

FCC Appendix RF Test Data for BLE

FCC ID : 2A4PQ-ZBY-78S-1303

Company : ALLPOWERS Industrial International Limited

EUT : Bluetooth module

Model Number : ZBY-78S

Report No. : CTA26030901701

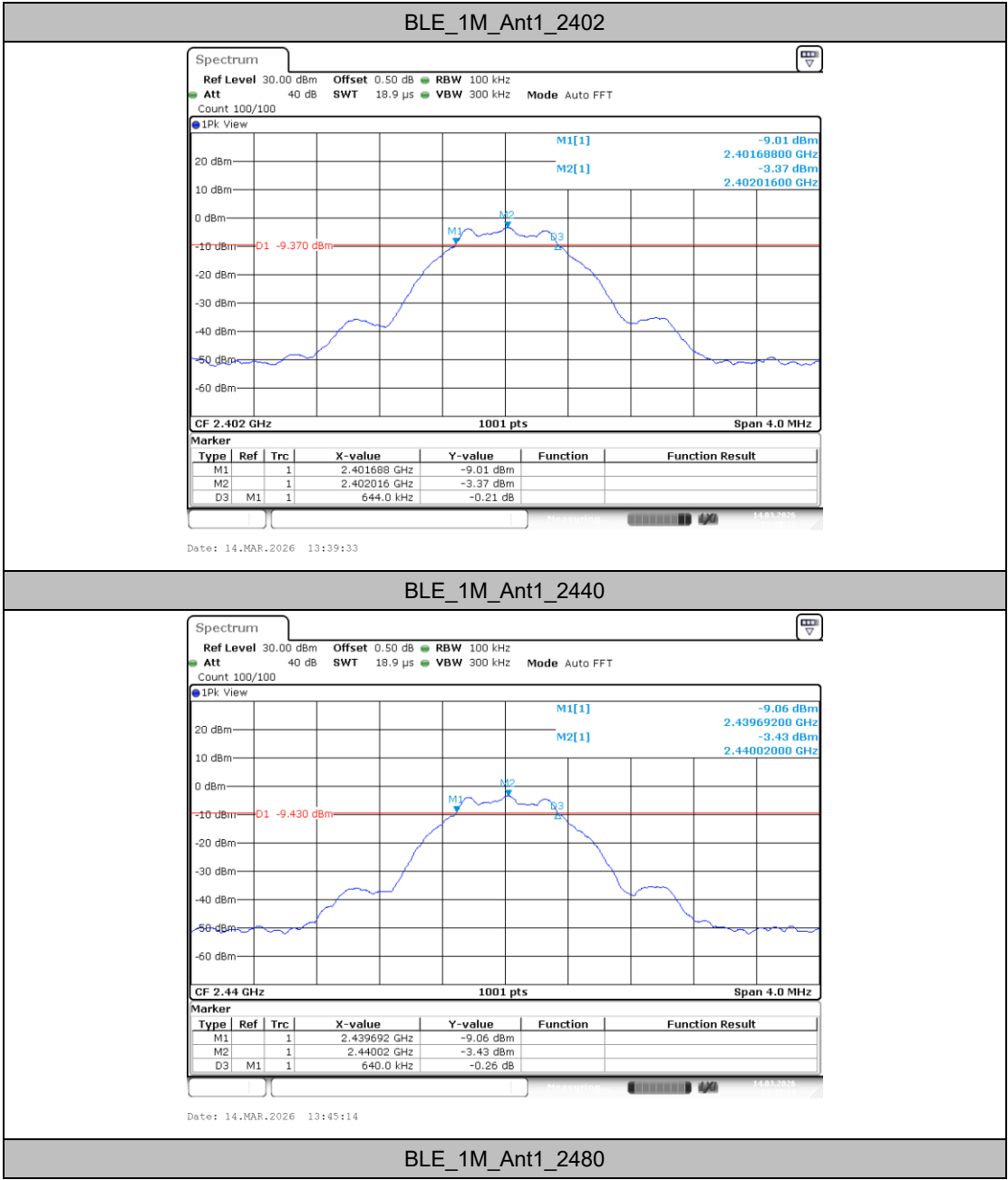
Reviewed By : Eric Wang

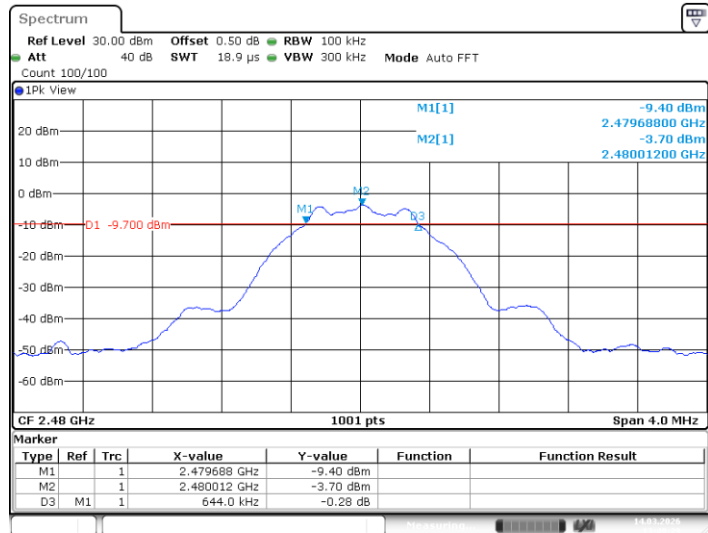
Appendix A: DTS Bandwidth

Test Result

TestMode	Antenna	Freq(MHz)	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	0.64	2401.69	2402.33	0.5	PASS
		2440	0.64	2439.69	2440.33	0.5	PASS
		2480	0.64	2479.69	2480.33	0.5	PASS
BLE_2M	Ant1	2402	1.12	2401.44	2402.56	0.5	PASS
		2440	1.13	2439.44	2440.57	0.5	PASS
		2480	1.12	2479.44	2480.57	0.5	PASS

