



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

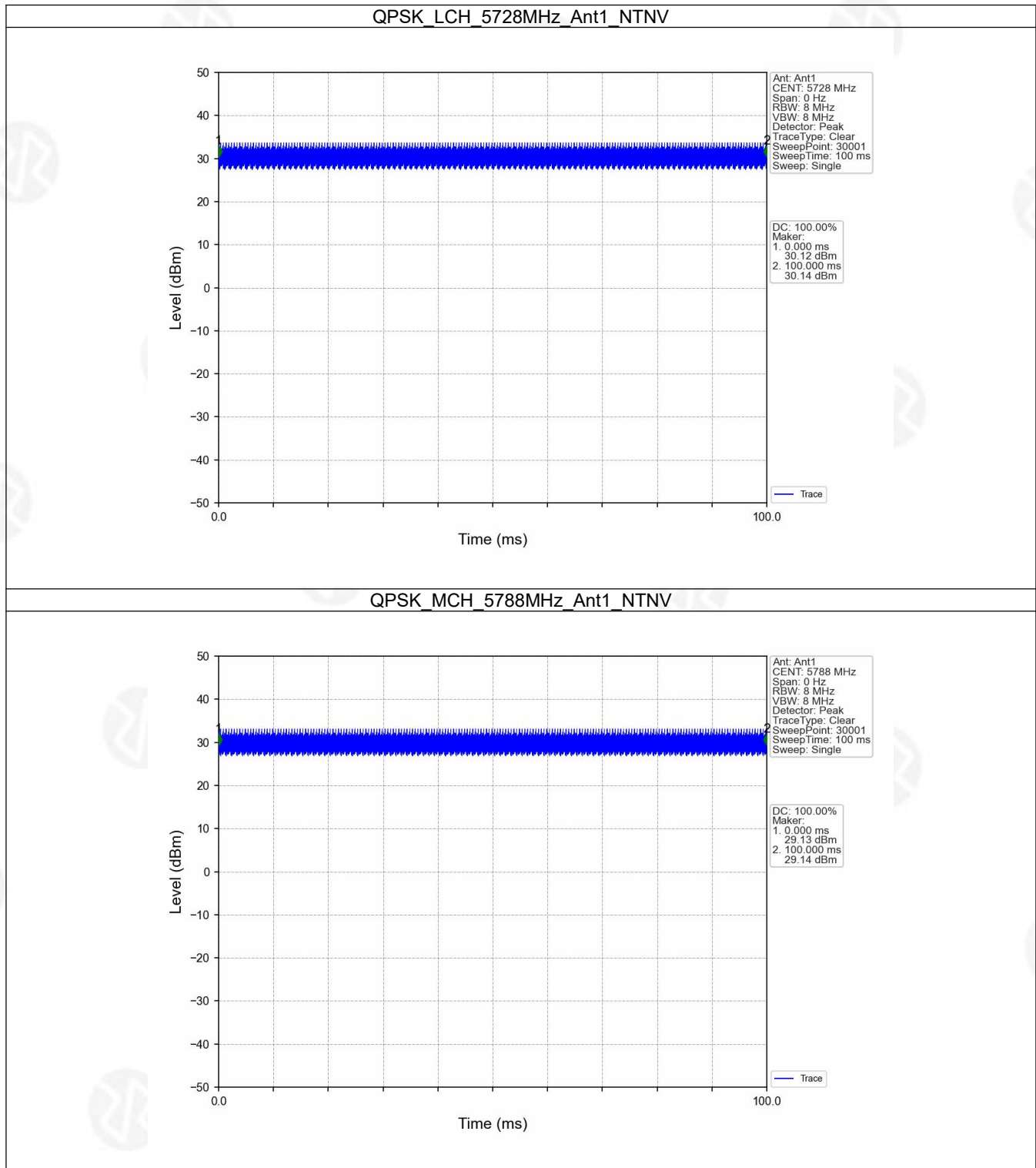
1.1 Ant1

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	5728	100.000	100.000	100.00	0.00	0.00
		5788	100.000	100.000	100.00	0.00	0.00
		5847	100.000	100.000	100.00	0.00	0.00
16QAM	MIMO	5728	100.000	100.000	100.00	0.00	0.00
		5788	100.000	100.000	100.00	0.00	0.00
		5847	100.000	100.000	100.00	0.00	0.00

