

- ☒ Undesirable radiated Spurious Emission in band edge

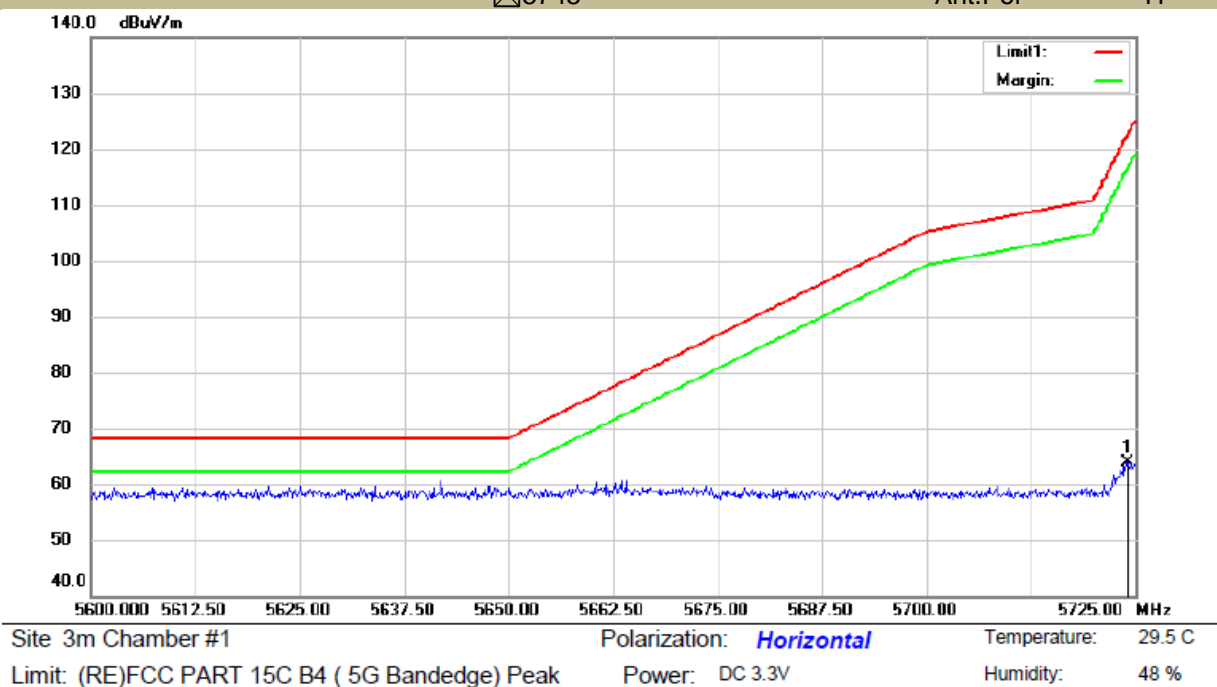
Antenna 1:

Test mode:		802.11n(HT20)		Frequency:		5745	
Freq. (MHz)	Ant.Pol. H/V	Field Strength (RBW=100KHz) (dBuV/m)	E.I.R.P (dBm)	Limit (dBm)	Verdict		
5724.05	H	63.86	-31.37	27	PASS		
5724.96	V	64.27	-30.96	27	PASS		

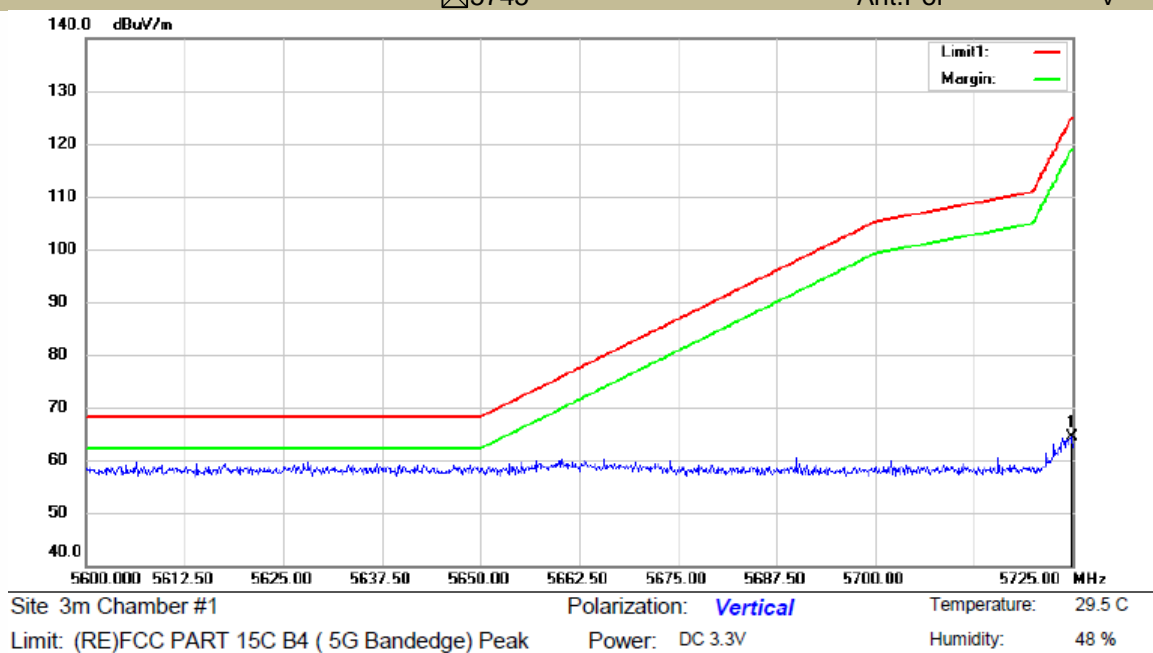
Test mode:		802.11n(HT20)		Frequency:		5825	
Freq. (MHz)	Ant.Pol. H/V	Field Strength (RBW=100KHz) (dBuV/m)	E.I.R.P (dBm)	Limit (dBm)	Verdict		
5852.01	V	59.73	-35.50	27	PASS		
5855.97	H	59.67	-35.56	27	PASS		

