

Appendix A for 5.2GWIFI Test Data

Product Name: dash cam

Test Model: V78

Environmental Conditions

Temperature:	25.7℃
Relative Humidity:	54.9%
ATM Pressure:	101.0 kPa
Test Engineer:	Leon Li
Supervised by:	Baret Wu

**Duty Cycle**

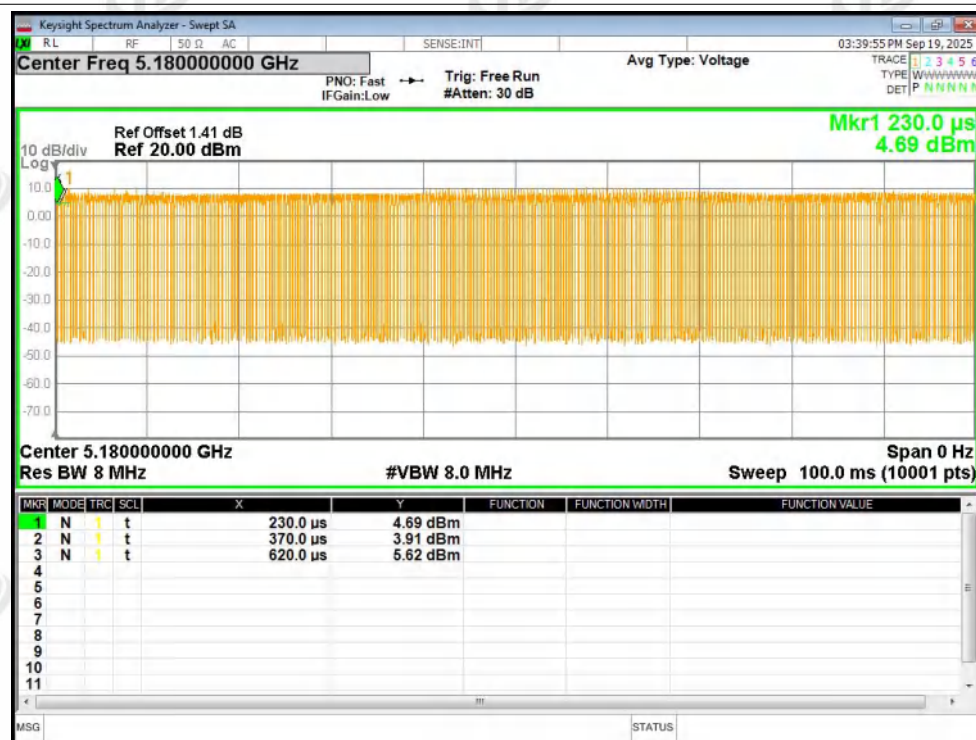
Mode	Frequency (MHz)	Antenna	T _{on} ms	T _{total} ms	Duty Cycle (%)	Correction Factor (dB)	1/T (kHz)
a	5180	Ant1	0.25	0.39	64.1	1.93	4
a	5200	Ant1	0.25	0.30	83.33	0.79	4
a	5240	Ant1	0.25	0.35	71.43	1.46	4
n20	5180	Ant1	1.93	2.10	91.9	0.37	0.52
n20	5200	Ant1	1.92	1.98	96.97	0.13	0.52
n20	5240	Ant1	1.92	1.98	96.97	0.13	0.52
n40	5190	Ant1	0.95	1.03	92.23	0.35	1.05
n40	5230	Ant1	0.94	1.04	90.38	0.44	1.06
ac20	5180	Ant1	1.93	2.09	92.34	0.35	0.52
ac20	5200	Ant1	1.93	1.97	97.97	0.09	0.52
ac20	5240	Ant1	1.94	2.03	95.57	0.2	0.52
ac40	5190	Ant1	0.96	1.11	86.49	0.63	1.04
ac40	5230	Ant1	0.95	1.09	87.16	0.6	1.05
ac80	5210	Ant1	0.46	0.58	79.31	1.01	2.17

Note:

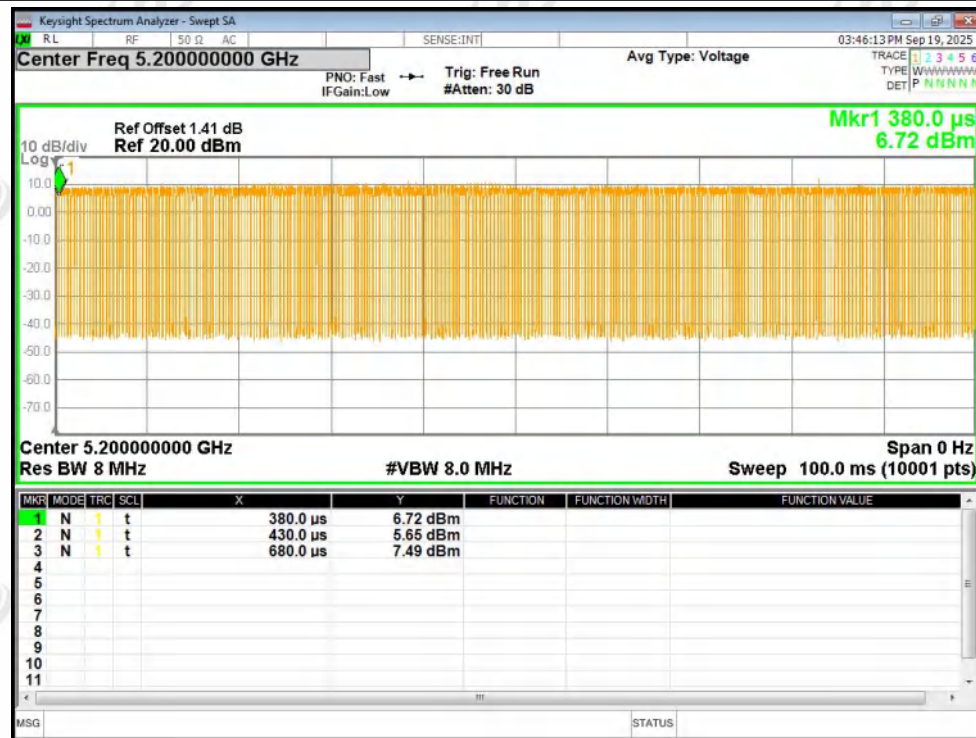
1. Duty Cycle = T_{on} / T_{total}
2. Correction Factor = $10 \log (1 / \text{Duty Cycle})$.
3. $1/T = 1/T_{on}$

