

RF Test Data for 2.4G Wi-Fi (Conducted Measurements)

General Description of EUT	
Product Name:	WiFi & BT combo module
Test Model:	EWN-8822CSE3AA
Sample ID:	HC-C-202308-0079-01-03-2#
Environmental Conditions	
Temperature:	25°C
Relative Humidity:	55%
Test Voltage:	DC 3.3V
Test Engineer:	Li Ying Jing
Note: For a more detailed features description, please refer to the report TBR-C-202308-0079-22 The report only show the worst case data.	

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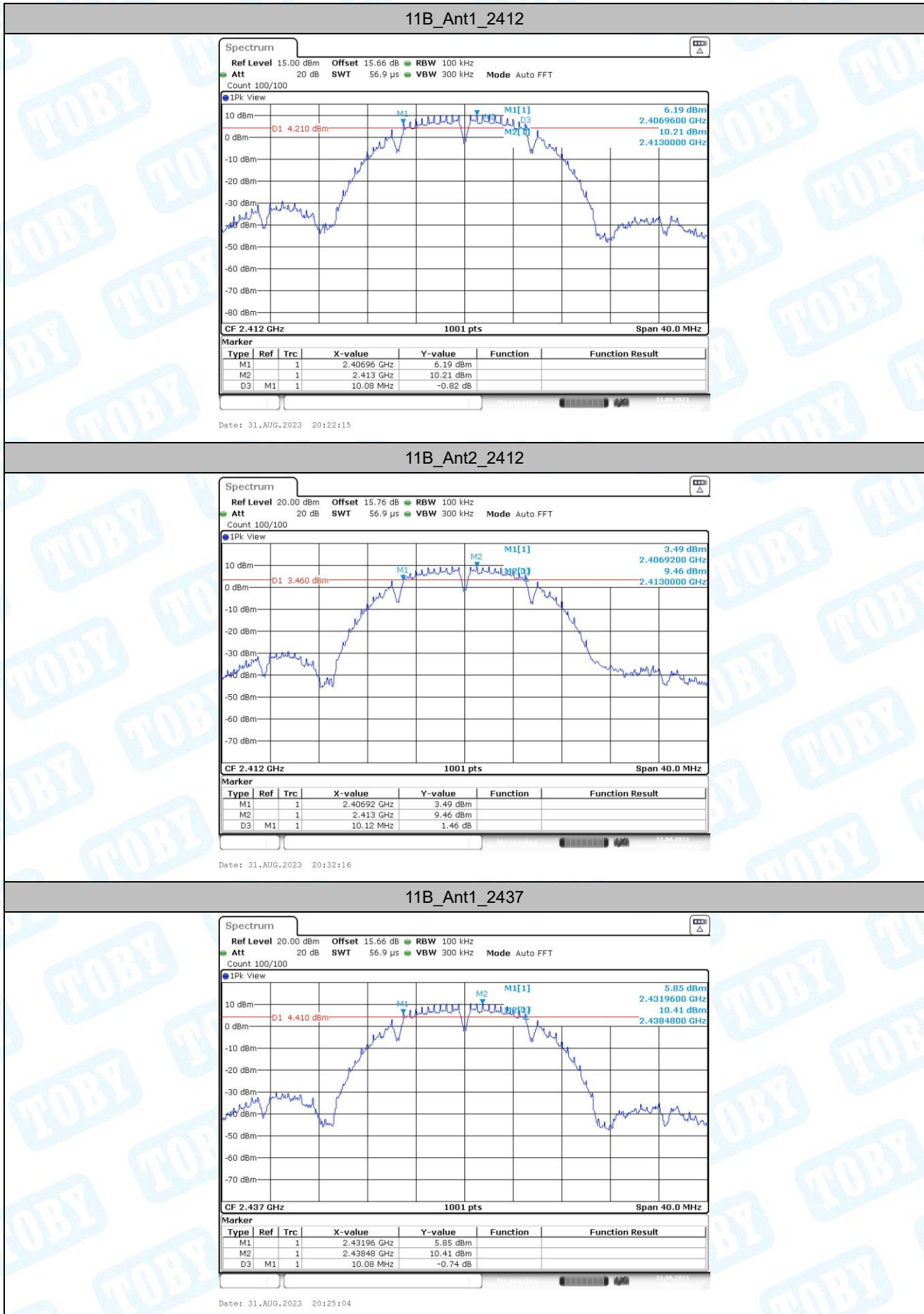
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1. DTS Bandwidth

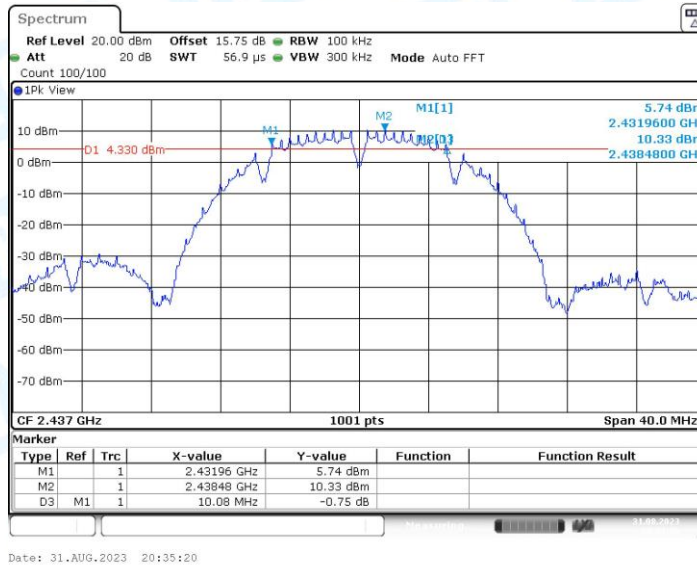
1.1. Test Result

TestMode	Antenna	Channel	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	10.08	2406.96	2417.04	0.5	PASS
	Ant2	2412	10.12	2406.92	2417.04	0.5	PASS
	Ant1	2437	10.08	2431.96	2442.04	0.5	PASS
	Ant2	2437	10.08	2431.96	2442.04	0.5	PASS
	Ant1	2462	10.08	2456.96	2467.04	0.5	PASS
	Ant2	2462	10.12	2456.92	2467.04	0.5	PASS
11G	Ant1	2412	16.32	2403.84	2420.16	0.5	PASS
	Ant2	2412	13.84	2404.44	2418.28	0.5	PASS
	Ant1	2437	16.32	2428.84	2445.16	0.5	PASS
	Ant2	2437	16.32	2428.84	2445.16	0.5	PASS
	Ant1	2462	12.64	2455.68	2468.32	0.5	PASS
	Ant2	2462	15.32	2454.24	2469.56	0.5	PASS
11N20MIMO	Ant1	2412	17.52	2403.24	2420.76	0.5	PASS
	Ant2	2412	16.52	2403.88	2420.40	0.5	PASS
	Ant1	2437	15.12	2429.44	2444.56	0.5	PASS
	Ant2	2437	17.56	2428.20	2445.76	0.5	PASS
	Ant1	2462	15.04	2454.44	2469.48	0.5	PASS
	Ant2	2462	17.16	2453.24	2470.40	0.5	PASS
11N40MIMO	Ant1	2422	35.04	2404.48	2439.52	0.5	PASS
	Ant2	2422	35.52	2404.40	2439.92	0.5	PASS
	Ant1	2437	33.84	2420.68	2454.52	0.5	PASS
	Ant2	2437	30.08	2419.48	2449.56	0.5	PASS
	Ant1	2452	33.84	2435.68	2469.52	0.5	PASS
	Ant2	2452	35.04	2434.48	2469.52	0.5	PASS

