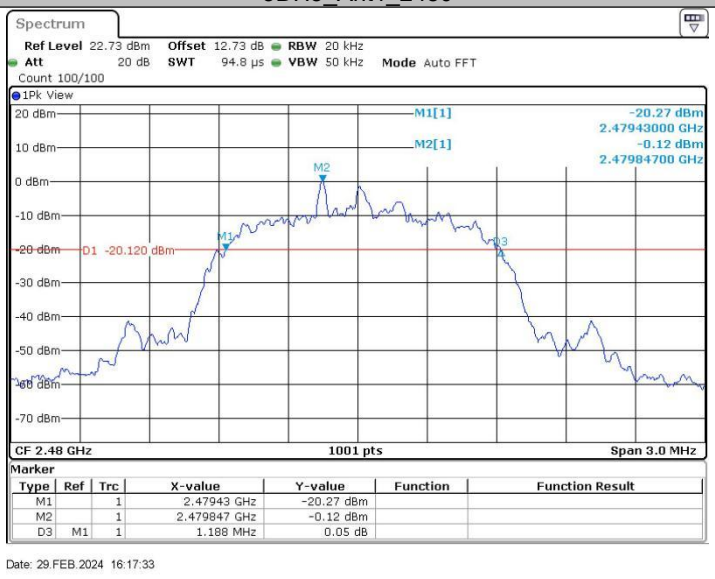
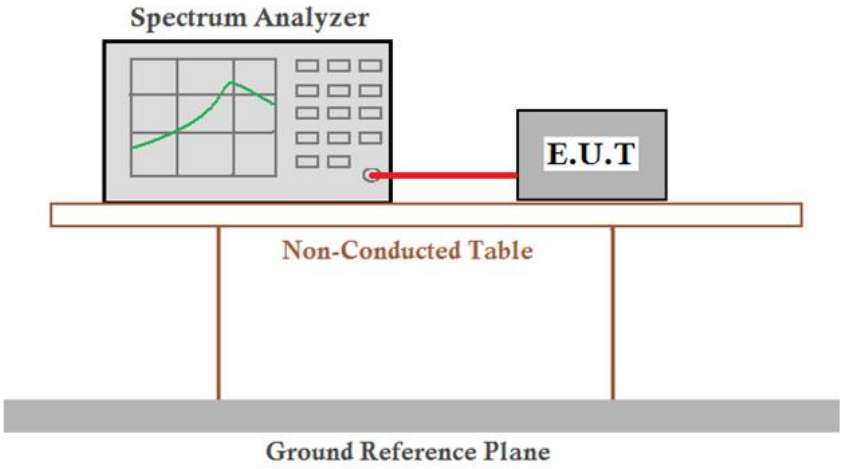
3DH5_Ant1_2480



5.5 Carrier Frequencies Separation

Test Requirement:	47 CFR Part 15C Section 15.247 (a)(1)
Test Method:	ANSI C63.10:2013
Test Setup:	 Remark: Offset=Cable loss+ attenuation factor.
Limit:	2/3 of the 20dB bandwidth
	Remark: the transmission power is less than 0.125W.
Exploratory Test Mode:	Hopping transmitting with all kind of modulation and all kind of data type
Final Test Mode:	Only the worst case is recorded in the report.
Test Results:	Pass

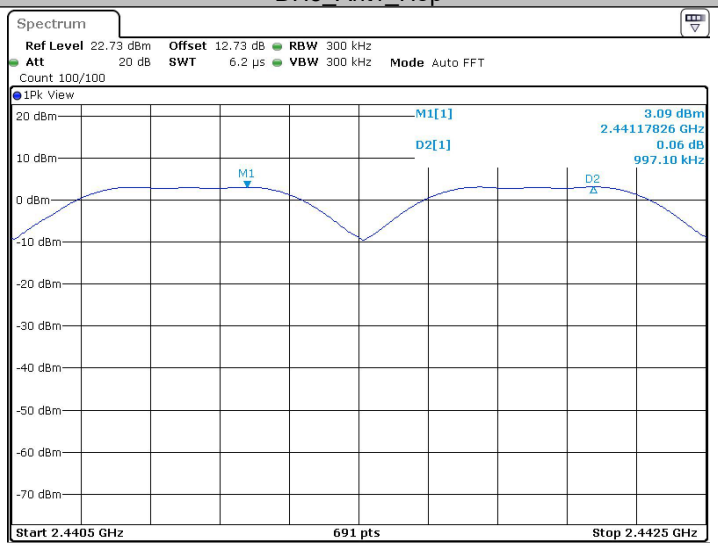
Measurement Data

TestMode	Freq(MHz)	Result[MHz]	Limit[MHz]	Verdict
DH5	Hop	0.997	≥0.627	PASS
2DH5	Hop	1	≥0.807	PASS
3DH5	Hop	1.003	≥0.793	PASS

Mode	20dB bandwidth (MHz) (worse case)	Limit (MHz) (Carrier Frequencies Separation)
GFSK	0.94	0.627
π/4DQPSK	1.21	0.807
8DPSK	1.19	0.793

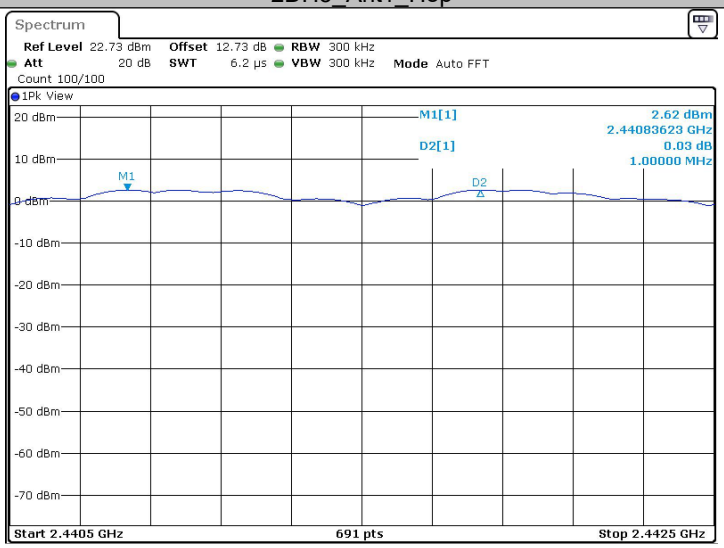
Test plot as follows:

DH5_Ant1_Hop



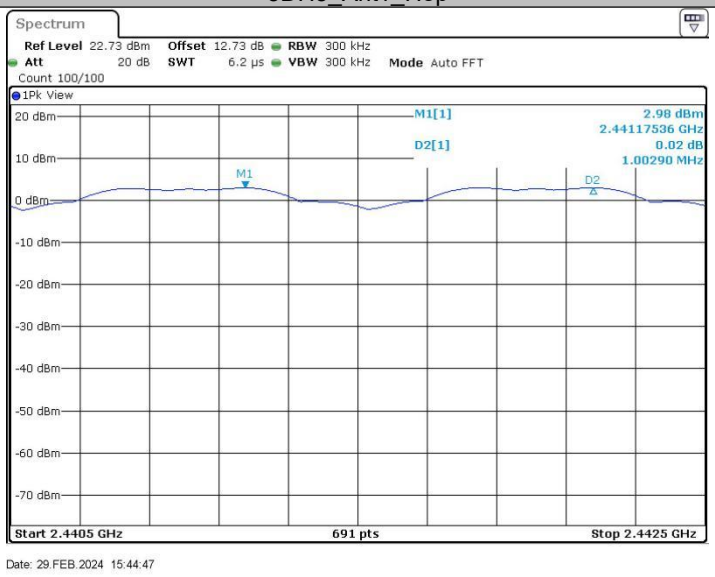
Date: 29.FEB.2024 15:28:57

2DH5_Ant1_Hop

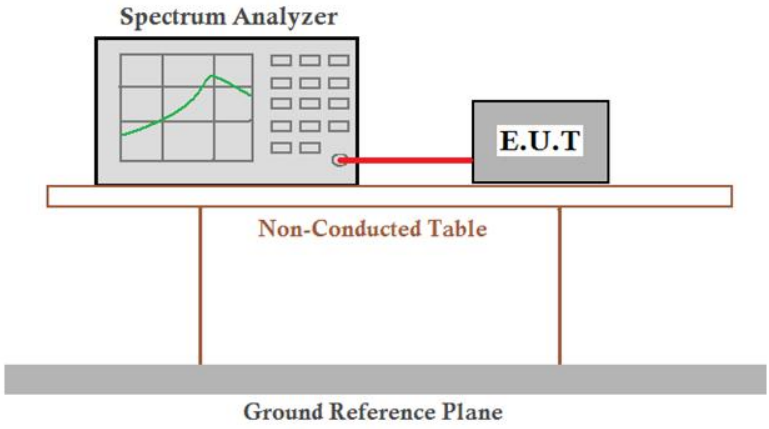


Date: 4.MAR.2024 10:22:24

3DH5_Ant1_Hop



5.6 Hopping Channel Number

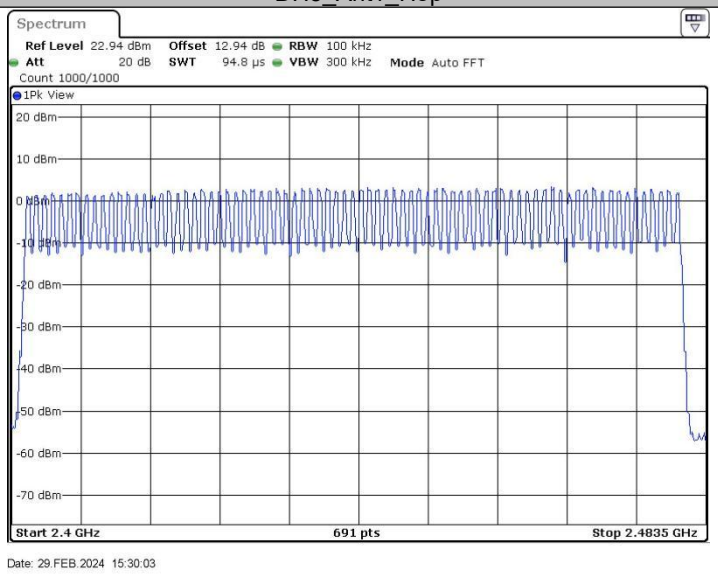
Test Requirement:	47 CFR Part 15C Section 15.247 (a)(1)
Test Method:	ANSI C63.10:2013
Test Setup:	 *Remark: Offset=Cable loss+ attenuation factor.*
Limit:	At least 15 channels
Exploratory Test Mode:	hopping transmitting with all kind of modulation and all kind of data type
Final Test Mode:	Only the worst case is recorded in the report.
Test Results:	Pass

Measurement Data

Mode	Hopping channel numbers	Limit
GFSK	79	≥15
π/4DQPSK	79	≥15
8DPSK	79	≥15

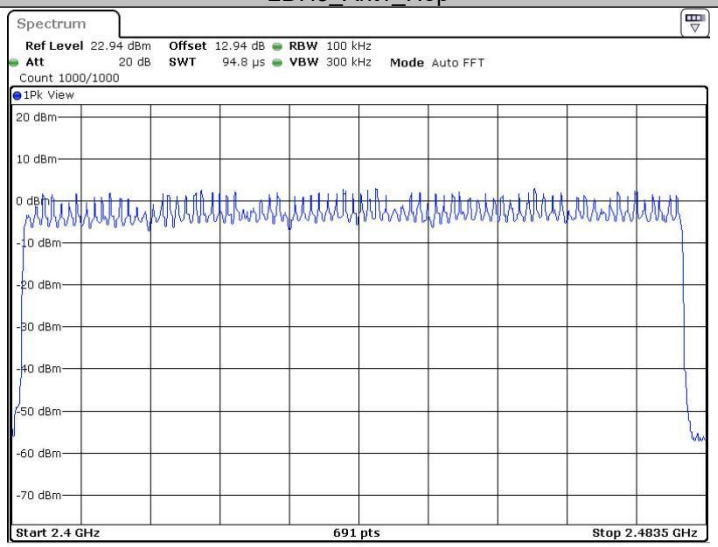
Test plot as follows:

DH5_Ant1_Hop



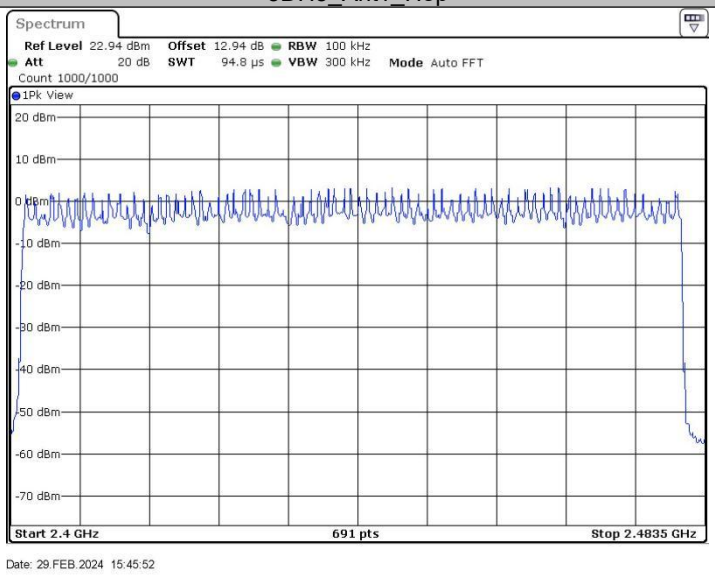
Date: 29.FEB.2024 15:30:03

2DH5_Ant1_Hop

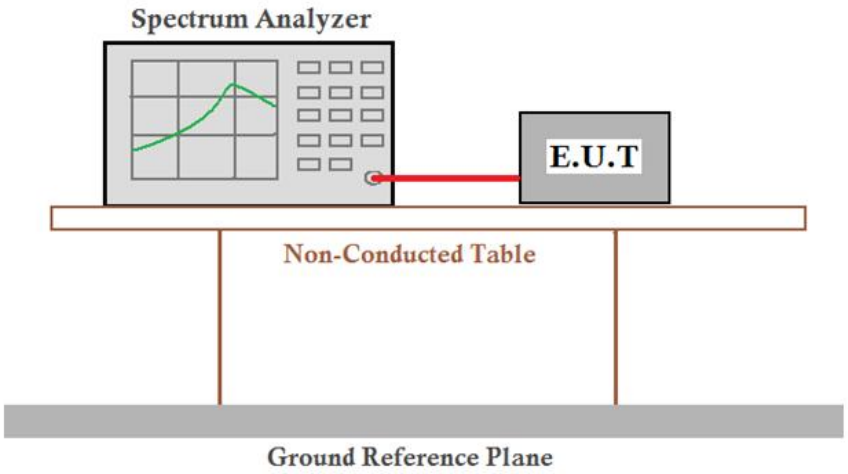


Date: 29.FEB.2024 15:36:49

3DH5_Ant1_Hop



5.7 Dwell Time

Test Requirement:	47 CFR Part 15C Section 15.247 (a)(1)
Test Method:	ANSI C63.10:2013
Test Setup:	 *Remark: Offset=Cable loss+ attenuation factor.*
Test Mode:	Hopping transmitting with all kind of modulation and all kind of data type.
Limit:	0.4 Second
Test Results:	Pass

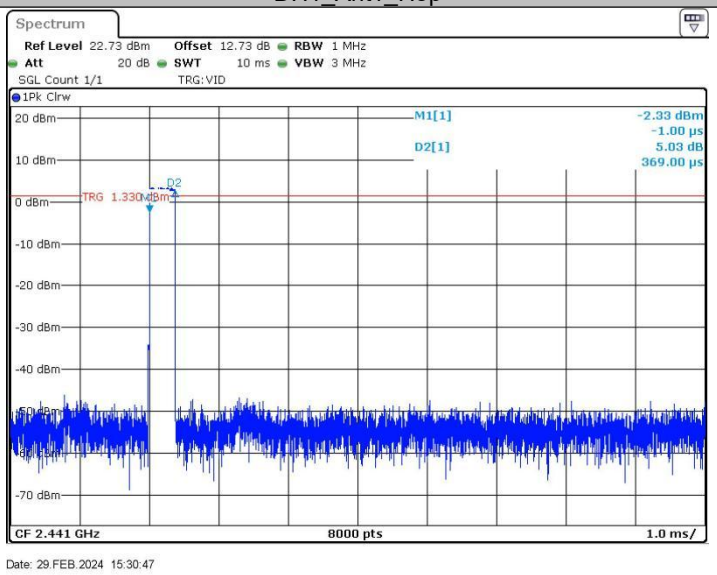
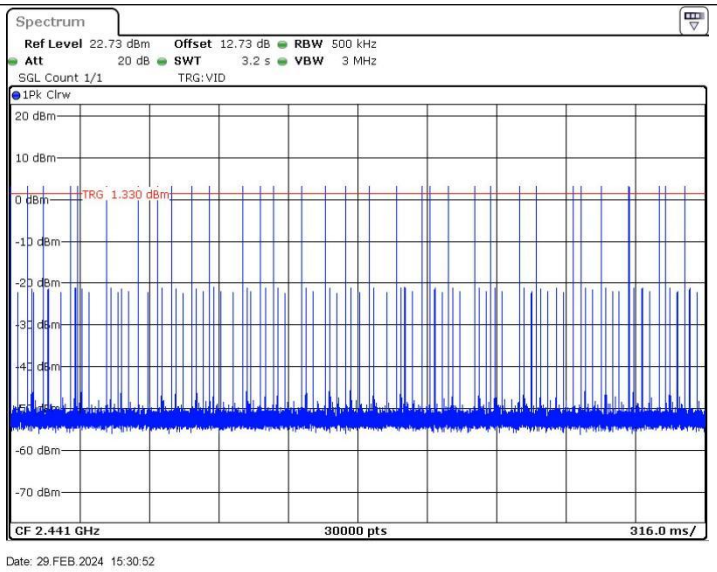
Measurement Data