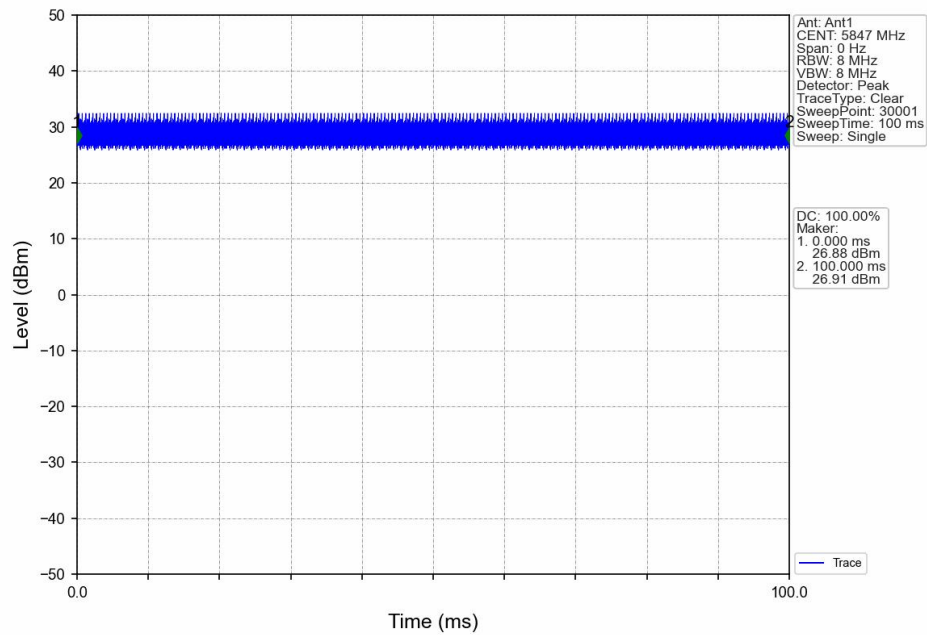


1.1.2 Test Graph

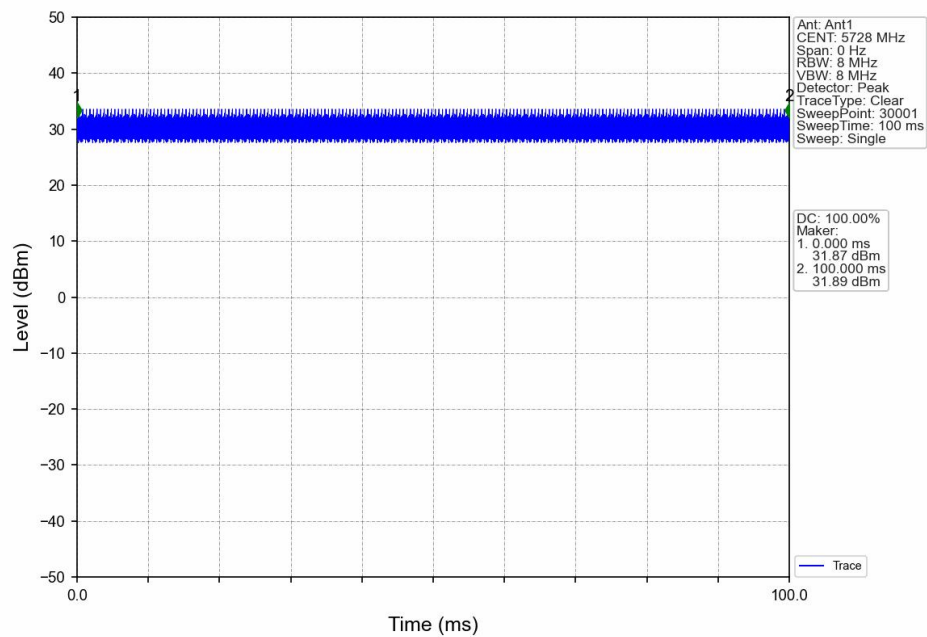




QPSK_HCH_5847MHz_Ant1_NTNV

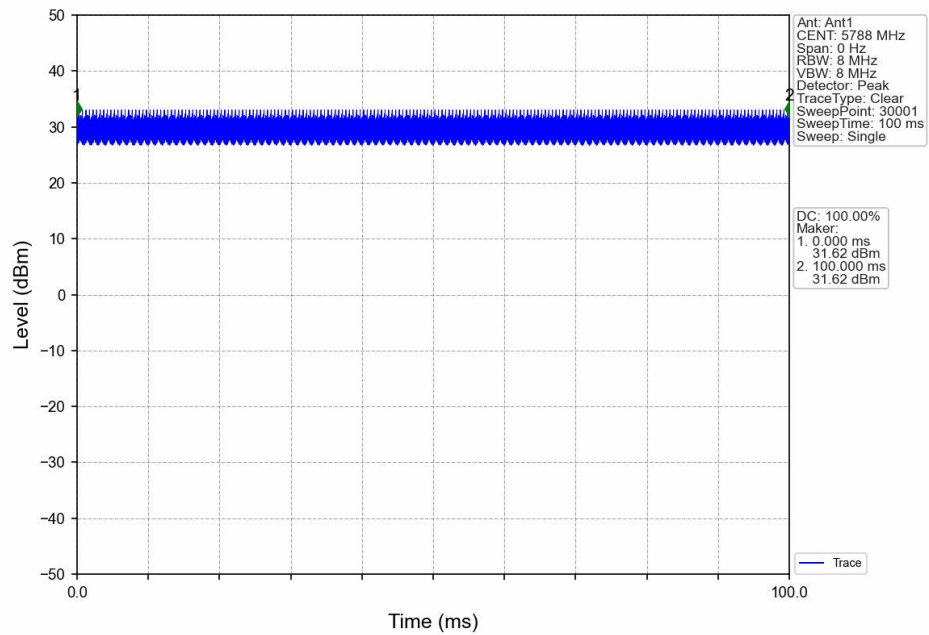


16QAM_LCH_5728MHz_Ant1_NTNV

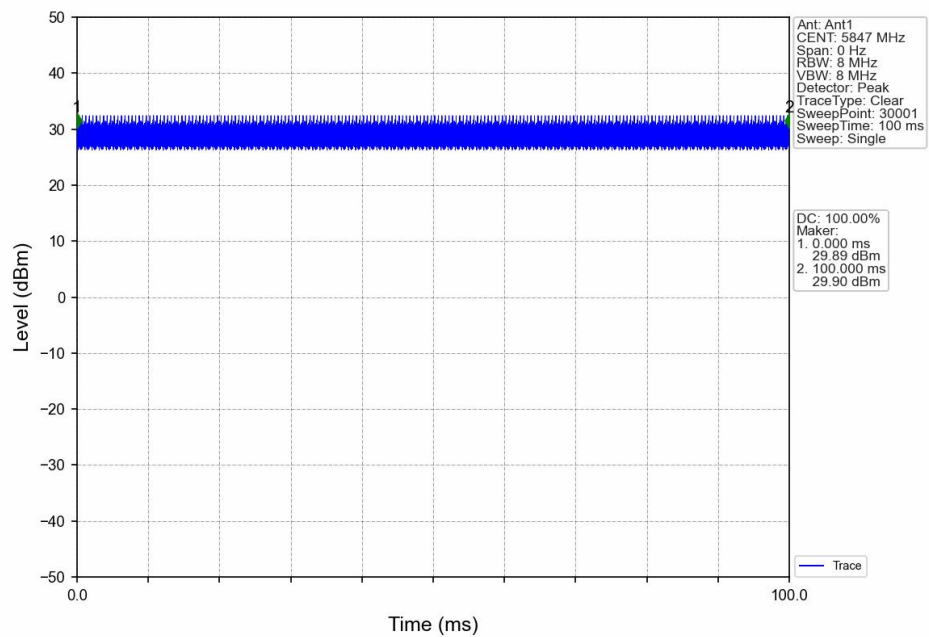




16QAM_MCH_5788MHz_Ant1_NTNV



16QAM_HCH_5847MHz_Ant1_NTNV





2. Bandwidth

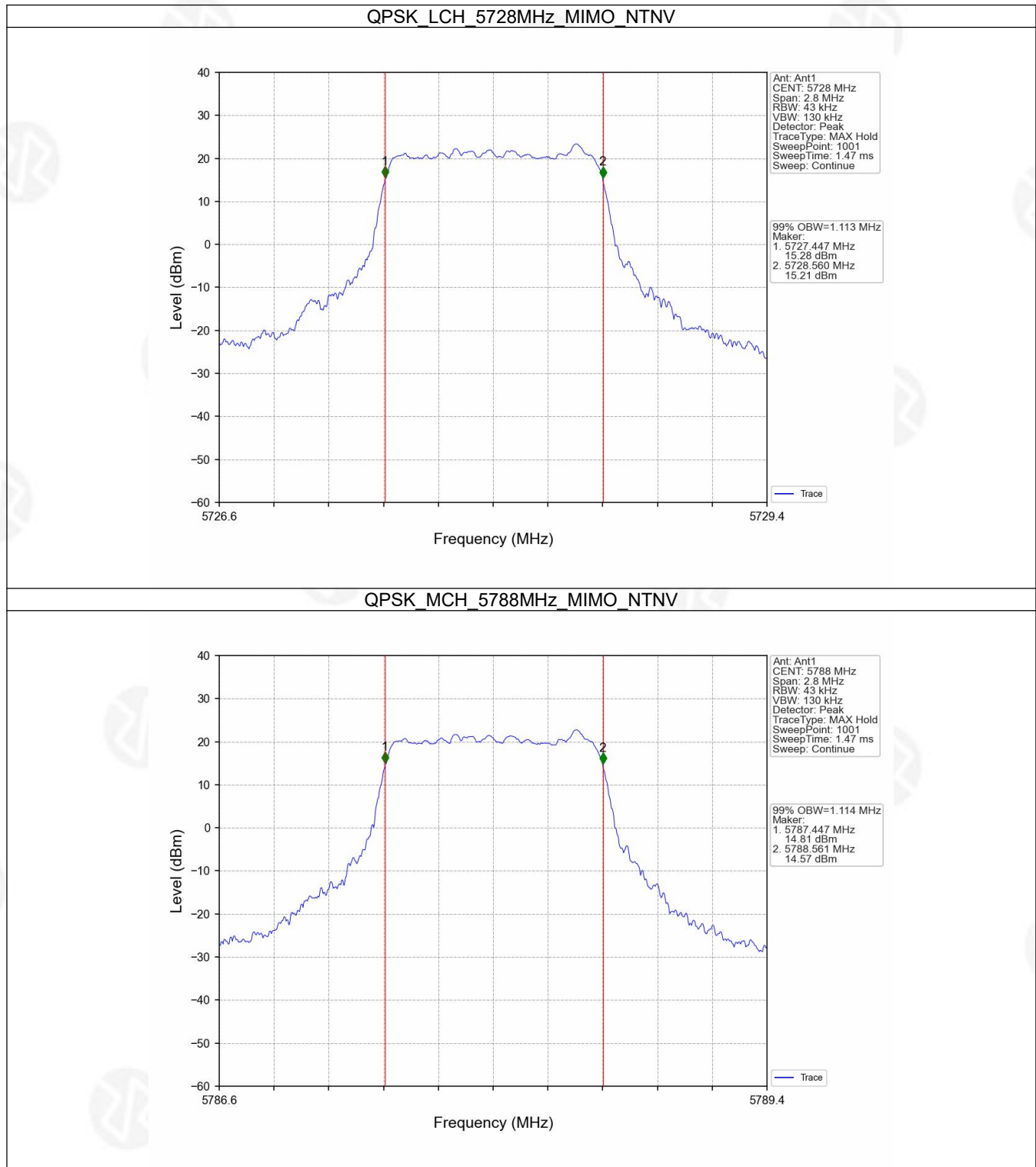
2.1 OBW

2.1.1 Test Result

Mode	TX Type	Frequency (MHz)	ANT	99% Occupied Bandwidth (MHz)		Verdict
				Result	Limit	
QPSK	MIMO	5728	MIMO	1.113	/	Pass
		5788	MIMO	1.114	/	Pass
		5847	MIMO	1.112	/	Pass
16QAM	MIMO	5728	MIMO	1.113	/	Pass
		5788	MIMO	1.113	/	Pass
		5847	MIMO	1.112	/	Pass

