

Appendix A for 5.2GWIFI Test Data
Product Name: CR-S1 Handheld Mapping System
Test Model: CR-S1

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

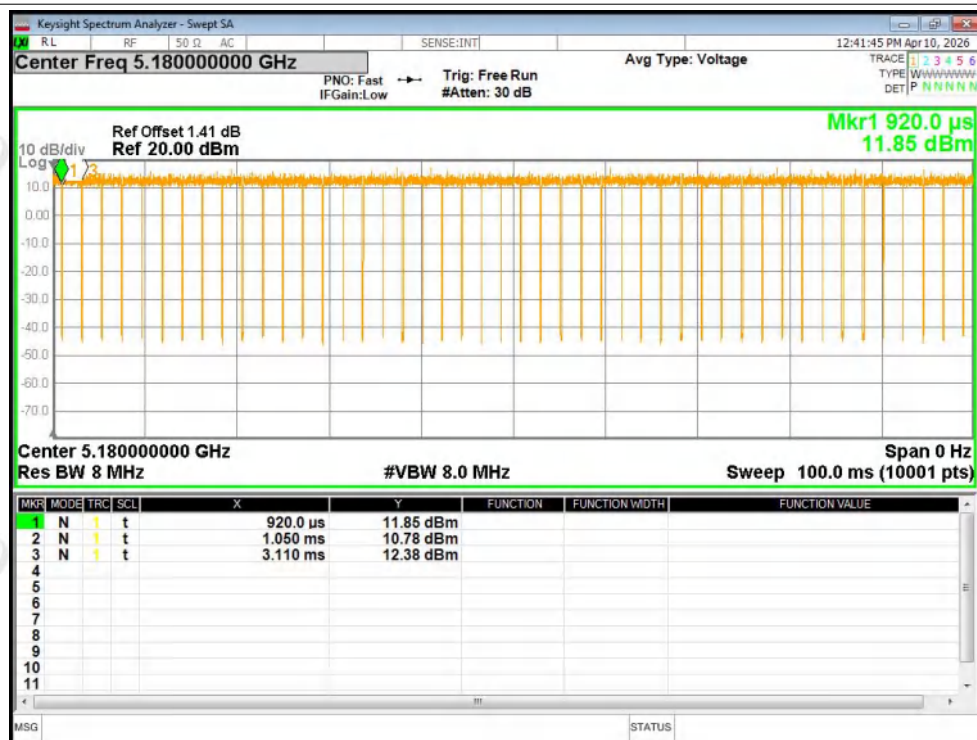
Mode	Frequency (MHz)	Antenna	T _{on} ms	T _{total} ms	Duty Cycle (%)	Correction Factor (dB)	1/T (kHz)
a	5180	Ant1	2.06	2.19	94.06	0.27	0.49
a	5200	Ant1	2.06	2.22	92.79	0.32	0.49
a	5240	Ant1	2.07	2.17	95.39	0.2	0.48
n20	5180	Ant1	1.92	2.27	84.58	0.73	0.52
n20	5200	Ant1	1.92	2.07	92.75	0.33	0.52
n20	5240	Ant1	1.92	2.09	91.87	0.37	0.52
n40	5190	Ant1	0.95	1.30	73.08	1.36	1.05
n40	5230	Ant1	0.94	0.99	94.95	0.23	1.06
ac20	5180	Ant1	1.93	2.09	92.34	0.35	0.52
ac20	5200	Ant1	1.93	2.07	93.24	0.3	0.52
ac20	5240	Ant1	1.93	2.09	92.34	0.35	0.52
ac40	5190	Ant1	0.95	1.08	87.96	0.56	1.05
ac40	5230	Ant1	0.95	1.10	86.36	0.64	1.05
ac80	5210	Ant1	0.46	0.50	92	0.36	2.17

Note:

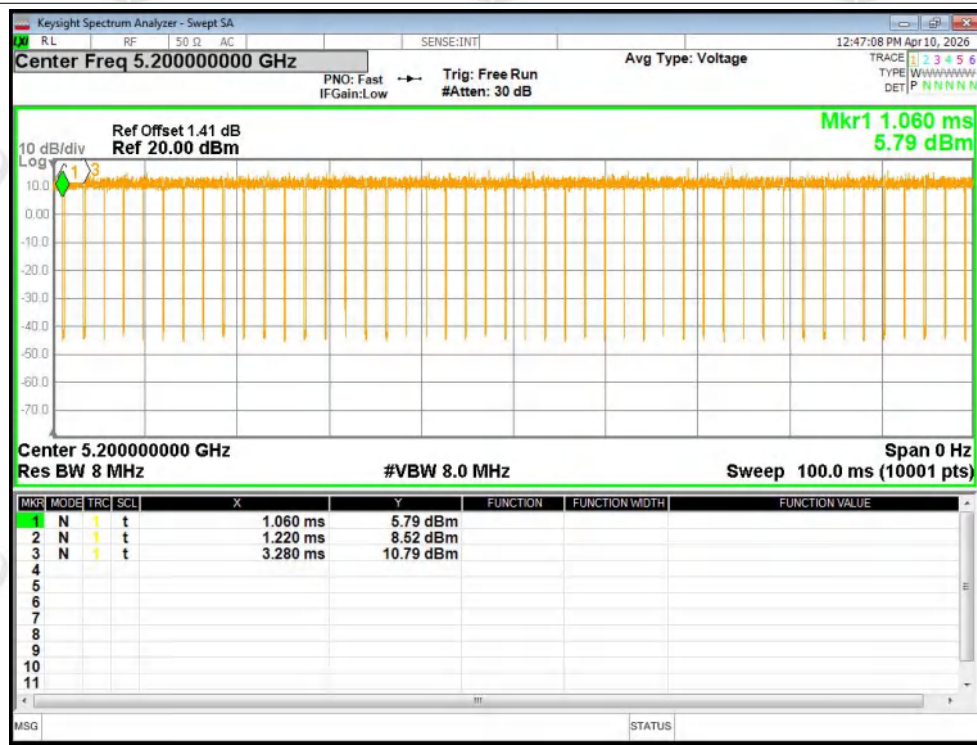
1. Duty Cycle = T_{on} / T_{total}
2. Correction Factor = $10 \log (1 / \text{Duty Cycle})$.
3. $1/T = 1/T_{on}$

