
FCC Test Report

Report No.: AGC05877241202FR03

FCC ID : 2APA9-CMSXJ111A
APPLICATION PURPOSE : Original Equipment
PRODUCT DESIGNATION : IMILAB C30 Dual
BRAND NAME : imilab, 
MODEL NAME : CMSXJ111A
APPLICANT : Shanghai Imilab Technology Co., Ltd.
DATE OF ISSUE : Feb. 12, 2025
STANDARD(S) : FCC Part 15 Subpart E §15.407
REPORT VERSION : V1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd



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Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Feb. 12, 2025	Valid	Initial Release

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1. General Information

Applicant	Shanghai Imilab Technology Co., Ltd.
Address	Room 001A, Floor 11, Block 1, No. 588 Zixing Road, Minhang District, Shanghai, China
Manufacturer	Shanghai Imilab Technology Co., Ltd.
Address	Room 001A, Floor 11, Block 1, No. 588 Zixing Road, Minhang District, Shanghai, China
Factory	N/A
Address	N/A
Product Designation	IMILAB C30 Dual
Brand Name	imilab, 
Test Model	CMSXJ111A
Series Model(s)	N/A
Difference Description	N/A
Date of receipt of test item	Dec. 11, 2024
Date of Test	Dec. 11, 2024 ~ Feb. 12, 2025
Deviation from Standard	No any deviation from the test method
Condition of Test Sample	Normal
Test Result	Pass
Test Report Form No	AGCER-FCC-5G WLAN-V1

Note: The test results of this report relate only to the tested sample identified in this report.

Prepared By		
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	(Project Engineer)	
Reviewed By		
	Calvin Liu	Feb. 12, 2025
	(Reviewer)	
Approved By		
	Angela Li	Feb. 12, 2025
	(Authorized Officer)	

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2. Product Information

2.1 Product Technical Description

Equipment Type	☐ Outdoor access points ☐ Fixed P2P access points	☐ Indoor access points ☒ Client devices
Operation Frequency	☒ U-NII 1:5150MHz~5250MHz ☒ U-NII 2C:5470MHz~5725MHz	☒ U-NII 2A: 5250MHz~5350MHz ☒ U-NII 3: 5725MHz~5850MHz
DFS Design Type	☐ Master ☐ Slave with radar detection ☒ Slave without radar detection	
TPC Function	☐ Yes ☒ No	
Hardware Version	LSAM124A1-1	
Software Version	5.3.1_0545	
Test Frequency Range	For 802.11a/n-HT20/ac-VHT20/ax-HE20: 5180~5240MHz/5260~5320MHz/5500~5720MHz/5745~5825MHz; For 802.11n-HT40/ac-VHT40/ax-HE40: 5190~5230MHz/5270~5310MHz/5510~5710MHz/5755~5795MHz;	
RF Output Power	802.11a: 14.59dBm ,802.11n(HT20):13.75dBm; 802.11n(HT40):13.70dBm; 802.11ac (VHT20):13.60dBm;802.11ac (VHT40):13.44dBm; 802.11ax (HE20):13.47dBm; 802.11ax (HE40):13.46dBm;	
Modulation	802.11a/n:(64-QAM, 16-QAM, QPSK, BPSK) OFDM 802.11ac :(256-QAM, 64-QAM, 16-QAM, QPSK, BPSK) OFDM 802.11ax :(1024-QAM,256-QAM, 64-QAM, 16-QAM, QPSK, BPSK) OFDMA	
Data Rate	802.11a:6/9/12/18/24/36/48/54Mbps; 802.11n: up to 150Mbps; 802.11ac: up to 200Mbps; 802.11ax: up to 287Mbps	
Number of channels	6 channels of U-NII-1 Band;6 channels of U- NII-2A Band 10 channels of U-NII-2C Band;7 channels of U- NII 3 Band	
Antenna Designation	PIFA Antenna	
Antenna Gain	1.4dBi	
Power Supply	DC 5V by adapter	

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2.2 Table of Carrier Frequency

For 5180~5240MHz:

4 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20):

Channel	Frequency	Channel	Frequency
36	5180 MHz	44	5220 MHz
40	5200 MHz	48	5240 MHz

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40):

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

For 5260~5320MHz:

5 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20) , 802.11ax (HE20):

Channel	Frequency	Channel	Frequency
52	5260 MHz	60	5300 MHz
56	5280 MHz	64	5320 MHz

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40) , 802.11ax (HE40):

Channel	Frequency	Channel	Frequency
54	5270 MHz	62	5310 MHz

For 5500~5700MHz:

11 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20):

Channel	Frequency	Channel	Frequency
100	5500 MHz	124	5620 MHz
104	5520 MHz	128	5640 MHz
108	5540 MHz	132	5660 MHz
112	5560 MHz	136	5680 MHz
116	5580 MHz	140	5700 MHz
120	5600 MHz		

5 channels are provided for 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40):

Channel	Frequency	Channel	Frequency
102	5510 MHz	126	5630 MHz
110	5550 MHz	134	5670 MHz
118	5590 MHz		

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For 5745~5825MHz:

5 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20) , 802.11ax (HE20):

Channel	Frequency	Channel	Frequency
149	5745 MHz	161	5805 MHz
153	5765 MHz	165	5825 MHz
157	5785 MHz	--	--

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40):

Channel	Frequency	Channel	Frequency
151	5755 MHz	159	5795 MHz

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2.3 IEEE 802.11n Modulation Scheme

MCS Index	N _{ss}	Modulation	R	N _{BPSC}	N _{CBPS}		N _{DBPS}		Data rate (Mbps)	
					20MHz	40MHz	20MHz	40MHz	800nsGI	
0	1	BPSK	1/2	1	52	108	26	54	6.5	13.5
1	1	QPSK	1/2	2	104	216	52	108	13.0	27.0
2	1	QPSK	3/4	2	104	216	78	162	19.5	40.5
3	1	16-QAM	1/2	4	208	432	104	216	26.0	54.0
4	1	16-QAM	3/4	4	208	432	156	324	39.0	81.0
5	1	64-QAM	2/3	6	312	648	208	432	52.0	108.0
6	1	64-QAM	3/4	6	312	648	234	489	58.5	121.5
7	1	64-QAM	5/6	6	312	648	260	540	65.0	135.0

Symbol	Explanation
NSS	Number of spatial streams
R	Code rate
NBPSC	Number of coded bits per single carrier
NCBPS	Number of coded bits per symbol
NDBPS	Number of data bits per symbol
GI	Guard interval

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2.4 Related Submittal(S) / Grant (S)

This submittal(s) (test report) is intended for **FCC ID: 2APA9-CMSXJ111A** filing to comply with the FCC Part 15 requirements.

2.5 Test Methodology

No.	Identity	Document Title
1	FCC 47 CFR Part 2	Frequency allocations and radio treaty matters; general rules and regulations
2	FCC 47 CFR Part 15	Radio Frequency Devices
3	ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices
4	KDB 662911	662911 D01 Multiple Transmitter Output v02r01
5	KDB 789033	789033 D02 General U-NII Test Procedures New Rules v02r01

2.6 Special Accessories

Refer to section 4.4.

2.7 Equipment Modifications

Not available for this EUT intended for grant.

2.8 Antenna Requirement

Standard Requirement
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.
EUT Antenna: The non-detachable antenna inside the device cannot be replaced by the user at will. The gain of the antenna is 1.4dBi.

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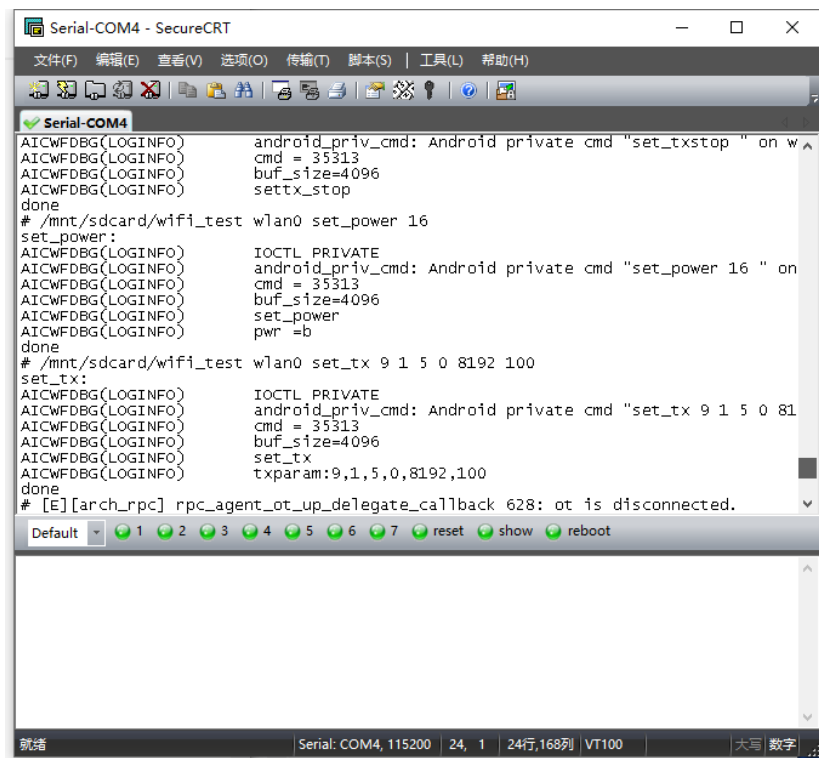
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2.9 Description of Test Software

For IEEE 802.11 mode:

The test utility software used during testing was “SecureCRT”.

Software Setting Diagram



```

Serial-COM4 - SecureCRT
文件(F) 编辑(E) 查看(V) 选项(O) 传输(T) 脚本(S) | 工具(L) 帮助(H)

Serial-COM4
AICWDBG(LOGINFO) android_priv_cmd: Android private cmd "set_txstop " on w
AICWDBG(LOGINFO) cmd = 35313
AICWDBG(LOGINFO) buf_size=4096
AICWDBG(LOGINFO) settx_stop
done
# /mnt/sdcard/wifi_test wlan0 set_power 16
set_power:
AICWDBG(LOGINFO) IOCTL_PRIVATE
AICWDBG(LOGINFO) android_priv_cmd: Android private cmd "set_power 16 " on
AICWDBG(LOGINFO) cmd = 35313
AICWDBG(LOGINFO) buf_size=4096
AICWDBG(LOGINFO) set_power
AICWDBG(LOGINFO) pwr =b
done
# /mnt/sdcard/wifi_test wlan0 set_tx 9 1 5 0 8192 100
set_tx:
AICWDBG(LOGINFO) IOCTL_PRIVATE
AICWDBG(LOGINFO) android_priv_cmd: Android private cmd "set_tx 9 1 5 0 81
AICWDBG(LOGINFO) cmd = 35313
AICWDBG(LOGINFO) buf_size=4096
AICWDBG(LOGINFO) set_tx
AICWDBG(LOGINFO) txparam:9,1,5,0,8192,100
done
# [E][arch_rpc] rpc_agent_ot_up_delegate_callback 628: ot is disconnected.

Default 1 2 3 4 5 6 7 reset show reboot
  
```

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Test Band	Test Mode	Channel	Power Index
U-NII 1	802.11a	L/M/H	17
	802.11n(HT20)	L/M/H	16
	802.11n(HT40)	L/M/H	16
	802.11ac(VHT20)	L/M/H	16
	802.11ac(VHT40)	L/M/H	16
	802.11ax(HE20)	L/M/H	16
	802.11ax(HE40)	L/M/H	16
U-NII 2A	802.11a	L/M/H	17
	802.11n(HT20)	L/M/H	16
	802.11n(HT40)	L/M/H	16
	802.11ac(VHT20)	L/M/H	16
	802.11ac(VHT40)	L/M/H	16
	802.11ax(HE20)	L/M/H	16
	802.11ax(HE40)	L/M/H	16
U-NII 2C	802.11a	L/M/H	15
	802.11n(HT20)	L/M/H	14
	802.11n(HT40)	L/M/H	14
	802.11ac(VHT20)	L/M/H	14
	802.11ac(VHT40)	L/M/H	14
	802.11ax(HE20)	L/M/H	14
	802.11ax(HE40)	L/M/H	14
U-NII 3	802.11a	L/M/H	19
	802.11n(HT20)	L/M/H	18
	802.11n(HT40)	L/M/H	18
	802.11ac(VHT20)	L/M/H	18
	802.11ac(VHT40)	L/M/H	18
	802.11ax(HE20)	L/M/H	18
	802.11ax(HE40)	L/M/H	18

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3. Test Environment

3.1 Address of The Test Laboratory

Laboratory: Attestation of Global Compliance (Shenzhen) Co., Ltd.