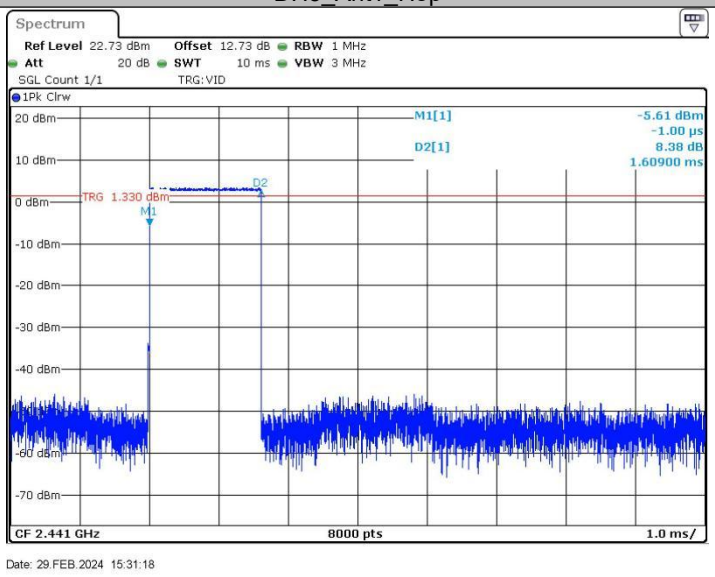
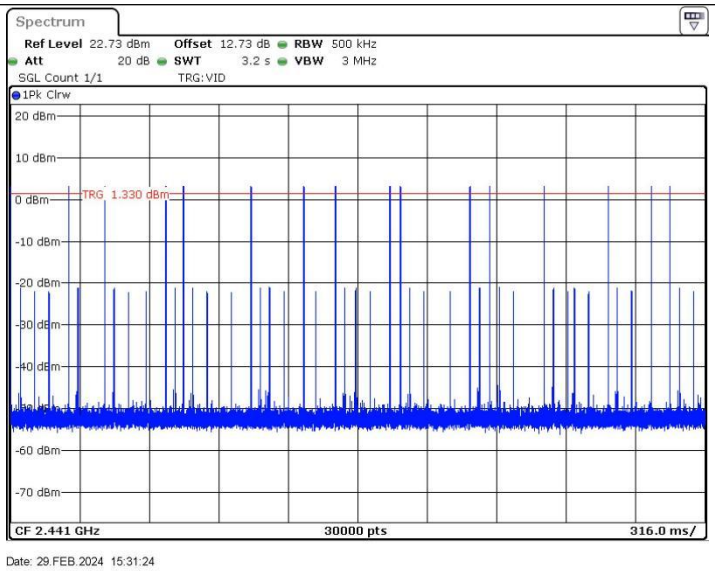
TestMode	Freq(MHz)	BurstWidth [ms]	TotalHops [Num]	Result[s]	Limit[s]	Verdict
DH1	Hop	0.369	330	0.122	≤0.4	PASS
DH3	Hop	1.609	160	0.257	≤0.4	PASS
DH5	Hop	2.850	110	0.314	≤0.4	PASS
2DH1	Hop	0.376	330	0.124	≤0.4	PASS
2DH3	Hop	1.621	170	0.276	≤0.4	PASS
2DH5	Hop	2.862	110	0.315	≤0.4	PASS
3DH1	Hop	0.376	330	0.124	≤0.4	PASS
3DH3	Hop	1.619	160	0.259	≤0.4	PASS
3DH5	Hop	2.862	120	0.343	≤0.4	PASS

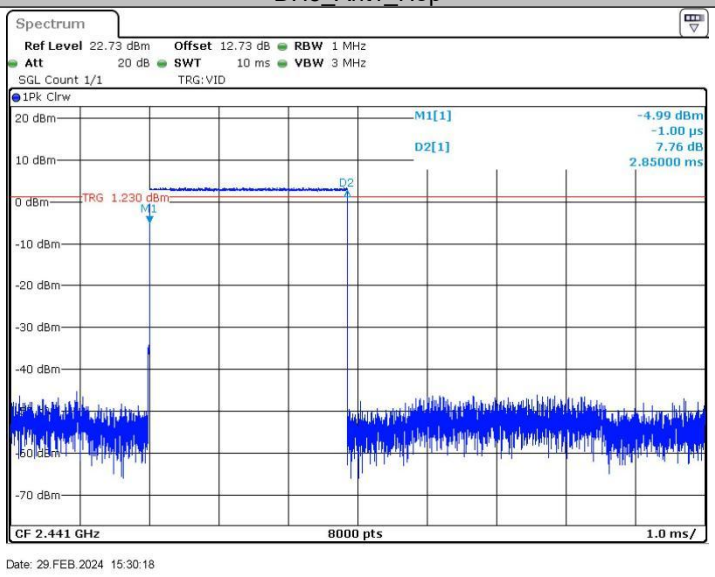
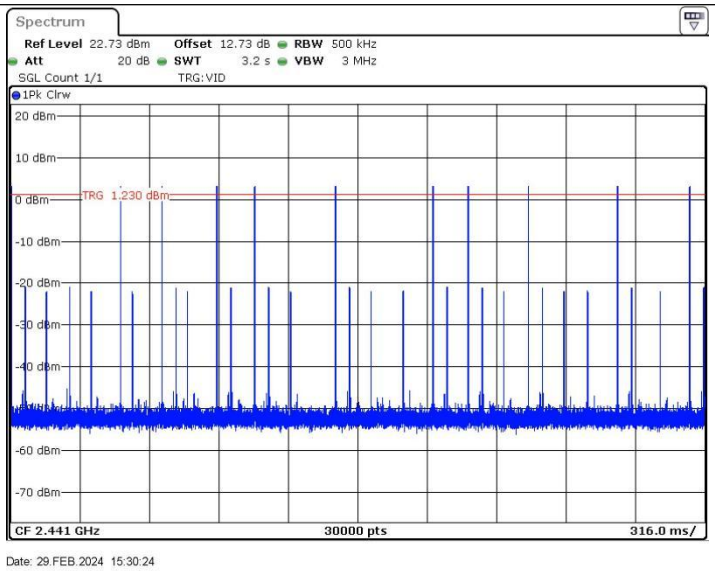
Remark:

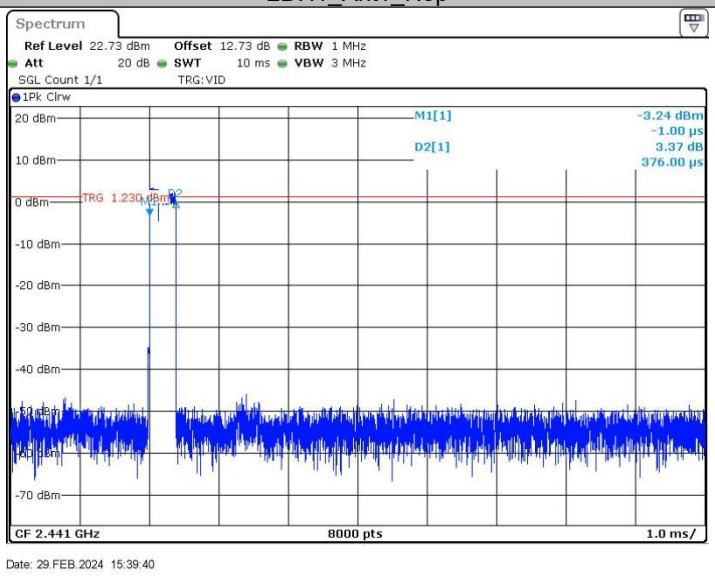
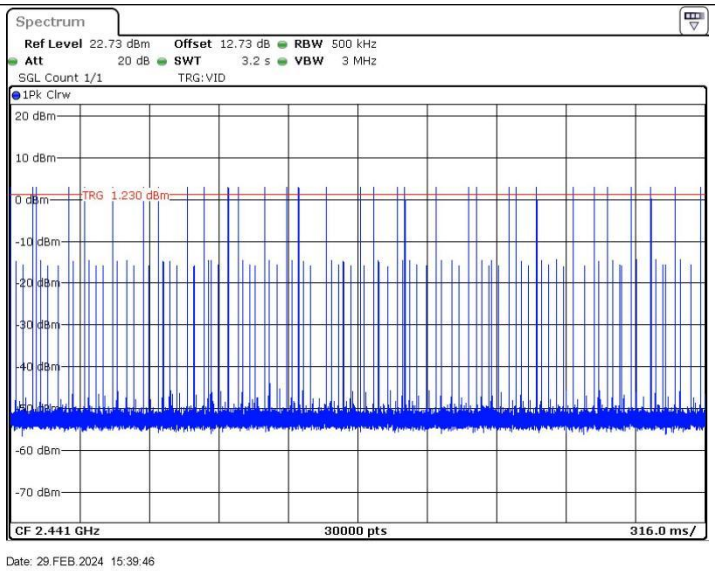
The test period: T= 0.4 Second/Channel x 79 Channel = 31.6 s

