

Appendix A for 5.2GWIFI Test Data

Product Name: IP / NETWORK CAMERA

Test Model: IN-9820 4K

Environmental Conditions

Temperature:	25.4℃
Relative Humidity:	54.3%
ATM Pressure:	101.0 kPa
Test Engineer:	Kimi Lu
Supervised by:	Baret Wu

**A.1 Duty Cycle**

Mode	Frequency (MHz)	Antenna	T _{on} ms	T _{total} ms	Duty Cycle (%)	Correction Factor (dB)	1/T (kHz)
a	5180	Ant2	2.06	9.95	20.7	6.84	0.49
a	5200	Ant2	2.06	11.74	17.55	7.56	0.49
a	5240	Ant2	2.07	10.02	20.66	6.85	0.48
n20	5180	Ant2	1.92	9.92	19.35	7.13	0.52
n20	5200	Ant2	1.92	9.95	19.3	7.14	0.52
n20	5240	Ant2	1.92	9.98	19.24	7.16	0.52
n40	5190	Ant2	0.95	9.92	9.58	10.19	1.05
n40	5230	Ant2	0.94	9.92	9.48	10.23	1.06
ac20	5180	Ant2	1.94	10.08	19.25	7.16	0.52
ac20	5200	Ant2	1.94	9.92	19.56	7.09	0.52
ac20	5240	Ant2	1.94	9.99	19.42	7.12	0.52
ac40	5190	Ant2	0.96	10.08	9.52	10.21	1.04
ac40	5230	Ant2	0.95	10.05	9.45	10.25	1.05
ac80	5210	Ant2	0.47	10.05	4.68	13.3	2.13

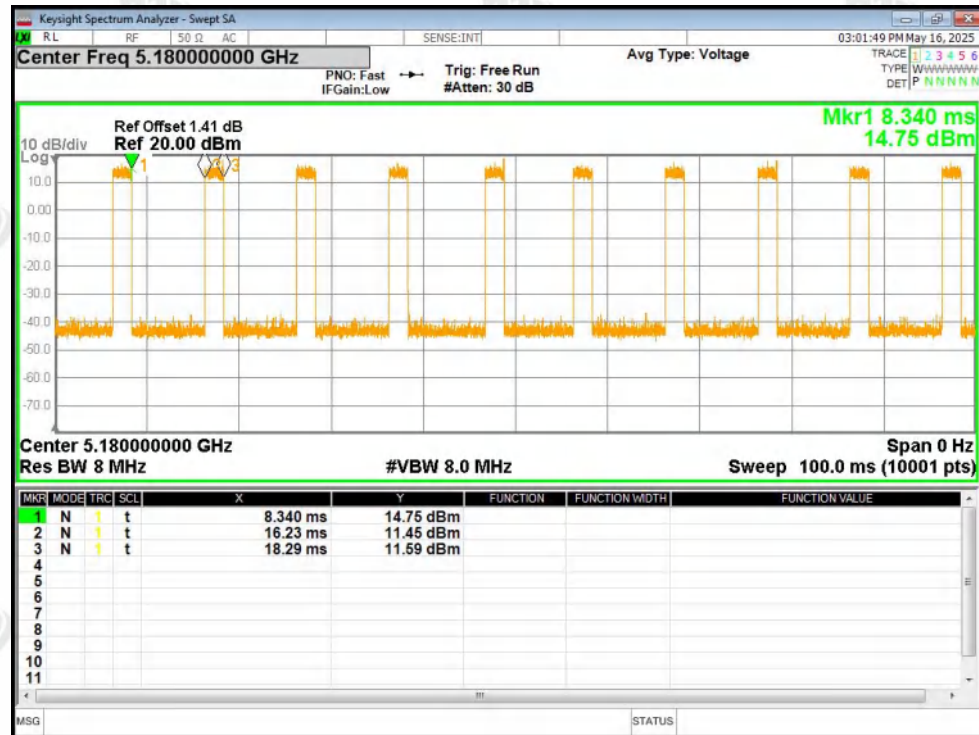
Note:

1. Duty Cycle = T_{on} / T_{total}
2. Correction Factor = $10 \log (1 / \text{Duty Cycle})$.
3. $1/T = 1/T_{on}$

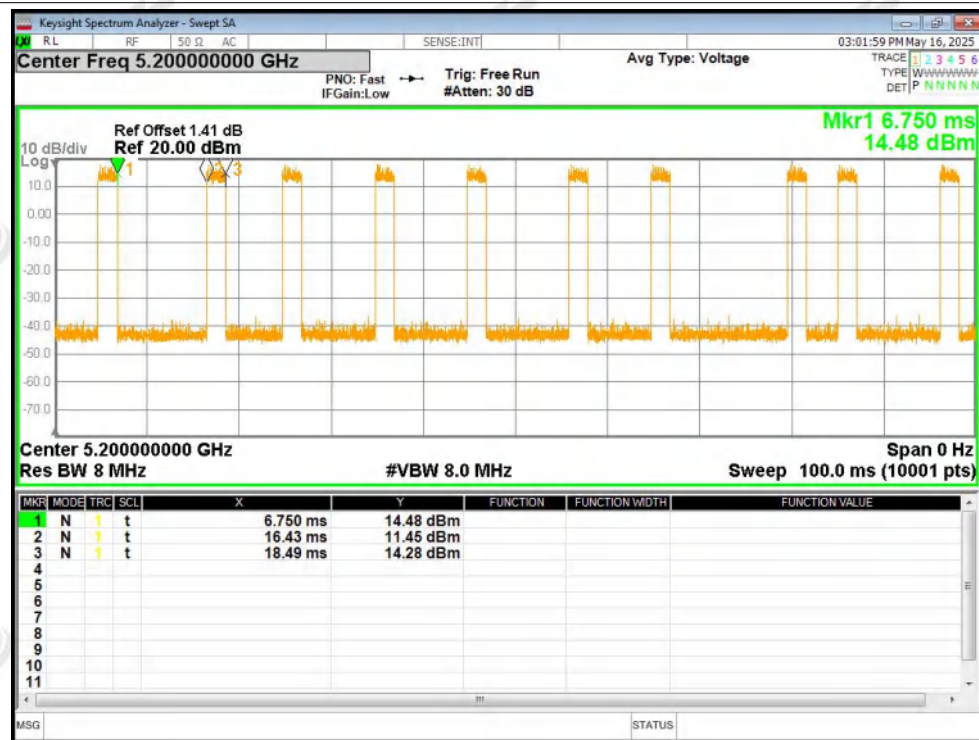


Test Graphs

Duty Cycle NVNT a 5180MHz Ant2

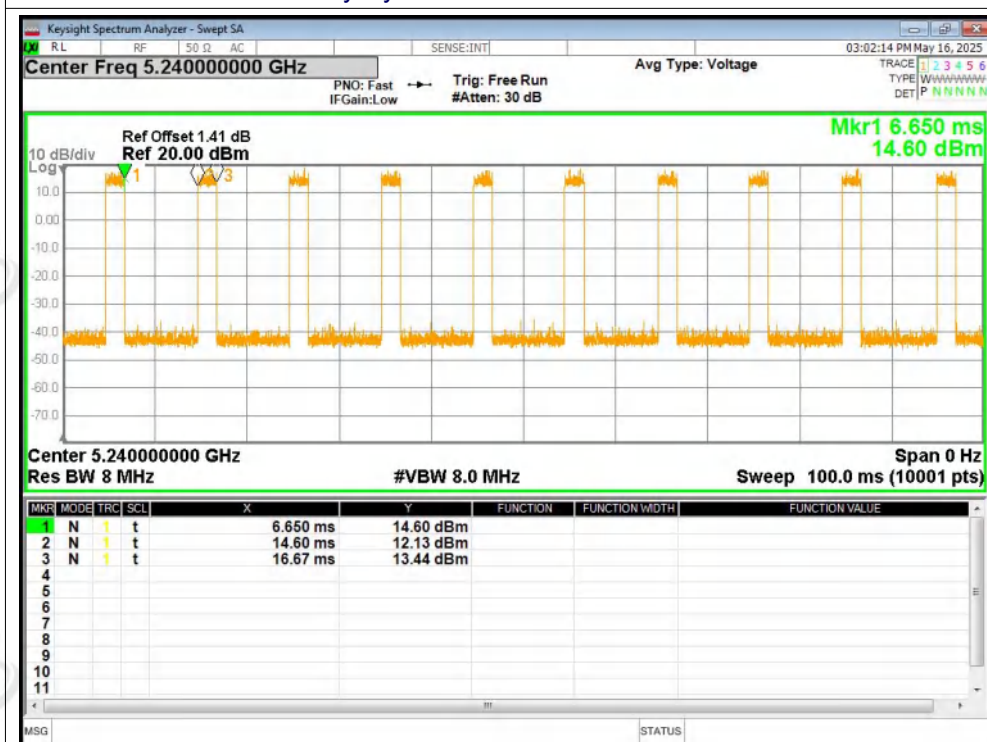


Duty Cycle NVNT a 5200MHz Ant2

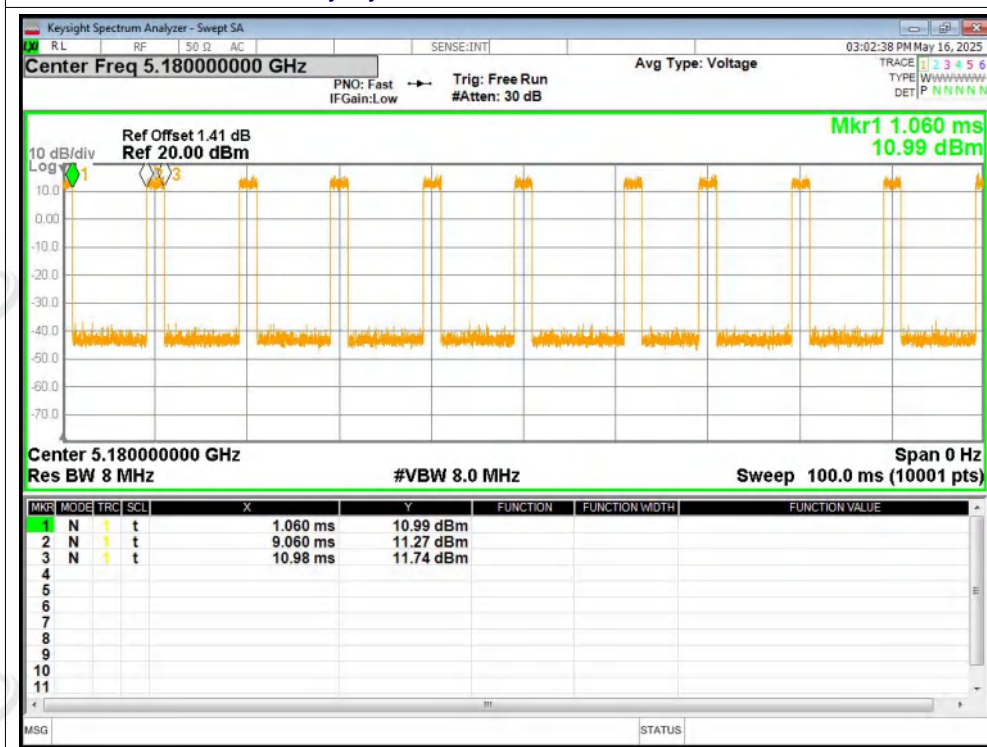




Duty Cycle NVNT a 5240MHz Ant2

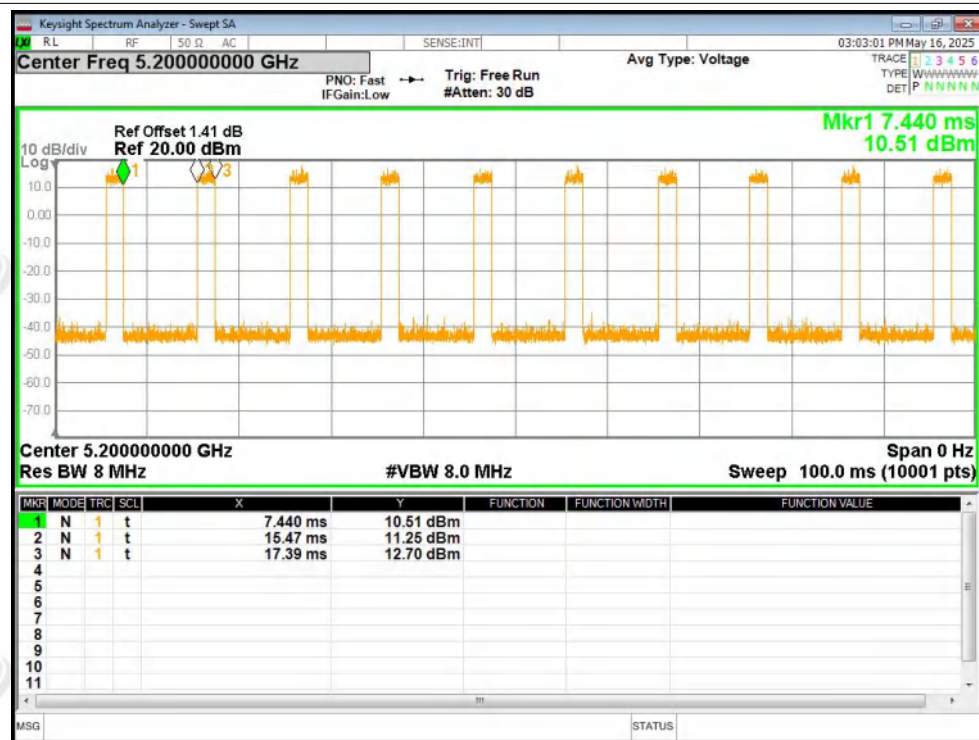


Duty Cycle NVNT n20 5180MHz Ant2





Duty Cycle NVNT n20 5200MHz Ant2

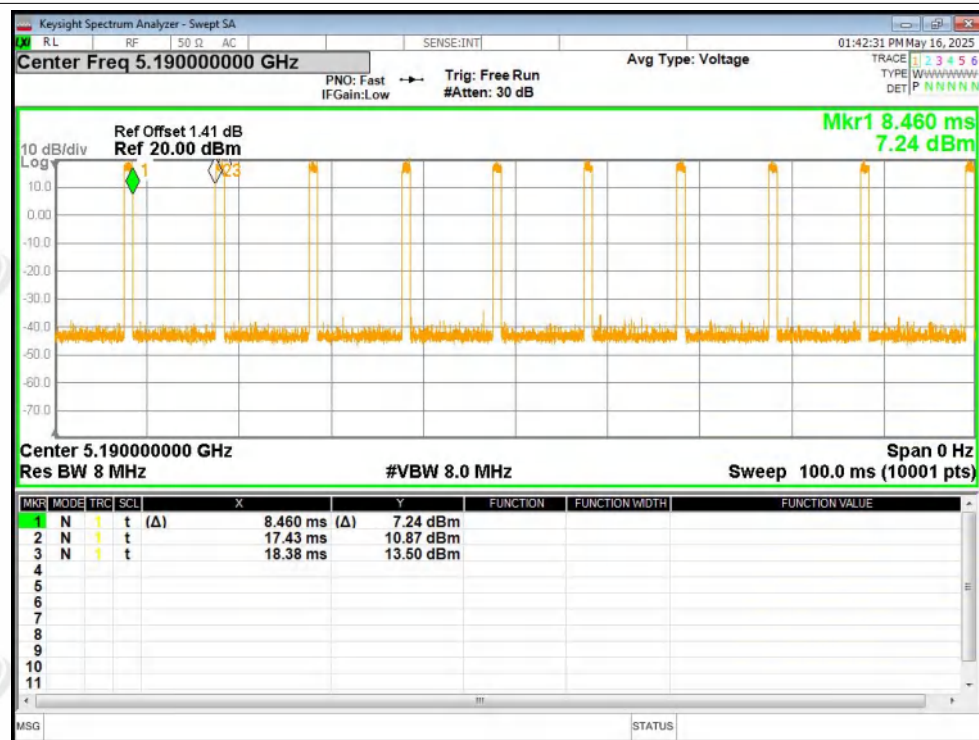


Duty Cycle NVNT n20 5240MHz Ant2

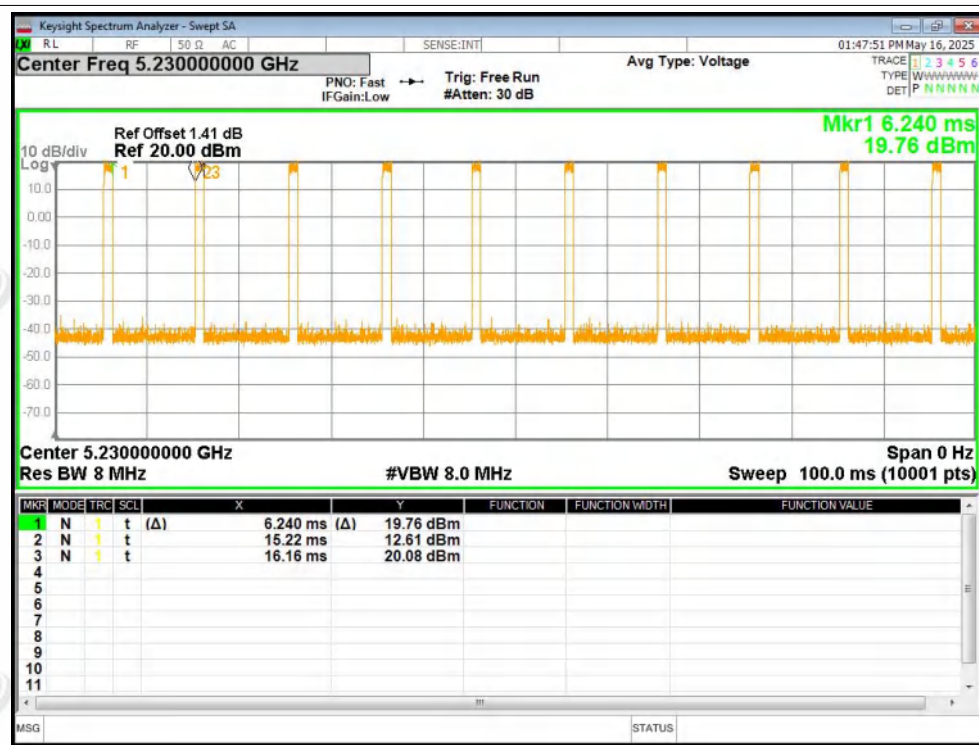




Duty Cycle NVNT n40 5190MHz Ant2

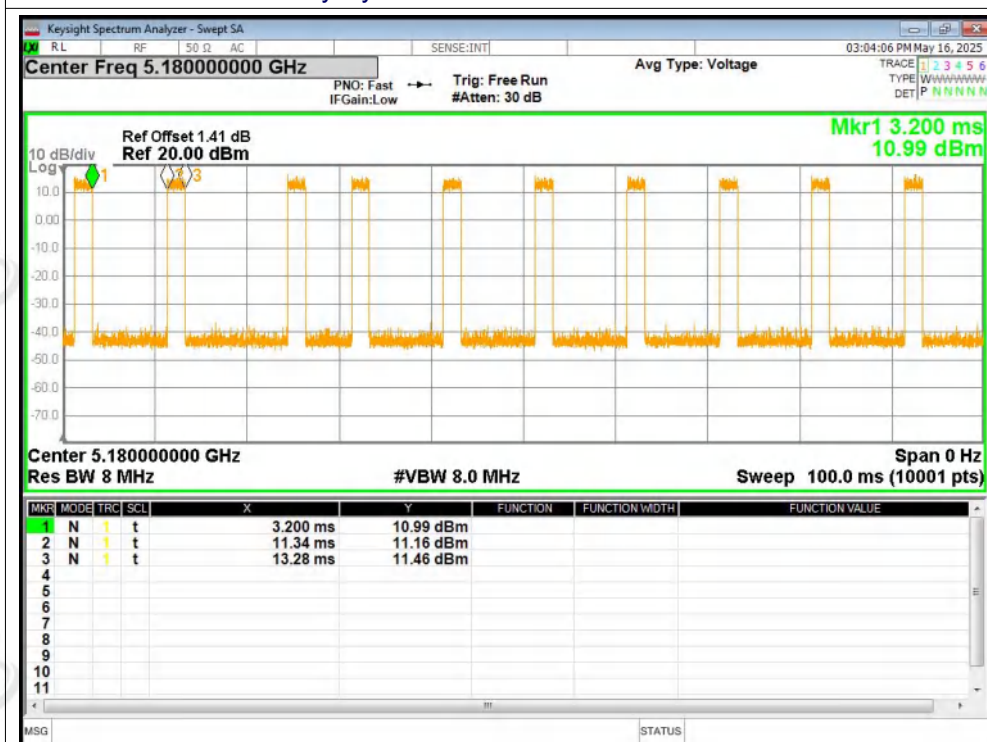


Duty Cycle NVNT n40 5230MHz Ant2

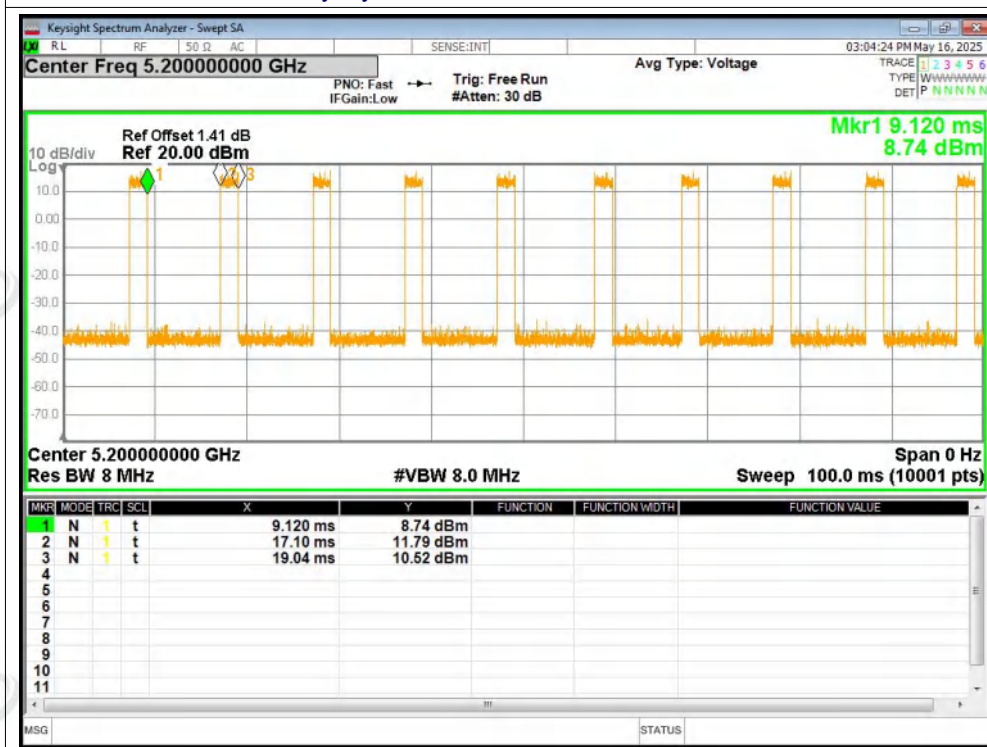




Duty Cycle NVNT ac20 5180MHz Ant2

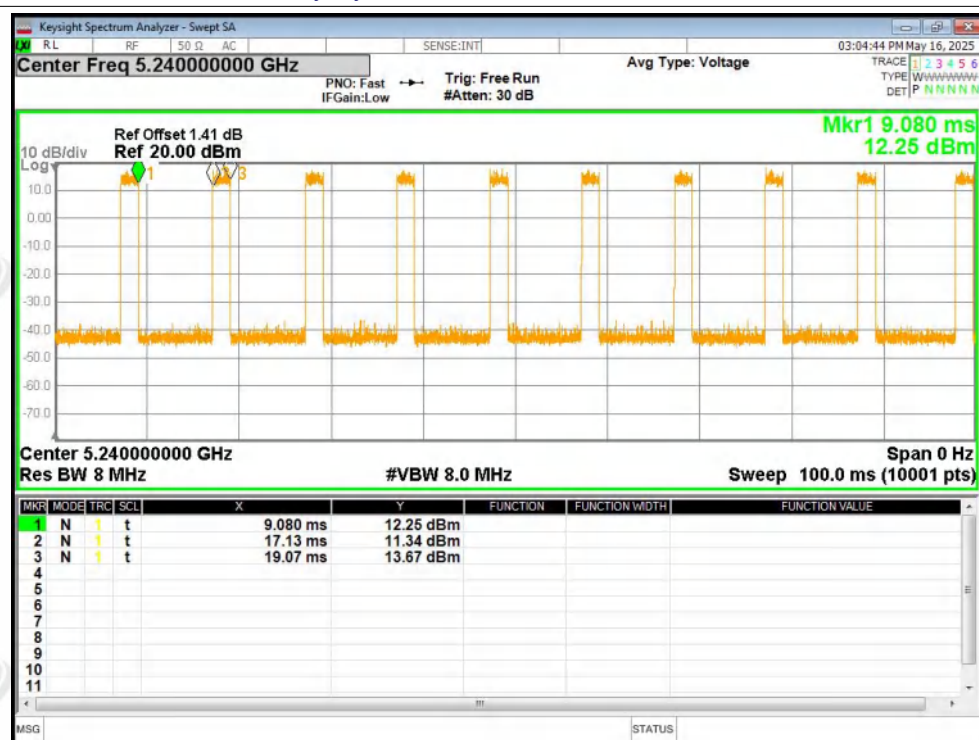


Duty Cycle NVNT ac20 5200MHz Ant2

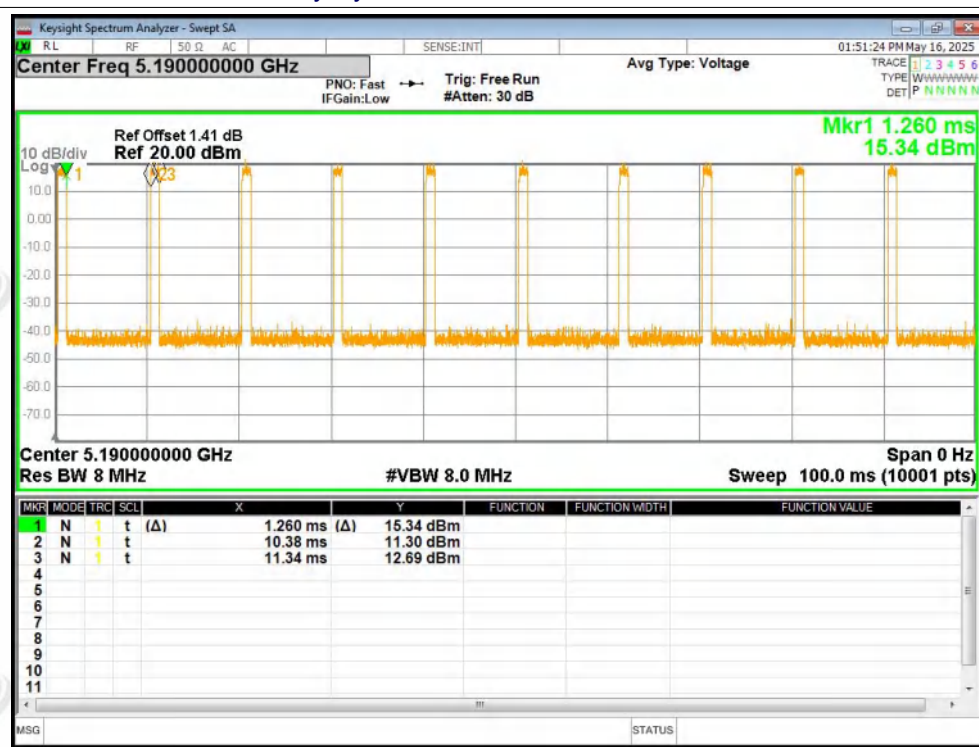




Duty Cycle NVNT ac20 5240MHz Ant2

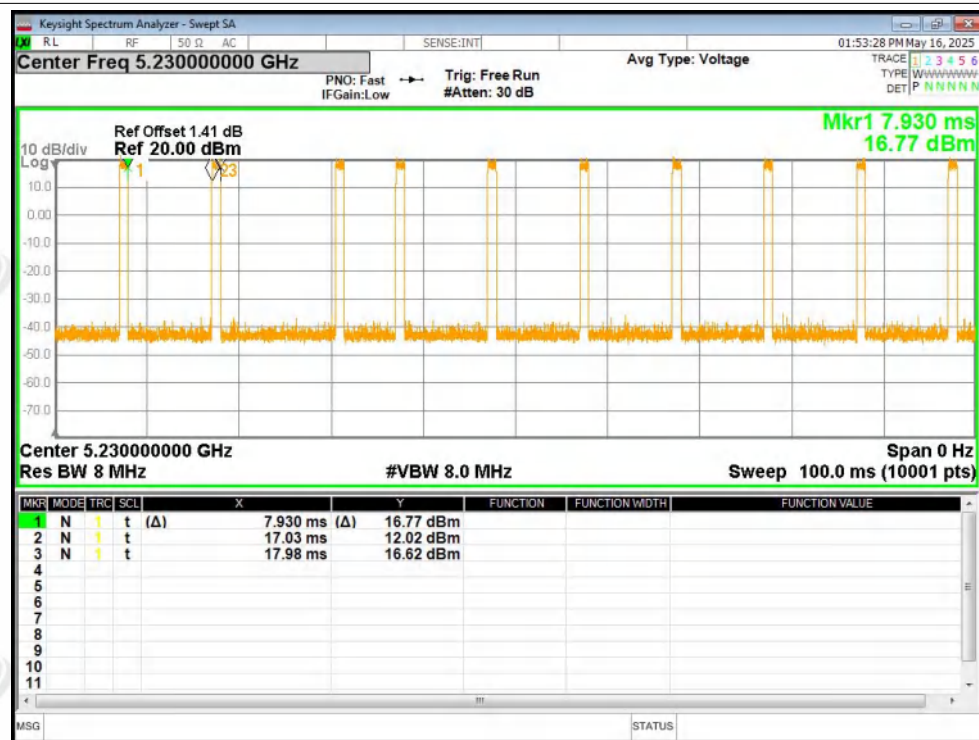


Duty Cycle NVNT ac40 5190MHz Ant2





Duty Cycle NVNT ac40 5230MHz Ant2



Duty Cycle NVNT ac80 5210MHz Ant2



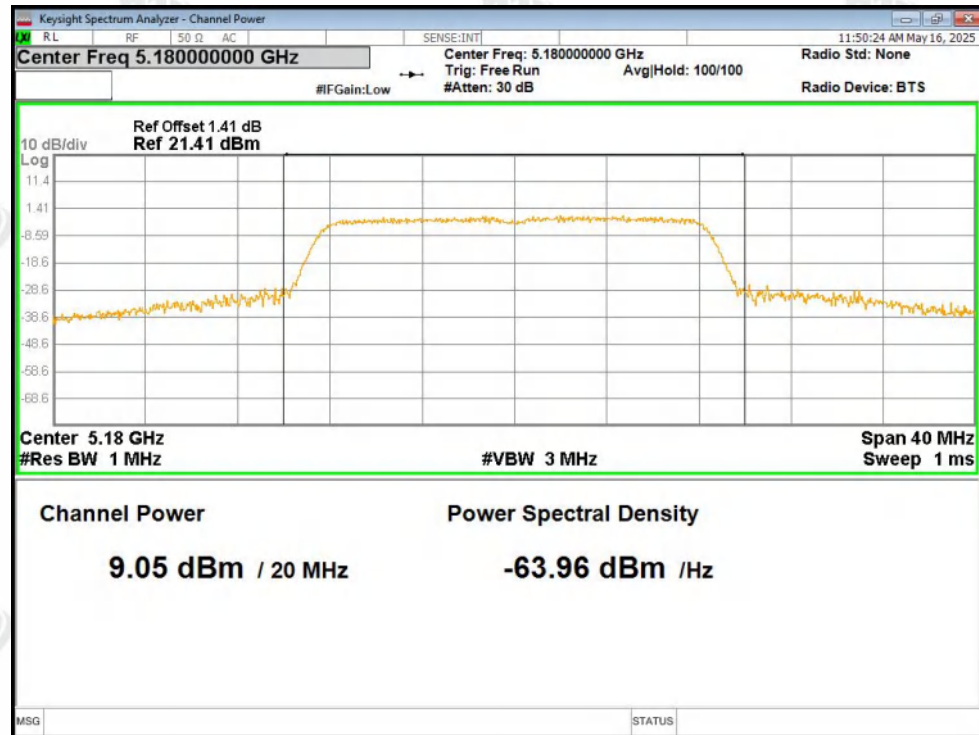
**ZHONGHAN****A.2 Maximum Conducted Output Power**

Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Duty Factor (dB)	Total Power (dBm)	Limit (dBm)	Verdict
NVNT	a	5180	Ant2	9.05	6.53	15.58	24	Pass
NVNT	a	5200	Ant2	9.95	6.84	16.79	24	Pass
NVNT	a	5240	Ant2	10.45	6.87	17.32	24	Pass
NVNT	n20	5180	Ant2	9.08	7.18	16.26	24	Pass
NVNT	n20	5200	Ant2	9.53	7.16	16.69	24	Pass
NVNT	n20	5240	Ant2	9.64	7.11	16.75	24	Pass
NVNT	n40	5190	Ant2	6.02	10.19	16.21	24	Pass
NVNT	n40	5230	Ant2	7.07	10.23	17.3	24	Pass
NVNT	ac20	5180	Ant2	10.62	7.07	17.69	24	Pass
NVNT	ac20	5200	Ant2	10.23	7.11	17.34	24	Pass
NVNT	ac20	5240	Ant2	9.86	7.15	17.01	24	Pass
NVNT	ac40	5190	Ant2	4.81	10.21	15.02	24	Pass
NVNT	ac40	5230	Ant2	7.52	10.25	17.77	24	Pass
NVNT	ac80	5210	Ant2	2.78	13.3	16.08	24	Pass

