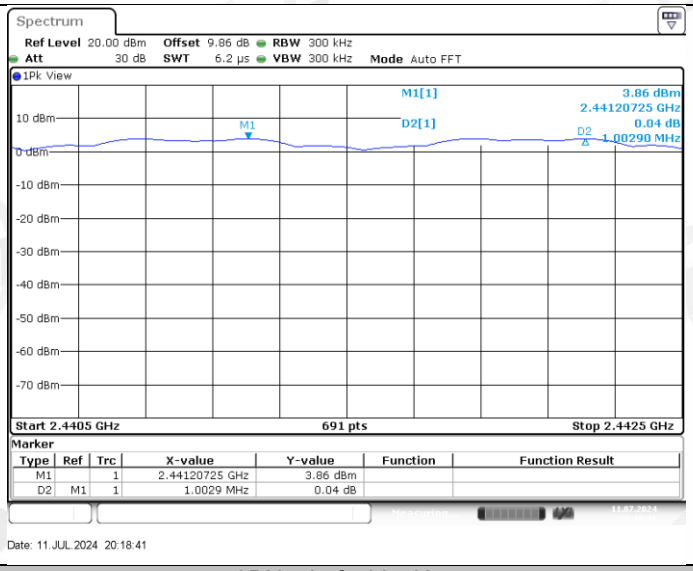
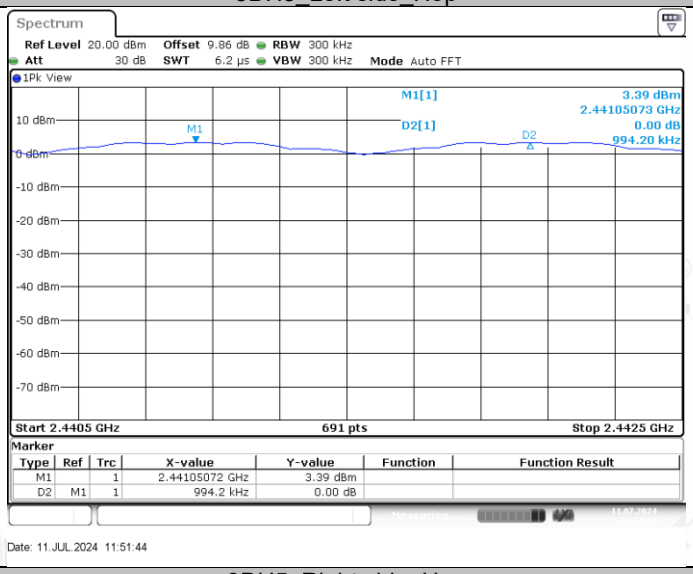
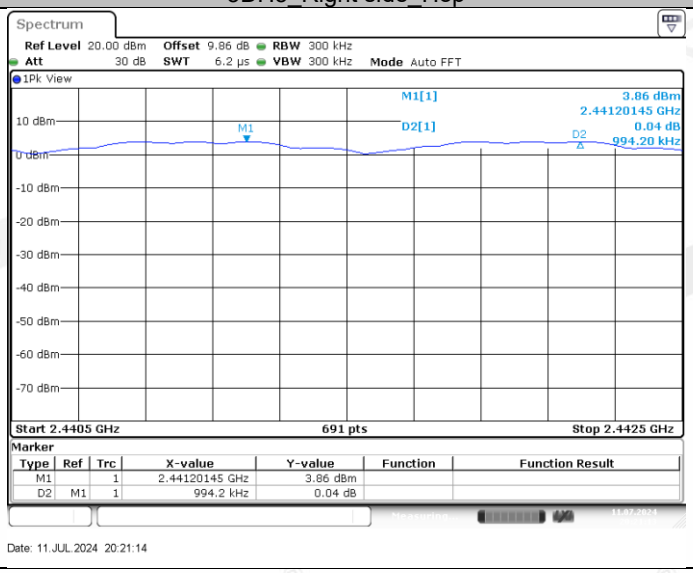


3DH5_Left side_Hop

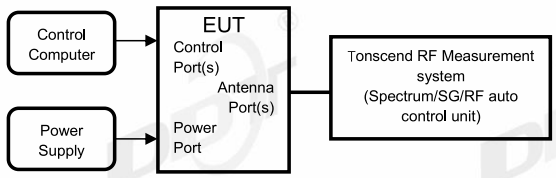


3DH5_Right side_Hop



8. Dwell Time

8.1. Block diagram of test setup



8.2. Limits

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

8.3. Test procedure

(1) The test according to ANSI C63.10-2013 clause 7.8.4.
(2) Connect EUT's antenna output to spectrum analyzer by RF cable, the path loss was compensated to the results.
(3) Set the EUT as maximum power setting and enable the EUT transmit continuously.
(4) Use the following spectrum analyzer settings for the maximum peak output power measurement:

RBW:	≤ channel spacing and where possible RBW should be set >>1 / T
VBW:	VBW ≥ RBW.
Span:	Zero span, centered on a hopping channel.
Detector Mode:	Peak
Sweep time:	Auto
Trace mode:	Clear Write.

(5) The test period: T= 0.4 Second/Channel x 79 Channel = 31.6 s
(6) Measure the hopping number and on time of each pulse with spectrum analyzer in zero span set, and calculate dwell time with formula Dwell time = total hops *pulse's on time.
(7) Measure and record the results in the report.

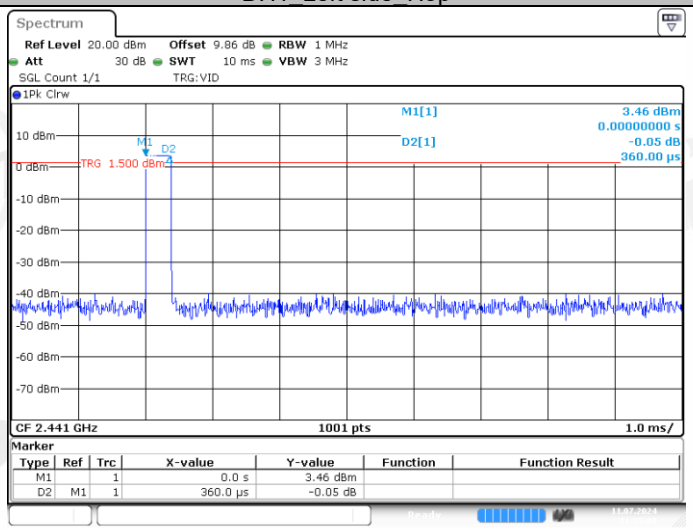
8.4. Test result

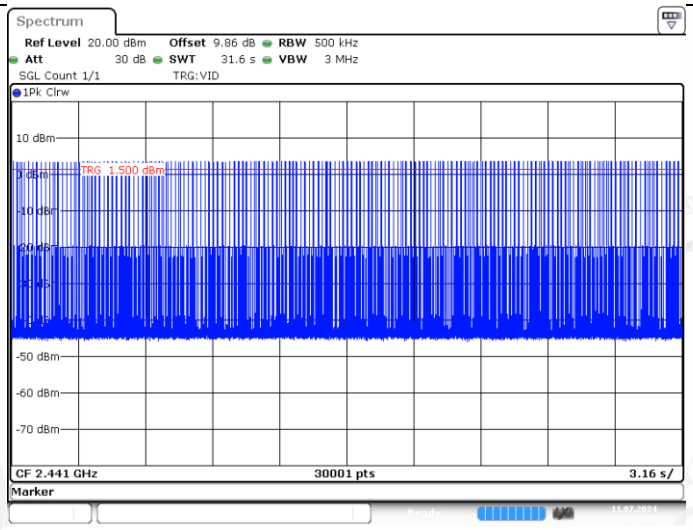
Test Engineer:	Zhongyao	Test Site:	RF Measurement System 3#
Ambient Condition:	26.4℃,38.7%RH	Test Date:	2024.07.11
Test Power Supply:	Battery	Sample Number:	S24040910-007

Test Mode	Antenna	Frequency [MHz]	BurstWidth [ms]	TotalHops [Num]	Result[s]	Limit[s]	Verdict
DH1	Left side	Hop	0.360	320	0.115	≤0.4	PASS
	Right side	Hop	0.360	318	0.114	≤0.4	PASS
DH3	Left side	Hop	1.620	162	0.262	≤0.4	PASS
	Right side	Hop	1.620	153	0.248	≤0.4	PASS
DH5	Left side	Hop	2.870	110	0.316	≤0.4	PASS
	Right side	Hop	2.870	104	0.298	≤0.4	PASS
2DH1	Left side	Hop	0.380	320	0.122	≤0.4	PASS
	Right side	Hop	0.380	318	0.121	≤0.4	PASS
2DH3	Left side	Hop	1.630	164	0.267	≤0.4	PASS
	Right side	Hop	1.630	162	0.264	≤0.4	PASS
2DH5	Left side	Hop	2.870	111	0.319	≤0.4	PASS
	Right side	Hop	2.870	123	0.353	≤0.4	PASS
3DH1	Left side	Hop	0.370	318	0.118	≤0.4	PASS
	Right side	Hop	0.370	321	0.119	≤0.4	PASS
3DH3	Left side	Hop	1.630	161	0.262	≤0.4	PASS
	Right side	Hop	1.630	157	0.256	≤0.4	PASS
3DH5	Left side	Hop	2.870	114	0.327	≤0.4	PASS
	Right side	Hop	2.880	107	0.308	≤0.4	PASS

