

RF Test Data for 5G Wi-Fi (Conducted Measurements)

General Description of EUT	
Product Name:	Heltec Indoor Hotspot
Test Model:	HT-M2808
Sample ID:	20210603-15-2#
Environmental Conditions	
Temperature:	24.3°C
Relative Humidity:	52%
Test Voltage:	DC 12V
Test Engineer:	Huang jianping
Note: For a more detailed features description, please refer to the report TB-RF183070.	

Contents

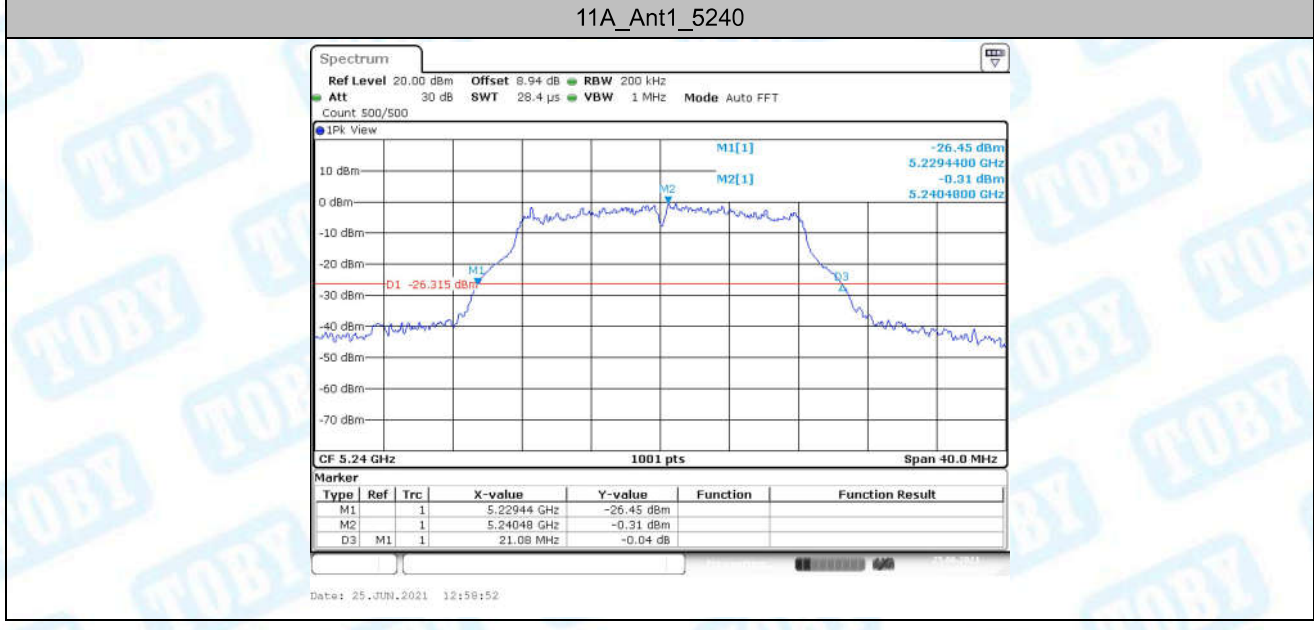
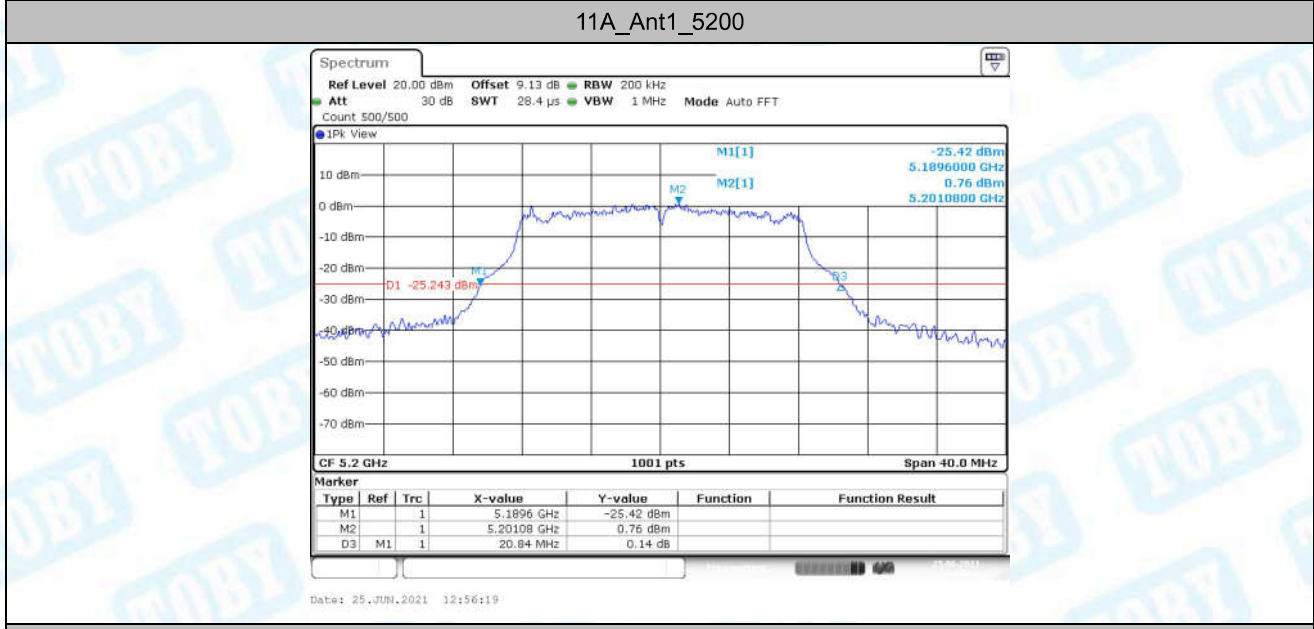
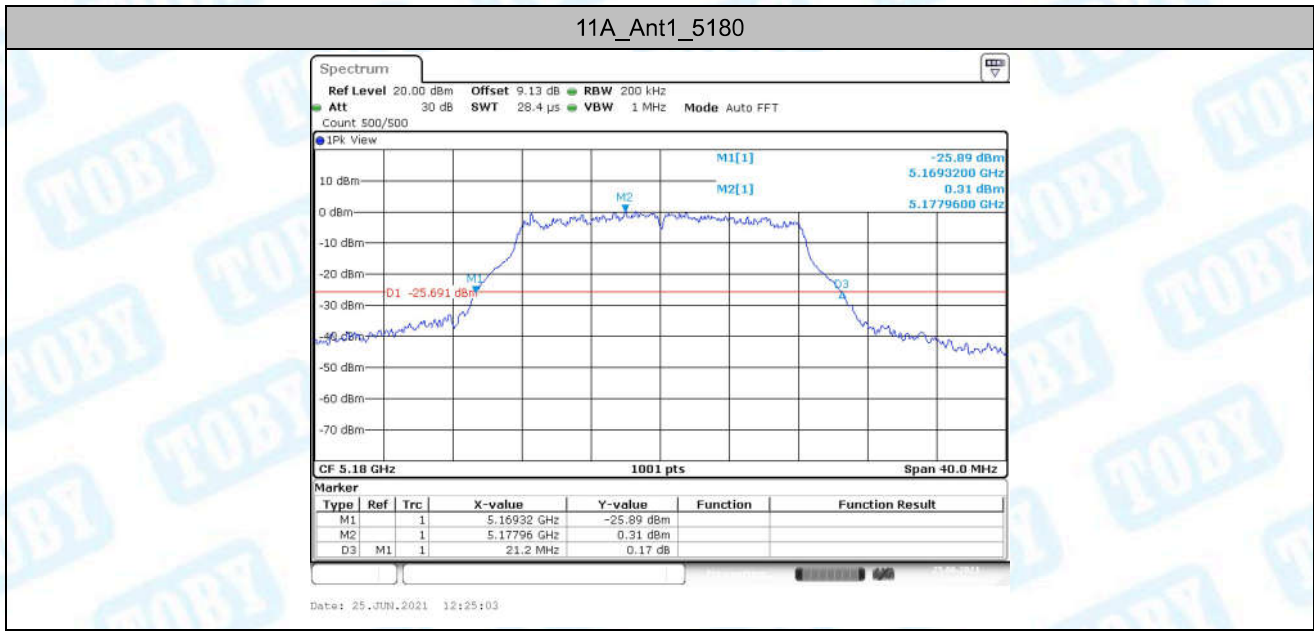
1. Emission Bandwidth.....	3
1.1. Test Result.....	3
1.2. Test Graphs.....	4
2. Occupied channel bandwidth.....	9
2.1. Test Result.....	9
2.2. Test Graphs.....	10
3. Maximum conducted output power.....	15
3.1. Test Result.....	15
4. Maximum power spectral density.....	16
4.1. Test Result.....	16
5.2. Test Graphs.....	17
5. Band edge measurements.....	22
5.1. Test Result.....	22
5.2. Test Graphs.....	23
7. Emissions in Restricted Bands.....	27
7.1. Test Result.....	27
7.2. Test Graphs.....	29
8. Conducted Spurious Emission.....	37
8.1. Test Result.....	37
8.2. Test Graphs.....	38
9. Frequency Stability.....	48
9.1. Test Result.....	48
10. Duty Cycle.....	49
10.1. Test Result.....	49
10.2. Test Graphs.....	50

1. Emission Bandwidth

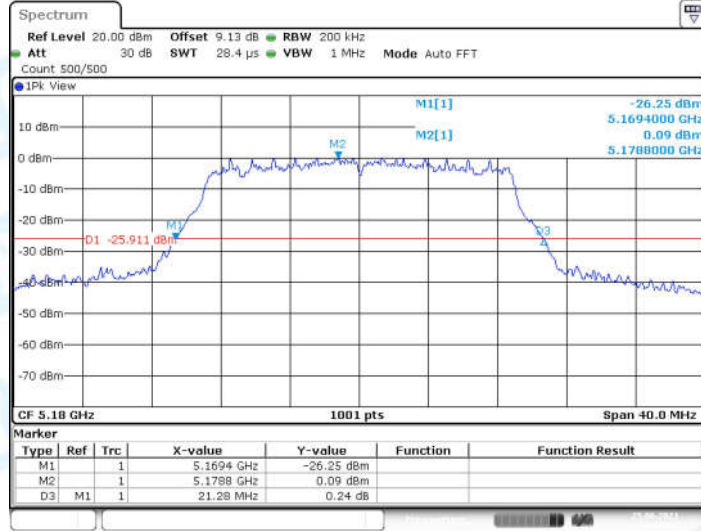
1.1. Test Result

TestMode	Antenna	Channel	26db EBW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11A	Ant1	5180	21.200	5169.320	5190.520	---	PASS
		5200	20.840	5189.600	5210.440	---	PASS
		5240	21.080	5229.440	5250.520	---	PASS
11N20SISO	Ant1	5180	21.280	5169.400	5190.680	---	PASS
		5200	21.360	5189.320	5210.680	---	PASS
		5240	21.480	5229.360	5250.840	---	PASS
11N40SISO	Ant1	5190	39.840	5170.160	5210.000	---	PASS
		5230	39.680	5210.400	5250.080	---	PASS
11AC20SISO	Ant1	5180	21.200	5169.400	5190.600	---	PASS
		5200	21.480	5189.360	5210.840	---	PASS
		5240	21.400	5229.320	5250.720	---	PASS
11AC40SISO	Ant1	5190	39.760	5170.240	5210.000	---	PASS
		5230	39.680	5210.160	5249.840	---	PASS
11AC80SISO	Ant1	5210	79.840	5170.320	5250.160	---	PASS

