

Appendix C: Maximum Conducted Output Power

Test Result

Test Mode	Channel	Antenna	Average Power[dBm]	Limit[dBm]	Verdict
11B MIMO	2412	Ant1	14.15	<=30	PASS
		Ant2	14.41	<=30	PASS
		total	17.32	<=30	PASS
	2437	Ant1	14.46	<=30	PASS
		Ant2	14.73	<=30	PASS
		total	17.64	<=30	PASS
	2462	Ant1	14.16	<=30	PASS
		Ant2	14.58	<=30	PASS
		total	17.41	<=30	PASS
11G MIMO	2412	Ant1	14.04	<=30	PASS
		Ant2	14.17	<=30	PASS
		total	17.28	<=30	PASS
	2437	Ant1	13.92	<=30	PASS
		Ant2	14.11	<=30	PASS
		total	17.19	<=30	PASS
	2462	Ant1	13.84	<=30	PASS
		Ant2	14.15	<=30	PASS
		total	17.17	<=30	PASS
11N20 MIMO	2412	Ant1	13.03	<=30	PASS
		Ant2	13.04	<=30	PASS
		total	16.23	<=30	PASS
	2437	Ant1	12.89	<=30	PASS
		Ant2	12.94	<=30	PASS
		total	16.11	<=30	PASS
	2462	Ant1	12.79	<=30	PASS
		Ant2	12.96	<=30	PASS
		total	16.07	<=30	PASS
11N40 MIMO	2422	Ant1	12.87	<=30	PASS
		Ant2	12.90	<=30	PASS
		total	16.25	<=30	PASS
	2437	Ant1	12.78	<=30	PASS
		Ant2	12.92	<=30	PASS
		total	16.22	<=30	PASS
	2452	Ant1	12.76	<=30	PASS
		Ant2	12.93	<=30	PASS
		total	16.21	<=30	PASS

Note: The maximum antenna gain is 1.17 dBi. The device employed Cyclic Delay Diversity (CDD) for 802.11 MIMO transmitting, per KDB 662911 D01 Multiple Transmitter Output v02r01, for power measurements on IEEE 802.11 devices:

Array Gain = 0dB (i.e., no array gain) For $N_{ANT} \leq 4$;

So: Directional gain < 6dBi, the limit is not reduced.

Appendix D: Power Spectral Density**Test Result**

Test Mode	Channel	Antenna	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
11B MIMO	2412	Ant1	-17.12	<=8	PASS
		Ant2	-16.66	<=8	PASS
		total	-13.87	<=8	PASS
	2437	Ant1	-16.93	<=8	PASS
		Ant2	-16.37	<=8	PASS
		total	-13.63	<=8	PASS
	2462	Ant1	-14.00	<=8	PASS
		Ant2	-13.82	<=8	PASS
		total	-10.90	<=8	PASS
11G MIMO	2412	Ant1	-16.76	<=8	PASS
		Ant2	-17.50	<=8	PASS
		total	-14.10	<=8	PASS
	2437	Ant1	-17.51	<=8	PASS
		Ant2	-17.27	<=8	PASS
		total	-14.38	<=8	PASS
	2462	Ant1	-17.42	<=8	PASS
		Ant2	-16.91	<=8	PASS
		total	-14.15	<=8	PASS
11N20 MIMO	2412	Ant1	-18.74	<=8	PASS
		Ant2	-18.53	<=8	PASS
		total	-15.62	<=8	PASS
	2437	Ant1	-18.92	<=8	PASS
		Ant2	-19.03	<=8	PASS
		total	-15.96	<=8	PASS
	2462	Ant1	-18.88	<=8	PASS
		Ant2	-18.74	<=8	PASS
		total	-15.80	<=8	PASS
11N40 MIMO	2422	Ant1	-17.22	<=8	PASS
		Ant2	-17.41	<=8	PASS
		total	-14.30	<=8	PASS
	2437	Ant1	-17.31	<=8	PASS
		Ant2	-16.82	<=8	PASS
		total	-14.05	<=8	PASS
	2452	Ant1	-17.29	<=8	PASS
		Ant2	-16.90	<=8	PASS
		total	-14.08	<=8	PASS

Note:

The result unit for 802.11n-HT40 mode is dBm/10kHz.

The Duty Cycle Factor is compensated in the graph.

The device employed Cyclic Delay Diversity (CDD) for 802.11 MIMO transmitting, per KDB 662911 D01 Multiple Transmitter Output v02r01, for power spectral density (PSD) measurements on the devices:

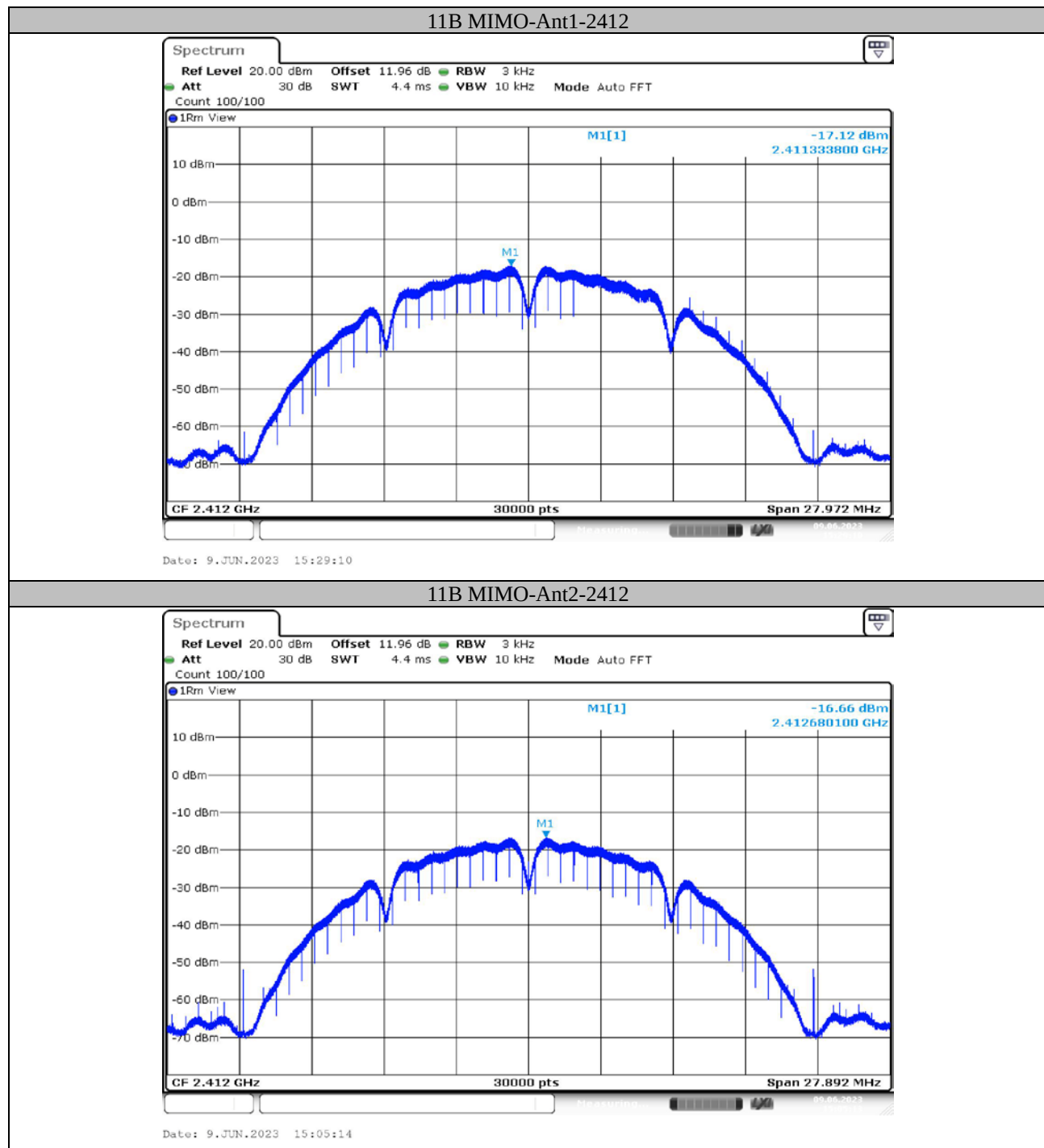
Array Gain = $10 \log(N_{\text{ANT}}/N_{\text{ss}})$ dB

Directional gain = $G_{\text{ANT}} + \text{Array Gain}$

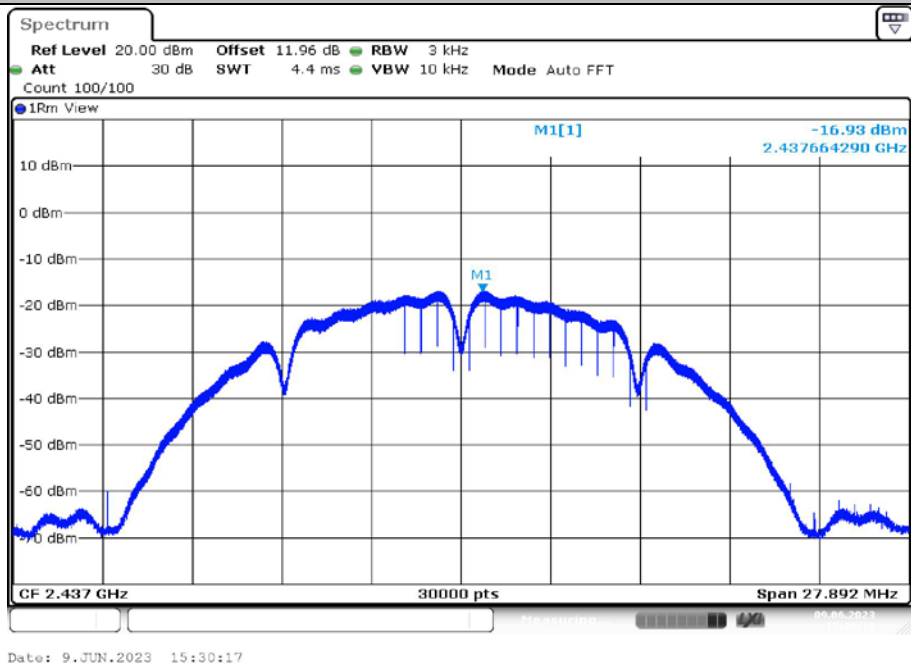
The $G_{\text{ANT}1} = 1.17\text{dBi}$ (MAX)

Directional gain = $1.17\text{dBi} + 10 * \log(2/1) = 4.18\text{dBi} < 6\text{dBi}$

