



Appendix B

RF Test Data for Zigbee (Conducted Measurement)

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

Test Model: BDE-MB1354R10UA32

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	Ant1	1.616	≥ 0.5	Pass
NVNT	Zigbee	2440	Ant1	1.58	≥ 0.5	Pass
NVNT	Zigbee	2480	Ant1	1.523	≥ 0.5	Pass

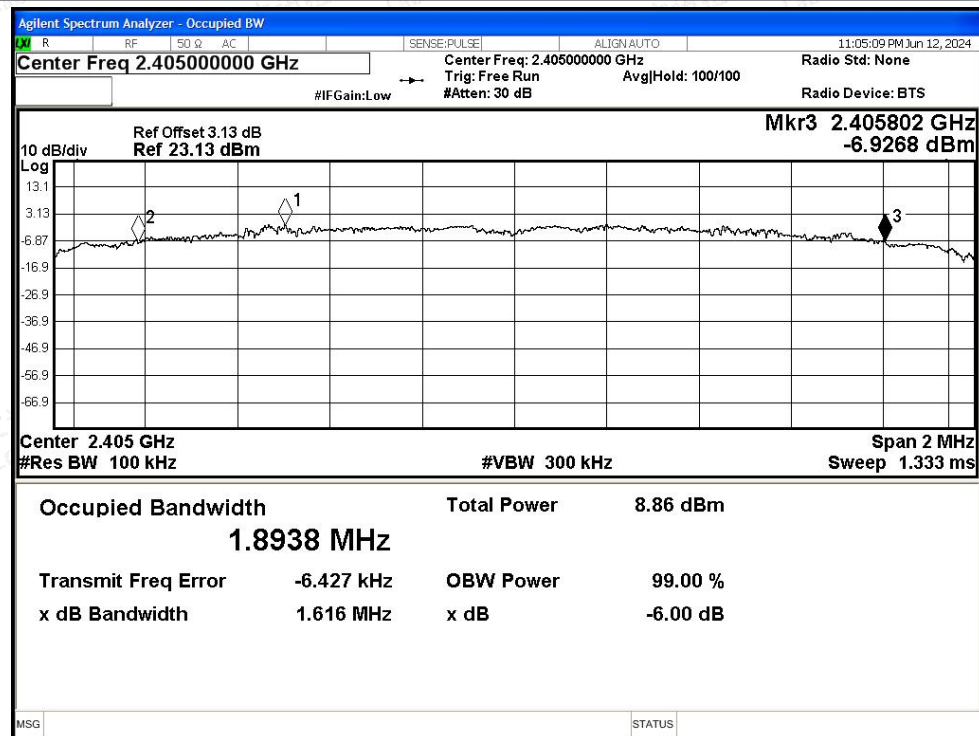


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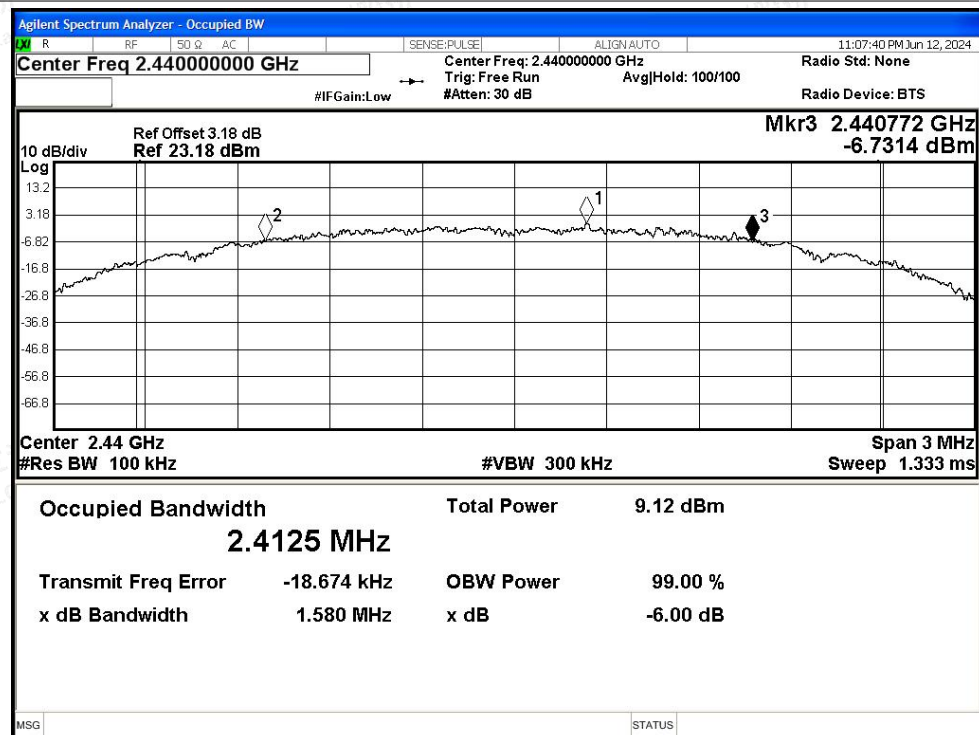


Test Graphs

-6dB Bandwidth NVNT Zigbee 2405MHz Ant1



-6dB Bandwidth NVNT Zigbee 2440MHz Ant1

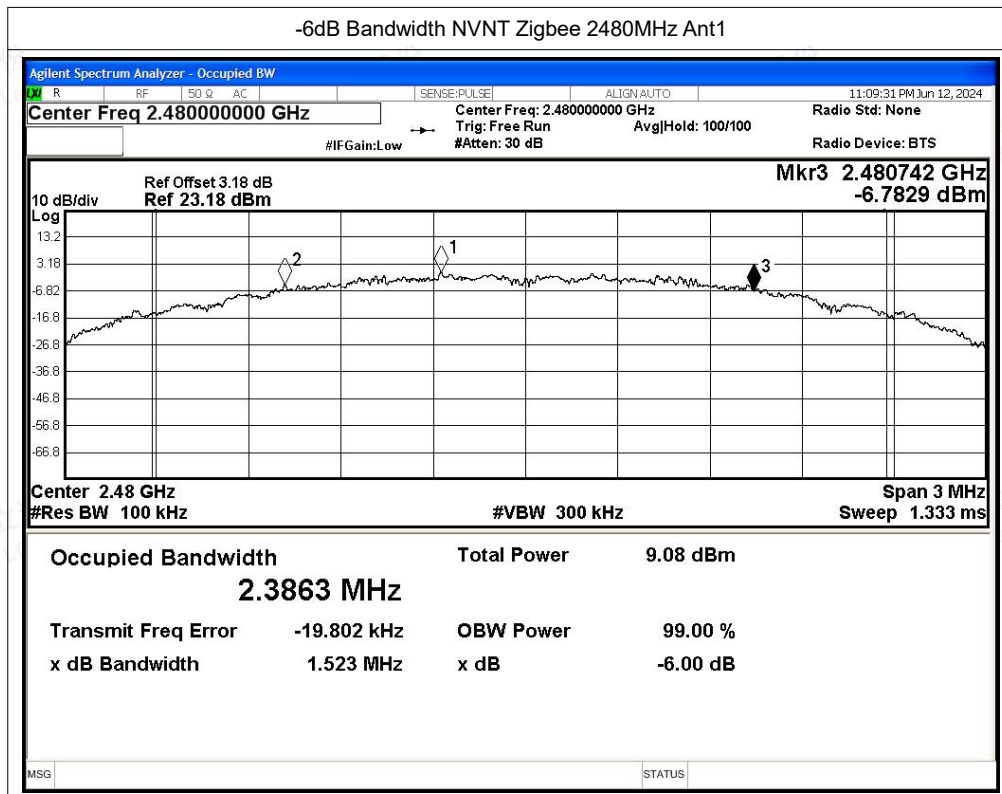


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B.2 Maximum Peak Conducted Output Power

Condition	Mode	Frequency (MHz)	Antenna	Total Power (dBm)	Limit (dBm)	Verdict
NVNT	Zigbee	2405	Ant1	3.34	30	Pass
NVNT	Zigbee	2440	Ant1	3.42	30	Pass
NVNT	Zigbee	2480	Ant1	3.20	30	Pass