Test Graphs

Duty Cycle NVNT a 5180MHz Ant1

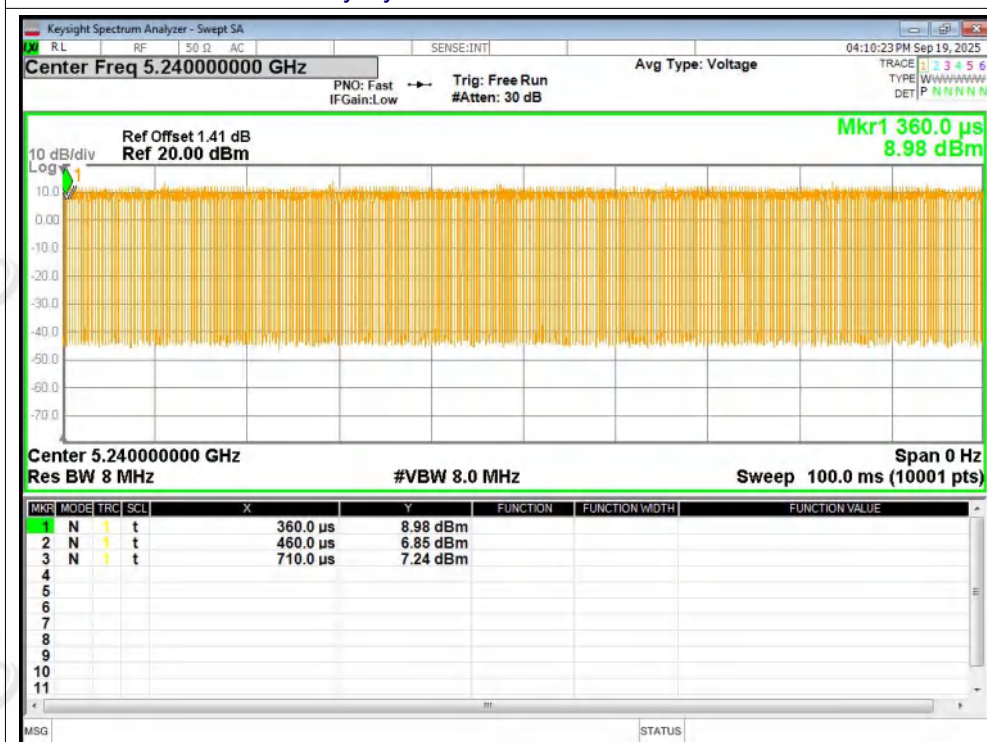


Duty Cycle NVNT a 5200MHz Ant1

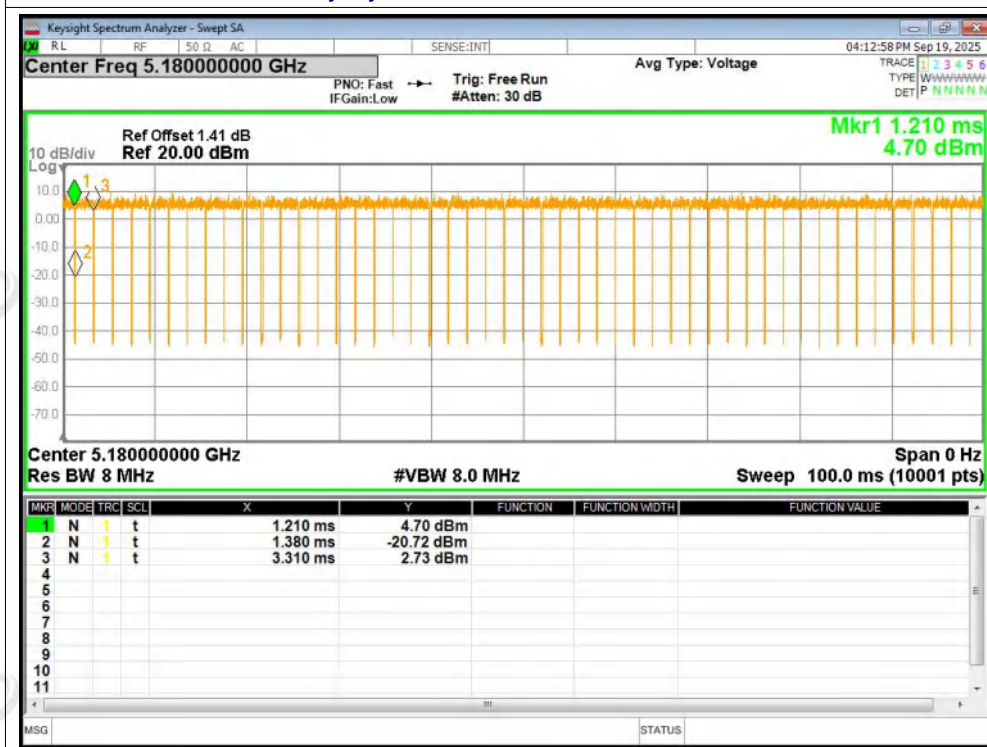




Duty Cycle NVNT a 5240MHz Ant1

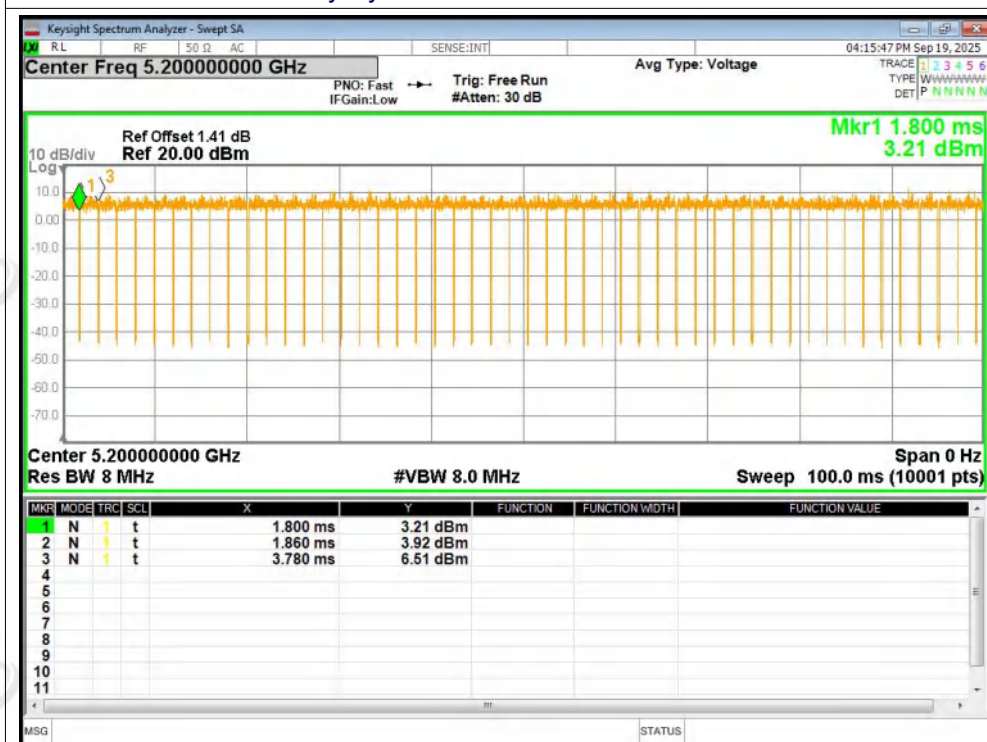


Duty Cycle NVNT n20 5180MHz Ant1

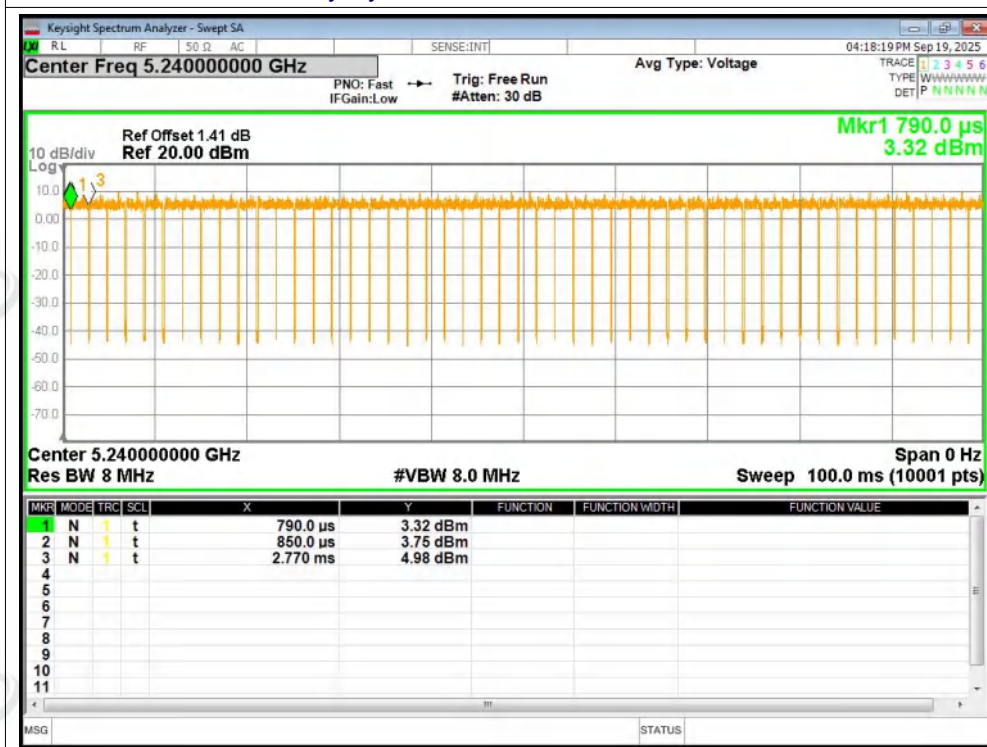




Duty Cycle NVNT n20 5200MHz Ant1

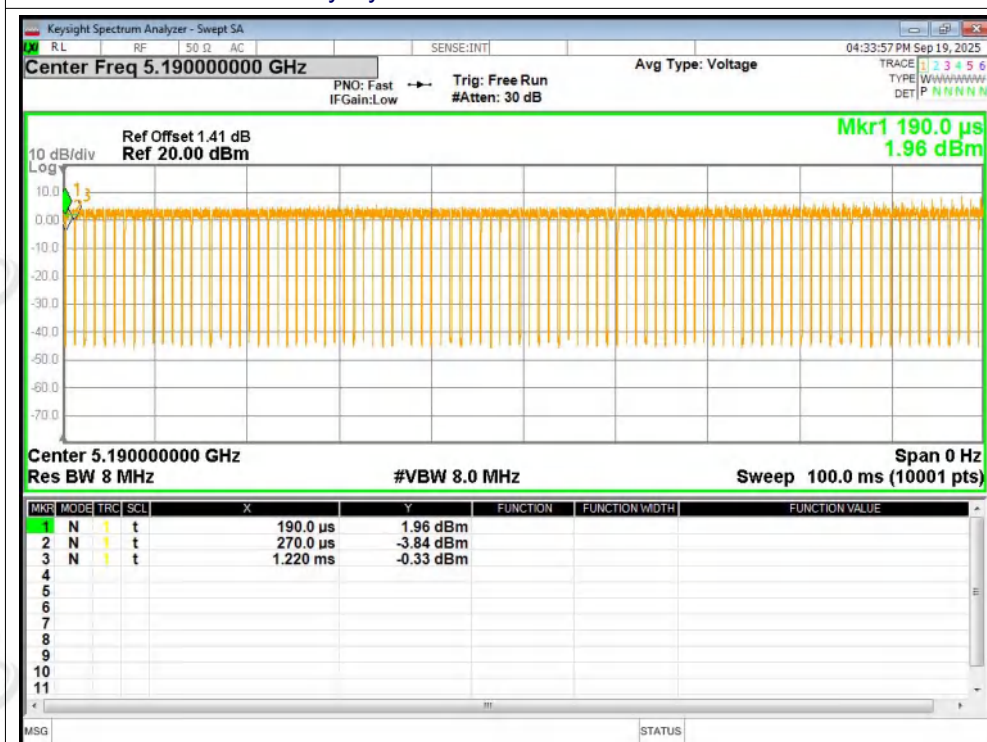


Duty Cycle NVNT n20 5240MHz Ant1

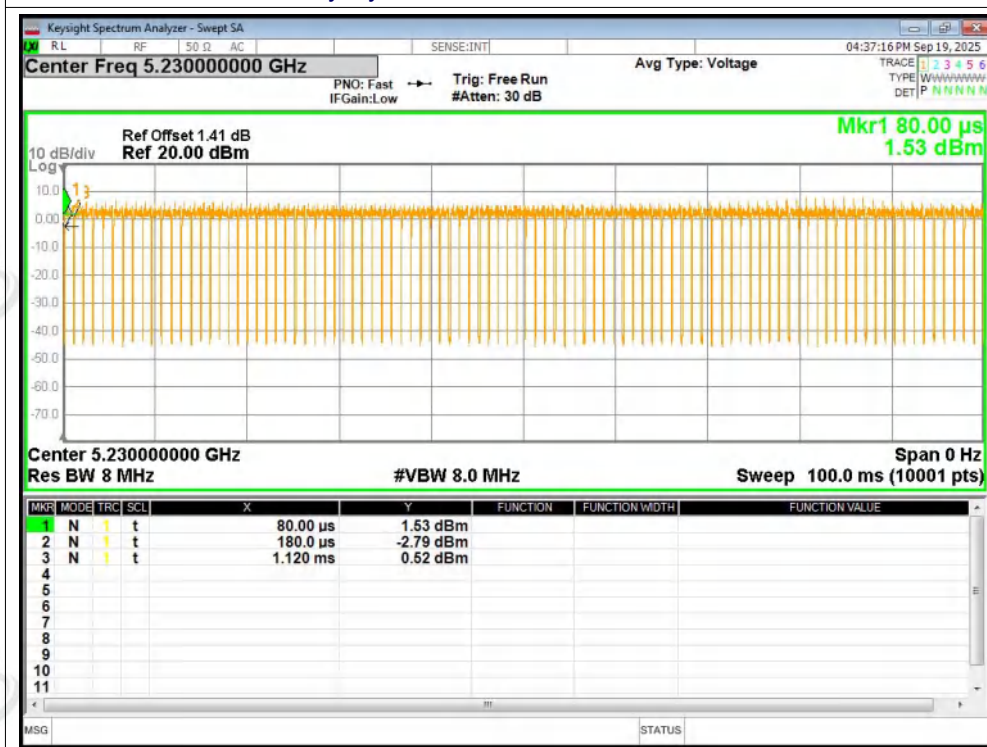




Duty Cycle NVNT n40 5190MHz Ant1

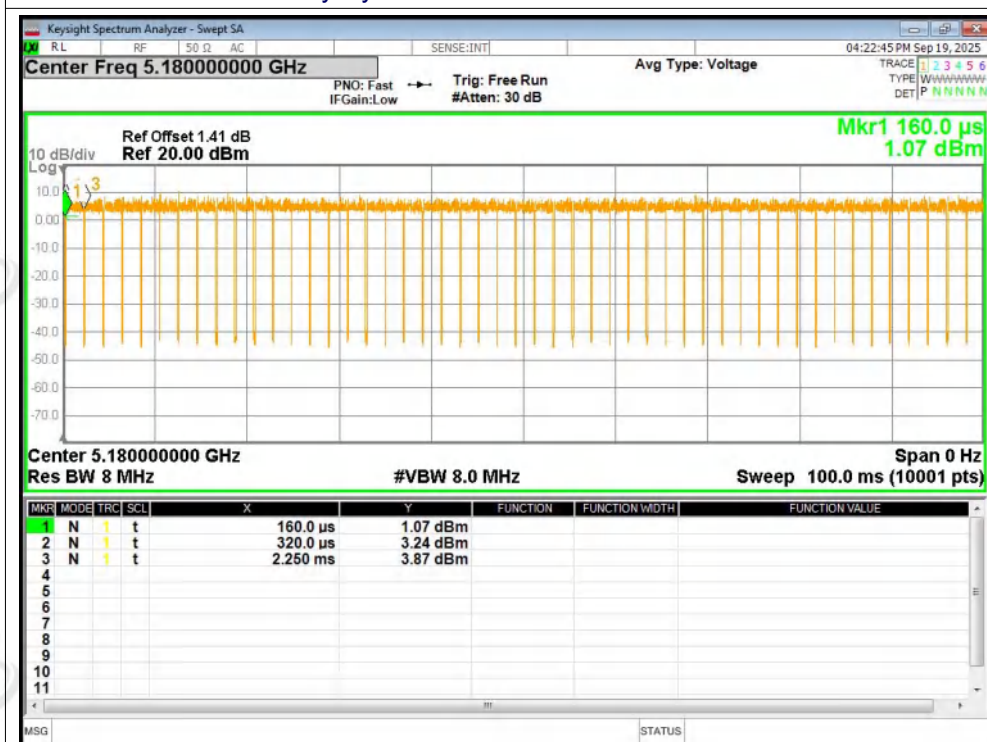


Duty Cycle NVNT n40 5230MHz Ant1

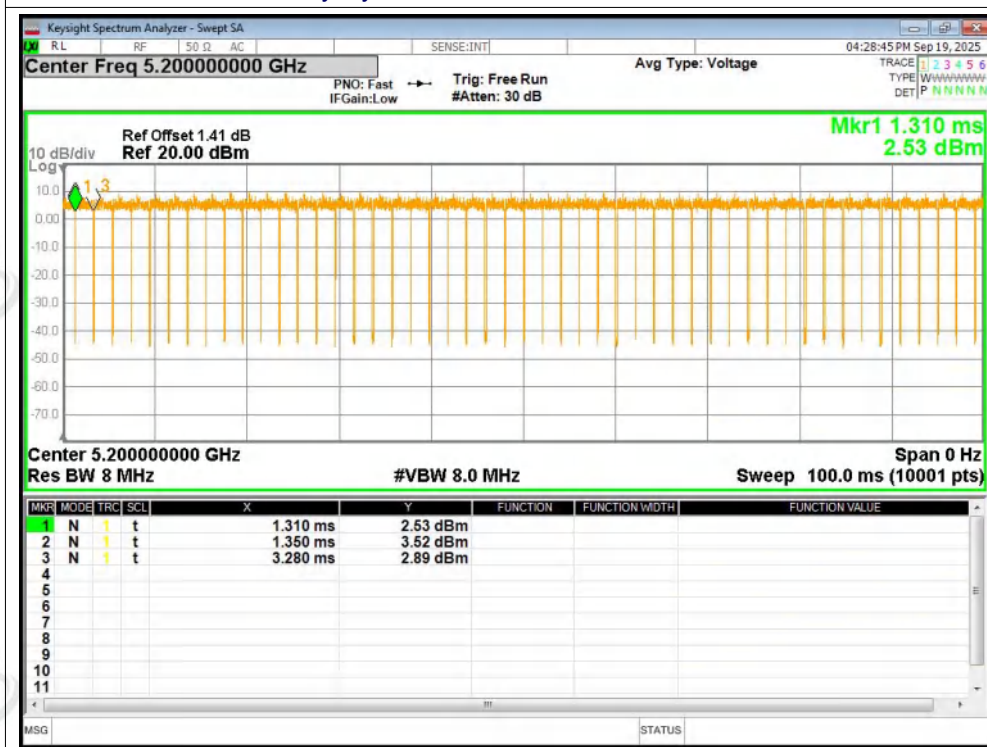




Duty Cycle NVNT ac20 5180MHz Ant1

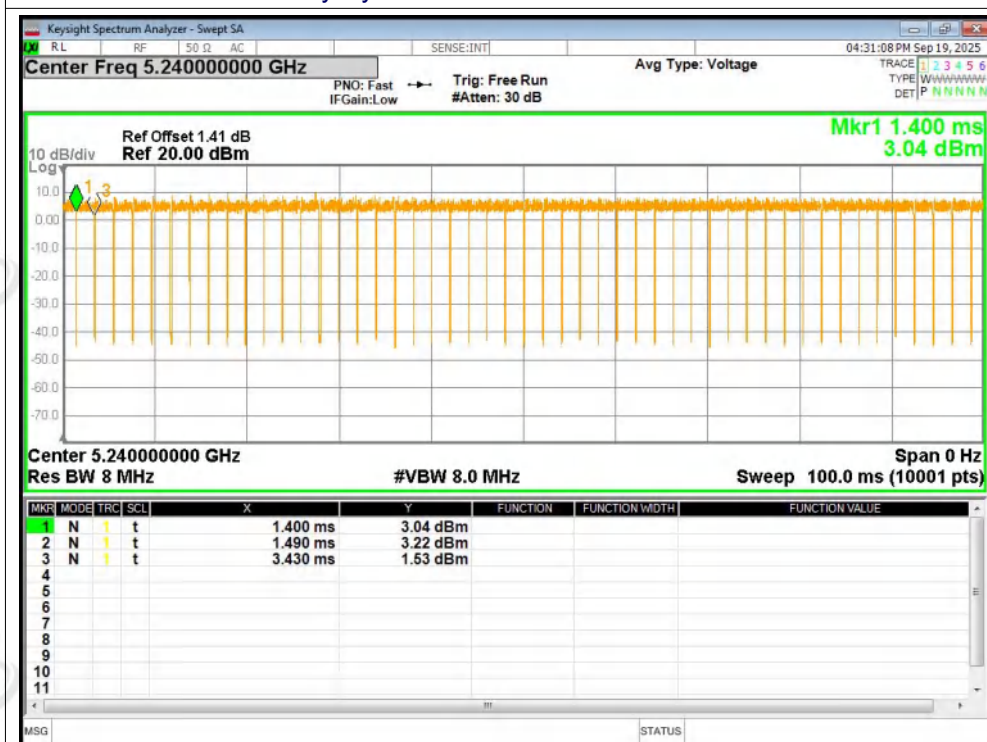


Duty Cycle NVNT ac20 5200MHz Ant1

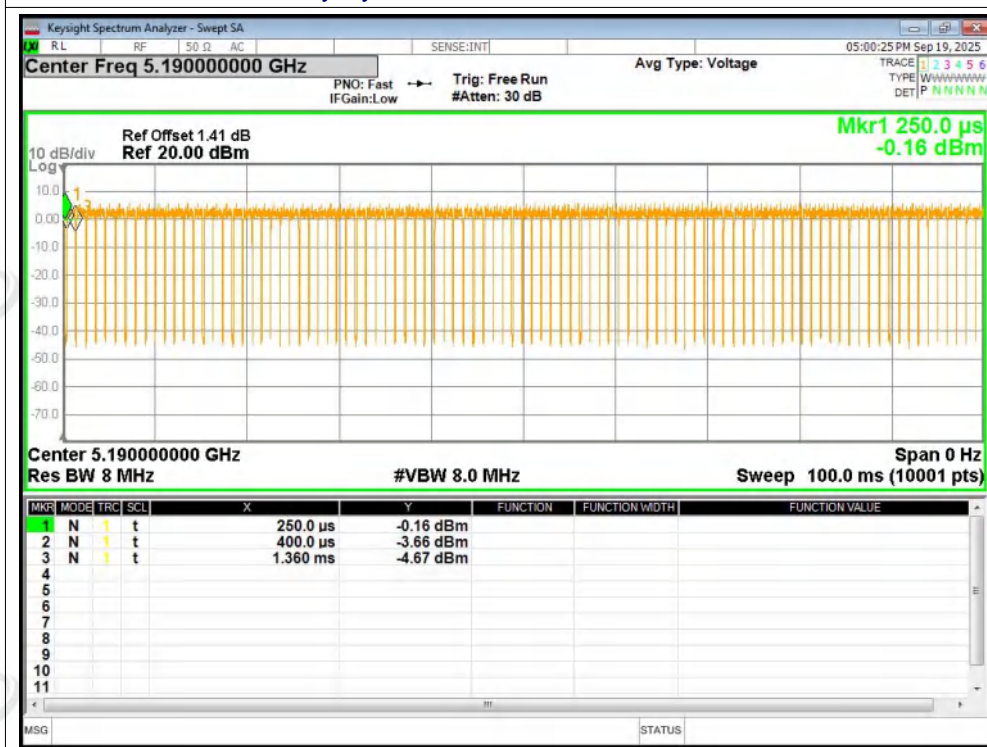




Duty Cycle NVNT ac20 5240MHz Ant1

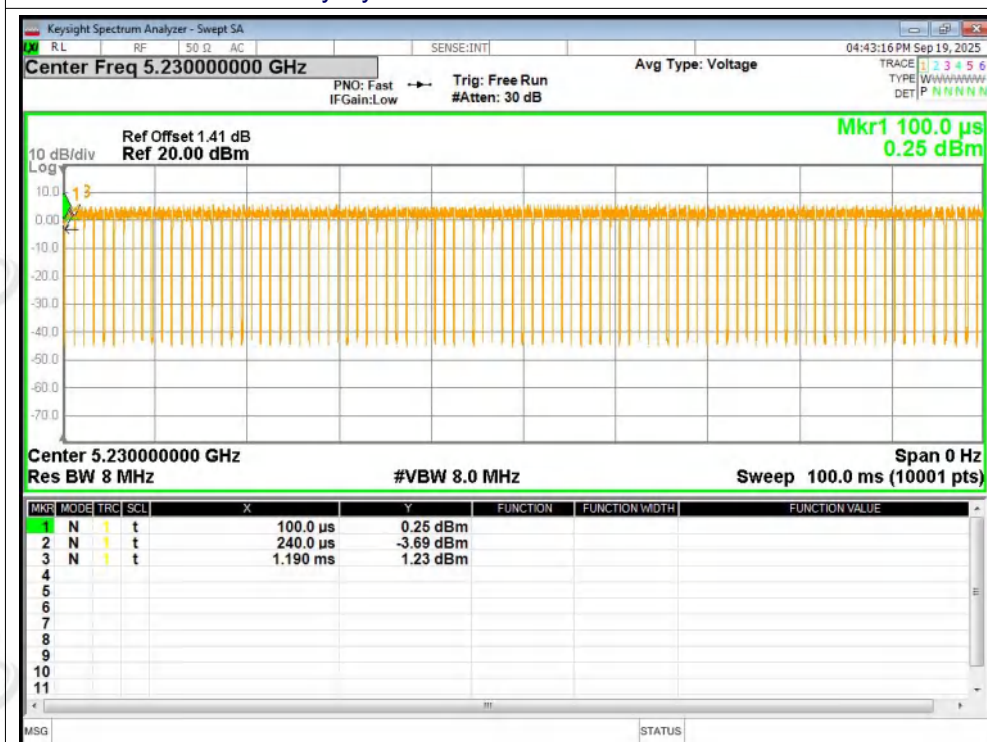


Duty Cycle NVNT ac40 5190MHz Ant1

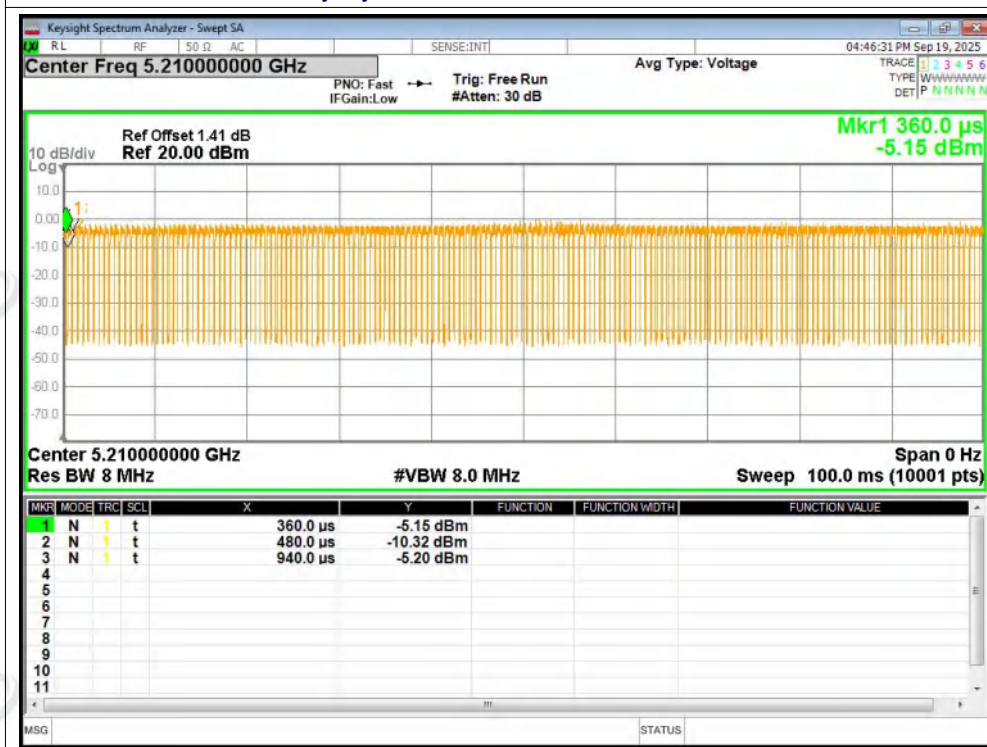




Duty Cycle NVNT ac40 5230MHz Ant1



Duty Cycle NVNT ac80 5210MHz Ant1





ZHONGHAN

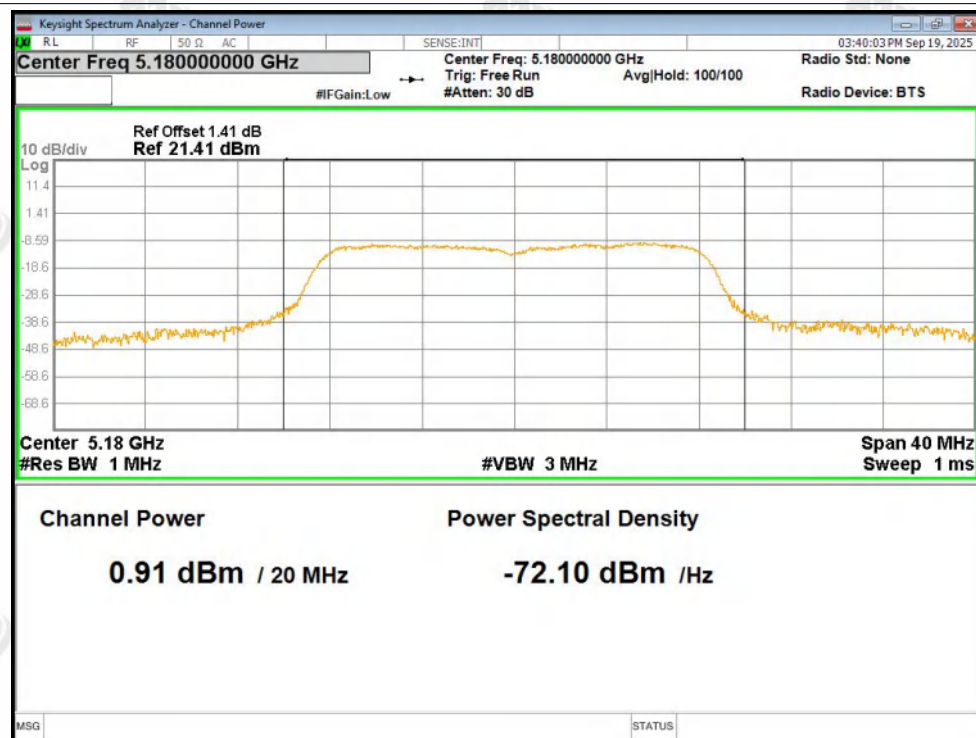
Maximum Conducted Output Power

Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Duty Factor (dB)	Total Power (dBm)	Limit (dBm)	Verdict
NVNT	a	5180	Ant1	0.91	1.93	2.84	24	Pass
NVNT	a	5200	Ant1	2.27	0.79	3.06	24	Pass
NVNT	a	5240	Ant1	3.26	1.46	4.72	24	Pass
NVNT	n20	5180	Ant1	1.74	0.37	2.11	24	Pass
NVNT	n20	5200	Ant1	1.94	0.13	2.07	24	Pass
NVNT	n20	5240	Ant1	1.47	0.13	1.6	24	Pass
NVNT	n40	5190	Ant1	1.33	0.35	1.68	24	Pass
NVNT	n40	5230	Ant1	1.1	0.44	1.54	24	Pass
NVNT	ac20	5180	Ant1	1.02	0.35	1.37	24	Pass
NVNT	ac20	5200	Ant1	1.3	0.09	1.39	24	Pass
NVNT	ac20	5240	Ant1	1.18	0.2	1.38	24	Pass
NVNT	ac40	5190	Ant1	1.29	0.63	1.92	24	Pass
NVNT	ac40	5230	Ant1	1.18	0.6	1.78	24	Pass
NVNT	ac80	5210	Ant1	-1.4	1.01	-0.39	24	Pass

