

TEST REPORT

Product : WIFI Module
Trade mark : GSD
Model/Type reference : W2HM2001P
Serial Number : N/A
Report Number : EED32M00207901
FCC ID : 2AC23-W2HM2001
Date of Issue : Nov. 10, 2020
Test Standards : 47 CFR Part 15Subpart C
Test result : PASS

Prepared for:

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Date:

Nov. 10, 2020

Aaron Ma



Check No.:3096372765

2 Version

Version No.	Date	Description
00	Nov. 10, 2020	Original

3 Test Summary

Test Item	Test Requirement	Test method	Result
Antenna Requirement	47 CFR Part 15 Subpart C Section 15.203/15.247 (c)	ANSI C63.10-2013	PASS
AC Power Line Conducted Emission	47 CFR Part 15 Subpart C Section 15.207	ANSI C63.10-2013	PASS
Conducted Peak Output Power	47 CFR Part 15 Subpart C Section 15.247 (b)(3)	ANSI C63.10-2013	PASS
6dB Occupied Bandwidth	47 CFR Part 15 Subpart C Section 15.247 (a)(2)	ANSI C63.10-2013	PASS
Power Spectral Density	47 CFR Part 15 Subpart C Section 15.247 (e)	ANSI C63.10-2013	PASS
Band-edge for RF Conducted Emissions	47 CFR Part 15 Subpart C Section 15.247(d)	ANSI C63.10-2013	PASS
RF Conducted Spurious Emissions	47 CFR Part 15 Subpart C Section 15.247(d)	ANSI C63.10-2013	PASS
Radiated Spurious Emissions	47 CFR Part 15 Subpart C Section 15.205/15.209	ANSI C63.10-2013	PASS
Restricted bands around fundamental frequency (Radiated Emission)	47 CFR Part 15 Subpart C Section 15.205/15.209	ANSI C63.10-2013	PASS

Remark:

Test according to ANSI C63.4-2014 & ANSI C63.10-2013.

Company Name and Address shown on Report, the sample(s) and sample Information was/ were provided by the applicant who should be responsible for the authenticity which CTI hasn't verified.

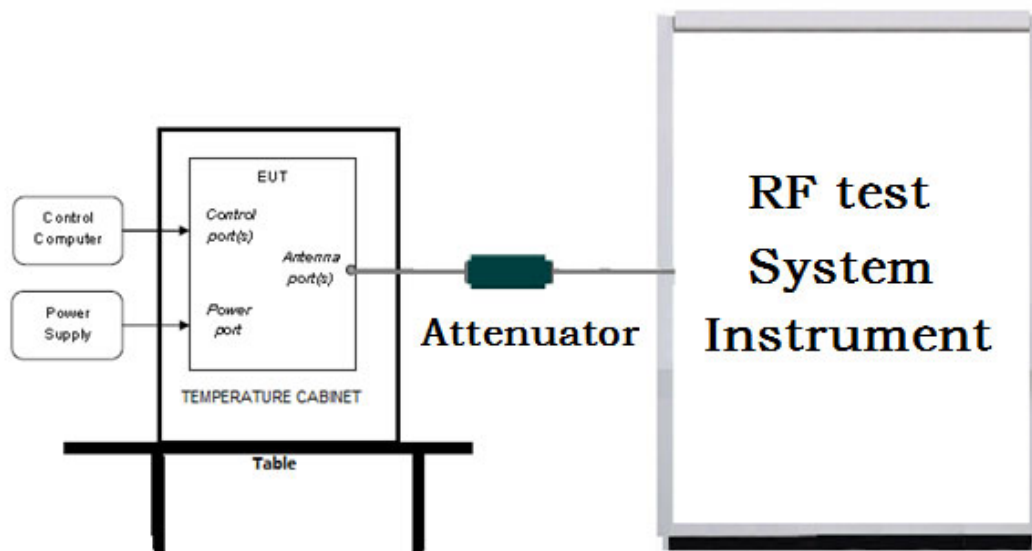
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5 Test Requirement

5.1 Test setup

5.1.1 For Conducted test setup



5.1.2 For Radiated Emissions test setup

Radiated Emissions setup:

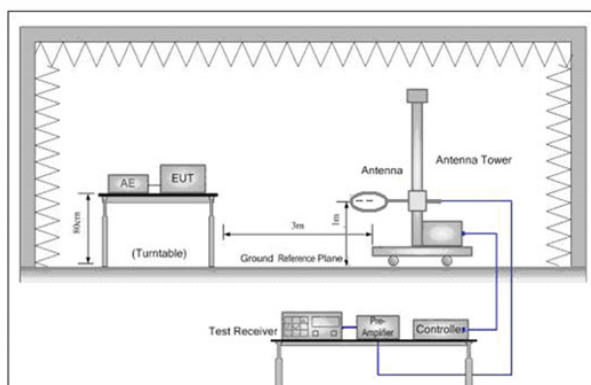


Figure 1. Below 30MHz

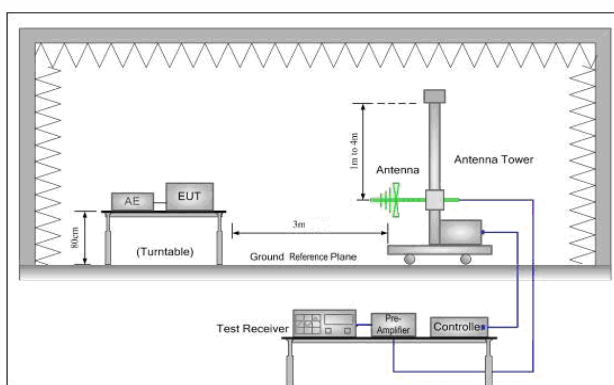


Figure 2. 30MHz to 1GHz

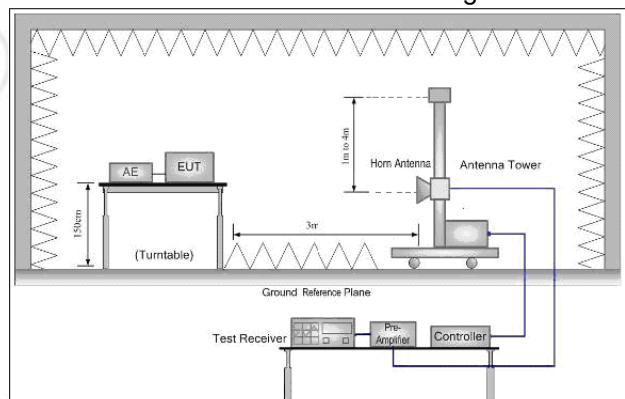
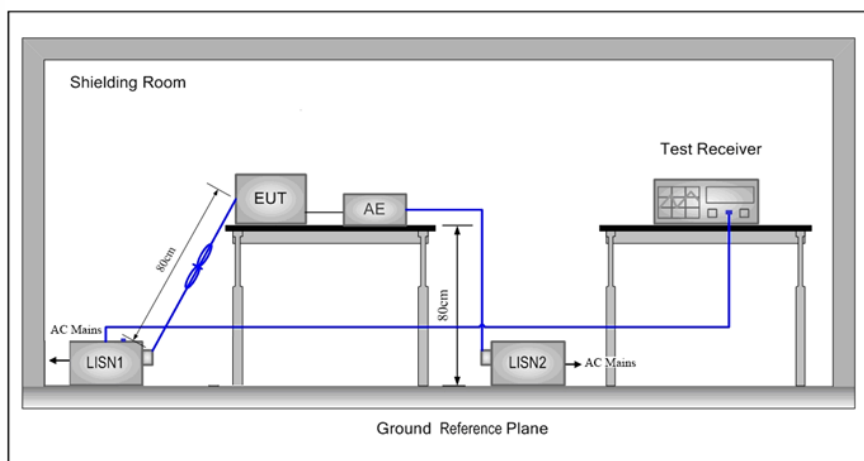


Figure 3. Above 1GHz

5.1.3 For Conducted Emissions test setup

Conducted Emissions setup



5.2 Test Environment

Operating Environment:	
Temperature:	23.0 °C
Humidity:	54 % RH
Atmospheric Pressure:	1010mbar

5.3 Test Condition

Test channel:

Test Mode	Tx/Rx	RF Channel		
		Low(L)	Middle(M)	High(H)
802.11b/g/n(HT20)	2412MHz ~2462 MHz	Channel 1	Channel 6	Channel11
		2412MHz	2437MHz	2462MHz
802.11n(HT40)	2422MHz ~2452 MHz	Channel 3	Channel 6	Channel9
		2422MHz	2437MHz	2452MHz
Transmitting mode:	Keep the EUT in transmitting mode with all kind of modulation and all kind of data rate.			

Test mode:

Pre-scan under all rate at lowest channel 1

Mode	802.11b							
Data Rate	1Mbps	2Mbps	5.5Mbps	11Mbps				
Power(dBm)	18.25	18.23	18.21	18.19				
Mode	802.11g							
Data Rate	6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
Power(dBm)	17.61	17.59	17.57	17.55	17.53	17.51	17.49	17.47
Mode	802.11n (HT20)							
Data Rate	6.5Mbps	13Mbps	19.5Mbps	26Mbps	39Mbps	52Mbps	58.5Mbps	65Mbps
Power(dBm)	16.44	16.42	16.40	16.38	16.36	16.34	16.32	16.30
Mode	802.11n (HT40)							
Data Rate	13.5Mbps	27Mbps	40.5Mbps	54Mbps	81Mbps	108Mbps	121.5Mbps	135Mbps
Power(dBm)	15.7	15.68	15.66	15.64	15.62	15.60	15.58	15.56

Through Pre-scan, 1Mbps of rate is the worst case of 802.11b; 6Mbps of rate is the worst case of 802.11g; 6.5Mbps of rate is the worst case of 802.11n(HT20); 13.5Mbps of rate is the worst case of 802.11n(HT40).

6 General Information

6.1 Client Information

Applicant:	Hui Zhou Gaoshengda Technology Co., LTD
Address of Applicant:	NO.75 Zhongkai Development Area,Huizhou,Guangdong,China
Manufacturer:	Hui Zhou Gaoshengda Technology Co., LTD
Address of Manufacturer:	NO.75 Zhongkai Development Area,Huizhou,Guangdong,China
Factory:	Hui Zhou Gaoshengda Technology Co., LTD
Address of Factory:	NO.75 Zhongkai Development Area,Huizhou,Guangdong,China

6.2 General Description of EUT

Product Name:	WIFI Module
Model No.(EUT):	W2HM2001P
Trade mark:	GSD
EUT Supports Radios application:	IEEE 802.11 b/g/n(HT20)(HT40): 2412MHz to 2462MHz,
Power Supply:	DC 3.3V
Sample Received Date:	Jul. 14, 2020
Sample tested Date:	Jul. 14, 2020 to Aug. 04, 2020

6.3 Product Specification subjective to this standard

Operation Frequency:	IEEE 802.11b/g/n(HT20): 2412MHz to 2462MHz IEEE 802.11n(HT40): 2422MHz to 2452MHz						
Channel Numbers:	IEEE 802.11b/g, IEEE 802.11n HT20: 11 Channels IEEE 802.11n HT40: 7 Channels						
Channel Separation:	5MHz						
Type of Modulation:	IEEE for 802.11b: DSSS(CCK,DQPSK,DBPSK) IEEE for 802.11g :OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE for 802.11n(HT20 and HT40) : OFDM (64QAM, 16QAM,QPSK,BPSK)						
Test Power Grade:	Default						
Test Software of EUT:	QATool_Dbg.exe						
Antenna Type and Gain:	Type: PIFA antenna Gain:2dBi						
Test Voltage:	DC 3.3V						
Operation Frequency each of channel(802.11b/g/n HT20)							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2412MHz	4	2427MHz	7	2442MHz	10	2457MHz
2	2417MHz	5	2432MHz	8	2447MHz	11	2462MHz
3	2422MHz	6	2437MHz	9	2452MHz		
Operation Frequency each of channel(802.11n HT40)							
Channel	Frequency	Channel	Frequency	Channel	Frequency		
3	2422MHz	6	2437MHz	9	2452MHz		
4	2427MHz	7	2442MHz				
5	2432MHz	8	2447MHz				

6.4 Description of Support Units

The EUT has been tested with associated equipment below.

Associated equipment name		Manufacturer	Model	S/N serial number	Certification	Supplied by
AE1	Notebook	DELL	DELL 3490	D245DX2	CE & FCC	DELL

6.5 Test Location

All tests were performed at:

Centre Testing International Group Co., Ltd

Building C, Hongwei Industrial Park Block 70, Bao'an District, Shenzhen, China

Telephone: +86 (0) 755 33683668 Fax: +86 (0) 755 33683385

No tests were sub-contracted.

FCC Designation No.: CN1164

6.6 Deviation from Standards

None.

6.7 Abnormalities from Standard Conditions

None.

6.8 Other Information Requested by the Customer

None.

6.9 Measurement Uncertainty (95% confidence levels, k=2)

No.	Item	Measurement Uncertainty
1	Radio Frequency	7.9×10^{-8}
2	RF power, conducted	0.46dB (30MHz-1GHz)
		0.55dB (1GHz-18GHz)
3	Radiated Spurious emission test	4.3dB (30MHz-1GHz)
		4.5dB (1GHz-12.75GHz)
4	Conduction emission	3.5dB (9kHz to 150kHz)
		3.1dB (150kHz to 30MHz)
5	Temperature test	0.64°C
6	Humidity test	3.8%
7	DC power voltages	0.026%

7 Equipment List

RF test system					
Equipment	Manufacturer	Mode No.	Serial Number	Cal. Date (mm-dd-yyyy)	Cal. Due date (mm-dd-yyyy)
Spectrum Analyzer	Keysight	N9010A	MY54510339	02-17-2020	02-16-2021
Signal Generator	Keysight	N5182B	MY53051549	02-17-2020	02-16-2021
Temperature/Humidity Indicator	biaozhi	HM10	1804186	06-29-2020	06-28-2021
High-pass filter	Sinoscite	FL3CX03WG18N M12-0398-002	---	---	---
High-pass filter	MICRO-TRONICS	SPA-F-63029-4	---	---	---
DC Power	Keysight	E3642A	MY56376072	02-17-2020	02-16-2021
PC-1	Lenovo	R4960d	---	---	---
BT&WI-FI Automatic control	R&S	OSP120	101374	02-17-2020	02-16-2021
RF control unit	JS Tonscend	JS0806-2	158060006	02-17-2020	02-16-2021
BT&WI-FI Automatic test software	JS Tonscend	JS1120-3	---	---	---

Conducted disturbance Test					
Equipment	Manufacturer	Model No.	Serial Number	Cal. date (mm-dd-yyyy)	Cal. Due date (mm-dd-yyyy)
Receiver	R&S	ESCI	100435	04-28-2020	04-27-2021
Temperature/Humidity Indicator	Defu	TH128	/	---	---
LISN	R&S	ENV216	100098	03-05-2020	03-04-2021
Barometer	changchun	DYM3	1188	---	---

3M Semi/full-anechoic Chamber					
Equipment	Manufacturer	Model No.	Serial Number	Cal. date (mm-dd-yyyy)	Cal. Due date (mm-dd-yyyy)
3M Chamber & Accessory Equipment	TDK	SAC-3	---	05-24-2019	05-23-2022
TRILOG Broadband Antenna	Schwarzbeck	VULB9163	9163-618	05-16-2020	05-15-2021
Loop Antenna	Schwarzbeck	FMZB 1519B	1519B-076	04-25-2018	04-24-2021
Receiver	R&S	ESCI7	100938-003	10-21-2019	10-20-2020
Multi device Controller	maturo	NCD/070/107 11112	---	---	---
Temperature/ Humidity Indicator	Shanghai qixiang	HM10	1804298	06-29-2020	06-28-2021
Cable line	Fulai(7M)	SF106	5219/6A	---	---
Cable line	Fulai(6M)	SF106	5220/6A	---	---
Cable line	Fulai(3M)	SF106	5216/6A	---	---
Cable line	Fulai(3M)	SF106	5217/6A	---	---

3M full-anechoic Chamber					
Equipment	Manufacturer	Model No.	Serial Number	Cal. date (mm-dd-yyyy)	Cal. Due date (mm-dd-yyyy)
RSE Automatic test software	JS Tonscend	JS36-RSE	10166	---	---
Receiver	Keysight	N9038A	MY57290136	03-05-2020	03-04-2021
Spectrum Analyzer	Keysight	N9020B	MY57111112	03-05-2020	03-04-2021
Spectrum Analyzer	Keysight	N9030B	MY57140871	03-05-2020	03-04-2021
TRILOG Broadband Antenna	Schwarzbeck	VULB 9163	9163-1148	04-25-2018	04-24-2021
Horn Antenna	Schwarzbeck	BBHA 9170	9170-832	04-25-2018	04-24-2021
Horn Antenna	ETS-LINDGREN	3117	00057407	07-10-2018	07-09-2021
Preamplifier	EMCI	EMC184055SE	980596	05-20-2020	05-19-2021
Preamplifier	EMCI	EMC001330	980563	04-22-2020	04-21-2021
Preamplifier	JS Tonscend	980380	EMC051845 SE	01-09-2020	01-08-2021
Temperature/Humidity Indicator	biaozhi	GM1360	EE1186631	04-27-2020	04-26-2021
Fully Anechoic Chamber	TDK	FAC-3	---	01-17-2018	01-16-2021
Filter bank	JS Tonscend	JS0806-F	188060094	04-10-2018	04-09-2021
Cable line	Times	SFT205-NMSM-2.50M	394812-0001	---	---
Cable line	Times	SFT205-NMSM-2.50M	394812-0002	---	---
Cable line	Times	SFT205-NMSM-2.50M	394812-0003	---	---
Cable line	Times	SFT205-NMSM-2.50M	393495-0001	---	---
Cable line	Times	EMC104-NMNM-1000	SN160710	---	---
Cable line	Times	SFT205-NMSM-3.00M	394813-0001	---	---
Cable line	Times	SFT205-NMNM-1.50M	381964-0001	---	---
Cable line	Times	SFT205-NMSM-7.00M	394815-0001	---	---
Cable line	Times	HF160-KMKM-3.00M	393493-0001	---	---

8 Radio Technical Requirements Specification

Reference documents for testing:

No.	Identity	Document Title
1	FCC Part15C	Subpart C-Intentional Radiators
2	ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices

Test Results List:

Test Requirement	Test method	Test item	Verdict	Note
Part15C Section 15.247 (a)(2)	ANSI C63.10	6dB Occupied Bandwidth	PASS	Appendix A) Appendix B)
Part15C Section 15.247 (b)(3)	ANSI C63.10	Conducted Peak Output Power	PASS	Appendix C)
Part15C Section 15.247 (e)	ANSI C63.10	Power Spectral Density	PASS	Appendix D)
Part15C Section 15.247(d)	ANSI C63.10	Band-edge for RF Conducted Emissions	PASS	Appendix E)
Part15C Section 15.247(d)	ANSI C63.10	RF Conducted Spurious Emissions	PASS	Appendix F)
Part15C Section 15.203/15.247 (c)	ANSI C63.10	Antenna Requirement	PASS	Appendix G)
Part15C Section 15.207	ANSI C63.10	AC Power Line Conducted Emission	PASS	Appendix H)
Part15C Section 15.205/15.209	ANSI C63.10	Restricted bands around fundamental frequency (Radiated Emission)	PASS	Appendix I)
Part15C Section 15.205/15.209	ANSI C63.10	Radiated Spurious Emissions	PASS	Appendix J)