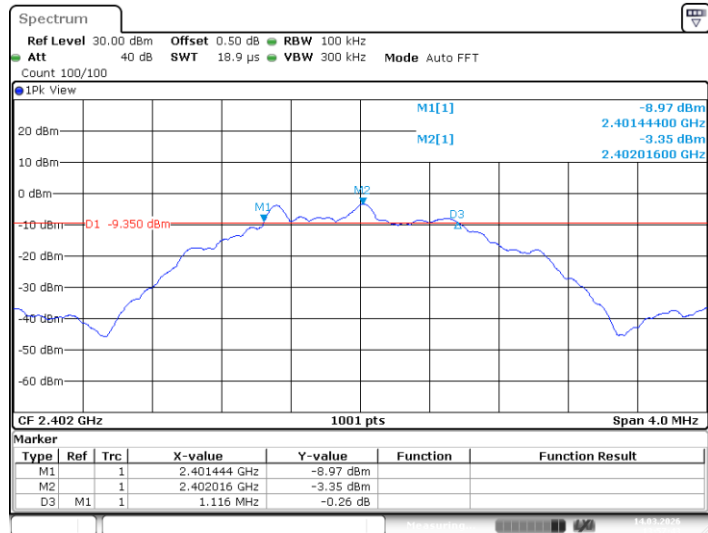
Test Graphs





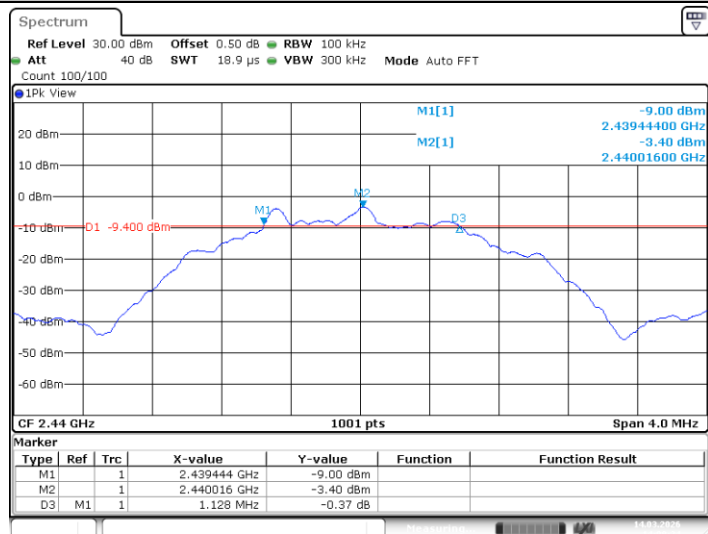
Date: 14.MAR.2026 13:49:28

BLE_2M_Ant1_2402



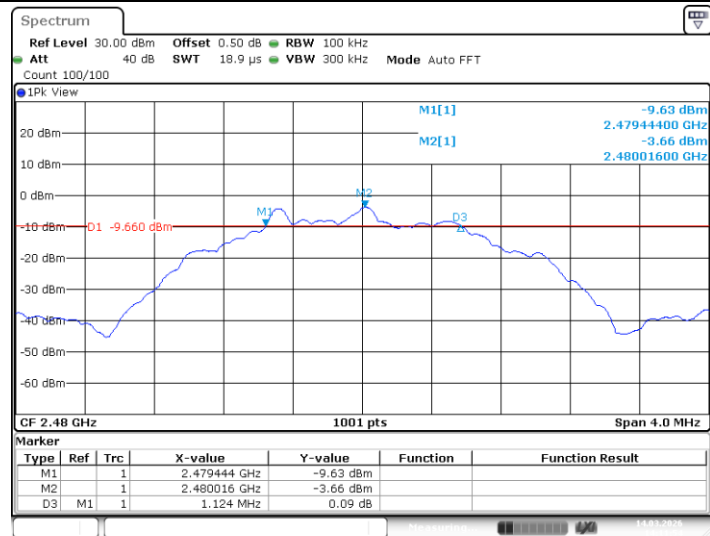
Date: 14.MAR.2026 13:57:43

BLE_2M_Ant1_2440



Date: 14.MAR.2026 14:09:23

BLE_2M_Ant1_2480

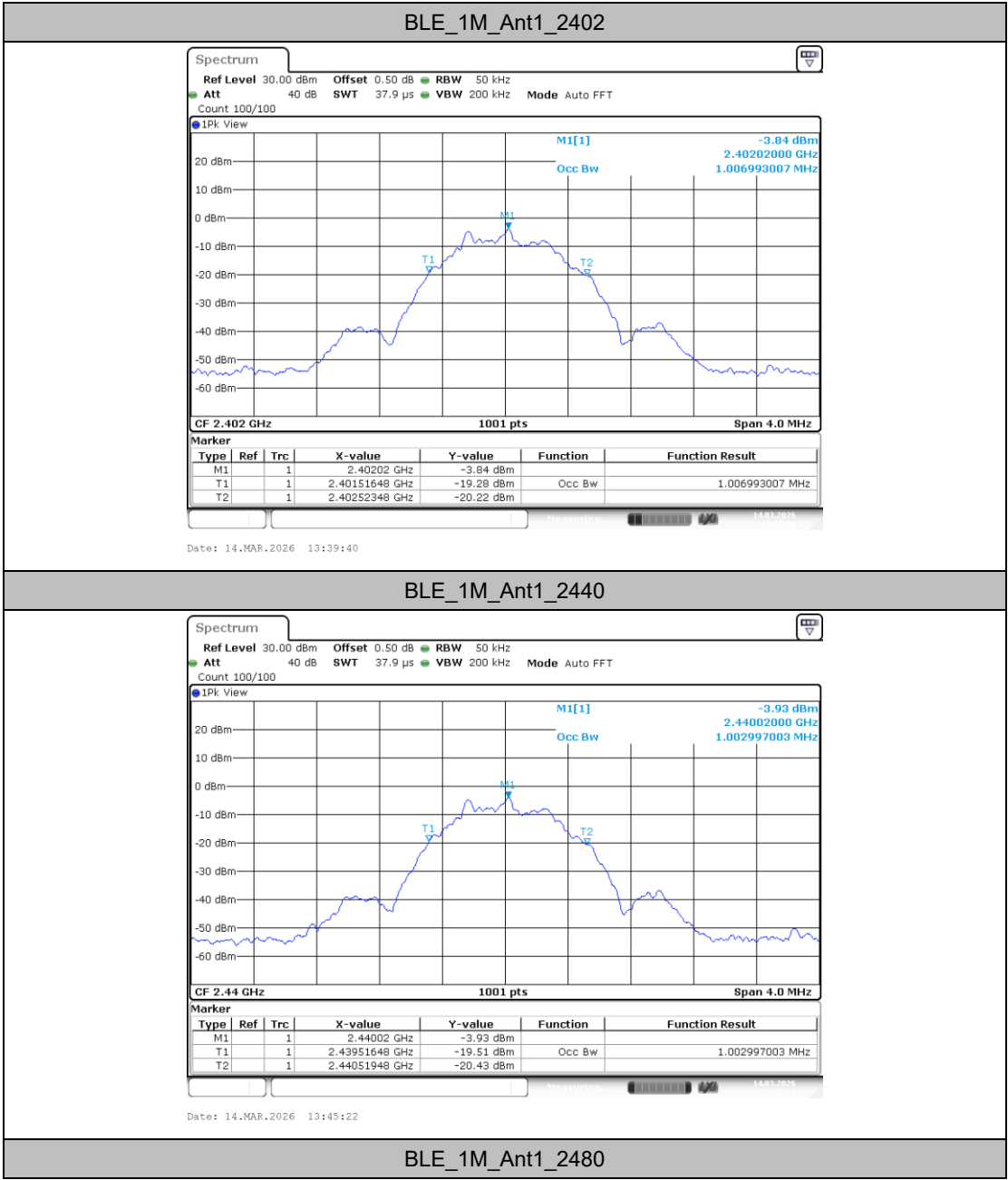


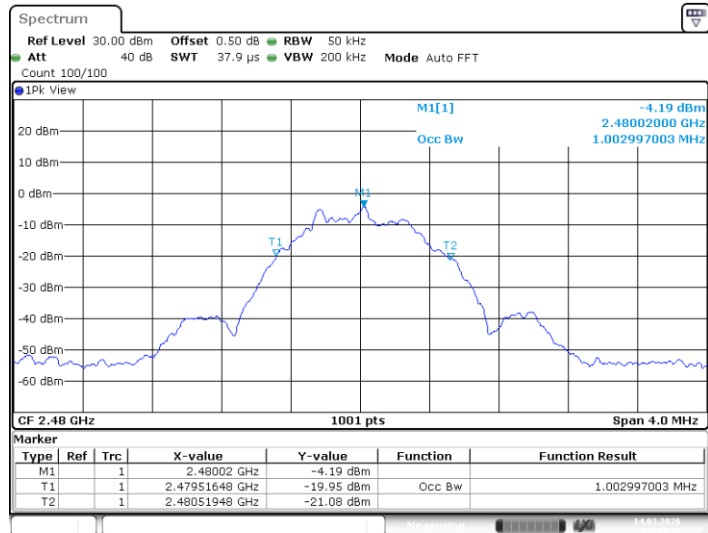
Appendix B: Occupied Channel Bandwidth

Test Result

TestMode	Antenna	Freq(MHz)	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	1.0070	2401.5165	2402.5235	---	---
		2440	1.0030	2439.5165	2440.5195	---	---
		2480	1.0030	2479.5165	2480.5195	---	---
BLE_2M	Ant1	2402	2.0020	2401.0290	2403.0310	---	---
		2440	2.0060	2439.0250	2441.0310	---	---
		2480	2.0020	2479.0290	2481.0310	---	---