Test Graphs

Duty Cycle NVNT a 5180MHz Ant1

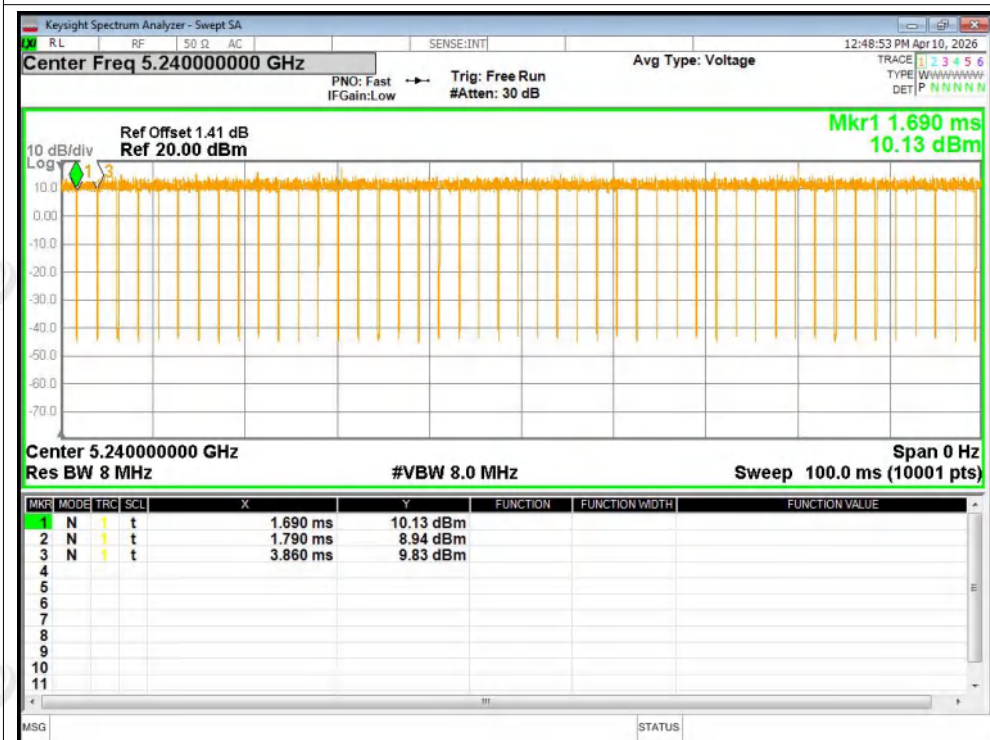


Duty Cycle NVNT a 5200MHz Ant1





Duty Cycle NVNT a 5240MHz Ant1

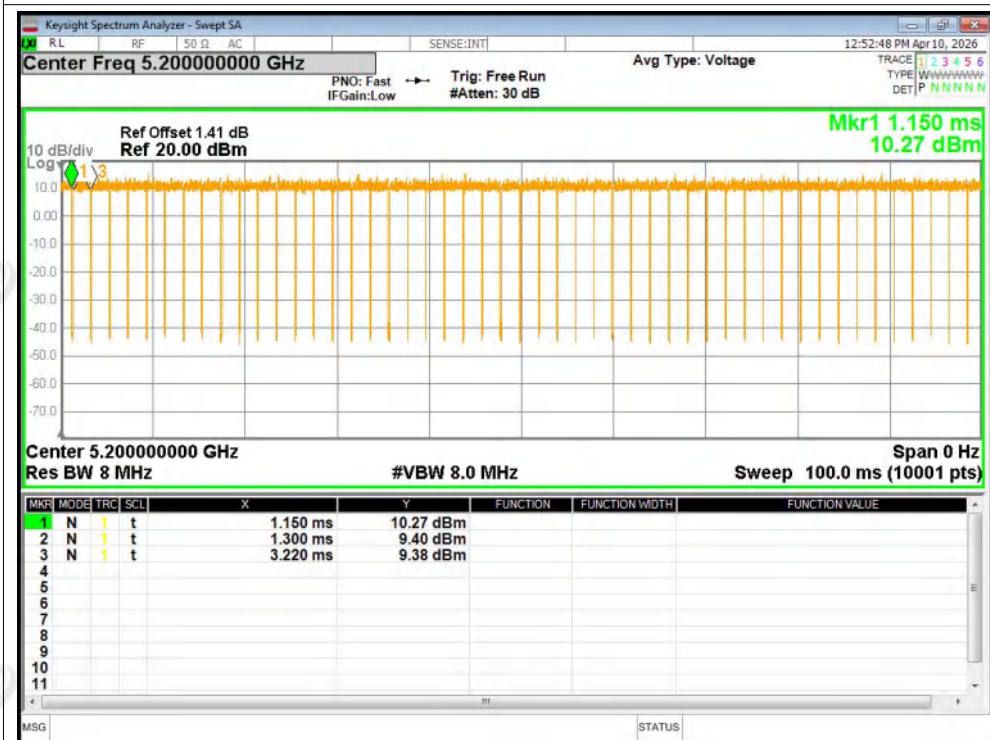


Duty Cycle NVNT n20 5180MHz Ant1

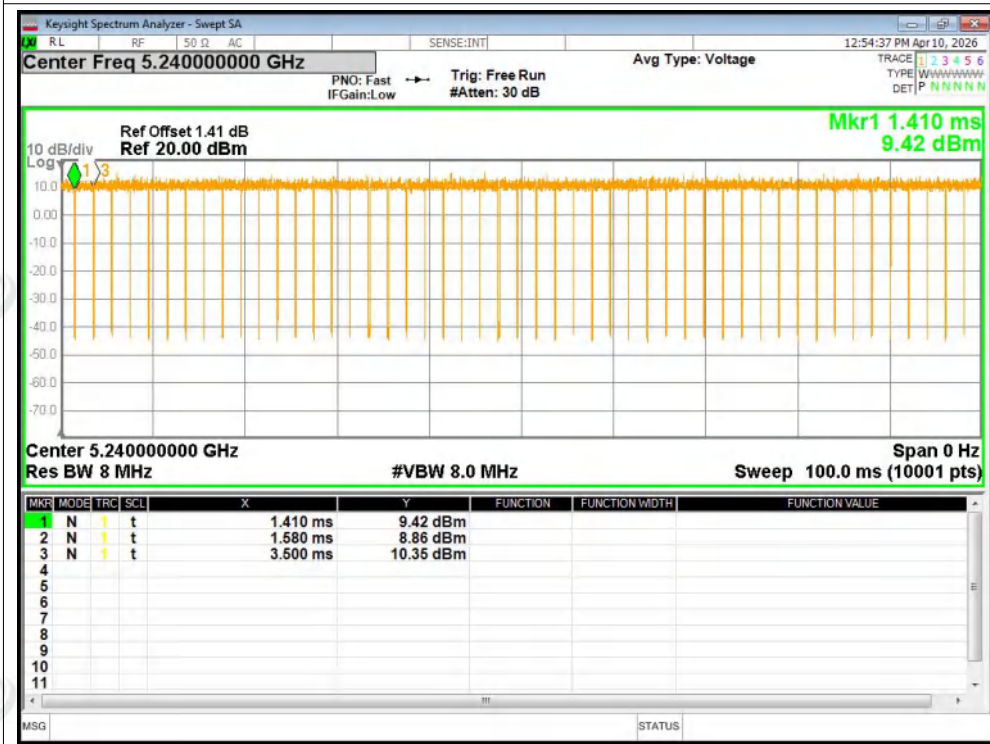




Duty Cycle NVNT n20 5200MHz Ant1

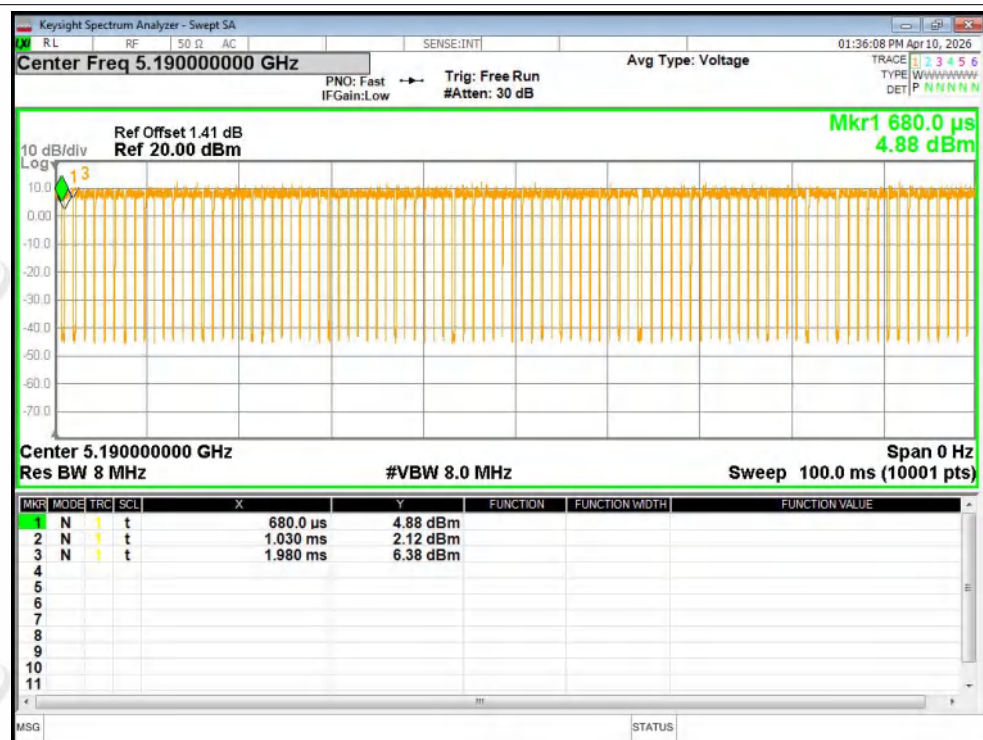


Duty Cycle NVNT n20 5240MHz Ant1

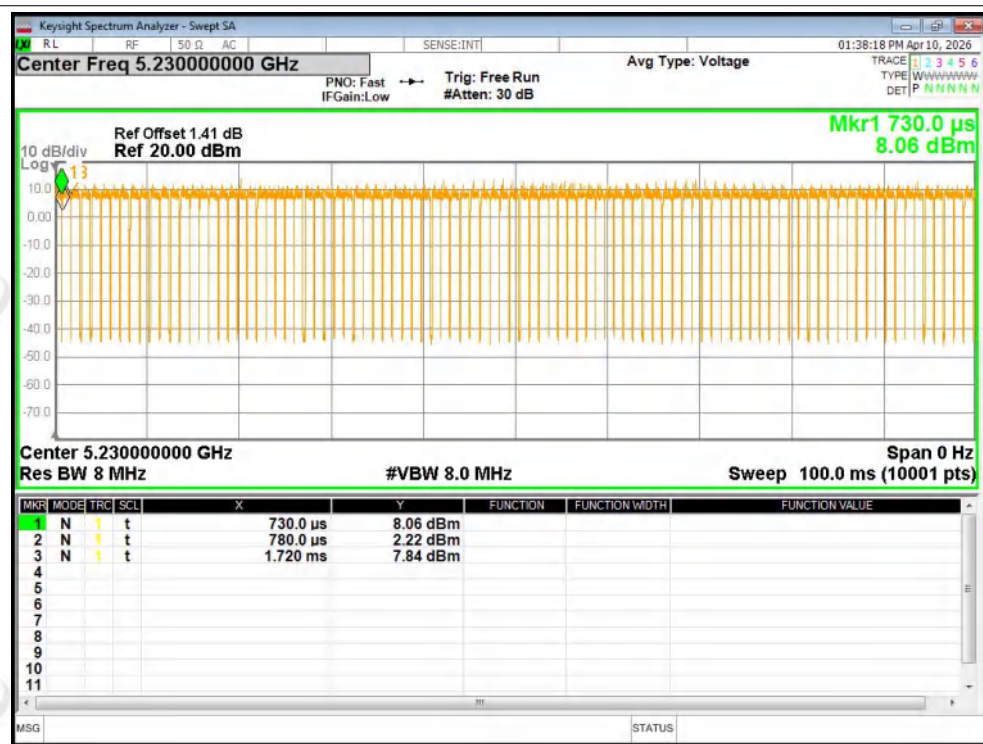




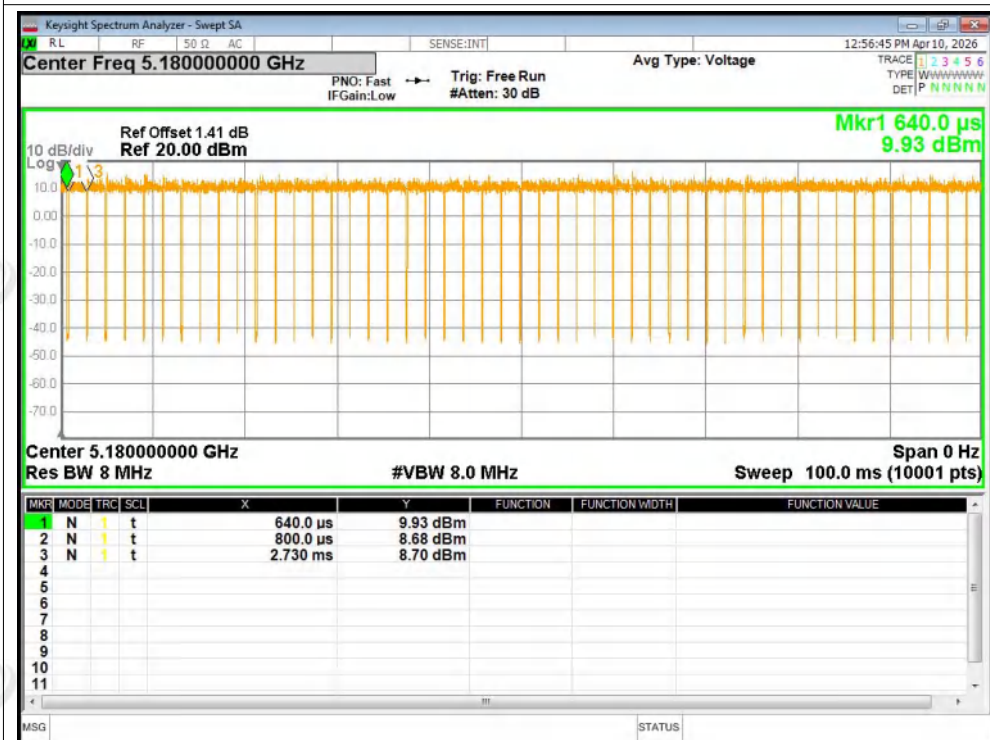
Duty Cycle NVNT n40 5190MHz Ant1



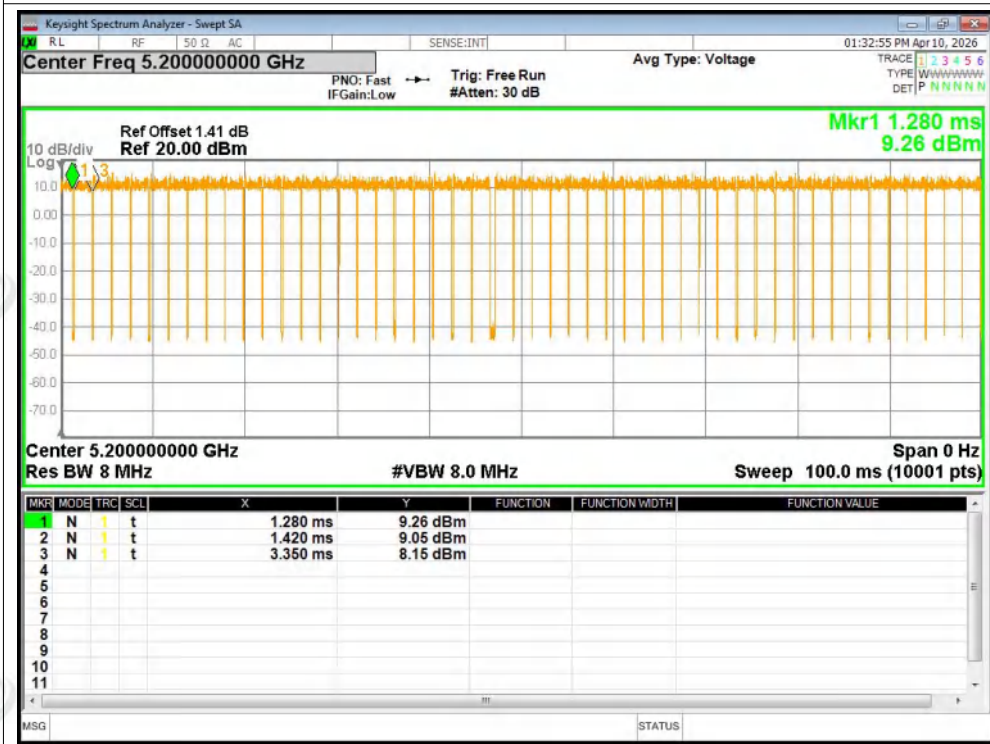
Duty Cycle NVNT n40 5230MHz Ant1



Duty Cycle NVNT ac20 5180MHz Ant1

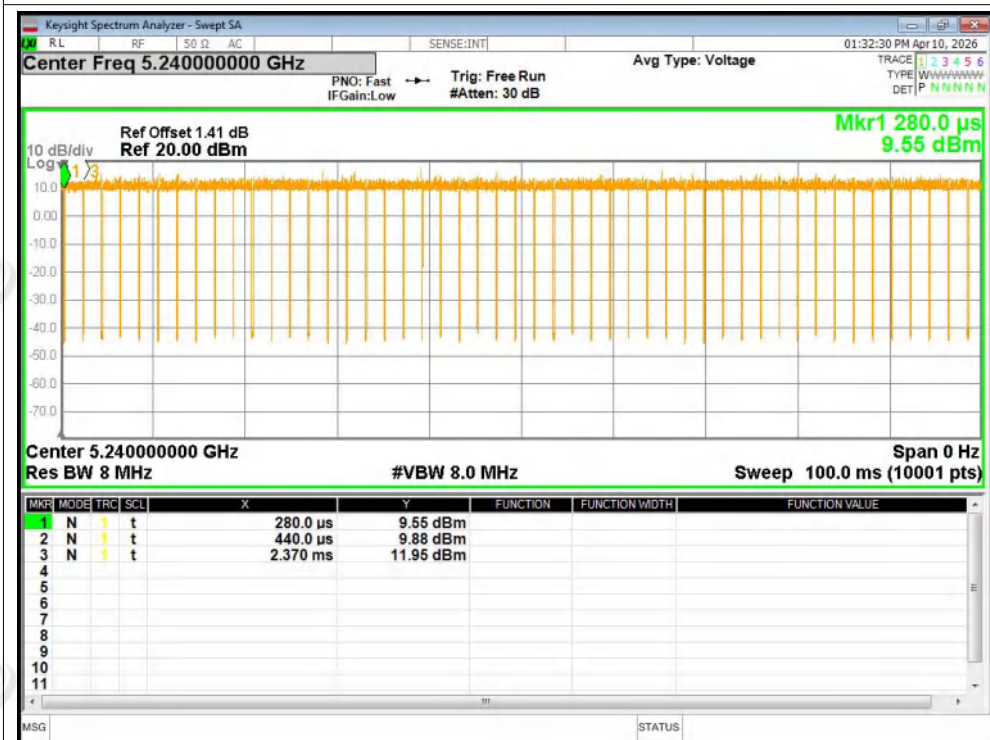


Duty Cycle NVNT ac20 5200MHz Ant1

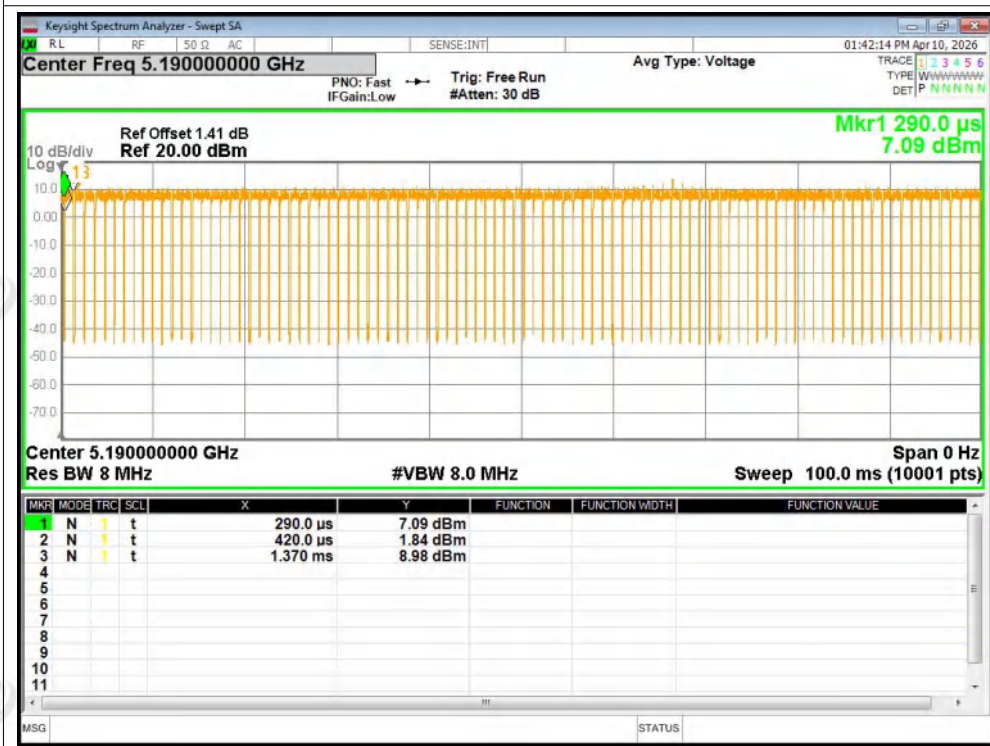




Duty Cycle NVNT ac20 5240MHz Ant1

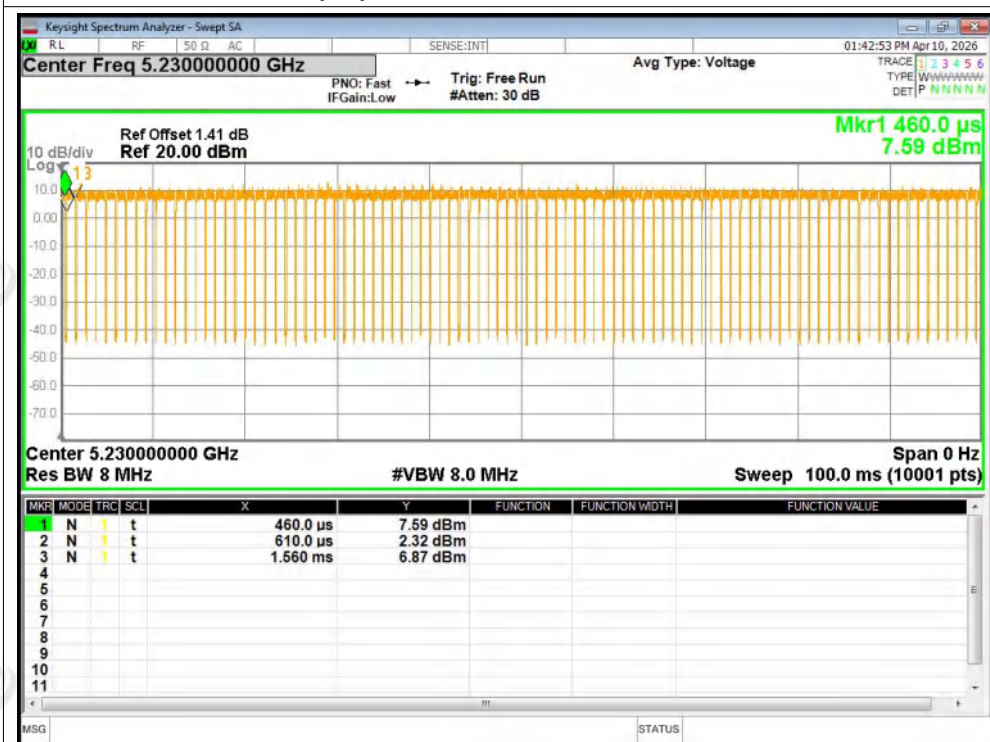


Duty Cycle NVNT ac40 5190MHz Ant1

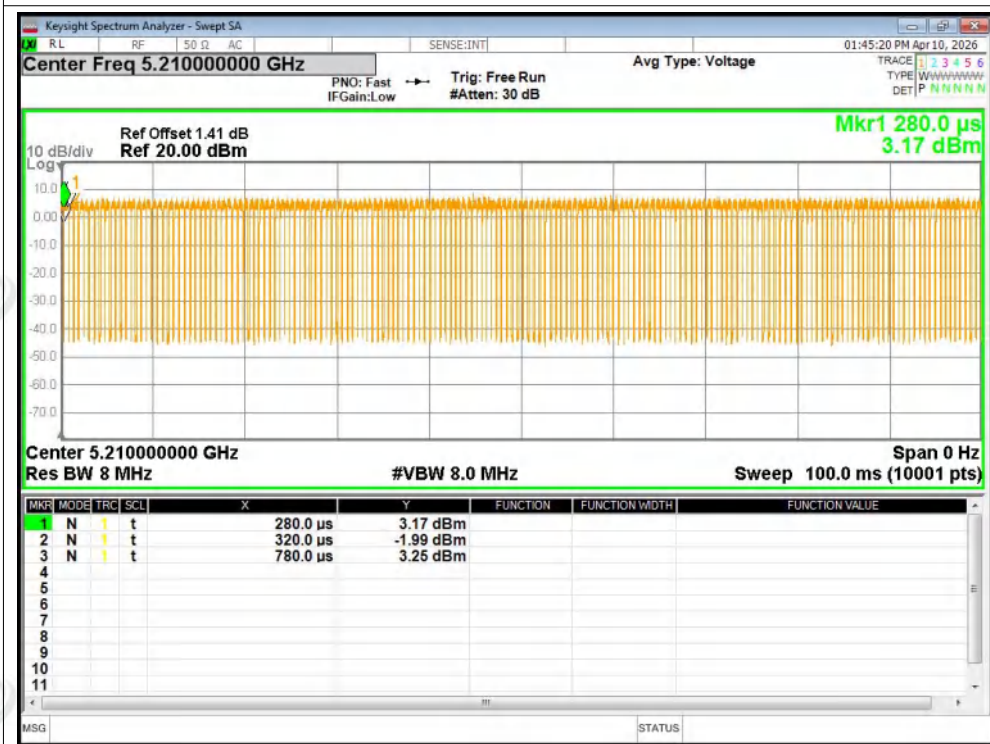




Duty Cycle NVNT ac40 5230MHz Ant1



Duty Cycle NVNT ac80 5210MHz Ant1



**ZHONGHAN****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	Ant1	7.26	0.27	7.53	24	Pass
NVNT	a	5200	Ant1	7.32	0.32	7.64	24	Pass
NVNT	a	5240	Ant1	7.17	0.2	7.37	24	Pass
NVNT	n20	5180	Ant1	6.96	0.73	7.69	24	Pass
NVNT	n20	5200	Ant1	7.08	0.33	7.41	24	Pass
NVNT	n20	5240	Ant1	7.21	0.37	7.58	24	Pass
NVNT	n40	5190	Ant1	6.48	1.36	7.84	24	Pass
NVNT	n40	5230	Ant1	7.24	0.23	7.47	24	Pass
NVNT	ac20	5180	Ant1	6.79	0.35	7.14	24	Pass
NVNT	ac20	5200	Ant1	6.99	0.3	7.29	24	Pass
NVNT	ac20	5240	Ant1	7.12	0.35	7.47	24	Pass
NVNT	ac40	5190	Ant1	6.95	0.56	7.51	24	Pass
NVNT	ac40	5230	Ant1	7.23	0.64	7.87	24	Pass
NVNT	ac80	5210	Ant1	7.15	0.36	7.51	24	Pass

Note: Total Power = Output Power + Duty cycle factor.



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A.3 -26dB Bandwidth

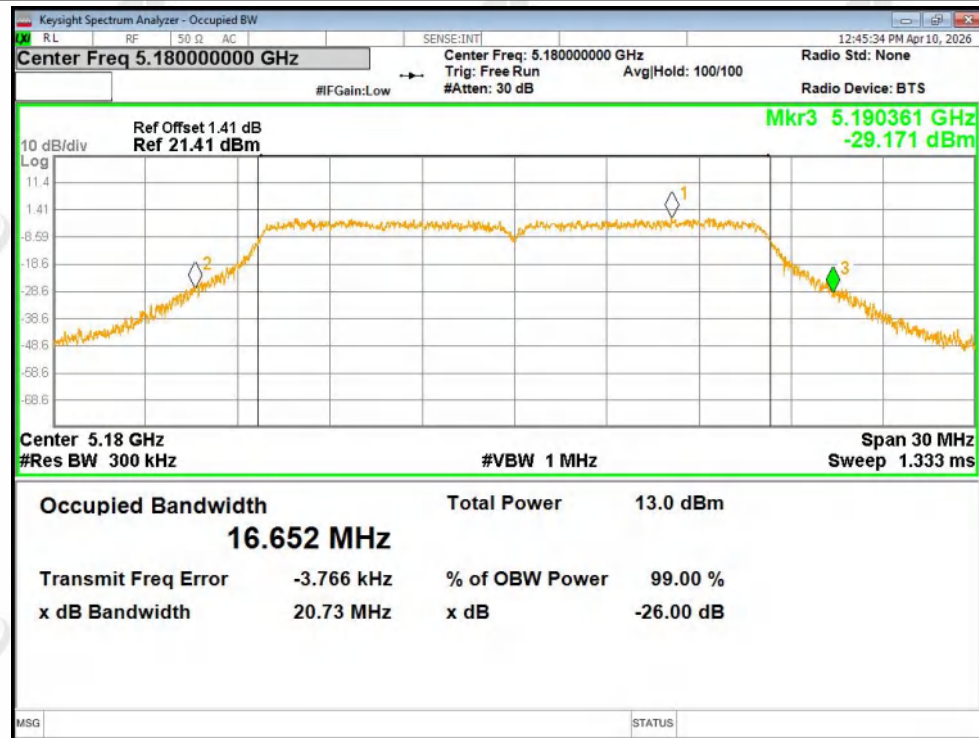
FCC ID: WR4-CRS1

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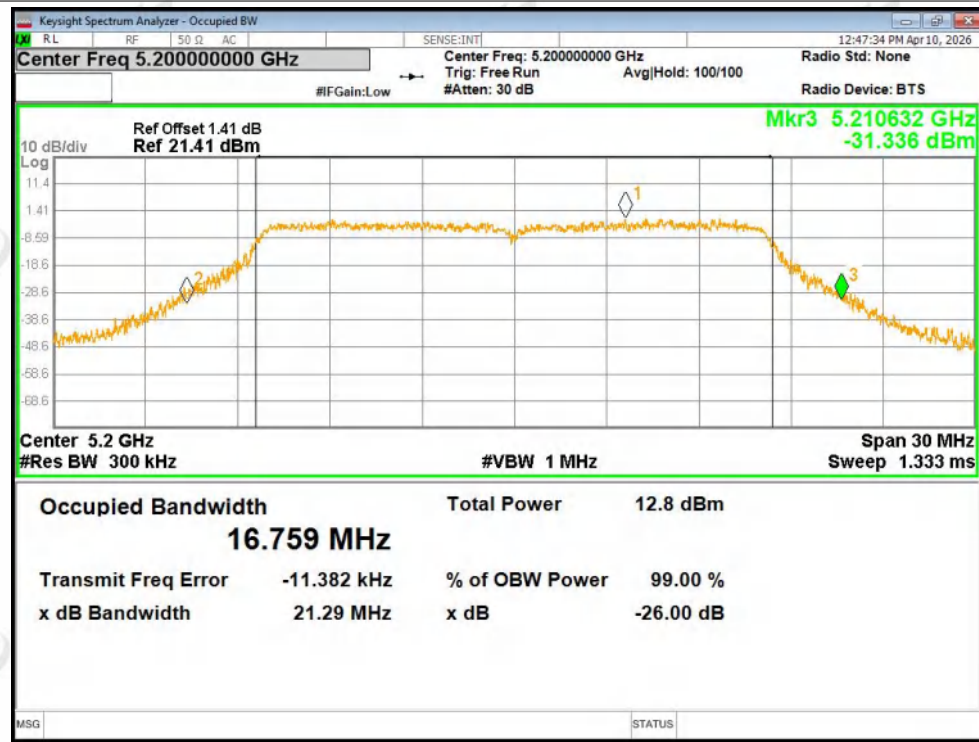
Condition	Mode	Frequency (MHz)	Antenna	-26 dB Bandwidth (MHz)	Verdict
NVNT	a	5180	Ant1	20.73	Pass
NVNT	a	5200	Ant1	21.287	Pass
NVNT	a	5240	Ant1	20.677	Pass
NVNT	n20	5180	Ant1	21.272	Pass
NVNT	n20	5200	Ant1	21.401	Pass
NVNT	n20	5240	Ant1	21.285	Pass
NVNT	n40	5190	Ant1	41.065	Pass
NVNT	n40	5230	Ant1	40.898	Pass
NVNT	ac20	5180	Ant1	21.209	Pass
NVNT	ac20	5200	Ant1	21.484	Pass
NVNT	ac20	5240	Ant1	21.636	Pass
NVNT	ac40	5190	Ant1	41.563	Pass
NVNT	ac40	5230	Ant1	41.019	Pass
NVNT	ac80	5210	Ant1	81.151	Pass

