Appendix A

RF Test Data for Zigbee (Conducted Measurement)

Product Name: Smart zigbee switch

Test Model: TYSH-Z2813

Environmental Conditions

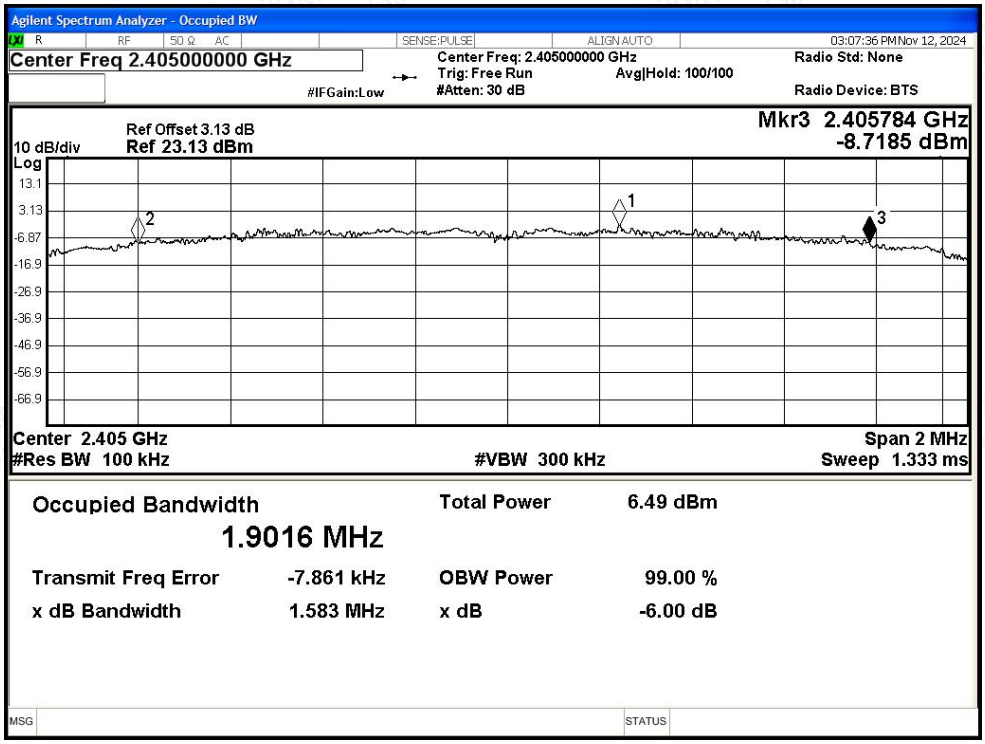
Temperature:	23.8°C
Relative Humidity:	52.1%
ATM Pressure:	100.0 kPa
Test Engineer:	Jerry Chu
Supervised by:	Nick Peng

A.1 -6dB Bandwidth

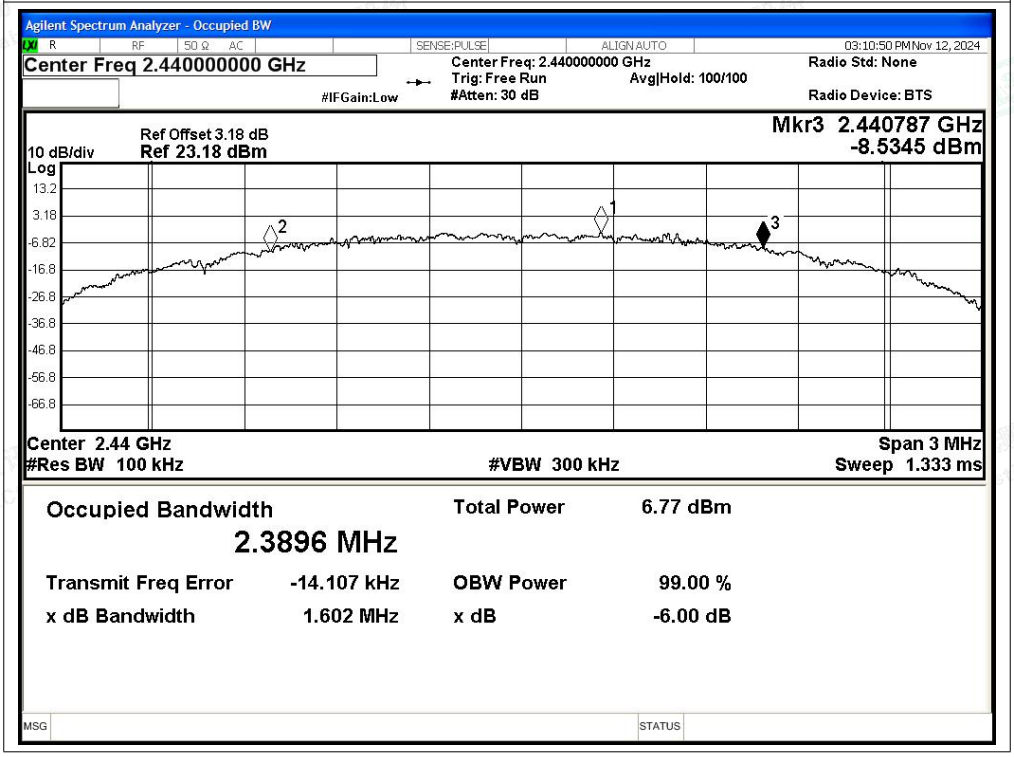
Condition	Mode	Frequency (MHz)	Antenna	-6 dB Bandwidth (MHz)	Limit -6 dB Bandwidth (MHz)	Verdict
NVNT	ZIGBEE	2405	Ant1	1.583	>=0.5	Pass
NVNT	ZIGBEE	2440	Ant1	1.602	>=0.5	Pass
NVNT	ZIGBEE	2480	Ant1	1.592	>=0.5	Pass

