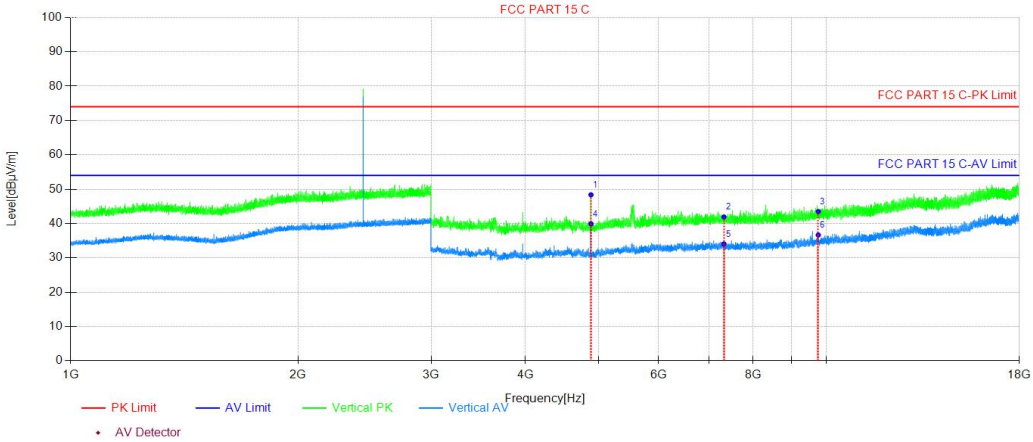
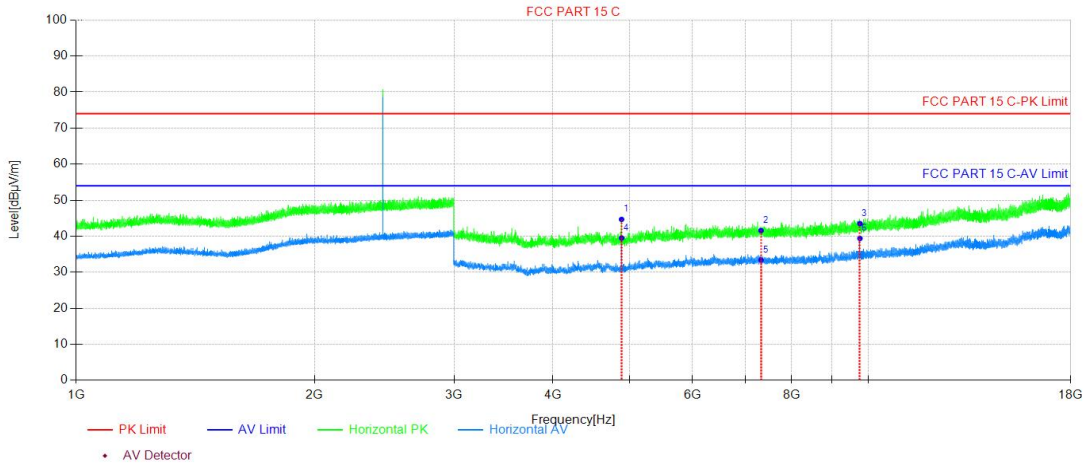
DH5 2441MHz

Vertical:



NO.	Freq. [MHz]	Reading Level [dBμV]	Correct Factor [dB/m]	Result Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	4882.59	50.09	-1.72	48.37	74.00	25.63	150	172	Peak
2	7323.21	39.44	2.47	41.91	74.00	32.09	150	0	Peak
3	9764.58	37.09	6.42	43.51	74.00	30.49	150	21	Peak
4	4882.59	41.66	-1.72	39.94	54.00	14.06	150	172	AV
5	7323.21	31.59	2.47	34.06	54.00	19.94	150	0	AV
6	9764.58	30.24	6.42	36.66	54.00	17.34	150	31	AV

