

Appendix A

RF Test Data for BT(BDR/EDR) (Conducted Measurement)

Product Name: 30 OZ SPEAKER LID

Trade Mark: NARWHAL

Test Model: 30 OZ SPEAKER LID

FCC ID: 2AX5G-30OZSPEAKER

Environmental Conditions

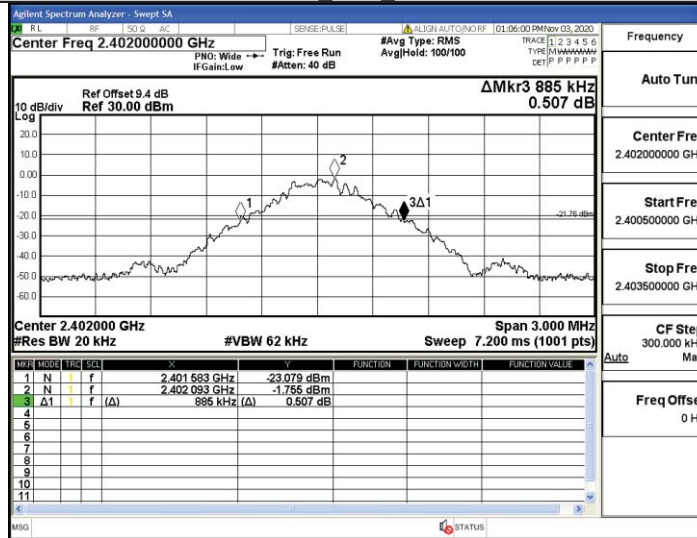
Temperature:	22.8° C
Relative Humidity:	56%
ATM Pressure:	100.0 kPa
Test Engineer:	Nancy Li
Supervised by:	Hugo Chen

A.1 20 dB Bandwidth

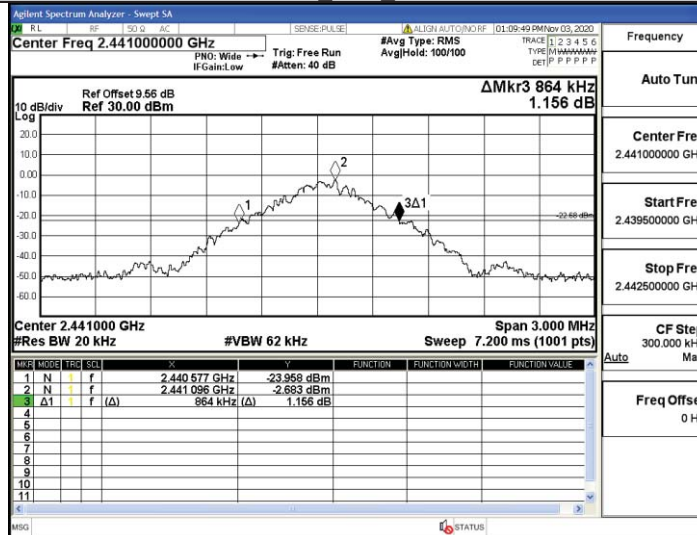
TestMode	Antenna	Channel	20db EBW[MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
DH5	Ant1	2402	0.885	2401.583	2402.468	---	PASS
		2441	0.864	2440.577	2441.441	---	PASS
		2480	0.885	2479.580	2480.465	---	PASS
2DH5	Ant1	2402	1.353	2401.364	2402.717	---	PASS
		2441	1.326	2440.373	2441.699	---	PASS
		2480	1.329	2479.373	2480.702	---	PASS
3DH5	Ant1	2402	1.320	2401.367	2402.687	---	PASS
		2441	1.278	2440.397	2441.675	---	PASS
		2480	1.314	2479.376	2480.690	---	PASS

Test Graph

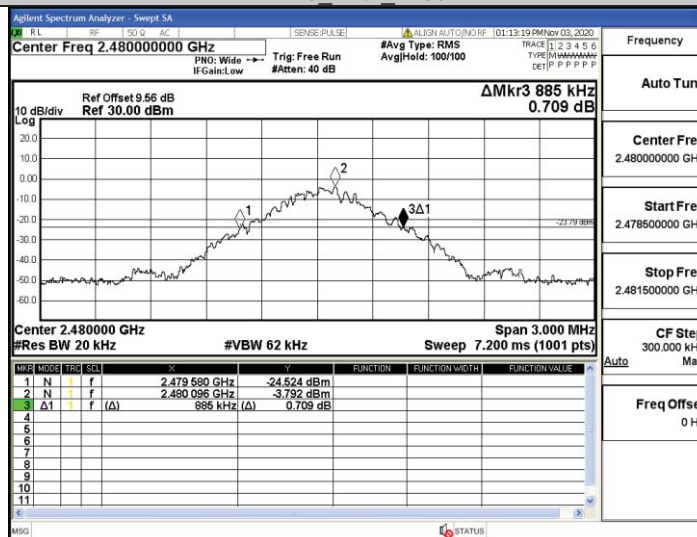
DH5_Ant1_2402



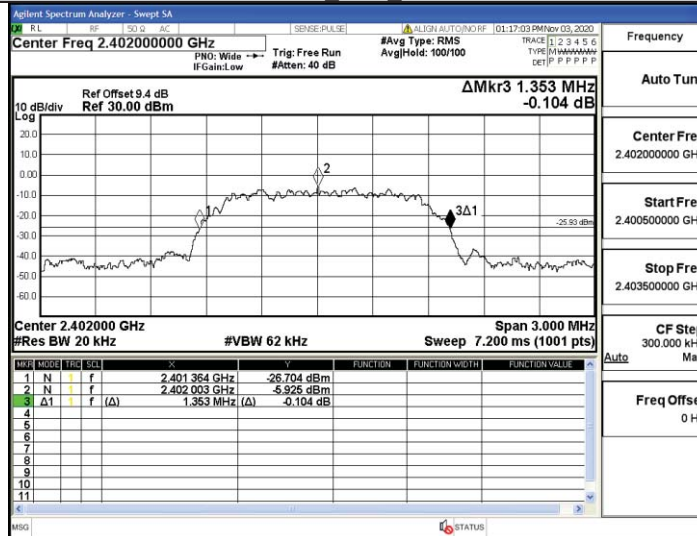
DH5_Ant1_2441



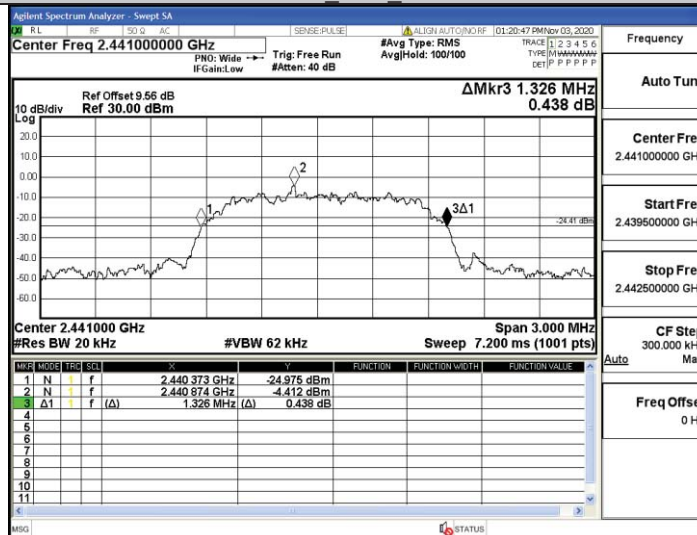
DH5_Ant1_2480



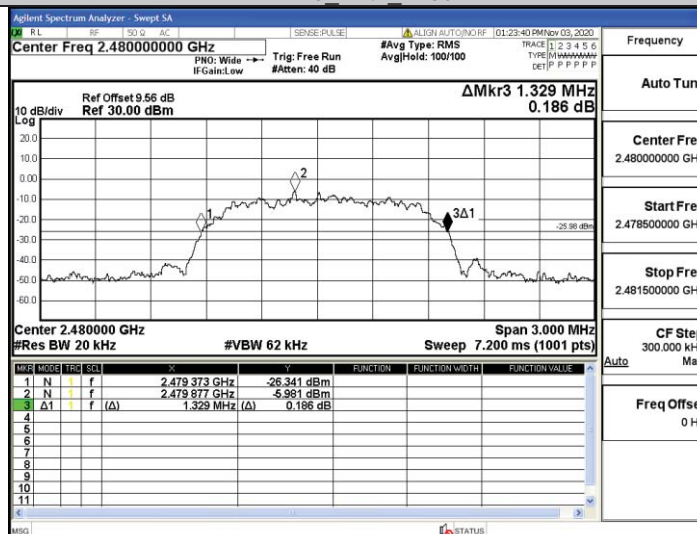
2DH5 Ant1 2402



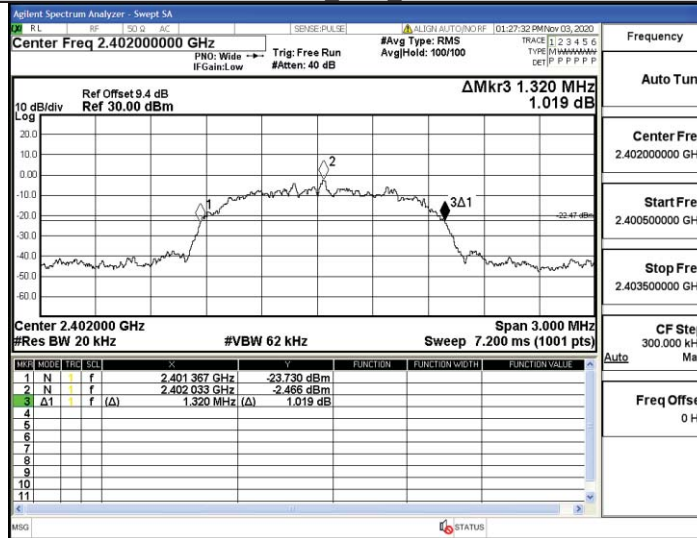
2DH5 Ant1 2441



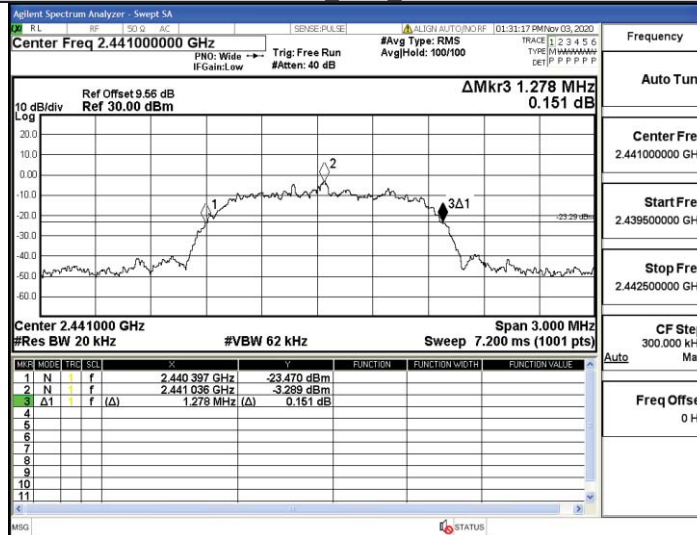
2DH5 Ant1 2480



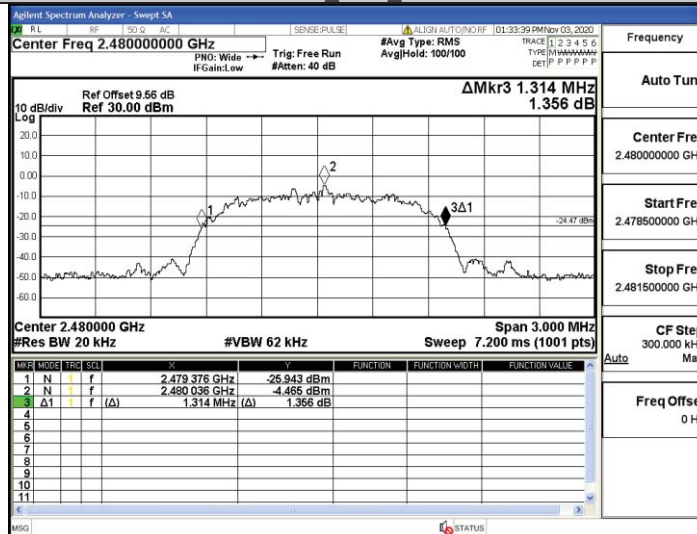
3DH5 Ant1 2402



3DH5 Ant1 2441



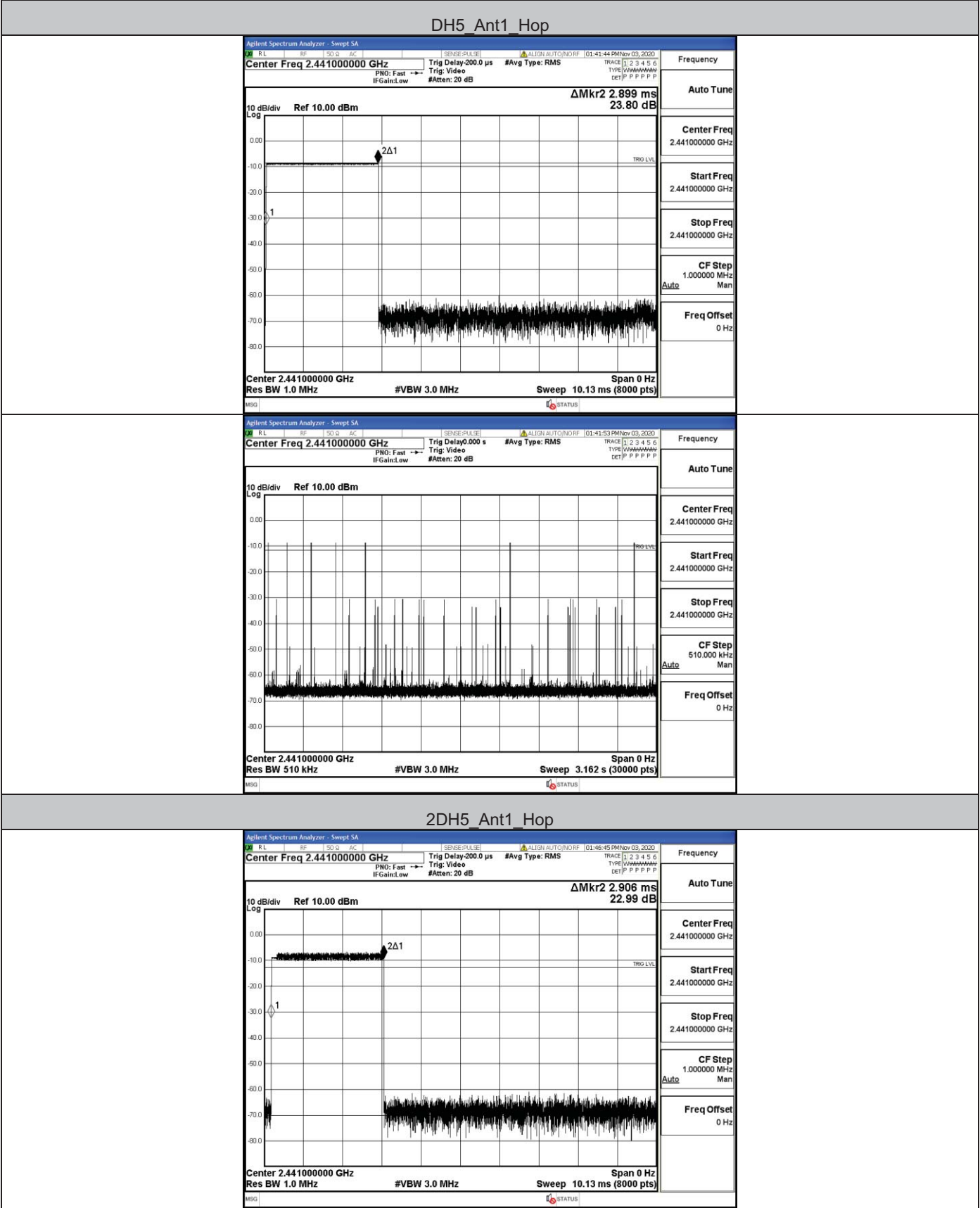
3DH5 Ant1 2480



A.2 Dwell Time

TestMode	Antenna	Channel	BurstWidth [ms]	TotalHops [Num]	Result[s]	Limit[s]	Verdict
DH5	Ant1	Hop	2.90	80	0.232	<=0.4	PASS
2DH5	Ant1	Hop	2.91	100	0.291	<=0.4	PASS
3DH5	Ant1	Hop	2.91	60	0.174	<=0.4	PASS

