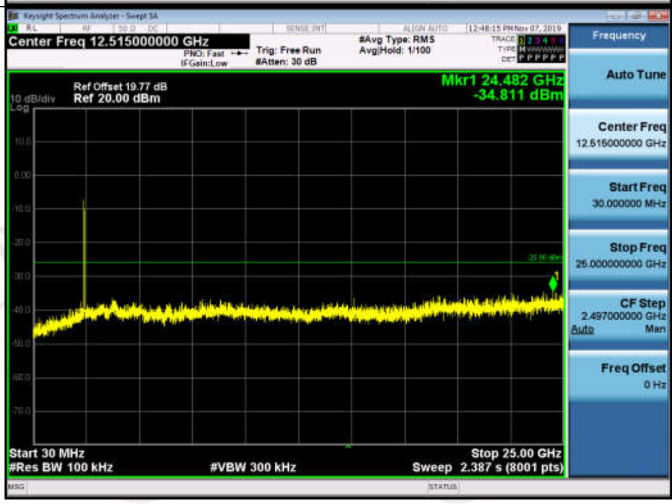
<tr><td>Puw/11N40SISO/LCH</td><td>
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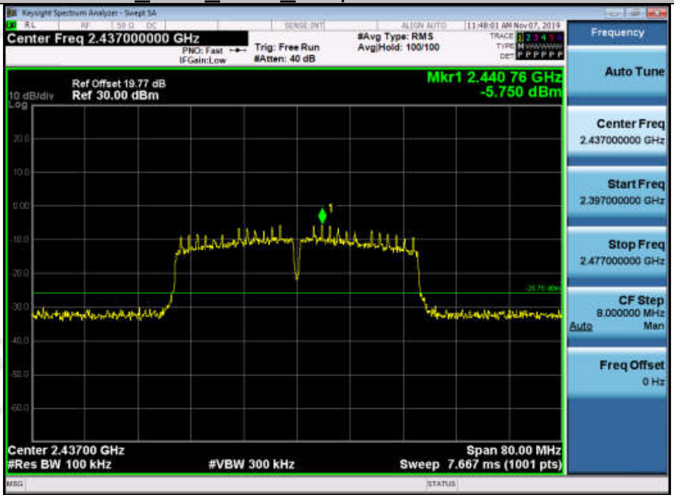
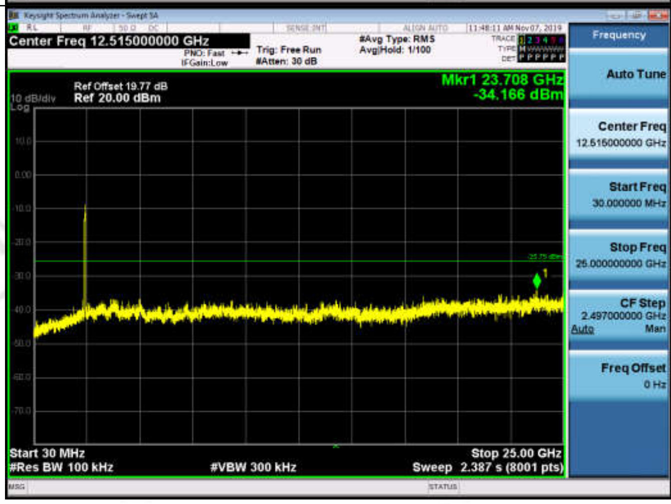
Pref/11N40SISO/MCH		
Puw/11N40SISO/MCH		

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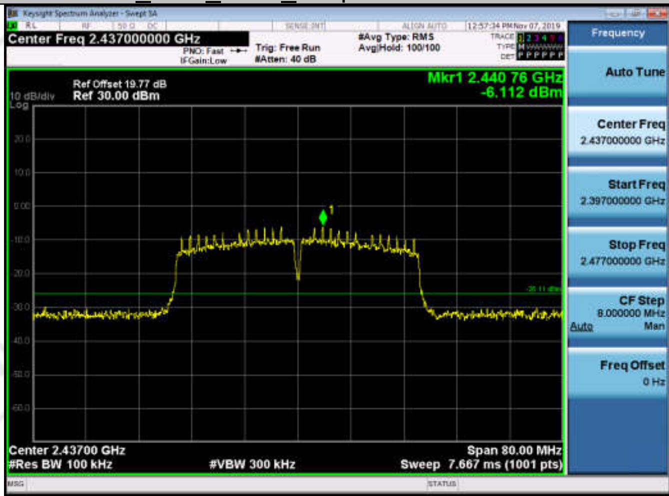
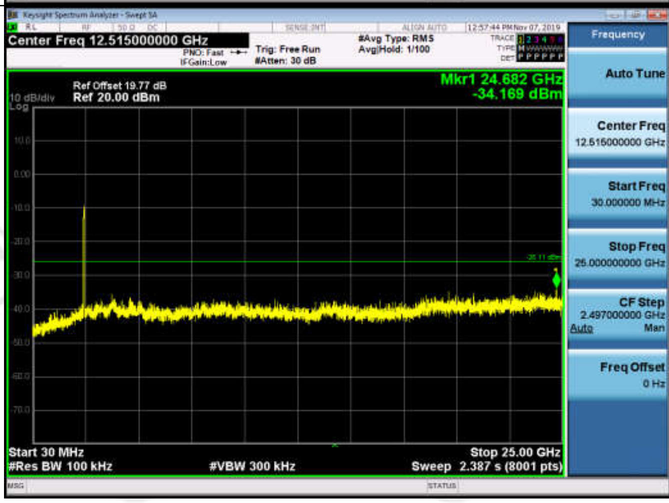
Pref/11N40SISO/MCH		
Puw/11N40SISO/MCH		

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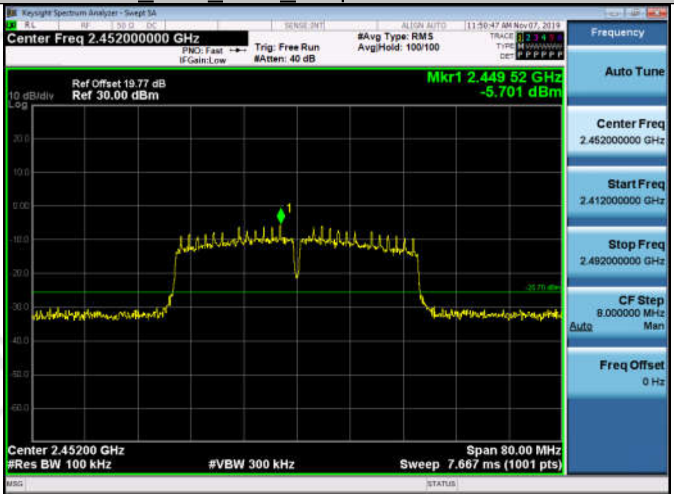
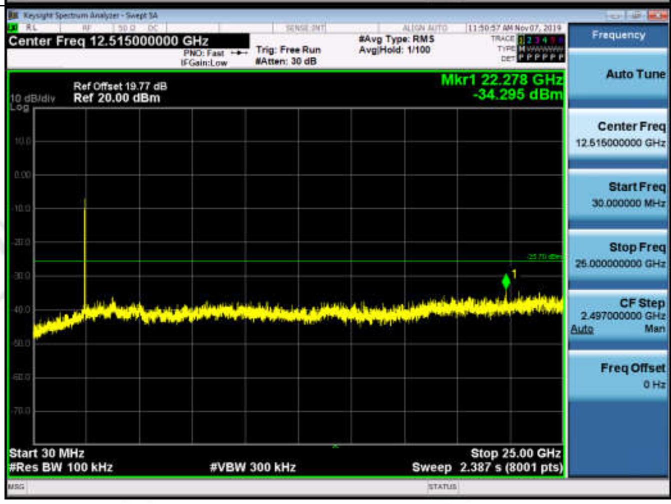
Pref/11N40SISO/HCH		
Puw/11N40SISO/HCH		

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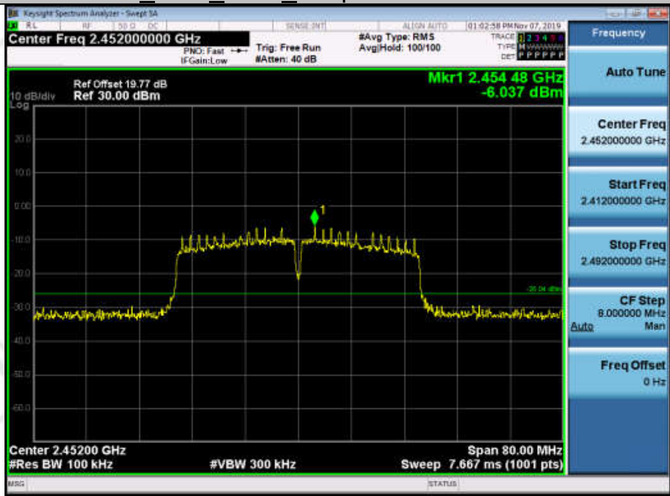
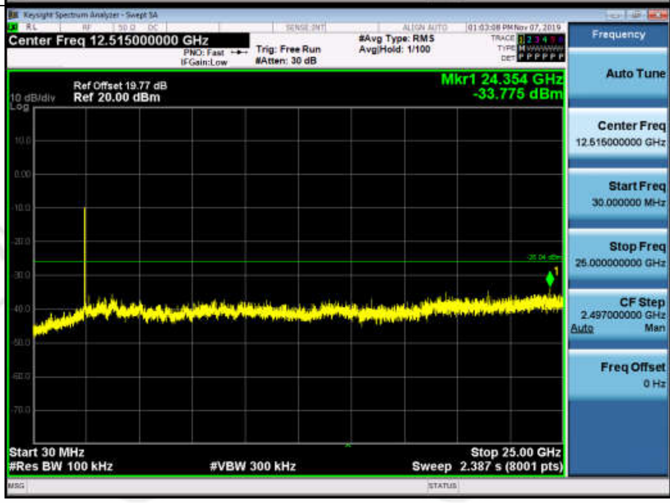
Pref/11N40SISO/HCH		
Puw/11N40SISO/HCH		

