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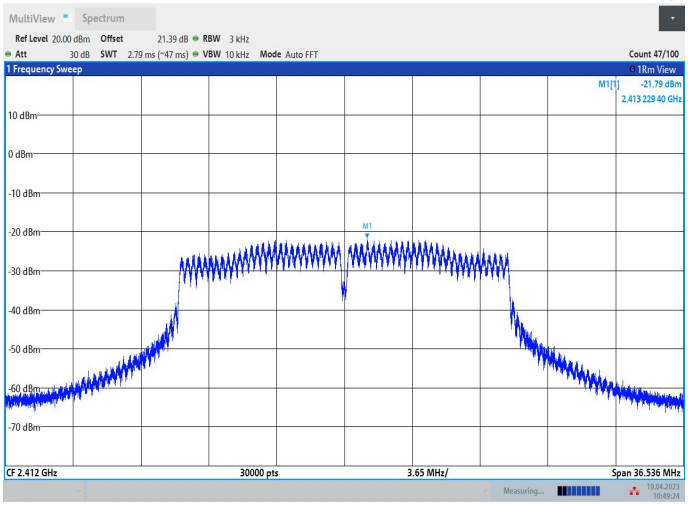

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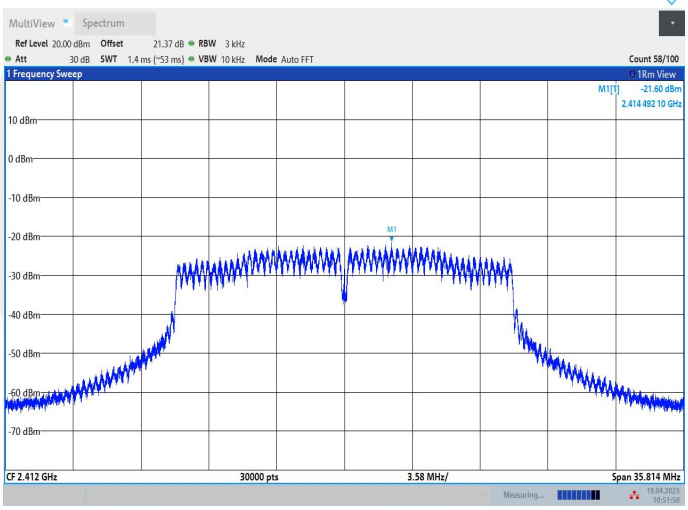

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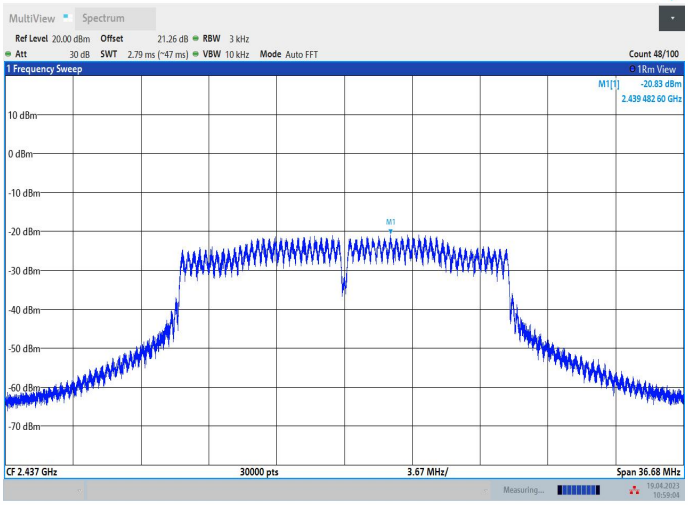

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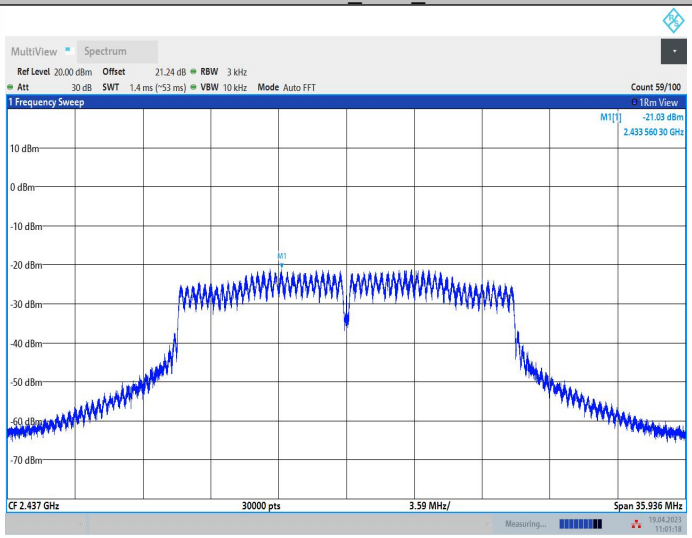

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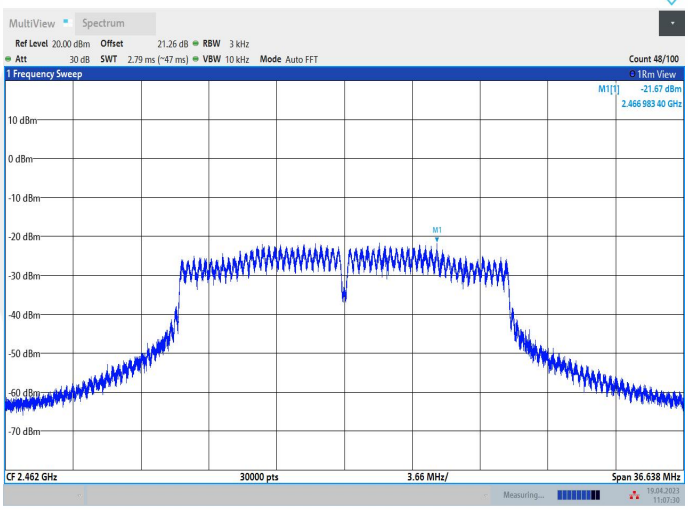

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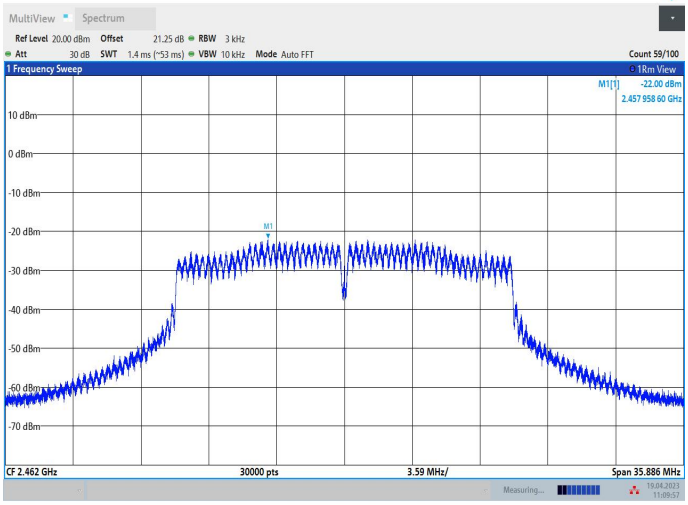