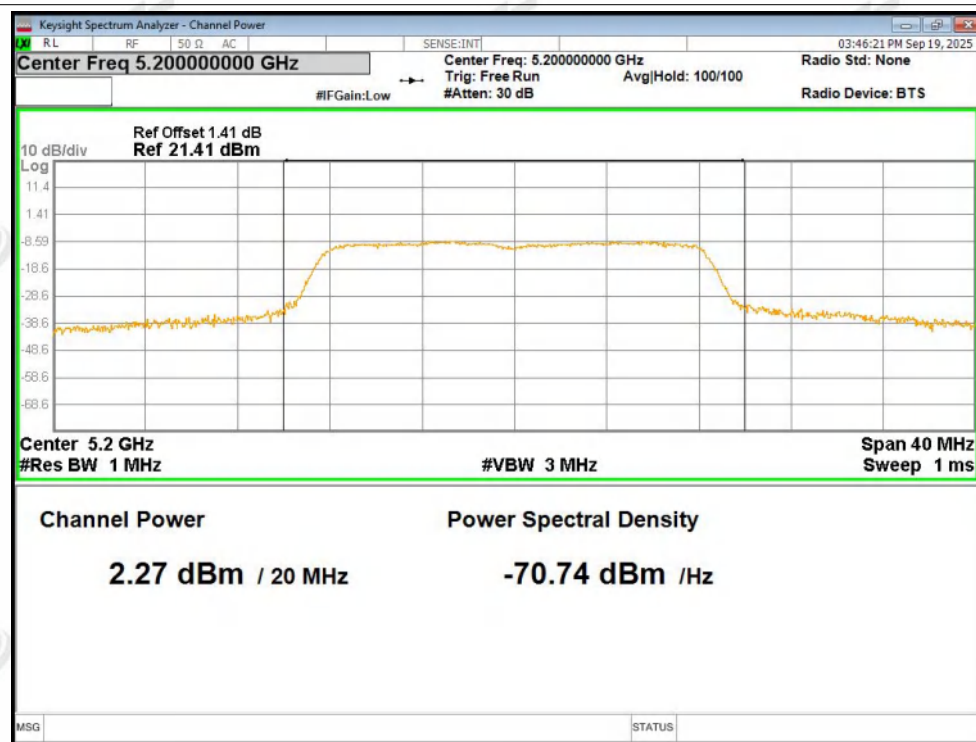


Test Graphs

Power NVNT a 5180MHz Ant1

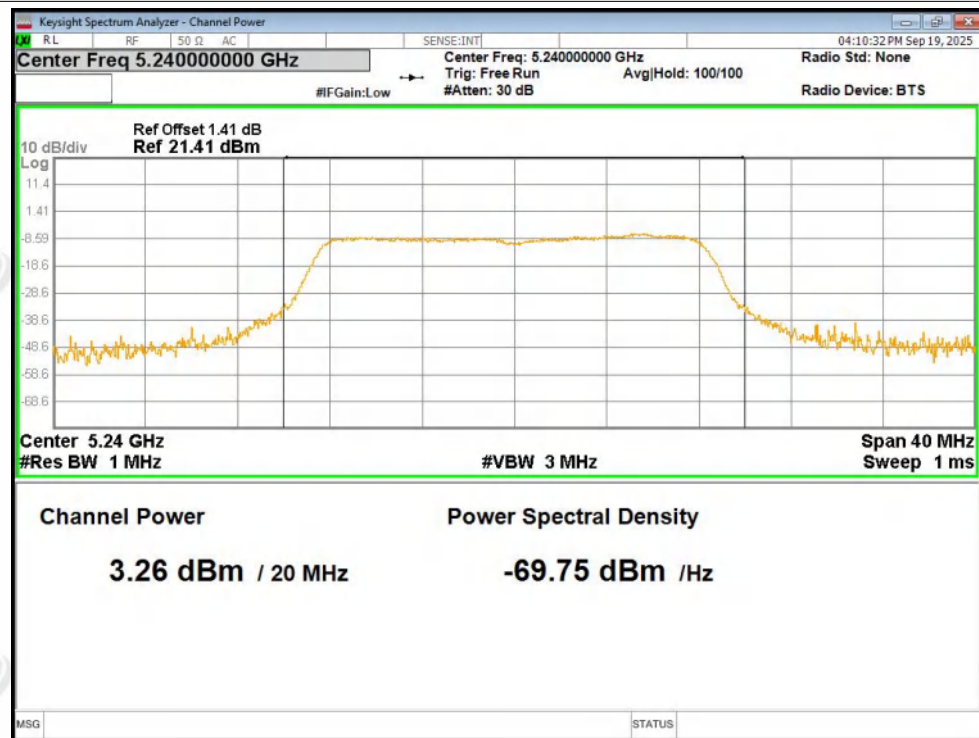


Power NVNT a 5200MHz Ant1

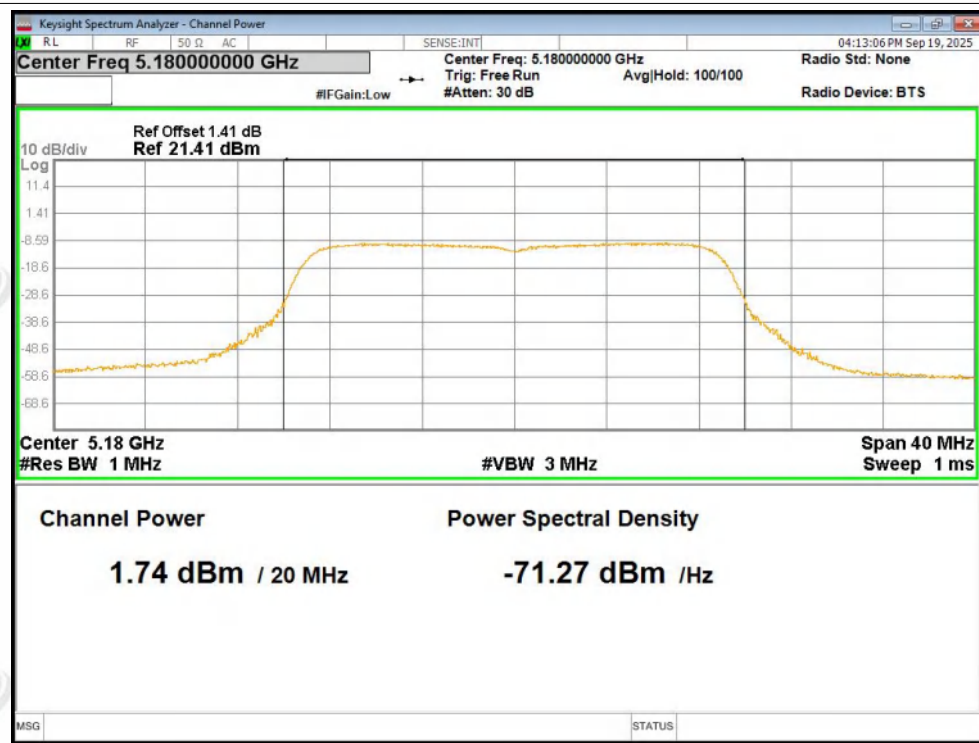




Power NVNT a 5240MHz Ant1

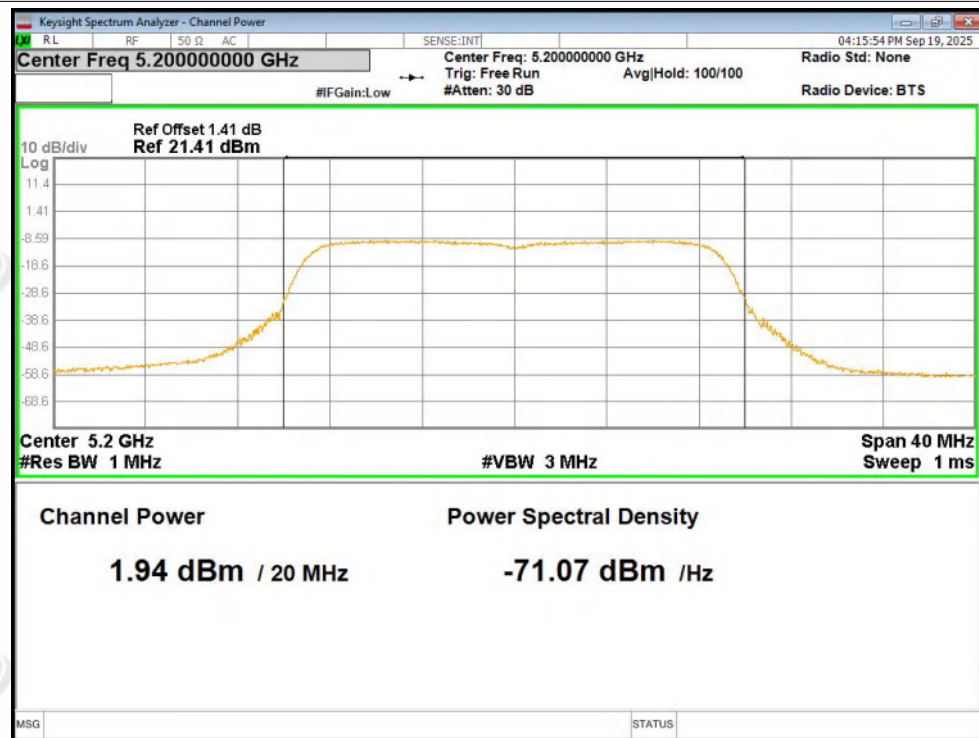


Power NVNT n20 5180MHz Ant1

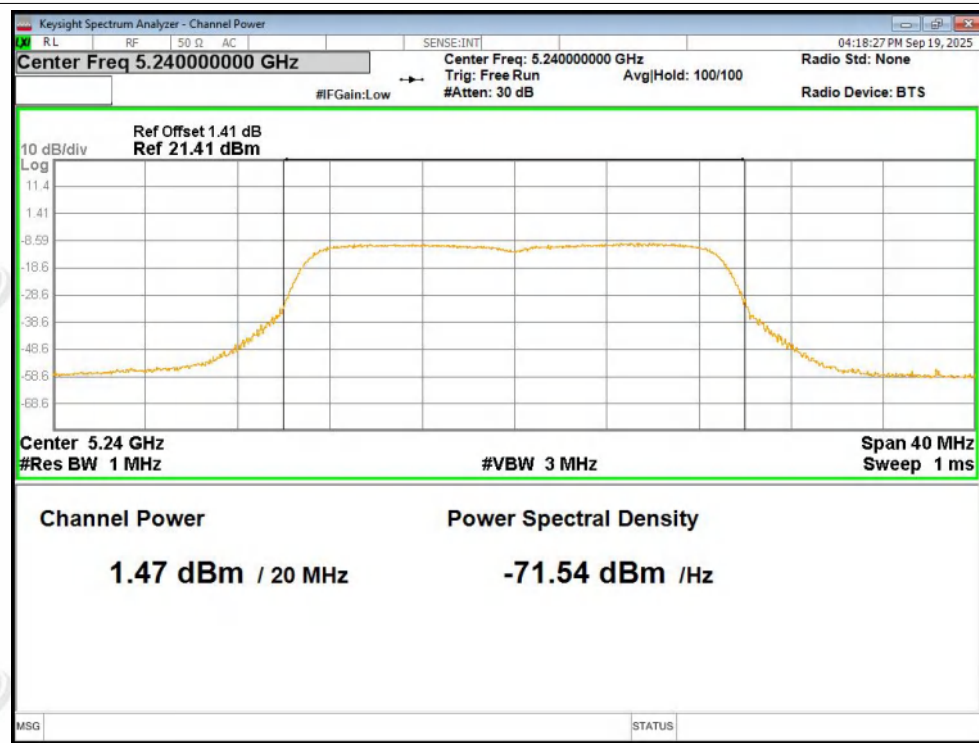




Power NVNT n20 5200MHz Ant1

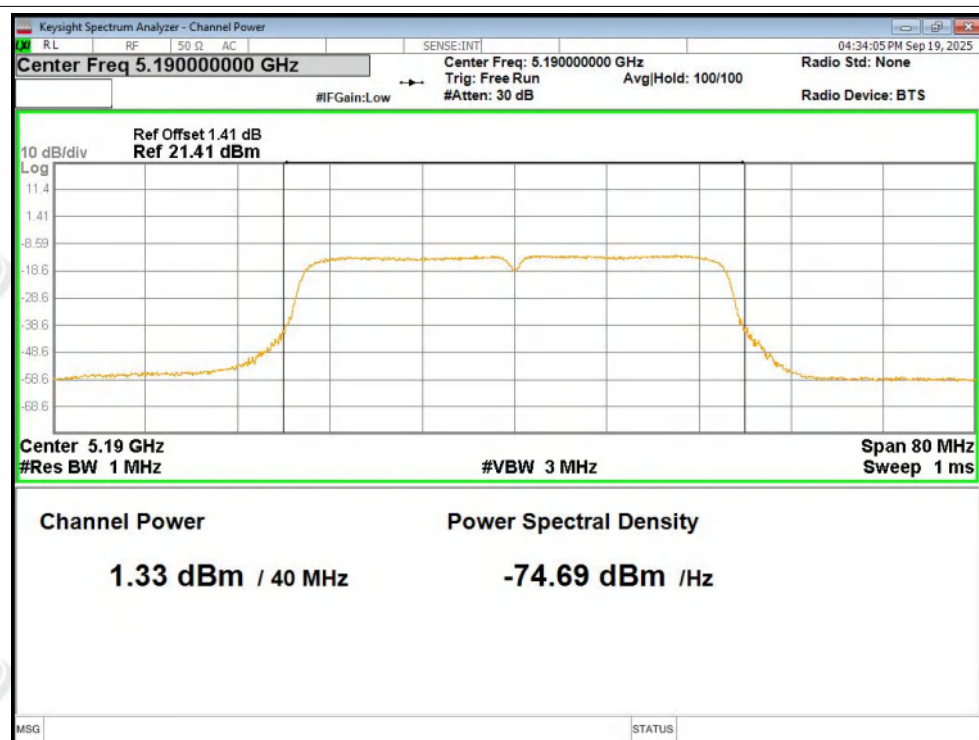


Power NVNT n20 5240MHz Ant1

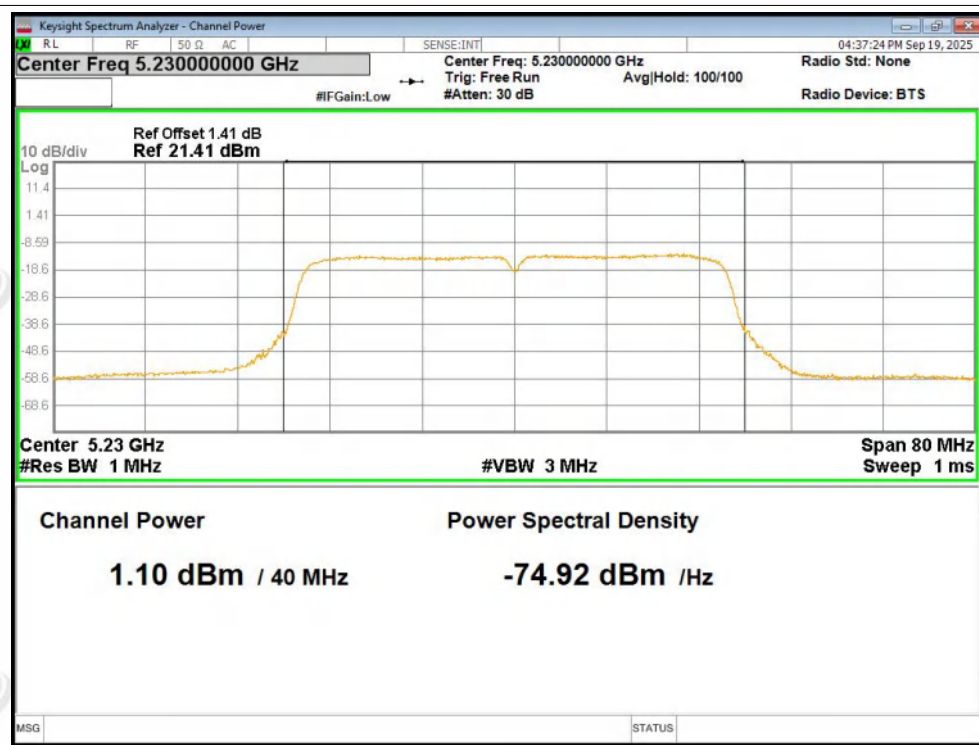




Power NVNT n40 5190MHz Ant1

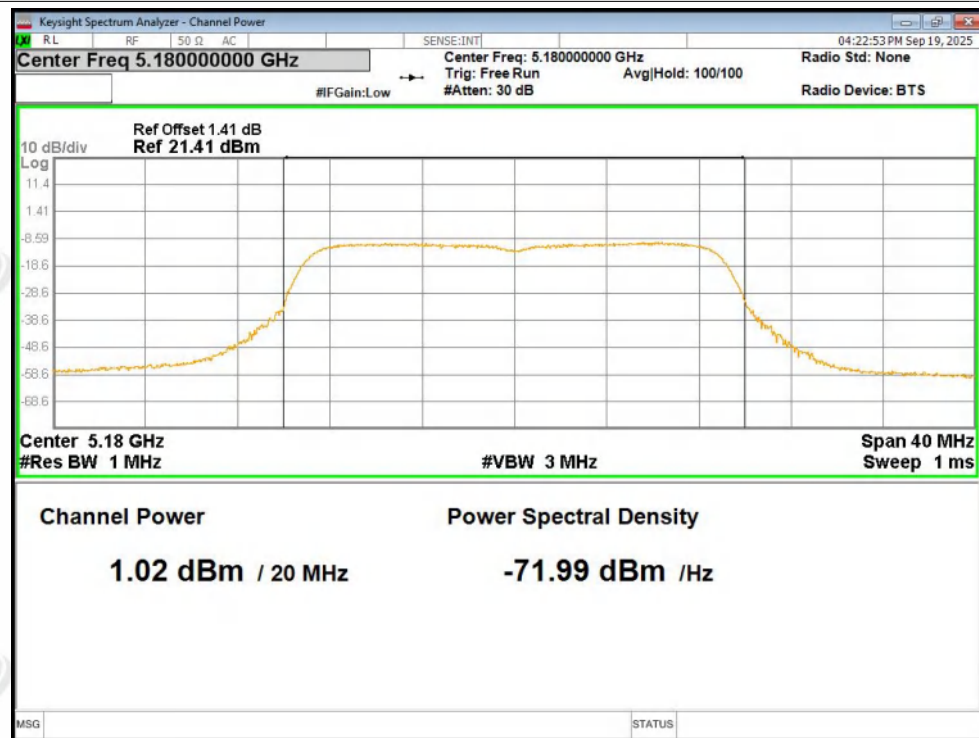


Power NVNT n40 5230MHz Ant1

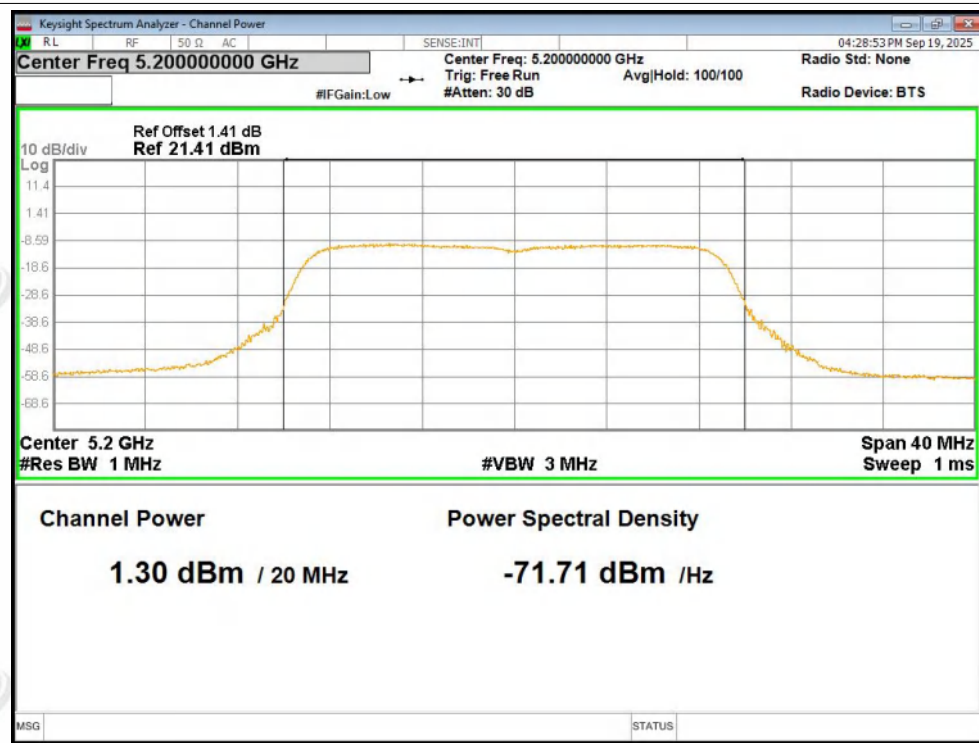




Power NVNT ac20 5180MHz Ant1

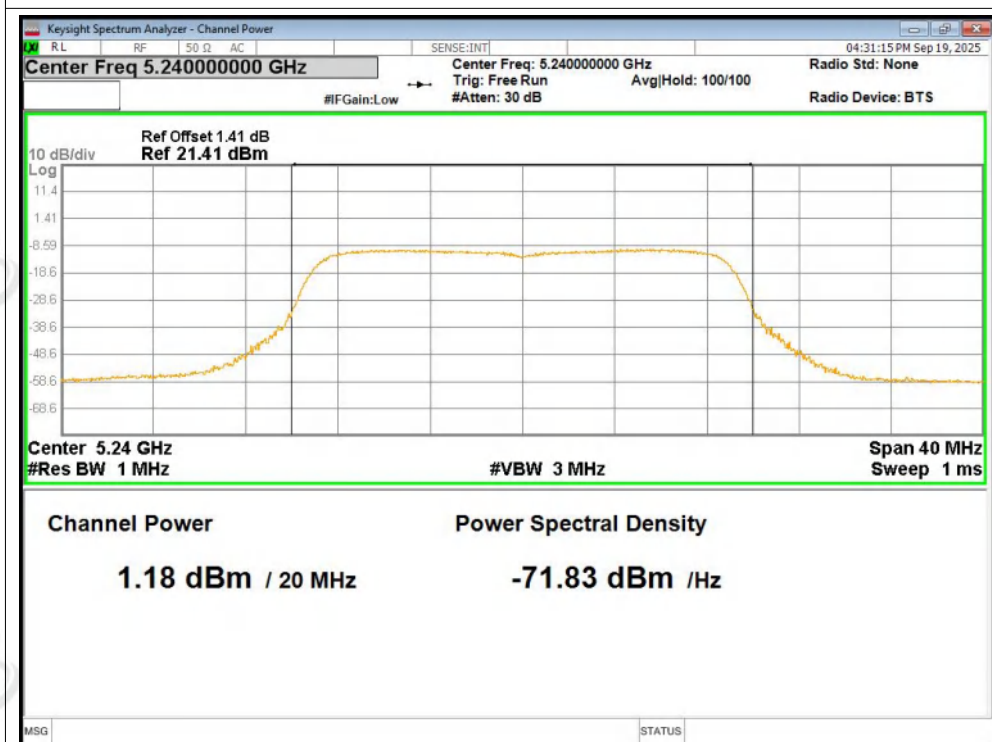


Power NVNT ac20 5200MHz Ant1

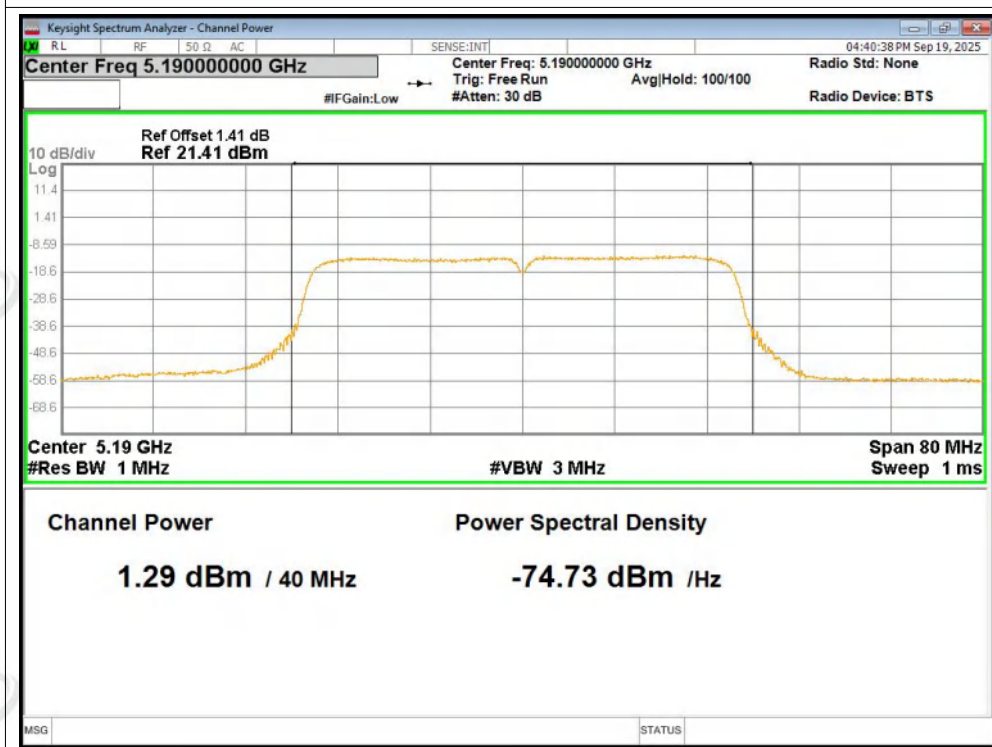




Power NVNT ac20 5240MHz Ant1

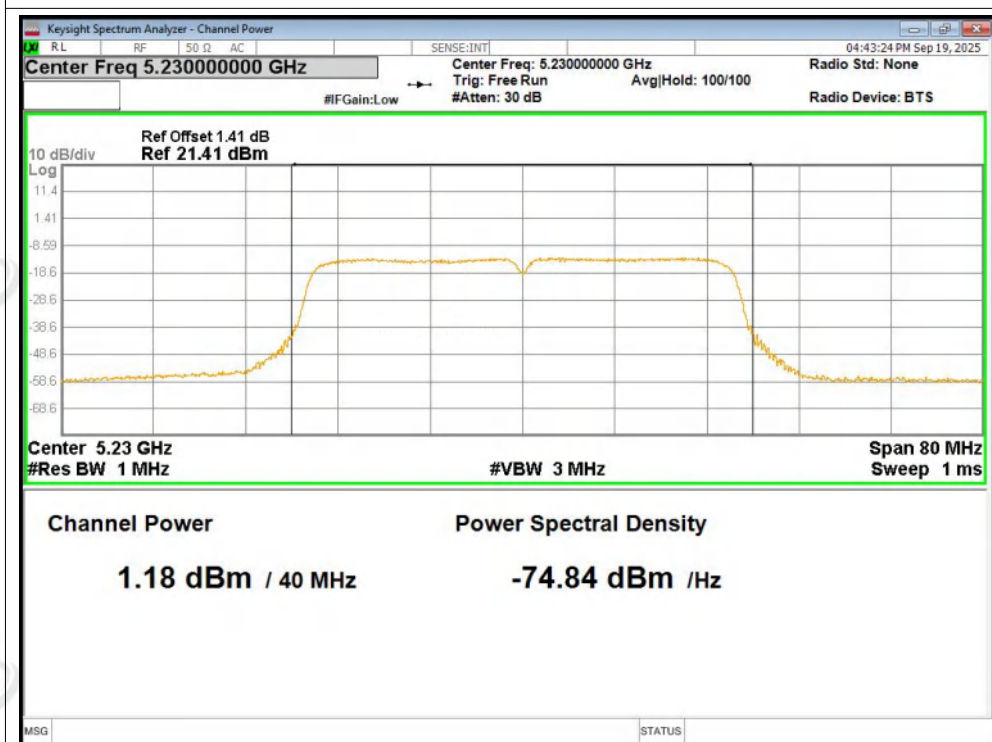


Power NVNT ac40 5190MHz Ant1

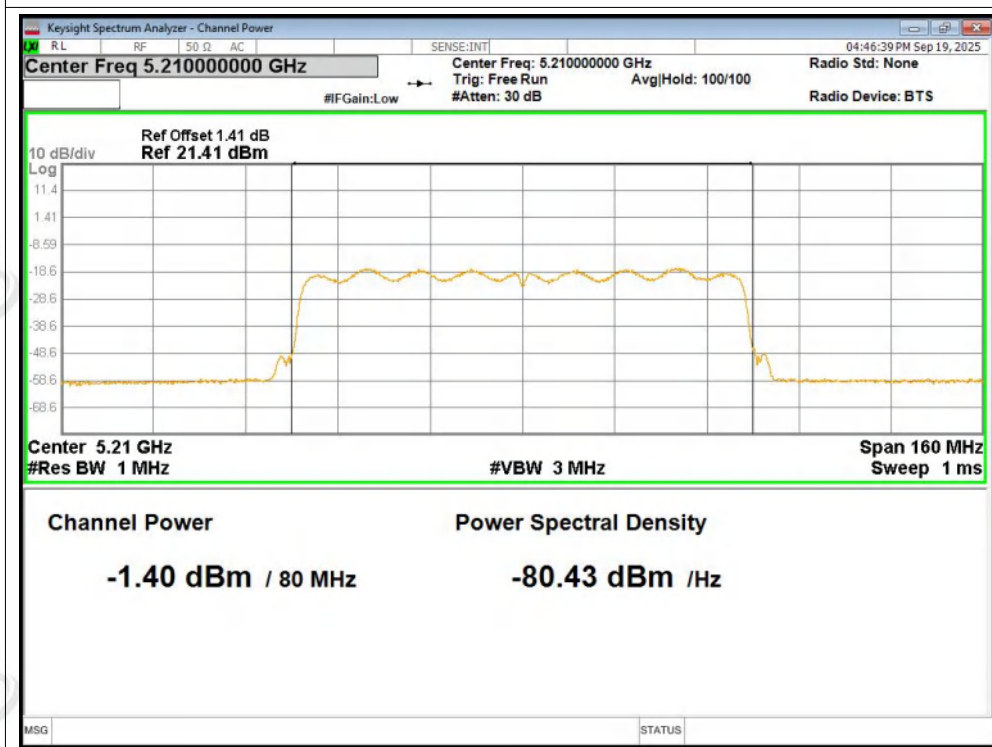




Power NVNT ac40 5230MHz Ant1



Power NVNT ac80 5210MHz Ant1



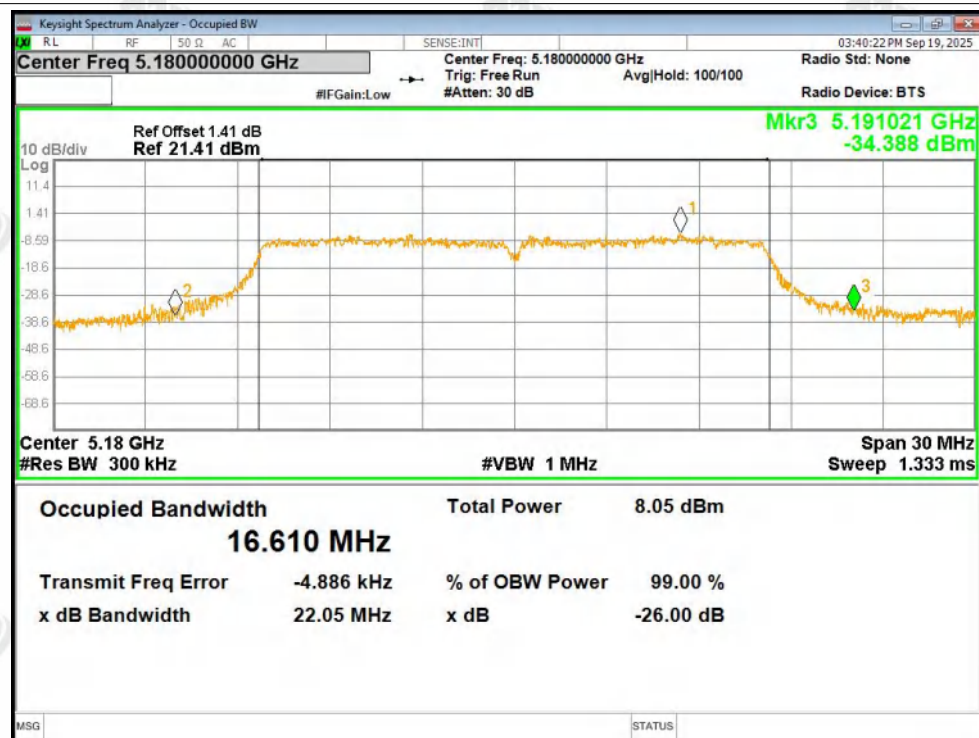
**ZHONGHAN****-26dB Bandwidth**

Condition	Mode	Frequency (MHz)	Antenna	-26 dB Bandwidth (MHz)	Verdict
NVNT	a	5180	Ant1	22.052	Pass
NVNT	a	5200	Ant1	29.885	Pass
NVNT	a	5240	Ant1	22.621	Pass
NVNT	n20	5180	Ant1	21.211	Pass
NVNT	n20	5200	Ant1	20.92	Pass
NVNT	n20	5240	Ant1	21.181	Pass
NVNT	n40	5190	Ant1	40.548	Pass
NVNT	n40	5230	Ant1	40.726	Pass
NVNT	ac20	5180	Ant1	21.212	Pass
NVNT	ac20	5200	Ant1	20.779	Pass
NVNT	ac20	5240	Ant1	20.895	Pass
NVNT	ac40	5190	Ant1	40.03	Pass
NVNT	ac40	5230	Ant1	39.886	Pass
NVNT	ac80	5210	Ant1	79.539	Pass

