



Appendix B

RF Test Data for Zigbee (Conducted Measurement)

Product Name: BDE Multi-Band & Multi-Protocol Wireless Module with PA

Test Model: BDE-MB1354P101UA32

Environmental Conditions

Temperature:	23.1° C
Relative Humidity:	52.3%
ATM Pressure:	100.0 kPa
Test Engineer:	Jose Zhu
Supervised by:	Nick Peng



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B.1 -6dB Bandwidth

Condition	Mode	Frequency (MHz)	Antenna	-6 dB Bandwidth (MHz)	Limit -6 dB Bandwidth (MHz)	Verdict
NVNT	Zigbee	2405	Ant	1.547	≥ 0.5	Pass
NVNT	Zigbee	2440	Ant	1.575	≥ 0.5	Pass
NVNT	Zigbee	2480	Ant	1.565	≥ 0.5	Pass



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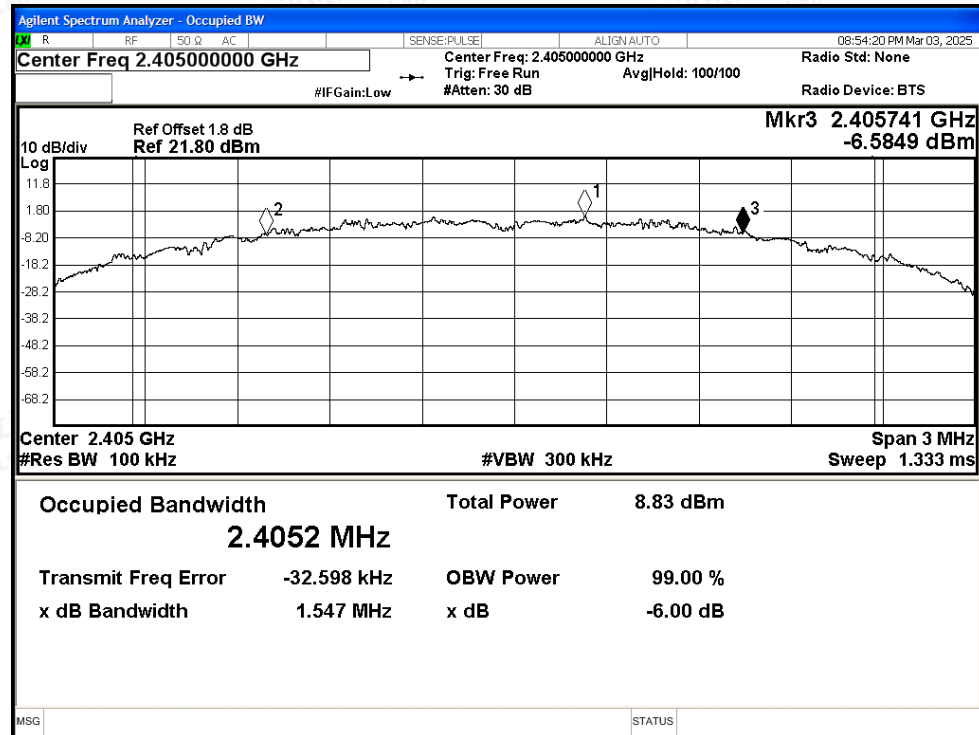
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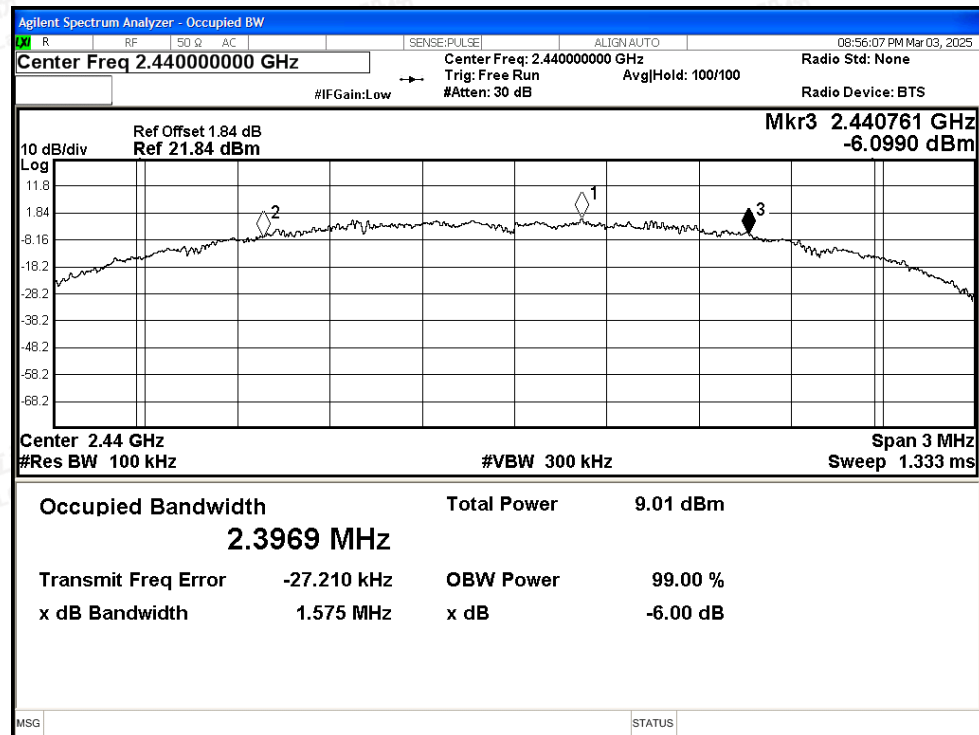


Test Graphs

-6dB Bandwidth NVNT Zigbee 2405MHz Ant



-6dB Bandwidth NVNT Zigbee 2440MHz Ant

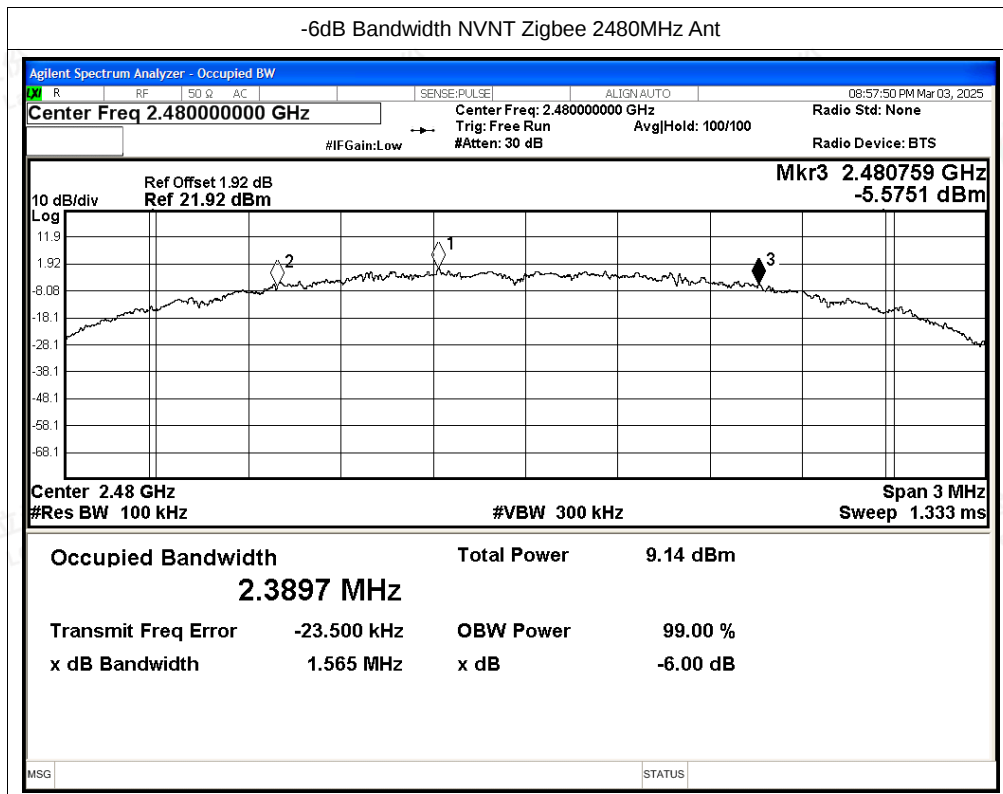


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B.2 Maximum Peak Conducted Output Power

