



RF Test Report

For

Project No.:	ZKT-240801L9141E-6
Model:	EF6-2
Client:	Autel Robotics Co., Ltd.
Manufacturer:	Autel Robotics Co., Ltd.
Product Description:	Autel Smart Controller SE V2
Test Engineer:	Jim Liu
Test Date:	2024-05-28

Test Summary

Item	Result
Duty Cycle	Pass
Bandwidth	Pass
Maximum Conducted Output Power	Pass
Maximum Power Spectral Density	Pass
Frequency Stability	Pass
Form731	Pass



1. Duty Cycle

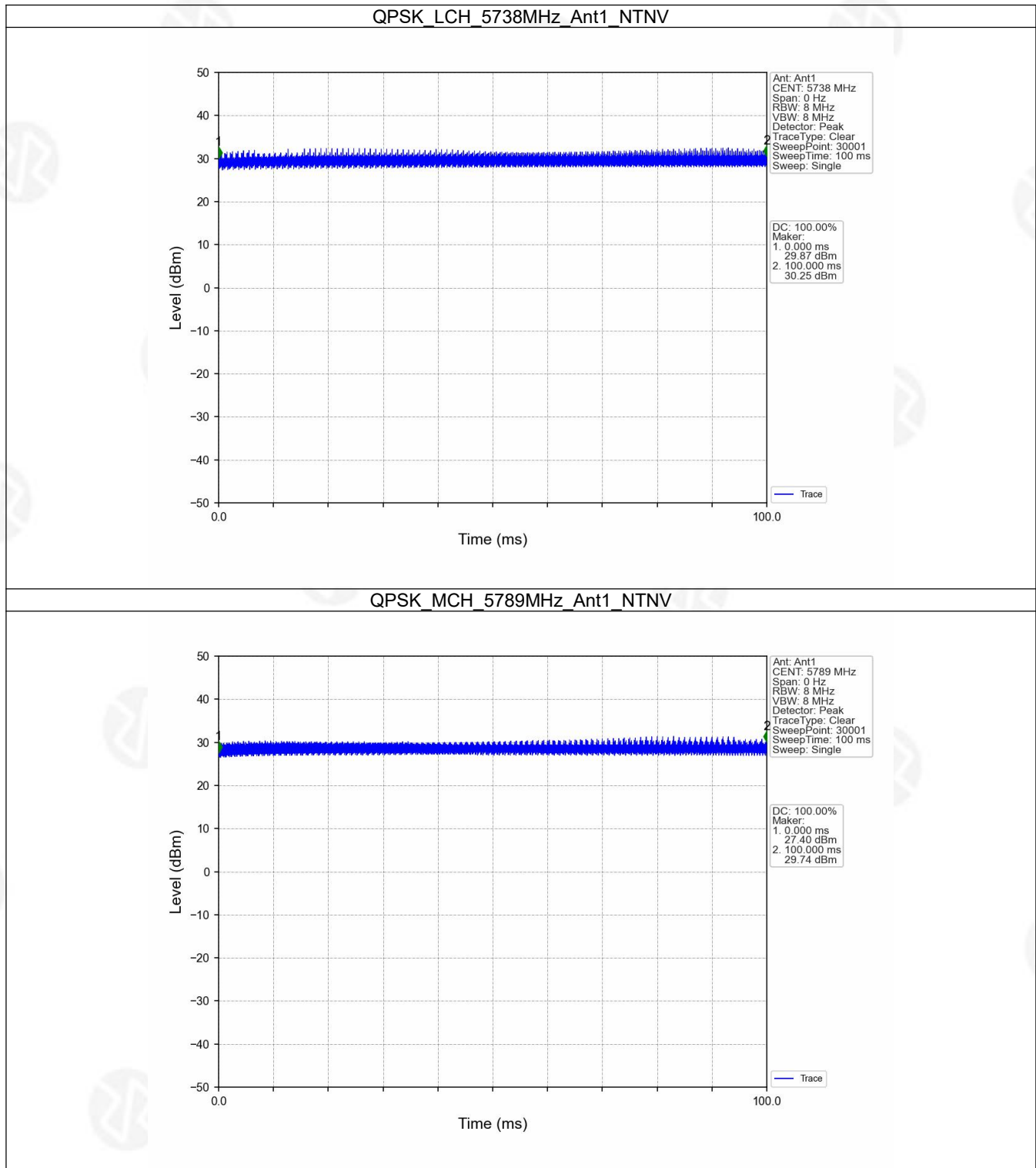
1.1 Ant1

1.1.1 Test Result

Ant1							
Mode	TX Type	Frequency (MHz)	T_on (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	Max. DC Variation (%)
QPSK	MIMO	5738	100.000	100.000	100.00	0.00	0.00
		5789	100.000	100.000	100.00	0.00	0.00
		5839	100.000	100.000	100.00	0.00	0.00
16QAM	MIMO	5738	100.000	100.000	100.00	0.00	0.00
		5789	100.000	100.000	100.00	0.00	0.00
		5839	100.000	100.000	100.00	0.00	0.00