Test Graph



Frequency

Auto Tune

Center Freq
2.441000000 GHz

Start Freq
2.441000000 GHz

Stop Freq
2.441000000 GHz

CF Step
1.000000 MHz
Man

Freq Offset
0 Hz

Agilent Spectrum Analyzer - Sweep SA

RL

RF

50 Ω

AC

SENSE: PULSE

ALGN: AUTO/NO RF

01:41:53 PM Nov 03, 2020

Center Freq 2.441000000 GHz

Trig Delay: 0.000 s

#Avg Type: RMS

TRAC: 1 2 3 4 5 6

TYPE: (WWWWWWWW)

DET: (PPPPPP)

PN0: Fast

IF Gain: Low

#Atten: 20 dB

10 dB/div

Ref 10.00 dBm

ΔMkr2 2.906 ms

22.99 dB

Log

0.00

-10.00

-20.00

-30.00

-40.00

-50.00

-60.00

-70.00

-80.00

2Δ1

1

TR0 LVL

Center 2.441000000 GHz

Res BW 510 kHz

#VBW 3.0 MHz

Sweep 3.162 s (30000 pts)

Span 0 Hz

MSG

STATUS

Frequency

Auto Tune

Center Freq
2.441000000 GHz

Start Freq
2.441000000 GHz

Stop Freq
2.441000000 GHz

CF Step
510.000 kHz
Man

Freq Offset
0 Hz

2DH5_Ant1_Hop

Agilent Spectrum Analyzer - Sweep SA

RL

RF

50 Ω

AC

SENSE: PULSE

ALGN: AUTO/NO RF

01:46:45 PM Nov 03, 2020

Center Freq 2.441000000 GHz

Trig Delay: 200.0 μs

#Avg Type: RMS

TRAC: 1 2 3 4 5 6

TYPE: (WWWWWWWW)

DET: (PPPPPP)

PN0: Fast

IF Gain: Low

#Atten: 20 dB

10 dB/div

Ref 10.00 dBm

ΔMkr2 2.906 ms

22.99 dB

Log

0.00

-10.00

-20.00

-30.00

-40.00

-50.00

-60.00

-70.00

-80.00

2Δ1

1

TR0 LVL

Center 2.441000000 GHz

Res BW 1.0 MHz

#VBW 3.0 MHz

Sweep 10.13 ms (8000 pts)

Span 0 Hz

MSG

STATUS

Frequency

Auto Tune

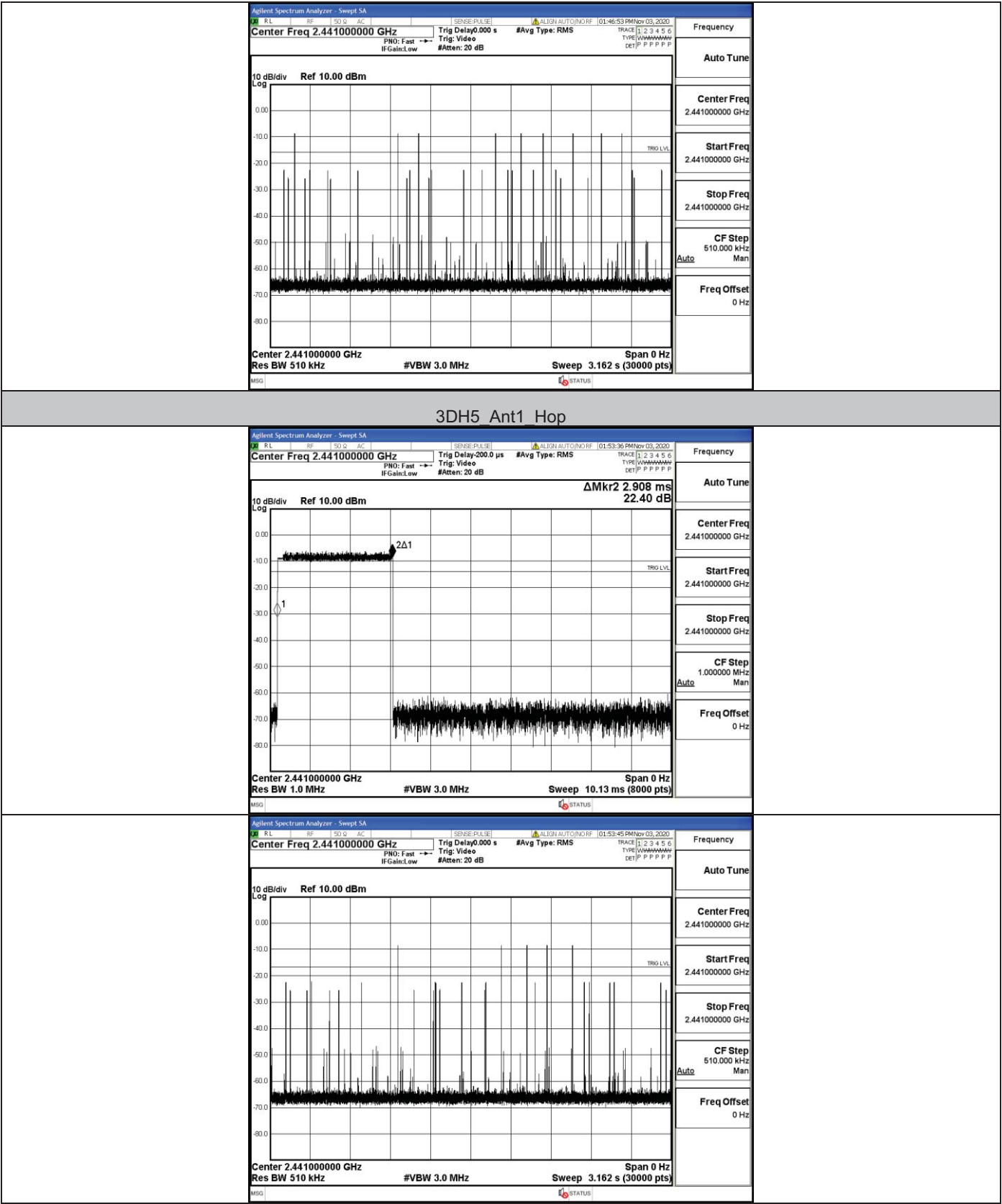
Center Freq
2.441000000 GHz

Start Freq
2.441000000 GHz

Stop Freq
2.441000000 GHz

CF Step
1.000000 MHz
Man

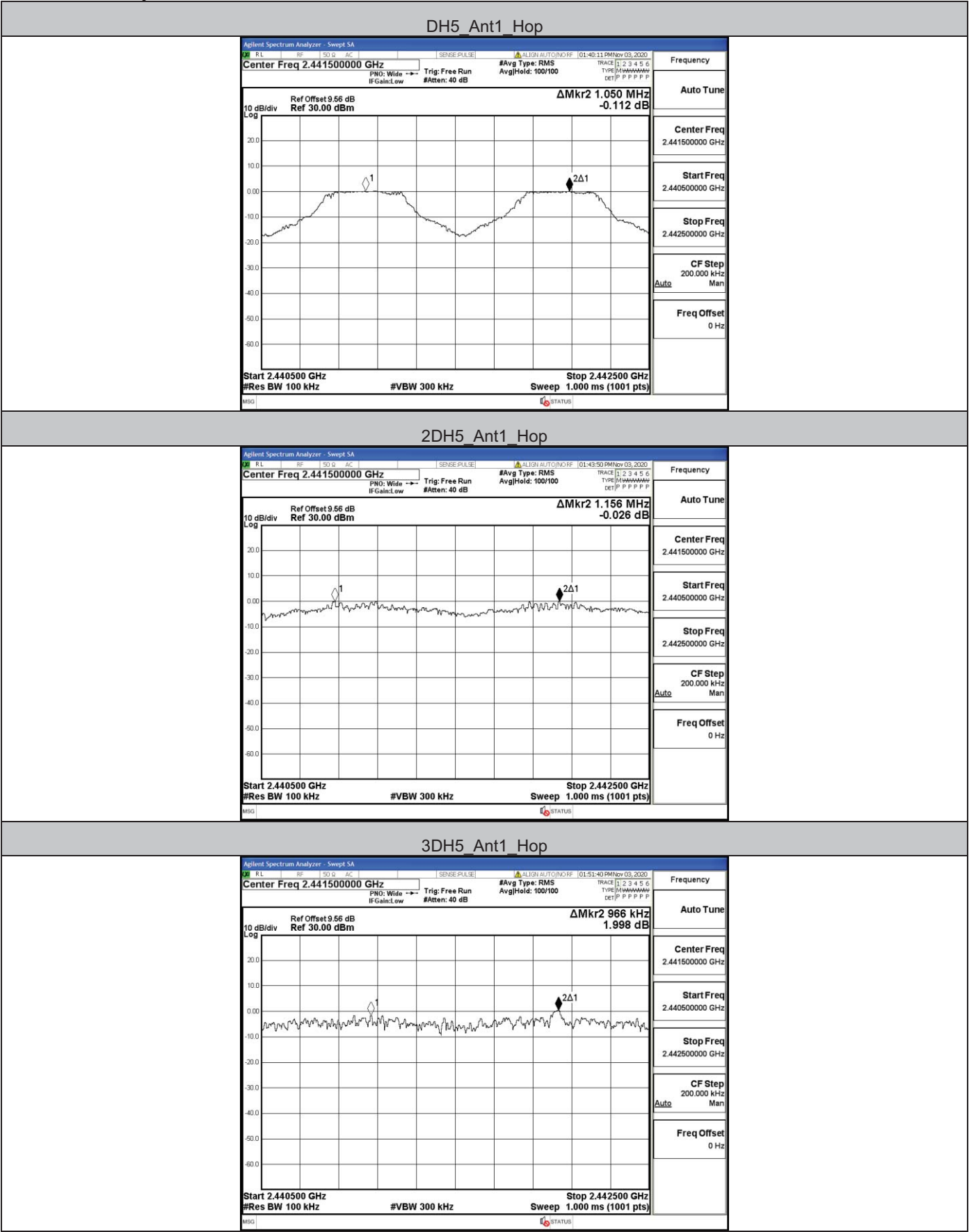
Freq Offset
0 Hz



A.3 Carrier Frequency Separation

TestMode	Antenna	Channel	Result[MHz]	Limit[MHz]	Verdict
DH5	Ant1	Hop	1.05	≥ 0.885	PASS
2DH5	Ant1	Hop	1.156	≥ 0.902	PASS
3DH5	Ant1	Hop	0.966	≥ 0.880	PASS

Test Graph

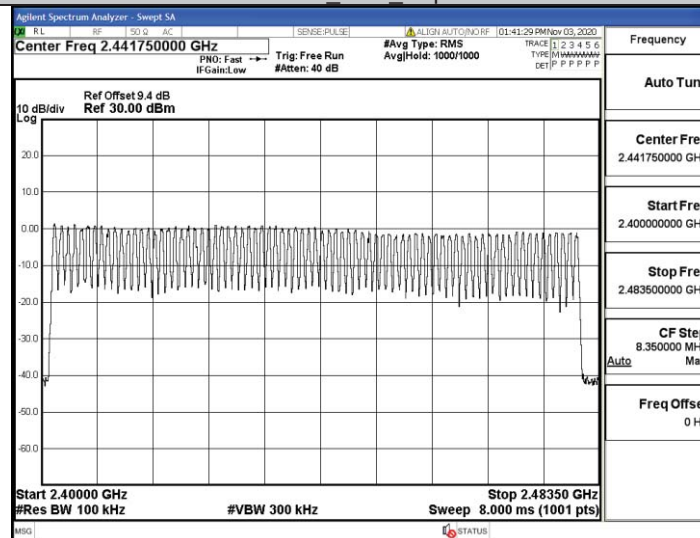


A.4 Hopping Channel Number

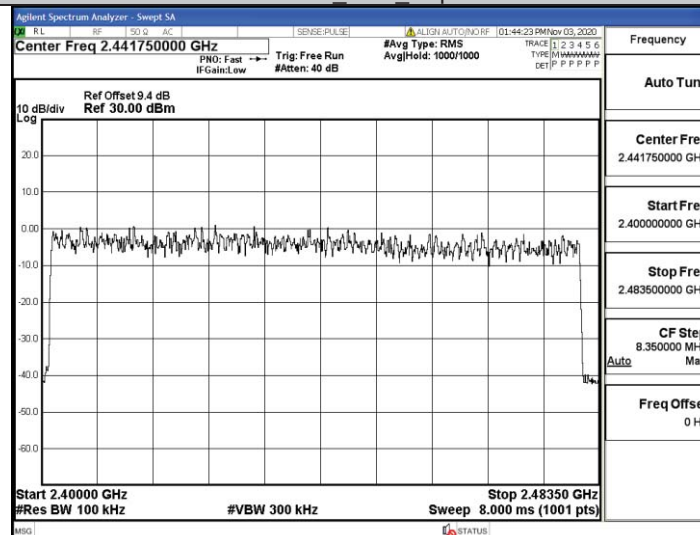
TestMode	Antenna	Channel	Result[Num]	Limit[Num]	Verdict
DH5	Ant1	Hop	79	>=15	PASS
2DH5	Ant1	Hop	79	>=15	PASS
3DH5	Ant1	Hop	79	>=15	PASS

