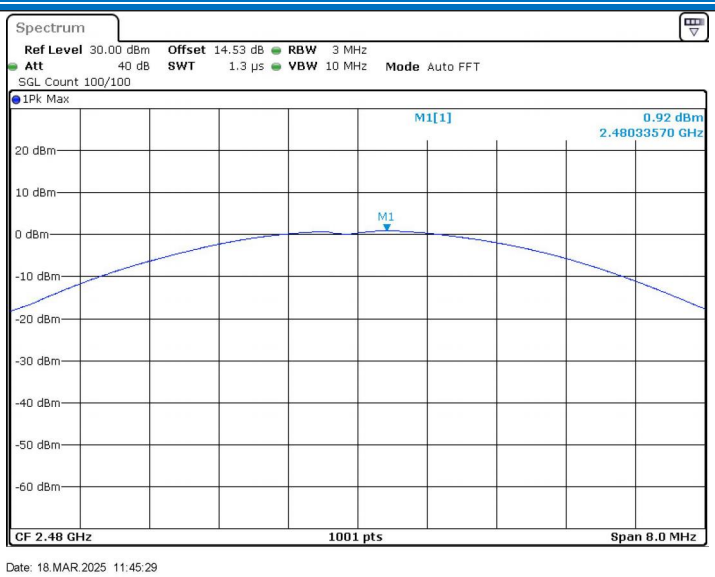
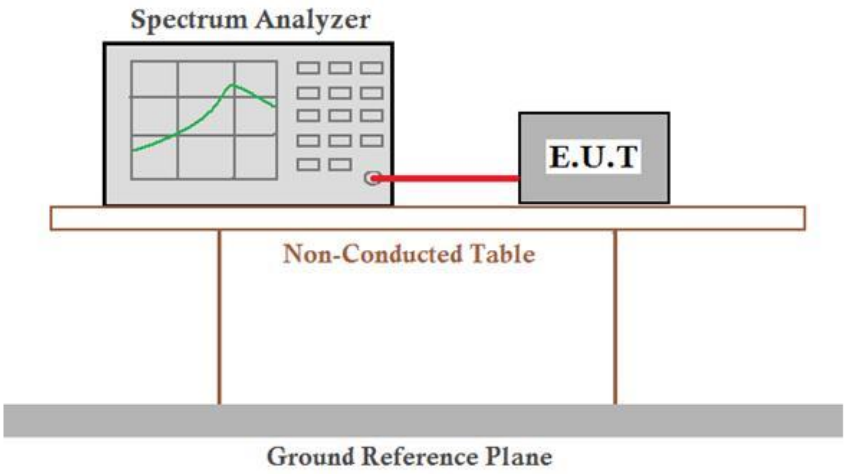

Spectrum
Ref Level 30.00 dBm Offset 14.53 dB RBW 3 MHz
Att 40 dB SWT 1.3 µs VBW 10 MHz Mode Auto FFT
SGL Count 100/100
1Pk Max
M1[1] 0.92 dBm
2.48033570 GHz
M1
20 dBm
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
CF 2.48 GHz
1001 pts
Span 8.0 MHz
Date: 18.MAR.2025 11:45:29

4.4 20dB Occupied Bandwidth

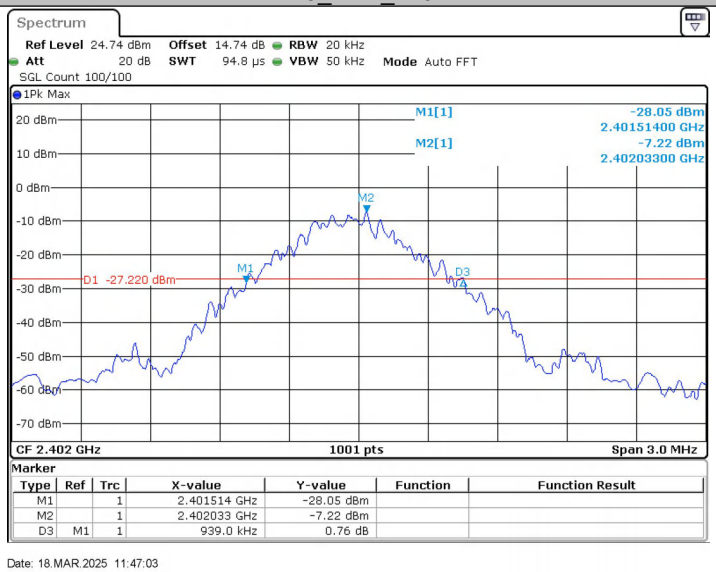
Test Requirement:	47 CFR Part 15C Section 15.247 (a)(1)
Test Method:	ANSI C63.10:2013
Test Setup:	 Remark: Offset=Cable loss+ attenuation factor.
Limit:	NA
Exploratory Test Mode:	Non-hopping transmitting with all kind of modulation and all kind of data type
Final Test Mode:	Only the worst case is recorded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

Measurement Data

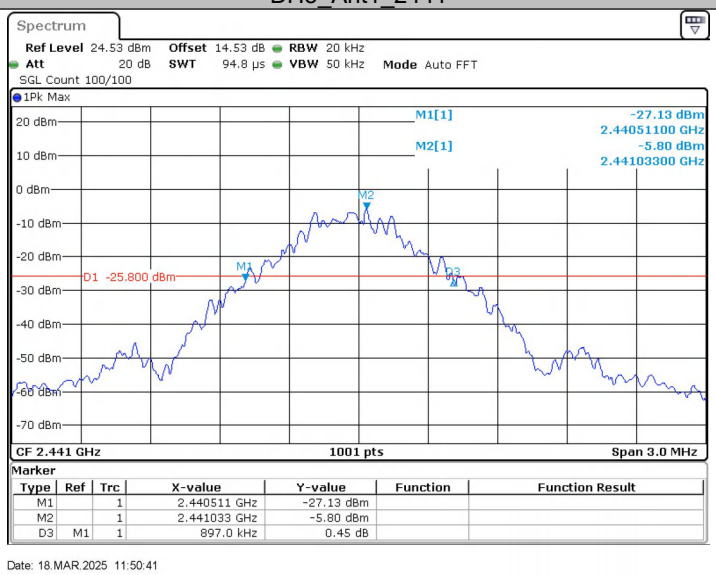
TestMode	Antenna	Freq(MHz)	20dB EBW[MHz]	FL[MHz]	FH[MHz]
DH5	Ant1	2402	0.94	2401.51	2402.45
		2441	0.90	2440.51	2441.41
		2480	0.94	2479.51	2480.45
2DH5	Ant1	2402	1.32	2401.31	2402.64
		2441	1.33	2440.31	2441.64
		2480	1.33	2479.31	2480.64

Test plot as follows:

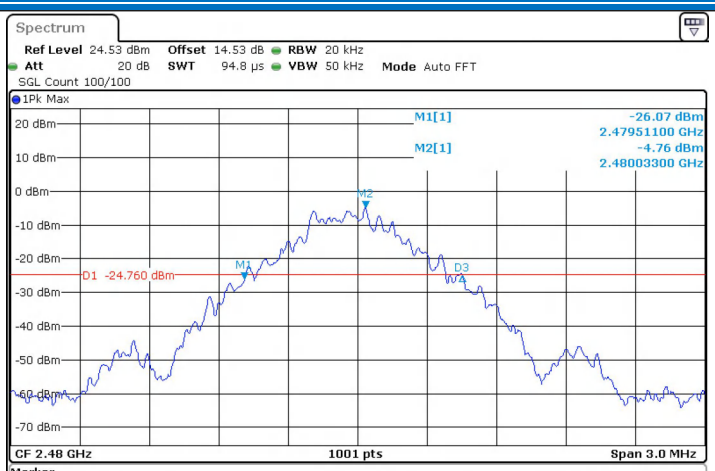
DH5_Ant1_2402



DH5_Ant1_2441



DH5_Ant1_2480

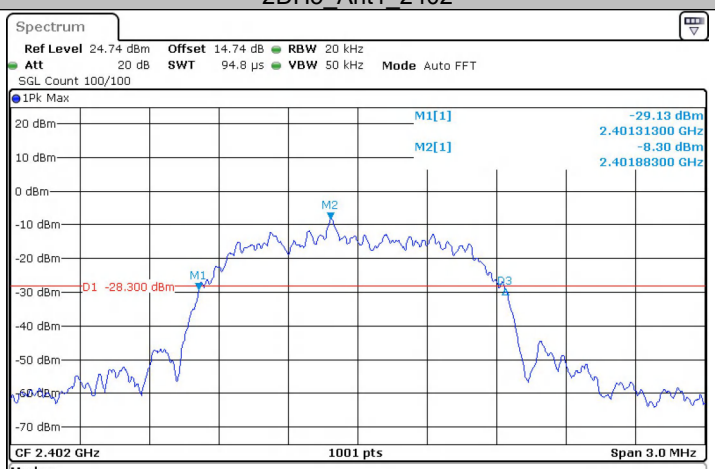


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.479511 GHz	-26.07 dBm		
M2		1	2.480033 GHz	-4.76 dBm		
D3	M1	1	942.0 kHz	1.05 dB		

