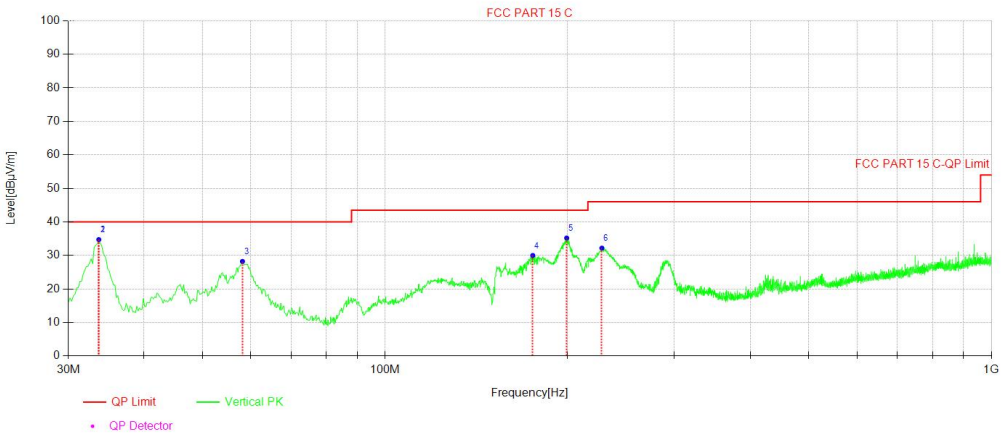
Test Configuration:	Measurements Below 1000MHz • RBW = 120 kHz • VBW = 300 kHz • Detector = Peak • Trace mode = max hold Peak Measurements Above 1000 MHz • RBW = 1 MHz • VBW ⩾ 3 MHz • Detector = Peak • Sweep time = auto • Trace mode = max hold Average Measurements Above 1000MHz • RBW = 1 MHz • VBW = 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. Charge+Transmitting mode.
Final Test Mode:	Pretest the EUT at Transmitting mode. Through Pre-scan, find the DH5 of data type is the worst case of All modulation type.
Instruments Used:	Refer to section 2.9 for details
Test Results:	Pass

Test data

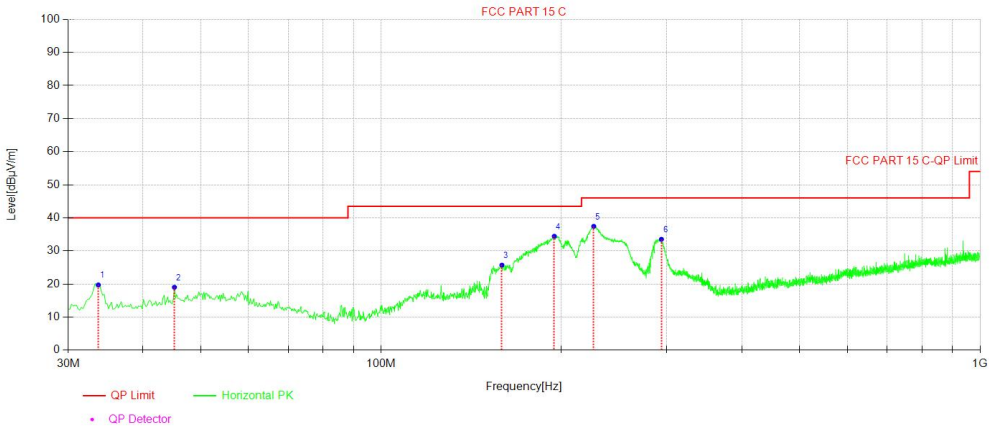
For 30-1000MHz

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	33.68	44.19	-9.45	34.74	40.00	5.26	100	70	QP
2	33.68	44.19	-9.45	34.74	40.00	5.26	100	70	QP
3	58.13	36.79	-8.56	28.23	40.00	11.77	100	176	QP
4	175.14	38.81	-8.80	30.01	43.50	13.49	100	1	QP
5	199.20	46.33	-11.12	35.21	43.50	8.29	100	6	QP
6	227.72	43.05	-10.85	32.20	46.00	13.80	100	288	QP

Horizontal :

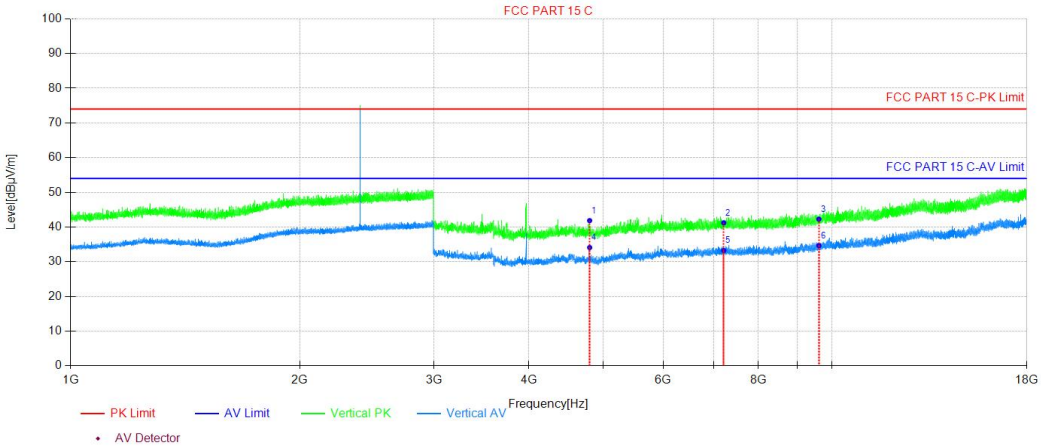


NO.	Freq. [MHz]	Reading Level [dBμV]	Correct Factor [dB/m]	Result Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	33.68	29.19	-9.45	19.74	40.00	20.26	200	330	QP
2	45.13	25.82	-6.79	19.03	40.00	20.97	100	71	QP
3	159.03	33.69	-7.96	25.73	43.50	17.77	200	330	QP
4	194.54	45.37	-10.92	34.45	43.50	9.05	200	264	QP
5	226.36	48.44	-10.98	37.46	46.00	8.54	100	42	QP
6	293.69	40.70	-7.17	33.53	46.00	12.47	100	359	QP