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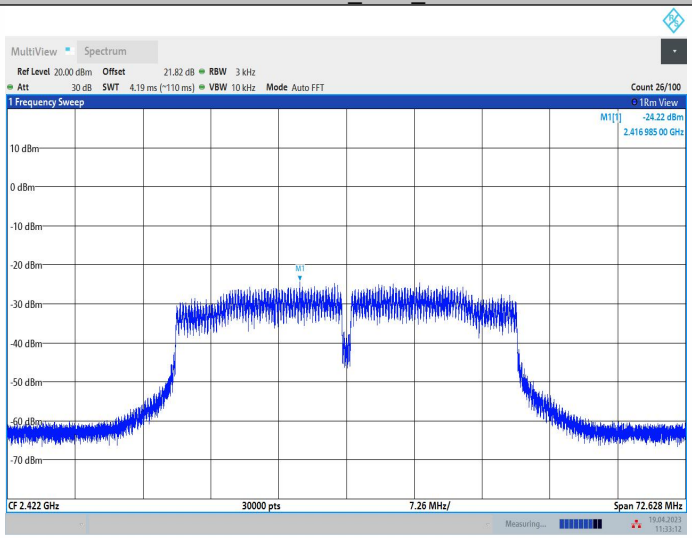

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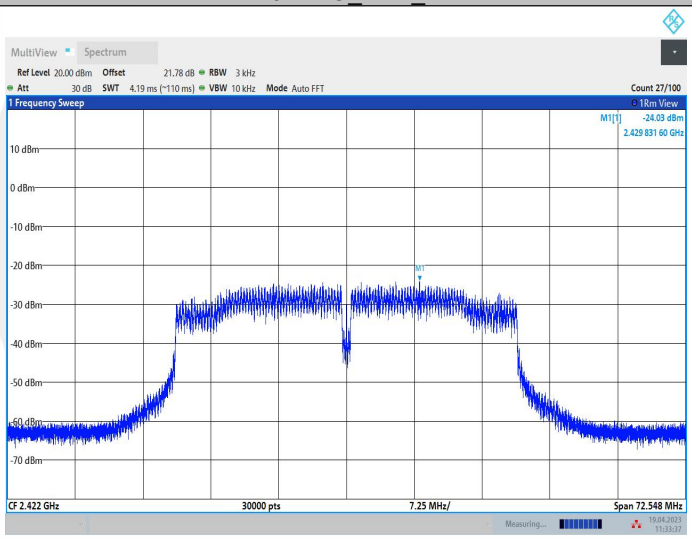

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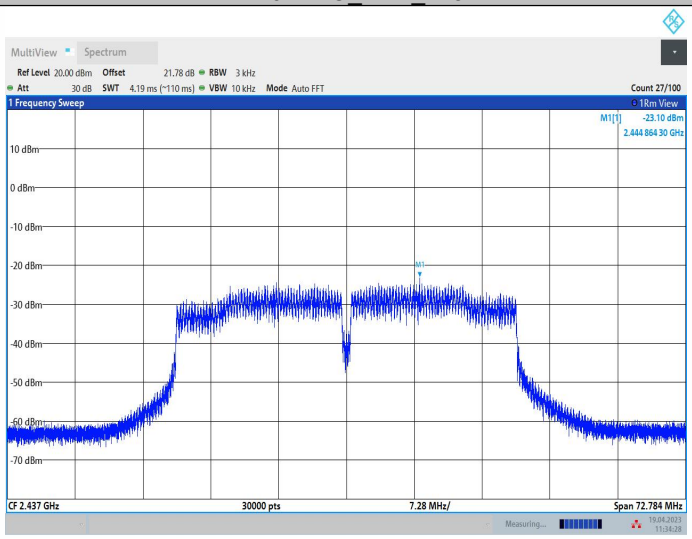

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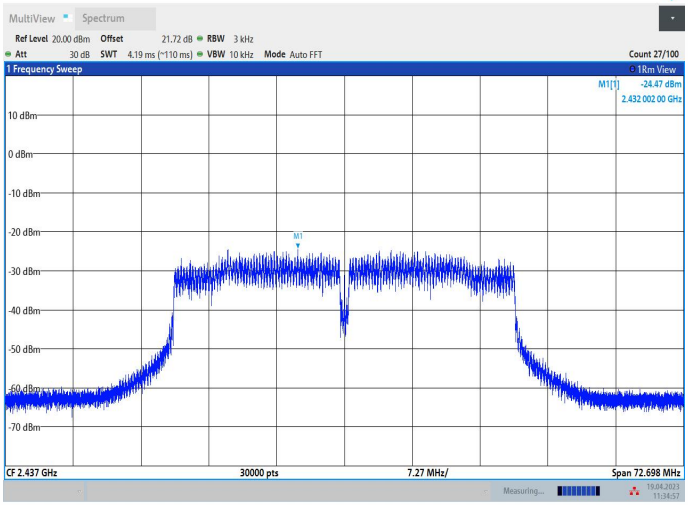

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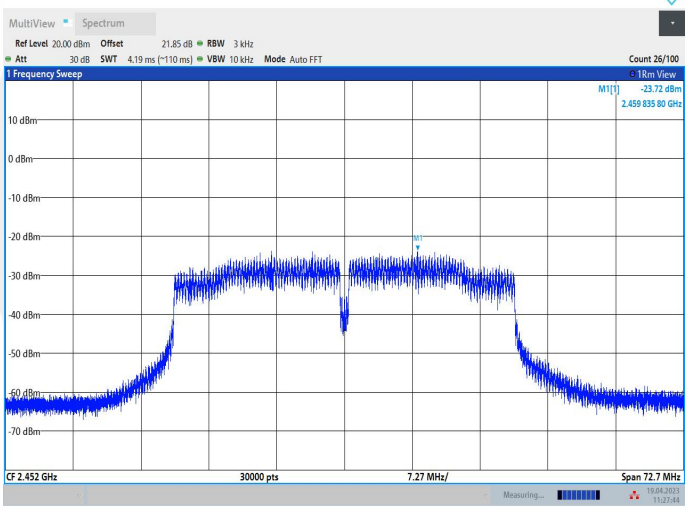

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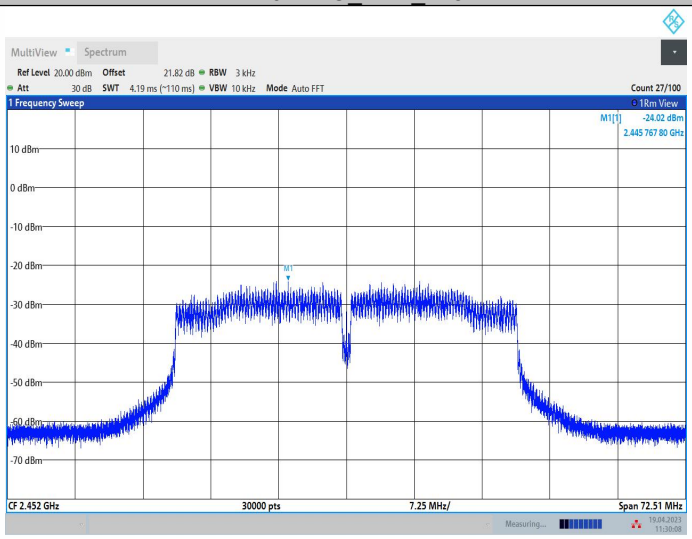
11N40MIMO_Ant2_2452



