FCC CERTIFICATION TEST REPORT

Applicant:	Sahara Presentation Systems Ltd
Address:	Europa House, Littlebrook DC1, Shield Road, Dartford, Kent DA1 5UR, United Kingdom
Manufacturer:	Sahara Presentation Systems Ltd
Address:	Europa House, Littlebrook DC1, Shield Road, Dartford, Kent DA1 5UR, United Kingdom
Product Description:	Clevershare Hub, CleverHub
Brand Name:	CLEVERTOUCH
Tested Model:	CleverHub
FCC ID:	2APKO-WB05
Report No.:	JCF230411215-003
Received Date:	Apr. 11, 2023
Tested Date:	Apr. 11, 2023 ~ Aug. 28, 2023
Issued Date:	Aug. 28, 2023
Test Standards:	FCC Rules and Regulations Part 15 Subpart E
Test Procedure:	ANSI C63.10:2013, 789033 D02 General U-NII Test Procedures New Rules v02r01, 662911 D01 Multiple Transmitter Output v02r01
Test Result:	Pass

Prepared By:

Roger Li/Engineer **Date:** Aug. 28, 2023

Reviewed By:

Kennys Zhang/Engineer **Date:** Aug. 28, 2023

Approved By:

Talent Zhang/Engineer **Date:** Aug. 28, 2023

Note: The test results in this report apply exclusively to the tested model / sample. Without written approval of Guangzhou Jingce Testing Technology Co., Ltd. the test report shall not be reproduced except in full.

Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Aug. 28, 2023	Original Report	/

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1. Test Report Declare

Applicant:	Sahara Presentation Systems Ltd
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Manufacturer:	Sahara Presentation Systems Ltd
Address:	Europa House, Littlebrook DC1, Shield Road, Dartford, Kent DA1 5UR, United Kingdom
Product Name:	Clevershare Hub, CleverHub
Brand Name:	CLEVERTOUCH
Model Name:	Clevershare Hub, CleverHub
Difference Description:	The products with all the models covered in this report are the same as each other, except for different model name.

We Declare:

The equipment described above is tested by Guangzhou Jingce Testing Technology Co., Ltd. and in the configuration tested the equipment complied with the standards specified above. The test results are contained in this test report and Guangzhou Jingce Testing Technology Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these tests.

2. Summary of test results

The EUT have been tested according to the applicable standards as referenced below.			
Clause	**Description of Test Item**	**Standard**	**Verdict**
1	6/26dB Bandwidth	FCC 15.407 (a)&(e)	Pass
2	99% Occupied Bandwidth	--	Pass
3	Maximum Conducted Output Power	FCC 15.407 (a)	Pass
4	Power Spectral Density	FCC 15.407 (a)	Pass
5	Frequency Stability Measurement	FCC 15.407 (g)	Pass
6	Radiated Band edge and Spurious Emission	FCC 15.407 (b) FCC 15.209 FCC 15.205	Pass
7	Power Line Conducted Emission	FCC 15.207	Pass
8	Antenna requirement	FCC 15.203	Pass
9	Dynamic Frequency Selection	FCC 15.407 (h)	Pass
Note: This report changes the software that add U-NII-2A and U-NII-2C band on the basis of report JCF230411201-004. So need add U-NII-2A and U-NII-2C band test data,the other test date reference JCF230411201-004.			

3. Test Laboratory

Guangzhou Jingce Testing Technology Co., Ltd.

Add.: No.192, Kezhu Road, Huangpu District, Guangzhou, Guangdong, China

Association for Laboratory Accreditation(A2LA). Certificate Number: 6594.01

FCC Designation Number: CN1331. Test Firm Registration Number: 360543

IC Test Firm Registration Number: 28796

Conformity Assessment Body identifier: CN0138

4. Equipment Under Test

4.1. Description of EUT

EUT Name:	Clevershare Hub, CleverHub
Model Number:	CleverHub
EUT Function Description:	Please refer the user's manual.
Power Supply:	Input: 100-240V ~ 50/60Hz 1.0A Max
Radio Specification:	IEEE 802.11a/n/ac/ax
Operation Frequency:	EEE 802.11a: 5180MHz—5825MHz IEEE 802.11n HT20: 5180MHz—5825MHz IEEE 802.11n HT40: 5190MHz—5795MHz IEEE 802.11ac VHT20: 5180MHz—5825MHz IEEE 802.11ac VHT40: 5190MHz—5795MHz IEEE 802.11ax HEW20: 5180MHz—5825MHz IEEE 802.11ax HEW40: 5190MHz—5795MHz
Modulation:	IEEE 802.11a: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n HT20, HT40: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11ac (VHT20/40): OFDM (256QAM, 64QAM, 16QAM, QPSK, BPSK) IEEE 802.11ax (HEW20/40): OFDMA (1024QAM, 256QAM, 64QAM, 16QAM, QPSK, BPSK)
Data Rate:	IEEE 802.11a: 6, 9, 12, 18, 24, 36, 48, 54Mbps IEEE 802.11n HT20: 7.2, 14.2, 21.7, 28.9, 43.3, 57.8, 65, 72.2 Mbps IEEE 802.11n HT40: 15, 30, 45, 60, 90, 120, 135, 150 Mbps IEEE 802.11ac VHT20: 7.2, 14.4, 21.7, 28.9, 43.3, 57.8, 65, 72.2, 86.7 Mbps IEEE 802.11ac VHT40: 15, 30, 45, 60, 90, 120, 135, 150, 180, 200 Mbps IEEE 802.11ax HEW20: 8.6, 17.2, 25.8, 34.4, 51.6, 68.8, 77.4, 86, 103.2, 114.7, 129, 143.4Mbps IEEE 802.11ax HEW40: 17.2, 34.4, 51.6, 68.8, 103.2, 137.6, 154.9, 172.1, 206.5, 229.4, 258.1, 286.8Mbps
Antenna Type:	FPC Antenna, MAX. Gain: 4.77 dBi

Note 1: EUT is the ab. of equipment under test.

Note 2: The antenna gain is declared by the customer and the laboratory is not responsible for the accuracy of the antenna gain.

4.2. Channel List

UNII-1 (For Bandwidth = 20 MHz)		UNII-1 (For Bandwidth = 40 MHz)	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
36	5180	38	5190
40	5200	46	5230
44	5220	/	/
48	5240	/	/

UNII-2A (For Bandwidth = 20 MHz)		UNII-2A (For Bandwidth = 40 MHz)	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
52	5260	54	5270
56	5280	62	5310

60	5300	/	/
64	5320	/	/

UNII-2C (For Bandwidth = 20 MHz)		UNII-2C (For Bandwidth = 40 MHz)	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
100	5500	102	5510
104	5520	110	5550
108	5540	118	5590
112	5560	126	5630
116	5580	134	5670
120	5600	142	5710
124	5620	/	/
128	5640	/	/
132	5660	/	/
136	5680	/	/
140	5700	/	/
144	5720	/	/

UNII-3 (For Bandwidth = 20 MHz)		UNII-3 (For Bandwidth = 40 MHz)	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
149	5745	151	5755
153	5765	159	5795
157	5785	/	/
161	5805	/	/
165	5825	/	/

4.3. Test Channel Configuration

Mode	Data rate (Mbps) (see Note)	Test Channel and Frequency
802.11a TX Mode	6	CH36, 5180
	6	CH44, 5220
	6	CH48, 5240
	6	CH52, 5260
	6	CH60, 5300
	6	CH64, 5320
	6	CH100, 5500
	6	CH116, 5580
	6	CH140, 5700
	6	Straddle CH144, 5720
	6	CH149, 5745
	6	CH157, 5785
	6	CH165, 5825
802.11n HT20 TX Mode	MCS 0	CH36, 5180
	MCS 0	CH44, 5220
	MCS 0	CH48, 5240
	MCS 0	CH52, 5260
	MCS 0	CH60, 5300
	MCS 0	CH64, 5320
	MCS 0	CH100, 5500
	MCS 0	CH116, 5580
	MCS 0	CH140, 5700
	6	Straddle CH144, 5720
	MCS 0	CH149, 5745
	MCS 0	CH157, 5785
	MCS 0	CH165, 5825
802.11n HT40 TX Mode	MCS 0	CH38, 5190
	MCS 0	CH46, 5230
	MCS 0	CH54, 5270
	MCS 0	CH62, 5310
	MCS 0	CH102, 5510
	MCS 0	CH110, 5550
	MCS 0	CH134, 5670
	MCS 0	Straddle CH142, 5710
	MCS 0	CH151, 5755
	MCS 0	CH159, 5795
802.11ac VHT20 TX Mode	MCS 0	CH36, 5180
	MCS 0	CH44, 5220
	MCS 0	CH48, 5240
	MCS 0	CH52, 5260
	MCS 0	CH60, 5300
	MCS 0	CH64, 5320
	MCS 0	CH100, 5500
	MCS 0	CH116, 5580
	MCS 0	CH140, 5700
	MCS 0	Straddle CH144, 5720
	MCS 0	CH149, 5745
	MCS 0	CH157, 5785
	MCS 0	CH165, 5825
802.11ac VHT40 TX Mode	MCS 0	CH38, 5190
	MCS 0	CH46, 5230
	MCS 0	CH54, 5270
	MCS 0	CH62, 5310
	MCS 0	CH102, 5510
	MCS 0	CH110, 5550
	MCS 0	CH134, 5670

	MCS 0	Straddle CH142, 5710
	MCS 0	CH151, 5755
	MCS 0	CH159, 5795
802.11ax HEW20 TX Mode	MCS 0	CH36, 5180
	MCS 0	CH44, 5220
	MCS 0	CH48, 5240
	MCS 0	CH52, 5260
	MCS 0	CH60, 5300
	MCS 0	CH64, 5320
	MCS 0	CH100, 5500
	MCS 0	CH116, 5580
	MCS 0	CH140, 5700
	MCS 0	Straddle CH144, 5720
	MCS 0	CH149, 5745
	MCS 0	CH157, 5785
	MCS 0	CH165, 5825
802.11ax HEW40 TX Mode	MCS 0	CH38, 5190
	MCS 0	CH46, 5230
	MCS 0	CH54, 5270
	MCS 0	CH62, 5310
	MCS 0	CH102, 5510
	MCS 0	CH110, 5550
	MCS 0	CH134, 5670
	MCS 0	Straddle CH142, 5710
	MCS 0	CH151, 5755
	MCS 0	CH159, 5795
RX Mode	MCS 0	/

4.4. Test Environment Conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature range:	21-25 ℃
Humidity range:	40-75%
Pressure range:	86-106 kPa

4.5. The Worse Case Power Setting Parameter

The Worse Case Power Setting Parameter			
Test Software	Secure CRT		
Mode	Rate	Channel	Soft set value
			Ant1
802.11a	6 MHz	36	2 0 9
		44	2 0 9
		48	2 0 9
		52	2 0 9
		60	2 0 9
		64	2 0 8
		100	2 0 8
		116	2 0 8
		140	2 0 10
		144	2 0 10
		149	2 0 8
		157	2 0 8
		165	2 0 8
802.11n HT20	MCS 0	36	2 0 9
		44	2 0 9
		48	2 0 9
		52	2 0 9

		60	2 0 9
		64	2 0 8
		100	2 0 8
		116	2 0 8
		140	2 0 10
		144	2 0 10
		149	2 0 8
		157	2 0 8
		165	2 0 8
802.11n HT40	MCS 0	38	2 0 9
		46	2 0 8
		54	2 0 8
		62	2 0 8
		102	2 0 8
		110	2 0 8
		134	2 0 9
		142	2 0 9
		151	2 0 7
		159	2 0 7
802.11ac VHT20	MCS 0	36	2 0 8
		44	2 0 8
		48	2 0 8
		52	2 0 8
		60	2 0 8
		64	2 0 8
		100	2 0 8
		116	2 0 8
		140	2 0 9
		144	2 0 9
		149	2 0 8
		157	2 0 8
		165	2 0 8
802.11ac VHT40	MCS 0	38	2 0 8
		46	2 0 8
		54	2 0 8
		62	2 0 8
		102	2 0 8
		110	2 0 8
		134	2 0 9
		142	2 0 9
		151	2 0 7
		159	2 0 7
802.11ax HEW20	MCS 0	36	2 0 8
		44	2 0 8
		48	2 0 8
		52	2 0 8
		60	2 0 8
		64	2 0 8
		100	2 0 8
		116	2 0 8
		140	2 0 9
		144	2 0 9
		149	2 0 8
		157	2 0 8
		165	2 0 8
802.11ax HEW40	MCS 0	38	2 0 8
		46	2 0 8
		54	2 0 8
		62	2 0 8
		102	2 0 8

		110	2 0 8
		134	2 0 9
		142	2 0 9
		151	2 0 7
		159	2 0 7

4.6. Description of Available Antennas

Test Mode	Transmit and Receive Mode	Description
802.11a	☒ 1TX, 1RX	Antenna 1 can be used as transmitting/receiving antenna.
802.11n HT20	☒ 1TX, 1RX	Antenna 1 can be used as transmitting/receiving antenna.
802.11n HT40	☒ 1TX, 1RX	Antenna 1 can be used as transmitting/receiving antenna.
802.11ac VHT20	☒ 1TX, 1RX	Antenna 1 can be used as transmitting/receiving antenna.
802.11ac VHT40	☒ 1TX, 1RX	Antenna 1 can be used as transmitting/receiving antenna.
802.11ax HEW20	☒ 1TX, 1RX	Antenna 1 can be used as transmitting/receiving antenna.
802.11ax HEW40	☒ 1TX, 1RX	Antenna 1 can be used as transmitting/receiving antenna.