For above 1GHz

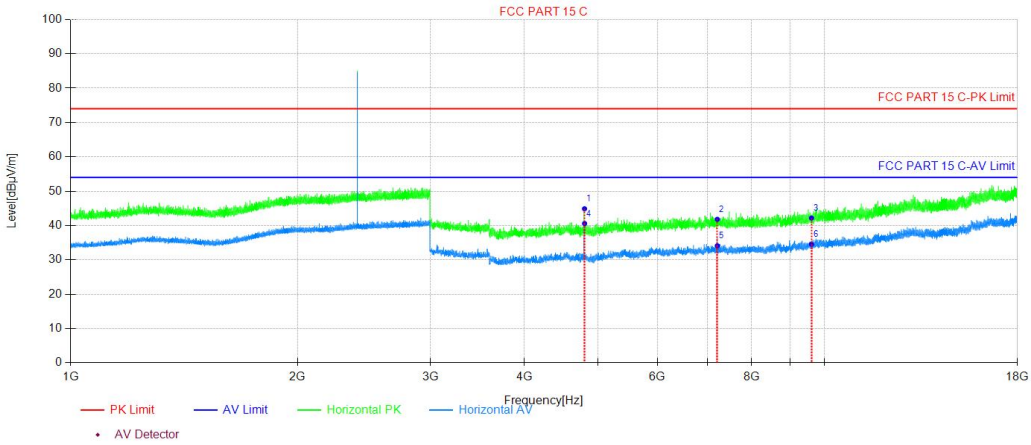
DH5 2402MHz

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	4803.84	42.99	-1.11	41.88	74.00	32.12	160	258	Peak
2	7206.21	38.84	2.39	41.23	74.00	32.77	150	216	Peak
3	9608.58	37.07	5.23	42.30	74.00	31.70	150	237	Peak
4	4804.59	35.20	-1.10	34.10	54.00	19.90	150	153	AV
5	7206.21	30.87	2.39	33.26	54.00	20.74	130	359	AV
6	9608.58	29.46	5.23	34.69	54.00	19.31	150	100	AV

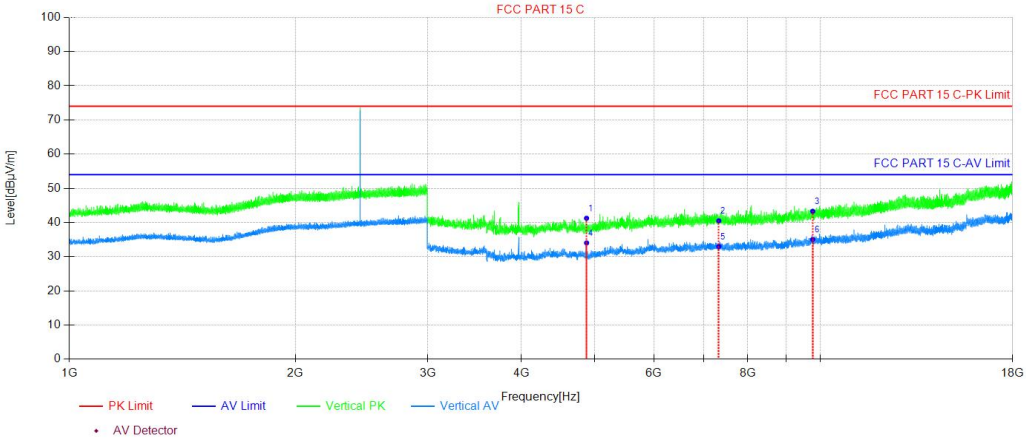
Horizontal:



NO.	Freq. [MHz]	Reading Level [dBμV]	Correct Factor [dB/m]	Result Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	4803.84	45.99	-1.11	44.88	74.00	29.12	150	49	Peak
2	7206.21	39.43	2.39	41.82	74.00	32.18	150	17	Peak
3	9608.58	36.95	5.23	42.18	74.00	31.82	150	360	Peak
4	4804.59	41.70	-1.10	40.60	54.00	13.40	160	38	AV
5	7206.21	31.73	2.39	34.12	54.00	19.88	150	113	AV
6	9608.58	29.34	5.23	34.57	54.00	19.43	150	360	AV

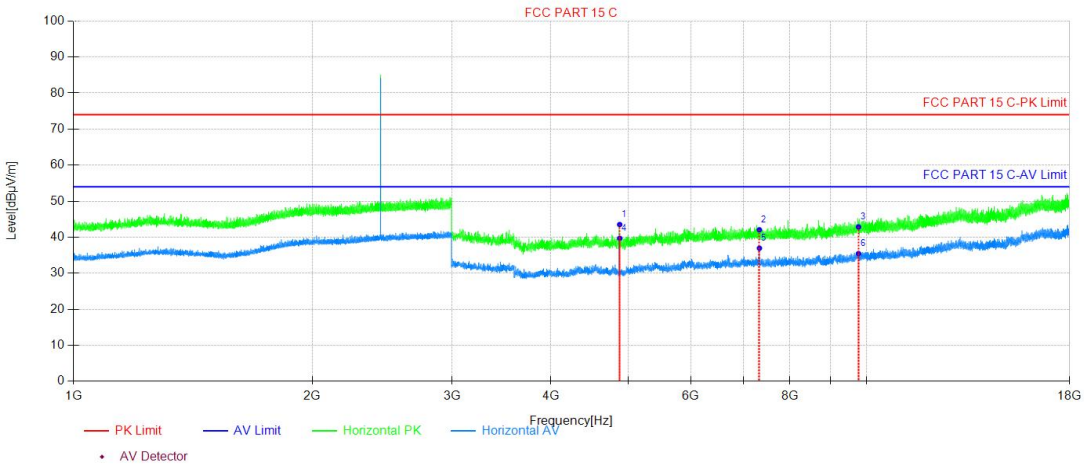
DH5 2441MHz

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	4881.84	42.98	-1.73	41.25	74.00	32.75	150	279	Peak
2	7323.21	38.05	2.47	40.52	74.00	33.48	150	28	Peak
3	9764.58	36.87	6.42	43.29	74.00	30.71	160	132	Peak
4	4882.59	35.76	-1.72	34.04	54.00	19.96	160	268	AV
5	7323.21	30.55	2.47	33.02	54.00	20.98	150	298	AV
6	9764.58	28.65	6.42	35.07	54.00	18.93	150	360	AV