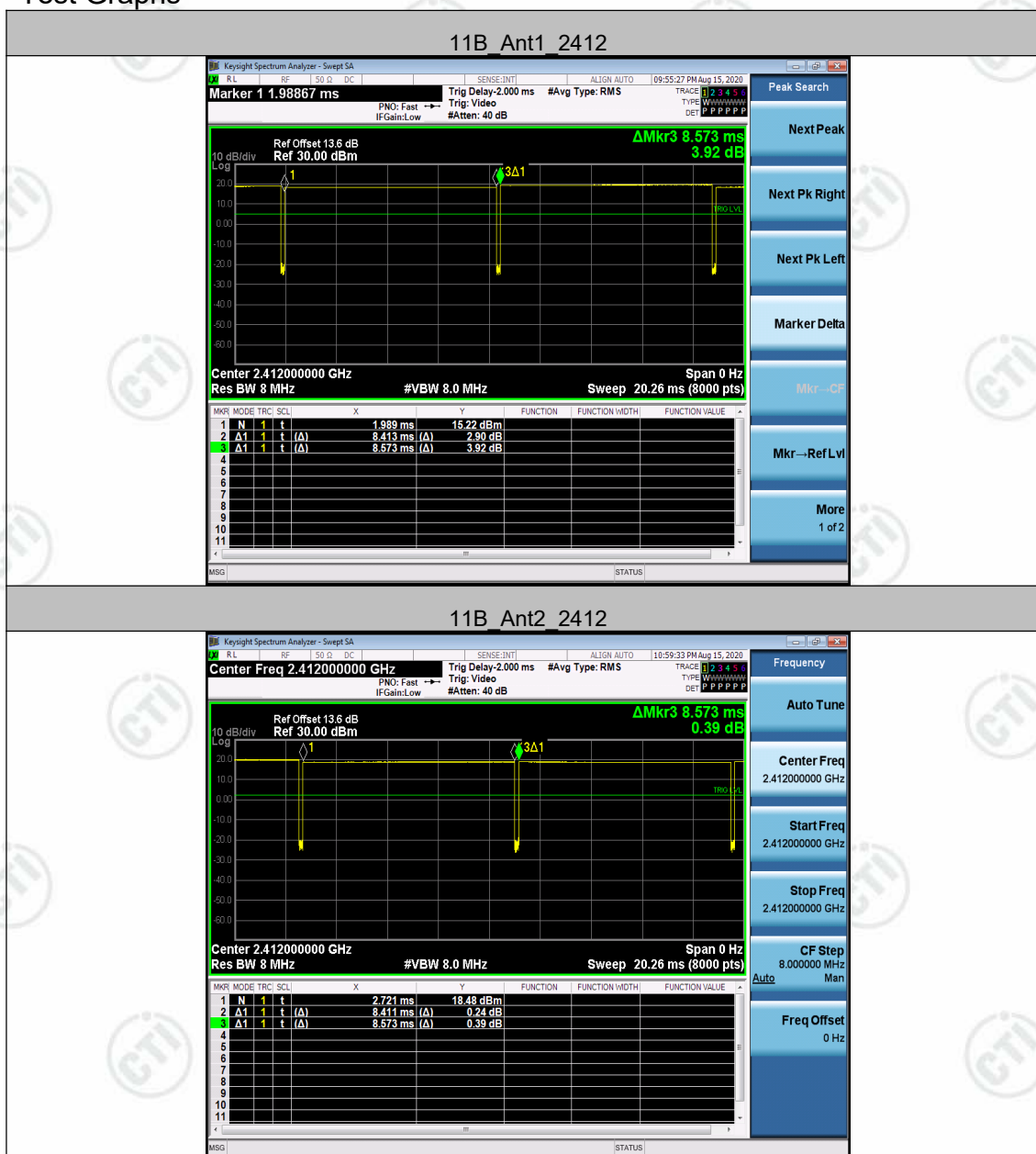
Duty Cycle

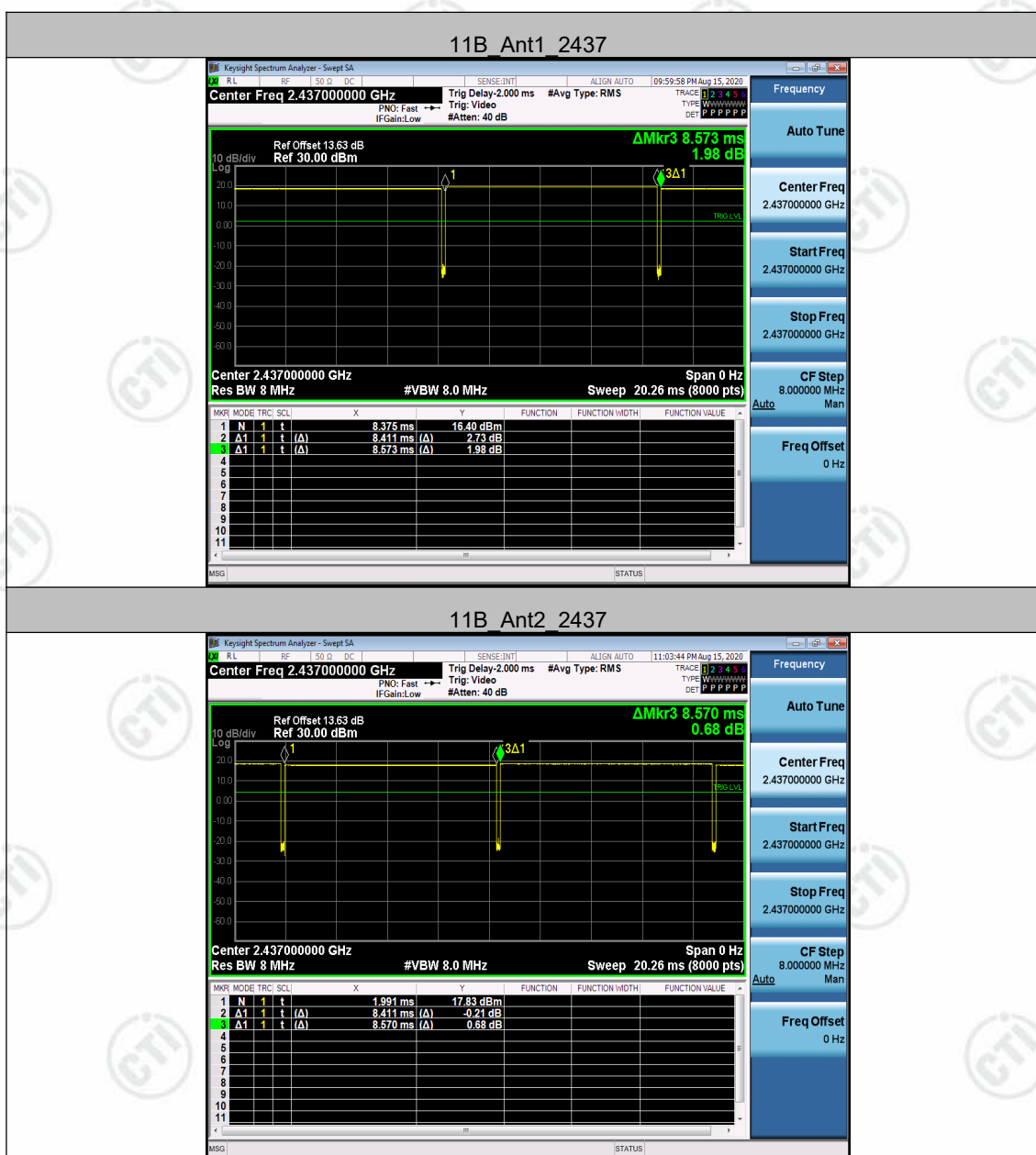
Test Result

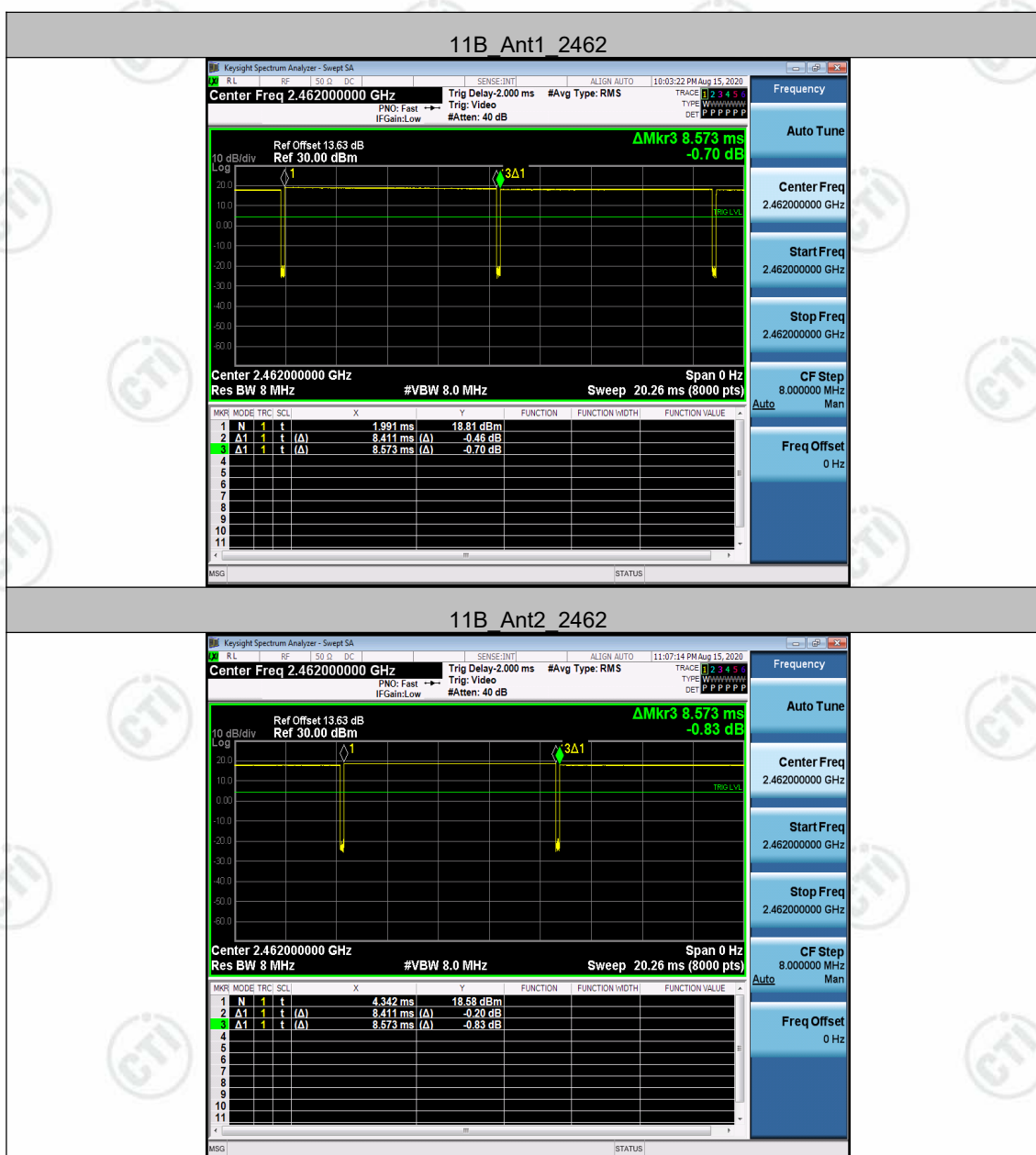
Test Mode	Antenna	Channel	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]	Limit	Verdict
11B	Ant1	2412	8.41	8.57	98.14	---	PASS
	Ant2	2412	8.41	8.57	98.11	---	PASS
	Ant1	2437	8.41	8.57	98.11	---	PASS
	Ant2	2437	8.41	8.57	98.14	---	PASS
	Ant1	2462	8.41	8.57	98.11	---	PASS
	Ant2	2462	8.41	8.57	98.11	---	PASS
11G	Ant1	2412	1.39	1.56	89.43	---	PASS
	Ant2	2412	1.42	1.59	89.70	---	PASS
	Ant1	2437	1.39	1.56	89.51	---	PASS
	Ant2	2437	1.42	1.59	89.62	---	PASS
	Ant1	2462	1.39	1.56	89.43	---	PASS
	Ant2	2462	1.42	1.59	89.62	---	PASS
11N20SISO	Ant1	2412	1.29	1.46	88.79	---	PASS
	Ant2	2412	1.32	1.48	88.89	---	PASS
	Ant1	2437	1.29	1.46	88.71	---	PASS
	Ant2	2437	1.32	1.48	88.89	---	PASS
	Ant1	2462	1.29	1.46	88.71	---	PASS
	Ant2	2462	1.32	1.48	88.89	---	PASS
11N40SISO	Ant1	2422	0.63	0.80	79.37	---	PASS
	Ant2	2422	0.63	0.80	79.37	---	PASS
	Ant1	2437	0.63	0.80	79.37	---	PASS
	Ant2	2437	0.63	0.80	79.37	---	PASS
	Ant1	2452	0.63	0.80	79.49	---	PASS
	Ant2	2452	0.63	0.80	79.37	---	PASS
11N20MIMO	Ant1	2412	0.66	0.83	80.21	---	PASS
	Ant2	2412	0.66	0.83	80.21	---	PASS
	Ant1	2437	0.66	0.83	80.21	---	PASS
	Ant2	2437	0.66	0.83	80.06	---	PASS
	Ant1	2462	0.66	0.83	80.06	---	PASS
	Ant2	2462	0.66	0.83	80.21	---	PASS

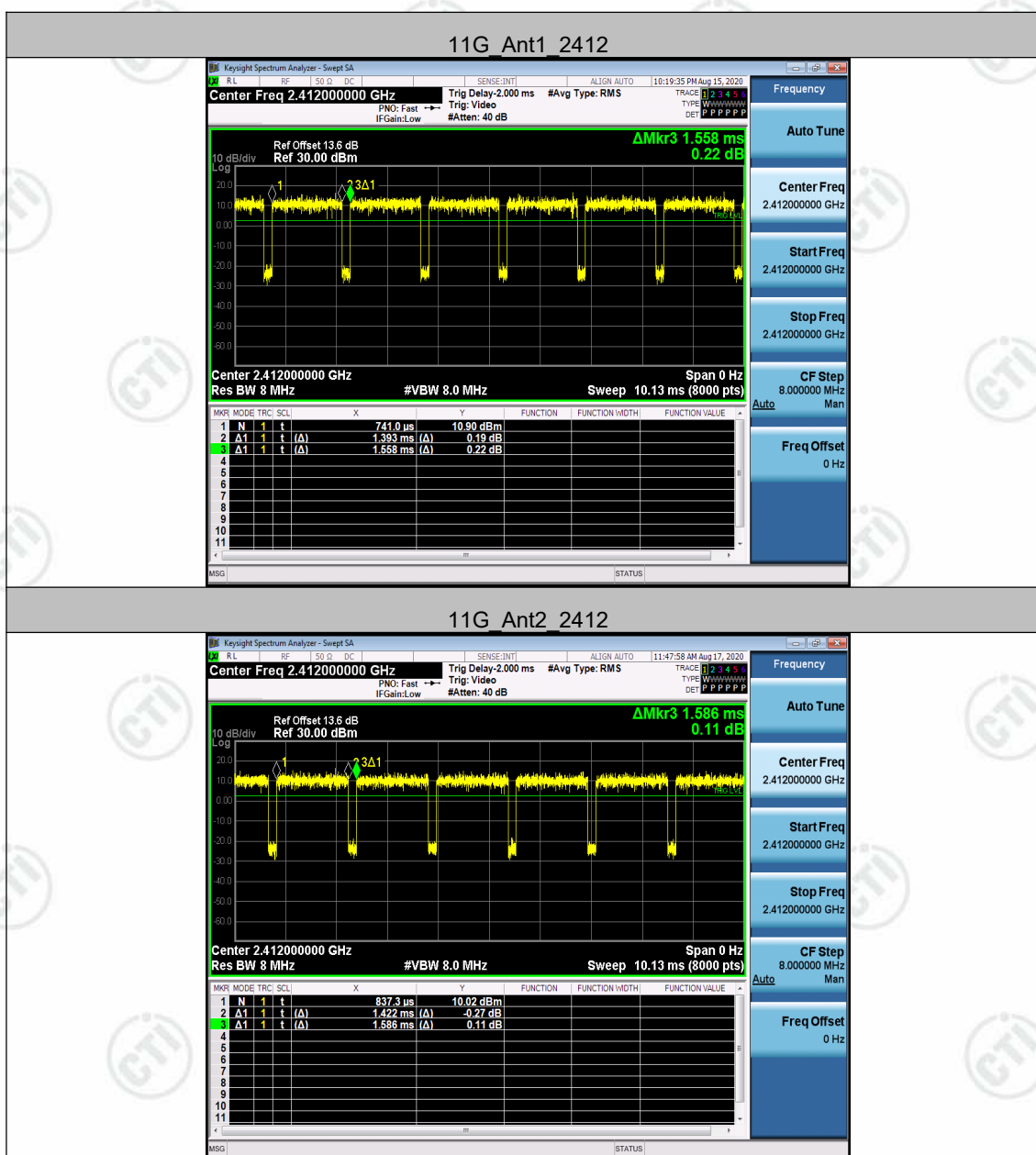
11N40MIMO	Ant1	2422	0.33	0.50	67.09	---	PASS
	Ant2	2422	0.33	0.50	66.92	---	PASS
	Ant1	2437	0.33	0.50	66.92	---	PASS
	Ant2	2437	0.33	0.50	66.92	---	PASS
	Ant1	2452	0.33	0.50	66.92	---	PASS
	Ant2	2452	0.33	0.50	67.09	---	PASS