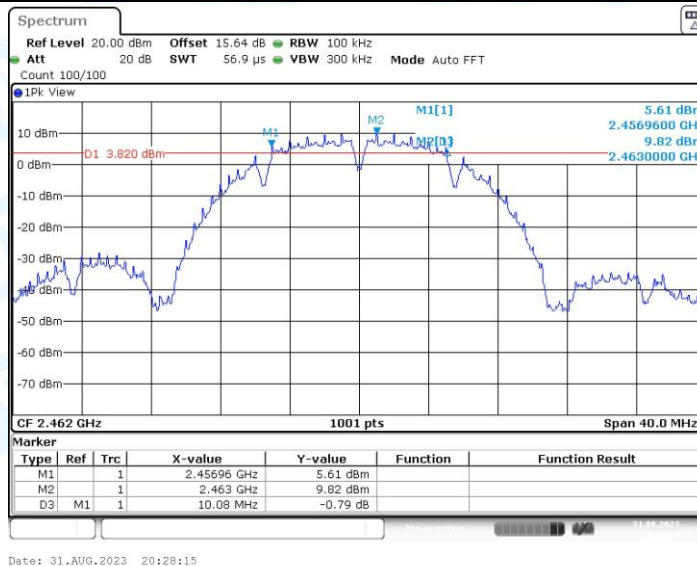
1.2. Test Graphs



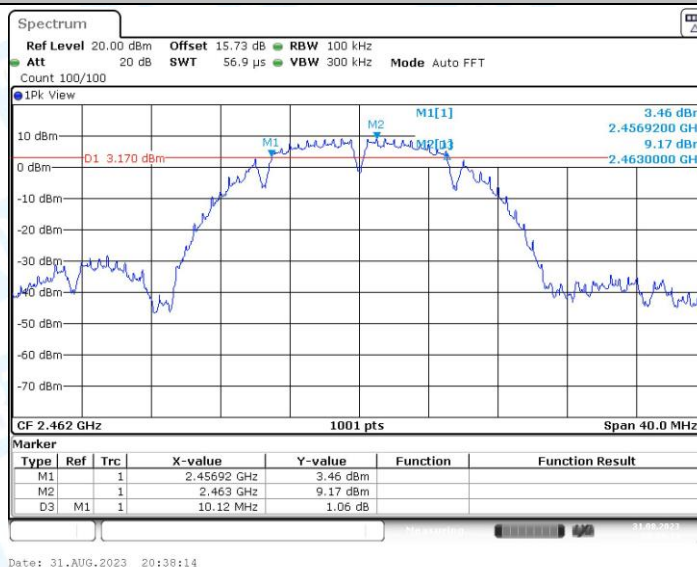
11B_Ant2_2437



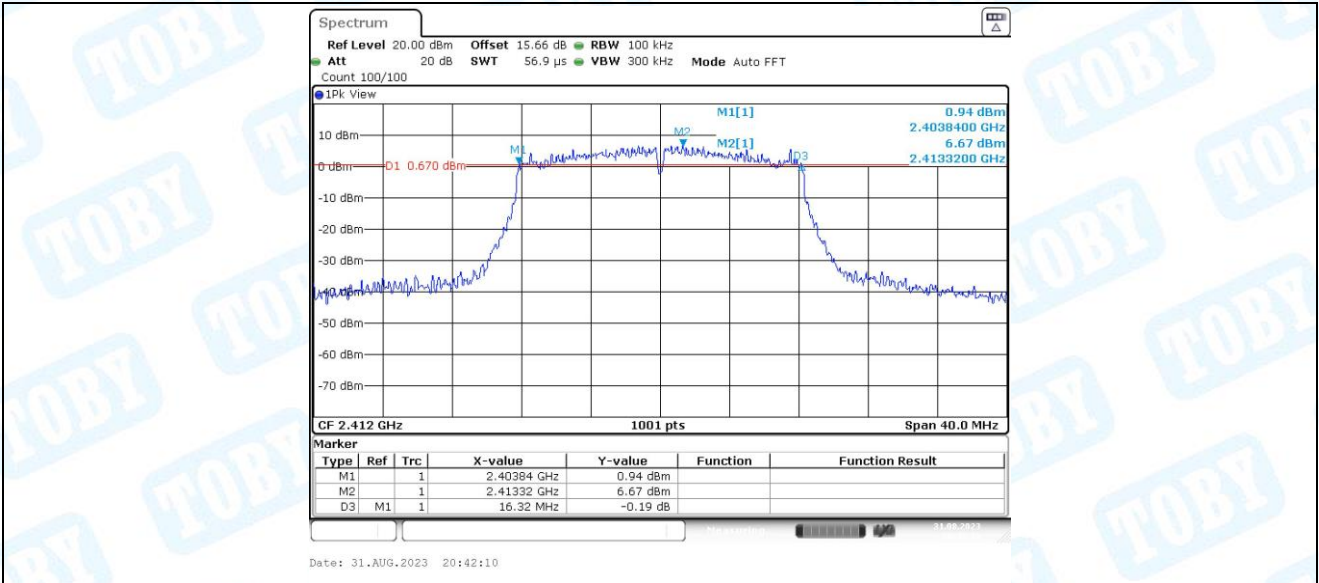
11B_Ant1_2462



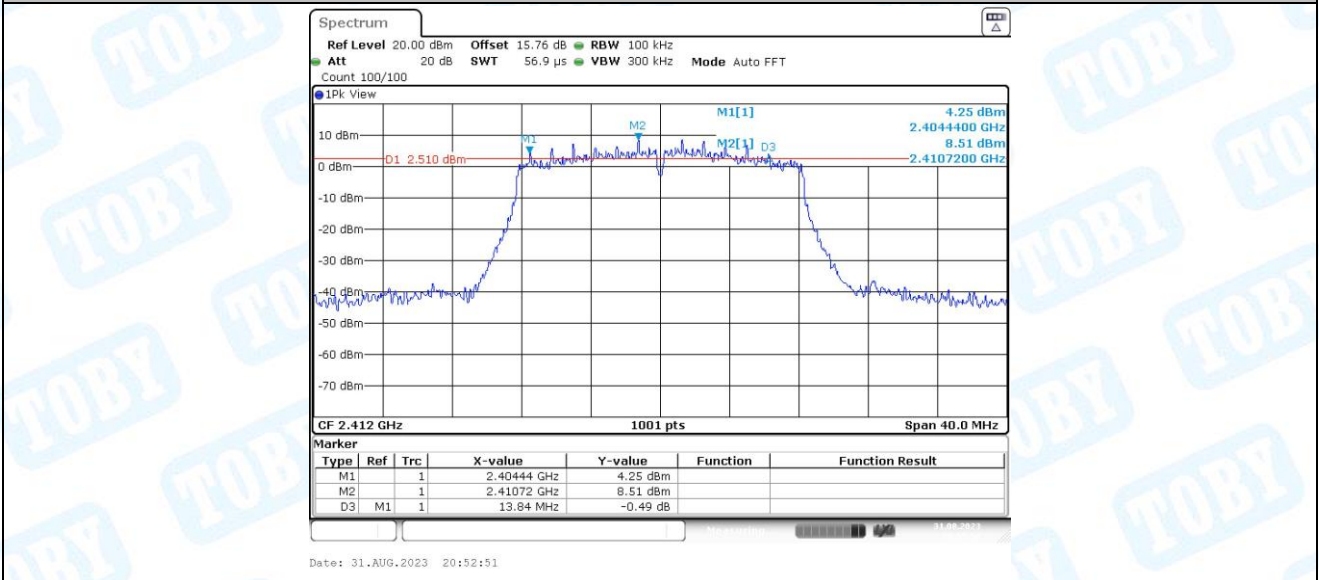
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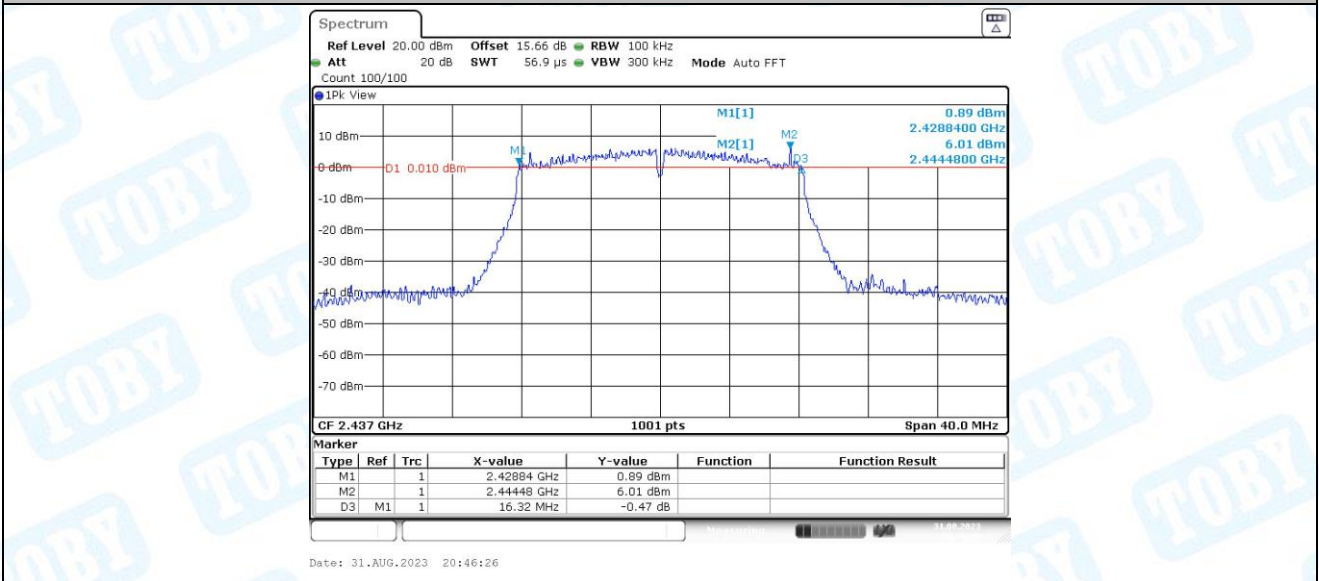
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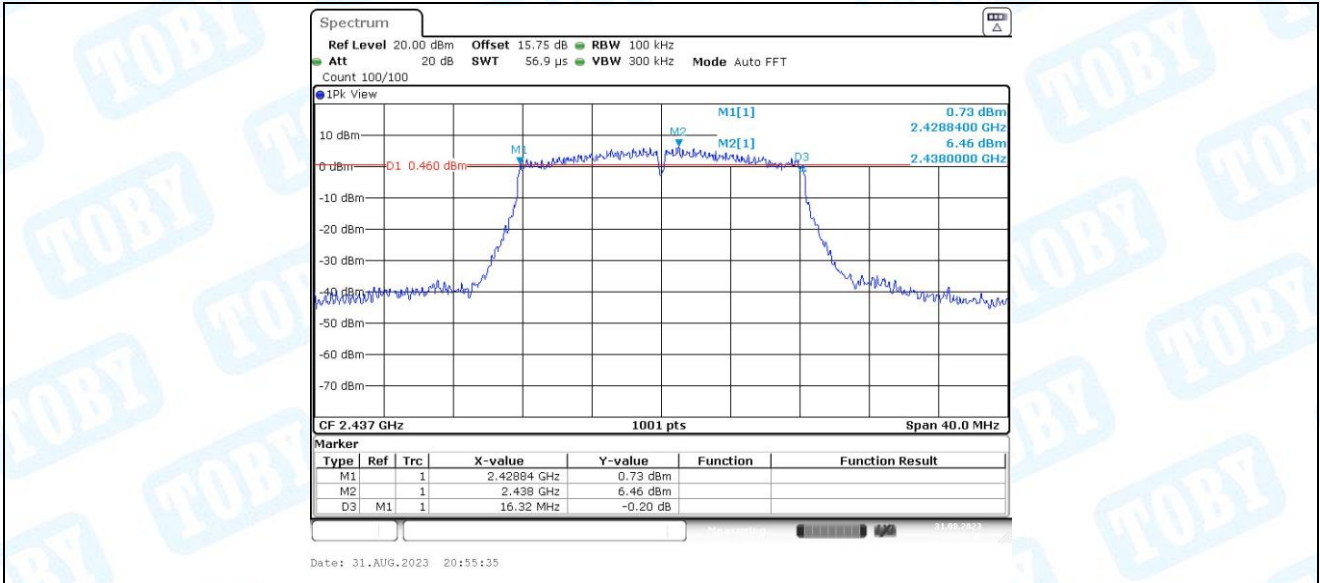
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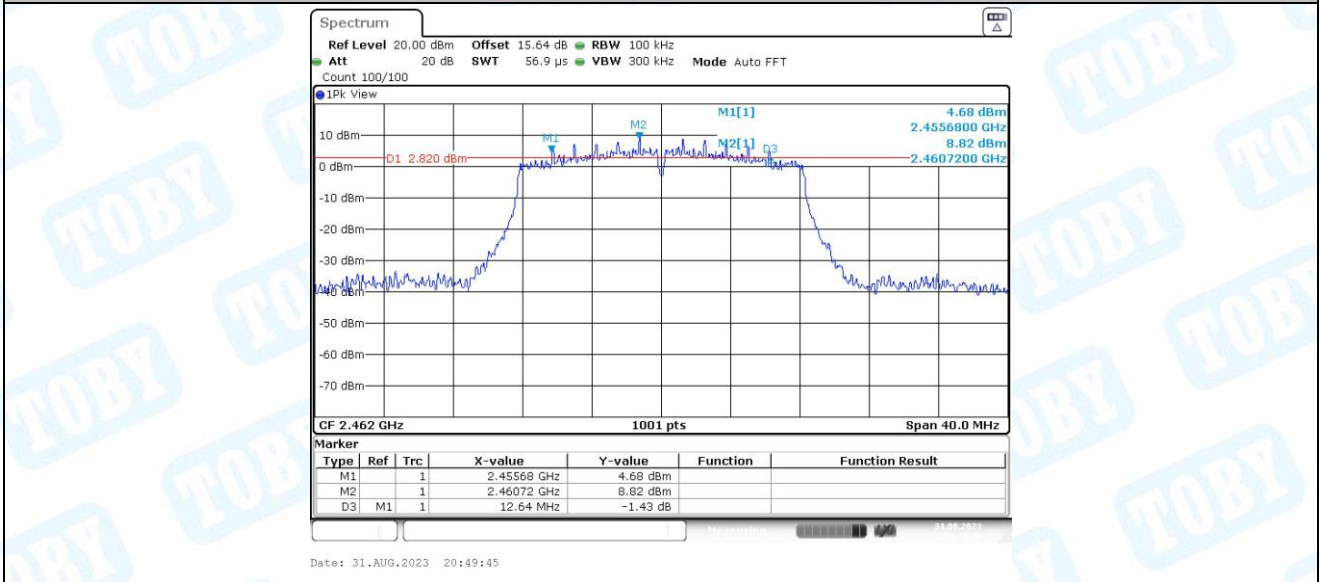
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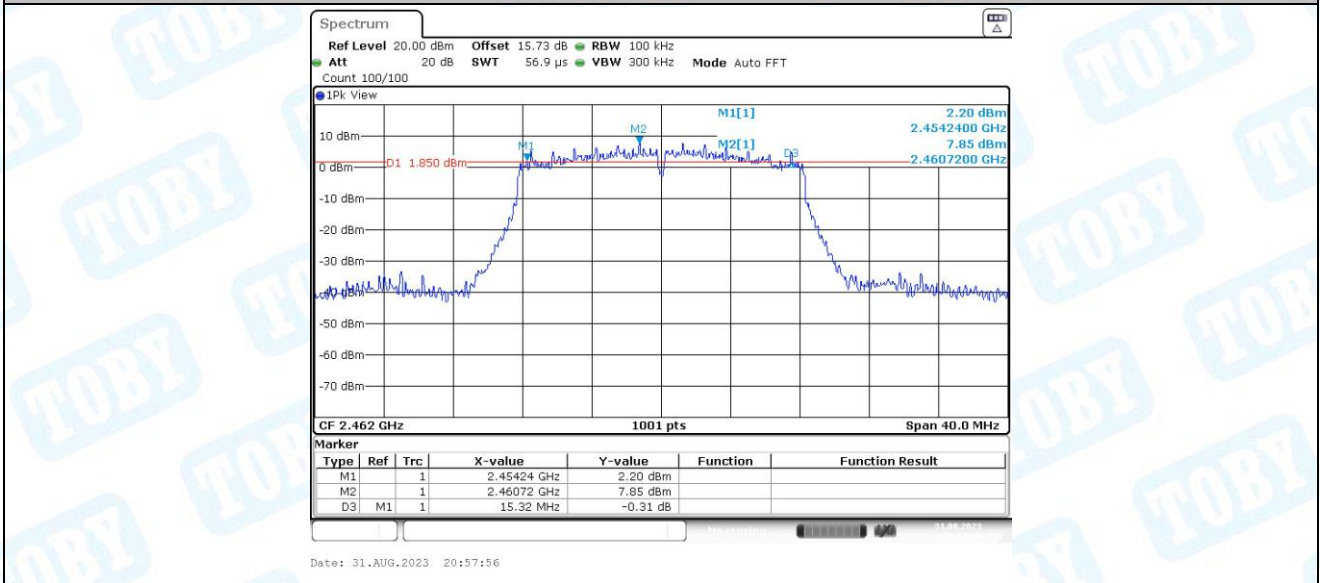
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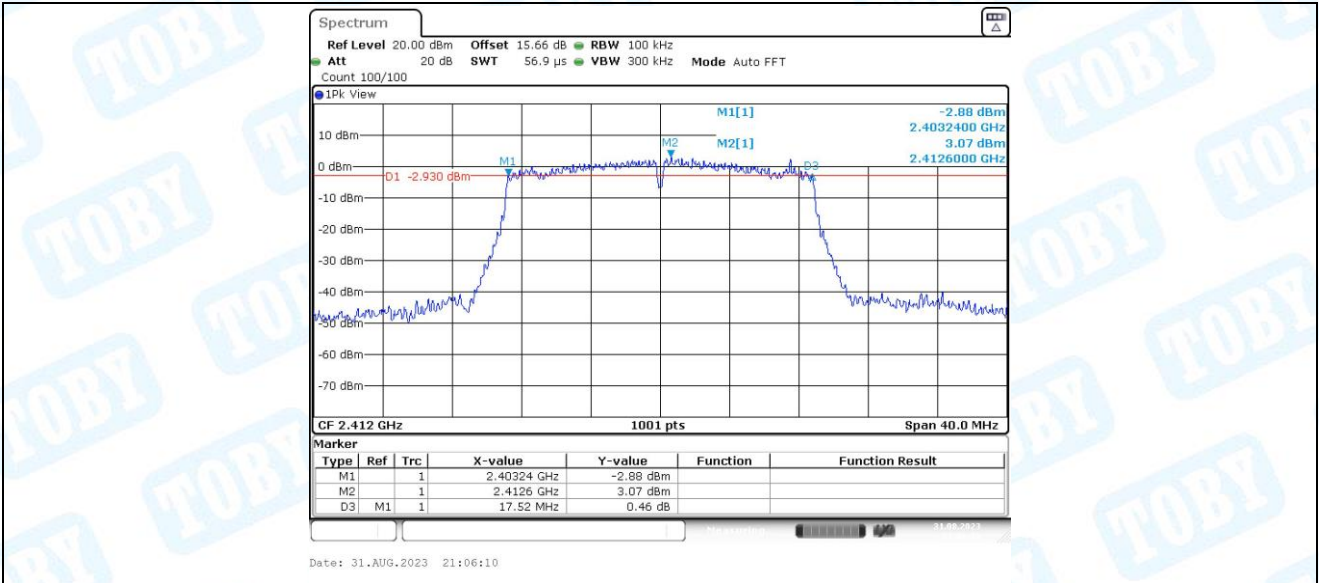
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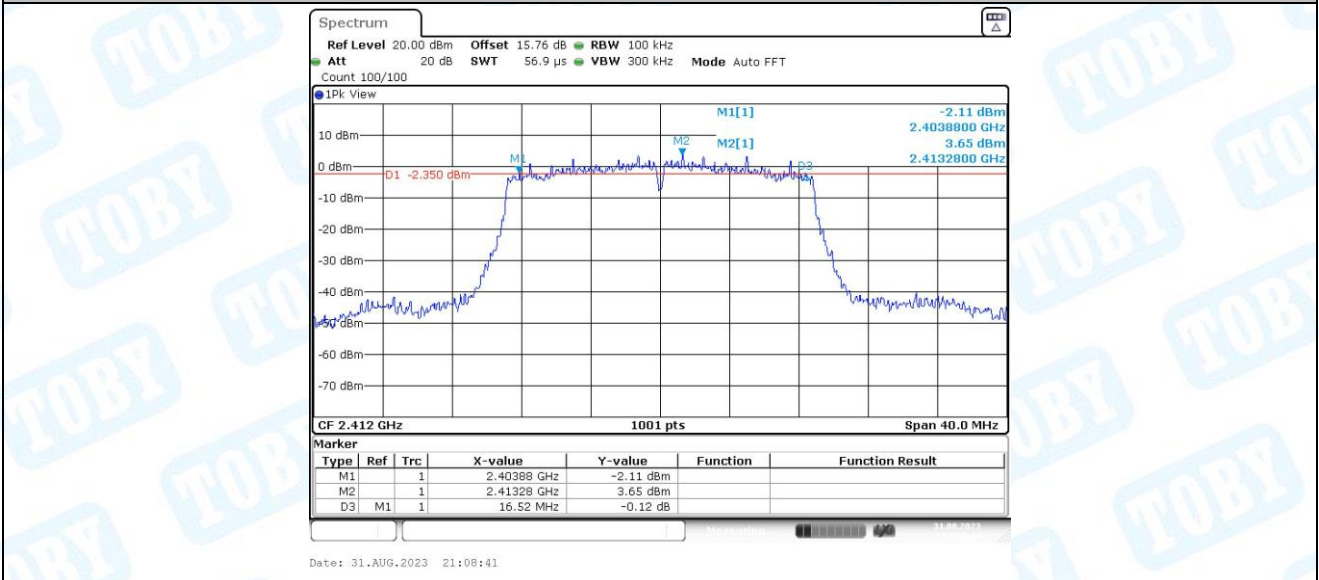
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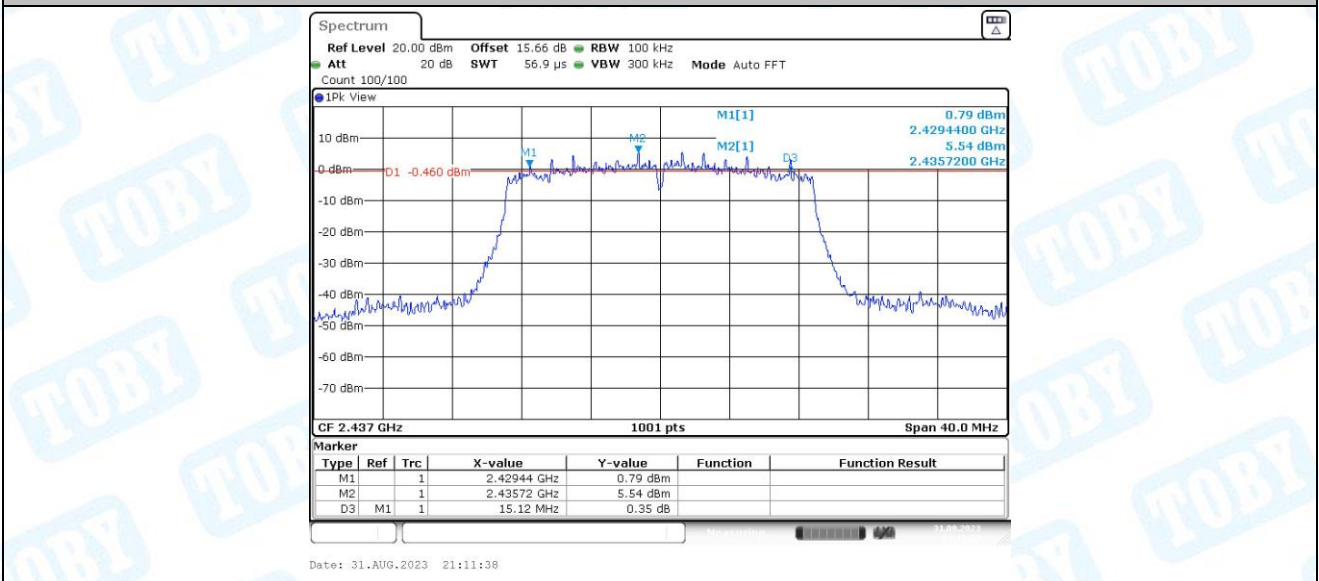
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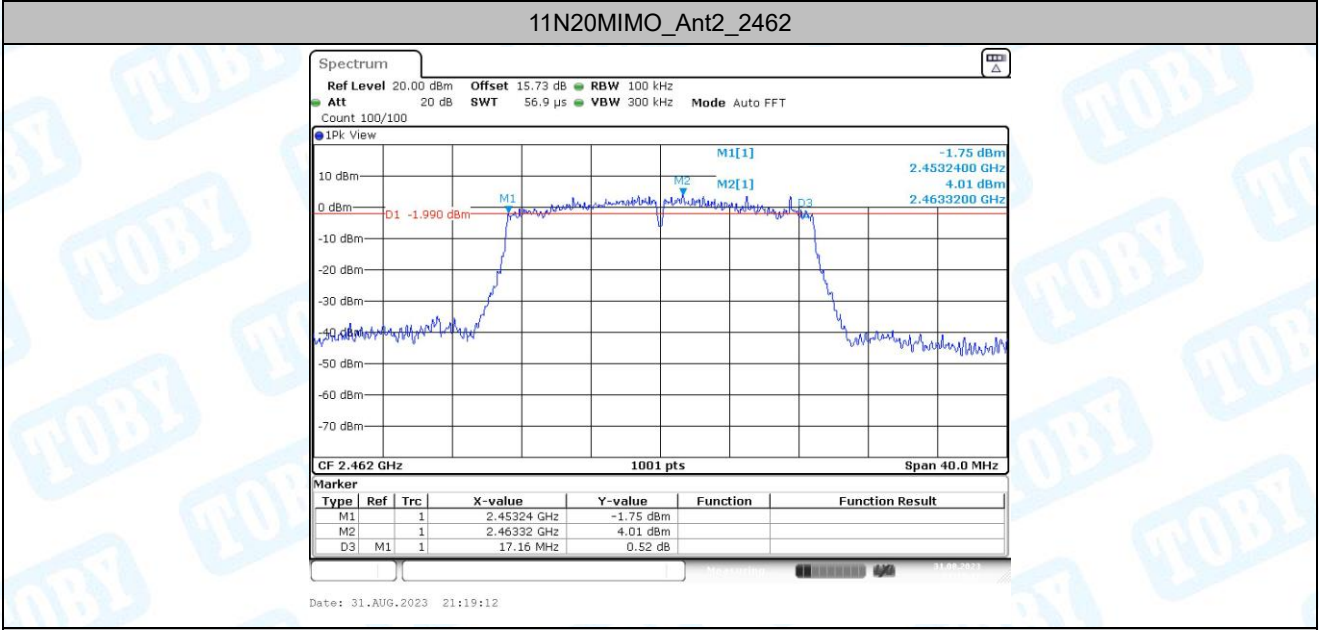
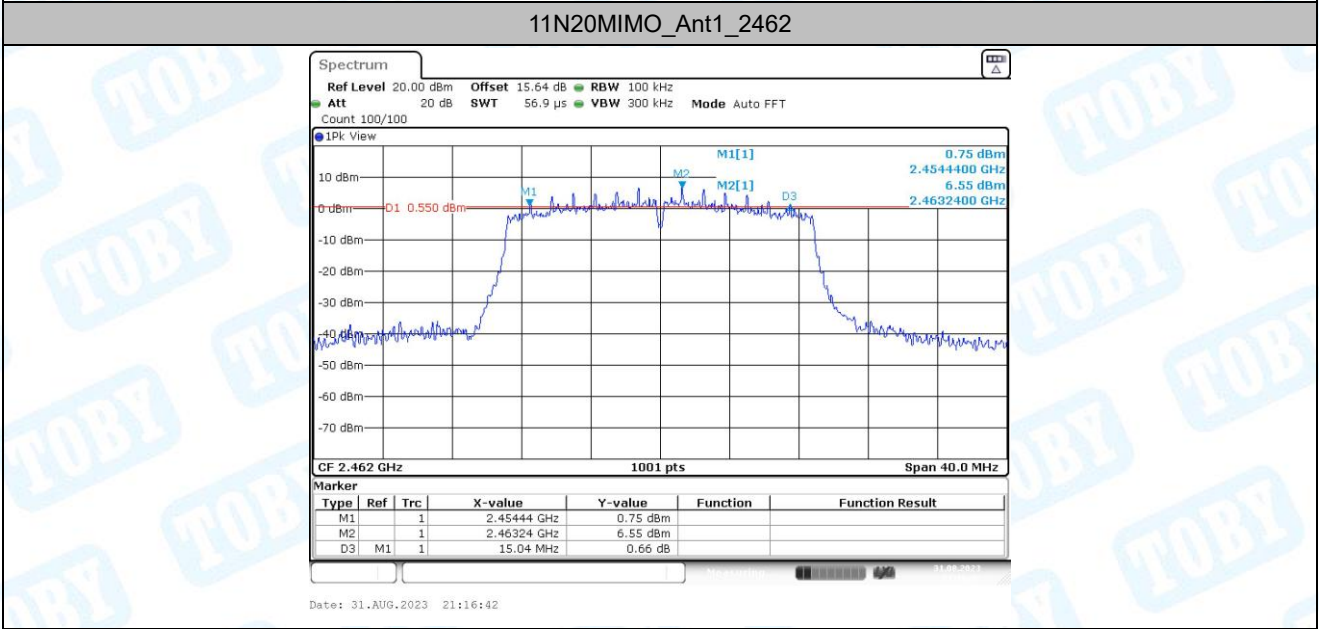
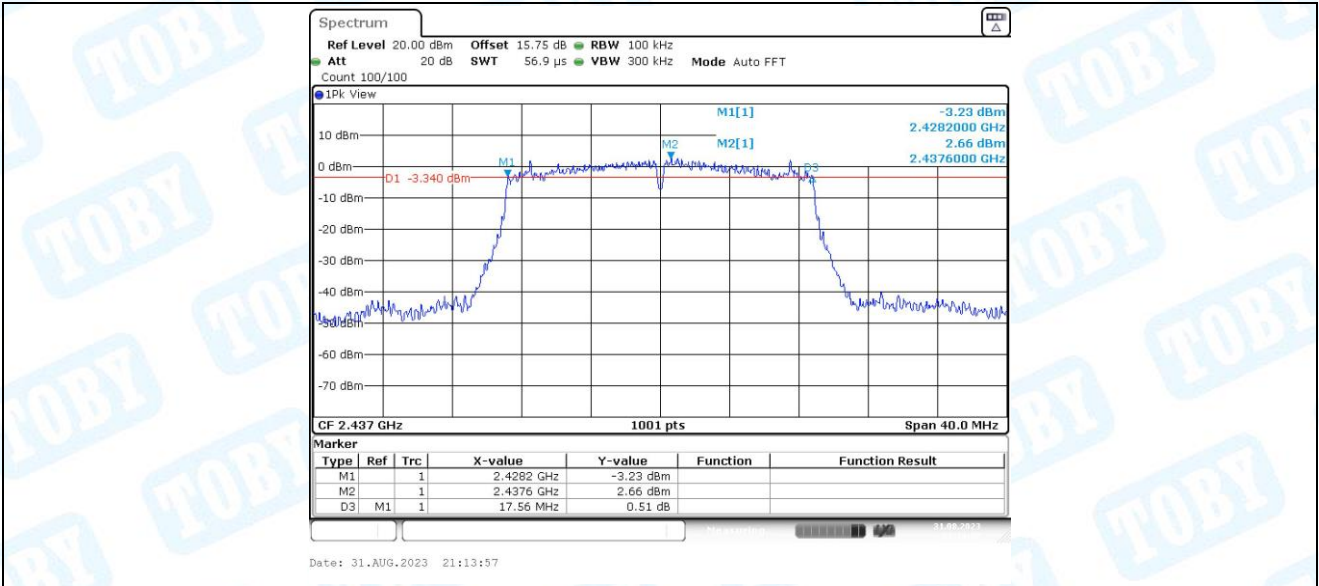
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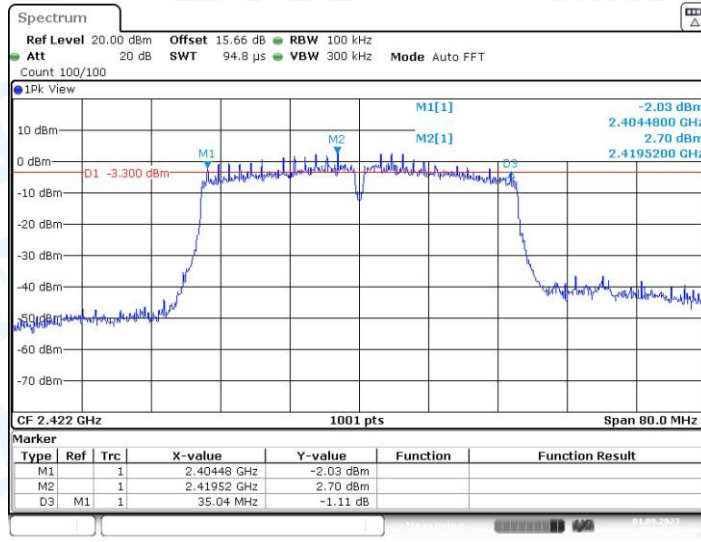