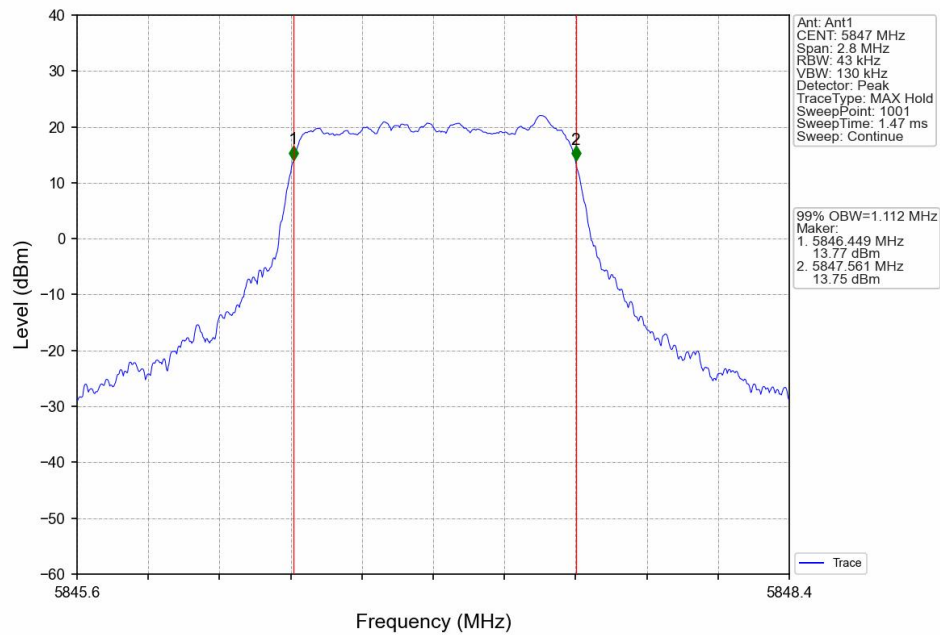


2.1.2 Test Graph

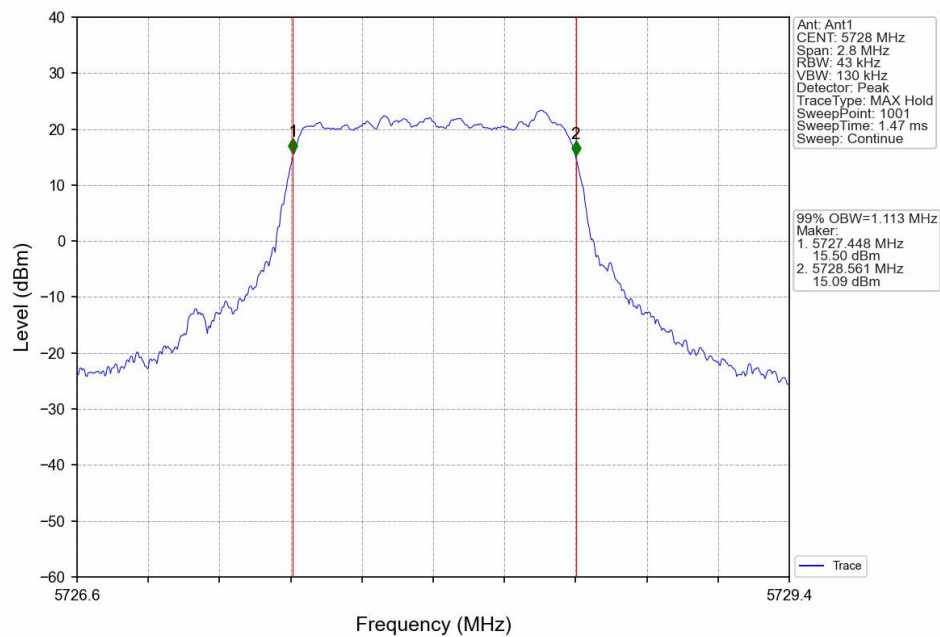




QPSK_HCH_5847MHz_MIMO_NTNV

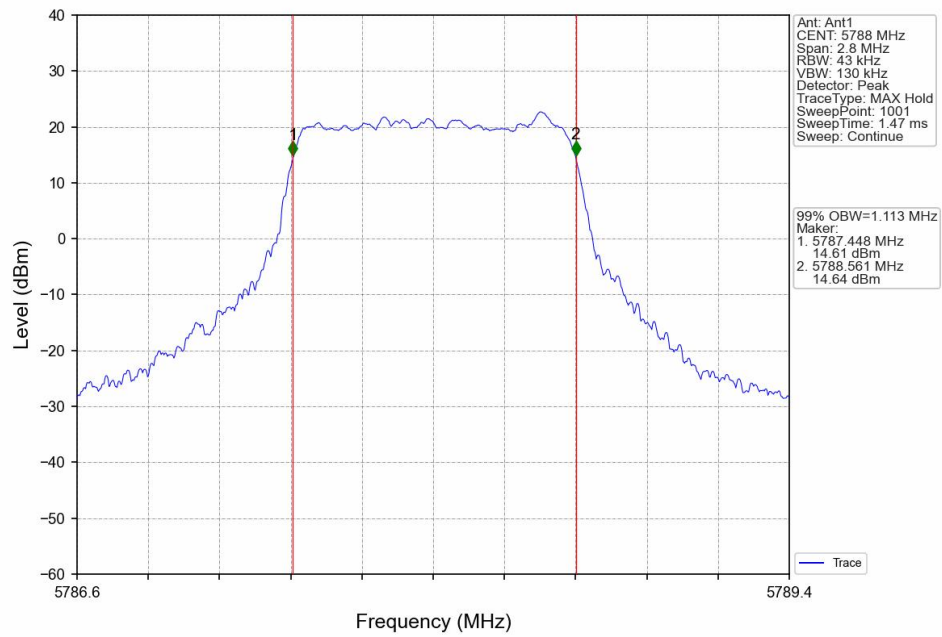


16QAM_LCH_5728MHz_MIMO_NTNV

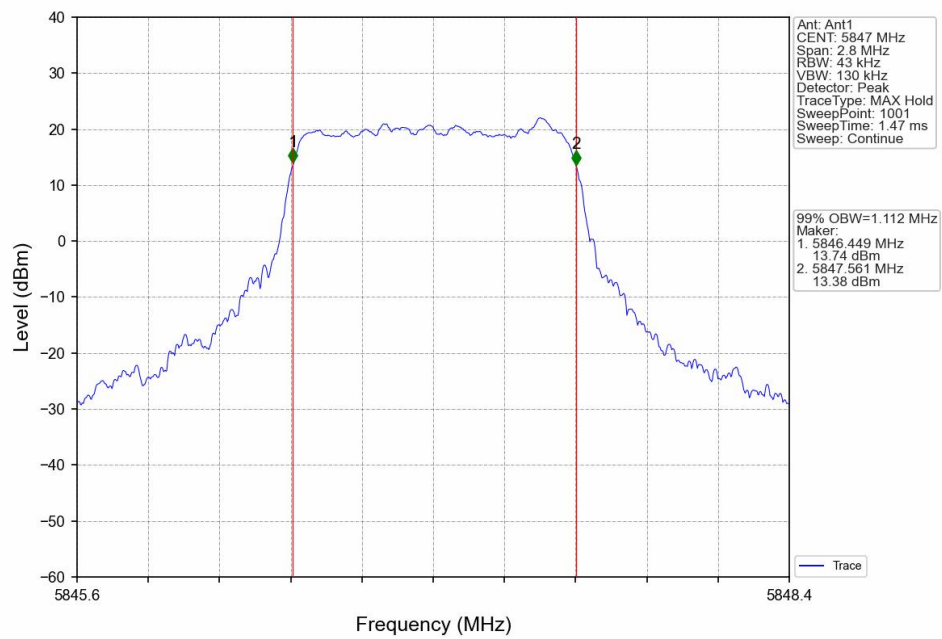




16QAM_MCH_5788MHz_MIMO_NTNV



16QAM_HCH_5847MHz_MIMO_NTNV





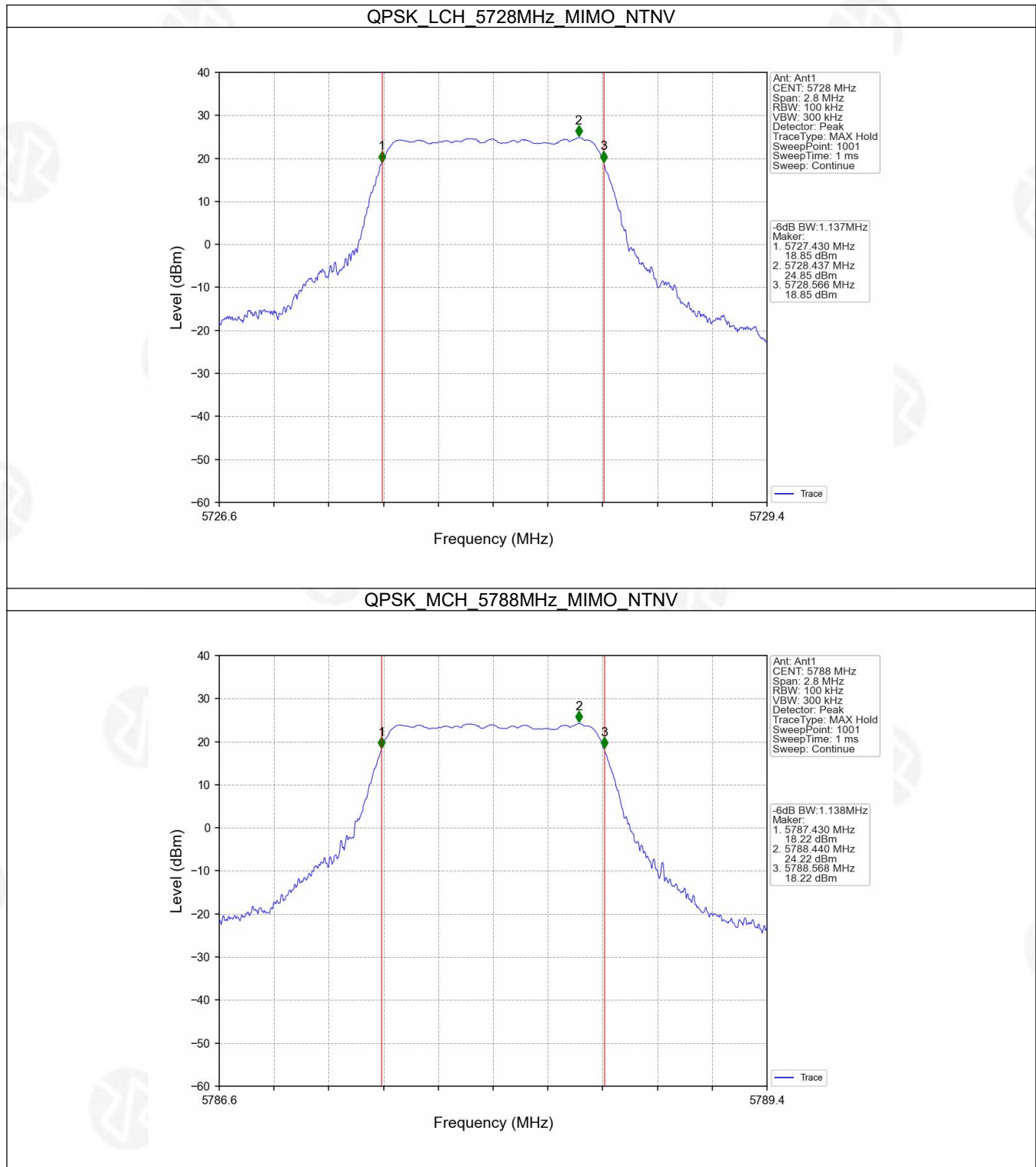
2.2 6dB BW

2.2.1 Test Result

Mode	TX Type	Frequency (MHz)	ANT	6dB Bandwidth (MHz)		Verdict
				Result	Limit	
QPSK	MIMO	5728	MIMO	1.137	≥ 0.5	Pass
		5788	MIMO	1.138	≥ 0.5	Pass
		5847	MIMO	1.133	≥ 0.5	Pass
16QAM	MIMO	5728	MIMO	1.135	≥ 0.5	Pass
		5788	MIMO	1.141	≥ 0.5	Pass
		5847	MIMO	1.142	≥ 0.5	Pass