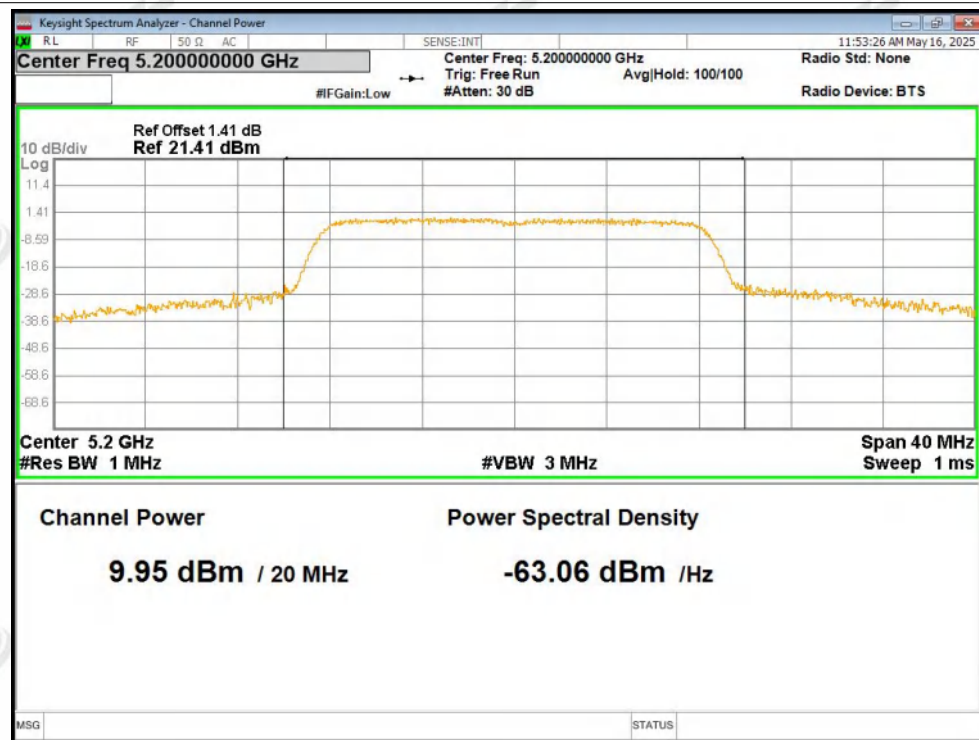


Test Graphs

Power NVNT a 5180MHz Ant2

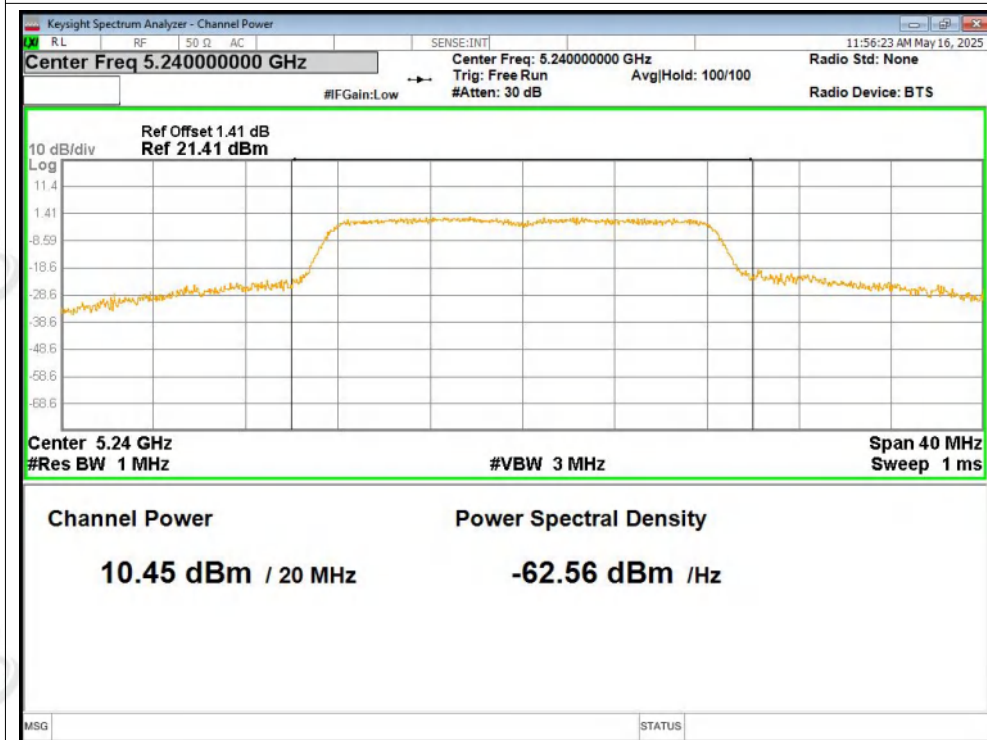


Power NVNT a 5200MHz Ant2

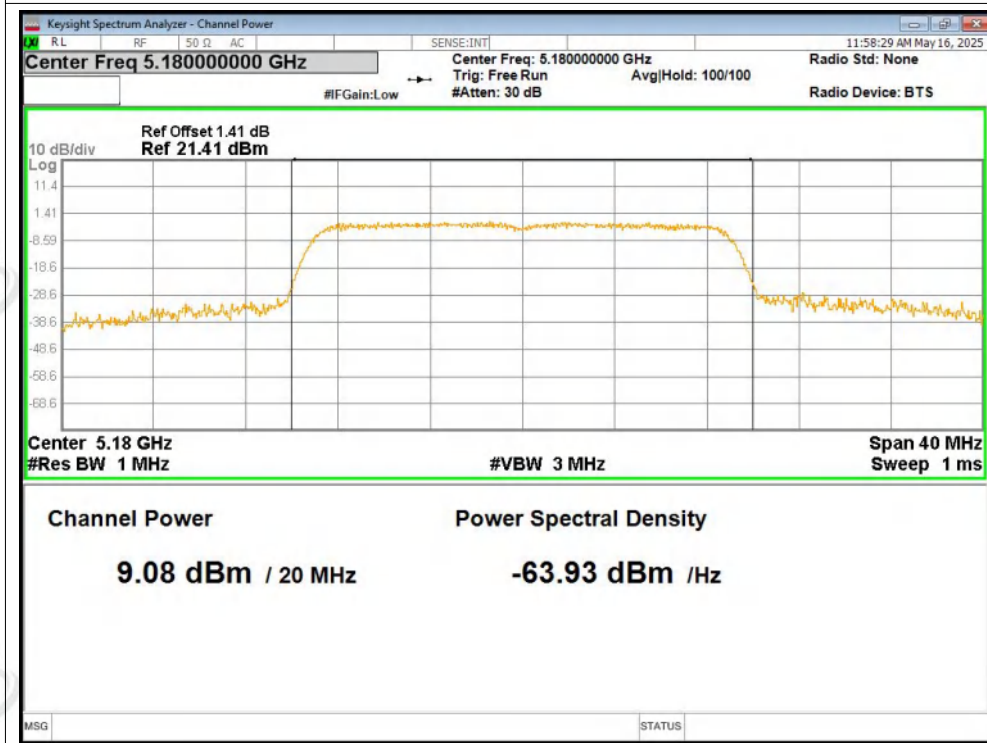




Power NVNT a 5240MHz Ant2

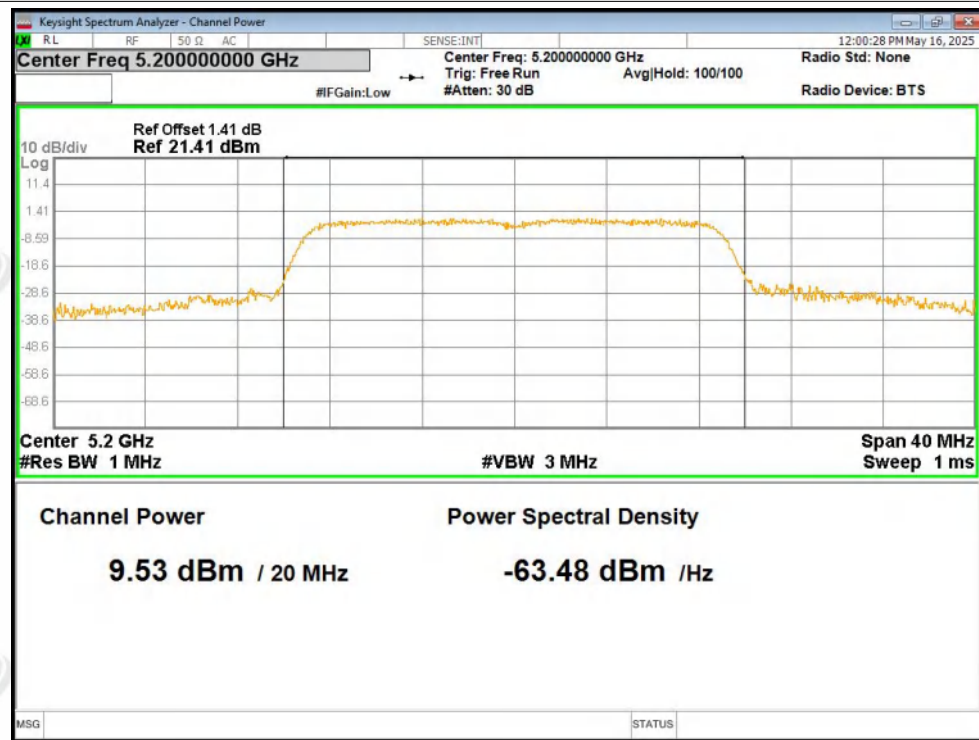


Power NVNT n20 5180MHz Ant2

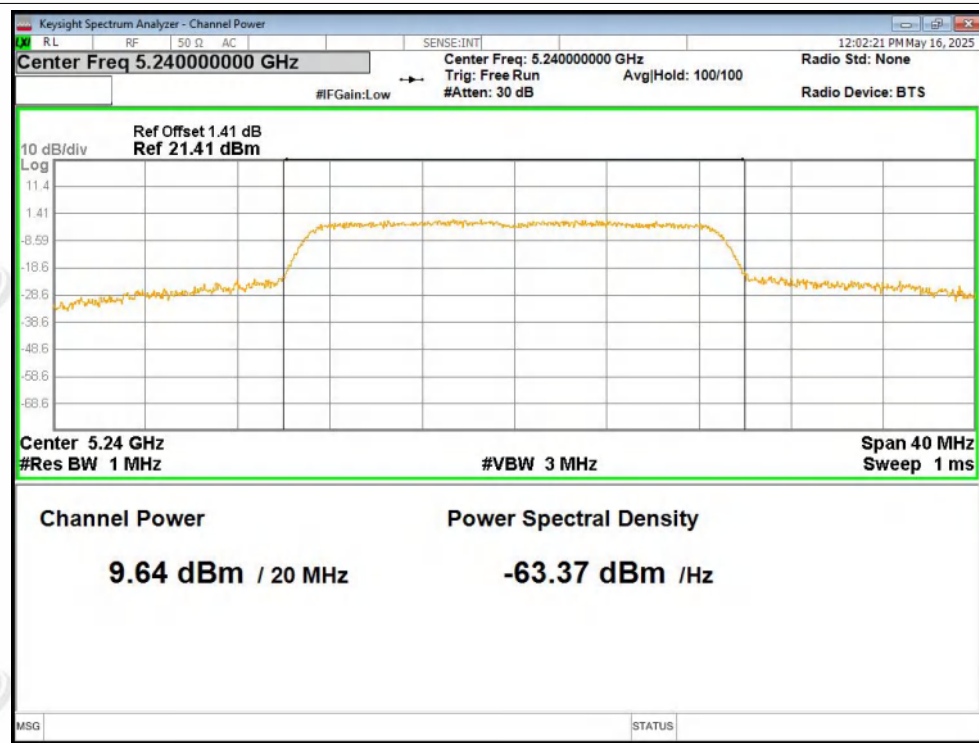




Power NVNT n20 5200MHz Ant2

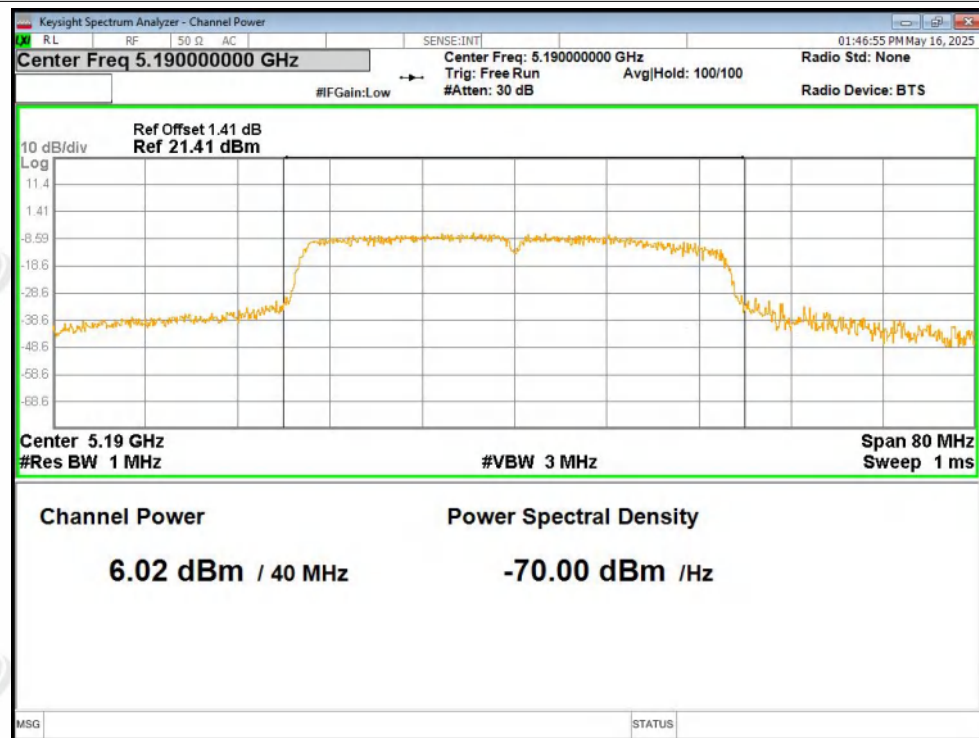


Power NVNT n20 5240MHz Ant2

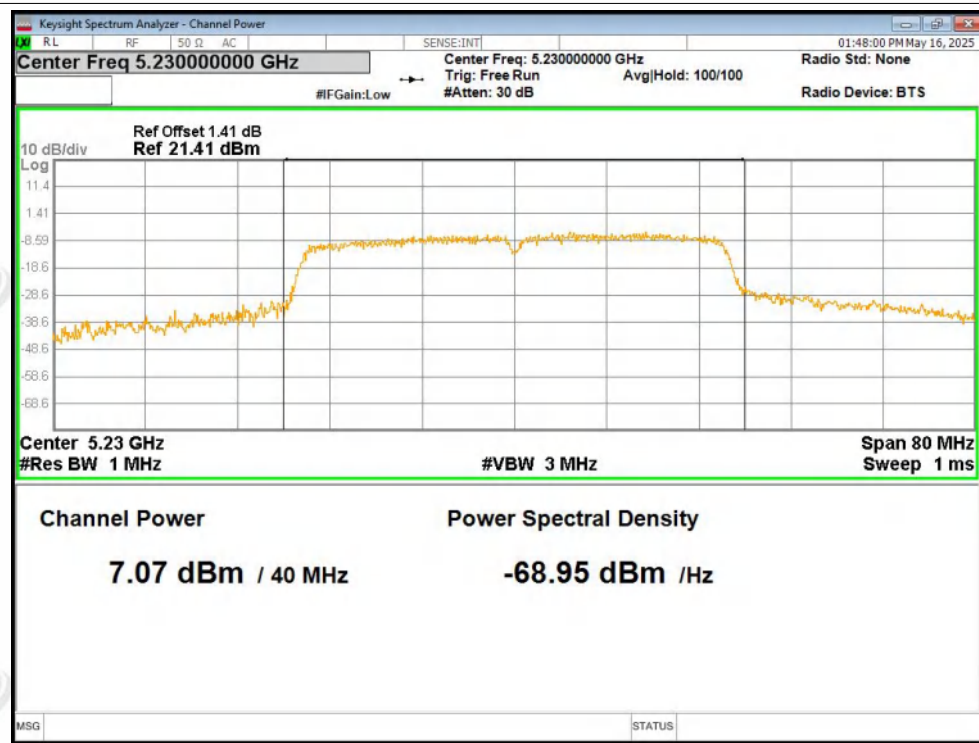




Power NVNT n40 5190MHz Ant2

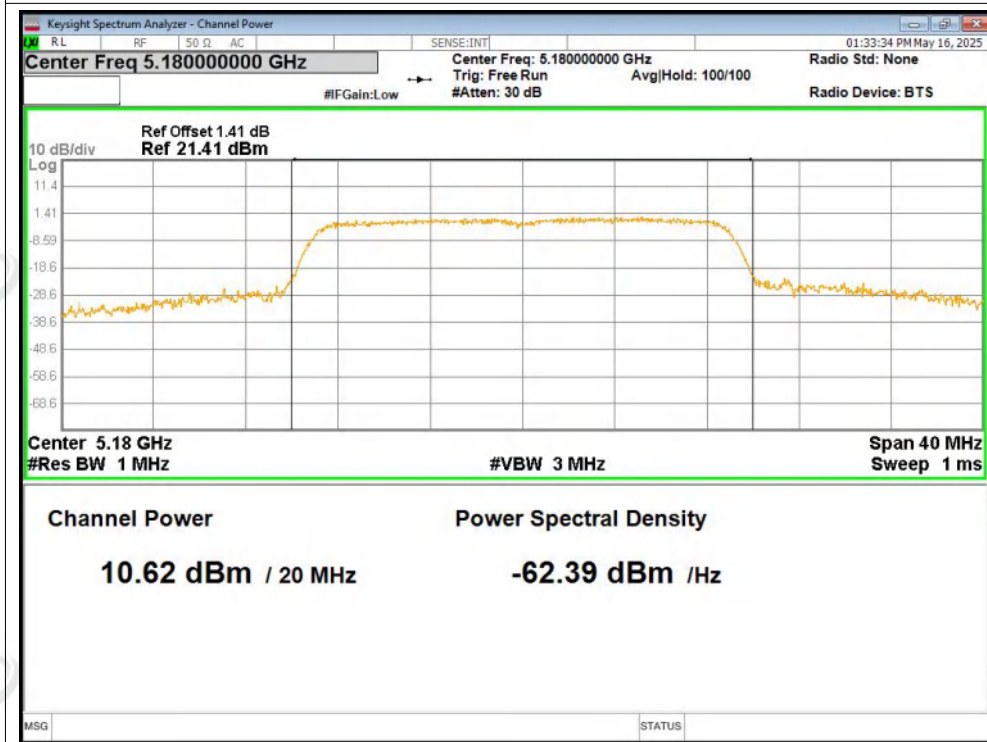


Power NVNT n40 5230MHz Ant2

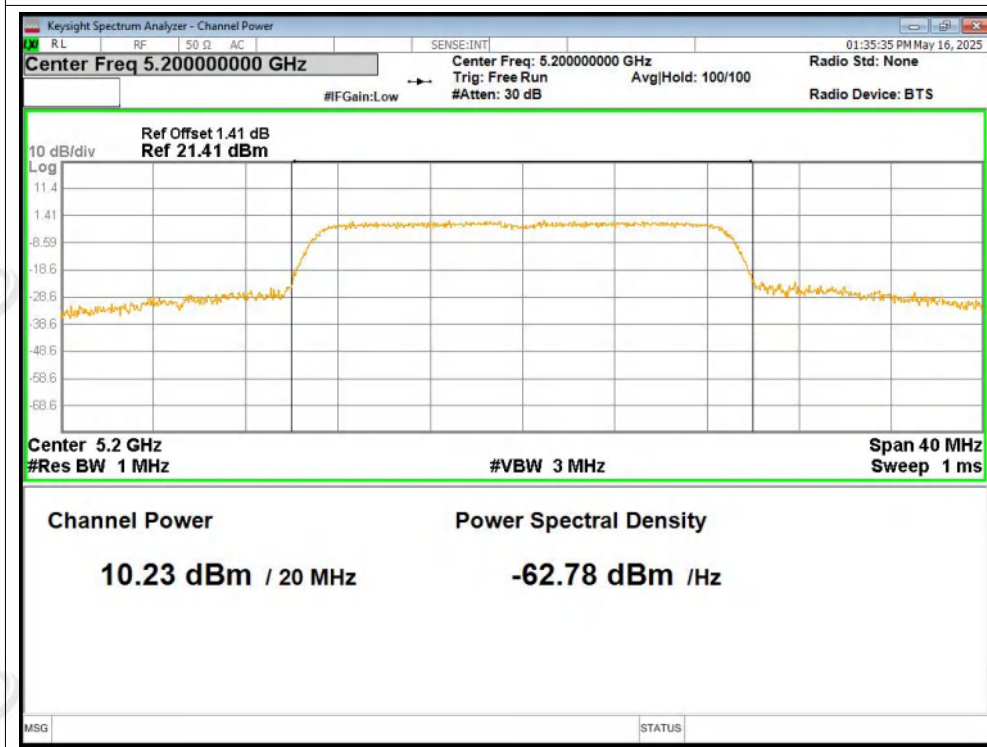




Power NVNT ac20 5180MHz Ant2

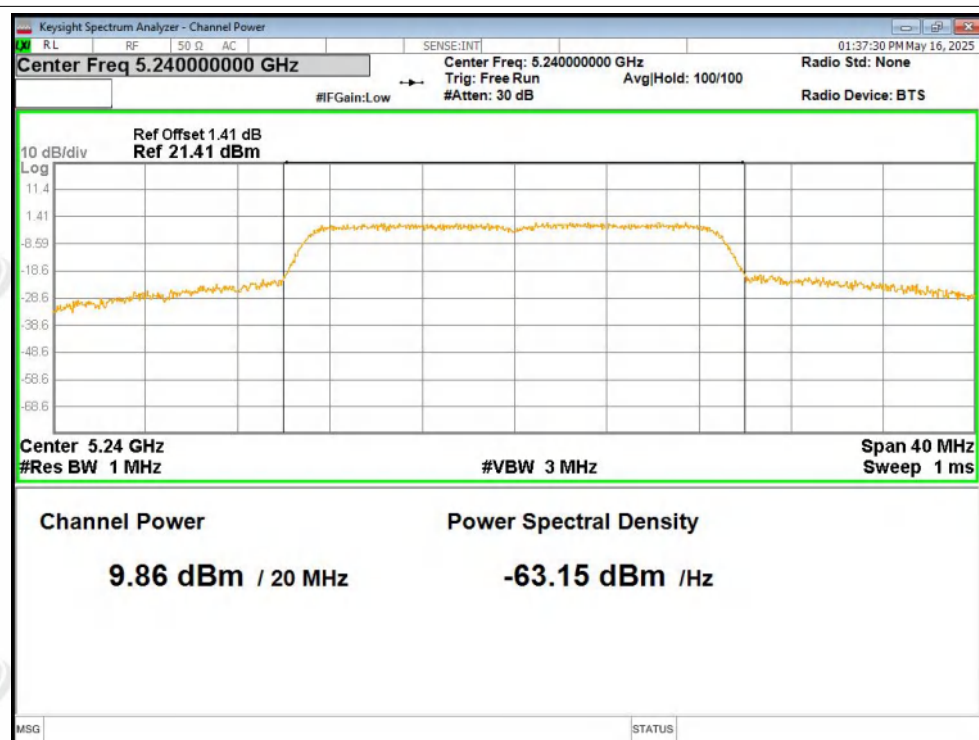


Power NVNT ac20 5200MHz Ant2

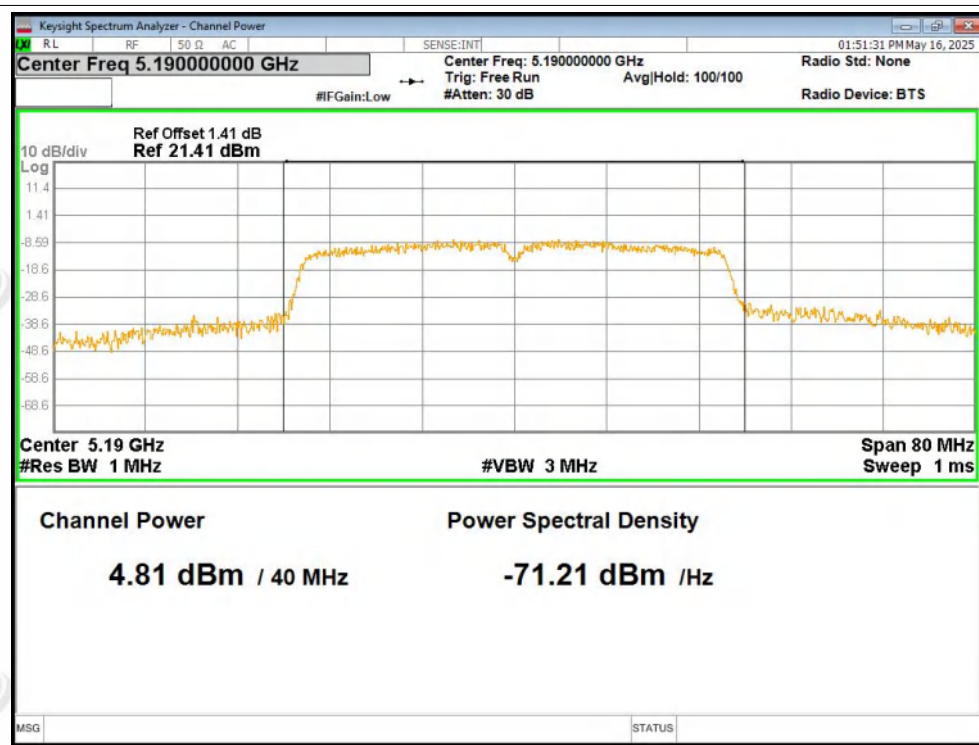




Power NVNT ac20 5240MHz Ant2

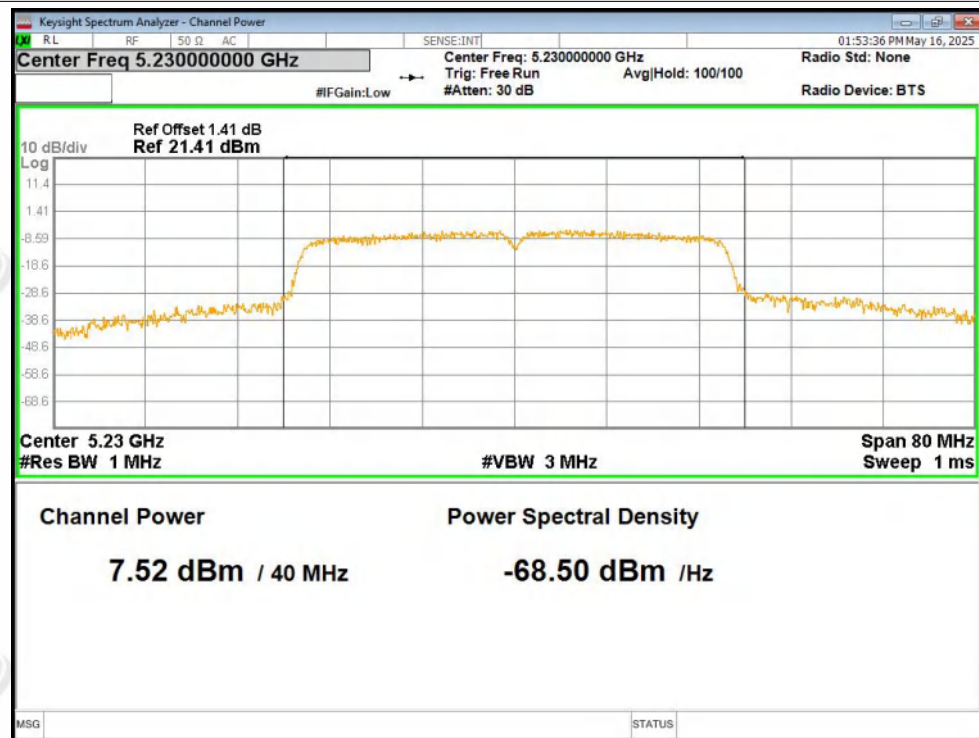


Power NVNT ac40 5190MHz Ant2

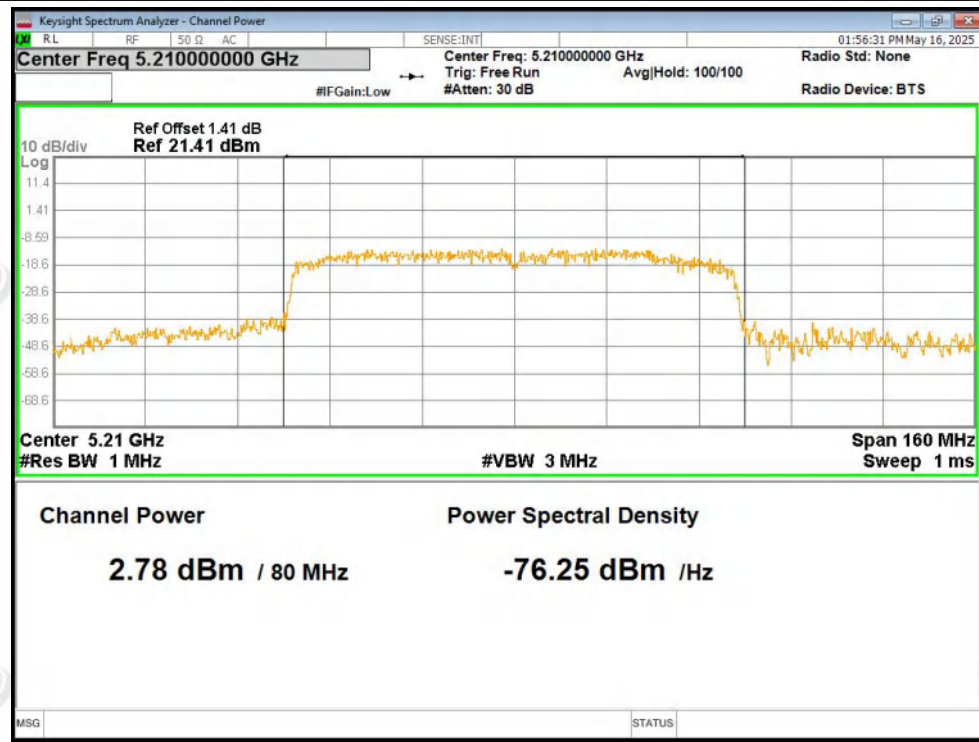




Power NVNT ac40 5230MHz Ant2



Power NVNT ac80 5210MHz Ant2



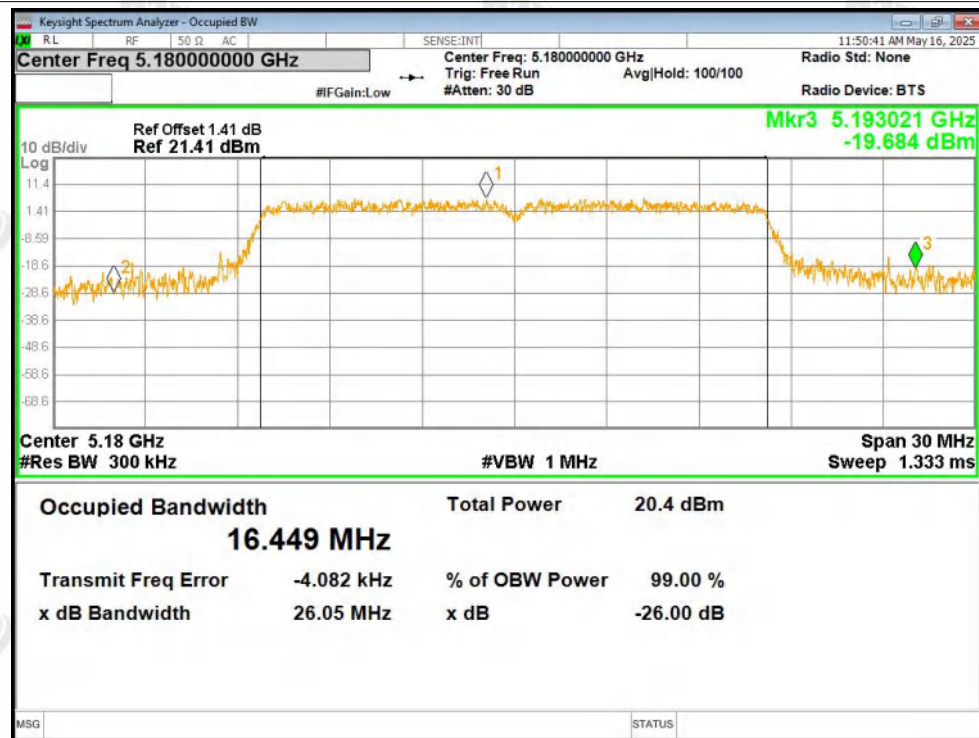
**ZHONGHAN****A.3 -26dB Bandwidth**

Condition	Mode	Frequency (MHz)	Antenna	-26 dB Bandwidth (MHz)	Verdict
NVNT	a	5180	Ant2	26.051	Pass
NVNT	a	5200	Ant2	26.915	Pass
NVNT	a	5240	Ant2	29.664	Pass
NVNT	n20	5180	Ant2	25.641	Pass
NVNT	n20	5200	Ant2	28.684	Pass
NVNT	n20	5240	Ant2	29.738	Pass
NVNT	n40	5190	Ant2	50.344	Pass
NVNT	n40	5230	Ant2	57.253	Pass
NVNT	ac20	5180	Ant2	28.983	Pass
NVNT	ac20	5200	Ant2	29.067	Pass
NVNT	ac20	5240	Ant2	29.972	Pass
NVNT	ac40	5190	Ant2	50.25	Pass
NVNT	ac40	5230	Ant2	55.758	Pass
NVNT	ac80	5210	Ant2	113.687	Pass

