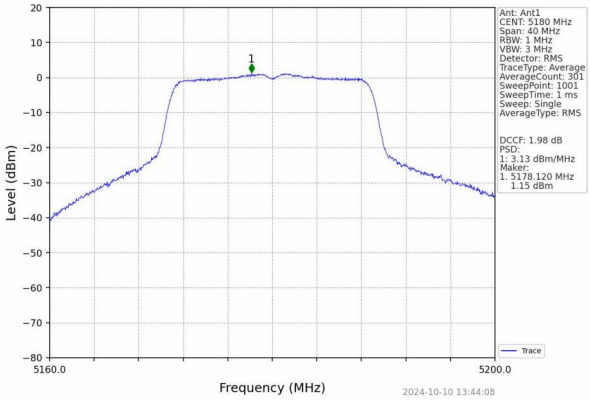
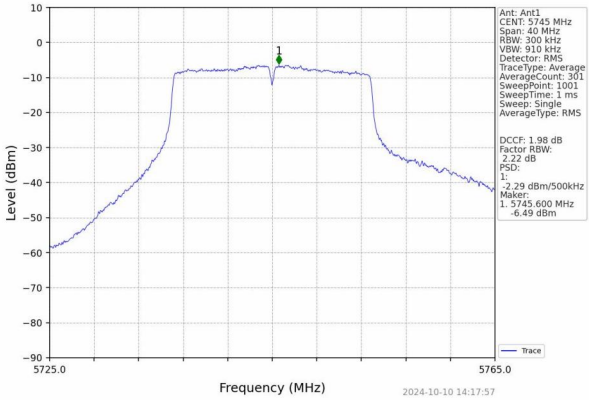
802.11ac(HT20)

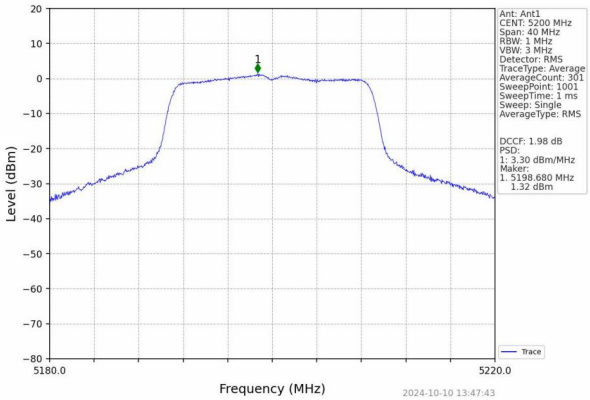
U-NII 1



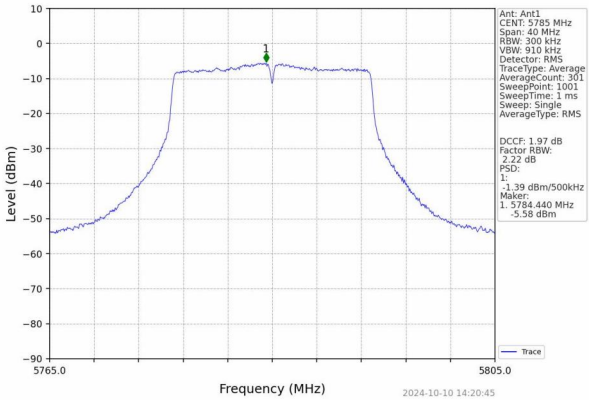
U-NII 3



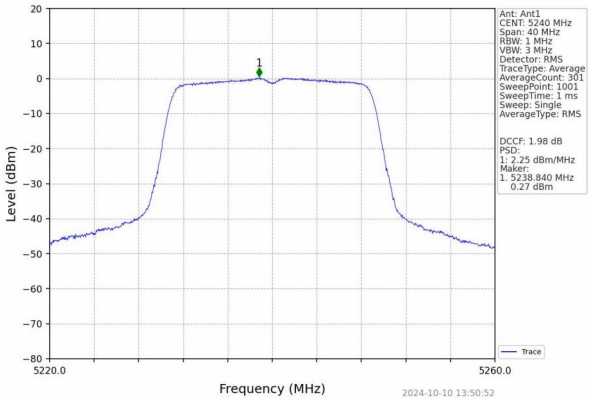
CH36



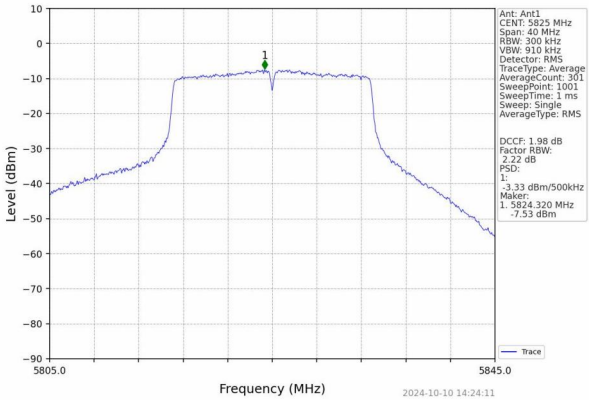
CH149



CH40

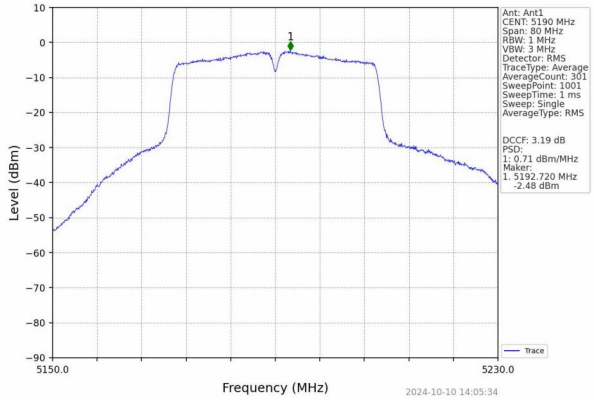
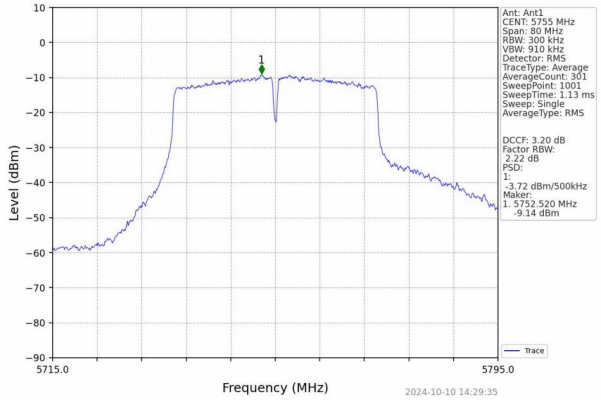
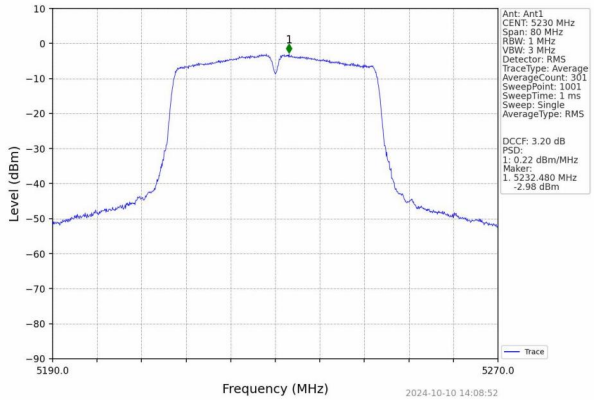
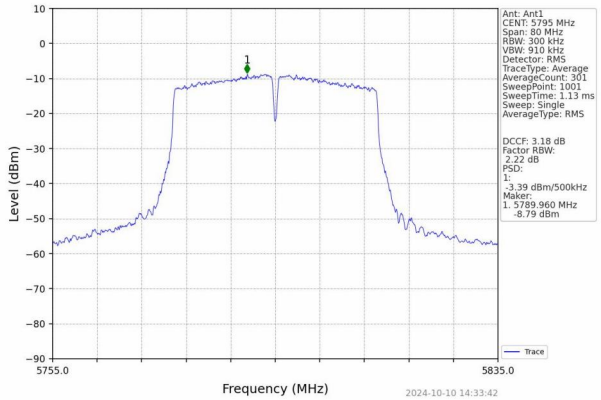


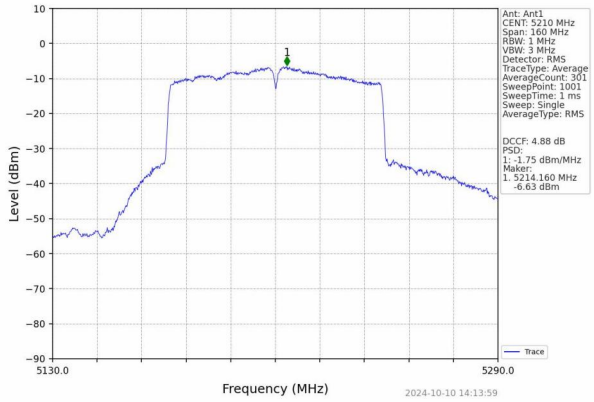
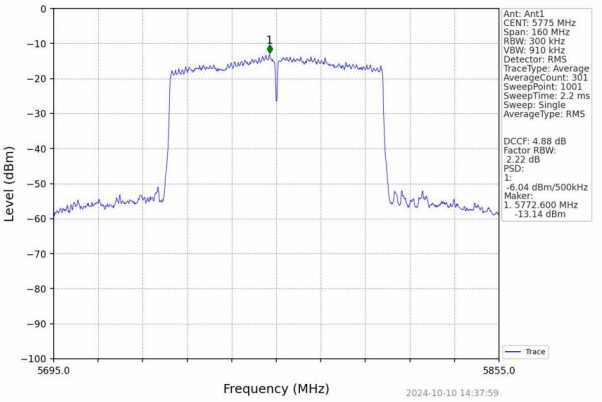
CH157



