

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

General Description of EUT	
Product Name:	Echo USB-Connect Box
Test Model:	RL-19002-1
Sample ID:	20210816-04-02
Environmental Conditions	
Temperature:	23.8°C
Relative Humidity:	48%
Test Voltage:	DC 3.7V
Test Engineer:	Huang jian ping
Note: For a more detailed features description, please refer to the report TB-FCC184738	

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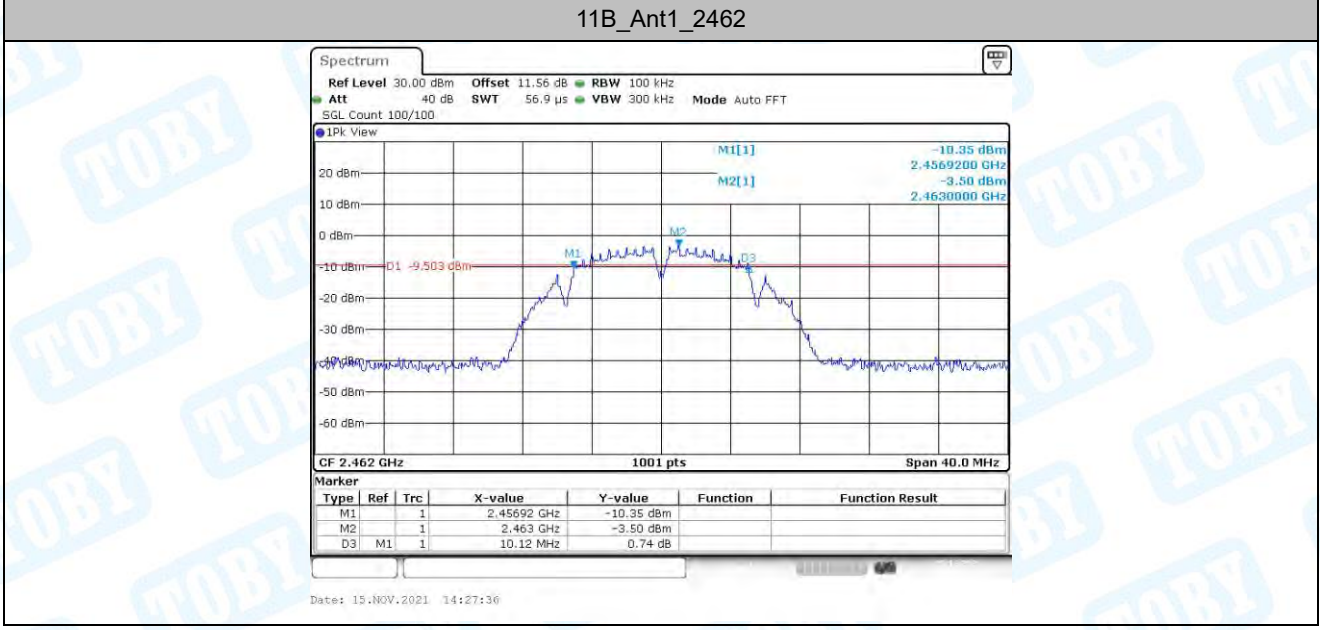
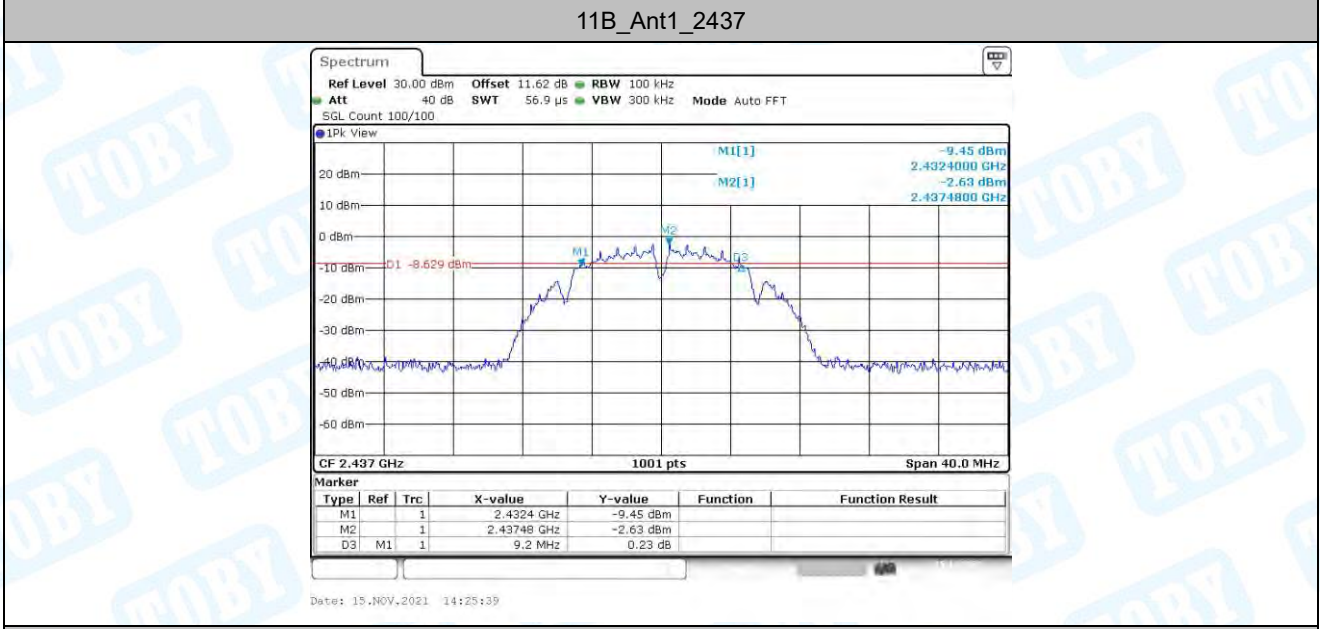
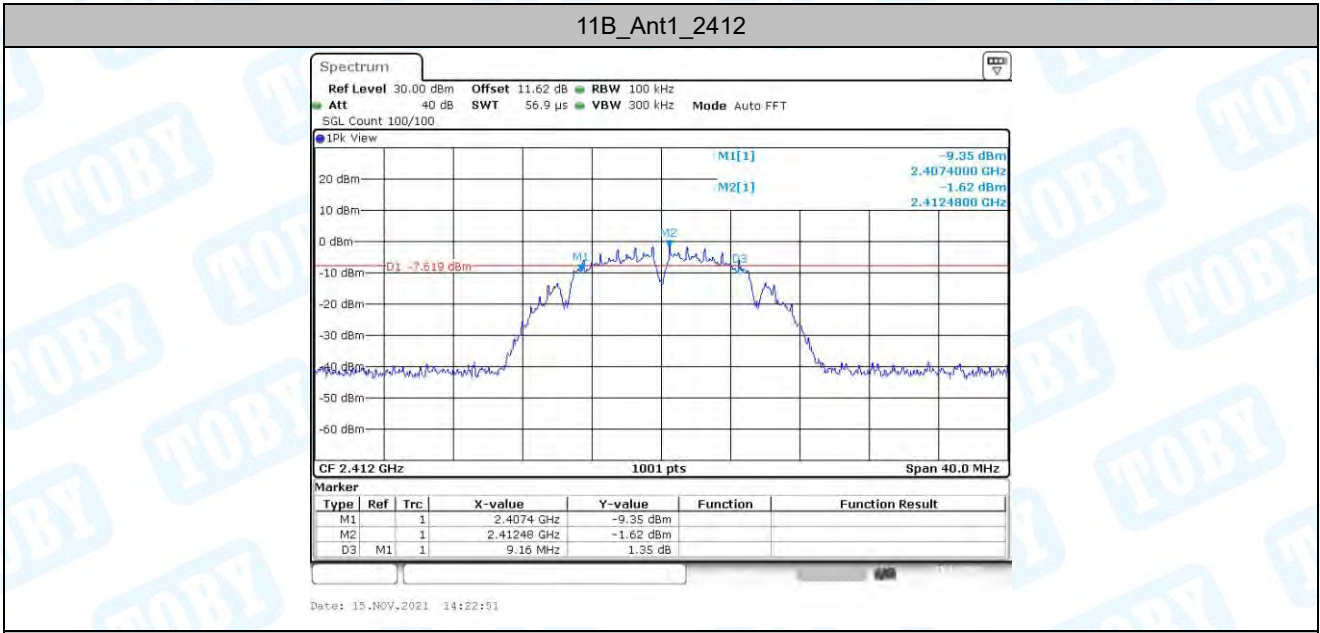
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1. DTS Bandwidth

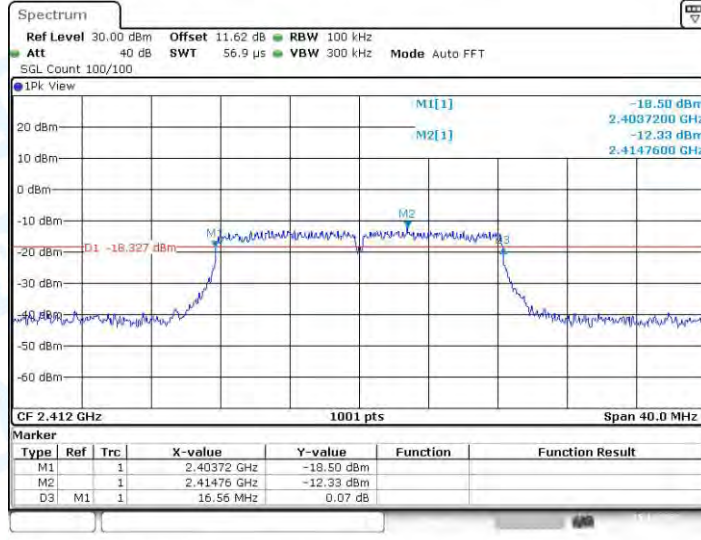
1.1. Test Result

TestMode	Antenna	Channel	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	9.160	2407.400	2416.560	0.5	PASS
		2437	9.200	2432.400	2441.600	0.5	PASS
		2462	10.120	2456.920	2467.040	0.5	PASS
11G	Ant1	2412	16.560	2403.720	2420.280	0.5	PASS
		2437	16.640	2428.680	2445.320	0.5	PASS
		2462	16.640	2453.680	2470.320	0.5	PASS
11N20SISO	Ant1	2412	17.760	2403.120	2420.880	0.5	PASS
		2437	17.760	2428.120	2445.880	0.5	PASS
		2462	17.720	2453.120	2470.840	0.5	PASS

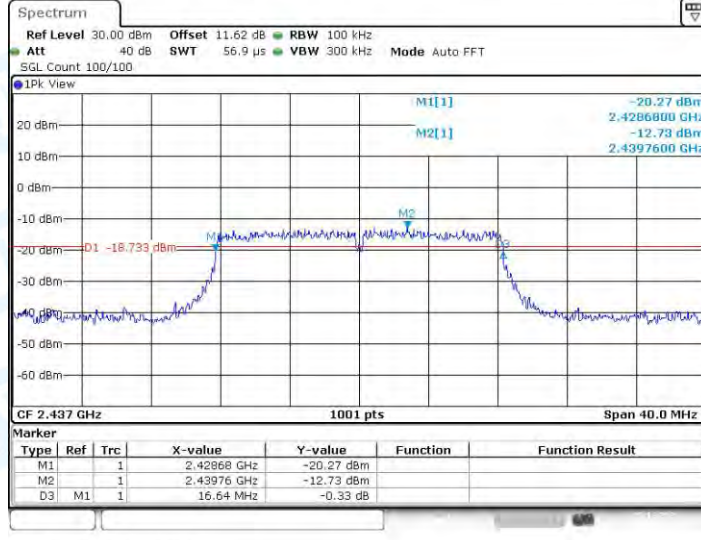
1.2. Test Graphs



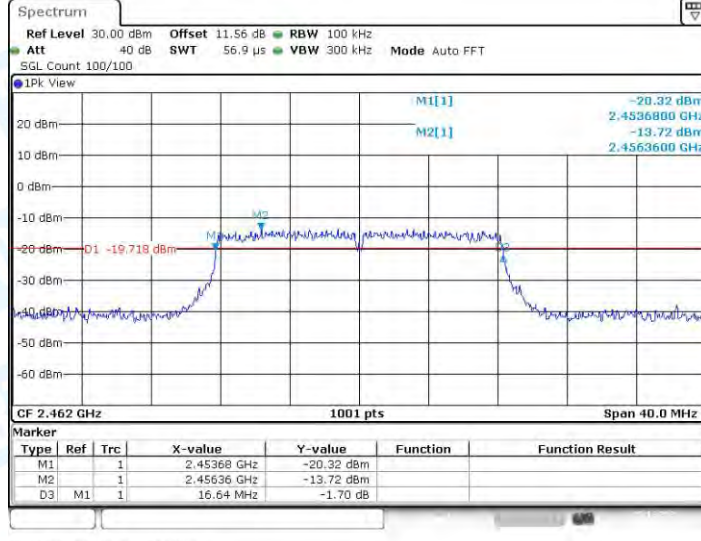
11G_Ant1_2412



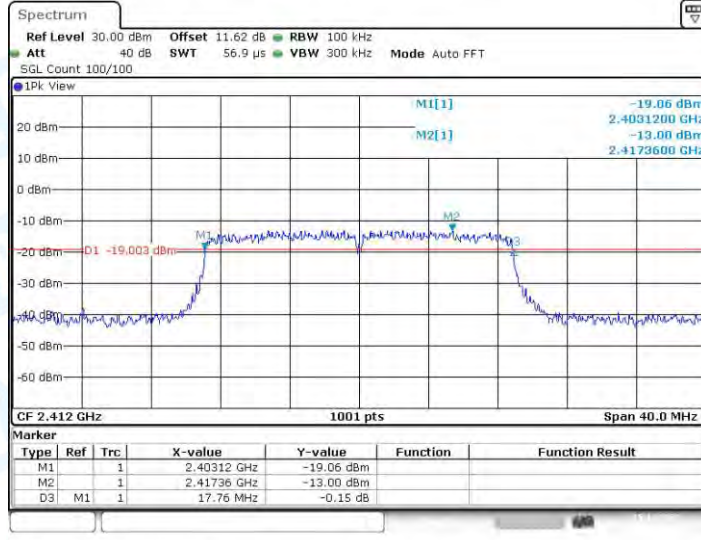
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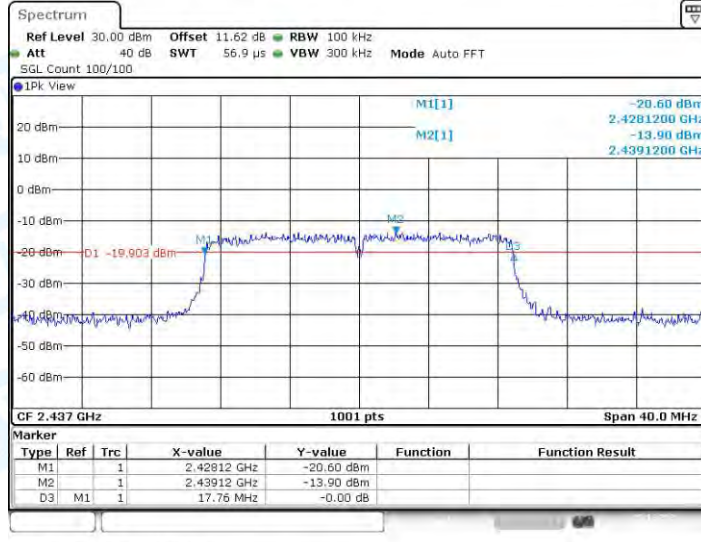
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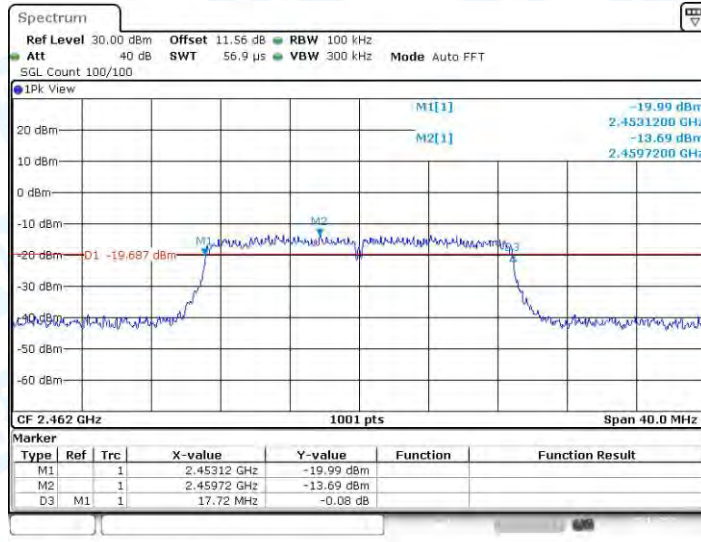
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11N20SISO_Ant1_2437



