

## Appendix A

### RF Test Data for Lora-FHSS(902-928MHz Hopping Mode)

#### (Conducted Measurement)

Product Name: LoRa module

Trade Mark: RAK

Test Model: RAK4260(H)

FCC ID: 2AF6B-RAK4260H

#### Environmental Conditions

|                    |           |
|--------------------|-----------|
| Temperature:       | 22.3℃     |
| Relative Humidity: | 48%       |
| ATM Pressure:      | 100.0 kPa |
| Test Engineer:     | Gary Qian |
| Supervised by:     | Eden Hu   |

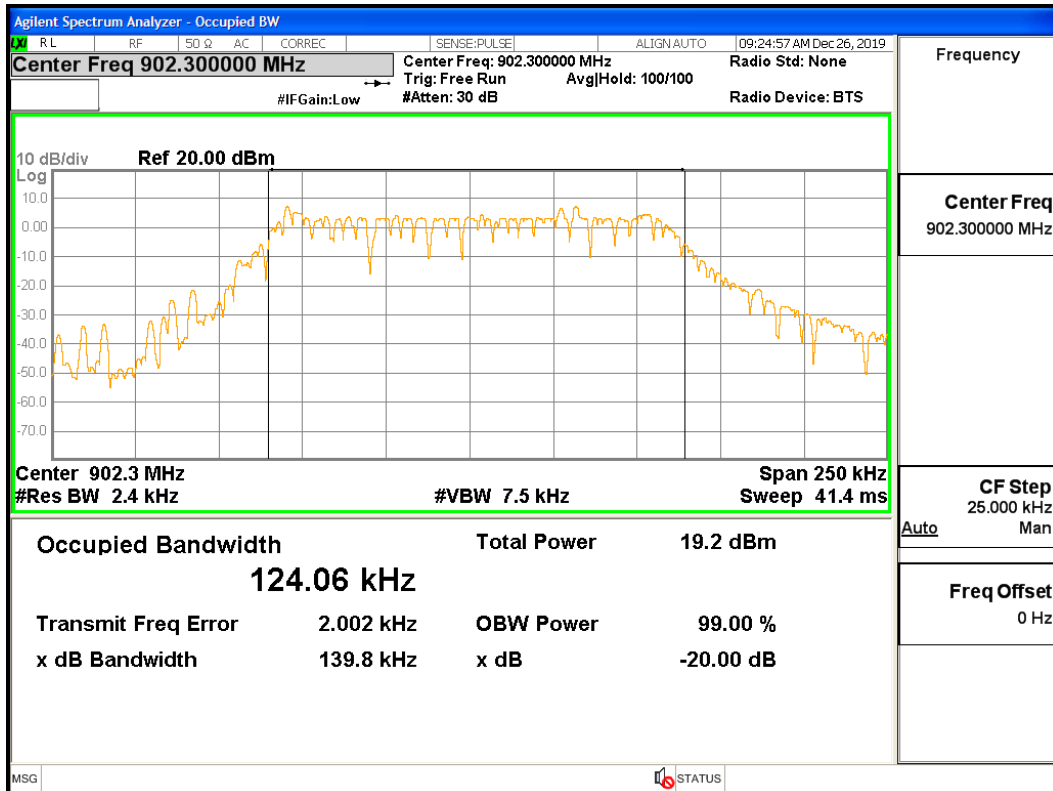
#### A.1 20 dB Bandwidth and 99% Occupied Bandwidth

| Mode      | Channel. | 20dB<br>Bandwidth<br>[MHz] | Limit(MHz)    | Verdict |
|-----------|----------|----------------------------|---------------|---------|
| LoRa-FHSS | LCH      | 0.140                      | Not Specified | PASS    |
| LoRa-FHSS | MCH      | 0.134                      | Not Specified | PASS    |
| LoRa-FHSS | HCH      | 0.141                      | Not Specified | PASS    |