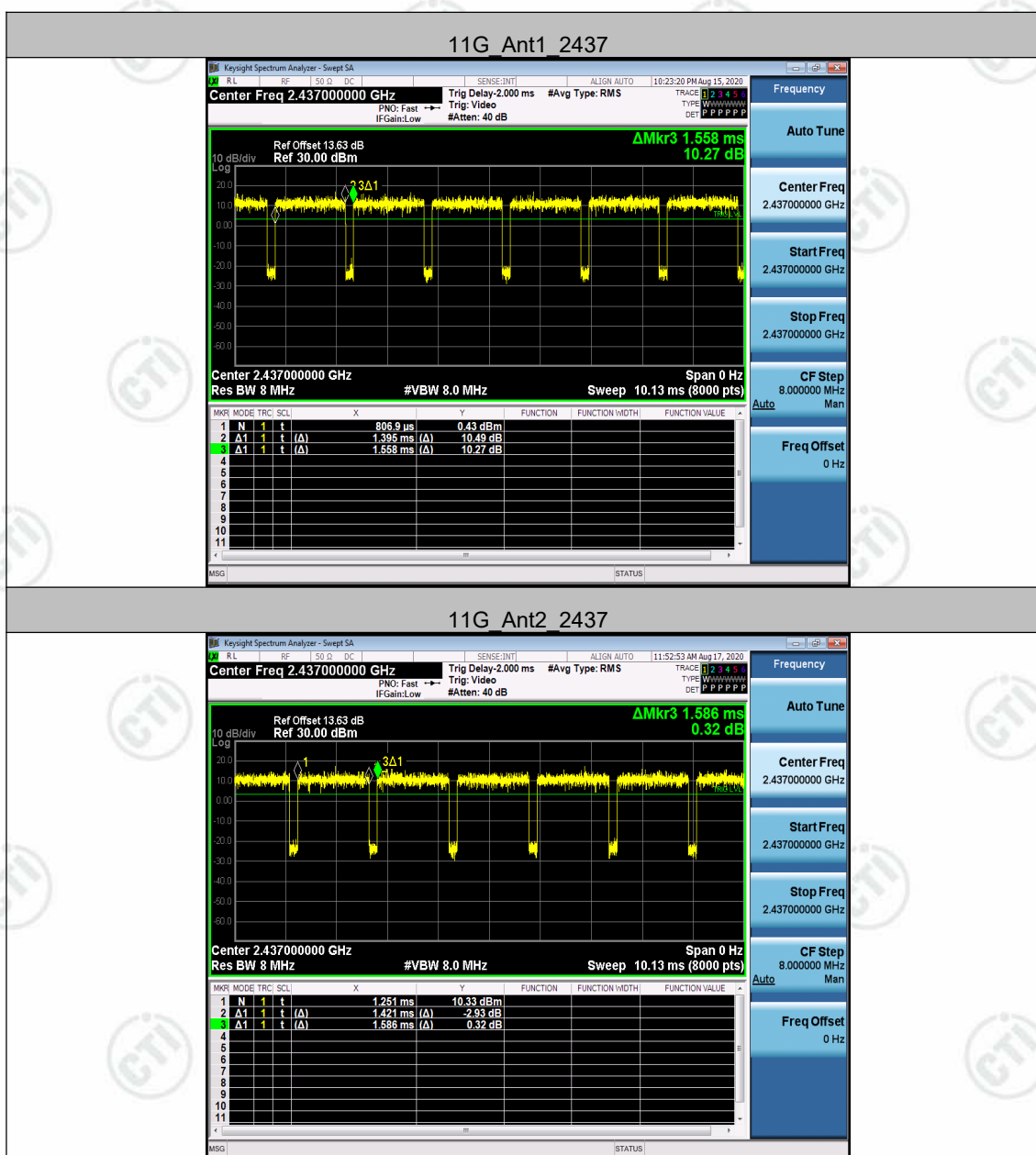
Test Graphs

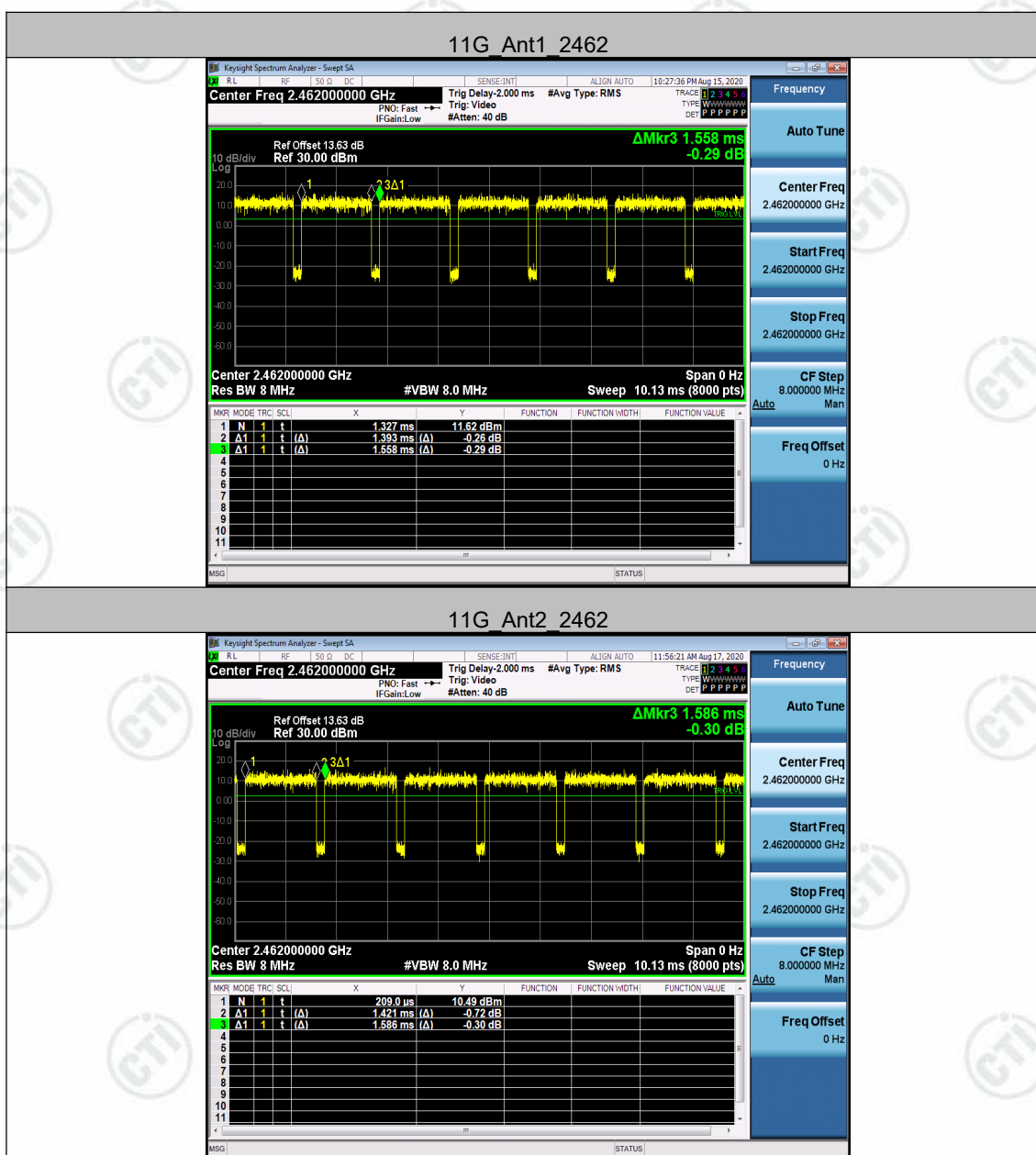


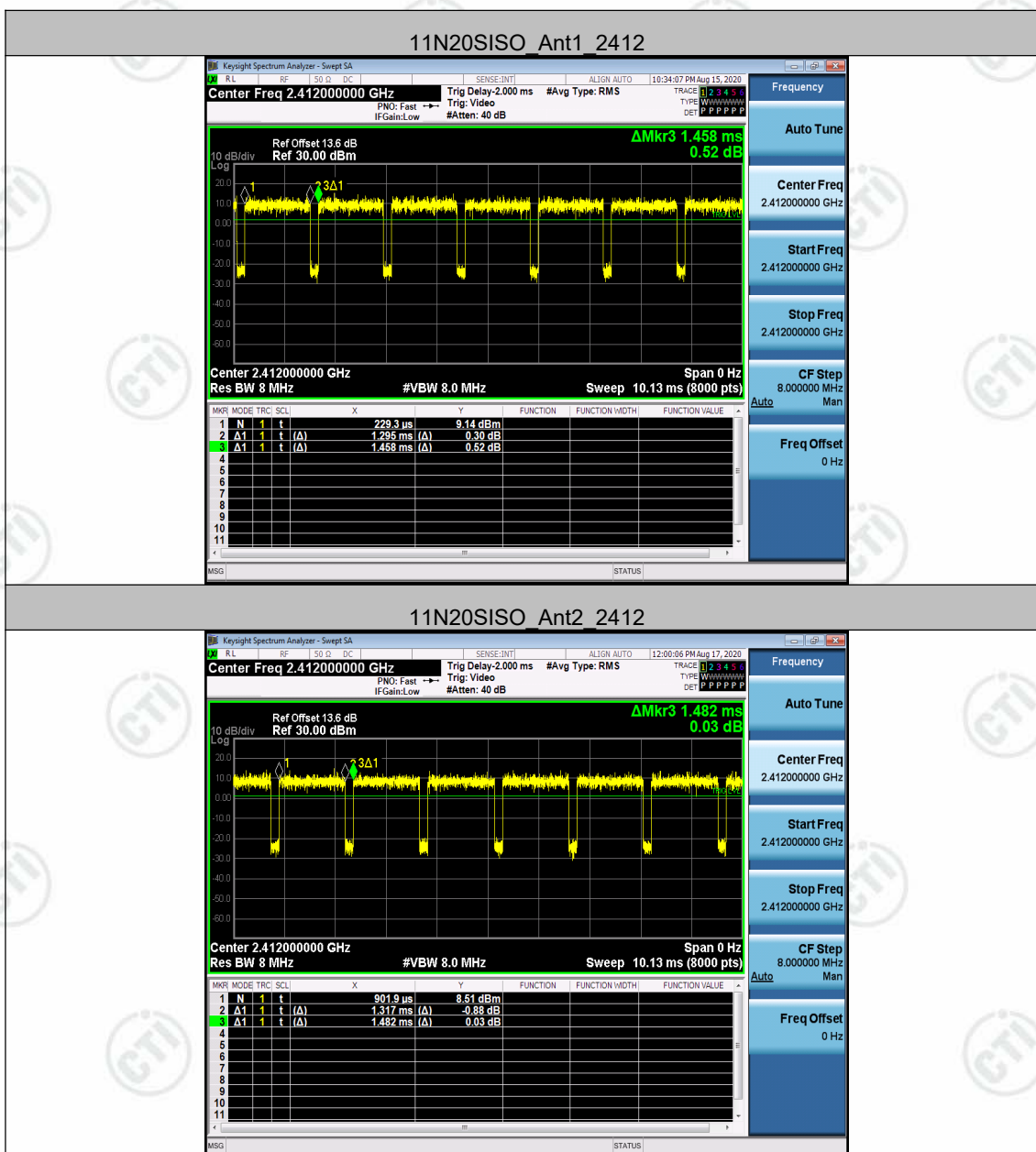


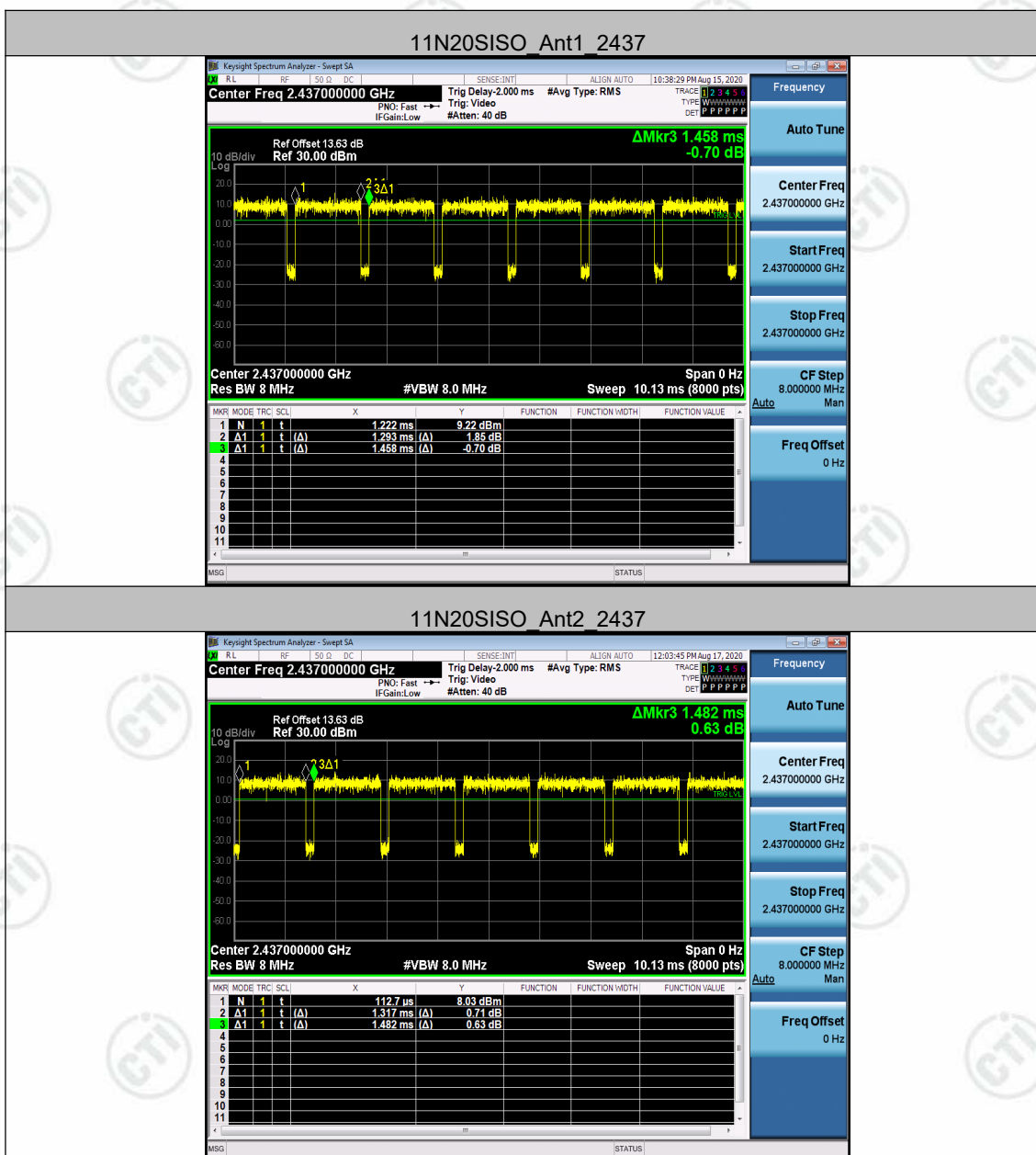


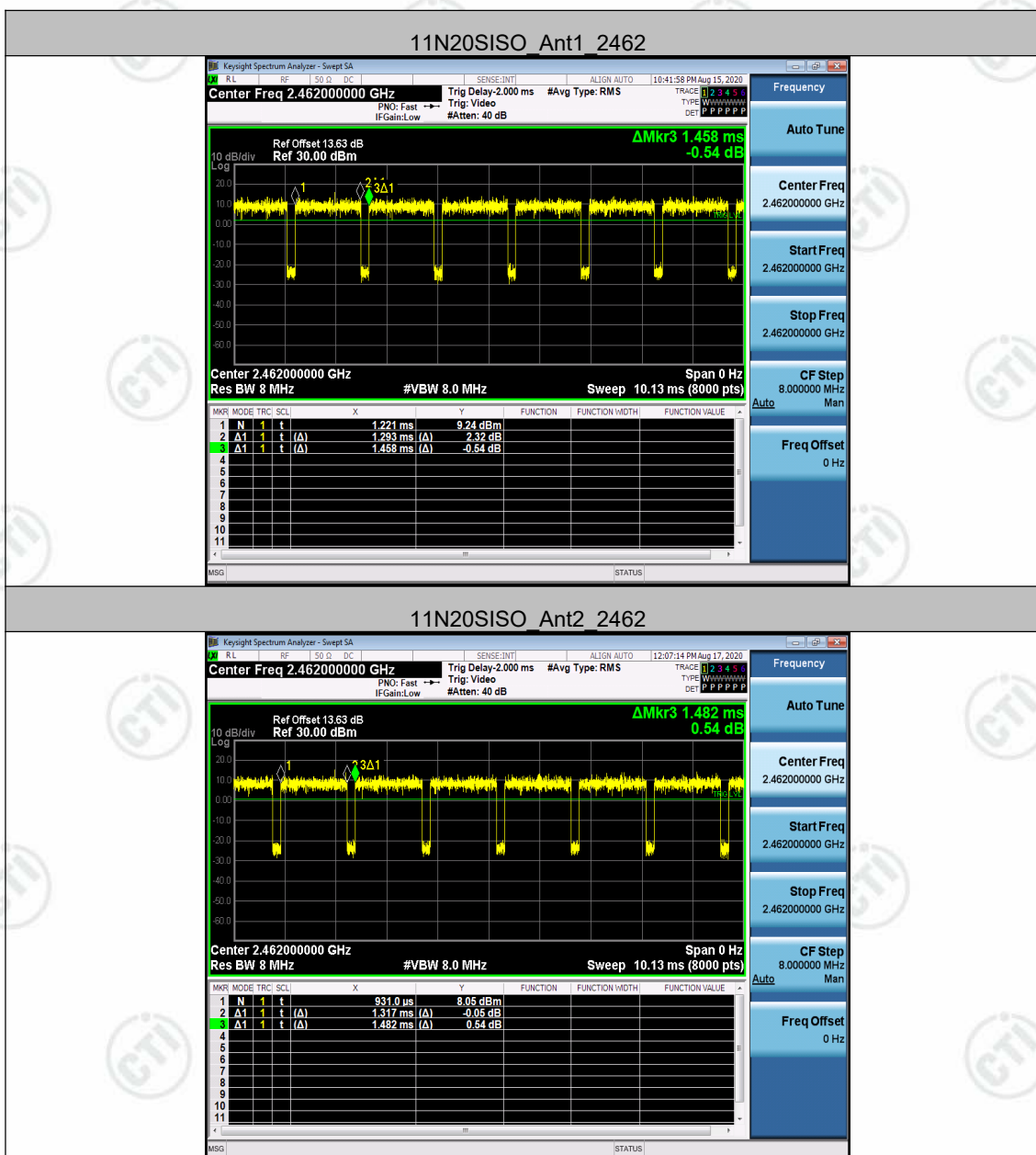


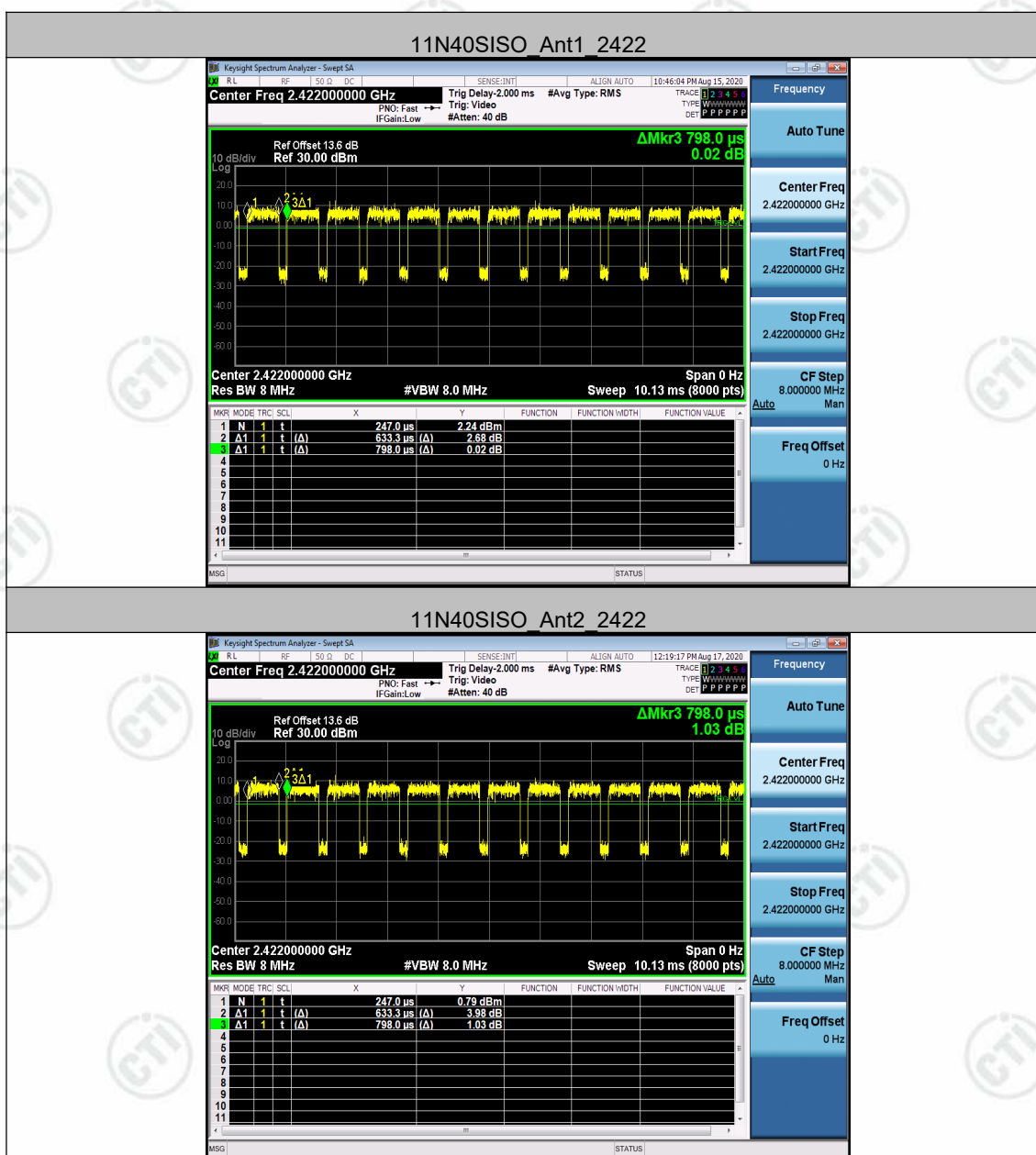


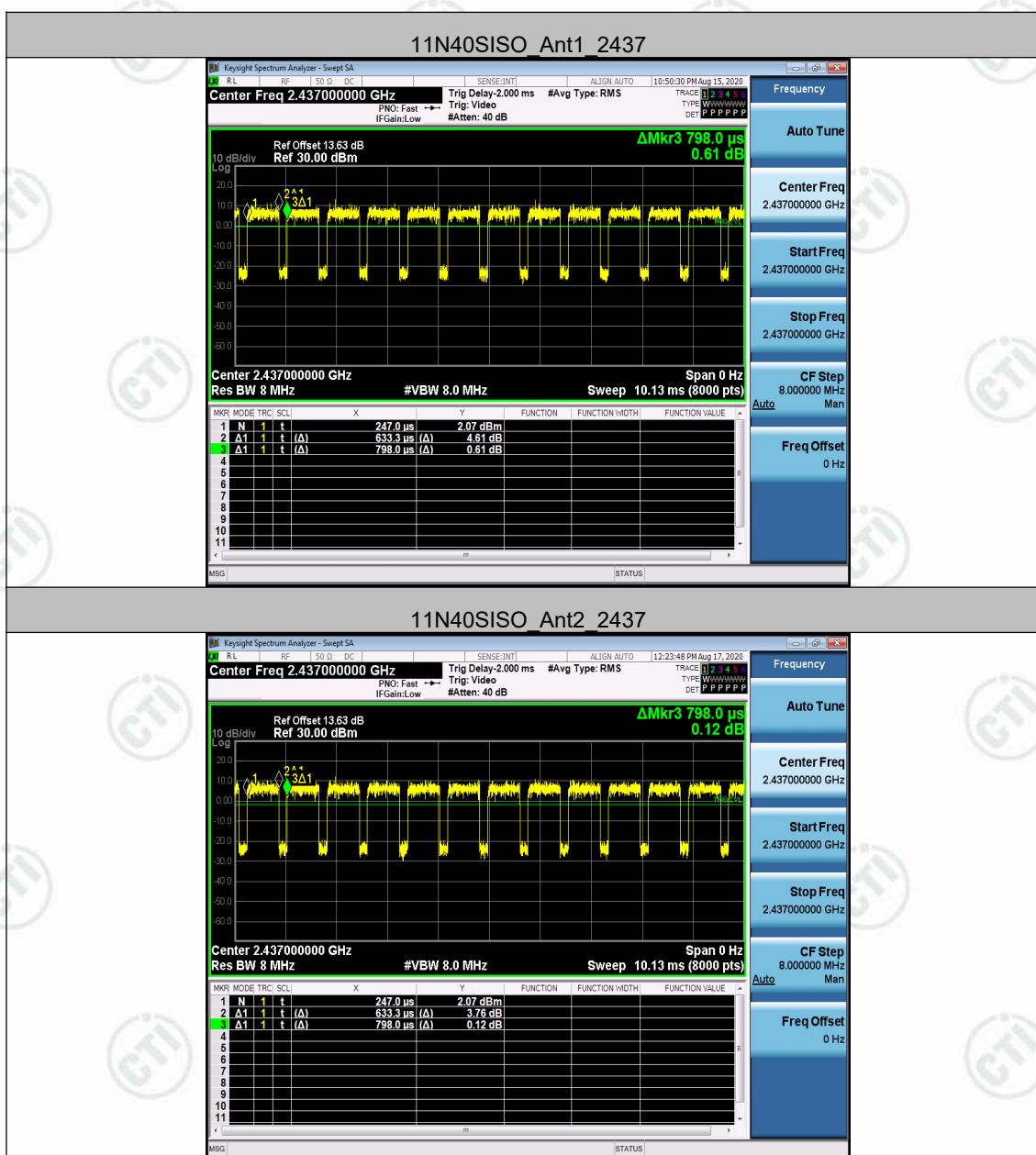


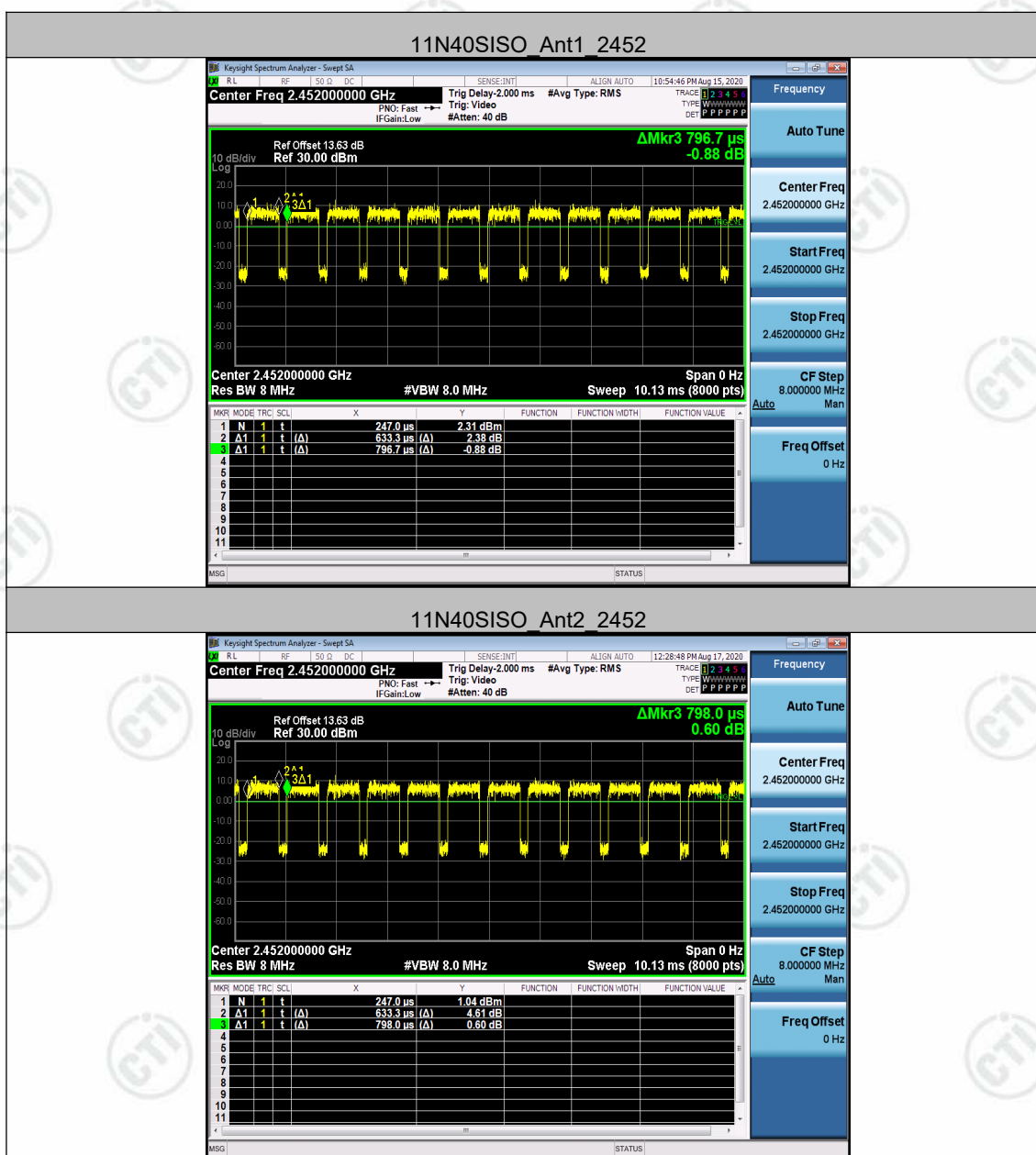


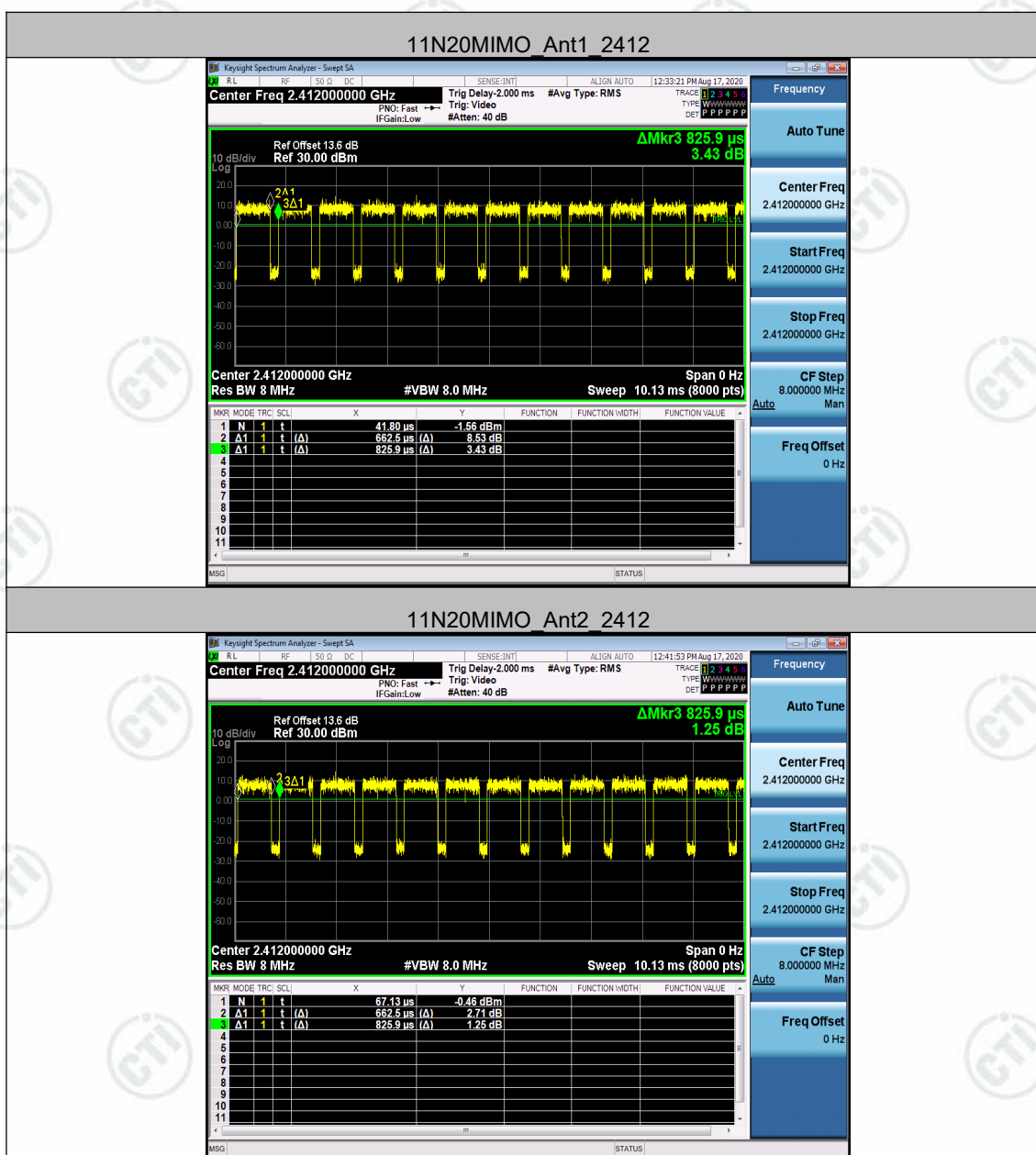


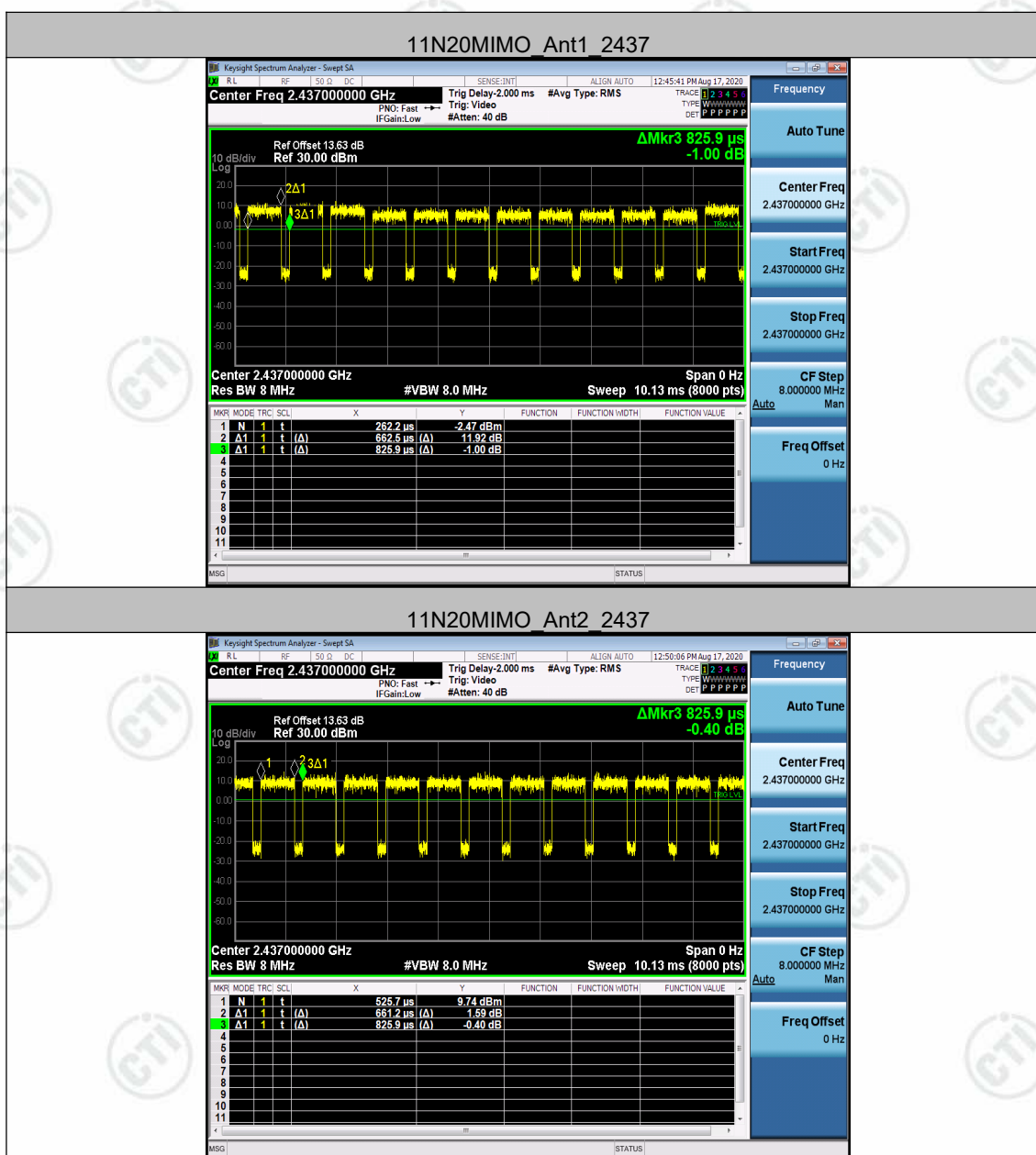


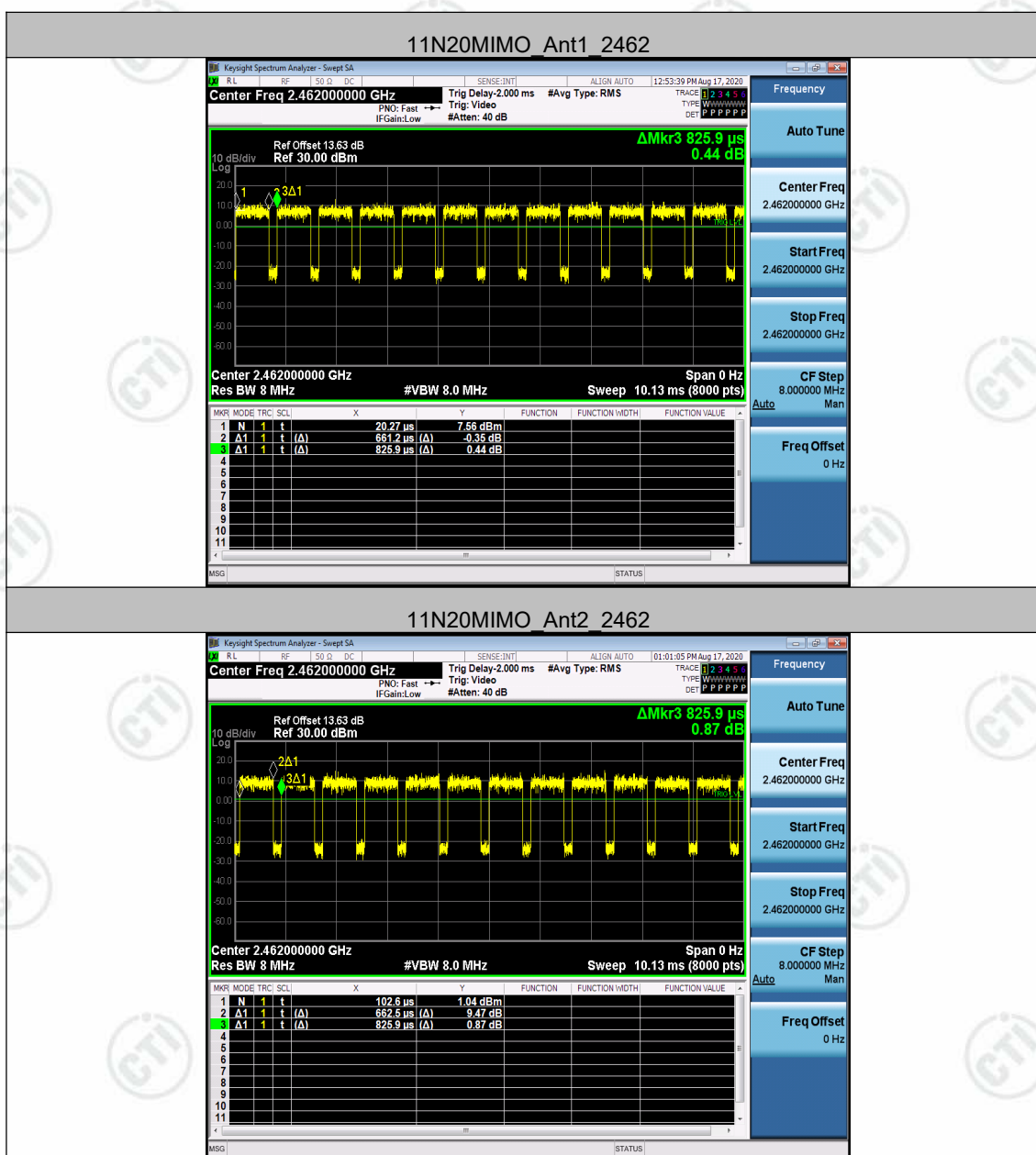


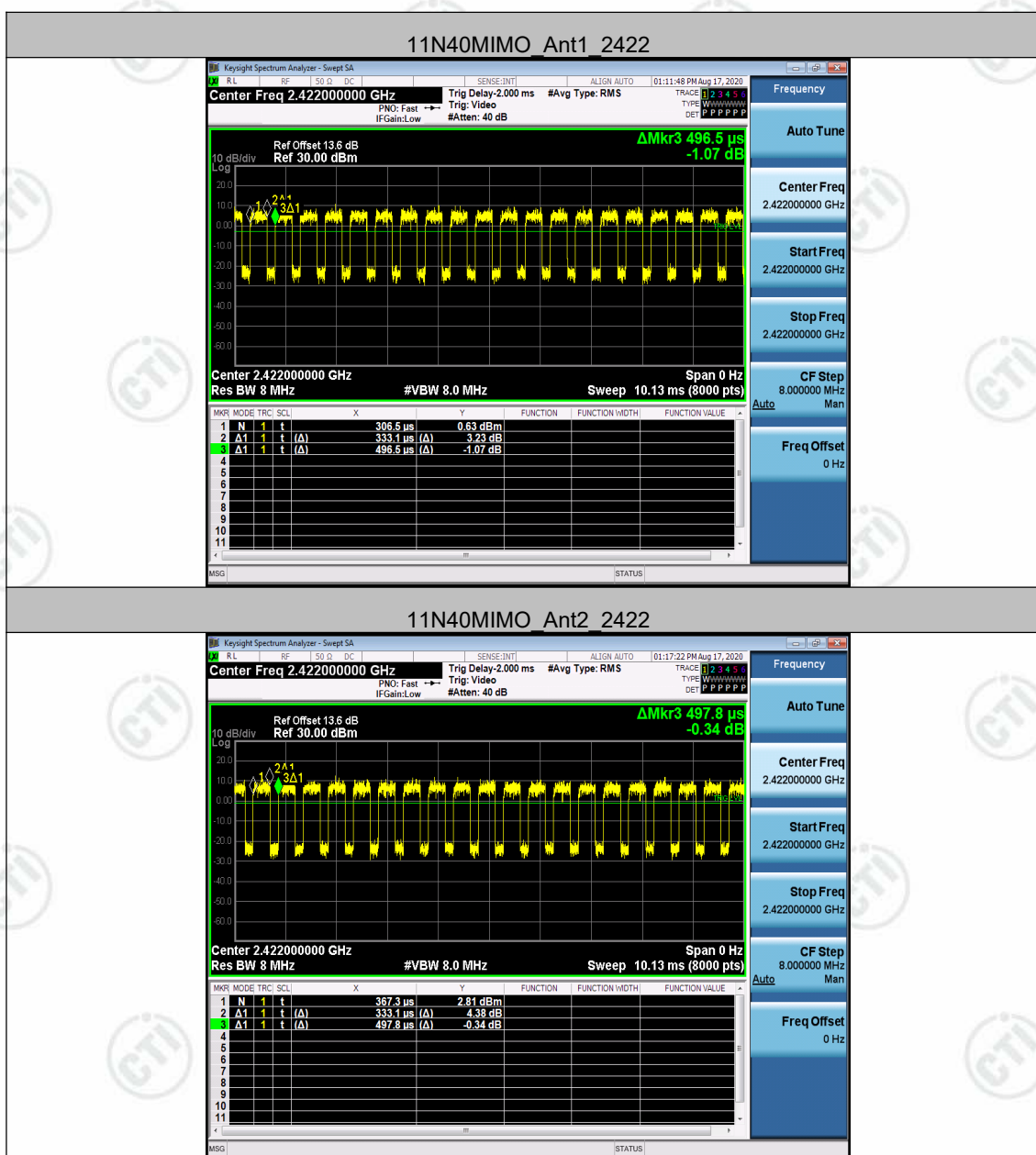


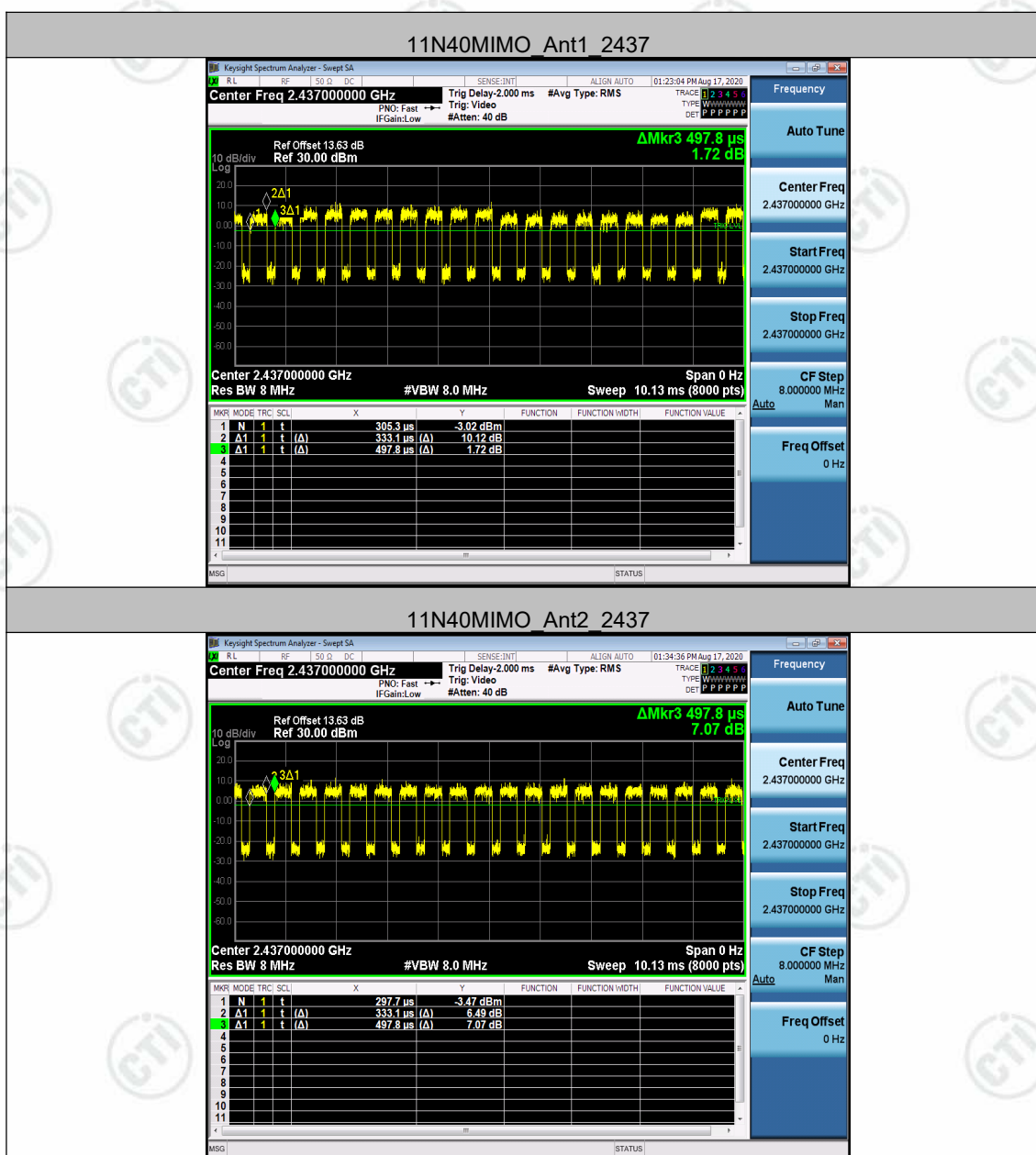