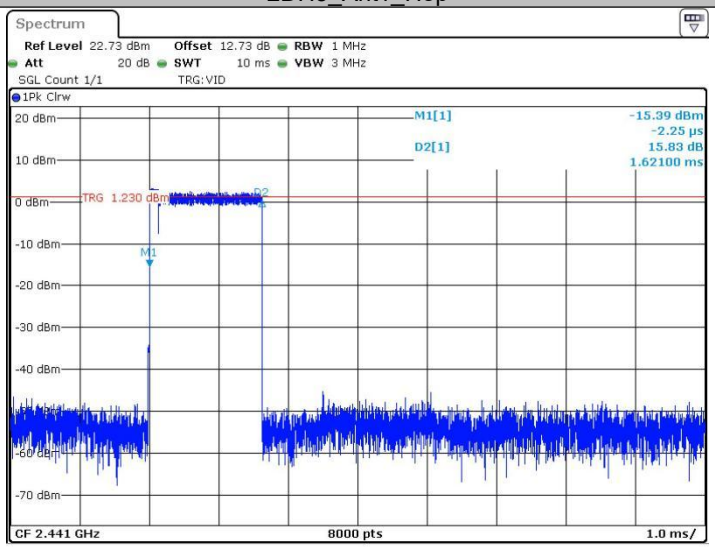
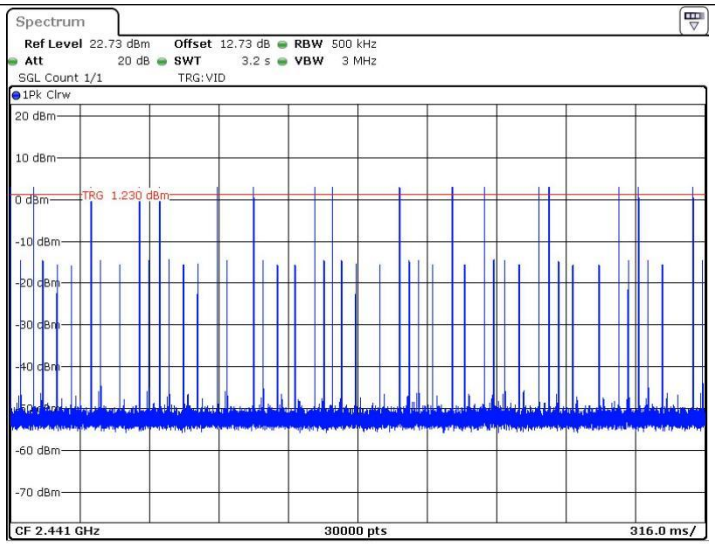
Test plot as follows:

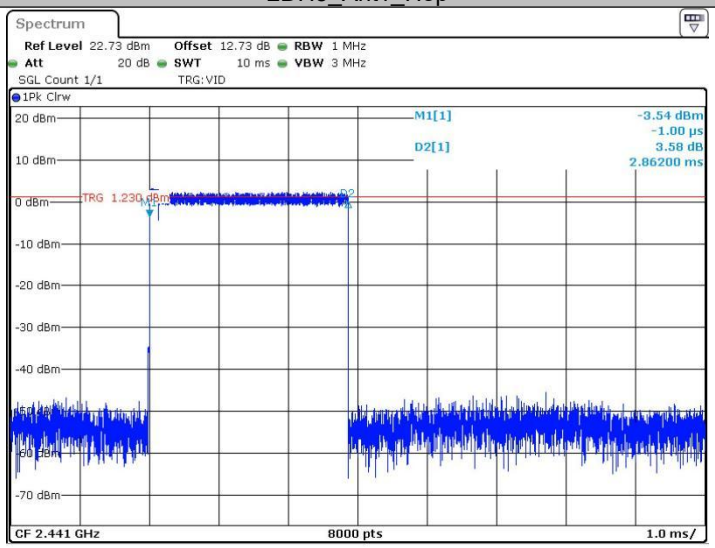
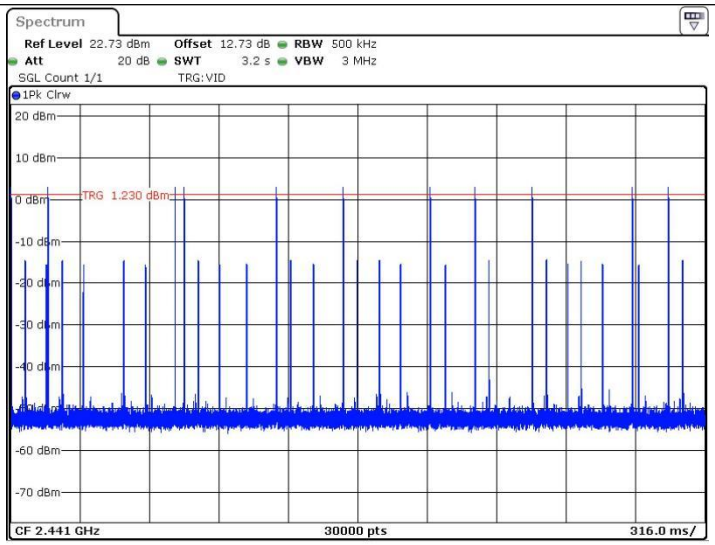
DH1_Ant1_Hop



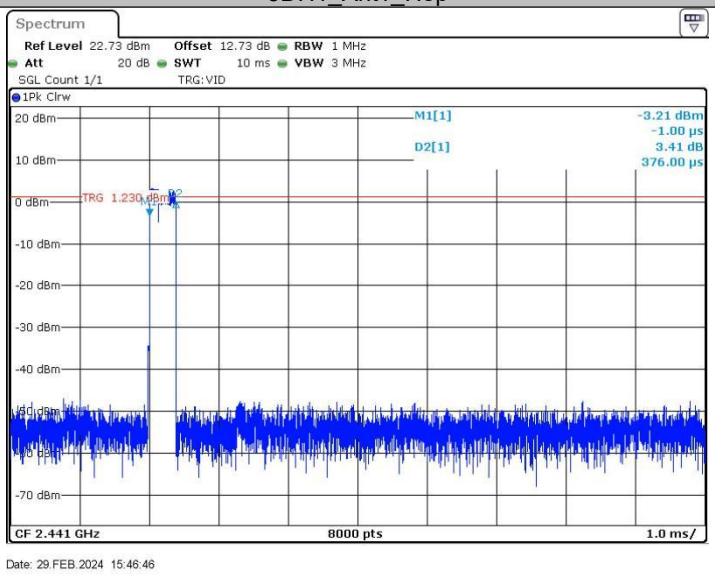
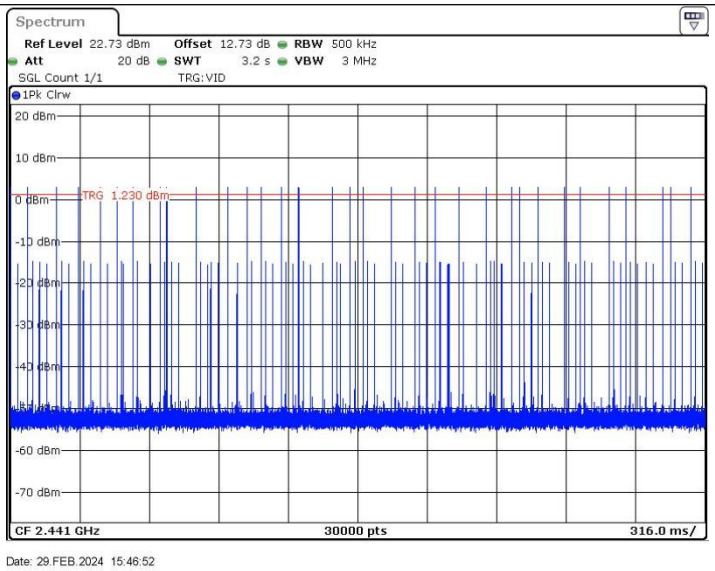
DH3_Ant1_Hop
 Spectrum Ref Level 22.73 dBm Offset 12.73 dB RBW 1 MHz Att 20 dB SWT 10 ms VBW 3 MHz SGL Count 1/1 TRG:VID 1Pk Clrw M1[1] -5.61 dBm -1.00 µs D2[1] 8.38 dB 1.60900 ms TRG 1.330 dBm CF 2.441 GHz 8000 pts 1.0 ms/ Date: 29.FEB.2024 15:31:18
 Spectrum Ref Level 22.73 dBm Offset 12.73 dB RBW 500 kHz Att 20 dB SWT 3.2 s VBW 3 MHz SGL Count 1/1 TRG:VID 1Pk Clrw TRG 1.330 dBm CF 2.441 GHz 30000 pts 316.0 ms/ Date: 29.FEB.2024 15:31:24