Condition	Mode	Frequency (MHz)	Antenna	Total Power (dBm)	Limit (dBm)	Verdict
NVNT	Zigbee	2405	Ant	3.08	30	Pass
NVNT	Zigbee	2440	Ant	3.28	30	Pass
NVNT	Zigbee	2480	Ant	3.44	30	Pass



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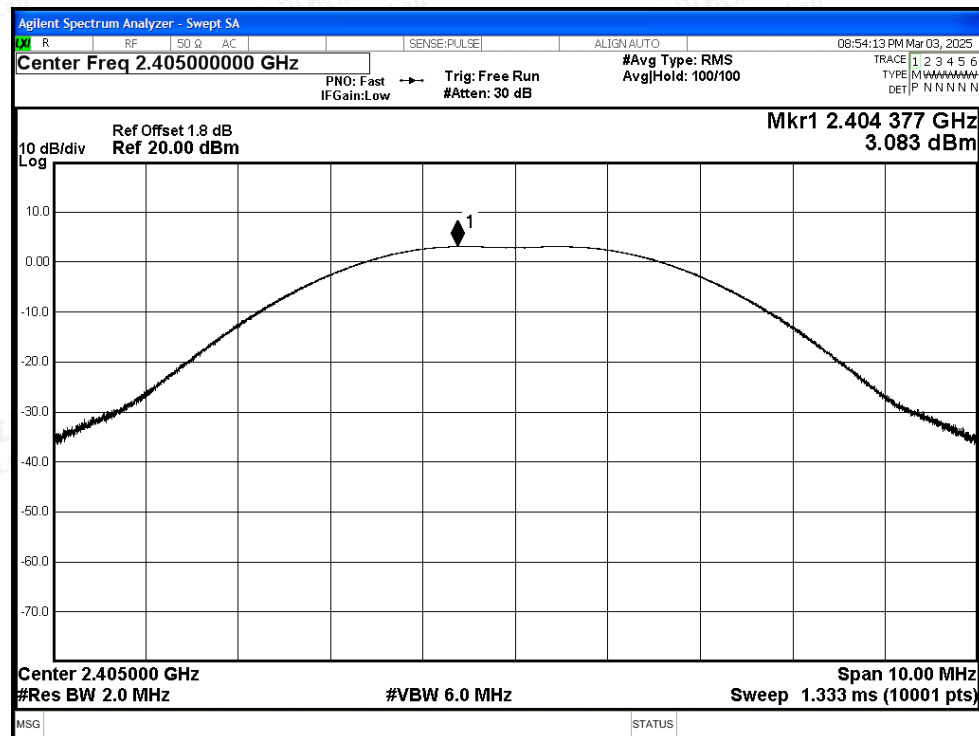
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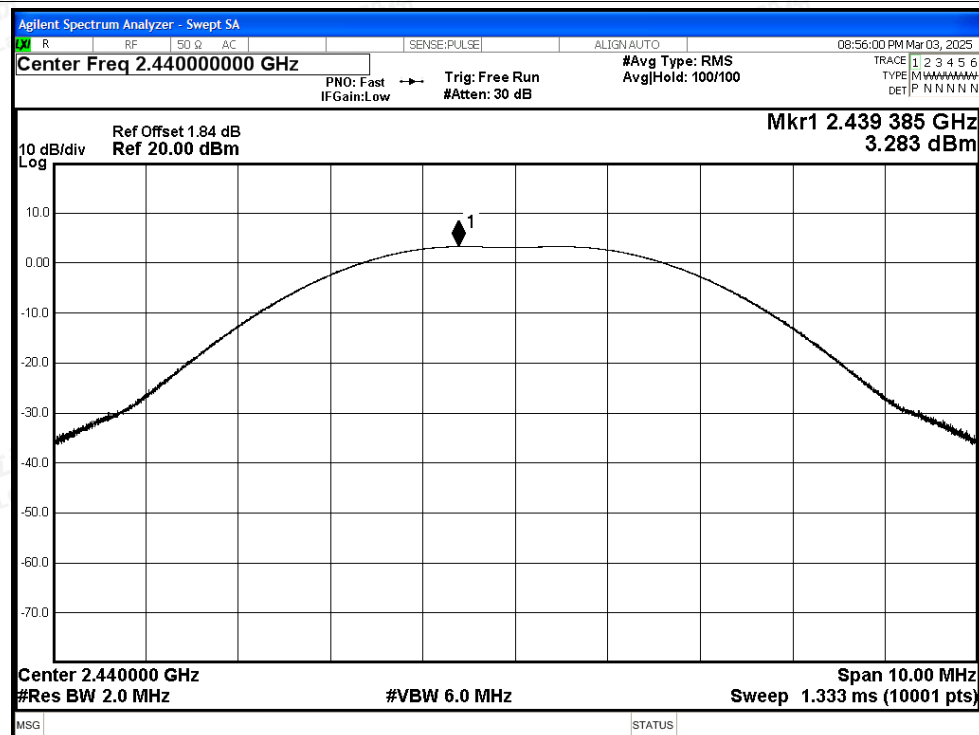


Test Graphs

Power NVNT Zigbee 2405MHz Ant



Power NVNT Zigbee 2440MHz Ant

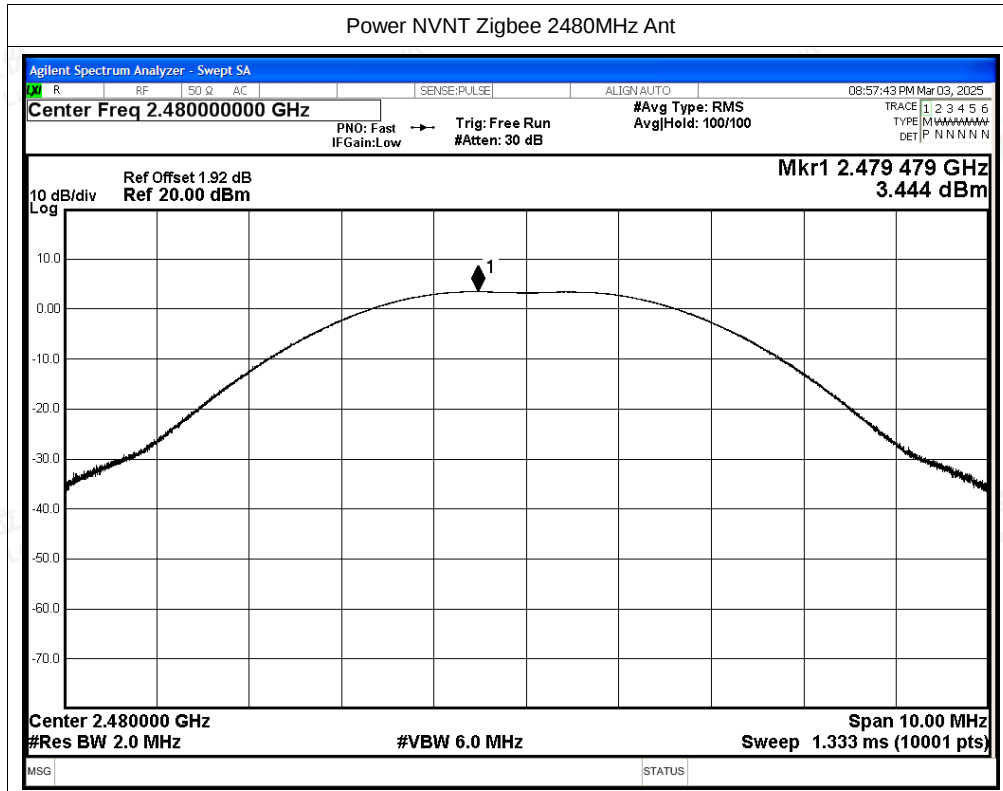


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B.3 Maximum Power Spectral Density Level

Condition	Mode	Frequency (MHz)	Antenna	Conducted PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
NVNT	Zigbee	2405	Ant	-12.86	8	Pass
NVNT	Zigbee	2440	Ant	-12.31	8	Pass
NVNT	Zigbee	2480	Ant	-11.96	8	Pass