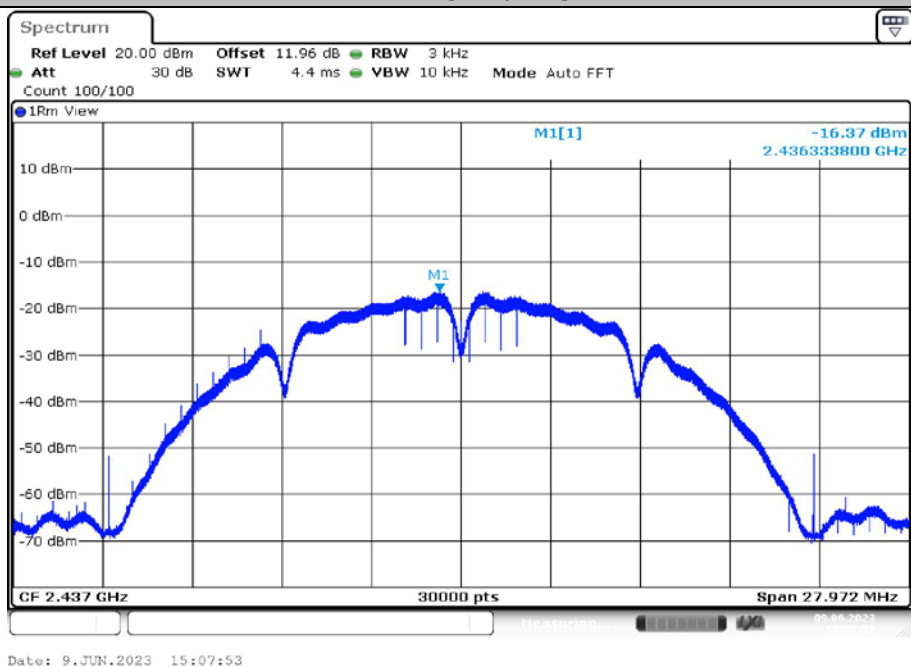
Test Graphs



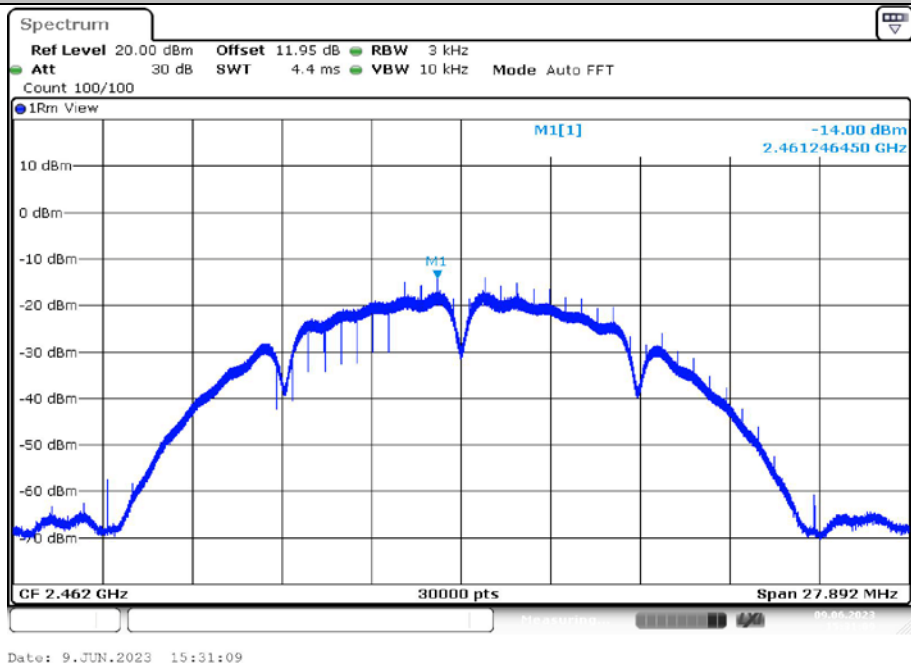
11B MIMO-Ant1-2437



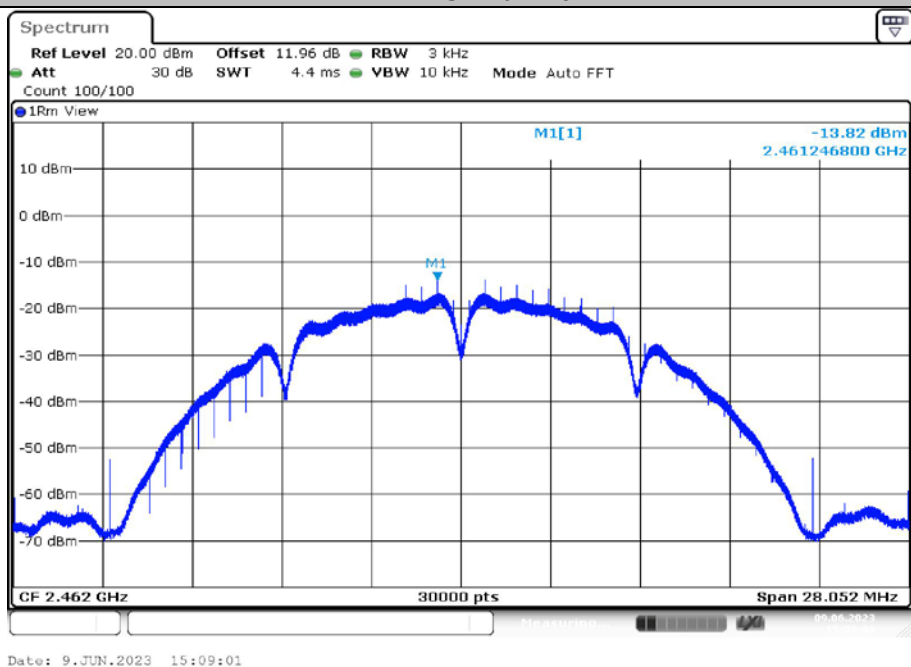
11B MIMO-Ant2-2437



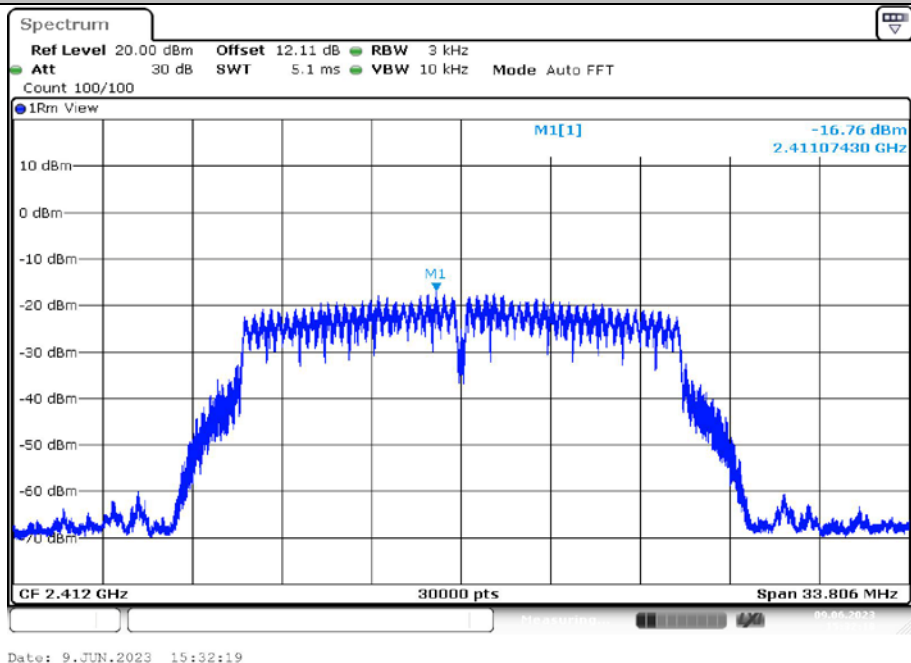
11B MIMO-Ant1-2462



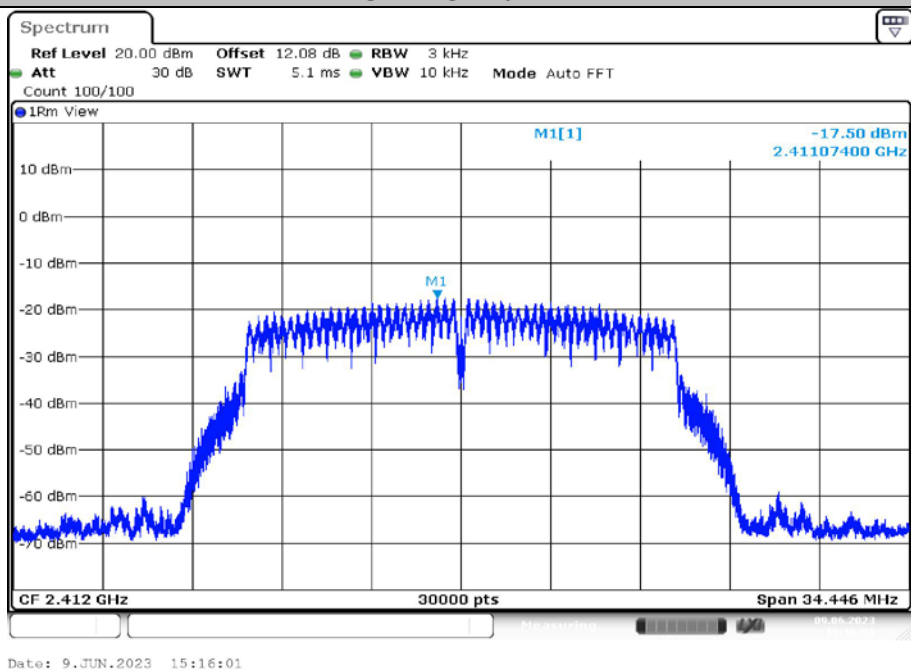
11B MIMO-Ant2-2462



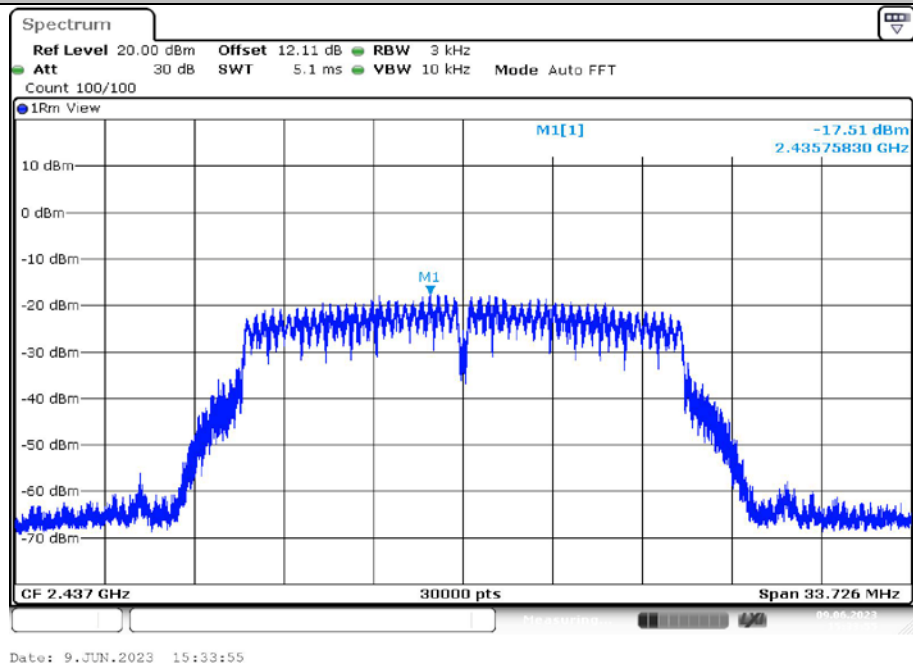
11G MIMO-Ant1-2412



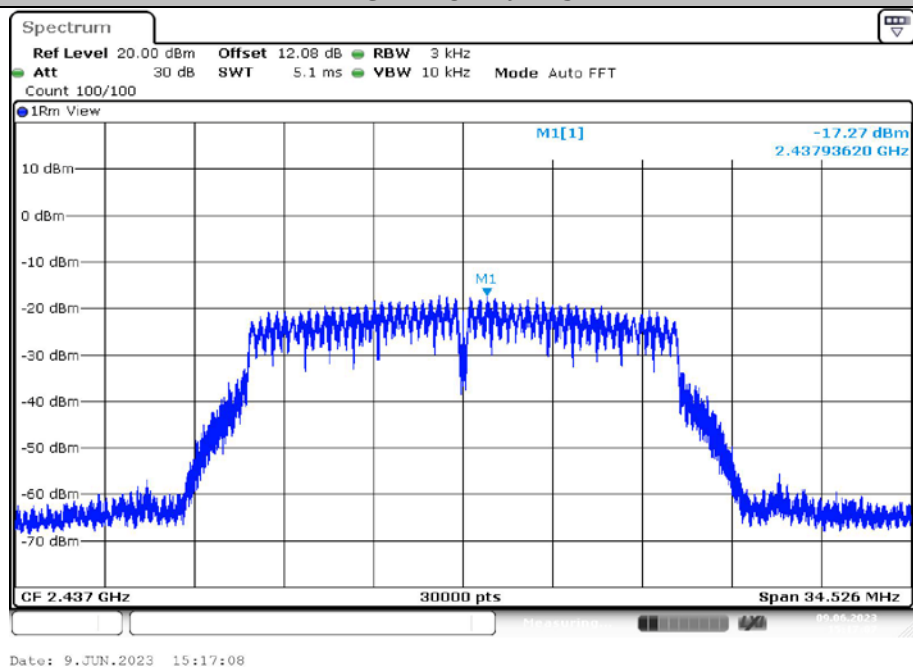