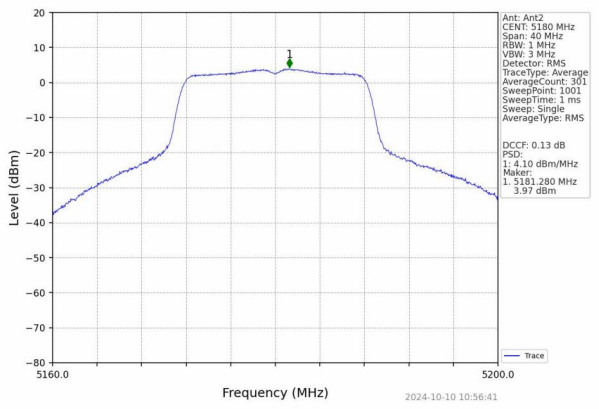
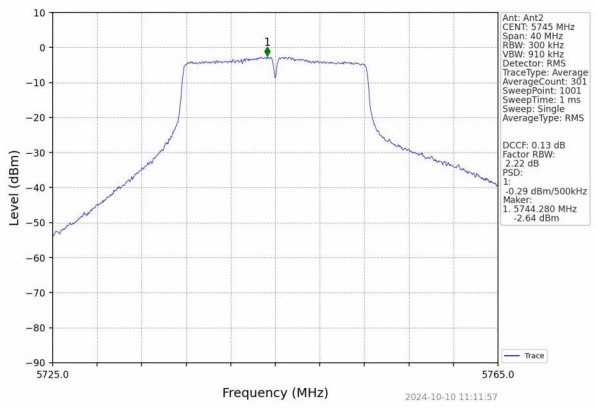
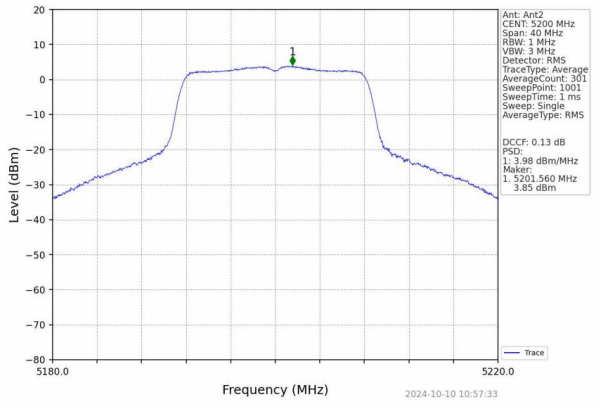
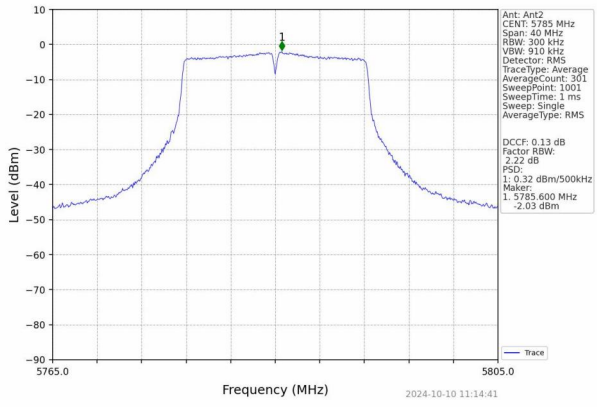
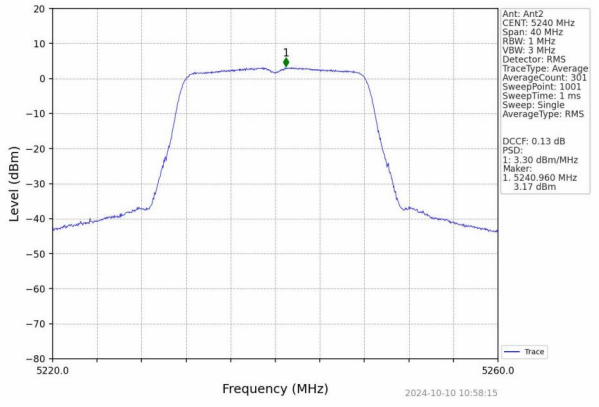
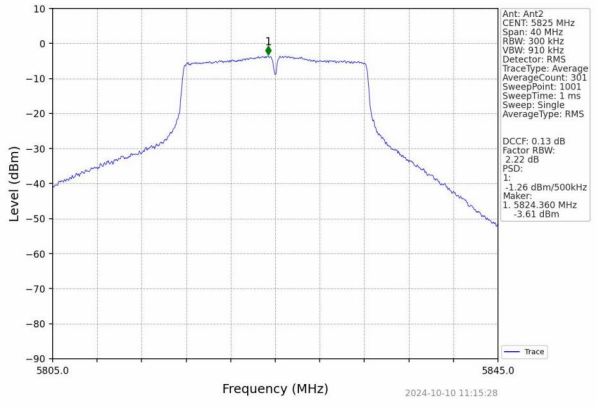
CH48

CH165

802.11ac(HT40)	
U-NII 1	*U-NII 3*
	
CH38	*CH151*
	
CH46	*CH159*

802.11ac(HT80)	
U-NII 1	*U-NII 3*
	
CH42	*CH155*

ANT 2

802.11a	
U-NII 1	*U-NII 3*
	
CH36	*CH149*
	
CH40	*CH157*
	
CH48	*CH165*

802.11n(HT20)	
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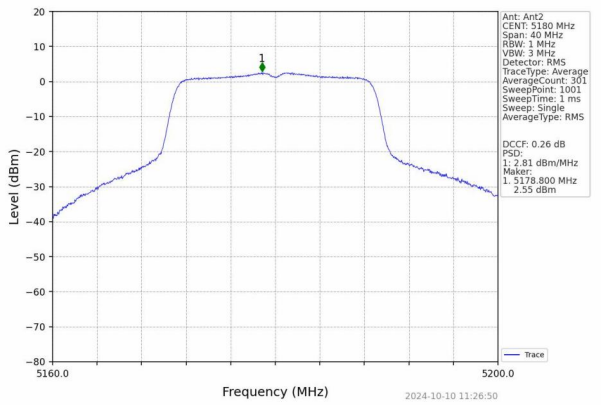
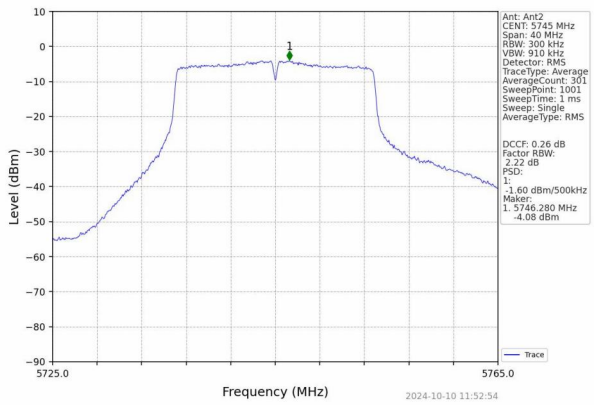