Address: 1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

3.2 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

CNAS-Lab Code: L5488

Attestation of Global Compliance (Shenzhen) Co., Ltd. has been assessed and proved to follow CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories.)

A2LA-Lab Cert. No.: 5054.02

Attestation of Global Compliance (Shenzhen) Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to follow ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

FCC-Registration No.: 975832

Attestation of Global Compliance (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files with Registration 975832.

IC-Registration No.: 24842 (CAB identifier: CN0063)

Attestation of Global Compliance (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the Certification and Engineering Bureau of Industry Canada. The acceptance letter from the IC is maintained in our files with Registration 24842.

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3.3 Environmental Conditions

	Normal Conditions
Temperature range (°C)	15 - 35
Relative humidity range	20% - 75%
Pressure range (kPa)	86 - 106
Power supply	DC 5V

3.4 Measurement Uncertainty

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95%.

Item	Measurement Uncertainty
Uncertainty of Conducted Emission for AC Port	$U_c = \pm 2.9 \text{ dB}$
Uncertainty of Radiated Emission below 1GHz	$U_c = \pm 3.9 \text{ dB}$
Uncertainty of Radiated Emission above 1GHz	$U_c = \pm 4.9 \text{ dB}$
Uncertainty of total RF power, conducted	$U_c = \pm 0.8 \text{ dB}$
Uncertainty of RF power density, conducted	$U_c = \pm 2.6 \text{ dB}$
Uncertainty of spurious emissions, conducted	$U_c = \pm 2 \%$
Uncertainty of Occupied Channel Bandwidth	$U_c = \pm 2.7 \%$

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3.5 List of Equipment Used

● RF Conducted Test System							
Used	Equipment No.	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
☒	AGC-ER-E036	Spectrum Analyzer	Agilent	N9020A	MY49100060	2024-05-24	2025-05-23
☒	AGC-ER-E062	Power Sensor	Agilent	U2021XA	MY54110007	2024-02-01	2025-01-31
☒	AGC-ER-E062	Power Sensor	Agilent	U2021XA	MY54110007	2025-01-14	2026-01-13
☒	AGC-ER-E063	Power Sensor	Agilent	U2021XA	MY54110009	2024-02-01	2025-01-31
☒	AGC-ER-E063	Power Sensor	Agilent	U2021XA	MY54110009	2025-01-14	2026-01-13
☒	AGC-ER-A001	6dB Attenuator	Eeatsheep	LM-XX-6-5W	N/A	2023-09-21	2025-09-20
☒	AGC-ER-E083	Signal Generator	Agilent	E4421B	US39340815	2024-05-24	2025-05-23
☒	N/A	RF Connection Cable	N/A	1#	N/A	Each time	N/A
☒	N/A	RF Connection Cable	N/A	2#	N/A	Each time	N/A

● Radiated Spurious Emission							
Used	Equipment No.	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
☒	AGC-EM-E046	EMI Test Receiver	R&S	ESCI	10096	2024-02-01	2025-01-31
☒	AGC-EM-E046	EMI Test Receiver	R&S	ESCI	10096	2025-01-14	2026-01-13
☒	AGC-EM-E116	EMI Test Receiver	R&S	ESCI	100034	2024-05-24	2025-05-23
☒	AGC-EM-E061	Spectrum Analyzer	Agilent	N9010A	MY53470504	2024-05-28	2025-05-27
☒	AGC-EM-E086	Loop Antenna	ZHINAN	ZN30900C	18051	2024-03-05	2026-03-04
☒	AGC-EM-E001	Wideband Antenna	SCHWARZBECK	VULB9168	D69250	2023-05-11	2025-05-10
☒	AGC-EM-E029	Broadband Ridged Horn Antenna	ETS	3117	00034609	2024-03-31	2025-03-30
☒	AGC-EM-E082	Horn Antenna	SCHWARZBECK	BBHA 9170	#768	2023-09-24	2025-09-23
☒	AGC-EM-E146	Pre-amplifier	ETS	3117-PA	00246148	2024-07-24	2026-07-23
☒	AGC-EM-A119	2.4G Filter	SongYi	N/A	N/A	2024-05-23	2025-05-22
☒	AGC-EM-A138	6dB Attenuator	Eeatsheep	LM-XX-6-5W	N/A	2023-06-09	2025-06-08
☐	AGC-EM-A139	6dB Attenuator	Eeatsheep	LM-XX-6-5W	N/A	2023-06-09	2025-06-08

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● AC Power Line Conducted Emission							
Used	Equipment No.	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
☒	AGC-EM-E045	EMI Test Receiver	R&S	ESPI	101206	2024-05-28	2025-05-27
☒	AGC-EM-A130	6dB Attenuator	Eeatsheep	LM-XX-6-5W	DC-6GZ	2023-06-09	2025-06-08
☒	AGC-EM-E023	AMN	R&S	100086	ESH2-Z5	2024-05-28	2025-05-27

● Test Software					
Used	Equipment No.	Test Equipment	Manufacturer	Model No.	Version Information
☒	AGC-EM-S001	CE Test System	R&S	ES-K1	V1.71
☒	AGC-EM-S003	RE Test System	FARA	EZ-EMC	VRA-03A
☐	AGC-EM-S004	RE Test System	Tonscend	TS ⁺ Ver2.1(JS32-RE)	4.0.0.0
☒	AGC-ER-S012	BT/WIFI Test System	Tonscend	JS1120-2	2.6
☒	AGC-EM-S011	RSE Test System	Tonscend	TS+-Ver2.1(JS36-RSE)	4.0.0.0

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4. System Test Configuration

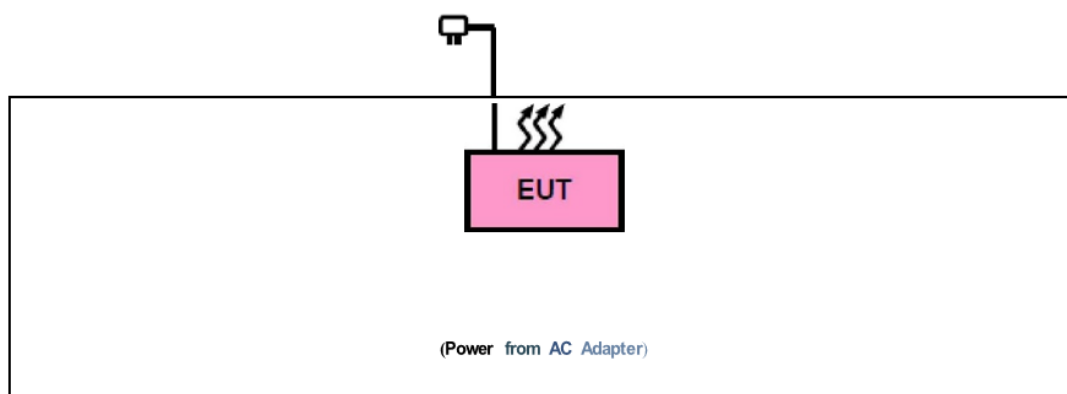
4.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commission's requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

4.2 EUT Exercise

The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

4.3 Configuration of Tested System



4.4 Equipment Used in Tested System

The following peripheral devices and interface cables were connected during the measurement:

☒ Test Accessories Come From The Laboratory

No.	Equipment	Manufacturer	Model No.	Specification Information	Cable
1	Control Box	--	USB-TTL	--	--
2	--	--	--	--	--

☒ Test Accessories Come From The Manufacturer

No.	Equipment	Manufacturer	Model No.	Specification Information	Cable
1	Adapter	JiangxiJian Aohai Technology Co., Ltd.	A319-050200U-US2	Input:100-240V~ 50/60Hz, Output: 5V = 2000mA	2.0m Unshielded
2	--	--	--	--	--

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4.5 Summary of Test Results

Item	FCC Rules	Description of Test	Result
1	§15.203	Antenna Equipment	Pass
2	§15.407(a/1/3)	RF Output Power	Pass
3	§15.407(e)	6 dB Bandwidth	Pass
4	§15.403(i)	99% Occupied Bandwidth	Pass
5	§15.407(a/1/3)	Power Spectral Density	Pass
6	§15.407(g)	Frequency Stability	Pass (See Note 1)
7	§15.407(c)	Transmission Discontinuation Requirement	Pass (See Note 2)
8	§15.407(b)(1/4)	Conducted Band Edge and Out-of-Band Emissions	Pass
9	§15.209, §15.407(b)(1/4)	Radiated Spurious Emission	Pass
10	§15.207	AC Power Line Conducted Emission	Pass

Note:

1. Refer to the manufacturer's declaration in the user manual.
2. The device operates without the transmission of information.

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5. Description of Test Modes

EUT Configure Mode	Applicable To				Description
	RE > 1G	RE < 1G	PLC	APCM	
A	☒	☒	☒	☒	Powered by Adapter with WIFI(5G) Link
B	--	--	--	--	Powered by Battery with WIFI(5G) Link
C	--	--	--	--	Powered by USB with WIFI(5G) Link

Where, **RE > 1G: Radiated Emission above 1GHz** **PLC: Power Line Conducted Emission**
RE < 1G: Radiated Emission below 1GHz **APCM: Antenna Port Conducted Measurement**

NOTE 1: The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on X-plane.

NOTE 2: "--" means no effect.

