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Annex for LoRa

Test Report No.: CTL2408075021-WF

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1. Bandwidth

1.1 Test Result

1.1.1 OBW

Mode	TX Type	Frequency (MHz)	ANT	99% Occupied Bandwidth (MHz)		Verdict
				Result	Limit	
LoRa	SISO	902.9	1	0.093	/	Pass
		914.1	1	0.093	/	Pass
		924.9	1	0.093	/	Pass

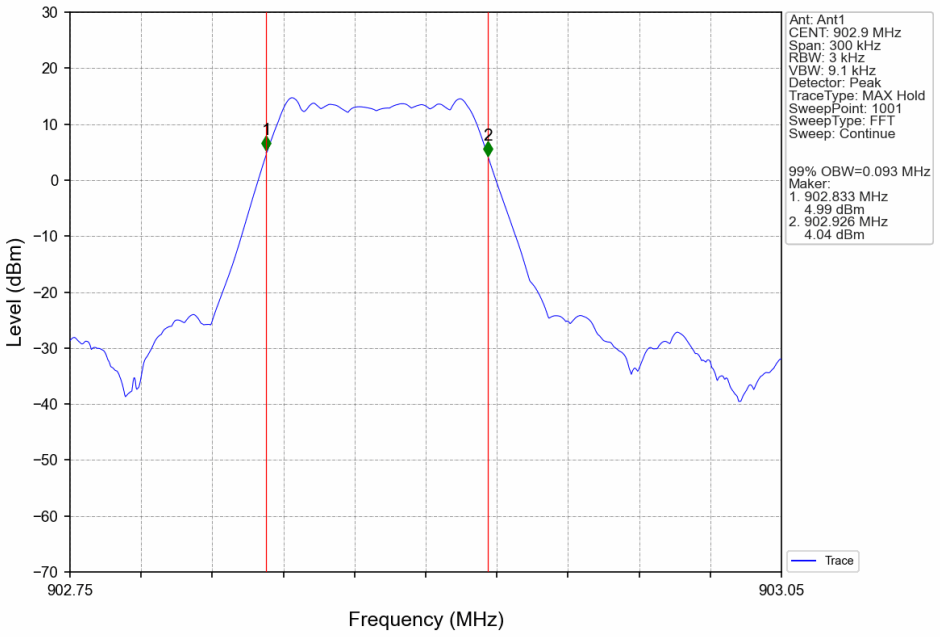
1.1.2 20dB BW

Mode	TX Type	Frequency (MHz)	ANT	20dB Bandwidth (MHz)		Verdict
				Result	Limit	
LoRa	SISO	902.9	1	0.108	/	Pass
		914.1	1	0.108	/	Pass
		924.9	1	0.107	/	Pass