Test Graphs

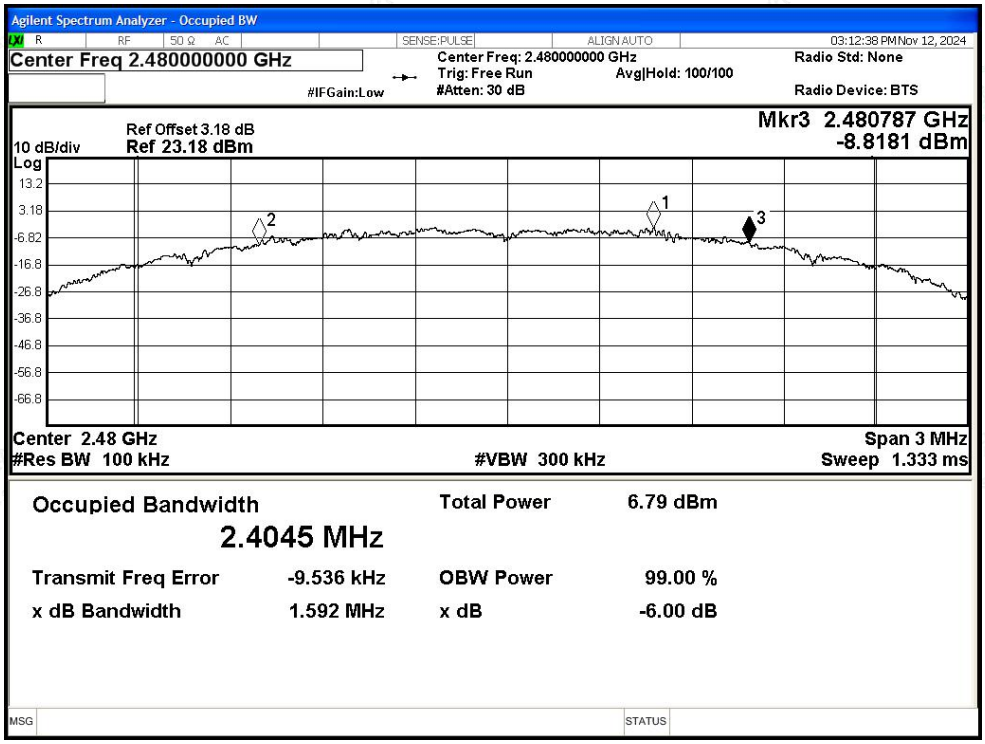
-6dB Bandwidth NVNT ZIGBEE 2405MHz Ant1



-6dB Bandwidth NVNT ZIGBEE 2440MHz Ant1



-6dB Bandwidth NVNT ZIGBEE 2480MHz Ant1

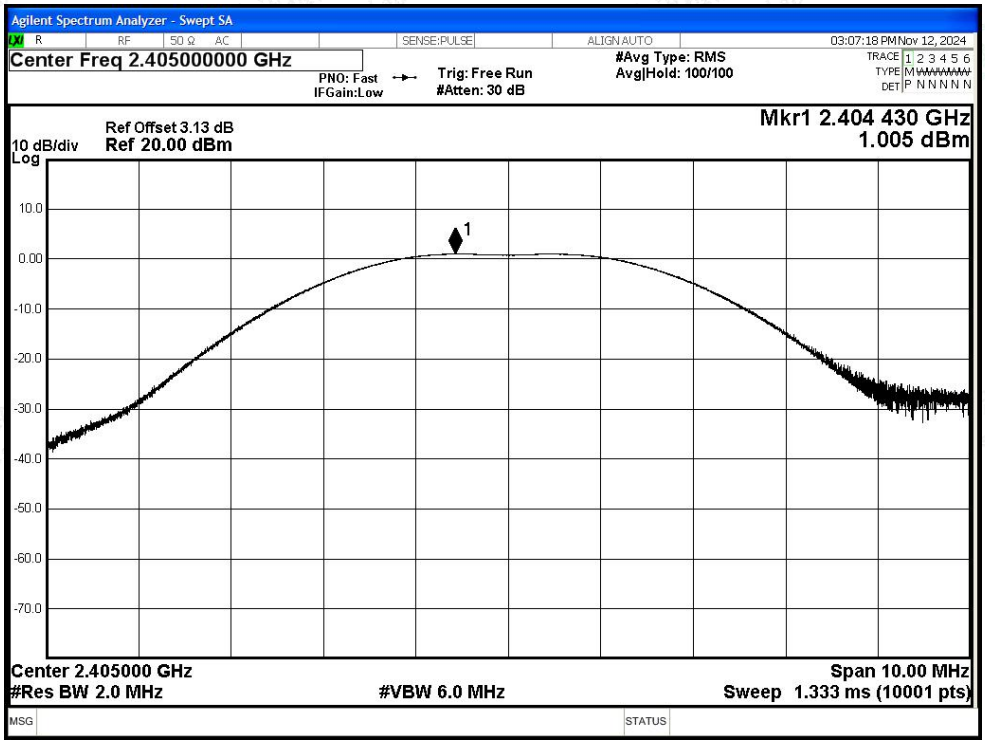


A.2 Maximum Peak Conducted Output Power

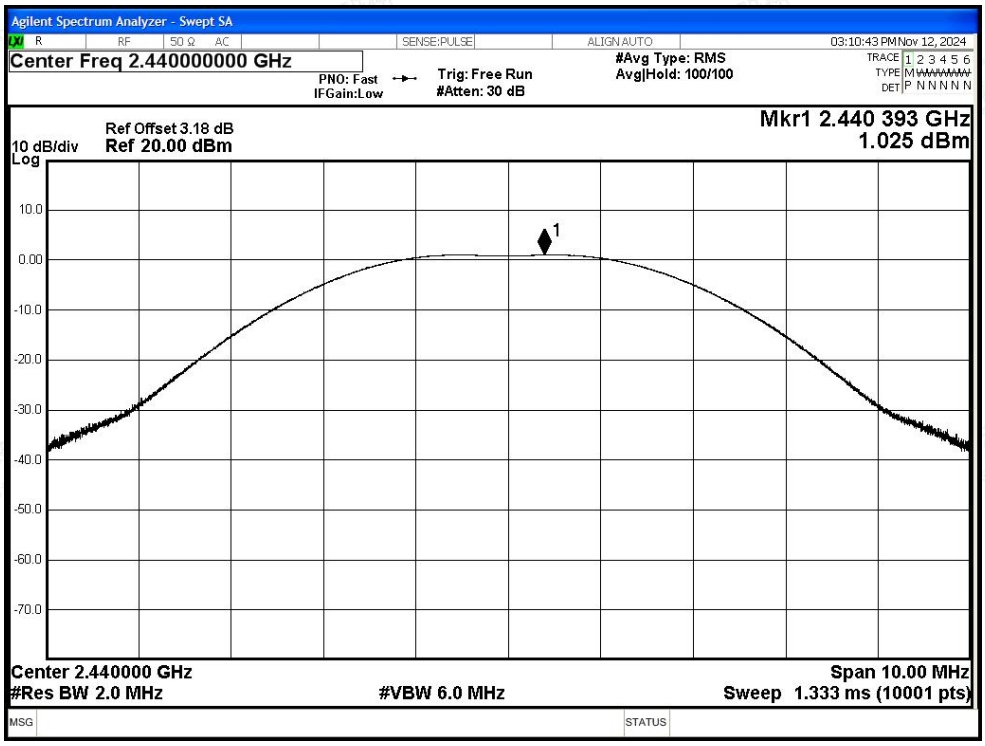
Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	ZIGBEE	2405	Ant	1	30	Pass
NVNT	ZIGBEE	2440	Ant	1.02	30	Pass
NVNT	ZIGBEE	2480	Ant	1.18	30	Pass