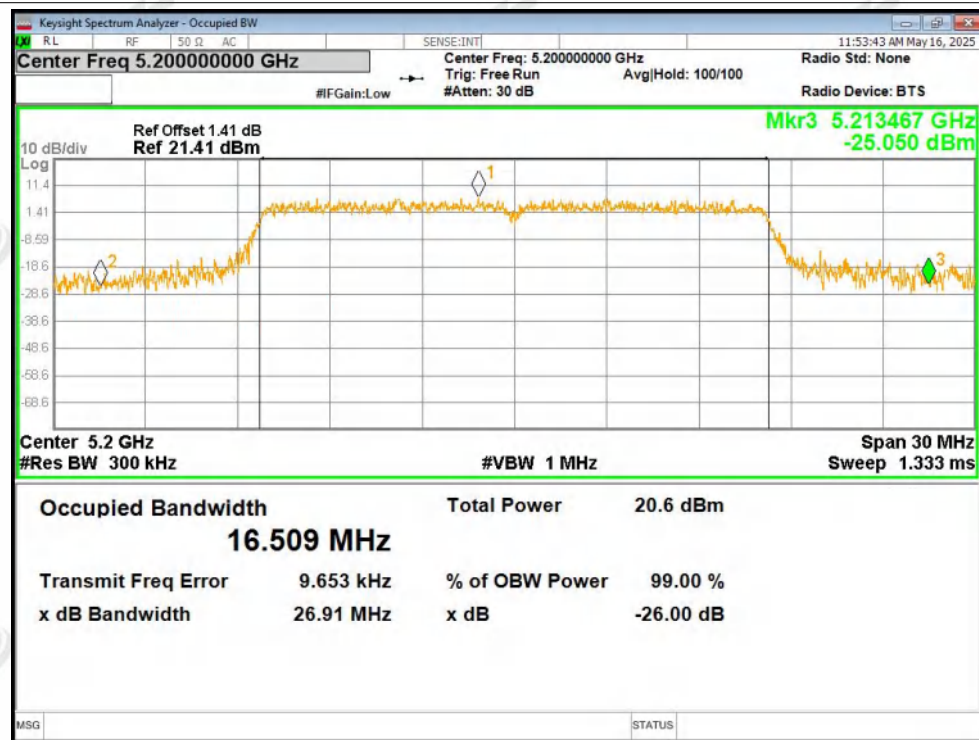


Test Graphs

-26dB Bandwidth NVNT a 5180MHz Ant2

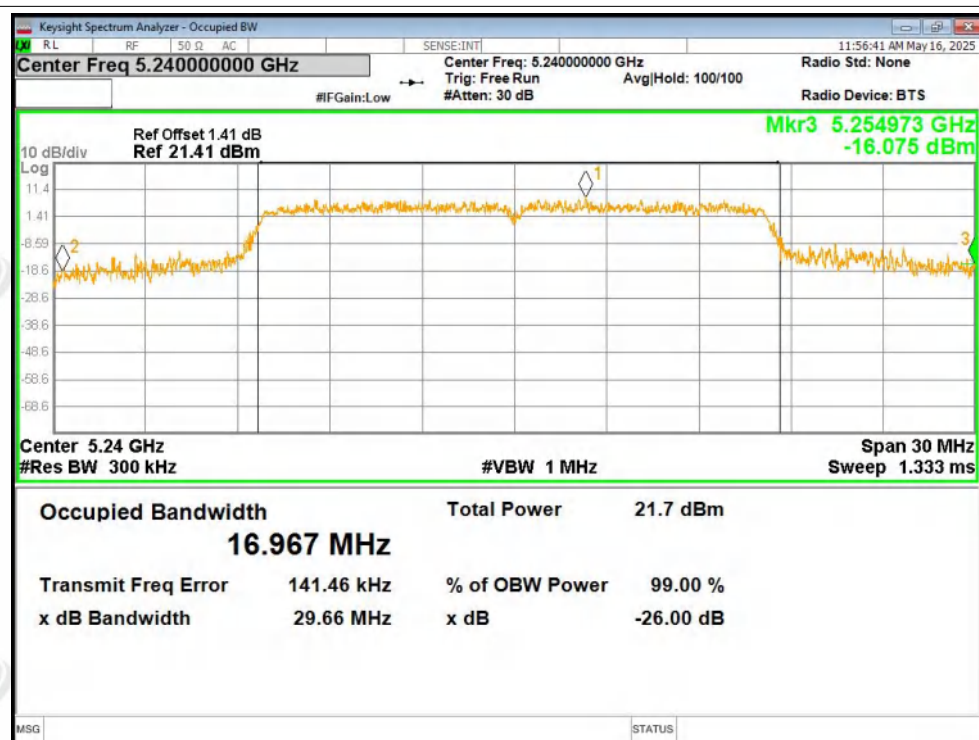


-26dB Bandwidth NVNT a 5200MHz Ant2

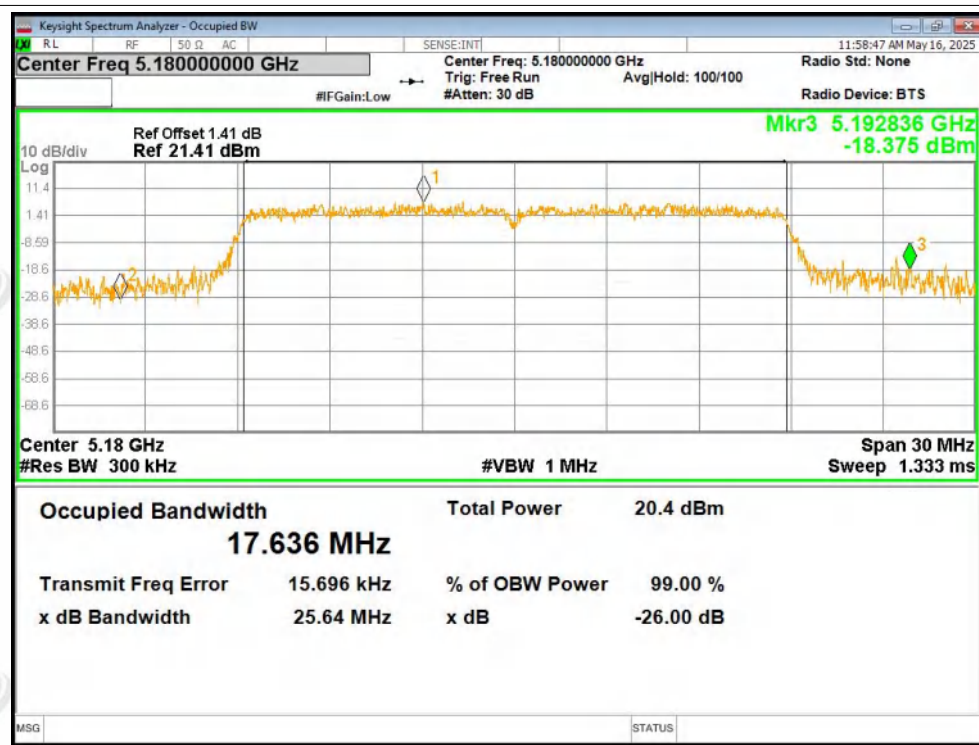




-26dB Bandwidth NVNT a 5240MHz Ant2

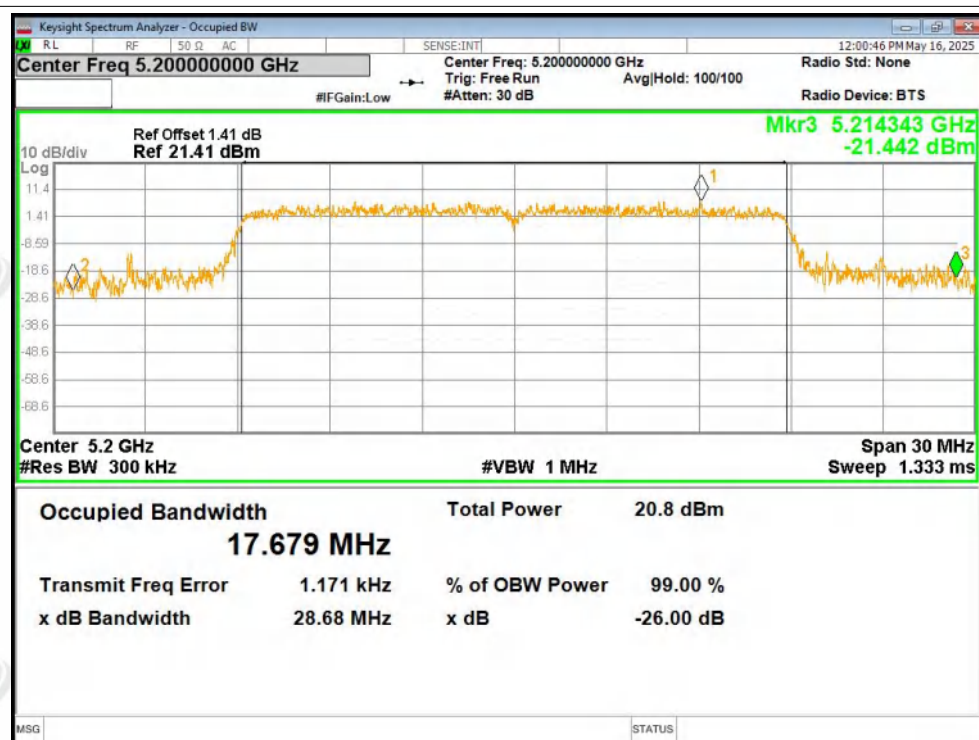


-26dB Bandwidth NVNT n20 5180MHz Ant2

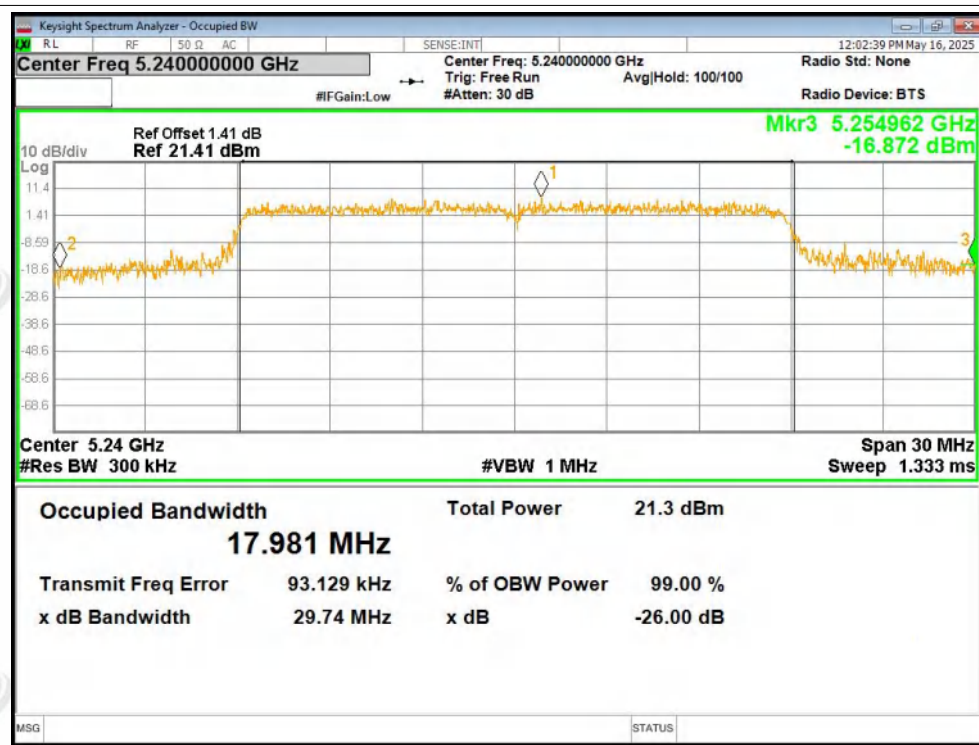




-26dB Bandwidth NVNT n20 5200MHz Ant2

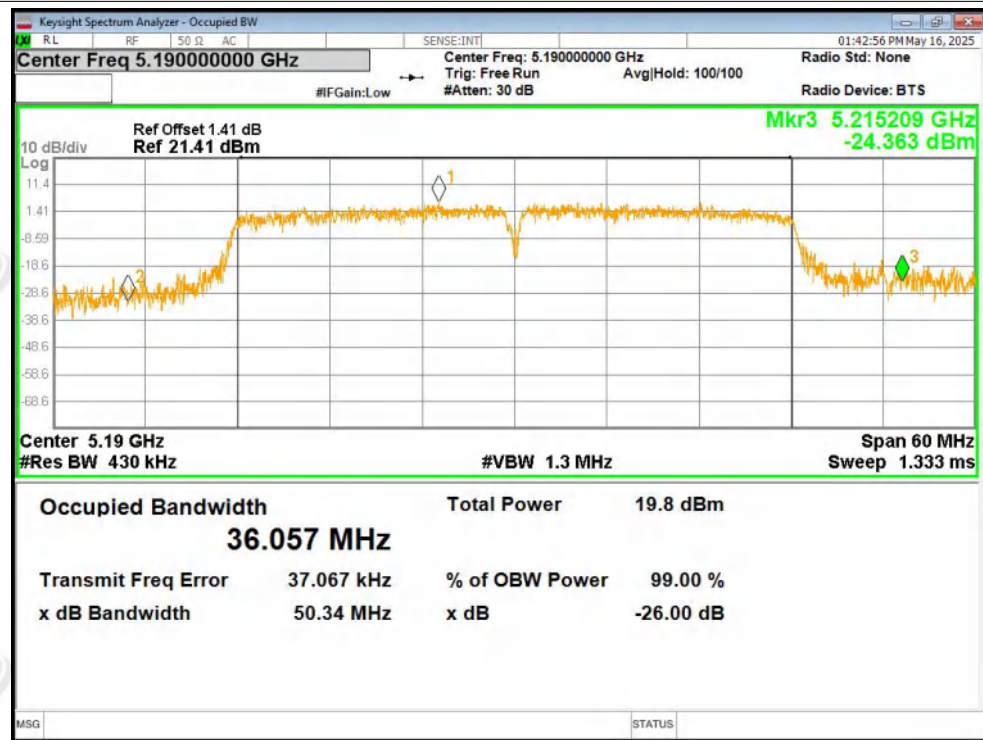


-26dB Bandwidth NVNT n20 5240MHz Ant2

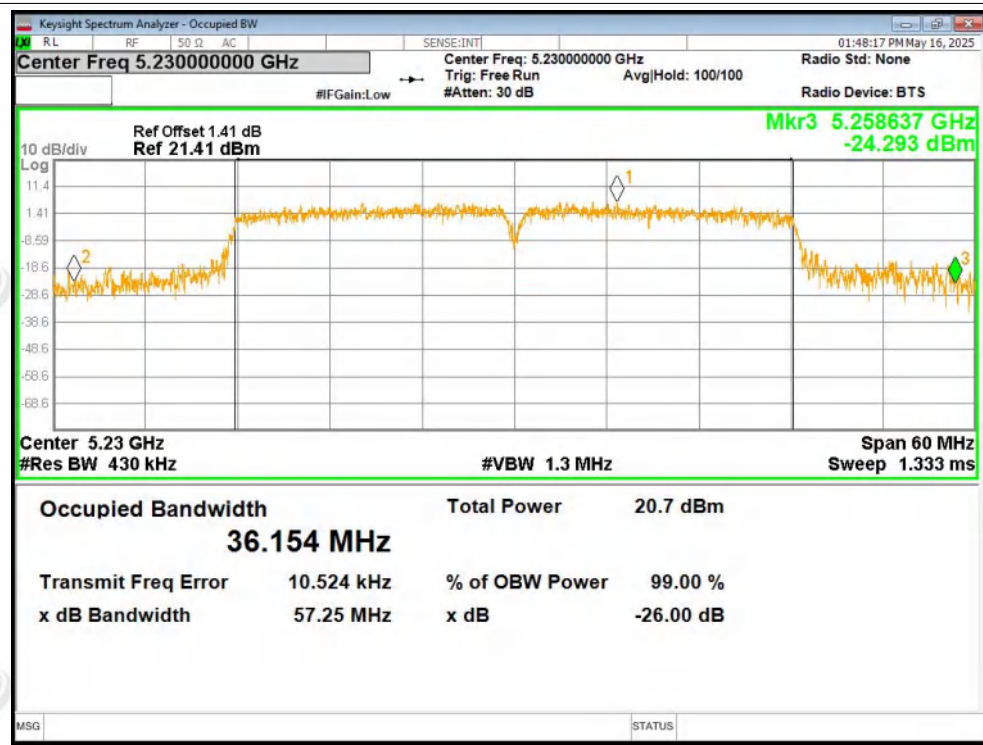




-26dB Bandwidth NVNT n40 5190MHz Ant2

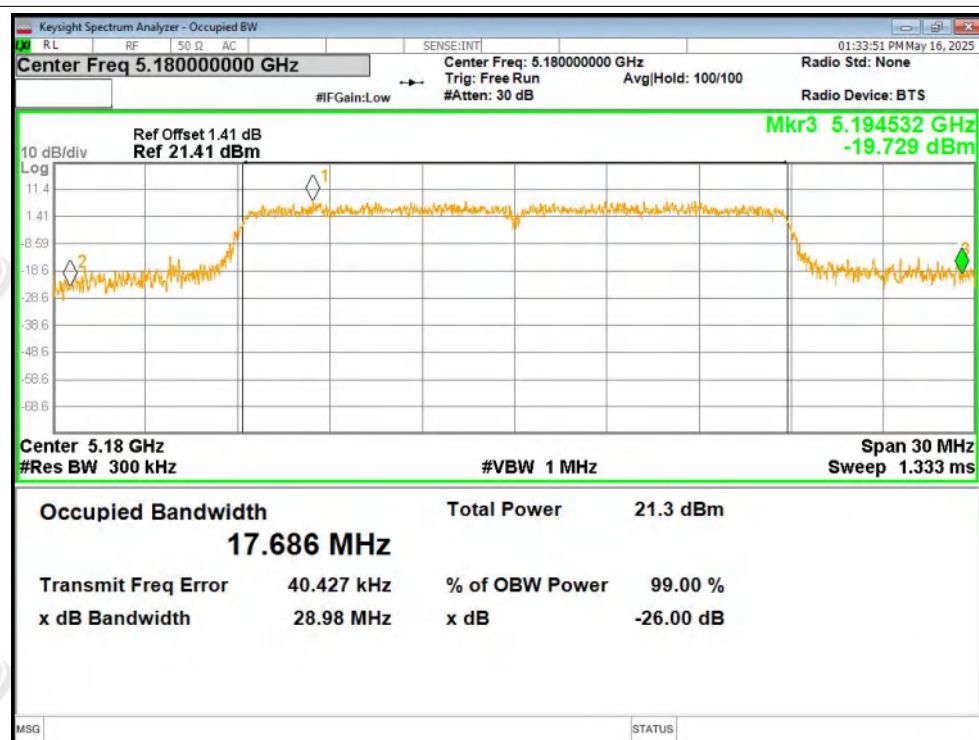


-26dB Bandwidth NVNT n40 5230MHz Ant2

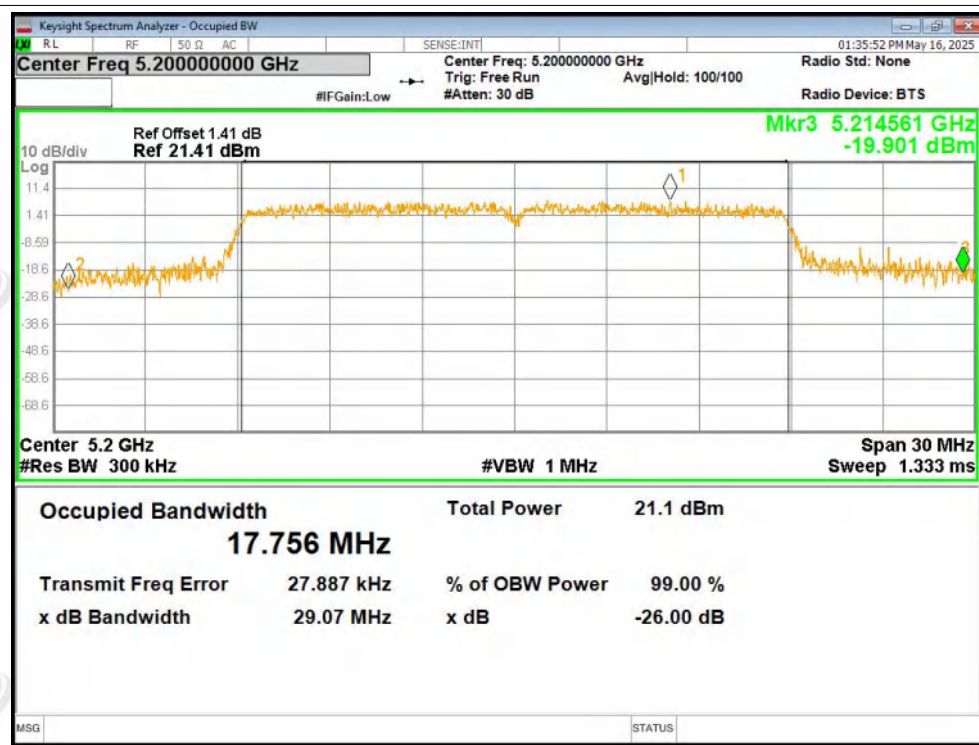




-26dB Bandwidth NVNT ac20 5180MHz Ant2

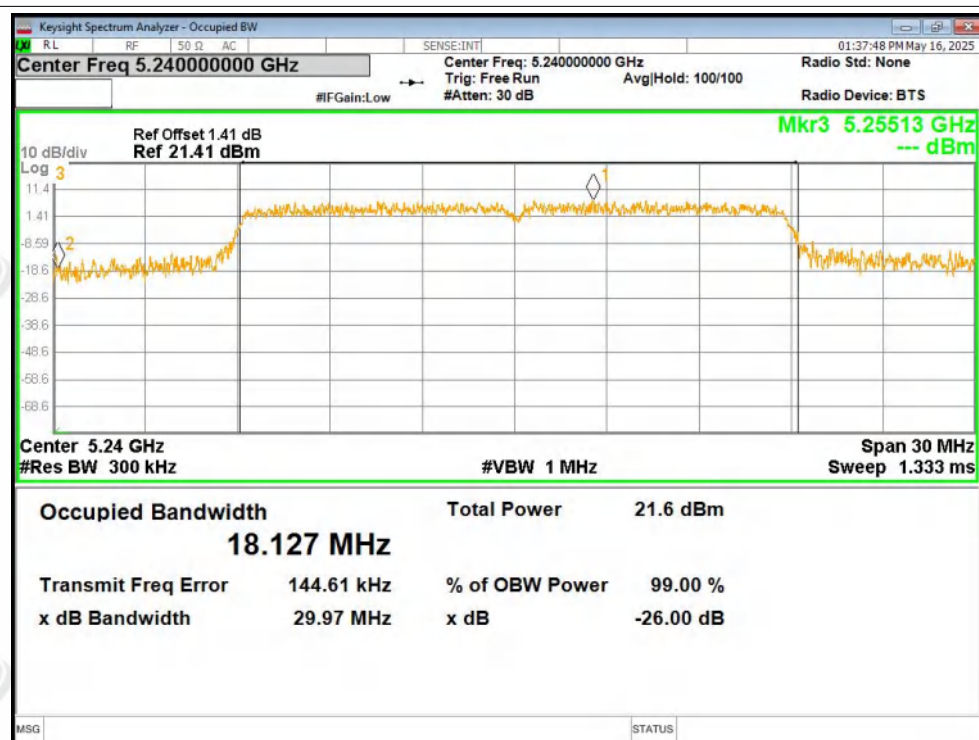


-26dB Bandwidth NVNT ac20 5200MHz Ant2

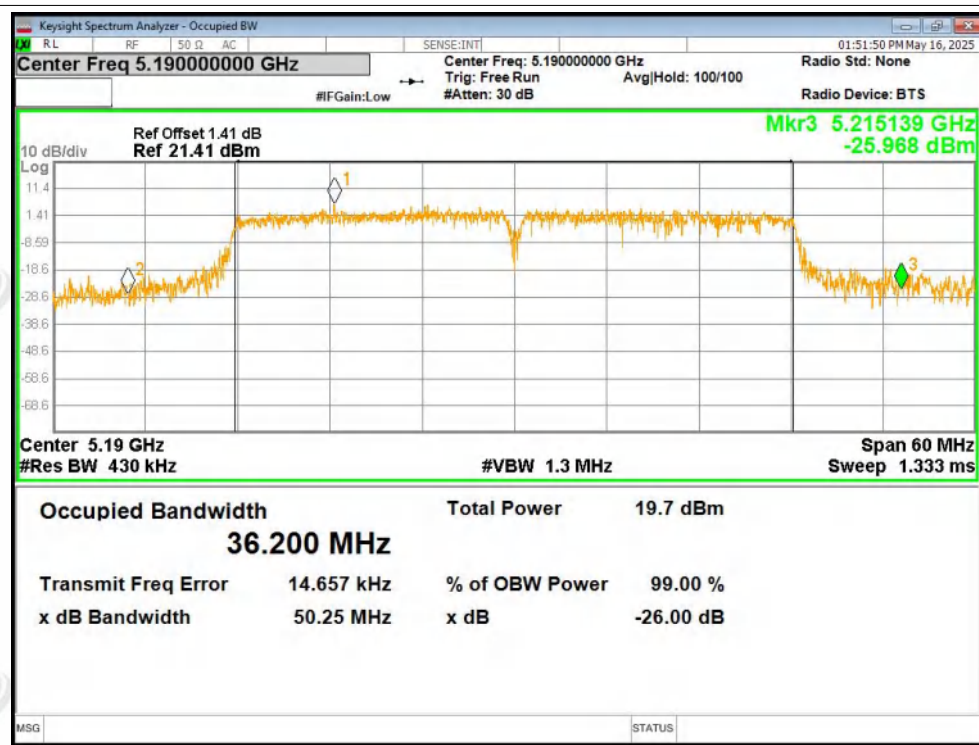




-26dB Bandwidth NVNT ac20 5240MHz Ant2

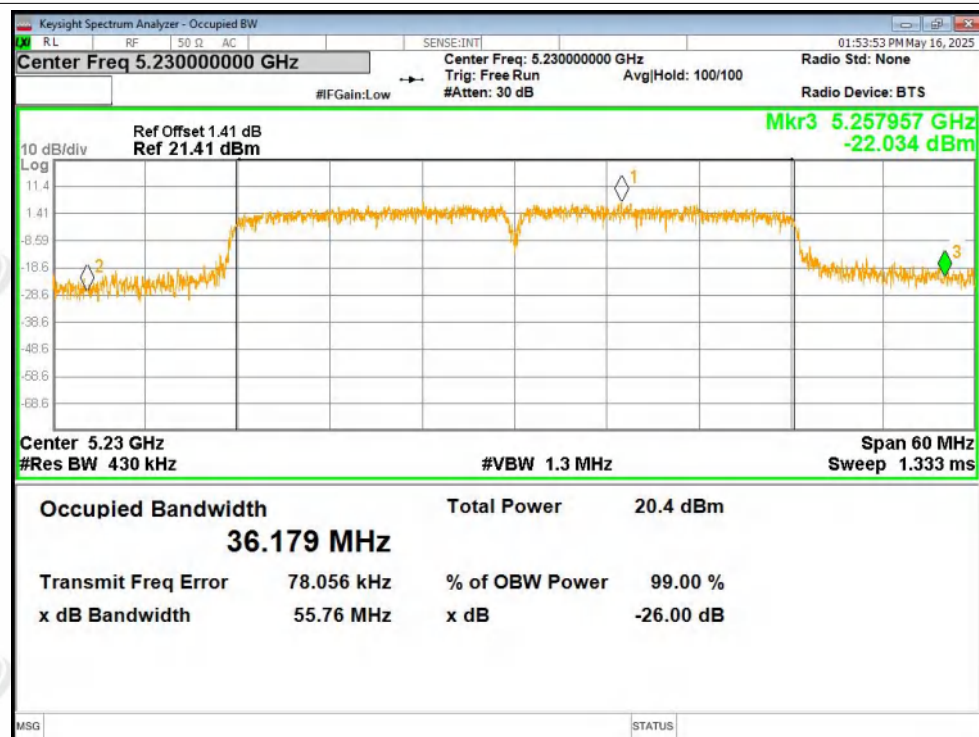


-26dB Bandwidth NVNT ac40 5190MHz Ant2

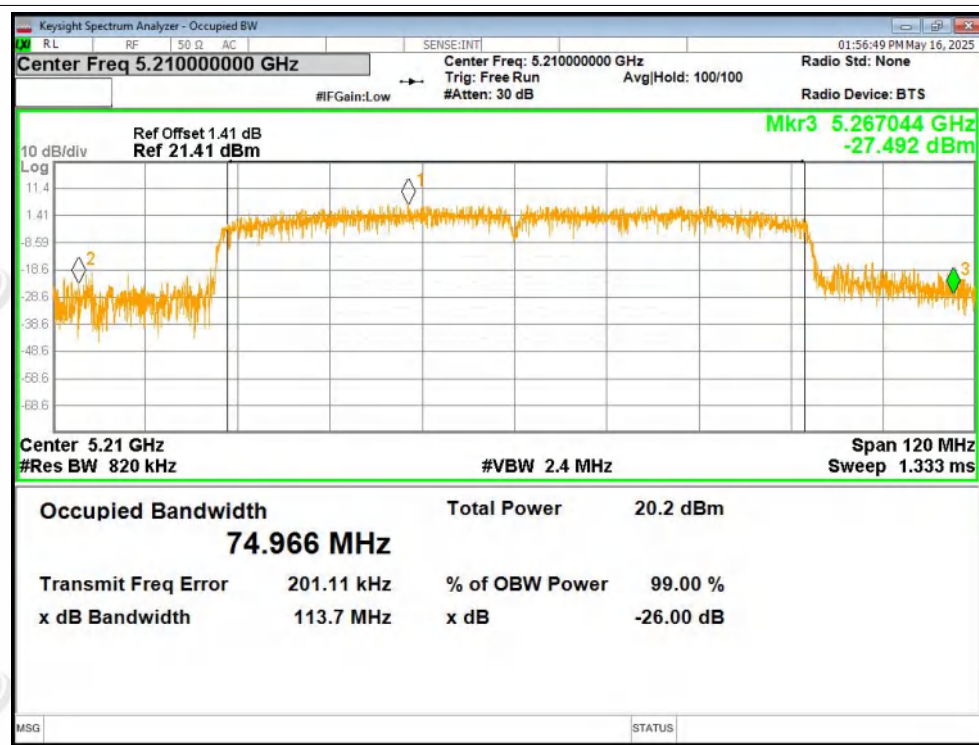




-26dB Bandwidth NVNT ac40 5230MHz Ant2



-26dB Bandwidth NVNT ac80 5210MHz Ant2



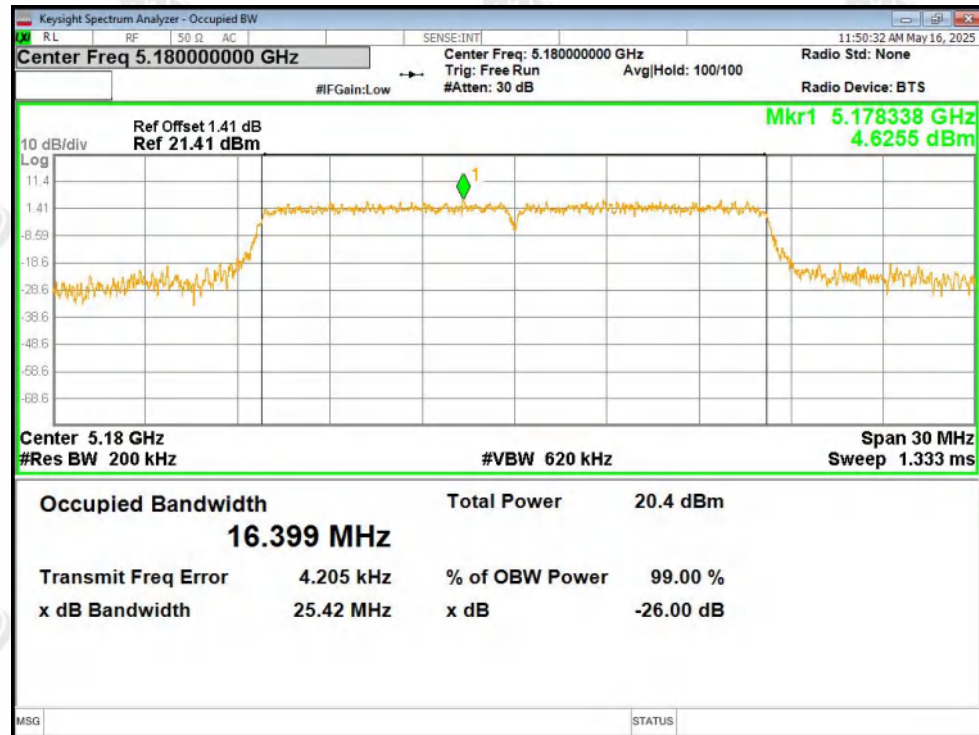
**ZHONGHAN****A.4 Occupied Channel Bandwidth**

Condition	Mode	Frequency (MHz)	Antenna	99% OBW (MHz)
NVNT	a	5180	Ant2	16.399
NVNT	a	5200	Ant2	16.455
NVNT	a	5240	Ant2	16.913
NVNT	n20	5180	Ant2	17.616
NVNT	n20	5200	Ant2	17.636
NVNT	n20	5240	Ant2	17.931
NVNT	n40	5190	Ant2	36.121
NVNT	n40	5230	Ant2	36.121
NVNT	ac20	5180	Ant2	17.692
NVNT	ac20	5200	Ant2	17.679
NVNT	ac20	5240	Ant2	18.101
NVNT	ac40	5190	Ant2	36.192
NVNT	ac40	5230	Ant2	36.07
NVNT	ac80	5210	Ant2	75.1