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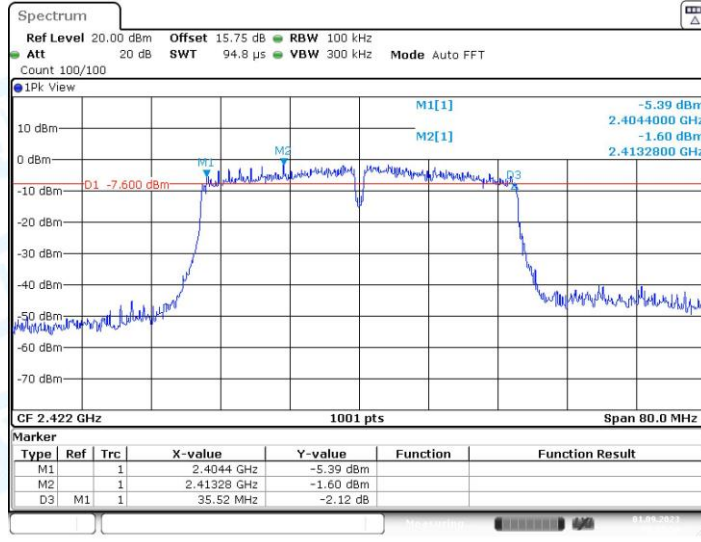
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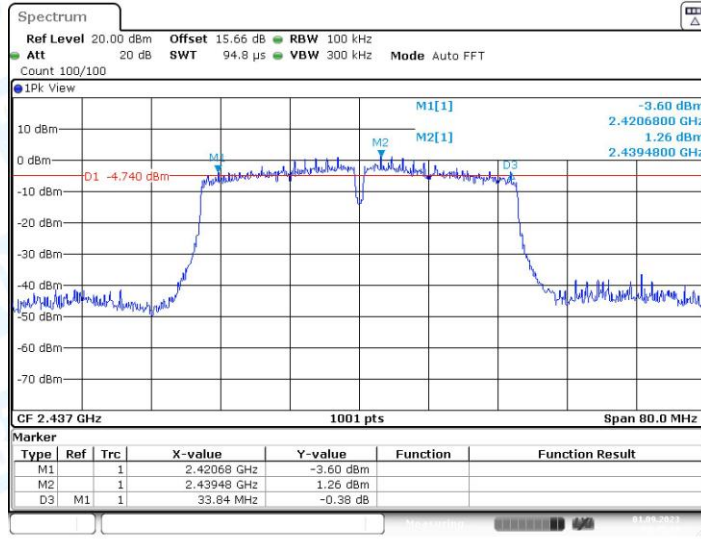
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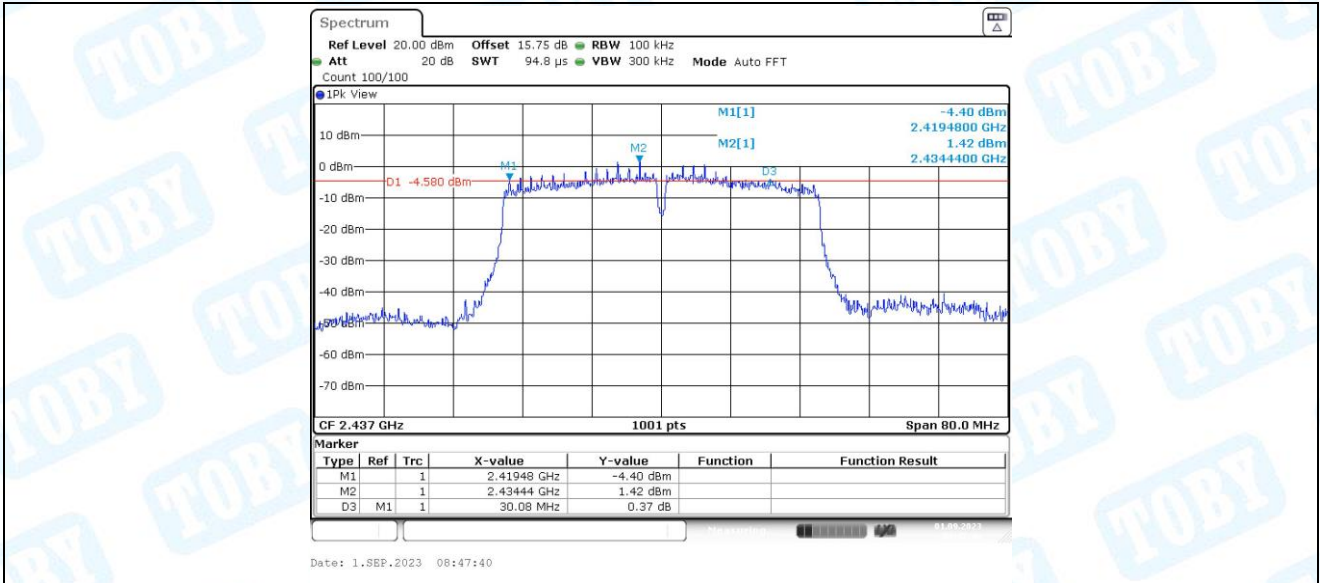
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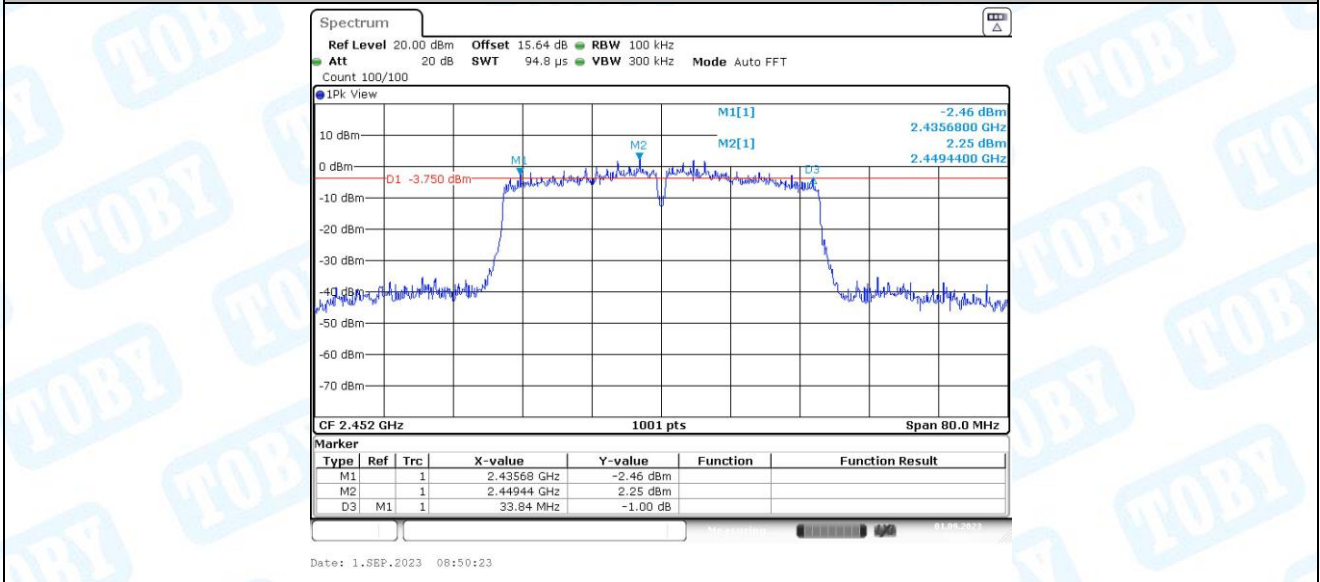


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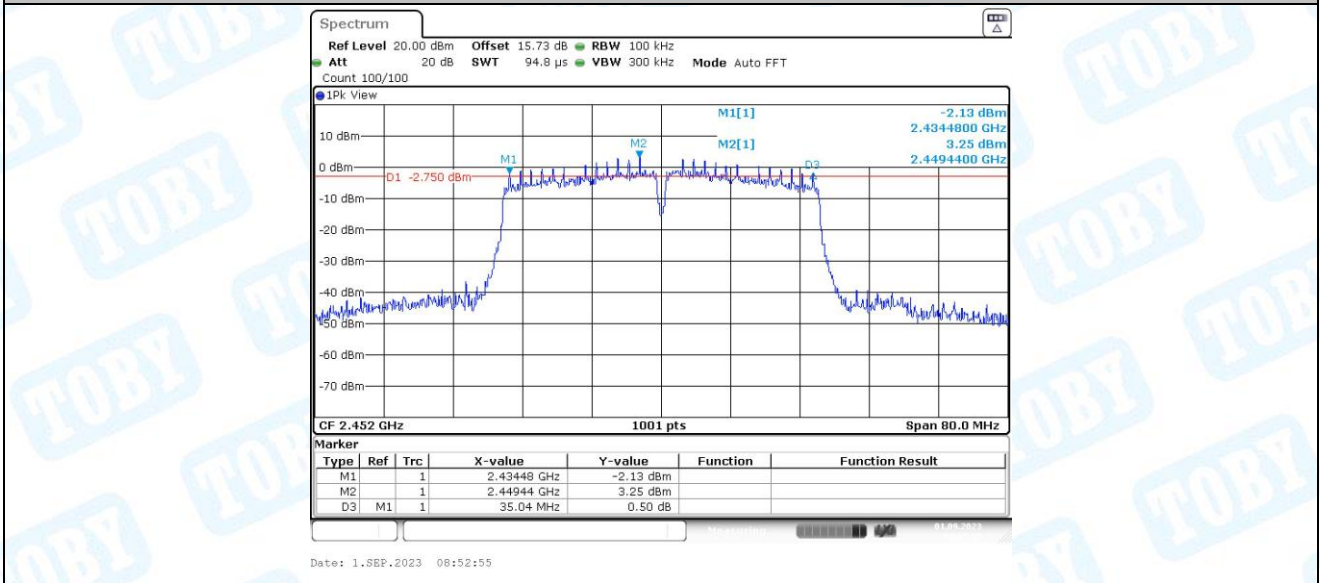
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11N40MIMO_Ant1_2452