11:30:08 19.04.2023

8.4 UNWANTED EMISSIONS IN NON-RESTRICTED FREQUENCY BANDS

8.4.1 Applicable Standard

According to FCC Part15.247(d) and KDB 558074 D01 15.247 Meas Guidance v05r02

8.4.2 Conformance Limit

According to FCC Part 15.247(d):
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

8.4.3 Test Configuration

Test according to clause 7.1 radio frequency test setup 1

8.4.4 Test Procedure

The transmitter output (antenna port) was connected to the spectrum analyzer

- **Reference level measurement**

Establish a reference level by using the following procedure:
Set instrument center frequency to DTS channel center frequency.
Set the span to ≥ 1.5 times the DTS bandwidth.
Set the RBW = 100 kHz.
Set the VBW ≥ 3 x RBW.
Set Detector = peak.
Set Sweep time = auto couple.
Set Trace mode = max hold.
Allow trace to fully stabilize.
Use the peak marker function to determine the maximum PSD level.
Note that the channel found to contain the maximum PSD level can be used to establish the reference level.

- **Emission level measurement**

Set the center frequency and span to encompass frequency range to be measured.
Set the RBW = 100 kHz.
Set the VBW =300 kHz.
Set Detector = peak
Sweep time = auto couple.
Trace mode = max hold.
Allow trace to fully stabilize.
Use the peak marker function to determine the maximum amplitude level.
Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) are attenuated by at least the minimum requirements . Report the three highest emissions relative to the limit.

8.4.5 Test Results

All the antennas and modulation modes were tested, and the worst data is shown in the table below.

Band edge measurements

TestMode	Antenna	ChName	Frequency [MHz]	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
11B	Ant1	Low	2412	6.50	-33.72	≤-23.5	PASS
	Ant2	Low	2412	6.15	-36.21	≤-23.85	PASS
	Ant1	High	2462	6.33	-37.37	≤-23.67	PASS
	Ant2	High	2462	5.84	-36.38	≤-24.16	PASS
11G	Ant1	Low	2412	2.47	-27.93	≤-27.53	PASS
	Ant2	Low	2412	2.48	-27.55	≤-27.52	PASS
	Ant1	High	2462	1.63	-36.56	≤-28.37	PASS
	Ant2	High	2462	0.33	-36.58	≤-29.67	PASS
11N20MIMO	Ant1	Low	2412	0.58	-29.8	≤-29.42	PASS
	Ant2	Low	2412	1.08	-29.35	≤-28.92	PASS
	Ant1	High	2462	0.91	-36.99	≤-29.09	PASS
	Ant2	High	2462	0.57	-36.9	≤-29.43	PASS
11N40MIMO	Ant1	Low	2422	-1.67	-32.22	≤-31.67	PASS
	Ant2	Low	2422	-2.04	-32.14	≤-32.04	PASS
	Ant1	High	2452	-2.03	-34.67	≤-32.03	PASS
	Ant2	High	2452	-2.55	-36.81	≤-32.55	PASS

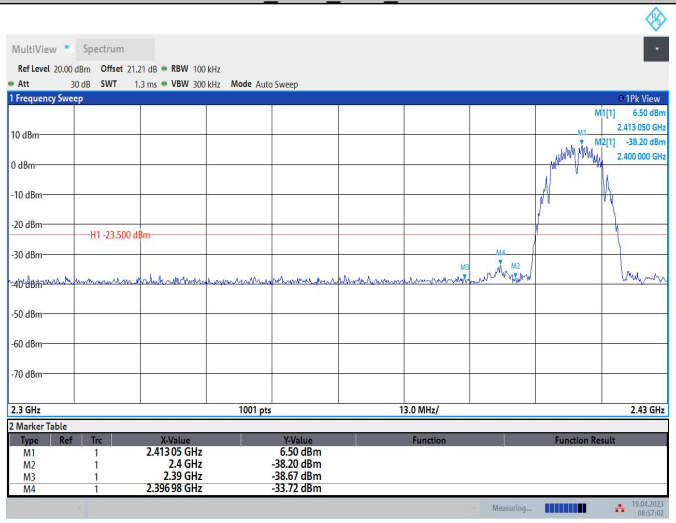
Conducted Spurious Emission

TestMode	Antenna	Frequency [MHz]	FreqRange [Mhz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
11B	Ant1	2412	Reference	6.57	6.57	---	PASS
			30~1000	6.57	-44.26	≤-23.43	PASS
			1000~26500	6.57	-39.94	≤-23.43	PASS
	Ant2	2412	Reference	6.19	6.19	---	PASS
			30~1000	6.19	-43.86	≤-23.81	PASS
			1000~26500	6.19	-40.21	≤-23.81	PASS
	Ant1	2437	Reference	6.43	6.43	---	PASS
			30~1000	6.43	-43.33	≤-23.57	PASS
			1000~26500	6.43	-40.38	≤-23.57	PASS
	Ant2	2437	Reference	6.44	6.44	---	PASS
			30~1000	6.44	-44.36	≤-23.56	PASS
			1000~26500	6.44	-41.24	≤-23.56	PASS
	Ant1	2462	Reference	6.40	6.40	---	PASS
			30~1000	6.40	-43.92	≤-23.6	PASS
			1000~26500	6.40	-40.87	≤-23.6	PASS
	Ant2	2462	Reference	5.97	5.97	---	PASS
			30~1000	5.97	-44.09	≤-24.03	PASS
			1000~26500	5.97	-40.94	≤-24.03	PASS
11G	Ant1	2412	Reference	2.88	2.88	---	PASS
			30~1000	2.88	-43.44	≤-27.12	PASS
			1000~26500	2.88	-40.11	≤-27.12	PASS
	Ant2	2412	Reference	3.06	3.06	---	PASS
			30~1000	3.06	-44.35	≤-26.94	PASS
			1000~26500	3.06	-40.15	≤-26.94	PASS
	Ant1	2437	Reference	5.10	5.10	---	PASS
			30~1000	5.10	-44.72	≤-24.9	PASS
			1000~26500	5.10	-40.8	≤-24.9	PASS
	Ant2	2437	Reference	4.65	4.65	---	PASS