Date: 18.MAR.2025 11:51:42

2DH5_Ant1_2402

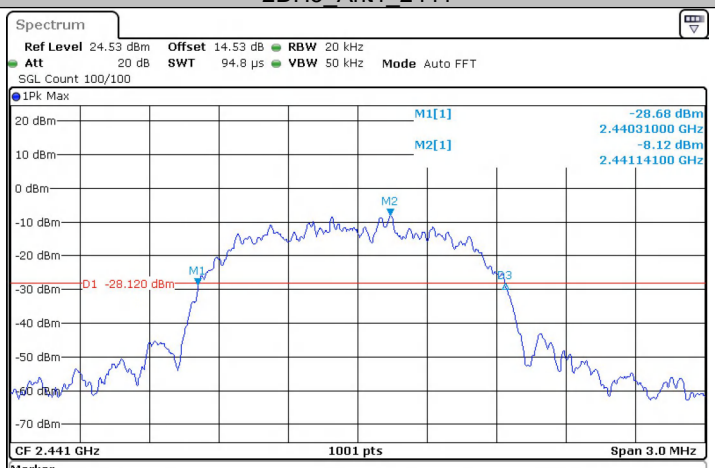


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.401313 GHz	-29.13 dBm		
M2		1	2.401883 GHz	-8.30 dBm		
D3	M1	1	1.323 MHz	0.24 dB		

Date: 18.MAR.2025 11:53:26

2DH5_Ant1_2441



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.44031 GHz	-28.68 dBm		
M2		1	2.441141 GHz	-8.12 dBm		
D3	M1	1	1.326 MHz	0.54 dB		

Date: 18.MAR.2025 11:54:49

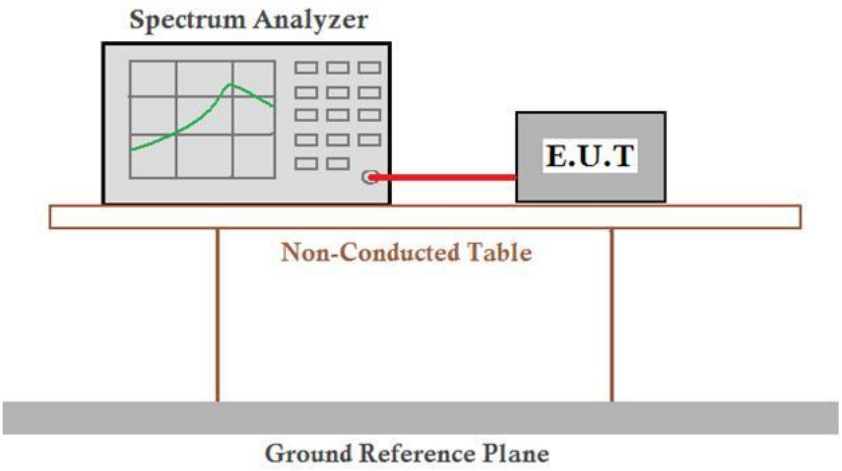
2DH5_Ant1_2480

Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.47931 GHz	-27.40 dBm		
M2		1	2.480099 GHz	-7.00 dBm		
D3	M1	1	1.329 MHz	-0.25 dB		

Date: 18.MAR.2025 11:56:20

4.5 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

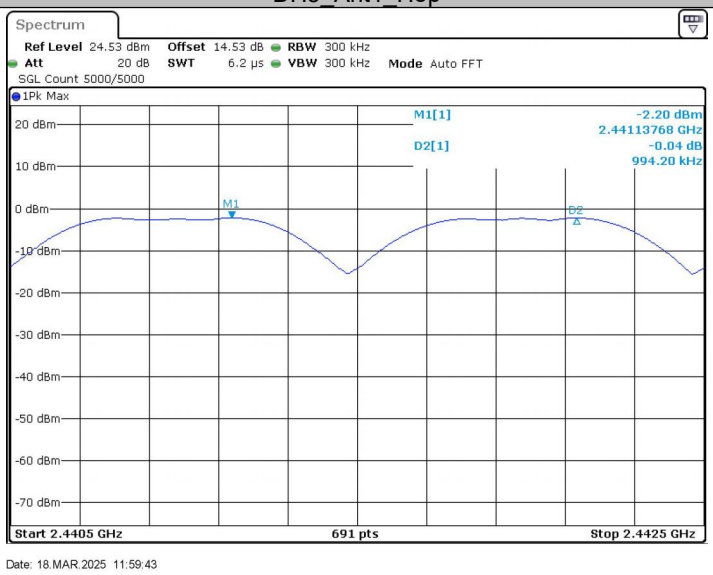
Measurement Data

TestMode	Freq(MHz)	Result[MHz]	Limit[MHz]	Verdict
DH5	Hop	0.994	≥0.627	PASS
2DH5	Hop	0.962	≥0.887	PASS

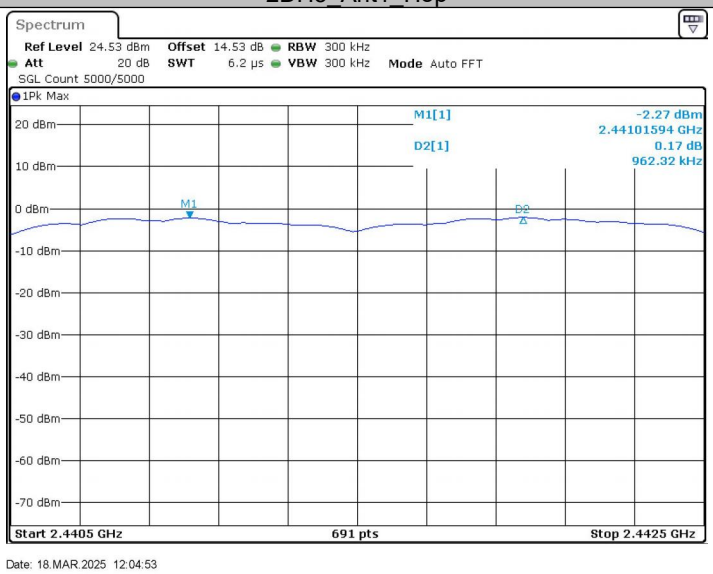
Mode	20dB bandwidth (MHz) (worse case)	Limit (MHz) (Carrier Frequencies Separation)
GFSK	0.94	≥0.627
π/4DQPSK	1.33	≥0.887

Test plot as follows:

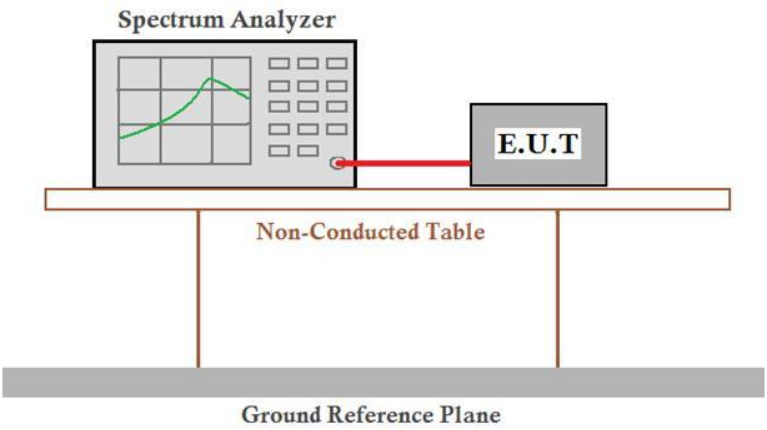
DH5_Ant1_Hop



2DH5_Ant1_Hop



4.6 Hopping Channel Number

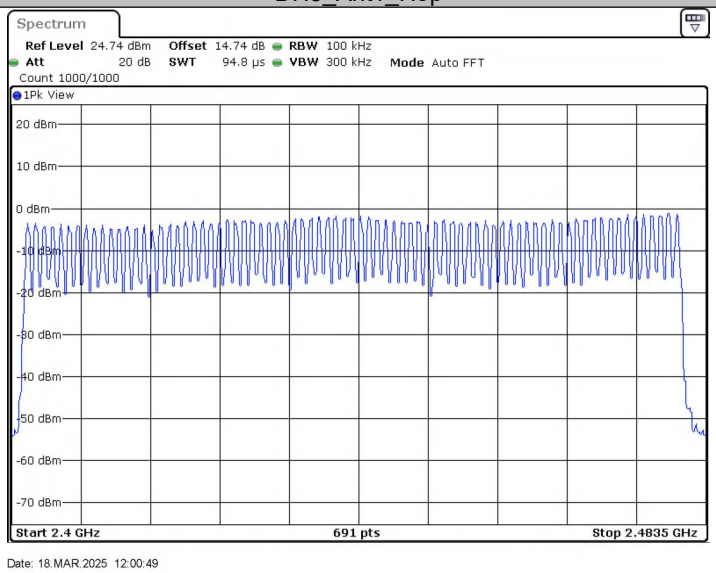
Test Requirement:	47 CFR Part 15C Section 15.247 (a)(1)
Test Method:	ANSI C63.10:2013
Test Setup:	 *Remark: Offset=Cable loss+ attenuation factor.*
Limit:	At least 15 channels
Exploratory Test Mode:	hopping transmitting with all kind of modulation and all kind of data type
Final Test Mode:	Only the worst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