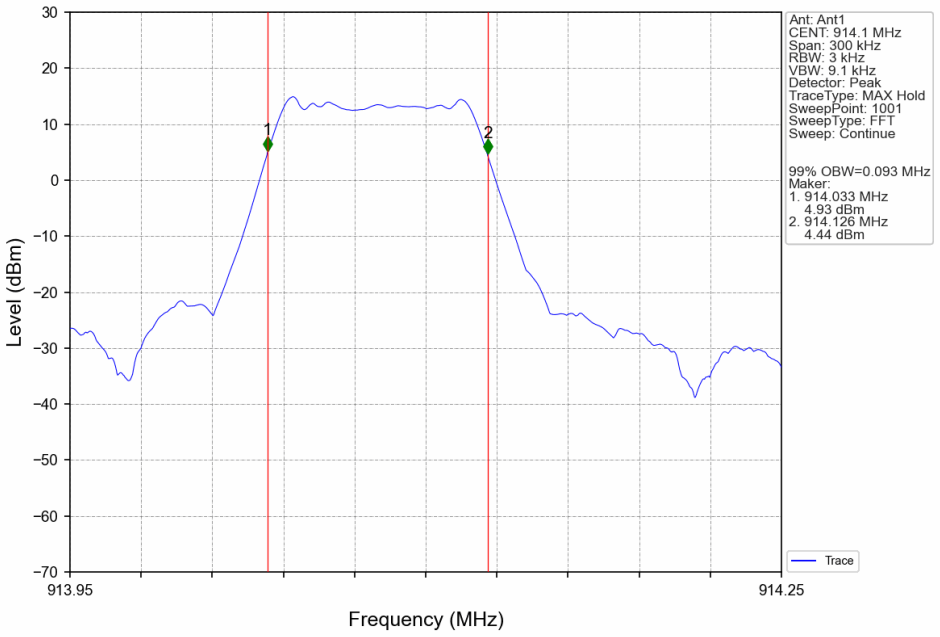
1.2 Test Graph

1.2.1 OBW

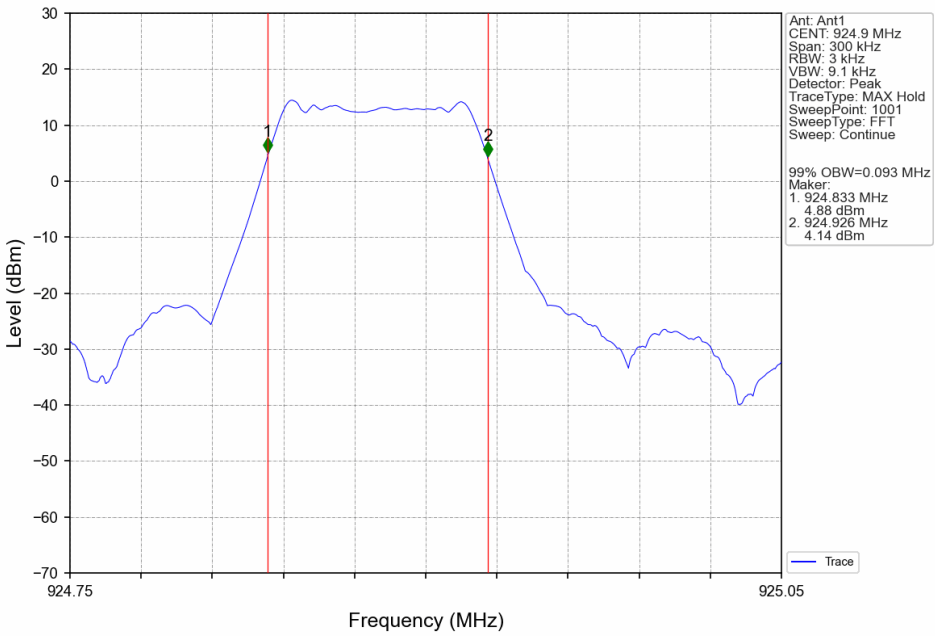
LoRa_LCH_902.9MHz_Ant1_NTNV



LoRa_MCH_914.1MHz_Ant1_NTNV

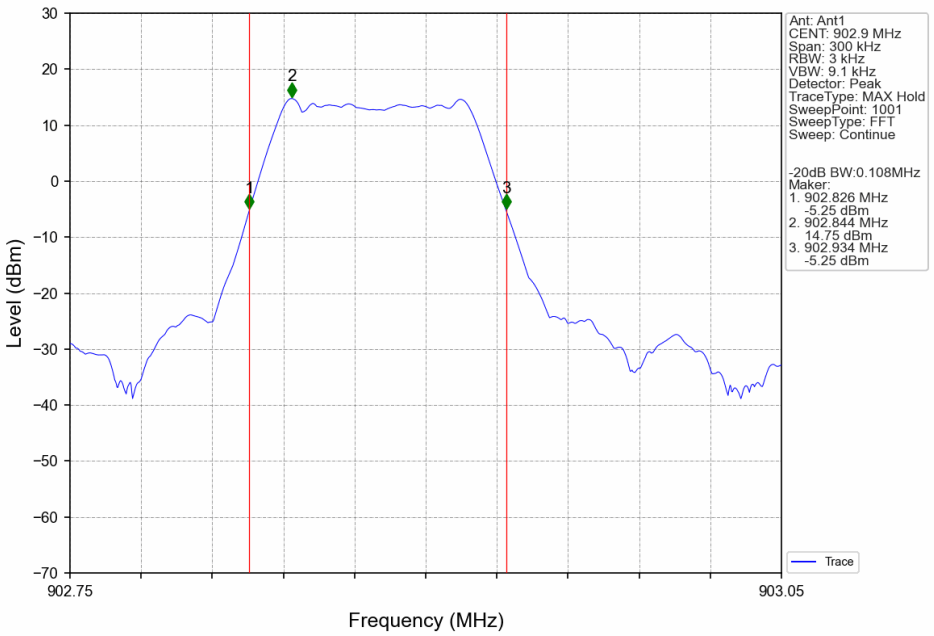


LoRa_HCH_924.9MHz_Ant1_NTNV

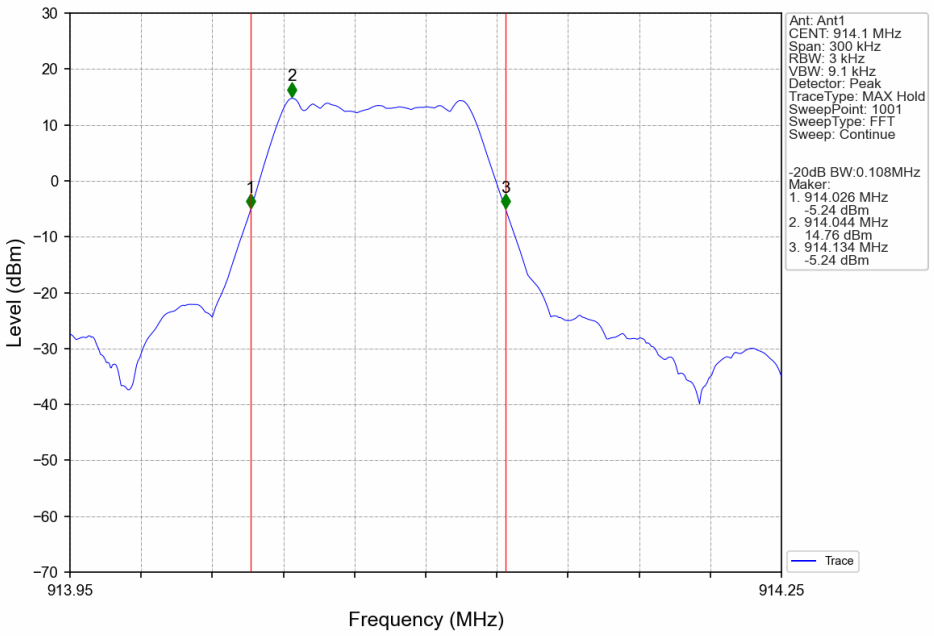


1.2.2 20dB BW

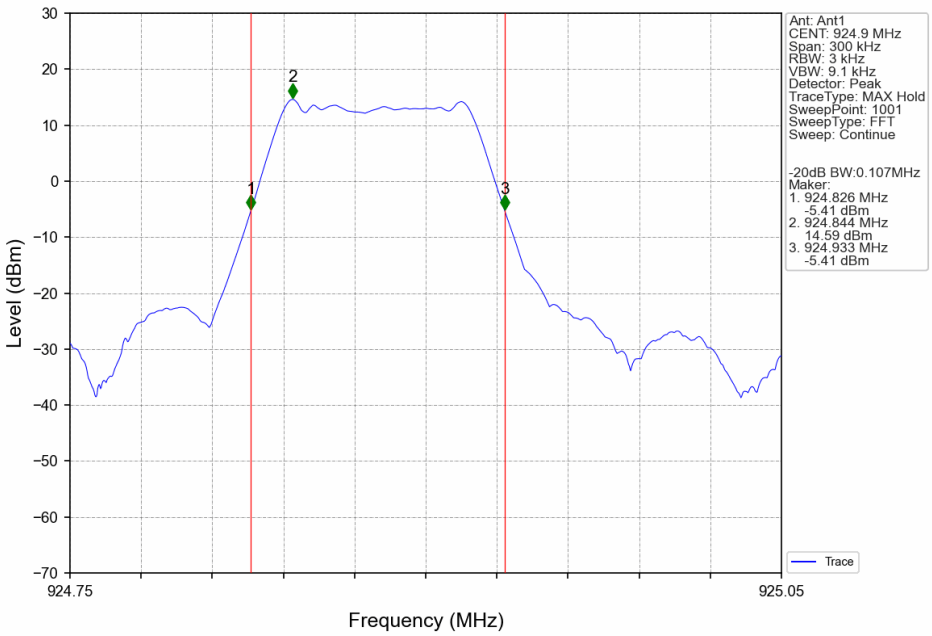
LoRa_LCH_902.9MHz_Ant1_NTNV