			30~1000	4.65	-43.68	≤-25.35	PASS
			1000~26500	4.65	-40.98	≤-25.35	PASS
	Ant1	2462	Reference	1.61	1.61	---	PASS
			30~1000	1.61	-43.85	≤-28.39	PASS
			1000~26500	1.61	-40.64	≤-28.39	PASS
	Ant2	2462	Reference	0.31	0.31	---	PASS
			30~1000	0.31	-43.76	≤-29.69	PASS
			1000~26500	0.31	-40.57	≤-29.69	PASS
11N20MIMO	Ant1	2412	Reference	0.91	0.91	---	PASS
			30~1000	0.91	-43.95	≤-29.09	PASS
			1000~26500	0.91	-40.63	≤-29.09	PASS
	Ant2	2412	Reference	0.67	0.67	---	PASS
			30~1000	0.67	-43.09	≤-29.33	PASS
			1000~26500	0.67	-40.86	≤-29.33	PASS
	Ant1	2437	Reference	2.03	2.03	---	PASS
			30~1000	2.03	-44.63	≤-27.97	PASS
			1000~26500	2.03	-40.71	≤-27.97	PASS
	Ant2	2437	Reference	1.88	1.88	---	PASS
			30~1000	1.88	-44.75	≤-28.12	PASS
			1000~26500	1.88	-39.82	≤-28.12	PASS
	Ant1	2462	Reference	1.00	1.00	---	PASS
			30~1000	1.00	-44.19	≤-29	PASS
			1000~26500	1.00	-40.73	≤-29	PASS
	Ant2	2462	Reference	0.70	0.70	---	PASS
			30~1000	0.70	-44.03	≤-29.3	PASS
			1000~26500	0.70	-41.07	≤-29.3	PASS
11N40MIMO	Ant1	2422	Reference	-1.69	-1.69	---	PASS
			30~1000	-1.69	-43.93	≤-31.69	PASS
			1000~26500	-1.69	-39.91	≤-31.69	PASS
	Ant2	2422	Reference	-2.09	-2.09	---	PASS
			30~1000	-2.09	-44.86	≤-32.09	PASS
			1000~26500	-2.09	-40.34	≤-32.09	PASS
	Ant1	2437	Reference	-1.93	-1.93	---	PASS
			30~1000	-1.93	-44.2	≤-31.93	PASS
			1000~26500	-1.93	-41.06	≤-31.93	PASS
	Ant2	2437	Reference	-2.01	-2.01	---	PASS
			30~1000	-2.01	-44.28	≤-32.01	PASS
			1000~26500	-2.01	-40.44	≤-32.01	PASS
	Ant1	2452	Reference	-2.06	-2.06	---	PASS
			30~1000	-2.06	-44.12	≤-32.06	PASS
			1000~26500	-2.06	-40.05	≤-32.06	PASS
	Ant2	2452	Reference	-2.63	-2.63	---	PASS
			30~1000	-2.63	-43.51	≤-32.63	PASS
			1000~26500	-2.63	-40.4	≤-32.63	PASS

Band edge measurements

11B_Ant1_Low_2412



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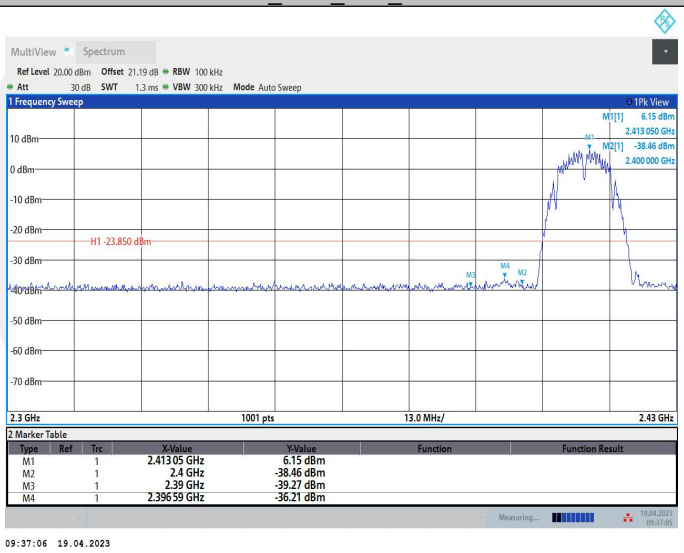

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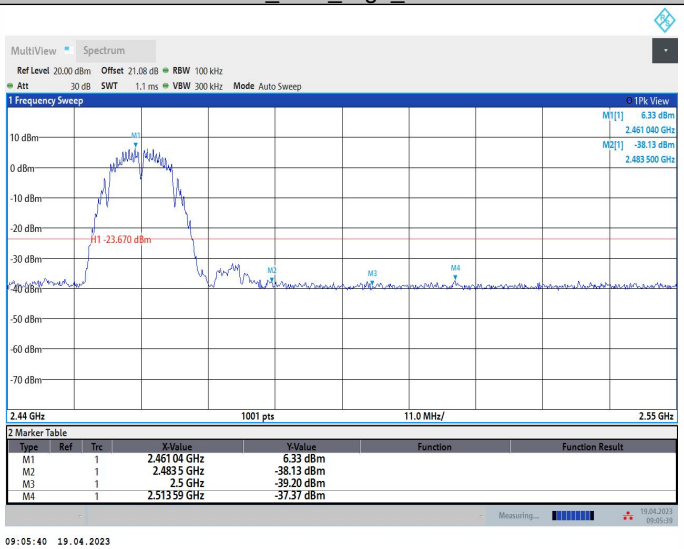

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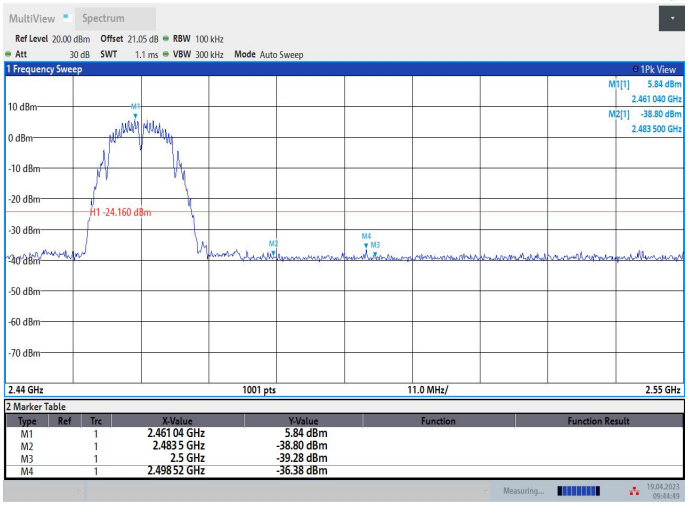

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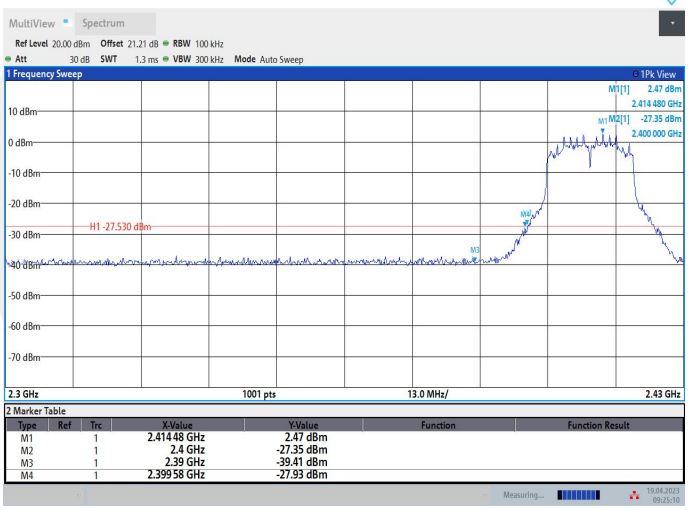