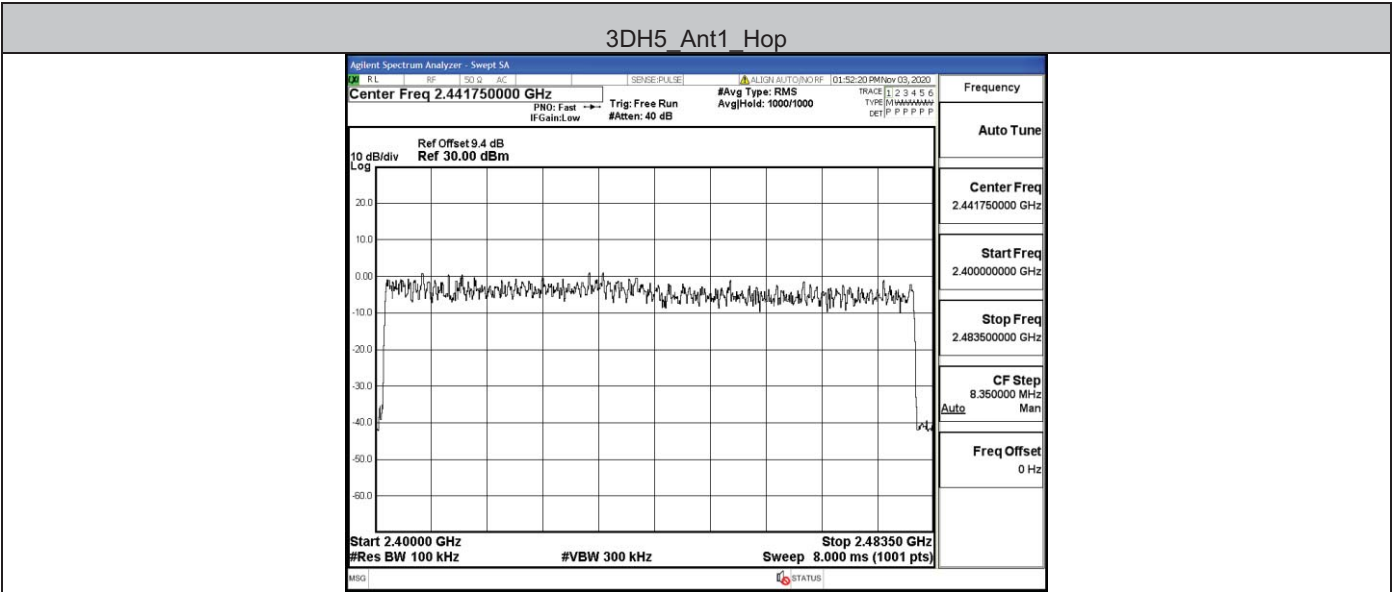
Test Graph

DH5_Ant1_Hop



2DH5_Ant1_Hop

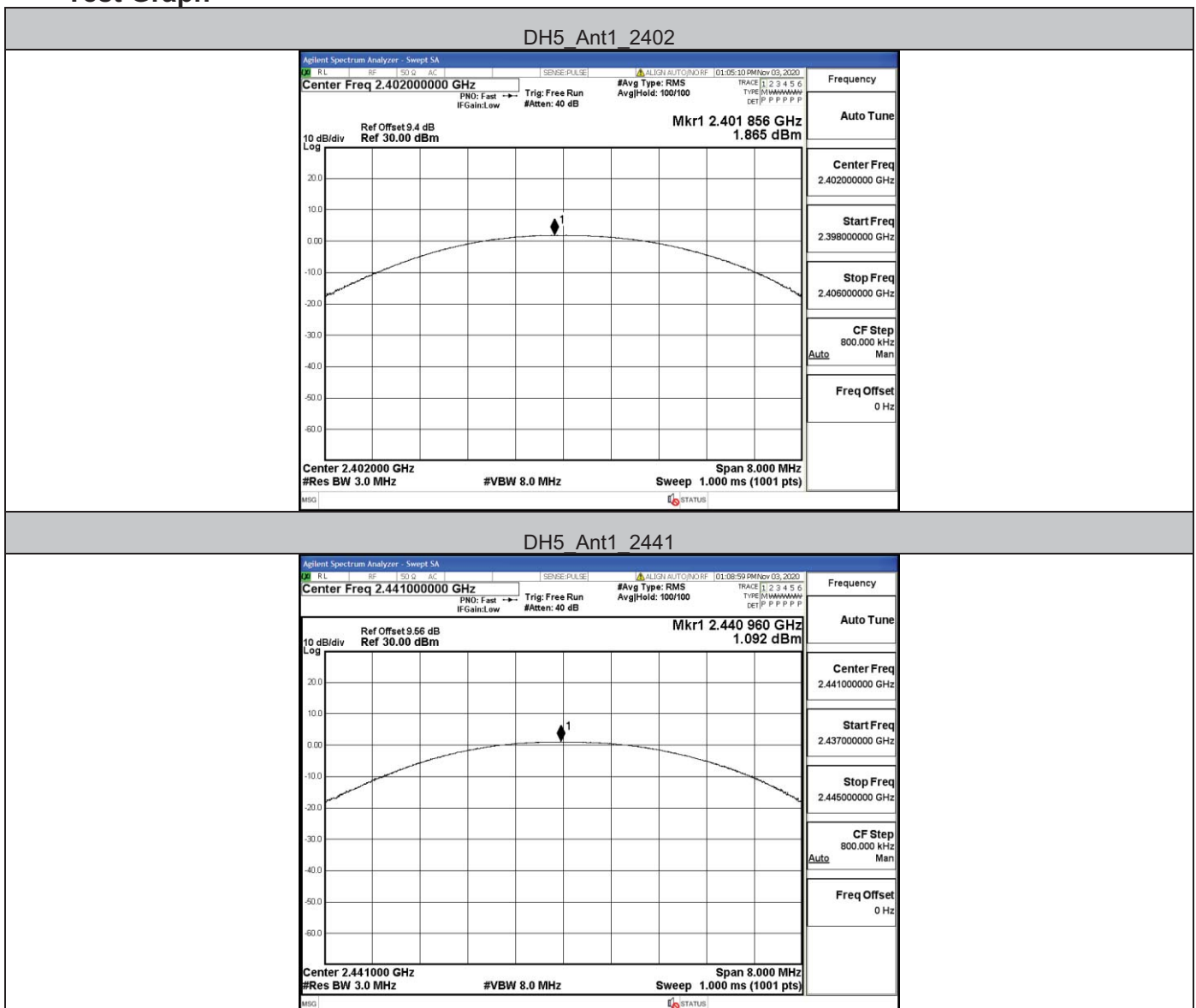


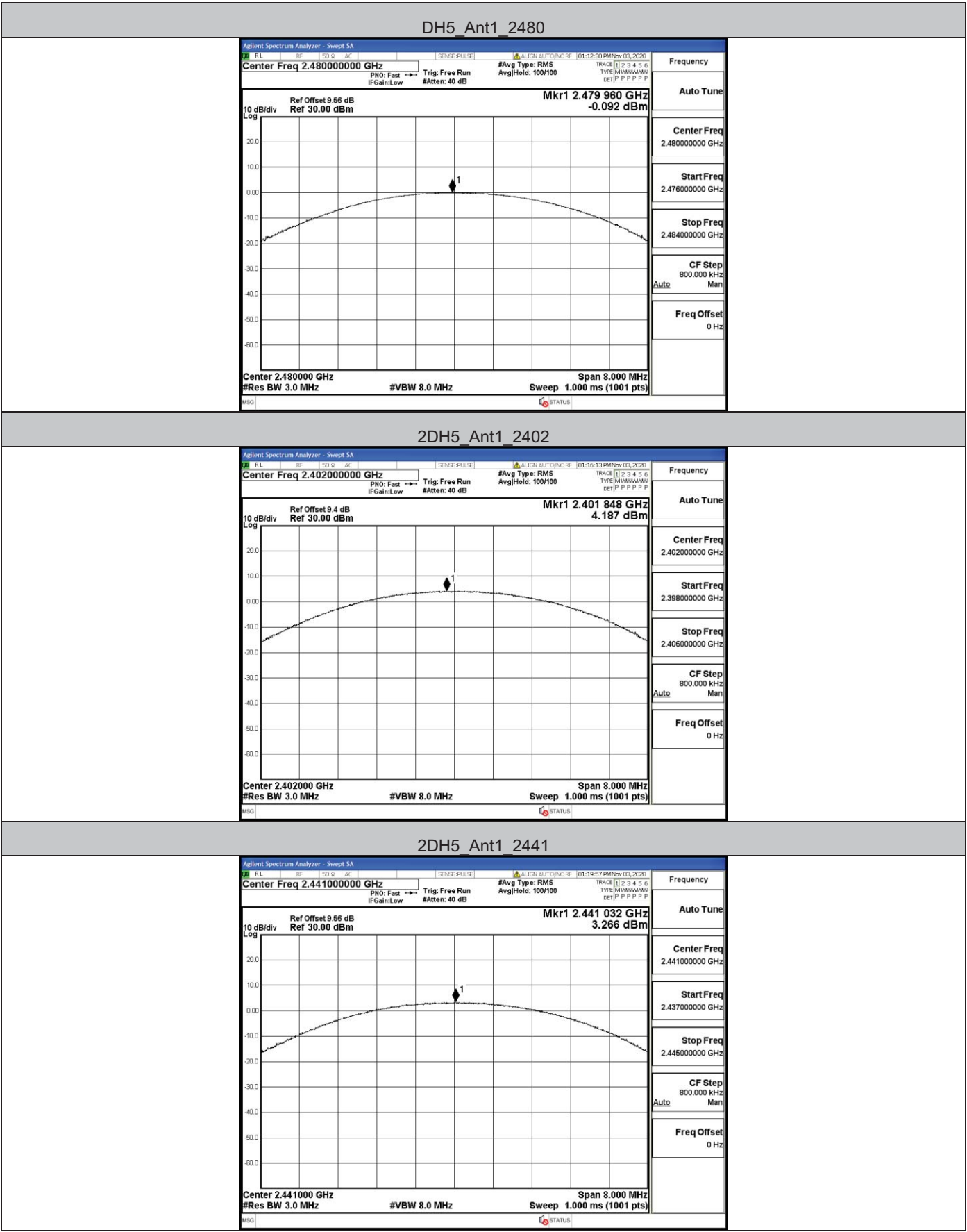


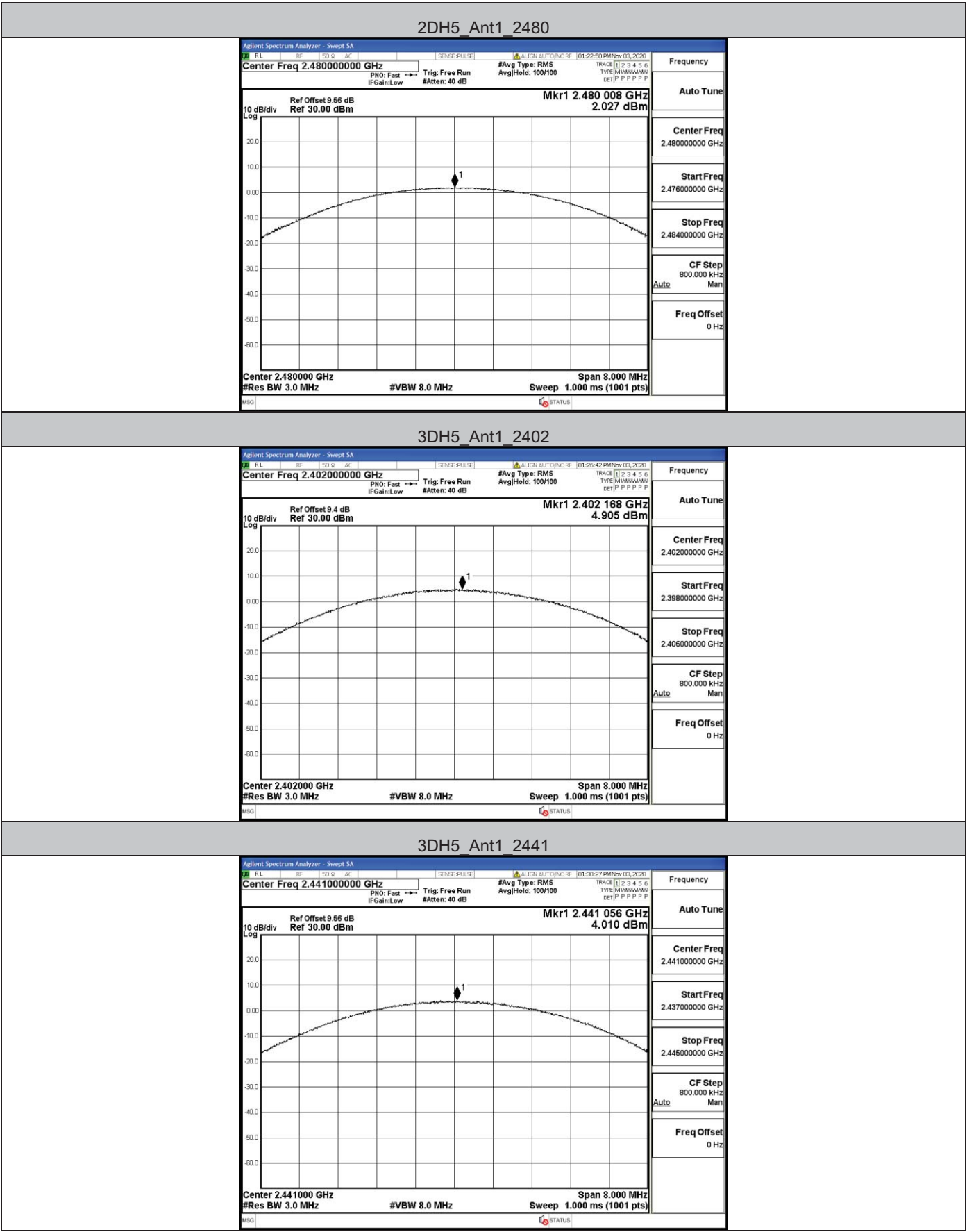
A.5 Conducted Peak Output Power

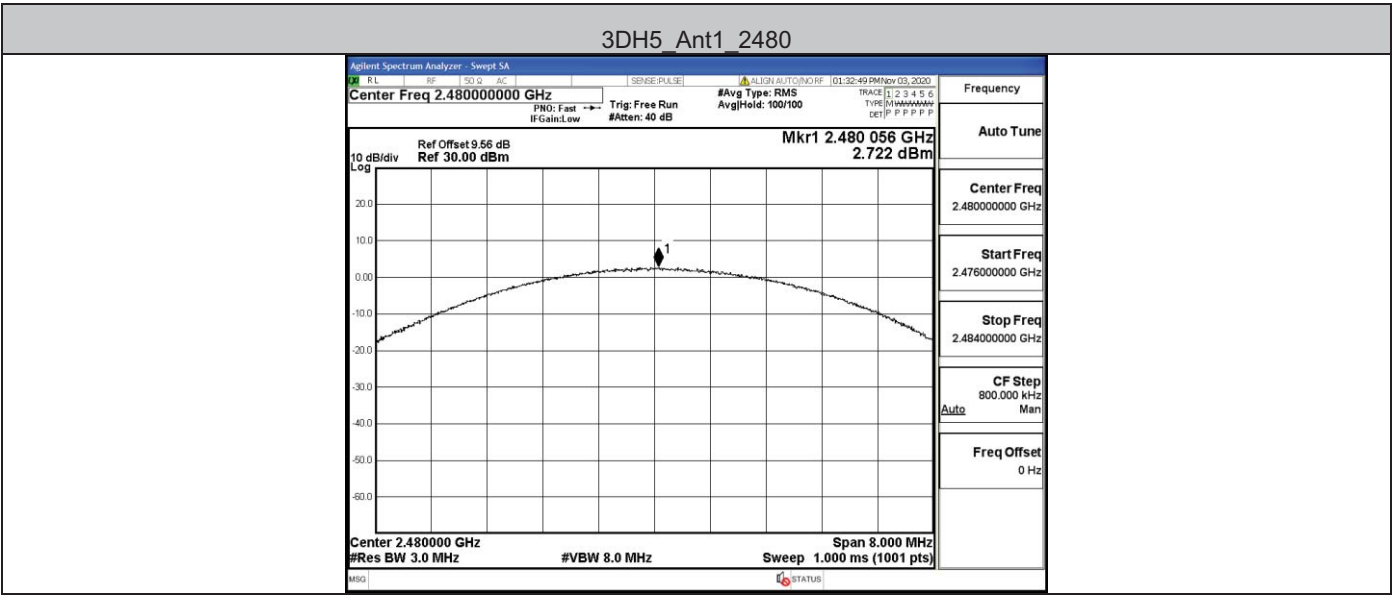
TestMode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
DH5	Ant1	2402	1.87	<=30	PASS
		2441	1.09	<=30	PASS
		2480	-0.09	<=30	PASS
2DH5	Ant1	2402	4.19	<=20.97	PASS
		2441	3.27	<=20.97	PASS
		2480	2.03	<=20.97	PASS
3DH5	Ant1	2402	4.91	<=20.97	PASS
		2441	4.01	<=20.97	PASS
		2480	2.72	<=20.97	PASS