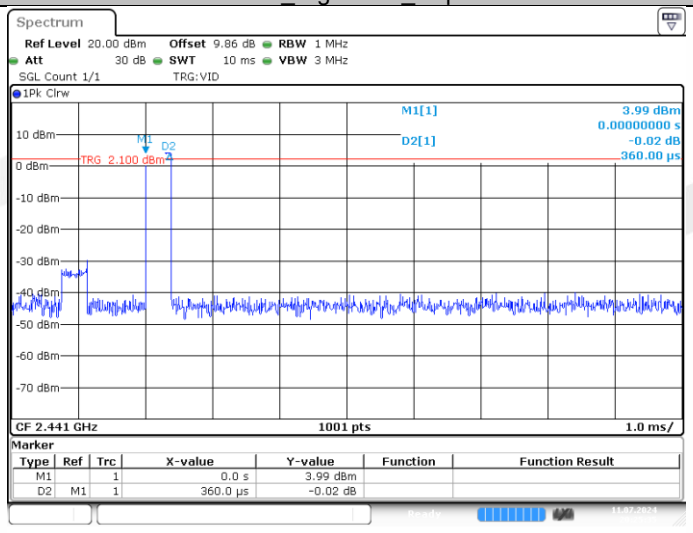
8.5. Test graphs

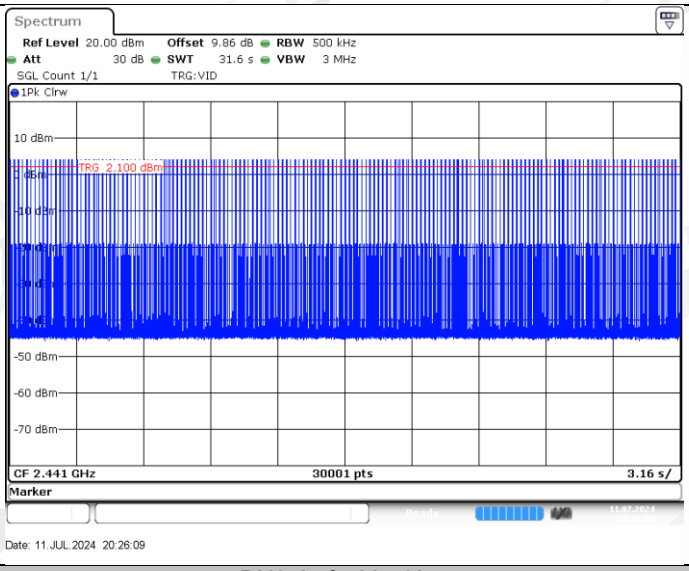
DH1_Left side_Hop



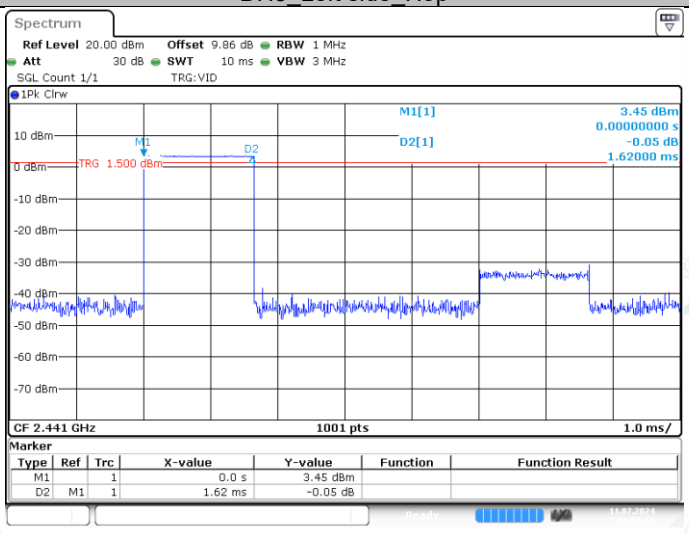


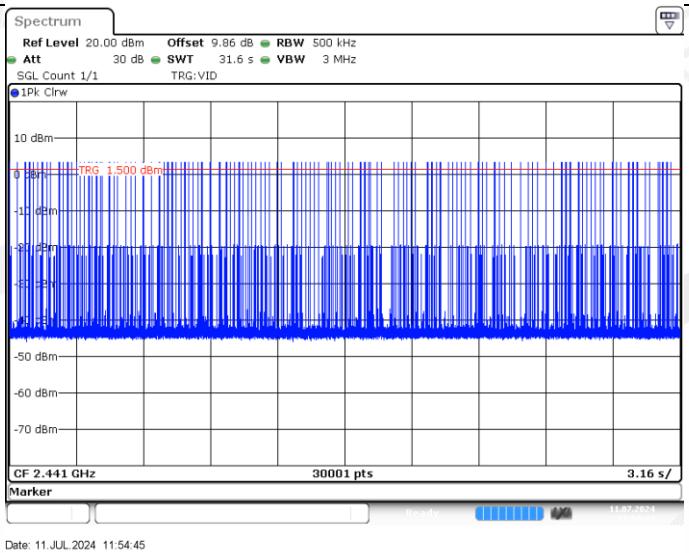
DH1_Right side_Hop



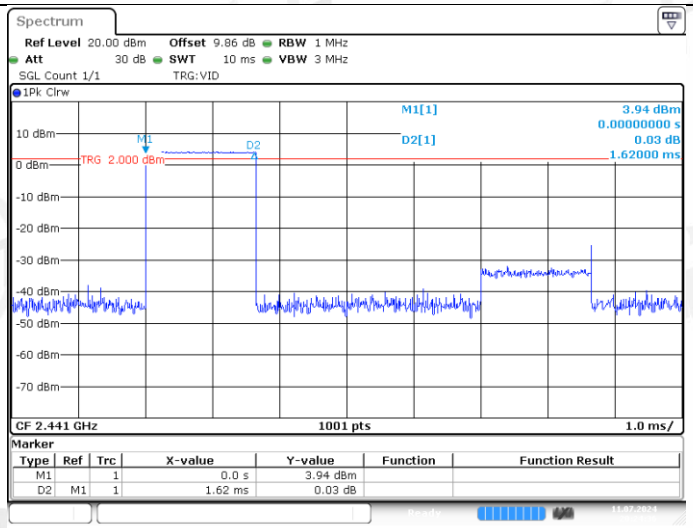


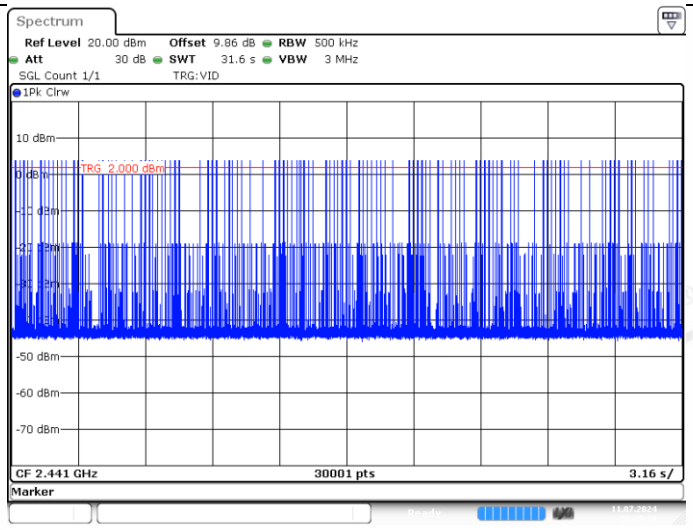
DH3_Left side_Hop



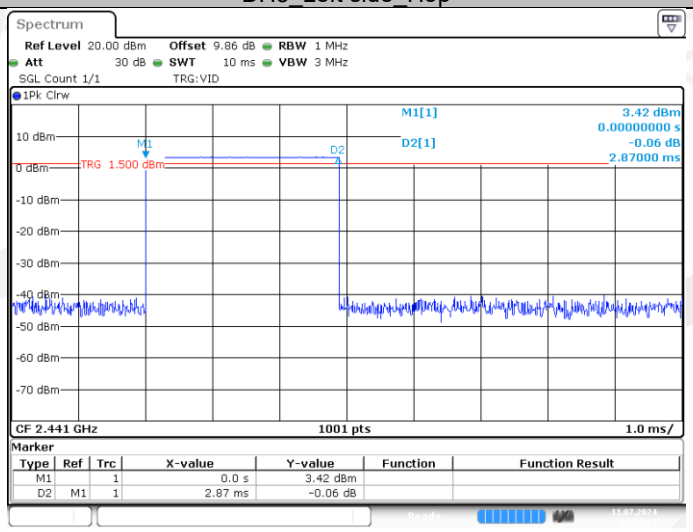


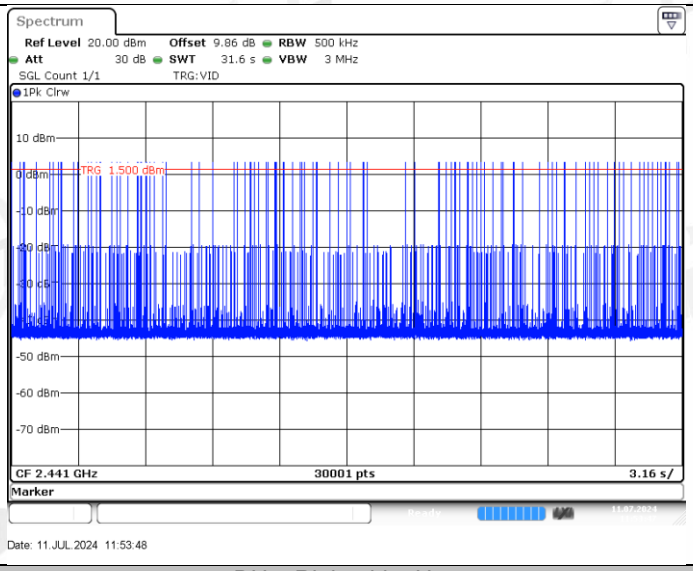
DH3_Right side_Hop



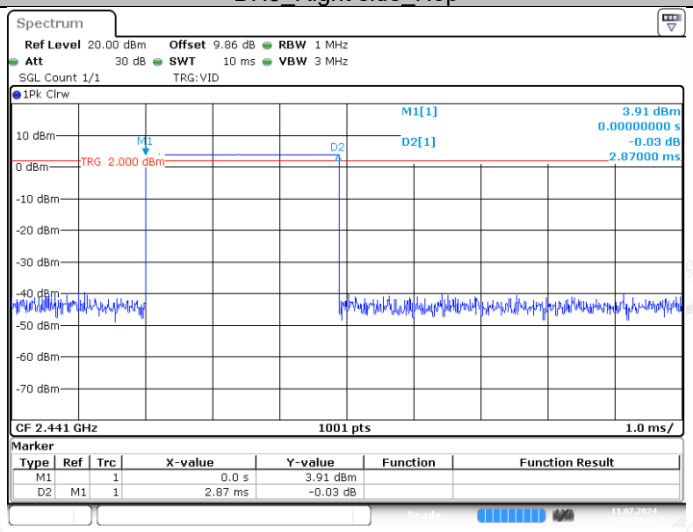


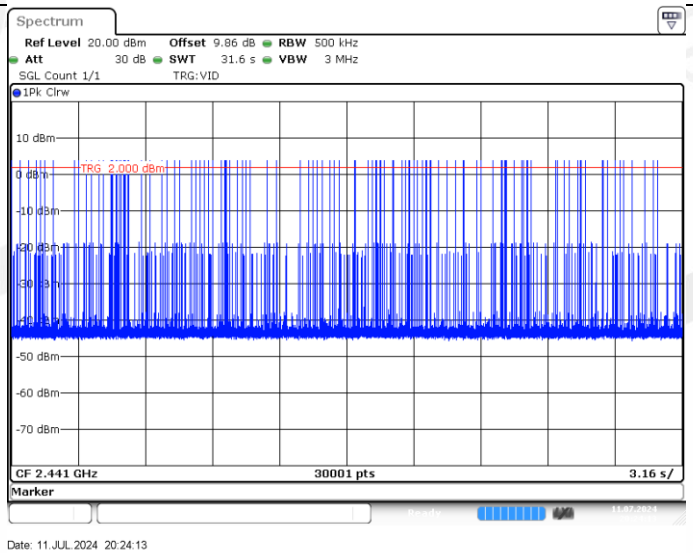
DH5_Left side_Hop



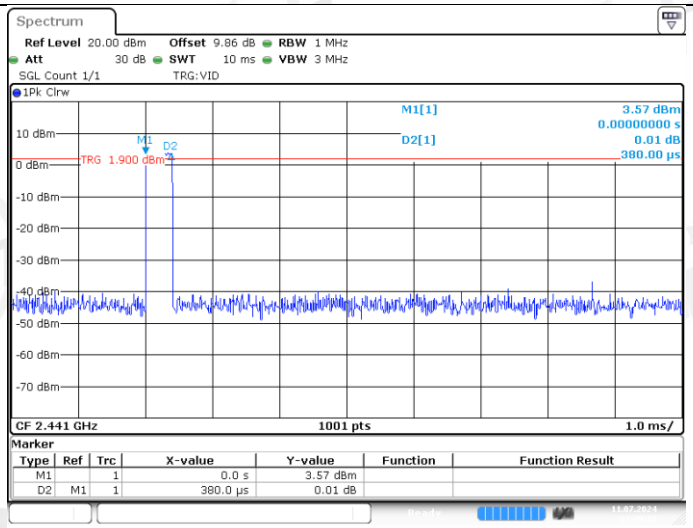


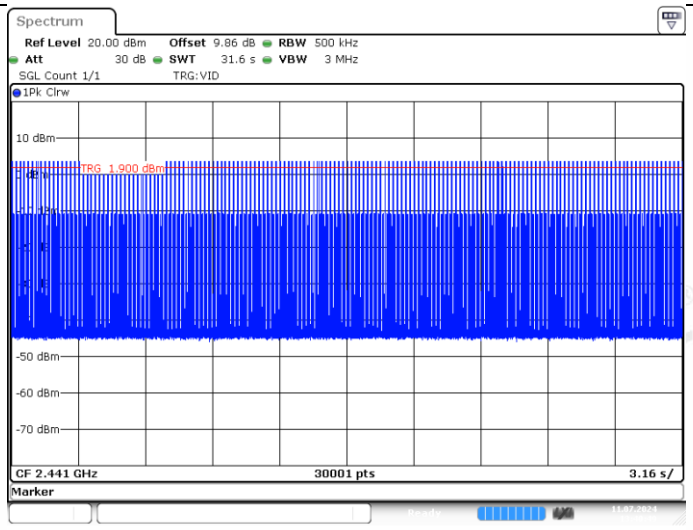
DH5_Right side_Hop



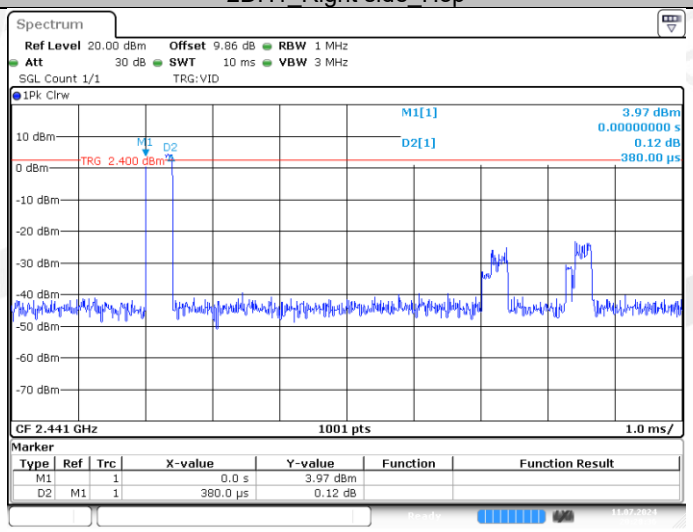


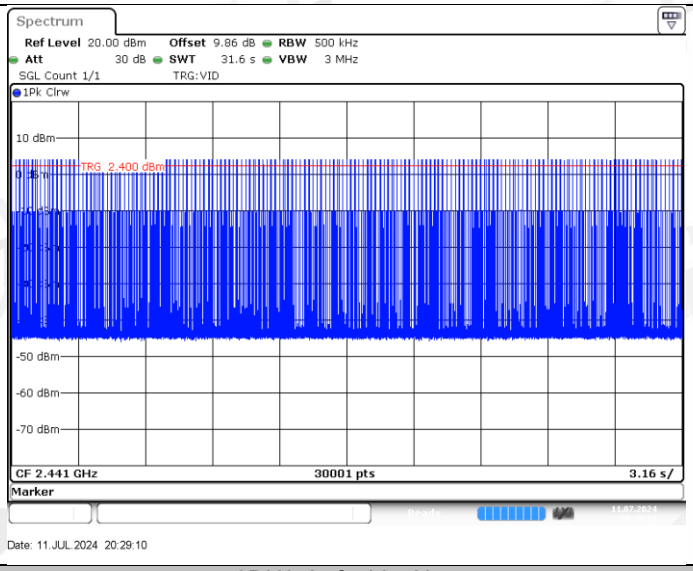
2DH1_Left side_Hop



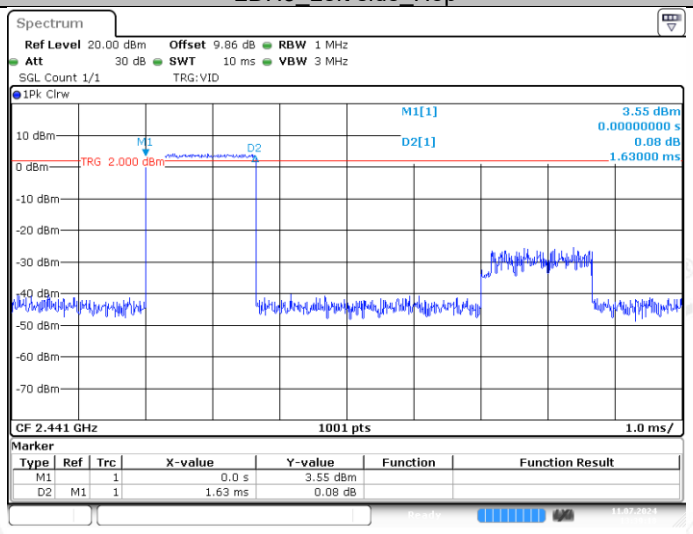


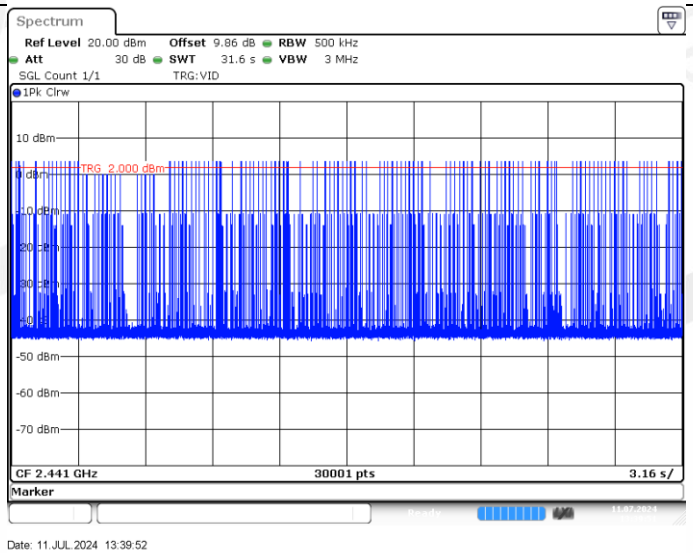
2DH1_Right side_Hop



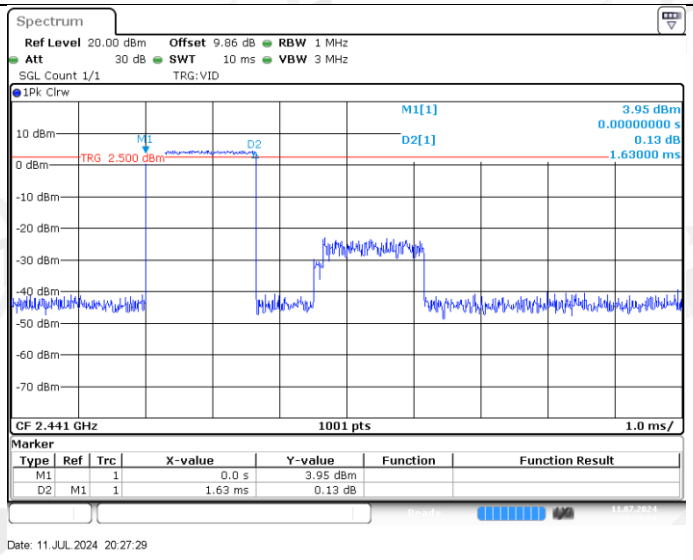


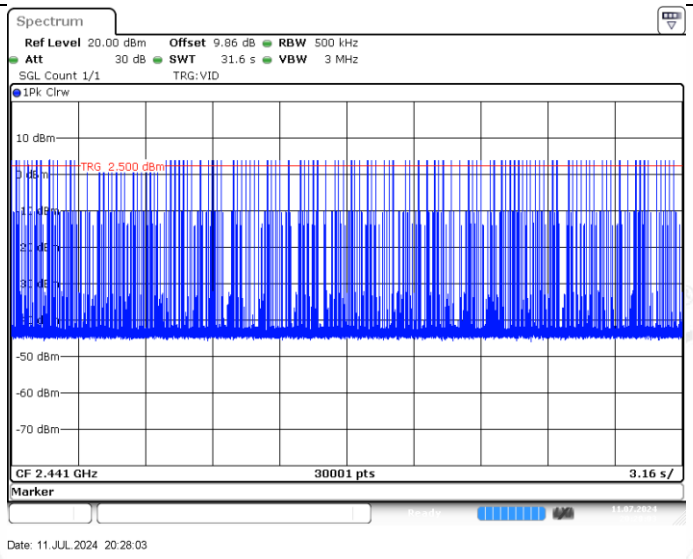
2DH3_Left side_Hop



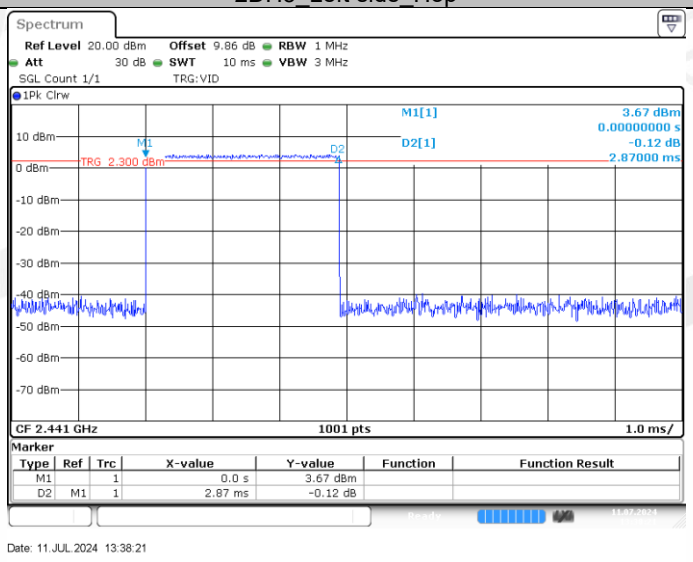


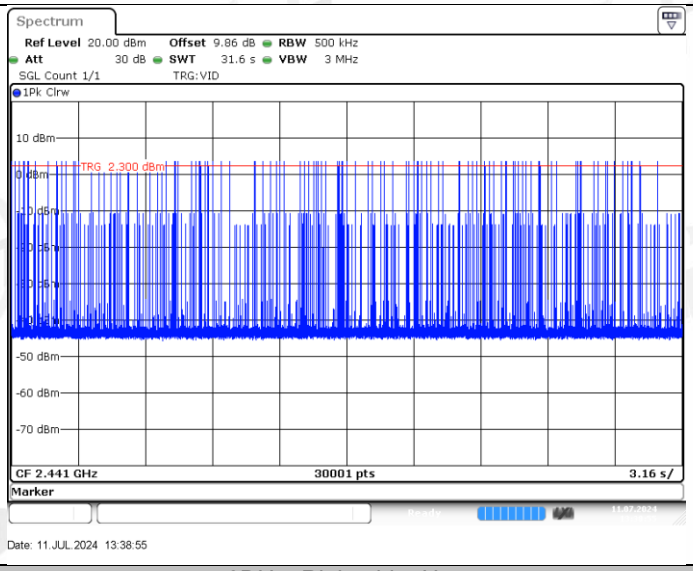
2DH3_Right side_Hop



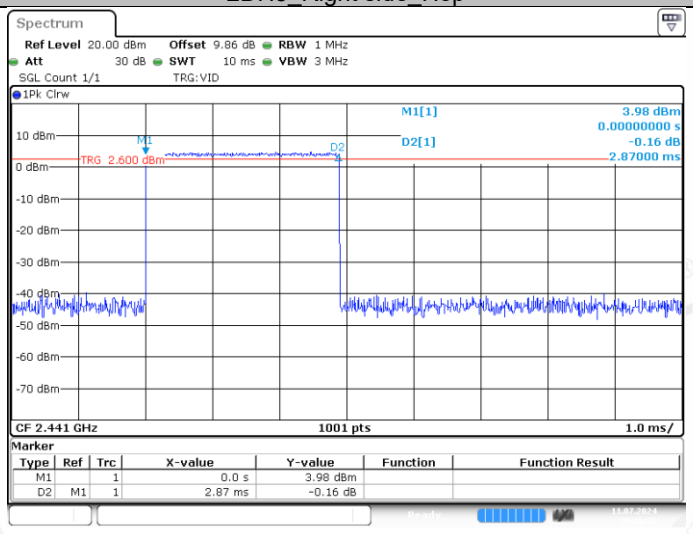


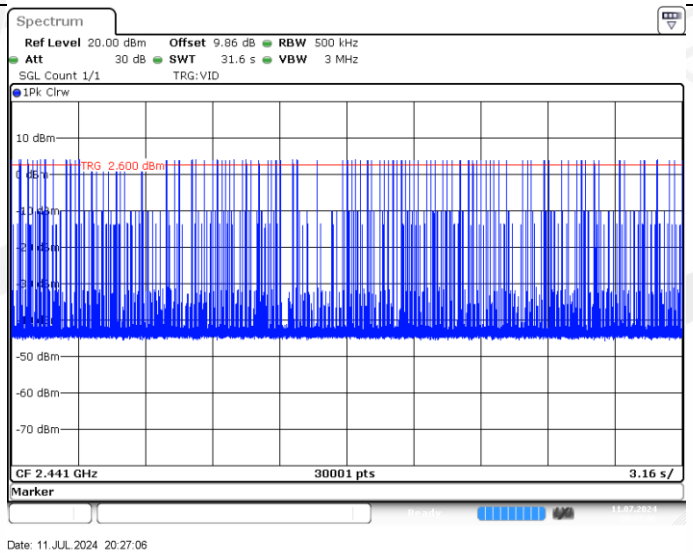
2DH5_Left side_Hop



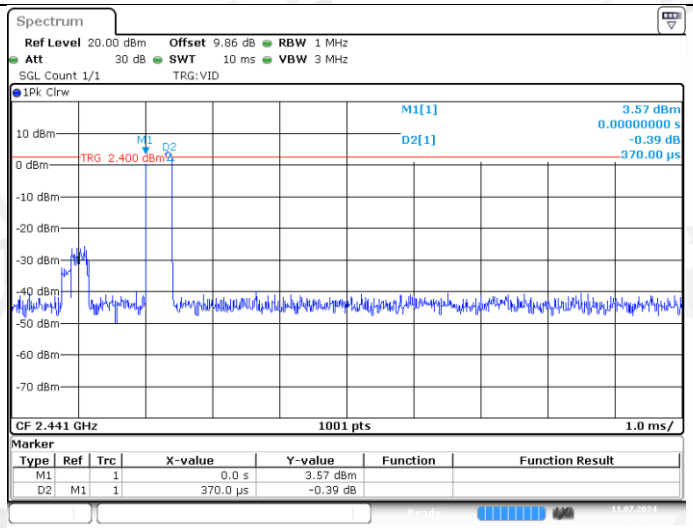


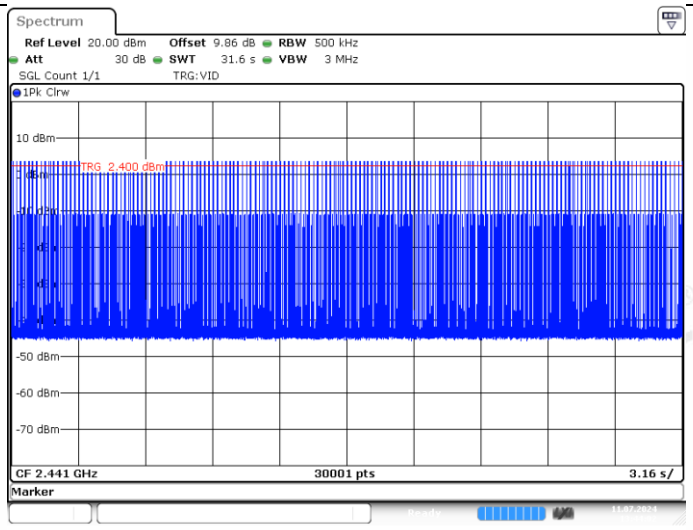
2DH5_Right side_Hop



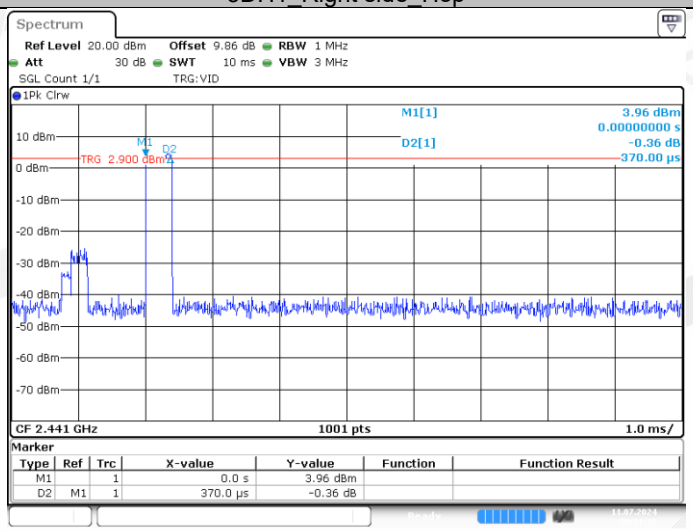


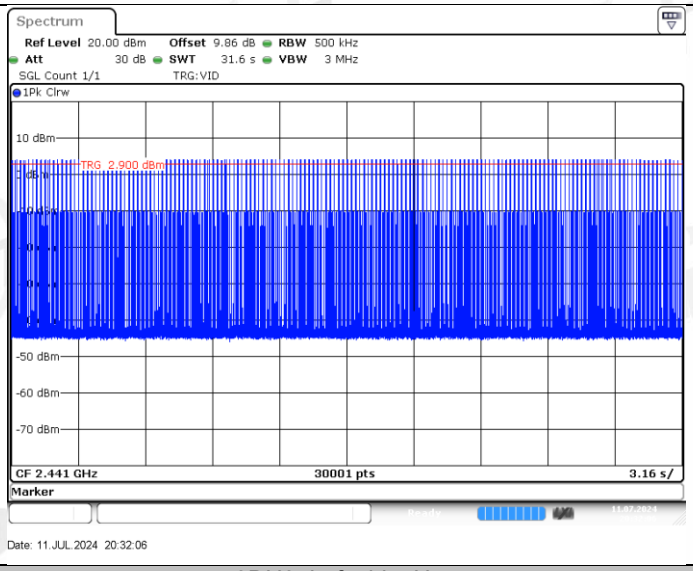
3DH1_Left side_Hop



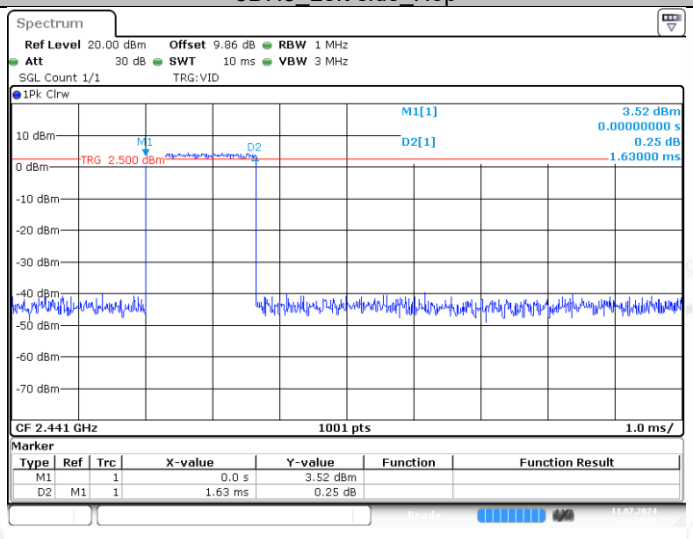


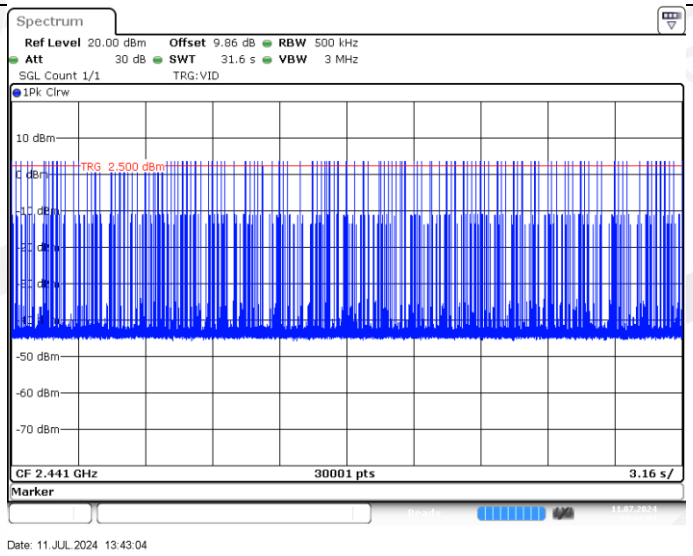
3DH1_Right side_Hop



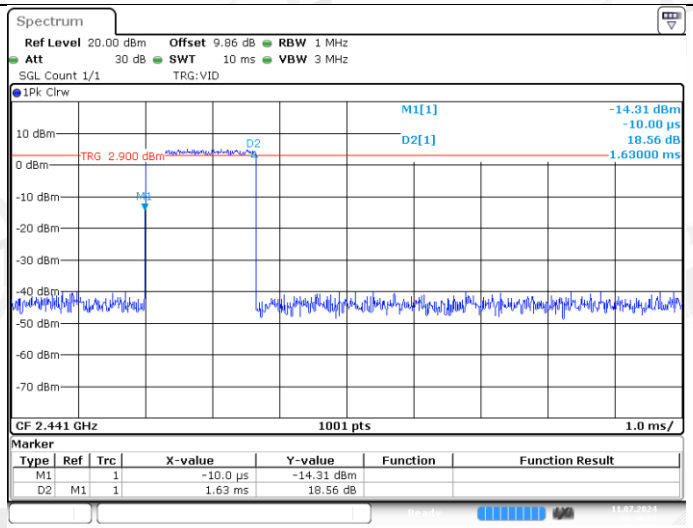


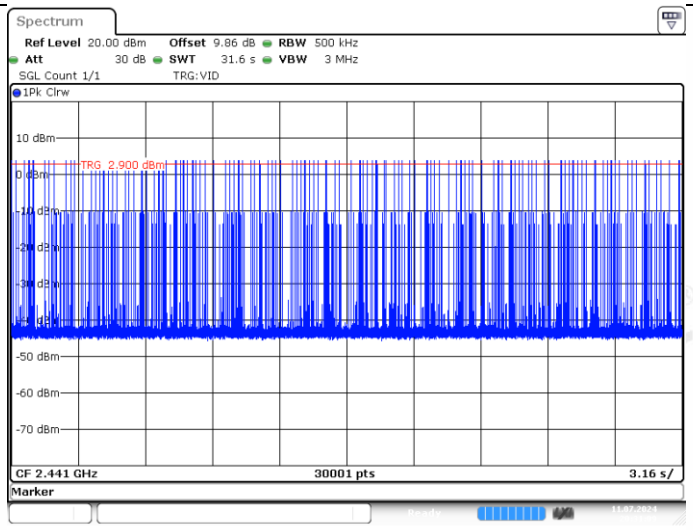
3DH3_Left side_Hop