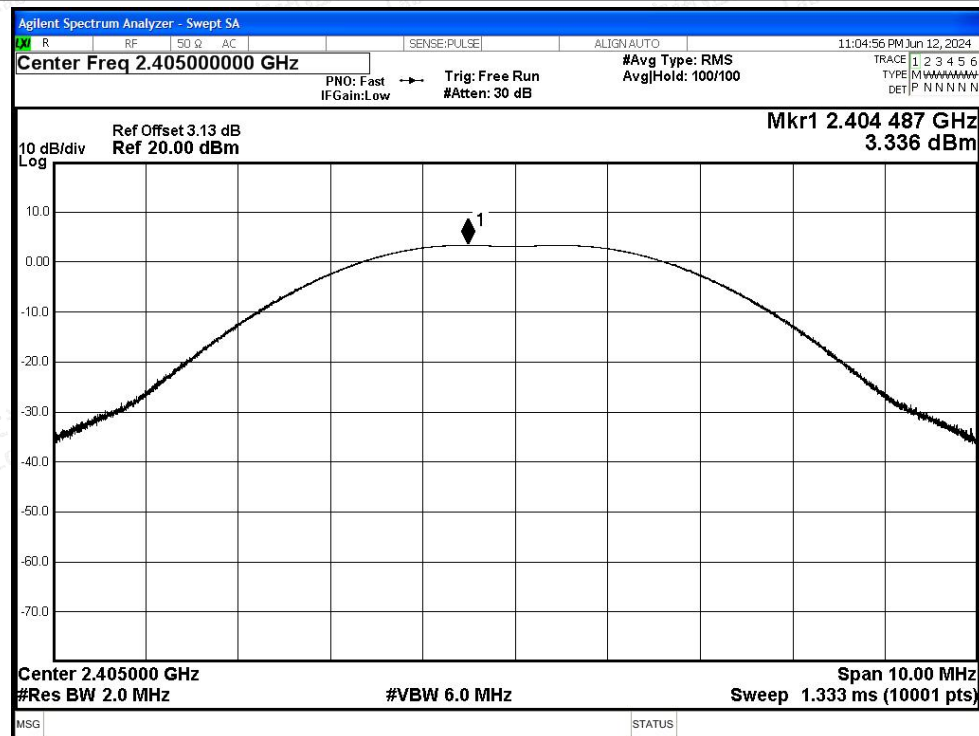


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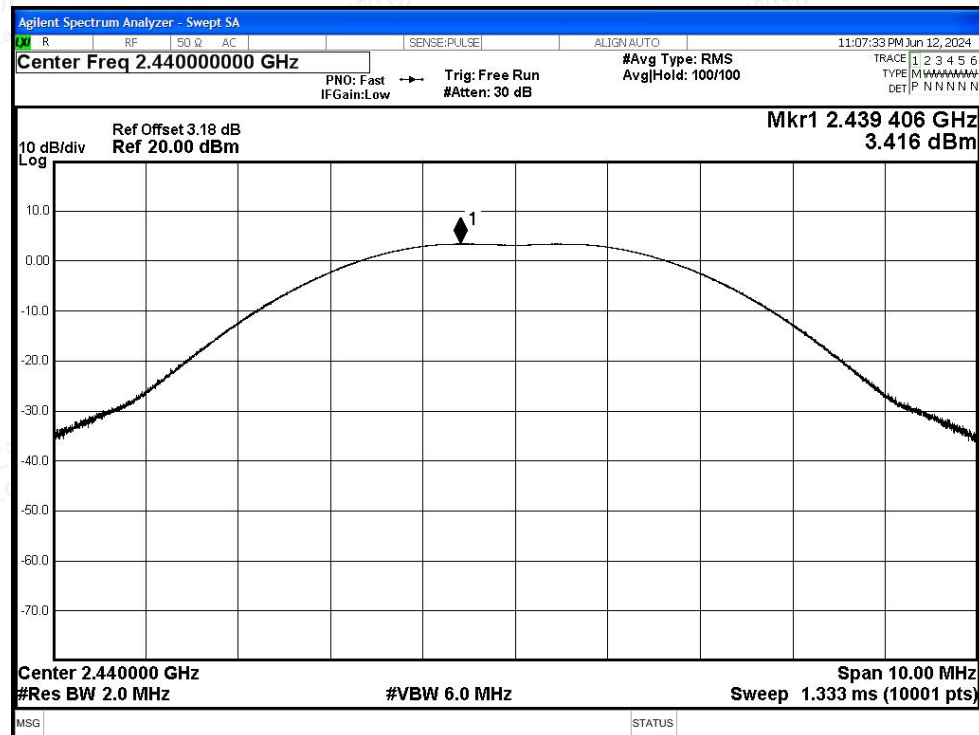


Test Graphs

Power NVNT Zigbee 2405MHz Ant1



Power NVNT Zigbee 2440MHz Ant1

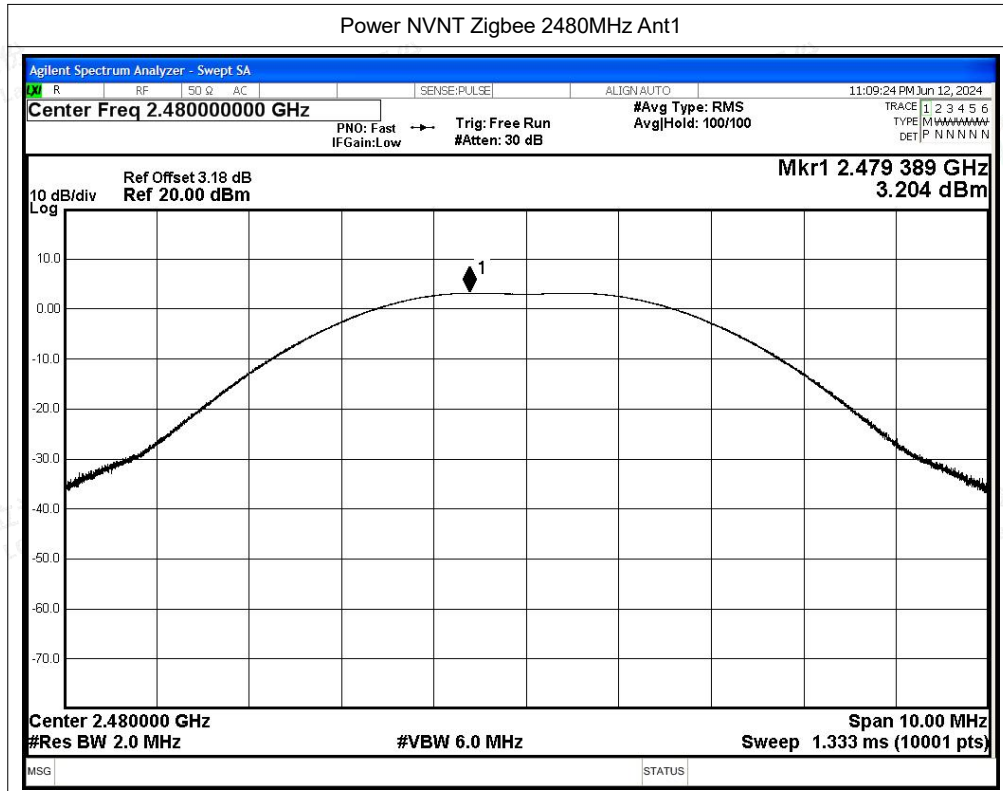


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B.3 Maximum Power Spectral Density Level

Condition	Mode	Frequency (MHz)	Antenna	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
NVNT	Zigbee	2405	Ant1	-11.31	8	Pass
NVNT	Zigbee	2440	Ant1	-12.14	8	Pass
NVNT	Zigbee	2480	Ant1	-11.35	8	Pass

