

Appendix A for 5GWIFI Test Data

Product Name: Smart Hub Pro

Test Model: HUB510

Environmental Conditions

Temperature:	25.4℃
Relative Humidity:	56%
ATM Pressure:	101.0 kPa
Test Engineer:	Leon Li
Supervised by:	Baret Wu

Duty Cycle	3
Maximum Conducted Output Power	11
-26dB Bandwidth	19
Occupied Channel Bandwidth	27
Maximum Power Spectral Density Level	35
Band Edge	43
Conducted RF Spurious Emission	50
Duty Cycle	59
Maximum Conducted Output Power	67
-26dB Bandwidth	75
Occupied Channel Bandwidth	83
Maximum Power Spectral Density Level	91
Band Edge	99
Conducted RF Spurious Emission	106
Duty Cycle	115
Maximum Conducted Output Power	125
-26dB Bandwidth	135
Occupied Channel Bandwidth	145
Maximum Power Spectral Density Level	155
Band Edge	165
Conducted RF Spurious Emission	172
Duty Cycle	183
Maximum Conducted Output Power	191
-6dB Bandwidth	199
Occupied Channel Bandwidth	207
Maximum Power Spectral Density Level	215
Band Edge	223
Conducted RF Spurious Emission	230

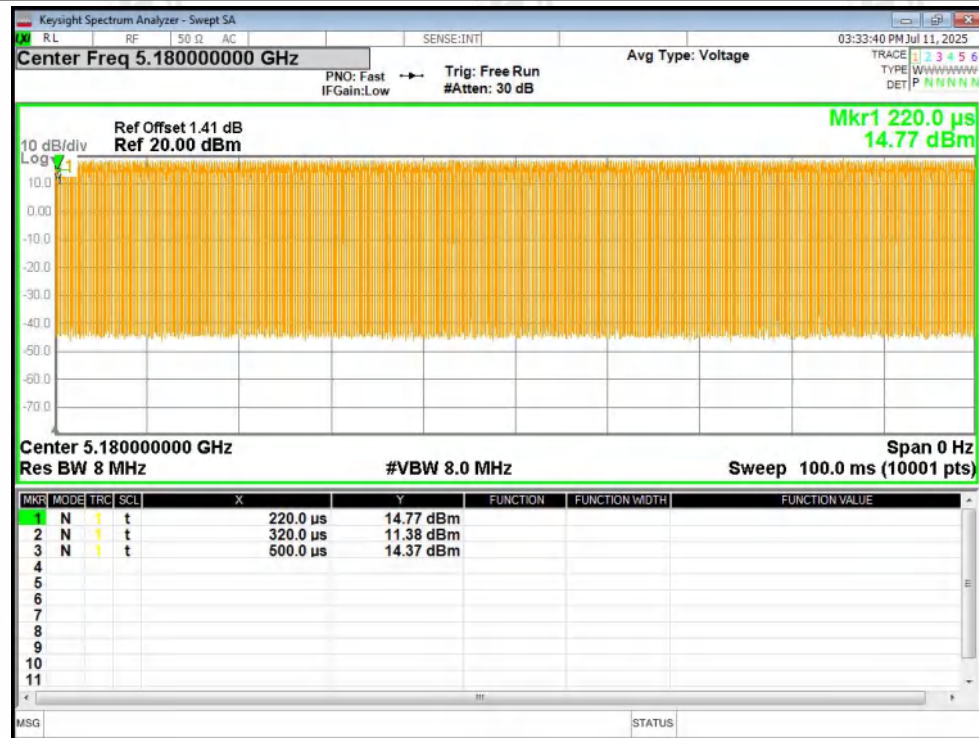
5.2G WIFI DATA

Duty Cycle

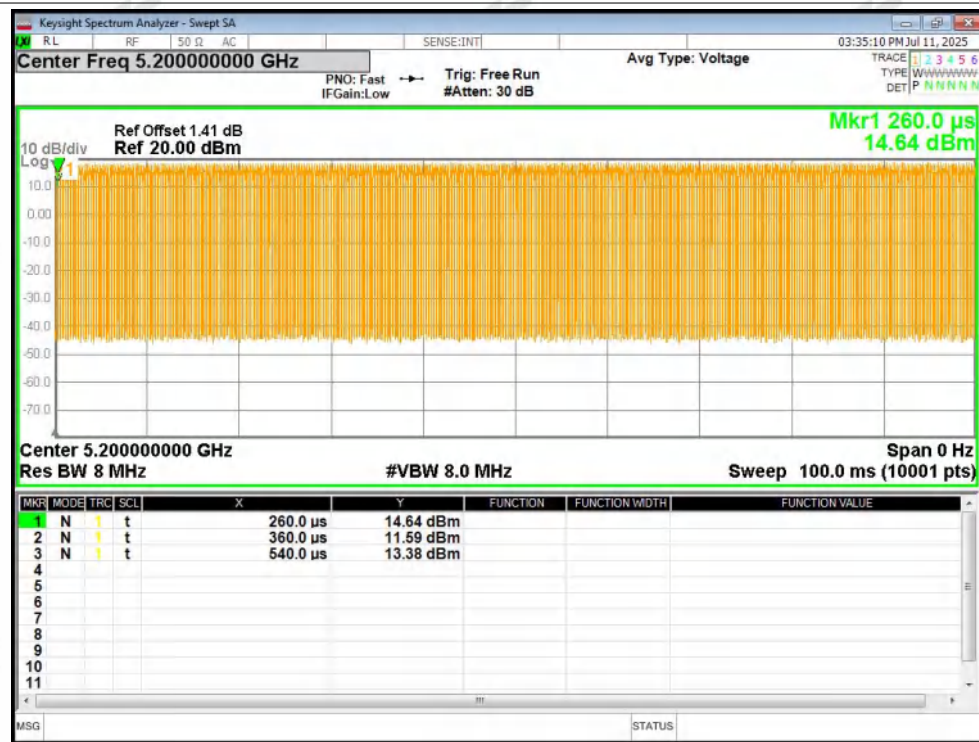
Condition	Mode	Frequency (MHz)	Antenna	Duty Cycle (%)	Correction Factor (dB)	1/T (kHz)
NVNT	a	5180	Ant1	64.29	1.92	5.56
NVNT	a	5200	Ant1	64.29	1.92	5.56
NVNT	a	5240	Ant1	64.29	1.92	5.56
NVNT	n20	5180	Ant1	60.71	2.17	5.88
NVNT	n20	5200	Ant1	62.96	2.01	5.88
NVNT	n20	5240	Ant1	64.29	1.92	5.56
NVNT	n40	5190	Ant1	50	3.01	10
NVNT	n40	5230	Ant1	50	3.01	10
NVNT	ac20	5180	Ant1	62.96	2.01	5.88
NVNT	ac20	5200	Ant1	62.96	2.01	5.88
NVNT	ac20	5240	Ant1	62.96	2.01	5.88
NVNT	ac40	5190	Ant1	50	3.01	10
NVNT	ac40	5230	Ant1	47.37	3.24	11.11
NVNT	ac80	5210	Ant1	81.82	0.87	11.11