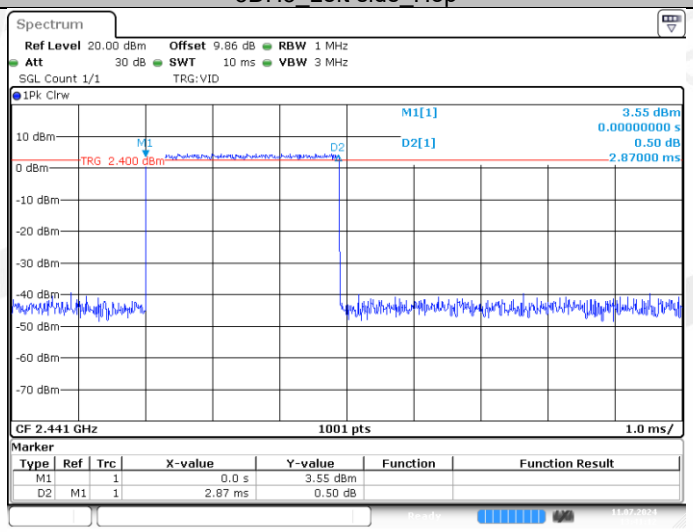


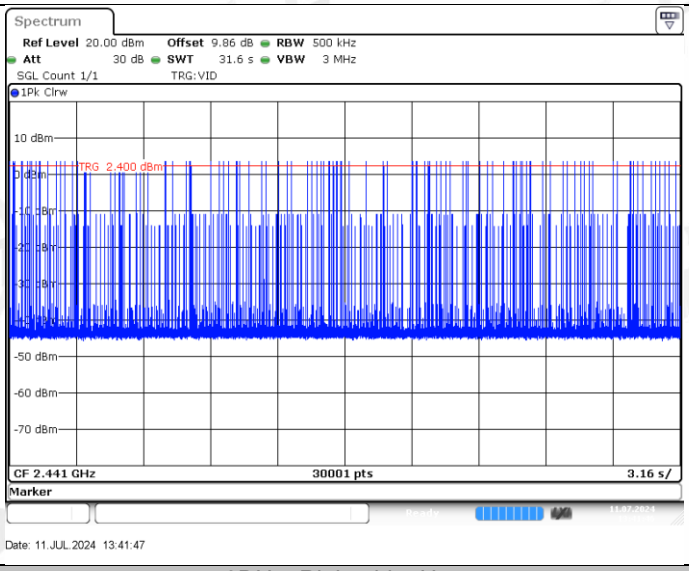
3DH3_Right side_Hop



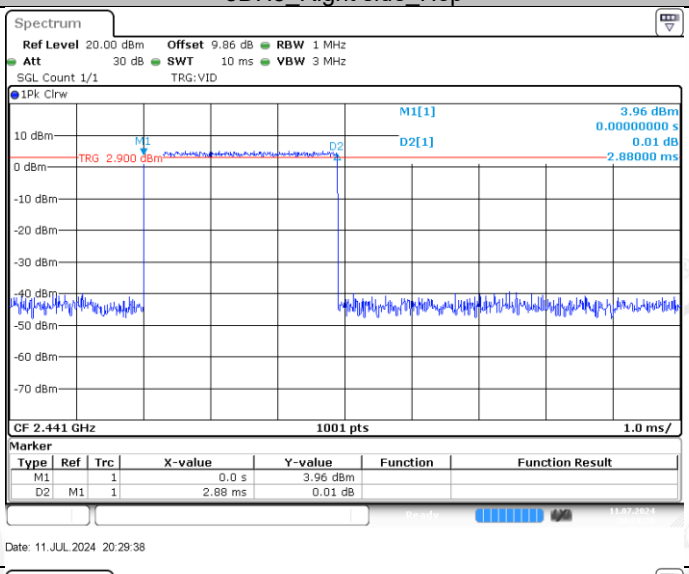


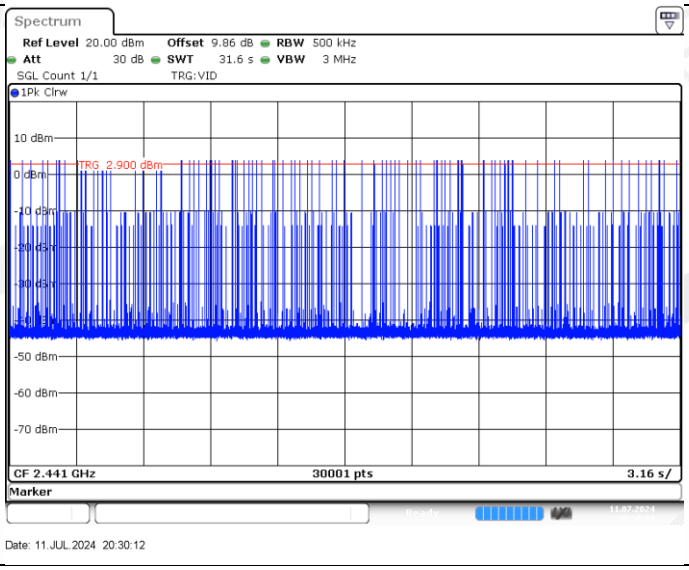
3DH5_Left side_Hop





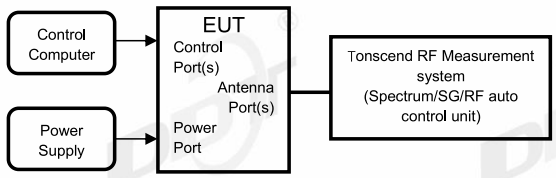
3DH5_Right side_Hop





9. Number of Hopping Channel

9.1. Block diagram of test setup



9.2. Limits

Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

9.3. Test procedure

(1) The test according to ANSI C63.10-2013 clause 7.8.3.
(2) Connect EUT's antenna output to spectrum analyzer by RF cable, the path loss was compensated to the results.
(3) Set the EUT as maximum power setting and enable the EUT transmit continuously.
(4) Use the following spectrum analyzer settings for the maximum peak output power measurement:

RBW:	RBW to less than 30% of the channel spacing or the 20 dB bandwidth, whichever is smaller.
VBW:	VBW ≥ RBW.
Span:	The frequency band of operation
Detector Mode:	Peak
Sweep time:	Auto
Trace mode:	Max hold

(5) Measure the hopping number and record the results in the report.
(6) Measure and record the results in the report.

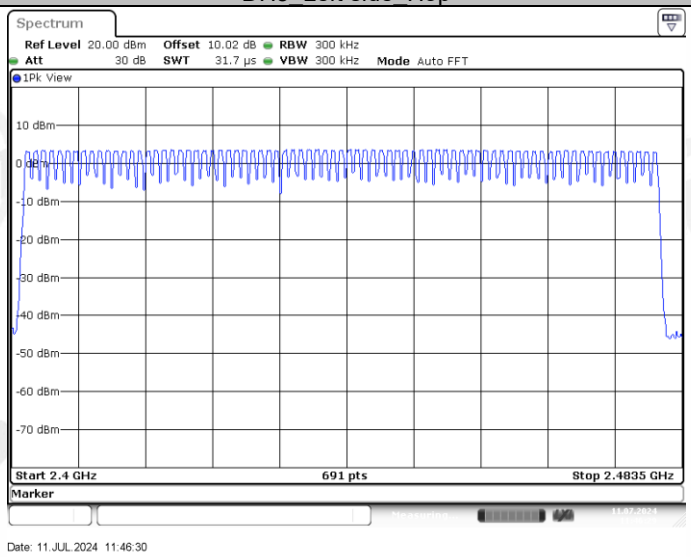
9.4. Test result

Test Engineer:	Zhongyao	Test Site:	RF Measurement System 3#
Ambient Condition:	26.4℃,38.7%RH	Test Date:	2024.07.11
Test Power Supply:	Battery	Sample Number:	S24040910-007

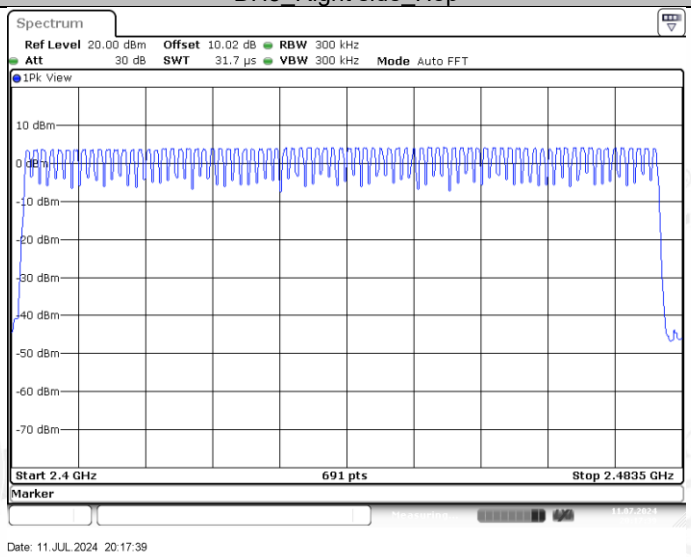
Test Mode	Antenna	Frequency [MHz]	Result [Num]	Limit [Num]	Verdict
DH5	Left side	Hop	79	≥15	PASS
	Right side	Hop	79	≥15	PASS
2DH5	Left side	Hop	79	≥15	PASS
	Right side	Hop	79	≥15	PASS
3DH5	Left side	Hop	79	≥15	PASS
	Right side	Hop	79	≥15	PASS

