



26dB Bandwidth:



11A Ant1 5200



































11AC40MIMO_Ant2_5795



6dB Bandwidth:

11A_Ant1_5745



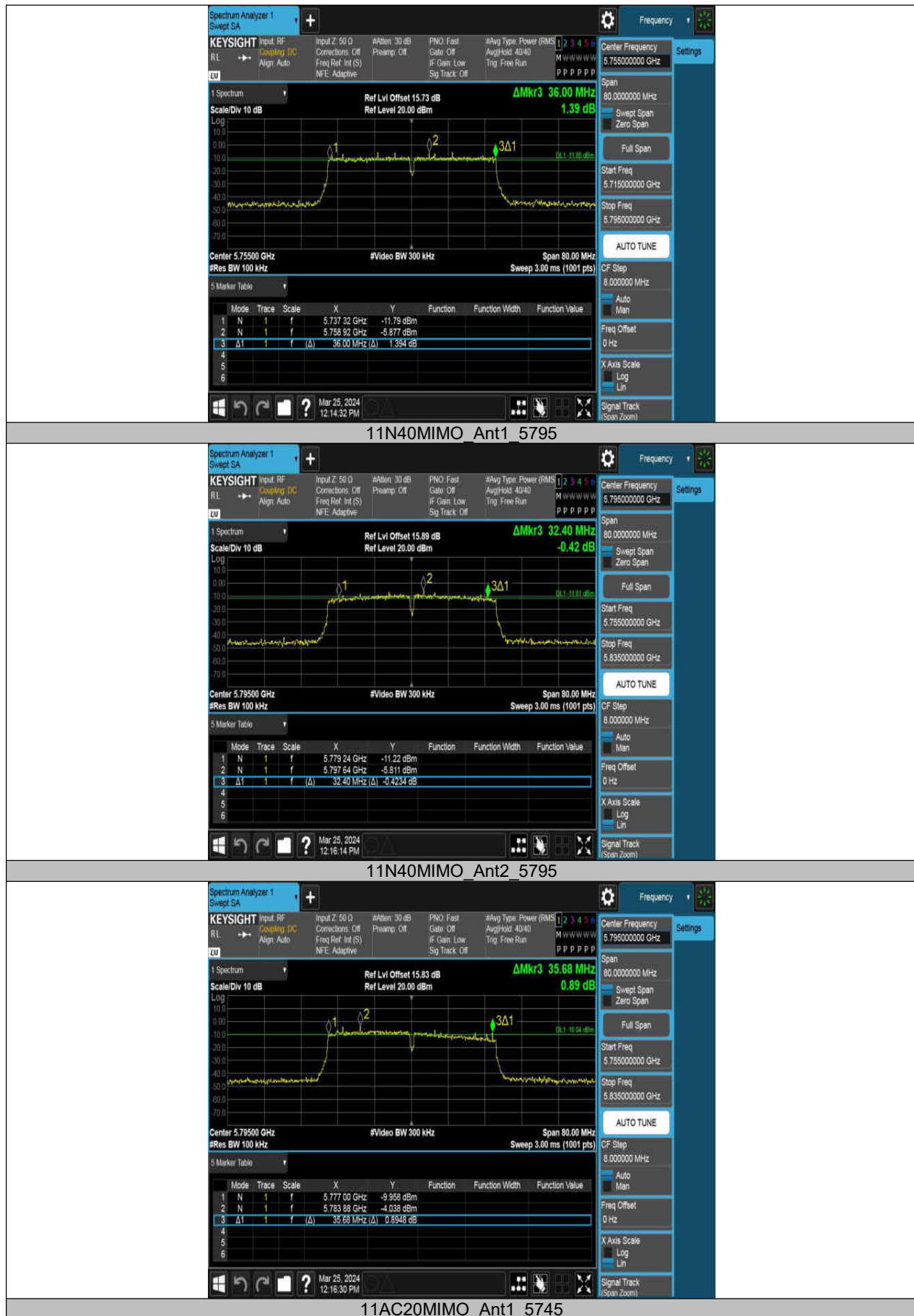
11A_Ant2_5745





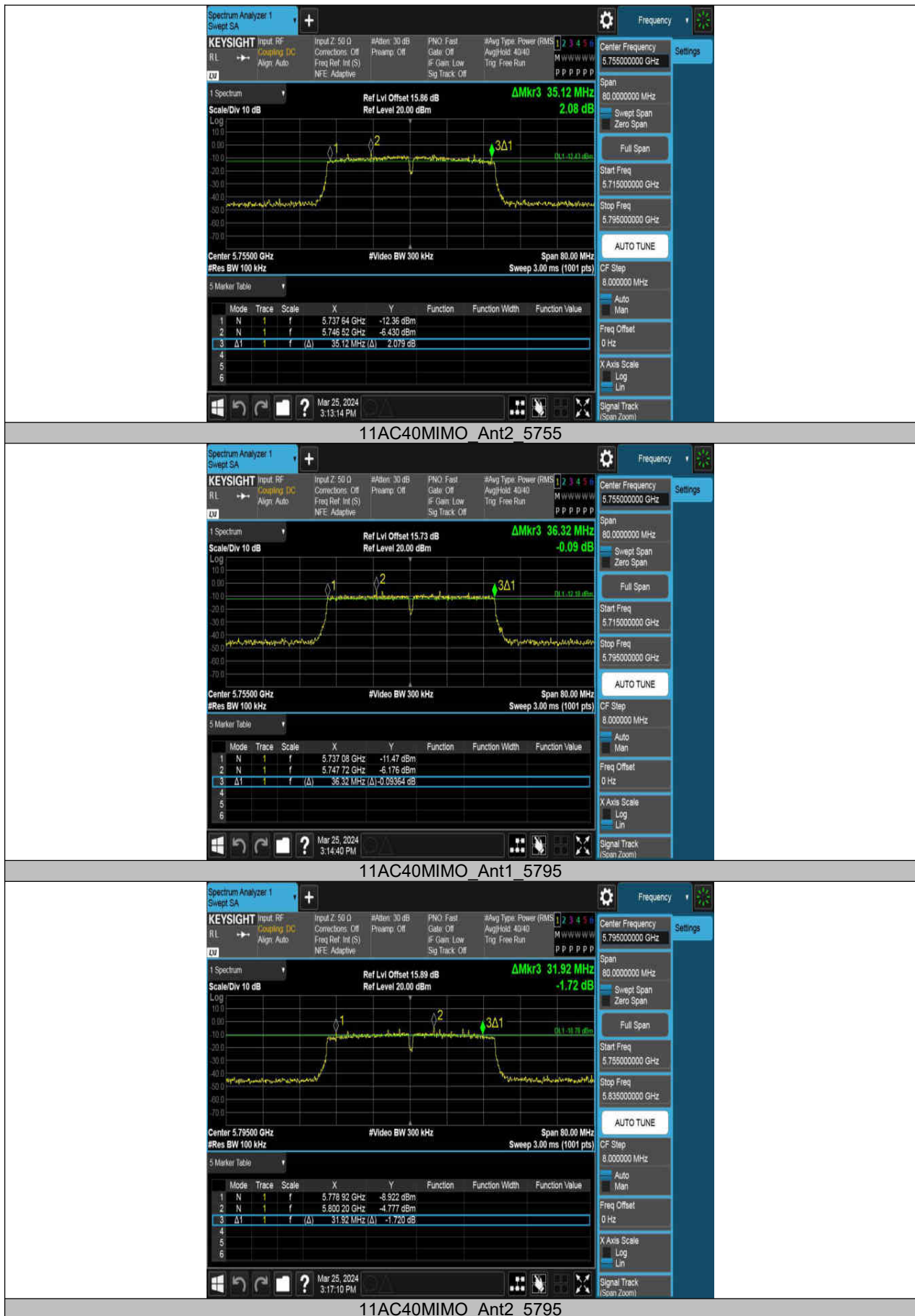














10. Maximum Output Power

10.1. Block Diagram of Test Setup

Same as section 8.1

10.2. Limits

FCC Part15, Subpart E		
Test Item	Limit	Frequency Range (MHz)
Conducted Output Power	☐ Outdoor Access Point: 1 W (30 dBm)	5150-5250
	☐ Indoor Access Point: 1 W (30 dBm)	
	☐ Fixed Point-To-Point Access Points: 1 W (30 dBm)	
	☒ Client Devices: 250 mW (24 dBm)	
	Shall not exceed the lesser of 250 mW (24dBm) or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz.	5250-5350 5470-5725
	Shall not exceed 1 Watt (30 dBm).	5725-5850

Note: The above limits are based upon the maximum antenna gain does not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

10.3. Test Procedure

- (1) Connect each EUT's antenna output to power meter by RF cable and attenuator
- (2) Add each antenna port's results to get the total output power of EUT.