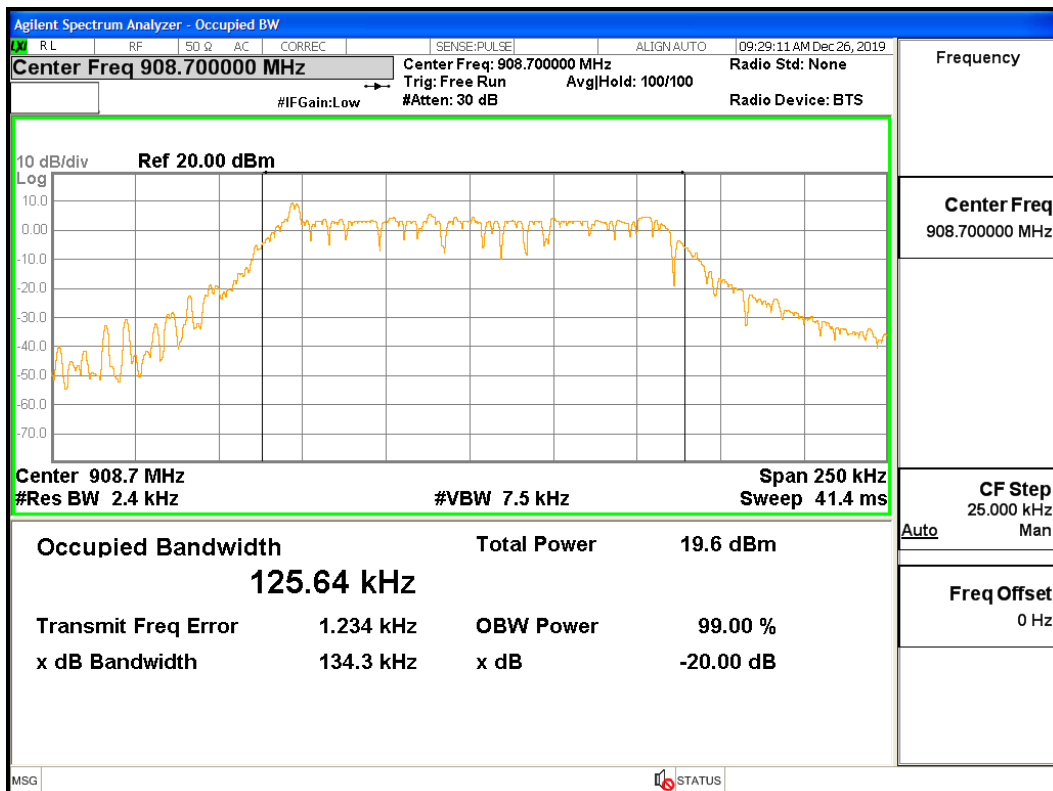
## Test Graph

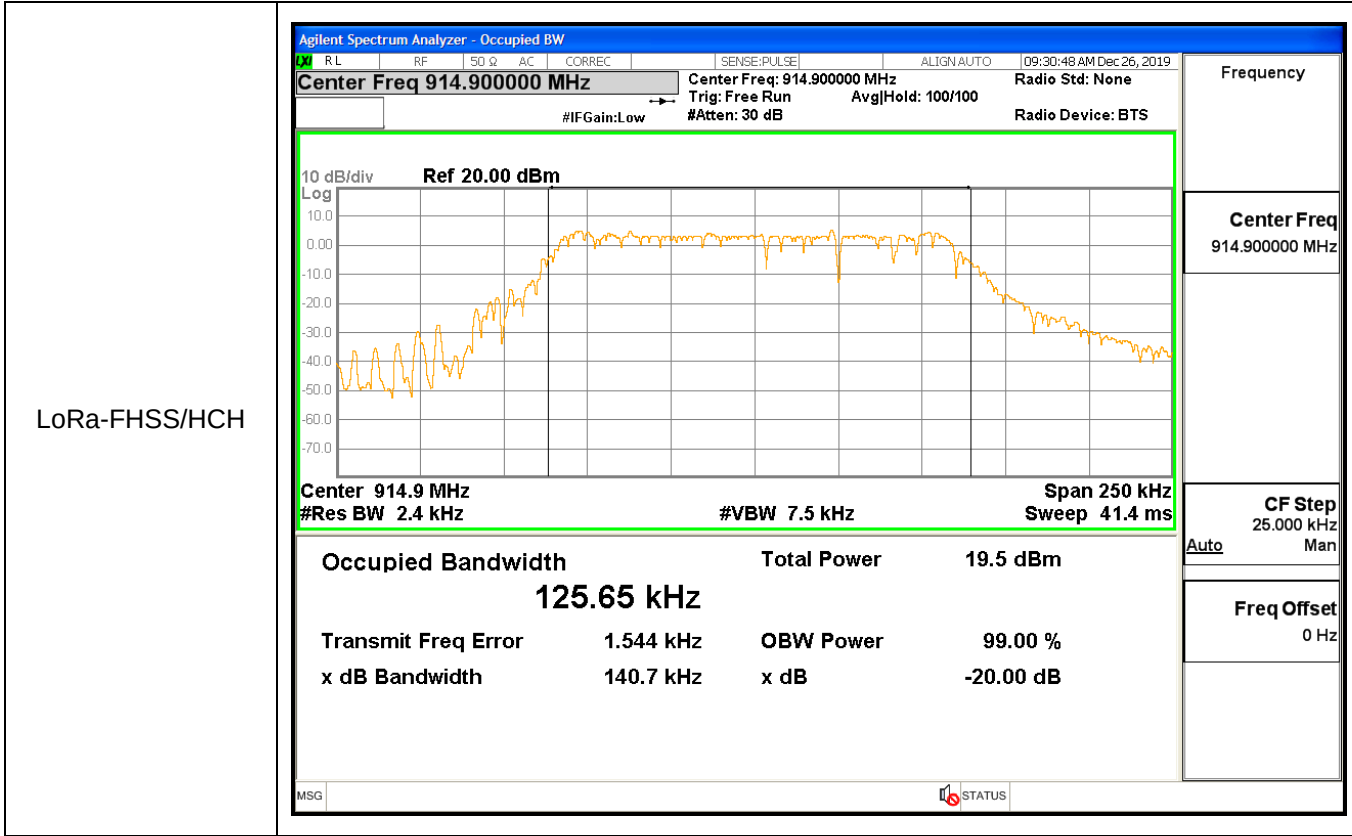
## Graphs

LoRa-FHSS/LCH



LoRa-FHSS/MCH

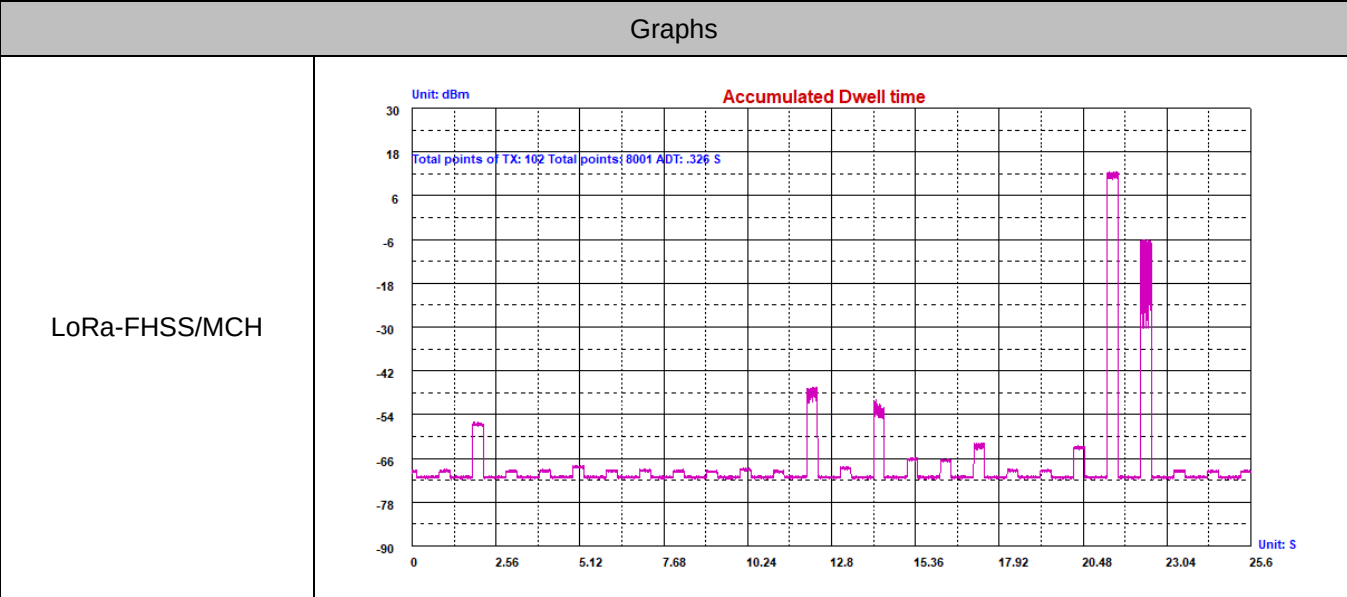




A.2 Dwell Time

| Mode      | Channel | TX <sub>on</sub> Points | Total Points | Dwell Time[s] | Limit [s] | Verdict |
|-----------|---------|-------------------------|--------------|---------------|-----------|---------|
| LoRa-FHSS | MCH     | 102                     | 8001         | 0.326         | 0.4       | PASS    |

