

## Appendix A

### RF Test Data (Conducted Measurement)

Product Name: water and gas module

Trade Mark: Vision Metering, LLC

Test Model: GLC-005

#### Environmental Conditions

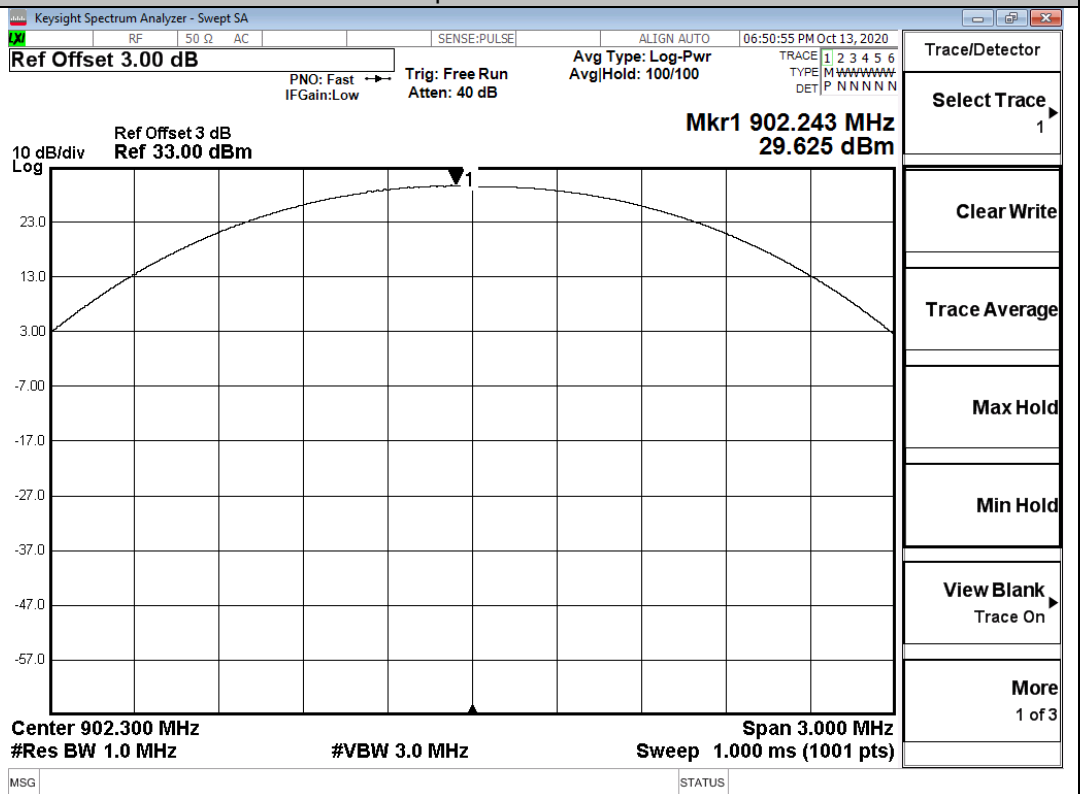
Temperature:	22.8° C
Relative Humidity:	53.7%
ATM Pressure:	100.0 kPa
Test Engineer:	Jay Li
Supervised by:	Li Huan

#### A.1 Maxmum Conducted Peak Output Power

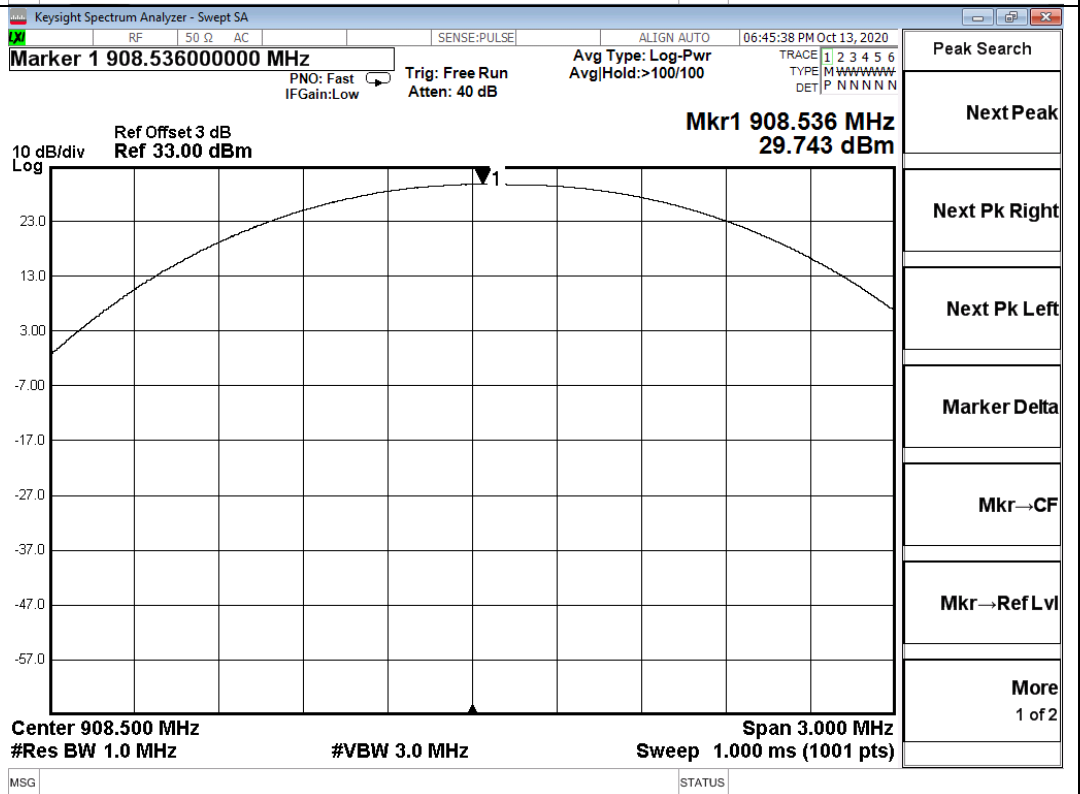
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
LORA	LCH	29.625	30	PASS
	MCH	29.743	30	PASS
	HCH	29.630	30	PASS

