



Appendix A for 5GWIFI Test Data

Product Name: ATOTO Car Navigation Multimedia Receiver

Test Model: F7G2A7WE

Environmental Conditions

Temperature:	21.6° C
Relative Humidity:	54%
ATM Pressure:	101.2 kPa
Test Engineer:	Jim Liu
Supervised by:	Lake Xie



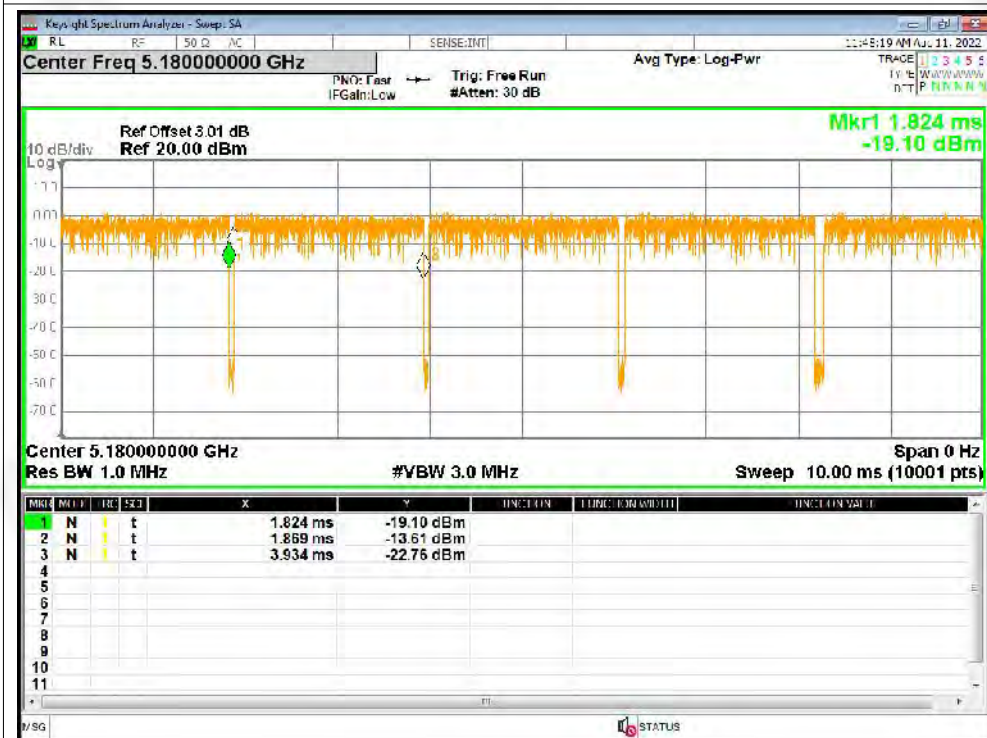
A.1 Duty Cycle

Condition	Mode	Frequency (MHz)	Antenna	Duty Cycle (%)	Correction Factor (dB)	1/T (kHz)
NVNT	a	5180	Ant1	97.87	0.09	0.48
NVNT	a	5200	Ant1	97.04	0.13	0.48
NVNT	a	5240	Ant1	97.87	0.09	0.48
NVNT	n20	5180	Ant1	91.87	0.37	0.52
NVNT	n20	5200	Ant1	94.54	0.24	0.52
NVNT	n20	5240	Ant1	92.62	0.33	0.52
NVNT	n40	5190	Ant1	3.77	0.31	0.51
NVNT	n40	5230	Ant1	0	0	0
NVNT	ac20	5180	Ant1	93.88	0.27	0.52
NVNT	ac20	5200	Ant1	92.22	0.35	0.52
NVNT	ac20	5240	Ant1	93.02	0.31	0.52
NVNT	ac40	5190	Ant1	0	0	0
NVNT	ac40	5230	Ant1	5.71	0.25	0.52
NVNT	ac80	5210	Ant1	0	0	0