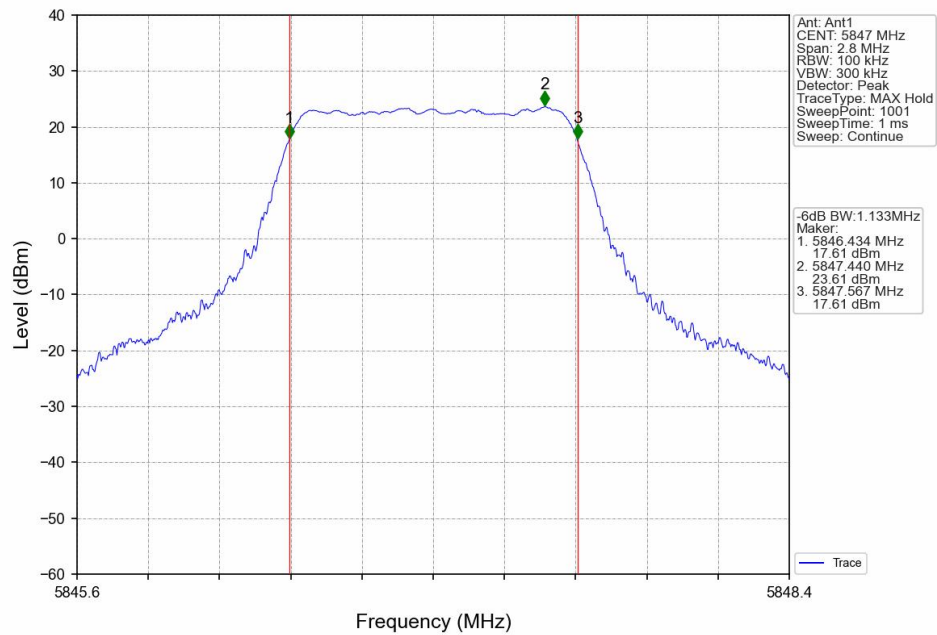


2.2.2 Test Graph

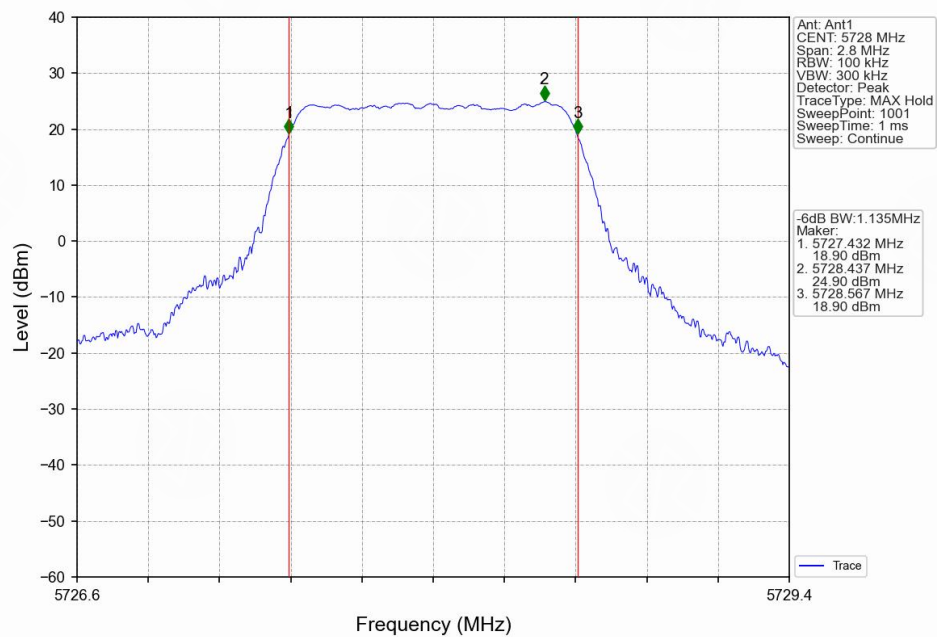




QPSK_HCH_5847MHz_MIMO_NTNV

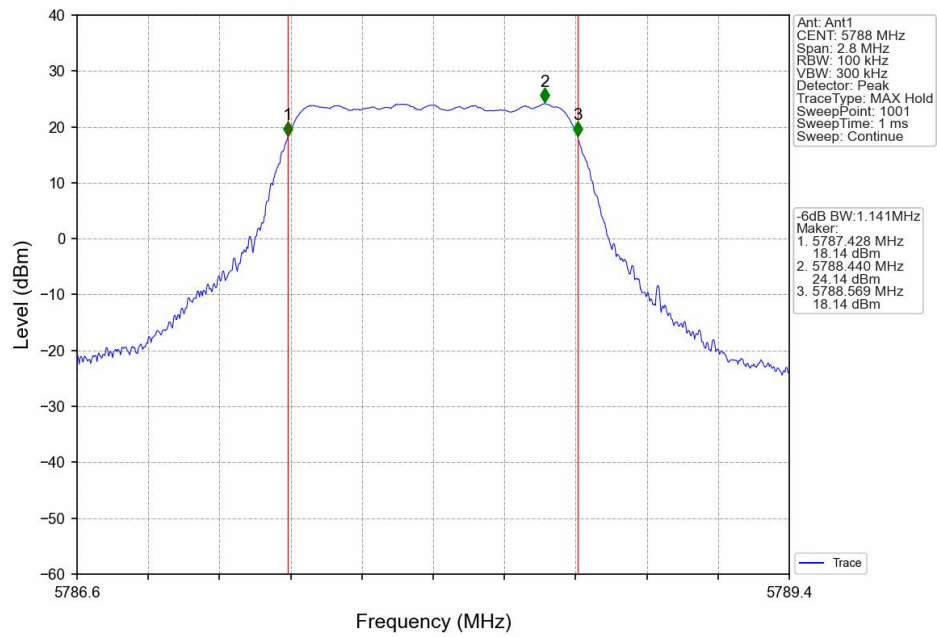


16QAM_LCH_5728MHz_MIMO_NTNV

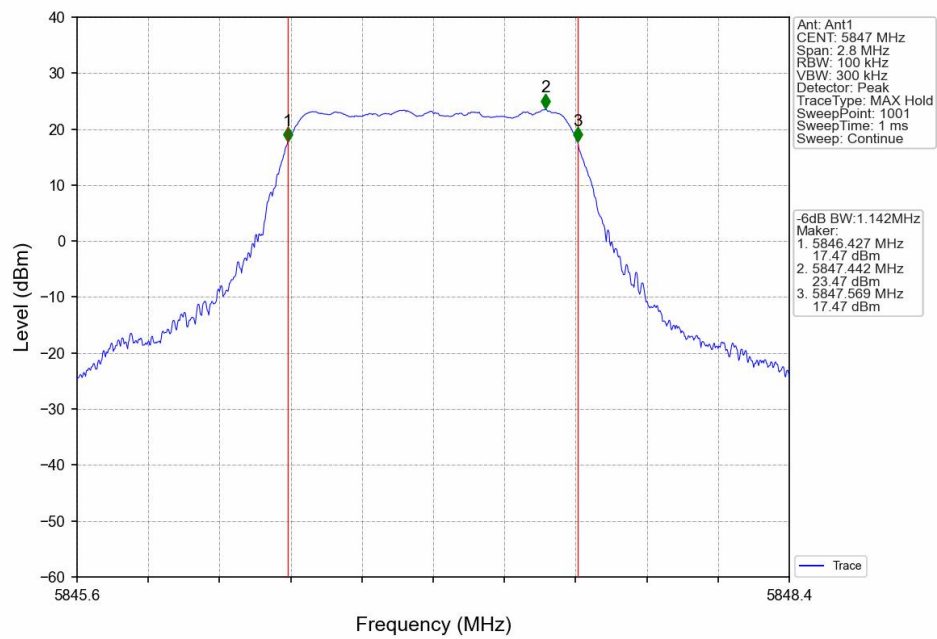




16QAM_MCH_5788MHz_MIMO_NTNV



16QAM_HCH_5847MHz_MIMO_NTNV





3. Maximum Conducted Output Power

3.1 Power

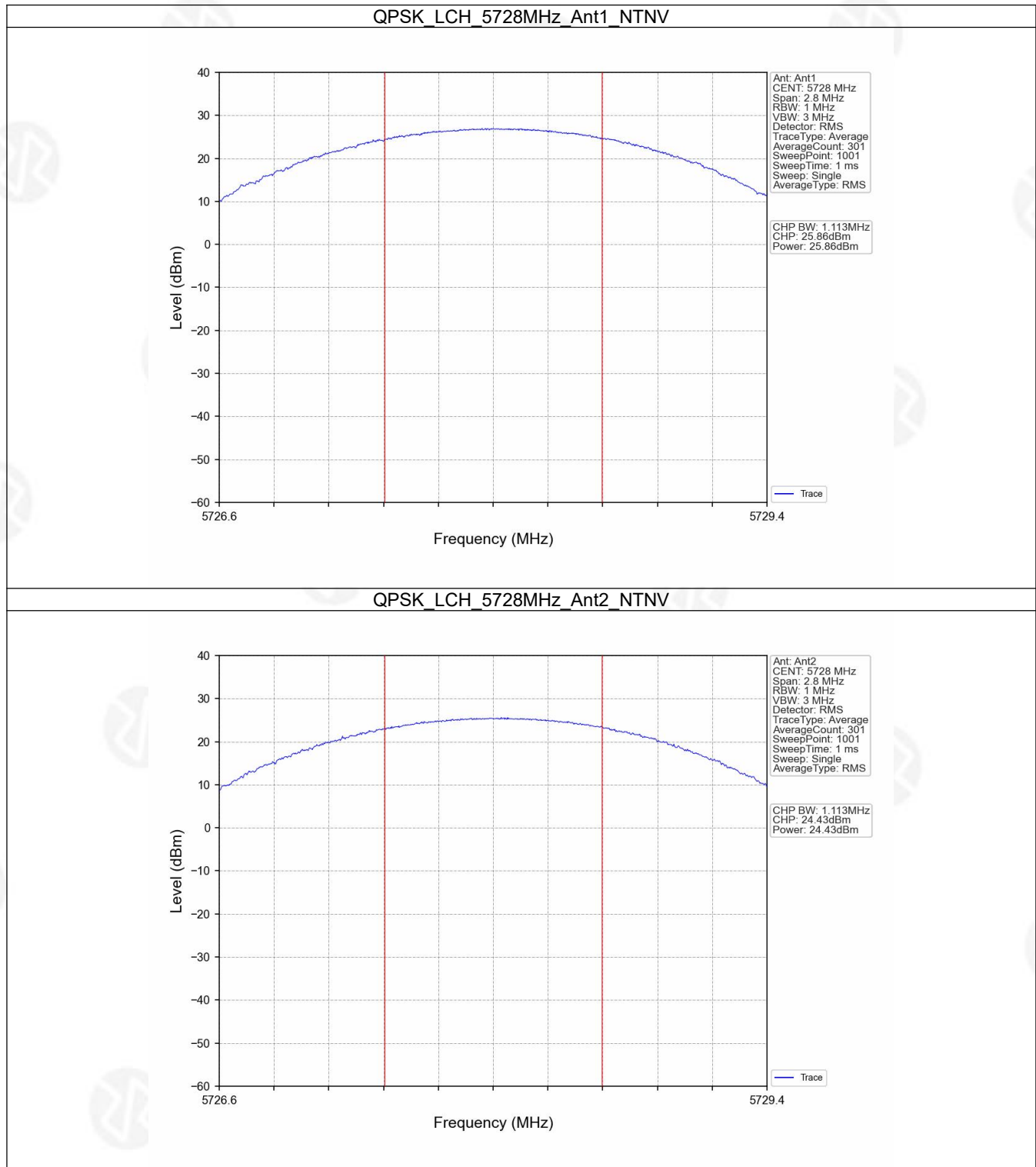
3.1.1 Test Result

Mode	TX Type	Frequency (MHz)	Maximum Average Conducted Output Power (dBm)				Verdict
			ANT1	ANT2	MIMO	Limit	
QPSK	MIMO	5728	25.86	24.43	28.21	<=30	Pass
		5788	25.42	24.30	27.91	<=30	Pass
		5847	24.59	23.74	27.20	<=30	Pass
16QAM	MIMO	5728	25.98	24.55	28.33	<=30	Pass
		5788	25.50	24.30	27.95	<=30	Pass
		5847	24.74	23.86	27.33	<=30	Pass