10.4. Test Result

Test Mode	Ant.	Freq. (MHz)	Channel Power (dBm)	DC Factor (dBm)	Result (dBm)	Limit (dBm)	EIRP (dBm)	Verdict
11A	Ant1	5180	12.00	0.32	12.32	≤23.98	15.11	PASS
	Ant2	5180	12.12	0.34	12.46	≤23.98	15.25	PASS
	Ant1	5200	11.24	0.27	11.51	≤23.98	14.30	PASS
	Ant2	5200	12.06	0.23	12.29	≤23.98	15.08	PASS
	Ant1	5240	12.62	0.44	13.06	≤23.98	15.85	PASS
	Ant2	5240	13.57	0.38	13.95	≤23.98	16.74	PASS
	Ant1	5745	11.77	0.31	12.08	≤30.00	14.87	PASS
	Ant2	5745	12.58	0.21	12.79	≤30.00	15.58	PASS
	Ant1	5785	12.47	0.36	12.83	≤30.00	15.62	PASS
	Ant2	5785	13.04	0.36	13.40	≤30.00	16.19	PASS
	Ant1	5825	12.81	0.40	13.21	≤30.00	16.00	PASS
	Ant2	5825	13.58	0.31	13.89	≤30.00	16.68	PASS
11N20MIMO	Ant1	5180	9.19	0.20	9.39	≤23.98	12.18	PASS
	Ant2	5180	8.87	0.35	9.22	≤23.98	12.01	PASS
	total	5180	---	---	12.32	≤23.98	15.11	PASS
	Ant1	5200	8.69	0.22	8.91	≤23.98	11.70	PASS
	Ant2	5200	8.96	0.31	9.27	≤23.98	12.06	PASS
	total	5200	---	---	11.81	≤23.98	14.60	PASS
	Ant1	5240	5.87	0.26	6.13	≤23.98	8.92	PASS
	Ant2	5240	7.27	0.39	7.66	≤23.98	10.45	PASS
	total	5240	---	---	9.97	≤23.98	12.76	PASS
	Ant1	5745	9.08	0.41	9.49	≤30.00	12.28	PASS
	Ant2	5745	10.35	0.31	10.66	≤30.00	13.45	PASS
	total	5745	---	---	13.12	≤30.00	15.91	PASS
	Ant1	5785	8.78	0.28	9.06	≤30.00	11.85	PASS
	Ant2	5785	9.22	0.28	9.50	≤30.00	12.29	PASS
	total	5785	---	---	12.30	≤30.00	15.09	PASS

	Ant1	5825	8.79	0.31	9.10	≤30.00	11.89	PASS
	Ant2	5825	9.31	0.24	9.55	≤30.00	12.34	PASS
	total	5825	---	---	12.34	≤30.00	15.13	PASS
11N40MIMO	Ant1	5190	8.41	0.91	9.32	≤23.98	12.11	PASS
	Ant2	5190	8.67	0.90	9.57	≤23.98	12.36	PASS
	total	5190	---	---	12.46	≤23.98	15.25	PASS
	Ant1	5230	7.15	0.95	8.10	≤23.98	10.89	PASS
	Ant2	5230	8.91	0.91	9.82	≤23.98	12.61	PASS
	total	5230	---	---	12.05	≤23.98	14.84	PASS
	Ant1	5755	8.50	0.91	9.41	≤30.00	12.20	PASS
	Ant2	5755	8.78	0.83	9.61	≤30.00	12.40	PASS
	total	5755	---	---	12.52	≤30.00	15.31	PASS
	Ant1	5795	8.84	0.91	9.75	≤30.00	12.54	PASS
	Ant2	5795	9.49	0.95	10.44	≤30.00	13.23	PASS
	total	5795	---	---	13.12	≤30.00	15.91	PASS
11AC20MIMO	Ant1	5180	9.09	0.49	9.58	≤23.98	12.37	PASS
	Ant2	5180	8.15	0.45	8.60	≤23.98	11.39	PASS
	total	5180	---	---	12.13	≤23.98	14.92	PASS
	Ant1	5200	7.94	0.34	8.28	≤23.98	11.07	PASS
	Ant2	5200	8.86	0.51	9.37	≤23.98	12.16	PASS
	total	5200	---	---	11.87	≤23.98	14.66	PASS
	Ant1	5240	6.14	0.43	6.57	≤23.98	9.36	PASS
	Ant2	5240	7.34	0.32	7.66	≤23.98	10.45	PASS
	total	5240	---	---	10.16	≤23.98	12.95	PASS
	Ant1	5745	7.65	0.43	8.08	≤30.00	10.87	PASS
	Ant2	5745	8.57	0.51	9.08	≤30.00	11.87	PASS
	total	5745	---	---	11.62	≤30.00	14.41	PASS
	Ant1	5785	8.92	0.32	9.24	≤30.00	12.03	PASS
	Ant2	5785	9.24	0.45	9.69	≤30.00	12.48	PASS
	total	5785	---	---	12.48	≤30.00	15.27	PASS
	Ant1	5825	8.52	0.32	8.84	≤30.00	11.63	PASS
	Ant2	5825	9.71	0.45	10.16	≤30.00	12.95	PASS
	total	5825	---	---	12.56	≤30.00	15.35	PASS
11AC40MIMO	Ant1	5190	8.68	0.98	9.66	≤23.98	12.45	PASS
	Ant2	5190	8.52	1.05	9.57	≤23.98	12.36	PASS
	total	5190	---	---	12.63	≤23.98	15.42	PASS
	Ant1	5230	6.49	1.01	7.50	≤23.98	10.29	PASS
	Ant2	5230	8.62	0.90	9.52	≤23.98	12.31	PASS
	total	5230	---	---	11.64	≤23.98	14.43	PASS
	Ant1	5755	8.17	1.05	9.22	≤30.00	12.01	PASS
	Ant2	5755	8.76	1.05	9.81	≤30.00	12.60	PASS
	total	5755	---	---	12.54	≤30.00	15.33	PASS
	Ant1	5795	8.97	0.87	9.84	≤30.00	12.63	PASS
	Ant2	5795	9.68	0.98	10.66	≤30.00	13.45	PASS
	total	5795	---	---	13.28	≤30.00	16.07	PASS

11. Power Spectral Density

11.1. Block Diagram of Test Setup

Same as section 8.1

11.2. Limits

CFR 47 FCC Part15, Subpart E		
Test Item	Limit	Frequency Range (MHz)
Power Spectral Density	☐ Outdoor Access Point: 17 dBm/MHz ☐ Indoor Access Point: 17 dBm/MHz ☐ Fixed Point-To-Point Access Points: 17 dBm/MHz ☐ Client Devices: 11 dBm/MHz	5150-5250
	11 dBm/MHz	5250-5350 5470-5725
	30 dBm/500 kHz	5725-5850

Note: The above limits are based upon the maximum antenna gain does not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

11.3. Test Procedure

The transmitter output was connected to a spectrum analyzer. Power density was measured by spectrum analyzer with 1MHz RBW and 3MHz VBW.

Connect the UUT to the spectrum analyzer and use the following settings:

5150 MHz~5250 MHz, 5250 MHz~5350 MHz, 5470 MHz~5725 MHz

Center Frequency	The centre frequency of the channel under test
Detector	RMS
RBW	1MHz
VBW	$\geq 3 \times \text{RBW}$
Span	Encompass the entire emissions bandwidth (EBW) of the signal
Trace	Max hold
Sweep time	Auto

5725 MHz-5850 MHz

Center Frequency	The centre frequency of the channel under test
Detector	RMS
RBW	500 kHz
VBW	$\geq 3 \times \text{RBW}$
Span	Encompass the entire emissions bandwidth (EBW) of the signal
Trace	Max hold
Sweep time	Auto

Note:

1. For UNII-3, according to KdB publication 789033 D02 General U-NII Test Procedures New Rules v02r01, section II.F.5., it is acceptable to set RBW at 1 MHz and VBW at 3 MHz if the spectrum analyzer does not have 500 kHz RBW.

2. The value measured with RBW=1MHz is to be added with $10\log(500\text{kHz}/1\text{MHz})$ which is - 3dB. For example, if the measured value is +30 dBm using RBW=500kHz (that is +30 dBm/500kHz), then the converted value will be +33 dBm/1MHz.

3. Allow trace to fully stabilize and use the peak marker function to determine the maximum amplitude level within the RBW.

