



Appendix D

RF Test Data for 5.2G WIFI(Conducted Measurement)

Product Name: M5ToughC5



Trade Mark: M5STACK

Test Model: ToughC5

Environmental Conditions

Temperature:	25.2° C
Relative Humidity:	52.1%
ATM Pressure:	100.0 kPa
Test Engineer:	Emiya Lin
Supervised by:	Simba Huang



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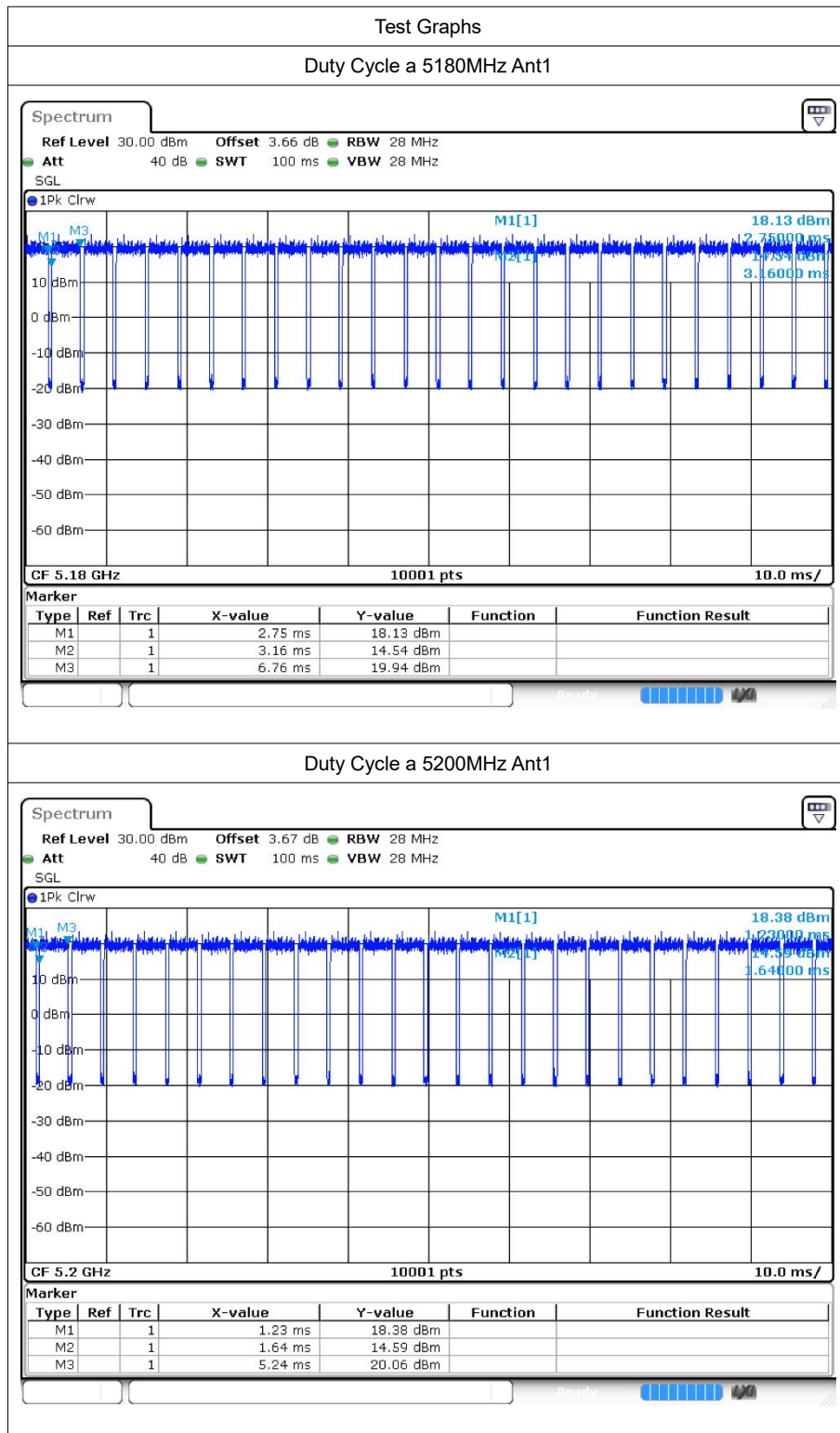
1 Duty Cycle

1.1 Test Result

Mode	Frequency (MHz)	Antenna	Duty Cycle (%)	Correction Factor (dB)	1/T (kHz)
a	5180	Ant1	89.87	0.46	0.28
a	5200	Ant1	89.87	0.46	0.28
a	5240	Ant1	89.87	0.46	0.28
n20	5180	Ant1	89.86	0.46	0.28
n20	5200	Ant1	89.86	0.46	0.28
n20	5240	Ant1	89.86	0.46	0.28
n40	5190	Ant1	89.64	0.47	0.41
n40	5230	Ant1	89.9	0.46	0.42
ac20	5180	Ant1	89.88	0.46	0.28
ac20	5200	Ant1	89.89	0.46	0.28
ac20	5240	Ant1	89.88	0.46	0.28
ax20	5180	Ant1	89.9	0.46	0.28
ax20	5200	Ant1	89.82	0.47	0.28
ax20	5240	Ant1	89.9	0.46	0.28