5. Description of Test Setup

5.1. Accessory

Description of Accessories	Manufacturer	Model Number	Description	Remark
Switching adapter	GangQi	GQ36-120300-Ax	Input: 100-240V 50/60Hz 1.0A Max Output: DC 12V3A 36.0W	/

5.2. Support Equipment

Equipment	Brand Name	Model Name	P/N
PC	Lenovo	T480	/

5.3. Test Setup

The EUT can work in Fixed Frequency mode.

5.4. Setup Diagram for Tests

6. Measurement uncertainty

Test Item	Uncertainty
AC Power Conduction emission	1.37 dB
All Radiated emissions	5.4dB
Conducted emissions	3.09 dB
Occupied Channel Bandwidth	1.1%
Conducted Output power	0.82dB
Power Spectral Density	0.82dB
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level using a coverage factor of k = 2.	

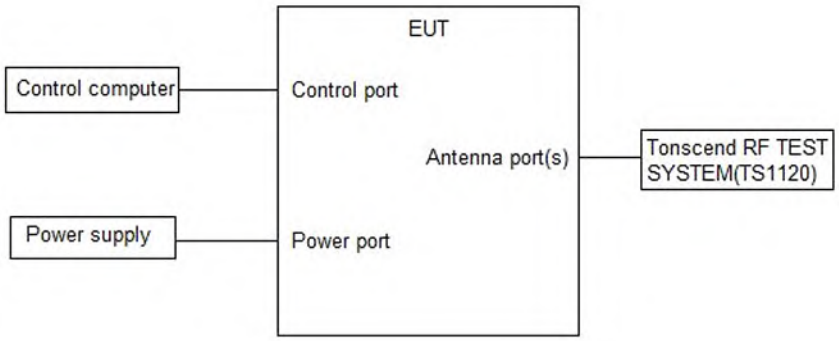
7. Measuring Instrument and Software Used

TS Test System						
Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due. Date
☑	Spectrum Analyzer	Keysight	N9030B	MY56320512	Jul. 10, 2023	Jul. 09, 2024
☑	Vector Signal Generator	Keysight	N5182B	MY57300334	Nov. 24, 2022	Nov. 23, 2023
☑	Signal Generator	Keysight	N5171B	MY57280639	Nov. 24, 2022	Nov. 23, 2023
☑	DC POWER	Keysight	E342A	MY59020356	Jul. 14, 2023	Jul. 13, 2024
☑	Incubator thermometer	GWS	EL-02JA	21107288	Nov. 03, 2022	Nov. 02, 2023
☑	Control unit(Power sensor)	Tonscend	JS0806-2	/	Jul. 10, 2023	Jul. 09, 2024
☑	Wideband radio communication tester	R&S	CMW500	163478	Jul. 11, 2023	Jul. 10, 2024
☑	Spectrum Analyzer	Keysight	N9020B	MY60112206	Nov. 24, 2022	Nov. 23, 2023
☑	Control unit(Power sensor)	Tonscend	JS0806-2	21H8060465	Nov. 25, 2022	Nov. 24, 2023
Software						
Used	Description	Manufacturer	Name		Version	
☑	Test software	TS+	JS1120-3		V3.3.10	
RSE Test System						
Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due. Date
☑	EMI Receiver	R&S	ESW	101685	Jul. 12, 2023	Jul. 11, 2024
☑	Bilog Antenna	Schwarzbeck	VULB 9163	01416	Mar. 21, 2023	Mar. 20, 2024
☑	Horn Antenna 1	Schwarzbeck	BBHA 9120 D	01673	Nov. 23, 2022	Nov. 22, 2023
☑	Horn Antenna 2	ETS	3116C	00217677	Sep. 19, 2022	Sep. 18, 2023
☑	Signal Pre-Amplifier	Tonscend	TAP01018050	AP21C806122	Jul. 10, 2023	Jul. 09, 2024
☑	Signal Pre-Amplifier	Tonscend	TAP9K3G32	AP20K806104	Jul. 10, 2023	Jul. 09, 2024
☑	Signal Pre-Amplifier	ETS	3116C-PA	00217677	Sep. 02, 2022	Sep. 01, 2023
☑	3m Fully-anechoic Chamber	ETS	RFD-100	/	Apr. 24, 2021	Apr. 23, 2024
Software						
Used	Description	Manufacturer	Name		Version	
☑	Test software	TS+	TS+		V3.0.0.4	
Conducted Emission Test For AC Power Port						
Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due. Date
☑	LISN	R&S	ENV216	102154	Jul. 10, 2023	Jul. 09, 2024
☑	EMI Receiver	R&S	ESR3	102509	Jul. 12, 2023	Jul. 11, 2024
Software						
Used	Description	Manufacturer	Name		Version	

☑	Test software	EZ	EZ-EMC		EMEC-3A1	
Other Instrument						
Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due. Date
☑	Temperature & Humidity	Temperature	HTC-1	/	Nov. 25, 2022	Nov. 24, 2023

8. Duty Cycle

8.1. Block Diagram of Test Setup



8.2. Limits

None; for reporting purposes only.

8.3. Procedure

Refer to KdB 789033 D02 General U-NII Test Procedures New Rules v02r01 section II.B.

The zero-span mode on a spectrum analyzer or EMI receiver, if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the on and off times of the transmitted signal.

Set the center frequency of the instrument to the center frequency of the transmission.

Set RBW ≥ EBW if possible; otherwise,

set RBW to the largest available value. Set VBW ≥ RBW.

Set detector = peak or average. The zero-span measurement method shall not be used unless both RBW and VBW are > 50/T, where T is defined in II.B.1.a), and the number of sweep points across duration T exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring duty cycle shall not be used if T ≤ 16.7 microseconds.)

8.4. Results

Test Mode	Ant.	Freq. (MHz)	Transmission Duration (ms)	Transmission Period (ms)	Duty Cycle (%)
11A	Ant1	5260	1.37	1.40	97.86
		5280	1.36	1.40	97.14
		5320	1.36	1.39	97.84
		5500	1.36	1.40	97.14
		5580	1.36	1.46	93.15
		5700	1.37	1.40	97.86
11N20SISO	Ant1	5260	1.27	1.31	96.95
		5280	1.27	1.37	92.70
		5320	1.28	1.31	97.71
		5500	1.28	1.31	97.71
		5580	1.27	1.31	96.95
		5700	1.27	1.37	92.70
11N40SISO	Ant1	5270	0.63	0.67	94.03
		5310	0.64	0.74	86.49
		5510	0.63	0.73	86.30
		5550	0.63	0.67	94.03
		5670	0.64	0.67	95.52
11AC20SISO	Ant1	5260	1.28	1.32	96.97
		5280	1.29	1.32	97.73
		5320	1.29	1.32	97.73
		5500	1.28	1.32	96.97
		5580	1.28	1.32	96.97
		5700	1.28	1.32	96.97

11AC40SISO	Ant1	5270	0.64	0.67	95.52
		5310	0.64	0.68	94.12
		5510	0.64	0.68	94.12
		5550	0.64	0.68	94.12
		5670	0.64	0.68	94.12
11AX20SISO	Ant1	5260	0.99	1.02	97.06
		5280	0.99	1.03	96.12
		5320	0.99	1.03	96.12
		5500	0.99	1.03	96.12
		5580	0.99	1.03	96.12
		5700	1.00	1.03	97.09
11AX40SISO	Ant1	5270	0.52	0.55	94.55
		5310	0.51	0.55	92.73
		5510	0.51	0.55	92.73
		5550	0.52	0.55	94.55
		5670	0.52	0.62	83.87

For U-NII-2C straddle channel:

Test Mode	Ant.	Freq. (MHz)	Transmission Duration (ms)	Transmission Period (ms)	Duty Cycle (%)
11A	Ant1	5720	1.36	1.40	97.14
11N20SISO	Ant1	5720	1.28	1.31	97.71
11N40SISO	Ant1	5710	0.64	0.74	86.49
11AC20SISO	Ant1	5720	1.29	1.39	92.81
11AC40SISO	Ant1	5710	0.64	0.68	94.12
11AX20SISO	Ant1	5720	0.99	1.03	96.12
11AX40SISO	Ant1	5710	0.52	0.62	83.87

8.5. Original Test Data

11A_Ant1_5260

11A_Ant1_5280

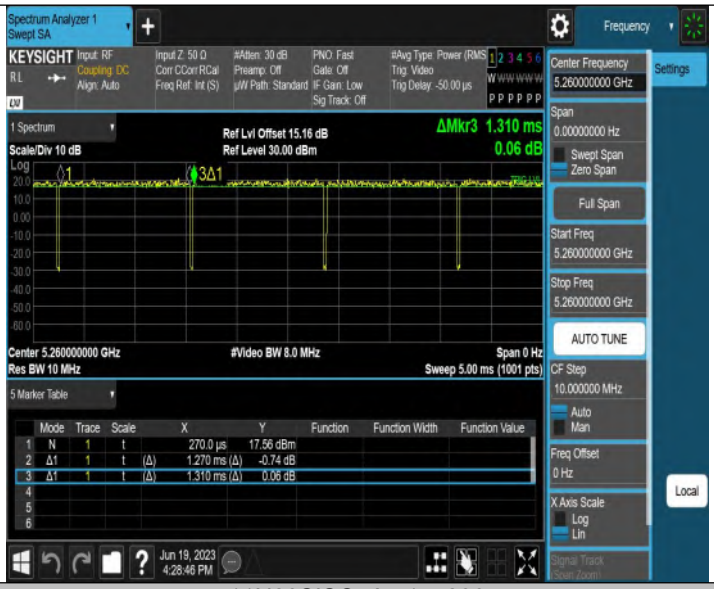
11A_Ant1_5320

11A_Ant1_5500

11A_Ant1_5580

11A_Ant1_5700

11N20SISO_Ant1_5260



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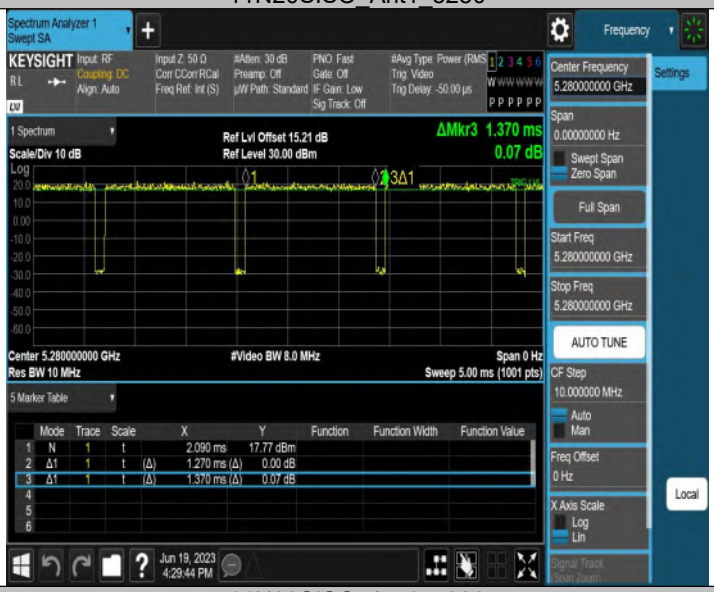

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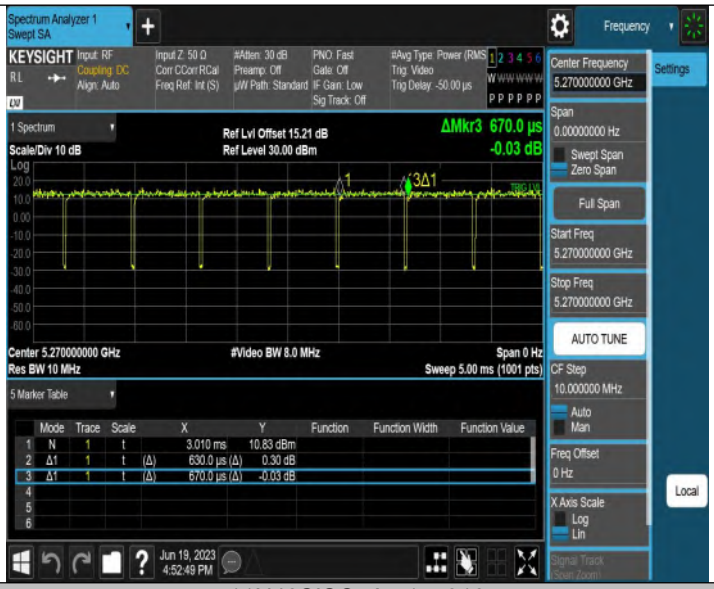
11N20SISO_Ant1_5500