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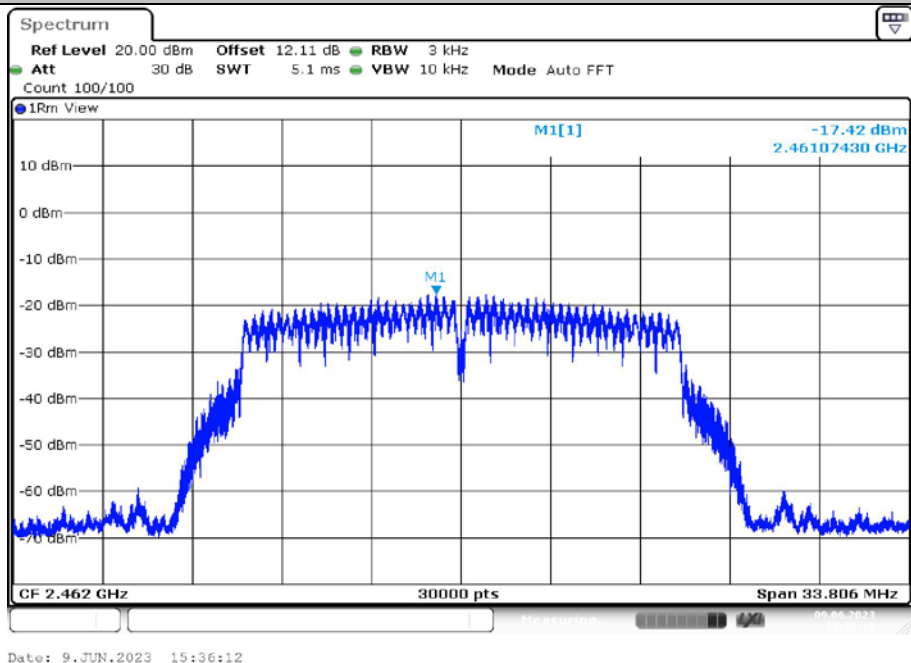
11G MIMO-Ant1-2437



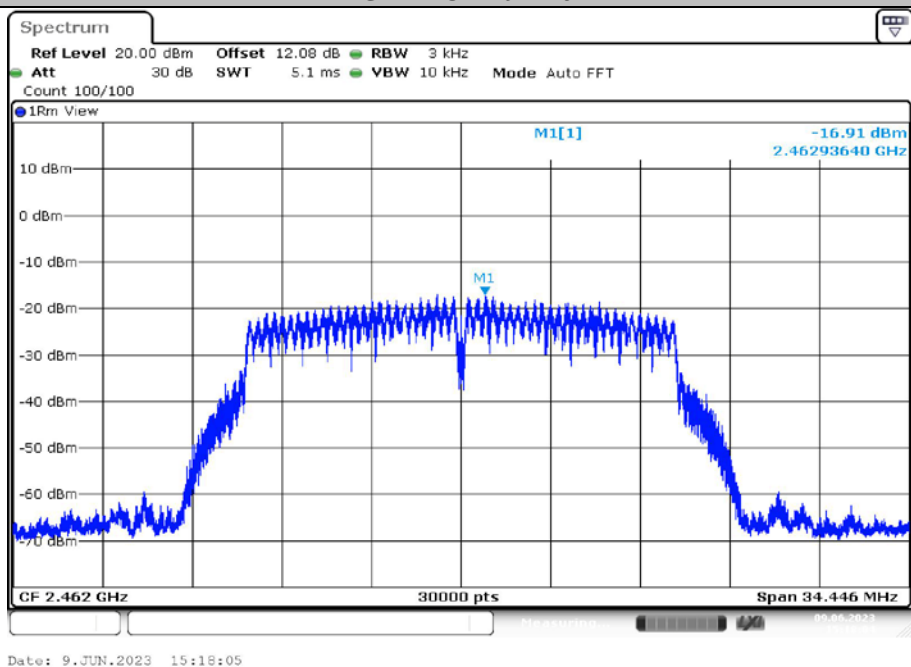
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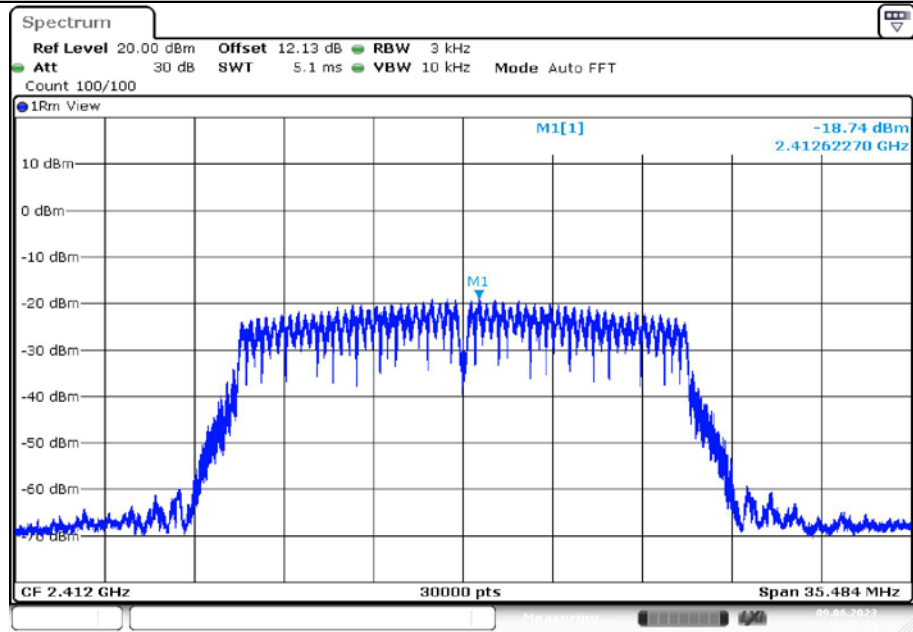
11G MIMO-Ant1-2462



11G MIMO-Ant2-2462

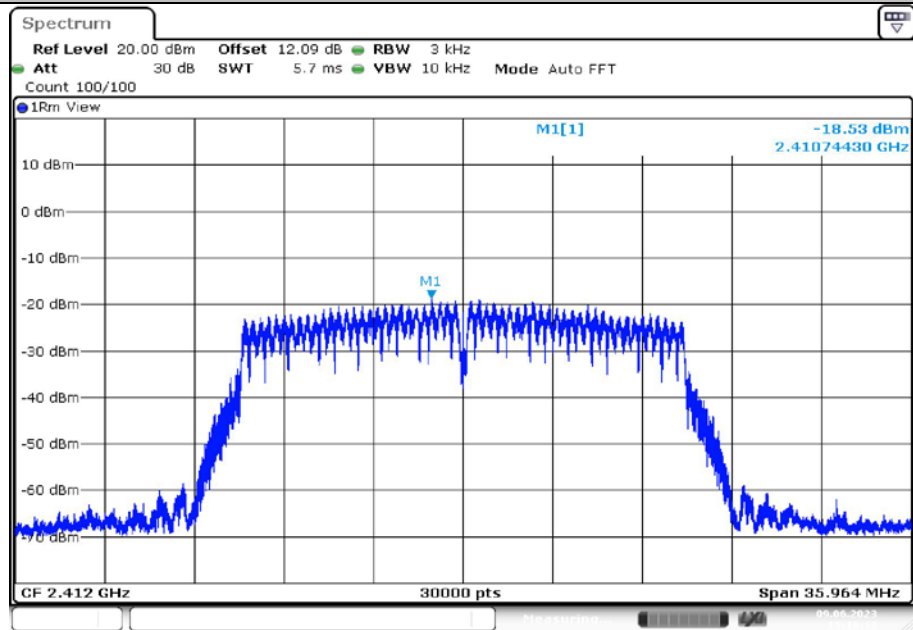


11N20MIMO-Ant1-2412



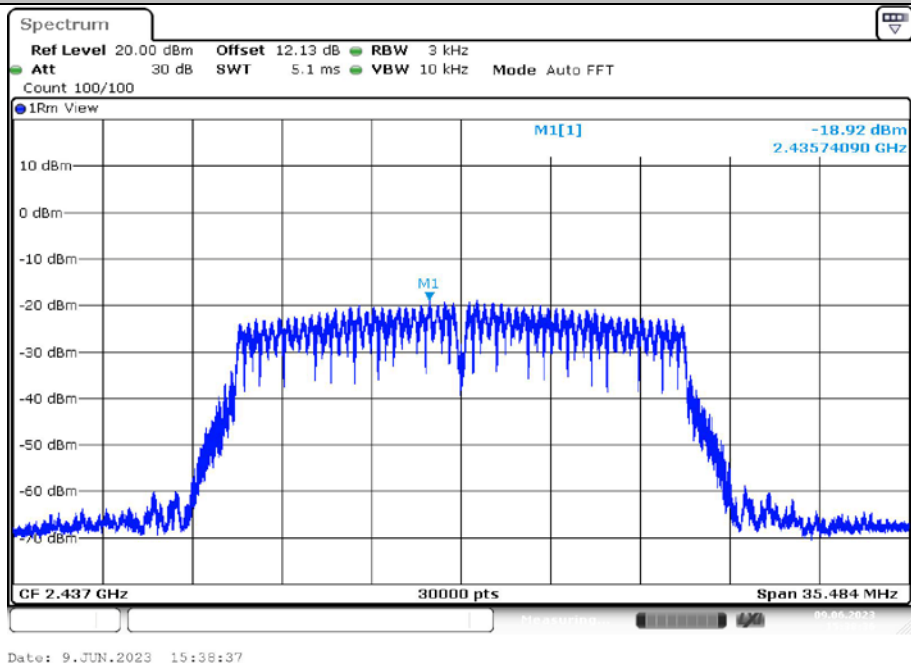
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11N20MIMO-Ant2-2412