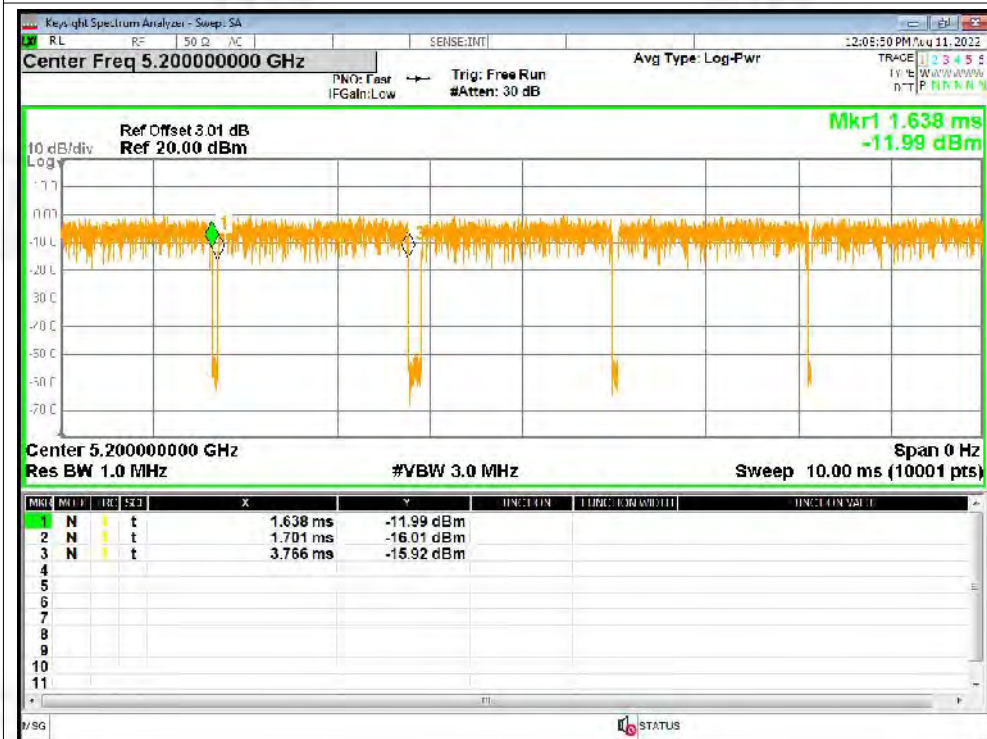


Test Graphs

Duty Cycle NVNT a 5180MHz Ant1

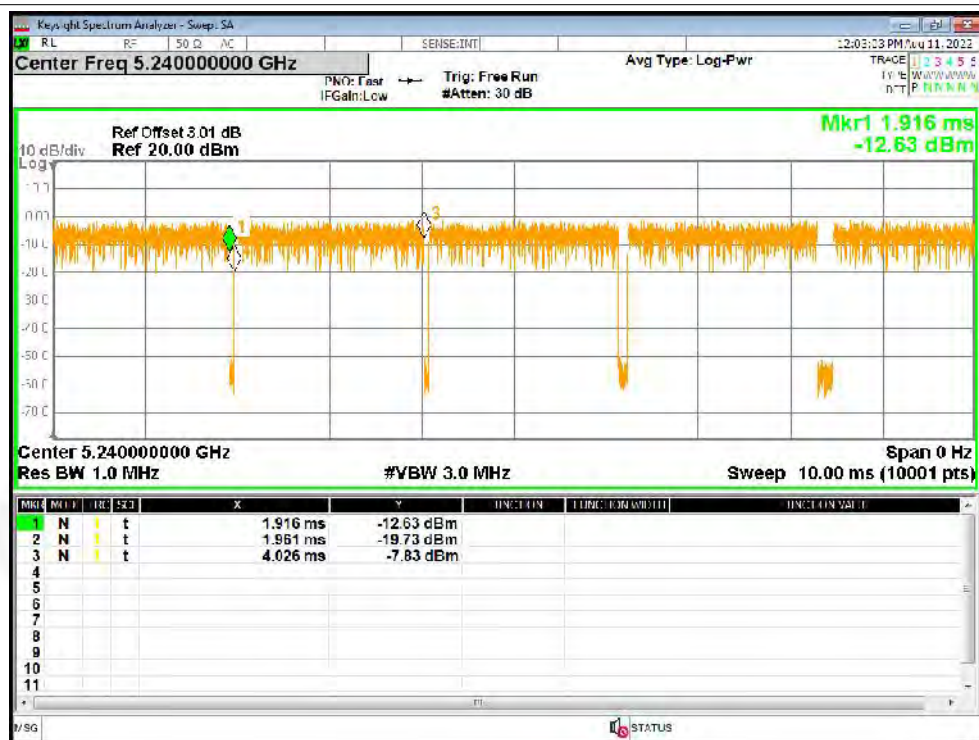


Duty Cycle NVNT a 5200MHz Ant1

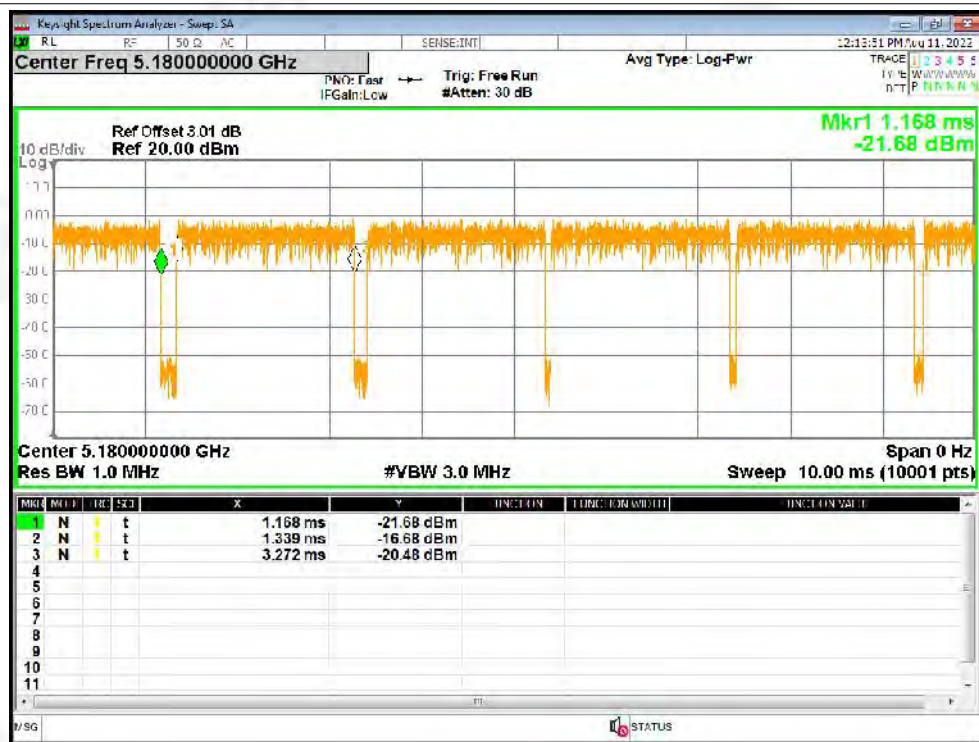




Duty Cycle NVNT a 5240MHz Ant1

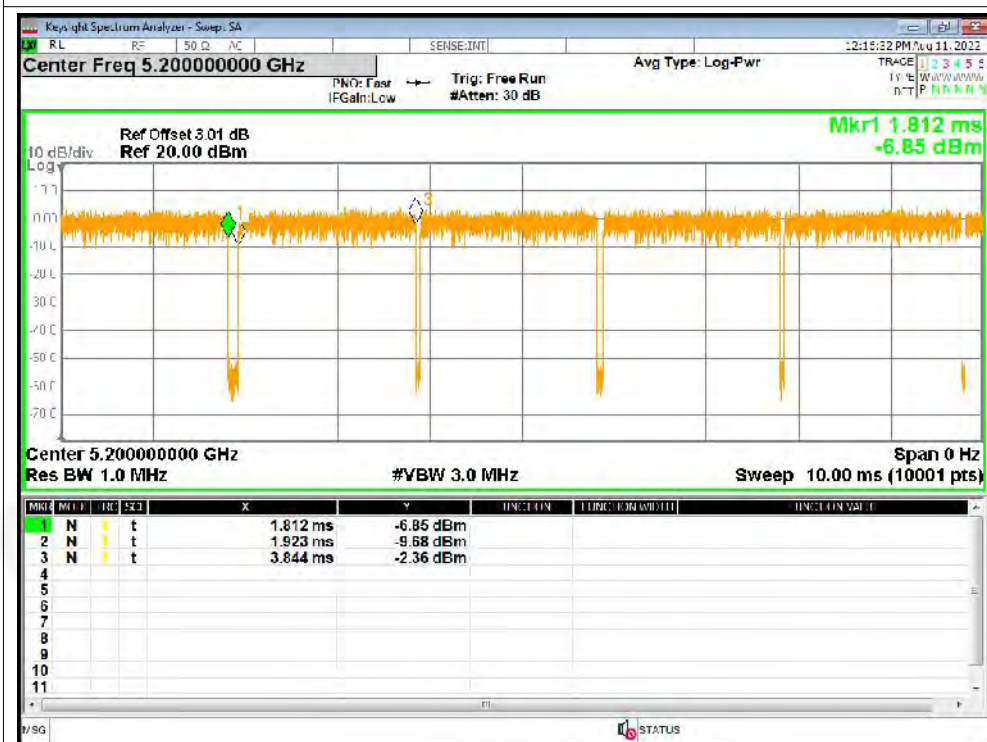


Duty Cycle NVNT n20 5180MHz Ant1

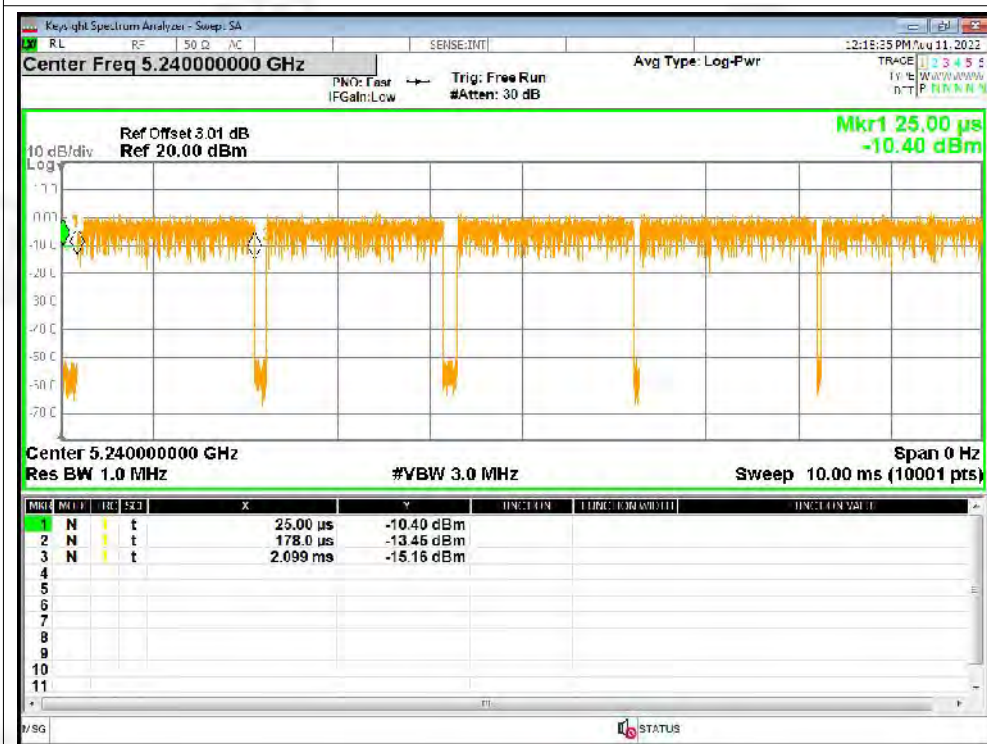




Duty Cycle NVNT n20 5200MHz Ant1



Duty Cycle NVNT n20 5240MHz Ant1

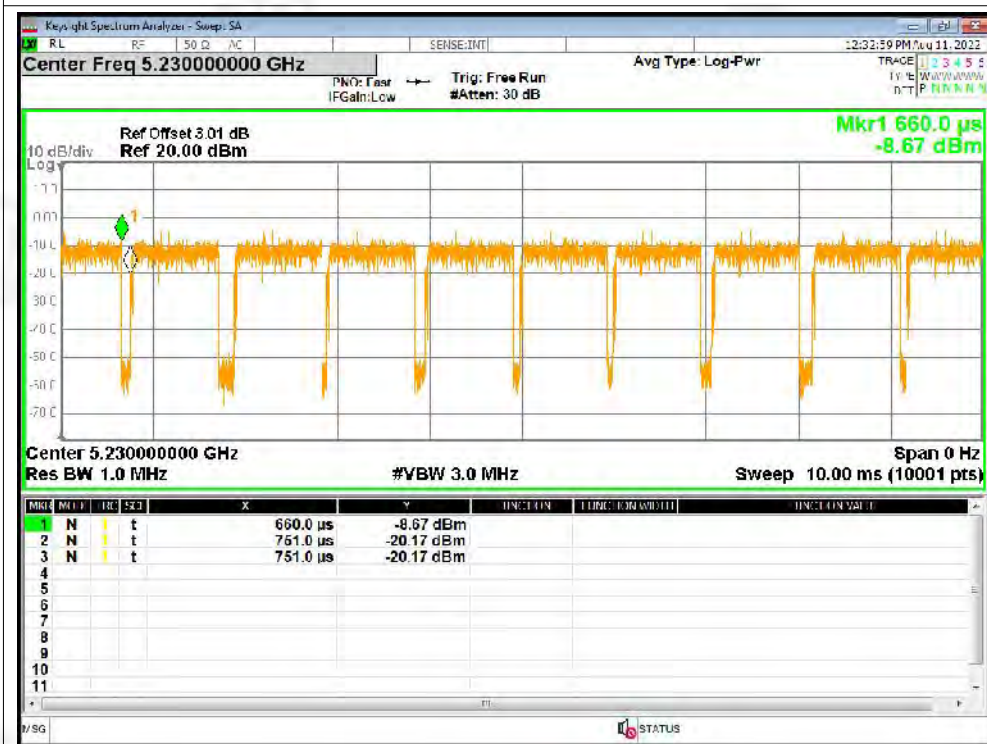




Duty Cycle NVNT n40 5190MHz Ant1



Duty Cycle NVNT n40 5230MHz Ant1

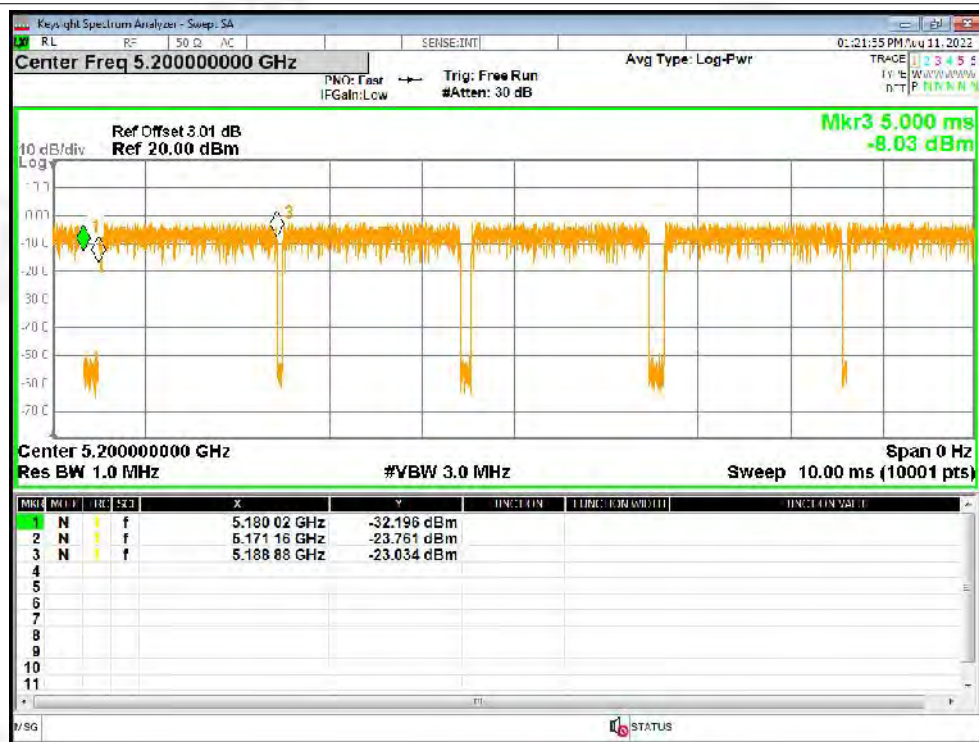


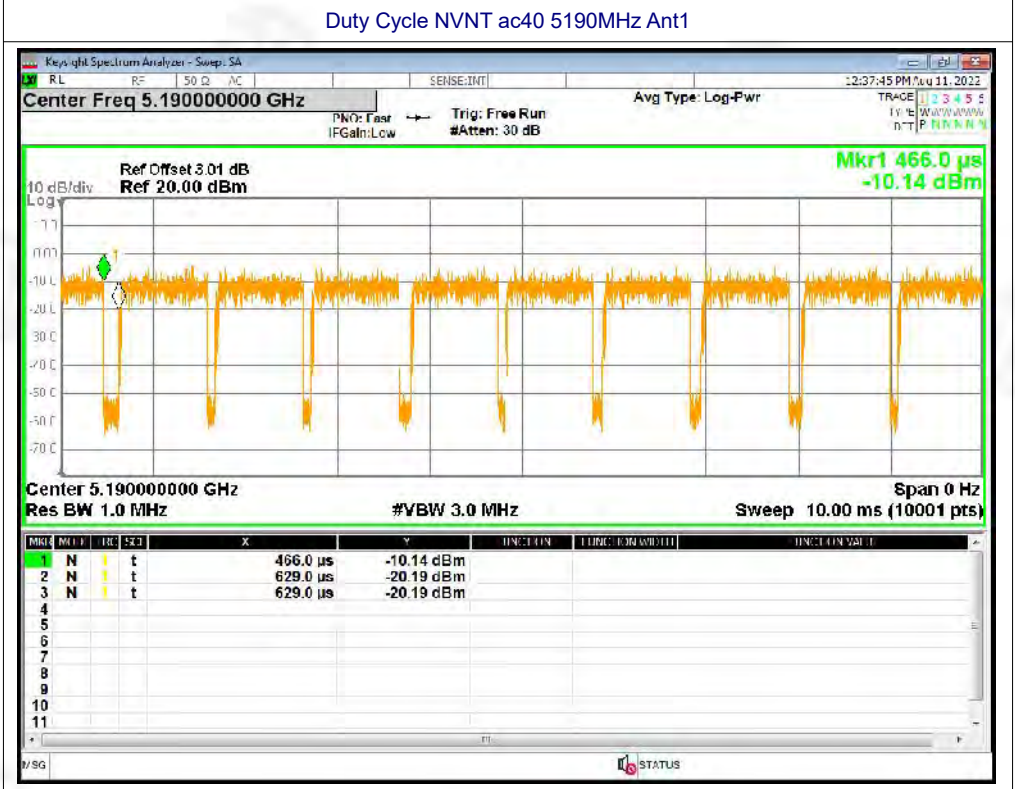
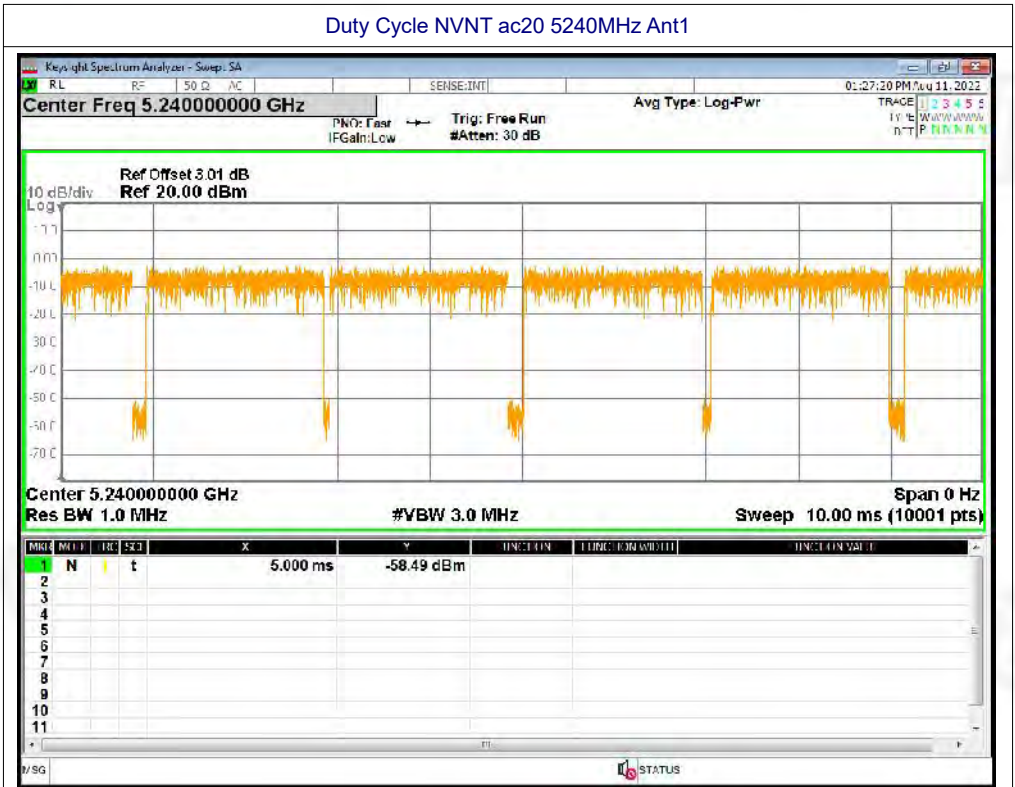


Duty Cycle NVNT ac20 5180MHz Ant1



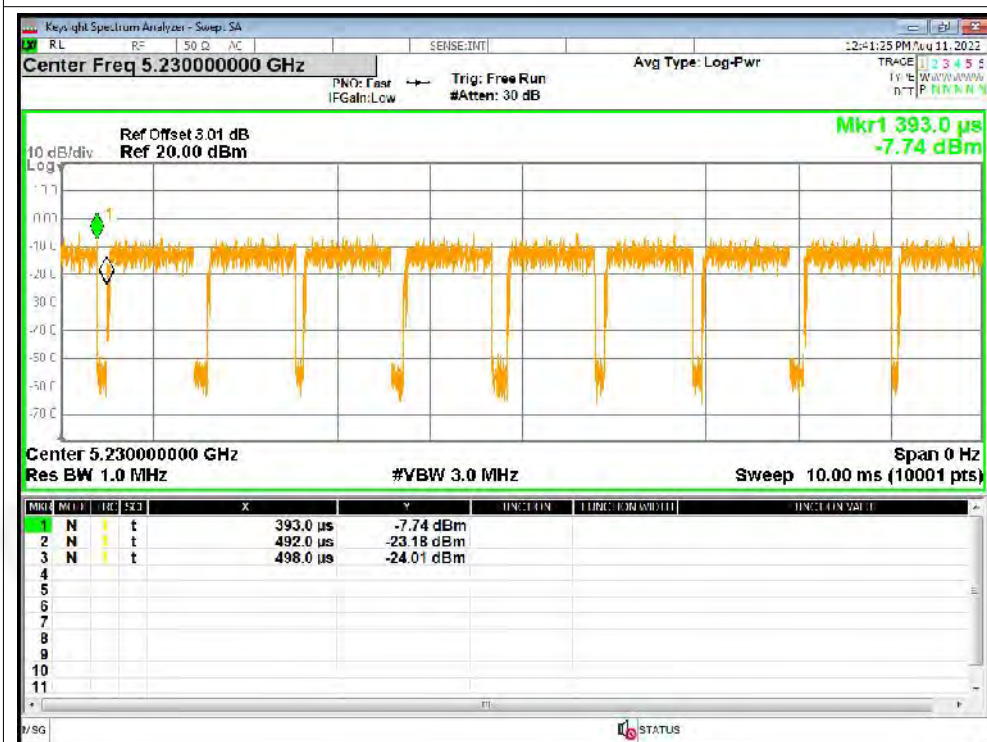
Duty Cycle NVNT ac20 5200MHz Ant1







Duty Cycle NVNT ac40 5230MHz Ant1



Duty Cycle NVNT ac80 5210MHz Ant1





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	6.97	0.09	7.06	24	Pass
NVNT	a	5200	Ant1	4.56	0.13	4.69	24	Pass
NVNT	a	5240	Ant1	4.41	0.09	4.50	24	Pass
NVNT	n20	5180	Ant1	4.56	0.37	4.93	24	Pass
NVNT	n20	5200	Ant1	8.00	0.24	8.24	24	Pass
NVNT	n20	5240	Ant1	7.08	0.33	7.41	24	Pass
NVNT	n40	5190	Ant1	4.35	0.12	4.47	24	Pass
NVNT	n40	5230	Ant1	4.06	0	4.06	24	Pass
NVNT	ac20	5180	Ant1	4.26	0.27	4.53	24	Pass
NVNT	ac20	5200	Ant1	3.95	0.35	4.3	24	Pass
NVNT	ac20	5240	Ant1	3.58	0.31	3.89	24	Pass
NVNT	ac40	5190	Ant1	4.45	0	4.45	24	Pass
NVNT	ac40	5230	Ant1	3.93	0.31	4.24	24	Pass
NVNT	ac80	5210	Ant1	4.23	0	4.23	24	Pass