● Radiated Emission Test (Above 1GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations be Meen available modulations, data rates and antenna ports (IF EUT with antenna diversity architecture).
- ☒ Support 802.11ax, device debugging is tested in Full RU state
- ☐ The device under test has multiple antennas. The mode that supports MIMO technology records the worst data, and the mode that does not support MIMO technology records antenna 1 as the worst data.
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Mode	Freq. Band (MHz)	Available Channel	Tested Channel	Modulation	Data Rate (Mbps)
A	802.11n (20MHz)	5180-5240	36 to 48	36, 40, 48	OFDM	6.0
A	802.11n (20MHz)	5260-5320	52 to 64	52, 60, 64	OFDM	6.0
A	802.11n (20MHz)	5500-5700	100 to 140	100, 116, 140	OFDM	6.0
A	802.11n (20MHz)	5745-5825	149 to 165	149, 157, 165	OFDM	6.0

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● **Radiated Emission Test (Below 1GHz):**

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations be Meen available modulations, data rates and antenna ports (If EUT with antenna diversity architecture).
- ☐ The device under test has multiple antennas. The mode that supports MIMO technology records the worst data, and the mode that does not support MIMO technology records antenna 1 as the worst data.
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Mode	Freq. Band (MHz)	Available Channel	Tested Channel	Modulation	Data Rate (Mbps)
A	802.11n(20MHz)	5180-5240	36 to 48	36	OFDM	MCS0

● **Power Line Conducted Emission Test:**

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations be Meen available modulations, data rates and antenna ports (If EUT with antenna diversity architecture).
- ☐ The device under test has multiple antennas. The mode that supports MIMO technology records the worst data, and the mode that does not support MIMO technology records antenna 1 as the worst data.
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Mode	Freq. Band (MHz)	Available Channel	Tested Channel	Modulation	Data Rate (Mbps)
A	802.11n(20MHz)	5180-5240	36 to 48	36	OFDM	MCS0

● **Band edge Measurement:**

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations be Meen available modulations, data rates and antenna ports (If EUT with antenna diversity architecture).
- ☒ Support 802.11ax, device debugging is tested in Full RU state
- ☒ The device under test has multiple antennas. The mode that supports MIMO technology records the worst data, and the mode that does not support MIMO technology records antenna 1 as the worst data.
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Mode	Freq. Band (MHz)	Available Channel	Tested Channel	Modulation	Data Rate (Mbps)
A	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	6.0
A	802.11n (40MHz)		38 to 46	38, 46	OFDM	MCS0
A	802.11a	5260-5320	52 to 64	52, 60, 64	OFDM	6.0
A	802.11n (40MHz)		54 to 62	54, 62	OFDM	MCS0
A	802.11a	5500-5700	100 to 140	100, 116, 140	OFDM	6.0
A	802.11n (40MHz)		102 to 134	102, 110, 134	OFDM	MCS0
A	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	6.0
A	802.11n (40MHz)		151 to 159	151, 159	OFDM	MCS0

● **Antenna Port Conducted Measurement:**

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations be Meen available modulations, data rates and antenna ports (If EUT with antenna diversity architecture).
- ☒ Support 802.11ax, device debugging is tested in Full RU state
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Mode	Freq. Band (MHz)	Available Channel	Tested Channel	Modulation	Data Rate (Mbps)
B	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	6.0

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B	802.11n (40MHz)		38 to 46	38, 46	OFDM	MCS0
B	802.11a	5260-5320	52 to 64	52, 60, 64	OFDM	6.0
B	802.11n (40MHz)		54 to 62	54, 62	OFDM	MCS0
B	802.11a	5500-5700	100 to 140	100, 116, 140	OFDM	6.0
B	802.11n (40MHz)		102 to 134	102, 110, 134	OFDM	MCS0
B	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	6.0
B	802.11n (40MHz)		151 to 159	151, 159	OFDM	MCS0

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6. Duty Cycle Measurement

5GHz WLAN (NII) operation is possible in 20MHz, 40MHz and 80MHz channel bandwidths. The maximum achievable duty cycles for all modes were determined based on measurements performed on a spectrum analyzer in zero-span mode with RBW = 8MHz, VBW = 50MHz, and detector = Average. The RBW and VBW were both greater than $50/T$, where T is the minimum transmission duration, and the number of sweep points across T was greater than 100. The duty cycles are as follows:

Operating mode	Data rates (Mbps)	Duty Cycle (%)	Duty Cycle Factor (dB)
Band U-NII1:5150MHz-5250MHz			
802.11a	6	92.33	0.35
802.11n_HT20	MCS0	96.6	0.15
802.11n_HT40	MCS0	96.8	0.14
802.11ac_VHT20	MCS0	97.55	0.11
802.11ac_VHT40	MCS0	97.34	0.12
802.11ax_HE20	MCS0	96.41	0.16
802.11ax_HE40	MCS0	94.34	0.25
Band U-NII 2A:5250MHz-5350MHz			
802.11a	6	89.37	0.49
802.11n_HT20	MCS0	97.68	0.1
802.11n_HT40	MCS0	97.05	0.13
802.11ac_VHT20	MCS0	97.72	0.1
802.11ac_VHT40	MCS0	97.73	0.1
802.11ax_HE20	MCS0	96.25	0.17
802.11ax_HE40	MCS0	97.04	-8.99

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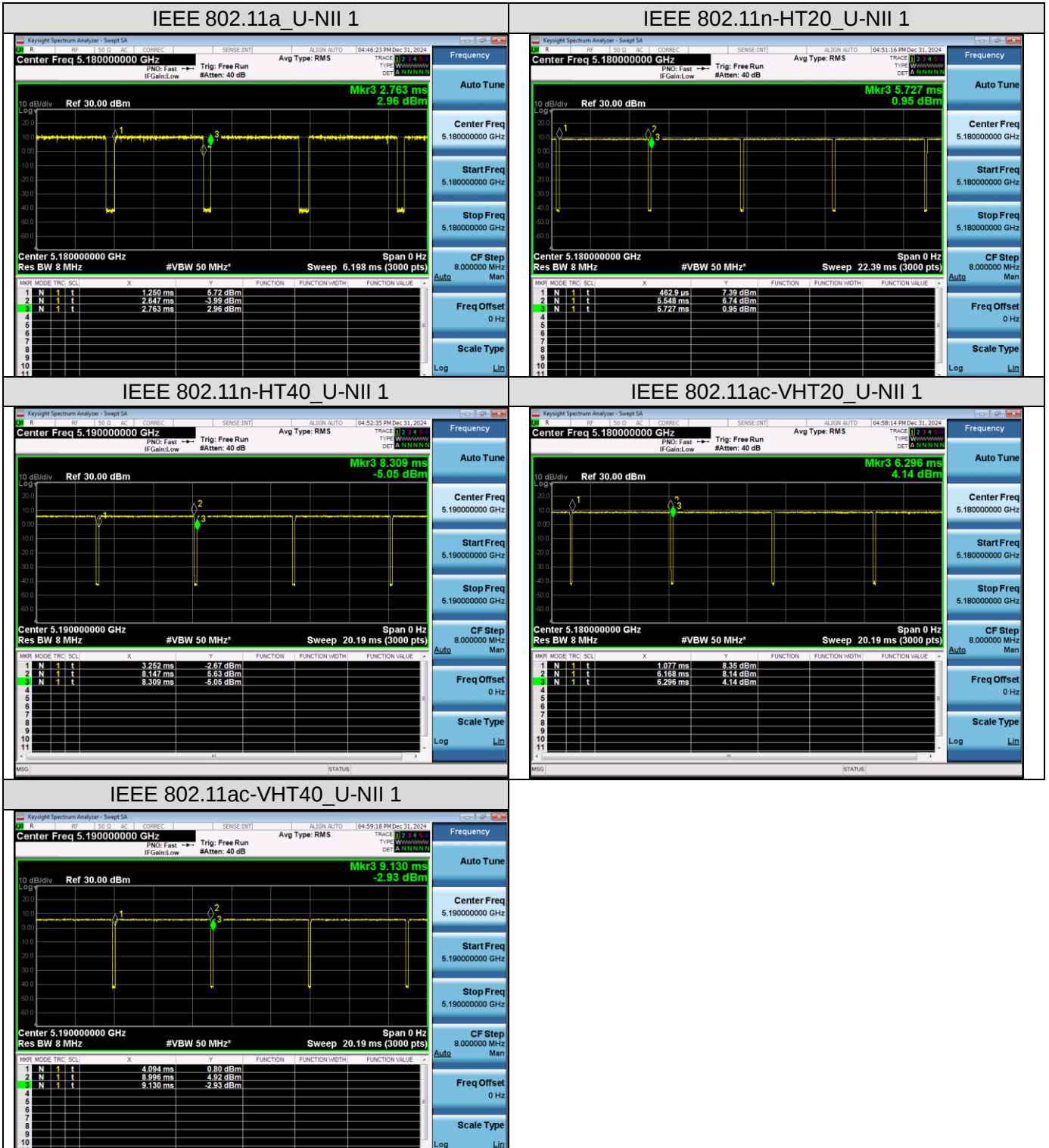
Operating mode	Data rates (Mbps)	Duty Cycle (%)	Duty Cycle Factor (dB)
Band U-NII 2C: 5470MHz~5725MHz			
802.11a	6	92.27	0.35
802.11n_HT20	MCS0	97.55	0.11
802.11n_HT40	MCS0	97.7	0.1
802.11ac_VHT20	MCS0	97.81	0.1
802.11ac_VHT40	MCS0	97.59	0.11
802.11ax_HE20	MCS0	97.05	0.13
802.11ax_HE40	MCS0	97.04	0.13
Band U-NII 3: 5725MHz~5850MHz			
802.11a	6	92.26	0.35
802.11n_HT20	MCS0	97.68	0.1
802.11n_HT40	MCS0	97.7	0.1
802.11ac_VHT20	MCS0	97.31	0.12
802.11ac_VHT40	MCS0	96.8	0.14
802.11ax_HE20	MCS0	97.04	0.13
802.11ax_HE40	MCS0	96.36	0.16

Remark:

1. Duty Cycle factor = $10 * \log (1/ \text{Duty cycle})$
2. The duty cycle of each frequency band mode reflects the determination requirements of the low channel measurement value.
3. Involving the test items of duty cycle compensation coefficient, the final results have been added and calculated by the software and presented.

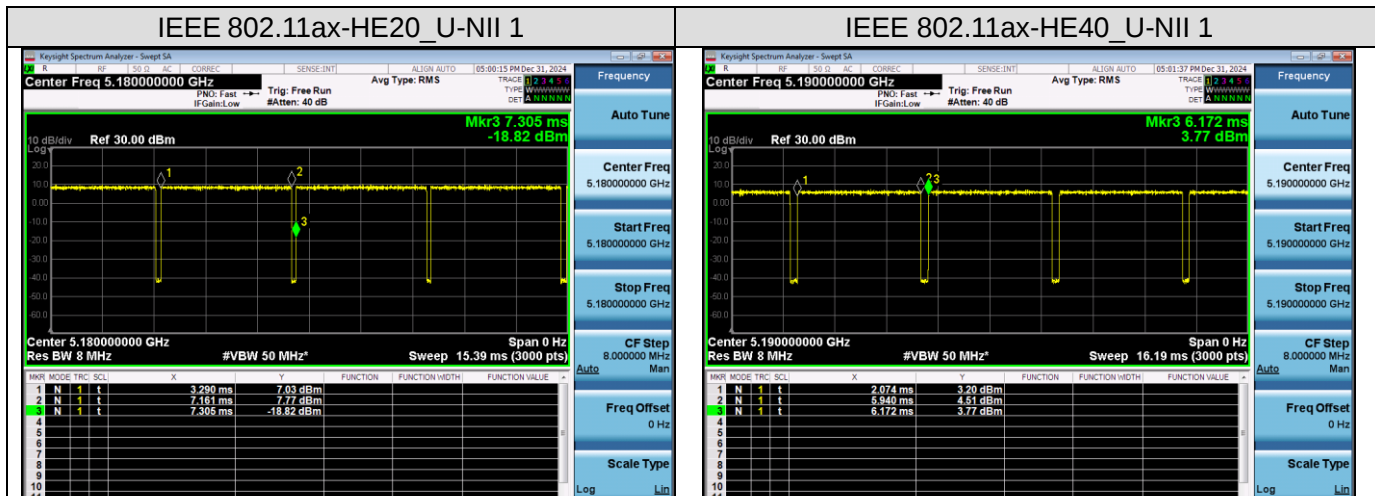
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The test plots as follows:



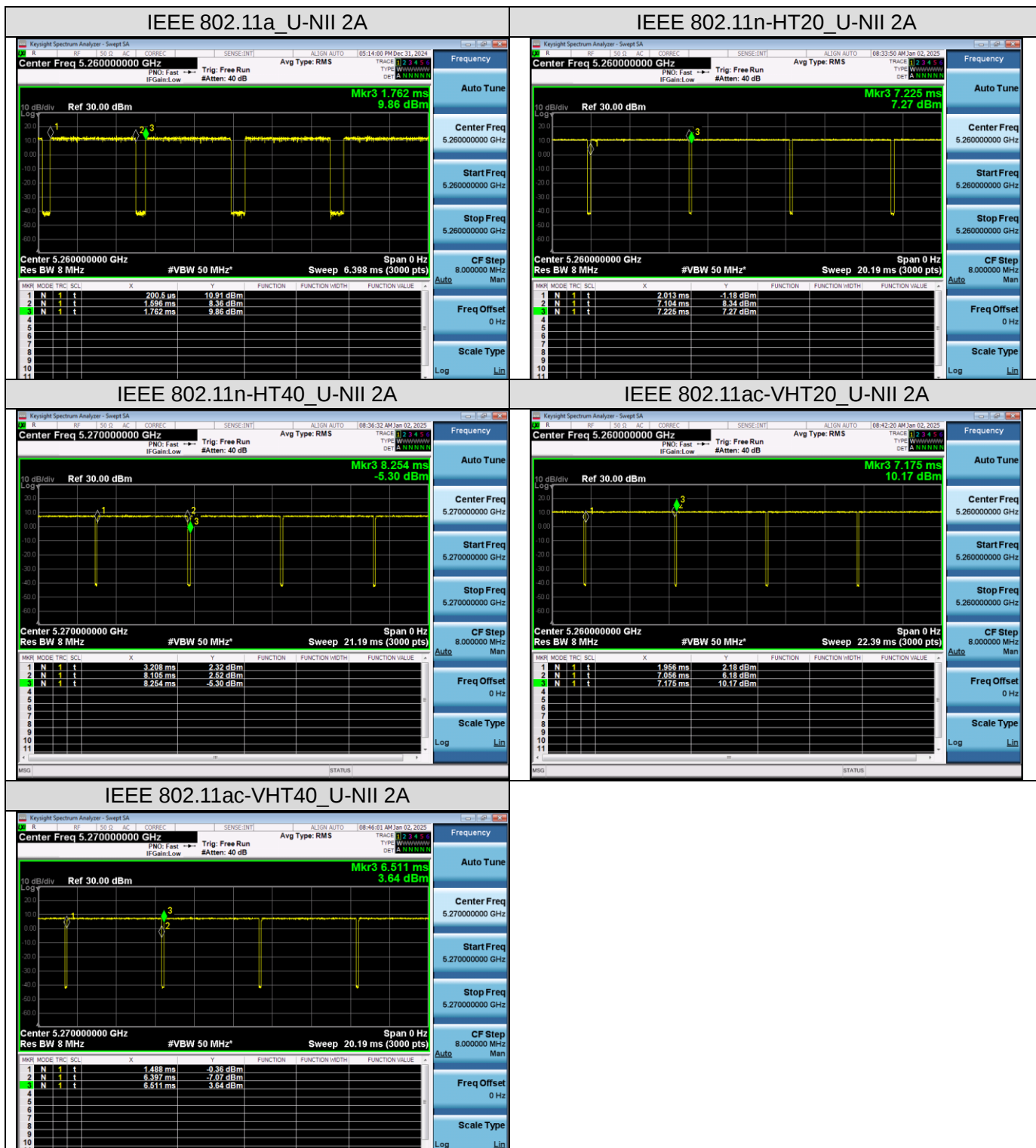
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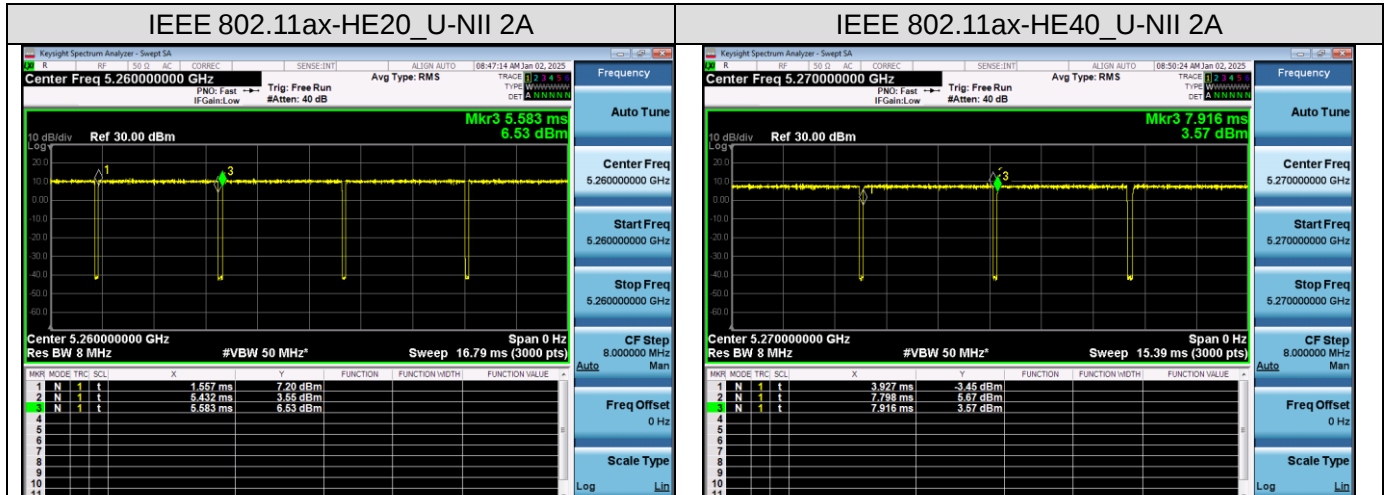
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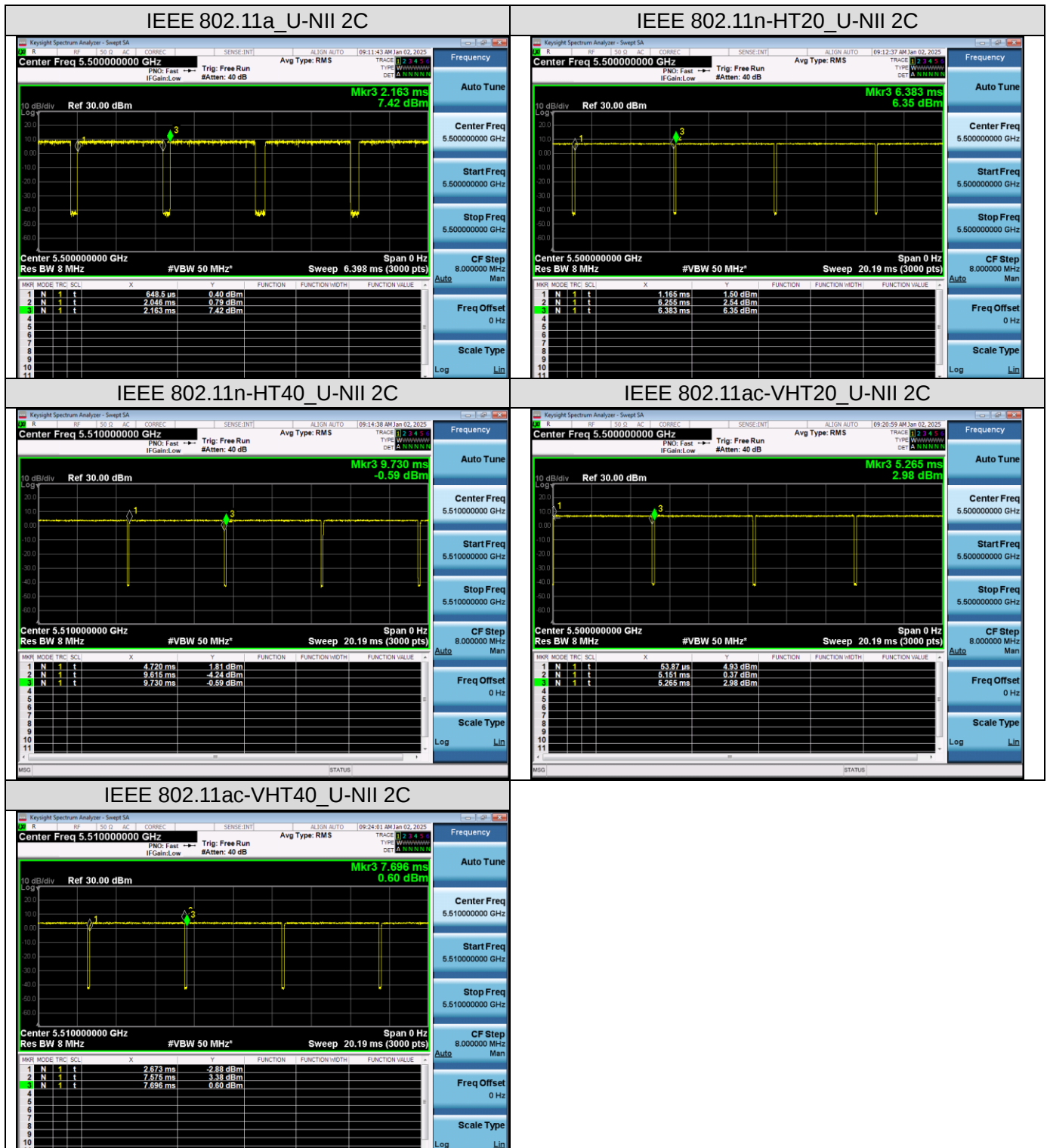
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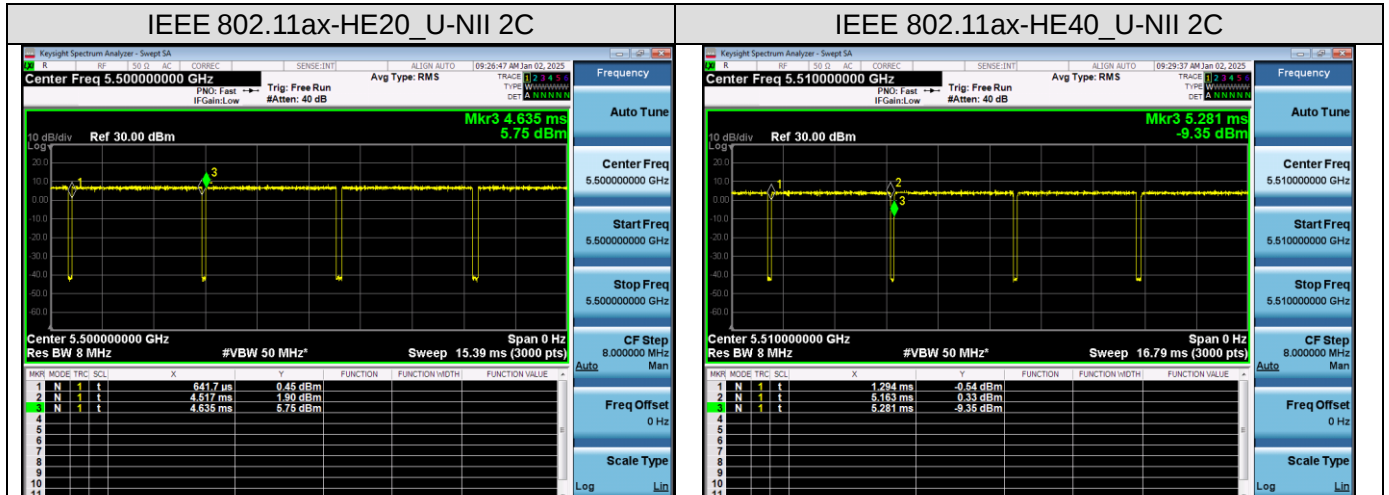