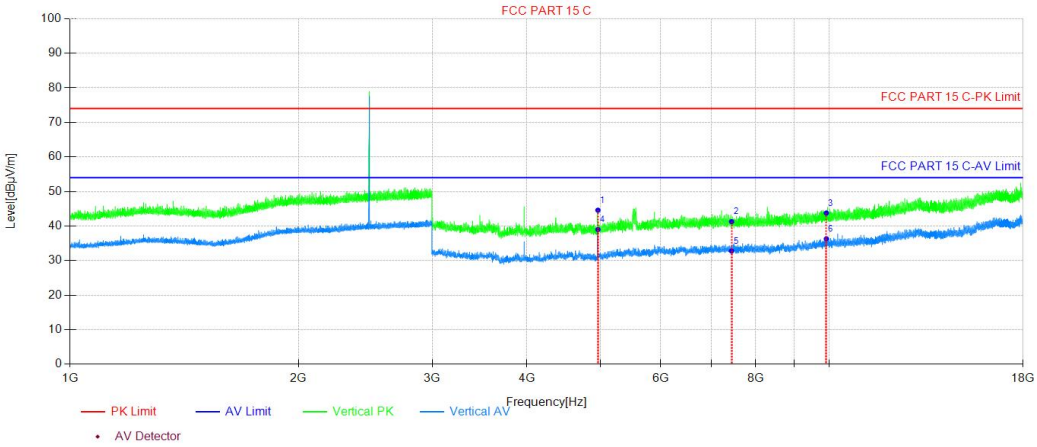
Horizontal:



NO.	Freq. [MHz]	Reading Level [dBμV]	Correct Factor [dB/m]	Result Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	4881.84	46.40	-1.73	44.67	74.00	29.33	150	181	Peak
2	7323.21	39.12	2.47	41.59	74.00	32.41	160	31	Peak
3	9764.58	37.11	6.42	43.53	74.00	30.47	150	308	Peak
4	4882.59	41.22	-1.72	39.50	54.00	14.50	150	297	AV
5	7323.21	30.95	2.47	33.42	54.00	20.58	150	267	AV
6	9764.58	32.96	6.42	39.38	54.00	14.62	150	338	AV

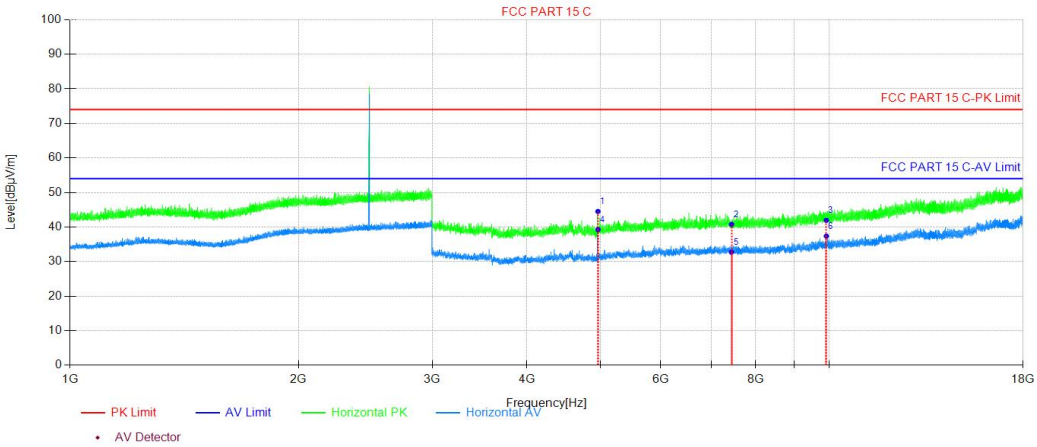
DH5 2480MHz

Vertical:



NO.	Freq. [MHz]	Reading Level [dBμV]	Correct Factor [dB/m]	Result Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	4959.84	46.36	-1.76	44.60	74.00	29.40	130	62	Peak
2	7440.22	38.55	2.73	41.28	74.00	32.72	150	30	Peak
3	9920.59	37.59	6.19	43.78	74.00	30.22	150	343	Peak
4	4960.59	40.73	-1.75	38.98	54.00	15.02	150	130	AV
5	7440.22	30.06	2.73	32.79	54.00	21.21	150	360	AV
6	9920.59	30.13	6.19	36.32	54.00	17.68	150	12	AV

Horizontal:



NO.	Freq. [MHz]	Reading Level [dBμV]	Correct Factor [dB/m]	Result Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	4959.84	46.27	-1.76	44.51	74.00	29.49	160	289	Peak
2	7440.22	38.06	2.73	40.79	74.00	33.21	160	341	Peak
3	9920.59	35.77	6.19	41.96	74.00	32.04	150	0	Peak
4	4960.59	41.03	-1.75	39.28	54.00	14.72	150	289	AV
5	7440.22	30.04	2.73	32.77	54.00	21.23	150	0	AV
6	9920.59	31.19	6.19	37.38	54.00	16.62	150	331	AV

Note:

1. The Measurement (Result Level) is calculated by Reading Level adding the Correct Factor(maybe including Ant.Factor and the Cable Factor etc.), The basic equation is as follows:

   Result Level= Reading Level + Correct Factor(including Ant.Factor, Cable Factor etc.)

2. The amplitude of 9KHz to 30MHz spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.

3. The amplitude of 18GHz to 25GHz spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be report.

4. All channels had been pre-test,only the worst case was reported.

3.10 Restricted bands around fundamental frequency

Test Requirement:	47 CFR Part 15C Section 15.209 and 15.205		
Test Method:	ANSI C63.10: 2013 Section 11.12		
Test Site:	Measurement Distance: 3m or 10m (Semi-Anechoic Chamber)		
Limit:	Frequency	Limit (dBuV/m)	Remark
	30MHz-88MHz	40.0	Quasi-peak
	88MHz-216MHz	43.5	Quasi-peak
	216MHz-960MHz	46.0	Quasi-peak
	960MHz-1GHz	54.0	Quasi-peak
	Above 1GHz	54.0	Average Value
		74.0	Peak Value
Test Setup:			