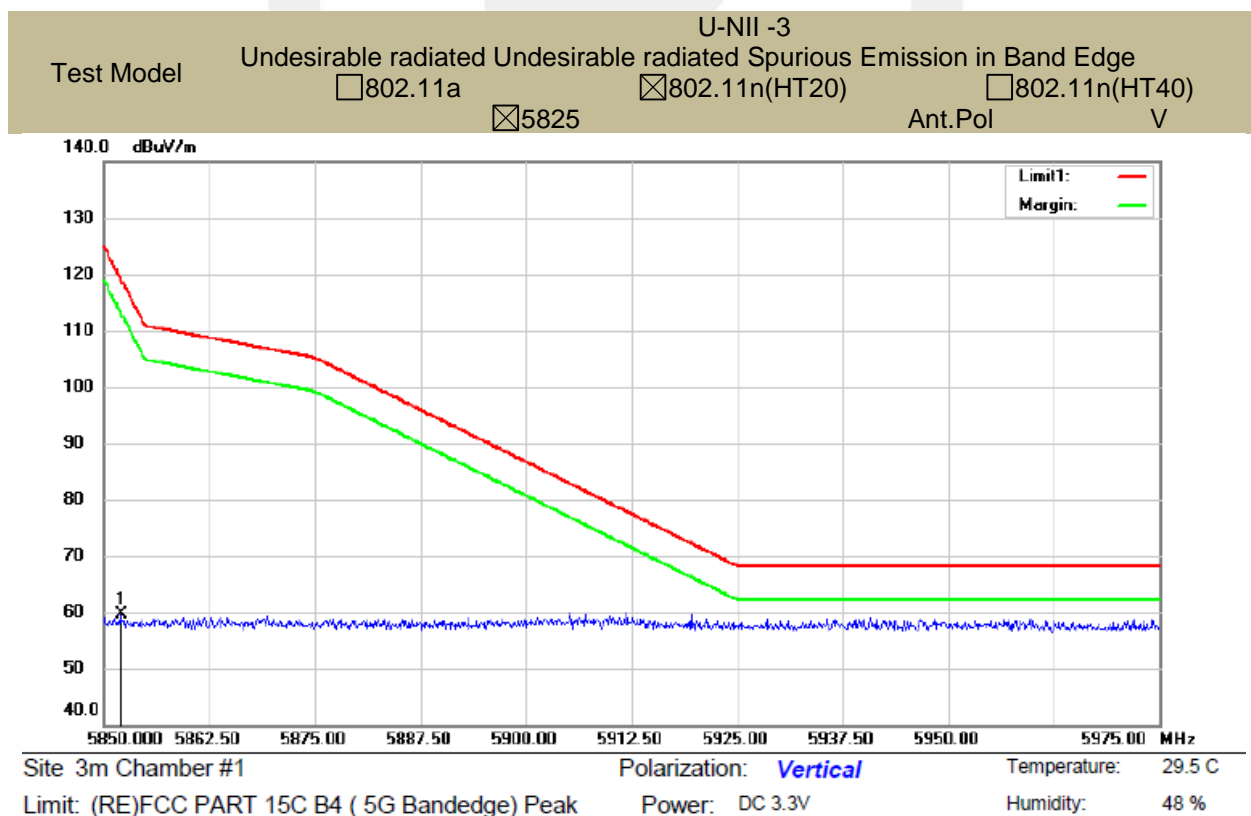
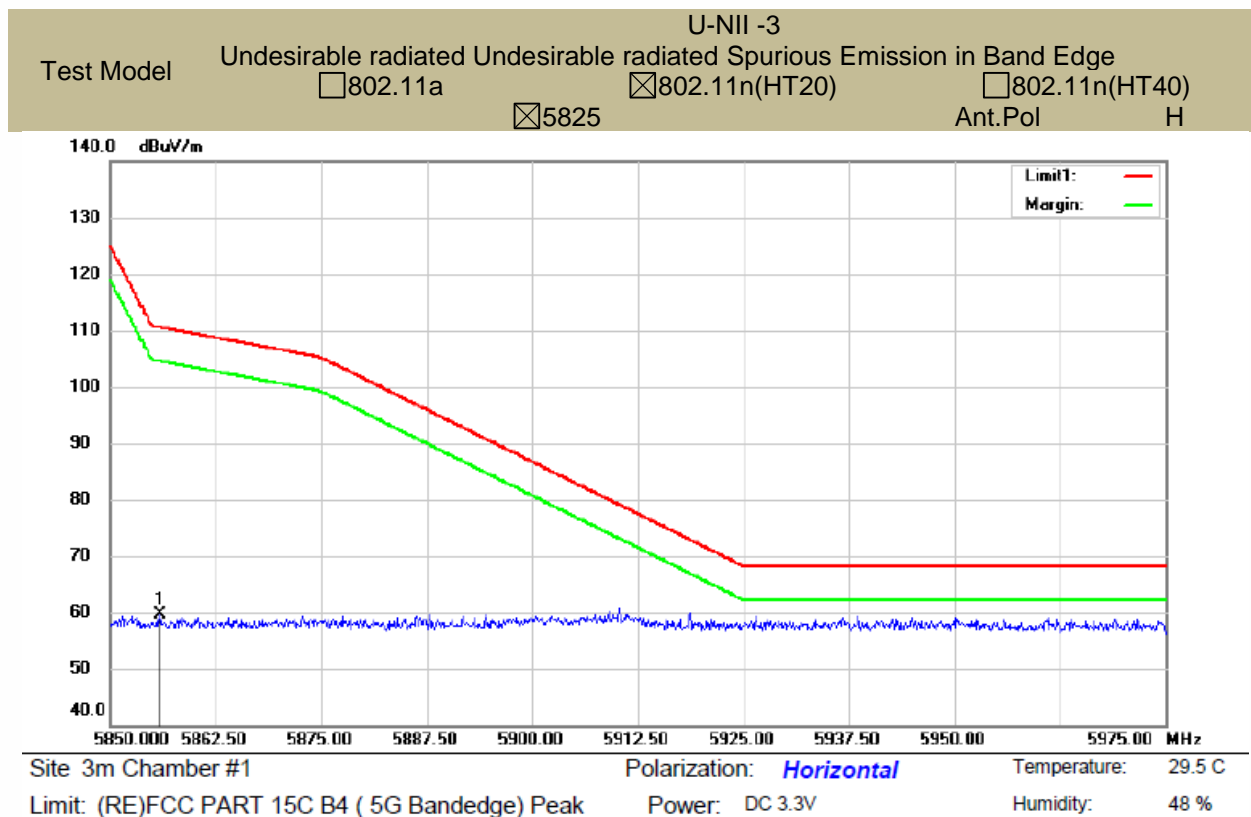
Note: (1) All Readings are Peak Value (VBW=3MHz) and AV Value (VBW=10Hz).
 (2) Emission Level= Reading Level+Probe Factor +Cable Loss.
 (3) $EIRP[dBm] = E[dBuV/m] + 20 \log(d[meters]) - 104.77$
 d is the measurement distance in 3 meters

U-NII -3			
Test Model	Undesirable radiated	Undesirable radiated	Spurious Emission in Band Edge
	<input type="checkbox"/> 802.11a	<input checked="" type="checkbox"/> 802.11n(HT20)	<input type="checkbox"/> 802.11n(HT40)
		<input checked="" type="checkbox"/> 5745	
			Ant.Pol H



U-NII -3			
Test Model	Undesirable radiated	Undesirable radiated	Spurious Emission in Band Edge
	<input type="checkbox"/> 802.11a	<input checked="" type="checkbox"/> 802.11n(HT20)	<input type="checkbox"/> 802.11n(HT40)
		<input checked="" type="checkbox"/> 5745	
			Ant.Pol V





Antenna 2:

Test mode: 802.11n(HT20) Frequency: 5745

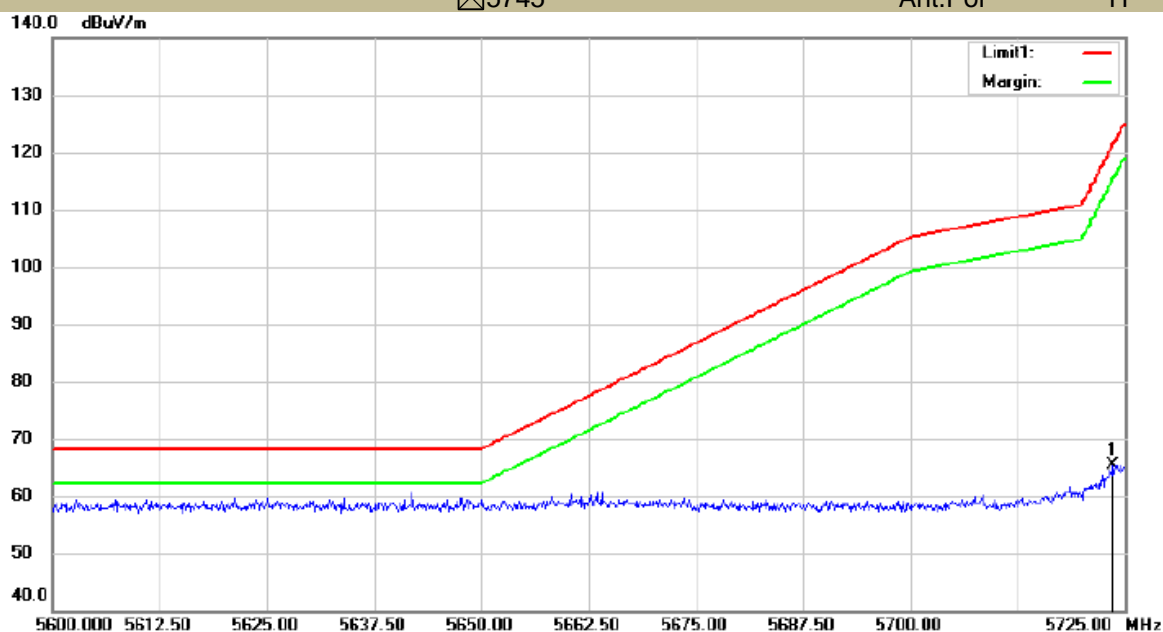
Freq. (MHz)	Ant.Pol. H/V	Field Strength (RBW=100KHz) (dBuV/m)	E.I.R.P (dBm)	Limit (dBm)	Verdict
5723.73	H	65.46	-29.77	27	PASS
5724.96	V	65.77	-29.46	27	PASS

Test mode: 802.11n(HT20) Frequency: 5825

Freq. (MHz)	Ant.Pol. H/V	Field Strength (RBW=100KHz) (dBuV/m)	E.I.R.P (dBm)	Limit (dBm)	Verdict
5852.01	V	61.23	-34.00	27	PASS
5855.97	H	61.67	-33.56	27	PASS

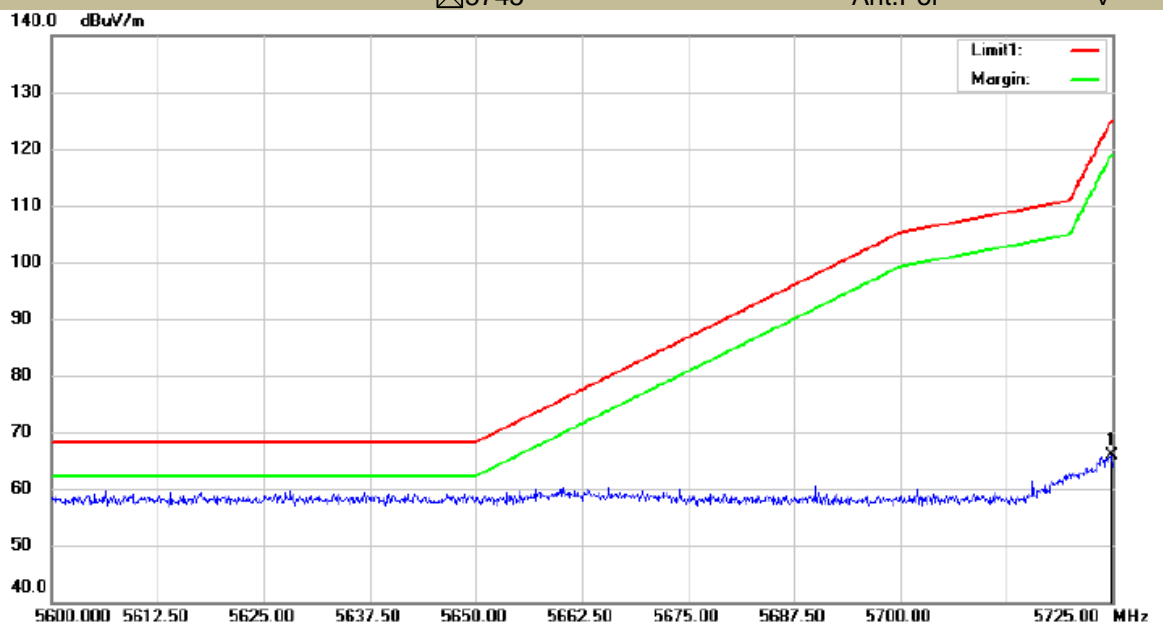
Note: (1) All Readings are Peak Value (VBW=3MHz) and AV Value (VBW=10Hz).
 (2) Emission Level= Reading Level+Probe Factor +Cable Loss.
 (3) $EIRP[dBm] = E[dBuV/m] + 20 \log(d[meters]) - 104.77$
 d is the measurement distance in 3 meters