LoRa_MCH_914.1MHz_Ant1_NTNV



LoRa_HCH_924.9MHz_Ant1_NTNV



2. Maximum Conducted Output Power

2.1 Test Result

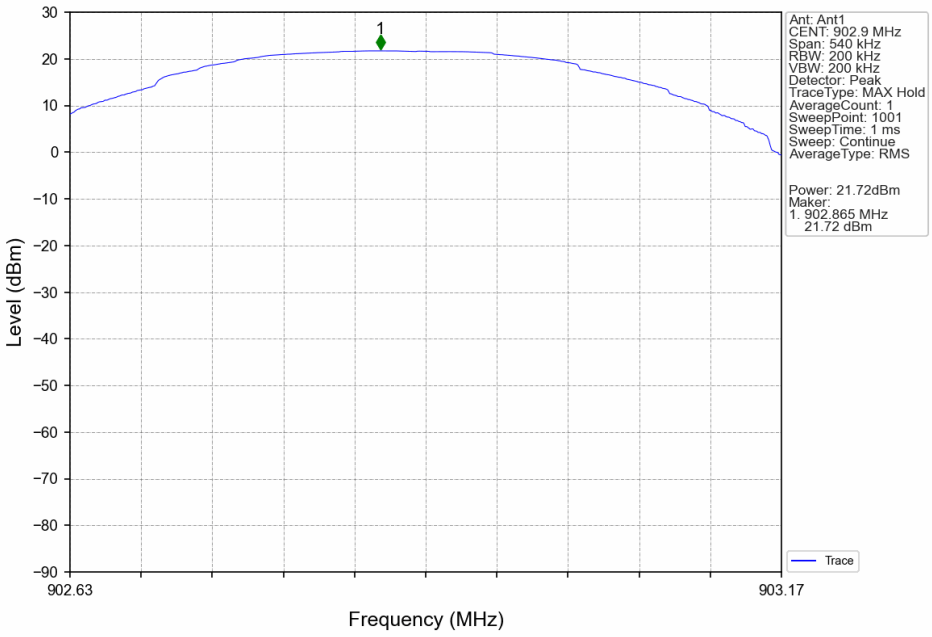
2.1.1 Power

Mode	TX Type	Frequency (MHz)	Maximum Peak Conducted Output Power (dBm)		Verdict
			ANT1	Limit	
LoRa	SISO	902.9	21.72	<=30	Pass
		914.1	21.36	<=30	Pass
		924.9	21.17	<=30	Pass
Note1: Antenna Gain: Ant1: 1.89dBi;					

