

TEST REPORT

Applicant: AltoBeam Inc.
EUT Description: ATBM6165 WIFI and BT Module
Test Model: ATBM6165
Series Model: ATBM6165-S1B
Brand: AltoBeam
FCC ID: 2BAVS-ATBM6165
Standards: FCC 47 CFR Part 15 Subpart E
Date of Receipt: 2025/12/26
Date of Test: 2025/12/26 to 2026/03/25
Date of Issue: 2026/03/25

TOWE. Tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of the model are manufactured with identical electrical and mechanical components. All sample tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise. Without written approval of TOWE, the test report shall not be reproduced except in full.



Jim Huang
Approved By:



Carey Chen
Reviewed By:

Revision History

Rev.	Issue Date	Description	Revised by
01	2026/03/25	Original	Carey Chen

Summary of Test Results

Clause	FCC Part	Test Items	Test Bands	Result
4.1	§15.203	Antenna Requirement	---	PASS
4.2	§15.407(g)	Frequency Stability	---	---
4.3	§15.207	AC Power Line Conducted Emission	Section 2.2	N/A
4.4	§15.407(a)(1)(iv) §15.407(a)(2) §15.407(a)(3)(i)	Maximum Conducted Output Power	U-NII-1 U-NII-2A U-NII-2C U-NII-3	PASS
4.5	§KDB 789033 II.C.1	Emission Bandwidth	U-NII-1 U-NII-2A U-NII-2C	Reporting purposes only
4.6	§15.407(e)	Minimum Emission Bandwidth	U-NII-3	PASS
4.7	§KDB 789033 II.D	Occupied Bandwidth	U-NII-1 U-NII-2A U-NII-2C U-NII-3	Reporting purposes only
4.8	§15.407(a)(1)(iv) §15.407(a)(2) §15.407(a)(3)(i)	Maximum Power Spectral Density	U-NII-1 U-NII-2A U-NII-2C U-NII-3	PASS
4.9	§15.407(b) §15.209(d)	Unwanted Emissions	U-NII-1 U-NII-2A U-NII-2C U-NII-3	PASS

Test Method: ANSI C63.10:2020, KDB 789033 D02 General UNII Test Procedures New Rules v02r01

Remark:

1. Pass is EUT meets standard requirements.
2. The EUT is DC power supply, "N/A" denotes "not applicable".

Table of Contents

1	General Description	5
1.1	Lab Information.....	5
1.1.1	Testing Location	5
1.1.2	Test Facility / Accreditations	5
1.2	Client Information	5
1.2.1	Applicant.....	5
1.2.2	Manufacturer.....	5
1.3	Product Information.....	6
2	Test Configuration	7
2.1	Test Channel	7
2.2	Worst-case configuration and Mode	9
2.3	Support Unit used in test	9
2.4	Test Environment.....	9
2.5	Test RF Cable	9
2.6	Modifications.....	9
2.7	Test Setup Diagram	10
2.7.1	Conducted Configuration	10
2.7.2	Radiated Configuration	11
3	Equipment and Measurement Uncertainty.....	12
3.1	Test Equipment List.....	12
3.2	Measurement Uncertainty	13
4	Test Results.....	14
4.1	Antenna Requirement.....	14
4.2	Frequency Stability.....	14
4.3	Maximum Conducted Output Power	15
4.4	Emission Bandwidth.....	16
4.5	Minimum Emission Bandwidth	17
4.6	Occupied Bandwidth	18
4.7	Maximum Power Spectral Density.....	19
4.8	Unwanted Emissions	20
5	Test Setup Photos.....	22
	Appendix.....	23

1 General Description

1.1 Lab Information

1.1.1 Testing Location

These measurements tests were conducted at the Sushi TOWE Wireless Testing(Shenzhen) Co., Ltd. Facility located at F401 and F101, Building E, Hongwei Industrial Zone, Liuxian 3rd Road, Bao'an District, Shenzhen, China. The measurement facility is compliant with the test site requirements specified in ANSI C63.4-2014

Tel.: +86-755-27212361

Contact Email: info@towewireless.com

1.1.2 Test Facility / Accreditations

A2LA (Certificate Number: 7088.01)

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated April 2017).

FCC Designation No.: CN1353

Sushi TOWE Wireless Testing(Shenzhen) Co., Ltd. has been recognized as an accredited testing laboratory.

Test Firm Registration Number: 684095

Designation Number: CN1353.

ISED CAB identifier: CN0152

Sushi TOWE Wireless Testing(Shenzhen) Co., Ltd. has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0152

Company Number: 31000

1.2 Client Information

1.2.1 Applicant

Applicant:	AltoBeam Inc.
Address:	B808,Tsinghua Tongfang Hi-Tech Plaza,Haidian,Beijing, China

1.2.2 Manufacturer

Manufacturer:	AltoBeam Inc.
Address:	B808,Tsinghua Tongfang Hi-Tech Plaza,Haidian,Beijing, China

1.3 Product Information

EUT Description:	ATBM6165 WIFI and BT Module			
Test Model:	ATBM6165			
Series Model:	ATBM6165-S1B			
Brand:	AltoBeam			
Hardware Version:	v1.8			
Software Version:	v1.0.89			
Modulation Type:	802.11a/n/ac/ax:	OFDM/OFDMA - BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM		
Smart System:	☒ SISO	802.11a/n/ac/ax	/	
	☐ MIMO	802.11n/ac/ax	()TX()RX	
	☐ CDD	802.11a	()TX()RX	
EUT Function:	☒ Client	☐ Outdoor AP	☐ Indoor AP ☐ Fixed P2P AP	
DFS Function:	☐ Master ☐ Slave with radar detection ☒ Slave without radar detection			
Frequency Range:	U-NII-1:	5150 ~ 5250MHz		
	U-NII-2A:	5250 ~ 5350MHz		
	U-NII-2C:	5470 ~ 5725MHz		
	U-NII-3:	5725 ~ 5850MHz		
Channel Frequency:	20M BWch.:	U-NII-1:	5180 ~ 5240MHz	4 Channels
		U-NII-2A:	5260 ~ 5320MHz	4 Channels
		U-NII-2C:	5500 ~ 5700MHz	11 Channels
		U-NII-3:	5745 ~ 5825MHz	5 Channels
	40M BWch.:	U-NII-1:	5190 ~ 5230MHz	2 Channels
		U-NII-2A:	5270 ~ 5310MHz	2 Channels
		U-NII-2C:	5510 ~ 5670MHz	5 Channels
		U-NII-3:	5755 ~ 5795MHz	2 Channels
Antenna Type:	☒ External, ☐ Integrated			
Antenna Gain:	Frequency Range	Ant(dBi)		
	U-NII-1:	2.34		
	U-NII-2A:	2.66		
	U-NII-2C:	2.40		
	U-NII-3:	2.57		
Remark: 1. The above EUT's information was declared by applicant, please refer to the specifications or user's manual for more detailed description. 2. Please refer to the "Declaration on model difference" provided by the client for specific model differences.				

2 Test Configuration

2.1 Test Channel

Frequency Channels for U-NII-1					
Channel	Frequency	Channel	Frequency	Channel	Frequency
36	5180MHz	40	5200MHz	46	5230MHz
38	5190MHz	44	5220MHz	48	5240MHz

Remark:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Modulation Type	Test Channel	Test Frequency
802.11a/n20 /ac20/ax20	The Lowest channel (CH36)	5180MHz
	The Middle channel (CH40)	5200MHz
	The Highest channel (CH48)	5240MHz
Modulation Type	Test Channel	Test Frequency
802.11n40 /ac40/ax40	The Lowest channel (CH38)	5190MHz
	The Highest channel (CH46)	5230MHz

Frequency Channels for U-NII-2A					
Channel	Frequency	Channel	Frequency	Channel	Frequency
52	5260MHz	56	5280MHz	62	5310MHz
54	5270MHz	60	5300MHz	64	5320MHz

Remark:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Modulation Type	Test Channel	Test Frequency
802.11a/n20 /ac20/ax20	The Lowest channel (CH52)	5260MHz
	The Middle channel (CH60)	5300MHz
	The Highest channel (CH64)	5320MHz
Modulation Type	Test Channel	Test Frequency
802.11n40 /ac40/ax40	The Lowest channel (CH54)	5270MHz
	The Highest channel (CH62)	5310MHz

Frequency Channels for U-NII-2C							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
100	5500MHz	112	5560MHz	126	5630MHz	140	5700MHz
102	5510MHz	116	5580MHz	128	5640MHz	/	
104	5520MHz	118	5590MHz	132	5660MHz		
108	5540MHz	120	5600MHz	134	5670MHz		
110	5550MHz	124	5620MHz	136	5680MHz		

Remark:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Modulation Type	Test Channel	Test Frequency
802.11a/n20 /ac20/ax20	The Lowest channel (CH100)	5500MHz
	The Middle channel (CH116)	5580MHz
	The Highest channel (CH140)	5700MHz
Modulation Type	Test Channel	Test Frequency
802.11n40 /ac40/ax40	The Lowest channel (CH102)	5510MHz
	The Middle channel (CH118)	5590MHz
	The Highest channel (CH134)	5670MHz

Frequency Channels for U-NII-3							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
149	5745MHz	153	5765MHz	159	5795MHz	165	5825MHz
151	5755MHz	157	5785MHz	161	5805MHz	/	

Remark:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Modulation Type	Test Channel	Test Frequency
802.11a/n20 /ac20/ax20	The Lowest channel (CH149)	5745MHz
	The Middle channel (CH157)	5785MHz
	The Highest channel (CH165)	5825MHz
Modulation Type	Test Channel	Test Frequency
802.11n40 /ac40/ax40	The Lowest channel (CH151)	5755MHz
	The Highest channel (CH159)	5795MHz

2.2 Worst-case configuration and Mode

Modulation Type	SISO - Data Rate	CDD/MIMO()TX()RX Data Rate
802.11a	6 Mbps	N/A
802.11n20	MCS0 (6.5 Mbps)	N/A
802.11n40	MCS0 (13.5 Mbps)	N/A
802.11ac20	MCS0 (6.5 Mbps)	N/A
802.11ac40	MCS0 (13.5 Mbps)	N/A
802.11ax20	MCS0 (8.6 Mbps)	N/A
802.11ax40	MCS0 (17.2 Mbps)	N/A
Transmitting mode:	Keep the EUT was programmed to be in continuously transmitting mode.	
Normal Link:	Keep the EUT operation to normal function.	