11N20SISO_Ant1_2462

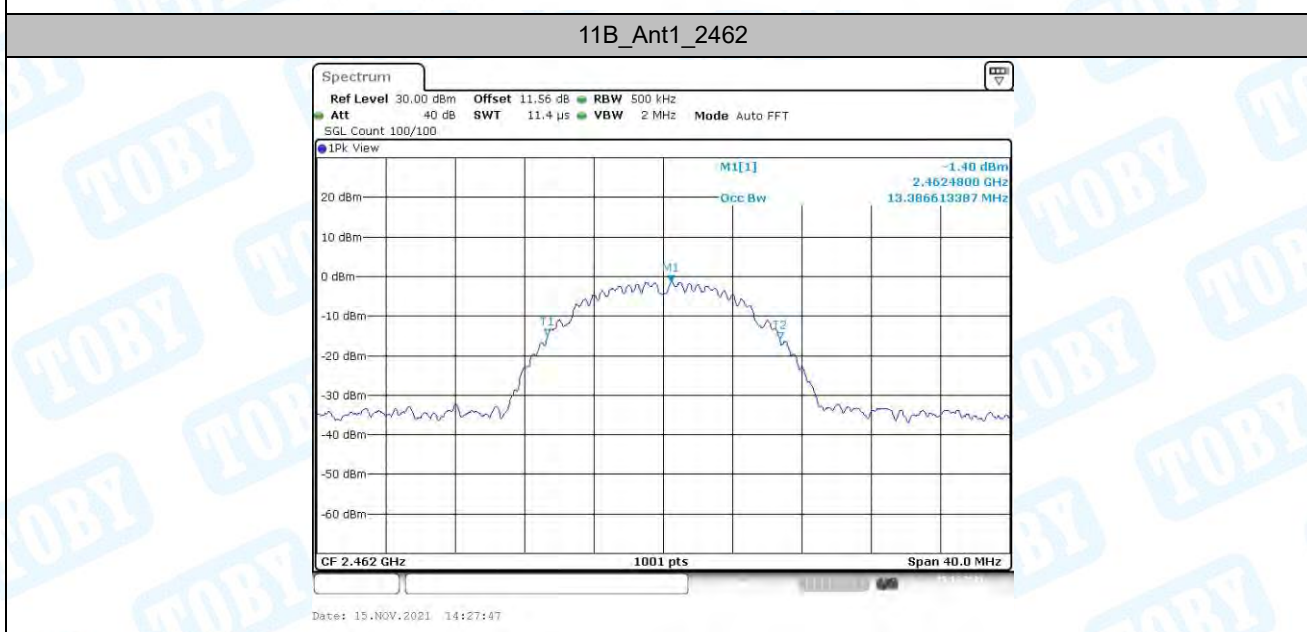
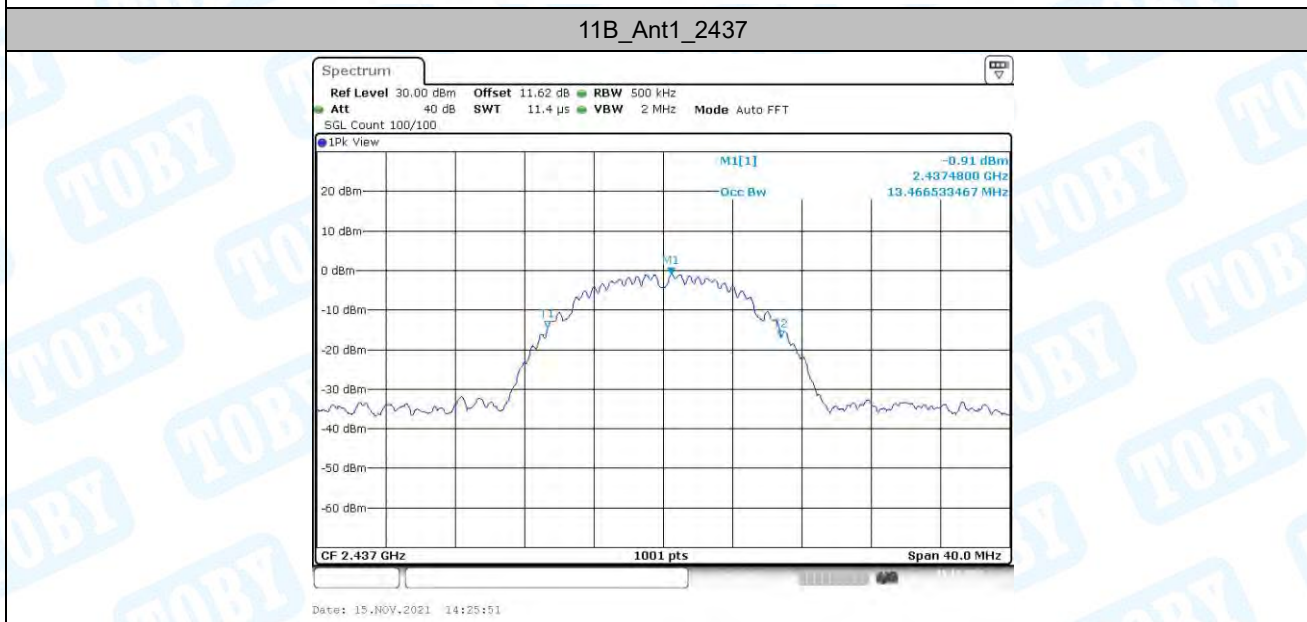
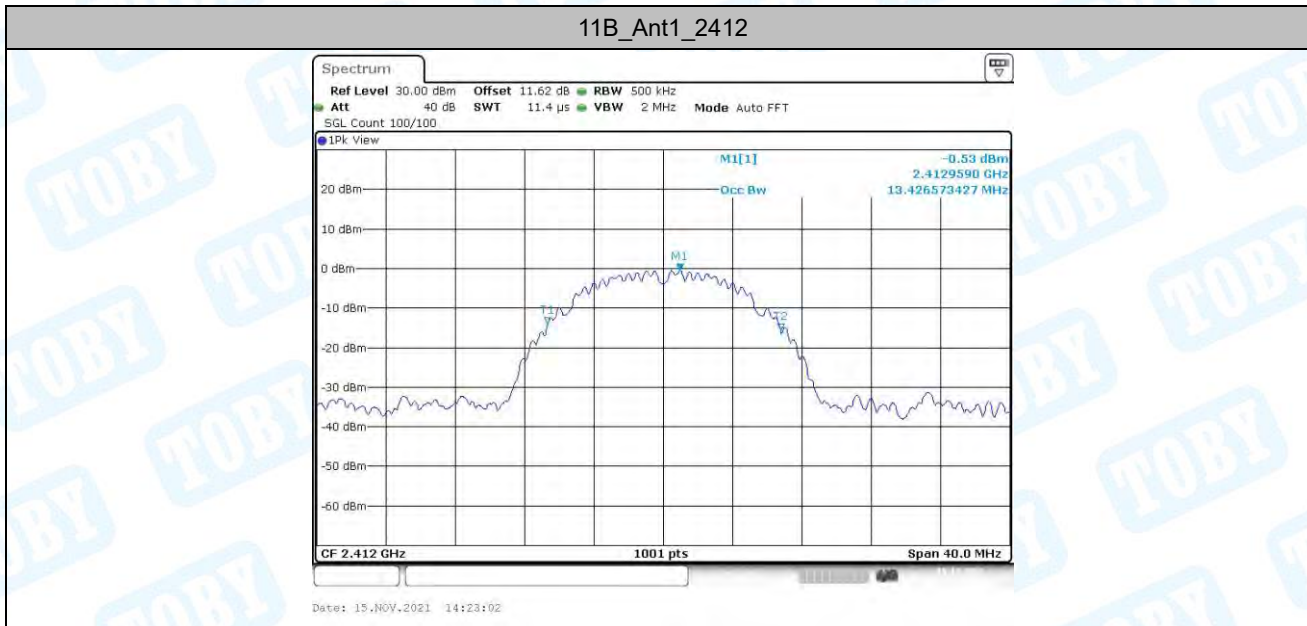


2. Occupied Channel Bandwidth

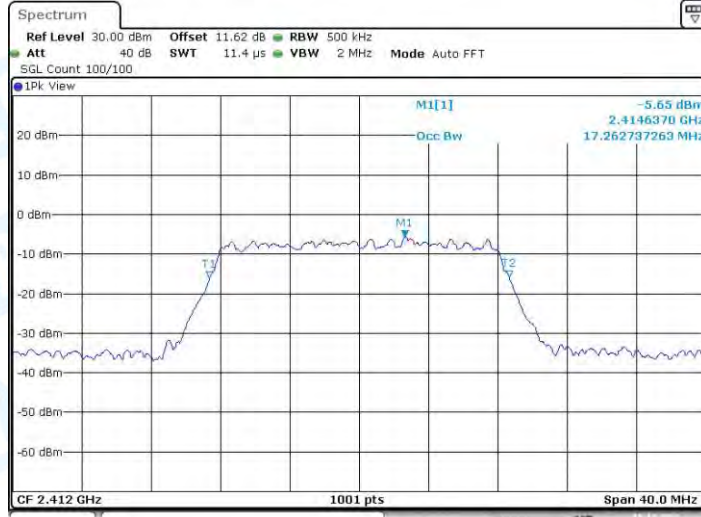
2.1. Test Result

TestMode	Antenna	Channel	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	13.427	2405.327	2418.753	---	PASS
		2437	13.467	2430.327	2443.793	---	PASS
		2462	13.387	2455.327	2468.713	---	PASS
11G	Ant1	2412	17.263	2403.369	2420.631	---	PASS
		2437	16.983	2428.409	2445.392	---	PASS
		2462	16.983	2453.449	2470.432	---	PASS
11N20SISO	Ant1	2412	17.862	2403.089	2420.951	---	PASS
		2437	18.022	2427.969	2445.991	---	PASS
		2462	18.022	2453.049	2471.071	---	PASS

2.2. Test Graphs



11G_Ant1_2412



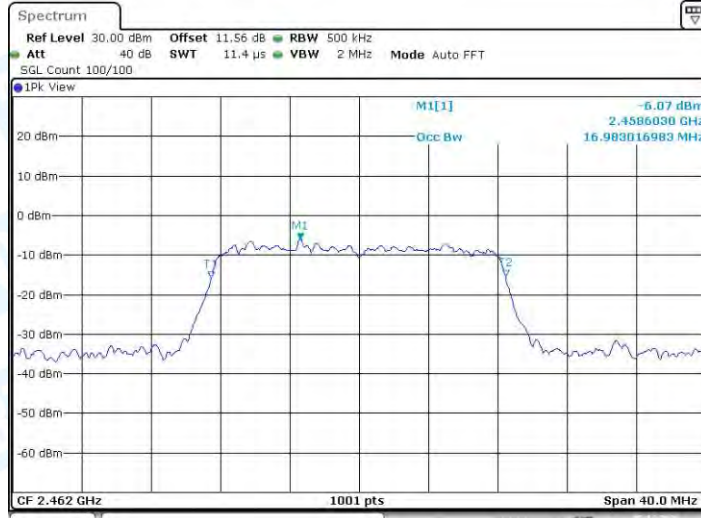
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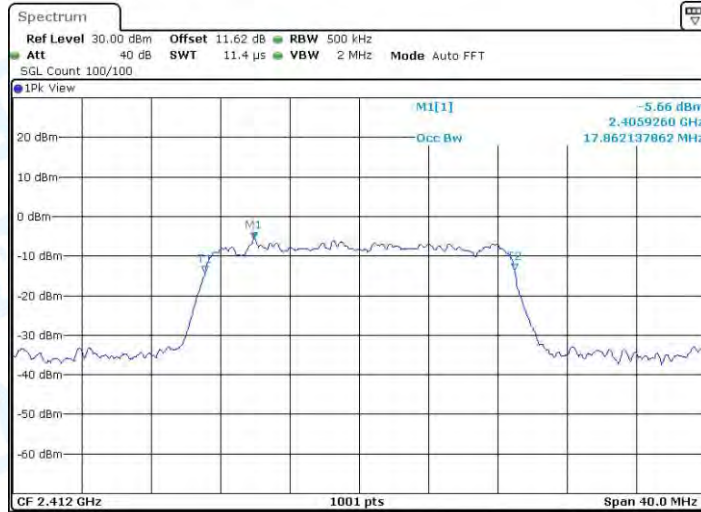
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11G_Ant1_2462



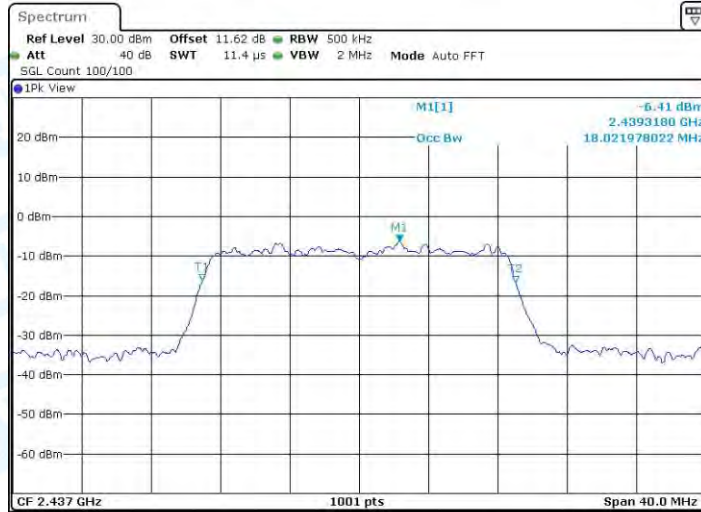
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11N20SISO_Ant1_2412



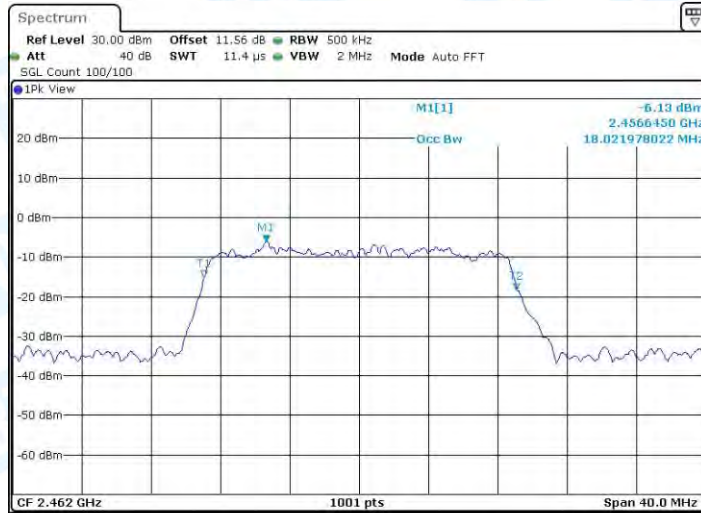
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11N20SISO_Ant1_2437