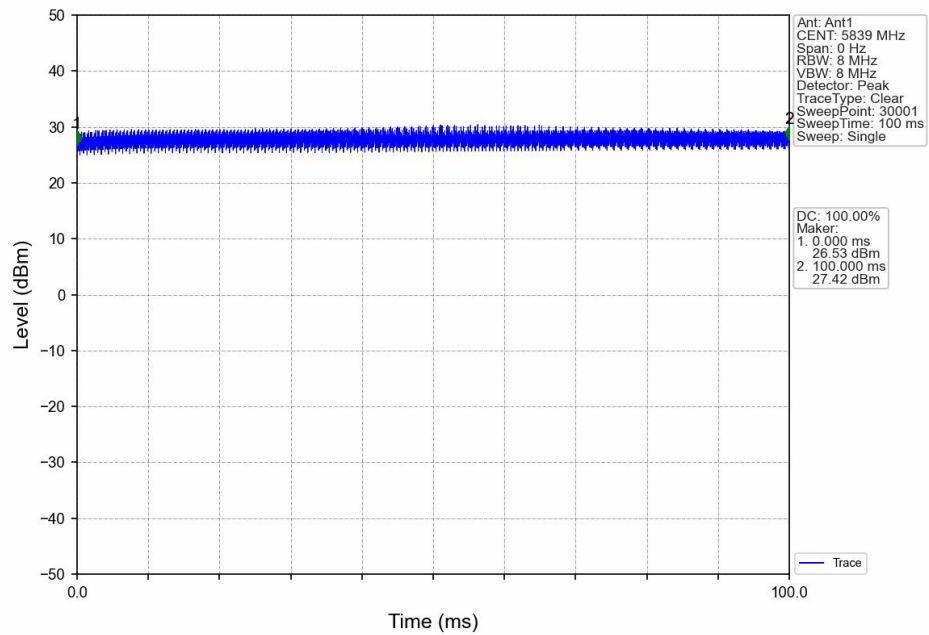


1.1.2 Test Graph

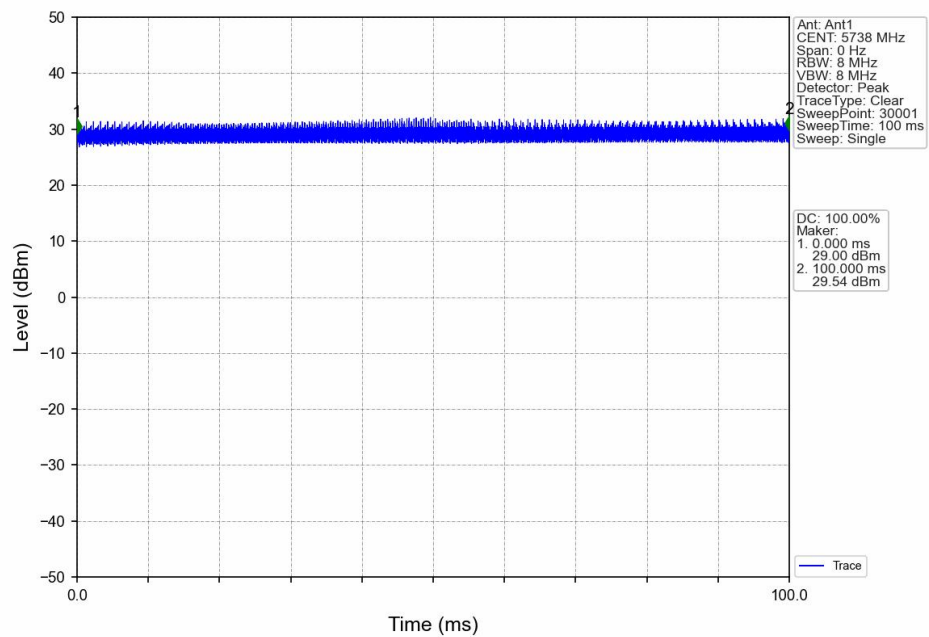




QPSK_HCH_5839MHz_Ant1_NTNV

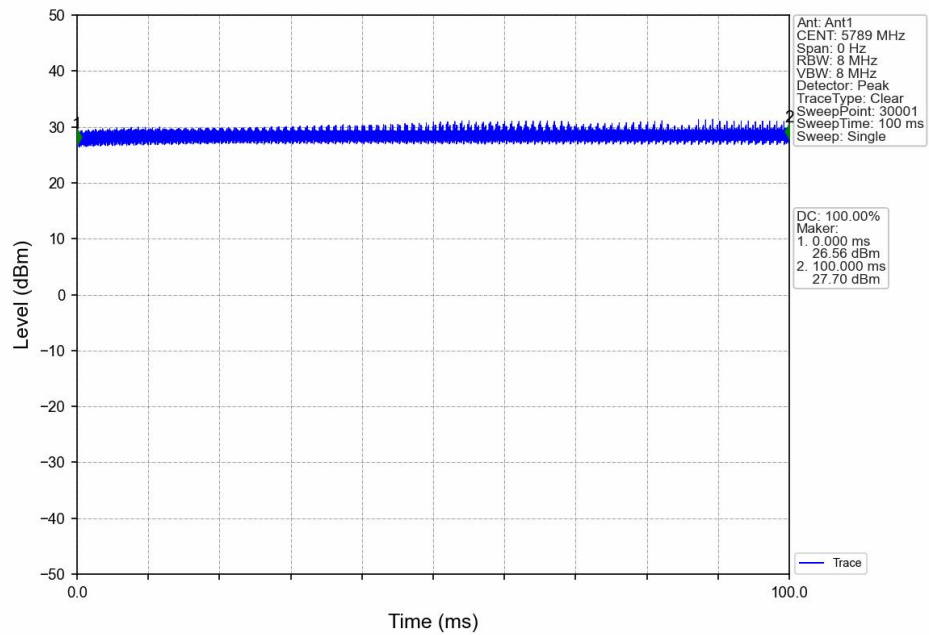


16QAM_LCH_5738MHz_Ant1_NTNV

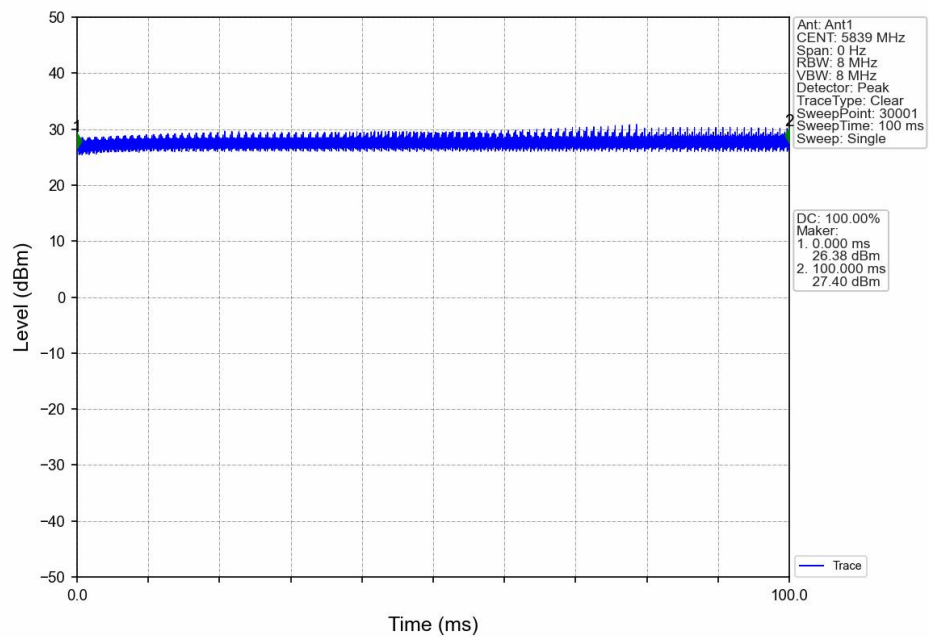




16QAM_MCH_5789MHz_Ant1_NTNV



16QAM_HCH_5839MHz_Ant1_NTNV





2. Bandwidth

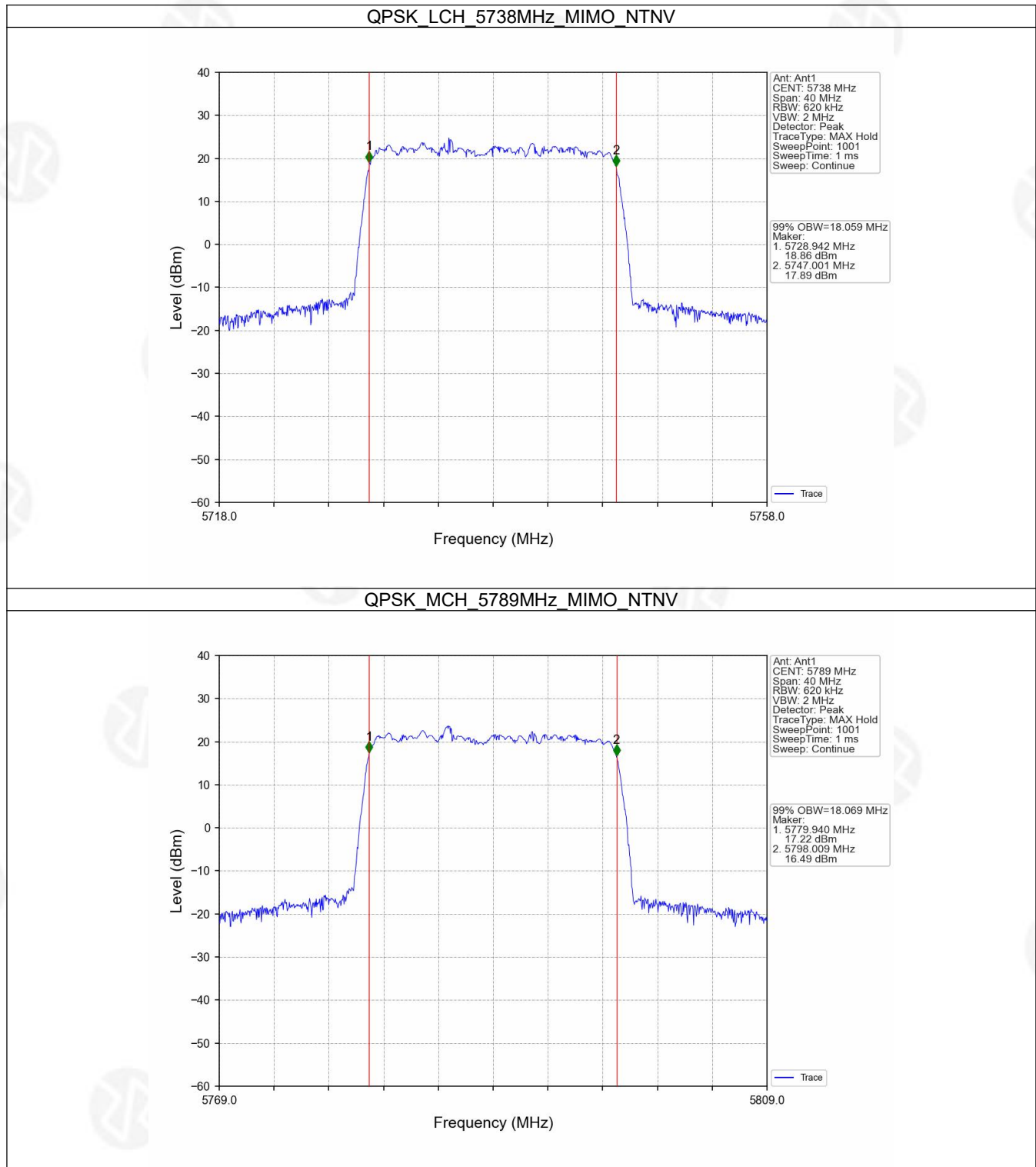
2.1 OBW

2.1.1 Test Result

Mode	TX Type	Frequency (MHz)	ANT	99% Occupied Bandwidth (MHz)		Verdict
				Result	Limit	
QPSK	MIMO	5738	MIMO	18.059	/	Pass
		5789	MIMO	18.069	/	Pass
		5839	MIMO	18.080	/	Pass
16QAM	MIMO	5738	MIMO	18.078	/	Pass
		5789	MIMO	18.066	/	Pass
		5839	MIMO	18.062	/	Pass