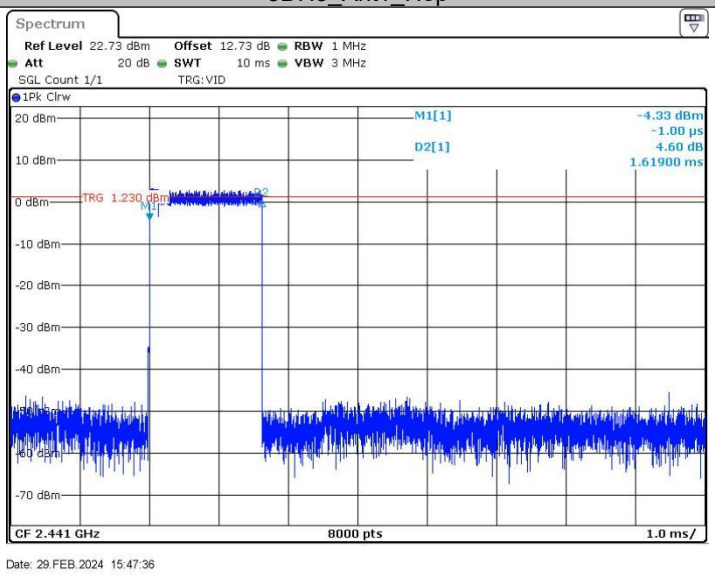
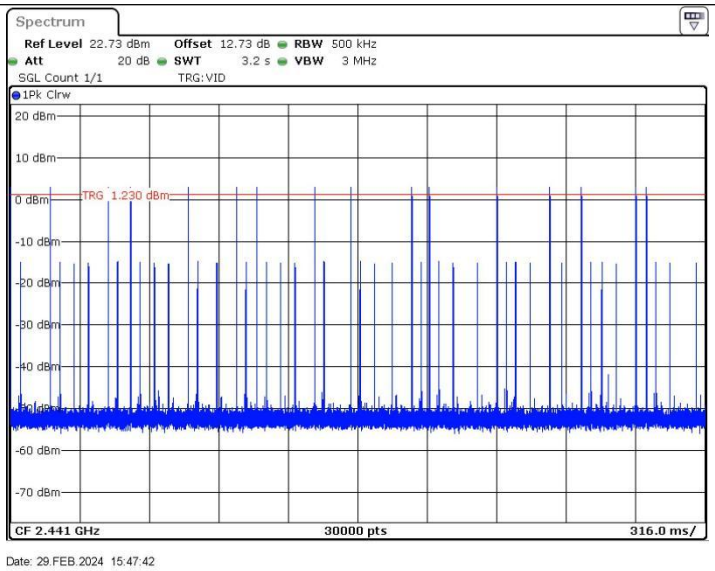
DH5_Ant1_Hop
 Spectrum Ref Level 22.73 dBm Offset 12.73 dB RBW 1 MHz Att 20 dB SWT 10 ms VBW 3 MHz SGL Count 1/1 TRG:VID 1Pk Clrw M1[1] -4.99 dBm -1.00 µs D2[1] 7.76 dB 2.85000 ms TRG 1.230 dBm CF 2.441 GHz 8000 pts 1.0 ms/ Date: 29.FEB.2024 15:30:18
 Spectrum Ref Level 22.73 dBm Offset 12.73 dB RBW 500 kHz Att 20 dB SWT 3.2 s VBW 3 MHz SGL Count 1/1 TRG:VID 1Pk Clrw TRG 1.230 dBm CF 2.441 GHz 30000 pts 316.0 ms/ Date: 29.FEB.2024 15:30:24

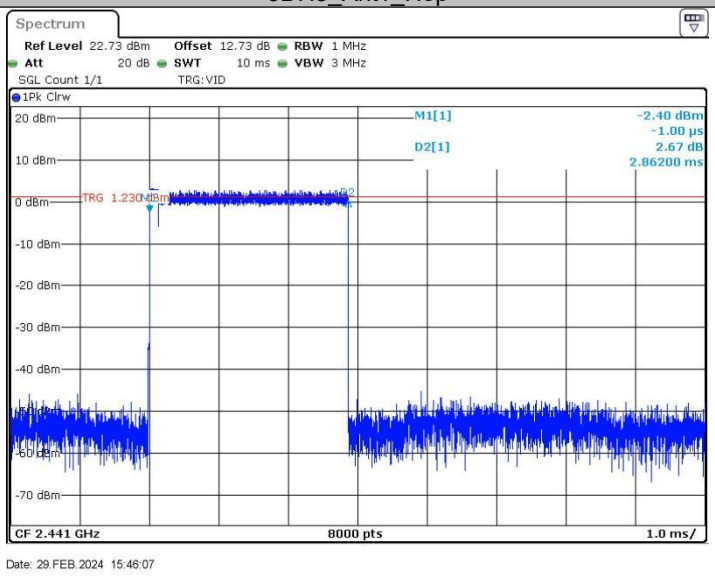
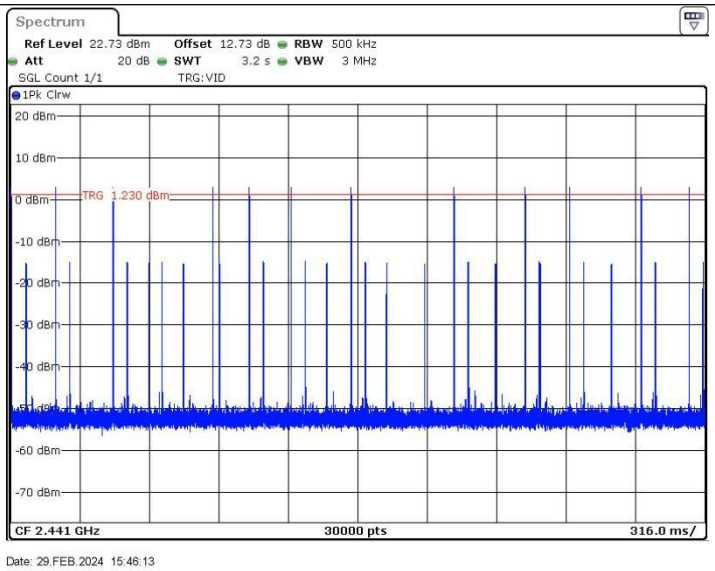
2DH1_Ant1_Hop



2DH3_Ant1_Hop



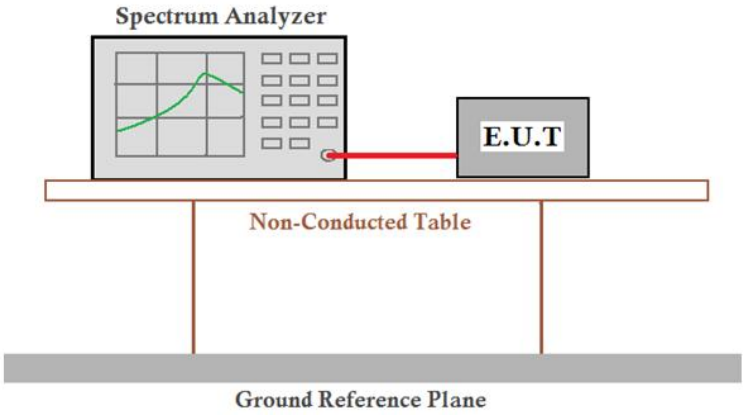
2DH5_Ant1_Hop



3DH1_Ant1_Hop



3DH3_Ant1_Hop



3DH5_Ant1_Hop



5.8 Band-edge for RF Conducted Emissions

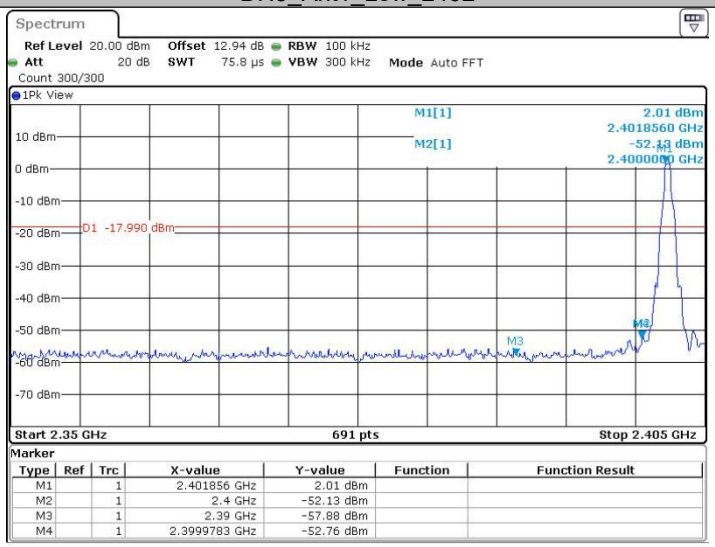
Test Requirement:	47 CFR Part 15C Section 15.247 (d)
Test Method:	ANSI C63.10:2013
Test Setup:	 *Remark: Offset=cable loss+ attenuation factor.*
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is 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.
Exploratory Test Mode:	Hopping and Non-hopping transmitting with all kind of modulation and all kind of data type
Final Test Mode:	Only the worst case is recorded in the report.
Test Results:	Pass