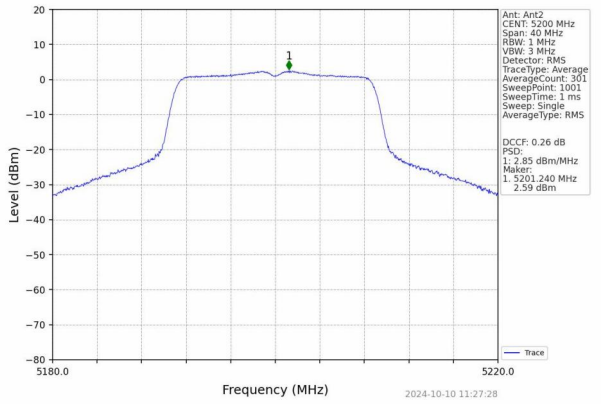
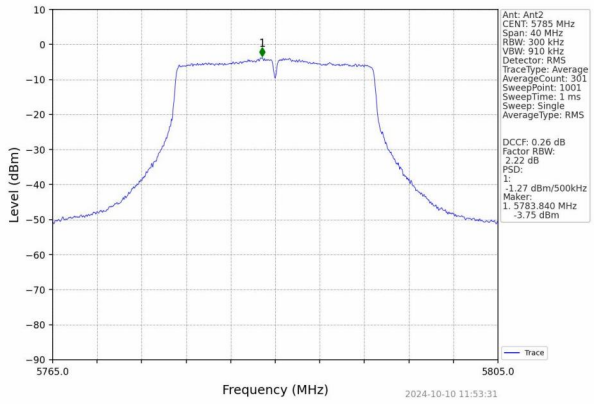
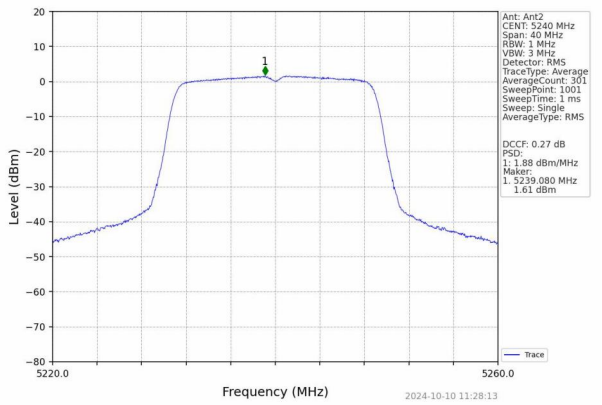
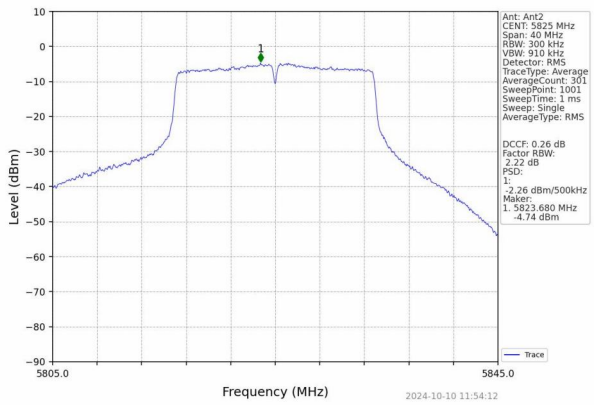
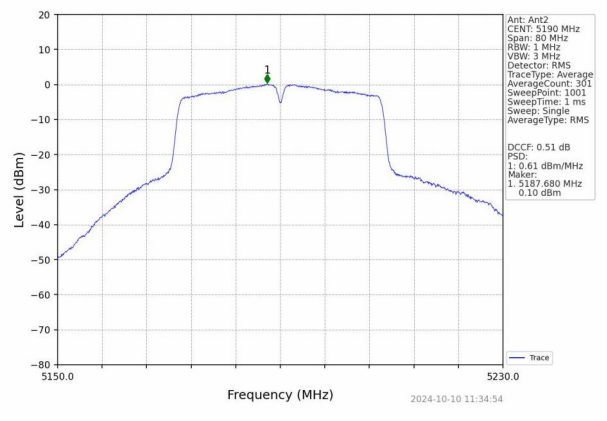
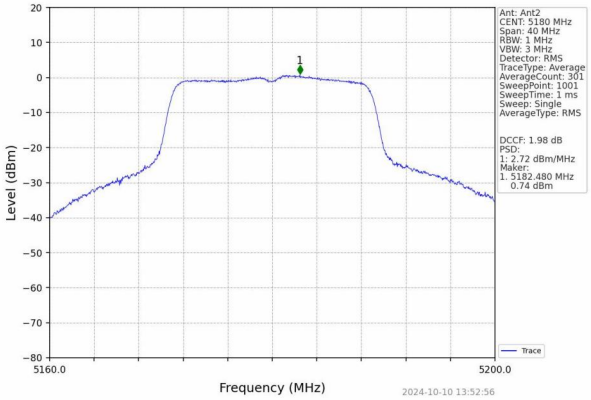
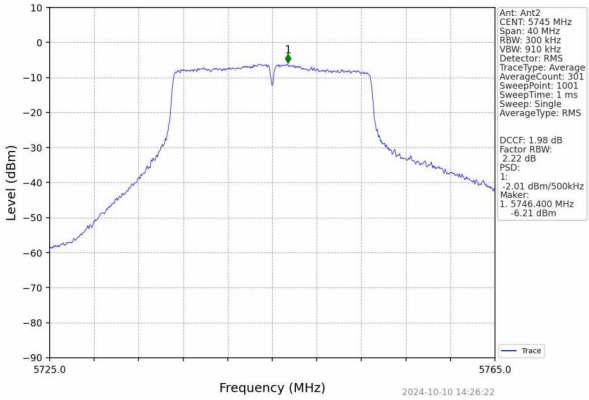
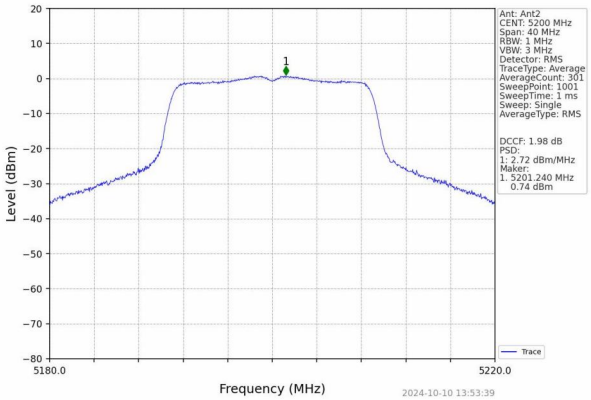
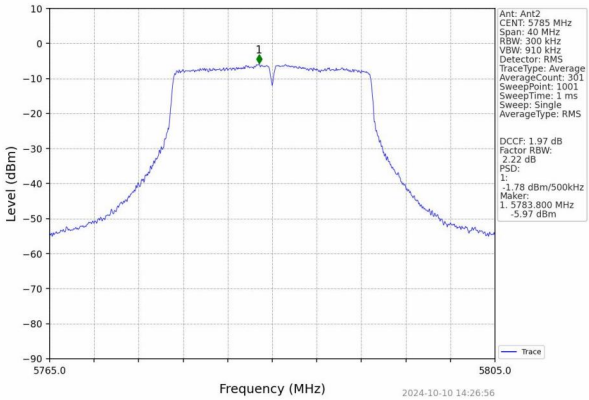
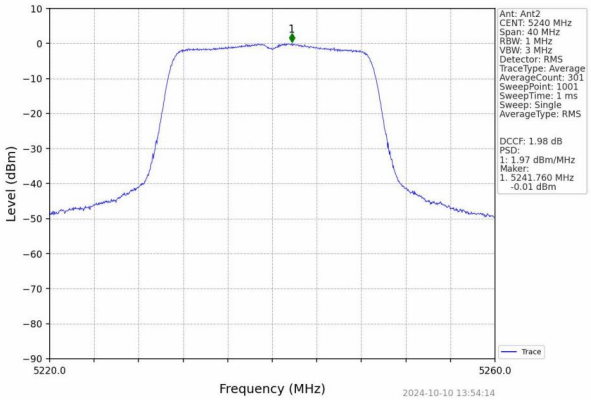
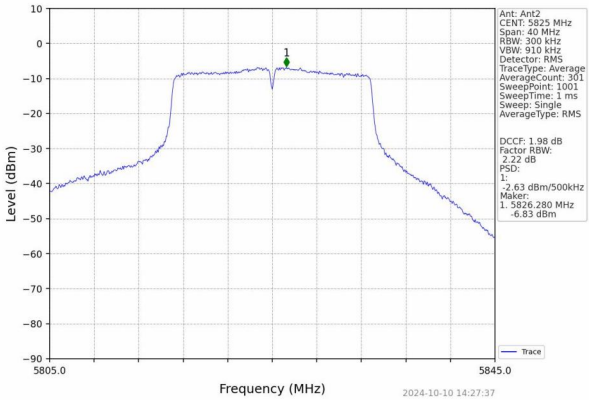
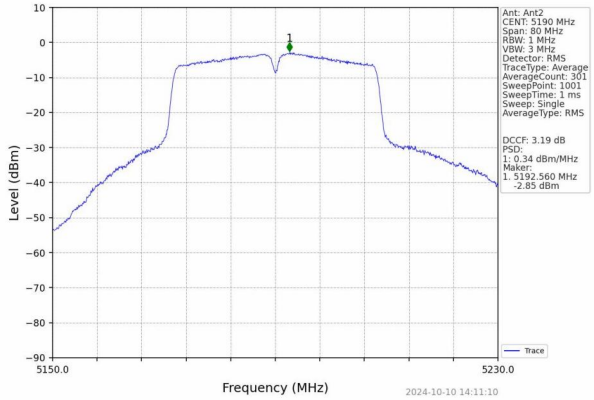
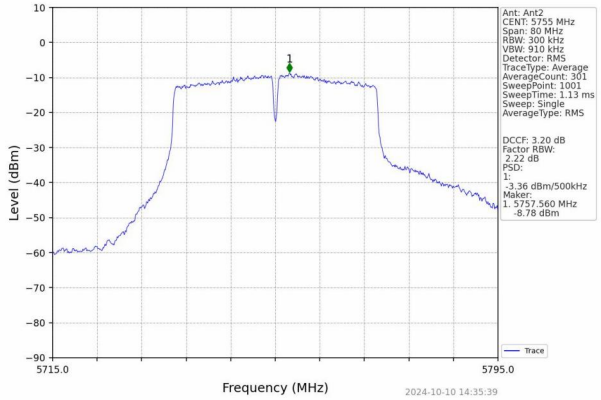
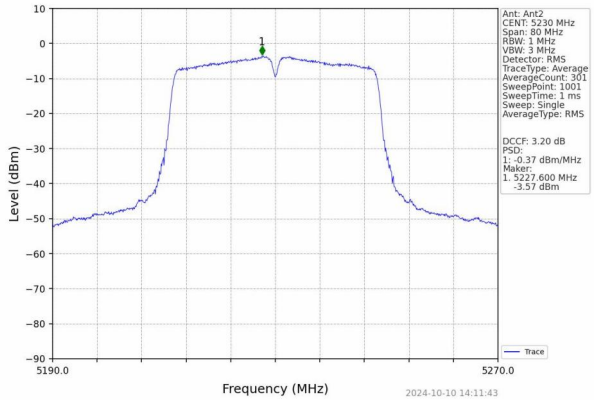
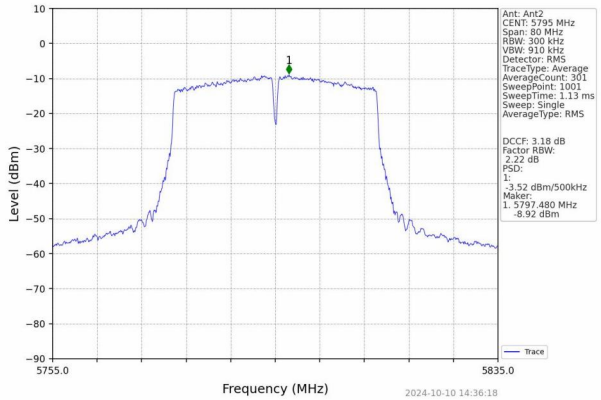
	