Test Graphs

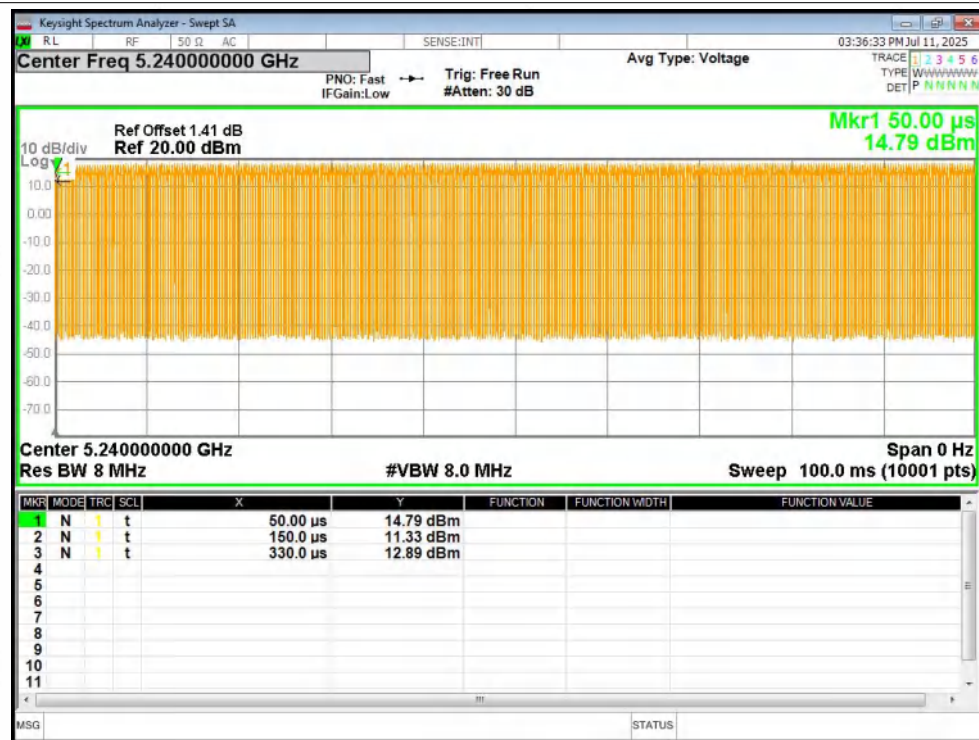
Duty Cycle NVNT a 5180MHz Ant1



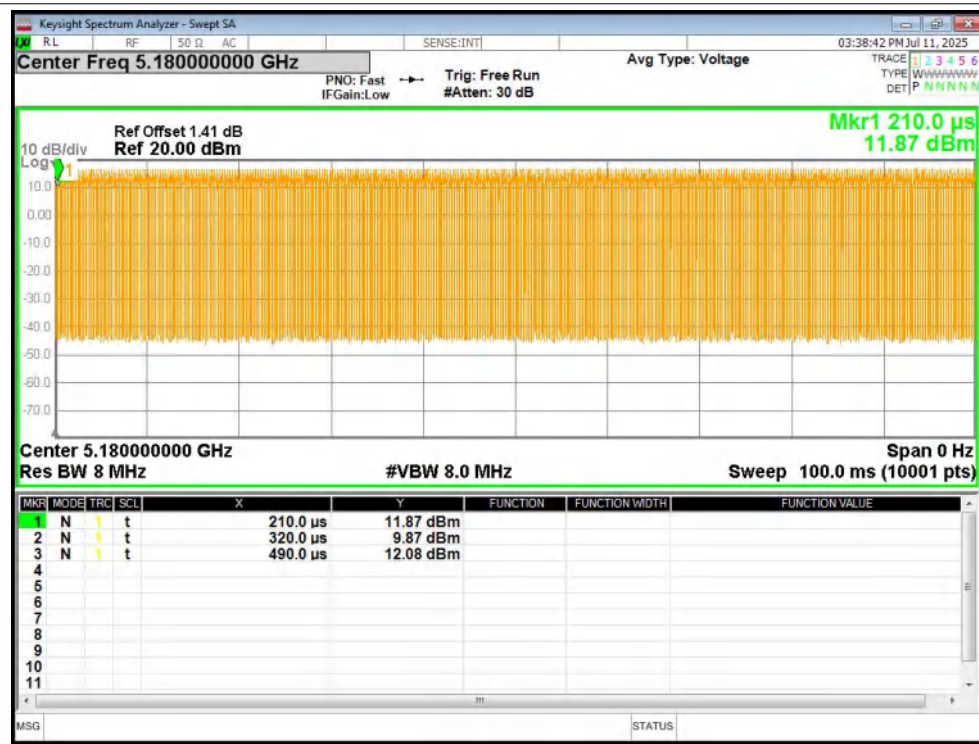
Duty Cycle NVNT a 5200MHz Ant1



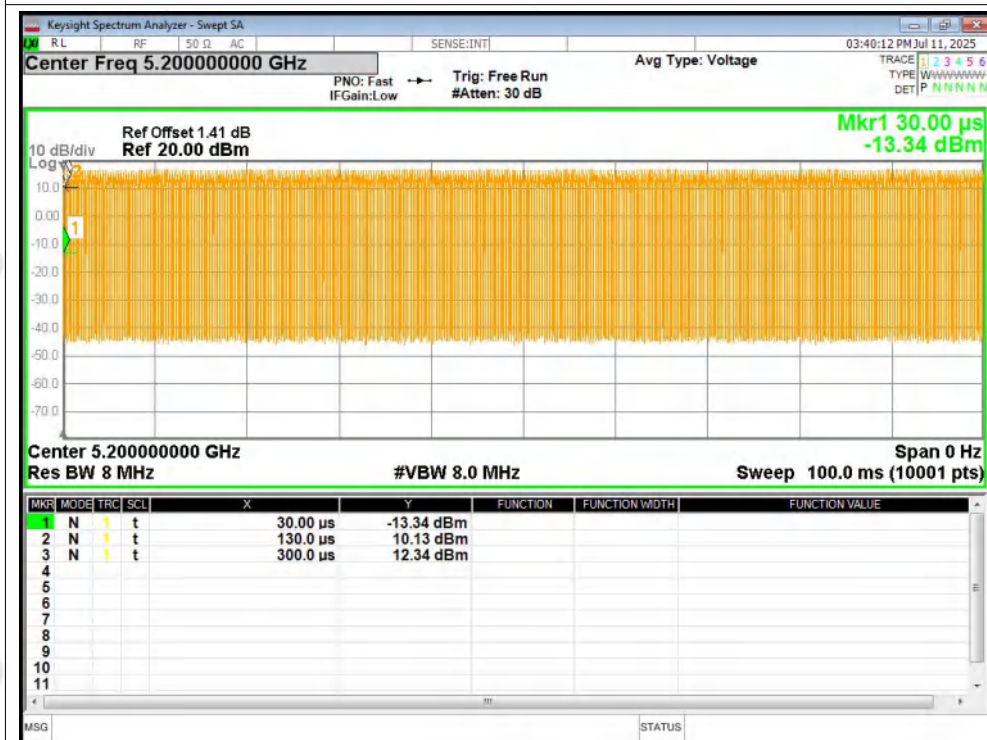
Duty Cycle NVNT a 5240MHz Ant1



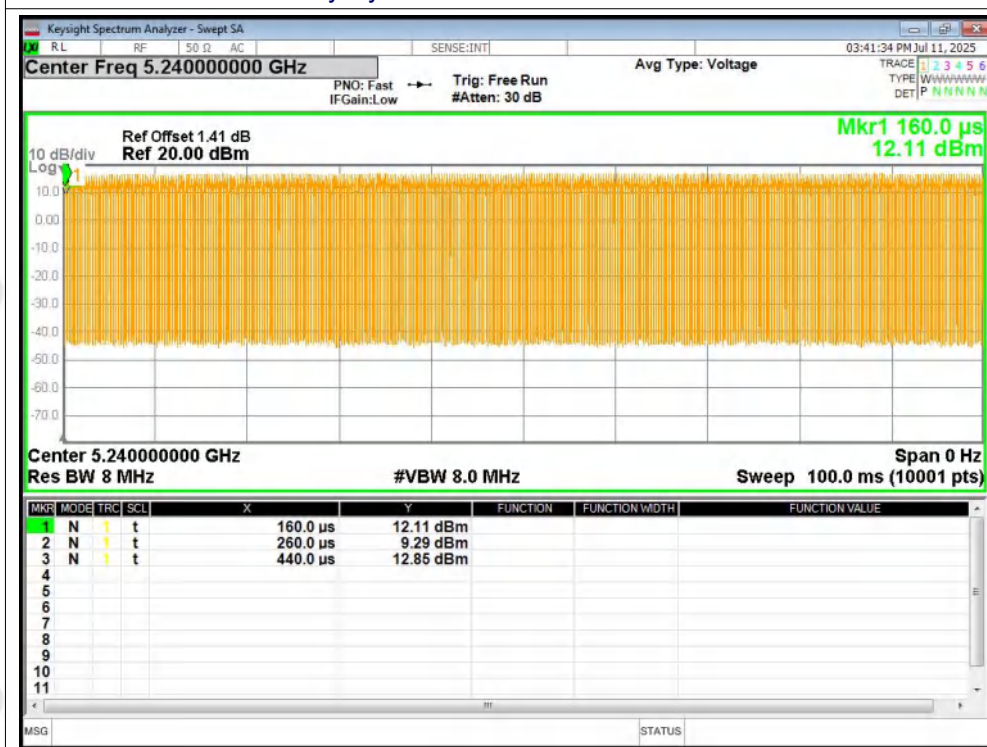
Duty Cycle NVNT n20 5180MHz Ant1



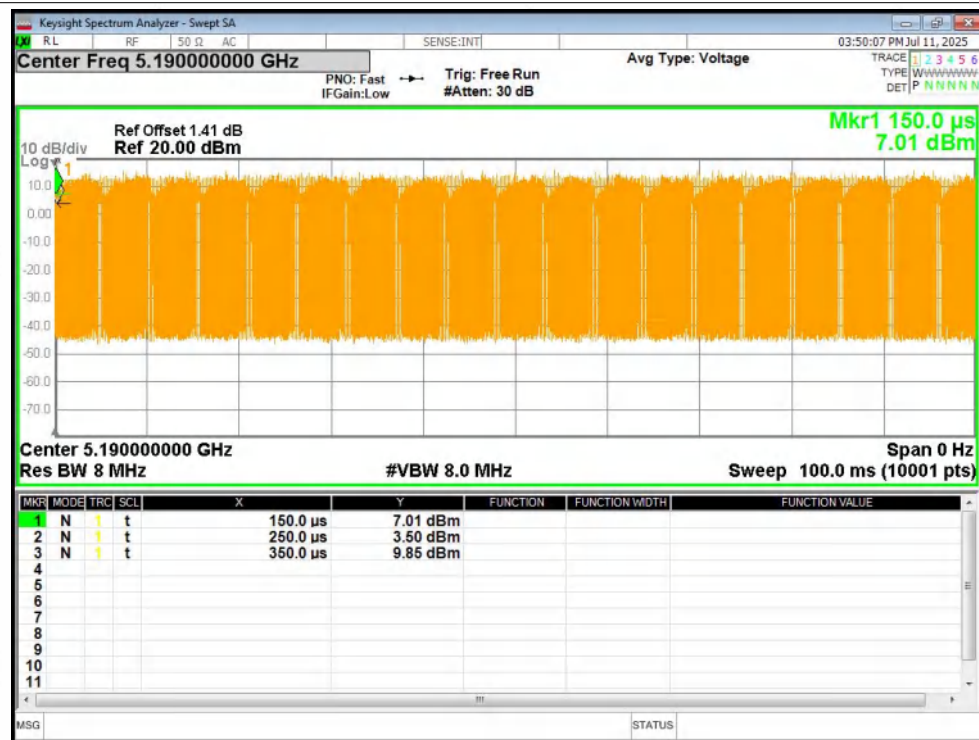
Duty Cycle NVNT n20 5200MHz Ant1



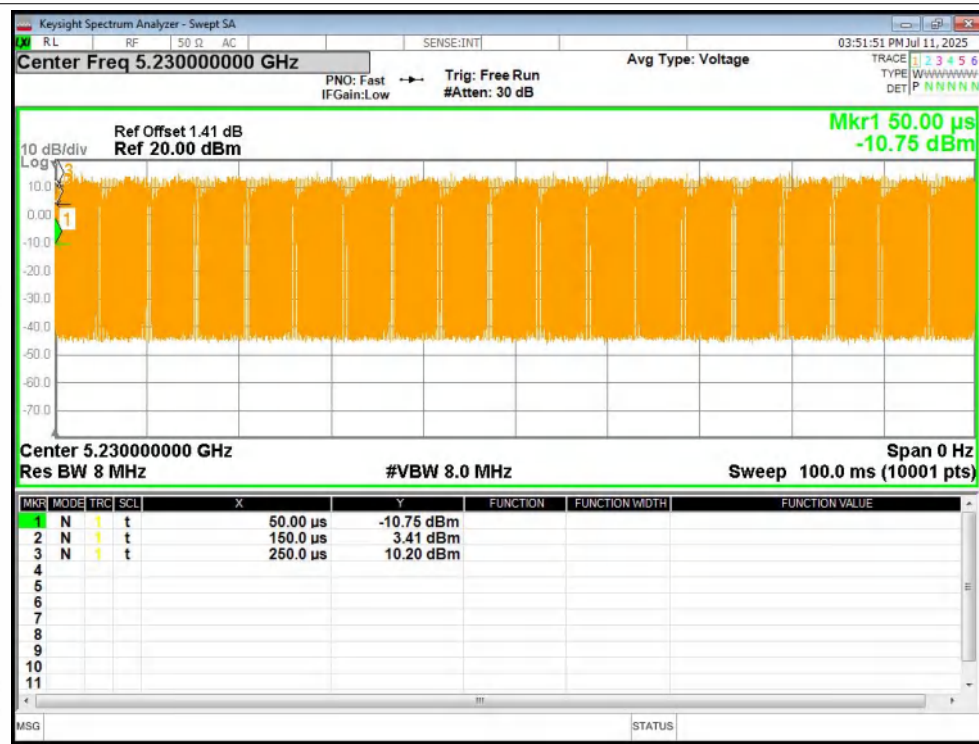
Duty Cycle NVNT n20 5240MHz Ant1



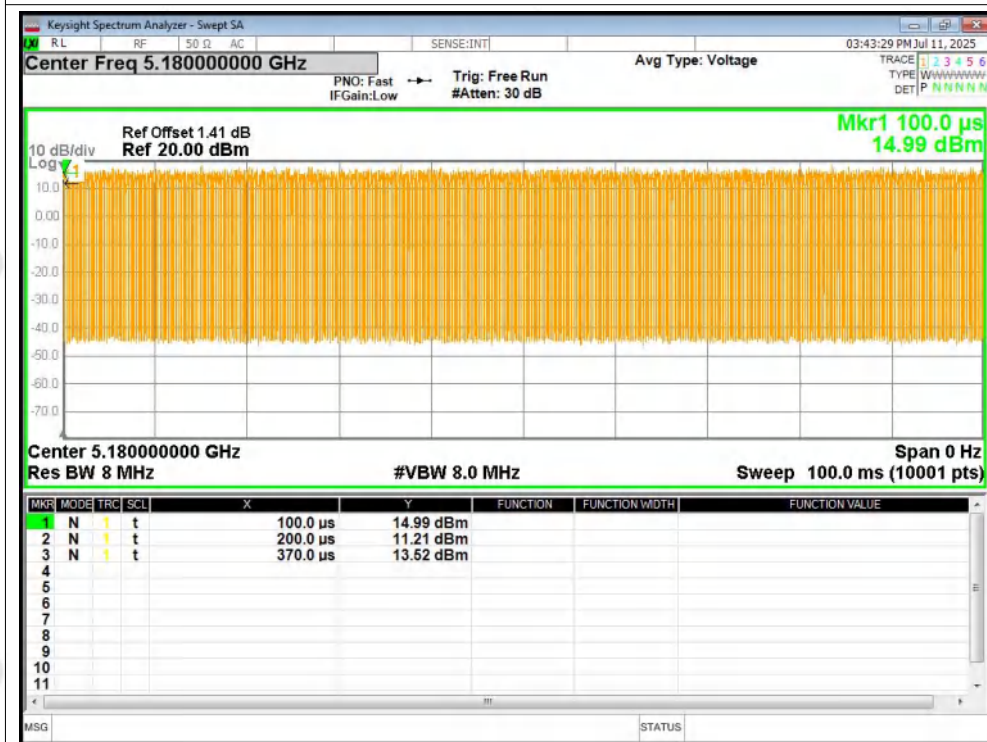
Duty Cycle NVNT n40 5190MHz Ant1



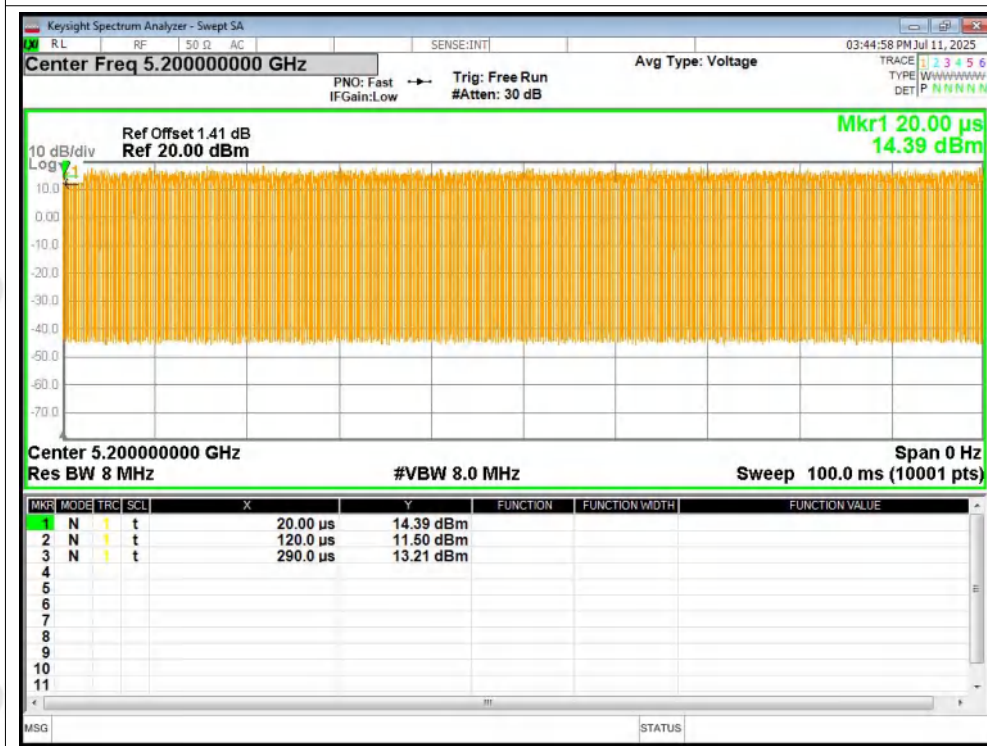
Duty Cycle NVNT n40 5230MHz Ant1



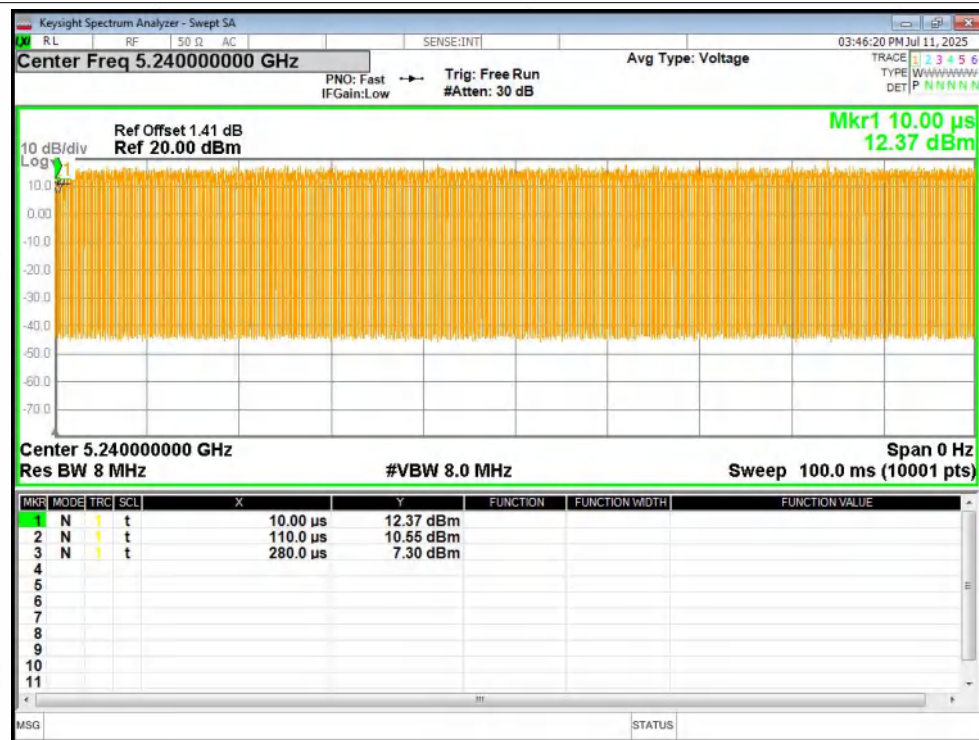
Duty Cycle NVNT ac20 5180MHz Ant1



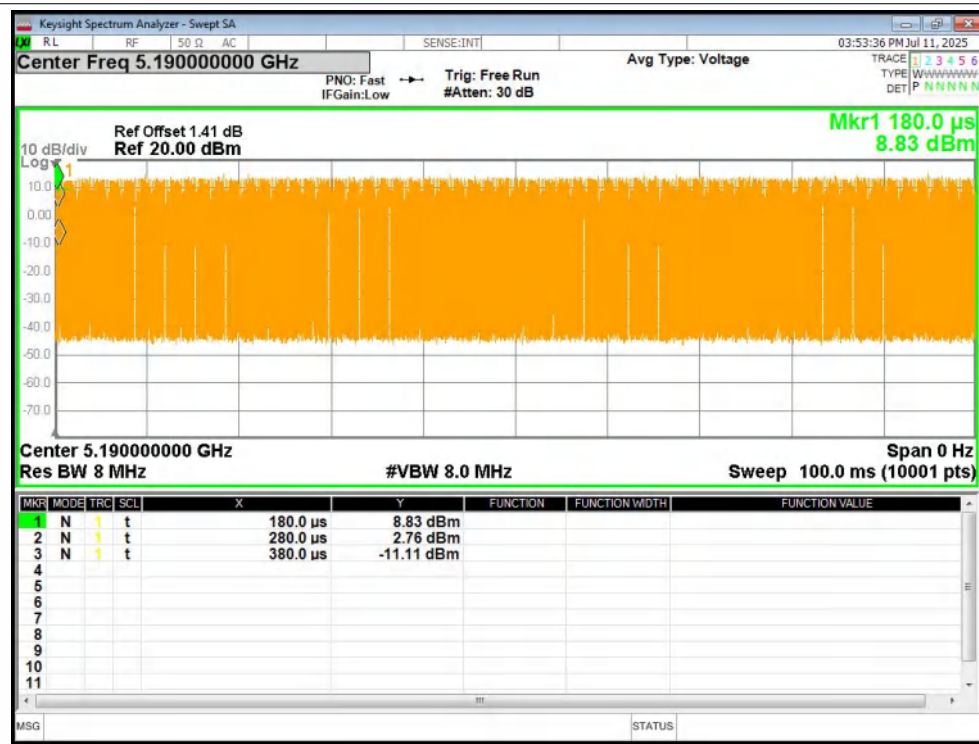
Duty Cycle NVNT ac20 5200MHz Ant1



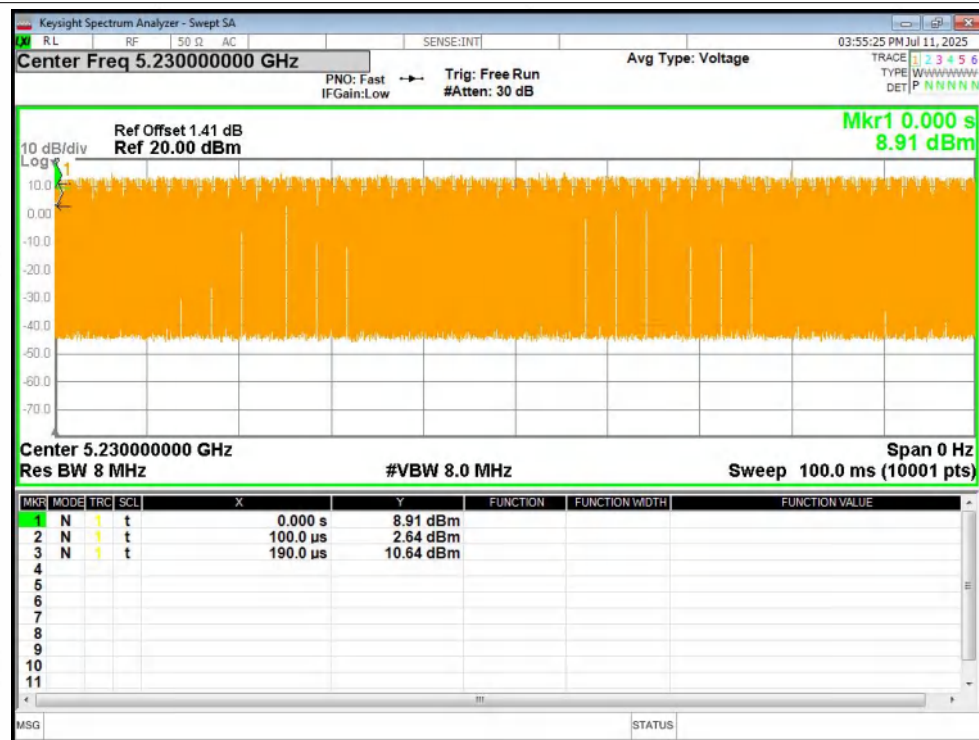
Duty Cycle NVNT ac20 5240MHz Ant1



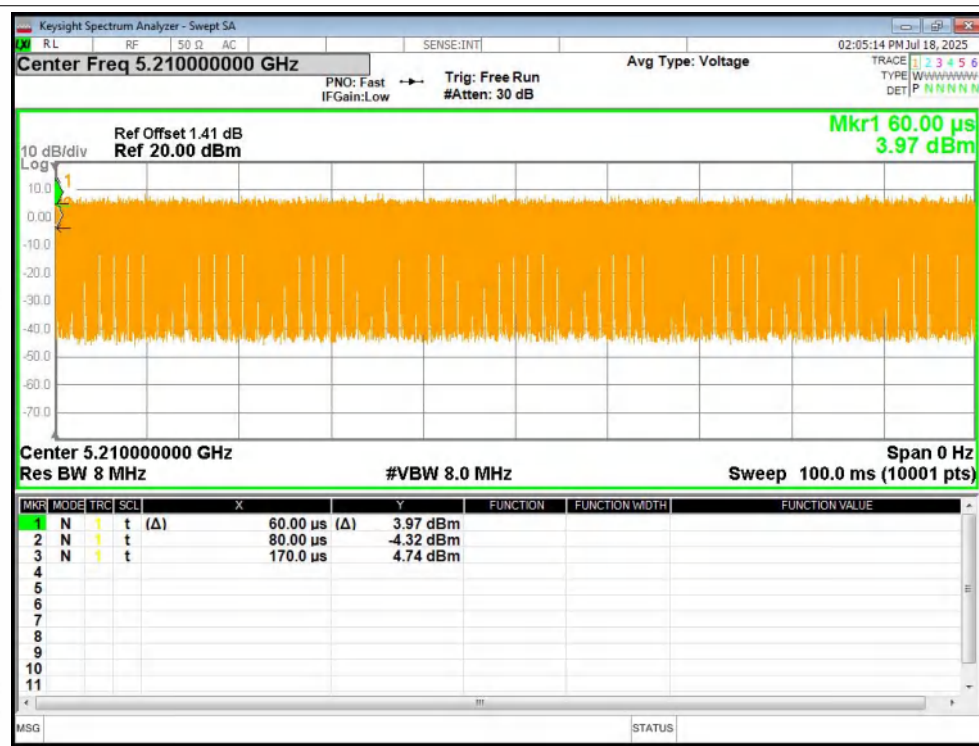
Duty Cycle NVNT ac40 5190MHz Ant1



Duty Cycle NVNT ac40 5230MHz Ant1



Duty Cycle NVNT ac80 5210MHz Ant1



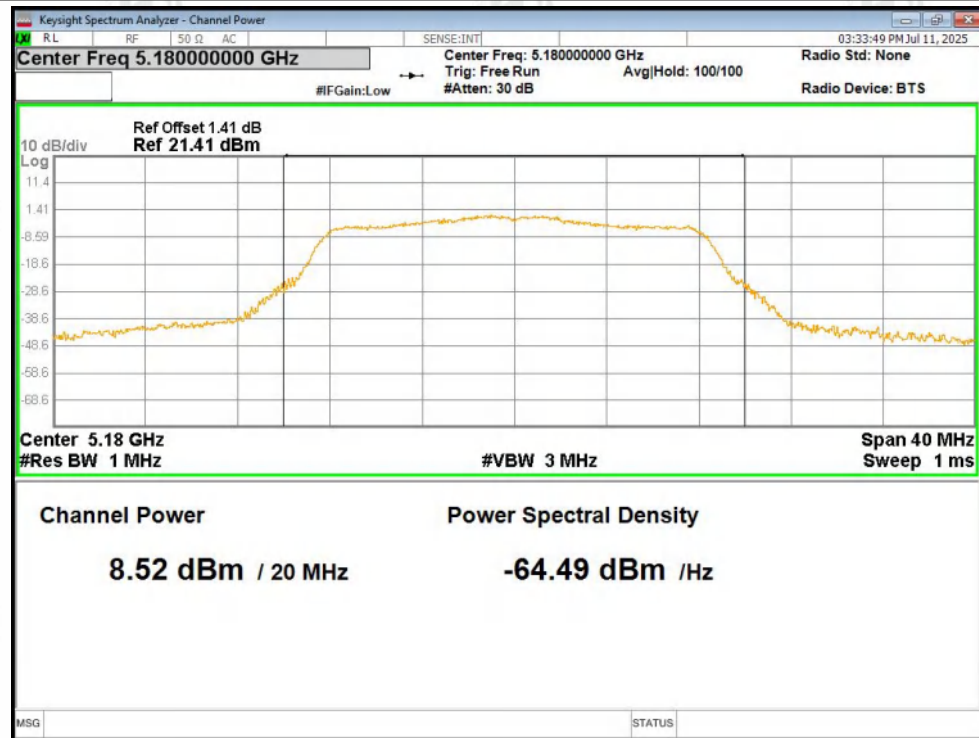


Maximum Conducted Output Power

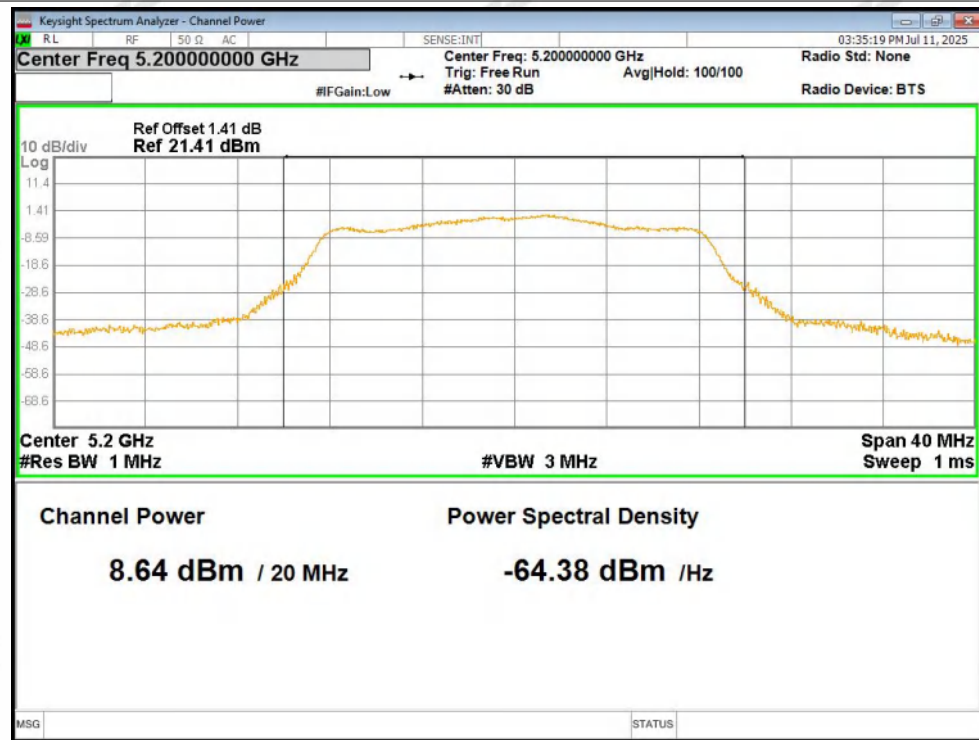
Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Duty Factor (dB)	Total Power (dBm)	Limit (dBm)	Verdict
NVNT	a	5180	Ant1	8.52	1.92	10.44	24	Pass
NVNT	a	5200	Ant1	8.64	1.92	10.56	24	Pass
NVNT	a	5240	Ant1	8.21	1.92	10.13	24	Pass
NVNT	n20	5180	Ant1	6.02	2.17	8.19	24	Pass
NVNT	n20	5200	Ant1	6.06	2.01	8.07	24	Pass
NVNT	n20	5240	Ant1	5.73	1.92	7.65	24	Pass
NVNT	n40	5190	Ant1	6.34	3.01	9.35	24	Pass
NVNT	n40	5230	Ant1	6.04	3.01	9.05	24	Pass
NVNT	ac20	5180	Ant1	7.43	2.01	9.44	24	Pass
NVNT	ac20	5200	Ant1	7.38	2.01	9.39	24	Pass
NVNT	ac20	5240	Ant1	6.98	2.01	8.99	24	Pass
NVNT	ac40	5190	Ant1	5.56	3.01	8.57	24	Pass
NVNT	ac40	5230	Ant1	5.28	3.24	8.52	24	Pass
NVNT	ac80	5210	Ant1	4.07	0.87	4.94	24	Pass