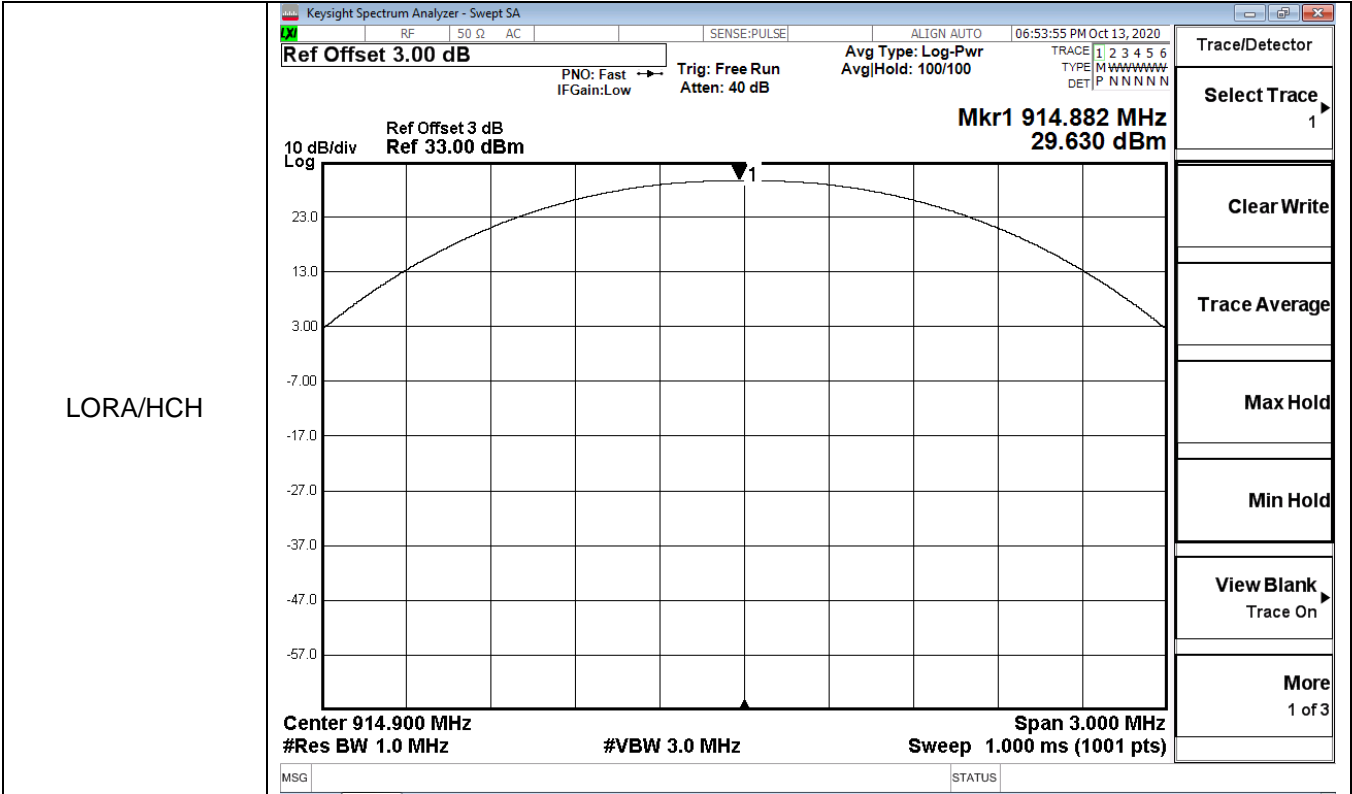
Test Graphs

LORA/LCH



LORA/MCH





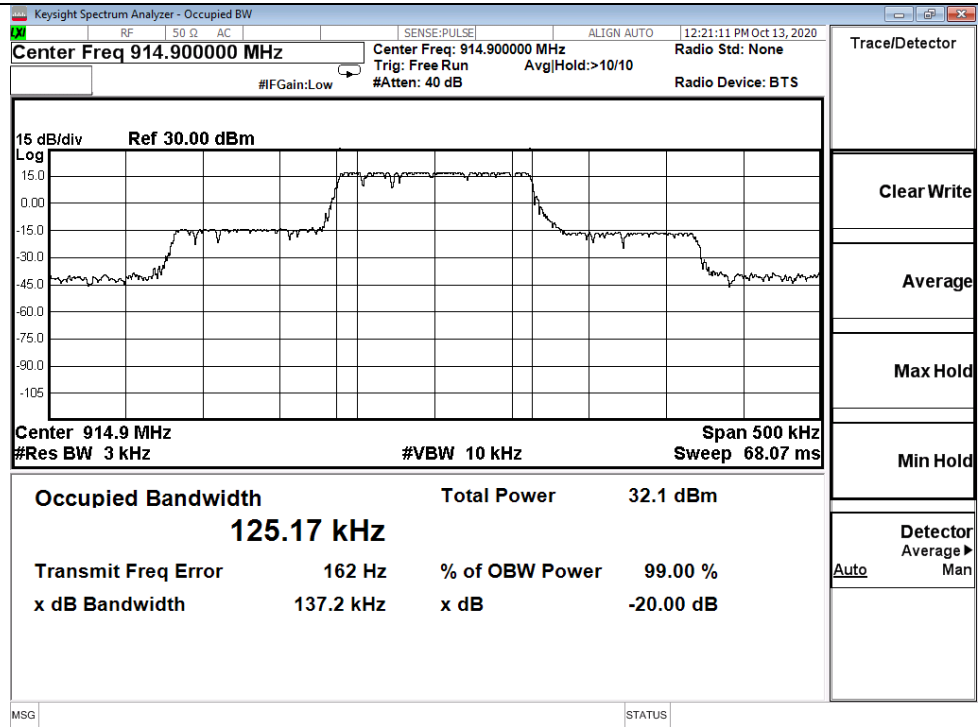
**A.2 20dB Bandwidth**

Mode	Channel.	20dB Bandwidth [KHz]	Limit [KHz]	Verdict
LORA	LCH	137.5	Not Specified	PASS
	MCH	135.8	Not Specified	PASS
	HCH	137.2	Not Specified	PASS