Measurement Data

TestMode	ChName	Freq(MHz)	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH5	Low	2402	2.01	-52.76	≤-17.99	PASS
	High	2480	2.40	-54.32	≤-17.6	PASS
	Low	Hop_2402	1.25	-54.75	≤-18.75	PASS
	High	Hop_2480	2.19	-54.14	≤-17.81	PASS
2DH5	Low	2402	1.90	-53.42	≤-18.1	PASS
	High	2480	2.16	-54.87	≤-17.84	PASS
	Low	Hop_2402	0.63	-55.67	≤-19.37	PASS
	High	Hop_2480	0.61	-54.28	≤-19.39	PASS
3DH5	Low	2402	1.97	-51.66	≤-18.03	PASS
	High	2480	2.34	-54.09	≤-17.66	PASS
	Low	Hop_2402	0.03	-55.67	≤-19.97	PASS
	High	Hop_2480	1.68	-54.6	≤-18.32	PASS

Test plot as follows:

DH5_Ant1_Low_2402

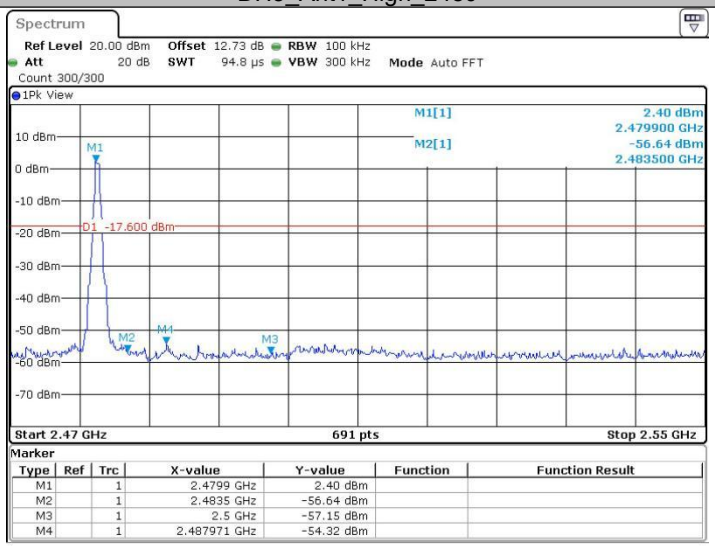


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.401856 GHz	2.01 dBm		
M2		1	2.4 GHz	-52.13 dBm		
M3		1	2.39 GHz	-57.88 dBm		
M4		1	2.3999783 GHz	-52.76 dBm		

Date: 29.FEB.2024 15:51:15

DH5_Ant1_High_2480

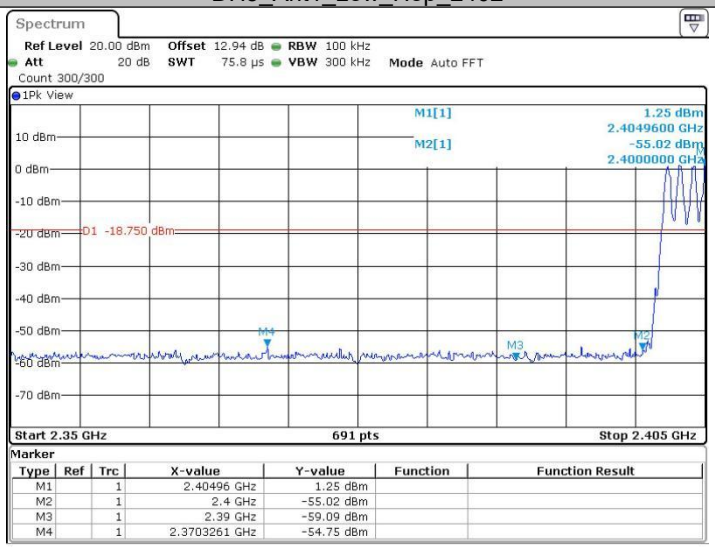


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.4799 GHz	2.40 dBm		
M2		1	2.4835 GHz	-56.64 dBm		
M3		1	2.5 GHz	-57.15 dBm		
M4		1	2.487971 GHz	-54.32 dBm		

Date: 29.FEB.2024 15:55:42

DH5_Ant1_Low_Hop_2402

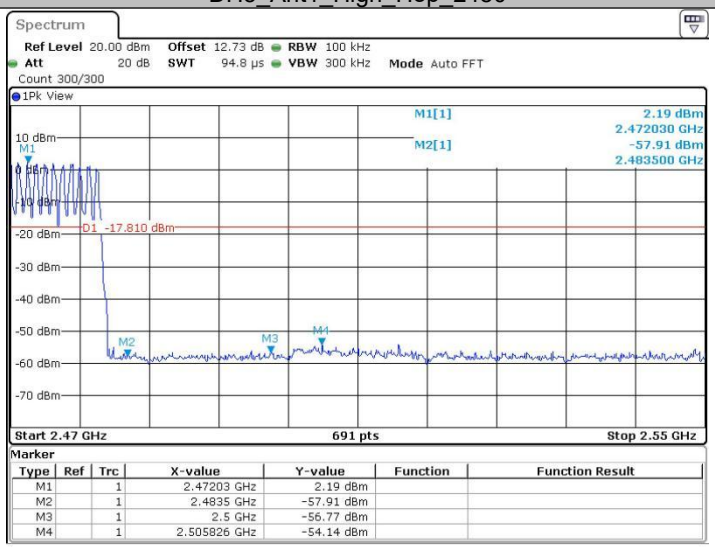


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.40496 GHz	1.25 dBm		
M2		1	2.4 GHz	-55.02 dBm		
M3		1	2.39 GHz	-59.09 dBm		
M4		1	2.3703261 GHz	-54.75 dBm		

Date: 29.FEB.2024 15:25:41

DH5_Ant1_High_Hop_2480

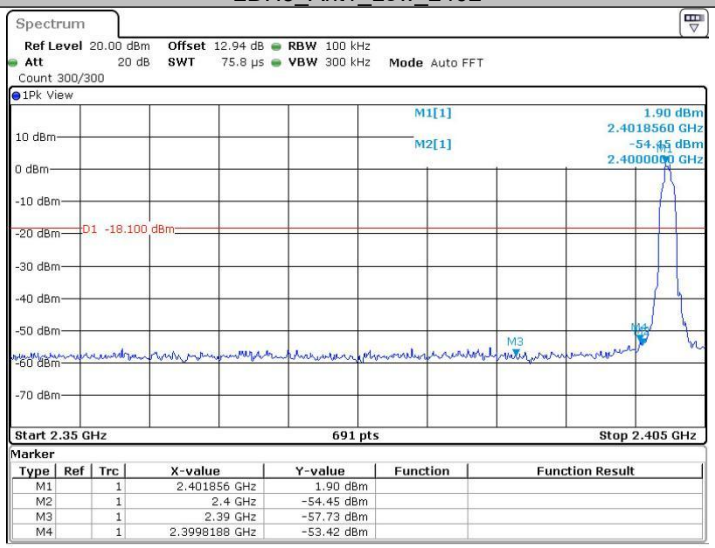


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.47203 GHz	2.19 dBm		
M2		1	2.4835 GHz	-57.91 dBm		
M3		1	2.5 GHz	-56.77 dBm		
M4		1	2.505826 GHz	-54.14 dBm		