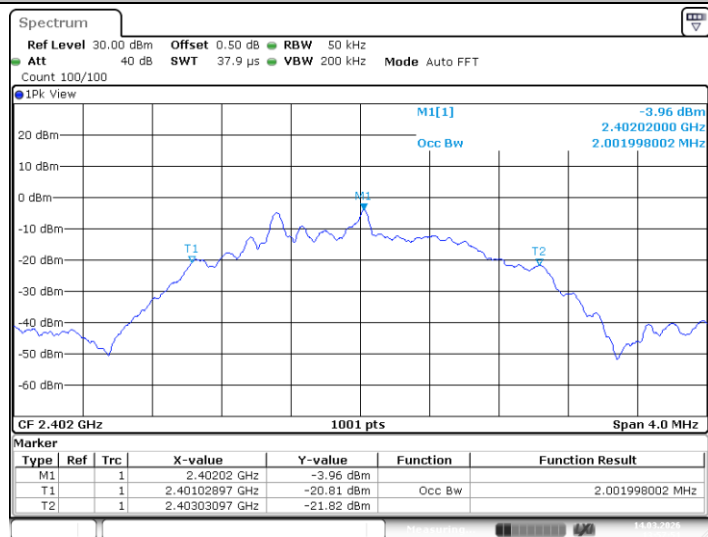
Test Graphs





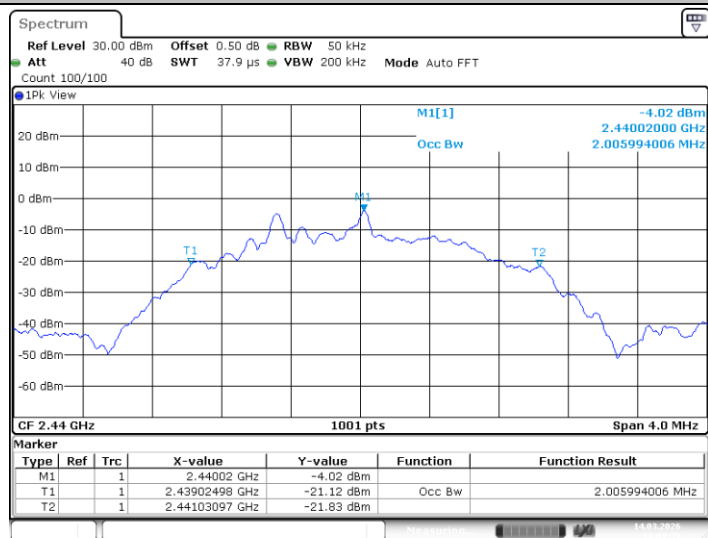
Date: 14.MAR.2026 13:49:36

BLE_2M_Ant1_2402



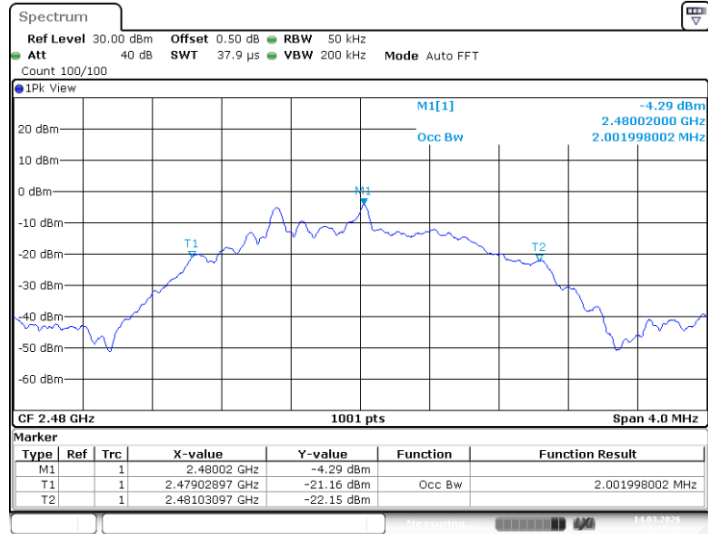
Date: 14.MAR.2026 13:57:51

BLE_2M_Ant1_2440



Date: 14.MAR.2026 14:09:31

BLE_2M_Ant1_2480



Date: 14.MAR.2026 14:12:01

Appendix C: Maximum conducted output power

Test Result Peak

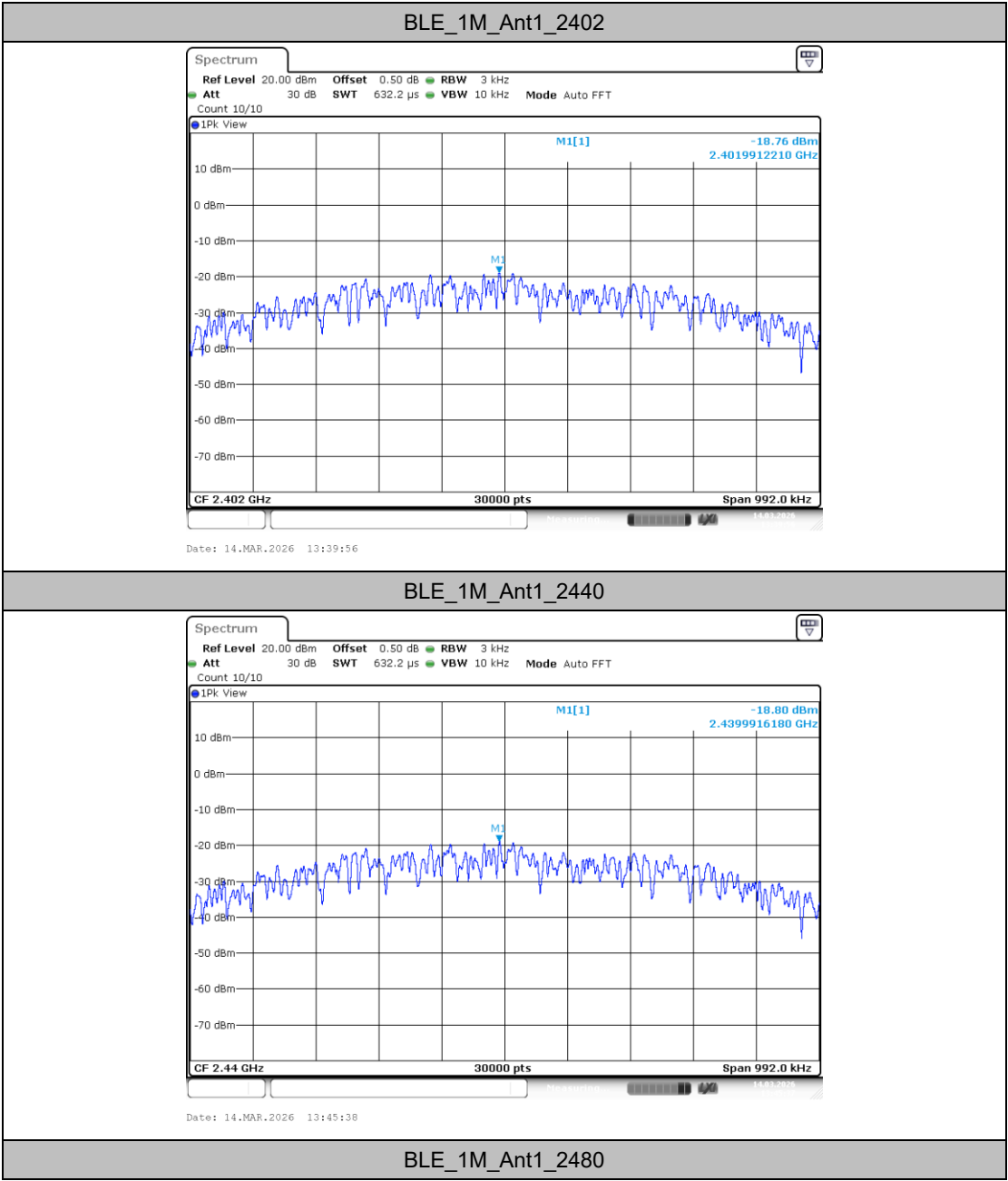
TestMode	Antenna	Freq(MHz)	Conducted Peak Power[dBm]	Conducted Limit[dBm]	Verdict
BLE_1M	Ant1	2402	-3.21	≤30	PASS
		2440	-3.30	≤30	PASS
		2480	-3.61	≤30	PASS
BLE_2M	Ant1	2402	-3.27	≤30	PASS
		2440	-3.35	≤30	PASS
		2480	-3.63	≤30	PASS

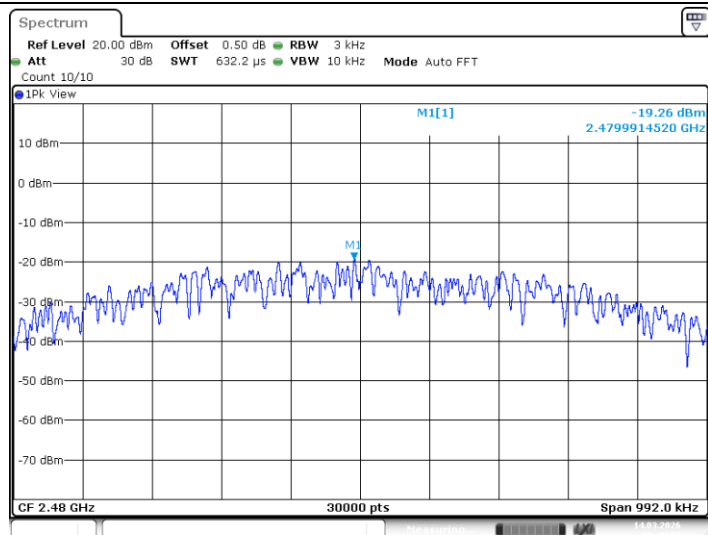
Appendix D: Maximum power spectral density

Test Result

TestMode	Antenna	Freq(MHz)	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
BLE_1M	Ant1	2402	-18.76	≤8.00	PASS
		2440	-18.80	≤8.00	PASS
		2480	-19.26	≤8.00	PASS
BLE_2M	Ant1	2402	-20.11	≤8.00	PASS
		2440	-19.97	≤8.00	PASS
		2480	-20.38	≤8.00	PASS