Test Graphs

-26dB Bandwidth NVNT a 5180MHz Ant1

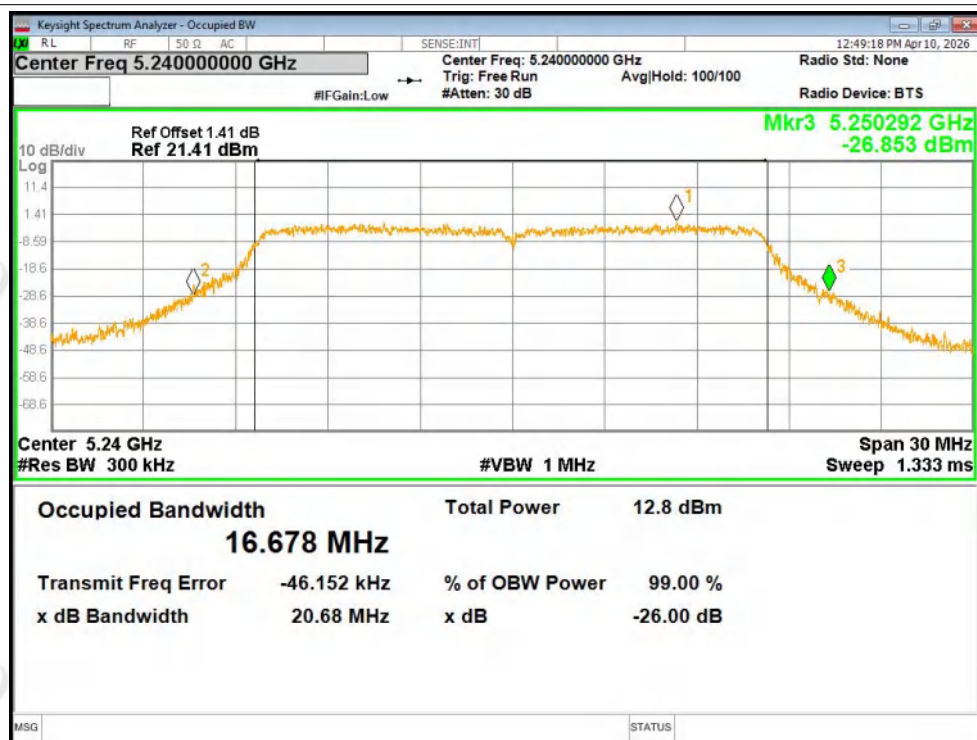


-26dB Bandwidth NVNT a 5200MHz Ant1

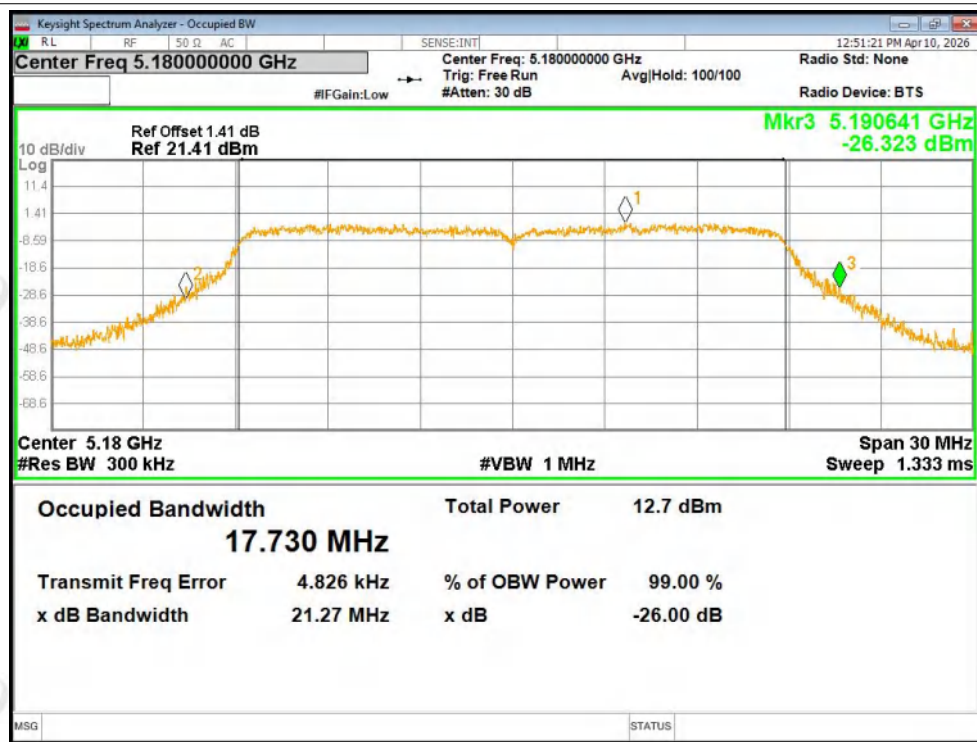




-26dB Bandwidth NVNT a 5240MHz Ant1

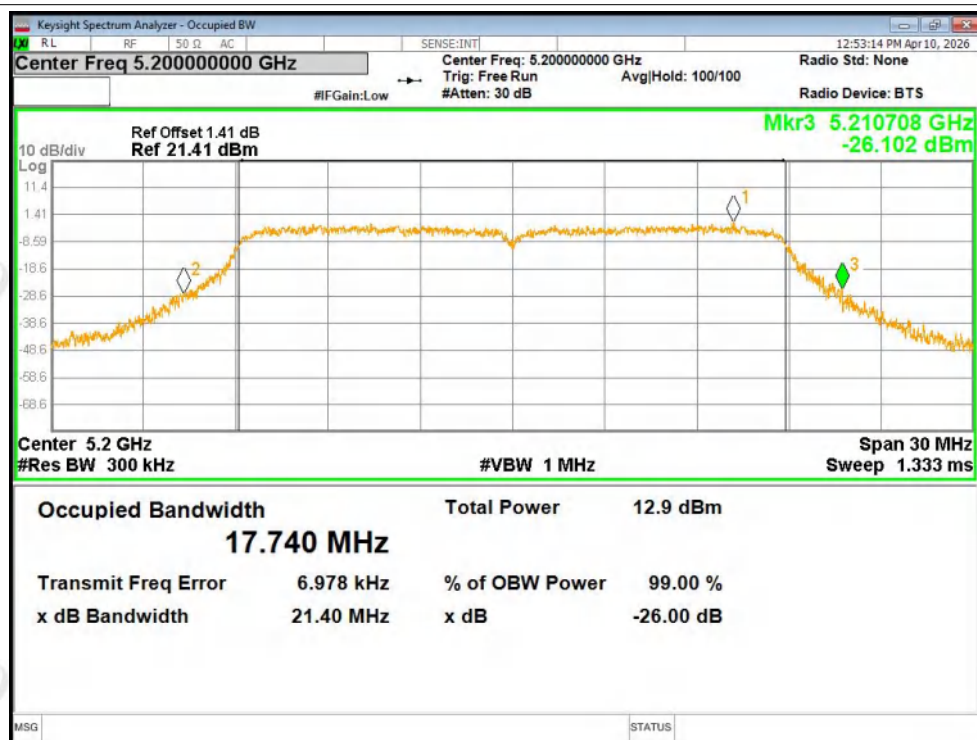


-26dB Bandwidth NVNT n20 5180MHz Ant1

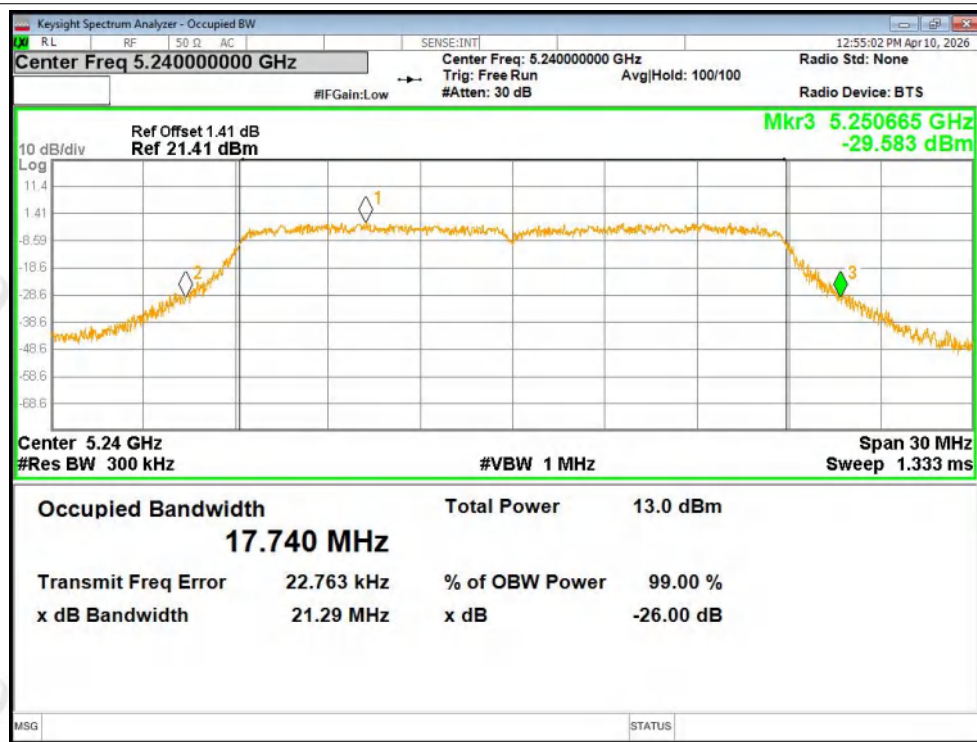




-26dB Bandwidth NVNT n20 5200MHz Ant1

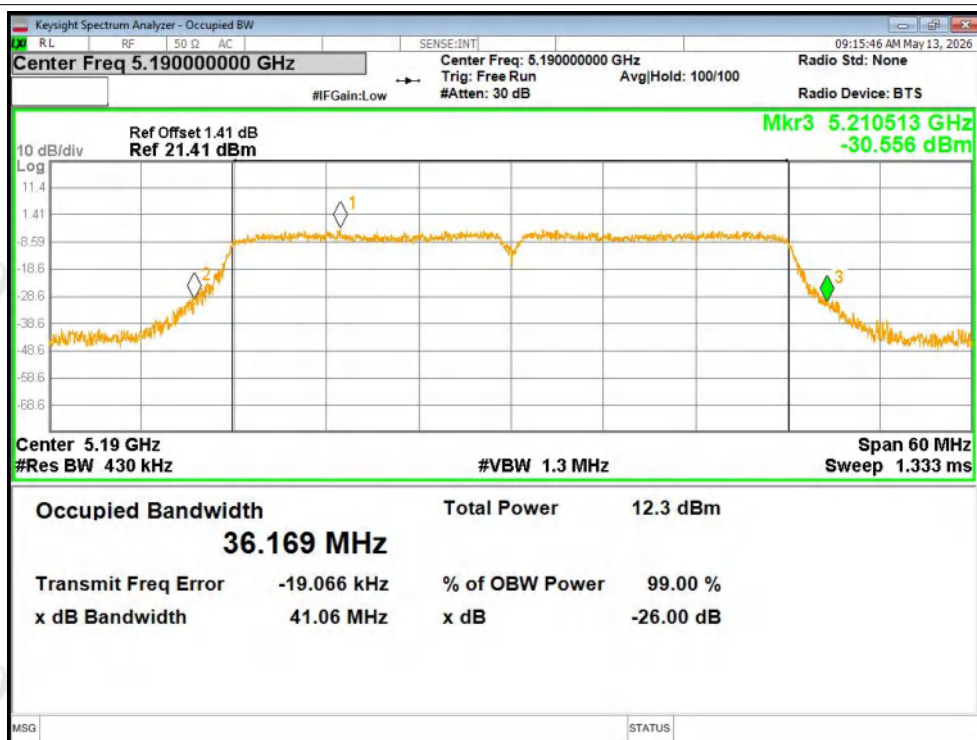


-26dB Bandwidth NVNT n20 5240MHz Ant1

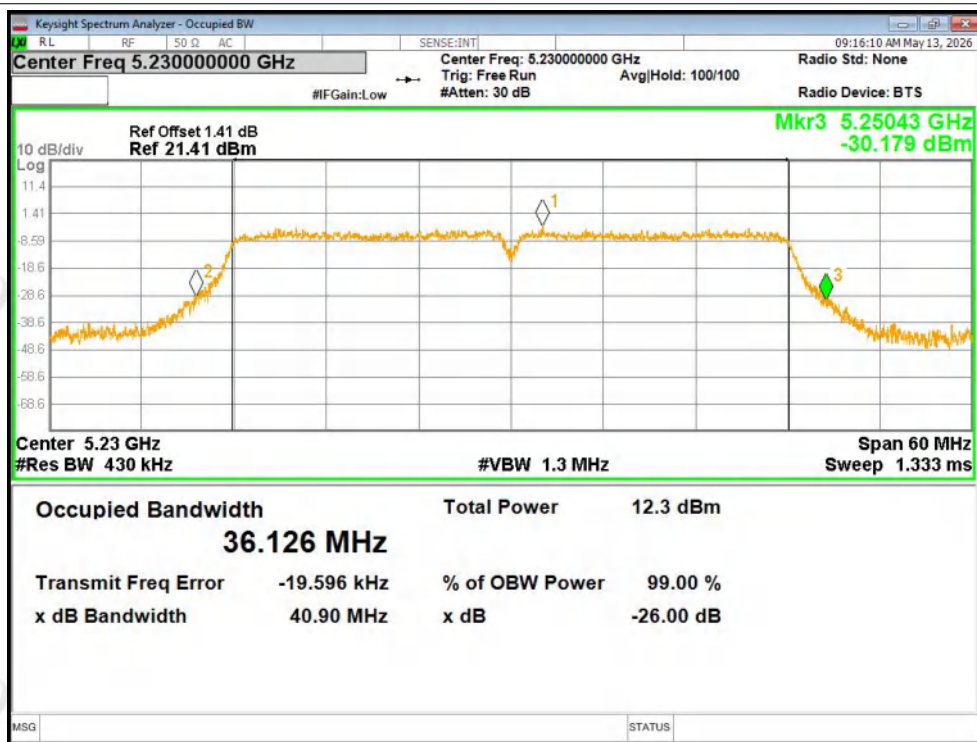




-26dB Bandwidth NVNT n40 5190MHz Ant1

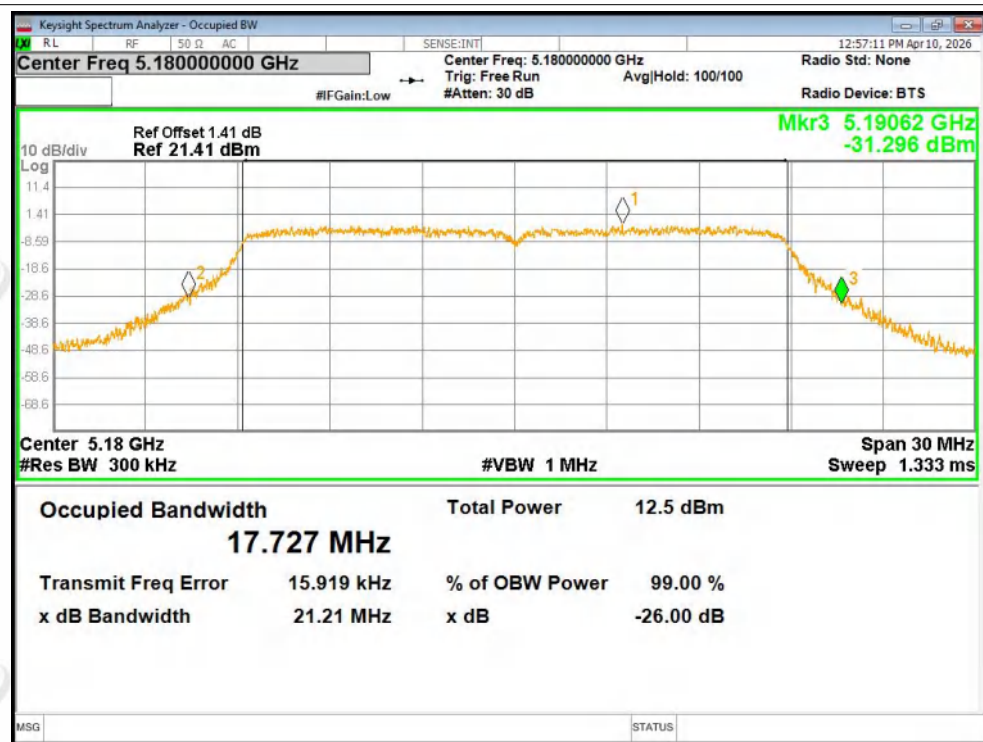


-26dB Bandwidth NVNT n40 5230MHz Ant1

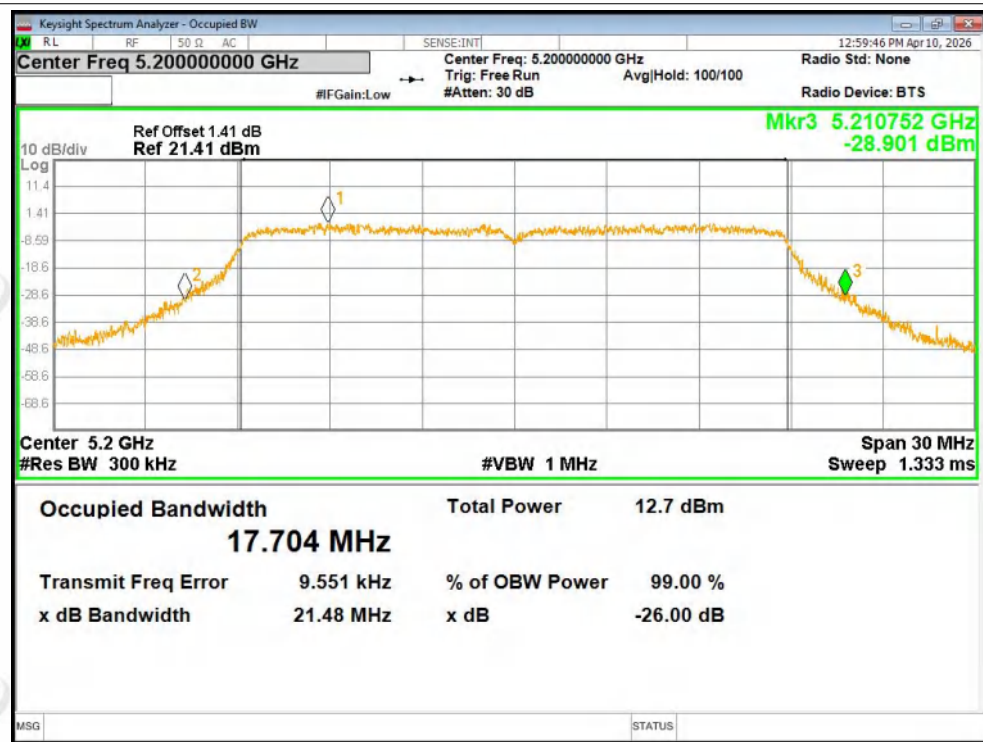




-26dB Bandwidth NVNT ac20 5180MHz Ant1

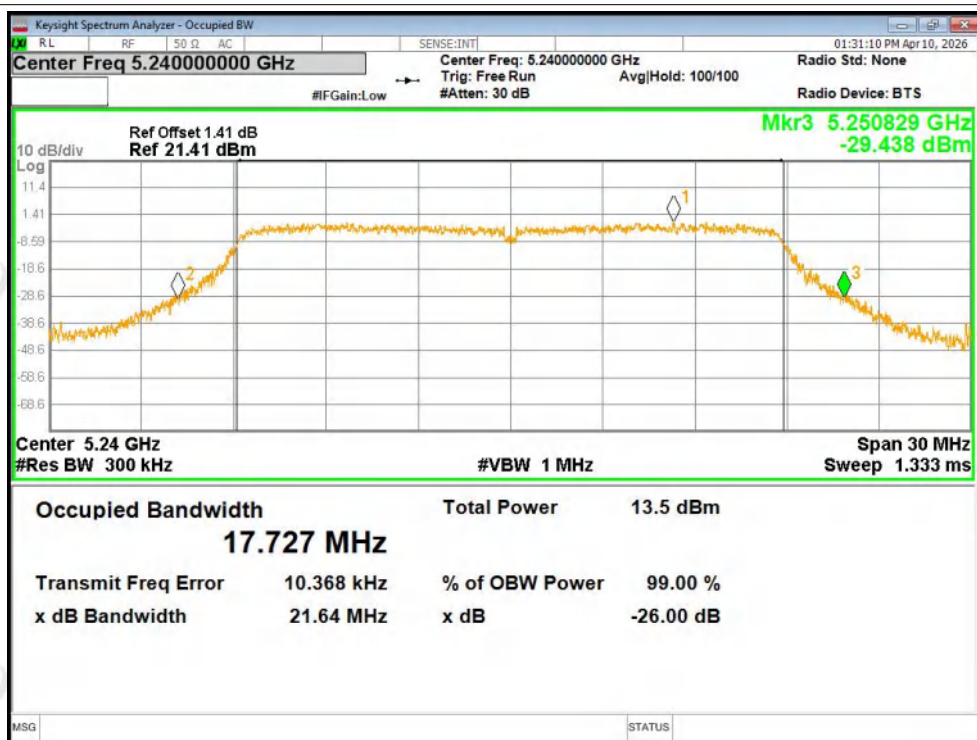


-26dB Bandwidth NVNT ac20 5200MHz Ant1

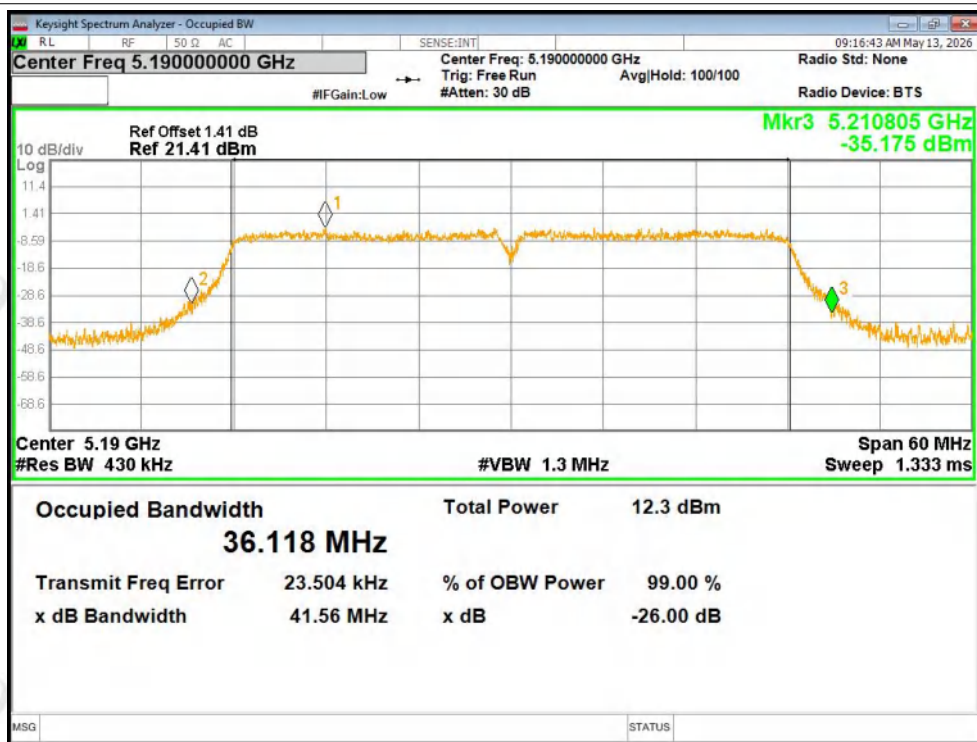




-26dB Bandwidth NVNT ac20 5240MHz Ant1

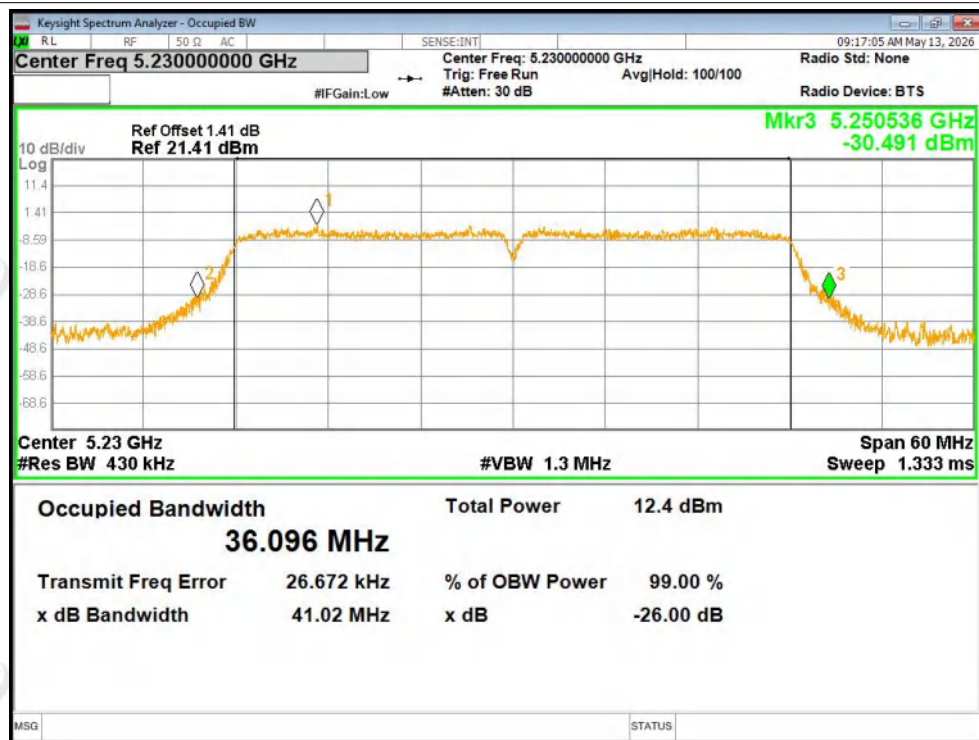


-26dB Bandwidth NVNT ac40 5190MHz Ant1

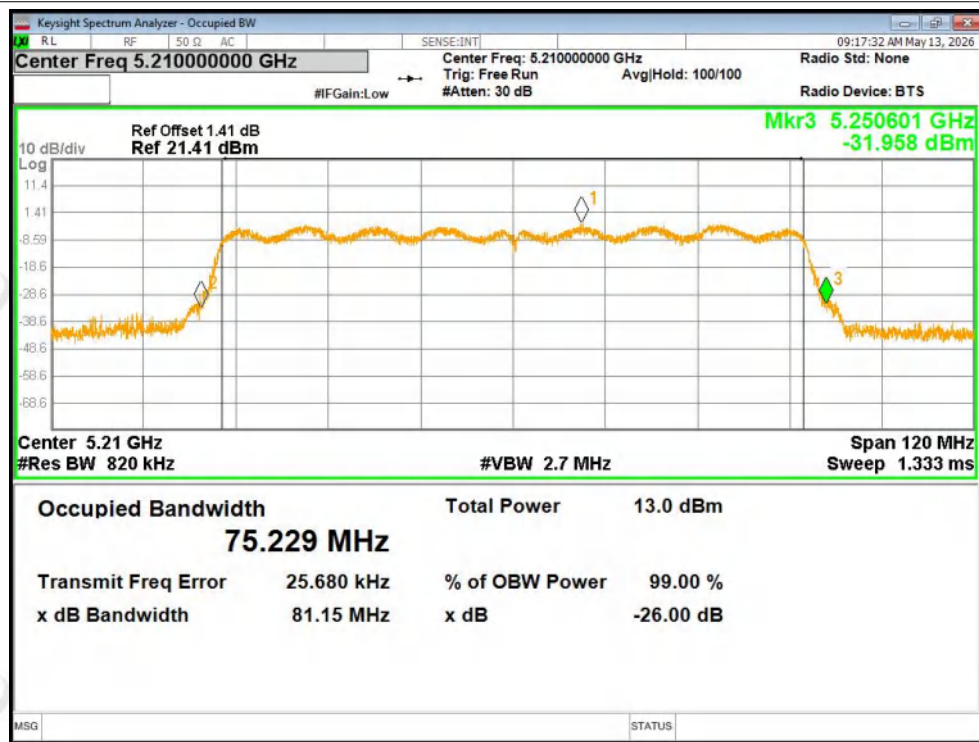




-26dB Bandwidth NVNT ac40 5230MHz Ant1



-26dB Bandwidth NVNT ac80 5210MHz Ant1



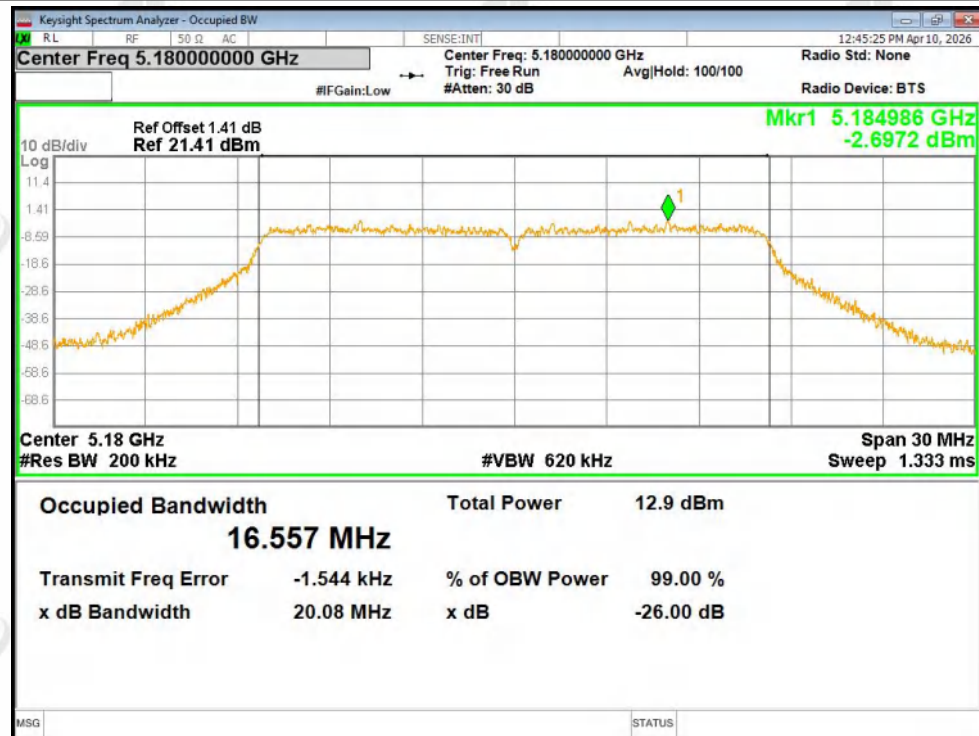


A.4 Occupied Channel Bandwidth

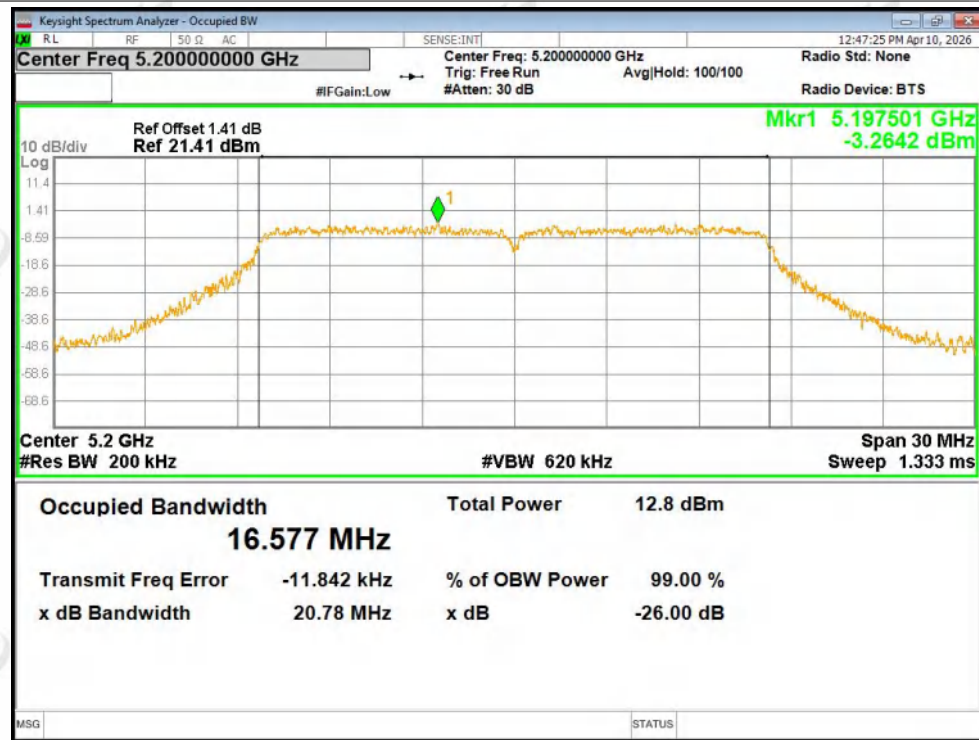
Condition	Mode	Frequency (MHz)	Antenna	99% OBW (MHz)
NVNT	a	5180	Ant1	16.557
NVNT	a	5200	Ant1	16.577
NVNT	a	5240	Ant1	16.529
NVNT	n20	5180	Ant1	17.62
NVNT	n20	5200	Ant1	17.636
NVNT	n20	5240	Ant1	17.618
NVNT	n40	5190	Ant1	36.18
NVNT	n40	5230	Ant1	36.136
NVNT	ac20	5180	Ant1	17.613
NVNT	ac20	5200	Ant1	17.635
NVNT	ac20	5240	Ant1	17.623
NVNT	ac40	5190	Ant1	36.154
NVNT	ac40	5230	Ant1	36.152
NVNT	ac80	5210	Ant1	75.223