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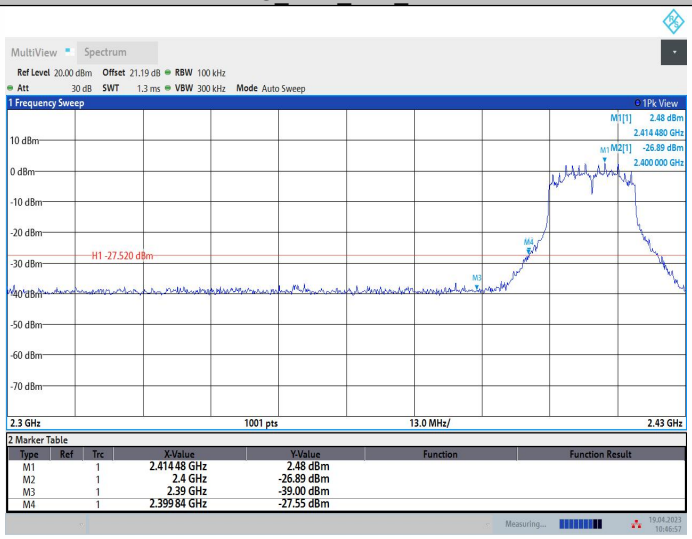

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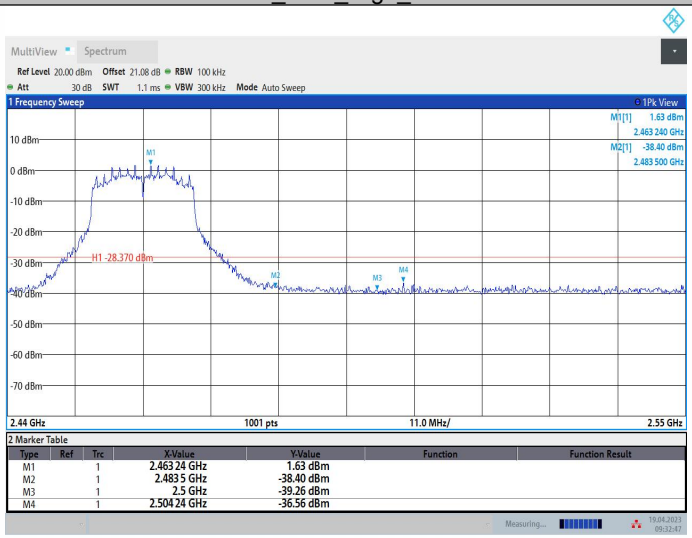

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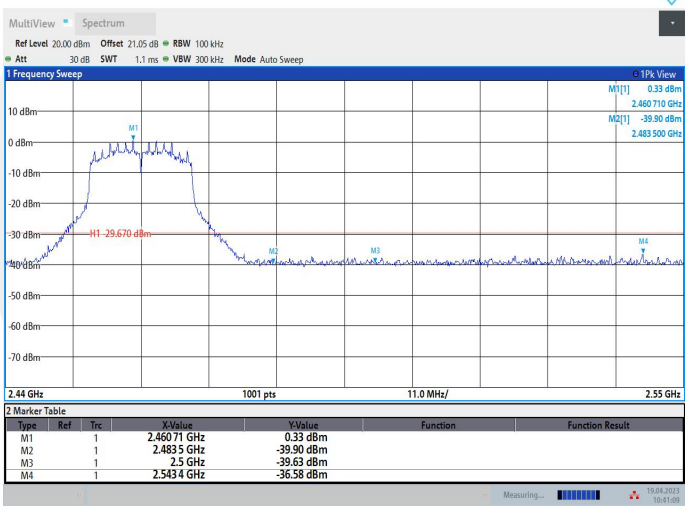

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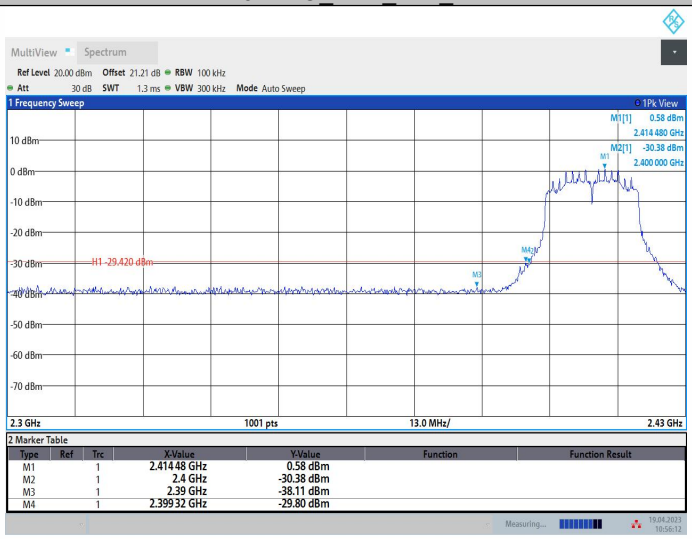

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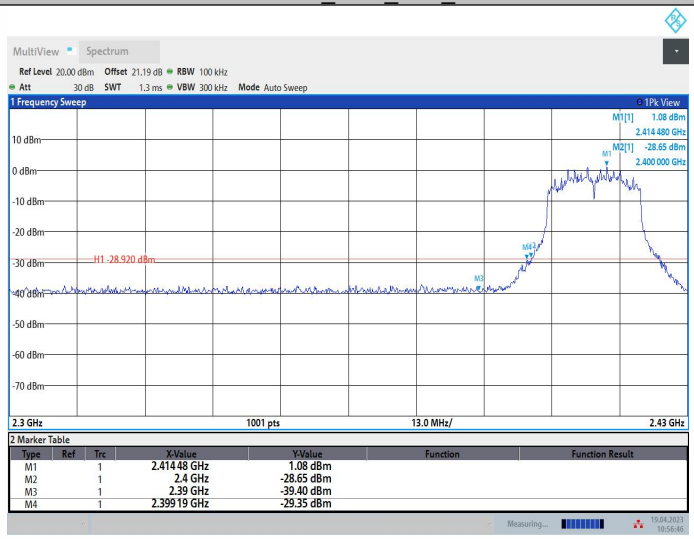

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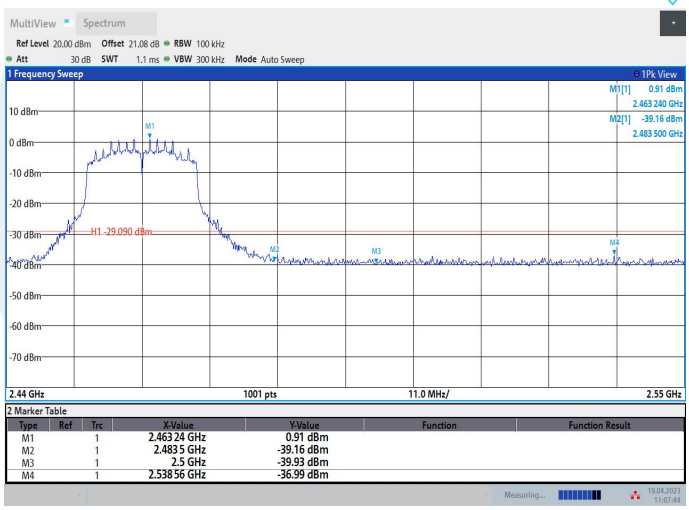