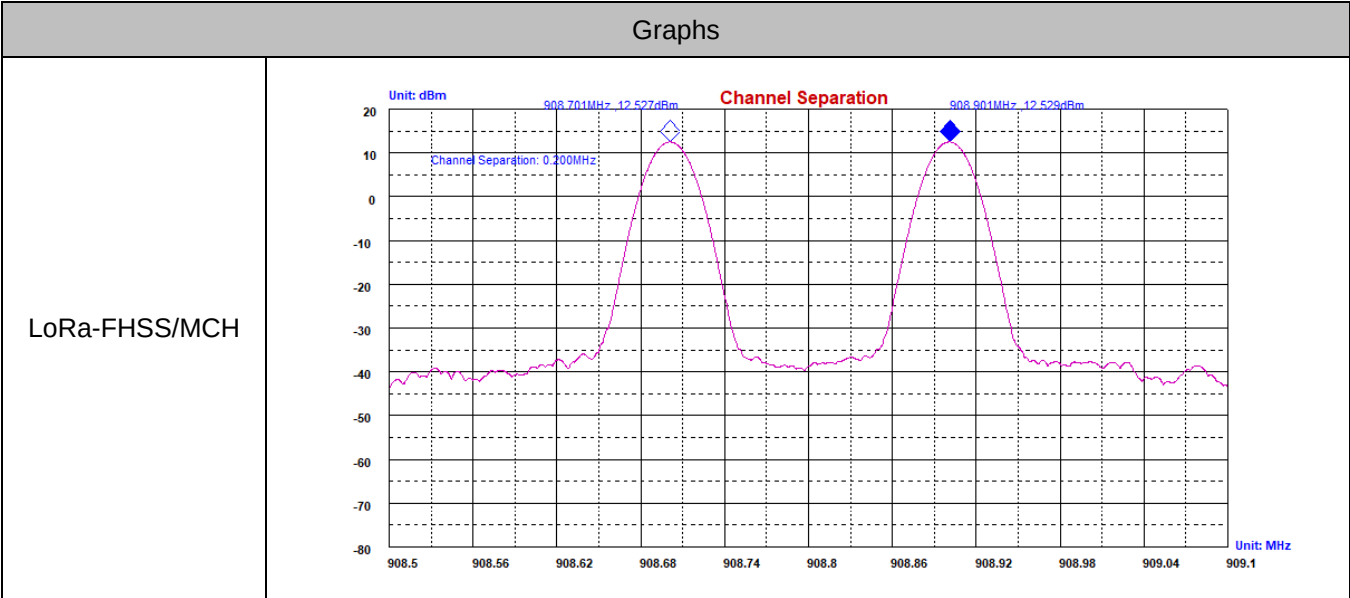
Test Graph



A.3 Carrier Frequency Separation

| Mode      | Channel. | Carrier Frequency Separation [KHz] | Limit [KHz] | Verdict |
|-----------|----------|------------------------------------|-------------|---------|
| LoRa-FHSS | MCH      | 497                                | 64.55       | PASS    |

Test Graph



Note: this test under absence of modulation condition.

A.4 Hopping Channel Number

| Mode | Channel. | Number of Hopping Channel[N] | Limit[N] | Verdict |
|------|----------|------------------------------|----------|---------|
| FHSS | Hop      | 64                           | >=15     | PASS    |