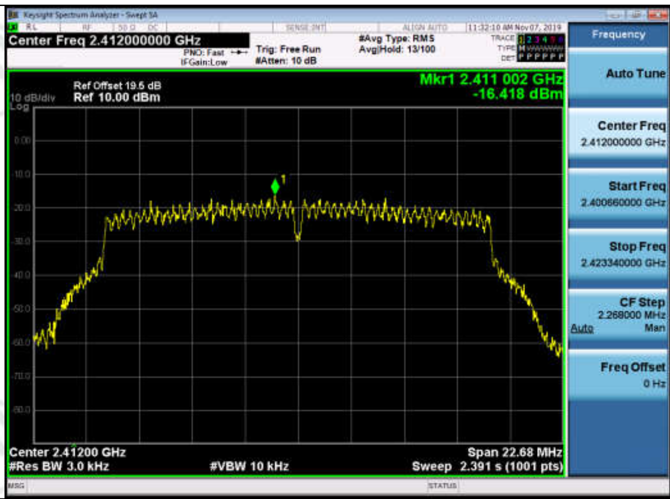
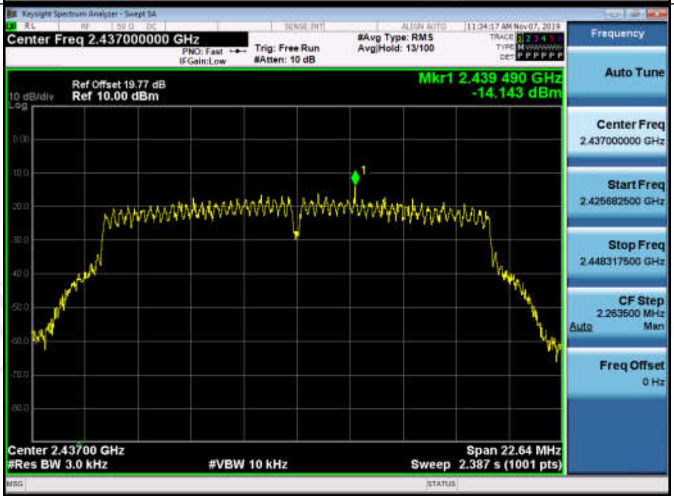
Appendix E): Power Spectral Density

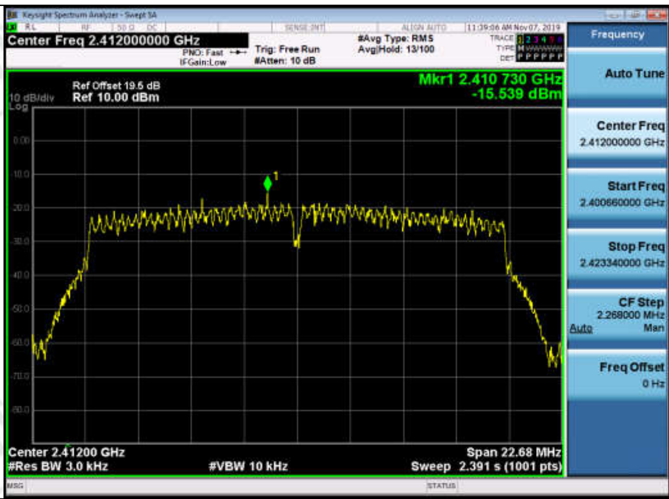
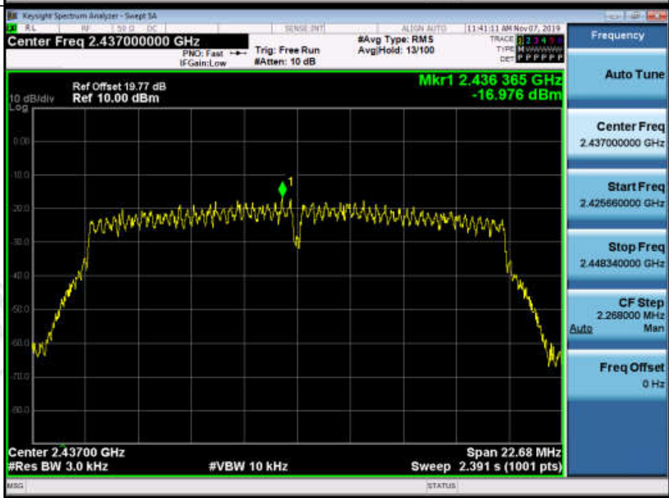
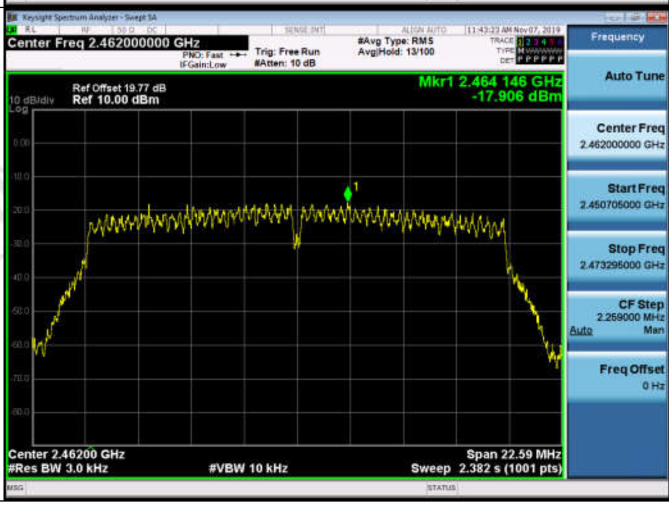
Result Table

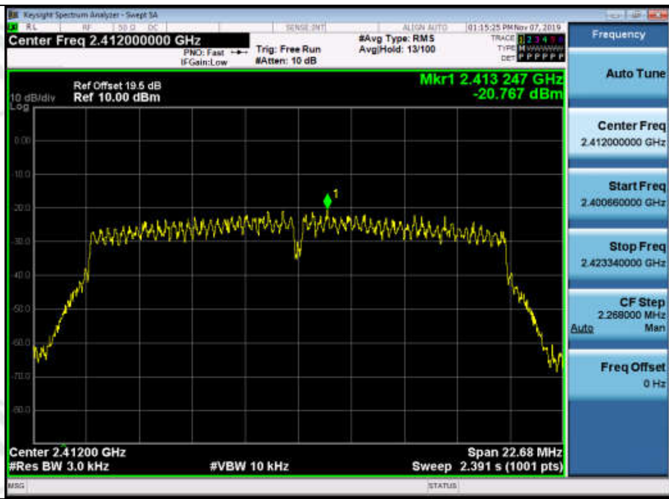
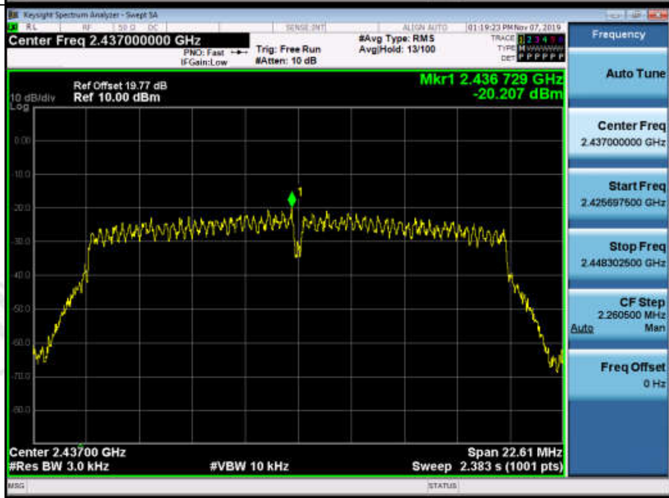
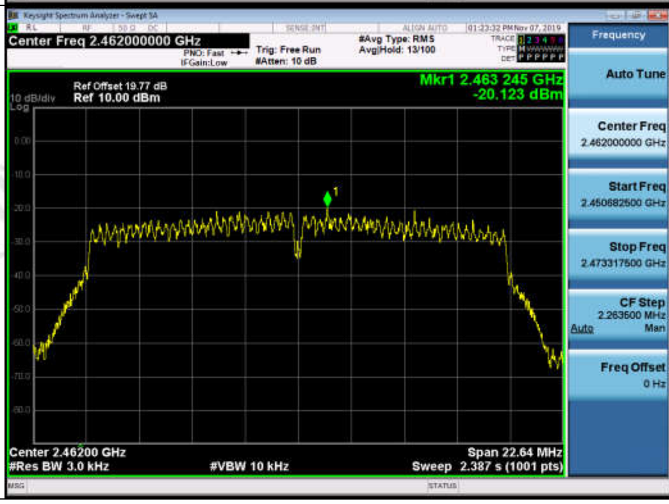
Mode	Antenna	Channel	Power Spectral Density [dBm/3kHz]	Verdict
11B	Ant1	LCH	-8.970	PASS
11B	Ant2	LCH	-10.133	PASS
11B	Ant1	MCH	-9.575	PASS
11B	Ant2	MCH	-9.788	PASS
11B	Ant1	HCH	-10.039	PASS
11B	Ant2	HCH	-9.956	PASS
11G	Ant1	LCH	-16.418	PASS
11G	Ant2	LCH	-15.068	PASS
11G	Ant1	MCH	-14.143	PASS
11G	Ant2	MCH	-14.289	PASS
11G	Ant1	HCH	-15.697	PASS
11G	Ant2	HCH	-16.502	PASS
11N20SISO	Ant1	LCH	-15.539	PASS
11N20SISO	Ant2	LCH	-17.219	PASS
11N20SISO	Ant1	MCH	-16.976	PASS
11N20SISO	Ant2	MCH	-16.861	PASS
11N20SISO	Ant1	HCH	-17.906	PASS
11N20SISO	Ant2	HCH	-17.931	PASS
11N20MIMO	Ant1	LCH	-20.767	PASS
11N20MIMO	Ant2	LCH	-16.927	PASS
11N20MIMO	Ant1+2	LCH	-15.43	PASS
11N20MIMO	Ant1	MCH	-20.207	PASS
11N20MIMO	Ant2	MCH	-19.365	PASS
11N20MIMO	Ant1+2	MCH	-16.76	PASS
11N20MIMO	Ant1	HCH	-20.123	PASS
11N20MIMO	Ant2	HCH	-16.088	PASS
11N20MIMO	Ant1+2	HCH	-14.64	PASS
11N40SISO	Ant1	LCH	-21.300	PASS
11N40SISO	Ant2	LCH	-21.635	PASS
11N40SISO	Ant1	MCH	-20.939	PASS
11N40SISO	Ant2	MCH	-21.643	PASS
11N40SISO	Ant1	HCH	-20.920	PASS
11N40SISO	Ant2	HCH	-21.622	PASS
11N40MIMO	Ant1	LCH	-24.778	PASS
11N40MIMO	Ant2	LCH	-23.668	PASS
11N40MIMO	Ant1+2	LCH	-21.18	PASS
11N40MIMO	Ant1	MCH	-24.712	PASS
11N40MIMO	Ant2	MCH	-24.579	PASS
11N40MIMO	Ant1+2	MCH	-21.63	PASS
11N40MIMO	Ant1	HCH	-24.775	PASS
11N40MIMO	Ant2	HCH	-23.751	PASS
11N40MIMO	Ant1+2	HCH	-21.22	PASS