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

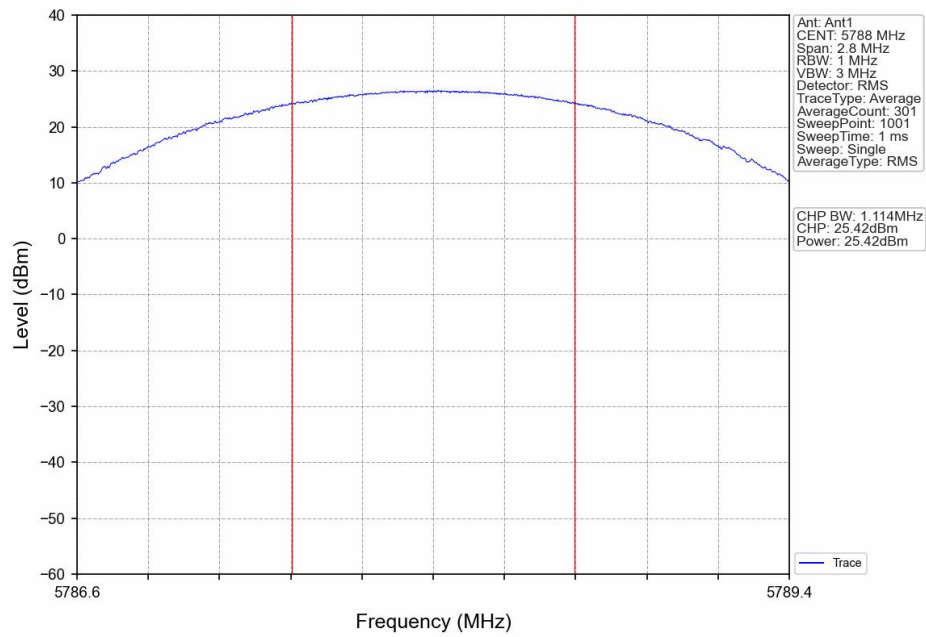


3.1.2 Test Graph

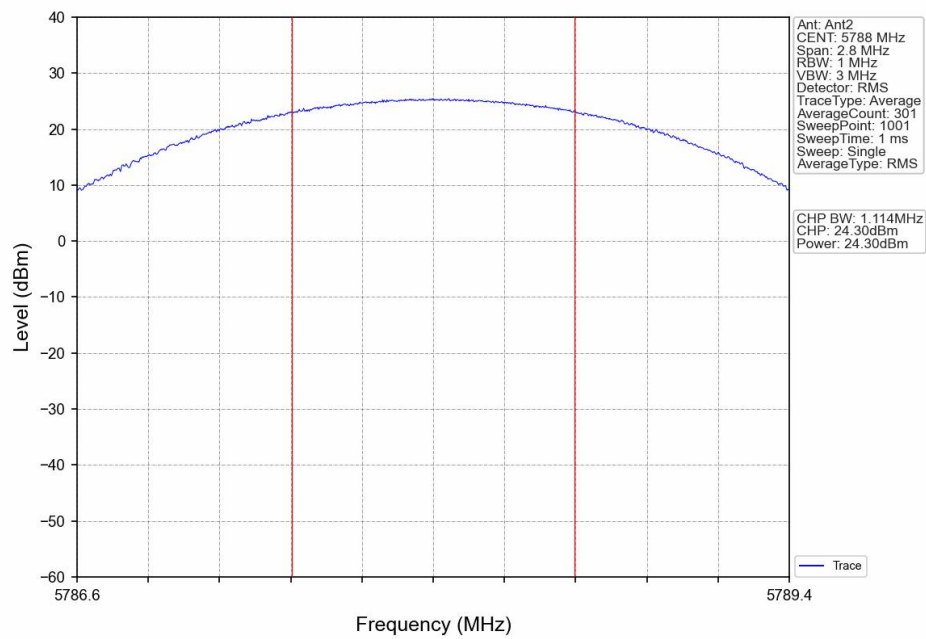




QPSK_MCH_5788MHz_Ant1_NTNV

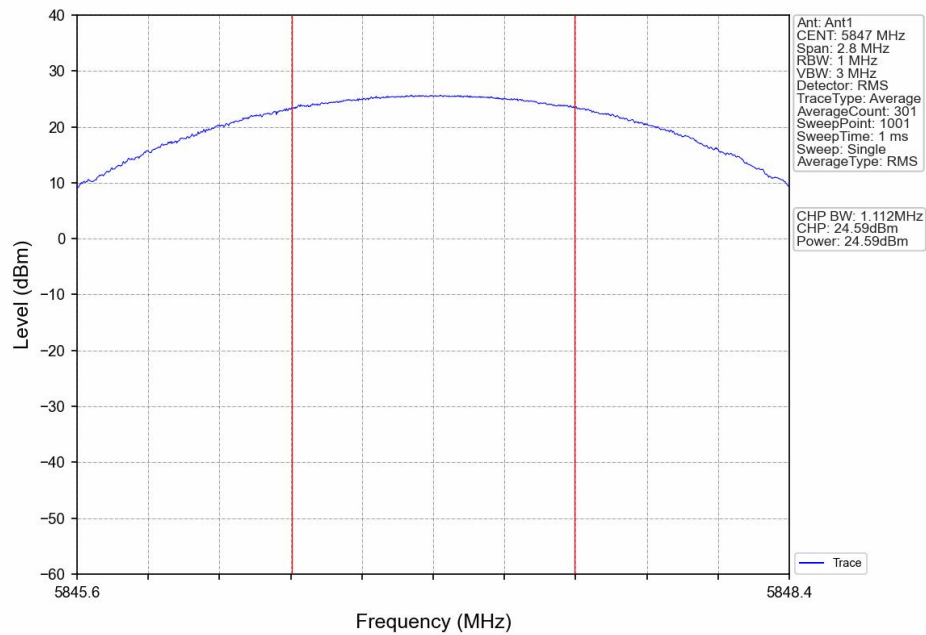


QPSK_MCH_5788MHz_Ant2_NTNV

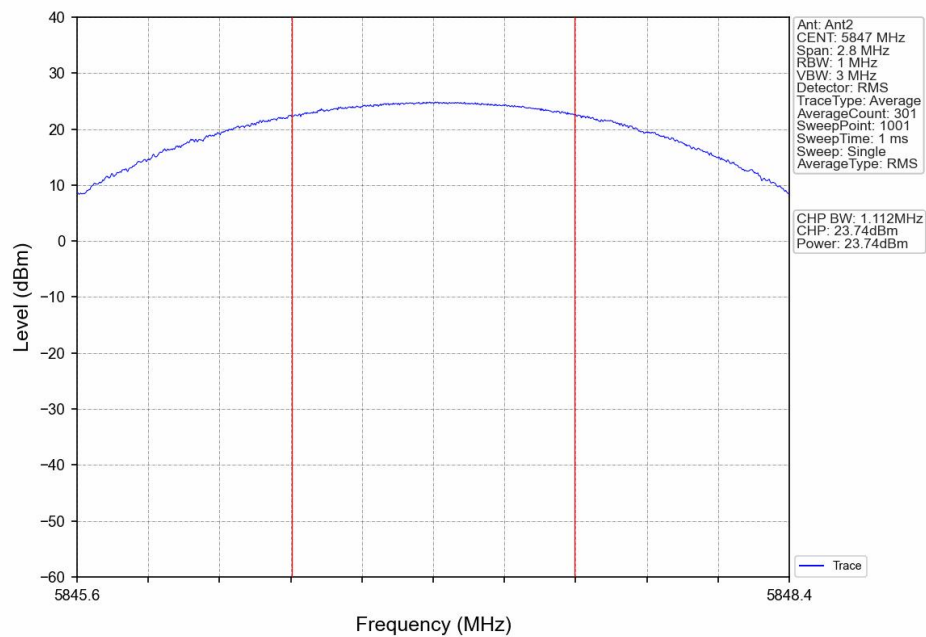




QPSK_HCH_5847MHz_Ant1_NTNV

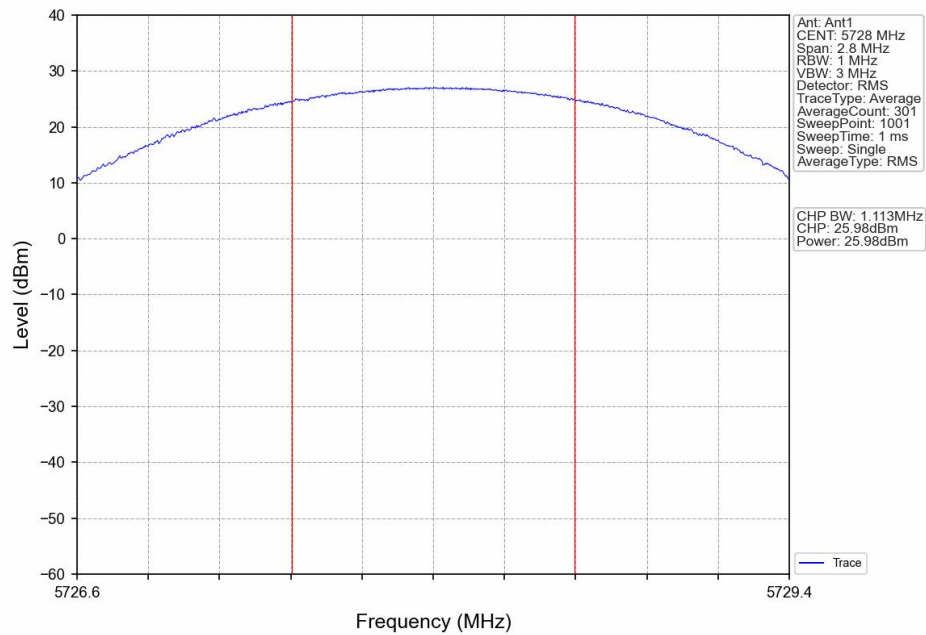


QPSK_HCH_5847MHz_Ant2_NTNV

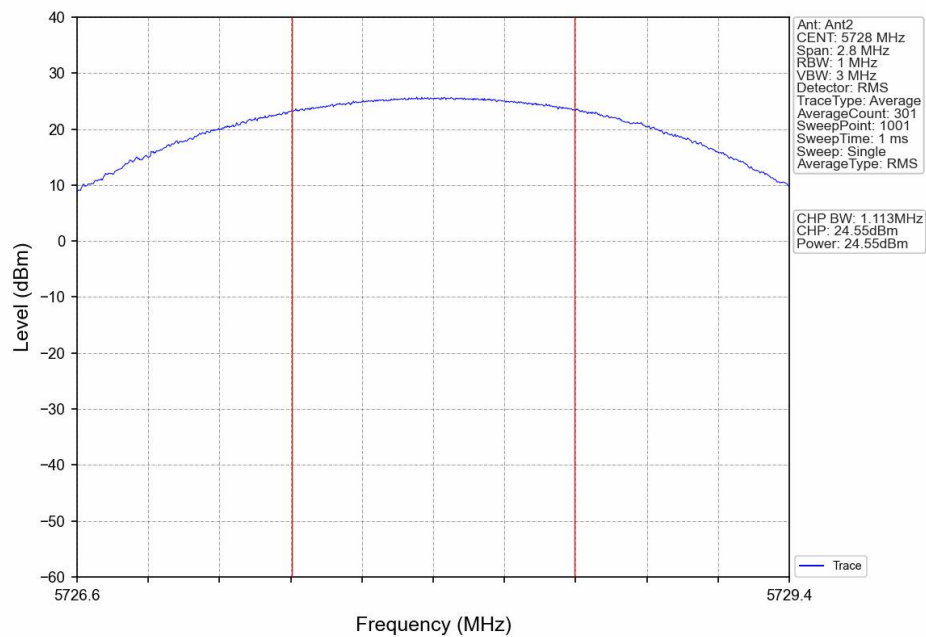




16QAM_LCH_5728MHz_Ant1_NTNV

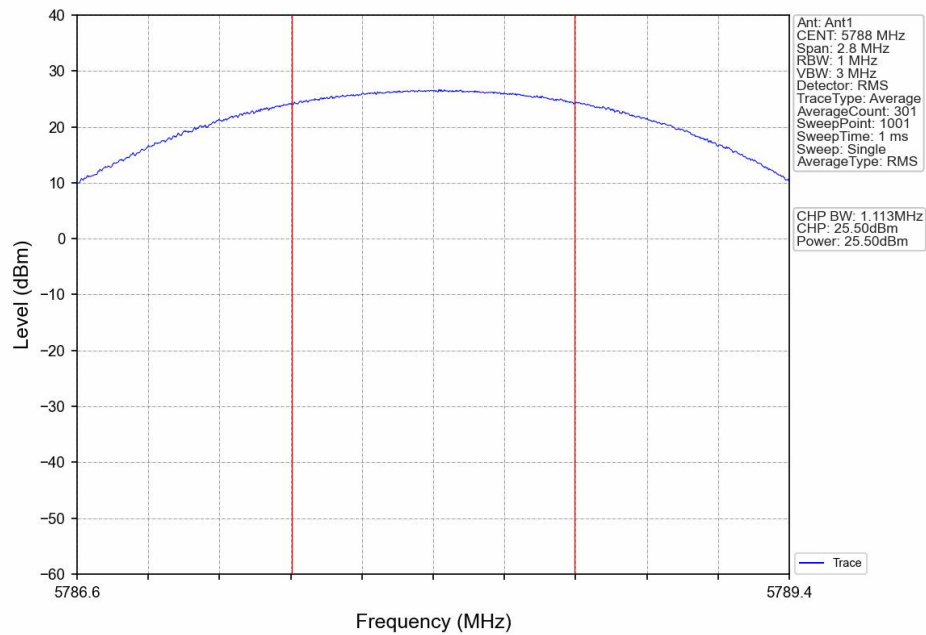


16QAM_LCH_5728MHz_Ant2_NTNV

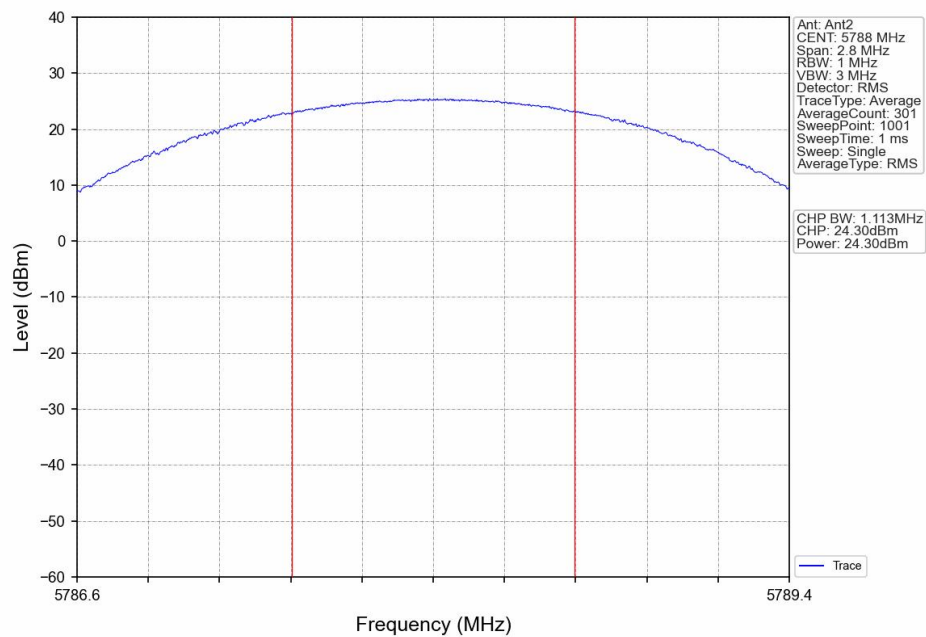




16QAM_MCH_5788MHz_Ant1_NTNV