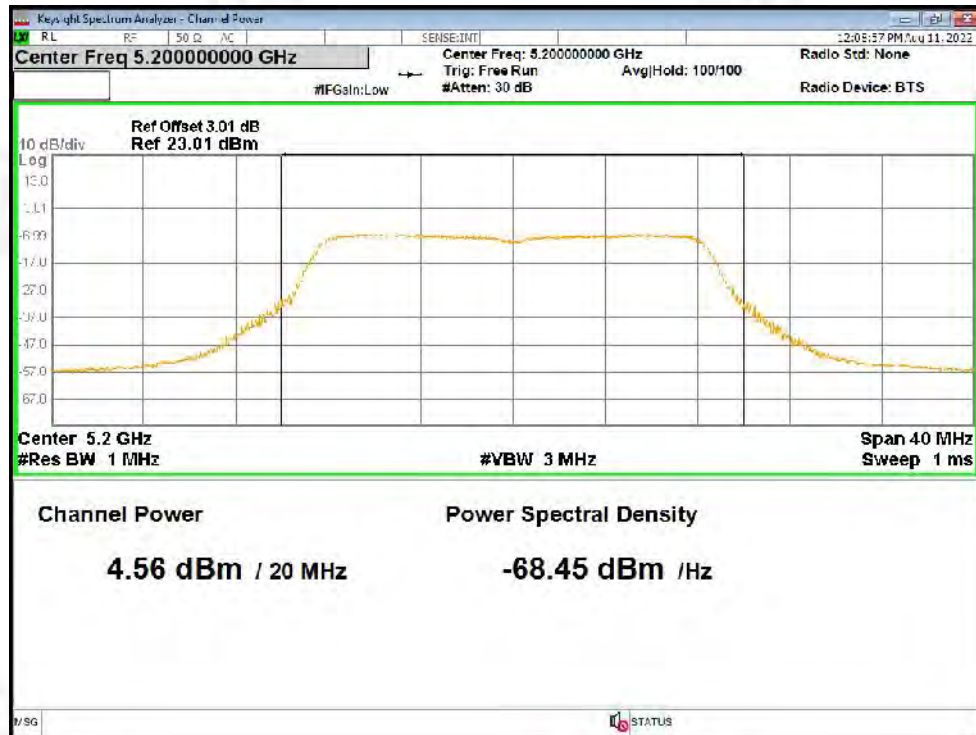


Test Graphs

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

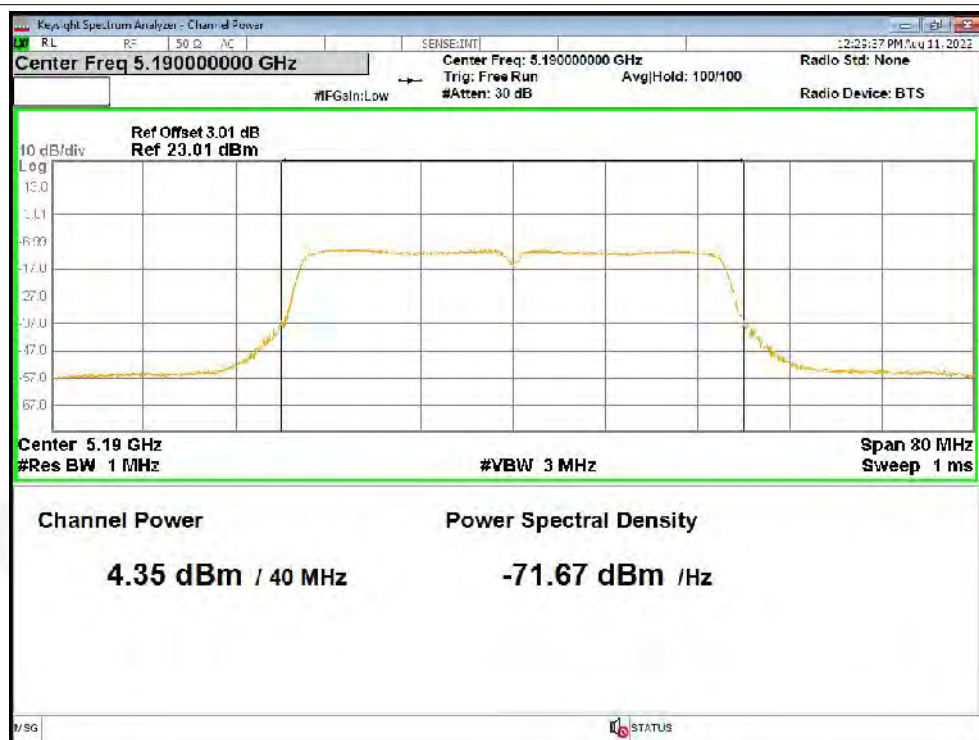


Power NVNT n20 5240MHz Ant1

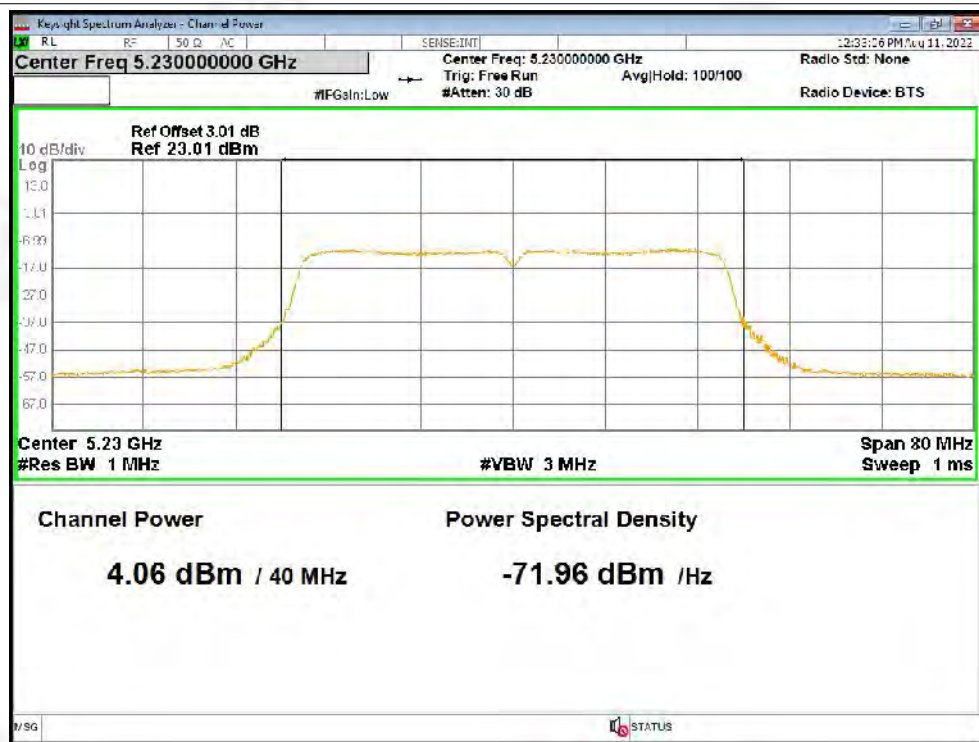




Power NVNT n40 5190MHz Ant1



Power NVNT n40 5230MHz Ant1





Power NVNT ac20 5180MHz Ant1



Power NVNT ac20 5200MHz Ant1

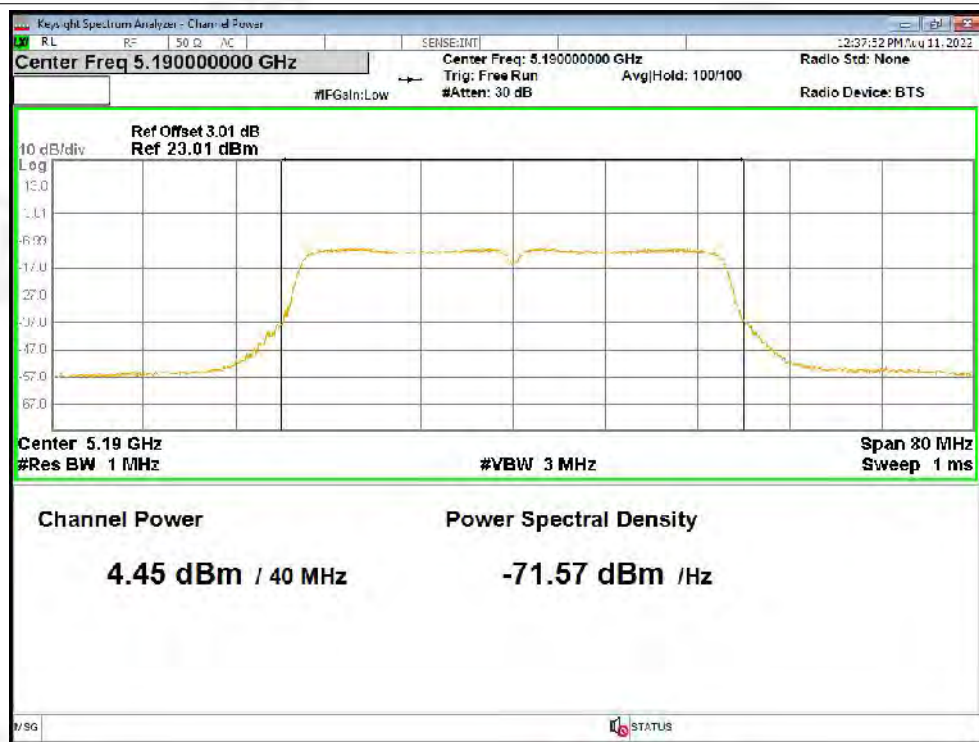




Power NVNT ac20 5240MHz Ant1

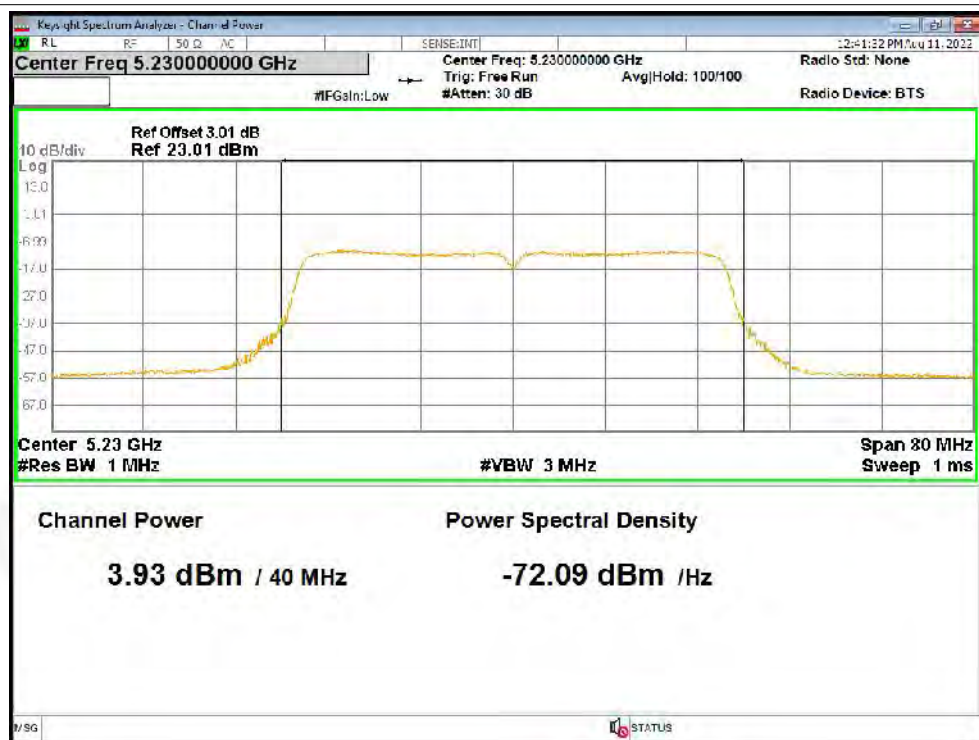


Power NVNT ac40 5190MHz Ant1





Power NVNT ac40 5230MHz Ant1



Power NVNT ac80 5210MHz Ant1





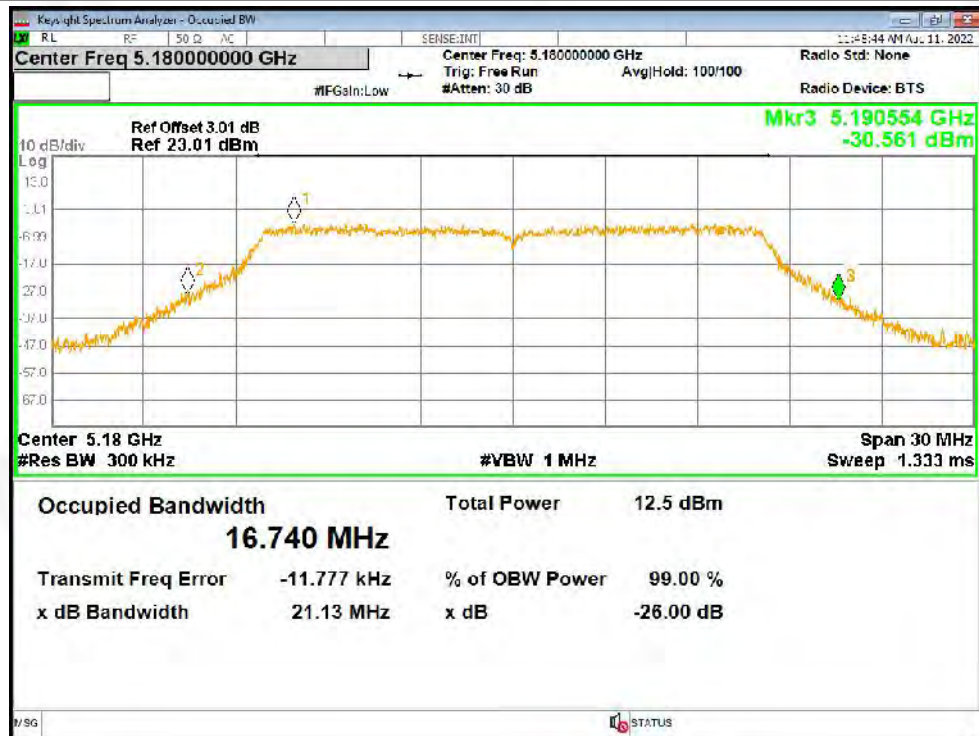
A.3 -26dB Bandwidth

Condition	Mode	Frequency (MHz)	Antenna	-26 dB Bandwidth (MHz)	Verdict
NVNT	a	5180	Ant1	21.131	Pass
NVNT	a	5200	Ant1	20.951	Pass
NVNT	a	5240	Ant1	21.276	Pass
NVNT	n20	5180	Ant1	21.86	Pass
NVNT	n20	5200	Ant1	21.345	Pass
NVNT	n20	5240	Ant1	21.378	Pass
NVNT	n40	5190	Ant1	40.82	Pass
NVNT	n40	5230	Ant1	40.52	Pass
NVNT	ac20	5180	Ant1	21.242	Pass
NVNT	ac20	5200	Ant1	21.572	Pass
NVNT	ac20	5240	Ant1	21.572	Pass
NVNT	ac40	5190	Ant1	40.33	Pass
NVNT	ac40	5230	Ant1	40.622	Pass
NVNT	ac80	5210	Ant1	80.211	Pass

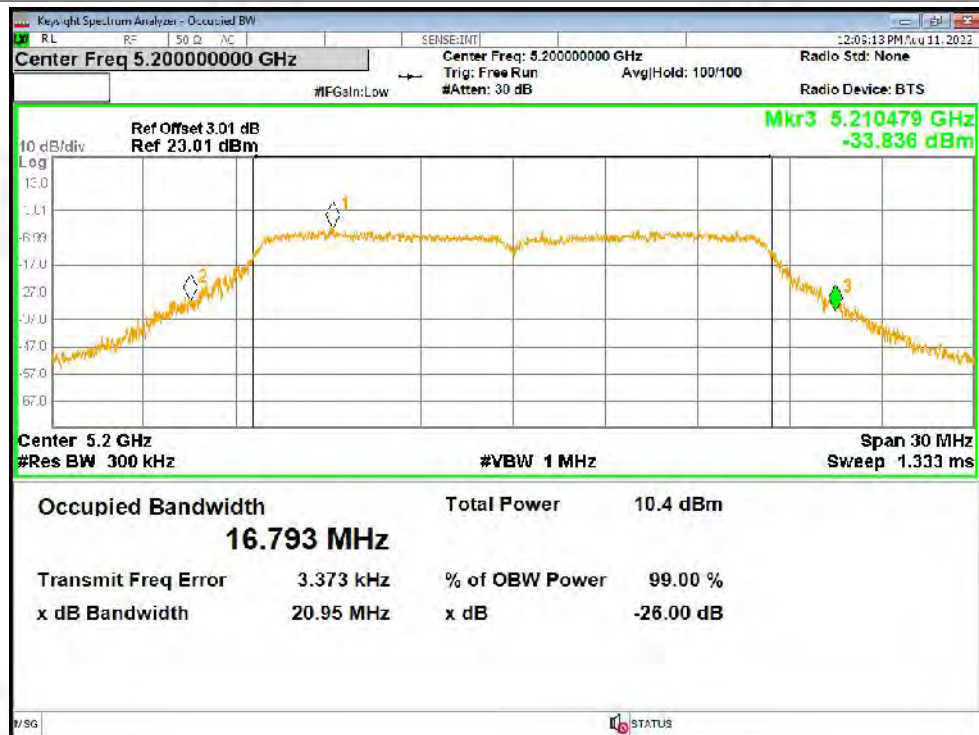


Test Graphs

-26dB Bandwidth NVNT a 5180MHz Ant1

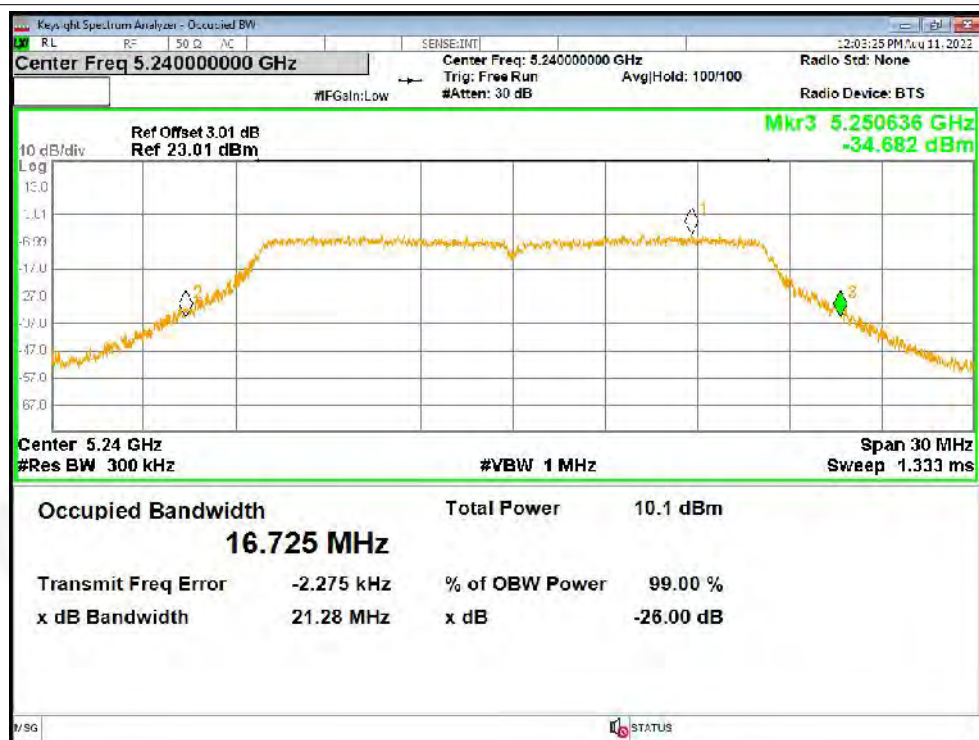


-26dB Bandwidth NVNT a 5200MHz Ant1

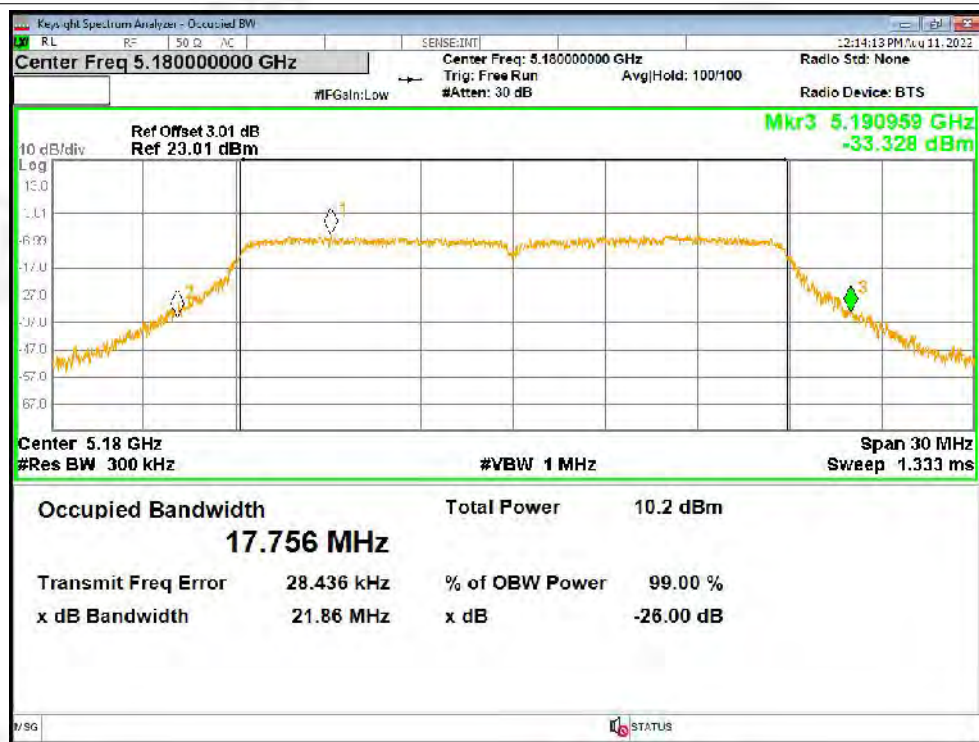


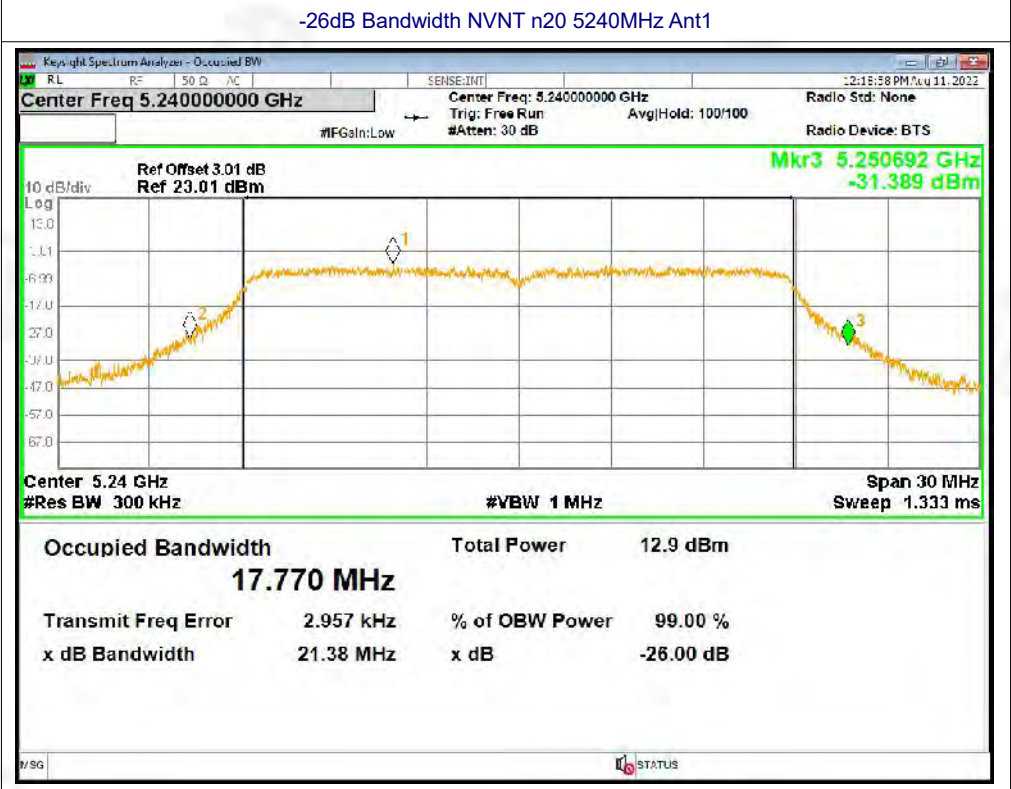
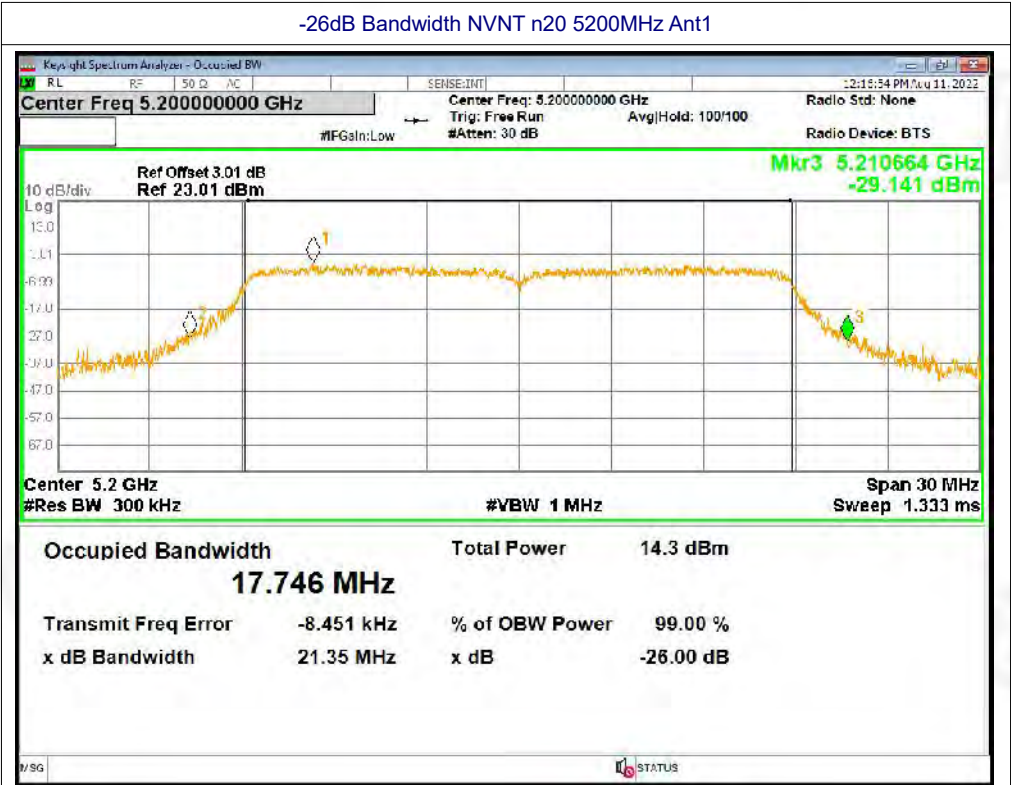