Test Graphs

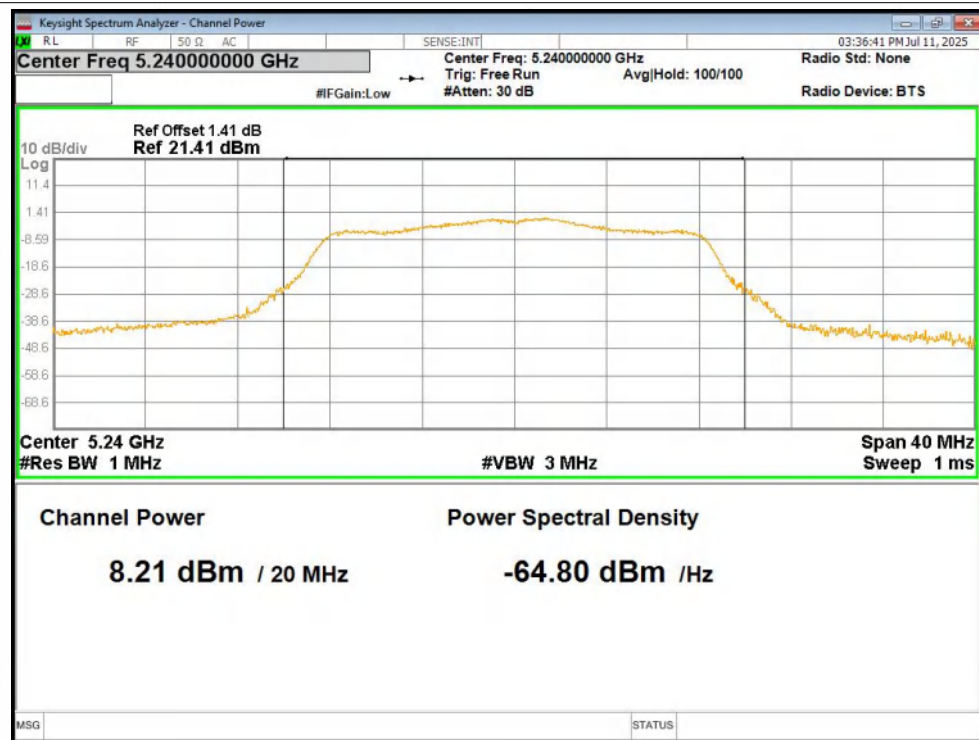
Power NVNT a 5180MHz Ant1



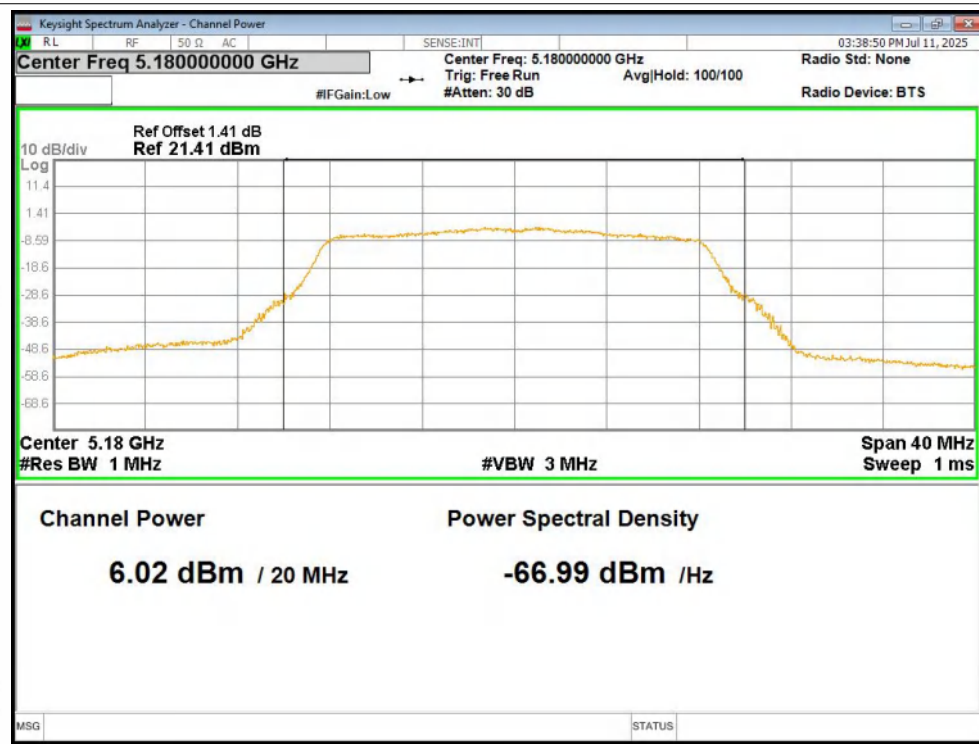
Power NVNT a 5200MHz Ant1



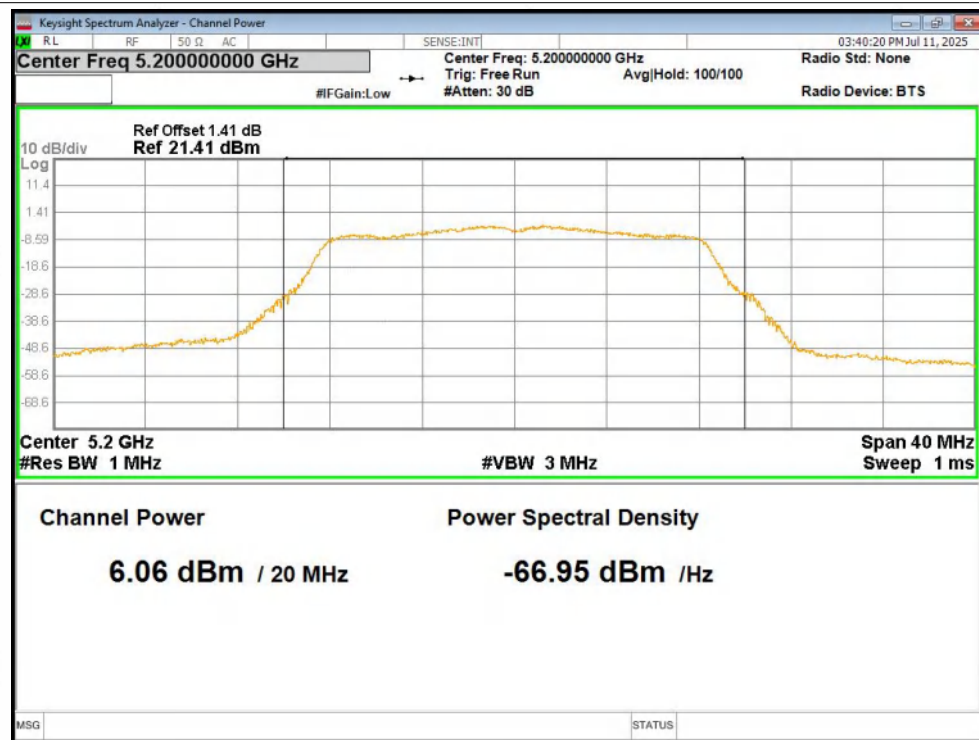
Power NVNT a 5240MHz Ant1



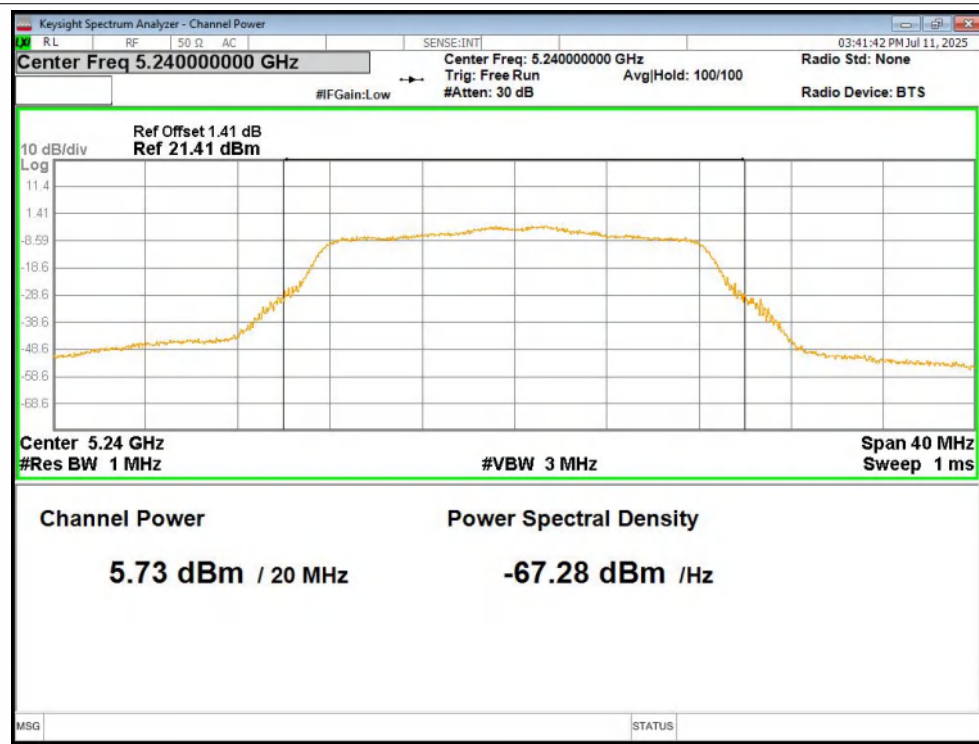
Power NVNT n20 5180MHz Ant1



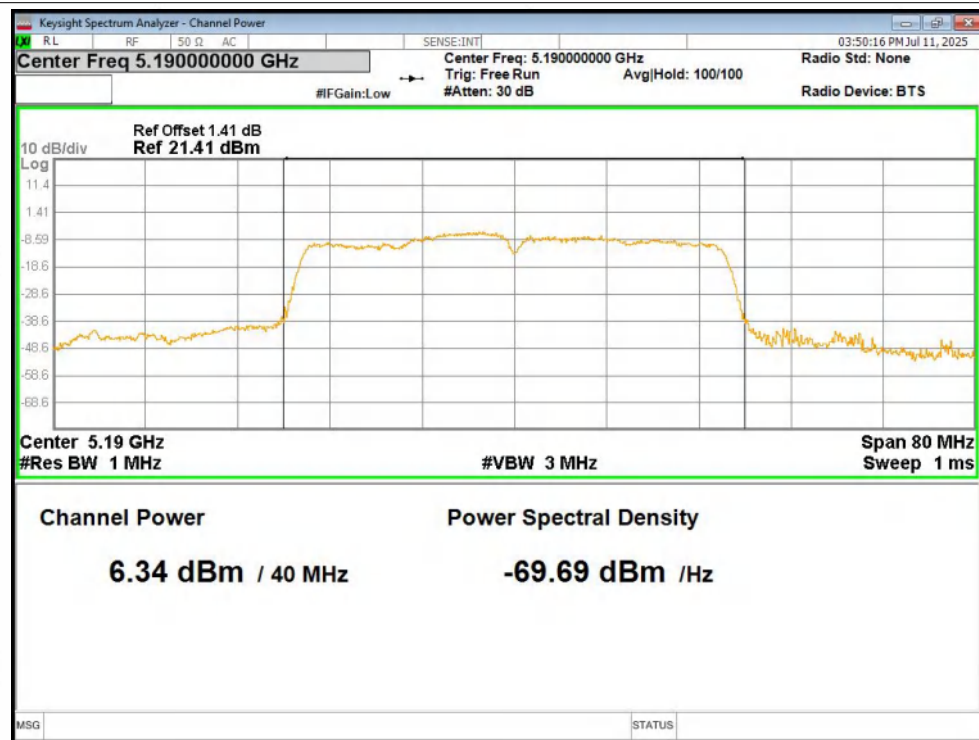
Power NVNT n20 5200MHz Ant1



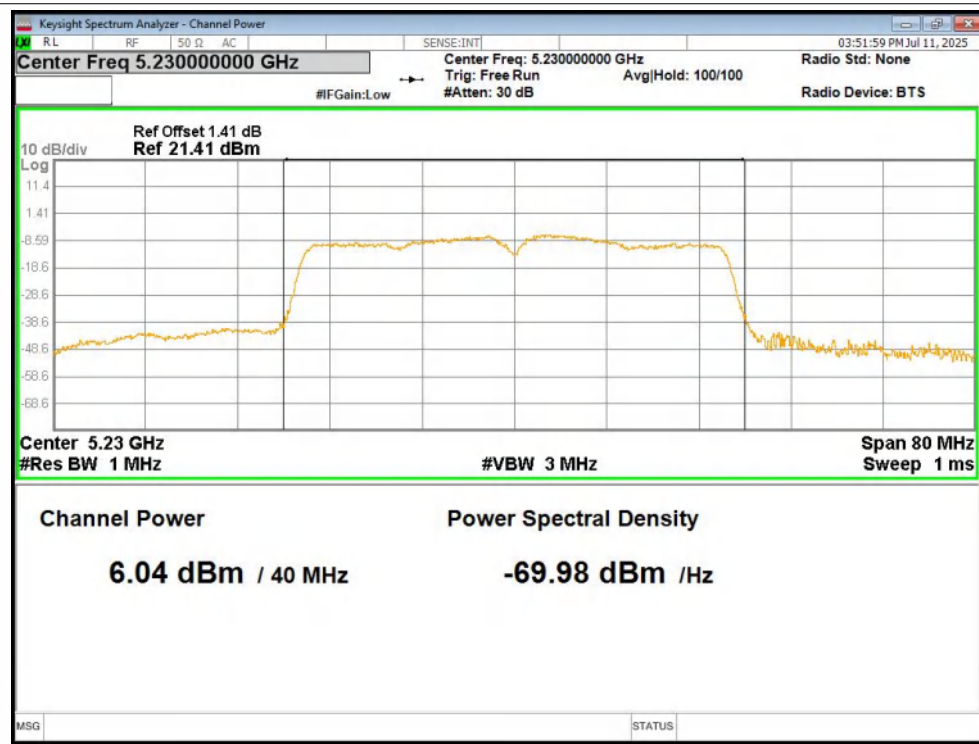
Power NVNT n20 5240MHz Ant1



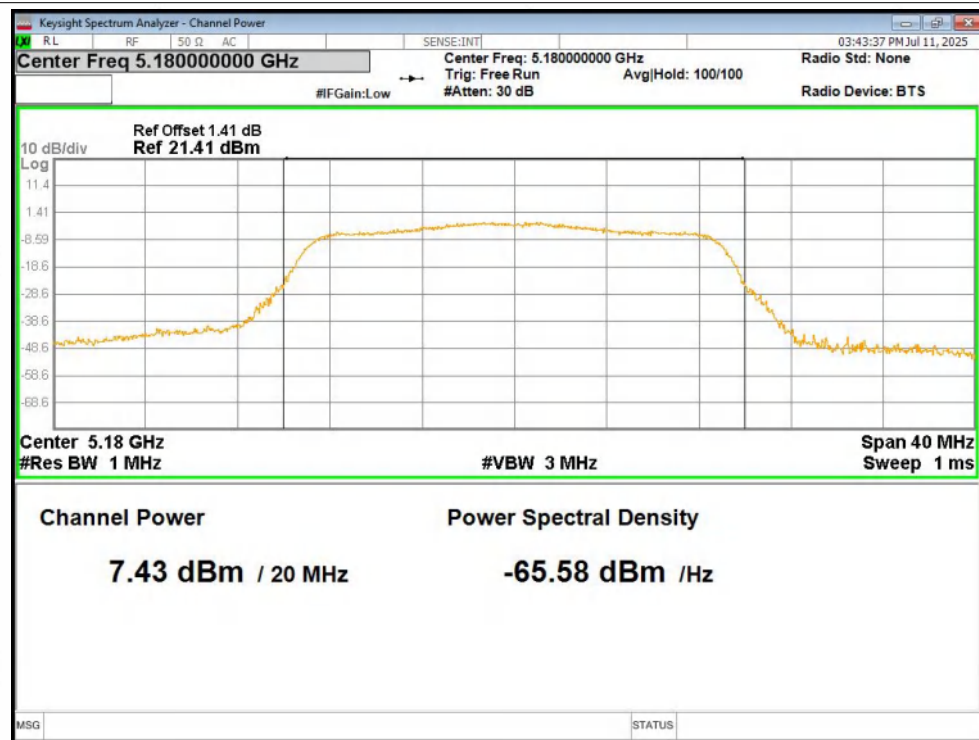
Power NVNT n40 5190MHz Ant1



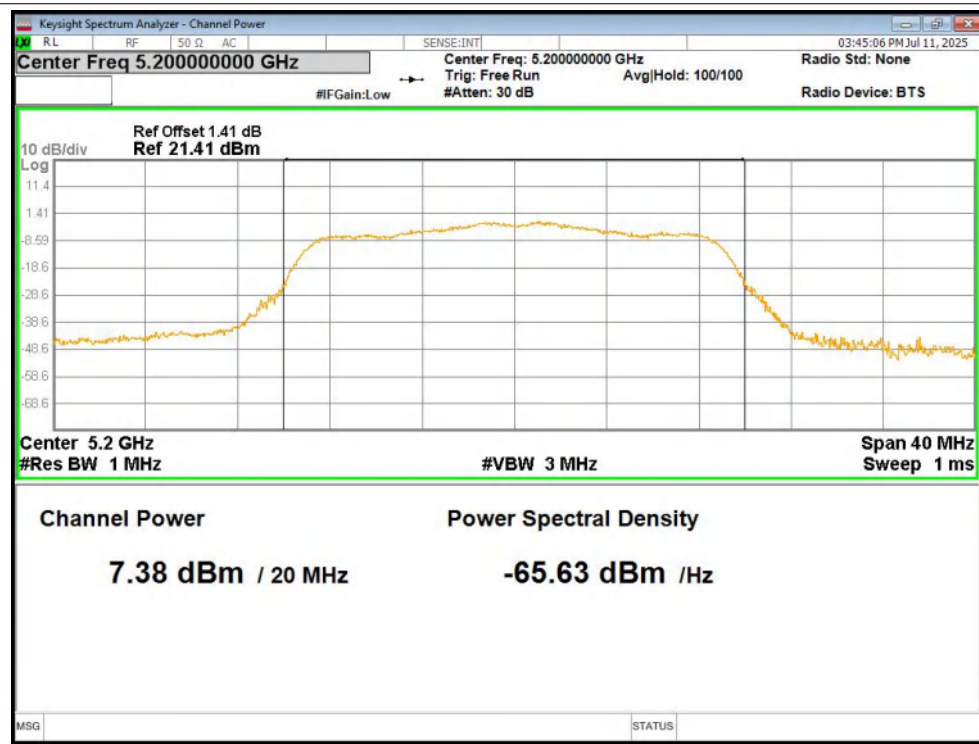
Power NVNT n40 5230MHz Ant1



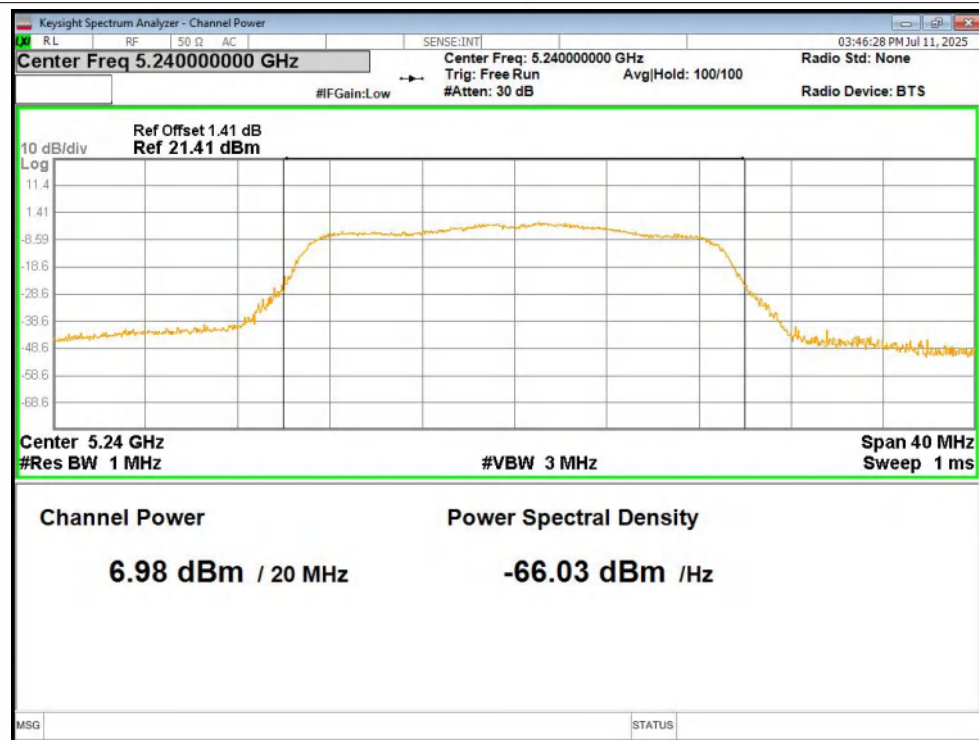
Power NVNT ac20 5180MHz Ant1



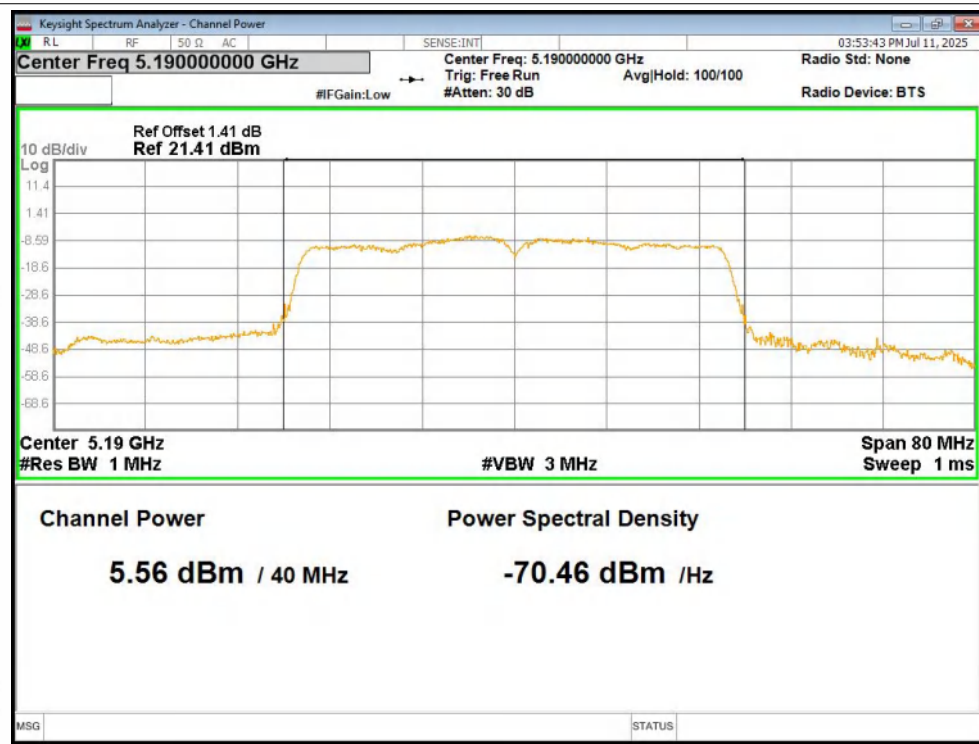
Power NVNT ac20 5200MHz Ant1



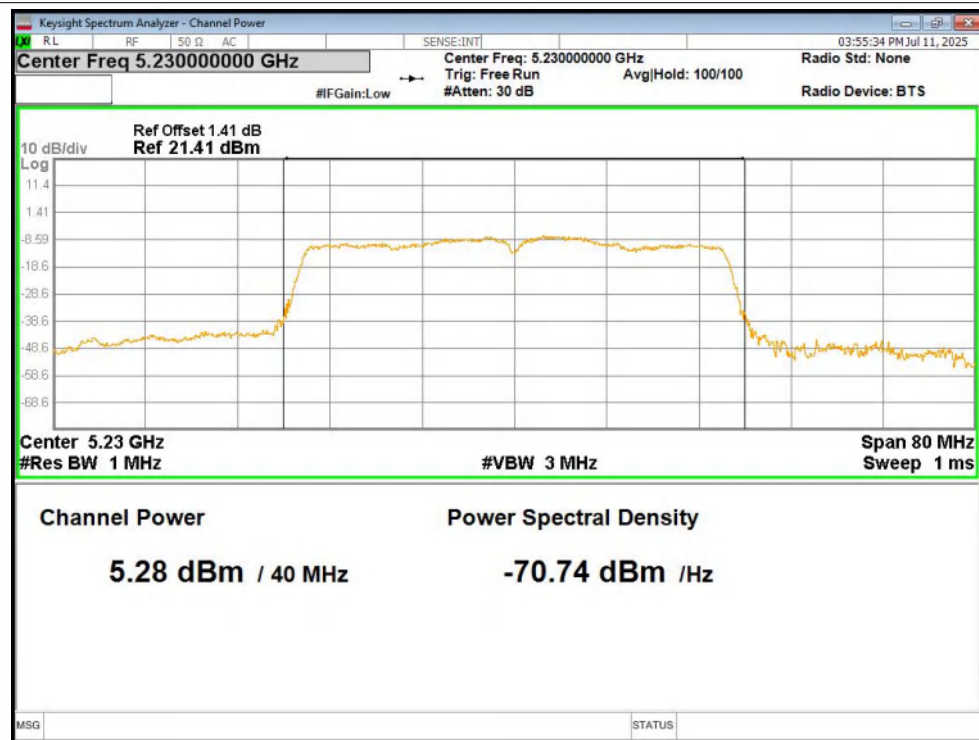
Power NVNT ac20 5240MHz Ant1



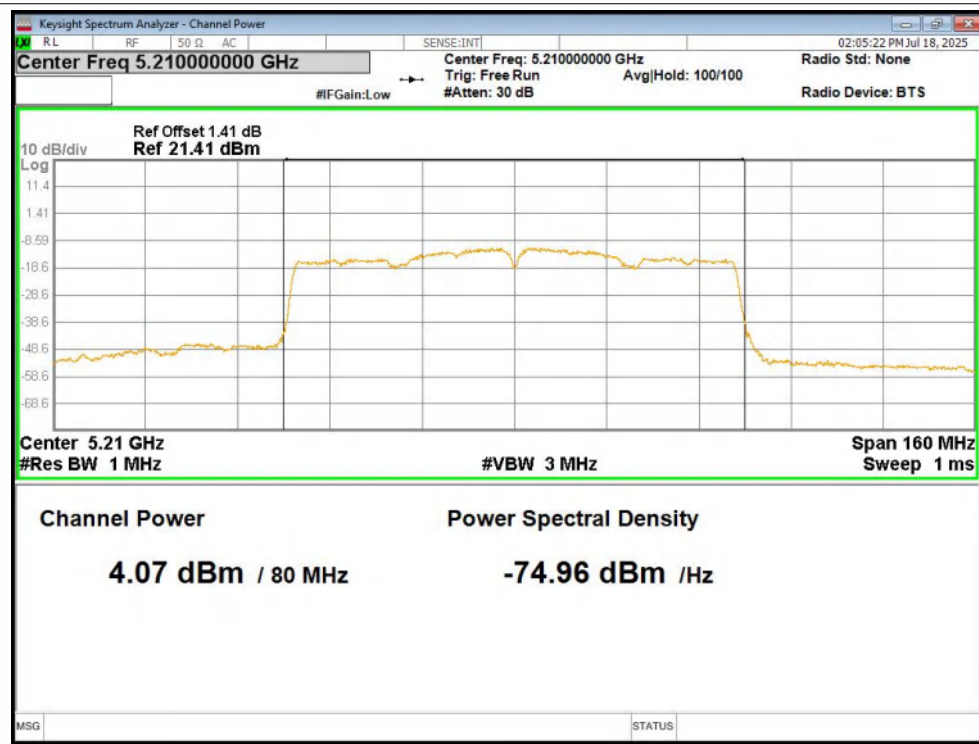
Power NVNT ac40 5190MHz Ant1



Power NVNT ac40 5230MHz Ant1



Power NVNT ac80 5210MHz Ant1

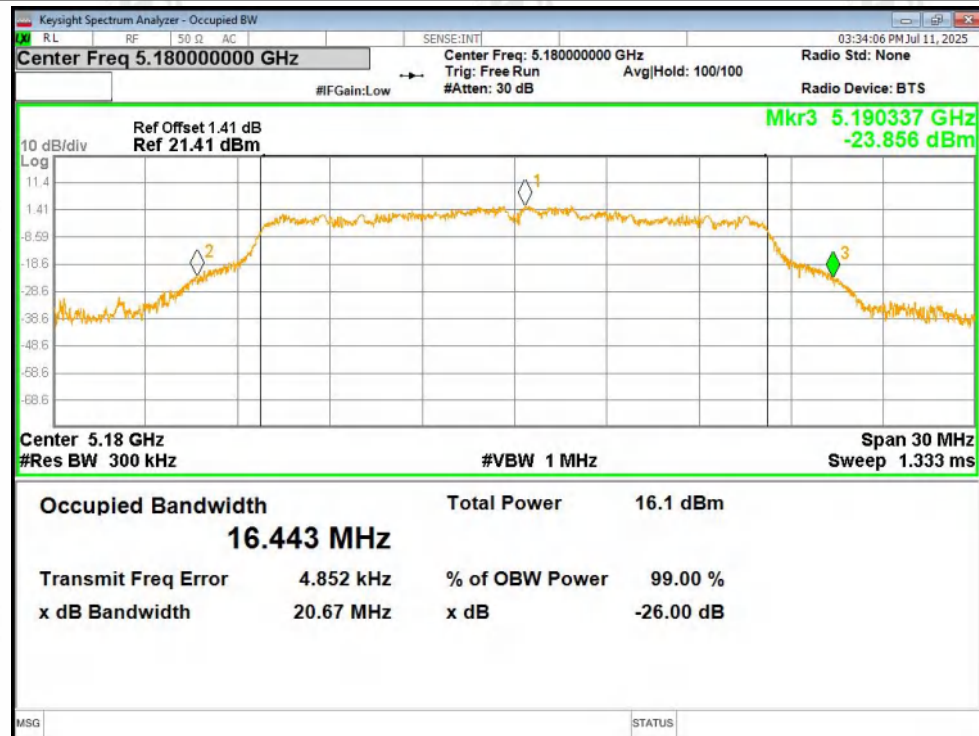


**-26dB Bandwidth**

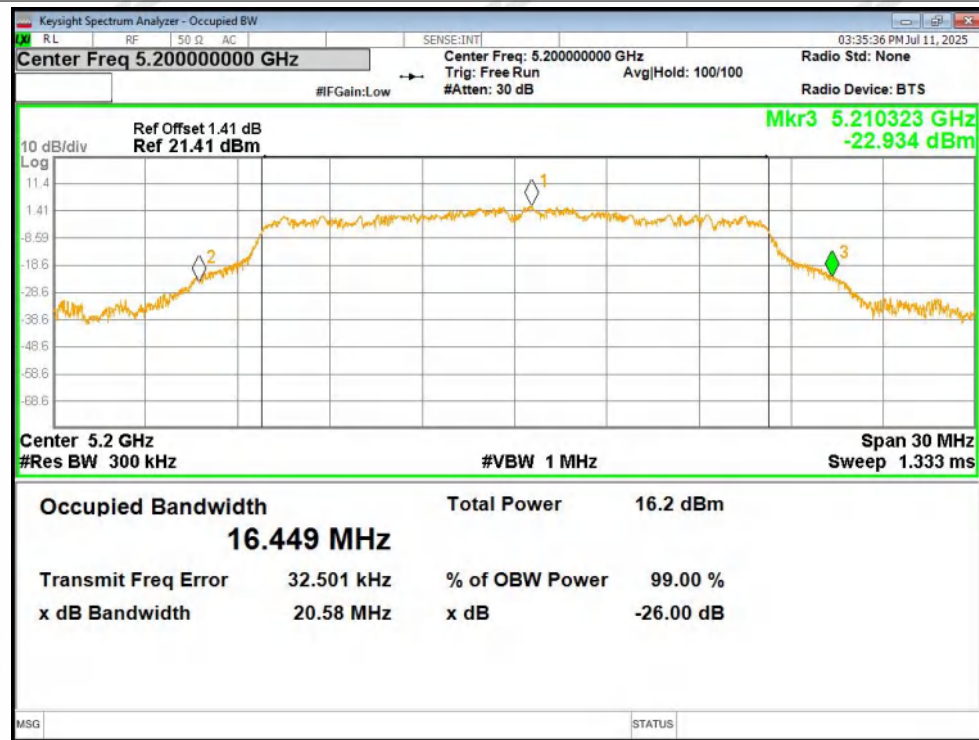
Condition	Mode	Frequency (MHz)	Antenna	-26 dB Bandwidth (MHz)	Verdict
NVNT	a	5180	Ant1	20.665	Pass
NVNT	a	5200	Ant1	20.582	Pass
NVNT	a	5240	Ant1	20.573	Pass
NVNT	n20	5180	Ant1	20.604	Pass
NVNT	n20	5200	Ant1	20.522	Pass
NVNT	n20	5240	Ant1	20.448	Pass
NVNT	n40	5190	Ant1	38.954	Pass
NVNT	n40	5230	Ant1	38.994	Pass
NVNT	ac20	5180	Ant1	21.286	Pass
NVNT	ac20	5200	Ant1	21.169	Pass
NVNT	ac20	5240	Ant1	21.179	Pass
NVNT	ac40	5190	Ant1	39.678	Pass
NVNT	ac40	5230	Ant1	39.74	Pass
NVNT	ac80	5210	Ant1	80.387	Pass