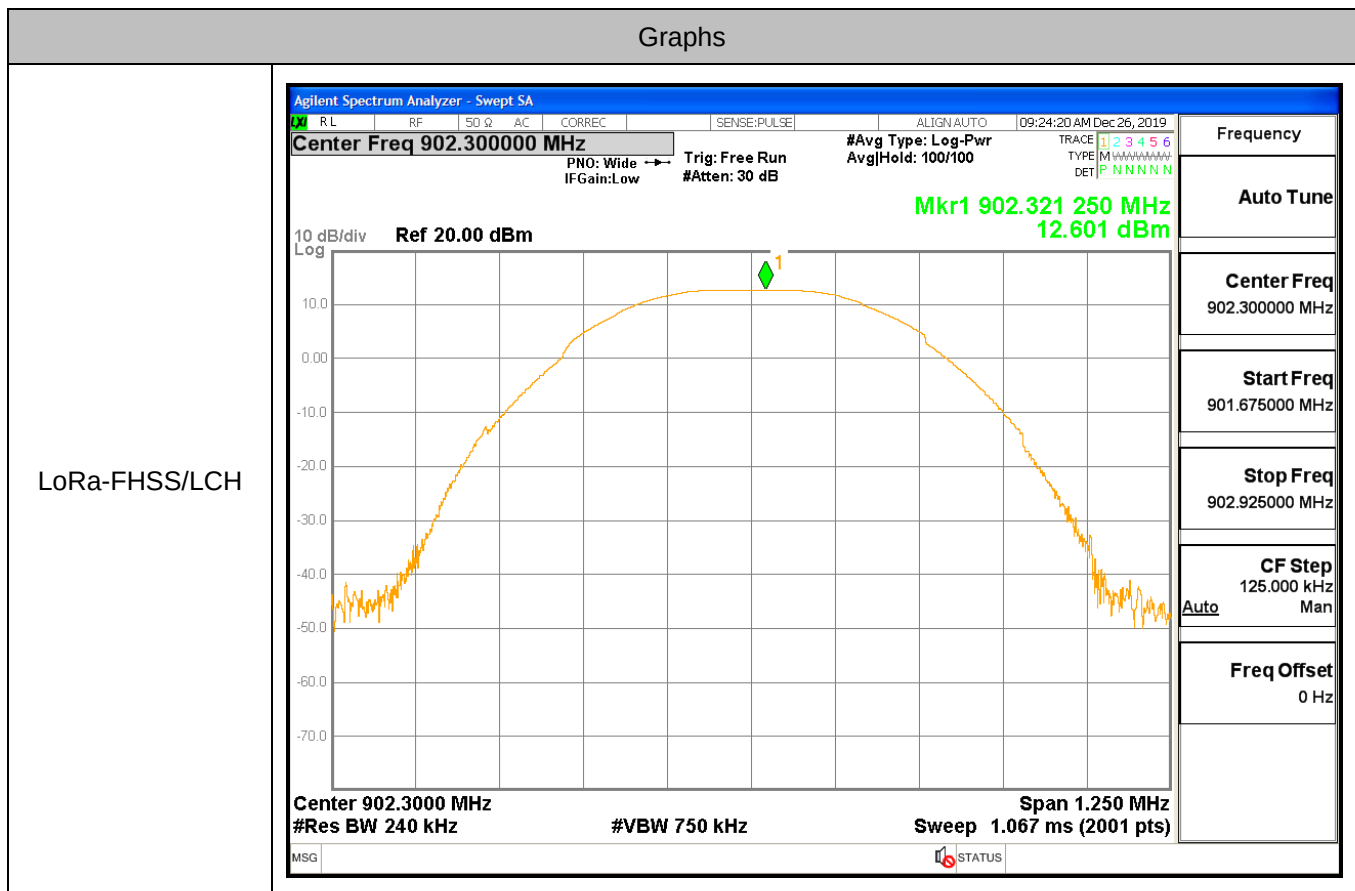
Test Graph



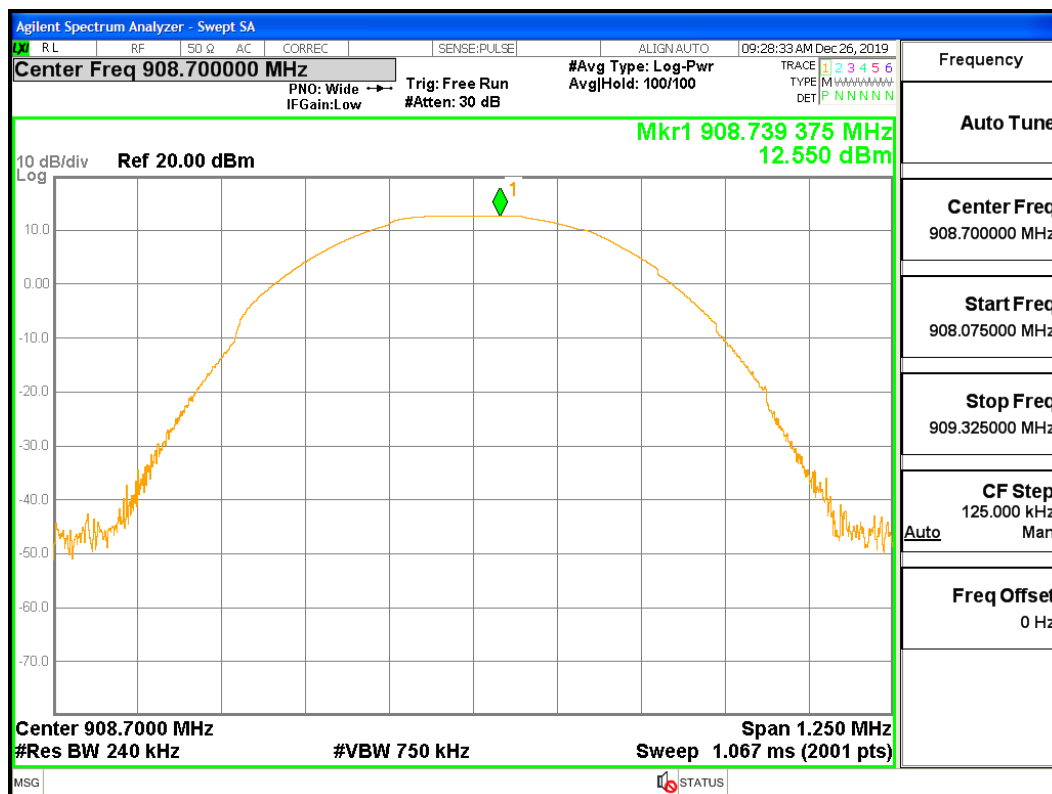
## A.5 Conducted Peak Output Power

| Mode          | Channel. | Reading Value [dBm] | Limit [dBm] | Verdict |
|---------------|----------|---------------------|-------------|---------|
| LoRa-FH<br>SS | LCH      | 12.601              | 30          | PASS    |
| LoRa-FH<br>SS | MCH      | 12.550              | 30          | PASS    |
| LoRa-FH<br>SS | HCH      | 12.509              | 30          | PASS    |