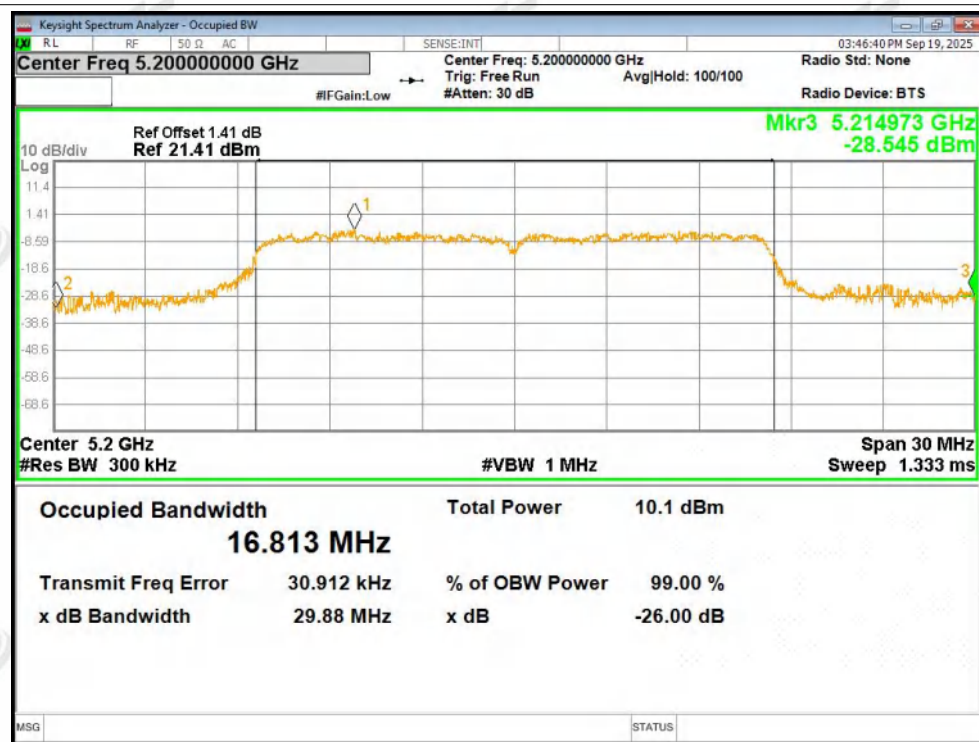


Test Graphs

-26dB Bandwidth NVNT a 5180MHz Ant1

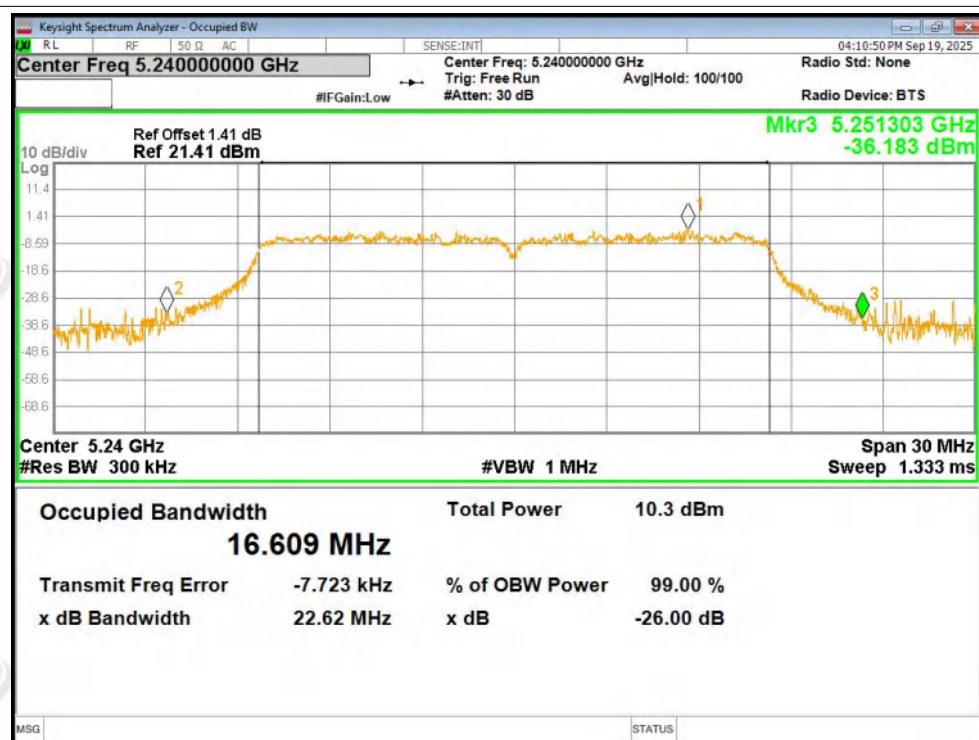


-26dB Bandwidth NVNT a 5200MHz Ant1

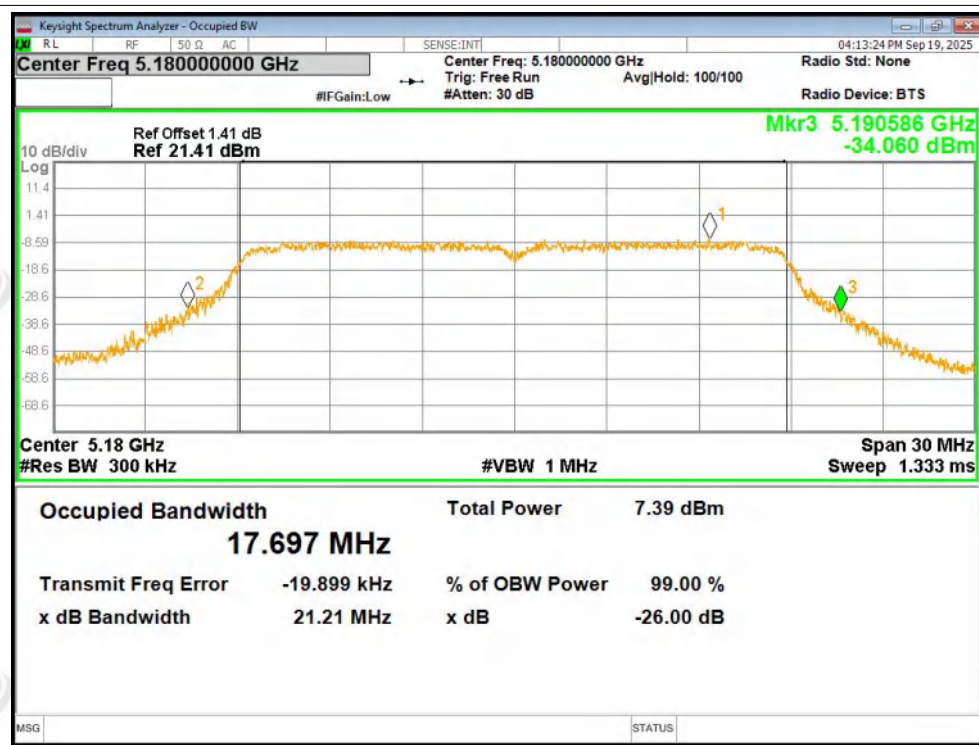




-26dB Bandwidth NVNT a 5240MHz Ant1

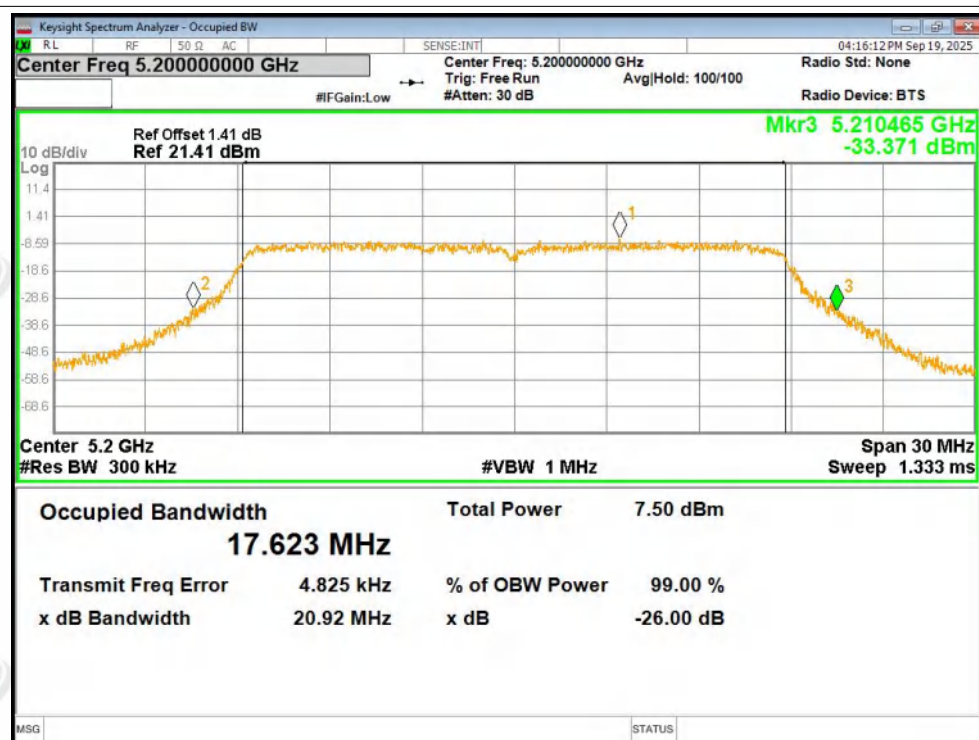


-26dB Bandwidth NVNT n20 5180MHz Ant1

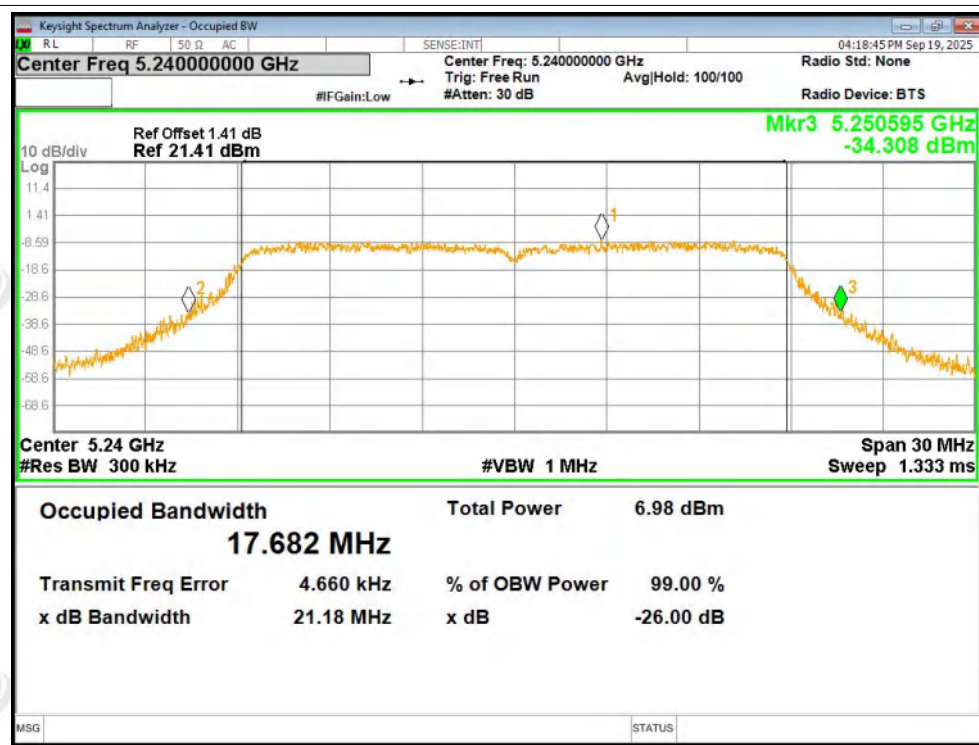




-26dB Bandwidth NVNT n20 5200MHz Ant1

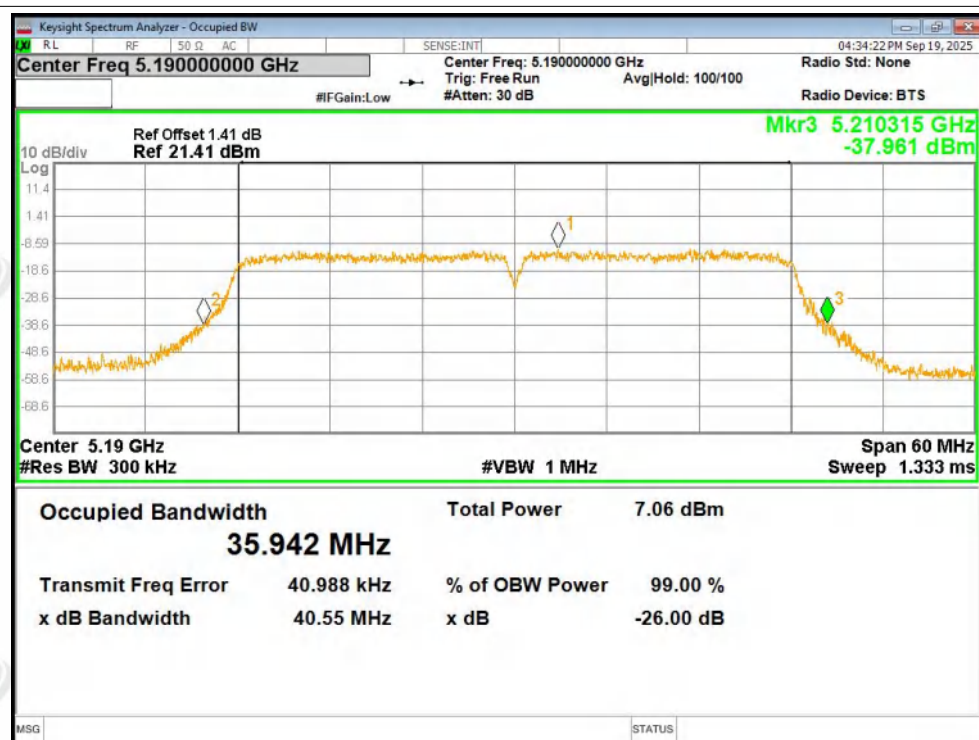


-26dB Bandwidth NVNT n20 5240MHz Ant1

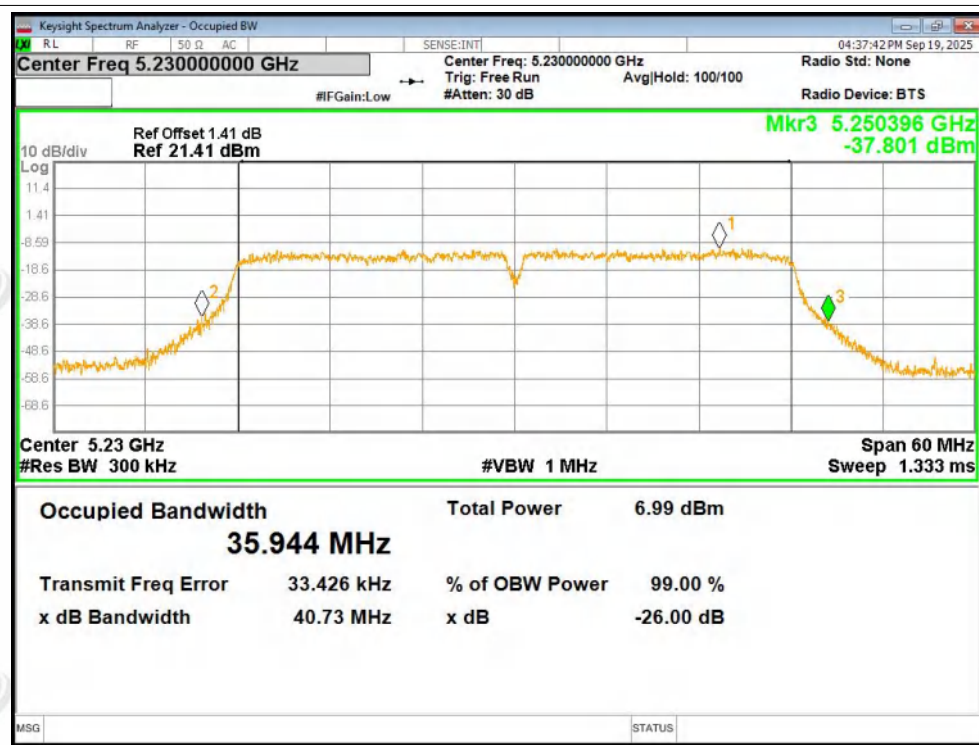




-26dB Bandwidth NVNT n40 5190MHz Ant1

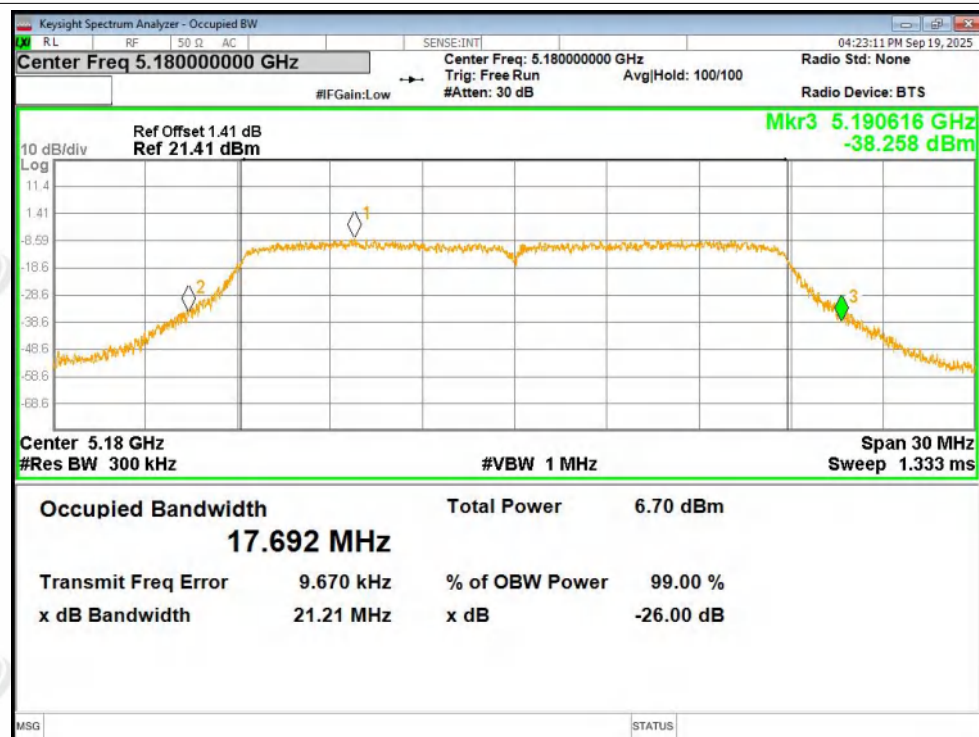


-26dB Bandwidth NVNT n40 5230MHz Ant1

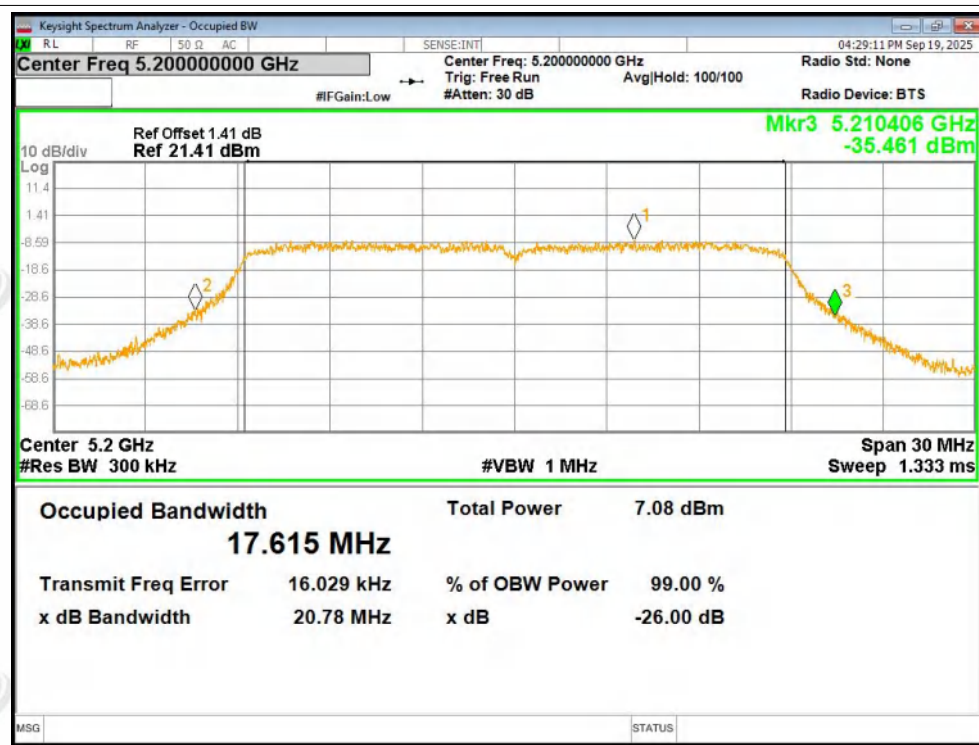




-26dB Bandwidth NVNT ac20 5180MHz Ant1

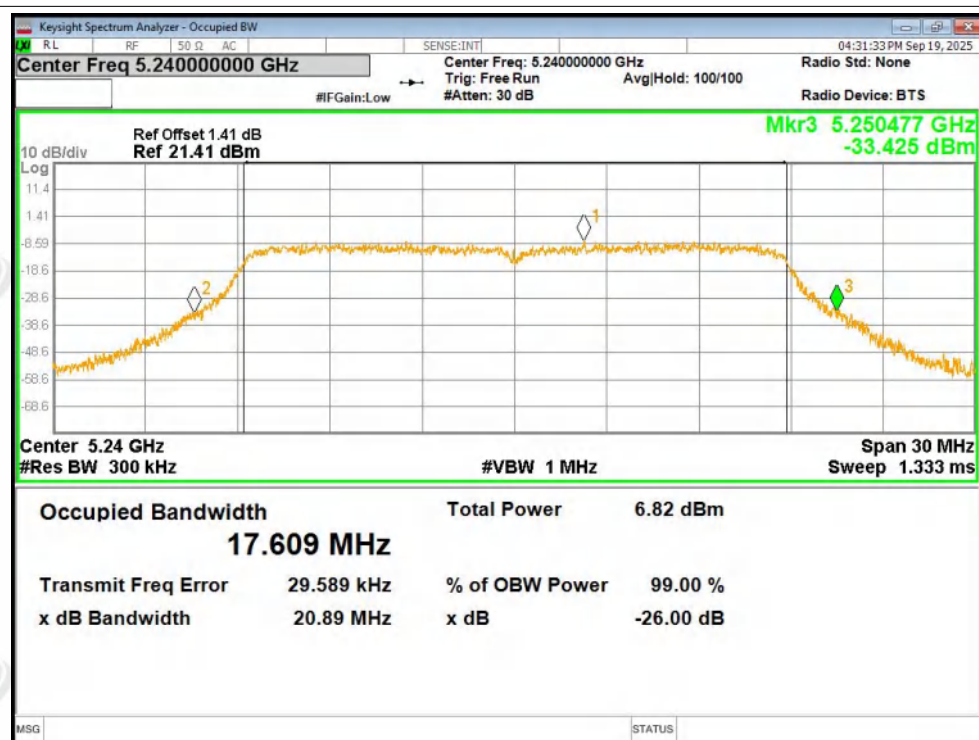


-26dB Bandwidth NVNT ac20 5200MHz Ant1

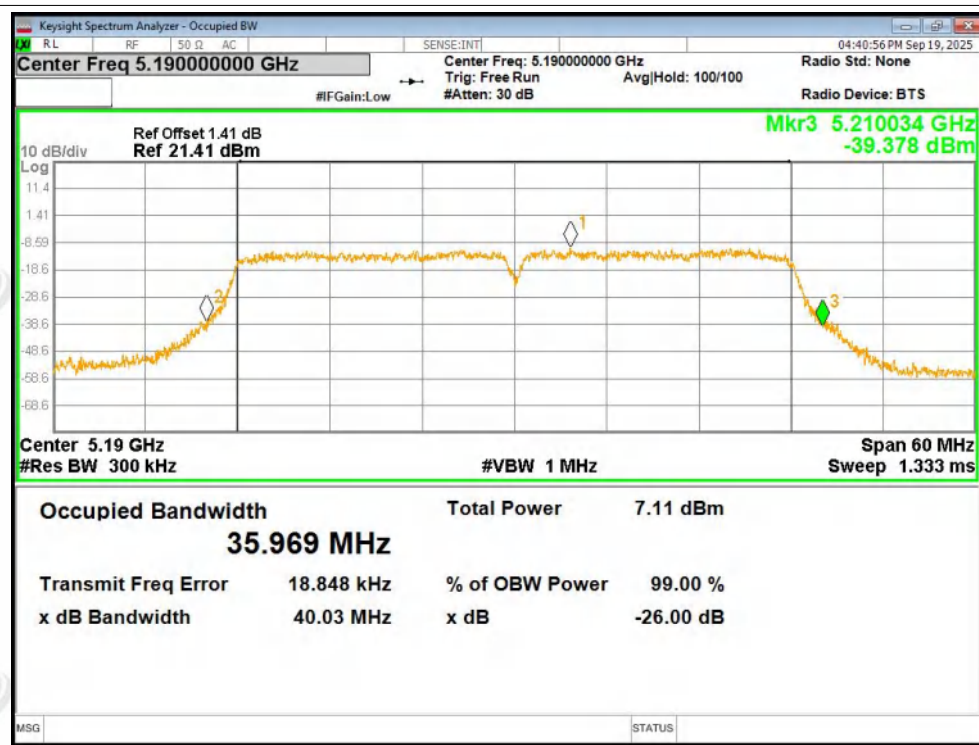




-26dB Bandwidth NVNT ac20 5240MHz Ant1

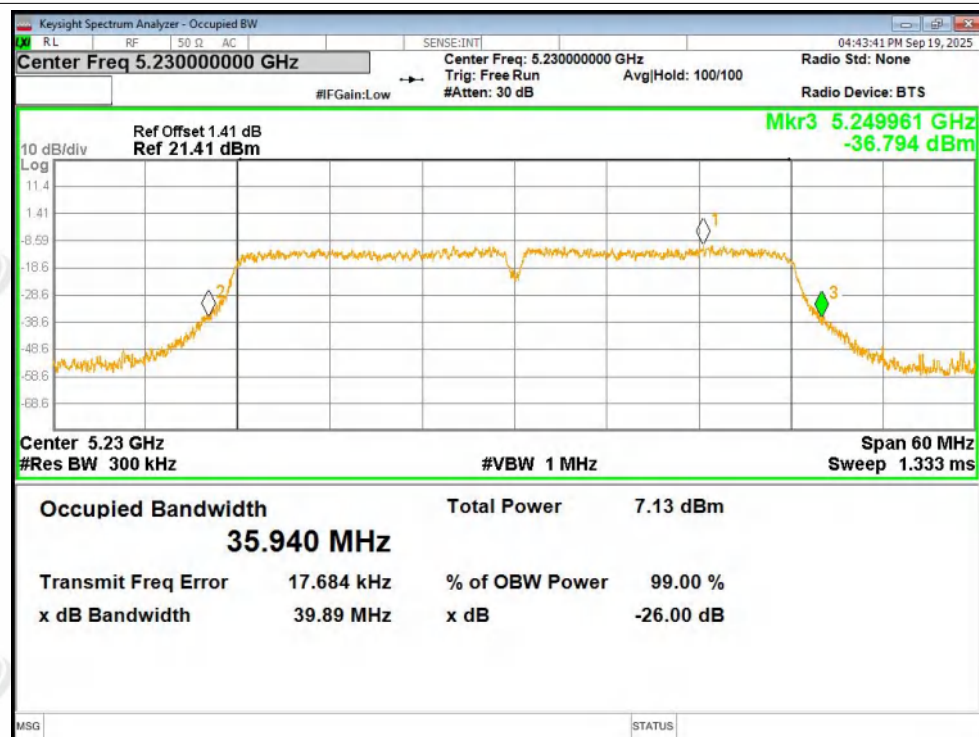


-26dB Bandwidth NVNT ac40 5190MHz Ant1

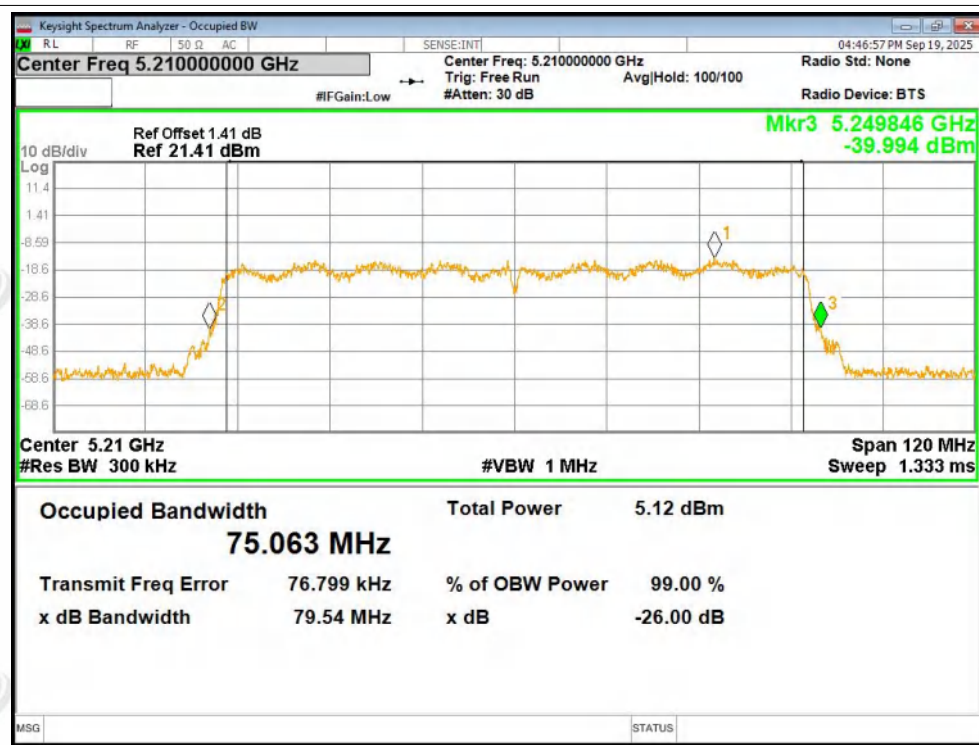




-26dB Bandwidth NVNT ac40 5230MHz Ant1



-26dB Bandwidth NVNT ac80 5210MHz Ant1



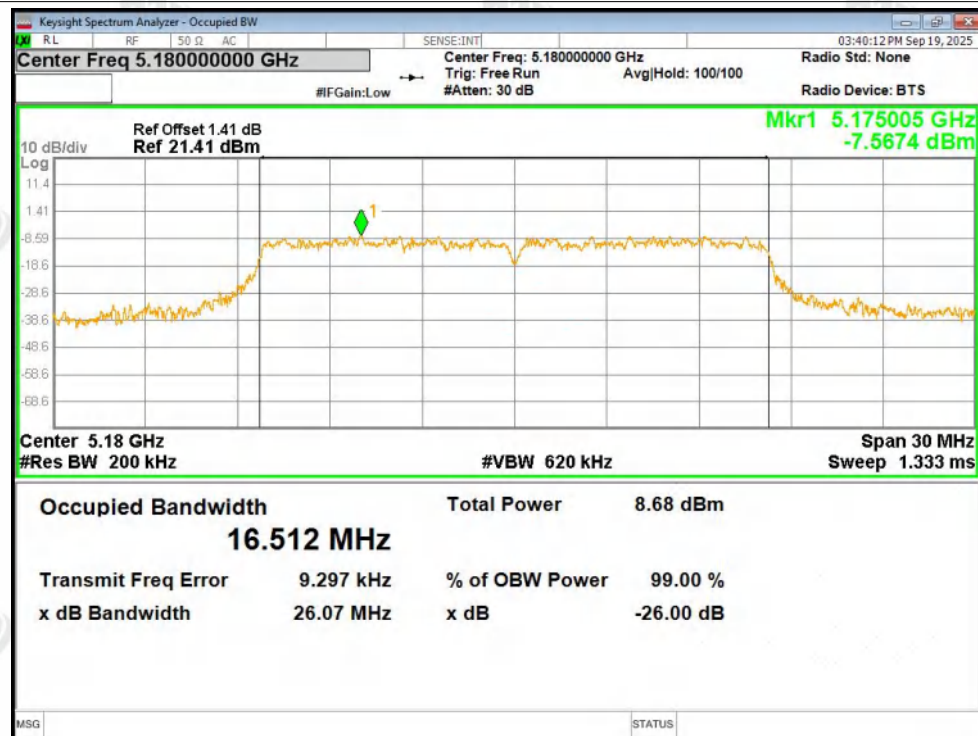
**ZHONGHAN****Occupied Channel Bandwidth**

Condition	Mode	Frequency (MHz)	Antenna	99% OBW (MHz)
NVNT	a	5180	Ant1	16.512
NVNT	a	5200	Ant1	16.575
NVNT	a	5240	Ant1	16.472
NVNT	n20	5180	Ant1	17.588
NVNT	n20	5200	Ant1	17.552
NVNT	n20	5240	Ant1	17.585
NVNT	n40	5190	Ant1	36.049
NVNT	n40	5230	Ant1	36.004
NVNT	ac20	5180	Ant1	17.583
NVNT	ac20	5200	Ant1	17.543
NVNT	ac20	5240	Ant1	17.559
NVNT	ac40	5190	Ant1	35.966
NVNT	ac40	5230	Ant1	36.078
NVNT	ac80	5210	Ant1	75.138