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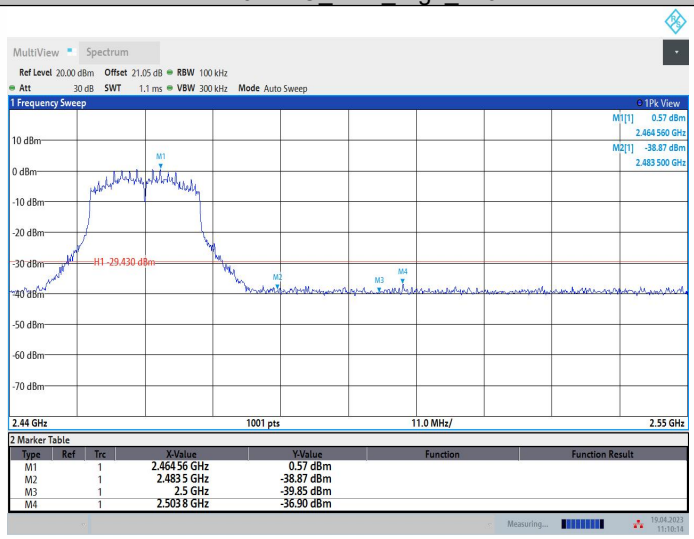

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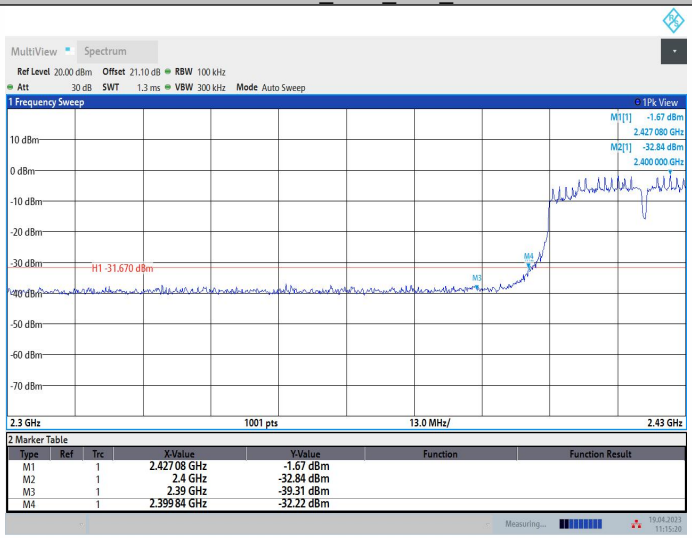

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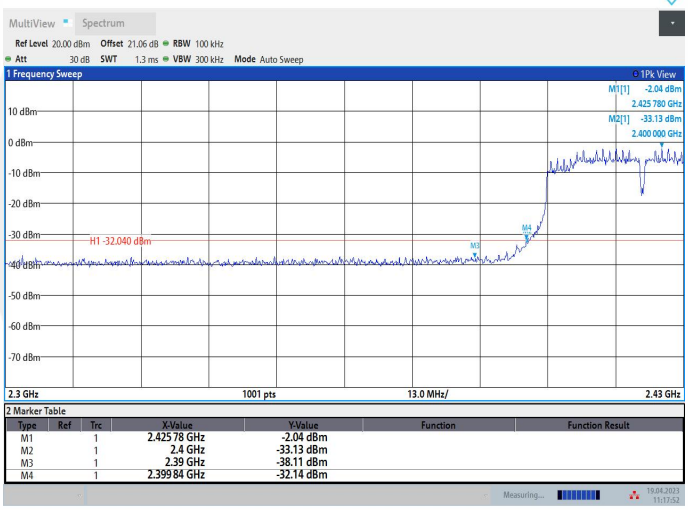
11N40MIMO_Ant2_Low_2422



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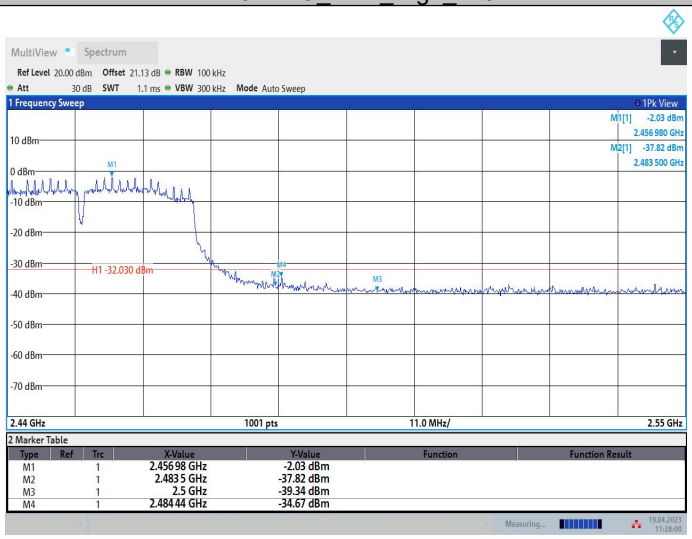
11N40MIMO_Ant1_High_2452



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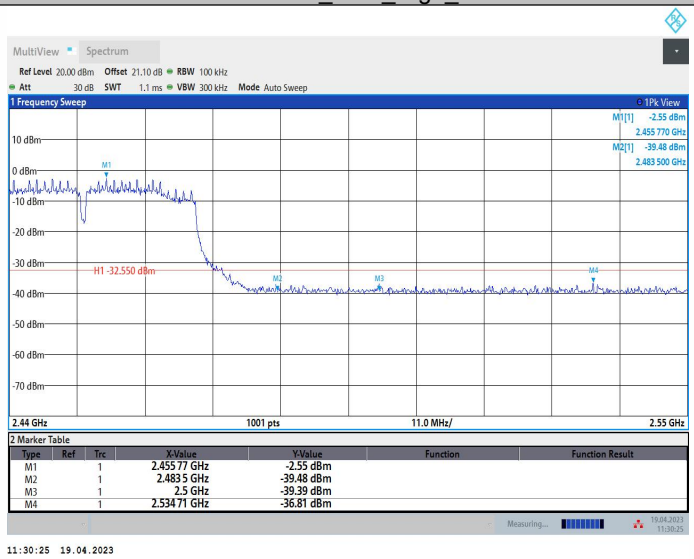
11N40MIMO_Ant2_High_2452