U-NII -3				
Test Model	Undesirable radiated	Undesirable radiated	Spurious Emission in Band Edge	
	<input type="checkbox"/> 802.11a	<input checked="" type="checkbox"/> 802.11n(HT20)	<input type="checkbox"/> 802.11n(HT40)	
		<input checked="" type="checkbox"/> 5745	Ant.Pol	H



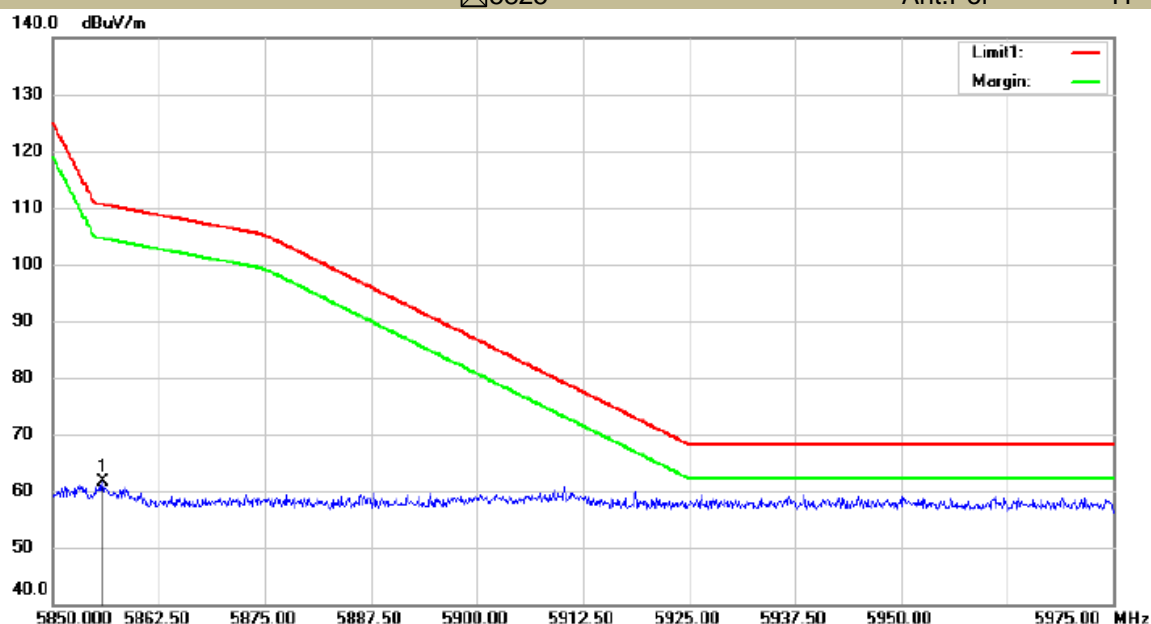
Site 3m Chamber #1 Polarization: **Horizontal** Temperature: 29.5 C
 Limit: (RE)FCC PART 15C B4 (5G Bandedge) Peak Power: DC 3.3V Humidity: 48 %

U-NII -3				
Test Model	Undesirable radiated	Undesirable radiated	Spurious Emission in Band Edge	
	<input type="checkbox"/> 802.11a	<input checked="" type="checkbox"/> 802.11n(HT20)	<input type="checkbox"/> 802.11n(HT40)	
		<input checked="" type="checkbox"/> 5745	Ant.Pol	V



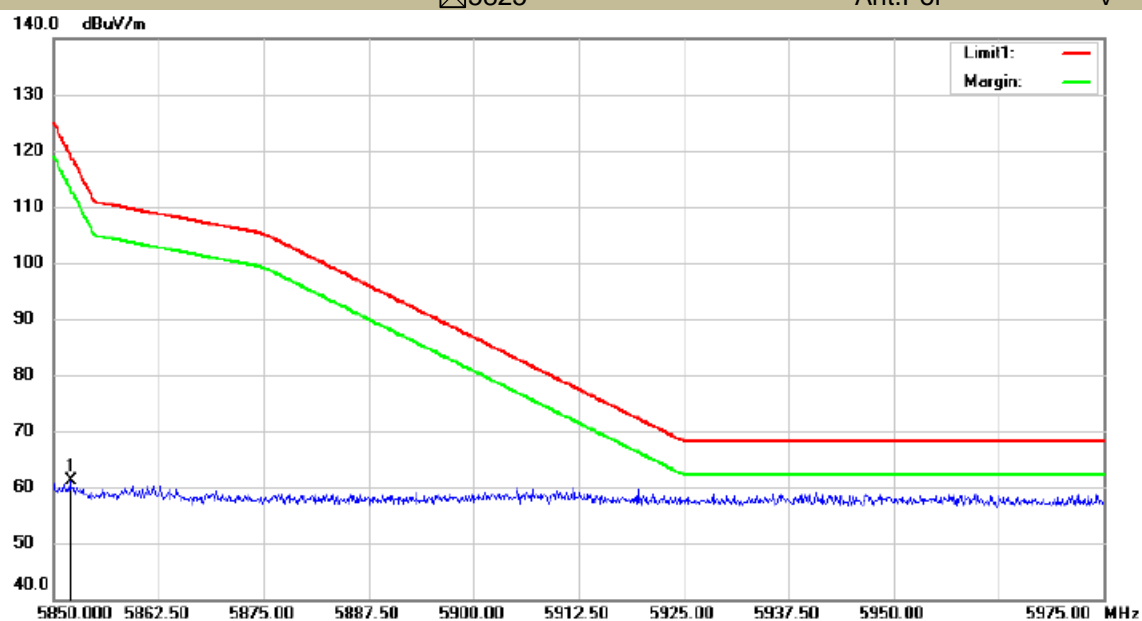
Site 3m Chamber #1 Polarization: **Vertical** Temperature: 29.5 C
 Limit: (RE)FCC PART 15C B4 (5G Bandedge) Peak Power: DC 3.3V Humidity: 48 %

U-NII -3			
Test Model	Undesirable radiated	Undesirable radiated	Spurious Emission in Band Edge
	<input type="checkbox"/> 802.11a	<input checked="" type="checkbox"/> 802.11n(HT20)	<input type="checkbox"/> 802.11n(HT40)
		<input checked="" type="checkbox"/> 5825	
			Ant.Pol H



Site 3m Chamber #1 Polarization: **Horizontal** Temperature: 29.5 C
 Limit: (RE)FCC PART 15C B4 (5G Bandedge) Peak Power: DC 3.3V Humidity: 48 %

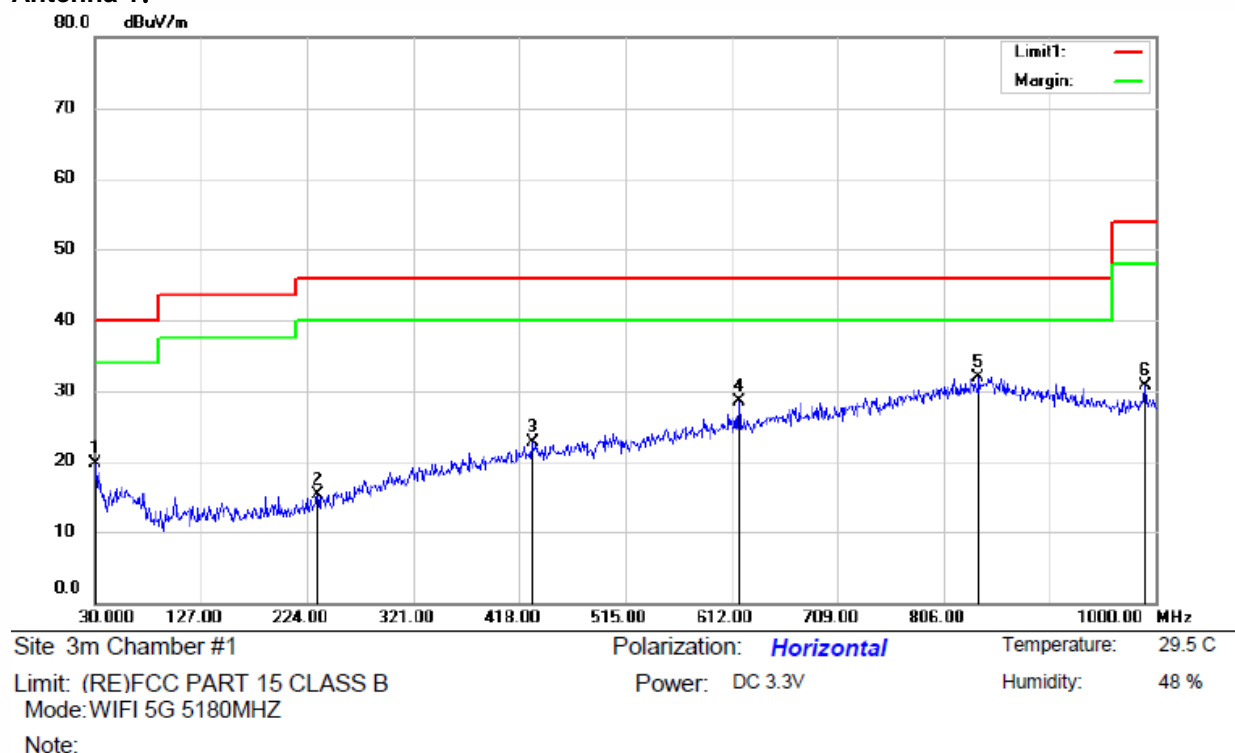
U-NII -3			
Test Model	Undesirable radiated	Undesirable radiated	Spurious Emission in Band Edge
	<input type="checkbox"/> 802.11a	<input checked="" type="checkbox"/> 802.11n(HT20)	<input type="checkbox"/> 802.11n(HT40)
		<input checked="" type="checkbox"/> 5825	
			Ant.Pol V