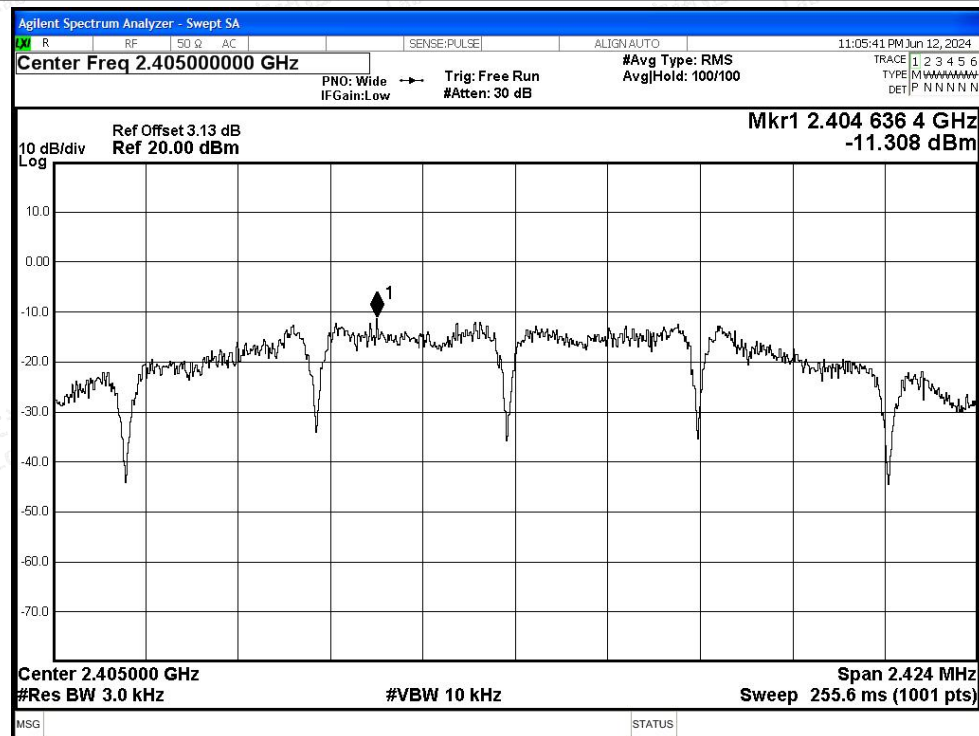


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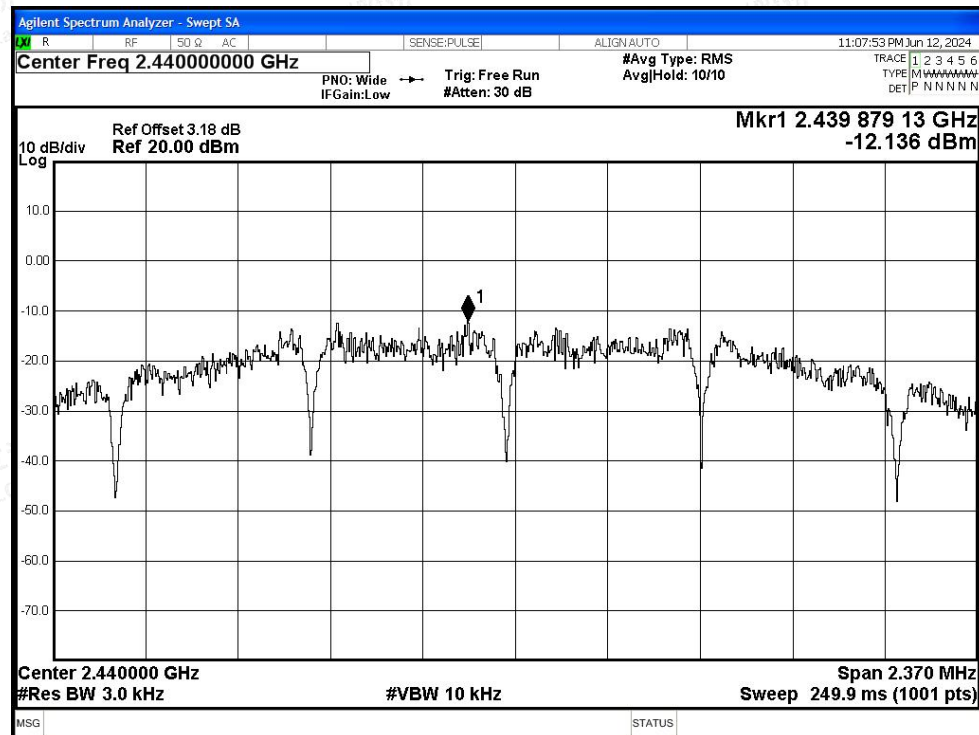


Test Graphs

PSD NVNT Zigbee 2405MHz Ant1



PSD NVNT Zigbee 2440MHz Ant1

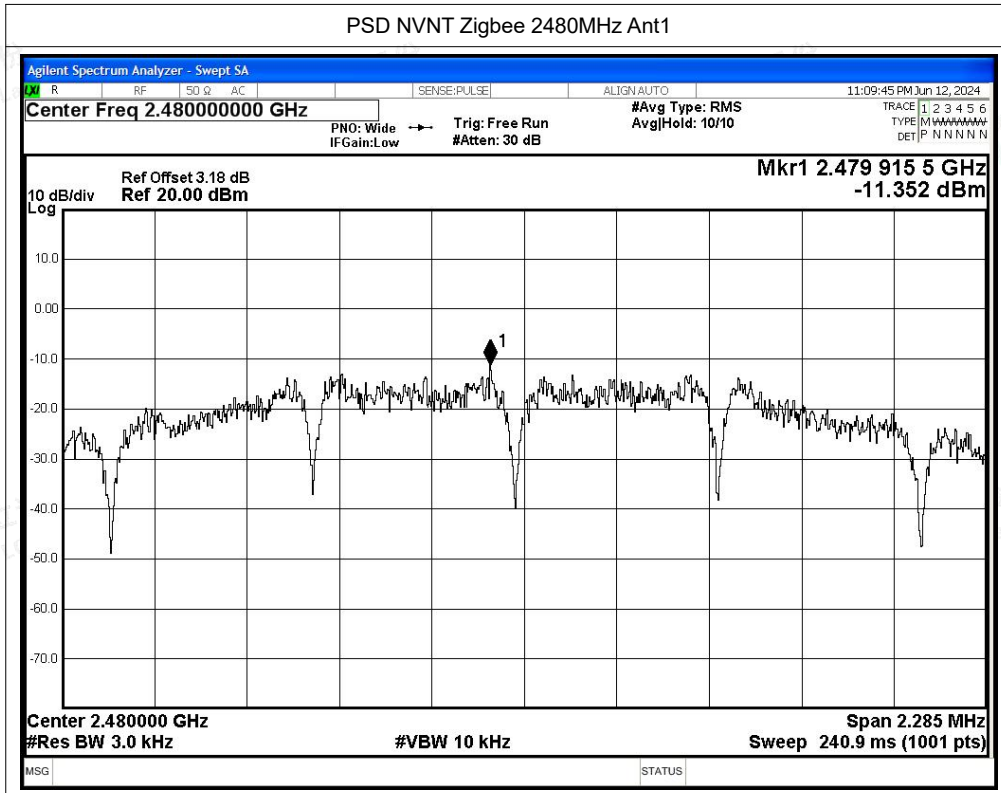


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B.4 Band Edge

Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	Zigbee	2405	Ant1	-49.07	-20	Pass
NVNT	Zigbee	2480	Ant1	-45.36	-20	Pass

