

Appendix A

RF Test Data for Lora-Hybrid(902-928MHz Hybrid Mode)

(Conducted Measurement)

Product Name: LoRa+BLE module

Trade Mark: RAK

Test Model: RAK4600(H)

FCC ID: 2AF6B- RAK4600H

Environmental Conditions

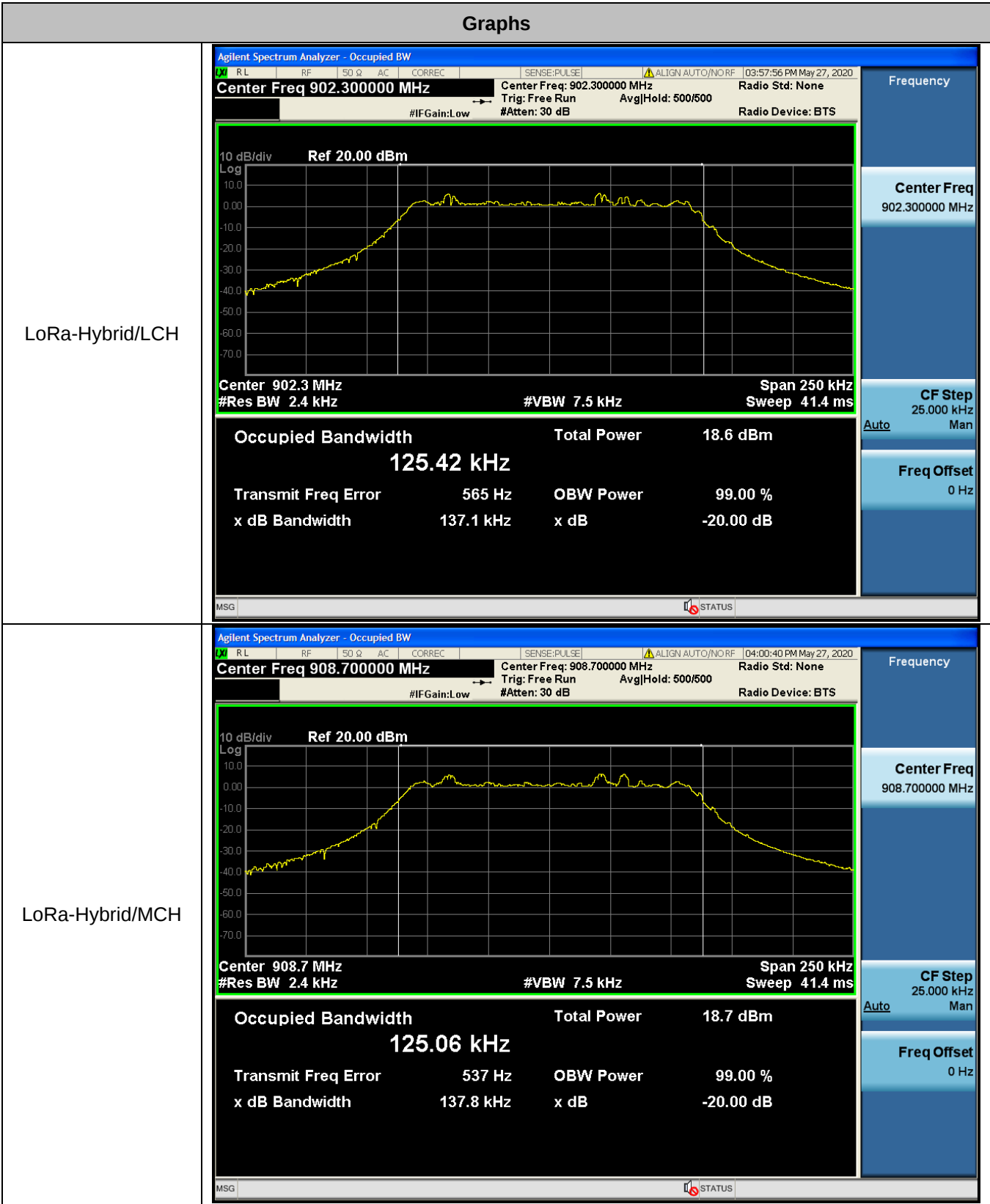
Temperature:	24.3℃
Relative Humidity:	48%
ATM Pressure:	100.0 kPa
Test Engineer:	Anna Hu
Supervised by:	Hugo Chen
NOTE	N/A

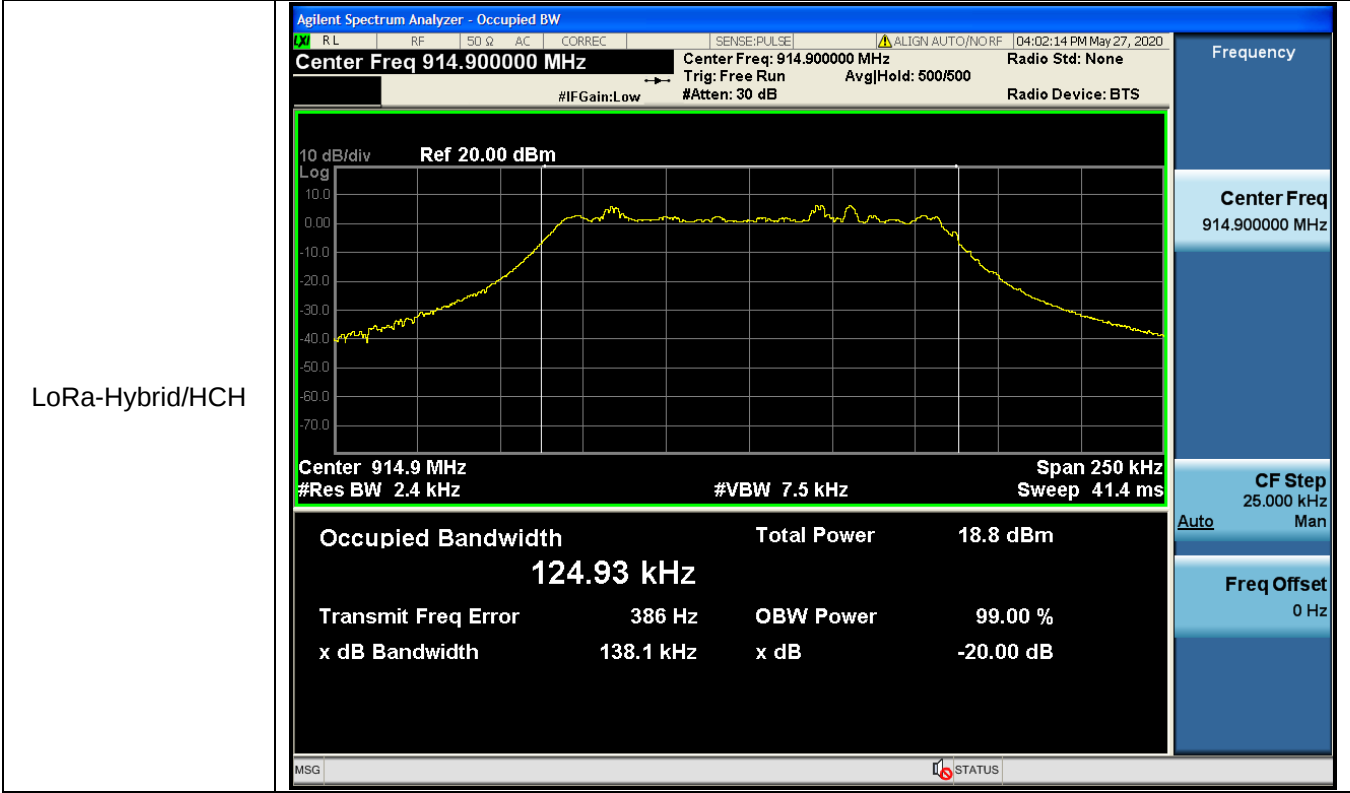
A.1 20 dB Bandwidth and 99% Occupied Bandwidth