11.4. Test Result

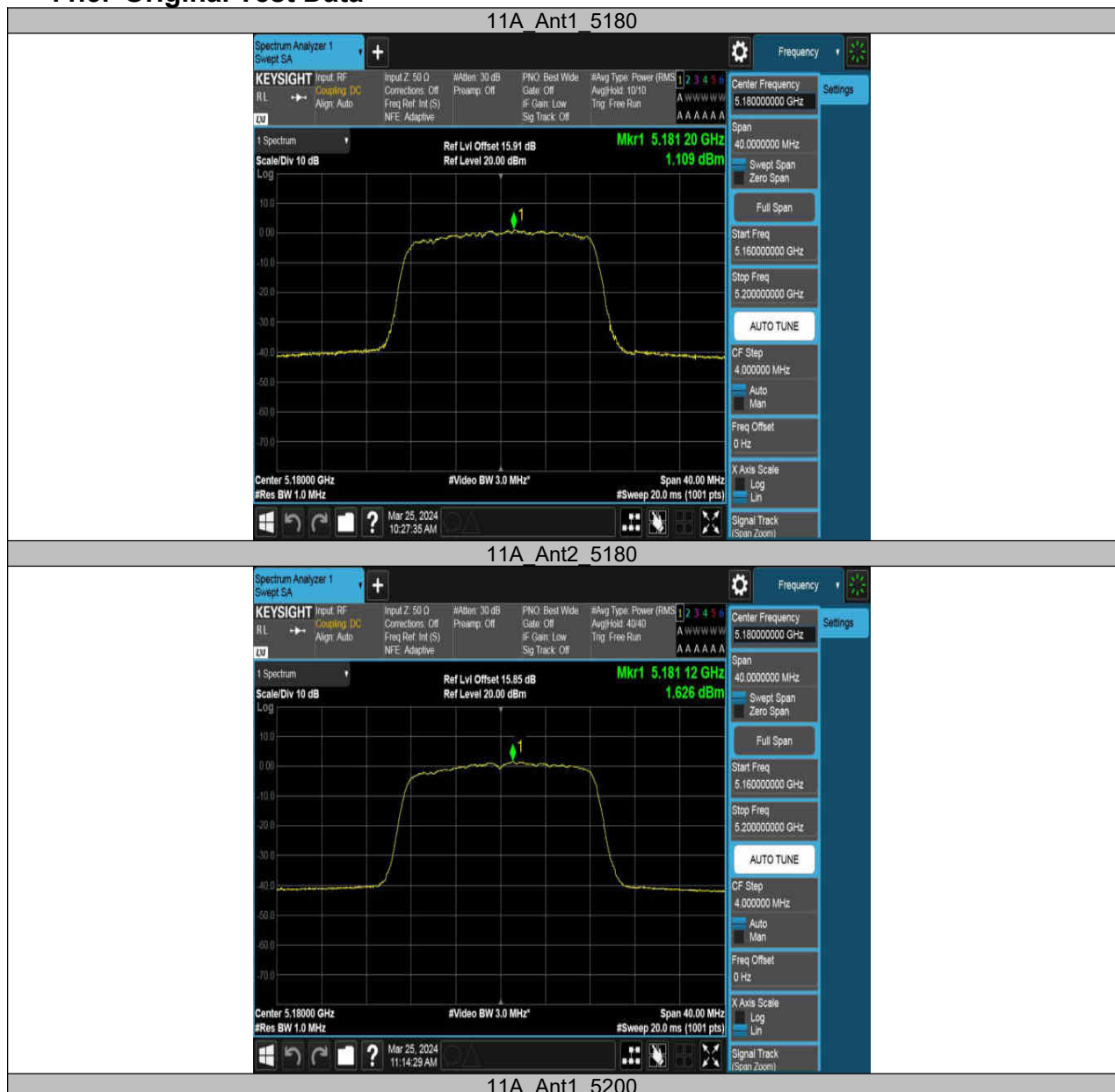
Test Mode	Ant.	Freq. (MHz)	Result (dBm/MHz)	Limit (dBm/MHz)	Verdict
11A	Ant1	5180	1.11	≤11.00	PASS
	Ant2	5180	1.63	≤11.00	PASS
	Ant1	5200	0.78	≤11.00	PASS
	Ant2	5200	0.10	≤11.00	PASS
	Ant1	5240	2.50	≤11.00	PASS
	Ant2	5240	2.44	≤11.00	PASS
	Ant1	5745	-1.27	≤30.00	PASS
	Ant2	5745	-1.49	≤30.00	PASS
	Ant1	5785	-0.82	≤30.00	PASS
	Ant2	5785	-0.49	≤30.00	PASS
	Ant1	5825	-1.06	≤30.00	PASS
	Ant2	5825	-0.16	≤30.00	PASS
11N20MIMO	Ant1	5180	-1.73	≤11.00	PASS
	Ant2	5180	-1.25	≤11.00	PASS
	total	5180	1.53	≤11.00	PASS
	Ant1	5200	-1.73	≤11.00	PASS
	Ant2	5200	-2.75	≤11.00	PASS
	total	5200	0.80	≤11.00	PASS
	Ant1	5240	-2.83	≤11.00	PASS
	Ant2	5240	-3.33	≤11.00	PASS
	total	5240	-0.06	≤11.00	PASS
	Ant1	5745	-2.90	≤30.00	PASS
	Ant2	5745	-3.09	≤30.00	PASS
	total	5745	0.02	≤30.00	PASS
	Ant1	5785	-4.30	≤30.00	PASS
	Ant2	5785	-4.12	≤30.00	PASS
	total	5785	-1.20	≤30.00	PASS
	Ant1	5825	-4.63	≤30.00	PASS
	Ant2	5825	-4.04	≤30.00	PASS
	total	5825	-1.31	≤30.00	PASS
11N40MIMO	Ant1	5190	-4.97	≤11.00	PASS
	Ant2	5190	-3.85	≤11.00	PASS
	total	5190	-1.36	≤11.00	PASS
	Ant1	5230	-5.45	≤11.00	PASS
	Ant2	5230	-4.75	≤11.00	PASS
	total	5230	-2.08	≤11.00	PASS
	Ant1	5755	-7.15	≤30.00	PASS
	Ant2	5755	-8.02	≤30.00	PASS
	total	5755	-4.55	≤30.00	PASS
	Ant1	5795	-7.49	≤30.00	PASS
	Ant2	5795	-6.33	≤30.00	PASS
	total	5795	-3.86	≤30.00	PASS
11AC20MIMO	Ant1	5180	-1.56	≤11.00	PASS
	Ant2	5180	-1.38	≤11.00	PASS
	total	5180	1.54	≤11.00	PASS
	Ant1	5200	-2.11	≤11.00	PASS
	Ant2	5200	-1.57	≤11.00	PASS
	total	5200	1.18	≤11.00	PASS
	Ant1	5240	-3.11	≤11.00	PASS
	Ant2	5240	-3.59	≤11.00	PASS
	total	5240	-0.33	≤11.00	PASS
	Ant1	5745	-4.68	≤30.00	PASS
	Ant2	5745	-5.28	≤30.00	PASS
	total	5745	-1.96	≤30.00	PASS
	Ant1	5785	-4.03	≤30.00	PASS
	Ant2	5785	-4.33	≤30.00	PASS

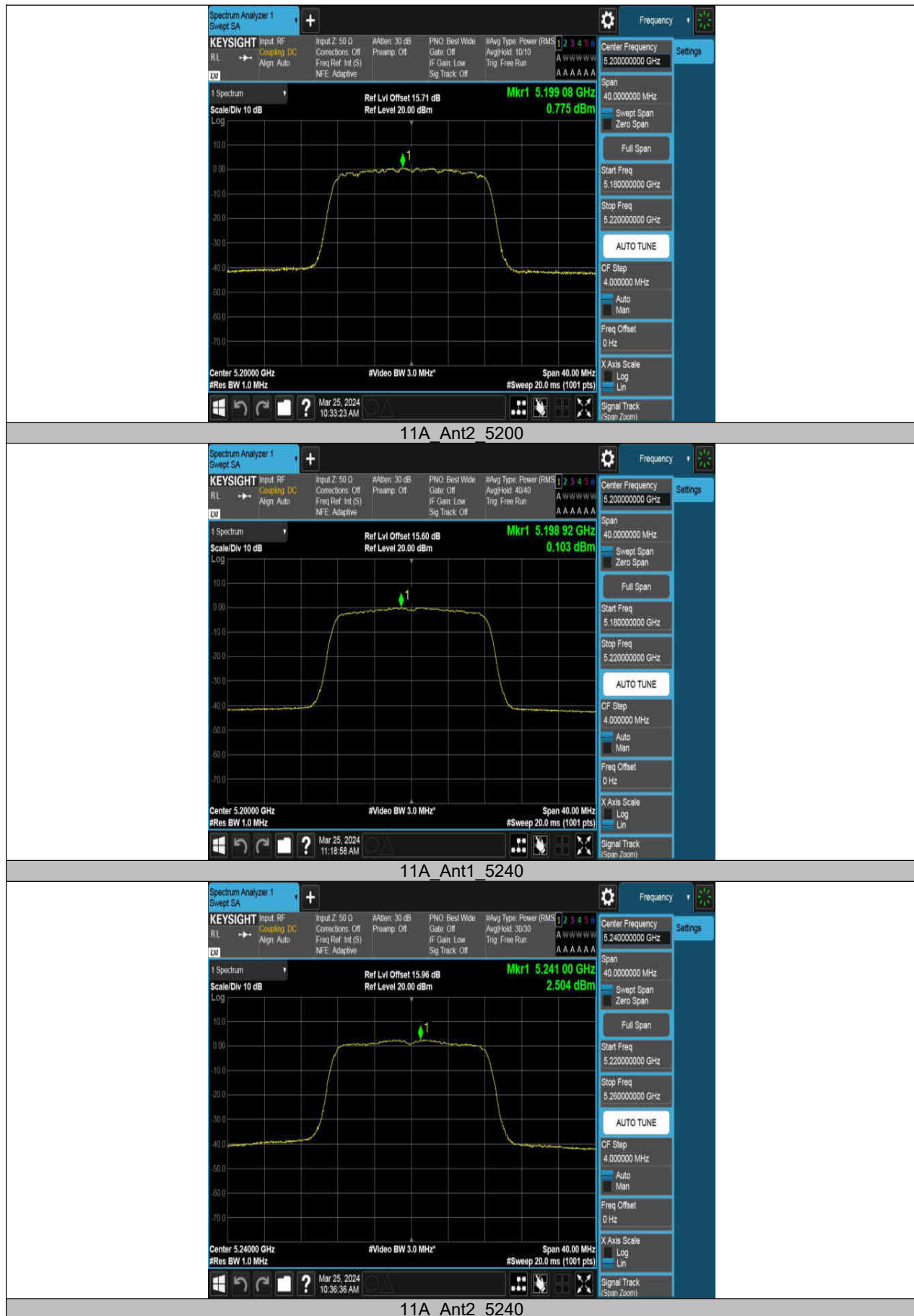
	total	5785	-1.17	≤30.00	PASS
	Ant1	5825	-4.53	≤30.00	PASS
	Ant2	5825	-4.19	≤30.00	PASS
	total	5825	-1.35	≤30.00	PASS
11AC40MIMO	Ant1	5190	-4.08	≤11.00	PASS
	Ant2	5190	-3.74	≤11.00	PASS
	total	5190	-0.90	≤11.00	PASS
	Ant1	5230	-5.01	≤11.00	PASS
	Ant2	5230	-4.61	≤11.00	PASS
	total	5230	-1.80	≤11.00	PASS
	Ant1	5755	-7.48	≤30.00	PASS
	Ant2	5755	-8.40	≤30.00	PASS
	total	5755	-4.91	≤30.00	PASS
	Ant1	5795	-7.45	≤30.00	PASS
	Ant2	5795	-6.04	≤30.00	PASS
	total	5795	-3.68	≤30.00	PASS