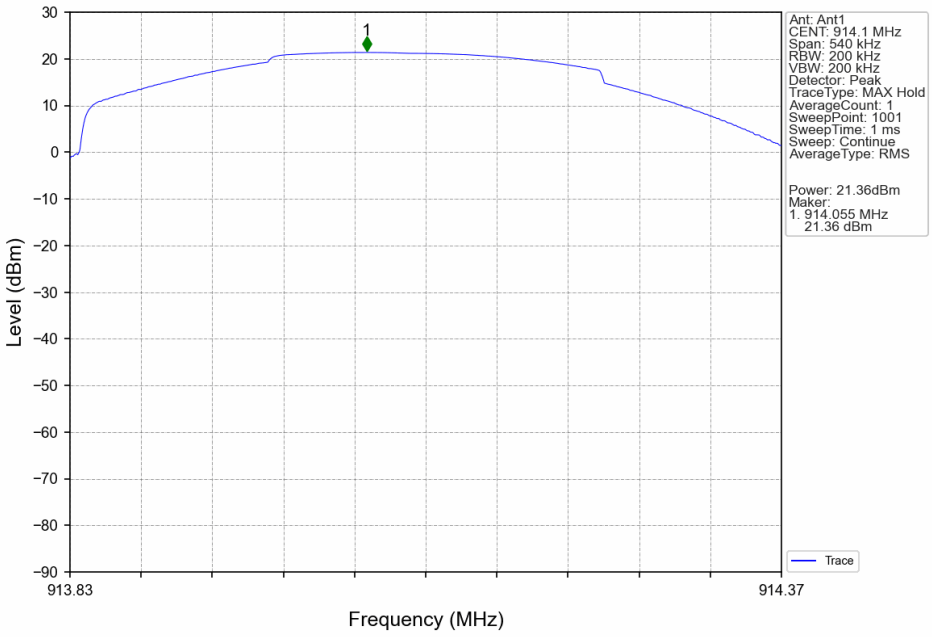
2.2 Test Graph

2.2.1 Power

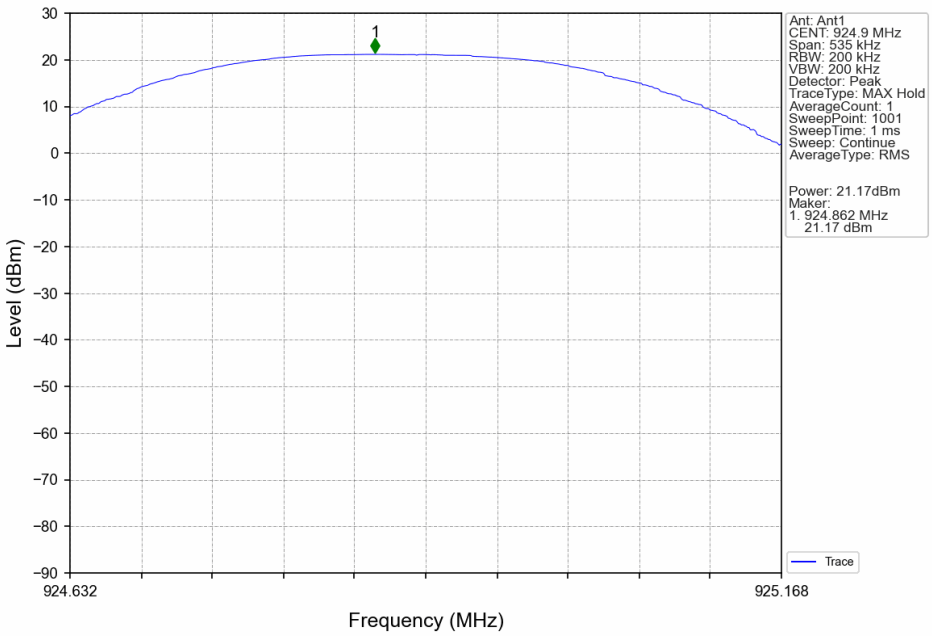
LoRa_LCH_902.9MHz_Ant1_NTNV



LoRa_MCH_914.1MHz_Ant1_NTNV



LoRa_HCH_924.9MHz_Ant1_NTNV



3. Carrier Frequency Separation

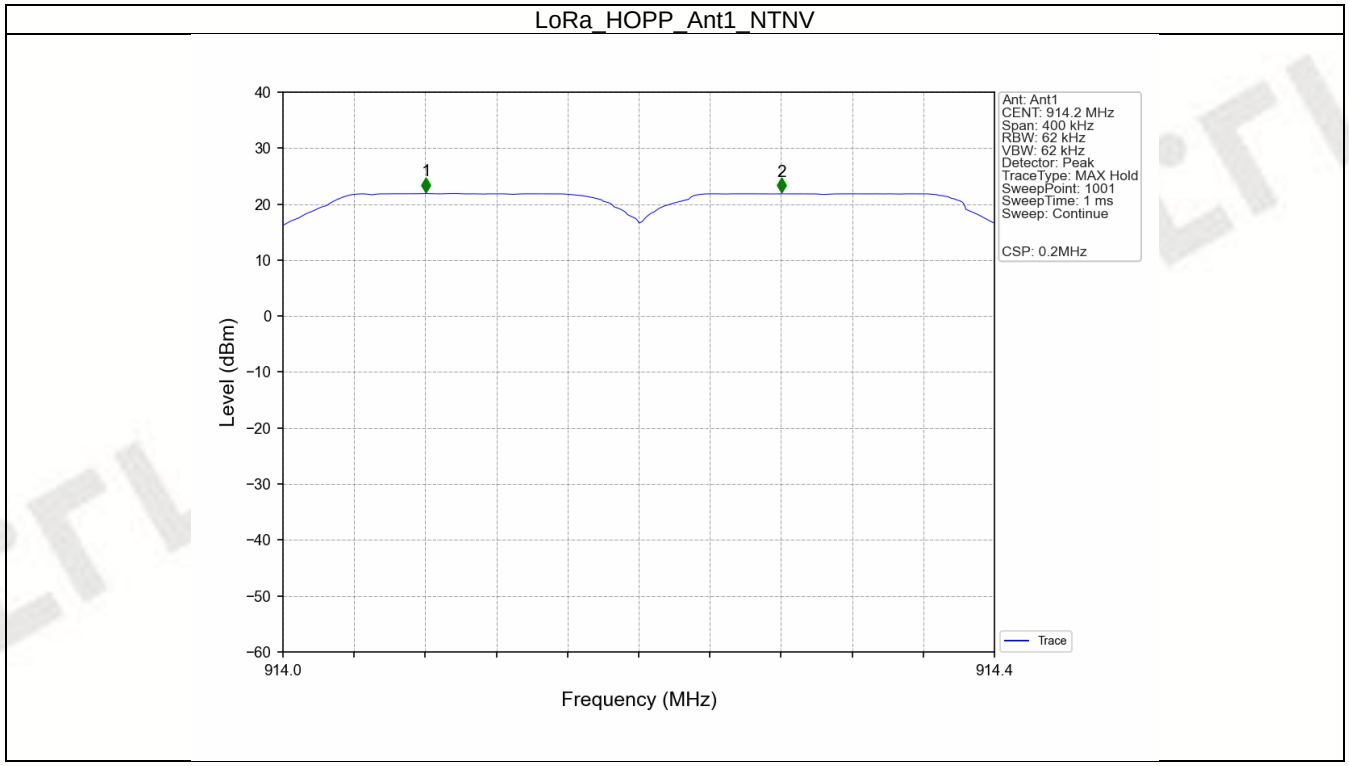
3.1 Test Result

3.1.1 Ant1

Ant1						
Mode	TX Type	Frequency (MHz)	Channel Separation (MHz)	20dB Bandwidth (MHz)	Limit (MHz)	Verdict
LoRa	SISO	HOPP	0.200	0.108	>=0.108	Pass