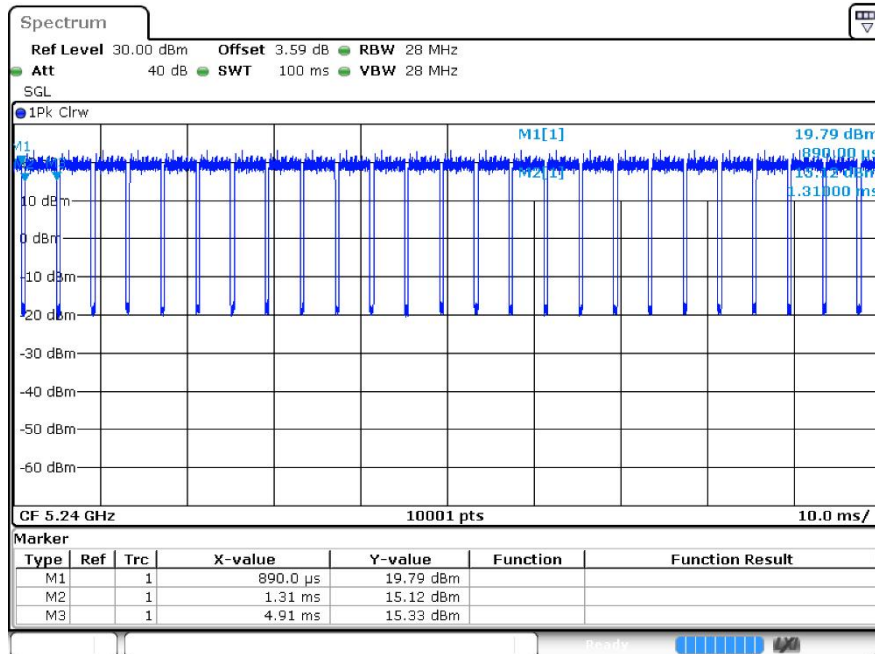


1.2 Test Graphs

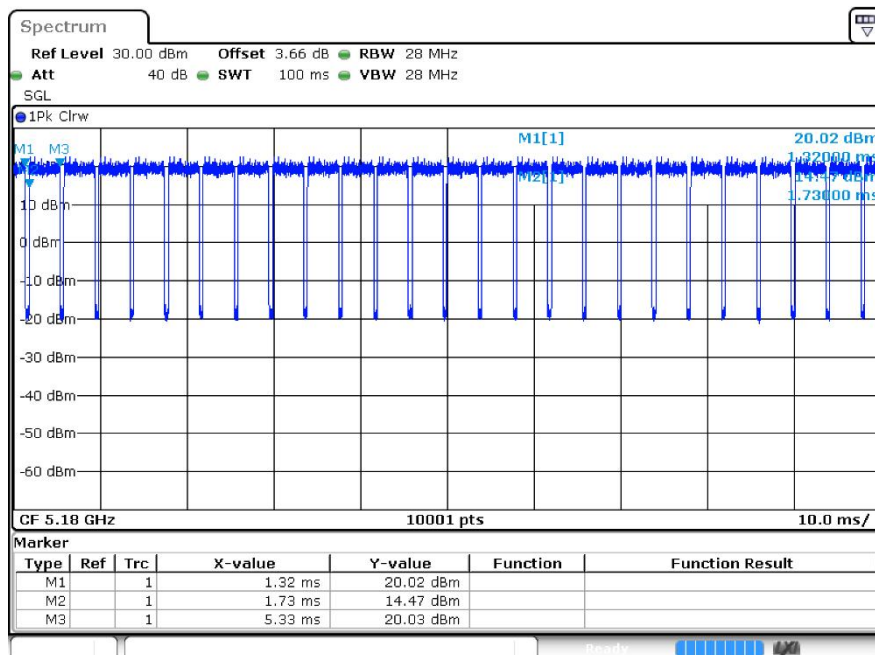




Duty Cycle a 5240MHz Ant1

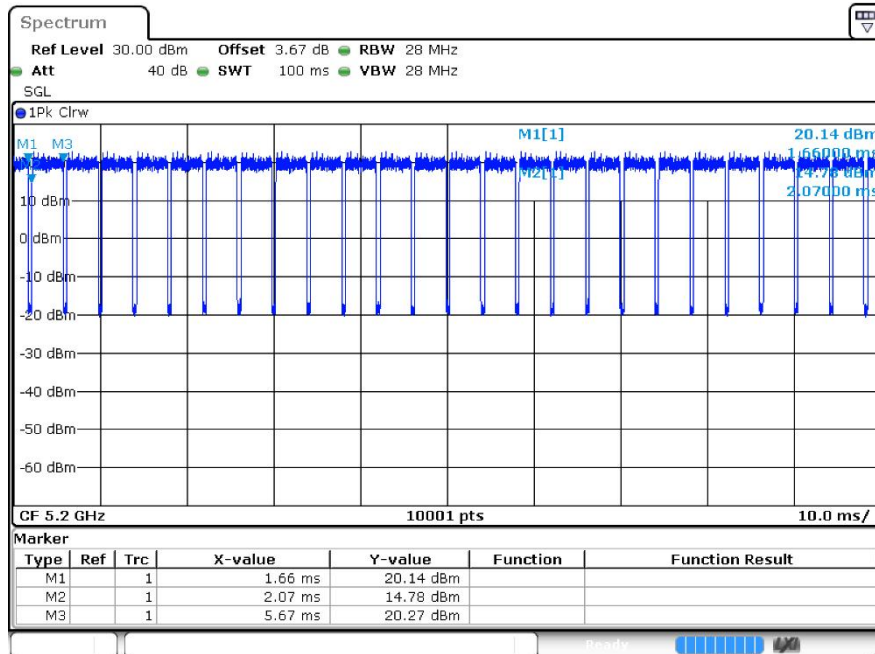


Duty Cycle n20 5180MHz Ant1

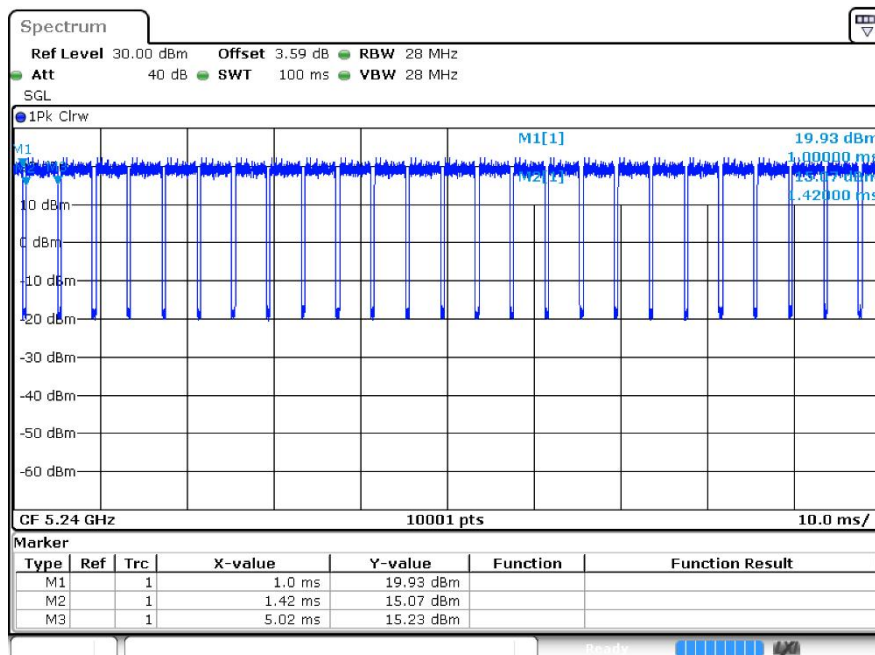


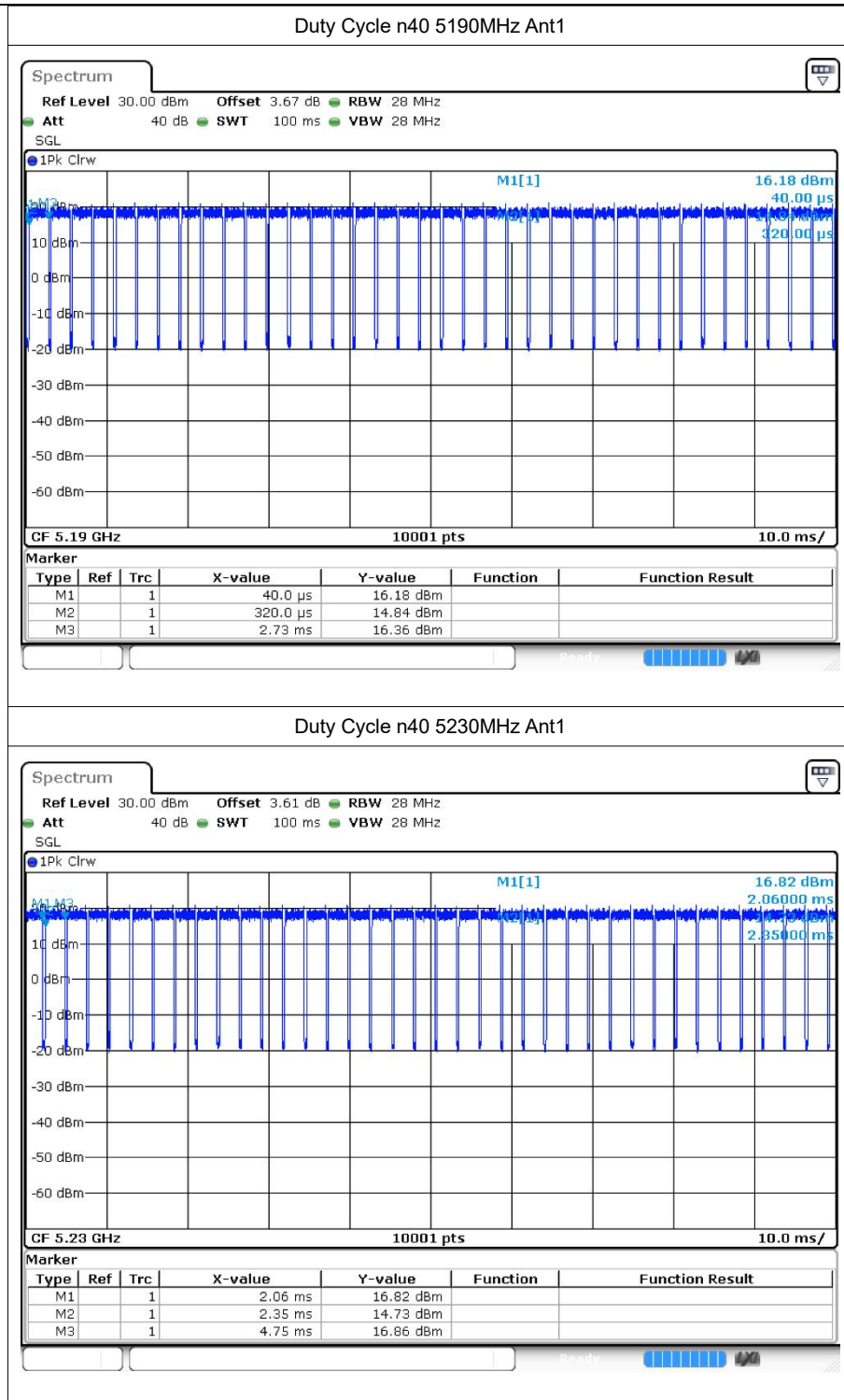


Duty Cycle a n20 5200MHz Ant1



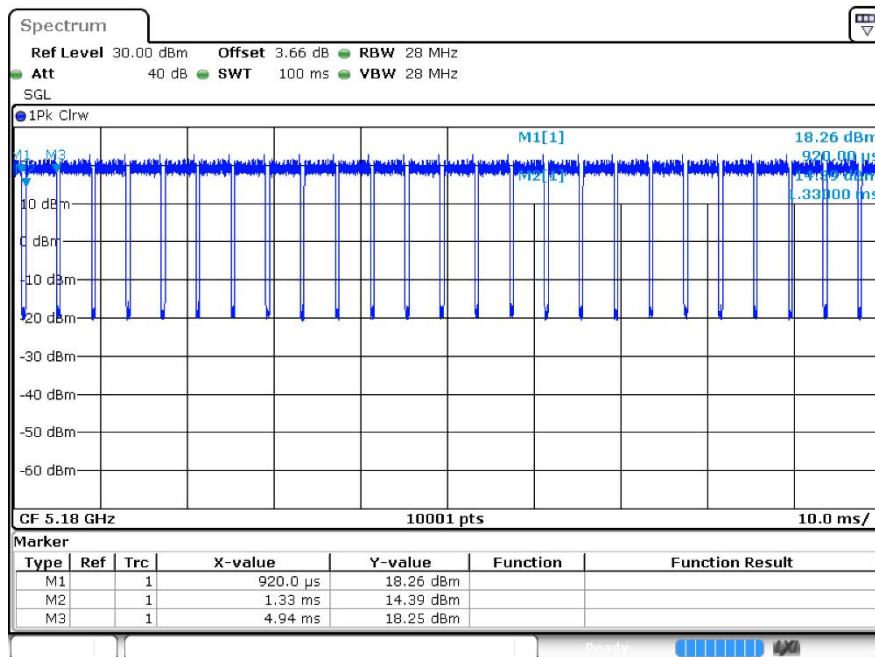
Duty Cycle n20 5240MHz Ant1



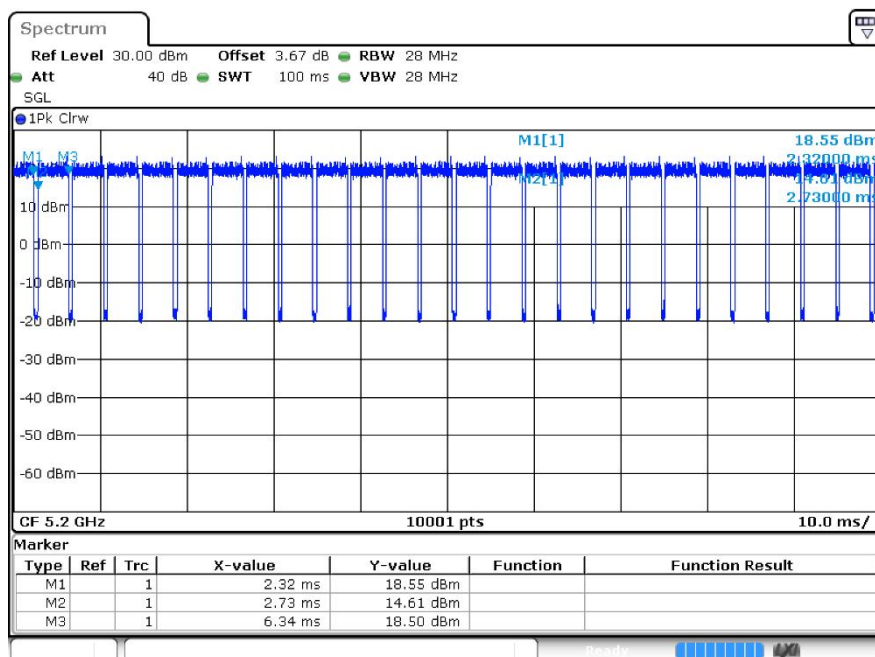


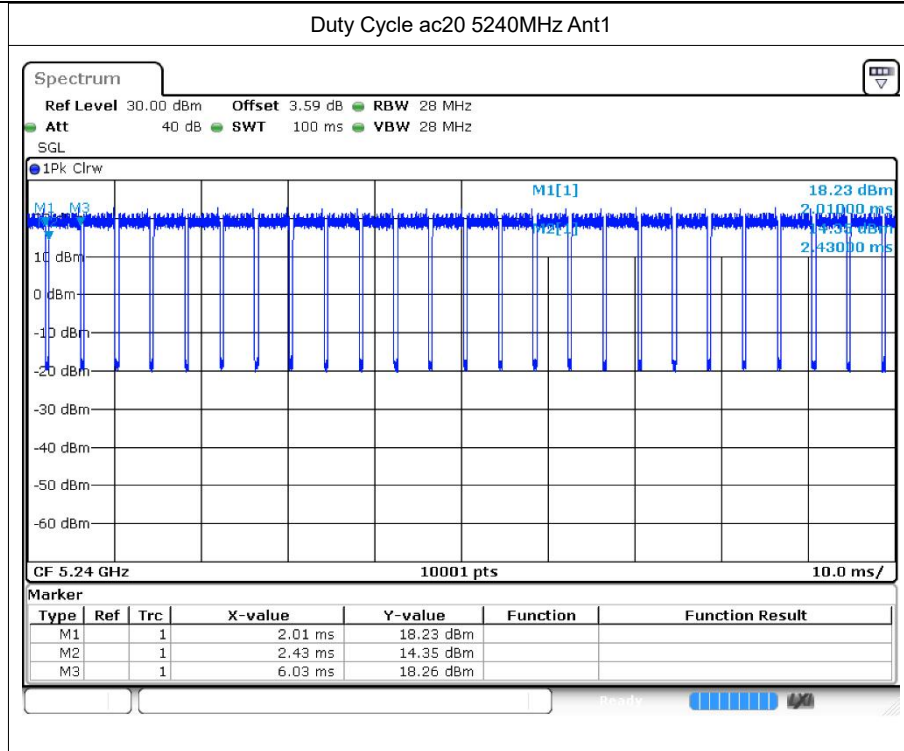


Duty Cycle ac20 5180MHz Ant1

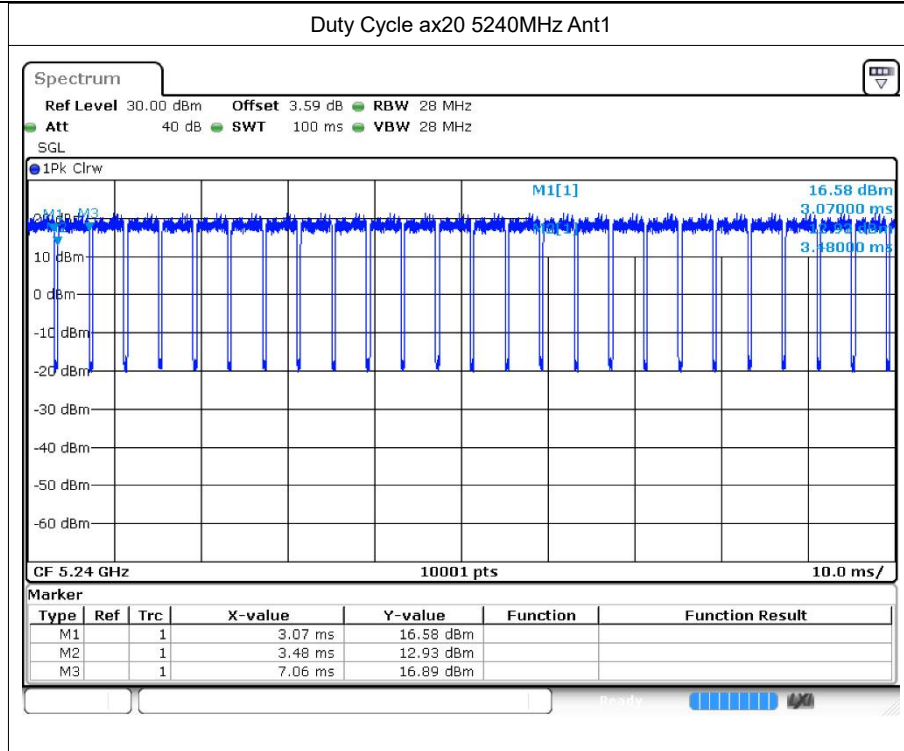


Duty Cycle ac20 5200MHz Ant1









2 Maximum Conducted Output Power

2.1 Test Result

Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Limit (dBm)	Verdict
a	5180	Ant1	15.35	24	Pass
a	5200	Ant1	15.43	24	Pass
a	5240	Ant1	15.18	24	Pass
n20	5180	Ant1	15.07	24	Pass
n20	5200	Ant1	15.16	24	Pass
n20	5240	Ant1	14.79	24	Pass
n40	5190	Ant1	14.29	24	Pass
n40	5230	Ant1	14.07	24	Pass
ac20	5180	Ant1	15.03	24	Pass
ac20	5200	Ant1	15.05	24	Pass
ac20	5240	Ant1	14.77	24	Pass
ax20	5180	Ant1	14.96	24	Pass
ax20	5200	Ant1	14.98	24	Pass
ax20	5240	Ant1	14.71	24	Pass

Note:

The duty factor has been compensated into the result.