Test Graphs

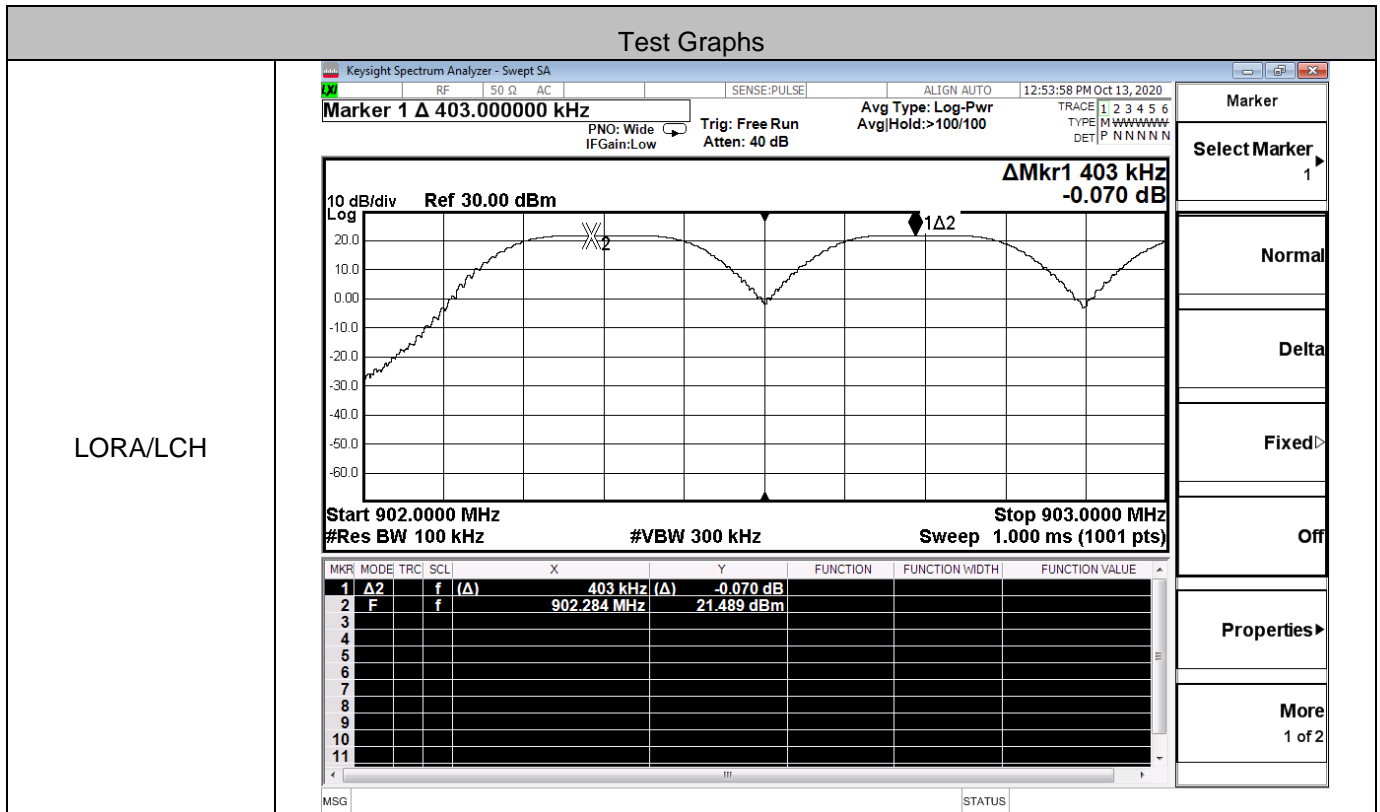
LORA/LCH	<p><b>Center Freq 902.300000 MHz</b>  <b>Center Freq: 902.300000 MHz</b>  <b>Trig: Free Run</b>  <b>#Atten: 40 dB</b>  <b>Avg Hold:&gt;10/10</b>  <b>Radio Std: None</b>  <b>Radio Device: BTS</b></p> <p>15 dB/div Ref 30.00 dBm</p> <p>Center 902.3 MHz Span 500 kHz                  #Res BW 3 kHz #VBW 10 kHz Sweep 68.07 ms</p> <p><b>Occupied Bandwidth 126.34 kHz</b>  <b>Total Power 30.5 dBm</b></p> <p>Transmit Freq Error -16 Hz % of OBW Power 99.00 %                  x dB Bandwidth 137.5 kHz x dB -20.00 dB</p>
LORA/MCH	<p><b>Ref Value 30.00 dBm</b>  <b>Center Freq: 908.600000 MHz</b>  <b>Trig: Free Run</b>  <b>#Atten: 40 dB</b>  <b>Avg Hold:&gt;10/10</b>  <b>Radio Std: None</b>  <b>Radio Device: BTS</b></p> <p>15 dB/div Ref 30.00 dBm</p> <p>Center 908.5 MHz Span 500 kHz                  #Res BW 3 kHz #VBW 10 kHz Sweep 68.07 ms</p> <p><b>Occupied Bandwidth 126.74 kHz</b>  <b>Total Power 31.6 dBm</b></p> <p>Transmit Freq Error -404 Hz % of OBW Power 99.00 %                  x dB Bandwidth 135.8 kHz x dB -20.00 dB</p>