3.2 Test Graph

3.2.1 Ant1



4. Number of Hopping Frequencies

4.1 Test Result

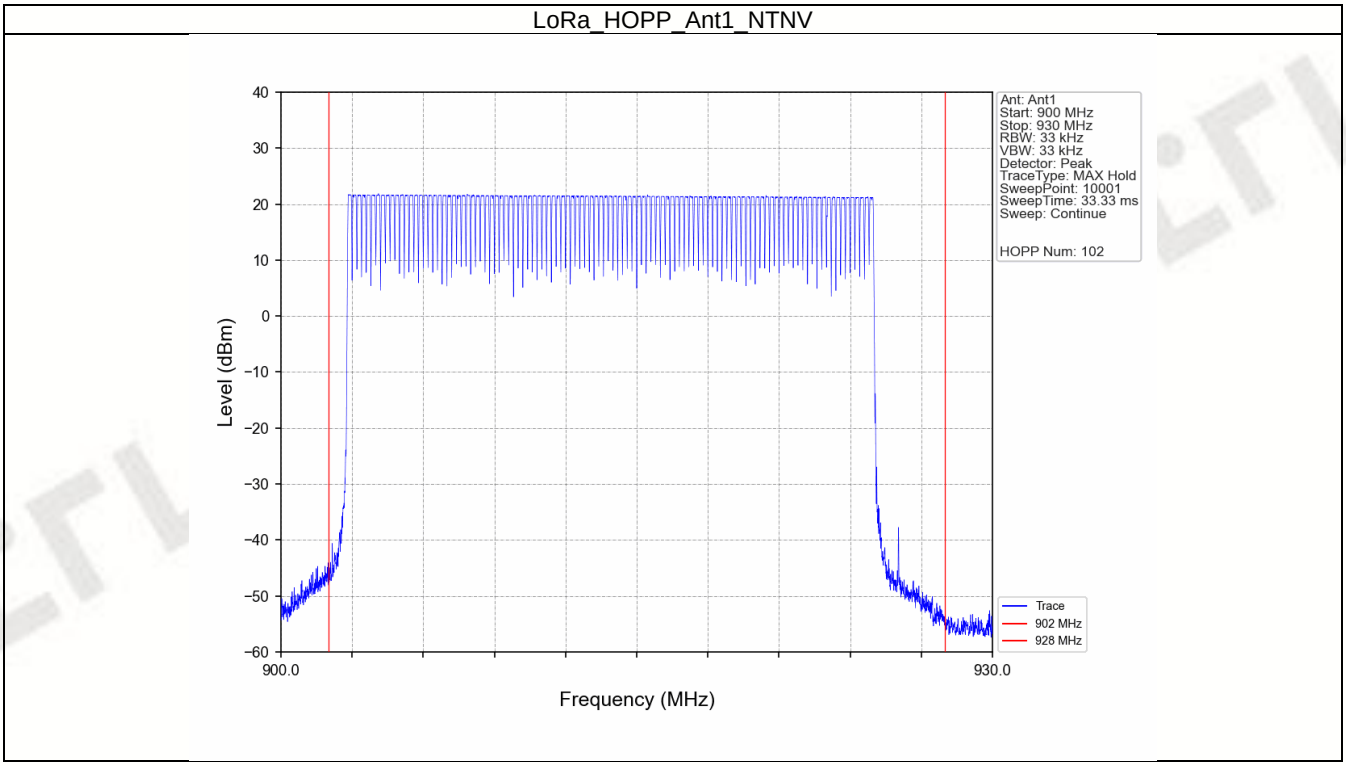
4.1.1 HoppNum

Mode	TX Type	Frequency (MHz)	Num of Hopping Frequencies		Verdict
			ANT1	Limit	
LoRa	SISO	HOPP	102	>=50	Pass

4.2 Test Graph

4.2.1 HoppNum

LoRa_HOPP_Ant1_NTNV



5. Time of Occupancy (Dwell Time)

5.1 Test Result

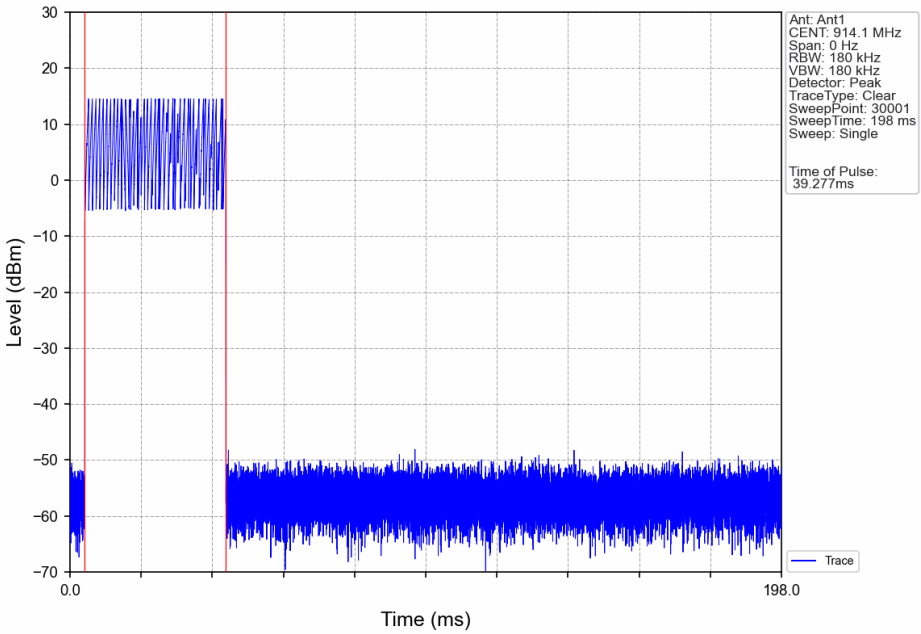
5.1.1 Ant1

Ant1								
Mode	TX Type	Frequency (MHz)	Duration of Single Pulse (ms)	Observation Period (s)	Num of Pulse in Observation Period	Dwell Time (ms)	Limit (ms)	Verdict
LoRa	SISO	HOPP	39.277	20.000	1	39.277	<=400	Pass

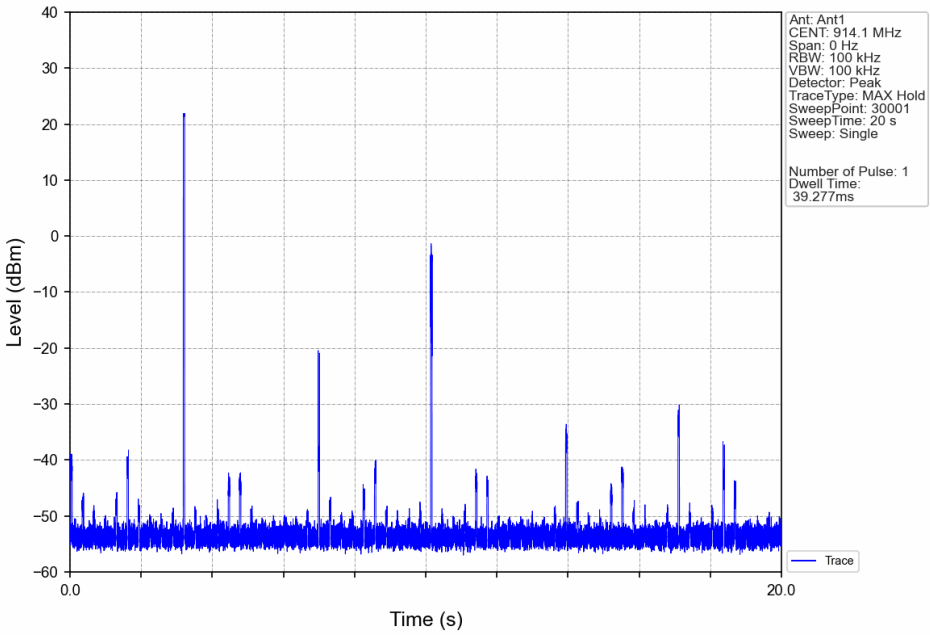
5.2 Test Graph

5.2.1 Ant1

LoRa_HOPP_Ant1_NTNV



LoRa_HOPP_Ant1_NTNV



6. Unwanted Emissions In Non-restricted Frequency Bands

6.1 Test Result

6.1.1 Ref

Mode	TX Type	Frequency (MHz)	ANT	Level of Reference (dBm)
LoRa	SISO	902.9	1	21.49
		914.1	1	21.44
		924.9	1	21.17
Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2013, the channel contains the maximum PSD level was used to establish the reference level.				