3 -26dB Bandwidth

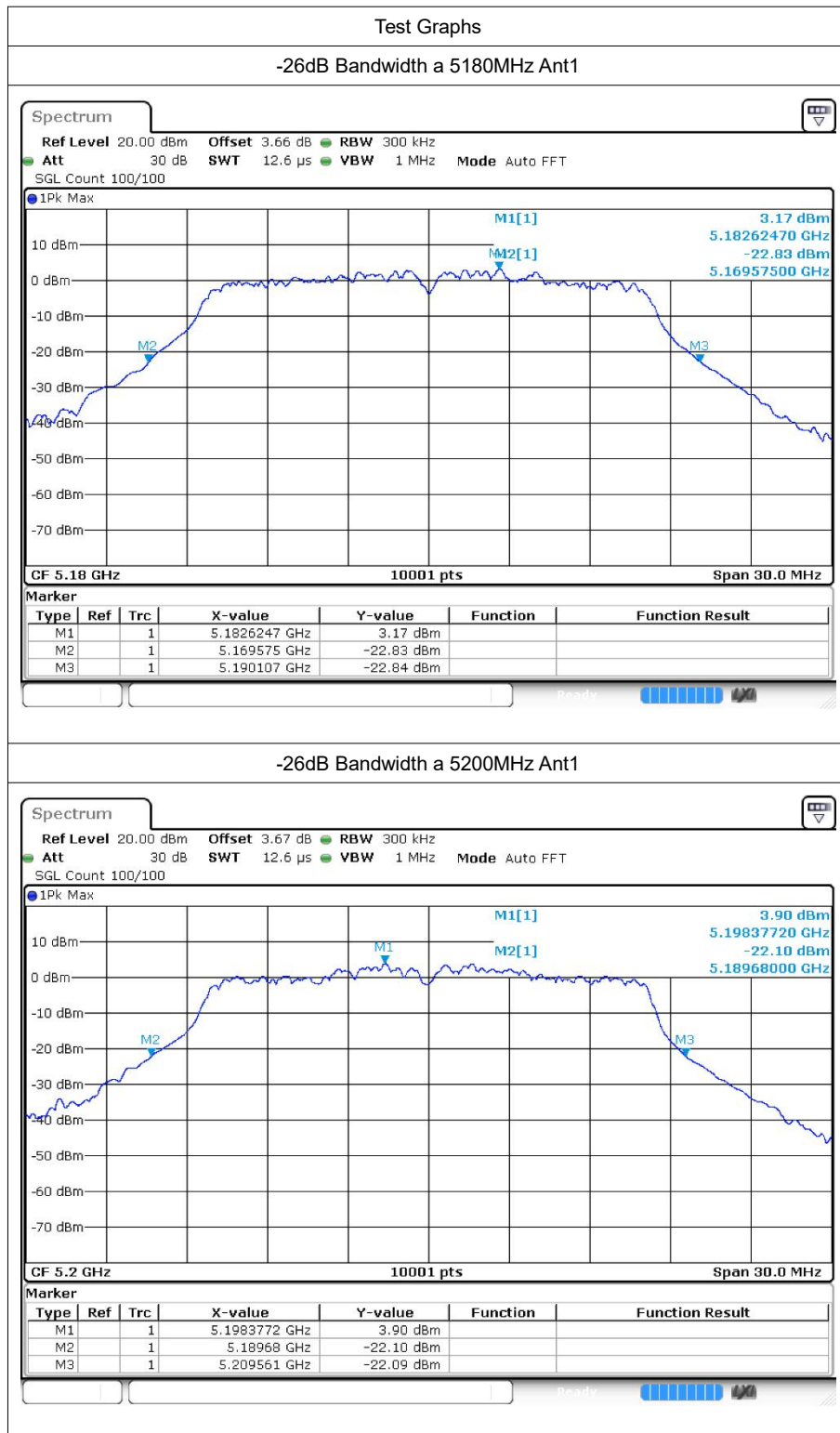
3.1 Test Result

Mode	Frequency (MHz)	Antenna	-26 dB Bandwidth (MHz)	Limit -26 dB Bandwidth (MHz)	Verdict
a	5180	Ant1	20.532	0.5	Pass
a	5200	Ant1	19.881	0.5	Pass
a	5240	Ant1	20.523	0.5	Pass
n20	5180	Ant1	21.138	0.5	Pass
n20	5200	Ant1	21.135	0.5	Pass
n20	5240	Ant1	21.144	0.5	Pass
n40	5190	Ant1	39.174	0.5	Pass
n40	5230	Ant1	39.384	0.5	Pass
ac20	5180	Ant1	21.237	0.5	Pass
ac20	5200	Ant1	21.186	0.5	Pass
ac20	5240	Ant1	21.597	0.5	Pass
ax20	5180	Ant1	20.919	0.5	Pass
ax20	5200	Ant1	21	0.5	Pass
ax20	5240	Ant1	20.754	0.5	Pass

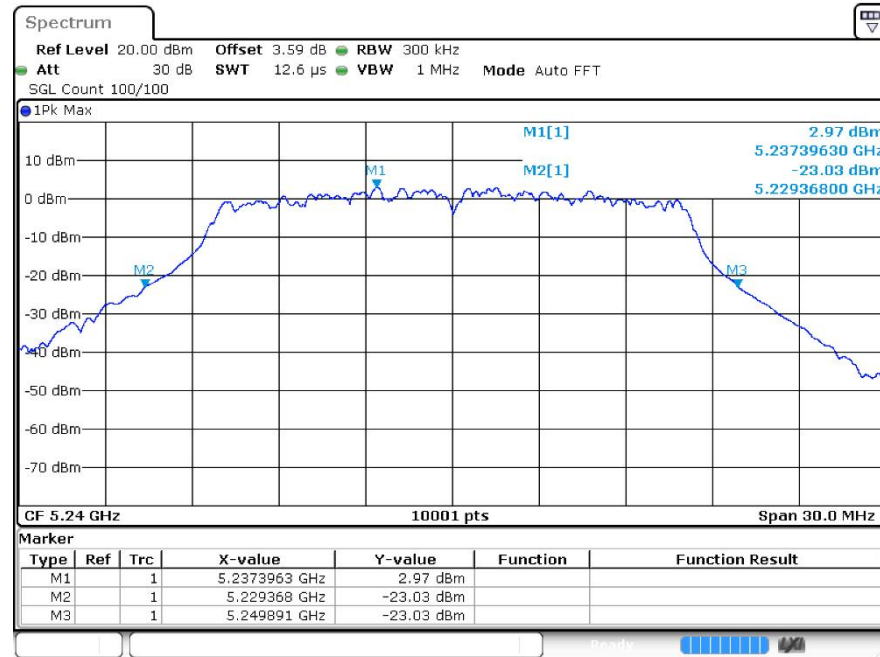
Note:

The duty factor has been compensated into the result.