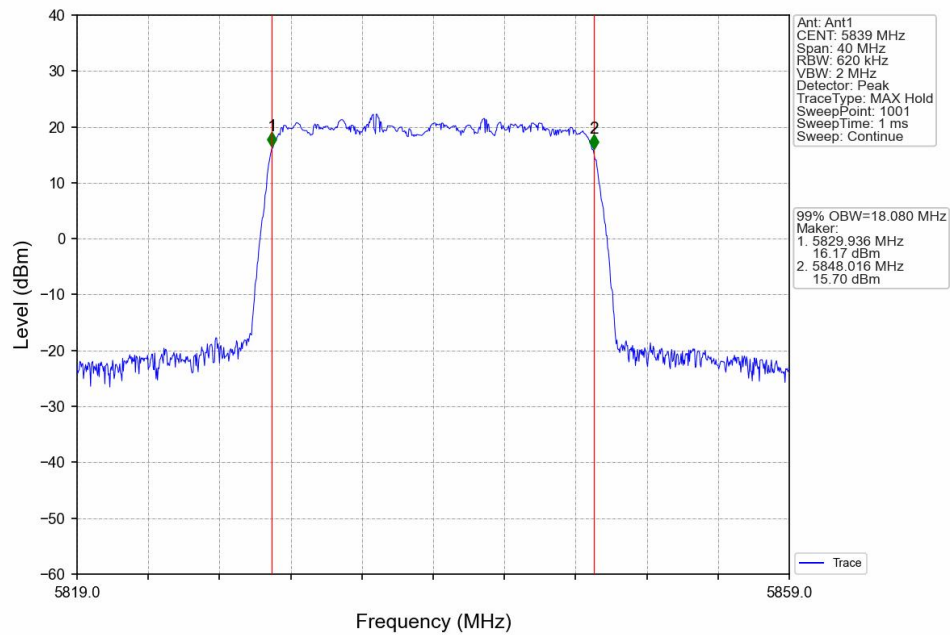


2.1.2 Test Graph

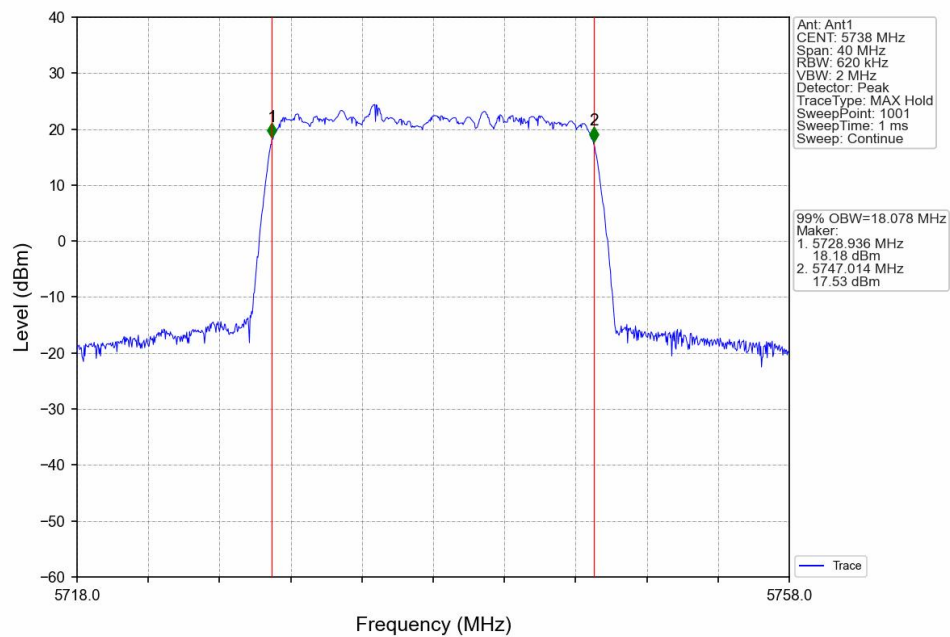




QPSK_HCH_5839MHz_MIMO_NTNV

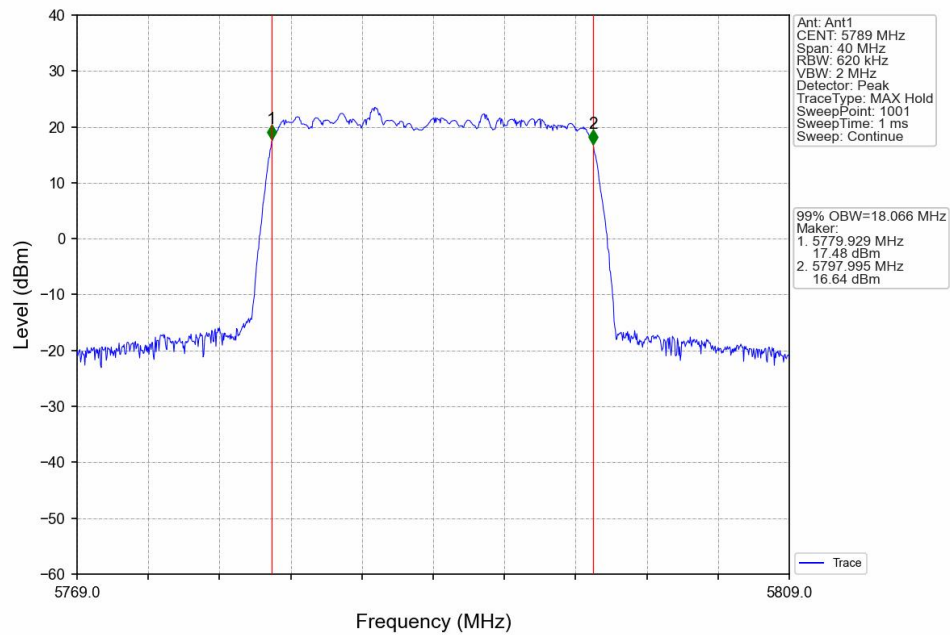


16QAM_LCH_5738MHz_MIMO_NTNV

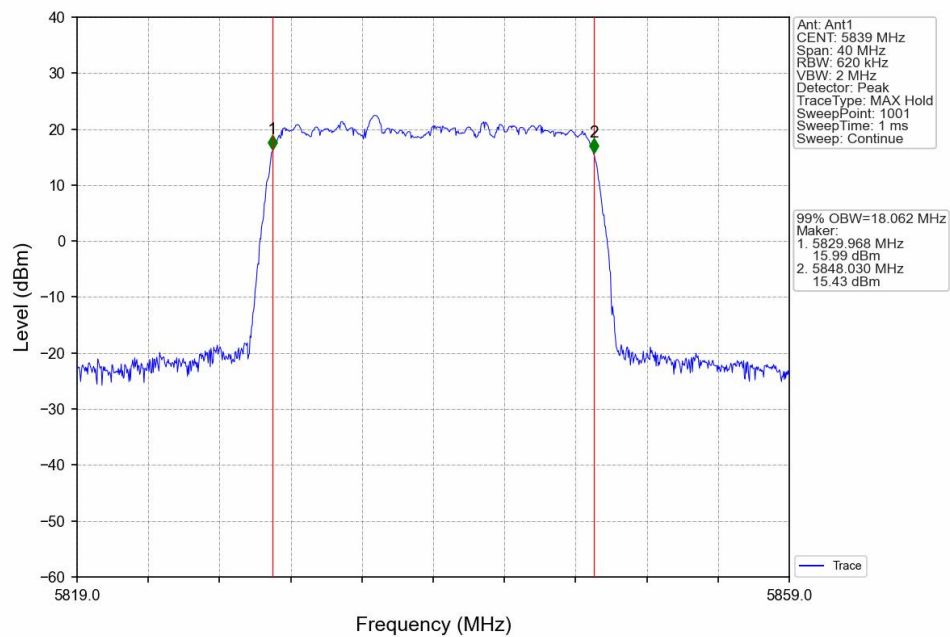




16QAM_MCH_5789MHz_MIMO_NTNV



16QAM_HCH_5839MHz_MIMO_NTNV





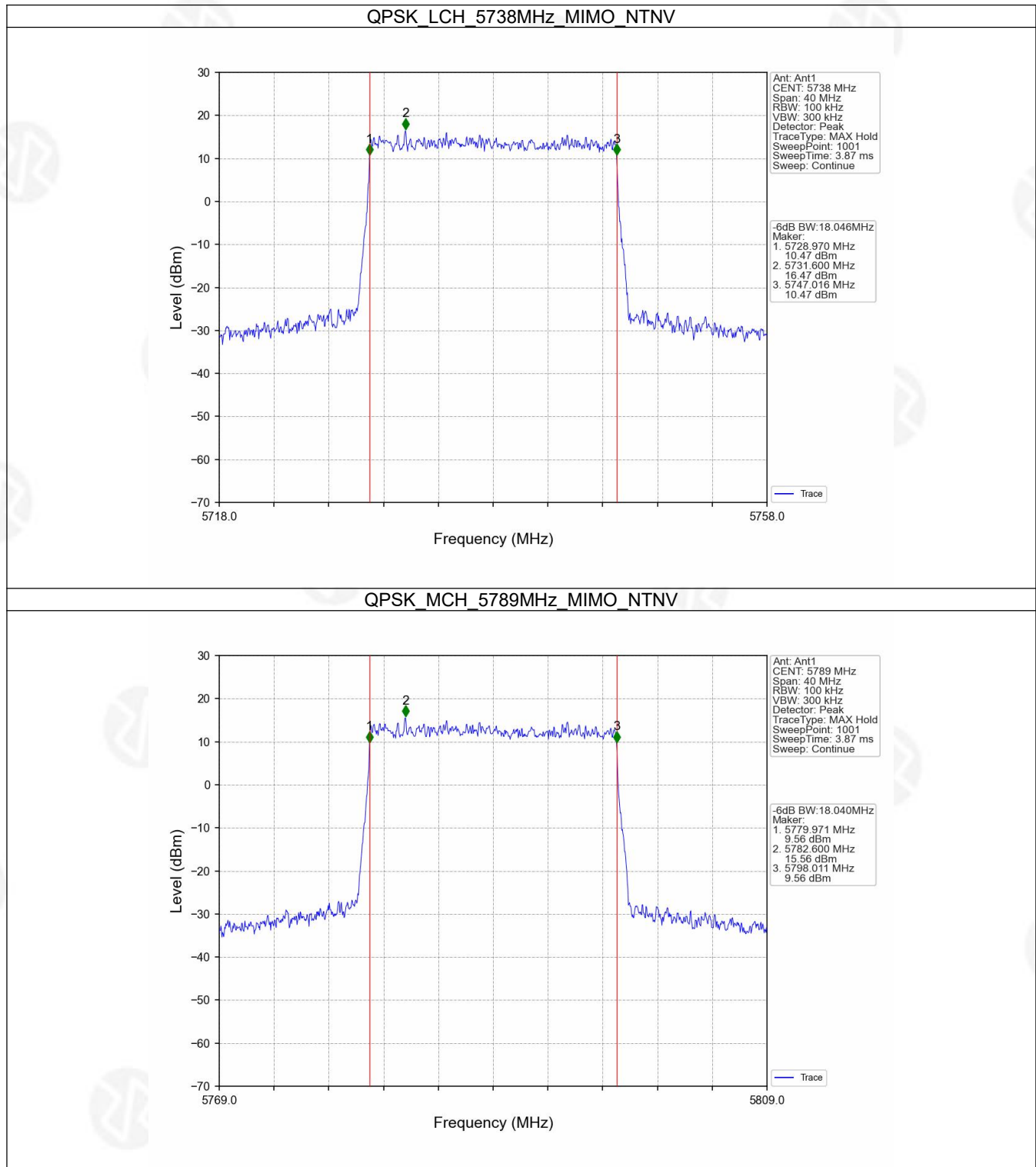
2.2 6dB BW

2.2.1 Test Result

Mode	TX Type	Frequency (MHz)	ANT	6dB Bandwidth (MHz)		Verdict
				Result	Limit	
QPSK	MIMO	5738	MIMO	18.046	≥ 0.5	Pass
		5789	MIMO	18.040	≥ 0.5	Pass
		5839	MIMO	18.045	≥ 0.5	Pass
16QAM	MIMO	5738	MIMO	18.064	≥ 0.5	Pass
		5789	MIMO	18.040	≥ 0.5	Pass
		5839	MIMO	18.055	≥ 0.5	Pass