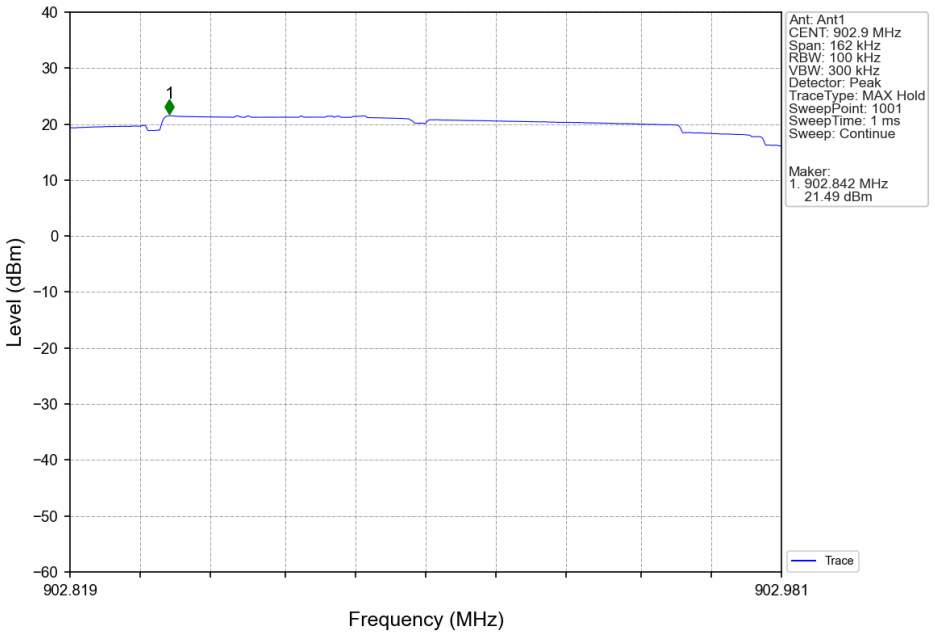
6.1.2 CSE

Mode	TX Type	Frequency (MHz)	ANT	Level of Reference (dBm)	Limit (dBm)	Verdict
LoRa	SISO	902.9	1	21.49	1.49	Pass
		914.1	1	21.49	1.49	Pass
		924.9	1	21.49	1.49	Pass
		HOPP	1	21.49	1.49	Pass
				21.49	1.49	Pass
Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2013, the channel contains the maximum PSD level was used to establish the reference level.						