Test Graphs

OBW NVNT a 5180MHz Ant1

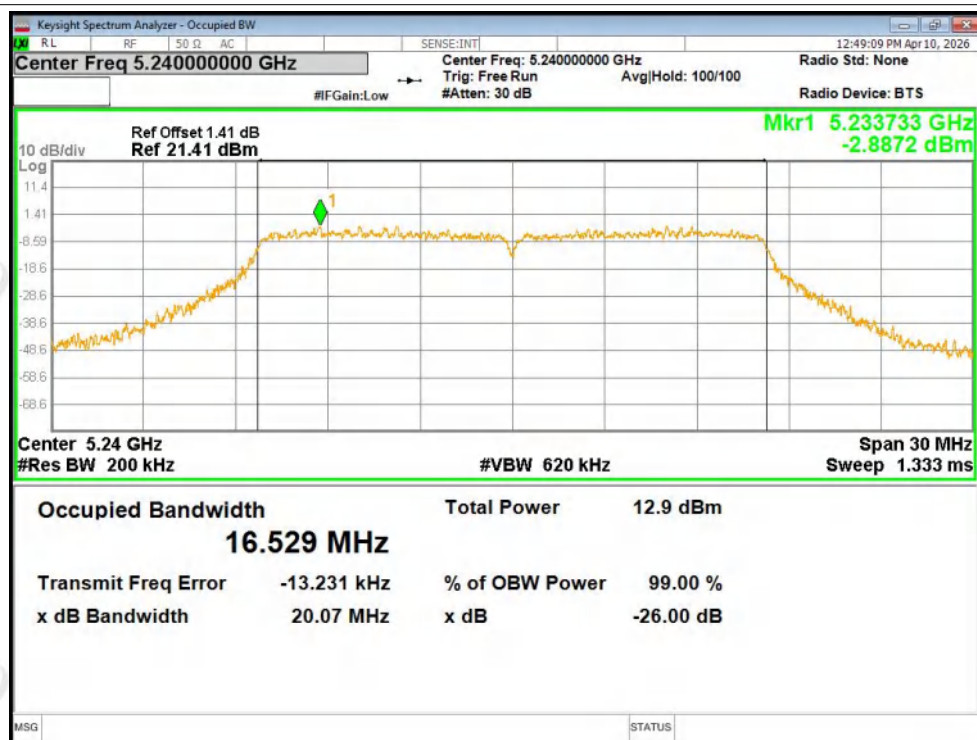


OBW NVNT a 5200MHz Ant1

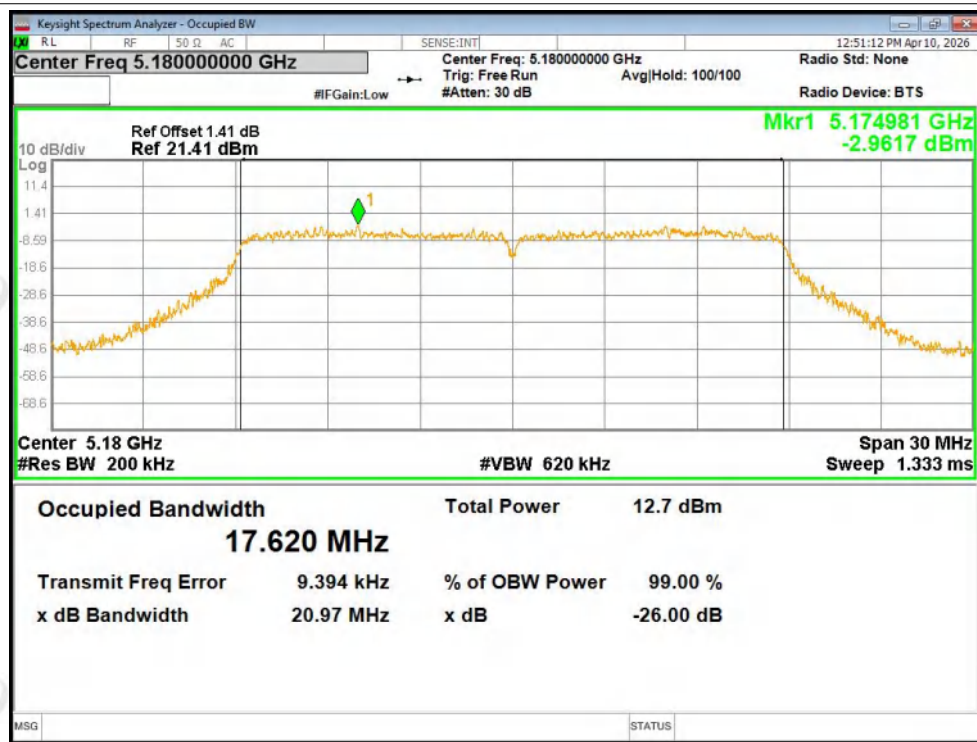




OBW NVNT a 5240MHz Ant1

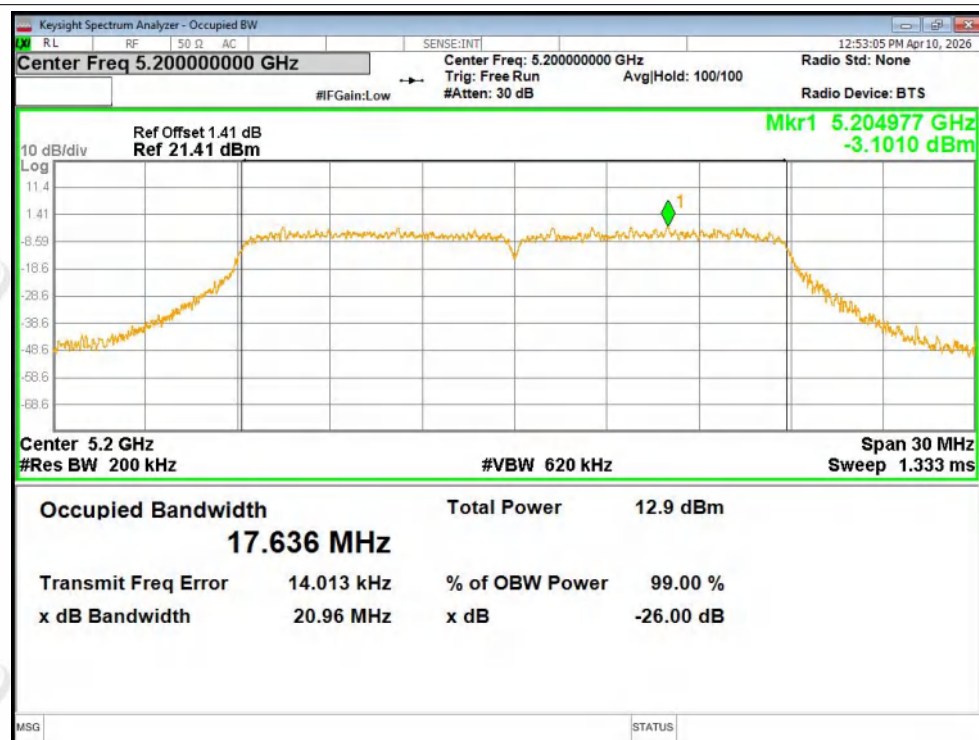


OBW NVNT n20 5180MHz Ant1

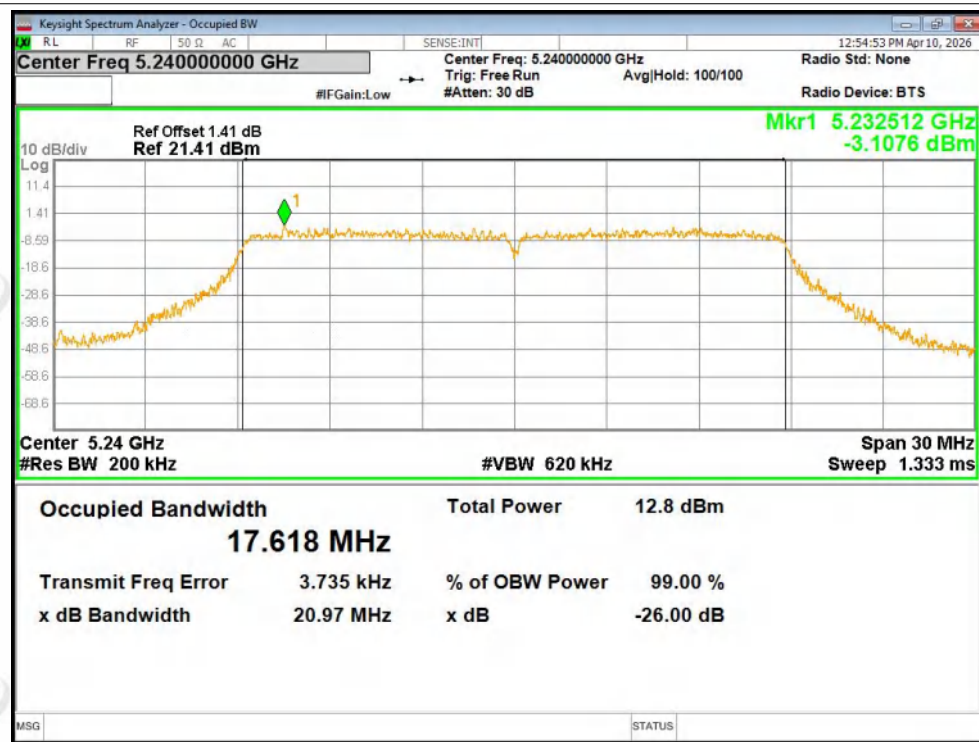




OBW NVNT n20 5200MHz Ant1

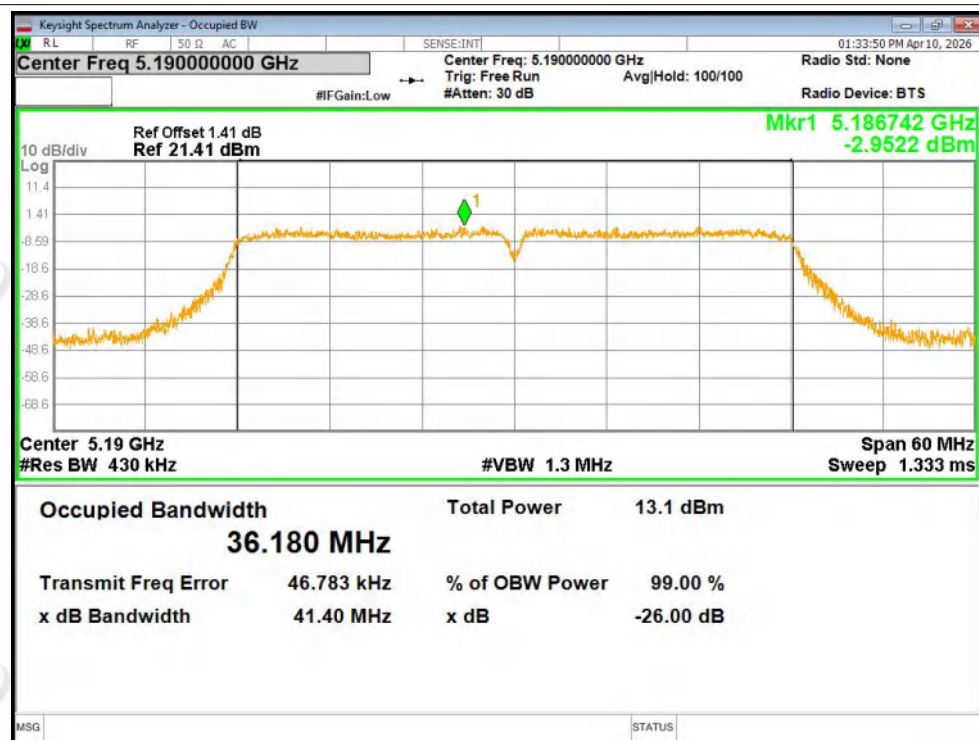


OBW NVNT n20 5240MHz Ant1

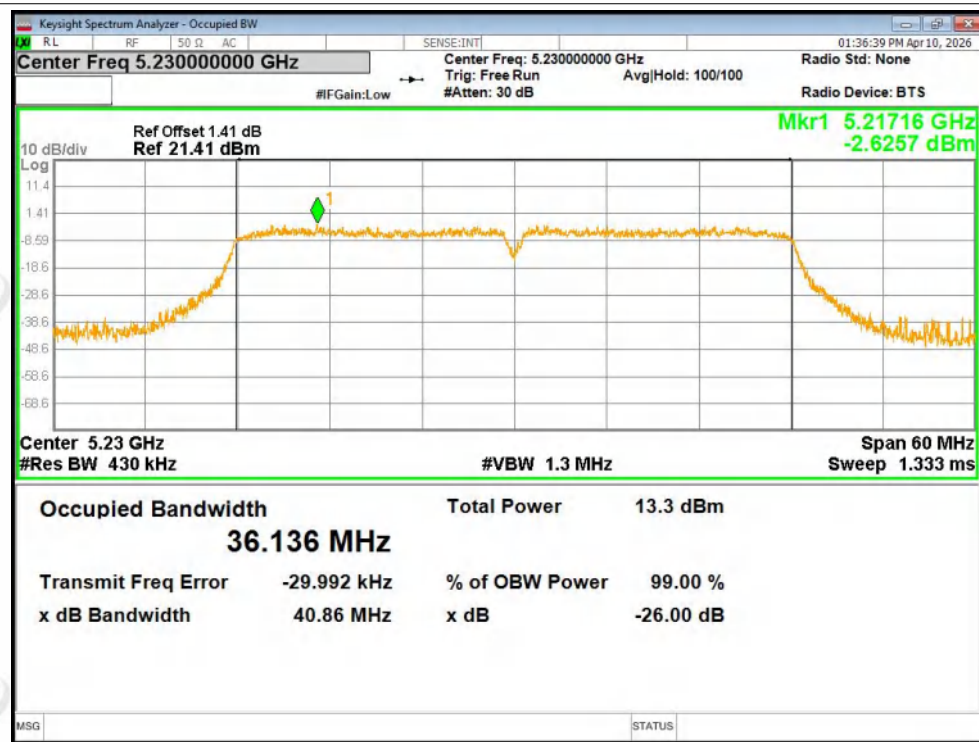




OBW NVNT n40 5190MHz Ant1

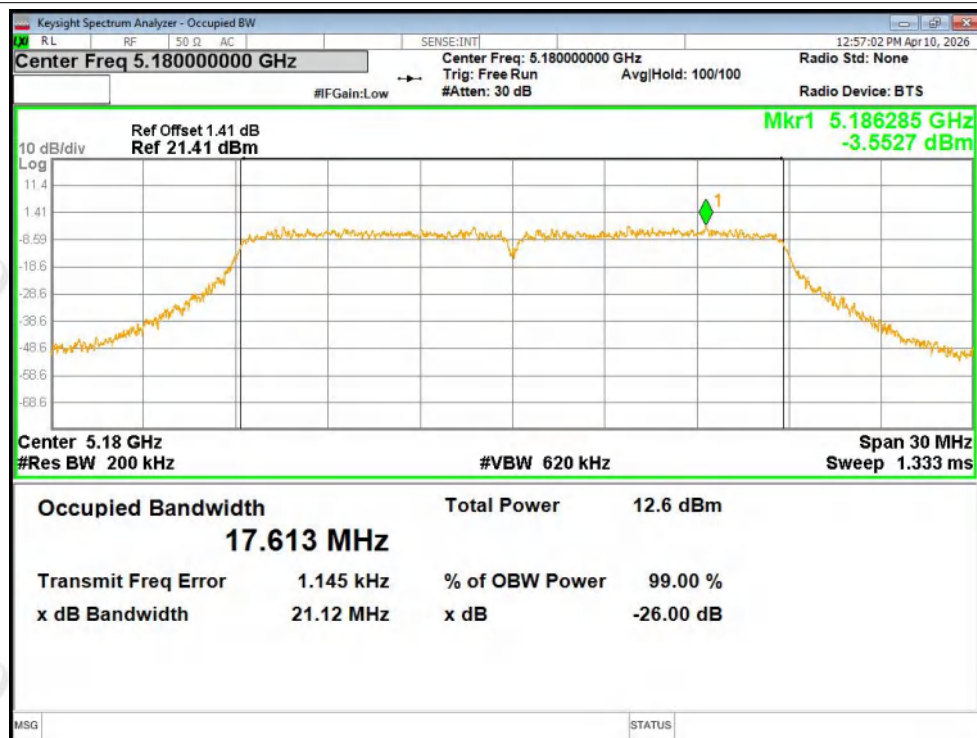


OBW NVNT n40 5230MHz Ant1

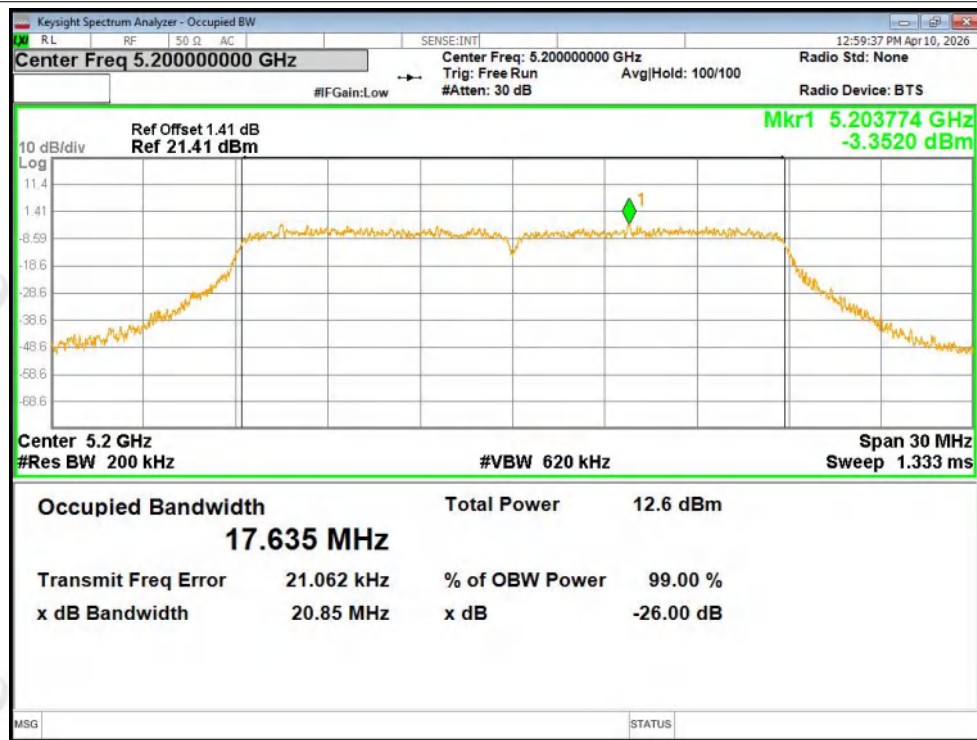




OBW NVNT ac20 5180MHz Ant1

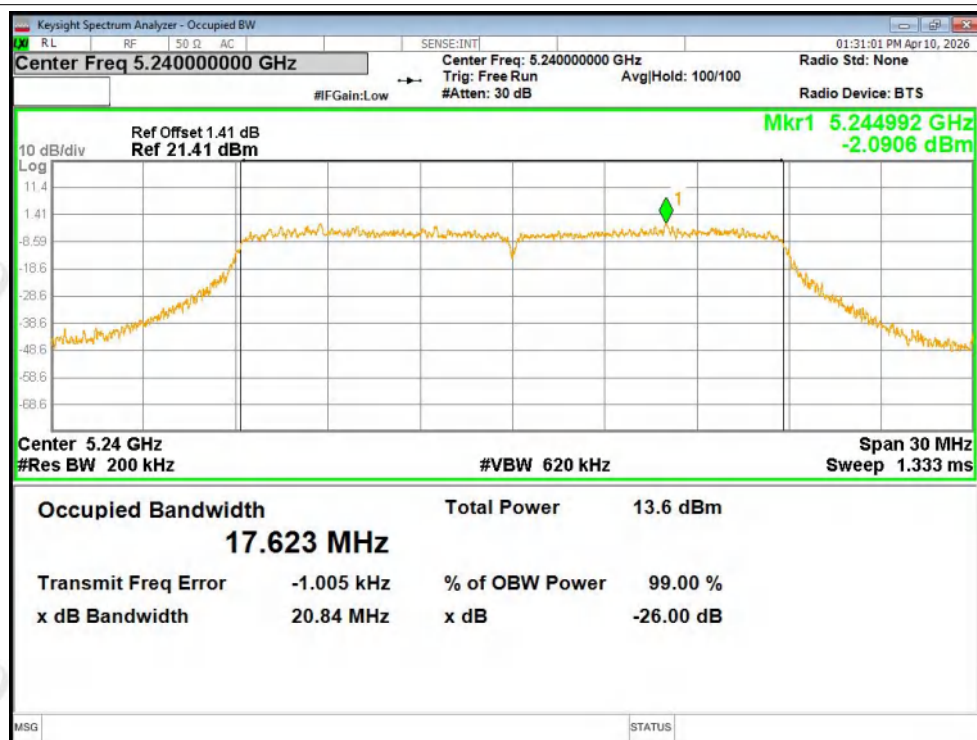


OBW NVNT ac20 5200MHz Ant1

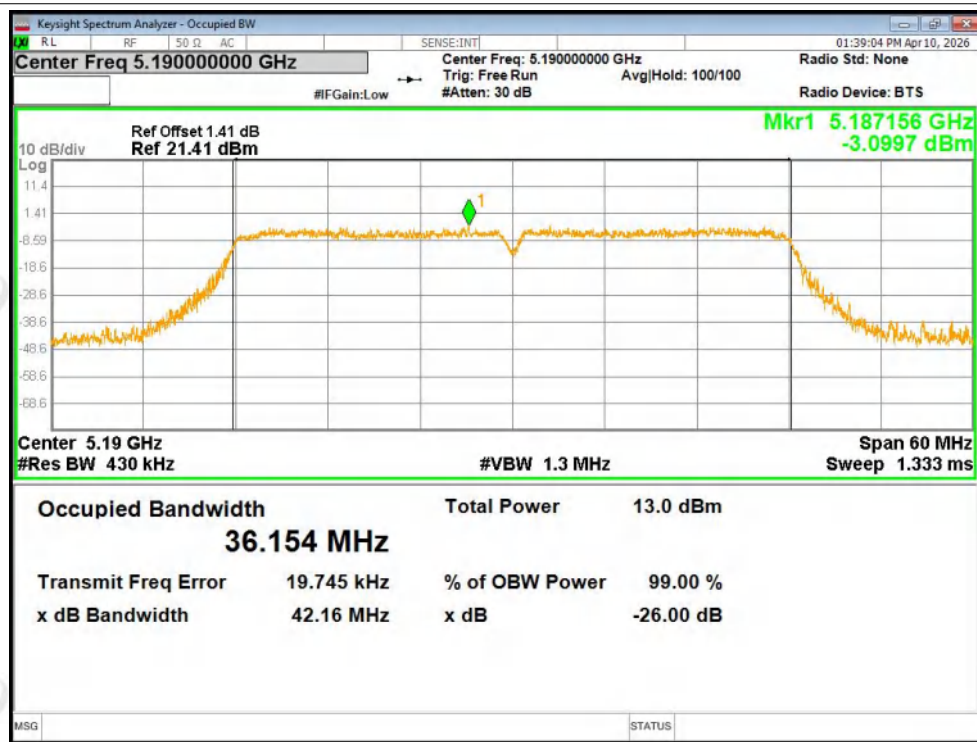




OBW NVNT ac20 5240MHz Ant1

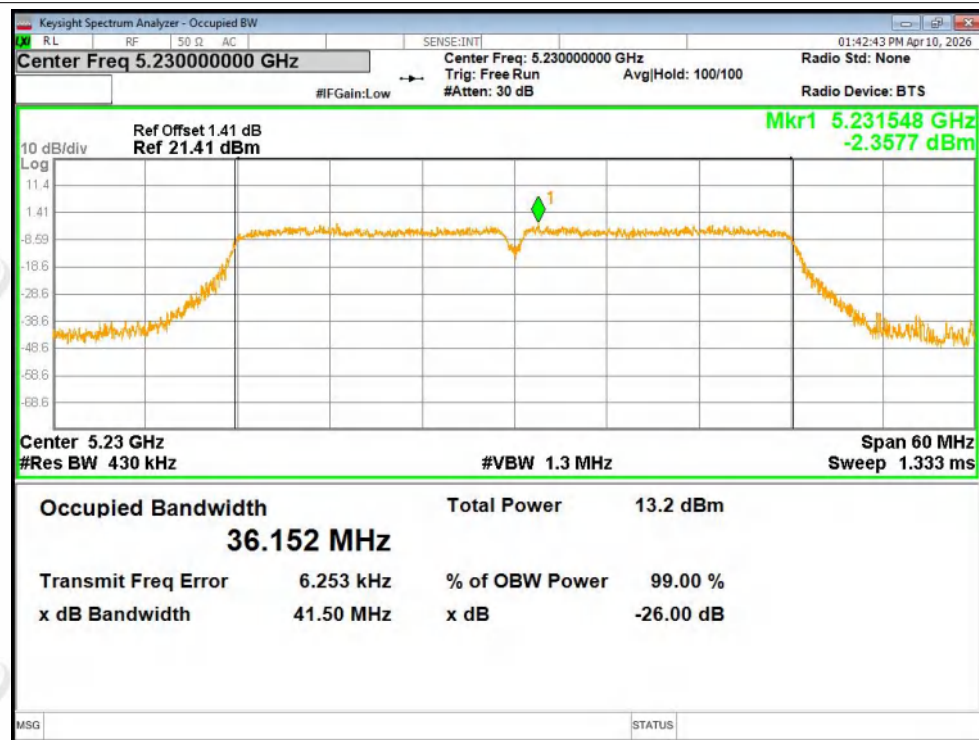


OBW NVNT ac40 5190MHz Ant1

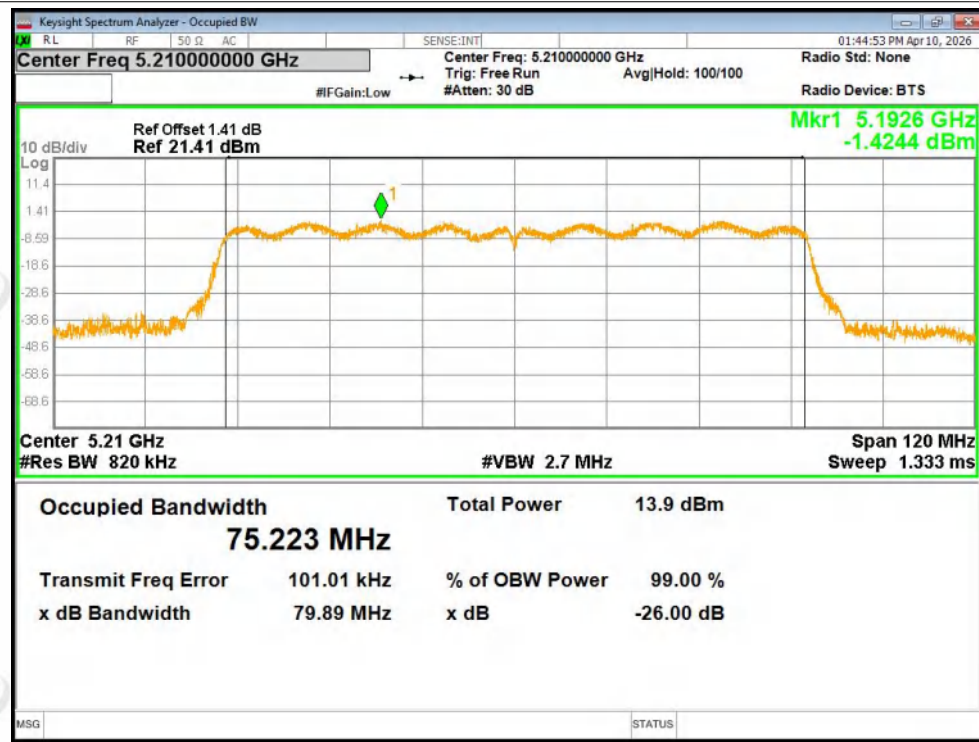




OBW NVNT ac40 5230MHz Ant1



OBW NVNT ac80 5210MHz Ant1

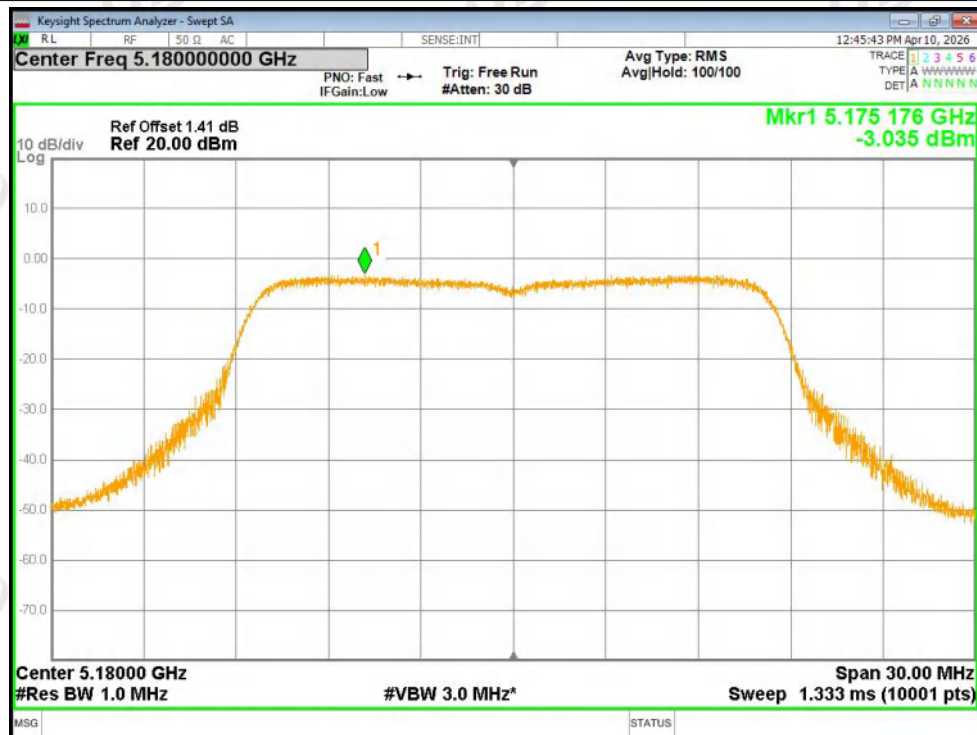


**ZHONGHAN****A.5 Maximum Power Spectral Density Level**

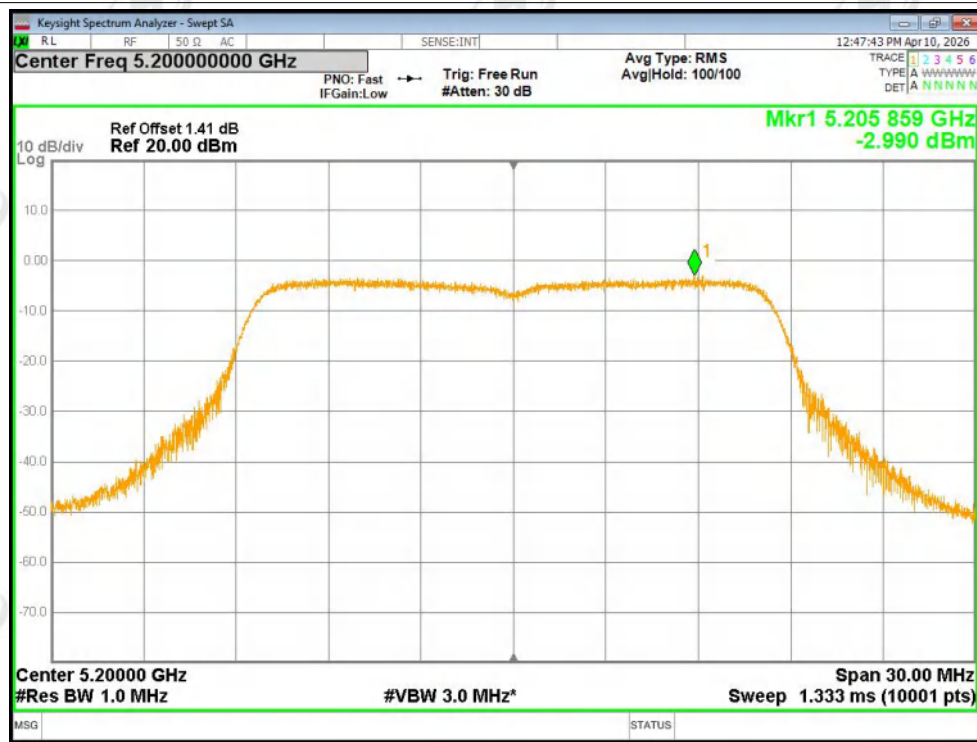
Condition	Mode	Frequency (MHz)	Antenna	Conducted PSD (dBm)	Duty Factor (dB)	Total PSD (dBm)	Limit (dBm)	Verdict
NVNT	a	5180	Ant1	-3.04	0.27	-2.77	11	Pass
NVNT	a	5200	Ant1	-2.99	0.32	-2.67	11	Pass
NVNT	a	5240	Ant1	-3.31	0.2	-3.11	11	Pass
NVNT	n20	5180	Ant1	-3.63	0.73	-2.90	11	Pass
NVNT	n20	5200	Ant1	-3.32	0.33	-2.99	11	Pass
NVNT	n20	5240	Ant1	-3.38	0.37	-3.01	11	Pass
NVNT	n40	5190	Ant1	-6.5	1.36	-5.14	11	Pass
NVNT	n40	5230	Ant1	-6.49	0.23	-6.26	11	Pass
NVNT	ac20	5180	Ant1	-3.74	0.35	-3.39	11	Pass
NVNT	ac20	5200	Ant1	-3.86	0.3	-3.56	11	Pass
NVNT	ac20	5240	Ant1	-2.71	0.35	-2.36	11	Pass
NVNT	ac40	5190	Ant1	-6.55	0.56	-5.99	11	Pass
NVNT	ac40	5230	Ant1	-6.7	0.64	-6.06	11	Pass
NVNT	ac80	5210	Ant1	-8.75	0.36	-8.39	11	Pass