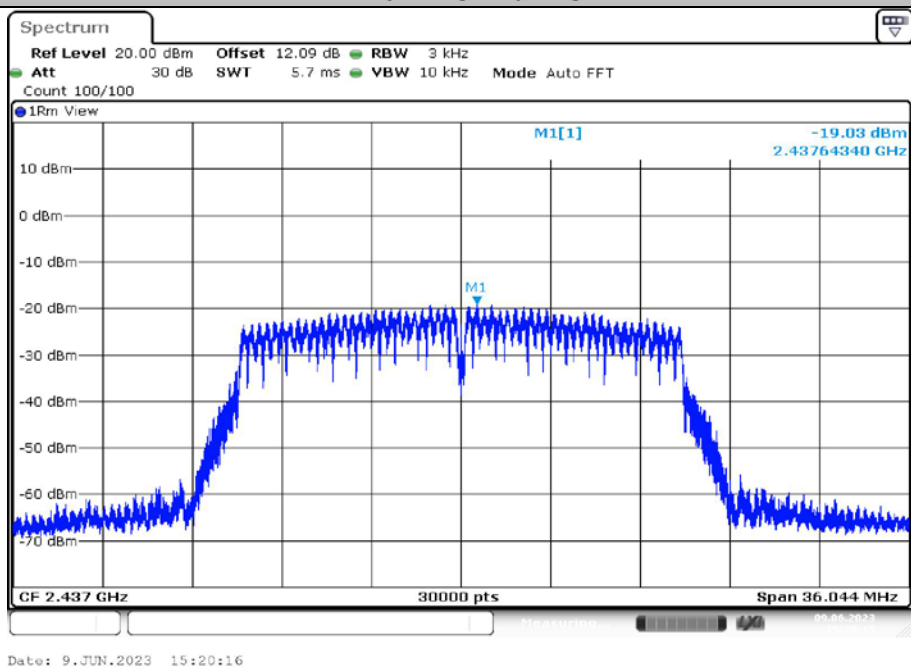


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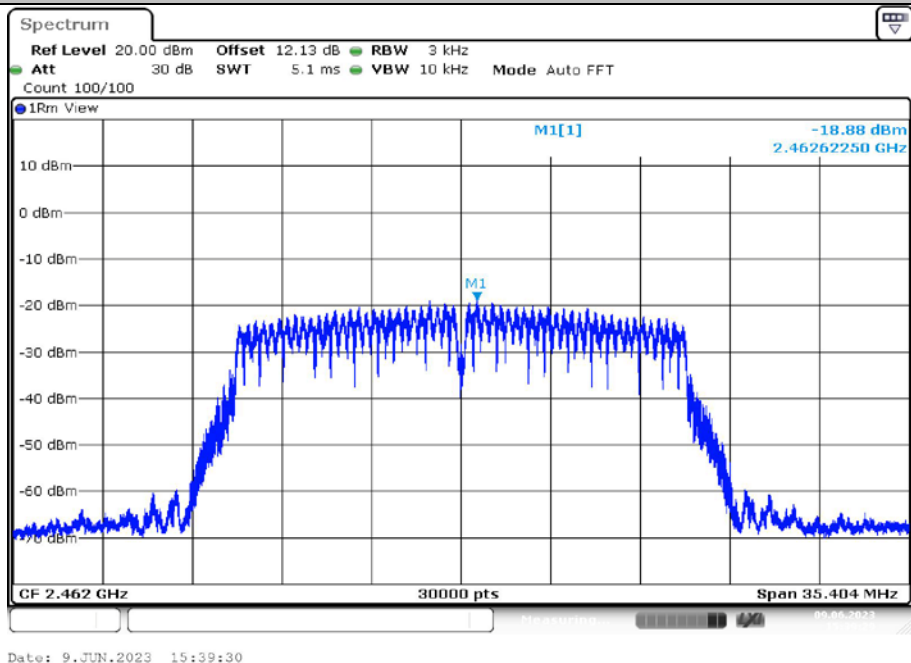
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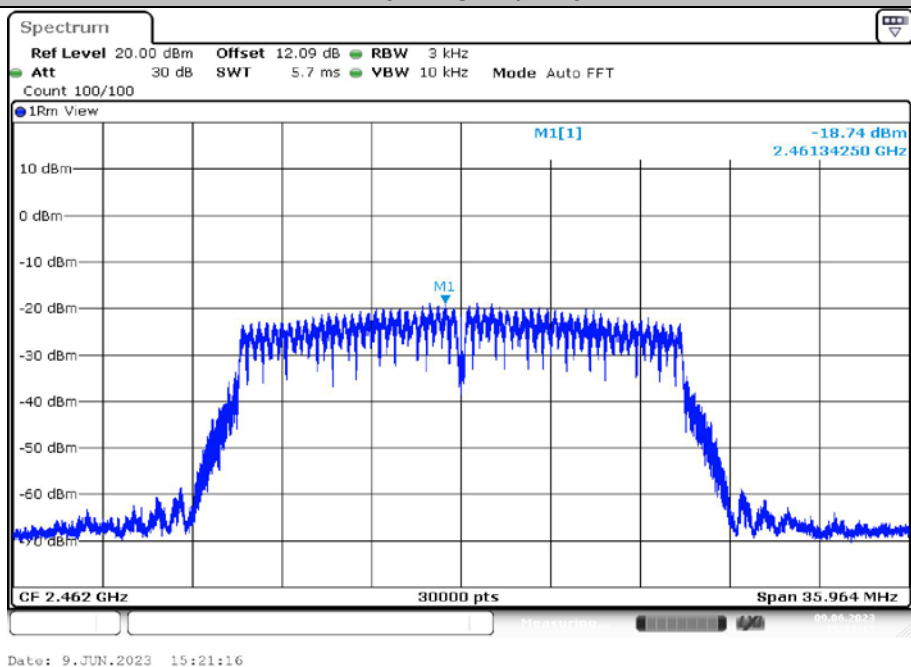
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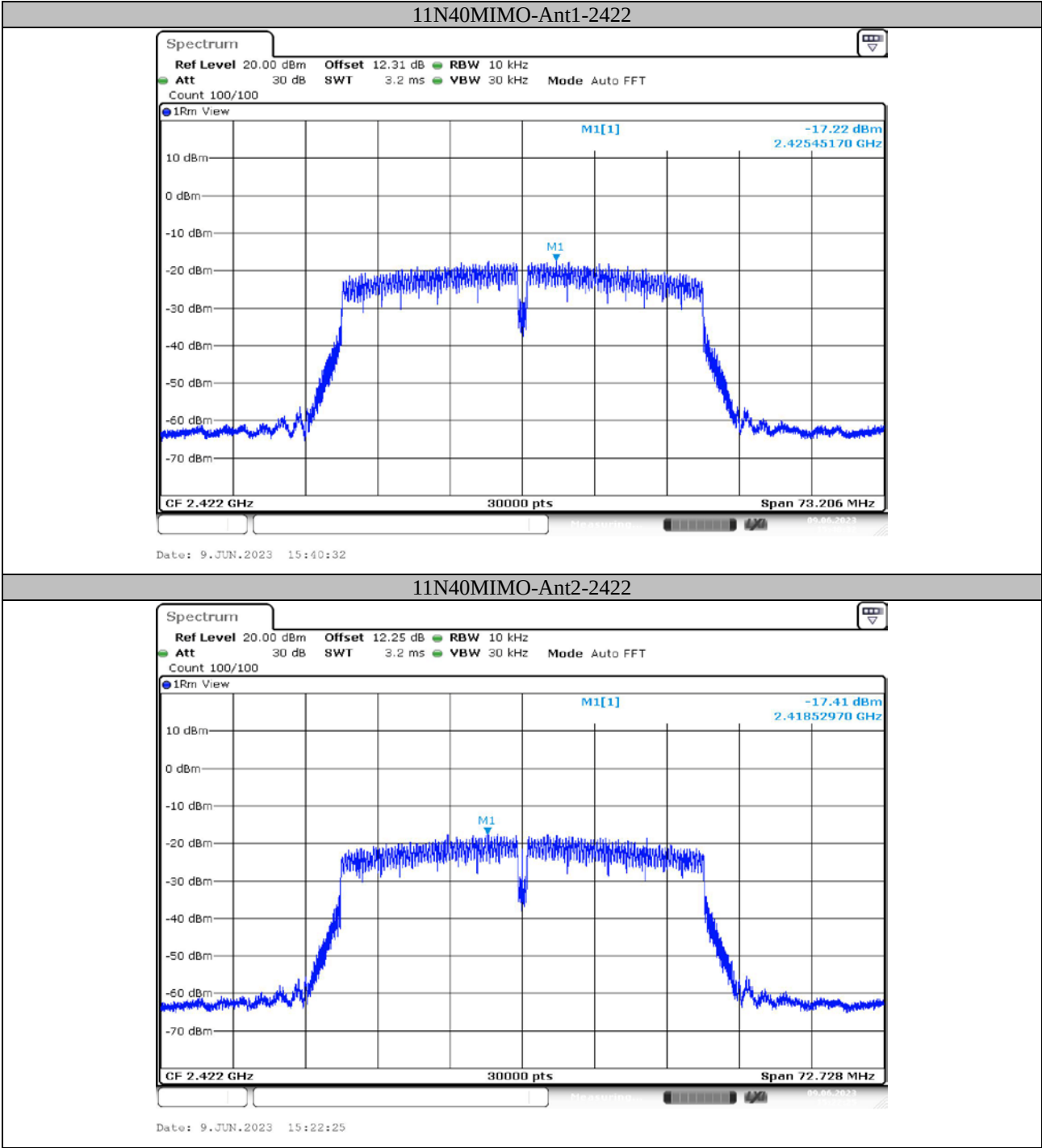