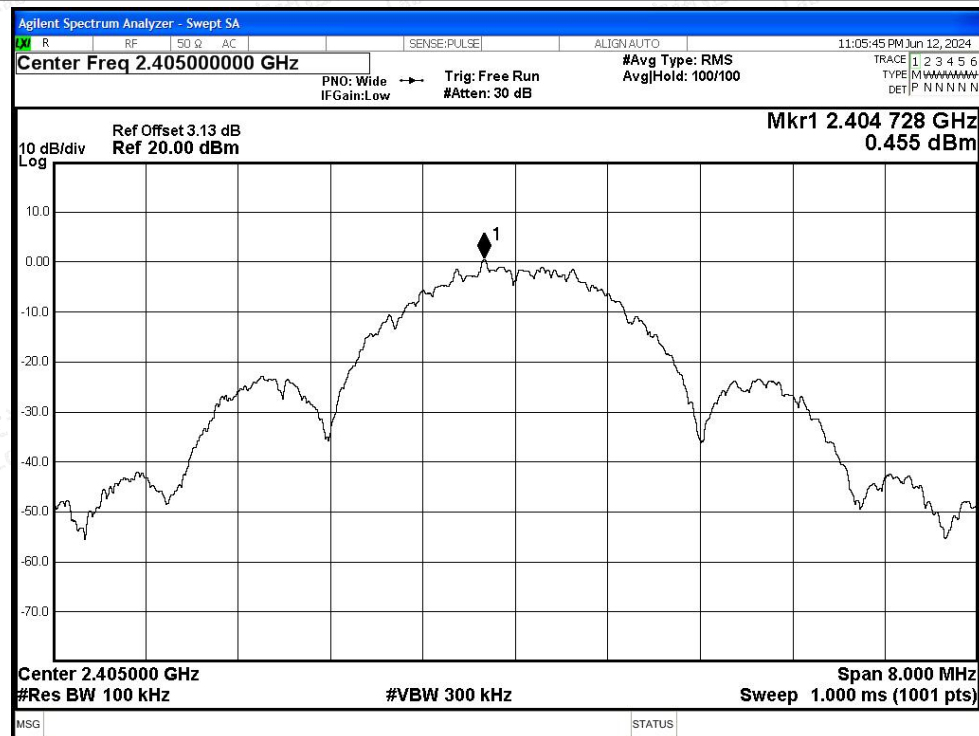


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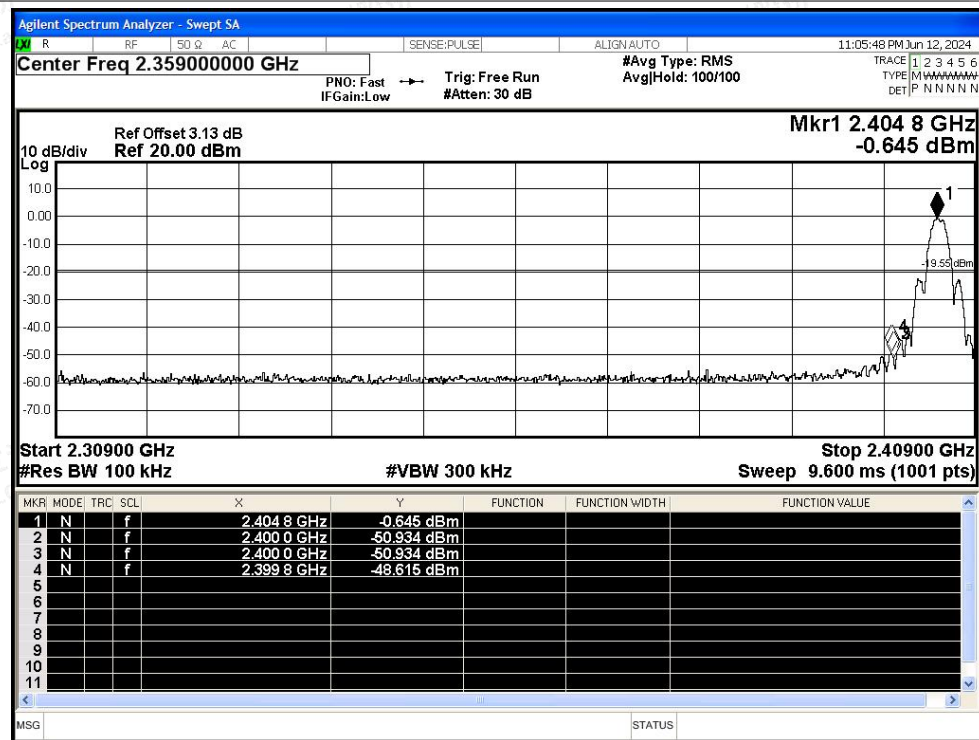


Test Graphs

Band Edge NVNT Zigbee 2405MHz Ant1 Ref



Band Edge NVNT Zigbee 2405MHz Ant1 Emission



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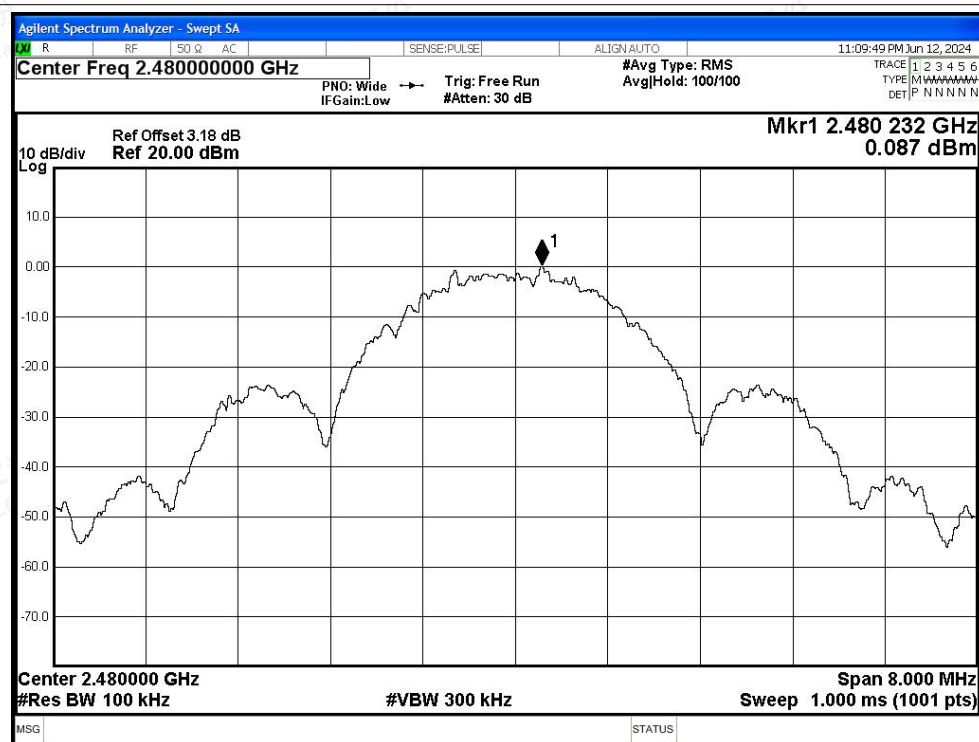
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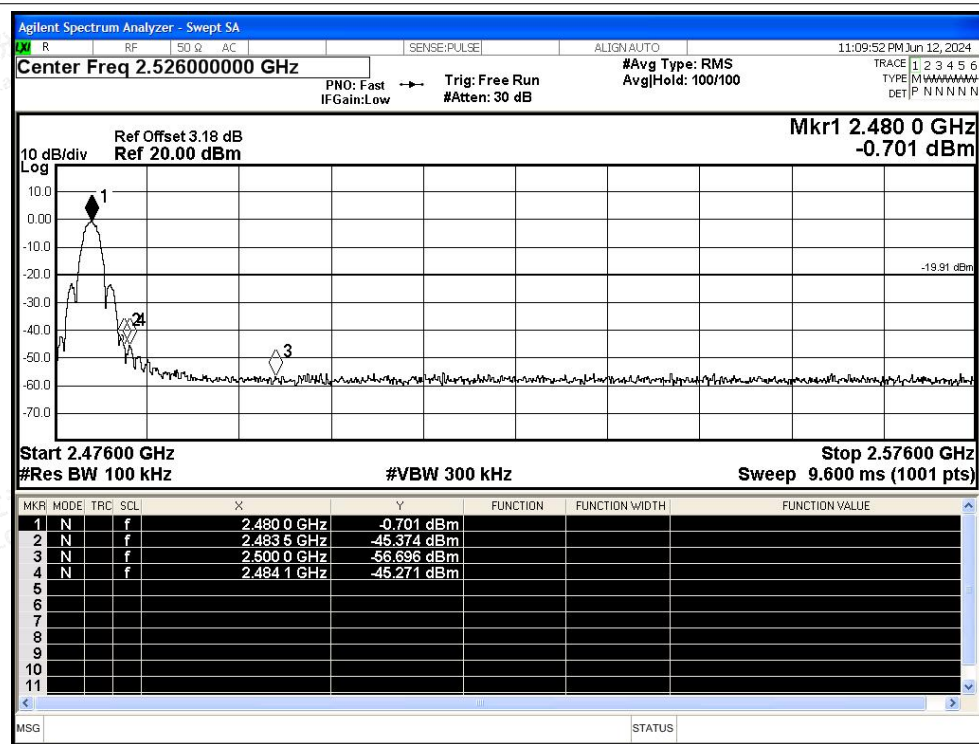
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Band Edge NVNT Zigbee 2480MHz Ant1 Ref



Band Edge NVNT Zigbee 2480MHz Ant1 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	Ant1	-45.45	-20	Pass
NVNT	Zigbee	2440	Ant1	-49.36	-20	Pass
NVNT	Zigbee	2480	Ant1	-47.17	-20	Pass