Test Graphs

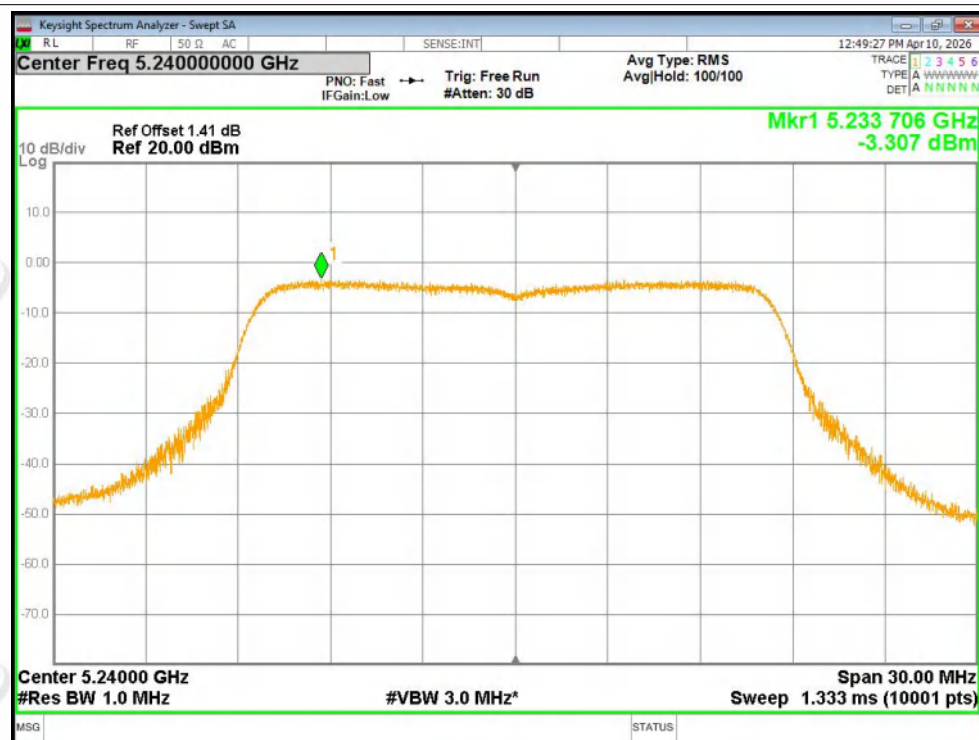
PSD NVNT a 5180MHz Ant1



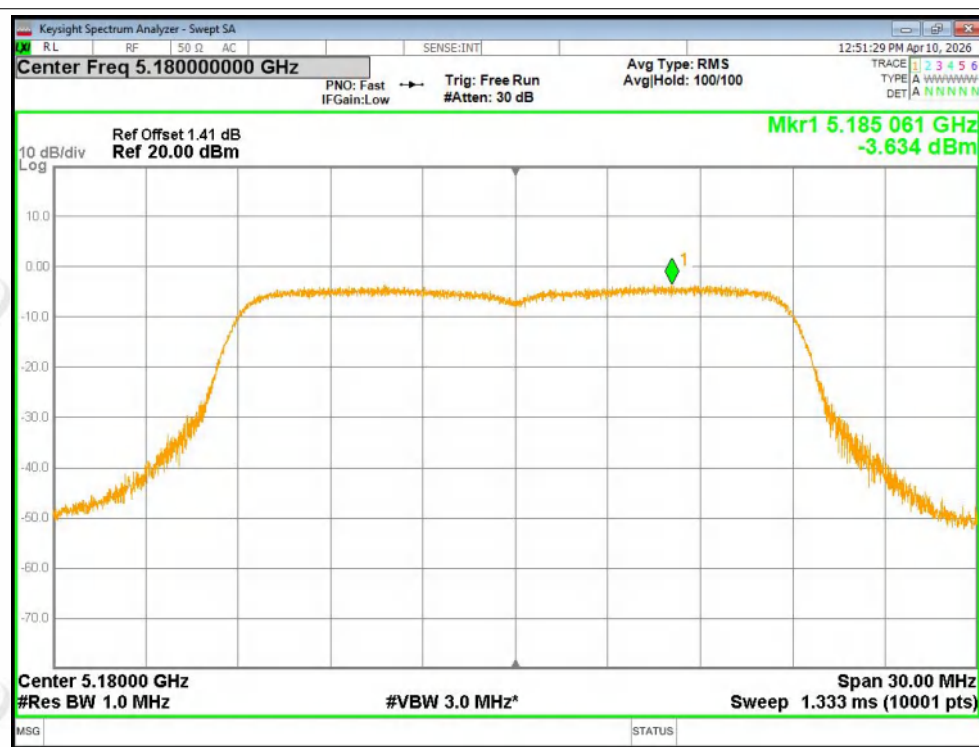
PSD NVNT a 5200MHz Ant1



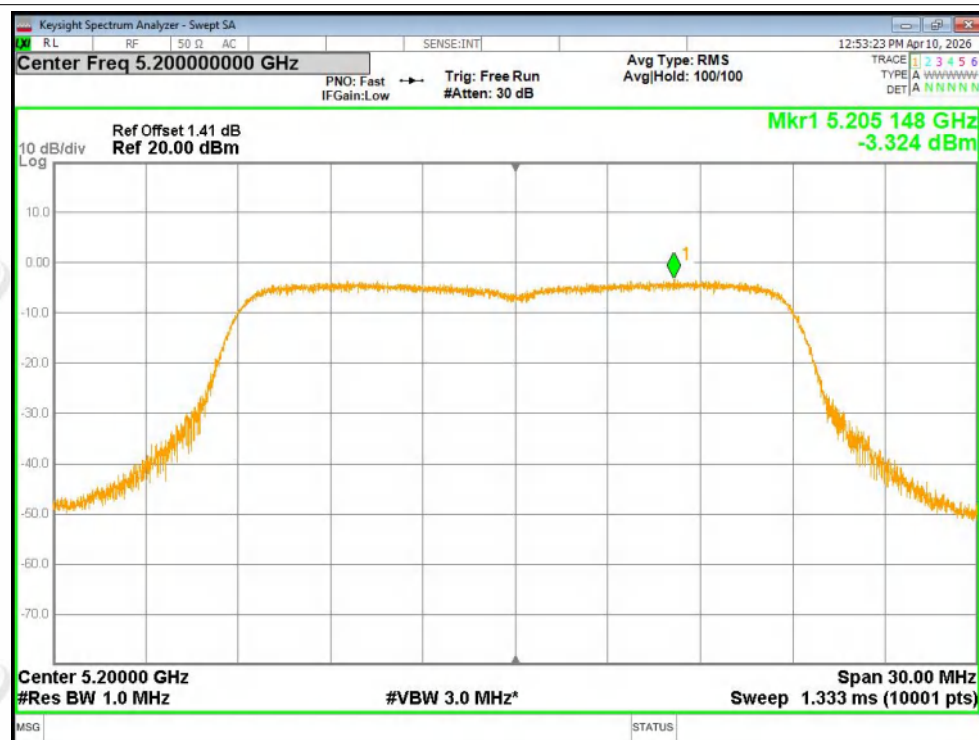
PSD NVNT a 5240MHz Ant1



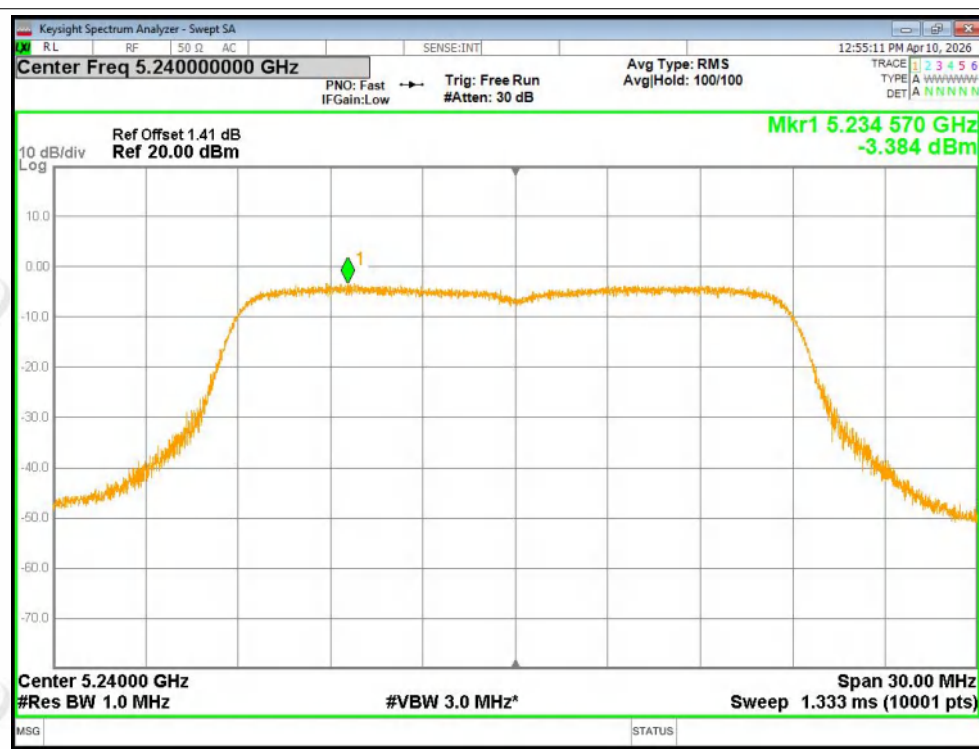
PSD NVNT n20 5180MHz Ant1



PSD NVNT n20 5200MHz Ant1

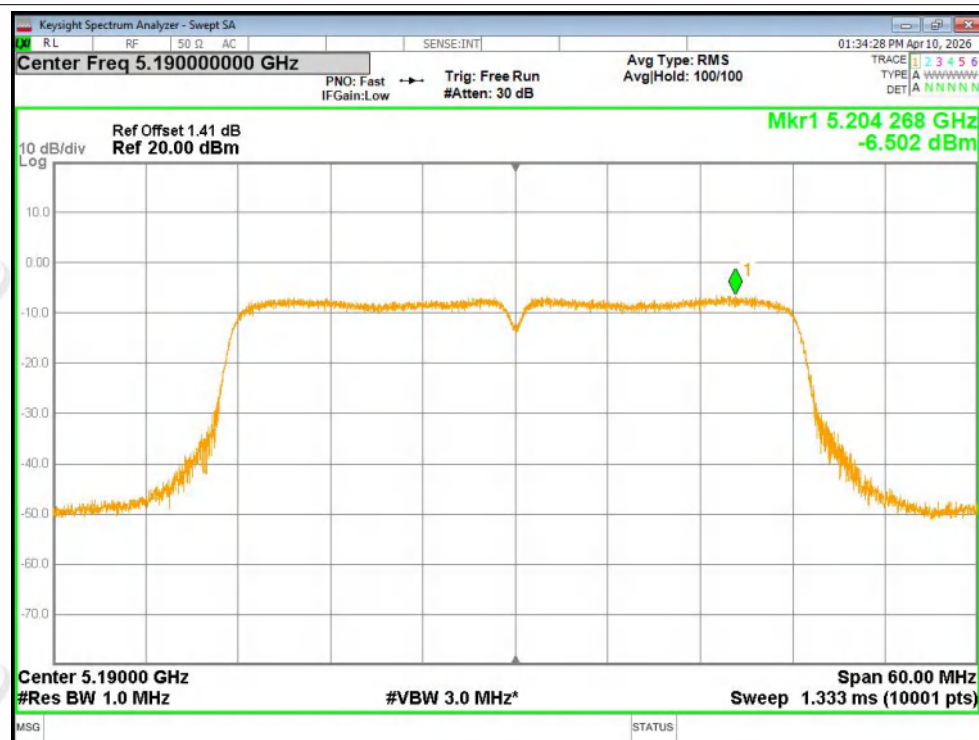


PSD NVNT n20 5240MHz Ant1

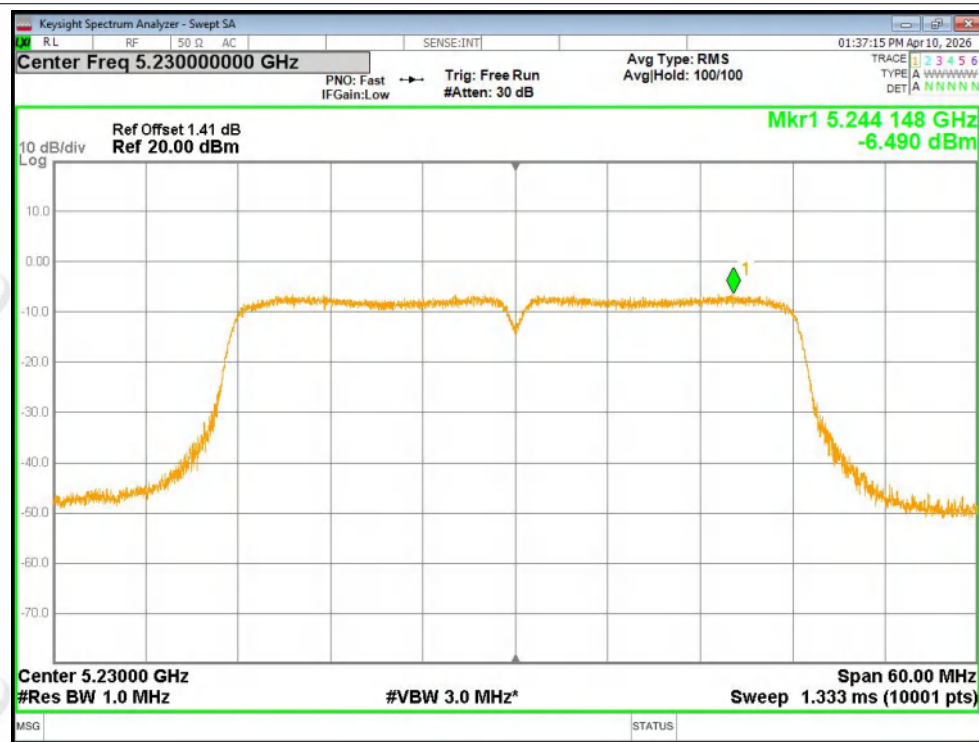




PSD NVNT n40 5190MHz Ant1

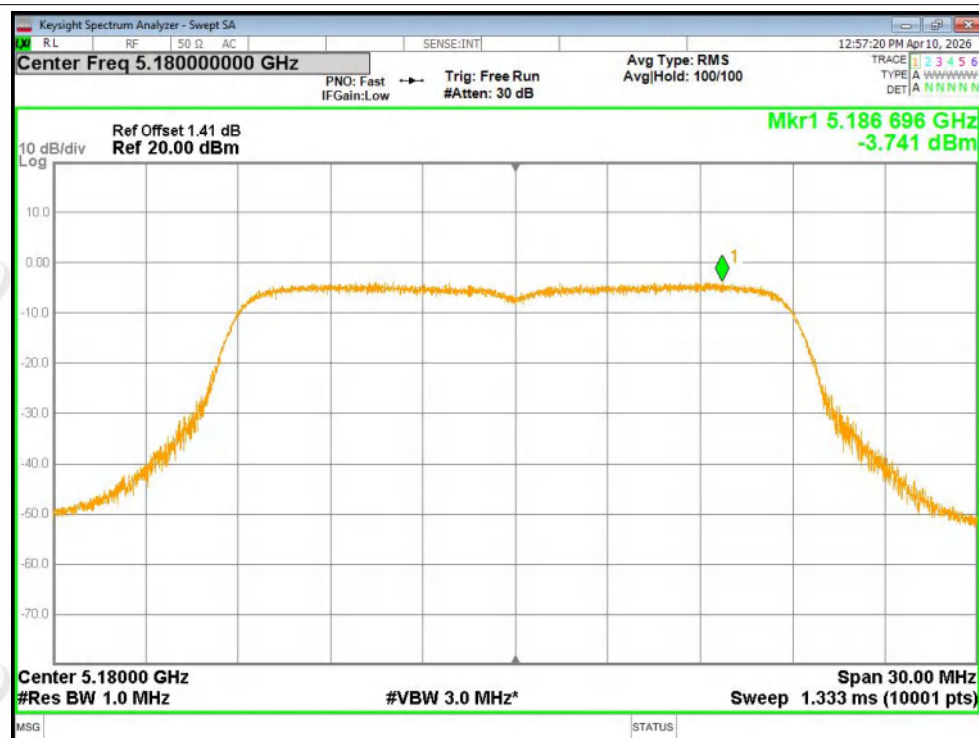


PSD NVNT n40 5230MHz Ant1

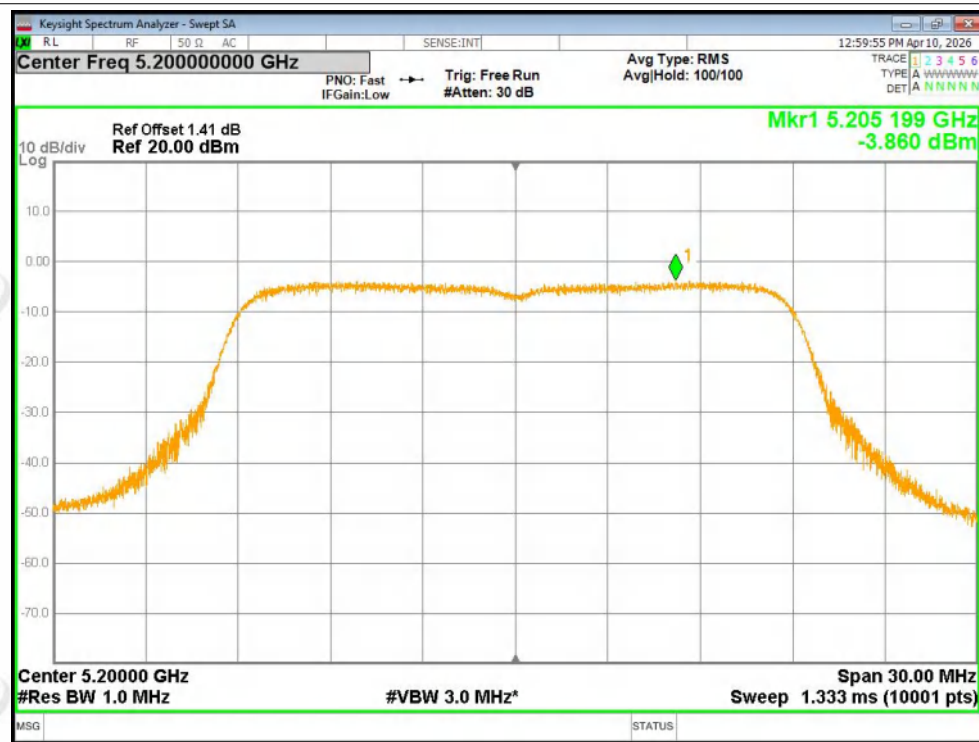




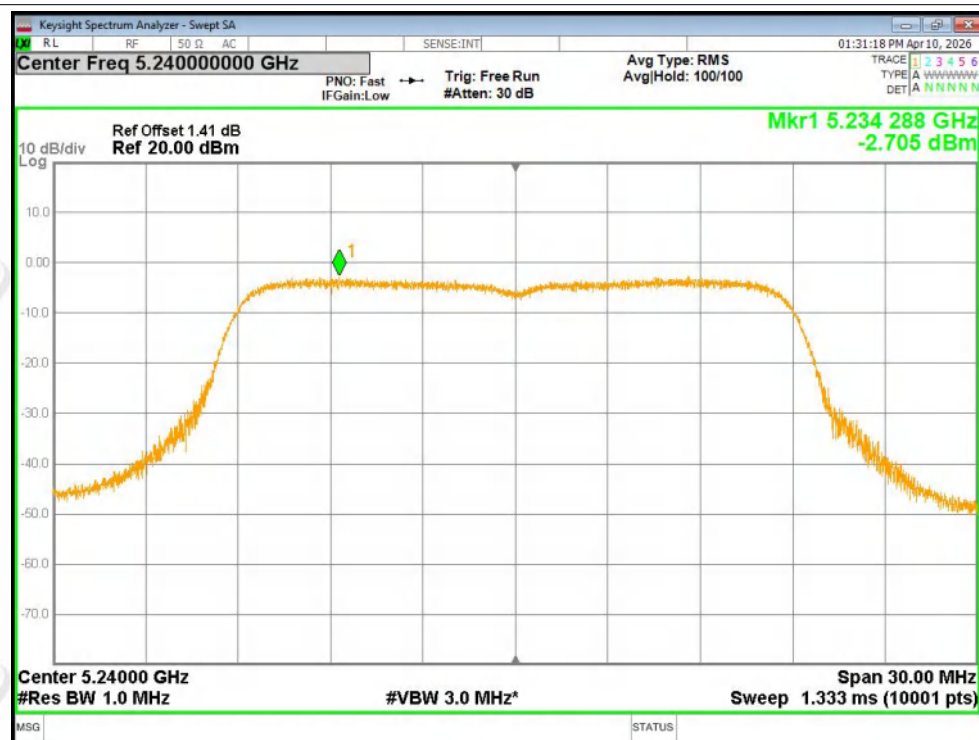
PSD NVNT ac20 5180MHz Ant1



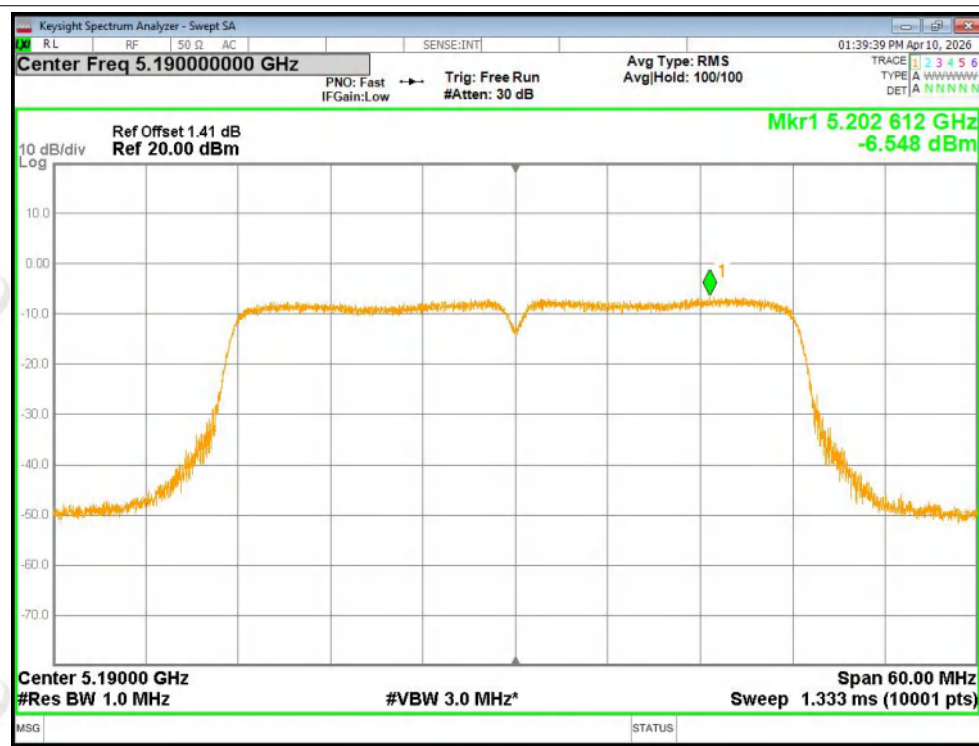
PSD NVNT ac20 5200MHz Ant1



PSD NVNT ac20 5240MHz Ant1

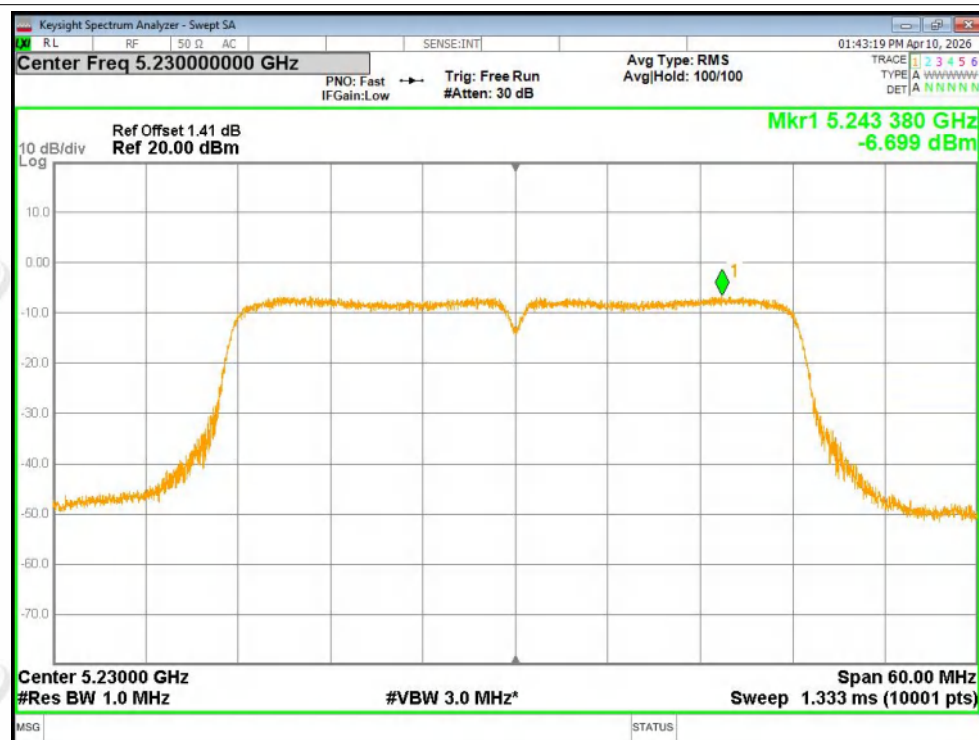


PSD NVNT ac40 5190MHz Ant1

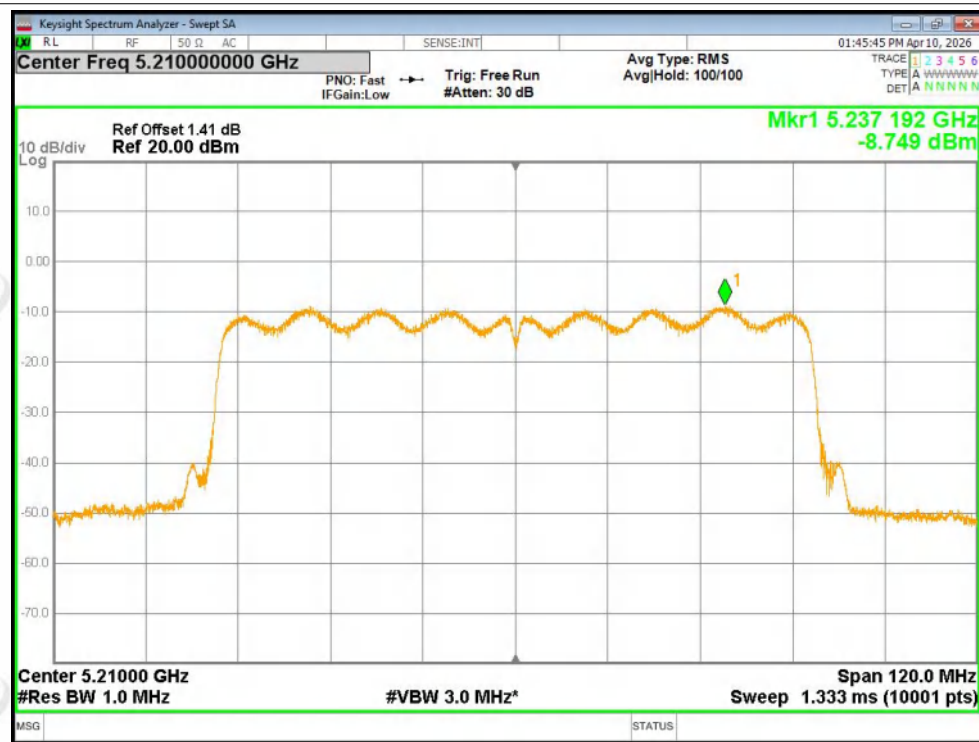




PSD NVNT ac40 5230MHz Ant1



PSD NVNT ac80 5210MHz Ant1

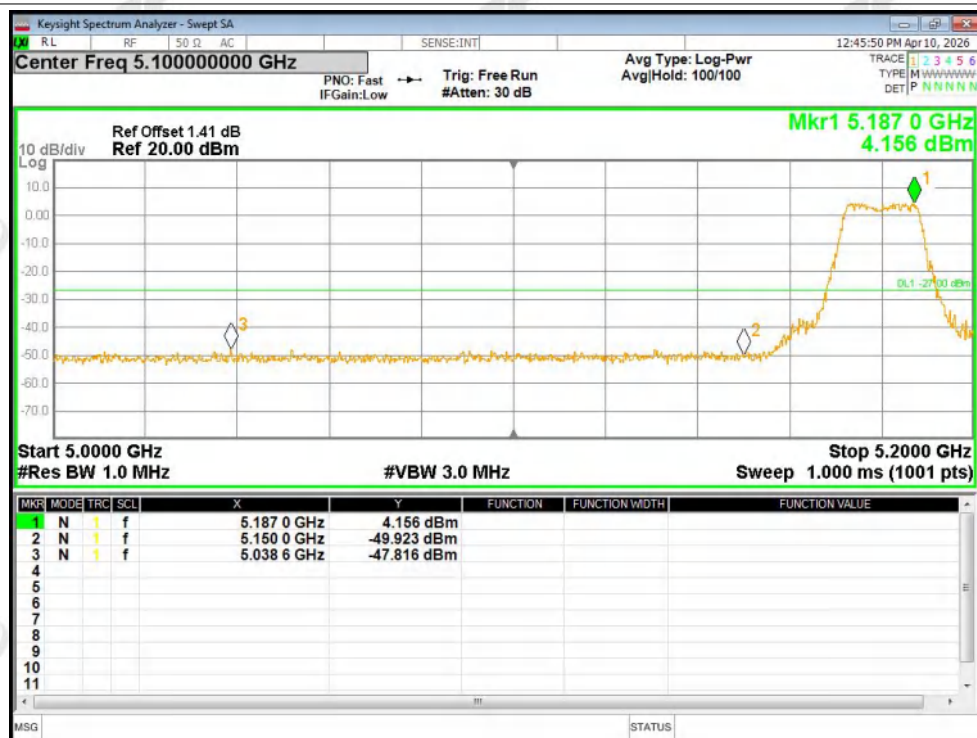


A.6 Band Edge

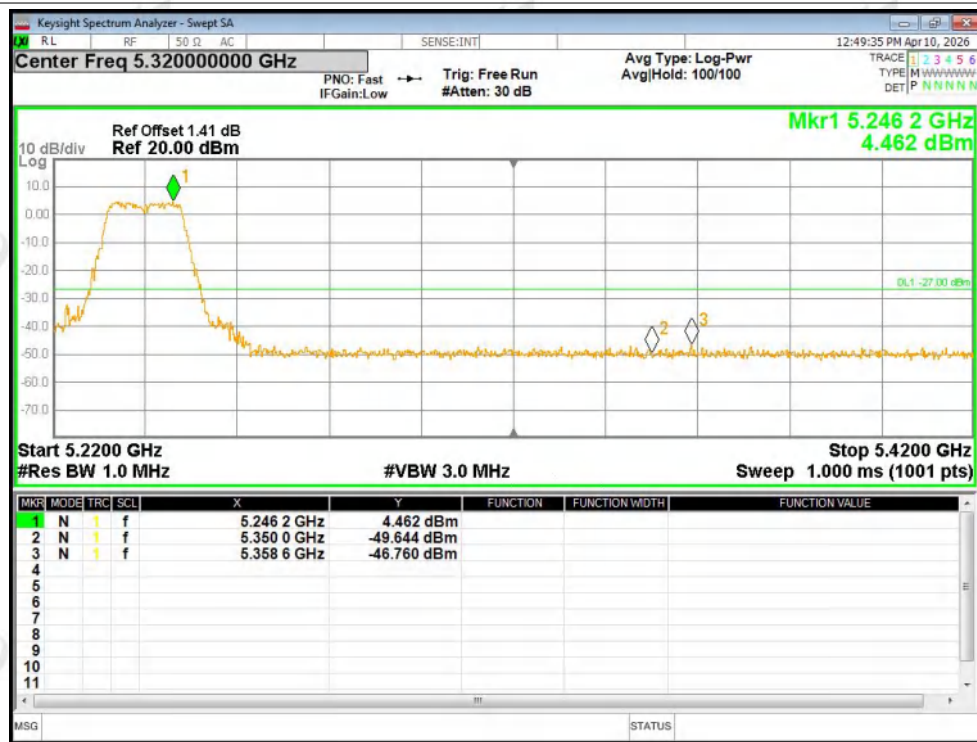
Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBm)	Antenna gain (dBi)	EIRP Value (dBm)	Limit (dBm)	Verdict
NVNT	a	5180	Ant1	-47.81	4.2	-43.61	-27	Pass
NVNT	a	5240	Ant1	-46.76	4.2	-42.56	-27	Pass
NVNT	n20	5180	Ant1	-47.53	4.2	-43.33	-27	Pass
NVNT	n20	5240	Ant1	-46.59	4.2	-42.39	-27	Pass
NVNT	n40	5190	Ant1	-40.76	4.2	-36.56	-27	Pass
NVNT	n40	5230	Ant1	-47.1	4.2	-42.90	-27	Pass
NVNT	ac20	5180	Ant1	-47.74	4.2	-43.54	-27	Pass
NVNT	ac20	5240	Ant1	-47.51	4.2	-43.31	-27	Pass
NVNT	ac40	5190	Ant1	-41.17	4.2	-36.97	-27	Pass
NVNT	ac40	5230	Ant1	-47.41	4.2	-43.21	-27	Pass
NVNT	ac80	5210	Ant1	-38.74	4.2	-34.54	-27	Pass