Date: 15.NOV.2021 14:46:30

11N20SISO_Ant1_2462



Date: 15.NOV.2021 14:48:27

3. Maximum conducted output power

3.1. Test Result

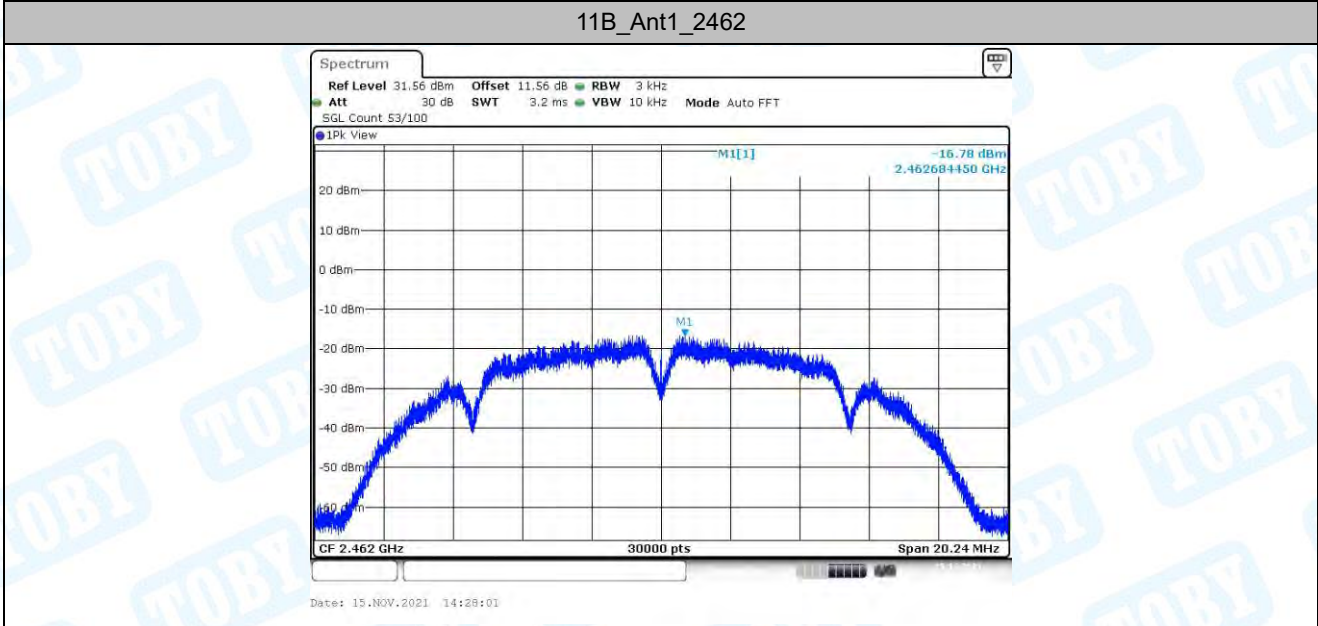
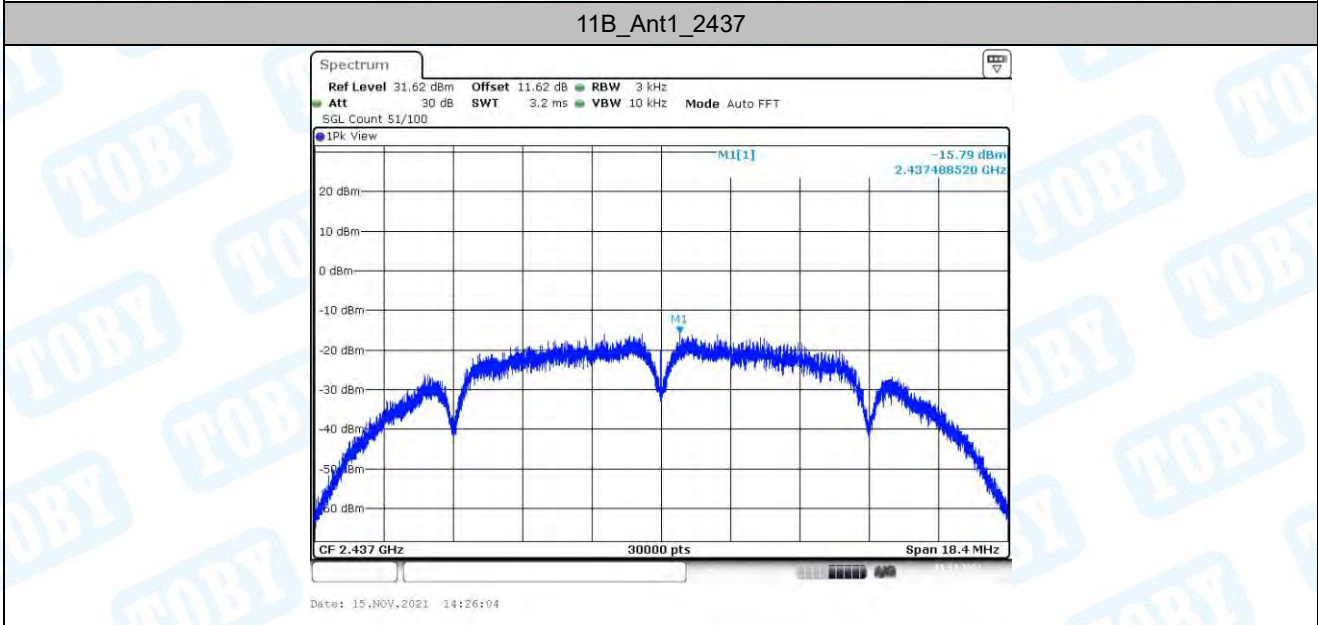
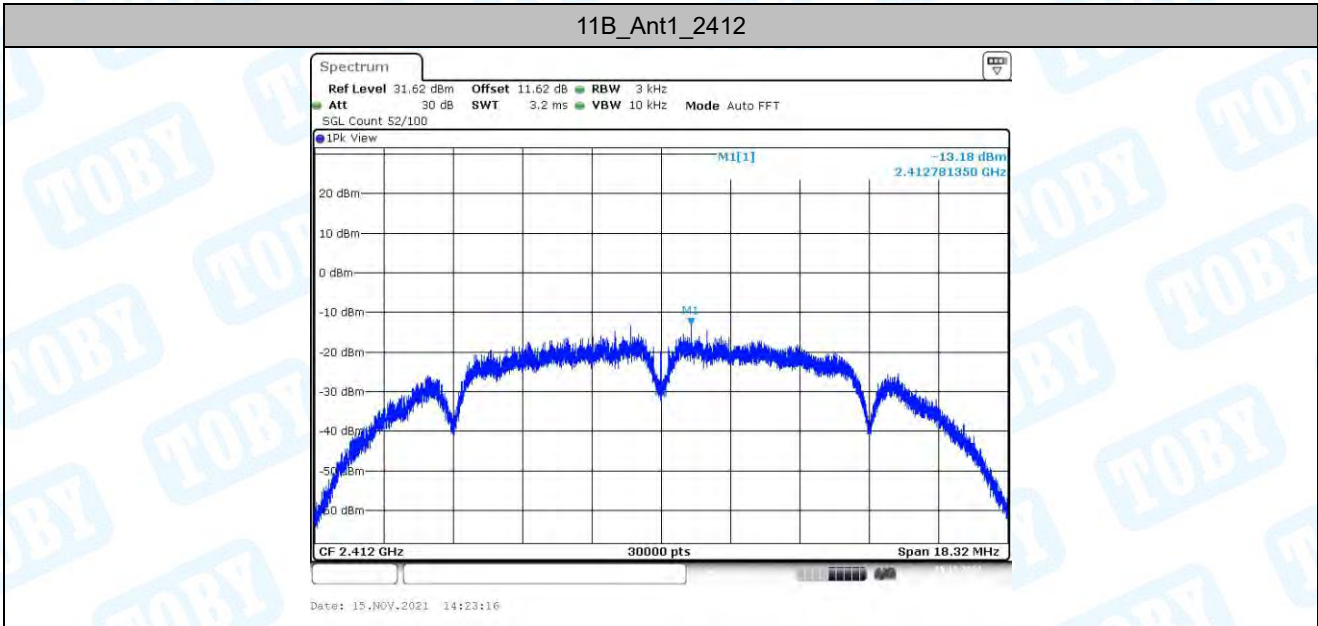
TestMode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
11B	Ant1	2412	10.96	≤30	PASS
		2437	10.55	≤30	PASS
		2462	10.08	≤30	PASS
11G	Ant1	2412	8.94	≤30	PASS
		2437	8.35	≤30	PASS
		2462	7.90	≤30	PASS
11N20SISO	Ant1	2412	8.83	≤30	PASS
		2437	8.13	≤30	PASS
		2462	7.94	≤30	PASS

4. Maximum power spectral density

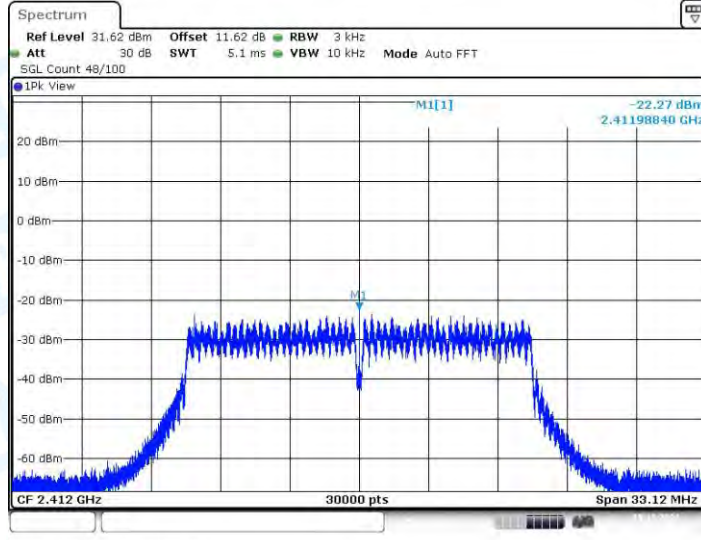
4.1. Test Result

TestMode	Antenna	Channel	Result[dBm/3-100kHz]	Limit[dBm/3kHz]	Verdict
11B	Ant1	2412	-13.18	≤8	PASS
		2437	-15.79	≤8	PASS
		2462	-16.78	≤8	PASS
11G	Ant1	2412	-22.27	≤8	PASS
		2437	-20.68	≤8	PASS
		2462	-22.32	≤8	PASS
11N20SISO	Ant1	2412	-22.34	≤8	PASS
		2437	-21.86	≤8	PASS
		2462	-21.3	≤8	PASS

4.2. Test Graphs

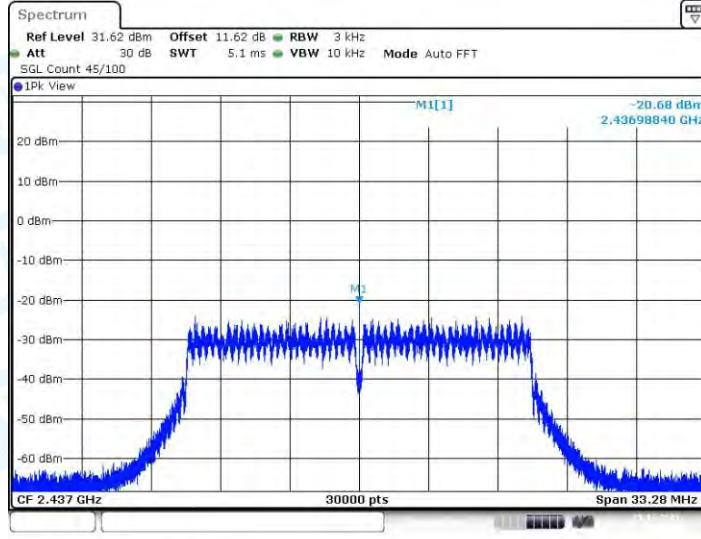


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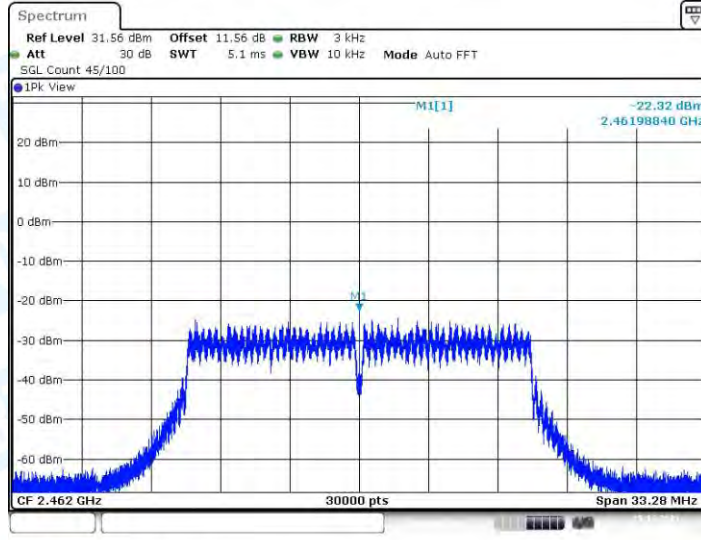
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11G_Ant1_2437



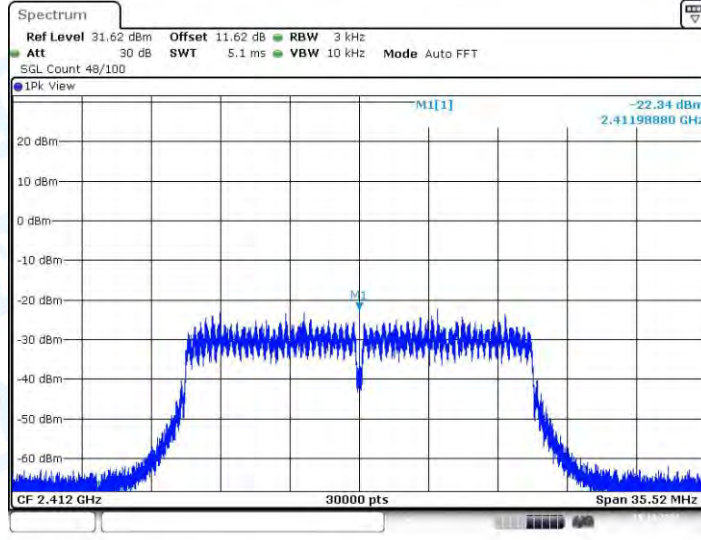
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11G_Ant1_2462



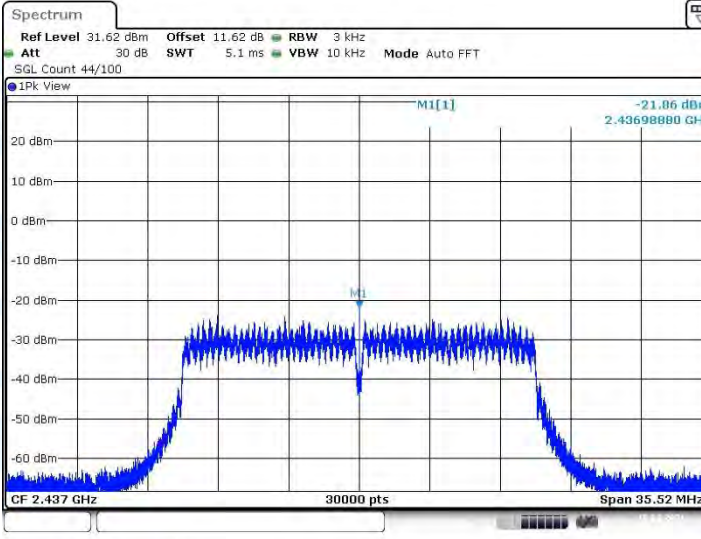
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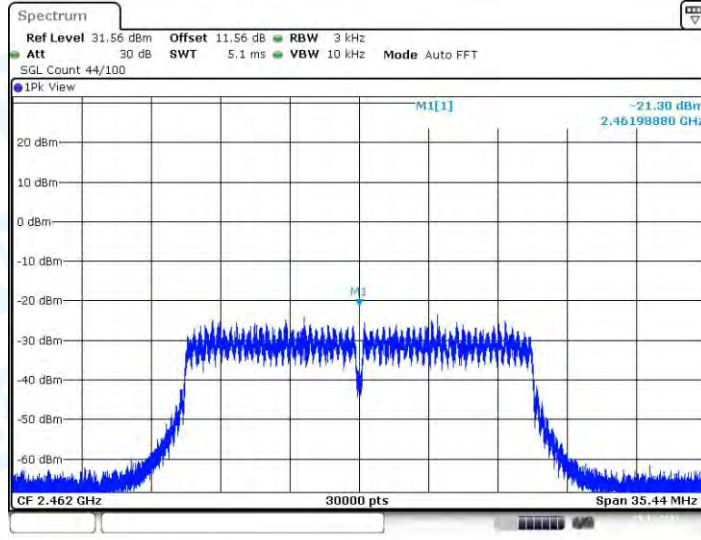
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11N20SISO_Ant1_2437