9.5. Test graphs

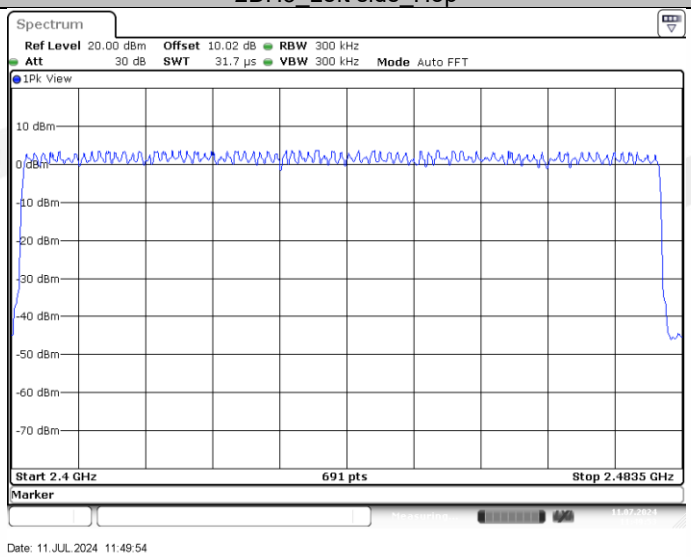
DH5_Left side_Hop



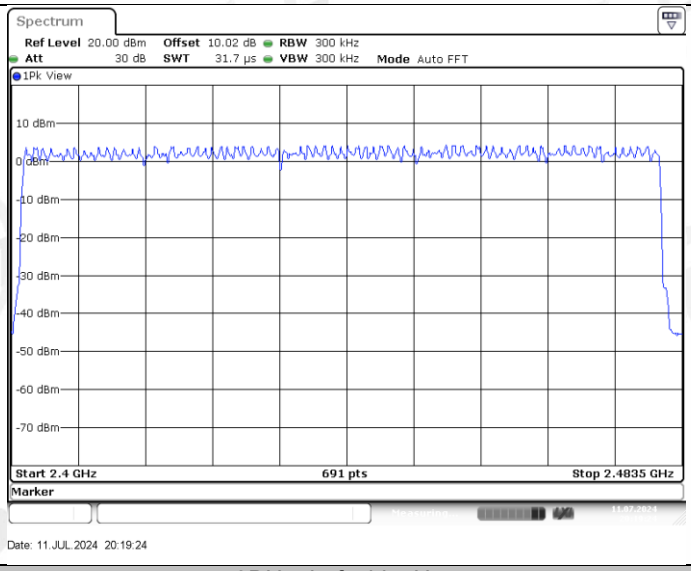
DH5_Right side_Hop



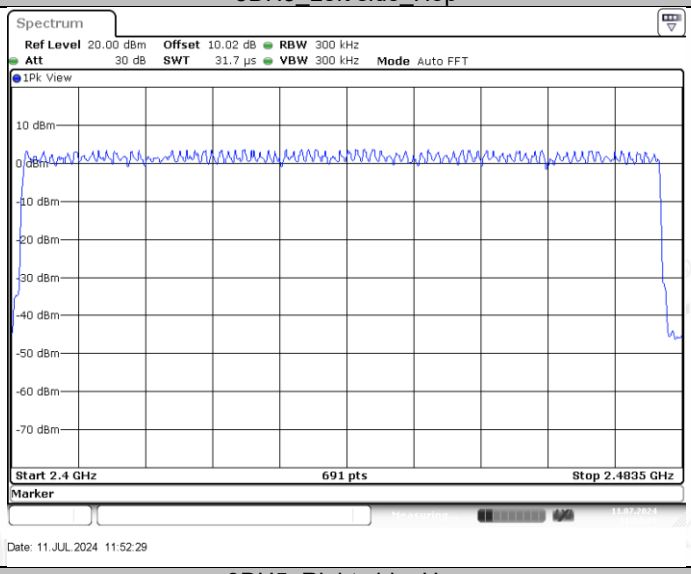
2DH5_Left side_Hop



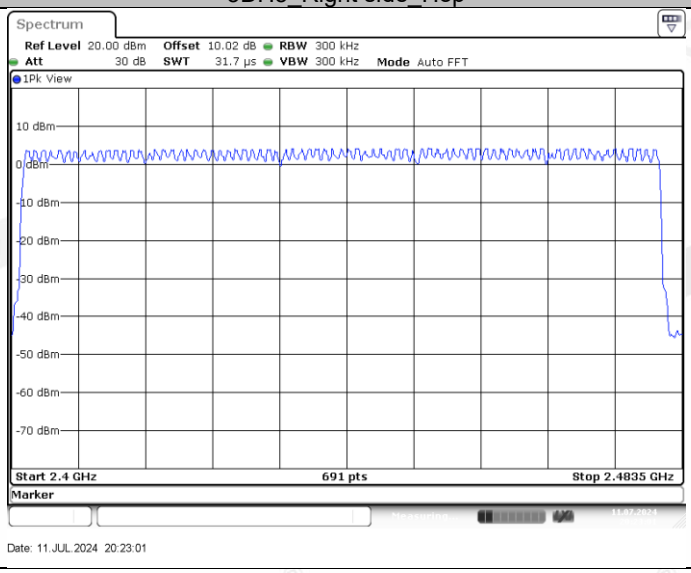
2DH5_Right side_Hop



3DH5_Left side_Hop

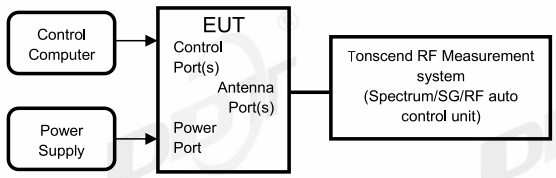


3DH5_Right side_Hop



10. Band Edge Compliance (Conducted Method)

10.1. Block diagram of test setup



10.2. Limit

All restriction band should comply with 15.209, other emission should be at least 20dB below the fundamental.

10.3. Test procedure

(1) Connect EUT's antenna output to spectrum analyzer by RF cable.
(2) Establish a reference level by using the following procedure:

RBW:	100 kHz
VBW:	300 kHz
Span	Encompass frequency range to be measured
Detector Mode:	Peak
Sweep time:	Auto
Trace mode	Max hold

(3) Allow the trace to stabilize, use the peak marker function to determine the maximum peak power level to establish the reference level.
(4) Then mark the maximum amplitude of all unwanted emissions outside of the authorized frequency band.

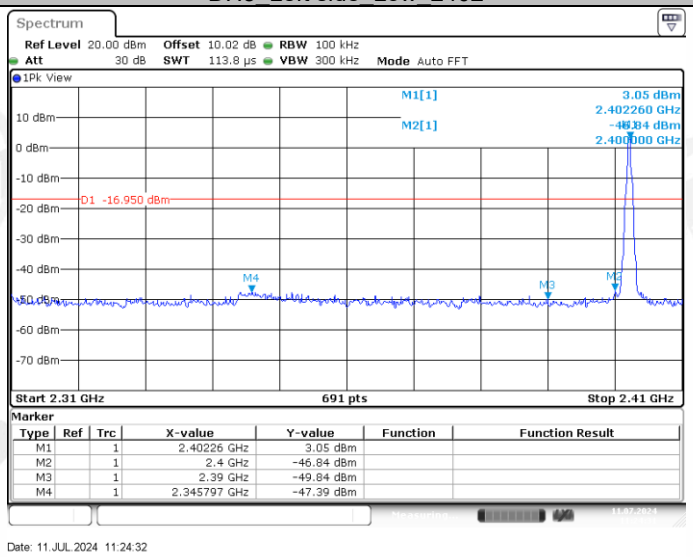
10.4. Test result

Test Engineer:	Zhongyao	Test Site:	RF Measurement System 3#
Ambient Condition:	26.4℃,38.7%RH	Test Date:	2024.07.11
Test Power Supply:	Battery	Sample Number:	S24040910-007

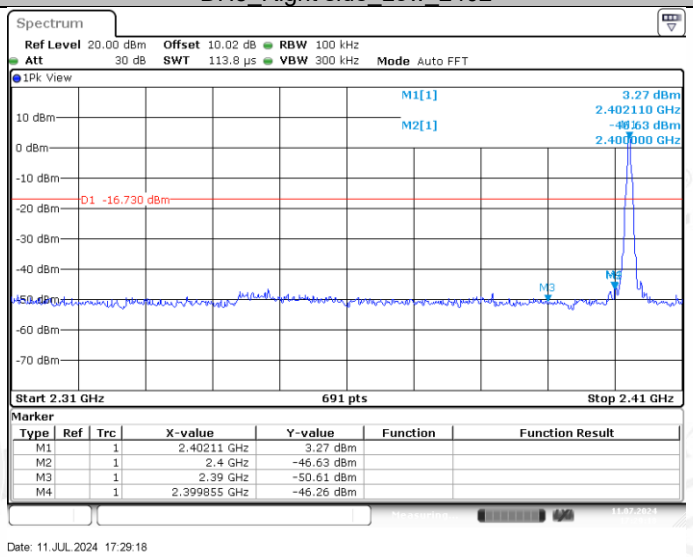
Mode	Freq. (MHz)	Verdict
GFSK	Hopping off 2402	Pass
	Hopping off 2480	Pass
	Hopping on	Pass
π/4-DQPSK	Hopping off 2402	Pass
	Hopping off 2480	Pass
	Hopping on	Pass
8DPSK	Hopping off 2402	Pass
	Hopping off 2480	Pass
	Hopping on	Pass