Mode	Channel.	20dB Bandwidth [MHz]	Limit(MHz)	Verdict
LoRa-Hybrid	LCH	0.137	Not Specified	PASS
LoRa-Hybrid	MCH	0.138	Not Specified	PASS
LoRa-Hybrid	HCH	0.138	Not Specified	PASS

Test Graph

Graphs

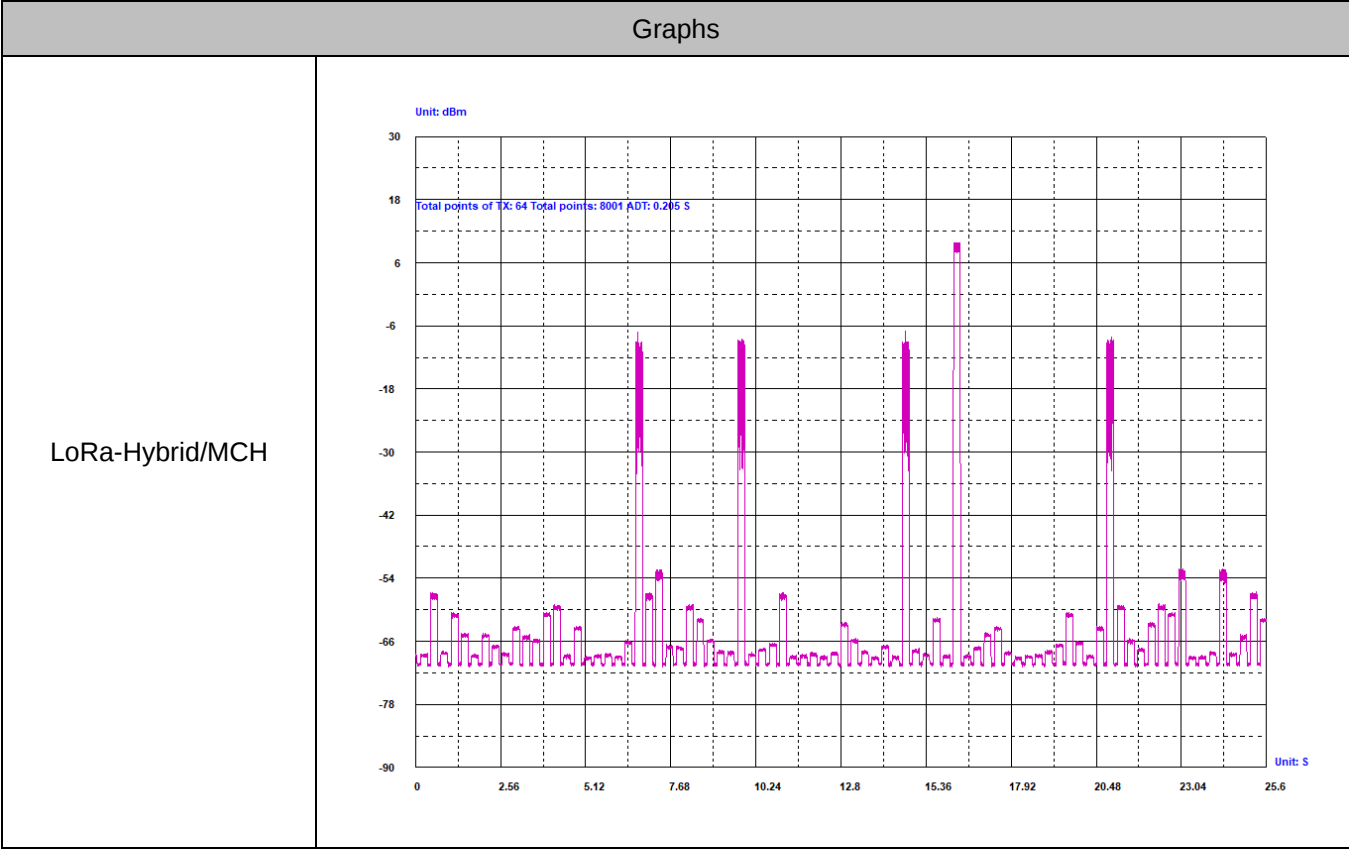




A.2 Dwell Time

Mode	Channel	TX _{on} Points	Total Points	Dwell Time[s]	Limit [s]	Verdict
LoRa-Hybrid	MCH	64	8001	0.205	0.4	PASS