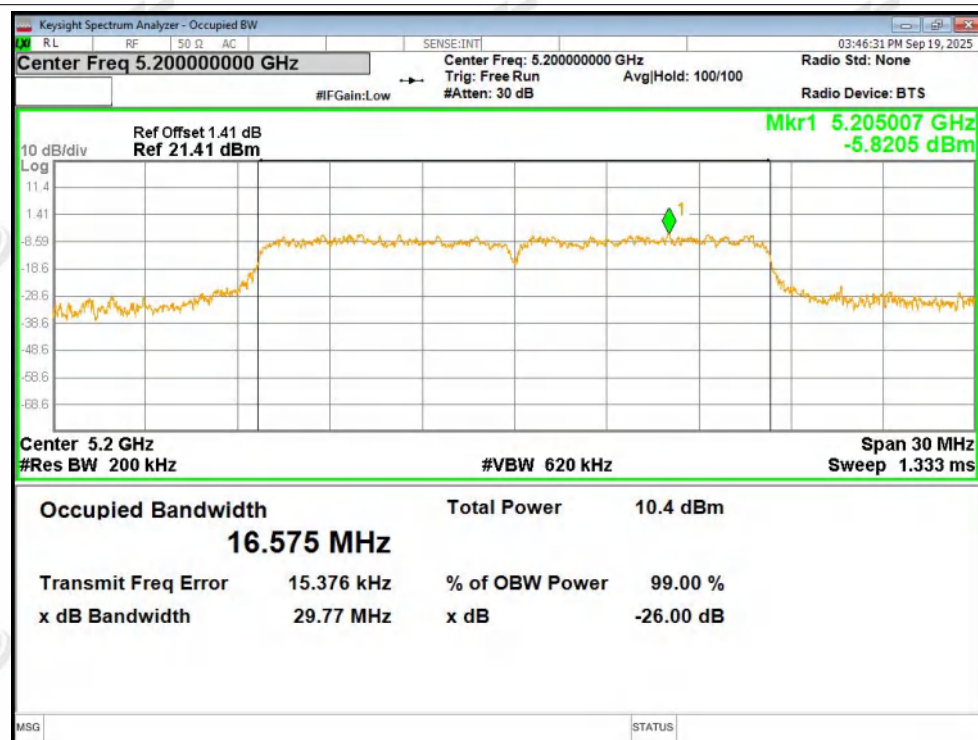


Test Graphs

OBW NVNT a 5180MHz Ant1

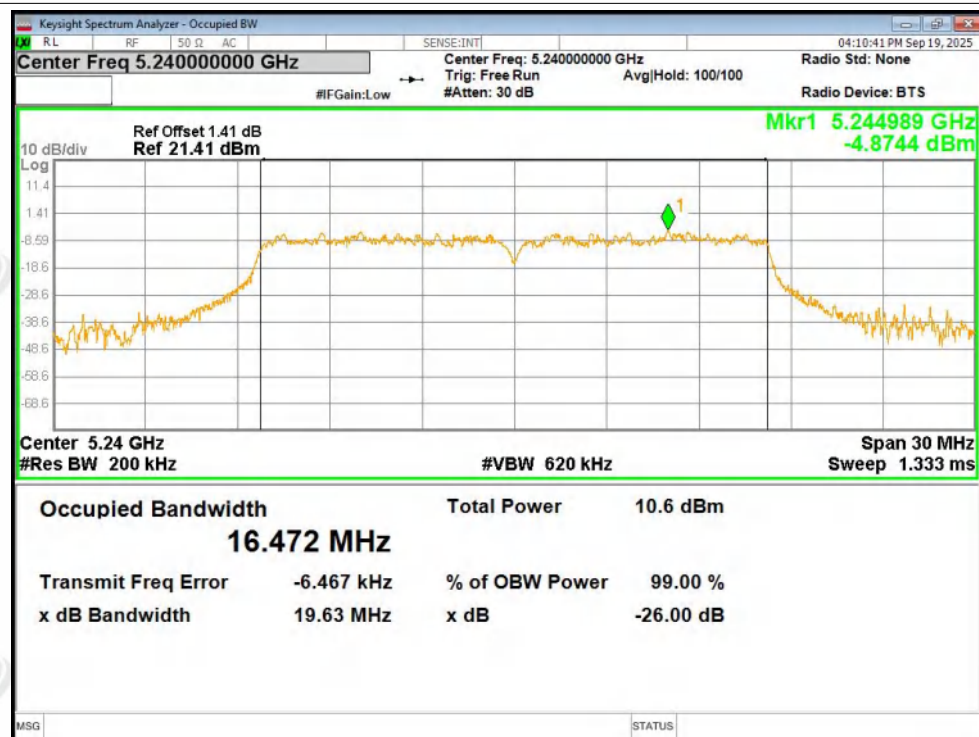


OBW NVNT a 5200MHz Ant1

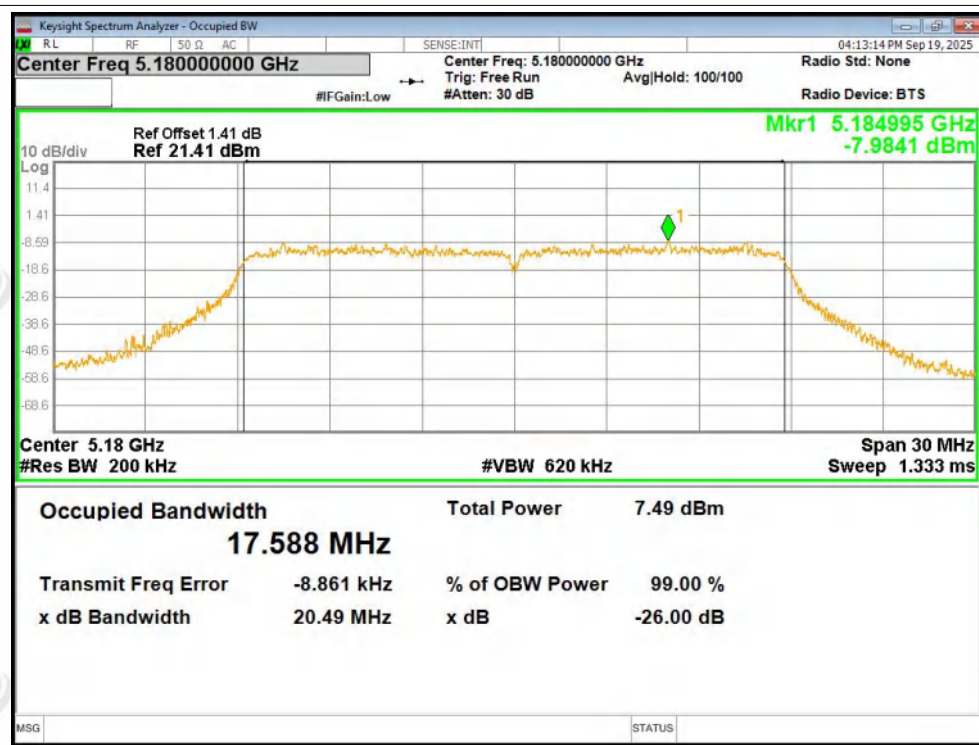




OBW NVNT a 5240MHz Ant1

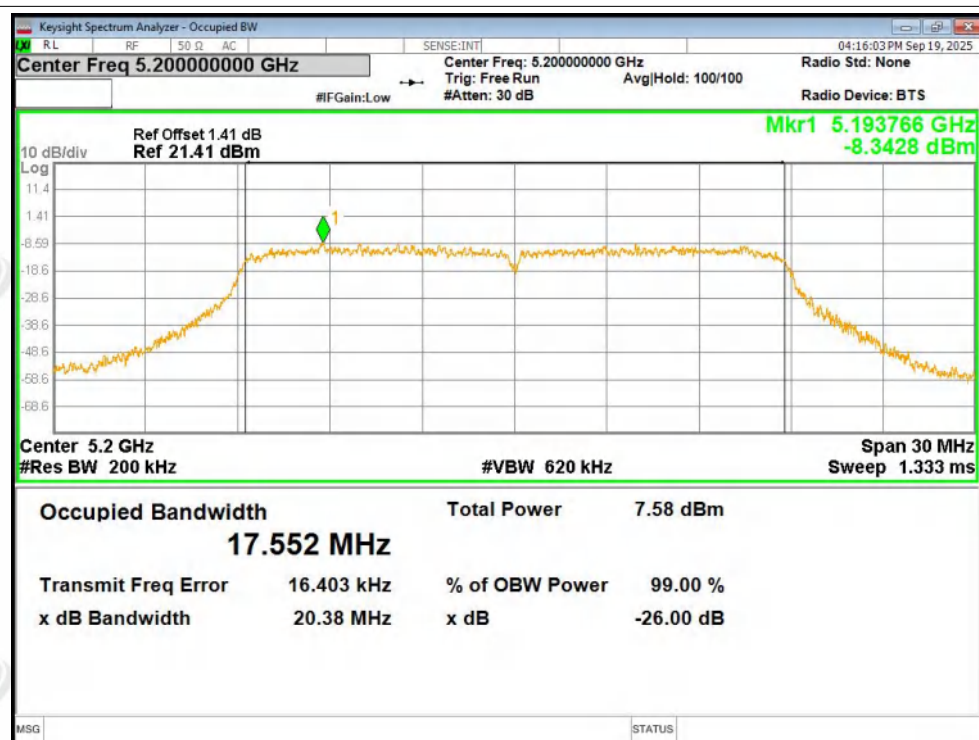


OBW NVNT n20 5180MHz Ant1

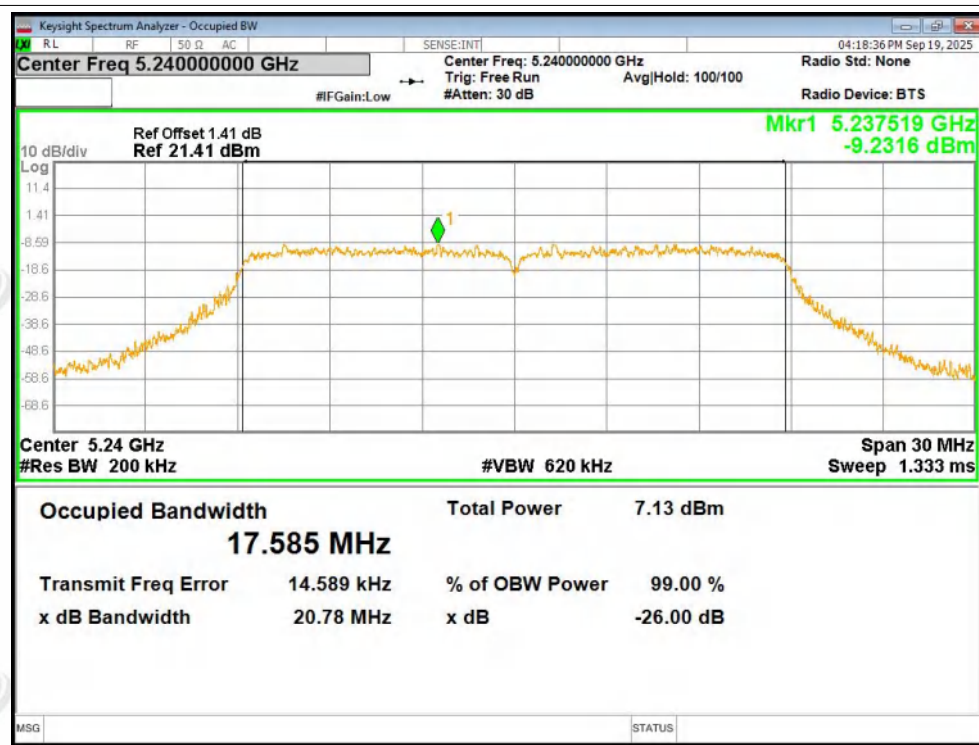




OBW NVNT n20 5200MHz Ant1

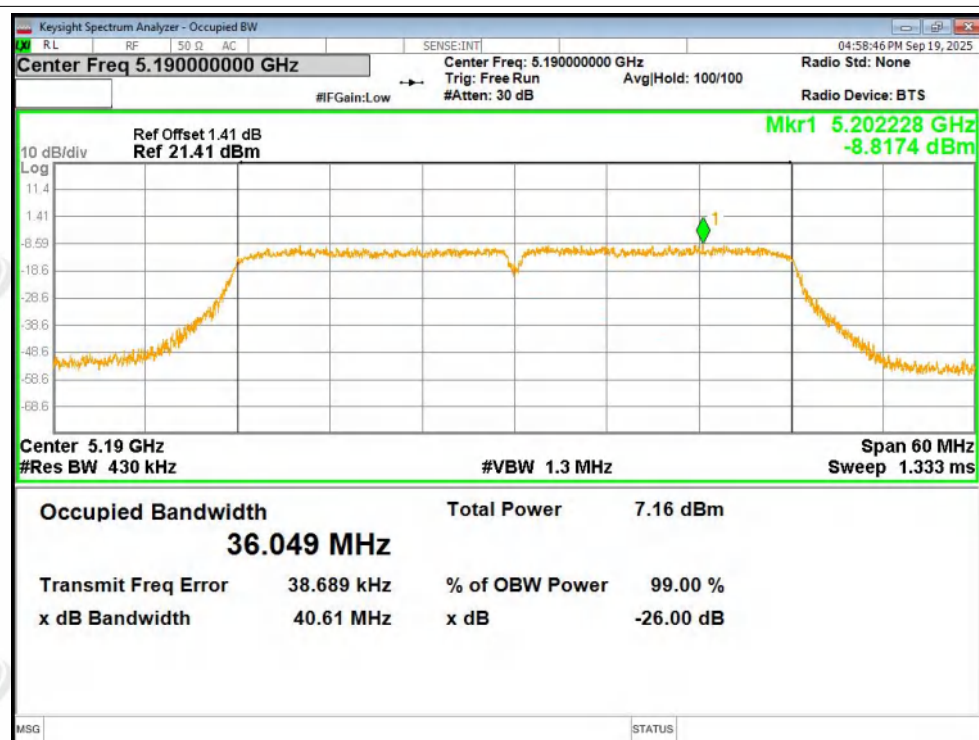


OBW NVNT n20 5240MHz Ant1

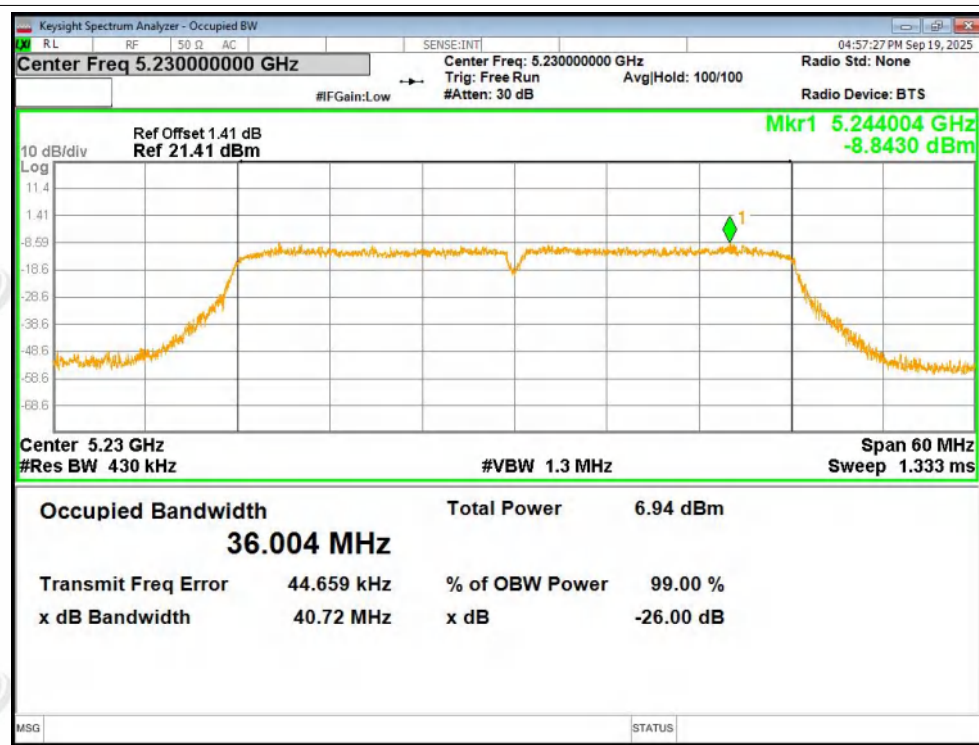




OBW NVNT n40 5190MHz Ant1

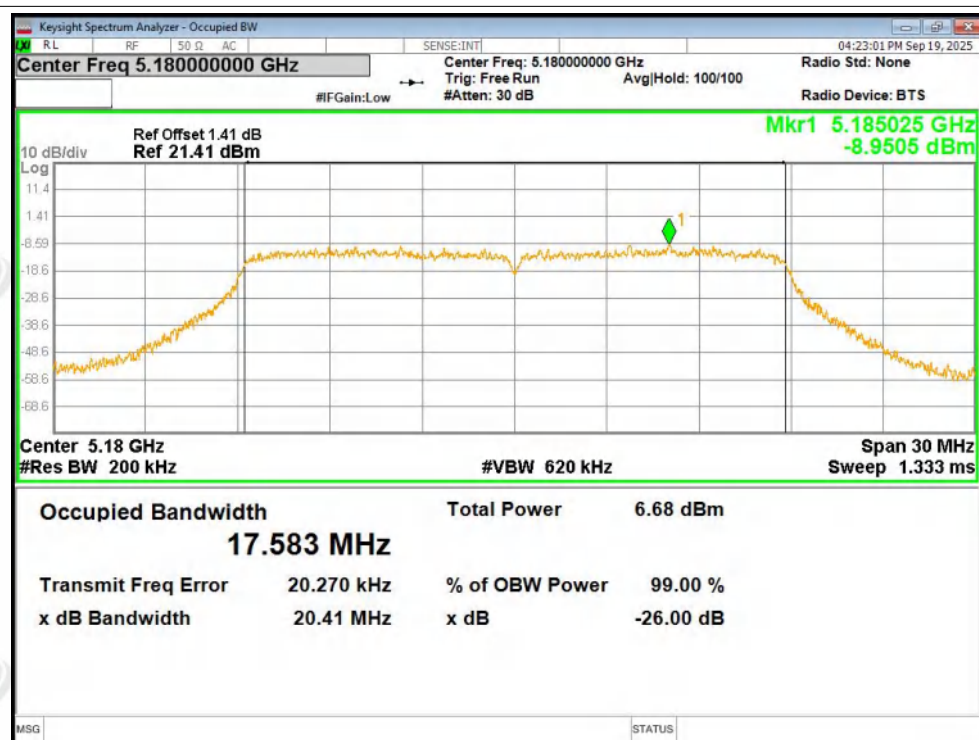


OBW NVNT n40 5230MHz Ant1

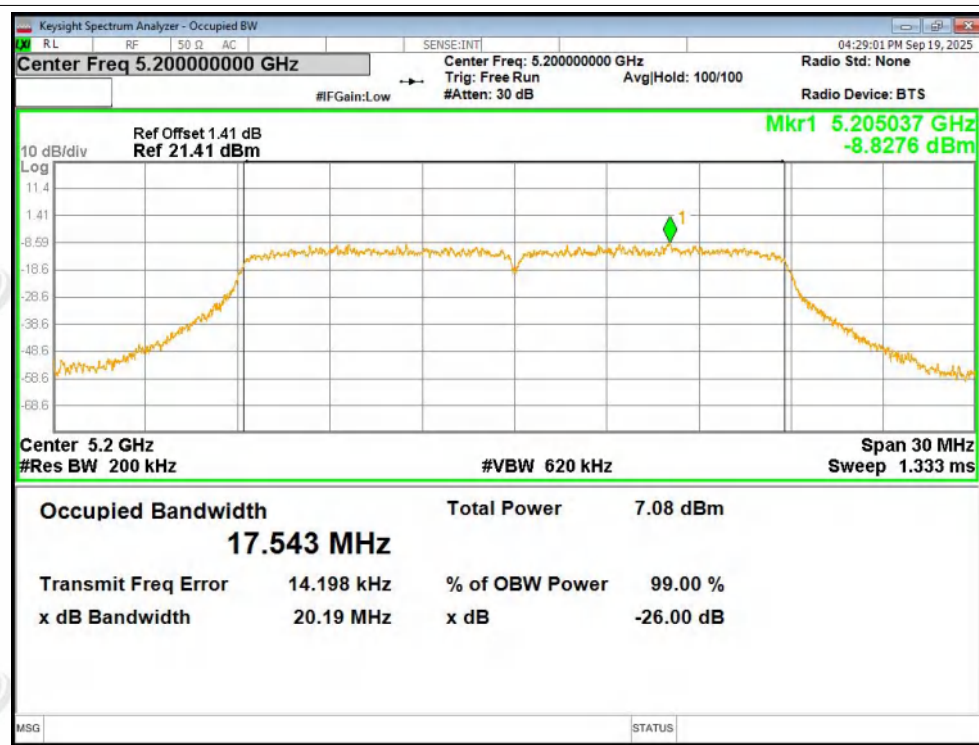




OBW NVNT ac20 5180MHz Ant1

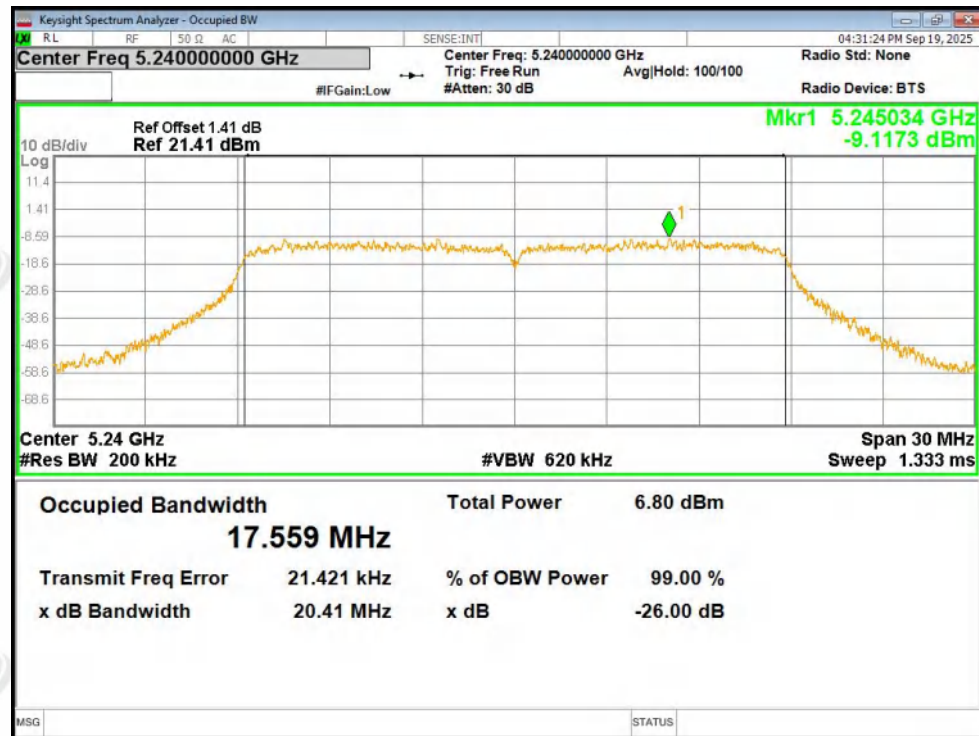


OBW NVNT ac20 5200MHz Ant1

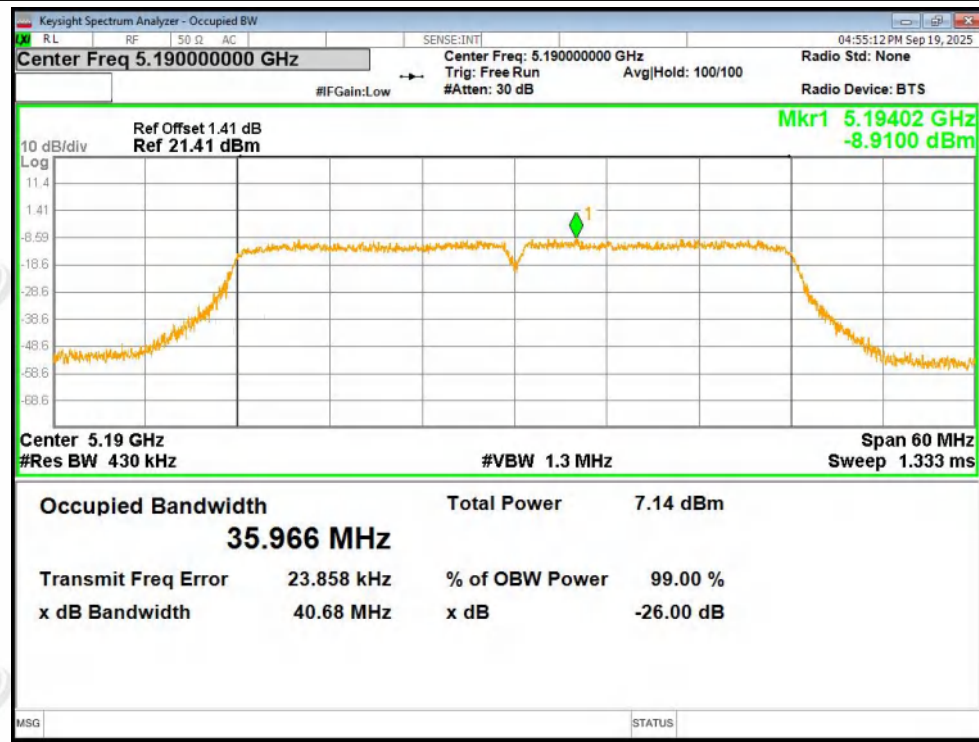




OBW NVNT ac20 5240MHz Ant1

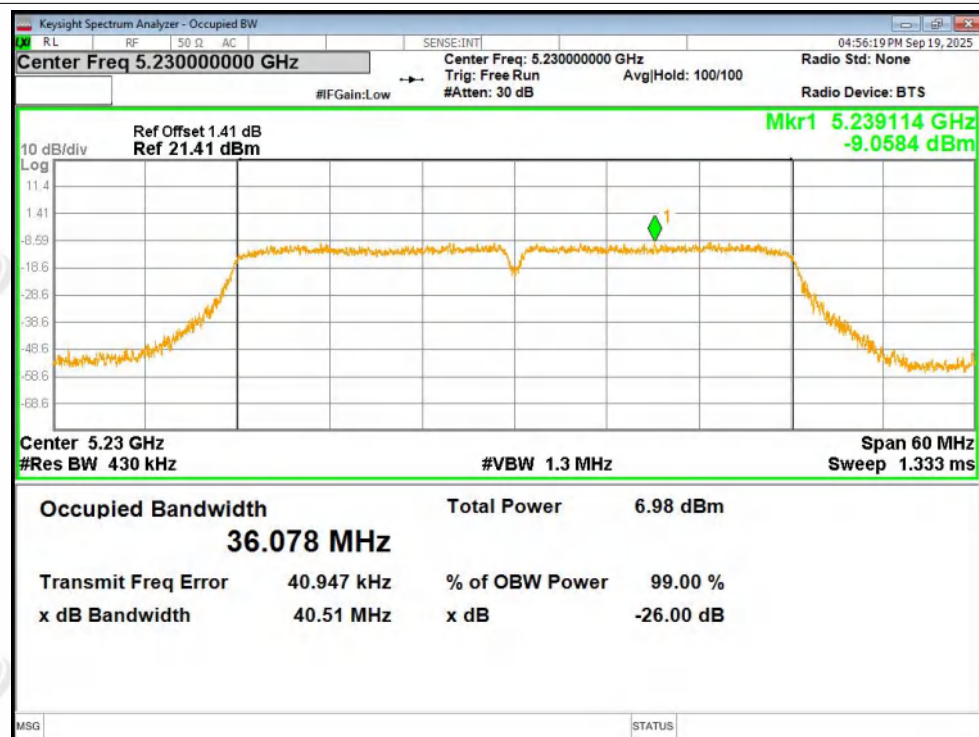


OBW NVNT ac40 5190MHz Ant1

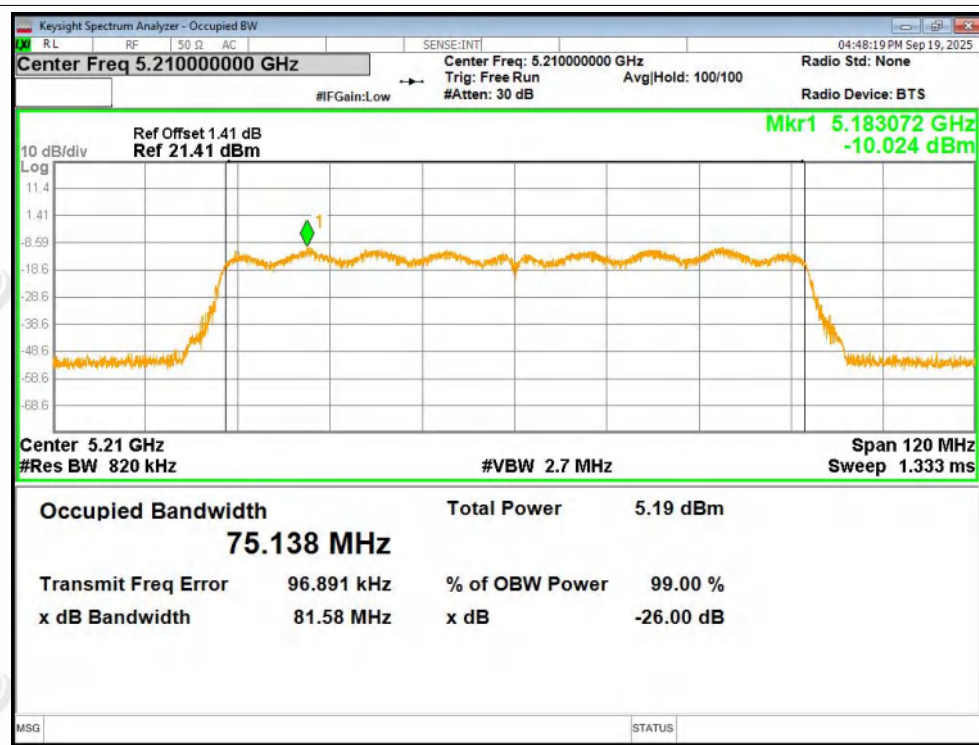




OBW NVNT ac40 5230MHz Ant1



OBW NVNT ac80 5210MHz Ant1



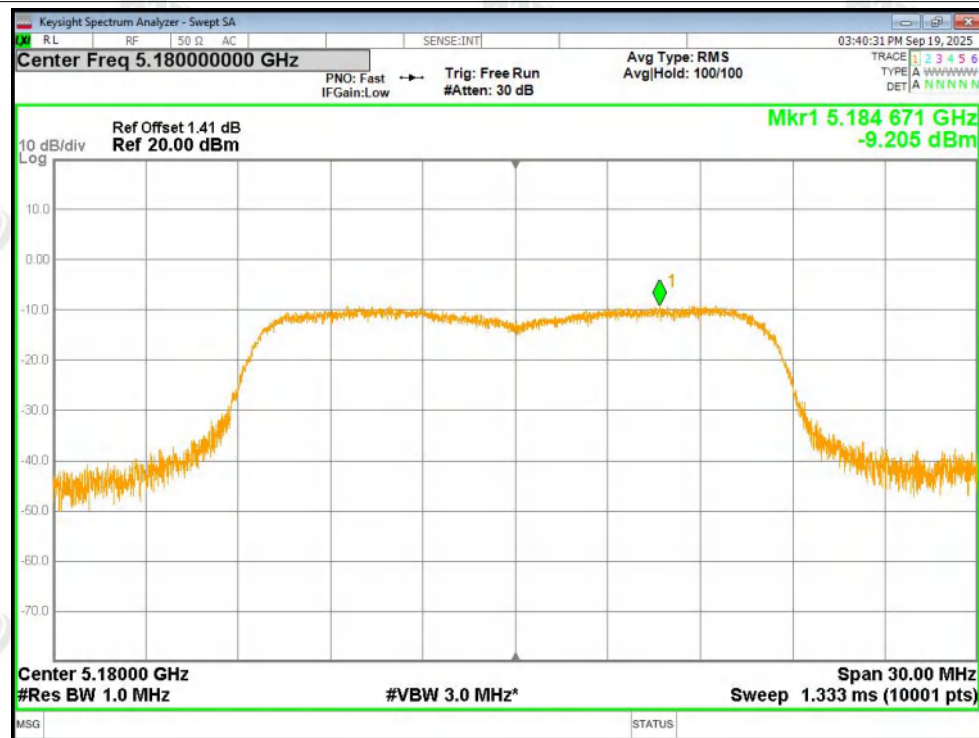
**ZHONGHAN****Maximum Power Spectral Density Level**

Condition	Mode	Frequency (MHz)	Antenna	Conducted PSD (dBm/MHz)	Duty Factor (dB)	Total PSD (dBm/MHz)	Limit (dBm/MHz)	Verdict
NVNT	a	5180	Ant1	-9.21	1.93	-7.28	11	Pass
NVNT	a	5200	Ant1	-7.24	0.79	-6.45	11	Pass
NVNT	a	5240	Ant1	-7.24	1.46	-5.78	11	Pass
NVNT	n20	5180	Ant1	-8.96	0.37	-8.59	11	Pass
NVNT	n20	5200	Ant1	-8.77	0.13	-8.64	11	Pass
NVNT	n20	5240	Ant1	-9.27	0.13	-9.14	11	Pass
NVNT	n40	5190	Ant1	-12.57	0.35	-12.22	11	Pass
NVNT	n40	5230	Ant1	-12.5	0.44	-12.06	11	Pass
NVNT	ac20	5180	Ant1	-9.75	0.35	-9.4	11	Pass
NVNT	ac20	5200	Ant1	-9.47	0.09	-9.38	11	Pass
NVNT	ac20	5240	Ant1	-9.41	0.2	-9.21	11	Pass
NVNT	ac40	5190	Ant1	-12.5	0.63	-11.87	11	Pass
NVNT	ac40	5230	Ant1	-12.42	0.6	-11.82	11	Pass
NVNT	ac80	5210	Ant1	-16.75	1.01	-15.74	11	Pass