10.5. Test graphs

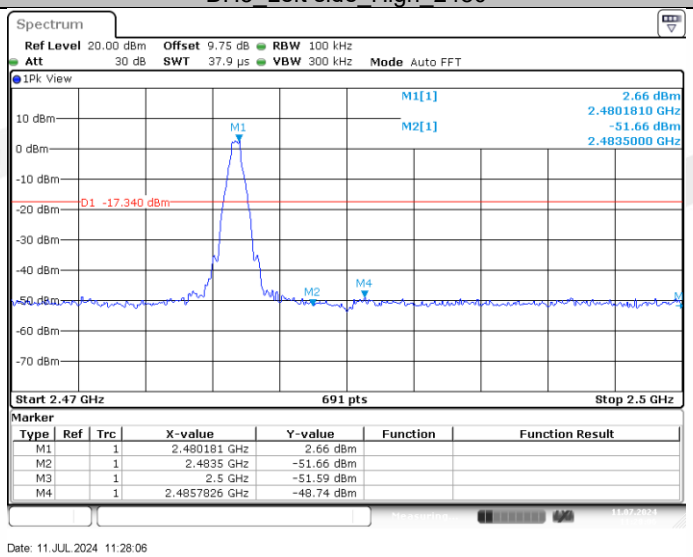
DH5_Left side_Low_2402



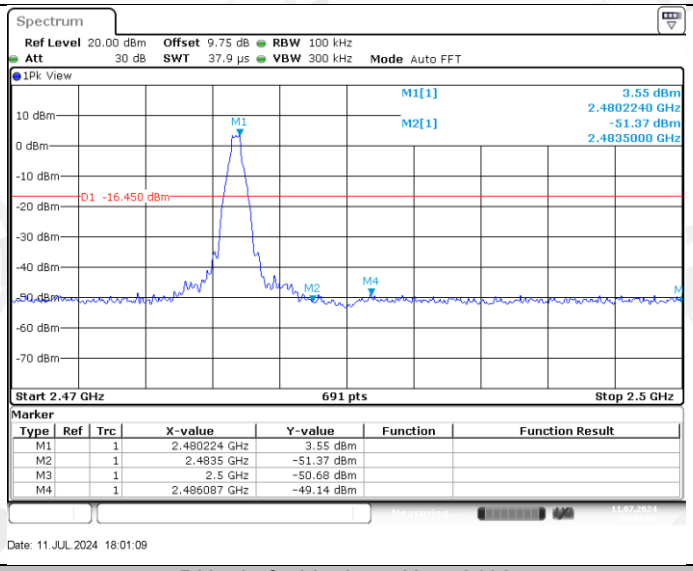
DH5_Right side_Low_2402



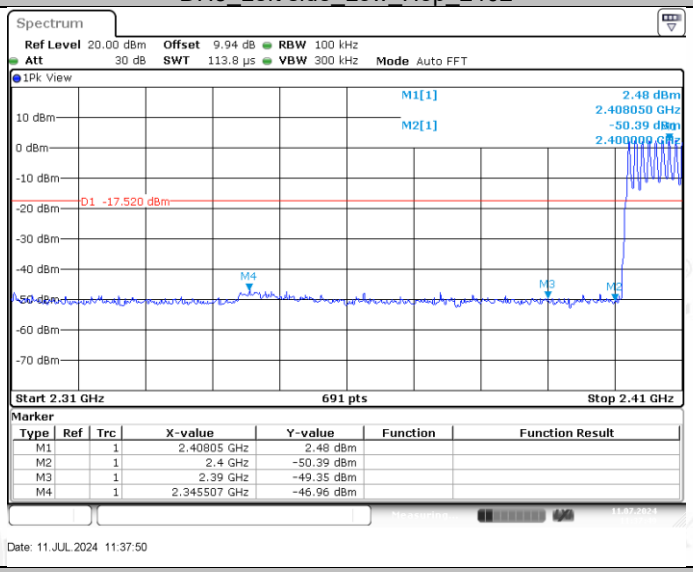
DH5_Left side_High_2480



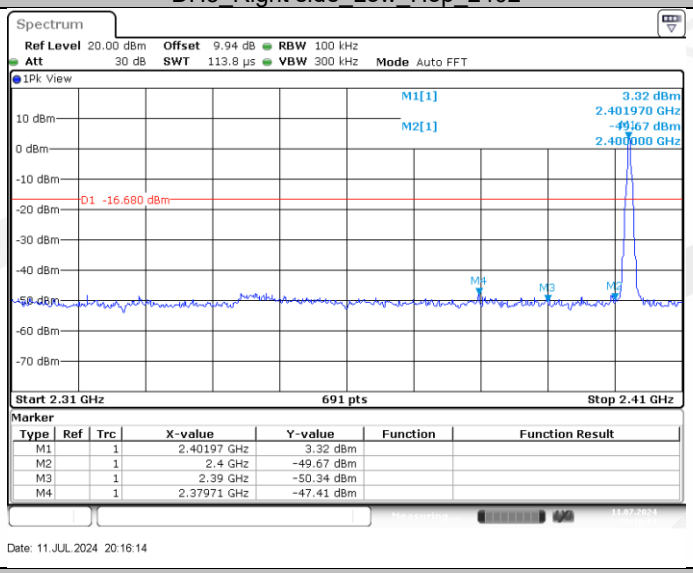
DH5_Right side_High_2480



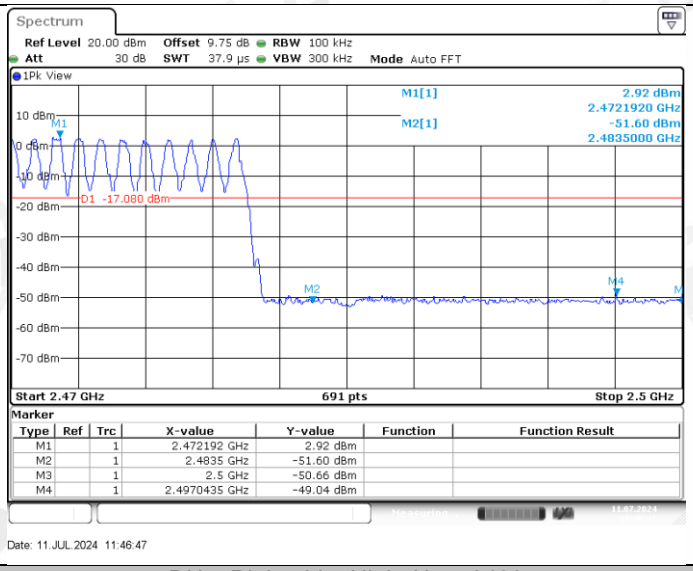
DH5_Left side_Low_Hop_2402



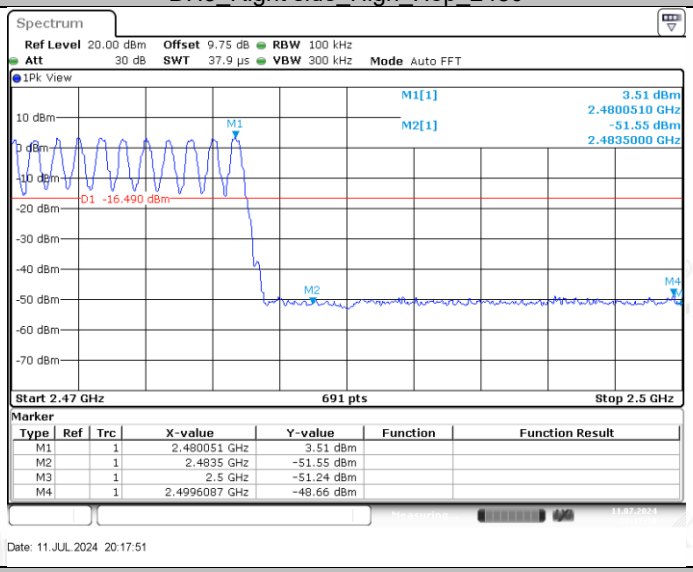
DH5_Right side_Low_Hop_2402



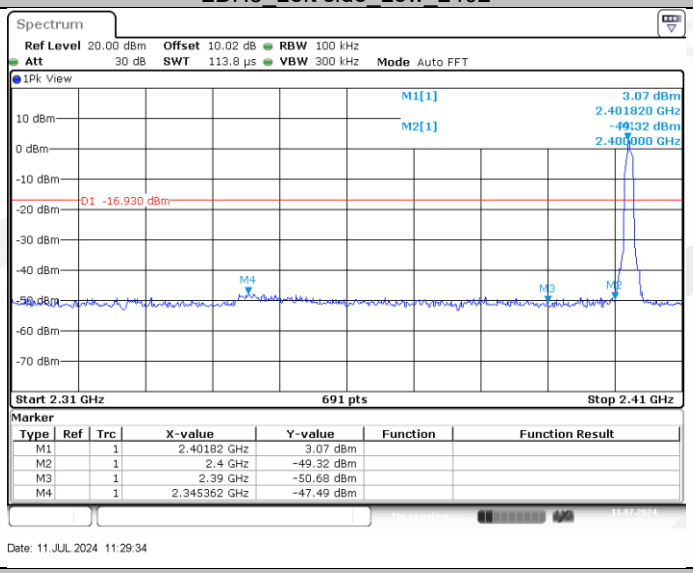
DH5_Left side_High_Hop_2480



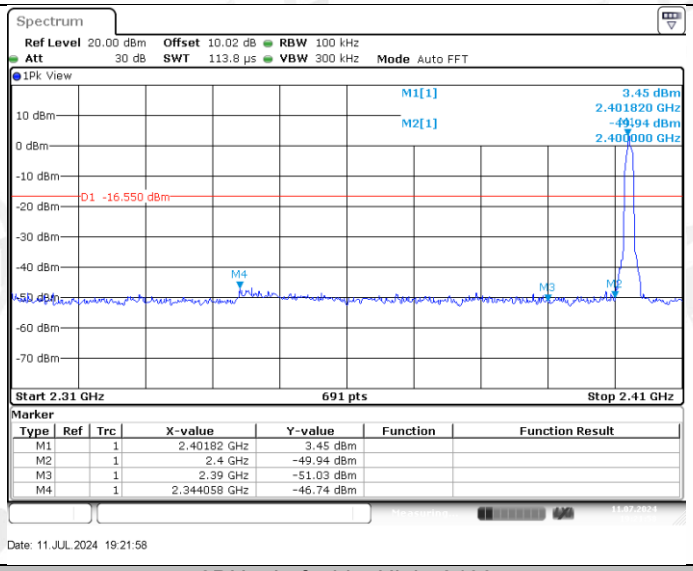
DH5_Right side_High_Hop_2480



2DH5_Left side_Low_2402



2DH5_Right side_Low_2402



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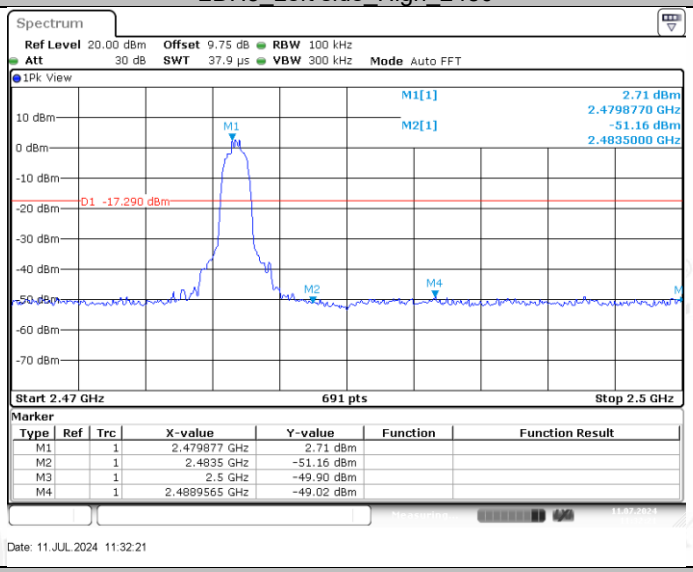
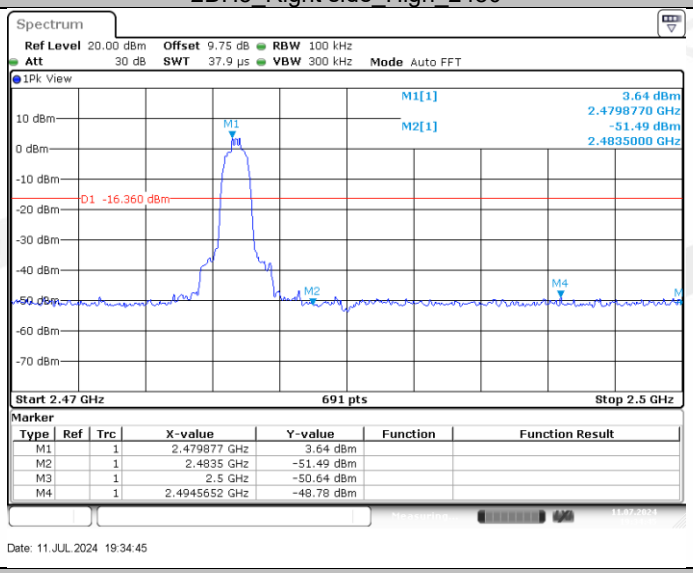
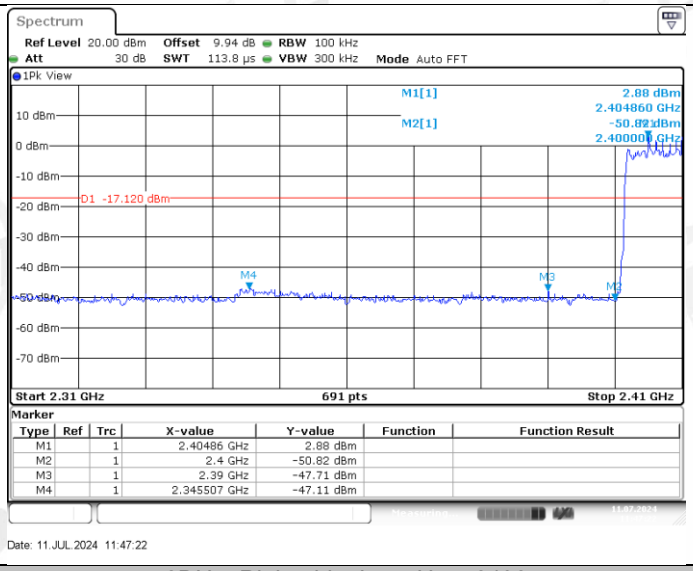