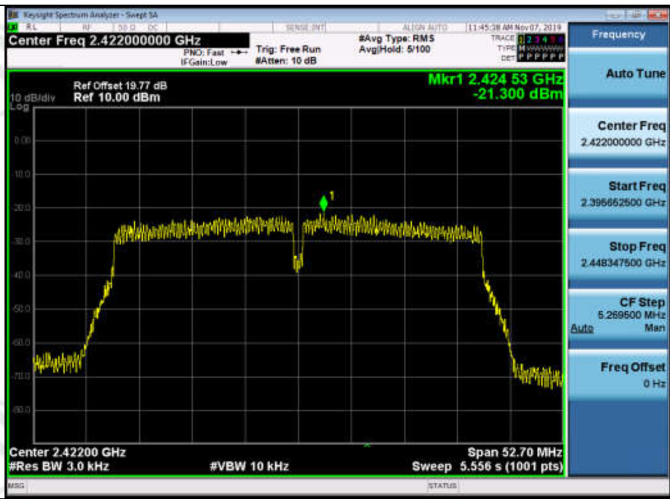
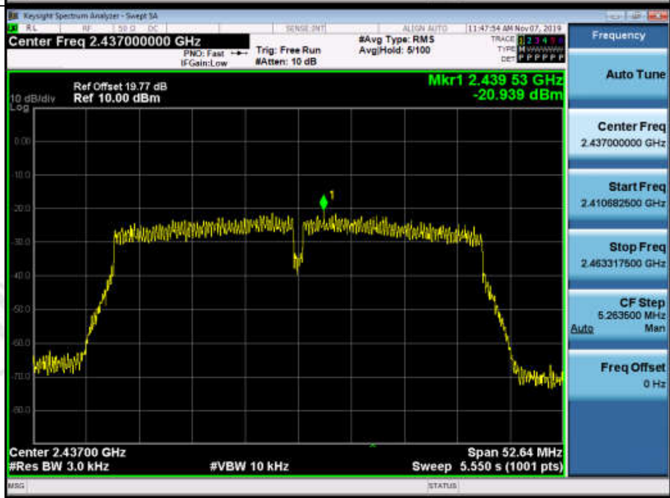
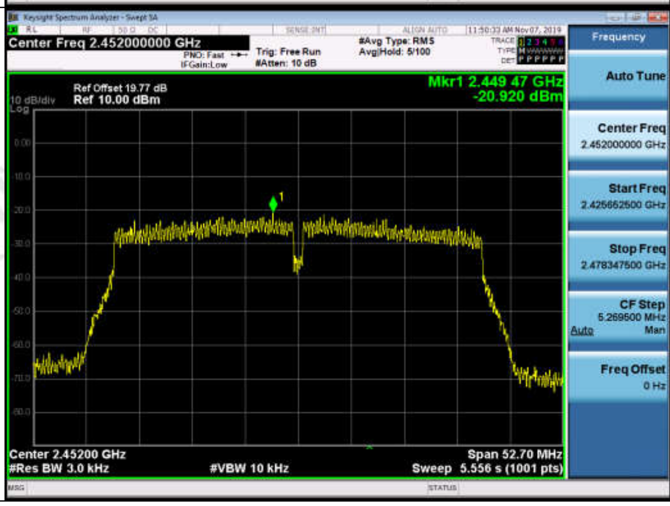
Test Graph