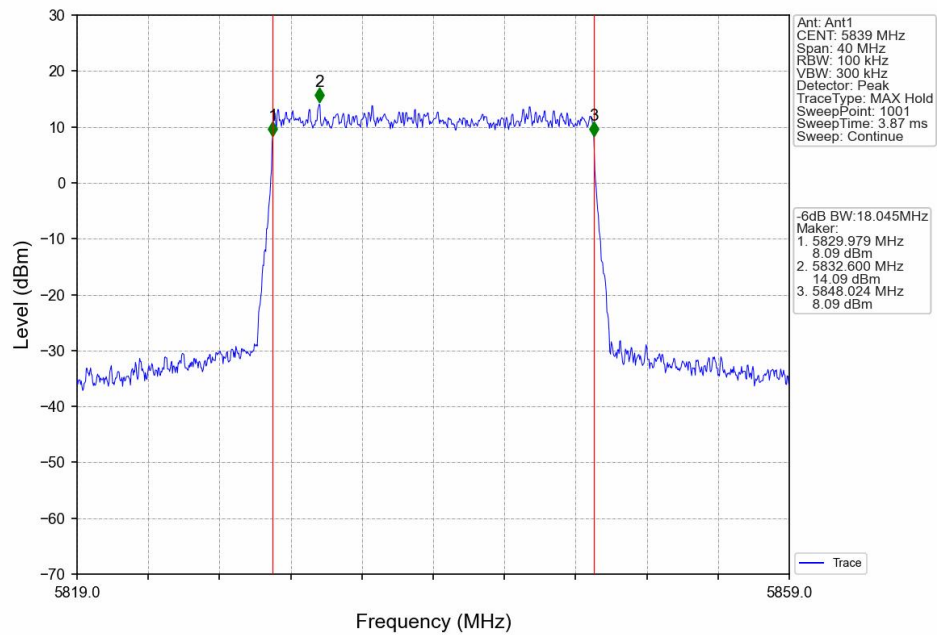


2.2.2 Test Graph

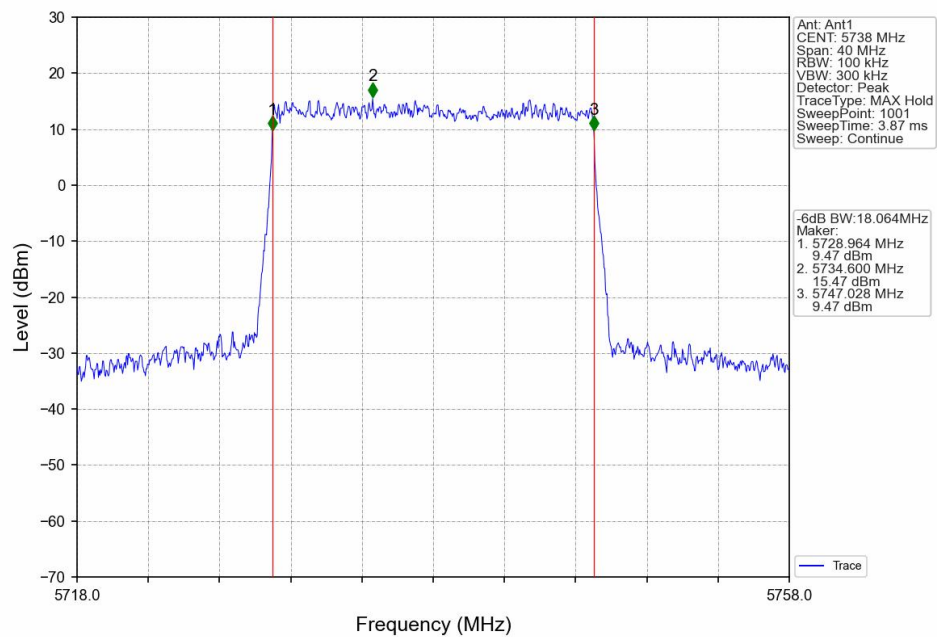




QPSK_HCH_5839MHz_MIMO_NTNV

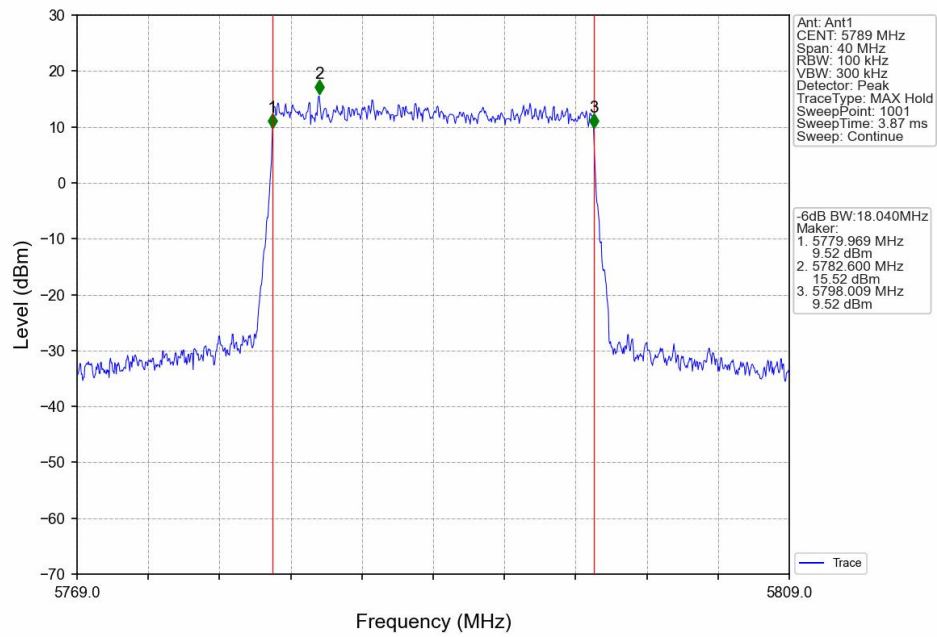


16QAM_LCH_5738MHz_MIMO_NTNV

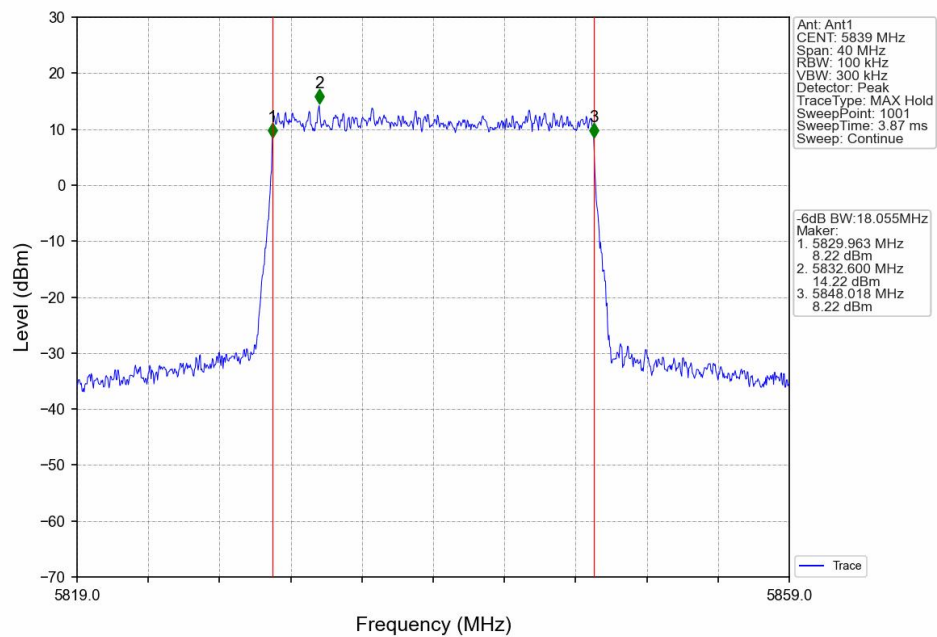




16QAM_MCH_5789MHz_MIMO_NTNV



16QAM_HCH_5839MHz_MIMO_NTNV





3. Maximum Conducted Output Power

3.1 Power

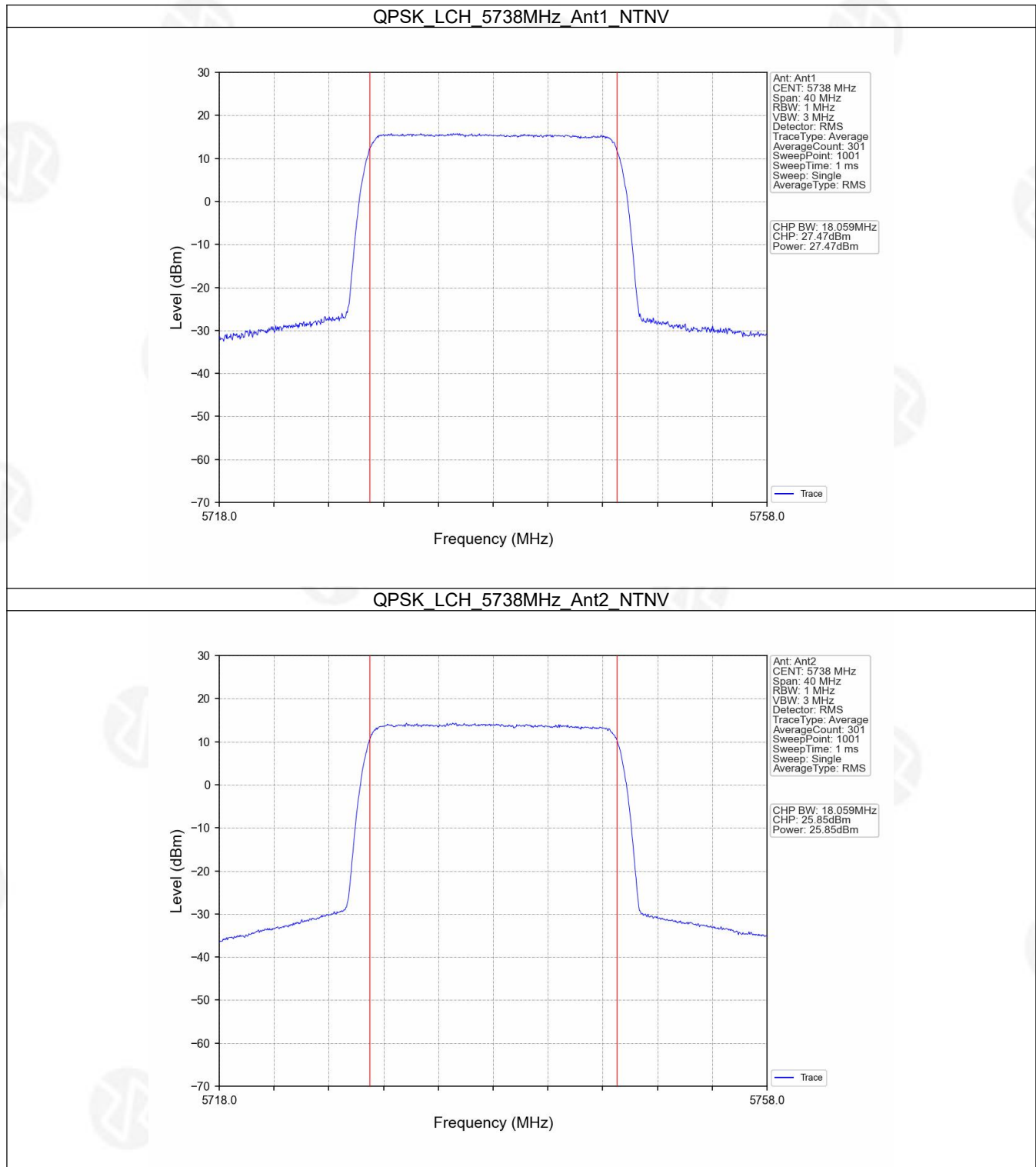
3.1.1 Test Result

Mode	TX Type	Frequency (MHz)	Maximum Average Conducted Output Power (dBm)				Verdict
			ANT1	ANT2	MIMO	Limit	
QPSK	MIMO	5738	27.47	25.85	29.75	<=30	Pass
		5789	26.41	25.17	28.84	<=30	Pass
		5839	25.38	24.54	27.99	<=30	Pass
16QAM	MIMO	5738	27.17	25.72	29.52	<=30	Pass
		5789	26.32	25.11	28.77	<=30	Pass
		5839	25.37	24.57	28.00	<=30	Pass

Note1: Antenna Gain: Ant1: 3.50dBi; Ant2: 3.10dBi;
Note2: Directional Gain: Uncorrelated(Directional Gain = Ant Gain)