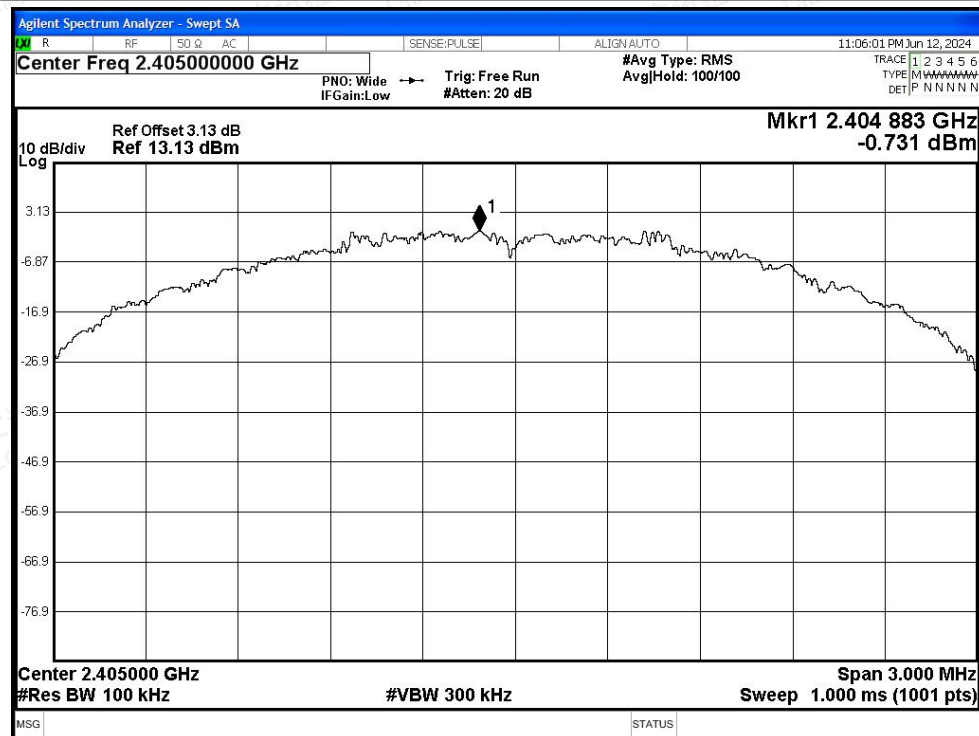


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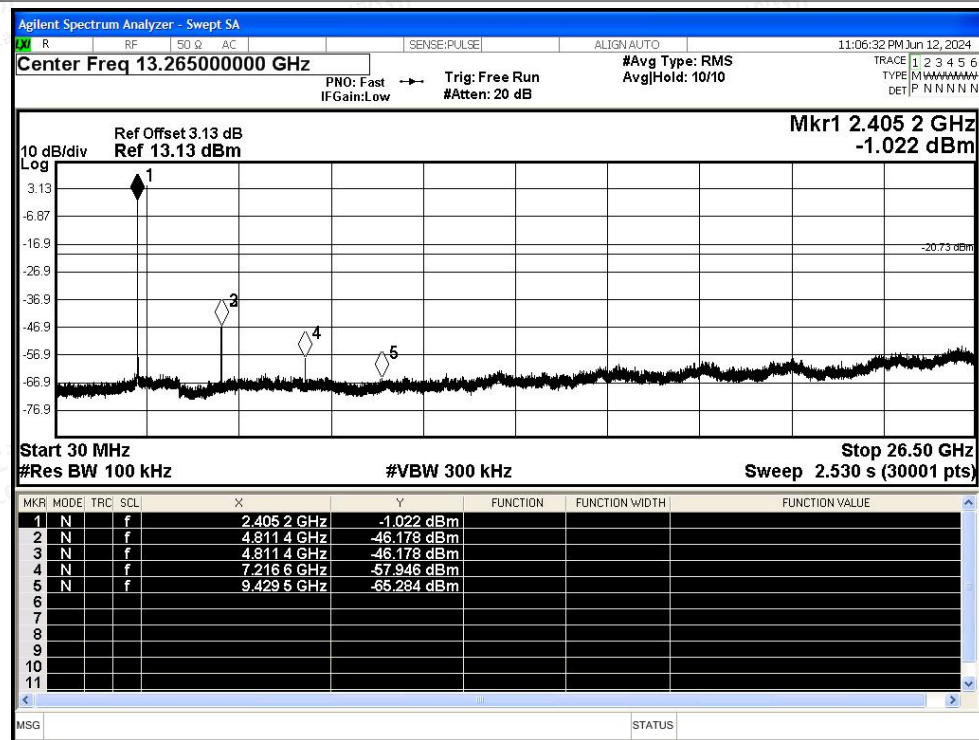


Test Graphs

Tx. Spurious NVNT Zigbee 2405MHz Ant1 Ref



Tx. Spurious NVNT Zigbee 2405MHz Ant1 Emission



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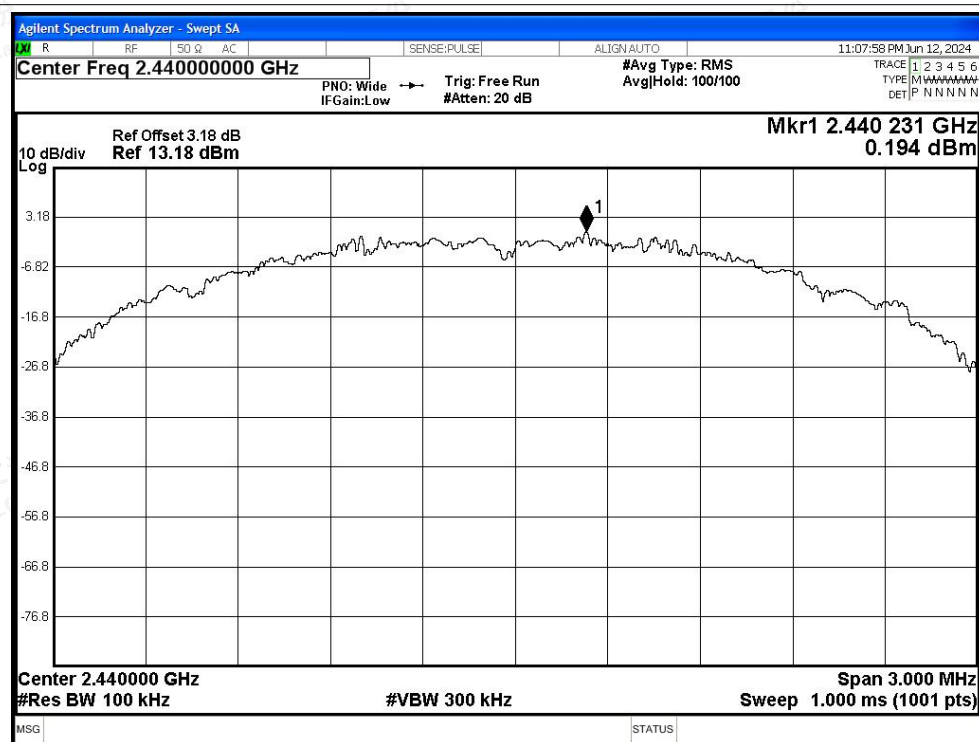
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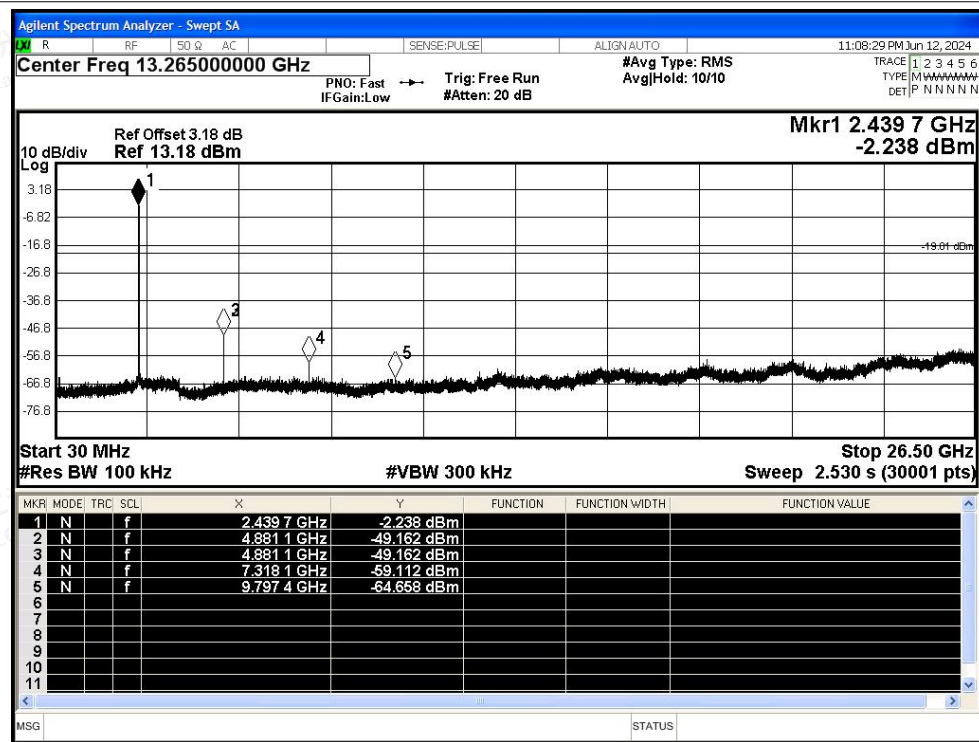
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Tx. Spurious NVNT Zigbee 2440MHz Ant1 Ref