Test Graph







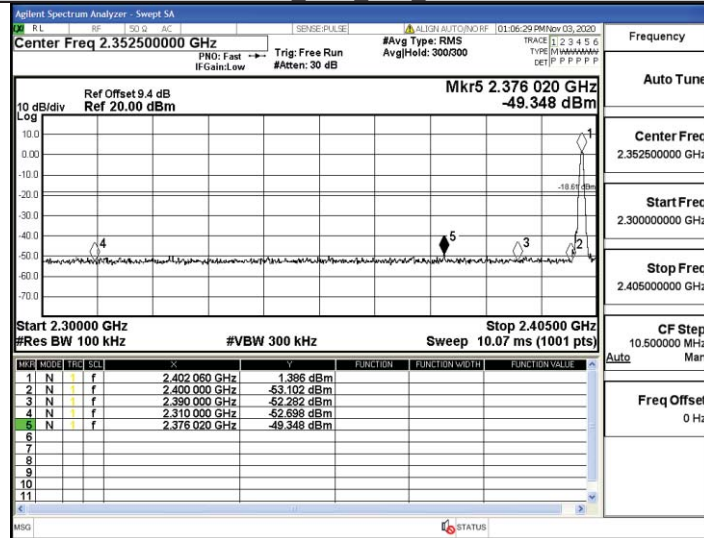


A.6 Band-edge for RF Conducted Emissions

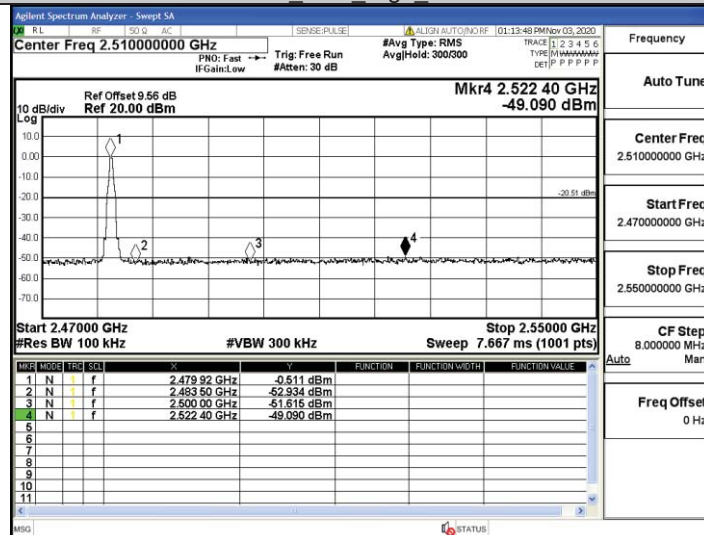
TestMode	Antenna	ChName	Channel	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH5	Ant1	Low	2402	-8.43	-50.87	<=-28.43	PASS
		High	2480	-6.24	-50.33	<=-26.24	PASS
		Low	Hop_2402	-8.71	-51.45	<=-28.71	PASS
		High	Hop_2480	-6.68	-50.23	<=-26.68	PASS
2DH5	Ant1	Low	2402	-8.33	-46.89	<=-28.33	PASS
		High	2480	-6.44	-50.04	<=-26.44	PASS
		Low	Hop_2402	-9.29	-50.78	<=-29.29	PASS
		High	Hop_2480	-6.79	-49.99	<=-26.79	PASS
3DH5	Ant1	Low	2402	-8.37	-46.43	<=-28.37	PASS
		High	2480	-6.43	-49.44	<=-26.43	PASS
		Low	Hop_2402	-11.16	-50.87	<=-31.16	PASS
		High	Hop_2480	-8.13	-49.46	<=-28.13	PASS