Graphs_Ant1		
11B/LCH		
11B/MCH		
11B/HCH		

11G/LCH	
11G/MCH	
11G/HCH	

11N20SISO/LCH		
11N20SISO/MCH		
11N20SISO/HCH		

11N20MIMO/LCH	
11N20MIMO/MCH	
11N20MIMO/HCH	

11N40SISO/LCH	
11N40SISO/MCH	
11N40SISO/HCH	

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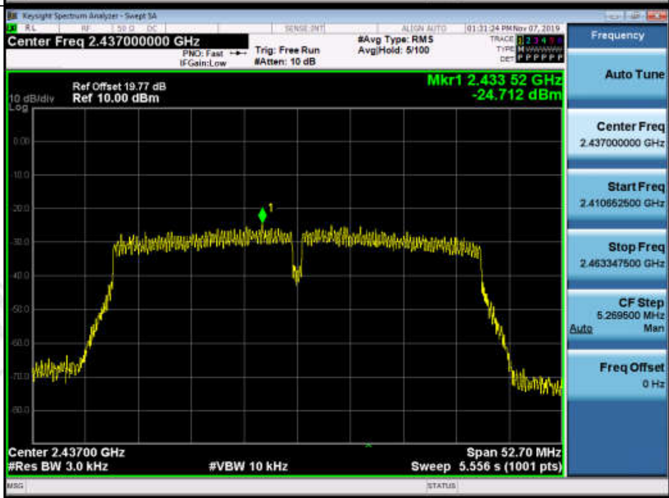
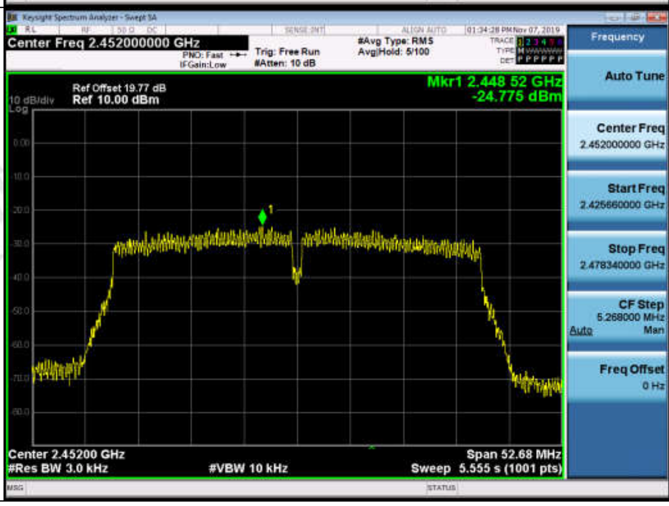
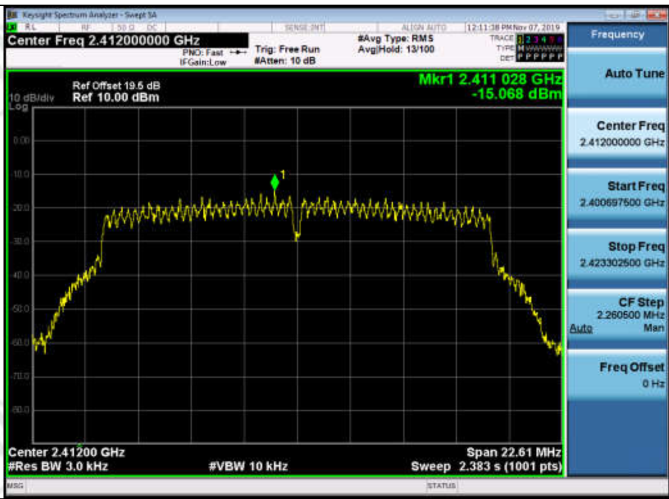
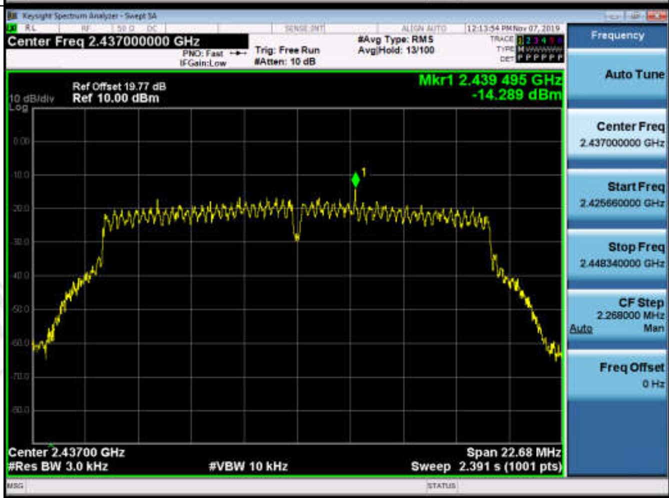
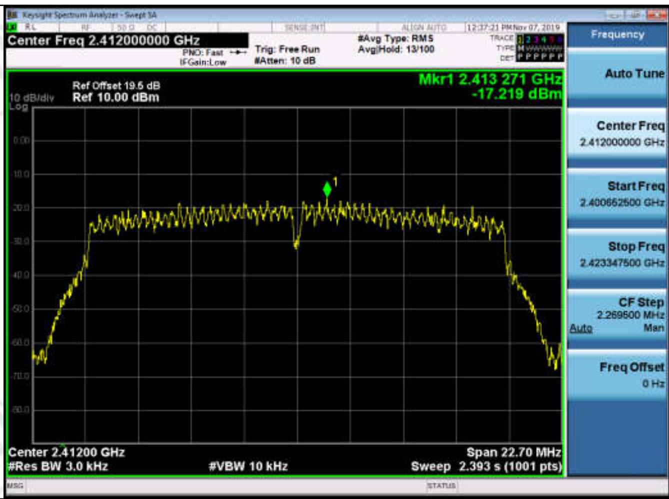
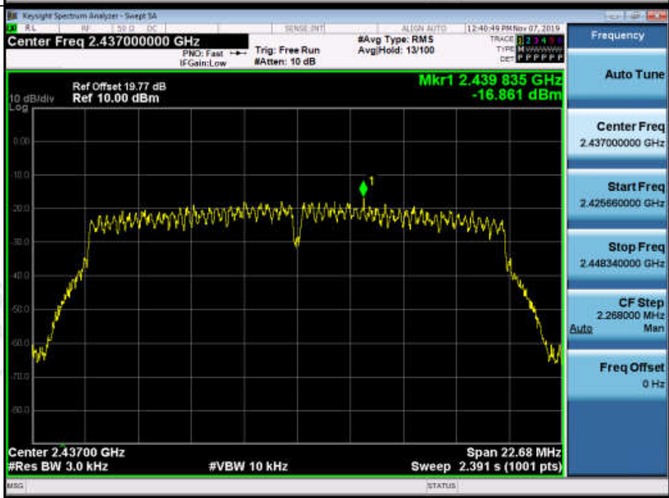
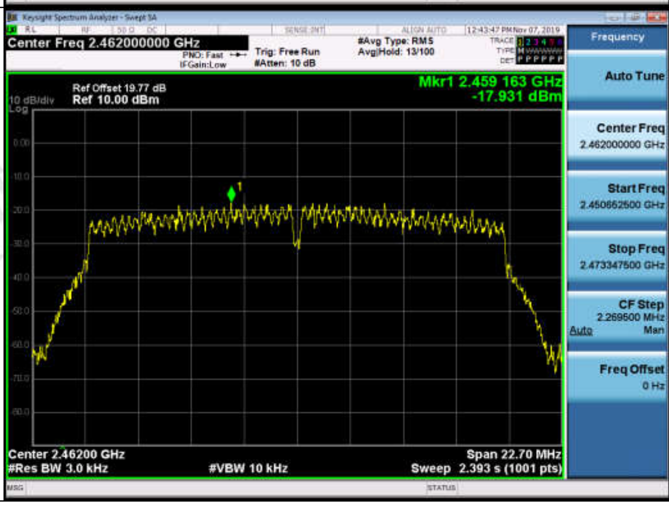
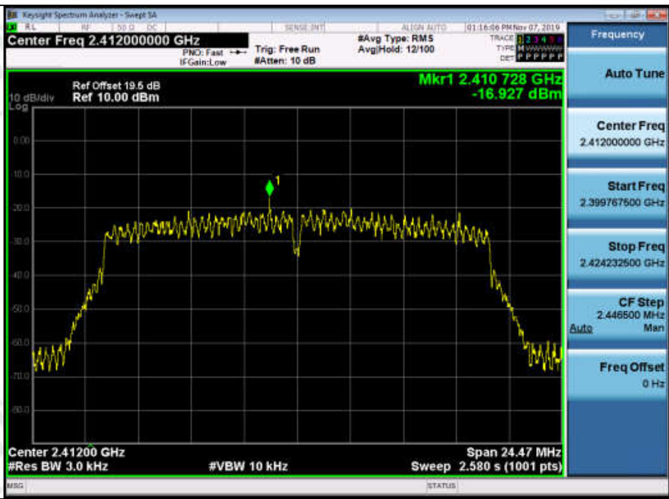
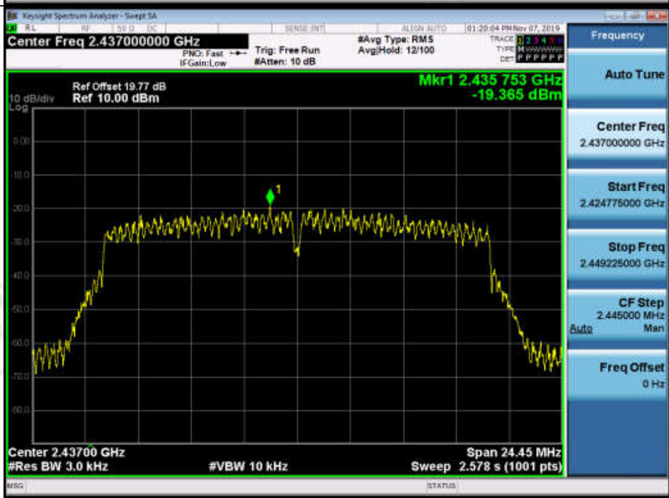
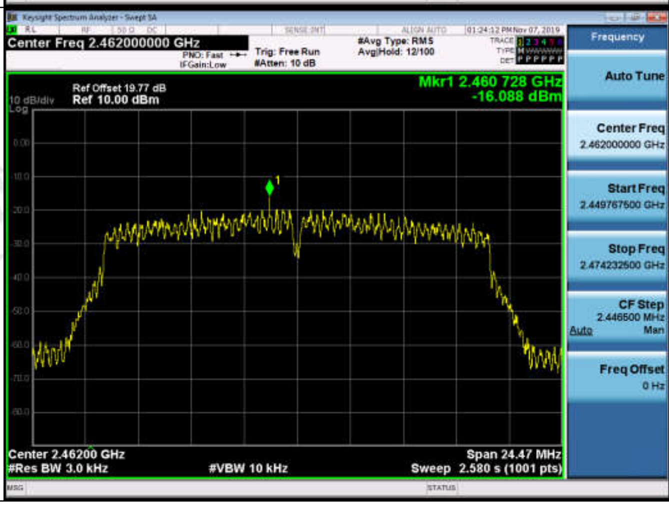
11N40MIMO/MCH		
11N40MIMO/HCH		