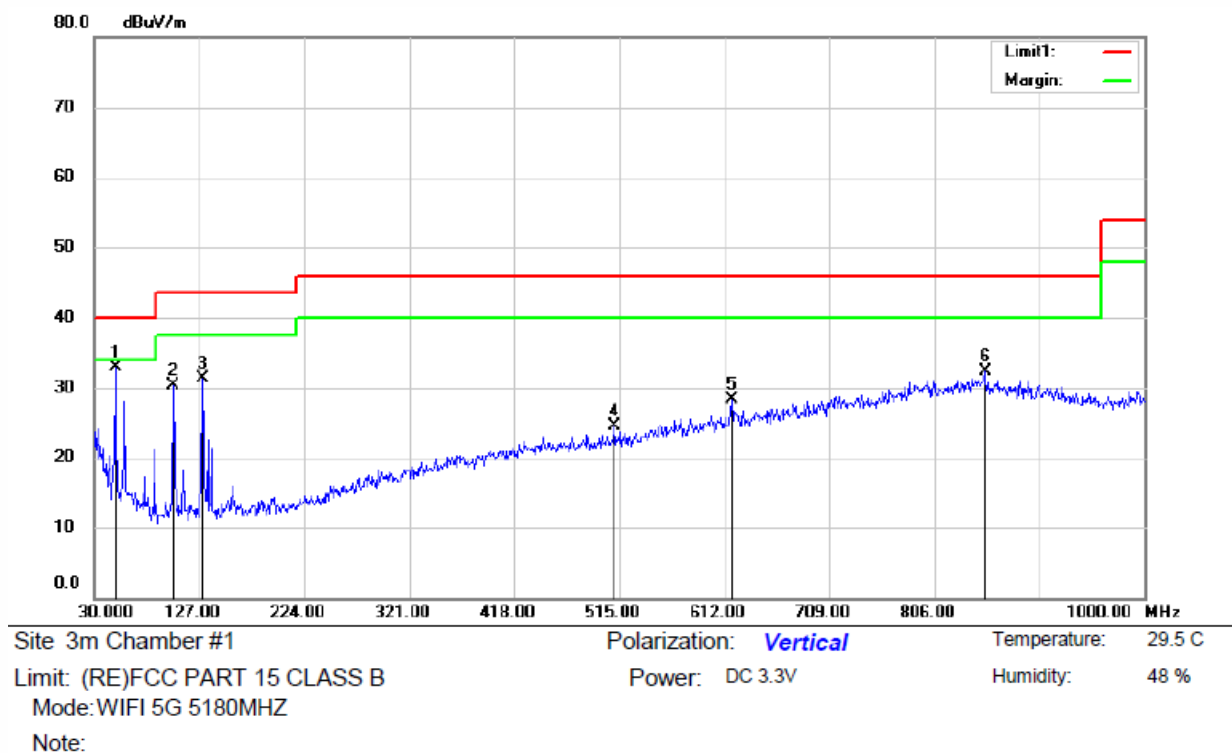
Site 3m Chamber #1 Polarization: **Vertical** Temperature: 29.5 C
 Limit: (RE)FCC PART 15C B4 (5G Bandedge) Peak Power: DC 3.3V Humidity: 48 %

- Undesirable radiated Spurious Emission below 1GHz (30MHz to 1GHz)
All the modes 802.11a/n has been tested and the worst result 802.11n (HT20) recorded as below:

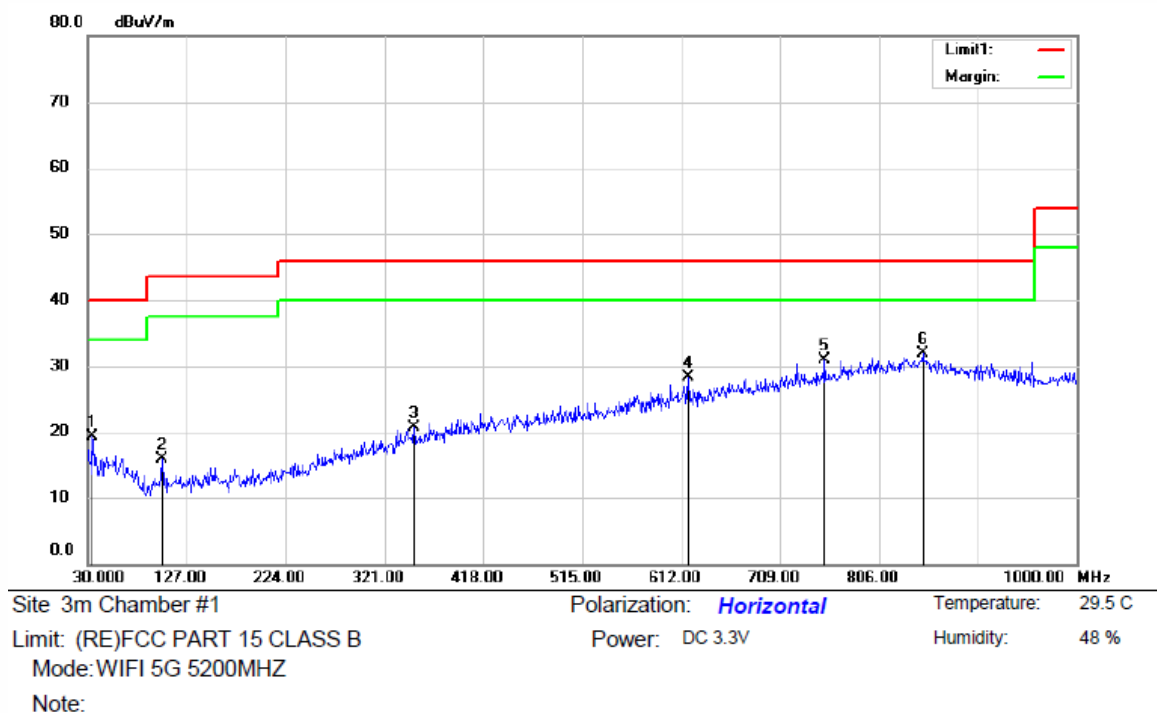
Antenna 1:



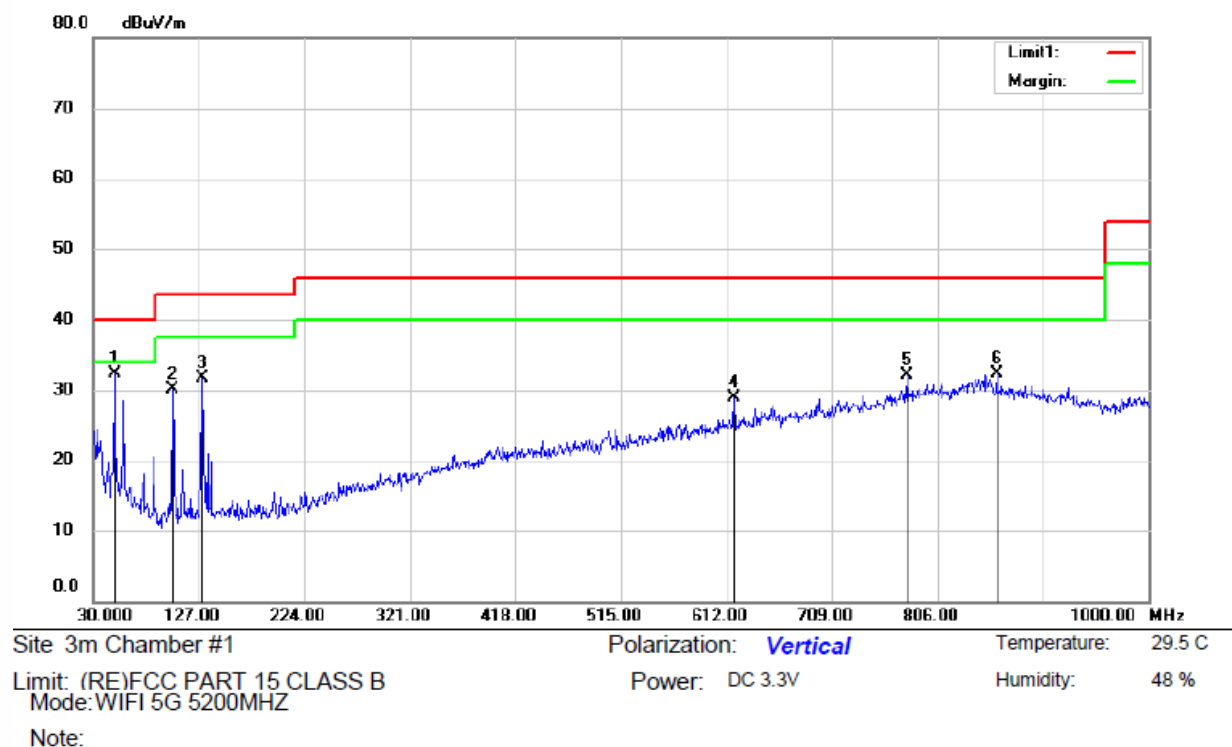
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Antenna Height cm	Table Degree	Comment
1		31.2123	34.13	-14.51	19.62	40.00	-20.38	QP			
2		234.4275	27.67	-12.36	15.31	46.00	-30.69	QP			
3		430.0036	28.28	-5.64	22.64	46.00	-23.36	QP			
4		619.5175	31.07	-2.50	28.57	46.00	-17.43	QP			
5	*	838.8585	29.05	2.81	31.86	46.00	-14.14	QP			
6		990.7850	30.42	0.31	30.73	54.00	-23.27	QP			