Test Graphs

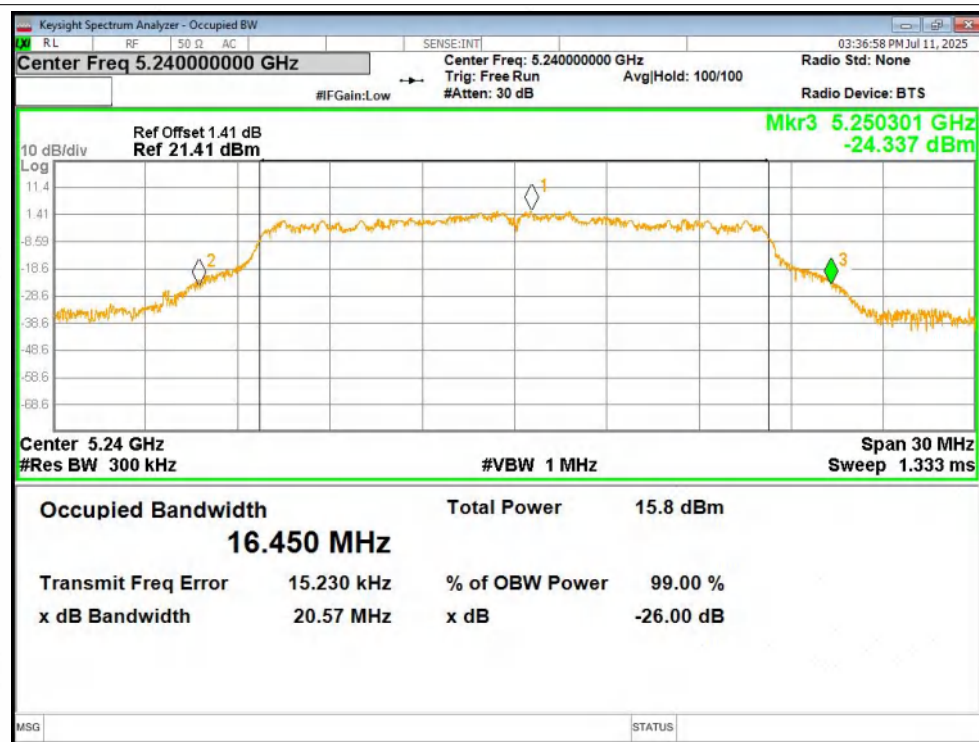
-26dB Bandwidth NVNT a 5180MHz Ant1



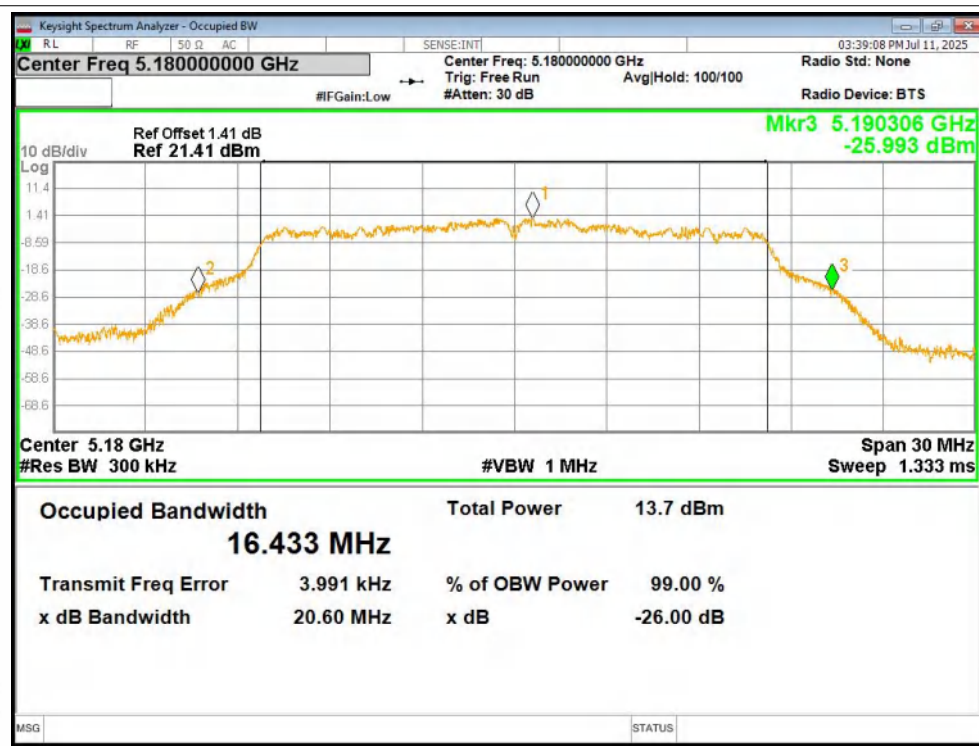
-26dB Bandwidth NVNT a 5200MHz Ant1



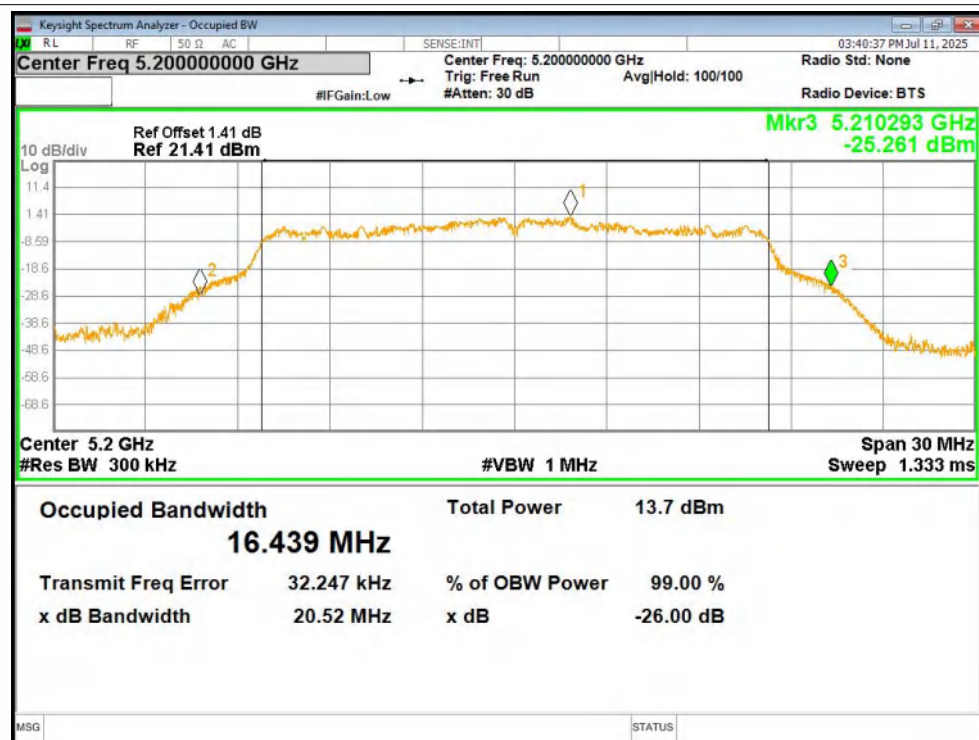
-26dB Bandwidth NVNT a 5240MHz Ant1



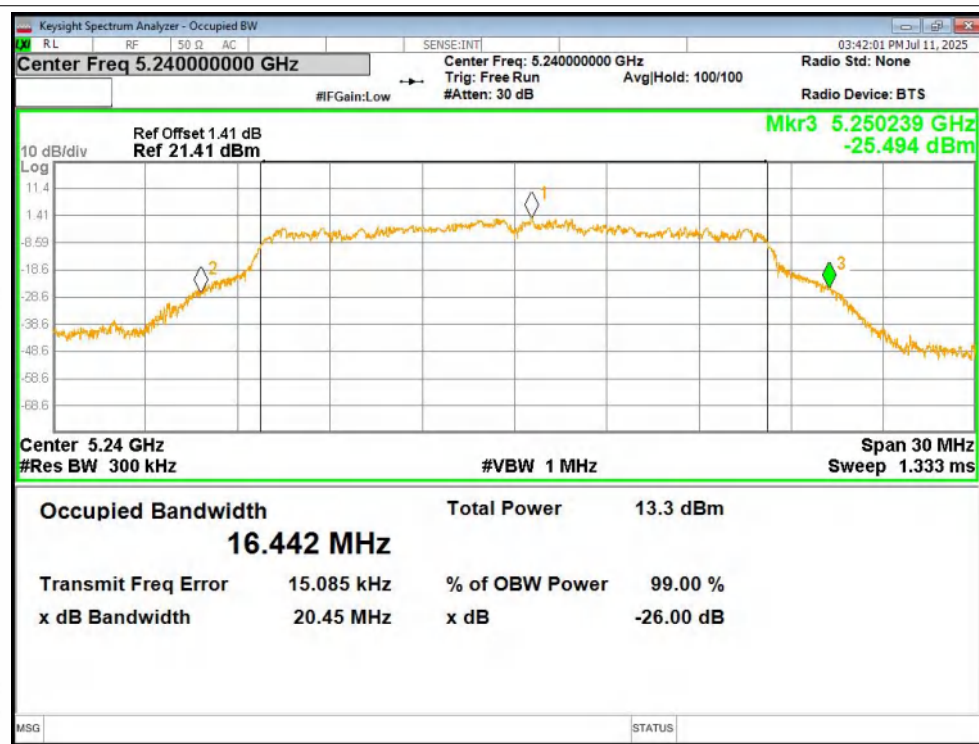
-26dB Bandwidth NVNT n20 5180MHz Ant1



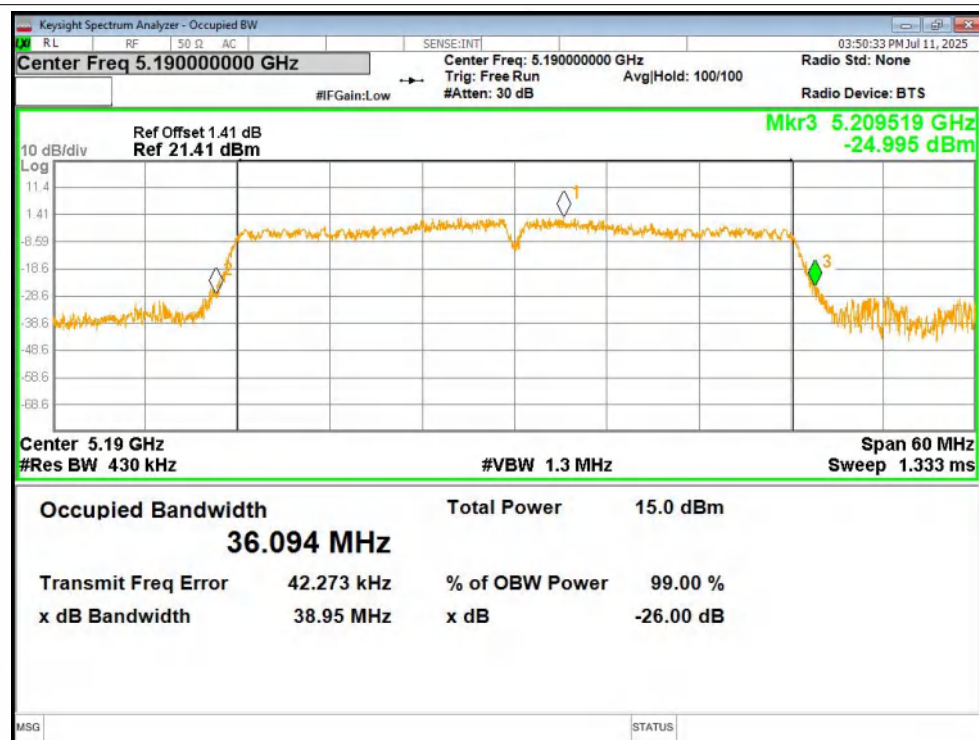
-26dB Bandwidth NVNT n20 5200MHz Ant1



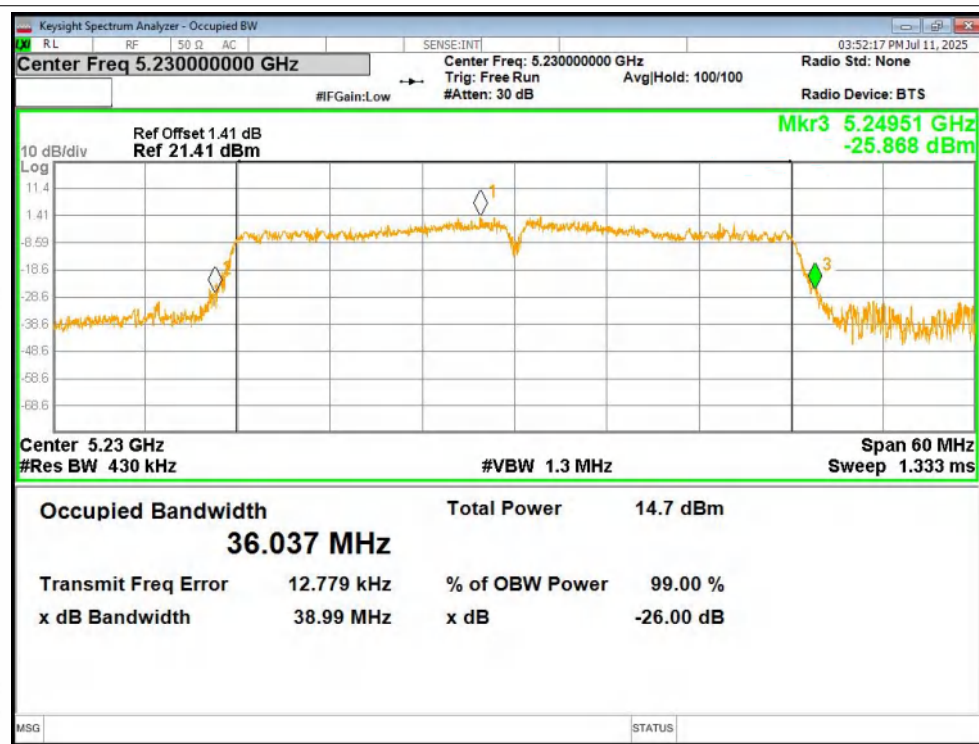
-26dB Bandwidth NVNT n20 5240MHz Ant1



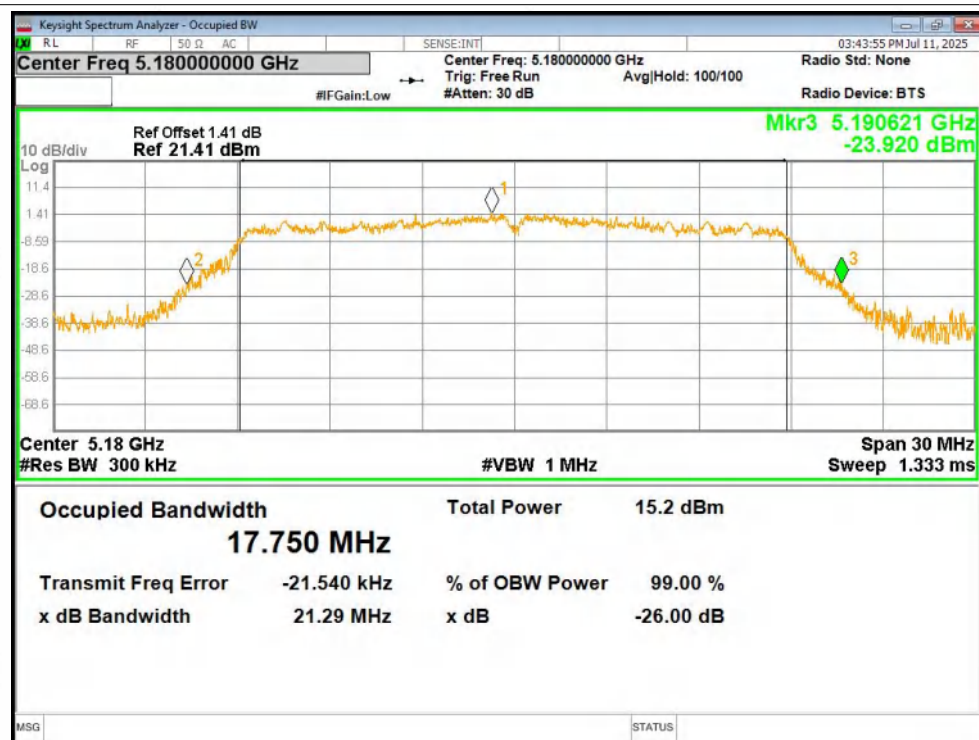
-26dB Bandwidth NVNT n40 5190MHz Ant1



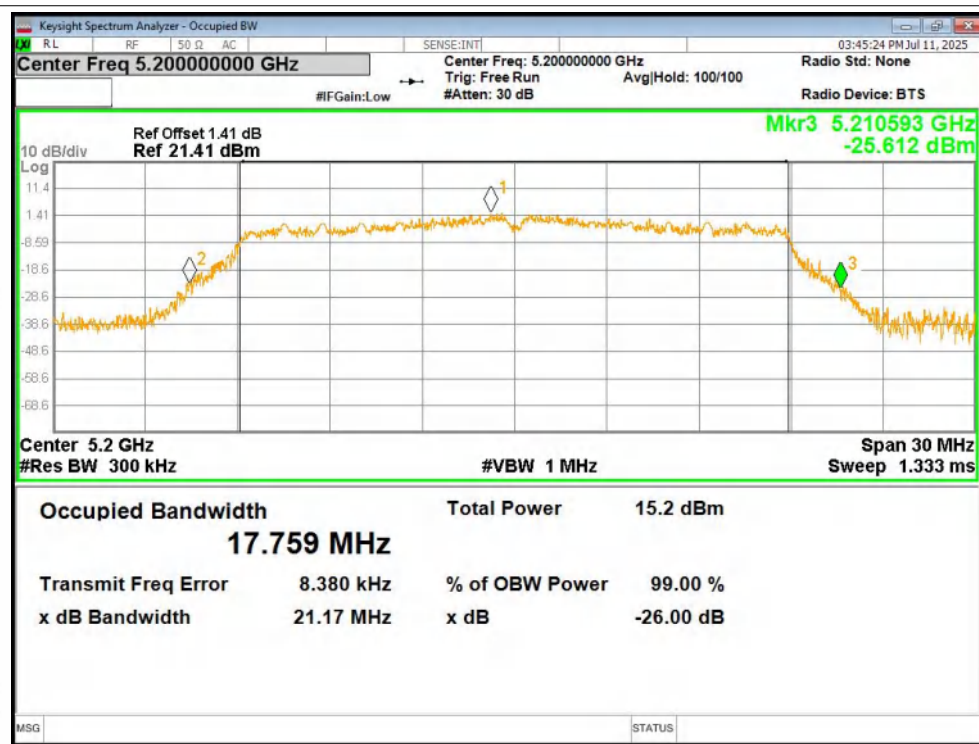
-26dB Bandwidth NVNT n40 5230MHz Ant1



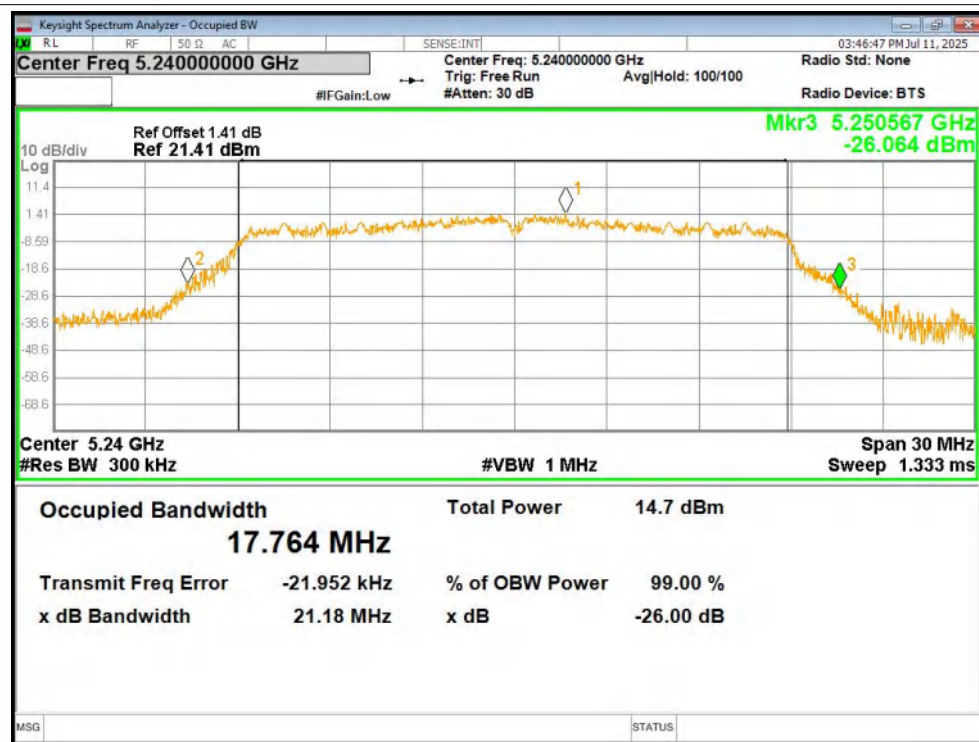
-26dB Bandwidth NVNT ac20 5180MHz Ant1



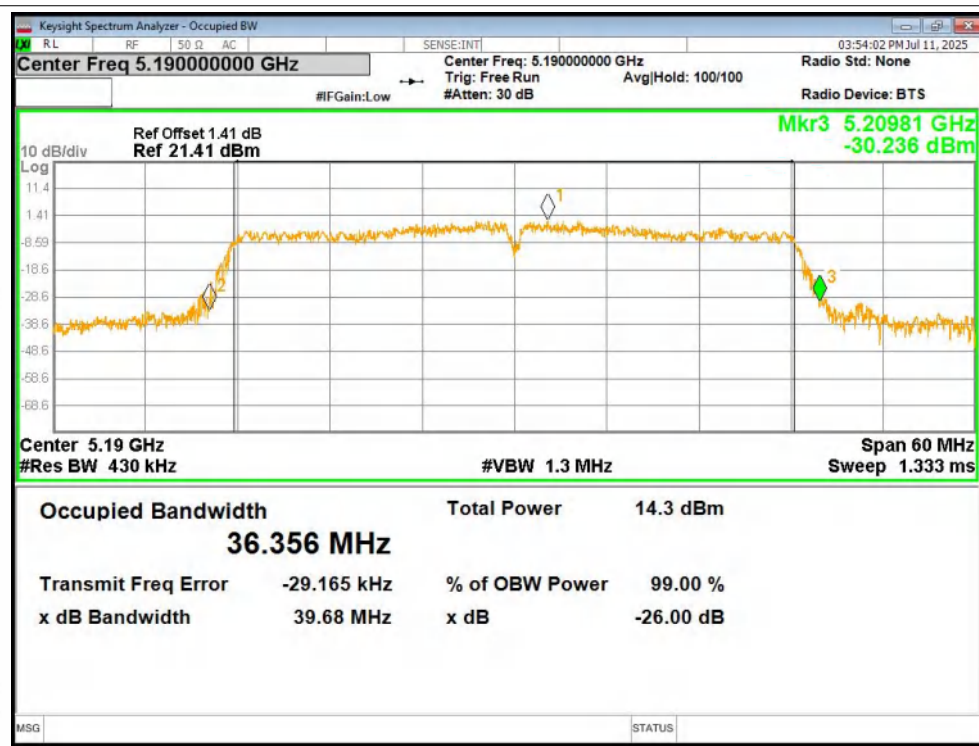
-26dB Bandwidth NVNT ac20 5200MHz Ant1



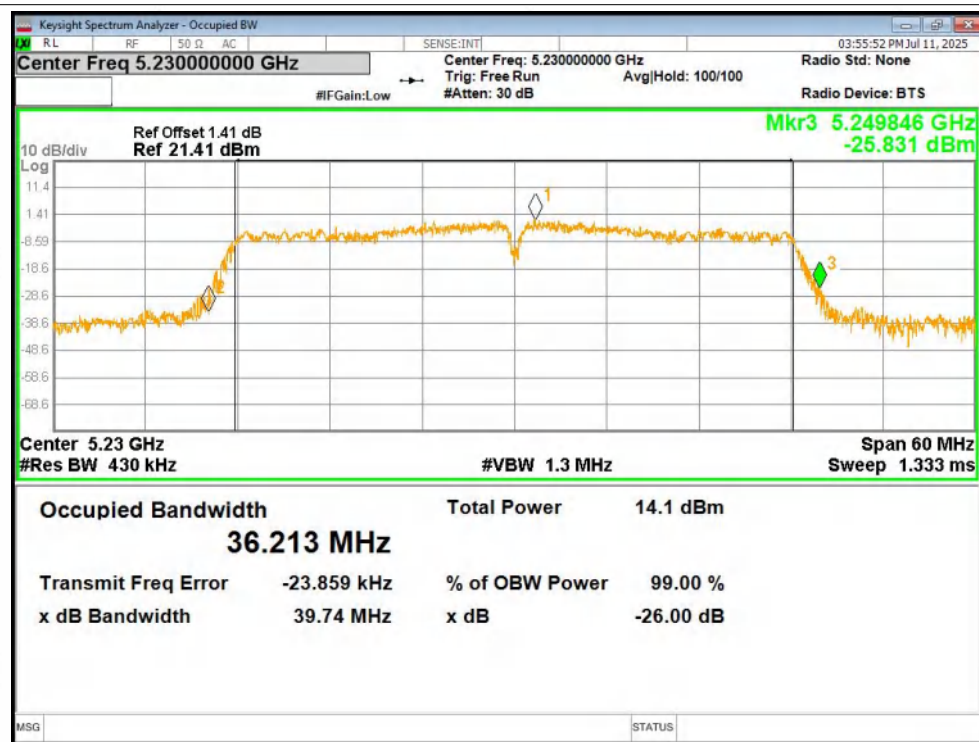
-26dB Bandwidth NVNT ac20 5240MHz Ant1



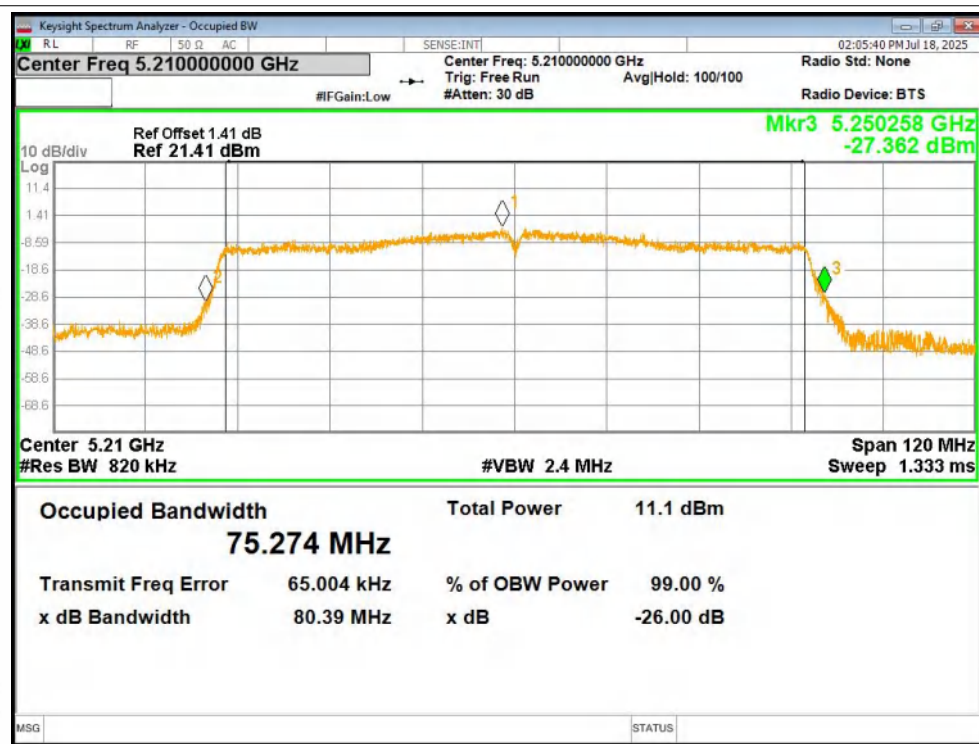
-26dB Bandwidth NVNT ac40 5190MHz Ant1



-26dB Bandwidth NVNT ac40 5230MHz Ant1



-26dB Bandwidth NVNT ac80 5210MHz Ant1

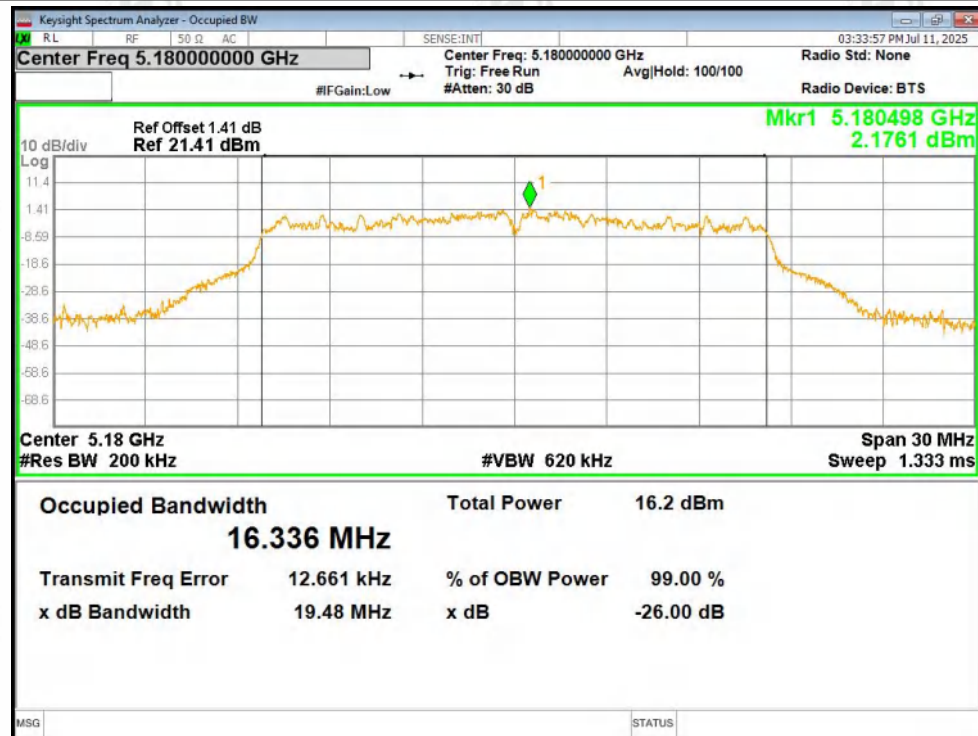


Occupied Channel Bandwidth

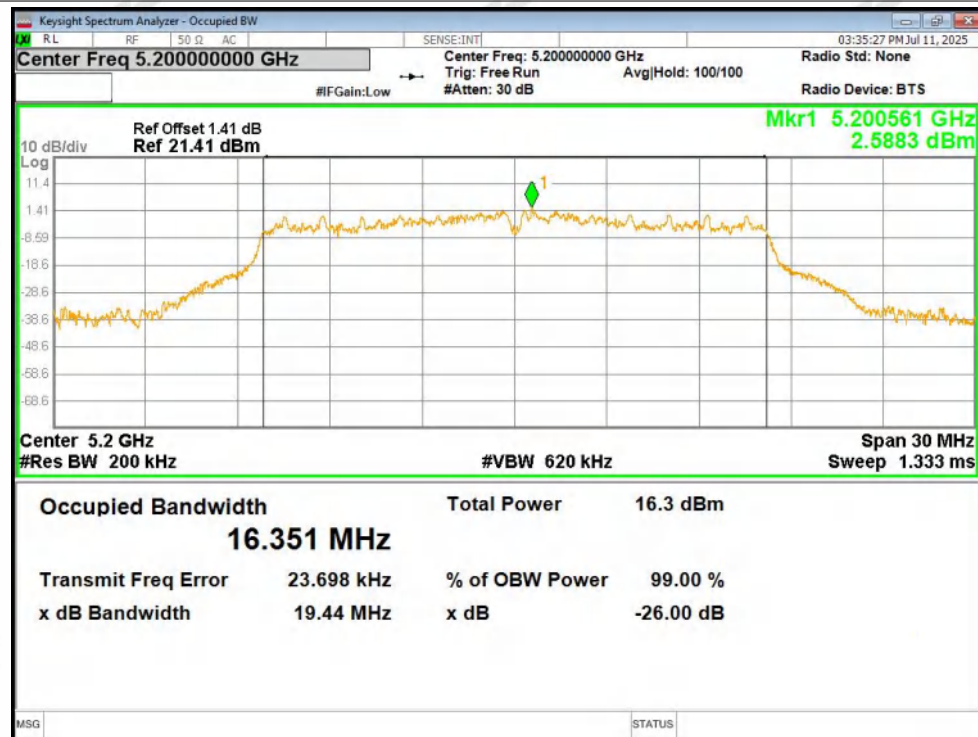
Condition	Mode	Frequency (MHz)	Antenna	99% OBW (MHz)
NVNT	a	5180	Ant1	16.336
NVNT	a	5200	Ant1	16.351
NVNT	a	5240	Ant1	16.371
NVNT	n20	5180	Ant1	16.352
NVNT	n20	5200	Ant1	16.337
NVNT	n20	5240	Ant1	16.344
NVNT	n40	5190	Ant1	36.07
NVNT	n40	5230	Ant1	36.09
NVNT	ac20	5180	Ant1	17.638
NVNT	ac20	5200	Ant1	17.618
NVNT	ac20	5240	Ant1	17.607
NVNT	ac40	5190	Ant1	36.256
NVNT	ac40	5230	Ant1	36.141
NVNT	ac80	5210	Ant1	75.272