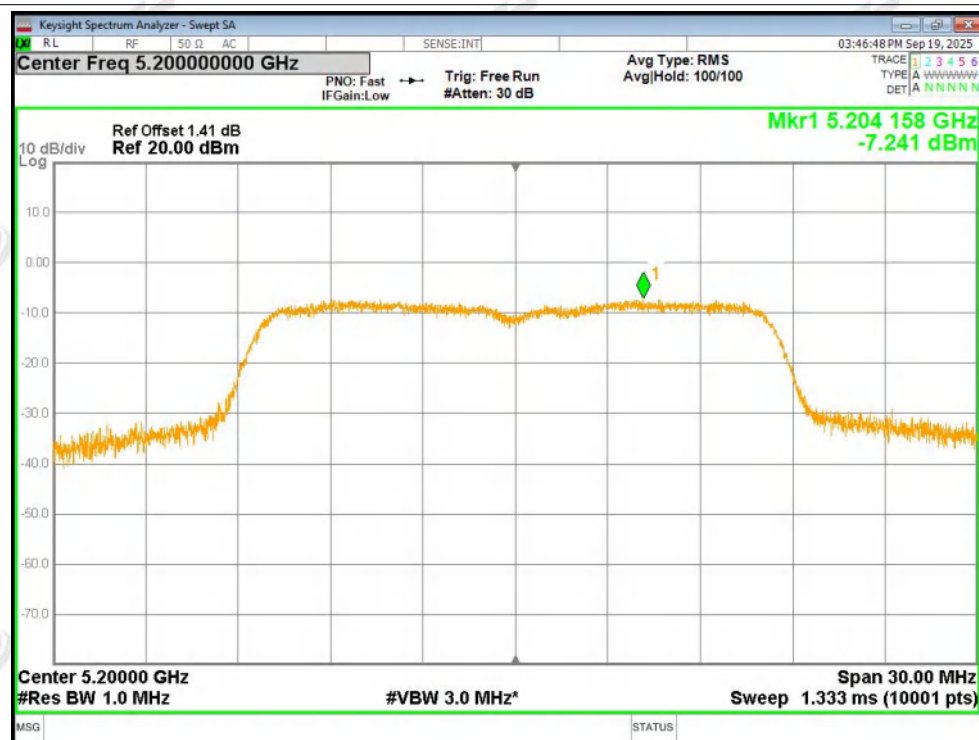


Test Graphs

PSD NVNT a 5180MHz Ant1

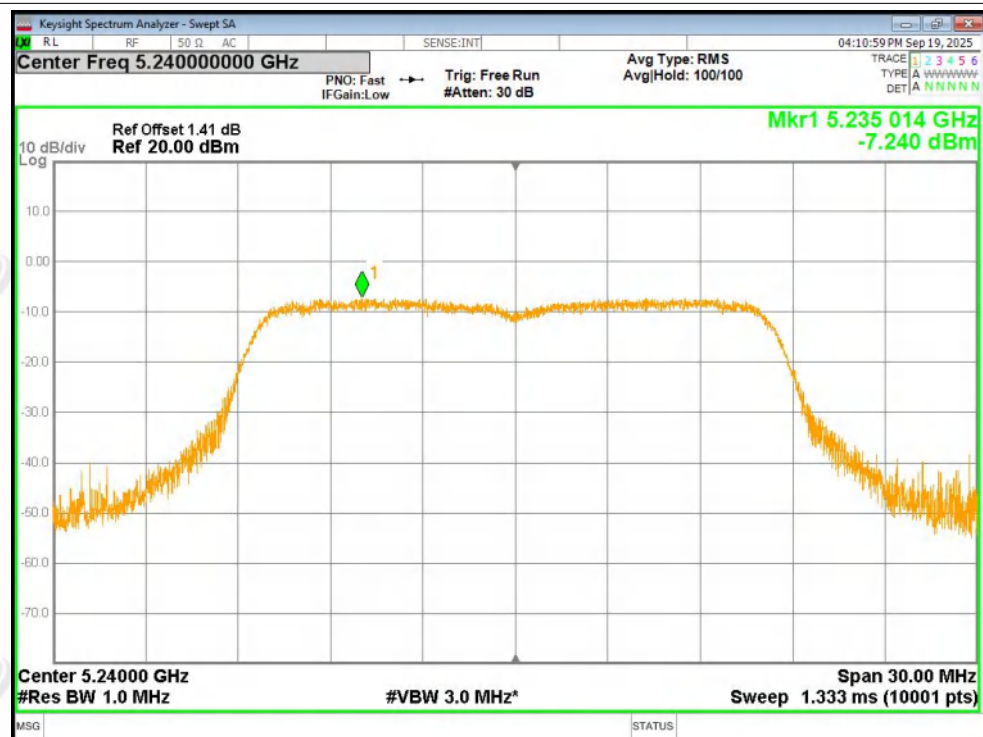


PSD NVNT a 5200MHz Ant1

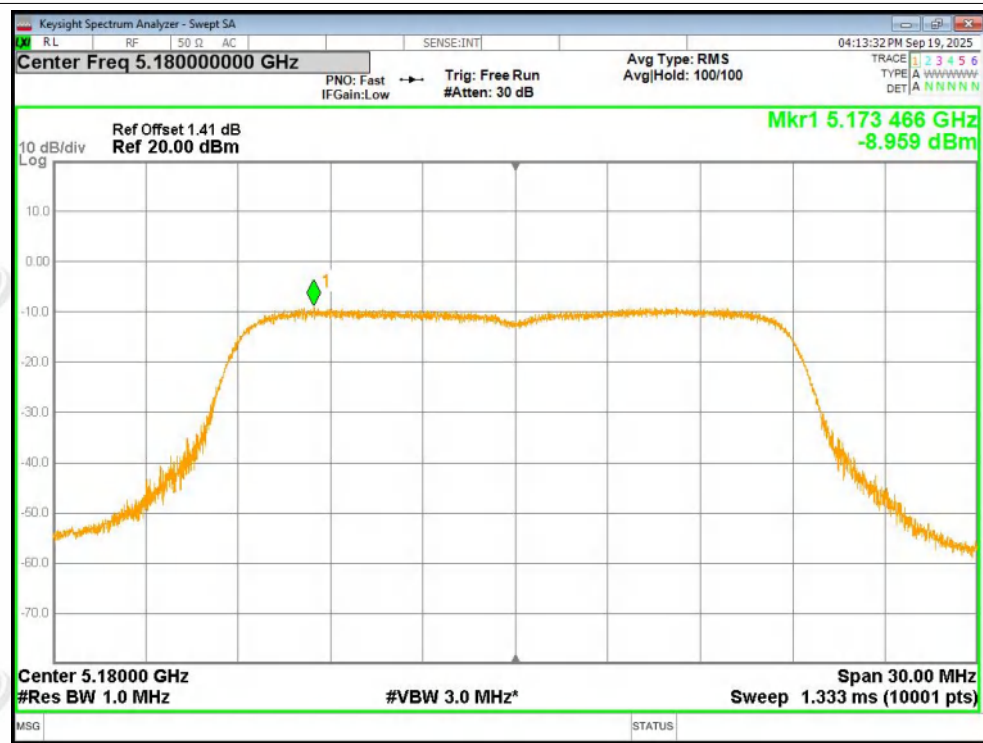




PSD NVNT a 5240MHz Ant1

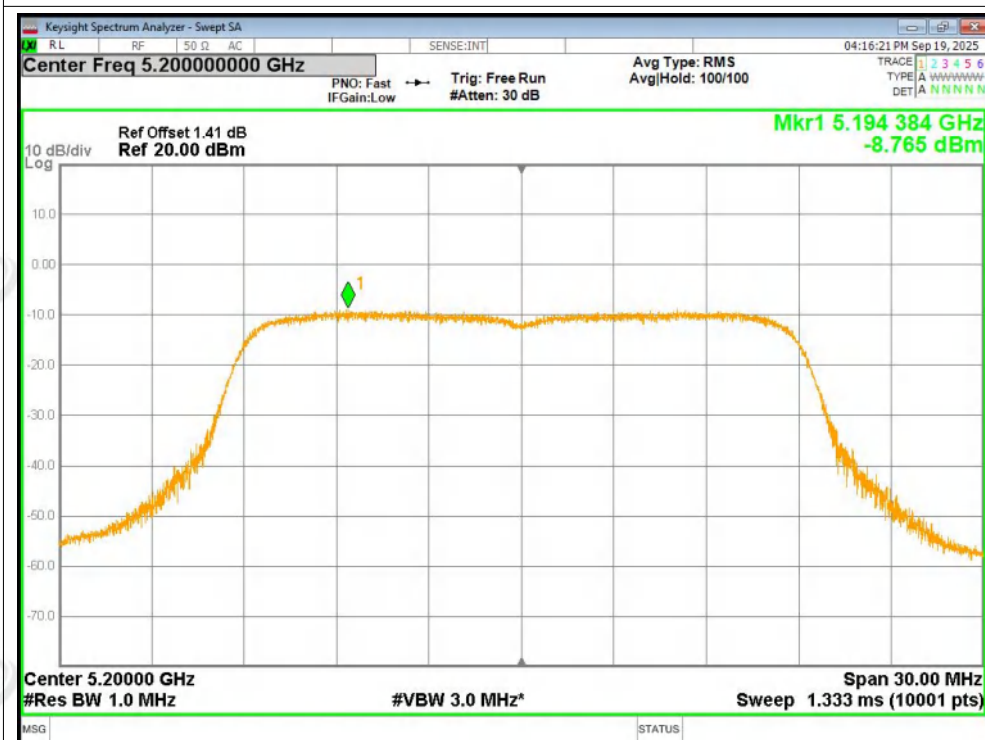


PSD NVNT n20 5180MHz Ant1

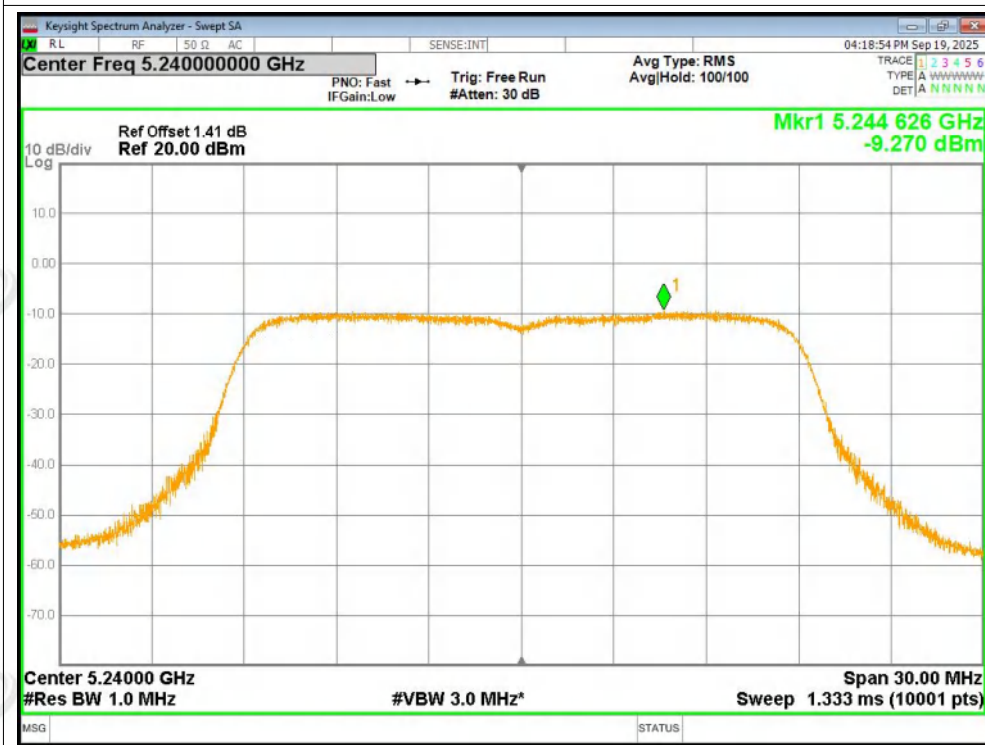




PSD NVNT n20 5200MHz Ant1

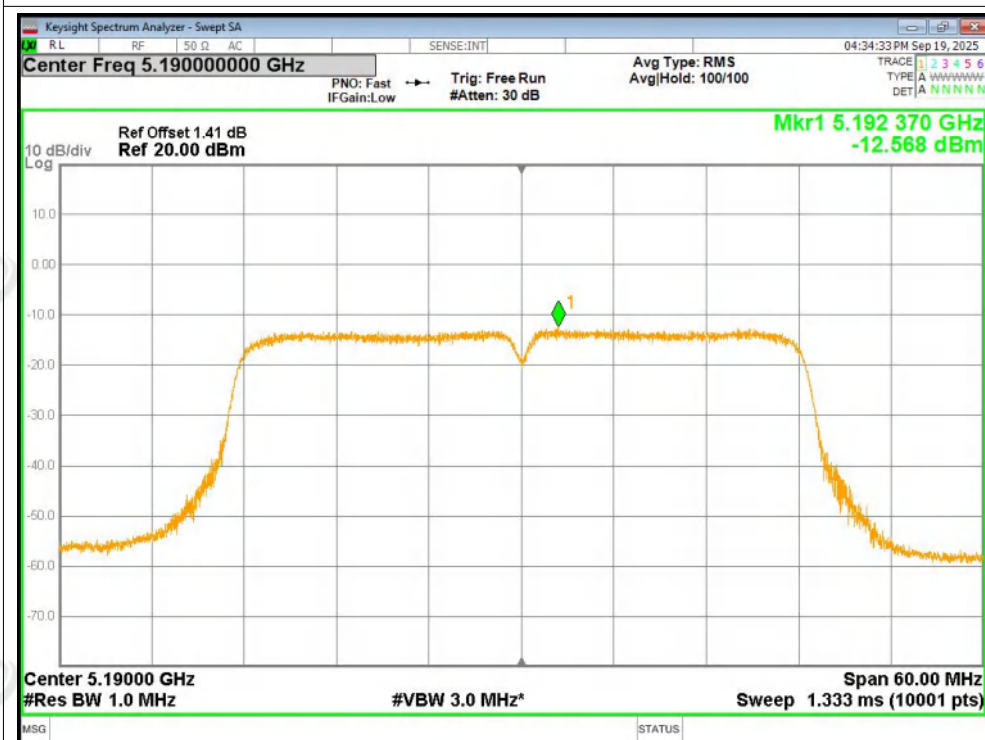


PSD NVNT n20 5240MHz Ant1

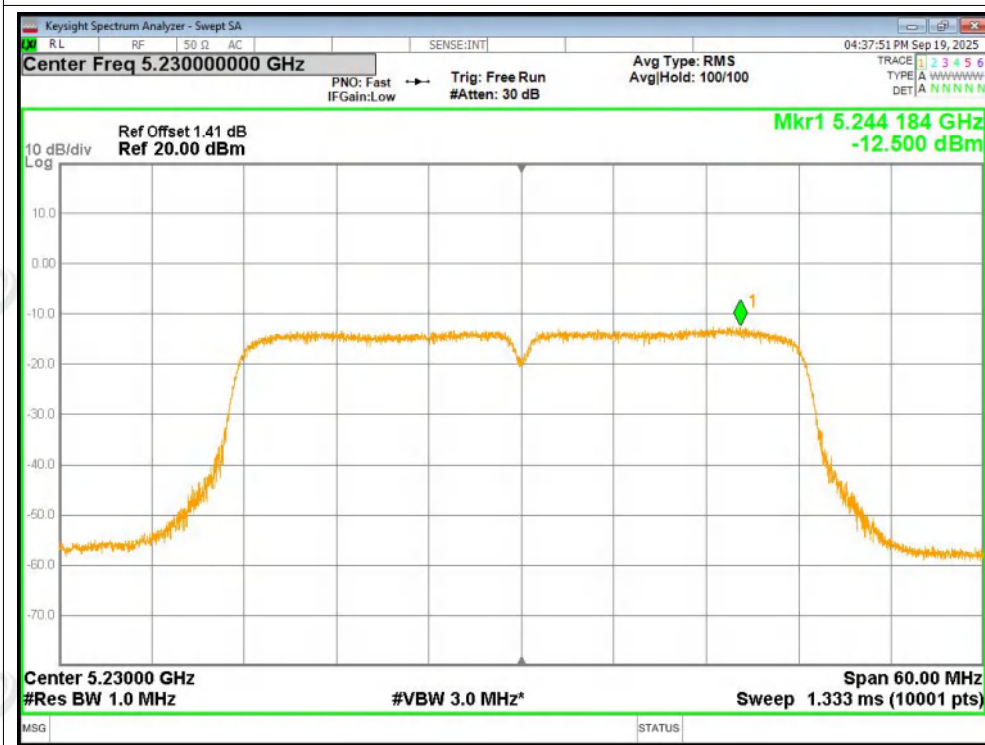




PSD NVNT n40 5190MHz Ant1

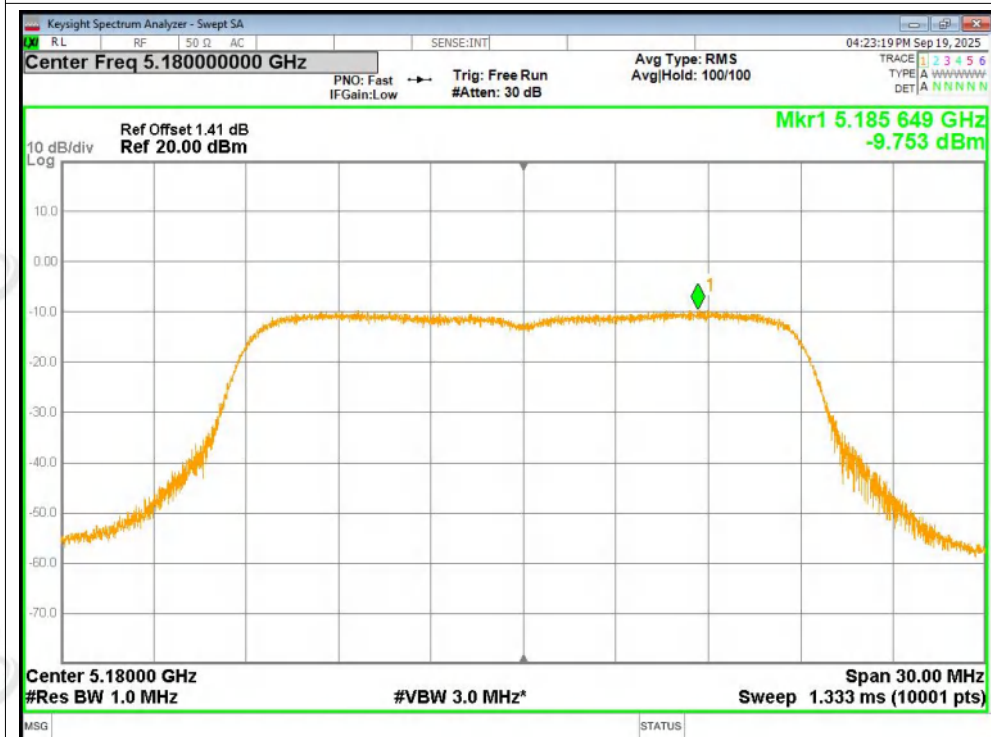


PSD NVNT n40 5230MHz Ant1

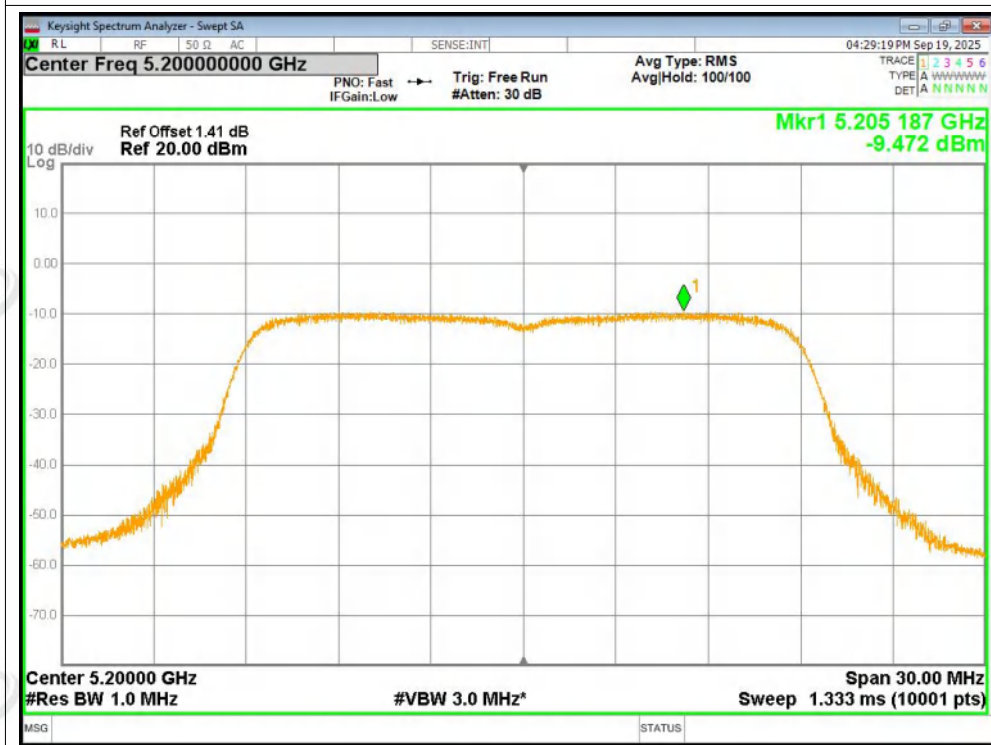




PSD NVNT ac20 5180MHz Ant1

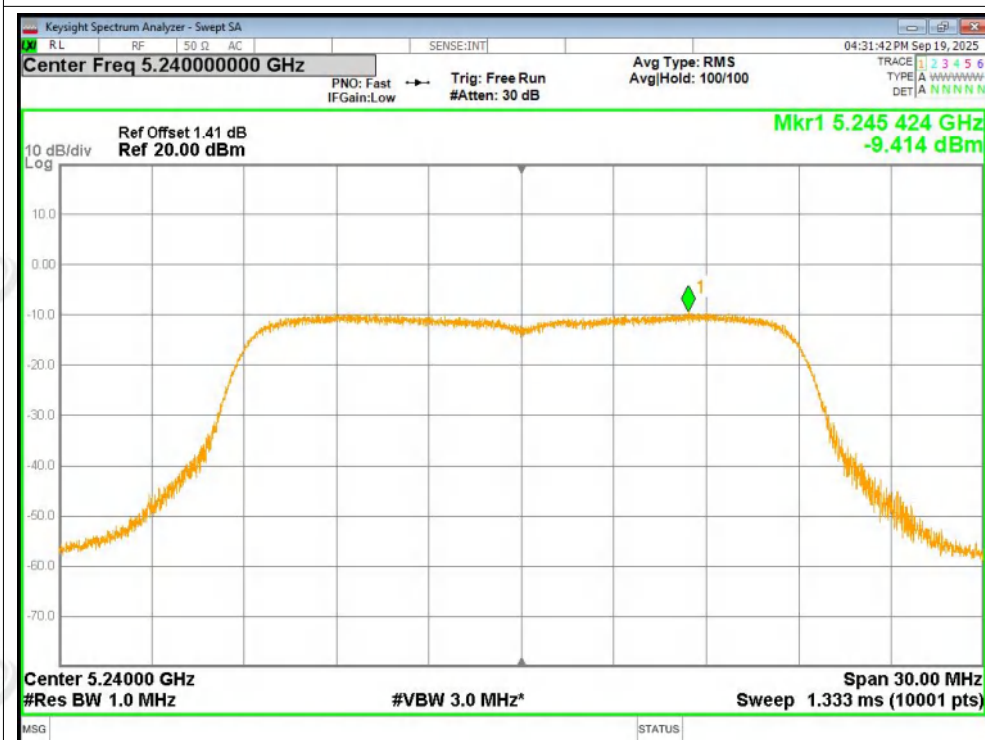


PSD NVNT ac20 5200MHz Ant1

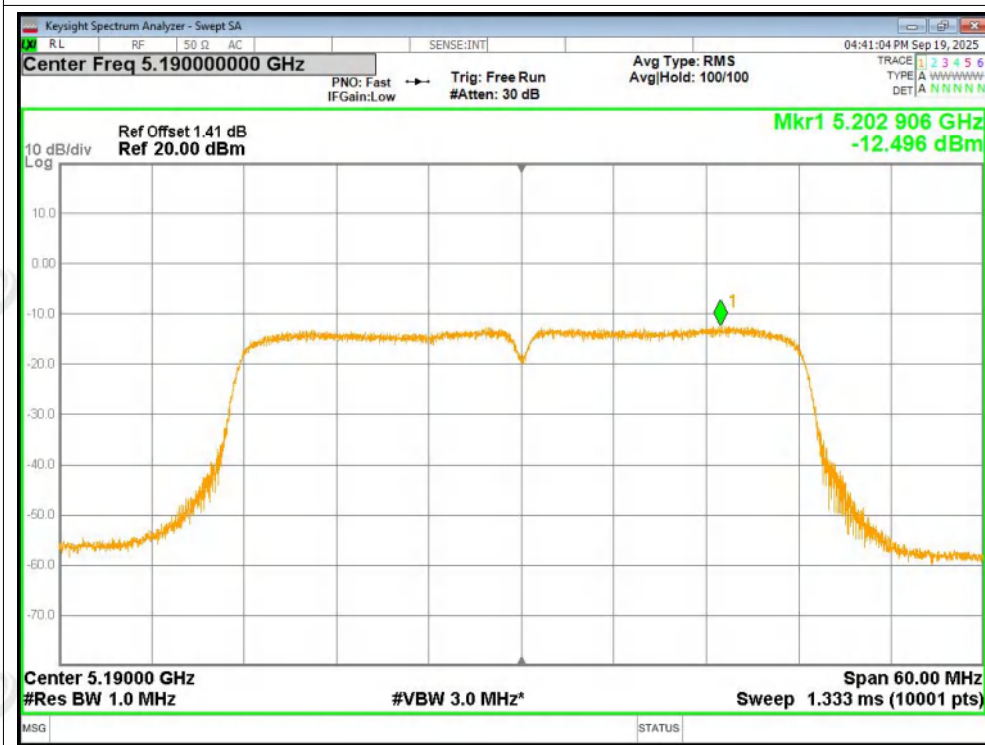




PSD NVNT ac20 5240MHz Ant1

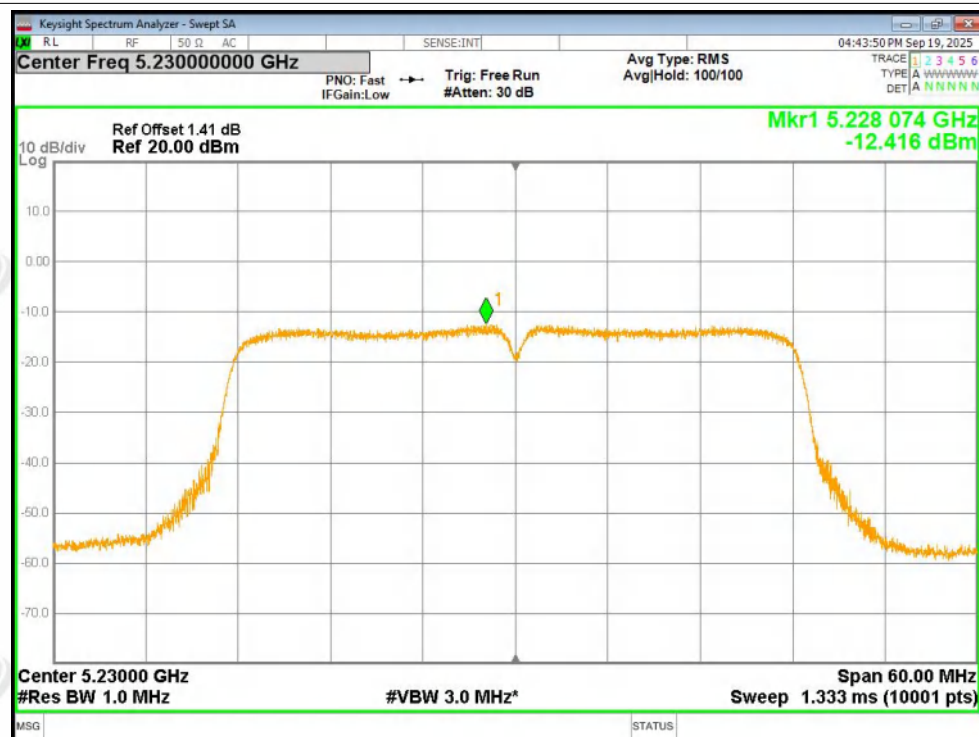


PSD NVNT ac40 5190MHz Ant1

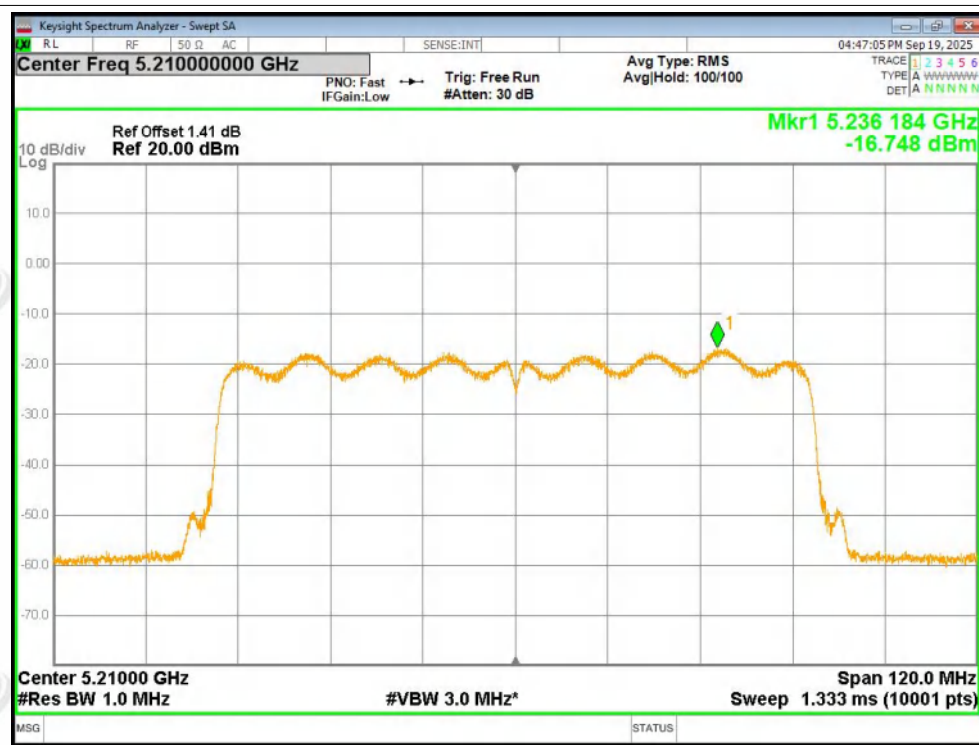




PSD NVNT ac40 5230MHz Ant1



PSD NVNT ac80 5210MHz Ant1





ZHONGHAN
Band Edge



FCC ID:2BSEK-V78



Page 42 of 57

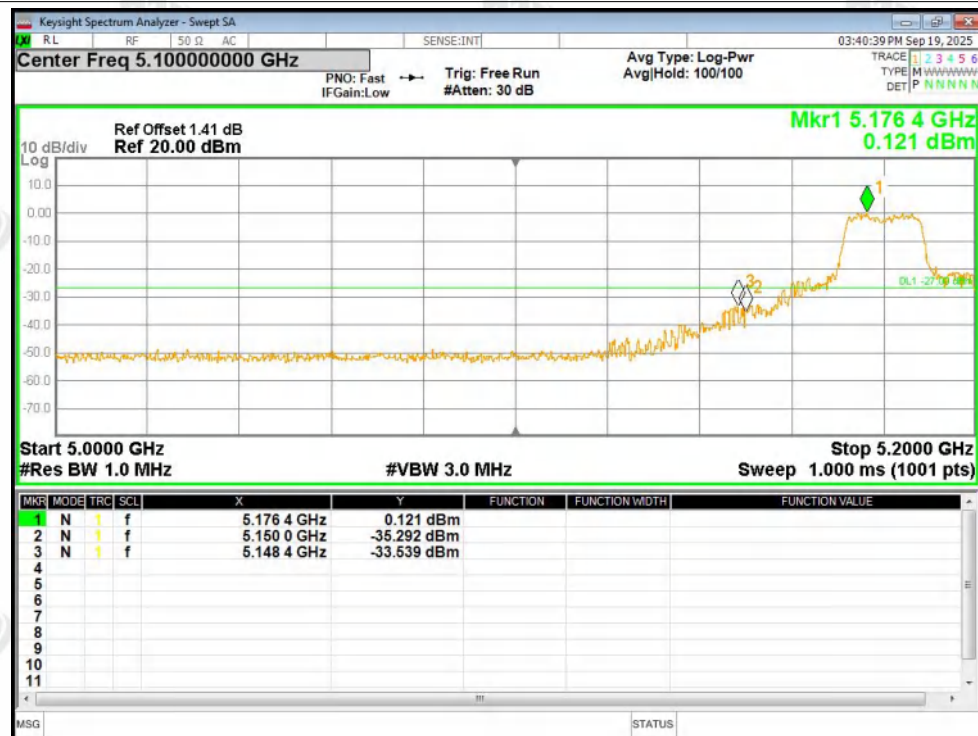


Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	a	5180	Ant1	-33.53	-27	Pass
NVNT	a	5240	Ant1	-47.5	-27	Pass
NVNT	n20	5180	Ant1	-48.48	-27	Pass
NVNT	n20	5240	Ant1	-47.93	-27	Pass
NVNT	n40	5190	Ant1	-47.21	-27	Pass
NVNT	n40	5230	Ant1	-47.92	-27	Pass
NVNT	ac20	5180	Ant1	-48.02	-27	Pass
NVNT	ac20	5240	Ant1	-47.04	-27	Pass
NVNT	ac40	5190	Ant1	-48.49	-27	Pass
NVNT	ac40	5230	Ant1	-47.78	-27	Pass
NVNT	ac80	5210	Ant1	-48.92	-27	Pass