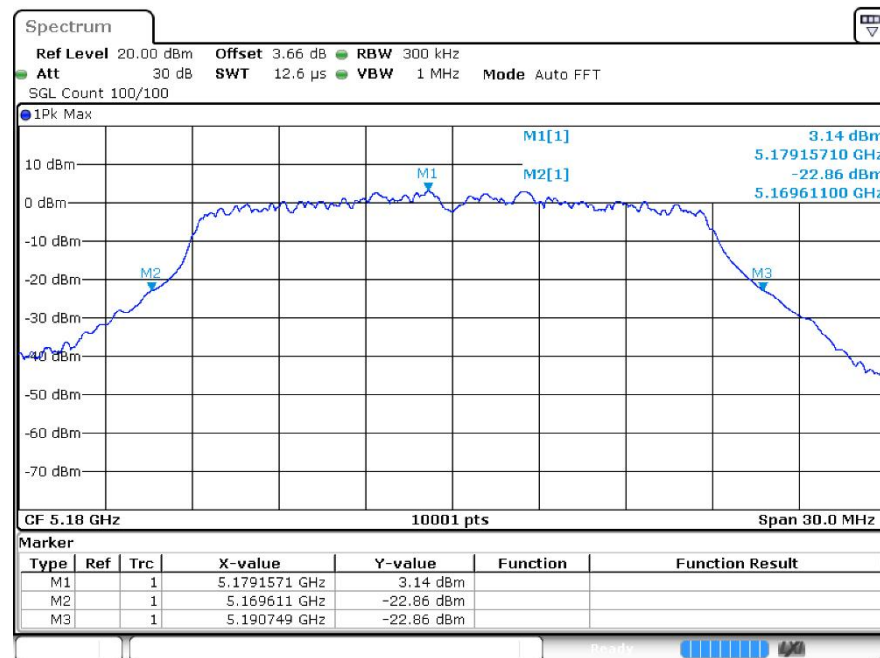
3.2 Test Graphs



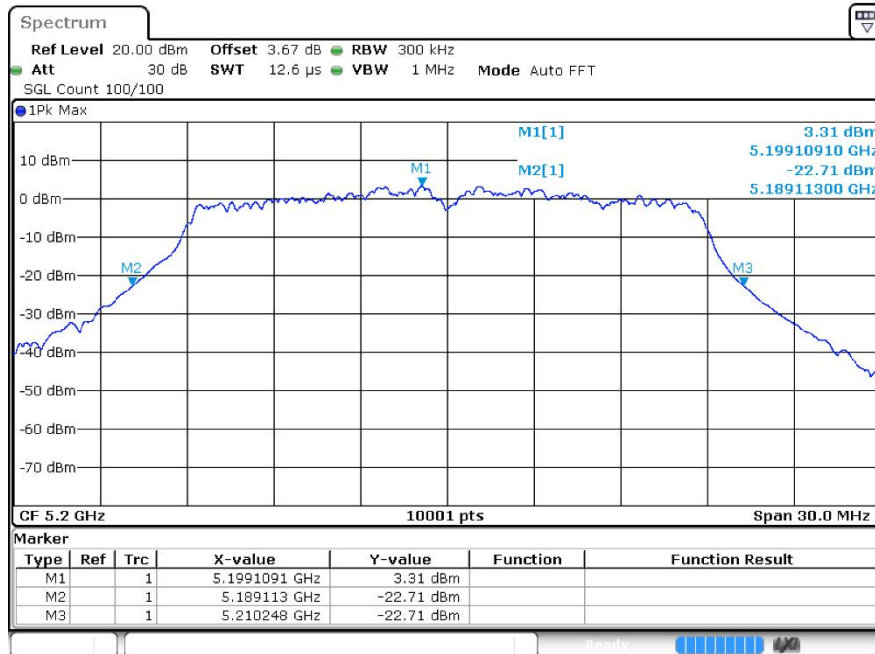
-26dB Bandwidth a 5240MHz Ant1



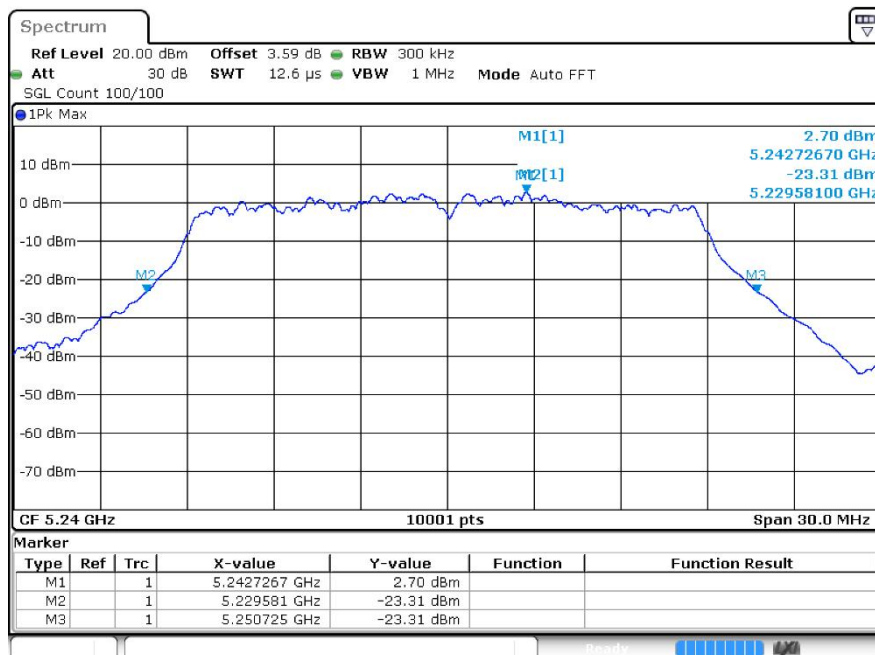
-26dB Bandwidth n20 5180MHz Ant1



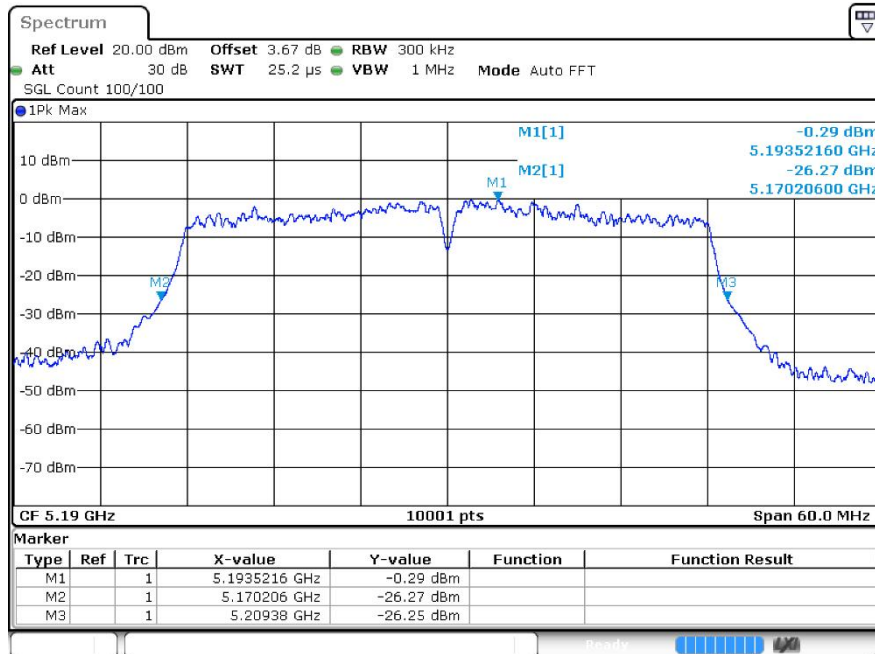
-26dB Bandwidth n20 5200MHz Ant1



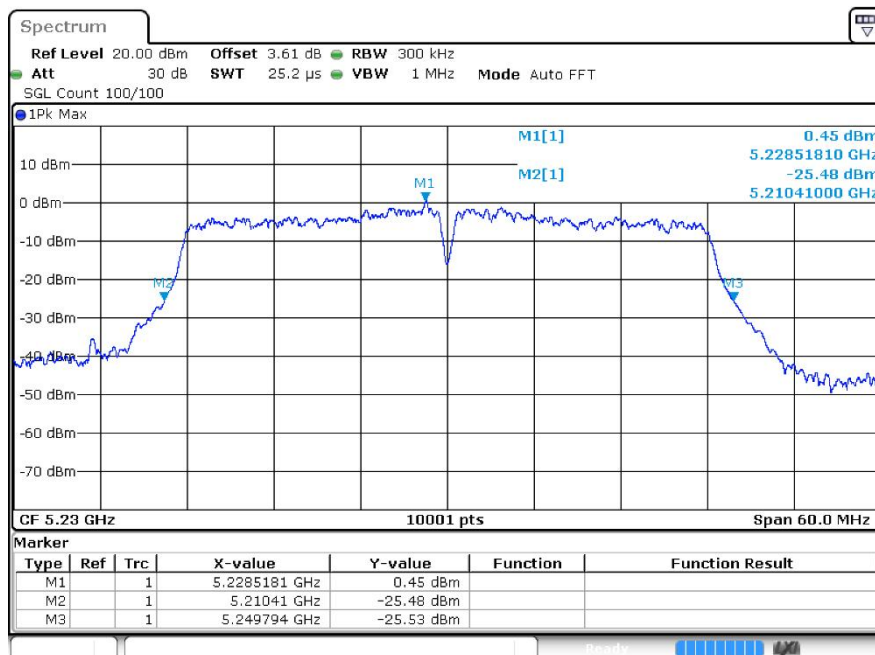
-26dB Bandwidth n20 5240MHz Ant1



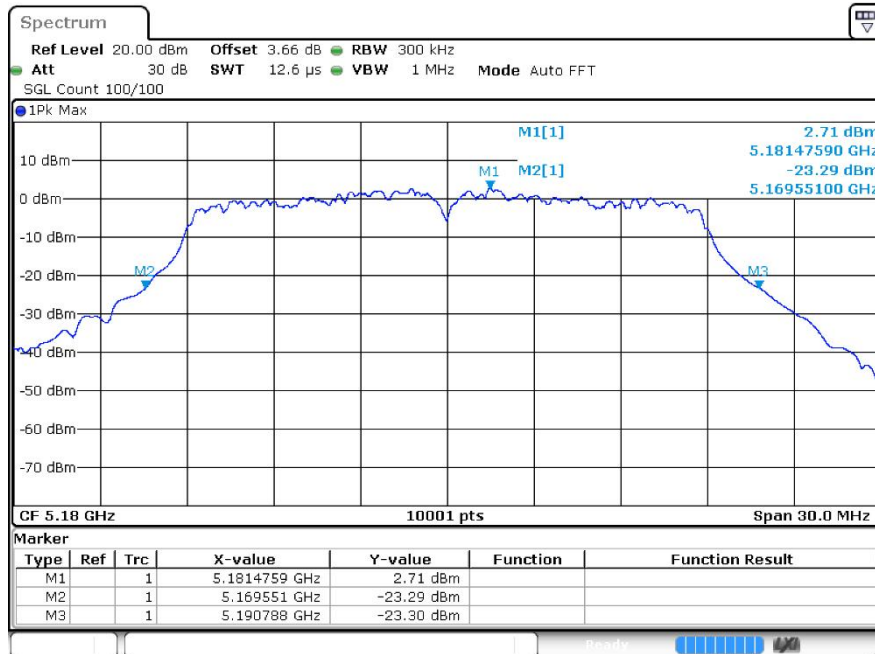
-26dB Bandwidth n40 5190MHz Ant1



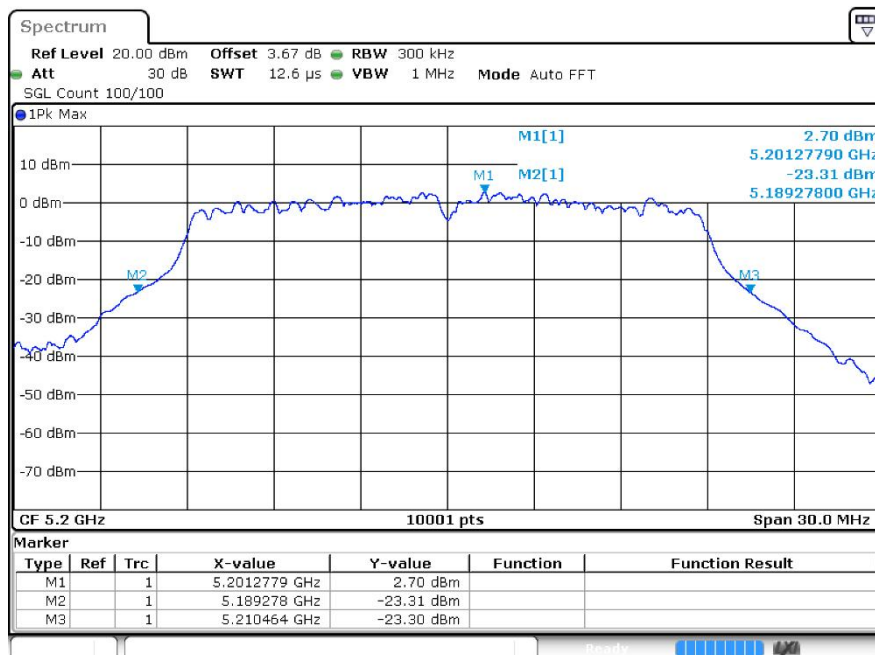
-26dB Bandwidth n40 5230MHz Ant1

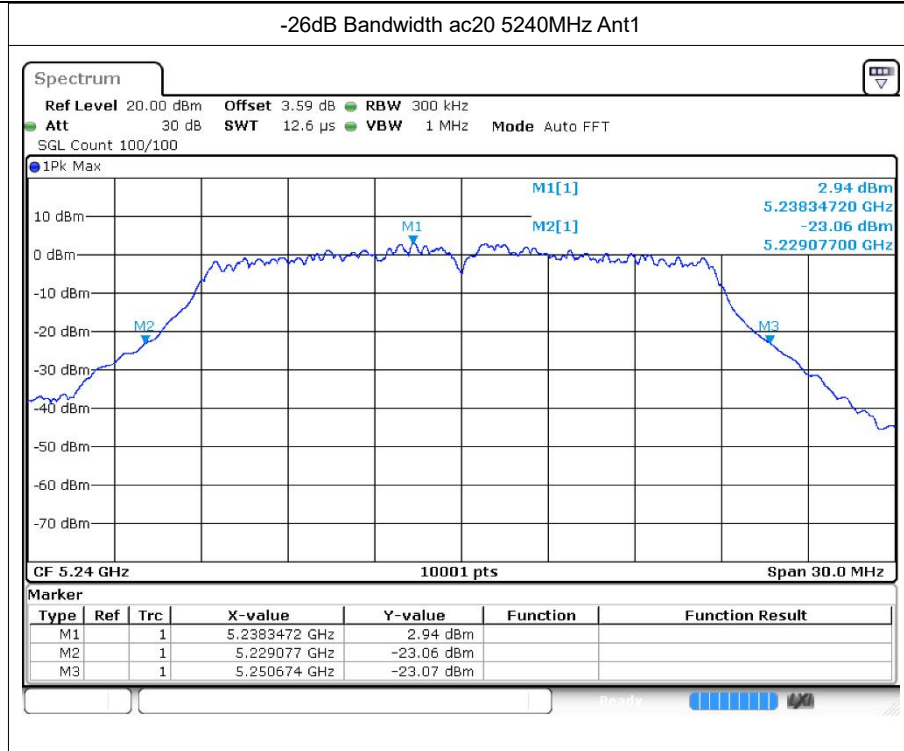


-26dB Bandwidth ac20 5180MHz Ant1

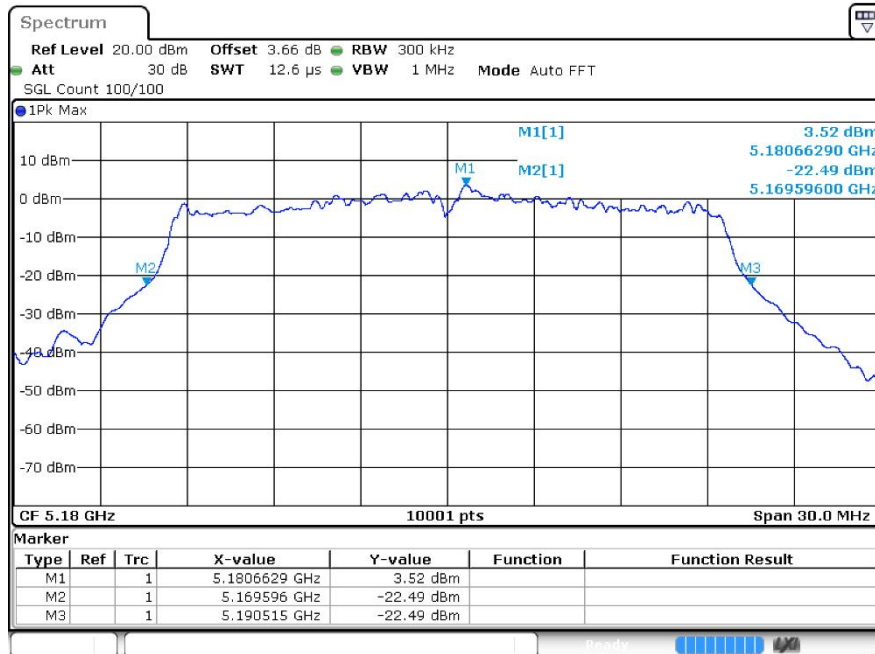