Test Graphs

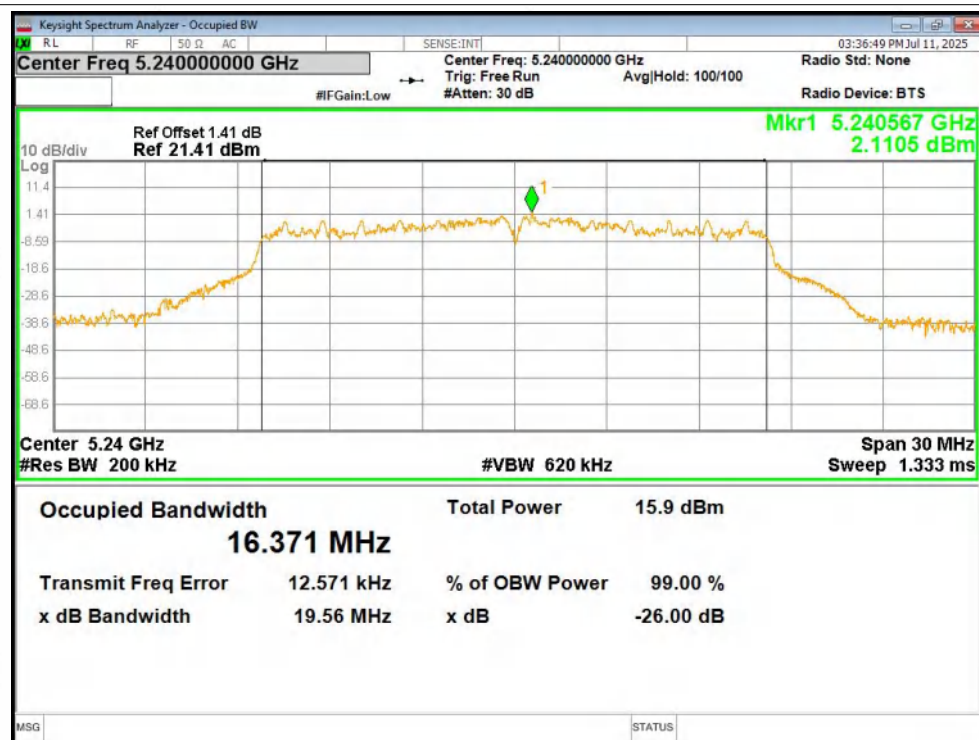
OBW NVNT a 5180MHz Ant1



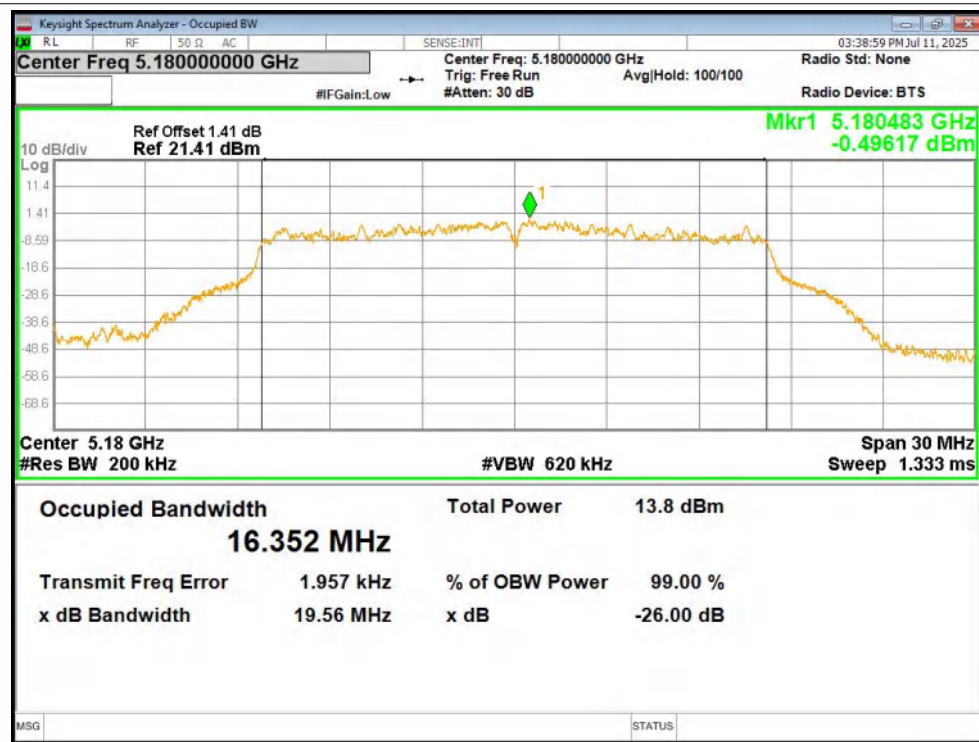
OBW NVNT a 5200MHz Ant1



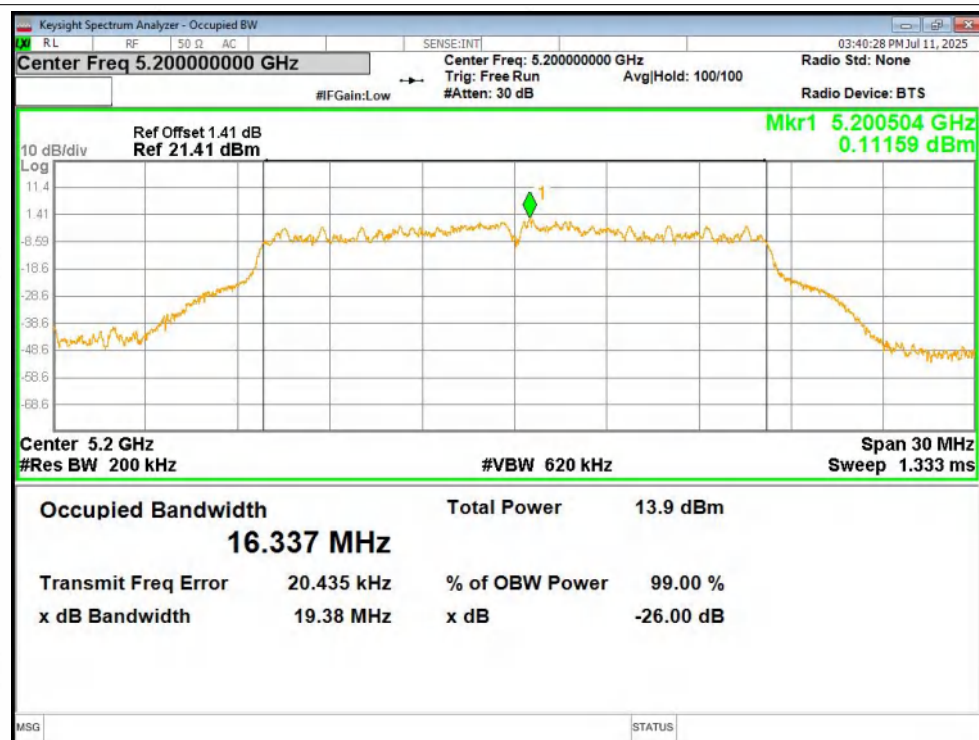
OBW NVNT a 5240MHz Ant1



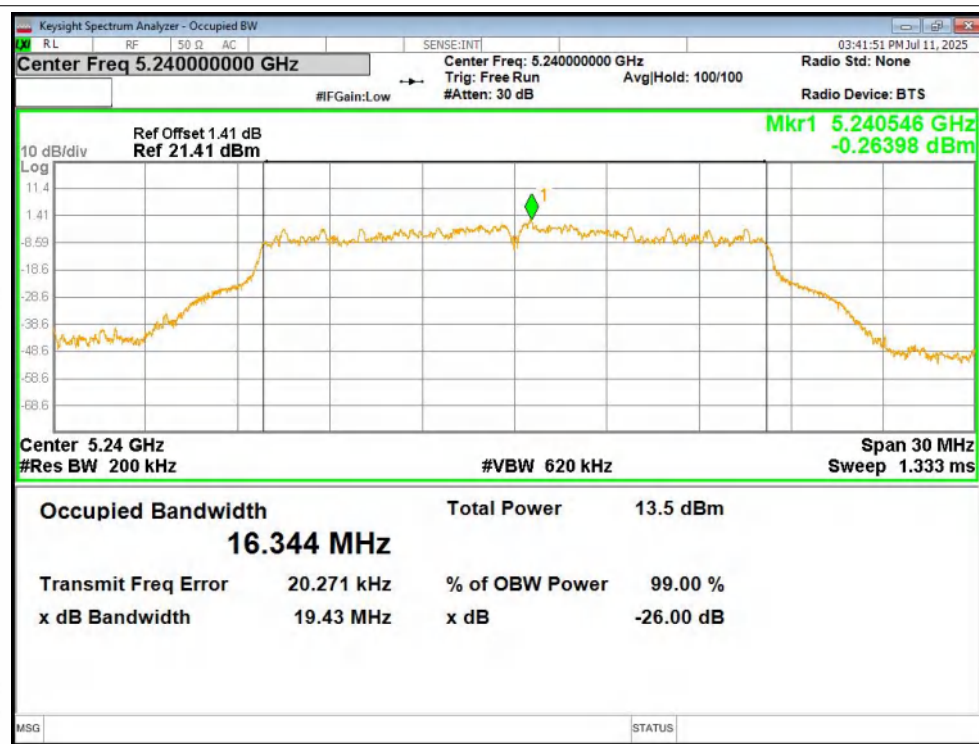
OBW NVNT n20 5180MHz Ant1



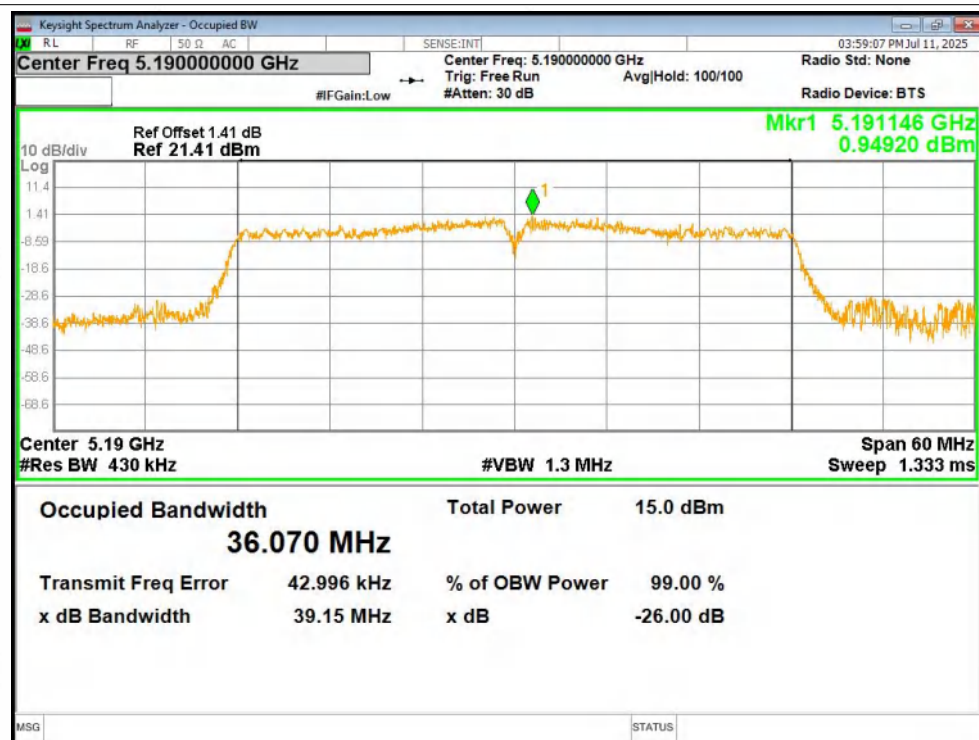
OBW NVNT n20 5200MHz Ant1



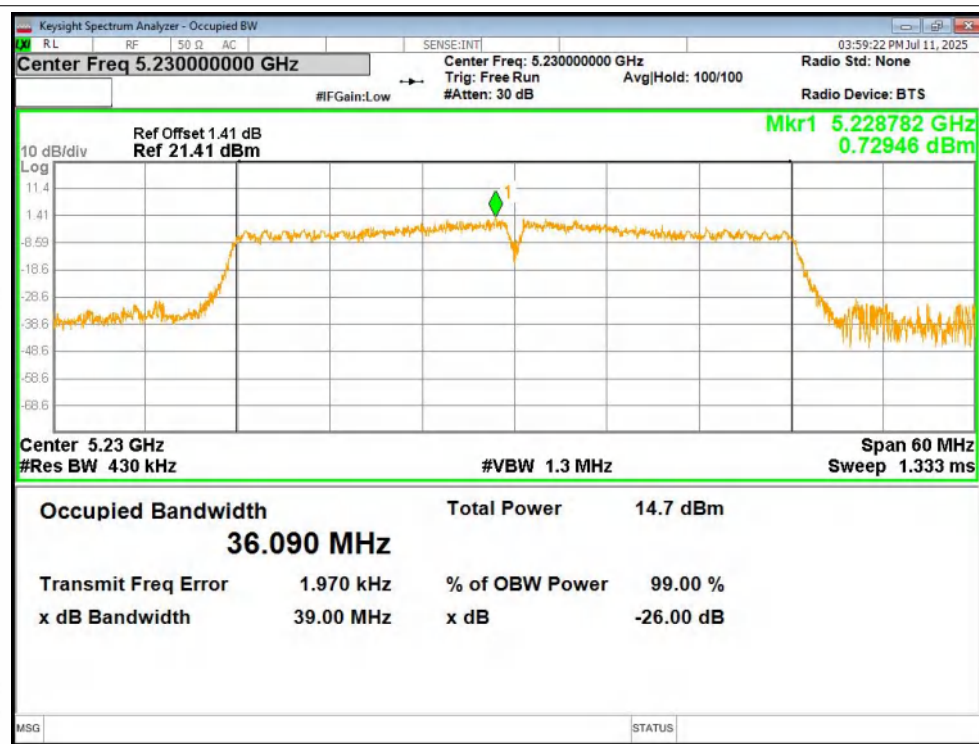
OBW NVNT n20 5240MHz Ant1



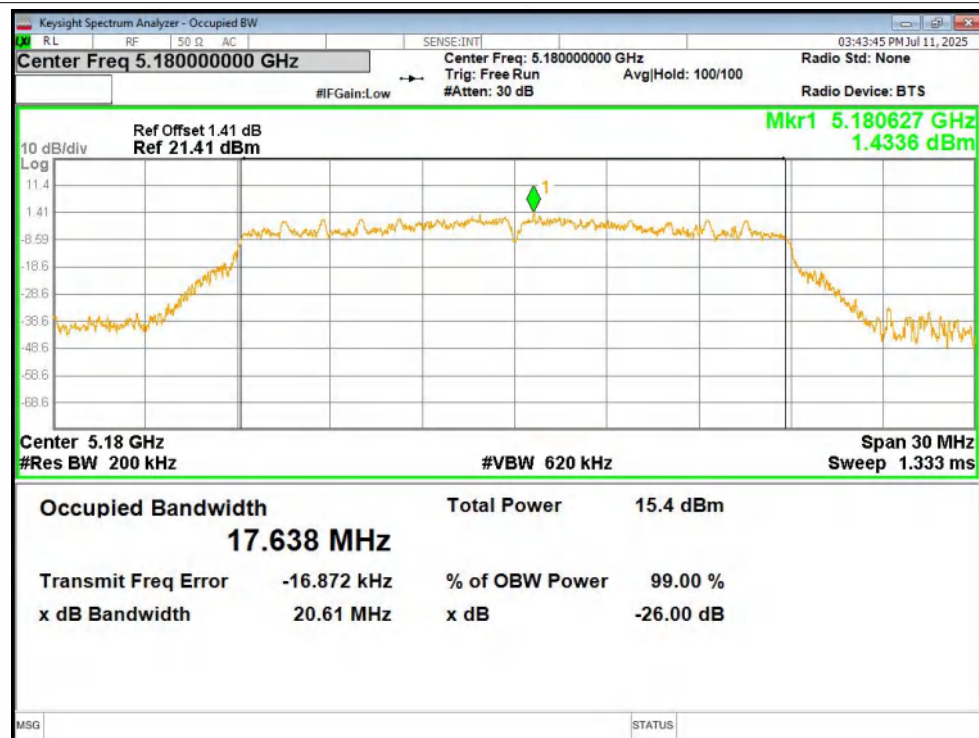
OBW NVNT n40 5190MHz Ant1



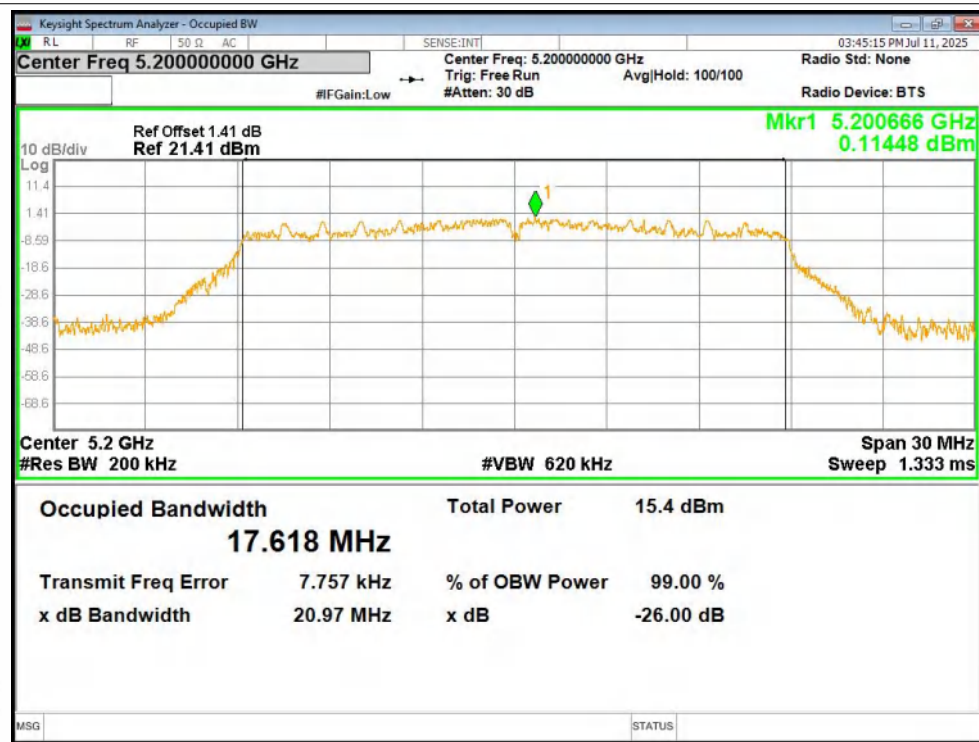
OBW NVNT n40 5230MHz Ant1



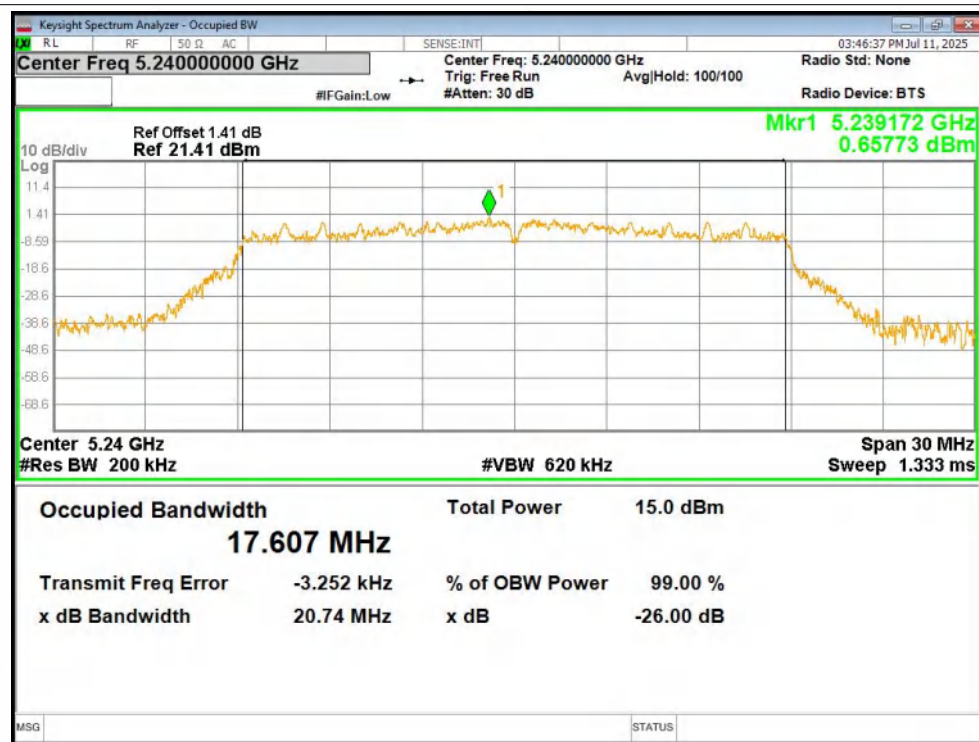
OBW NVNT ac20 5180MHz Ant1



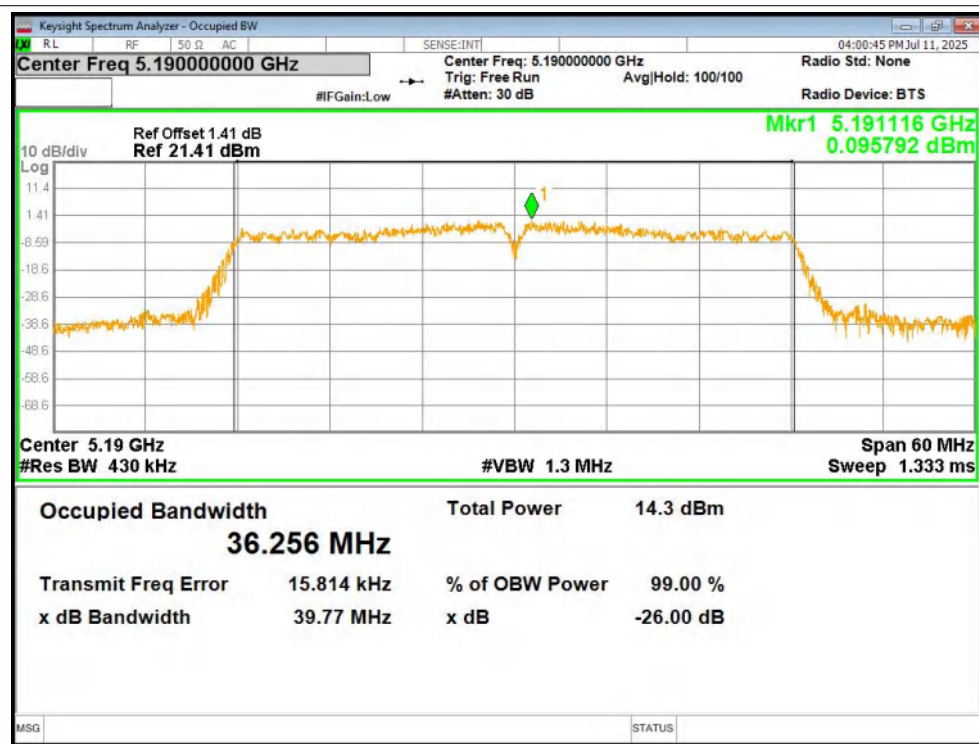
OBW NVNT ac20 5200MHz Ant1



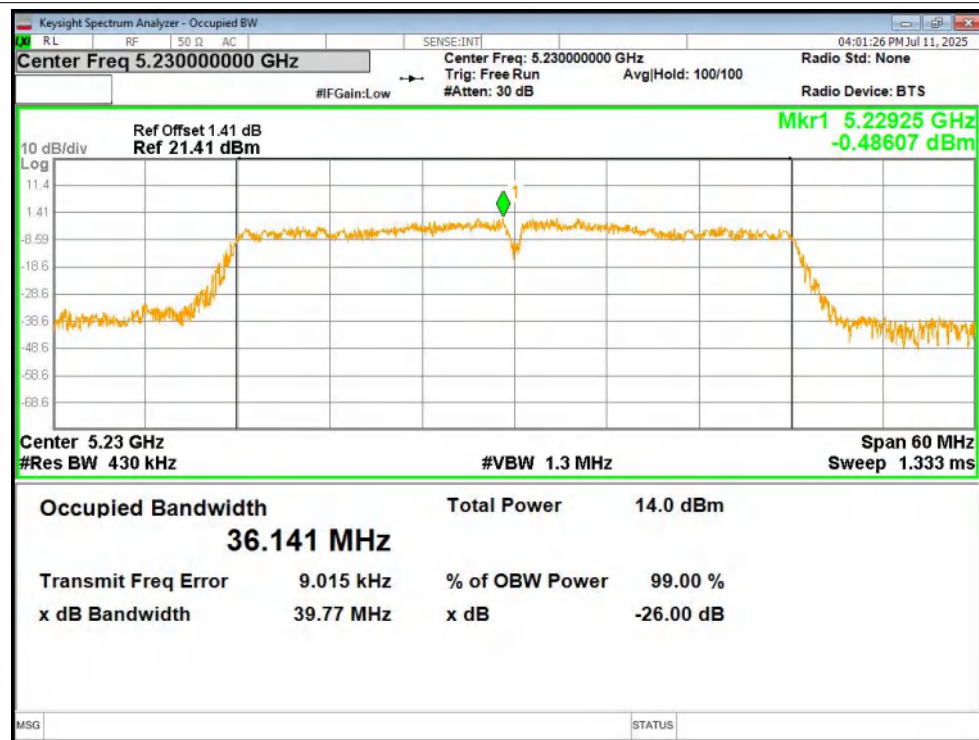
OBW NVNT ac20 5240MHz Ant1



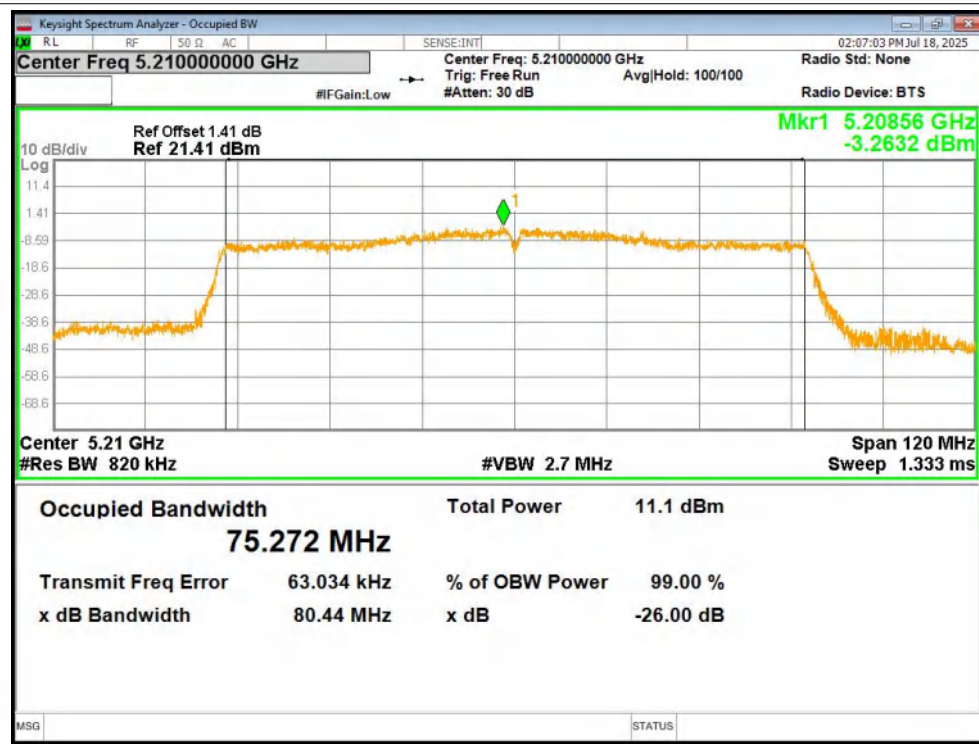
OBW NVNT ac40 5190MHz Ant1



OBW NVNT ac40 5230MHz Ant1



OBW NVNT ac80 5210MHz Ant1





Maximum Power Spectral Density Level

Condition	Mode	Frequency (MHz)	Antenna	Conducted PSD (dBm/MHz)	Duty Factor (dB)	Total PSD (dBm/MHz)	Limit (dBm/MHz)	Verdict
NVNT	a	5180	Ant1	-16.12	1.92	-14.2	11	Pass
NVNT	a	5200	Ant1	-16.82	1.92	-14.9	11	Pass
NVNT	a	5240	Ant1	-18.53	1.92	-16.61	11	Pass
NVNT	n20	5180	Ant1	-20.96	2.17	-18.79	11	Pass
NVNT	n20	5200	Ant1	-19.32	2.01	-17.31	11	Pass
NVNT	n20	5240	Ant1	-18.86	1.92	-16.94	11	Pass
NVNT	n40	5190	Ant1	-28.53	3.01	-25.52	11	Pass
NVNT	n40	5230	Ant1	-27.37	3.01	-24.36	11	Pass
NVNT	ac20	5180	Ant1	-18.87	2.01	-16.86	11	Pass