Tx. Spurious NVNT Zigbee 2440MHz Ant1 Emission



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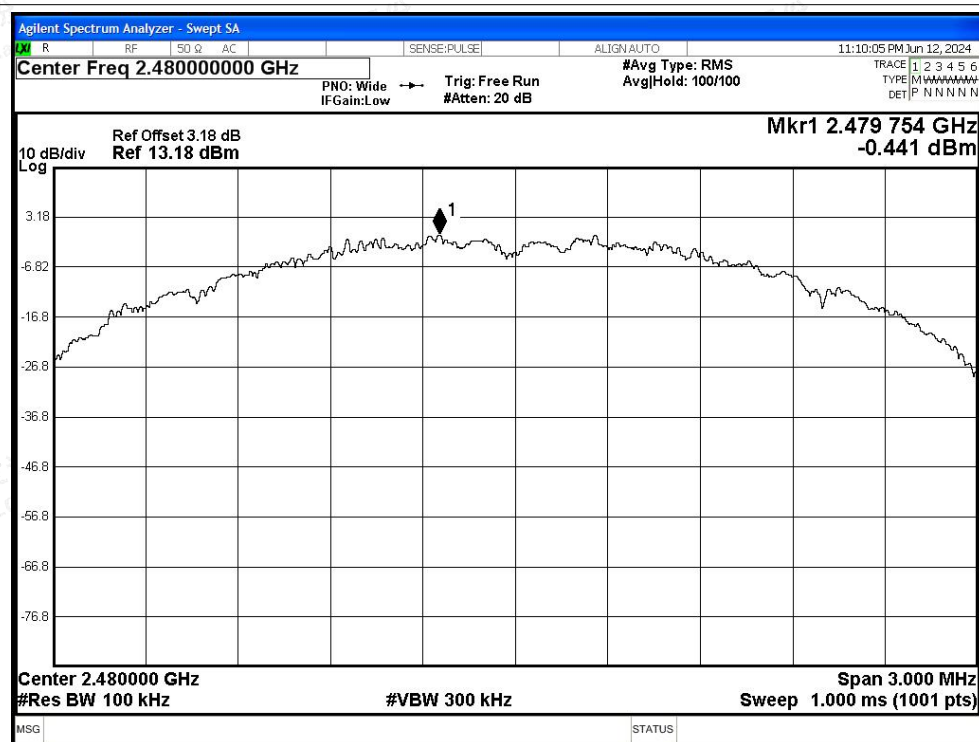
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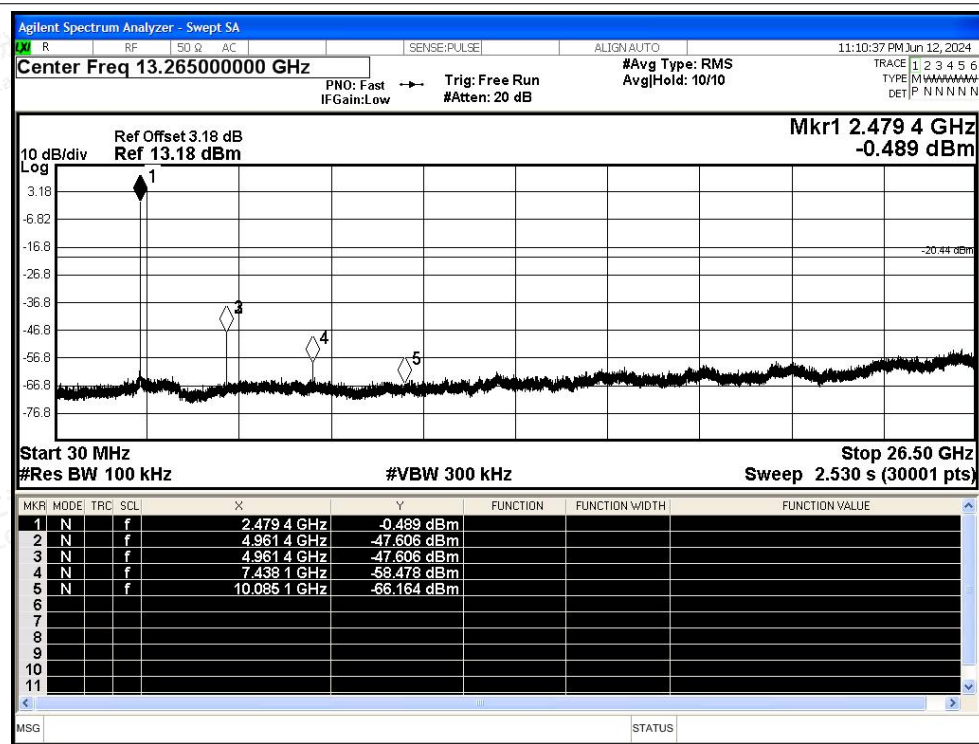
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Tx. Spurious NVNT Zigbee 2480MHz Ant1 Ref



Tx. Spurious NVNT Zigbee 2480MHz Ant1 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	Ant1	100	0	0
NVNT	Zigbee	2440	Ant1	100	0	0
NVNT	Zigbee	2480	Ant1	100	0	0