Measurement Data

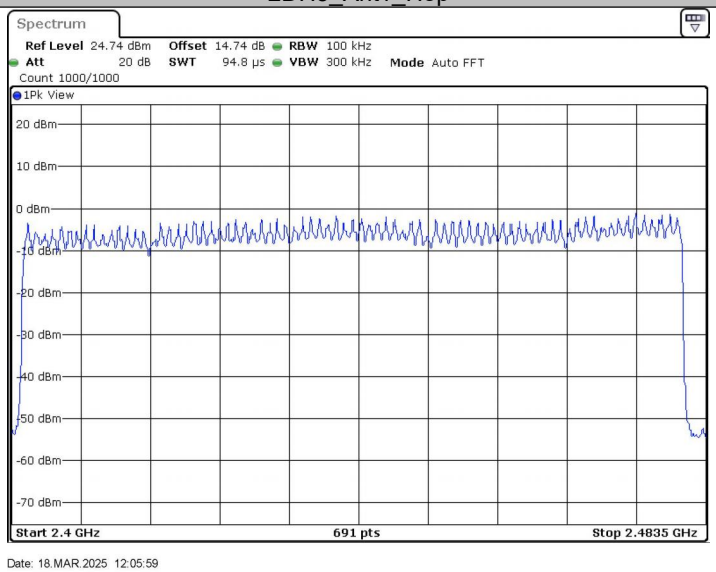
TestMode	Freq(MHz)	Result[Num]	Limit[Num]	Verdict
DH5	Hop	79	≥15	PASS
2DH5	Hop	79	≥15	PASS

Test plot as follows:

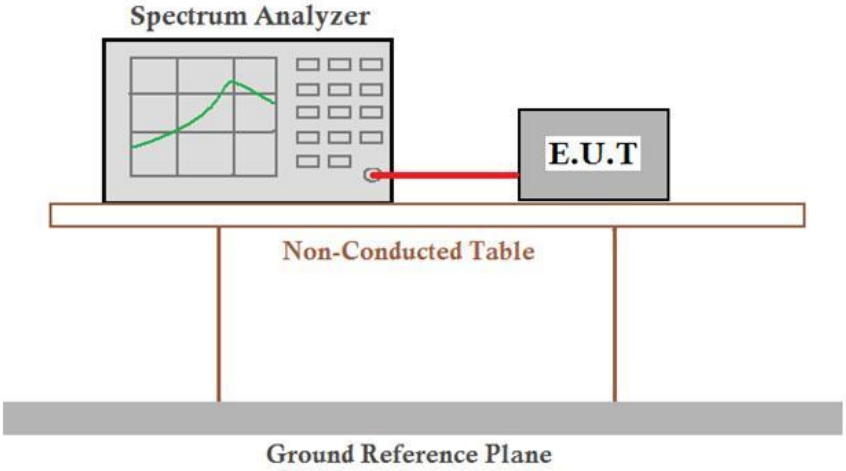
DH5_Ant1_Hop



2DH5_Ant1_Hop



4.7 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

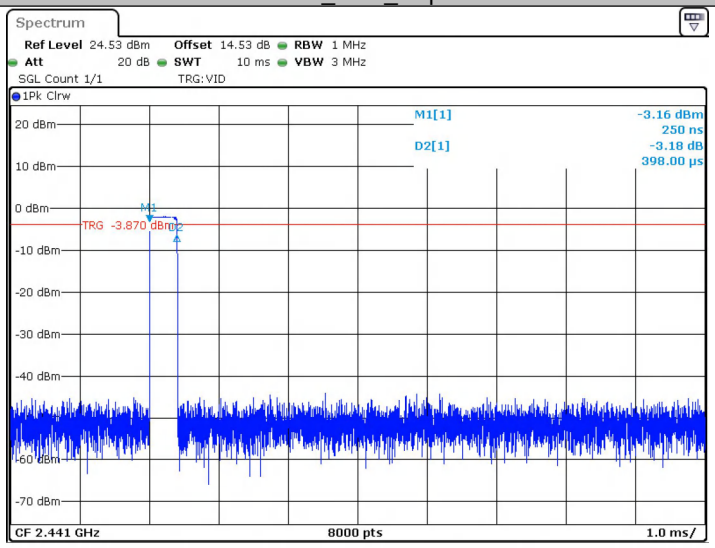
TestMode	Freq(MHz)	BurstWidth [ms]	TotalHops [Num]	Result[s]	Limit[s]	Verdict
DH1	Hop	0.398	320	0.127	≤0.4	PASS
DH3	Hop	1.648	160	0.264	≤0.4	PASS
DH5	Hop	2.887	130	0.375	≤0.4	PASS
2DH1	Hop	0.409	330	0.135	≤0.4	PASS
2DH3	Hop	1.653	160	0.264	≤0.4	PASS
2DH5	Hop	2.893	100	0.289	≤0.4	PASS

Remark:

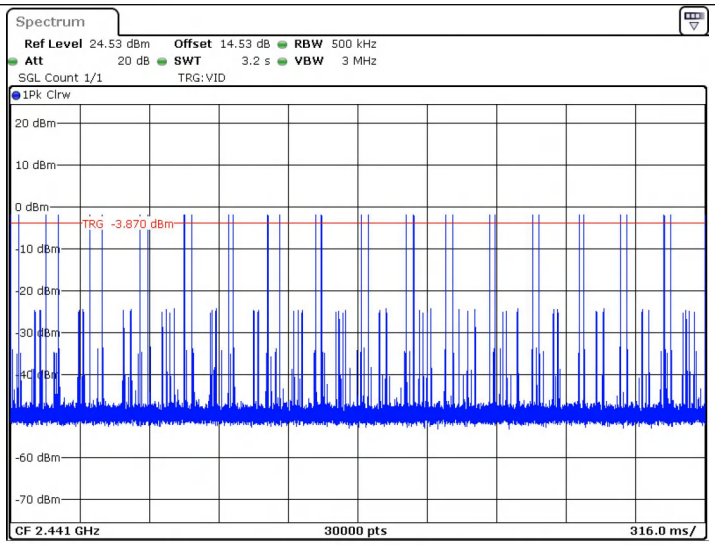
The test period: T= 0.4 Second/Channel x 79 Channel = 31.6 s

Test plot as follows:

DH1_Ant1_Hop

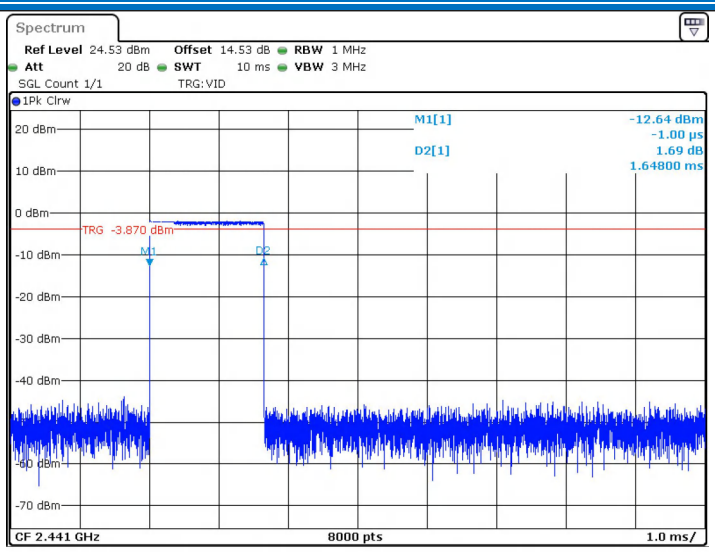


Date: 18.MAR.2025 12:03:22

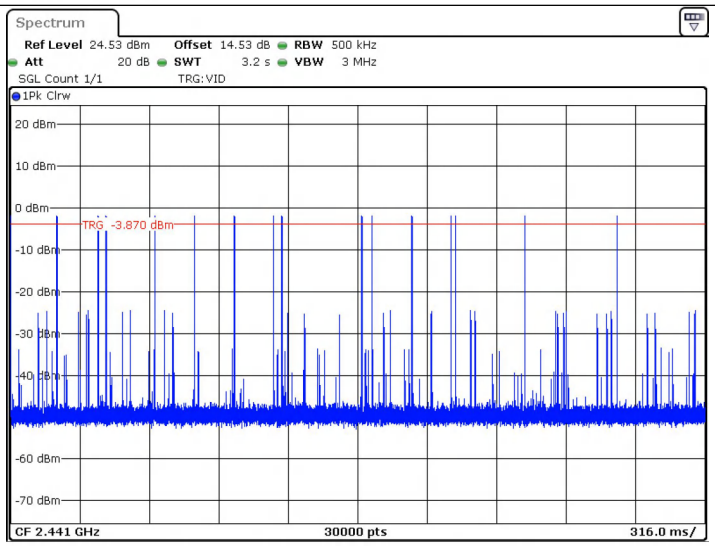


Date: 18.MAR.2025 12:03:28

DH3_Ant1_Hop

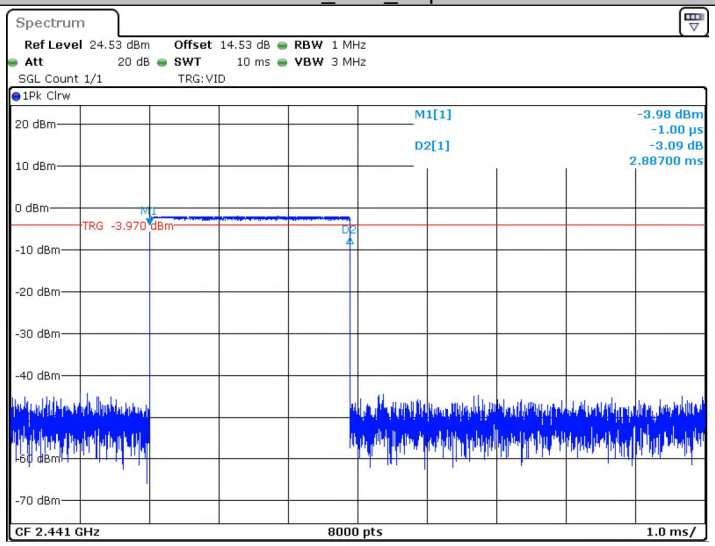


Date: 18.MAR.2025 12:03:52

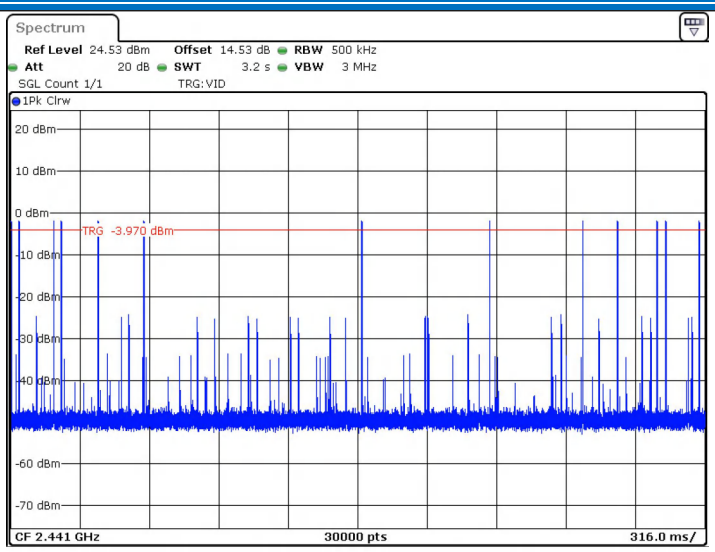


Date: 18.MAR.2025 12:03:57

DH5_Ant1_Hop

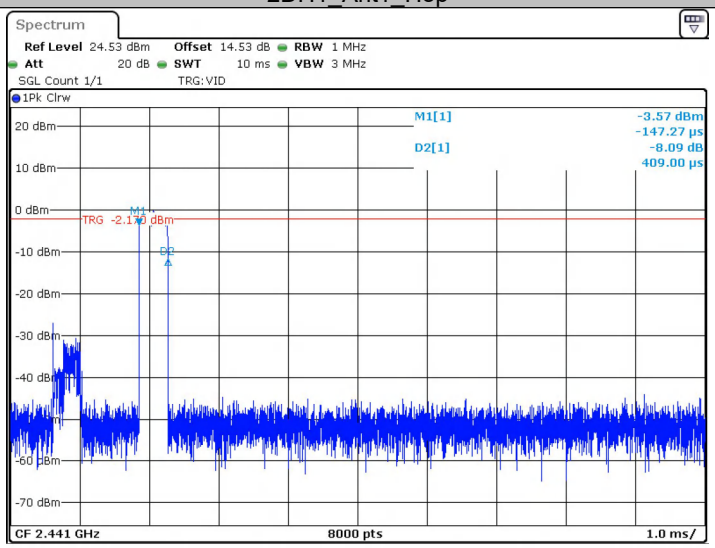


Date: 18.MAR.2025 12:01:04

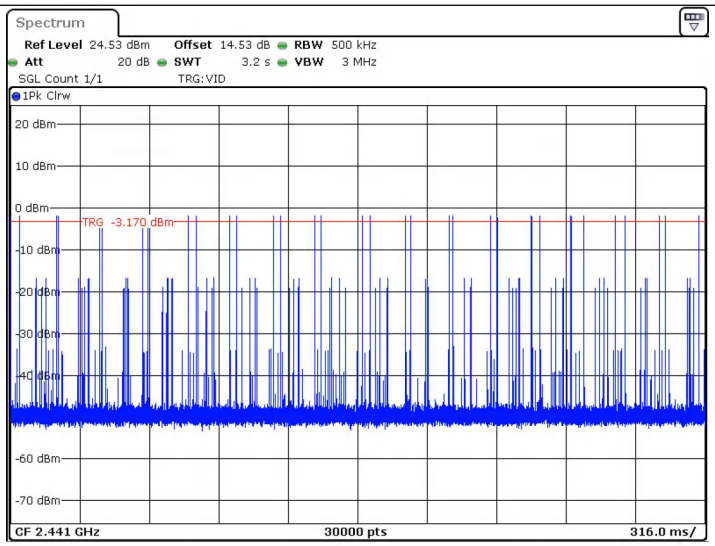


Date: 18.MAR.2025 12:01:10

2DH1_Ant1_Hop

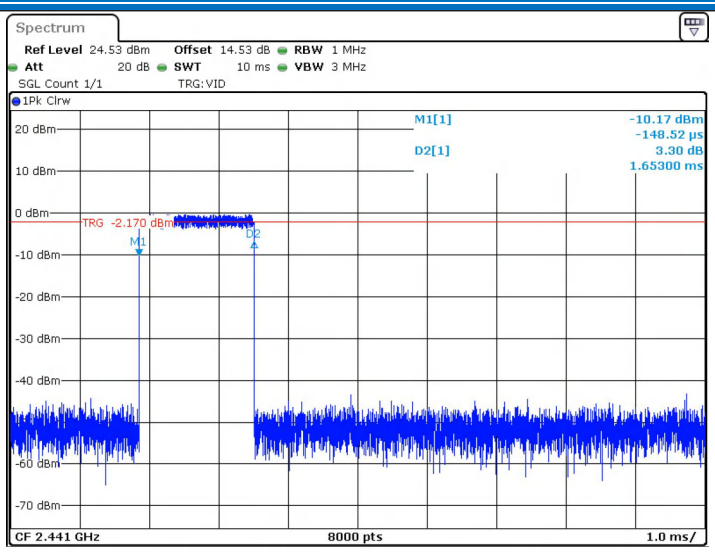


Date: 18.MAR.2025 12:08:27

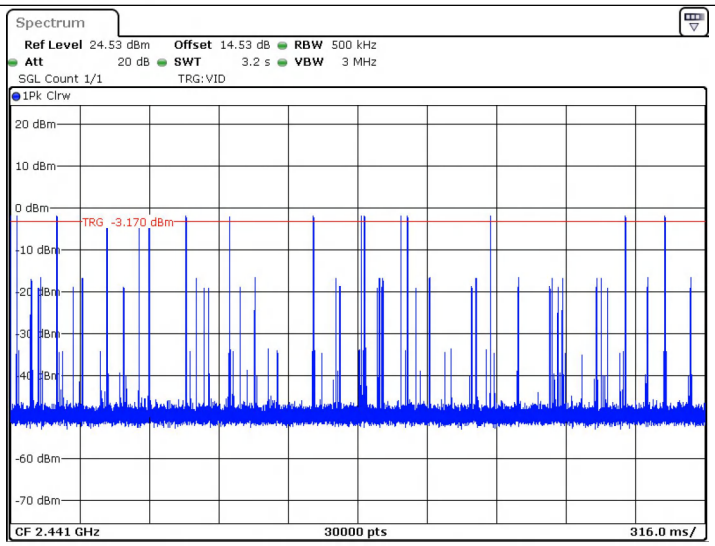


Date: 18.MAR.2025 12:08:38

2DH3_Ant1_Hop

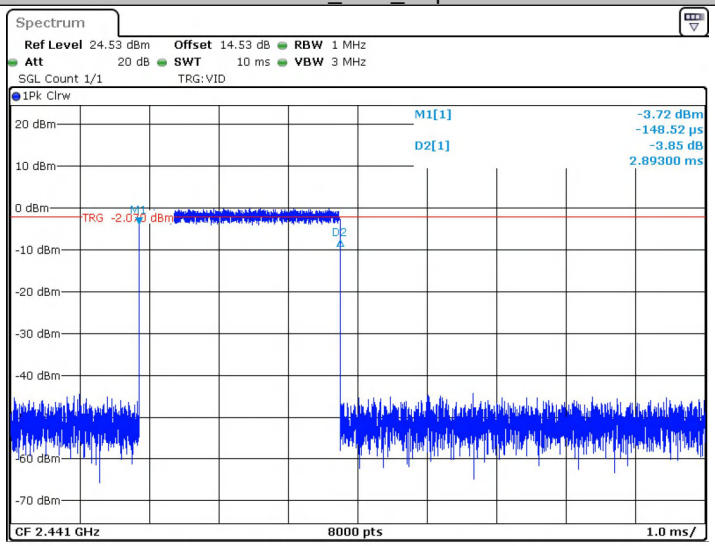


Date: 18.MAR.2025 12:08:59

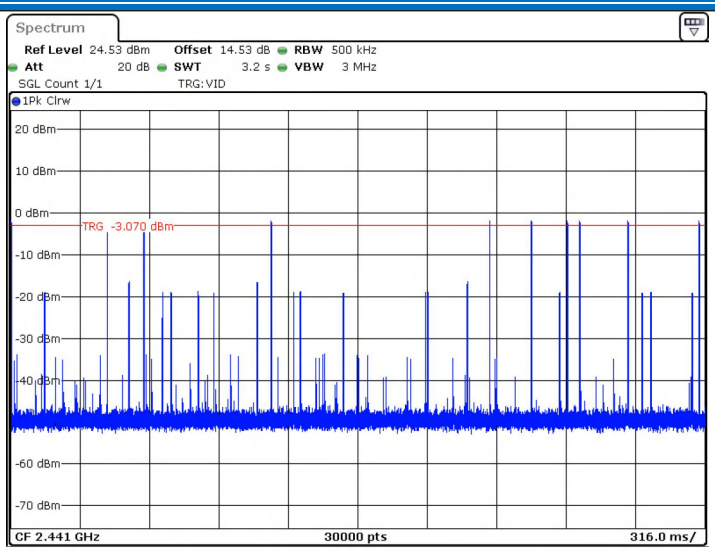


Date: 18.MAR.2025 12:09:10

2DH5_Ant1_Hop

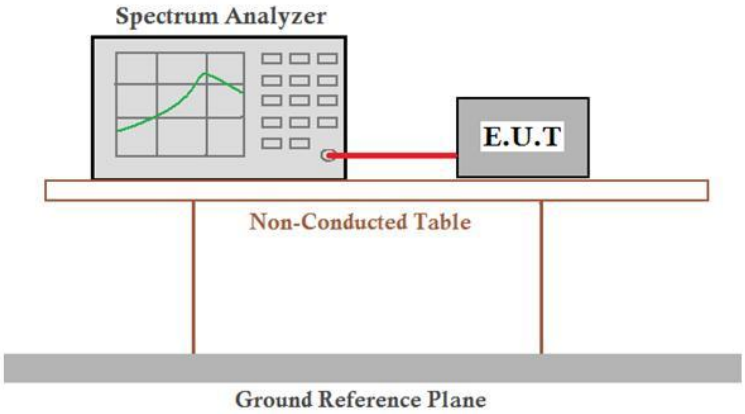


Date: 18.MAR.2025 12:06:14



Date: 18.MAR.2025 12:06:26

4.8 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

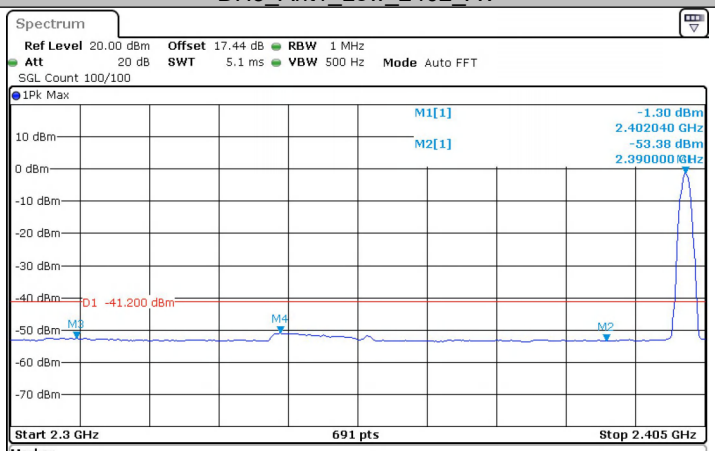
Measurement Data

ChName	Freq(MHz)	Detector	Freq [MHz]	Result [dBm]	Limit [dBm]	Result [dBuV/m]	Limit [dBuV/m]	Verdict
Low	2402	AV	2310.000	-52.71	≤-41.20	42.49	≤54	PASS
		AV	2340.783	-51.01	≤-41.20	44.19	≤54	PASS
		AV	2390.000	-53.38	≤-41.20	41.82	≤54	PASS
		Peak	2310.000	-43.52	≤-21.20	51.68	≤74	PASS
		Peak	2340.783	-39.2	≤-21.20	56.00	≤74	PASS
		Peak	2390.000	-44.61	≤-21.20	50.59	≤74	PASS
High	2480	AV	2483.500	-52.95	≤-41.20	42.25	≤54	PASS
		AV	2483.913	-52.82	≤-41.20	42.38	≤54	PASS
		AV	2500.000	-53.35	≤-41.20	41.85	≤54	PASS
		Peak	2483.500	-45.65	≤-21.20	49.55	≤74	PASS
		Peak	2499.797	-40.83	≤-21.20	54.37	≤74	PASS
		Peak	2500.000	-41.11	≤-21.20	54.09	≤74	PASS
Low	Hop_2402	Peak	2310.000	-45.56	≤-21.20	49.64	≤74	PASS
		Peak	2340.783	-40.8	≤-21.20	54.40	≤74	PASS
		Peak	2390.000	-42.93	≤-21.20	52.27	≤74	PASS