-26dB Bandwidth ac20 5200MHz Ant1

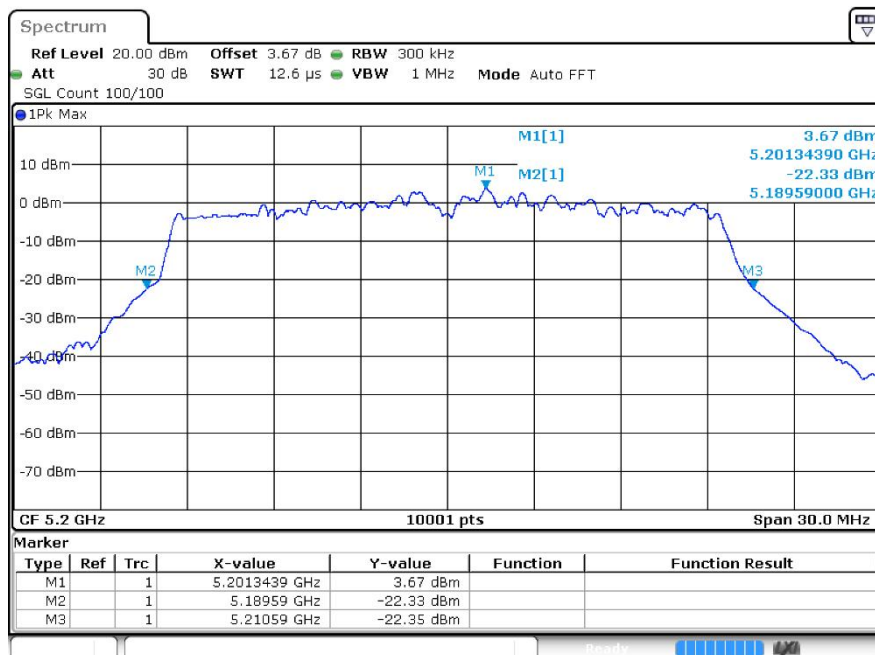


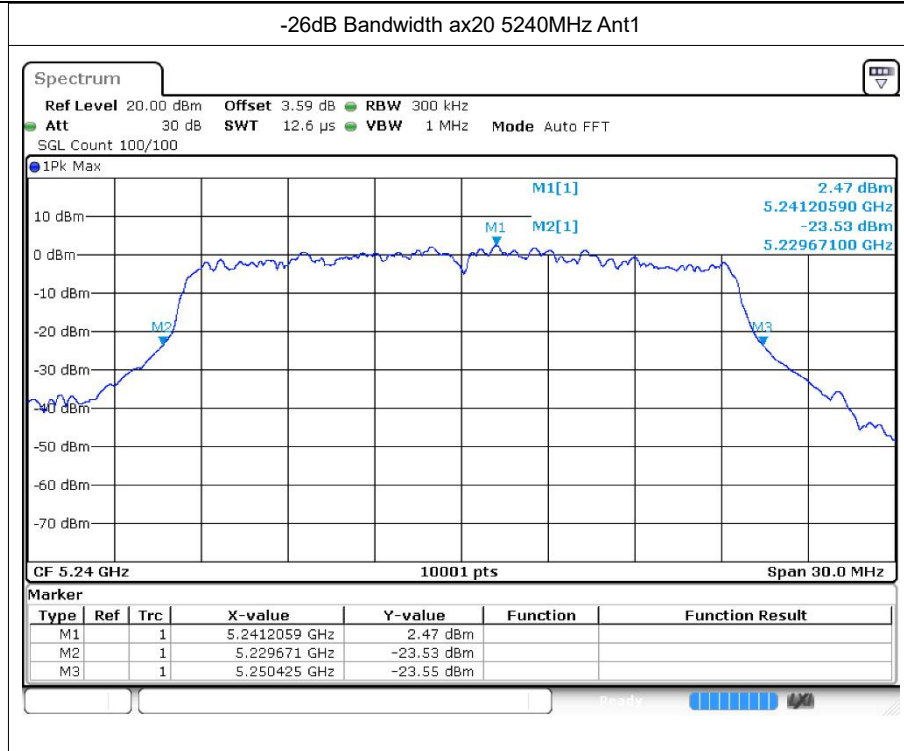


-26dB Bandwidth ax20 5180MHz Ant1



-26dB Bandwidth ax20 5200MHz Ant1





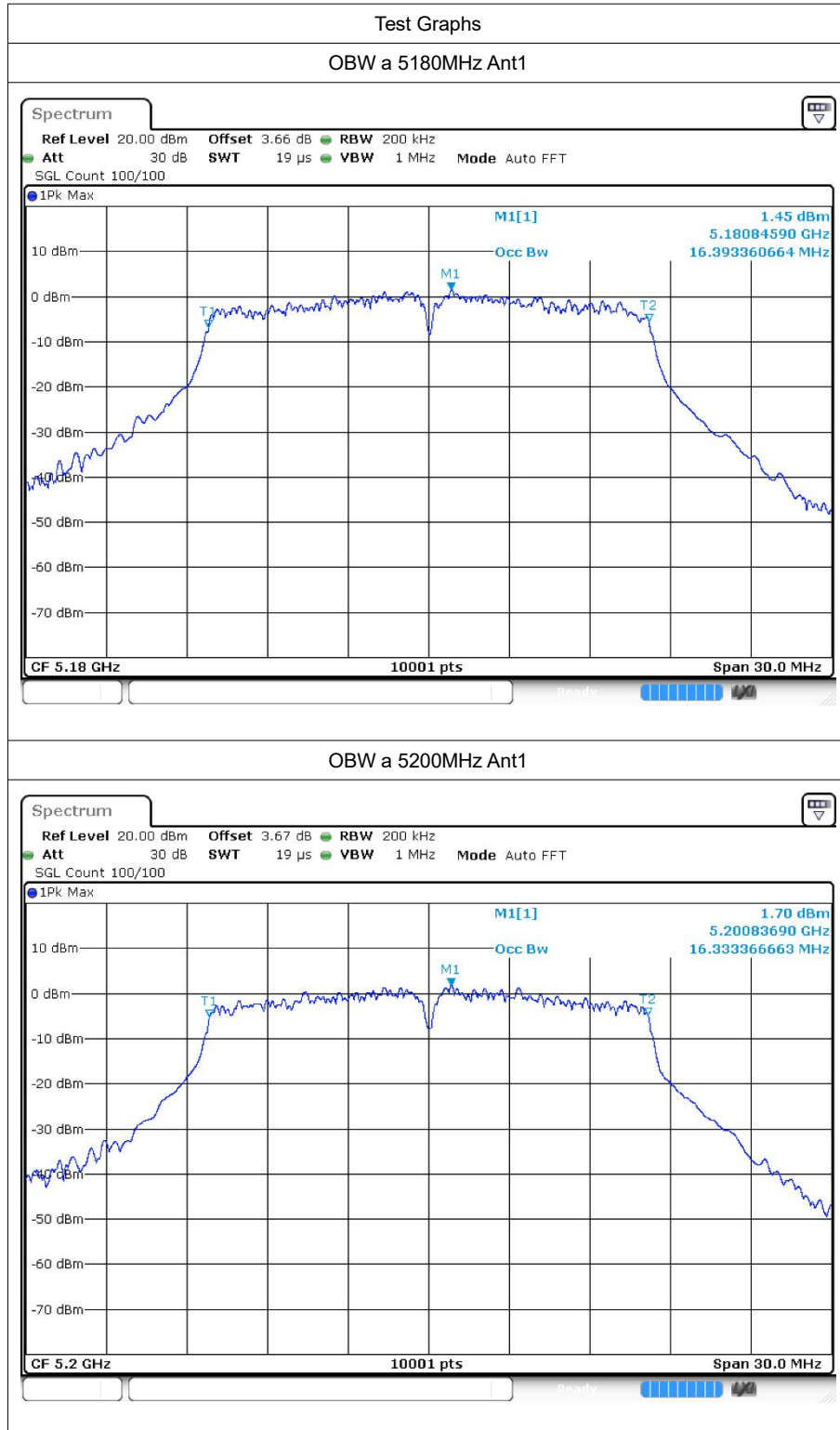


4 Occupied Channel Bandwidth

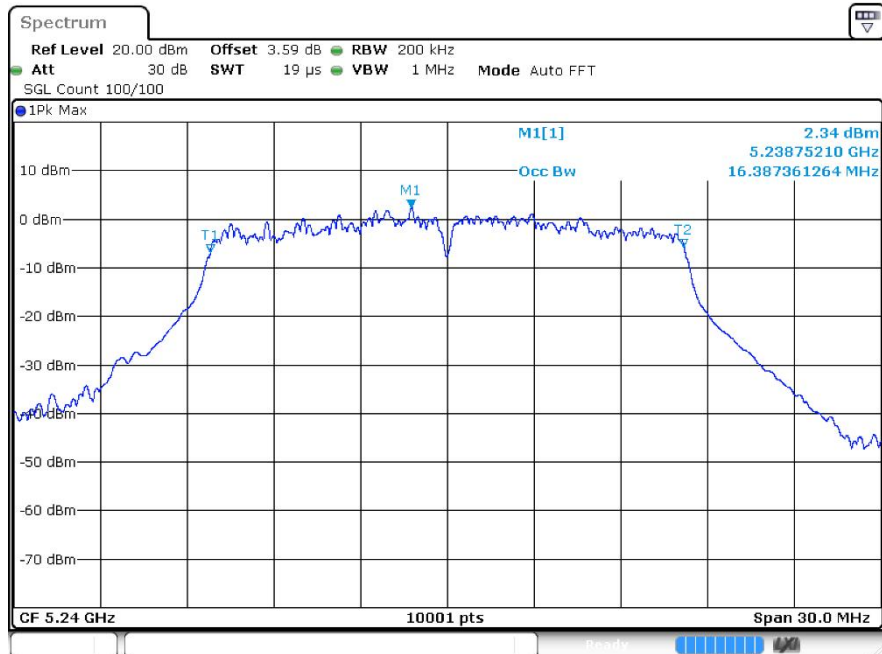
4.1 Test Result

Mode	Frequency (MHz)	Antenna	99% OBW (MHz)
a	5180	Ant1	16.393
a	5200	Ant1	16.333
a	5240	Ant1	16.387
n20	5180	Ant1	17.572
n20	5200	Ant1	17.557
n20	5240	Ant1	17.515
n40	5190	Ant1	36.02
n40	5230	Ant1	35.936
ac20	5180	Ant1	17.554
ac20	5200	Ant1	17.575
ac20	5240	Ant1	17.638
ax20	5180	Ant1	18.913
ax20	5200	Ant1	18.832
ax20	5240	Ant1	18.868