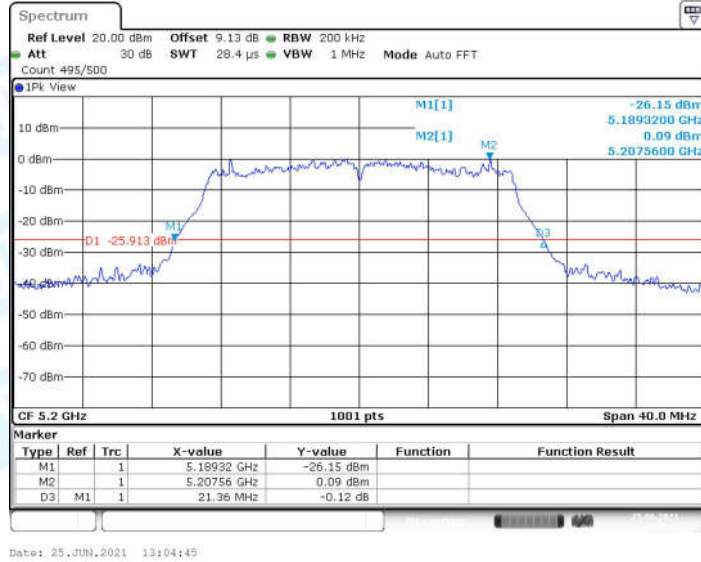
1.2. Test Graphs



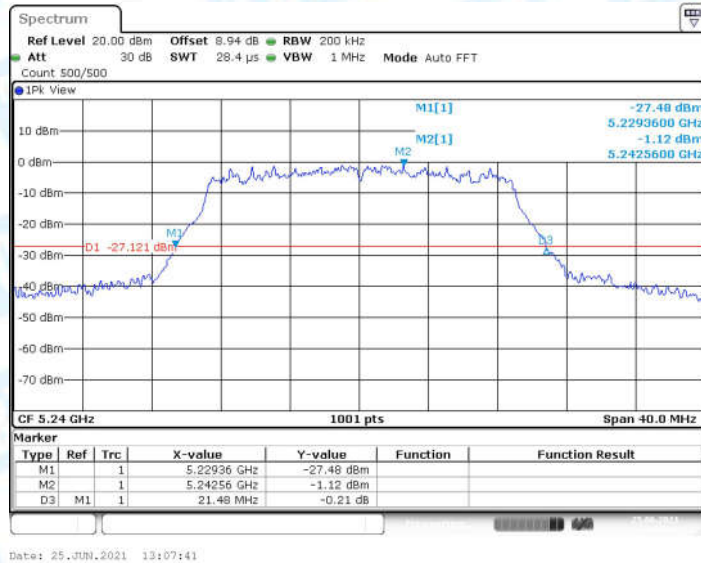
11N20SISO_Ant1_5180



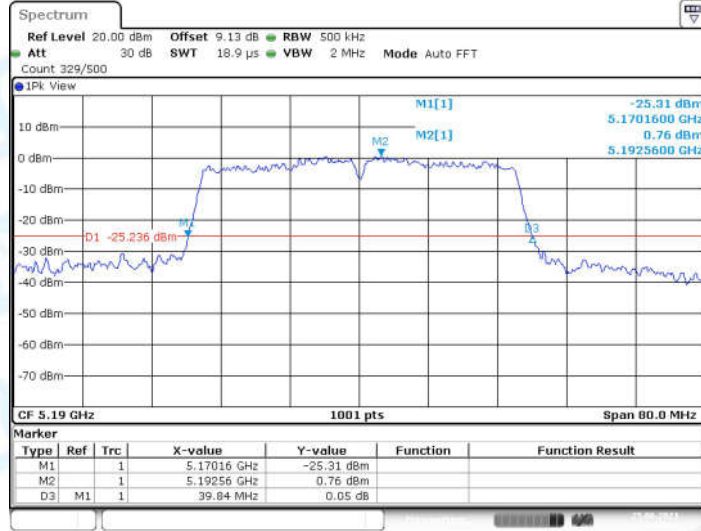
11N20SISO_Ant1_5200



11N20SISO_Ant1_5240

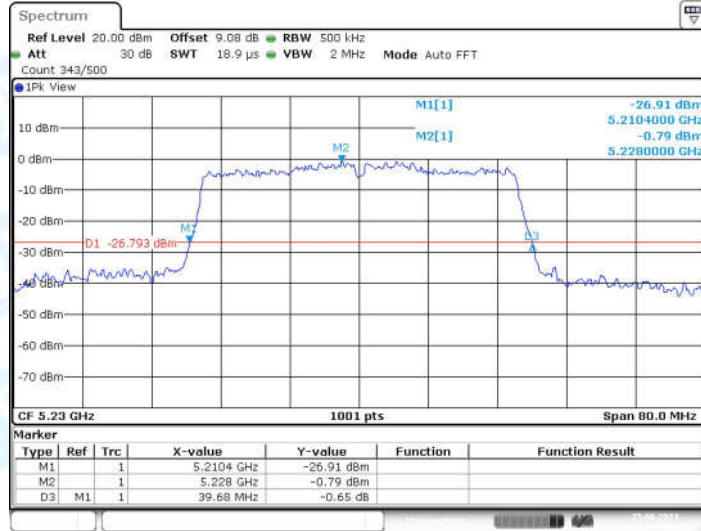


11N40SISO_Ant1_5190



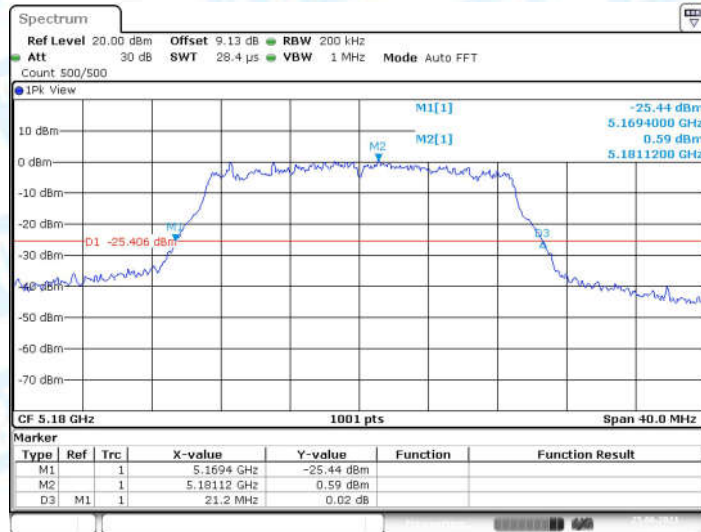
Date: 25 JUN 2021 13:10:22

11N40SISO_Ant1_5230



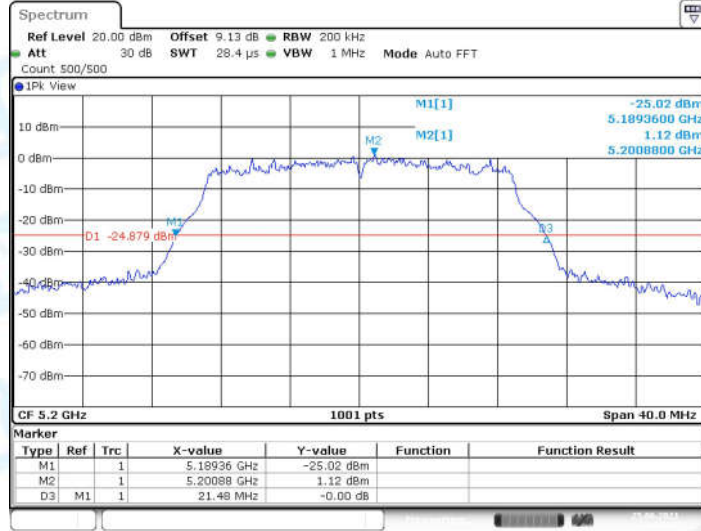
Date: 25 JUN 2021 13:55:01

11AC20SISO_Ant1_5180

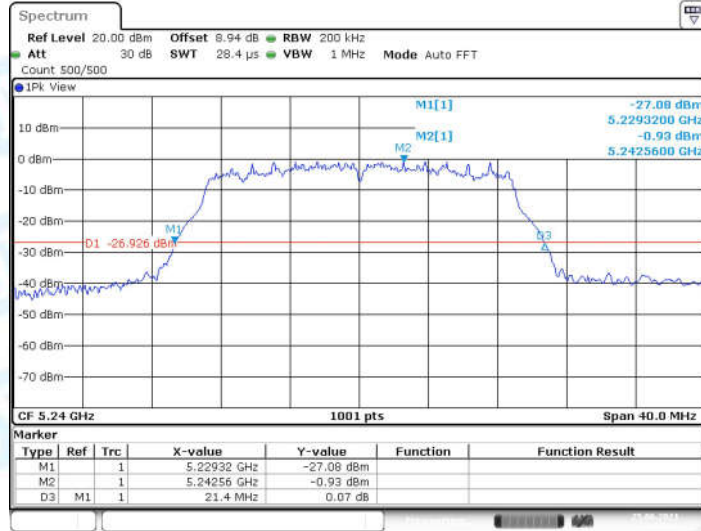


Date: 25 JUN 2021 13:59:12

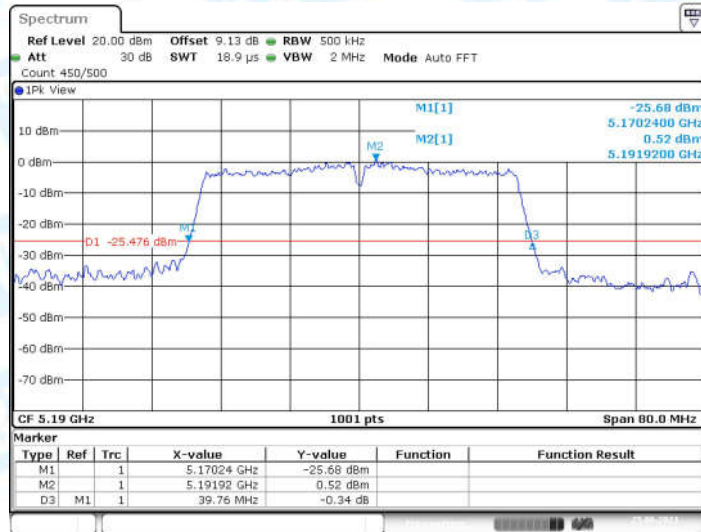
11AC20SISO_Ant1_5200



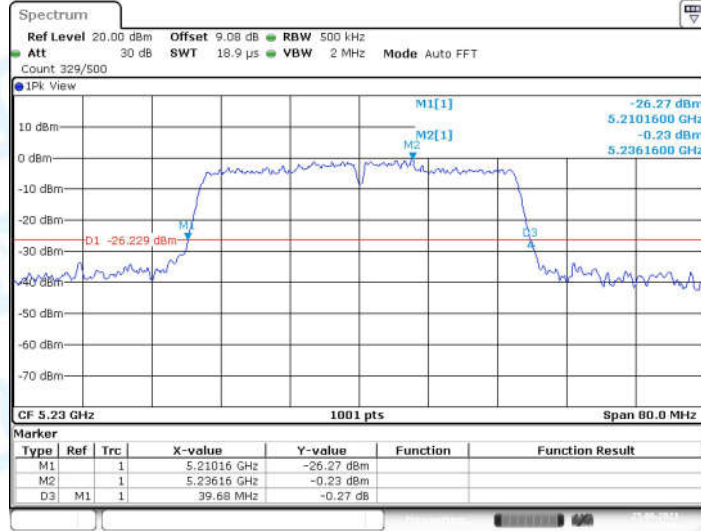
11AC20SISO_Ant1_5240



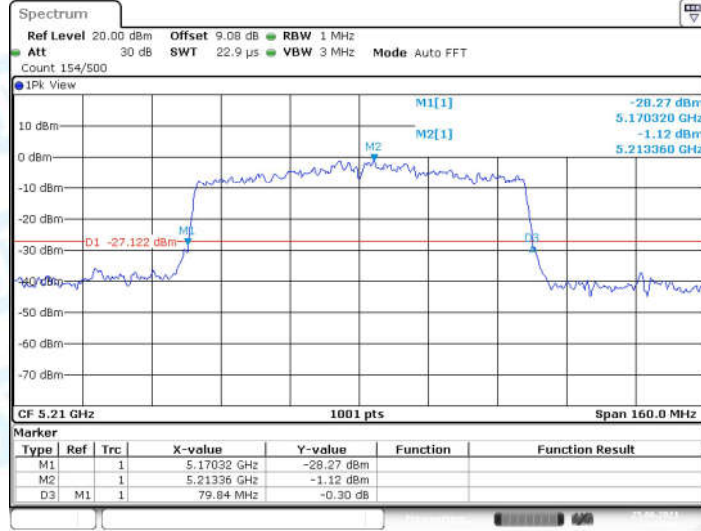
11AC40SISO_Ant1_5190



11AC40SISO_Ant1_5230



11AC80SISO_Ant1_5210

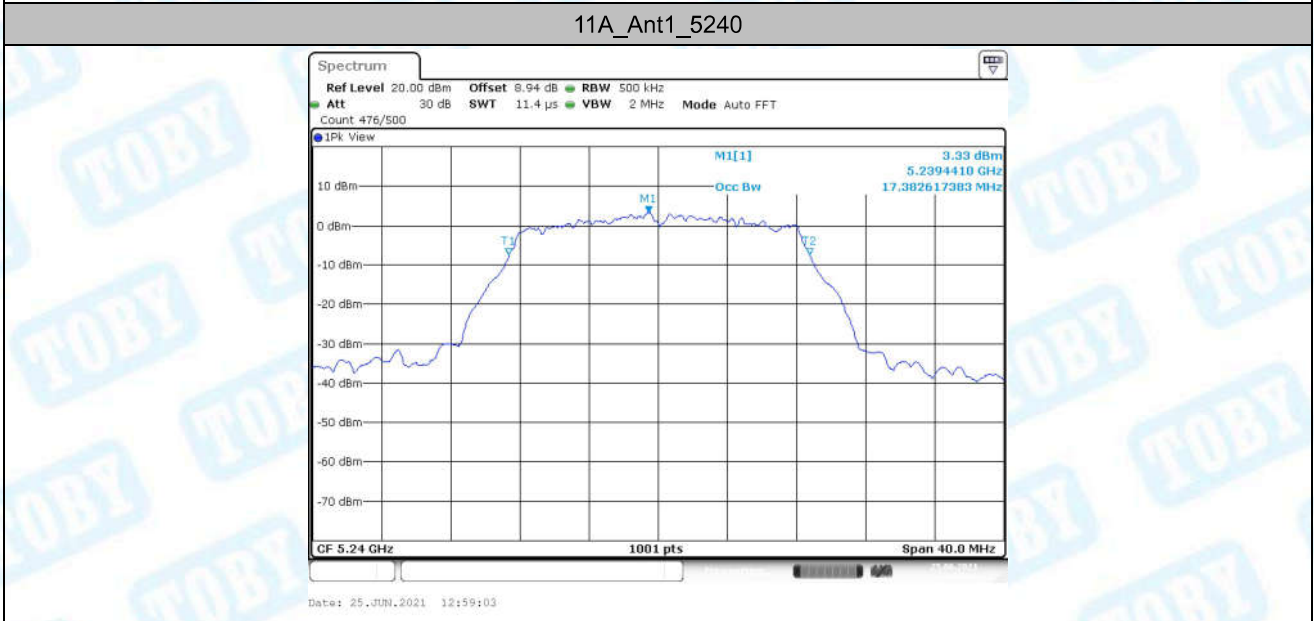
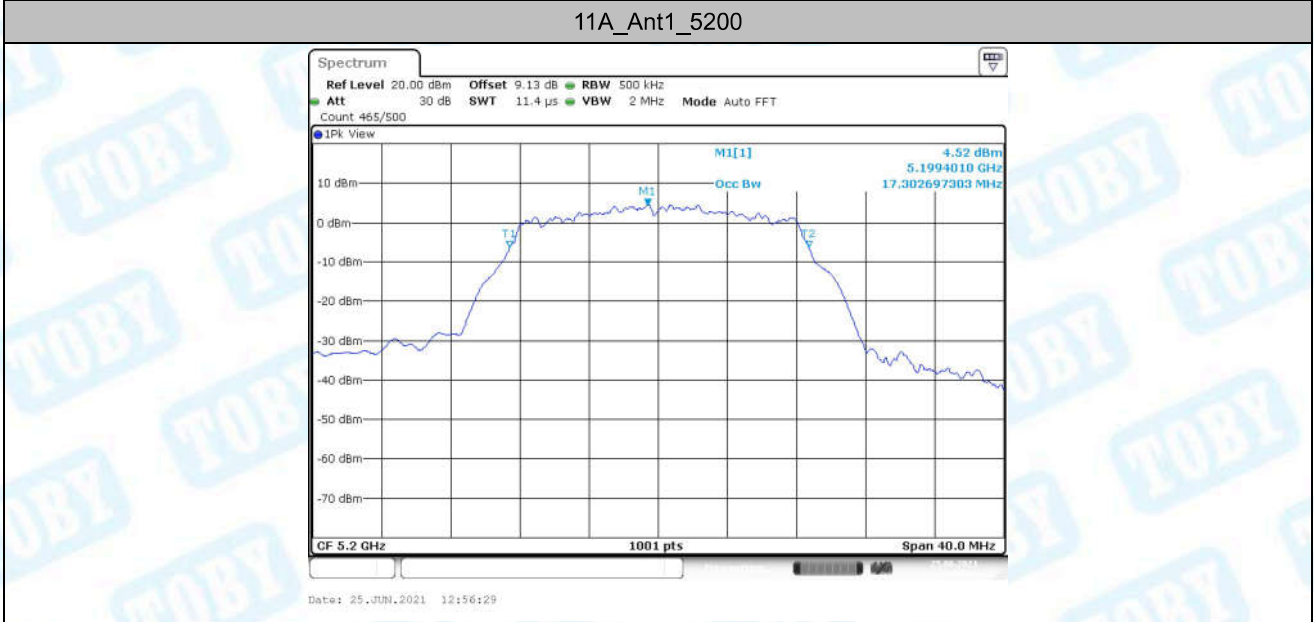