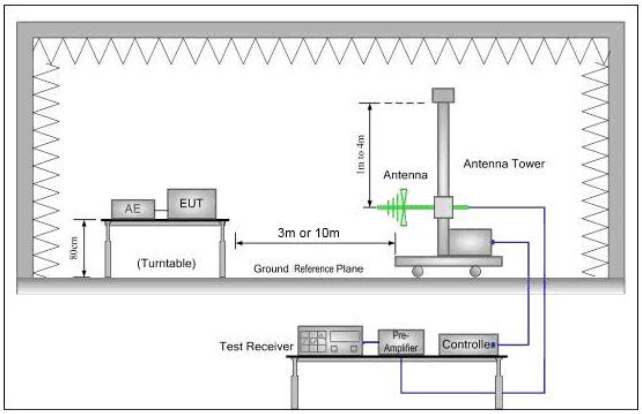


Figure 1. 30MHz to 1GHz

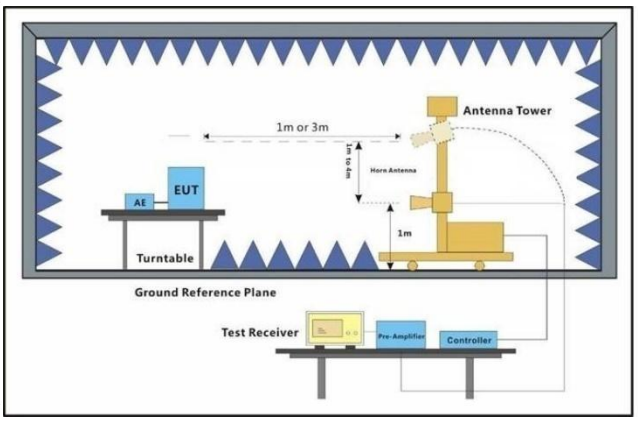


Figure 2. Above 1 GHz

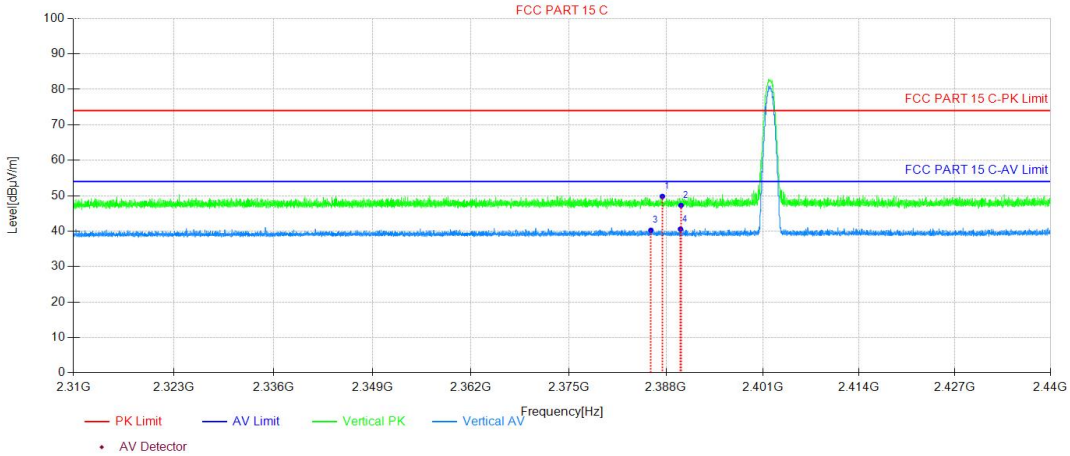
Test Procedure:	a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation. b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 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. c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. d. 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. e. 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 table was turned from 0 degrees to 360 degrees to find the maximum reading. f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. g. 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 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.
Test Configuration:	Measurements Below 1000MHz

	• RBW = 120 kHz • VBW = 300 kHz • Detector = Peak • Trace mode = max hold Peak Measurements Above 1000 MHz • RBW = 1 MHz • VBW ⩾ 3 MHz • Detector = Peak • Sweep time = auto • Trace mode = max hold Average Measurements Above 1000MHz • RBW = 1 MHz • VBW = 10 Hz, when duty cycle is no less than 98 percent. • VBW ⩾ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates. Transmitting mode.
Final Test Mode:	Pretest the EUT Transmitting mode. Through Pre-scan, find the DH5 of data type is the worst case of all modulation type. Only the worst case is recorded in the report.
Instruments Used:	Refer to section 2.9 for details
Test Results:	Pass

Test Date

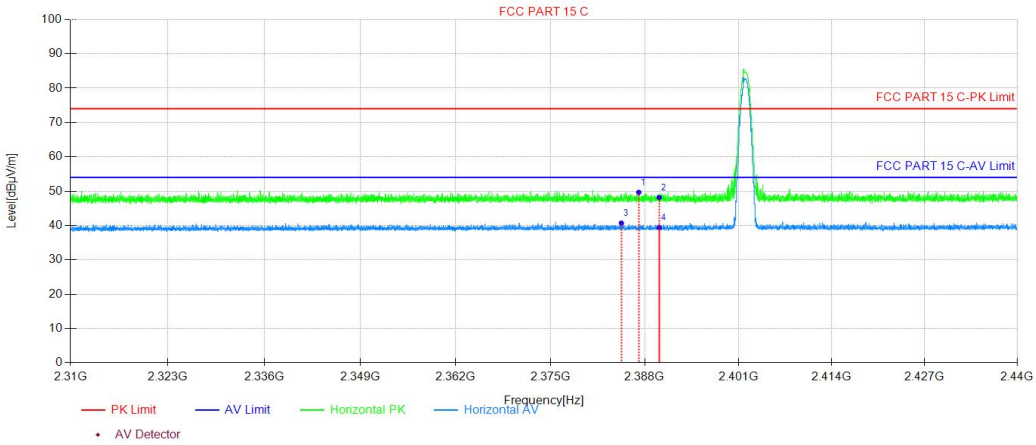
DH5 2402MHz

Vertical:



NO.	Freq. [MHz]	Reading Level [dBμV]	Correct Factor [dB/m]	Result Level [dBμV/m]	AV Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	2387.51	48.45	1.37	49.82	74.00	24.18	150	149	Peak
2	2390.01	45.90	1.37	47.27	74.00	26.73	150	360	Peak
3	2385.97	38.89	1.37	40.26	54.00	13.74	150	353	AV
4	2389.93	39.23	1.37	40.60	54.00	13.40	150	360	AV