LORA/HCH

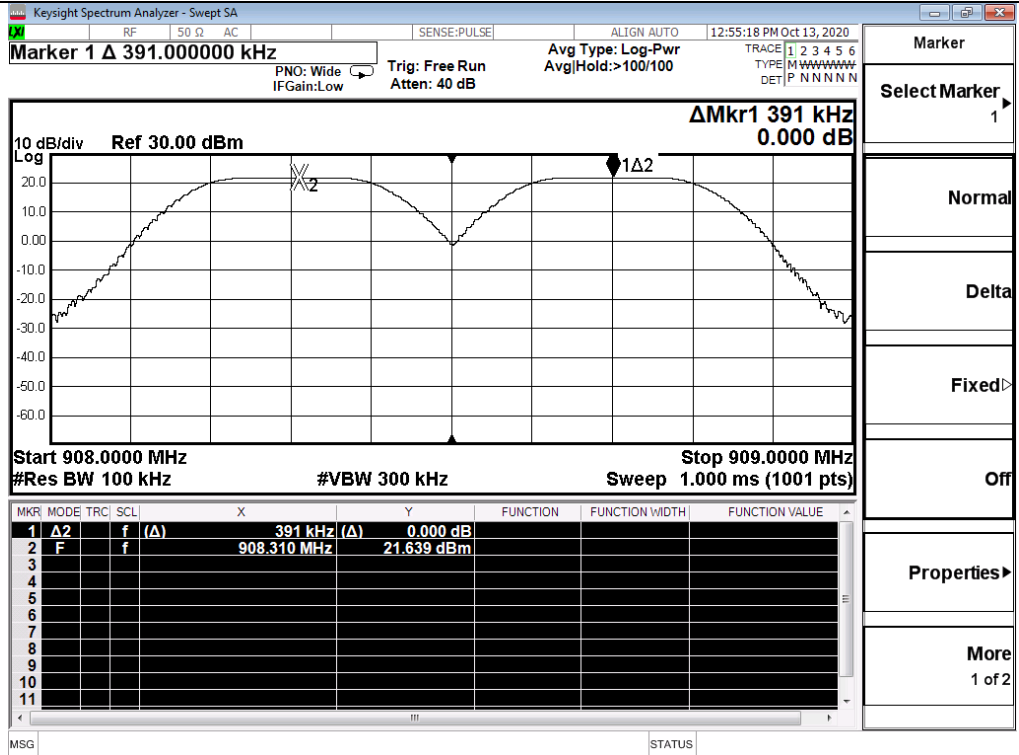


### A.3 Carrier Frequency Separation

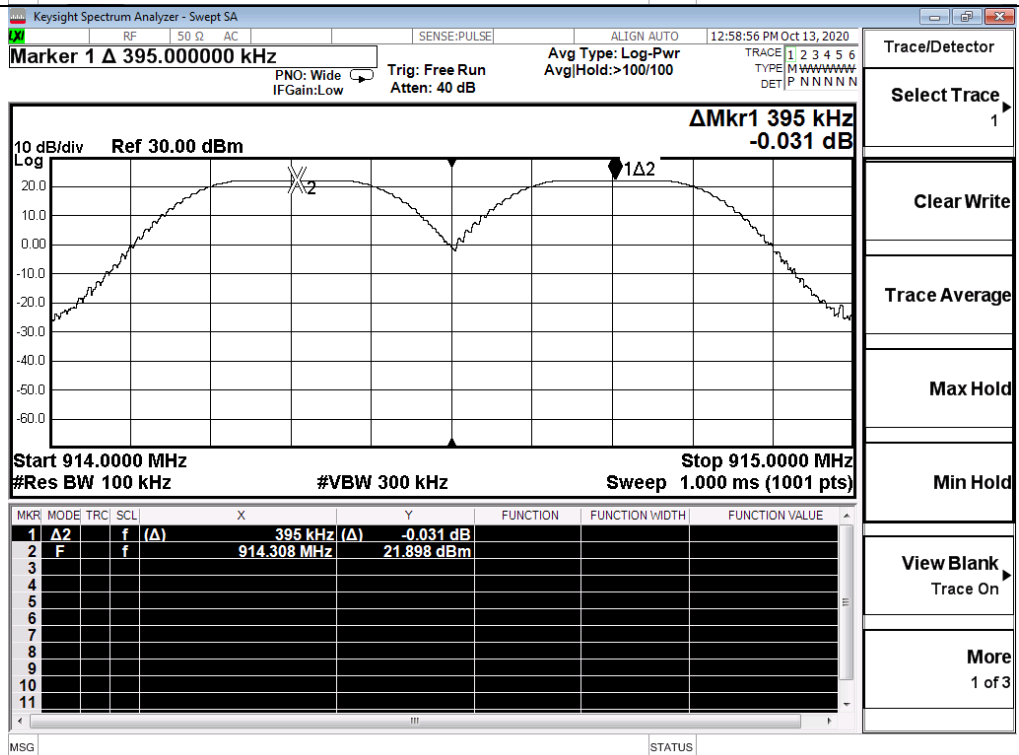
Mode	Channel.	Carrier Frequency Separation [KHz]	Limit [KHz]	Verdict
LORA	LCH	403	137.5	PASS
	MCH	391	135.8	PASS
	HCH	395	137.2	PASS