Date: 29.FEB.2024 15:31:43

2DH5_Ant1_Low_2402

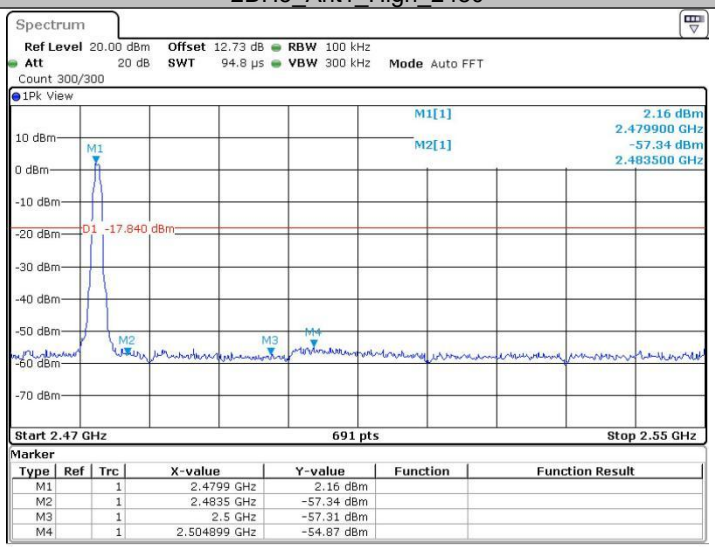


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.401856 GHz	1.90 dBm		
M2		1	2.4 GHz	-54.45 dBm		
M3		1	2.39 GHz	-57.73 dBm		
M4		1	2.3998188 GHz	-53.42 dBm		

Date: 29.FEB.2024 15:58:37

2DH5_Ant1_High_2480

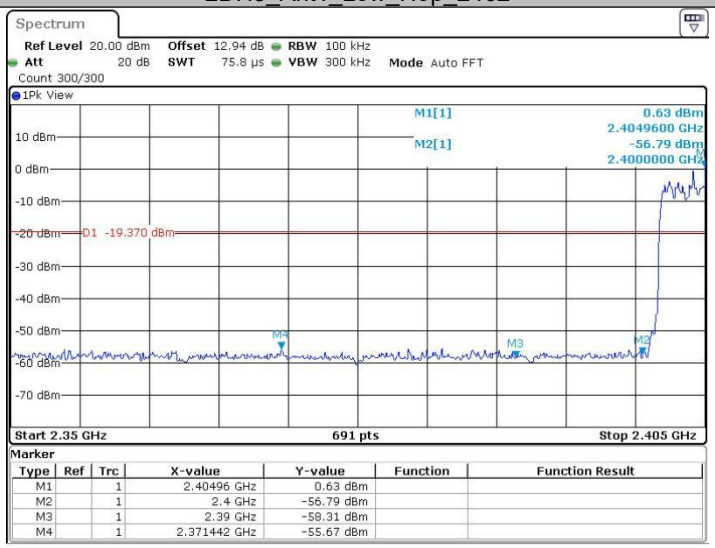


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.4799 GHz	2.16 dBm		
M2		1	2.4835 GHz	-57.34 dBm		
M3		1	2.5 GHz	-57.31 dBm		
M4		1	2.504899 GHz	-54.87 dBm		

Date: 29.FEB.2024 16:04:09

2DH5_Ant1_Low_Hop_2402

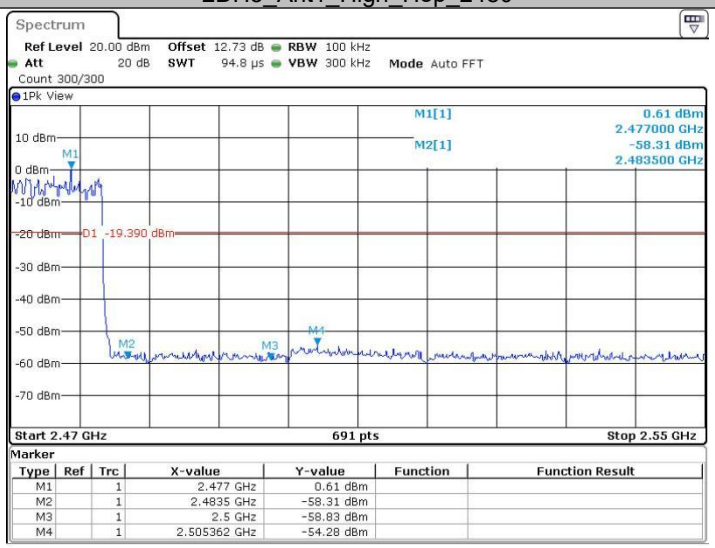


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.40496 GHz	0.63 dBm		
M2		1	2.4 GHz	-56.79 dBm		
M3		1	2.39 GHz	-58.31 dBm		
M4		1	2.371442 GHz	-55.67 dBm		

Date: 29.FEB.2024 15:33:26

2DH5_Ant1_High_Hop_2480

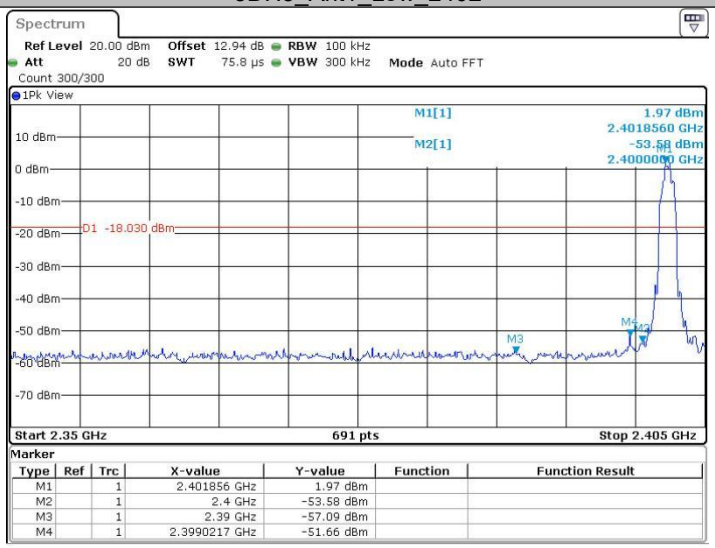


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.477 GHz	0.61 dBm		
M2		1	2.4835 GHz	-58.31 dBm		
M3		1	2.5 GHz	-58.83 dBm		
M4		1	2.505362 GHz	-54.28 dBm		

Date: 29.FEB.2024 15:40:54

3DH5_Ant1_Low_2402

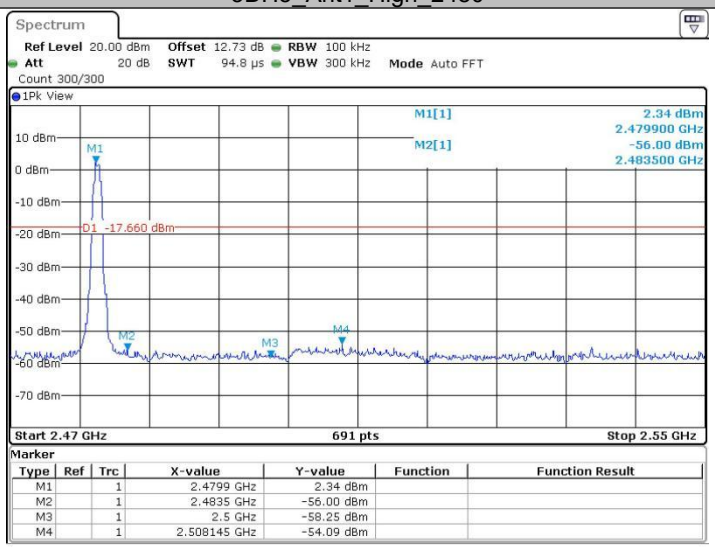


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.401856 GHz	1.97 dBm		
M2		1	2.4 GHz	-53.58 dBm		
M3		1	2.39 GHz	-57.09 dBm		
M4		1	2.3990217 GHz	-51.66 dBm		

Date: 29.FEB.2024 16:08:00

3DH5_Ant1_High_2480



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.4799 GHz	2.34 dBm		
M2		1	2.4835 GHz	-56.00 dBm		
M3		1	2.5 GHz	-58.25 dBm		
M4		1	2.508145 GHz	-54.09 dBm		

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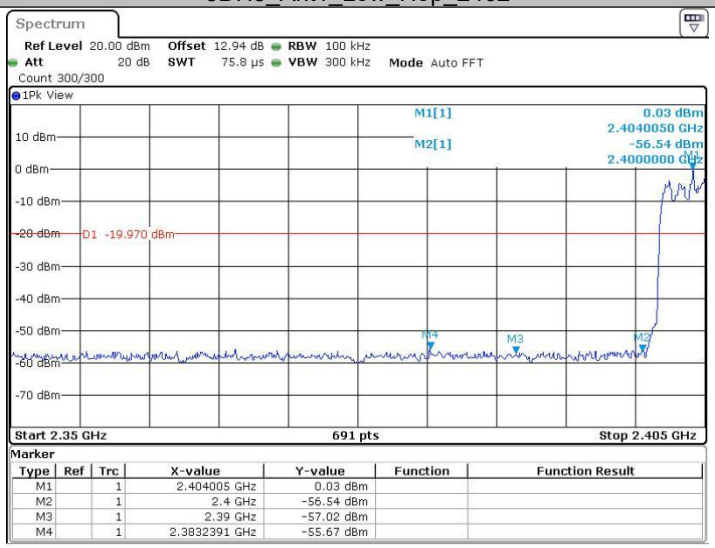
3DH5_Ant1_Low_Hop_2402