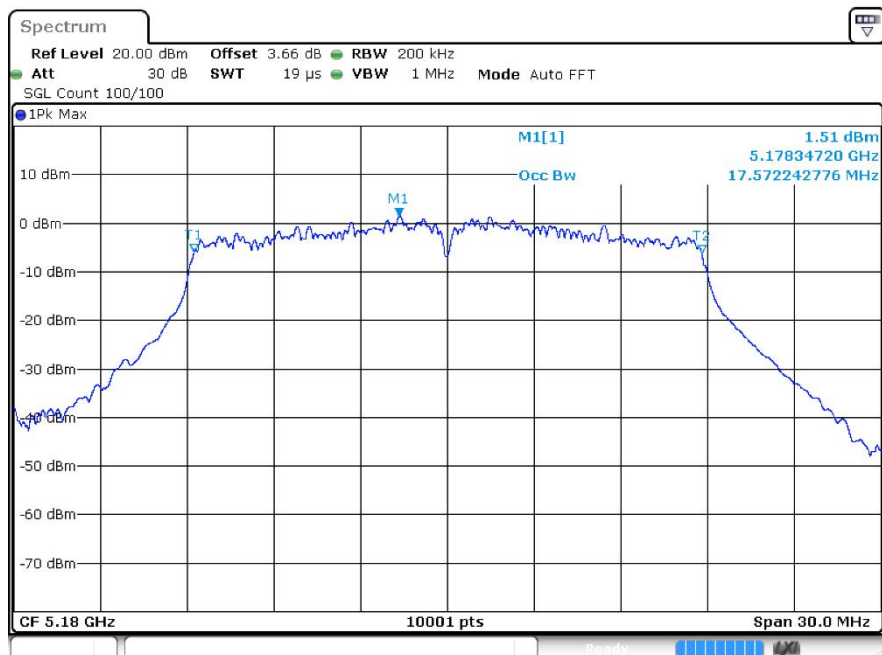
4.2 Test Graphs



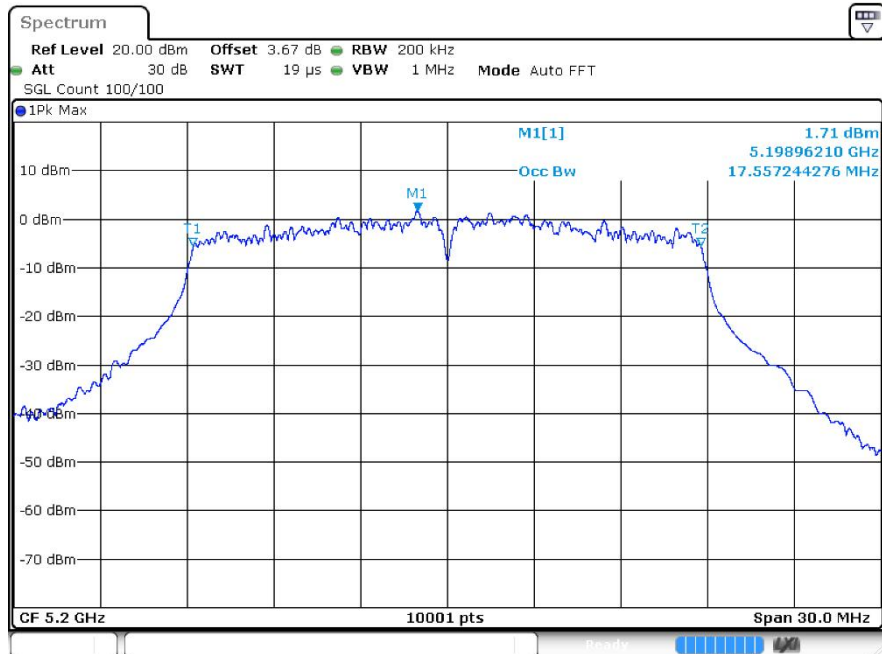
OBW a 5240MHz Ant1



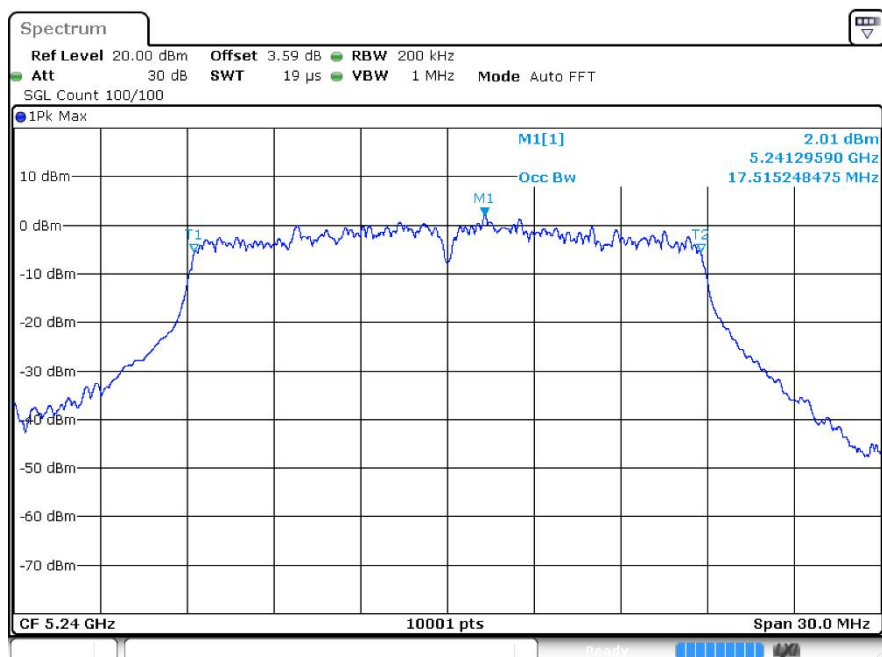
OBW n20 5180MHz Ant1



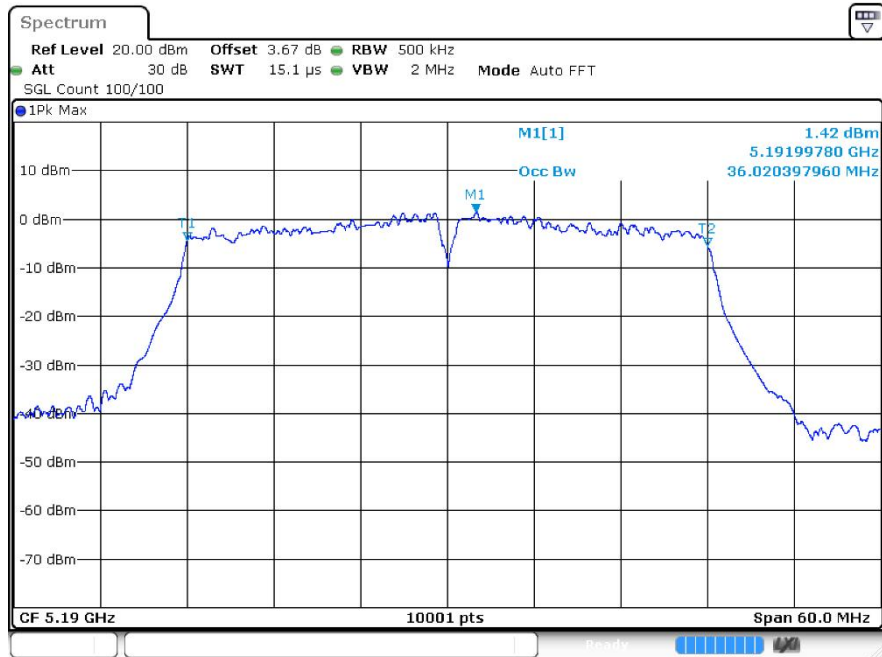
OBW n20 5200MHz Ant1



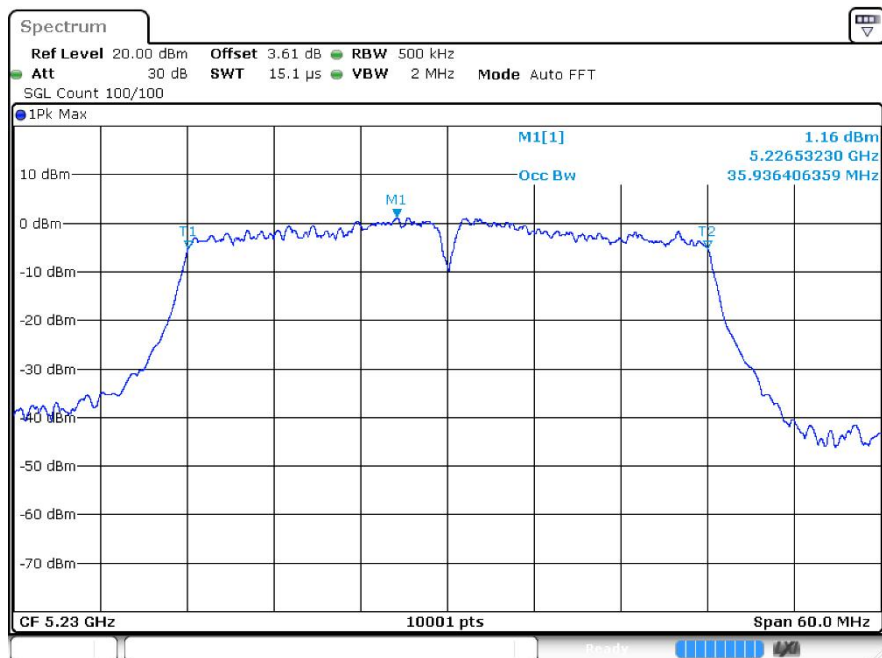
OBW n20 5240MHz Ant1



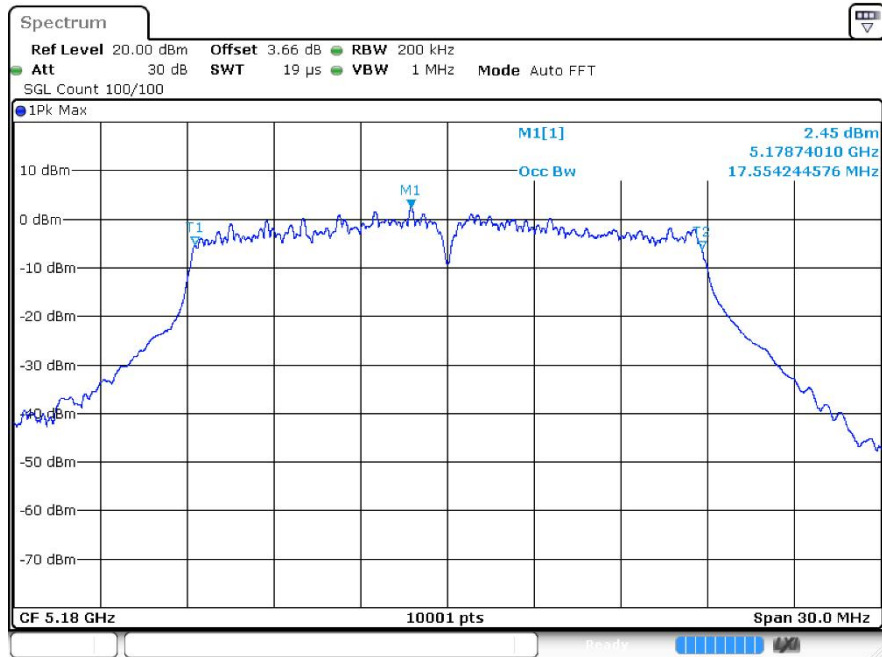
OBW n40 5190MHz Ant1



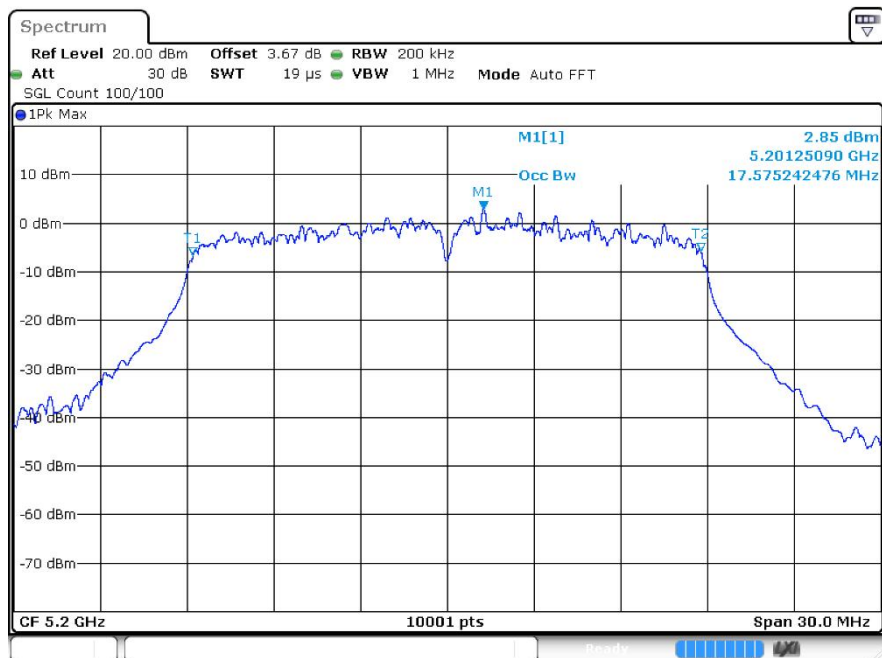
OBW n40 5230MHz Ant1

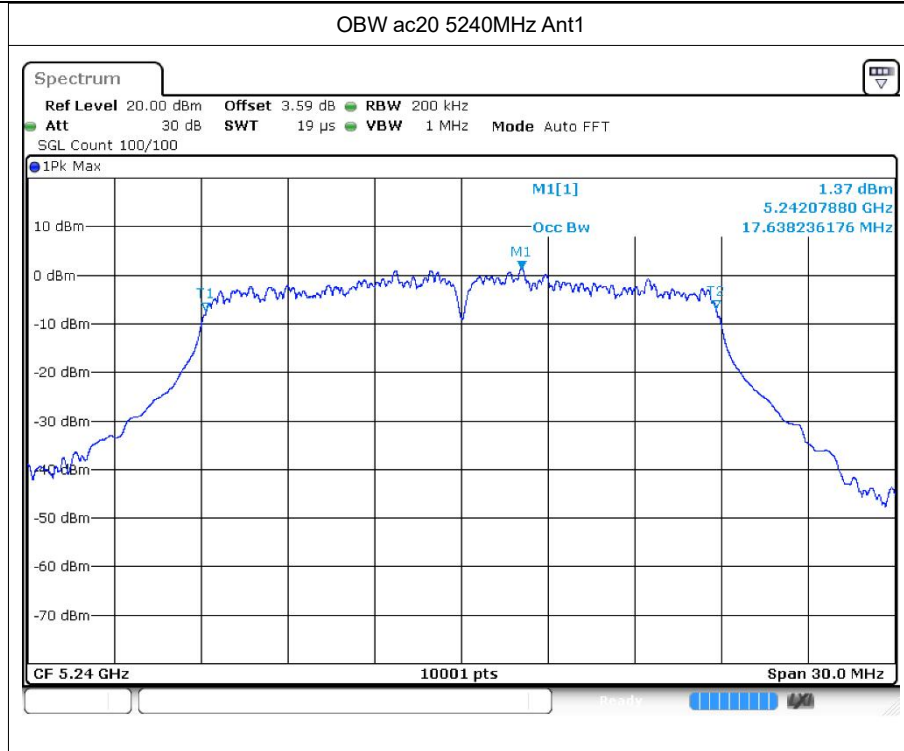


OBW ac20 5180MHz Ant1

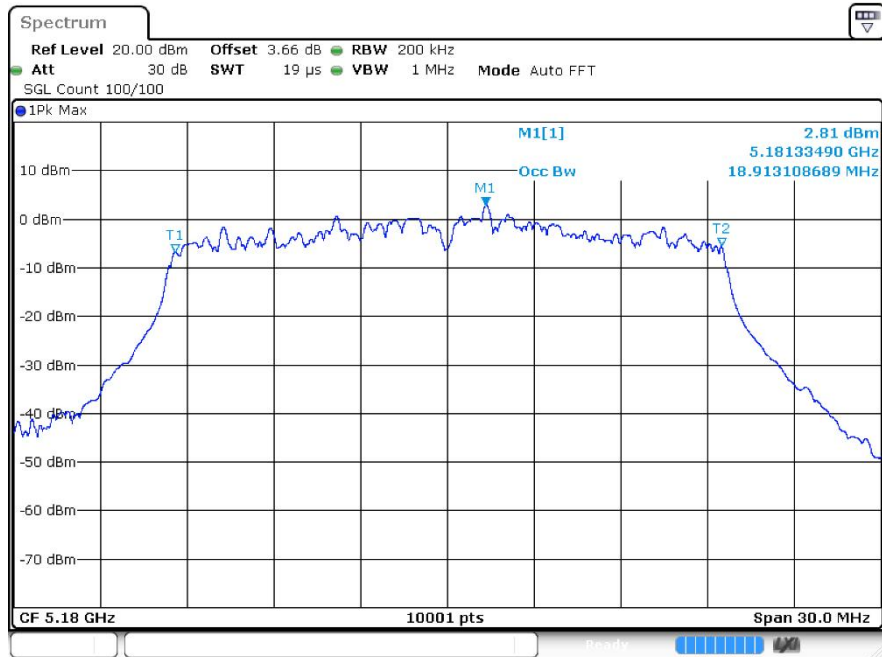


OBW ac20 5200MHz Ant1

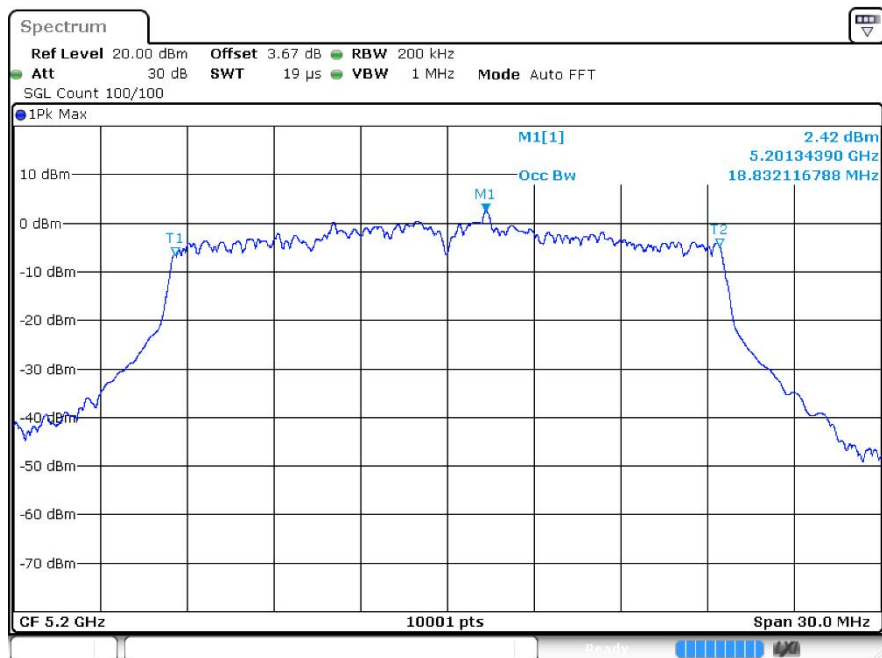


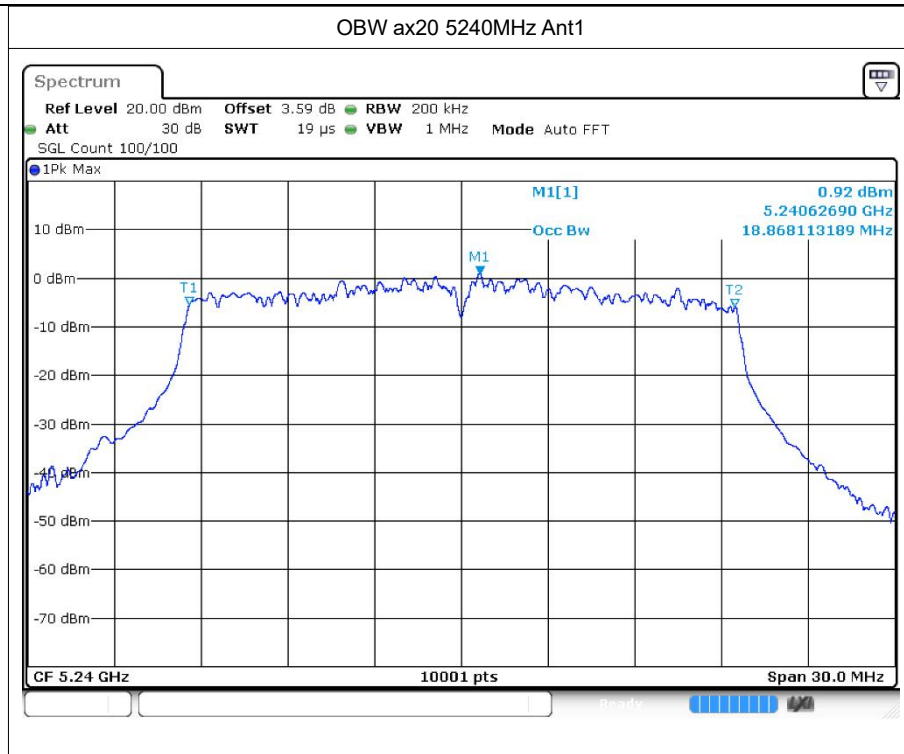


OBW ax20 5180MHz Ant1



OBW ax20 5200MHz Ant1





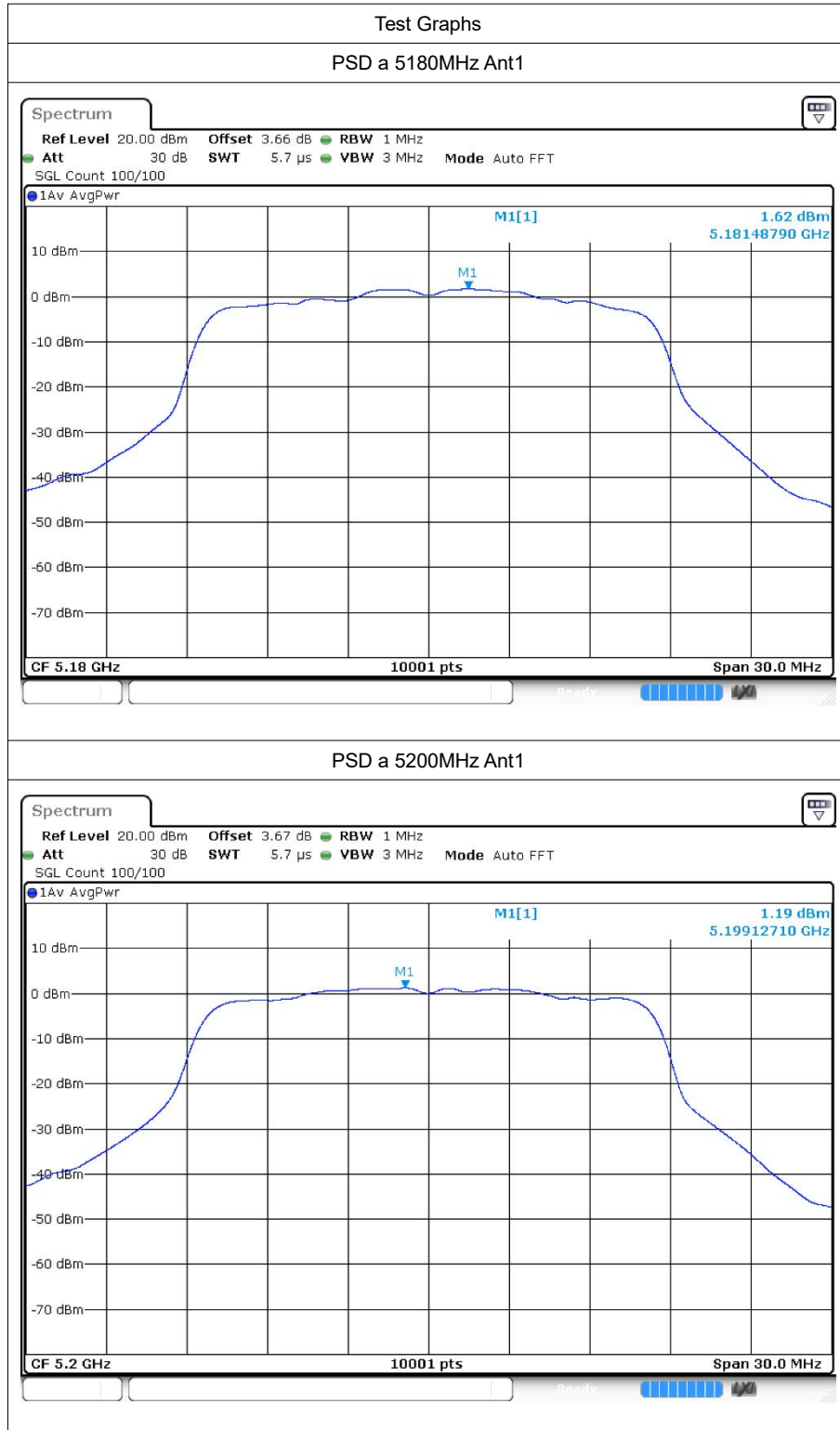