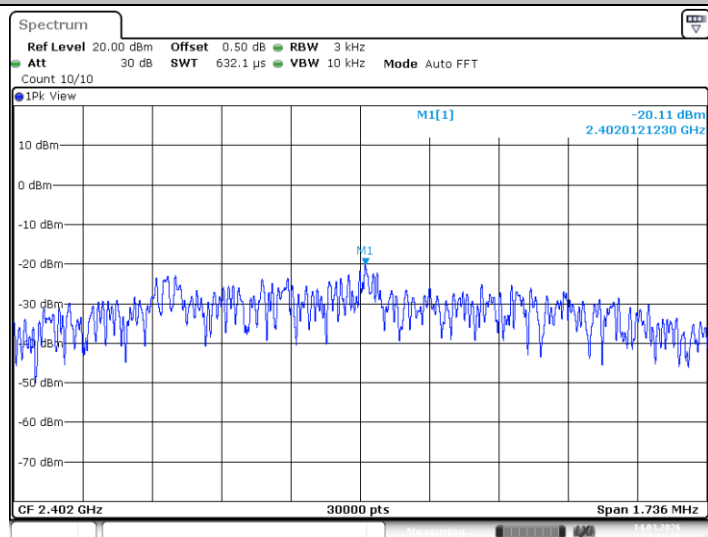
Test Graphs





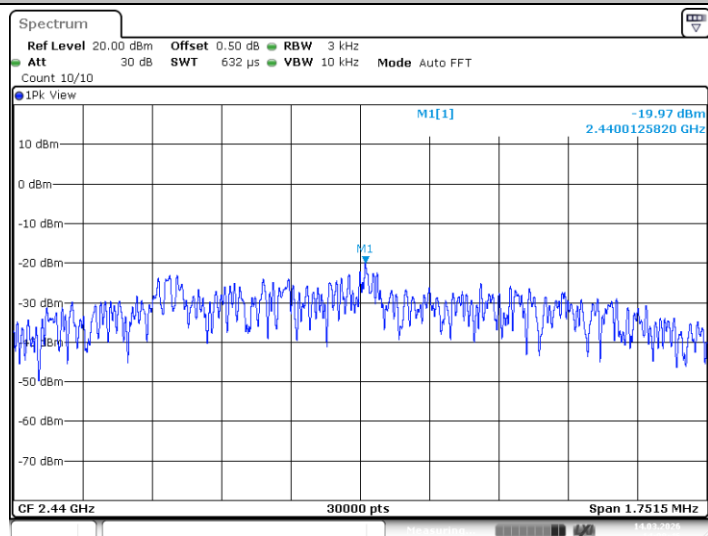
Date: 14.MAR.2026 13:49:52

BLE_2M_Ant1_2402



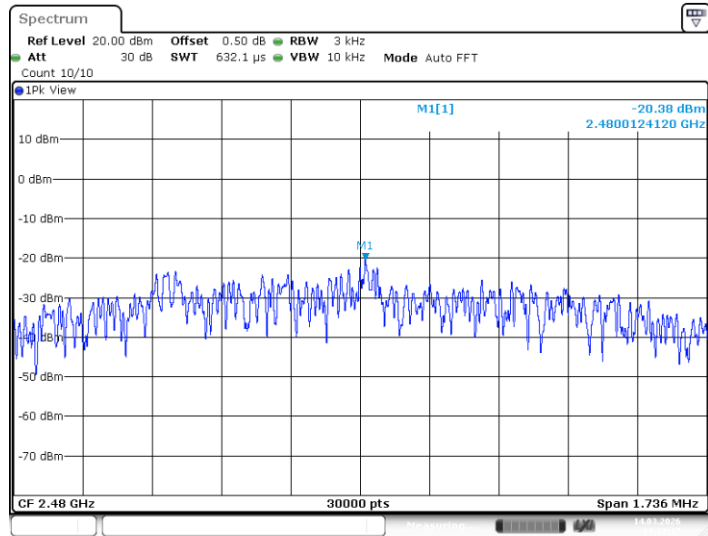
Date: 14.MAR.2026 13:58:07

BLE_2M_Ant1_2440



Date: 14.MAR.2026 14:09:47

BLE_2M_Ant1_2480



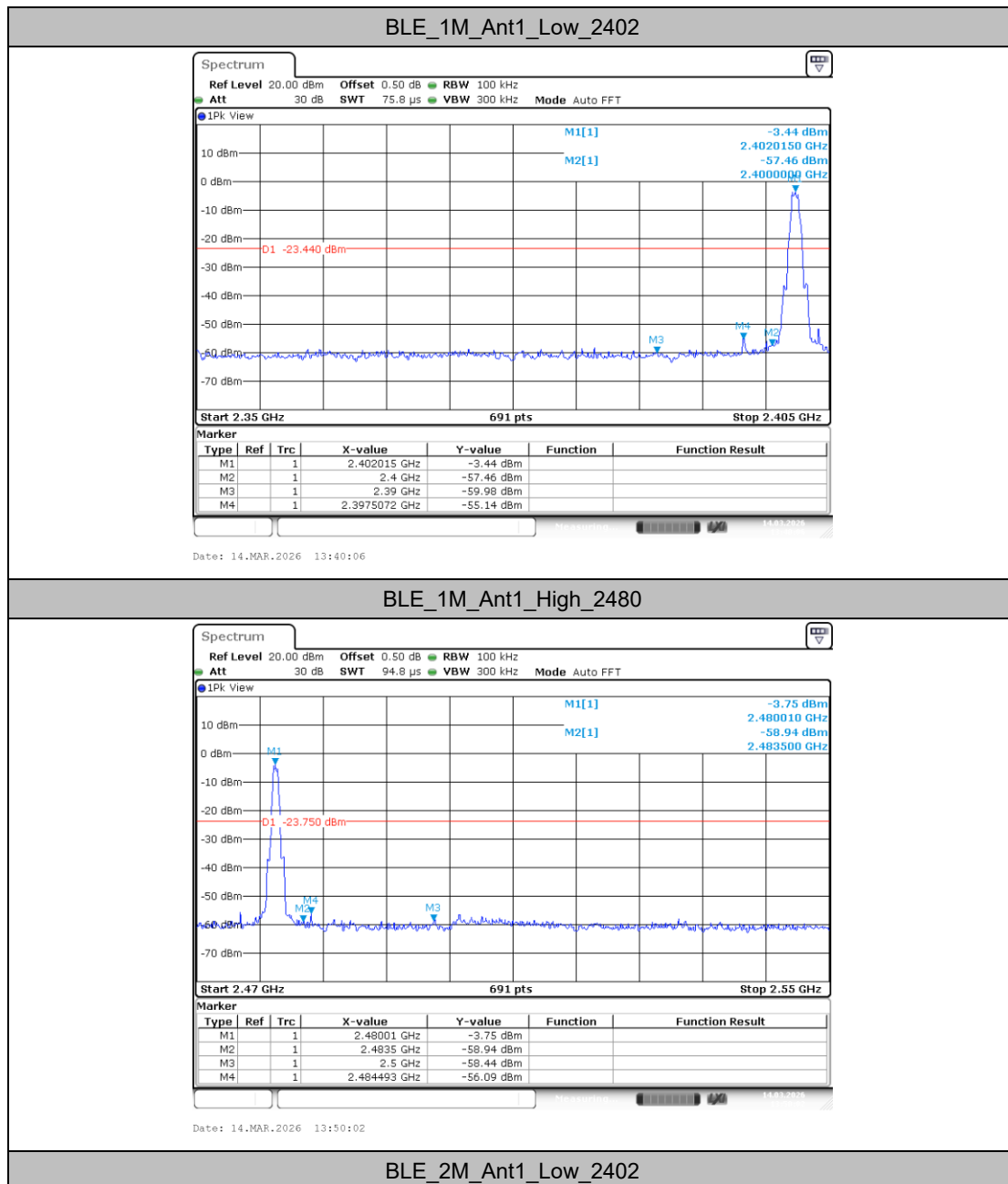
Date: 14.MAR.2026 14:12:17

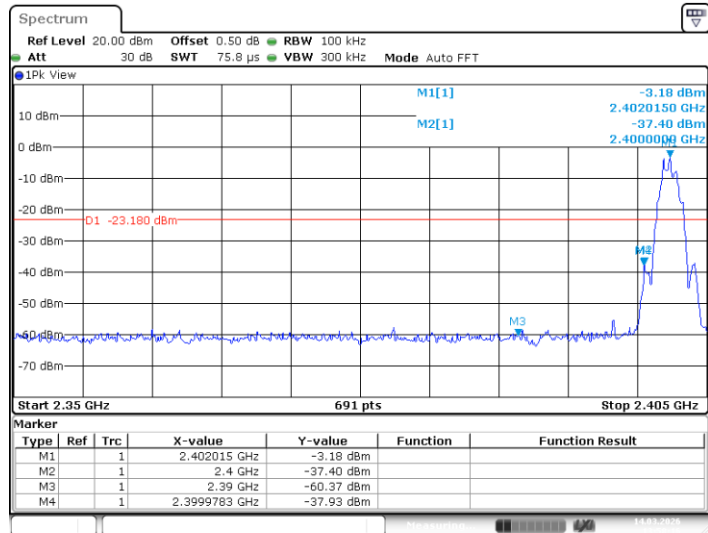
Appendix E: Band edge measurements

Test Result

TestMod e	Antenn a	ChNam e	Freq(MHz)	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdic t
BLE_1M	Ant1	Low	2402	-3.44	-55.14	≤-23.44	PASS
		High	2480	-3.75	-56.09	≤-23.75	PASS
BLE_2M	Ant1	Low	2402	-3.18	-37.93	≤-23.18	PASS
		High	2480	-3.73	-55.86	≤-23.73	PASS

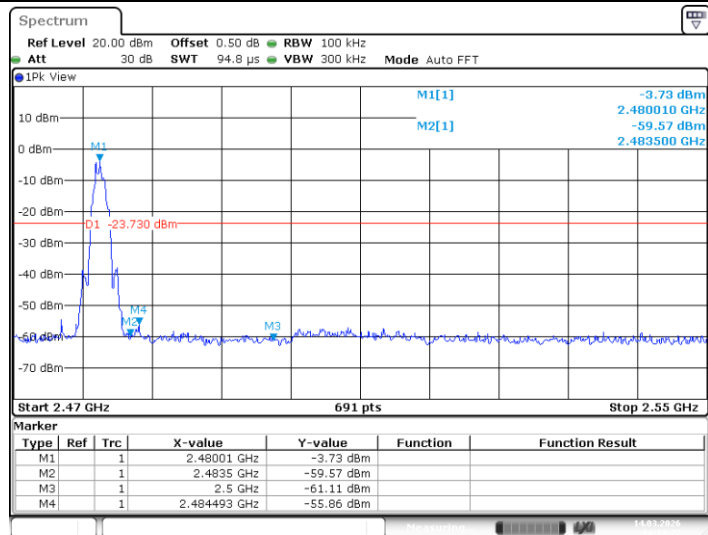
Test Graphs





Date: 14.MAR.2026 13:58:17

BLE_2M_Ant1_High_2480



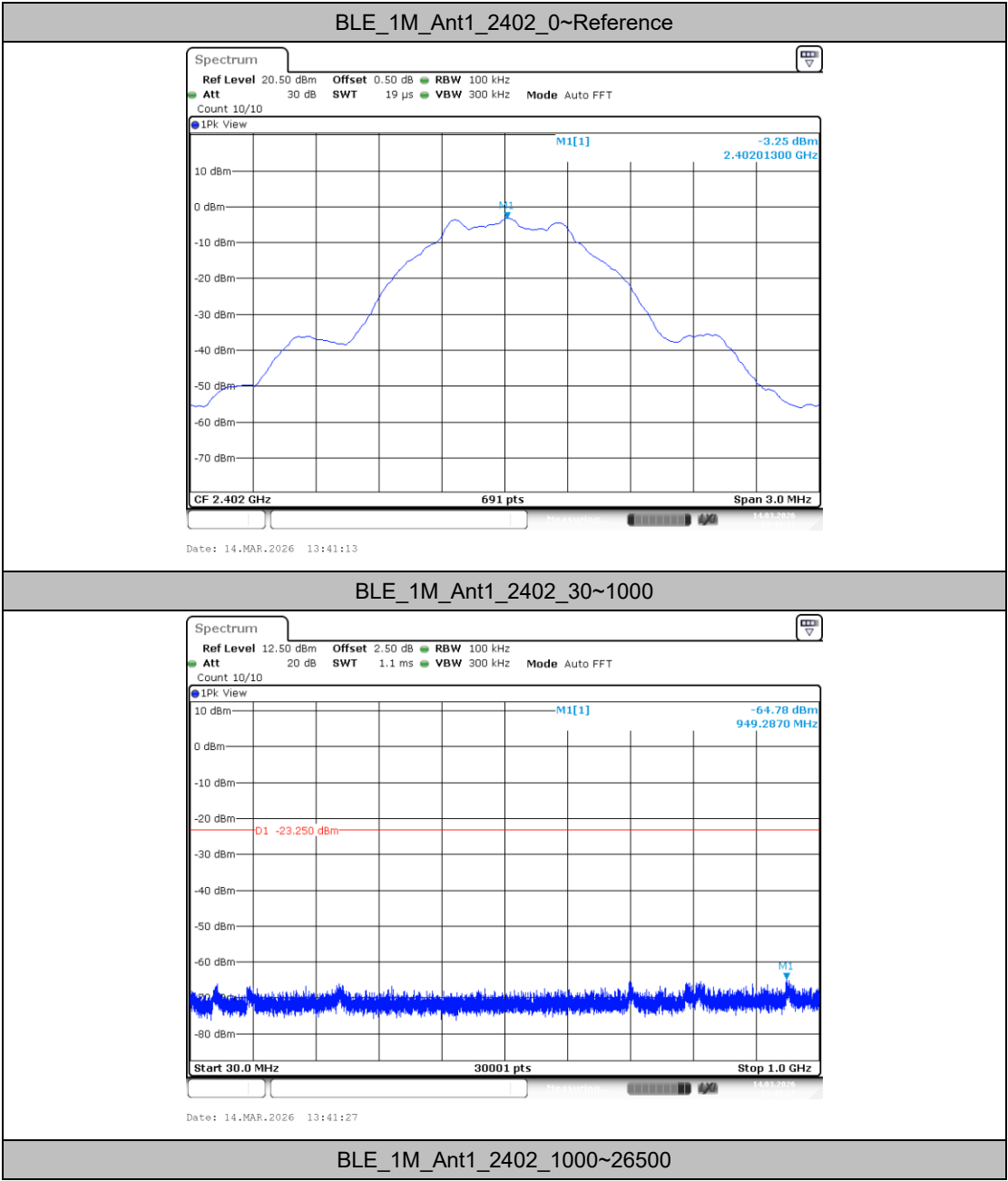
Date: 14.MAR.2026 14:12:27

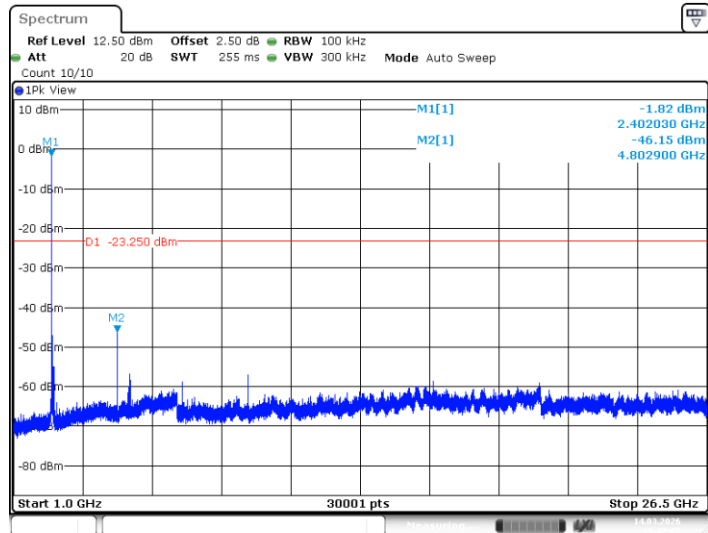
Appendix F: Conducted Spurious Emission

Test Result

TestMode	Antenna	Freq(MHz)	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	Reference	-3.25	-3.25	---	PASS
			30~1000	-3.25	-64.78	≤-23.25	PASS
			1000~26500	-3.25	-46.15	≤-23.25	PASS
		2440	Reference	-3.45	-3.45	---	PASS
			30~1000	-3.45	-64.2	≤-23.45	PASS
			1000~26500	-3.45	-46.86	≤-23.45	PASS
		2480	Reference	-3.78	-3.78	---	PASS
			30~1000	-3.78	-64.66	≤-23.78	PASS
			1000~26500	-3.78	-47.02	≤-23.78	PASS
BLE_2M	Ant1	2402	Reference	-3.25	-3.25	---	PASS
		2440	Reference	-3.43	-3.43	---	PASS
			30~1000	-3.43	-64.61	≤-23.43	PASS
			1000~26500	-3.43	-46.33	≤-23.43	PASS
		2480	Reference	-3.78	-3.78	---	PASS
			30~1000	-3.78	-63.88	≤-23.78	PASS
			1000~26500	-3.78	-50.26	≤-23.78	PASS