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.404005 GHz	0.03 dBm		
M2		1	2.4 GHz	-56.54 dBm		
M3		1	2.39 GHz	-57.02 dBm		
M4		1	2.3832391 GHz	-55.67 dBm		

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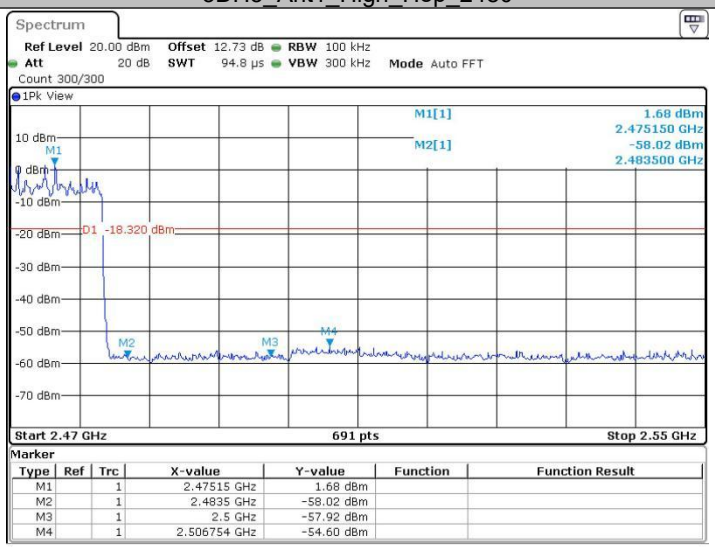
3DH5_Ant1_High_Hop_2480



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.47515 GHz	1.68 dBm		
M2		1	2.4835 GHz	-58.02 dBm		
M3		1	2.5 GHz	-57.92 dBm		
M4		1	2.506754 GHz	-54.60 dBm		

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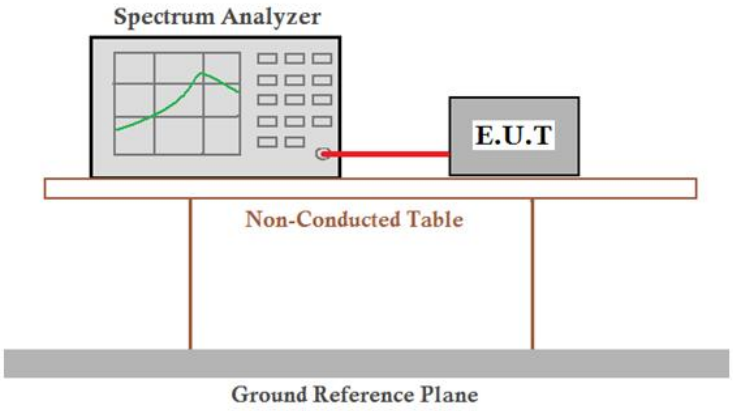
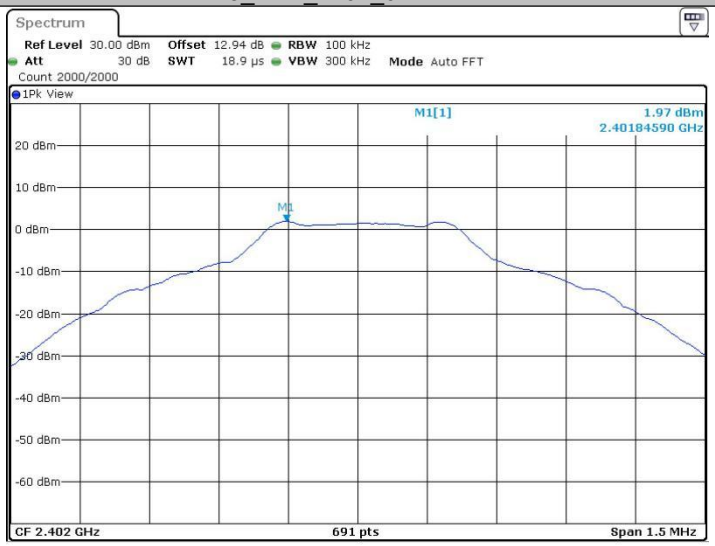
5.9 Spurious RF Conducted Emissions

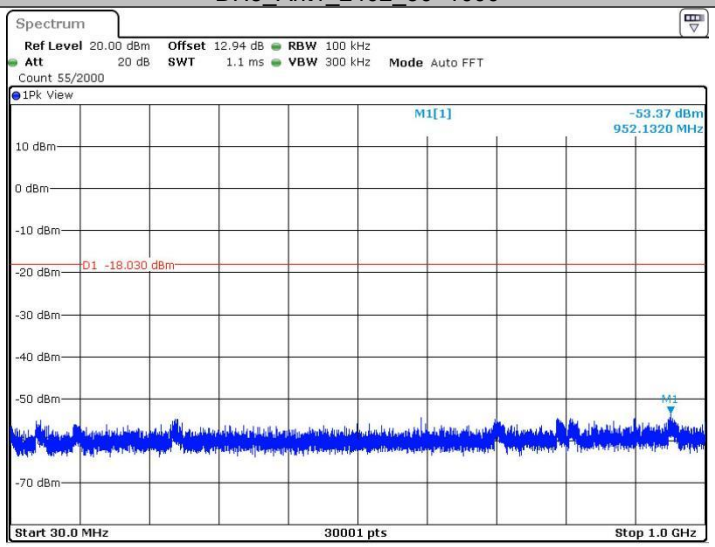
Test Requirement:	47 CFR Part 15C Section 15.247 (d)
Test Method:	ANSI C63.10:2013
Test Setup:	 *Remark: Offset=cable loss+ attenuation factor.*
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is 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.
Exploratory Test Mode:	Non-hopping transmitting with all kind of modulation and all kind of data type
Final Test Mode:	Through Pre-scan, find the DH5 of data type is the worst case of GFSK modulation type, 2-DH5 of data type is the worst case of π/4DQPSK modulation type, 3-DH5 of data type is the worst case of 8DPSK modulation type.
Test Results:	Pass

DH5_Ant1_2402_0~Reference



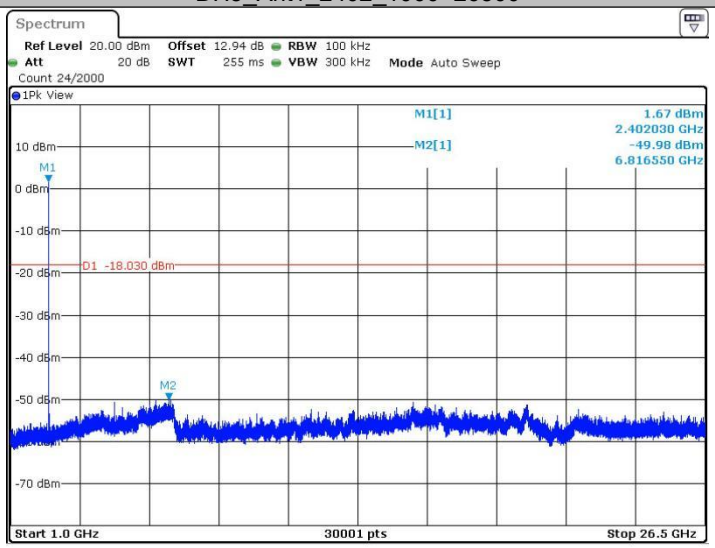
Date: 29.FEB.2024 15:52:53

DH5_Ant1_2402_30~1000



Date: 29.FEB.2024 15:53:00

DH5_Ant1_2402_1000~26500



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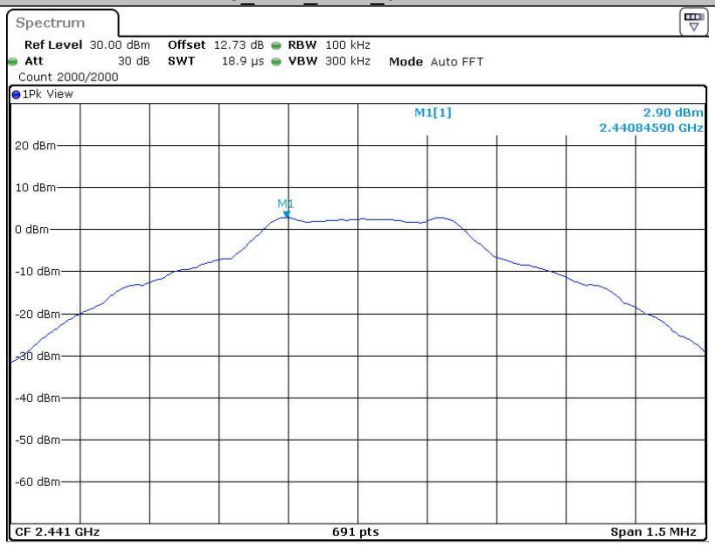
DH5_Ant1_2441_0~Reference



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