Test Graphs

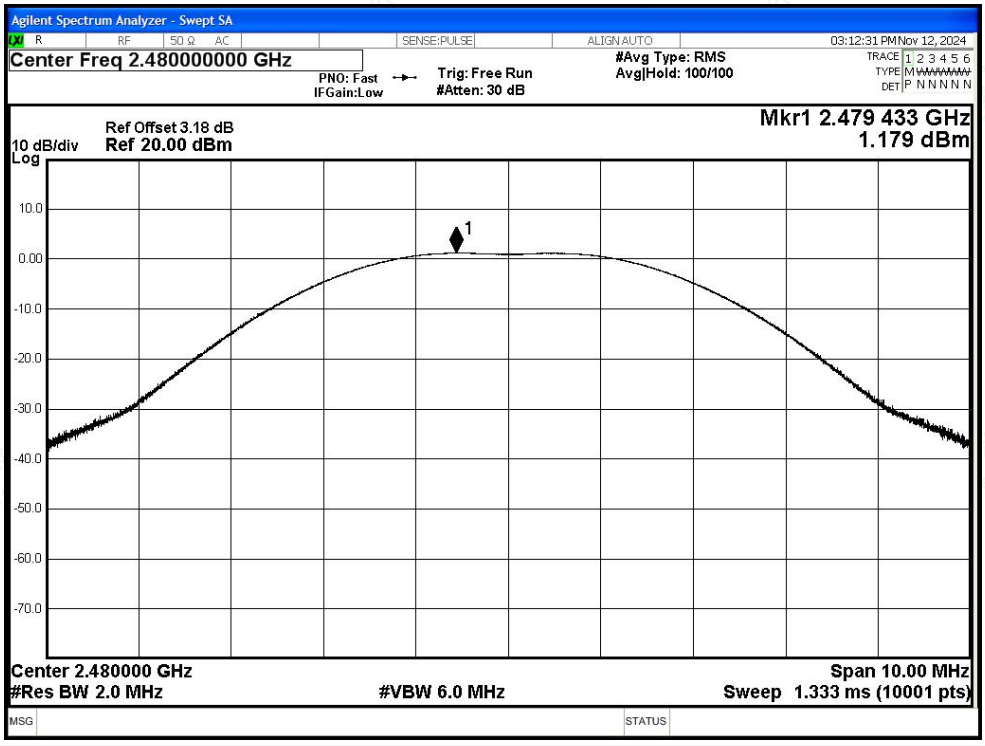
Power NVNT ZIGBEE 2405MHz Ant1



Power NVNT ZIGBEE 2440MHz Ant1



Power NVNT ZIGBEE 2480MHz Ant1

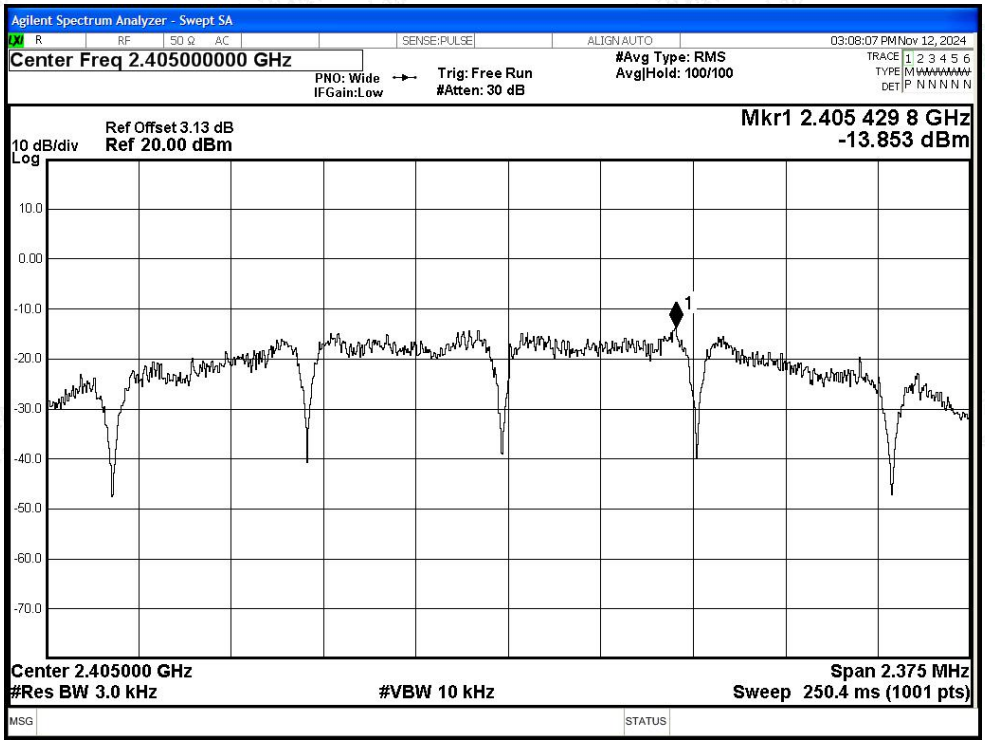


A.3 Maximum Power Spectral Density Level

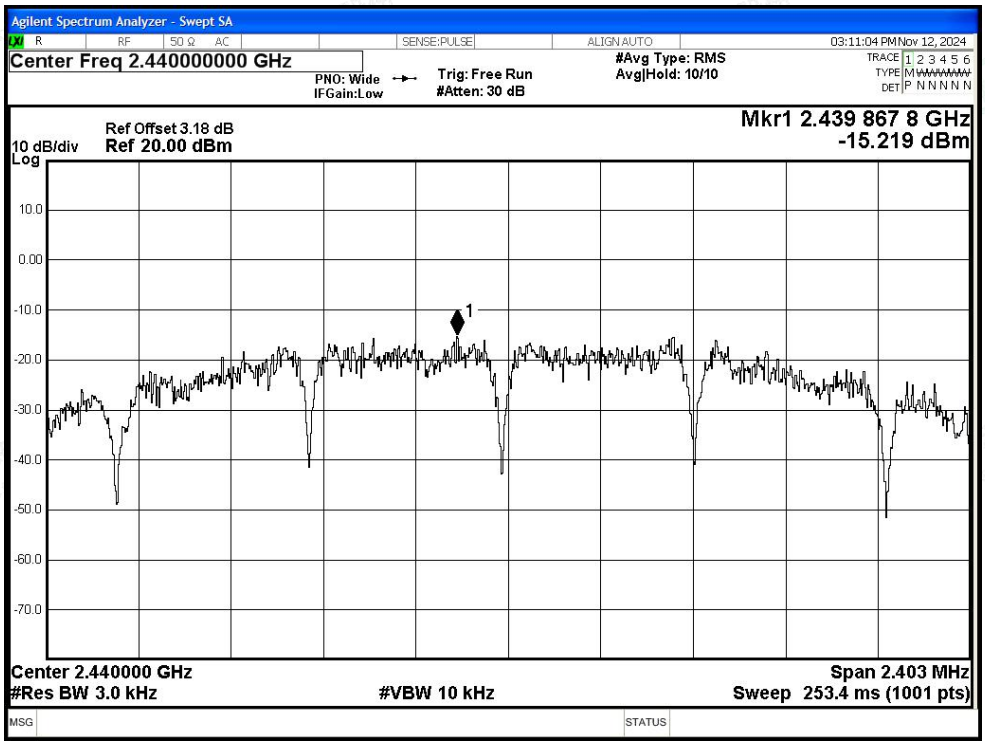
Condition	Mode	Frequency (MHz)	Antenna	Conducted PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
NVNT	ZIGBEE	2405	Ant	-13.85	8	Pass
NVNT	ZIGBEE	2440	Ant	-15.22	8	Pass
NVNT	ZIGBEE	2480	Ant	-12.61	8	Pass