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11N20SISO_Ant1_2462



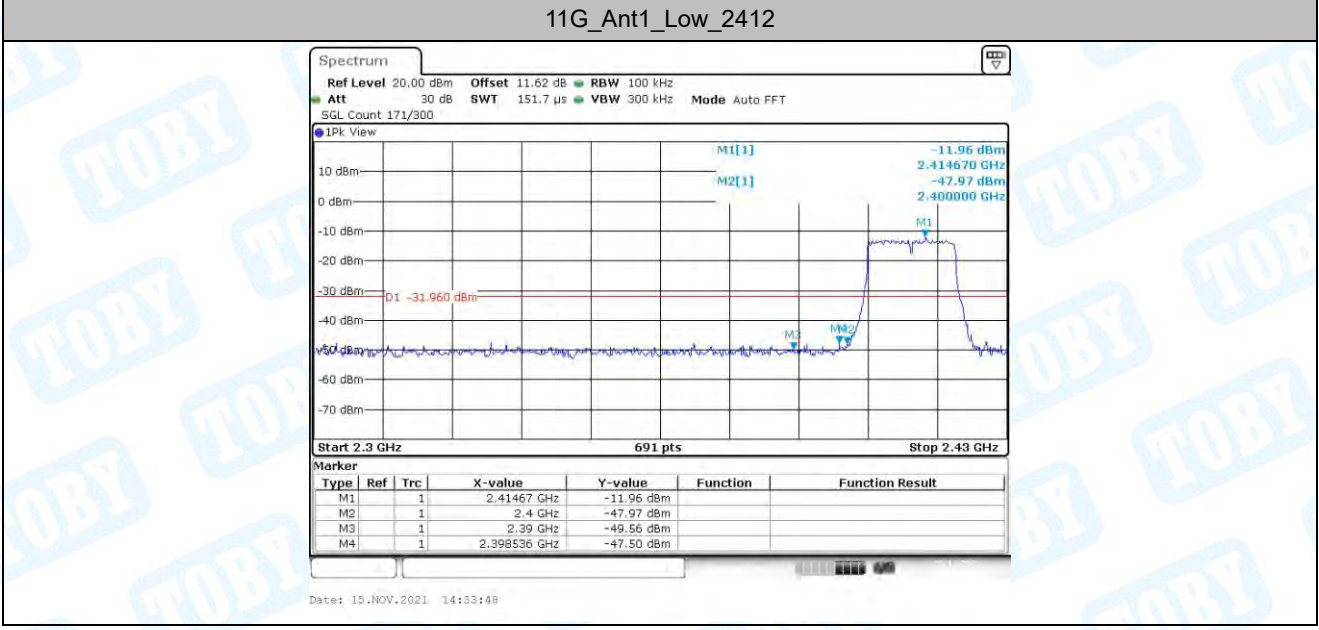
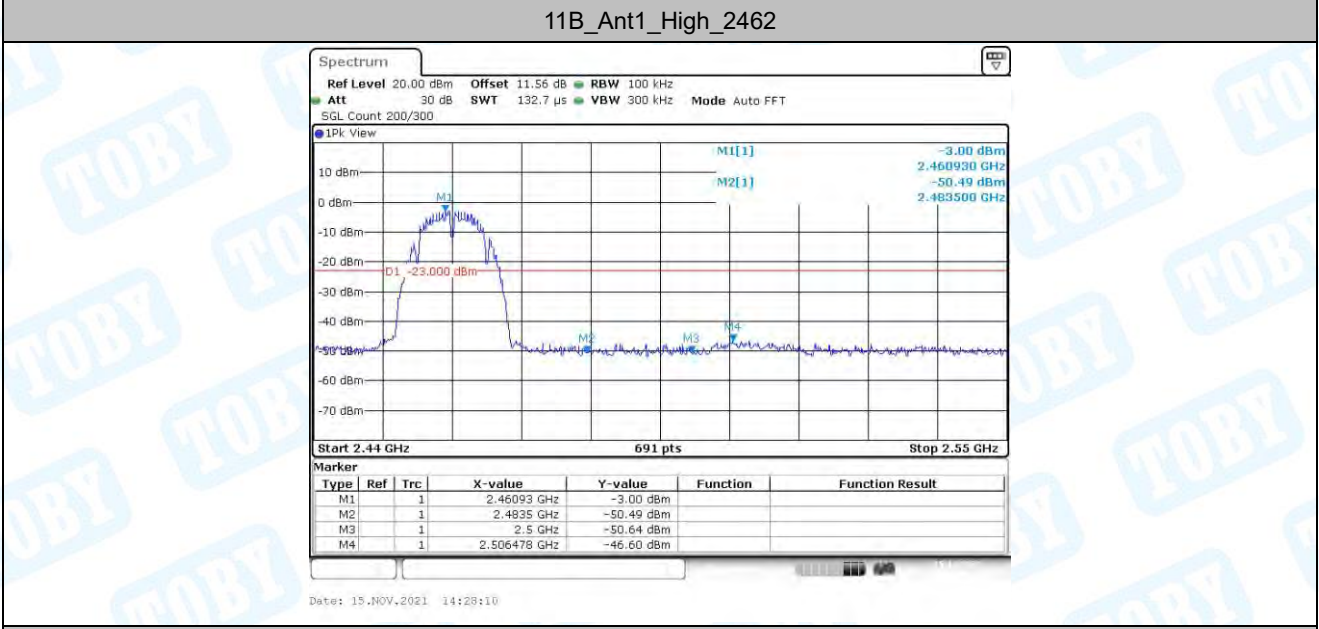
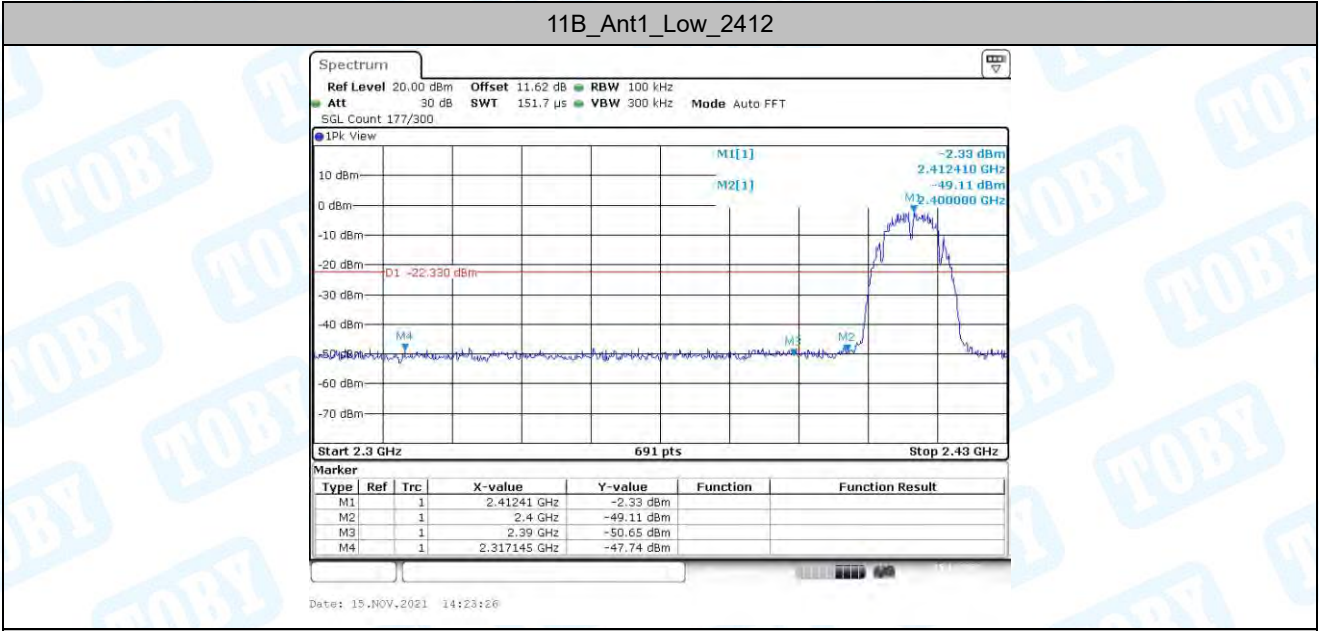
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5. Band edge measurements

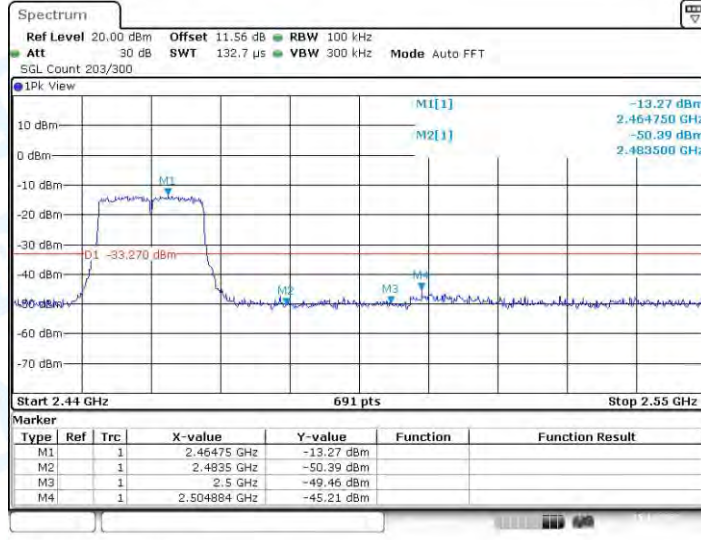
5.1. Test Result

TestMode	Antenna	ChName	Channel	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
11B	Ant1	Low	2412	-2.33	-47.74	≤-22.33	PASS
		High	2462	-3.00	-46.6	≤-23	PASS
11G	Ant1	Low	2412	-11.96	-47.5	≤-31.96	PASS
		High	2462	-13.27	-45.21	≤-33.27	PASS
11N20SISO	Ant1	Low	2412	-13.12	-47.57	≤-33.12	PASS
		High	2462	-13.91	-46.01	≤-33.91	PASS

5.2. Test Graphs

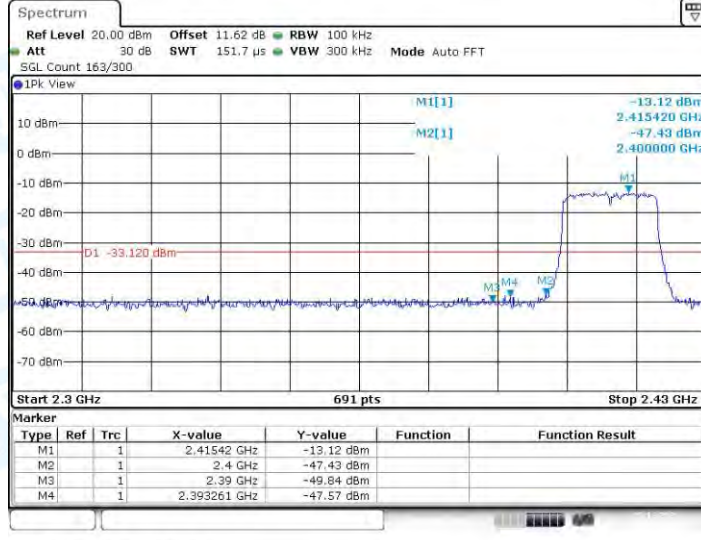


11G_Ant1_High_2462



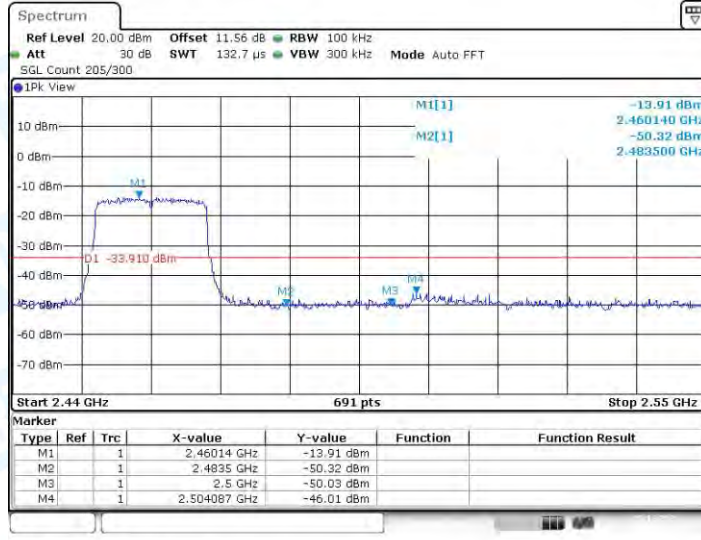
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11N20SISO_Ant1_Low_2412



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11N20SISO_Ant1_High_2462



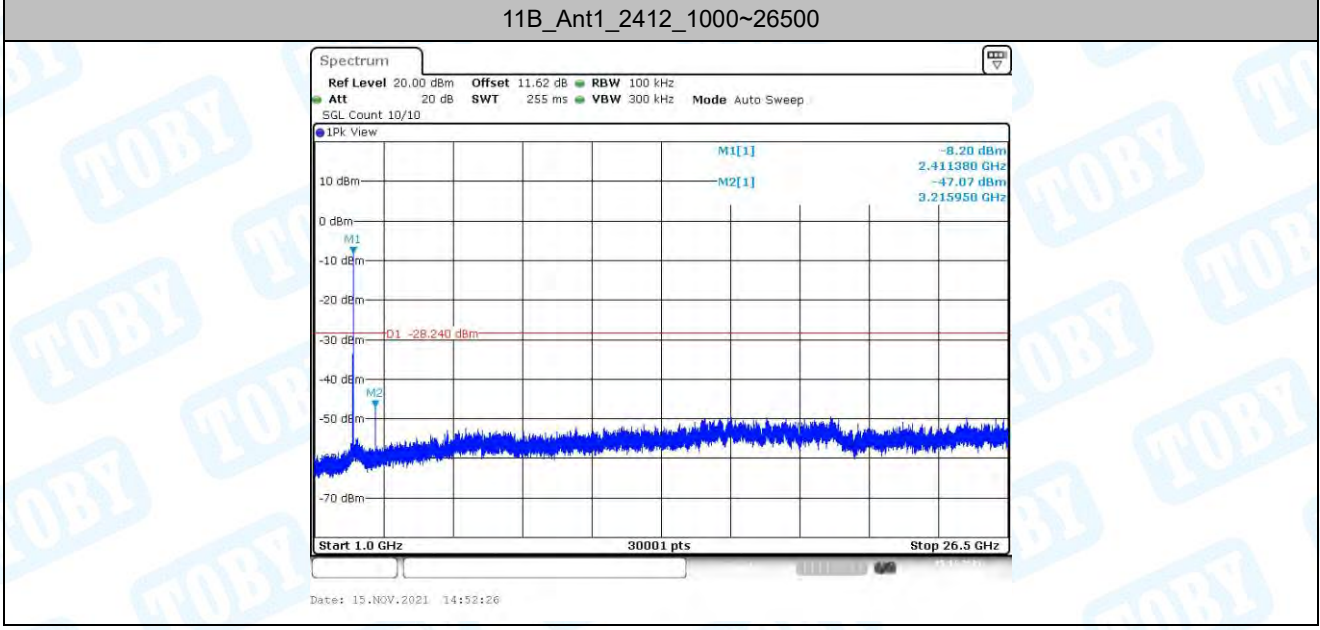
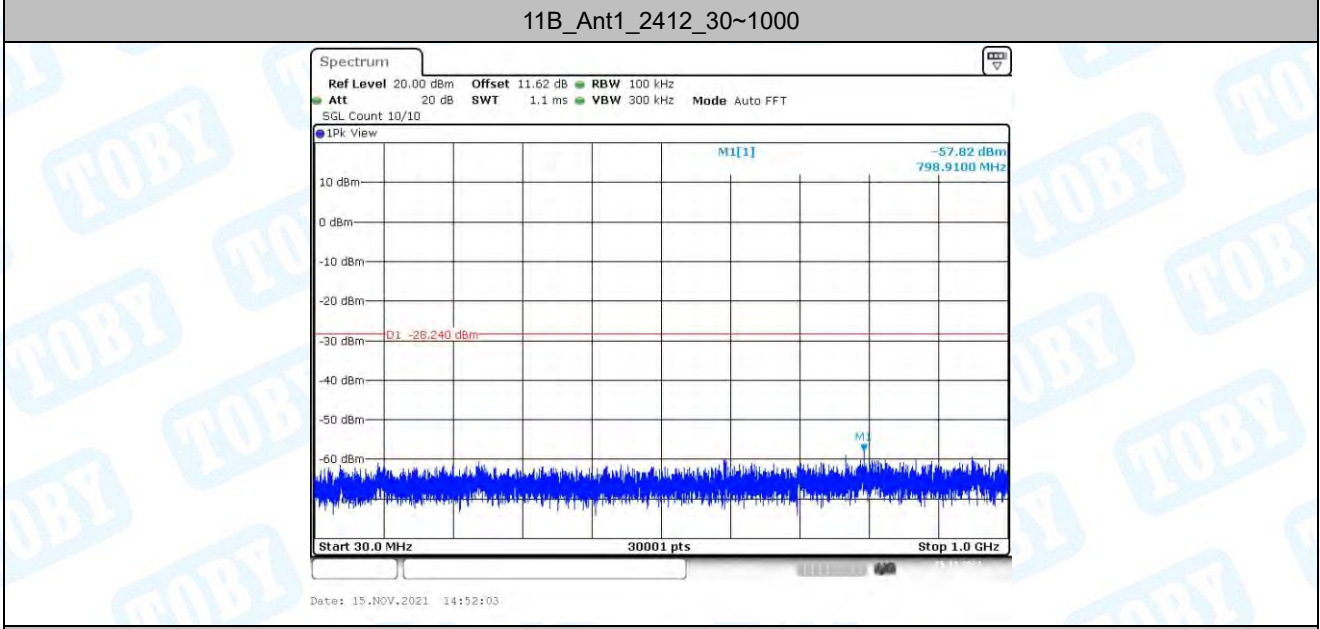
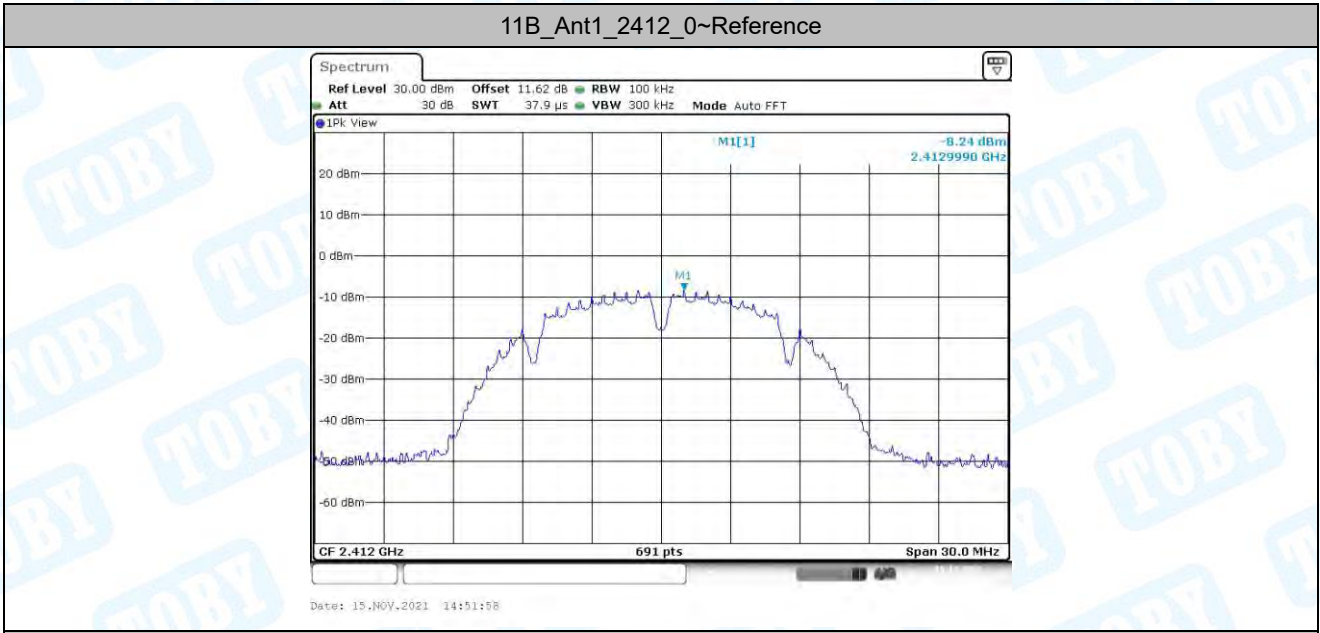
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6. Conducted Spurious Emission