CH36	*CH149*
	
CH40	*CH157*
	
CH48	*CH165*

802.11n(HT40)	
U-NII 1	*U-NII 3*
	
CH38	*CH151*
CH46	*CH159*

802.11ac(HT20)	
U-NII 1	*U-NII 3*
	
CH36	*CH149*
	
CH40	*CH157*
	
CH48	*CH165*

802.11ac(HT40)	
U-NII 1	*U-NII 3*
	
CH38	*CH151*
	
CH46	*CH159*

802.11ac(HT80)	
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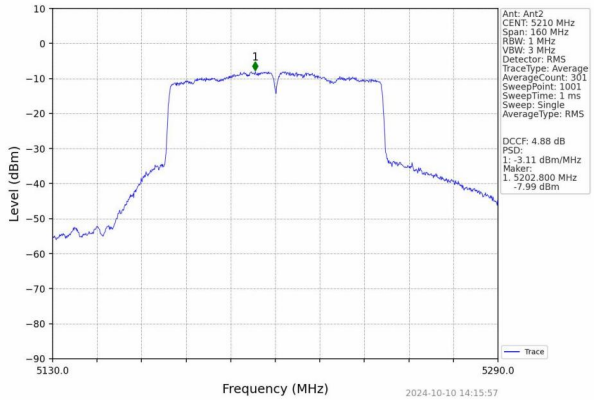
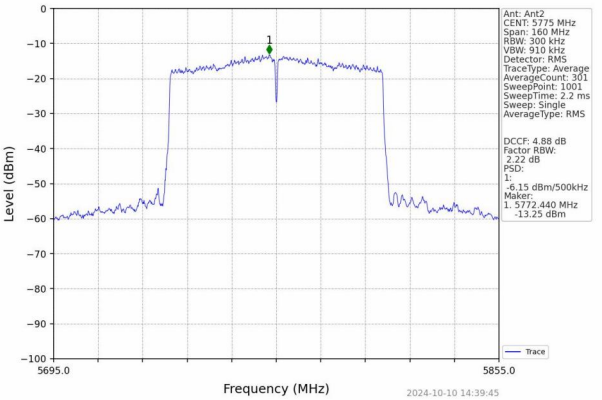
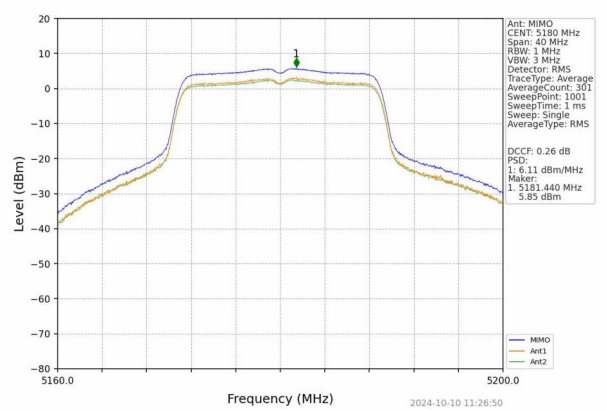
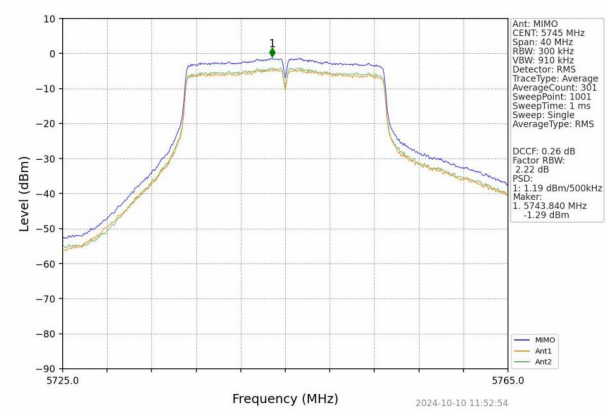
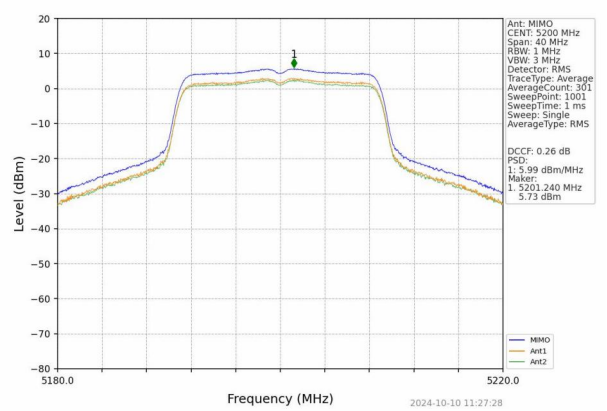
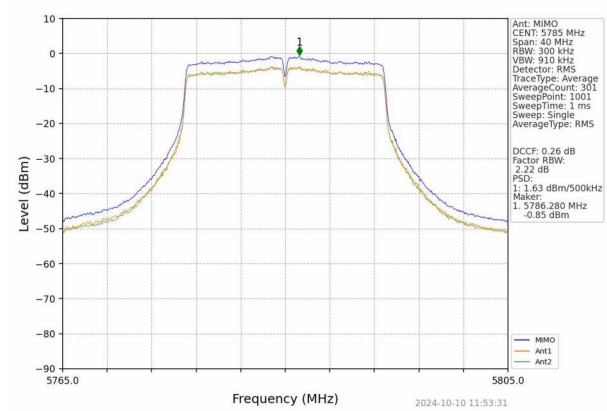
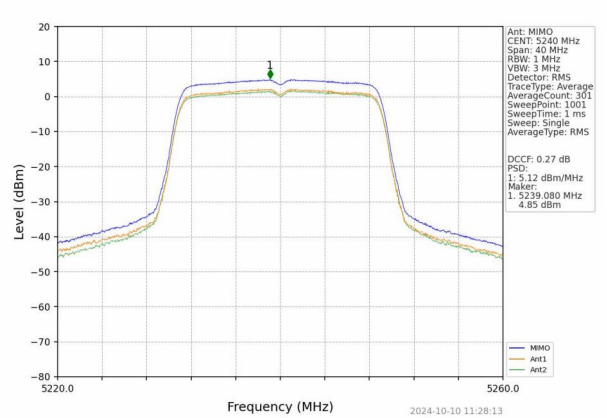
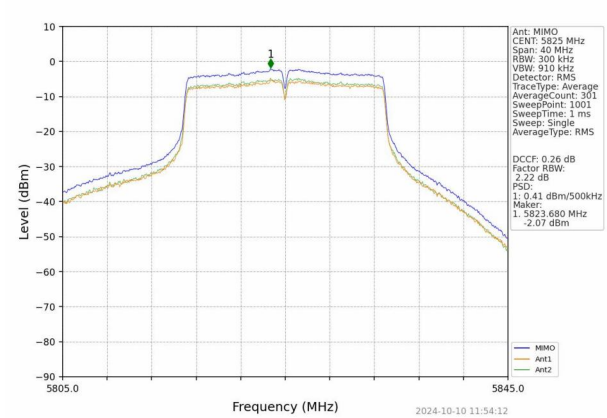
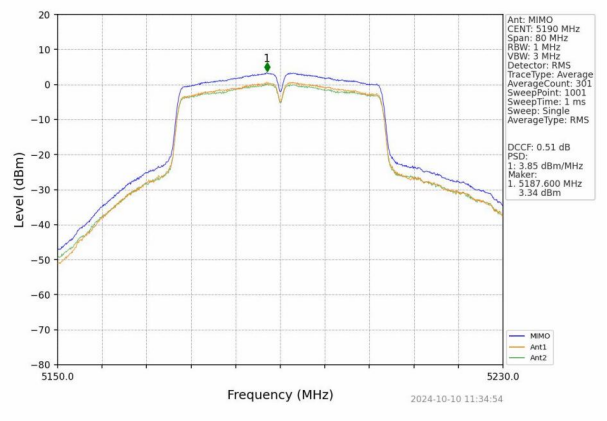
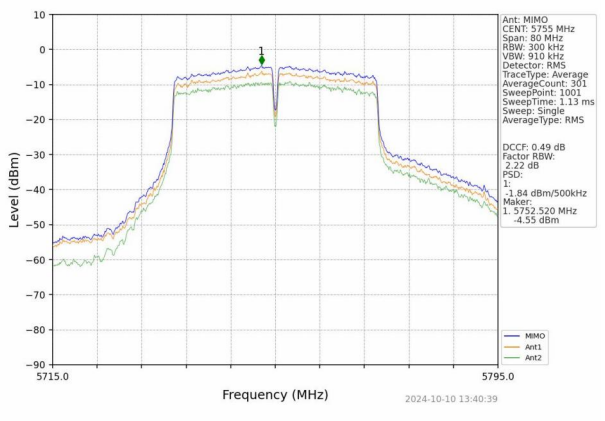
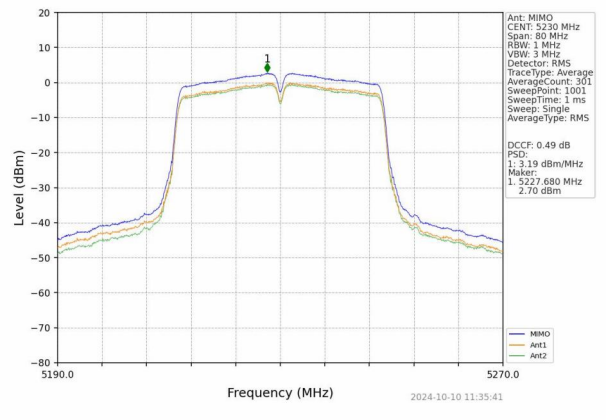
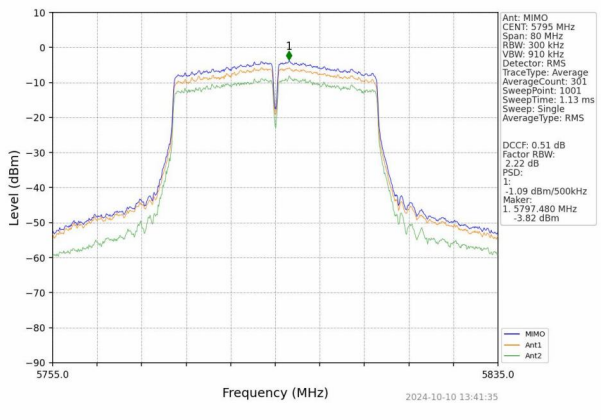
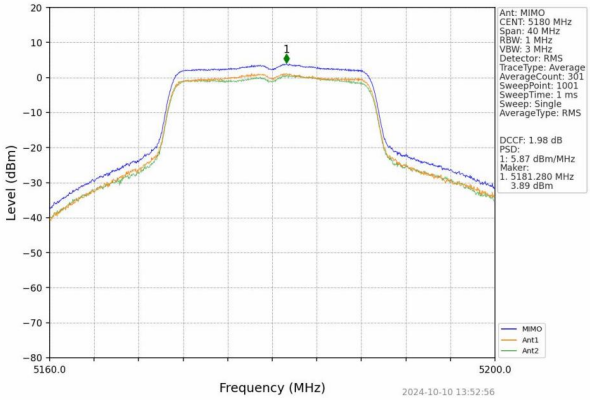
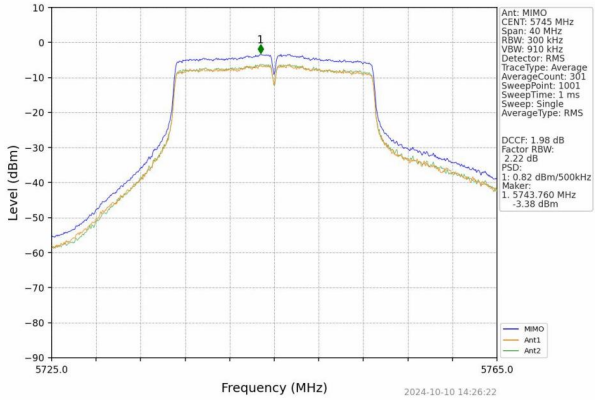
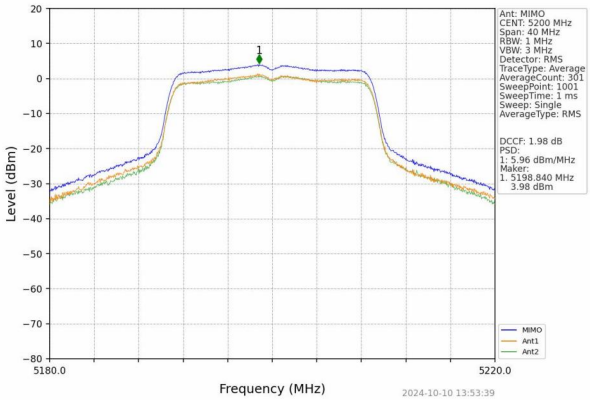
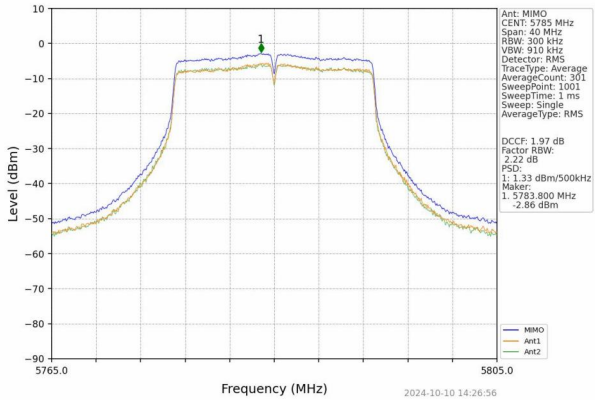
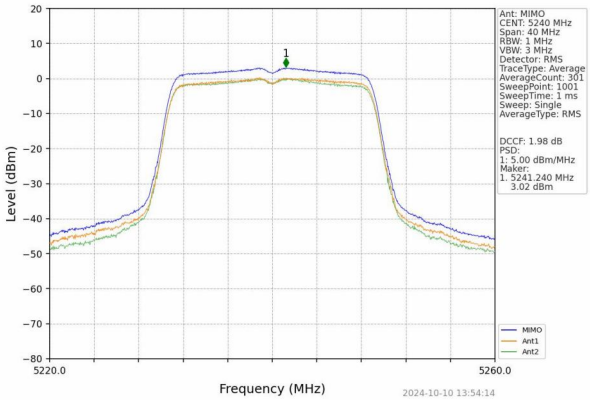
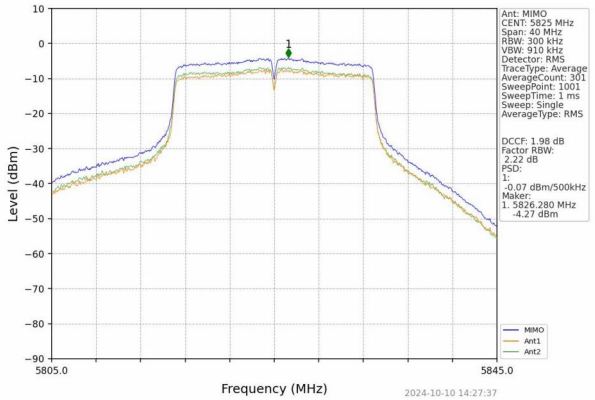
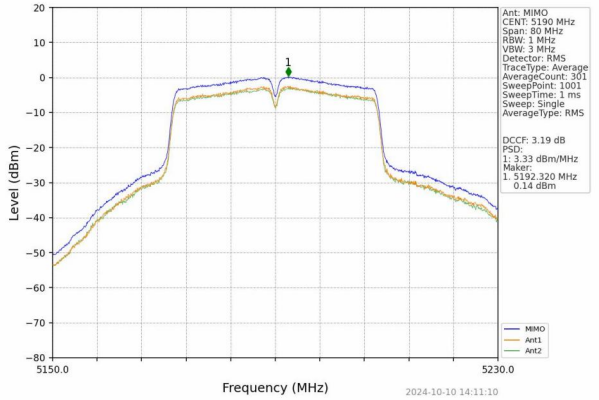
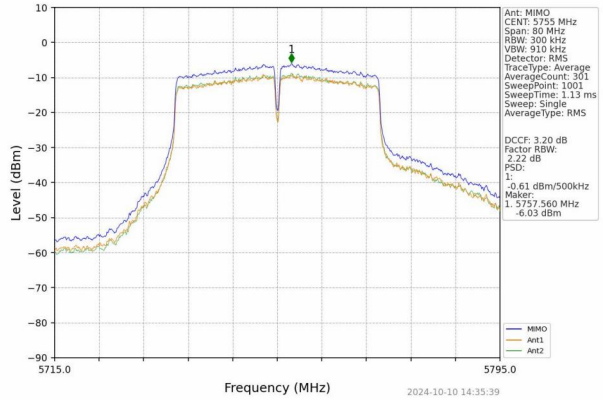
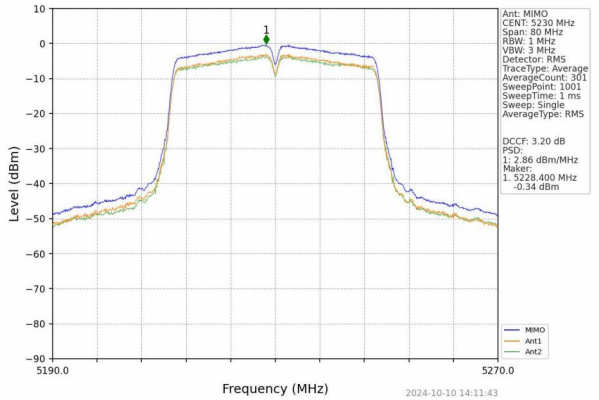
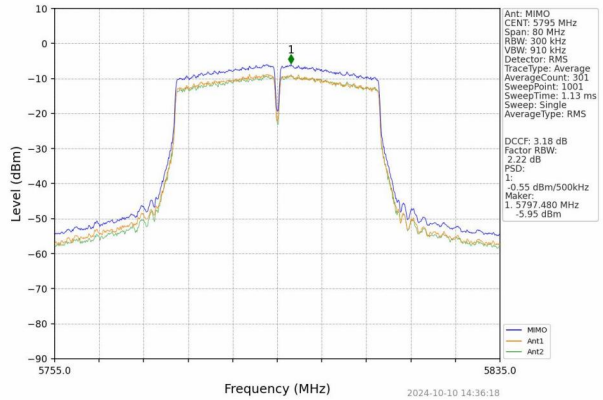
	