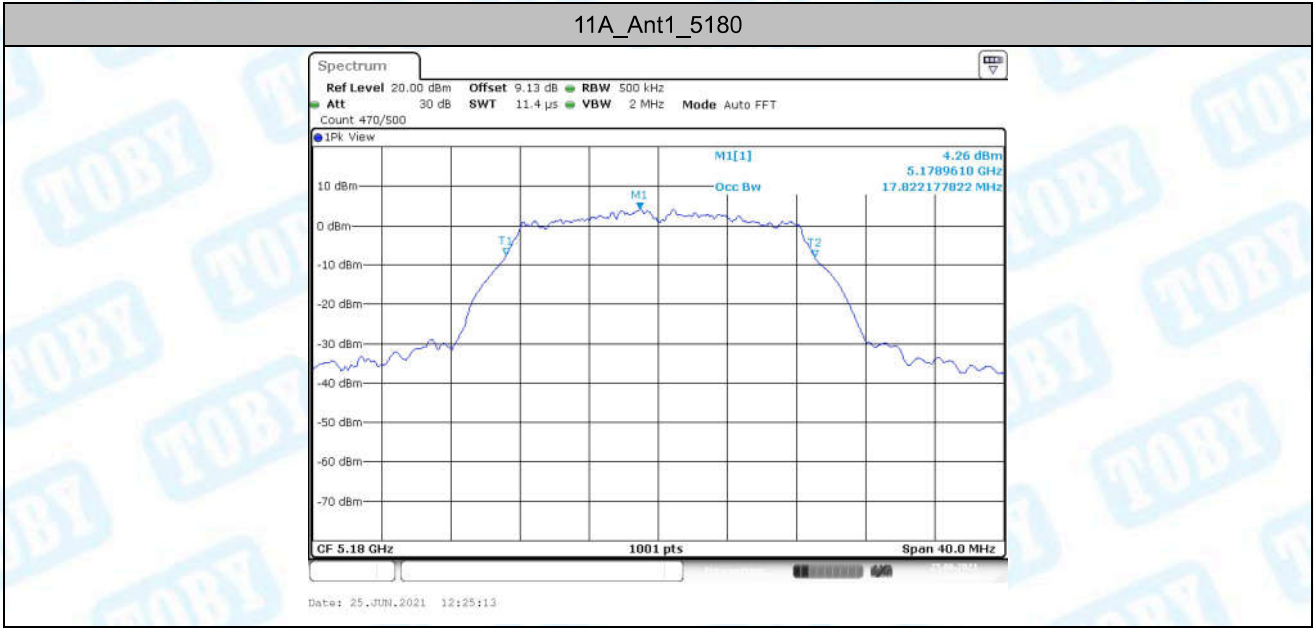


2. Occupied channel bandwidth

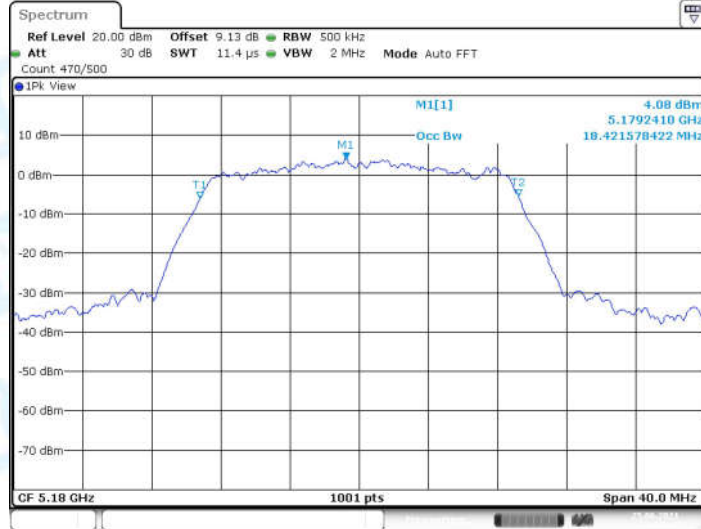
2.1. Test Result

TestMode	Antenna	Channel	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11A	Ant1	5180	17.822	5171.209	5189.031	---	PASS
		5200	17.303	5191.409	5208.711	---	PASS
		5240	17.383	5231.369	5248.751	---	PASS
11N20SISO	Ant1	5180	18.422	5170.769	5189.191	---	PASS
		5200	18.262	5191.009	5209.271	---	PASS
		5240	18.462	5230.849	5249.311	---	PASS
11N40SISO	Ant1	5190	36.523	5171.778	5208.302	---	PASS
		5230	36.284	5211.938	5248.222	---	PASS
11AC20SISO	Ant1	5180	18.342	5170.809	5189.151	---	PASS
		5200	18.222	5190.929	5209.151	---	PASS
		5240	18.222	5231.049	5249.271	---	PASS
11AC40SISO	Ant1	5190	36.204	5171.938	5208.142	---	PASS
		5230	36.204	5211.938	5248.142	---	PASS
11AC80SISO	Ant1	5210	75.604	5172.278	5247.882	---	PASS