High	Hop_2480	Peak	2483.500	-46.91	≤-21.20	48.29	≤74	PASS
		Peak	2490.754	-42.49	≤-21.20	52.71	≤74	PASS
		Peak	2500.000	-44.4	≤-21.20	50.80	≤74	PASS
Low	2402	AV	2310.000	-52.88	≤-41.20	42.32	≤54	PASS
		AV	2340.174	-50.95	≤-41.20	44.25	≤54	PASS
		AV	2390.000	-53.47	≤-41.20	41.73	≤54	PASS
		Peak	2310.000	-42.98	≤-21.20	52.22	≤74	PASS
		Peak	2341.087	-40.92	≤-21.20	54.28	≤74	PASS
		Peak	2390.000	-44.77	≤-21.20	50.43	≤74	PASS
High	2480	AV	2483.500	-52.88	≤-41.20	42.32	≤54	PASS
		AV	2483.913	-52.78	≤-41.20	42.42	≤54	PASS
		AV	2500.000	-53.38	≤-41.20	41.82	≤54	PASS
		Peak	2483.500	-44.4	≤-21.20	50.80	≤74	PASS
		Peak	2484.029	-42.22	≤-21.20	52.98	≤74	PASS
		Peak	2500.000	-45.28	≤-21.20	49.92	≤74	PASS
Low	Hop_2402	Peak	2310.000	-44.74	≤-21.20	50.46	≤74	PASS
		Peak	2346.565	-39.83	≤-21.20	55.37	≤74	PASS
		Peak	2390.000	-44.72	≤-21.20	50.48	≤74	PASS
High	Hop_2480	Peak	2483.500	-45.96	≤-21.20	49.24	≤74	PASS
		Peak	2499.333	-39.9	≤-21.20	55.30	≤74	PASS

		Peak	2500.000	-42.38	≤-21.20	52.82	≤74	PASS

Test plot as follows:

DH5_Ant1_Low_2402_AV

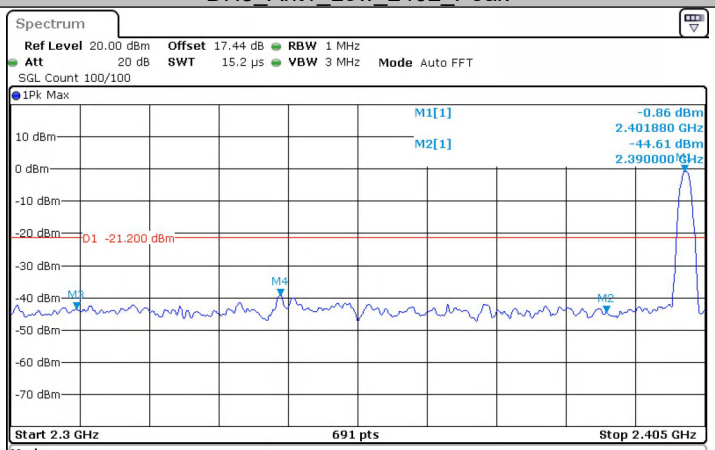


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.40204 GHz	-1.30 dBm		
M2		1	2.39 GHz	-53.38 dBm		
M3		1	2.31 GHz	-52.71 dBm		
M4		1	2.340783 GHz	-51.01 dBm		

Date: 18.MAR.2025 11:47:29

DH5_Ant1_Low_2402_Peak



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.40188 GHz	-0.86 dBm		
M2		1	2.39 GHz	-44.61 dBm		
M3		1	2.31 GHz	-43.52 dBm		
M4		1	2.340783 GHz	-39.20 dBm		

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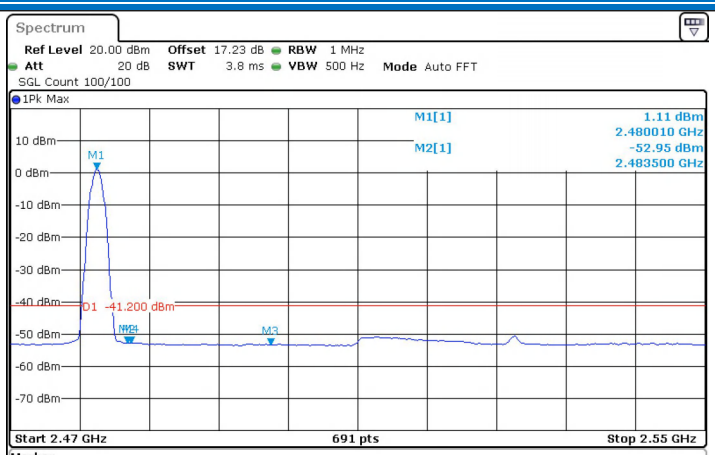
DH5_Ant1_High_2480_AV

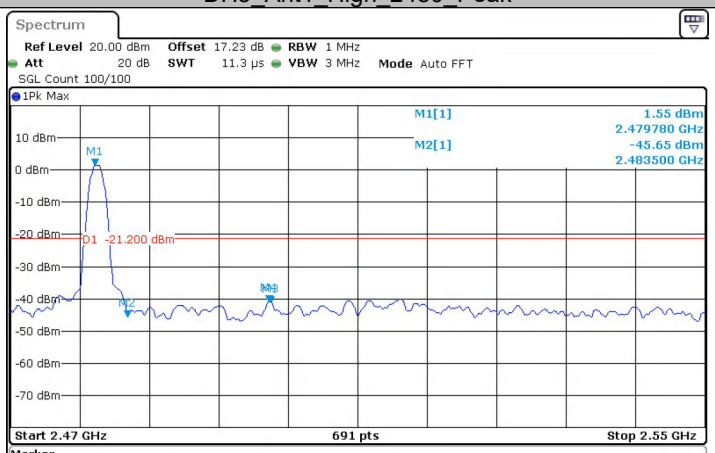


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.48001 GHz	1.11 dBm		
M2		1	2.4835 GHz	-52.95 dBm		
M3		1	2.5 GHz	-53.35 dBm		
M4		1	2.483913 GHz	-52.82 dBm		