CH42	*CH155*

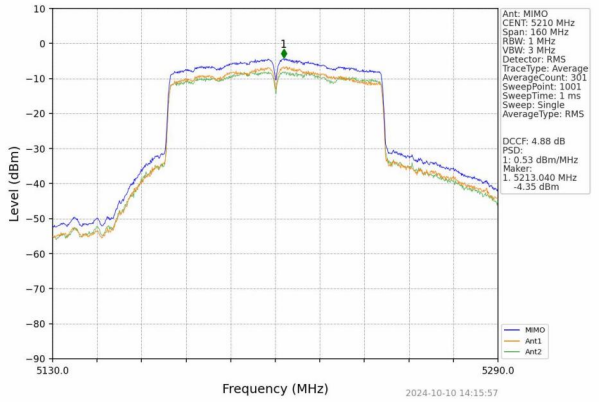
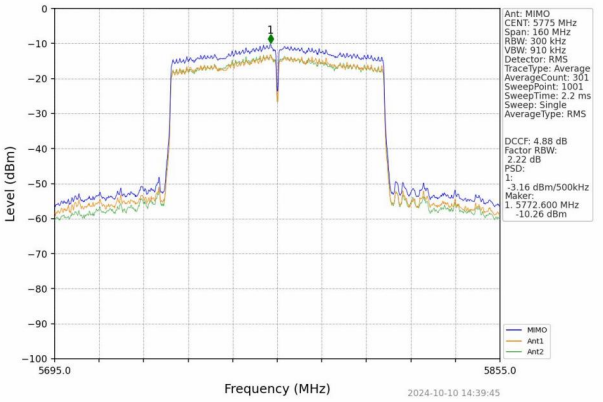
MIMO

802.11n(HT20)	
U-NII 1	*U-NII 3*
	
CH36	*CH149*
	
CH40	*CH157*
	
CH48	*CH165*

802.11n(HT40)	
U-NII 1	*U-NII 3*
	
CH38	*CH151*
	
CH46	*CH159*

802.11ac(HT20)	
U-NII 1	*U-NII 3*
	
CH36	*CH149*
	
CH40	*CH157*
	
CH48	*CH165*

802.11ac(HT40)	
U-NII 1	*U-NII 3*
	
CH38	*CH151*
	
CH46	*CH159*

802.11ac(HT80)	
U-NII 1	*U-NII 3*
	
CH42	*CH155*

4.5 Emission Bandwidth (26dB Bandwidth)

Limit

N/A

Test Procedure

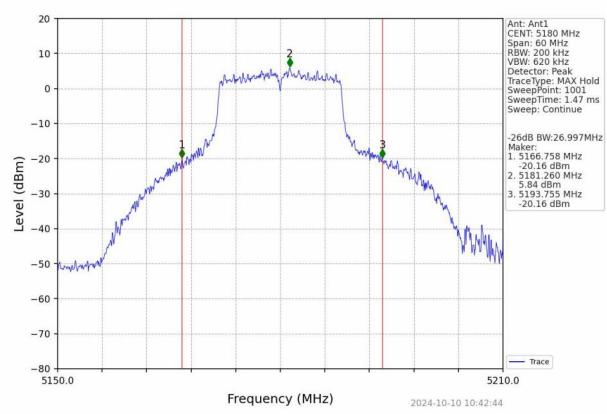
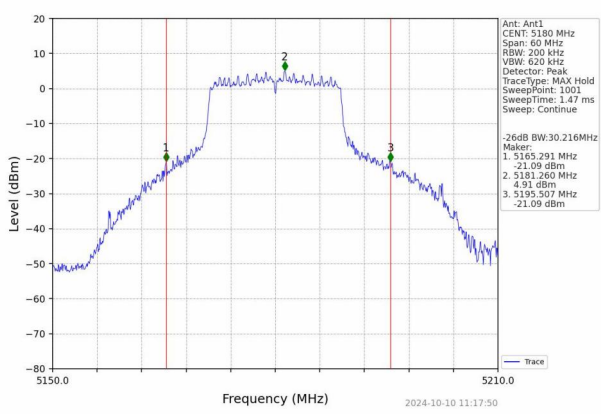
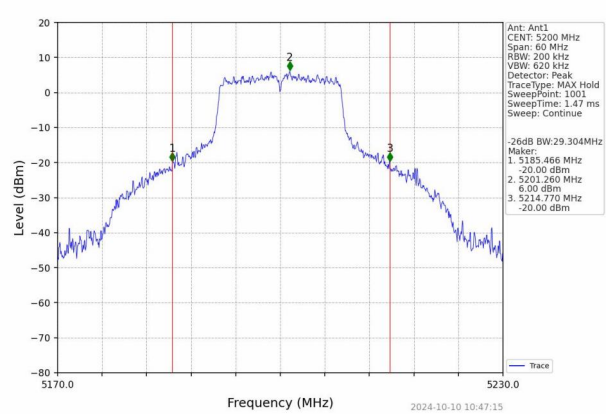
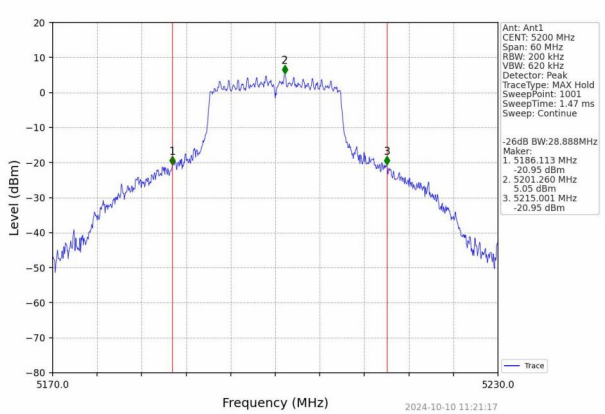
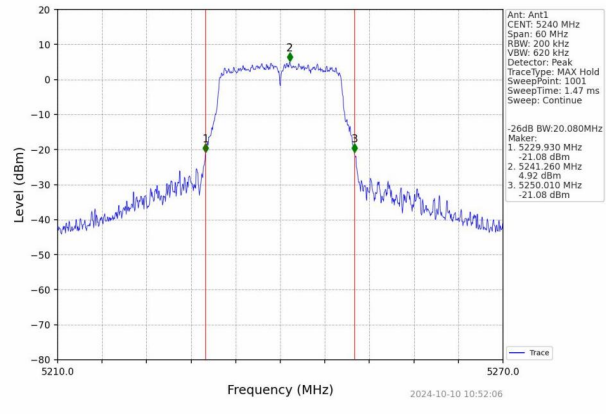
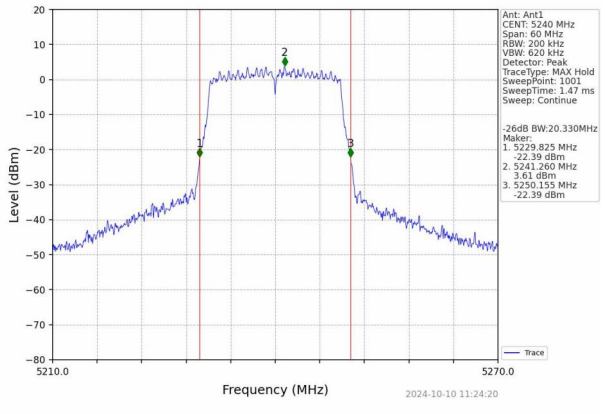
1. Set resolution bandwidth (RBW) = approximately 1 % of the EBW.
2. Set the video bandwidth (VBW) > RBW.
3. Detector = Peak.
4. Trace mode = Max hold.
5. Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW / EBW ratio is approximately 1 %.

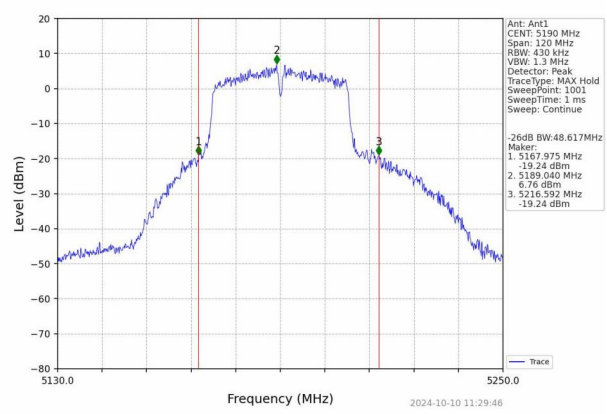
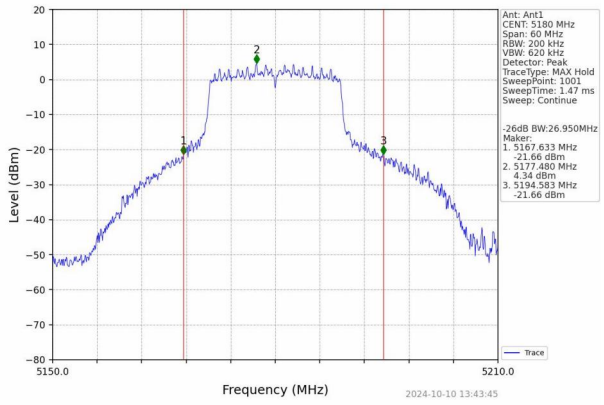
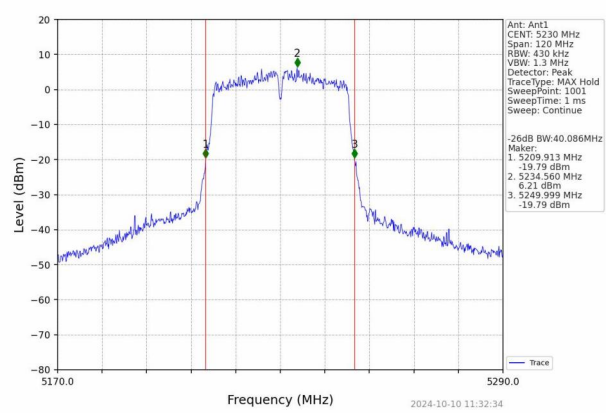
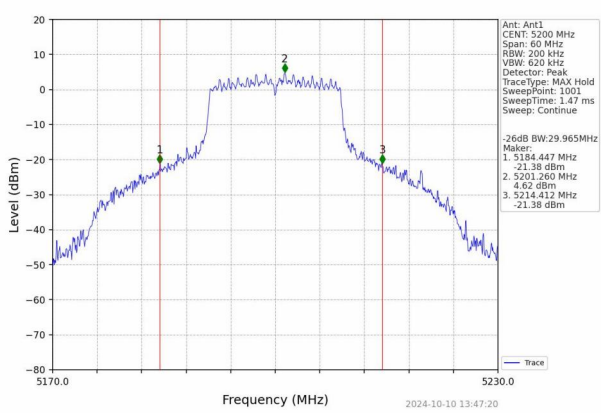
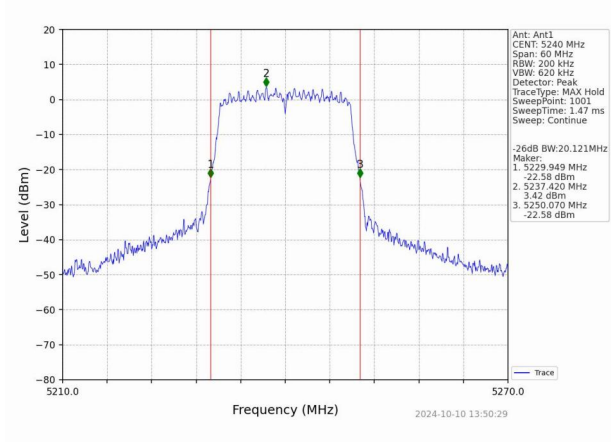
Test Configuration