Test Graph

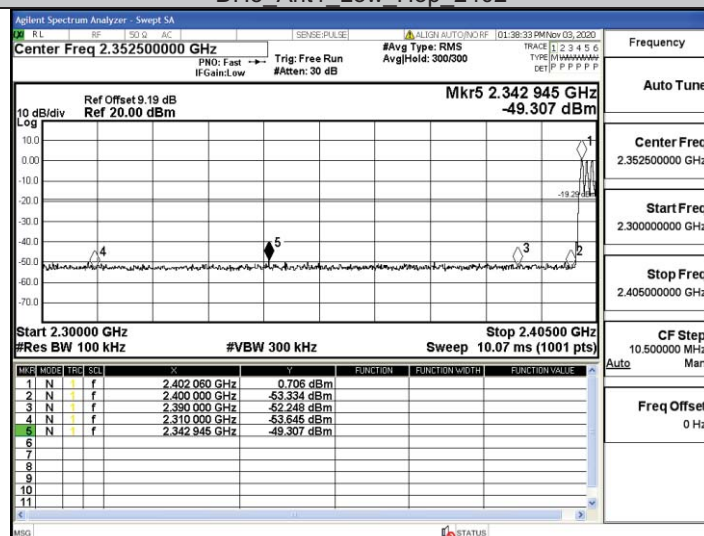
DH5_Ant1_Low_2402



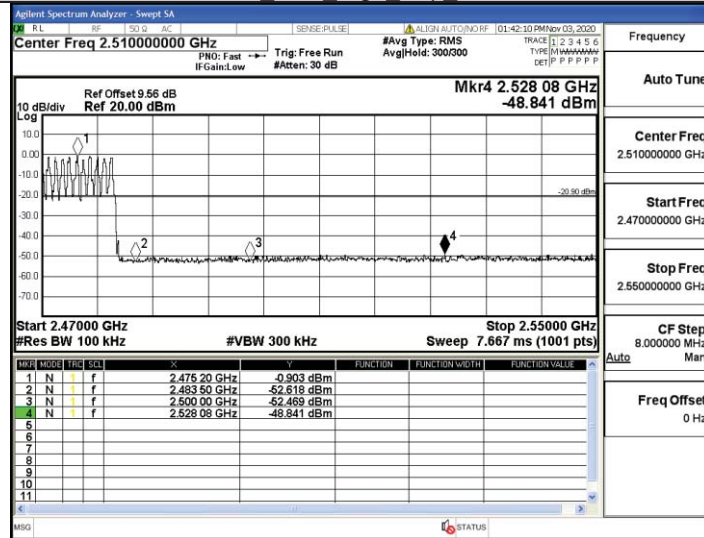
DH5_Ant1_High_2480



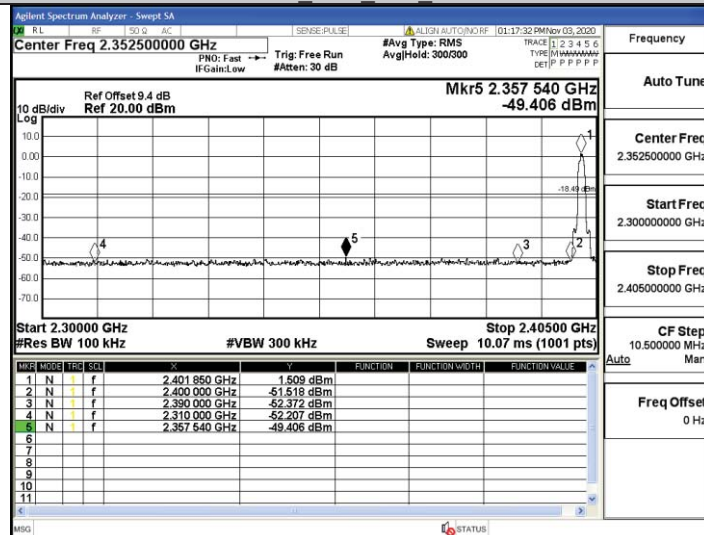
DH5_Ant1_Low_Hop_2402



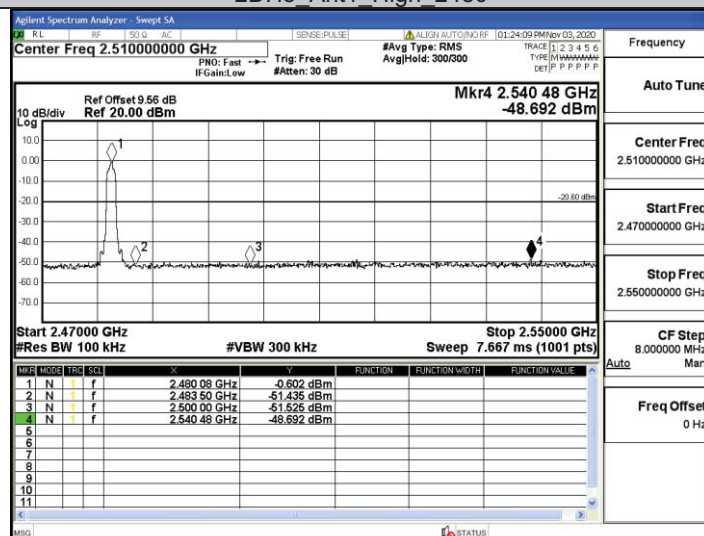
DH5_Ant1_High_Hop_2480



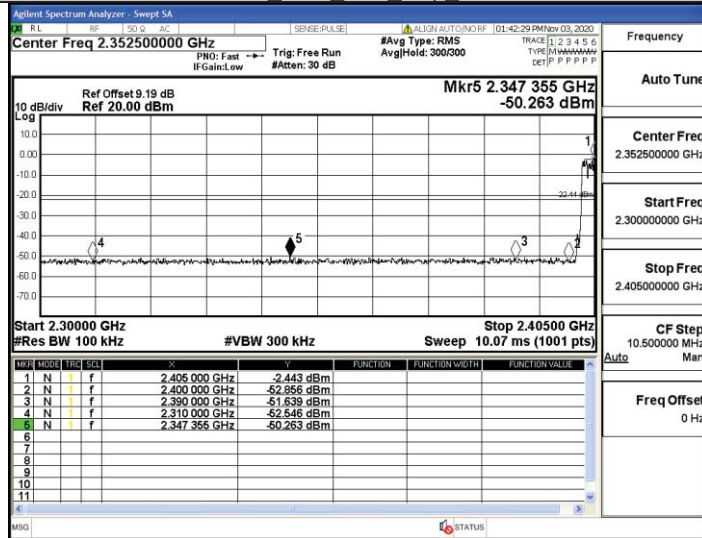
2DH5_Ant1_Low_2402



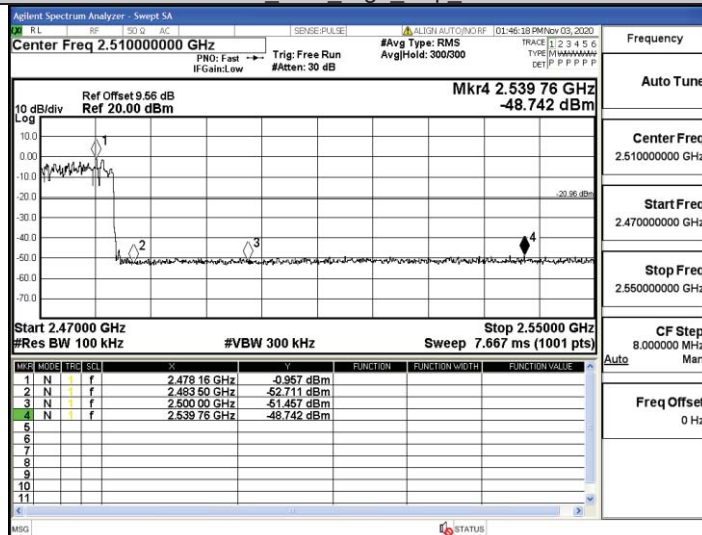
2DH5_Ant1_High_2480



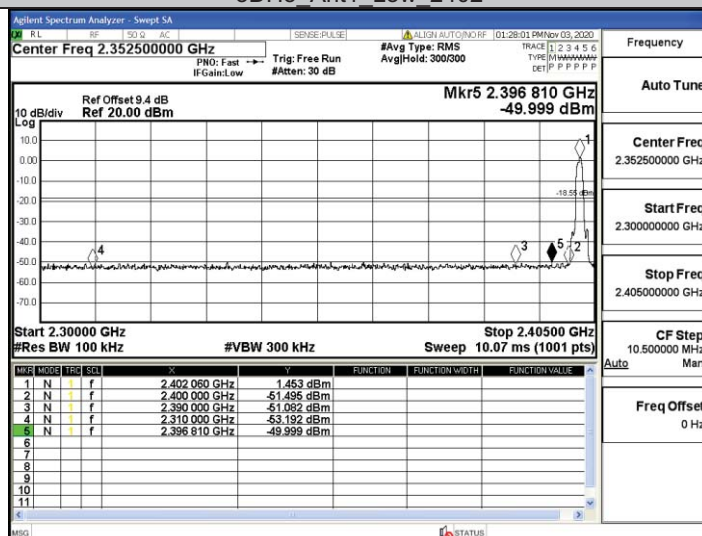
2DH5 Ant1 Low Hop 2402



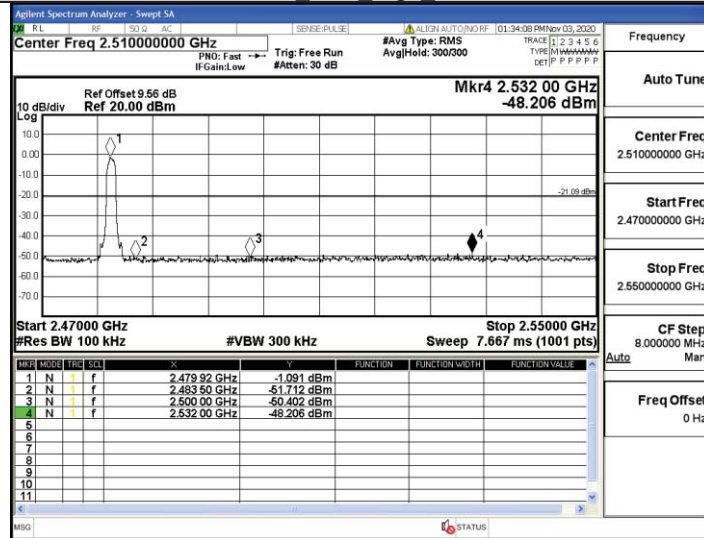
2DH5 Ant1 High Hop 2480