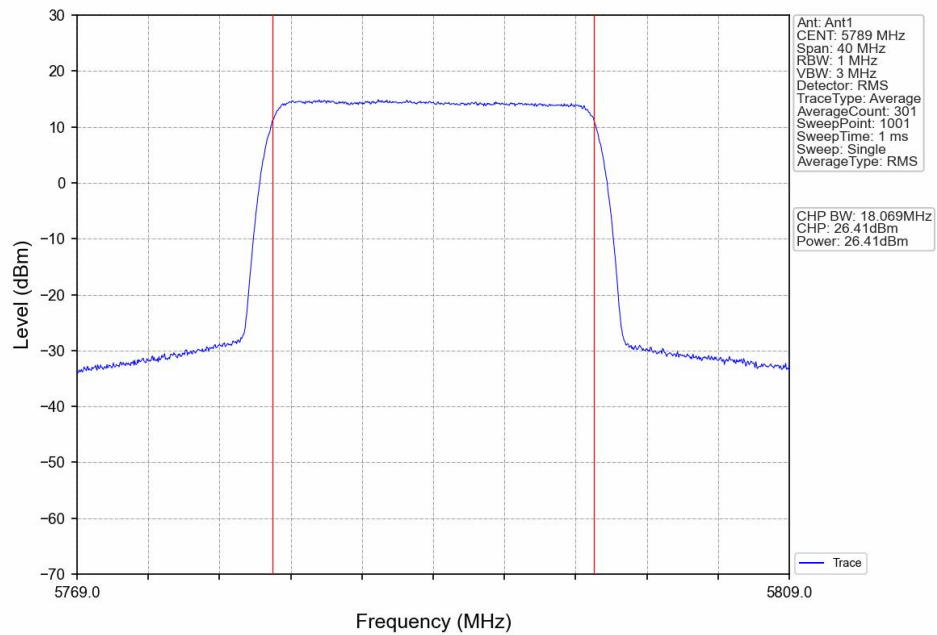


3.1.2 Test Graph

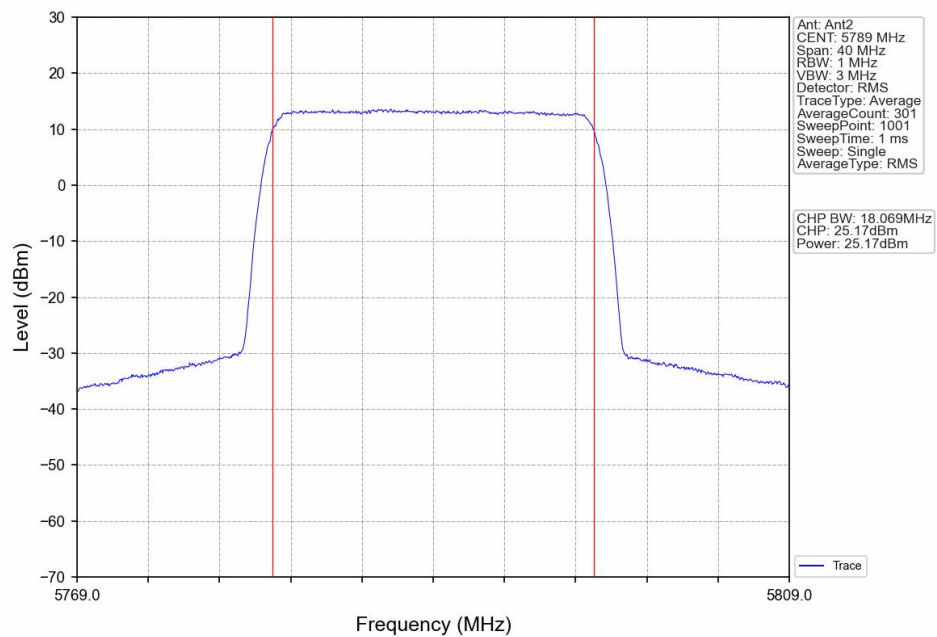




QPSK_MCH_5789MHz_Ant1_NTNV

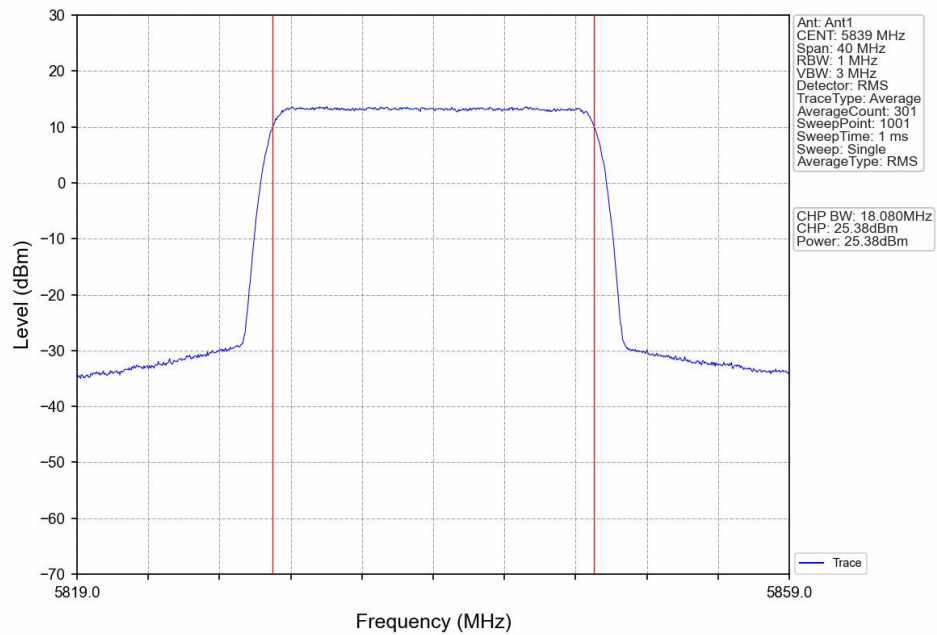


QPSK_MCH_5789MHz_Ant2_NTNV

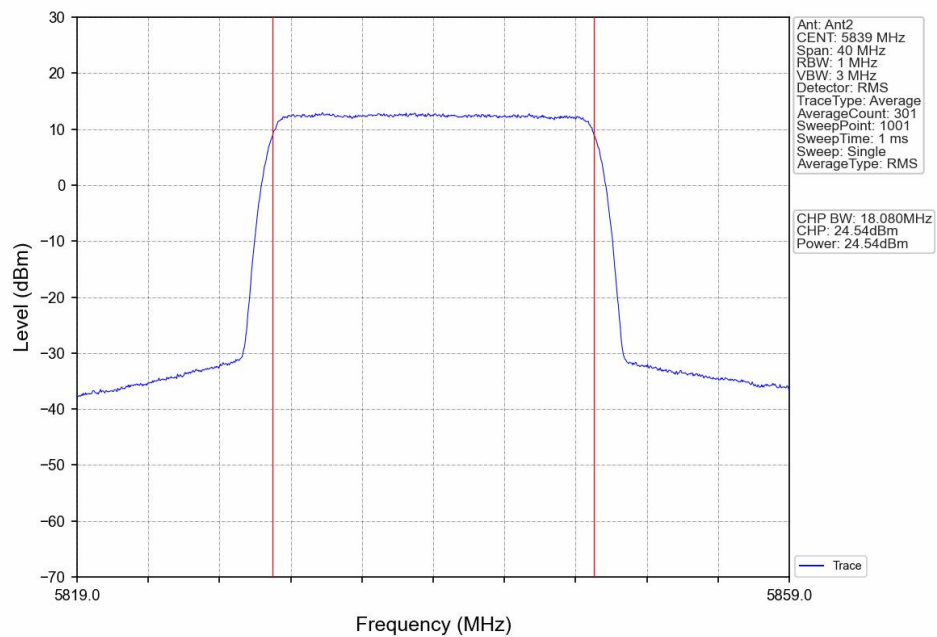




QPSK_HCH_5839MHz_Ant1_NTNV

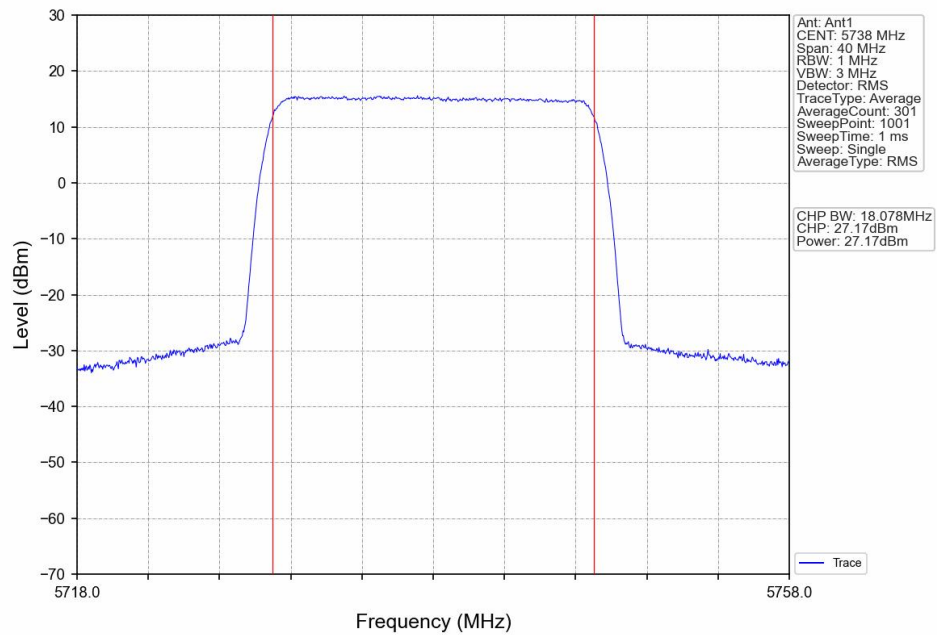


QPSK_HCH_5839MHz_Ant2_NTNV

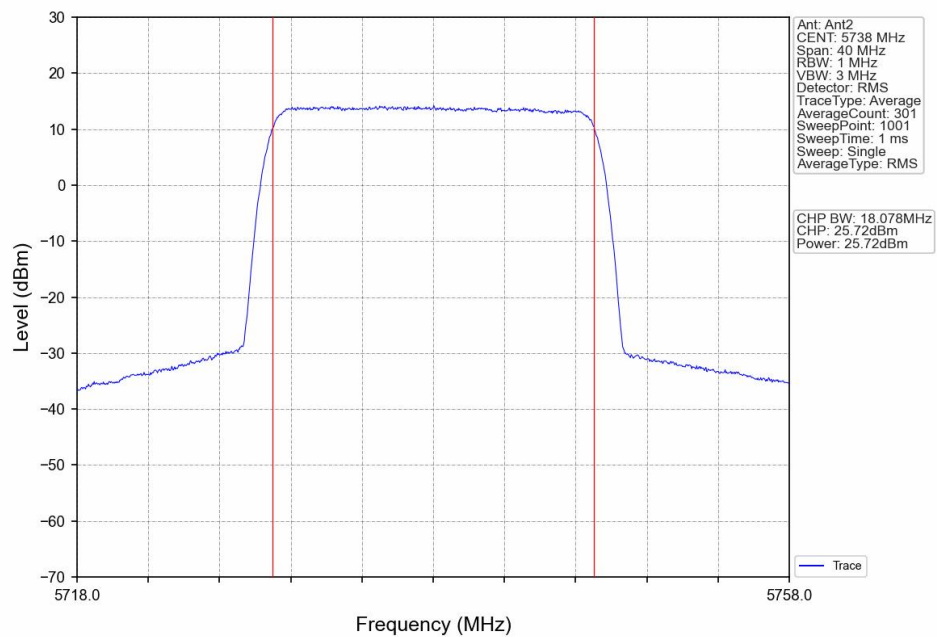




16QAM_LCH_5738MHz_Ant1_NTNV

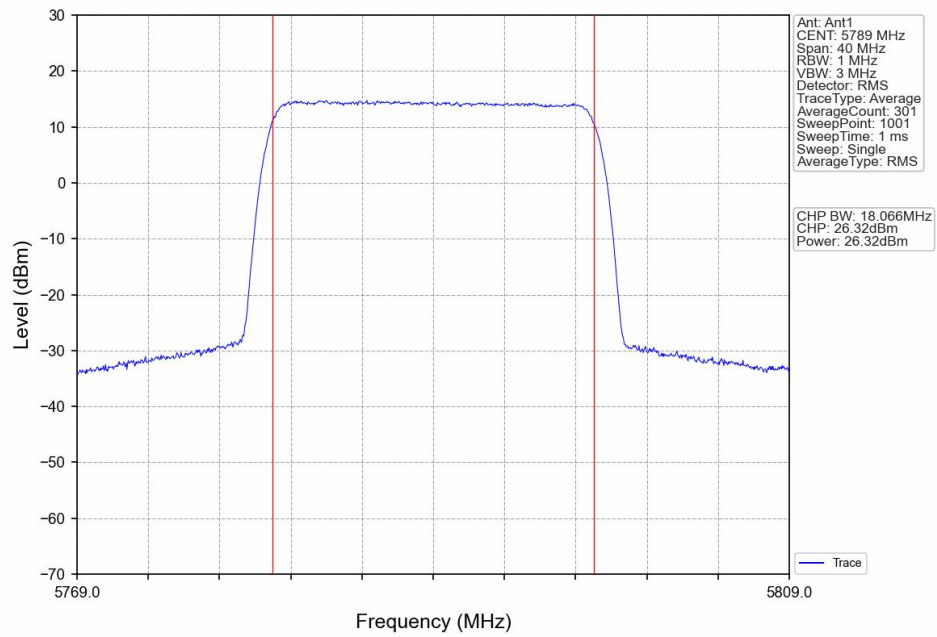


16QAM_LCH_5738MHz_Ant2_NTNV

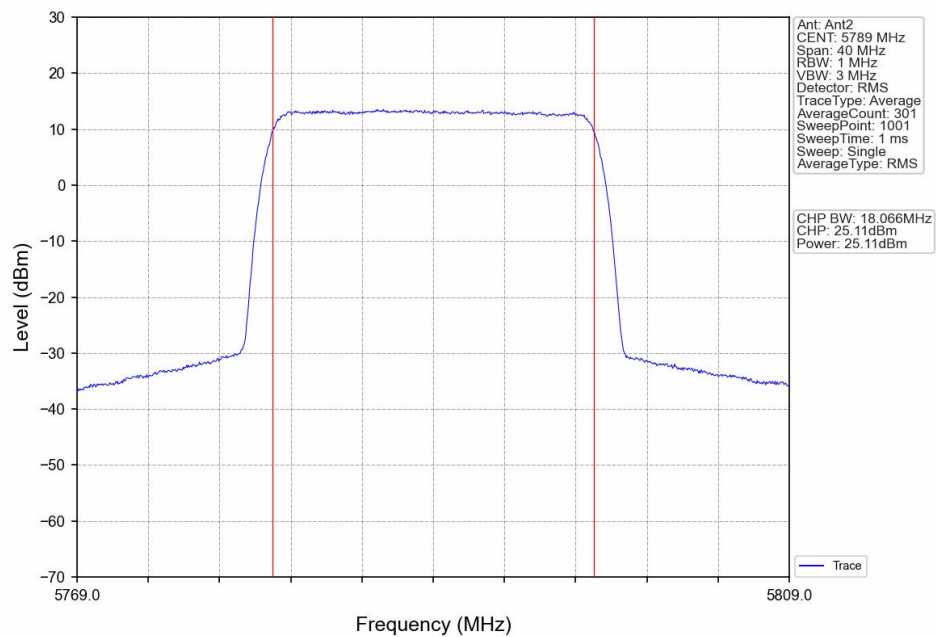




16QAM_MCH_5789MHz_Ant1_NTNV

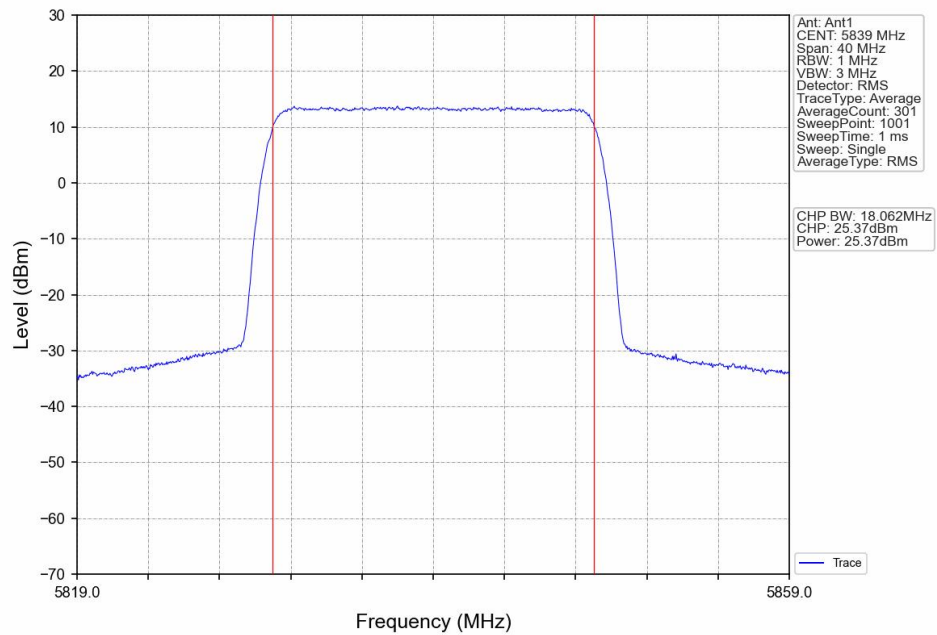


16QAM_MCH_5789MHz_Ant2_NTNV