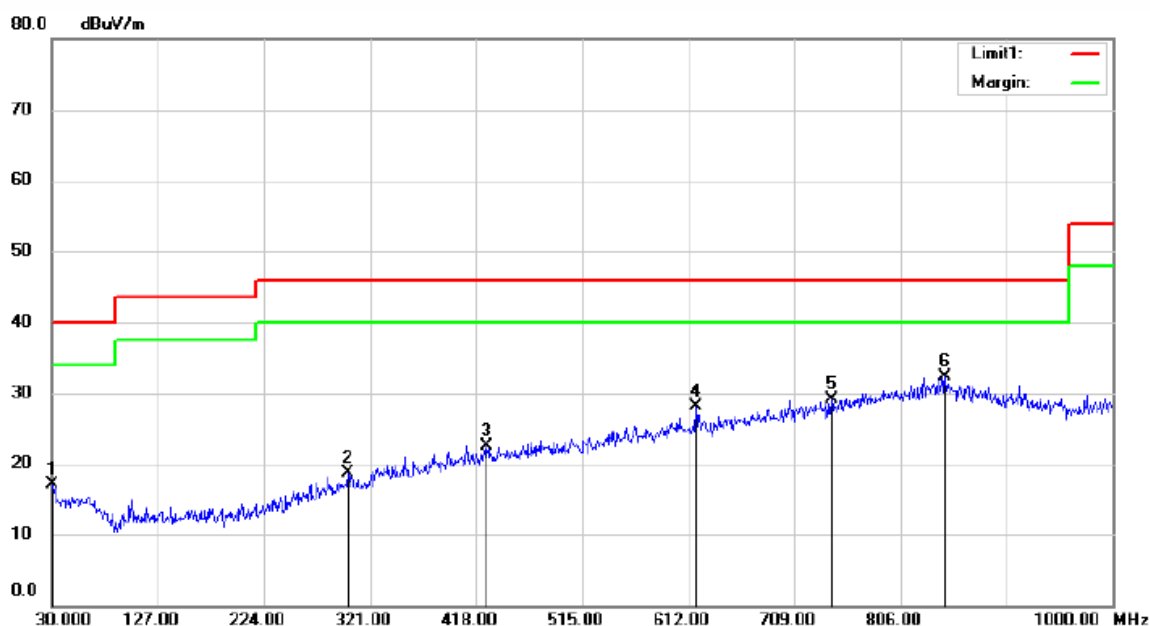
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	49.5212	45.06	-12.12	32.94	40.00	-7.06	QP		
2		103.4775	44.72	-14.45	30.27	43.50	-13.23	QP		
3		130.5161	45.52	-14.24	31.28	43.50	-12.22	QP		
4		510.1500	29.53	-5.08	24.45	46.00	-21.55	QP		
5		619.5175	30.79	-2.50	28.29	46.00	-17.71	QP		
6		853.2875	29.53	2.68	32.21	46.00	-13.79	QP		



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Antenna	Table	
		MHz	Level	Factor	ment			Height	Degree	Comment
			dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	
1		34.1225	33.31	-14.10	19.21	40.00	-20.79	QP		
2		103.5986	30.27	-14.44	15.83	43.50	-27.67	QP		
3		350.9486	28.37	-7.64	20.73	46.00	-25.27	QP		
4		619.5175	30.88	-2.50	28.38	46.00	-17.62	QP		
5		752.8925	30.62	0.20	30.82	46.00	-15.18	QP		
6	*	849.1650	29.03	2.92	31.95	46.00	-14.05	QP		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Antenna Height cm	Table Degree	Detector	Comment
1	*	49.5212	44.44	-12.12	32.32	40.00	-7.68			QP	
2		103.4775	44.57	-14.45	30.12	43.50	-13.38			QP	
3		130.5161	45.90	-14.24	31.66	43.50	-11.84			QP	
4		619.5175	31.47	-2.50	28.97	46.00	-17.03			QP	
5		778.1123	30.82	1.22	32.04	46.00	-13.96			QP	
6		861.0475	30.15	2.16	32.31	46.00	-13.69			QP	