Test Graphs

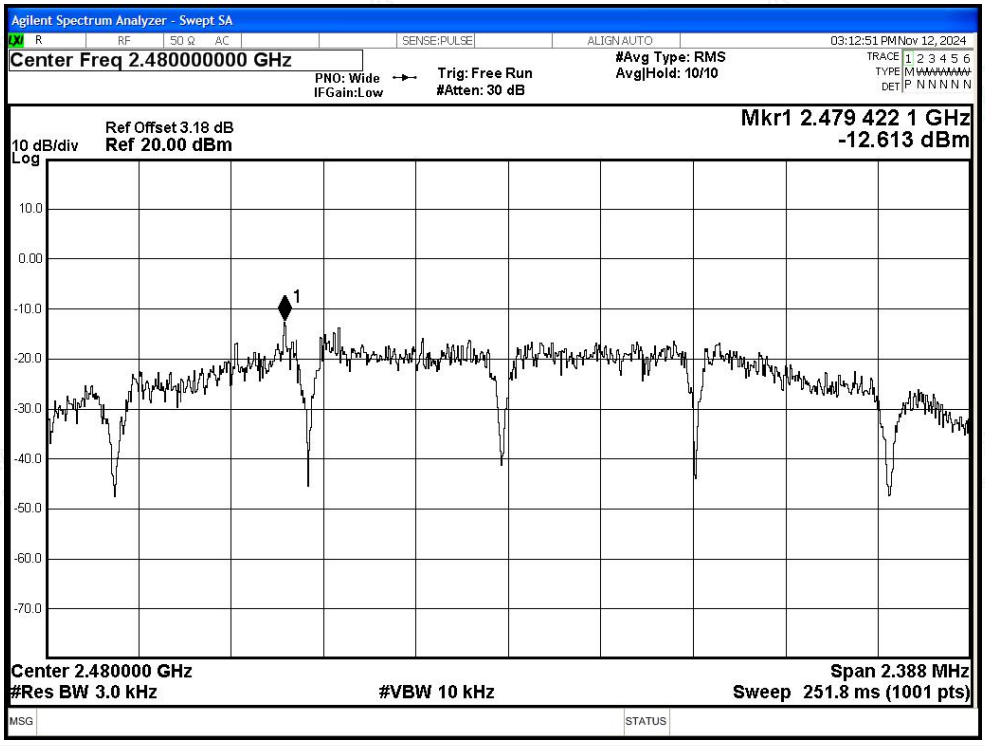
PSD NVNT ZIGBEE 2405MHz Ant1



PSD NVNT ZIGBEE 2440MHz Ant1



PSD NVNT ZIGBEE 2480MHz Ant1

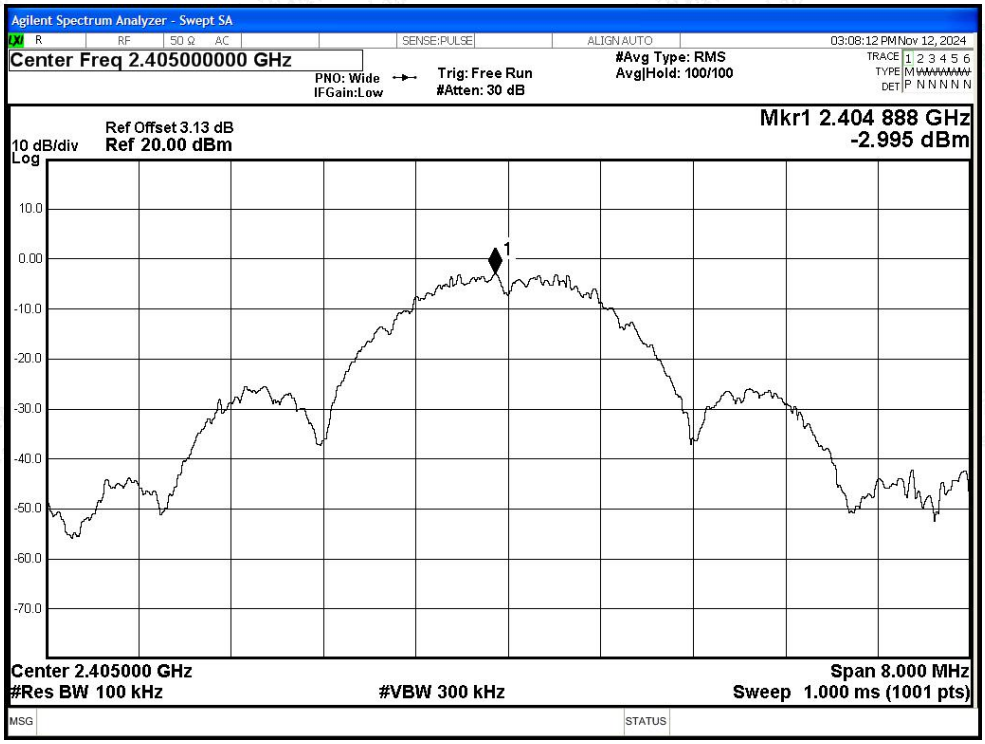


A.4 Band Edge

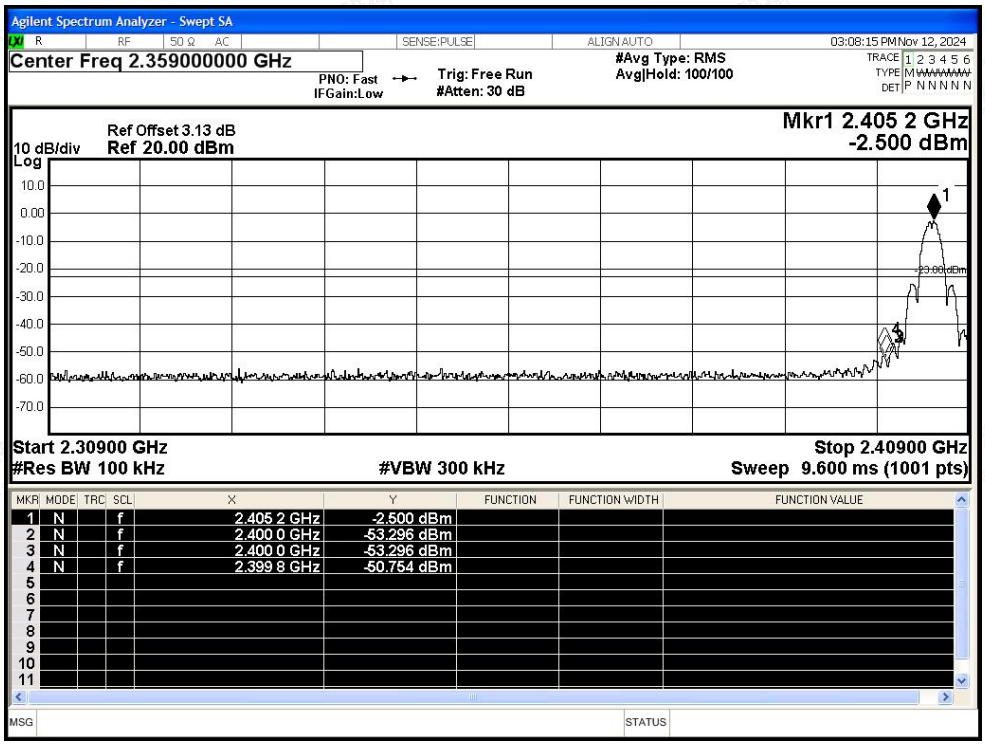
Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	ZIGBEE	2405	Ant1	-47.76	-20	Pass
NVNT	ZIGBEE	2480	Ant1	-44.5	-20	Pass

Test Graphs

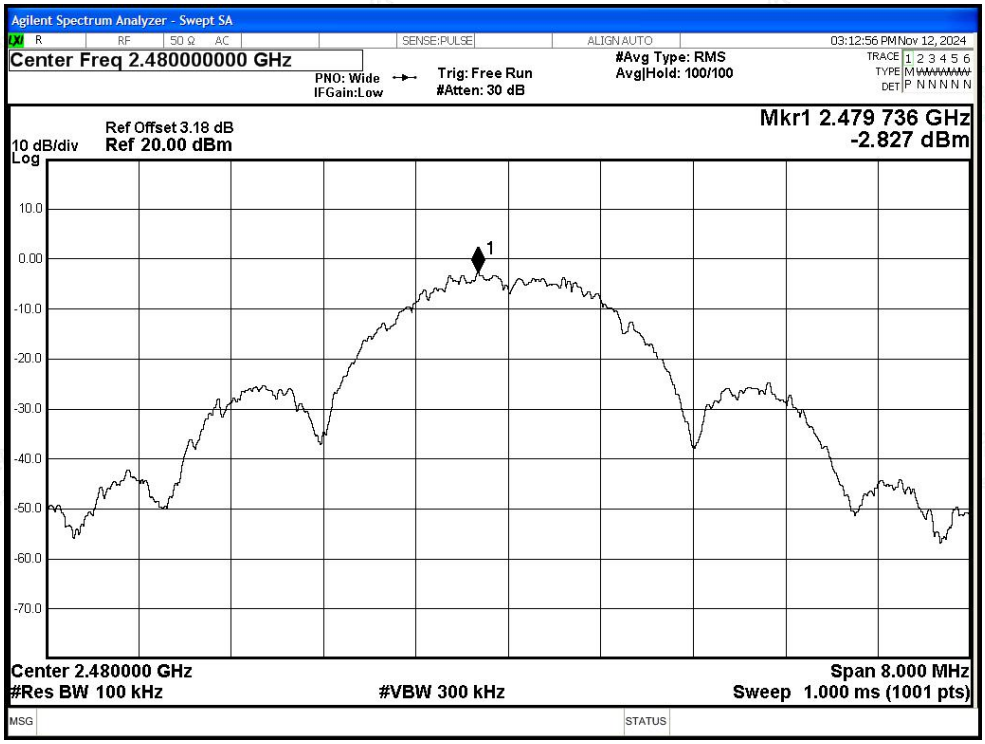
Band Edge NVNT ZIGBEE 2405MHz Ant1 Ref



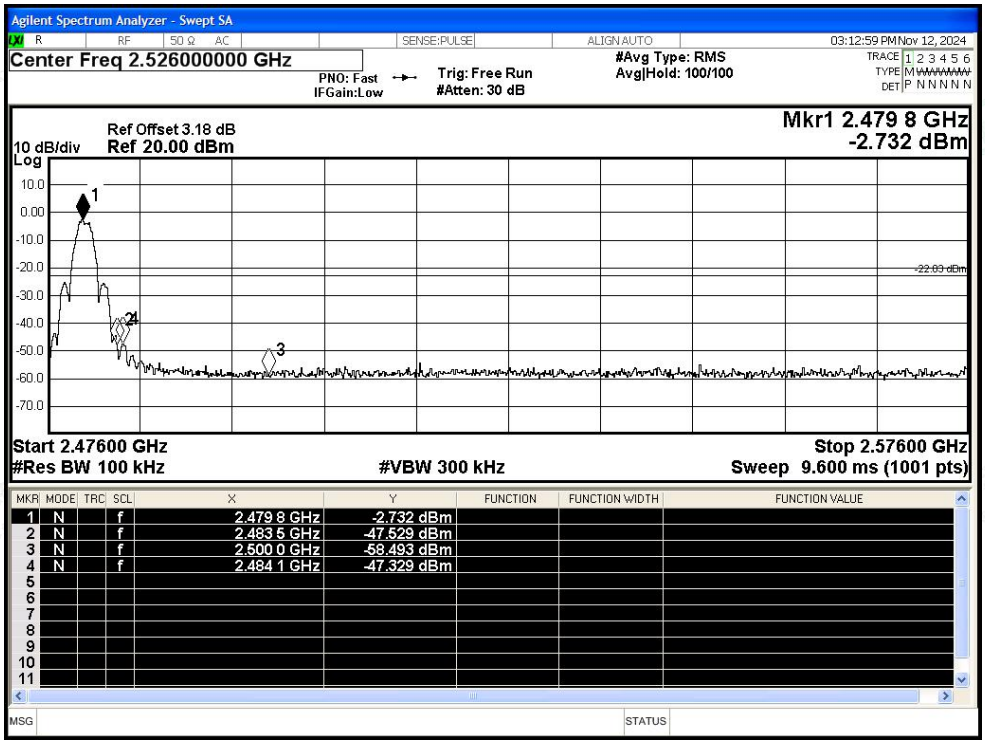
Band Edge NVNT ZIGBEE 2405MHz Ant1 Emission