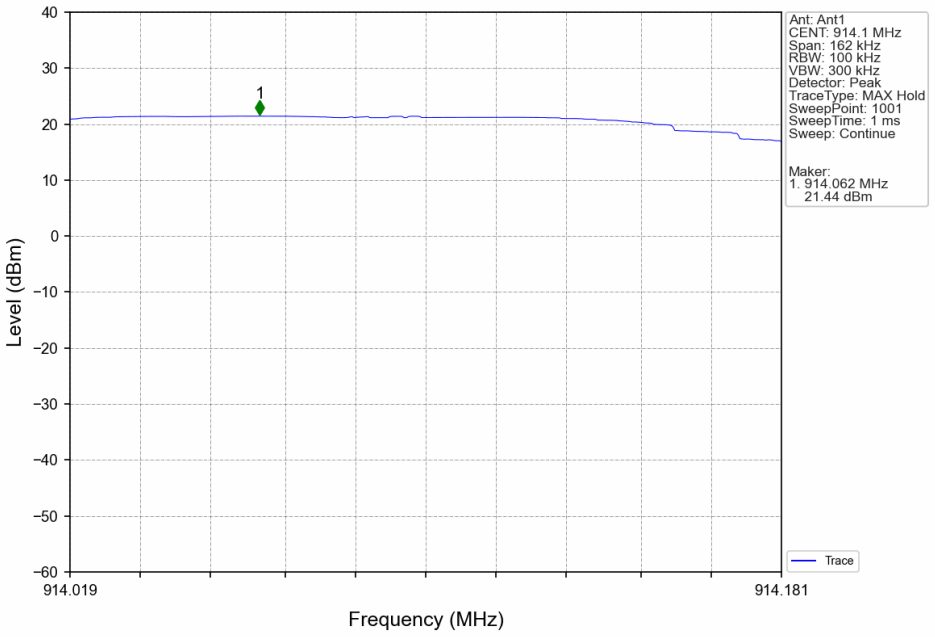
6.2 Test Graph

6.2.1 Ref

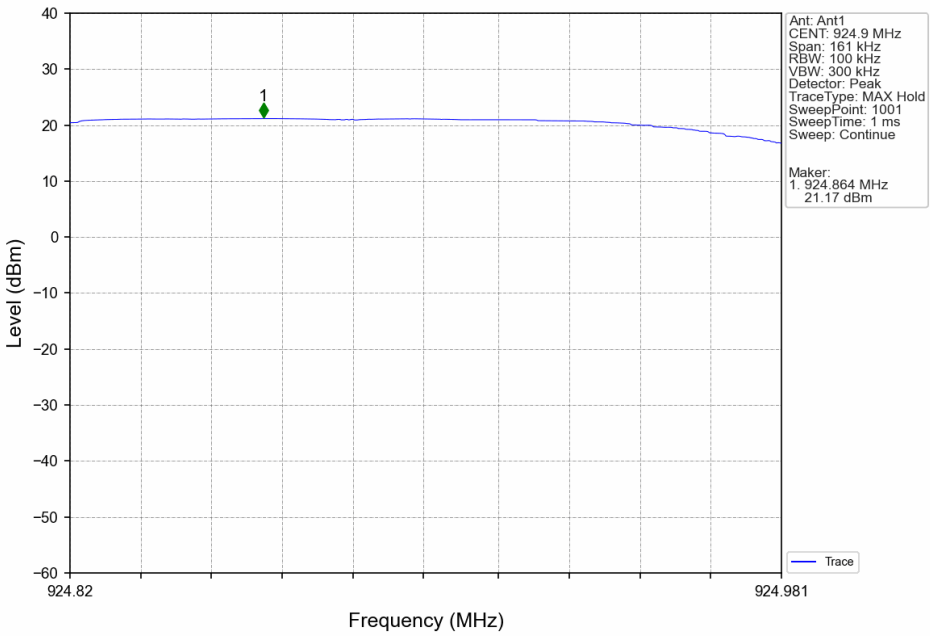
LoRa_LCH_902.9MHz_Ant1_NTNV



LoRa_MCH_914.1MHz_Ant1_NTNV

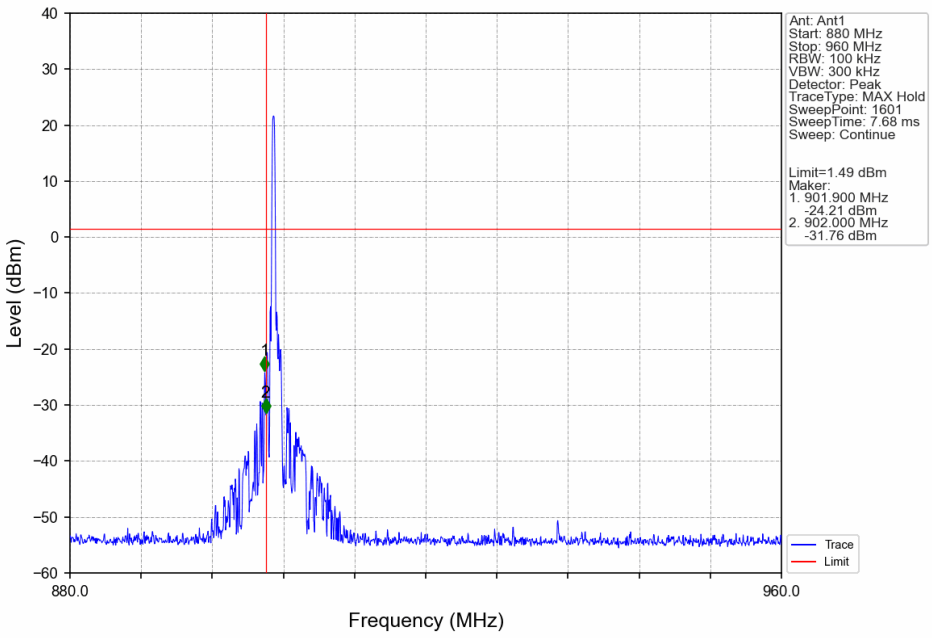


LoRa_HCH_924.9MHz_Ant1_NTNV

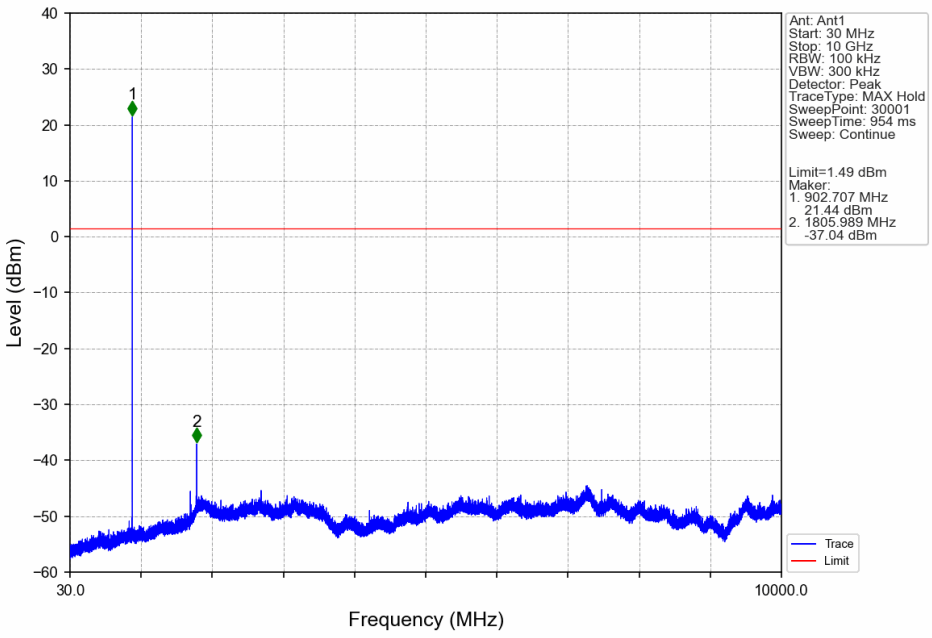


6.2.2 CSE

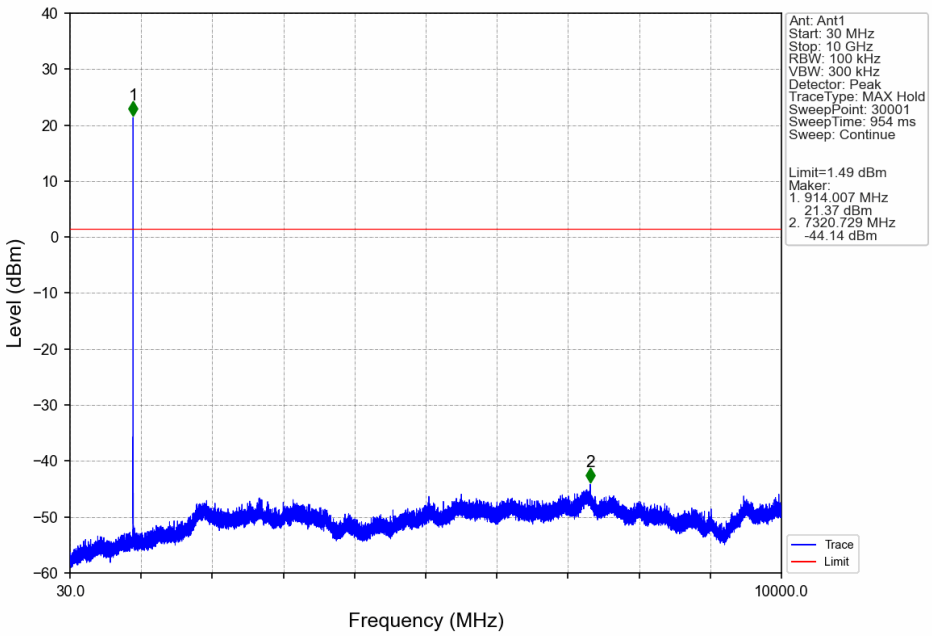