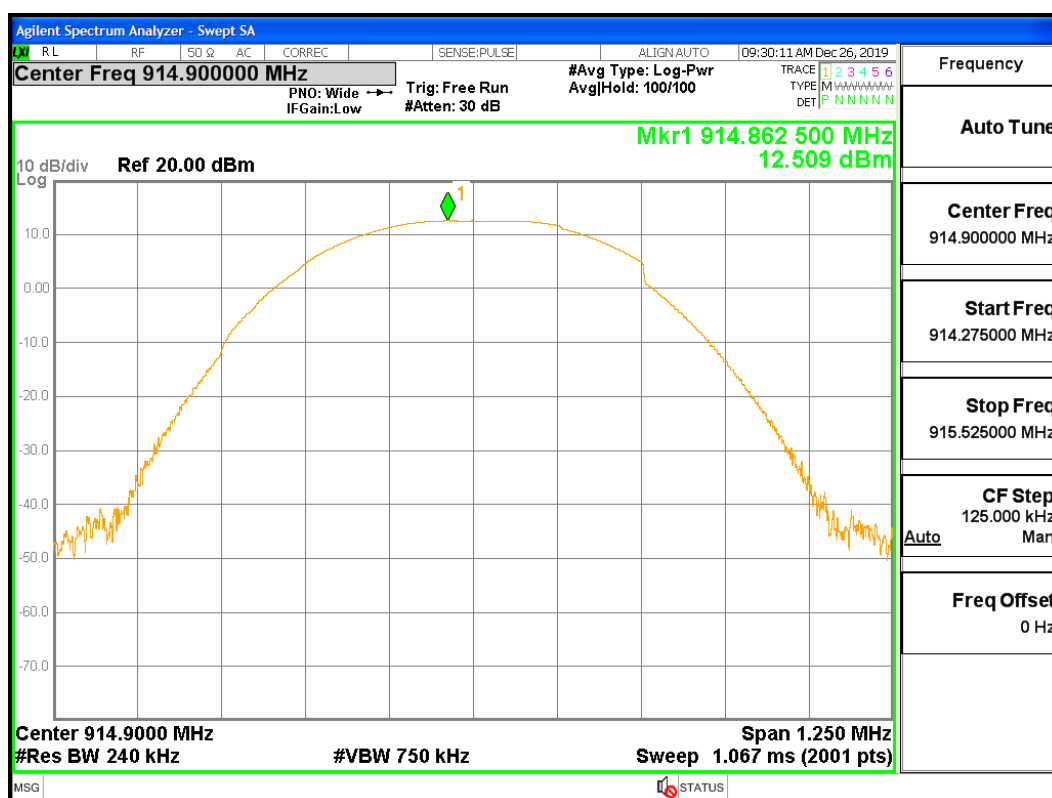
### Test Graph



LoRa-FHSS/MCH



LoRa-FHSS/HCH



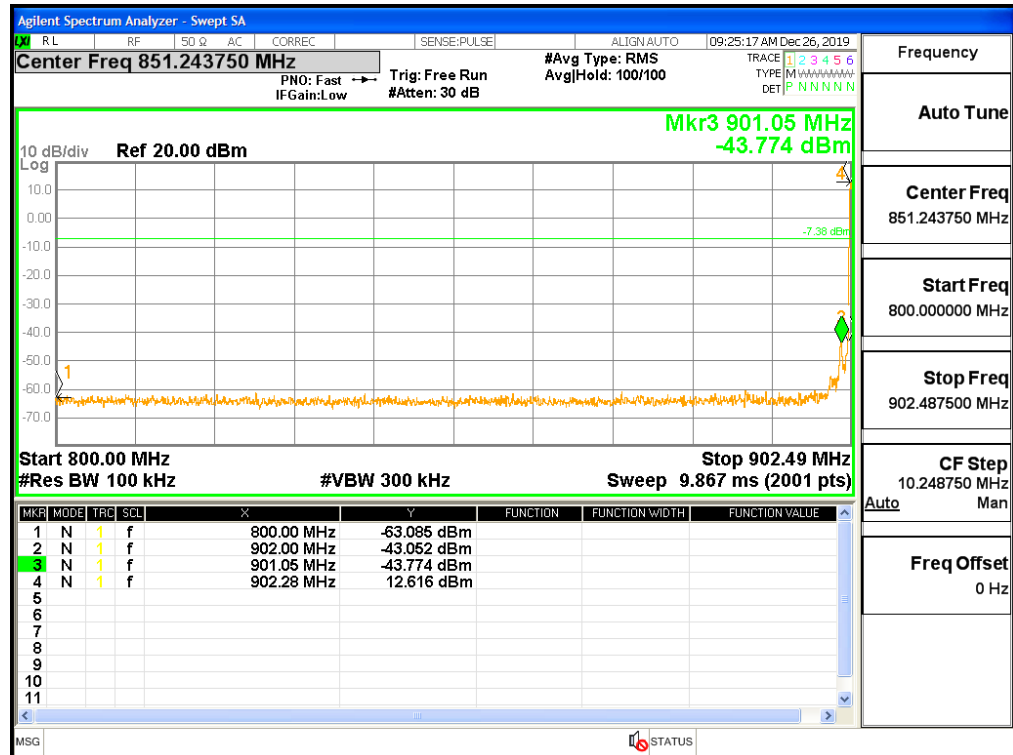
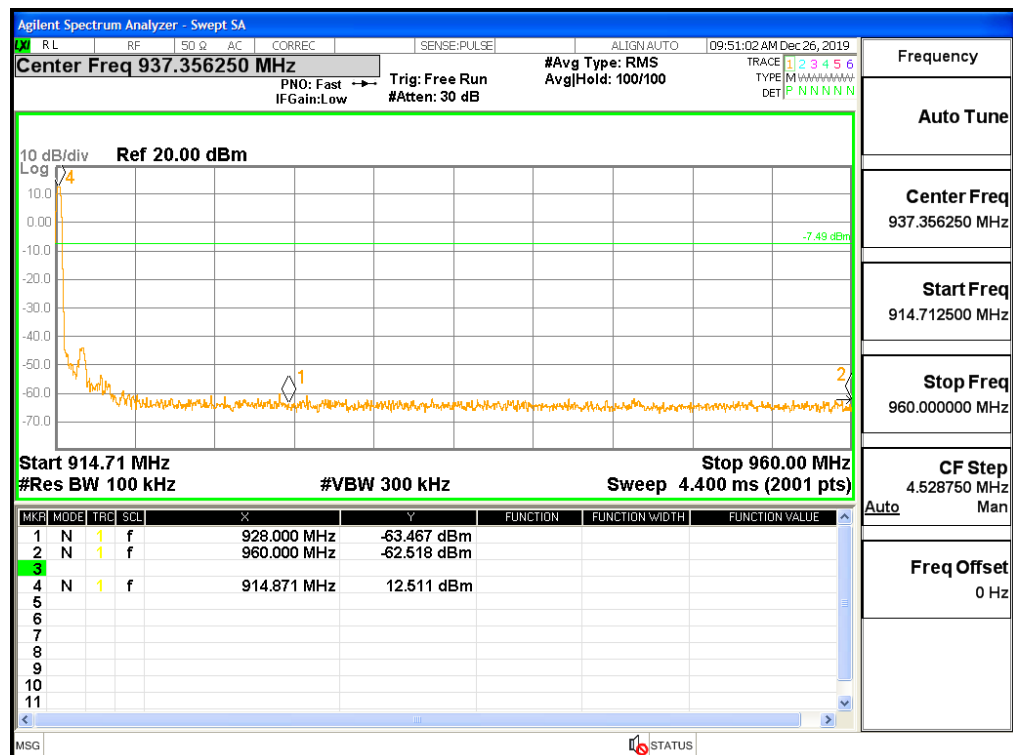