Graphs_Ant2		
11B/LCH		
11B/MCH		
11B/HCH		

11G/LCH		
11G/MCH		
11G/HCH		

11N20SISO/LCH			
11N20SISO/MCH			
11N20SISO/HCH			

11N20MIMO/LCH		
11N20MIMO/MCH		
11N20MIMO/HCH		

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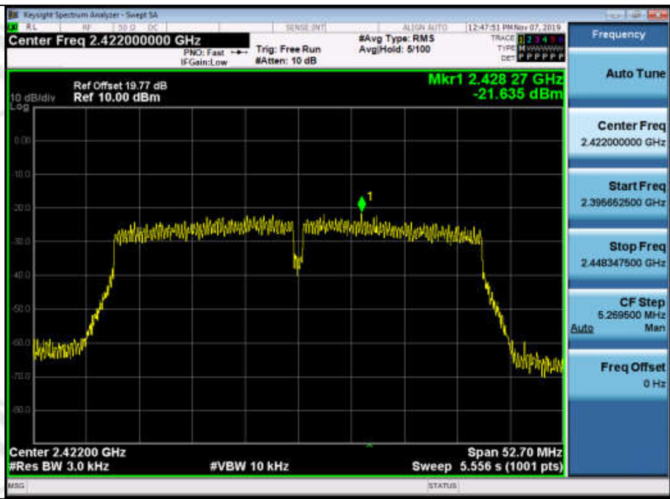
<tr><td>11N40SISO/LCH</td><td></td><td>
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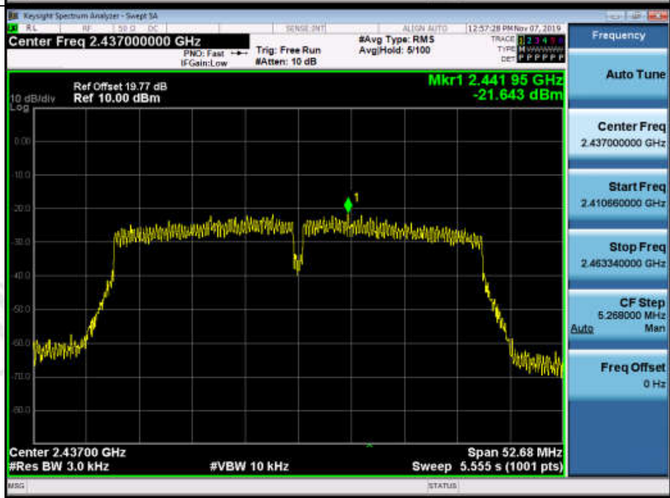
<tr><td>11N40SISO/MCH</td><td></td><td>
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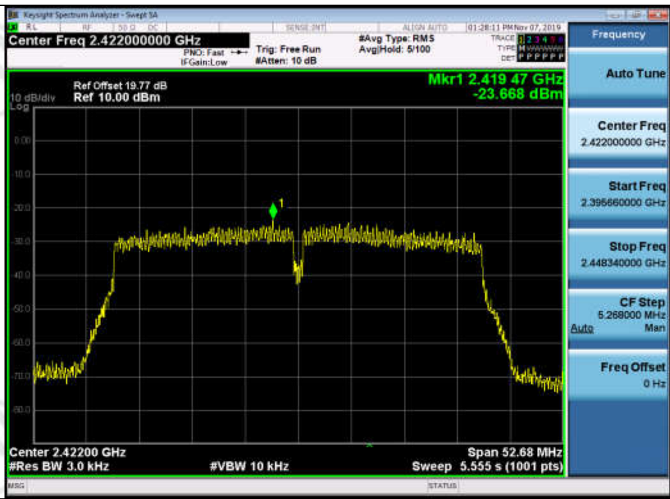
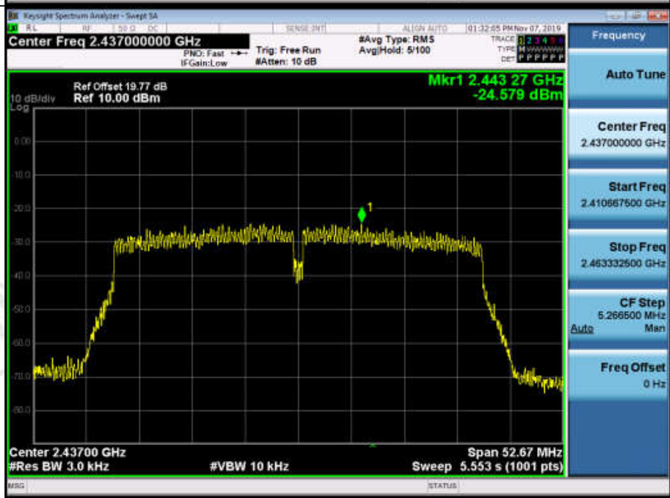
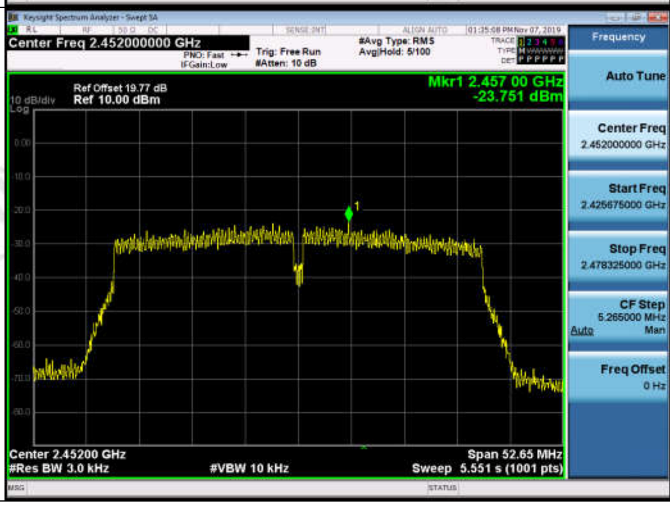
11N40MIMO/LCH		
11N40MIMO/MCH		
11N40MIMO/HCH		

Appendix F): Antenna Requirement

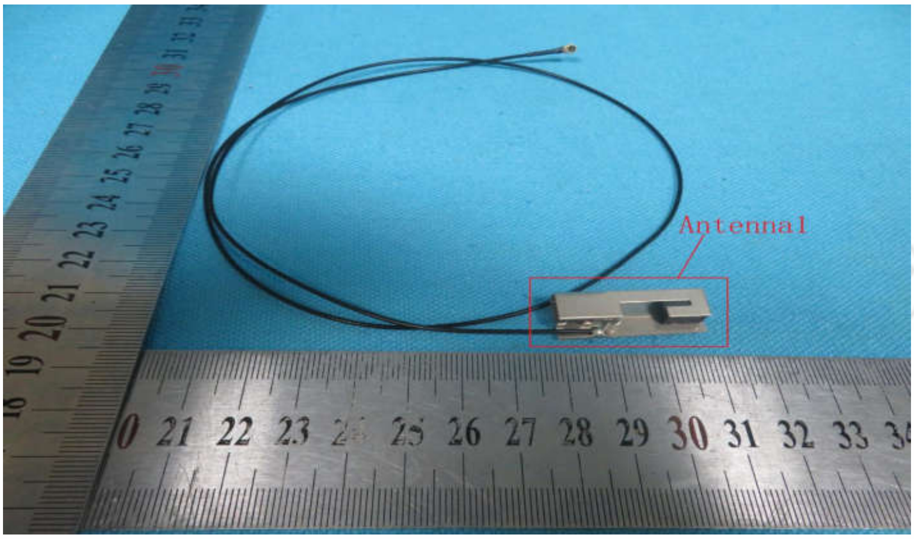
15.203 requirement:

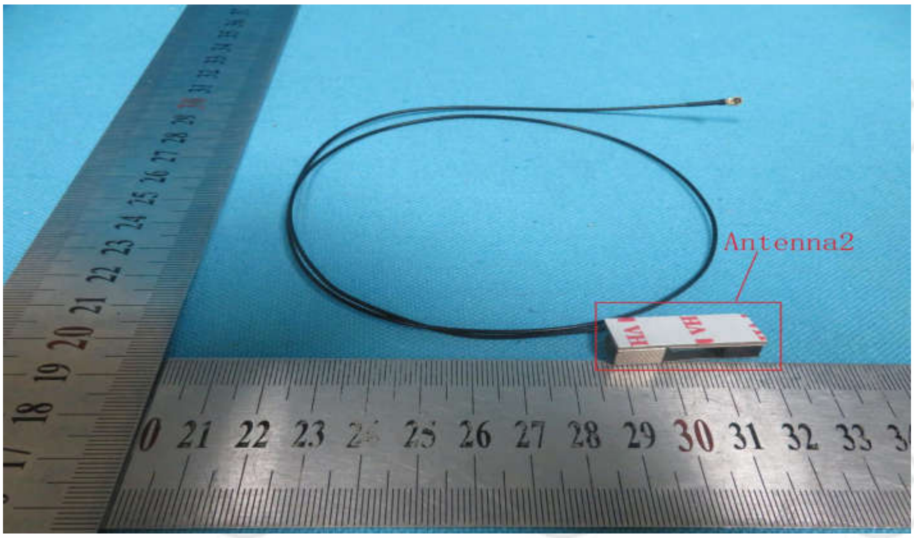
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

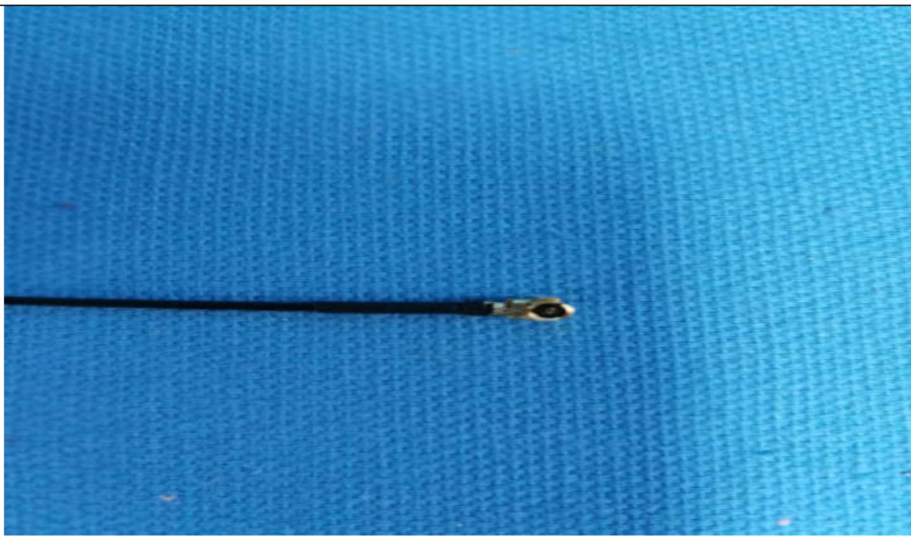
15.247(b) (4) requirement:

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

EUT Antenna:







Appendix G): AC Power Line Conducted Emission

<table>
<tr><td>Test Procedure:</td><td>Test frequency range :150KHz-30MHz
1)The mains terminal disturbance voltage test was conducted in a shielded room.
2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.
3)The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,
4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.
5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.</td></tr>
<tr><td>Limit:</td><td>
<table>
<tr><td rowspan="2">Frequency range (MHz)</td><td colspan="2">Limit (dBμV)</td></tr>
<tr><td>Quasi-peak</td><td>Average</td></tr>
<tr><td>0.15-0.5</td><td>66 to 56*</td><td>56 to 46*</td></tr>
<tr><td>0.5-5</td><td>56</td><td>46</td></tr>
<tr><td>5-30</td><td>60</td><td>50</td></tr>
</table>
* The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.
NOTE : The lower limit is applicable at the transition frequency</td></tr>
</table>