11N40MIMO_Ant2_2452

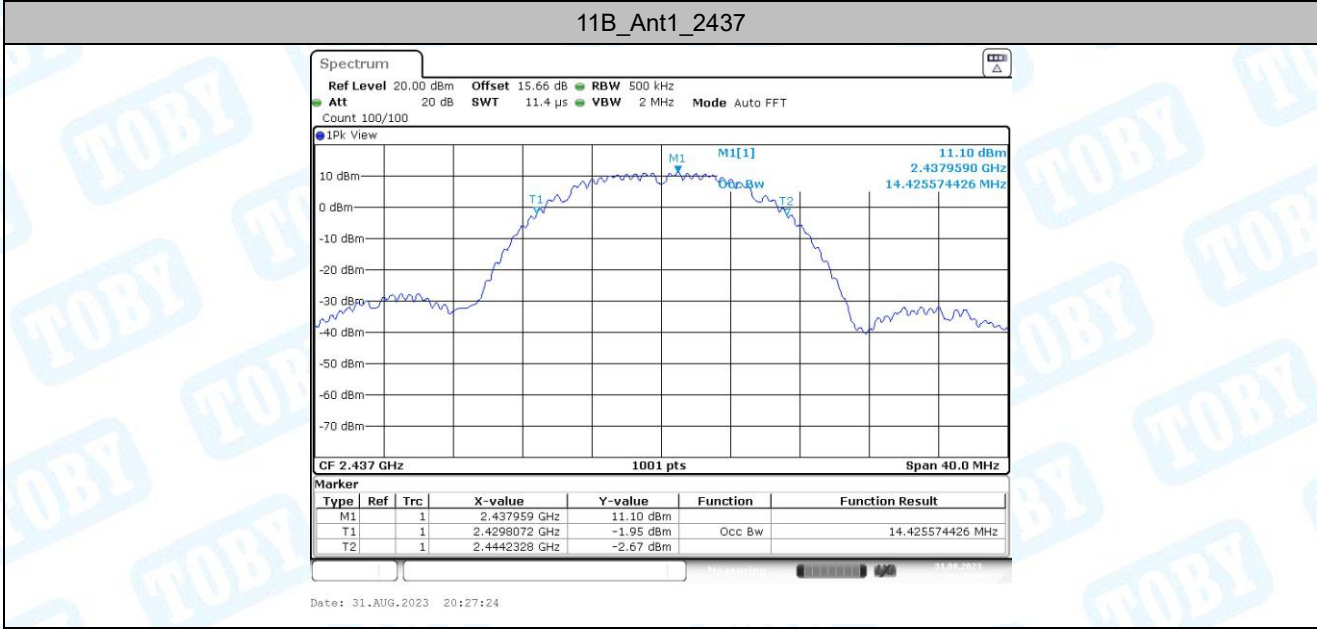
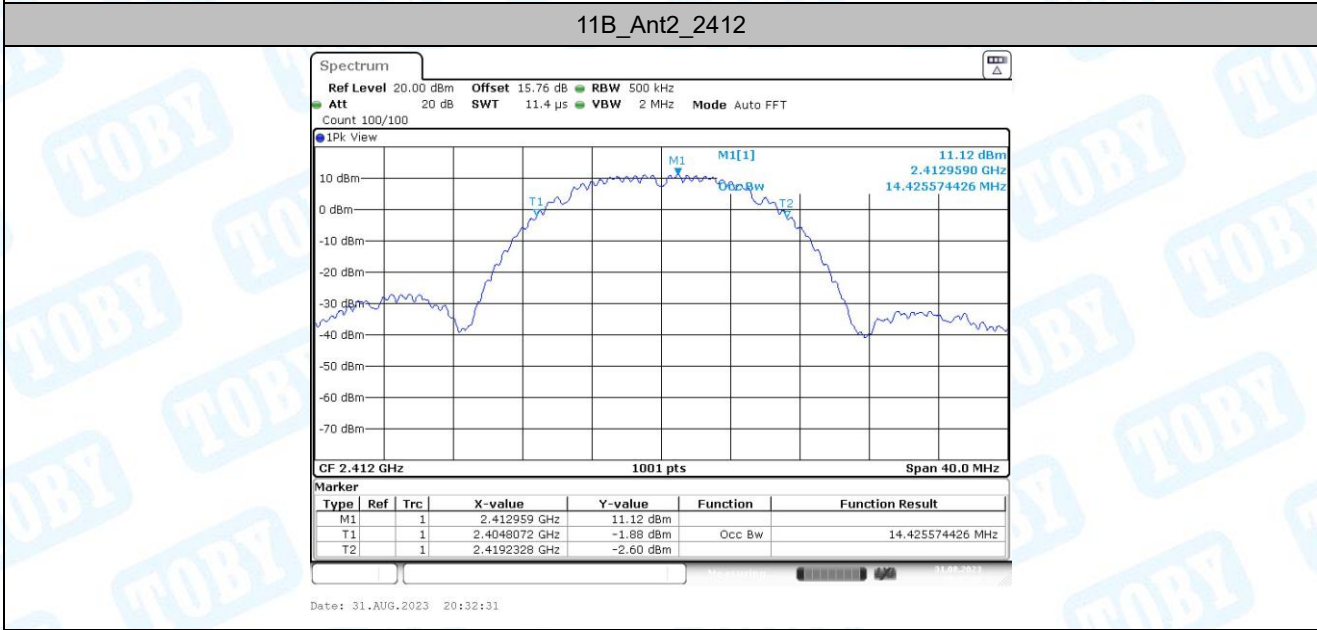
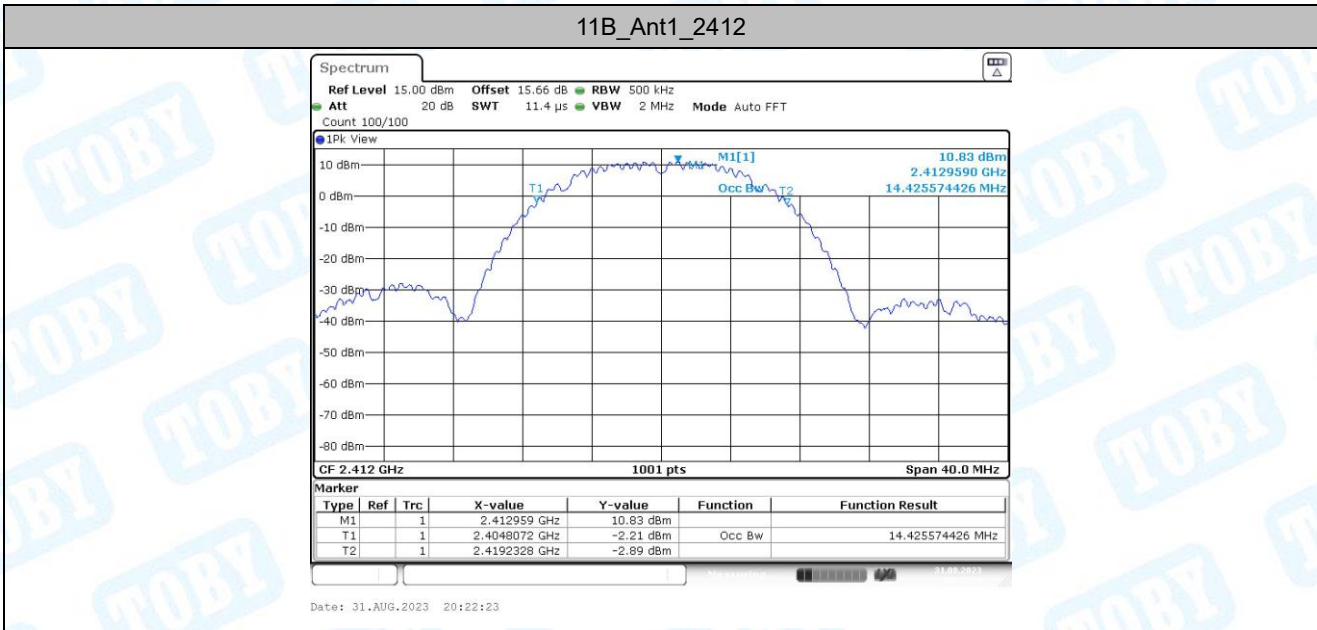


2. Occupied Channel Bandwidth

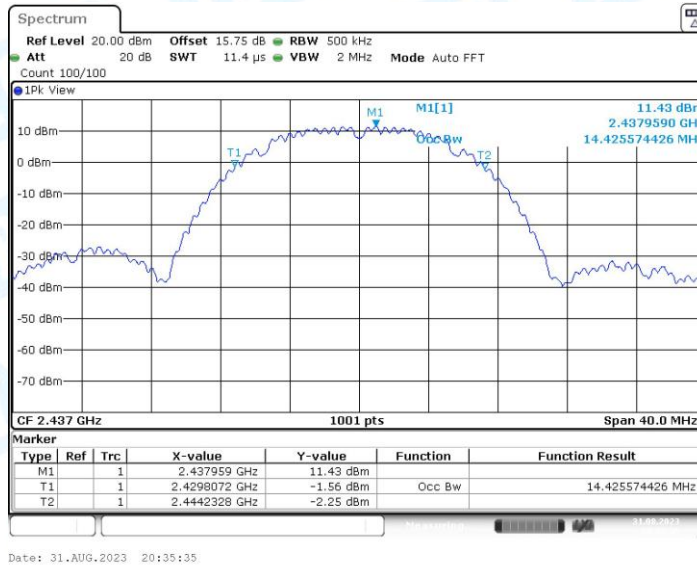
2.1. Test Result

TestMode	Antenna	Channel	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	14.426	2404.8072	2419.2328	---	---
	Ant2	2412	14.426	2404.8072	2419.2328	---	---
	Ant1	2437	14.426	2429.8072	2444.2328	---	---
	Ant2	2437	14.426	2429.8072	2444.2328	---	---
	Ant1	2462	14.545	2454.6873	2469.2328	---	---
	Ant2	2462	14.426	2454.8072	2469.2328	---	---
11G	Ant1	2412	16.304	2403.8482	2420.1518	---	---
	Ant2	2412	16.384	2403.8082	2420.1918	---	---
	Ant1	2437	16.384	2428.8482	2445.2318	---	---
	Ant2	2437	16.384	2428.8482	2445.2318	---	---
	Ant1	2462	16.384	2453.8082	2470.1918	---	---
	Ant2	2462	16.384	2453.8082	2470.1918	---	---
11N20MIMO	Ant1	2412	17.502	2403.2488	2420.7512	---	---
	Ant2	2412	17.463	2403.2887	2420.7512	---	---
	Ant1	2437	17.502	2428.2488	2445.7512	---	---
	Ant2	2437	17.502	2428.2488	2445.7512	---	---
	Ant1	2462	17.502	2453.2488	2470.7512	---	---
	Ant2	2462	17.502	2453.2088	2470.7113	---	---
11N40MIMO	Ant1	2422	35.804	2404.0979	2439.9021	---	---
	Ant2	2422	35.804	2404.0979	2439.9021	---	---
	Ant1	2437	35.804	2419.0979	2454.9021	---	---
	Ant2	2437	35.884	2419.0180	2454.9021	---	---
	Ant1	2452	35.724	2434.0979	2469.8222	---	---
	Ant2	2452	35.724	2434.0979	2469.8222	---	---