**A.6 Band-edge for RF Conducted Emissions**

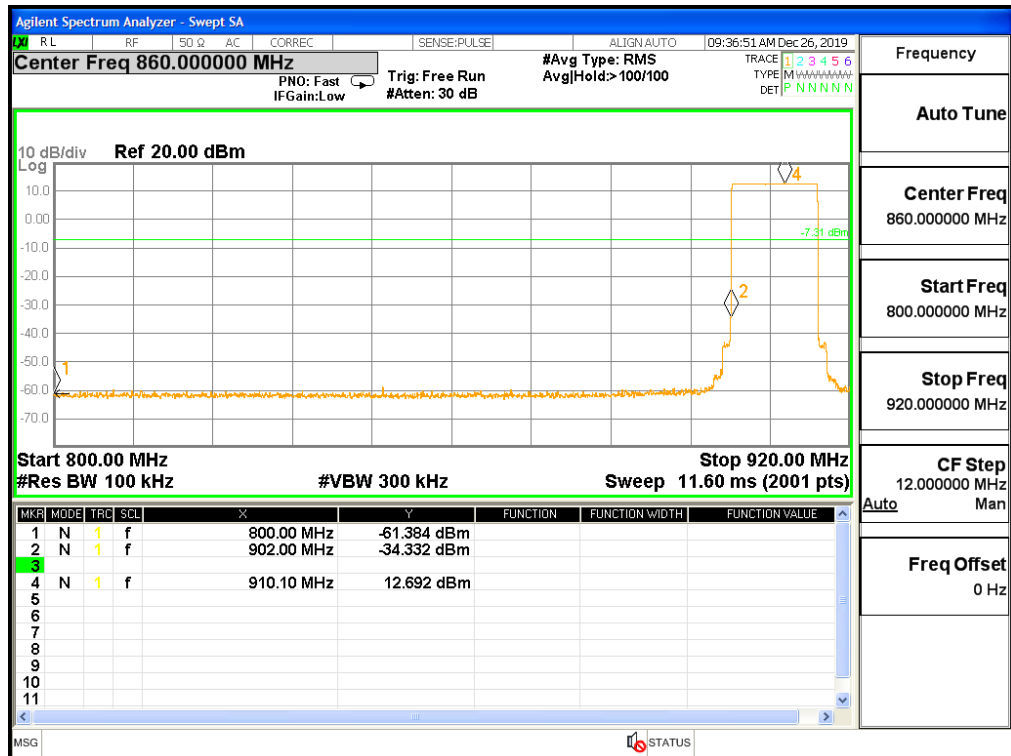
| Type      | Carrier Frequency(MHz) | Frequency(MHz) | Carrier Frequency Power [dBm] | Bandedge Peak(dBm) | Upper limit(dBm) | Conclusion |
|-----------|------------------------|----------------|-------------------------------|--------------------|------------------|------------|
| LoRa-FHSS | LCH                    | 902            | 12.616                        | -43.05             | -7.384           | Pass       |
| LoRa-FHSS | LCH                    | 800            | 12.522                        | -63.66             | -7.478           | Pass       |
| LoRa-FHSS | HCH                    | 902            | 18.237                        | -32.54             | -1.763           | Pass       |
| LoRa-FHSS | LCH                    | 902            | 18.233                        | -40.65             | -1.767           | Pass       |
| LoRa-FHSS | Hopping                | 902            | 12.692                        | -34.33             | -7.308           | Pass       |
| LoRa-FHSS | Hopping                | 902            | 12.601                        | -33.47             | -7.399           | Pass       |
| LoRa-FHSS | Hopping                | 902            | 12.568                        | -55.48             | -7.432           | Pass       |
| LoRa-FHSS | Hopping                | 928            | 12.593                        | -60.50             | -7.407           | Pass       |