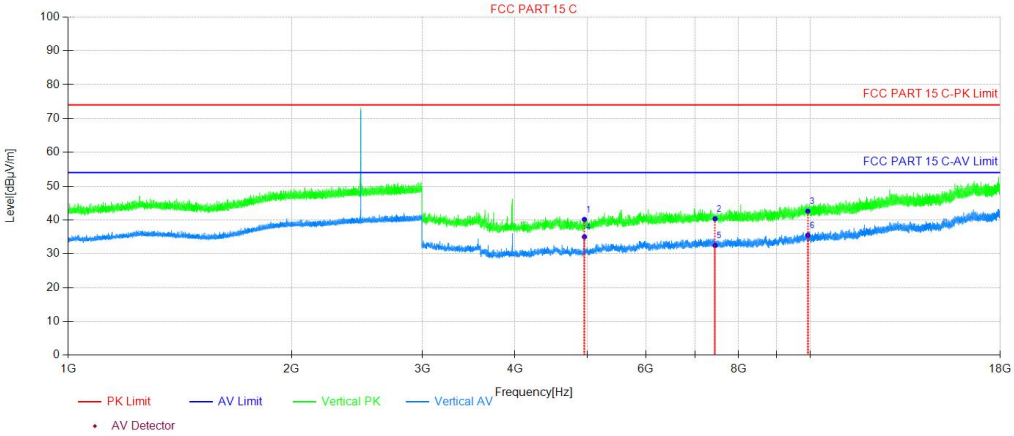
Horizontal:



NO.	Freq. [MHz]	Reading Level [dBμV]	Correct Factor [dB/m]	Result Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	4881.844	45.25	-1.73	43.52	74.00	30.48	140	46	Peak
2	7323.216	39.60	2.47	42.07	74.00	31.93	140	121	Peak
3	9764.588	36.44	6.42	42.86	74.00	31.14	150	317	Peak
4	4882.594	41.43	-1.72	39.71	54.00	14.29	150	37	AV
5	7323.966	34.48	2.47	36.95	54.00	17.05	150	27	AV
6	9764.588	29.05	6.42	35.47	54.00	18.53	150	359	AV

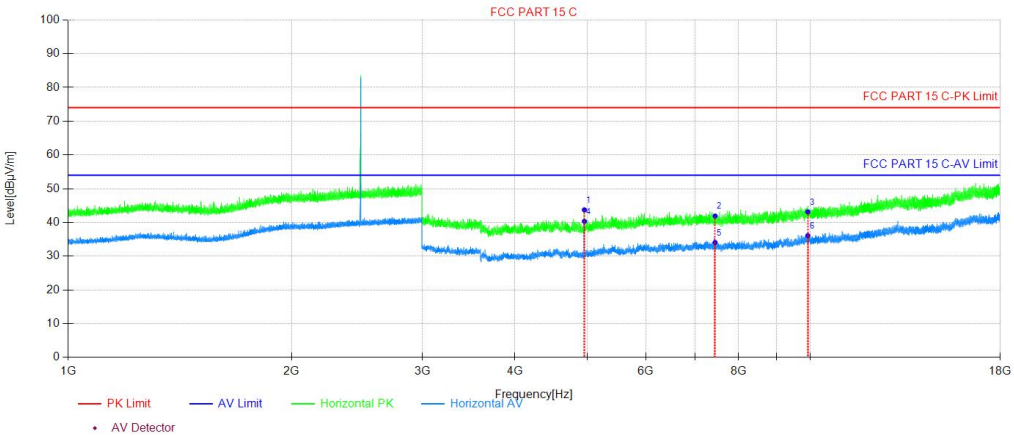
DH5 2480MHz

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	4960.59	41.91	-1.75	40.16	74.00	33.84	150	11	Peak
2	7440.22	37.62	2.73	40.35	74.00	33.65	160	209	Peak
3	9920.59	36.41	6.19	42.60	74.00	31.40	150	114	Peak
4	4960.59	36.76	-1.75	35.01	54.00	18.99	150	177	AV
5	7440.22	29.74	2.73	32.47	54.00	21.53	150	73	AV
6	9920.59	29.32	6.19	35.51	54.00	18.49	150	334	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	4960.59	45.48	-1.75	43.73	74.00	30.27	150	71	Peak
2	7440.22	39.19	2.73	41.92	74.00	32.08	150	18	Peak
3	9920.59	36.95	6.19	43.14	74.00	30.86	150	299	Peak
4	4960.59	42.08	-1.75	40.33	54.00	13.67	150	49	AV
5	7440.22	31.33	2.73	34.06	54.00	19.94	150	278	AV
6	9920.59	29.92	6.19	36.11	54.00	17.89	150	360	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:			