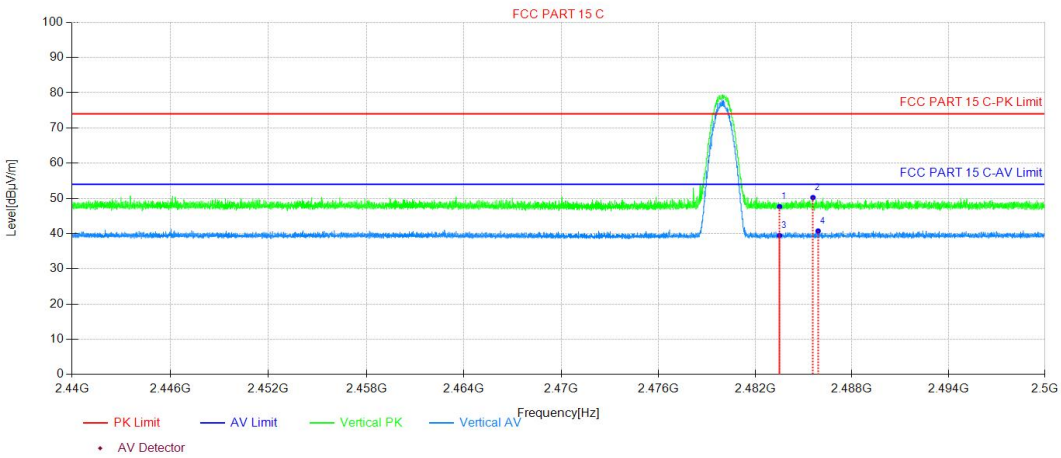
Horizontal:



NO.	Freq. [MHz]	Reading Level [dBμV]	Correct Factor [dB/m]	Result Level [dBμV/m]	AV Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	2387.18	48.30	1.37	49.67	74.00	24.33	150	135	Peak
2	2390.01	46.81	1.37	48.18	74.00	25.82	150	217	Peak
3	2384.78	39.35	1.37	40.72	54.00	13.28	150	24	AV
4	2390.01	38.00	1.37	39.37	54.00	14.63	150	224	AV

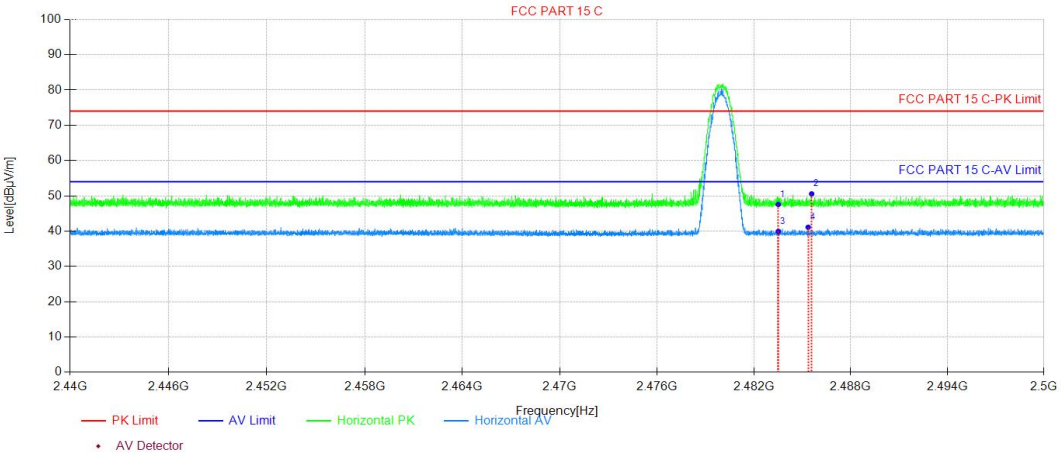
DH5 2480MHz

Vertical:



NO.	Freq. [MHz]	Reading Level [dBμV]	Correct Factor [dB/m]	Result Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	2483.50	45.82	1.86	47.68	74.00	26.32	150	179	Peak
2	2485.58	48.39	1.86	50.25	74.00	23.75	150	150	Peak
3	2483.50	37.62	1.86	39.48	54.00	14.52	150	37	AV
4	2485.89	38.90	1.86	40.76	54.00	13.24	150	113	AV

Horizontal:



NO.	Freq. [MHz]	Reading Level [dBμV]	Correct Factor [dB/m]	Result Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	2483.50	45.73	1.86	47.59	74.00	26.41	150	296	Peak
2	2485.57	48.71	1.86	50.57	74.00	23.43	150	203	Peak
3	2483.50	38.07	1.86	39.93	54.00	14.07	150	1	AV
4	2485.35	39.25	1.86	41.11	54.00	12.89	150	303	AV

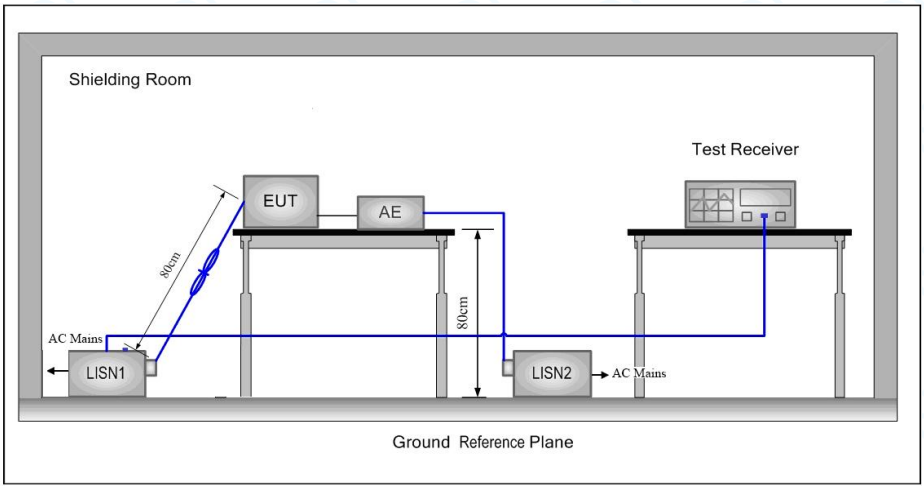
Note:

1. The Measurement (Result Level) is calculated by Reading Level adding the Correct Factor(maybe including Ant.Factor and the Cable Factor etc.), The basic equation is as follows:

Result Level= Reading Level + Correct Factor(including Ant.Factor ,Cable Factor)

2. All channels had been pre-test,only the worst case was reported

3.11 AC Power Line Conducted Emissions

Test Requirement:	47 CFR Part 15C Section 15.207		
Test Method:	ANSI C63.10: 2013		
Test Frequency Range:	150kHz to 30MHz		
Limit:	Frequency range (MHz)	Limit (dBuV)	
		Quasi-peak	Average
	0.15-0.5	66 to 56*	56 to 46*
	0.5-5	56	46
	5-30	60	50
	* Decreases with the logarithm of the frequency.		
Test Procedure:	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. 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 2013 on conducted measurement.		
Test Setup:			

Exploratory Test Mode:	Transmitting with all kind of modulations, data rates at lowest, middle and highest channel. Charge + Transmitting mode.
Final Test Mode:	Through Pre-scan, find the the worst case.
Instruments Used:	Refer to section 2.9 for details
Test Results:	N/A

Note:The wireless function does not work while the prototype is charging.

4 Appendix

Appendix A: 20dB Emission Bandwidth

Test Result

Test Mode	Antenna	Freq(MHz)	20dB EBW[MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
DH5	Ant1	2402	0.954	2401.532	2402.486	---	---
		2441	0.948	2440.532	2441.480	---	---
		2480	0.957	2479.529	2480.486	---	---
2DH5	Ant1	2402	1.335	2401.325	2402.660	---	---
		2441	1.296	2440.358	2441.654	---	---
		2480	1.278	2479.364	2480.642	---	---
3DH5	Ant1	2402	1.278	2401.355	2402.633	---	---
		2441	1.302	2440.346	2441.648	---	---
		2480	1.302	2479.346	2480.648	---	---