5 Maximum Power Spectral Density Level

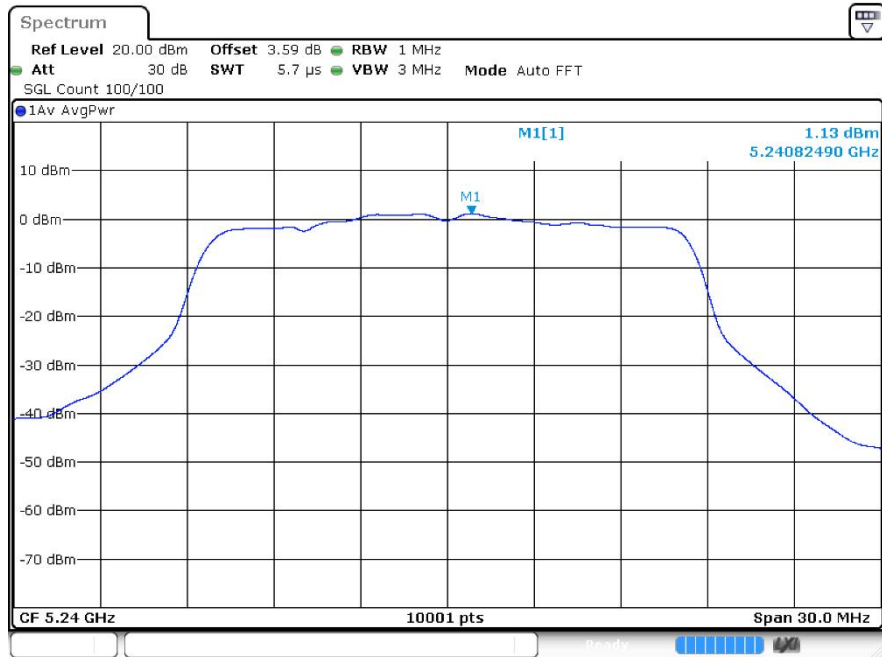
5.1 Test Result

Mode	Frequency (MHz)	Antenna	Conducted PSD (dBm)	Duty Factor (dB)	Total PSD (dBm)	Limit (dBm)	Verdict
a	5180	Ant1	1.62	0.46	2.08	11	Pass
a	5200	Ant1	1.19	0.46	1.65	11	Pass
a	5240	Ant1	1.13	0.46	1.59	11	Pass
n20	5180	Ant1	2.02	0.46	2.48	11	Pass
n20	5200	Ant1	1.03	0.46	1.49	11	Pass
n20	5240	Ant1	1.09	0.46	1.55	11	Pass
n40	5190	Ant1	-2.37	0.47	-1.9	11	Pass
n40	5230	Ant1	-2.85	0.46	-2.39	11	Pass
ac20	5180	Ant1	0.93	0.46	1.39	11	Pass
ac20	5200	Ant1	0.71	0.46	1.17	11	Pass
ac20	5240	Ant1	1.37	0.46	1.83	11	Pass
ax20	5180	Ant1	0.24	0.46	0.7	11	Pass
ax20	5200	Ant1	-0.57	0.47	-0.1	11	Pass
ax20	5240	Ant1	-0.44	0.46	0.02	11	Pass