6.1. Test Result

TestMode	Antenna	Channel	FreqRange [Mhz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
11B	Ant1	2412	Reference	-8.24	-8.24	---	PASS
			30~1000	-8.24	-57.82	≤-28.24	PASS
			1000~26500	-8.24	-47.07	≤-28.24	PASS
		2437	Reference	-1.96	-1.96	---	PASS
			30~1000	-1.96	-59.44	≤-21.96	PASS
			1000~26500	-1.96	-46.39	≤-21.96	PASS
		2462	Reference	-2.55	-2.55	---	PASS
			30~1000	-2.55	-58.42	≤-22.55	PASS
			1000~26500	-2.55	-47.86	≤-22.55	PASS
11G	Ant1	2412	Reference	-12.63	-12.63	---	PASS
			30~1000	-12.63	-58.56	≤-32.63	PASS
			1000~26500	-12.63	-46.78	≤-32.63	PASS
		2437	Reference	-12.80	-12.80	---	PASS
			30~1000	-12.80	-59.41	≤-32.8	PASS
			1000~26500	-12.80	-46.15	≤-32.8	PASS
		2462	Reference	-12.83	-12.83	---	PASS
			30~1000	-12.83	-59.48	≤-32.83	PASS
			1000~26500	-12.83	-47.15	≤-32.83	PASS
11N20SISO	Ant1	2412	Reference	-11.38	-11.38	---	PASS
			30~1000	-11.38	-59.25	≤-31.38	PASS
			1000~26500	-11.38	-46.37	≤-31.38	PASS
		2437	Reference	-11.66	-11.66	---	PASS
			30~1000	-11.66	-58.52	≤-31.66	PASS
			1000~26500	-11.66	-46.63	≤-31.66	PASS
		2462	Reference	-10.81	-10.81	---	PASS
			30~1000	-10.81	-58.22	≤-30.81	PASS
			1000~26500	-10.81	-47.13	≤-30.81	PASS

6.2. Test Graphs

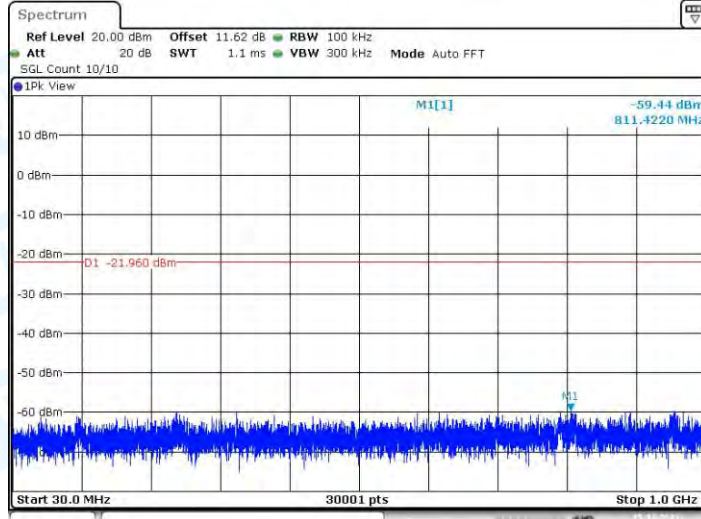


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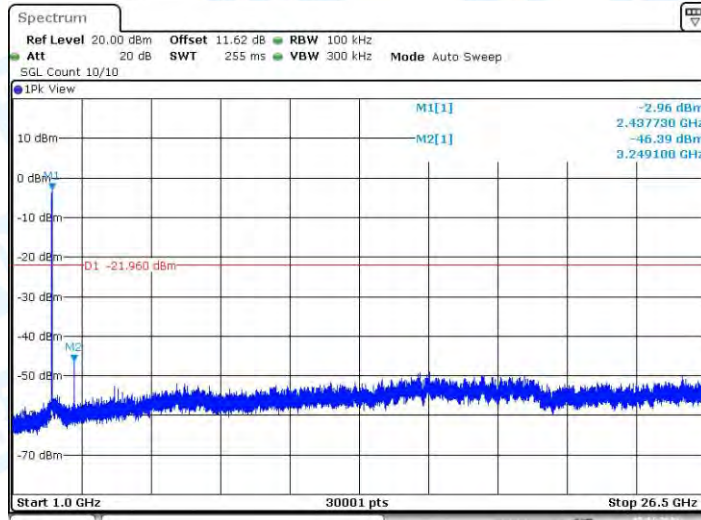
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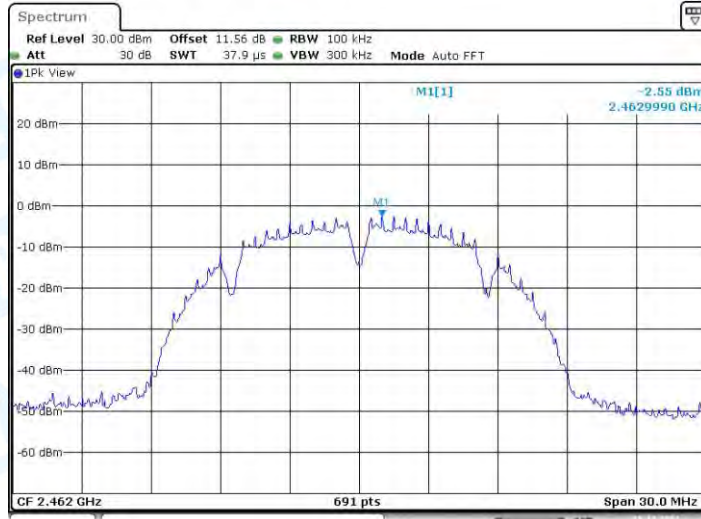
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11B_Ant1_2437_1000~26500



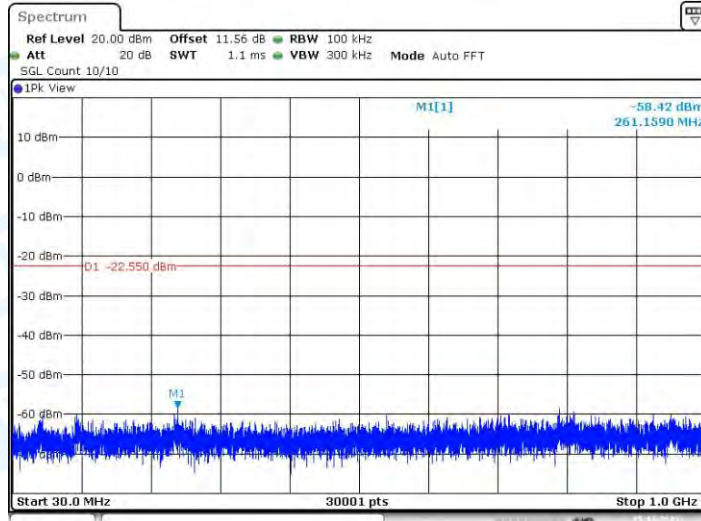
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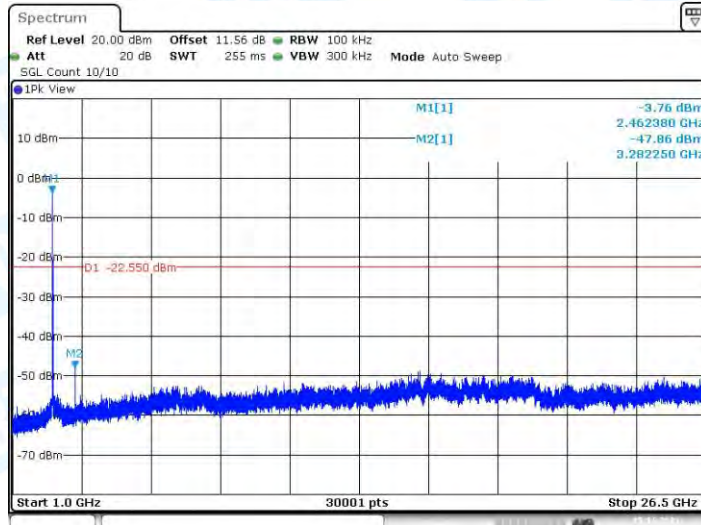
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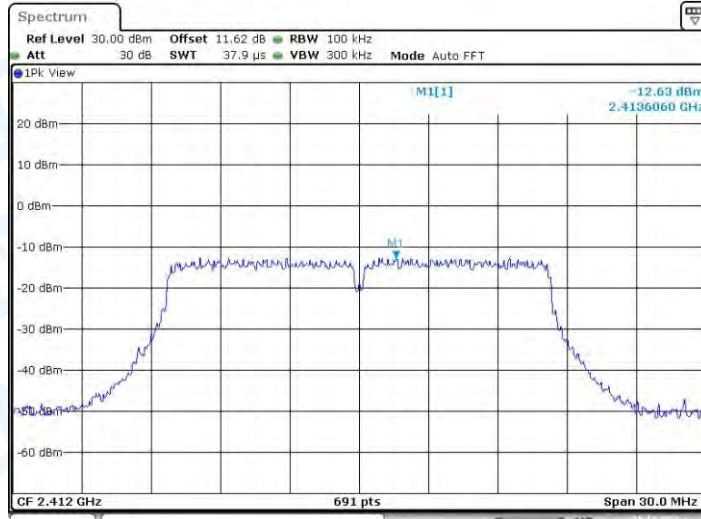
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11B_Ant1_2462_1000~26500



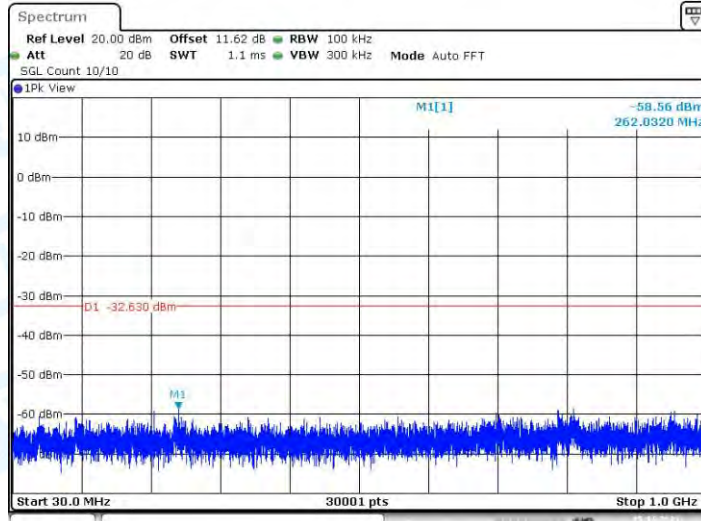
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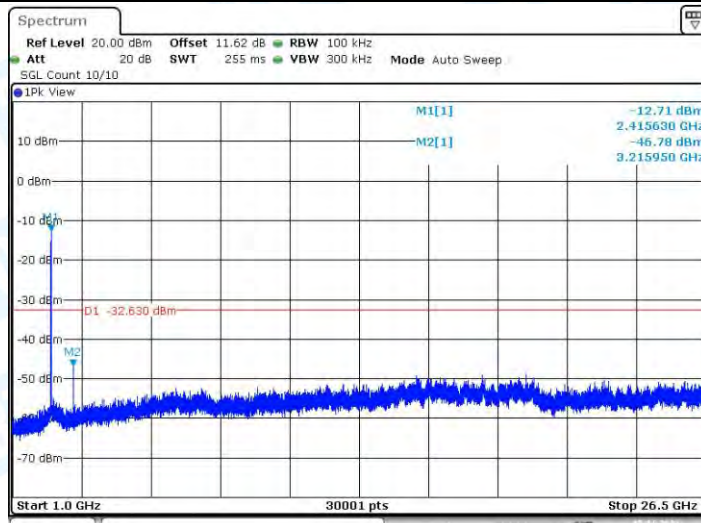
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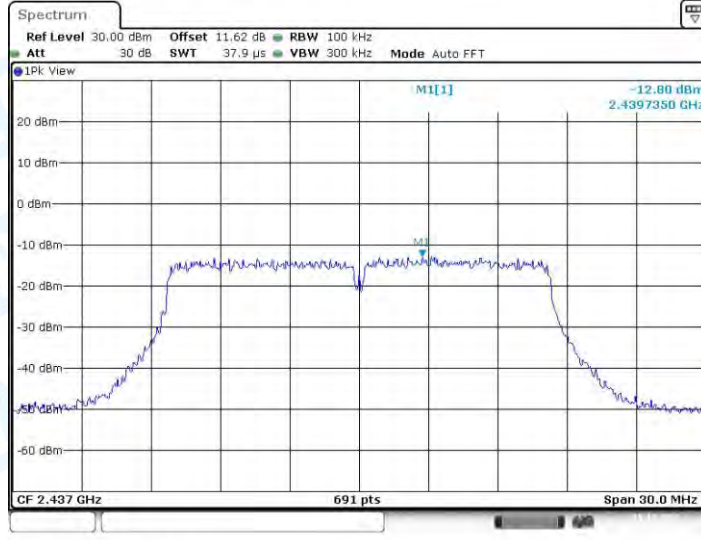
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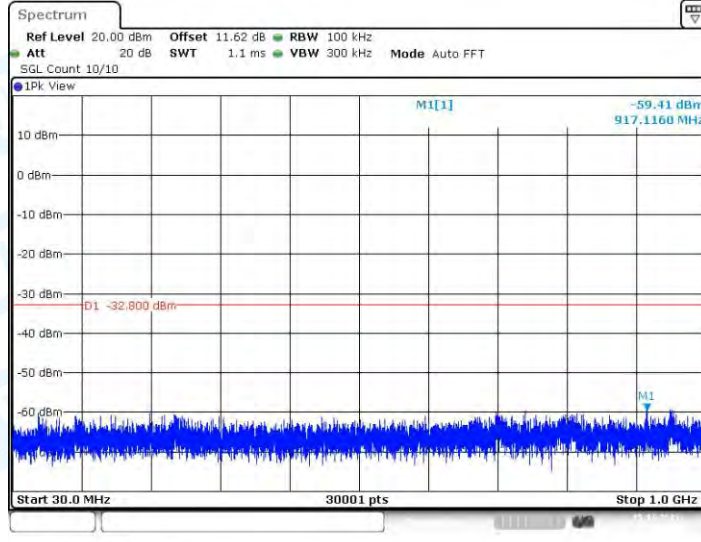


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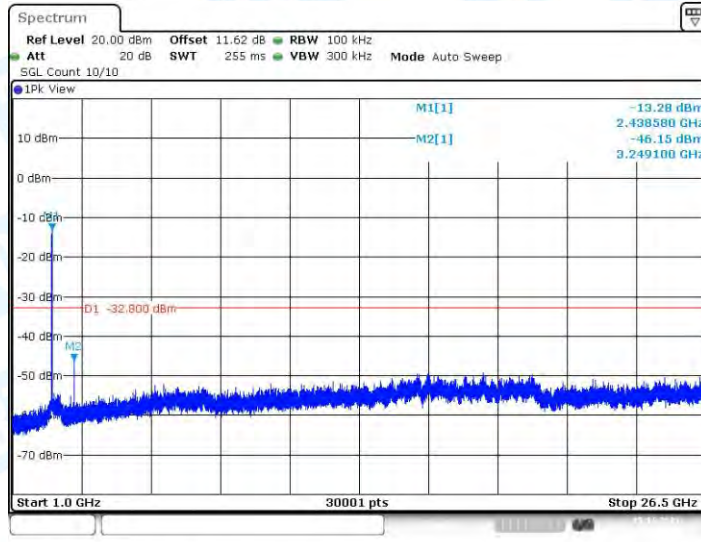
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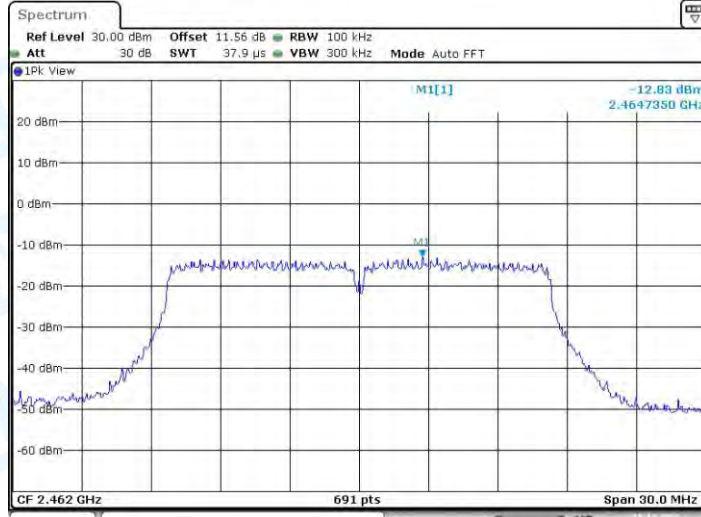
11G_Ant1_2437_30~1000