NVNT	ac20	5200	Ant1	-18.78	2.01	-16.77	11	Pass
NVNT	ac20	5240	Ant1	-21.43	2.01	-19.42	11	Pass
NVNT	ac40	5190	Ant1	-31.64	3.01	-28.63	11	Pass
NVNT	ac40	5230	Ant1	-30.21	3.24	-26.97	11	Pass
NVNT	ac80	5210	Ant1	-18.95	0.87	-18.08	11	Pass

Test Graphs

PSD NVNT a 5180MHz Ant1



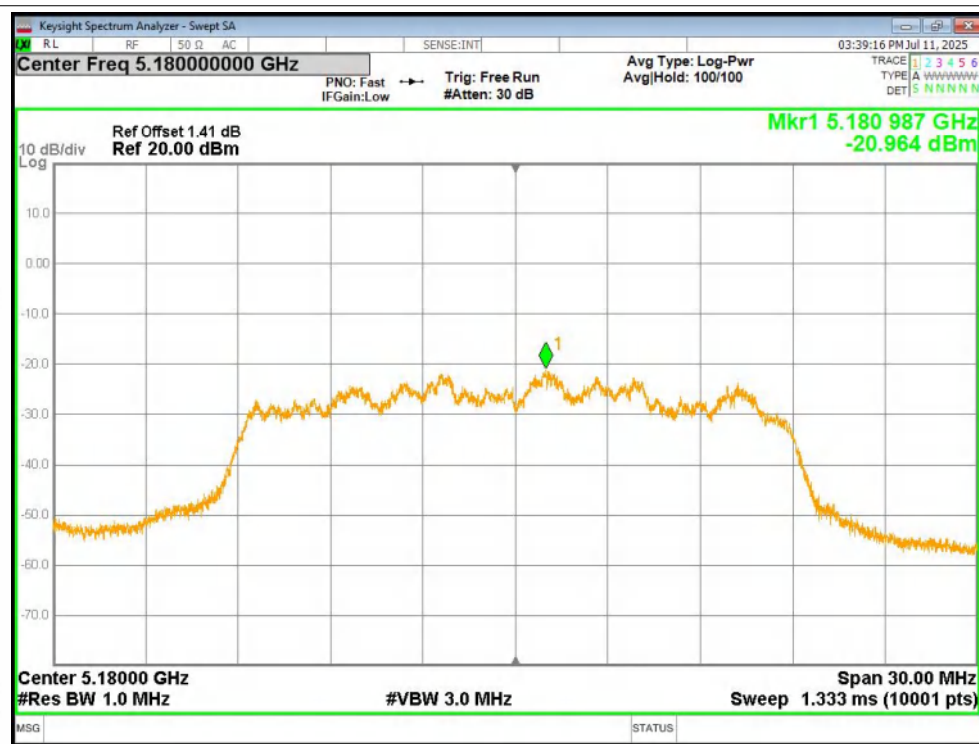
PSD NVNT a 5200MHz Ant1



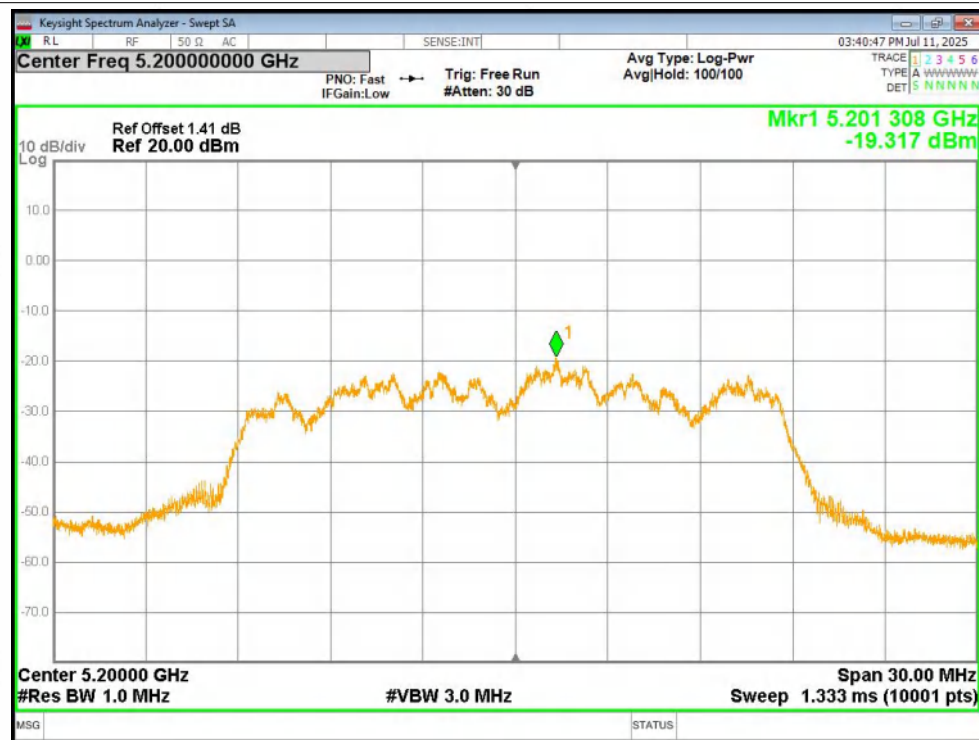
PSD NVNT a 5240MHz Ant1



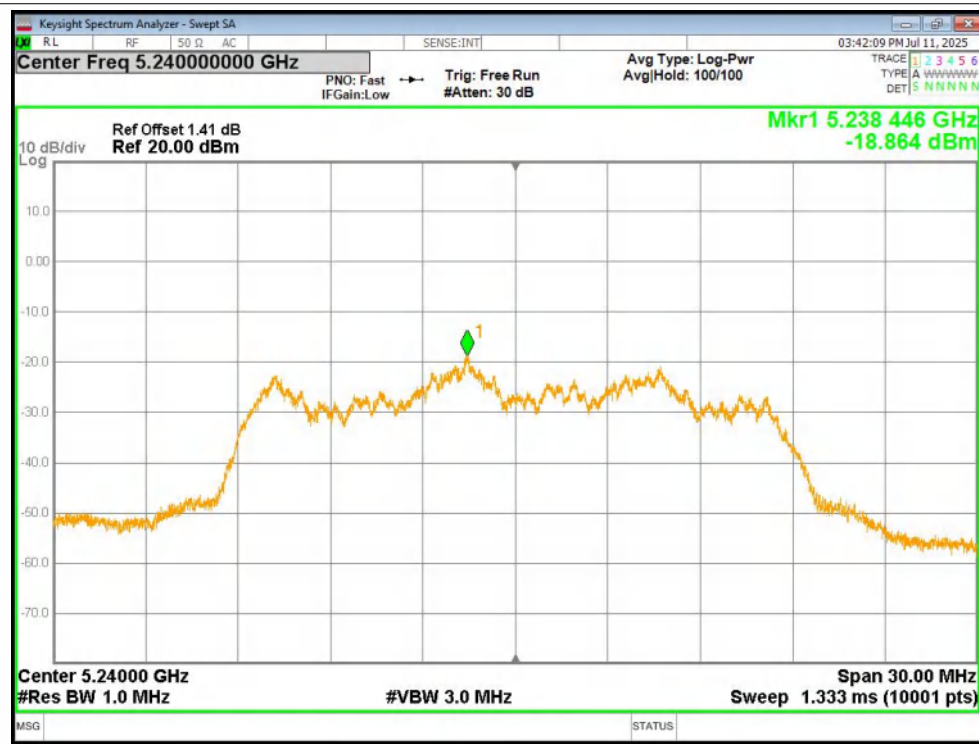
PSD NVNT n20 5180MHz Ant1



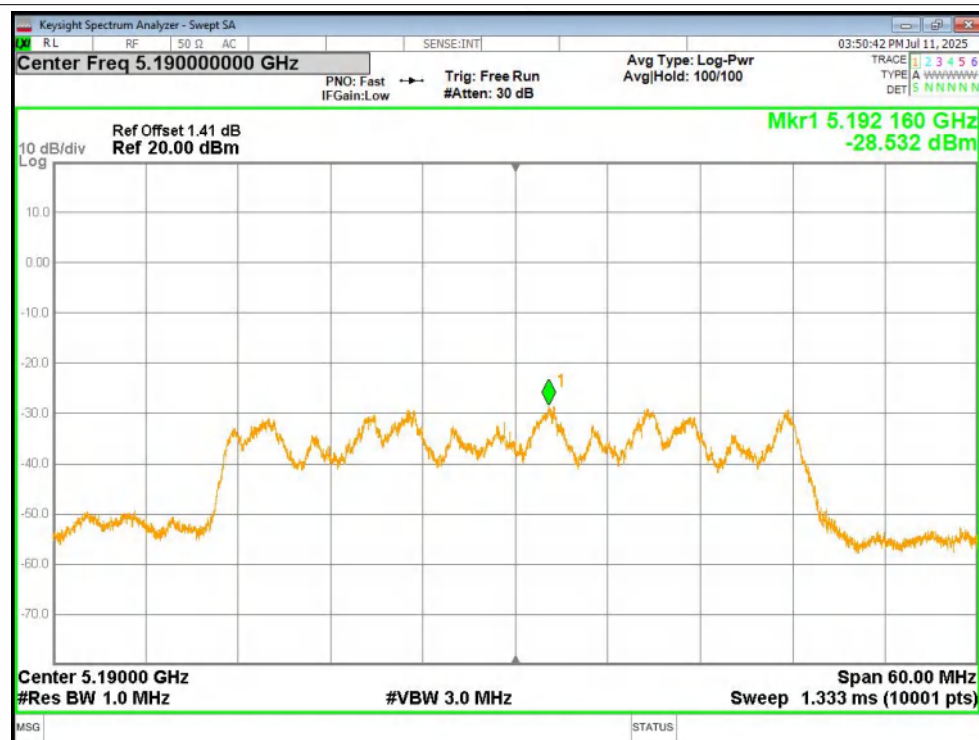
PSD NVNT n20 5200MHz Ant1



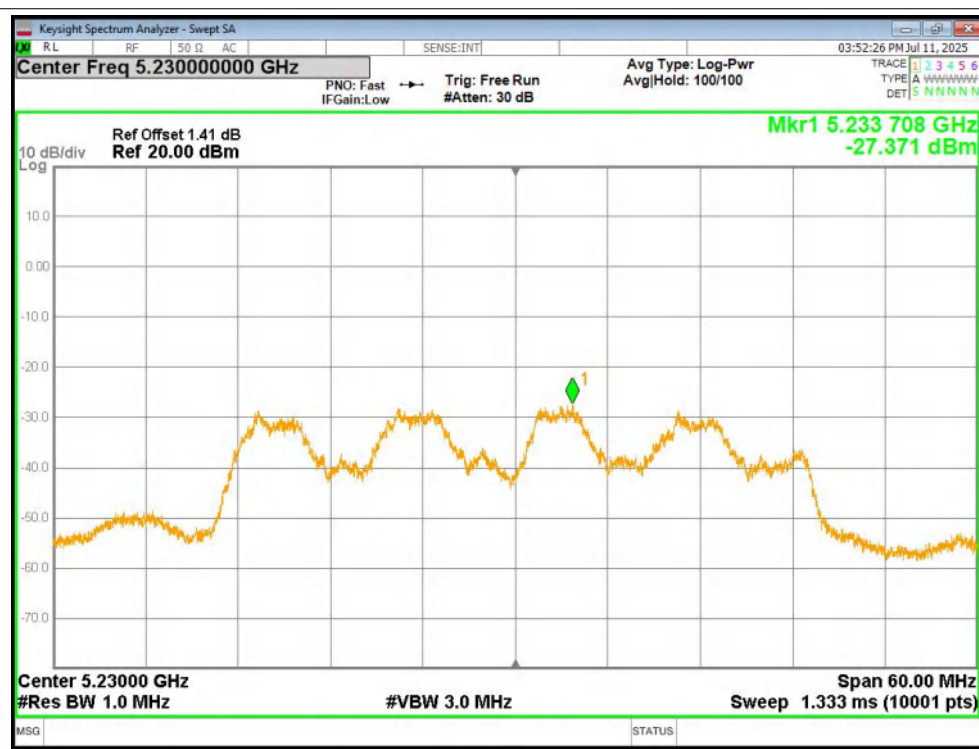
PSD NVNT n20 5240MHz Ant1



PSD NVNT n40 5190MHz Ant1



PSD NVNT n40 5230MHz Ant1



PSD NVNT ac20 5180MHz Ant1



PSD NVNT ac20 5200MHz Ant1



PSD NVNT ac20 5240MHz Ant1



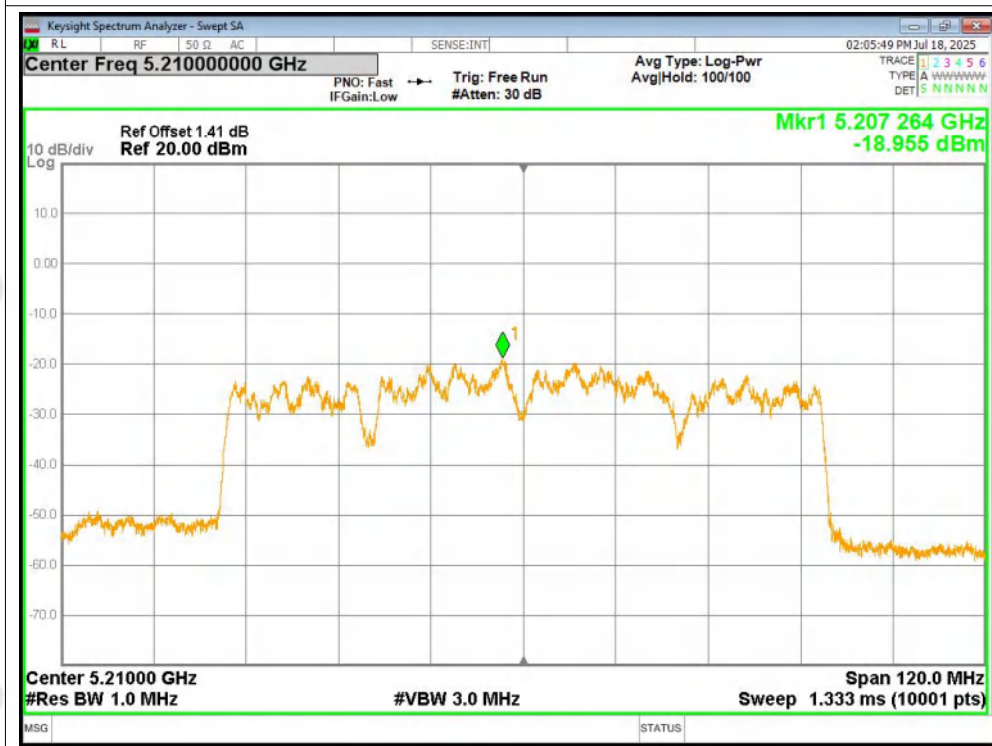
PSD NVNT ac40 5190MHz Ant1



PSD NVNT ac40 5230MHz Ant1



PSD NVNT ac80 5210MHz Ant1



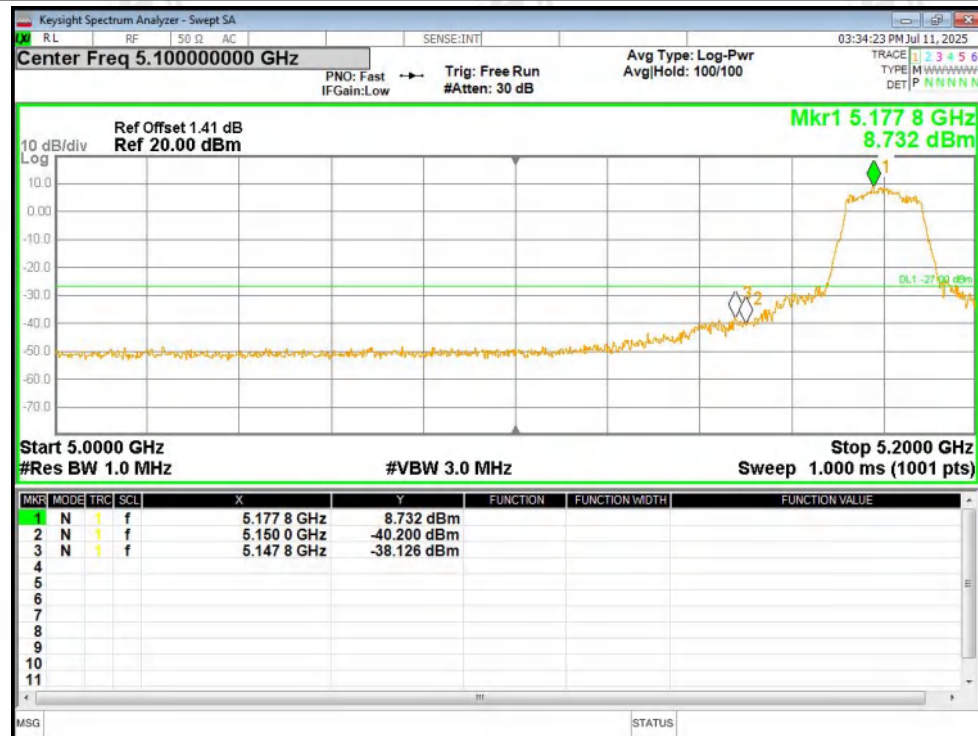


Band Edge

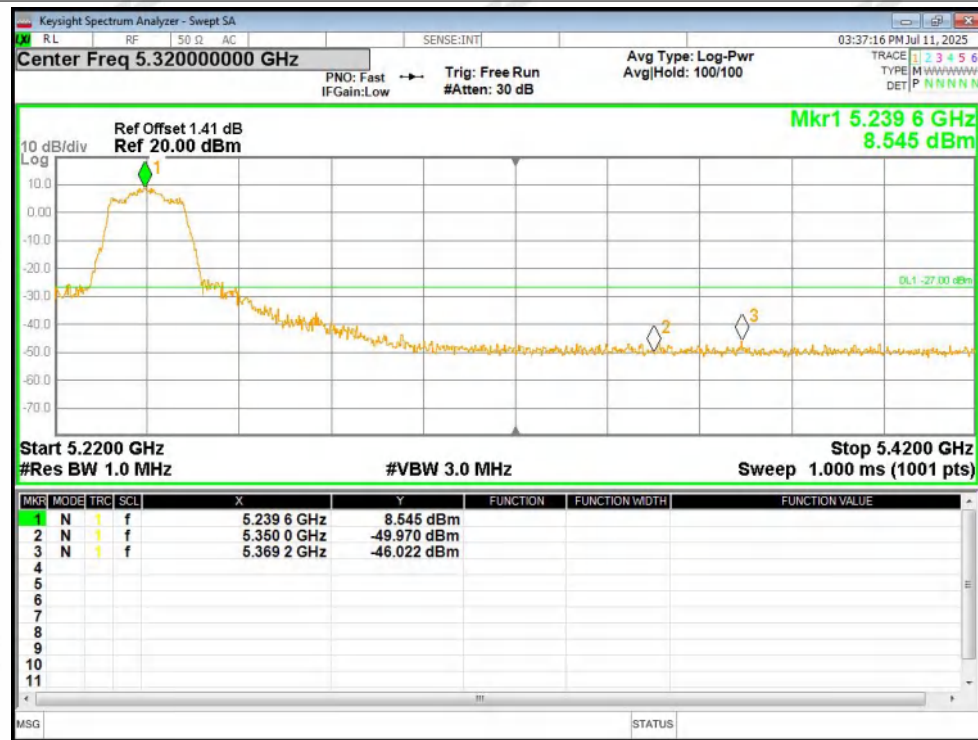
Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBm)	Limit (dBm)	Verdict
NVNT	a	5180	Ant1	-38.12	-27	Pass
NVNT	a	5240	Ant1	-46.02	-27	Pass
NVNT	n20	5180	Ant1	-42.02	-27	Pass
NVNT	n20	5240	Ant1	-47.02	-27	Pass
NVNT	n40	5190	Ant1	-29.4	-27	Pass
NVNT	n40	5230	Ant1	-46.54	-27	Pass
NVNT	ac20	5180	Ant1	-37.03	-27	Pass
NVNT	ac20	5240	Ant1	-47.23	-27	Pass
NVNT	ac40	5190	Ant1	-34.12	-27	Pass
NVNT	ac40	5230	Ant1	-46.74	-27	Pass
NVNT	ac80	5210	Ant1	-38.32	-27	Pass