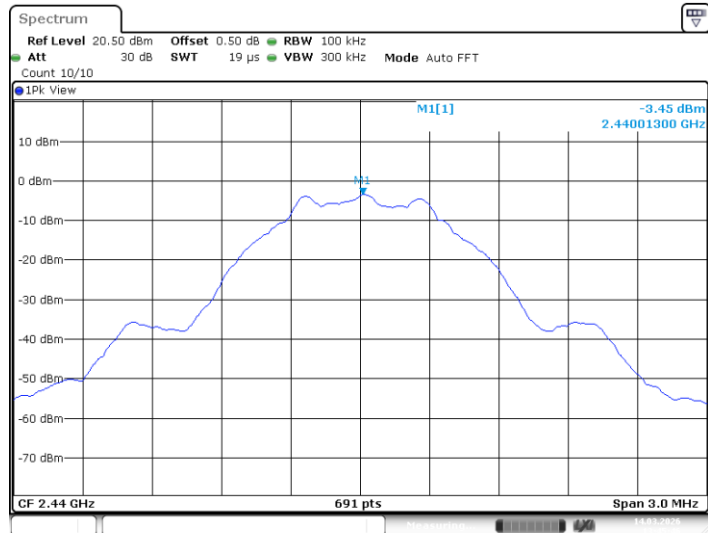
Test Graphs





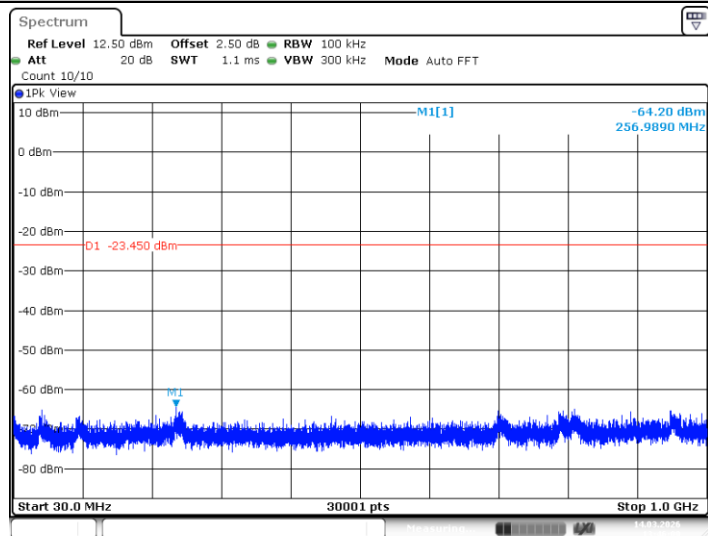
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BLE_1M_Ant1_2440_0~Reference



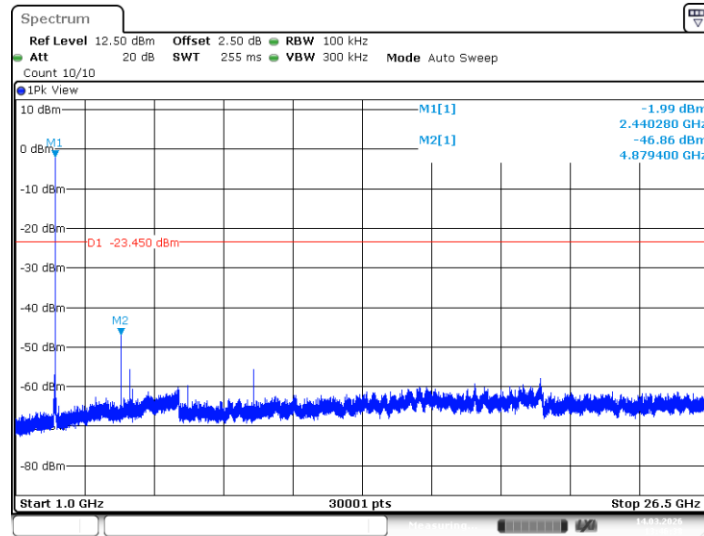
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BLE_1M_Ant1_2440_30~1000



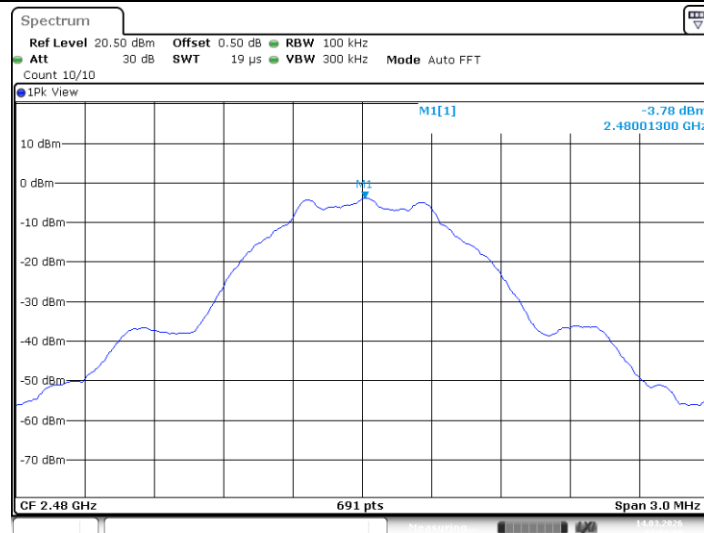
Date: 14.MAR.2026 13:46:01

BLE_1M_Ant1_2440_1000~26500



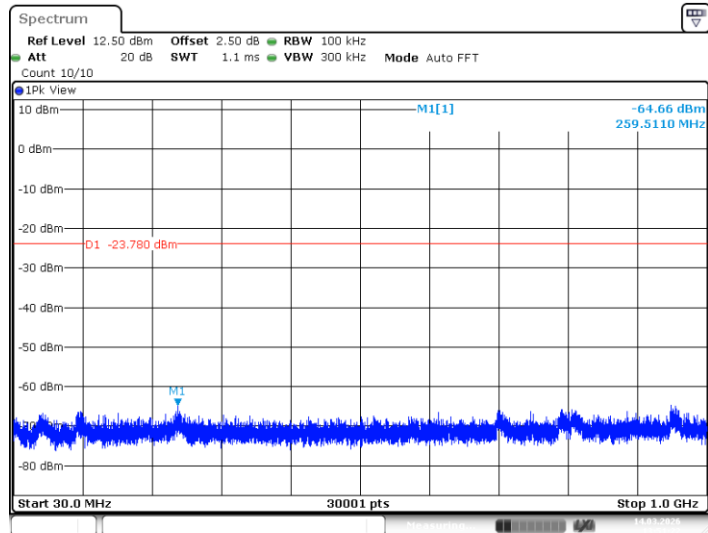
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BLE_1M_Ant1_2480_0~Reference



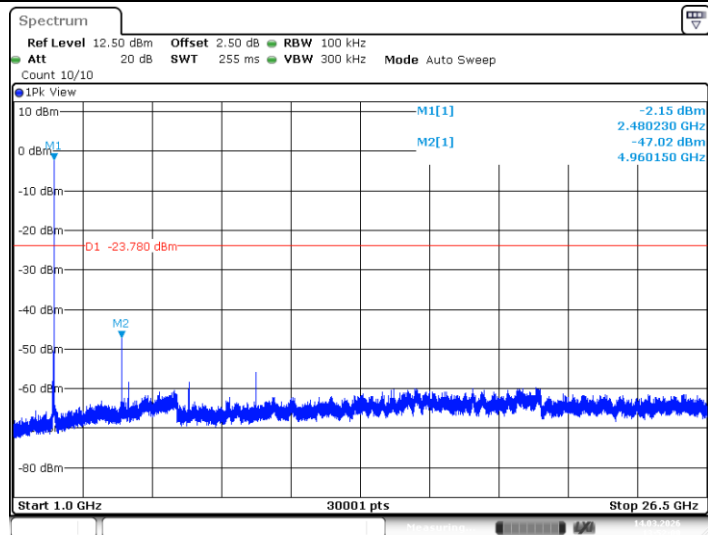
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BLE_1M_Ant1_2480_30~1000



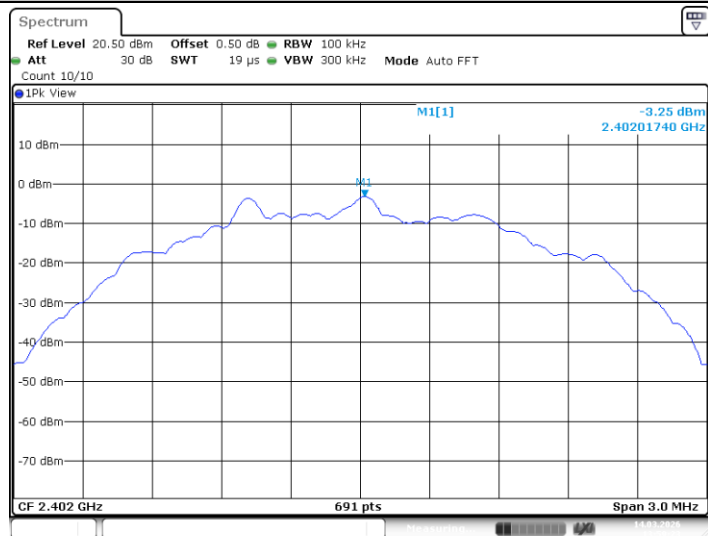
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BLE_1M_Ant1_2480_1000~26500