11N20SISO_Ant1_5580

11N20SISO_Ant1_5700

11N40SISO_Ant1_5270



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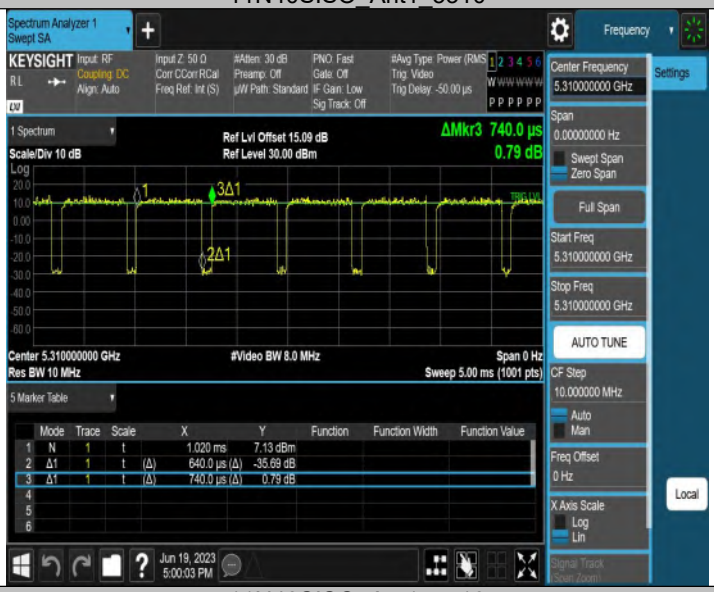

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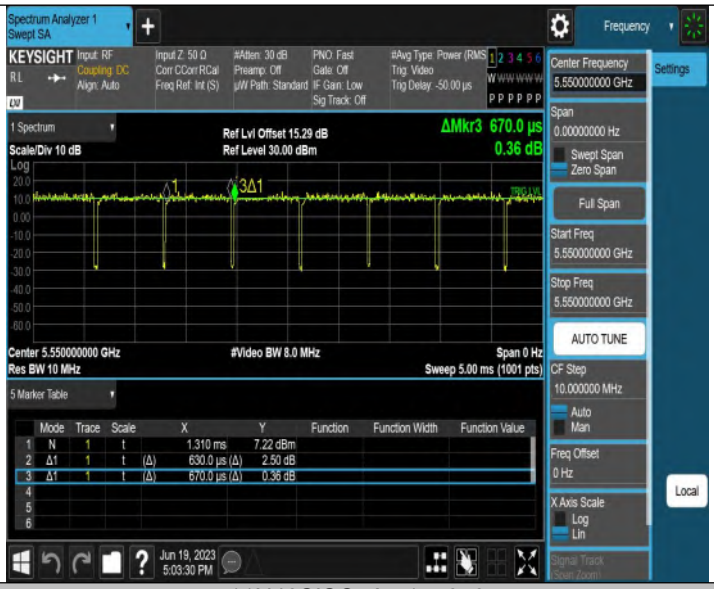
11N40SISO_Ant1_5550



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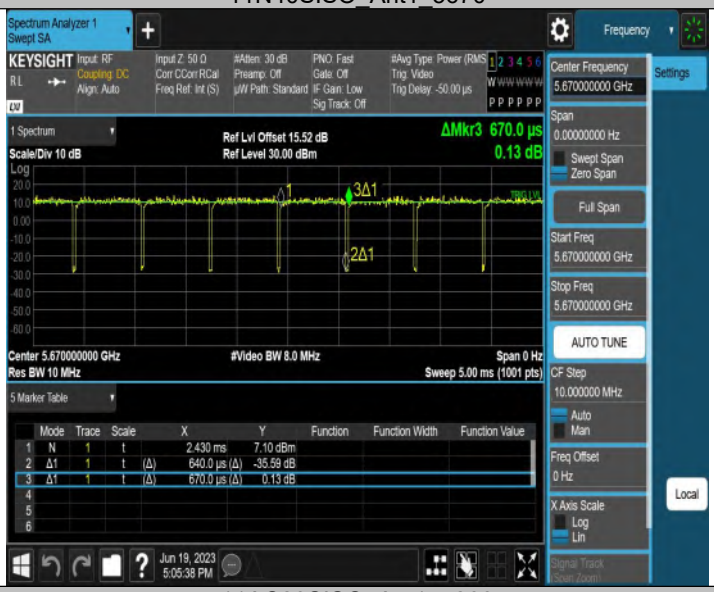


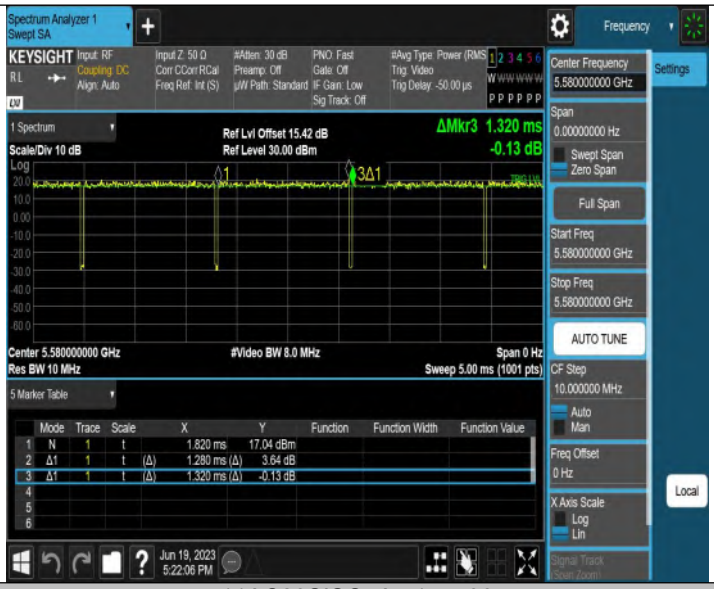
11AC20SISO_Ant1_5260

11AC20SISO_Ant1_5280

11AC20SISO_Ant1_5320

11AC20SISO_Ant1_5500

11AC20SISO_Ant1_5580



11AC20SISO_Ant1_5700

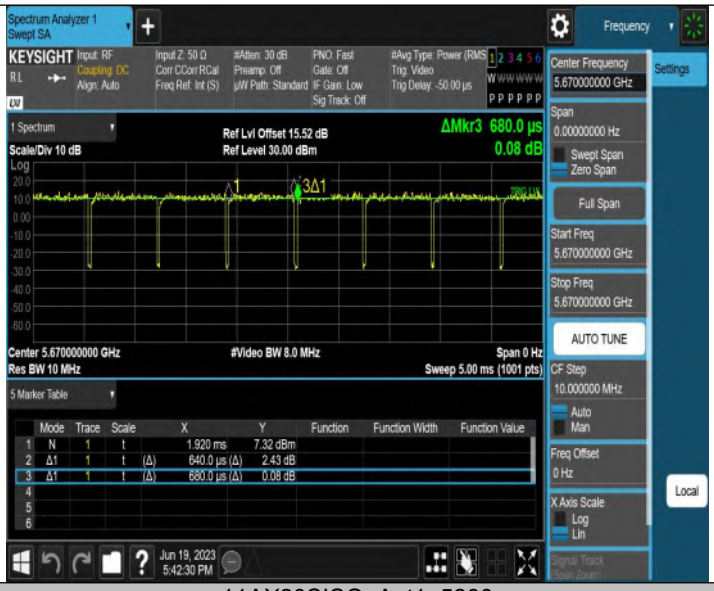
11AC40SISO_Ant1_5270

11AC40SISO_Ant1_5310

11AC40SISO_Ant1_5510

11AC40SISO_Ant1_5550

11AC40SISO_Ant1_5670



11AX20SISO_Ant1_5260

11AX20SISO_Ant1_5280

11AX20SISO_Ant1_5320

11AX20SISO_Ant1_5500

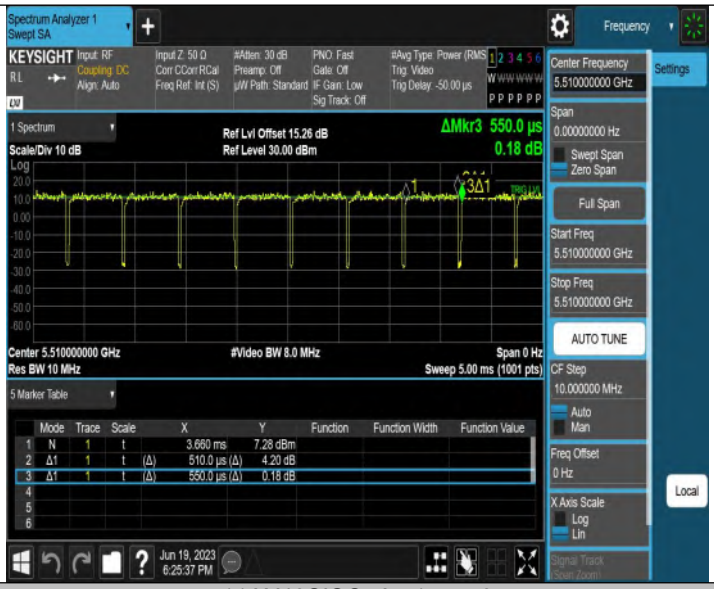
11AX20SISO_Ant1_5580

11AX20SISO_Ant1_5700

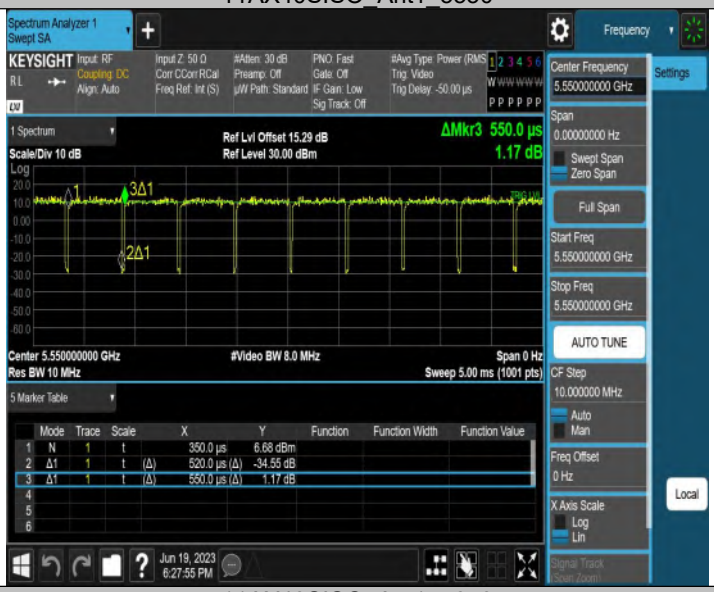
11AX40SISO_Ant1_5270

11AX40SISO_Ant1_5310

11AX40SISO_Ant1_5510



11AX40SISO_Ant1_5550



11AX40SISO_Ant1_5670

For U-NII-2C straddle channel:

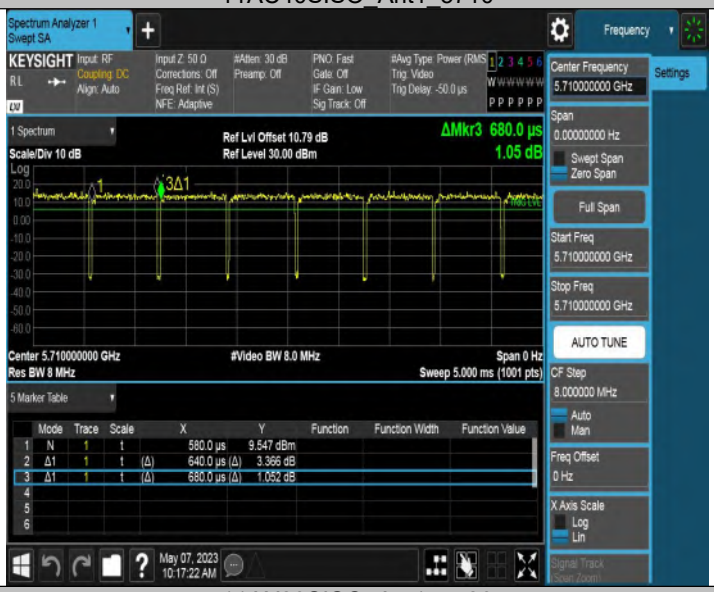
11A_Ant1_5720

11N20SISO_Ant1_5720

11N40SISO_Ant1_5710

11AC20SISO_Ant1_5720

11AC40SISO_Ant1_5710



11AX20SISO_Ant1_5720

11AX40SISO_Ant1_5710


Spectrum Analyzer 1
Swept SA
KEYSIGHT
Input: RF
Coupling: DC
Align: Auto
Input Z: 50 Ω
Corrections: Off
Freq Ref: Int (S)
NFE: Adaptive
#Atten: 30 dB
Preamp: Off
PNO: Fast
Gate: Off
IF Gain: Low
Sig Track: Off
#Avg Type: Power (RMS)
Trig: Video
Trig Delay: -50.0 µs
1 Spectrum
Ref Lvl Offset 10.79 dB
Ref Level 30.00 dBm
ΔMkr3 620.0 µs
0.60 dB
Scale/Div 10 dB
Log
20.0
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
1
3Δ1
2Δ1
Center 5.710000000 GHz
Res BW 8 MHz
#Video BW 8.0 MHz
Span 0 Hz
Sweep 5.000 ms (1001 pts)
5 Marker Table
Mode Trace Scale X Y Function Function Width Function Value
1 N 1 1 2.610 ms 9.685 dBm
2 Δ1 1 1 (Δ) 520.0 µs (Δ) -41.95 dB
3 Δ1 1 1 (Δ) 620.0 µs (Δ) 0.5975 dB
4
5
6
May 07, 2023
10:28:39 AM
Frequency
Settings
Center Frequency
5.710000000 GHz
Span
0.00000000 Hz
Swept Span
Zero Span
Full Span
Start Freq
5.710000000 GHz
Stop Freq
5.710000000 GHz
AUTO TUNE
CF Step
8.000000 MHz
Auto
Man
Freq Offset
0 Hz
X Axis Scale
Log
Lin

9. 26dB Bandwidth, 6dB Bandwidth and 99% Bandwidth

9.1. Block Diagram of Test Setup

Same as section 8.1

9.2. Limits

FCC Part15, Subpart E		
Test Item	Limit	Frequency Range (MHz)
Bandwidth	26 dB Bandwidth	5150 - 5250
	26 dB Bandwidth	5250 - 5350
	26 dB Bandwidth	For FCC: 5470 - 5725 For IC: 5470 - 5600 5650 - 5725
	Minimum 500 kHz 6 dB Bandwidth	5725 - 5850
	For reporting purposes only.	For IC: 5150 ~ 5825

9.3. Test Procedure

(1) Connect EUT's antenna output to spectrum analyzer by RF cable.