-26dB Bandwidth NVNT a 5240MHz Ant1



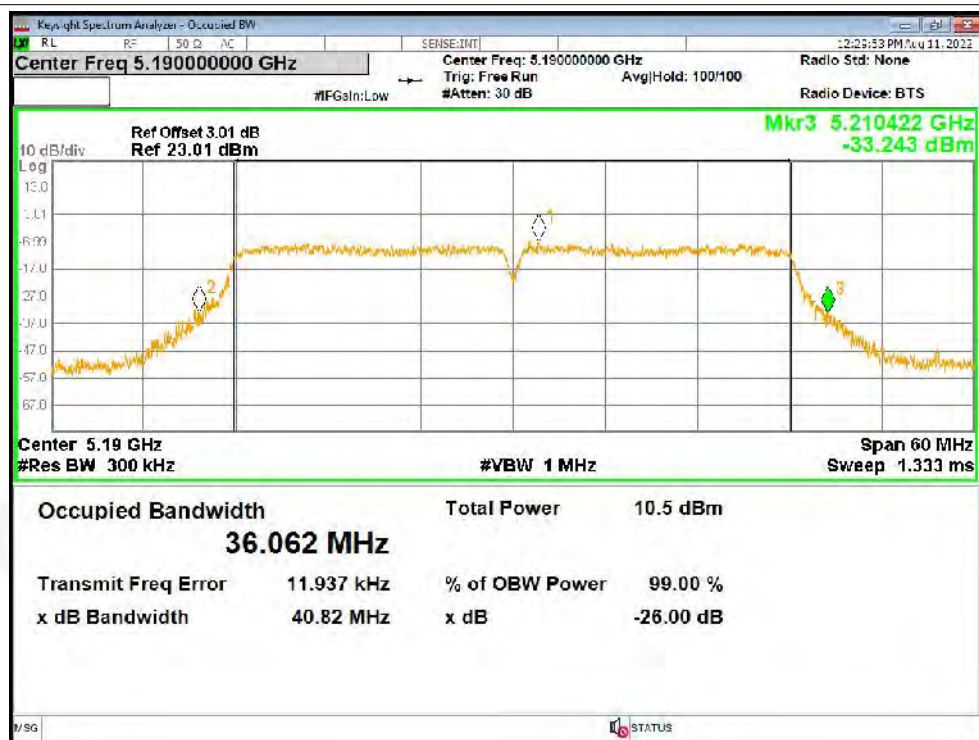
-26dB Bandwidth NVNT n20 5180MHz Ant1



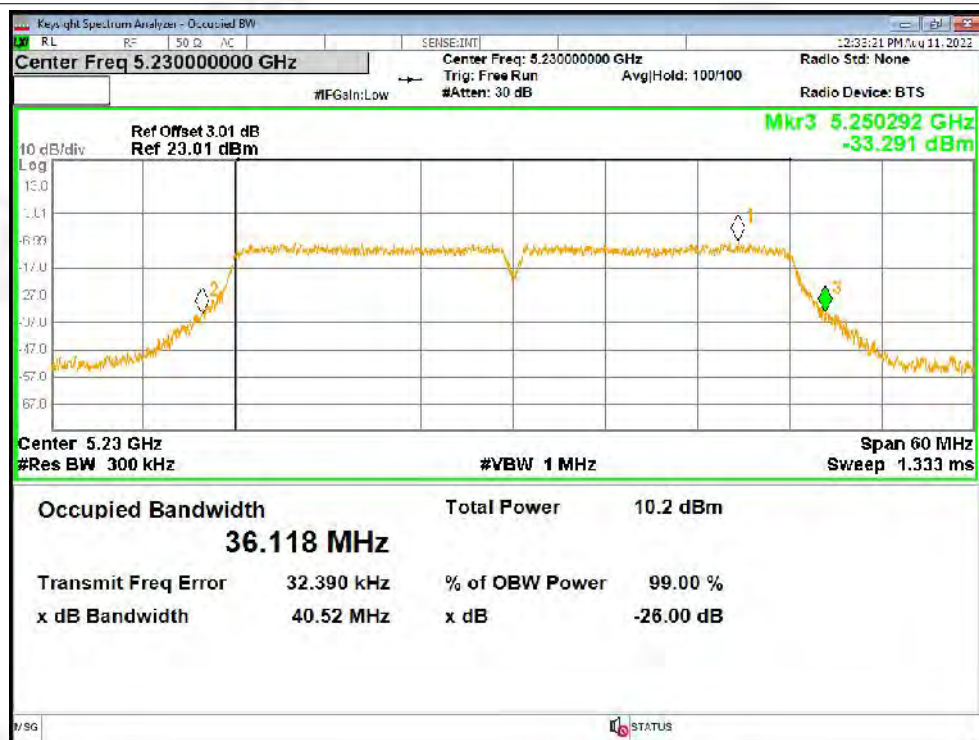


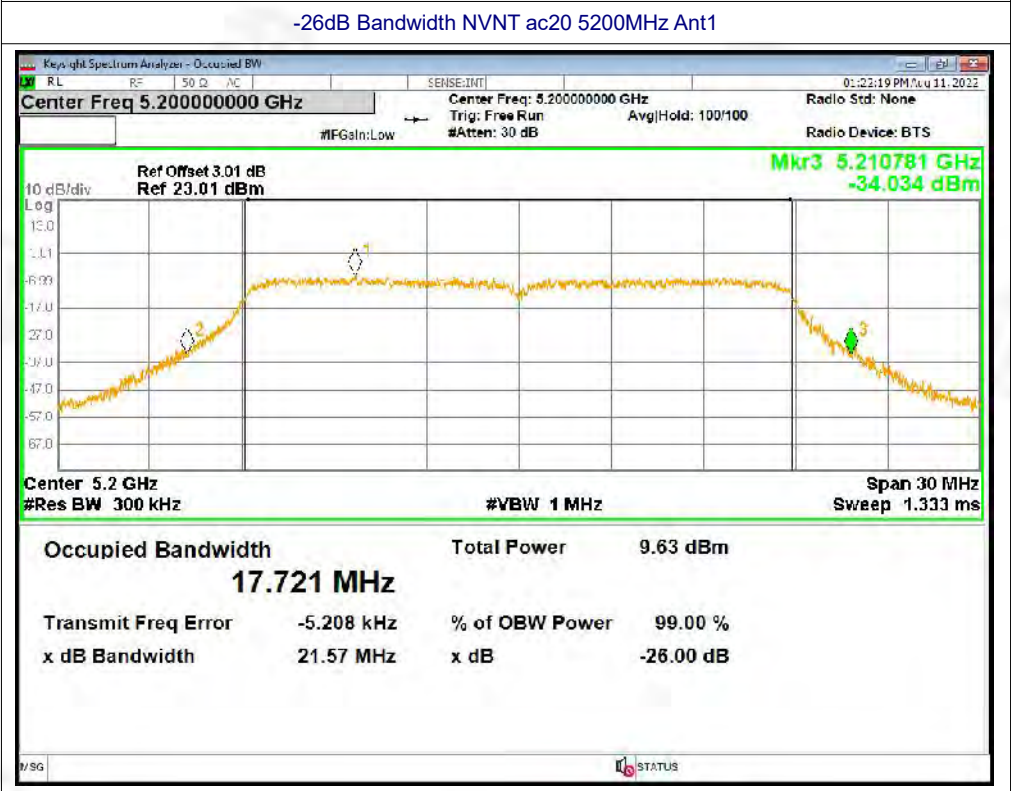
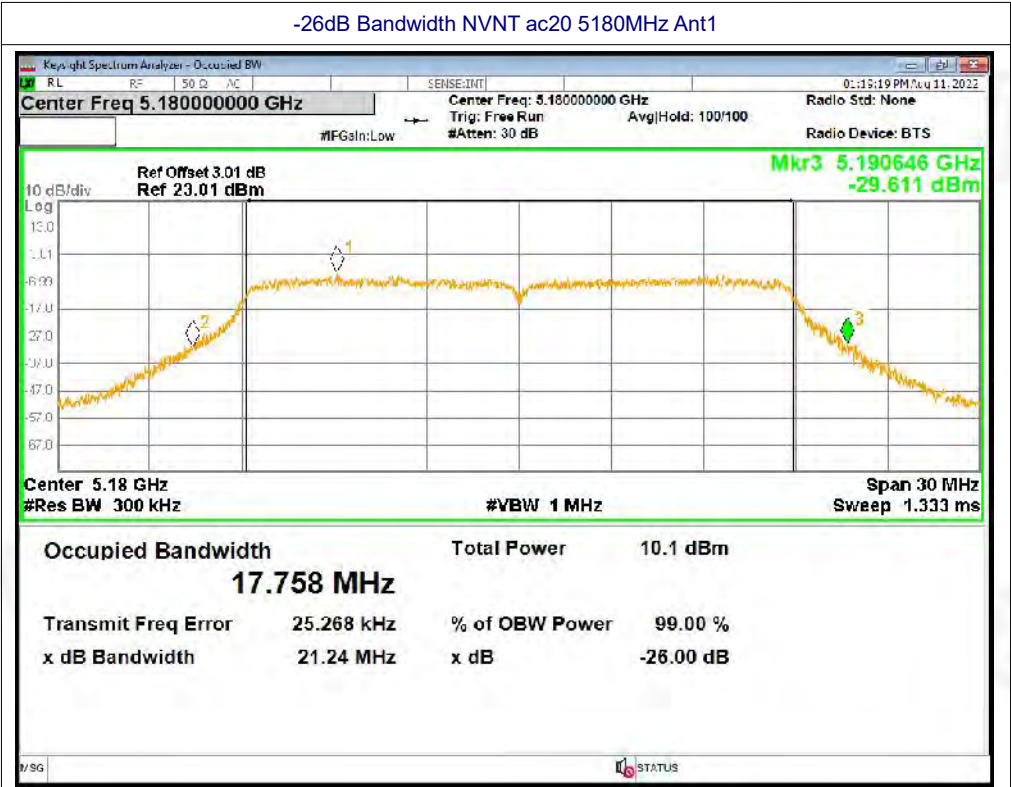


-26dB Bandwidth NVNT n40 5190MHz Ant1



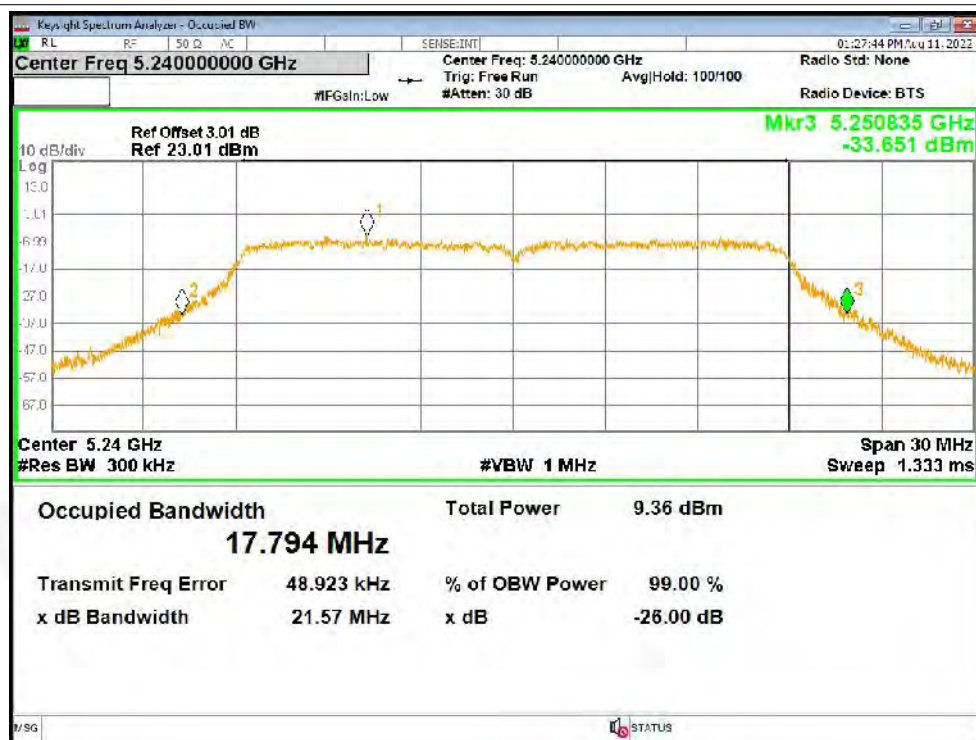
-26dB Bandwidth NVNT n40 5230MHz Ant1



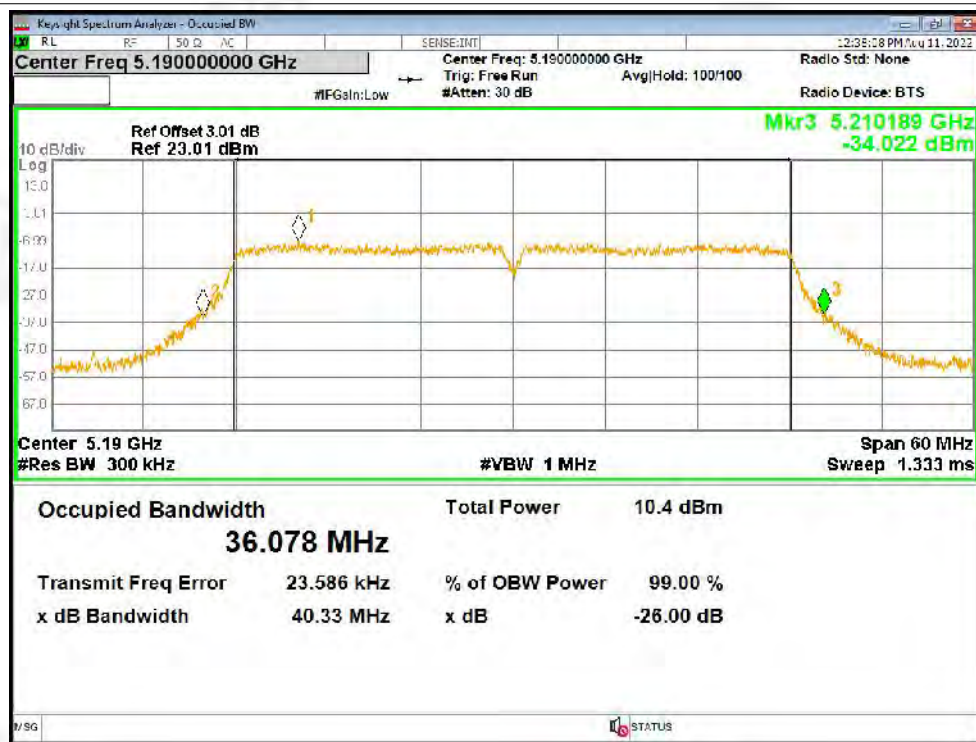


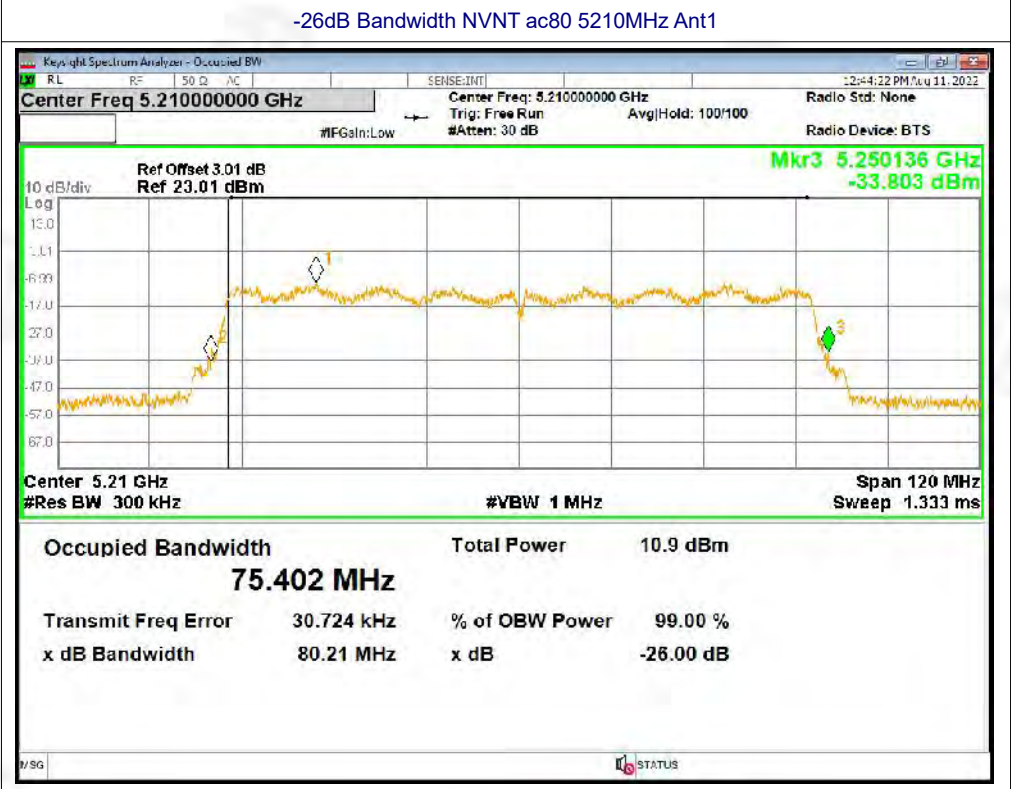
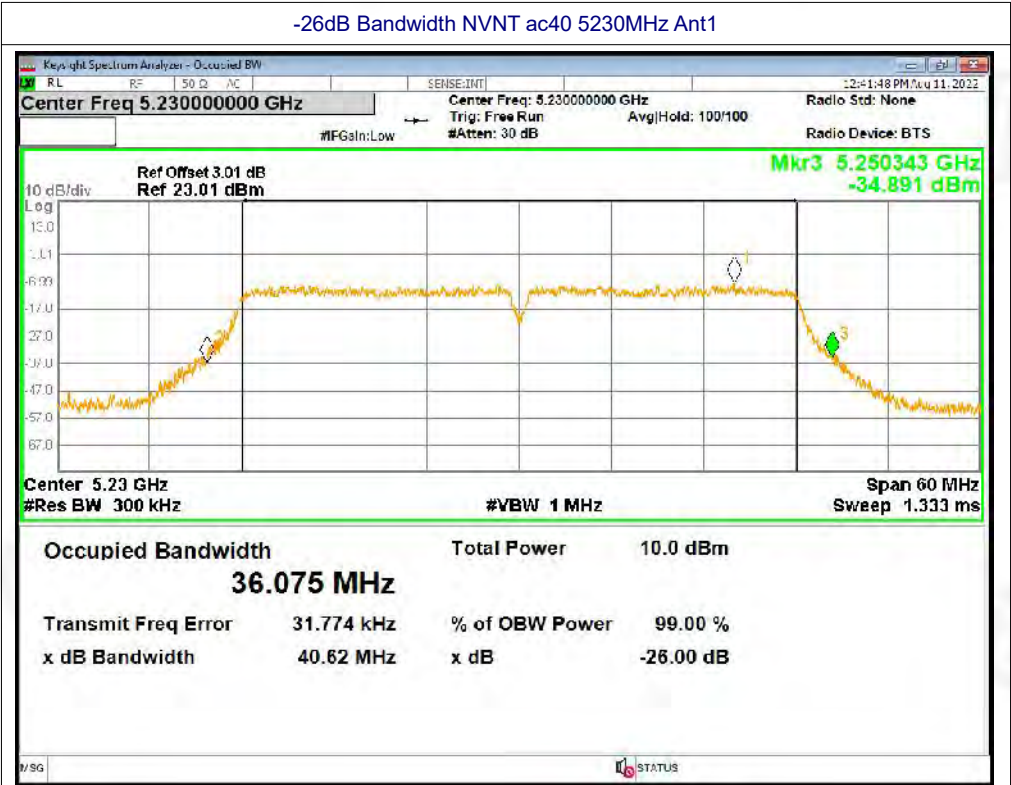


-26dB Bandwidth NVNT ac20 5240MHz Ant1



-26dB Bandwidth NVNT ac40 5190MHz Ant1







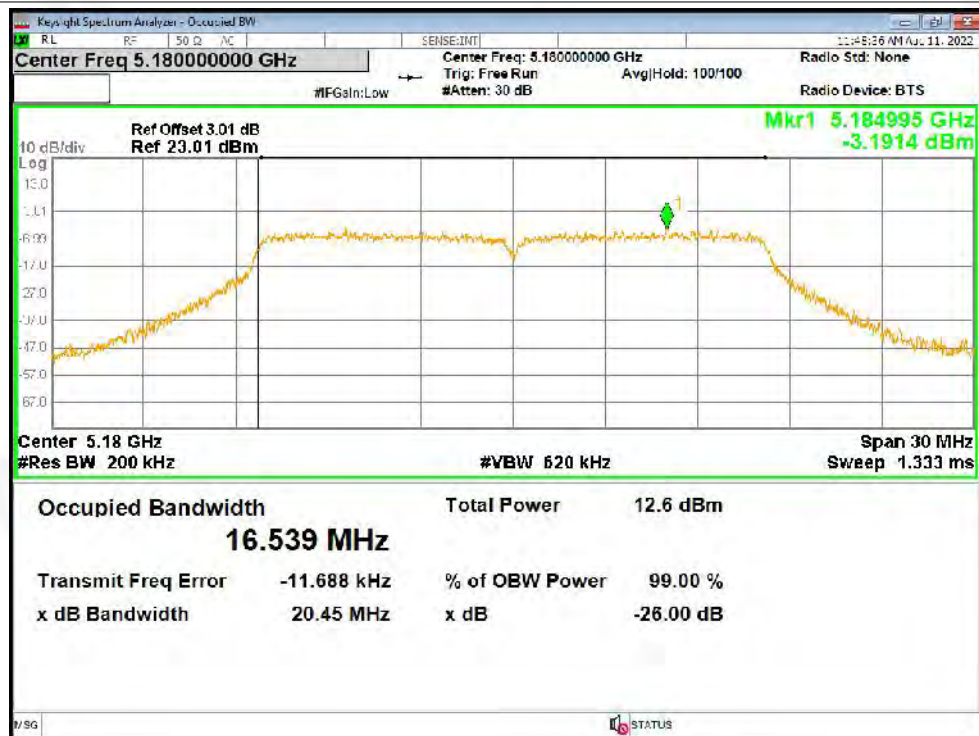
A.4 Occupied Channel Bandwidth

Condition	Mode	Frequency (MHz)	Antenna	99% OBW (MHz)
NVNT	a	5180	Ant1	16.539
NVNT	a	5200	Ant1	16.563
NVNT	a	5240	Ant1	16.563
NVNT	n20	5180	Ant1	17.647
NVNT	n20	5200	Ant1	17.647
NVNT	n20	5240	Ant1	17.633
NVNT	n40	5190	Ant1	36.113
NVNT	n40	5230	Ant1	36.193
NVNT	ac20	5180	Ant1	17.637
NVNT	ac20	5200	Ant1	17.638
NVNT	ac20	5240	Ant1	17.66
NVNT	ac40	5190	Ant1	36.147
NVNT	ac40	5230	Ant1	36.143
NVNT	ac80	5210	Ant1	75.466