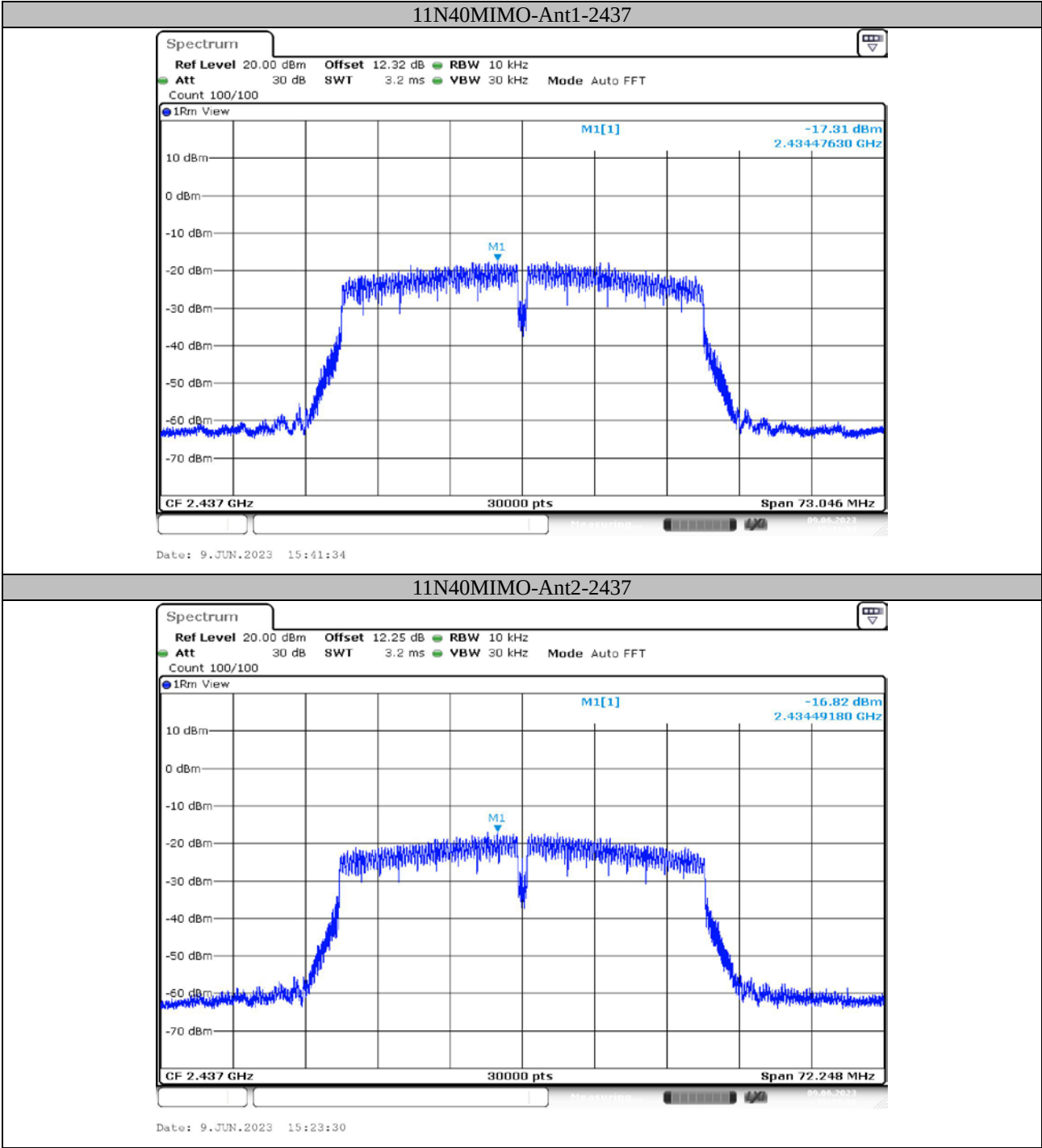
11N20MIMO-Ant1-2462



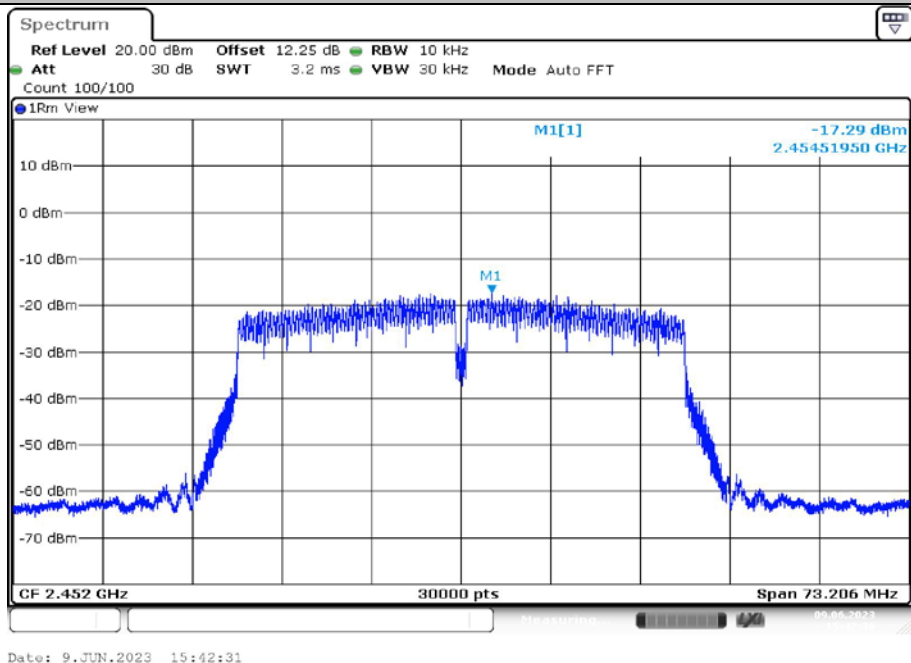
11N20MIMO-Ant2-2462



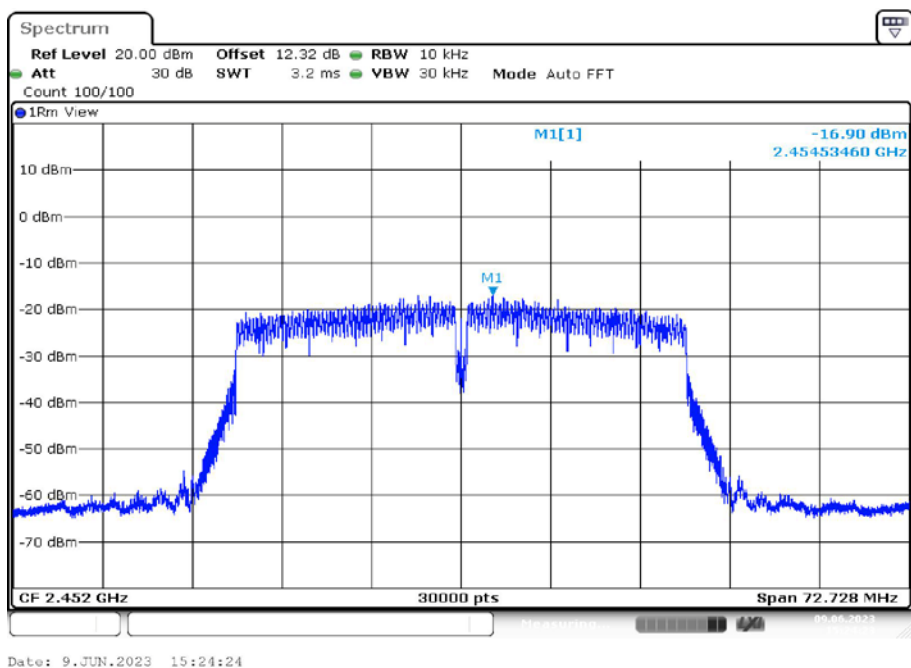




11N40MIMO-Ant1-2452

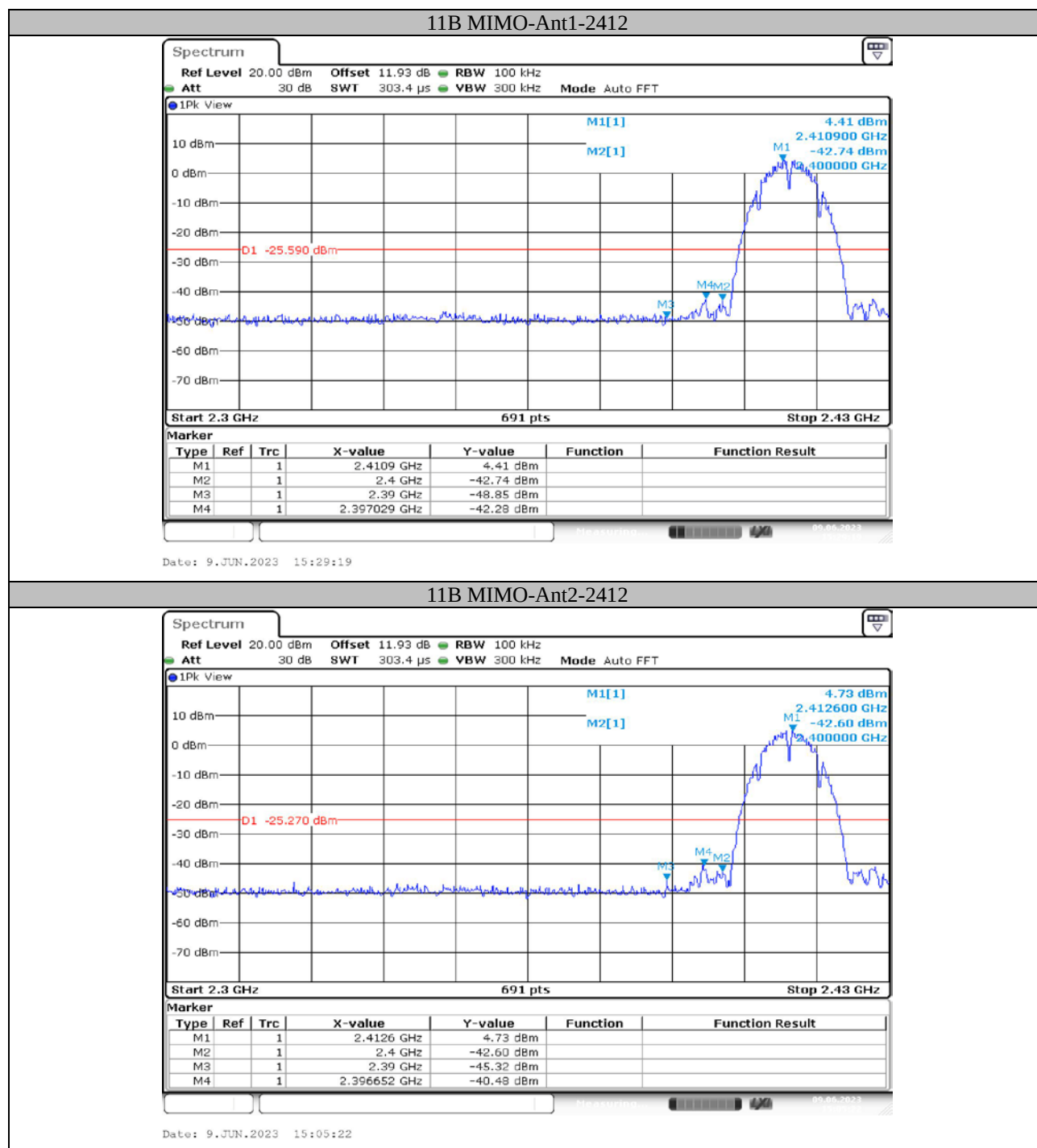


11N40MIMO-Ant2-2452

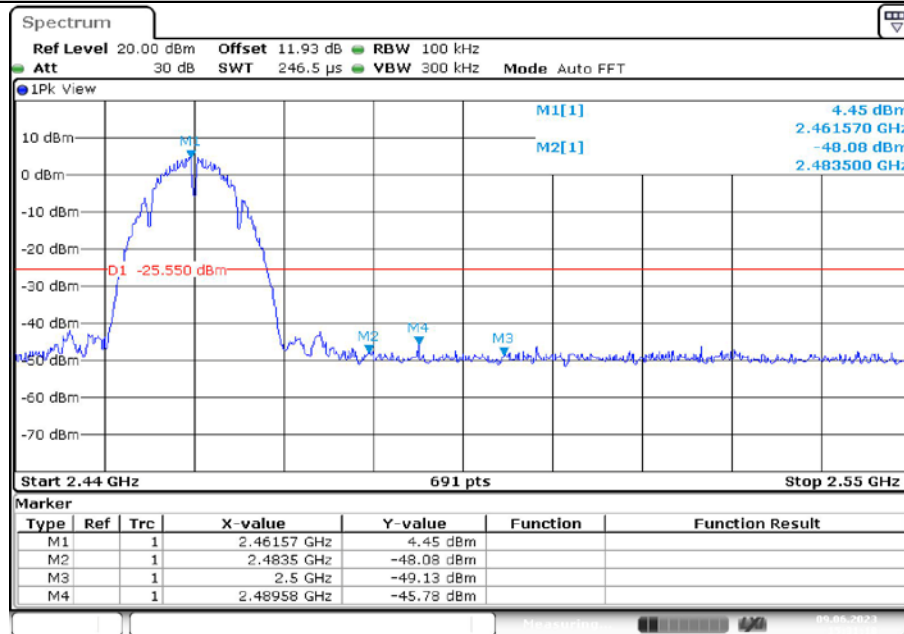


Appendix E: Band Edge Measurements

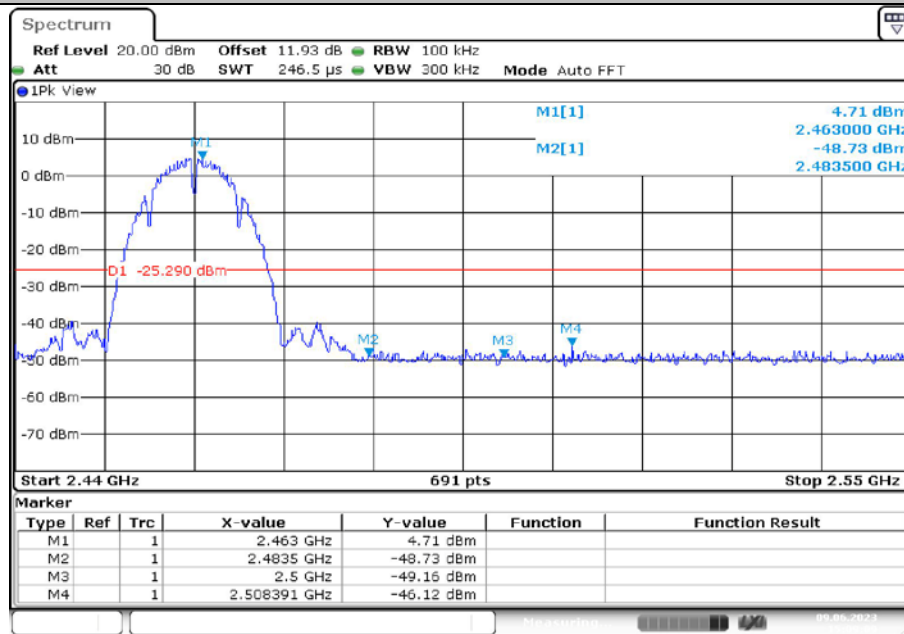
Test Graphs

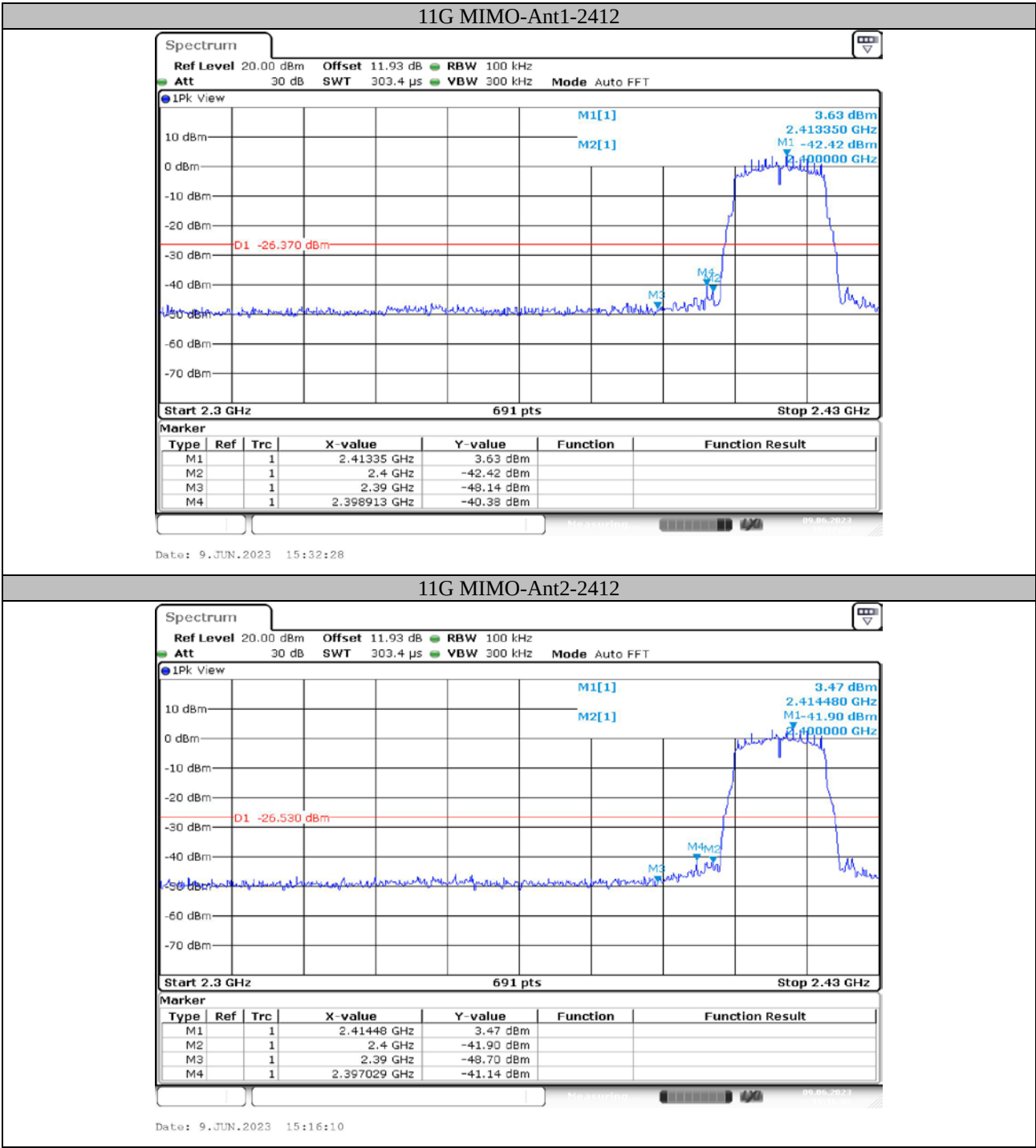


11B MIMO-Ant1-2462

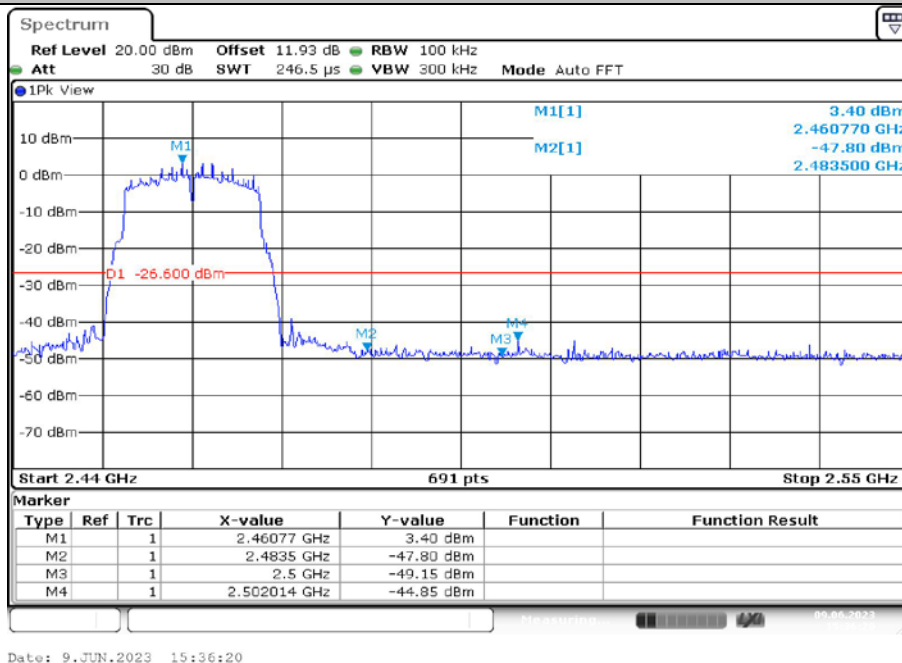


11B MIMO-Ant2-2462

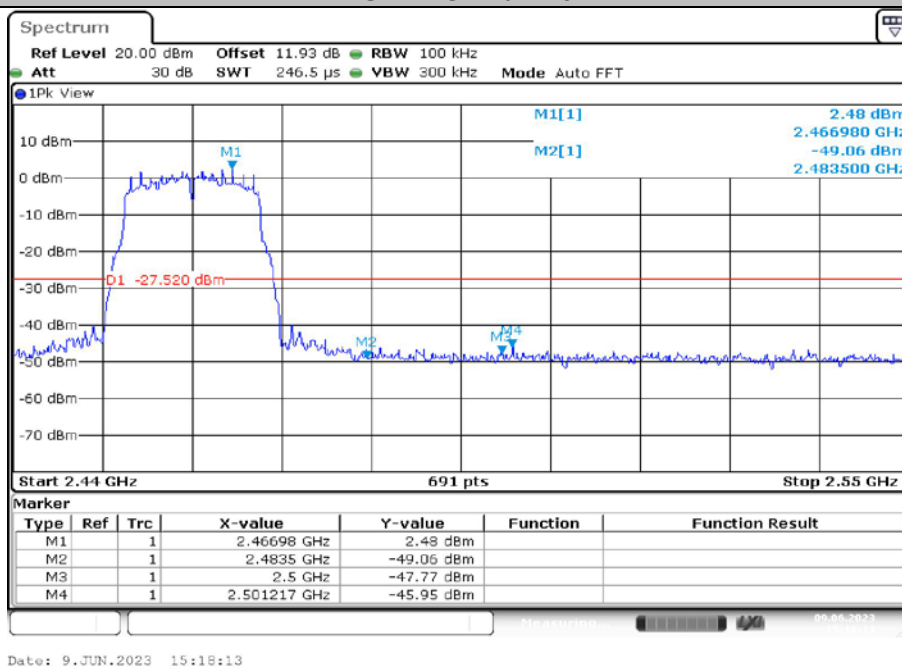




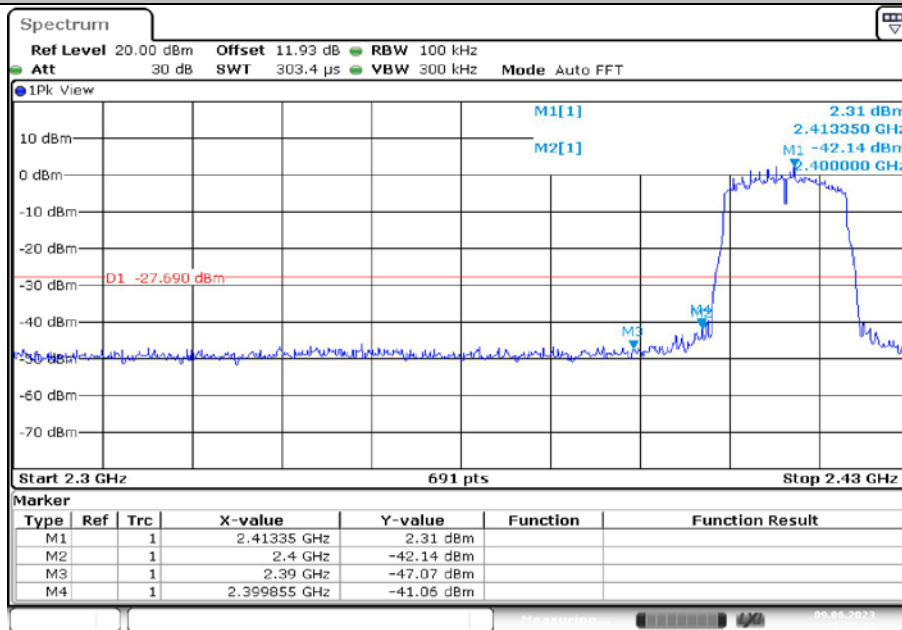
11G MIMO-Ant1-2462