LORA/MCH

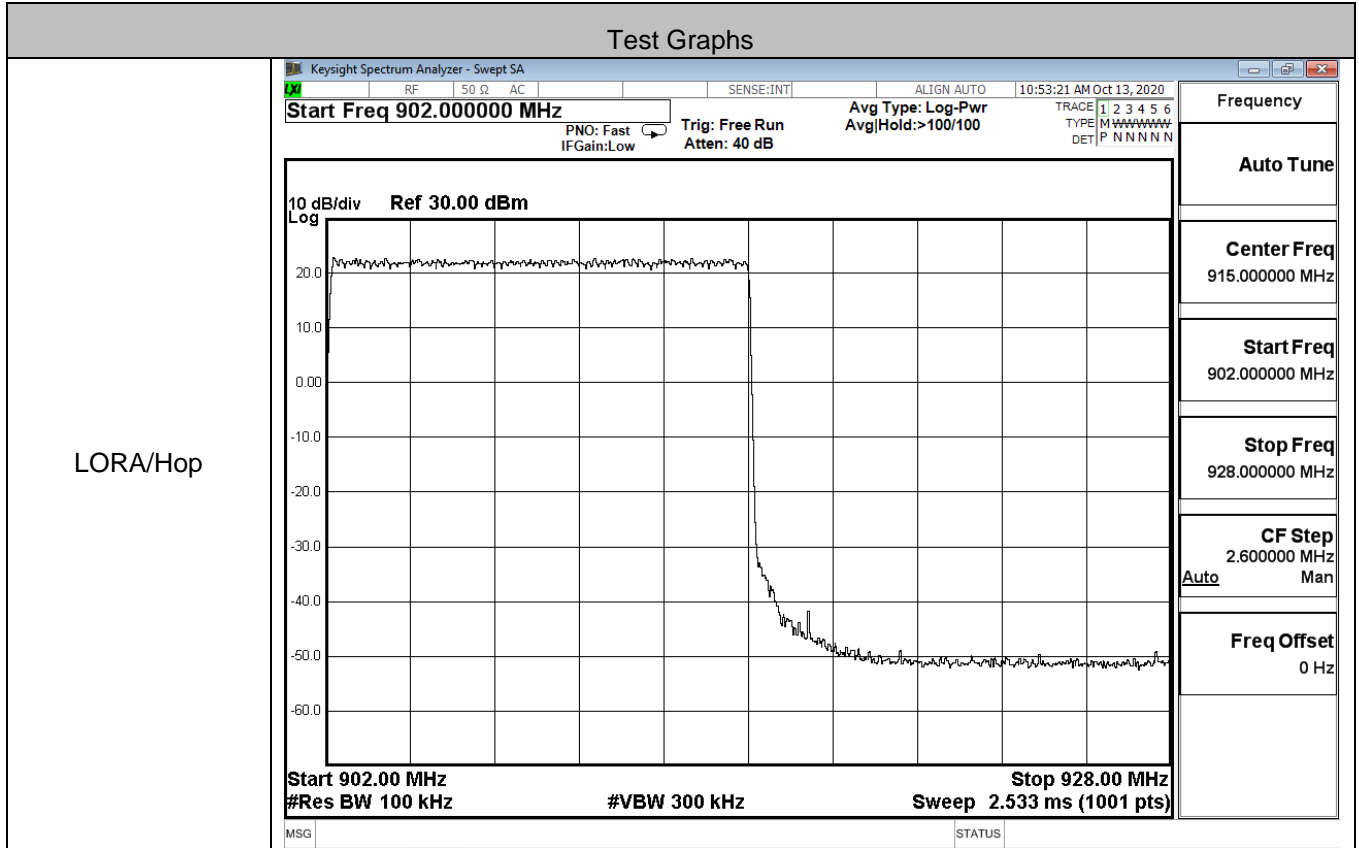


LORA/HCH



### A.4 Hopping Channel Number

Mode	Channel.	Number of Hopping Channel [N]	Limit [N]	Verdict
LORA	Hop	64	>=50	PASS





A.5 Dwell Time

Mode	Frequency (MHz)	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
LORA	908.5	370	1	0.370	0.4	PASS

### Test Graphs

LORA MCH

Keysight Spectrum Analyzer - Swept SA

Marker 1  $\Delta$  370.000 ms

PNO: Wide IFGain: Low Trig: Free Run Atten: 40 dB

Avg Type: Log-Pwr AvgHold: 25/100

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$\Delta$ Mkr1 370.0 ms  
-0.487 dB

Center 908.500000 MHz Res BW 100 kHz #VBW 300 kHz Sweep 2.000 s (1001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	$\Delta$	t	( $\Delta$ )	370.0 ms	( $\Delta$ )	-0.487 dB		
2	F	t		1.014 s		20.542 dBm		