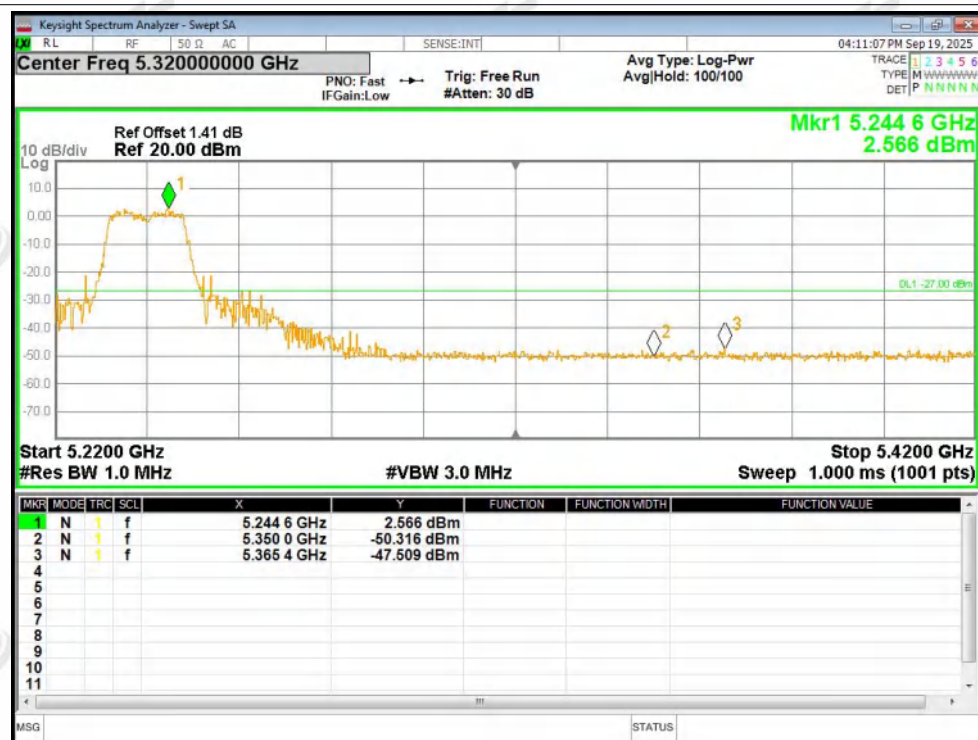


Test Graphs

Band Edge NVNT a 5180MHz Low Ant1

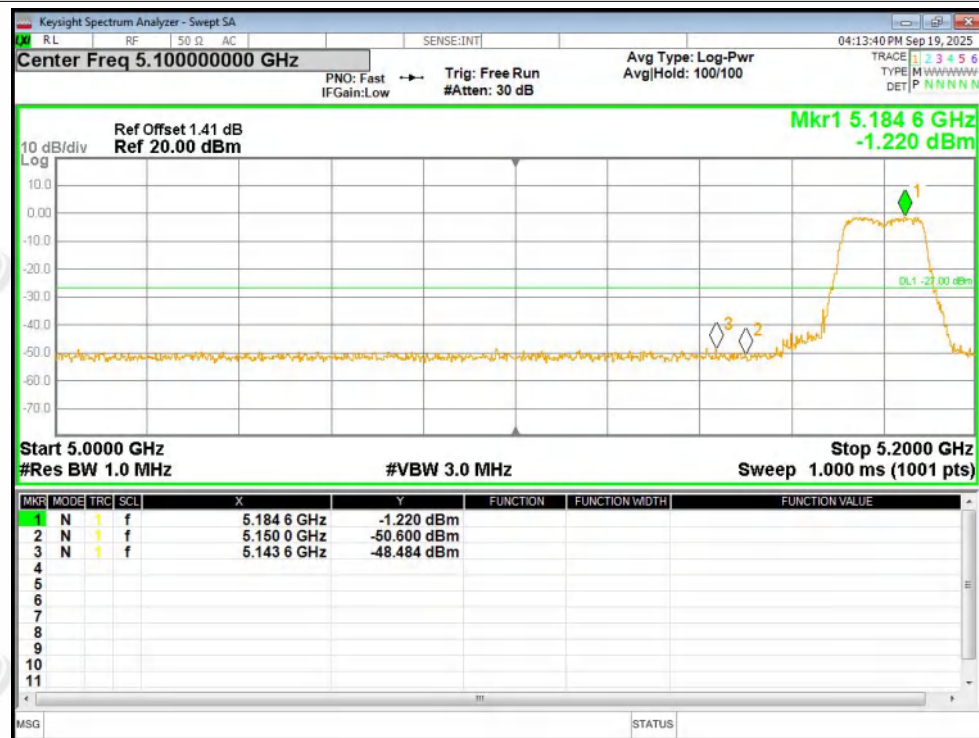


Band Edge NVNT a 5240MHz High Ant1

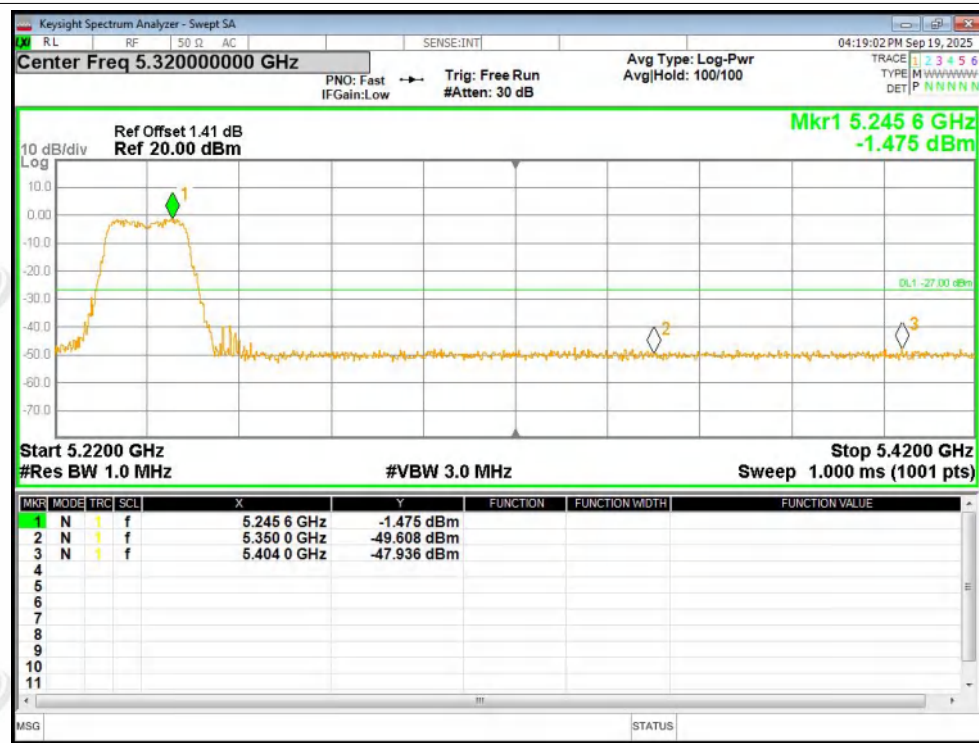




Band Edge NVNT n20 5180MHz Low Ant1

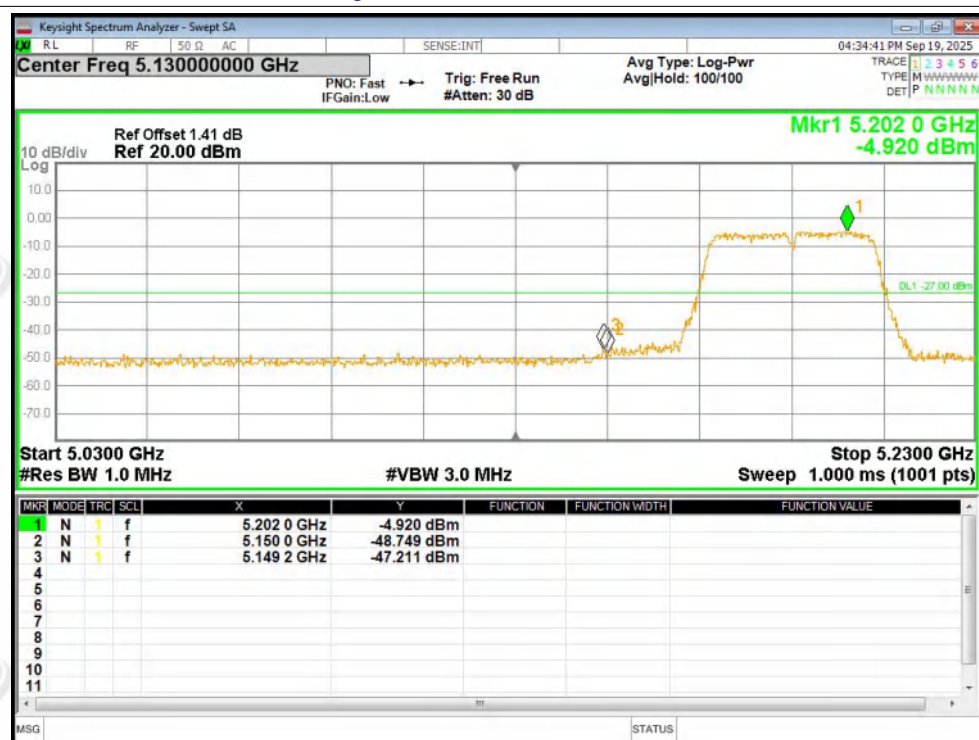


Band Edge NVNT n20 5240MHz High Ant1





Band Edge NVNT n40 5190MHz Low Ant1

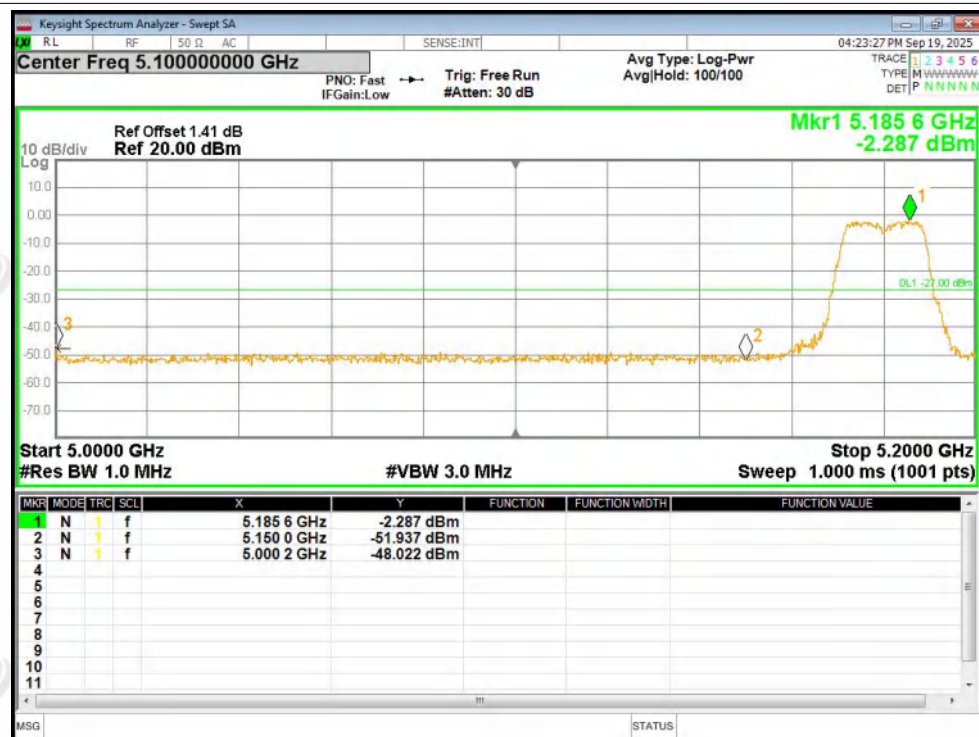


Band Edge NVNT n40 5230MHz High Ant1

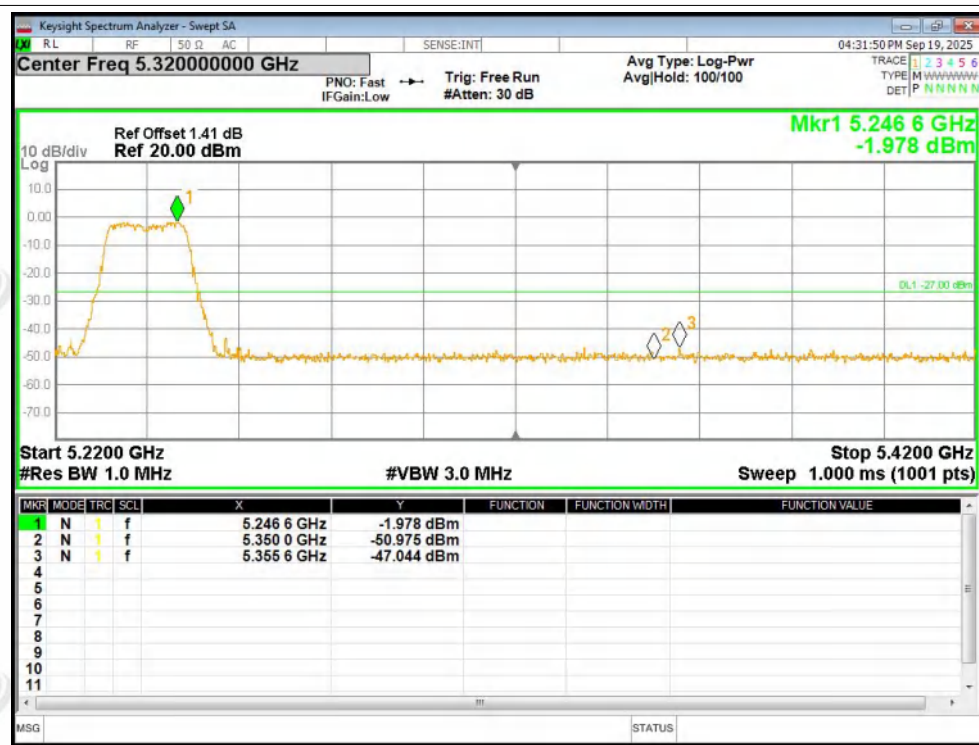




Band Edge NVNT ac20 5180MHz Low Ant1

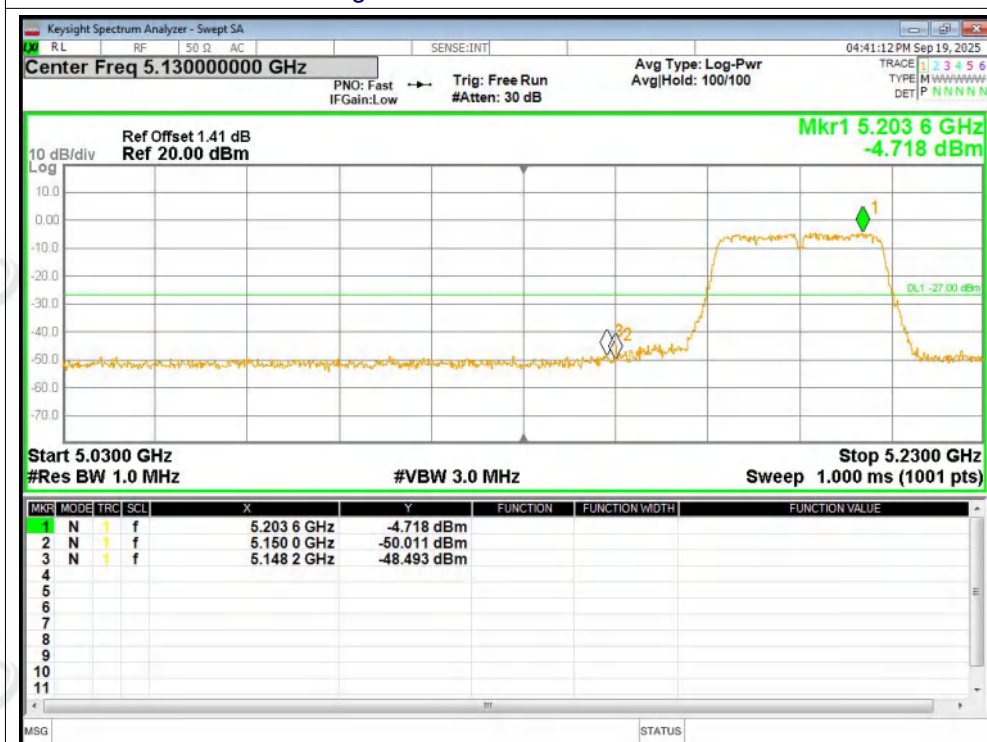


Band Edge NVNT ac20 5240MHz High Ant1

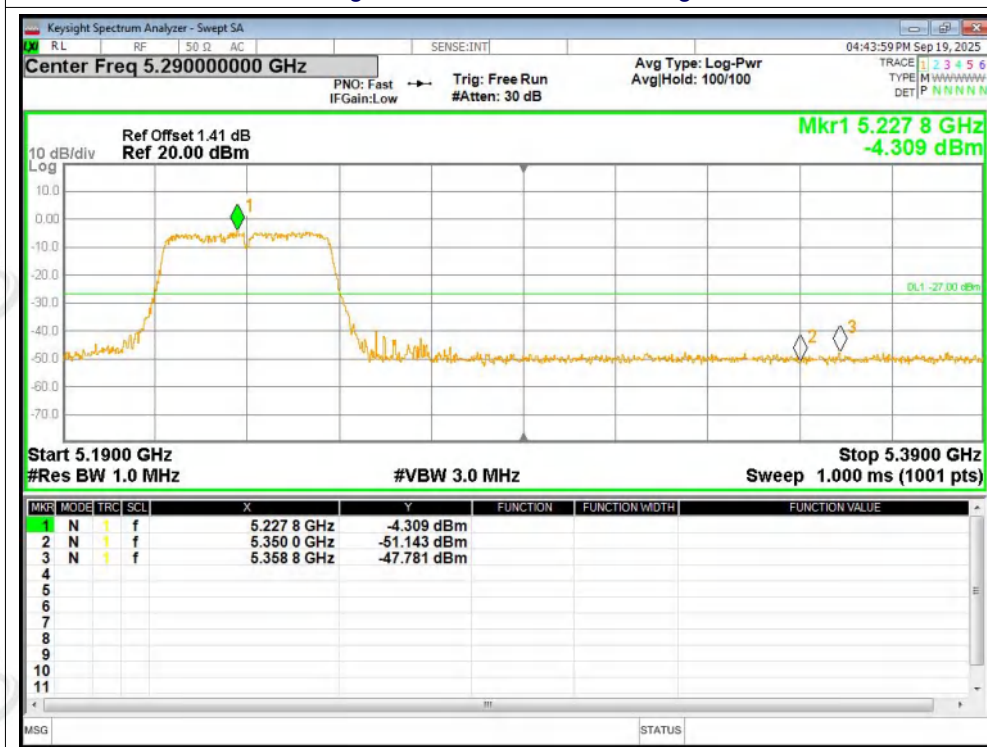




Band Edge NVNT ac40 5190MHz Low Ant1

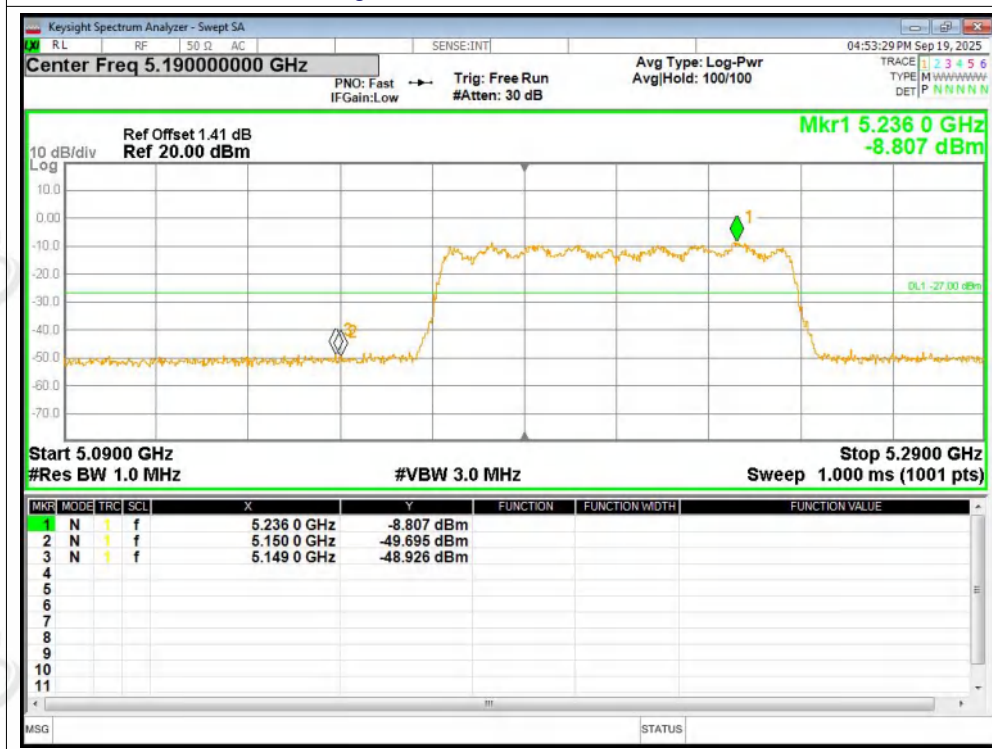


Band Edge NVNT ac40 5230MHz High Ant1





Band Edge NVNT ac80 5210MHz Low Ant1



**ZHONGHAN****Frequency Stability****Voltage**

Test Mode	Channel	Voltage [Vdc]	Temperature (°C)	Measured Frequency (MHz)	Limit (MHz)	Verdict
a	5180	NV	NT	5180.02	Within 5150-5250MHz	Pass
		LV	NT	5180.01		
		HV	NT	5180.03		

Temperature

Test Mode	Channel	Voltage [Vdc]	Temperature (°C)	Measured Frequency (MHz)	Limit (MHz)	Verdict
a	5180	NV	-30	5180.05	Within 5150-5250MHz	Pass
		NV	-20	5180.07		
		NV	-10	5180.04		
		NV	0	5180.00		
		NV	10	5180.01		
		NV	20	5180.05		
		NV	30	5180.09		
		NV	40	5180.03		
		NV	50	5180.04		

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

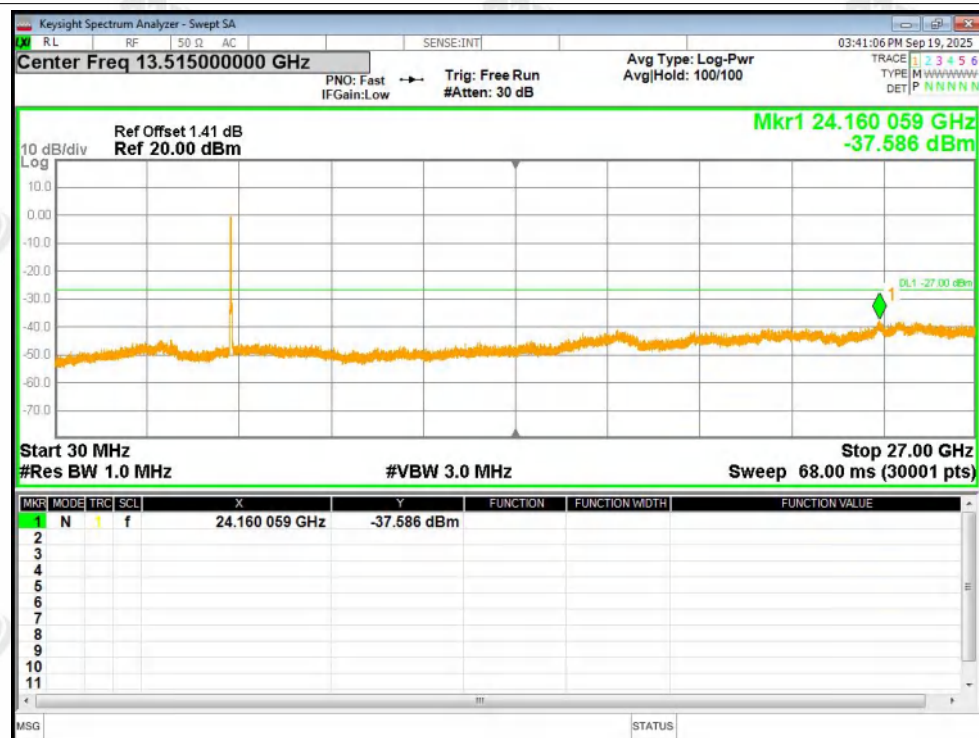
**ZHONGHAN****Conducted RF Spurious Emission**

Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	a	5180	Ant1	-37.58	-27	Pass
NVNT	a	5200	Ant1	-36.87	-27	Pass
NVNT	a	5240	Ant1	-37.35	-27	Pass
NVNT	n20	5180	Ant1	-37.1	-27	Pass
NVNT	n20	5200	Ant1	-37.5	-27	Pass
NVNT	n20	5240	Ant1	-37.72	-27	Pass
NVNT	n40	5190	Ant1	-37.5	-27	Pass
NVNT	n40	5230	Ant1	-37.28	-27	Pass
NVNT	ac20	5180	Ant1	-37.45	-27	Pass
NVNT	ac20	5200	Ant1	-37.4	-27	Pass
NVNT	ac20	5240	Ant1	-37.52	-27	Pass
NVNT	ac40	5190	Ant1	-37.23	-27	Pass
NVNT	ac40	5230	Ant1	-37.54	-27	Pass
NVNT	ac80	5210	Ant1	-36.82	-27	Pass