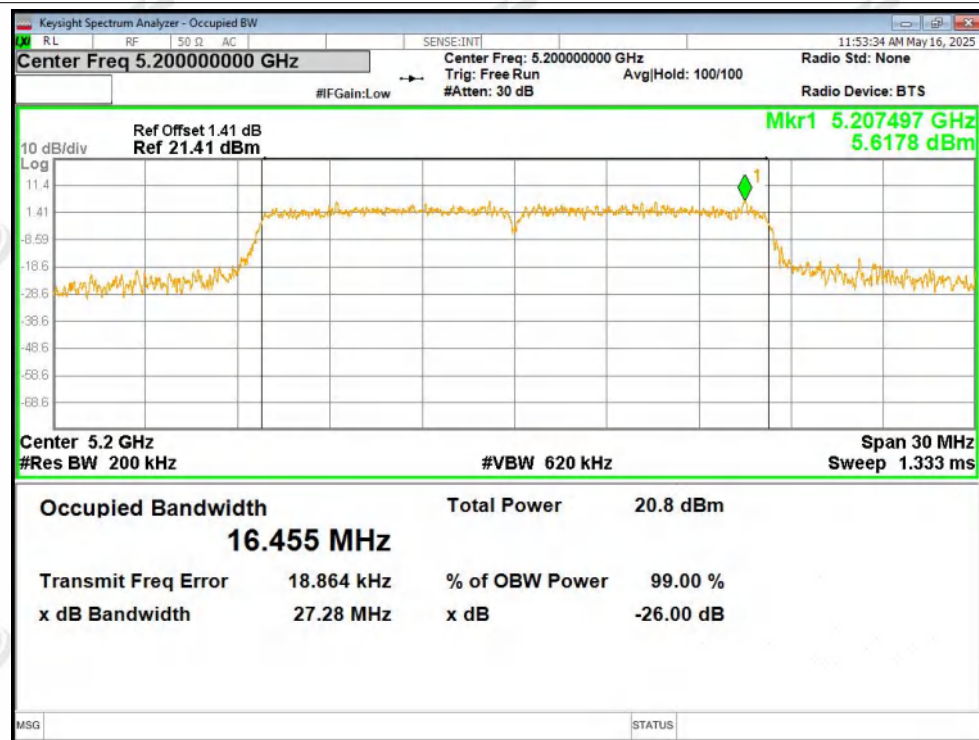


Test Graphs

OBW NVNT a 5180MHz Ant2

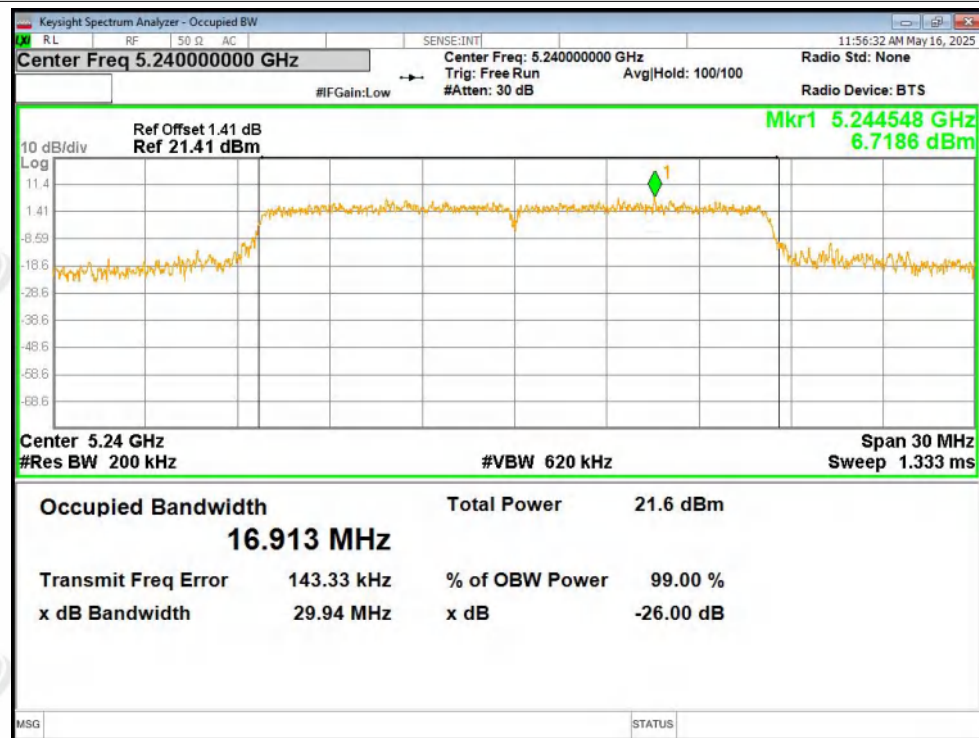


OBW NVNT a 5200MHz Ant2

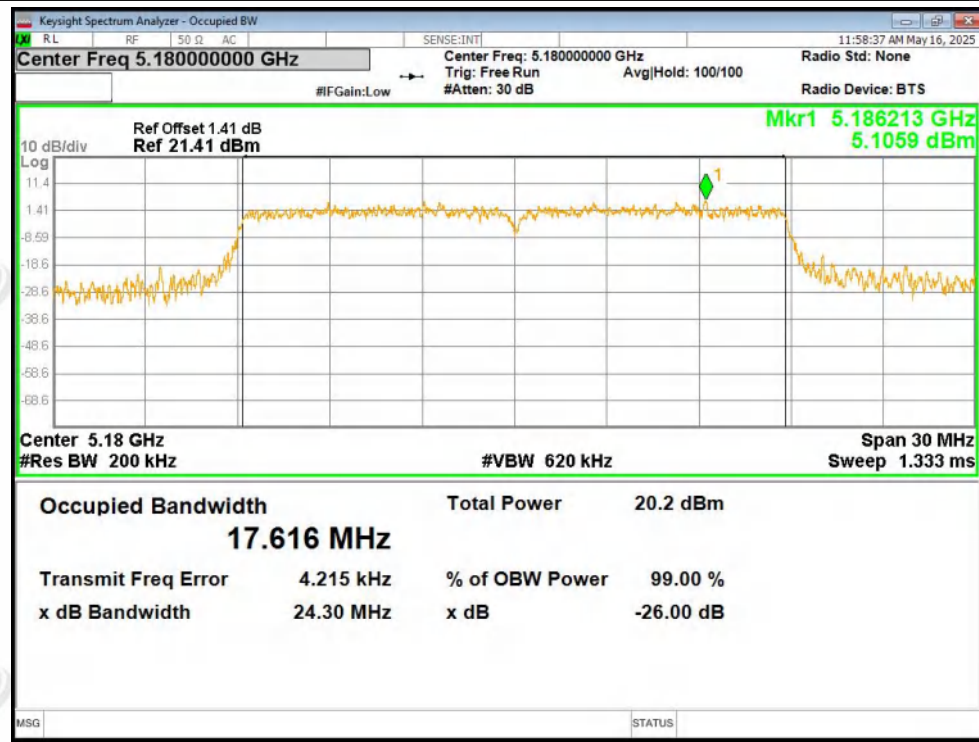




OBW NVNT a 5240MHz Ant2

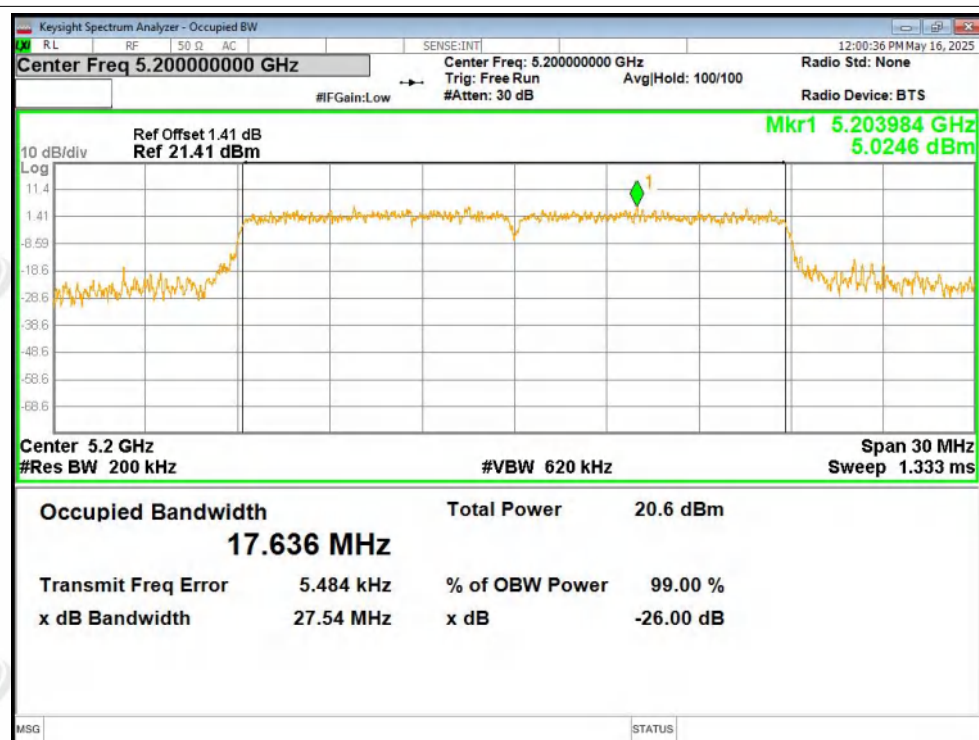


OBW NVNT n20 5180MHz Ant2

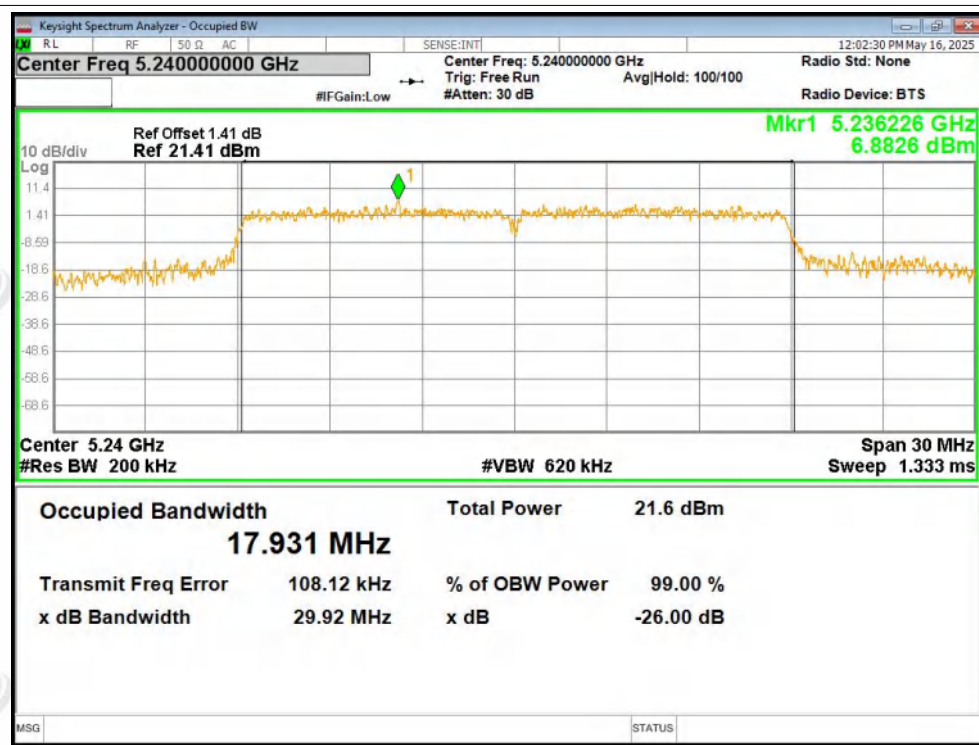




OBW NVNT n20 5200MHz Ant2

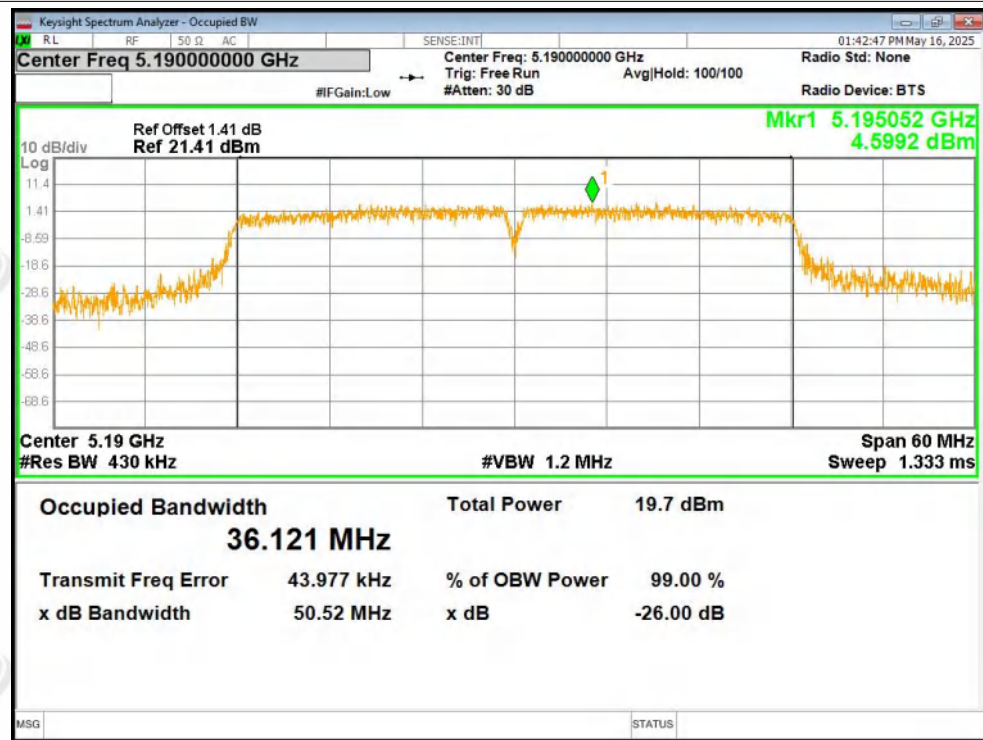


OBW NVNT n20 5240MHz Ant2

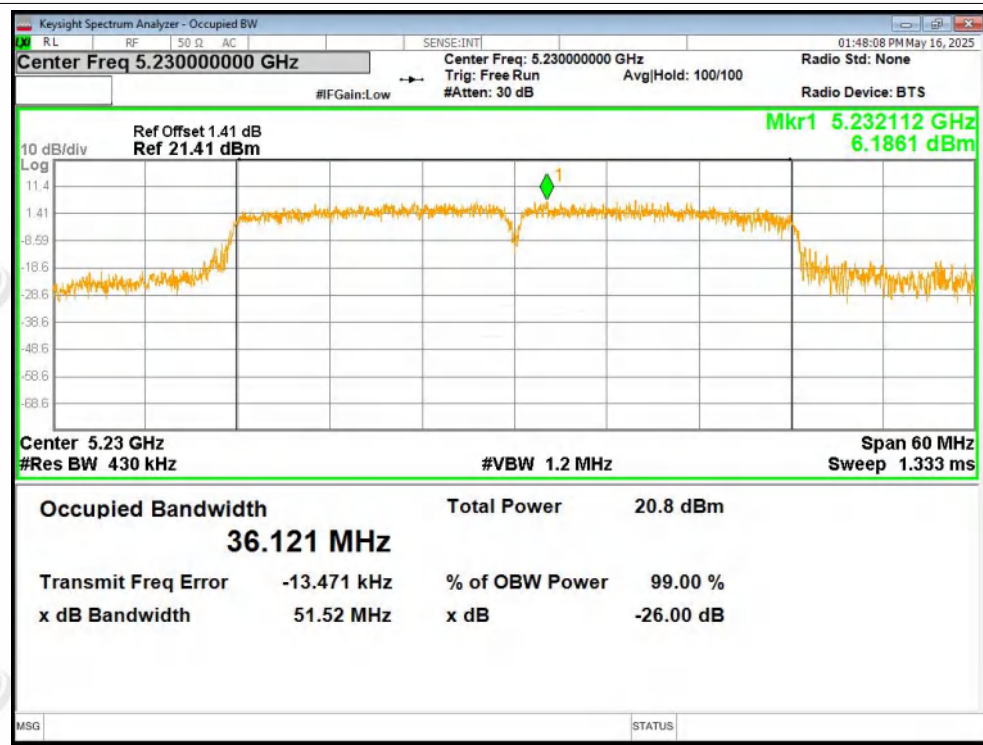




OBW NVNT n40 5190MHz Ant2

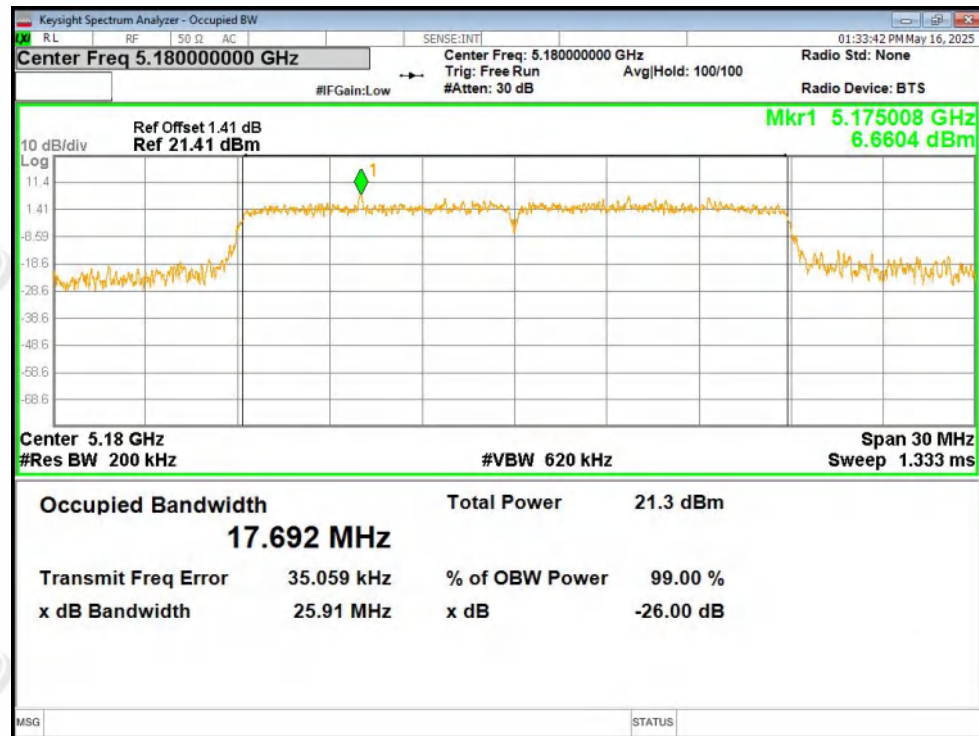


OBW NVNT n40 5230MHz Ant2

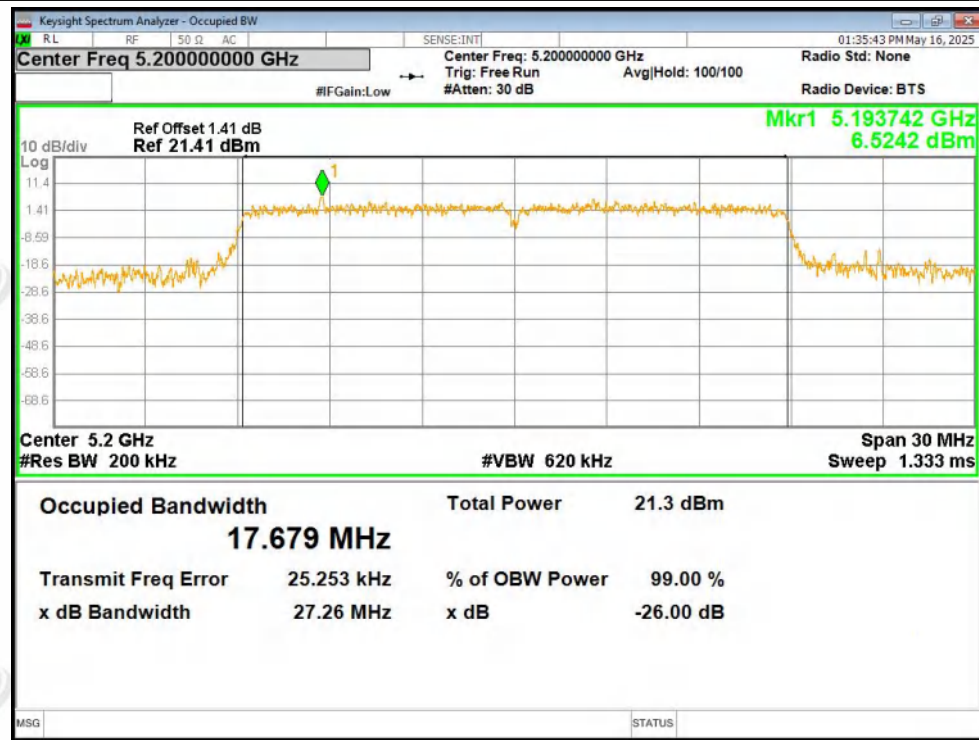




OBW NVNT ac20 5180MHz Ant2

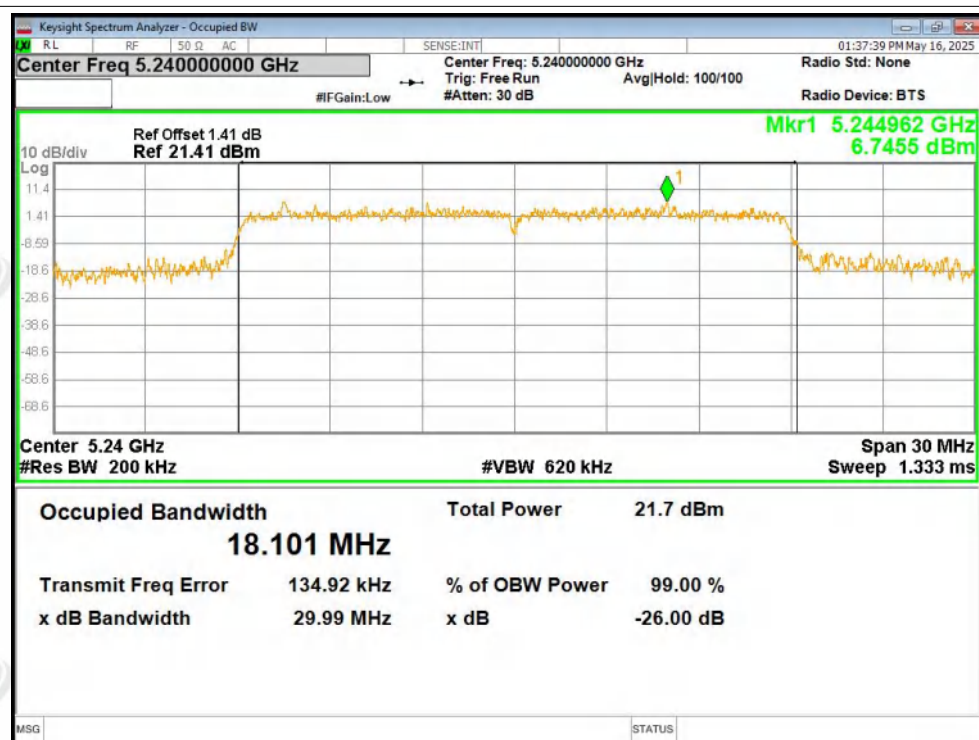


OBW NVNT ac20 5200MHz Ant2

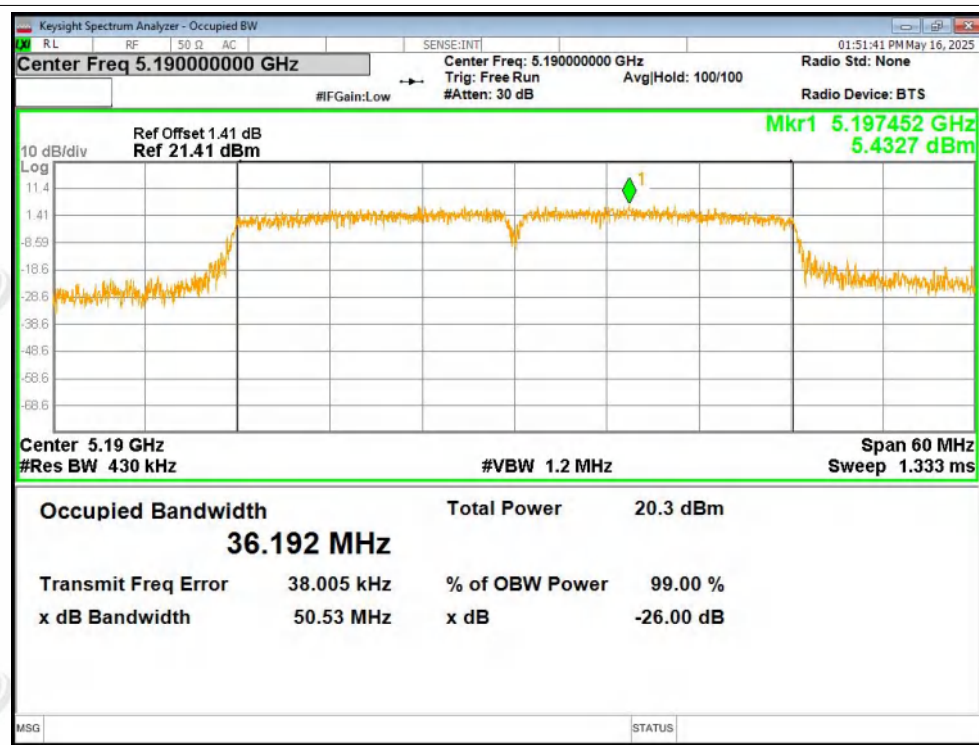




OBW NVNT ac20 5240MHz Ant2

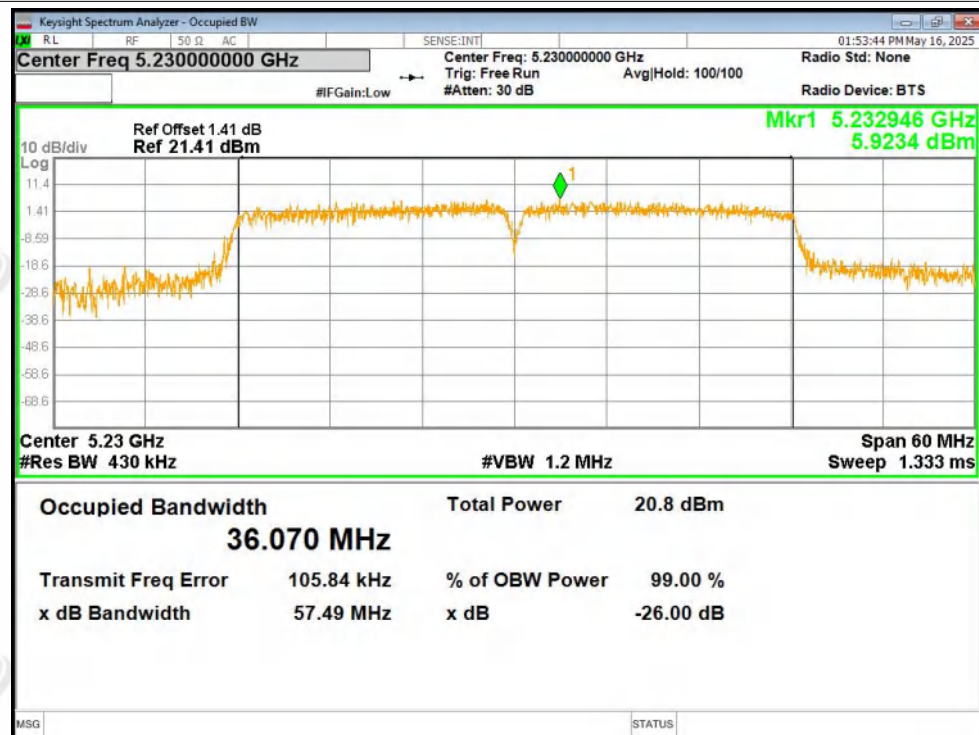


OBW NVNT ac40 5190MHz Ant2

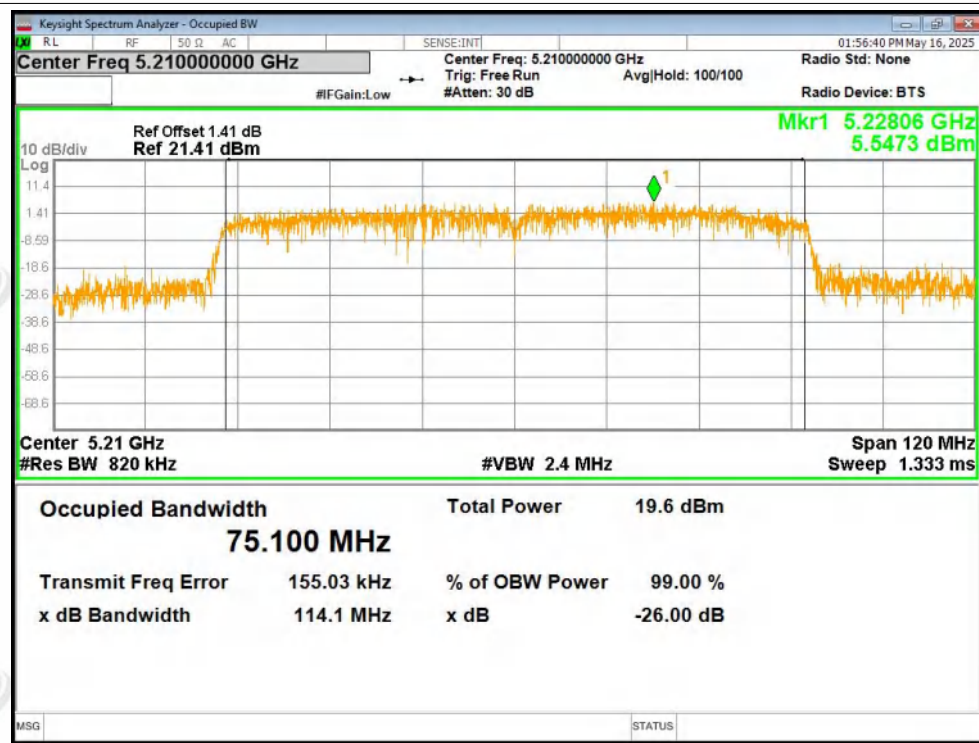




OBW NVNT ac40 5230MHz Ant2



OBW NVNT ac80 5210MHz Ant2





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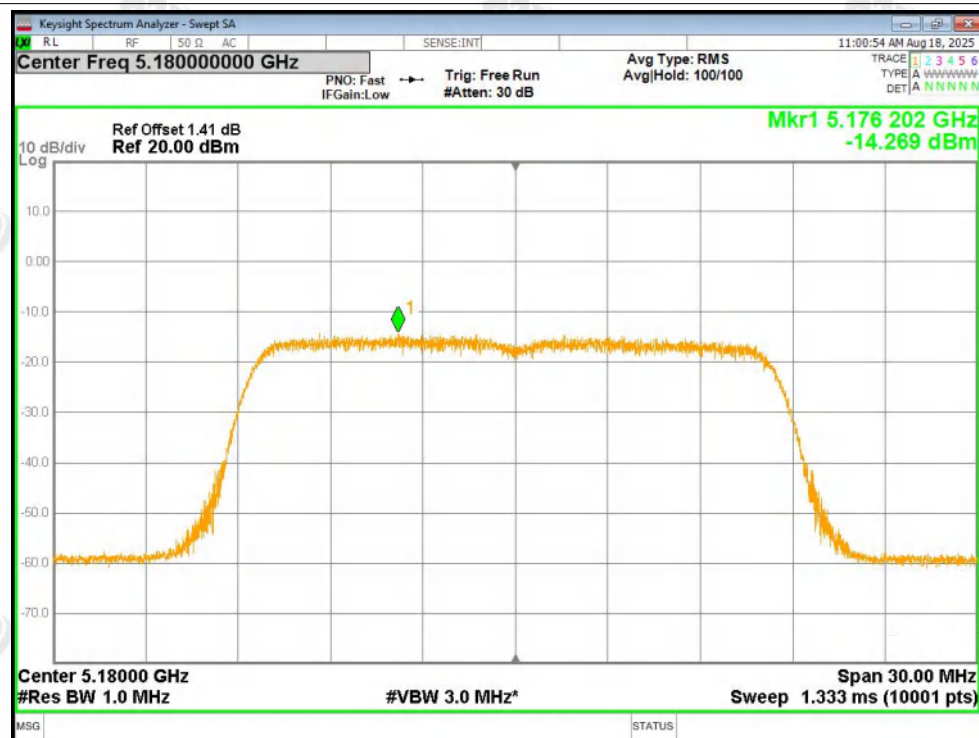
A.5 Maximum Power Spectral Density Level

Condition	Mode	Frequency (MHz)	Antenna	Conducted PSD (dBm)	Duty Factor (dB)	Total PSD (dBm)	Limit (dBm)	Verdict
NVNT	a	5180	Ant2	-14.27	6.84	-7.43	11	Pass
NVNT	a	5200	Ant2	-15.07	7.56	-7.51	11	Pass
NVNT	a	5240	Ant2	-14.79	6.85	-7.94	11	Pass
NVNT	n20	5180	Ant2	-14.56	7.13	-7.43	11	Pass
NVNT	n20	5200	Ant2	-14.12	7.14	-6.98	11	Pass
NVNT	n20	5240	Ant2	-15.95	7.16	-8.79	11	Pass
NVNT	n40	5190	Ant2	-18.32	10.19	-8.13	11	Pass
NVNT	n40	5230	Ant2	-20.49	10.23	-10.26	11	Pass
NVNT	ac20	5180	Ant2	-14.56	7.16	-7.4	11	Pass
NVNT	ac20	5200	Ant2	-15.13	7.09	-8.04	11	Pass
NVNT	ac20	5240	Ant2	-15.18	7.12	-8.06	11	Pass
NVNT	ac40	5190	Ant2	-18.53	10.21	-8.32	11	Pass
NVNT	ac40	5230	Ant2	-19.56	10.25	-9.31	11	Pass
NVNT	ac80	5210	Ant2	-23.21	13.3	-9.91	11	Pass