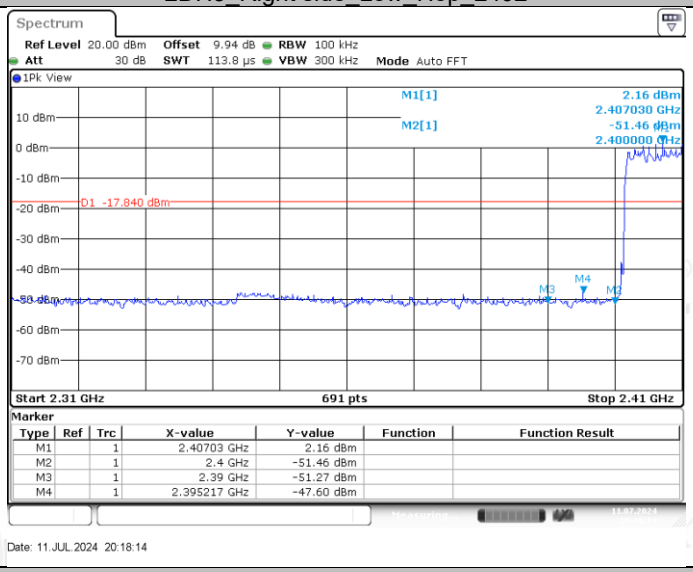
2DH5_Right side_High_2480



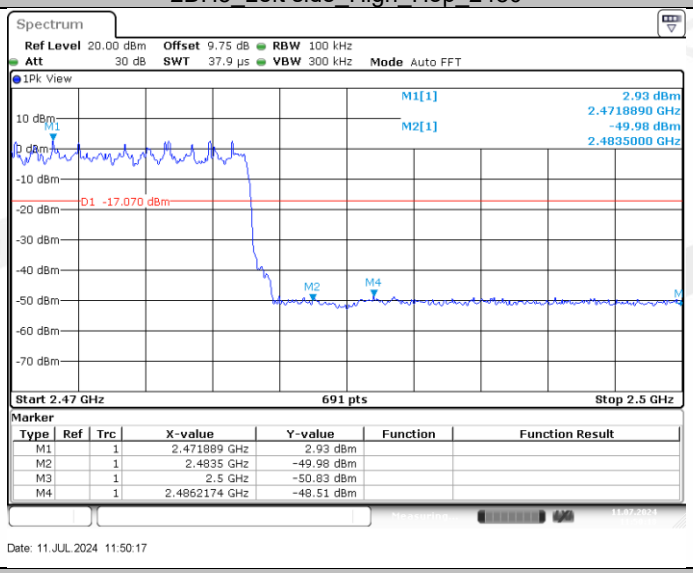
2DH5_Left side_Low_Hop_2402



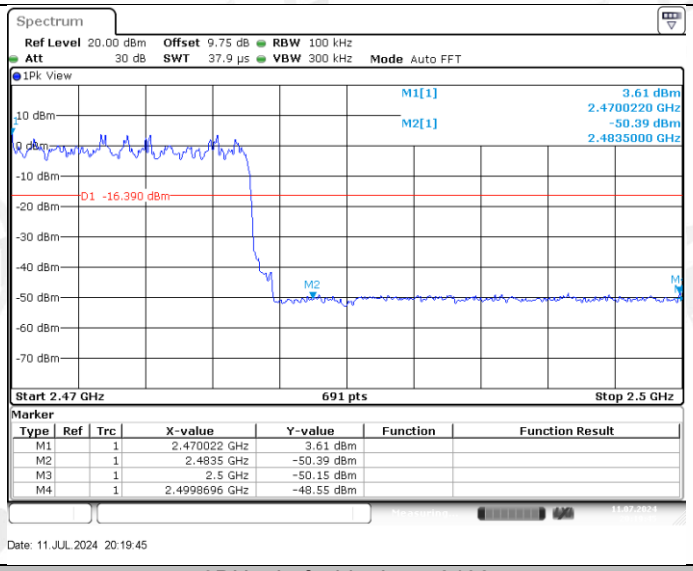
2DH5_Right side_Low_Hop_2402



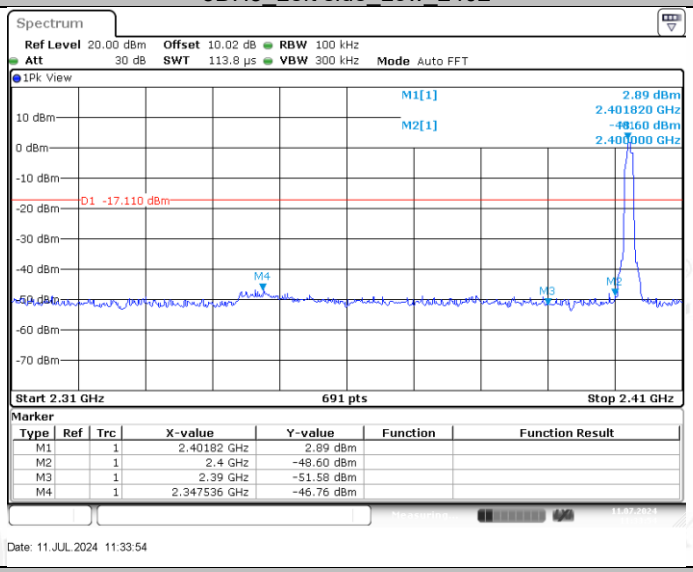
2DH5_Left side_High_Hop_2480



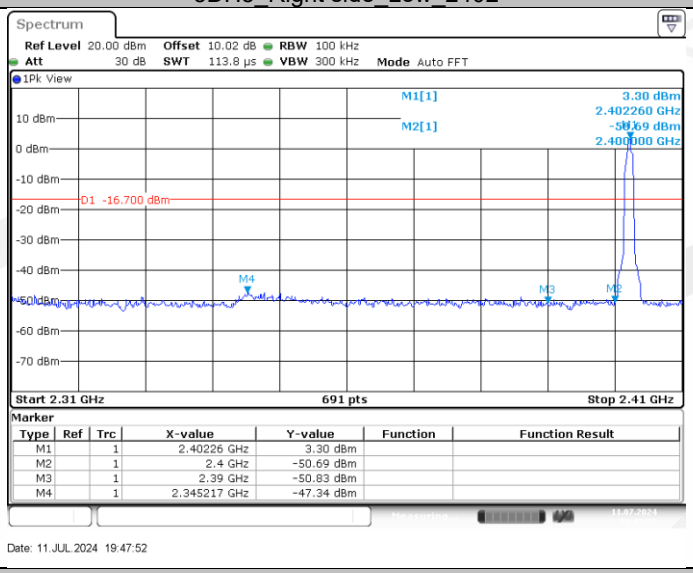
2DH5_Right side_High_Hop_2480



3DH5_Left side_Low_2402



3DH5_Right side_Low_2402



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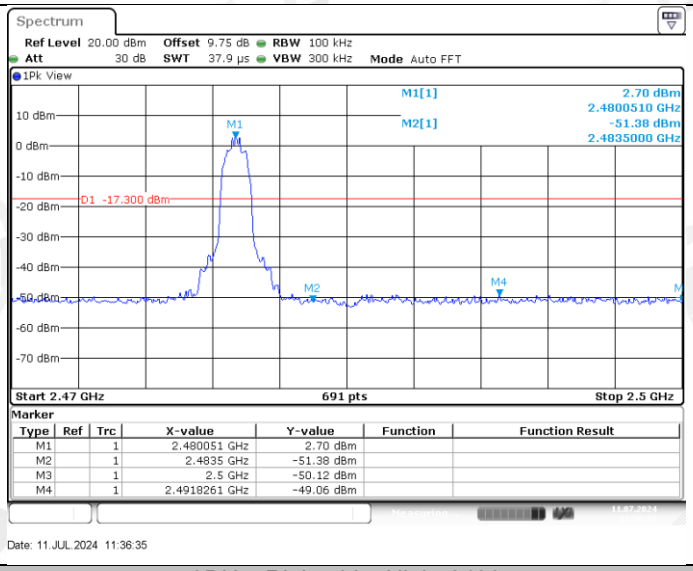

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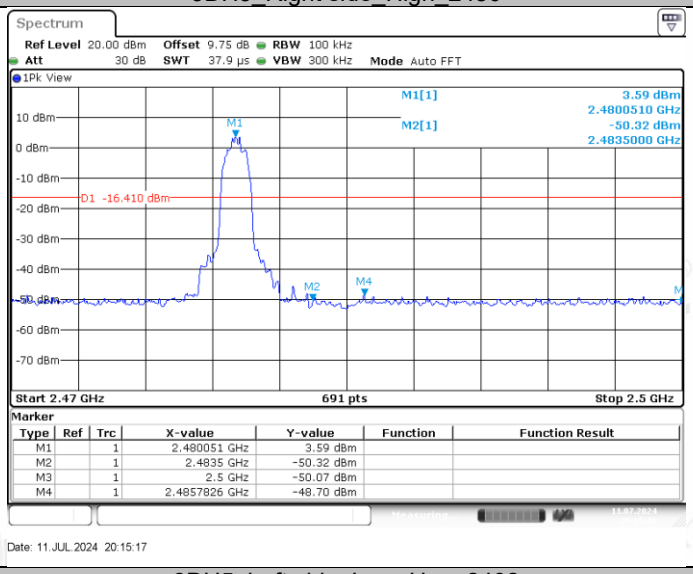
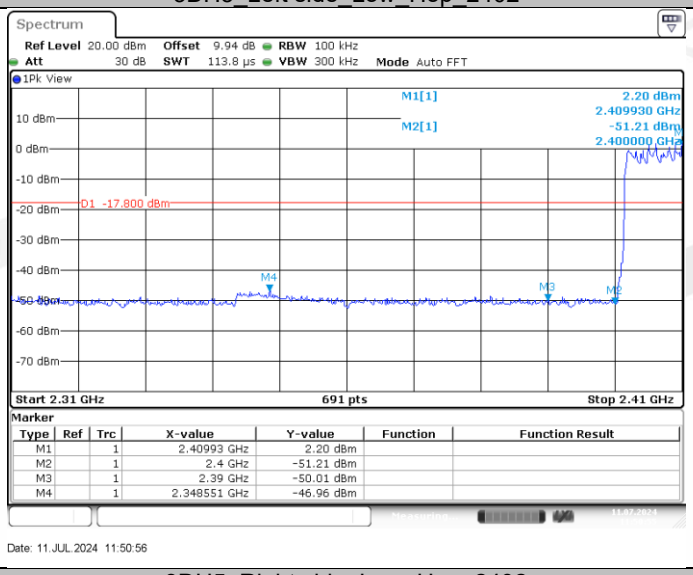


3DH5_Left side_Low_Hop_2402



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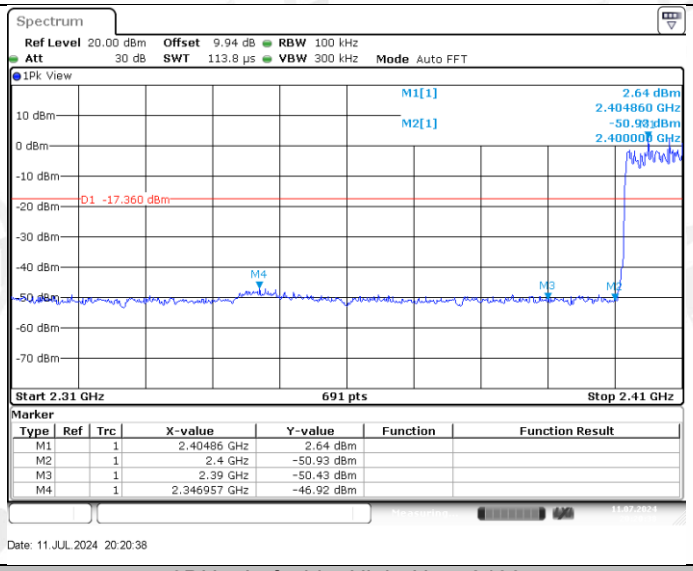
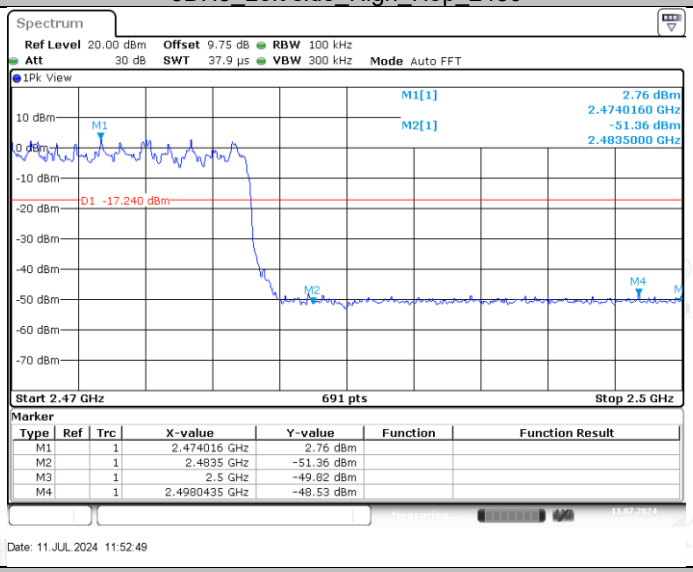
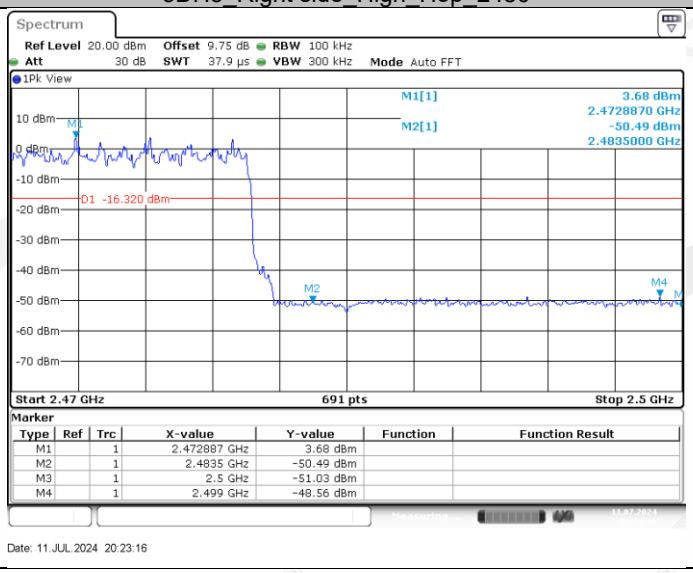


3DH5_Left side_High_Hop_2480

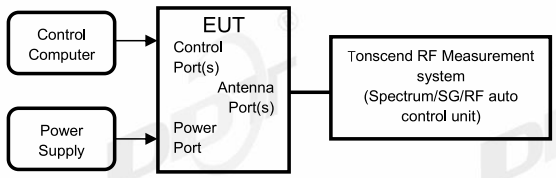


3DH5_Right side_High_Hop_2480



11. RF Conducted Spurious Emissions

11.1. Block diagram of test setup



11.2. Limits

In any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in 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.

11.3. Test procedure

(1) Connect EUT's antenna output to spectrum analyzer by RF cable.
(2) Establish a reference level by using the following procedure:

Center frequency	Test frequency
RBW:	100 kHz
VBW:	300 kHz
Span	Wide enough to capture the peak level of the in-band emission
Detector Mode:	Peak
Sweep time:	Auto
Trace mode	Max hold

(3) Allow the trace to stabilize, use the peak marker function to determine the maximum peak power level to establish the reference level.
(4) Set the spectrum analyzer as follows:

RBW:	100 kHz
VBW:	300 kHz
Span	Encompass frequency range to be measured
Number of measurement points	≥Span/RBW
Detector Mode:	Peak
Sweep time:	Auto
Trace mode	Max hold

Allow the trace to stabilize, use the peak marker function to determine the maximum amplitude of all unwanted emissions outside of the authorized frequency band

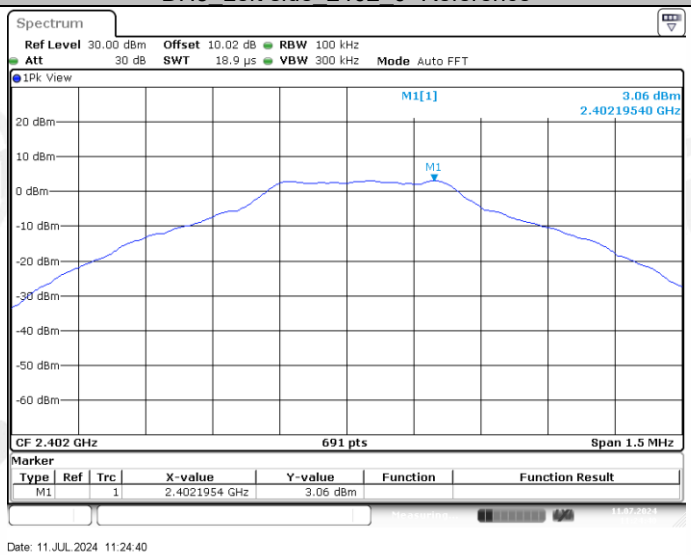
11.4. Test result

Test Engineer:	Zhongyao	Test Site:	RF Measurement System 3#
Ambient Condition:	26.4℃,38.7%RH	Test Date:	2024.07.11
Test Power Supply:	Battery	Sample Number:	S24040910-007

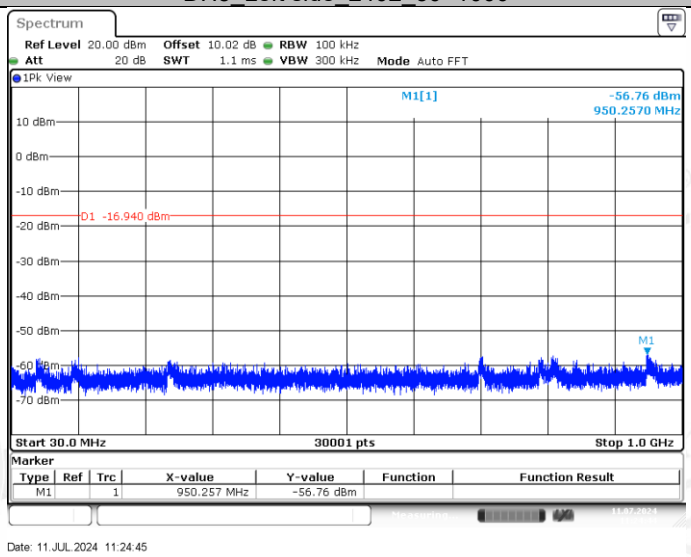
Mode	Freq. (MHz)	Verdict
GFSK	Hopping off 2402	Pass
	Hopping off 2441	Pass
	Hopping off 2480	Pass
π/4-DQPSK	Hopping off 2402	Pass
	Hopping off 2441	Pass
	Hopping off 2480	Pass
8DPSK	Hopping off 2402	Pass
	Hopping off 2441	Pass
	Hopping off 2480	Pass