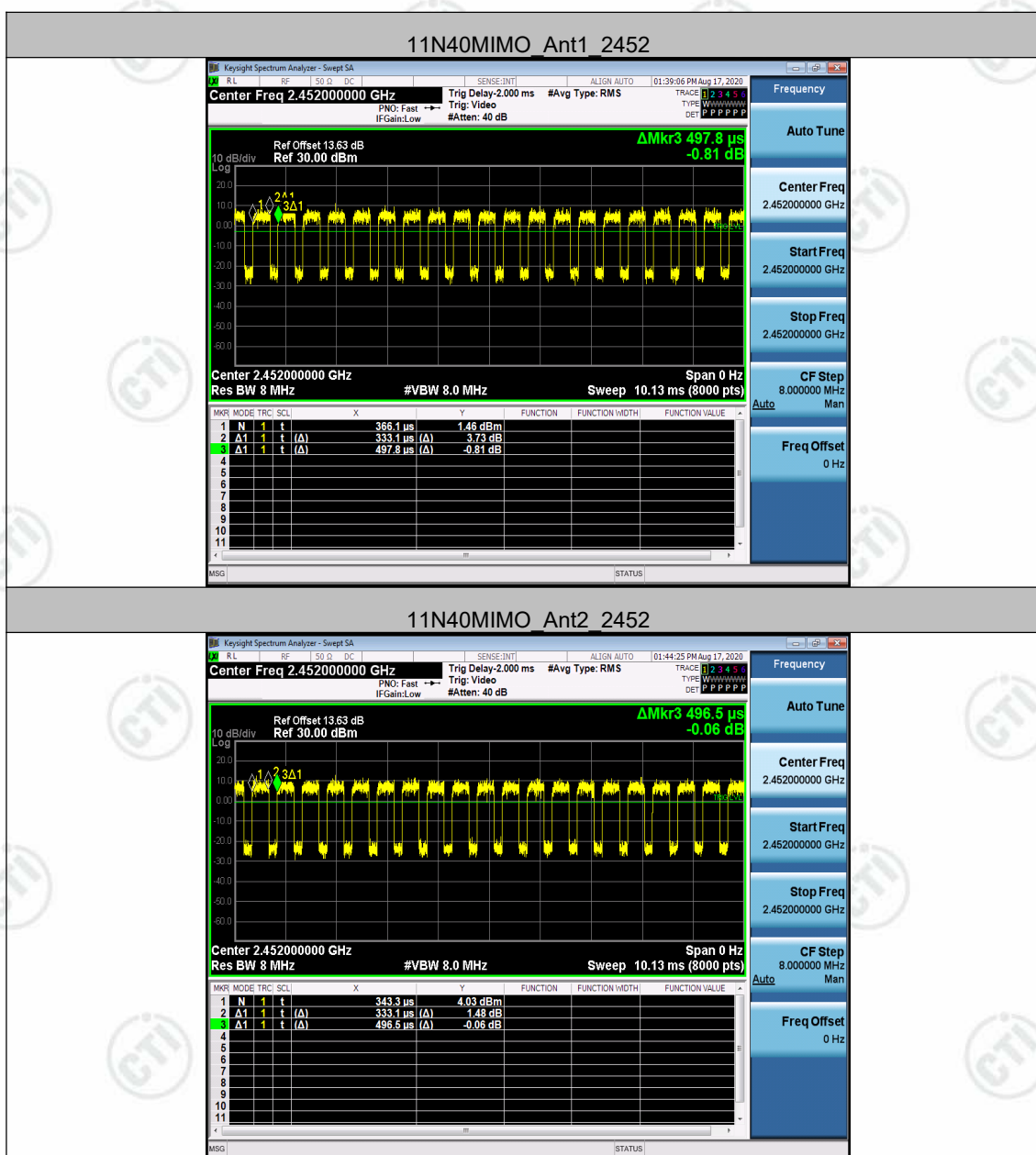












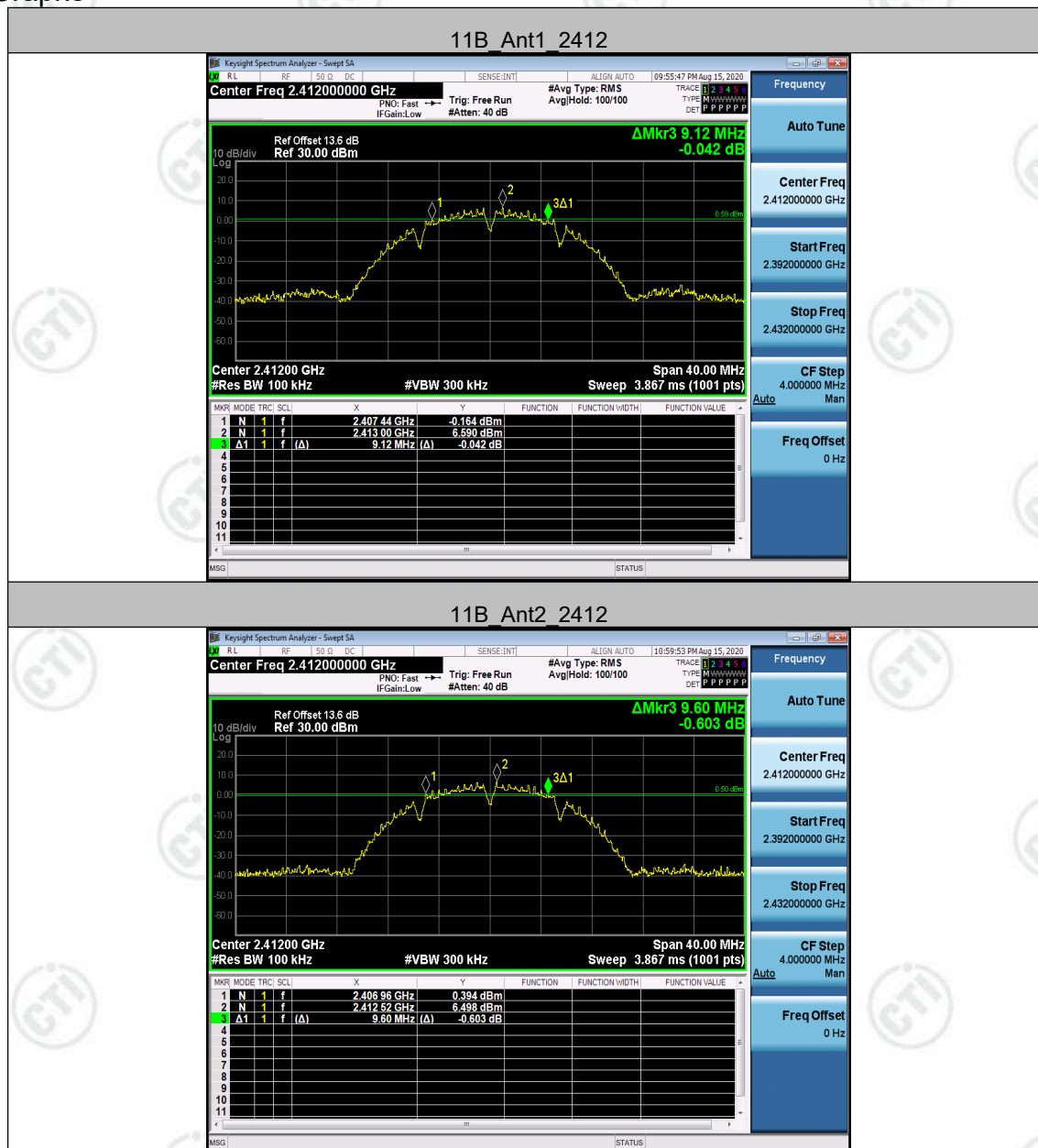
Appendix A: DTS Bandwidth

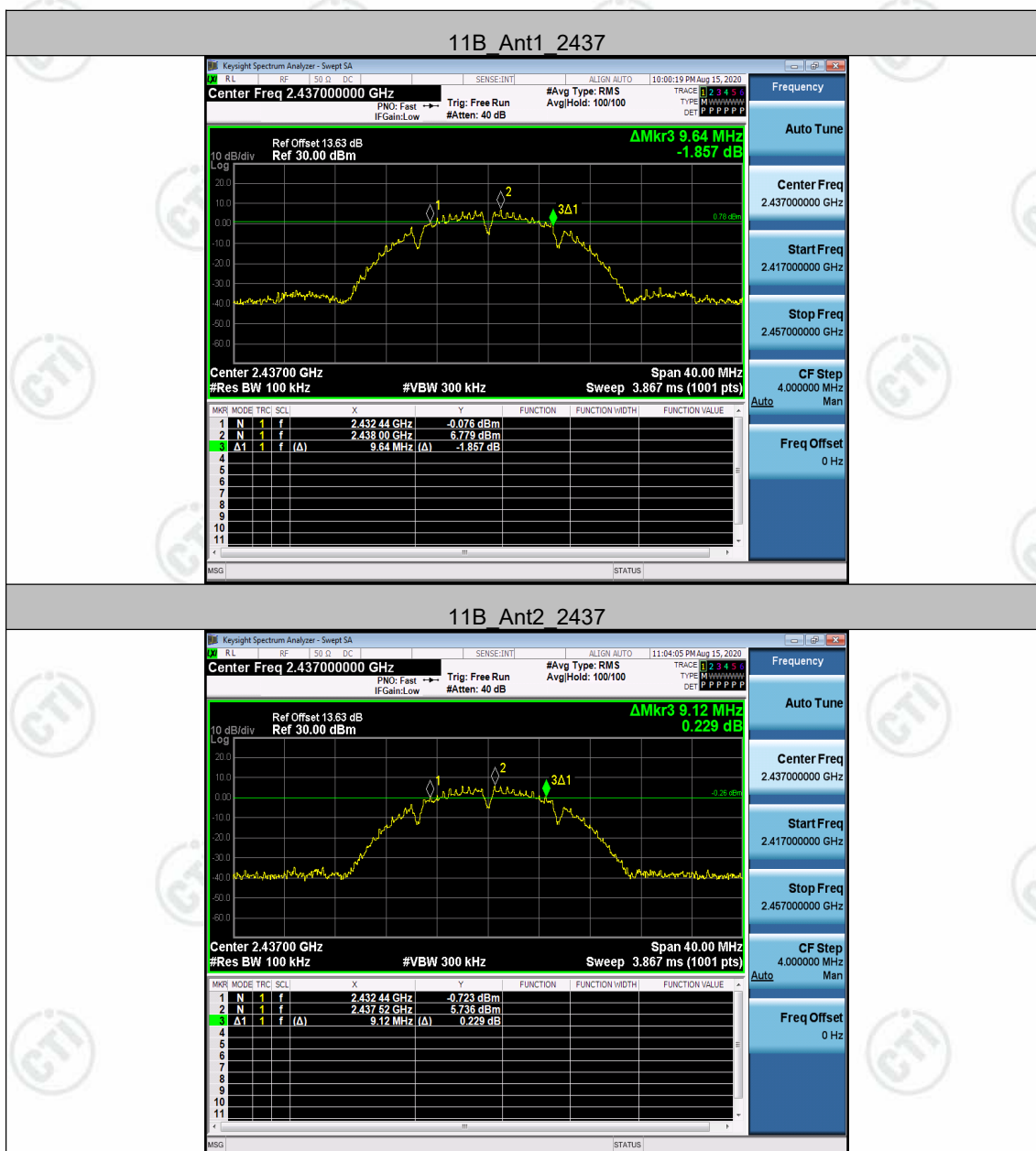
Test Result

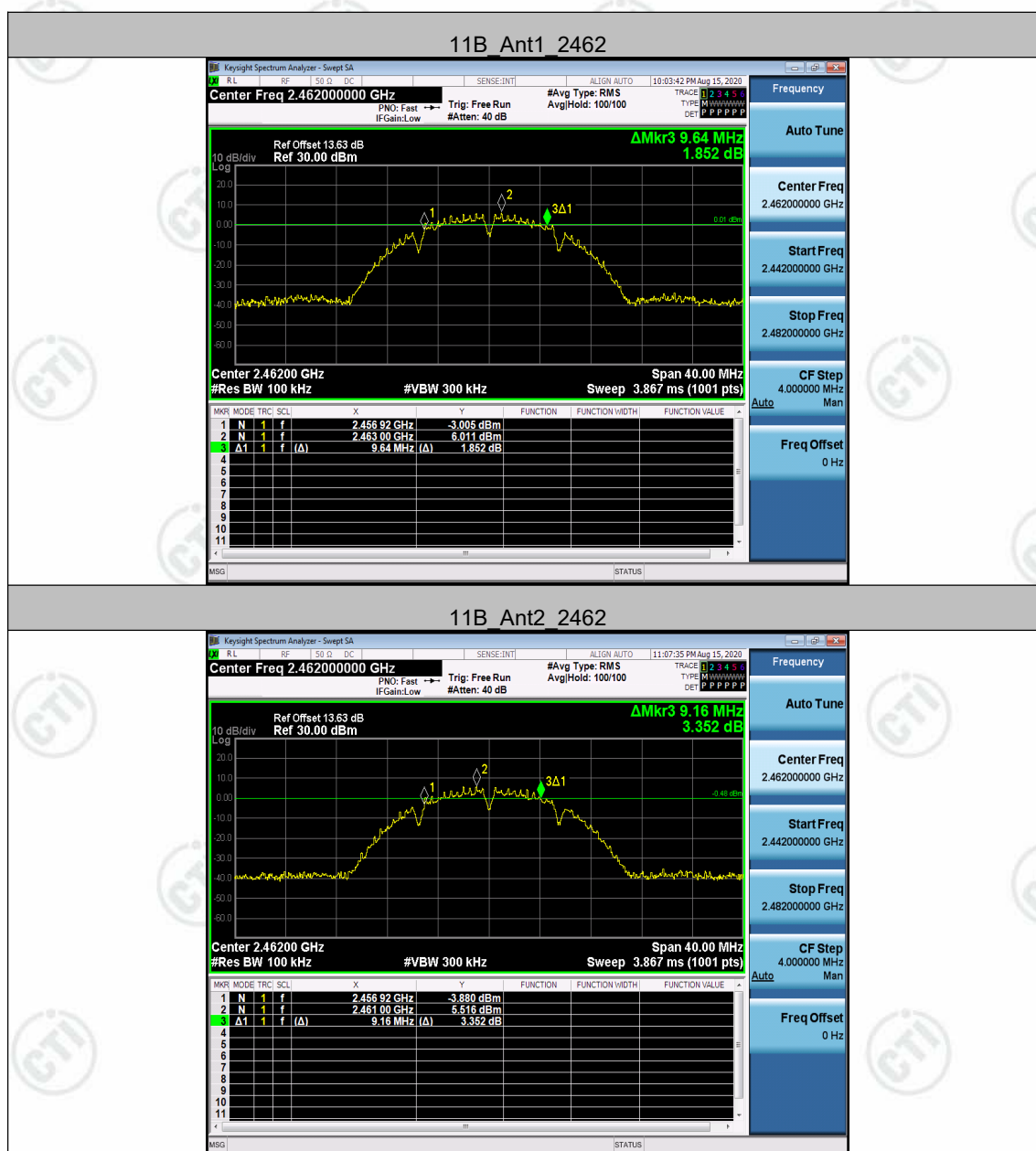
Test Mode	Antenna	Channel	DTS BW [MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	9.120	0.5	PASS
	Ant2	2412	9.600	0.5	PASS
	Ant1	2437	9.640	0.5	PASS
	Ant2	2437	9.120	0.5	PASS
	Ant1	2462	9.640	0.5	PASS
	Ant2	2462	9.160	0.5	PASS
11G	Ant1	2412	12.480	0.5	PASS
	Ant2	2412	15.120	0.5	PASS
	Ant1	2437	14.840	0.5	PASS
	Ant2	2437	15.800	0.5	PASS
	Ant1	2462	15.200	0.5	PASS
	Ant2	2462	14.880	0.5	PASS
11N20SISO	Ant1	2412	15.120	0.5	PASS
	Ant2	2412	15.120	0.5	PASS
	Ant1	2437	13.880	0.5	PASS
	Ant2	2437	15.120	0.5	PASS
	Ant1	2462	12.720	0.5	PASS
	Ant2	2462	14.480	0.5	PASS
11N40SISO	Ant1	2422	35.200	0.5	PASS
	Ant2	2422	35.200	0.5	PASS
	Ant1	2437	32.720	0.5	PASS
	Ant2	2437	35.200	0.5	PASS
	Ant1	2452	35.200	0.5	PASS
	Ant2	2452	34.000	0.5	PASS
11N20MIMO	Ant1	2412	15.160	0.5	PASS
	Ant2	2412	13.880	0.5	PASS
	Ant1	2437	14.200	0.5	PASS
	Ant2	2437	13.920	0.5	PASS
	Ant1	2462	10.120	0.5	PASS
	Ant2	2462	13.840	0.5	PASS