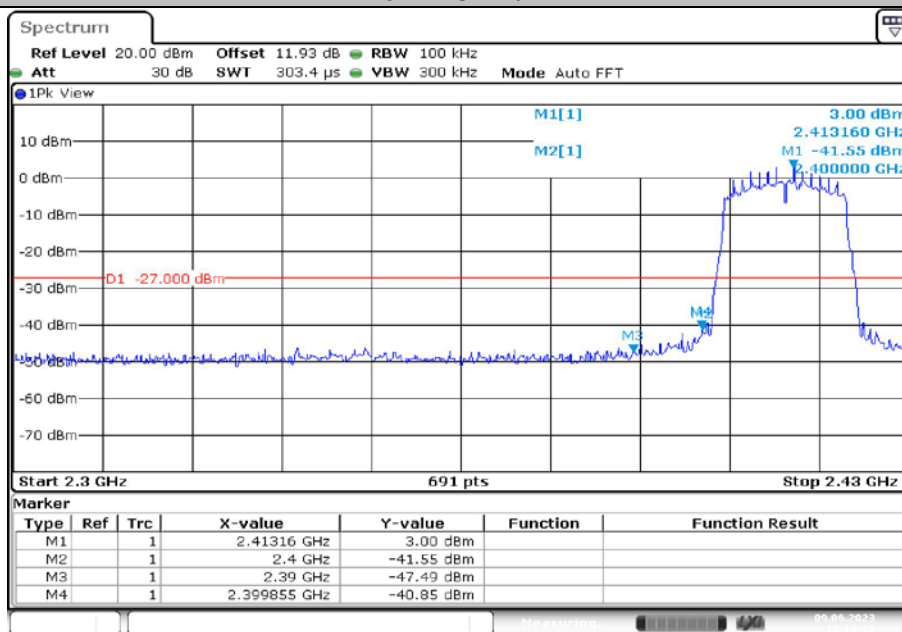
11G MIMO-Ant2-2462



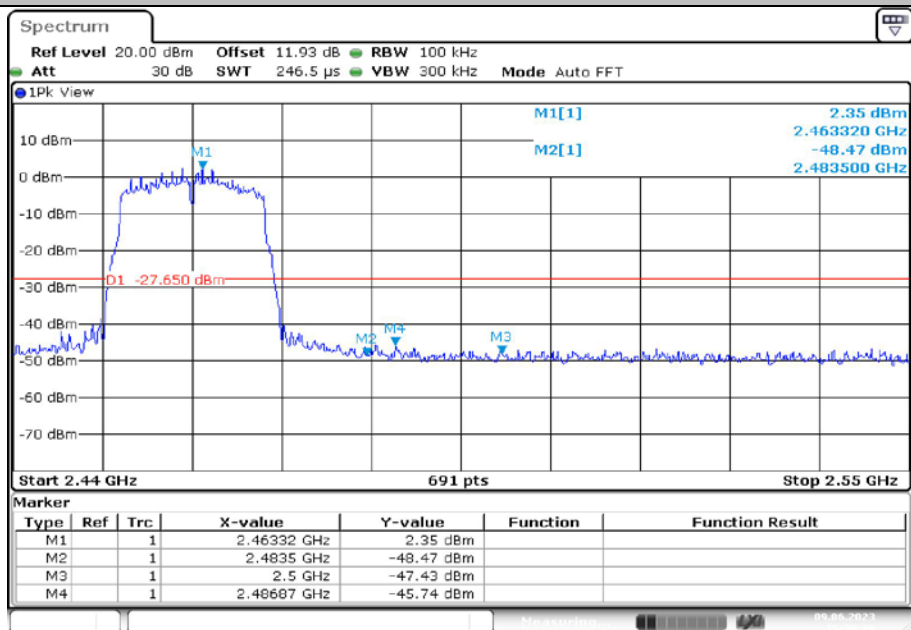
11N20MIMO-Ant1-2412



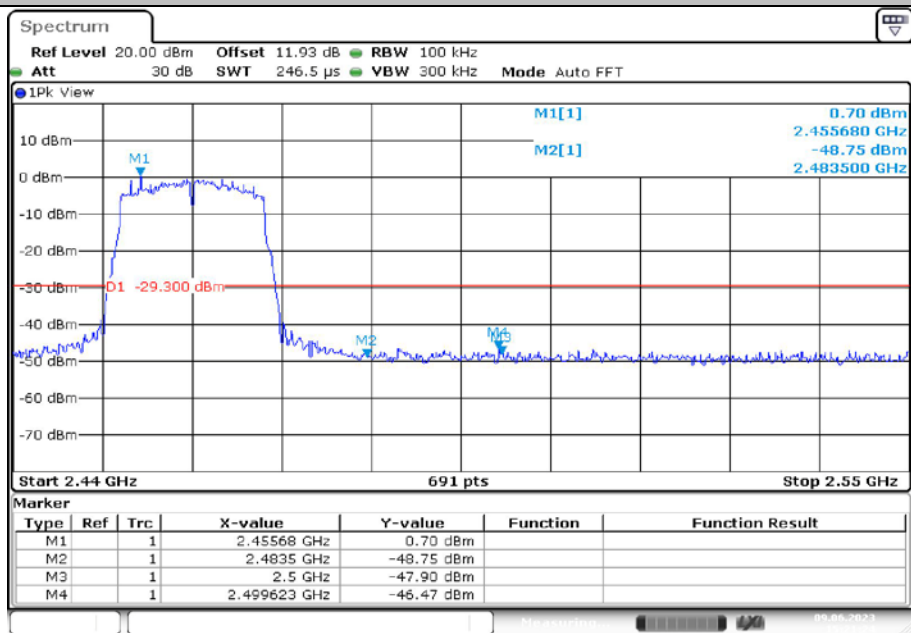
11N20MIMO-Ant2-2412

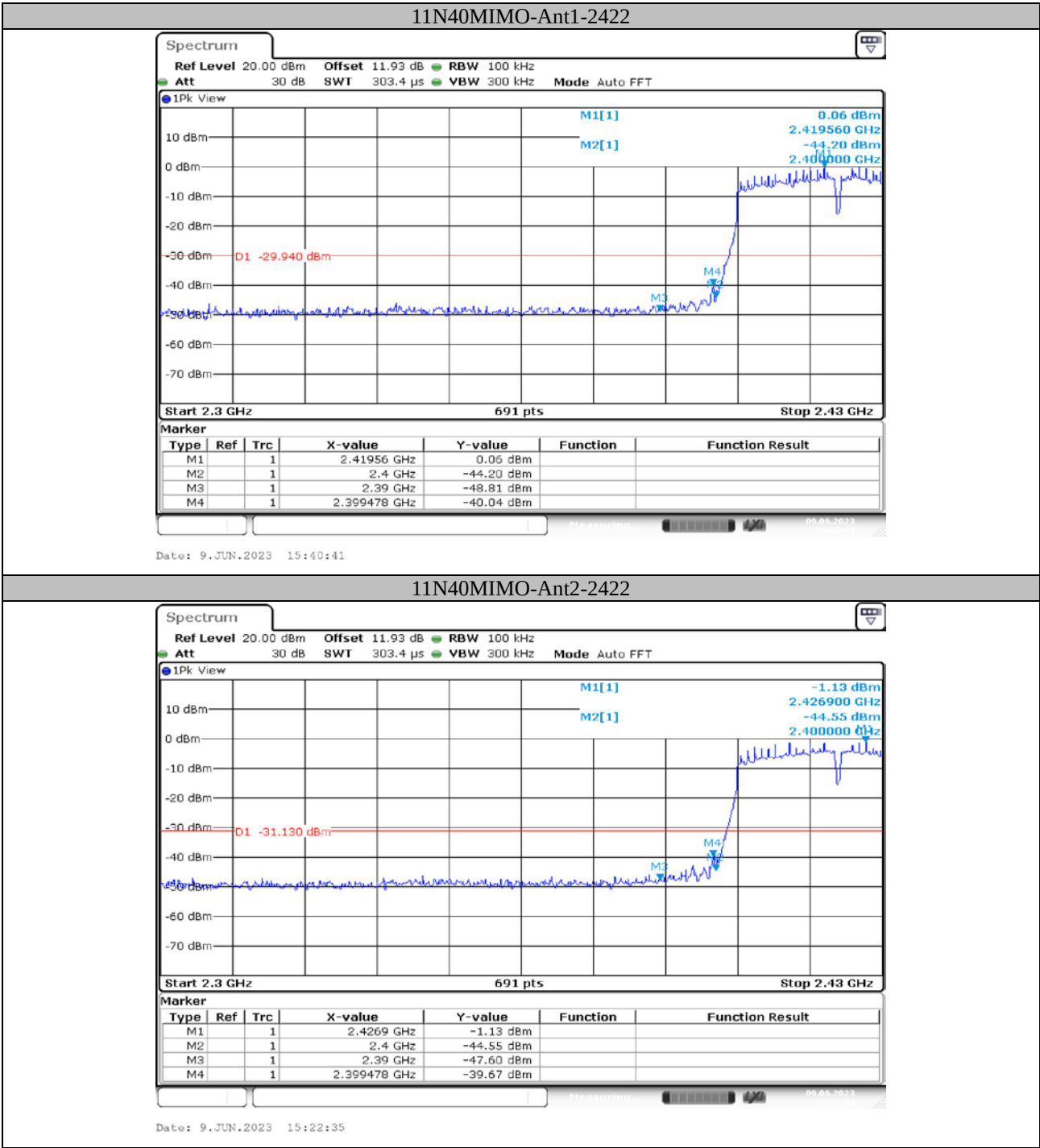


11N20MIMO-Ant1-2462

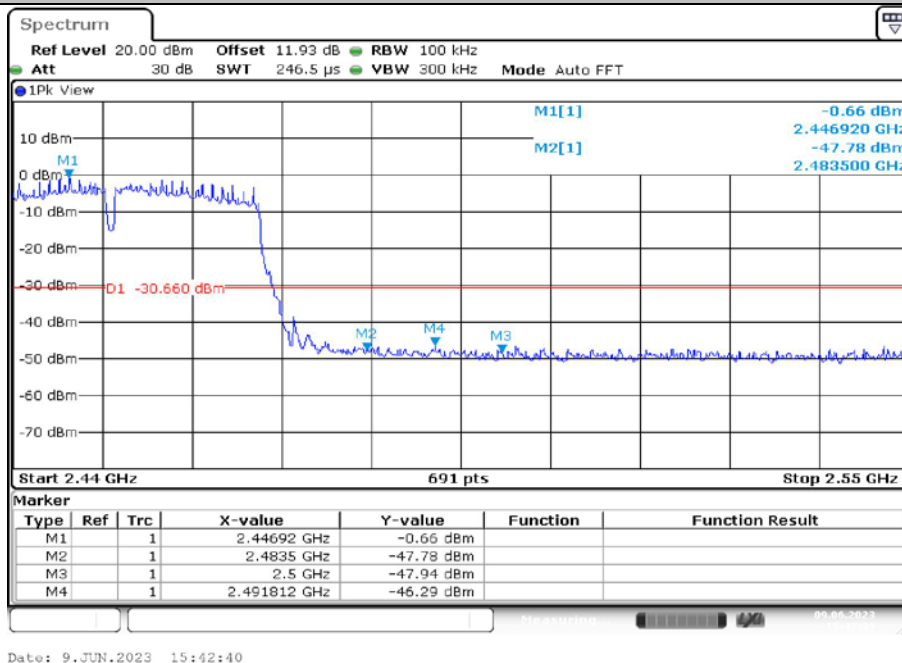


11N20MIMO-Ant2-2462

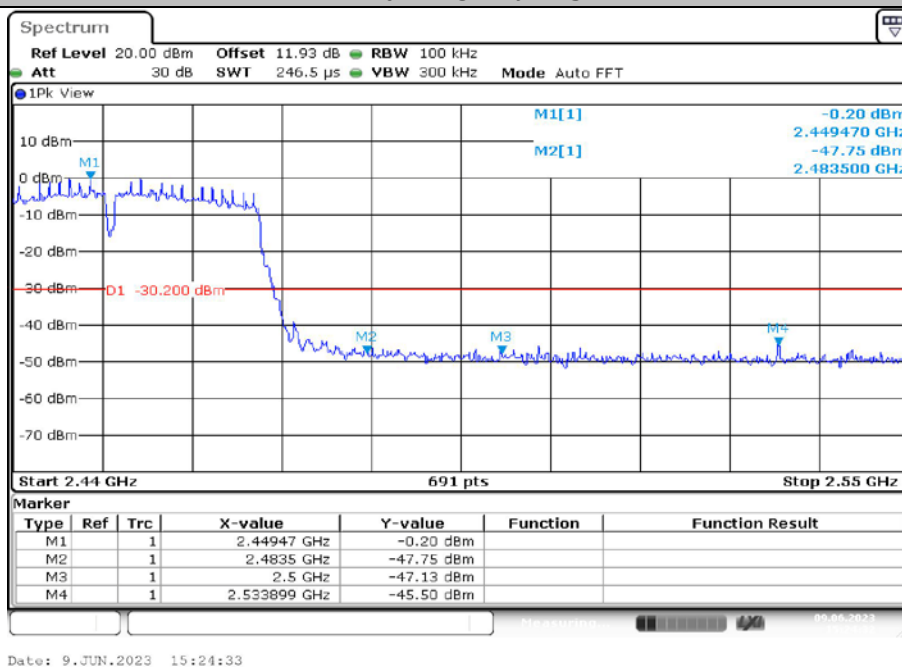




11N40MIMO-Ant1-2452



11N40MIMO-Ant2-2452



Appendix F: Duty Cycle

Environmental Conditions

Temperature:	25°C
Relative Humidity:	46-49%
ATM Pressure:	101.0 kPa

The testing was performed by Matt Liang on 2023-06-09 and 2023-06-15.

EUT operation mode: Transmitting