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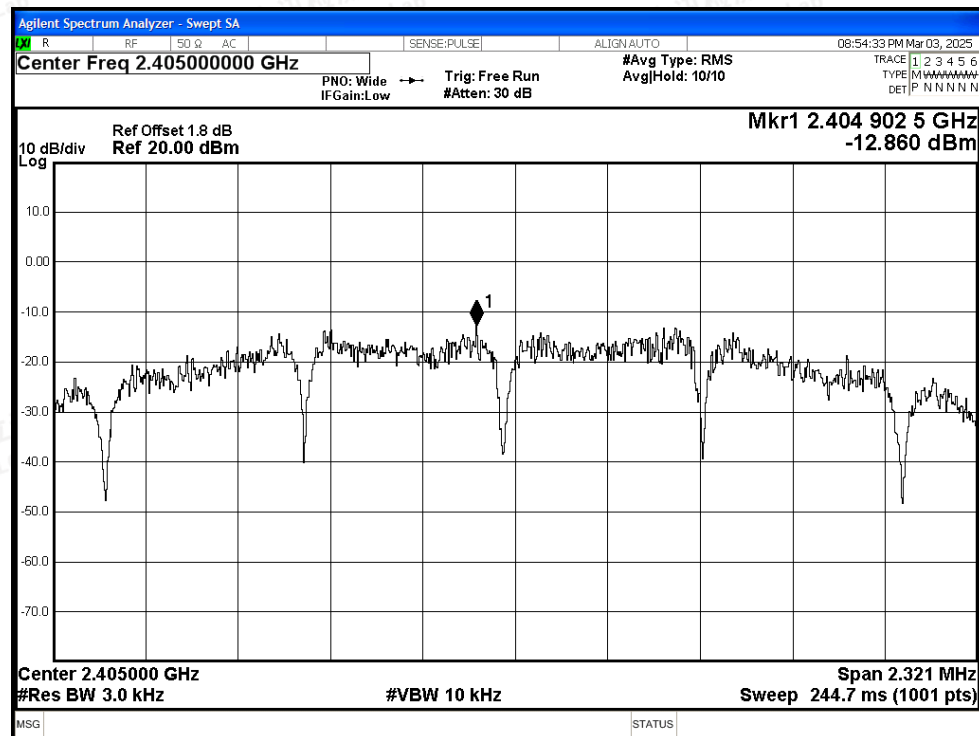
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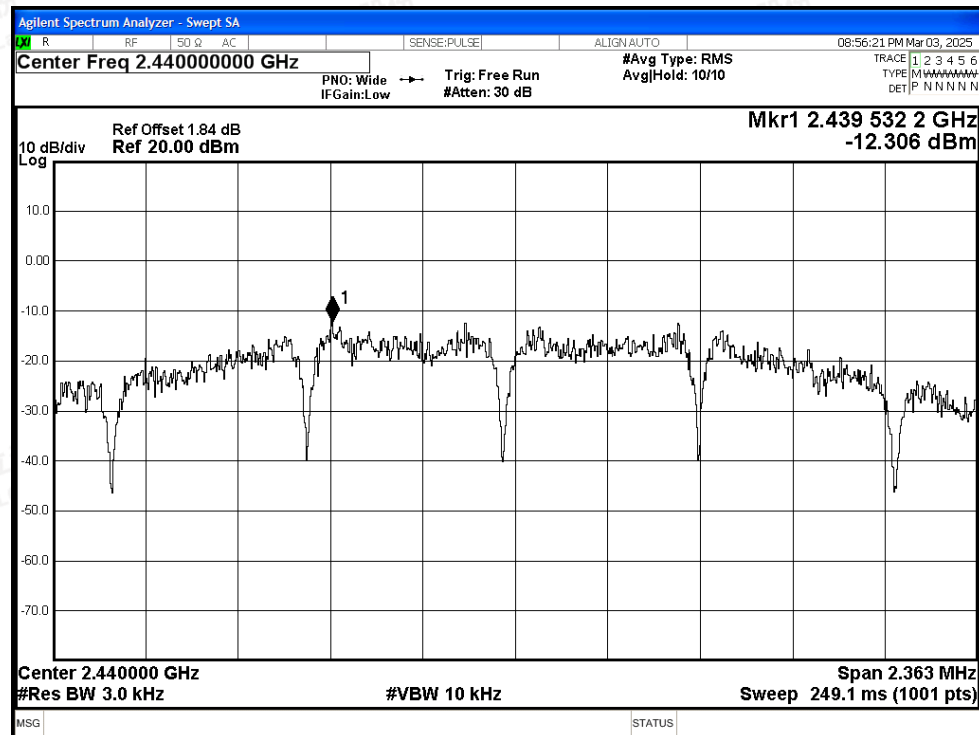


Test Graphs

PSD NVNT Zigbee 2405MHz Ant



PSD NVNT Zigbee 2440MHz Ant

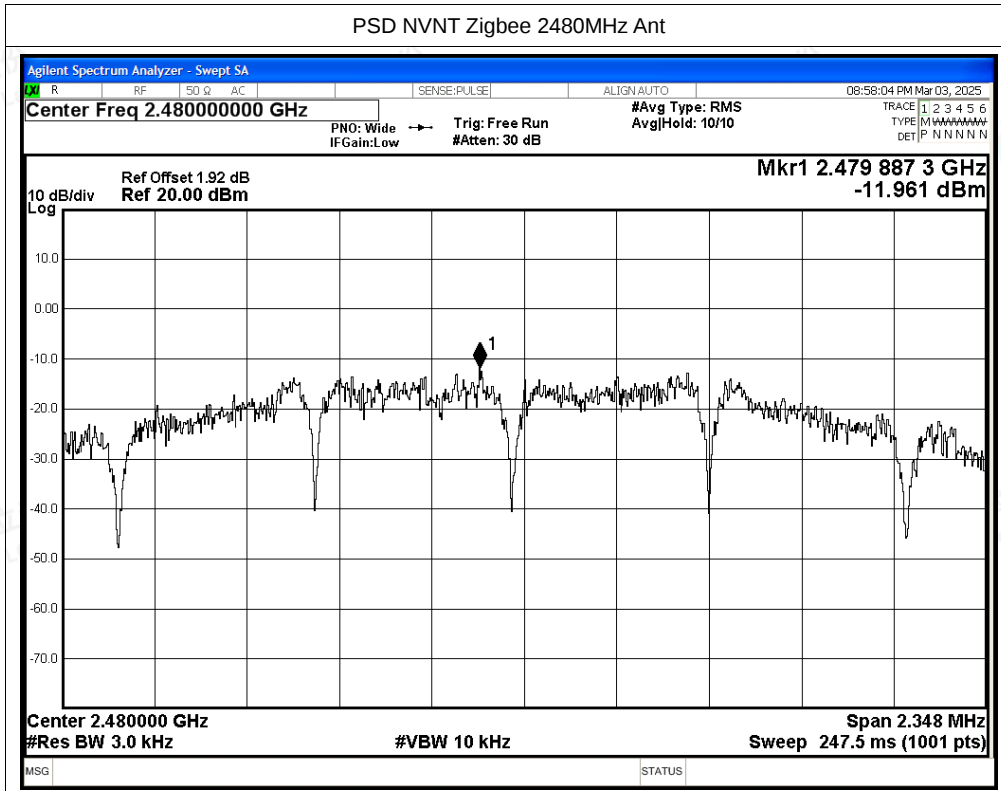


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B.4 Band Edge

Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	Zigbee	2405	Ant	-47.98	-20	Pass
NVNT	Zigbee	2480	Ant	-43.02	-20	Pass