11G_Ant1_2437_1000~26500

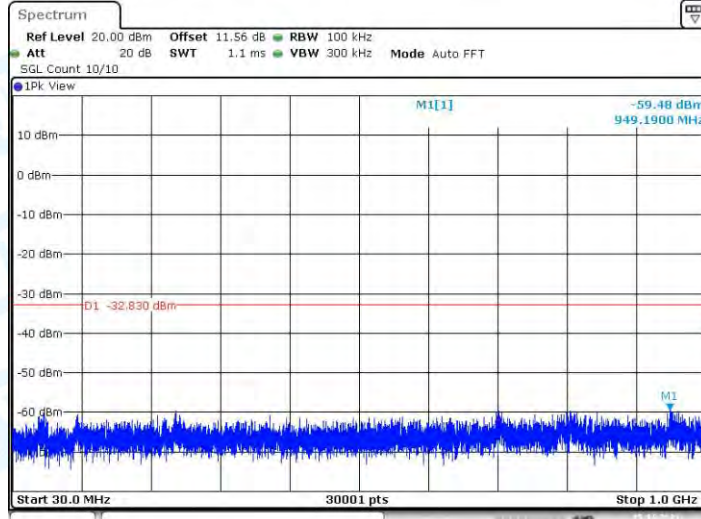


11G_Ant1_2462_0~Reference



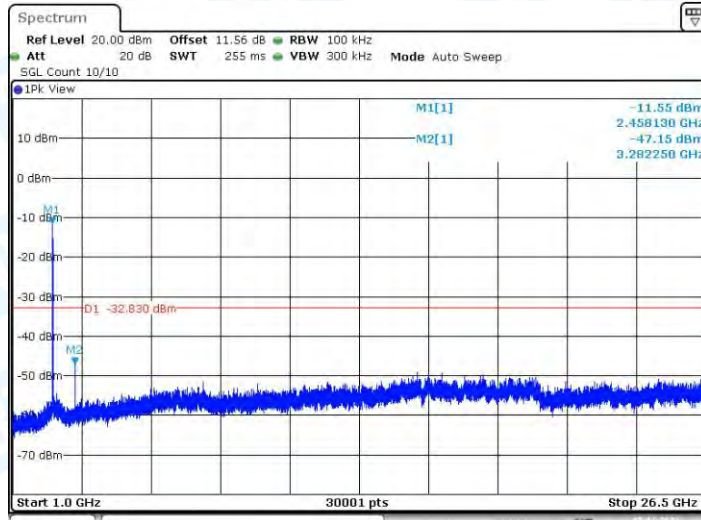
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11G_Ant1_2462_30~1000



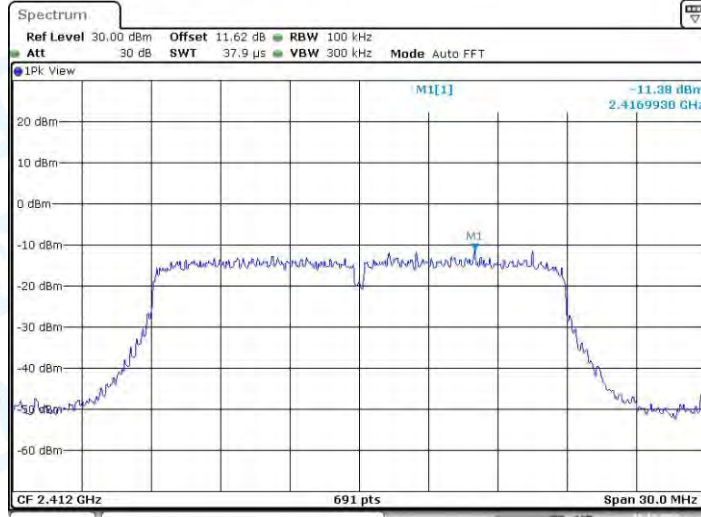
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11G_Ant1_2462_1000~26500

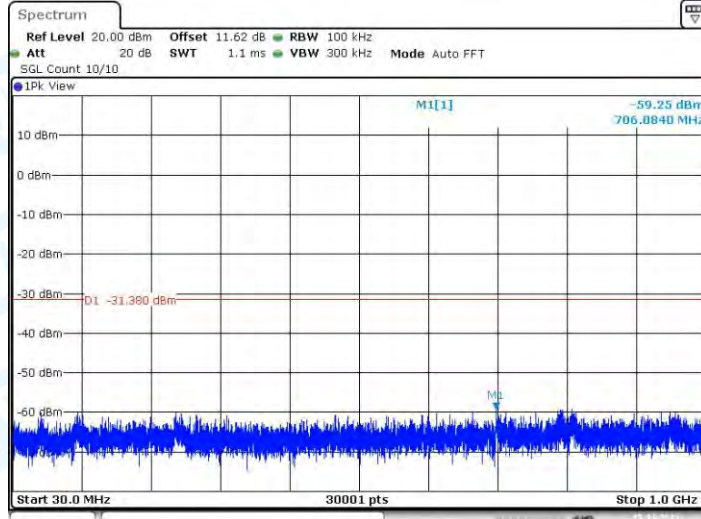


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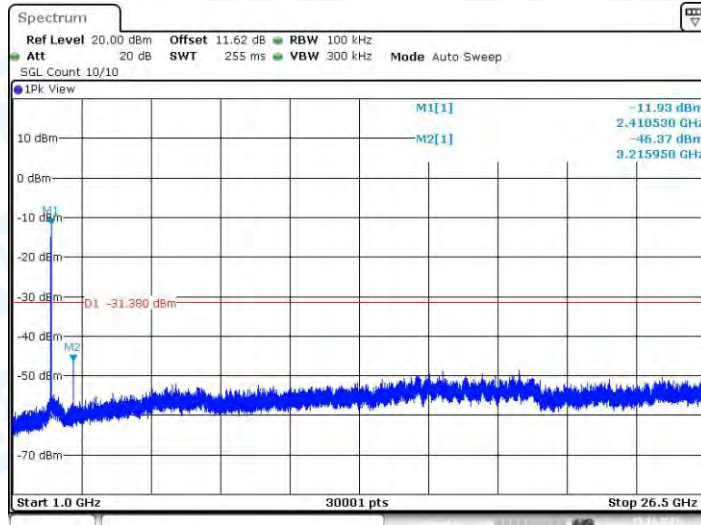
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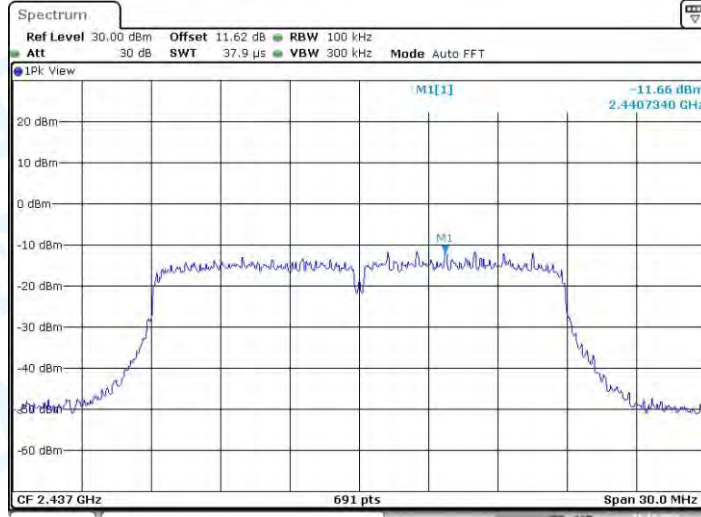
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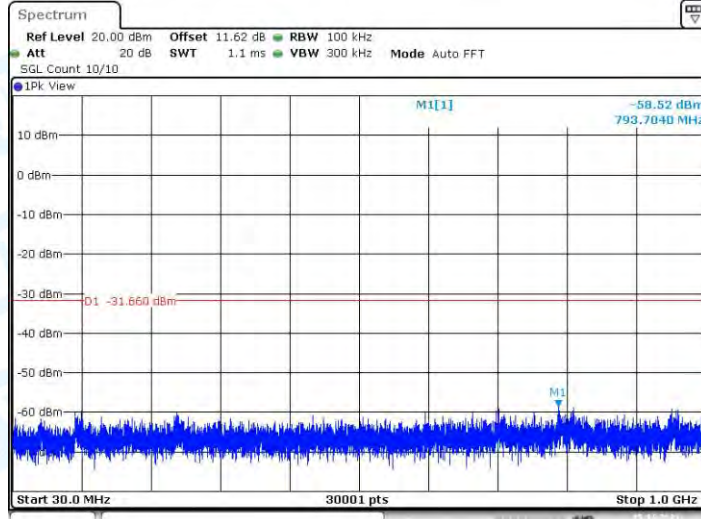
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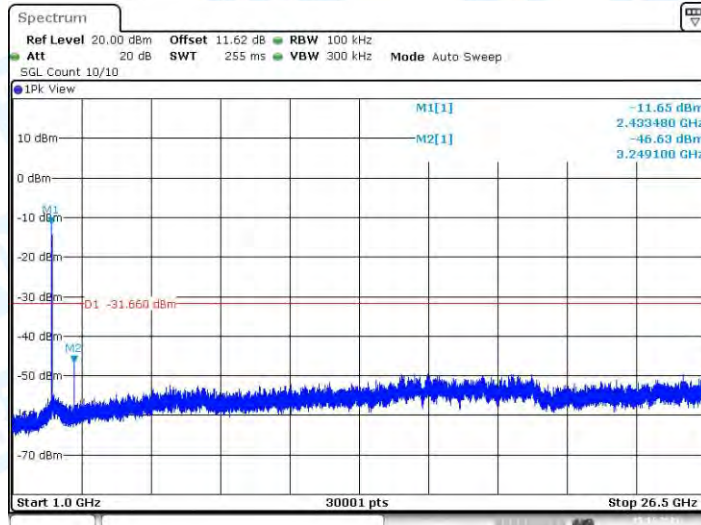
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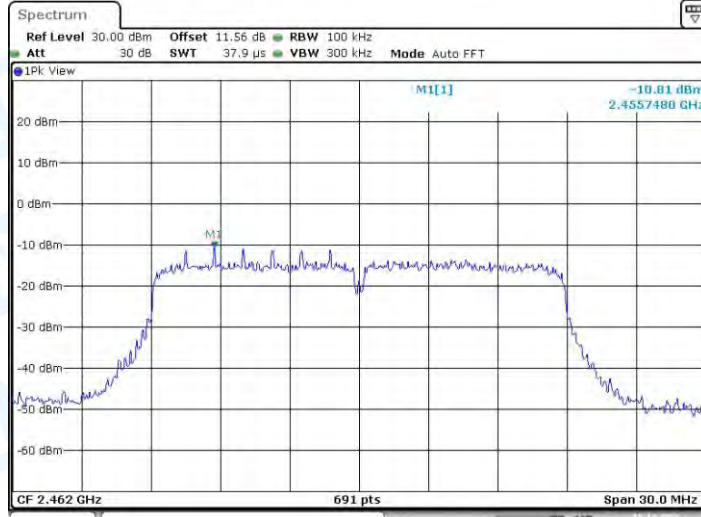
11N20SISO_Ant1_2437_30~1000



11N20SISO_Ant1_2437_1000~26500

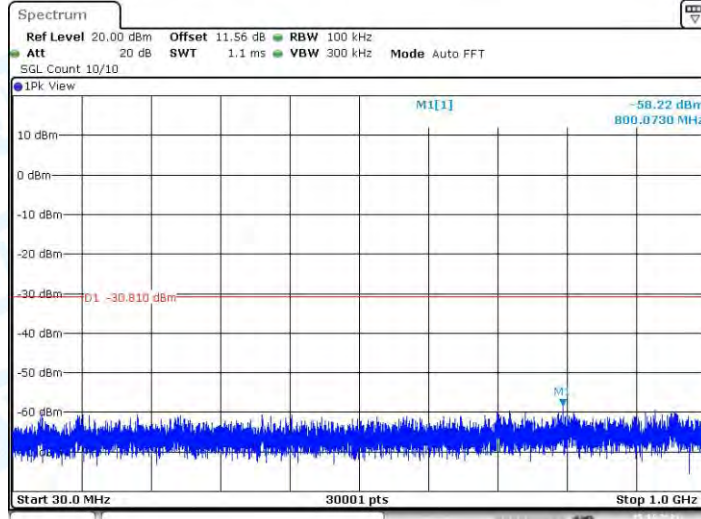


11N20SISO_Ant1_2462_0~Reference



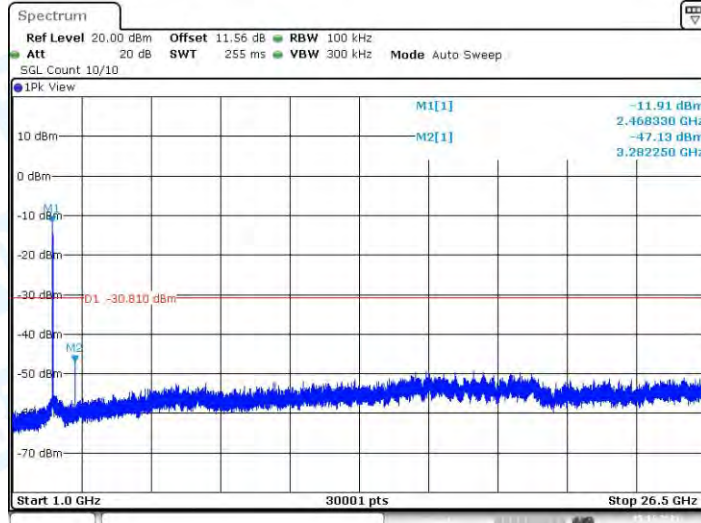
Date: 15.NOV.2021 14:49:58

11N20SISO_Ant1_2462_30~1000



Date: 15.NOV.2021 14:50:03

11N20SISO_Ant1_2462_1000~26500



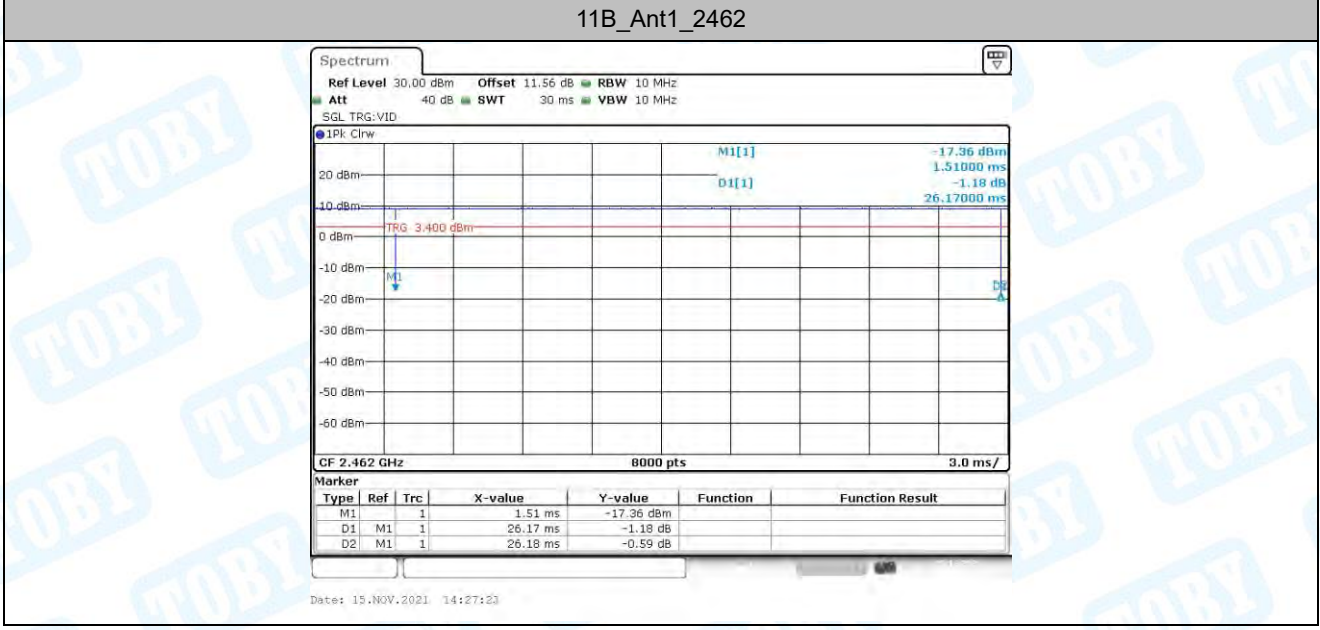
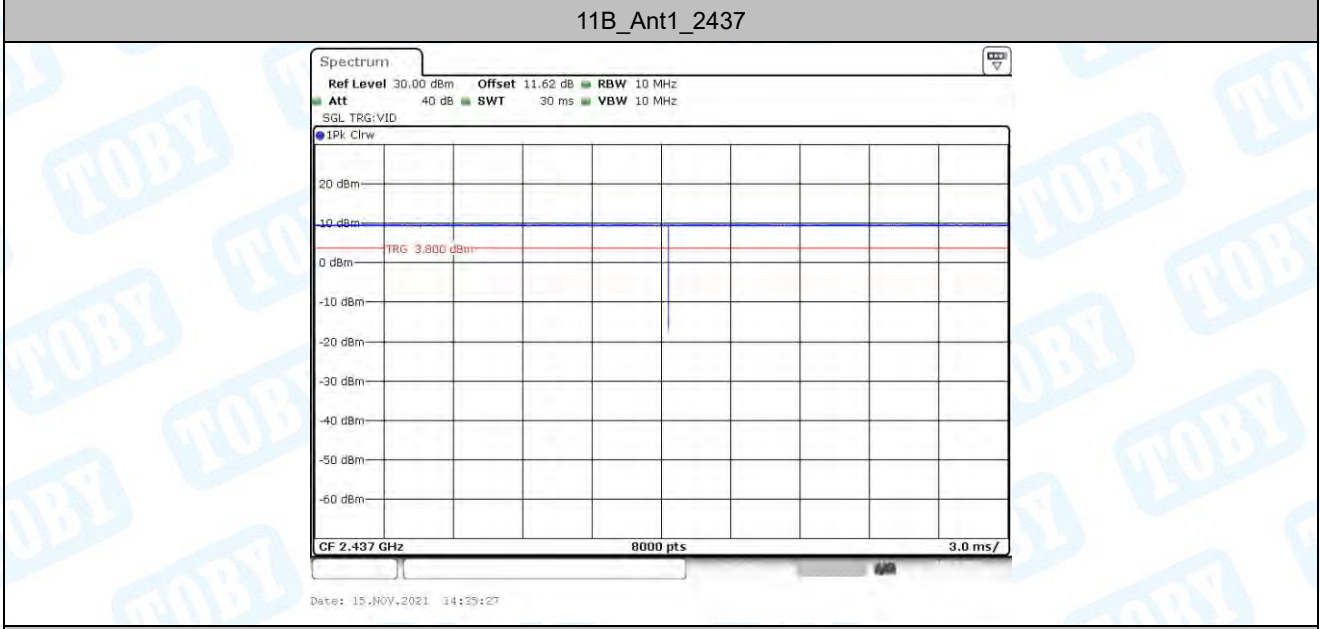
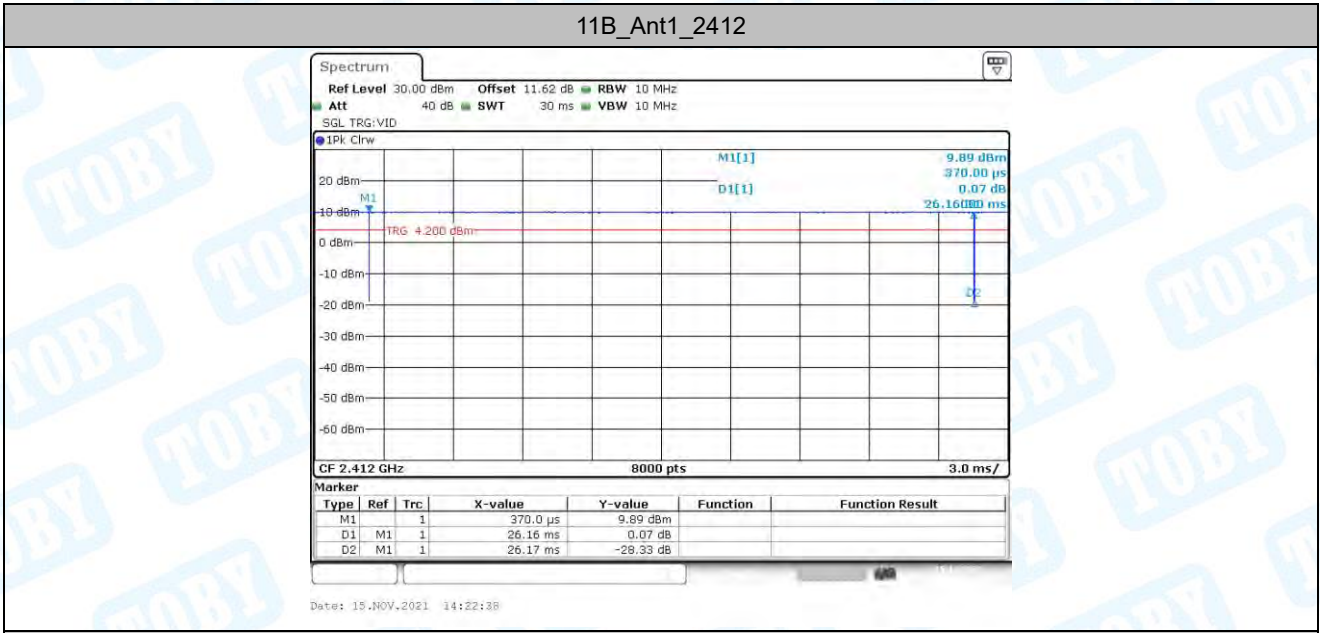
Date: 15.NOV.2021 14:50:26