Test Graphs

Band Edge NVNT a 5180MHz Low Ant1

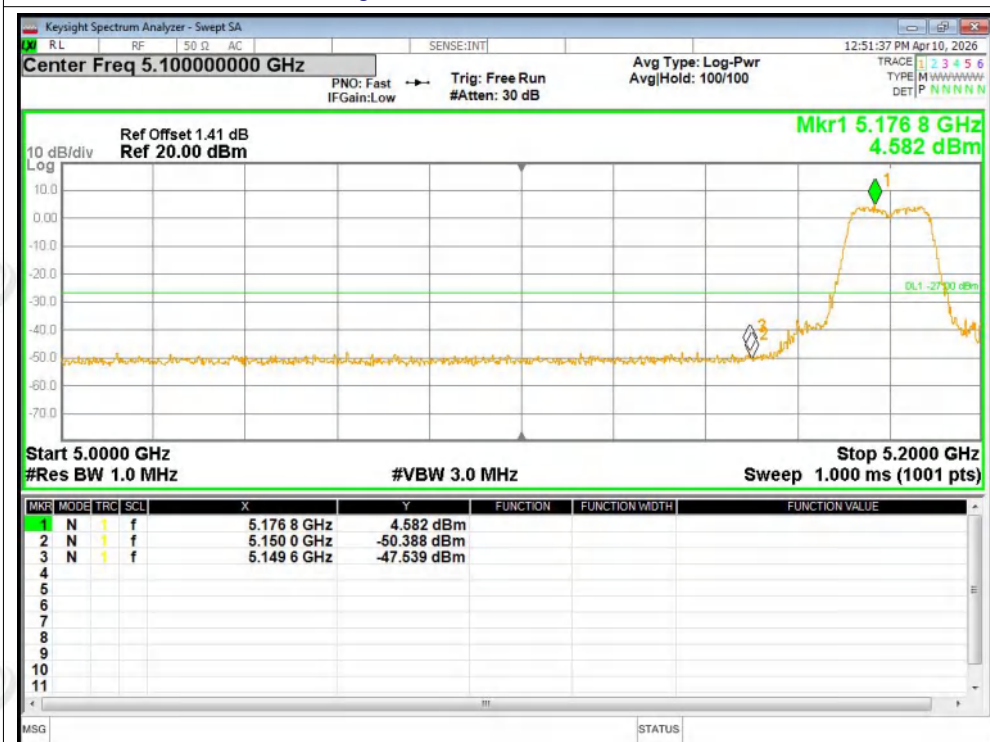


Band Edge NVNT a 5240MHz High Ant1

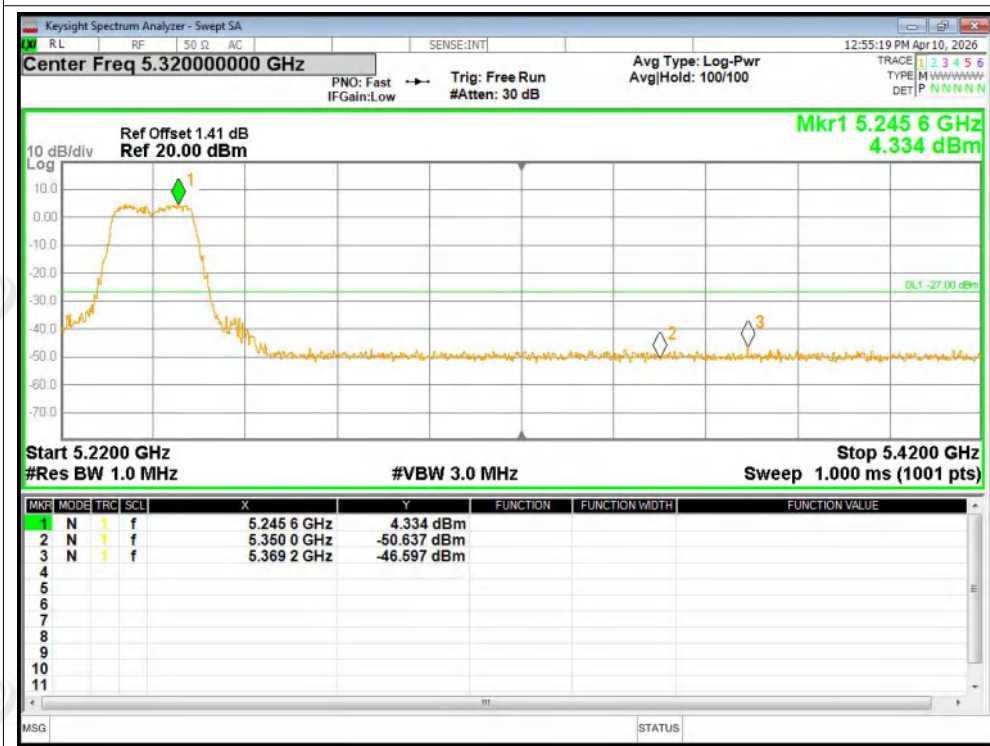




Band Edge NVNT n20 5180MHz Low Ant1

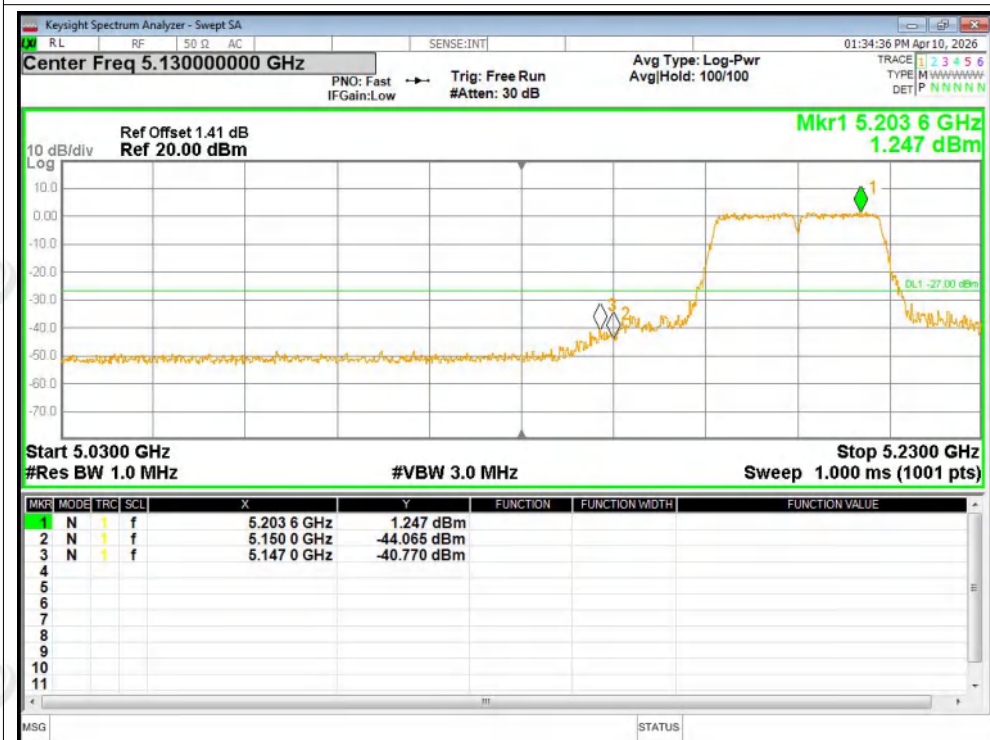


Band Edge NVNT n20 5240MHz High Ant1

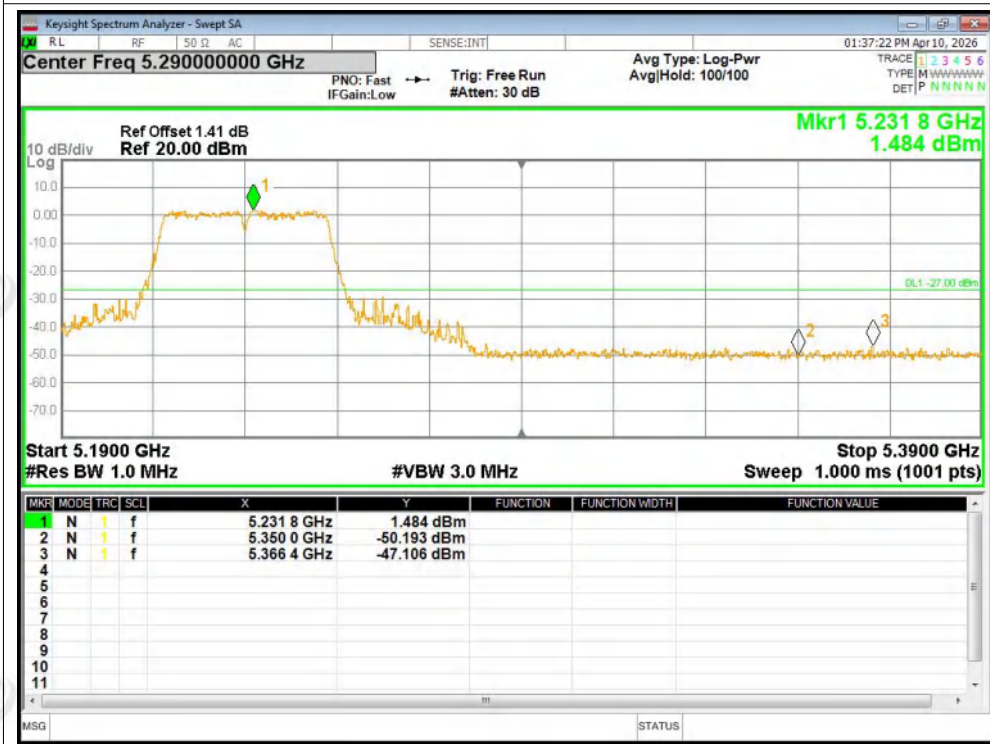




Band Edge NVNT n40 5190MHz Low Ant1

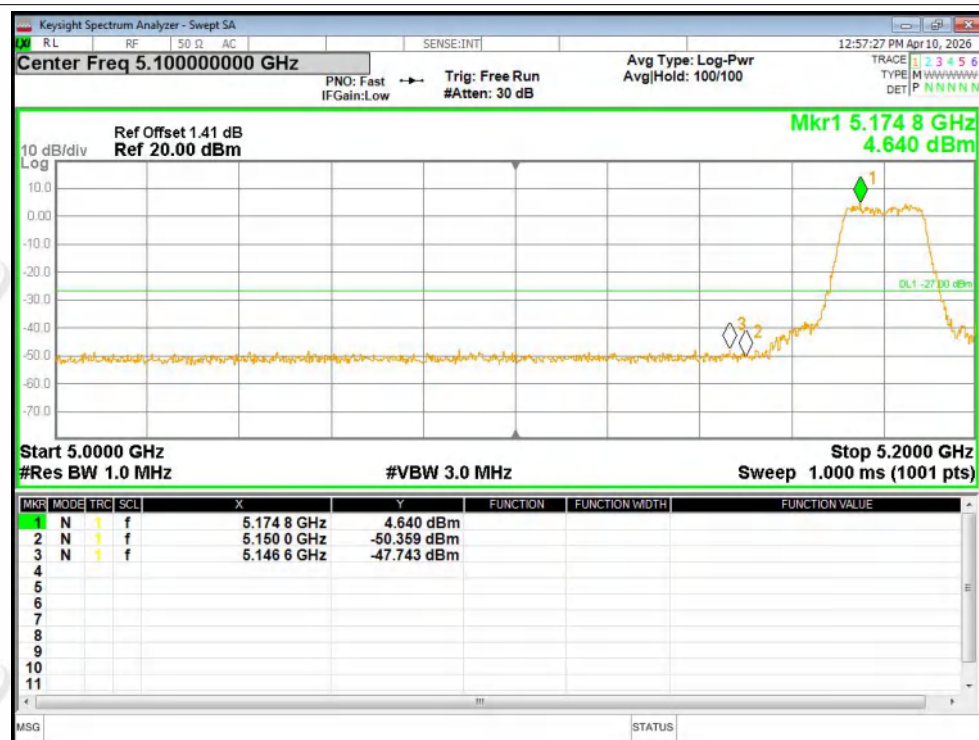


Band Edge NVNT n40 5230MHz High Ant1

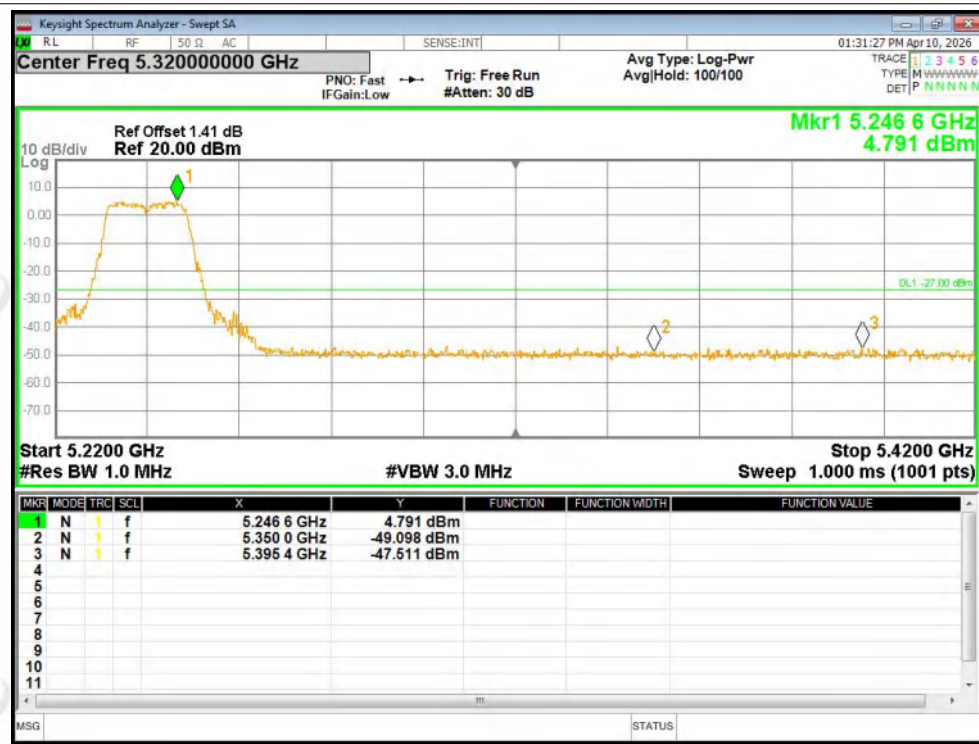




Band Edge NVNT ac20 5180MHz Low Ant1

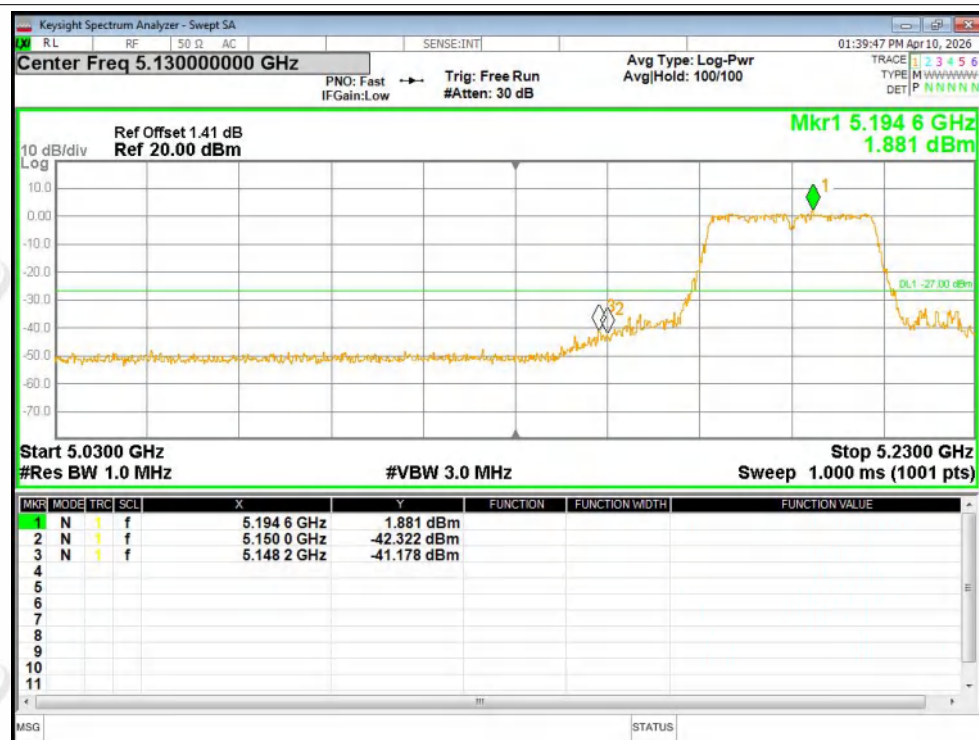


Band Edge NVNT ac20 5240MHz High Ant1

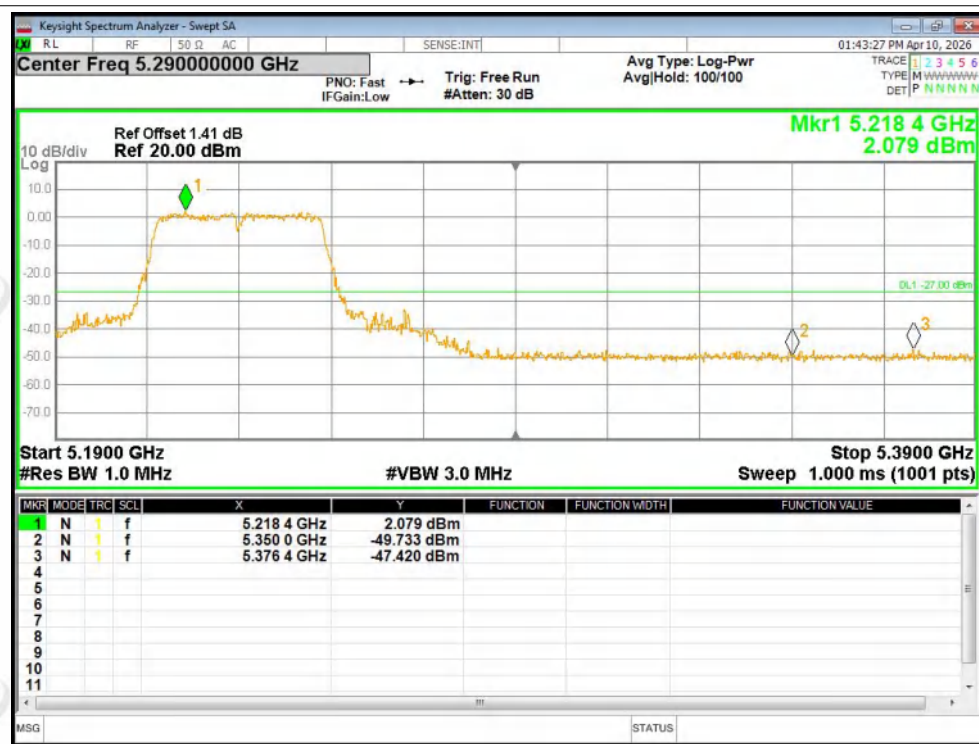


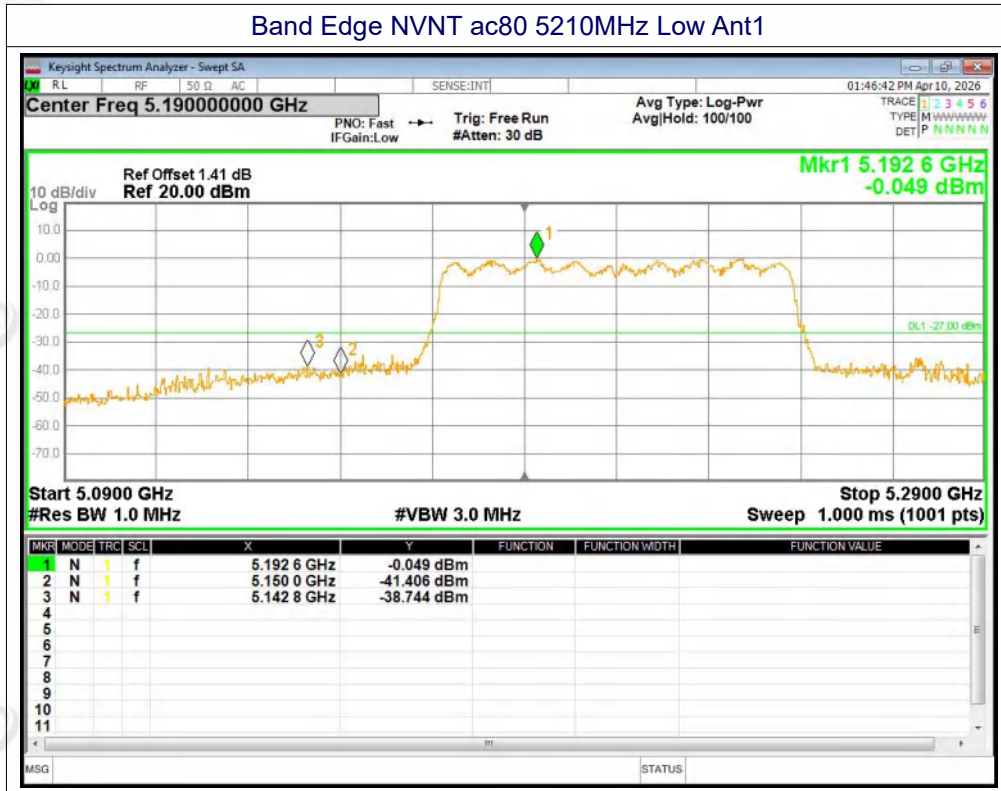


Band Edge NVNT ac40 5190MHz Low Ant1



Band Edge NVNT ac40 5230MHz High Ant1



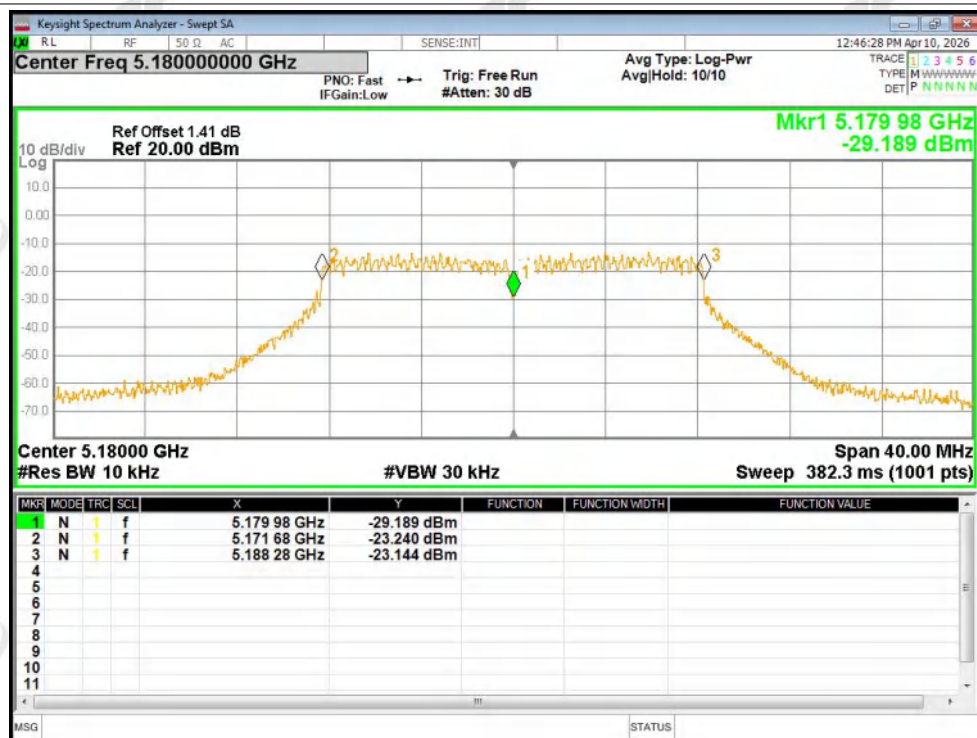


**ZHONGHAN****A.7 Frequency Stability**

Condition	Mode	Frequency (MHz)	Antenna	Measured Frequency (MHz)	Frequency Error (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
NVNT	a	5180	Ant1	5179.98	-20000	-3.86	Within 5180-5240MHz	Pass
NVNT	a	5200	Ant1	5200	0	0		Pass
NVNT	a	5240	Ant1	5239.98	-20000	-3.82		Pass
NVNT	n20	5180	Ant1	5179.98	-20000	-3.86		Pass
NVNT	n20	5200	Ant1	5200	0	0		Pass
NVNT	n20	5240	Ant1	5240	0	0		Pass
NVNT	n40	5190	Ant1	5190	0	0		Pass
NVNT	n40	5230	Ant1	5230	0	0		Pass
NVNT	ac20	5180	Ant1	5180	0	0		Pass
NVNT	ac20	5200	Ant1	5199.98	-20000	-3.85		Pass
NVNT	ac20	5240	Ant1	5239.98	-20000	-3.82		Pass
NVNT	ac40	5190	Ant1	5190	0	0		Pass
NVNT	ac40	5230	Ant1	5230	0	0		Pass
NVNT	ac80	5210	Ant1	5210	0	0		Pass