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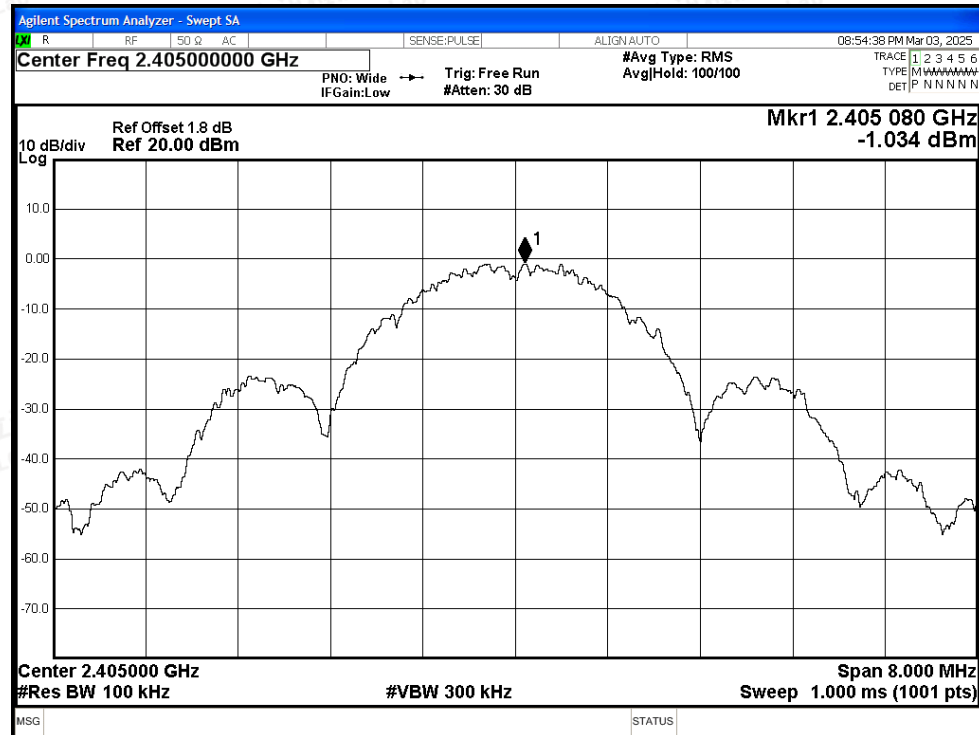
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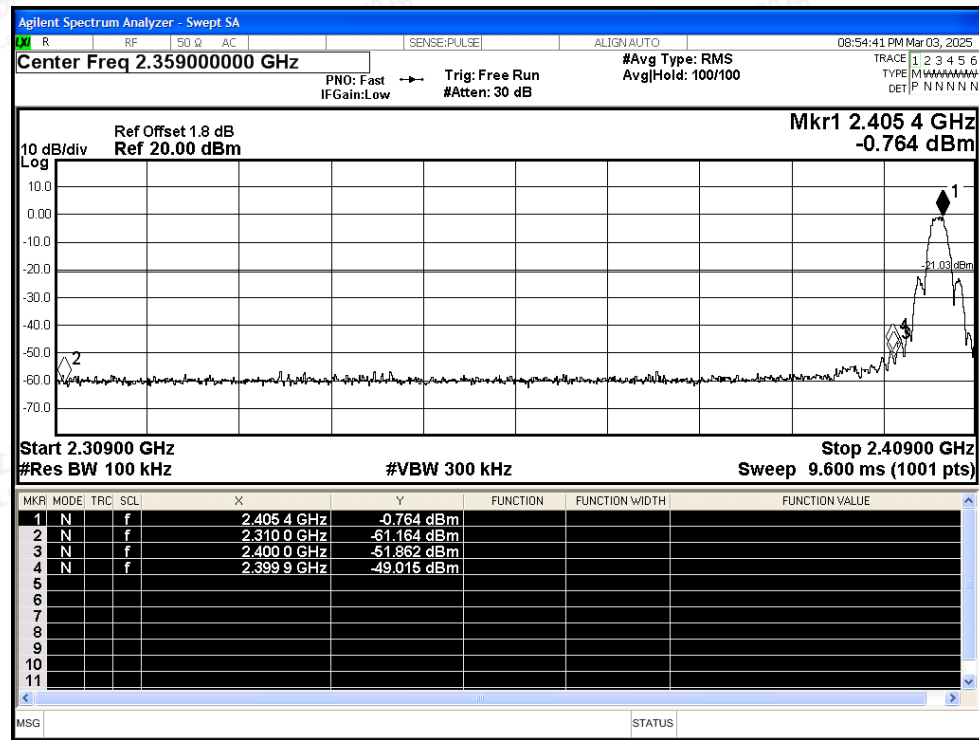


Test Graphs

Band Edge NVNT Zigbee 2405MHz Ant Ref



Band Edge NVNT Zigbee 2405MHz Ant Emission



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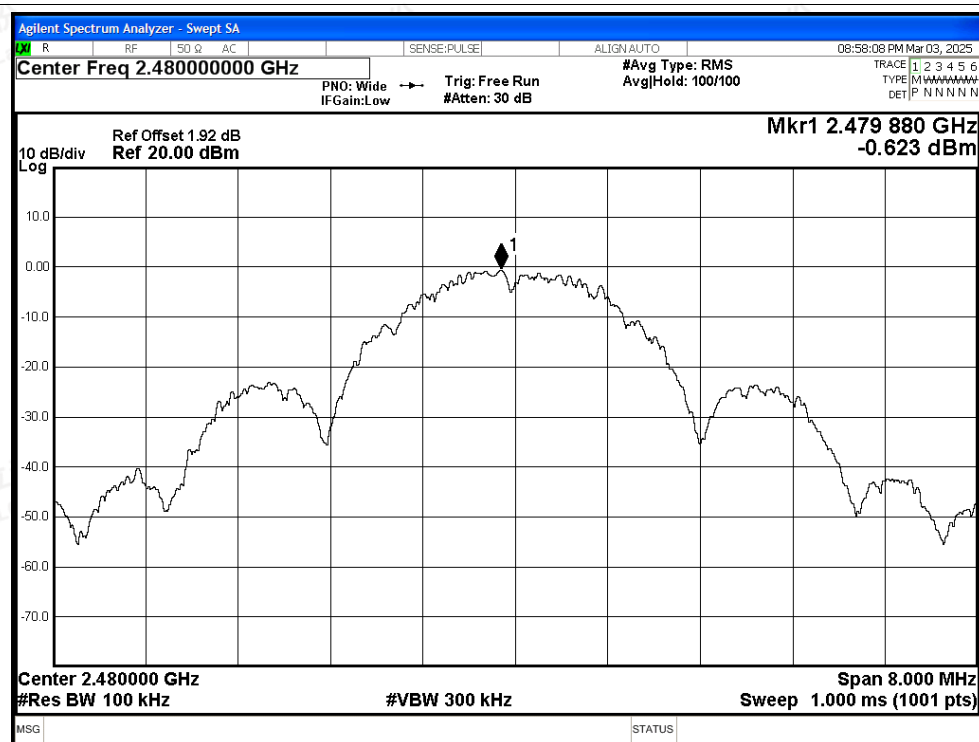
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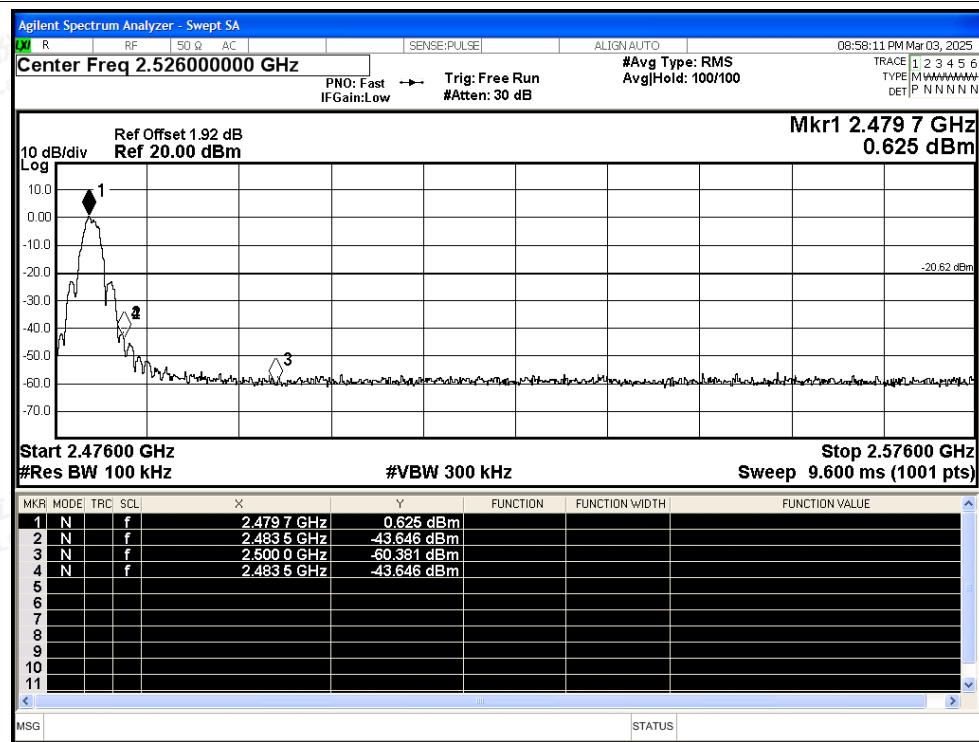
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Band Edge NVNT Zigbee 2480MHz Ant Ref