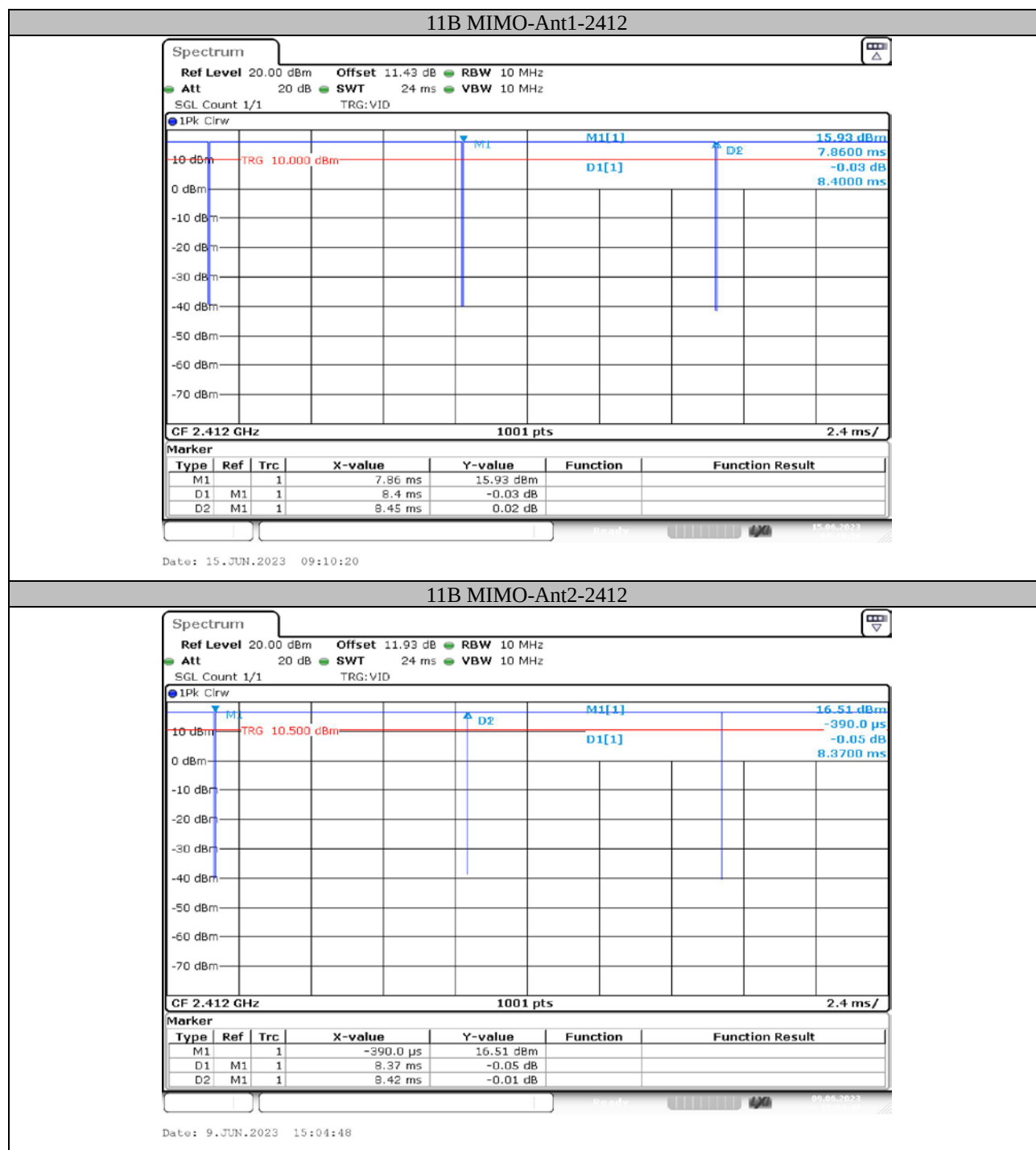
Test Result: Compliant. Please refer to the table and plots.

Test Mode	Channel	Antenna	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]	Factor	1/T Minimum VBW[kHz]
11B MIMO	2412	Ant1	8.40	8.45	99.41	/	/
		Ant2	8.37	8.42	99.41	/	/
	2437	Ant1	8.37	8.42	99.41	/	/
		Ant2	8.38	8.43	99.41	/	/
	2462	Ant1	8.38	8.42	99.52	/	/
		Ant2	8.37	8.42	99.41	/	/
11G MIMO	2412	Ant1	1.39	1.45	95.86	0.18	0.72
		Ant2	1.39	1.44	96.53	0.15	0.72
	2437	Ant1	1.39	1.45	95.86	0.18	0.72
		Ant2	1.40	1.45	96.55	0.15	0.71
	2462	Ant1	1.39	1.45	95.86	0.18	0.72
		Ant2	1.39	1.44	96.53	0.15	0.72
11N20 MIMO	2412	Ant1	1.29	1.35	95.56	0.20	0.78