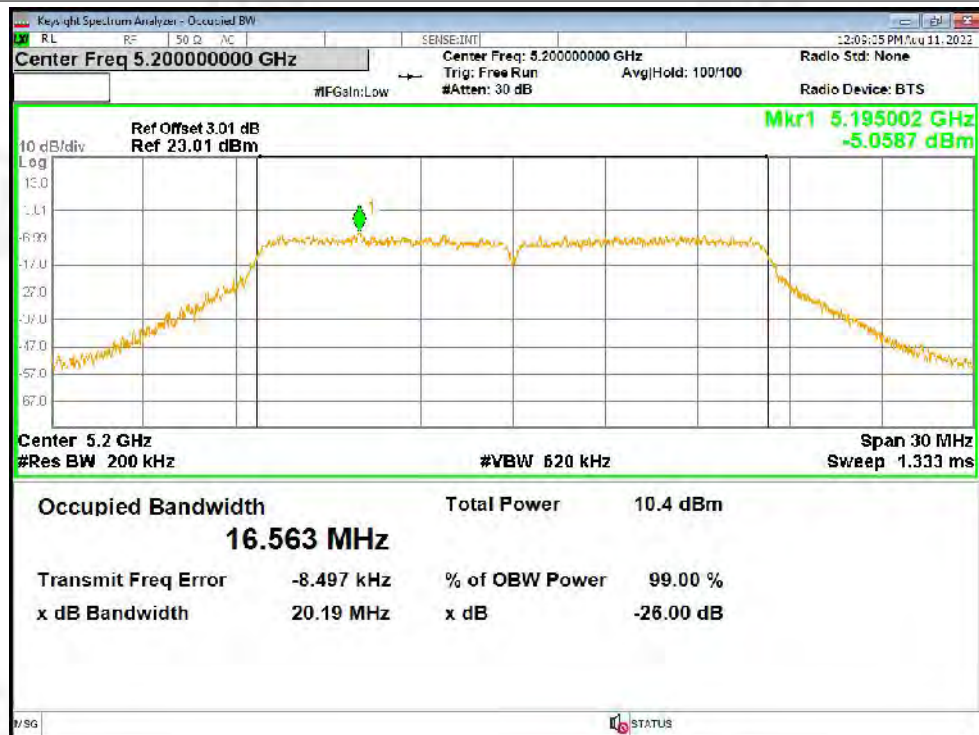


Test Graphs

OBW NVNT a 5180MHz Ant1

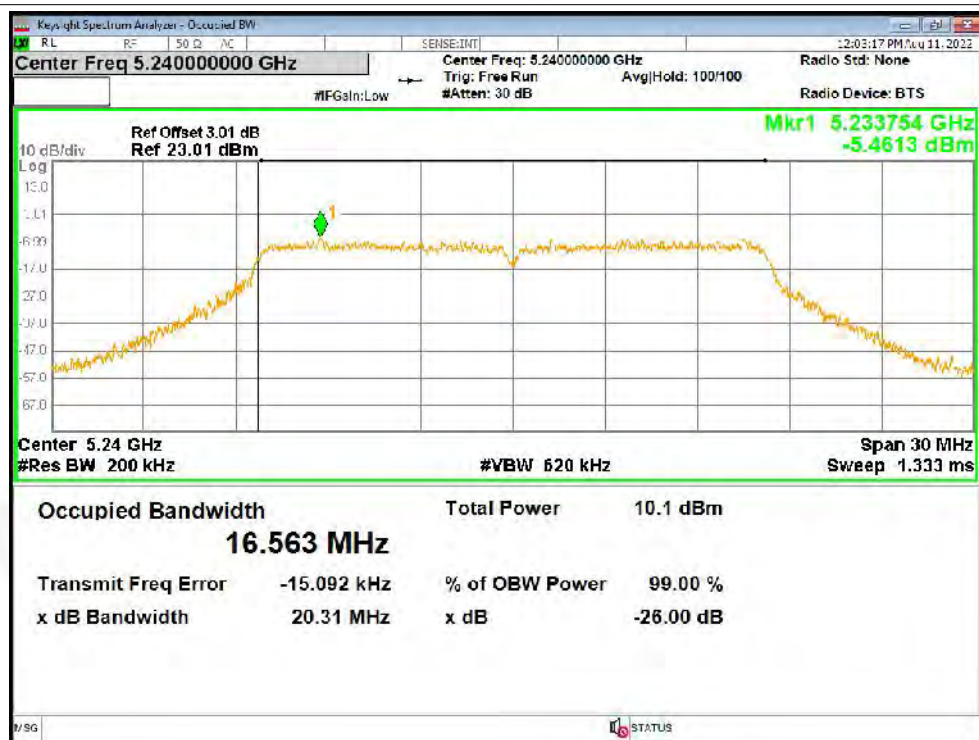


OBW NVNT a 5200MHz Ant1

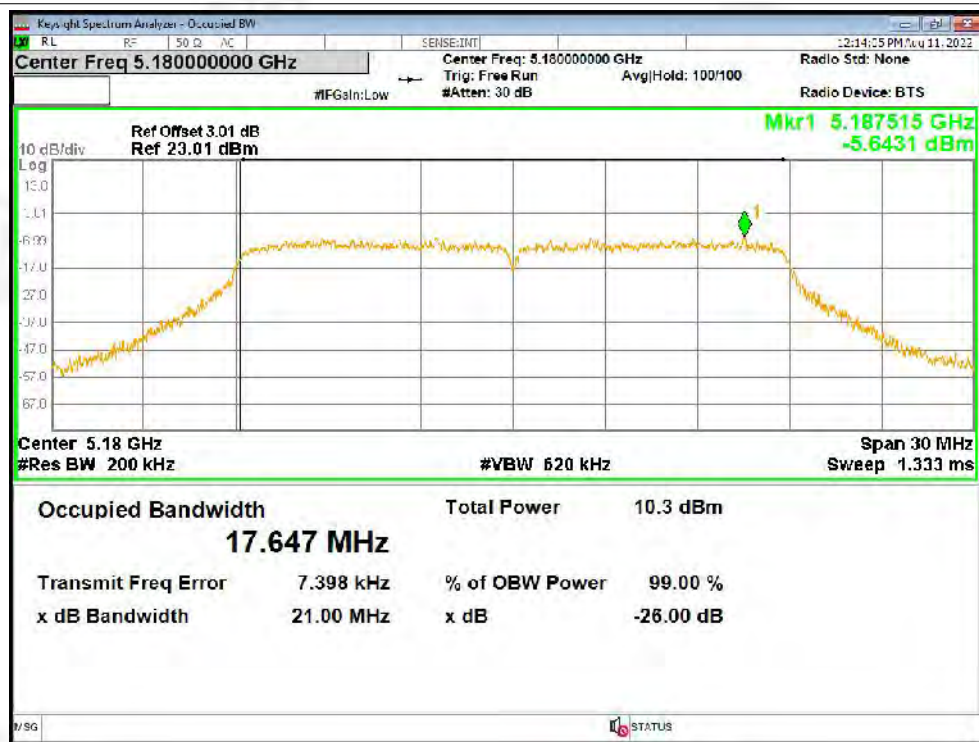




OBW NVNT a 5240MHz Ant1

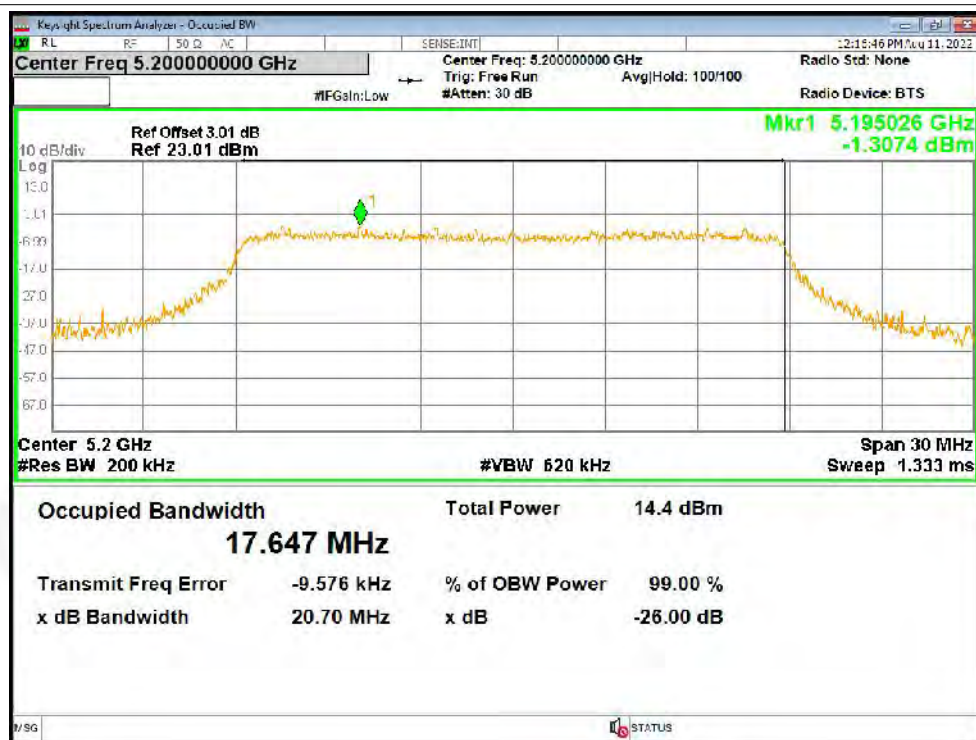


OBW NVNT n20 5180MHz Ant1

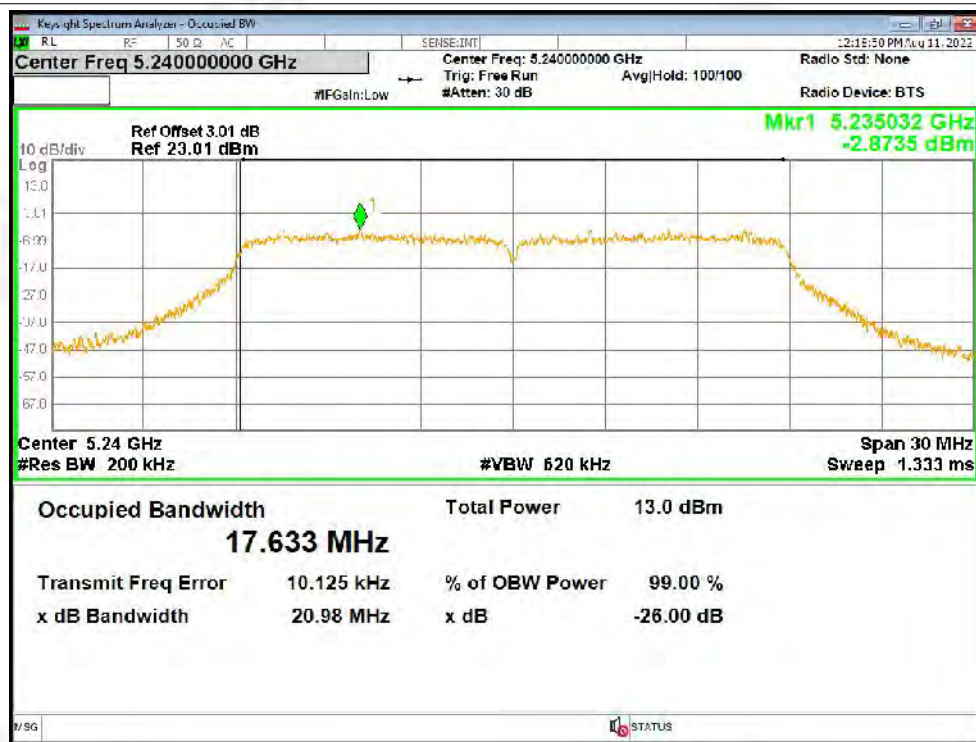




OBW NVNT n20 5200MHz Ant1

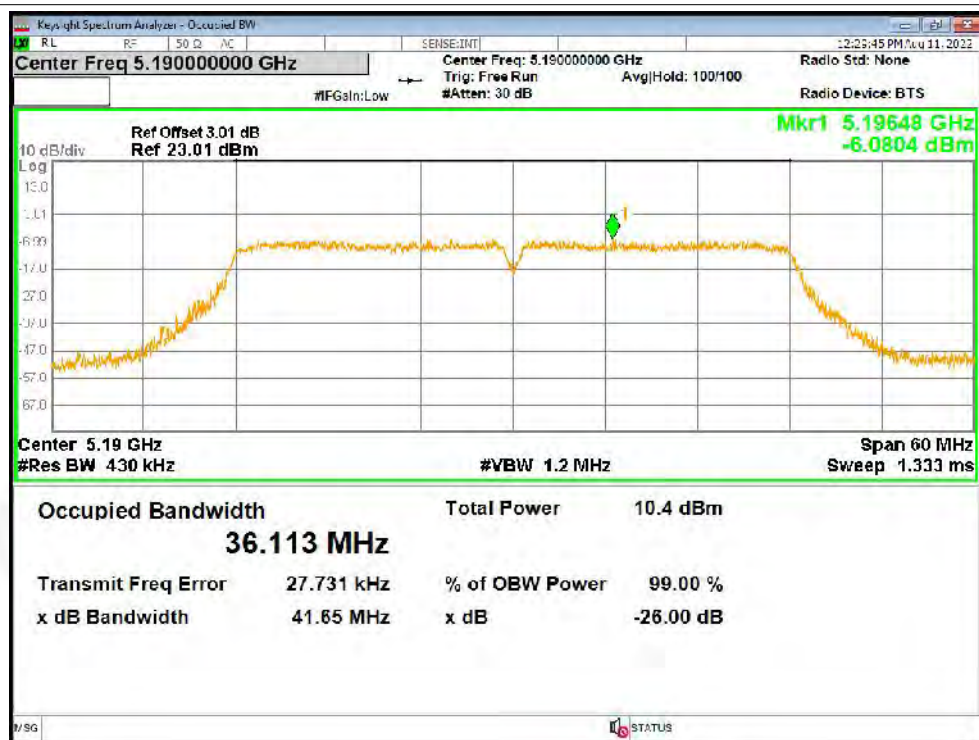


OBW NVNT n20 5240MHz Ant1

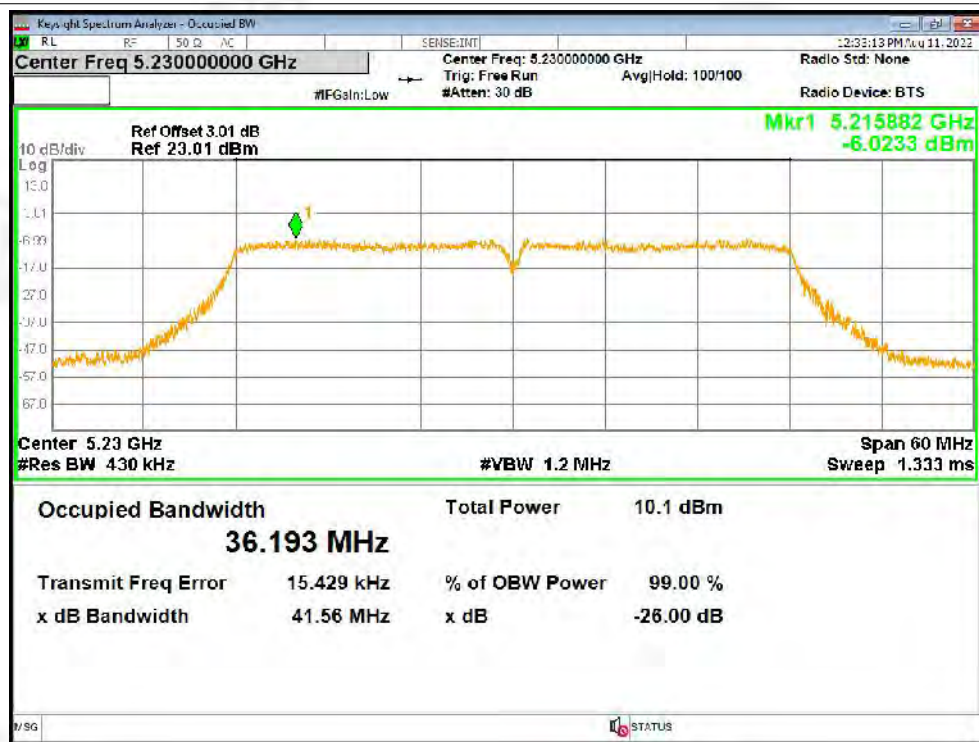




OBW NVNT n40 5190MHz Ant1

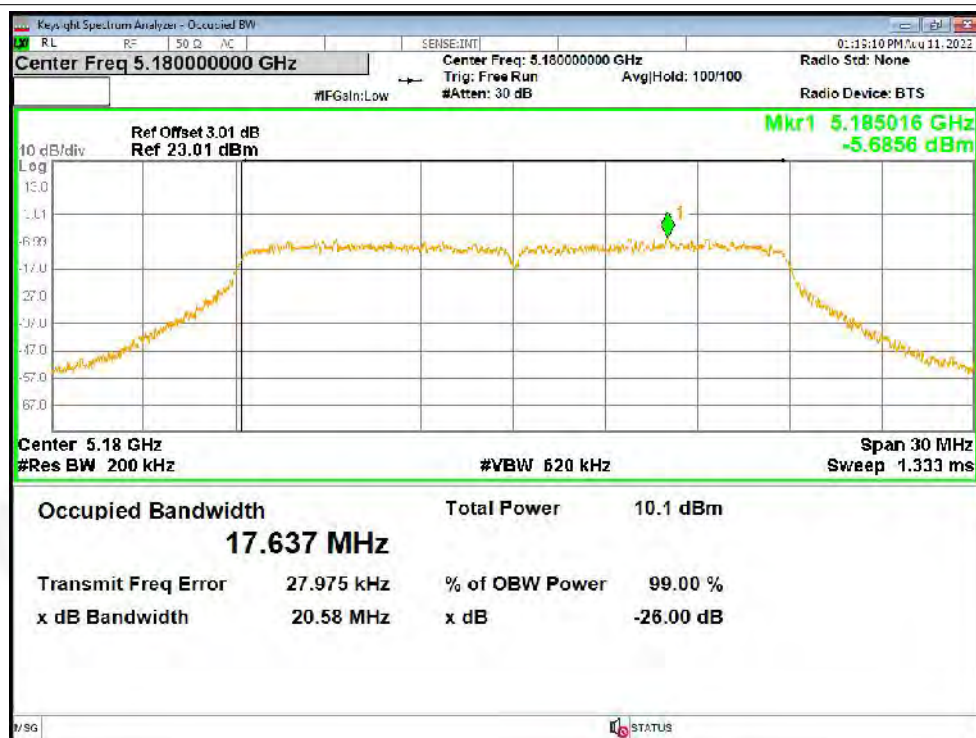


OBW NVNT n40 5230MHz Ant1

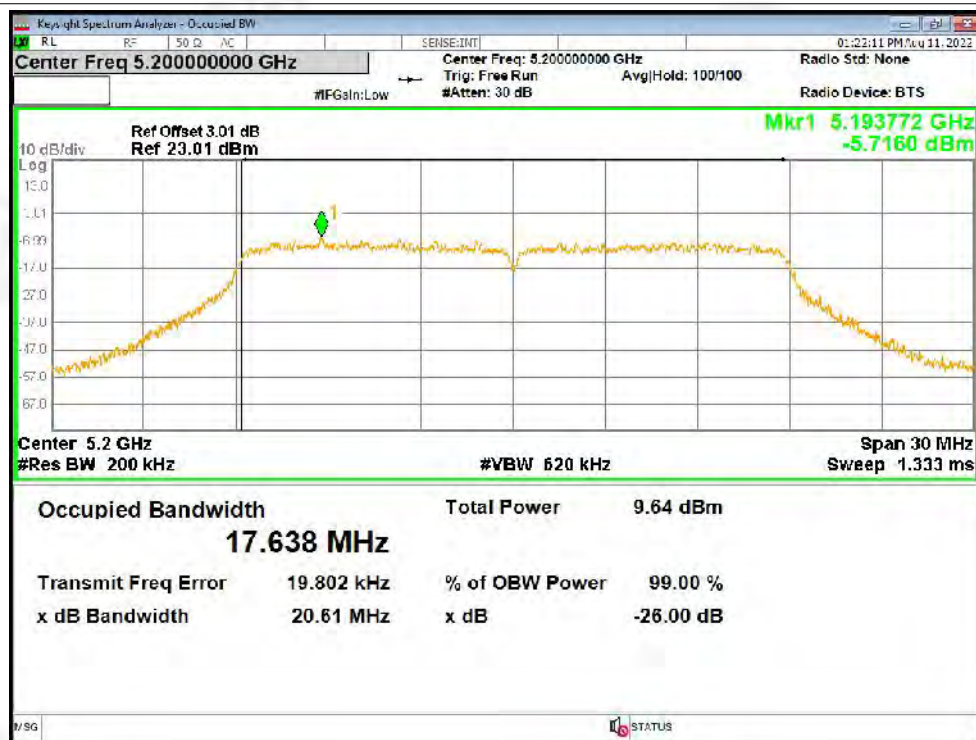




OBW NVNT ac20 5180MHz Ant1



OBW NVNT ac20 5200MHz Ant1

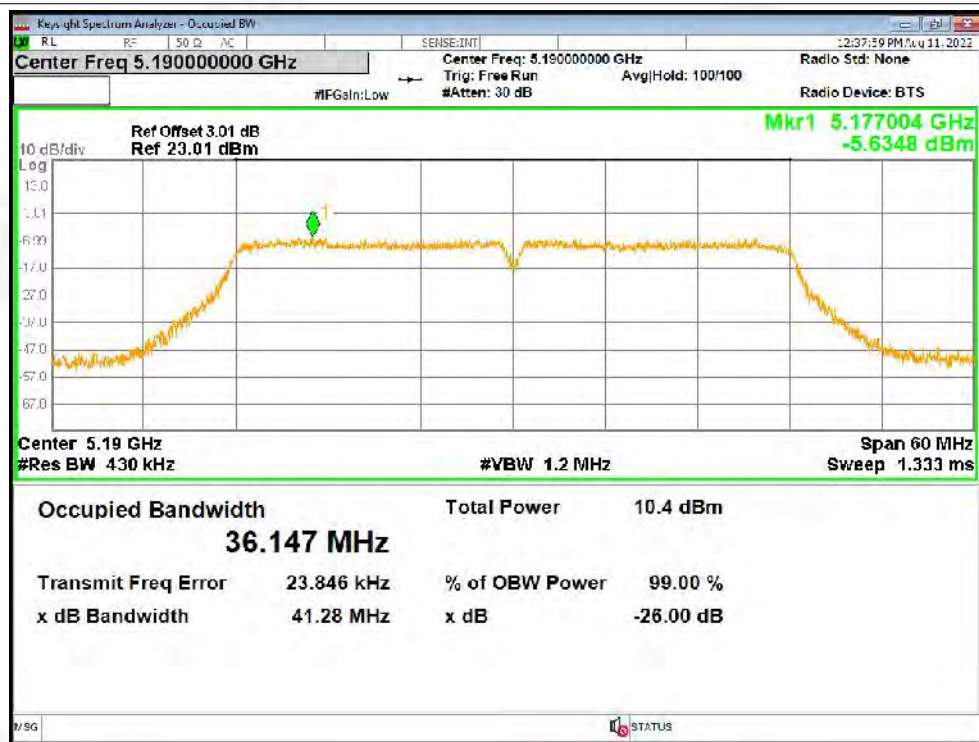




OBW NVNT ac20 5240MHz Ant1

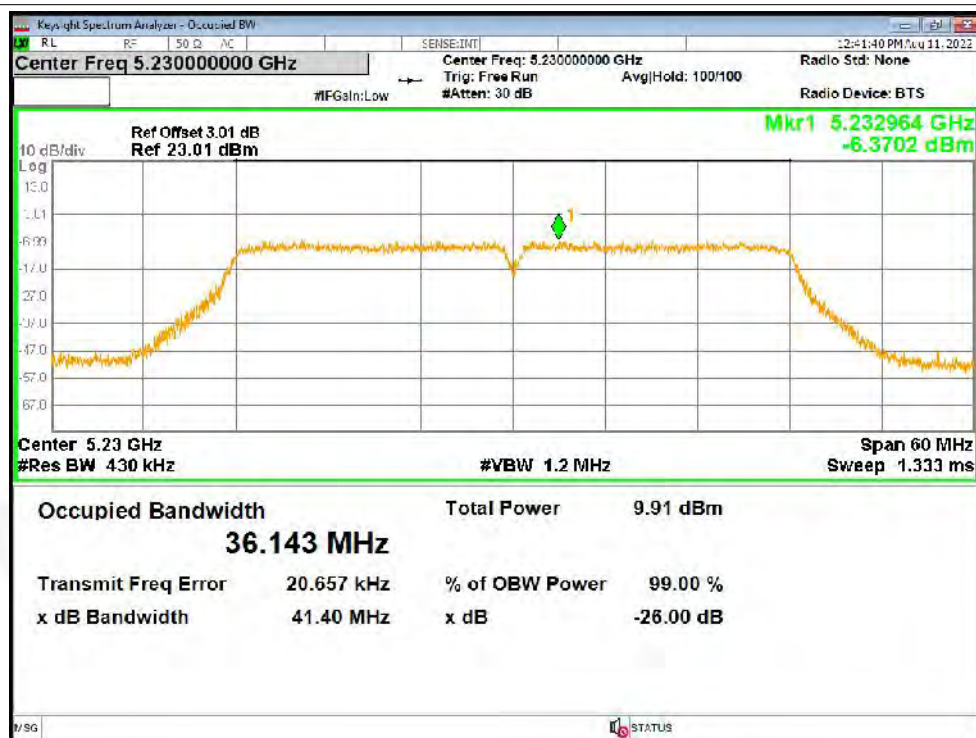


OBW NVNT ac40 5190MHz Ant1

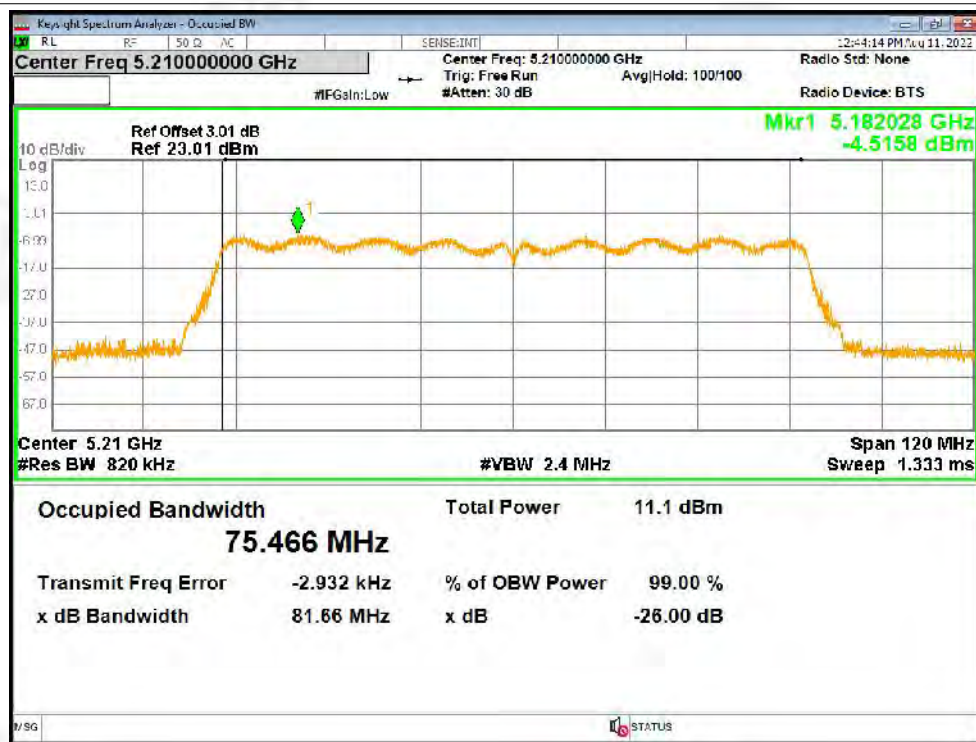




OBW NVNT ac40 5230MHz Ant1



OBW NVNT ac80 5210MHz Ant1





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	-6.29	0.09	-6.2	11	Pass
NVNT	a	5200	Ant1	-8.76	0.13	-8.63	11	Pass
NVNT	a	5240	Ant1	-8.79	0.09	-8.7	11	Pass
NVNT	n20	5180	Ant1	-8.93	0.37	-8.56	11	Pass
NVNT	n20	5200	Ant1	-5.71	0.24	-5.47	11	Pass