Marker

Select Marker 1

Normal

Delta

Fixed

Off

Properties

More 1 of 2

Keysight Spectrum Analyzer - Swept SA

Video BW 100 kHz

PNO: Wide IFGain: Low Trig: Free Run Atten: 40 dB

Avg Type: Log-Pwr AvgHold: 1/100

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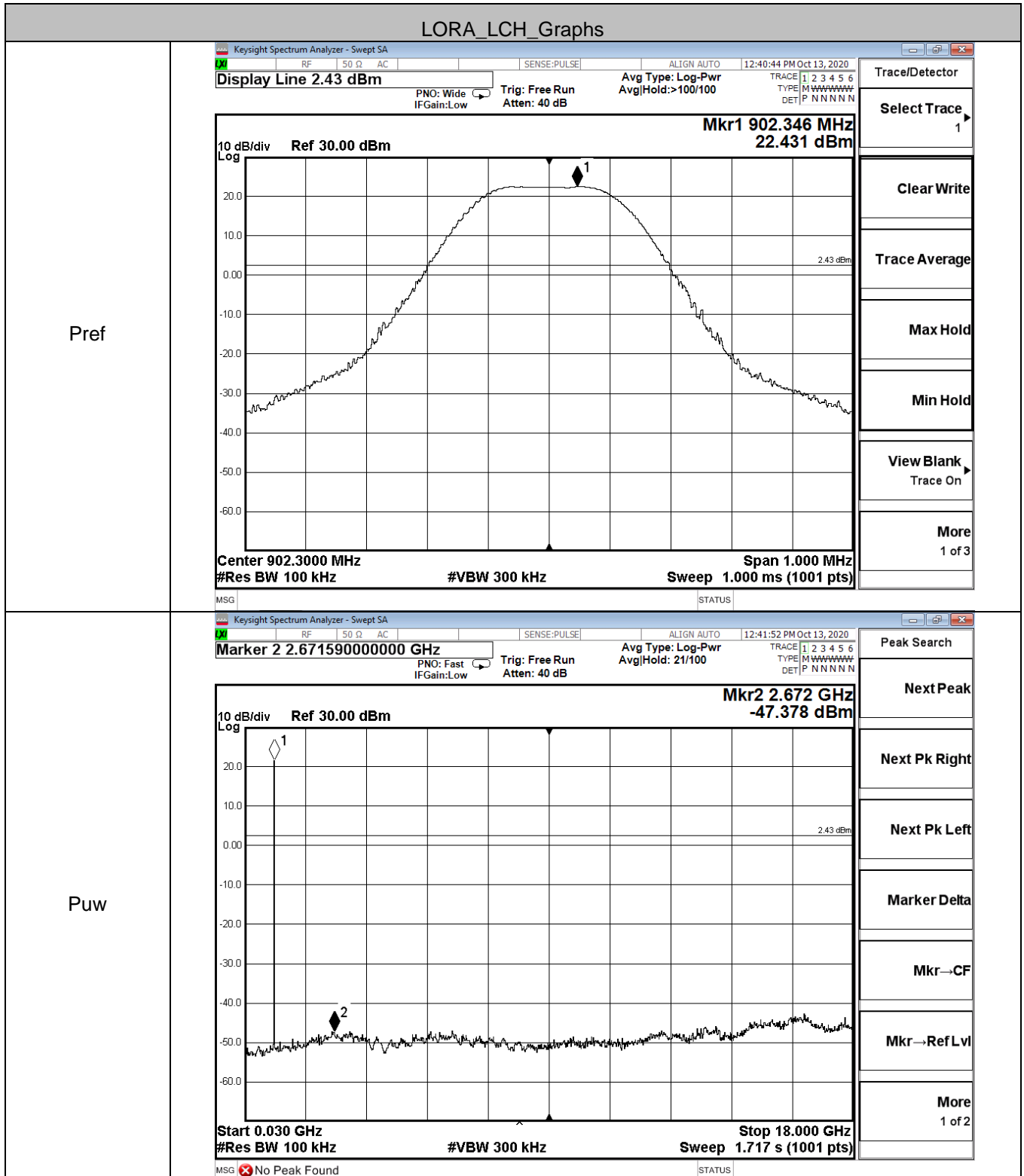
BW  
Res BW 100 kHz  
Video BW 100 kHz  
Auto Man  
VBW:3dB RBW 10.0 Auto Man  
Span:3dB RBW 106 Auto Man  
RBW Control [Gaussian,-3 dB]

Center 908.500000 MHz Res BW 100 kHz #VBW 100 kHz Sweep 20.00 s (1001 pts)

MSG STATUS

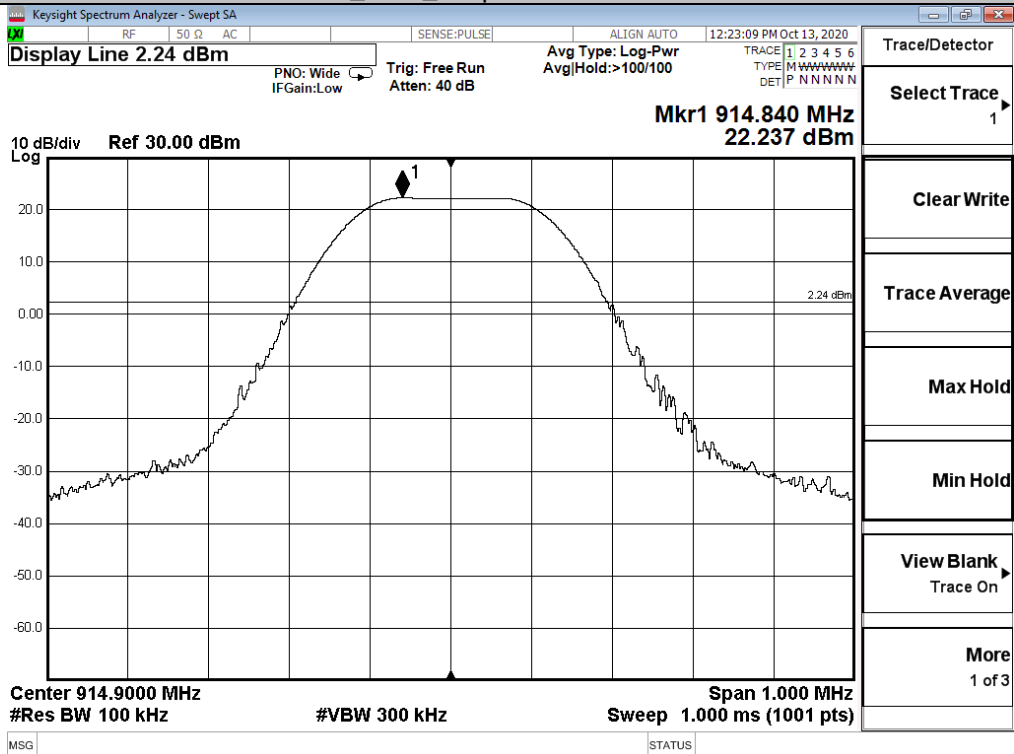
### A.6 RF Conducted Spurious Emissions

Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
LORA	LCH	22.431	-47.378	2.43	PASS
	HCH	22.237	-46.264	2.24	PASS