Center Frequency	The centre frequency of the channel under test
Detector	Peak
RBW	For 6 dB Bandwidth: RBW=100 kHz For 26 dB Bandwidth: approximately 1% of the emission bandwidth. For 99 % Occupied Bandwidth: approximately 1 % ~ 5 % of the OBW.
VBW	For 6 dB Bandwidth: VBW=300 kHz For 26 dB Bandwidth: >3*RBW For 99 % Bandwidth: >3*RBW
Trace	Max hold
Sweep	Auto couple

(2) Allow the trace to stabilize, 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 26 dB and 6 dB relative to the maximum level measured in the fundamental emission.

(3) Use the 99 % power bandwidth function of the instrument, allow the trace to stabilize and report the measured bandwidth.

9.4. Test Result

Test Mode	Ant.	Freq. (MHz)	OCB (MHz)	FL (MHz)	FH (MHz)	Limit (MHz)	Verdict
11A	Ant1	5260	16.292	5251.8140	5268.1060	---	---
		5280	16.413	5271.7354	5288.1484	---	---
		5320	16.429	5311.7918	5328.2208	---	---
		5500	16.362	5491.8055	5508.1675	---	---
		5580	16.336	5571.8227	5588.1587	---	---
		5700	16.360	5691.7553	5708.1153	---	---
11N20SISO	Ant1	5260	17.461	5251.2356	5268.6966	---	---
		5280	17.435	5271.2814	5288.7164	---	---
		5320	17.464	5311.2610	5328.7250	---	---
		5500	17.530	5491.2215	5508.7515	---	---
		5580	17.441	5571.2469	5588.6879	---	---
		5700	17.511	5691.1733	5708.6843	---	---
11N40SISO	Ant1	5270	35.924	5252.1128	5288.0368	---	---
		5310	36.205	5291.8837	5328.0887	---	---
		5510	35.900	5491.8978	5527.7978	---	---
		5550	36.092	5531.8678	5567.9598	---	---
		5670	35.984	5652.1008	5688.0848	---	---
11AC20SISO	Ant1	5260	17.500	5251.2418	5268.7418	---	---
		5280	17.470	5271.2444	5288.7144	---	---
		5320	17.463	5311.2567	5328.7197	---	---
		5500	17.434	5491.2786	5508.7126	---	---
		5580	17.486	5571.2538	5588.7398	---	---
		5700	17.587	5691.1510	5708.7380	---	---
11AC40SISO	Ant1	5270	35.968	5251.9024	5287.8704	---	---
		5310	36.134	5291.9122	5328.0462	---	---
		5510	35.846	5491.9333	5527.7793	---	---
		5550	36.118	5531.9051	5568.0231	---	---
		5670	36.245	5651.9120	5688.1570	---	---
11AX20SISO	Ant1	5260	18.685	5250.6536	5269.3386	---	---
		5280	18.718	5270.5993	5289.3173	---	---
		5320	18.791	5310.6251	5329.4161	---	---
		5500	18.782	5490.5475	5509.3295	---	---
		5580	18.400	5570.7252	5589.1252	---	---
		5700	18.769	5690.4952	5709.2642	---	---
11AX40SISO	Ant1	5270	37.570	5251.1536	5288.7236	---	---
		5310	37.383	5291.3049	5328.6879	---	---
		5510	37.467	5491.2081	5528.6751	---	---
		5550	37.720	5531.0944	5568.8144	---	---
		5670	37.477	5651.4144	5688.8914	---	---

Test Mode	Ant.	Freq. (MHz)	26dB EBW (MHz)	FL (MHz)	FH (MHz)	Limit (MHz)	Verdict
11A	Ant1	5260	18.680	5250.800	5269.480	---	---
		5280	19.040	5270.200	5289.240	---	---
		5320	18.280	5310.960	5329.240	---	---
		5500	19.480	5490.240	5509.720	---	---
		5580	19.320	5570.360	5589.680	---	---
		5700	19.240	5689.760	5709.000	---	---
11N20SISO	Ant1	5260	19.320	5250.360	5269.680	---	---
		5280	19.760	5270.000	5289.760	---	---
		5320	19.400	5310.120	5329.520	---	---
		5500	20.200	5490.080	5510.280	---	---
		5580	20.440	5570.200	5590.640	---	---
		5700	19.400	5690.320	5709.720	---	---
11N40SISO	Ant1	5270	39.200	5250.720	5289.920	---	---
		5310	40.960	5289.200	5330.160	---	---
		5510	40.560	5489.360	5529.920	---	---
		5550	41.120	5529.440	5570.560	---	---
		5670	41.600	5649.040	5690.640	---	---
11AC20SISO	Ant1	5260	19.880	5250.040	5269.920	---	---
		5280	20.680	5269.440	5290.120	---	---
		5320	19.280	5310.440	5329.720	---	---
		5500	20.560	5490.160	5510.720	---	---
		5580	19.440	5570.160	5589.600	---	---
		5700	19.360	5690.080	5709.440	---	---
11AC40SISO	Ant1	5270	39.280	5249.840	5289.120	---	---
		5310	39.200	5290.560	5329.760	---	---
		5510	40.800	5489.760	5530.560	---	---
		5550	41.520	5529.760	5571.280	---	---
		5670	38.560	5650.880	5689.440	---	---
11AX20SISO	Ant1	5260	19.720	5250.160	5269.880	---	---
		5280	19.760	5269.920	5289.680	---	---
		5320	19.880	5310.040	5329.920	---	---
		5500	19.920	5490.040	5509.960	---	---
		5580	20.080	5569.920	5590.000	---	---
		5700	19.400	5690.280	5709.680	---	---
11AX40SISO	Ant1	5270	40.080	5250.000	5290.080	---	---
		5310	40.880	5289.680	5330.560	---	---
		5510	39.760	5489.920	5529.680	---	---
		5550	39.760	5530.400	5570.160	---	---
		5670	38.800	5650.560	5689.360	---	---

For U-NII-2C straddle channel:

Test Mode	Ant.	Freq. (MHz)	OCB (MHz)	FL (MHz)	FH (MHz)	Limit (MHz)	Verdict
11A	Ant1	5720	16.953	5711.5790	5728.5320	---	---
		5720_UNII-2C	13.421	5711.5790	5725	---	---
		5720_UNII-3	3.532	5725	5728.5320	---	---
11N20SISO	Ant1	5720	17.948	5711.0859	5729.0339	---	---
		5720_UNII-2C	13.914	5711.0859	5725	---	---
		5720_UNII-3	4.034	5725	5729.0339	---	---
11N40SISO	Ant1	5710	36.587	5691.8353	5728.4223	---	---
		5710_UNII-2C	33.165	5691.8353	5725	---	---
		5710_UNII-3	3.422	5725	5728.4223	---	---
11AC20SISO	Ant1	5720	17.985	5711.0580	5729.0430	---	---
		5720_UNII-2C	13.942	5711.0580	5725	---	---
		5720_UNII-3	4.043	5725	5729.0430	---	---
11AC40SISO	Ant1	5710	36.788	5691.7354	5728.5234	---	---
		5710_UNII-2C	33.265	5691.7354	5725	---	---
		5710_UNII-3	3.523	5725	5728.5234	---	---

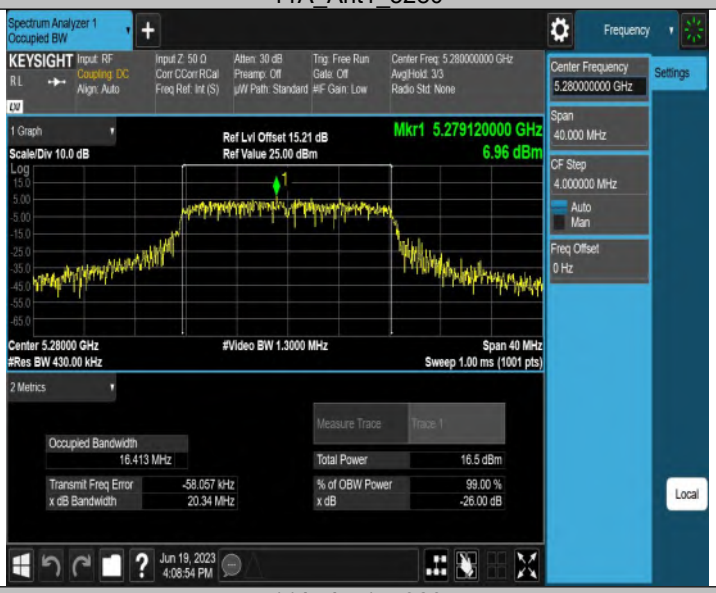
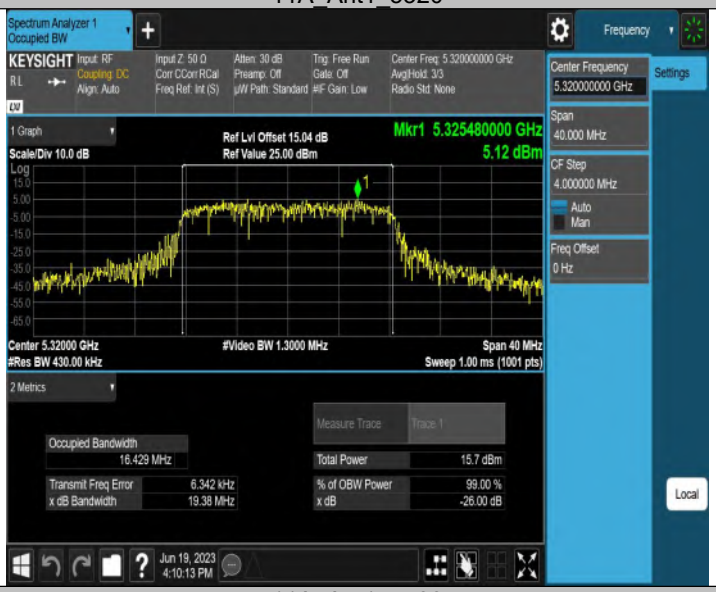
11AX20SISO	Ant1	5720	19.031	5710.5026	5729.5336	---	---
		5720_UNII-2C	14.497	5710.5026	5725	---	---
		5720_UNII-3	4.534	5725	5729.5336	---	---
11AX40SISO	Ant1	5710	38.107	5691.0098	5729.1168	---	---
		5710_UNII-2C	33.99	5691.0098	5725	---	---
		5710_UNII-3	4.117	5725	5729.1168	---	---

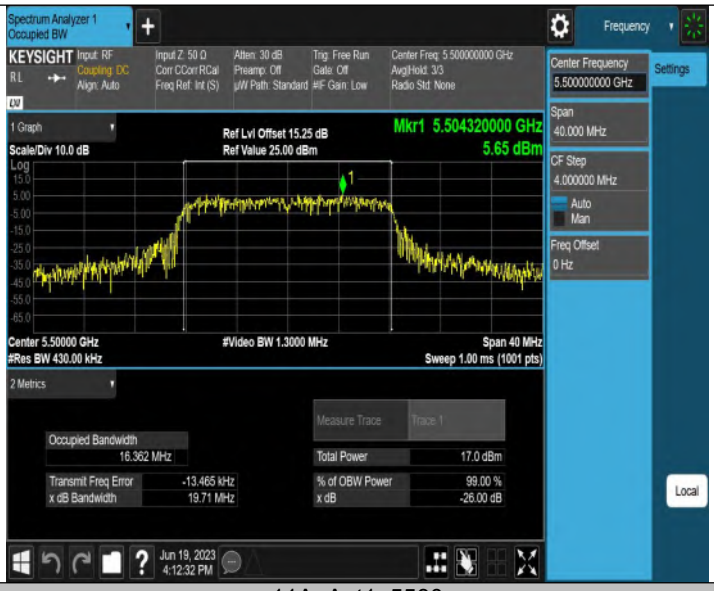
TestMode	Antenna	Frequency[MHz]	26db EBW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11A	Ant1	5720	32.240	5703.320	5735.560	---	---
		5720_UNII-2C	21.68	5703.320	5725	---	---
		5720_UNII-3	10.56	5725	5735.560	---	---
11N20SISO	Ant1	5720	35.720	5701.080	5736.800	---	---
		5720_UNII-2C	23.92	5701.080	5725	---	---
		5720_UNII-3	11.8	5725	5736.800	---	---
11N40SISO	Ant1	5710	66.480	5680.160	5746.640	---	---
		5710_UNII-2C	44.84	5680.160	5725	---	---
		5710_UNII-3	21.64	5725	5746.640	---	---
11AC20SISO	Ant1	5720	34.840	5703.680	5738.520	---	---
		5720_UNII-2C	21.32	5703.680	5725	---	---
		5720_UNII-3	13.52	5725	5738.520	---	---
11AC40SISO	Ant1	5710	71.520	5674.080	5745.600	---	---
		5710_UNII-2C	50.92	5674.080	5725	---	---
		5710_UNII-3	20.6	5725	5745.600	---	---
11AX20SISO	Ant1	5720	30.320	5704.800	5735.120	---	---
		5720_UNII-2C	20.2	5704.800	5725	---	---
		5720_UNII-3	10.12	5725	5735.120	---	---
11AX40SISO	Ant1	5710	69.040	5676.480	5745.520	---	---
		5710_UNII-2C	48.52	5676.480	5725	---	---
		5710_UNII-3	20.52	5725	5745.520	---	---