NVNT	n20	5240	Ant1	-6.28	0.33	-5.95	11	Pass
NVNT	n40	5190	Ant1	-13.47	14.24	0.77	11	Pass
NVNT	n40	5230	Ant1	-13.63	0	-13.63	11	Pass
NVNT	ac20	5180	Ant1	-10.15	0.27	-9.88	11	Pass
NVNT	ac20	5200	Ant1	-8.57	0.35	-8.22	11	Pass
NVNT	ac20	5240	Ant1	-10.75	0.31	-10.44	11	Pass
NVNT	ac40	5190	Ant1	-14.46	0	-14.46	11	Pass
NVNT	ac40	5230	Ant1	-13.39	12.43	-0.96	11	Pass
NVNT	ac80	5210	Ant1	-17.45	0	-17.45	11	Pass



Test Graphs

PSD NVNT a 5180MHz Ant1



PSD NVNT a 5200MHz Ant1



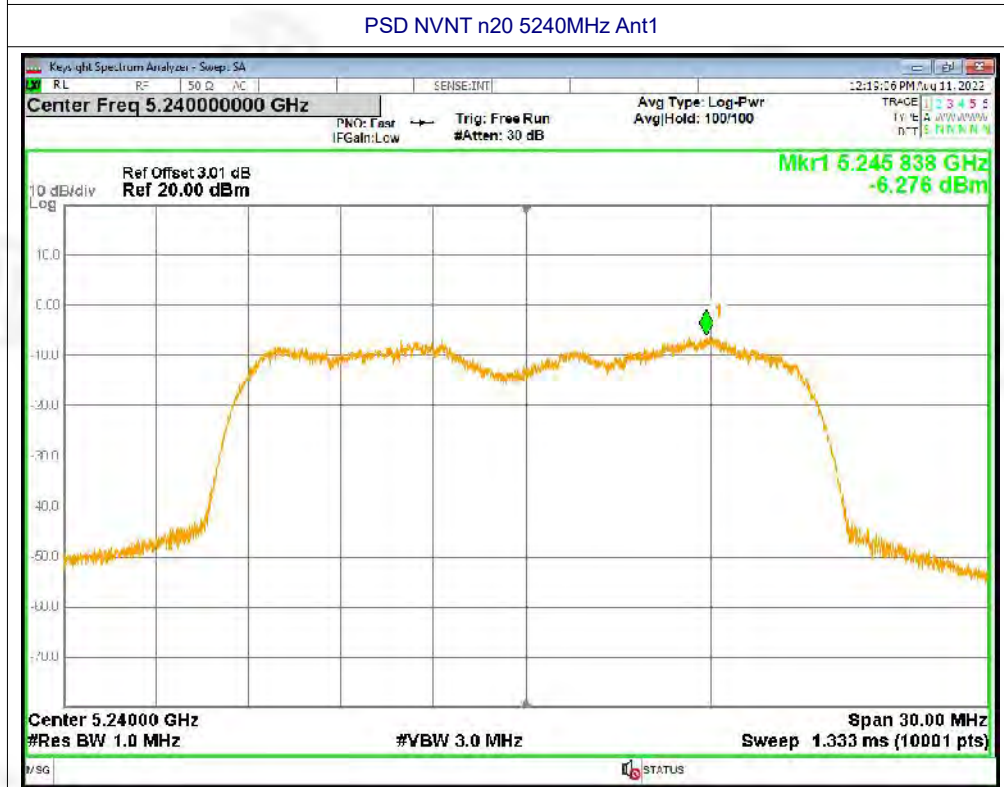
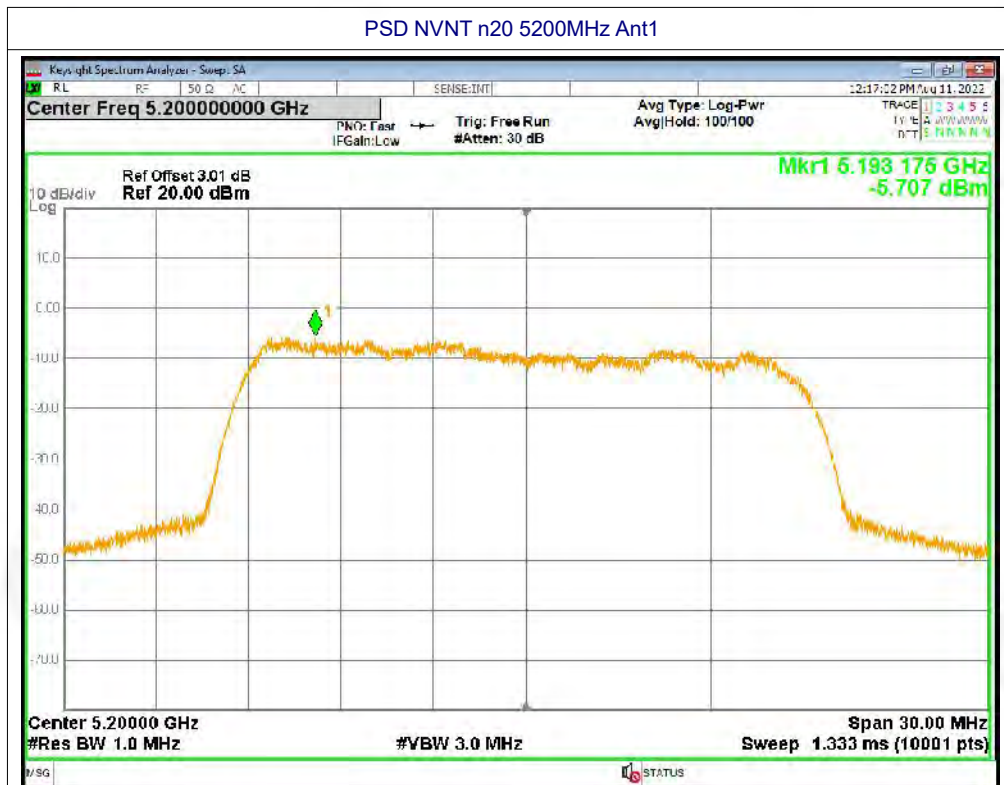


PSD NVNT a 5240MHz Ant1



PSD NVNT n20 5180MHz Ant1







PSD NVNT 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





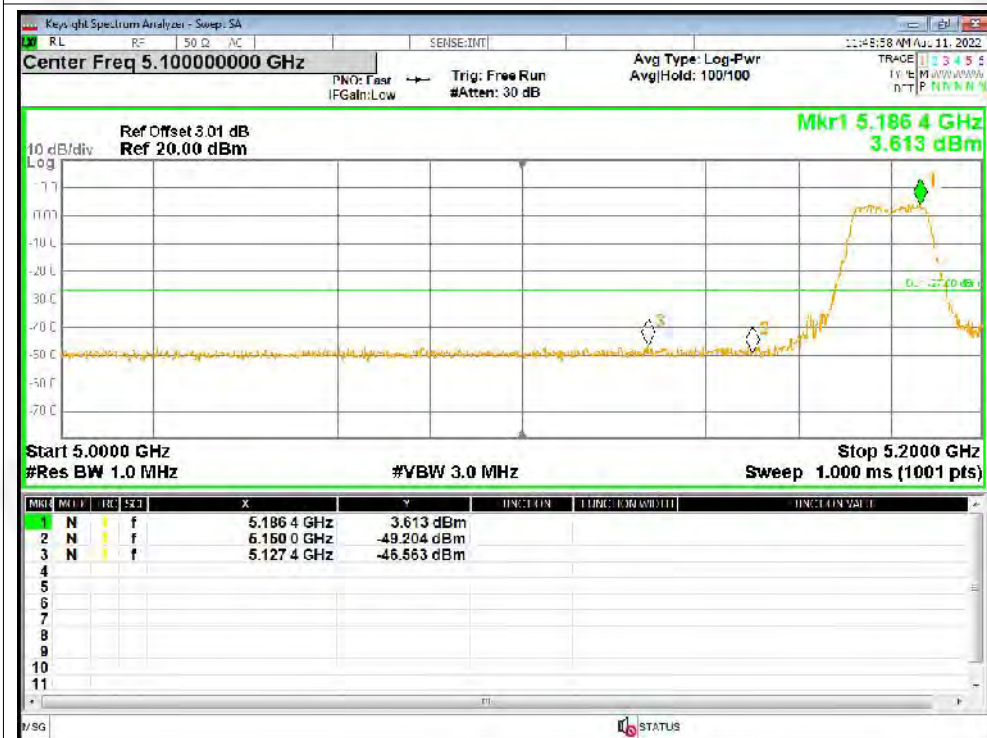
A.6 Band Edge

Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	a	5180	Ant1	-46.56	-27	Pass
NVNT	a	5240	Ant1	-46.51	-27	Pass
NVNT	n20	5180	Ant1	-47.07	-27	Pass
NVNT	n20	5240	Ant1	-45.55	-27	Pass
NVNT	n40	5190	Ant1	-46.38	-27	Pass
NVNT	n40	5230	Ant1	-46.37	-27	Pass
NVNT	ac20	5180	Ant1	-47.06	-27	Pass
NVNT	ac20	5240	Ant1	-46.44	-27	Pass
NVNT	ac40	5190	Ant1	-46.61	-27	Pass
NVNT	ac40	5230	Ant1	-46.93	-27	Pass
NVNT	ac80	5210	Ant1	-44.4	-27	Pass