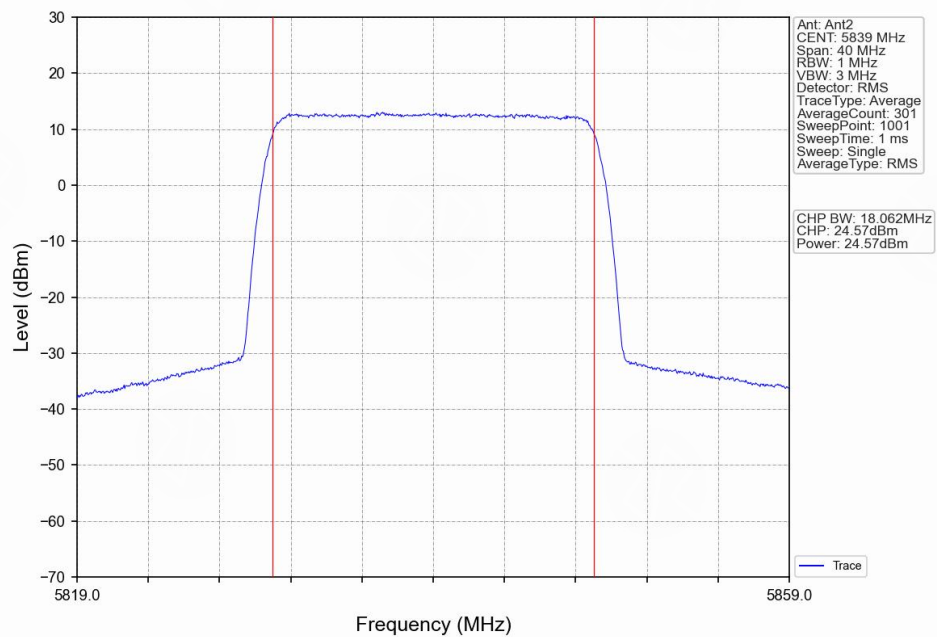




16QAM_HCH_5839MHz_Ant1_NTNV



16QAM_HCH_5839MHz_Ant2_NTNV





4. Maximum Power Spectral Density

4.1 PSD-Band3

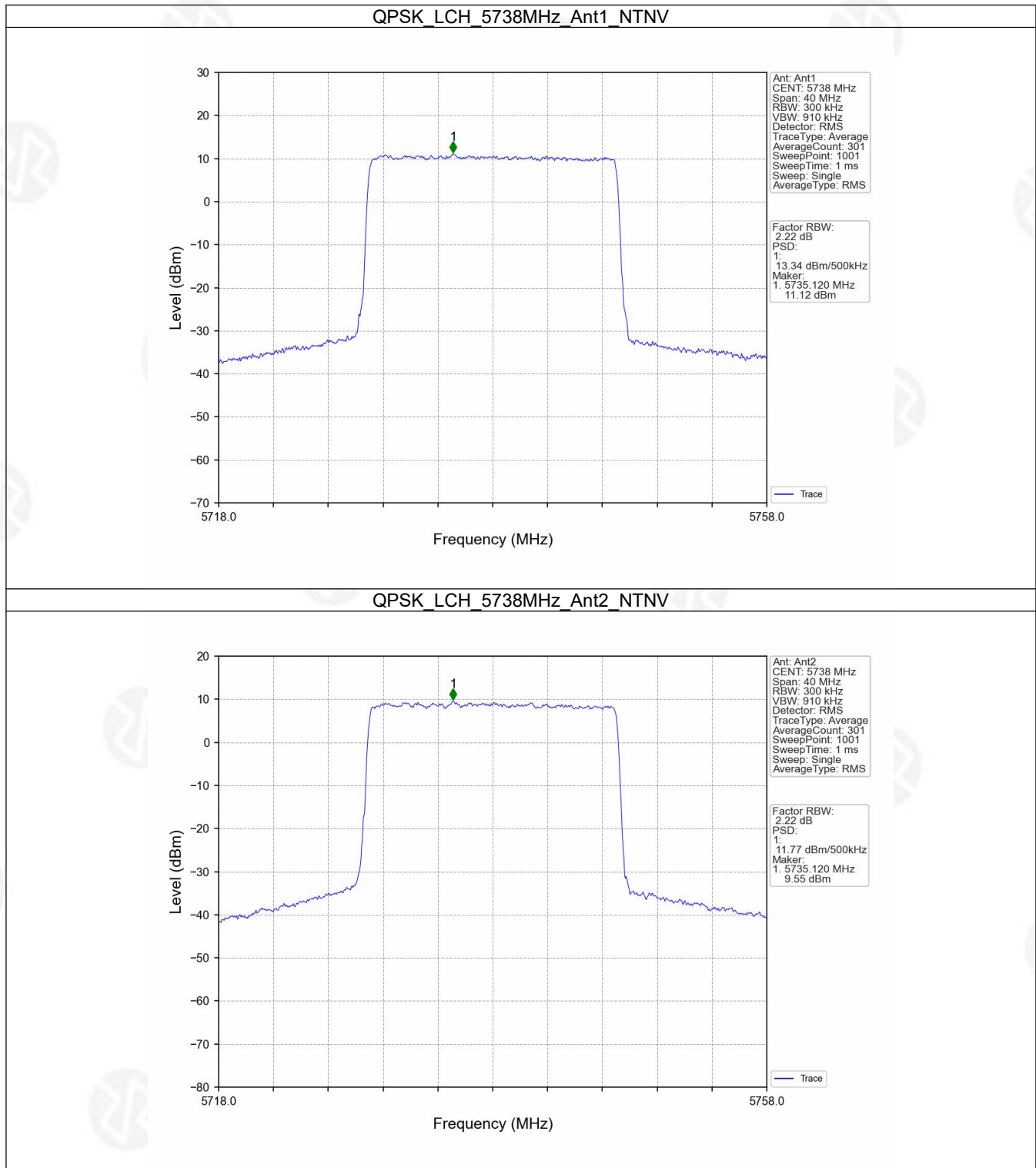
4.1.1 Test Result

Mode	TX Type	Frequency (MHz)	Maximum PSD (dBm/500kHz)				Verdict
			ANT1	ANT2	MIMO	Limit	
QPSK	MIMO	5738	13.34	11.77	15.63	<=30	Pass
		5789	12.46	11.13	14.65	<=30	Pass
		5839	11.18	10.22	13.62	<=30	Pass
16QAM	MIMO	5738	12.90	11.45	15.18	<=30	Pass
		5789	12.25	10.85	14.43	<=30	Pass
		5839	11.17	10.57	13.71	<=30	Pass

Note1: Antenna Gain: Ant1: 3.50dBi; Ant2: 3.10dBi;
Note2: Directional Gain: Uncorrelated(Directional Gain = Ant Gain)