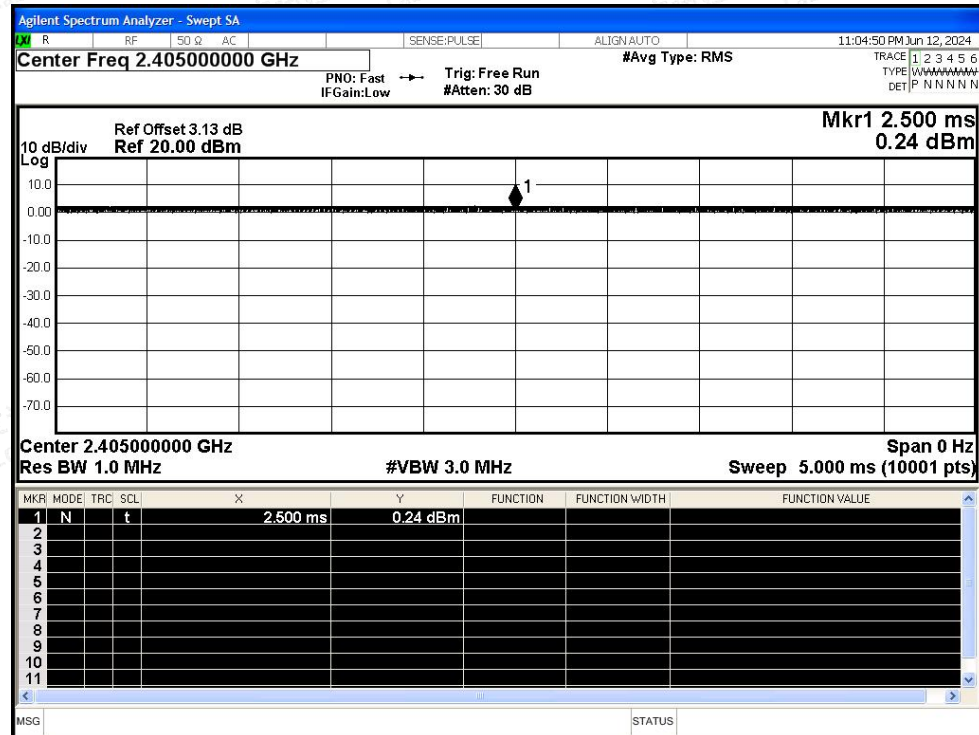


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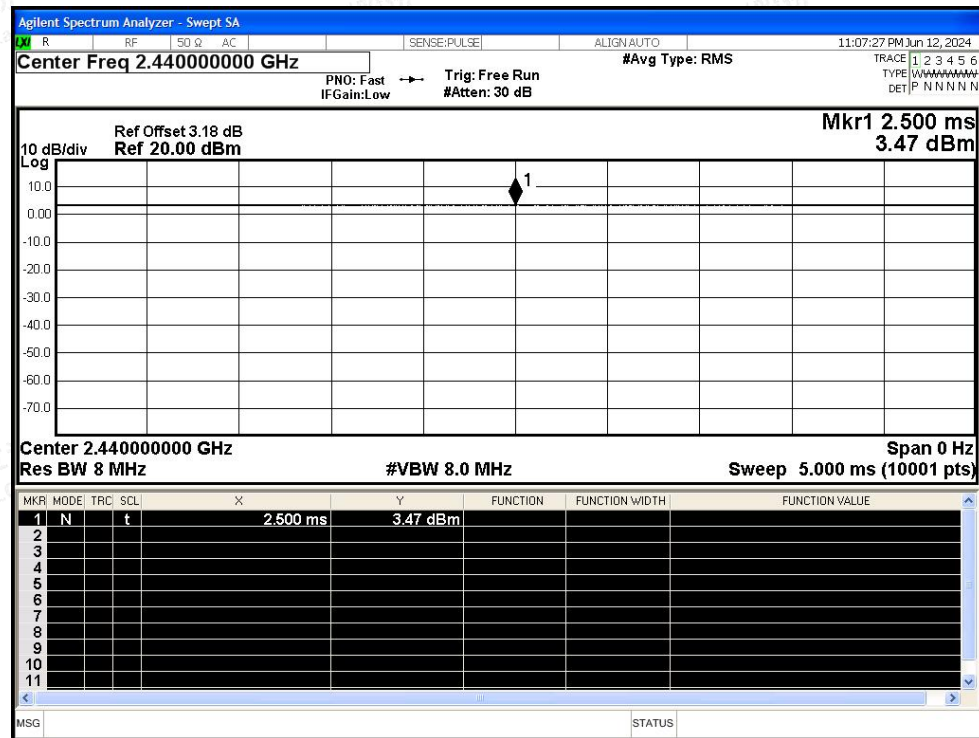


Test Graphs

Duty Cycle NVNT Zigbee 2405MHz Ant1



Duty Cycle NVNT Zigbee 2440MHz Ant1

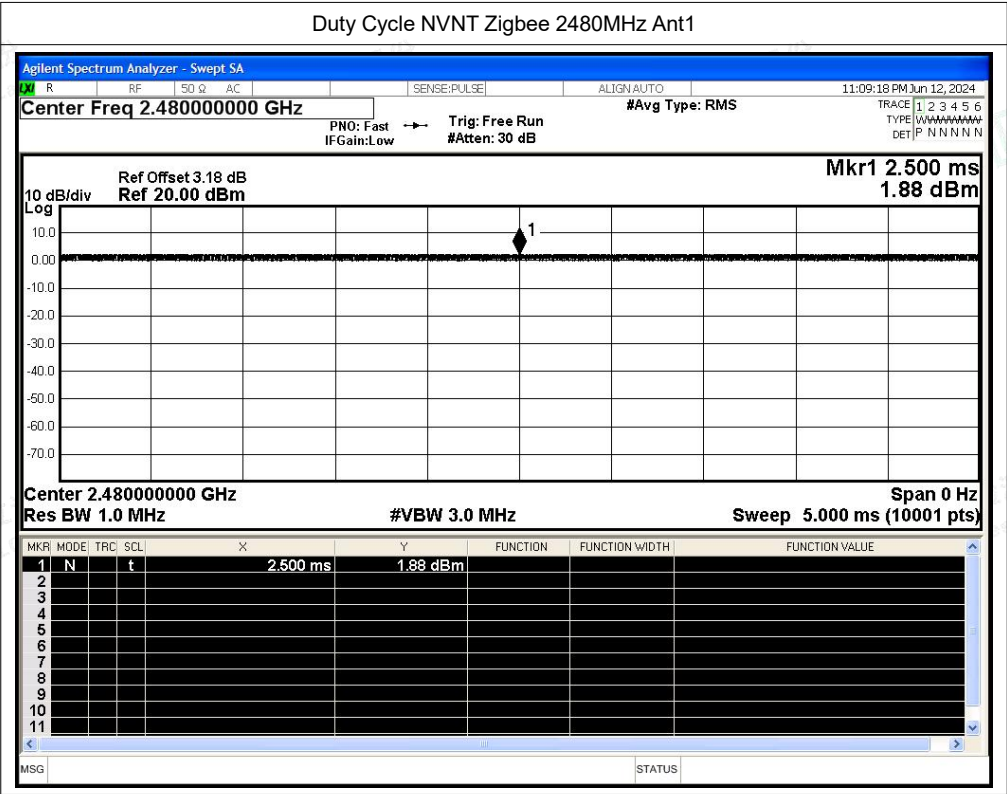


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B.7 Restrict Band

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	Ant1	2310	-48.14	3.0	-	50.12	Peak	74	Pass
NVNT	Zigbee	2405	Ant1	2310	-57.76	3.0	0	40.50	Average	54	Pass
NVNT	Zigbee	2405	Ant1	2310.99	-46.03	3.0	-	52.23	Peak	74	Pass
NVNT	Zigbee	2405	Ant1	2384.943	-56.08	3.0	0	42.18	Average	54	Pass
NVNT	Zigbee	2405	Ant1	2390	-48.81	3.0	-	49.45	Peak	74	Pass
NVNT	Zigbee	2405	Ant1	2390	-56.75	3.0	0	41.51	Average	54	Pass
NVNT	Zigbee	2480	Ant1	2483.5	-40.98	3.0	-	57.28	Peak	74	Pass
NVNT	Zigbee	2480	Ant1	2483.5	-48.13	3.0	0	50.13	Average	54	Pass
NVNT	Zigbee	2480	Ant1	2483.512	-40.98	3.0	-	57.28	Peak	74	Pass
NVNT	Zigbee	2480	Ant1	2483.512	-48.13	3.0	0	50.13	Average	54	Pass
NVNT	Zigbee	2480	Ant1	2500	-50.33	3.0	-	47.93	Peak	74	Pass
NVNT	Zigbee	2480	Ant1	2500	-56.91	3.0	0	41.35	Average	54	Pass