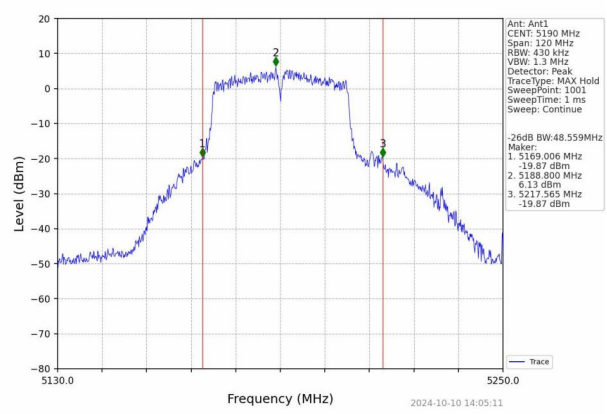
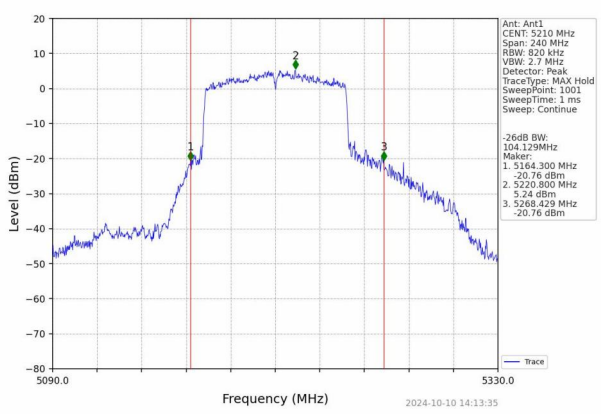
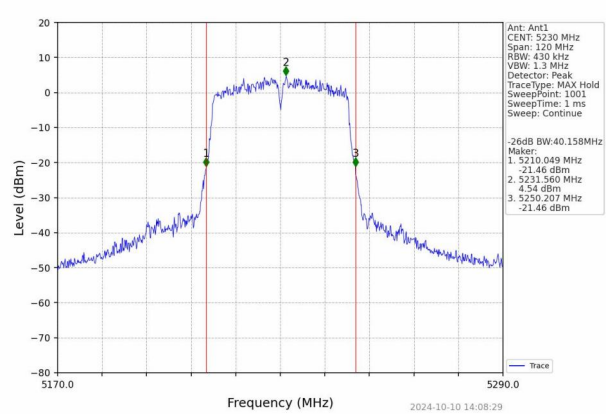
Test Results

Mode	TX Type	Frequency (MHz)	ANT	26dB Bandwidth (MHz)		Verdict
				Result	Limit	
802.11a	SISO	5180	1	26.997	/	Pass
		5200	1	29.304	/	Pass
		5240	1	20.080	/	Pass
802.11n (HT20)	MIMO	5180	1	30.216	/	Pass
		5200	1	28.888	/	Pass
		5240	1	20.330	/	Pass
802.11n (HT40)	MIMO	5190	1	48.617	/	Pass
		5230	1	40.086	/	Pass
802.11ac (VHT20)	MIMO	5180	1	26.950	/	Pass
		5200	1	29.965	/	Pass
		5240	1	20.121	/	Pass
802.11ac (VHT40)	MIMO	5190	1	48.559	/	Pass
		5230	1	40.158	/	Pass
802.11ac (VHT80)	MIMO	5210	1	104.129	/	Pass

Test plot as follows:

802.11a	*802.11n(HT20)*
	
CH36	*CH36*
	
CH40	*CH40*
	
CH48	*CH48*

802.11n(HT40)	*802.11ac(HT20)*
	
CH38	*CH36*
	
CH46	*CH40*
	
	CH48

802.11ac(HT40)	*802.11ac(HT80)*
	
CH38	*CH42*
	
CH46	

4.6 Minimum Emission Bandwidth (6dB Bandwidth)

Limit

Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

Test Procedure

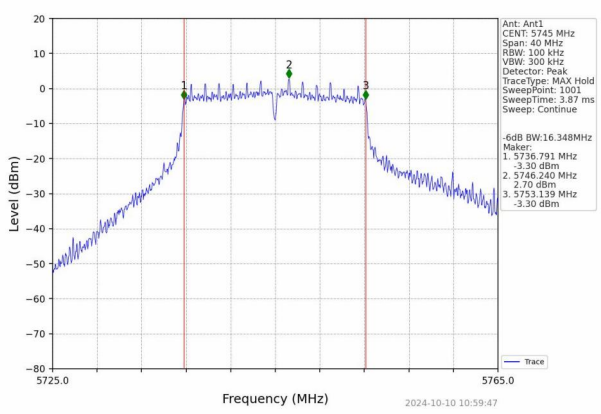
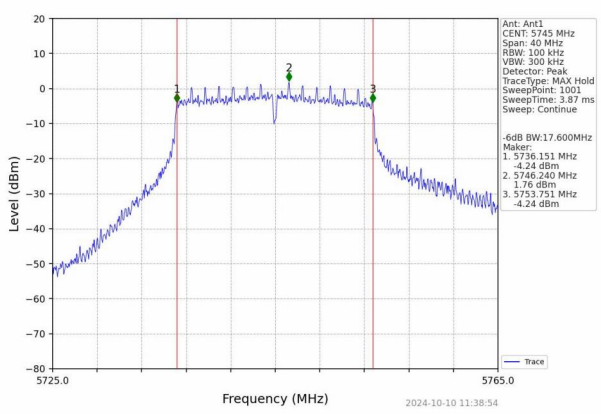
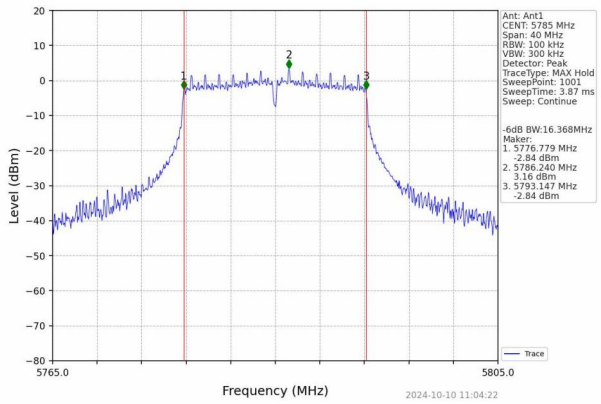
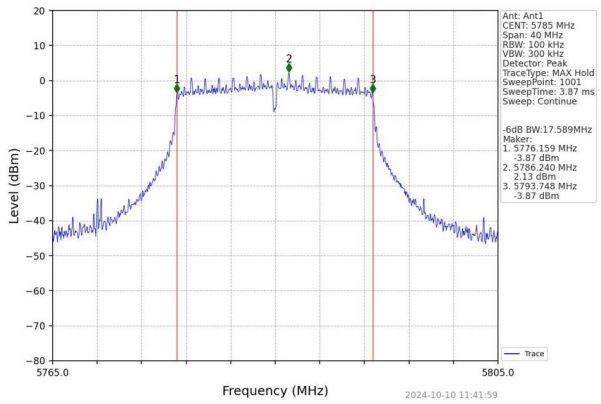
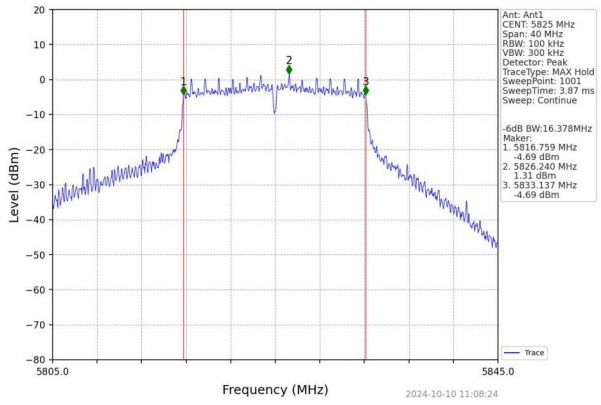
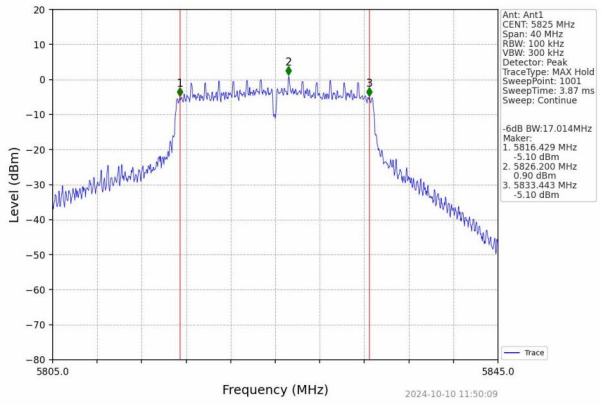
1. Set resolution bandwidth (RBW) = 100 kHz
2. Set the video bandwidth 3 x RBW.
3. Detector = Peak.
4. Trace mode = Max hold.
5. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

Test Configuration

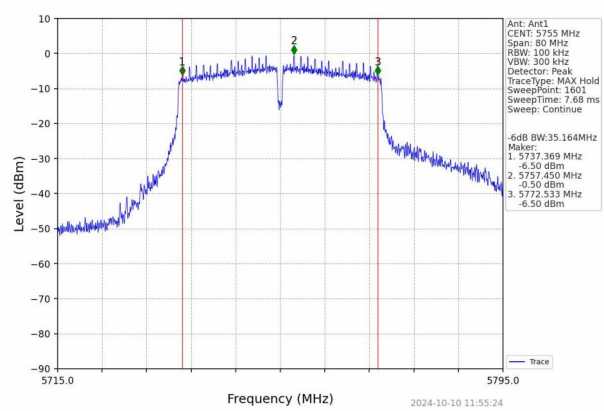
Test Results

Mode	TX Type	Frequency (MHz)	ANT	6dB Bandwidth (MHz)		Verdict
				Result	Limit	
802.11a	SISO	5745	1	16.348	>=0.5	Pass
		5785	1	16.368	>=0.5	Pass
		5825	1	16.378	>=0.5	Pass
802.11n (HT20)	MIMO	5745	1	17.600	>=0.5	Pass
		5785	1	17.589	>=0.5	Pass
		5825	1	17.014	>=0.5	Pass
802.11n (HT40)	MIMO	5755	1	35.164	>=0.5	Pass
		5795	1	35.145	>=0.5	Pass
802.11ac (VHT20)	MIMO	5745	1	17.558	>=0.5	Pass
		5785	1	17.554	>=0.5	Pass
		5825	1	17.567	>=0.5	Pass
802.11ac (VHT40)	MIMO	5755	1	35.161	>=0.5	Pass
		5795	1	35.157	>=0.5	Pass
802.11ac (VHT80)	MIMO	5775	1	75.111	>=0.5	Pass

Test plot as follows:

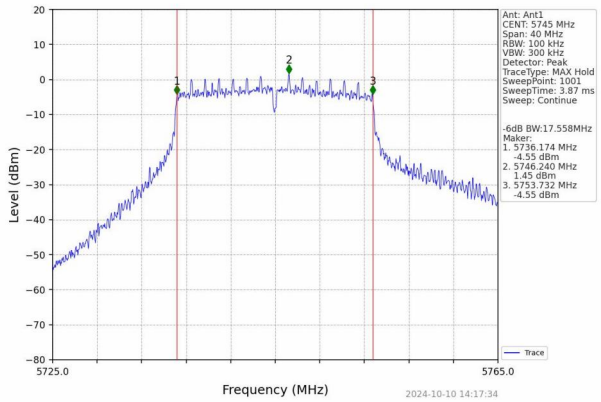
802.11a	*802.11n(HT20)*
	
CH149	*CH149*
	
CH157	*CH157*
	
CH165	*CH165*

802.11n(HT40)

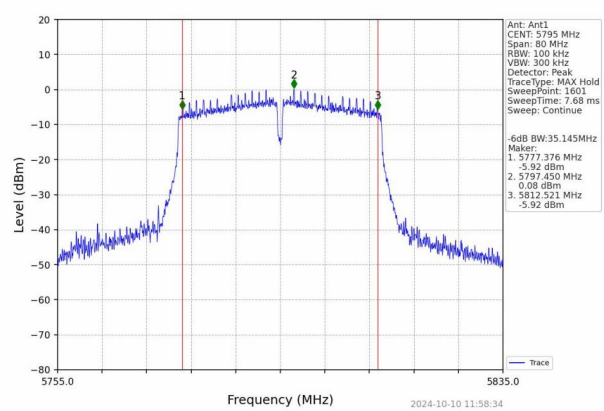


CH151

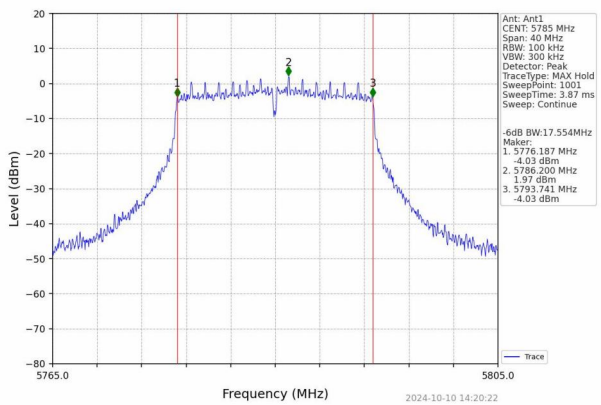
802.11ac(HT20)