LoRa_LCH_902.9MHz_Ant1_NTNV



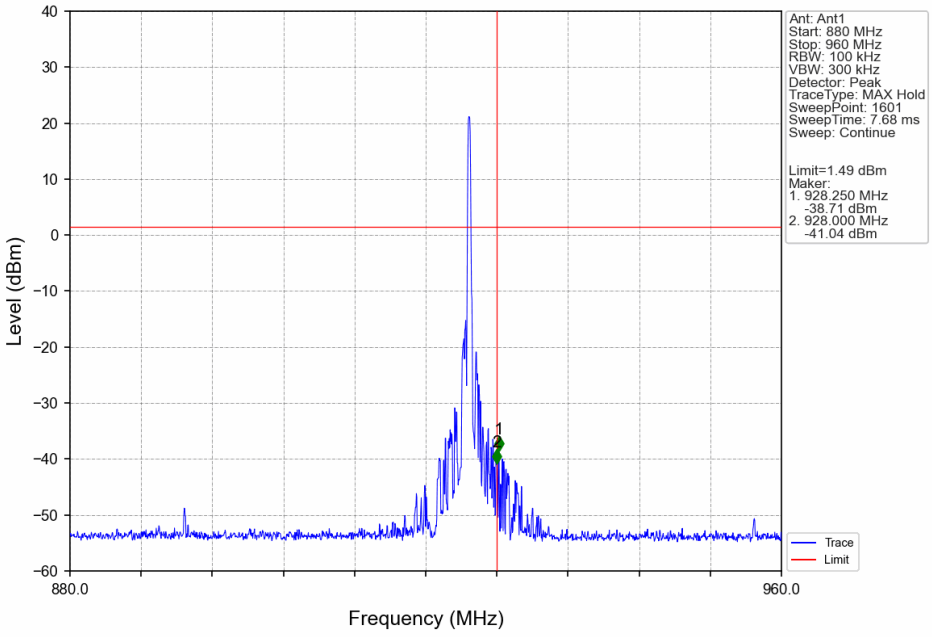
LoRa_LCH_902.9MHz_Ant1_NTNV



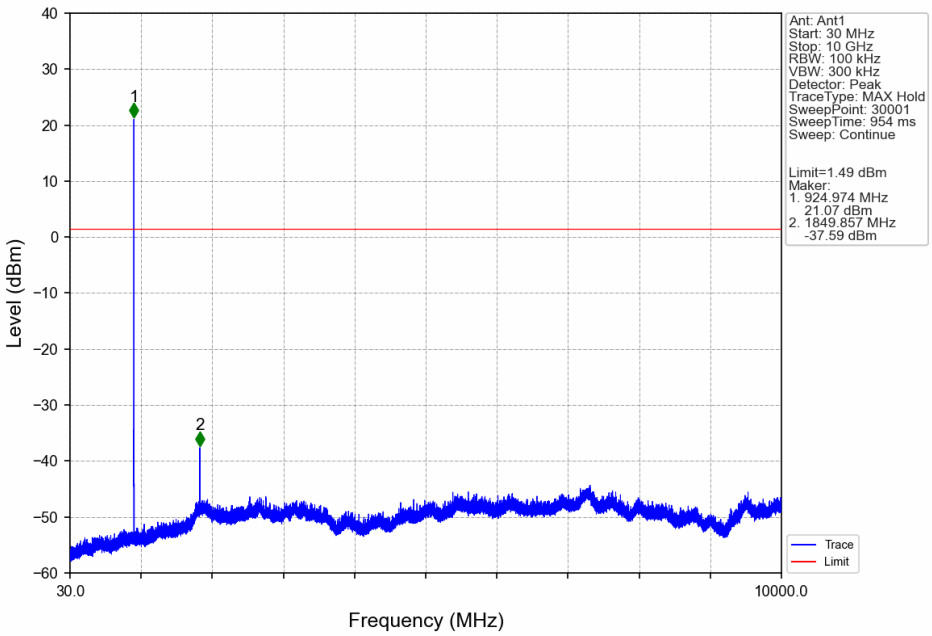
LoRa_MCH_914.1MHz_Ant1_NTNV



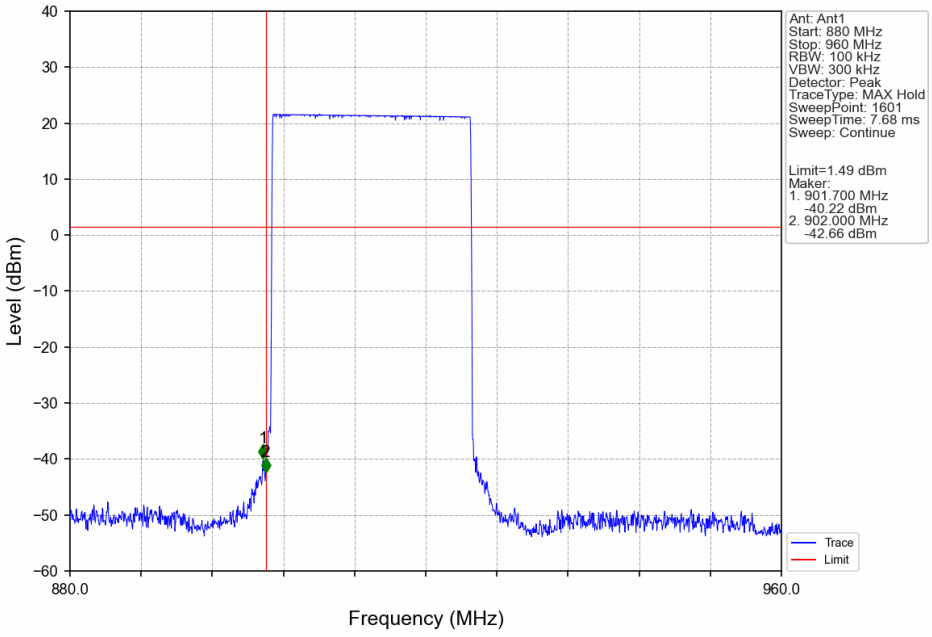
LoRa_HCH_924.9MHz_Ant1_NTNV



LoRa_HCH_924.9MHz_Ant1_NTNV



LoRa_HOPP_Ant1_NTNV



LoRa_HOPP_Ant1_NTNV