9.5. Original Test Data

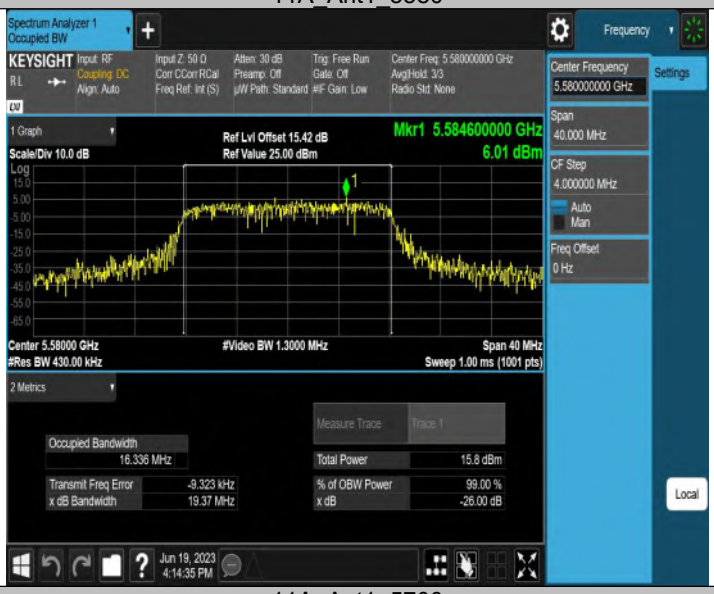
99% Bandwidth:

11A_Ant1_5260

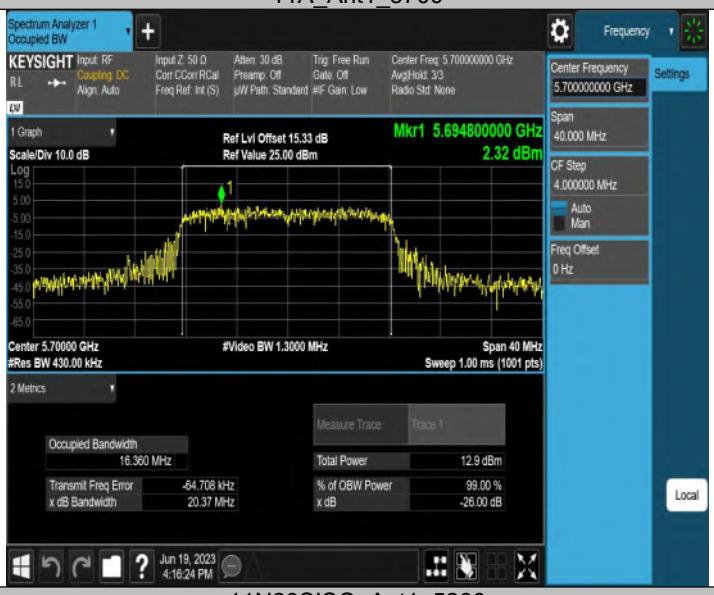
11A_Ant1_5280

11A_Ant1_5320

11A_Ant1_5500



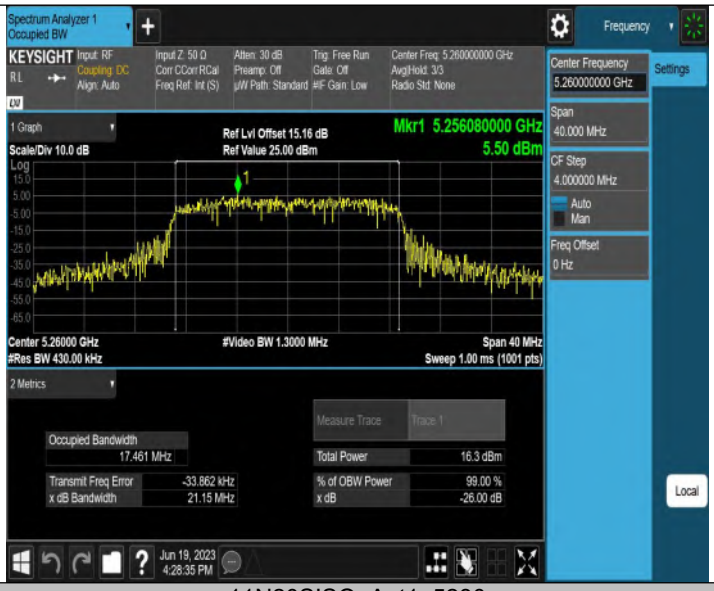
11A_Ant1_5580



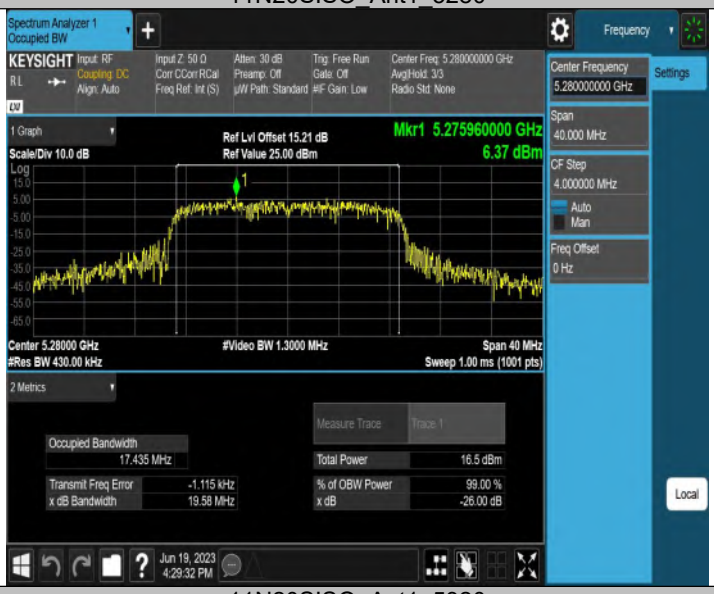
11A_Ant1_5700



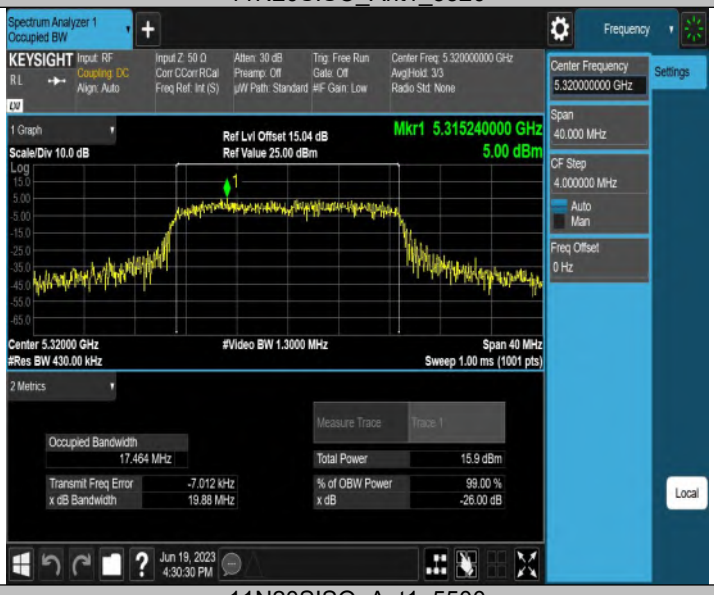
11N20SISO_Ant1_5260



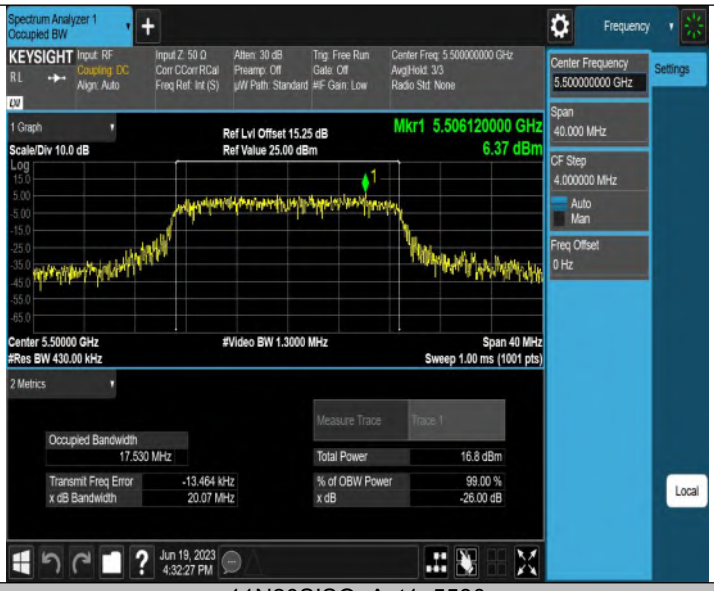
11N20SISO_Ant1_5280



11N20SISO_Ant1_5320

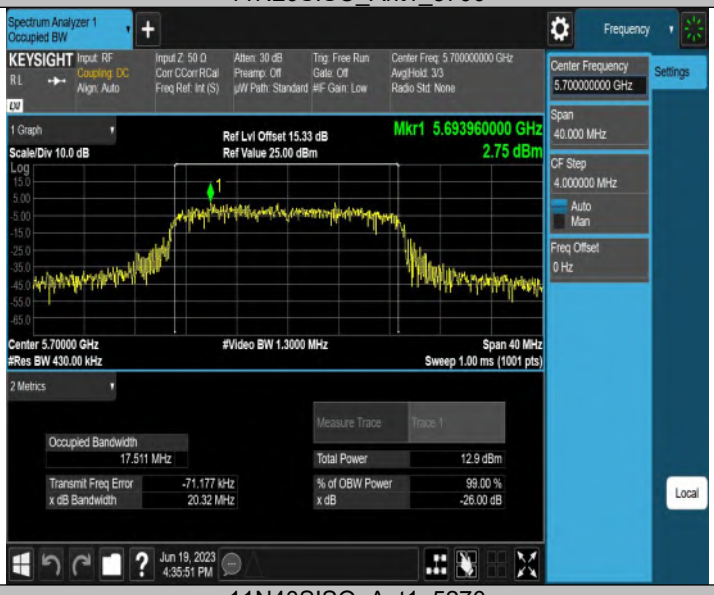


11N20SISO_Ant1_5500

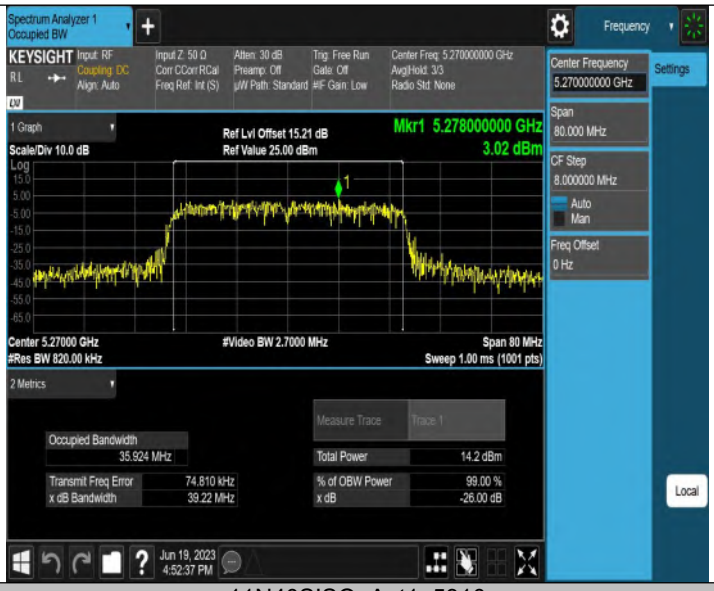


11N20SISO_Ant1_5580

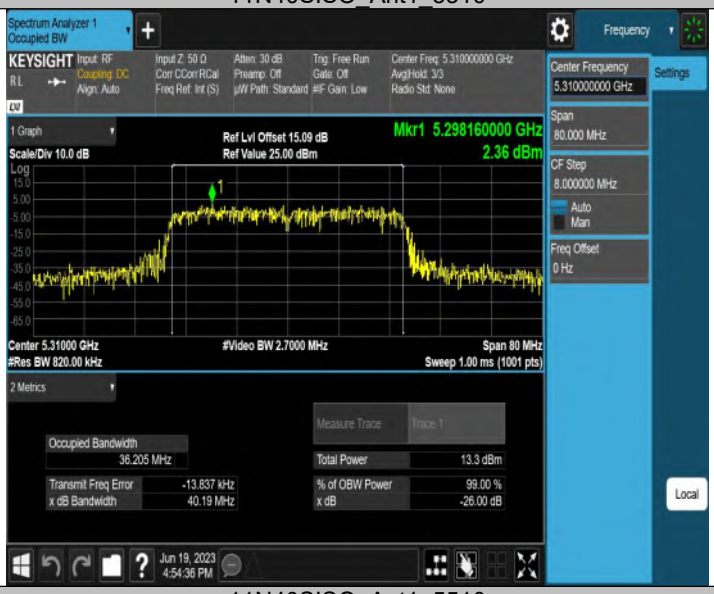
11N20SISO_Ant1_5700



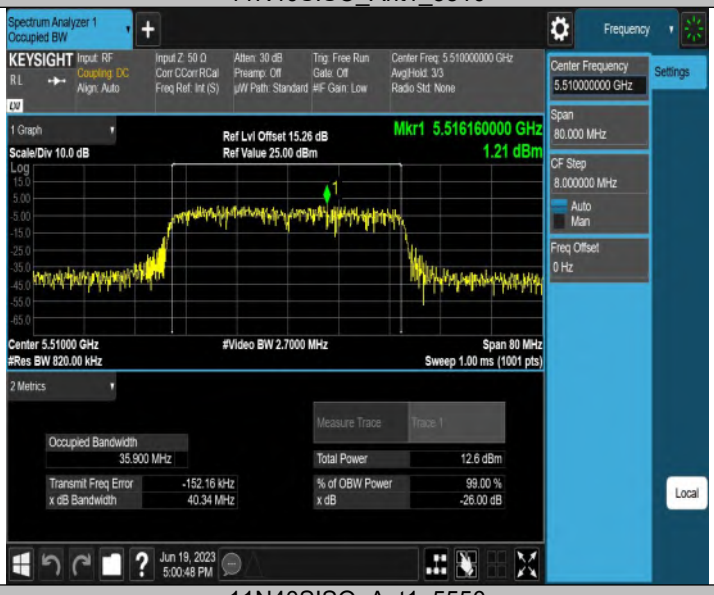
11N40SISO_Ant1_5270



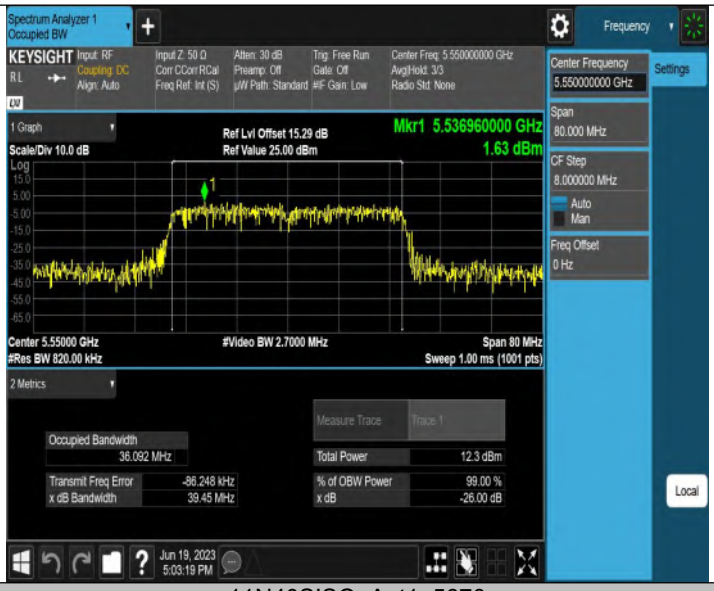
11N40SISO_Ant1_5310



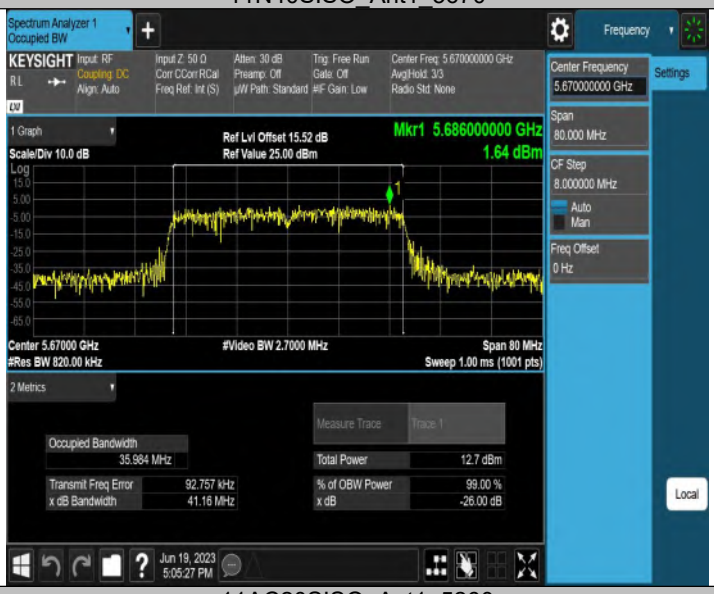
11N40SISO_Ant1_5510



11N40SISO_Ant1_5550

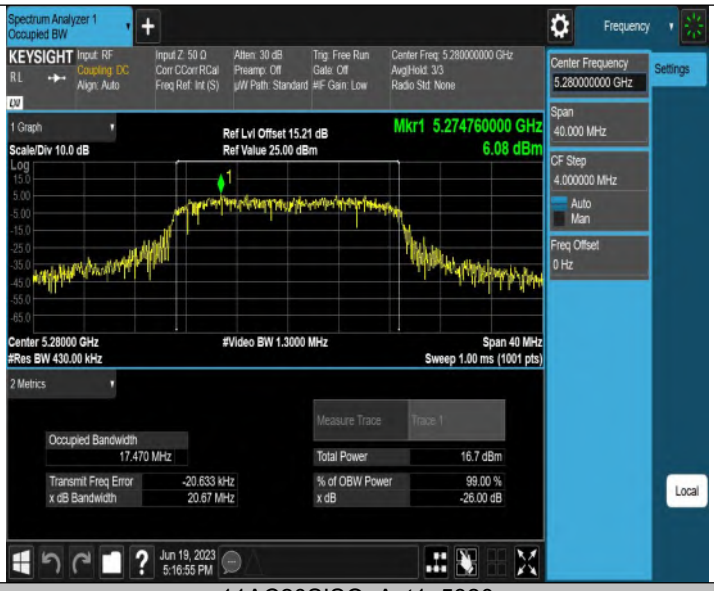


11N40SISO_Ant1_5670



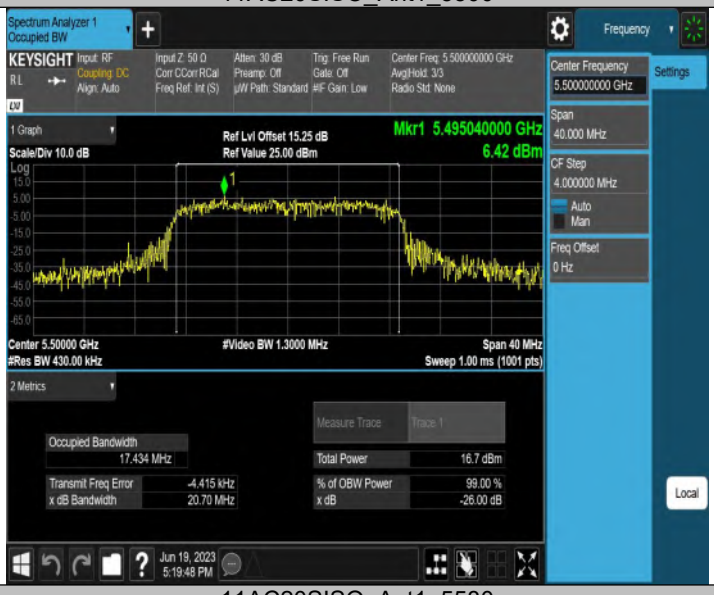
11AC20SISO_Ant1_5260

11AC20SISO_Ant1_5280

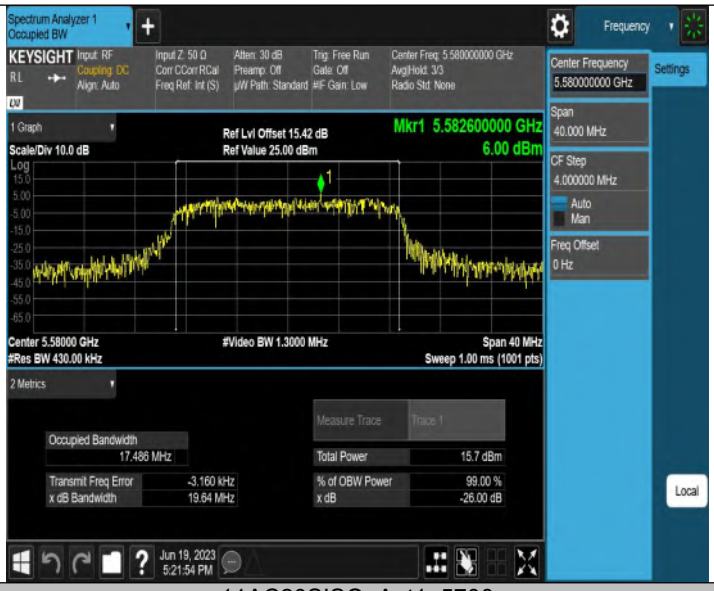


11AC20SISO_Ant1_5320