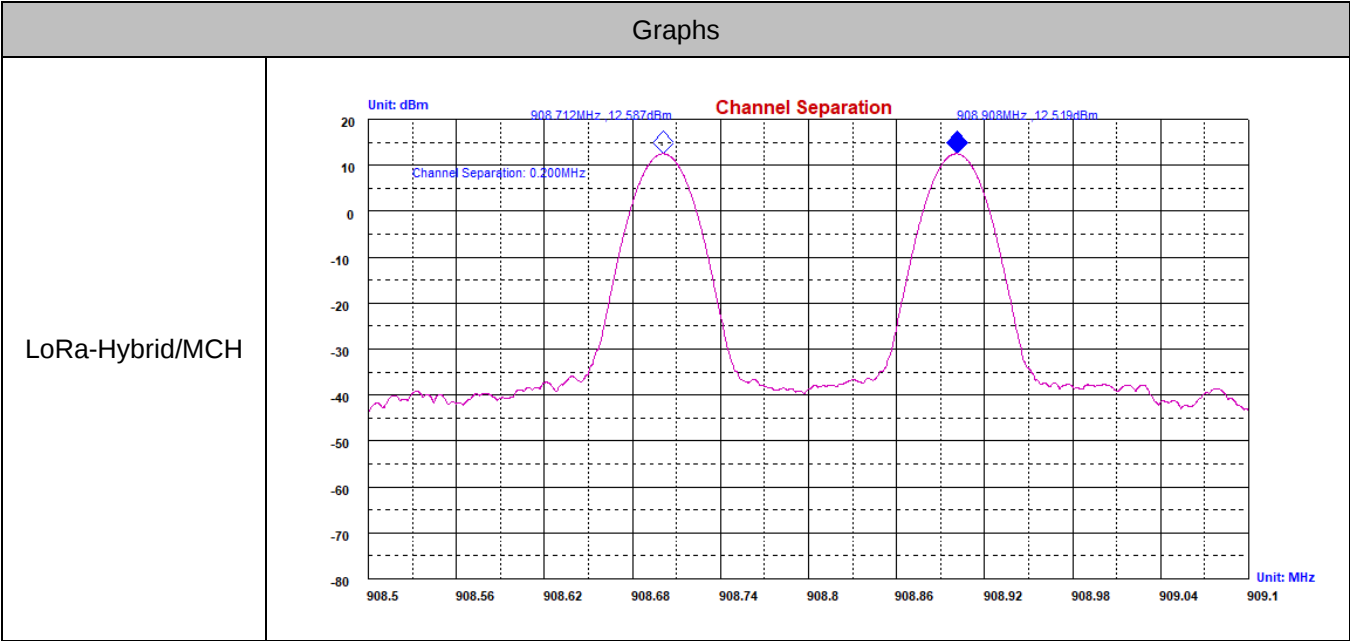
Test Graph



A.3 Carrier Frequency Separation

Mode	Channel.	Carrier Frequency Separation [KHz]	Limit [KHz]	Verdict
LoRa-Hybrid	MCH	200	64.55	PASS

Test Graph

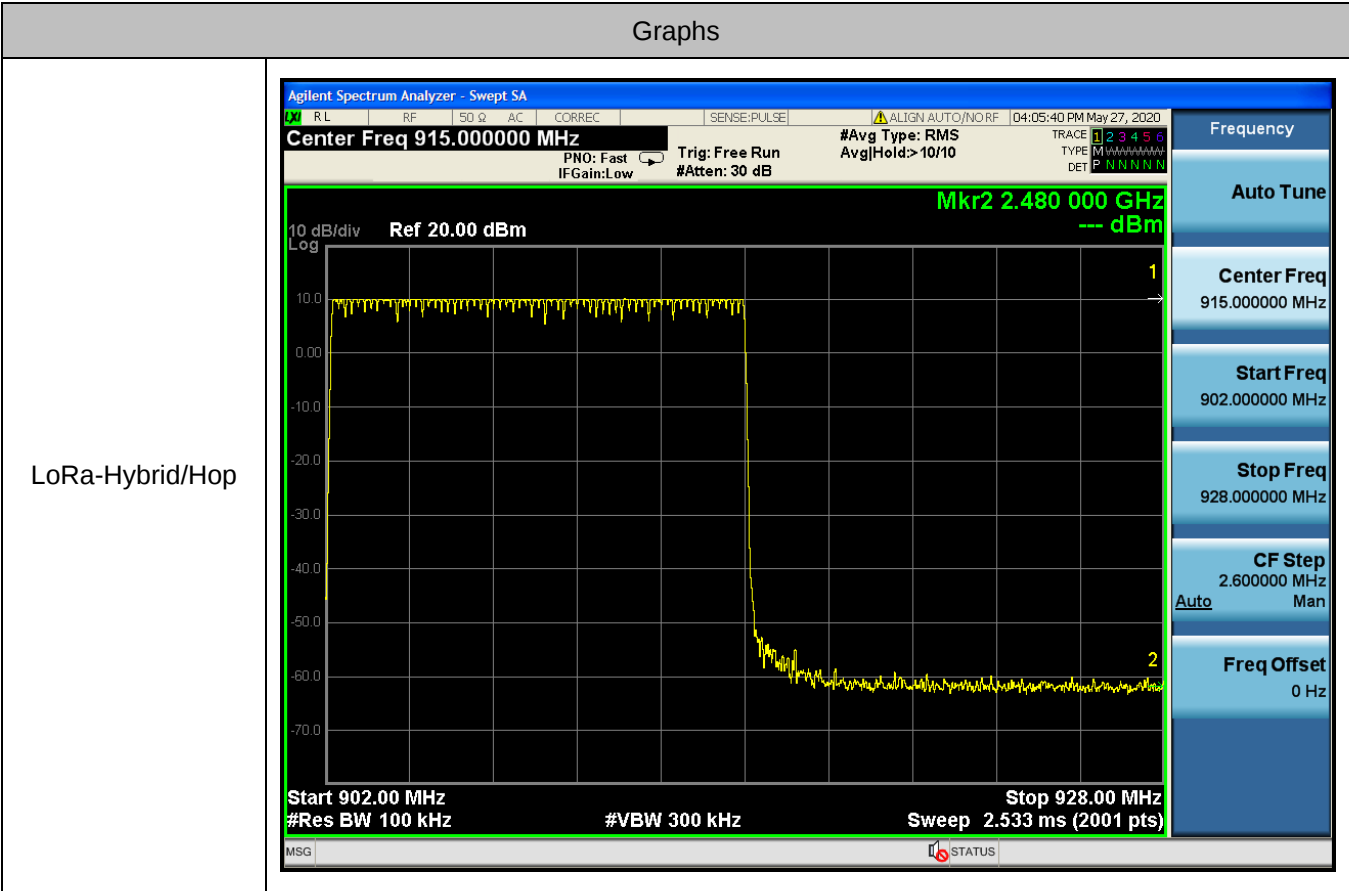


Note: this test under absence of modulation condition.