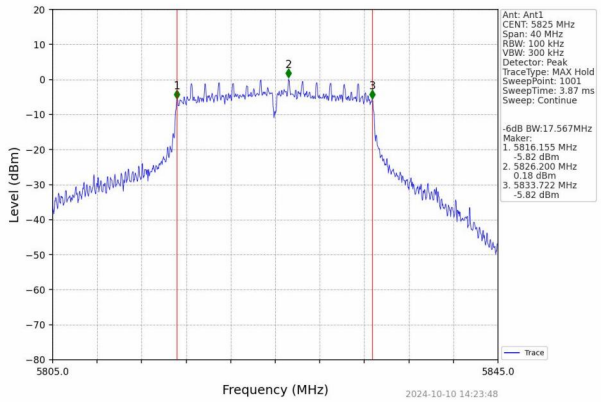
CH149



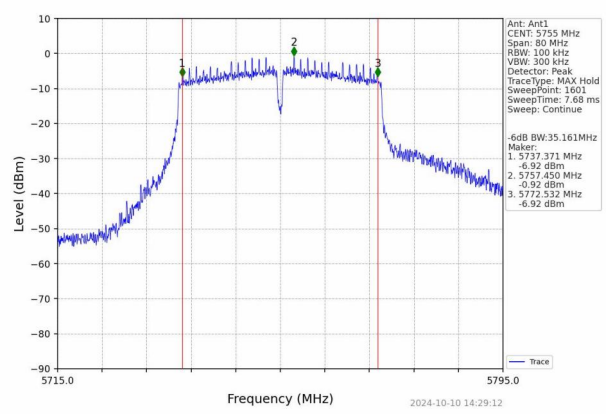
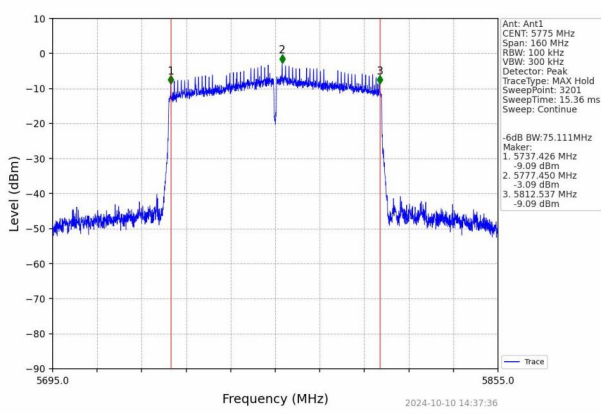
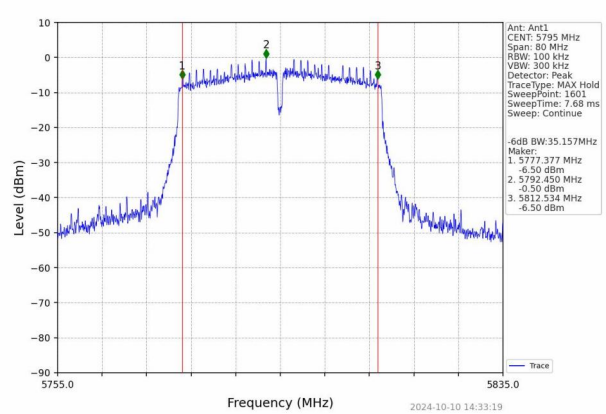
CH159



CH157



CH165

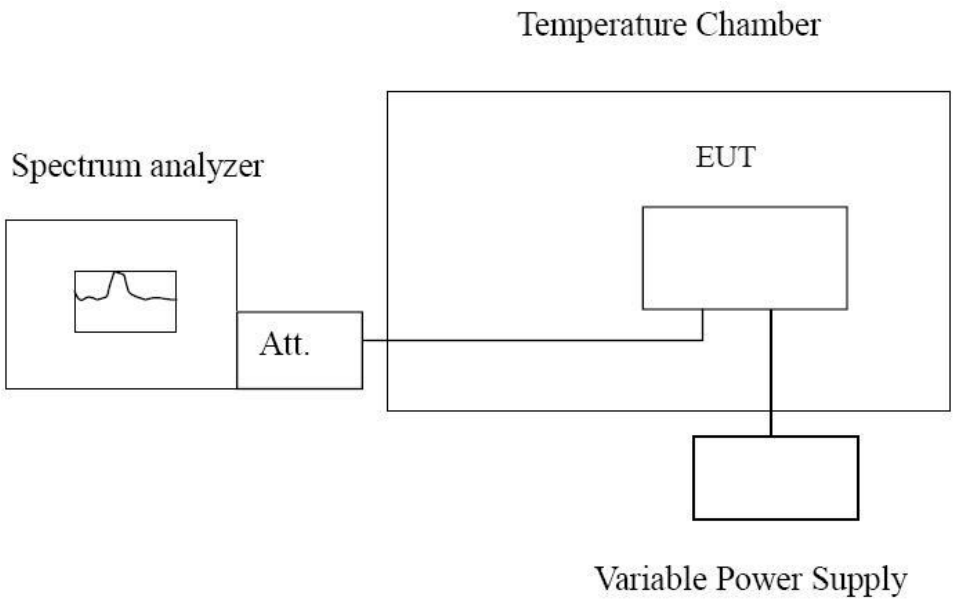
802.11ac(HT40)	*802.11ac(HT80)*
	
CH151	*CH155*
	
CH159	

4.7 Frequency Stability

LIMIT

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 users manual.

TEST CONFIGURATION



TEST PROCEDURE

Frequency Stability under Temperature Variations:
The equipment under test was connected to an external AC or DC power supply and input rated voltage. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. The EUT was placed inside the temperature chamber. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 20℃ operating frequency as reference frequency. Turn EUT off and set the chamber temperature to -30℃. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10℃ increased per stage until the highest temperature of +50℃ reached.

Frequency Stability under Voltage Variations:
Set chamber temperature to 20℃. Use a variable AC power supply / DC power source to power the EUT and set the voltage to rated voltage. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency.
Reduce the input voltage to specify extreme voltage variation (±15%) and endpoint, record the maximum frequency change.

TEST RESULTS

Record worst case as below:

Ant1							
Mode	TX Type	Frequency (MHz)	Temperature (°C)	Voltage (VAC)	Measured Frequency (MHz)	Limit (MHz)	Verdict
802.11a	SISO	5180	20	102	5179.980	5150 to 5250	Pass
				120	5180.020	5150 to 5250	Pass
				138	5180.060	5150 to 5250	Pass
			-30	120	5180.020	5150 to 5250	Pass
			-20	120	5180.020	5150 to 5250	Pass
			-10	120	5180.040	5150 to 5250	Pass
			0	120	5179.980	5150 to 5250	Pass
			10	120	5180.040	5150 to 5250	Pass
			30	120	5180.020	5150 to 5250	Pass
			40	120	5180.020	5150 to 5250	Pass
			50	120	5180.040	5150 to 5250	Pass
		5200	20	102	5200.020	5150 to 5250	Pass
				120	5200.020	5150 to 5250	Pass
				138	5200.000	5150 to 5250	Pass
			-30	120	5200.060	5150 to 5250	Pass
			-20	120	5200.020	5150 to 5250	Pass
			-10	120	5200.000	5150 to 5250	Pass
			0	120	5200.000	5150 to 5250	Pass
			10	120	5199.980	5150 to 5250	Pass
			30	120	5199.960	5150 to 5250	Pass
			40	120	5200.040	5150 to 5250	Pass
			50	120	5200.000	5150 to 5250	Pass
		5240	20	102	5239.980	5150 to 5250	Pass
				120	5240.040	5150 to 5250	Pass
				138	5240.020	5150 to 5250	Pass
			-30	120	5240.000	5150 to 5250	Pass
			-20	120	5239.980	5150 to 5250	Pass
			-10	120	5240.000	5150 to 5250	Pass
			0	120	5240.020	5150 to 5250	Pass
			10	120	5240.000	5150 to 5250	Pass
			30	120	5240.000	5150 to 5250	Pass
			40	120	5239.940	5150 to 5250	Pass
			50	120	5240.040	5150 to 5250	Pass
		5745	20	102	5744.920	5725 to 5850	Pass
				120	5745.020	5725 to 5850	Pass
				138	5744.940	5725 to 5850	Pass
			-30	120	5745.000	5725 to 5850	Pass
			-20	120	5745.000	5725 to 5850	Pass
			-10	120	5745.000	5725 to 5850	Pass
			0	120	5745.020	5725 to 5850	Pass
			10	120	5744.960	5725 to 5850	Pass
			30	120	5744.940	5725 to 5850	Pass
			40	120	5745.080	5725 to 5850	Pass
			50	120	5745.020	5725 to 5850	Pass
		5785	20	102	5785.000	5725 to 5850	Pass
				120	5785.020	5725 to 5850	Pass
				138	5785.000	5725 to 5850	Pass
			-30	120	5785.040	5725 to 5850	Pass
			-20	120	5784.960	5725 to 5850	Pass
			-10	120	5785.020	5725 to 5850	Pass
			0	120	5785.040	5725 to 5850	Pass
			10	120	5785.020	5725 to 5850	Pass
			30	120	5784.980	5725 to 5850	Pass
			40	120	5785.020	5725 to 5850	Pass
			50	120	5785.040	5725 to 5850	Pass
		5825	20	102	5824.980	5725 to 5850	Pass
				120	5825.020	5725 to 5850	Pass
				138	5825.000	5725 to 5850	Pass
			-30	120	5825.000	5725 to 5850	Pass
			-20	120	5825.020	5725 to 5850	Pass
			-10	120	5824.960	5725 to 5850	Pass
			0	120	5824.980	5725 to 5850	Pass
			10	120	5824.940	5725 to 5850	Pass