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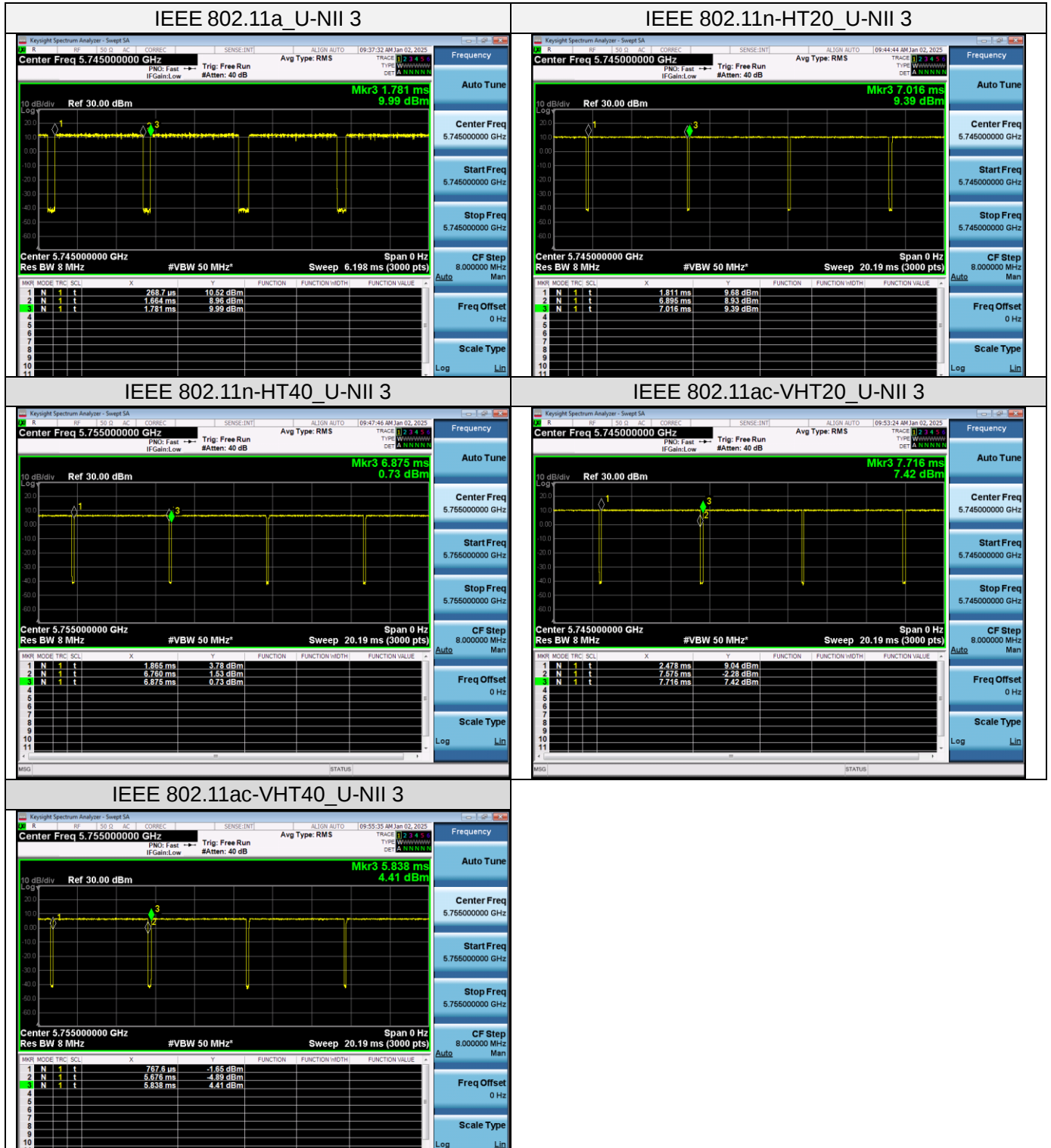


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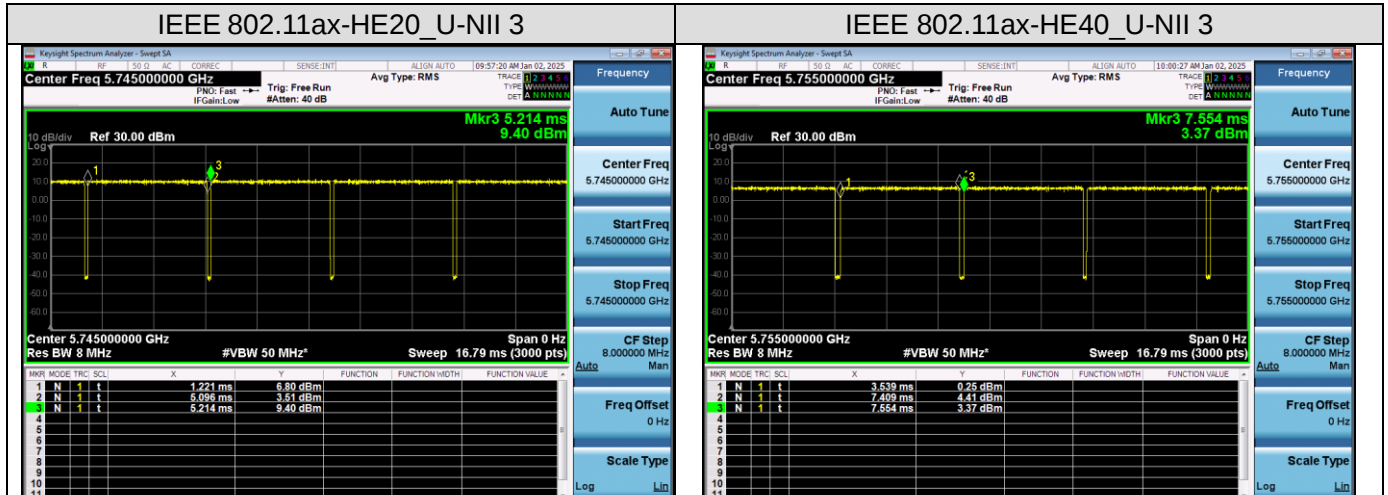


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7. RF Output Power Measurement

7.1 Provisions Applicable

Operation Band	EUT Category		LIMIT
U-NII-1	☐	Outdoor Access Point	1 Watt (30 dBm) (Max. e.i.r.p < 125mW(21 dBm) at any elevation angle above 30 degrees as measured from the horizon)
	☐	Fixed point-to-point Access Point	1 Watt (30 dBm)
	☐	Indoor Access Point	1 Watt (30 dBm)
	☒	Client devices	250mW (23.98 dBm)
U-NII-2A	/		250mW (23.98 dBm) or 11 dBm+10 log B*
U-NII-2C	/		250mW (23.98 dBm) or 11 dBm+10 log B*
U-NII-3	/		1 Watt (30 dBm)

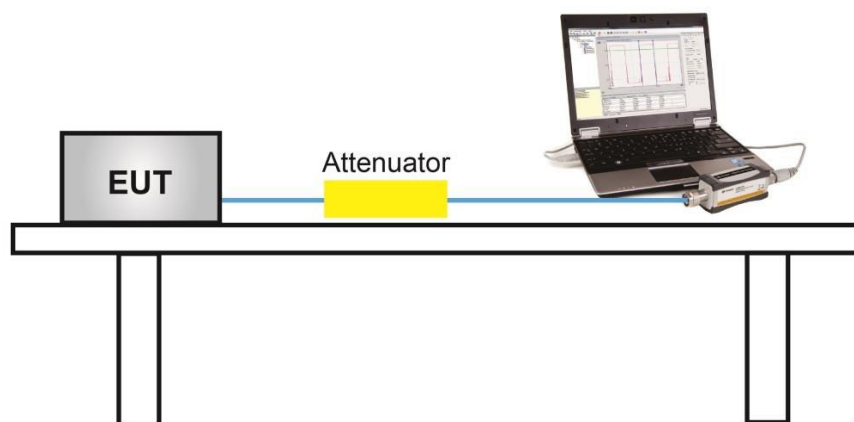
Note: Where B is the 26dB emission bandwidth in MHz.

7.2 Measurement Procedure

☒ Method PM is Measurement using an RF average power meter. The procedure for this method is as follows:

1. The testing follows the ANSI C63.10 Section 12.3.3.1
2. Measurements may be performed using a wideband RF power meter with a thermocouple detector or equivalent if all of the following conditions are satisfied:
3. The EUT is configured to transmit continuously, or to transmit with a constant duty cycle.
4. At all times when the EUT is transmitting, it shall be transmitting at its maximum power control level.
5. The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five.
6. Determine according to the duty cycle of the equipment: when it is less than 98%, follow the steps below.
7. Measure the average power of the transmitter. This measurement is an average over both the ON and OFF periods of the transmitter.
8. Adjust the measurement in dBm by adding $[10 \log (1 / D)]$, where D is the duty cycle {e.g., $[10 \log (1 / 0.25)]$, if the duty cycle is 25%}.
9. The final test results have been increased by the duty cycle factor and recorded in the report.

7.3 Measurement Setup (Block Diagram of Configuration)



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7.4 Measurement Result

Test Data of Conducted Output Power for band 5.15-5.25 GHz				
Test Mode	Test Channel (MHz)	Average Power (dBm)	Limits (dBm)	Pass or Fail
802.11a	5180	12.49	23.98	Pass
	5200	13.63	23.98	Pass
	5240	14.59	23.98	Pass
802.11n20	5180	11.77	23.98	Pass
	5200	12.53	23.98	Pass
	5240	13.52	23.98	Pass
802.11n40	5190	12.18	23.98	Pass
	5230	13.28	23.98	Pass
802.11ac20	5180	11.60	23.98	Pass
	5200	12.47	23.98	Pass
	5240	13.39	23.98	Pass
802.11ac40	5190	12.12	23.98	Pass
	5230	13.27	23.98	Pass
802.11ax20	5180	11.63	23.98	Pass
	5200	12.34	23.98	Pass
	5240	13.46	23.98	Pass
802.11ax40	5190	12.04	23.98	Pass
	5230	13.23	23.98	Pass

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Test Data of Conducted Output Power for band 5.25-5.35 GHz				
Test Mode	Test Channel (MHz)	Average Power (dBm)	Limits (dBm)	Pass or Fail
802.11a	5260	14.25	23.98	Pass
	5300	14.50	23.98	Pass
	5320	13.46	23.98	Pass
802.11n20	5260	13.57	23.98	Pass
	5300	13.75	23.98	Pass
	5320	13.50	23.98	Pass
802.11n40	5270	13.70	23.98	Pass
	5310	13.51	23.98	Pass
802.11ac20	5260	13.35	23.98	Pass
	5300	13.53	23.98	Pass
	5320	13.25	23.98	Pass
802.11ac40	5270	13.44	23.98	Pass
	5310	13.44	23.98	Pass
802.11ax20	5260	13.33	23.98	Pass
	5300	13.47	23.98	Pass
	5320	13.15	23.98	Pass
802.11ax40	5270	13.46	23.98	Pass
	5310	13.41	23.98	Pass

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Test Data of Conducted Output Power for band 5.470-5.725 GHz				
Test Mode	Test Channel (MHz)	Average Power (dBm)	Limits (dBm)	Pass or Fail
802.11a	5500	11.58	23.98	Pass
	5580	13.07	23.98	Pass
	5700	12.38	23.98	Pass
802.11n20	5500	10.58	23.98	Pass
	5580	12.16	23.98	Pass
	5700	11.38	23.98	Pass
802.11n40	5510	10.99	23.98	Pass
	5590	12.79	23.98	Pass
	5670	12.21	23.98	Pass
802.11ac20	5500	10.50	23.98	Pass
	5580	12.19	23.98	Pass
	5700	11.43	23.98	Pass
802.11ac40	5510	11.03	23.98	Pass
	5590	12.55	23.98	Pass
	5670	12.21	23.98	Pass
802.11ax20	5500	10.63	23.98	Pass
	5580	12.09	23.98	Pass
	5700	11.40	23.98	Pass
802.11ax40	5510	11.04	23.98	Pass
	5590	12.70	23.98	Pass
	5670	12.19	23.98	Pass

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Test Data of Conducted Output Power for band 5.725-5.850 GHz				
Test Mode	Test Channel (MHz)	Average Power (dBm)	Limits (dBm)	Pass or Fail
802.11a	5745	14.52	30	Pass
	5785	13.20	30	Pass
	5825	11.80	30	Pass
802.11n20	5745	13.55	30	Pass
	5785	12.13	30	Pass
	5825	10.94	30	Pass
802.11n40	5755	13.36	30	Pass
	5795	11.88	30	Pass
802.11ac20	5745	13.60	30	Pass
	5785	12.14	30	Pass
	5825	10.98	30	Pass
802.11ac40	5755	13.36	30	Pass
	5795	11.84	30	Pass
802.11ax20	5745	13.33	30	Pass
	5785	12.15	30	Pass
	5825	10.92	30	Pass
802.11ax40	5755	13.36	30	Pass
	5795	11.91	30	Pass

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8. 6dB&26dB Bandwidth Measurement

8.1 Provisions Applicable

The minimum 6dB bandwidth shall be at least 500 kHz.