Test Graphs

Freq. Stability NVNT a 5180MHz Ant1

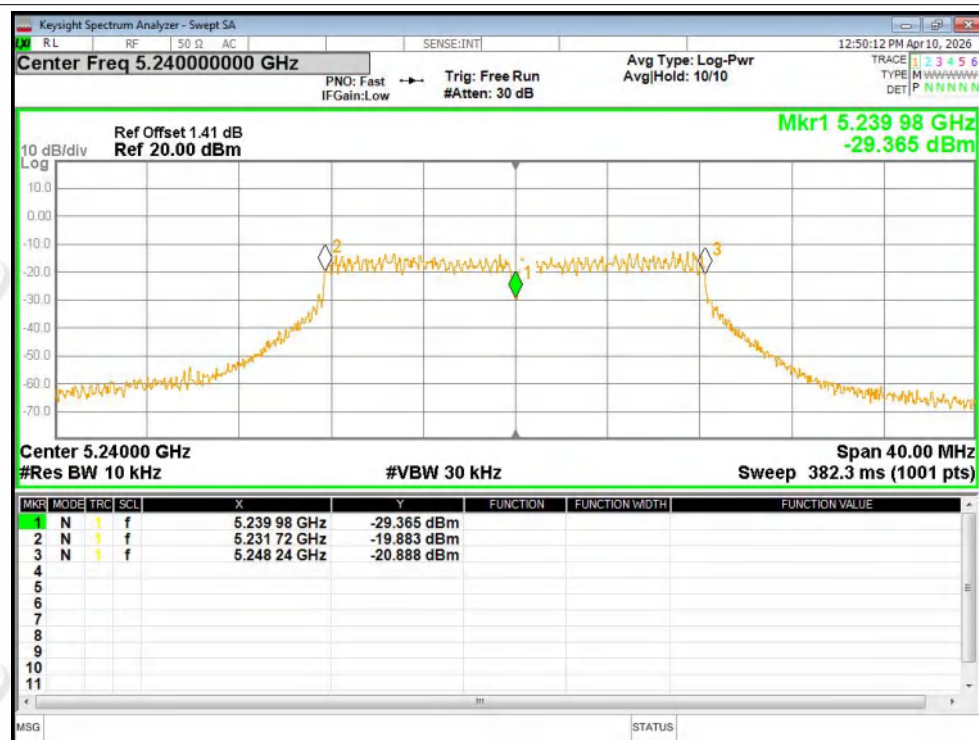


Freq. Stability NVNT a 5200MHz Ant1

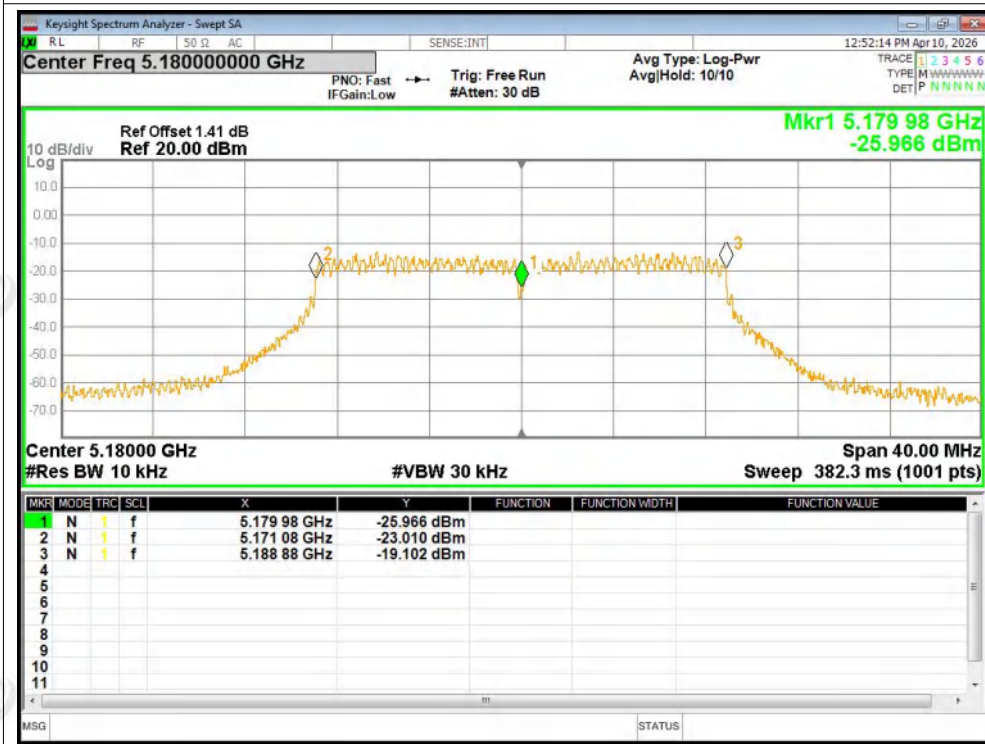




Freq. Stability NVNT a 5240MHz Ant1

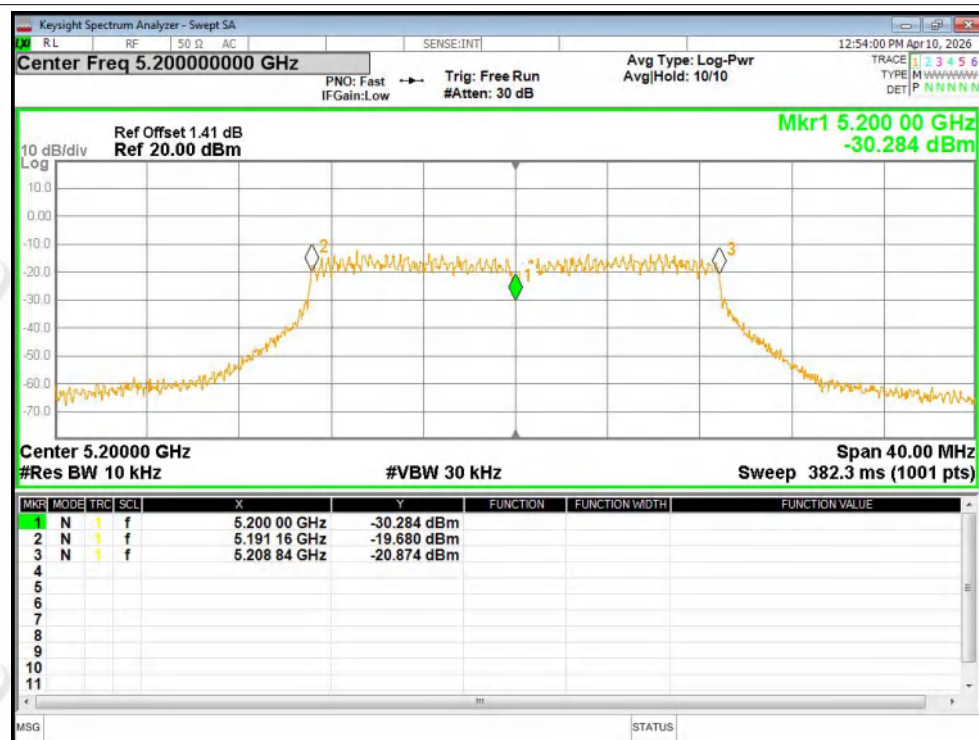


Freq. Stability NVNT n20 5180MHz Ant1

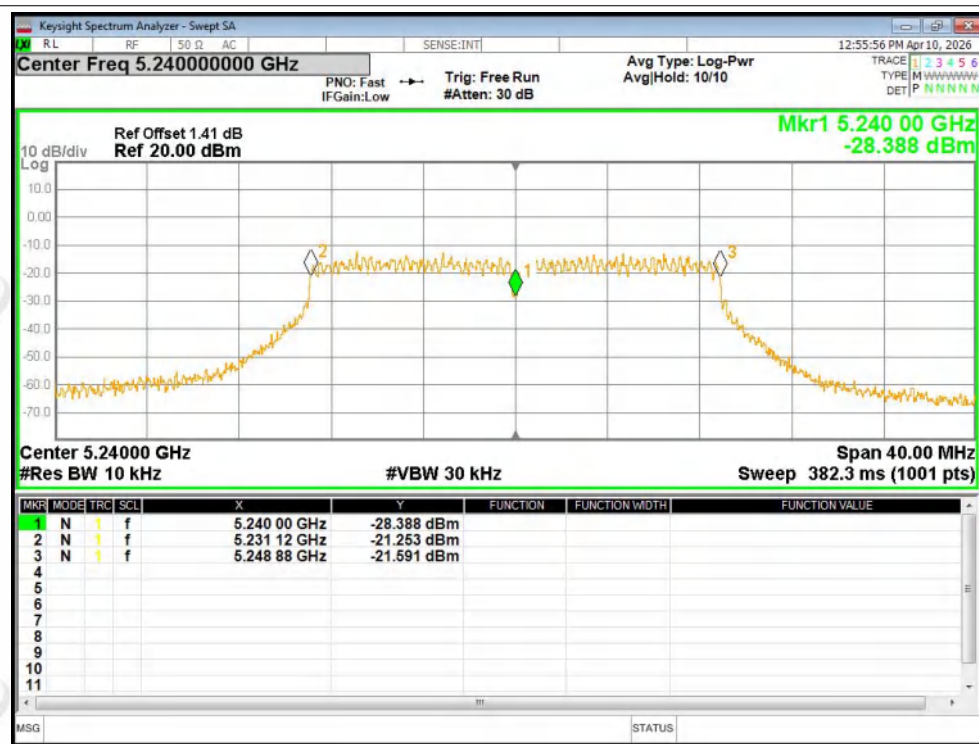




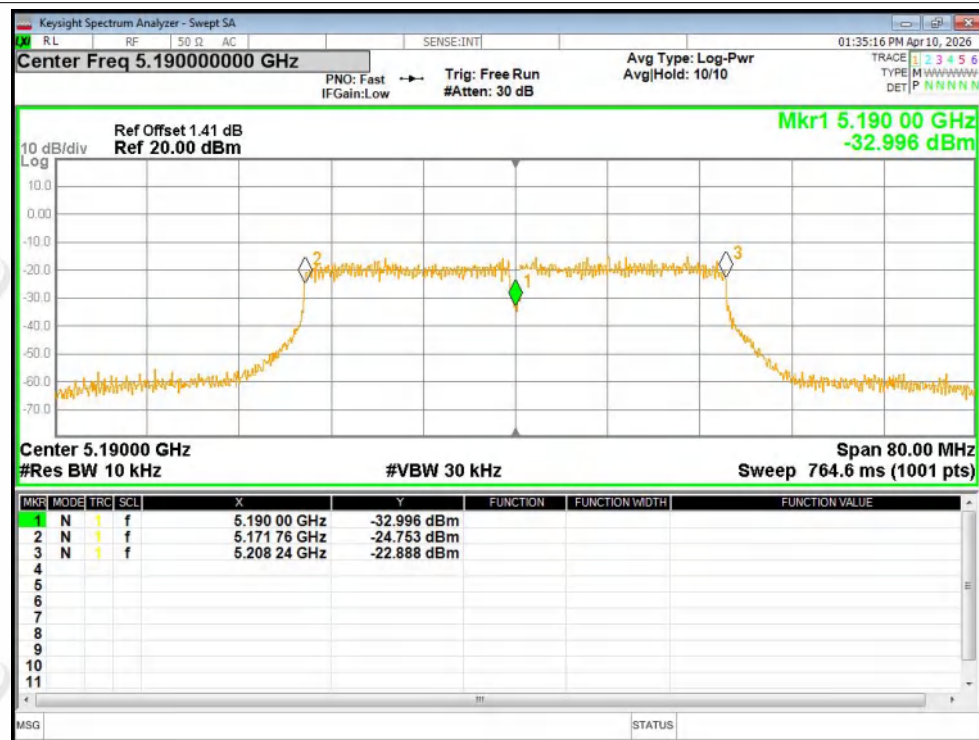
Freq. Stability NVNT n20 5200MHz Ant1



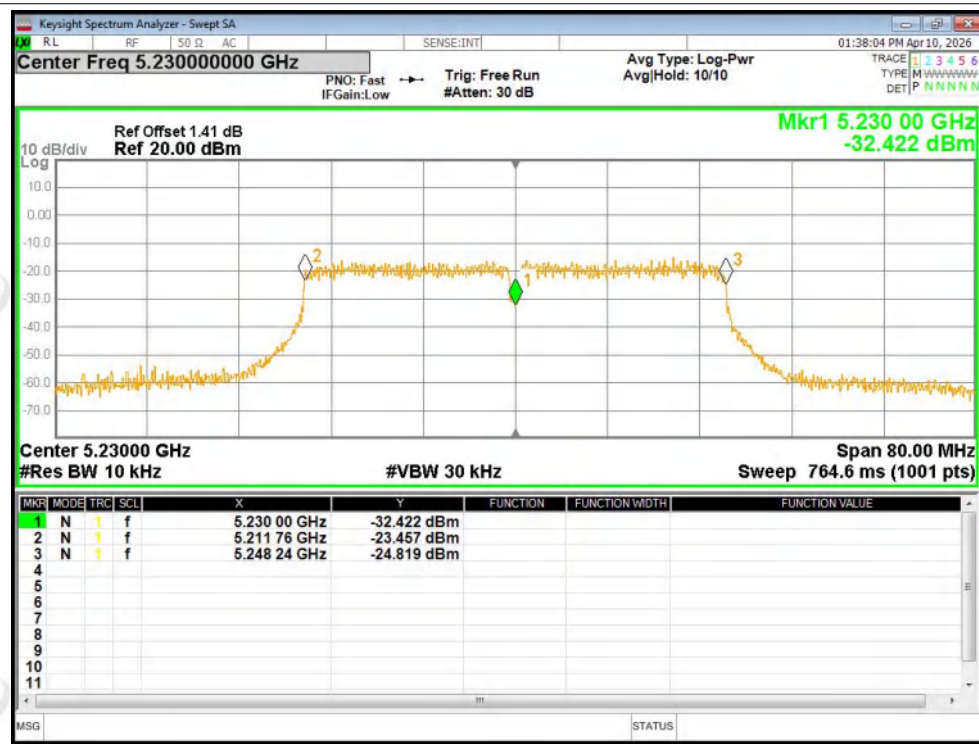
Freq. Stability NVNT n20 5240MHz Ant1



Freq. Stability NVNT n40 5190MHz Ant1

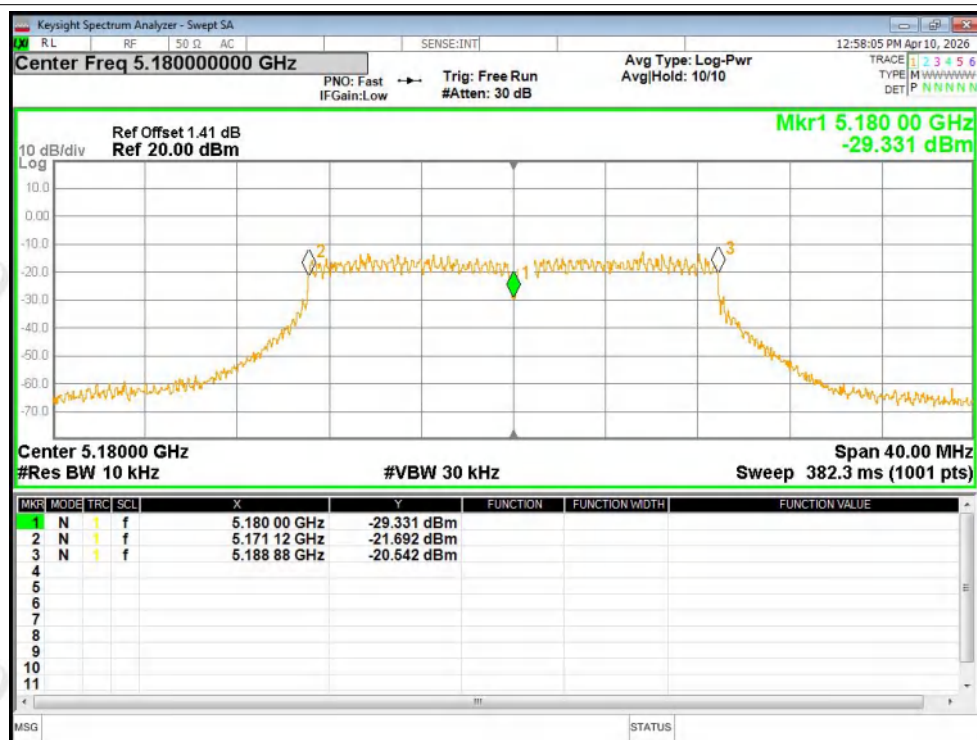


Freq. Stability NVNT n40 5230MHz Ant1

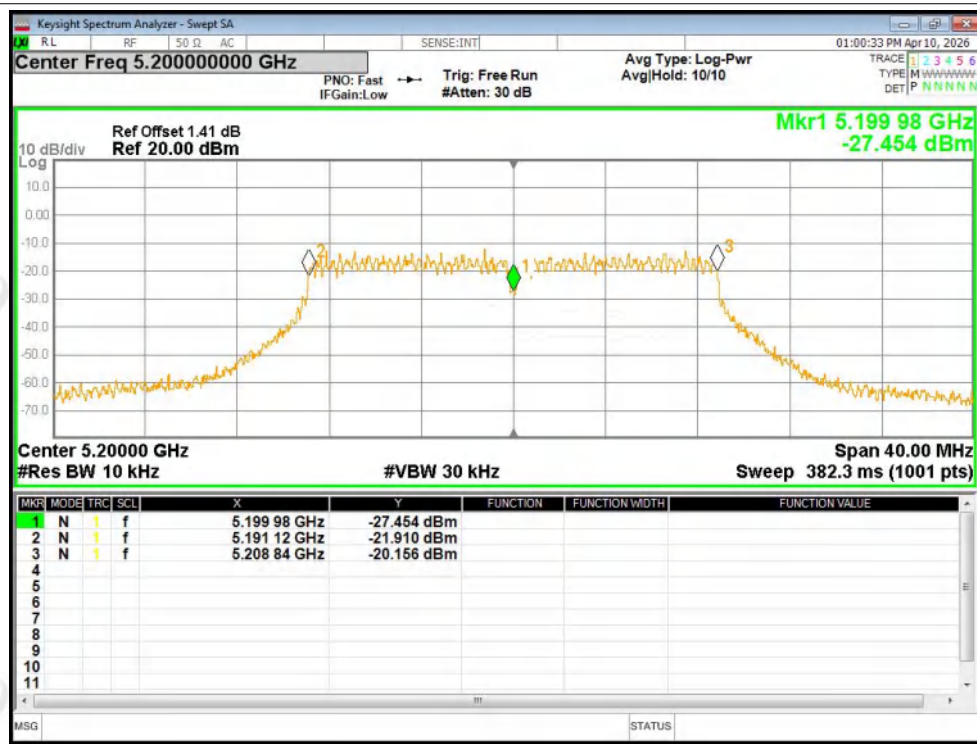




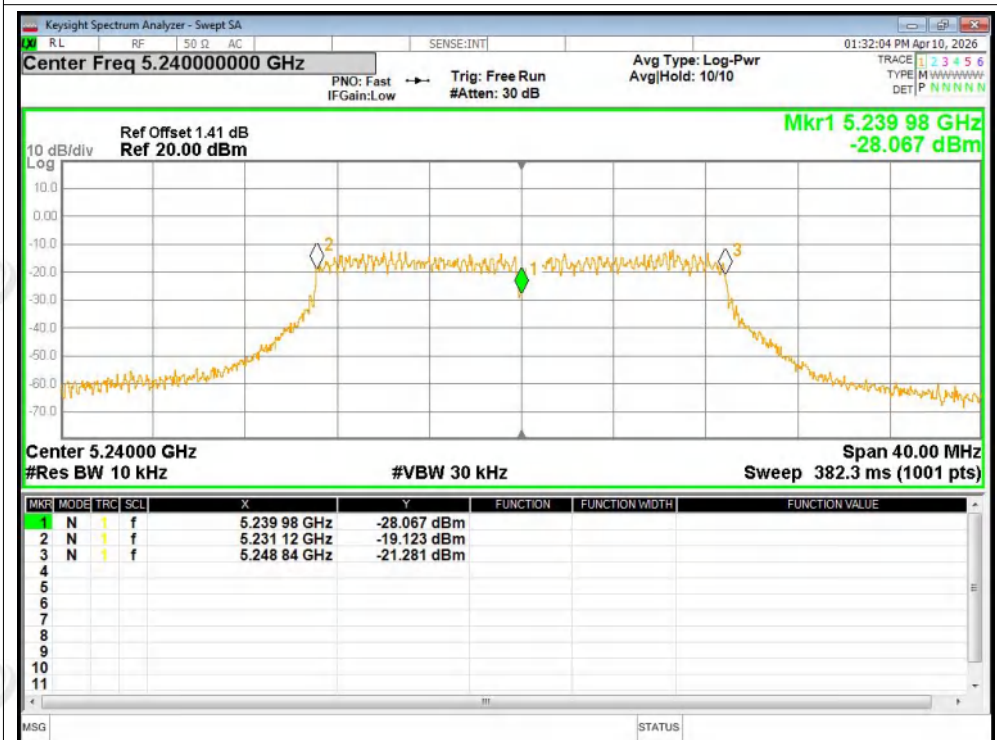
Freq. Stability NVNT ac20 5180MHz Ant1



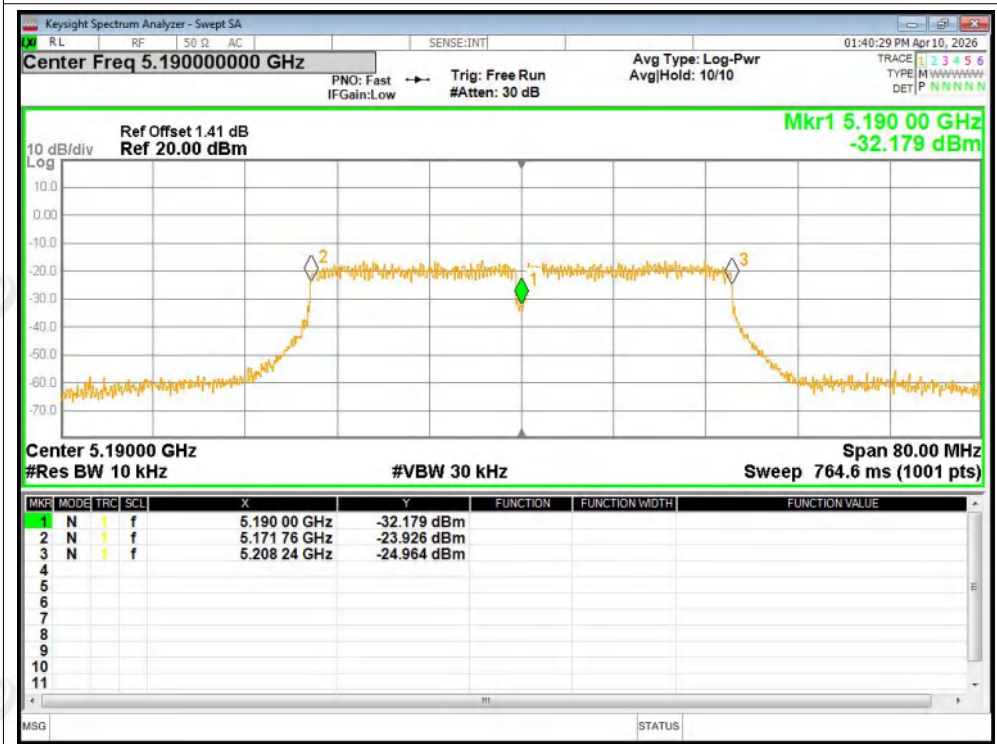
Freq. Stability NVNT ac20 5200MHz Ant1



Freq. Stability NVNT ac20 5240MHz Ant1

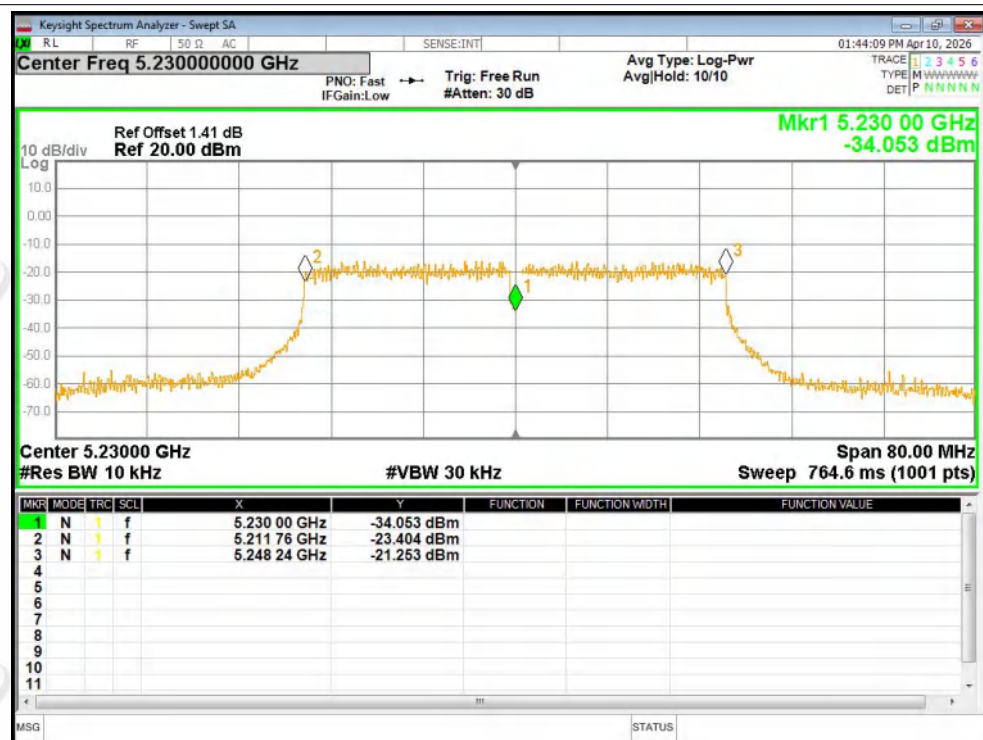


Freq. Stability NVNT ac40 5190MHz Ant1





Freq. Stability NVNT ac40 5230MHz Ant1



Freq. Stability NVNT ac80 5210MHz Ant1

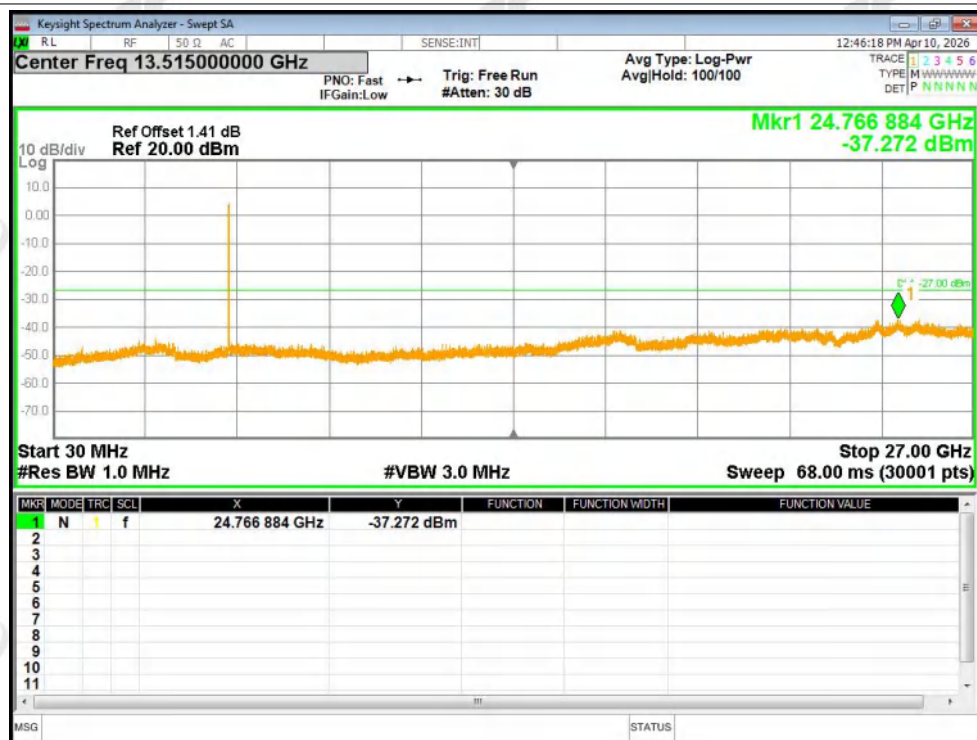


**ZHONGHAN****A.8 Conducted RF Spurious Emission**

Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBm)	ANT Gain (dBi)	EIRP Value (dBm)	Limit (dBm)	Verdict
NVNT	a	5180	Ant1	-37.27	4.2	-33.07	-27	Pass
NVNT	a	5200	Ant1	-37.45	4.2	-33.25	-27	Pass
NVNT	a	5240	Ant1	-37.51	4.2	-33.31	-27	Pass
NVNT	n20	5180	Ant1	-37.81	4.2	-33.61	-27	Pass
NVNT	n20	5200	Ant1	-37.16	4.2	-32.96	-27	Pass