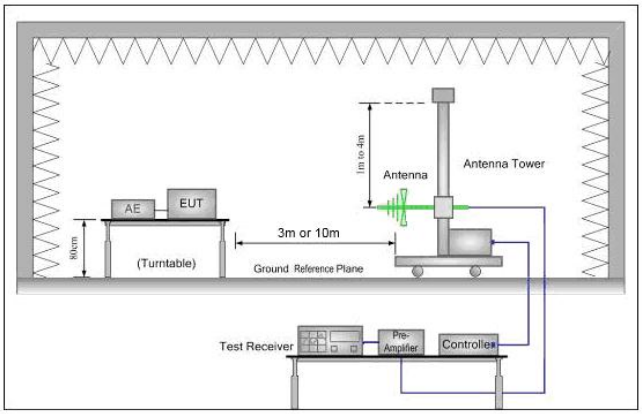


Figure 1. 30MHz to 1GHz

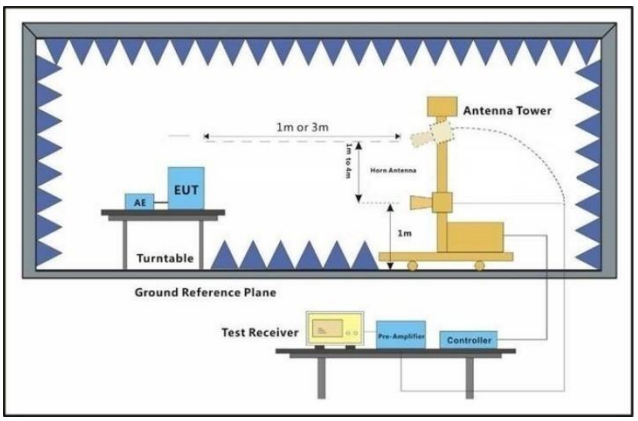


Figure 2. Above 1 GHz

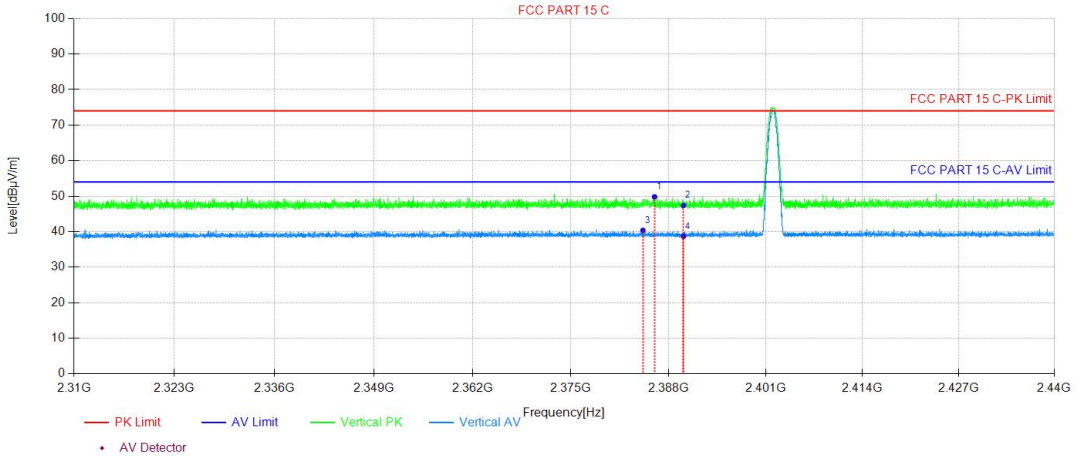
Test Procedure:	a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation. b. For above 1GHz, the EUT was placed on the top of a rotating 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

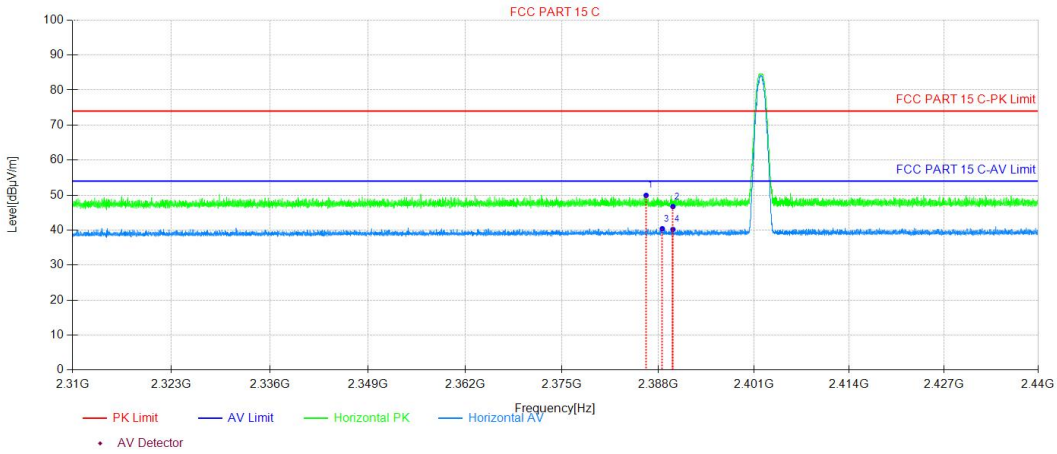
DH5 2402MHz

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	2386.14	48.47	1.37	49.84	74.00	24.16	150	271	Peak
2	2390.01	46.02	1.37	47.39	74.00	26.61	150	189	Peak
3	2384.60	39.03	1.37	40.40	54.00	13.60	150	250	AV
4	2390.01	37.29	1.37	38.66	54.00	15.34	150	234	AV