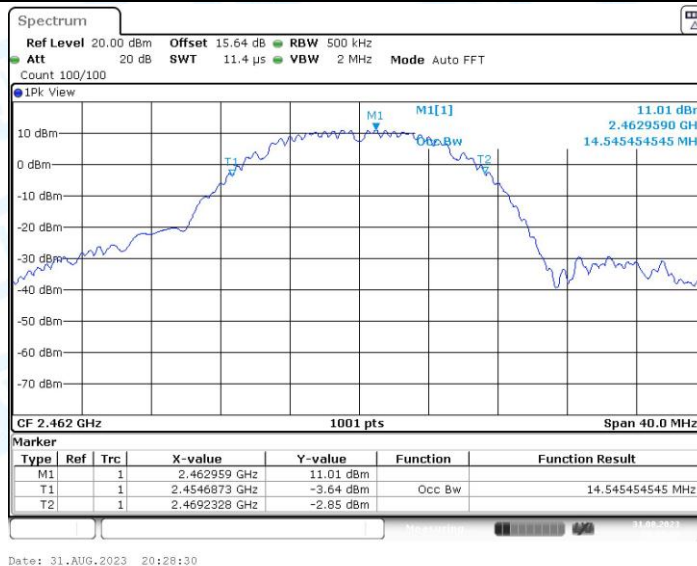
2.2. Test Graphs



11B_Ant2_2437



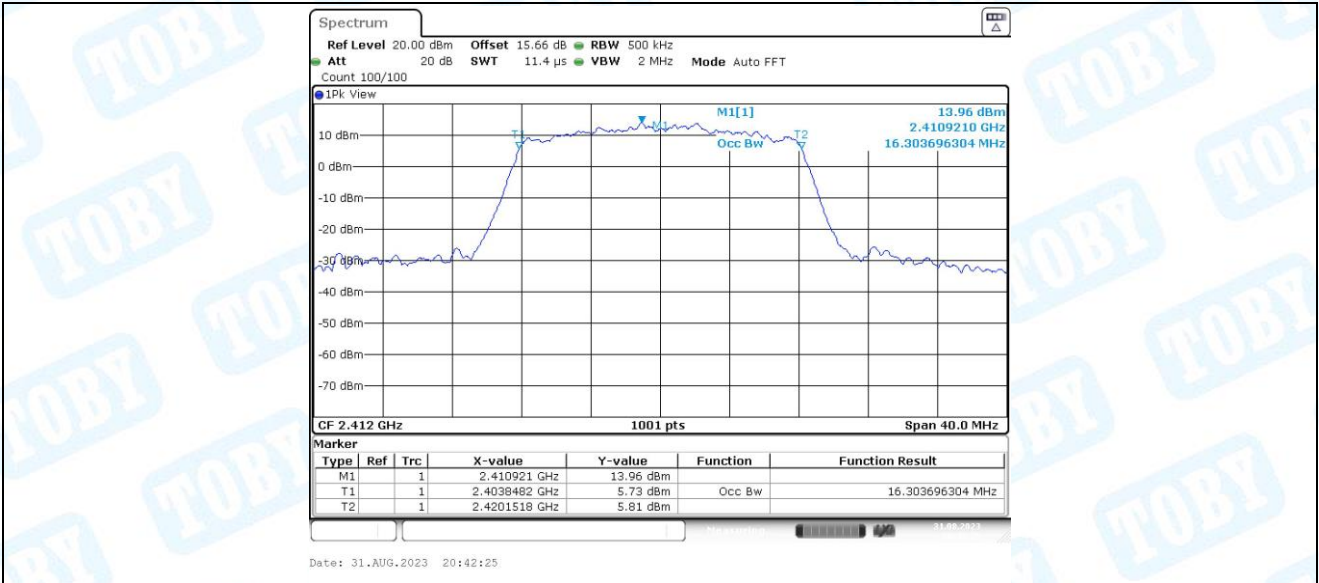
11B_Ant1_2462



11B_Ant2_2462



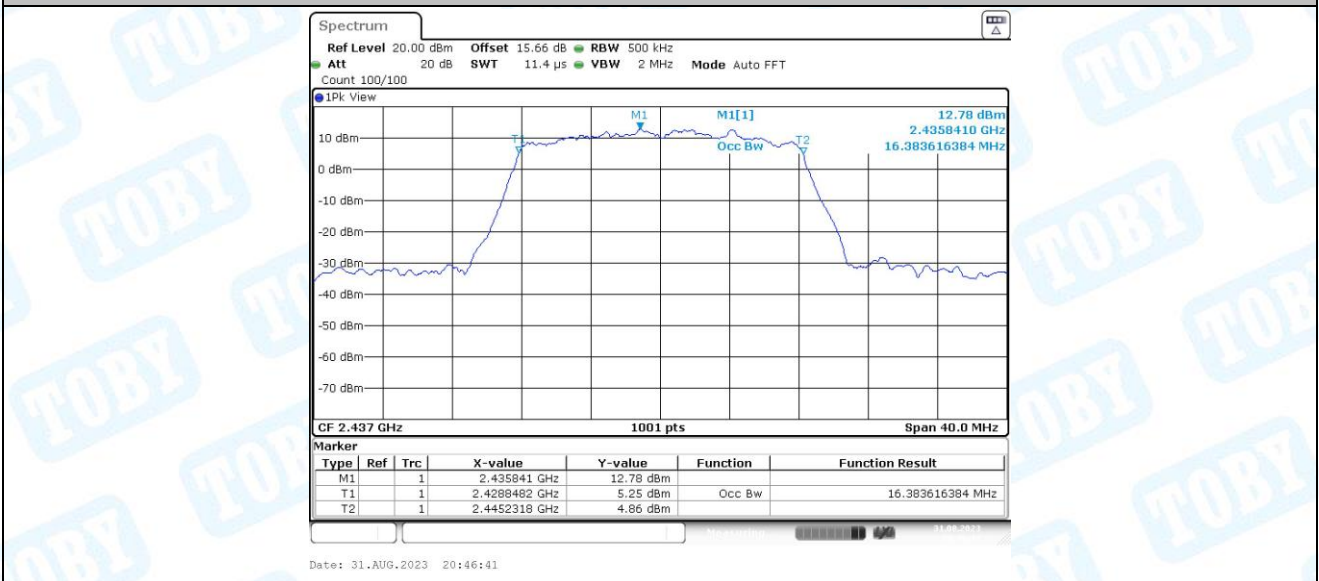
11G_Ant1_2412



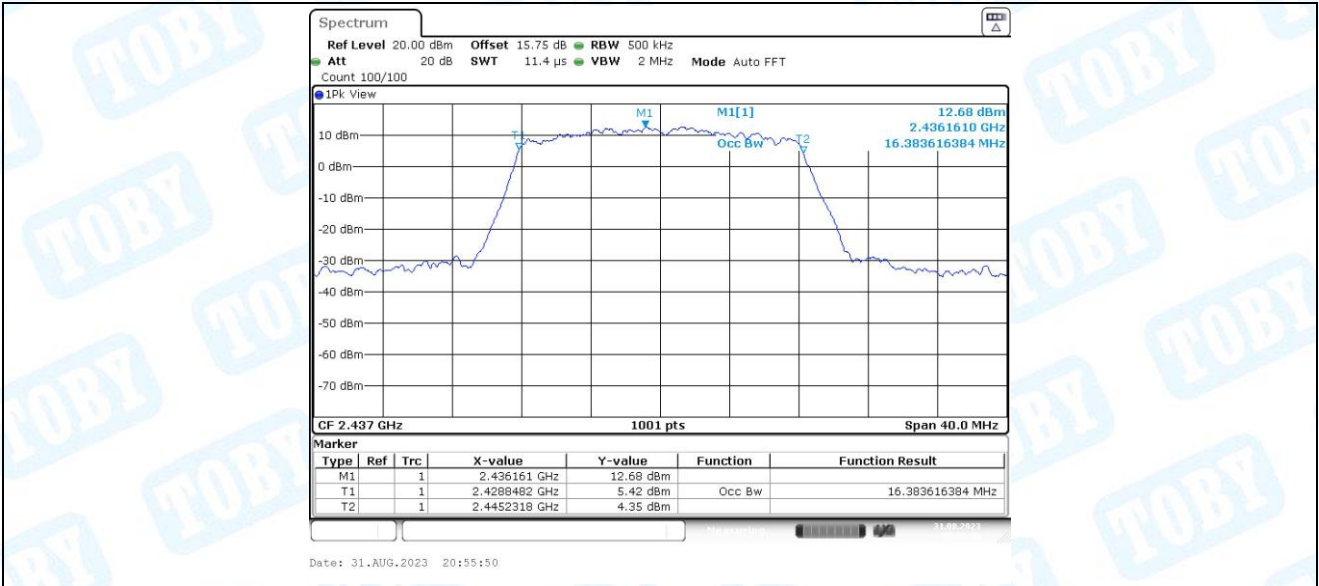
11G_Ant2_2412



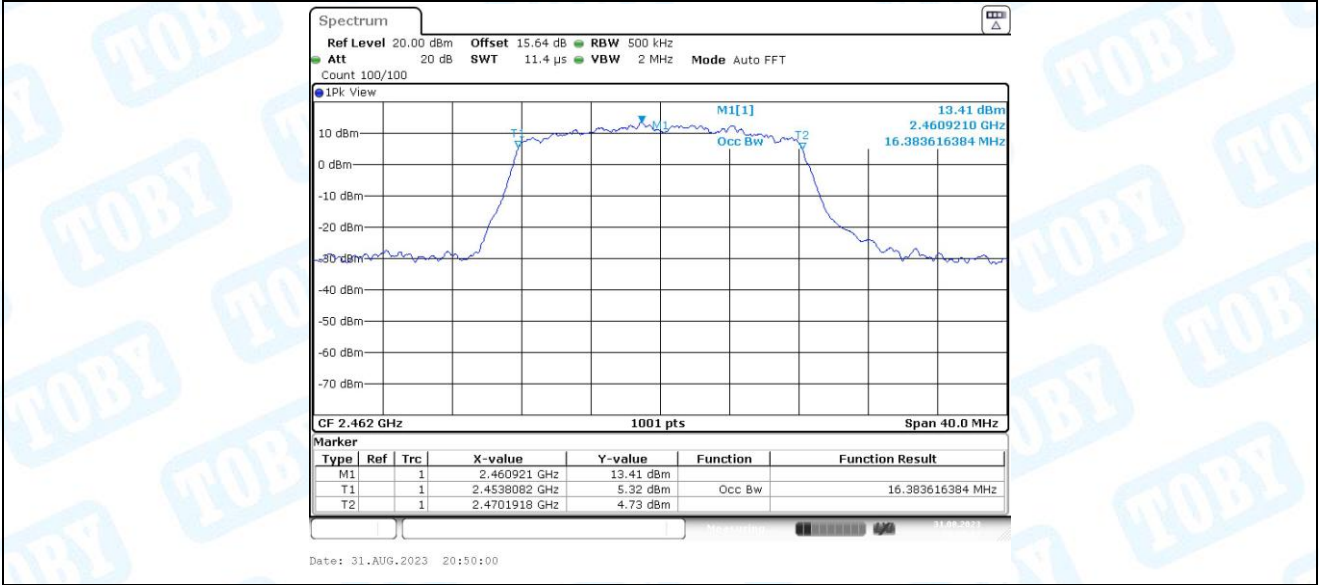
11G_Ant1_2437



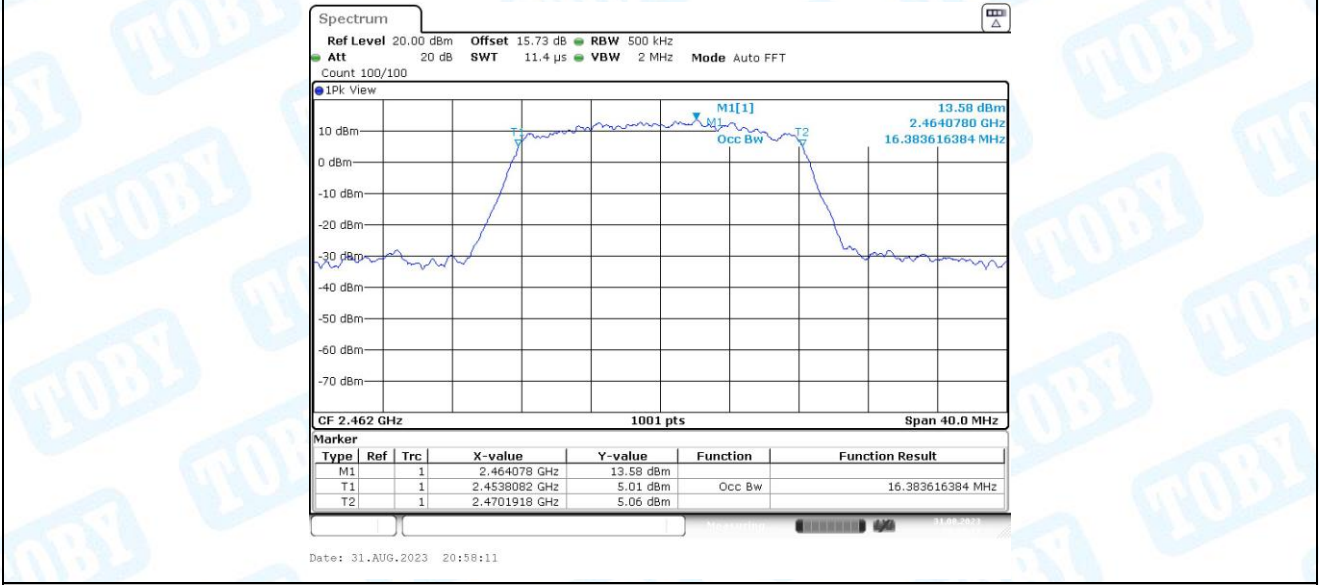
11G_Ant2_2437



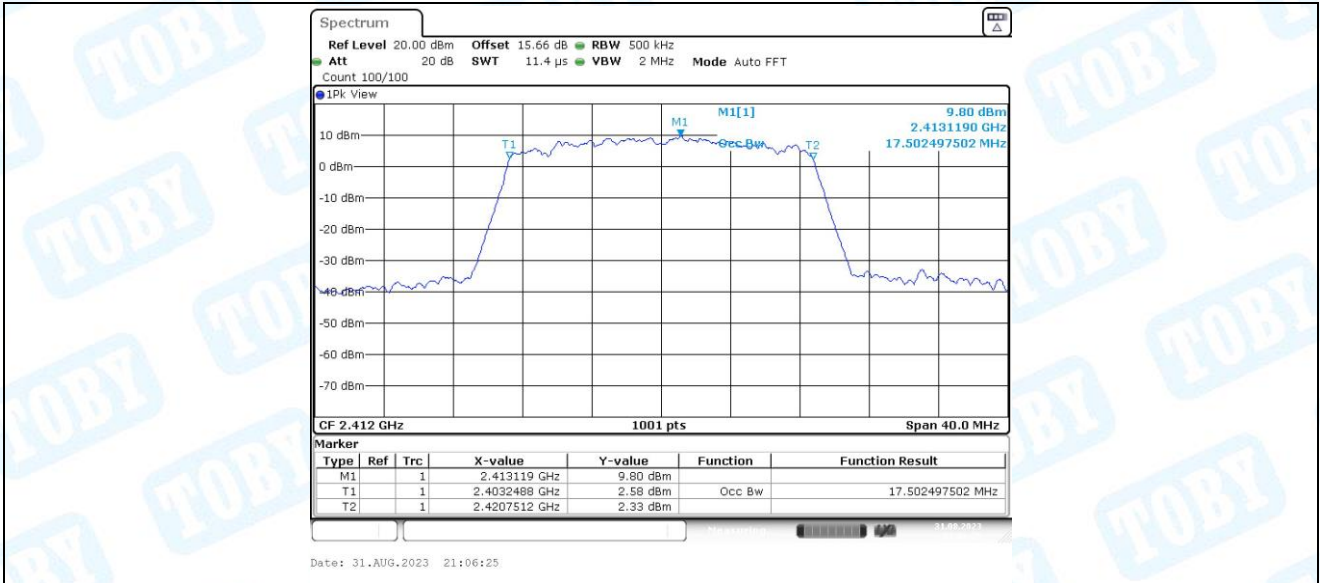
11G_Ant1_2462



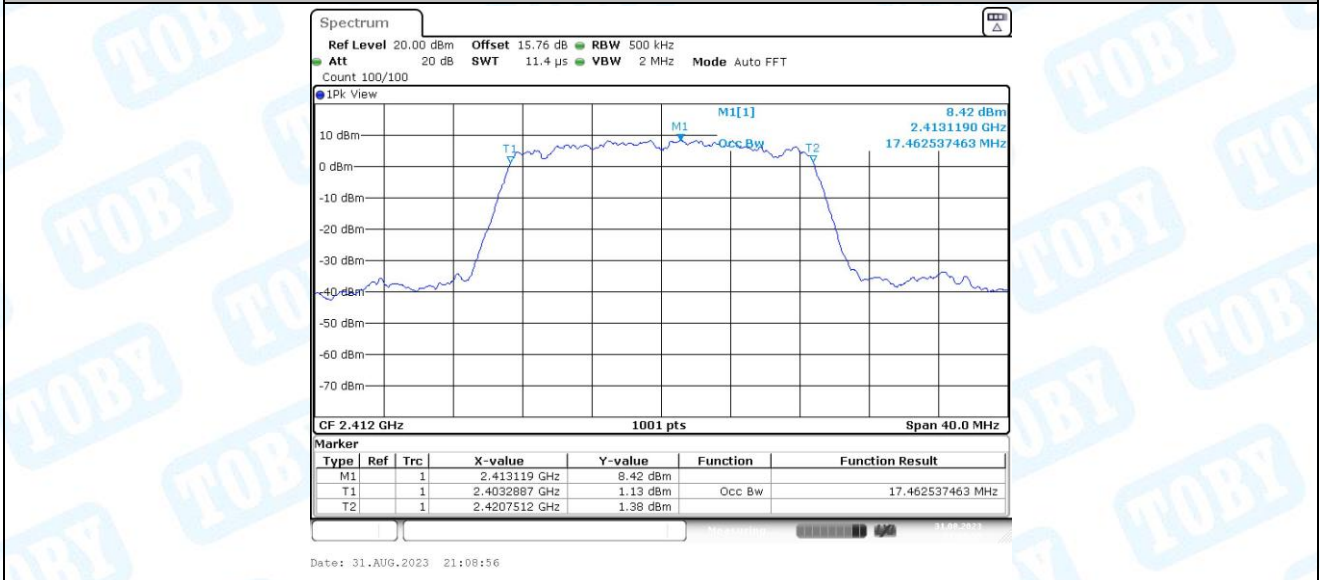
11G_Ant2_2462



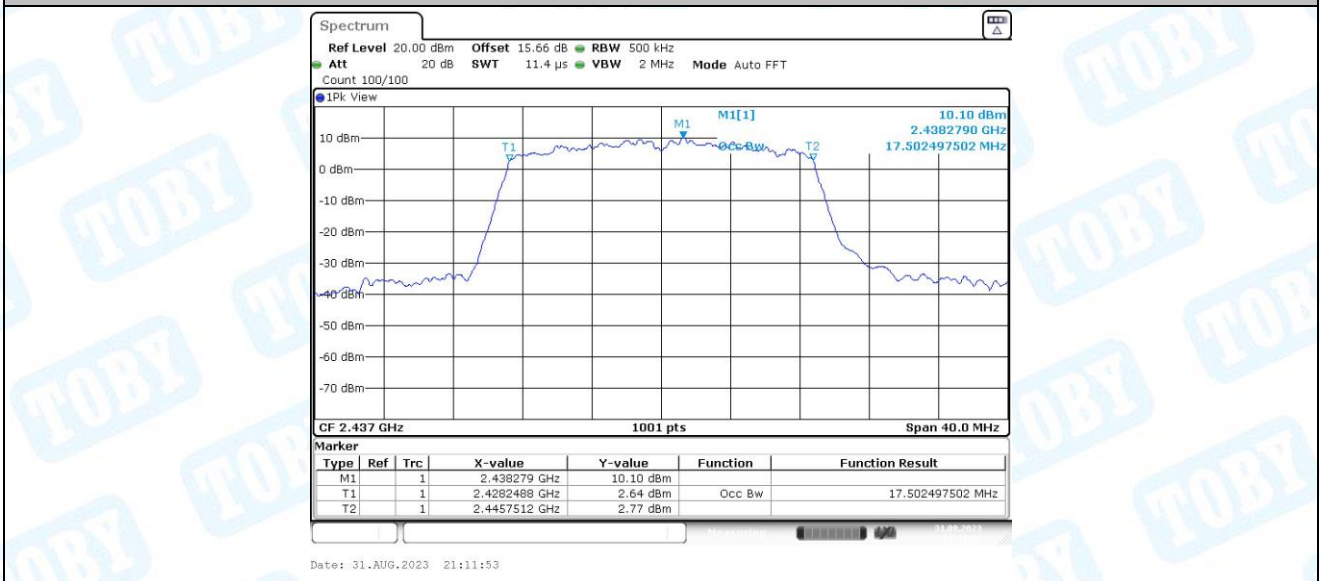