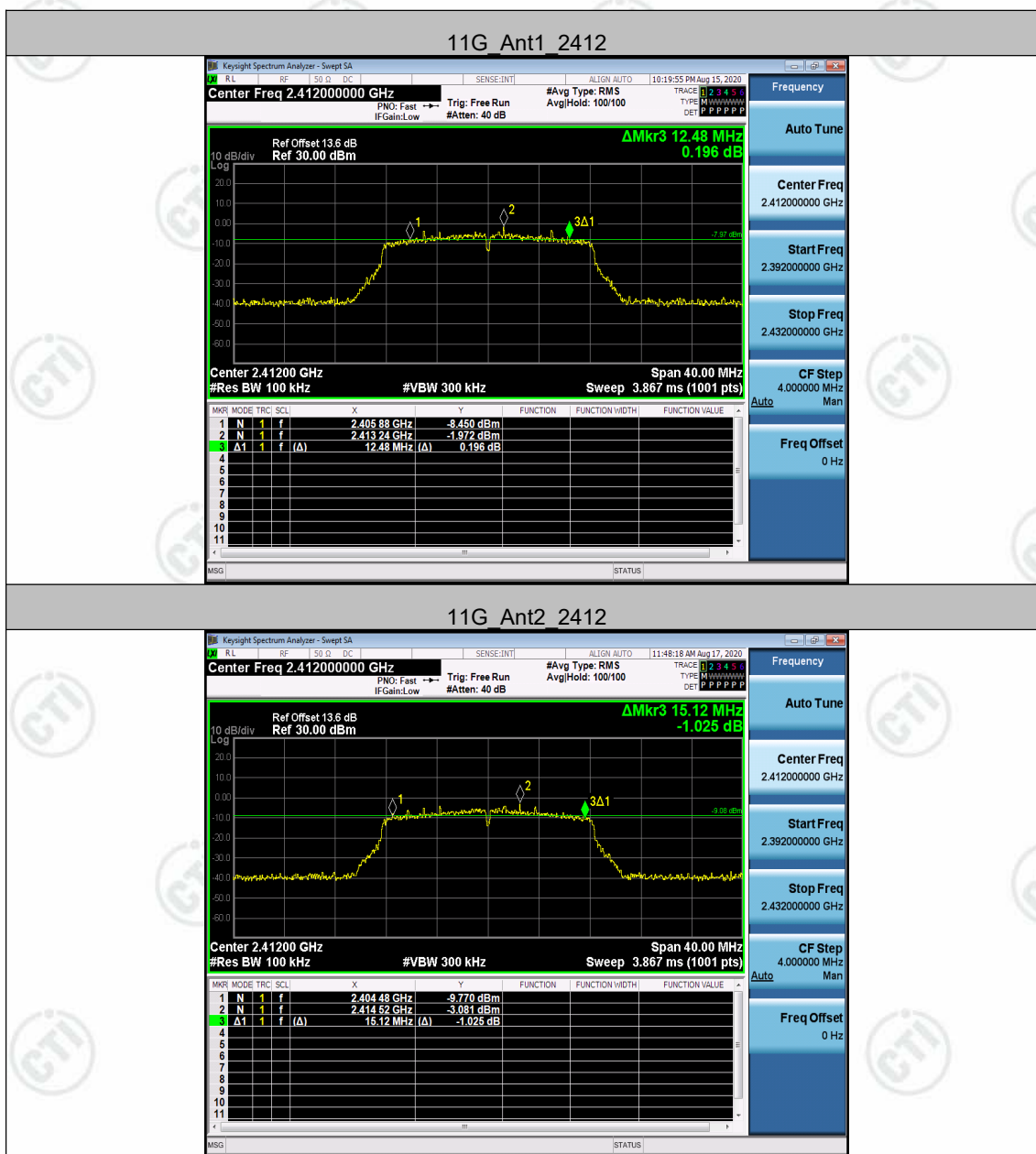
11N40MIMO	Ant1	2422	33.920	0.5	PASS
	Ant2	2422	34.000	0.5	PASS
	Ant1	2437	31.520	0.5	PASS
	Ant2	2437	32.720	0.5	PASS
	Ant1	2452	31.360	0.5	PASS
	Ant2	2452	35.200	0.5	PASS