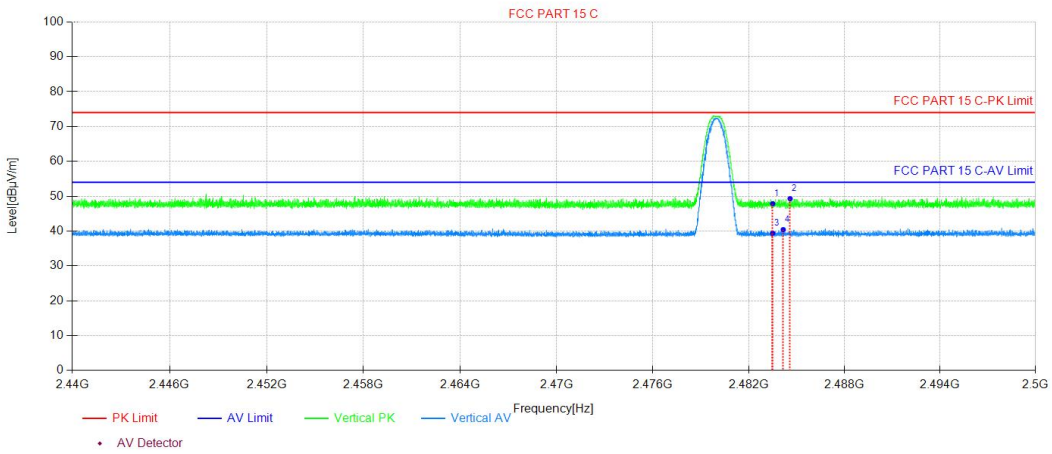
Horizontal:



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	2386.38	48.57	1.37	49.94	74.00	24.06	150	258	Peak
2	2390.01	45.38	1.37	46.75	74.00	27.25	150	5	Peak
3	2388.56	39.04	1.37	40.41	54.00	13.59	150	71	AV
4	2390.01	38.84	1.37	40.21	54.00	13.79	150	265	AV

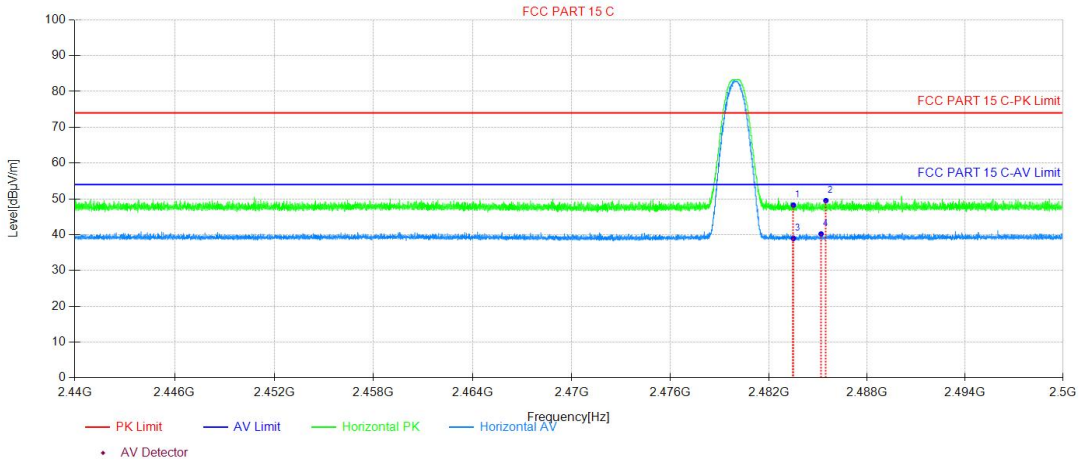
DH5 2480MHz

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	45.99	1.86	47.85	74.00	26.15	150	145	Peak
2	2484.59	47.43	1.86	49.29	74.00	24.71	150	0	Peak
3	2483.50	37.53	1.86	39.39	54.00	14.61	150	11	AV
4	2484.16	38.56	1.86	40.42	54.00	13.58	150	212	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	46.42	1.86	48.28	74.00	25.72	150	4	Peak
2	2485.49	47.67	1.86	49.53	74.00	24.47	150	77	Peak
3	2483.50	37.10	1.86	38.96	54.00	15.04	150	128	AV
4	2485.19	38.37	1.86	40.23	54.00	13.77	150	261	AV

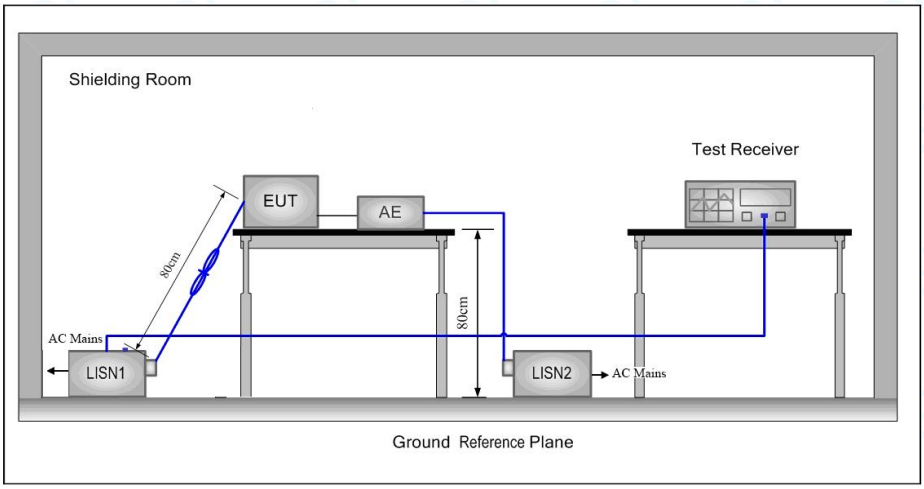
Note:

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.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