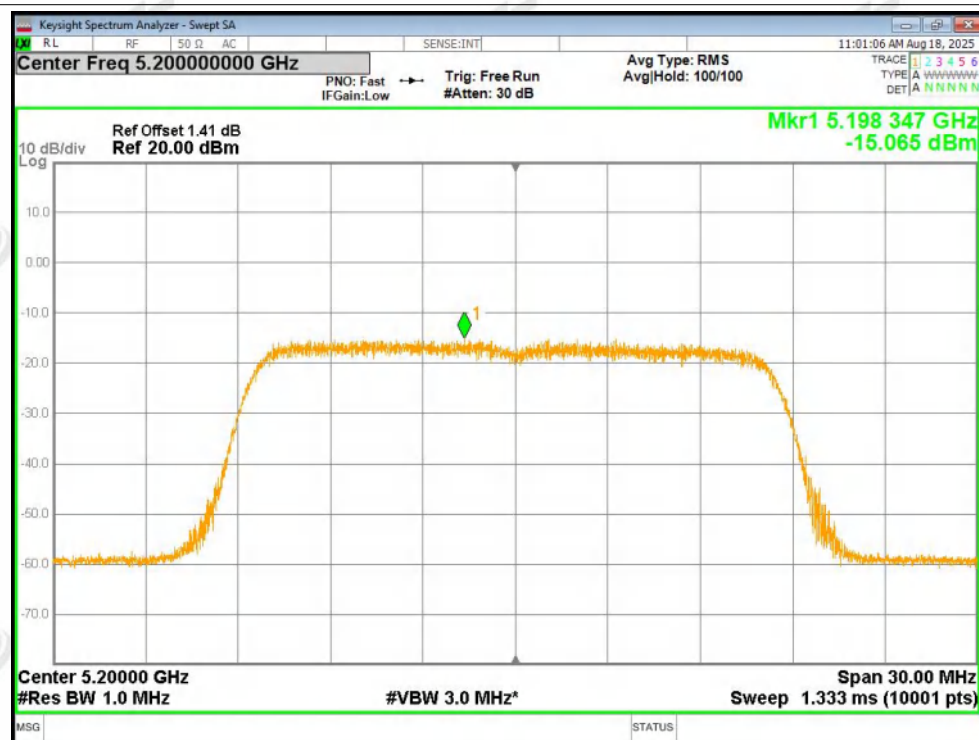


Test Graphs

PSD NVNT a 5180MHz Ant1

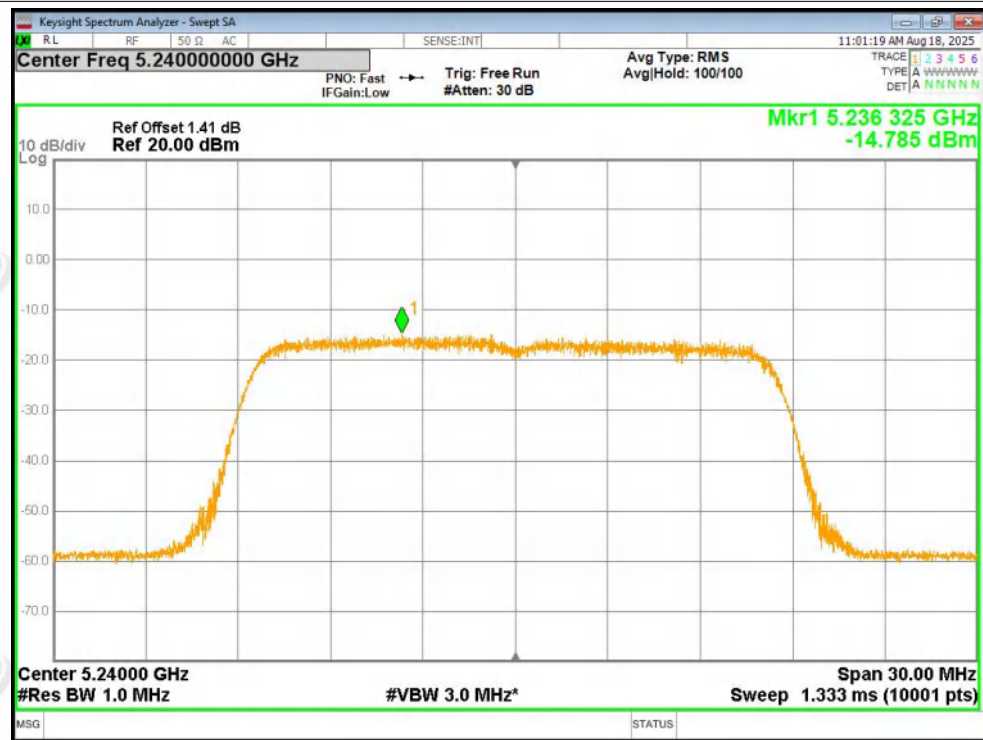


PSD NVNT a 5200MHz Ant1

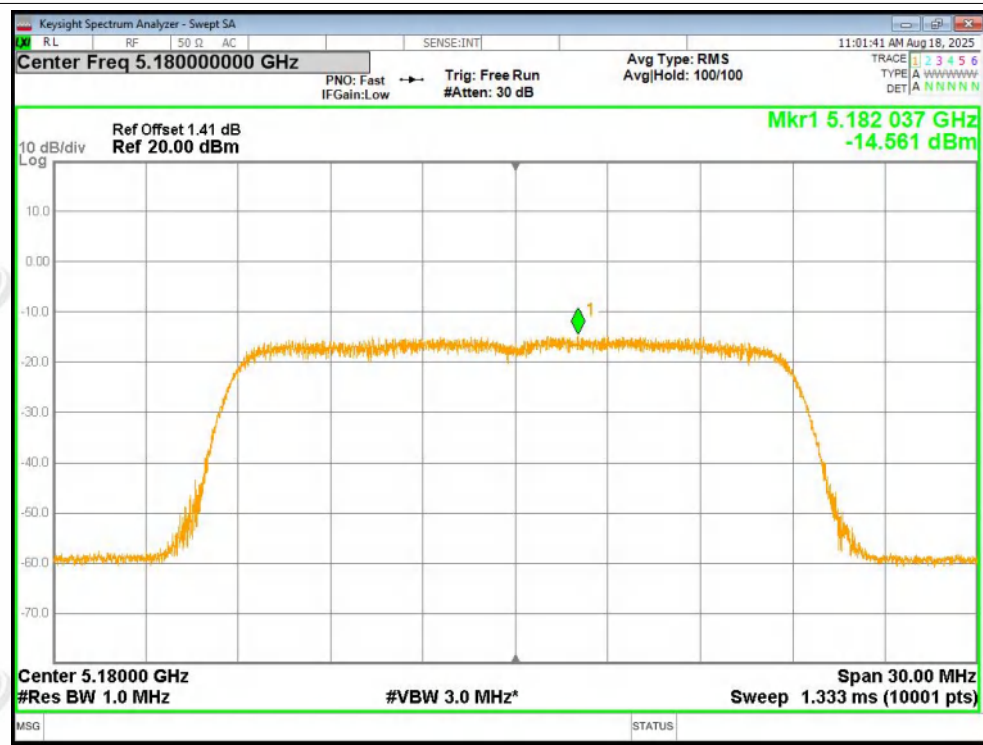




PSD NVNT a 5240MHz Ant1

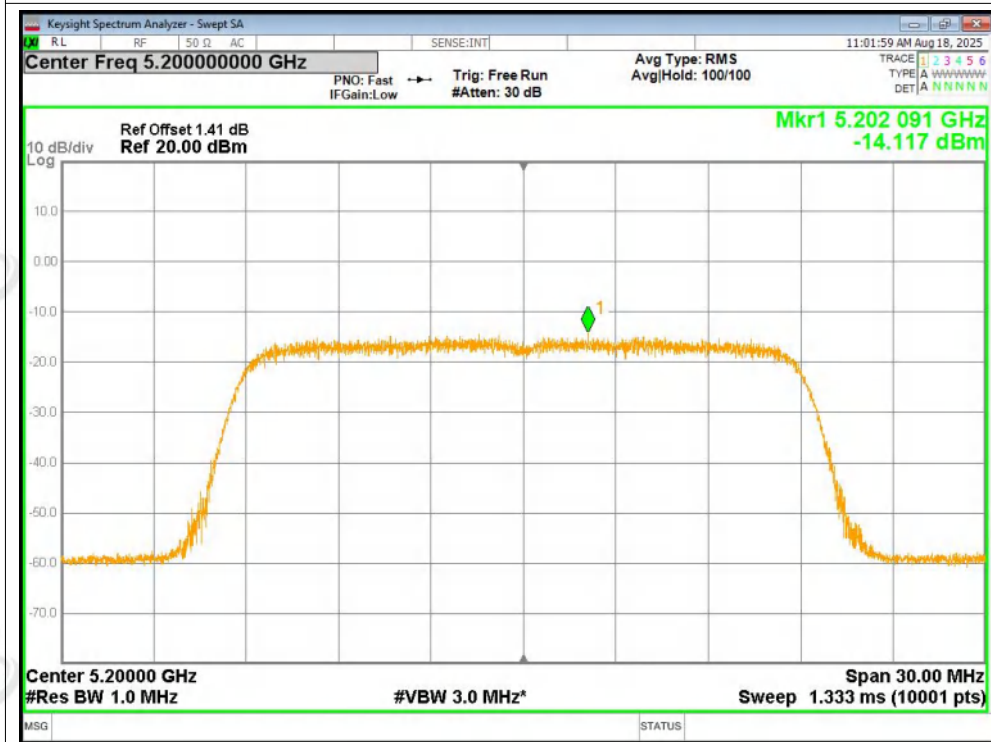


PSD NVNT n20 5180MHz Ant1

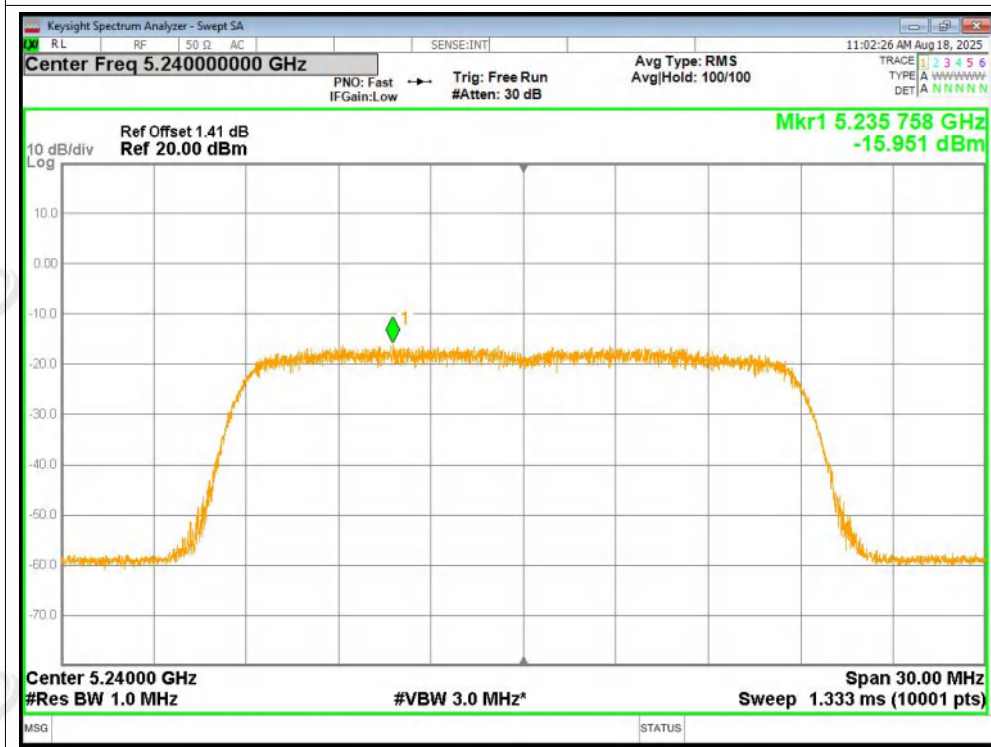




PSD NVNT n20 5200MHz Ant1

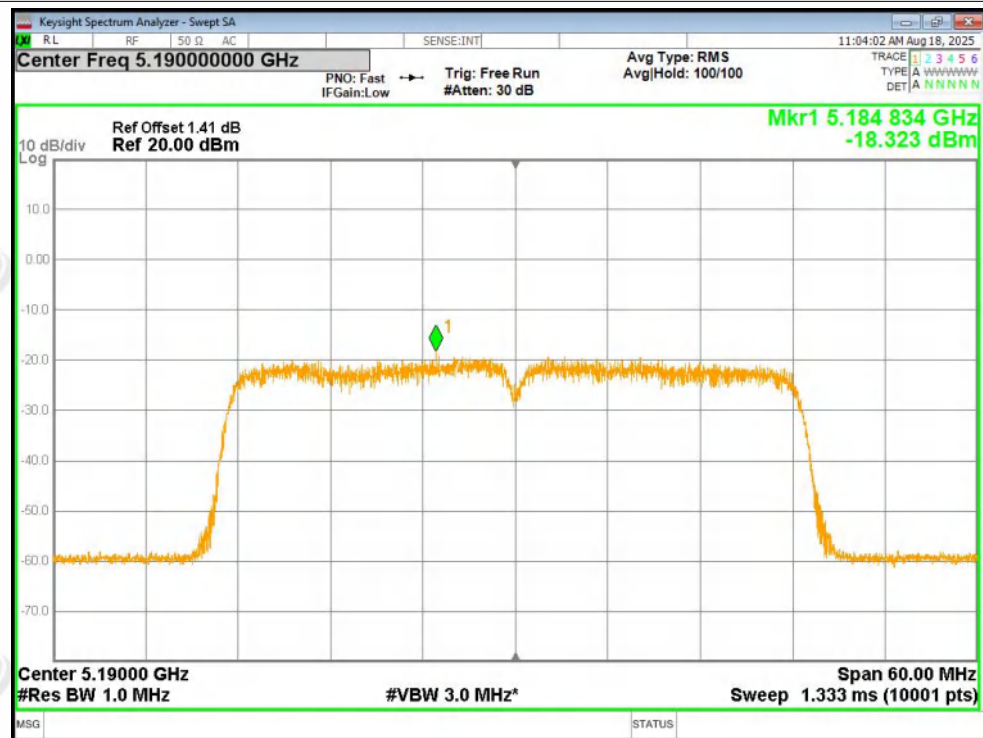


PSD NVNT n20 5240MHz Ant1

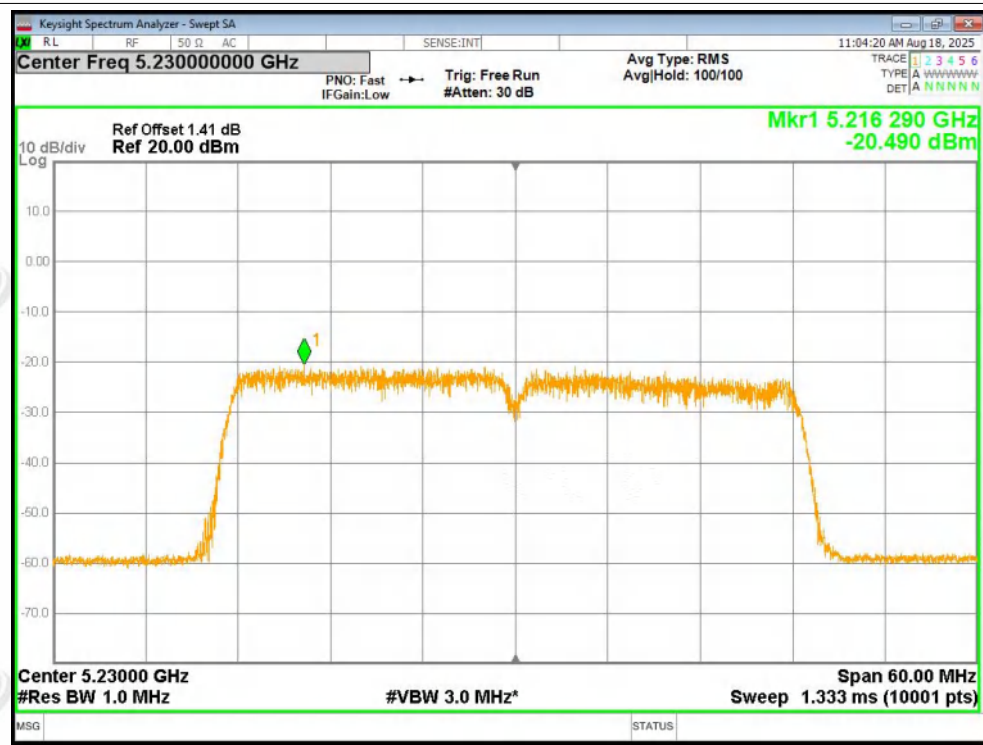




PSD NVNT n40 5190MHz Ant1

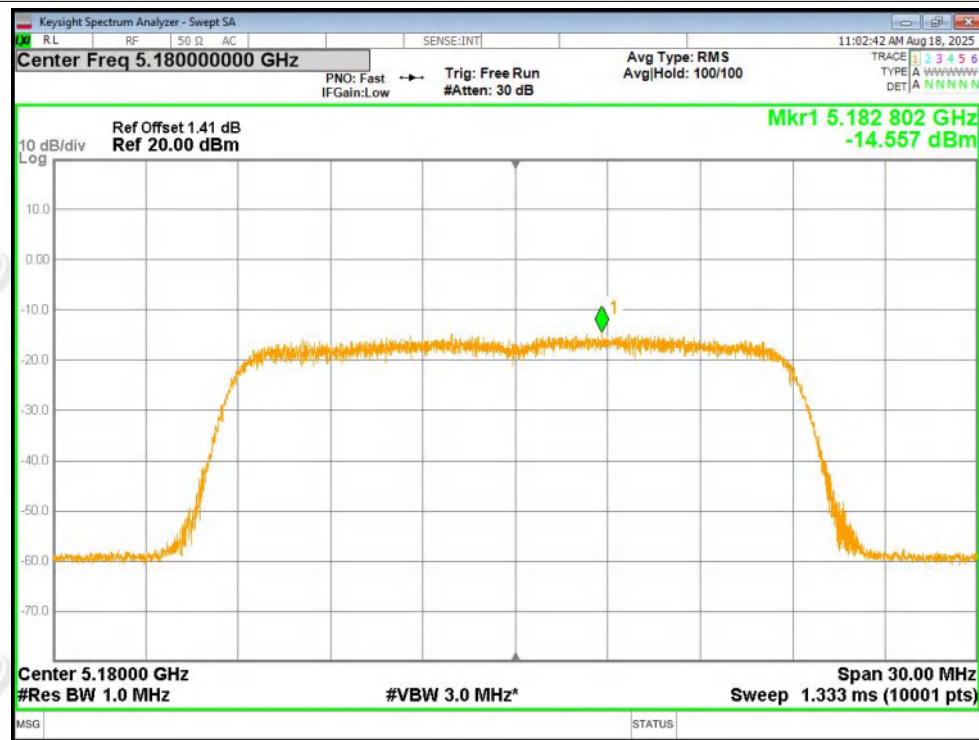


PSD NVNT n40 5230MHz Ant1

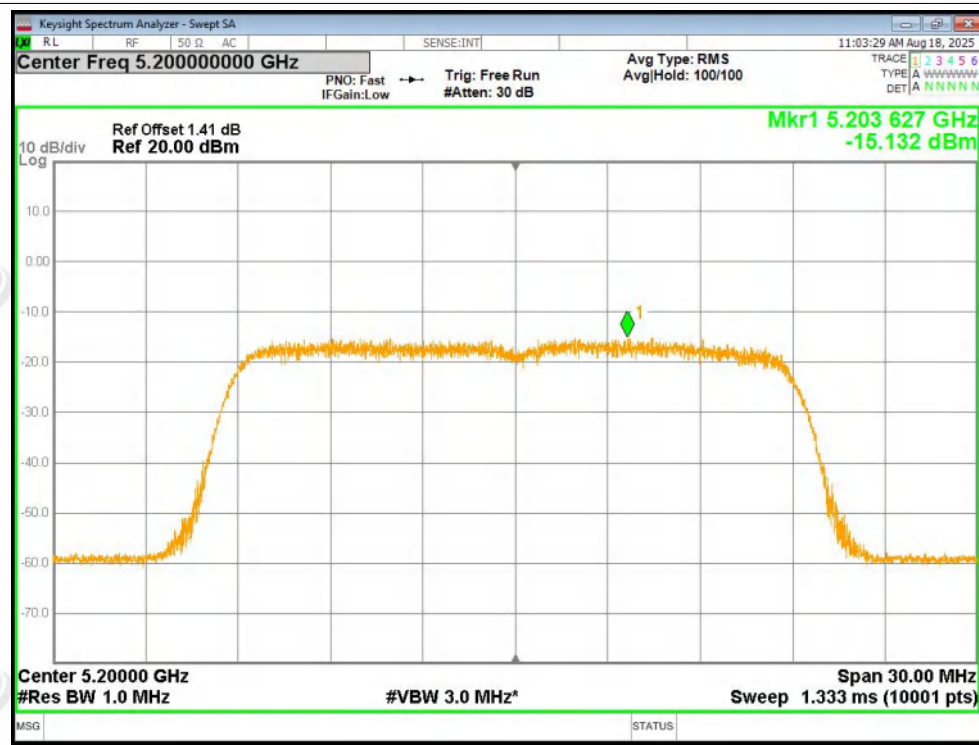




PSD NVNT ac20 5180MHz Ant1

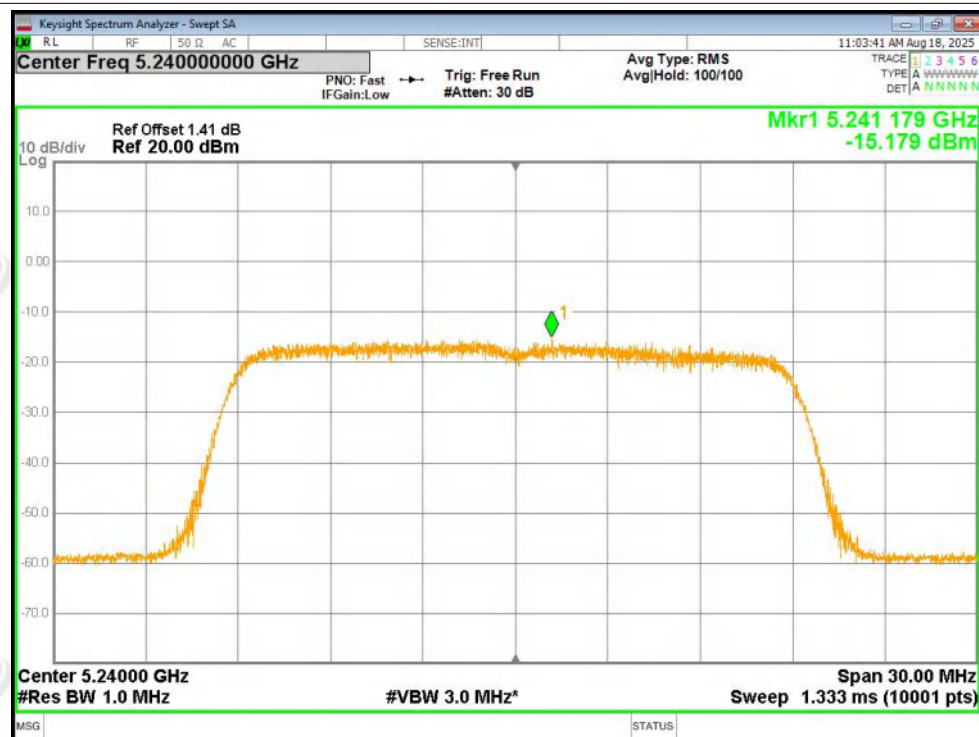


PSD NVNT ac20 5200MHz Ant1

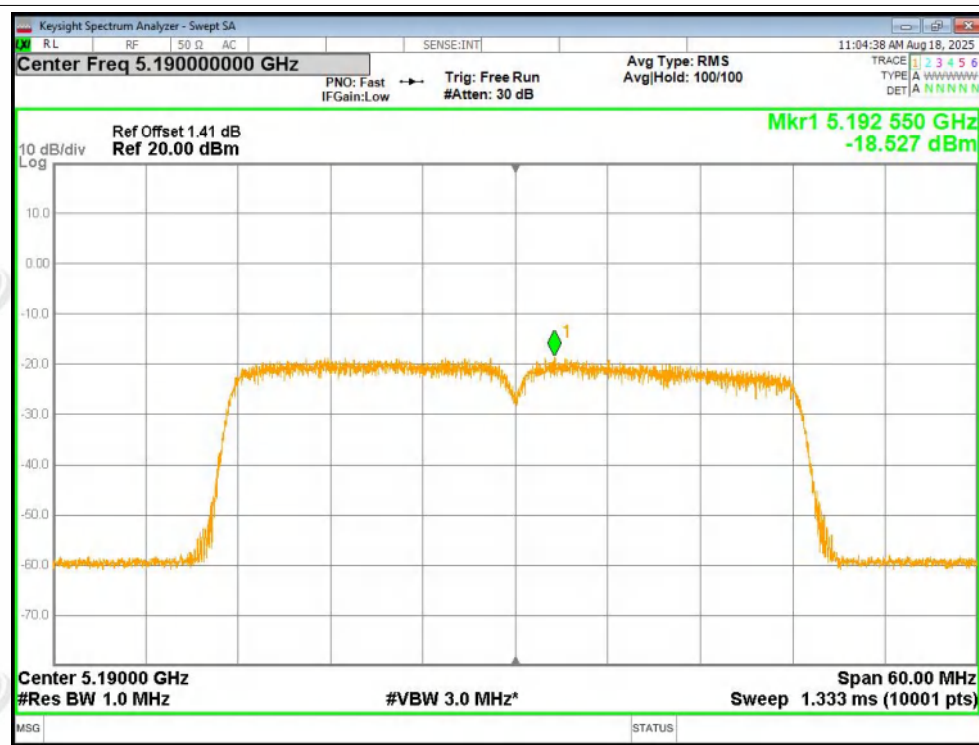




PSD NVNT ac20 5240MHz Ant1

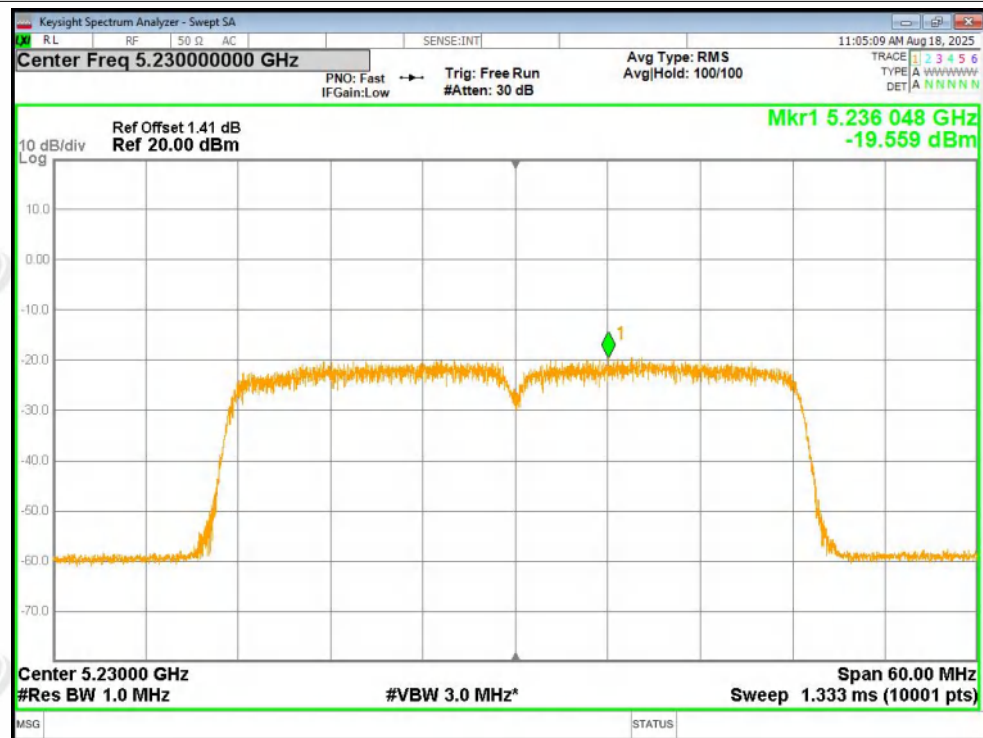


PSD NVNT ac40 5190MHz Ant1

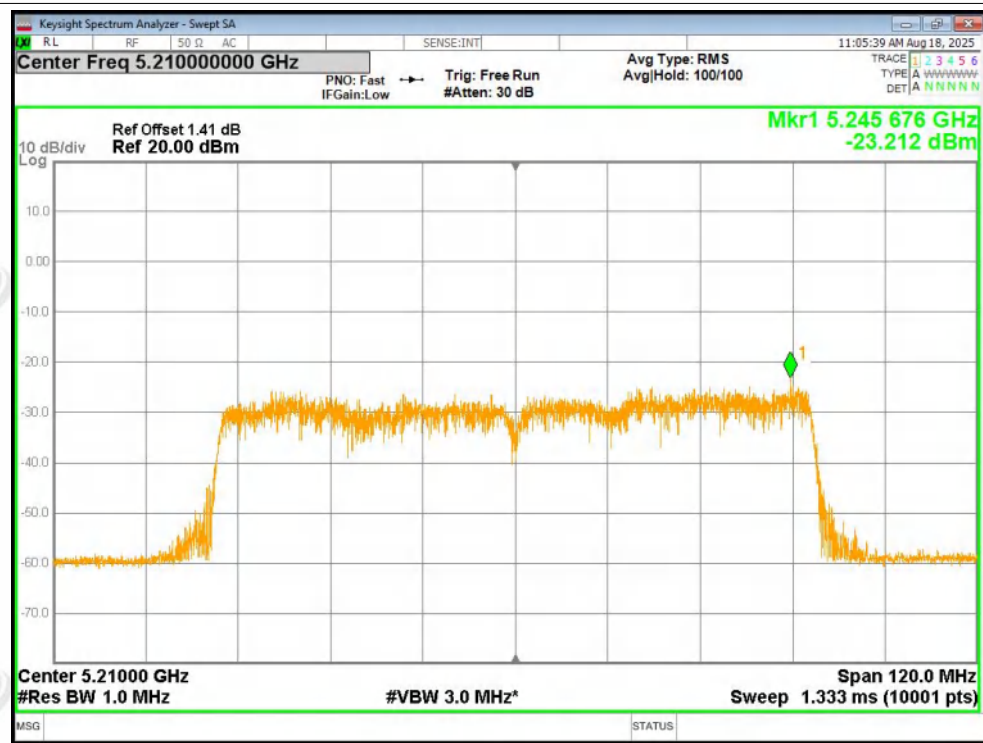




PSD NVNT ac40 5230MHz Ant1



PSD NVNT ac80 5210MHz Ant1



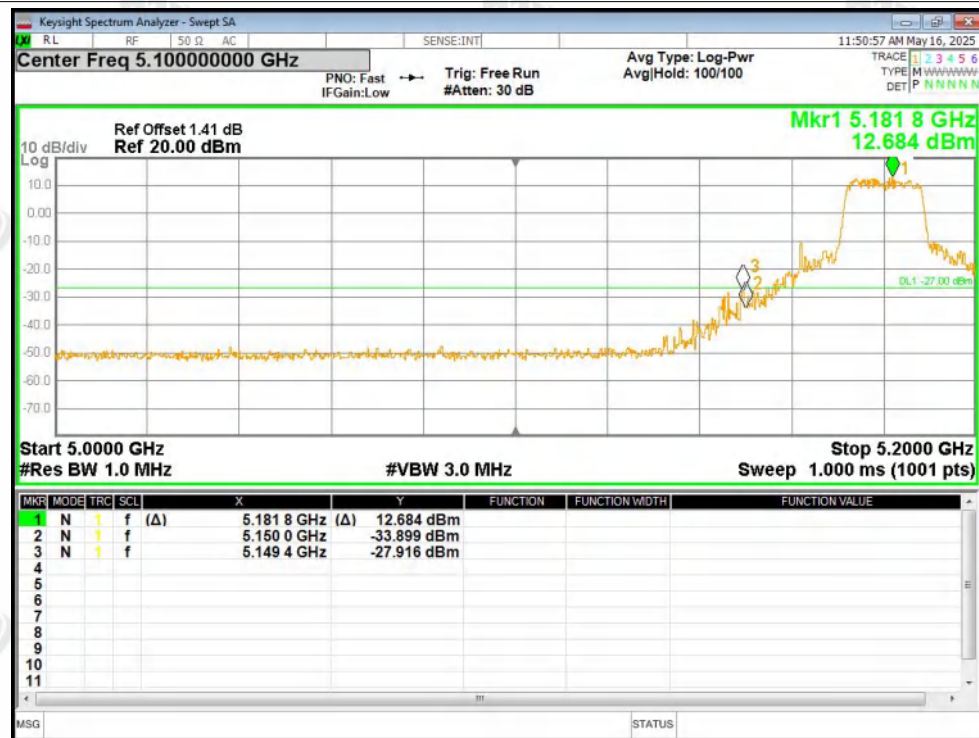
**ZHONGHAN****A.6 Band Edge**

Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	a	5180	Ant2	-27.91	-27	Pass
NVNT	a	5240	Ant2	-47.16	-27	Pass
NVNT	n20	5180	Ant2	-31.93	-27	Pass
NVNT	n20	5240	Ant2	-47.61	-27	Pass
NVNT	n40	5190	Ant2	-46.8	-27	Pass
NVNT	n40	5230	Ant2	-44.78	-27	Pass
NVNT	ac20	5180	Ant2	-30.57	-27	Pass
NVNT	ac20	5240	Ant2	-46.97	-27	Pass
NVNT	ac40	5190	Ant2	-42.69	-27	Pass
NVNT	ac40	5230	Ant2	-44.09	-27	Pass
NVNT	ac80	5210	Ant2	-45.48	-27	Pass