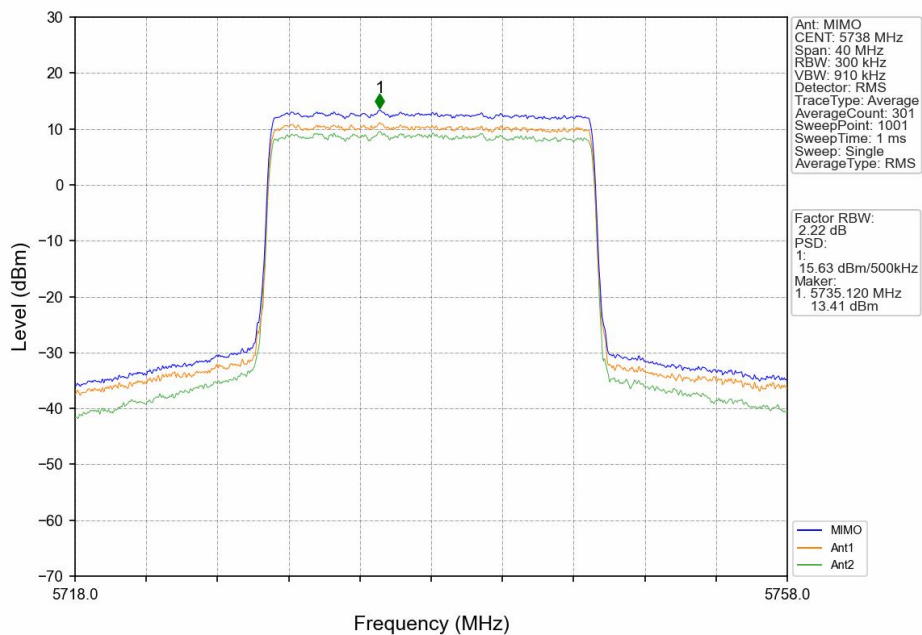


4.1.2 Test Graph

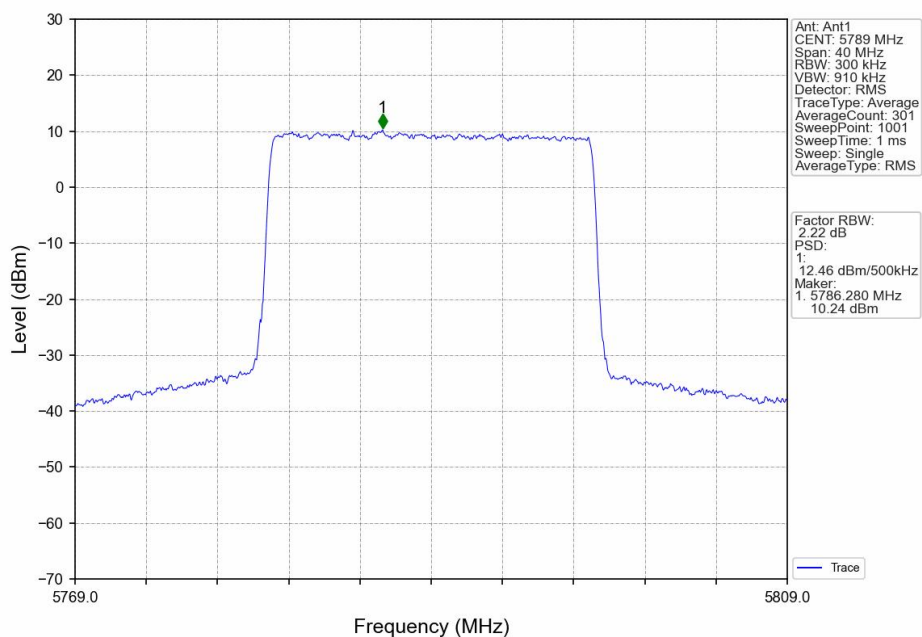




QPSK_LCH_5738MHz_MIMO_NTNV

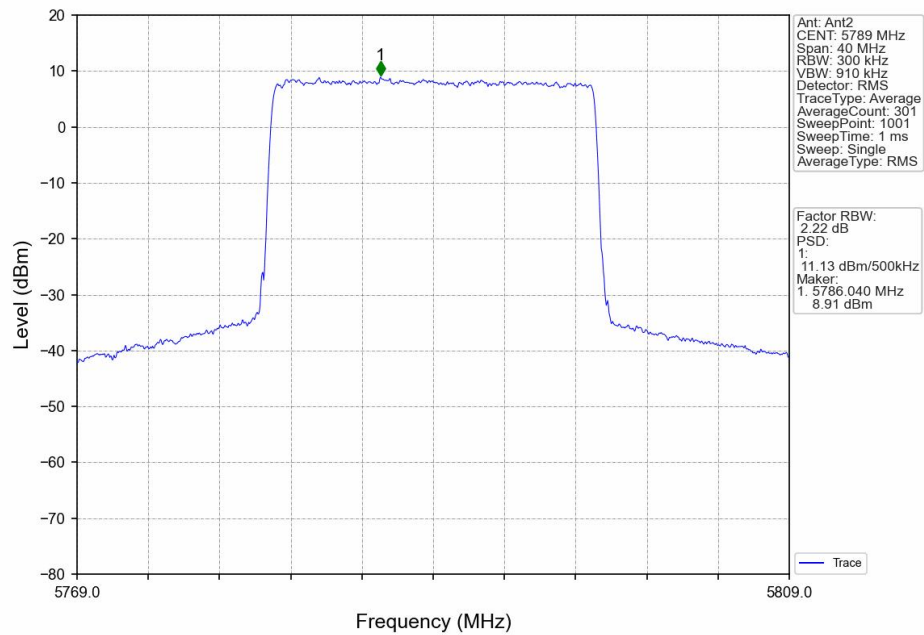


QPSK_MCH_5789MHz_Ant1_NTNV

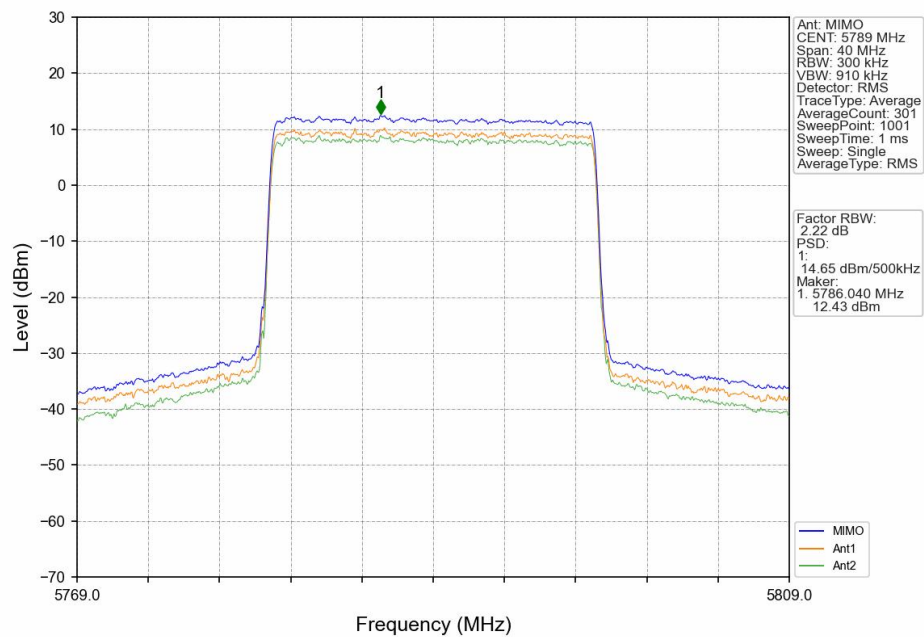




QPSK_MCH_5789MHz_Ant2_NTNV

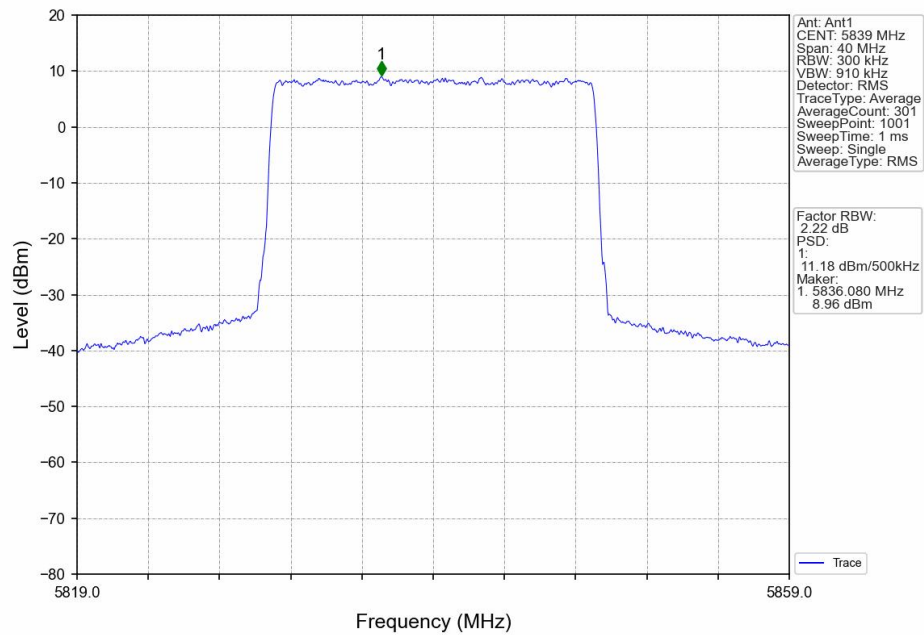


QPSK_MCH_5789MHz_MIMO_NTNV

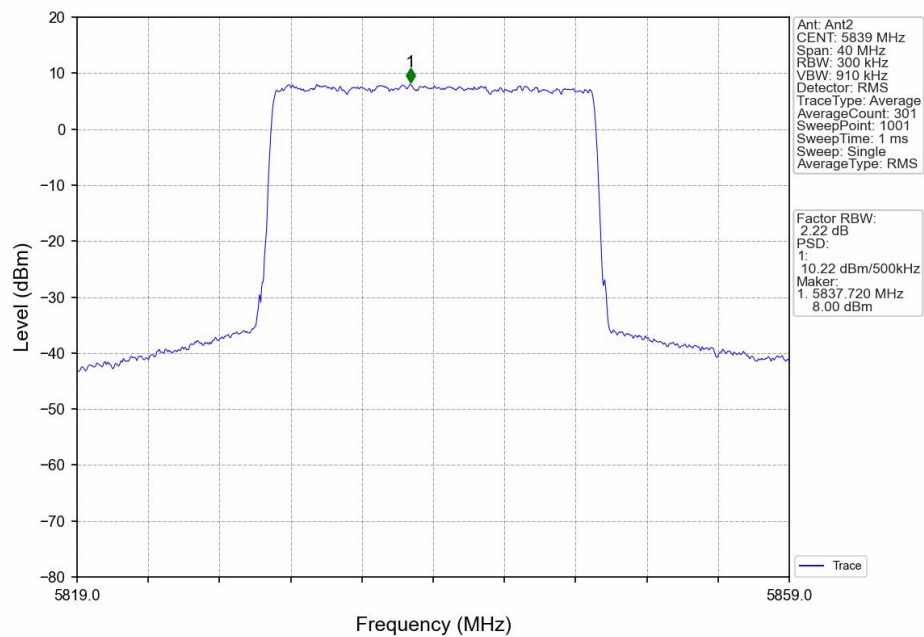




QPSK_HCH_5839MHz_Ant1_NTNV

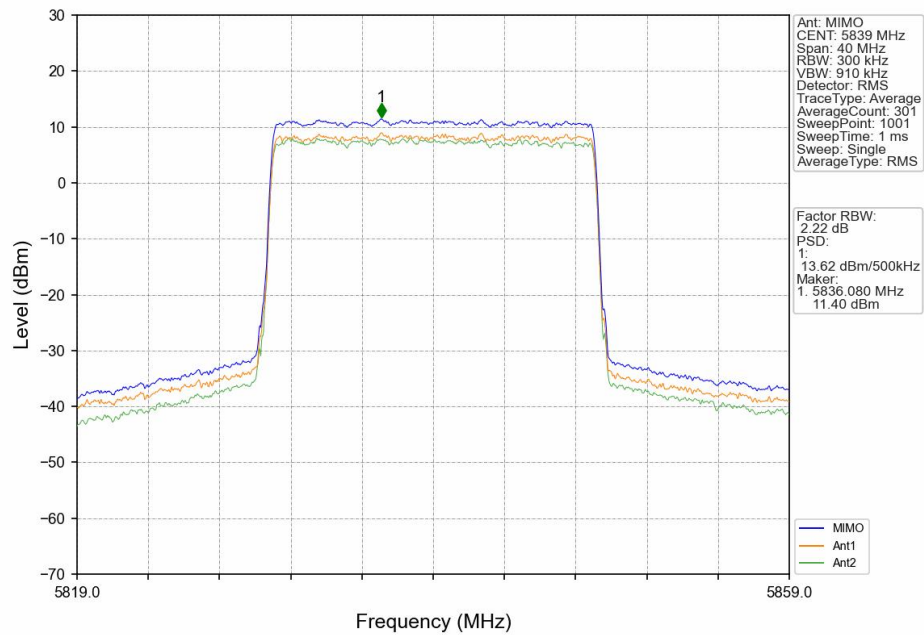


QPSK_HCH_5839MHz_Ant2_NTNV

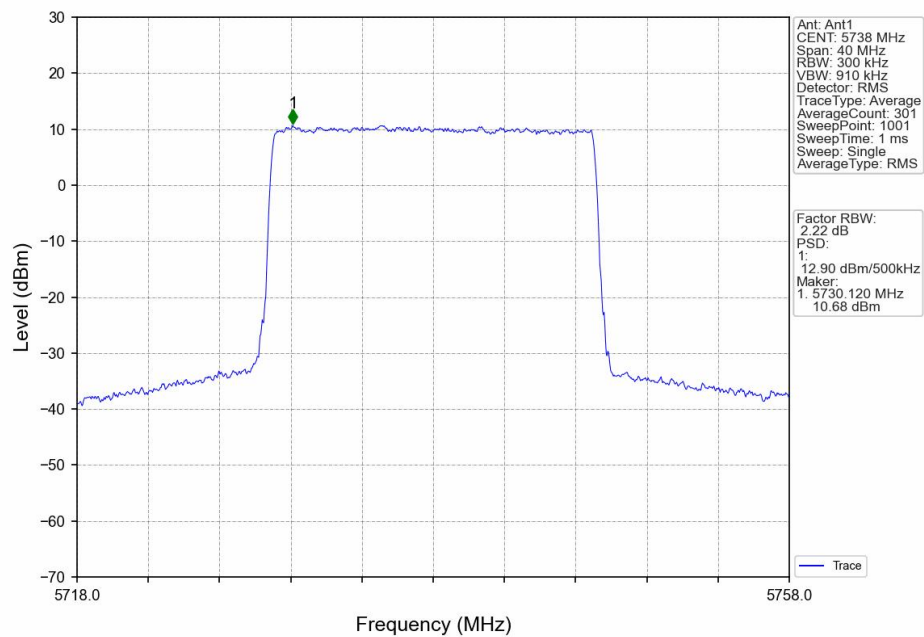




QPSK_HCH_5839MHz_MIMO_NTNV

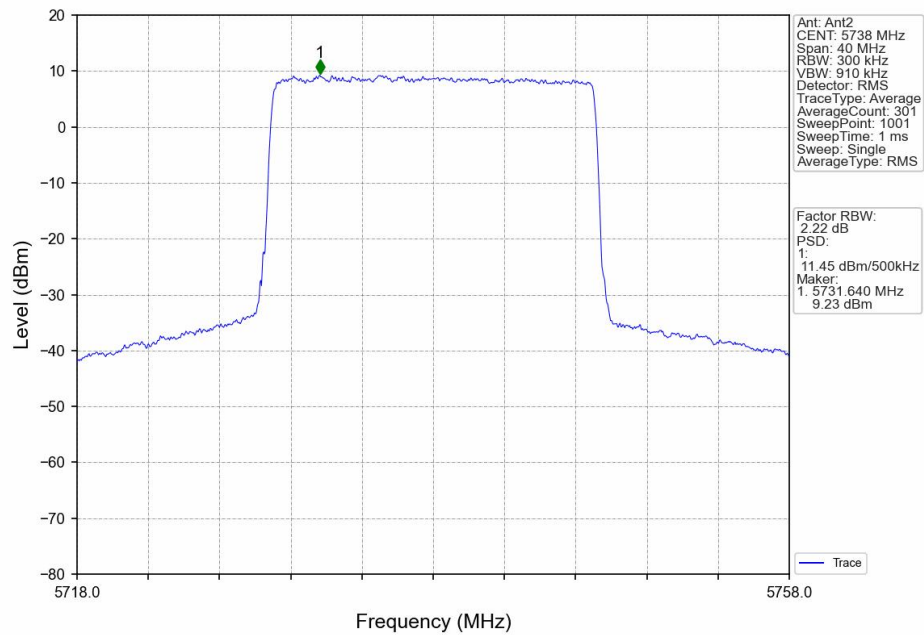


16QAM_LCH_5738MHz_Ant1_NTNV

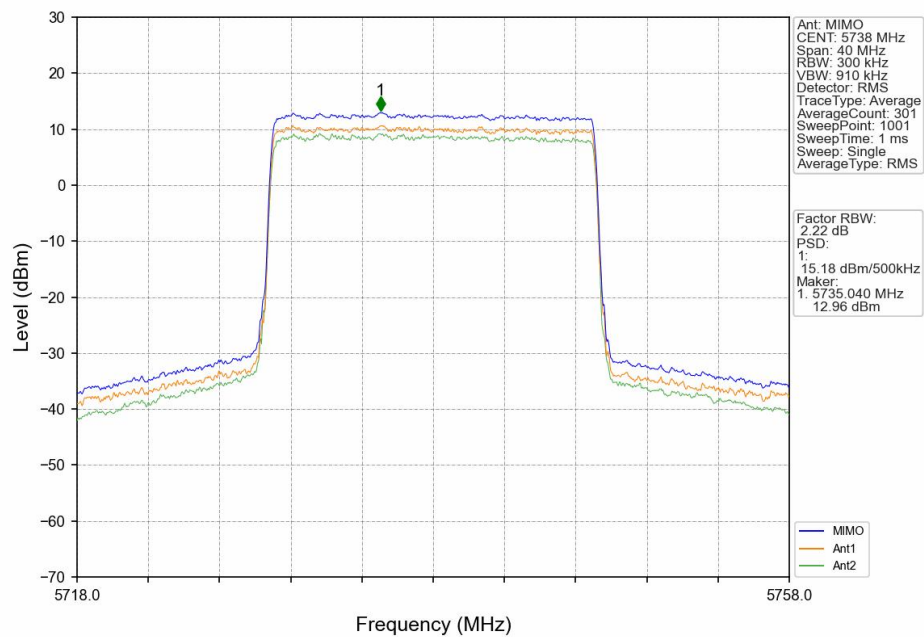




16QAM_LCH_5738MHz_Ant2_NTNV

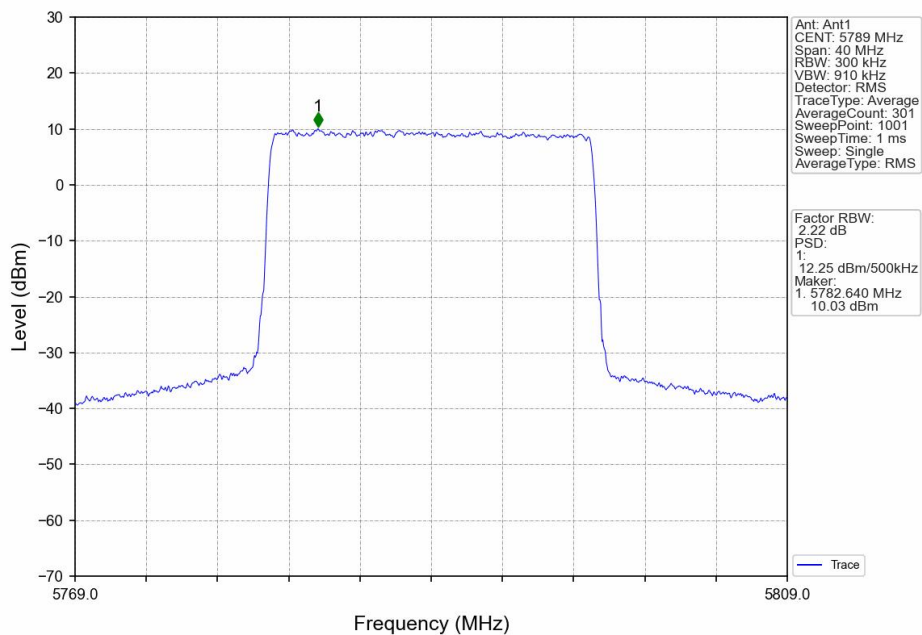


16QAM_LCH_5738MHz_MIMO_NTNV

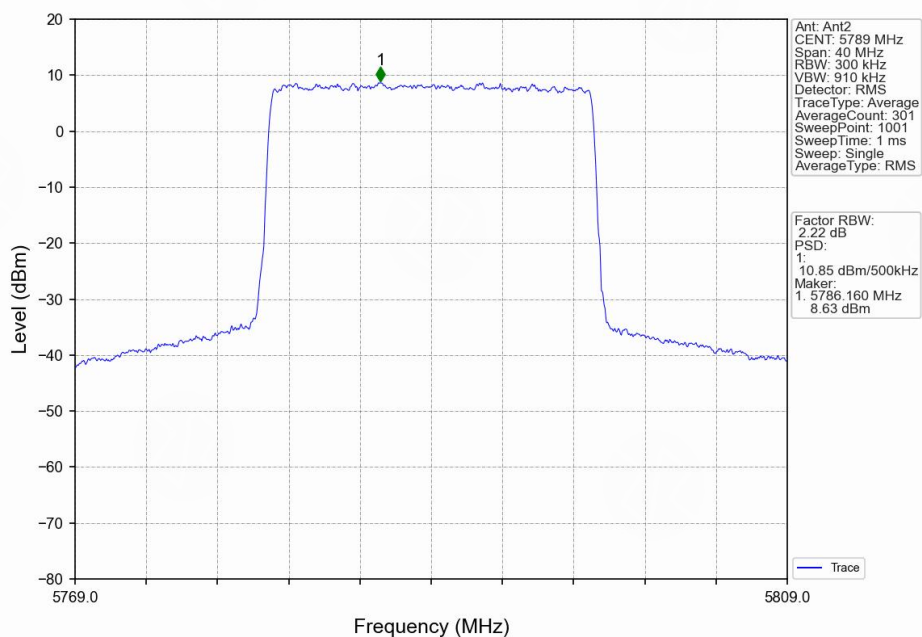




16QAM_MCH_5789MHz_Ant1_NTNV

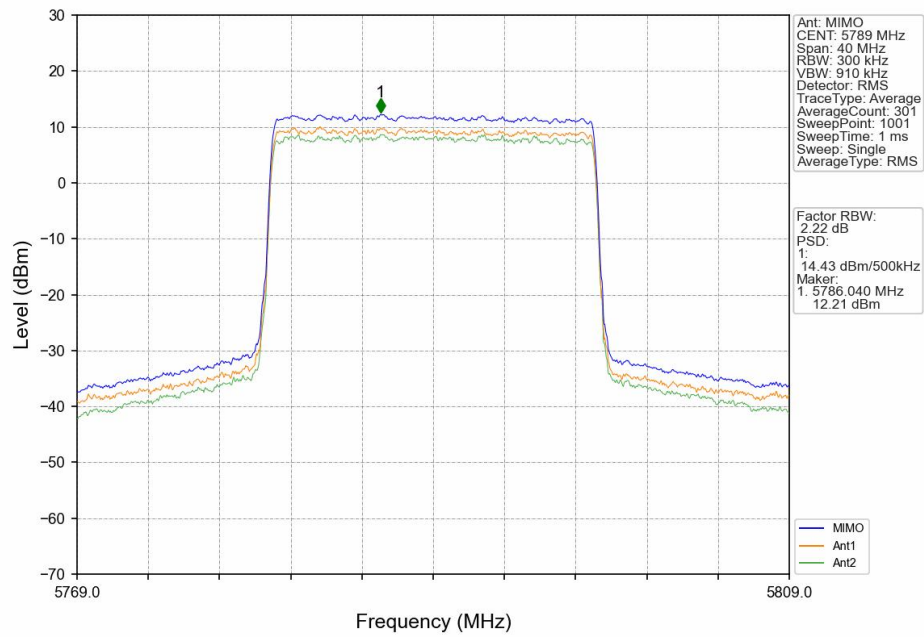


16QAM_MCH_5789MHz_Ant2_NTNV

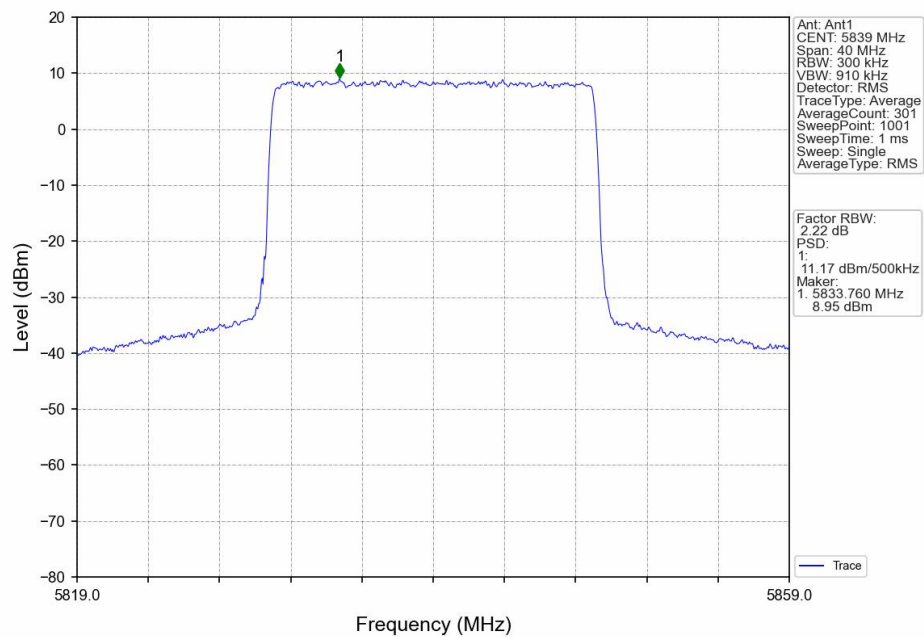




16QAM_MCH_5789MHz_MIMO_NTNV

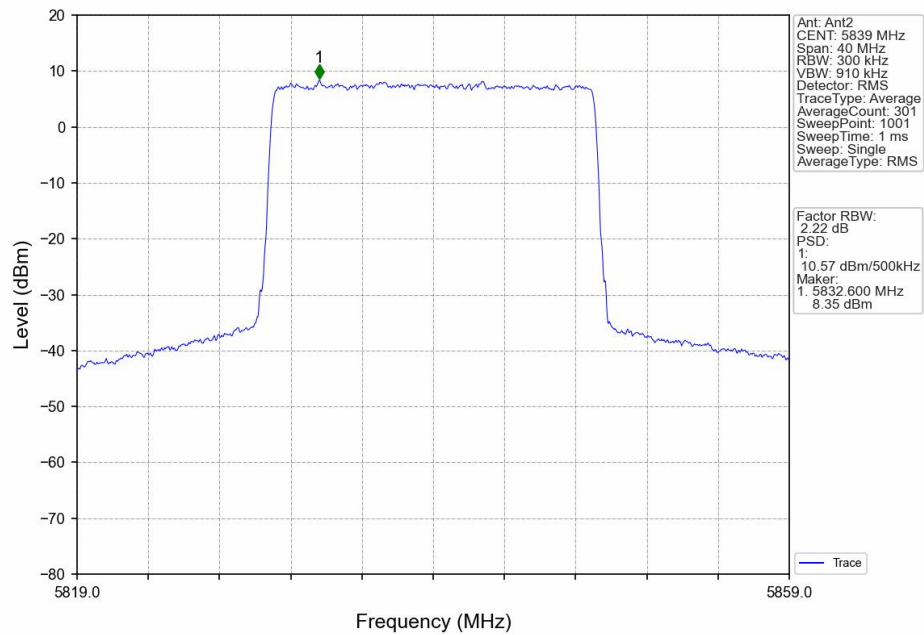


16QAM_HCH_5839MHz_Ant1_NTNV

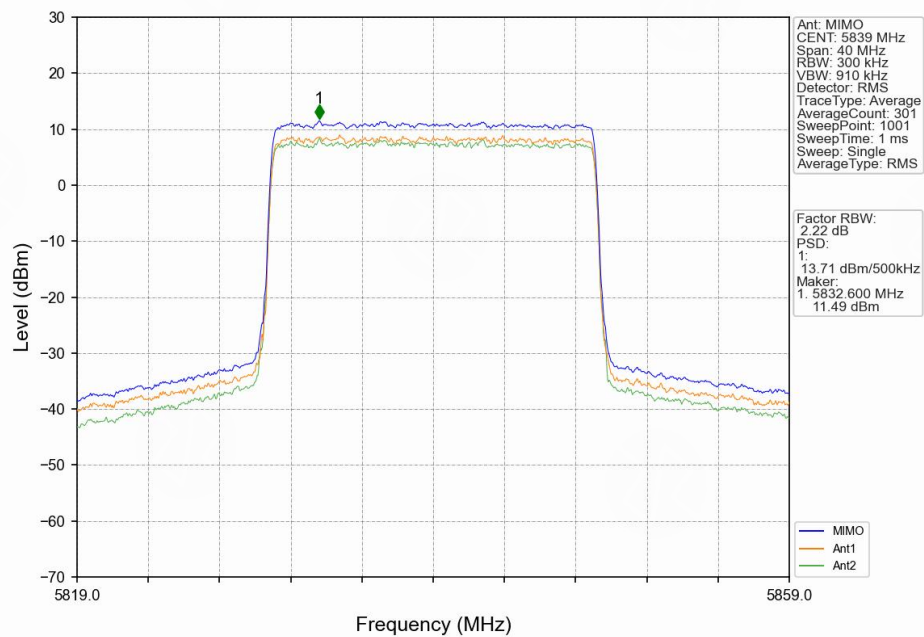




16QAM_HCH_5839MHz_Ant2_NTNV



16QAM_HCH_5839MHz_MIMO_NTNV





5. Frequency Stability

5.1 Ant1

5.1.1 Test Result

Ant1							
Mode	TX Type	Frequency (MHz)	Temperature (°C)	Voltage (VAC)	Measured Frequency (MHz)	Limit (MHz)	Verdict
QPSK	MIMO	5738	20	102	5738.000	5725 to 5850	Pass
				120	5738.020	5725 to 5850	Pass
				138	5738.000	5725 to 5850	Pass
			-30	120	5738.000	5725 to 5850	Pass
			-20	120	5738.000	5725 to 5850	Pass
			-10	120	5738.020	5725 to 5850	Pass
			0	120	5738.000	5725 to 5850	Pass
			10	120	5738.000	5725 to 5850	Pass
			30	120	5738.020	5725 to 5850	Pass
			40	120	5738.000	5725 to 5850	Pass
			50	120	5738.000	5725 to 5850	Pass
		5789	20	102	5789.020	5725 to 5850	Pass
				120	5789.020	5725 to 5850	Pass
				138	5789.020	5725 to 5850	Pass
			-30	120	5789.000	5725 to 5850	Pass
			-20	120	5789.000	5725 to 5850	Pass
			-10	120	5789.000	5725 to 5850	Pass