Band Edge NVNT Zigbee 2480MHz Ant Emission



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B.5 Conducted RF Spurious Emission

Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	Zigbee	2405	Ant	-42.11	-20	Pass
NVNT	Zigbee	2440	Ant	-44.37	-20	Pass
NVNT	Zigbee	2480	Ant	-47.06	-20	Pass



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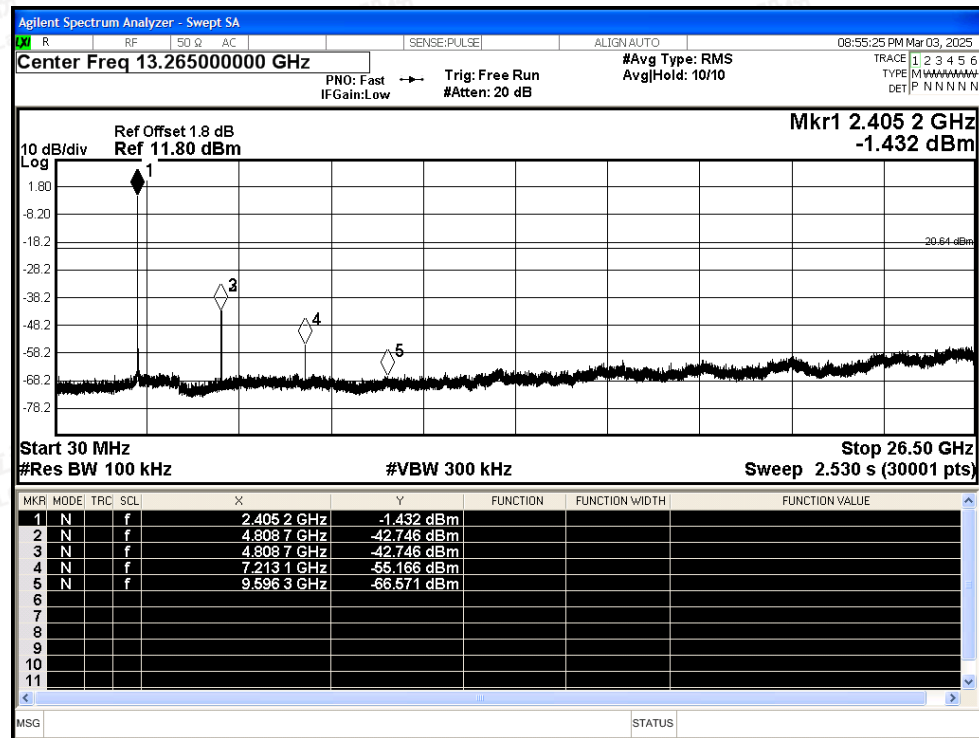


Test Graphs

Tx. Spurious NVNT Zigbee 2405MHz Ant Ref



Tx. Spurious NVNT Zigbee 2405MHz Ant Emission



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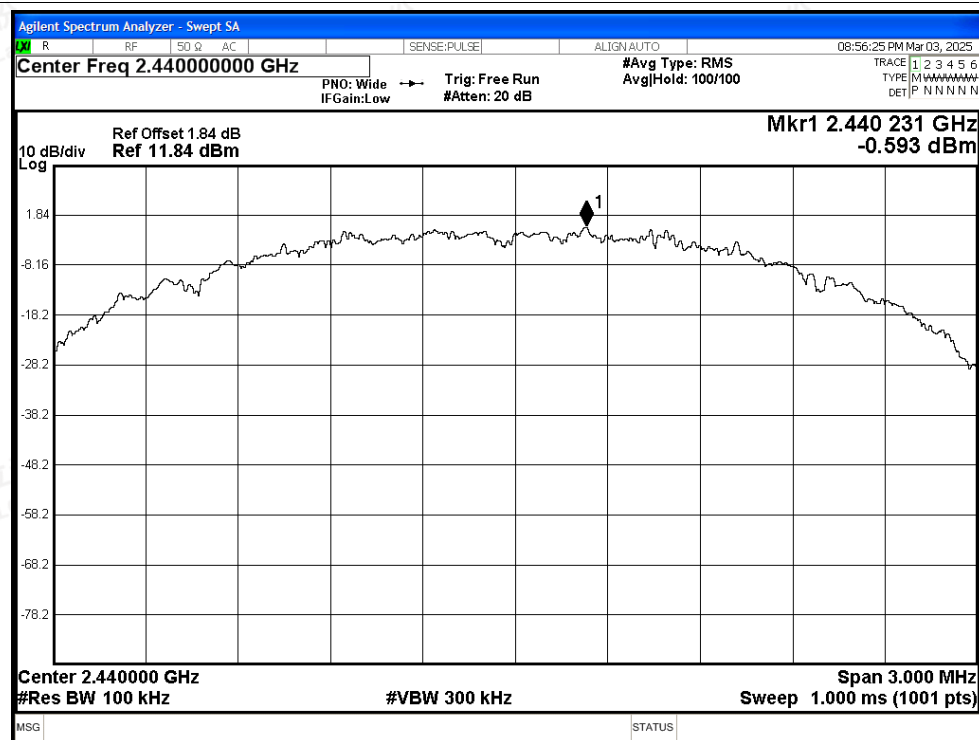
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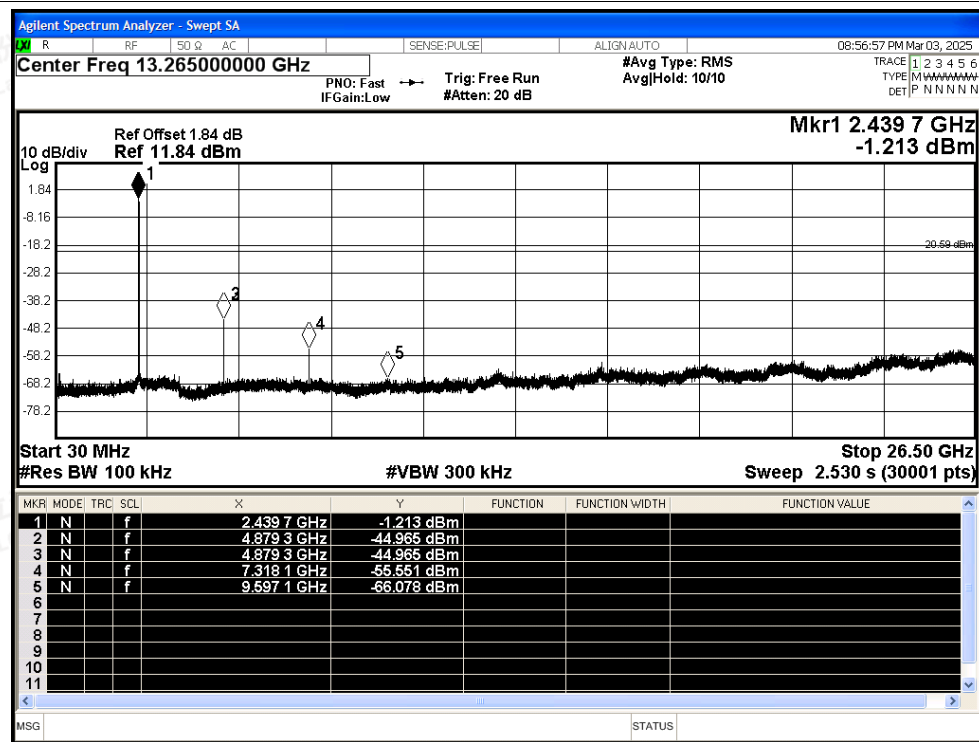
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Tx. Spurious NVNT Zigbee 2440MHz Ant Ref