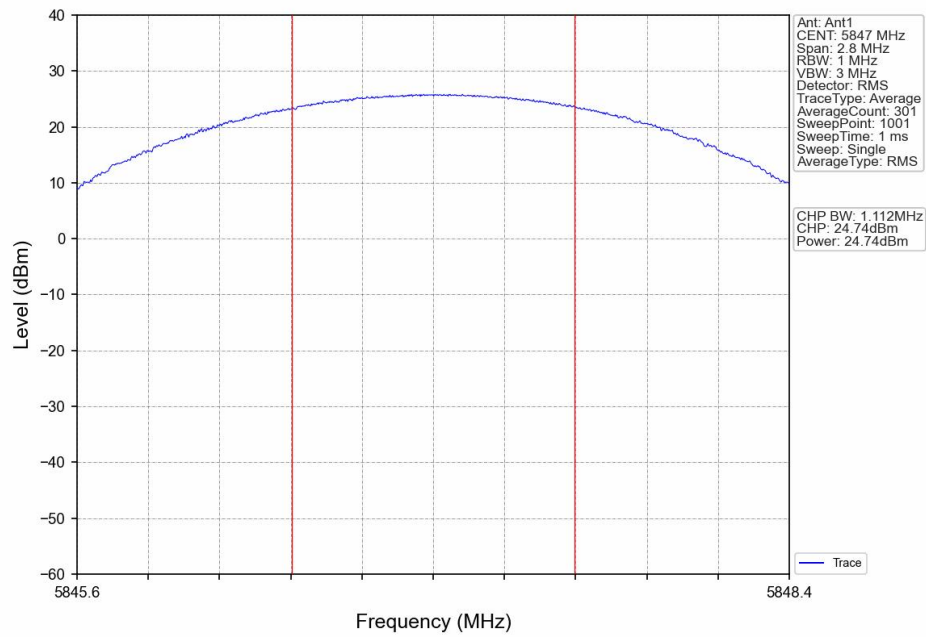


16QAM_MCH_5788MHz_Ant2_NTNV

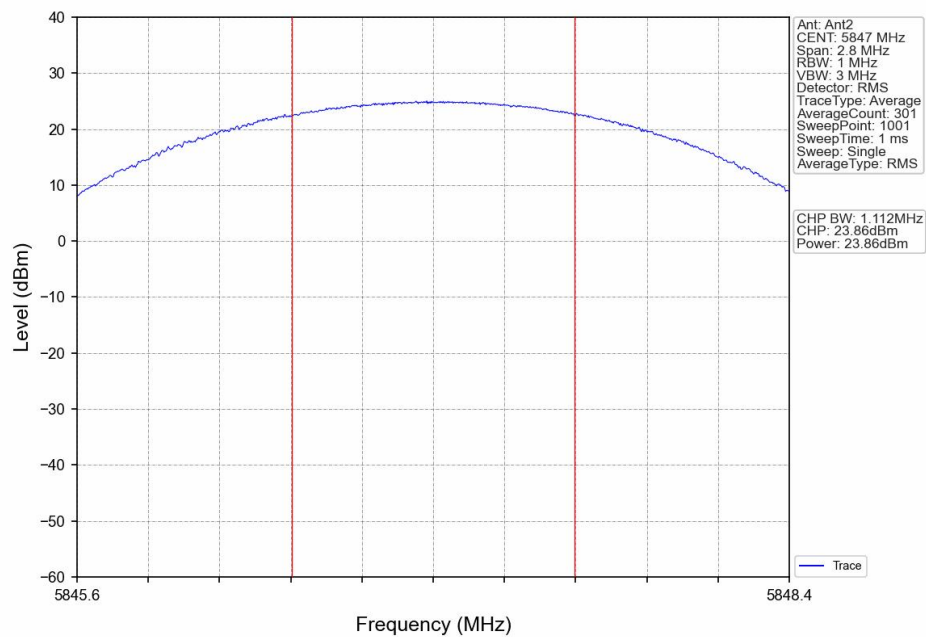




16QAM_HCH_5847MHz_Ant1_NTNV



16QAM_HCH_5847MHz_Ant2_NTNV





4. Maximum Power Spectral Density

4.1 PSD-Band3

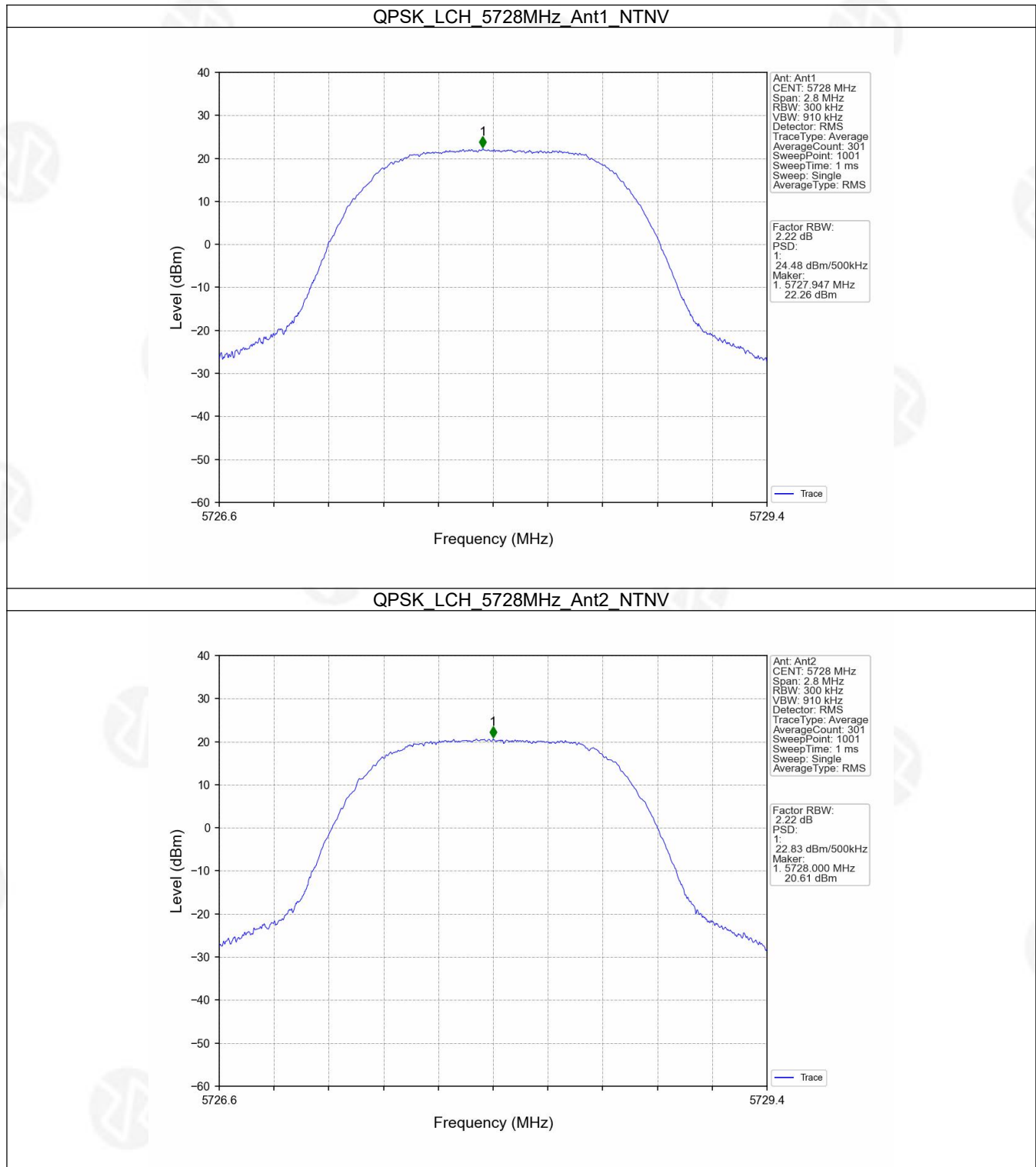
4.1.1 Test Result

Mode	TX Type	Frequency (MHz)	Maximum PSD (dBm/500kHz)				Verdict
			ANT1	ANT2	MIMO	Limit	
QPSK	MIMO	5728	24.48	22.83	26.67	<=30	Pass
		5788	23.90	22.78	26.31	<=30	Pass
		5847	23.17	22.14	25.63	<=30	Pass
16QAM	MIMO	5728	24.36	22.89	26.56	<=30	Pass
		5788	23.86	22.77	26.27	<=30	Pass
		5847	23.22	22.41	25.62	<=30	Pass