2.2. Test Graphs

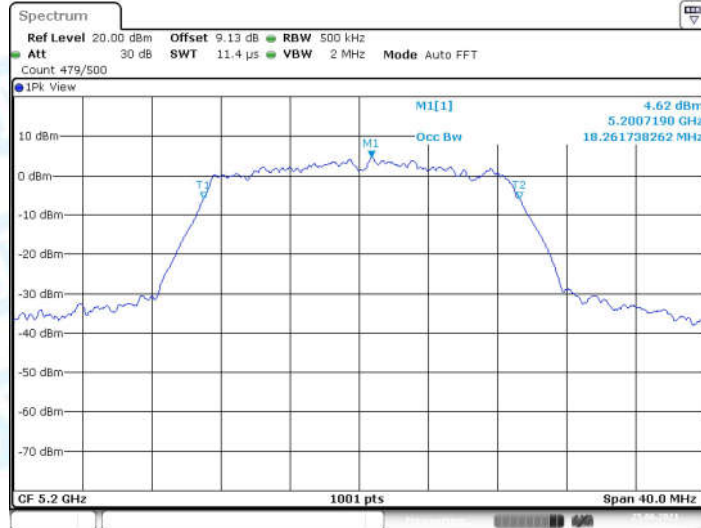


11N20SISO_Ant1_5180



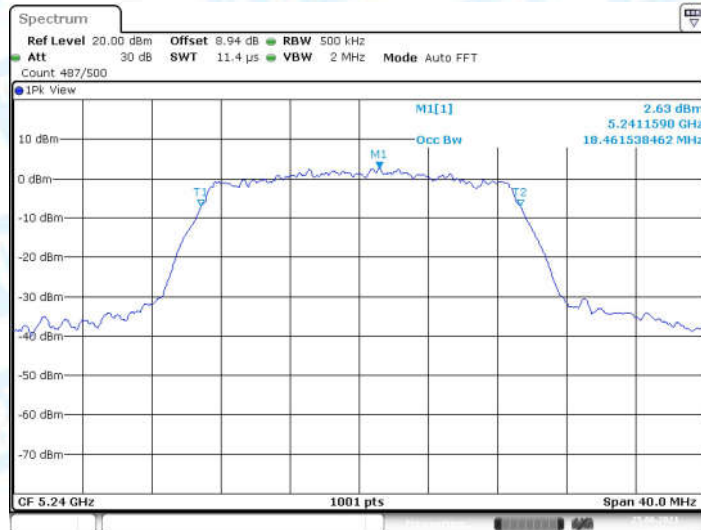
Date: 25 JUN.2021 13:01:47

11N20SISO_Ant1_5200



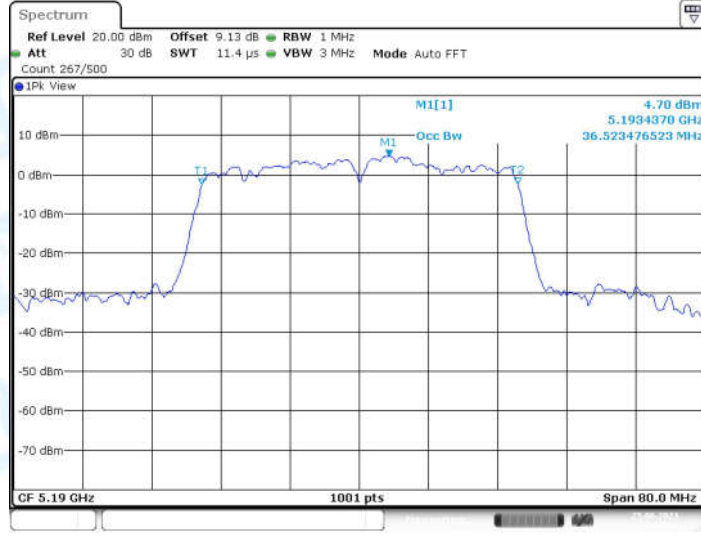
Date: 25 JUN.2021 13:04:55

11N20SISO_Ant1_5240



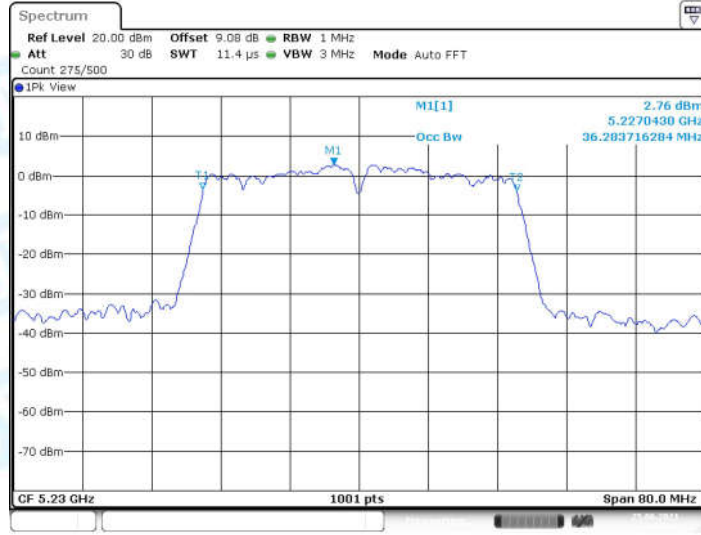
Date: 25 JUN.2021 13:07:51

11N40SISO_Ant1_5190



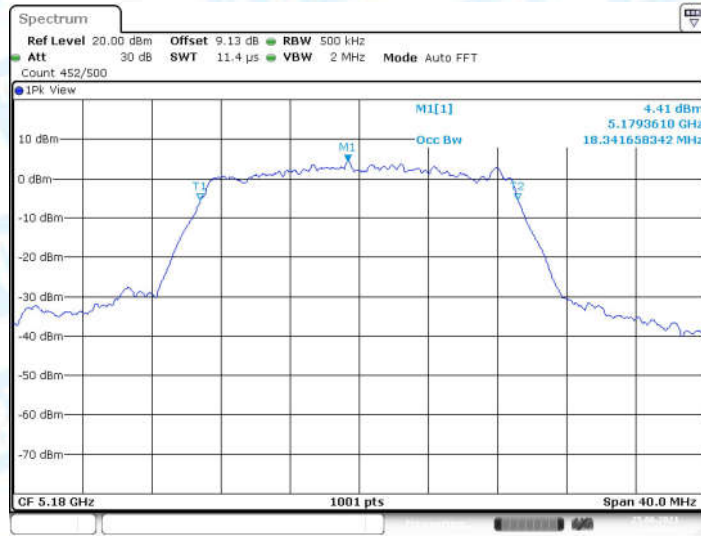
Date: 25 JUN 2021 13:10:32

11N40SISO_Ant1_5230



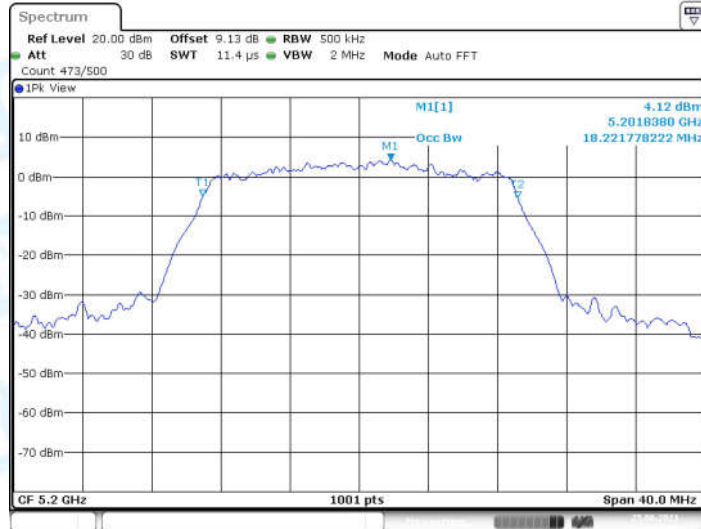
Date: 25 JUN 2021 13:55:12

11AC20SISO_Ant1_5180



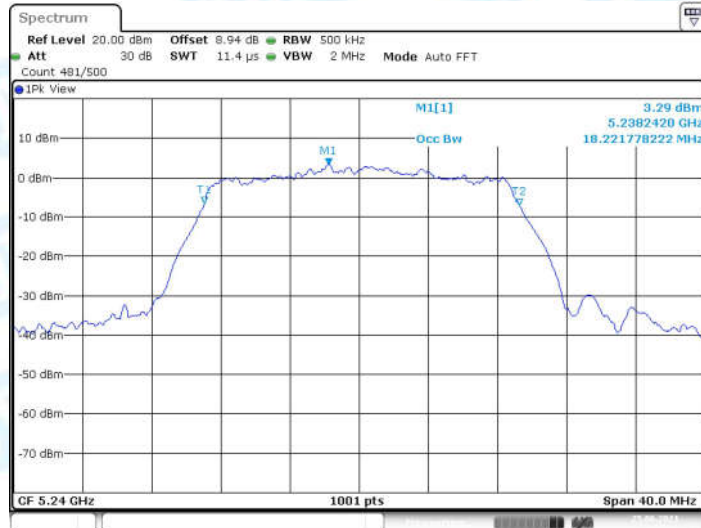
Date: 25 JUN 2021 13:59:22

11AC20SISO_Ant1_5200



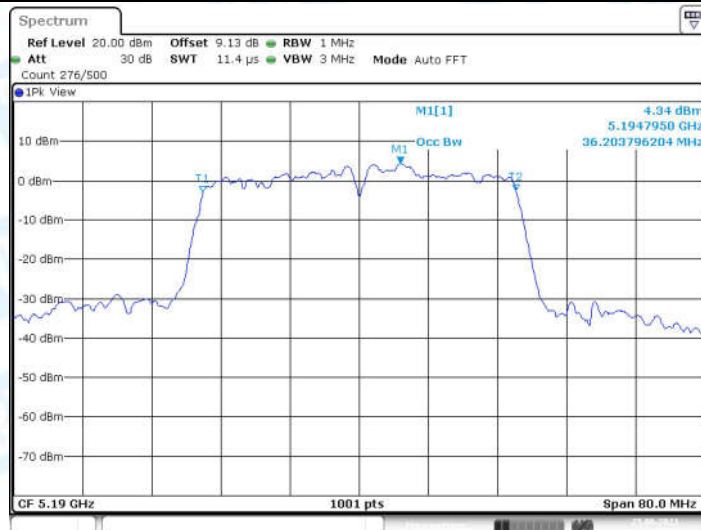
Date: 25 JUN 2021 14:03:07

11AC20SISO_Ant1_5240



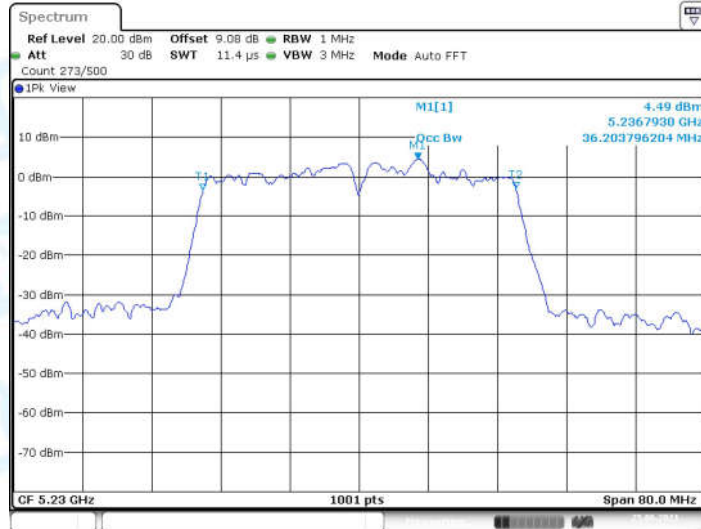
Date: 25 JUN 2021 14:05:33

11AC40SISO_Ant1_5190



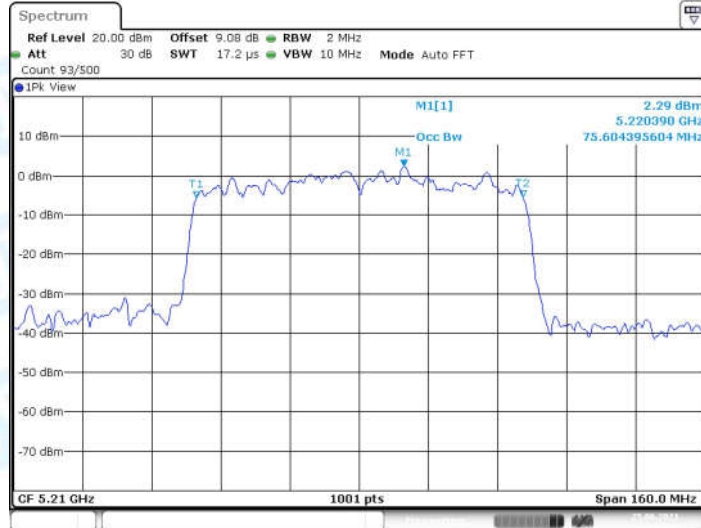
Date: 25 JUN 2021 14:16:06

11AC40SISO_Ant1_5230



Date: 25 JUN 2021 14:19:50

11AC80SISO_Ant1_5210



Date: 25 JUN 2021 14:35:11

3. Maximum conducted output power

3.1. Test Result

TestMode	Antenna	Channel	Conducted power [dBm]	Limit [dBm]	EIRP [dBm]	Limit [dBm]	Verdict
11A	Ant1	5180	10.95	<=23.98	15.95	<=22.51	PASS
		5200	10.97	<=23.98	15.97	<=22.38	PASS
		5240	9.87	<=23.98	14.87	<=22.40	PASS
11N20SISO	Ant1	5180	10.66	<=23.98	15.66	<=22.65	PASS
		5200	10.70	<=23.98	15.70	<=22.62	PASS
		5240	9.38	<=23.98	14.38	<=22.66	PASS
11N40SISO	Ant1	5190	9.55	<=23.98	14.55	<=23	PASS
		5230	8.92	<=23.98	13.92	<=23	PASS
11AC20SISO	Ant1	5180	10.74	<=23.98	15.74	<=22.63	PASS
		5200	10.74	<=23.98	15.74	<=22.61	PASS
		5240	9.60	<=23.98	14.60	<=22.61	PASS
11AC40SISO	Ant1	5190	9.88	<=23.98	14.88	<=23	PASS
		5230	9.13	<=23.98	14.13	<=23	PASS
11AC80SISO	Ant1	5210	7.54	<=23.98	12.54	<=23	PASS

Note: The Duty Cycle Factor is compensated in the graph.

4. Maximum power spectral density

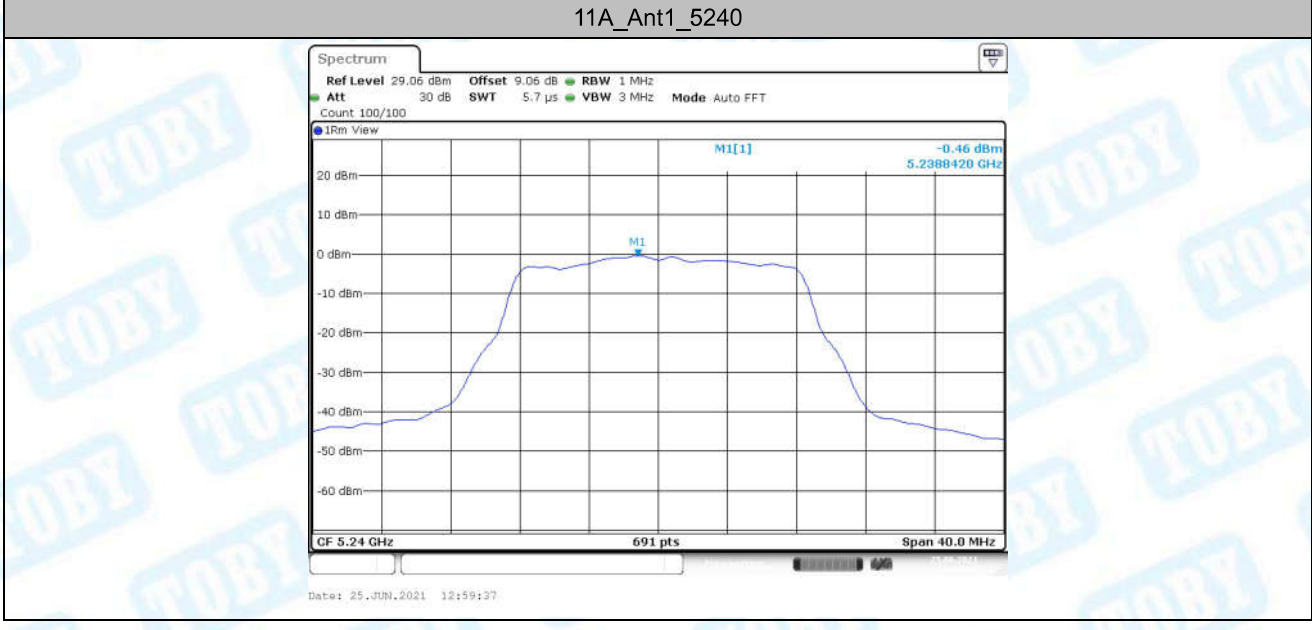
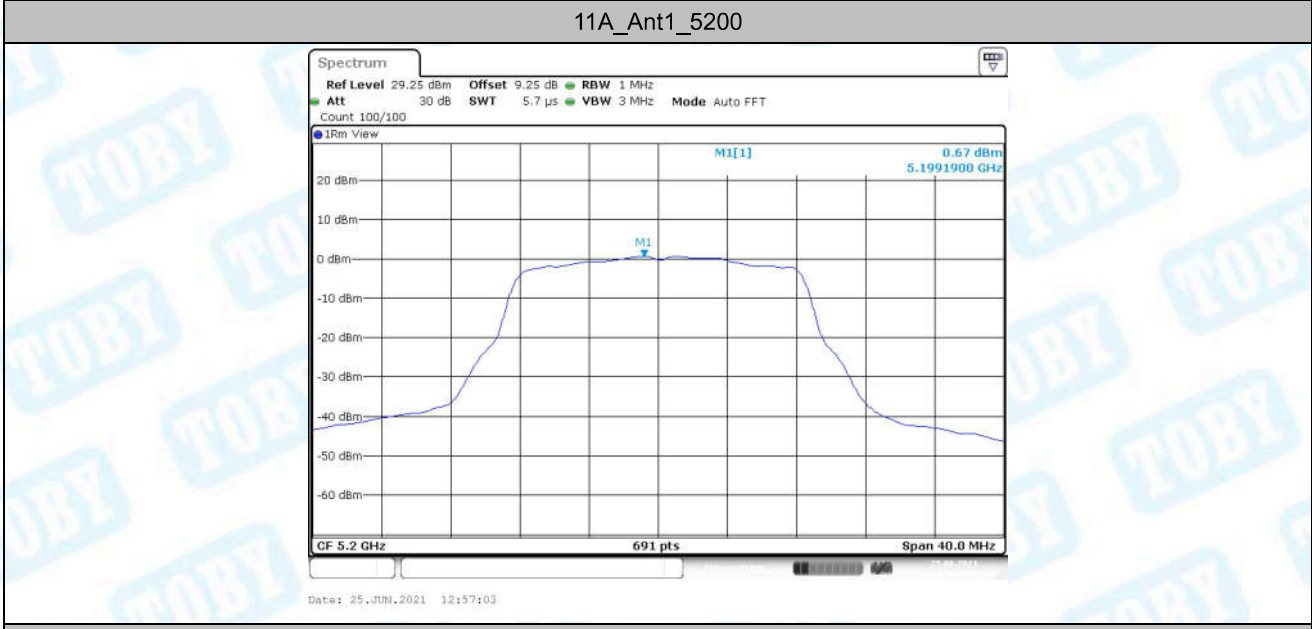
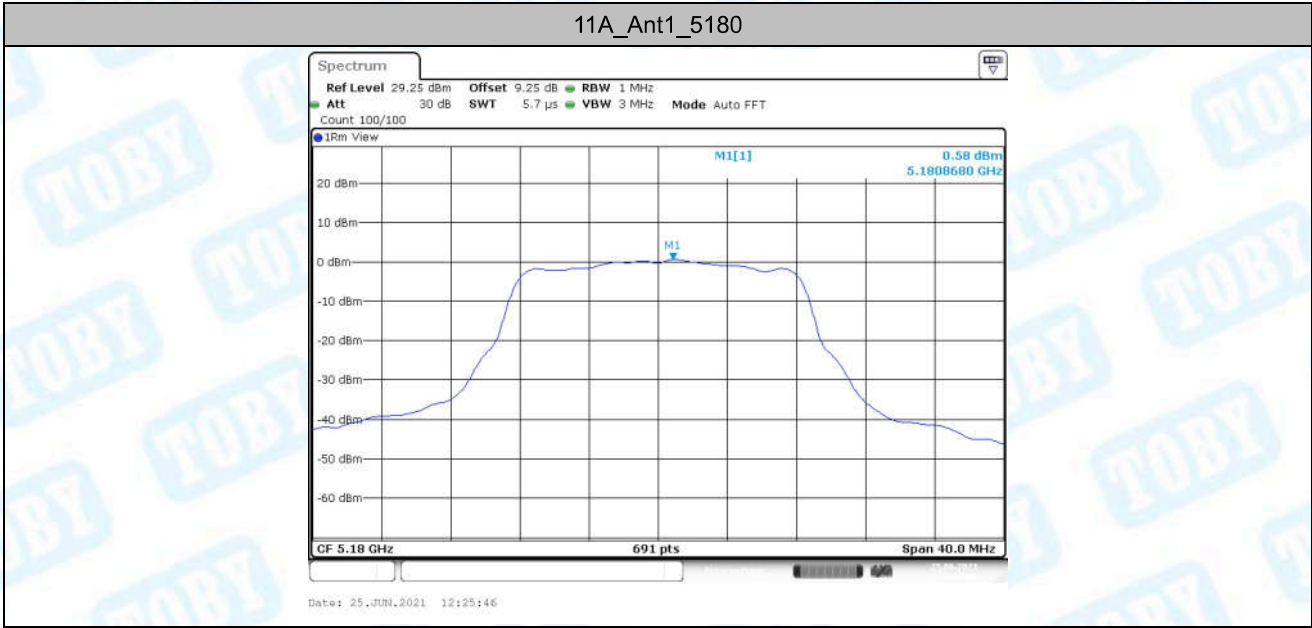
4.1. Test Result