7. Duty Cycle

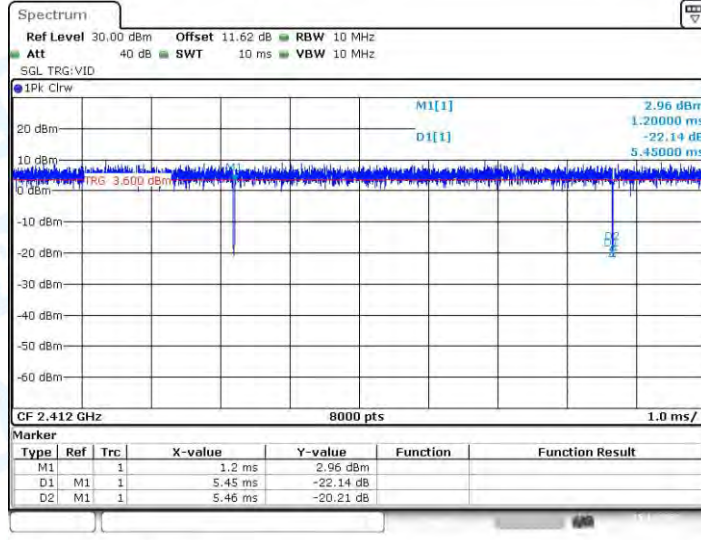
7.1. Test Result

Test Mode	Antenna	Channel	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]	1/T [KHz]	Limit	Verdict
11B	Ant1	2412	26.16	26.17	99.96	0.038	---	PASS
		2437	30.00	30.00	100.00	0.033	---	PASS
		2462	26.17	26.18	99.96	0.038	---	PASS
11G	Ant1	2412	5.45	5.46	99.82	0.183	---	PASS
		2437	5.45	5.47	99.63	0.183	---	PASS
		2462	5.45	5.46	99.82	0.183	---	PASS
11N20SISO	Ant1	2412	5.05	5.06	99.80	0.198	---	PASS
		2437	5.05	5.07	99.61	0.198	---	PASS
		2462	5.05	5.07	99.61	0.198	---	PASS

7.2. Test Graphs

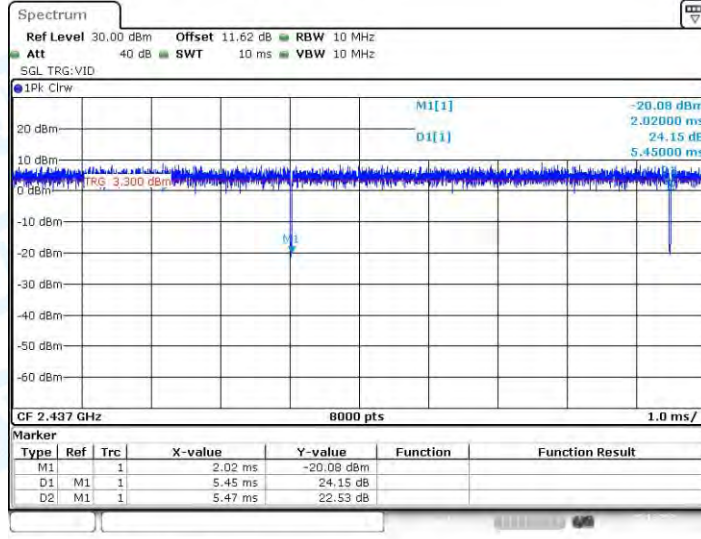


11G_Ant1_2412



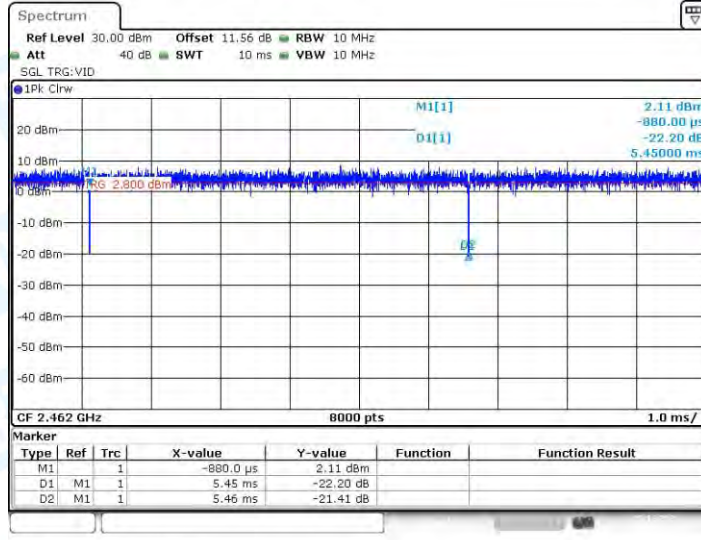
Date: 15.NOV.2021 14:33:00

11G_Ant1_2437



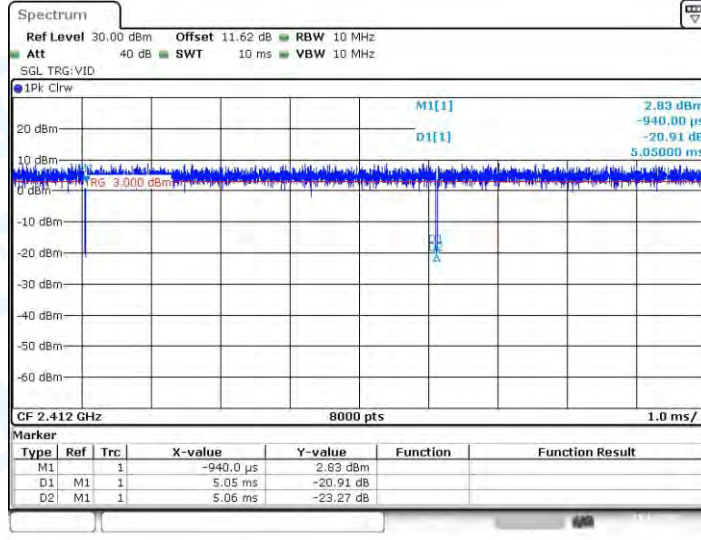
Date: 15.NOV.2021 14:36:03

11G_Ant1_2462



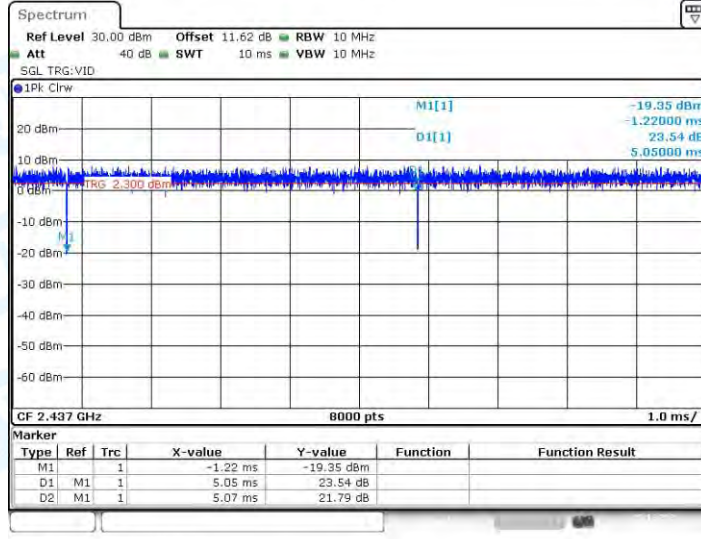
Date: 15.NOV.2021 14:40:24

11N20SISO_Ant1_2412



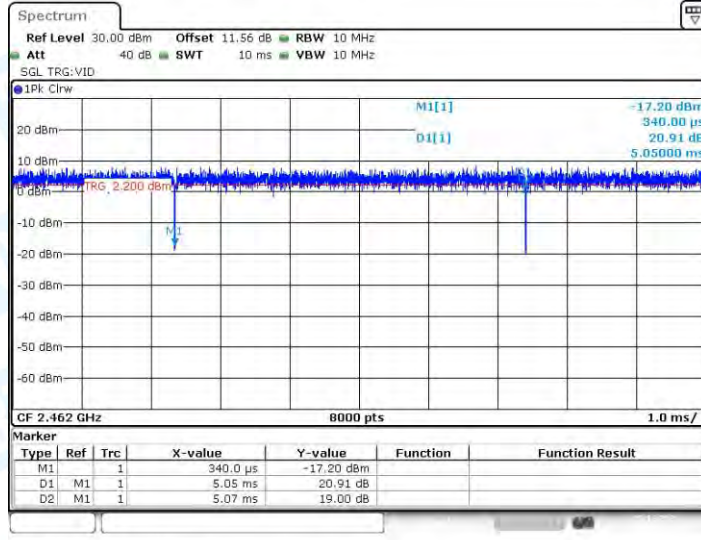
Date: 15.NOV.2021 14:43:22

11N20SISO_Ant1_2437



Date: 15.NOV.2021 14:46:06

11N20SISO_Ant1_2462



Date: 15.NOV.2021 14:48:03

8. Emissions in Restricted Bands

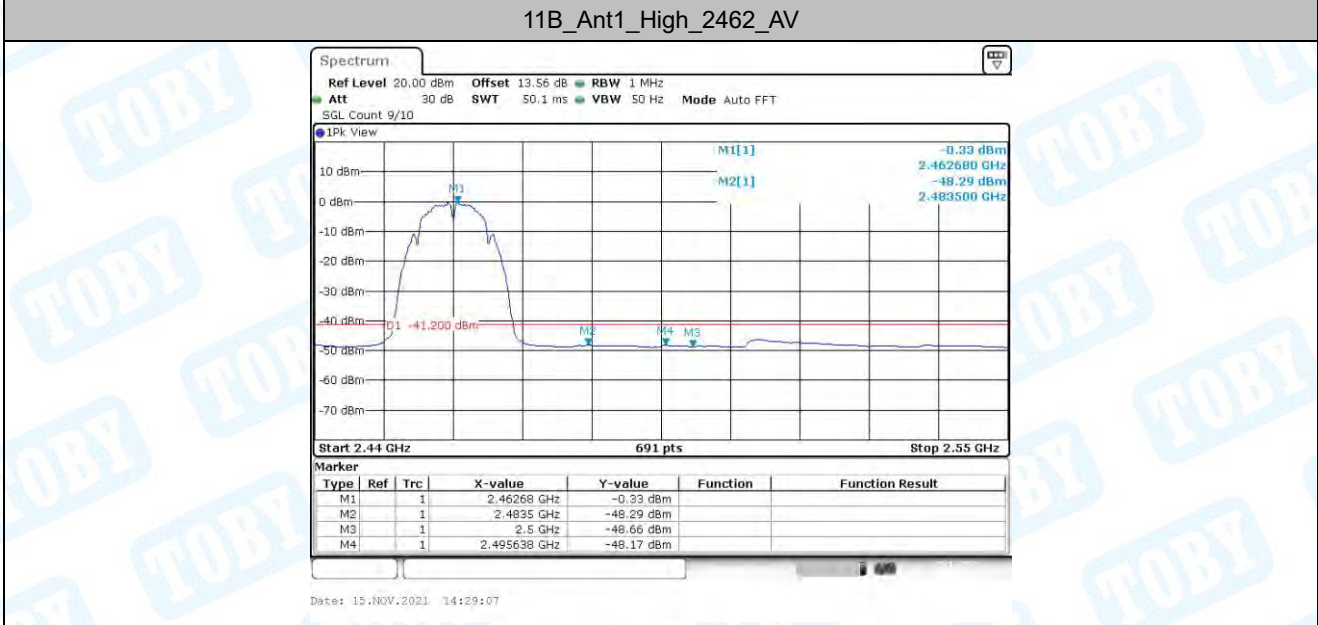
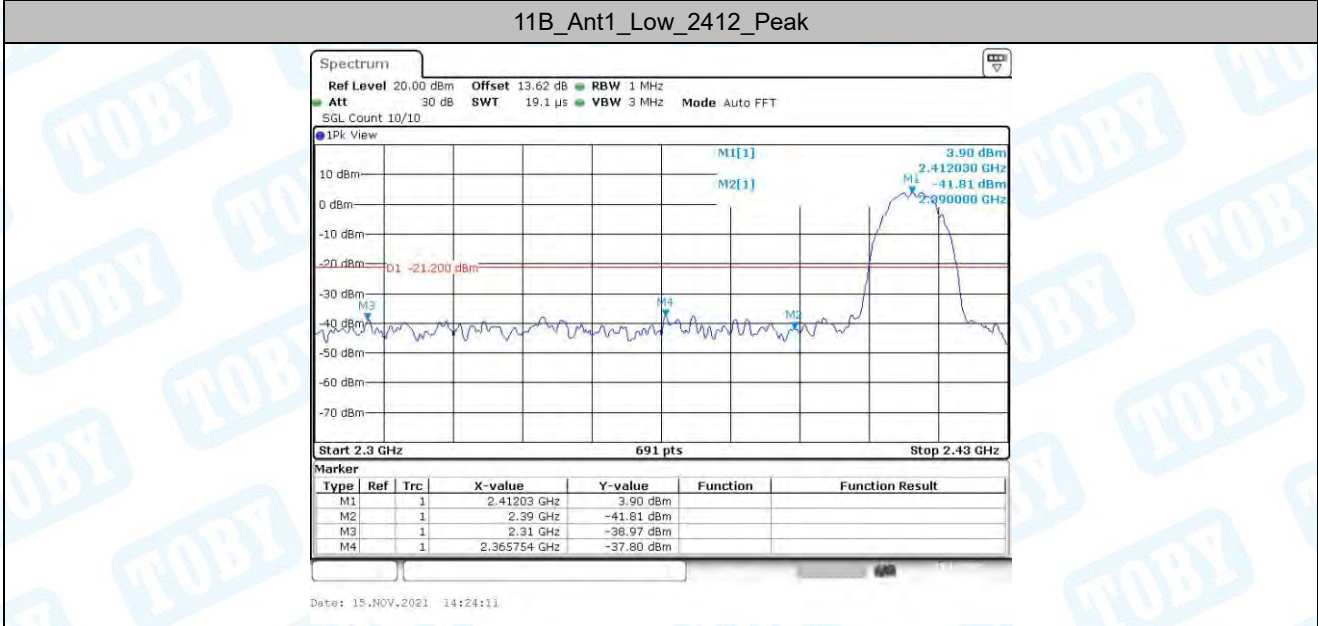
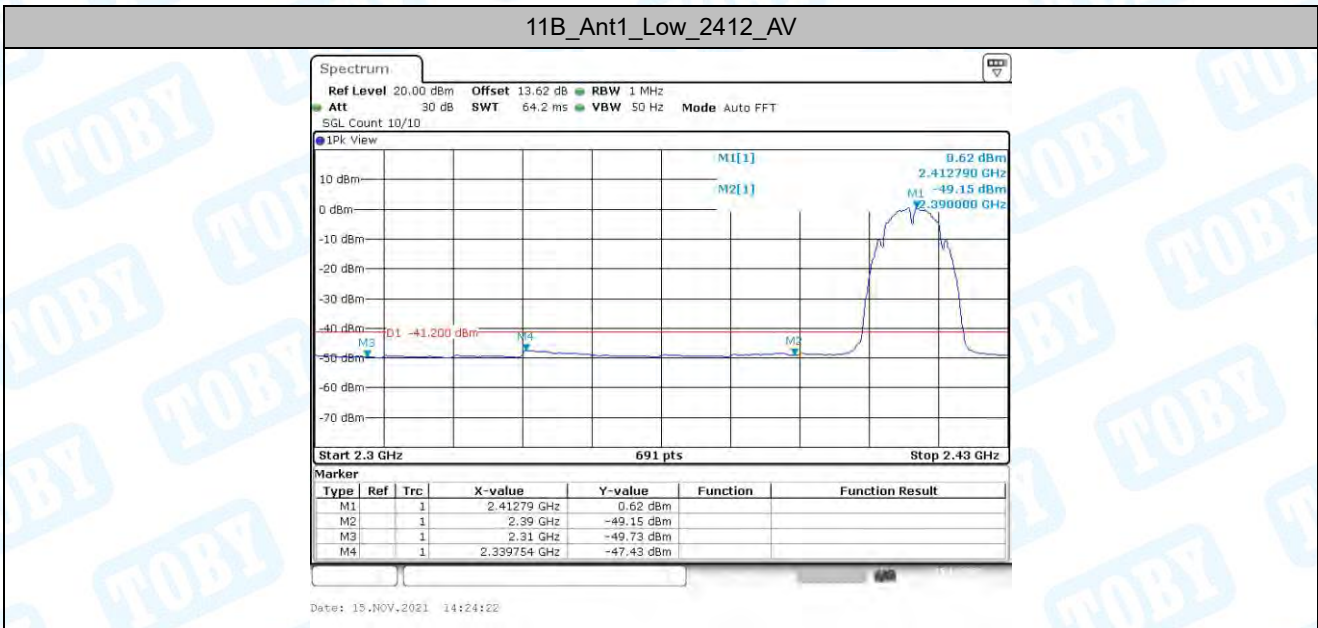
8.1. Test Result