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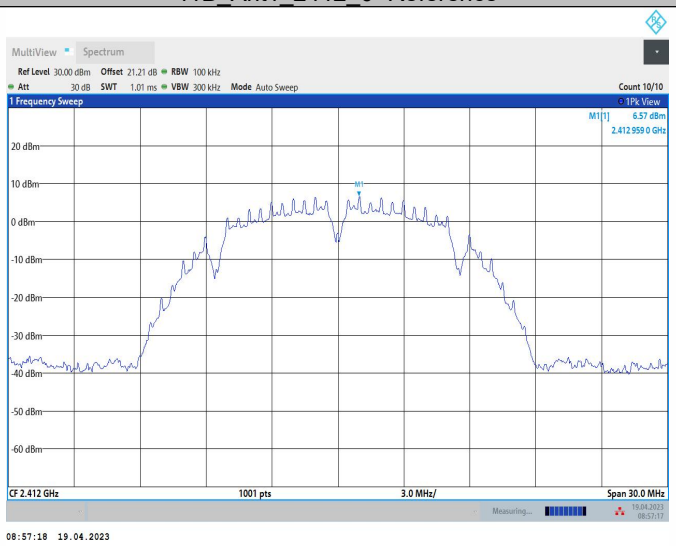
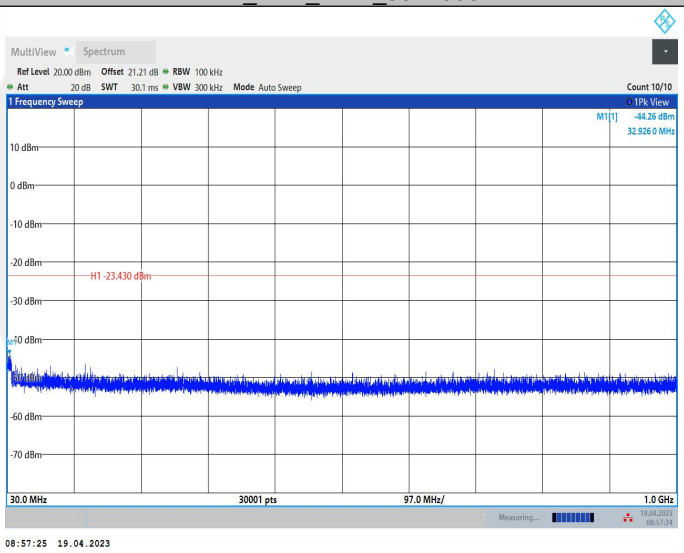
Conducted Spurious Emission

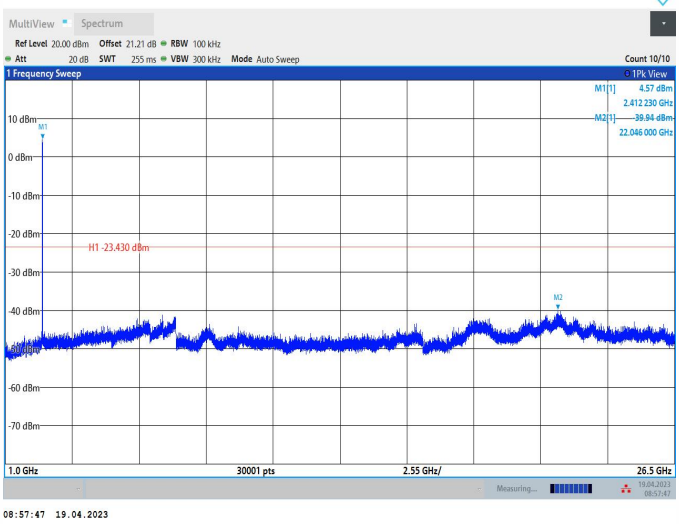
11B_Ant1_2412_0~Reference



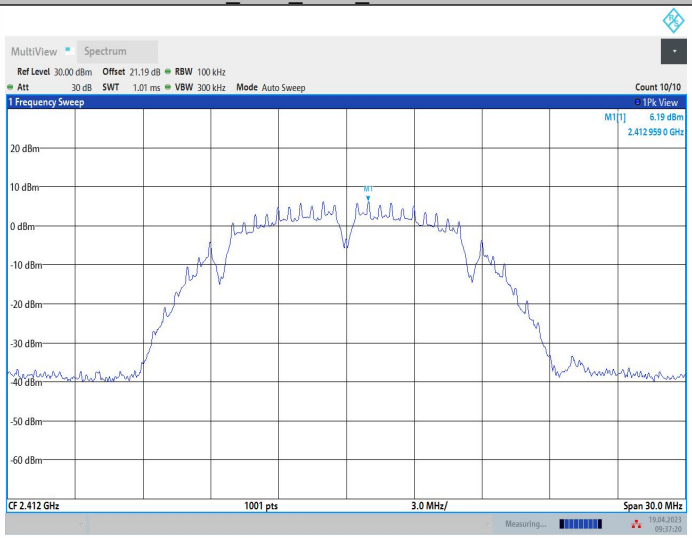
11B_Ant1_2412_30~1000



11B_Ant1_2412_1000~26500



11B_Ant2_2412_0~Reference



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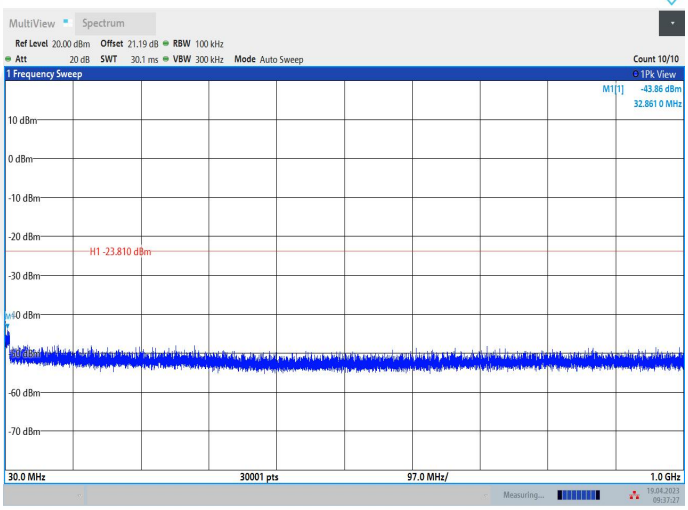
11B_Ant2_2412_30~1000



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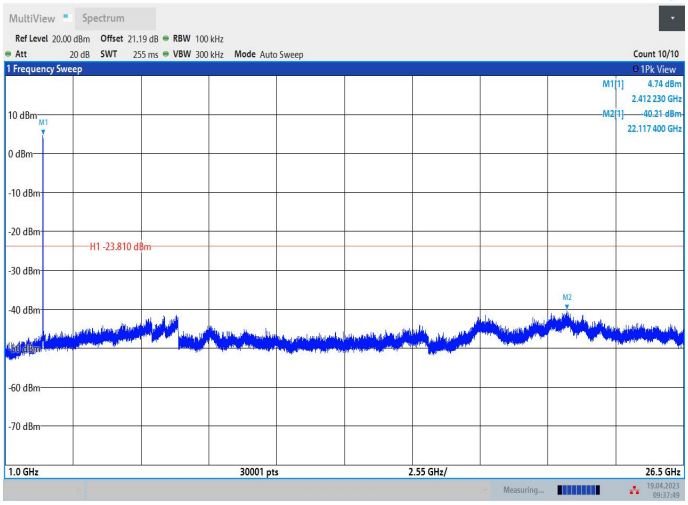
11B_Ant2_2412_1000~26500