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

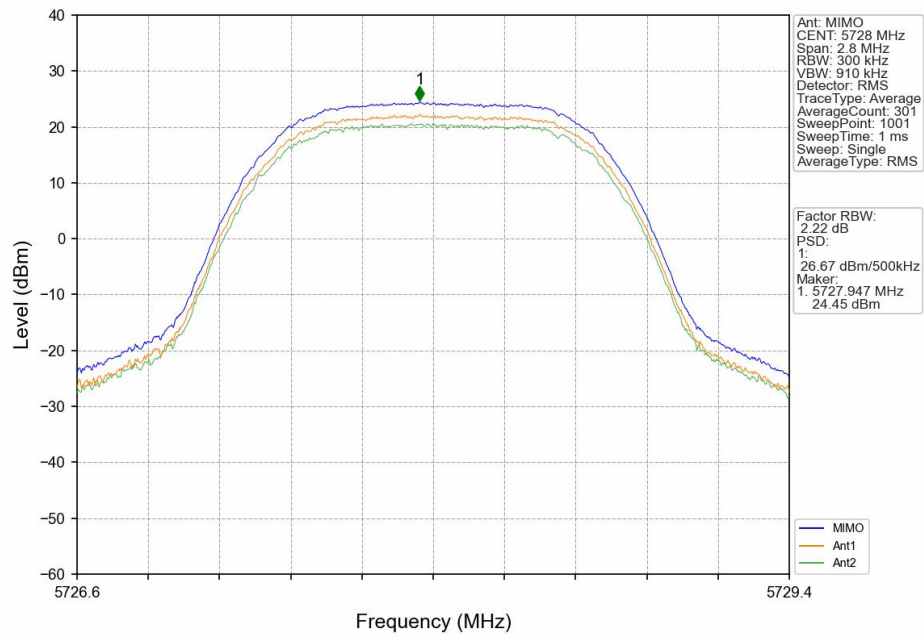


4.1.2 Test Graph

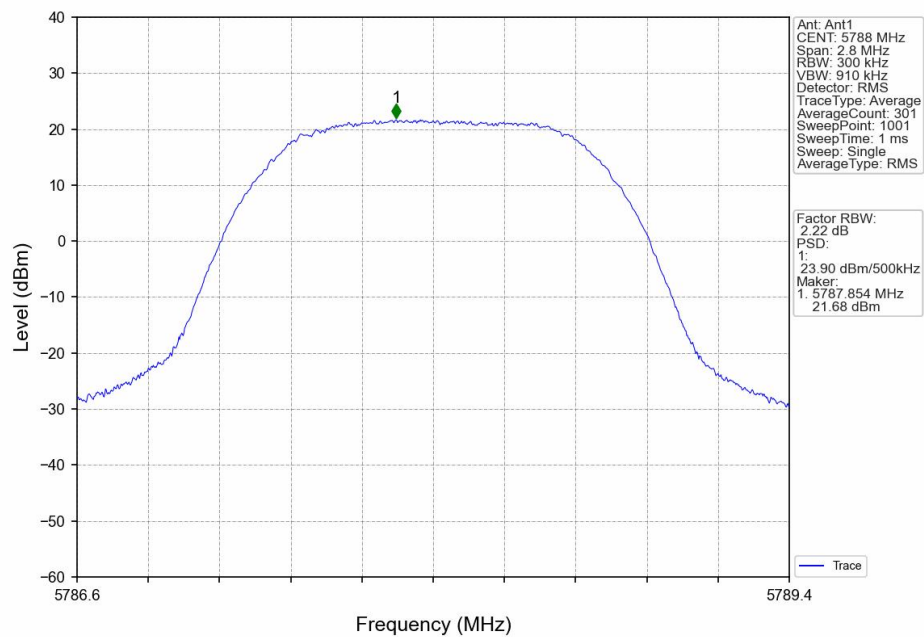




QPSK_LCH_5728MHz_MIMO_NTNV

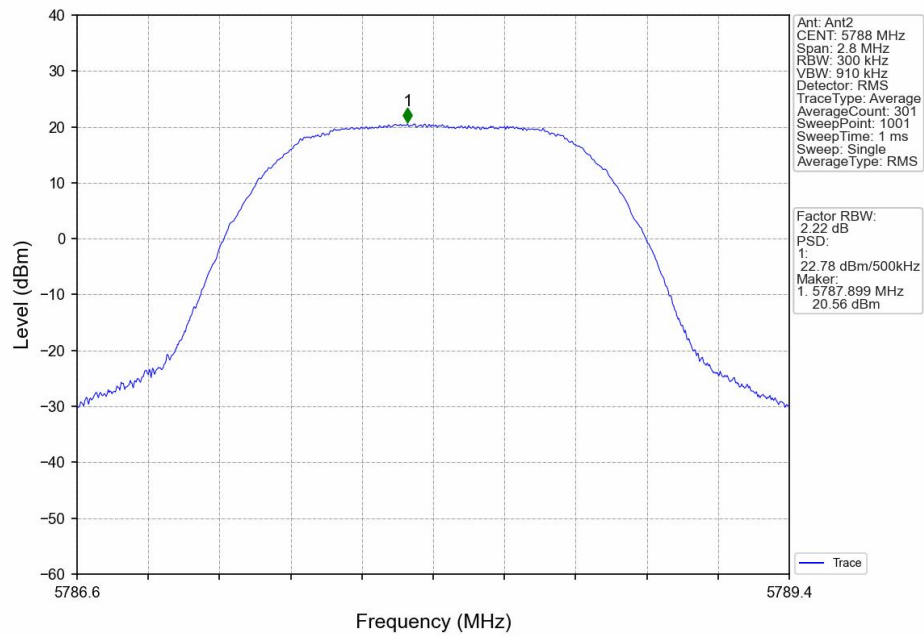


QPSK_MCH_5788MHz_Ant1_NTNV

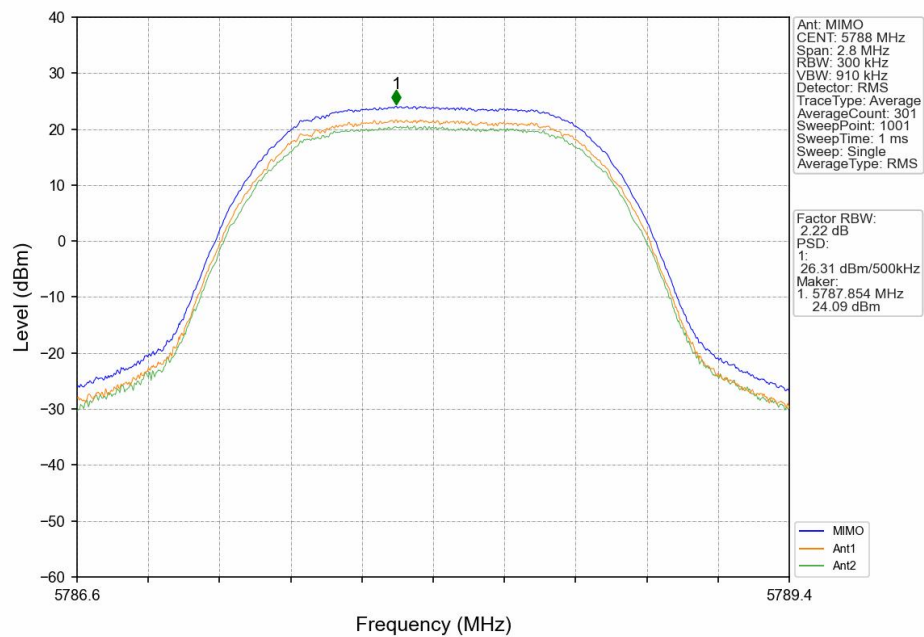




QPSK_MCH_5788MHz_Ant2_NTNV

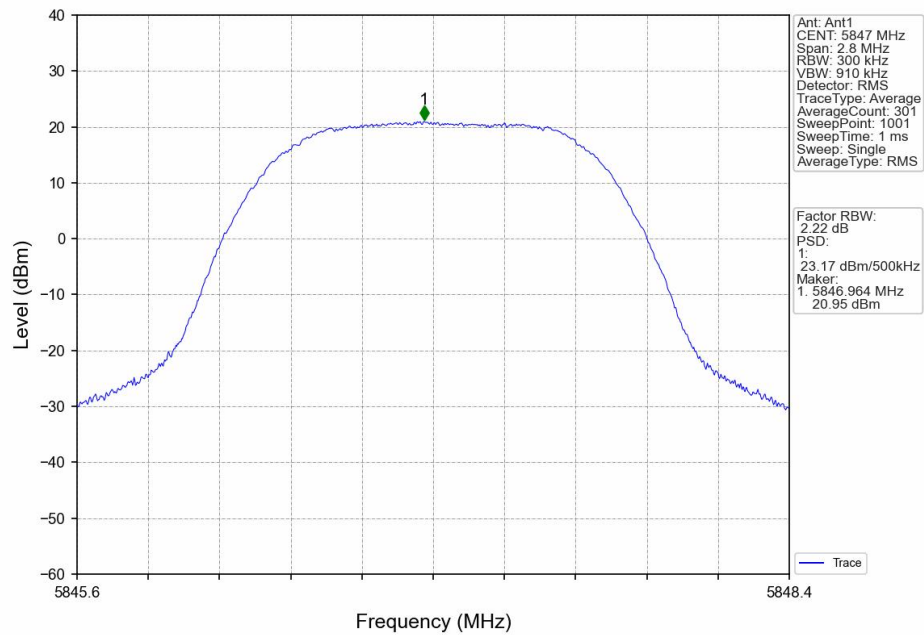


QPSK_MCH_5788MHz_MIMO_NTNV

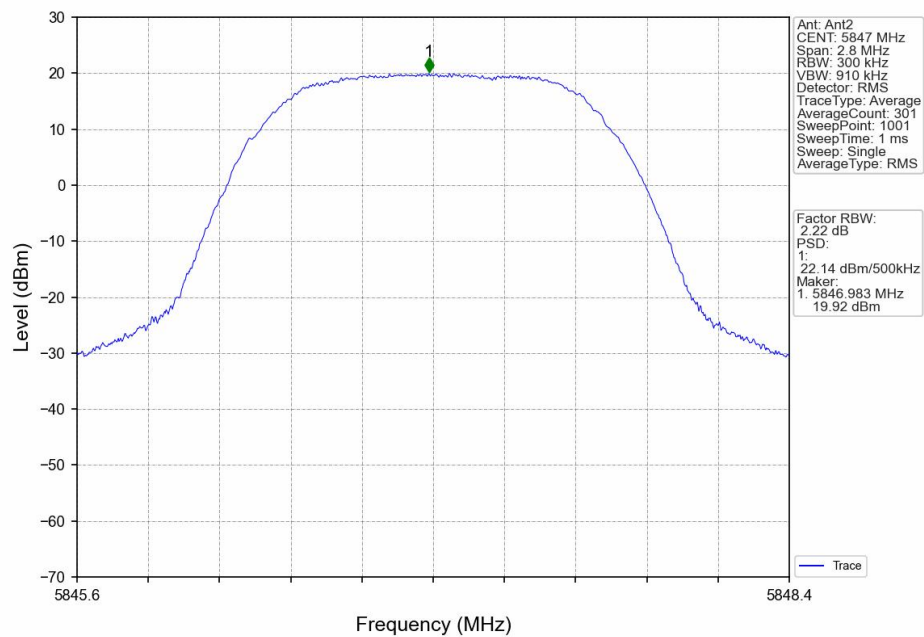




QPSK_HCH_5847MHz_Ant1_NTNV

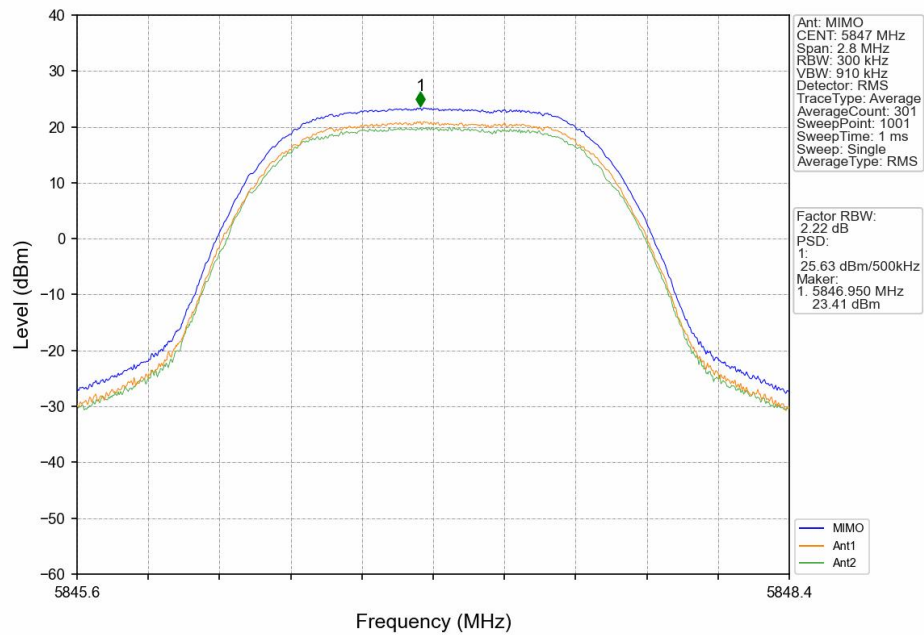


QPSK_HCH_5847MHz_Ant2_NTNV

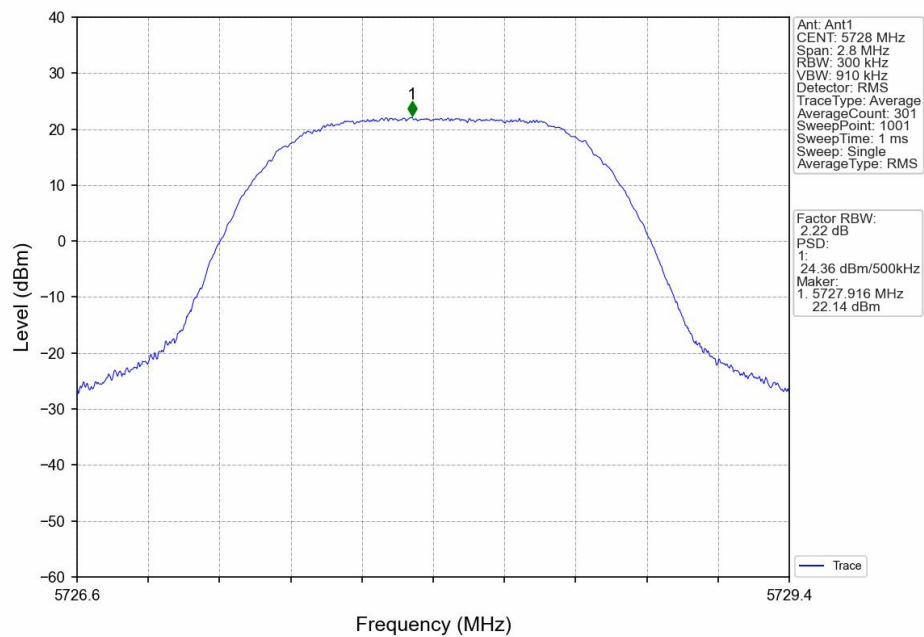




QPSK_HCH_5847MHz_MIMO_NTNV

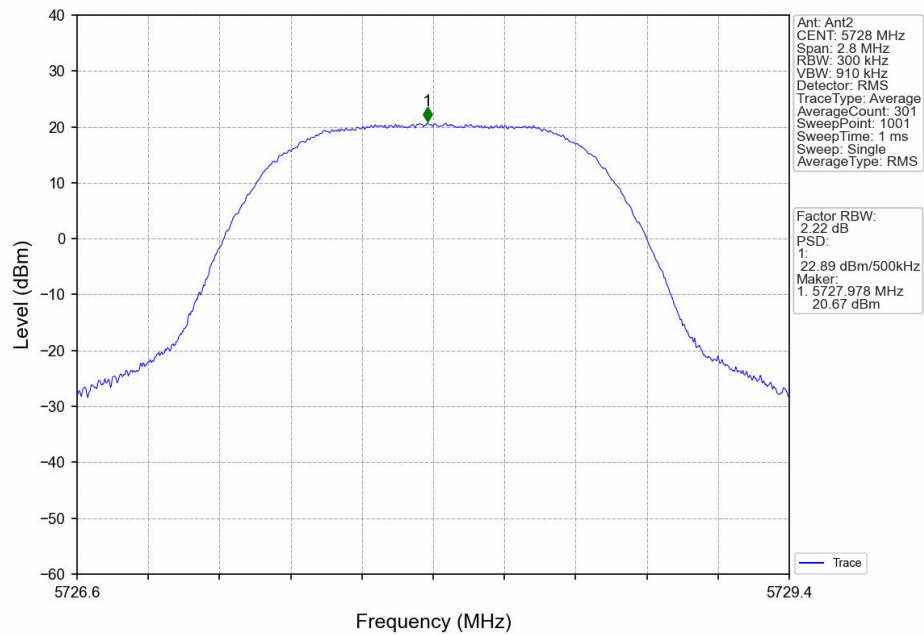


16QAM_LCH_5728MHz_Ant1_NTNV

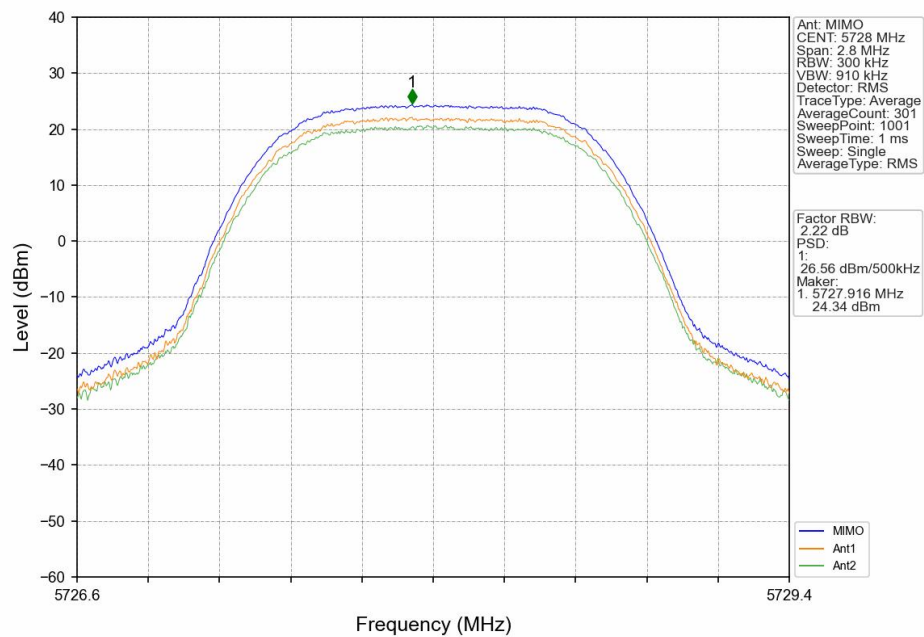




16QAM_LCH_5728MHz_Ant2_NTNV

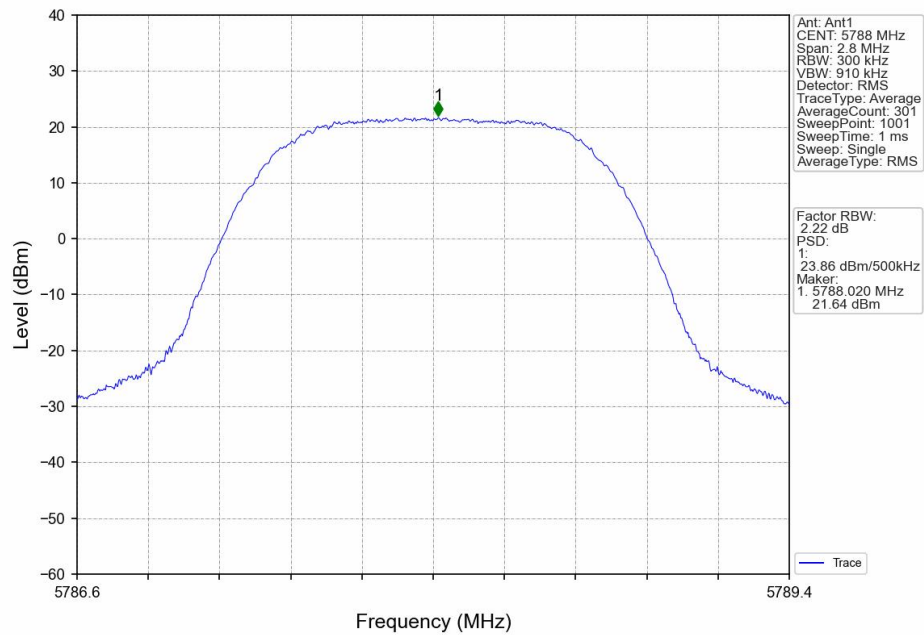


16QAM_LCH_5728MHz_MIMO_NTNV

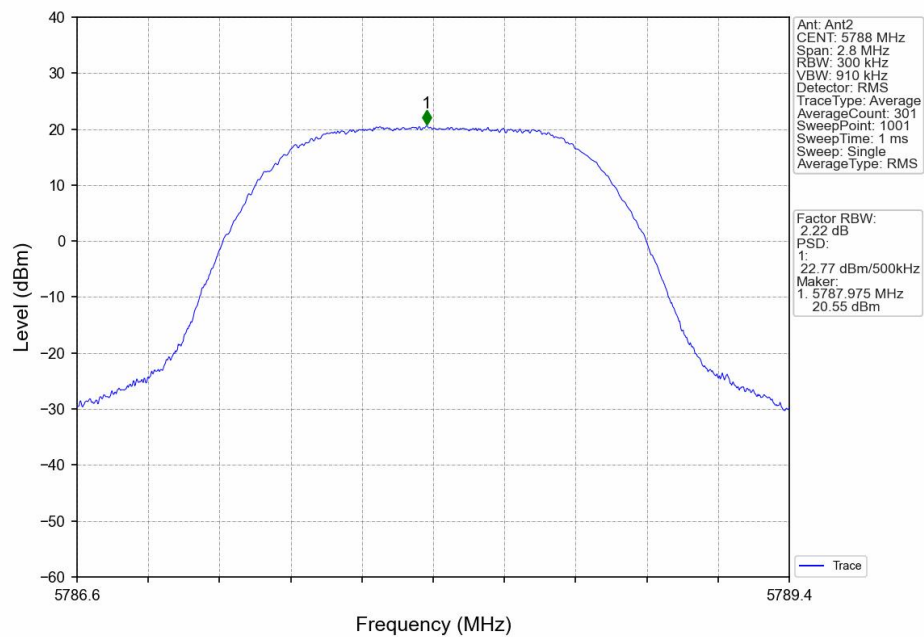




16QAM_MCH_5788MHz_Ant1_NTNV

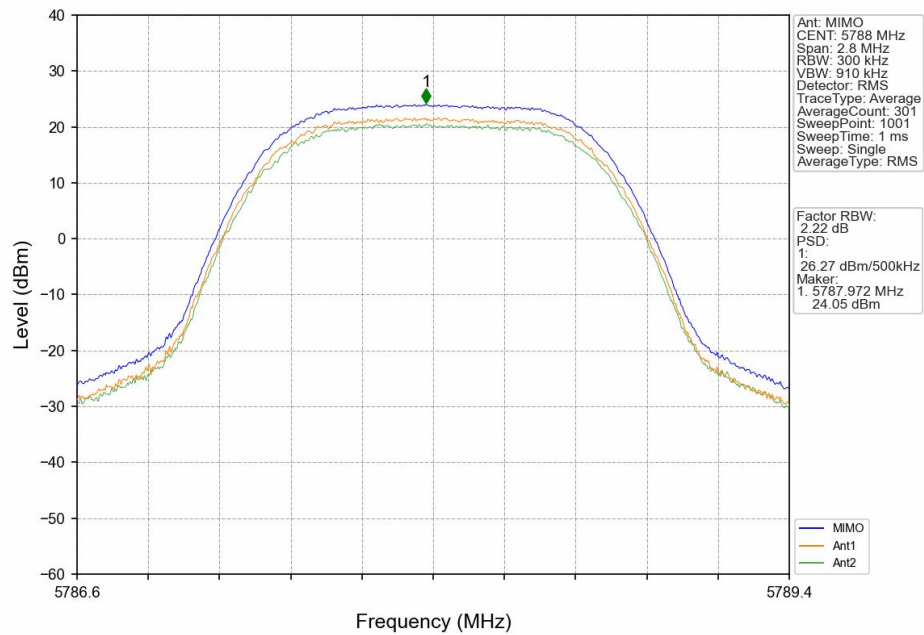


16QAM_MCH_5788MHz_Ant2_NTNV

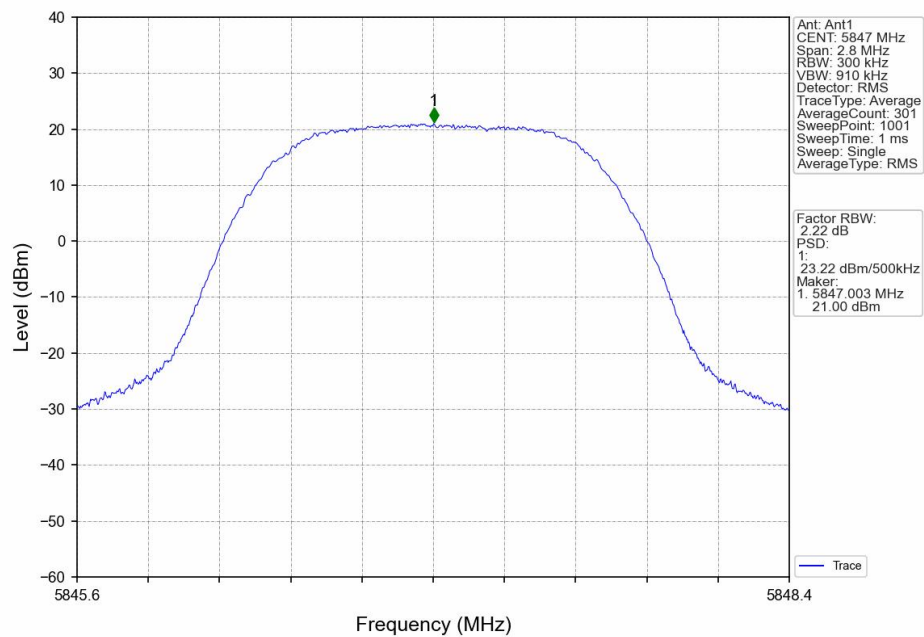




16QAM_MCH_5788MHz_MIMO_NTNV

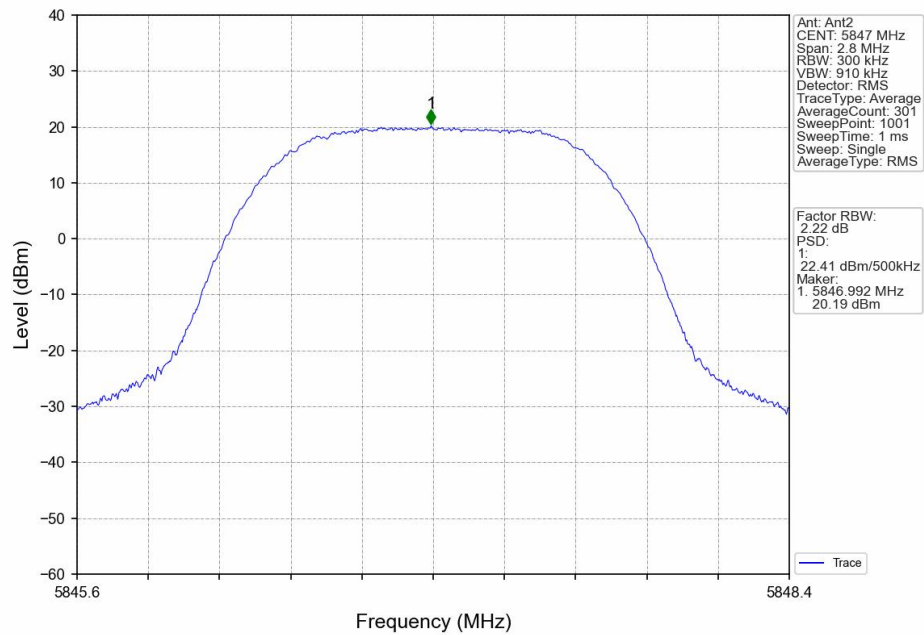


16QAM_HCH_5847MHz_Ant1_NTNV

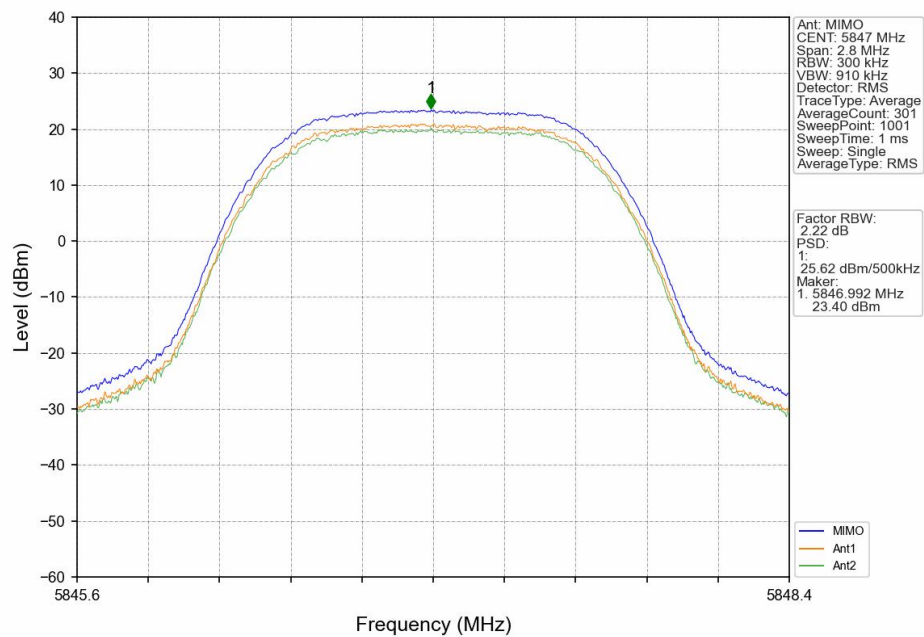




16QAM_HCH_5847MHz_Ant2_NTNV



16QAM_HCH_5847MHz_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	5728	20	102	5727.992	5725 to 5850	Pass
				120	5727.993	5725 to 5850	Pass
				138	5727.986	5725 to 5850	Pass
			-30	120	5727.993	5725 to 5850	Pass
			-20	120	5727.987	5725 to 5850	Pass
			-10	120	5727.986	5725 to 5850	Pass
			0	120	5727.989	5725 to 5850	Pass
			10	120	5727.990	5725 to 5850	Pass
			30	120	5727.990	5725 to 5850	Pass
			40	120	5727.982	5725 to 5850	Pass
			50	120	5727.990	5725 to 5850	Pass
		5788	20	102	5787.990	5725 to 5850	Pass
				120	5787.987	5725 to 5850	Pass
				138	5787.987	5725 to 5850	Pass
			-30	120	5787.989	5725 to 5850	Pass
			-20	120	5787.986	5725 to 5850	Pass
			-10	120	5787.987	5725 to 5850	Pass