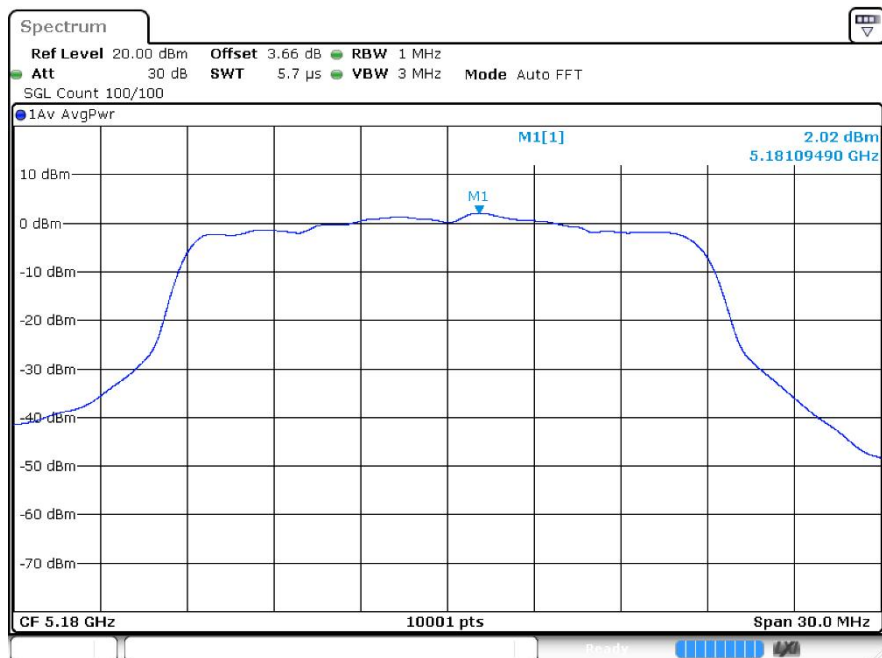
5.2 Test Graphs



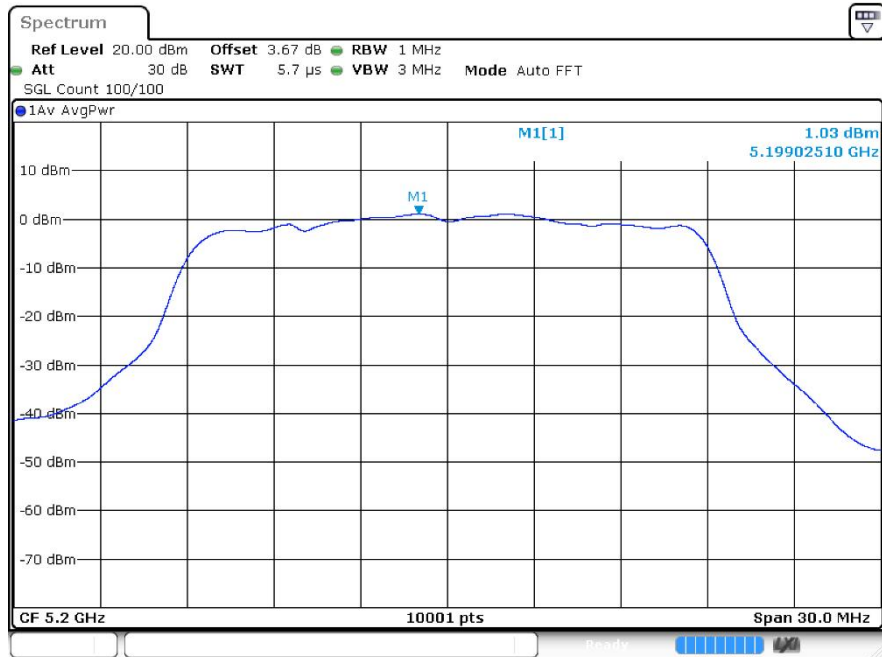
PSD a 5240MHz Ant1



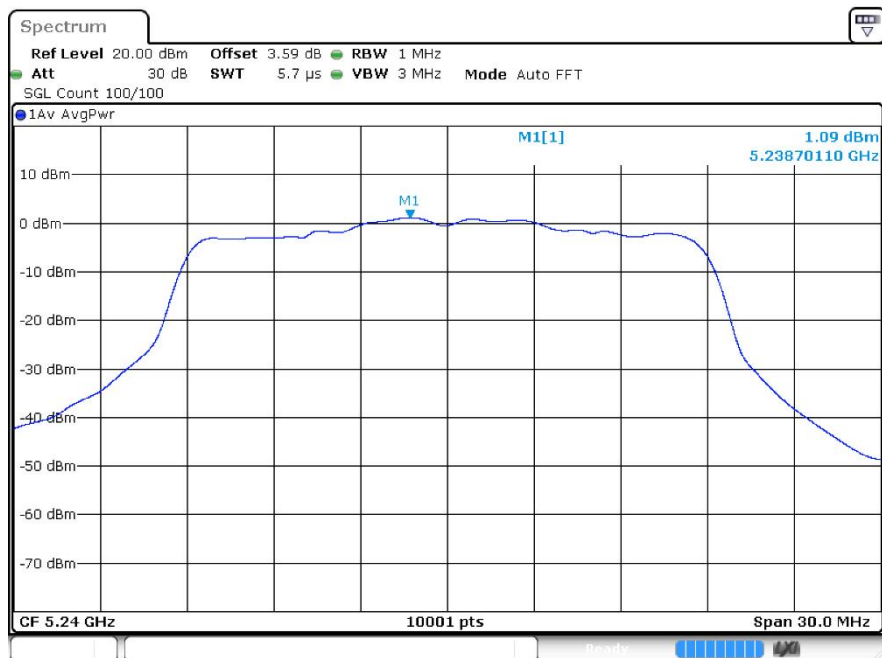
PSD n20 5180MHz Ant1



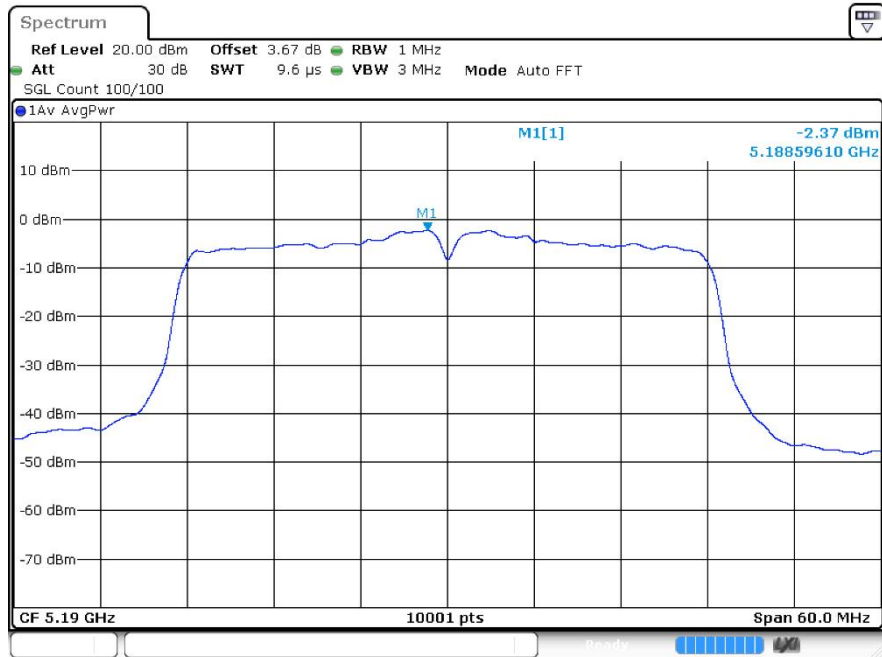
PSD n20 5200MHz Ant1



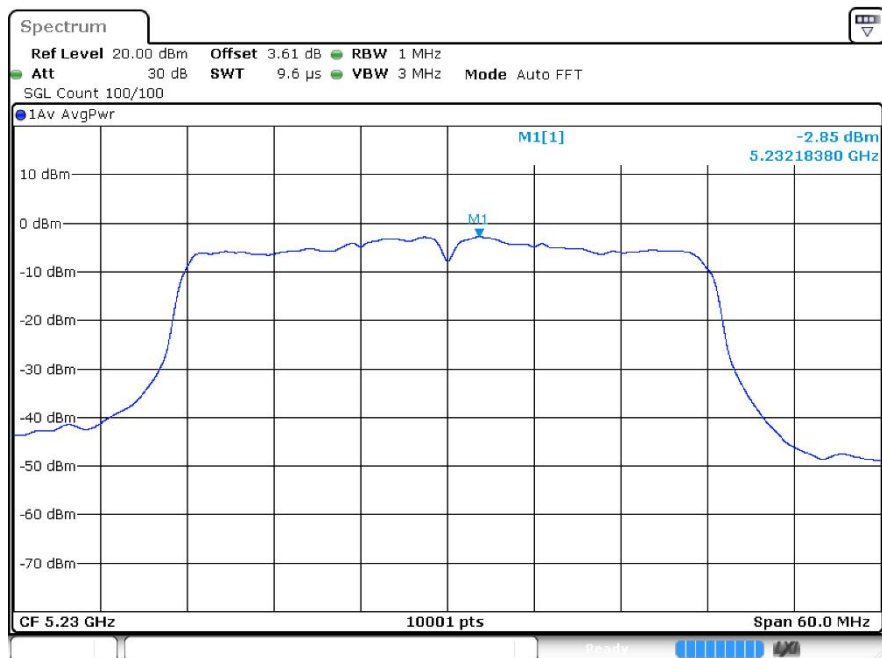
PSD n20 5240MHz Ant1



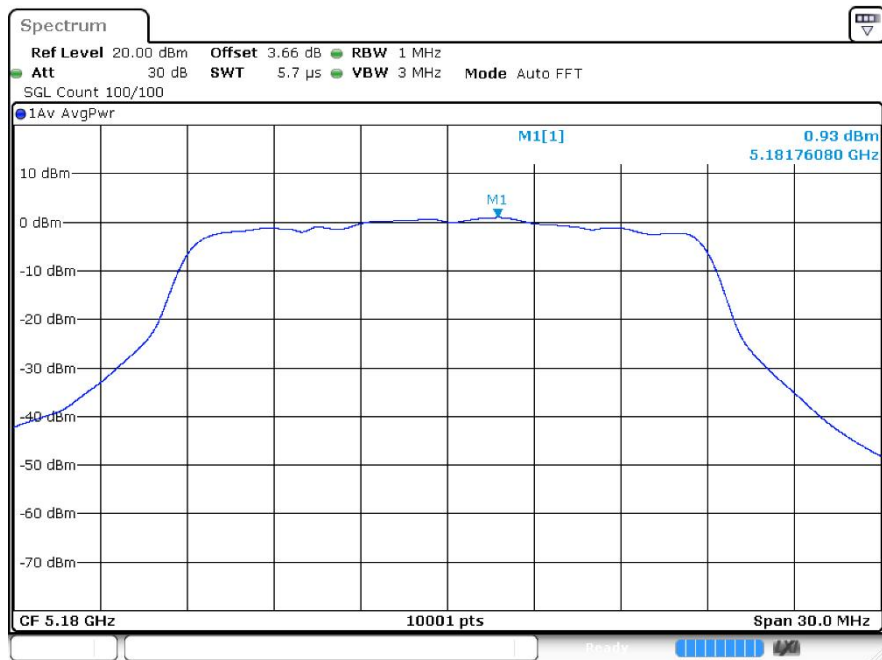
PSD n40 5190MHz Ant1



PSD n40 5230MHz Ant1



PSD ac20 5180MHz Ant1



PSD ac20 5200MHz Ant1