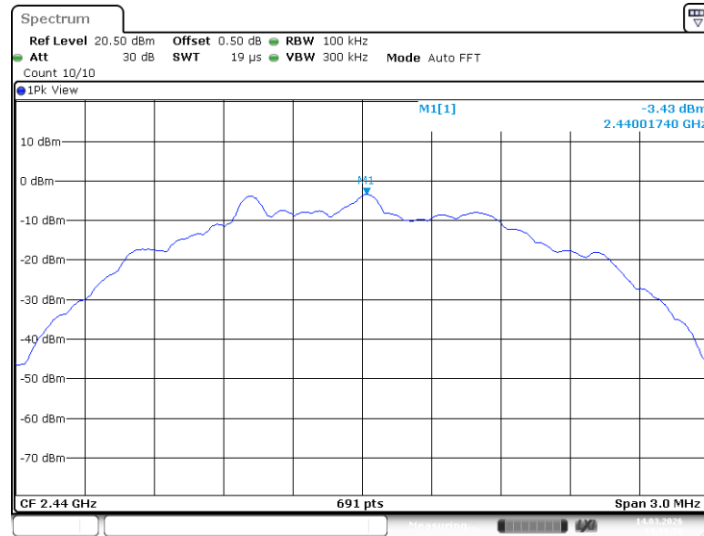
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BLE_2M_Ant1_2402_0~Reference



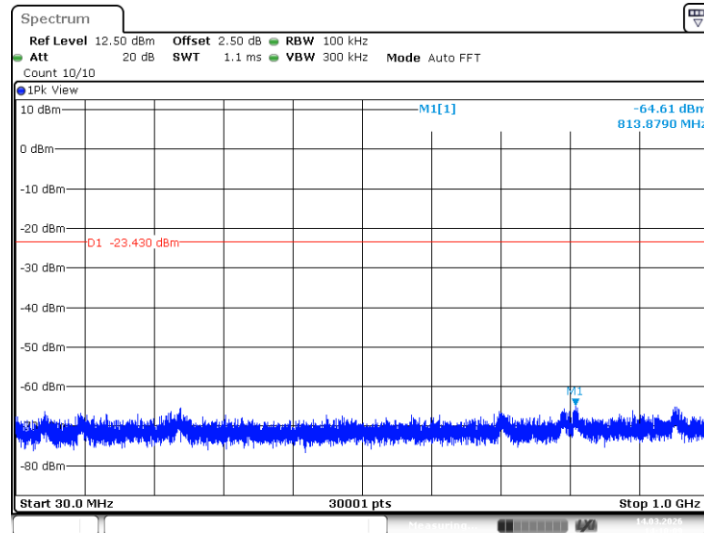
Date: 14.MAR.2026 13:59:23

BLE_2M_Ant1_2440_0~Reference



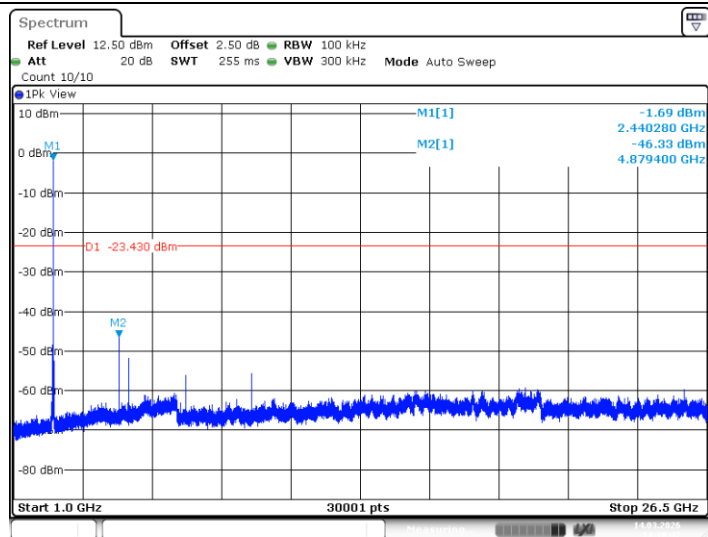
Date: 14.MAR.2026 14:09:55

BLE_2M_Ant1_2440_30~1000



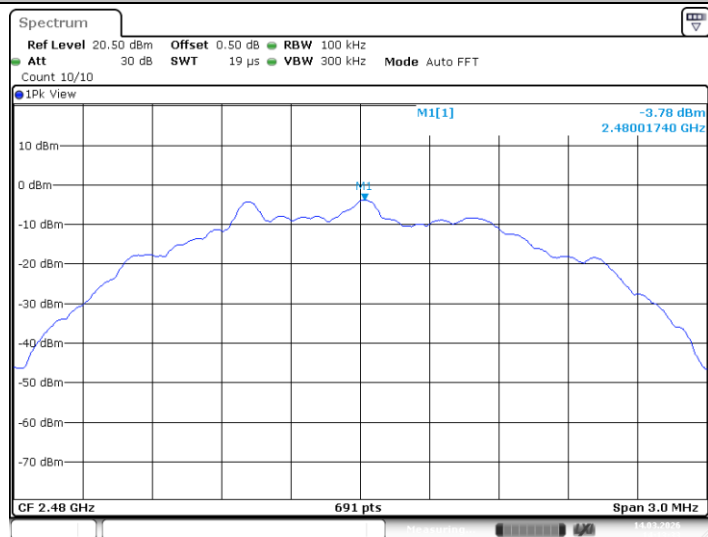
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BLE_2M_Ant1_2440_1000~26500



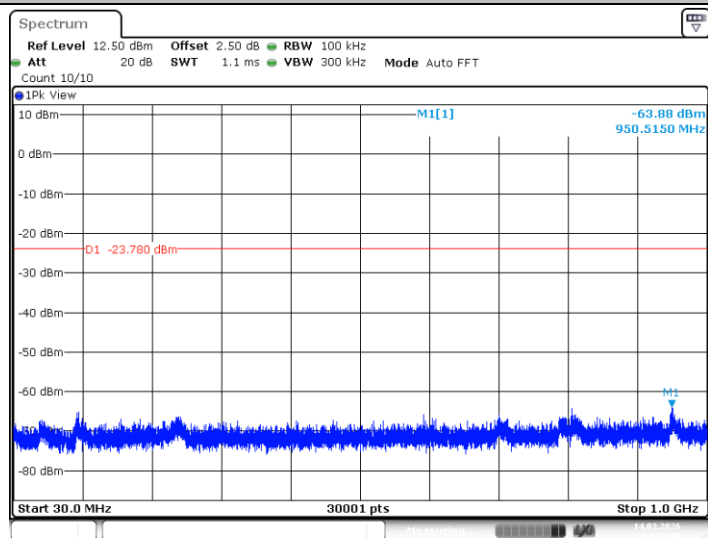
Date: 14.MAR.2026 14:10:47

BLE_2M_Ant1_2480_0~Reference



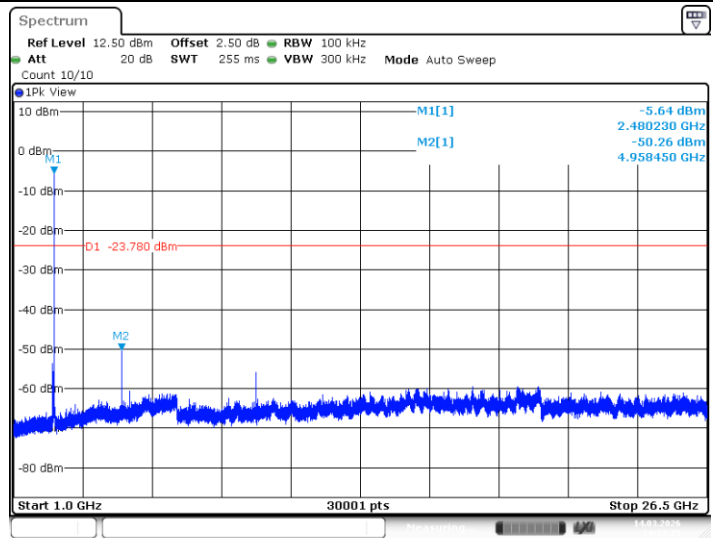
Date: 14.MAR.2026 14:13:34

BLE_2M_Ant1_2480_30~1000



Date: 14.MAR.2026 14:13:48

BLE_2M_Ant1_2480_1000~26500



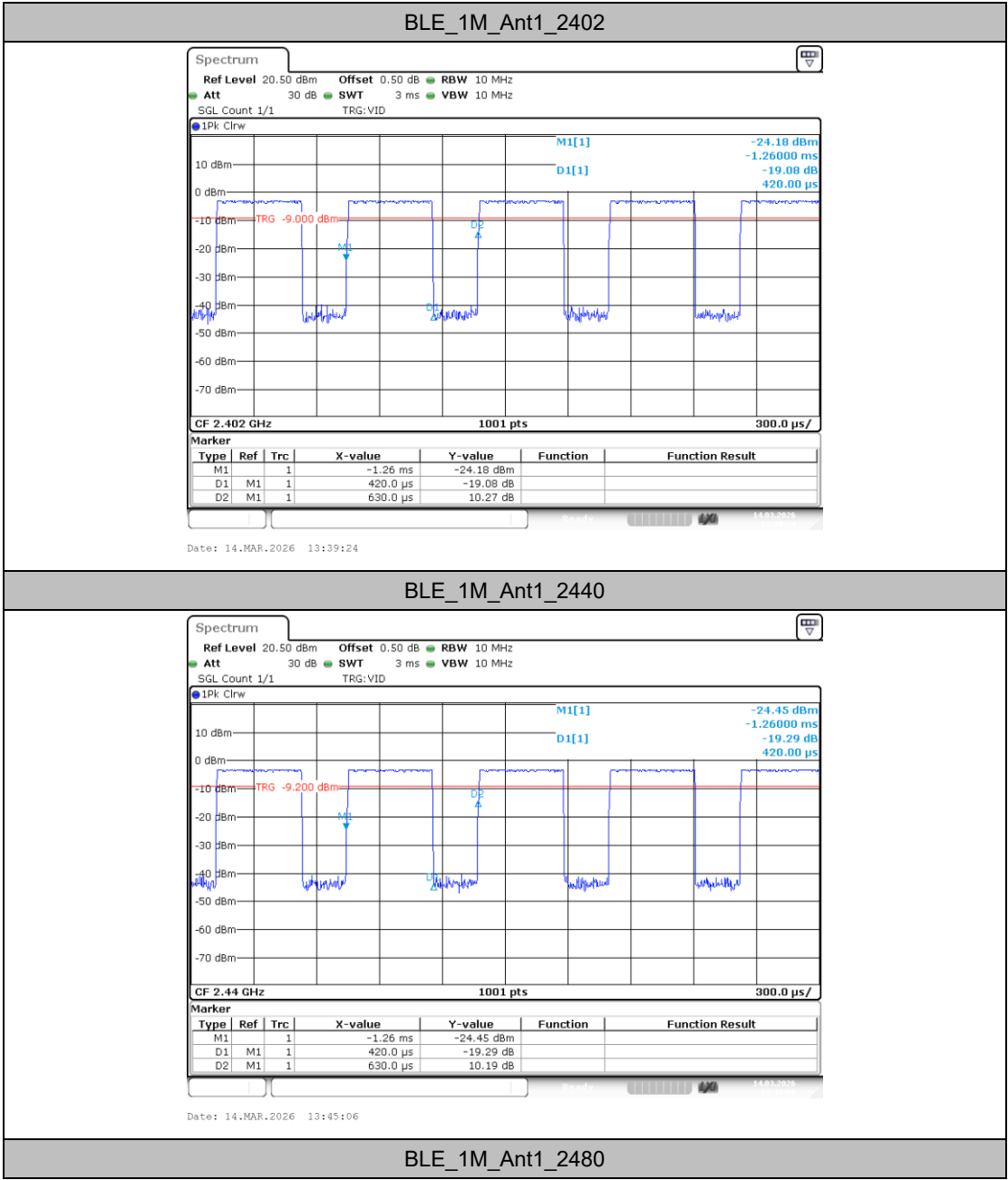
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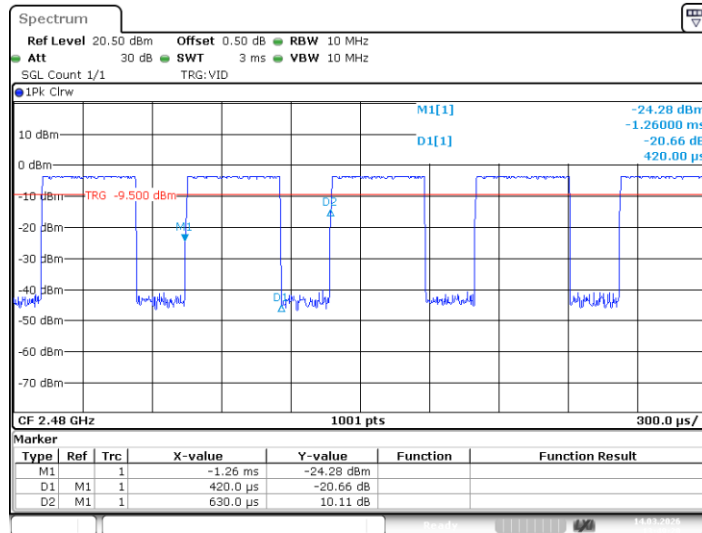
Appendix G: Duty Cycle