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

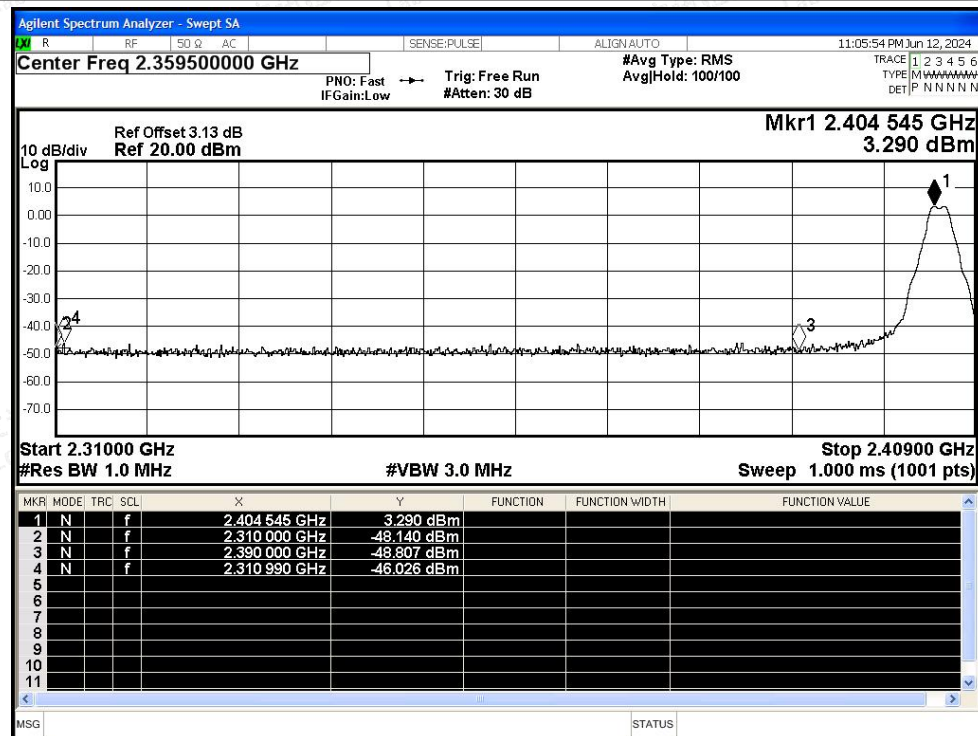


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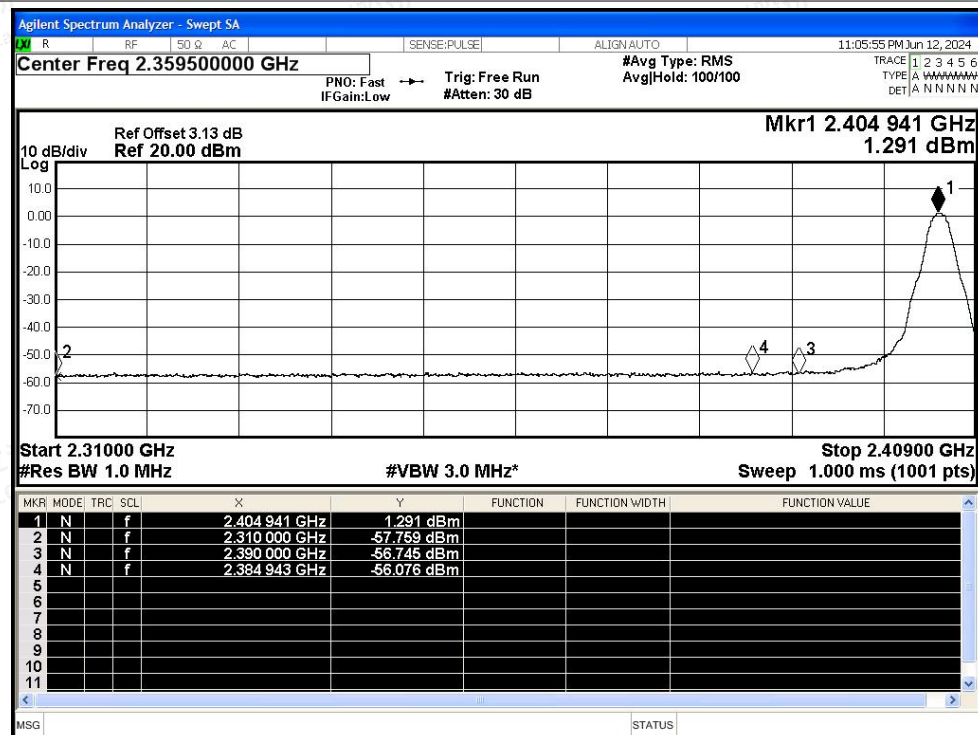


Test Graphs

Restrict Band NVNT Zigbee 2405MHz Ant1 Peak



Restrict Band NVNT Zigbee 2405MHz Ant1 Average



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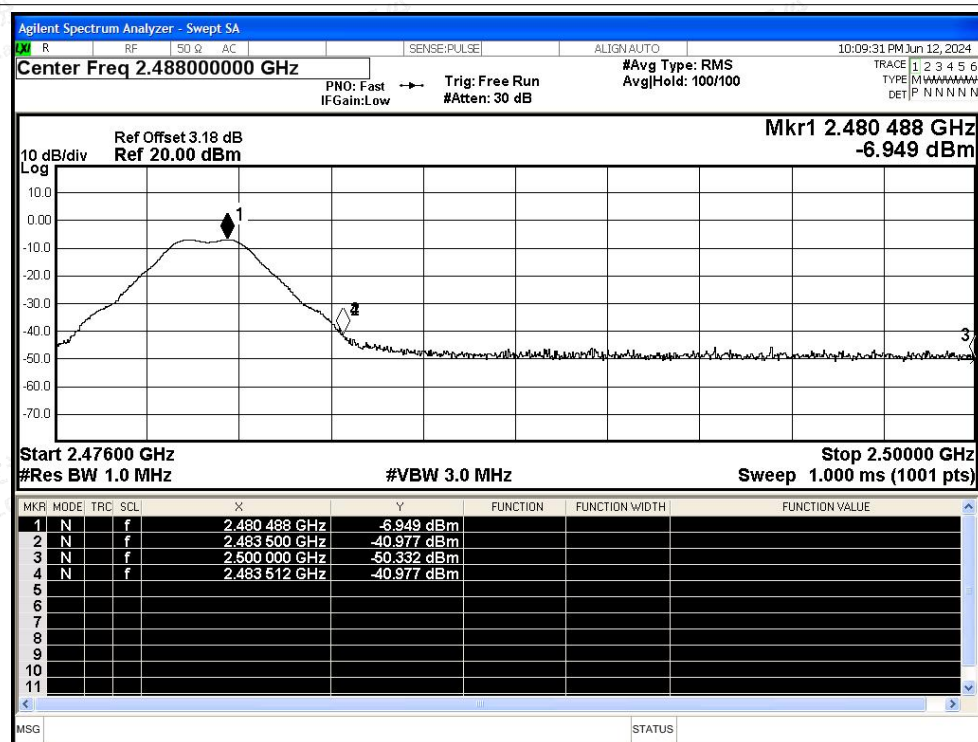
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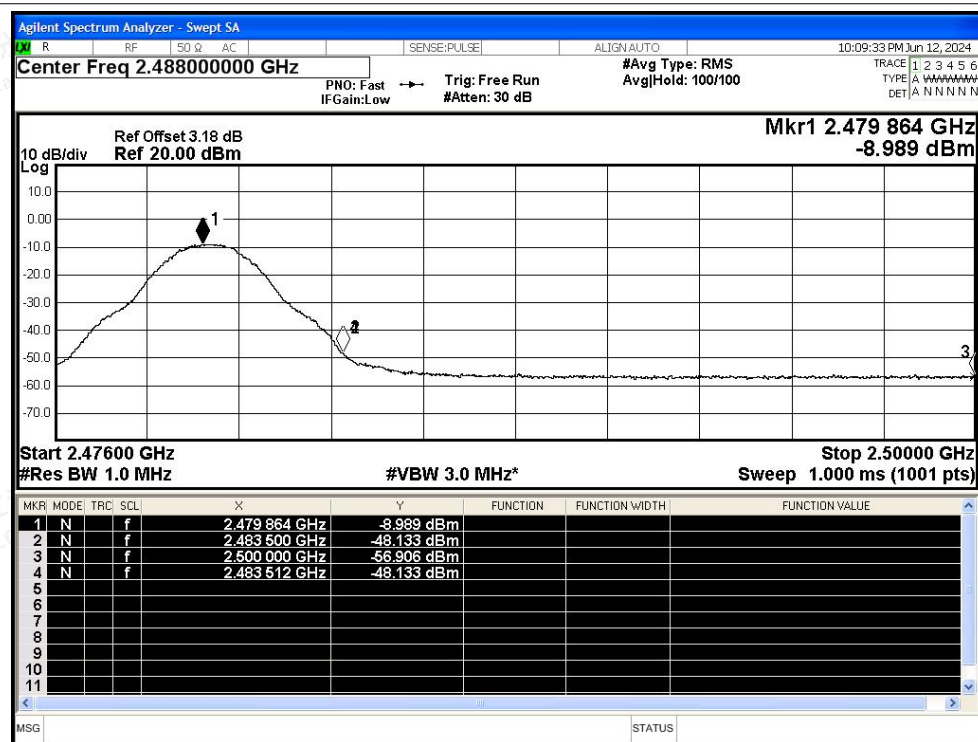
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Restrict Band NVNT Zigbee 2480MHz Ant1 Peak



Restrict Band NVNT Zigbee 2480MHz Ant1 Average



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