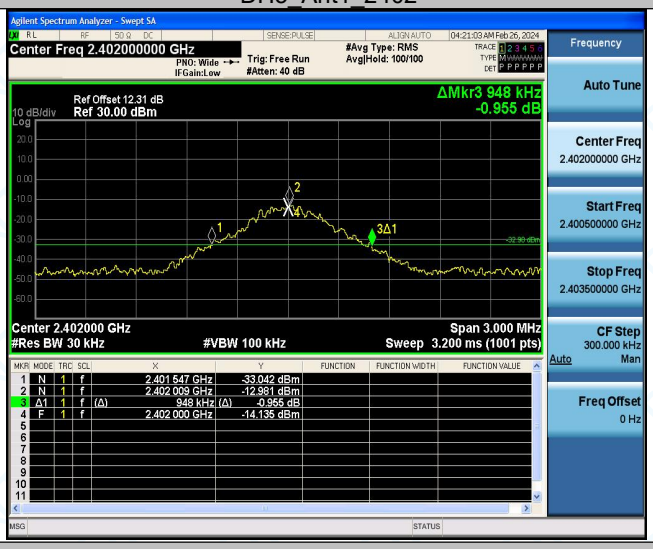
Appendix A: 20dB Emission Bandwidth

Test Result

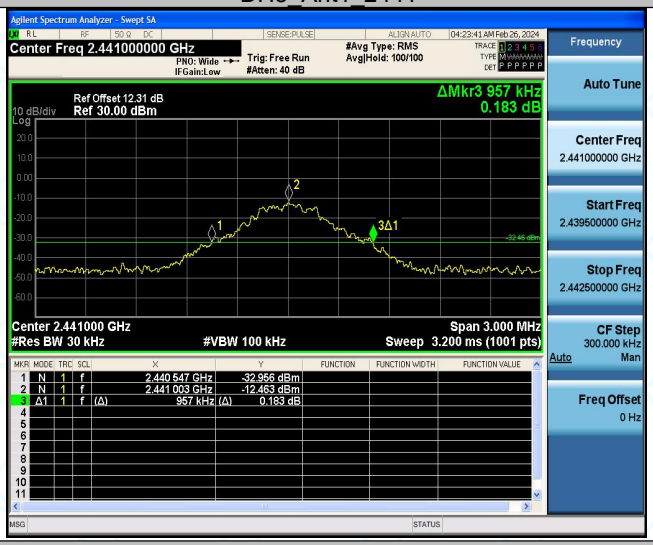
Test Mode	Antenna	Freq(MHz)	20dB EBW[MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
DH5	Ant1	2402	0.948	2401.547	2402.495	---	---
		2441	0.957	2440.547	2441.504	---	---
		2480	0.960	2479.541	2480.501	---	---
2DH5	Ant1	2402	1.308	2401.349	2402.657	---	---
		2441	1.317	2440.343	2441.660	---	---
		2480	1.287	2479.376	2480.663	---	---

Test Graphs

DH5_Ant1_2402



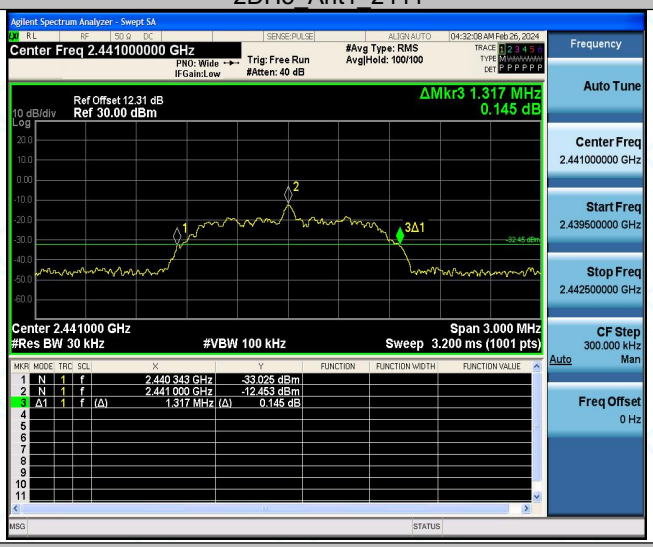
DH5_Ant1_2441



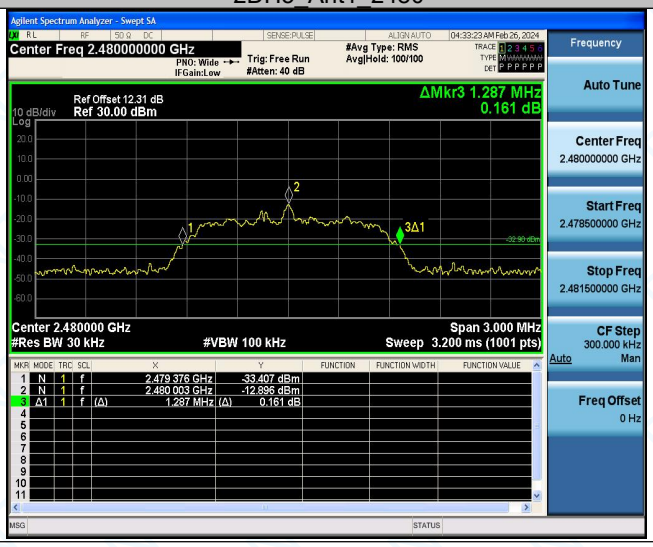
DH5_Ant1_2480

2DH5_Ant1_2402

2DH5_Ant1_2441



2DH5_Ant1_2480



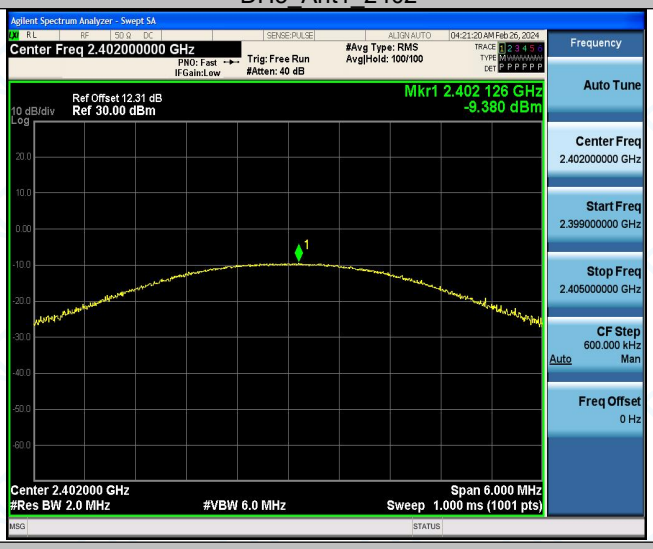
Appendix B: Maximum conducted output power