A.4 Hopping Channel Number

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

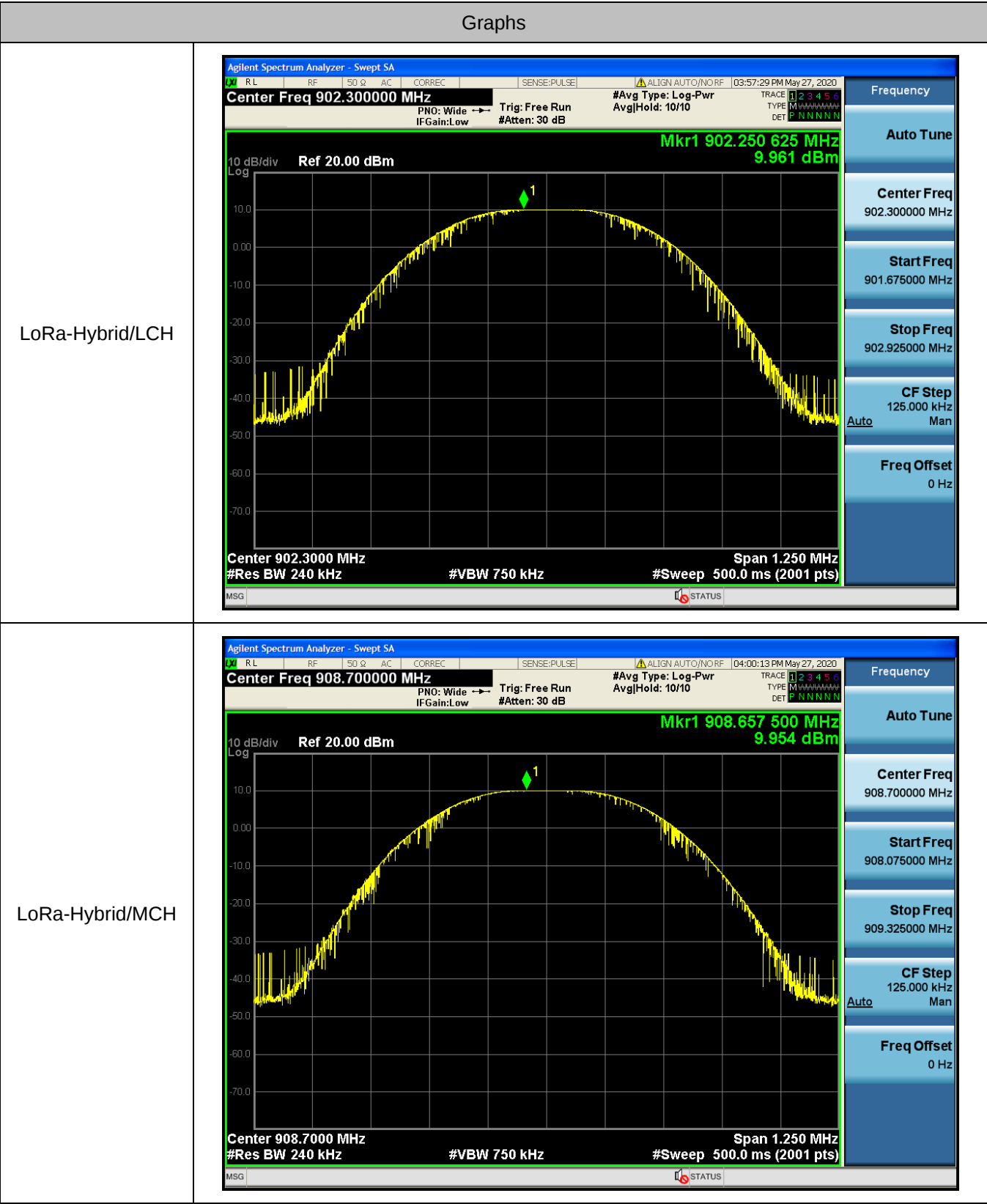
Test Graph

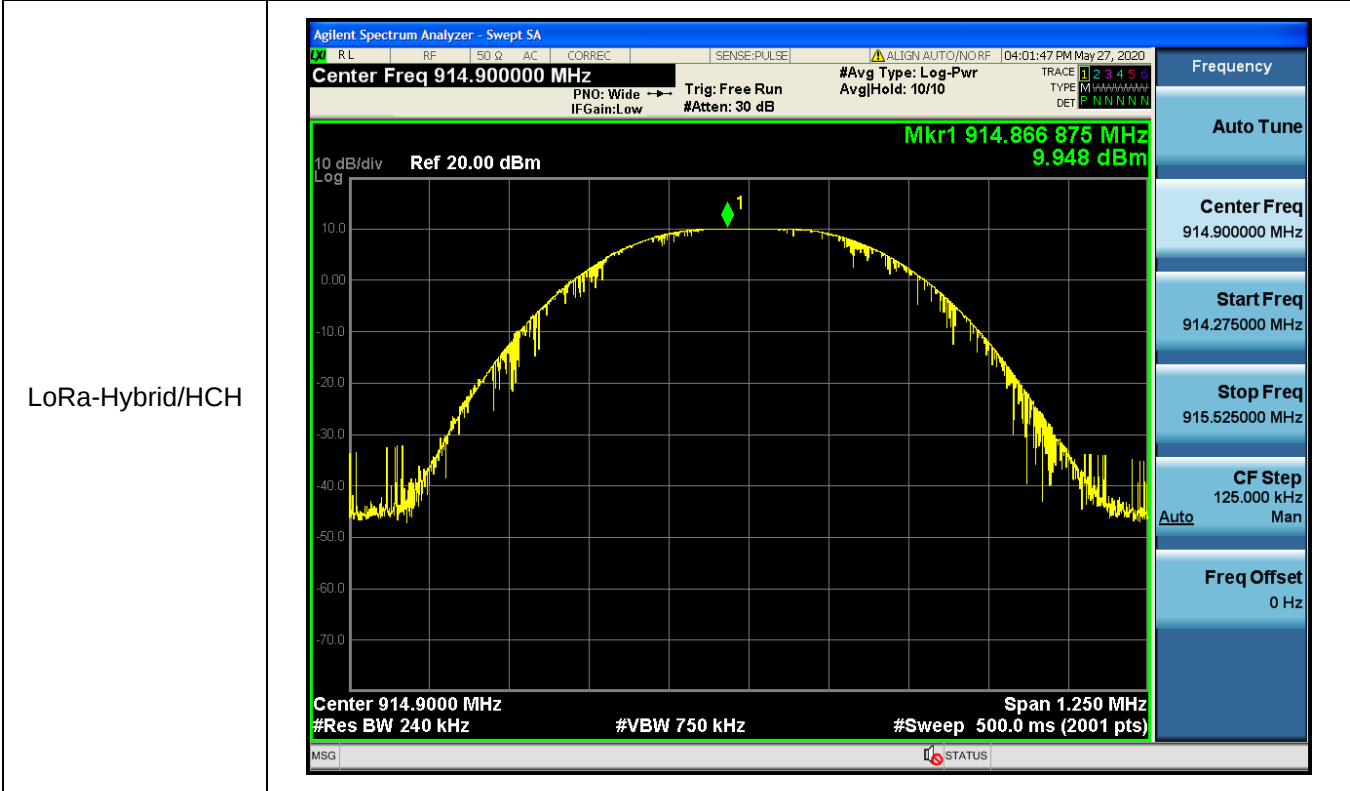


A.5 Conducted Peak Output Power

Mode	Channel.	Reading Value [dBm]	Limit [dBm]	Verdict
LoRa-Hybrid	LCH	9.961	30	PASS
LoRa-Hybrid	MCH	9.954	30	PASS
LoRa-Hybrid	HCH	9.948	30	PASS

Test Graph