TestMode	Antenna	Channel	Power [dBm/MHz]	Limit [dBm/MHz]	EIRP [dBm/MHz]	Limit [dBm/MHz]	Verdict
11A	Ant1	5180	0.58	<=11	5.58	<=10	PASS
		5200	0.67	<=11	5.67	<=10	PASS
		5240	-0.46	<=11	4.54	<=10	PASS
11N20SISO	Ant1	5180	-0.1	<=11	4.90	<=10	PASS
		5200	0.41	<=11	5.41	<=10	PASS
		5240	-1.31	<=11	3.69	<=10	PASS
11N40SISO	Ant1	5190	-4.03	<=11	0.97	<=10	PASS
		5230	-4.68	<=11	0.32	<=10	PASS
11AC20SISO	Ant1	5180	0.25	<=11	5.25	<=10	PASS
		5200	0.26	<=11	5.26	<=10	PASS
		5240	-1.04	<=11	3.96	<=10	PASS
11AC40SISO	Ant1	5190	-3.28	<=11	1.72	<=10	PASS
		5230	-4.36	<=11	0.64	<=10	PASS
11AC80SISO	Ant1	5210	-7.69	<=11	-2.69	<=10	PASS

Note: 1.The Result and Limit Unit is dBm/500 kHz in the band 5.725–5.85 GHz.

2.The Duty Cycle Factor and RBW Factor is compensated in the graph.