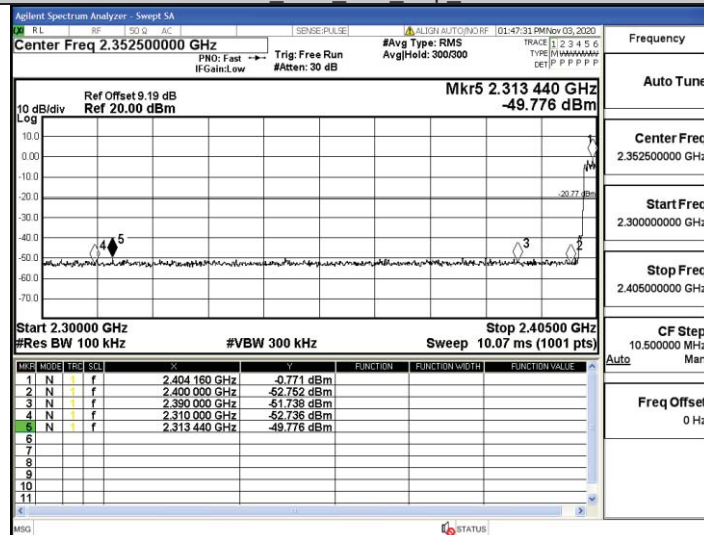
3DH5 Ant1 Low 2402



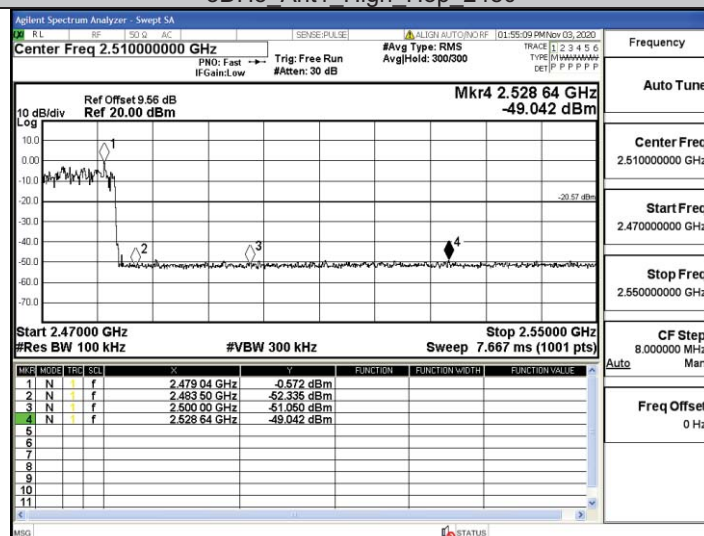
3DH5 Ant1 High 2480



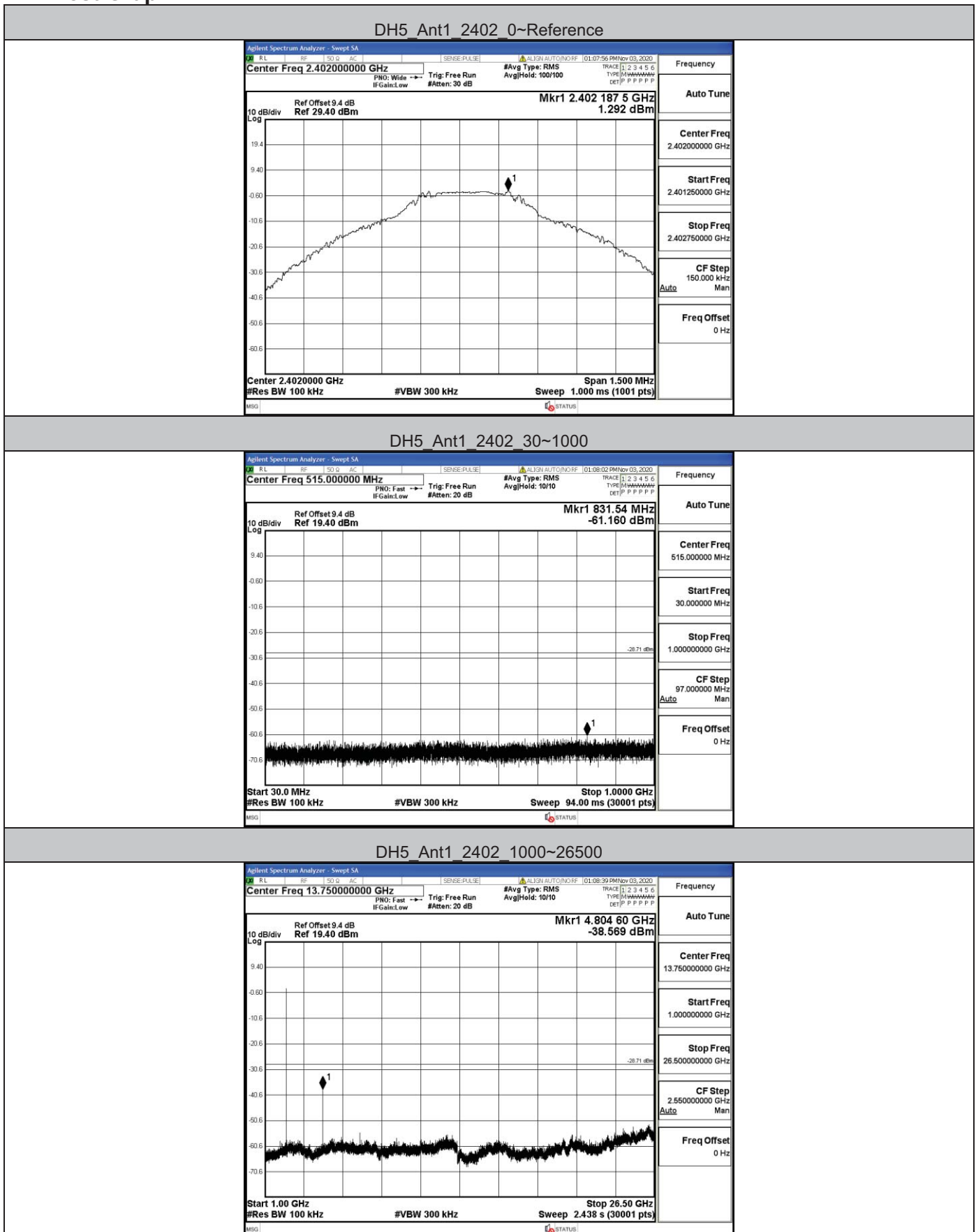
3DH5 Ant1 Low Hop 2402



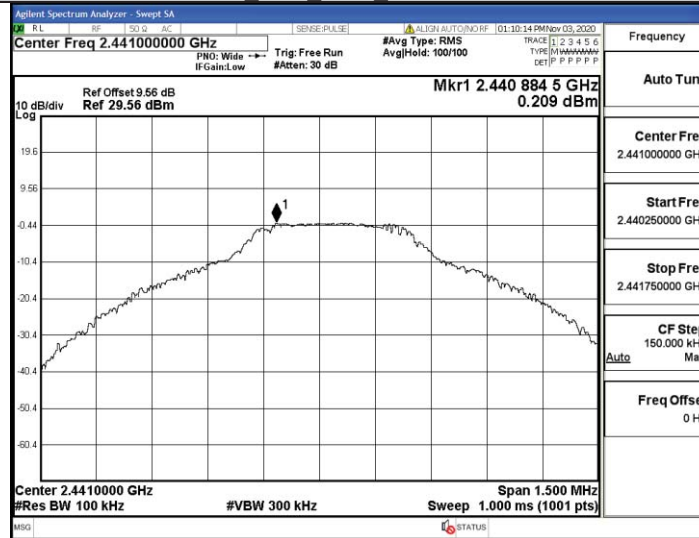
3DH5 Ant1 High Hop 2480



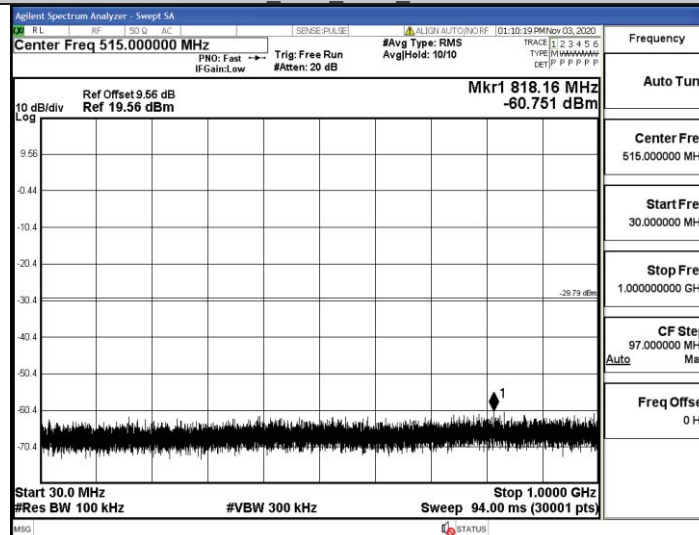
A.7 RF Conducted Spurious Emissions Test Graph



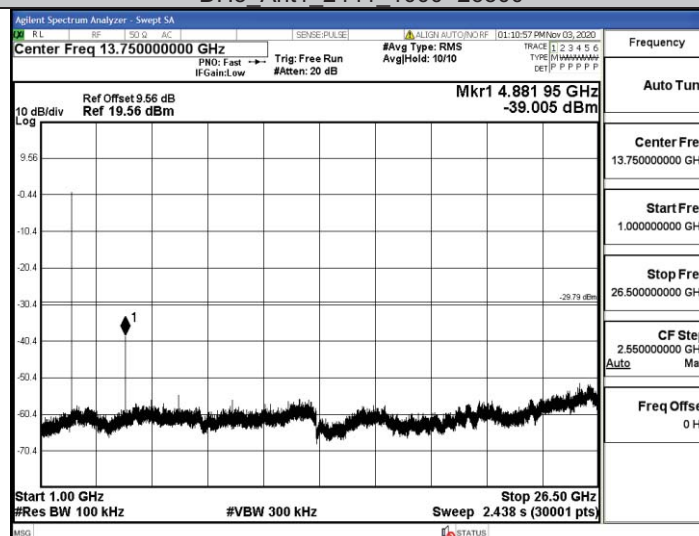
DH5_Ant1_2441_0~Reference

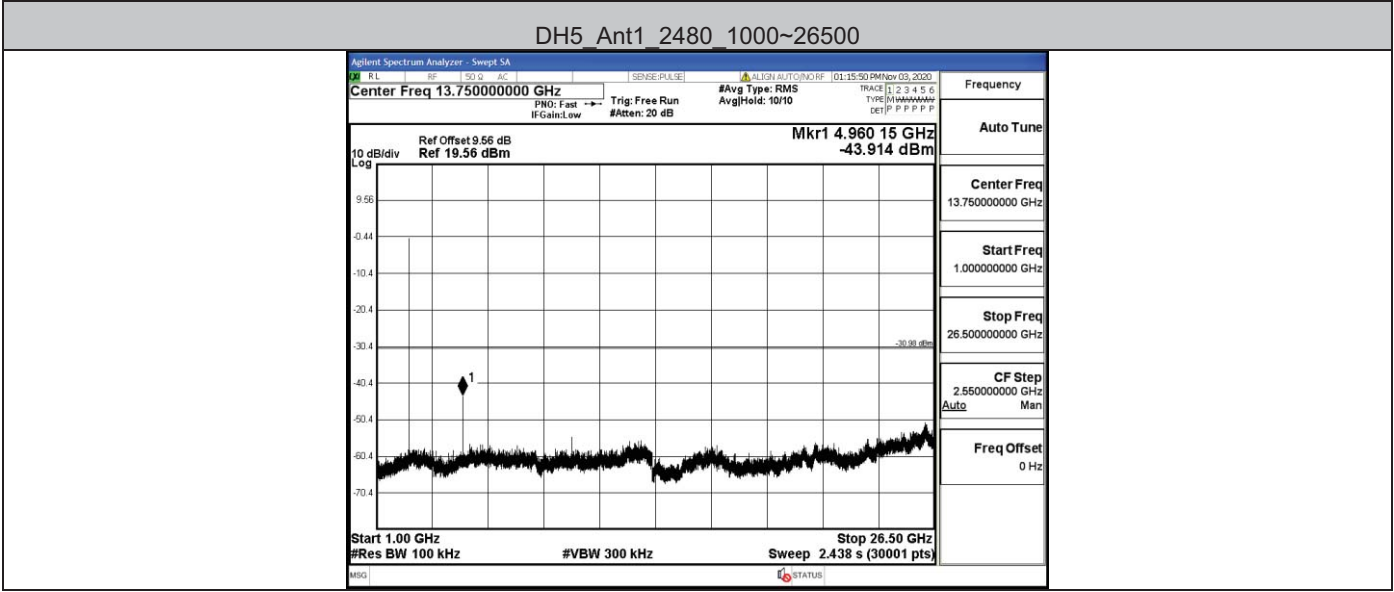
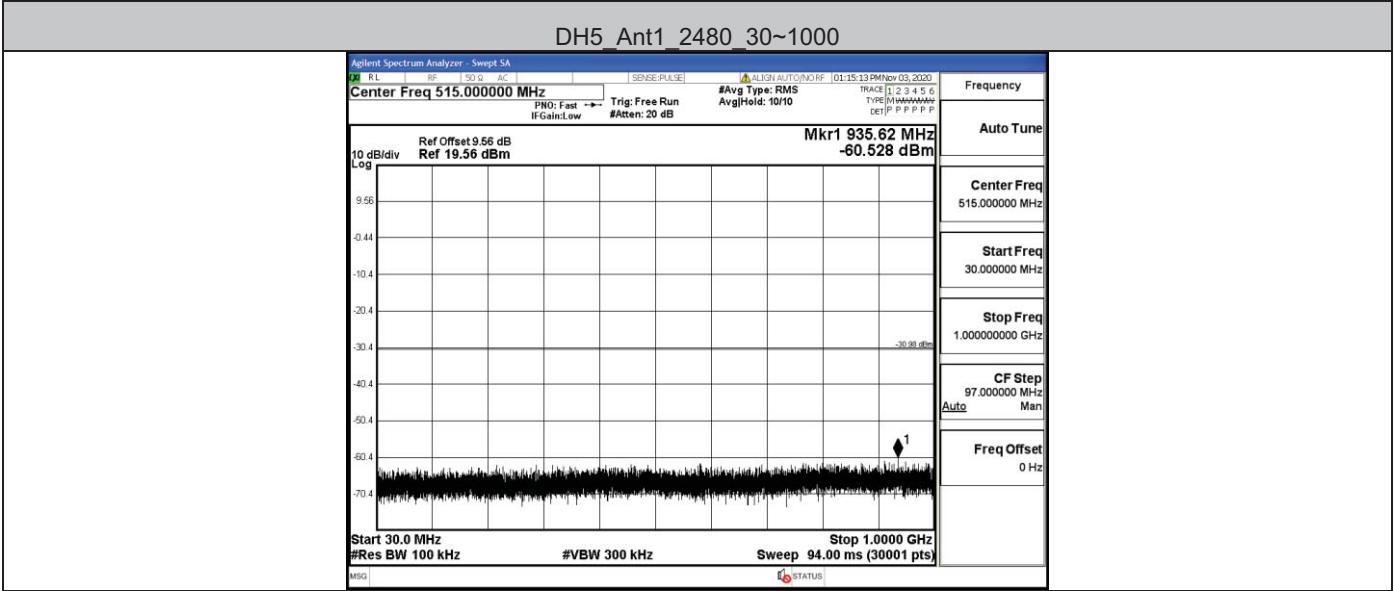
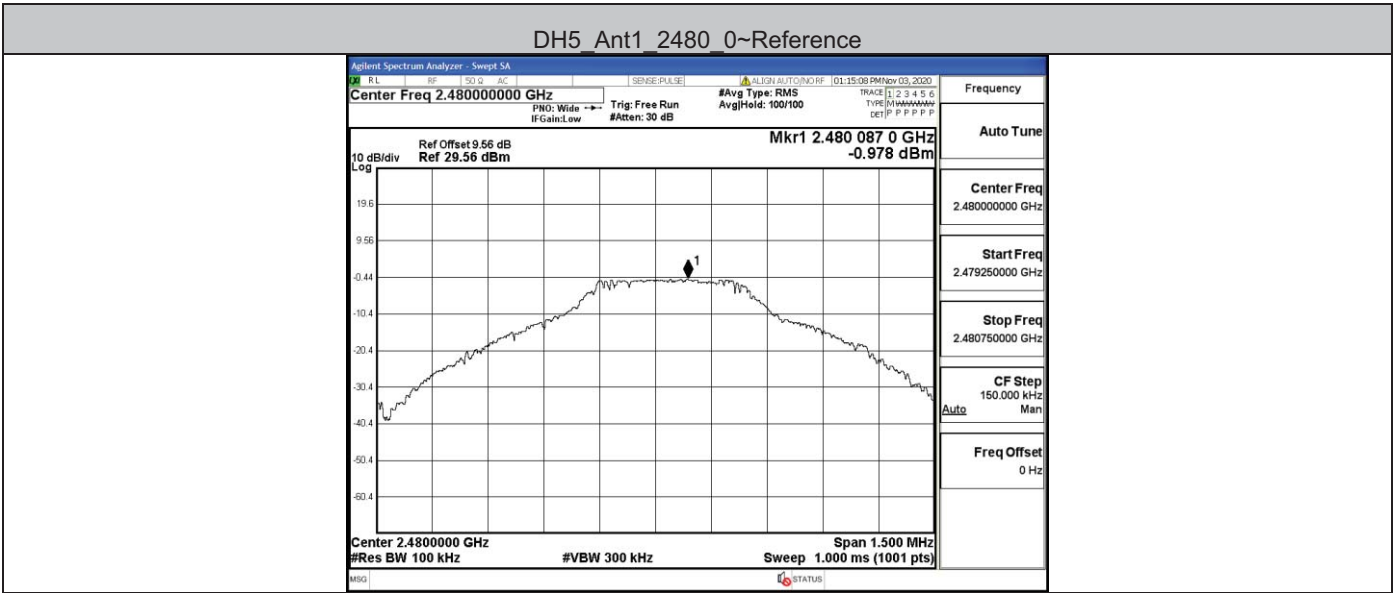