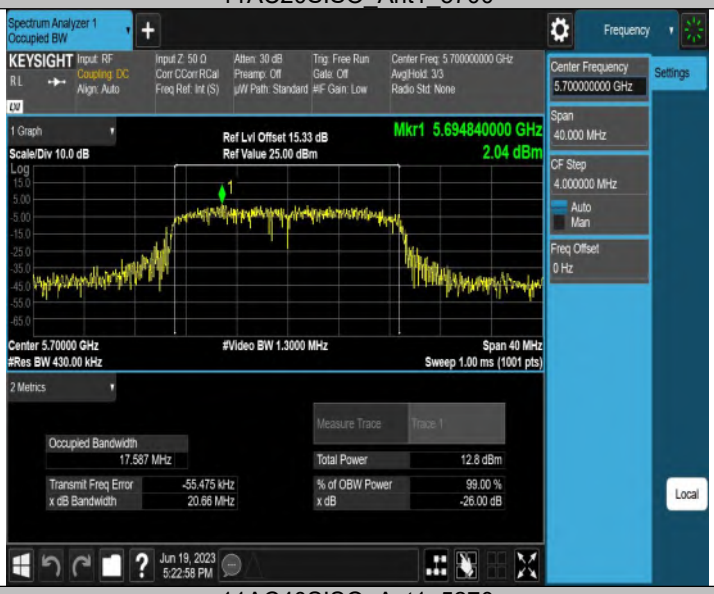
11AC20SISO_Ant1_5500



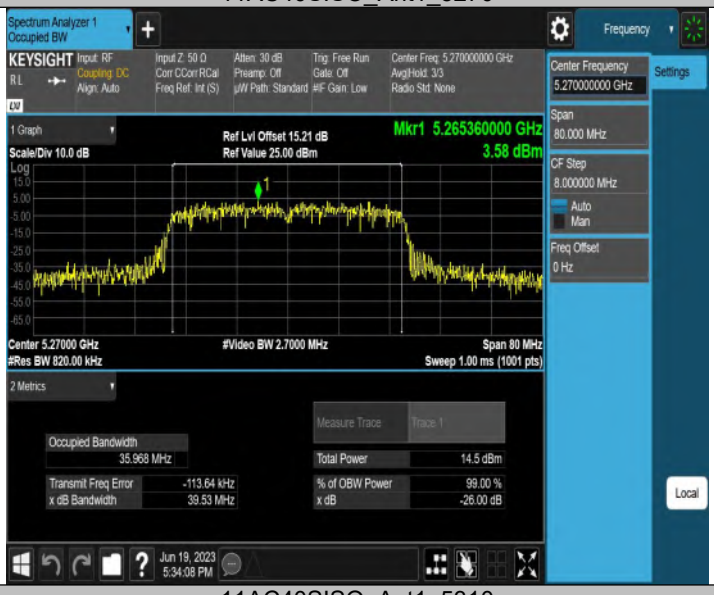
11AC20SISO_Ant1_5580



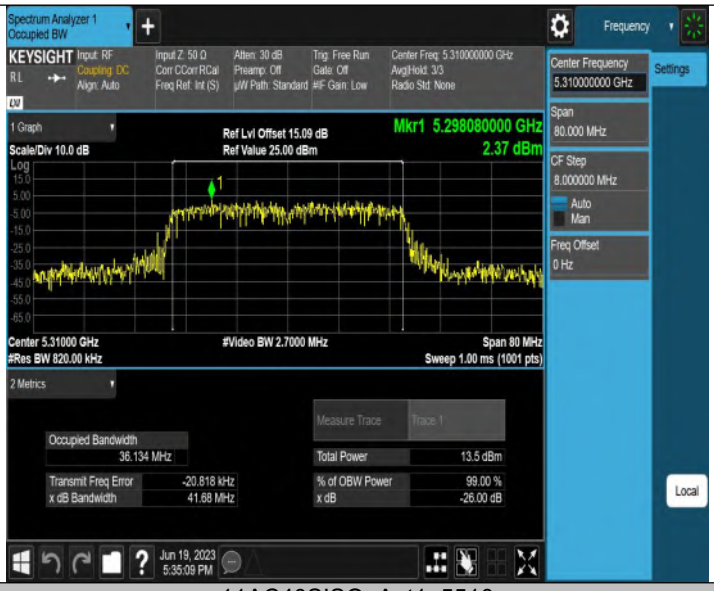
11AC20SISO_Ant1_5700



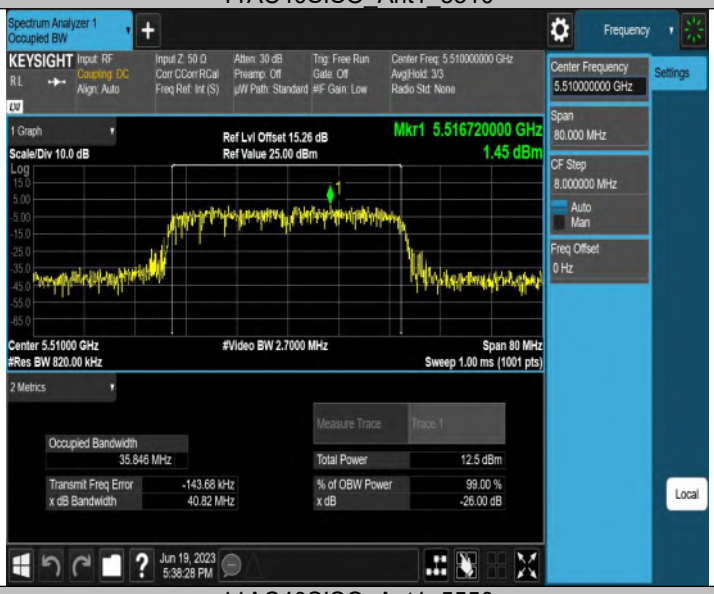
11AC40SISO_Ant1_5270



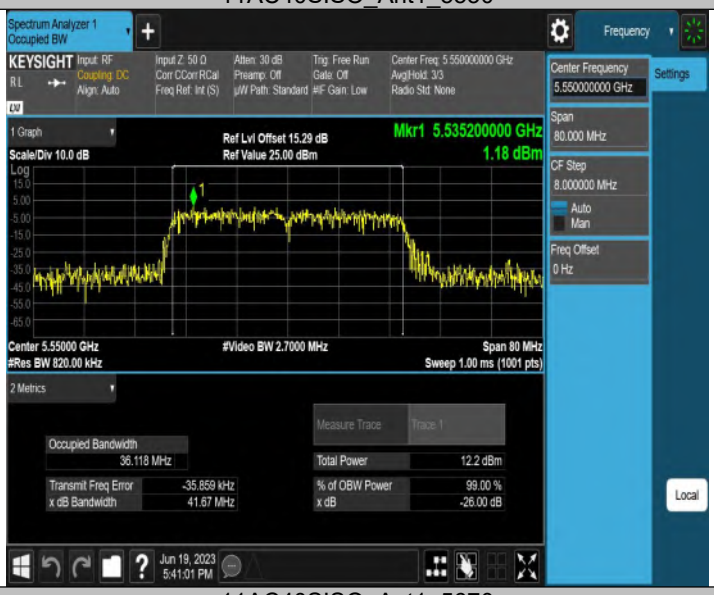
11AC40SISO_Ant1_5310



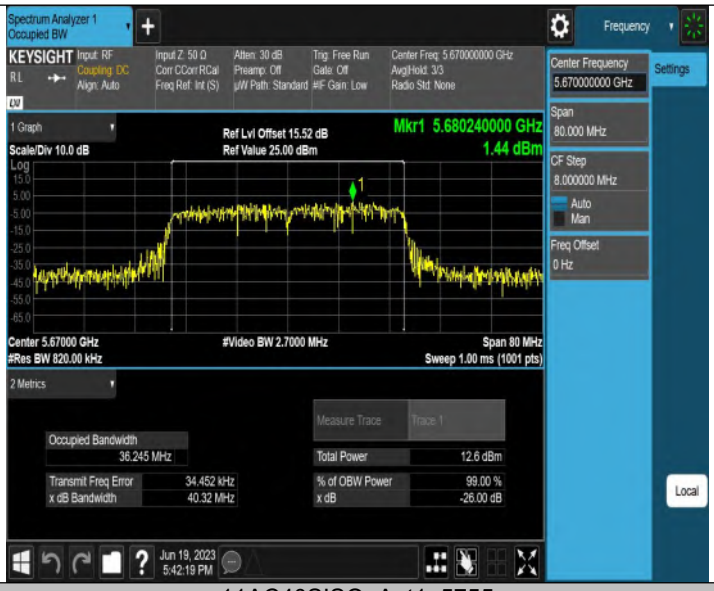
11AC40SISO_Ant1_5510



11AC40SISO_Ant1_5550

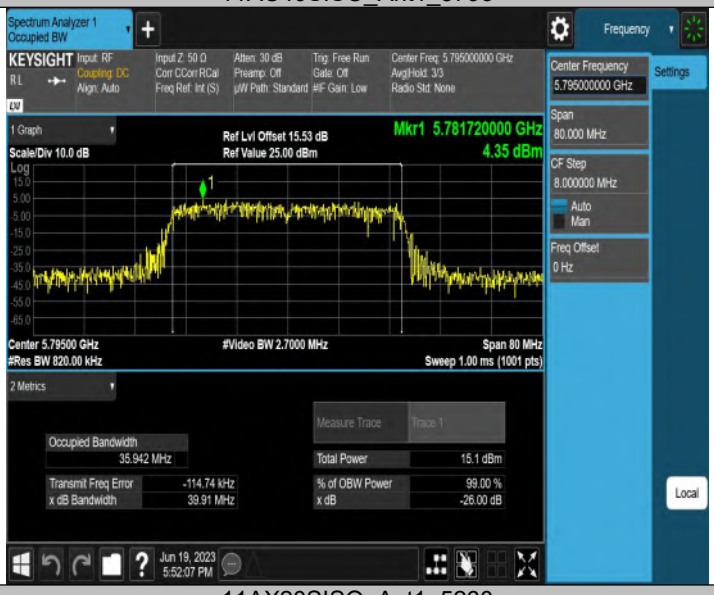


11AC40SISO_Ant1_5670



11AC40SISO_Ant1_5755

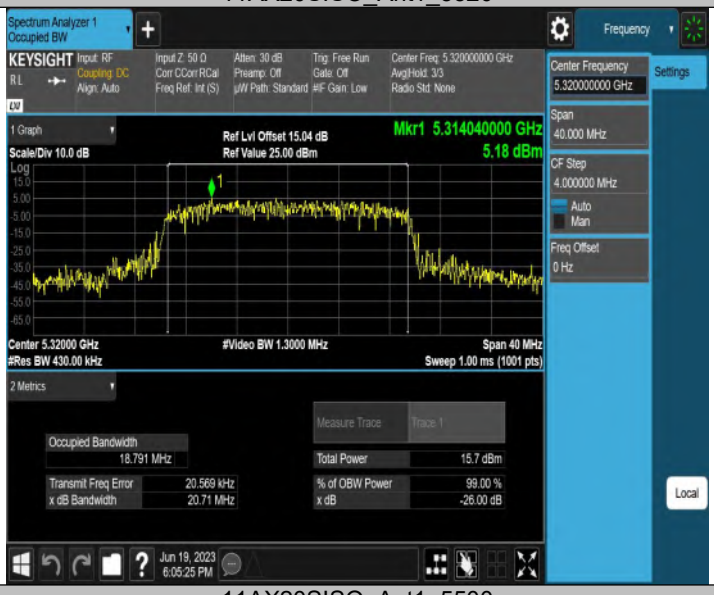
11AC40SISO_Ant1_5795



11AX20SISO_Ant1_5260

11AX20SISO_Ant1_5280

11AX20SISO_Ant1_5320



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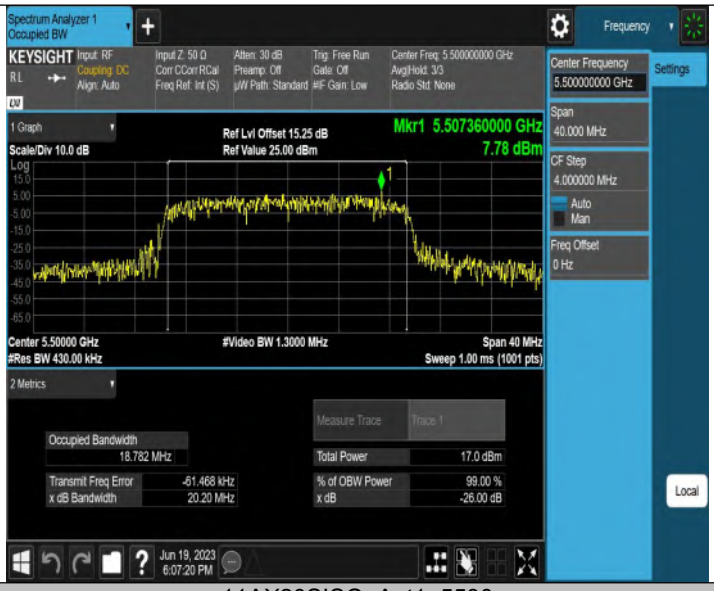
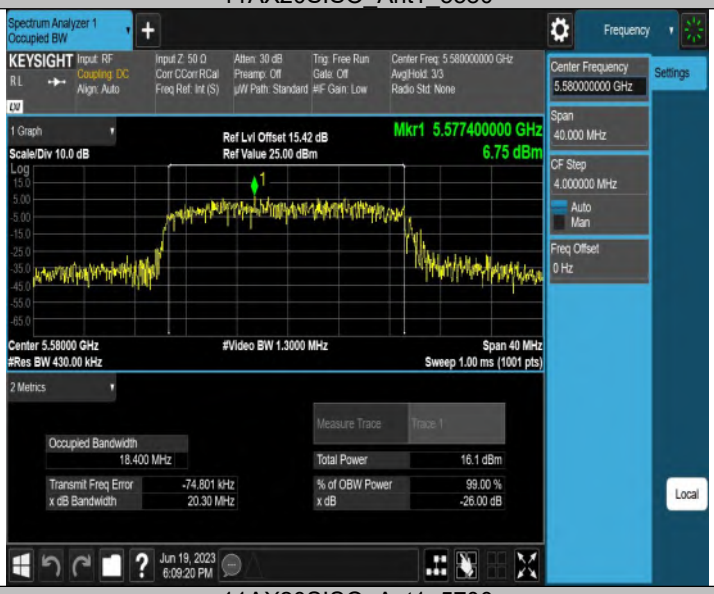


11AX20SISO_Ant1_5580



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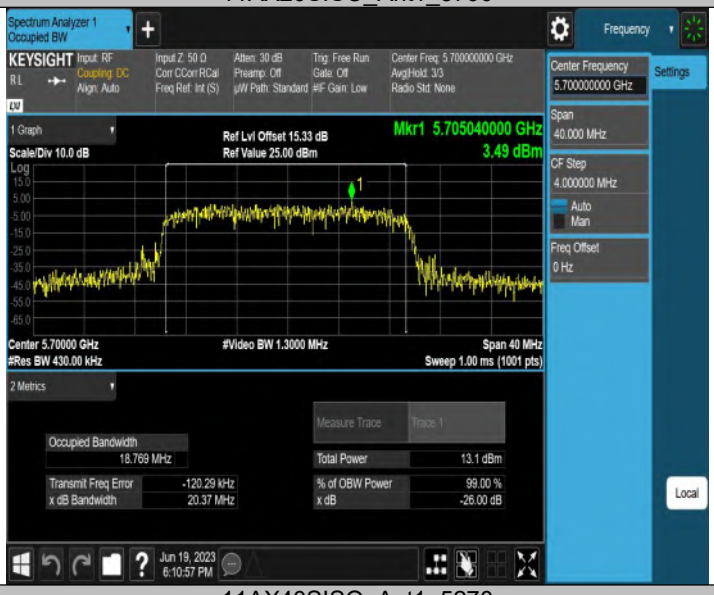

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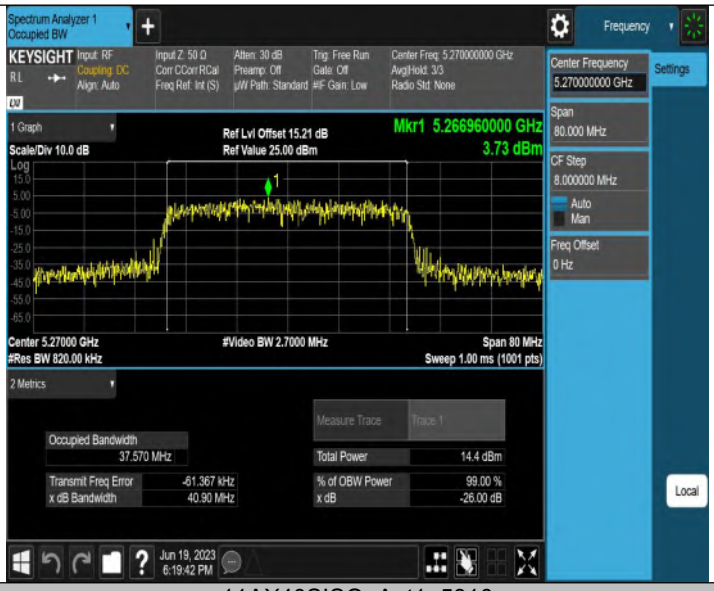