Tx. Spurious NVNT Zigbee 2440MHz Ant Emission



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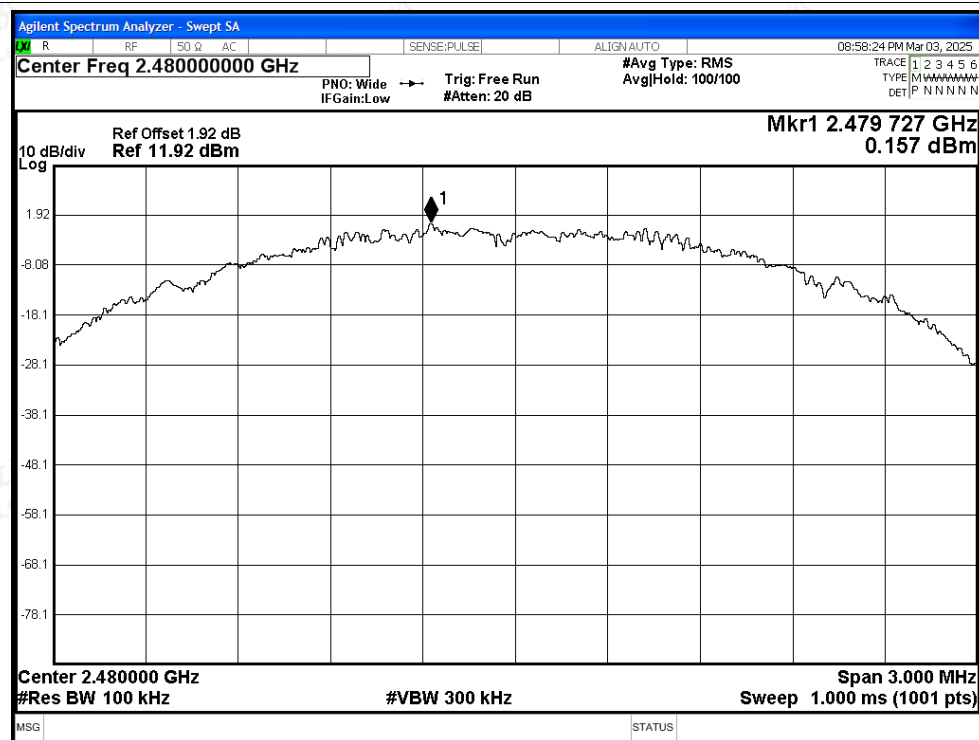
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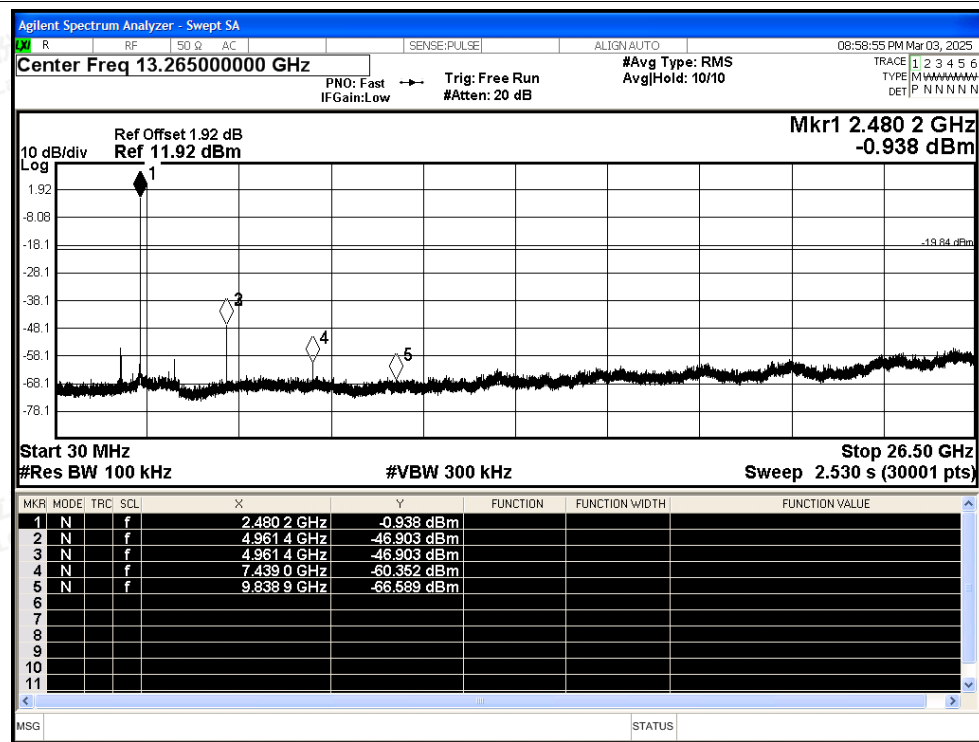
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Tx. Spurious NVNT Zigbee 2480MHz Ant Ref



Tx. Spurious NVNT Zigbee 2480MHz Ant Emission



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B.6 Duty Cycle

Condition	Mode	Frequency (MHz)	Antenna	Duty Cycle (%)	Correction Factor (dB)	1/T (kHz)
NVNT	Zigbee	2405	Ant	100	0	0
NVNT	Zigbee	2440	Ant	100	0	0
NVNT	Zigbee	2480	Ant	100	0	0



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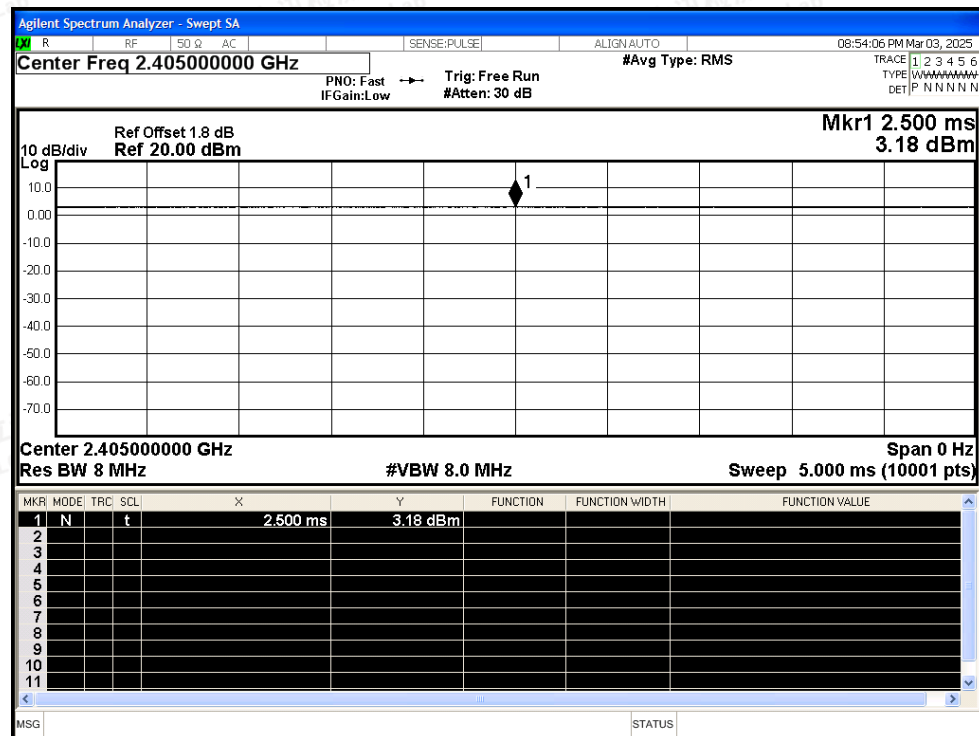
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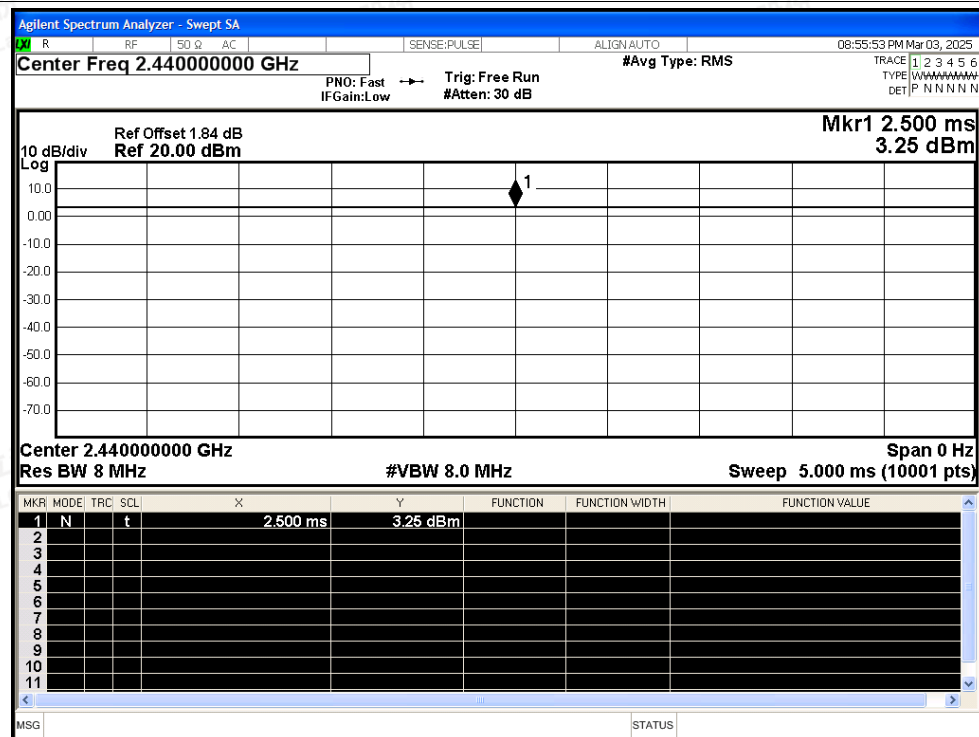