Site 3m Chamber #1

Polarization: **Horizontal**

Temperature: 29.5 C

Limit: (RE)FCC PART 15 CLASS B

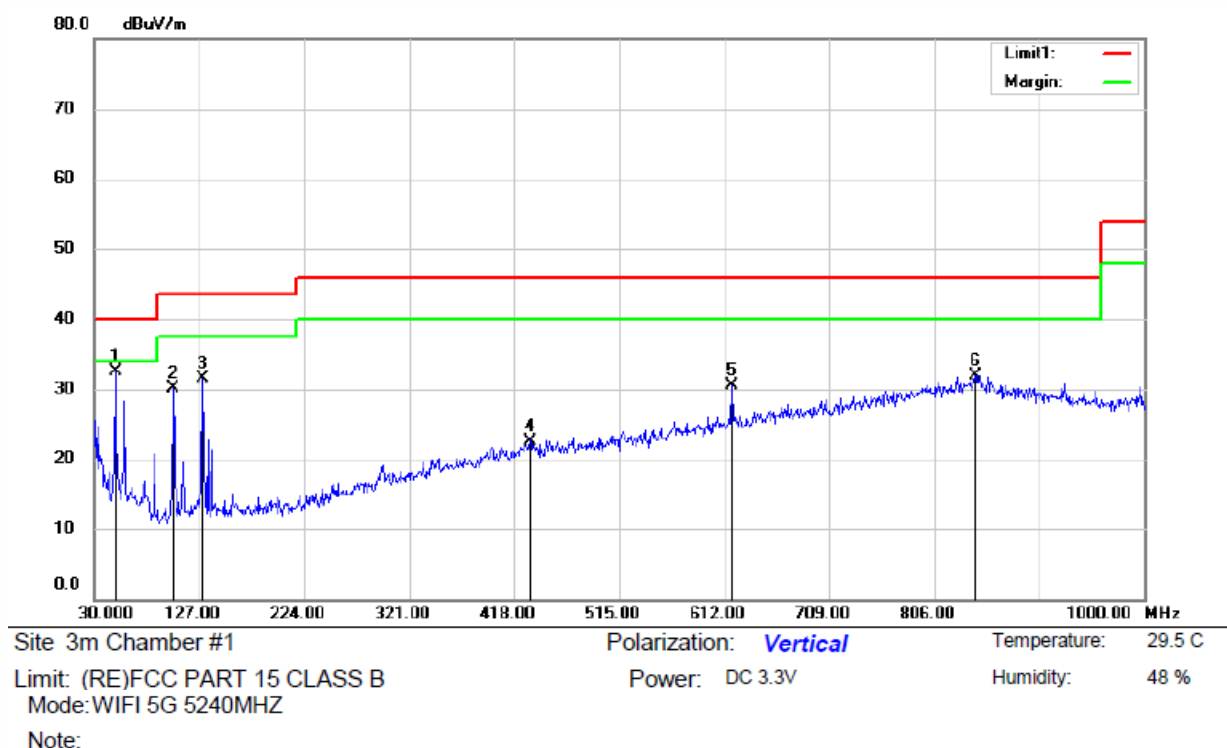
Power: DC 3.3V

Humidity: 48 %

Mode:WIFI 5G 5240MHZ

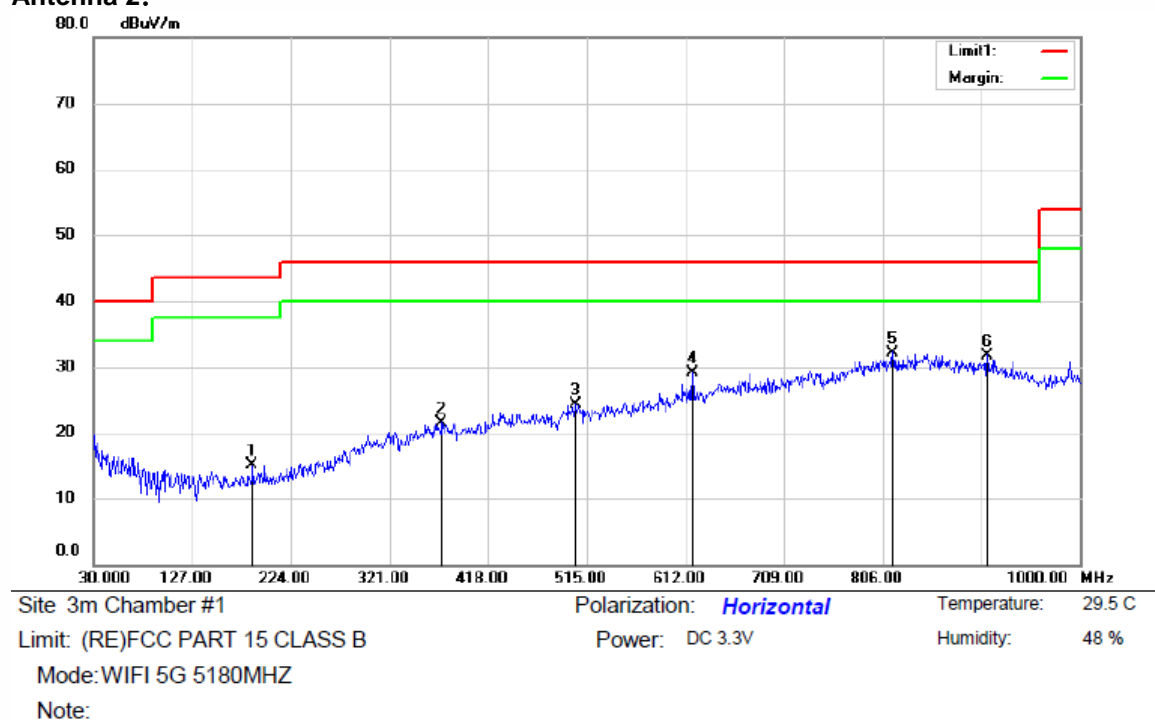
Note:

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Antenna	Table	
		MHz	Level	Factor	ment			Height	Degree	Comment
			dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	
1		30.9700	31.72	-14.52	17.20	40.00	-22.80	QP		
2		300.9936	27.63	-8.99	18.64	46.00	-27.36	QP		
3		427.8211	28.25	-5.74	22.51	46.00	-23.49	QP		
4		619.5175	30.57	-2.50	28.07	46.00	-17.93	QP		
5		743.3137	29.08	0.01	29.09	46.00	-16.91	QP		
6	*	847.2250	29.44	2.91	32.35	46.00	-13.65	QP		

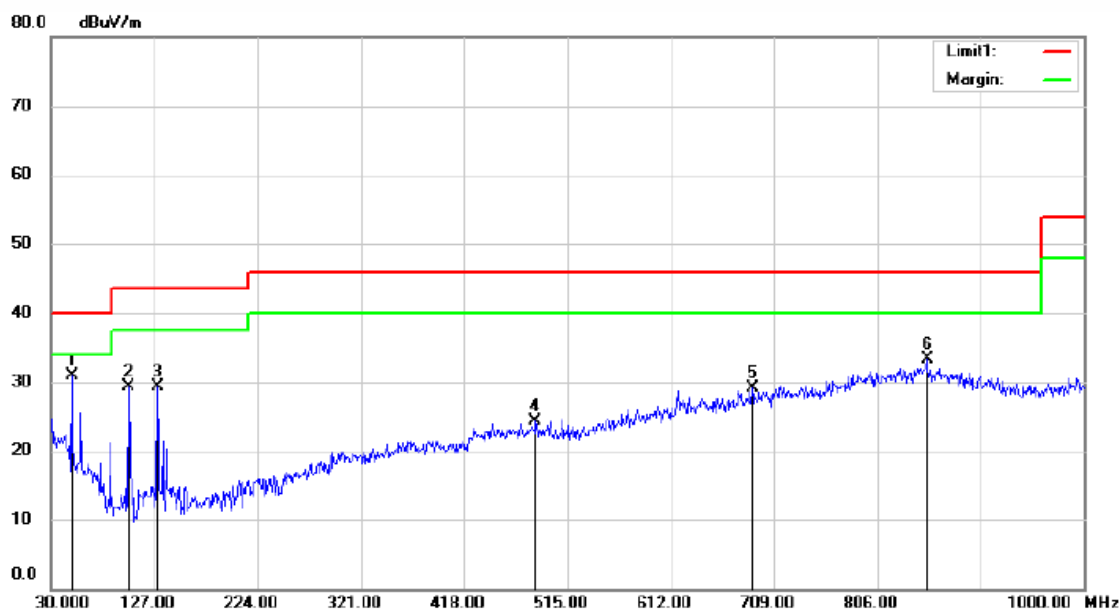


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Antenna Height cm	Table Degree	Comment
1	*	49.5212	44.71	-12.12	32.59	40.00	-7.41	QP			
2		103.4775	44.61	-14.45	30.16	43.50	-13.34	QP			
3		130.5161	45.74	-14.24	31.50	43.50	-12.00	QP			
4		432.7925	28.31	-5.71	22.60	46.00	-23.40	QP			
5		619.5175	33.01	-2.50	30.51	46.00	-15.49	QP			
6		844.0724	29.07	2.89	31.96	46.00	-14.04	QP			

Antenna 2:



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Antenna	Table	
		MHz	Level	Factor	ment			Height	Degree	Comment
			dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	
1		186.8975	28.86	-13.74	15.12	43.50	-28.38	QP		
2		372.6524	28.81	-7.21	21.60	46.00	-24.40	QP		
3		504.3300	29.33	-5.00	24.33	46.00	-21.67	QP		
4		619.5175	31.57	-2.50	29.07	46.00	-16.93	QP		
5	*	815.9424	30.31	1.89	32.20	46.00	-13.80	QP		
6		909.3050	30.70	1.10	31.80	46.00	-14.20	QP		