NVNT	n20	5240	Ant1	-37.58	4.2	-33.38	-27	Pass
NVNT	n40	5190	Ant1	-36.46	4.2	-32.26	-27	Pass
NVNT	n40	5230	Ant1	-37.07	4.2	-32.87	-27	Pass
NVNT	ac20	5180	Ant1	-37.54	4.2	-33.34	-27	Pass
NVNT	ac20	5200	Ant1	-36.82	4.2	-32.62	-27	Pass
NVNT	ac20	5240	Ant1	-36.94	4.2	-32.74	-27	Pass
NVNT	ac40	5190	Ant1	-37.55	4.2	-33.35	-27	Pass
NVNT	ac40	5230	Ant1	-37.34	4.2	-33.14	-27	Pass
NVNT	ac80	5210	Ant1	-36.86	4.2	-32.66	-27	Pass

Test Graphs

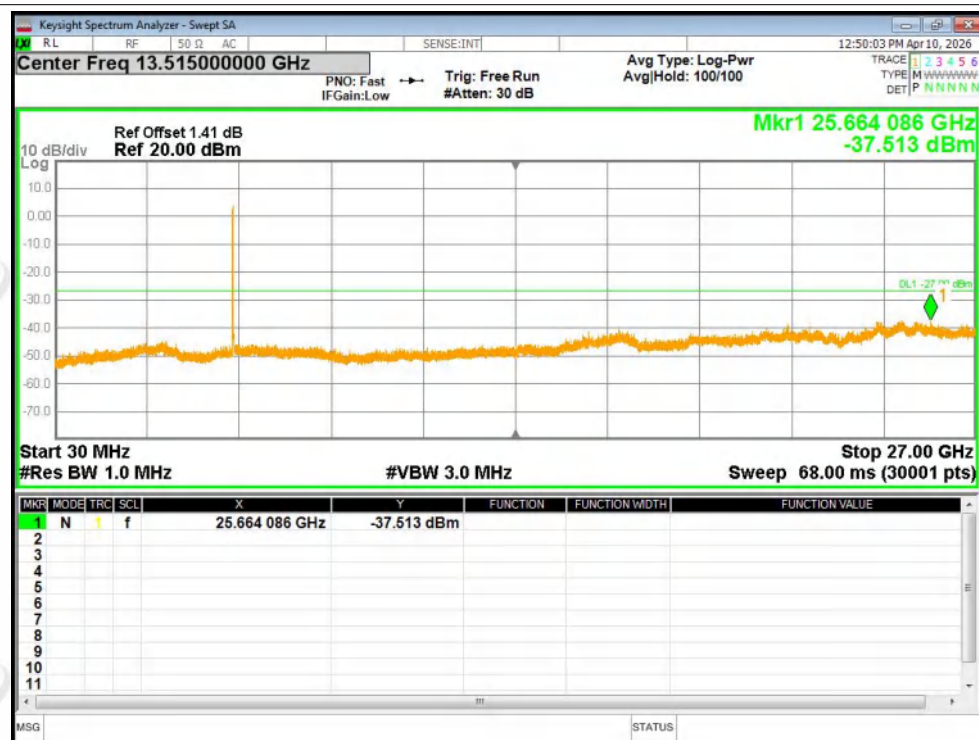
Tx. Spurious NVNT a 5180MHz Ant1 Emission



Tx. Spurious NVNT a 5200MHz Ant1 Emission



Tx. Spurious NVNT a 5240MHz Ant1 Emission

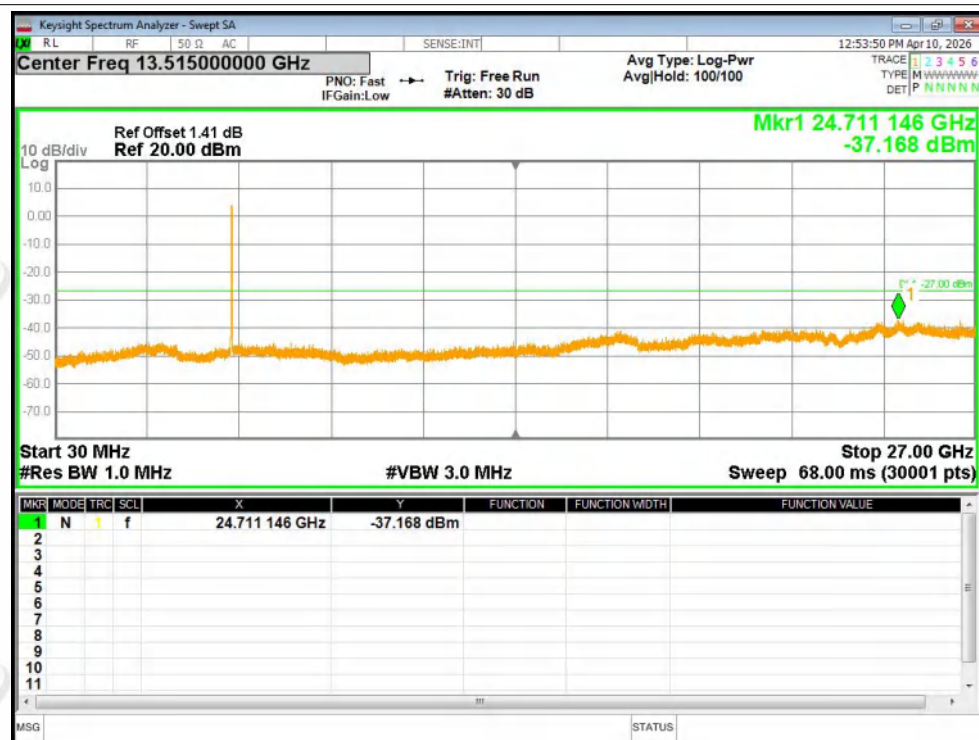


Tx. Spurious NVNT n20 5180MHz Ant1 Emission





Tx. Spurious NVNT n20 5200MHz Ant1 Emission

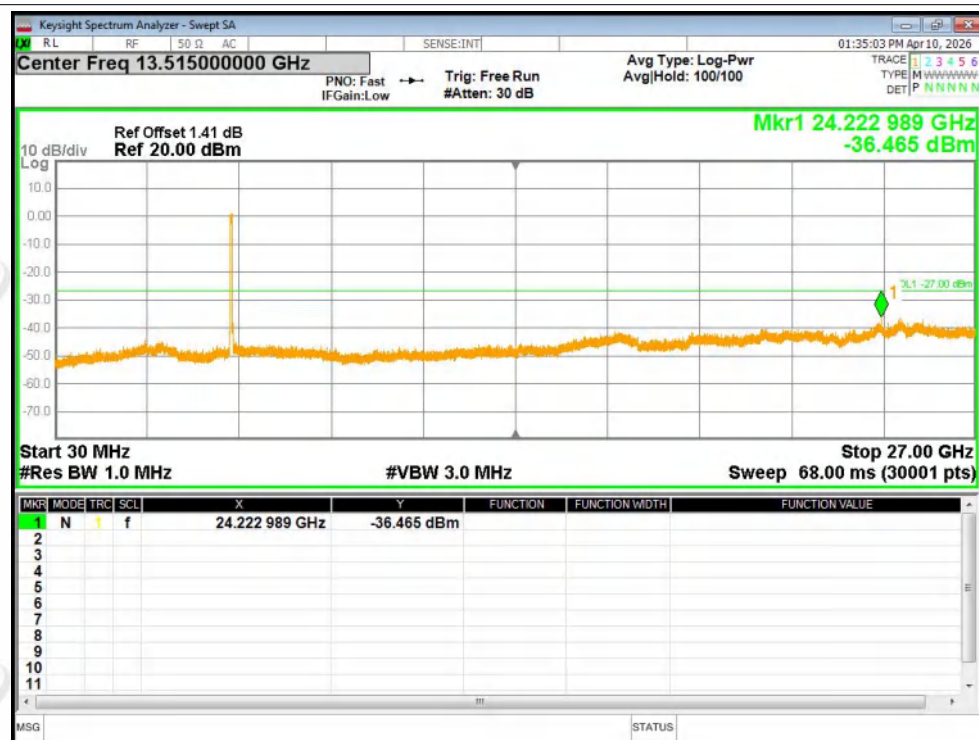


Tx. Spurious NVNT n20 5240MHz Ant1 Emission





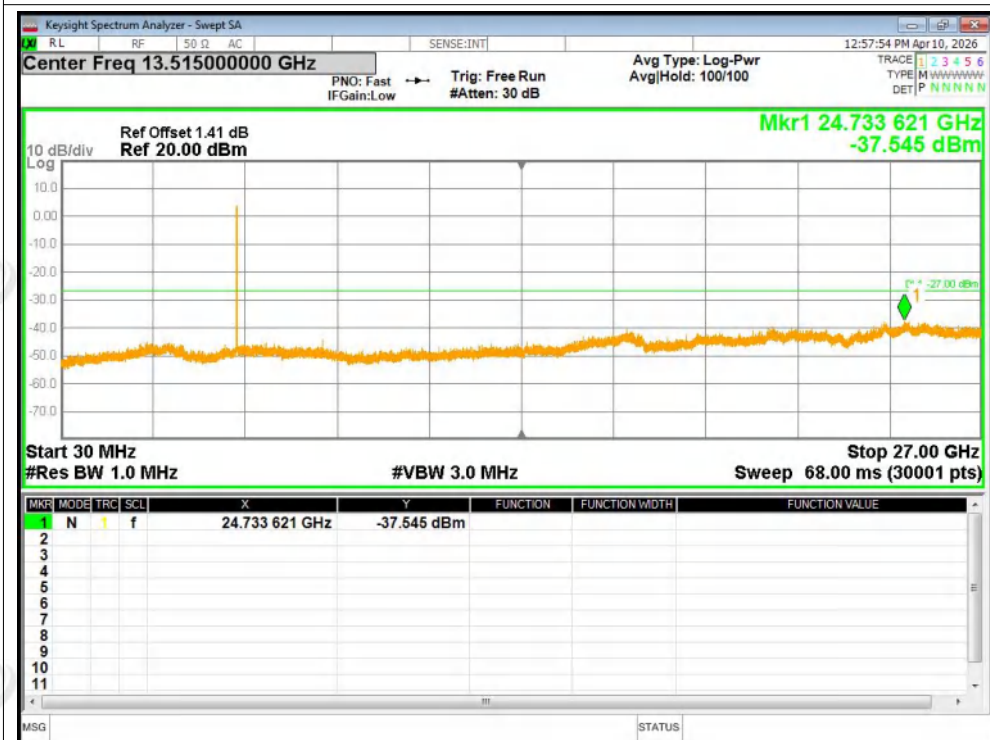
Tx. Spurious NVNT n40 5190MHz Ant1 Emission



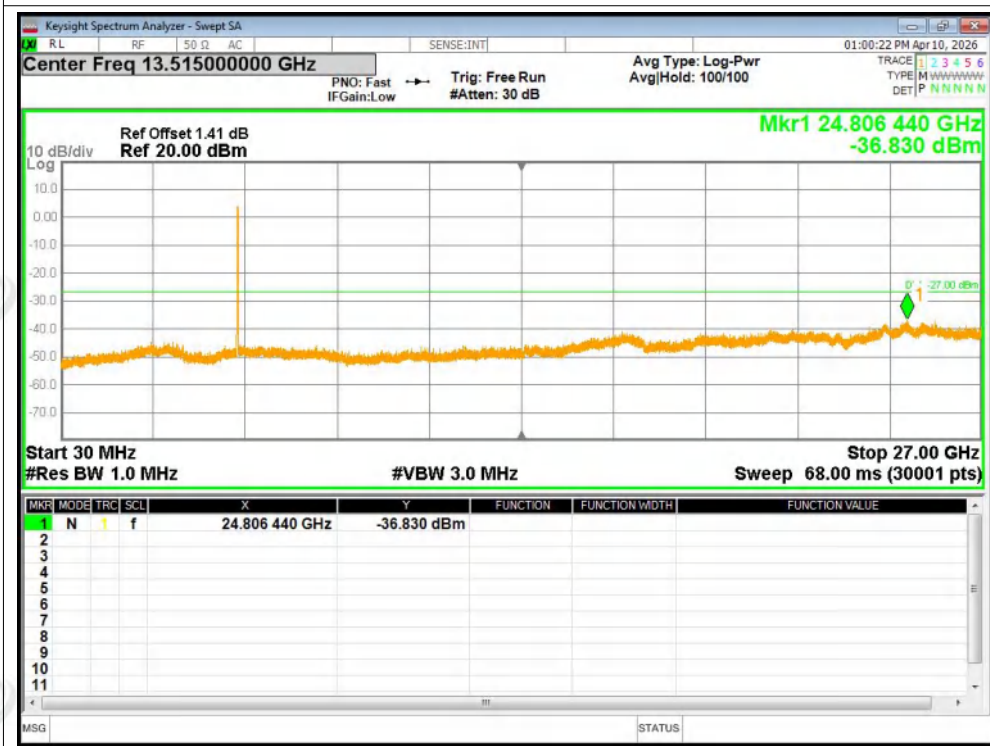
Tx. Spurious NVNT n40 5230MHz Ant1 Emission



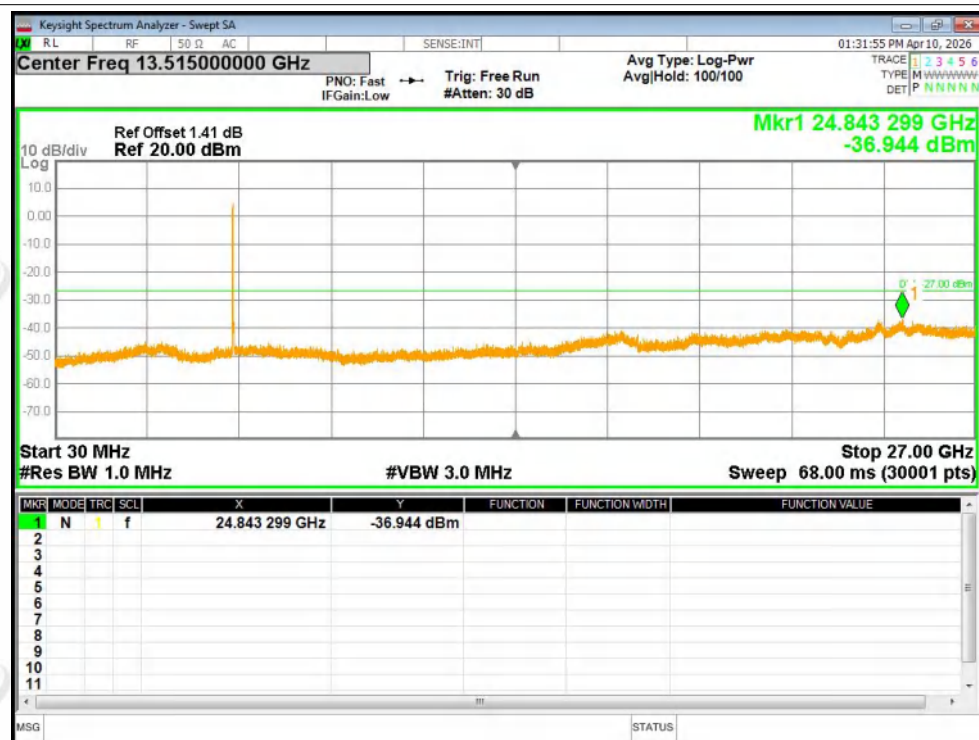
Tx. Spurious NVNT ac20 5180MHz Ant1 Emission



Tx. Spurious NVNT ac20 5200MHz Ant1 Emission



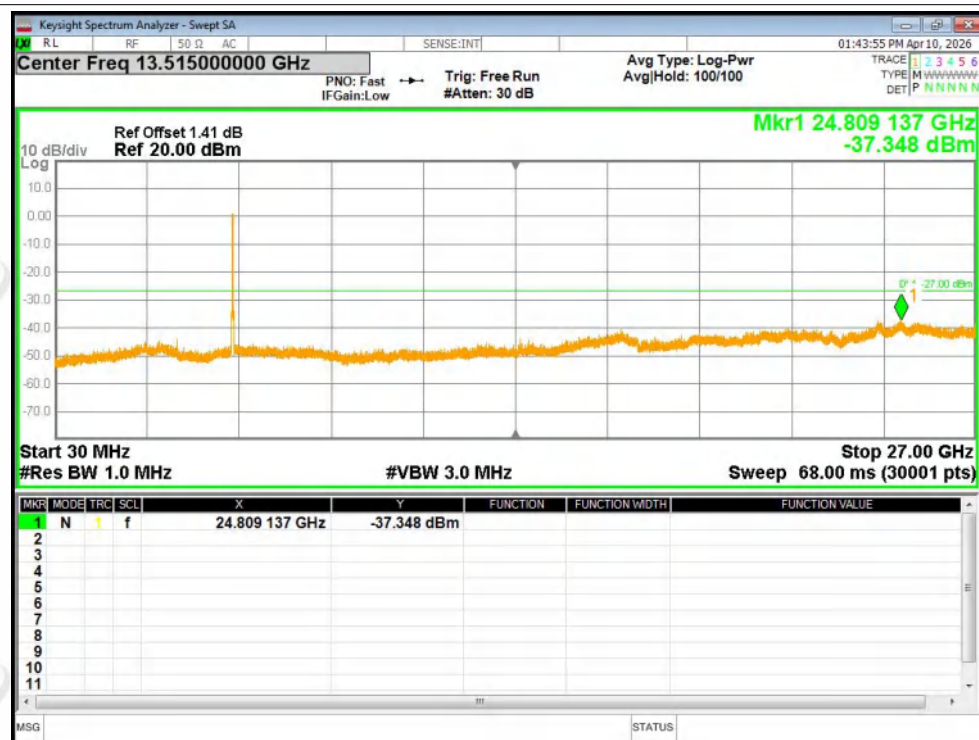
Tx. Spurious NVNT ac20 5240MHz Ant1 Emission



Tx. Spurious NVNT ac40 5190MHz Ant1 Emission



Tx. Spurious NVNT ac40 5230MHz Ant1 Emission



Tx. Spurious NVNT ac80 5210MHz Ant1 Emission



Remark1: From 26.5GHz to 40GHz,the amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.