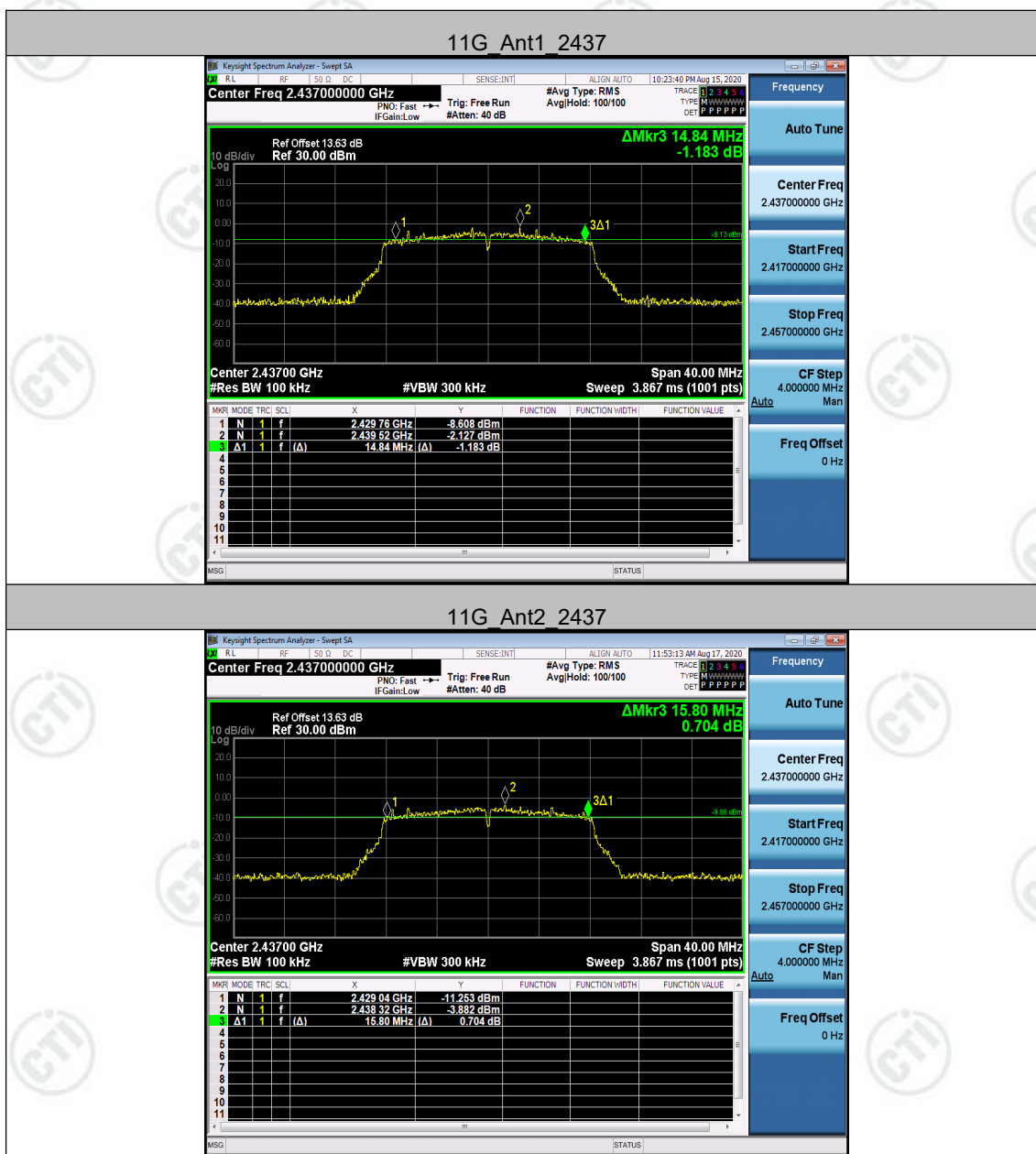
Test Graphs

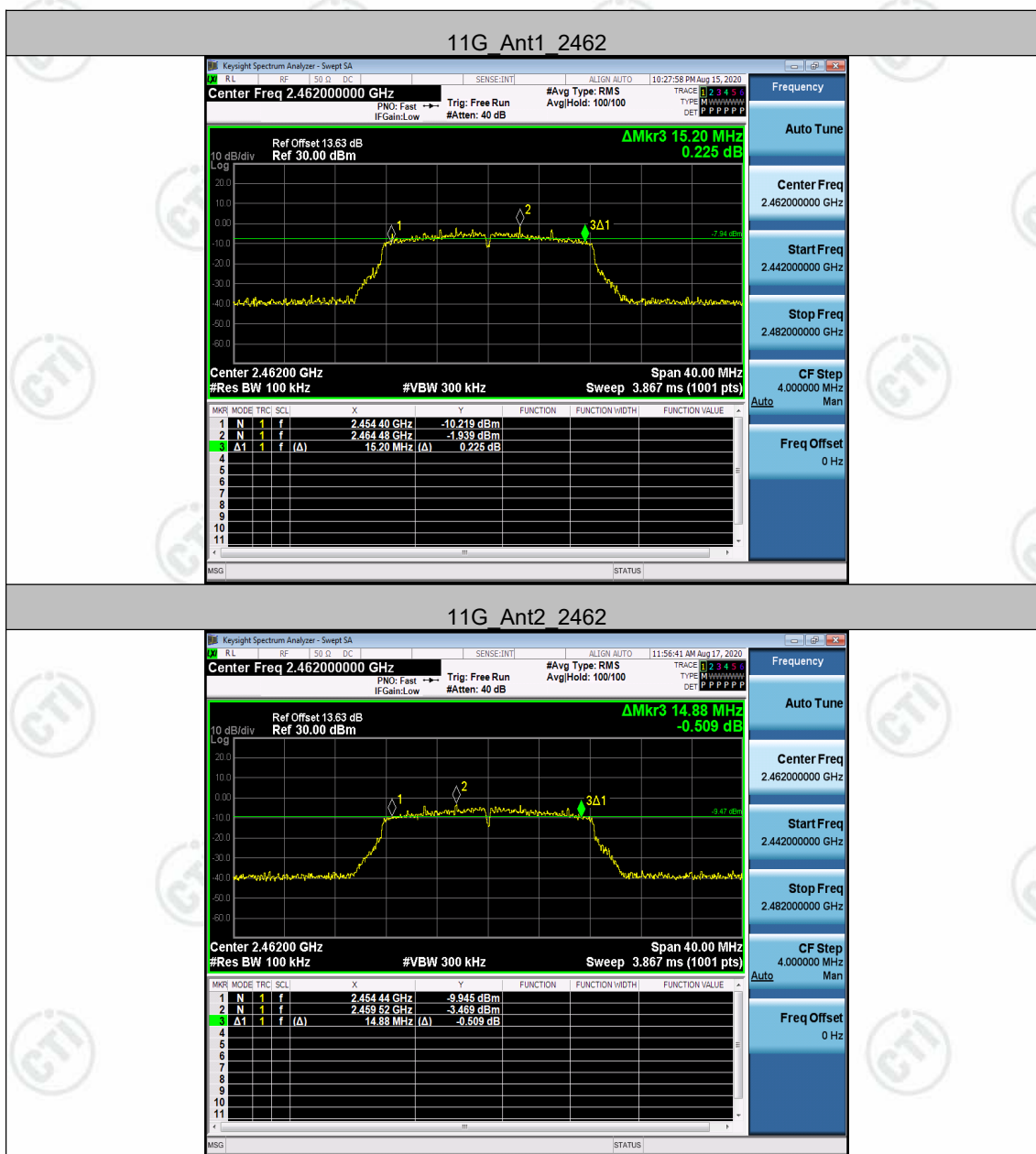


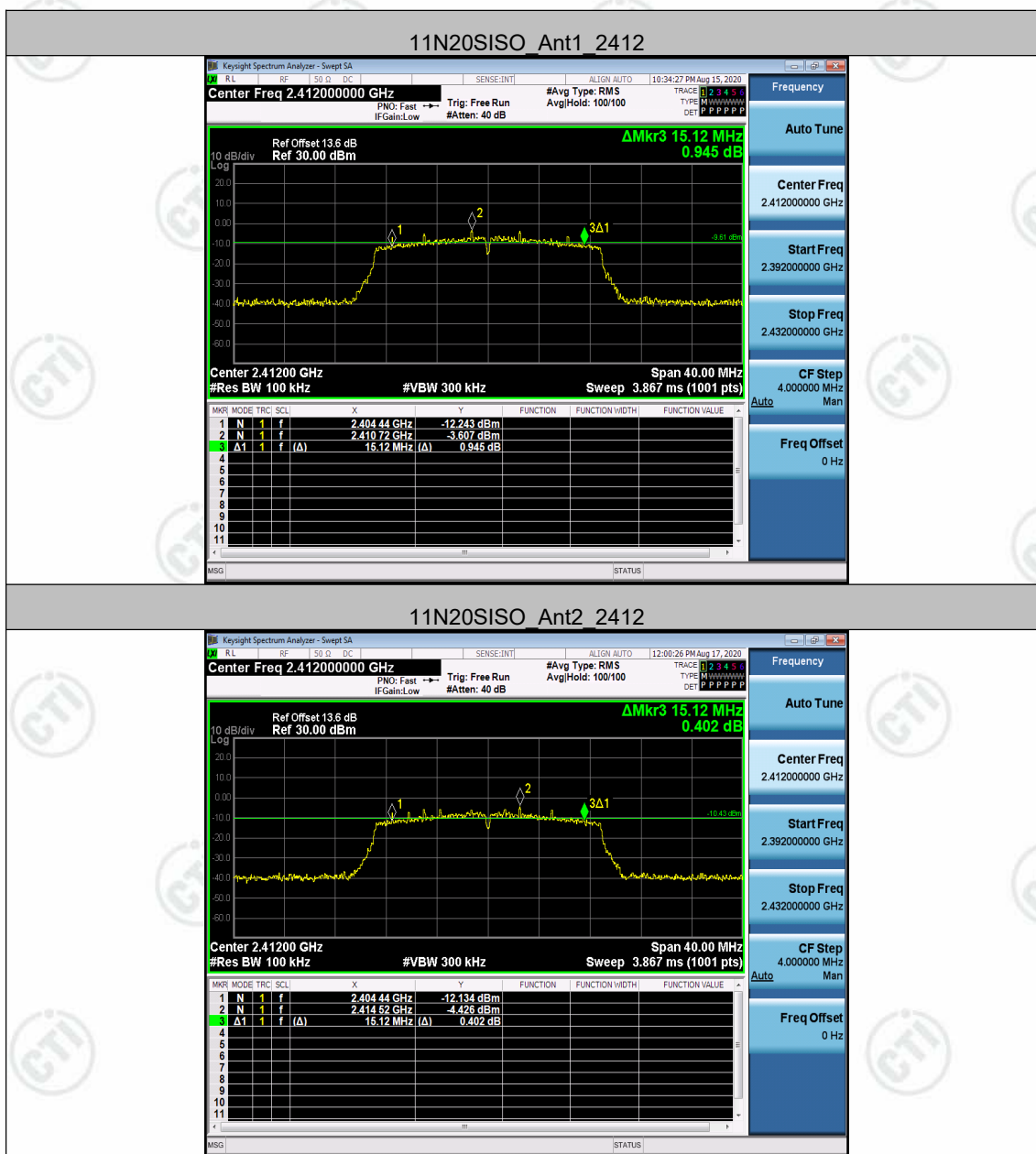


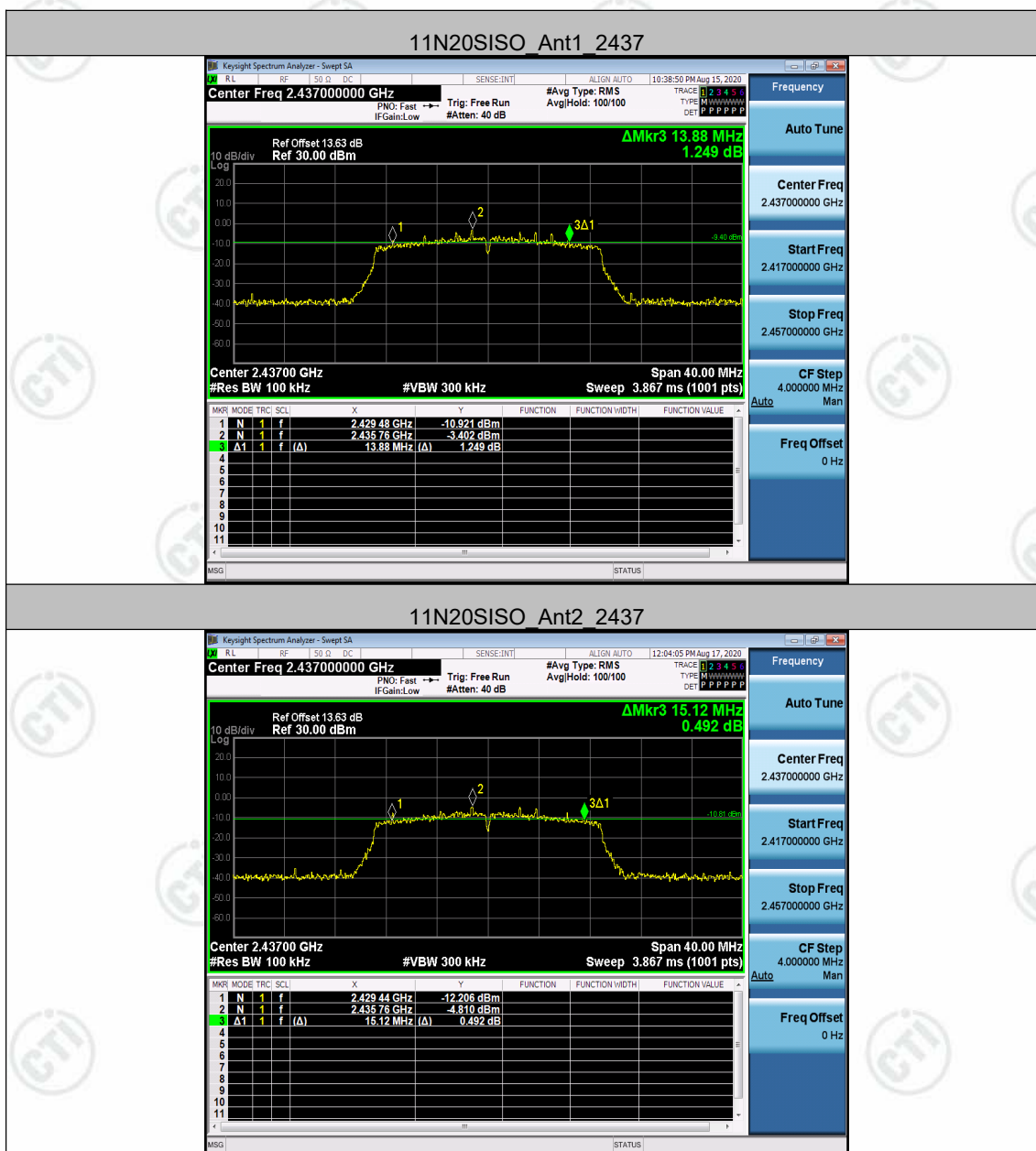


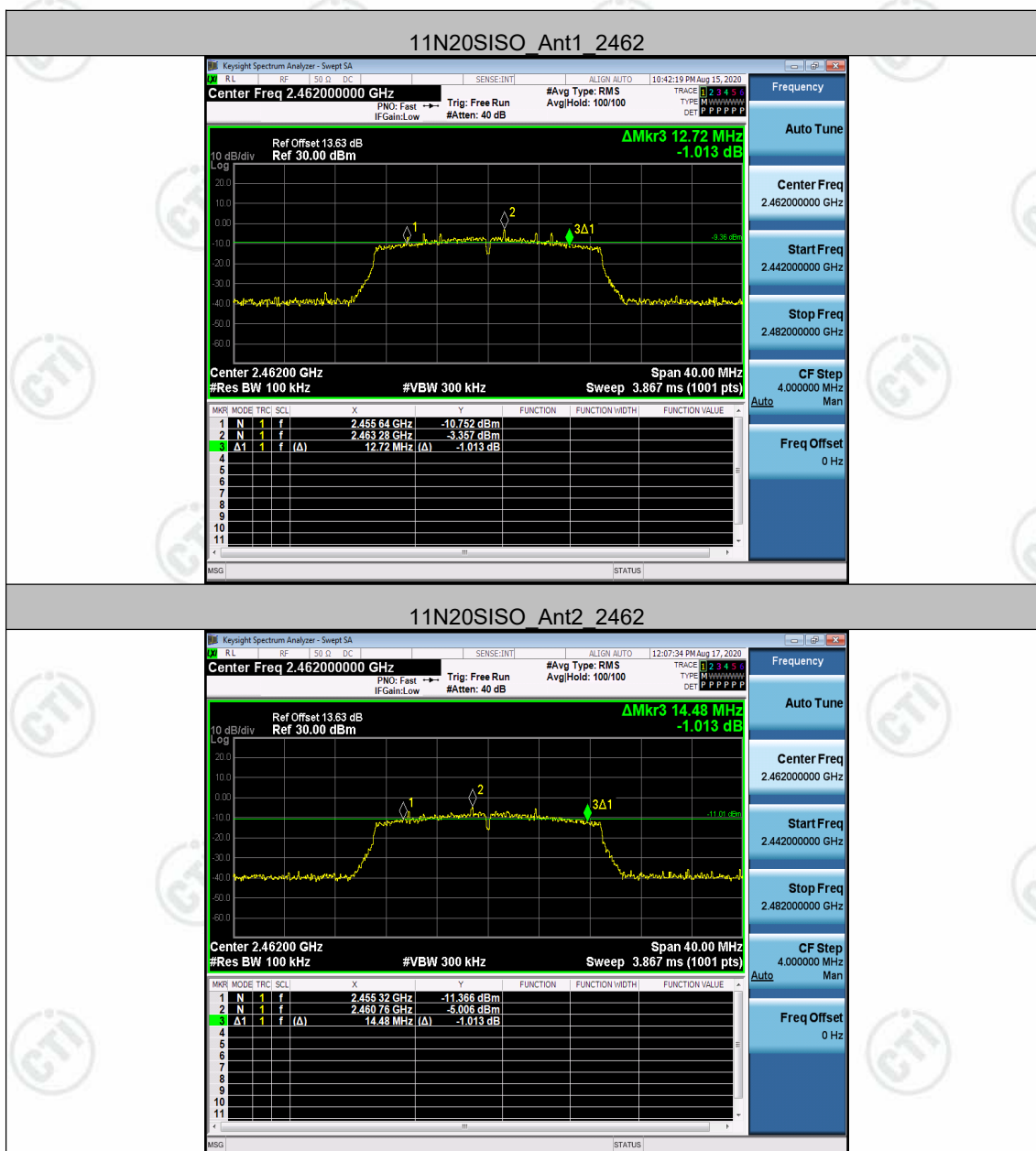


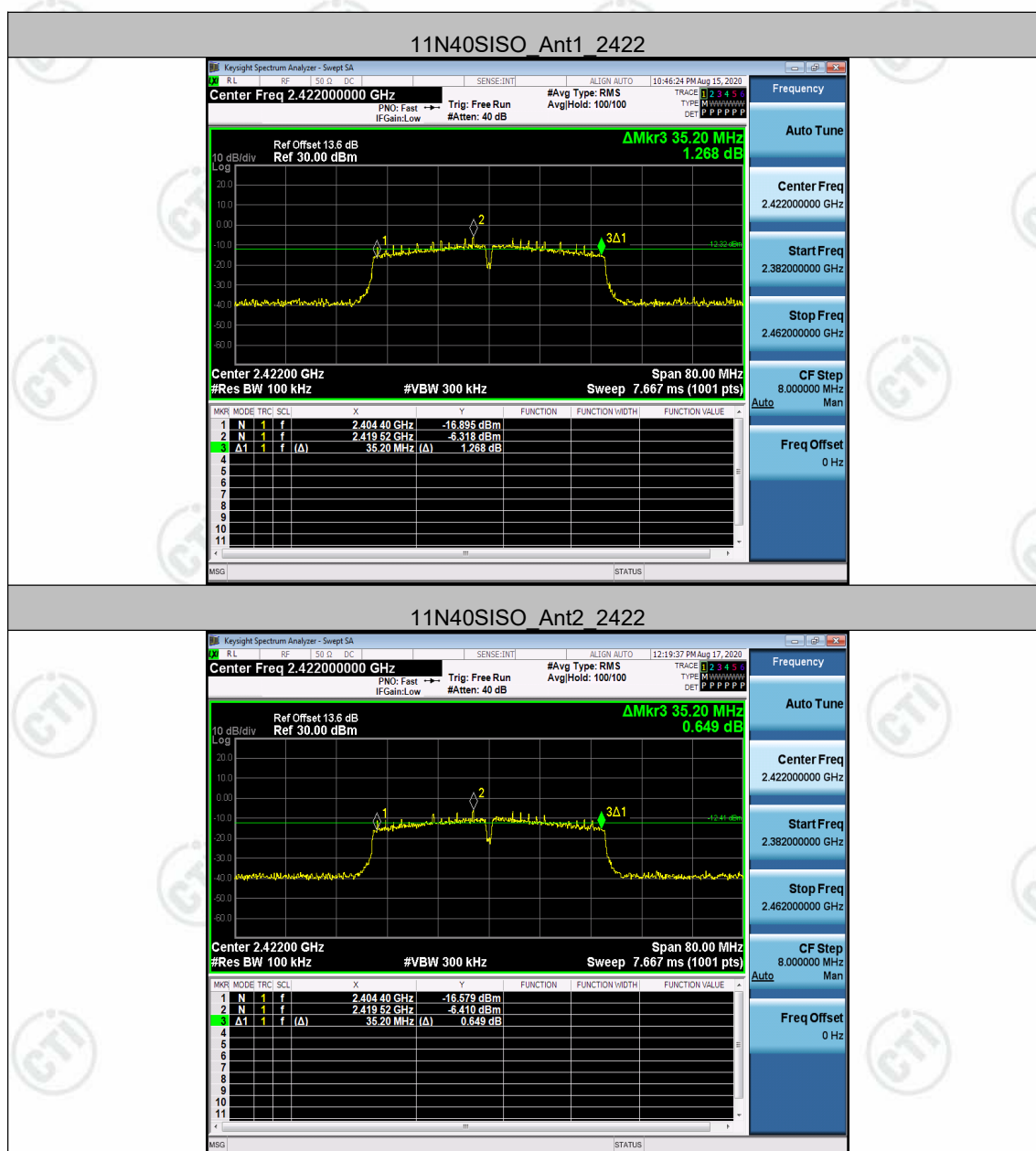


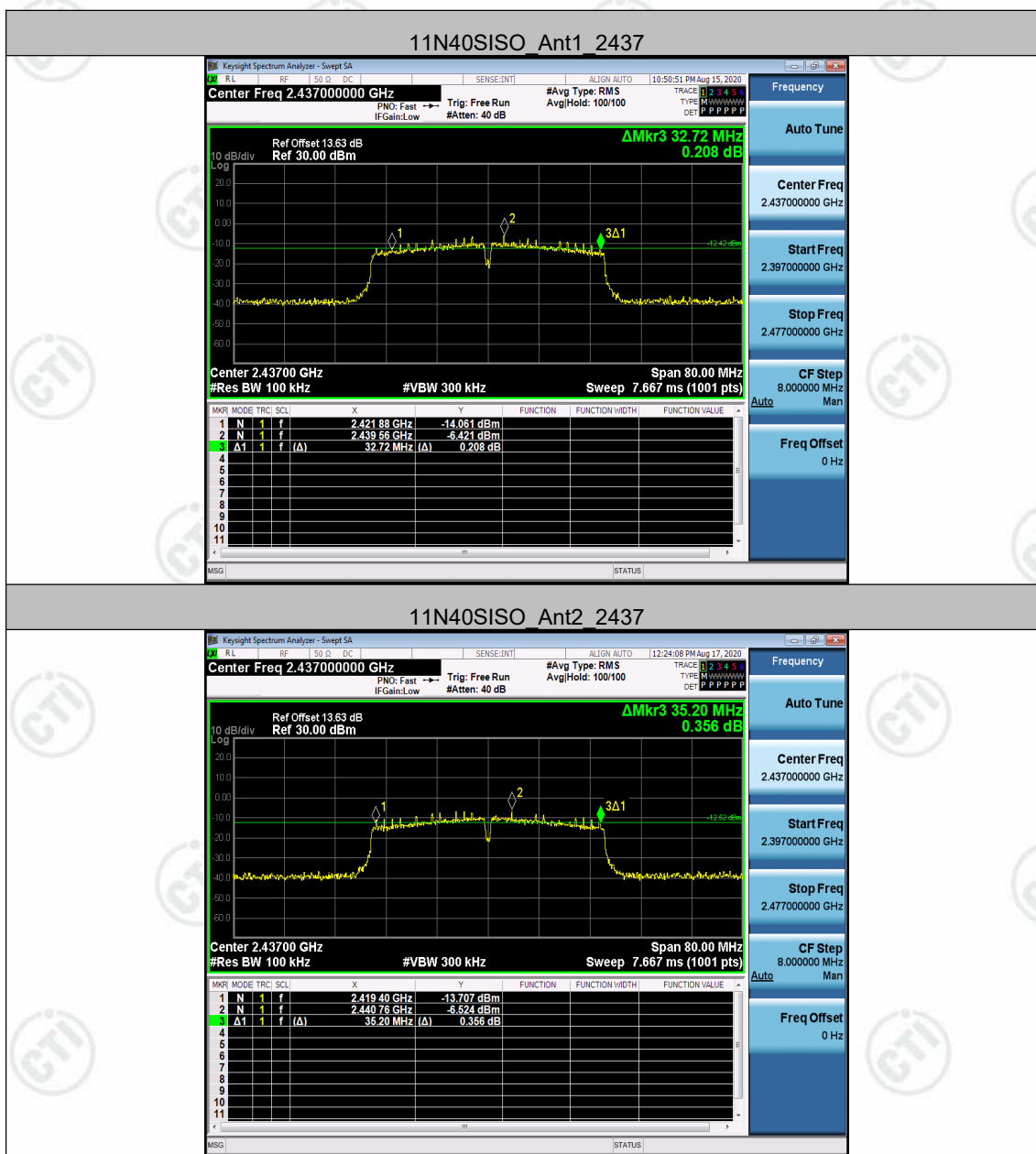


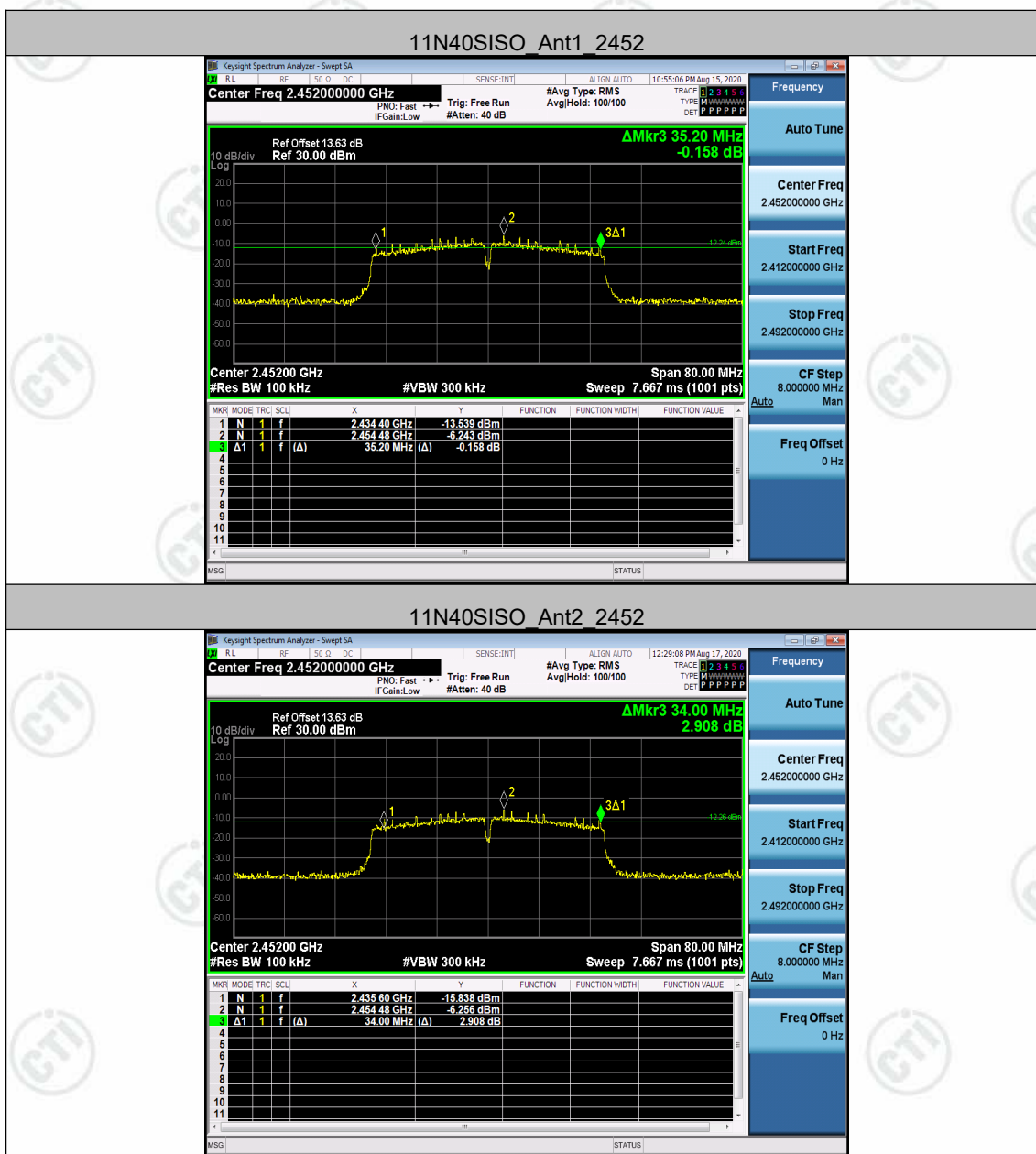


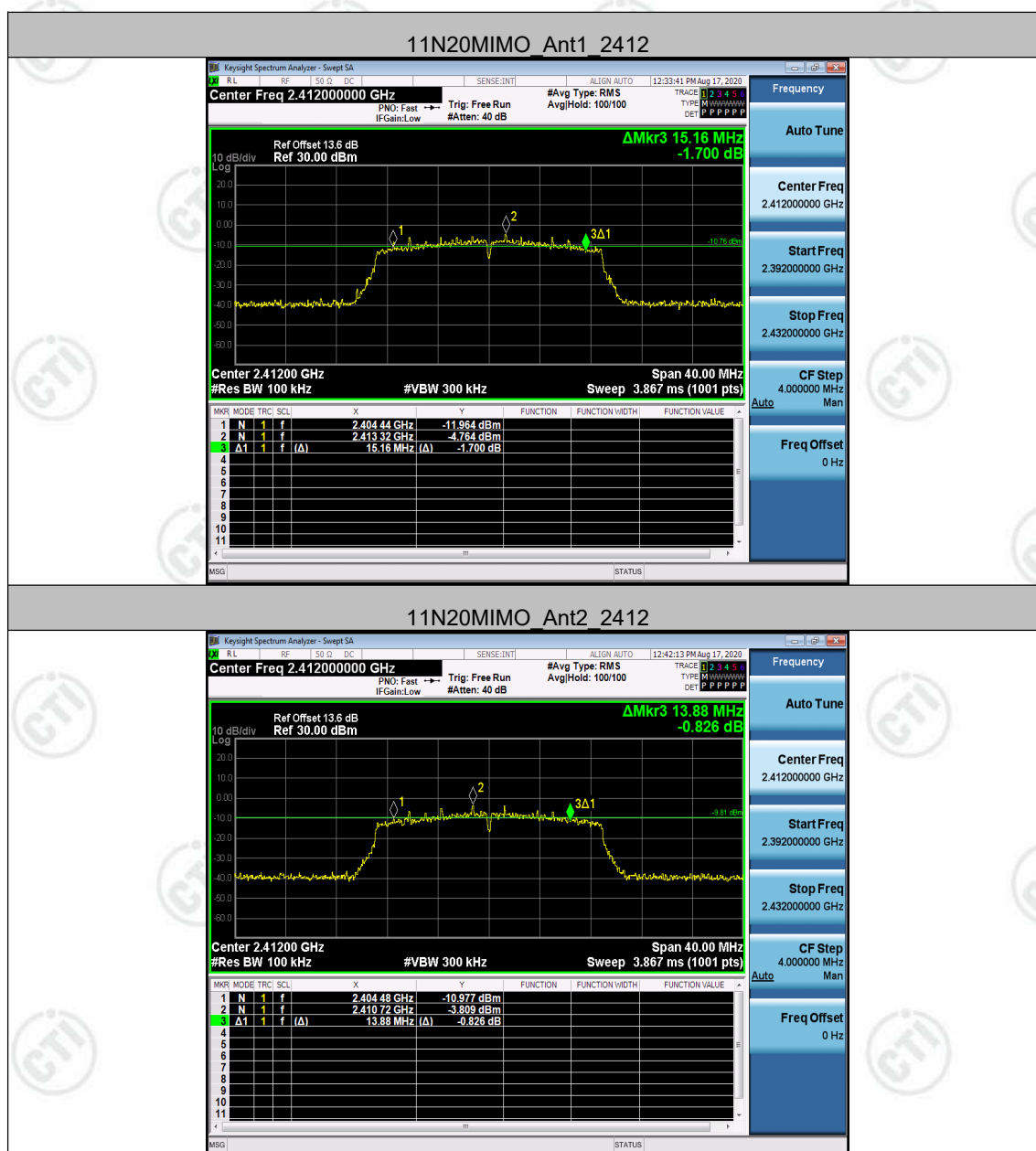


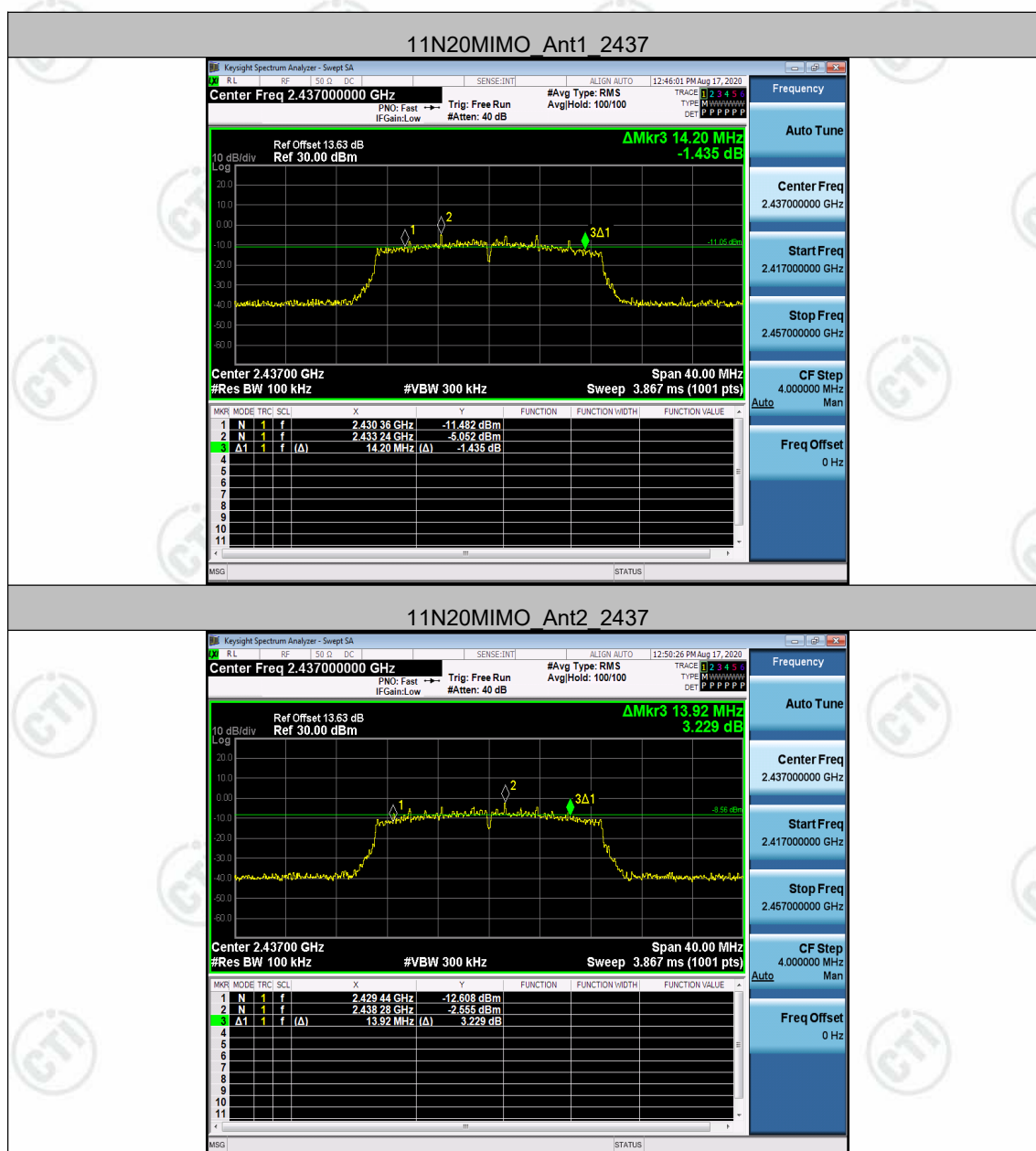


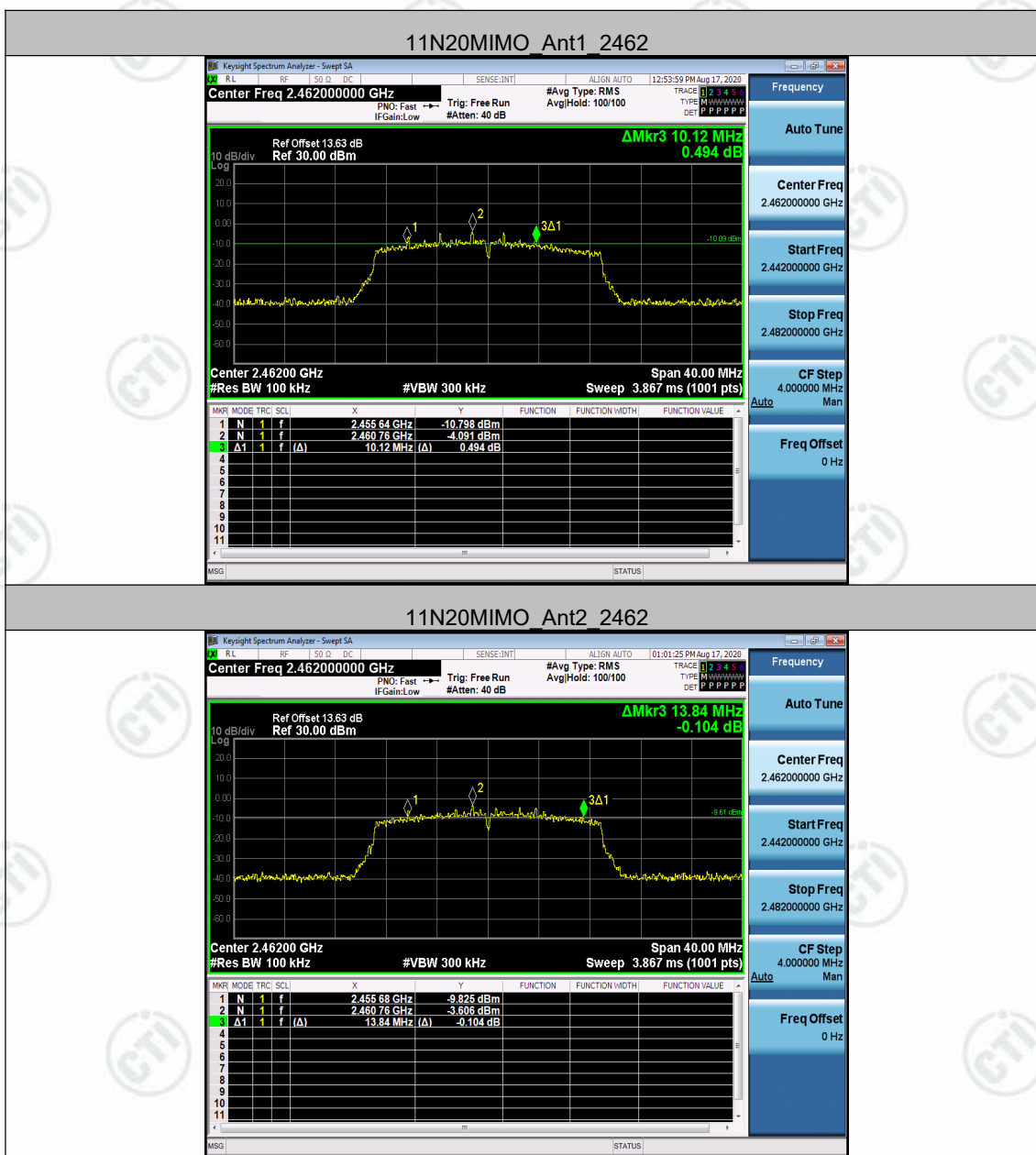


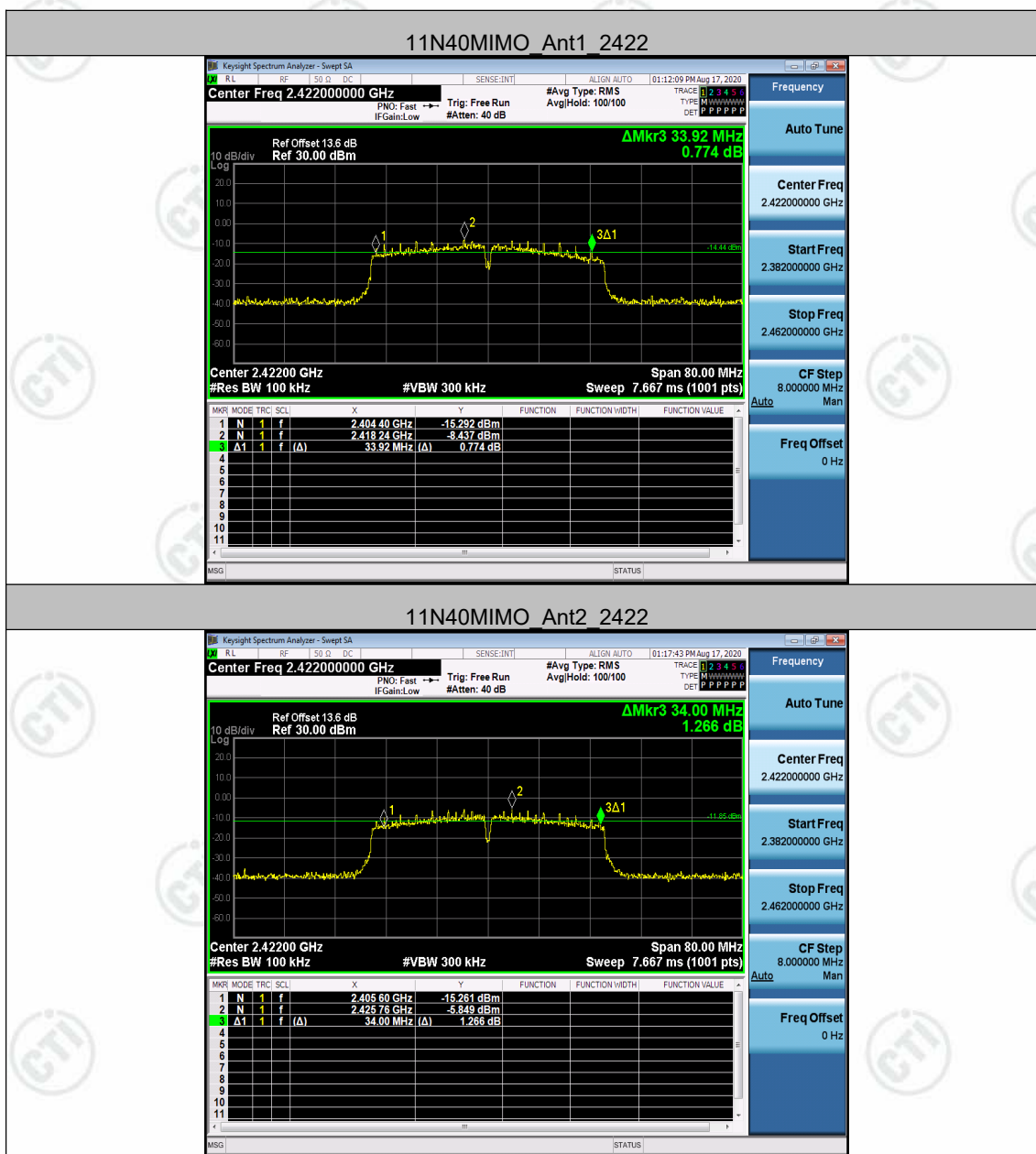


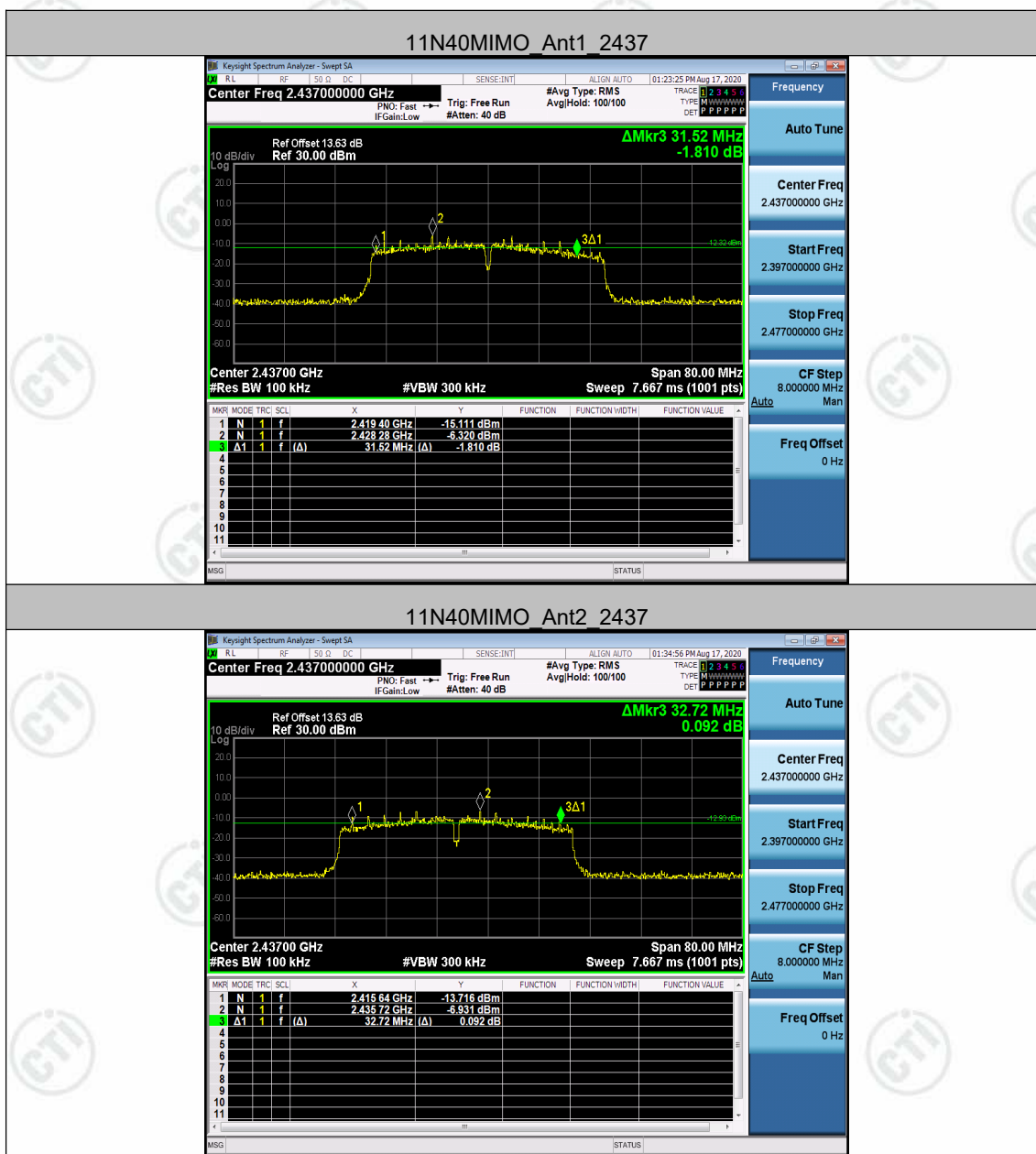


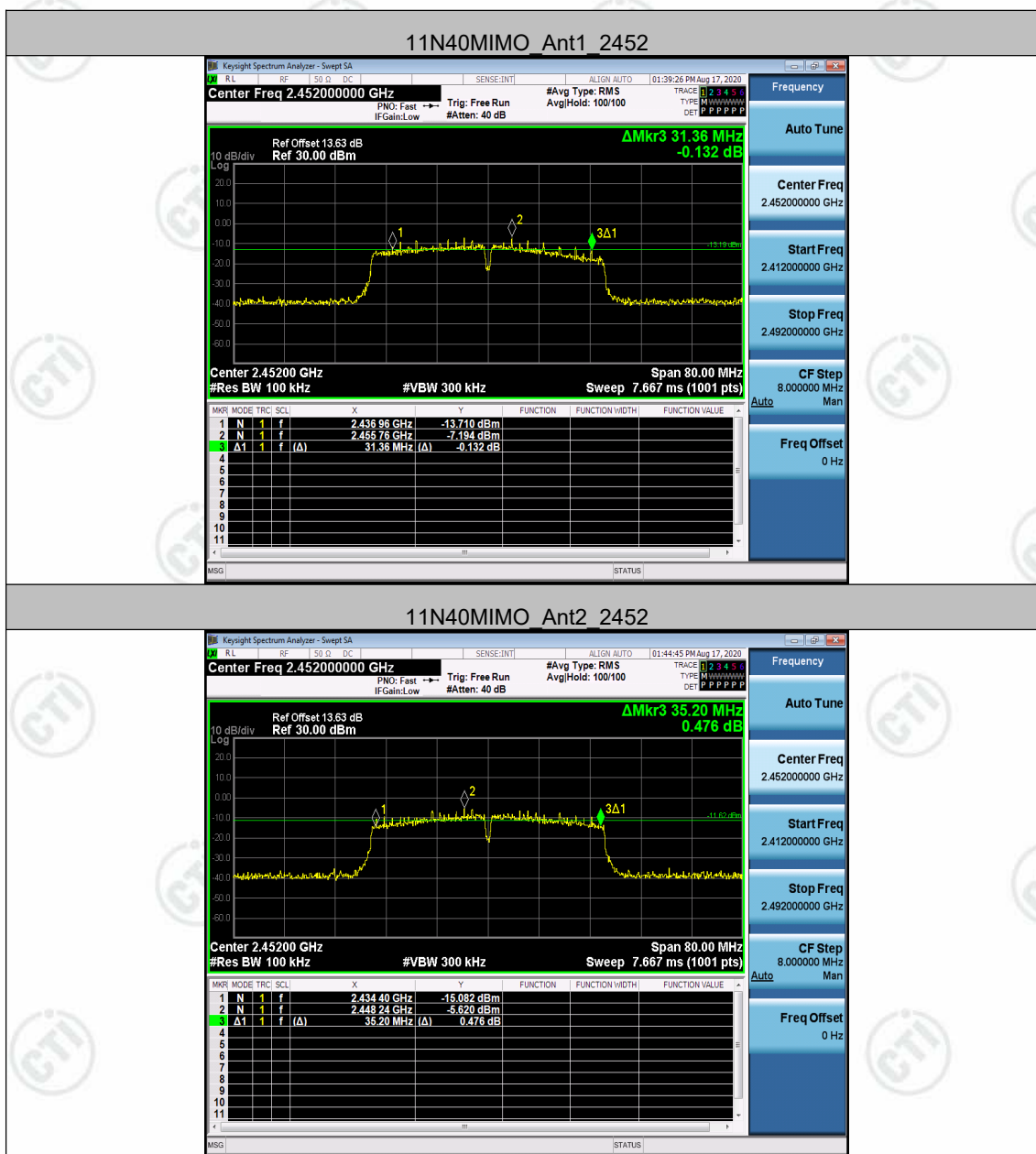












Appendix B: Occupied Channel Bandwidth

Test Result

Test Mode	Antenna	Channel	OCB [MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	14.485	---	PASS
	Ant2	2412	14.322	---	PASS
	Ant1	2437	14.524	---	PASS
	Ant2	2437	14.324	---	PASS
	Ant1	2462	14.436	---	PASS