11N20MIMO_Ant1_2412



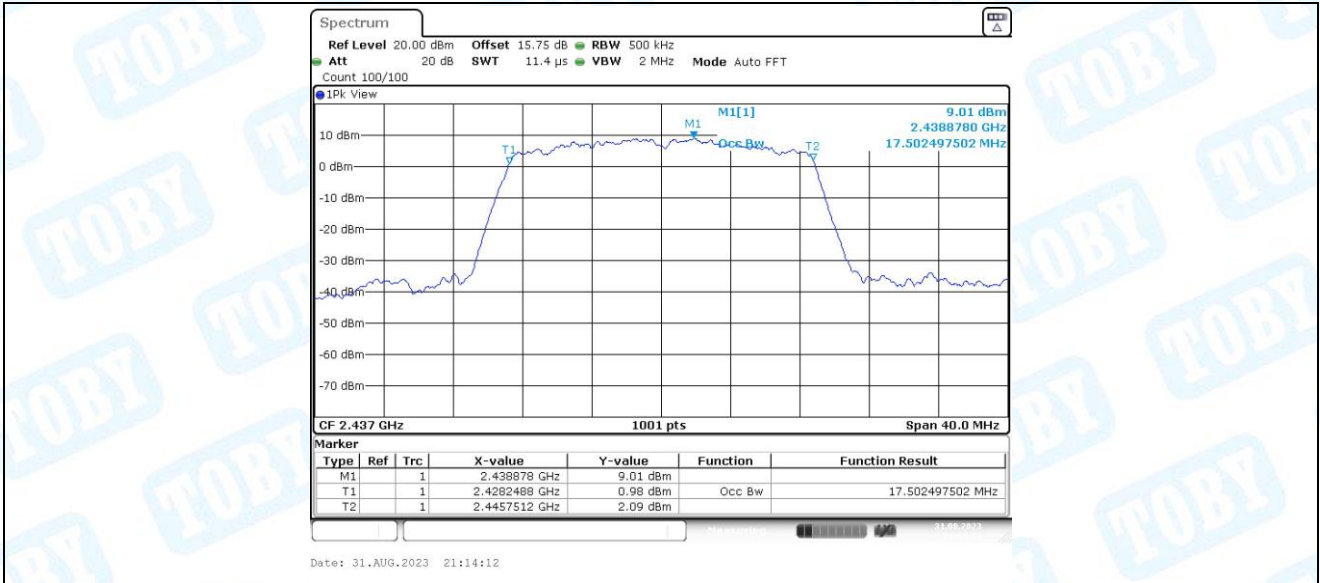
11N20MIMO_Ant2_2412



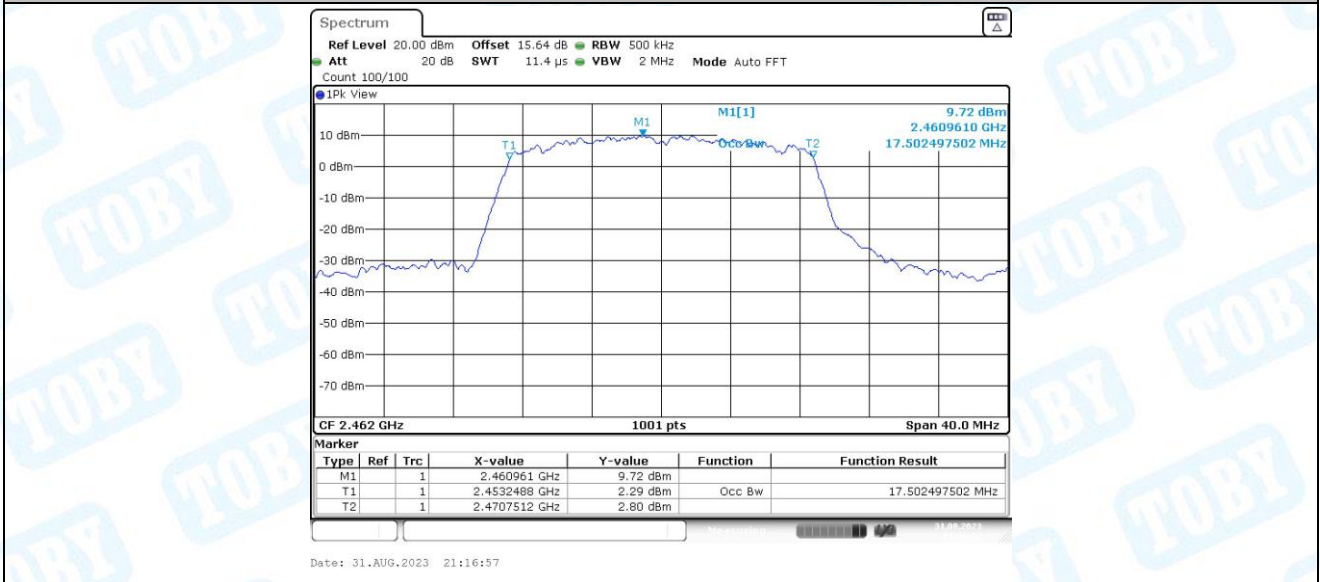
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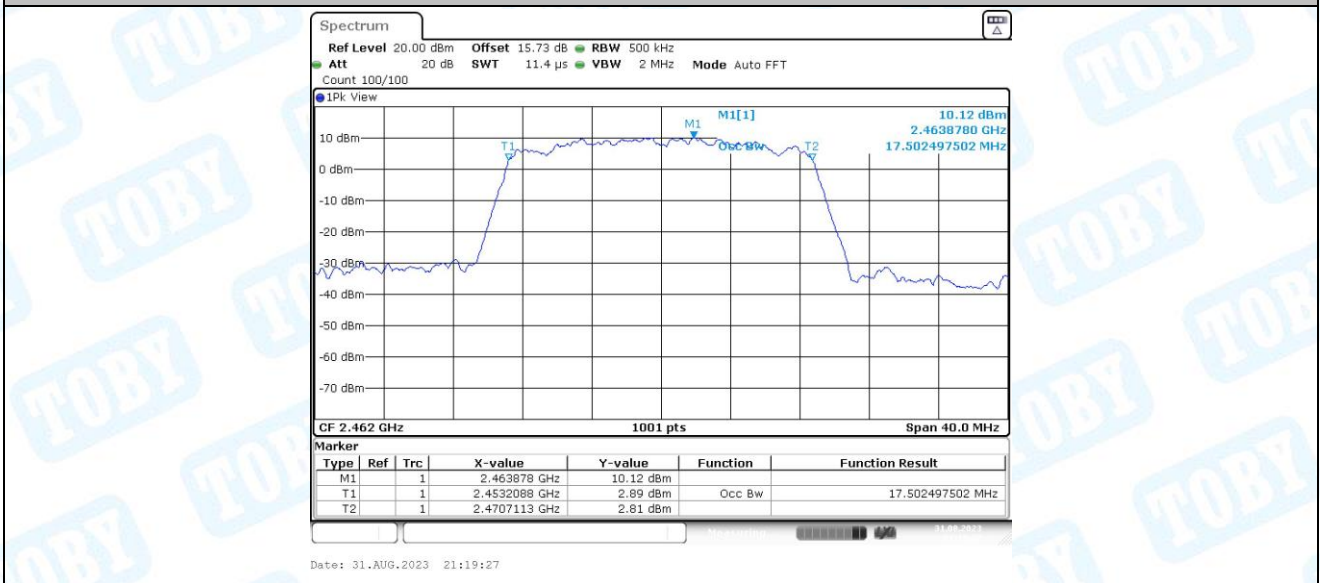
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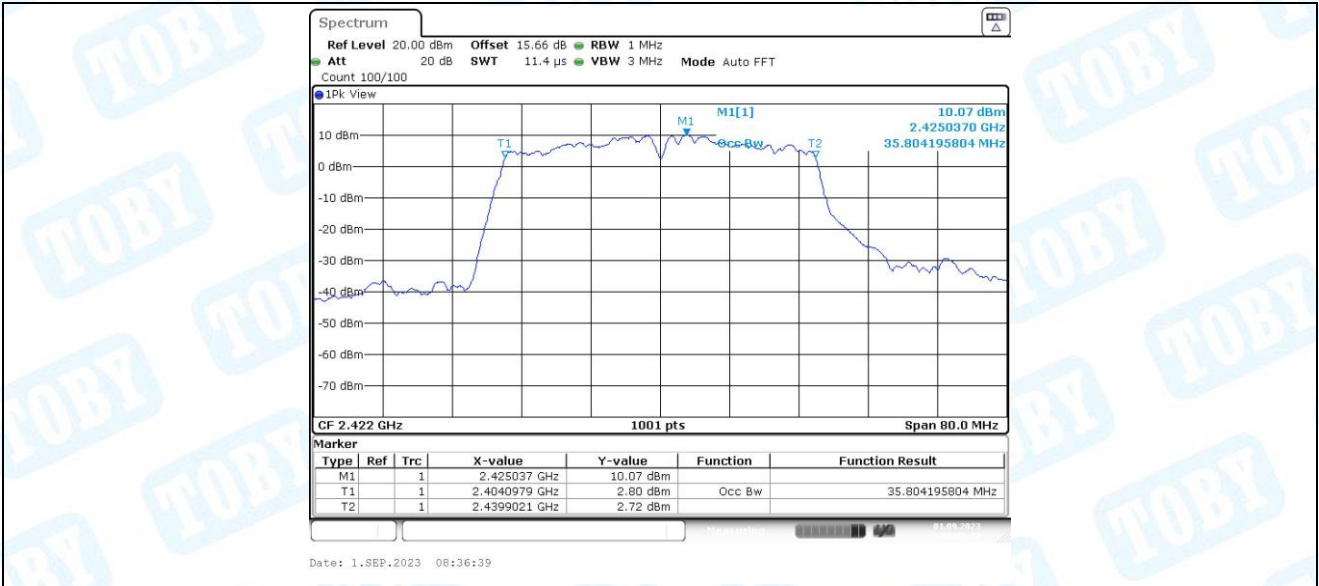
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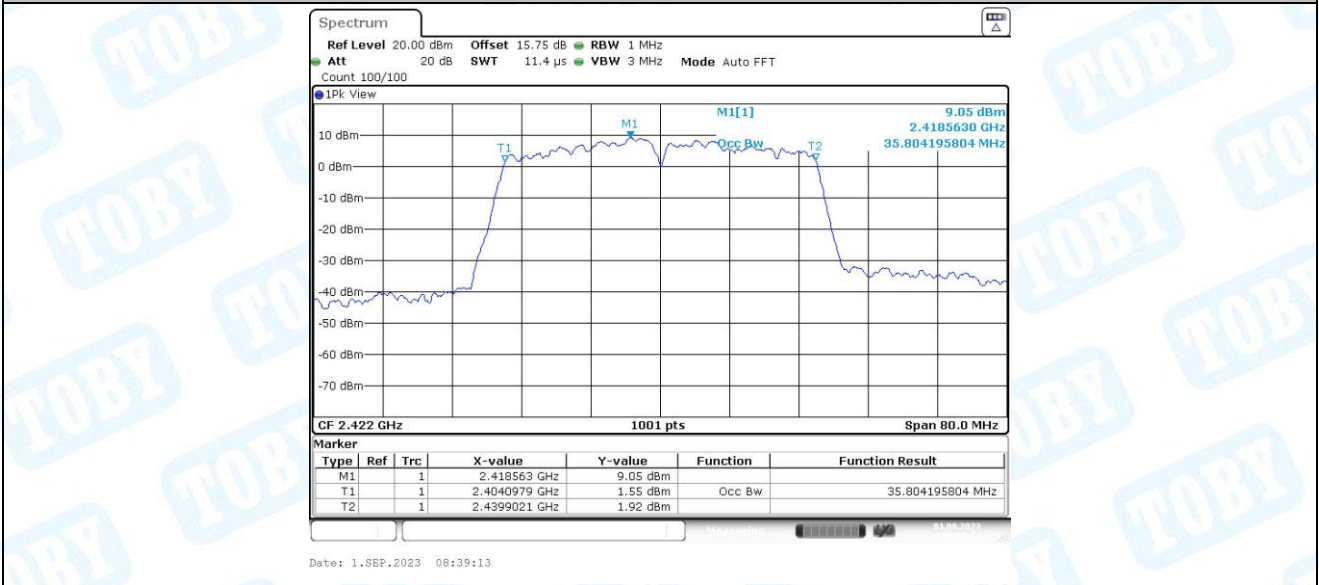
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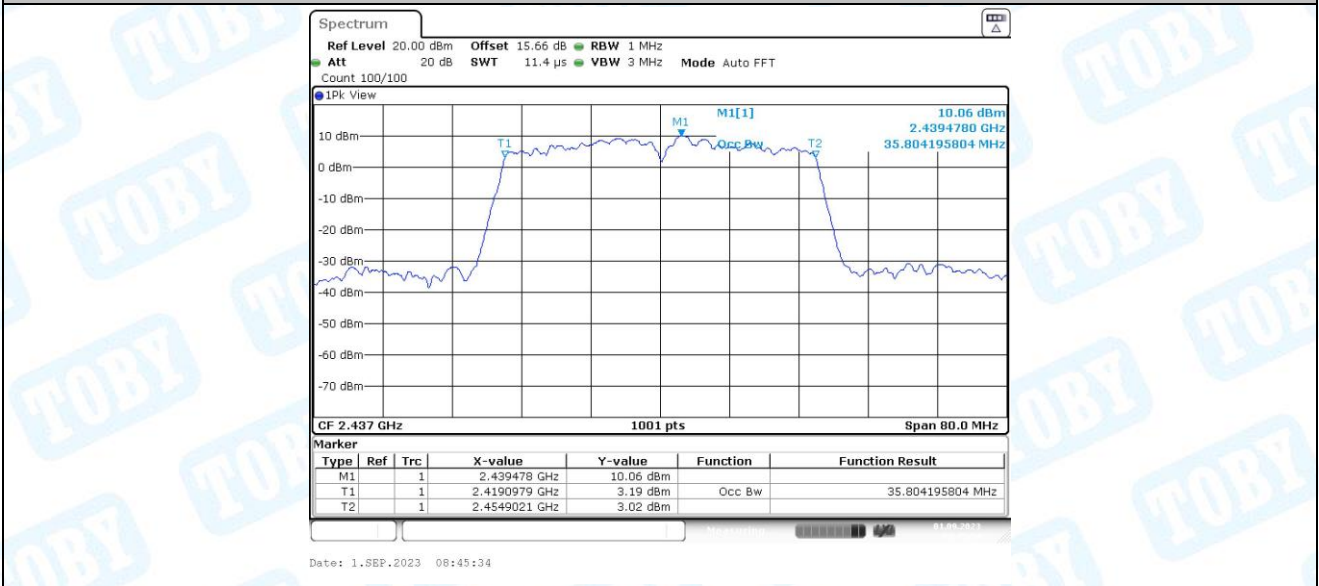
11N40MIMO_Ant1_2422