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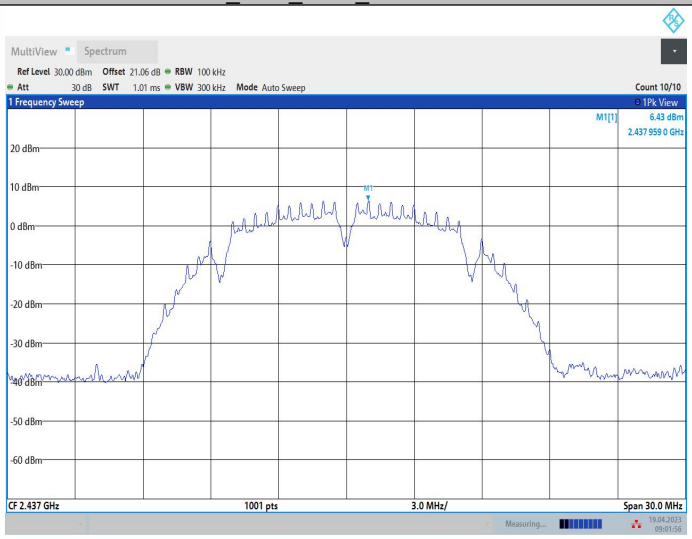
11B_Ant1_2437_0~Reference



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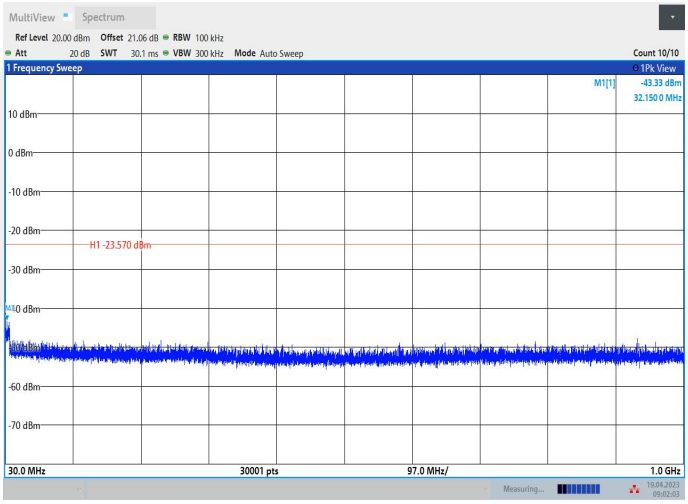

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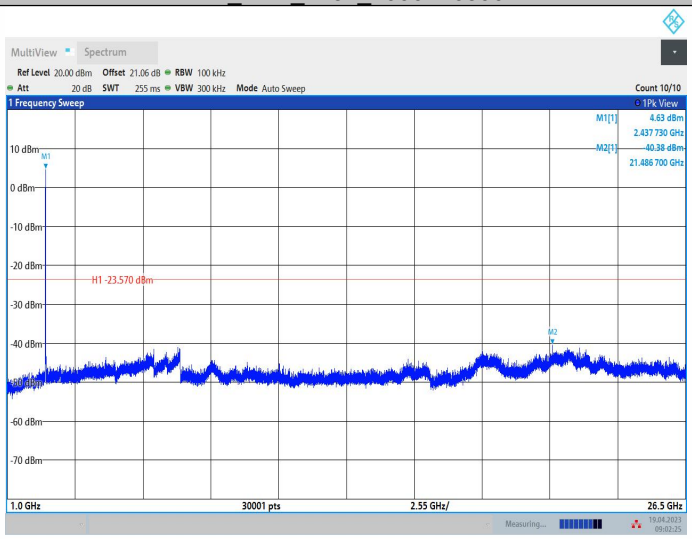

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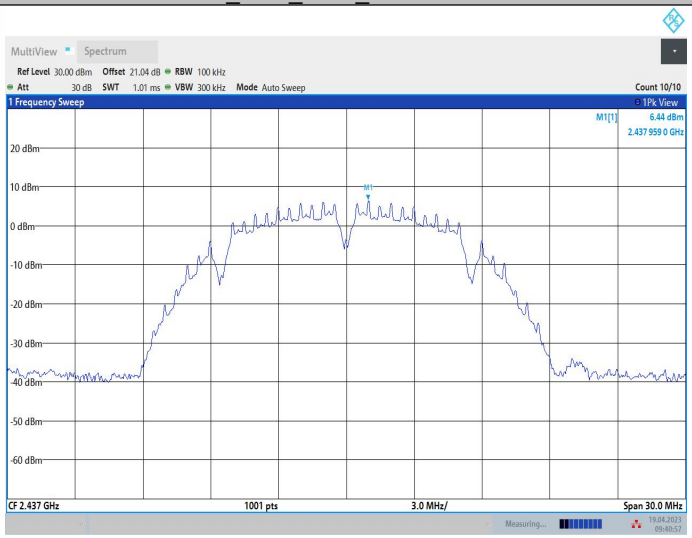

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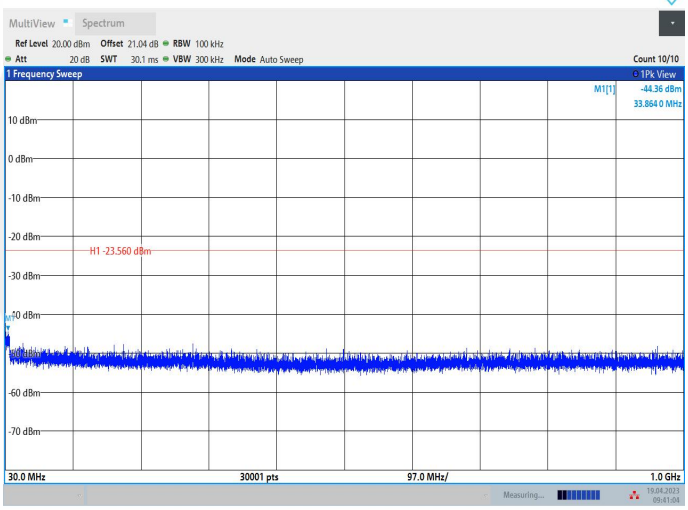

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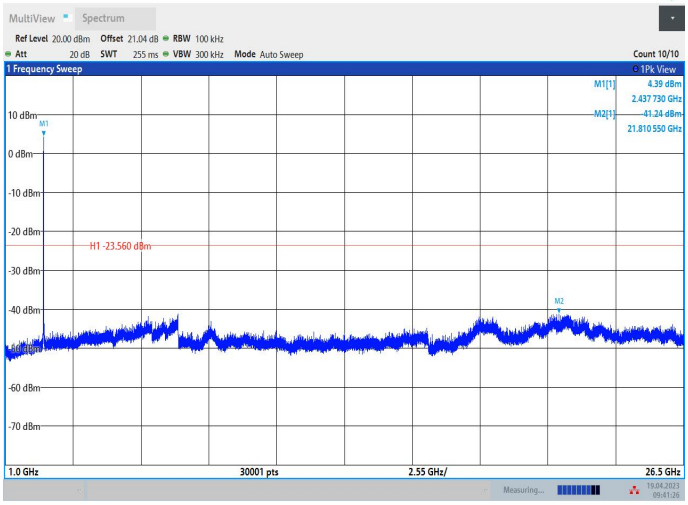

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