Band Edge NVNT ZIGBEE 2480MHz Ant1 Ref



Band Edge NVNT ZIGBEE 2480MHz Ant1 Emission

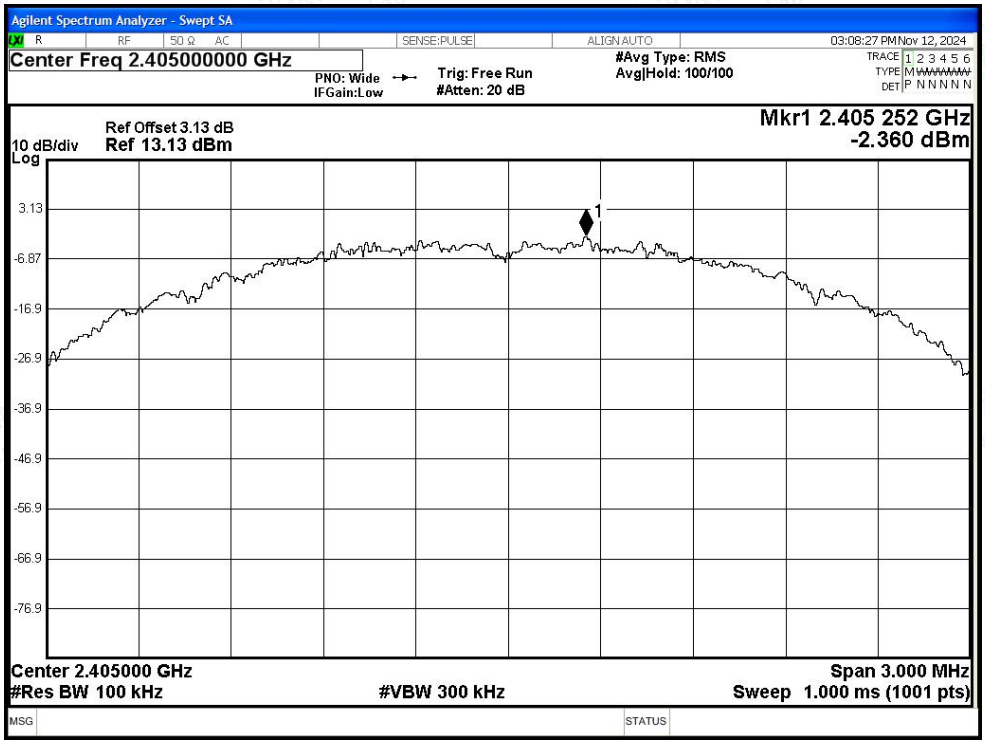


A.5 Conducted RF Spurious Emission

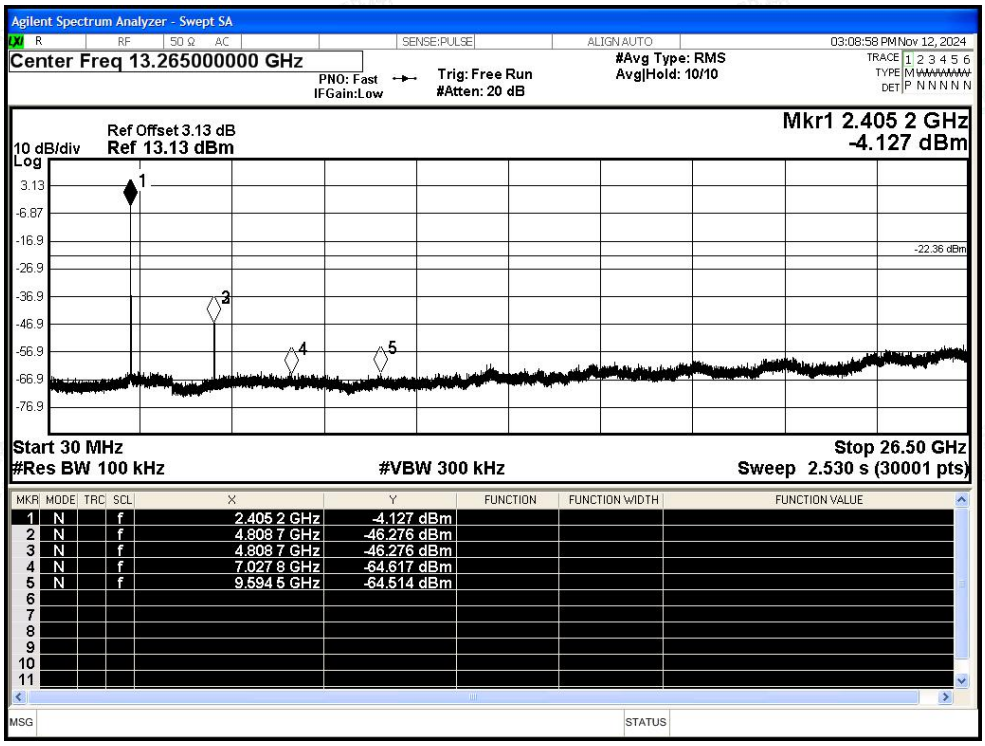
Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	ZIGBEE	2405	Ant1	-43.92	-20	Pass
NVNT	ZIGBEE	2440	Ant1	-45.57	-20	Pass
NVNT	ZIGBEE	2480	Ant1	-47.18	-20	Pass