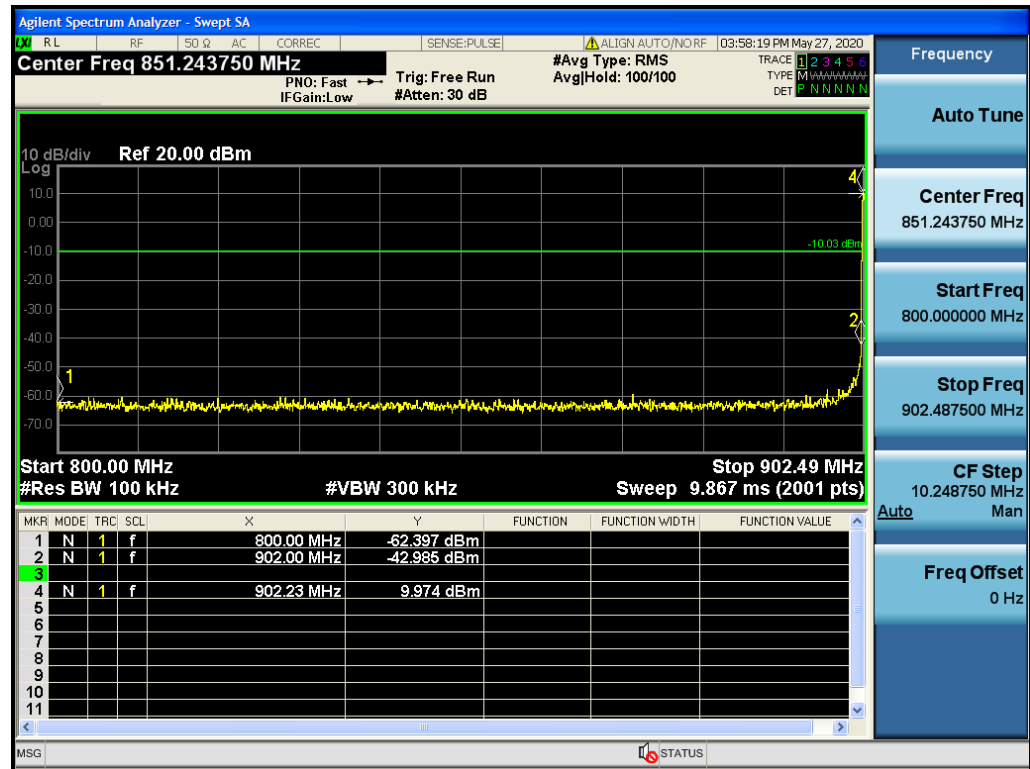
A.6 Band-edge for RF Conducted Emissions

Type	Carrier Frequency(MHz)	Frequency(MHz)	Carrier Frequency Power [dBm]	Bandedge Peak(dBm)	Upper limit(dBm)	Conclusion
LoRa-Hybrid	LCH	902	9.974	-42.98	-10.026	Pass
LoRa-Hybrid	HCH	928	9.972	-62.75	-10.028	Pass
LoRa-Hybrid	Hopping	902	10.211	-43.24	-9.789	Pass
LoRa-Hybrid	Hopping	928	10.057	-62.4	-9.943	Pass