Test Result

TestMode	Antenna	Freq(MHz)	ON Time [ms]	Period [ms]	X	DC [%]	xFactor	Limit	Verdict
BLE_1M	Ant1	2402	0.42	0.63	0.6667	66.67	1.76	---	---
		2440	0.42	0.63	0.6667	66.67	1.76	---	---
		2480	0.42	0.63	0.6667	66.67	1.76	---	---
BLE_2M	Ant1	2402	0.23	0.62	0.3710	37.10	4.31	---	---
		2440	0.23	0.62	0.3710	37.10	4.31	---	---
		2480	0.23	0.62	0.3710	37.10	4.31	---	---

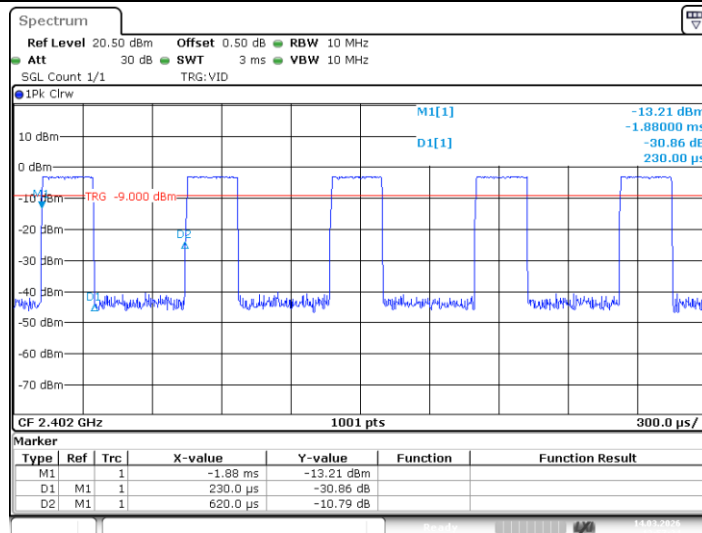
Test Graphs





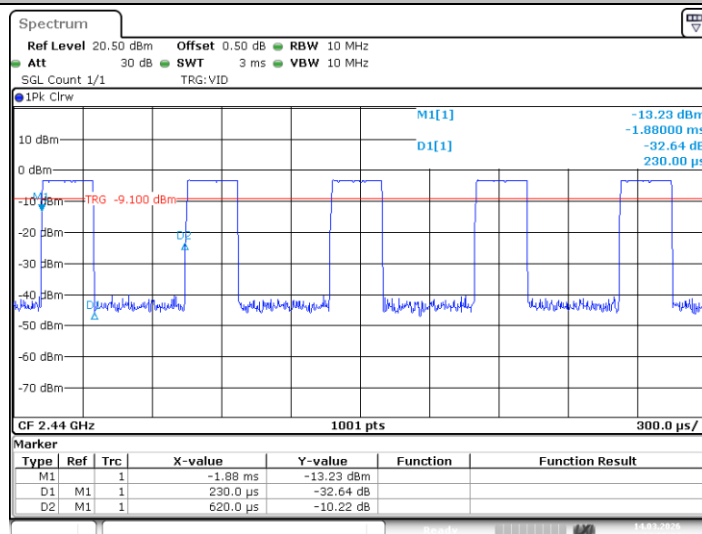
Date: 14.MAR.2026 13:49:20

BLE_2M_Ant1_2402



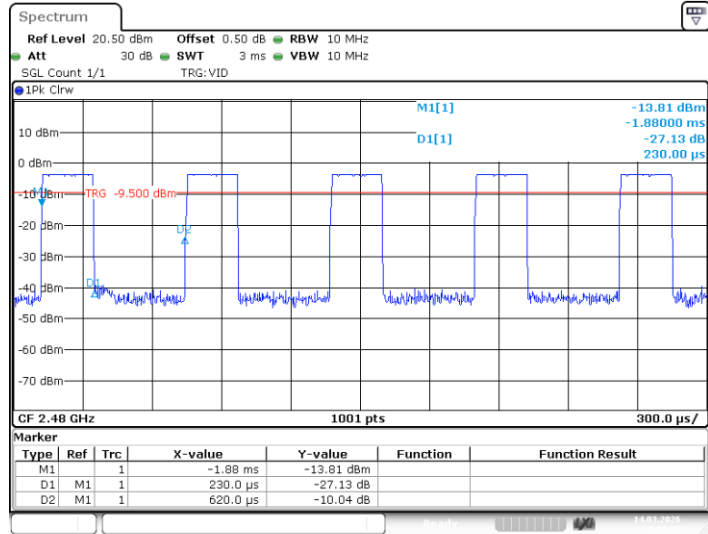
Date: 14.MAR.2026 13:57:34

BLE_2M_Ant1_2440



Date: 14.MAR.2026 14:09:15

BLE_2M_Ant1_2480



Date: 14.MAR.2026 14:11:45

Appendix H: Emissions in Restricted Bands

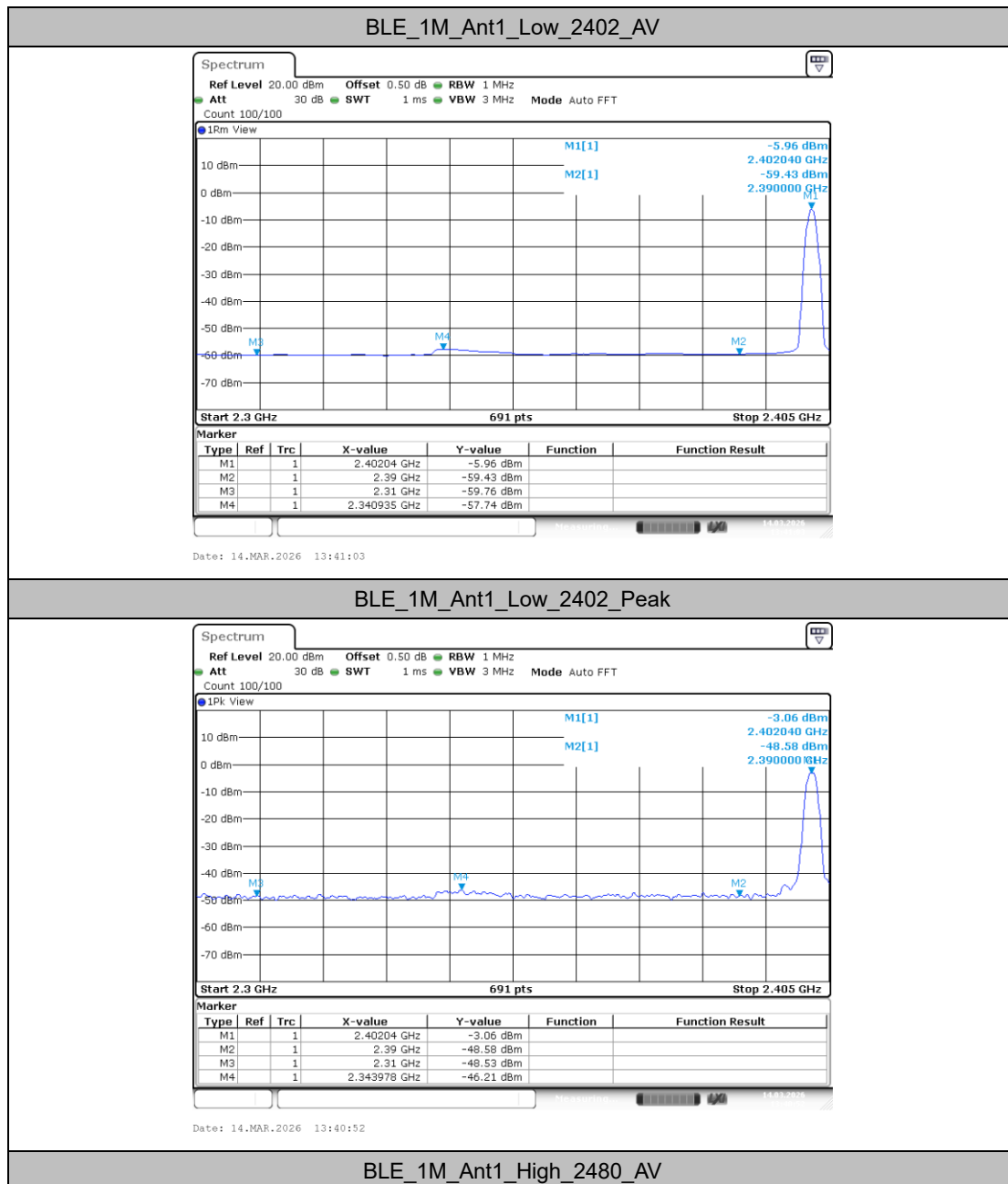
Test Result

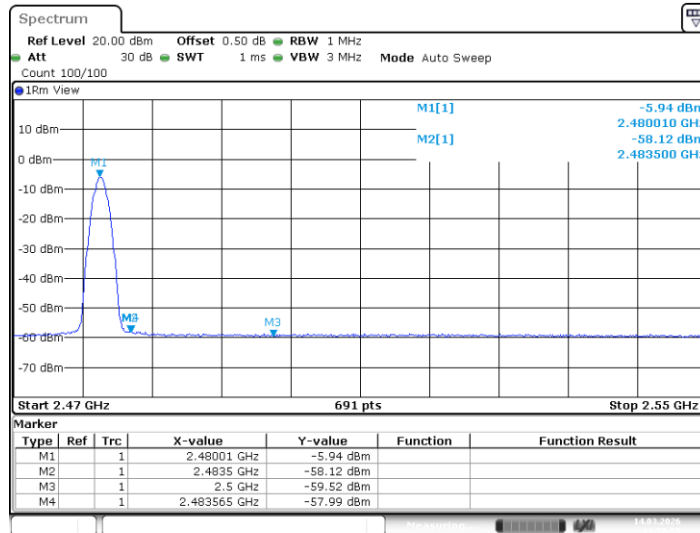
TestMode	Antenna	ChName	Freq(MHz)	Detector	Freq [MHz]	Result [dBm]	Gain [dB]	DC Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Verdict
BLE_1M	Ant1	Low	2402	AV	2310.000	-59.76	2.00	1.76	39.20	≤54	PASS
				AV	2340.935	-57.74	2.00	1.76	41.22	≤54	PASS
				AV	2390.000	-59.43	2.00	1.76	39.53	≤54	PASS
				Peak	2310.000	-48.53	2.00	0.00	48.67	≤74	PASS
				Peak	2343.978	-46.21	2.00	0.00	50.99	≤74	PASS
				Peak	2390.000	-48.58	2.00	0.00	48.62	≤74	PASS
		High	2480	AV	2483.500	-58.12	2.00	1.76	40.84	≤54	PASS
				AV	2483.565	-57.99	2.00	1.76	40.97	≤54	PASS
				AV	2500.000	-59.52	2.00	1.76	39.44	≤54	PASS