11.5. Test graphs

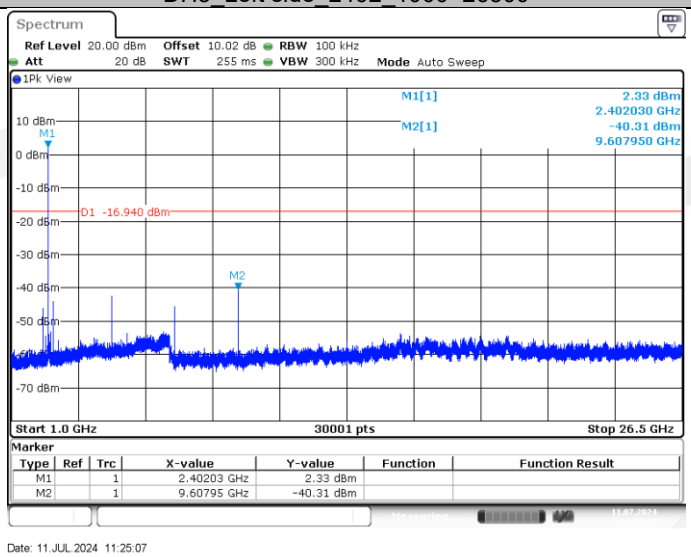
DH5_Left side_2402_0~Reference



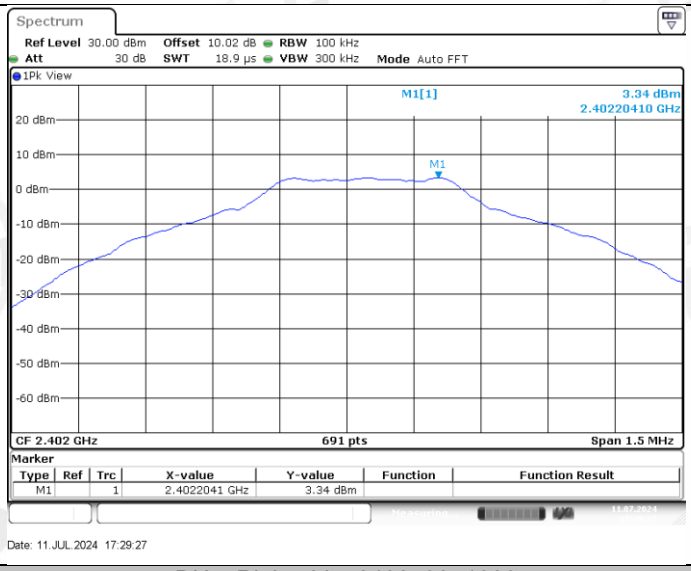
DH5_Left side_2402_30~1000



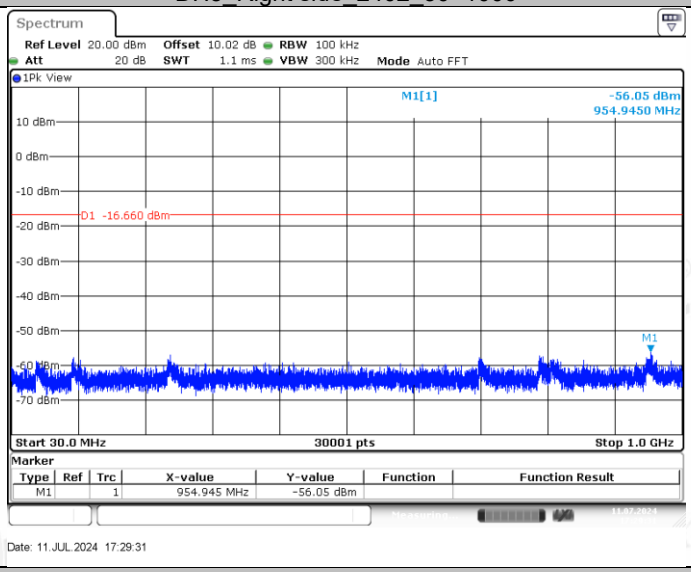
DH5_Left side_2402_1000~26500



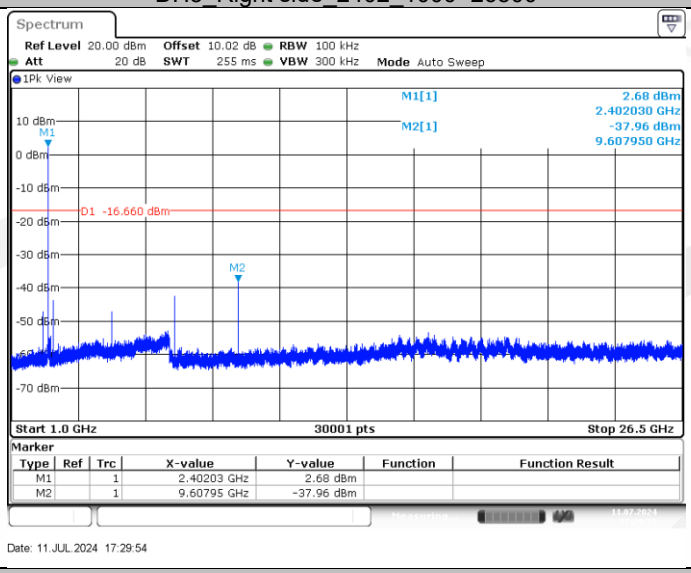
DH5_Right side_2402_0~Reference



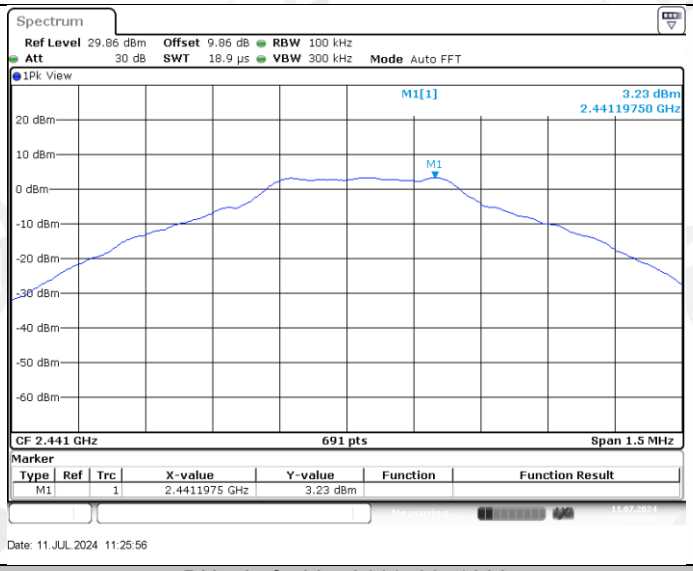
DH5_Right side_2402_30~1000



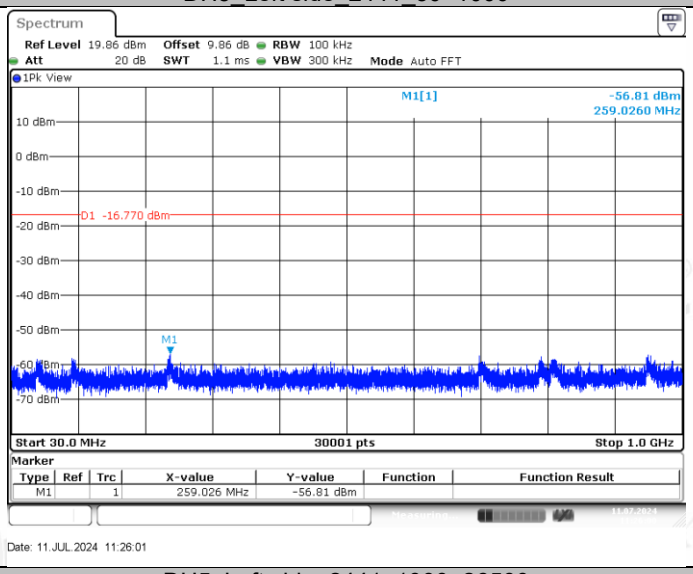
DH5_Right side_2402_1000~26500



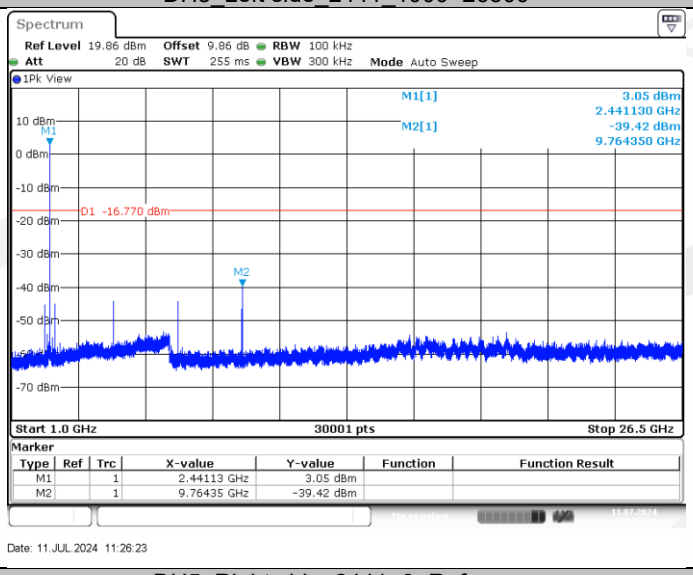
DH5_Left side_2441_0~Reference



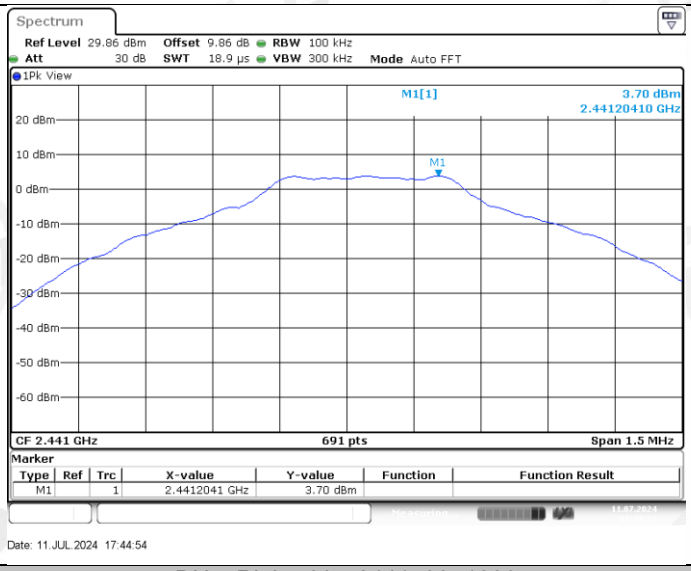
DH5_Left side_2441_30~1000



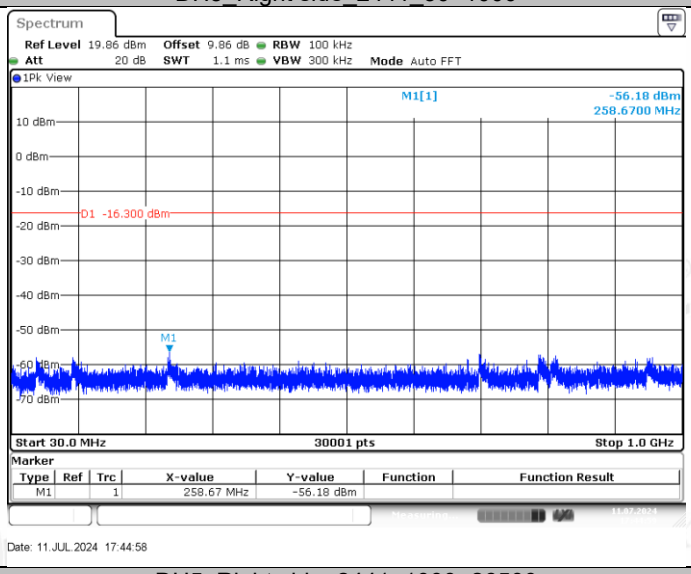
DH5_Left side_2441_1000~26500



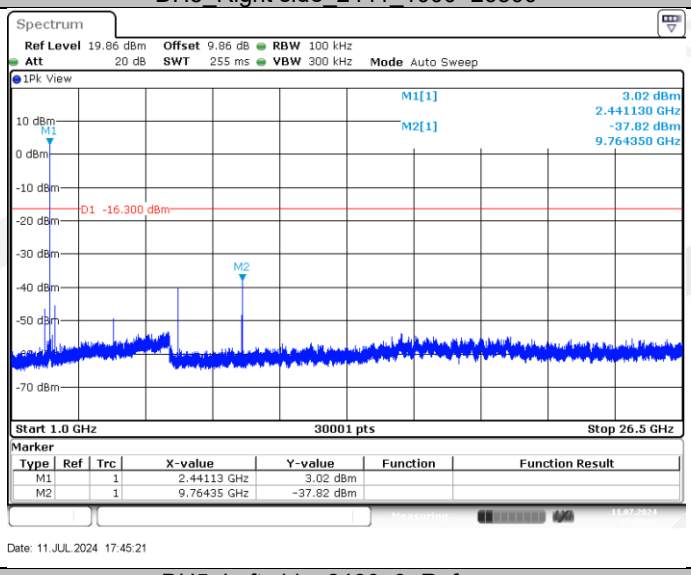
DH5_Right side_2441_0~Reference



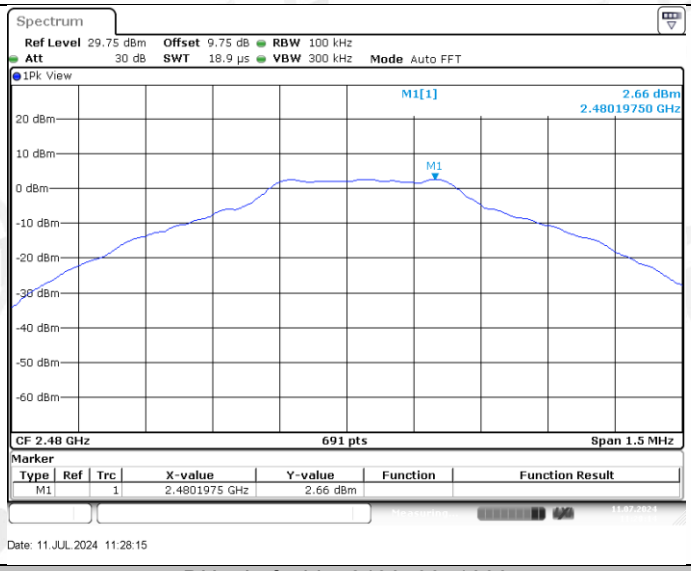
DH5_Right side_2441_30~1000



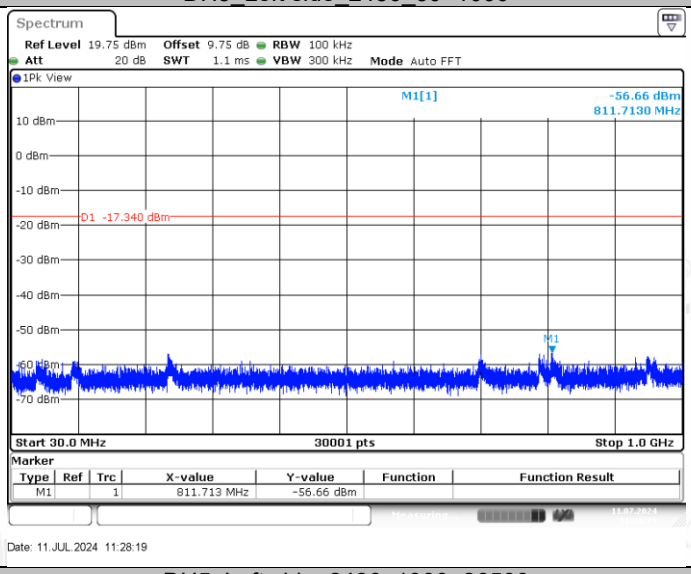
DH5_Right side_2441_1000~26500



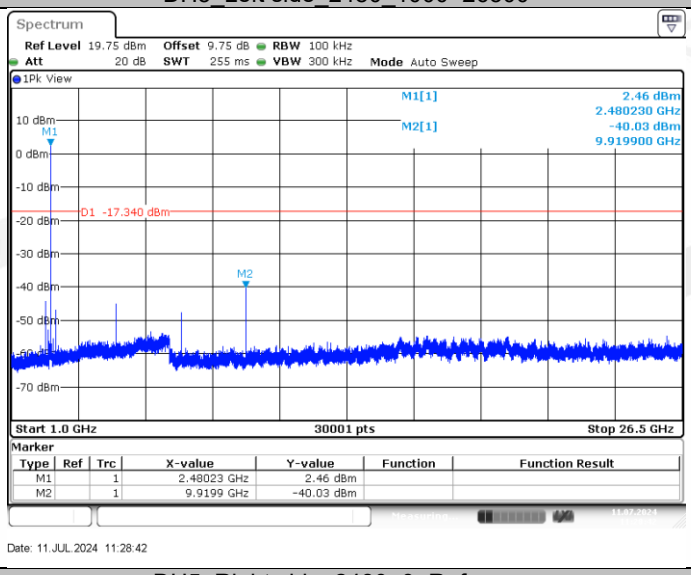
DH5_Left side_2480_0~Reference