2.3 Support Unit used in test

Description	Manufacturer	Model	Serial Number
Laptop	Lenovo	Thinkbook 14 G4+IAP	YX05AZ13
Power adapter*	GUANGZHOU JINFENG ELECTRONIC TECHNOLOGY CO.,LTD.	JF-0502	--
Remark: * the information of table is provided by client.			

2.4 Test Environment

Temperature:	Normal: 15°C ~ 35°C
Humidity:	45 ~ 56 % RH Ambient
Voltage:	DC 3.3V
Remark: The testing environment is within the scope of the EUT user manual and meets the requirements of the standard testing environment.	

2.5 Test RF Cable

For all conducted test items: The offset level is set spectrum analyzer to compensate the RF cable loss and attenuator factor between RF conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level will be exactly the RF output level.

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

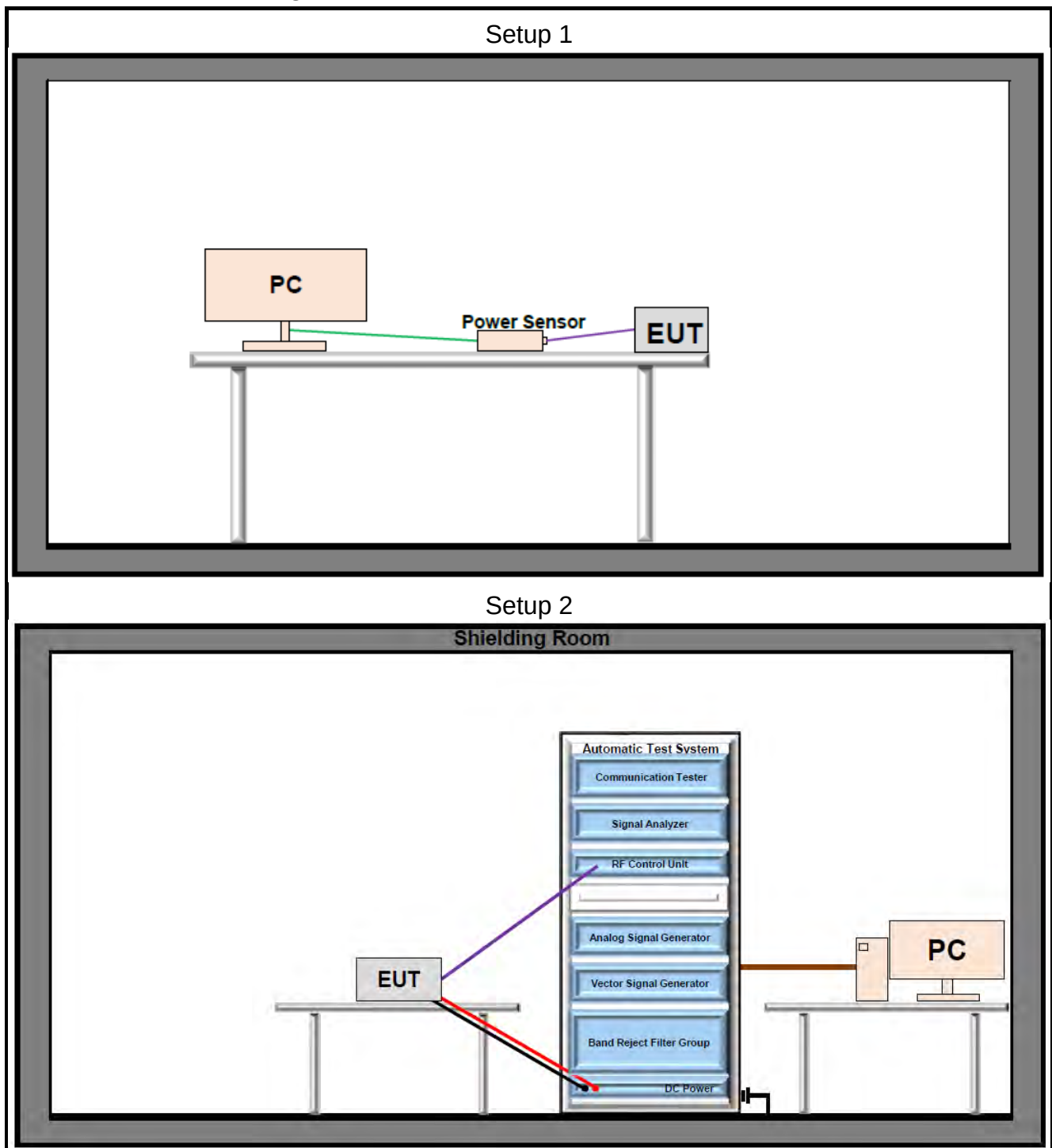
Offset = RF cable loss + attenuator factor.

2.6 Modifications

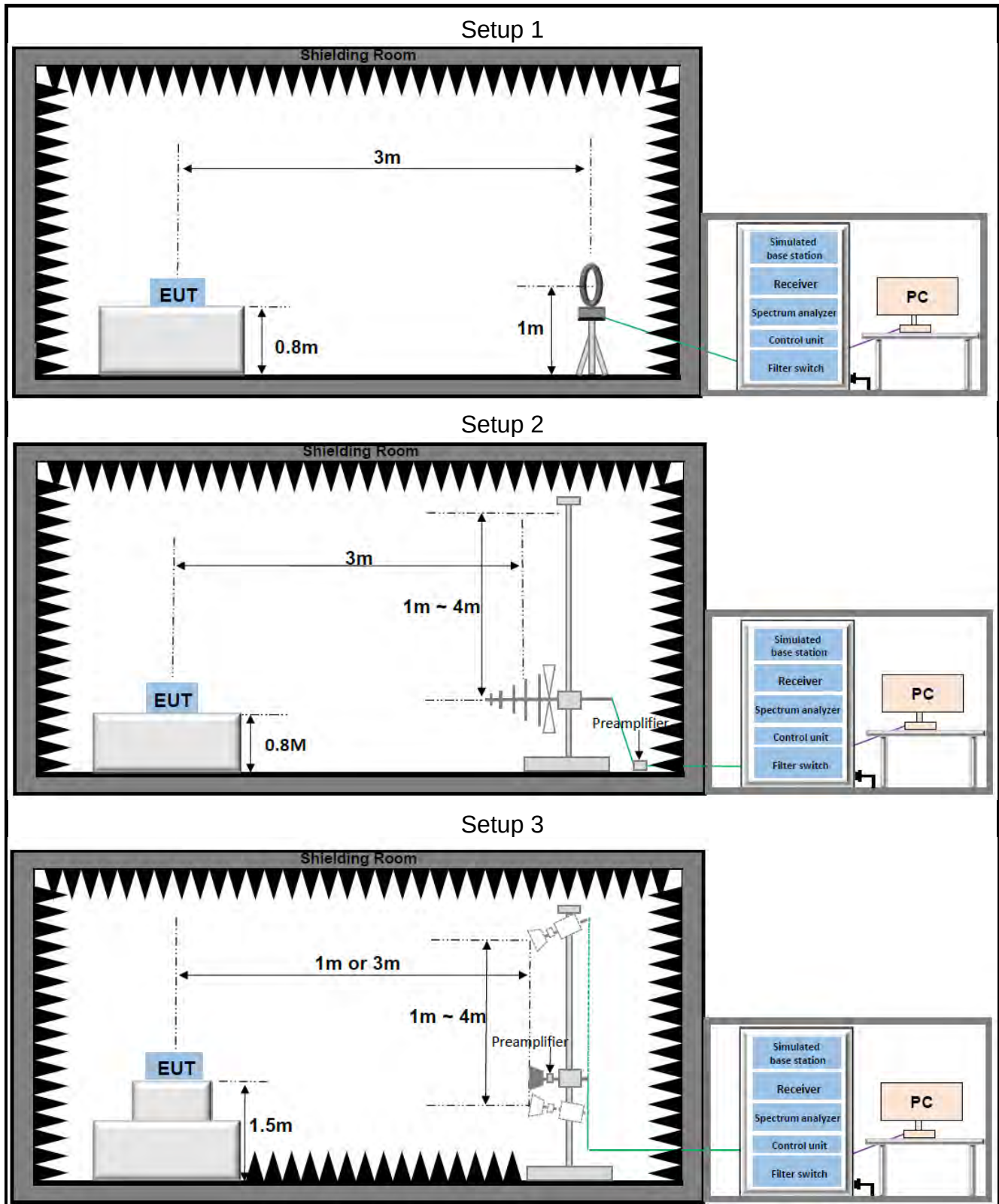
No modifications were made during testing.