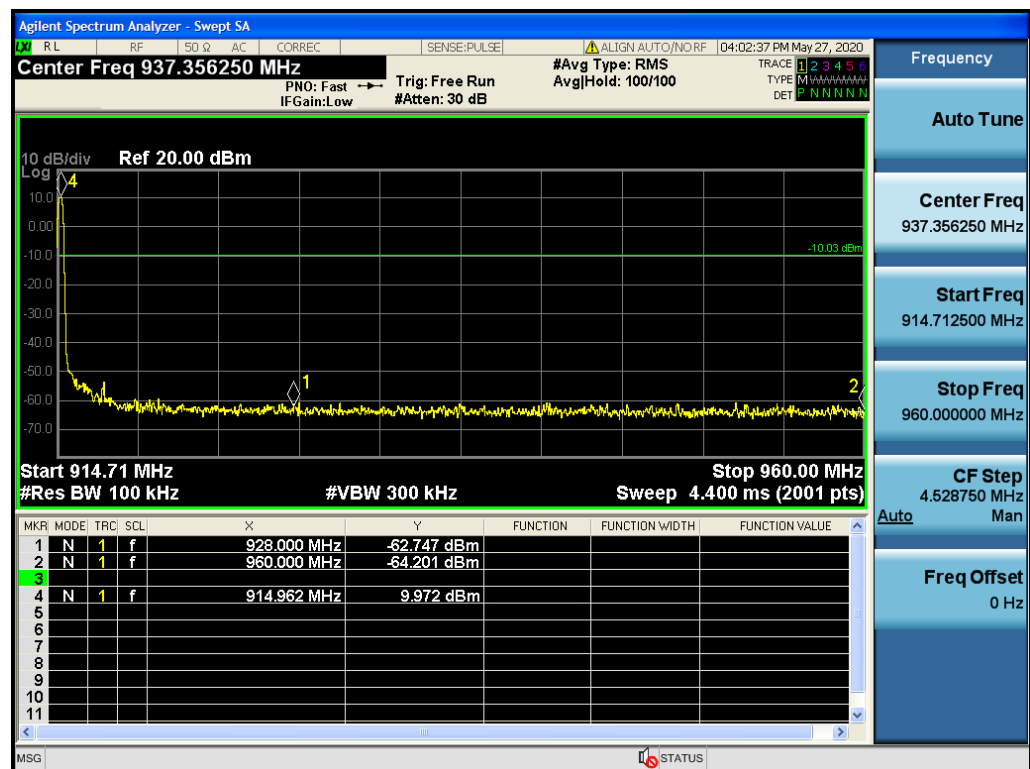
Test Graph

Graphs

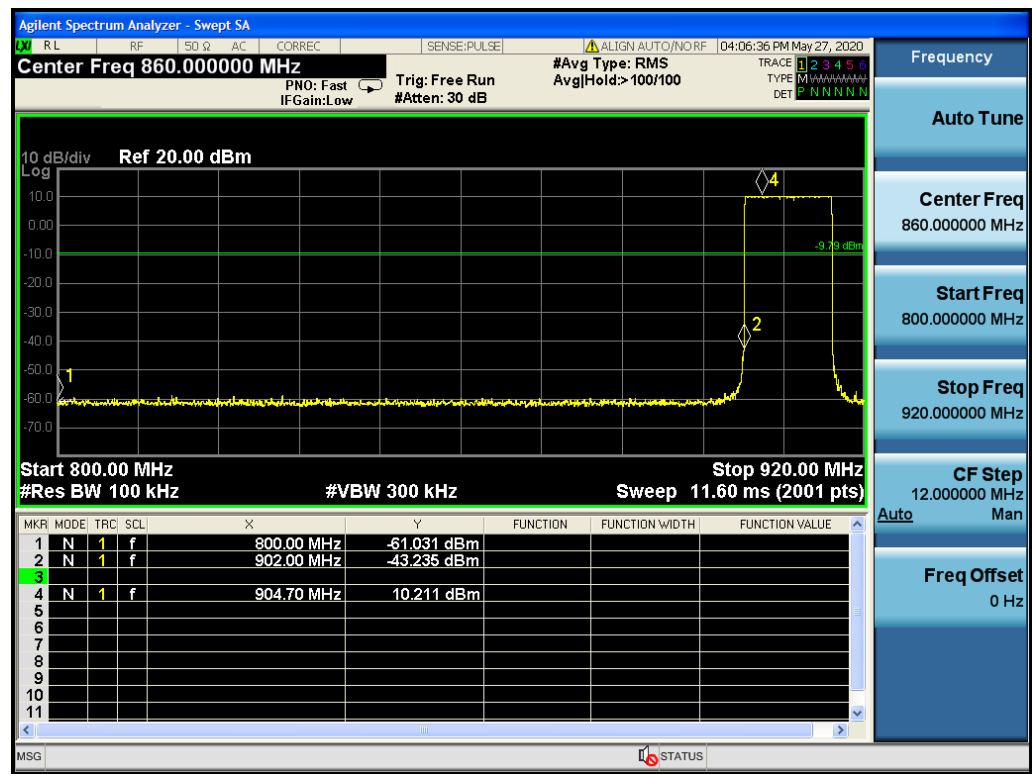
LoRa-Hybrid/LCH/No Hop



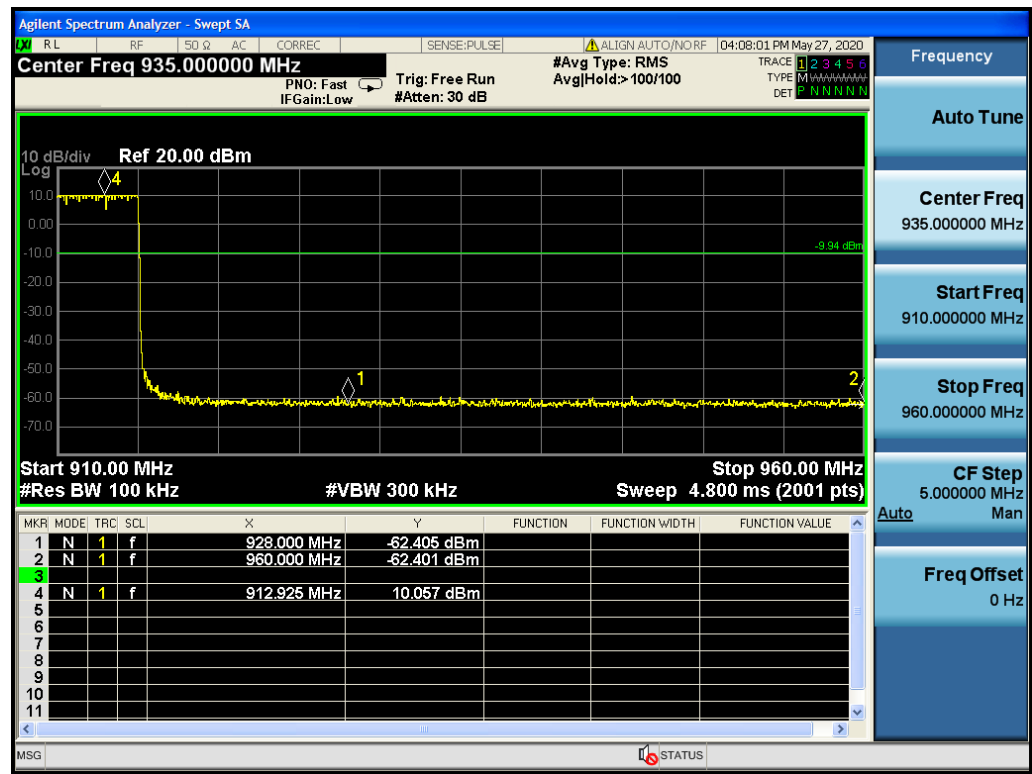
LoRa-Hybrid/HCH/No Hop



LoRa-Hybrid/LCH/Hop