Measurement Data

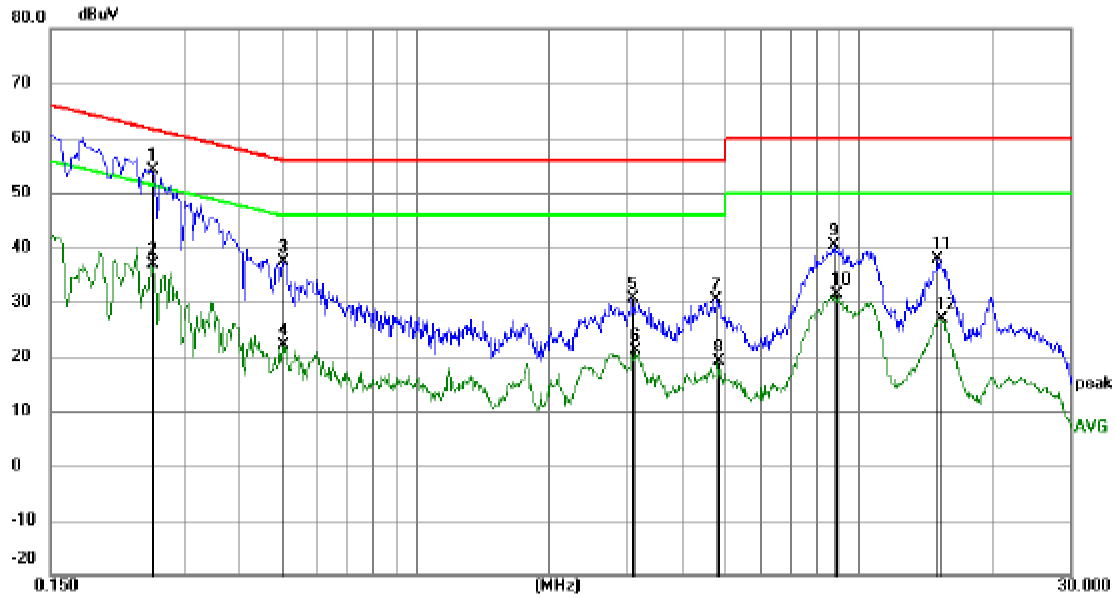
An initial pre-scan was performed on the live and neutral lines with peak detector.

Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

Product : WIFI Module **Model/Type reference** : W5LM2001

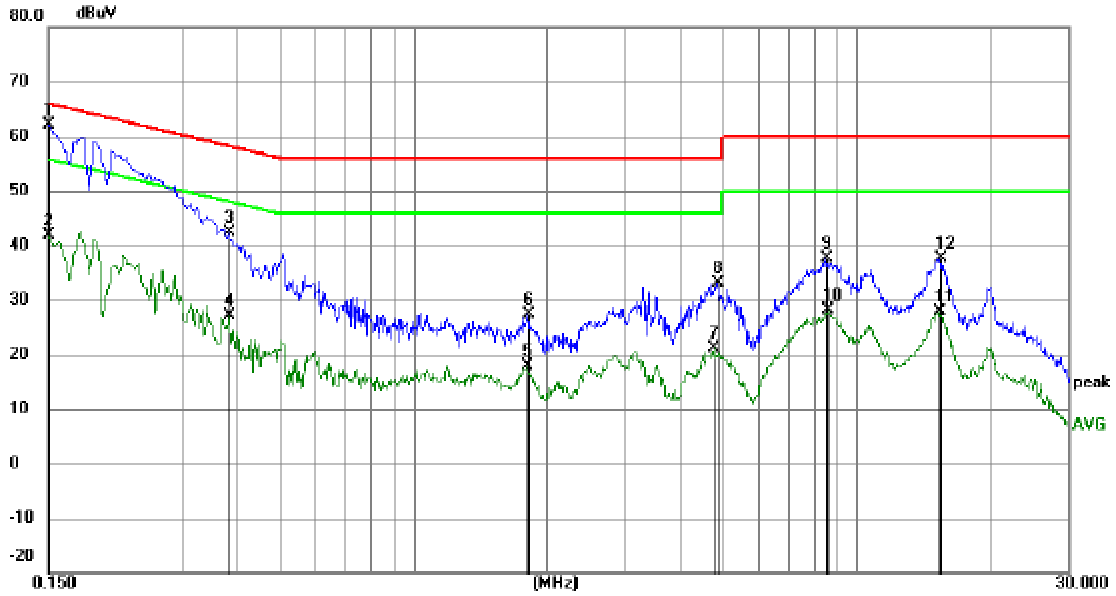
Temperature : 24℃ **Humidity** : 52%

Live line:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	0.2535	43.96	10.06	54.02	61.64	-7.62	QP	
2		0.2535	26.80	10.06	36.86	51.64	-14.78	AVG	
3		0.5010	27.41	10.00	37.41	56.00	-18.59	QP	
4		0.5010	12.20	10.00	22.20	46.00	-23.80	AVG	
5		3.0750	20.75	9.83	30.58	56.00	-25.42	QP	
6		3.1245	11.21	9.83	21.04	46.00	-24.96	AVG	
7		4.7715	20.51	9.83	30.34	56.00	-25.66	QP	
8		4.7985	9.21	9.83	19.04	46.00	-26.96	AVG	
9		8.7944	30.49	9.92	40.41	60.00	-19.59	QP	
10		8.8890	21.40	9.92	31.32	50.00	-18.68	AVG	
11		15.0630	27.91	9.98	37.89	60.00	-22.11	QP	
12		15.3150	17.00	9.98	26.98	50.00	-23.02	AVG	

Neutral line:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	0.1500	52.26	9.97	62.23	66.00	-3.77	QP	
2		0.1500	31.93	9.97	41.90	56.00	-14.10	AVG	
3		0.3840	32.24	10.02	42.26	58.19	-15.93	QP	
4		0.3840	17.19	10.02	27.21	48.19	-20.98	AVG	
5		1.8015	8.13	9.85	17.98	46.00	-28.02	AVG	
6		1.8105	17.54	9.85	27.39	56.00	-28.61	QP	
7		4.7490	11.42	9.83	21.25	46.00	-24.75	AVG	
8		4.8300	23.33	9.83	33.16	56.00	-22.84	QP	
9		8.5155	27.75	9.91	37.66	60.00	-22.34	QP	
10		8.6100	18.27	9.91	28.18	50.00	-21.82	AVG	
11		15.3510	17.88	9.98	27.86	50.00	-22.14	AVG	
12		15.4140	27.53	9.98	37.51	60.00	-22.49	QP	

Notes:

1. The following Quasi-Peak and Average measurements were performed on the EUT:
2. Final Test Level =Receiver Reading + LISN Factor + Cable Loss.

Appendix H): Restricted bands around fundamental frequency (Radiated)

Receiver Setup:

Frequency	Detector	RBW	VBW	Remark
30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak
Above 1GHz	Peak	1MHz	3MHz	Peak
	Peak	1MHz	10Hz	Average

Test Procedure:

Below 1GHz test procedure as below:

Test method Refer as KDB 558074 D01

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable was turned from 0 degrees to 360 degrees to find the maximum reading.
e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
f. Place a marker at the end of the restricted band closest to the transmit frequency to show compliance. Also measure any emissions in the restricted bands. Save the spectrum analyzer plot. Repeat for each power and modulation for lowest and highest channel

Above 1GHz test procedure as below:

g. Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber change form table 0.8 meter to 1.5 meter(Above 18GHz the distance is 1 meter and table is 1.5 meter).
h. Test the EUT in the lowest channel , the Highest channel
i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is worse case.
j. Repeat above procedures until all frequencies measured was complete.

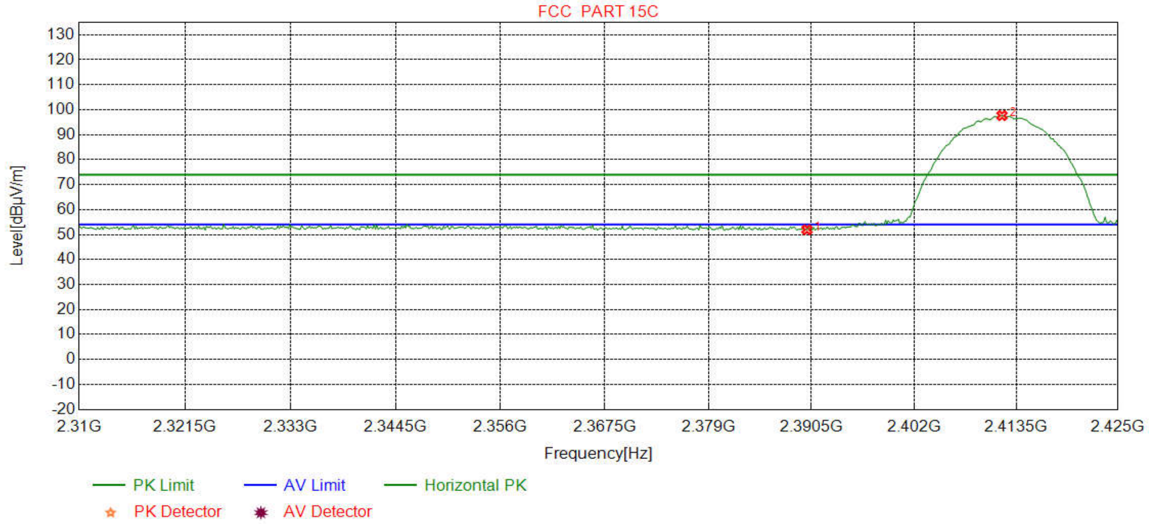
Limit:

Frequency	Limit (dBμV/m @3m)	Remark
30MHz-88MHz	40.0	Quasi-peak Value
88MHz-216MHz	43.5	Quasi-peak Value
216MHz-960MHz	46.0	Quasi-peak Value
960MHz-1GHz	54.0	Quasi-peak Value
Above 1GHz	54.0	Average Value
	74.0	Peak Value

Test plot as follows:
Ant 1:

Mode:	802.11 b(11Mbps) Transmitting	Channel:	2412
Remark:	PK		

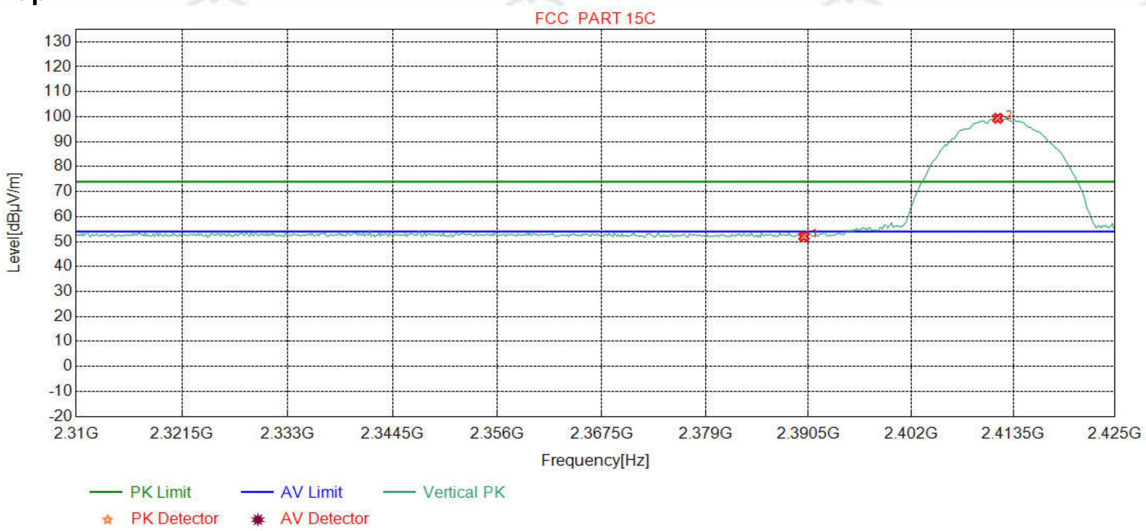
Test Graph



NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity
1	2390.0000	32.25	13.37	-42.44	48.76	51.94	74.00	22.06	Pass	Horizontal
2	2411.9024	32.28	13.35	-42.43	94.45	97.65	74.00	-23.65	Pass	Horizontal

Mode:	802.11 b(11Mbps) Transmitting	Channel:	2412
Remark:	PK		

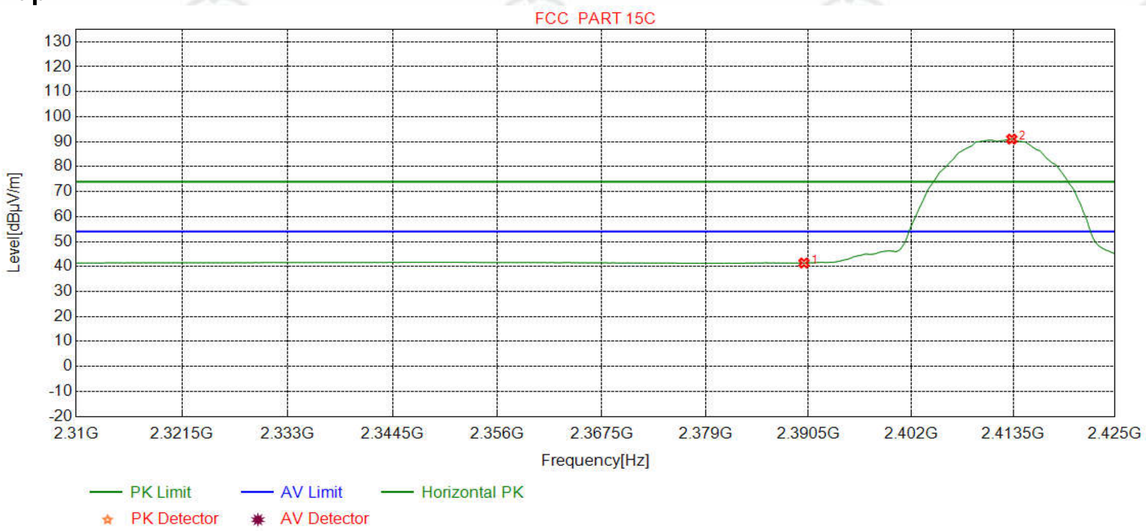
Test Graph



NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity
1	2390.0000	32.25	13.37	-42.44	48.88	52.06	74.00	21.94	Pass	Vertical
2	2411.7584	32.28	13.35	-42.43	96.17	99.37	74.00	-25.37	Pass	Vertical

Mode:	802.11 b(11Mbps) Transmitting	Channel:	2412
Remark:	AV		

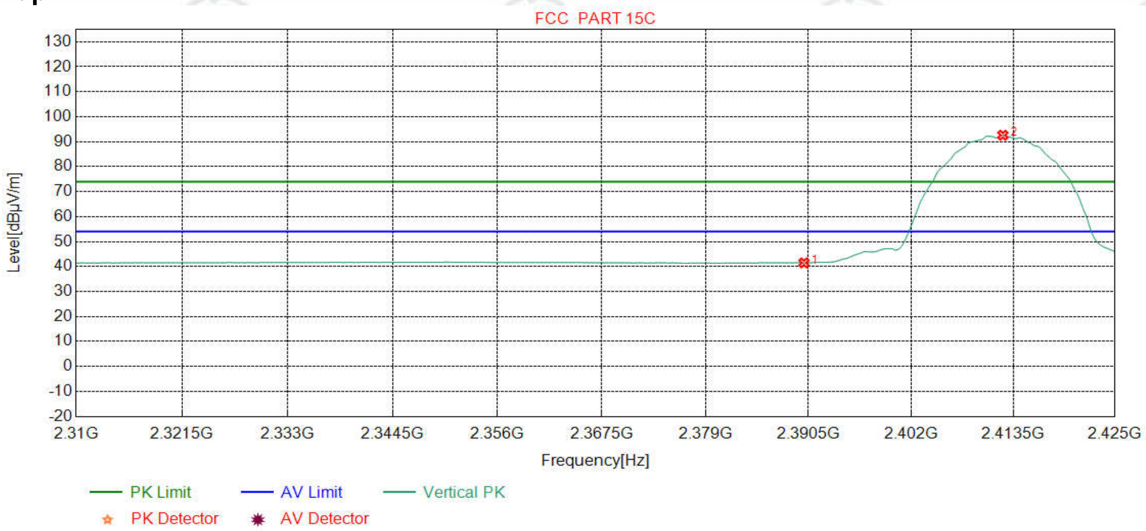
Test Graph



NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity
1	2390.0000	32.25	13.37	-42.44	38.23	41.41	54.00	12.59	Pass	Horizontal
2	2413.3417	32.28	13.36	-42.43	87.82	91.03	54.00	-37.03	Pass	Horizontal

Mode:	802.11 b(11Mbps) Transmitting	Channel:	2412
Remark:	AV		

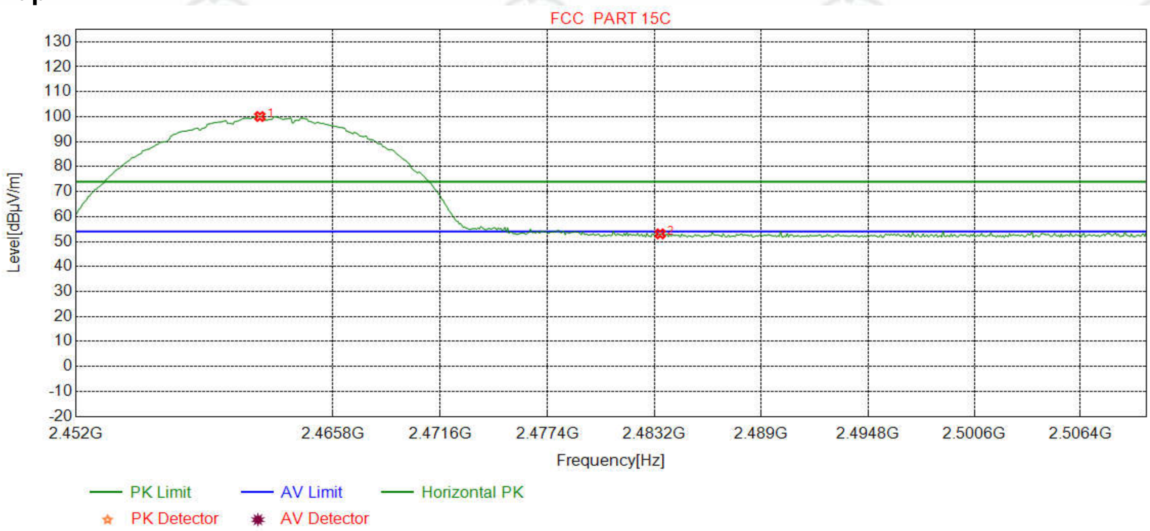
Test Graph



NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBµV]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Result	Polarity
1	2390.0000	32.25	13.37	-42.44	38.28	41.46	54.00	12.54	Pass	Vertical
2	2412.3342	32.28	13.36	-42.43	89.38	92.59	54.00	-38.59	Pass	Vertical