Test Graphs

Tx. Spurious NVNT ZIGBEE 2405MHz Ant1 Ref

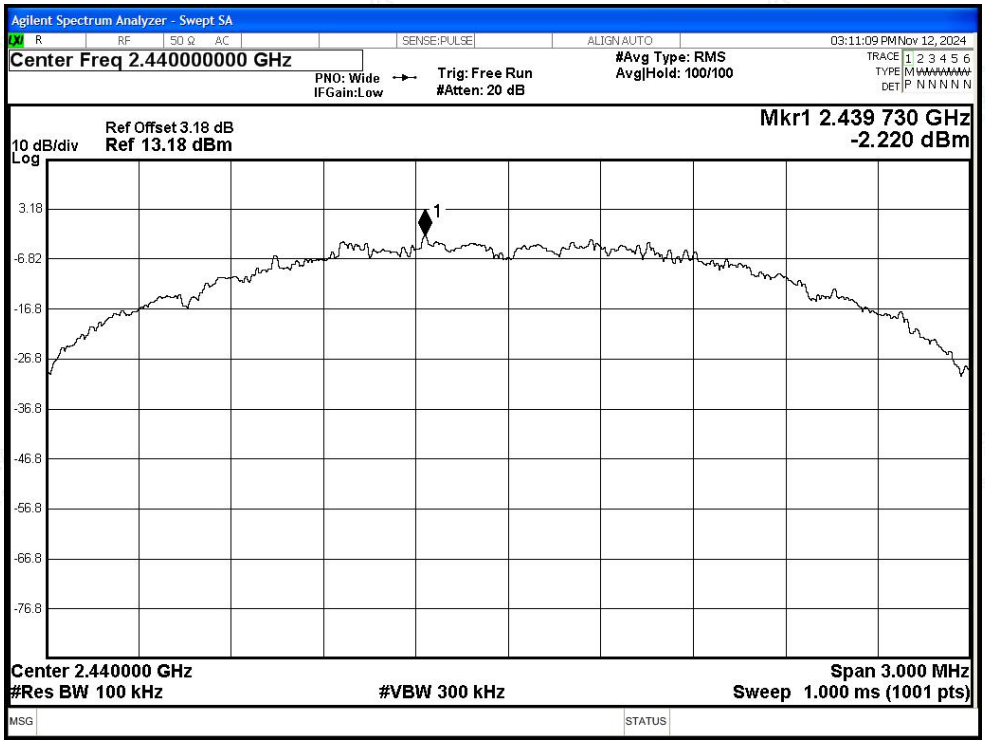


Tx. Spurious NVNT ZIGBEE 2405MHz Ant1 Emission

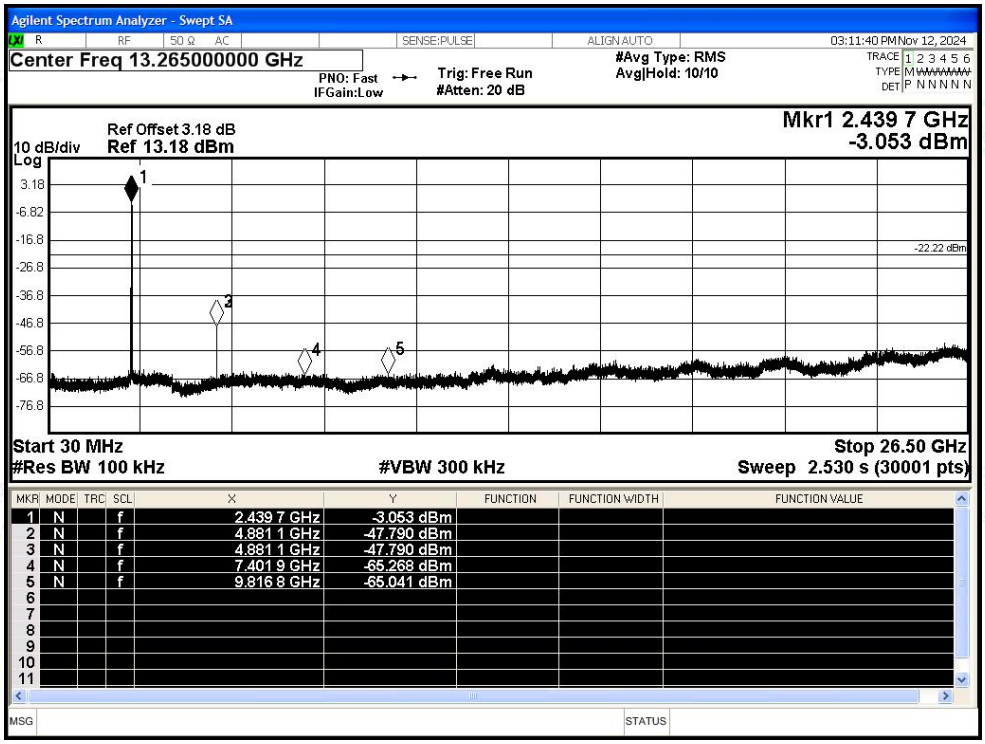


MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N		f	2.405 2 GHz	-4.127 dBm			
2	N		f	4.808 7 GHz	-46.276 dBm			
3	N		f	4.808 7 GHz	-46.276 dBm			
4	N		f	7.027 8 GHz	-64.617 dBm			
5	N		f	9.594 5 GHz	-64.514 dBm			
6								
7								
8								
9								
10								
11								

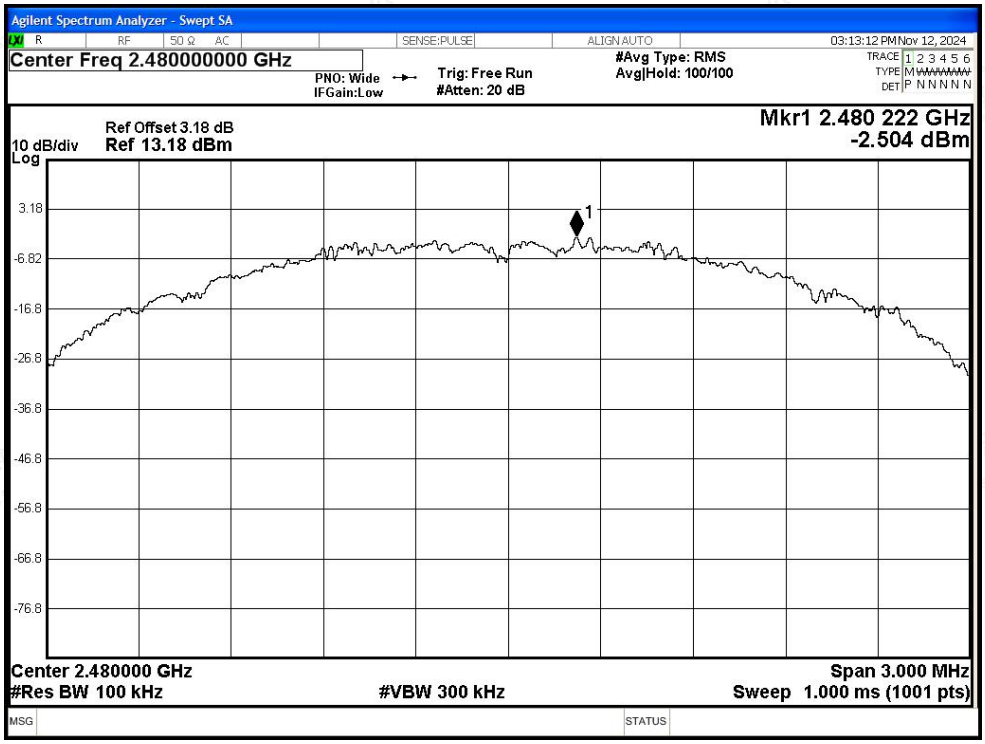
Tx. Spurious NVNT ZIGBEE 2440MHz Ant1 Ref



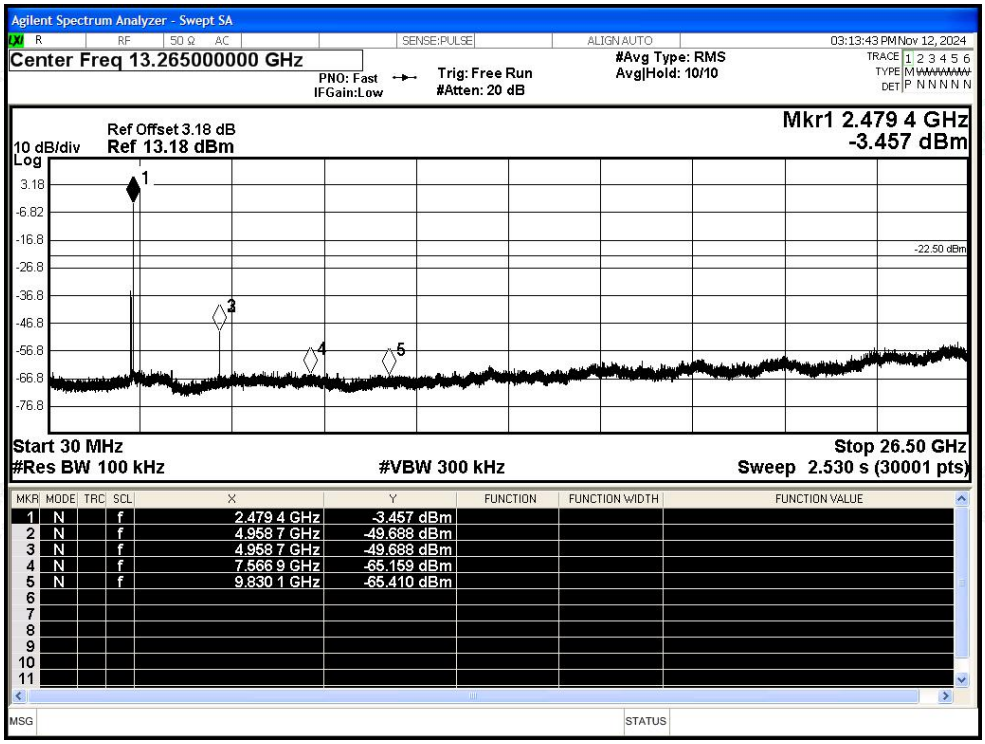
Tx. Spurious NVNT ZIGBEE 2440MHz Ant1 Emission