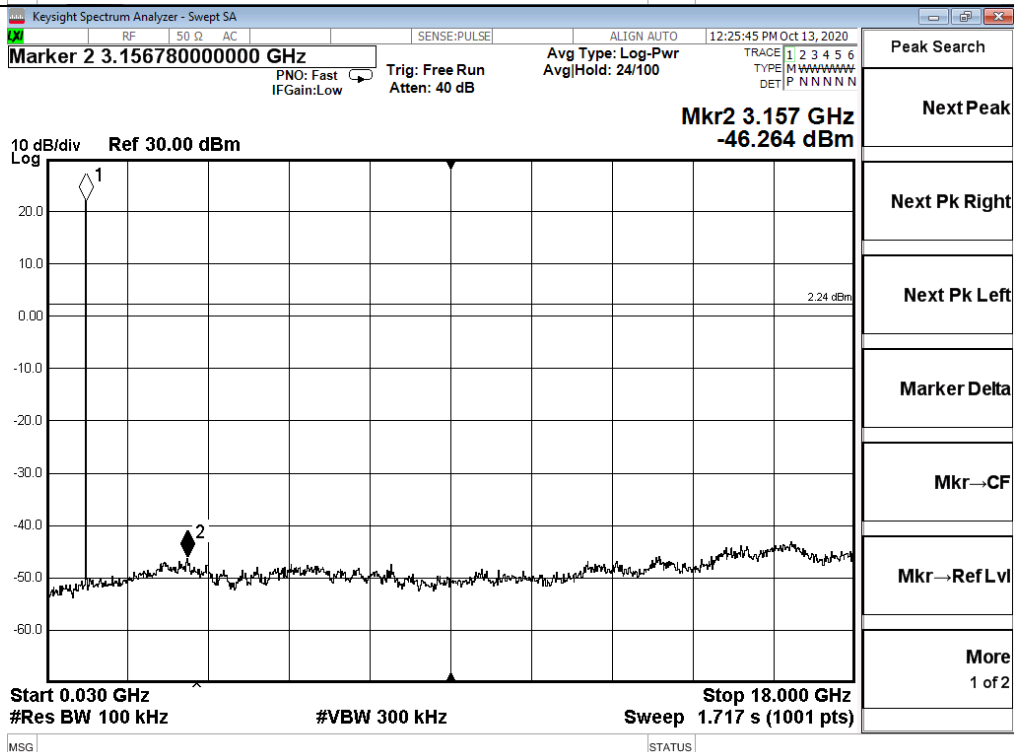


LORA\_HCH\_Graphs

Pref



Puw

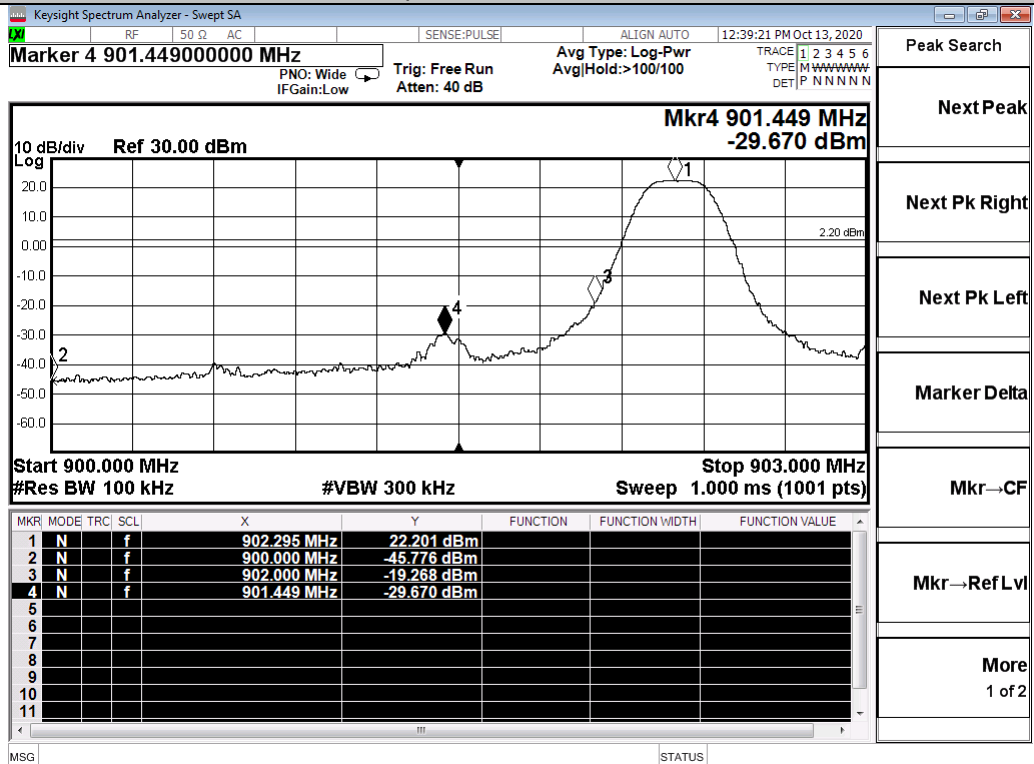


**A.7 Band-edge for RF Conducted Emissions**

Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
LORA	LCH	902.3	22.201	Off	-19.268	2.20	PASS
			21.784	On	-37.196	1.78	PASS
	HCH	914.9	21.550	Off	-31.695	1.55	PASS
			22.000	On	-44.704	2.00	PASS