Mode:	802.11 b(11Mbps) Transmitting	Channel:	2462
Remark:	PK		

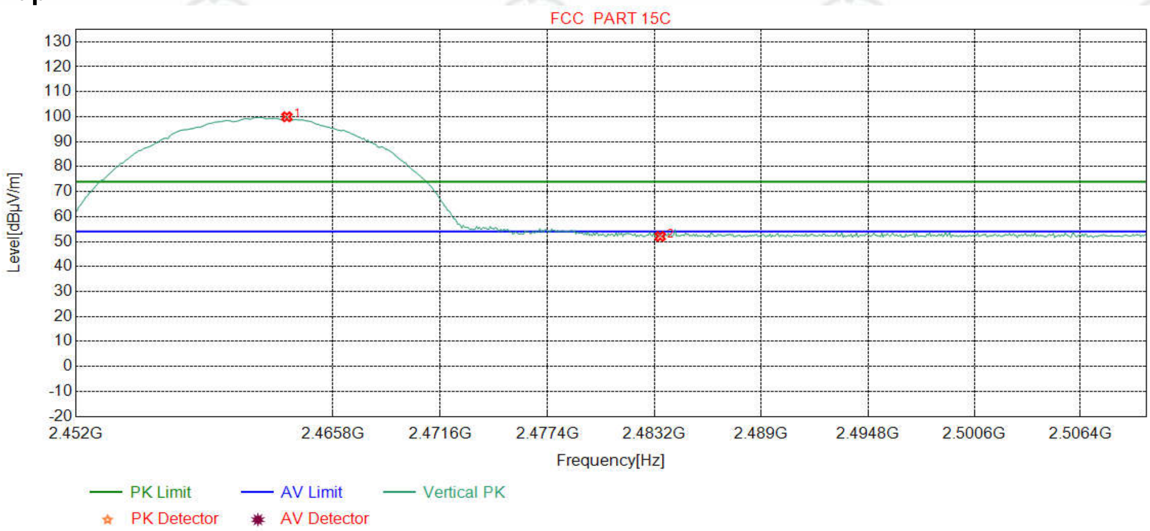
Test Graph



NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBµV]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Result	Polarity
1	2461.8723	32.35	13.48	-42.41	96.65	100.07	74.00	-26.07	Pass	Horizontal
2	2483.5000	32.38	13.38	-42.40	49.73	53.09	74.00	20.91	Pass	Horizontal

Mode:	802.11 b(11Mbps) Transmitting	Channel:	2462
Remark:	PK		

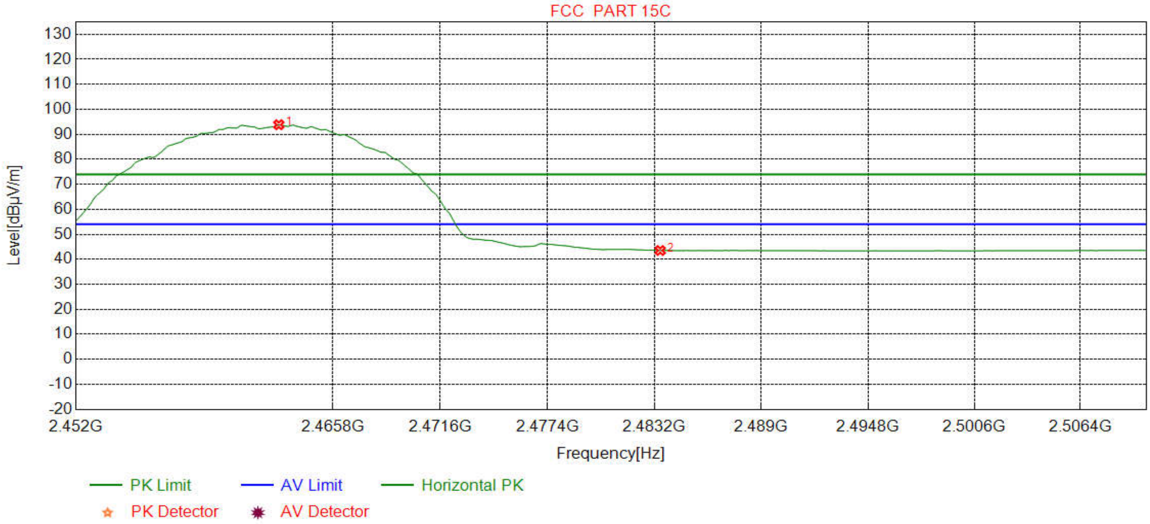
Test Graph



NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity
1	2463.3242	32.35	13.47	-42.41	96.55	99.96	74.00	-25.96	Pass	Vertical
2	2483.5000	32.38	13.38	-42.40	48.69	52.05	74.00	21.95	Pass	Vertical

Mode:	802.11 b(11Mbps) Transmitting	Channel:	2462
Remark:	AV		

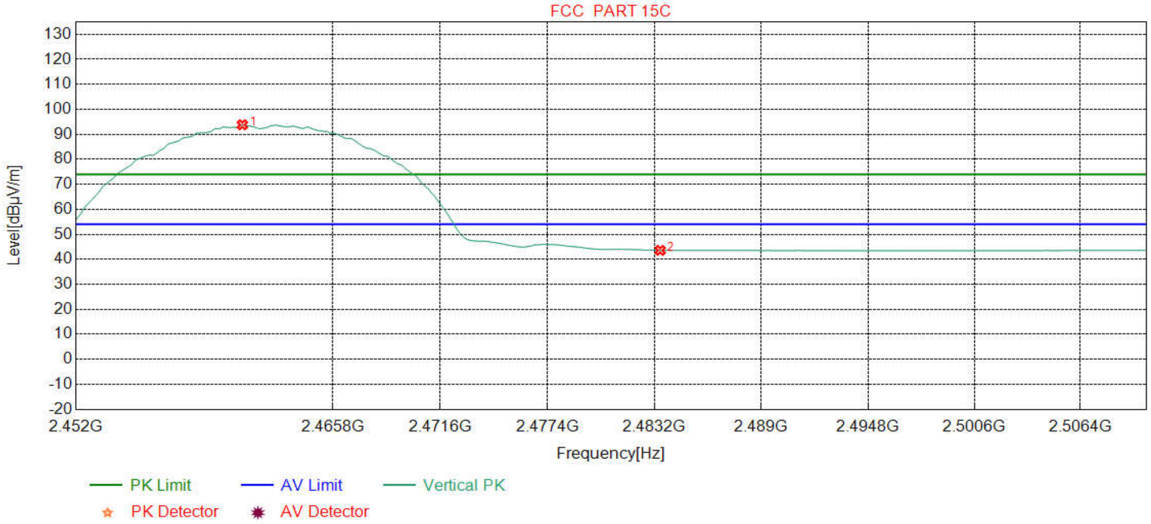
Test Graph



NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBµV]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Result	Polarity
1	2462.8886	32.35	13.47	-42.41	90.42	93.83	54.00	-39.83	Pass	Horizontal
2	2483.5000	32.38	13.38	-42.40	40.16	43.52	54.00	10.48	Pass	Horizontal

Mode:	802.11 b(11Mbps) Transmitting	Channel:	2462
Remark:	AV		

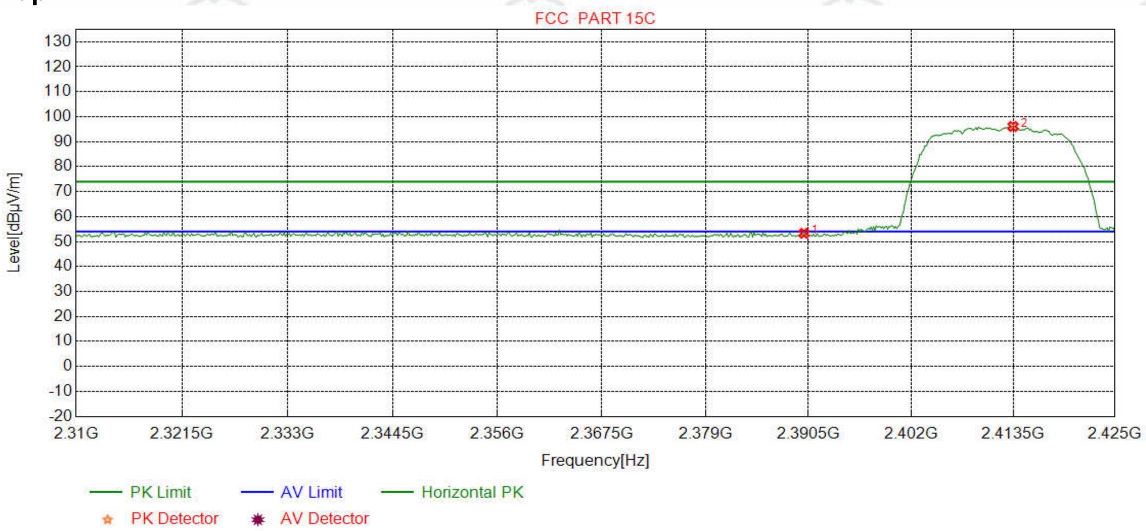
Test Graph



NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBµV]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Result	Polarity
1	2460.9287	32.35	13.48	-42.41	90.39	93.81	54.00	-39.81	Pass	Vertical
2	2483.5000	32.38	13.38	-42.40	40.21	43.57	54.00	10.43	Pass	Vertical

Mode:	802.11 g(6Mbps) Transmitting	Channel:	2412
Remark:	PK		

Test Graph



NO	Freq. [MHz]	Ant Factor [dB]	Cable loss [dB]	Pream gain [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity
1	2390.0000	32.25	13.37	-42.44	50.11	53.29	74.00	20.71	Pass	Horizontal
2	2413.4856	32.28	13.36	-42.43	92.88	96.09	74.00	-22.09	Pass	Horizontal