Test Graphs

DH5_Ant1_2402

DH5_Ant1_2441

DH5_Ant1_2480

2DH5_Ant1_2402

2DH5_Ant1_2441

2DH5_Ant1_2480

3DH5_Ant1_2402

3DH5_Ant1_2441

3DH5_Ant1_2480

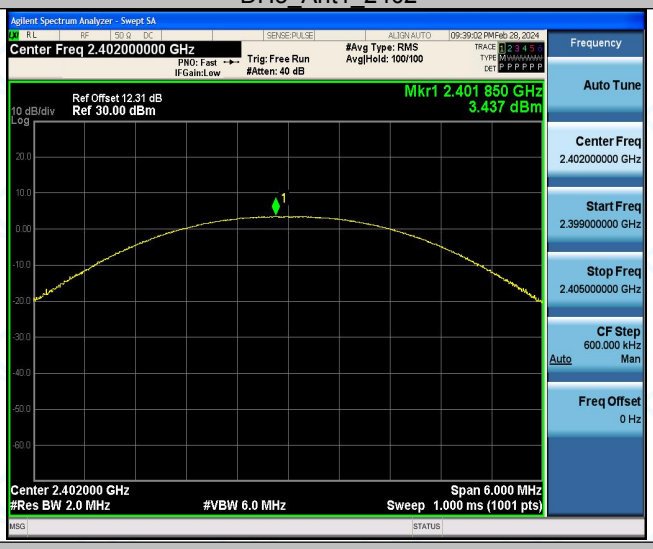
Appendix B: Maximum conducted output power

Test Result

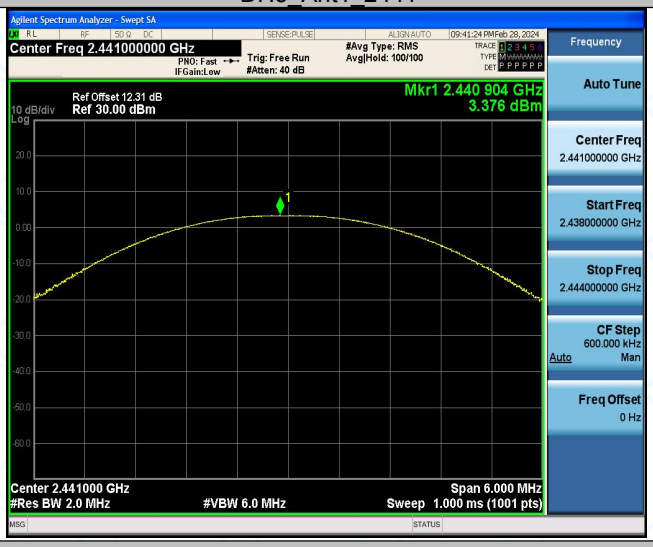
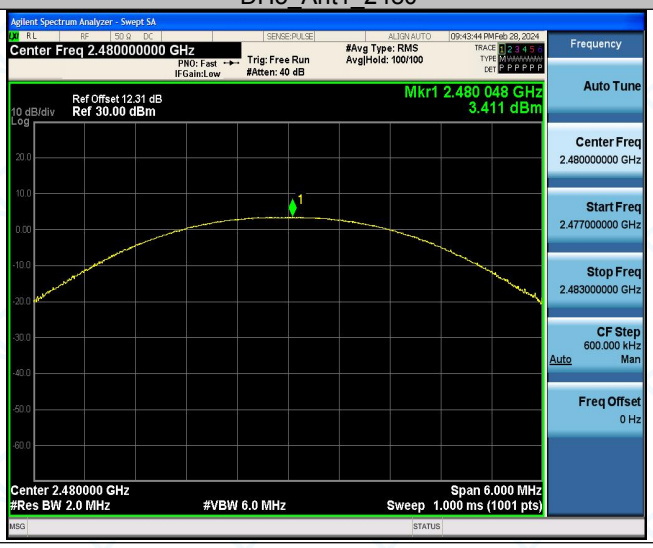
Test Mode	Antenna	Freq(MHz)	Conducted Peak Powert[dBm]	Conducted Limit[dBm]	Verdict
DH5	Ant1	2402	3.44	≤20.97	PASS
		2441	3.38	≤20.97	PASS
		2480	3.41	≤20.97	PASS
2DH5	Ant1	2402	4.72	≤20.97	PASS
		2441	4.52	≤20.97	PASS
		2480	4.11	≤20.97	PASS
3DH5	Ant1	2402	4.88	≤20.97	PASS
		2441	4.90	≤20.97	PASS
		2480	4.34	≤20.97	PASS

Test Graphs

DH5_Ant1_2402



DH5_Ant1_2441



DH5_Ant1_2480