			0	120	5787.986	5725 to 5850	Pass
			10	120	5787.992	5725 to 5850	Pass
			30	120	5787.993	5725 to 5850	Pass
			40	120	5787.987	5725 to 5850	Pass
			50	120	5787.987	5725 to 5850	Pass
		5847	20	102	5846.996	5725 to 5850	Pass
				120	5846.989	5725 to 5850	Pass
				138	5846.992	5725 to 5850	Pass
			-30	120	5846.997	5725 to 5850	Pass
			-20	120	5846.993	5725 to 5850	Pass
			-10	120	5847.000	5725 to 5850	Pass
			0	120	5846.996	5725 to 5850	Pass
			10	120	5846.993	5725 to 5850	Pass
			30	120	5846.994	5725 to 5850	Pass
			40	120	5846.990	5725 to 5850	Pass
			50	120	5846.993	5725 to 5850	Pass
16QAM	MIMO	5728	20	102	5727.992	5725 to 5850	Pass
				120	5727.990	5725 to 5850	Pass
				138	5727.992	5725 to 5850	Pass
			-30	120	5727.990	5725 to 5850	Pass
			-20	120	5727.992	5725 to 5850	Pass
			-10	120	5727.994	5725 to 5850	Pass
			0	120	5727.993	5725 to 5850	Pass
			10	120	5727.987	5725 to 5850	Pass
			30	120	5727.987	5725 to 5850	Pass
			40	120	5727.987	5725 to 5850	Pass
			50	120	5727.990	5725 to 5850	Pass
		5788	20	102	5787.994	5725 to 5850	Pass
				120	5787.992	5725 to 5850	Pass



				138	5787.993	5725 to 5850	Pass
			-30	120	5787.992	5725 to 5850	Pass
			-20	120	5787.990	5725 to 5850	Pass
			-10	120	5787.989	5725 to 5850	Pass
			0	120	5787.989	5725 to 5850	Pass
			10	120	5787.987	5725 to 5850	Pass
			30	120	5787.989	5725 to 5850	Pass
			40	120	5787.989	5725 to 5850	Pass
			50	120	5787.993	5725 to 5850	Pass
		5847	20	102	5846.992	5725 to 5850	Pass
				120	5846.994	5725 to 5850	Pass
				138	5846.992	5725 to 5850	Pass
			-30	120	5846.990	5725 to 5850	Pass
			-20	120	5846.994	5725 to 5850	Pass
			-10	120	5846.993	5725 to 5850	Pass
			0	120	5846.990	5725 to 5850	Pass
			10	120	5846.992	5725 to 5850	Pass
			30	120	5846.987	5725 to 5850	Pass
			40	120	5846.994	5725 to 5850	Pass
			50	120	5846.996	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)
5728	5847	0.6808	28.33