2.7 Test Setup Diagram

2.7.1 Conducted Configuration



2.7.2 Radiated Configuration



3 Equipment and Measurement Uncertainty

All test and measuring equipment utilized to perform the tests documented in this report are calibrated on a regular basis, whichever is less, and where applicable is traceable to recognized national standards.

3.1 Test Equipment List

RF Conducted					
Description	Manufacturer	Model	S.N.	Last Due	Cal Due
Signal Analyzer	Keysight	N9020A	US46470429	2025/03/14	2026/03/13
				2026/03/05	2027/03/04
Signal Generator	R&S	SMR20	101027	2025/03/11	2026/03/10
				2026/03/05	2027/03/04
Vector Signal Generator	R&S	SMM100A	549353	2025/05/29	2026/05/28
Power Sensor	Anritsu	MA24408A	12520	2025/05/29	2026/05/28
RF Control Unit	Tonscend	JS0806-2	23C80620671	2025/05/29	2026/05/28
EXA Signal Analyzer, Multi-touch	Keysight	N9010B	MY63440541	2025/05/29	2026/05/28
Attenuator	Yin Saige	SMA-10dBm	N/A	N/A	N/A
Measurement Software	Tonscend	TS1120-3	10659	N/A	N/A

Radiated Emission					
Description	Manufacturer	Model	S.N.	Last Due	Cal Due
Double-Ridged Horn Antennas	Tonscend	HA32-18	806HA003608251015	2025/12/13	2028/12/12
Biconic Logarithmic Periodic Antennas	Tonscend	BLA32-30	80SBLA001011251010	2025/12/13	2028/12/12
Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	1290	2023/06/25	2026/06/24
Loop Antenna	Schwarzbeck	FMZB 1519C	1519C-028	2023/06/29	2026/06/28
Signal Analyzer*	Keysight	N9020A	MY57120015	2026/01/19	2028/01/18
EXA Signal Analyzer, Multi-touch	Keysight	N9010B	MY63440541	2025/05/29	2026/05/28
EMI Tester Receiver	Rohde & Schwarz	ESR7	102719	2025/05/29	2026/05/28
Low Noise Amplifier*	Tonscend	TAP9K3G40	806JSAP044710251054	2026/01/19	2028/01/18
Low Noise Amplifier*	Tonscend	TAP01018050	806JSAF044509251052	2026/01/19	2028/01/18
Low Noise Amplifier	Tonscend	TAP18040048	AP22G806247	2025/03/11	2027/03/10
Hygrometer	BINGYU	HTC-1	N/A	2025/07/25	2026/07/24
Radio Frequency Switch	Townshend	JS0806s	806JSSX019811251028	N/A	N/A
Test Software	Tonscend	TS+	Version: 5.0.0	N/A	N/A
N/A: Not applicable, confirmed internally by the laboratory					
*There were no testing before 2026/01/19.					

3.2 Measurement Uncertainty

Parameter	U _{lab}
Frequency Error	679.98Hz
Output Power	0.76dB
Conducted Spurious Emissions	2.22dB
Radiated Emissions(9kHz~30MHz)	2.40dB
Radiated Emissions(30MHz~1000MHz)	4.66dB
Radiated Emissions(1GHz~18GHz)	5.42dB
Radiated Emissions(18GHz~40GHz)	5.46dB

Uncertainty figures are valid to a confidence level of 95%

4 Test Results

4.1 Antenna Requirement

Standard Applicable:	47 CFR Part 15E Section 15.203
15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.	
The antenna gain and type as provided by the manufacturer are as follows: The antenna Type is External. With Antenna gain is U-NII-1: 2.34dBi; U-NII-2A: 2.66dBi; U-NII-2C: 2.40dBi; U-NII-3: 2.57dBi; Antenna Anti-Replacement Construction: An embedded-in antenna design is used.	

4.2 Frequency Stability

Standard Applicable:	47 CFR Part 15E Section 15.407(g)
Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.	

4.3 Maximum Conducted Output Power

Limits

For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi.

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in megahertz.

For the band 5.725-5.850 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.

Test Procedure

KDB 789033 D02 General UNII Test Procedures New Rules v02r01 Section II.E.3.b (Other Channel)

KDB 789033 D02 General UNII Test Procedures New Rules v02r01 Section II.E.2.b(Straddle Channel)

Test Settings

1. PM-G:
Set to the maximum power setting and enable the EUT transmit continuously.
The power output was measured on the EUT antenna port using RF Cable with an attenuator connected to a power sensor. Output power was read directly from the power sensor.
Measure and record the results in the test report.
2. SA:
RBW = 1MHz
VBW $\geq$ 3MHz
Span = Encompass the EBW (or, alternatively, the entire 99% occupied bandwidth)
Sweep = Auto
Detector = power averaging (rms)

Test Setup

Refer to section 2.7.1 Setup 1 for details.

Measuring Instruments

The measuring equipment is listed in the section 3.1 of this test report.

Test Result

The detailed test data see: **Appendix**.

4.4 Emission Bandwidth

Limits

None, for reporting purposes only.

Test Procedure

KDB 789033 D02 General UNII Test Procedures New Rules v02r01 Section II.C.1.

Test Settings

1. Set to the maximum power setting and enable the EUT transmit continuously.
2. The transmitter output is connected to a spectrum analyzer:
3. RBW = 1% - 5%(99%BW)
4. VBW = 3 times the RBW
5. Sweep = Auto
6. Detector = Peak
7. Trace = Max hold
8. The trace was allowed to stabilize
9. Measure and record the results in the test report.

Test Notes

The signal analyzers' automatic bandwidth measurement capability of the spectrum analyzer was used to perform the 26dB bandwidth measurement. The "X" dB bandwidth parameter was set to X= 26. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.

Test Setup

Refer to section 2.7.1 Setup 2 for details.

Measuring Instruments

The measuring equipment is listed in the section 3.1 of this test report.

Test Result

The detailed test data see: **Appendix**.

4.5 Minimum Emission Bandwidth

Limits

Within the 5.725-5.850 GHz and 5.850-5.895 GHz bands, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

Test Procedure

KDB 789033 D02 General UNII Test Procedures New Rules v02r01 Section II.C.2.

Test Settings

1. Set to the maximum power setting and enable the EUT transmit continuously.
2. The transmitter output is connected to a spectrum analyzer:
3. RBW = 100kHz(DTS)
4. VBW = 3 times the RBW
5. Sweep = Auto
6. Detector = Peak
7. Trace = Max hold
8. The trace was allowed to stabilize
9. Measure and record the results in the test report.

Test Notes

Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

Test Setup

Refer to section 2.7.1- Setup 2 for details.

Measuring Instruments

The measuring equipment is listed in the section 3.1 of this test report.

Test Result

The detailed test data see: **Appendix**.

4.6 Occupied Bandwidth

Limits

None, for reporting purposes only.

Test Procedure

KDB 789033 D02 General UNII Test Procedures New Rules v02r01 Section II.D.

Test Settings

1. Set to the maximum power setting and enable the EUT transmit continuously.
2. The transmitter output is connected to a spectrum analyzer:
3. RBW = 1% - 5%(99%BW)
4. VBW = 3 times the RBW
5. Sweep = Auto
6. Detector = Peak
7. Trace = Max hold
8. The trace was allowed to stabilize
9. Measure and record the results in the test report.

Test Setup

Refer to section 2.7.1- Setup 2 for details.

Measuring Instruments

The measuring equipment is listed in the section 3.1 of this test report.

Test Result

The detailed test data see: **Appendix**.

4.7 Maximum Power Spectral Density

Limits

For client devices in the 5.15-5.25 GHz band, the maximum power spectral density shall not exceed 11 dBm in any 1-megahertz band.

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum power spectral density shall not exceed 11 dBm in any 1-megahertz band.

For the band 5.725-5.85 GHz, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band.

Test Procedure

KDB 789033 D02 General UNII Test Procedures New Rules v02r01 Section II.F

Test Settings

1. Set to the maximum power setting and enable the EUT transmit continuously
2. The transmitter output is connected to a spectrum analyzer
3. RBW = 1MHz (for 5.15–5.25 GHz, 5.25–5.35 GHz, and 5.47–5.725 GHz)
4. RBW = 500kHz (for 5.725–5.85 GHz)
5. VBW $\geq$ 3 times RBW
6. Sweep = Auto
7. Detector = Peak
8. Trace = Max hold
9. The trace was allowed to stabilize
10. Measure and record the results in the test report.