Test Graphs

Duty Cycle NVNT Zigbee 2405MHz Ant



Duty Cycle NVNT Zigbee 2440MHz Ant

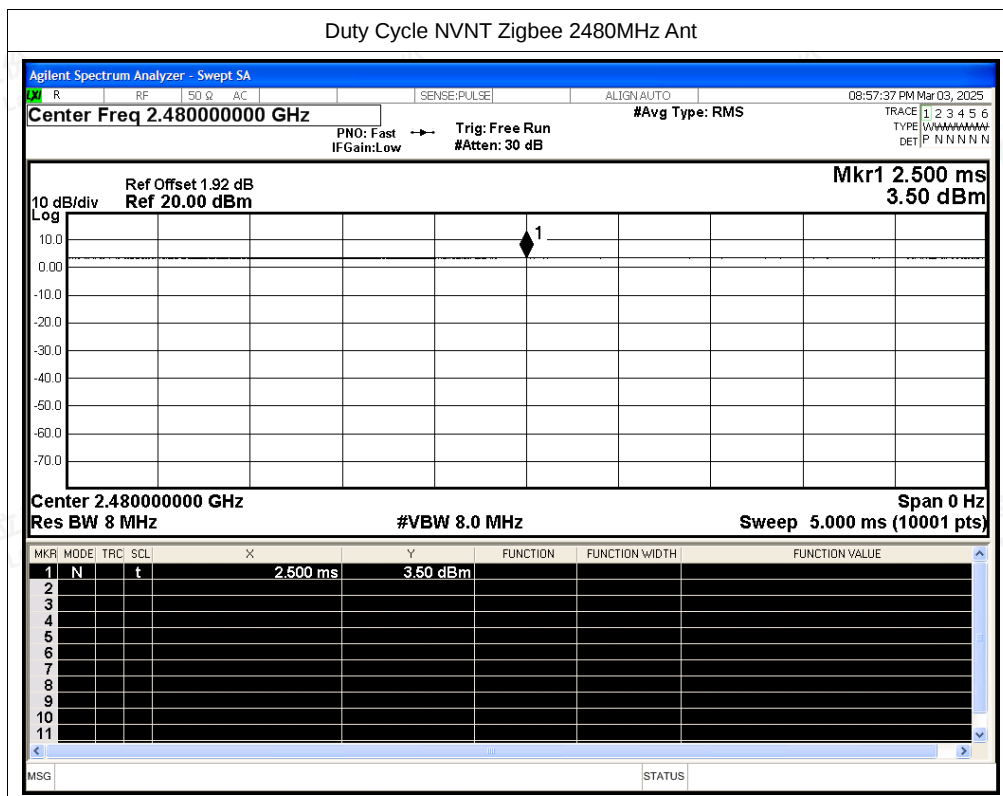


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B.7 Restrict Band

Worst Case:

Condition	Mode	Frequency (MHz)	Antenna	Spur Freq (MHz)	Power (dBm)	Gain (dBi)	Duty Factor (dB)	E (dBuV/m)	Detector	Limit (dBuV/m)	Verdict
NVNT	Zigbee	2405	Ant	2310	-50.3	3	-	47.96	Peak	74	Pass
NVNT	Zigbee	2405	Ant	2310	-59.03	3	0	39.23	Average	54	Pass
NVNT	Zigbee	2405	Ant	2387.121	-47.2	3	-	51.06	Peak	74	Pass
NVNT	Zigbee	2405	Ant	2389.398	-57.26	3	0	41.00	Average	54	Pass
NVNT	Zigbee	2405	Ant	2390	-49.6	3	-	48.66	Peak	74	Pass
NVNT	Zigbee	2405	Ant	2390	-57.81	3	0	40.45	Average	54	Pass
NVNT	Zigbee	2480	Ant	2483.5	-39.28	3	-	58.98	Peak	74	Pass
NVNT	Zigbee	2480	Ant	2483.5	-44.82	3	0	53.44	Average	54	Pass
NVNT	Zigbee	2480	Ant	2483.524	-39.56	3	-	58.70	Peak	74	Pass
NVNT	Zigbee	2480	Ant	2483.524	-45.39	3	0	52.87	Average	54	Pass
NVNT	Zigbee	2480	Ant	2509	-49.97	3	-	48.29	Peak	74	Pass
NVNT	Zigbee	2480	Ant	2509	-57.94	3	0	40.32	Average	54	Pass