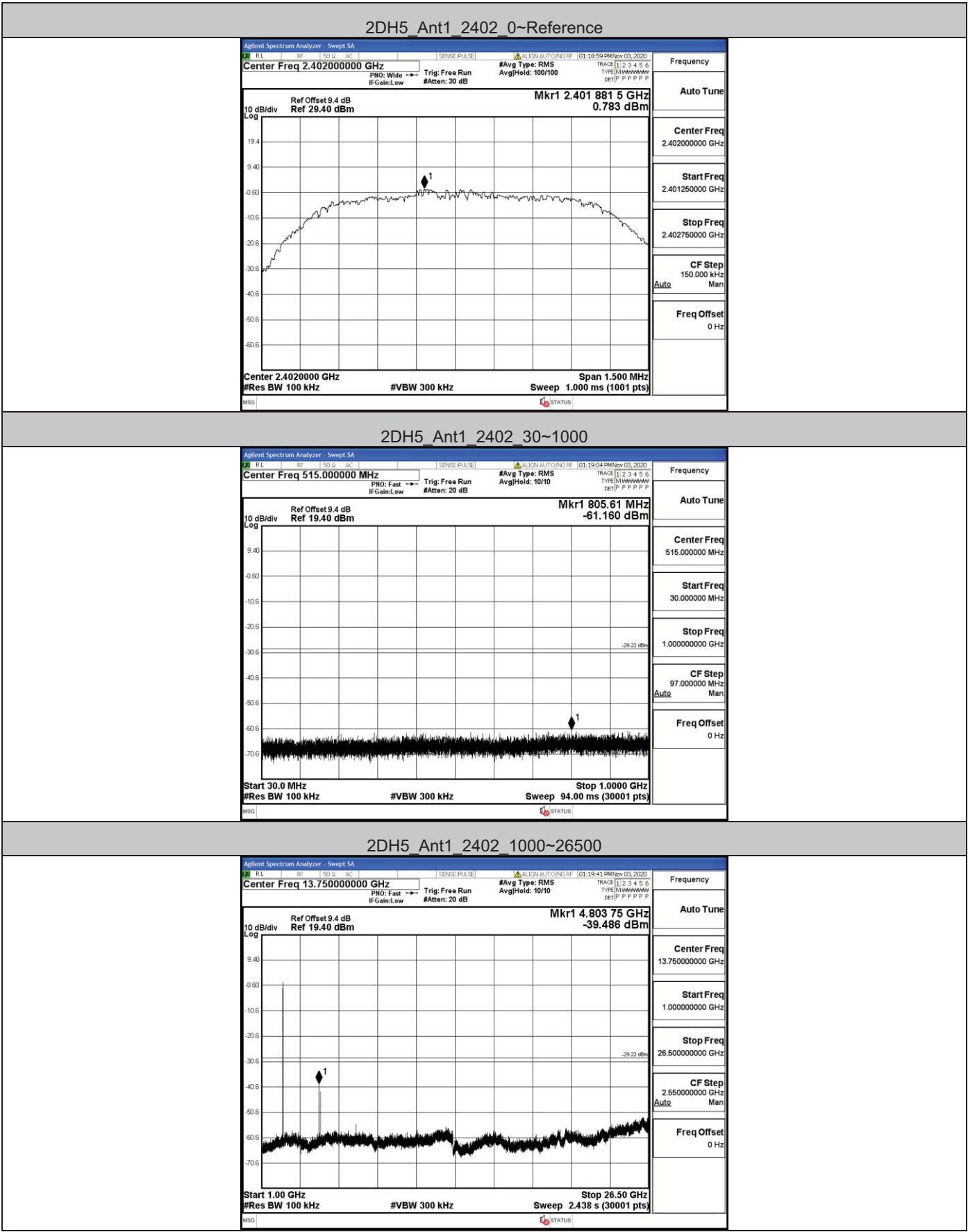
DH5_Ant1_2441_30~1000



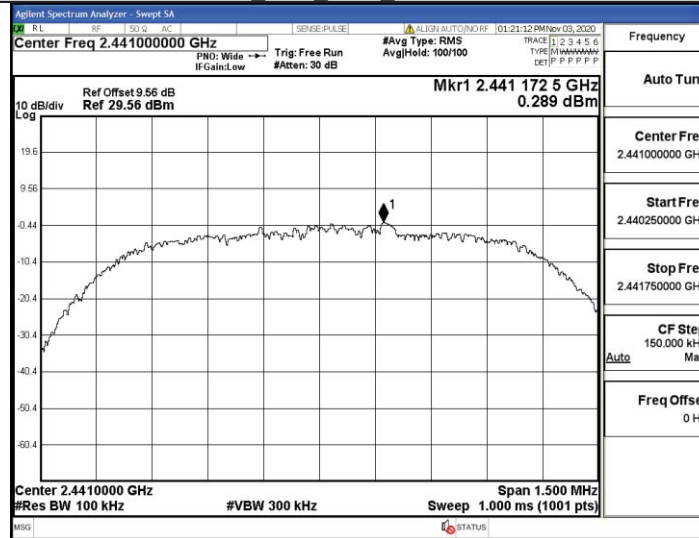
DH5_Ant1_2441_1000~26500



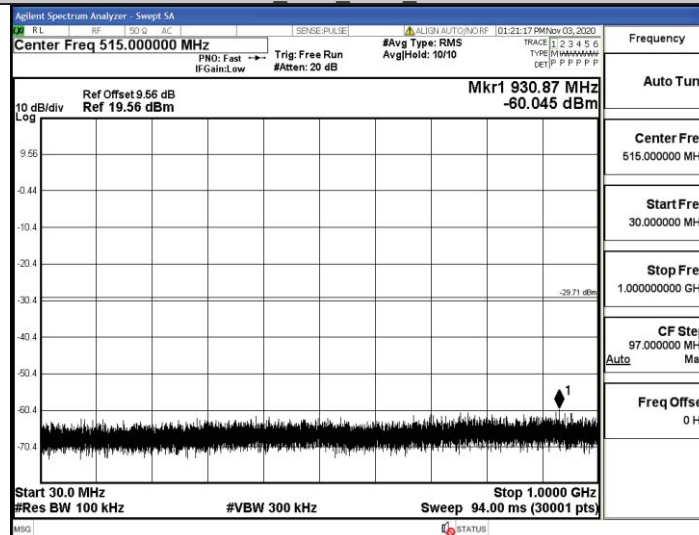




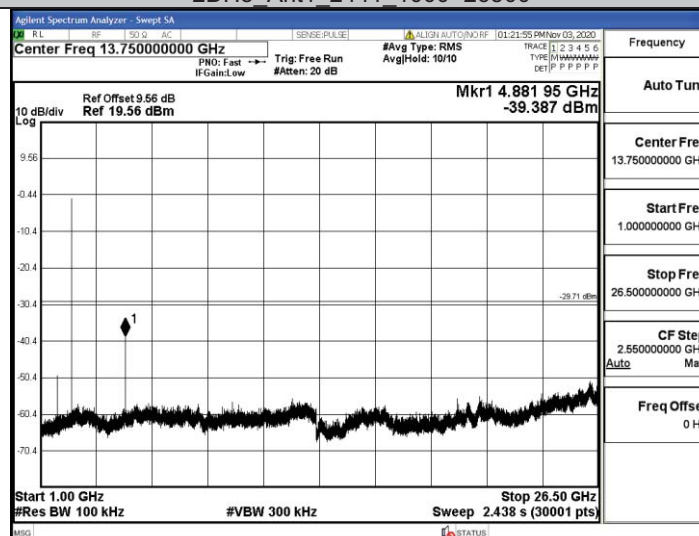
2DH5 Ant1 2441 0~Reference

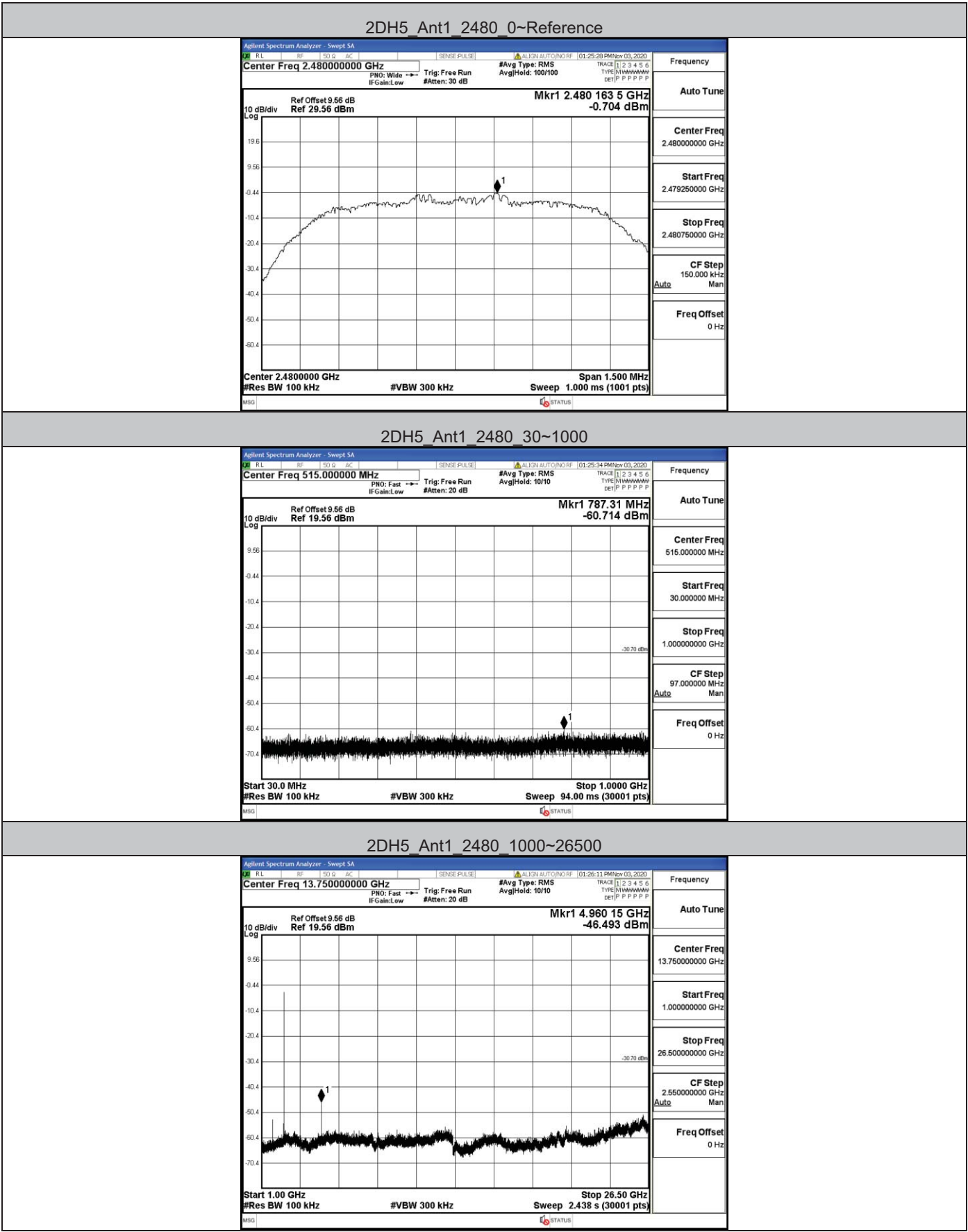


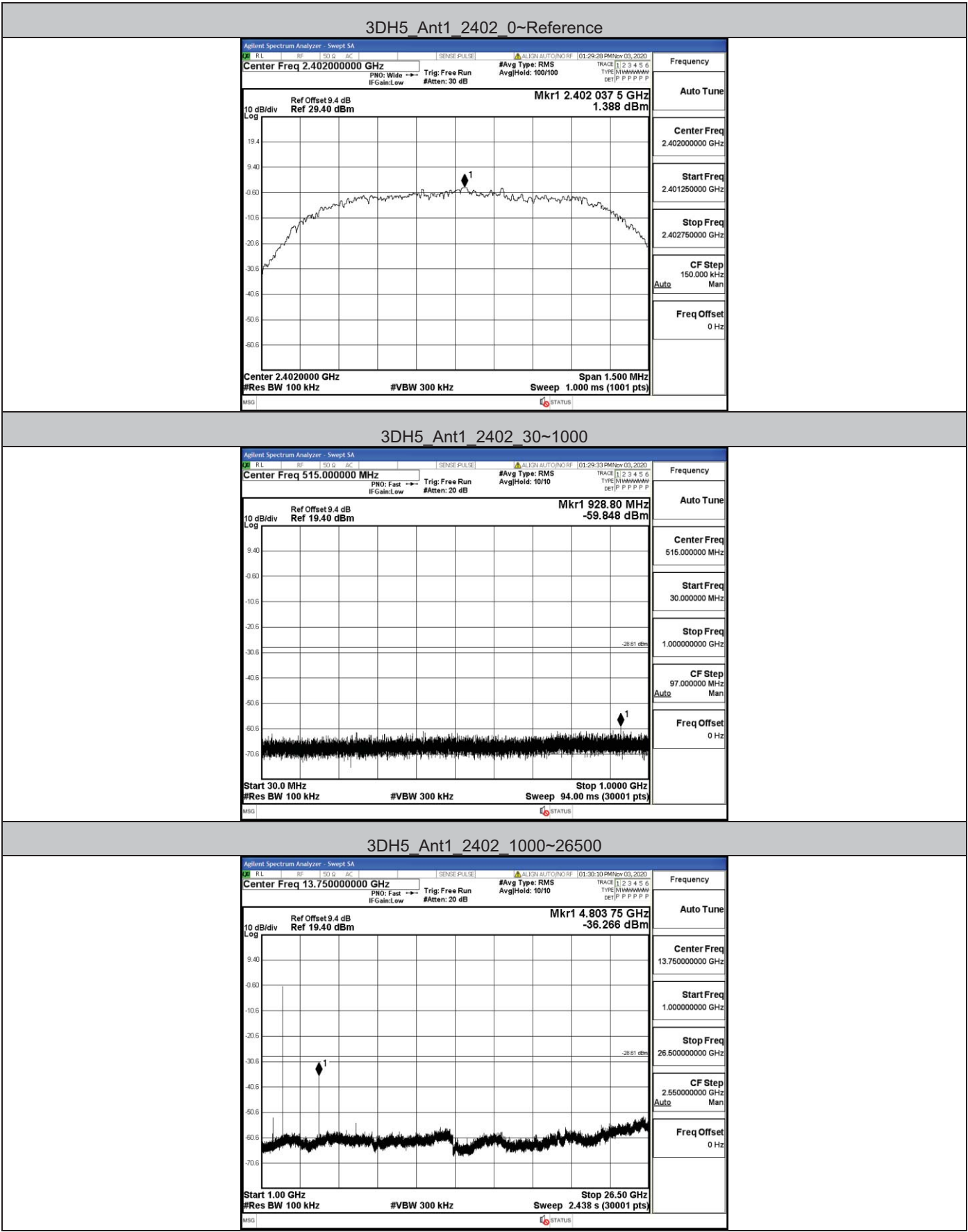
2DH5 Ant1 2441 30~1000

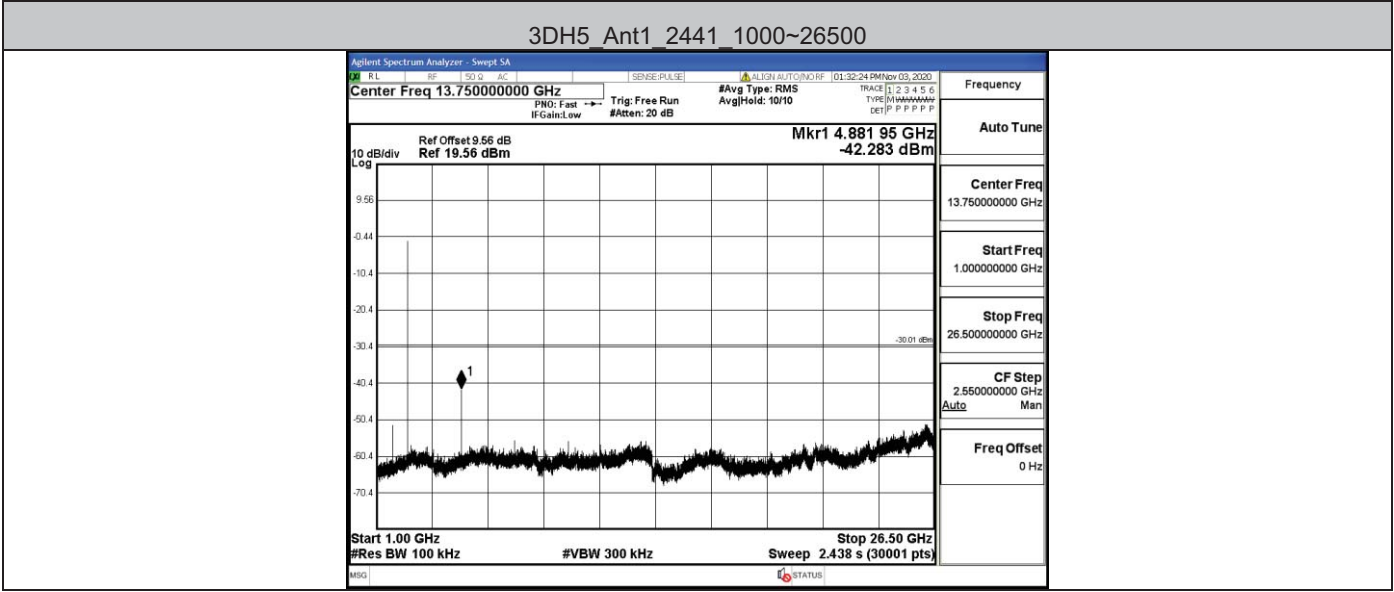
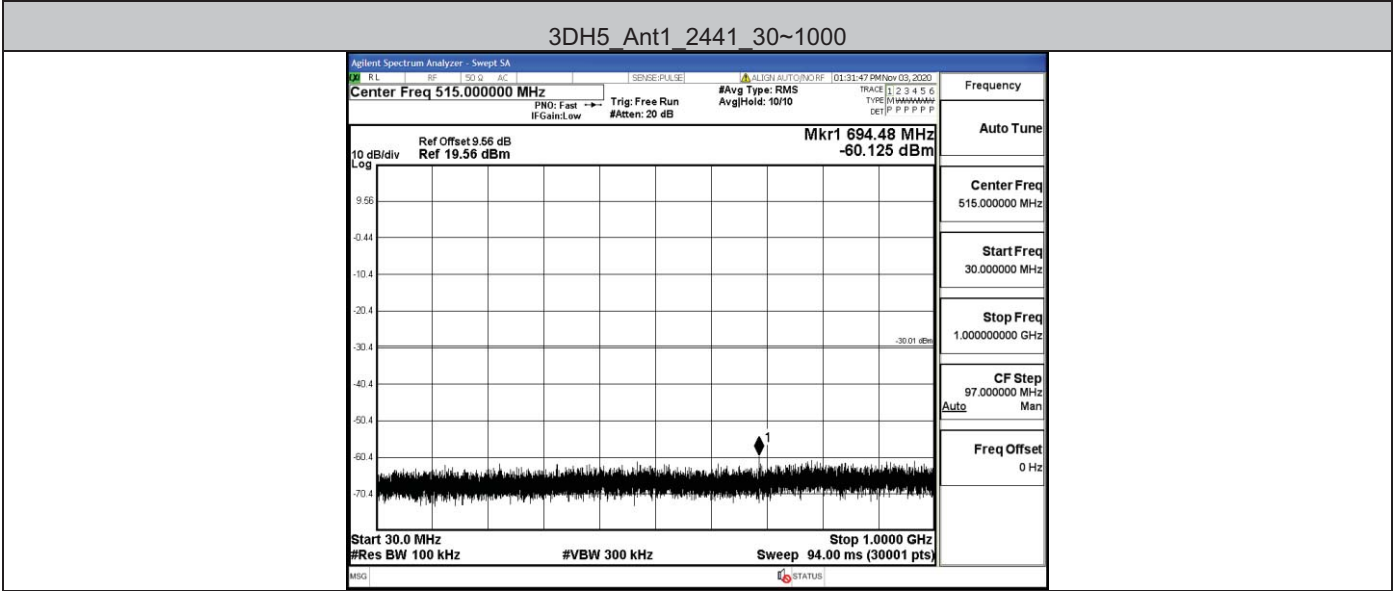
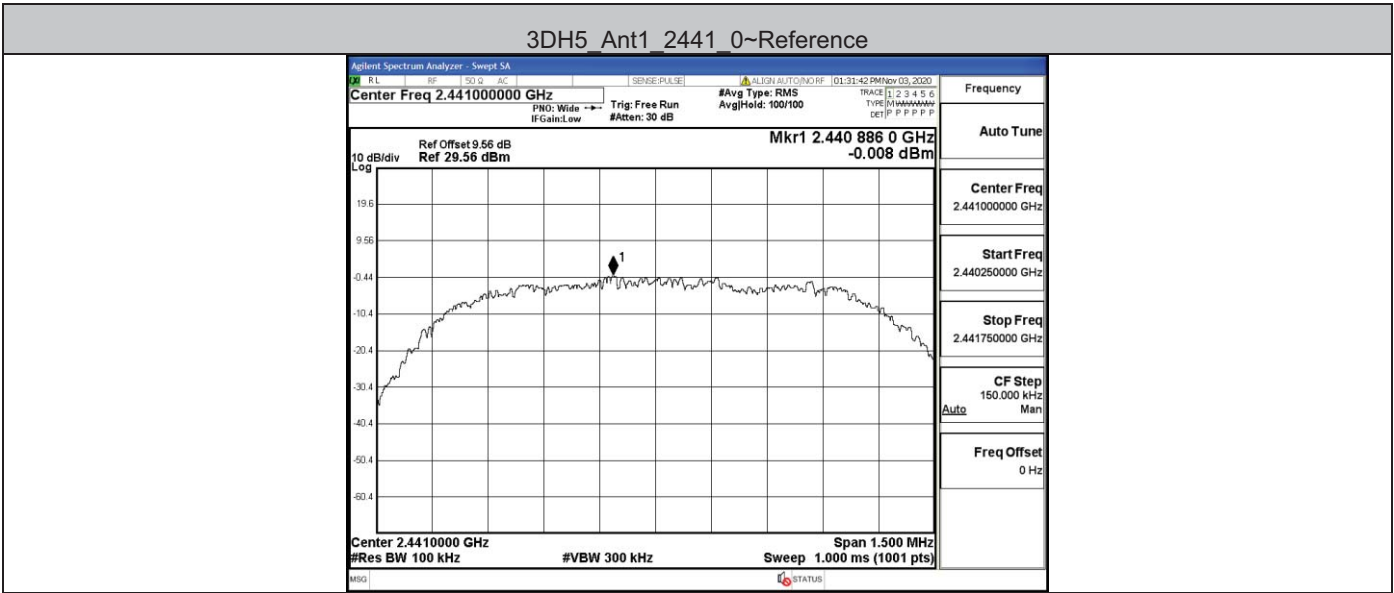


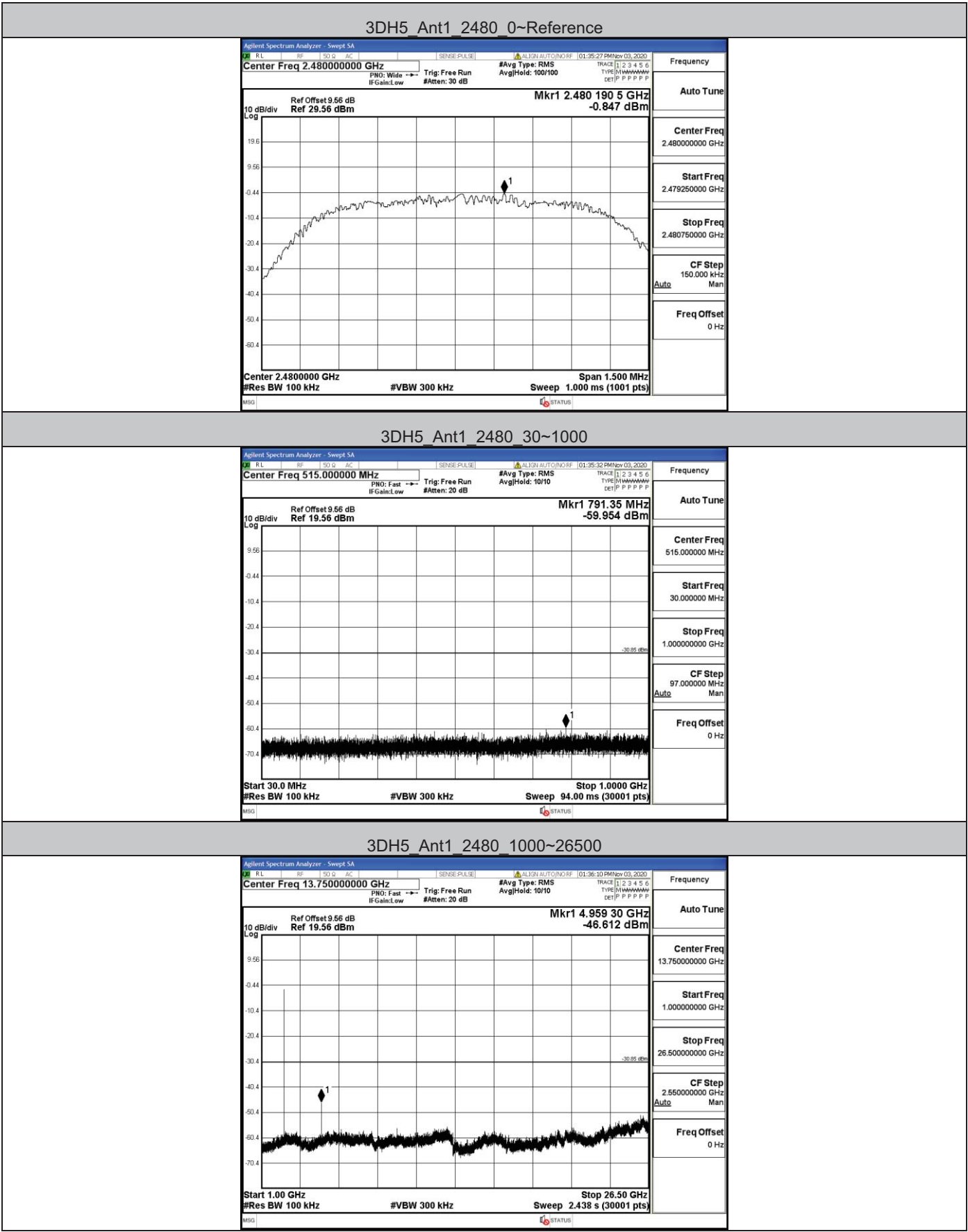
2DH5 Ant1 2441 1000~26500











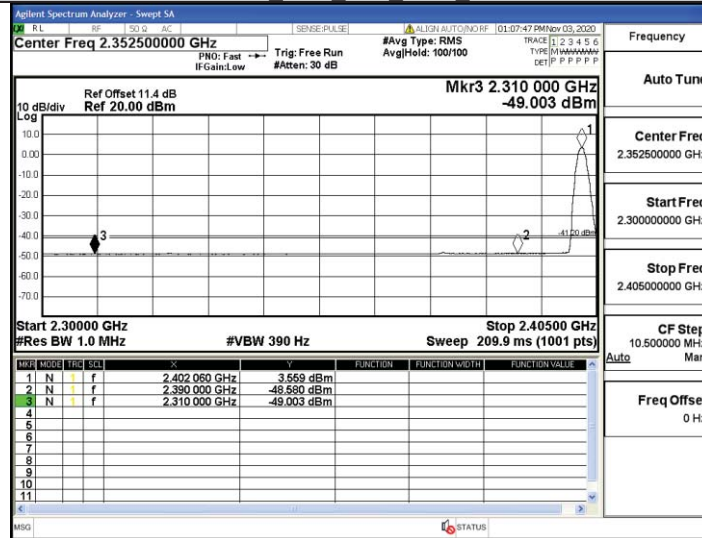
A.8 Restrict-band band-edge measurements