Test Result

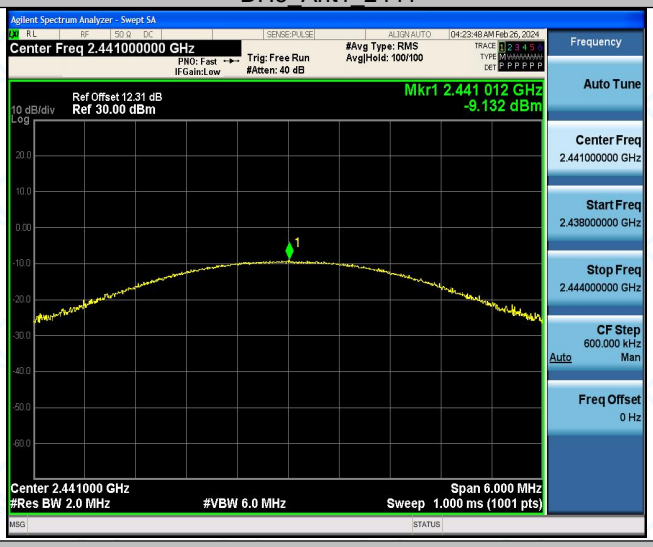
Test Mode	Antenna	Freq(MHz)	Conducted Peak Powert[dBm]	Conducted Limit[dBm]	Verdict
DH5	Ant1	2402	-9.38	≤20.97	PASS
		2441	-9.13	≤20.97	PASS
		2480	-9.62	≤20.97	PASS
2DH5	Ant1	2402	-9.12	≤20.97	PASS
		2441	-8.94	≤20.97	PASS
		2480	-9.28	≤20.97	PASS