			0	120	5789.020	5725 to 5850	Pass
			10	120	5788.980	5725 to 5850	Pass
			30	120	5789.000	5725 to 5850	Pass
			40	120	5789.000	5725 to 5850	Pass
			50	120	5789.000	5725 to 5850	Pass
		5839	20	102	5839.000	5725 to 5850	Pass
				120	5838.980	5725 to 5850	Pass
				138	5839.020	5725 to 5850	Pass
			-30	120	5839.000	5725 to 5850	Pass
			-20	120	5839.000	5725 to 5850	Pass
			-10	120	5838.980	5725 to 5850	Pass
			0	120	5839.040	5725 to 5850	Pass
			10	120	5839.020	5725 to 5850	Pass
			30	120	5839.020	5725 to 5850	Pass
			40	120	5839.020	5725 to 5850	Pass
			50	120	5839.000	5725 to 5850	Pass
16QAM	MIMO	5738	20	102	5738.020	5725 to 5850	Pass
				120	5738.020	5725 to 5850	Pass
				138	5738.000	5725 to 5850	Pass
			-30	120	5737.980	5725 to 5850	Pass
			-20	120	5738.000	5725 to 5850	Pass
			-10	120	5738.020	5725 to 5850	Pass
			0	120	5738.000	5725 to 5850	Pass
			10	120	5738.020	5725 to 5850	Pass
			30	120	5738.020	5725 to 5850	Pass
			40	120	5738.020	5725 to 5850	Pass
			50	120	5737.980	5725 to 5850	Pass
		5789	20	102	5789.040	5725 to 5850	Pass
				120	5788.980	5725 to 5850	Pass



				138	5789.020	5725 to 5850	Pass
			-30	120	5788.980	5725 to 5850	Pass
			-20	120	5789.000	5725 to 5850	Pass
			-10	120	5789.000	5725 to 5850	Pass
			0	120	5789.000	5725 to 5850	Pass
			10	120	5789.020	5725 to 5850	Pass
			30	120	5788.980	5725 to 5850	Pass
			40	120	5789.000	5725 to 5850	Pass
			50	120	5789.020	5725 to 5850	Pass
		5839	20	102	5839.020	5725 to 5850	Pass
				120	5839.000	5725 to 5850	Pass
				138	5839.020	5725 to 5850	Pass
			-30	120	5838.980	5725 to 5850	Pass
			-20	120	5839.000	5725 to 5850	Pass
			-10	120	5838.980	5725 to 5850	Pass
			0	120	5839.020	5725 to 5850	Pass
			10	120	5839.000	5725 to 5850	Pass
			30	120	5839.040	5725 to 5850	Pass
			40	120	5839.020	5725 to 5850	Pass
			50	120	5839.040	5725 to 5850	Pass

6. Form731

6.1 Form731

6.1.1 Test Result

Lower Freq (MHz)	High Freq (MHz)	MAX Power (W)	MAX Power (dBm)
5738	5839	0.9441	29.75