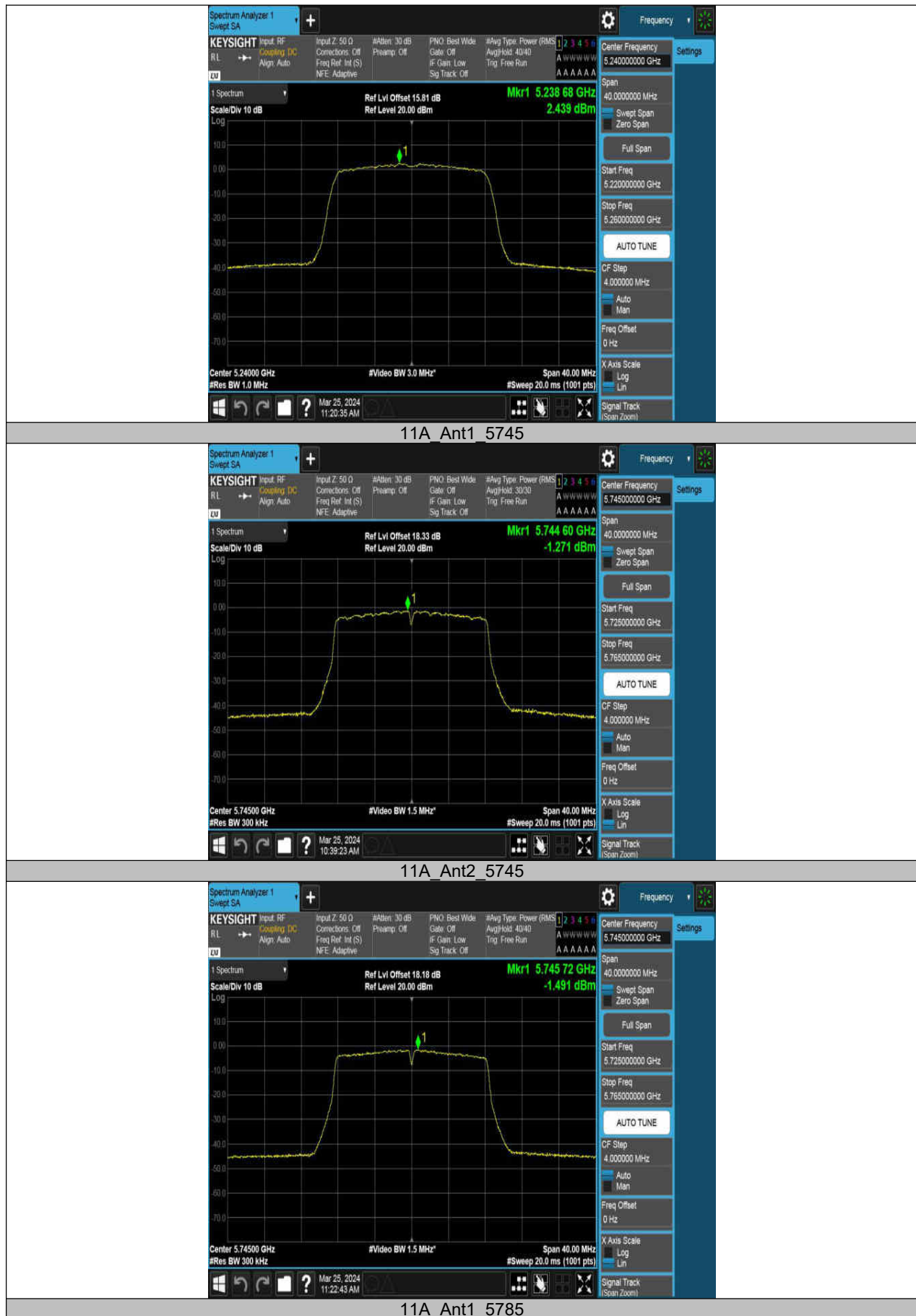
Note: 1.The Result and Limit Unit is dBm/500 kHz in the band 5.725–5.85 GHz.

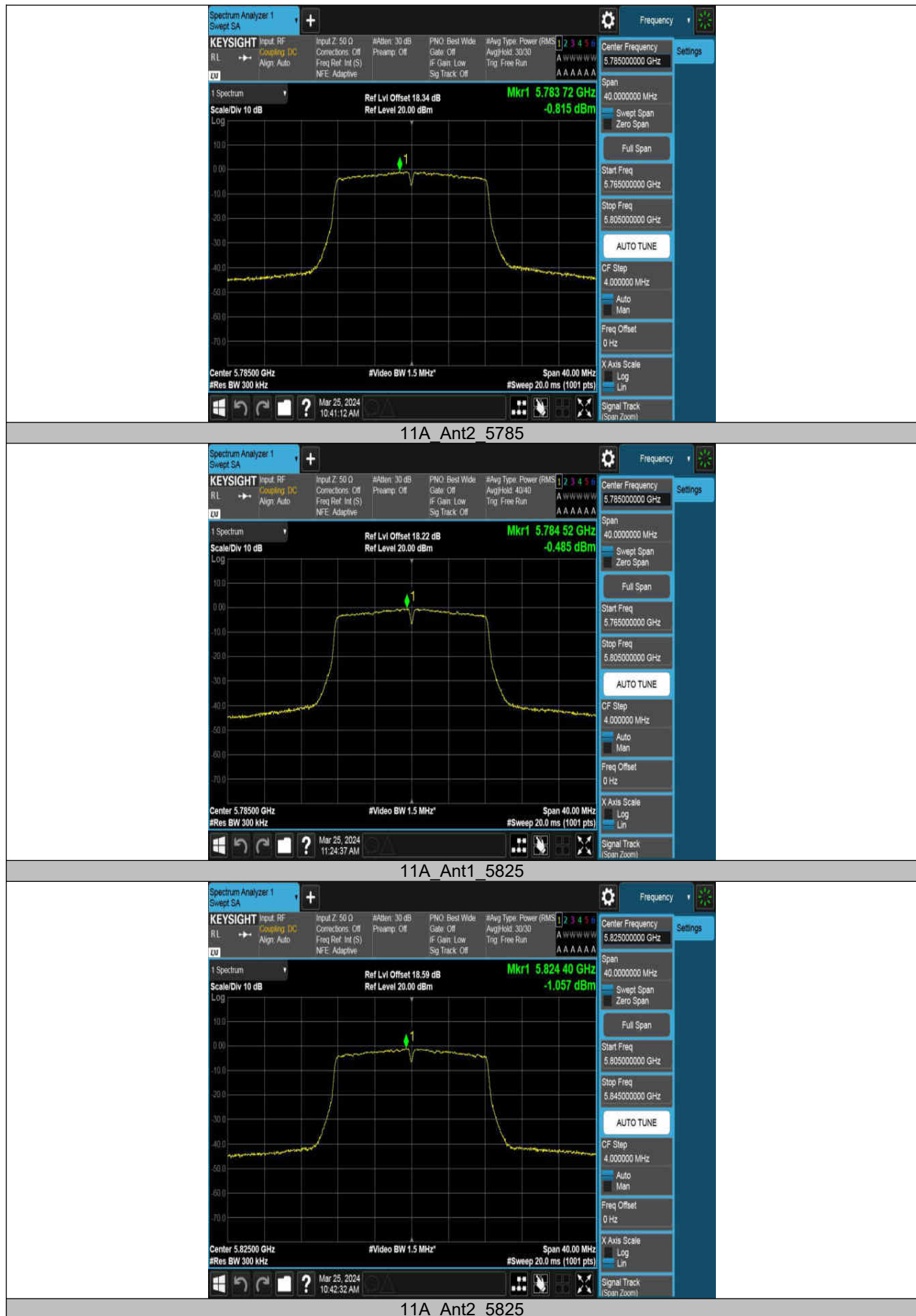
2.The Duty Cycle Factor and RBW Factor is compensated in the graph.