8.2 Measurement Procedure

◆ -6dB bandwidth (DTS bandwidth) Test setting:

1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
2. Set the EUT Work on operation frequency individually.
3. Set RBW = 100kHz.
4. Set the VBW $\geq 3 \times$ RBW. Detector = Peak. Trace mode = max hold.
5. Measure the maximum width of the emission that is 6 dB down from the peak of the emission.

◆ 99% occupied bandwidth test setting:

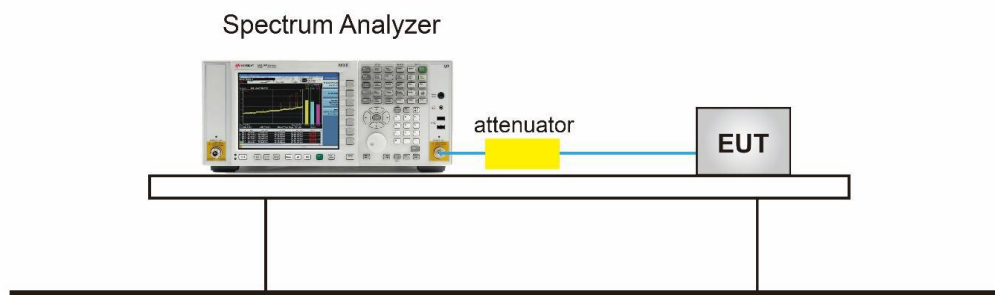
1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
2. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
3. Set Span = approximately 1.5 to 5 times the OBW, centered on a nominal channel
The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW and video bandwidth (VBW) shall be approximately three times RBW; Sweep = auto; Detector function = peak
4. Set SPA Trace 1 Max hold, then View.

◆ -26dB Bandwidth test setting:

1. Set RBW = approximately 1% of the emission bandwidth.
2. Set the VBW > RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Measure the maximum width of the emission that is 26 dB down from the maximum of the emission.
Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

Note: The EUT was tested according to KDB 789033 for compliance to FCC 47CFR 15.407 requirements.

8.3 Measurement Setup (Block Diagram of Configuration)



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8.4 Measurement Results

Test Data of Occupied Bandwidth and -26dB Bandwidth for band 5.15-5.25 GHz-ANT 1					
Test Mode	Test Channel (MHz)	99% Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Limits (MHz)	Pass or Fail
802.11a	5180	16.696	23.828	N/A	Pass
	5200	16.621	23.253	N/A	Pass
	5240	16.641	23.712	N/A	Pass
802.11n20	5180	17.911	24.451	N/A	Pass
	5200	17.841	23.831	N/A	Pass
	5240	17.799	24.665	N/A	Pass
802.11n40	5190	36.371	43.491	N/A	Pass
	5230	36.296	44.442	N/A	Pass
802.11ac20	5180	17.833	24.315	N/A	Pass
	5200	17.832	24.609	N/A	Pass
	5240	17.838	23.912	N/A	Pass
802.11ac40	5190	36.353	45.590	N/A	Pass
	5230	36.303	44.853	N/A	Pass
802.11ax20	5180	19.032	22.805	N/A	Pass
	5200	19.009	24.740	N/A	Pass
	5240	19.097	25.327	N/A	Pass
802.11ax40	5190	37.846	45.128	N/A	Pass
	5230	37.950	44.679	N/A	Pass

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Test Data of Occupied Bandwidth and -26dB Bandwidth for band 5.25-5.35 GHz-ANT 1					
Test Mode	Test Channel (MHz)	99% Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Limits (MHz)	Pass or Fail
802.11a	5260	16.641	23.283	N/A	Pass
	5300	16.662	23.506	N/A	Pass
	5320	16.627	22.664	N/A	Pass
802.11n20	5260	17.844	24.870	N/A	Pass
	5300	17.894	25.249	N/A	Pass
	5320	17.894	24.534	N/A	Pass
802.11n40	5270	36.399	45.324	N/A	Pass
	5310	36.435	45.517	N/A	Pass
802.11ac20	5260	17.934	25.014	N/A	Pass
	5300	17.905	24.462	N/A	Pass
	5320	17.941	25.245	N/A	Pass
802.11ac40	5270	36.313	43.481	N/A	Pass
	5310	36.394	44.958	N/A	Pass
802.11ax20	5260	19.089	24.544	N/A	Pass
	5300	19.101	24.565	N/A	Pass
	5320	19.135	24.922	N/A	Pass
802.11ax40	5270	37.922	46.268	N/A	Pass
	5310	37.898	44.130	N/A	Pass

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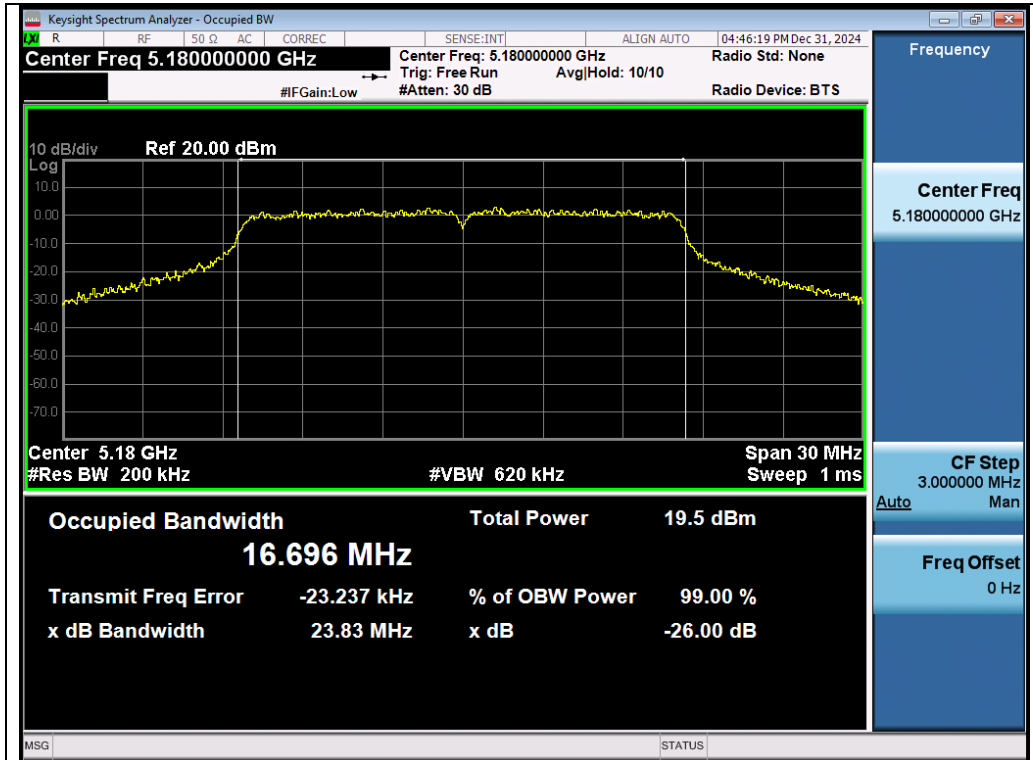
Test Data of Occupied Bandwidth and -26dB Bandwidth for band 5.47-5.725 GHz-ANT 1					
Test Mode	Test Channel (MHz)	99% Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Limits (MHz)	Pass or Fail
802.11a	5500	16.847	25.019	N/A	Pass
	5600	16.811	24.399	N/A	Pass
	5700	16.750	22.982	N/A	Pass
802.11n20	5500	18.063	25.831	N/A	Pass
	5600	17.980	25.482	N/A	Pass
	5700	18.023	25.781	N/A	Pass
802.11n40	5510	36.675	46.563	N/A	Pass
	5590	36.559	45.345	N/A	Pass
	5670	36.579	45.762	N/A	Pass
802.11ac20	5500	18.046	25.970	N/A	Pass
	5600	18.050	26.063	N/A	Pass
	5700	18.044	25.372	N/A	Pass
802.11ac40	5510	36.706	46.788	N/A	Pass
	5590	36.667	46.078	N/A	Pass
	5670	36.624	46.203	N/A	Pass
802.11ax20	5500	19.251	25.732	N/A	Pass
	5600	19.179	24.812	N/A	Pass
	5700	19.227	26.469	N/A	Pass
802.11ax40	5510	38.050	45.505	N/A	Pass
	5590	38.050	46.102	N/A	Pass
	5670	38.032	44.492	N/A	Pass

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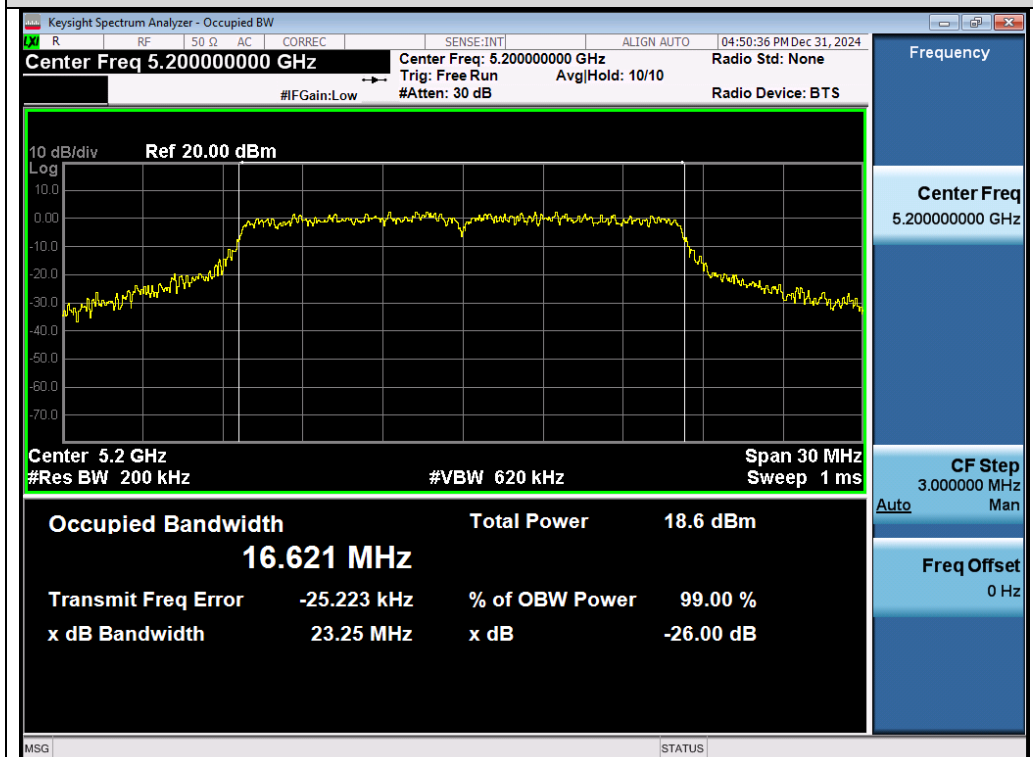
Test Data of Occupied Bandwidth and DTS Bandwidth for band 5.725-5.85 GHz-ANT 1					
Test Mode	Test Channel (MHz)	99% Occupied Bandwidth (MHz)	DTS Bandwidth (MHz)	Limits (MHz)	Pass or Fail
802.11a	5745	16.849	16.408	0.5	Pass
	5785	16.798	16.383	0.5	Pass
	5825	16.844	16.398	0.5	Pass
802.11n20	5745	18.066	17.636	0.5	Pass
	5785	18.062	17.629	0.5	Pass
	5825	18.011	17.765	0.5	Pass
802.11n40	5755	36.600	36.415	0.5	Pass
	5795	36.622	36.409	0.5	Pass
802.11ac20	5745	18.039	17.664	0.5	Pass
	5785	18.083	17.629	0.5	Pass
	5825	17.948	17.600	0.5	Pass
802.11ac40	5755	36.432	36.391	0.5	Pass
	5795	36.500	36.373	0.5	Pass
802.11ax20	5180	19.174	19.009	0.5	Pass
	5200	19.197	19.011	0.5	Pass
	5240	19.189	19.005	0.5	Pass
802.11ax40	5190	38.071	38.078	0.5	Pass
	5230	38.058	38.158	0.5	Pass