Test Graphs

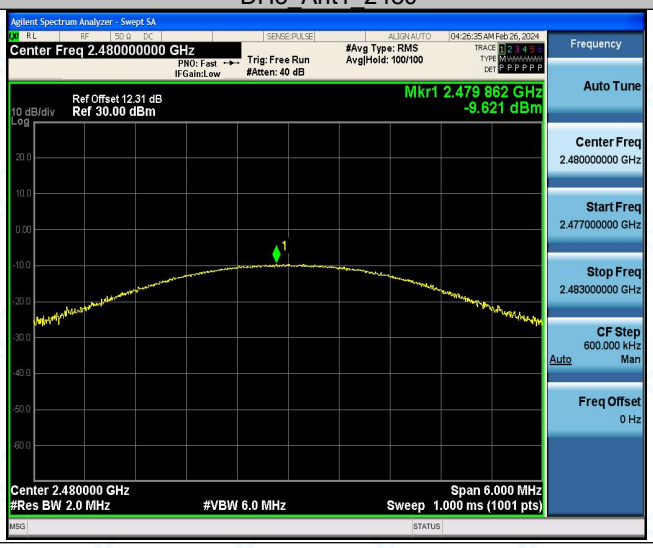
DH5_Ant1_2402



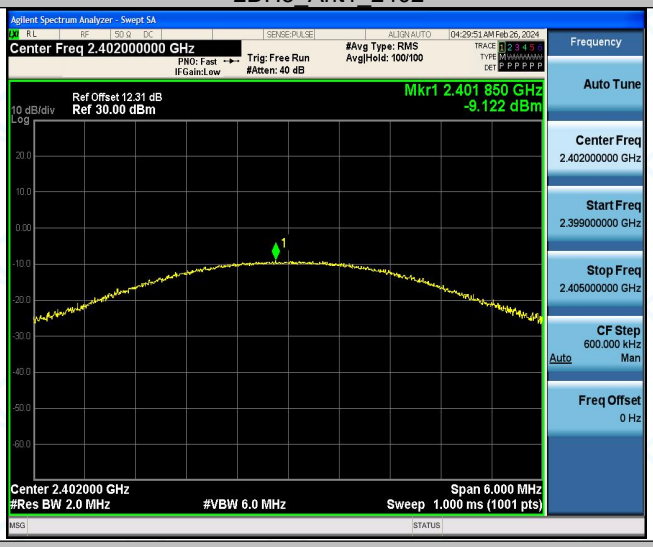
DH5_Ant1_2441



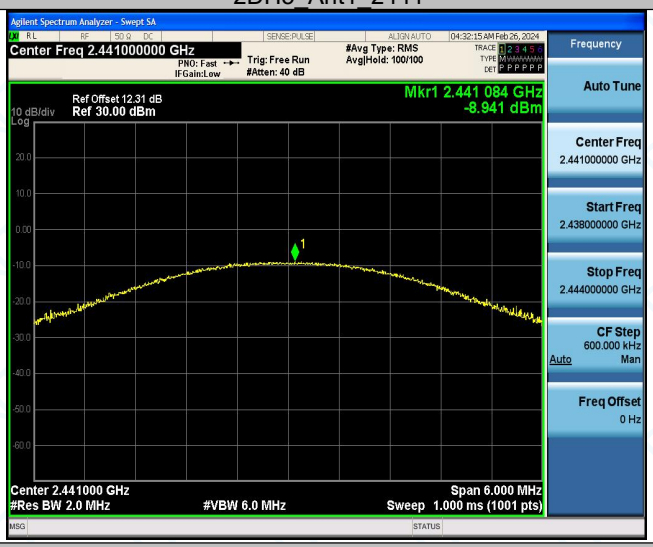
DH5_Ant1_2480



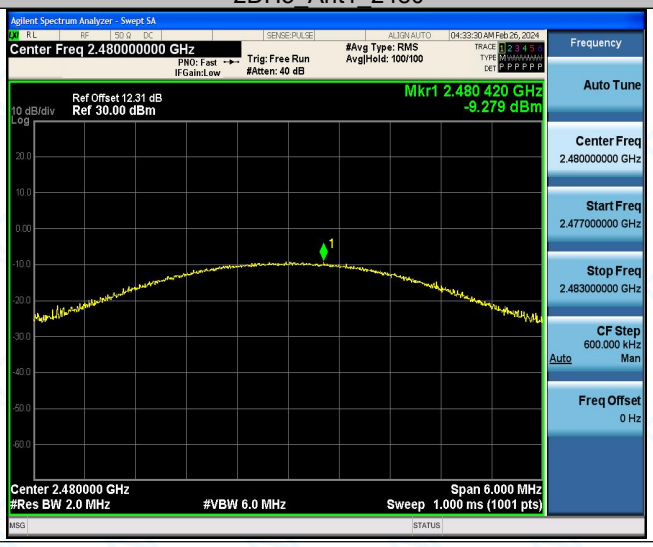
2DH5_Ant1_2402



2DH5_Ant1_2441



2DH5_Ant1_2480



Appendix C: Carrier frequency separation

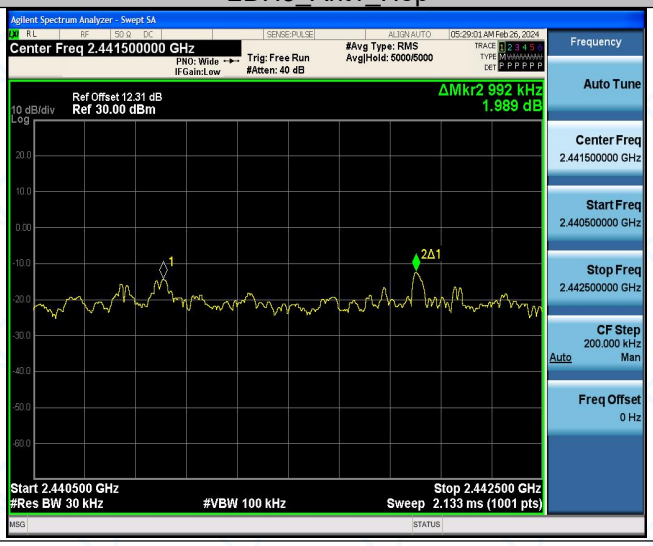
Test Result

Test Mode	Antenna	Freq(MHz)	Result[MHz]	Limit[MHz]	Verdict
DH5	Ant1	Hop	1.022	≥0.960	PASS
2DH5	Ant1	Hop	0.992	≥0.878	PASS

Test Graphs

DH5_Ant1_Hop

2DH5_Ant1_Hop



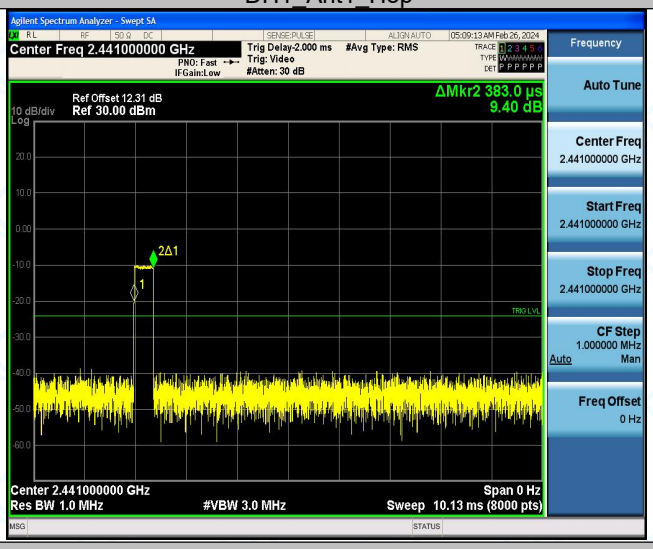
Appendix D: Dwell Time

Test Result

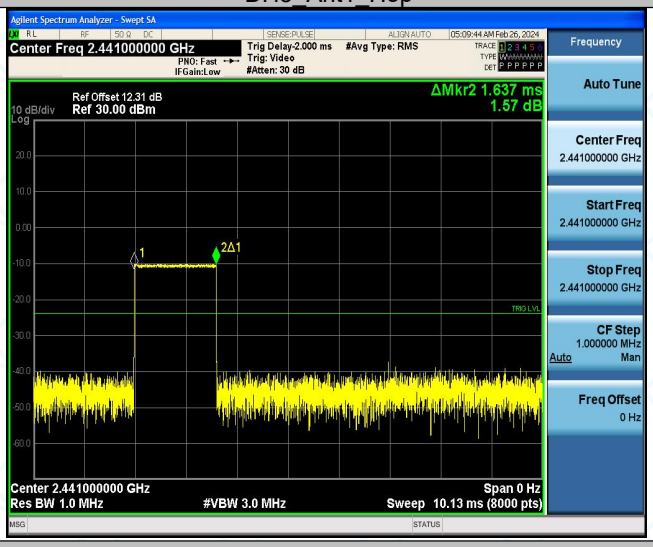
Test Mode	Antenna	Freq(MHz)	BurstWidth [ms]	TotalHops [Num]	Result[s]	Limit[s]	Verdict
DH1	Ant1	Hop	0.383	320	0.123	≤0.4	PASS
DH3	Ant1	Hop	1.637	160	0.262	≤0.4	PASS
DH5	Ant1	Hop	2.889	106.67	0.308	≤0.4	PASS
2DH1	Ant1	Hop	0.390	320	0.125	≤0.4	PASS
2DH3	Ant1	Hop	1.642	160	0.263	≤0.4	PASS
2DH5	Ant1	Hop	2.891	106.67	0.308	≤0.4	PASS

Test Graphs

DH1_Ant1_Hop



DH3_Ant1_Hop



DH5_Ant1_Hop