				Peak	2483.500	-47.04	2.00	0.00	50.16	≤74	PASS
				Peak	2484.725	-44.09	2.00	0.00	53.11	≤74	PASS
				Peak	2500.000	-47.97	2.00	0.00	49.23	≤74	PASS
BLE_2M	Ant1	Low	2402	AV	2310.000	-59.74	2.00	4.31	41.77	≤54	PASS
				AV	2340.022	-57.83	2.00	4.31	43.68	≤54	PASS
				AV	2390.000	-59.62	2.00	4.31	41.89	≤54	PASS
				Peak	2310.000	-48.25	2.00	0.00	48.95	≤74	PASS
				Peak	2344.587	-46.03	2.00	0.00	51.17	≤74	PASS
				Peak	2390.000	-47.92	2.00	0.00	49.28	≤74	PASS
		High	2480	AV	2483.500	-58.5	2.00	4.31	43.01	≤54	PASS
				AV	2484.145	-58.28	2.00	4.31	43.23	≤54	PASS
				AV	2500.000	-59.3	2.00	4.31	42.21	≤54	PASS
				Peak	2483.500	-45.97	2.00	0.00	51.23	≤74	PASS
				Peak	2484.261	-43.1	2.00	0.00	54.10	≤74	PASS
				Peak	2500.000	-47.85	2.00	0.00	49.35	≤74	PASS

Note:

1. 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.

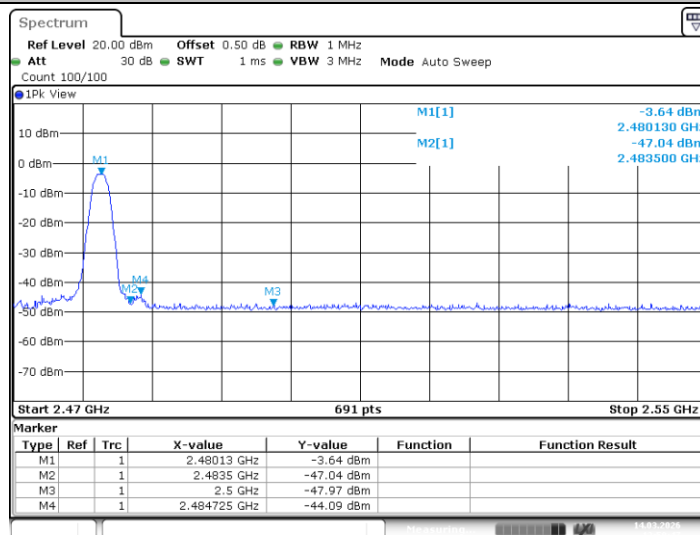
Test Graphs





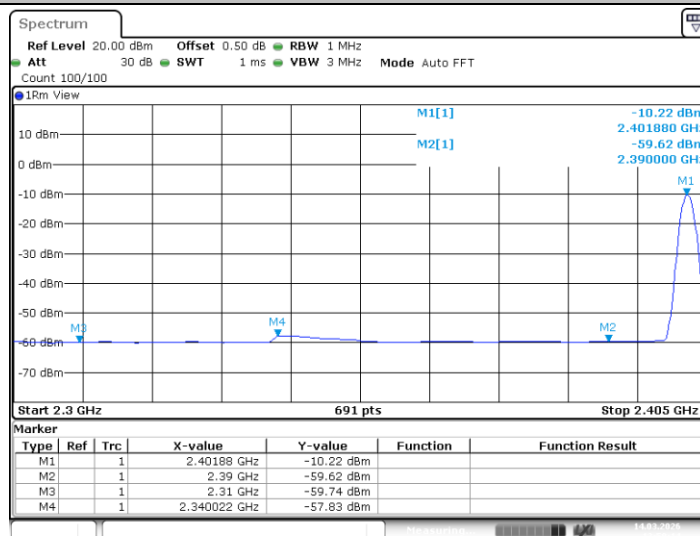
Date: 14.MAR.2026 13:50:59

BLE_1M_Ant1_High_2480_Peak



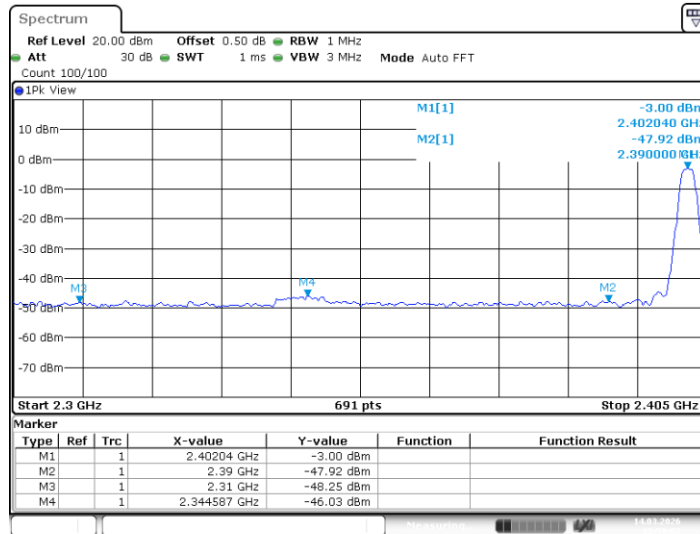
Date: 14.MAR.2026 13:50:48

BLE_2M_Ant1_Low_2402_AV



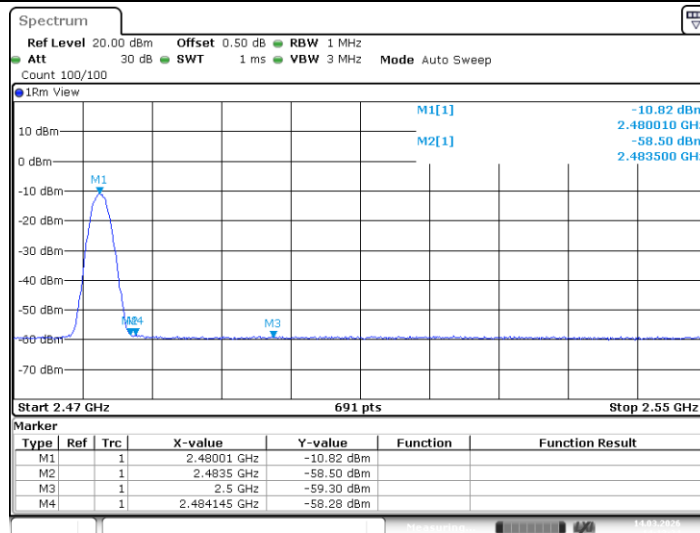
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BLE_2M_Ant1_Low_2402_Peak



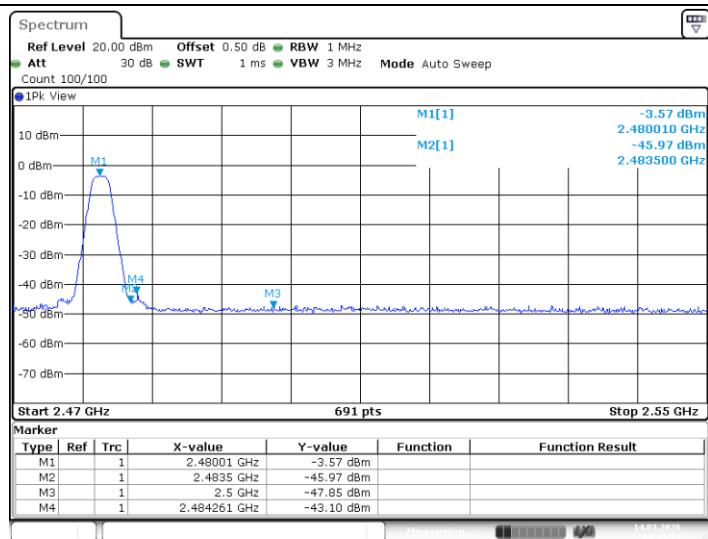
Date: 14.MAR.2026 13:59:02

BLE_2M_Ant1_High_2480_AV



Date: 14.MAR.2026 14:13:24

BLE_2M_Ant1_High_2480_Peak



Date: 14.MAR.2026 14:13:13