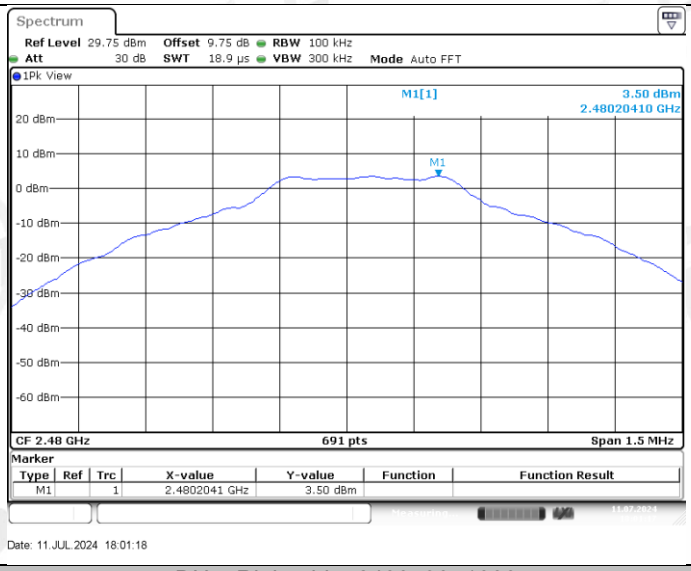
DH5_Left side_2480_30~1000



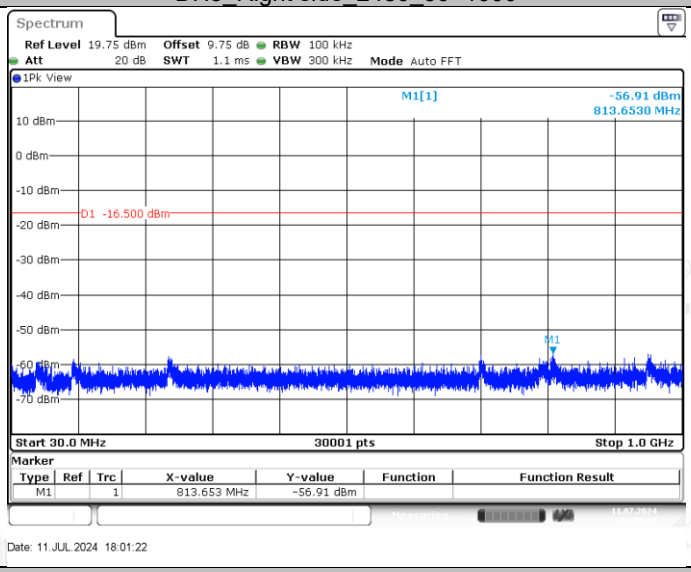
DH5_Left side_2480_1000~26500



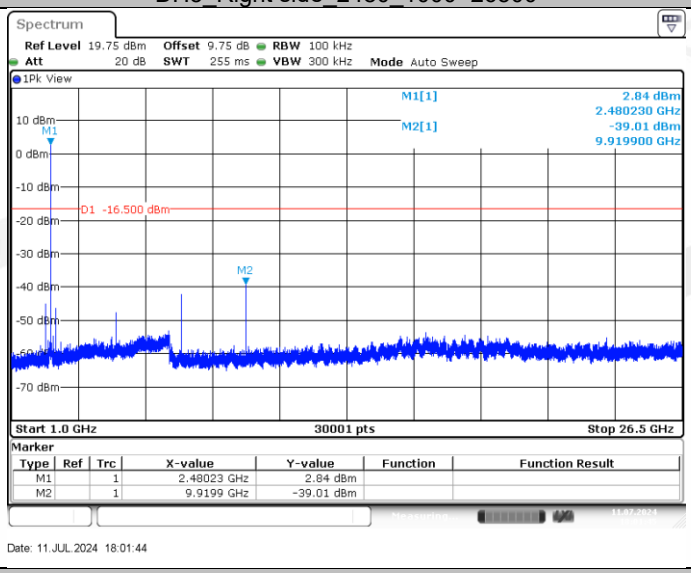
DH5_Right side_2480_0~Reference



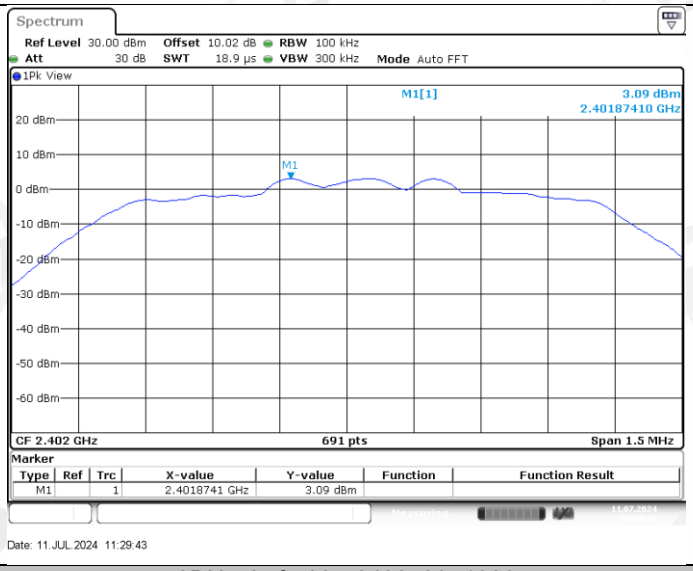
DH5_Right side_2480_30~1000



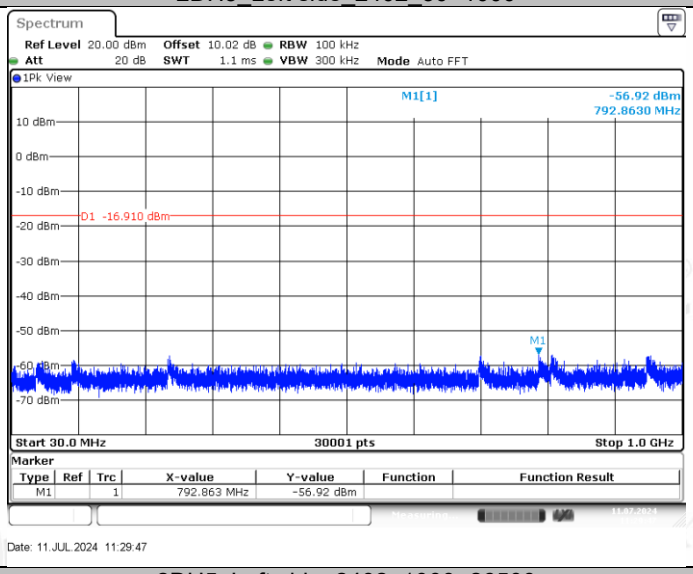
DH5_Right side_2480_1000~26500



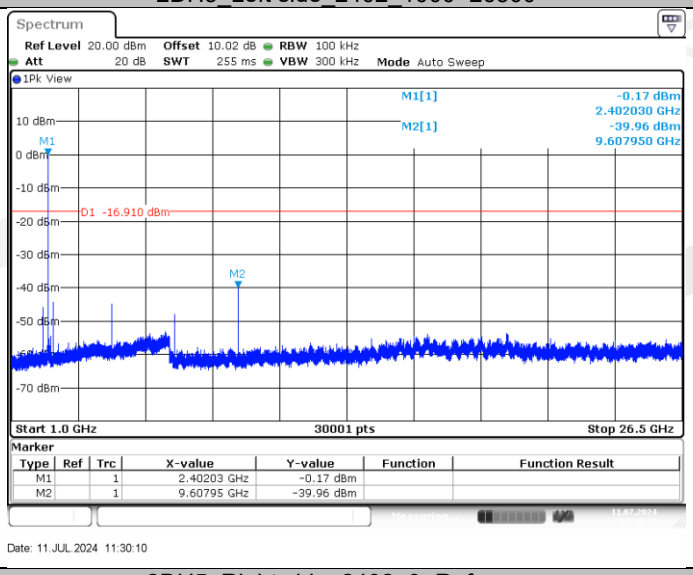
2DH5_Left side_2402_0~Reference



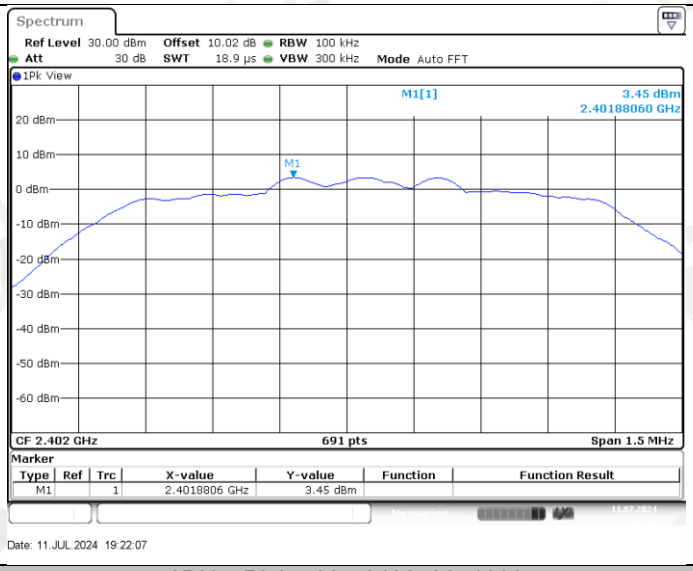
2DH5_Left side_2402_30~1000



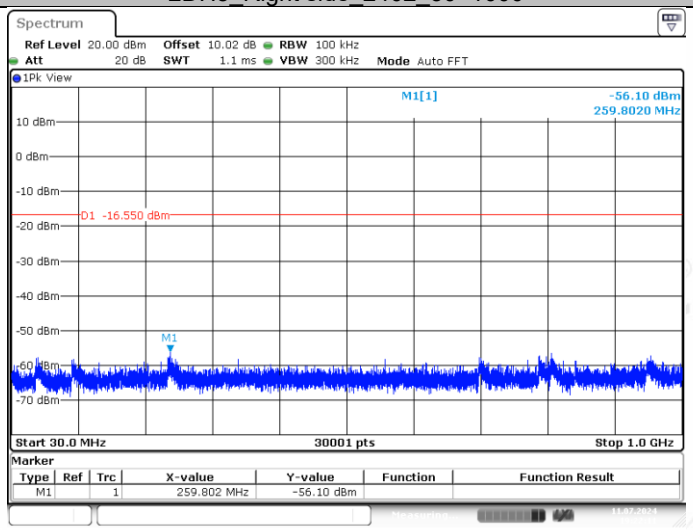
2DH5_Left side_2402_1000~26500



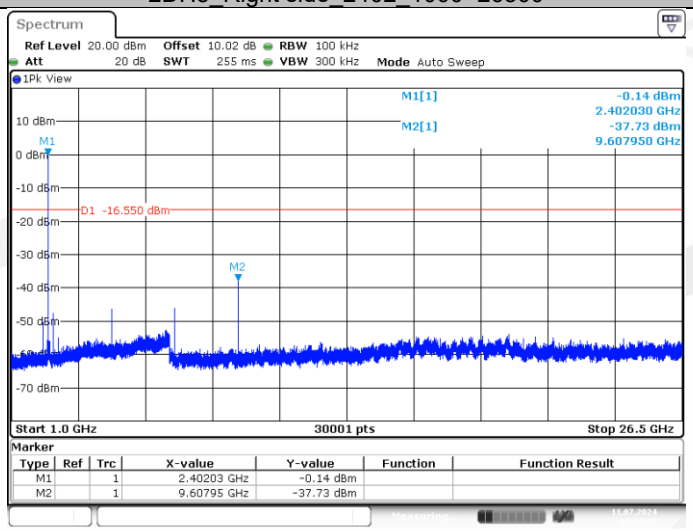
2DH5_Right side_2402_0~Reference



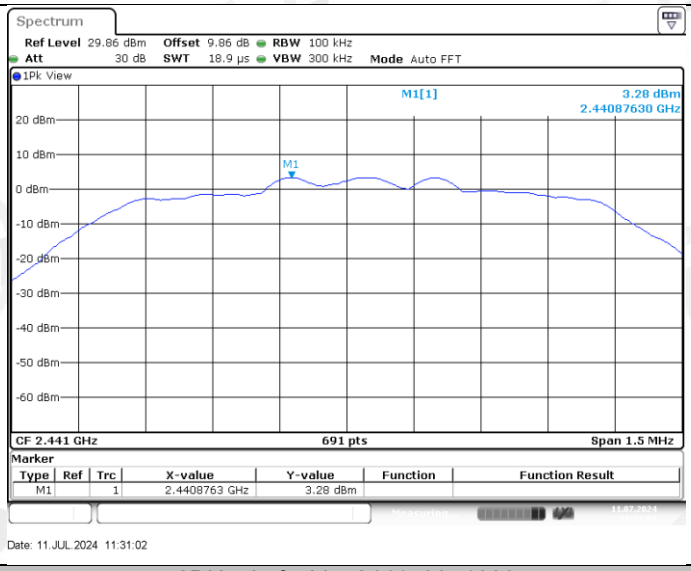
2DH5_Right side_2402_30~1000



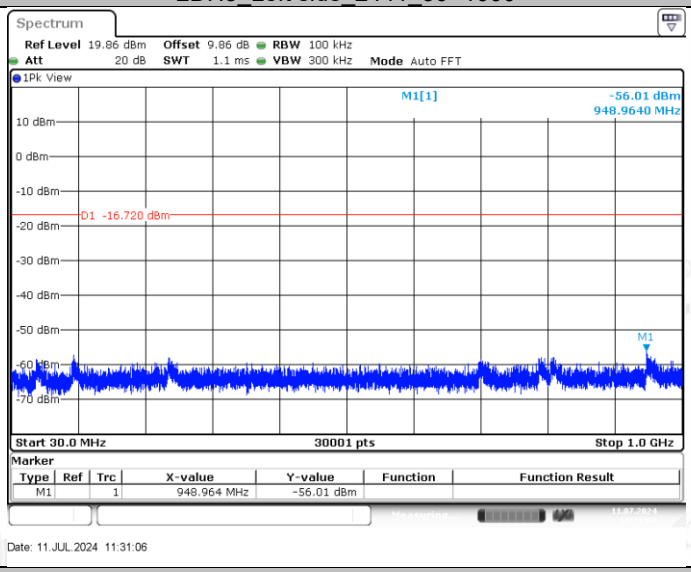
2DH5_Right side_2402_1000~26500



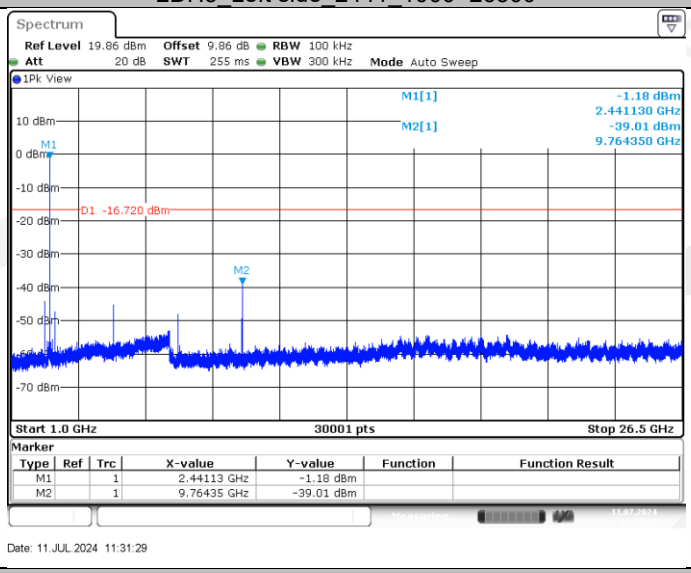
2DH5_Left side_2441_0~Reference



2DH5_Left side_2441_30~1000



2DH5_Left side_2441_1000~26500



2DH5_Right side_2441_0~Reference