Date: 18.MAR.2025 11:52:06

DH5_Ant1_High_2480_Peak

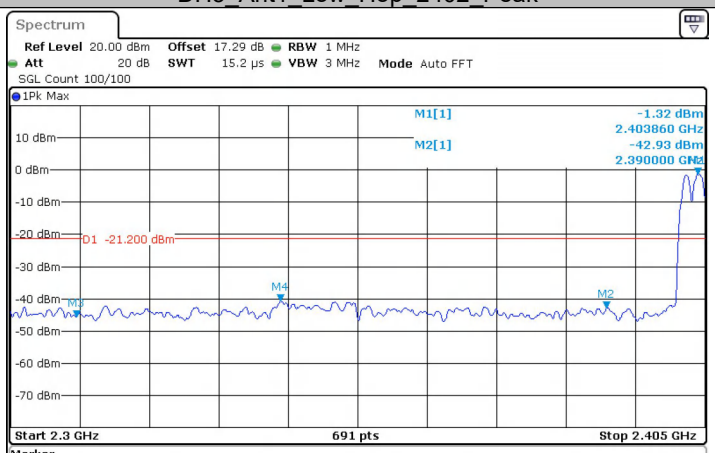


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.47978 GHz	1.55 dBm		
M2		1	2.4835 GHz	-45.65 dBm		
M3		1	2.5 GHz	-41.11 dBm		
M4		1	2.499797 GHz	-40.83 dBm		

Date: 18.MAR.2025 11:52:00

DH5_Ant1_Low_Hop_2402_Peak

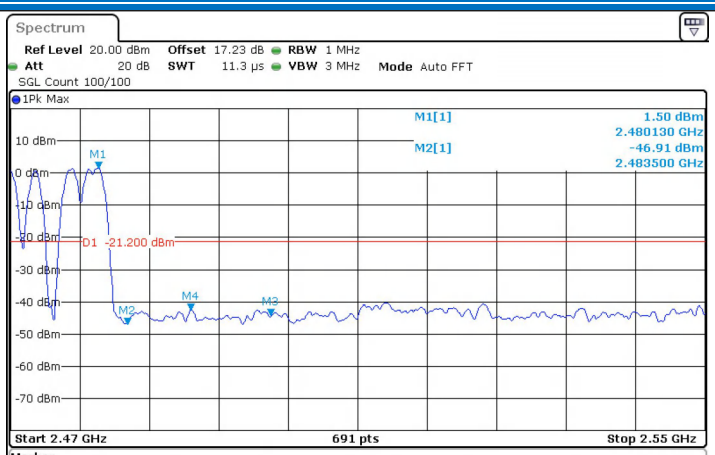


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.40386 GHz	-1.32 dBm		
M2		1	2.39 GHz	-42.93 dBm		
M3		1	2.31 GHz	-45.56 dBm		
M4		1	2.340783 GHz	-40.80 dBm		

Date: 18.MAR.2025 11:57:29

DH5_Ant1_High_Hop_2480_Peak

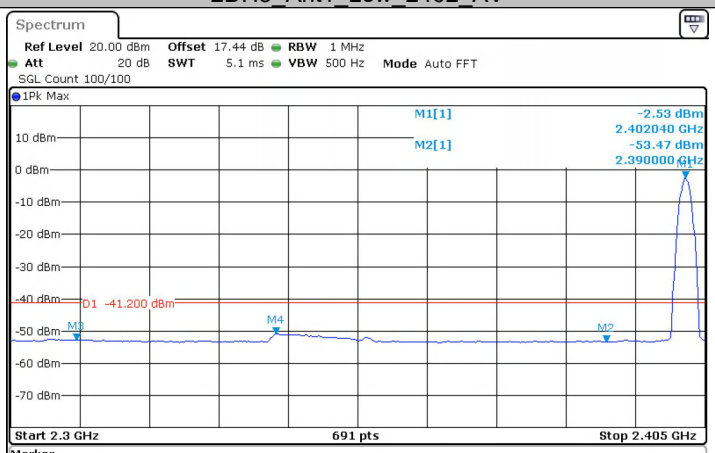


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.48013 GHz	1.50 dBm		
M2		1	2.4835 GHz	-46.91 dBm		
M3		1	2.5 GHz	-44.40 dBm		
M4		1	2.490754 GHz	-42.49 dBm		

Date: 18.MAR.2025 12:04:17

2DH5_Ant1_Low_2402_AV



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.40204 GHz	-2.53 dBm		
M2		1	2.39 GHz	-53.47 dBm		
M3		1	2.31 GHz	-52.88 dBm		
M4		1	2.340174 GHz	-50.95 dBm		

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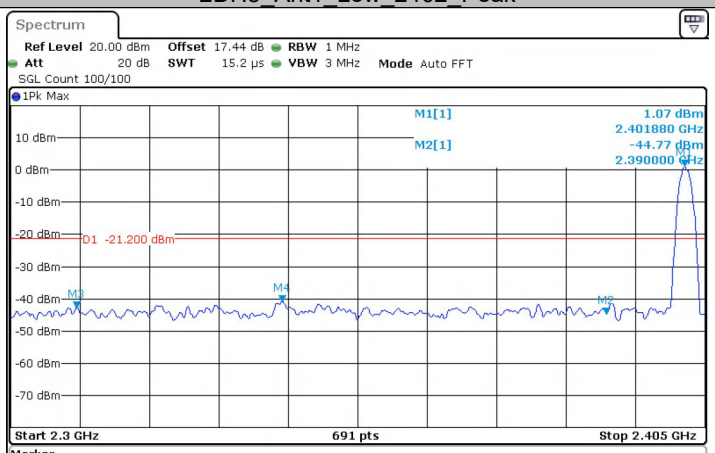
2DH5_Ant1_Low_2402_Peak



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.40188 GHz	1.07 dBm		
M2		1	2.39 GHz	-44.77 dBm		
M3		1	2.31 GHz	-42.98 dBm		
M4		1	2.341087 GHz	-40.92 dBm		

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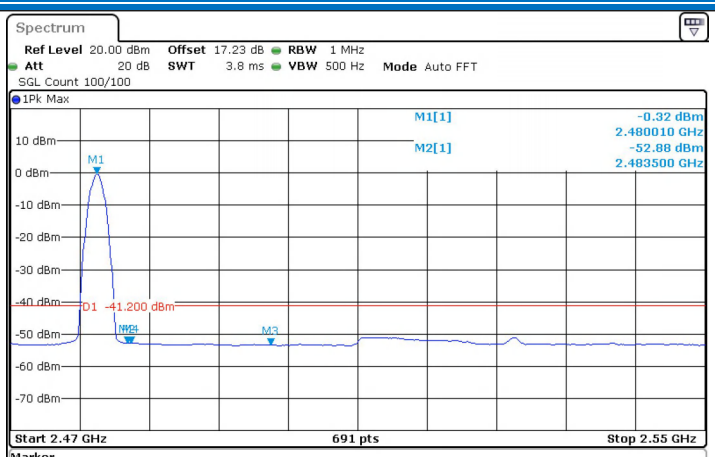
2DH5_Ant1_High_2480_AV



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.48001 GHz	-0.32 dBm		
M2		1	2.4835 GHz	-52.88 dBm		
M3		1	2.5 GHz	-53.38 dBm		
M4		1	2.483913 GHz	-52.78 dBm		

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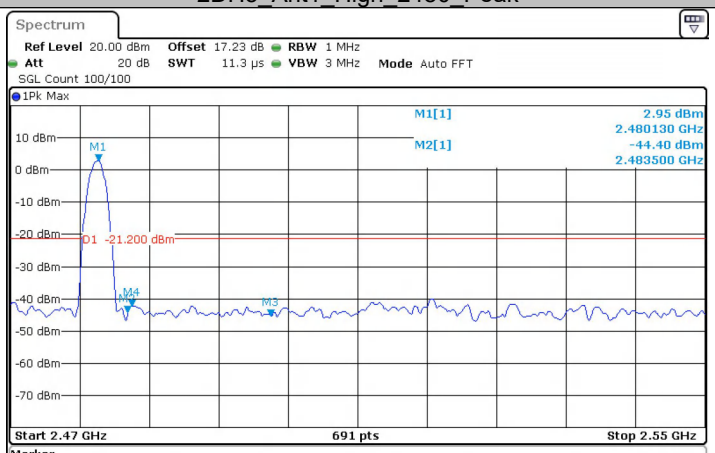
2DH5_Ant1_High_2480_Peak



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.48013 GHz	2.95 dBm		
M2		1	2.4835 GHz	-44.40 dBm		
M3		1	2.5 GHz	-45.28 dBm		
M4		1	2.484029 GHz	-42.22 dBm		