			30	120	5825.040	5725 to 5850	Pass
			40	120	5825.020	5725 to 5850	Pass
			50	120	5824.980	5725 to 5850	Pass
802.11n (HT20)	MIMO	5180	20	102	5179.980	5150 to 5250	Pass
				120	5180.000	5150 to 5250	Pass
				138	5179.980	5150 to 5250	Pass
			-30	120	5180.020	5150 to 5250	Pass
			-20	120	5180.000	5150 to 5250	Pass
			-10	120	5180.000	5150 to 5250	Pass
			0	120	5180.000	5150 to 5250	Pass
			10	120	5179.960	5150 to 5250	Pass
			30	120	5180.020	5150 to 5250	Pass
			40	120	5179.960	5150 to 5250	Pass
			50	120	5180.000	5150 to 5250	Pass
		5200	20	102	5199.980	5150 to 5250	Pass
				120	5200.000	5150 to 5250	Pass
				138	5200.020	5150 to 5250	Pass
			-30	120	5199.960	5150 to 5250	Pass
			-20	120	5199.980	5150 to 5250	Pass
			-10	120	5200.020	5150 to 5250	Pass
			0	120	5199.980	5150 to 5250	Pass
			10	120	5200.020	5150 to 5250	Pass
			30	120	5200.000	5150 to 5250	Pass
			40	120	5200.000	5150 to 5250	Pass
			50	120	5200.000	5150 to 5250	Pass
		5240	20	102	5240.000	5150 to 5250	Pass
				120	5240.020	5150 to 5250	Pass
				138	5239.980	5150 to 5250	Pass
			-30	120	5239.980	5150 to 5250	Pass
			-20	120	5239.960	5150 to 5250	Pass
			-10	120	5240.060	5150 to 5250	Pass
			0	120	5240.000	5150 to 5250	Pass
			10	120	5239.960	5150 to 5250	Pass
			30	120	5240.020	5150 to 5250	Pass
			40	120	5240.040	5150 to 5250	Pass
			50	120	5240.000	5150 to 5250	Pass
		5745	20	102	5744.980	5725 to 5850	Pass
				120	5744.980	5725 to 5850	Pass
				138	5745.000	5725 to 5850	Pass
			-30	120	5745.020	5725 to 5850	Pass
			-20	120	5744.960	5725 to 5850	Pass
			-10	120	5745.020	5725 to 5850	Pass
			0	120	5745.000	5725 to 5850	Pass
			10	120	5744.960	5725 to 5850	Pass
			30	120	5744.980	5725 to 5850	Pass
			40	120	5745.000	5725 to 5850	Pass
			50	120	5744.980	5725 to 5850	Pass
		5785	20	102	5784.980	5725 to 5850	Pass
				120	5784.980	5725 to 5850	Pass
				138	5784.980	5725 to 5850	Pass
			-30	120	5784.960	5725 to 5850	Pass
			-20	120	5785.020	5725 to 5850	Pass
			-10	120	5784.960	5725 to 5850	Pass
			0	120	5784.980	5725 to 5850	Pass
			10	120	5785.000	5725 to 5850	Pass
			30	120	5785.000	5725 to 5850	Pass
			40	120	5784.980	5725 to 5850	Pass
			50	120	5784.980	5725 to 5850	Pass
		5825	20	102	5824.980	5725 to 5850	Pass
				120	5825.000	5725 to 5850	Pass
				138	5824.980	5725 to 5850	Pass
			-30	120	5825.000	5725 to 5850	Pass
			-20	120	5825.000	5725 to 5850	Pass
			-10	120	5824.980	5725 to 5850	Pass
			0	120	5825.040	5725 to 5850	Pass
			10	120	5825.020	5725 to 5850	Pass
			30	120	5824.980	5725 to 5850	Pass

			40	120	5825.020	5725 to 5850	Pass
			50	120	5825.000	5725 to 5850	Pass
802.11n (HT40)	MIMO	5190	20	102	5190.080	5150 to 5250	Pass
				120	5190.080	5150 to 5250	Pass
				138	5190.000	5150 to 5250	Pass
			-30	120	5190.040	5150 to 5250	Pass
			-20	120	5190.040	5150 to 5250	Pass
			-10	120	5190.040	5150 to 5250	Pass
			0	120	5190.080	5150 to 5250	Pass
			10	120	5190.080	5150 to 5250	Pass
			30	120	5190.080	5150 to 5250	Pass
			40	120	5190.080	5150 to 5250	Pass
			50	120	5190.040	5150 to 5250	Pass
		5230	20	102	5230.040	5150 to 5250	Pass
				120	5230.040	5150 to 5250	Pass
				138	5230.040	5150 to 5250	Pass
			-30	120	5230.000	5150 to 5250	Pass
			-20	120	5230.080	5150 to 5250	Pass
			-10	120	5230.000	5150 to 5250	Pass
			0	120	5230.040	5150 to 5250	Pass
			10	120	5230.080	5150 to 5250	Pass
			30	120	5230.040	5150 to 5250	Pass
			40	120	5230.040	5150 to 5250	Pass
			50	120	5230.040	5150 to 5250	Pass
		5755	20	102	5755.080	5725 to 5850	Pass
				120	5755.040	5725 to 5850	Pass
				138	5755.040	5725 to 5850	Pass
			-30	120	5755.040	5725 to 5850	Pass
			-20	120	5755.080	5725 to 5850	Pass
			-10	120	5755.040	5725 to 5850	Pass
			0	120	5755.120	5725 to 5850	Pass
			10	120	5755.040	5725 to 5850	Pass
			30	120	5755.040	5725 to 5850	Pass
			40	120	5755.040	5725 to 5850	Pass
			50	120	5755.040	5725 to 5850	Pass
		5795	20	102	5795.040	5725 to 5850	Pass
				120	5795.040	5725 to 5850	Pass
				138	5795.040	5725 to 5850	Pass
			-30	120	5795.040	5725 to 5850	Pass
			-20	120	5795.040	5725 to 5850	Pass
			-10	120	5795.000	5725 to 5850	Pass
			0	120	5795.040	5725 to 5850	Pass
			10	120	5795.080	5725 to 5850	Pass
			30	120	5795.040	5725 to 5850	Pass
			40	120	5795.080	5725 to 5850	Pass
			50	120	5795.080	5725 to 5850	Pass
802.11ac (VHT20)	MIMO	5180	20	102	5180.020	5150 to 5250	Pass
				120	5180.040	5150 to 5250	Pass
				138	5180.000	5150 to 5250	Pass
			-30	120	5180.060	5150 to 5250	Pass
			-20	120	5179.960	5150 to 5250	Pass
			-10	120	5180.000	5150 to 5250	Pass
			0	120	5180.000	5150 to 5250	Pass
			10	120	5180.000	5150 to 5250	Pass
			30	120	5179.960	5150 to 5250	Pass
			40	120	5180.060	5150 to 5250	Pass
			50	120	5180.040	5150 to 5250	Pass
		5200	20	102	5199.960	5150 to 5250	Pass
				120	5200.020	5150 to 5250	Pass
				138	5199.960	5150 to 5250	Pass
			-30	120	5199.960	5150 to 5250	Pass
			-20	120	5200.000	5150 to 5250	Pass
			-10	120	5200.020	5150 to 5250	Pass
			0	120	5199.960	5150 to 5250	Pass
			10	120	5200.000	5150 to 5250	Pass
			30	120	5199.960	5150 to 5250	Pass
			40	120	5200.000	5150 to 5250	Pass

			50	120	5199.980	5150 to 5250	Pass
		5240	20	102	5240.040	5150 to 5250	Pass
				120	5239.940	5150 to 5250	Pass
				138	5239.980	5150 to 5250	Pass
			-30	120	5239.980	5150 to 5250	Pass
			-20	120	5240.040	5150 to 5250	Pass
			-10	120	5240.020	5150 to 5250	Pass
			0	120	5239.900	5150 to 5250	Pass
			10	120	5239.960	5150 to 5250	Pass
			30	120	5240.020	5150 to 5250	Pass
			40	120	5240.000	5150 to 5250	Pass
			50	120	5240.020	5150 to 5250	Pass
		5745	20	102	5745.000	5725 to 5850	Pass
				120	5744.980	5725 to 5850	Pass
				138	5745.000	5725 to 5850	Pass
			-30	120	5744.980	5725 to 5850	Pass
			-20	120	5744.940	5725 to 5850	Pass
			-10	120	5744.980	5725 to 5850	Pass
			0	120	5744.980	5725 to 5850	Pass
			10	120	5744.980	5725 to 5850	Pass
			30	120	5744.980	5725 to 5850	Pass
			40	120	5744.960	5725 to 5850	Pass
			50	120	5745.000	5725 to 5850	Pass
		5785	20	102	5784.980	5725 to 5850	Pass
				120	5785.020	5725 to 5850	Pass
				138	5784.980	5725 to 5850	Pass
			-30	120	5784.960	5725 to 5850	Pass
			-20	120	5784.980	5725 to 5850	Pass
			-10	120	5785.000	5725 to 5850	Pass
			0	120	5784.960	5725 to 5850	Pass
			10	120	5785.000	5725 to 5850	Pass
			30	120	5784.940	5725 to 5850	Pass
			40	120	5784.980	5725 to 5850	Pass
			50	120	5784.960	5725 to 5850	Pass
		5825	20	102	5824.980	5725 to 5850	Pass
				120	5825.000	5725 to 5850	Pass
				138	5825.000	5725 to 5850	Pass
			-30	120	5824.960	5725 to 5850	Pass
			-20	120	5824.980	5725 to 5850	Pass
			-10	120	5824.980	5725 to 5850	Pass
			0	120	5825.000	5725 to 5850	Pass
			10	120	5825.000	5725 to 5850	Pass
			30	120	5825.060	5725 to 5850	Pass
			40	120	5825.020	5725 to 5850	Pass
			50	120	5825.000	5725 to 5850	Pass
802.11ac (VHT40)	MIMO	5190	20	102	5190.040	5150 to 5250	Pass
				120	5190.080	5150 to 5250	Pass
				138	5190.080	5150 to 5250	Pass
			-30	120	5190.080	5150 to 5250	Pass
			-20	120	5190.040	5150 to 5250	Pass
			-10	120	5190.080	5150 to 5250	Pass
			0	120	5190.080	5150 to 5250	Pass
			10	120	5190.080	5150 to 5250	Pass
			30	120	5190.040	5150 to 5250	Pass
			40	120	5190.000	5150 to 5250	Pass
			50	120	5190.040	5150 to 5250	Pass
		5230	20	102	5230.040	5150 to 5250	Pass
				120	5230.000	5150 to 5250	Pass
				138	5230.080	5150 to 5250	Pass
			-30	120	5230.080	5150 to 5250	Pass
			-20	120	5230.040	5150 to 5250	Pass
			-10	120	5230.080	5150 to 5250	Pass
			0	120	5230.040	5150 to 5250	Pass
			10	120	5230.080	5150 to 5250	Pass
			30	120	5230.040	5150 to 5250	Pass
			40	120	5230.080	5150 to 5250	Pass
			50	120	5230.000	5150 to 5250	Pass

		5755	20	102	5755.040	5725 to 5850	Pass
				120	5755.000	5725 to 5850	Pass
				138	5755.040	5725 to 5850	Pass
			-30	120	5755.040	5725 to 5850	Pass
			-20	120	5755.040	5725 to 5850	Pass
			-10	120	5755.040	5725 to 5850	Pass
			0	120	5755.040	5725 to 5850	Pass
			10	120	5755.080	5725 to 5850	Pass
			30	120	5755.040	5725 to 5850	Pass
			40	120	5755.040	5725 to 5850	Pass
			50	120	5755.040	5725 to 5850	Pass
		5795	20	102	5795.040	5725 to 5850	Pass
				120	5795.000	5725 to 5850	Pass
				138	5795.080	5725 to 5850	Pass
			-30	120	5795.080	5725 to 5850	Pass
			-20	120	5795.000	5725 to 5850	Pass
			-10	120	5795.000	5725 to 5850	Pass
			0	120	5795.000	5725 to 5850	Pass
			10	120	5795.000	5725 to 5850	Pass
			30	120	5795.040	5725 to 5850	Pass
			40	120	5795.040	5725 to 5850	Pass
			50	120	5795.080	5725 to 5850	Pass
802.11ac (VHT80)	MIMO	5210	20	102	5210.075	5150 to 5250	Pass
				120	5210.075	5150 to 5250	Pass
				138	5210.075	5150 to 5250	Pass
			-30	120	5210.075	5150 to 5250	Pass
			-20	120	5210.075	5150 to 5250	Pass
			-10	120	5210.075	5150 to 5250	Pass
			0	120	5210.075	5150 to 5250	Pass
			10	120	5210.075	5150 to 5250	Pass
			30	120	5210.150	5150 to 5250	Pass
			40	120	5210.075	5150 to 5250	Pass
			50	120	5210.075	5150 to 5250	Pass
		5775	20	102	5775.075	5725 to 5850	Pass
				120	5775.075	5725 to 5850	Pass
				138	5775.075	5725 to 5850	Pass
			-30	120	5775.075	5725 to 5850	Pass
			-20	120	5775.075	5725 to 5850	Pass
			-10	120	5775.075	5725 to 5850	Pass
			0	120	5775.075	5725 to 5850	Pass
			10	120	5775.075	5725 to 5850	Pass
			30	120	5775.075	5725 to 5850	Pass
			40	120	5775.075	5725 to 5850	Pass
			50	120	5775.075	5725 to 5850	Pass

5 Test Setup Photos of the EUT

Reference to the **appendix I** for details.

6 Photos of the EUT

Reference to the **appendix II** for details.

********** **End of Report** **********