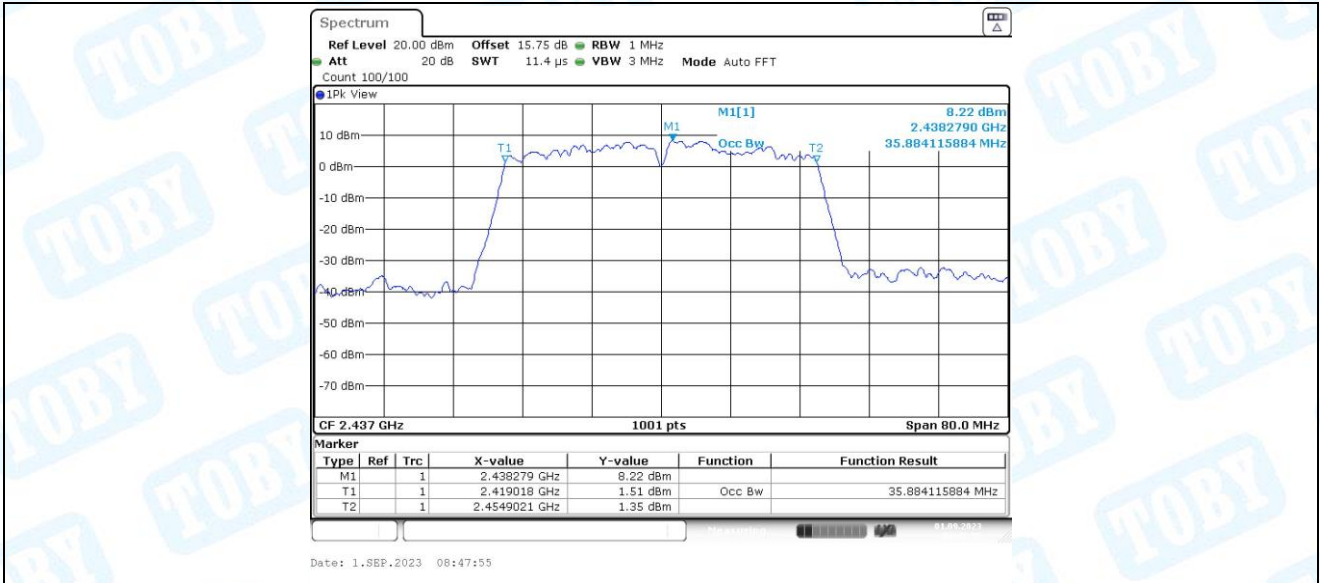
11N40MIMO_Ant2_2422



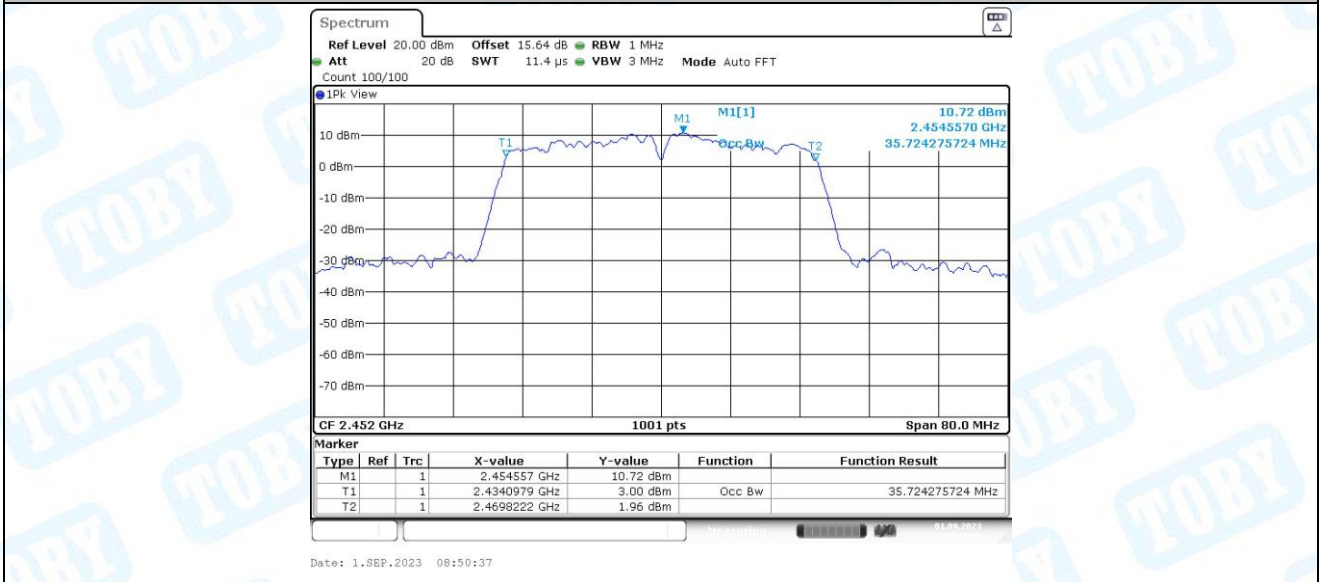
11N40MIMO_Ant1_2437



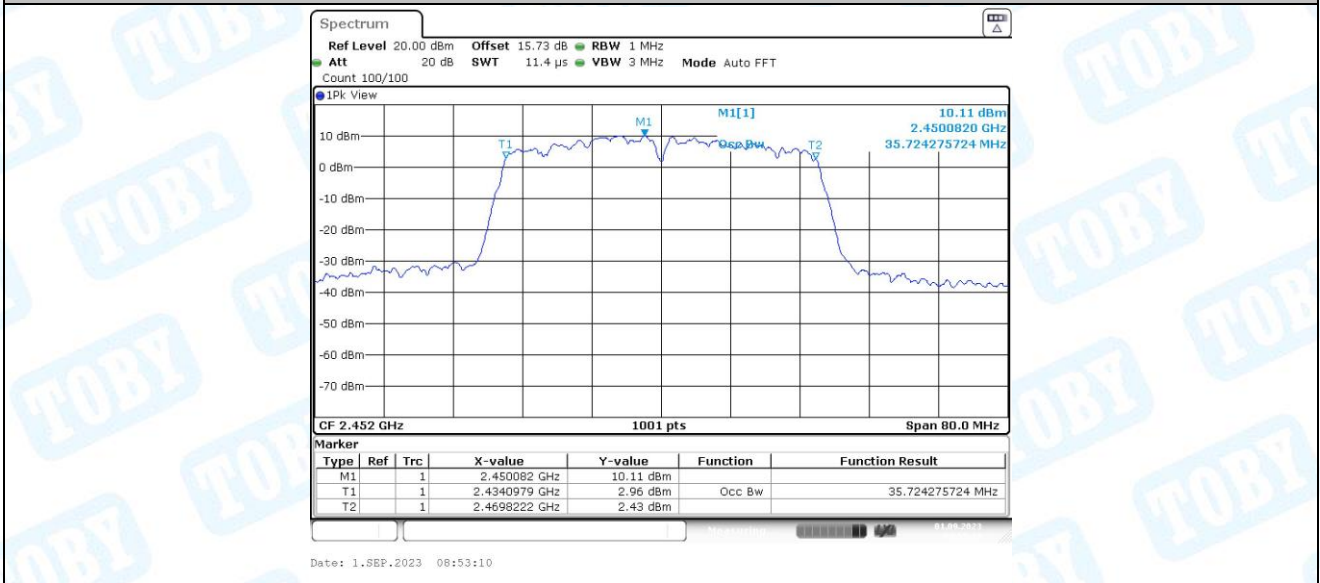
11N40MIMO_Ant2_2437



11N40MIMO_Ant1_2452



11N40MIMO_Ant2_2452



3. Maximum conducted output power

3.1. Test Result

TestMode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
11B	Ant1	2412	20.39	≤30.00	PASS
	Ant2	2412	19.78	≤30.00	PASS
	Ant1	2437	20.60	≤30.00	PASS
	Ant2	2437	20.06	≤30.00	PASS
	Ant1	2462	20.51	≤30.00	PASS
	Ant2	2462	19.93	≤30.00	PASS
11G	Ant1	2412	20.09	≤30.00	PASS
	Ant2	2412	18.63	≤30.00	PASS
	Ant1	2437	19.74	≤30.00	PASS
	Ant2	2437	18.60	≤30.00	PASS
	Ant1	2462	19.59	≤30.00	PASS
	Ant2	2462	18.81	≤30.00	PASS
11N20MIMO	Ant1	2412	16.84	≤30.00	PASS
	Ant2	2412	15.15	≤30.00	PASS
	total	2412	19.09	≤27.99	PASS
	Ant1	2437	16.82	≤30.00	PASS
	Ant2	2437	15.61	≤30.00	PASS
	total	2437	19.27	≤27.99	PASS
	Ant1	2462	17.25	≤30.00	PASS
	Ant2	2462	16.51	≤30.00	PASS
total	2462	19.91	≤27.99	PASS	
11N40MIMO	Ant1	2422	17.08	≤30.00	PASS
	Ant2	2422	15.16	≤30.00	PASS
	total	2422	19.24	≤27.99	PASS
	Ant1	2437	16.99	≤30.00	PASS
	Ant2	2437	15.07	≤30.00	PASS
	total	2437	19.15	≤27.99	PASS
	Ant1	2452	17.50	≤30.00	PASS
	Ant2	2452	16.56	≤30.00	PASS
total	2452	20.07	≤27.99	PASS	

Note: The EUT incorporates a MIMO function. Physically, the EUT provides two antennas for transmitting and receiving.
 When ANT.1(5dBi) and ANT. 2(5dBi) transmitting simultaneously, so the Directional Gain= 8.01dBi > 6dBi.
 So Pout = Plimit-(G_{TX}-6)=(30-2.01)dBm =27.99dBm

Directional Gain=ANT. Gain+10*LOG(NANT)

4. Maximum power spectral density

4.1. Test Result

TestMode	Antenna	Channel	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
11B	Ant1	2412	-11.62	≤8.00	PASS
	Ant2	2412	-10.66	≤8.00	PASS
	Ant1	2437	-11.66	≤8.00	PASS
	Ant2	2437	-11.02	≤8.00	PASS
	Ant1	2462	-11.58	≤8.00	PASS
	Ant2	2462	-10.83	≤8.00	PASS
11G	Ant1	2412	-10.58	≤8.00	PASS
	Ant2	2412	-10.89	≤8.00	PASS
	Ant1	2437	-10.22	≤8.00	PASS
	Ant2	2437	-10.72	≤8.00	PASS
	Ant1	2462	-10.69	≤8.00	PASS
	Ant2	2462	-10.58	≤8.00	PASS
11N20MIMO	Ant1	2412	-13.3	≤8.00	PASS
	Ant2	2412	-14.39	≤8.00	PASS
	total	2412	-10.80	≤5.99	PASS
	Ant1	2437	-13.01	≤8.00	PASS
	Ant2	2437	-12.85	≤8.00	PASS
	total	2437	-9.92	≤5.99	PASS
	Ant1	2462	-13.11	≤8.00	PASS
	Ant2	2462	-12.33	≤8.00	PASS
total	2462	-9.69	≤5.99	PASS	
11N40MIMO	Ant1	2422	-15.37	≤8.00	PASS
	Ant2	2422	-16.37	≤8.00	PASS
	total	2422	-12.83	≤5.99	PASS
	Ant1	2437	-16.34	≤8.00	PASS
	Ant2	2437	-16.91	≤8.00	PASS
	total	2437	-13.61	≤5.99	PASS
	Ant1	2452	-15.88	≤8.00	PASS
	Ant2	2452	-15.42	≤8.00	PASS
total	2452	-12.63	≤5.99	PASS	

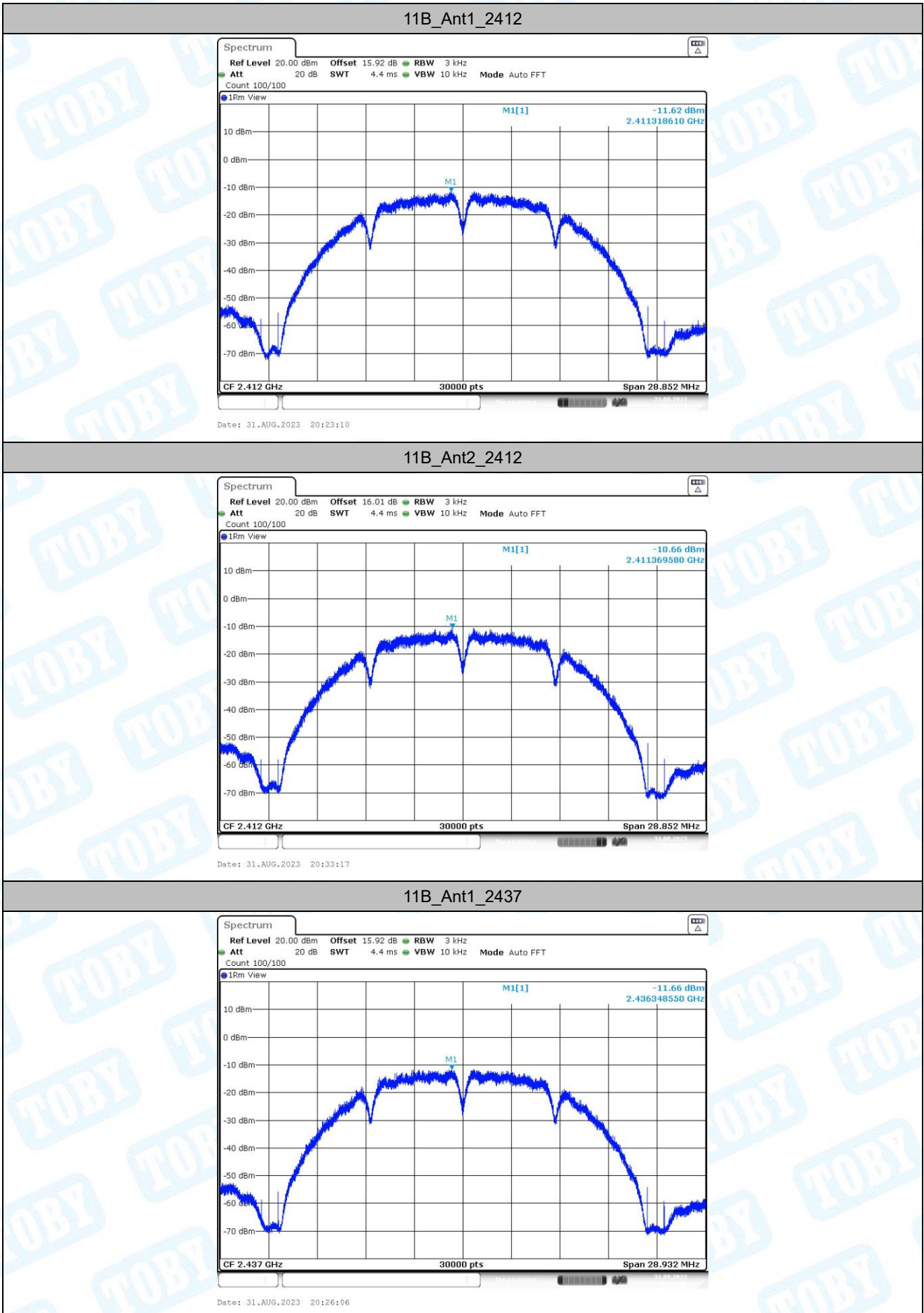
Note: The EUT incorporates a MIMO function. Physically, the EUT provides two antennas for transmitting and receiving.

When ANT.1(5dBi) and ANT. 2(5dBi) transmitting simultaneously, so the Directional Gain= 8.01dBi > 6dBi.

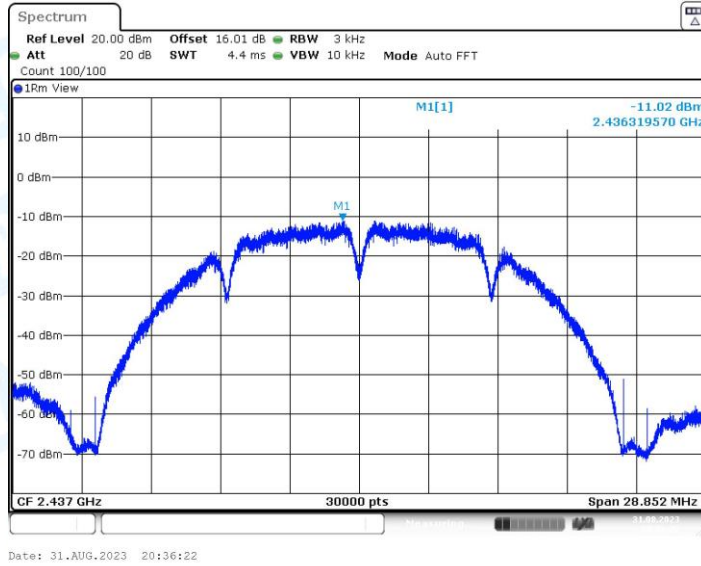
So $PSD_{out} = PSD_{limit} - (G_{TX} - 6) = (8 - 2.01) \text{dBm} = 5.99 \text{dBm}$

Directional Gain = ANT. Gain + 10 * LOG(NANT)