## Test Graph

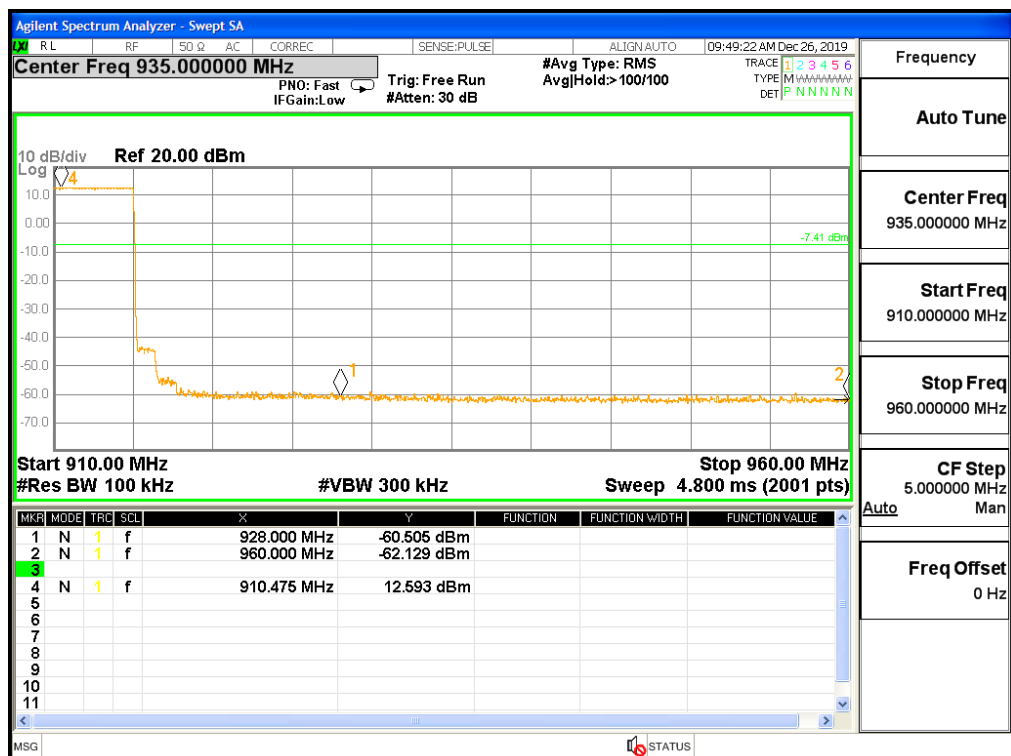
## Graphs

LoRa-FHSS/LCH/No  
HopLoRa-FHSS/HCH/No  
Hop

LoRa-FHSS/LCH/Hop



LoRa-FHSS/HCH/Hop

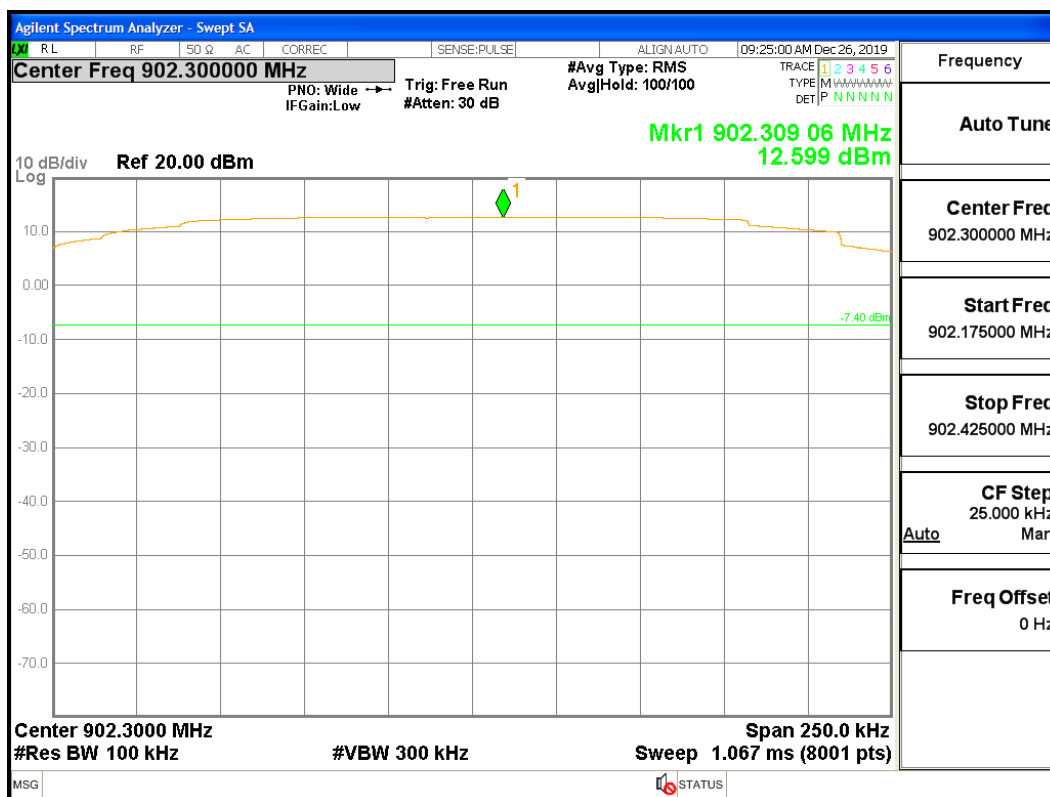


## A.7 RF Conducted Spurious Emissions

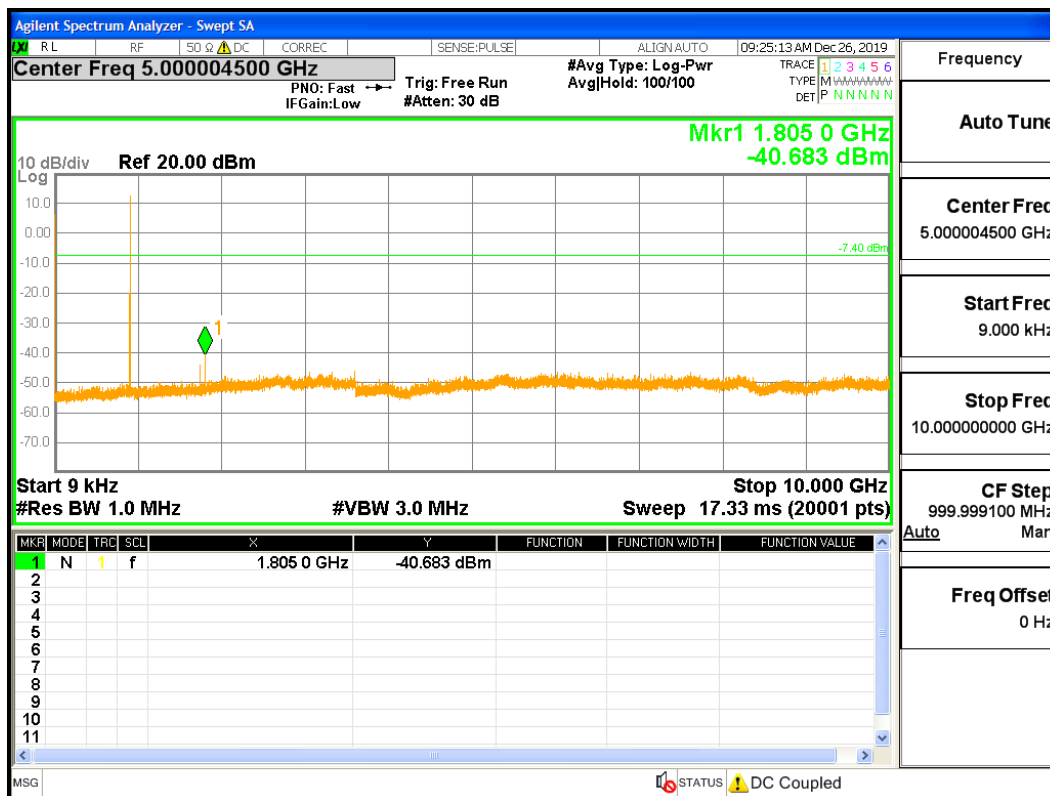