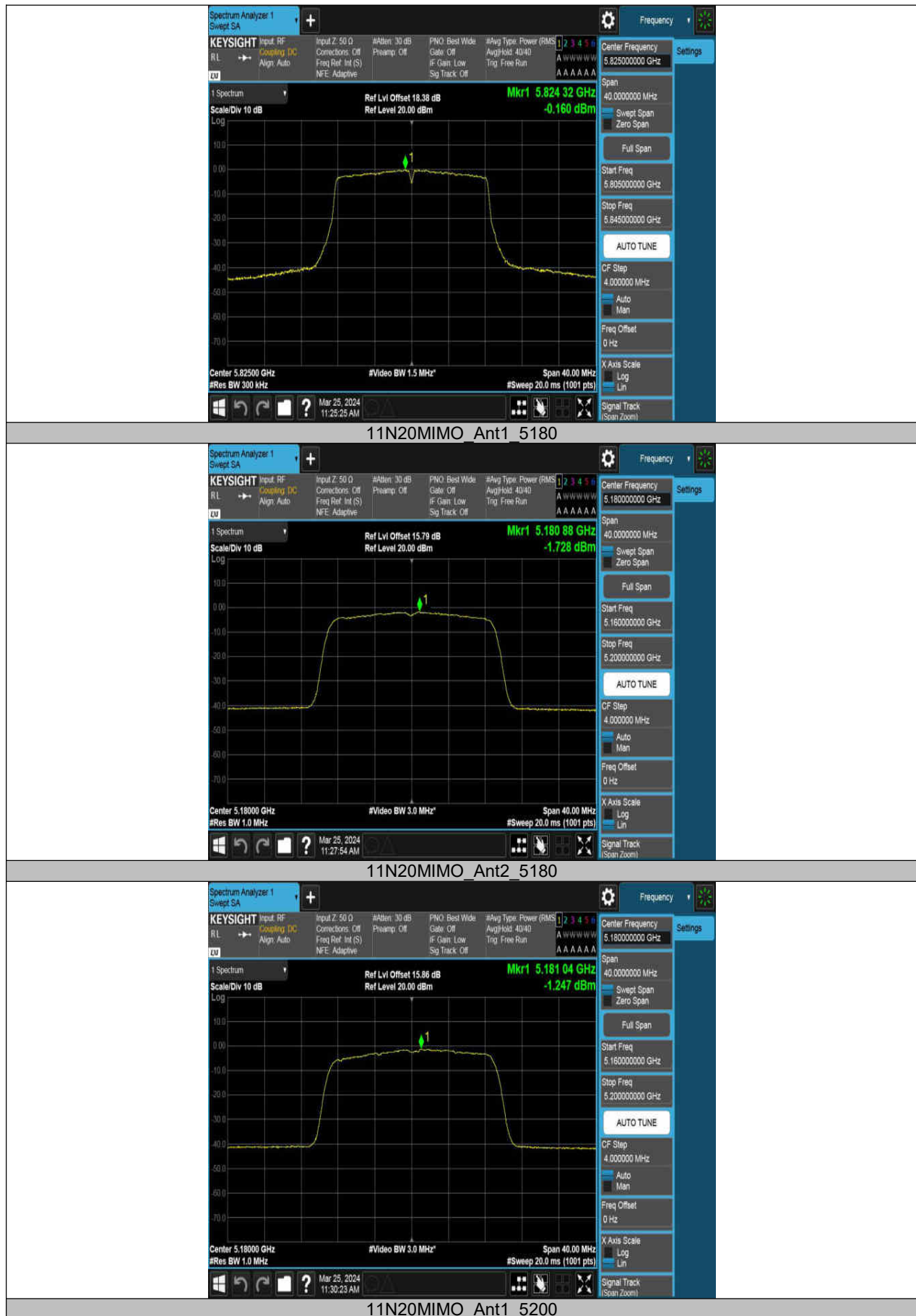
11.5. Original Test Data

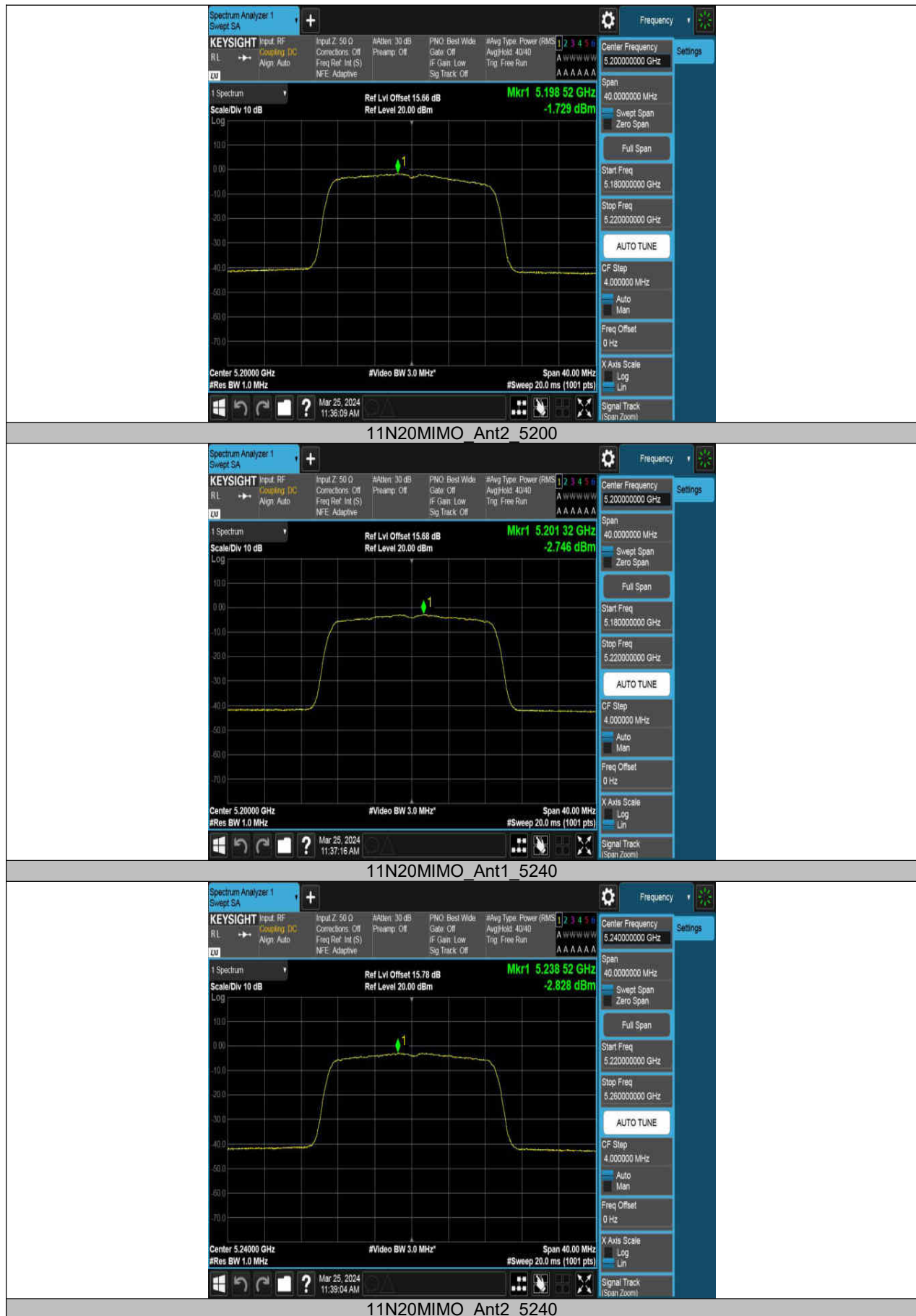


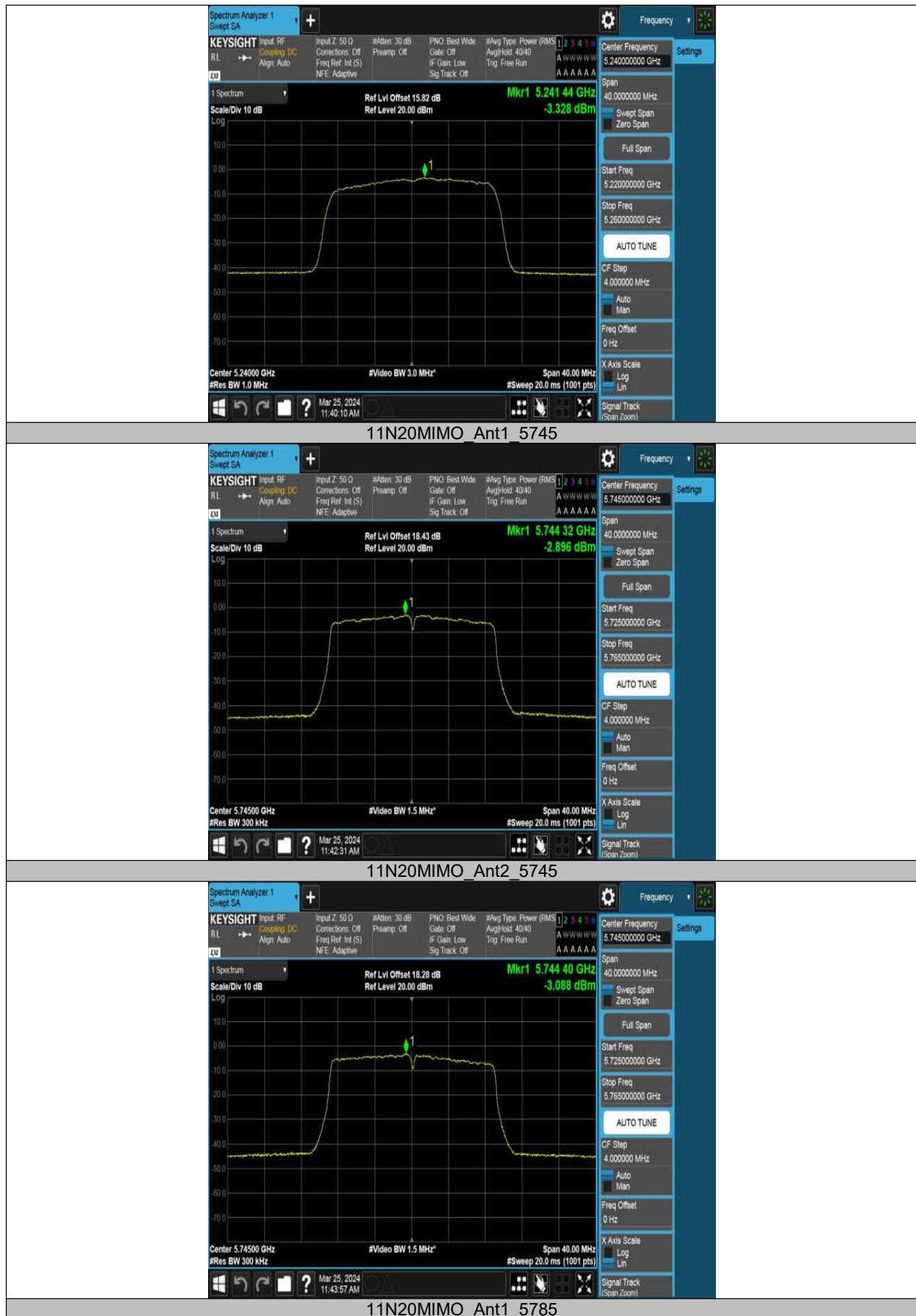


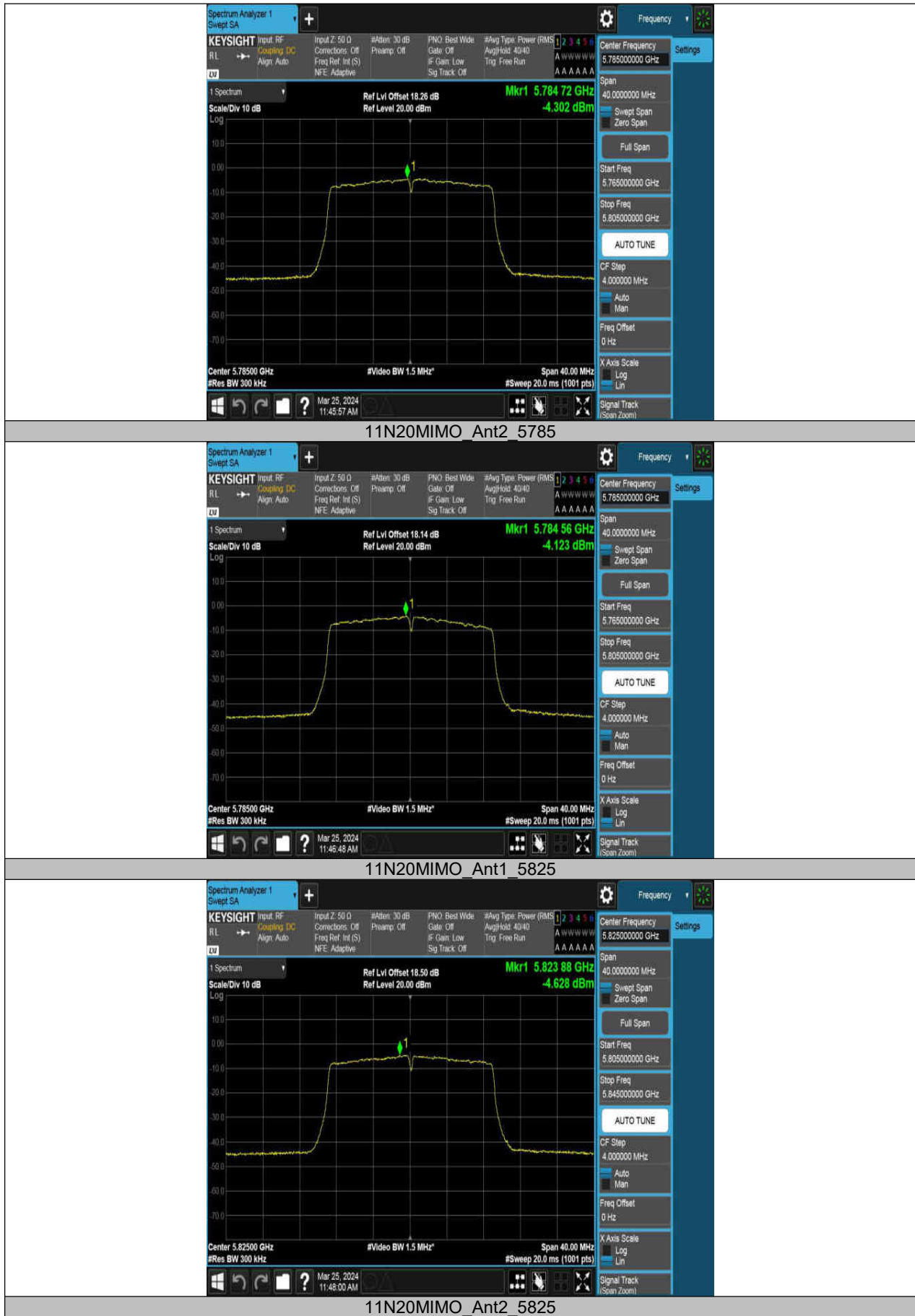


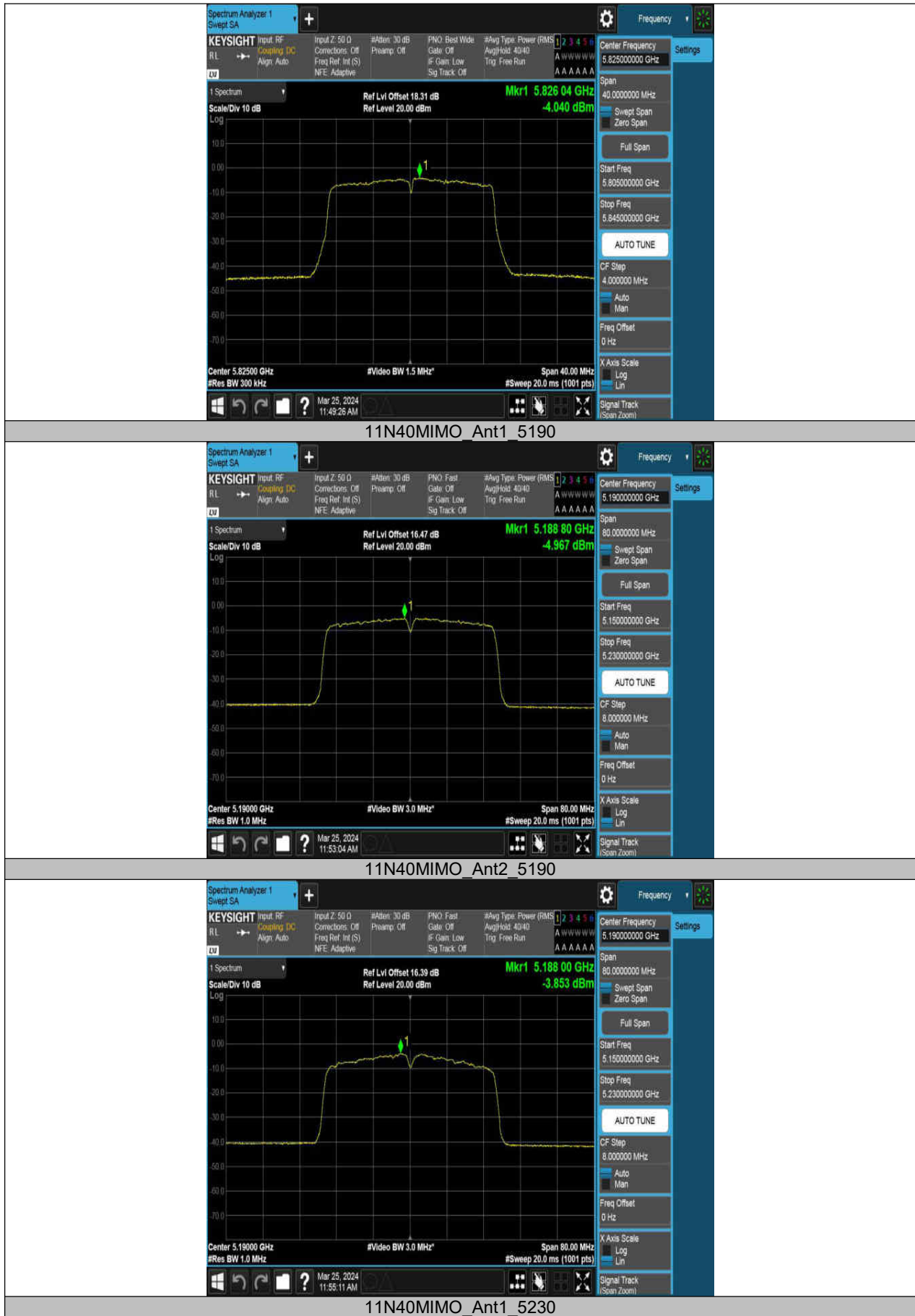






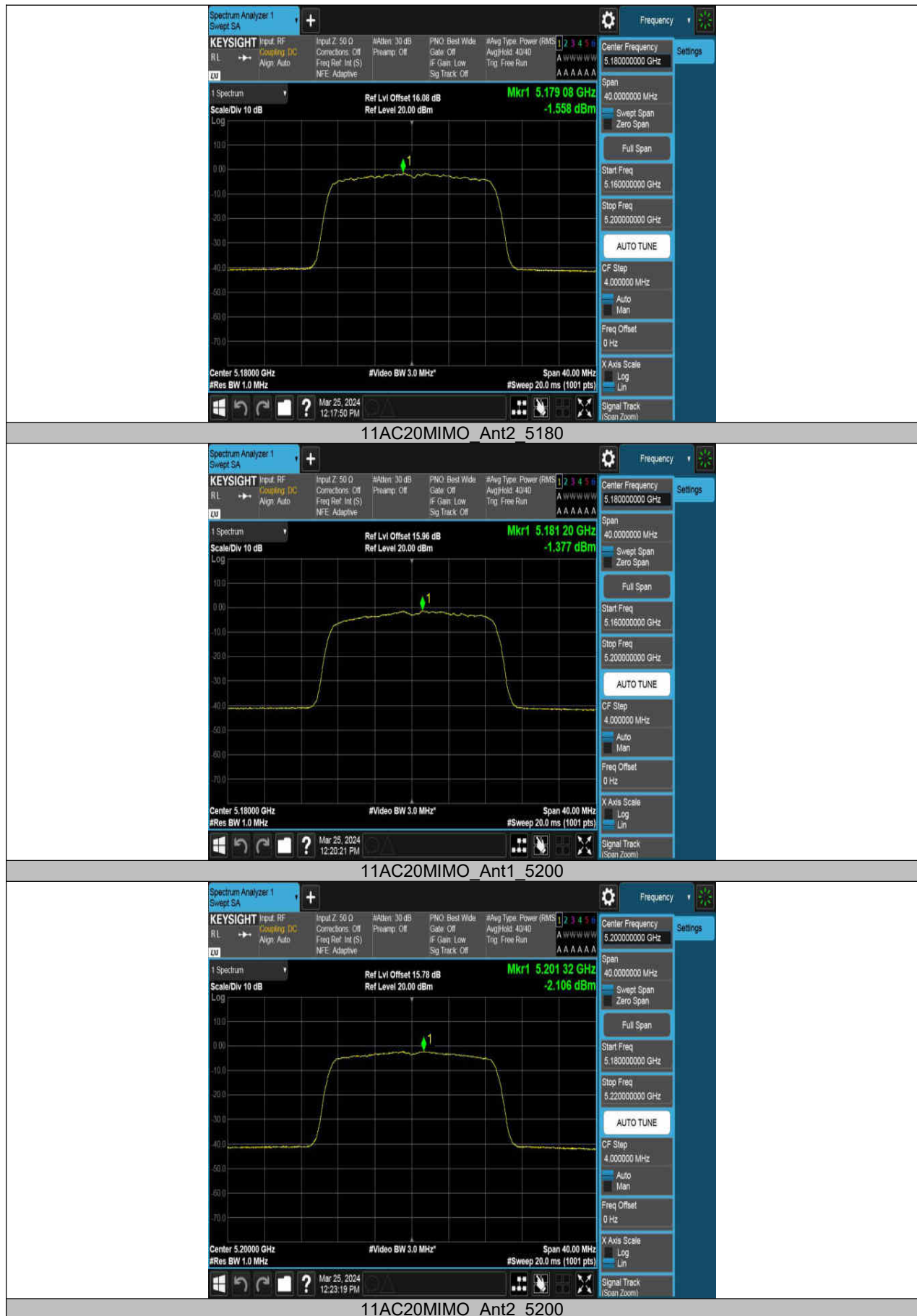




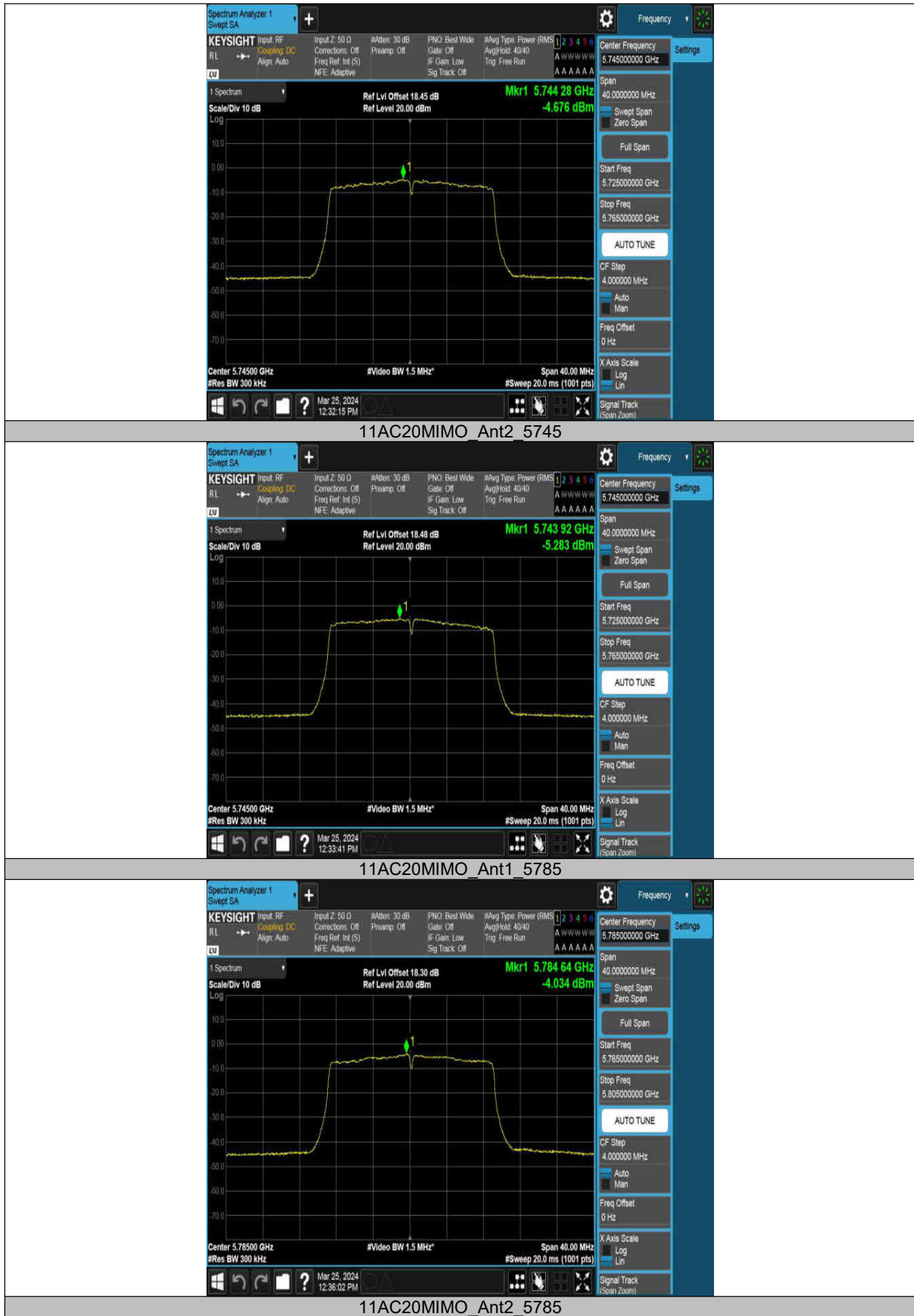


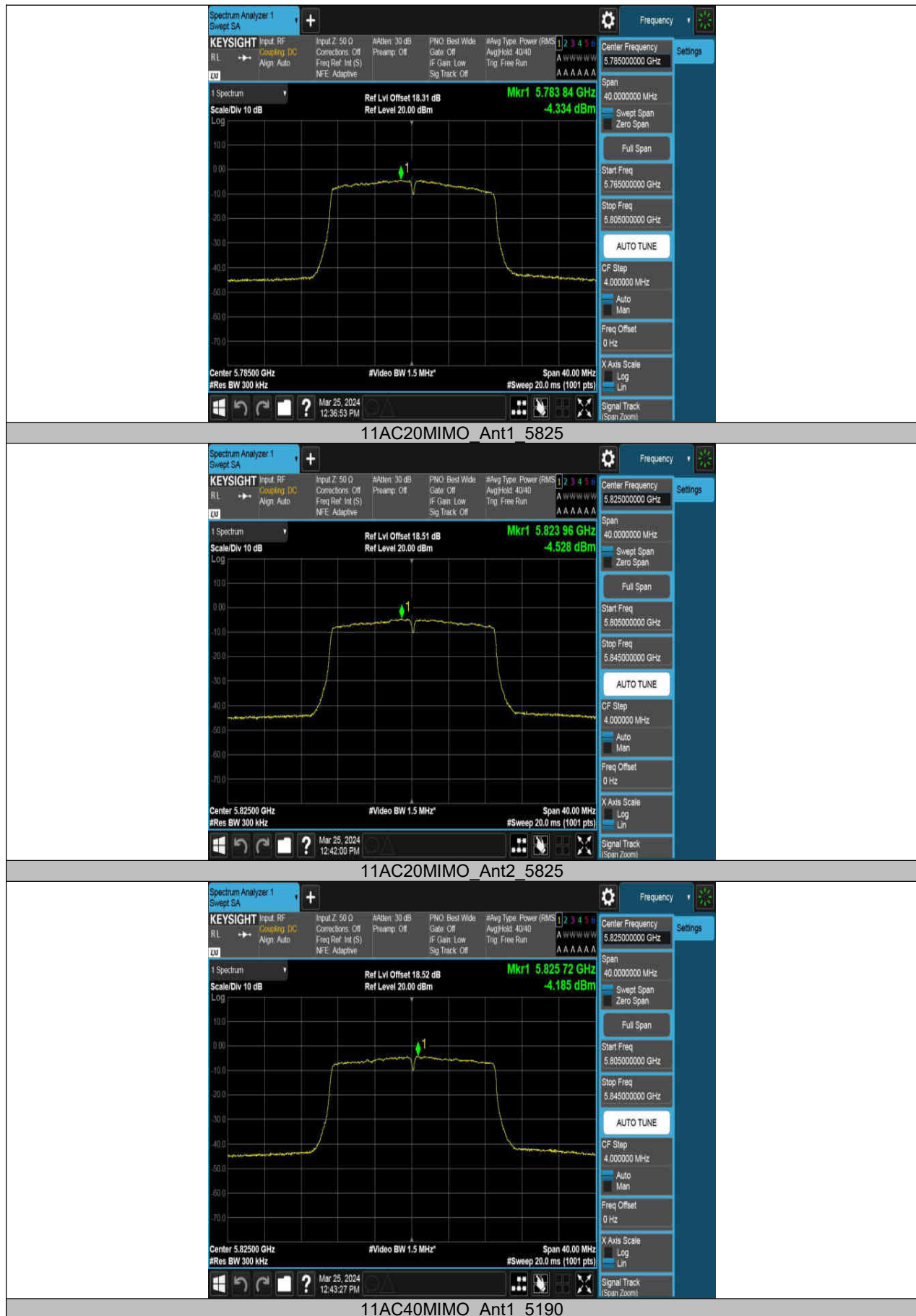


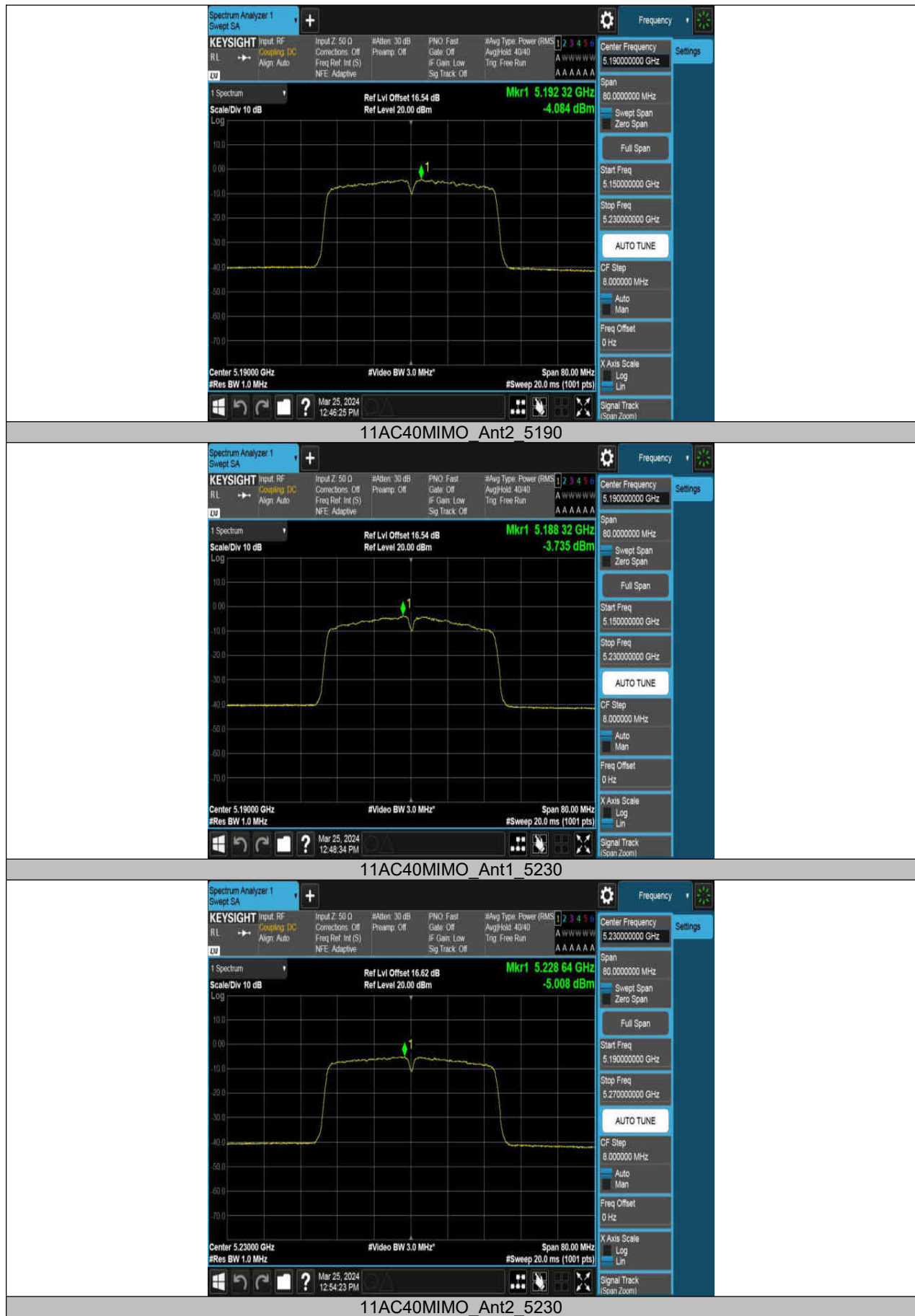
















12. Frequency Stability Measurement

12.1. Block Diagram of Test Setup

Same as section 8.1

12.2. Limit of Frequency Stability

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

12.3. Test Procedures