Tx. Spurious NVNT ZIGBEE 2480MHz Ant1 Ref



Tx. Spurious NVNT ZIGBEE 2480MHz Ant1 Emission

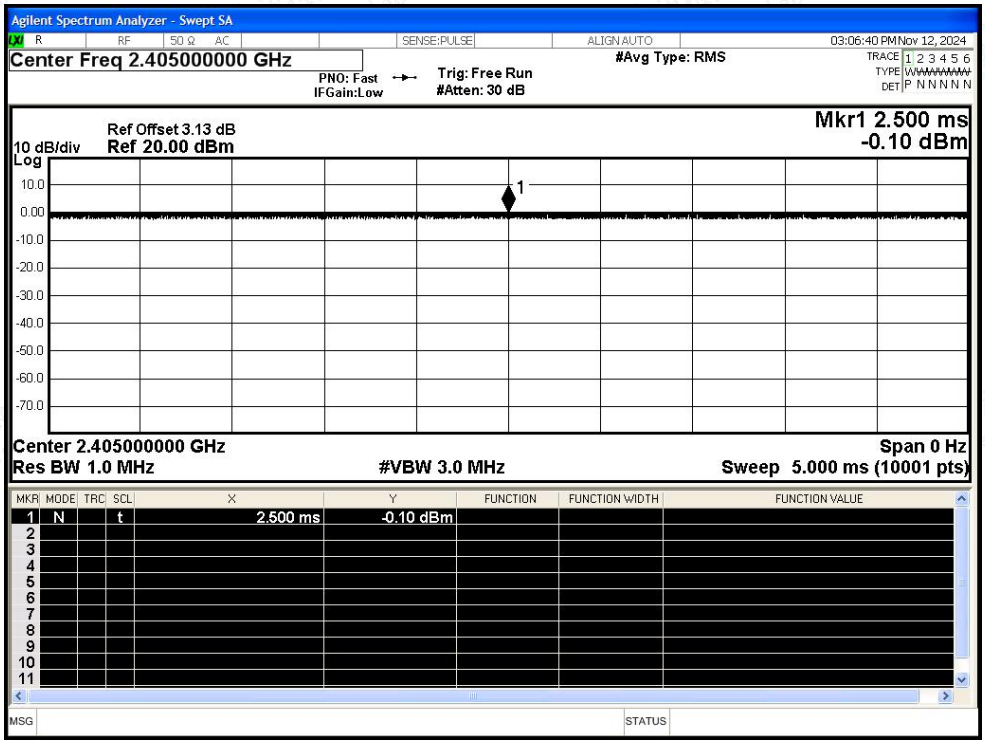


A.6 Duty Cycle

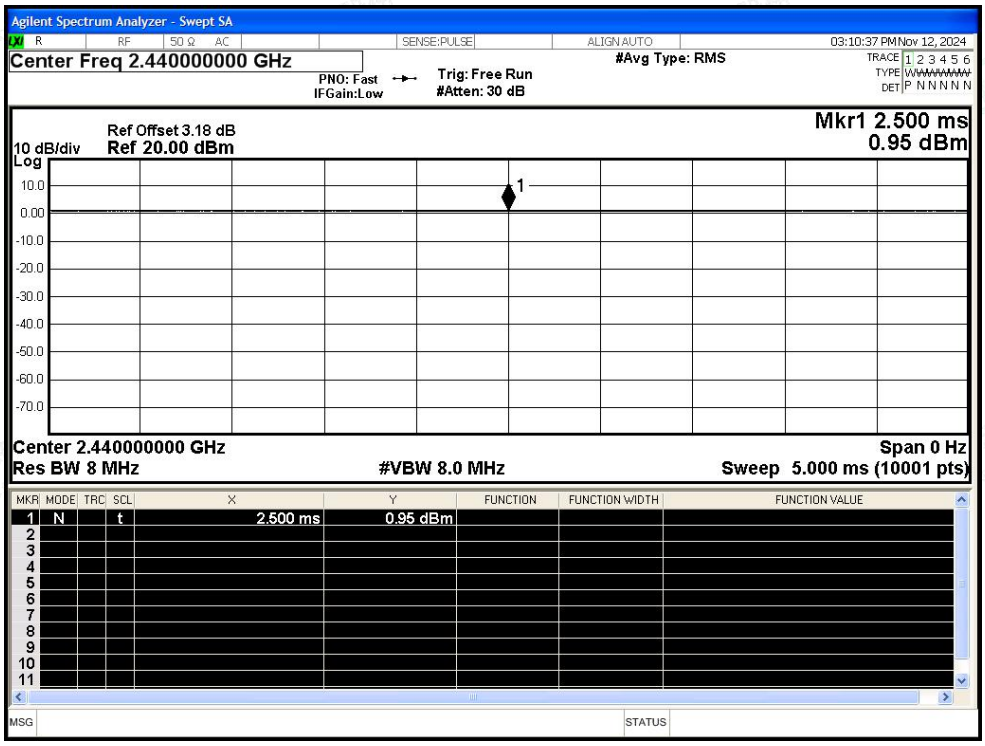
Condition	Mode	Frequency (MHz)	Antenna	Duty Cycle (%)	Correction Factor (dB)	1/T (kHz)
NVNT	ZIGBEE	2405	Ant1	100	0	0
NVNT	ZIGBEE	2440	Ant1	100	0	0
NVNT	ZIGBEE	2480	Ant1	100	0	0