Test Setup

Refer to section 2.7.1- Setup 2 for details.

Measuring Instruments

The measuring equipment is listed in the section 3.1 of this test report.

Test Result

The detailed test data see: **Appendix**.

4.8 Unwanted Emissions

Limits

Spurious emissions are permitted in an of the frequency bands:

MHz	MHz	MHz	MHz	GHz	GHz
0.090 - 0.110	12.29 - 12.293	149.9 - 150.05	1660 - 1710	4.5 - 5.15	14.47 - 14.5
0.495 - 0.505	12.51975 - 12.52025	156.52475 - 156.52525	1718.8 - 1722.2	5.35 - 5.46	15.35 - 16.2
2.1735 - 2.1905	12.5767 - 12.57725	156.7 - 156.9	2200 - 2300	7.25 - 7.75	17.7 - 21.4
4.125 - 128	13.36 - 13.41	162.0125 - 167.17	2310 - 2390	8.025 - 8.5	22.01 - 23.12
4.17725 - 4.17775	16.42 - 16.423	167.72 - 173.2	2483.5 - 2500	9.0 - 9.2	23.6 - 24.0
4.20725 - 4.20775	16.69475 - 16.69525	240 - 285	2655 - 2900	9.3 - 9.5	31.2 - 31.8
6.215 - 6.218	1680425 - 1680475	322 - 335.4	3260 - 3267	10.6 - 12.7	36.43 - 36.5
6.26775 - 6.26825	25.5 - 25.67	399.9 - 410	3332 - 3339	13.25 - 13.4	
6.31175 - 6.31225	37.5 - 38.25	608 - 614	3345.8 - 3358		
8.291 - 8.294	73 - 74.6	960 - 1240	3600 - 4400		
8.362 - 8.366	74.8 - 75.2	1300 - 1427			
8.37625 - 8.38675	108 - 121.94	1435 - 1626.5			
8.41425 - 8.41475	123 - 138	1645.5 - 1646.5			

Radiated disturbance of an intentional radiator:

Frequency	Field strength ($\mu\text{V/m}$)	Limit (dB $\mu\text{V/m}$)	Remark	Measurement distance (m)
0.009MHz-0.490MHz	2400/F(kHz)	-	-	300
0.490MHz-1.705MHz	24000/F(kHz)	-	-	30
1.705MHz-30MHz	30	-	-	30
30MHz-88MHz	100	40.0	Quasi-peak	3
88MHz-216MHz	150	43.5	Quasi-peak	3
216MHz-960MHz	200	46.0	Quasi-peak	3
960MHz-1GHz	500	54.0	Quasi-peak	3
Above 1GHz	500	74.0	Peak	3
		54.0	Average	

Un-restricted band emissions above 1GHz limit:

For transmitters operating in the 5.15-5.25 GHz band:

All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

For transmitters operating in the 5.25-5.35 GHz band:

All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

For transmitters operating in the 5.47-5.725 GHz band:

All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

For transmitters operating solely in the 5.725-5.850 GHz band:

All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

Test Procedure

ANSI C63.10:2020 Section 6.4 & 6.5 & 6.6.

KDB 789033 D02 General UNII Test Procedures New Rules v02r01 Section II.G.3 ~ 6.

Test Settings

1. For radiated emissions measurements performed at frequencies less than or equal to 1GHz, the EUT shall be placed on a RF-transparent table or support at a nominal height of 80cm above the reference ground plane.
2. For radiated emissions measurements performed at frequencies above 1GHz, the EUT shall be placed on a RF-transparent table or support at a nominal height of 80cm above the ground plane.
3. Radiated measurements shall be made with the measurement antenna positioned in both horizontal and vertical polarization. The measurement antenna shall be varied from 1m to 4m in height above the reference ground in a search for the relative positioning that produces the maximum radiated signal level (i.e, field strength or received power), when orienting the measurement antenna in vertical polarization, the minimum height of the lowest element of the antenna shall clear the site reference ground plane by at least 25cm.
4. For each suspected emission, the EUT was ranged its worst case and then tune the antenna tower(from 1~4m) and turntable(from 0~360°) find the maximum reading. Preamplifier and a high pass filter are used for the test in order get better signal level comply with the guidelines.
5. The simulated base station was set to force the EUT to its maximum transmitting power.
6. The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.
7. spectrum analyzer setting:
Measurements Below 1000MHz: RBW = 120 kHz; VBW ≥ 300 kHz; Detector = Peak
Measurements Above 1000MHz: RBW = 1 MHz; VBW ≥ 3 MHz; Detector = Peak
Average Measurements Above 1000MHz:
RBW = 1 MHz, VBW ≥ 1/T, with peak detector for average measurements.
8. The field strength is calculated by adding the Antenna Factor, Cable Factor. The basic equation with a sample calculation is as follows:
Level = Reading(dBμV) + Factor(dB):
Factor = Cable Factor(dB) + AF(dB/m) - Preamplifier gain(dB)
AF = Antenna Factor(dB/m)
Margin = Limit(dBμV/m) – Level(dBμV/m)
9. Repeat above procedures until all frequencies measured was complete.
10. Measure and record the results in the test report.

Test Notes

1. Emissions below 18GHz were measured at a 3-meter test distance while emissions above 18GHz were measured at a 1-meter test distance with the application of a distance correction factor.
2. Radiated spurious emissions were investigated from 9kHz to 30MHz, 30MHz-1GHz and above 1GHz. the disturbance between 9kHz to 30MHz and 18GHz to 40GHz was very low. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be recorded, so only the harmonics had been displayed.
3. These frequencies which near "-" should be ignored because they are Fundamental frequency.

Test Setup

Refer to section 2.7.2 for details.

Measuring Instruments

The measuring equipment is listed in the section 3.1 of this test report.

Test Result

The detailed test data see: **Appendix.**

5 Test Setup Photos

The detailed test data see: **Appendix A - BTWIFI Setup Photos**

Appendix

Emission Bandwidth Test Result

TestMode	Antenna	Frequency[MHz]	26dB EBW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11a	Ant1	5180	27.920	5164.240	5192.160	---	---
11a	Ant1	5200	27.800	5184.280	5212.080	---	---
11a	Ant1	5240	27.840	5224.200	5252.040	---	---
11a	Ant1	5260	27.400	5244.280	5271.680	---	---
11a	Ant1	5300	25.800	5286.080	5311.880	---	---
11a	Ant1	5320	26.840	5304.320	5331.160	---	---
11a	Ant1	5500	22.680	5488.200	5510.880	---	---
11a	Ant1	5520	23.680	5507.160	5530.840	---	---
11a	Ant1	5600	24.120	5587.080	5611.200	---	---
11a	Ant1	5680	25.040	5667.080	5692.120	---	---
11a	Ant1	5700	20.880	5689.520	5710.400	---	---
11a	Ant1	5745	24.880	5732.120	5757.000	---	---
11a	Ant1	5785	22.200	5773.200	5795.400	---	---
11a	Ant1	5825	24.440	5812.160	5836.600	---	---
11n20SISO	Ant1	5180	26.120	5166.960	5193.080	---	---
11n20SISO	Ant1	5200	26.360	5186.920	5213.280	---	---
11n20SISO	Ant1	5240	27.960	5225.520	5253.480	---	---
11n20SISO	Ant1	5260	25.800	5247.400	5273.200	---	---
11n20SISO	Ant1	5300	25.720	5287.760	5313.480	---	---
11n20SISO	Ant1	5320	25.800	5306.560	5332.360	---	---
11n20SISO	Ant1	5500	21.120	5489.760	5510.880	---	---
11n20SISO	Ant1	5600	23.120	5589.080	5612.200	---	---
11n20SISO	Ant1	5700	21.520	5689.440	5710.960	---	---
11n20SISO	Ant1	5745	23.360	5734.000	5757.360	---	---
11n20SISO	Ant1	5785	23.120	5774.000	5797.120	---	---
11n20SISO	Ant1	5825	23.440	5813.920	5837.360	---	---
11n40SISO	Ant1	5190	47.440	5161.920	5209.360	---	---
11n40SISO	Ant1	5230	73.520	5191.600	5265.120	---	---
11n40SISO	Ant1	5270	73.520	5231.680	5305.200	---	---
11n40SISO	Ant1	5310	38.720	5290.480	5329.200	---	---
11n40SISO	Ant1	5510	38.320	5490.800	5529.120	---	---
11n40SISO	Ant1	5590	60.320	5561.120	5621.440	---	---
11n40SISO	Ant1	5670	38.480	5650.800	5689.280	---	---
11n40SISO	Ant1	5755	60.560	5726.120	5786.680	---	---
11n40SISO	Ant1	5795	58.000	5768.600	5826.600	---	---
11ac20SISO	Ant1	5180	25.280	5167.000	5192.280	---	---
11ac20SISO	Ant1	5200	25.160	5187.000	5212.160	---	---
11ac20SISO	Ant1	5240	25.200	5227.040	5252.240	---	---
11ac20SISO	Ant1	5260	23.920	5248.280	5272.200	---	---
11ac20SISO	Ant1	5300	24.200	5287.080	5311.280	---	---
11ac20SISO	Ant1	5320	23.080	5308.160	5331.240	---	---
11ac20SISO	Ant1	5500	21.520	5489.080	5510.600	---	---
11ac20SISO	Ant1	5520	23.040	5508.080	5531.120	---	---
11ac20SISO	Ant1	5600	22.560	5588.920	5611.480	---	---
11ac20SISO	Ant1	5680	22.160	5668.880	5691.040	---	---
11ac20SISO	Ant1	5700	21.920	5689.000	5710.920	---	---
11ac20SISO	Ant1	5745	22.960	5733.440	5756.400	---	---
11ac20SISO	Ant1	5785	22.200	5774.080	5796.280	---	---
11ac20SISO	Ant1	5825	22.360	5813.920	5836.280	---	---
11ac40SISO	Ant1	5190	51.120	5162.640	5213.760	---	---
11ac40SISO	Ant1	5230	72.000	5193.520	5265.520	---	---
11ac40SISO	Ant1	5270	72.240	5233.280	5305.520	---	---
11ac40SISO	Ant1	5310	46.960	5286.880	5333.840	---	---
11ac40SISO	Ant1	5510	38.800	5490.320	5529.120	---	---
11ac40SISO	Ant1	5550	59.040	5521.680	5580.720	---	---
11ac40SISO	Ant1	5590	71.120	5554.160	5625.280	---	---