Test Graphs

Band Edge NVNT a 5180MHz Low Ant2

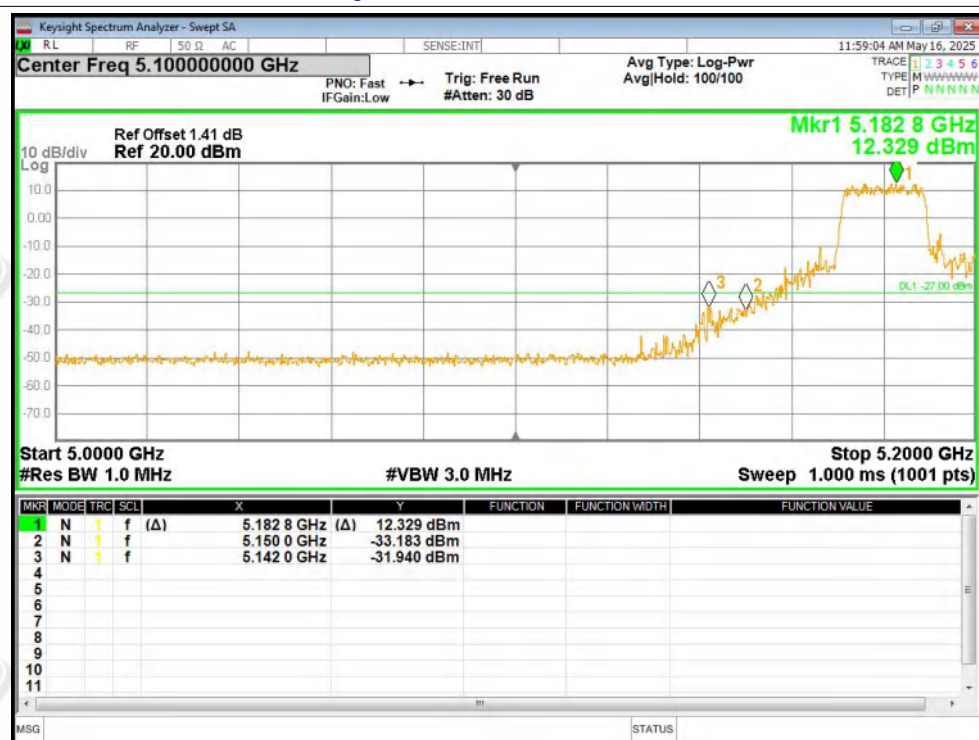


Band Edge NVNT a 5240MHz High Ant2

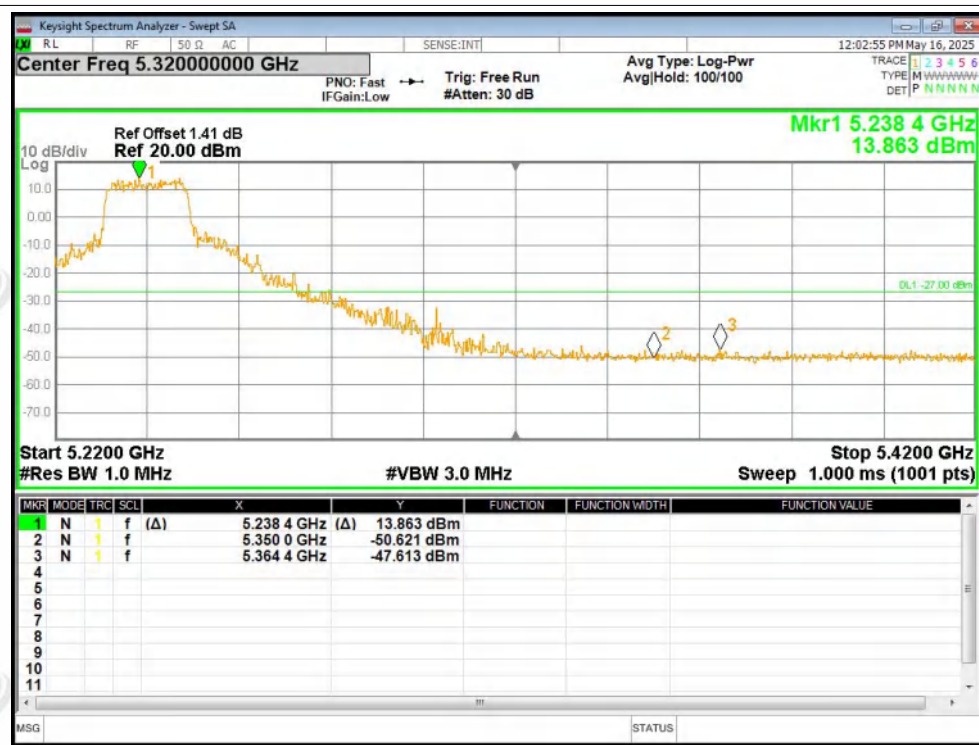




Band Edge NVNT n20 5180MHz Low Ant2

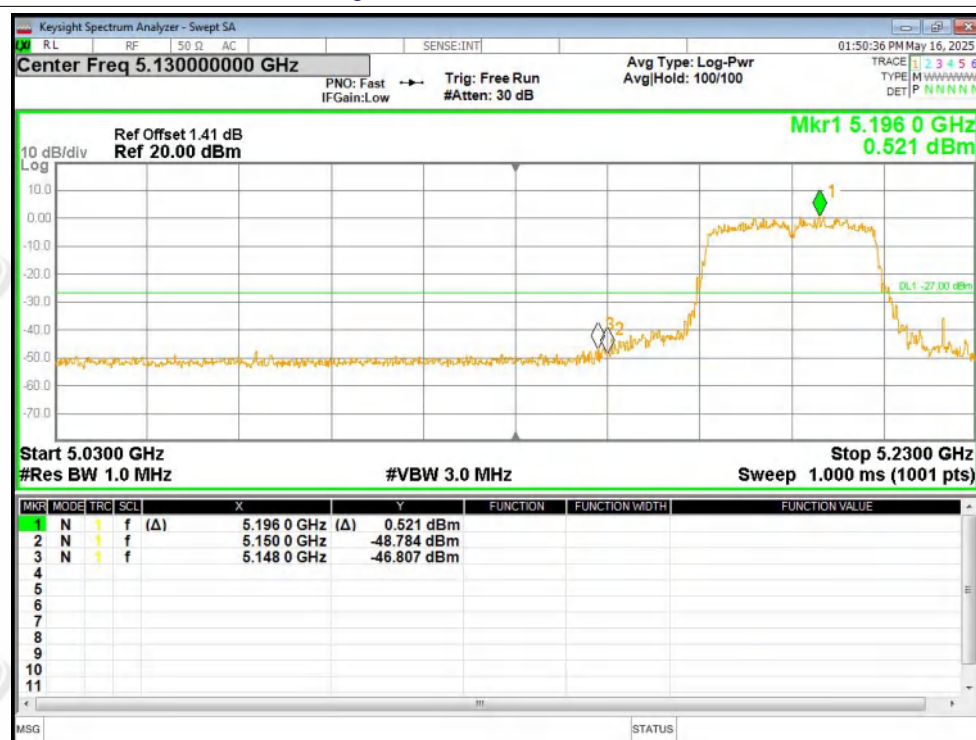


Band Edge NVNT n20 5240MHz High Ant2

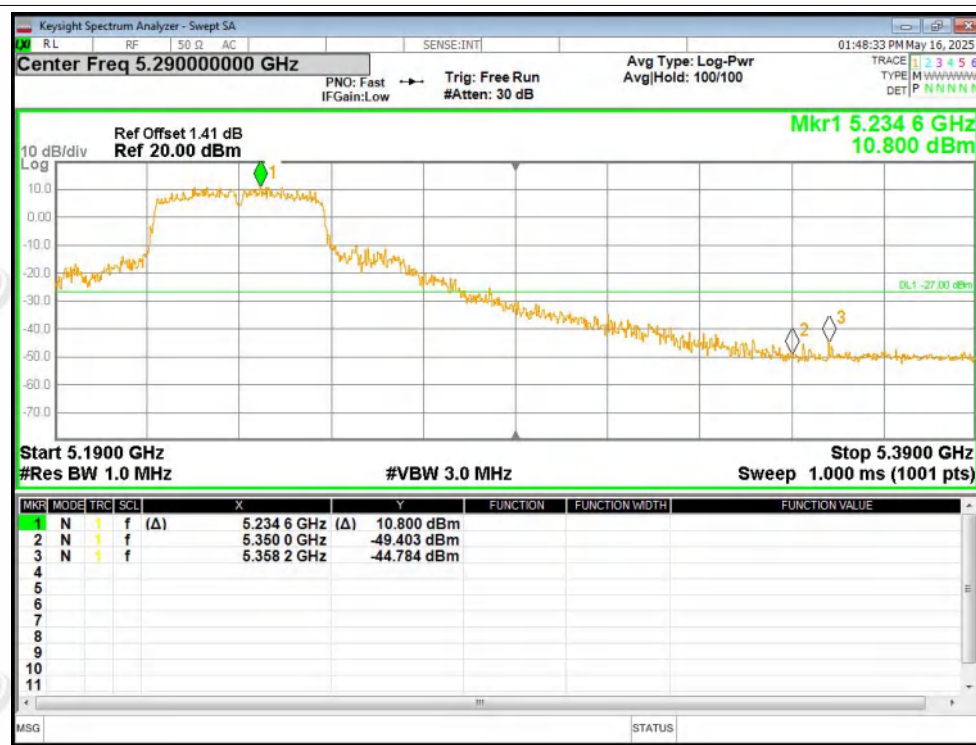




Band Edge NVNT n40 5190MHz Low Ant2

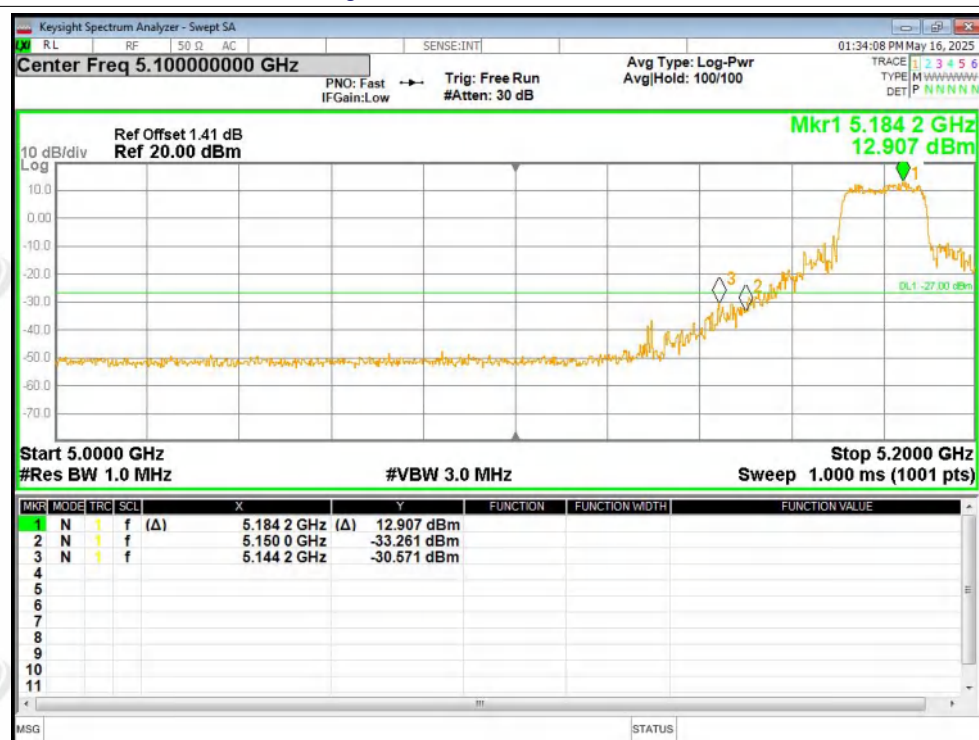


Band Edge NVNT n40 5230MHz High Ant2





Band Edge NVNT ac20 5180MHz Low Ant2

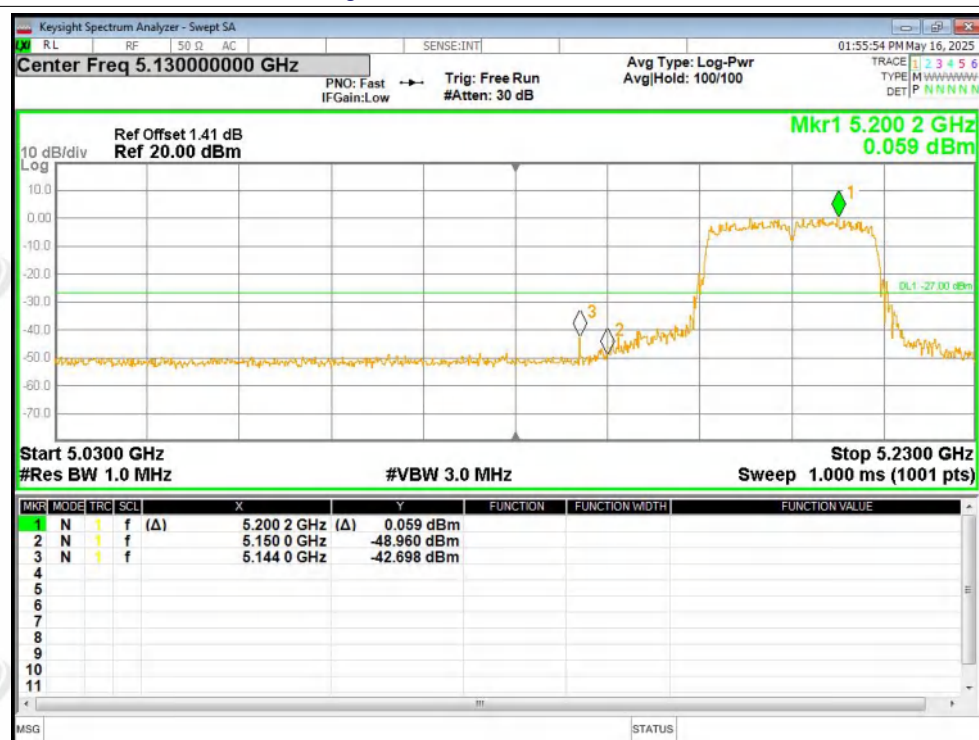


Band Edge NVNT ac20 5240MHz High Ant2





Band Edge NVNT ac40 5190MHz Low Ant2

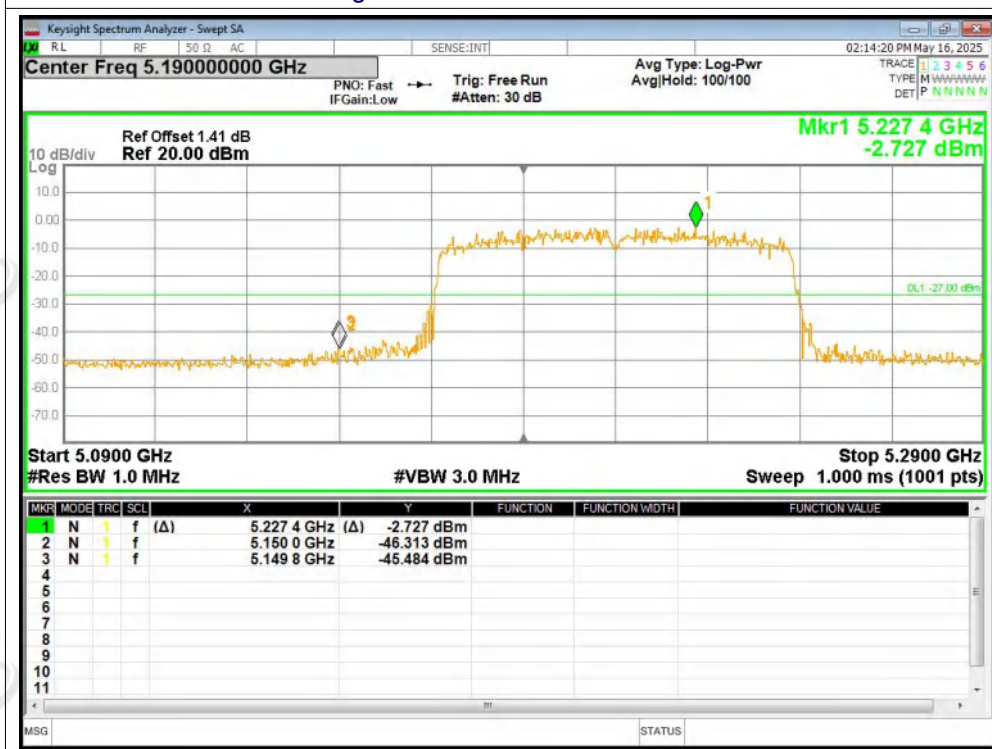


Band Edge NVNT ac40 5230MHz High Ant2





Band Edge NVNT ac80 5210MHz Low Ant2





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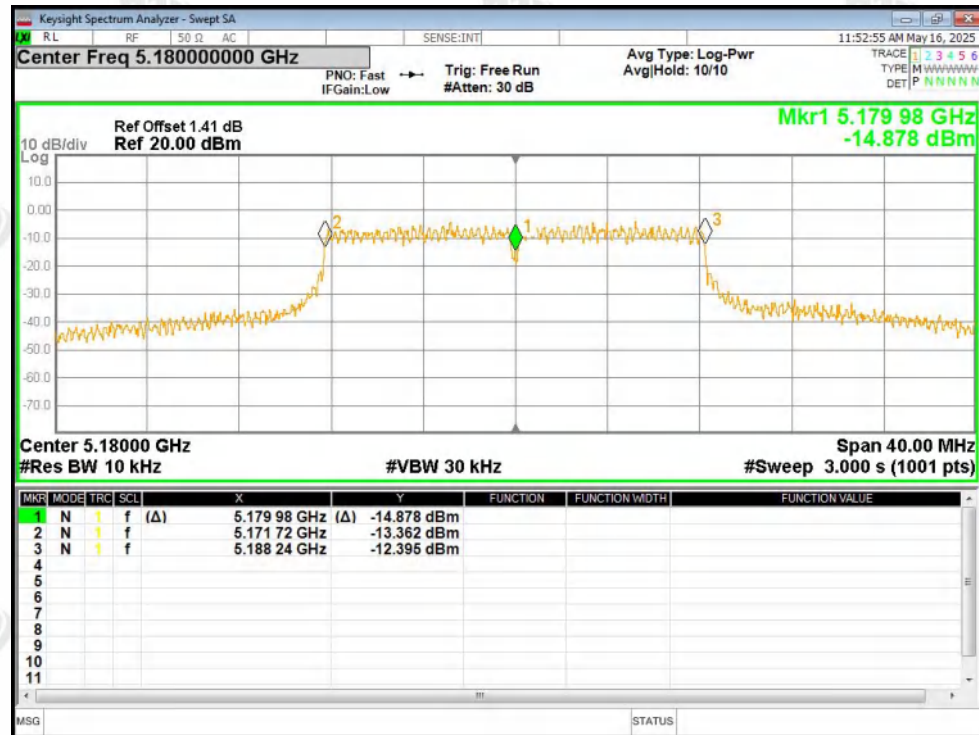
A.7 Frequency Stability

Condition	Mode	Frequency (MHz)	Antenna	Measured Frequency (MHz)	Frequency Error (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
NVNT	a	5180	Ant2	5179.98	-20000	-3.86	Within 5180-5240MHz	Pass
NVNT	a	5200	Ant2	5199.98	-20000	-3.85		Pass
NVNT	a	5240	Ant2	5239.98	-20000	-3.82		Pass
NVNT	n20	5180	Ant2	5180	0	0		Pass
NVNT	n20	5200	Ant2	5199.98	-20000	-3.85		Pass
NVNT	n20	5240	Ant2	5240	0	0		Pass
NVNT	n40	5190	Ant2	5190.04	40000	7.71		Pass
NVNT	n40	5230	Ant2	5230	0	0		Pass
NVNT	ac20	5180	Ant2	5179.98	-20000	-3.86		Pass
NVNT	ac20	5200	Ant2	5200	0	0		Pass
NVNT	ac20	5240	Ant2	5240	0	0		Pass
NVNT	ac40	5190	Ant2	5190	0	0		Pass
NVNT	ac40	5230	Ant2	5230	0	0		Pass
NVNT	ac80	5210	Ant2	5210.08	80000	15.36		Pass



Test Graphs

Freq. Stability NVNT a 5180MHz Ant2

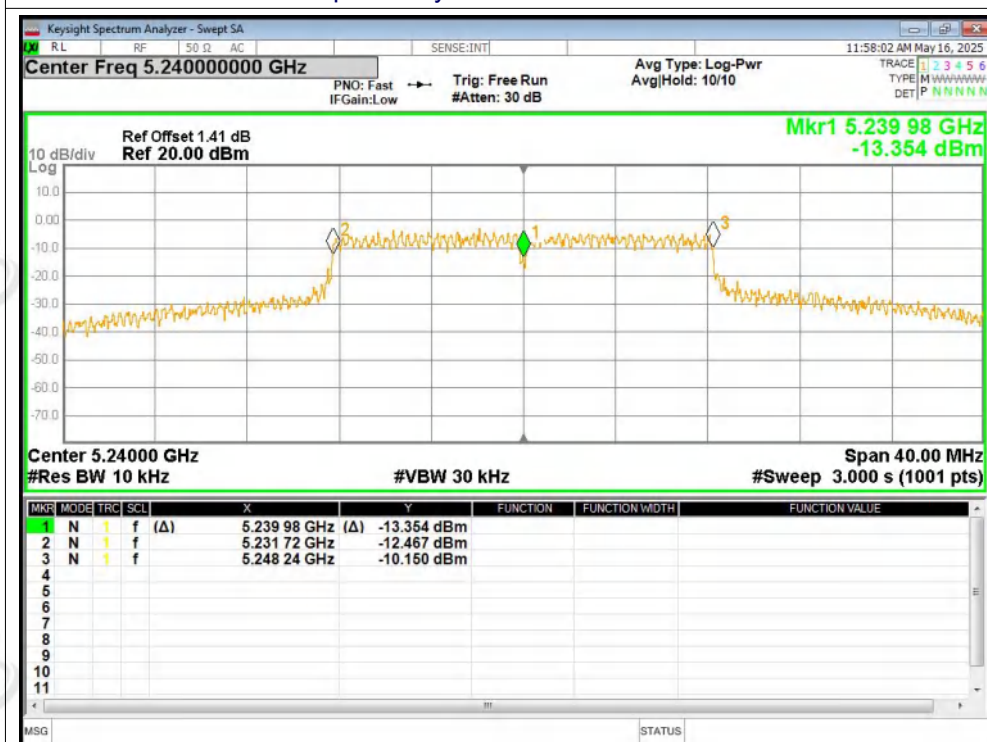


Freq. Stability NVNT a 5200MHz Ant2

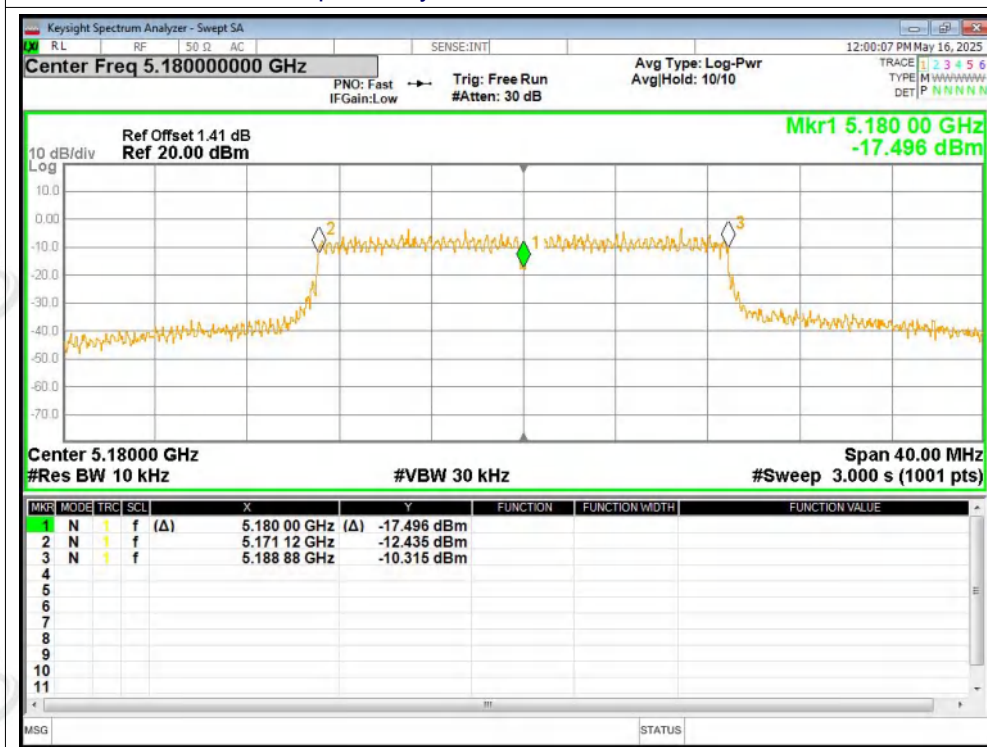




Freq. Stability NVNT a 5240MHz Ant2

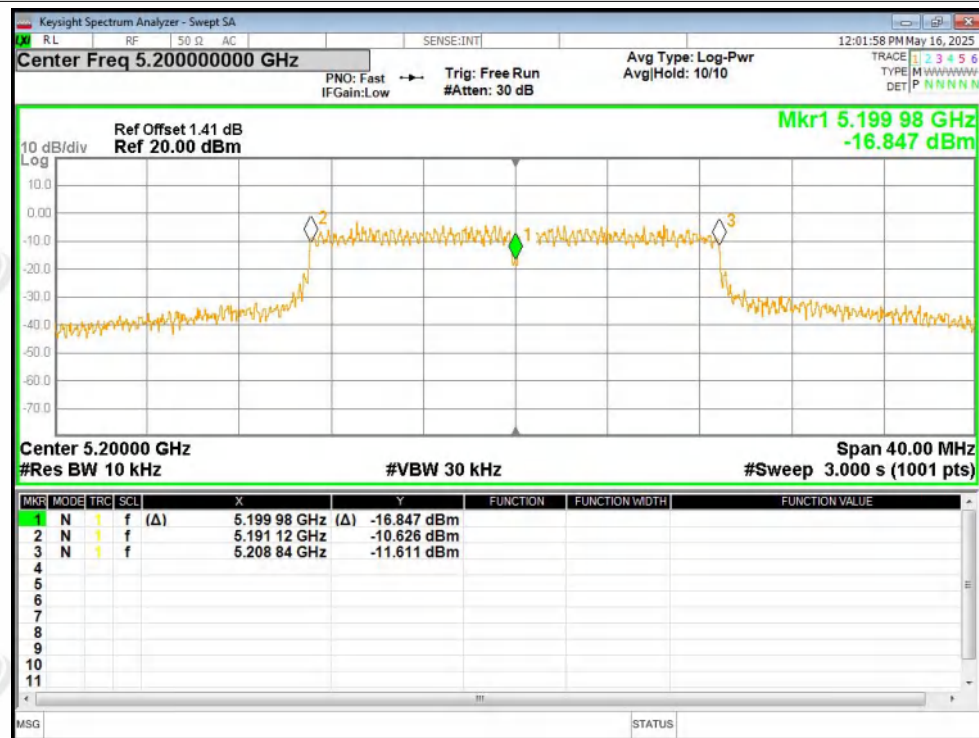


Freq. Stability NVNT n20 5180MHz Ant2

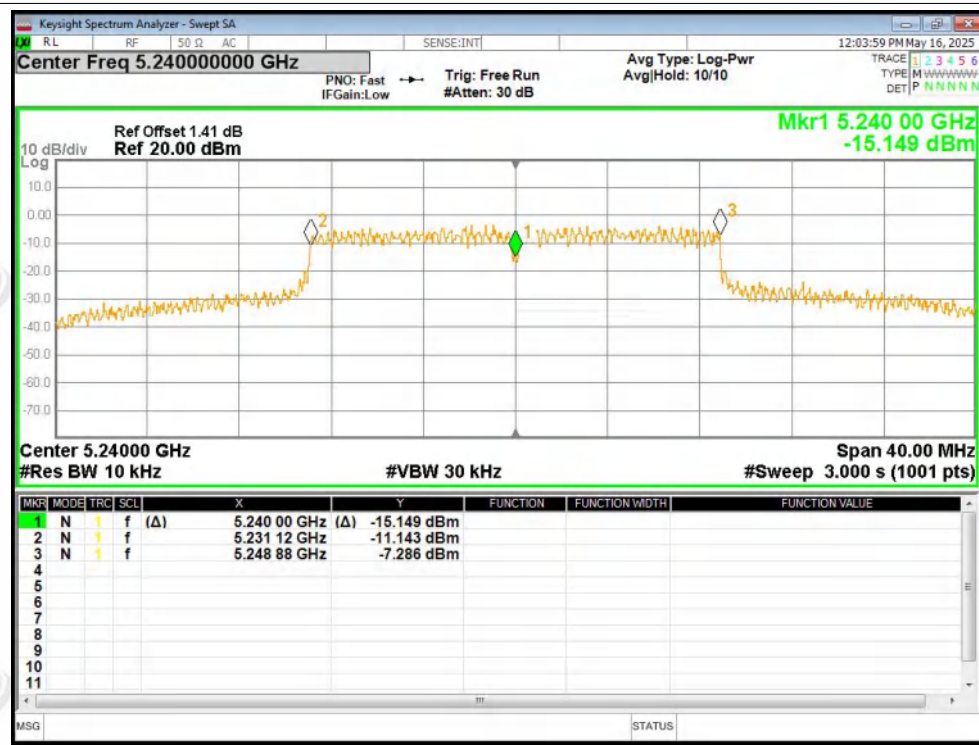




Freq. Stability NVNT n20 5200MHz Ant2

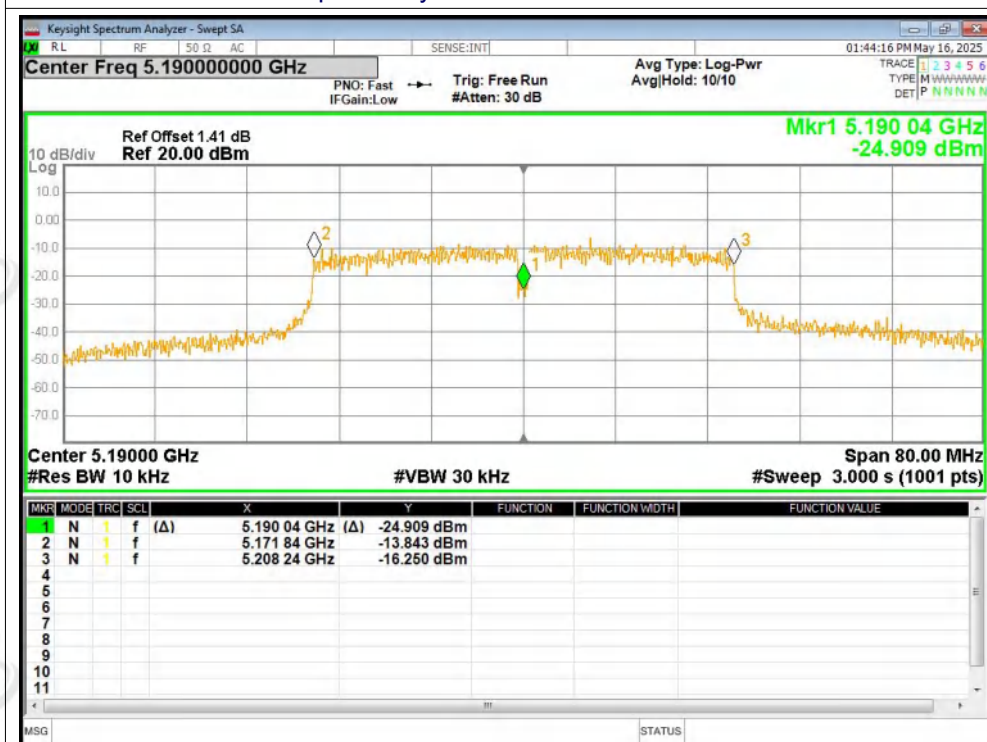


Freq. Stability NVNT n20 5240MHz Ant2





Freq. Stability NVNT n40 5190MHz Ant2



Freq. Stability NVNT n40 5230MHz Ant2

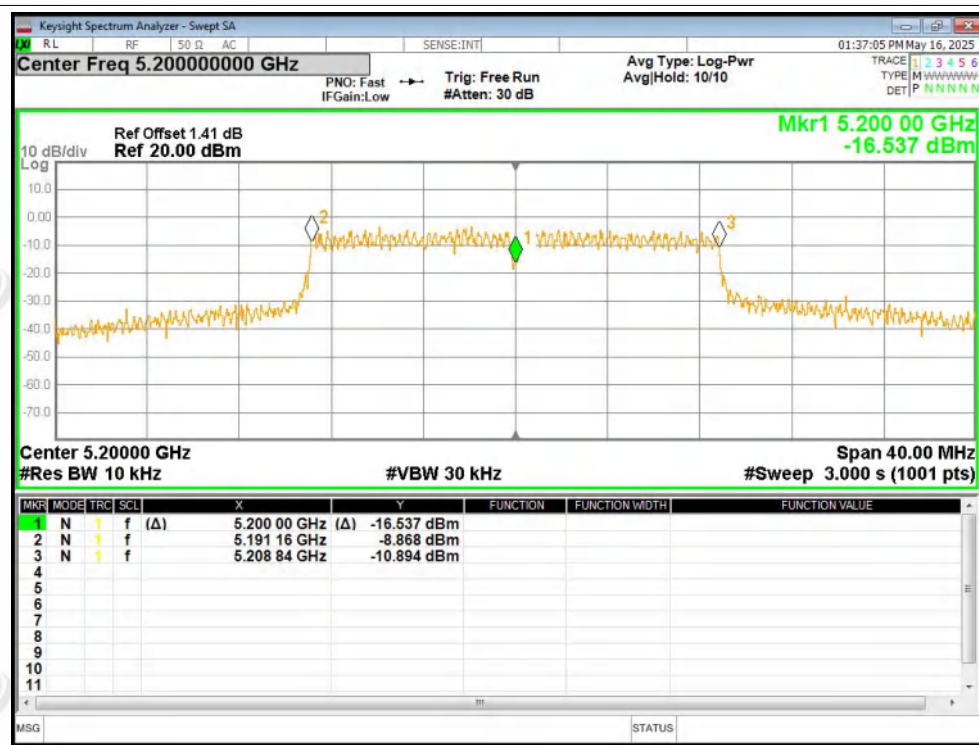




Freq. Stability NVNT ac20 5180MHz Ant2

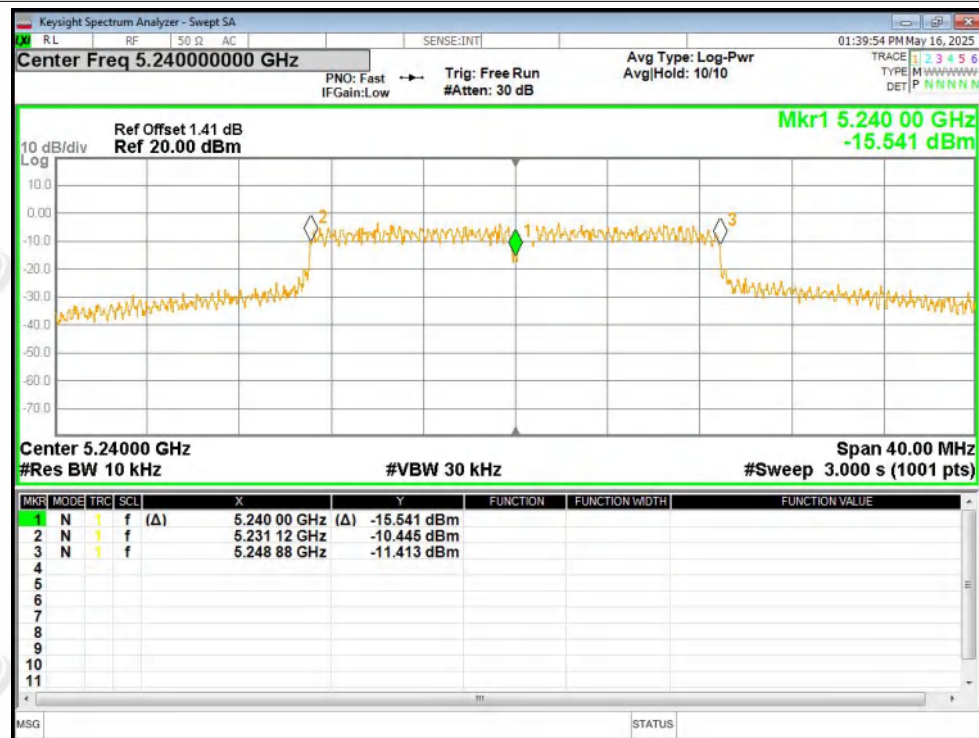


Freq. Stability NVNT ac20 5200MHz Ant2





Freq. Stability NVNT ac20 5240MHz Ant2



Freq. Stability NVNT ac40 5190MHz Ant2

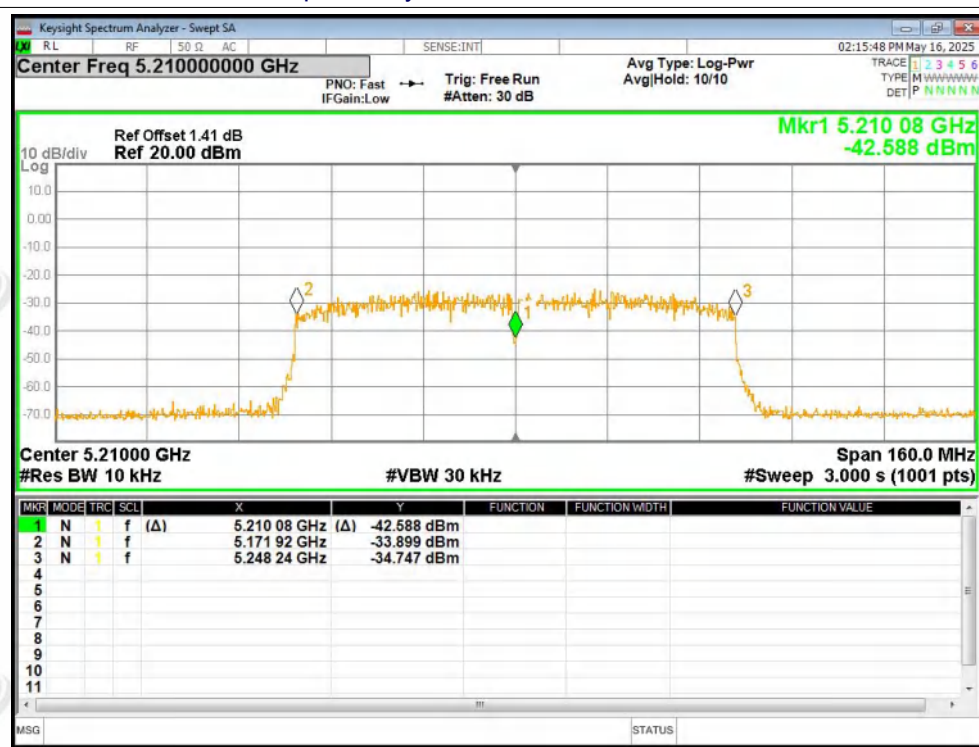




Freq. Stability NVNT ac40 5230MHz Ant2



Freq. Stability NVNT ac80 5210MHz Ant2



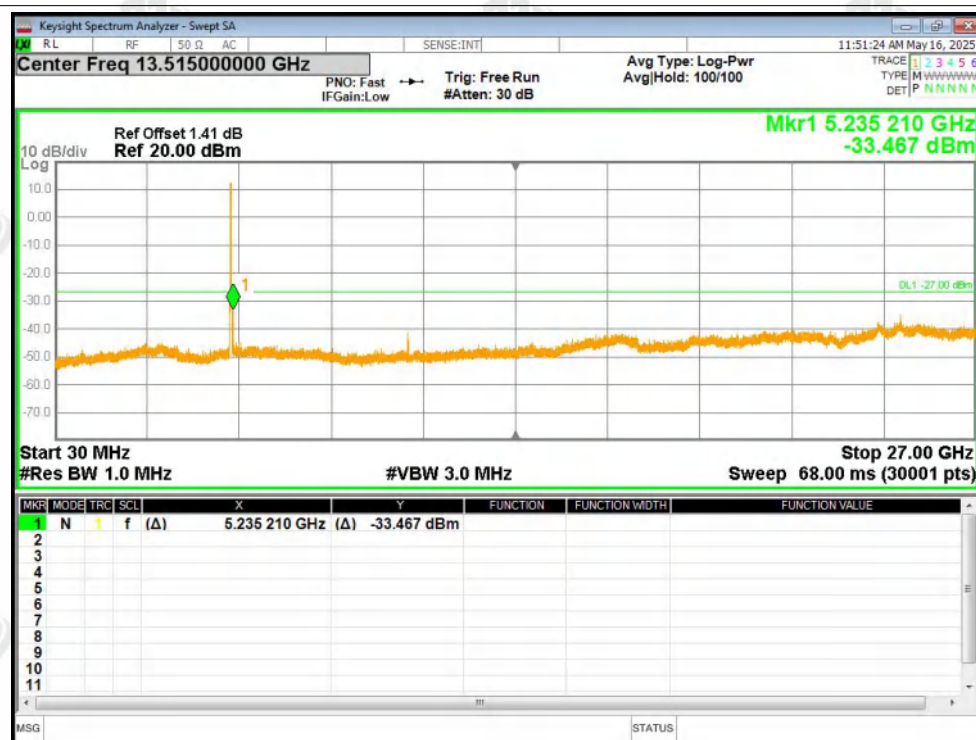
**ZHONGHAN****A.8 Conducted RF Spurious Emission**

Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	a	5180	Ant2	-33.46	-27	Pass
NVNT	a	5200	Ant2	-37.05	-27	Pass
NVNT	a	5240	Ant2	-31.05	-27	Pass
NVNT	n20	5180	Ant2	-37.26	-27	Pass
NVNT	n20	5200	Ant2	-37.12	-27	Pass
NVNT	n20	5240	Ant2	-32.17	-27	Pass
NVNT	n40	5190	Ant2	-37.96	-27	Pass
NVNT	n40	5230	Ant2	-36.68	-27	Pass
NVNT	ac20	5180	Ant2	-36.37	-27	Pass
NVNT	ac20	5200	Ant2	-33.58	-27	Pass
NVNT	ac20	5240	Ant2	-34.85	-27	Pass
NVNT	ac40	5190	Ant2	-37.09	-27	Pass
NVNT	ac40	5230	Ant2	-37.72	-27	Pass
NVNT	ac80	5210	Ant2	-36.45	-27	Pass

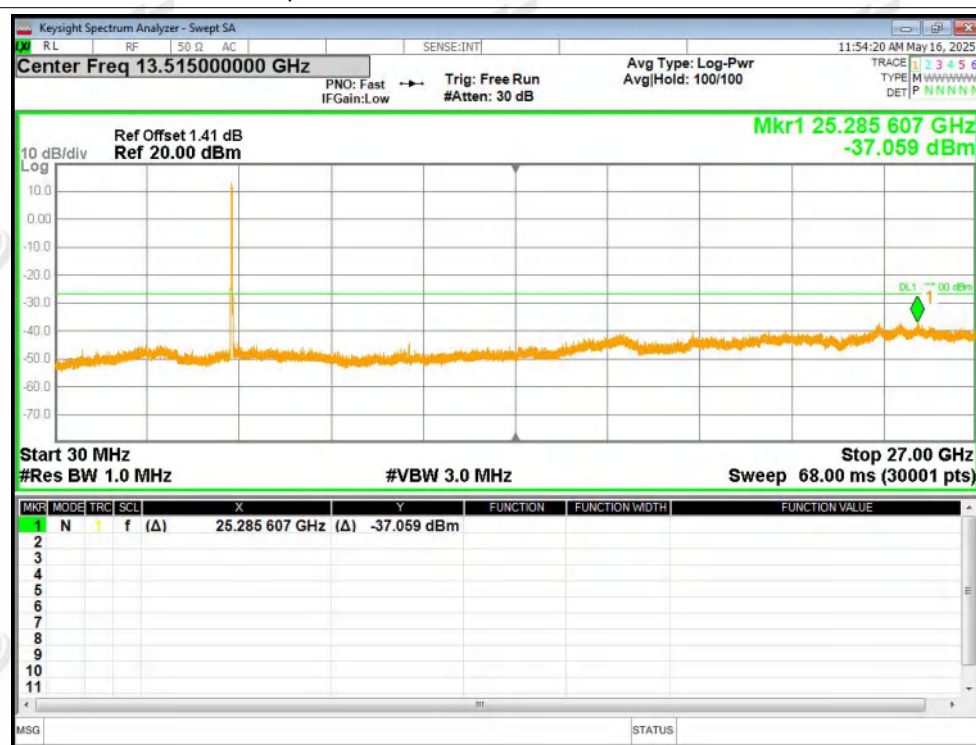


Test Graphs

Tx. Spurious NVNT a 5180MHz Ant2 Emission



Tx. Spurious NVNT a 5200MHz Ant2 Emission

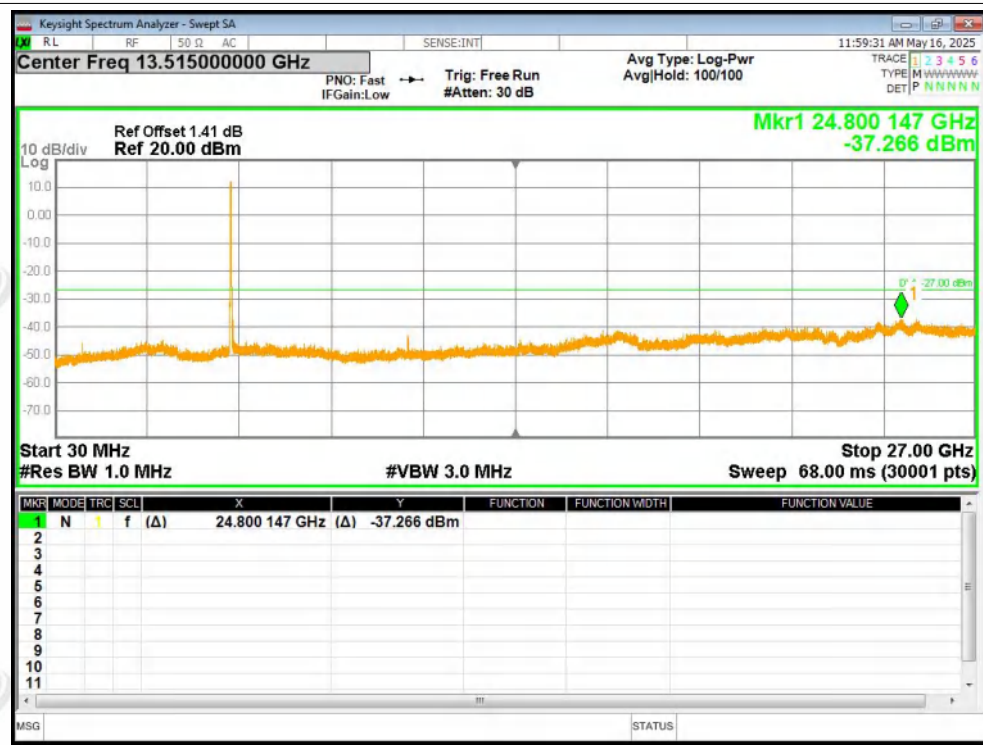




Tx. Spurious NVNT a 5240MHz Ant2 Emission

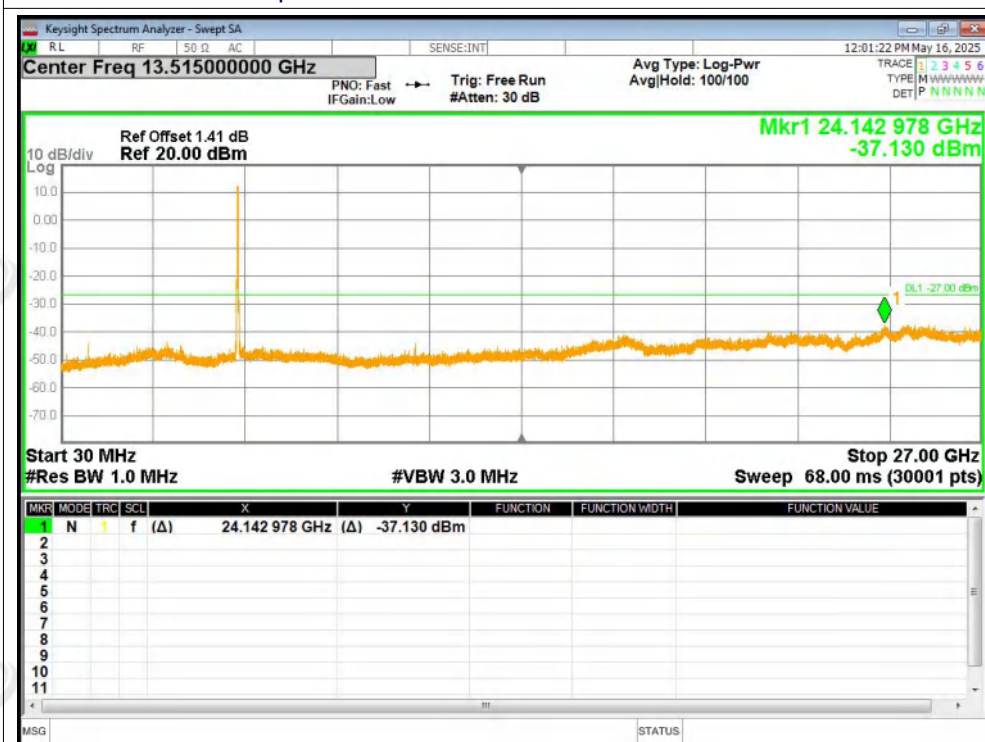


Tx. Spurious NVNT n20 5180MHz Ant2 Emission

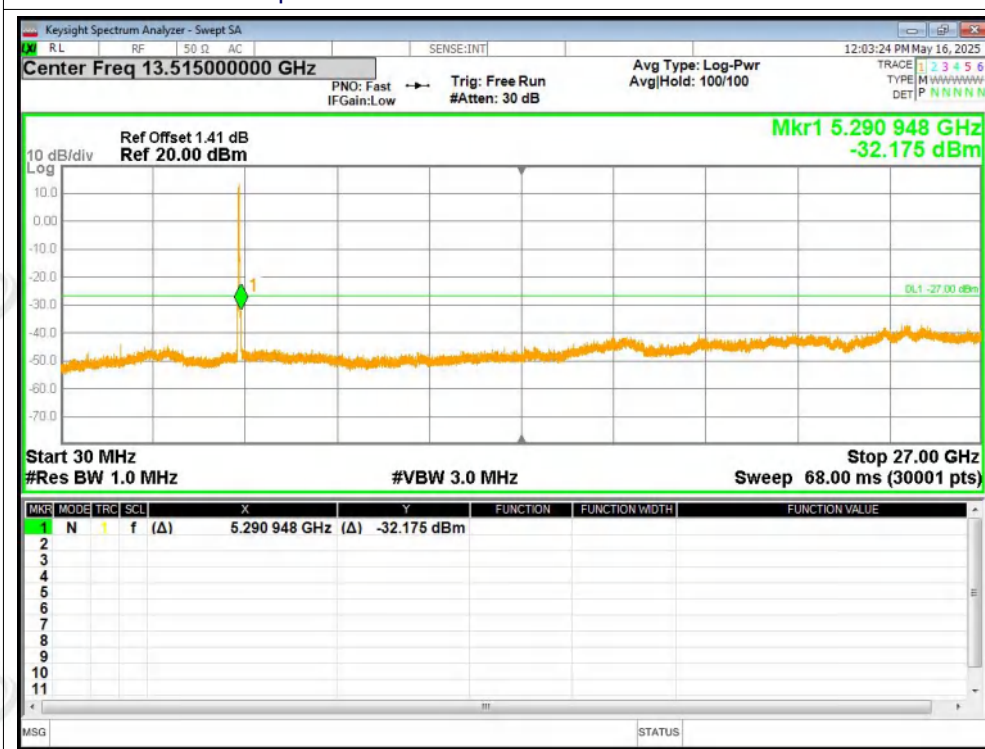




Tx. Spurious NVNT n20 5200MHz Ant2 Emission

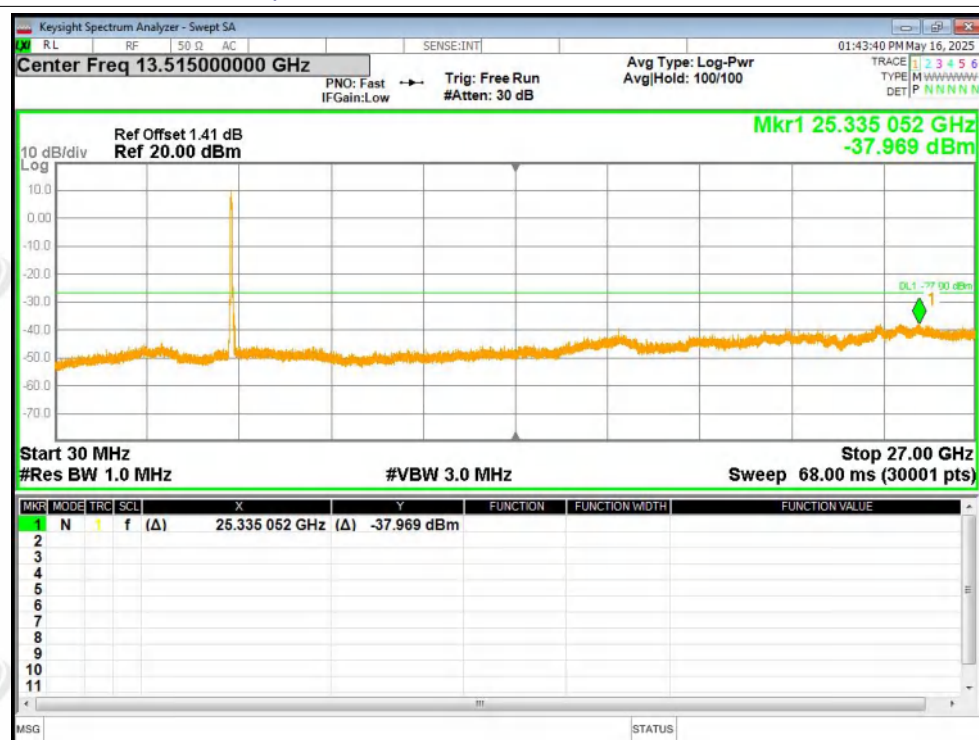


Tx. Spurious NVNT n20 5240MHz Ant2 Emission

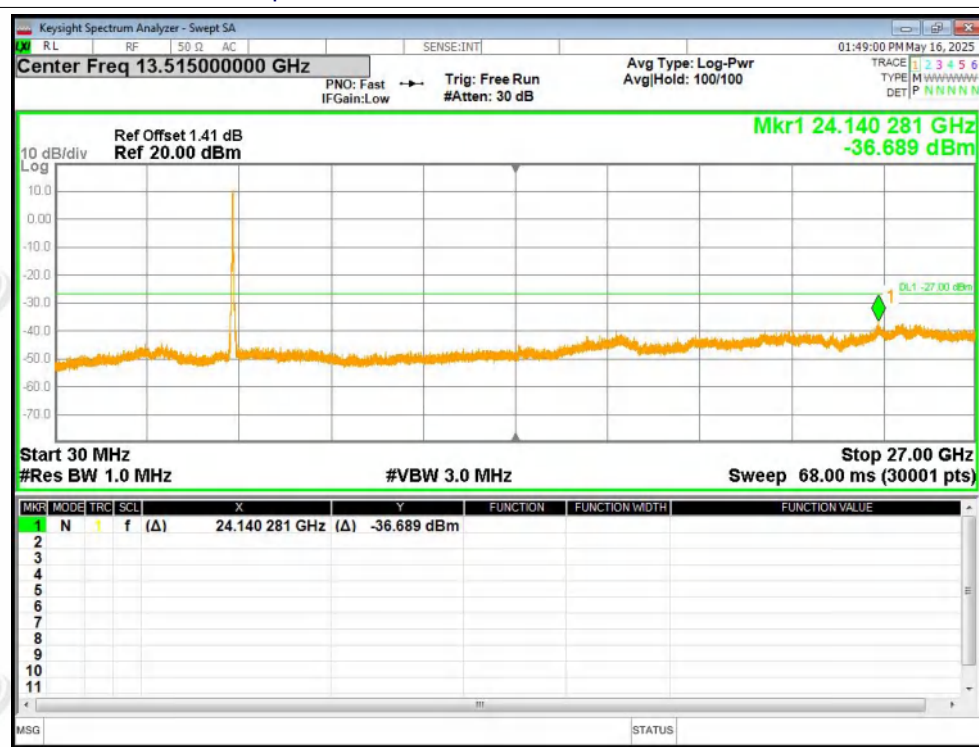




Tx. Spurious NVNT n40 5190MHz Ant2 Emission

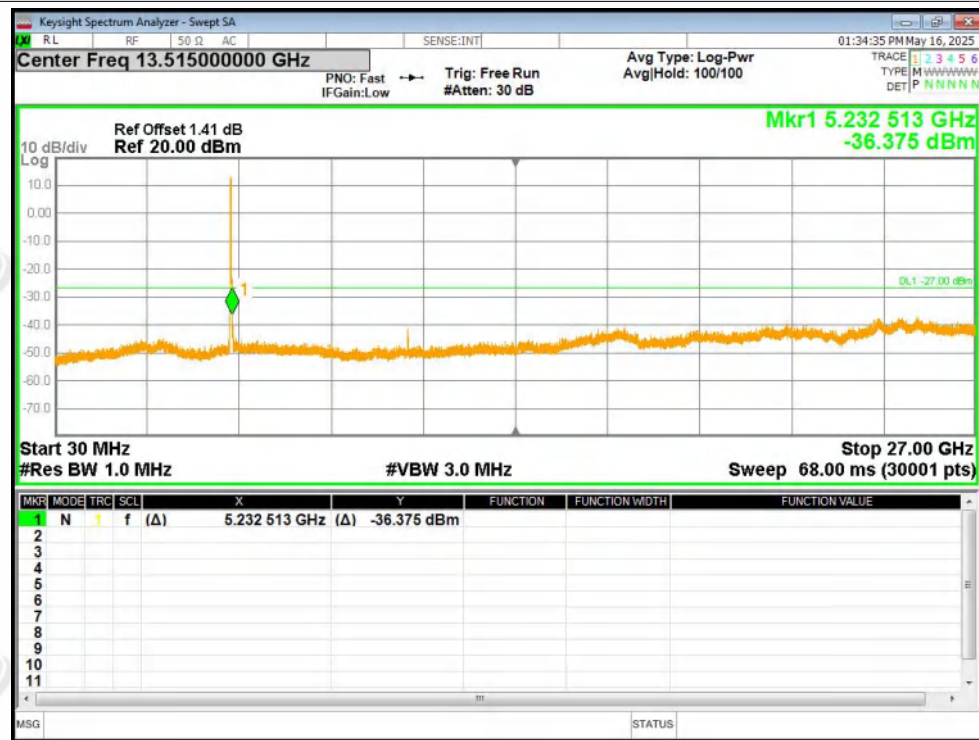


Tx. Spurious NVNT n40 5230MHz Ant2 Emission

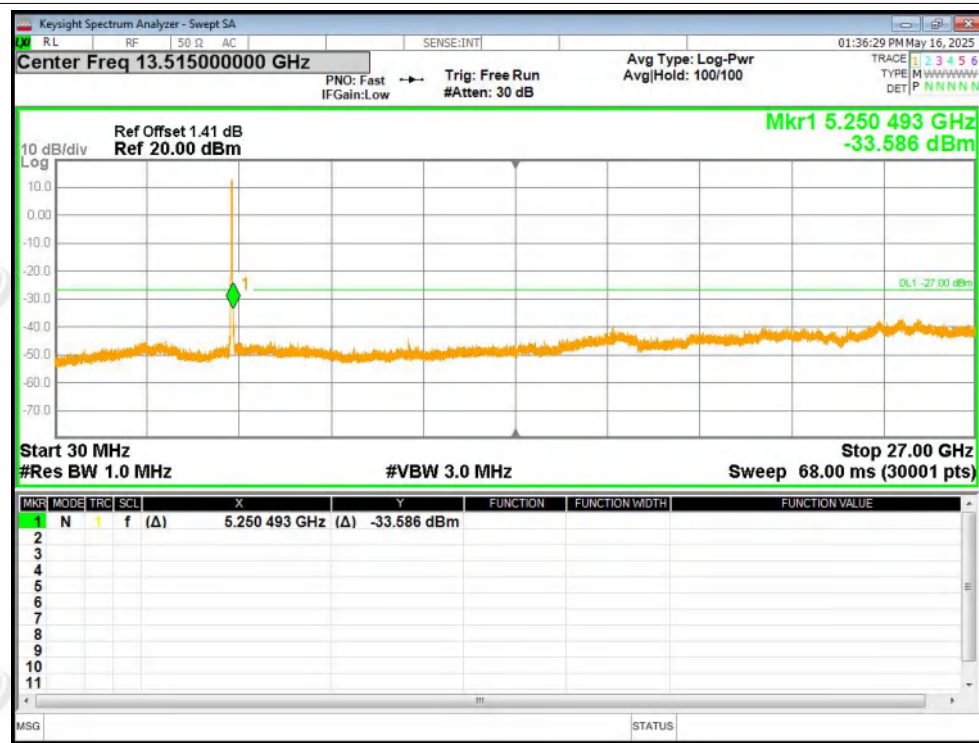




Tx. Spurious NVNT ac20 5180MHz Ant2 Emission

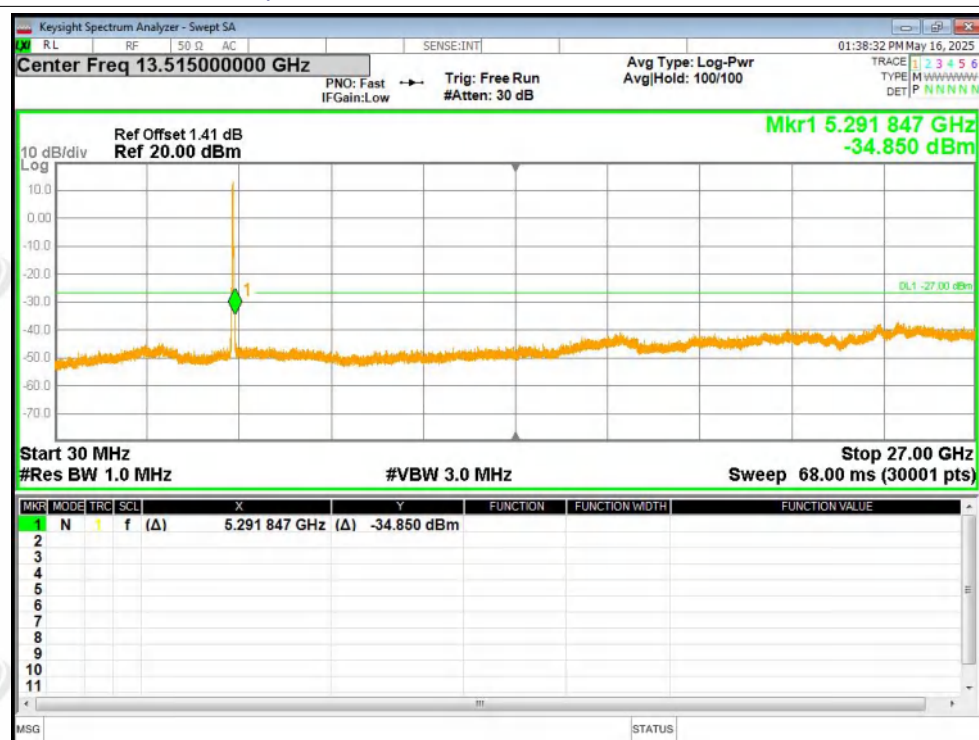


Tx. Spurious NVNT ac20 5200MHz Ant2 Emission

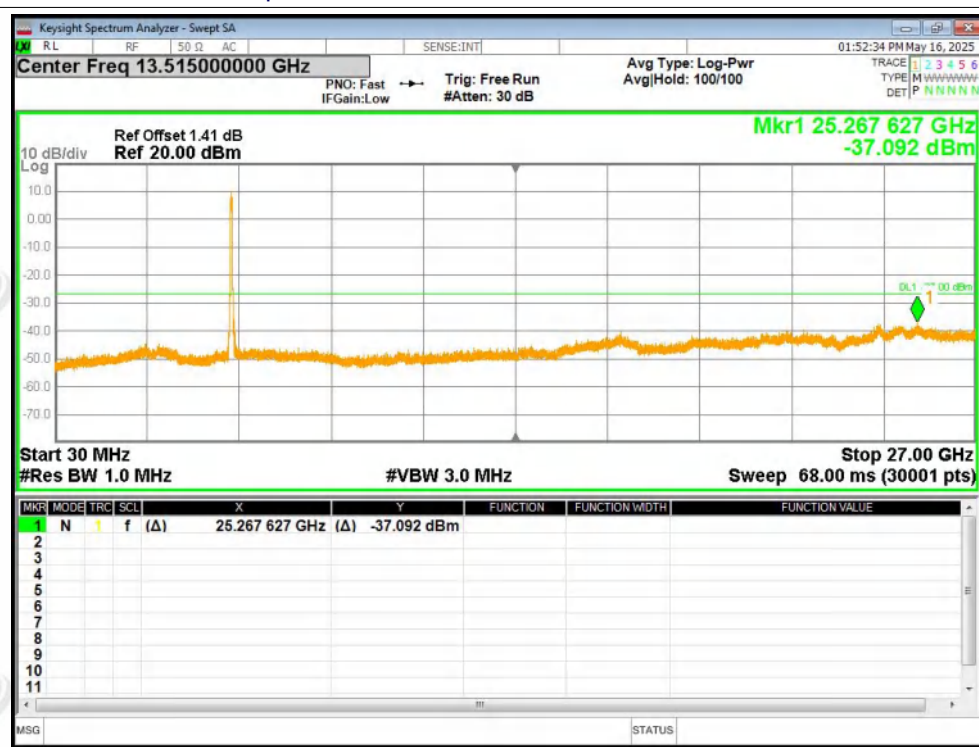




Tx. Spurious NVNT ac20 5240MHz Ant2 Emission

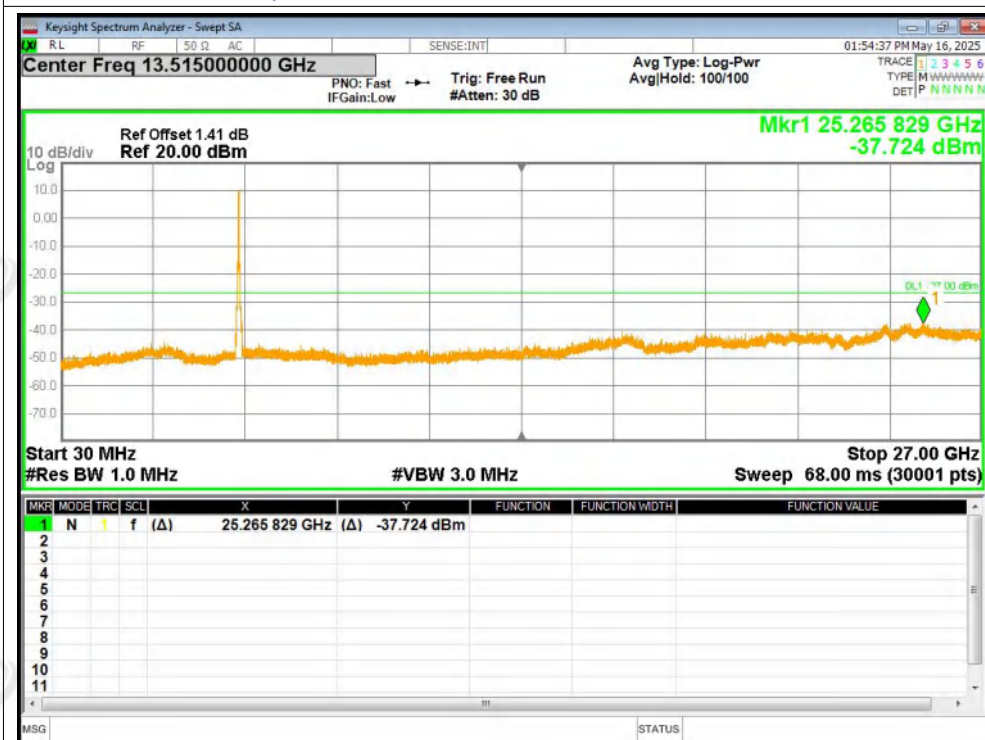


Tx. Spurious NVNT ac40 5190MHz Ant2 Emission





Tx. Spurious NVNT ac40 5230MHz Ant2 Emission



Tx. Spurious NVNT ac80 5210MHz Ant2 Emission