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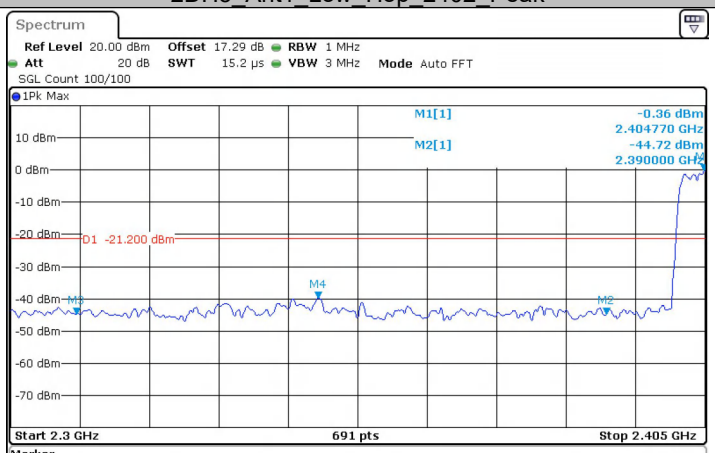
2DH5_Ant1_Low_Hop_2402_Peak

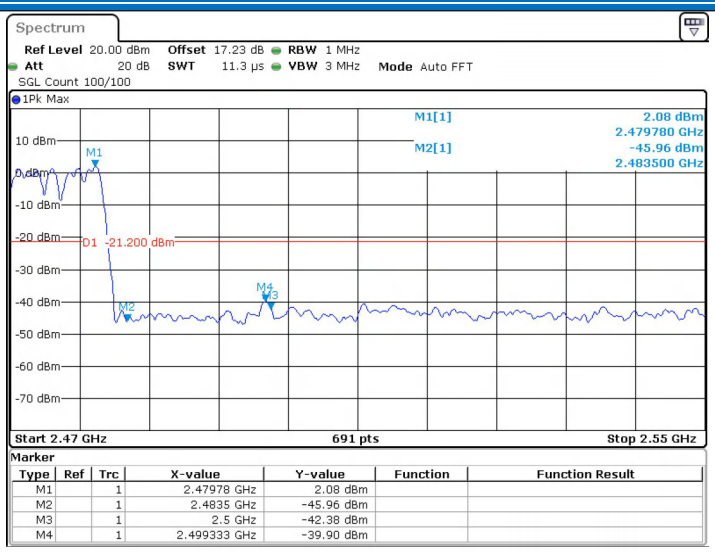


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.40477 GHz	-0.36 dBm		
M2		1	2.39 GHz	-44.72 dBm		
M3		1	2.31 GHz	-44.74 dBm		
M4		1	2.346565 GHz	-39.83 dBm		

Date: 18.MAR.2025 12:04:43

2DH5_Ant1_High_Hop_2480_Peak

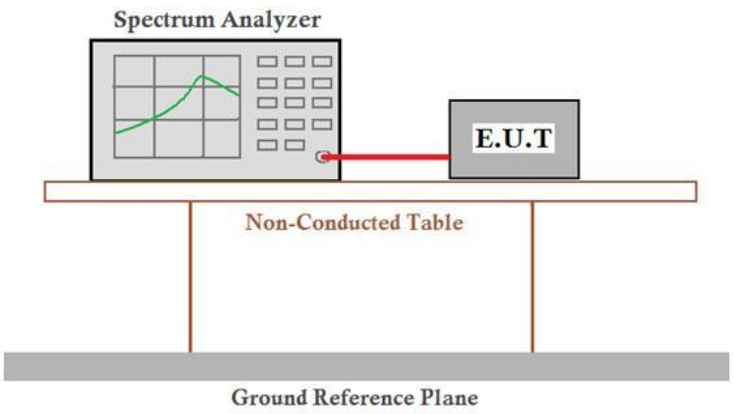


Marker

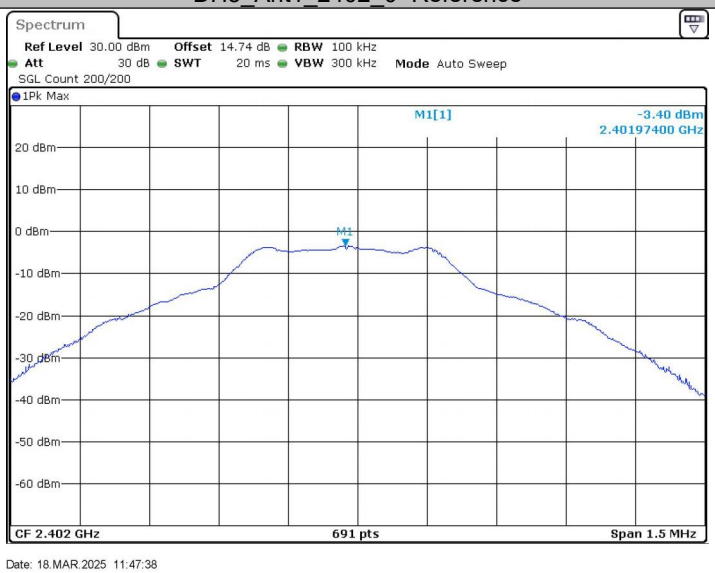
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.47978 GHz	2.08 dBm		
M2		1	2.4835 GHz	-45.96 dBm		
M3		1	2.5 GHz	-42.38 dBm		
M4		1	2.499333 GHz	-39.90 dBm		