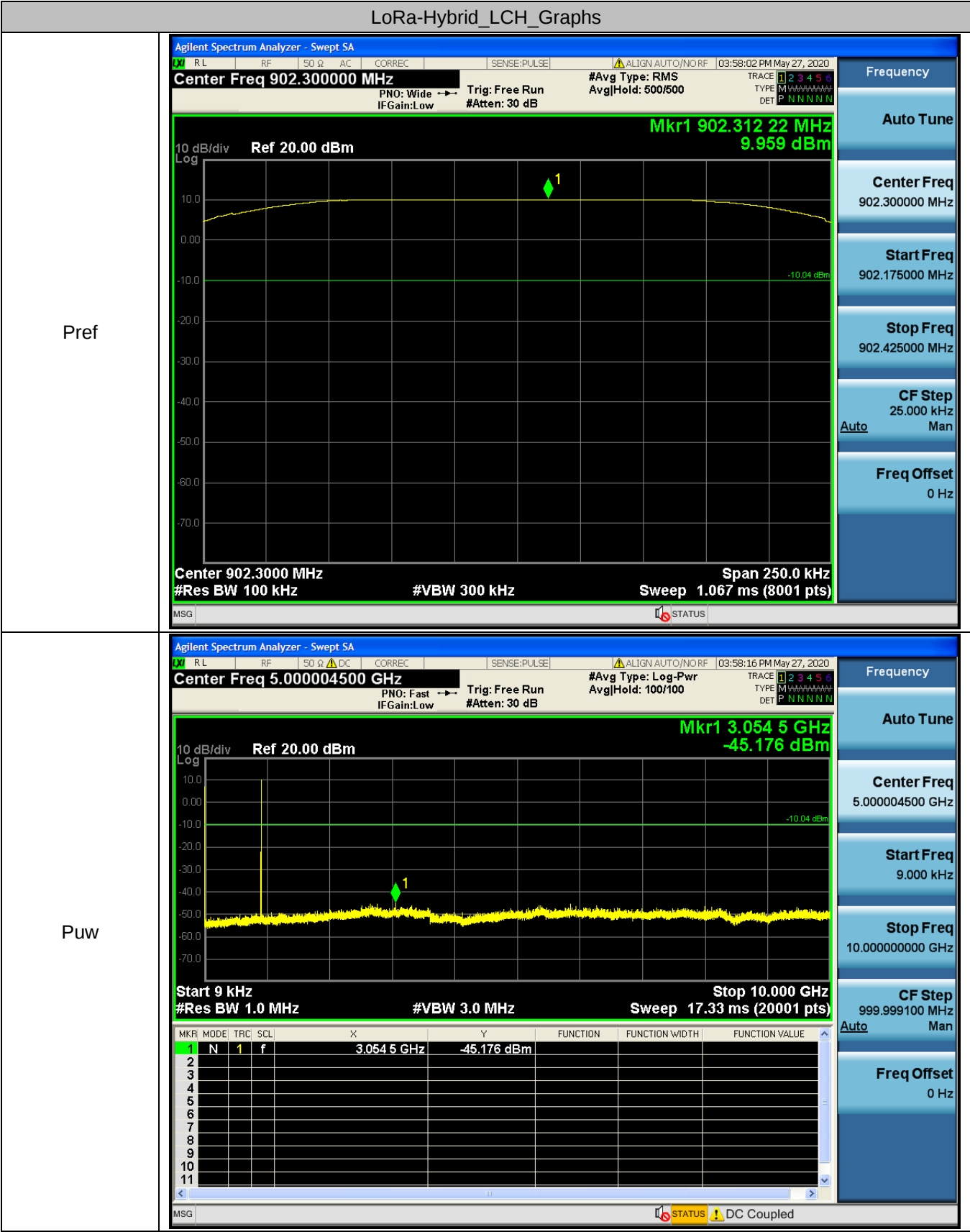


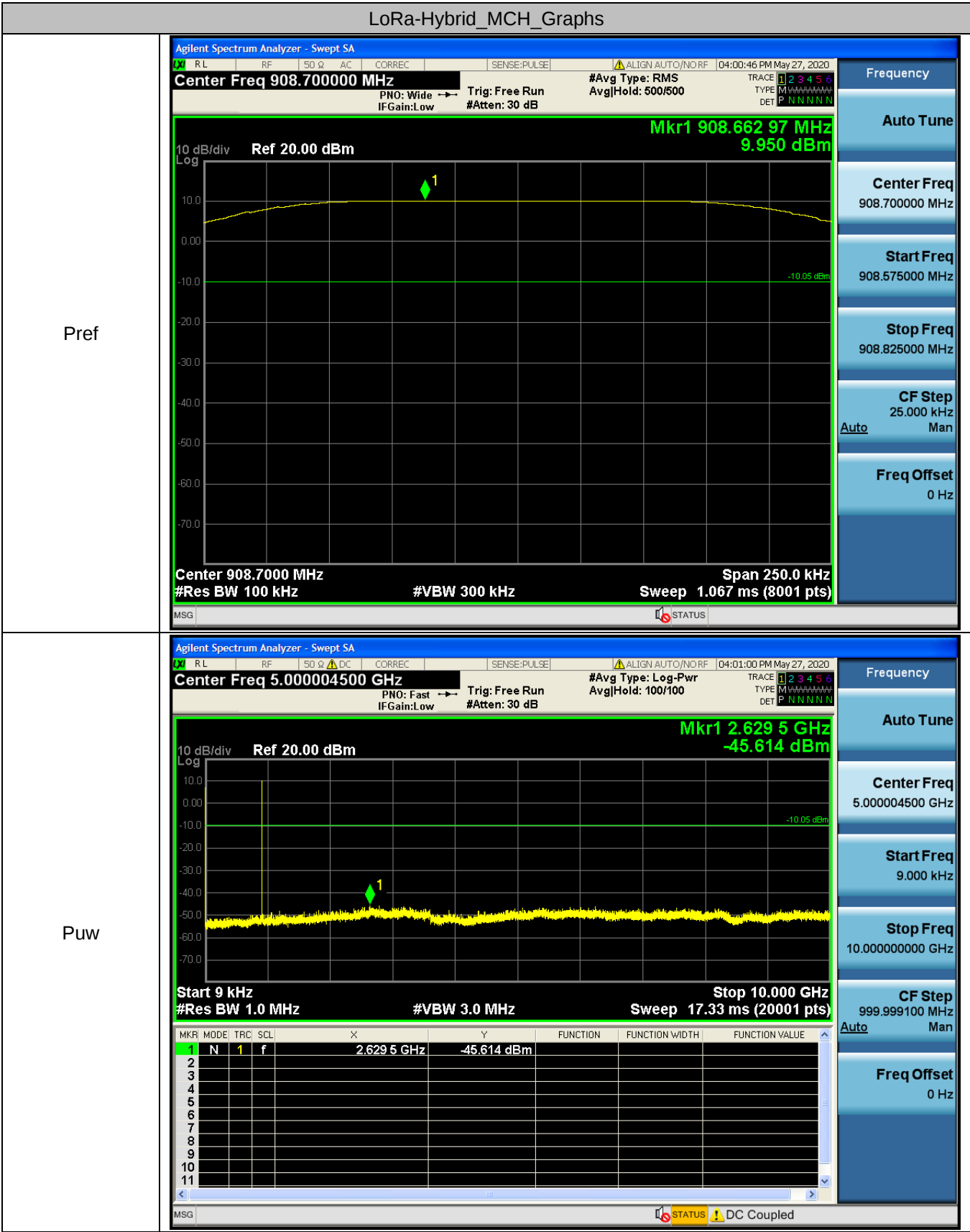
LoRa-Hybrid/HCH/Hop

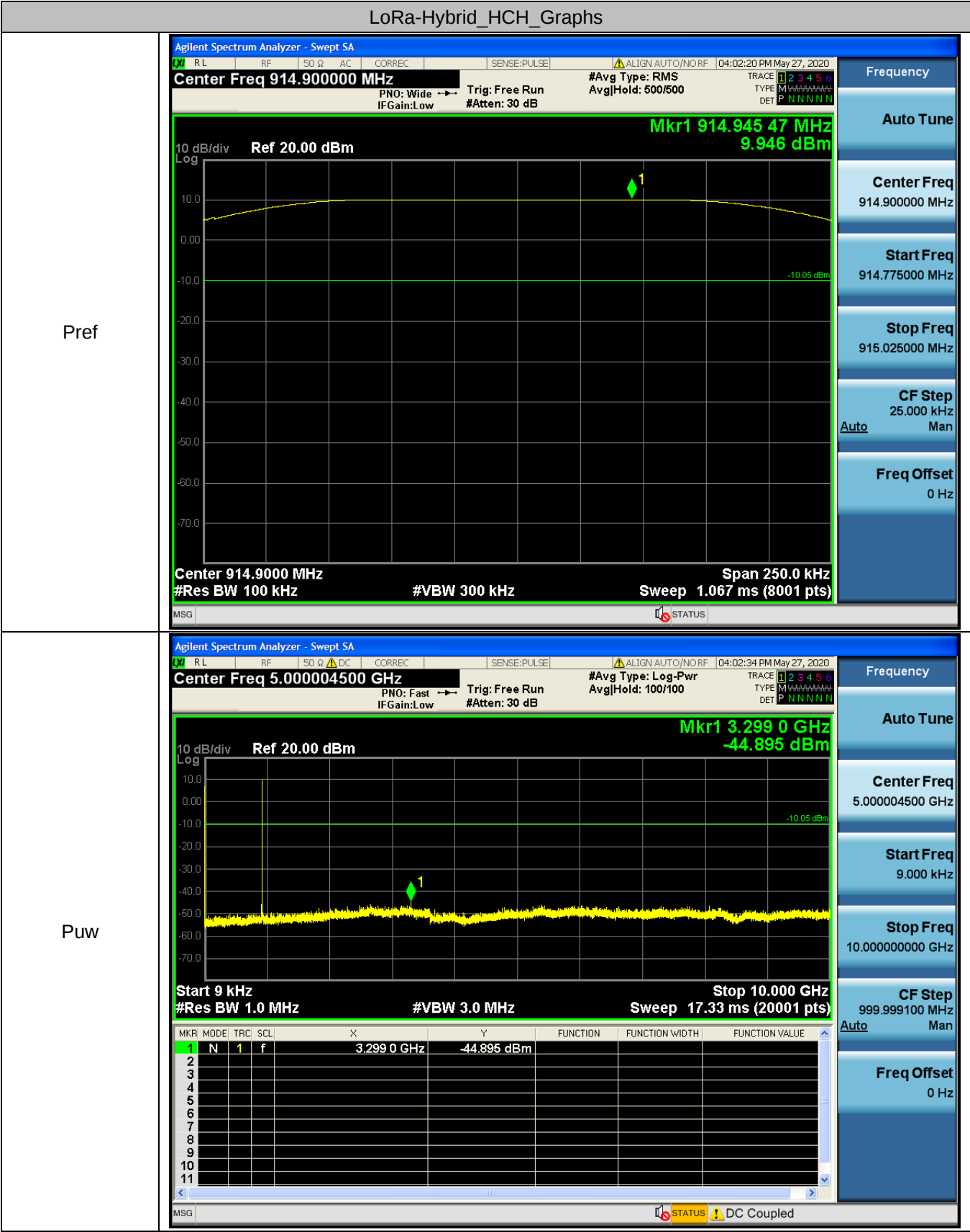


A.7 RF Conducted Spurious Emissions

Test Graph







A.8 Maximum Peak power spectral density

Test Mode	Test	Ant	PSD[dBm/3KHz]	Limit[dBm/3KHz]	Verdict
LoRa-Hybrid	902.3	Ant1	7.429	8.00	PASS
LoRa-Hybrid	908.7	Ant1	7.010	8.00	PASS
LoRa-Hybrid	914.9	Ant1	7.782	8.00	PASS