11ac40SISO	Ant1	5630	61.840	5598.960	5660.800	---	---
11ac40SISO	Ant1	5670	39.920	5649.200	5689.120	---	---
11ac40SISO	Ant1	5755	67.120	5719.000	5786.120	---	---
11ac40SISO	Ant1	5795	66.800	5759.160	5825.960	---	---
11ax20SISO	Ant1	5180	21.760	5169.400	5191.160	---	---
11ax20SISO	Ant1	5200	21.720	5189.360	5211.080	---	---
11ax20SISO	Ant1	5240	21.760	5229.320	5251.080	---	---
11ax20SISO	Ant1	5260	21.600	5249.360	5270.960	---	---
11ax20SISO	Ant1	5300	22.640	5288.600	5311.240	---	---
11ax20SISO	Ant1	5320	22.680	5308.520	5331.200	---	---
11ax20SISO	Ant1	5500	21.200	5489.400	5510.600	---	---
11ax20SISO	Ant1	5520	22.240	5509.160	5531.400	---	---
11ax20SISO	Ant1	5600	21.720	5589.360	5611.080	---	---
11ax20SISO	Ant1	5680	21.440	5669.360	5690.800	---	---
11ax20SISO	Ant1	5700	21.120	5689.480	5710.600	---	---
11ax20SISO	Ant1	5745	21.280	5734.400	5755.680	---	---
11ax20SISO	Ant1	5785	21.320	5774.440	5795.760	---	---
11ax20SISO	Ant1	5825	21.240	5814.480	5835.720	---	---
11ax40SISO	Ant1	5190	42.960	5166.640	5209.600	---	---
11ax40SISO	Ant1	5230	66.960	5193.200	5260.160	---	---
11ax40SISO	Ant1	5270	54.720	5243.680	5298.400	---	---
11ax40SISO	Ant1	5310	39.440	5290.160	5329.600	---	---
11ax40SISO	Ant1	5510	39.360	5490.320	5529.680	---	---
11ax40SISO	Ant1	5550	55.680	5523.120	5578.800	---	---
11ax40SISO	Ant1	5590	50.560	5566.720	5617.280	---	---
11ax40SISO	Ant1	5630	53.440	5603.760	5657.200	---	---
11ax40SISO	Ant1	5670	39.360	5650.240	5689.600	---	---
11ax40SISO	Ant1	5755	42.960	5731.640	5774.600	---	---
11ax40SISO	Ant1	5795	52.320	5771.560	5823.880	---	---