		Ant2	1.30	1.35	96.30	0.16	0.77
	2437	Ant1	1.29	1.35	95.56	0.20	0.78
		Ant2	1.30	1.35	96.30	0.16	0.77
	2462	Ant1	1.29	1.35	95.56	0.20	0.78
		Ant2	1.30	1.35	96.30	0.16	0.77
11N40 MIMO	2422	Ant1	0.65	0.71	91.55	0.38	1.54
		Ant2	0.65	0.70	92.86	0.32	1.54
	2437	Ant1	0.64	0.70	91.43	0.39	1.56
		Ant2	0.65	0.70	92.86	0.32	1.54
	2452	Ant1	0.65	0.70	92.86	0.32	1.54
		Ant2	0.64	0.70	91.43	0.39	1.56

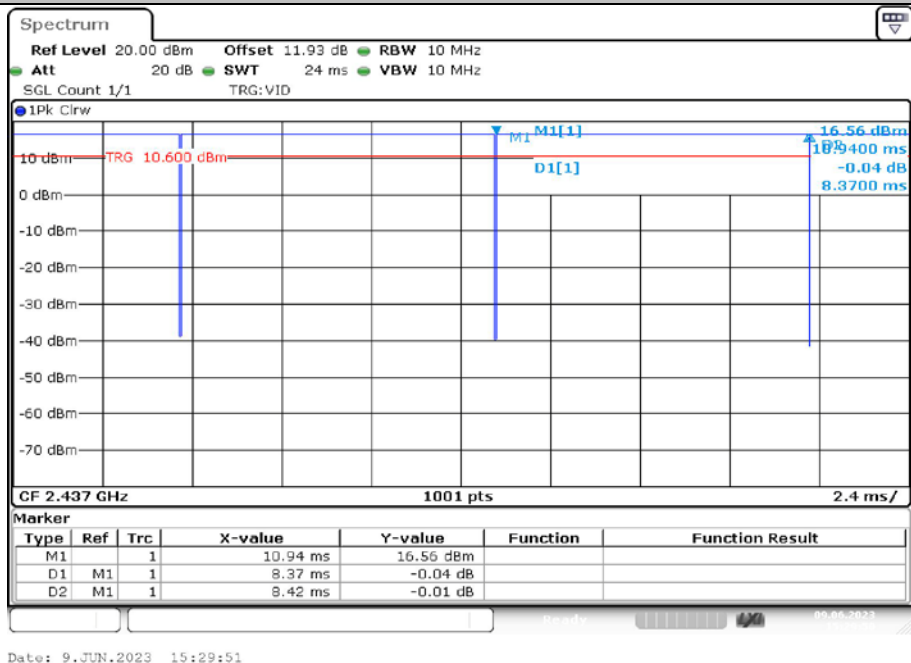
Note: DC factor= $10 \cdot \log_{10}(1/\text{duty cycle})$

Only when the duty cycle less than 98%, the DC factor and 1/T used for test.

Test Graphs



11B MIMO-Ant1-2437



11B MIMO-Ant2-2437