5.2. Test Graphs



11N20SISO_Ant1_5180



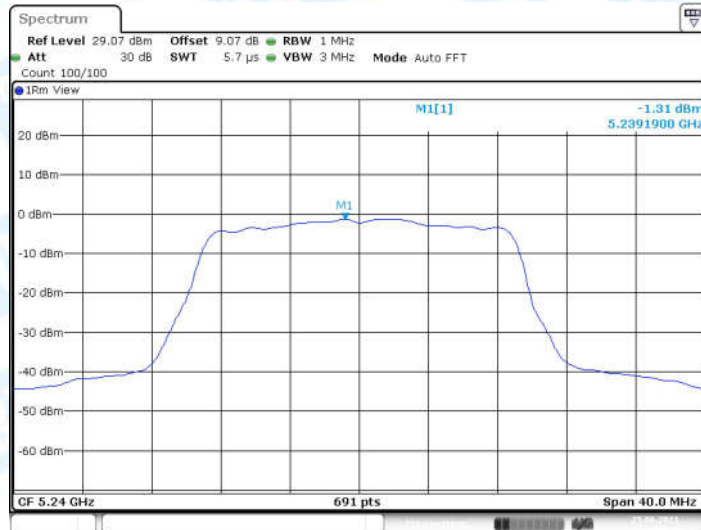
Date: 25 JUN 2021 13:02:21

11N20SISO_Ant1_5200



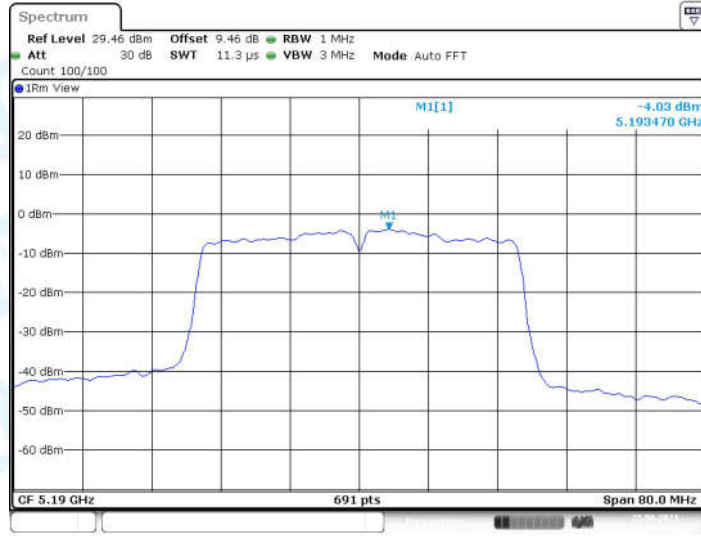
Date: 25 JUN 2021 13:05:29

11N20SISO_Ant1_5240



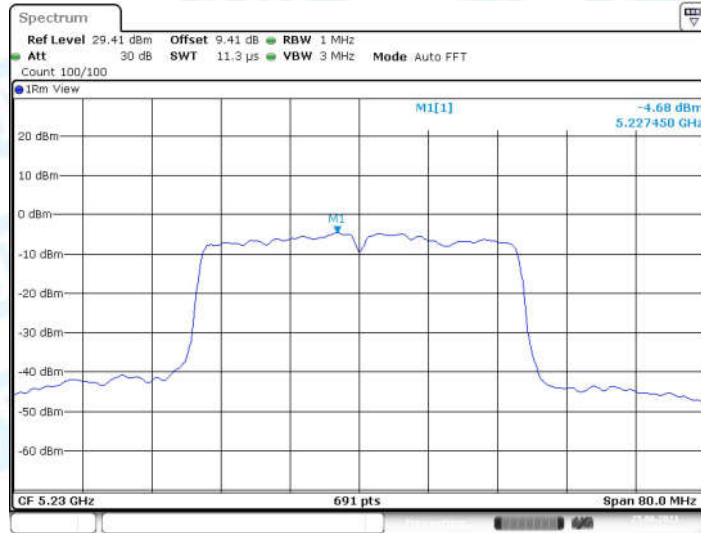
Date: 25 JUN 2021 13:06:25

11N40SISO_Ant1_5190



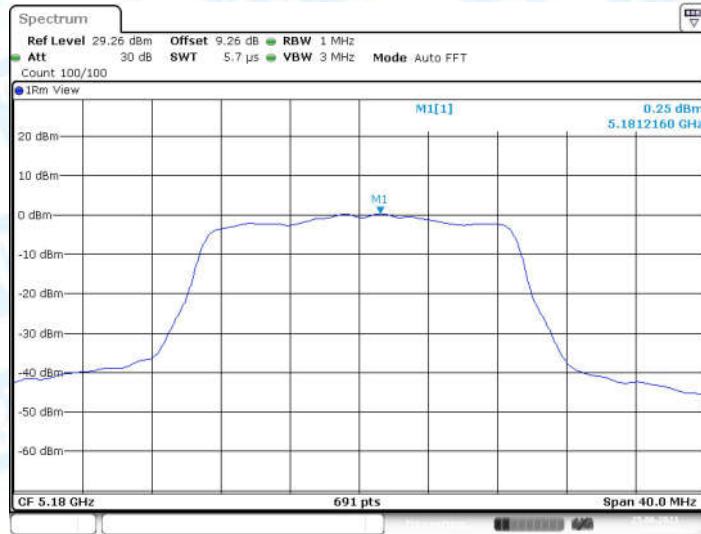
Date: 25 JUN 2021 13:51:41

11N40SISO_Ant1_5230



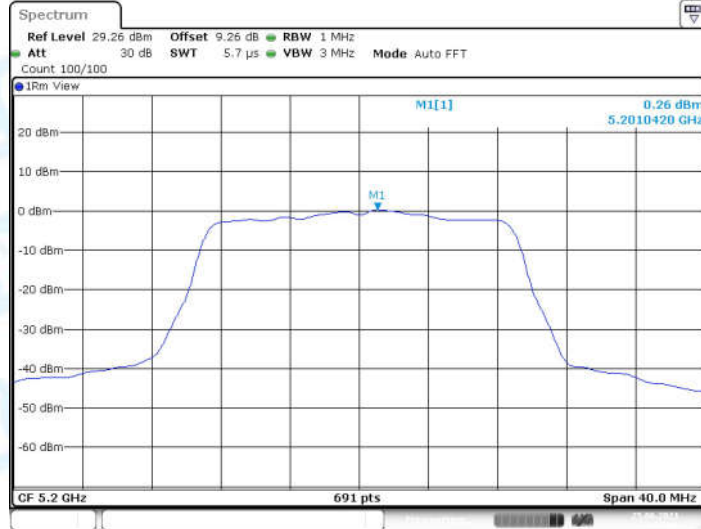
Date: 25 JUN 2021 13:55:43

11AC20SISO_Ant1_5180



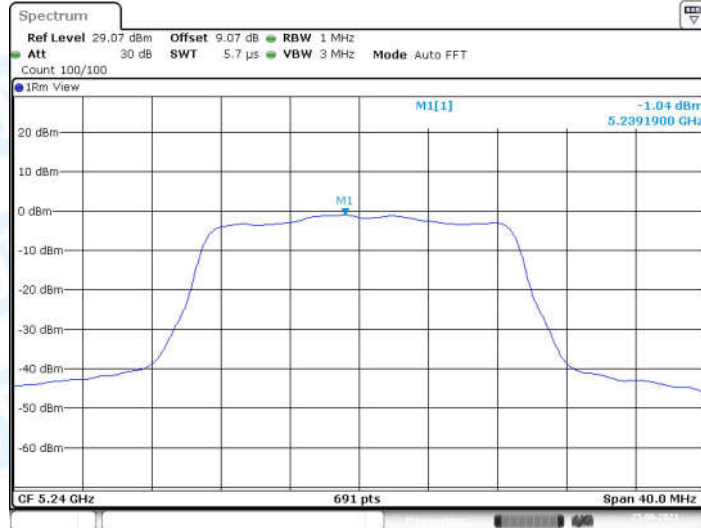
Date: 25 JUN 2021 13:59:56

11AC20SISO_Ant1_5200



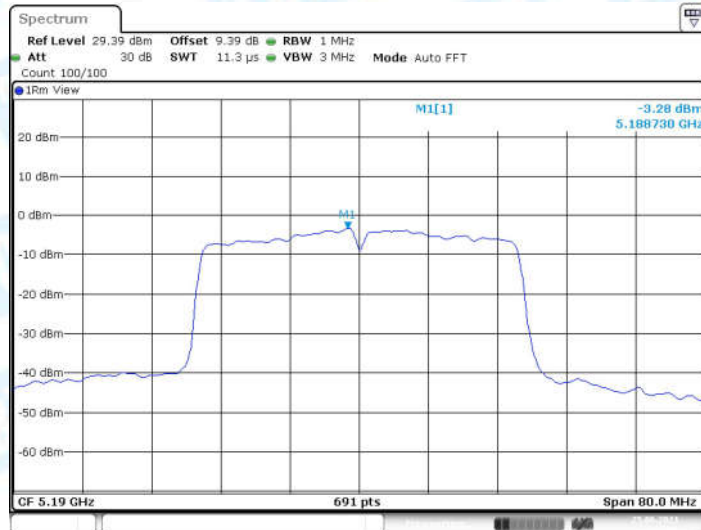
Date: 25 JUN 2021 14:02:14

11AC20SISO_Ant1_5240



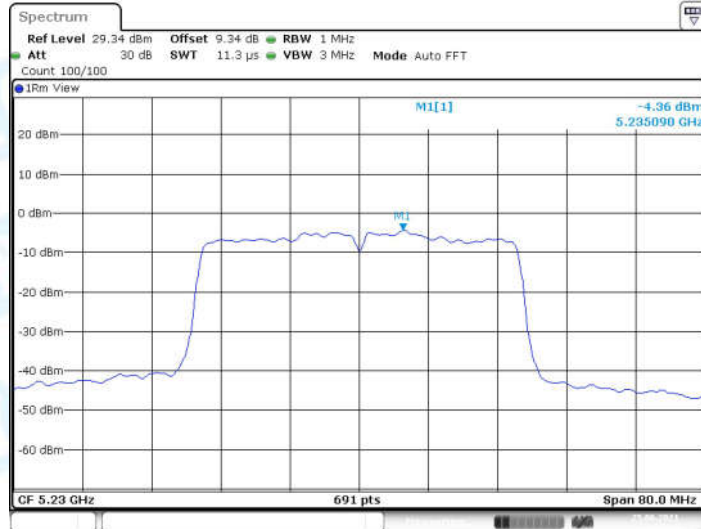
Date: 25 JUN 2021 14:06:07

11AC40SISO_Ant1_5190



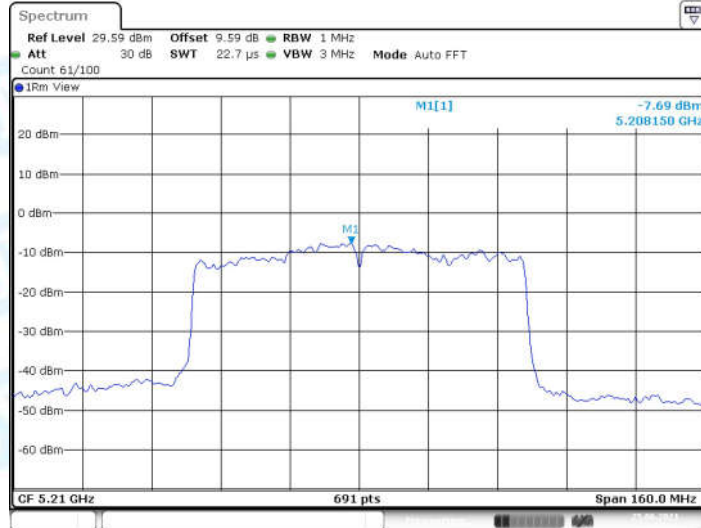
Date: 25 JUN 2021 14:16:40

11AC40SISO_Ant1_5230



Date: 25 JUN, 2021 14:20:24

11AC80SISO_Ant1_5210



Date: 25 JUN, 2021 13:32:30

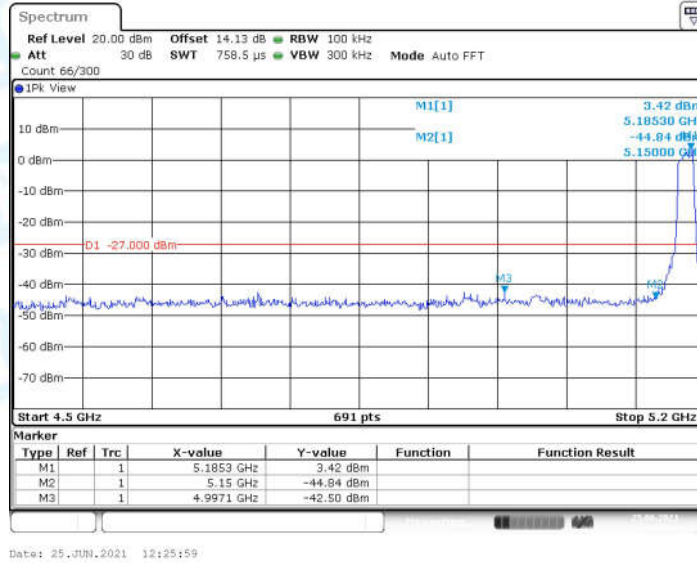
5. Band edge measurements

5.1. Test Result

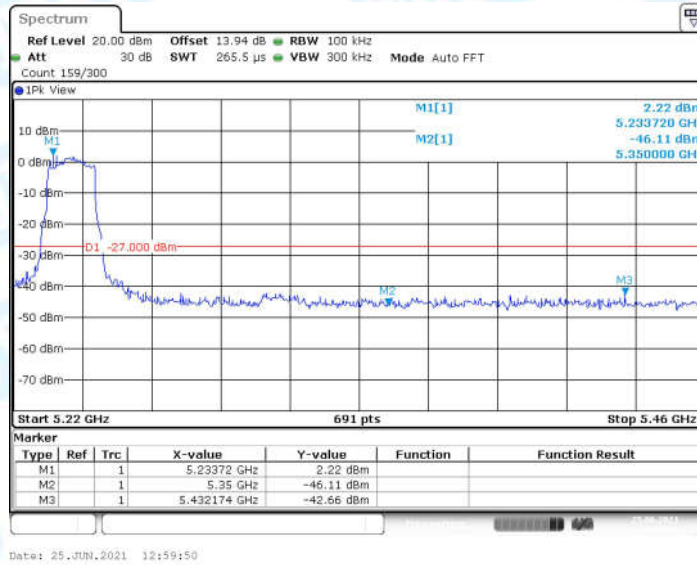
TestMode	Antenna	ChName	Channel	Result[dBm]	Limit[dBm]	Verdict
11A	Ant1	Low	5180	-42.5	<=-27	PASS
		High	5240	-42.66	<=-27	PASS
11N20SISO	Ant1	Low	5180	-42.46	<=-27	PASS
		High	5240	-43.08	<=-27	PASS
11N40SISO	Ant1	Low	5190	-38.55	<=-27	PASS
		High	5230	-42.06	<=-27	PASS
11AC20SISO	Ant1	Low	5180	-42.42	<=-27	PASS
		High	5240	-42.04	<=-27	PASS
11AC40SISO	Ant1	Low	5190	-39.83	<=-27	PASS
		High	5230	-42.31	<=-27	PASS
11AC80SISO	Ant1	Low	5210	-37.26	<=-27	PASS
		High	5210	-43.01	<=-27	PASS