Test Graphs

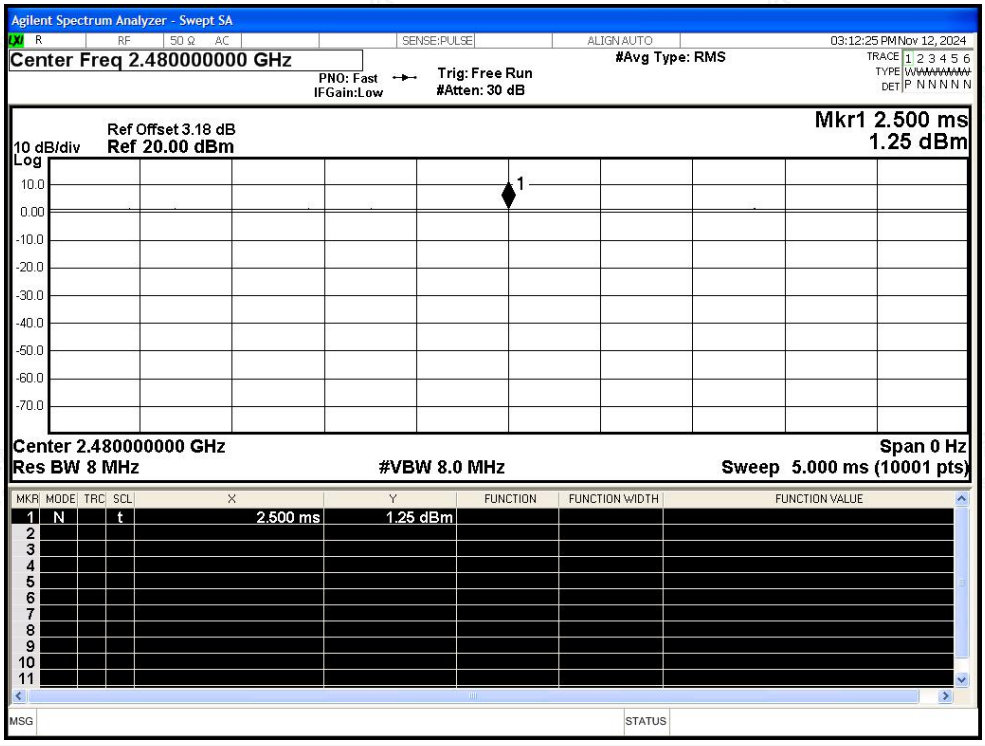
Duty Cycle NVNT ZIGBEE 2405MHz Ant1



Duty Cycle NVNT ZIGBEE 2440MHz Ant1



Duty Cycle NVNT ZIGBEE 2480MHz Ant1

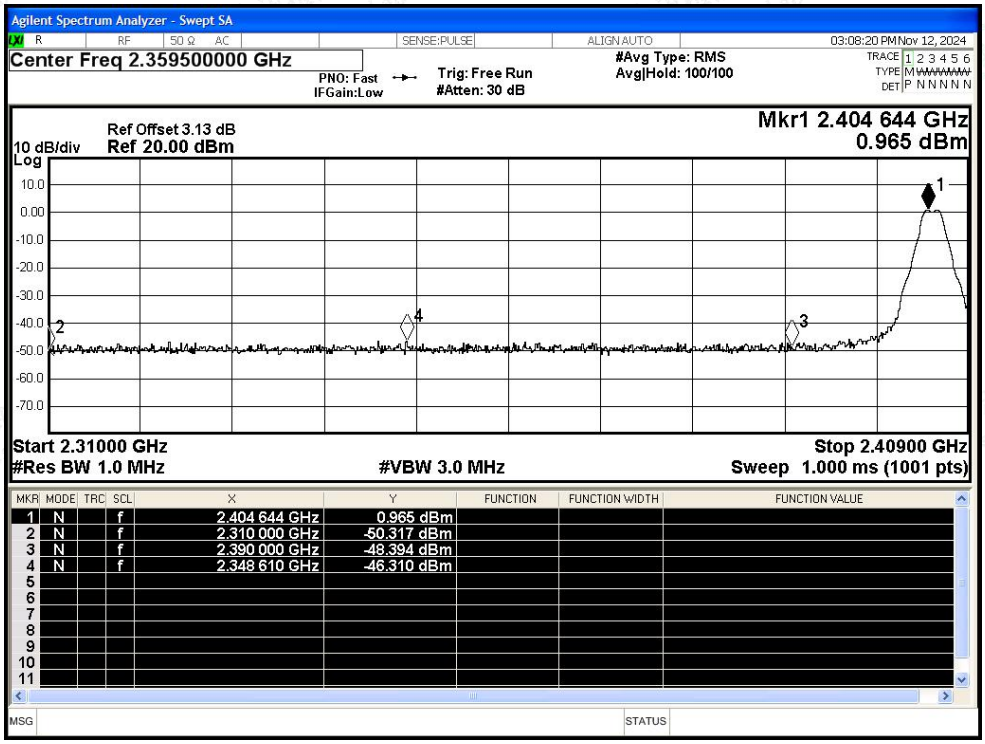


A.7 Restrict Band

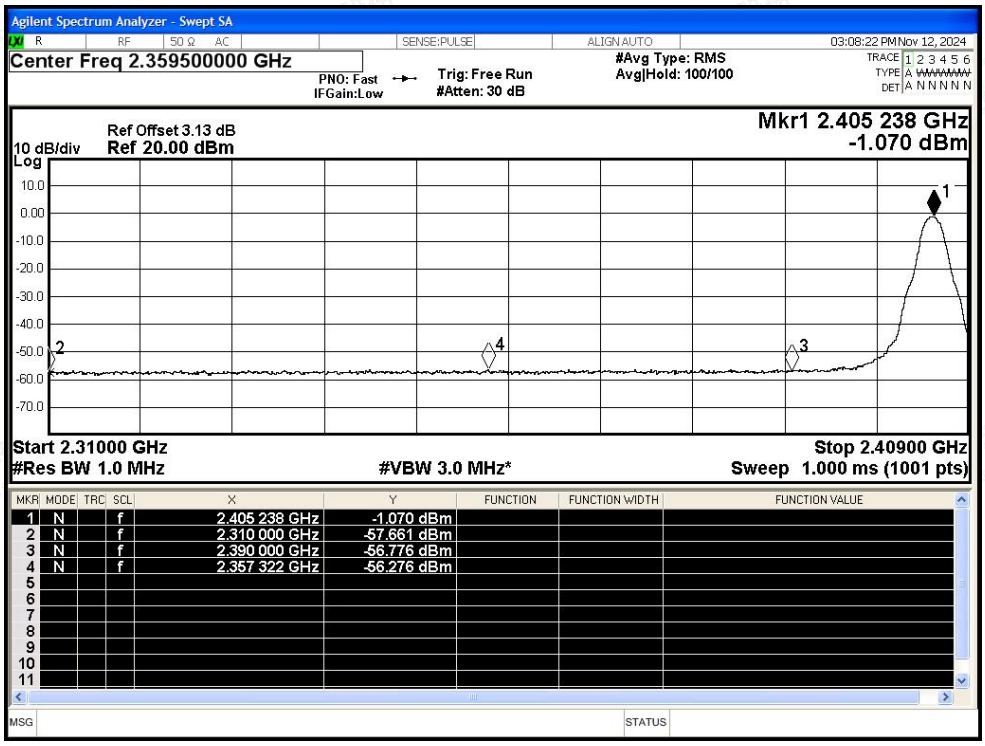
Condition	Mode	Frequency (MHz)	Antenna	Spur Freq (MHz)	Power (dBm)	Gain (dBi)	Duty Factor (dB)	E (dBuV/m)	Detector	Limit (dBuV/m)	Verdict
NVNT	ZIGBEE	2405	Ant1	2310	-50.32	2	-	46.94	Peak	74	Pass
NVNT	ZIGBEE	2405	Ant1	2310	-57.66	2	0	39.6	Average	54	Pass
NVNT	ZIGBEE	2405	Ant1	2348.61	-46.31	2	-	50.95	Peak	74	Pass
NVNT	ZIGBEE	2405	Ant1	2357.322	-56.28	2	0	40.98	Average	54	Pass
NVNT	ZIGBEE	2405	Ant1	2390	-48.39	2	-	48.87	Peak	74	Pass
NVNT	ZIGBEE	2405	Ant1	2390	-56.78	2	0	40.48	Average	54	Pass
NVNT	ZIGBEE	2480	Ant1	2483.5	-39.86	2	-	57.4	Peak	74	Pass
NVNT	ZIGBEE	2480	Ant1	2483.5	-46.42	2	0	50.84	Average	54	Pass
NVNT	ZIGBEE	2480	Ant1	2483.536	-39.25	2	-	58.01	Peak	74	Pass
NVNT	ZIGBEE	2480	Ant1	2483.512	-46.42	2	0	50.84	Average	54	Pass
NVNT	ZIGBEE	2480	Ant1	2500	-49.28	2	-	47.98	Peak	74	Pass
NVNT	ZIGBEE	2480	Ant1	2500	-56.79	2	0	40.47	Average	54	Pass

Test Graphs

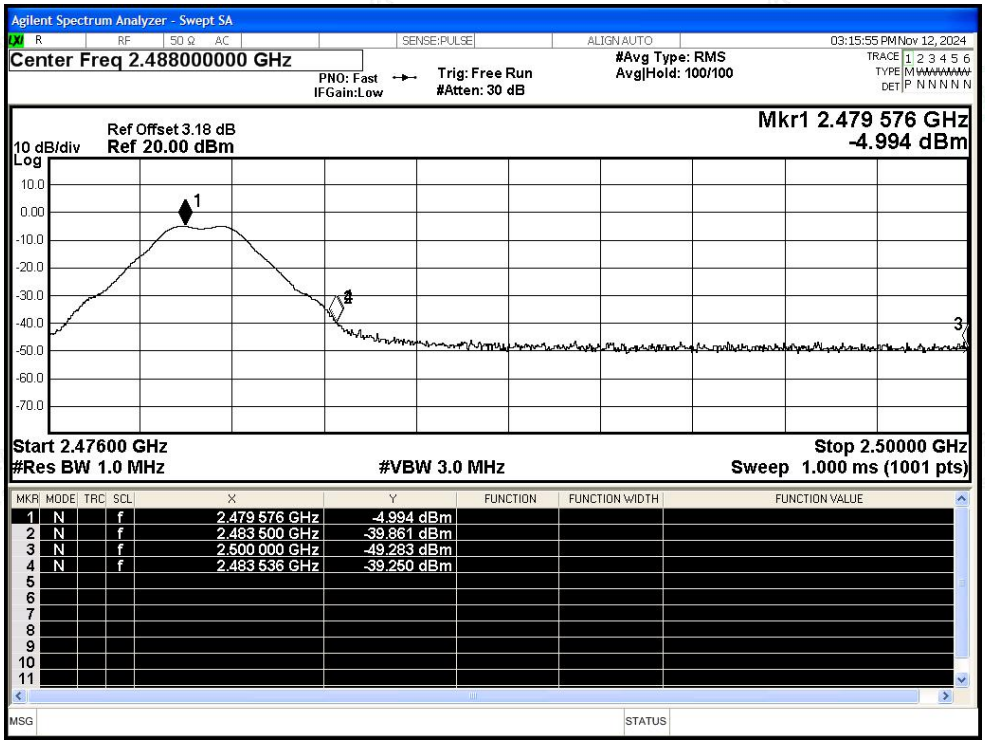
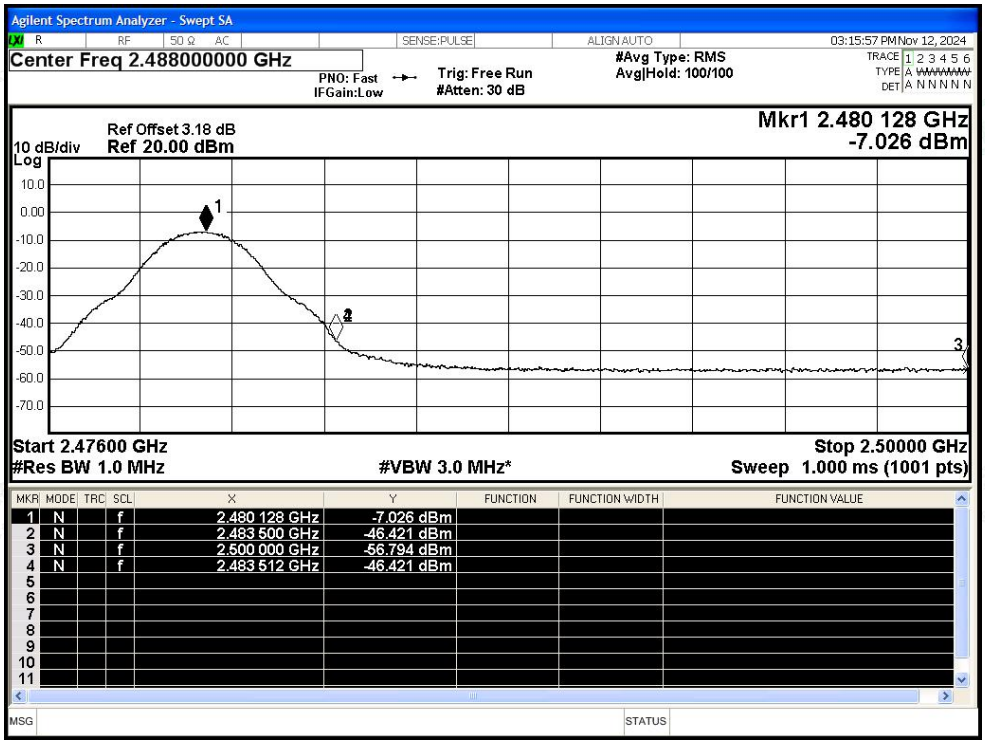
Restrict Band NVNT ZIGBEE 2405MHz Ant1 Peak



Restrict Band NVNT ZIGBEE 2405MHz Ant1 Average



Restrict Band NVNT ZIGBEE 2480MHz Ant1 Peak



Restrict Band NVNT ZIGBEE 2480MHz Ant1 Average