	Ant2	2462	14.318	---	PASS
11G	Ant1	2412	16.738	---	PASS
	Ant2	2412	16.748	---	PASS
	Ant1	2437	16.800	---	PASS
	Ant2	2437	16.719	---	PASS
	Ant1	2462	16.831	---	PASS
	Ant2	2462	16.747	---	PASS
11N20SISO	Ant1	2412	17.837	---	PASS
	Ant2	2412	17.795	---	PASS
	Ant1	2437	17.885	---	PASS
	Ant2	2437	17.879	---	PASS
	Ant1	2462	17.809	---	PASS
	Ant2	2462	17.795	---	PASS
11N40SISO	Ant1	2422	36.193	---	PASS
	Ant2	2422	36.256	---	PASS
	Ant1	2437	36.203	---	PASS
	Ant2	2437	36.225	---	PASS
	Ant1	2452	36.121	---	PASS
	Ant2	2452	36.168	---	PASS
11N20MIMO	Ant1	2412	17.796	---	PASS
	Ant2	2412	17.706	---	PASS
	Ant1	2437	17.829	---	PASS
	Ant2	2437	17.620	---	PASS
	Ant1	2462	17.821	---	PASS
	Ant2	2462	17.745	---	PASS

11N40MIMO	Ant1	2422	36.299	---	PASS
	Ant2	2422	36.113	---	PASS
	Ant1	2437	36.035	---	PASS
	Ant2	2437	36.214	---	PASS
	Ant1	2452	36.118	---	PASS
	Ant2	2452	36.061	---	PASS

Test Graphs