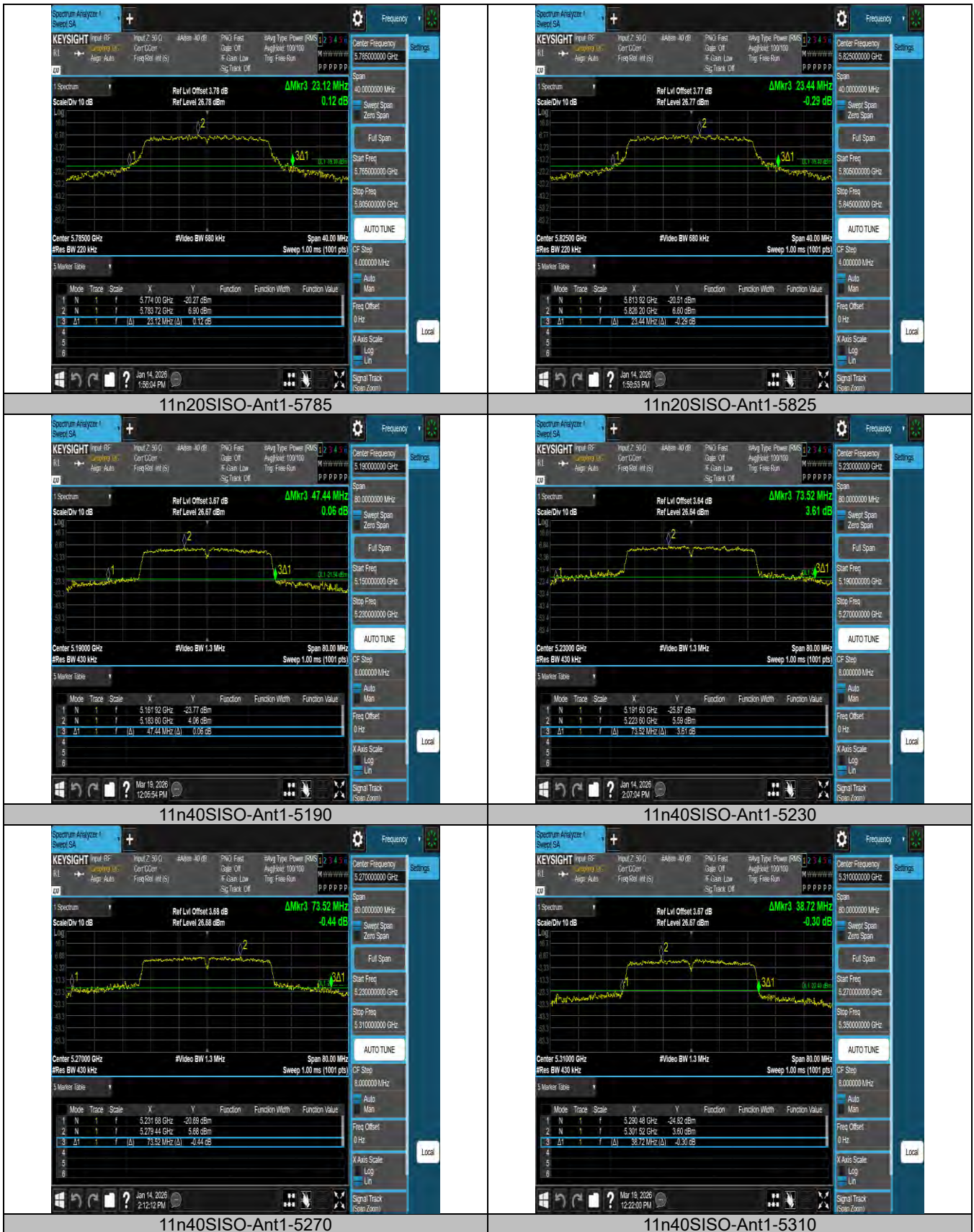
Test Graphs

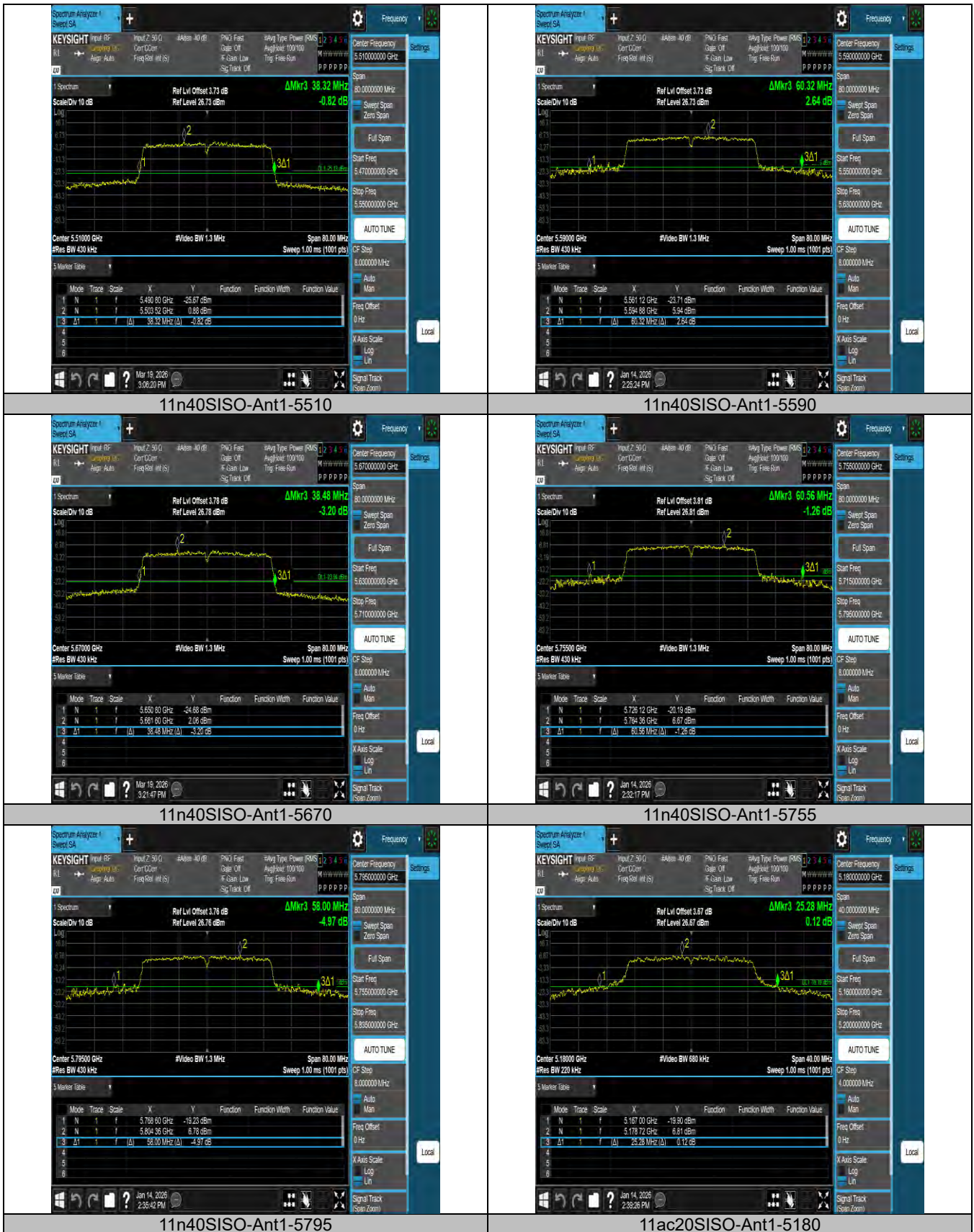






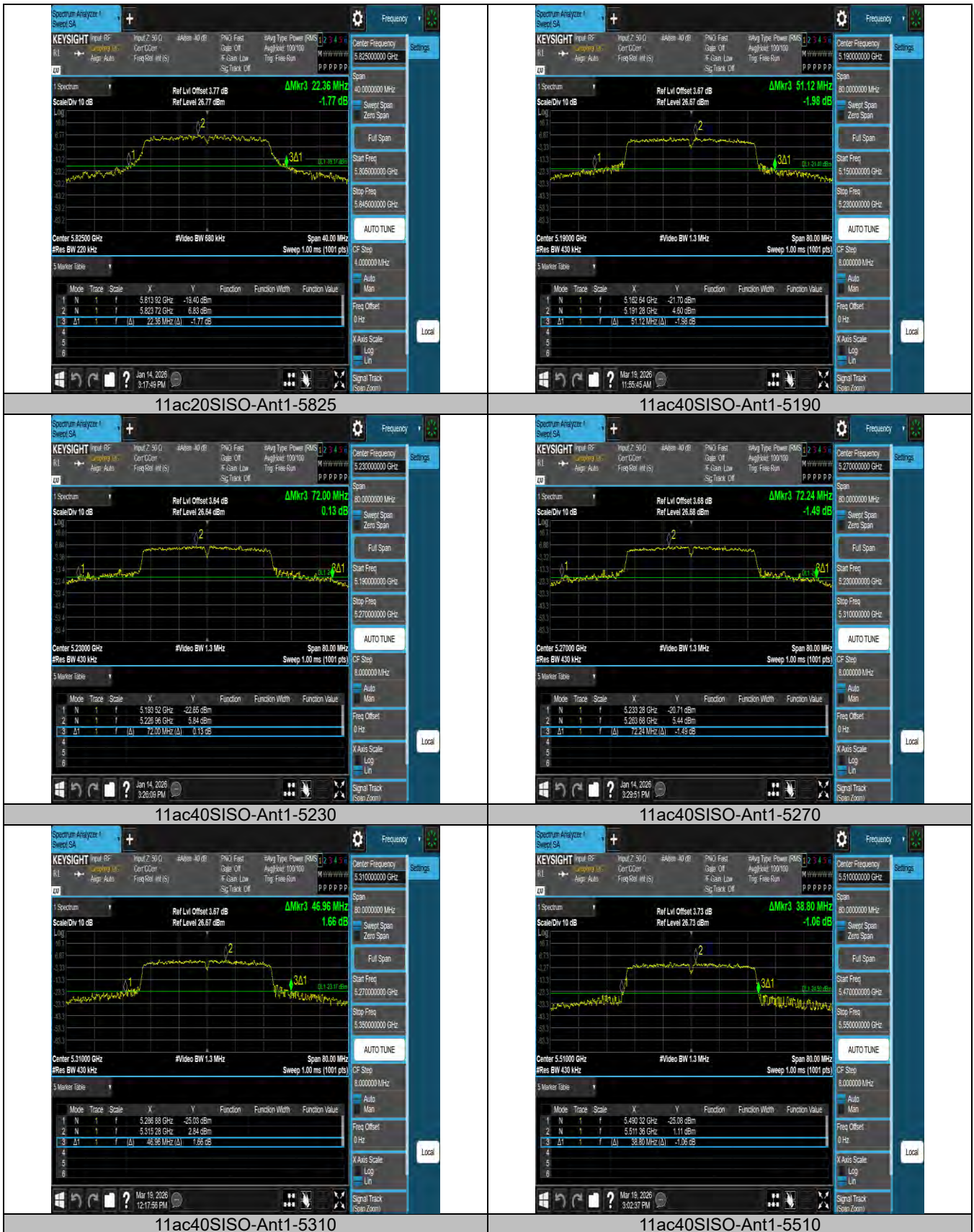


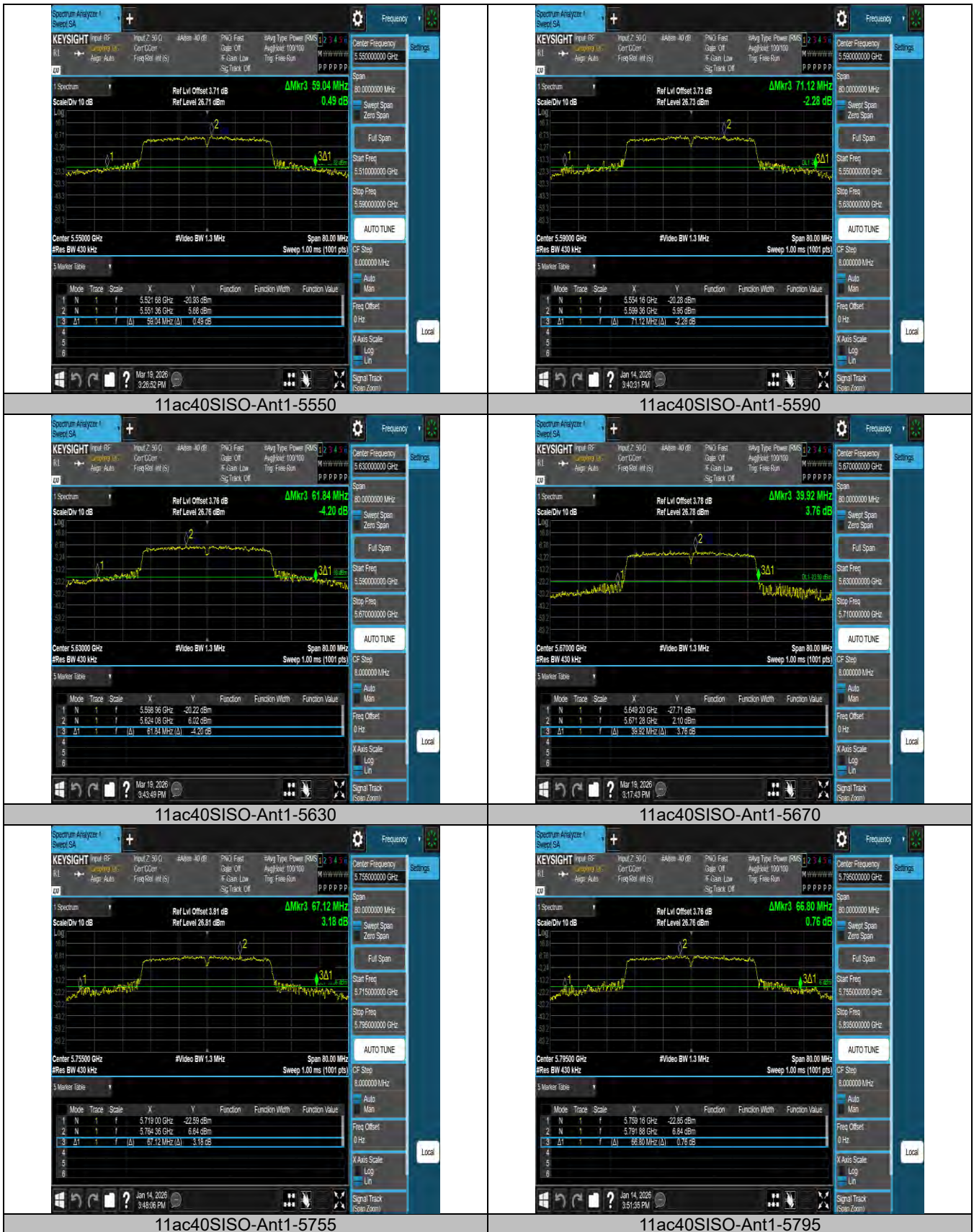


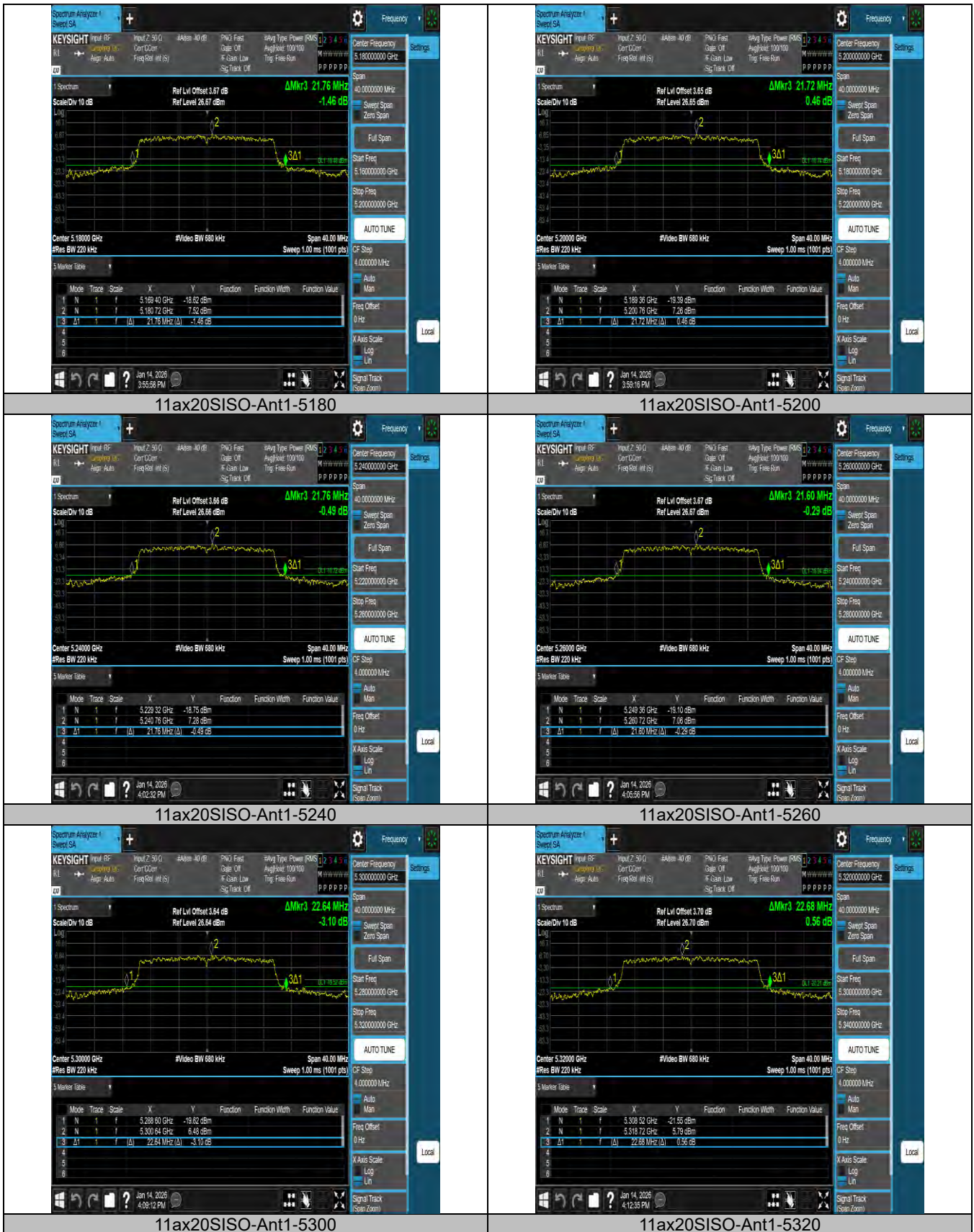




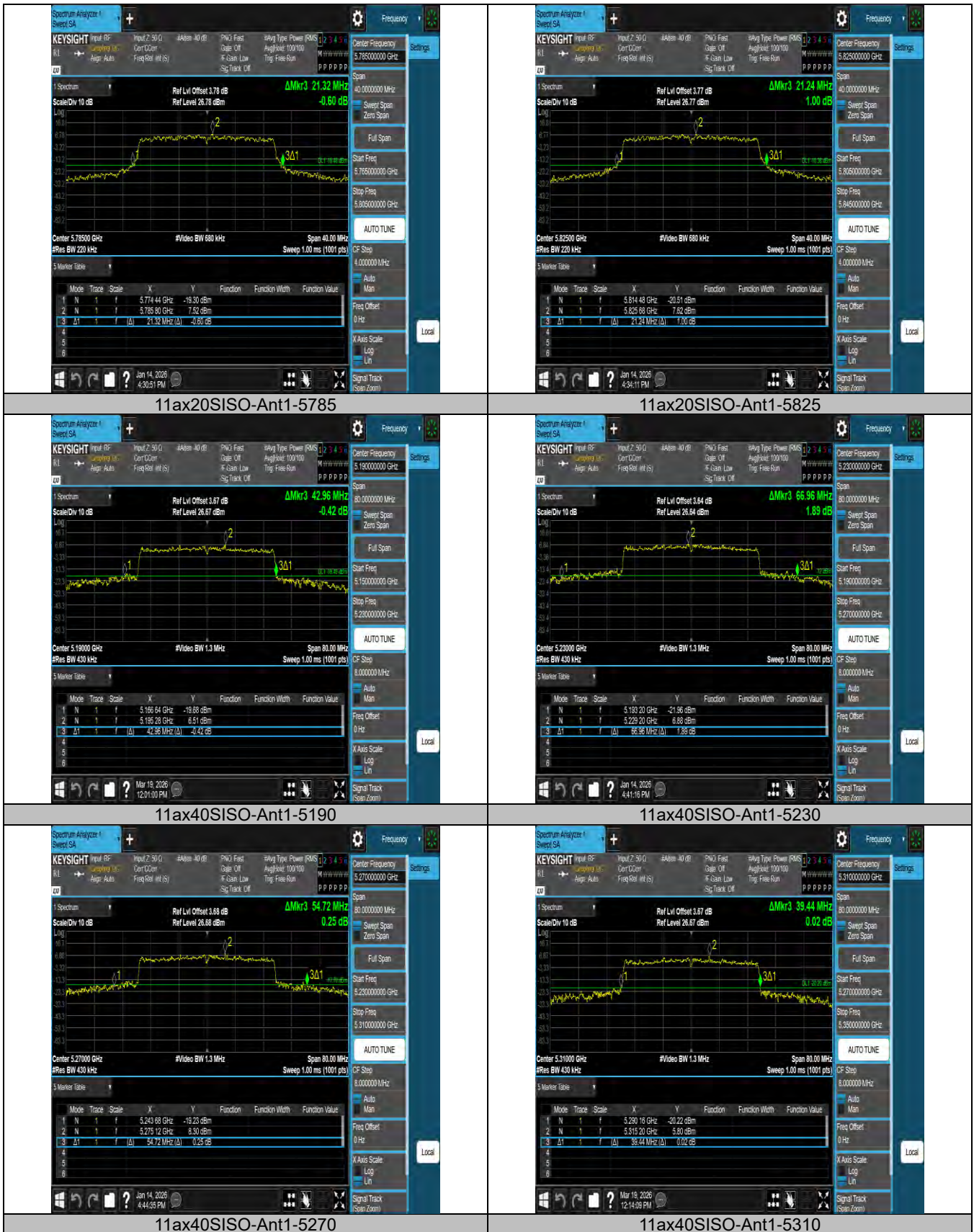




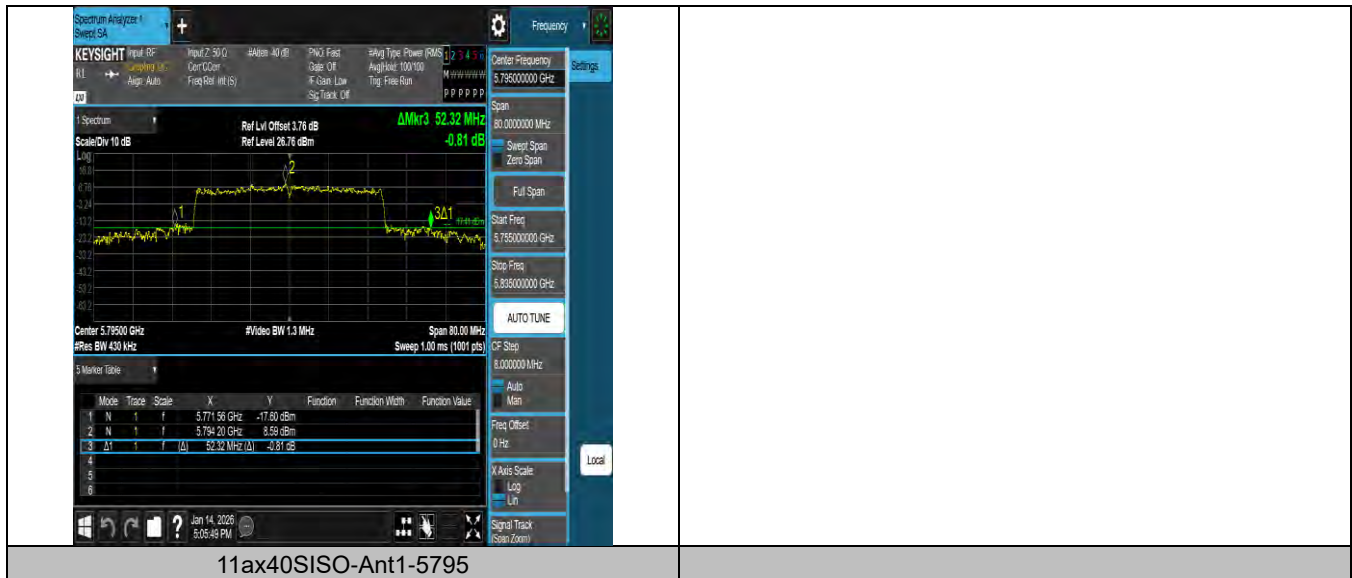












11ax40SISO-Ant1-5795

Occupied channel bandwidth

Test Result

TestMode	Antenna	Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11a	Ant1	5180	17.616	5170.9901	5188.6061	---	---
11a	Ant1	5200	17.593	5190.9988	5208.5918	---	---
11a	Ant1	5240	17.664	5230.9194	5248.5834	---	---
11a	Ant1	5260	17.474	5251.0520	5268.5260	---	---
11a	Ant1	5300	17.433	5291.1311	5308.5641	---	---
11a	Ant1	5320	17.402	5311.1098	5328.5118	---	---
11a	Ant1	5500	17.165	5491.4064	5508.5714	---	---
11a	Ant1	5520	17.231	5511.3633	5528.5943	---	---
11a	Ant1	5600	17.224	5591.3745	5608.5985	---	---
11a	Ant1	5680	17.324	5671.2589	5688.5829	---	---
11a	Ant1	5700	17.022	5691.5243	5708.5463	---	---
11a	Ant1	5745	17.231	5736.3755	5753.6065	---	---
11a	Ant1	5785	17.200	5776.3582	5793.5582	---	---
11a	Ant1	5825	17.220	5816.3651	5833.5851	---	---
11n20SISO	Ant1	5180	19.109	5170.5489	5189.6579	---	---
11n20SISO	Ant1	5200	18.946	5190.5881	5209.5341	---	---
11n20SISO	Ant1	5240	18.913	5230.6198	5249.5328	---	---
11n20SISO	Ant1	5260	18.724	5250.6504	5269.3744	---	---
11n20SISO	Ant1	5300	18.776	5290.6761	5309.4521	---	---
11n20SISO	Ant1	5320	18.628	5310.6675	5329.2955	---	---
11n20SISO	Ant1	5500	18.177	5491.0244	5509.2014	---	---
11n20SISO	Ant1	5600	18.516	5590.7688	5609.2848	---	---
11n20SISO	Ant1	5700	18.188	5691.0235	5709.2115	---	---
11n20SISO	Ant1	5745	18.503	5735.8015	5754.3045	---	---