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Test Graphs of Occupied Bandwidth and -26dB Bandwidth for band 5.15-5.25 GHz

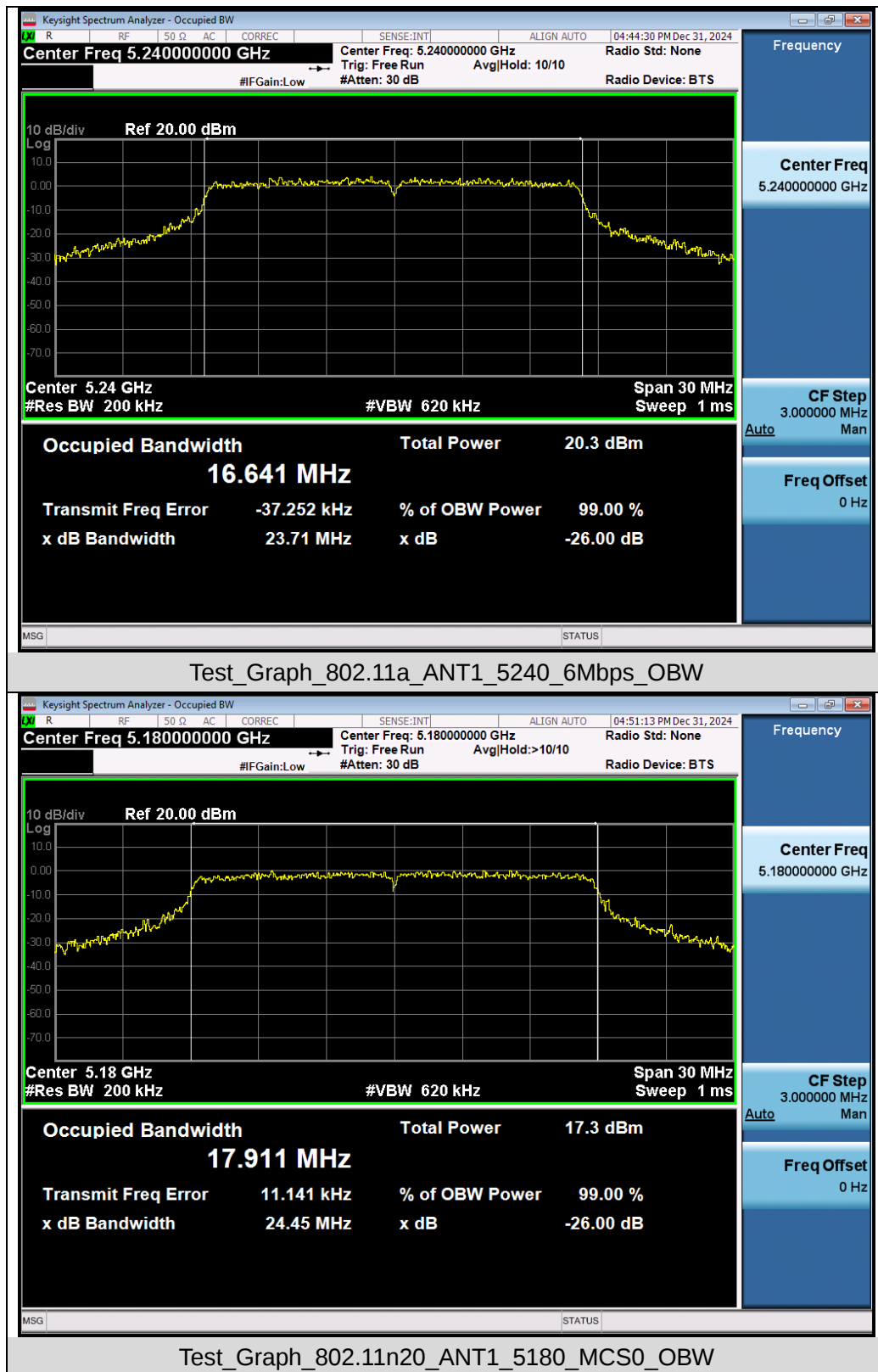


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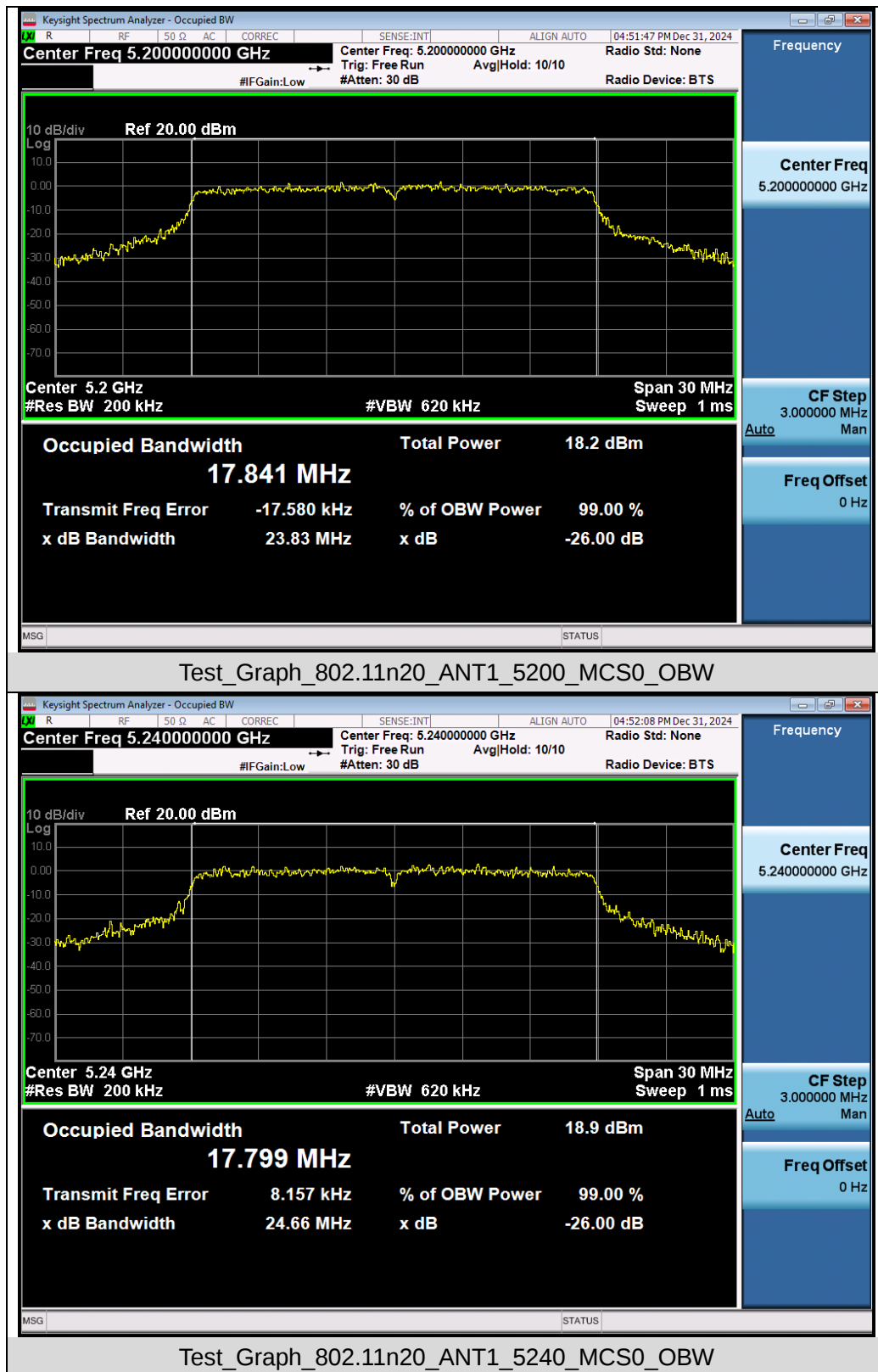


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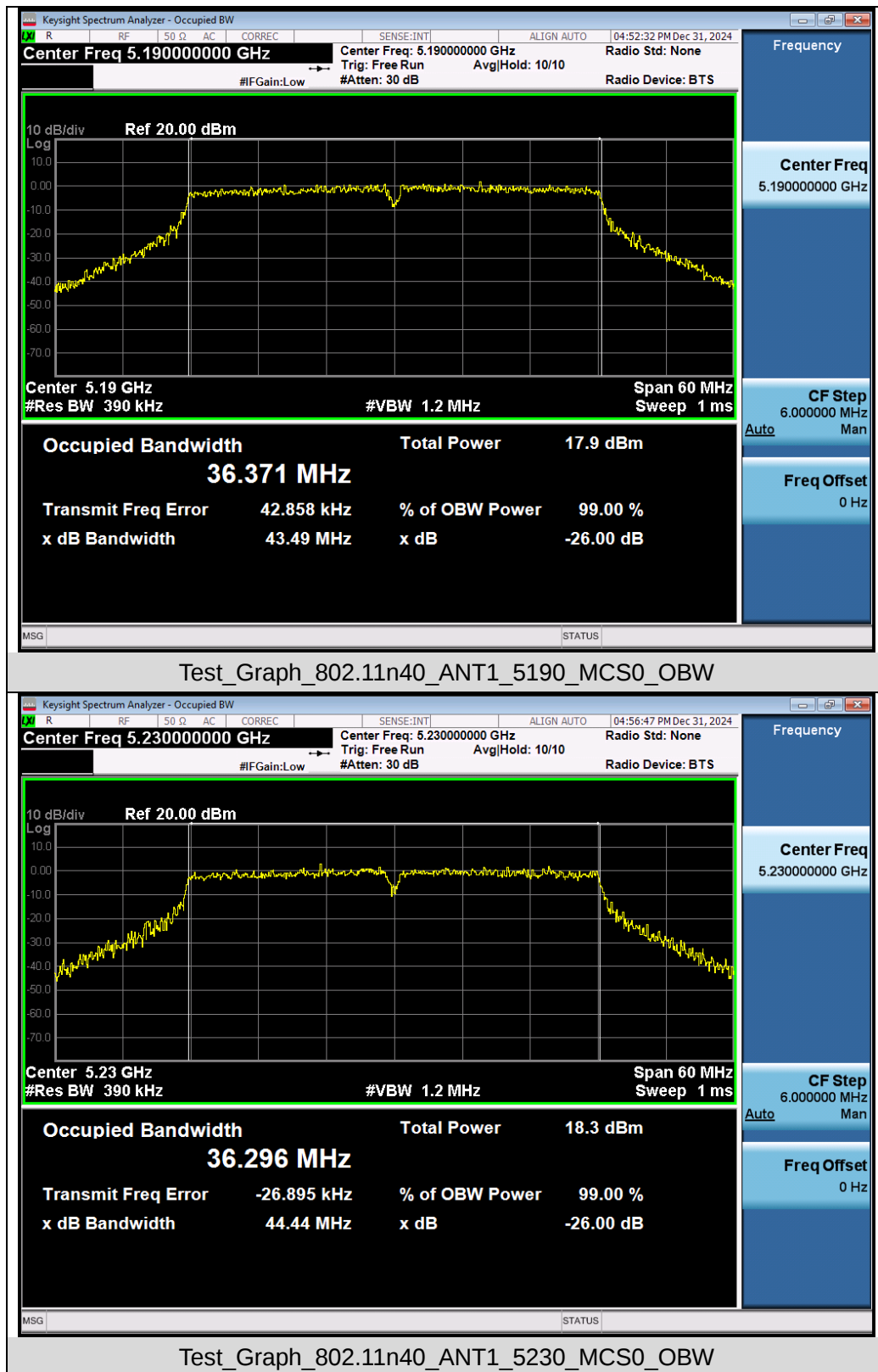