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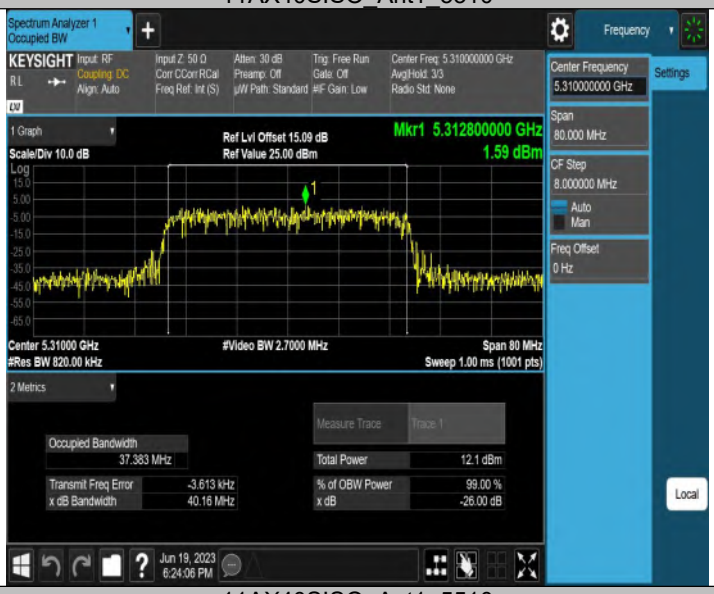

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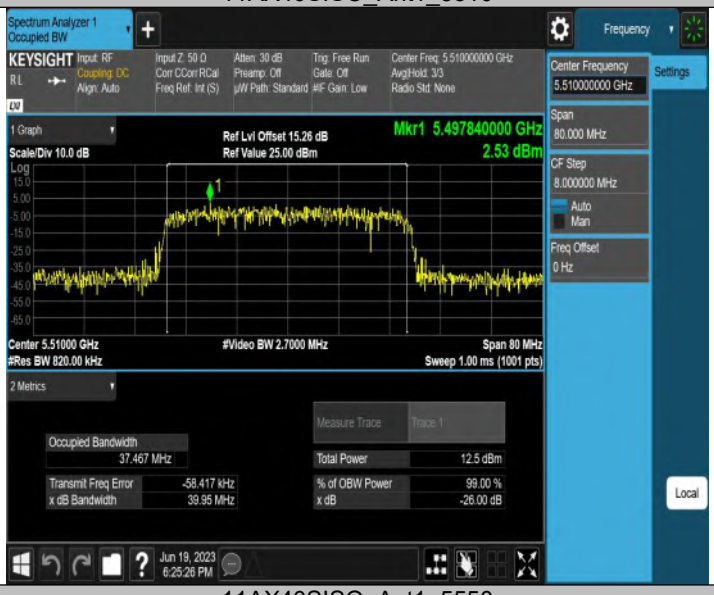

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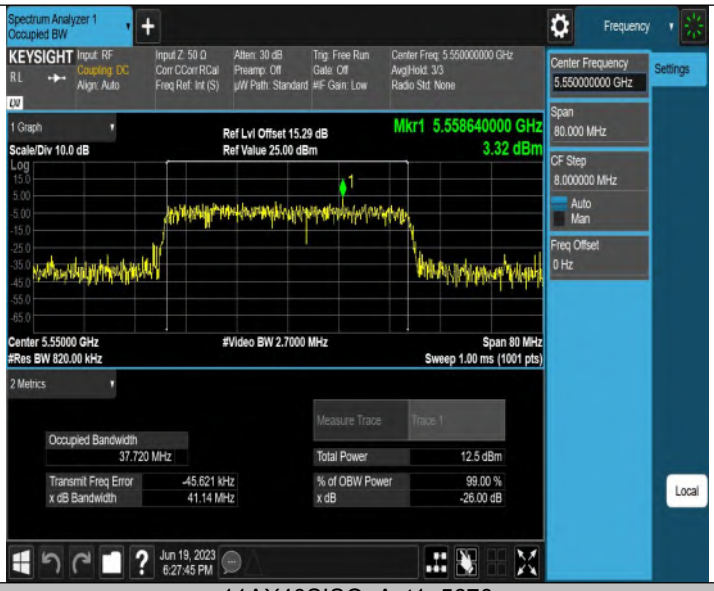
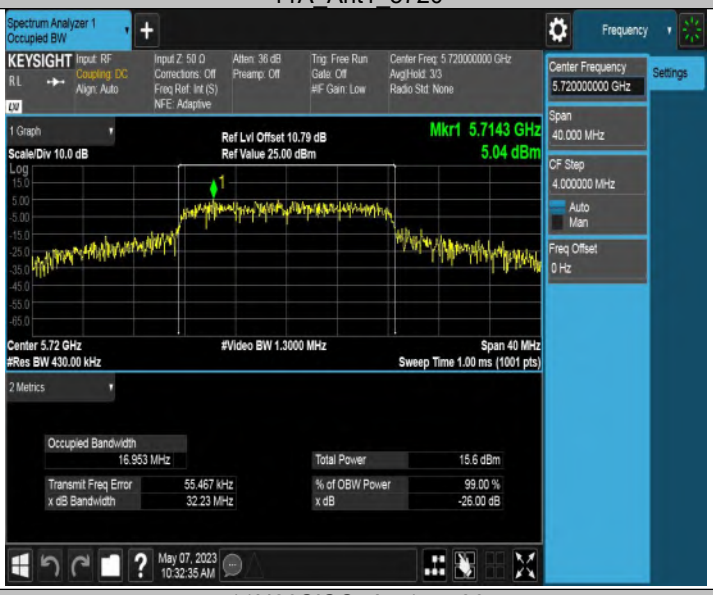


11AX40SISO_Ant1_5670

For U-NII-2C straddle channel:

11A_Ant1_5720



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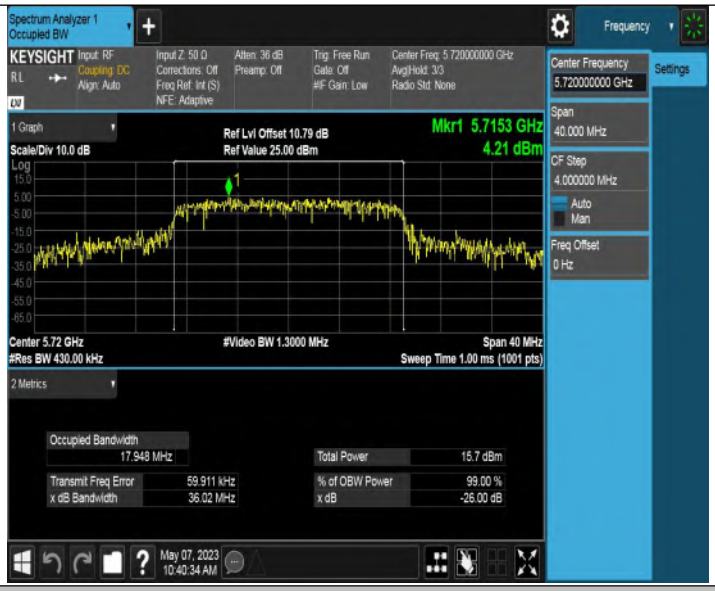

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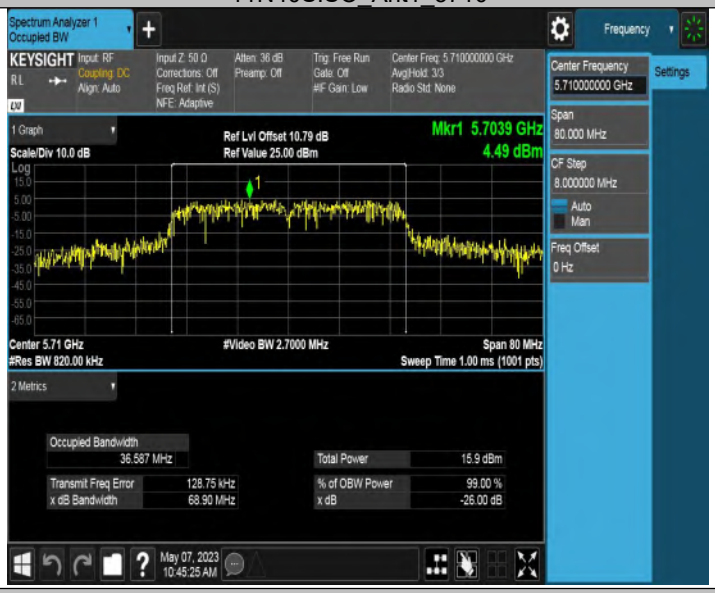

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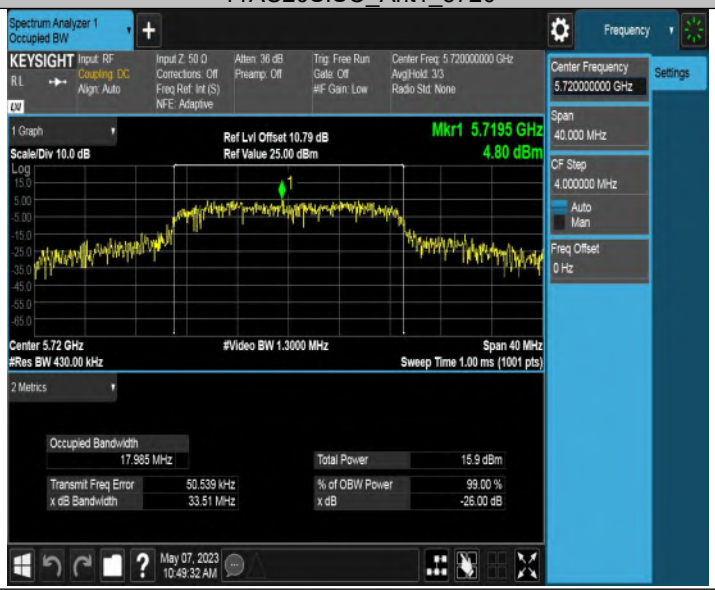

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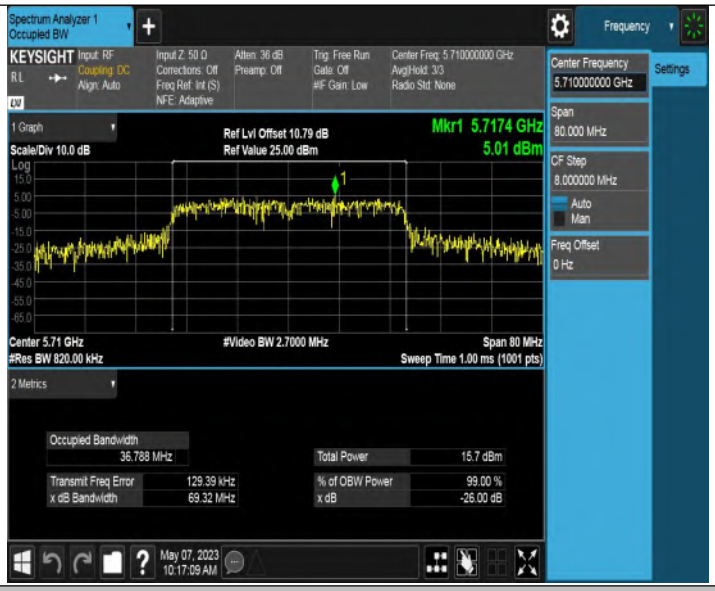

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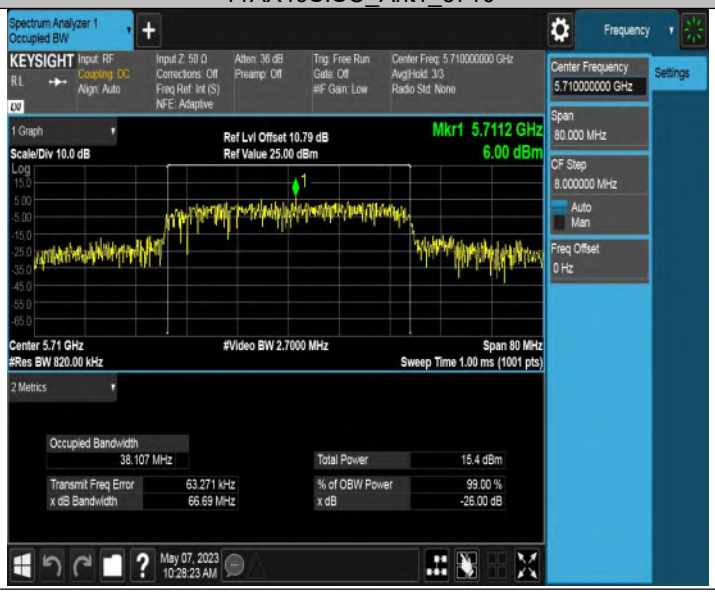

26dB Bandwidth:

11A_Ant1_5260

11A_Ant1_5280

11A_Ant1_5320

11A_Ant1_5500

11A_Ant1_5580

11A_Ant1_5700

11N20SISO_Ant1_5260

11N20SISO_Ant1_5280

11N20SISO_Ant1_5320

11N20SISO_Ant1_5500

11N20SISO_Ant1_5580

11N20SISO_Ant1_5700

11N40SISO_Ant1_5270

11N40SISO_Ant1_5310

11N40SISO_Ant1_5510

11N40SISO_Ant1_5550

11N40SISO_Ant1_5670

11N40SISO_Ant1_5755

11N40SISO_Ant1_5795