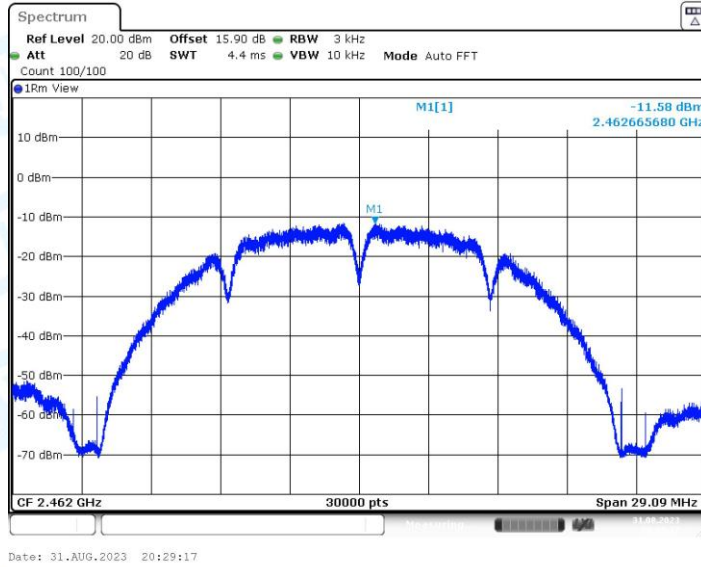
4.2. Test Graphs



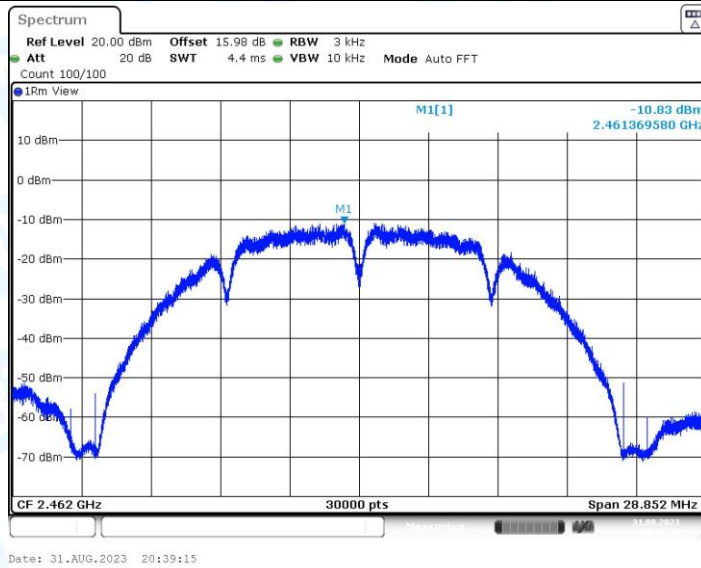
11B_Ant2_2437



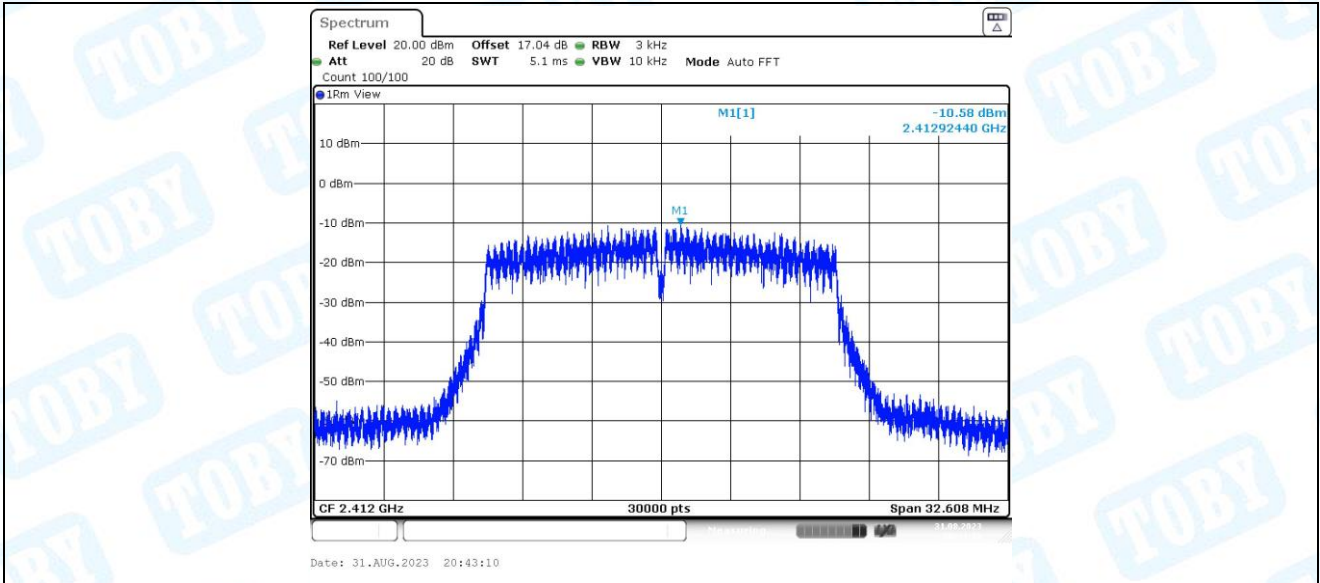
11B_Ant1_2462



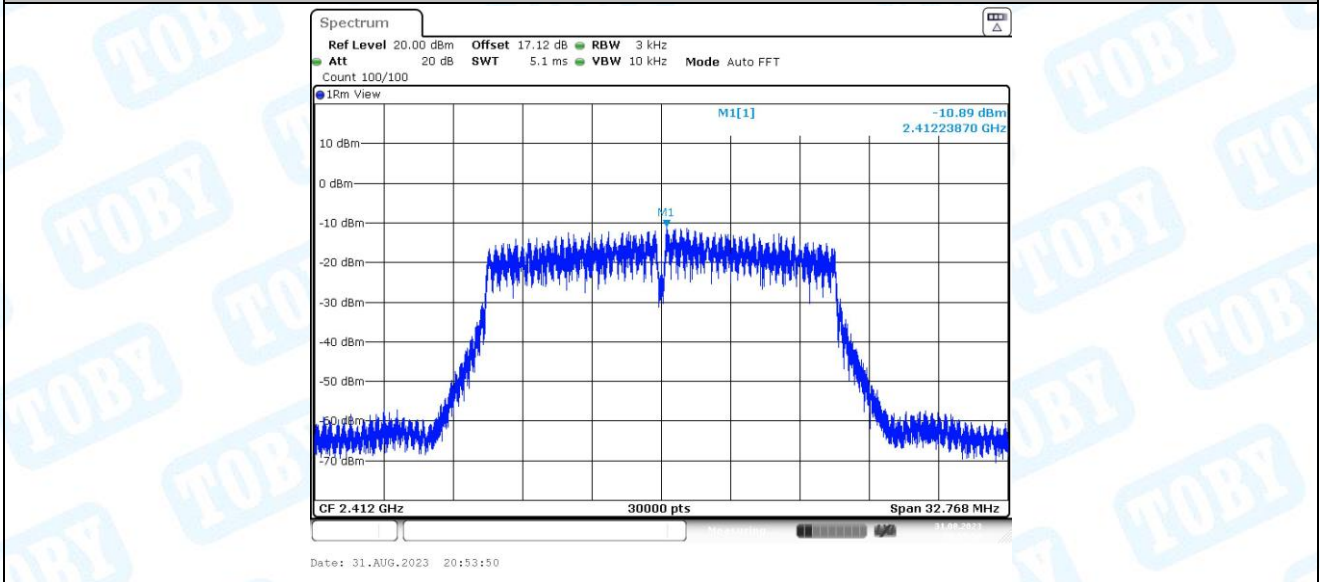
11B_Ant2_2462



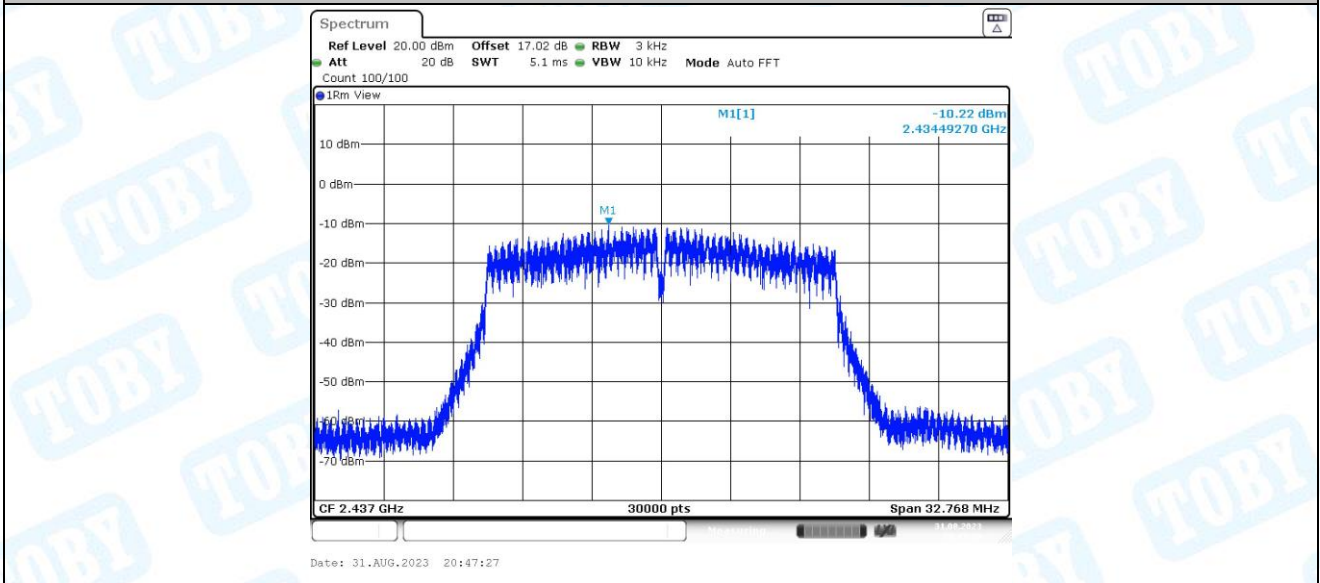
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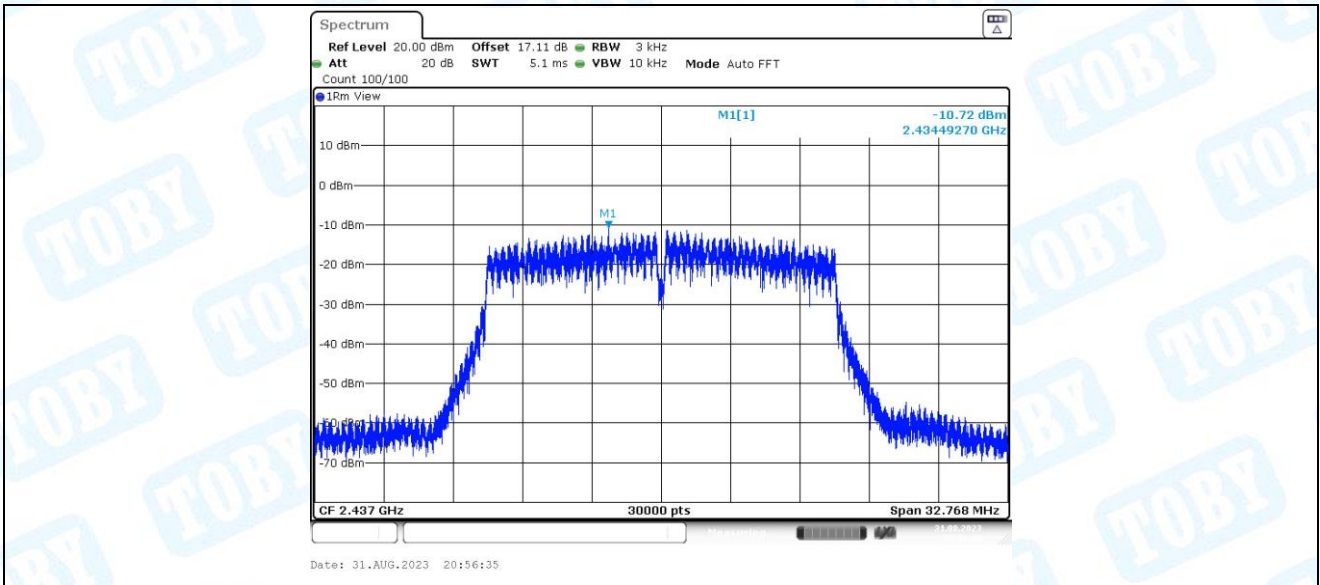
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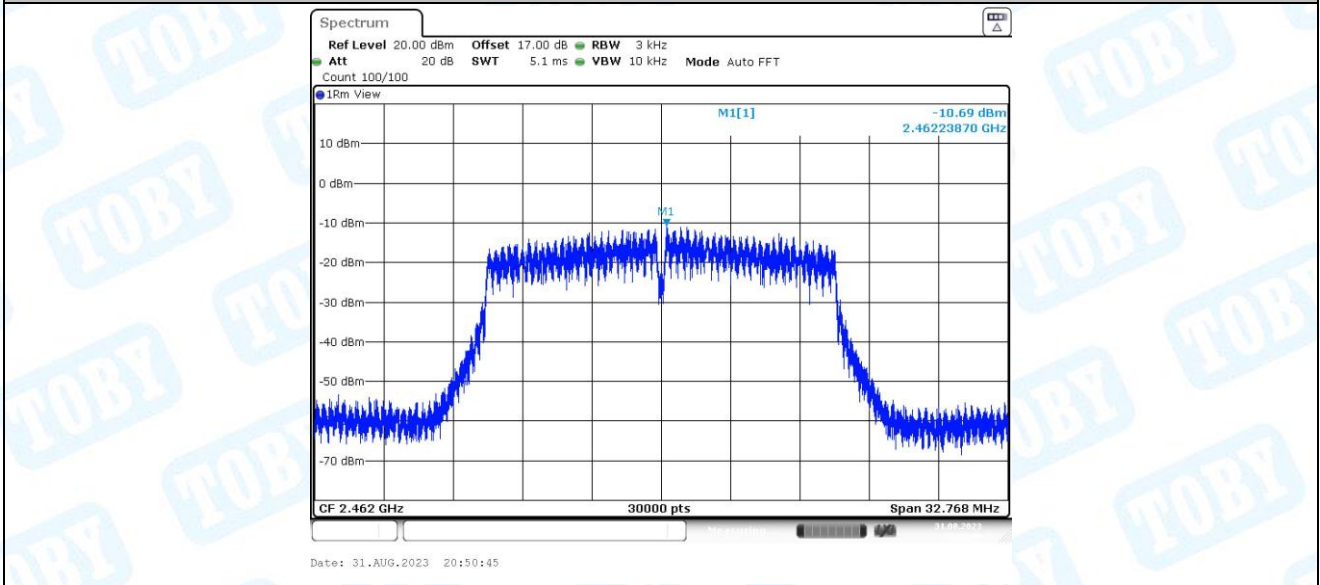
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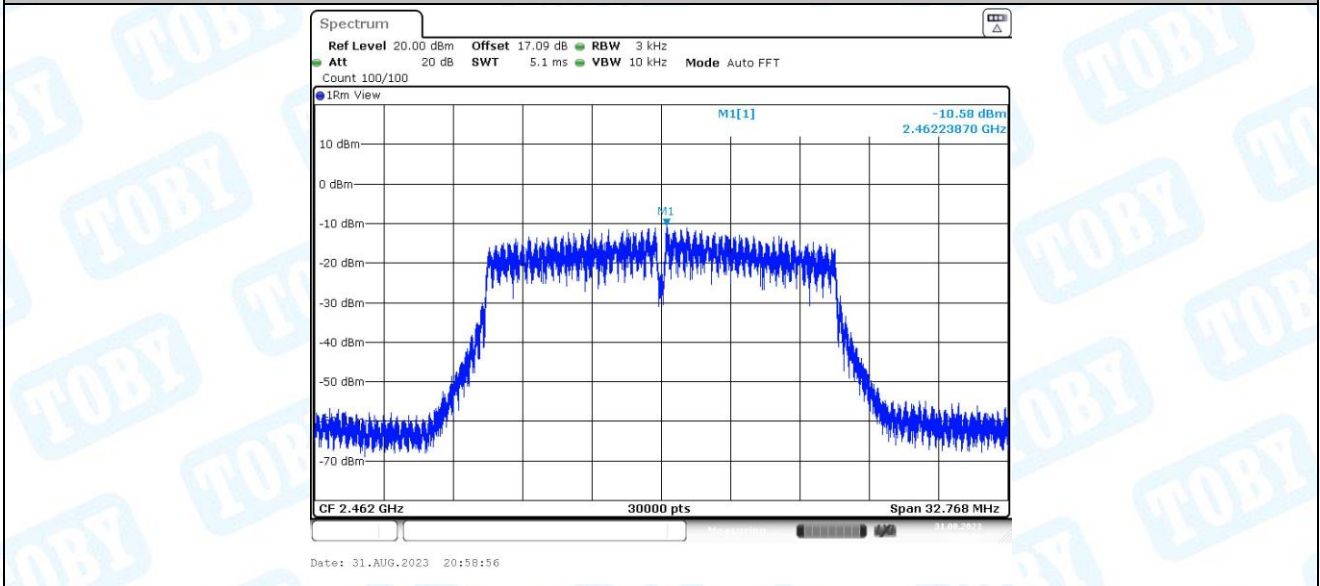
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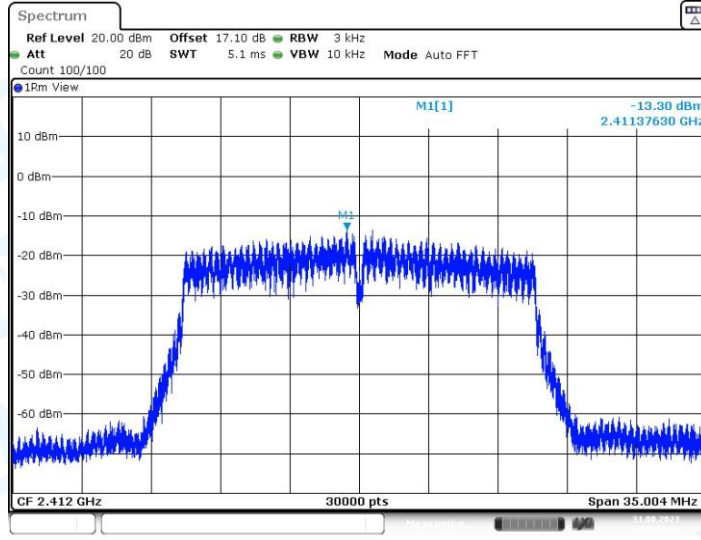
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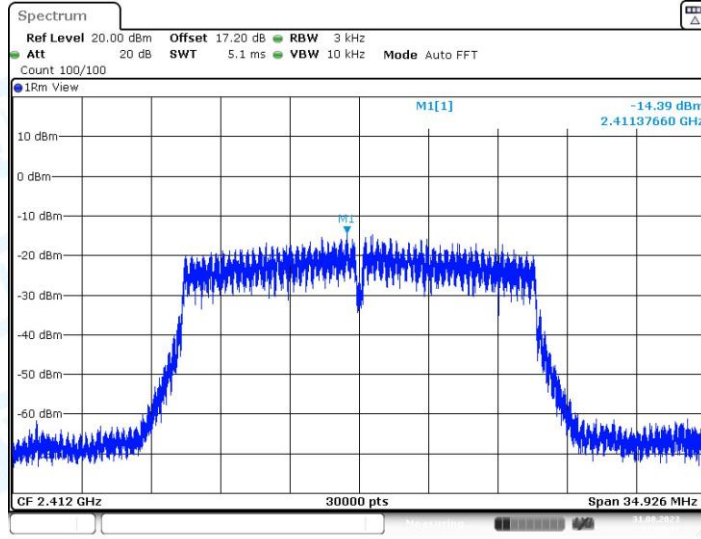
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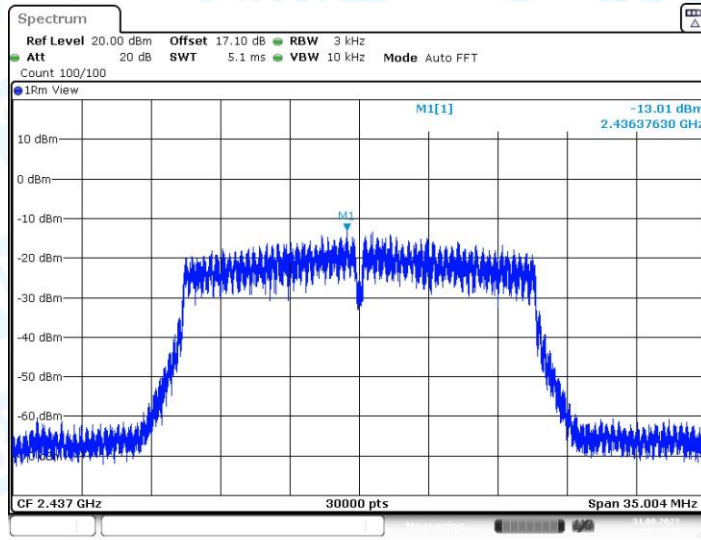
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