TestMode	Antenna	ChName	Channel	Detector	Freq	Result	Limit	Verdict
DH5	Ant1	Low	2402	AV	2310.000	-49	<=-41.20	PASS
				AV	2390.000	-48.58	<=-41.20	PASS
				Peak	2310.000	-41.38	<=-21.20	PASS
				Peak	2390.000	-41.44	<=-21.20	PASS
		High	2480	AV	2483.500	-47.9	<=-41.20	PASS
				AV	2500.000	-47.95	<=-41.20	PASS
				Peak	2483.500	-41.69	<=-21.20	PASS
				Peak	2500.000	-40.1	<=-21.20	PASS
2DH5	Ant1	Low	2402	AV	2310.000	-48.86	<=-41.20	PASS
				AV	2390.000	-48.75	<=-41.20	PASS
				Peak	2310.000	-41.22	<=-21.20	PASS
				Peak	2390.000	-42.35	<=-21.20	PASS
		High	2480	AV	2483.500	-47.66	<=-41.20	PASS
				AV	2500.000	-47.95	<=-41.20	PASS
				Peak	2483.500	-42.04	<=-21.20	PASS
				Peak	2500.000	-40.42	<=-21.20	PASS
3DH5	Ant1	Low	2402	AV	2310.000	-48.98	<=-41.20	PASS
				AV	2390.000	-48.67	<=-41.20	PASS
				Peak	2310.000	-42.02	<=-21.20	PASS
				Peak	2390.000	-43.04	<=-21.20	PASS
		High	2480	AV	2483.500	-47.73	<=-41.20	PASS
				AV	2500.000	-47.99	<=-41.20	PASS
				Peak	2483.500	-42.21	<=-21.20	PASS
				Peak	2500.000	-40.58	<=-21.20	PASS

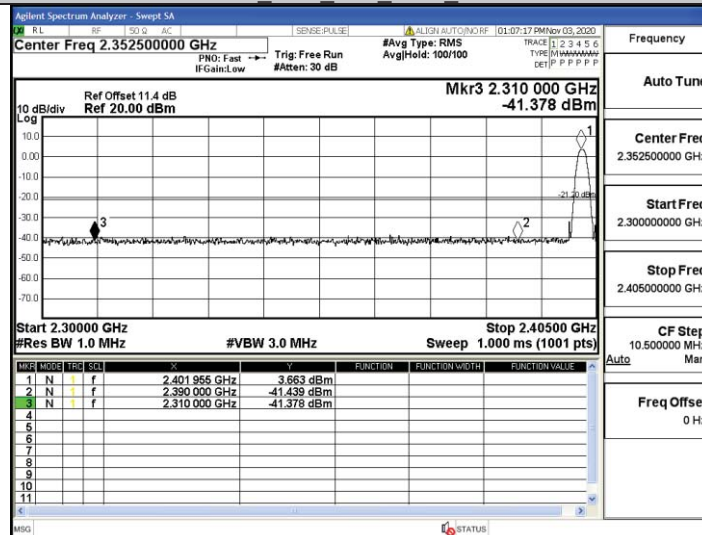
1. The Antenna Gain is compensated in the graph with 2dBi and Antenna Gain which is Higher.
2. The limit in dBm for average detector is conversion from 54dBuV/m, according to 15.209(a). The limit in dBm for peak detector is 20dB above the limit of average detector in dBm.

Test Graphs

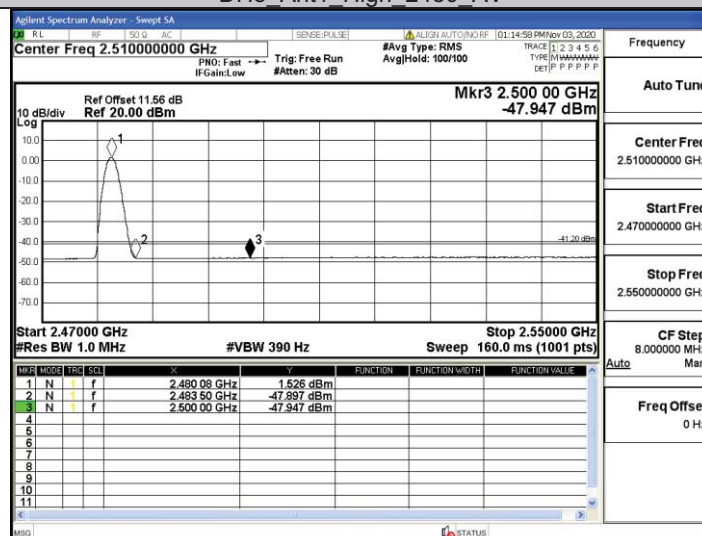
DH5 Ant1 Low 2402 AV



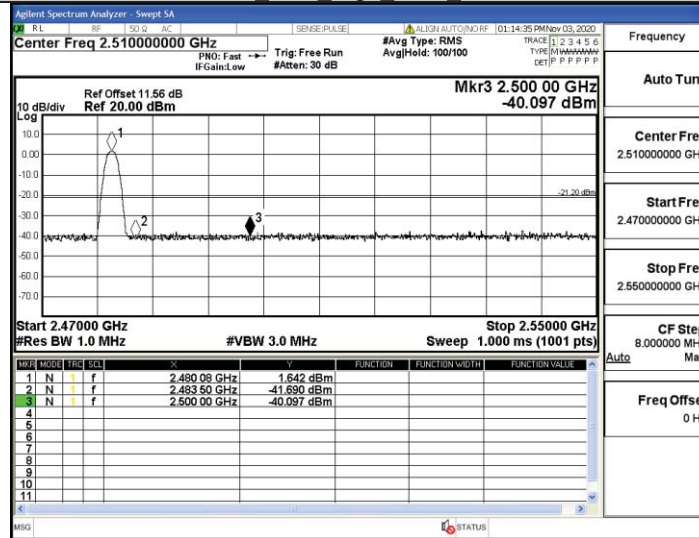
DH5 Ant1 Low 2402 Peak



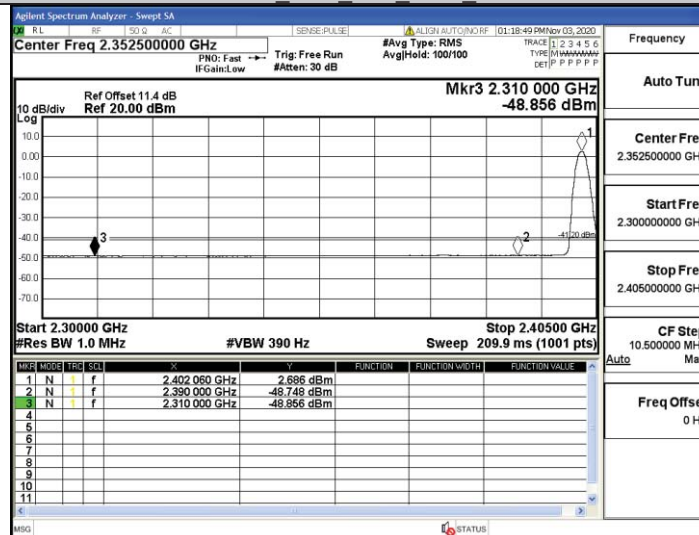
DH5 Ant1 High 2480 AV



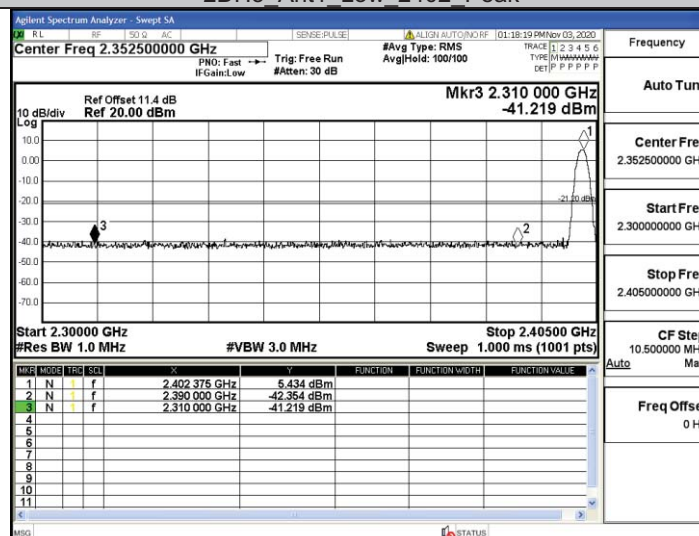
DH5 Ant1 High 2480 Peak



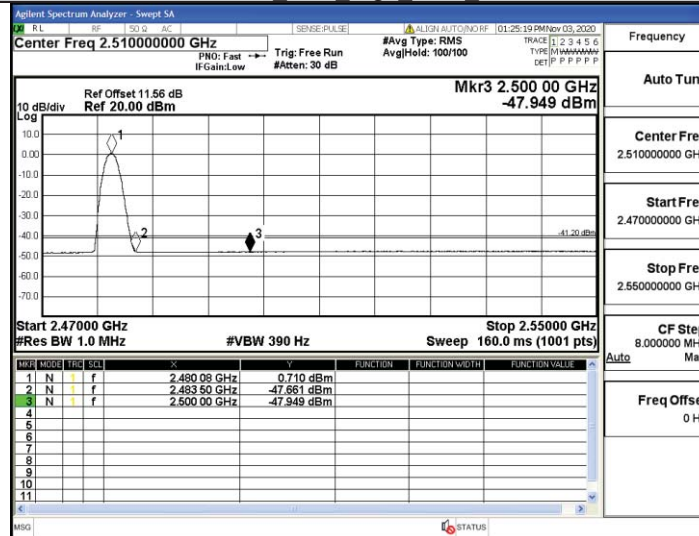
2DH5 Ant1 Low 2402 AV



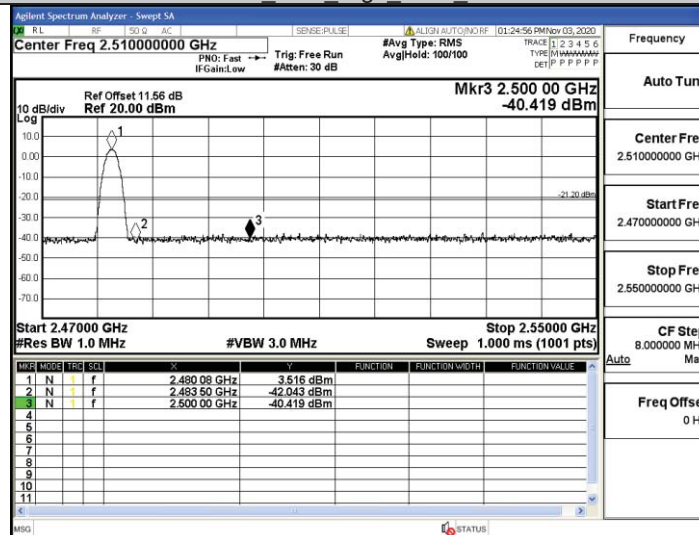
2DH5 Ant1 Low 2402 Peak



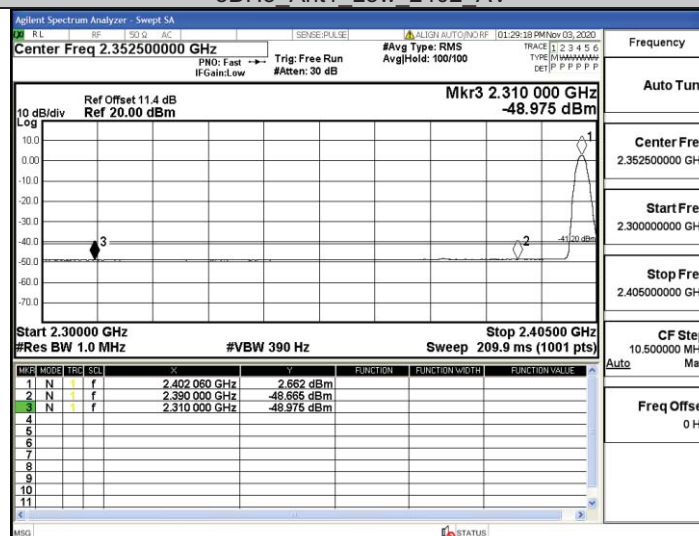
2DH5 Ant1 High 2480 AV



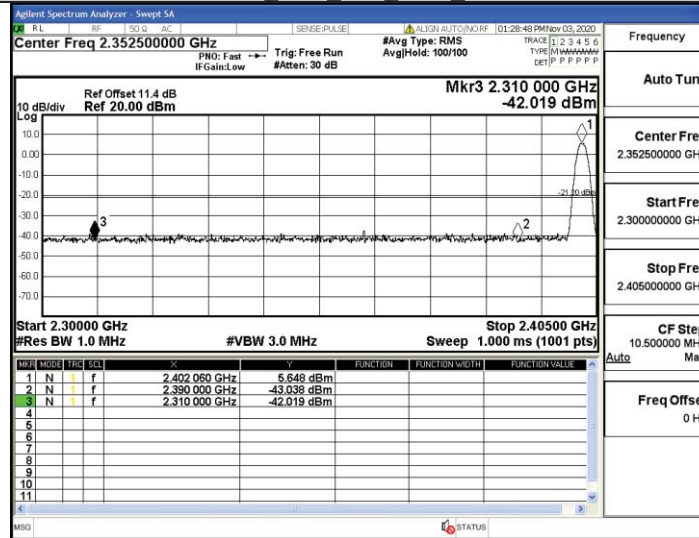
2DH5 Ant1 High 2480 Peak



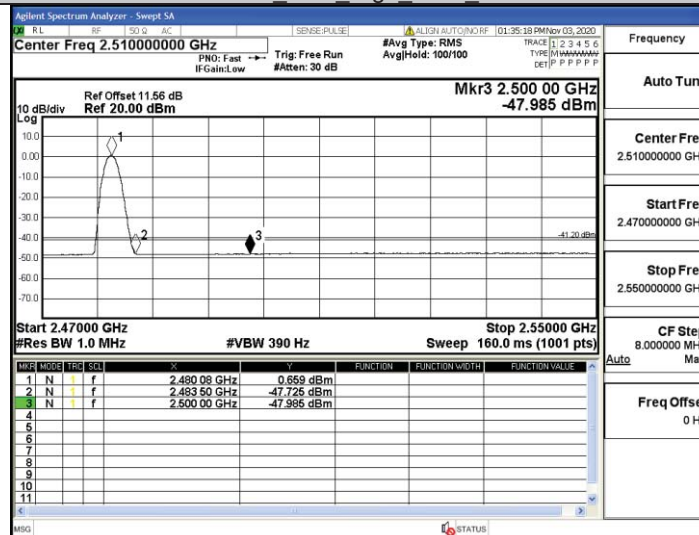
3DH5 Ant1 Low 2402 AV



3DH5 Ant1 Low 2402 Peak



3DH5 Ant1 High 2480 AV



3DH5 Ant1 High 2480 Peak