5.2. Test Graphs

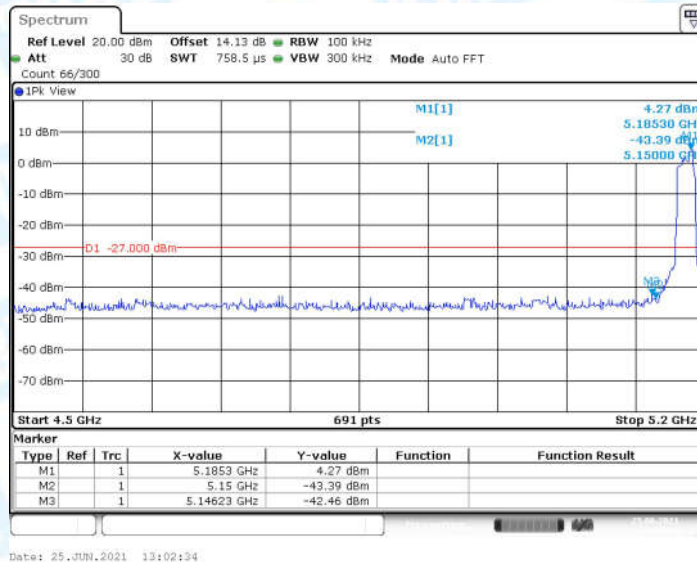
11A_Ant1_Low_5180



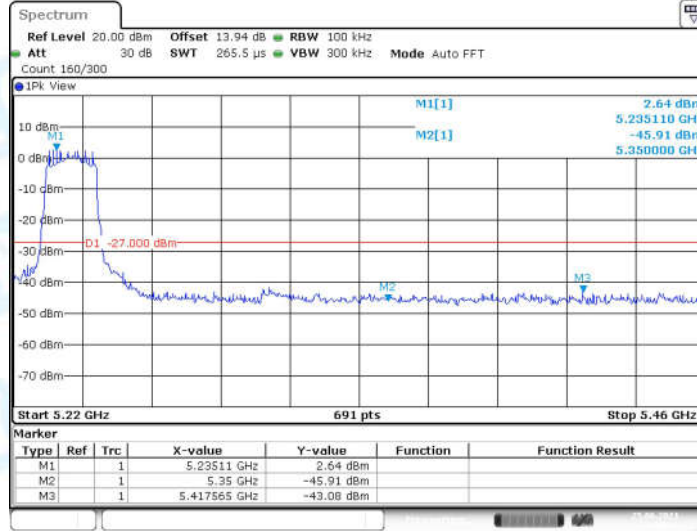
11A_Ant1_High_5240



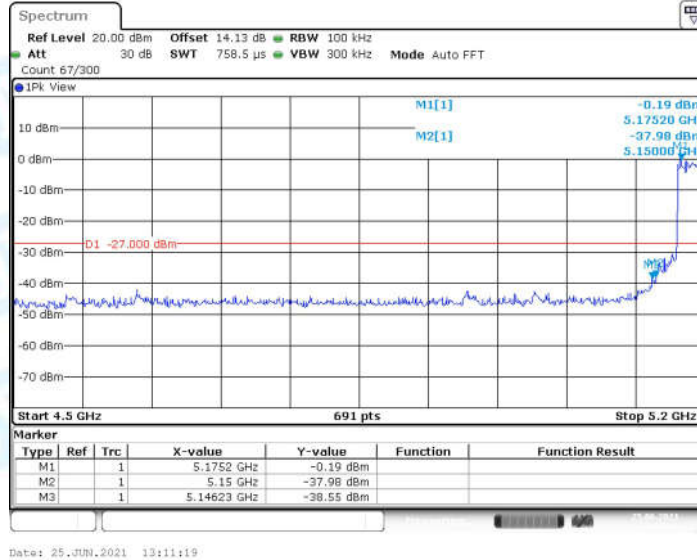
11N20SISO_Ant1_Low_5180



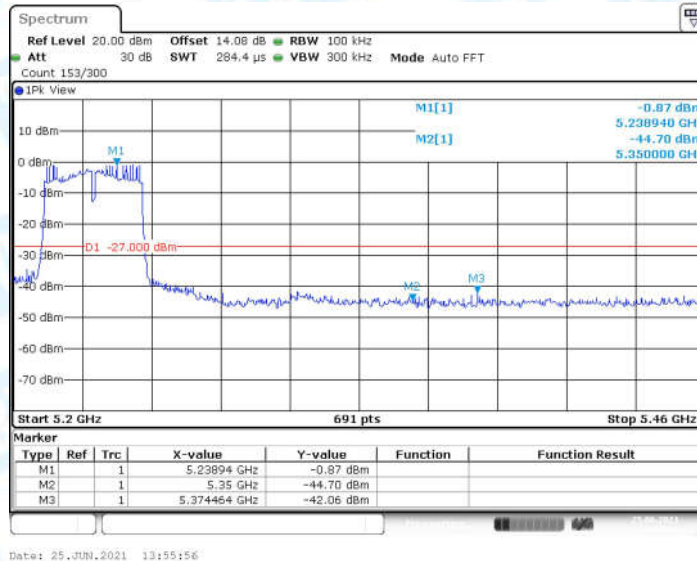
11N20SISO_Ant1_High_5240



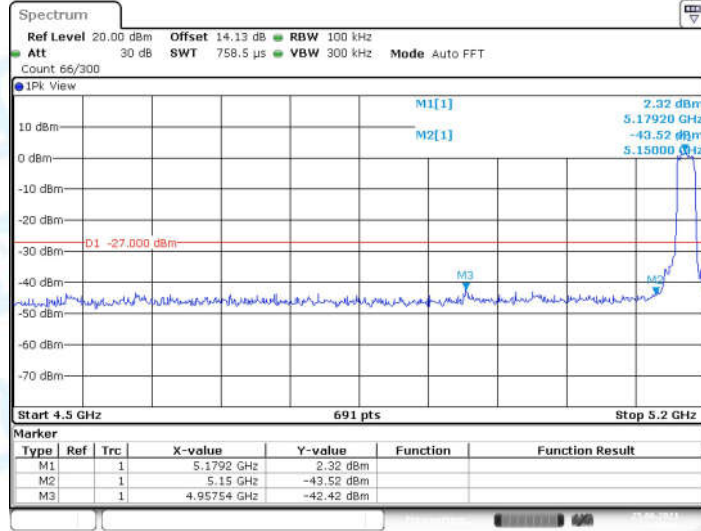
11N40SISO_Ant1_Low_5190



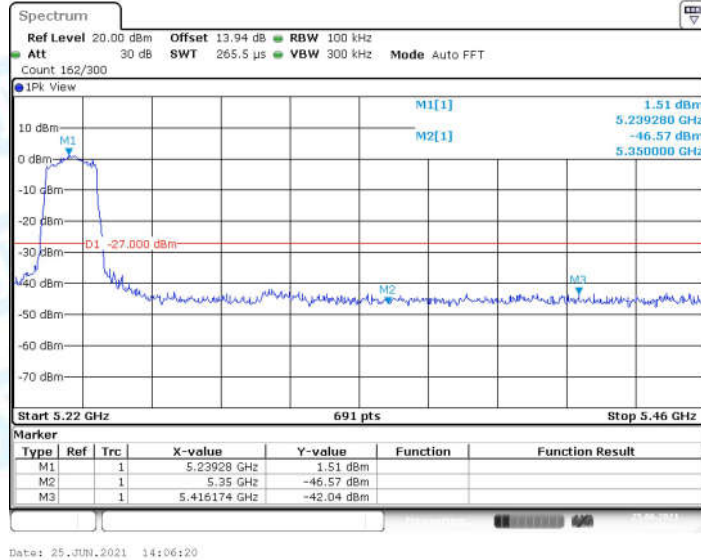
11N40SISO_Ant1_High_5230



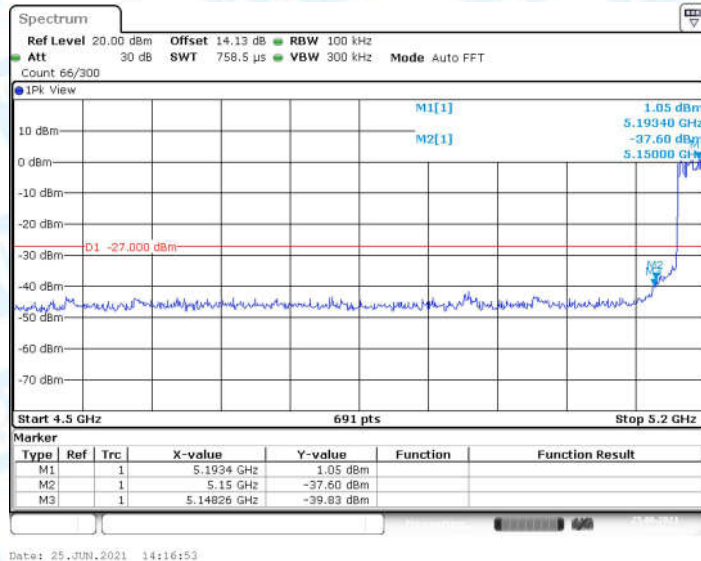
11AC20SISO_Ant1_Low_5180



11AC20SISO_Ant1_High_5240



11AC40SISO_Ant1_Low_5190

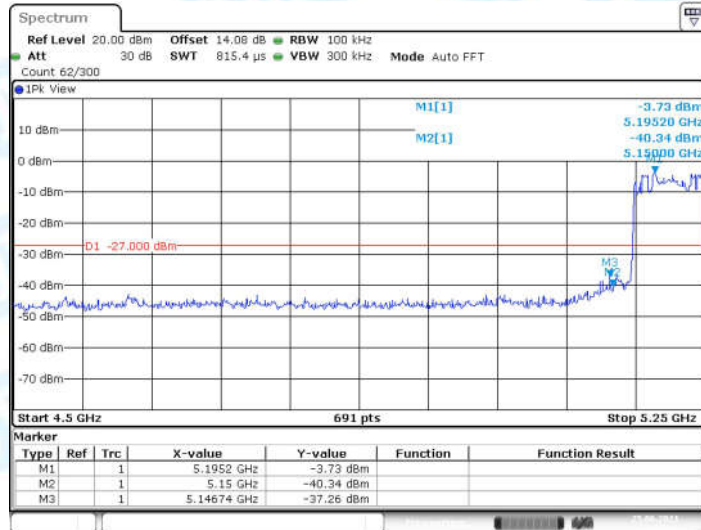


11AC40SISO_Ant1_High_5230



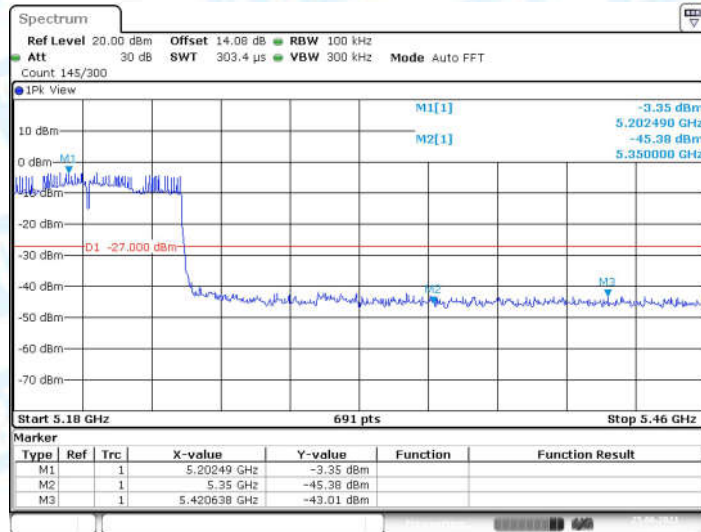
Date: 25 JUN 2021 14:20:17

11AC80SISO_Ant1_Low_5210



Date: 25 JUN 2021 13:32:43

11AC80SISO_Ant1_High_5210



Date: 25 JUN 2021 13:32:57

7. Emissions in Restricted Bands

7.1. Test Result

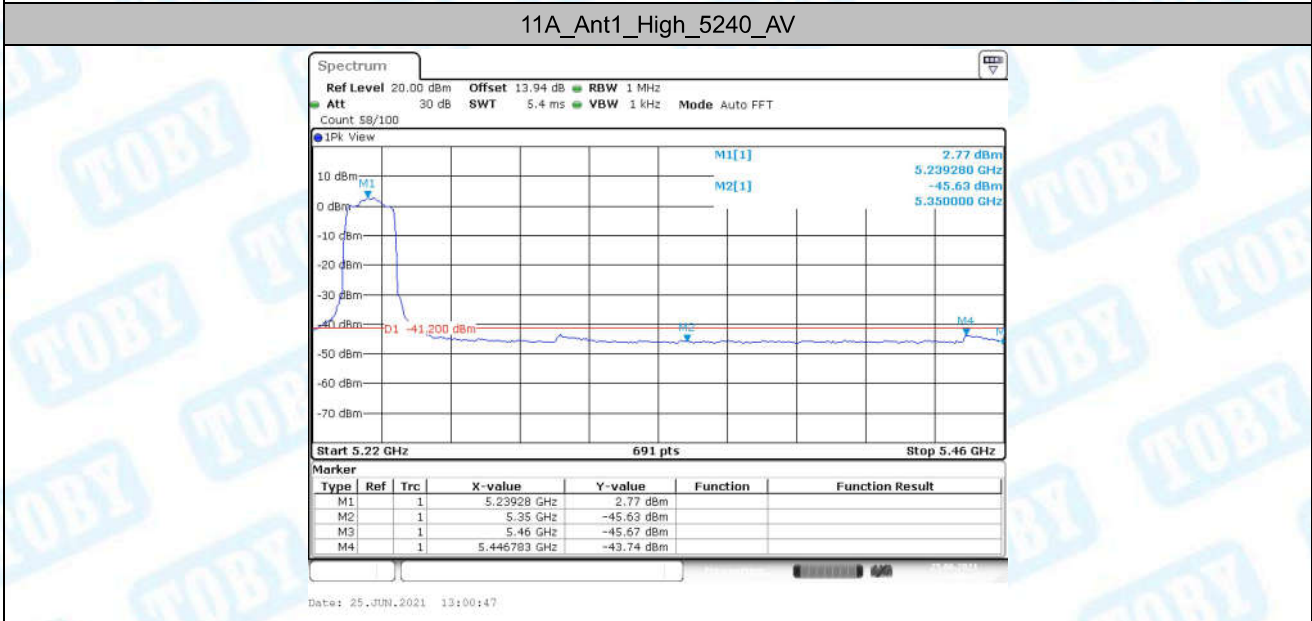
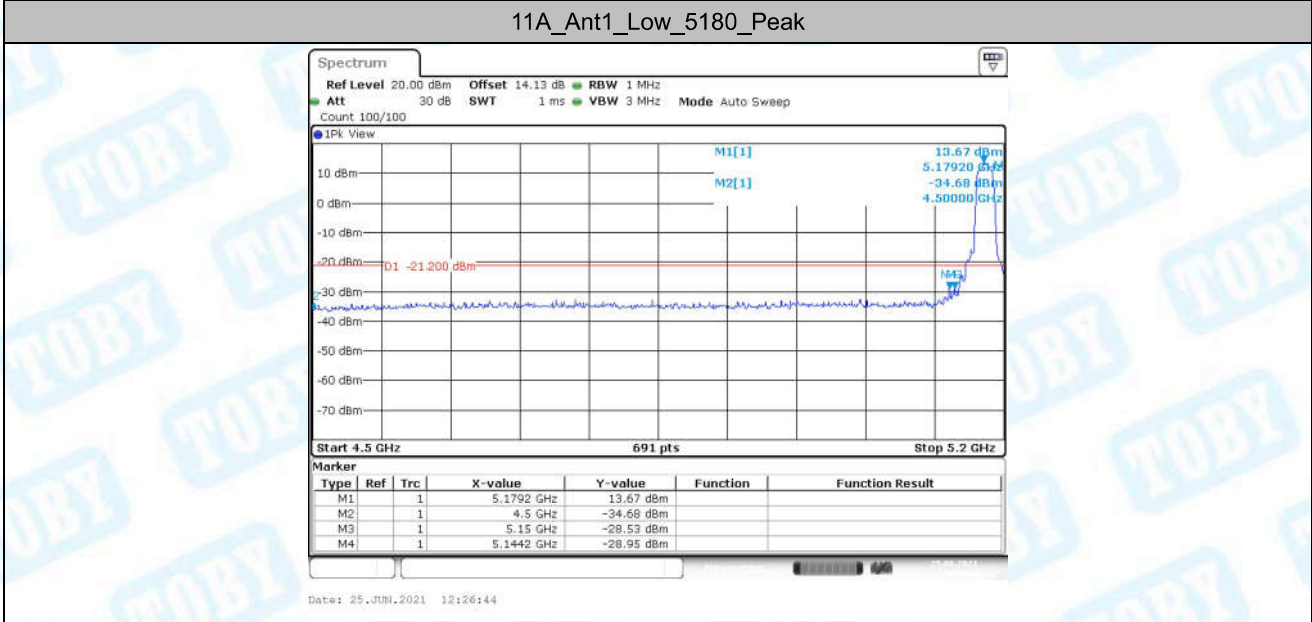
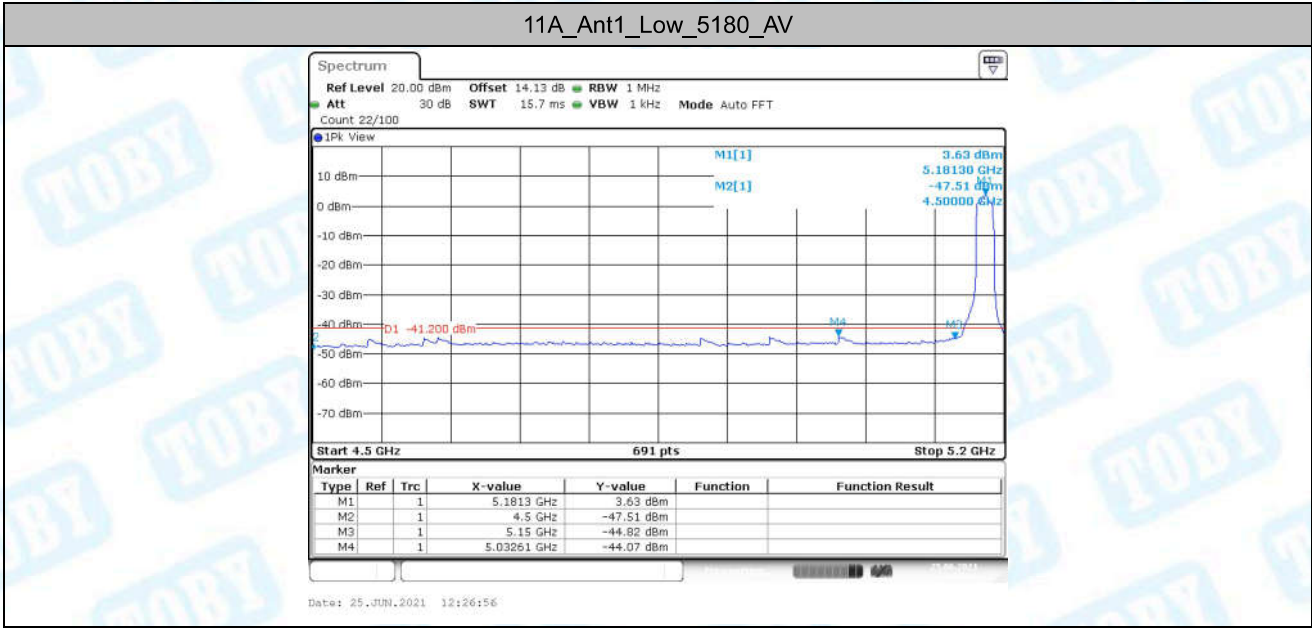
TestMode	Antenna	ChName	Channel	Detector	Freq [MHz]	EIRP [dBm]	Limit [dBm]	Verdict
11A	Ant1	Low	5180	AV	4500.000	-47.51	<=-41.20	PASS
				AV	5032.609	-44.07	<=-41.20	PASS
				AV	5150.000	-44.82	<=-41.20	PASS
				Peak	4500.000	-34.68	<=-21.20	PASS
				Peak	5144.203	-28.95	<=-21.20	PASS
				Peak	5150.000	-28.53	<=-21.20	PASS
		High	5240	AV	5350.000	-45.63	<=-41.20	PASS
				AV	5446.783	-43.74	<=-41.20	PASS
				AV	5460.000	-45.67	<=-41.20	PASS
				Peak	5350.000	-34.03	<=-21.20	PASS
				Peak	5447.826	-32.4	<=-21.20	PASS
				Peak	5460.000	-34.94	<=-21.20	PASS
11N20SISO	Ant1	Low	5180	AV	4500.000	-47.45	<=-41.20	PASS
				AV	5032.609	-43.89	<=-41.20	PASS
				AV	5150.000	-44.31	<=-41.20	PASS
				Peak	4500.000	-36.5	<=-21.20	PASS
				Peak	5145.217	-30.02	<=-21.20	PASS
				Peak	5150.000	-29.41	<=-21.20	PASS
		High	5240	AV	5350.000	-45.7	<=-41.20	PASS
				AV	5446.783	-43.88	<=-41.20	PASS
				AV	5460.000	-45.58	<=-41.20	PASS
				Peak	5350.000	-36.27	<=-21.20	PASS
				Peak	5449.217	-32.2	<=-21.20	PASS
				Peak	5460.000	-35.27	<=-21.20	PASS
11N40SISO	Ant1	Low	5190	AV	4500.000	-46.86	<=-41.20	PASS
				AV	5149.275	-42.2	<=-41.20	PASS
				AV	5150.000	-41.4	<=-41.20	PASS
				Peak	4500.000	-35.91	<=-21.20	PASS
				Peak	5144.203	-27.25	<=-21.20	PASS
				Peak	5150.000	-28.48	<=-21.20	PASS
		High	5230	AV	5350.000	-45.11	<=-41.20	PASS
				AV	5447.188	-43.28	<=-41.20	PASS
				AV	5460.000	-45.16	<=-41.20	PASS
				Peak	5350.000	-35.27	<=-21.20	PASS
				Peak	5450.580	-32.92	<=-21.20	PASS
				Peak	5460.000	-34.91	<=-21.20	PASS
11AC20SISO	Ant1	Low	5180	AV	4500.000	-47.37	<=-41.20	PASS
				AV	5032.609	-44.12	<=-41.20	PASS
				AV	5150.000	-44.71	<=-41.20	PASS
				Peak	4500.000	-35.85	<=-21.20	PASS
				Peak	5148.261	-30.53	<=-21.20	PASS