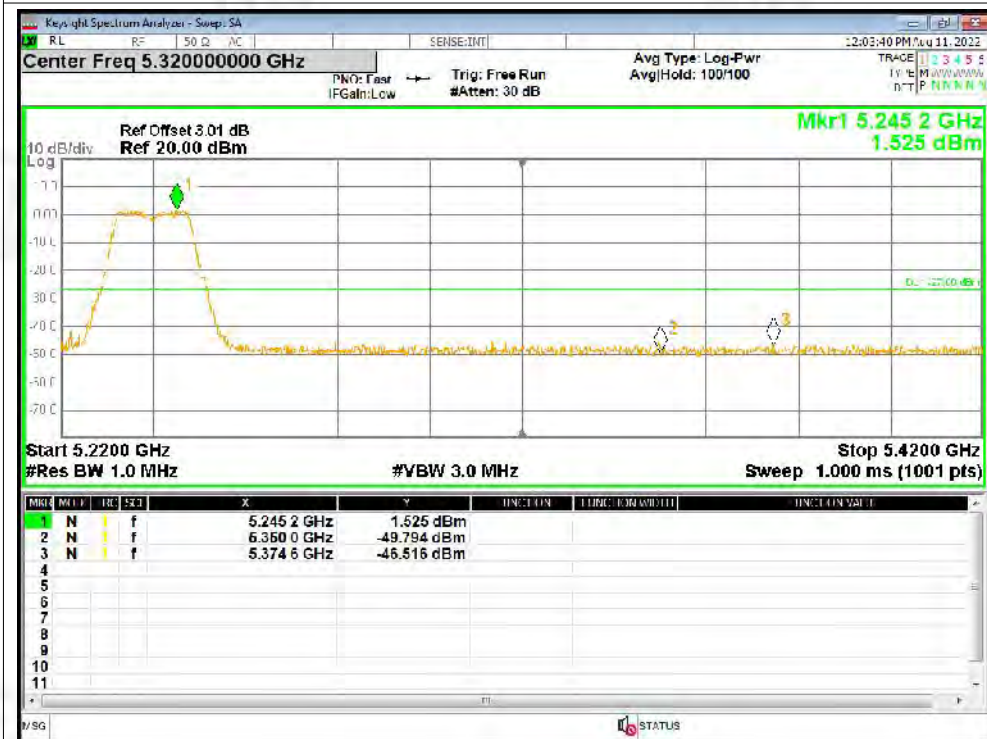


Test Graphs

Band Edge NVNT a 5180MHz Low Ant1

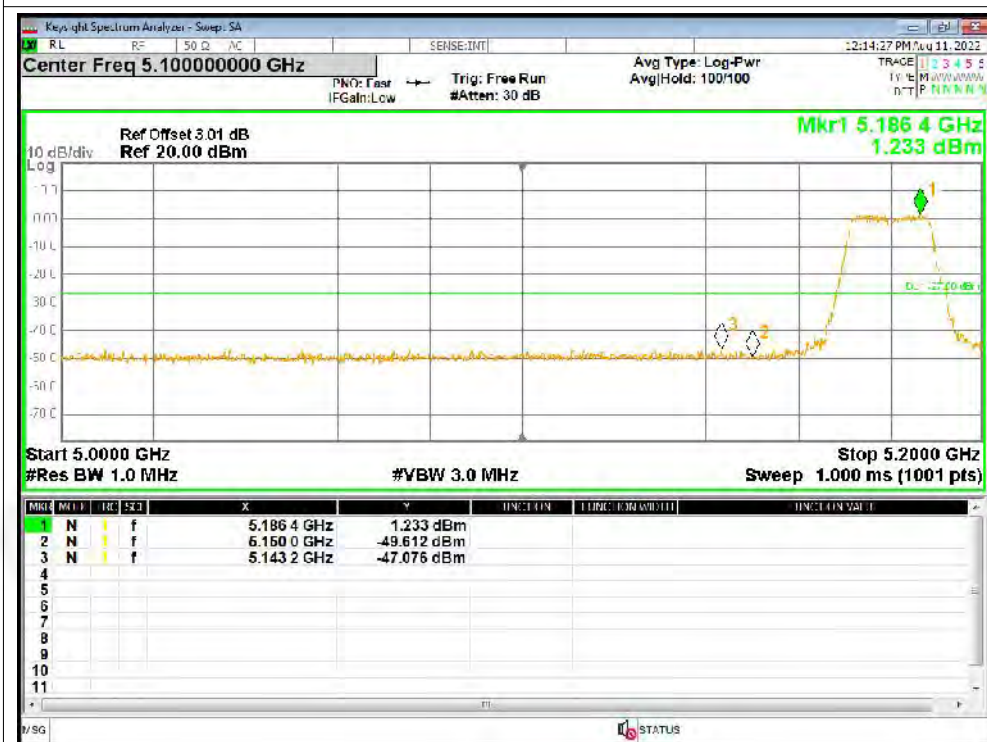


Band Edge NVNT a 5240MHz High Ant1

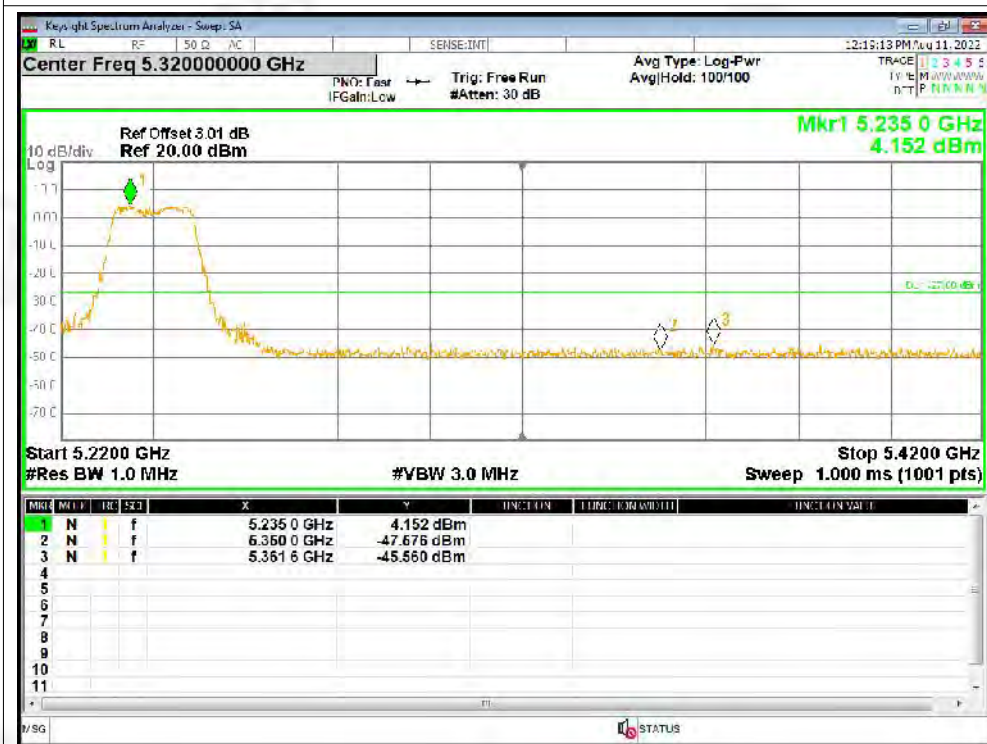




Band Edge NVNT n20 5180MHz Low Ant1



Band Edge NVNT n20 5240MHz High Ant1





Band Edge NVNT n40 5190MHz Low Ant1

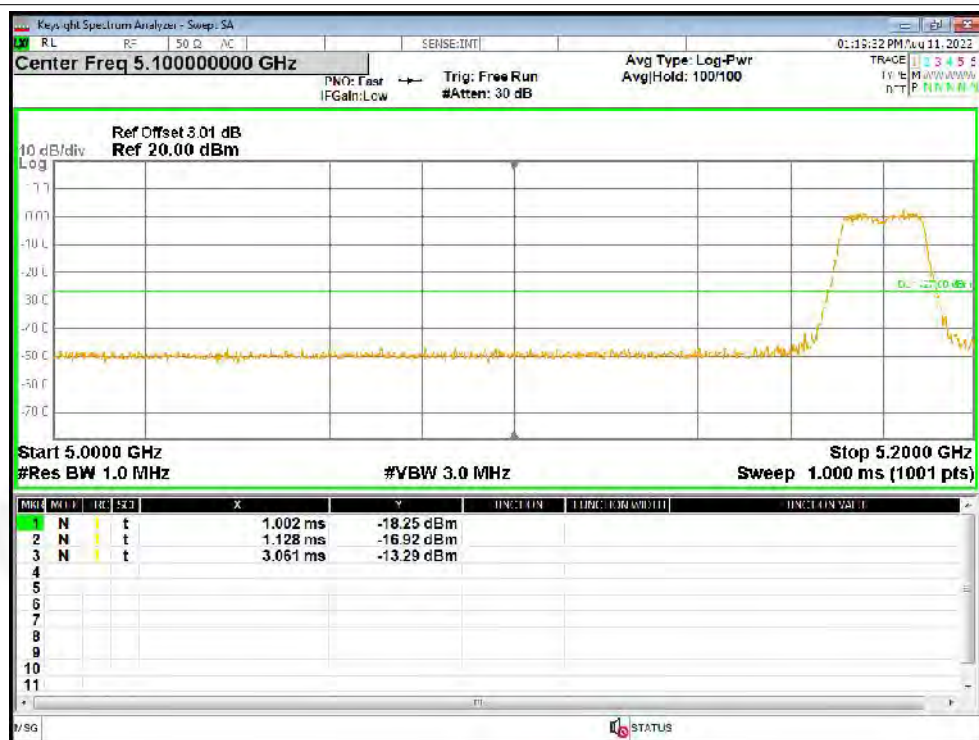


Band Edge NVNT n40 5230MHz High Ant1

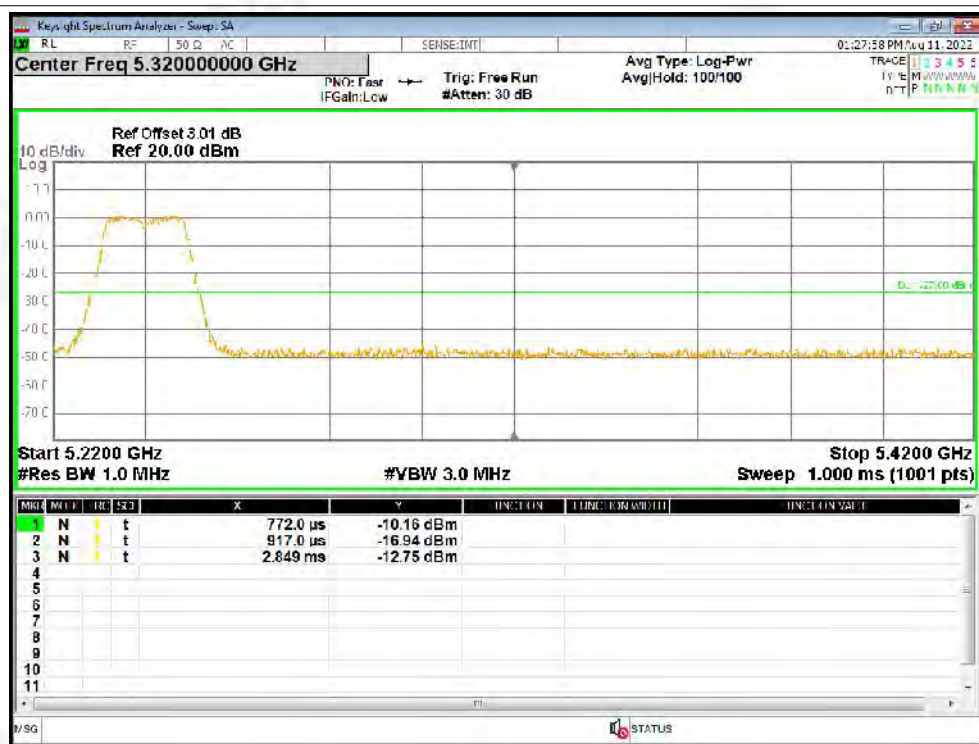




Band Edge NVNT ac20 5180MHz Low Ant1

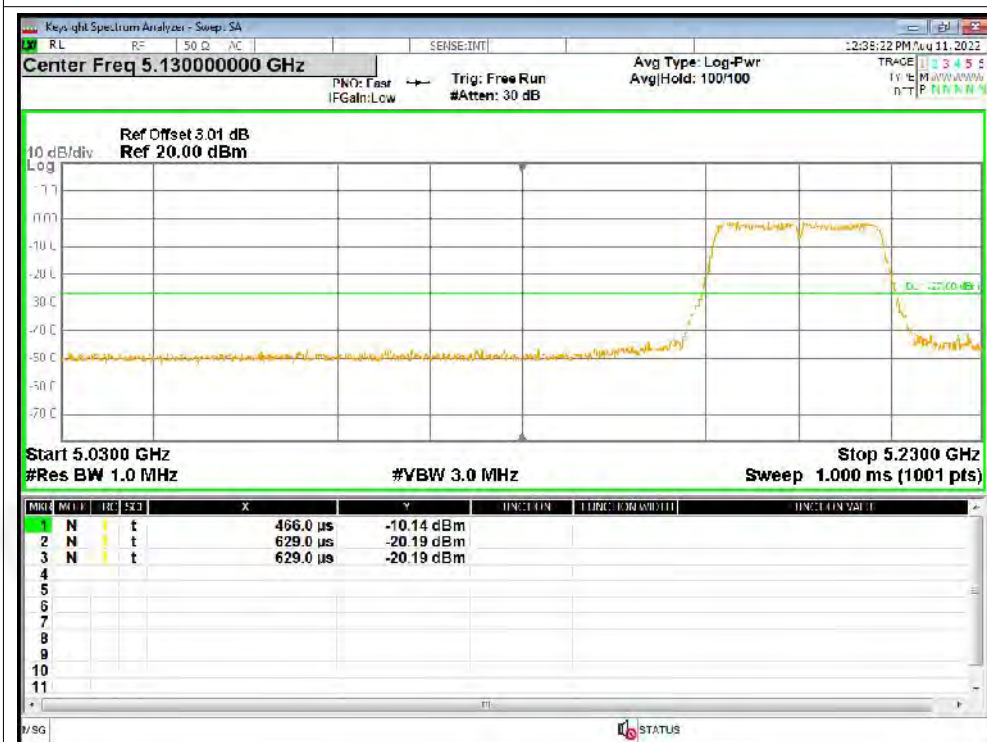


Band Edge NVNT ac20 5240MHz High Ant1

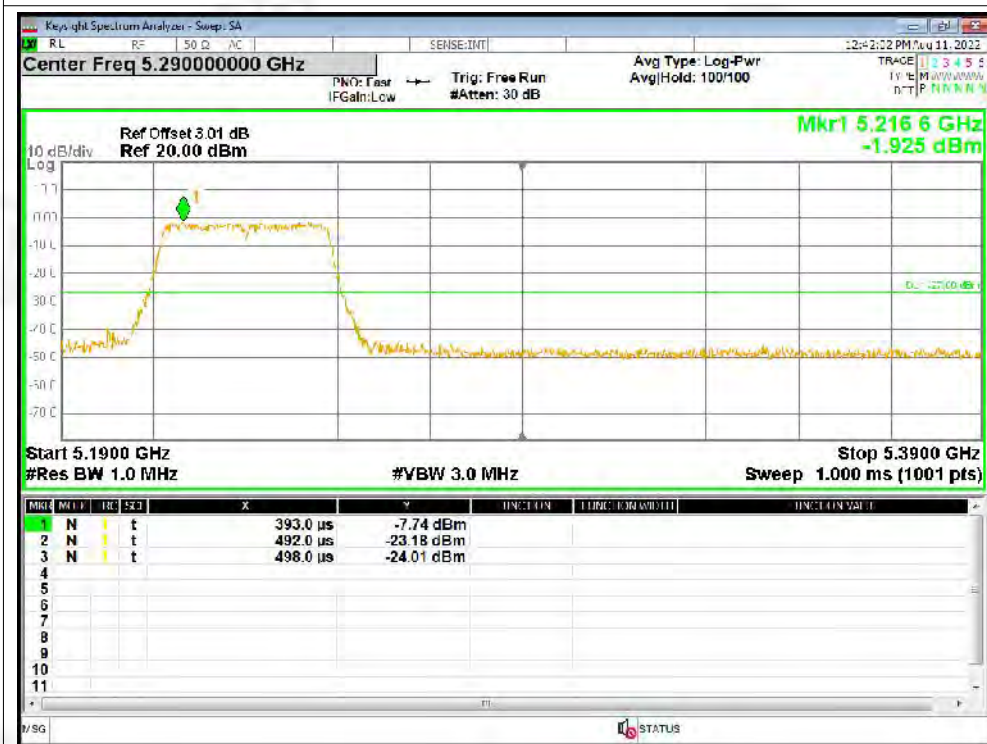


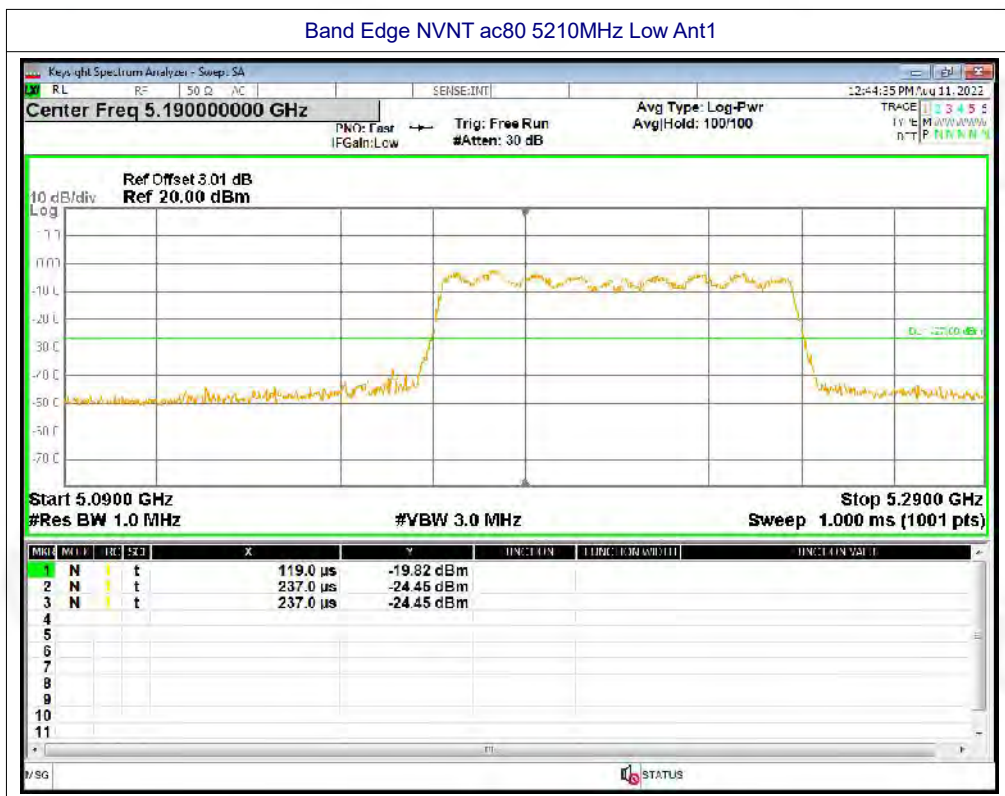


Band Edge NVNT ac40 5190MHz Low Ant1



Band Edge NVNT ac40 5230MHz High Ant1







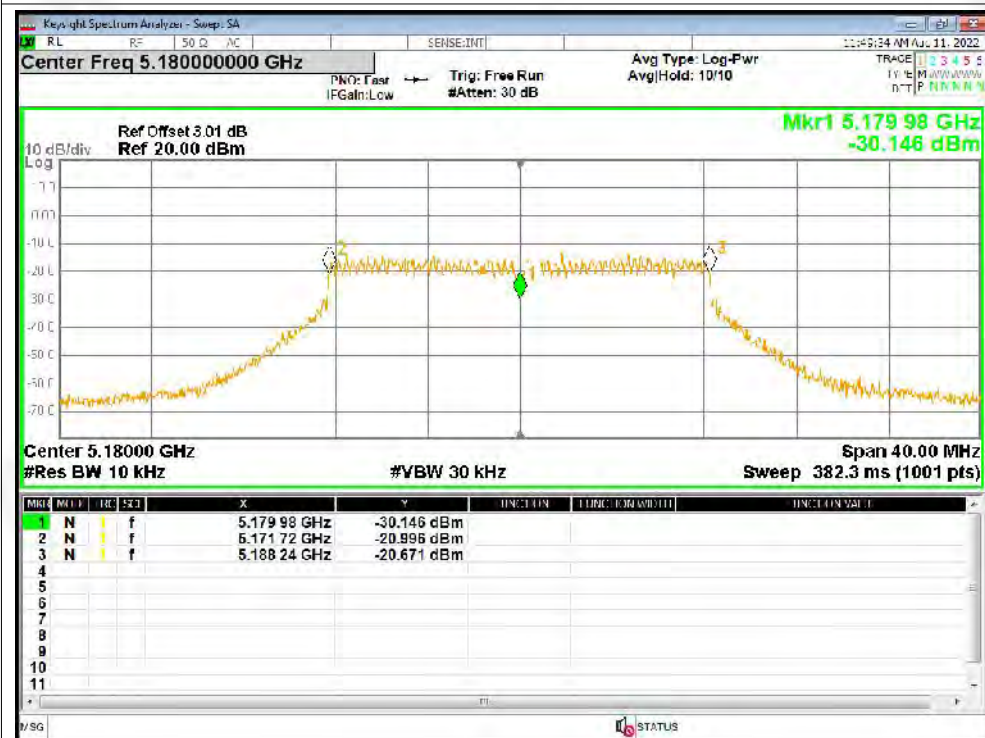
A.7 Frequency Stability

Condition	Mode	Frequency (MHz)	Antenna	Measured Frequency (MHz)	Frequency Error (Hz)	Deviation (ppm)	Limit	Verdict
NVNT	a	5180	Ant1	5179.98	-20000	-3.86	Within 5150-5250MHz	Pass
NVNT	a	5200	Ant1	5200	0	0	Within 5150-5250MHz	Pass
NVNT	a	5240	Ant1	5240	0	0	Within 5150-5250MHz	Pass
NVNT	n20	5180	Ant1	5180.02	20000	3.86	Within 5150-5250MHz	Pass
NVNT	n20	5200	Ant1	5200	0	0	Within 5150-5250MHz	Pass
NVNT	n20	5240	Ant1	5240.02	20000	3.82	Within 5150-5250MHz	Pass
NVNT	n40	5190	Ant1	5190	0	0	Within 5150-5250MHz	Pass
NVNT	n40	5230	Ant1	5230	0	0	Within 5150-5250MHz	Pass
NVNT	ac20	5180	Ant1	5180.02	20000	3.86	Within 5150-5250MHz	Pass
NVNT	ac20	5200	Ant1	5200.02	20000	3.85	Within 5150-5250MHz	Pass
NVNT	ac20	5240	Ant1	5240.02	20000	3.82	Within 5150-5250MHz	Pass
NVNT	ac40	5190	Ant1	5190	0	0	Within 5150-5250MHz	Pass
NVNT	ac40	5230	Ant1	5230	0	0	Within 5150-5250MHz	Pass
NVNT	ac80	5210	Ant1	5210	0	0	Within 5150-5250MHz	Pass