## Test Graph

## LoRa-FHSS\_LCH\_Graphs

Pref

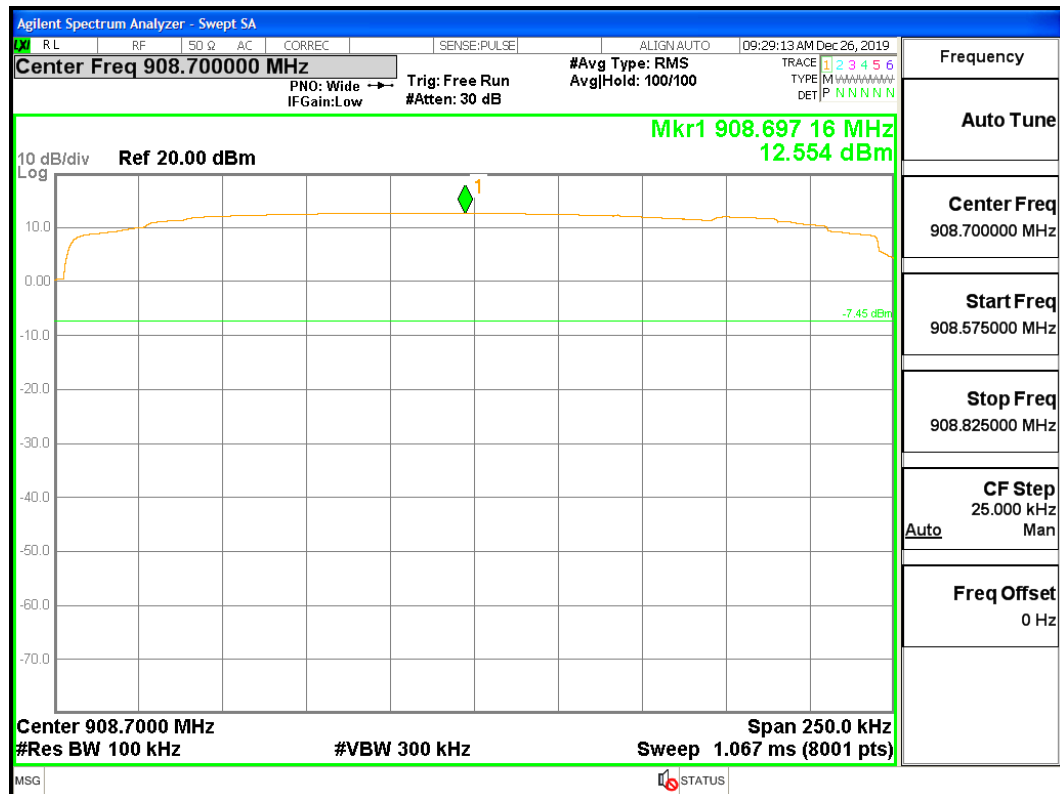


PuW

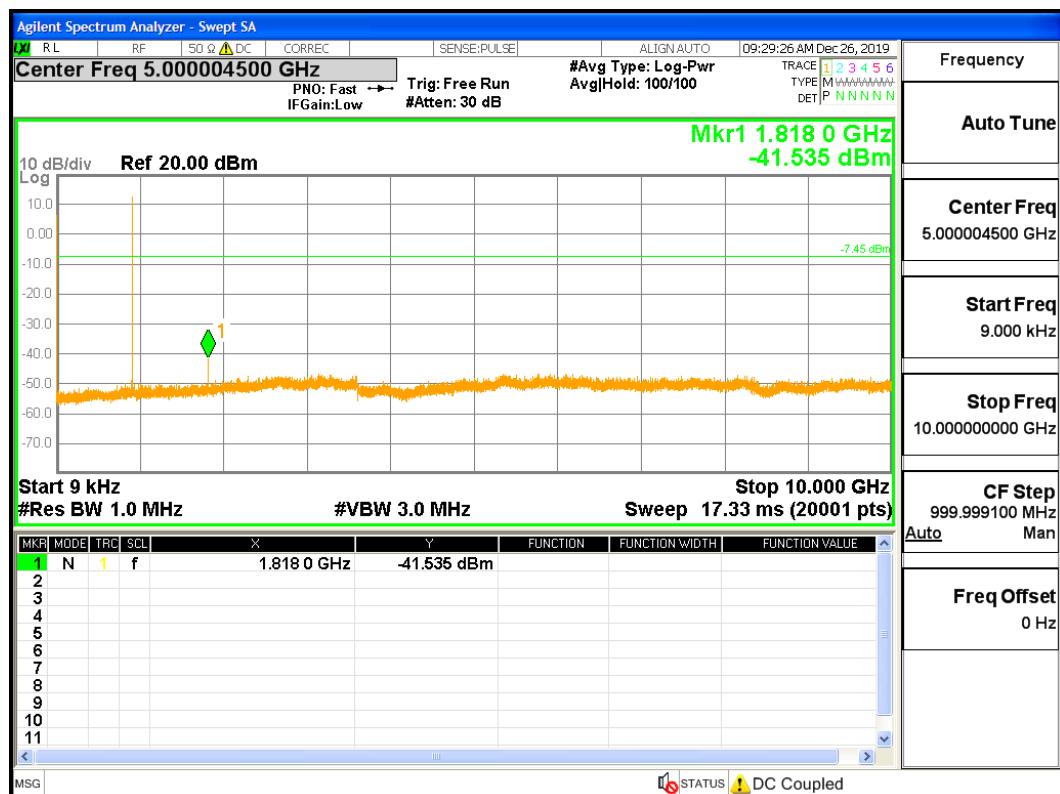


## LoRa-FHSS\_MCH\_Graphs

Pref

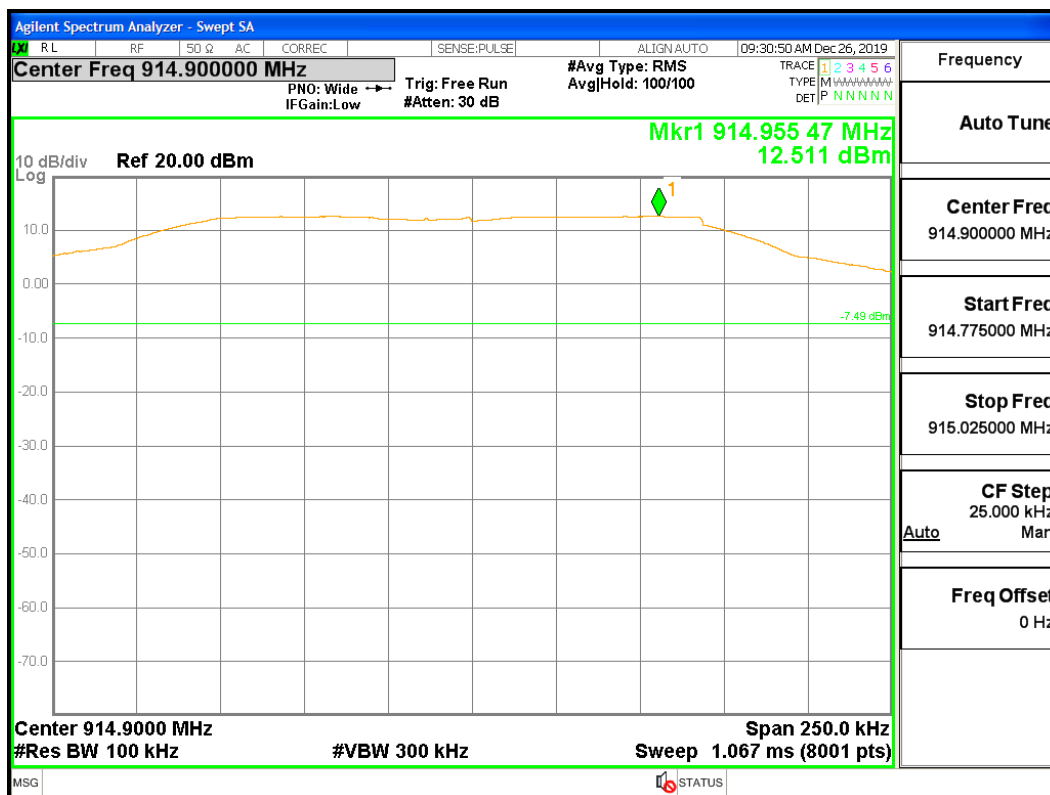


PuW



## LoRa-FHSS\_HCH\_Graphs

Pref



Puw