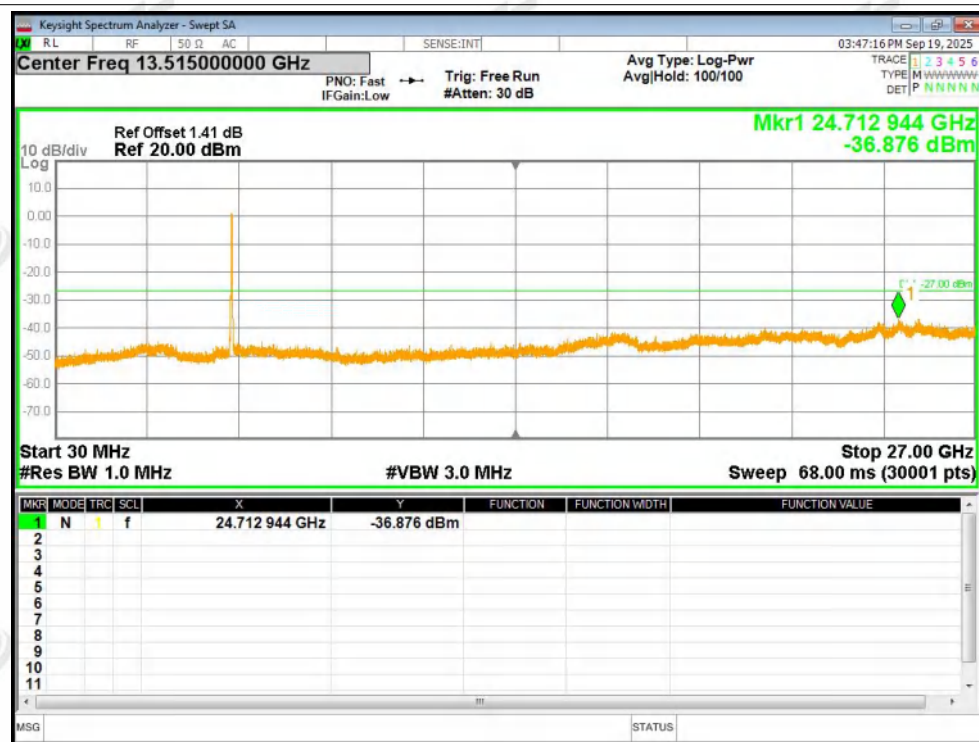


Test Graphs

Tx. Spurious NVNT a 5180MHz Ant1 Emission

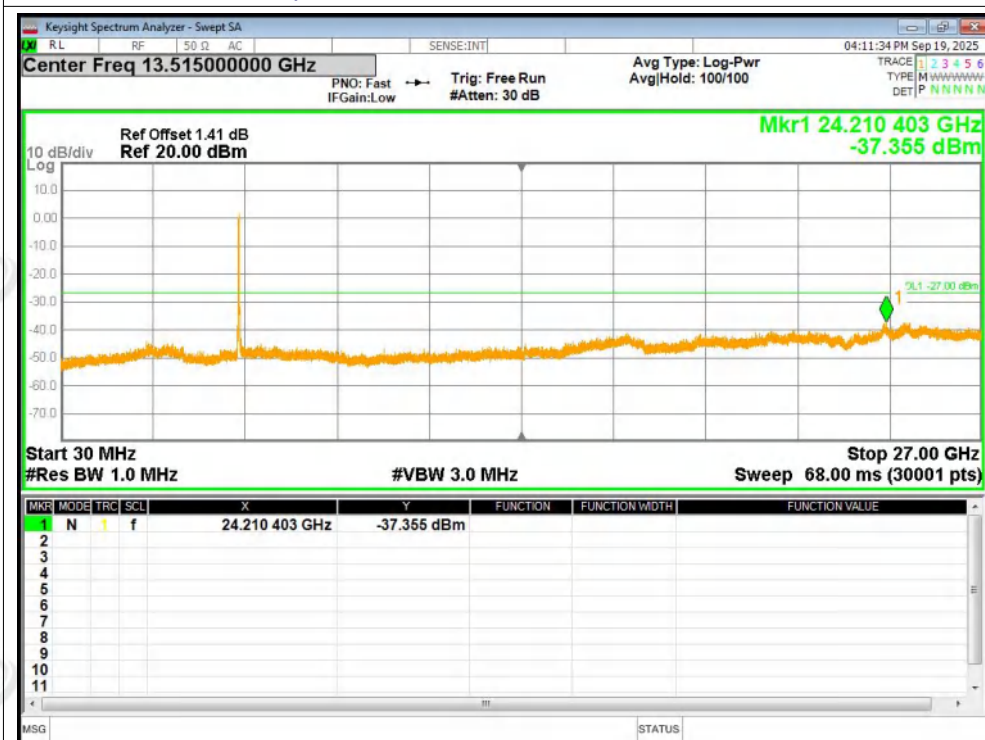


Tx. Spurious NVNT a 5200MHz Ant1 Emission

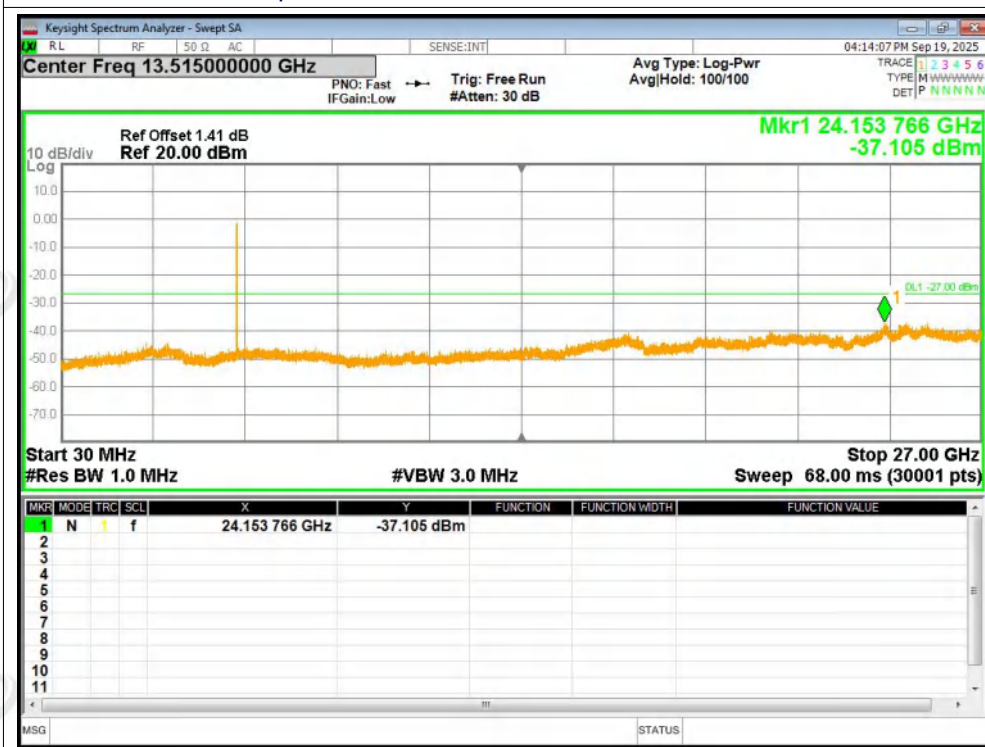




Tx. Spurious NVNT a 5240MHz Ant1 Emission

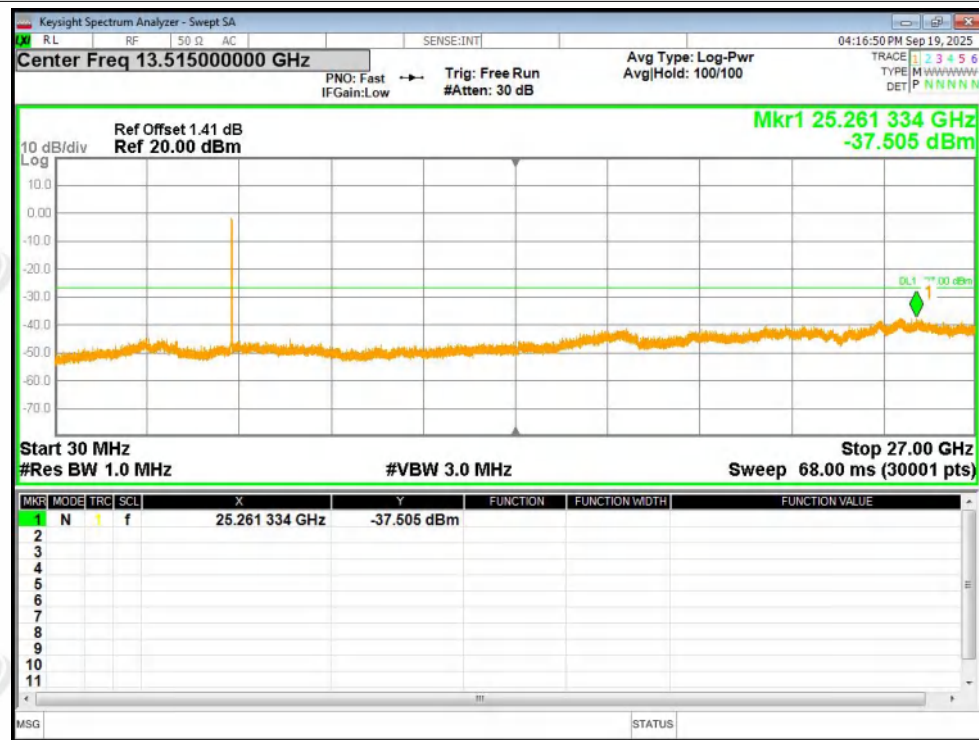


Tx. Spurious NVNT n20 5180MHz Ant1 Emission

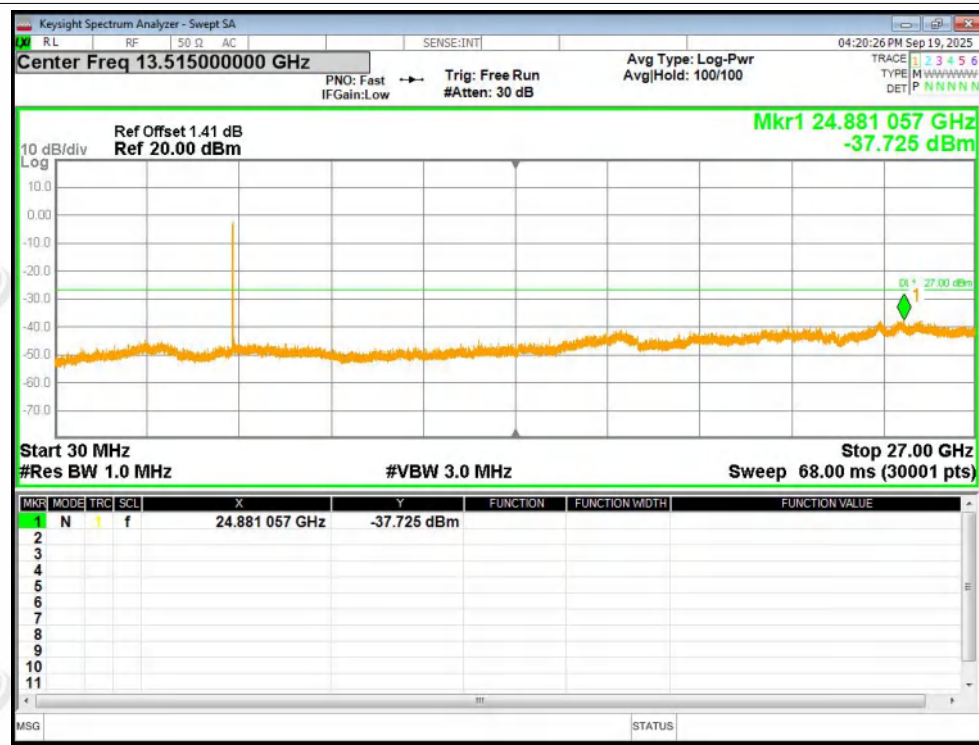




Tx. Spurious NVNT n20 5200MHz Ant1 Emission

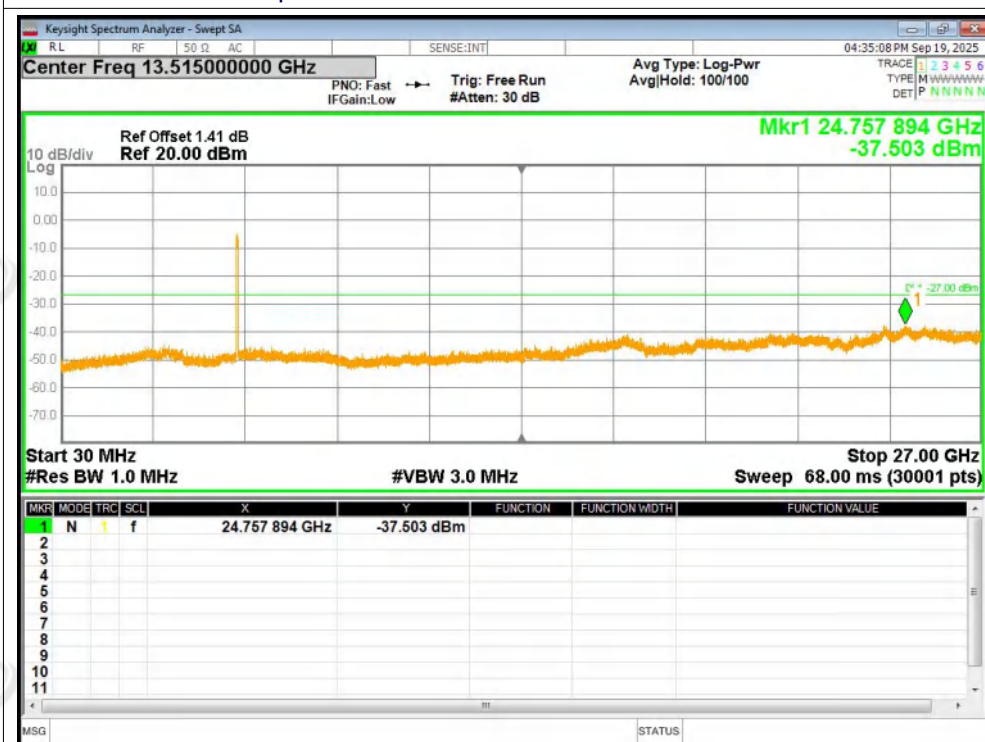


Tx. Spurious NVNT n20 5240MHz Ant1 Emission

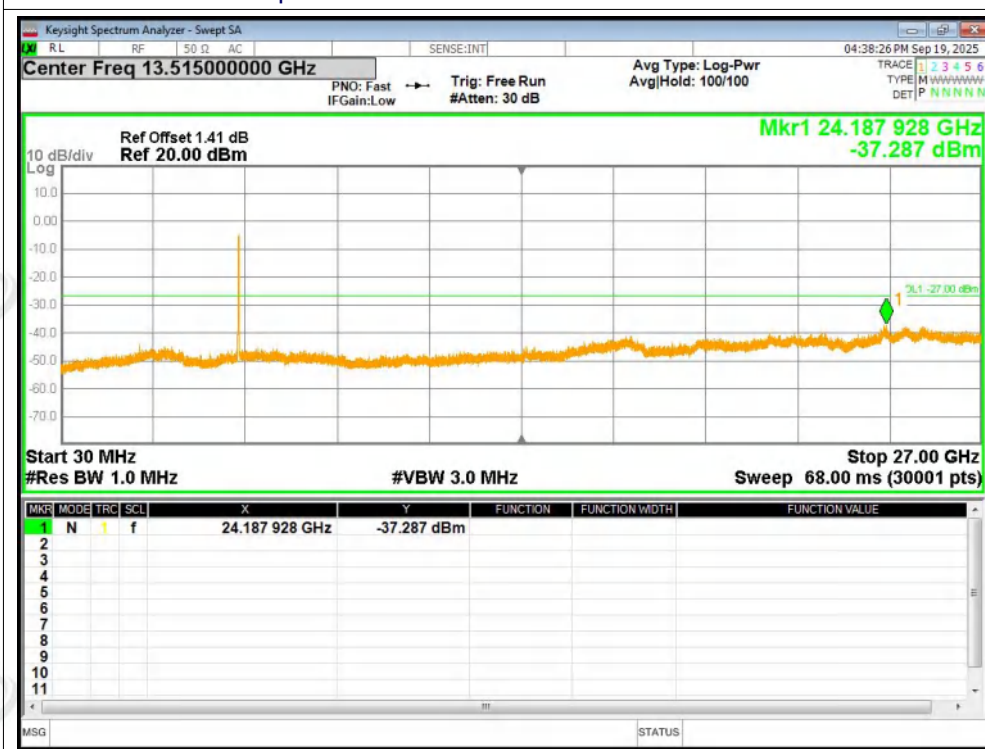




Tx. Spurious NVNT n40 5190MHz Ant1 Emission

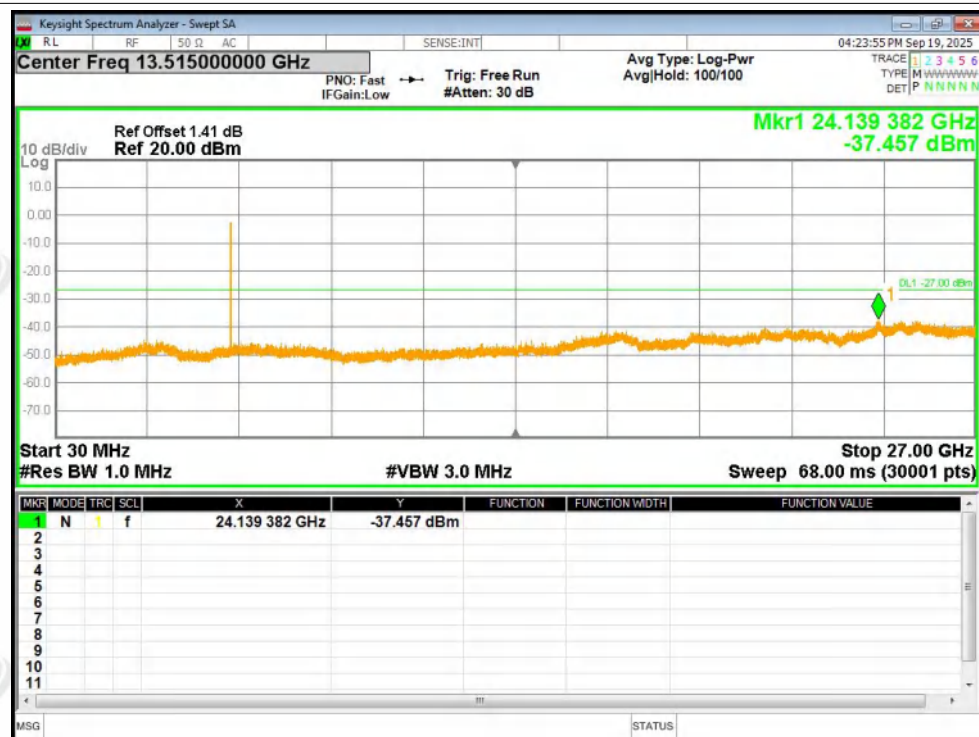


Tx. Spurious NVNT n40 5230MHz Ant1 Emission

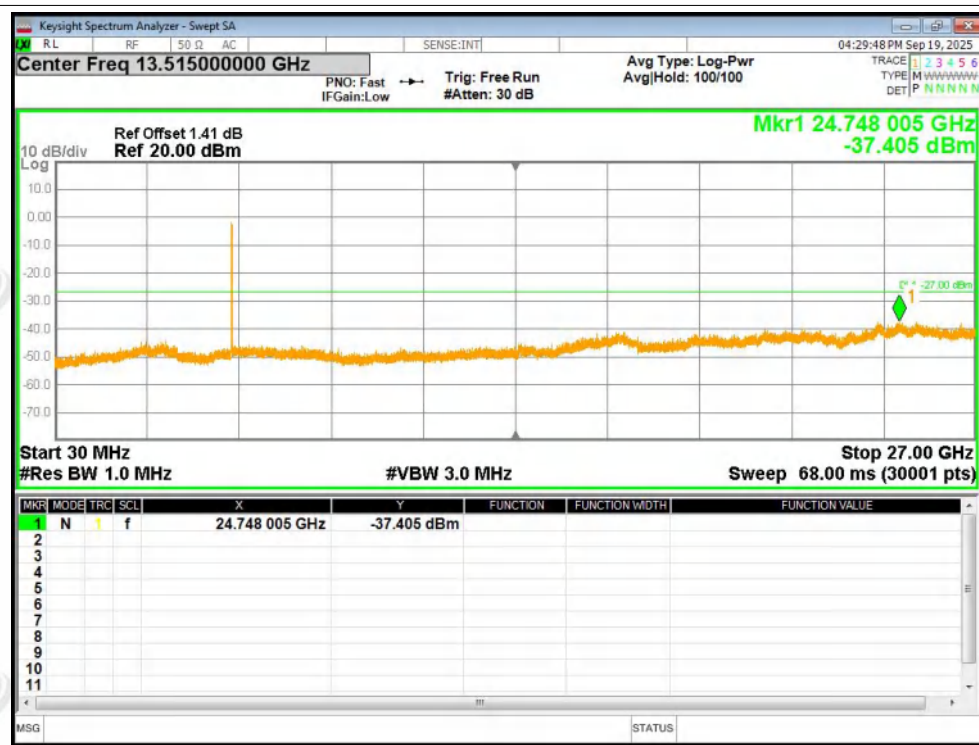




Tx. Spurious NVNT ac20 5180MHz Ant1 Emission

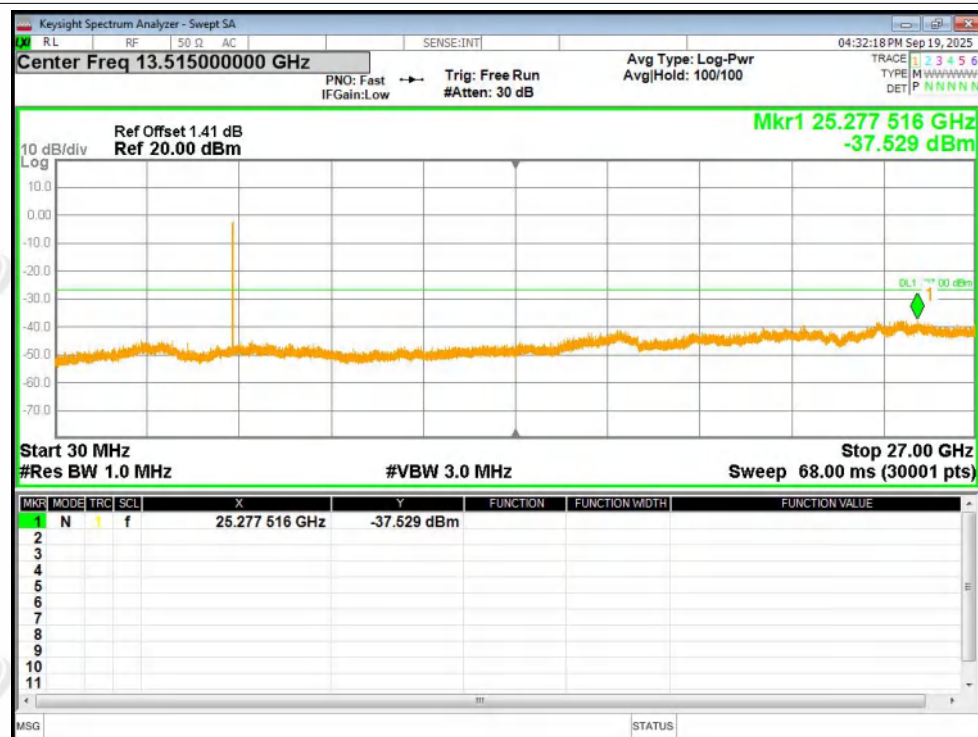


Tx. Spurious NVNT ac20 5200MHz Ant1 Emission

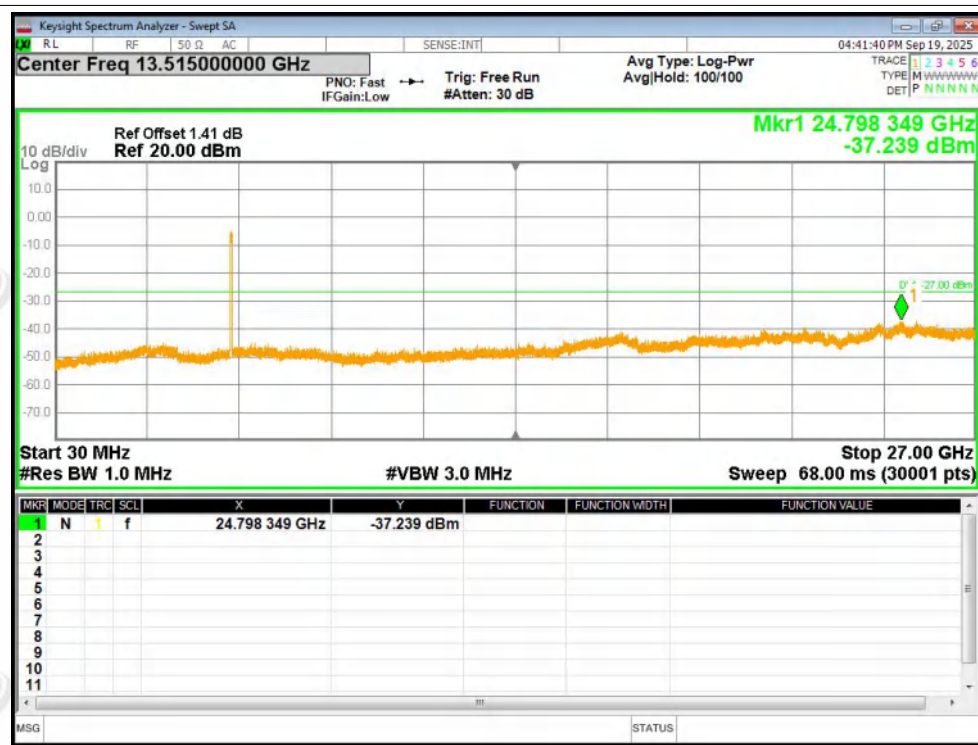




Tx. Spurious NVNT ac20 5240MHz Ant1 Emission

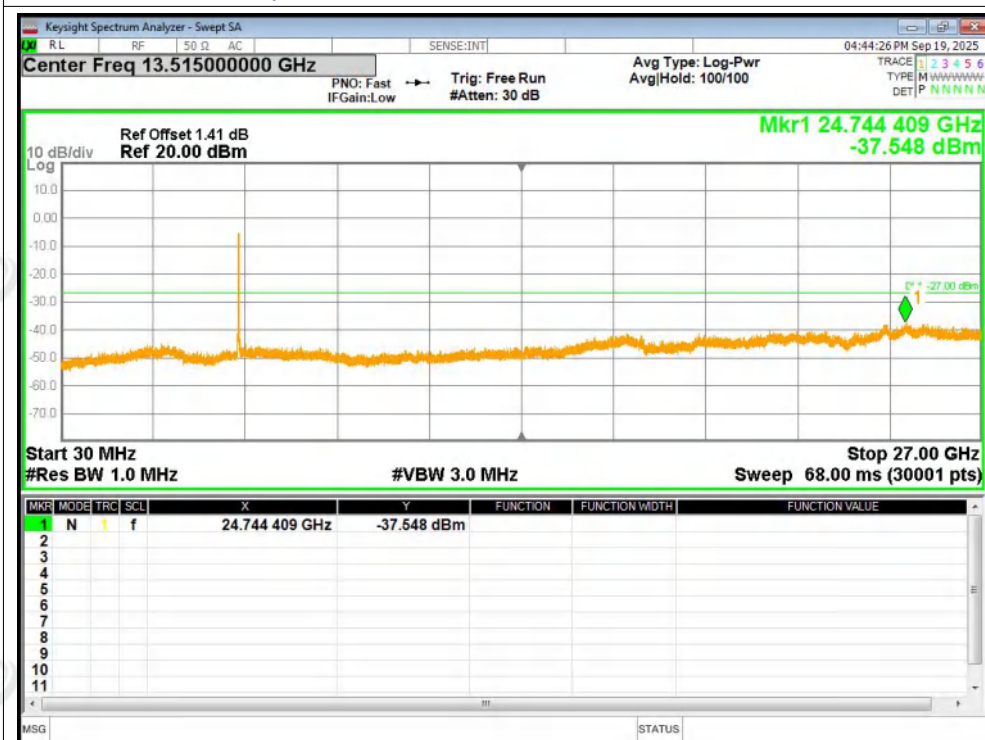


Tx. Spurious NVNT ac40 5190MHz Ant1 Emission





Tx. Spurious NVNT ac40 5230MHz Ant1 Emission



Tx. Spurious NVNT ac80 5210MHz Ant1 Emission