		High	5240	Peak	5150.000	-26.35	<=-21.20	PASS
				AV	5350.000	-45.69	<=-41.20	PASS
				AV	5447.478	-43.95	<=-41.20	PASS
				AV	5460.000	-45.46	<=-41.20	PASS
				Peak	5350.000	-35.6	<=-21.20	PASS
				Peak	5449.217	-32.86	<=-21.20	PASS
				Peak	5460.000	-34.89	<=-21.20	PASS
11AC40SISO	Ant1	Low	5190	AV	4500.000	-47.02	<=-41.20	PASS
				AV	5149.275	-41.92	<=-41.20	PASS
				AV	5150.000	-41.96	<=-41.20	PASS
				Peak	4500.000	-36.1	<=-21.20	PASS
				Peak	5141.159	-27.29	<=-21.20	PASS
				Peak	5150.000	-26.65	<=-21.20	PASS
		High	5230	AV	5350.000	-45.32	<=-41.20	PASS
				AV	5447.565	-43.35	<=-41.20	PASS
				AV	5460.000	-45.18	<=-41.20	PASS
				Peak	5350.000	-36.28	<=-21.20	PASS
				Peak	5447.565	-31.56	<=-21.20	PASS
				Peak	5460.000	-33.25	<=-21.20	PASS
11AC80SISO	Ant1	Low	5210	AV	4500.000	-46.53	<=-41.20	PASS
				AV	5146.739	-42.38	<=-41.20	PASS
				AV	5150.000	-42.62	<=-41.20	PASS
				Peak	4500.000	-35.55	<=-21.20	PASS
				Peak	5136.957	-30.35	<=-21.20	PASS
				Peak	5150.000	-31.69	<=-21.20	PASS
		High	5210	AV	5350.000	-44.33	<=-41.20	PASS
				AV	5448.232	-42.7	<=-41.20	PASS
				AV	5460.000	-44.81	<=-41.20	PASS
				Peak	5350.000	-35.17	<=-21.20	PASS
				Peak	5449.855	-32.26	<=-21.20	PASS
				Peak	5460.000	-35.43	<=-21.20	PASS

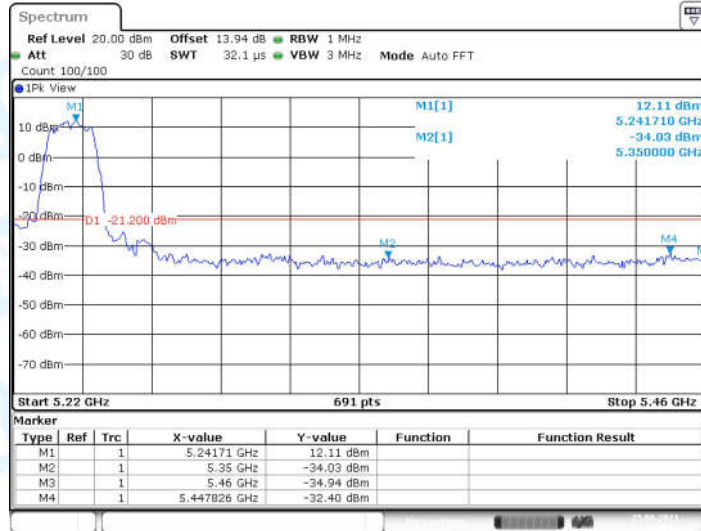
Note:

1. The Antenna Gain is compensated in the graph.
2. For transmitters operating in 5150-5350 GHz band and 5470-5725 GHz band: The limit in dBm for average detector is conversion from 54dBuV/m, according to 15.209(a) or RSS-Gen 8.10. The limit in dBm for peak detector is 20dB above the limit of average detector in dBm.

7.2. Test Graphs

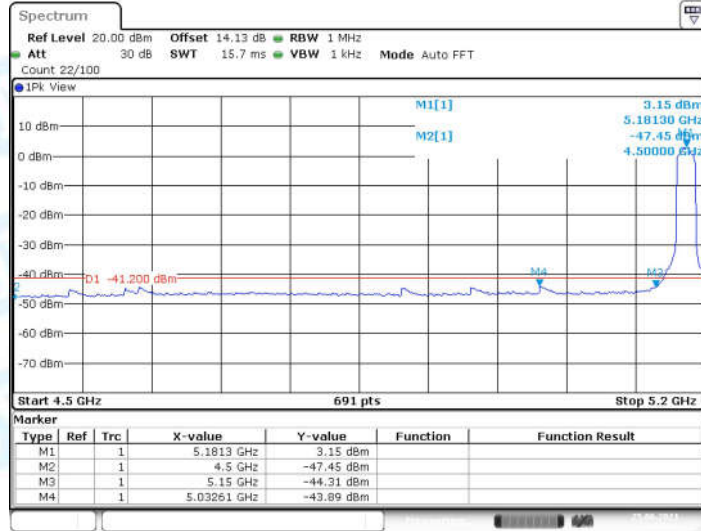


11A_Ant1_High_5240_Peak



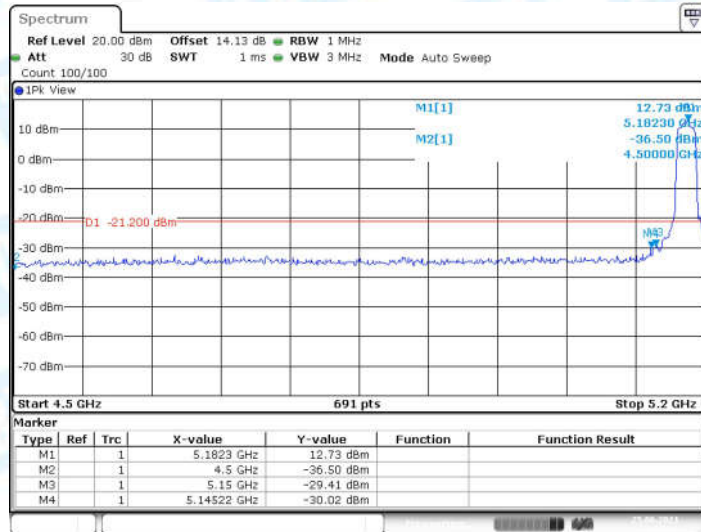
Date: 25 JUN 2021 13:00:35

11N20SISO_Ant1_Low_5180_AV



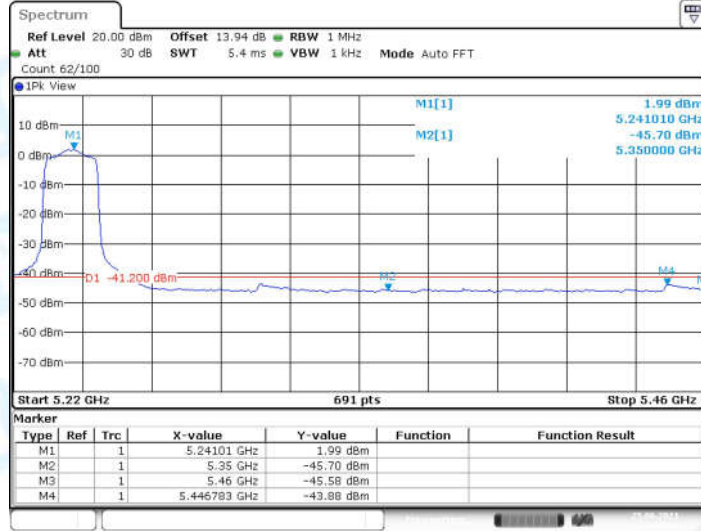
Date: 25 JUN 2021 13:03:31

11N20SISO_Ant1_Low_5180_Peak



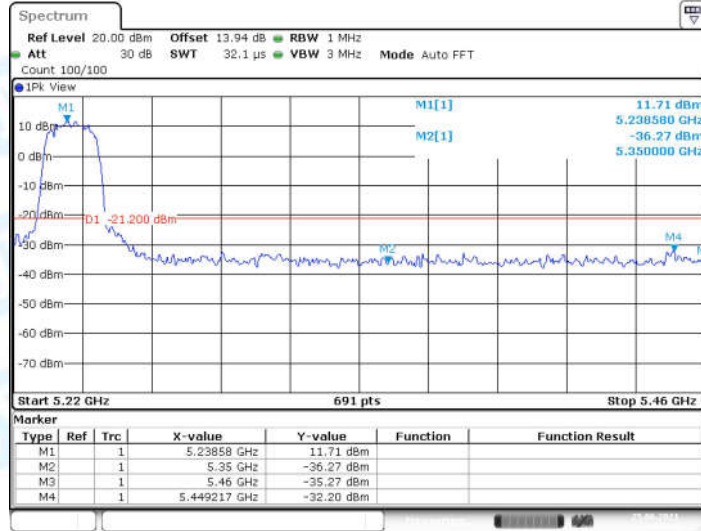
Date: 25 JUN 2021 13:03:19

11N20SISO_Ant1_High_5240_AV



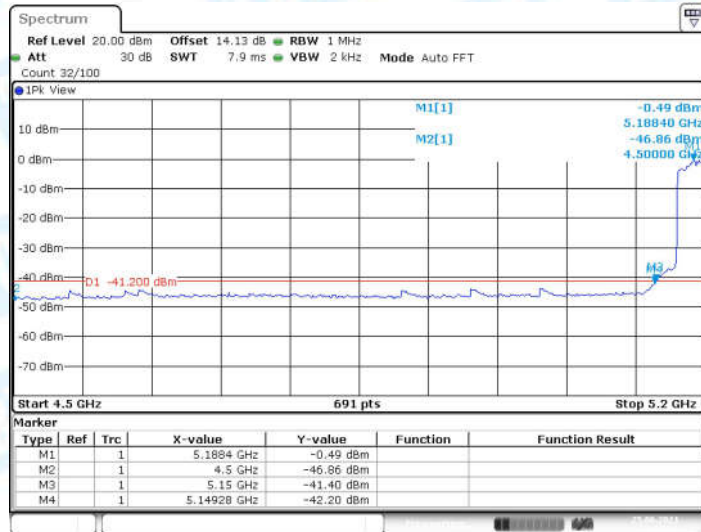
Date: 25 JUN 2021 13:09:15

11N20SISO_Ant1_High_5240_Peak



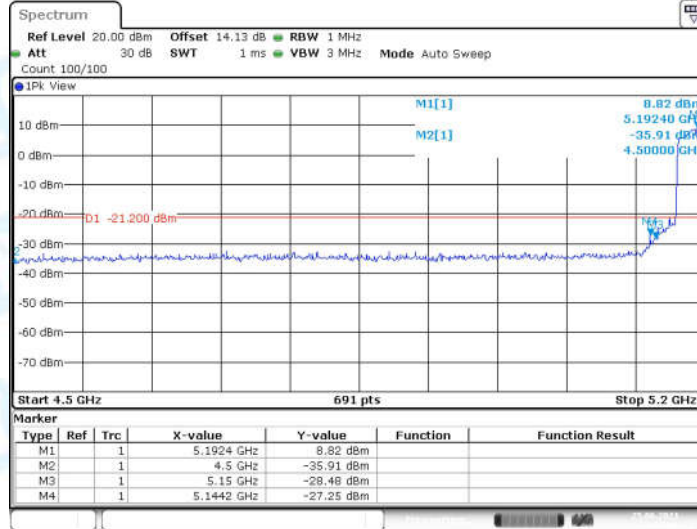
Date: 25 JUN 2021 13:09:23

11N40SISO_Ant1_Low_5190_AV

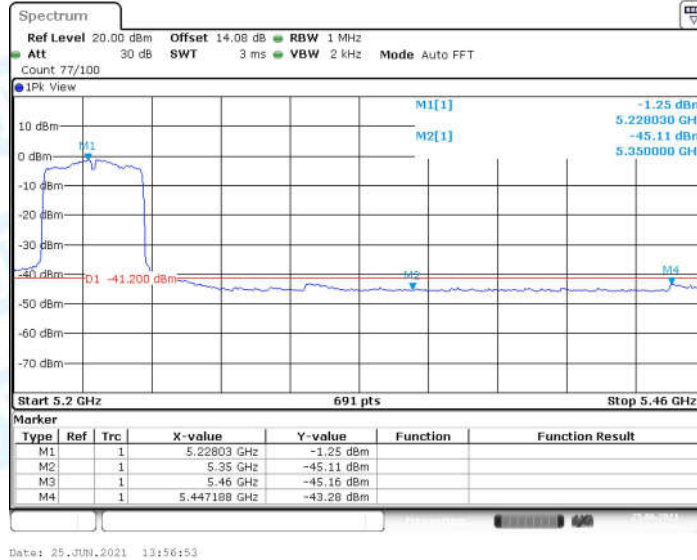


Date: 25 JUN 2021 13:50:57

11N40SISO_Ant1_Low_5190_Peak



11N40SISO_Ant1_High_5230_AV



11N40SISO_Ant1_High_5230_Peak