Site: 3m Chamber #1

Polarization: **Vertical**

Temperature: 29.5 C

Limit: (RE)FCC PART 15 CLASS B

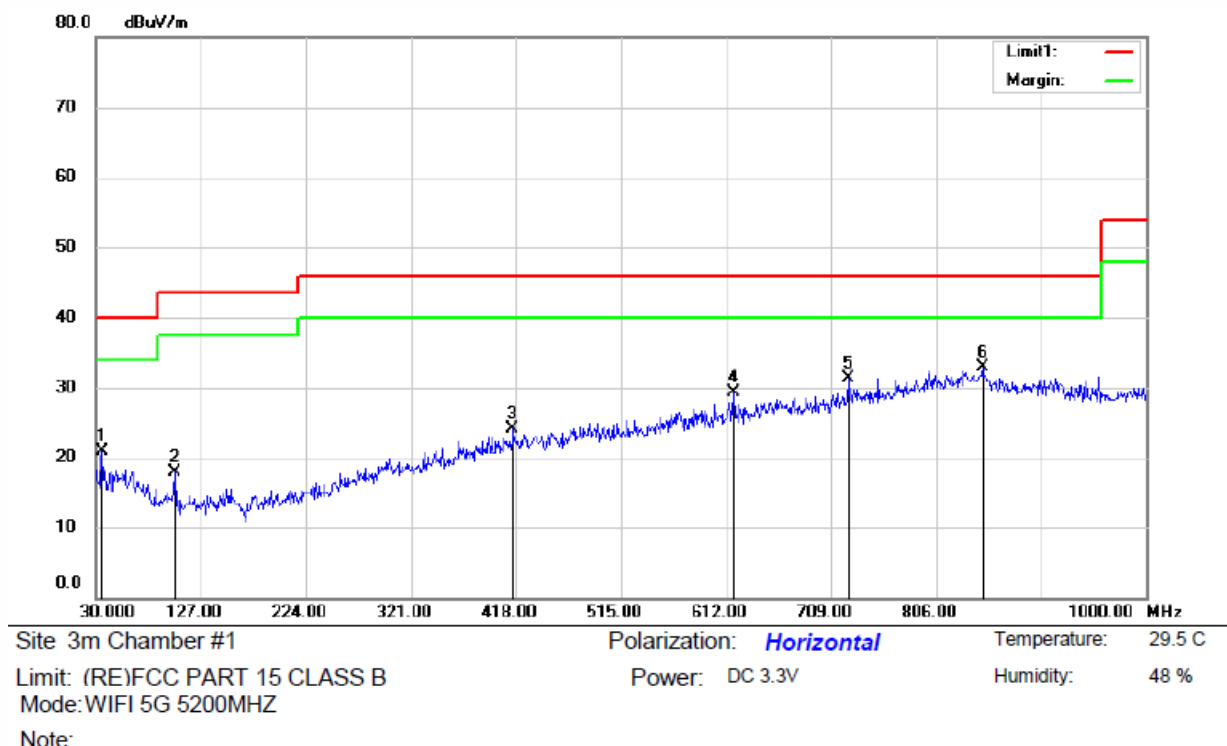
Power: DC 3.3V

Humidity: 48 %

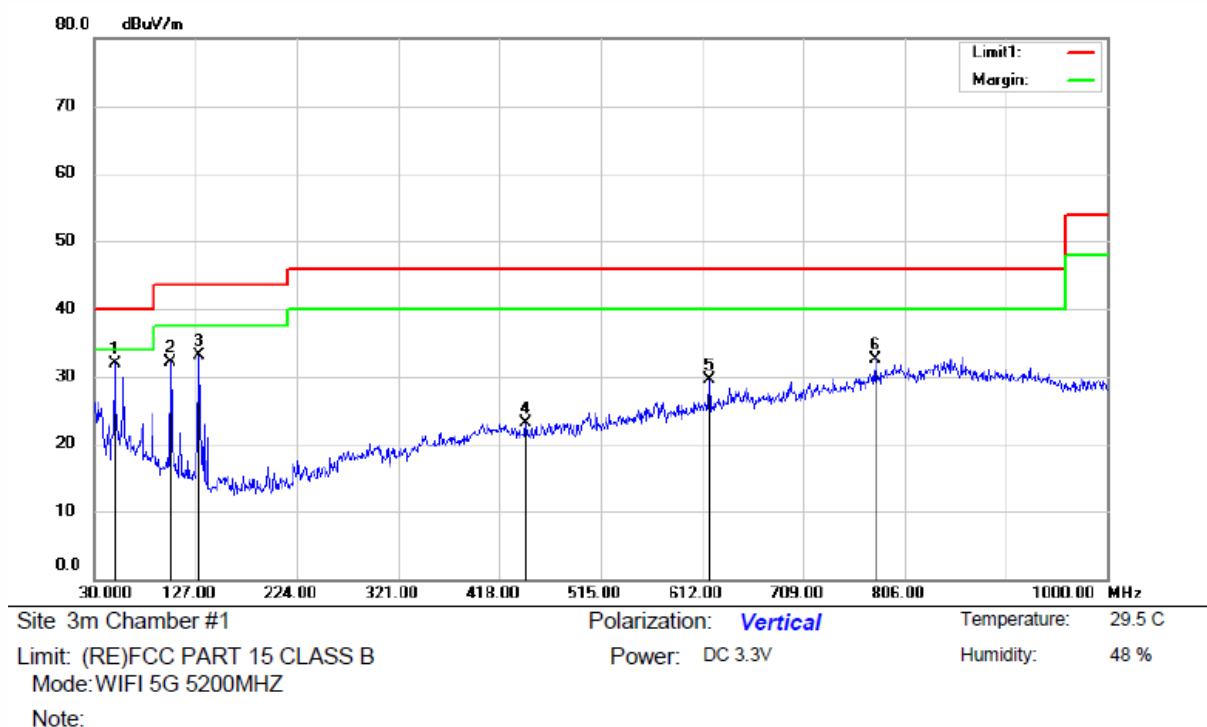
Mode: WIFI 5G 5180MHZ

Note:

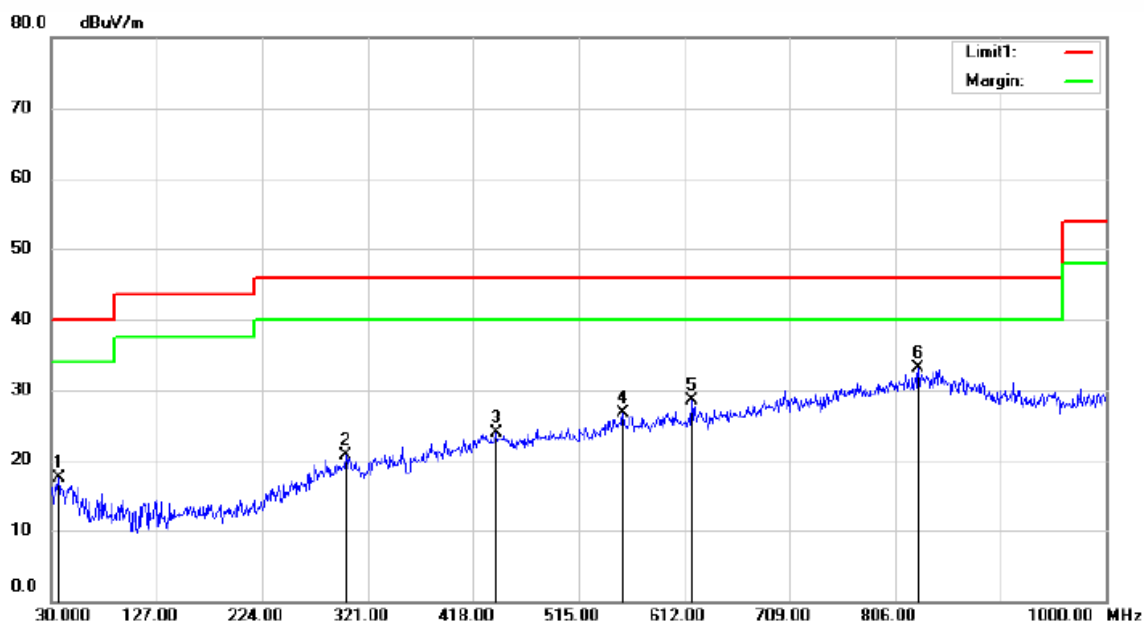
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1	*	49.5212	43.06	-12.12	30.94	40.00	-9.06	QP		
2		103.4775	43.72	-14.45	29.27	43.50	-14.23	QP		
3		130.5160	43.52	-14.24	29.28	43.50	-14.22	QP		
4		485.2937	29.84	-5.46	24.38	46.00	-21.62	QP		
5		689.4787	30.16	-1.09	29.07	46.00	-16.93	QP		
6		853.2875	30.53	2.68	33.21	46.00	-12.79	QP		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Antenna Height cm	Table Degree	Comment
1		35.9411	34.52	-13.55	20.97	40.00	-19.03	QP		
2		103.5986	32.27	-14.44	17.83	43.50	-25.67	QP		
3		415.9386	30.25	-6.14	24.11	46.00	-21.89	QP		
4		619.5175	31.88	-2.50	29.38	46.00	-16.62	QP		
5		724.6412	31.67	-0.29	31.38	46.00	-14.62	QP		
6	*	849.1650	30.03	2.92	32.95	46.00	-13.05	QP		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	49.5212	43.94	-12.12	31.82	40.00	-8.18	QP		
2		103.4775	46.57	-14.45	32.12	43.50	-11.38	QP		
3		130.5160	47.40	-14.24	33.16	43.50	-10.34	QP		
4		443.7050	29.00	-5.84	23.16	46.00	-22.84	QP		
5		619.5175	31.97	-2.50	29.47	46.00	-16.53	QP		
6		778.1123	31.32	1.22	32.54	46.00	-13.46	QP		



Site 3m Chamber #1

Polarization: **Horizontal**

Temperature: 29.5 C

Limit: (RE)FCC PART 15 CLASS B

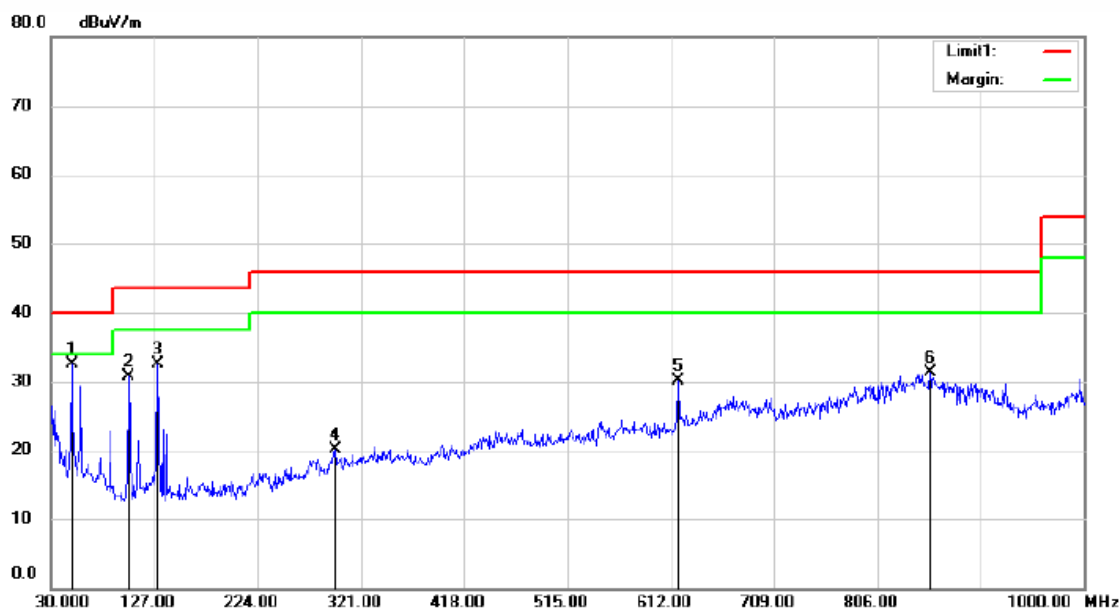
Power: DC 3.3V

Humidity: 48 %

Mode: WIFI 5G 5240MHZ

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		37.0324	30.89	-13.42	17.47	40.00	-22.53	QP		
2		300.9936	29.63	-8.99	20.64	46.00	-25.36	QP		
3		439.9461	29.74	-5.89	23.85	46.00	-22.15	QP		
4		555.9823	30.49	-3.88	26.61	46.00	-19.39	QP		
5		619.5175	31.07	-2.50	28.57	46.00	-17.43	QP		
6	*	827.5823	30.69	2.32	33.01	46.00	-12.99	QP		