Note: For restrict band, only max antenna gain recorded in this report



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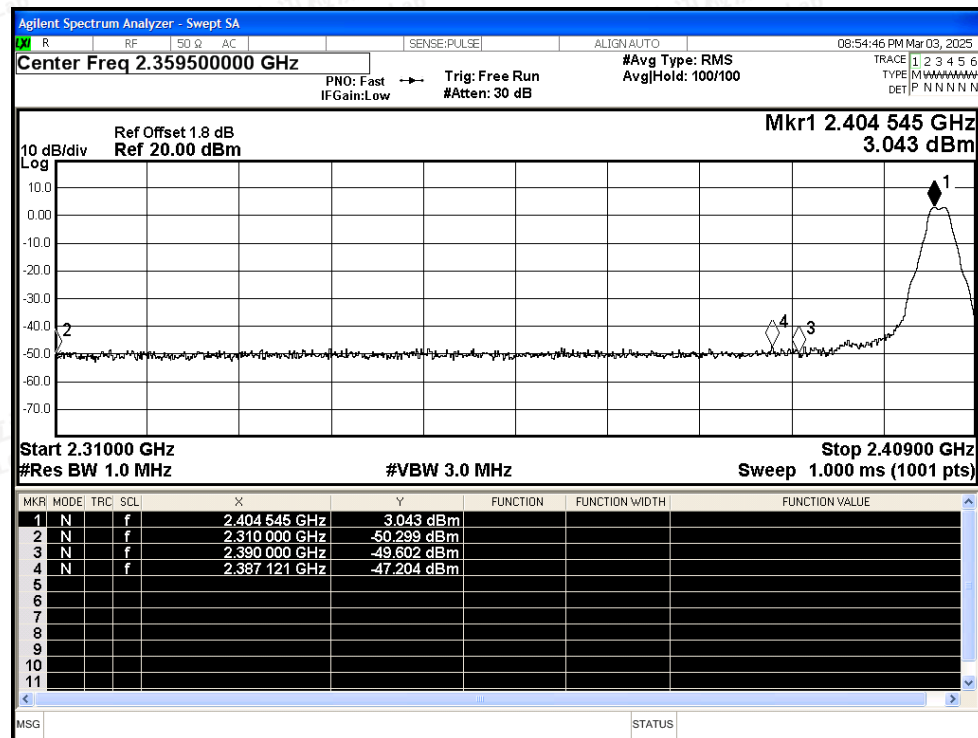
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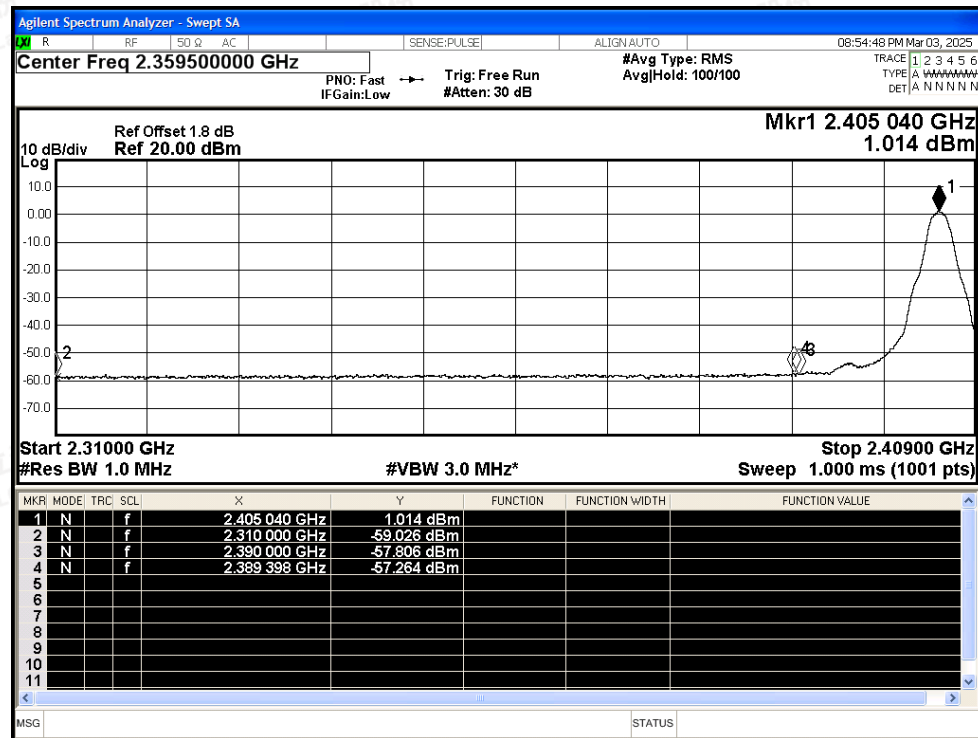


Test Graphs

Restrict Band NVNT Zigbee 2405MHz Ant Peak



Restrict Band NVNT Zigbee 2405MHz Ant Average



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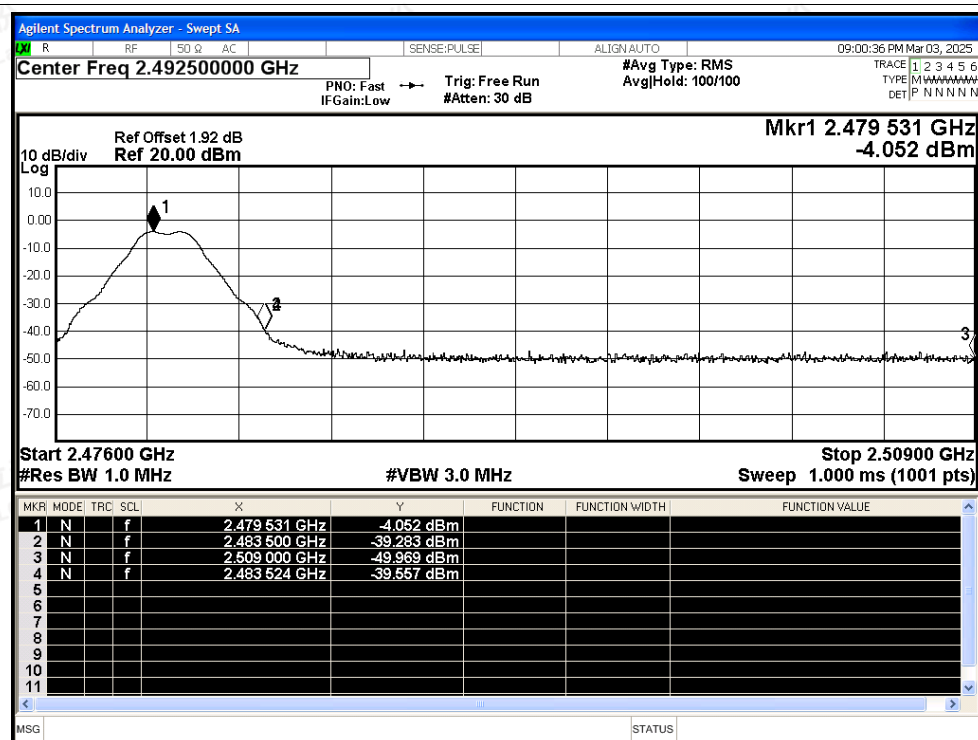
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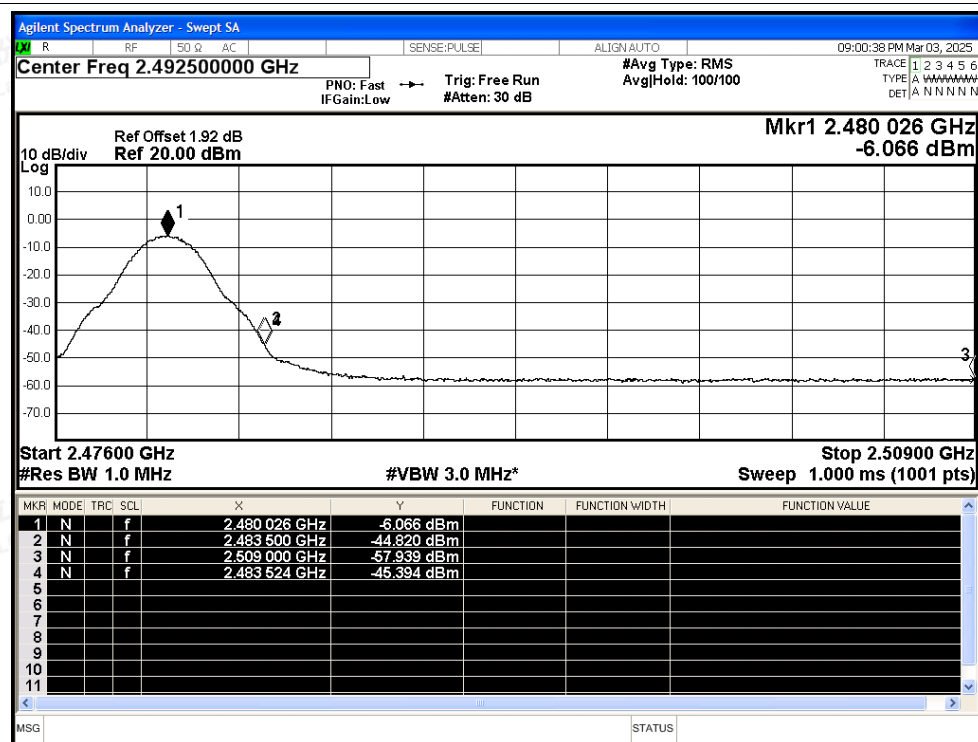
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Restrict Band NVNT Zigbee 2480MHz Ant Peak



Restrict Band NVNT Zigbee 2480MHz Ant Average



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