Test Graphs

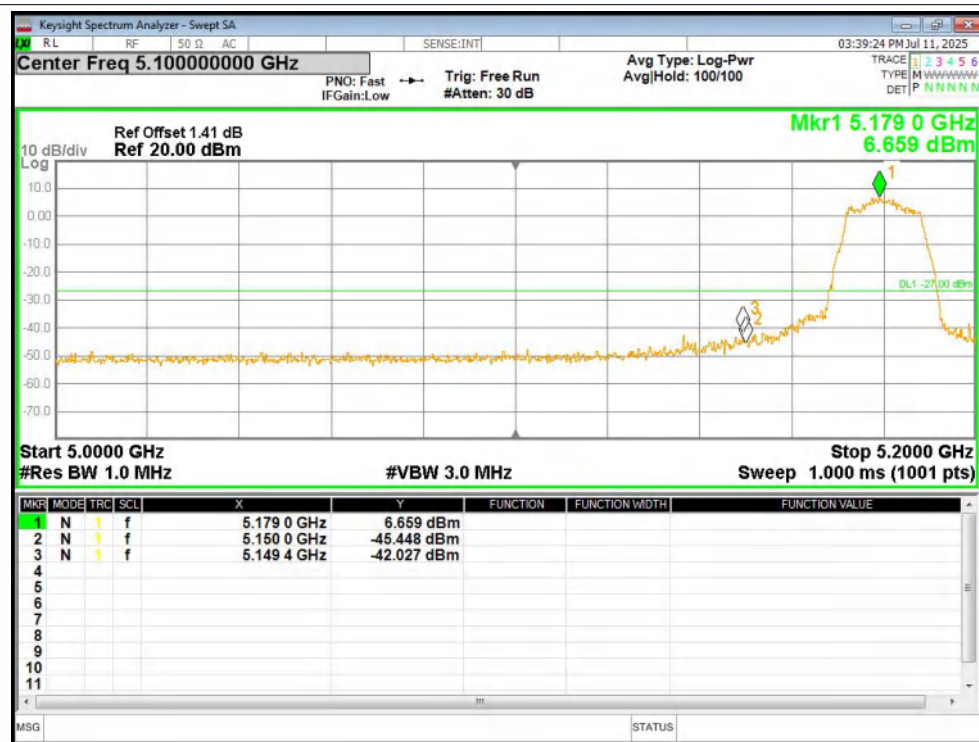
Band Edge NVNT a 5180MHz Low Ant1



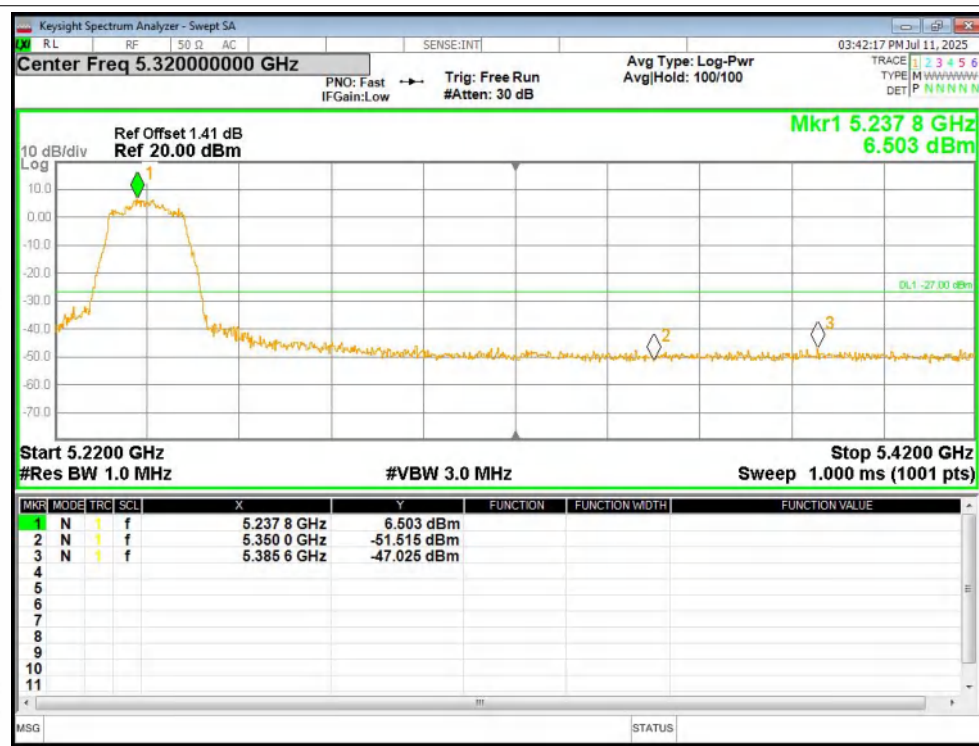
Band Edge NVNT a 5240MHz High Ant1



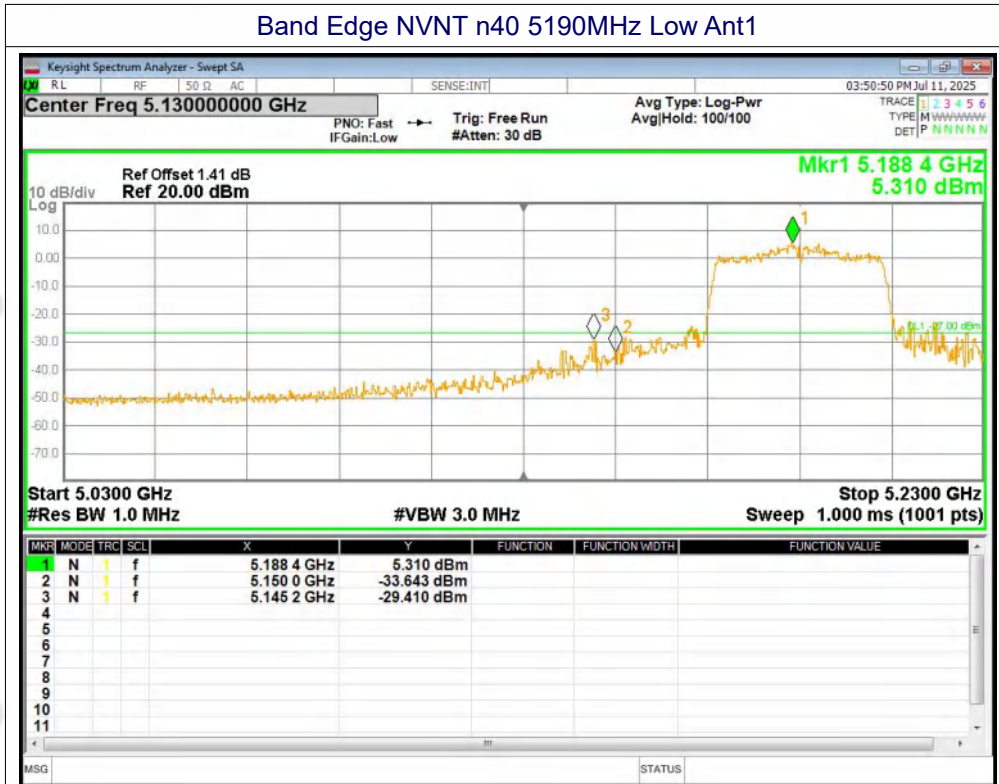
Band Edge NVNT n20 5180MHz Low Ant1



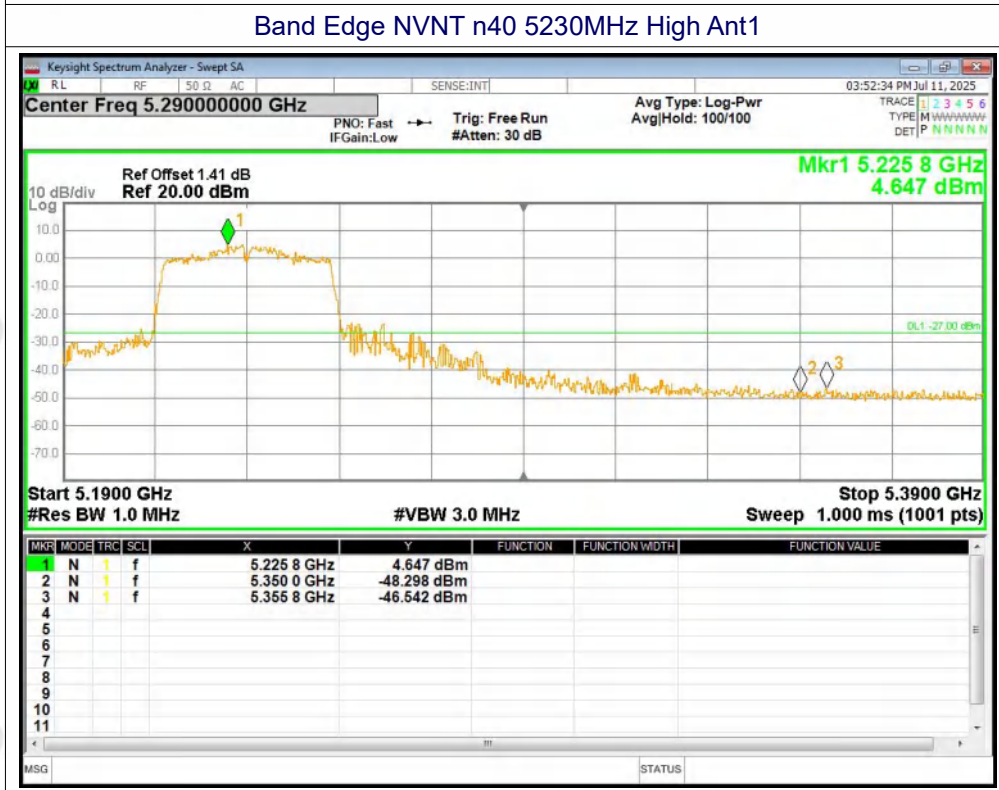
Band Edge NVNT n20 5240MHz High Ant1



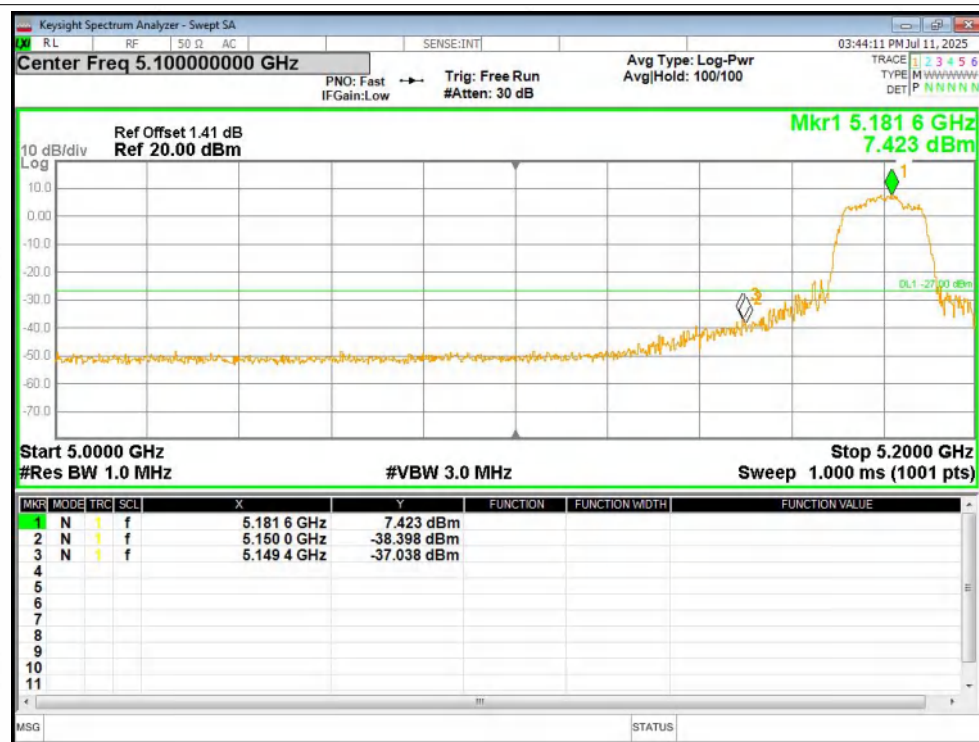
Band Edge NVNT n40 5190MHz Low Ant1



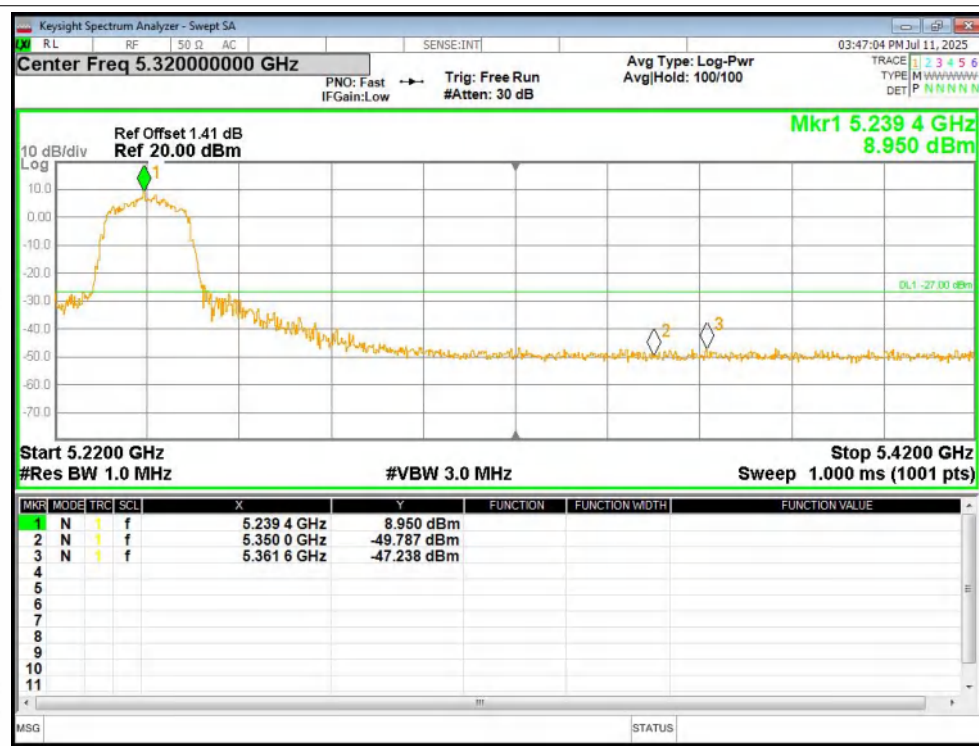
Band Edge NVNT n40 5230MHz High Ant1



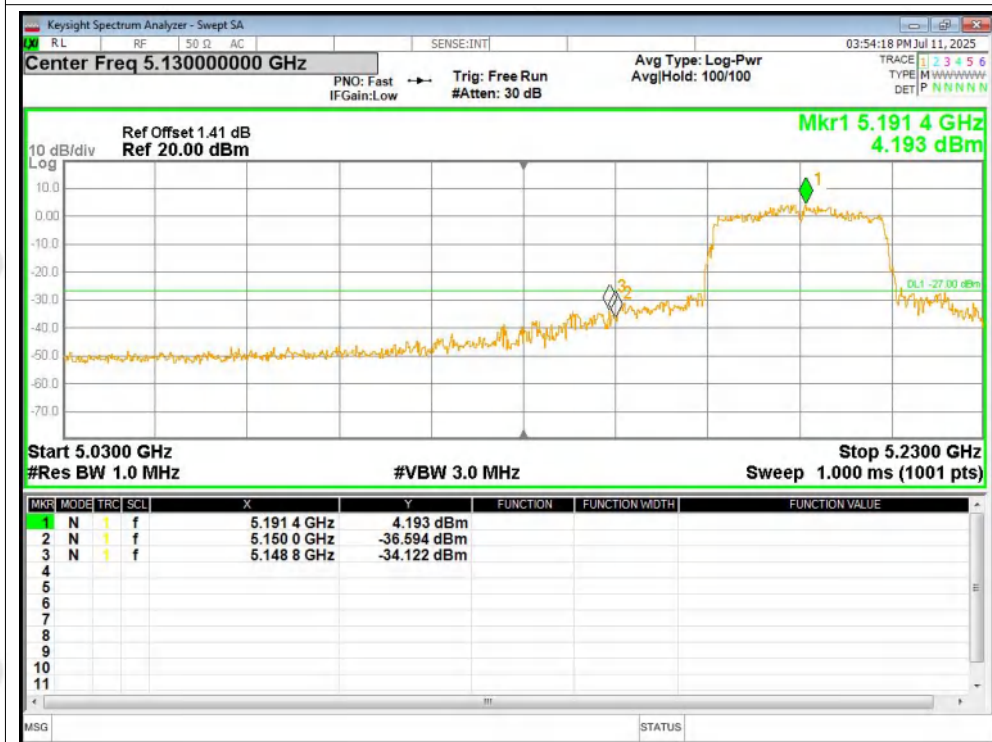
Band Edge NVNT ac20 5180MHz Low Ant1



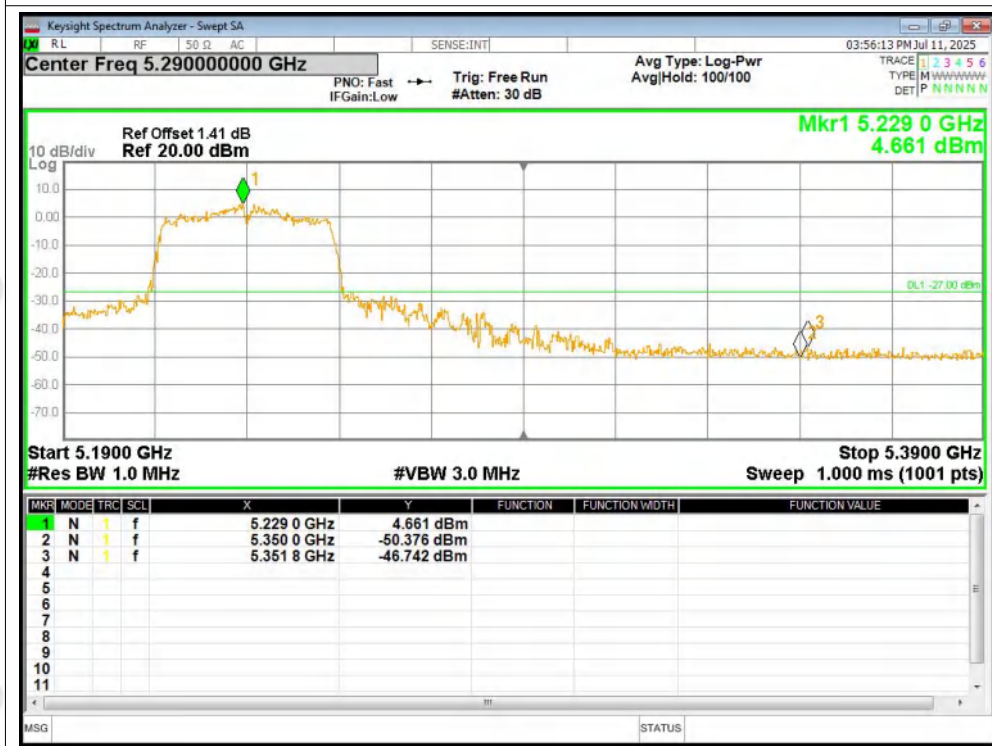
Band Edge NVNT ac20 5240MHz High Ant1

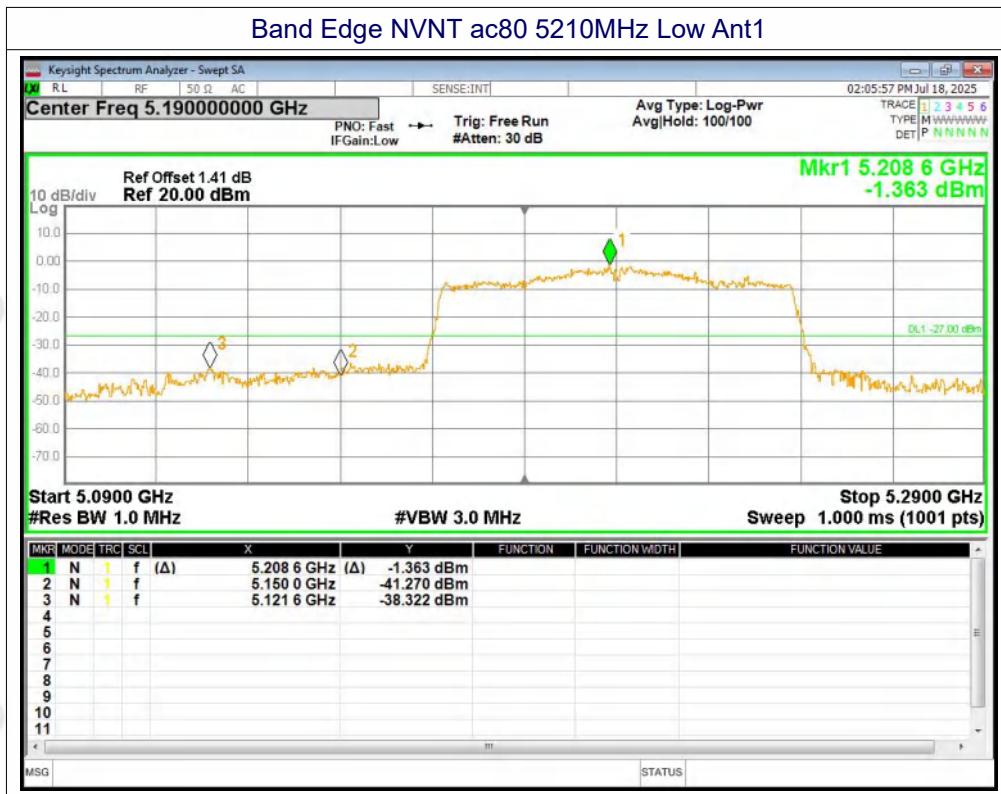


Band Edge NVNT ac40 5190MHz Low Ant1



Band Edge NVNT ac40 5230MHz High Ant1





Frequency Stability

Voltage						
Test Mode	Channel	Voltage [Vdc]	Temperature (°C)	Measured Frequency (MHz)	Limit (MHz)	Verdict
a	5180	NV	NT	5180.08	Within 5150-5250MHz	Pass
		LV	NT	5180.04		
		HV	NT	5180.02		
Temperature						
Test Mode	Channel	Voltage [Vdc]	Temperature (°C)	Measured Frequency (MHz)	Limit (MHz)	Verdict
a	5180	NV	-30	5180.08	Within 5150-5250MHz	Pass
		NV	-20	5180.07		
		NV	-10	5180.06		
		NV	0	5180.04		
		NV	10	5180.05		
		NV	20	5180.04		
		NV	30	5180.05		
		NV	40	5180.02		
		NV	50	5180.01		

Note: Only show the worst case 802.11 a Mode 5180MHz.

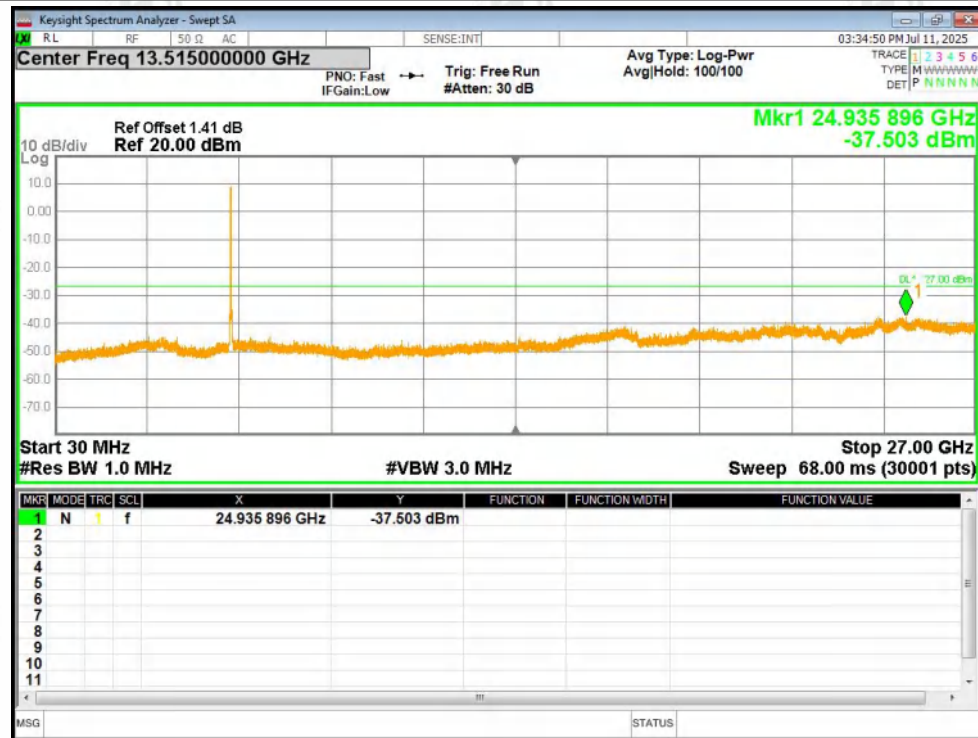


Conducted RF Spurious Emission

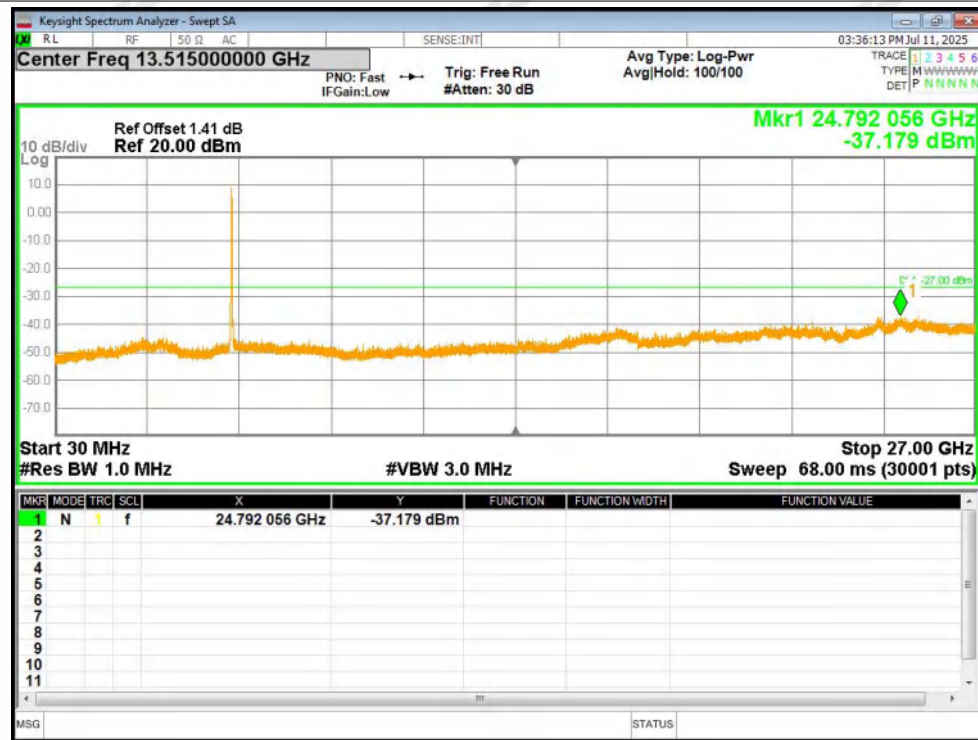
Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBm)	Limit (dBm)	Verdict
NVNT	a	5180	Ant1	-37.5	-27	Pass
NVNT	a	5200	Ant1	-37.17	-27	Pass
NVNT	a	5240	Ant1	-37.37	-27	Pass
NVNT	n20	5180	Ant1	-37.15	-27	Pass
NVNT	n20	5200	Ant1	-37.17	-27	Pass
NVNT	n20	5240	Ant1	-37.13	-27	Pass
NVNT	n40	5190	Ant1	-36.98	-27	Pass
NVNT	n40	5230	Ant1	-36.99	-27	Pass
NVNT	ac20	5180	Ant1	-37.1	-27	Pass
NVNT	ac20	5200	Ant1	-37.08	-27	Pass
NVNT	ac20	5240	Ant1	-37.37	-27	Pass
NVNT	ac40	5190	Ant1	-37.11	-27	Pass
NVNT	ac40	5230	Ant1	-37.19	-27	Pass
NVNT	ac80	5210	Ant1	-37.93	-27	Pass