TestMode	Antenna	ChName	Channel	Detector	Freq [MHz]	Result [dBm]	Limit [dBm]	Verdict
11B	Ant1	Low	2412	AV	2310.000	-49.73	≤-41.20	PASS
				AV	2339.754	-47.43	≤-41.20	PASS
				AV	2390.000	-49.15	≤-41.20	PASS
				Peak	2310.000	-38.97	≤-21.20	PASS
				Peak	2365.754	-37.8	≤-21.20	PASS
				Peak	2390.000	-41.81	≤-21.20	PASS
		High	2462	AV	2483.500	-48.29	≤-41.20	PASS
				AV	2495.638	-48.17	≤-41.20	PASS
				AV	2500.000	-48.66	≤-41.20	PASS
				Peak	2483.500	-41.37	≤-21.20	PASS
				Peak	2495.957	-37.59	≤-21.20	PASS
				Peak	2500.000	-43.68	≤-21.20	PASS
11G	Ant1	Low	2412	AV	2310.000	-49.55	≤-41.20	PASS
				AV	2340.130	-47.23	≤-41.20	PASS
				AV	2390.000	-49.34	≤-41.20	PASS
				Peak	2310.000	-44.83	≤-21.20	PASS
				Peak	2340.319	-37.7	≤-21.20	PASS
				Peak	2390.000	-41.69	≤-21.20	PASS
		High	2462	AV	2483.500	-48.32	≤-41.20	PASS
				AV	2495.638	-48.04	≤-41.20	PASS
				AV	2500.000	-48.61	≤-41.20	PASS
				Peak	2483.500	-39.67	≤-21.20	PASS
				Peak	2496.116	-38.04	≤-21.20	PASS
				Peak	2500.000	-41.49	≤-21.20	PASS
11N20SISO	Ant1	Low	2412	AV	2310.000	-49.58	≤-41.20	PASS
				AV	2339.942	-47.22	≤-41.20	PASS
				AV	2390.000	-49.29	≤-41.20	PASS
				Peak	2310.000	-39.83	≤-21.20	PASS
				Peak	2347.290	-38.32	≤-21.20	PASS
				Peak	2390.000	-42.86	≤-21.20	PASS
		High	2462	AV	2483.500	-48.25	≤-41.20	PASS
				AV	2495.638	-47.92	≤-41.20	PASS
				AV	2500.000	-48.55	≤-41.20	PASS
				Peak	2483.500	-39.79	≤-21.20	PASS
				Peak	2492.290	-38.64	≤-21.20	PASS
				Peak	2500.000	-45.45	≤-21.20	PASS

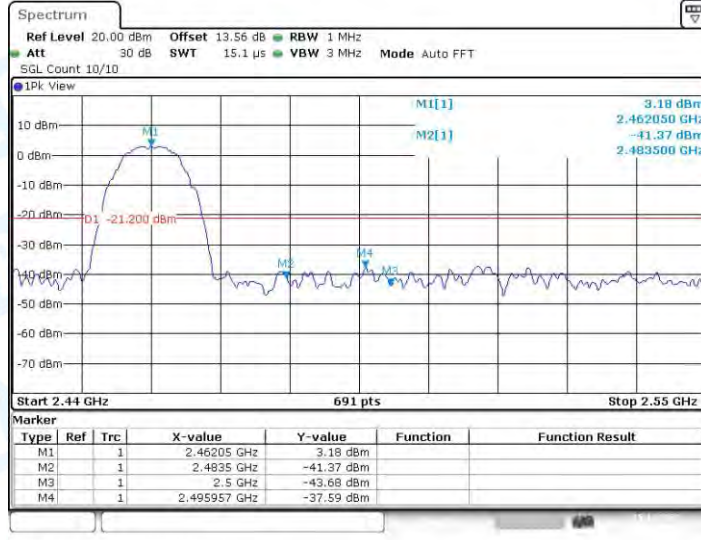
Note:

- The Antenna Gain is compensated in the graph.
- The limit in dBm for average detector is conversion from 54dBuV/m, according to 15.209(a). The limit in dBm for peak detector is 20dB above the limit of average detector in dBm.

8.2. Test Graphs

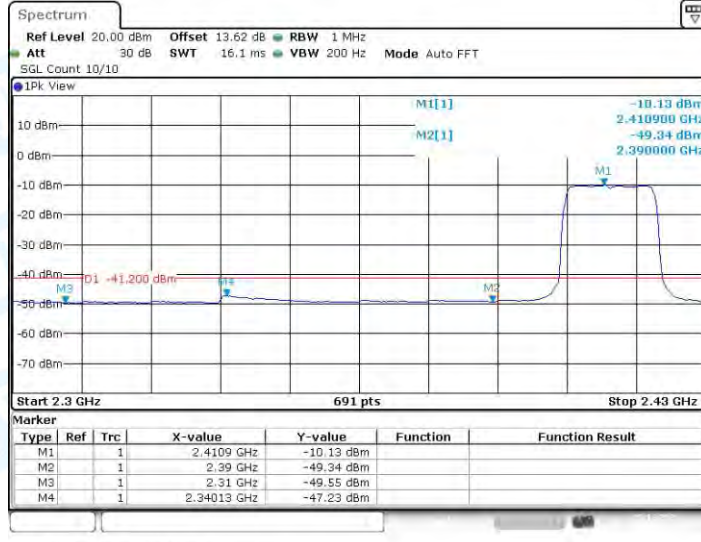


11B_Ant1_High_2462_Peak



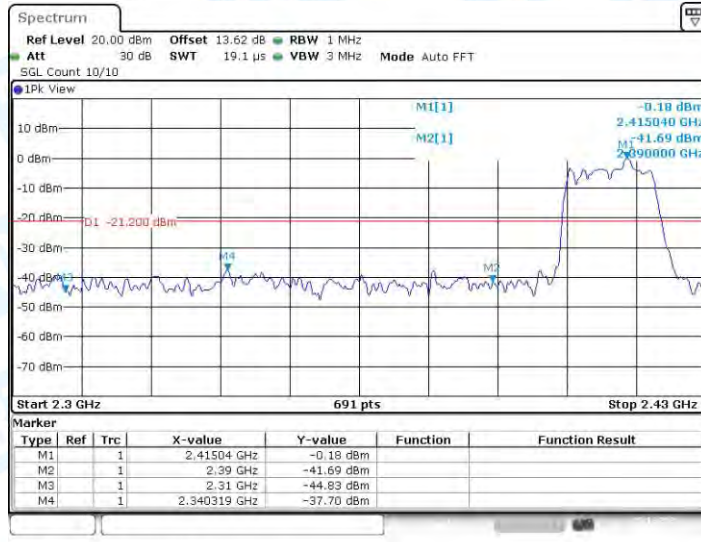
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11G_Ant1_Low_2412_AV



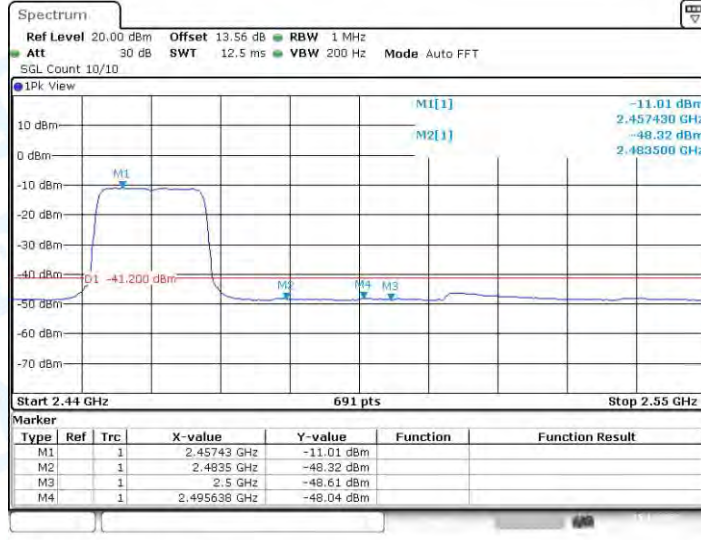
Date: 15.NOV.2021 14:34:44

11G_Ant1_Low_2412_Peak



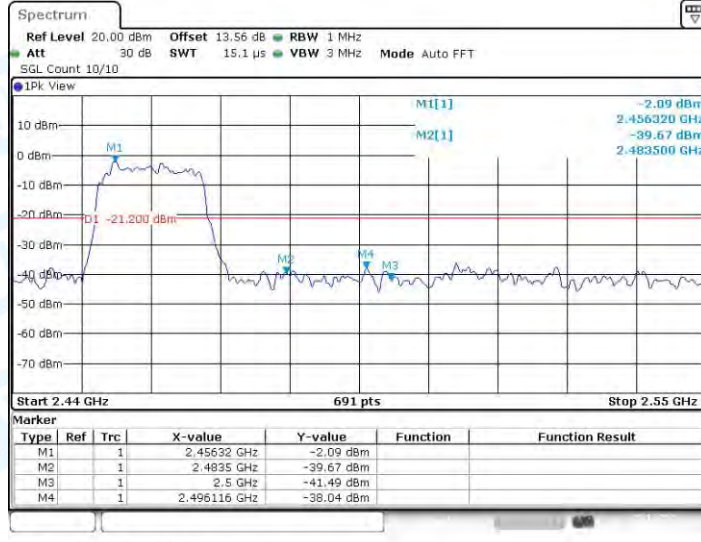
Date: 15.NOV.2021 14:34:32

11G_Ant1_High_2462_AV



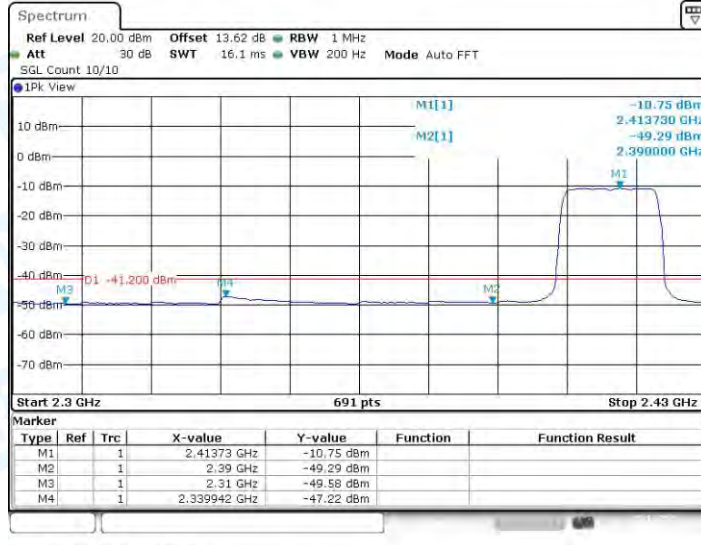
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11G_Ant1_High_2462_Peak



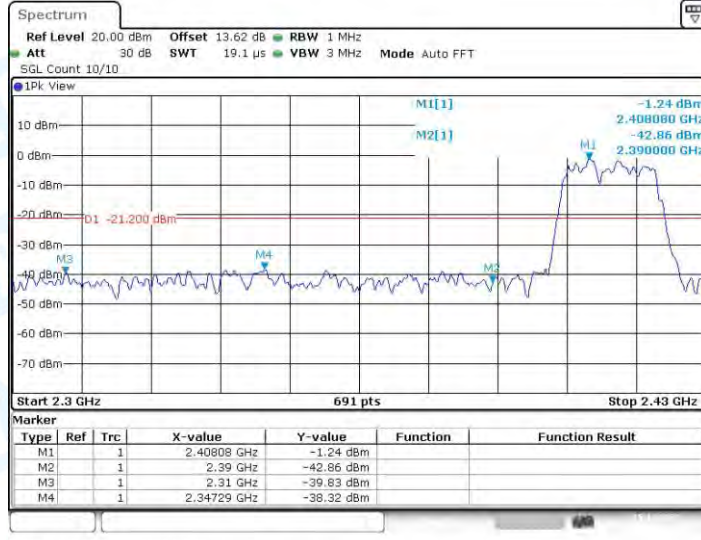
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11N20SISO_Ant1_Low_2412_AV

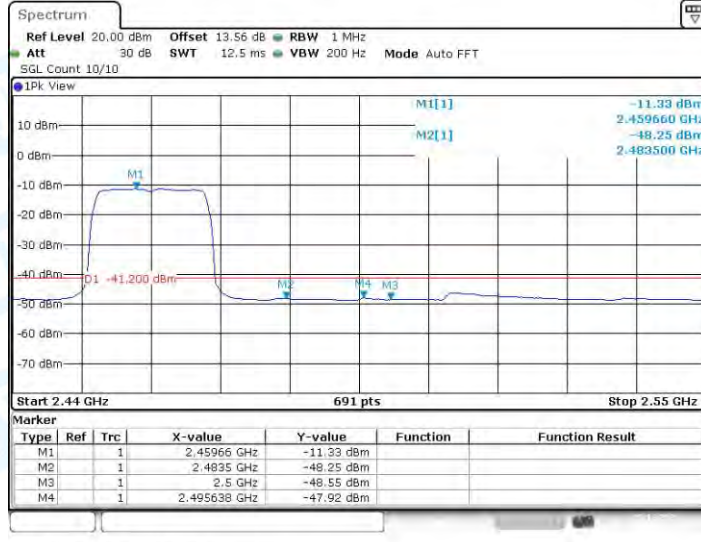


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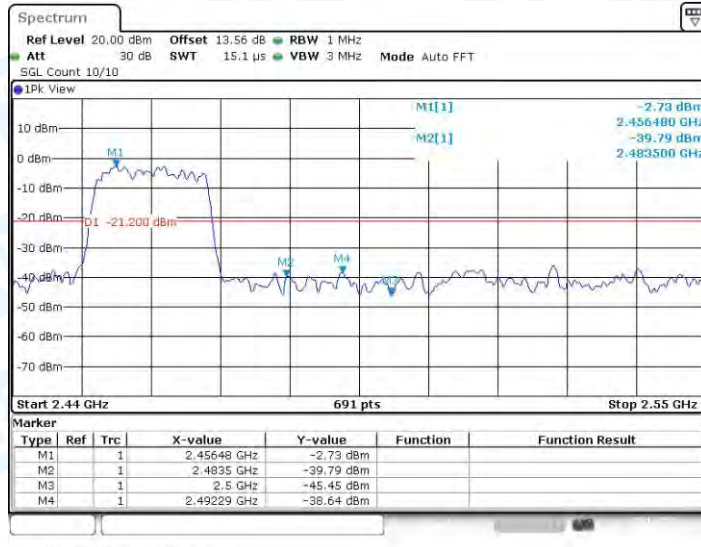
11N20SISO_Ant1_Low_2412_Peak



11N20SISO_Ant1_High_2462_AV



11N20SISO_Ant1_High_2462_Peak



-----End of the report-----