Date: 18.MAR.2025 12:10:00

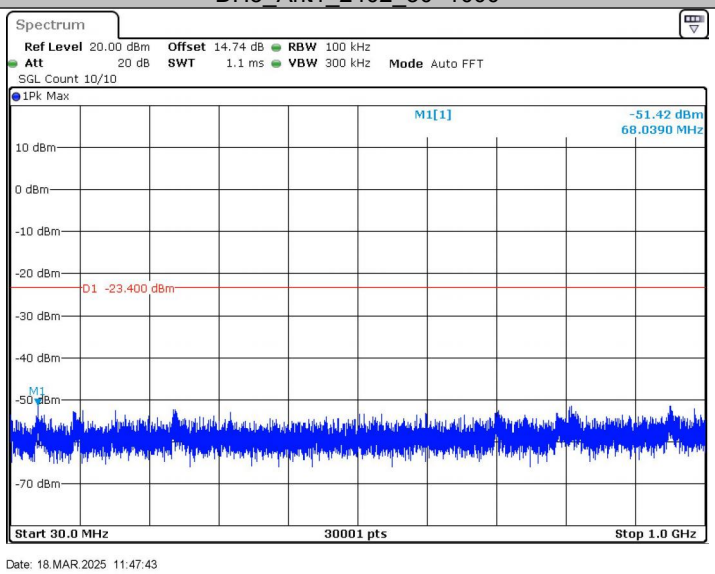
4.9 Spurious RF Conducted Emissions

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

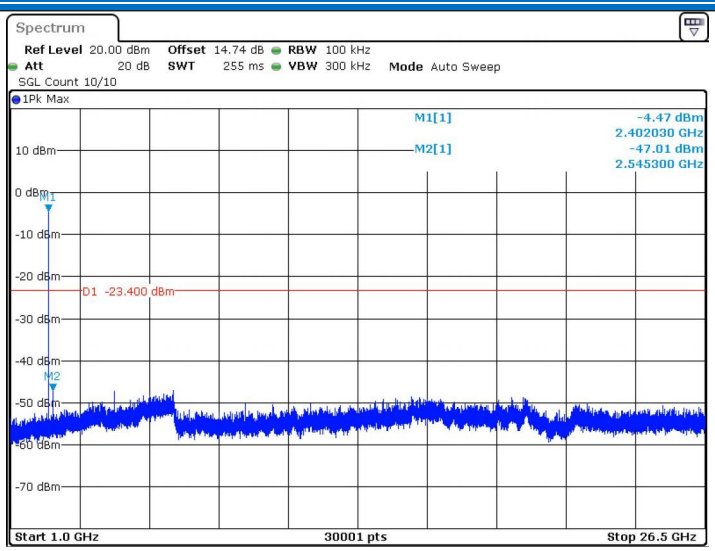
DH5_Ant1_2402_0~Reference



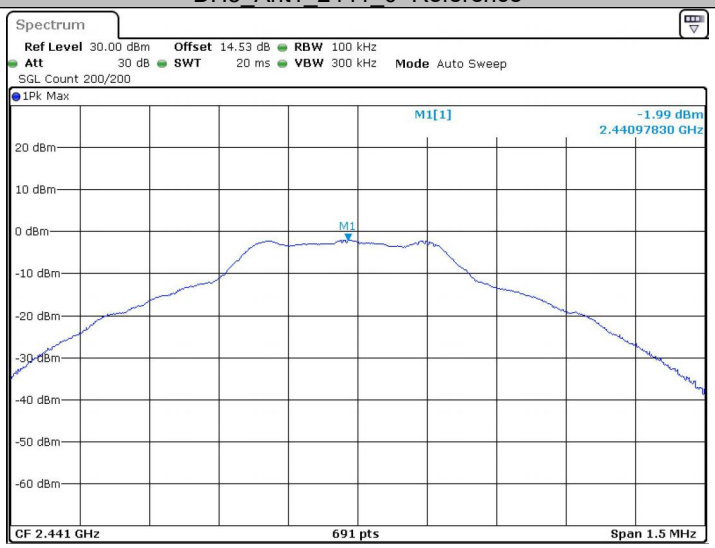
DH5_Ant1_2402_30~1000



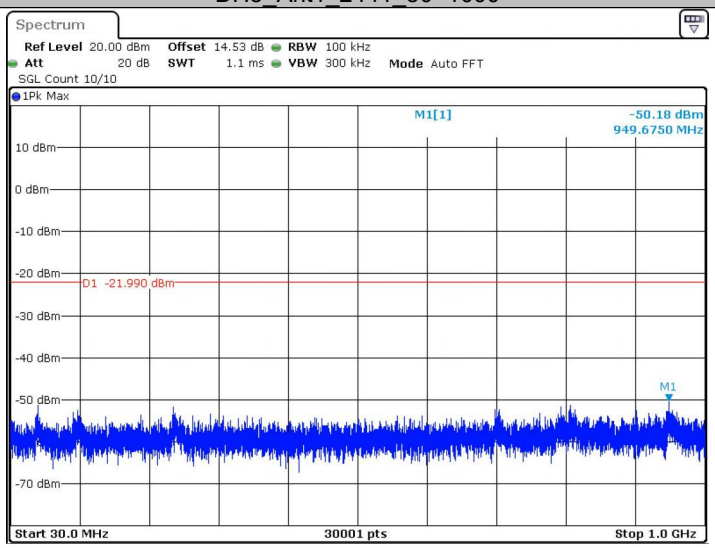
DH5_Ant1_2402_1000~26500



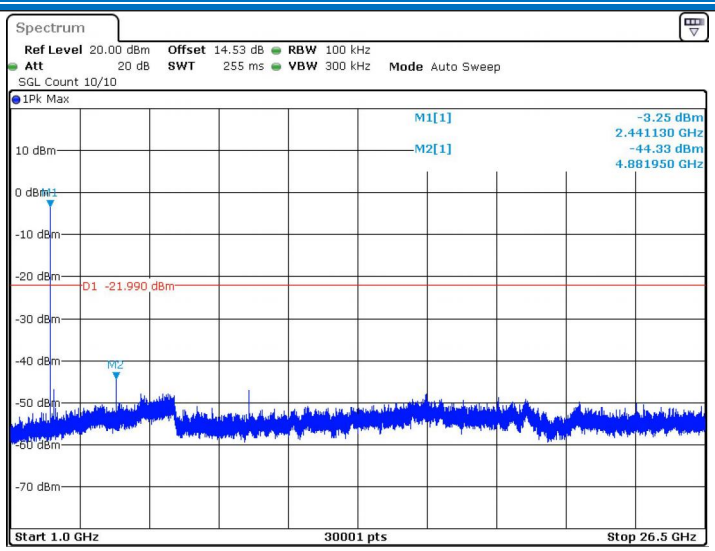
DH5_Ant1_2441_0~Reference



DH5_Ant1_2441_30~1000



DH5_Ant1_2441_1000~26500



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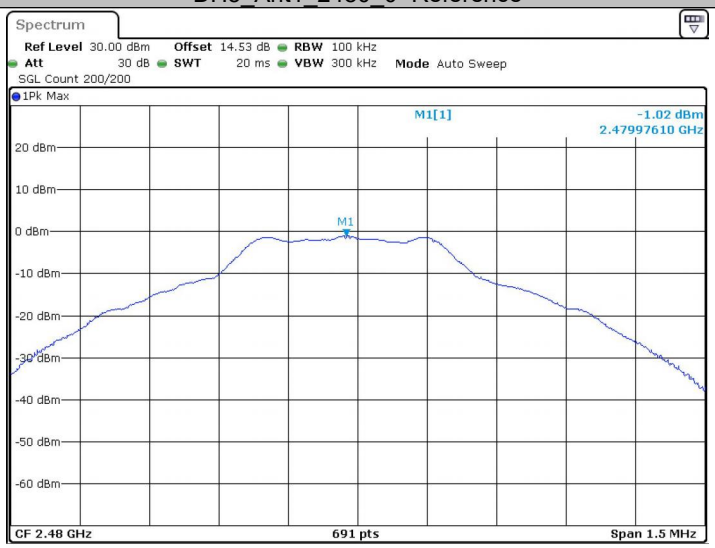
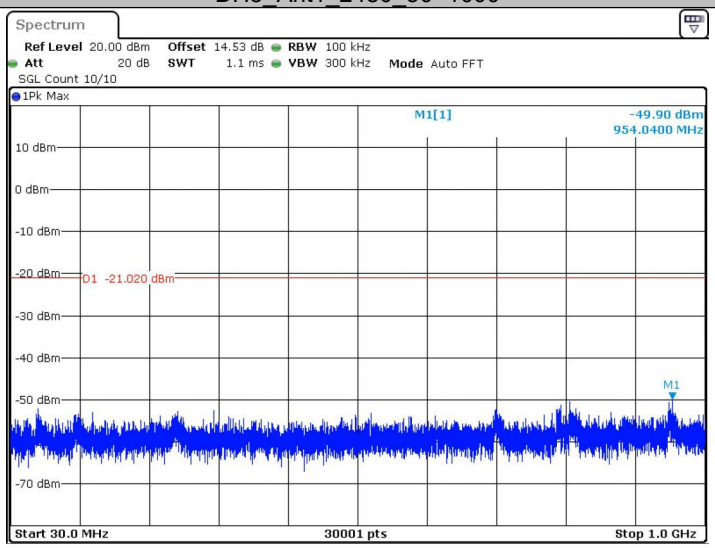
DH5_Ant1_2480_0~Reference



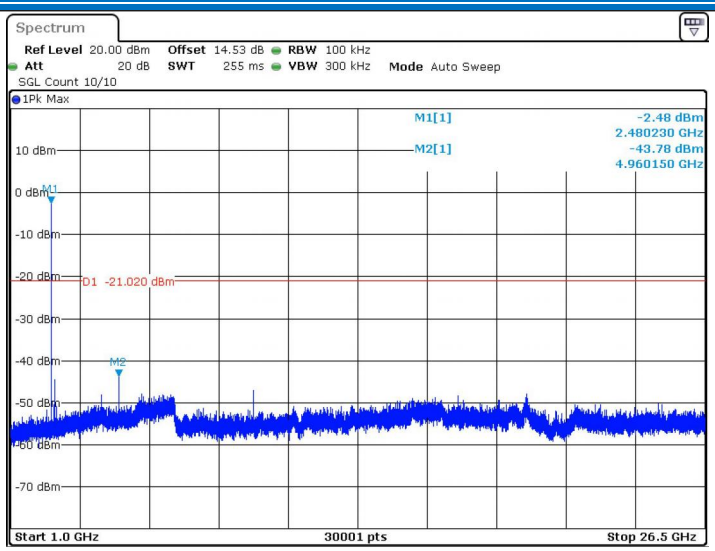
Date: 18.MAR.2025 11:52:15

DH5_Ant1_2480_30~1000

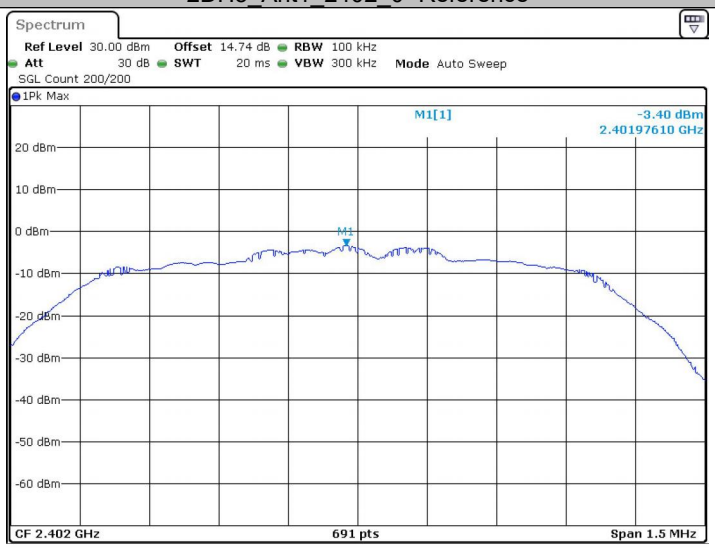


Date: 18.MAR.2025 11:52:20

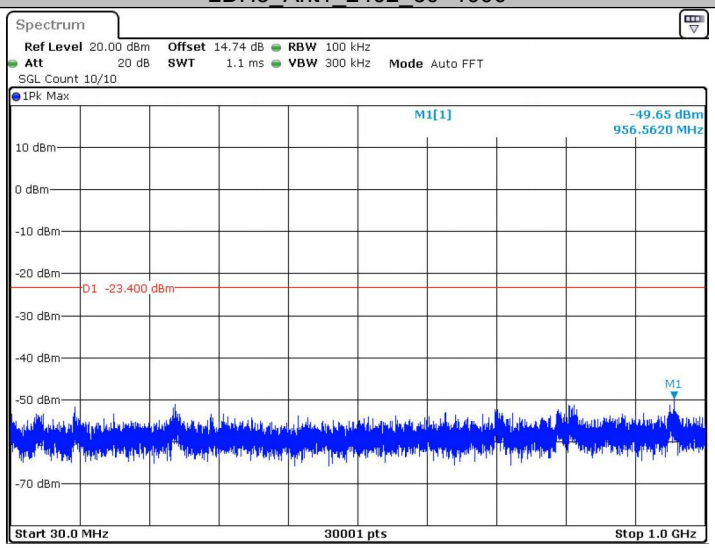
DH5_Ant1_2480_1000~26500



2DH5_Ant1_2402_0~Reference



2DH5_Ant1_2402_30~1000



2DH5_Ant1_2402_1000~26500