11n20SISO	Ant1	5785	18.448	5775.7879	5794.2359	---	---
11n20SISO	Ant1	5825	18.519	5815.7757	5834.2947	---	---
11n40SISO	Ant1	5190	36.160	5171.8164	5207.9764	---	---
11n40SISO	Ant1	5230	36.964	5211.3657	5248.3297	---	---
11n40SISO	Ant1	5270	36.792	5251.5664	5288.3584	---	---
11n40SISO	Ant1	5310	36.030	5291.9126	5327.9426	---	---
11n40SISO	Ant1	5510	35.973	5491.9905	5527.9635	---	---
11n40SISO	Ant1	5590	36.393	5571.7762	5608.1692	---	---
11n40SISO	Ant1	5670	35.948	5651.9886	5687.9366	---	---
11n40SISO	Ant1	5755	36.214	5736.8632	5773.0772	---	---
11n40SISO	Ant1	5795	36.302	5776.8416	5813.1436	---	---
11ac20SISO	Ant1	5180	18.806	5170.5216	5189.3276	---	---
11ac20SISO	Ant1	5200	18.704	5190.5717	5209.2757	---	---
11ac20SISO	Ant1	5240	18.745	5230.5319	5249.2769	---	---
11ac20SISO	Ant1	5260	18.588	5250.6140	5269.2020	---	---
11ac20SISO	Ant1	5300	18.576	5290.6586	5309.2346	---	---
11ac20SISO	Ant1	5320	18.554	5310.6304	5329.1844	---	---
11ac20SISO	Ant1	5500	18.437	5490.7603	5509.1973	---	---
11ac20SISO	Ant1	5520	18.541	5510.7408	5529.2818	---	---
11ac20SISO	Ant1	5600	18.452	5590.7609	5609.2129	---	---
11ac20SISO	Ant1	5680	18.451	5670.7230	5689.1740	---	---
11ac20SISO	Ant1	5700	18.366	5690.8079	5709.1739	---	---
11ac20SISO	Ant1	5745	18.396	5735.7988	5754.1948	---	---
11ac20SISO	Ant1	5785	18.336	5775.8009	5794.1369	---	---
11ac20SISO	Ant1	5825	18.358	5815.7982	5834.1562	---	---
11ac40SISO	Ant1	5190	36.435	5171.6966	5208.1316	---	---
11ac40SISO	Ant1	5230	38.682	5210.4692	5249.1512	---	---
11ac40SISO	Ant1	5270	37.619	5251.2144	5288.8334	---	---
11ac40SISO	Ant1	5310	36.291	5291.8430	5328.1340	---	---
11ac40SISO	Ant1	5510	36.161	5491.9189	5528.0799	---	---
11ac40SISO	Ant1	5550	36.949	5531.6454	5568.5944	---	---