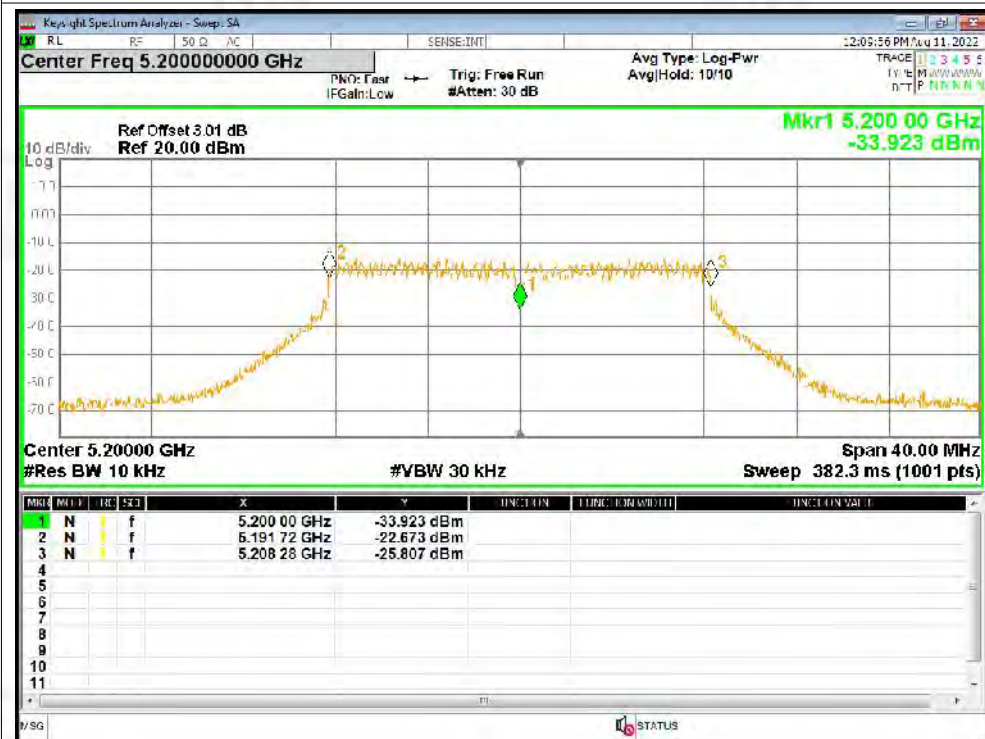


Test Graphs

Freq. Stability NVNT a 5180MHz Ant1

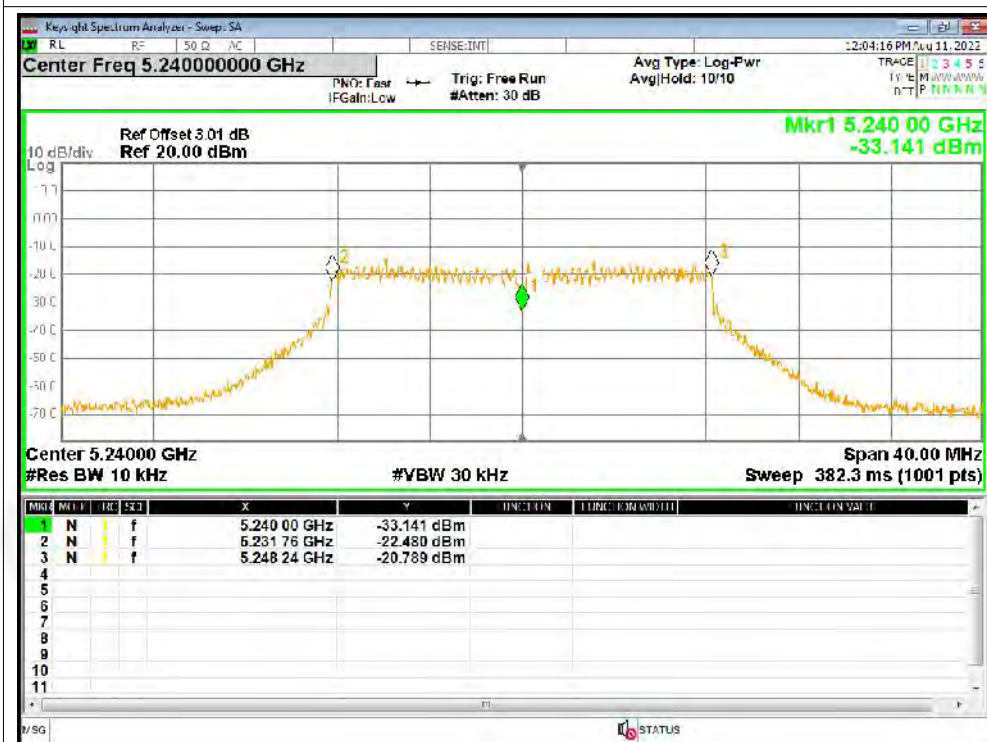


Freq. Stability NVNT a 5200MHz Ant1





Freq. Stability NVNT a 5240MHz Ant1

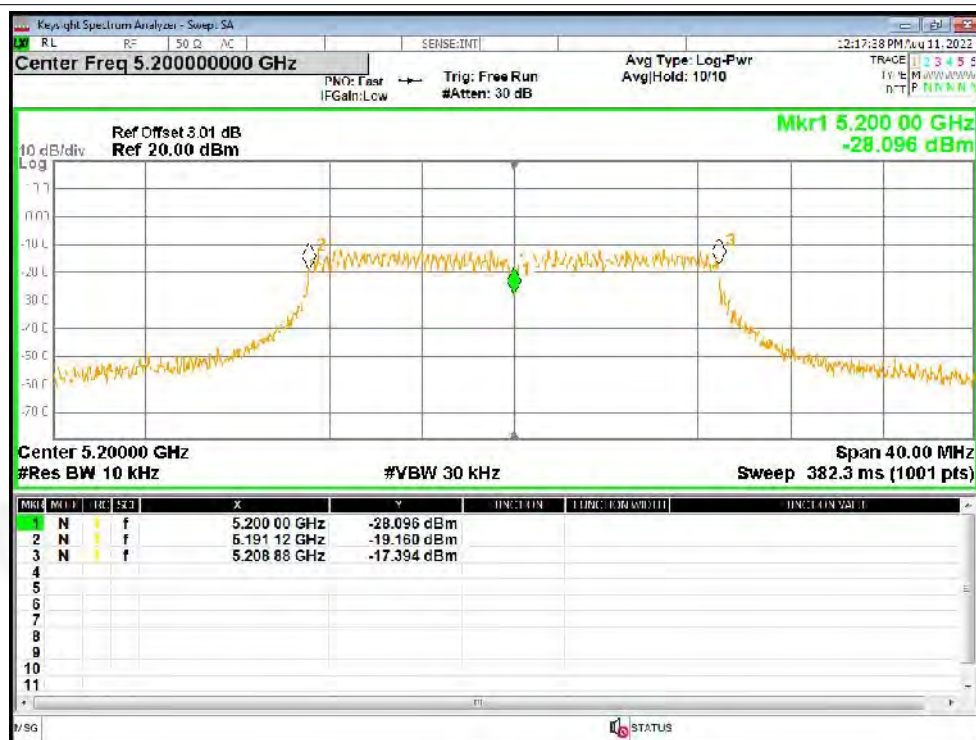


Freq. Stability NVNT n20 5180MHz Ant1

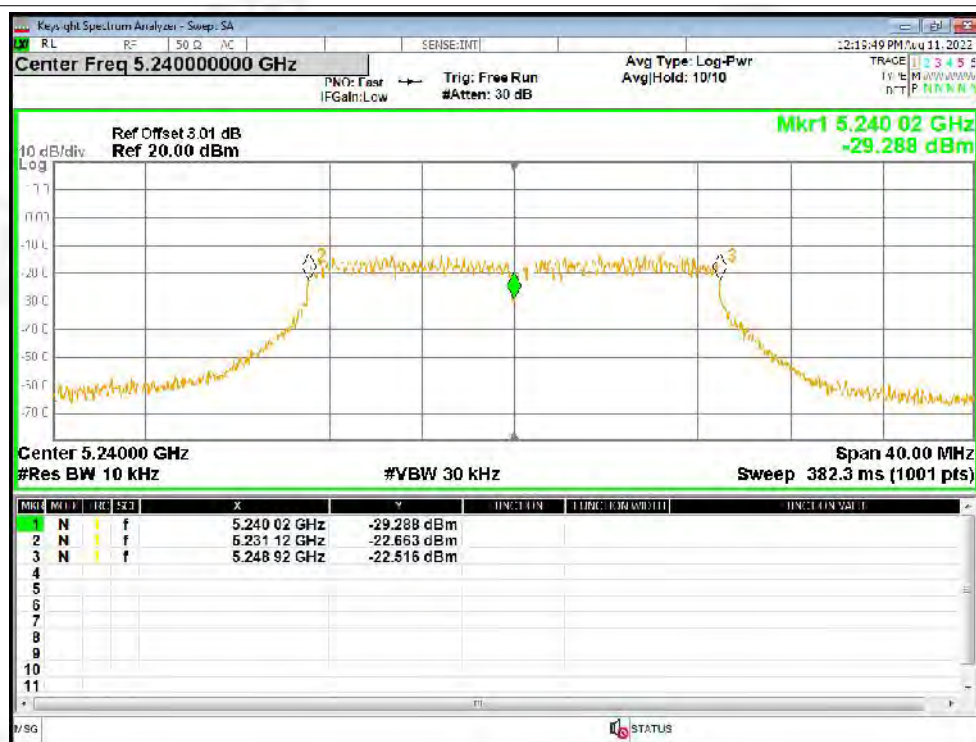




Freq. Stability NVNT n20 5200MHz Ant1



Freq. Stability NVNT n20 5240MHz Ant1





Freq. Stability NVNT n40 5190MHz Ant1

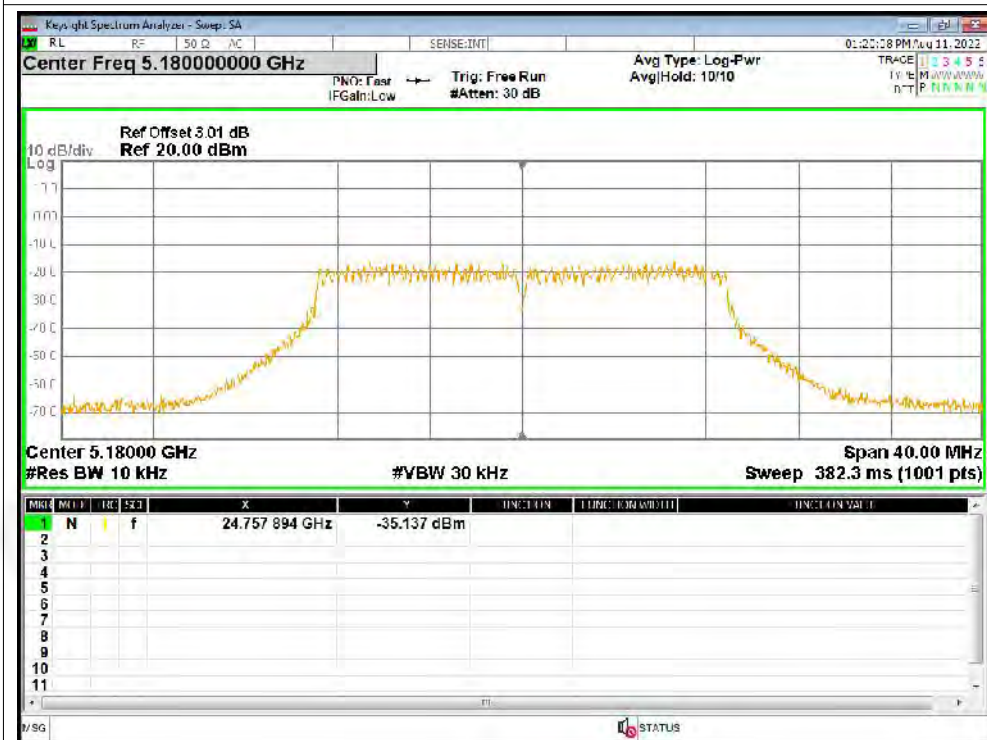


Freq. Stability NVNT n40 5230MHz Ant1





Freq. Stability NVNT ac20 5180MHz Ant1



Freq. Stability NVNT ac20 5200MHz Ant1

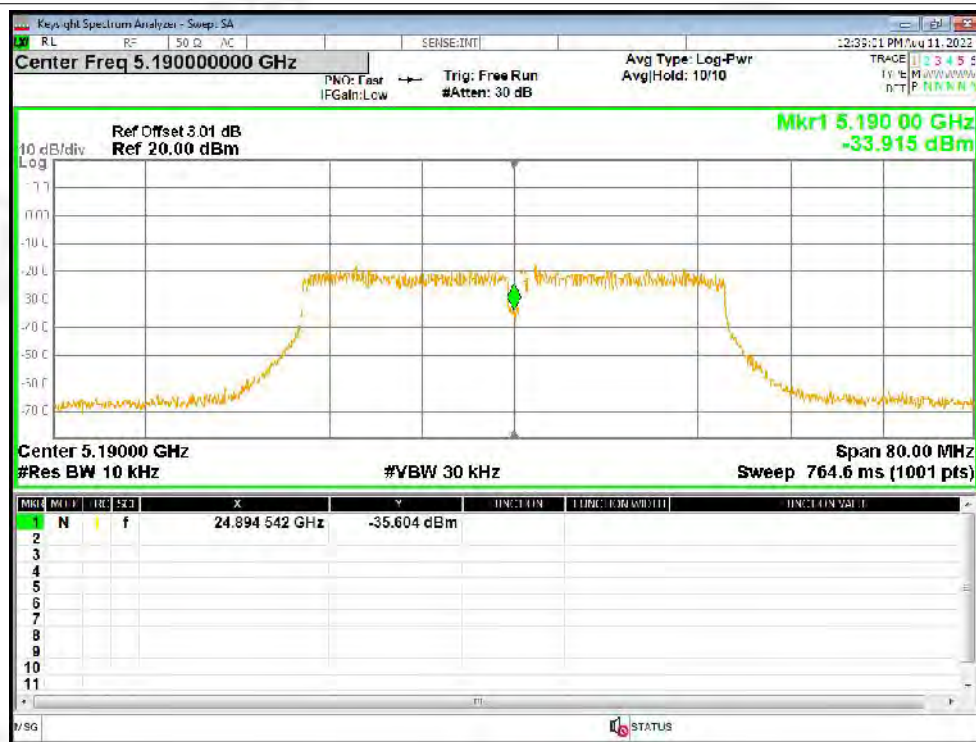




Freq. Stability NVNT ac20 5240MHz Ant1

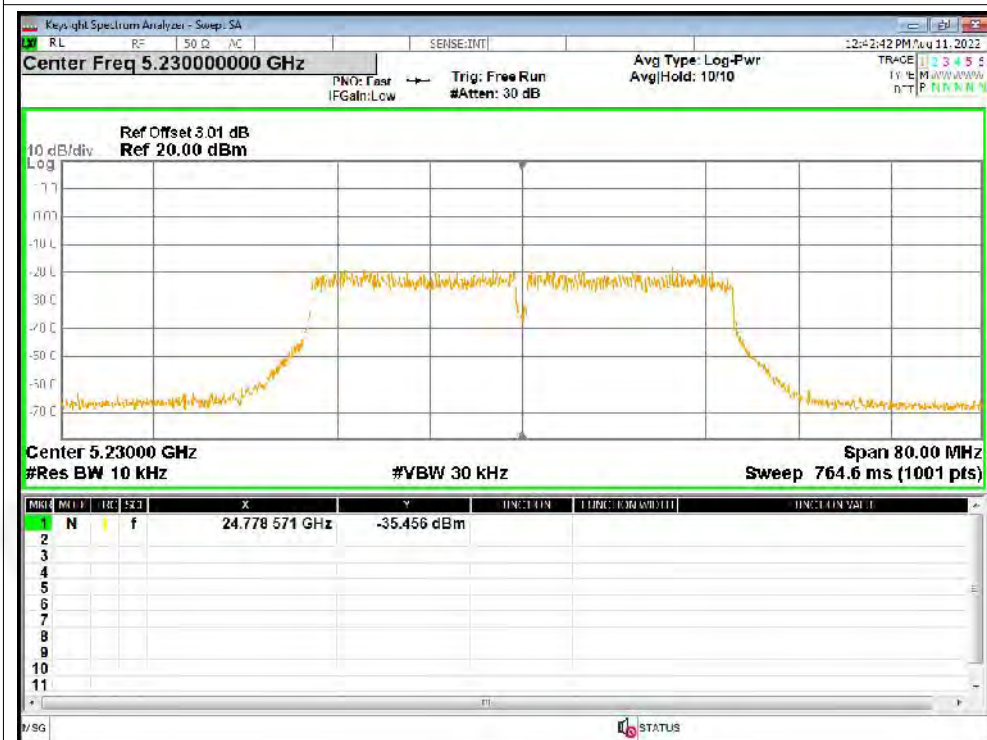


Freq. Stability NVNT ac40 5190MHz Ant1





Freq. Stability NVNT ac40 5230MHz Ant1



Freq. Stability NVNT ac80 5210MHz Ant1





A.8 Conducted RF Spurious Emission

Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	a	5180	Ant1	-36.03	-27	Pass
NVNT	a	5200	Ant1	-34.47	-27	Pass
NVNT	a	5240	Ant1	-36.23	-27	Pass
NVNT	n20	5180	Ant1	-36.14	-27	Pass
NVNT	n20	5200	Ant1	-35.34	-27	Pass
NVNT	n20	5240	Ant1	-36.2	-27	Pass
NVNT	n40	5190	Ant1	-35.67	-27	Pass
NVNT	n40	5230	Ant1	-35.66	-27	Pass
NVNT	ac20	5180	Ant1	-35.13	-27	Pass
NVNT	ac20	5200	Ant1	-35.8	-27	Pass
NVNT	ac20	5240	Ant1	-35.17	-27	Pass
NVNT	ac40	5190	Ant1	-35.6	-27	Pass
NVNT	ac40	5230	Ant1	-35.45	-27	Pass
NVNT	ac80	5210	Ant1	-35.38	-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