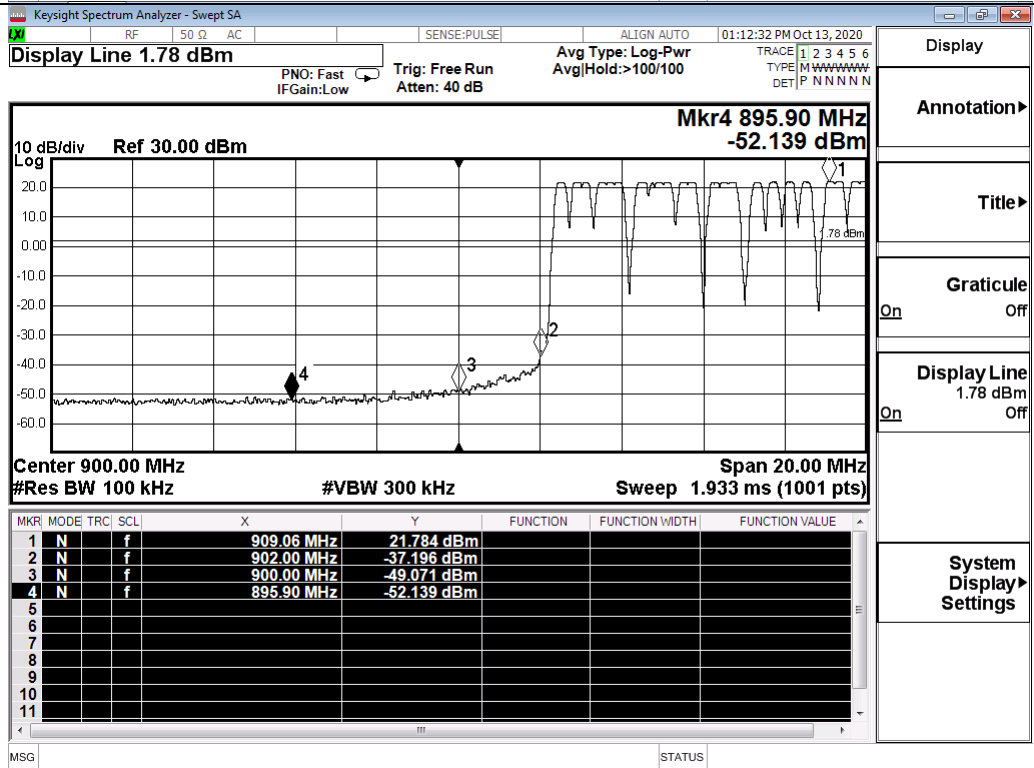
Test Graphs

LORA/LCH/No Hop



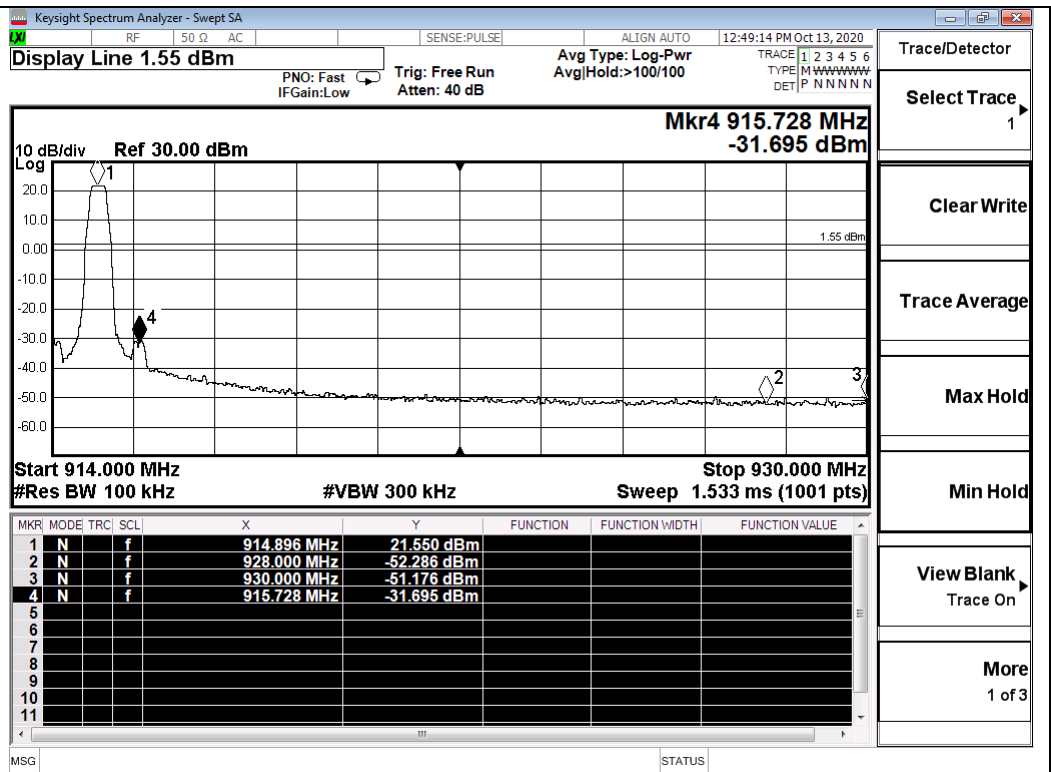
- Peak Search
- Next Peak
- Next Pk Right
- Next Pk Left
- Marker Delta
- Mkr→CF
- Mkr→Ref Lvl
- More  
1 of 2

LORA/LCH/Hop



- Display
- Annotation▶
- Title▶
- Graticule  
On Off
- Display Line  
1.78 dBm  
On Off
- System Display▶  
Settings

LORA/HCH/No Hop



LORA/HCH/Hop