11ac40SISO	Ant1	5590	36.948	5571.4907	5608.4387	---	---
11ac40SISO	Ant1	5630	36.756	5611.6492	5648.4052	---	---
11ac40SISO	Ant1	5670	36.113	5651.9247	5688.0377	---	---
11ac40SISO	Ant1	5755	36.787	5736.5175	5773.3045	---	---
11ac40SISO	Ant1	5795	37.050	5776.4424	5813.4924	---	---
11ax20SISO	Ant1	5180	19.249	5170.3484	5189.5974	---	---
11ax20SISO	Ant1	5200	19.239	5190.3447	5209.5837	---	---

11ax20SISO	Ant1	5240	19.259	5230.3347	5249.5937	---	---
11ax20SISO	Ant1	5260	19.213	5250.3511	5269.5641	---	---
11ax20SISO	Ant1	5300	19.227	5290.3616	5309.5886	---	---
11ax20SISO	Ant1	5320	19.218	5310.3465	5329.5645	---	---
11ax20SISO	Ant1	5500	19.134	5490.3903	5509.5243	---	---
11ax20SISO	Ant1	5520	19.196	5510.3793	5529.5753	---	---
11ax20SISO	Ant1	5600	19.185	5590.3794	5609.5644	---	---
11ax20SISO	Ant1	5680	19.179	5670.3705	5689.5495	---	---
11ax20SISO	Ant1	5700	19.121	5690.4092	5709.5302	---	---
11ax20SISO	Ant1	5745	19.161	5735.3896	5754.5506	---	---
11ax20SISO	Ant1	5785	19.143	5775.3875	5794.5305	---	---
11ax20SISO	Ant1	5825	19.148	5815.3854	5834.5334	---	---
11ax40SISO	Ant1	5190	38.193	5170.7946	5208.9876	---	---
11ax40SISO	Ant1	5230	38.635	5210.5153	5249.1503	---	---
11ax40SISO	Ant1	5270	38.490	5250.6779	5289.1679	---	---
11ax40SISO	Ant1	5310	38.048	5290.8955	5328.9435	---	---
11ax40SISO	Ant1	5510	37.918	5490.9833	5528.9013	---	---
11ax40SISO	Ant1	5550	38.407	5530.7067	5569.1137	---	---
11ax40SISO	Ant1	5590	38.276	5570.7905	5609.0665	---	---
11ax40SISO	Ant1	5630	38.292	5610.7356	5649.0276	---	---
11ax40SISO	Ant1	5670	37.876	5651.0120	5688.8880	---	---
11ax40SISO	Ant1	5755	38.139	5735.8635	5774.0025	---	---
11ax40SISO	Ant1	5795	38.225	5775.8397	5814.0647	---	---

Test Graphs