Test Graphs

Tx. Spurious NVNT a 5180MHz Ant1 Emission



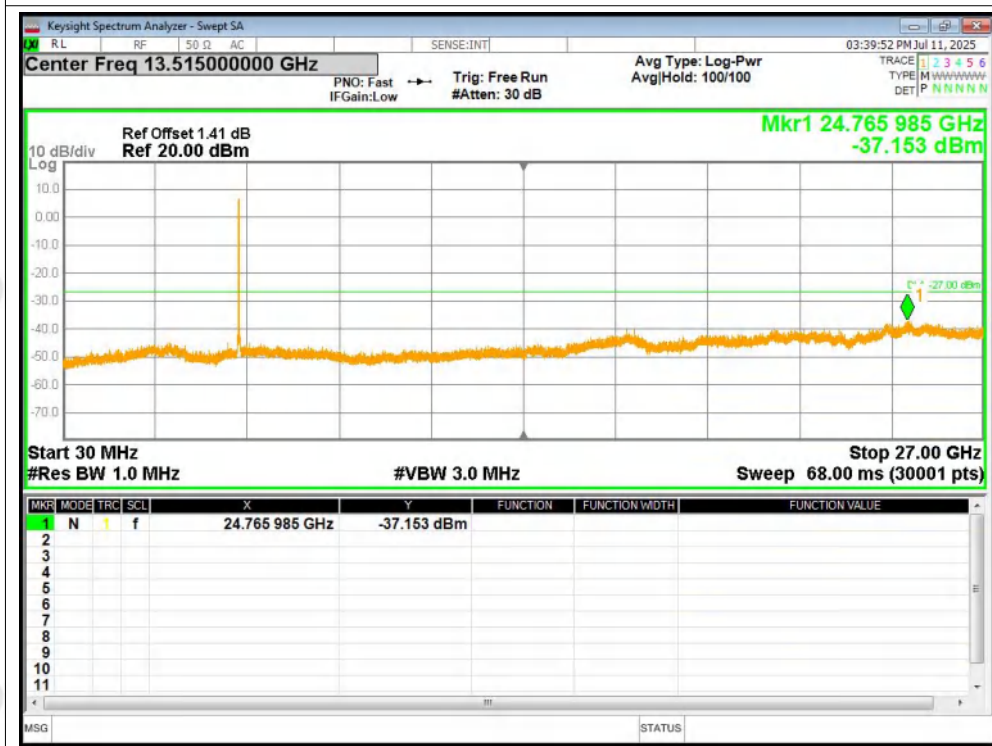
Tx. Spurious NVNT a 5200MHz Ant1 Emission



Tx. Spurious NVNT a 5240MHz Ant1 Emission



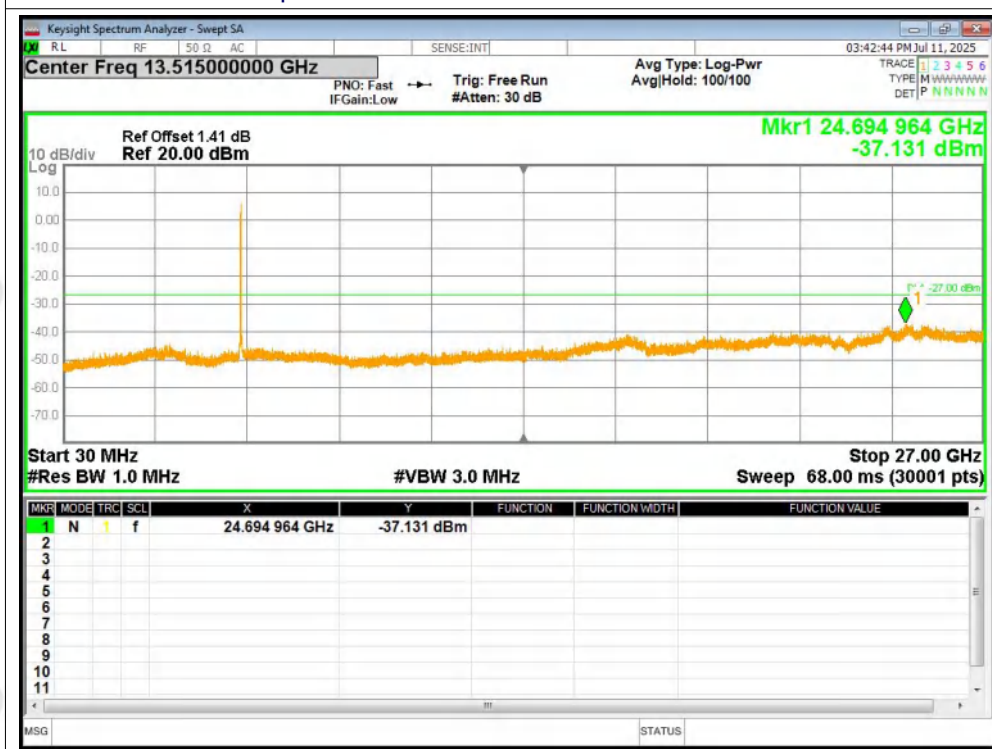
Tx. Spurious NVNT n20 5180MHz Ant1 Emission



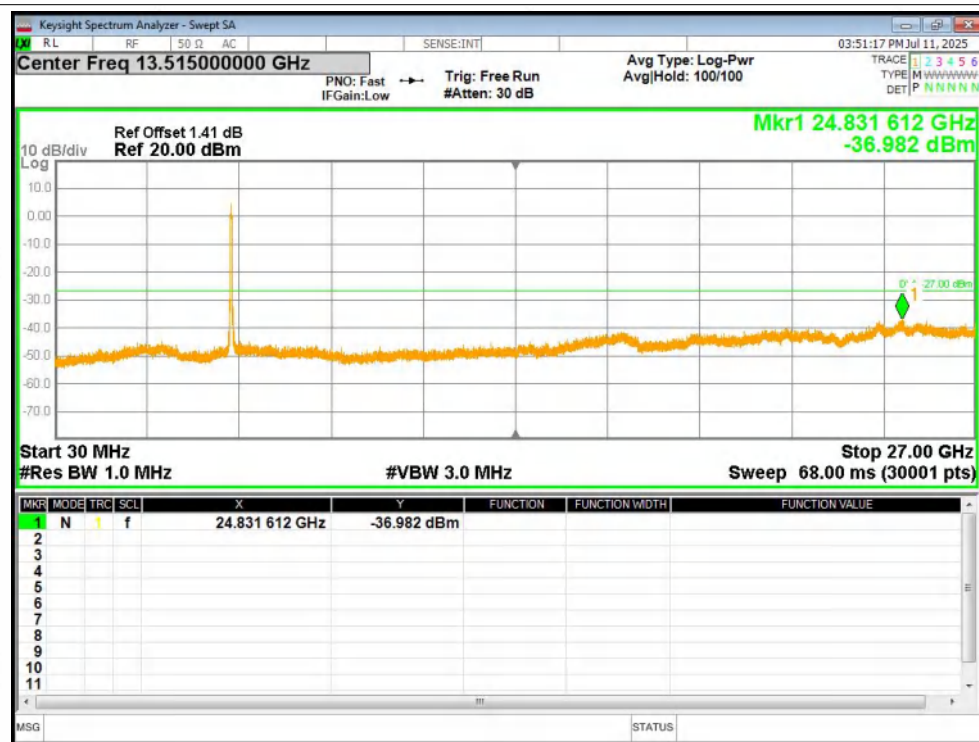
Tx. Spurious NVNT n20 5200MHz Ant1 Emission



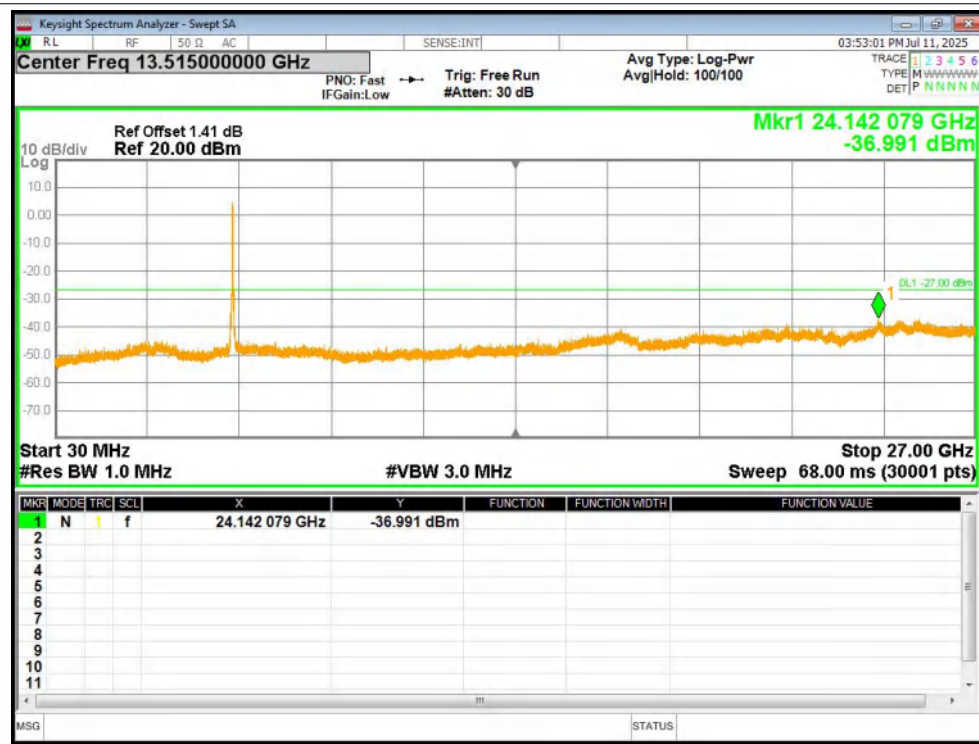
Tx. Spurious NVNT n20 5240MHz Ant1 Emission



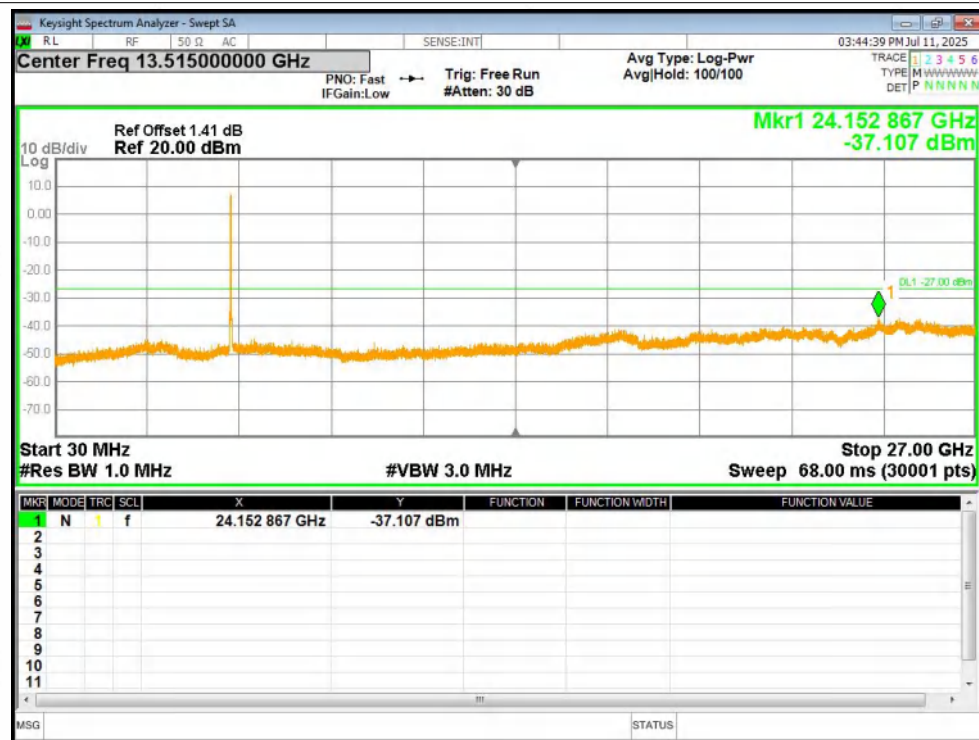
Tx. Spurious NVNT n40 5190MHz Ant1 Emission



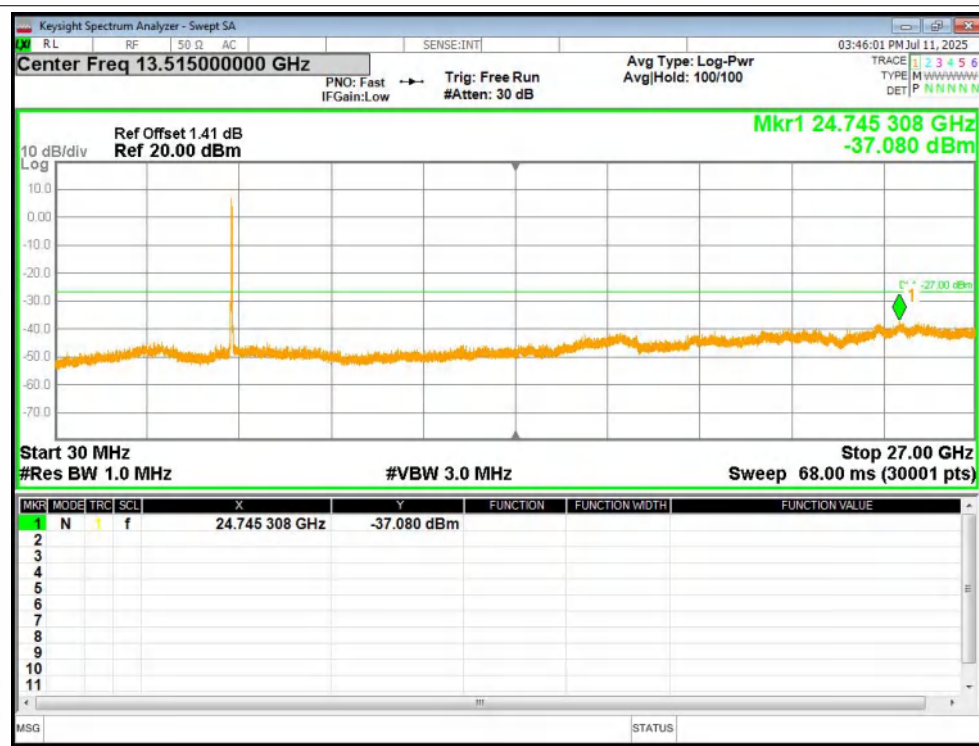
Tx. Spurious NVNT n40 5230MHz Ant1 Emission



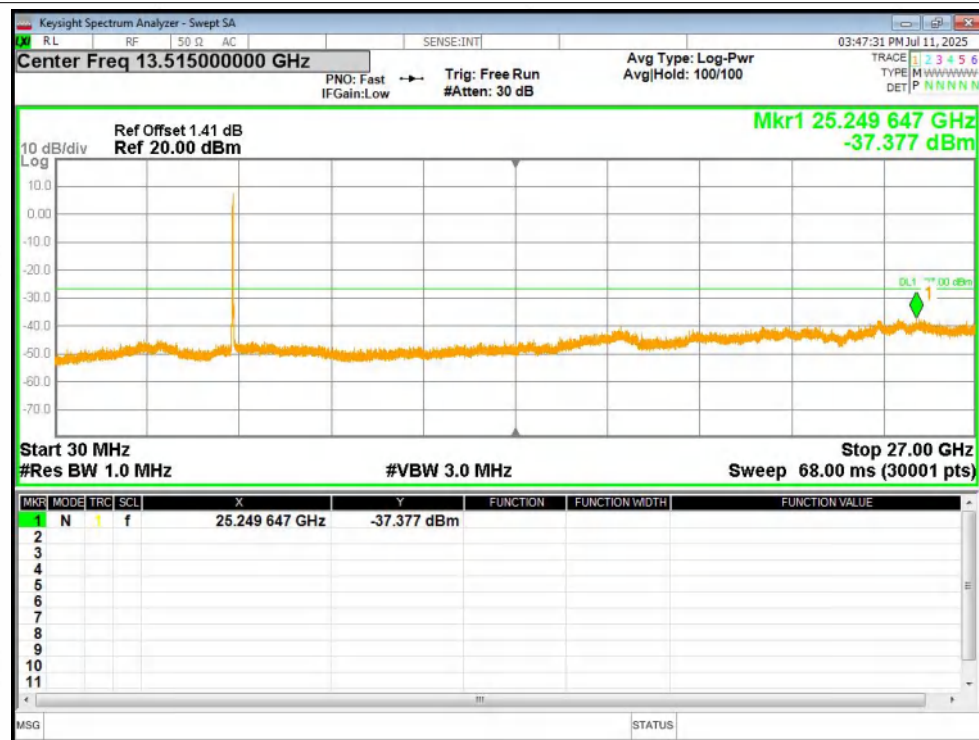
Tx. Spurious NVNT ac20 5180MHz Ant1 Emission



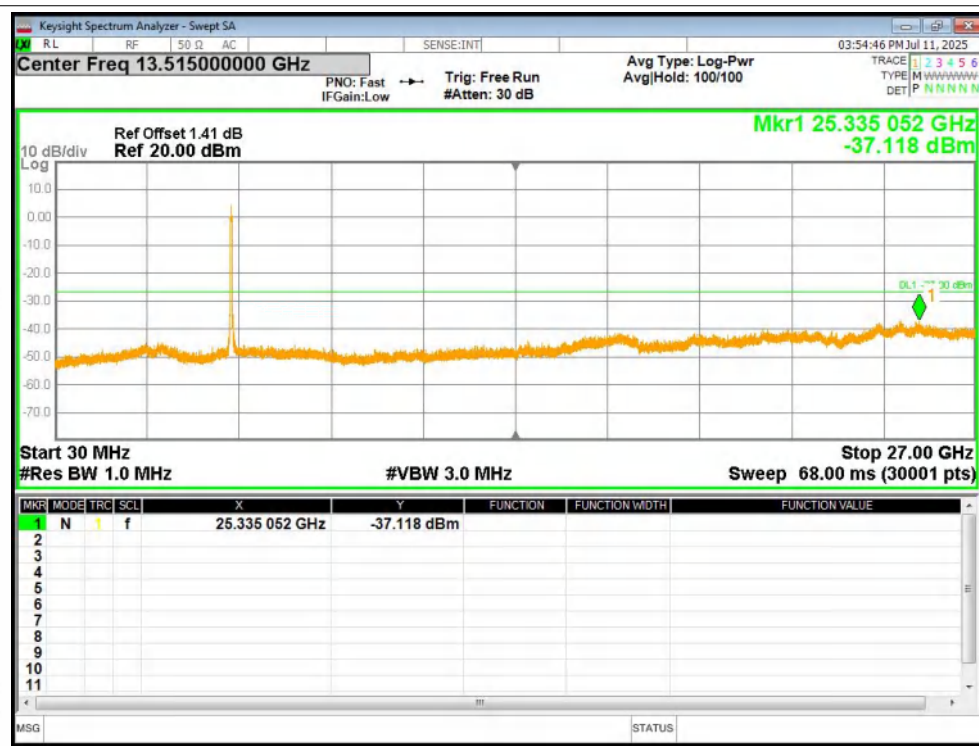
Tx. Spurious NVNT ac20 5200MHz Ant1 Emission



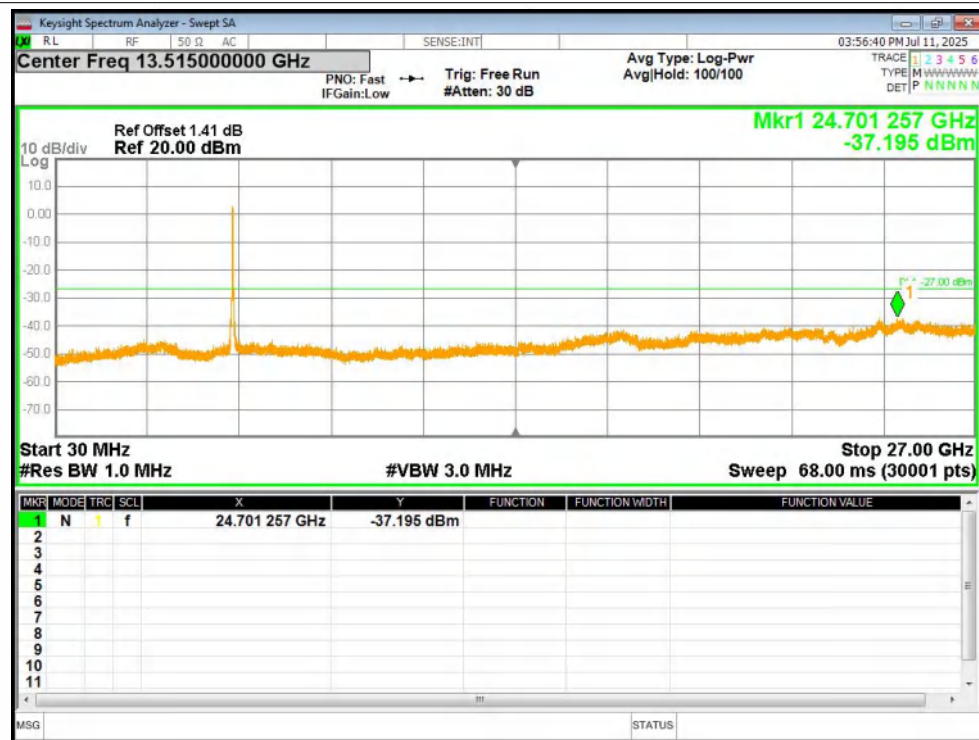
Tx. Spurious NVNT ac20 5240MHz Ant1 Emission



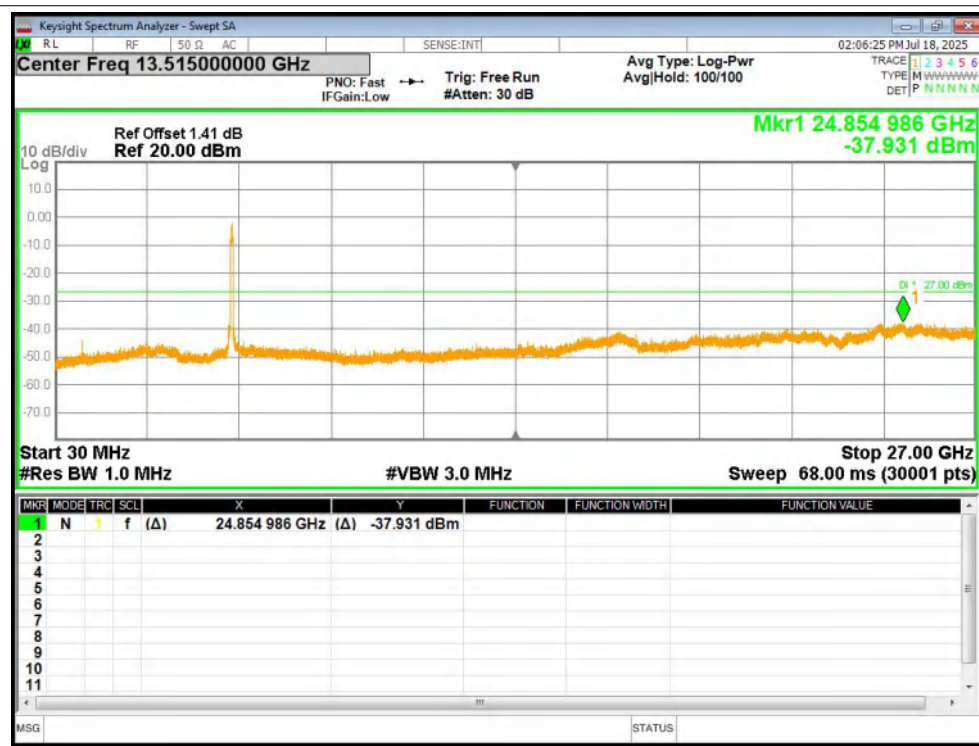
Tx. Spurious NVNT ac40 5190MHz Ant1 Emission



Tx. Spurious NVNT ac40 5230MHz Ant1 Emission



Tx. Spurious NVNT ac80 5210MHz Ant1 Emission



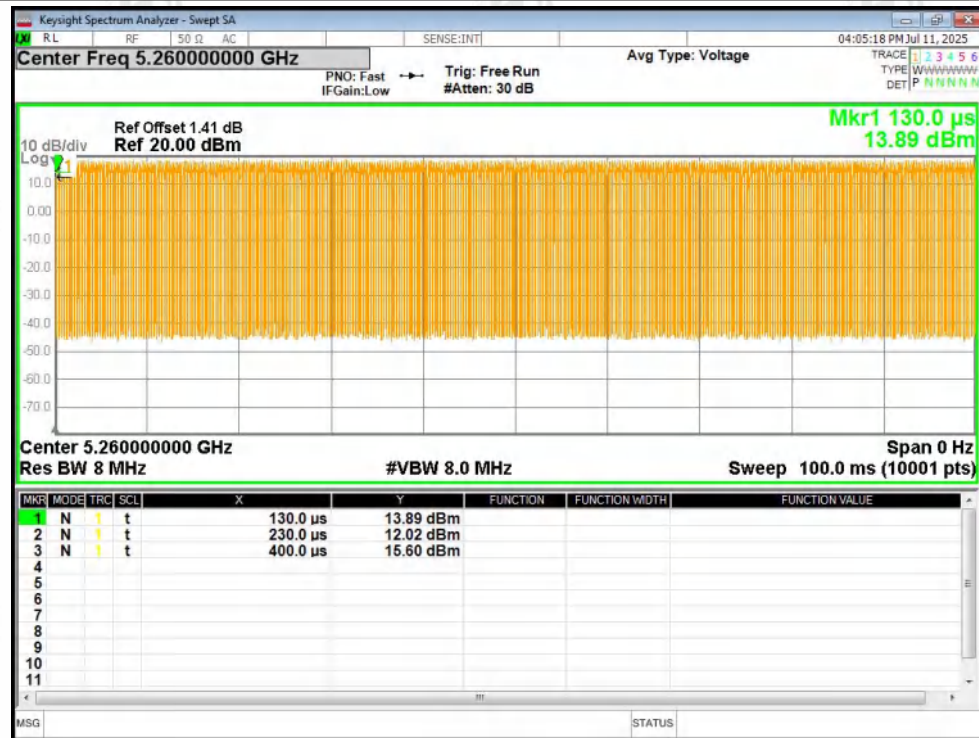
5.3G WIFI DATA

Duty Cycle

Condition	Mode	Frequency (MHz)	Antenna	Duty Cycle (%)	Correction Factor (dB)	1/T (kHz)
NVNT	a	5260	Ant1	62.96	2.01	5.88
NVNT	a	5280	Ant1	64.29	1.92	5.56
NVNT	a	5320	Ant1	64.29	1.92	5.56
NVNT	n20	5260	Ant1	60.71	2.17	5.88
NVNT	n20	5280	Ant1	64.29	1.92	5.56
NVNT	n20	5320	Ant1	64.29	1.92	5.56
NVNT	n40	5270	Ant1	50	3.01	10
NVNT	n40	5310	Ant1	50	3.01	10
NVNT	ac20	5260	Ant1	62.96	2.01	5.88
NVNT	ac20	5280	Ant1	62.96	2.01	5.88
NVNT	ac20	5320	Ant1	61.54	2.11	6.25
NVNT	ac40	5270	Ant1	47.37	3.24	11.11
NVNT	ac40	5310	Ant1	50	3.01	10
NVNT	ac80	5290	Ant1	81.82	0.87	11.11

Test Graphs

Duty Cycle NVNT a 5260MHz Ant1



Duty Cycle NVNT a 5280MHz Ant1