(1) To ensure emission at the band edge is maintained within the authorized band, those values shall be measured by radiation emissions at upper and lower frequency points, and finally compensated by frequency deviation as procedures below.

(2) The EUT was operated at the maximum output power, and connected to the spectrum analyzer, which is set to maximum hold function and peak detector. The peak value of the power envelope was measured and noted. The upper and lower frequency points were respectively measured relatively 10 dB lower than the measured peak value.

(3) The frequency deviation was calculated by adding the upper frequency point and the lower frequency point divided by two. Those detailed values of frequency deviation are provided in table below.

12.4. Test Result

Test Mode	Antenna	Frequency (MHz)	Voltage			Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
			Voltage (Vdc)	Temperature (°C)					
11N20MIMO	Ant1	5180	NV	NT		79000.00	15.250965	20	PASS
			LV	NT		78000.00	15.057915	20	PASS
			HV	NT		80000.00	15.444015	20	PASS
		5200	NV	NT		82000.00	15.769231	20	PASS
			LV	NT		79000.00	15.192308	20	PASS
			HV	NT		83000.00	15.961538	20	PASS
		5240	NV	NT		88000.00	16.793893	20	PASS
			LV	NT		85000.00	16.221374	20	PASS
			HV	NT		89000.00	16.984733	20	PASS
		5745	NV	NT		56000.00	9.747607	20	PASS
			LV	NT		42000.00	7.310705	20	PASS
			HV	NT		66000.00	11.488251	20	PASS
		5785	NV	NT		89000.00	15.384615	20	PASS
			LV	NT		84000.00	14.520311	20	PASS
			HV	NT		93000.00	16.076059	20	PASS
		5825	NV	NT		-10000.00	-1.716738	20	PASS
			LV	NT		-14000.00	-2.403433	20	PASS
			HV	NT		-6000.00	-1.030043	20	PASS
11N40MIMO	Ant1	5190	NV	NT		35000.00	6.743738	20	PASS
			LV	NT		34000.00	6.551060	20	PASS
			HV	NT		35000.00	6.743738	20	PASS
		5230	NV	NT		36000.00	6.883365	20	PASS
			LV	NT		34000.00	6.500956	20	PASS
			HV	NT		37000.00	7.074570	20	PASS
		5755	NV	NT		49000.00	8.514335	20	PASS
			LV	NT		45000.00	7.819288	20	PASS
			HV	NT		51000.00	8.861859	20	PASS
		5795	NV	NT		65000.00	11.216566	20	PASS
			LV	NT		64000.00	11.044003	20	PASS
			HV	NT		66000.00	11.389129	20	PASS