Site 3m Chamber #1

Polarization: **Vertical**

Temperature: 29.5 C

Limit: (RE)FCC PART 15 CLASS B

Power: DC 3.3V

Humidity: 48 %

Mode: WIFI 5G 5240MHZ

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1	*	49.5212	44.71	-12.12	32.59	40.00	-7.41	QP		
2		103.4775	45.11	-14.45	30.66	43.50	-12.84	QP		
3		130.5160	46.74	-14.24	32.50	43.50	-11.00	QP		
4		296.7500	29.22	-9.18	20.04	46.00	-25.96	QP		
5		619.5175	32.51	-2.50	30.01	46.00	-15.99	QP		
6		855.5910	28.76	2.51	31.27	46.00	-14.73	QP		

8.6 POWER LINE CONDUCTED EMISSIONS

8.6.1 Applicable Standard

According to FCC Part 15.207(a)

8.6.2 Conformance Limit

Frequency(MHz)	Conducted Emission Limit	
	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

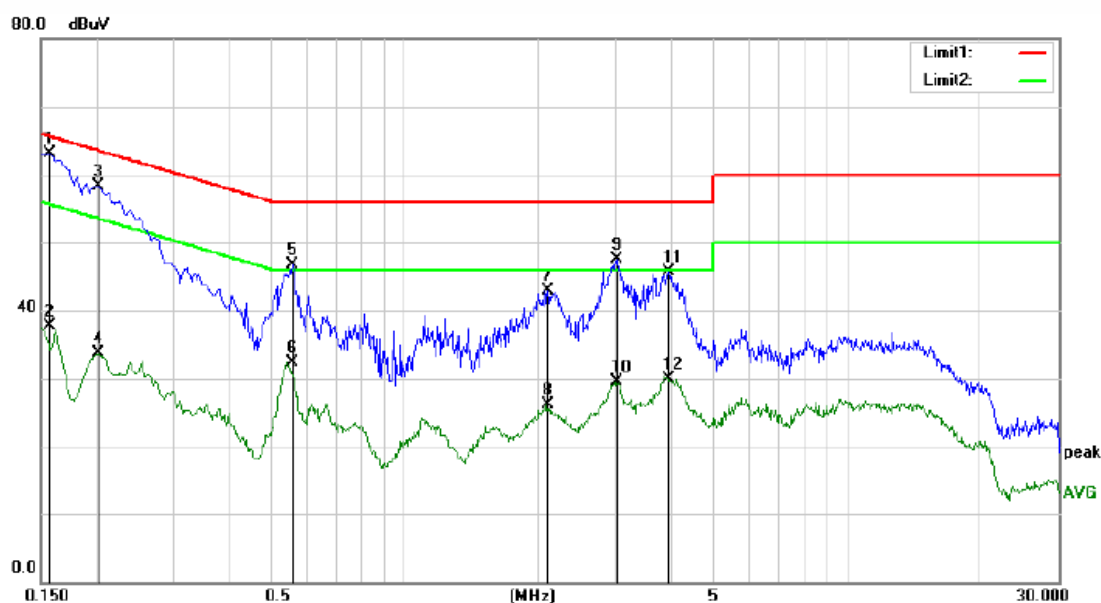
Test according to clause 6.3 conducted emission test setup

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



Site Conduction #1

Phase: **L1**

Temperature: 19.4

Limit: (CE)FCC PART 15 class B_QP

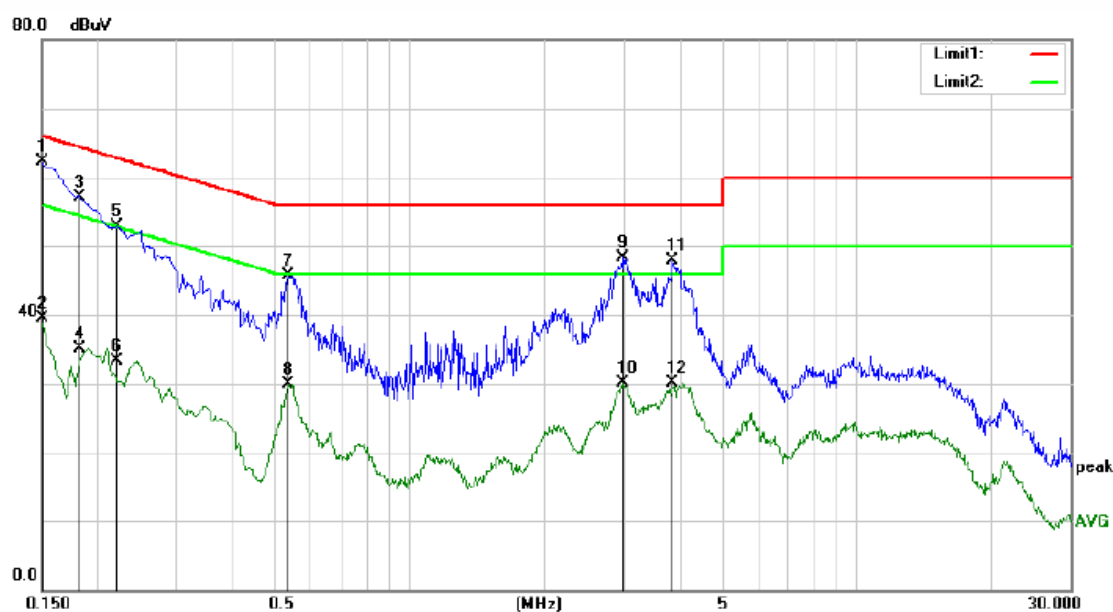
Power: AC120V/60Hz

Humidity: 37 %

Mode: WIFI Mode

Note:

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1	*	0.1580	53.62	9.44	63.06	65.57	-2.51	QP	
2		0.1580	28.20	9.44	37.64	55.57	-17.93	AVG	
3		0.2020	48.80	9.44	58.24	63.53	-5.29	QP	
4		0.2020	24.22	9.44	33.66	53.53	-19.87	AVG	
5		0.5580	37.41	9.28	46.69	56.00	-9.31	QP	
6		0.5580	23.04	9.28	32.32	46.00	-13.68	AVG	
7		2.1020	33.11	9.81	42.92	56.00	-13.08	QP	
8		2.1020	16.30	9.81	26.11	46.00	-19.89	AVG	
9		3.0180	37.64	9.82	47.46	56.00	-8.54	QP	
10		3.0180	19.73	9.82	29.55	46.00	-16.45	AVG	
11		3.9420	35.97	9.82	45.79	56.00	-10.21	QP	
12		3.9420	19.99	9.82	29.81	46.00	-16.19	AVG	



Site Conduction #1

Phase: **N**

Temperature: 19.4

Limit: (CE)FCC PART 15 class B_QP

Power: AC120V/60Hz

Humidity: 37 %

Mode: WIFI Mode

Note:

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1	*	0.1500	52.78	9.44	62.22	66.00	-3.78	QP	
2		0.1500	30.08	9.44	39.52	56.00	-16.48	AVG	
3		0.1825	47.65	9.44	57.09	64.37	-7.28	QP	
4		0.1825	25.59	9.44	35.03	54.37	-19.34	AVG	
5		0.2220	43.53	9.40	52.93	62.74	-9.81	QP	
6		0.2220	23.92	9.40	33.32	52.74	-19.42	AVG	
7		0.5340	36.44	9.27	45.71	56.00	-10.29	QP	
8		0.5340	20.64	9.27	29.91	46.00	-16.09	AVG	
9		2.9820	38.44	9.82	48.26	56.00	-7.74	QP	
10		2.9820	20.22	9.82	30.04	46.00	-15.96	AVG	
11		3.8780	38.17	9.82	47.99	56.00	-8.01	QP	
12		3.8780	20.32	9.82	30.14	46.00	-15.86	AVG	

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 15.407 (a), 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 2 antenna: One PCB antenna, one IPEX connector antenna; their antenna gains are both 2.0 dBi;

Note:

- ☒ Antennas 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.

Detail of factor for radiated emission

Frequency(MHz)	Ant_F(dB)	Cab_L(dB)	Preamp(dB)	Correct Factor(dB)
0.009	20.6	0.03	\	20.63
0.15	20.7	0.1	\	20.8
1	20.9	0.15	\	21.05
10	20.1	0.28	\	20.38
30	18.8	0.45	\	19.25
30	11.7	0.62	27.9	-15.58
100	12.5	1.02	27.8	-14.28
300	12.9	1.91	27.5	-12.69
600	19.2	2.92	27	-4.88
800	21.1	3.54	26.6	-1.96
1000	22.3	4.17	26.2	0.27
1000	25.6	1.76	41.4	-14.04
3000	28.9	3.27	43.2	-11.03
5000	31.1	4.2	44.6	-9.3
8000	36.2	5.95	44.7	-2.55
10000	38.4	6.3	43.9	0.8
12000	38.5	7.14	42.3	3.34
15000	40.2	8.15	41.4	6.95
18000	45.4	9.02	41.3	13.12
18000	37.9	1.81	47.9	-8.19
21000	37.9	1.95	48.7	-8.85
25000	39.3	2.01	42.8	-1.49
28000	39.6	2.16	46.0	-4.24
31000	41.2	2.24	44.5	-1.06
34000	41.5	2.29	46.6	-2.81
37000	43.8	2.30	46.4	-0.3
40000	43.2	2.50	42.2	3.5

----- END OF REPORT -----