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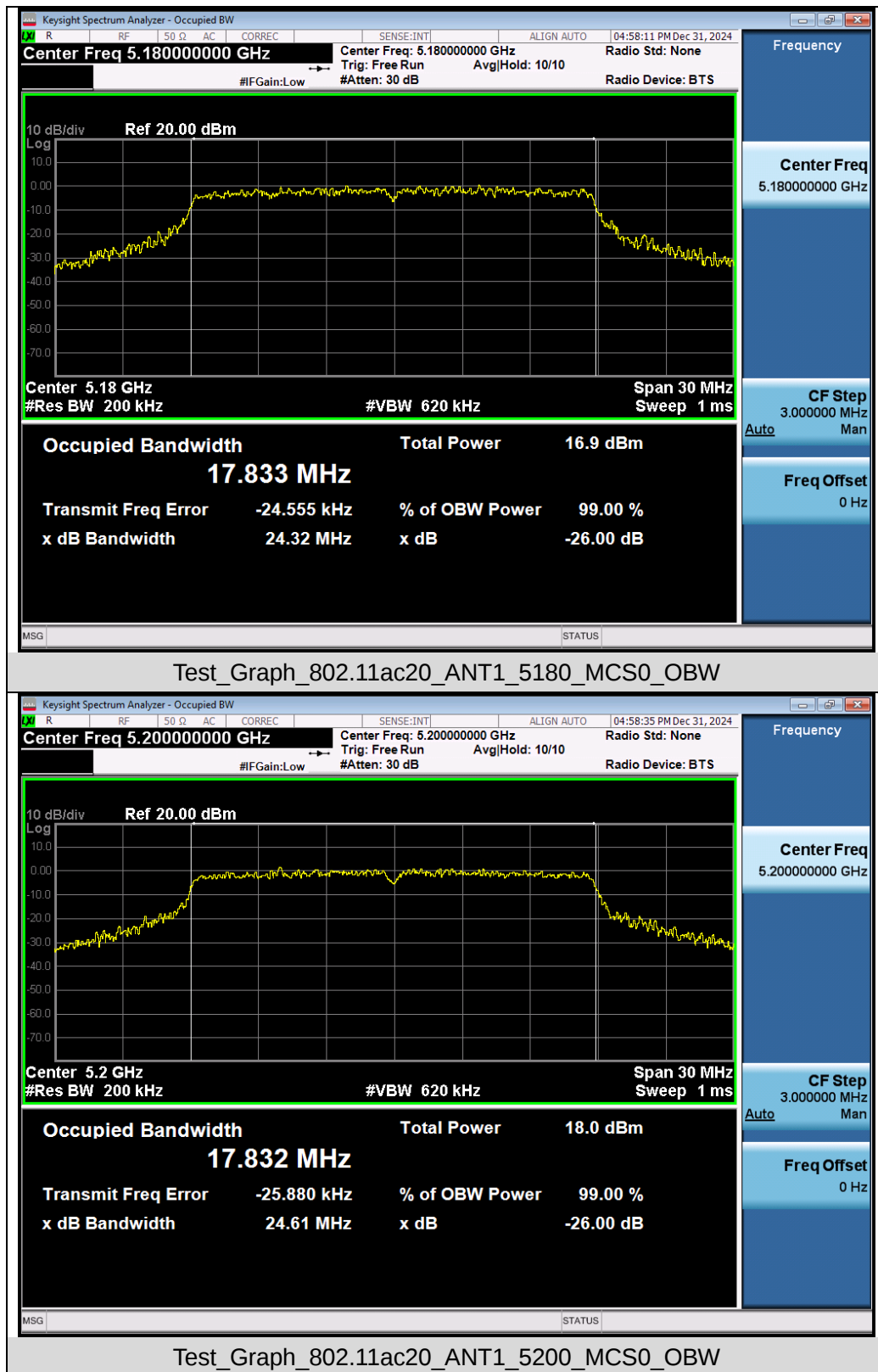


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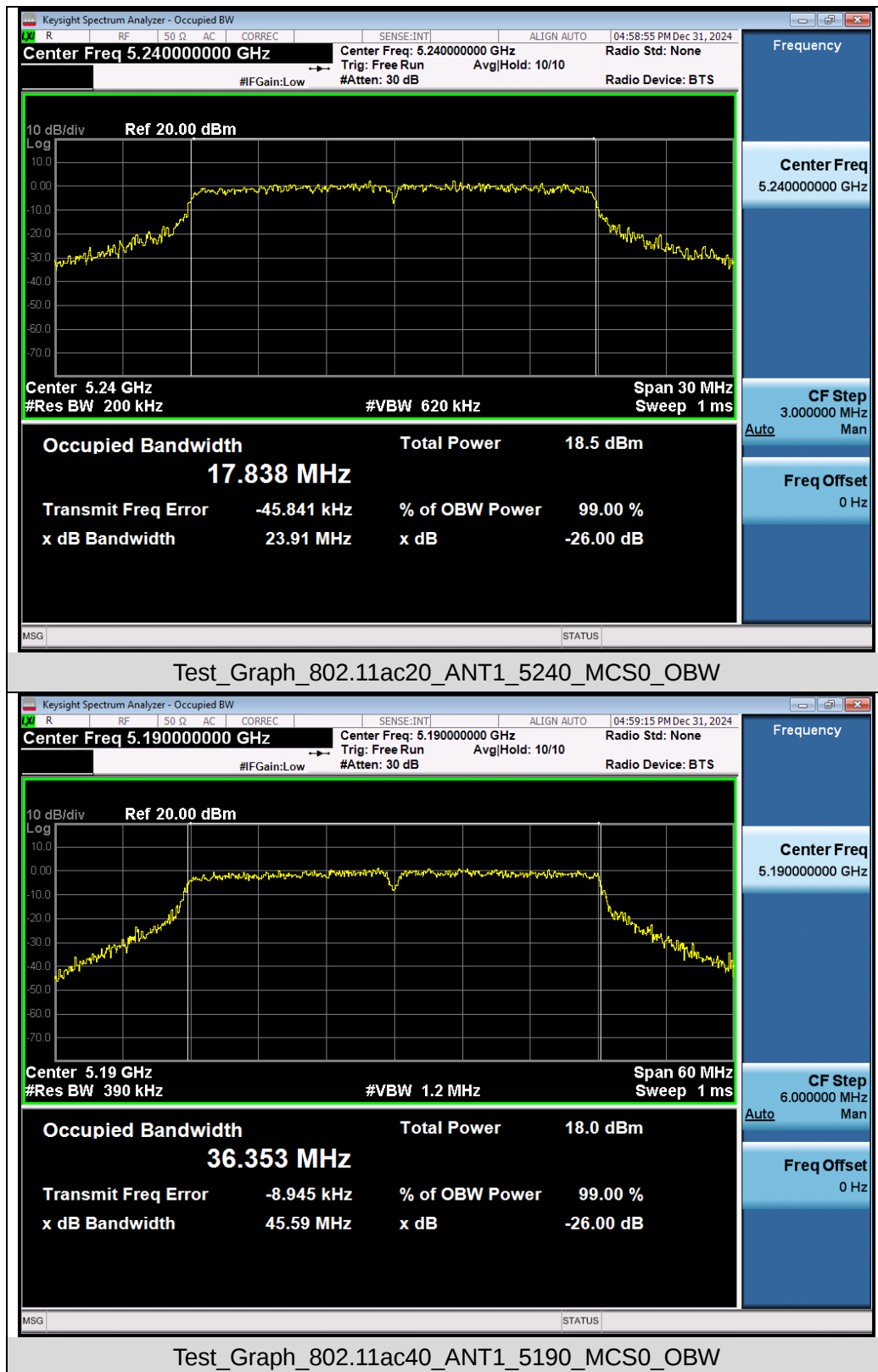
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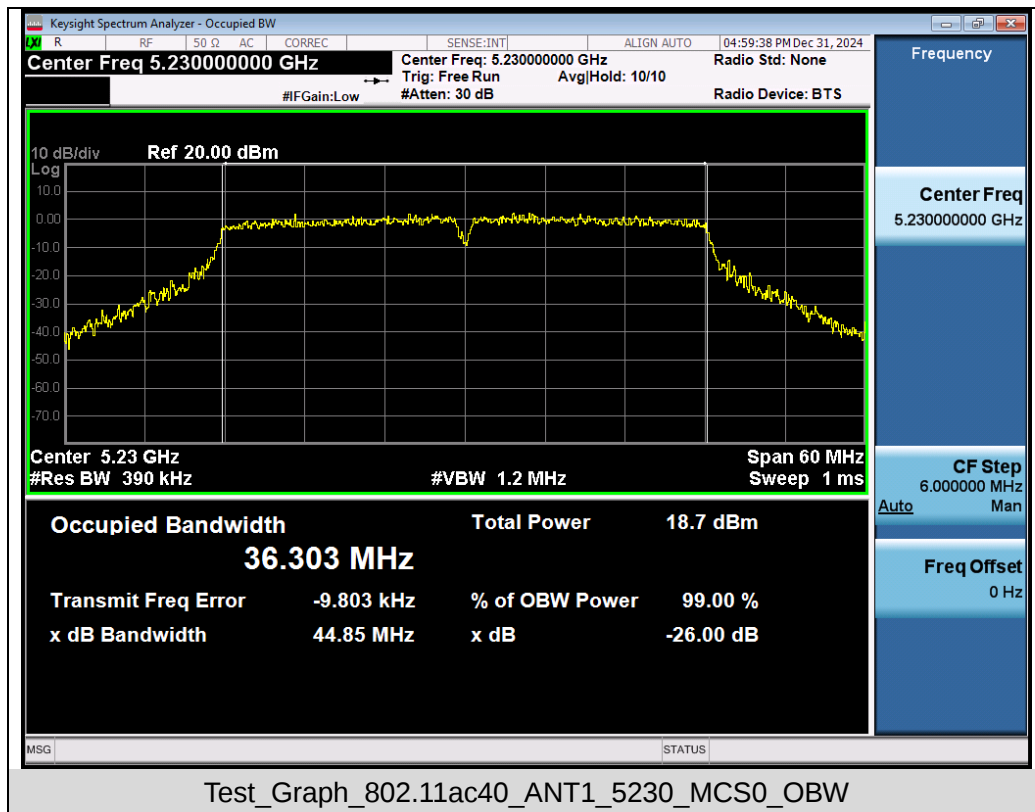
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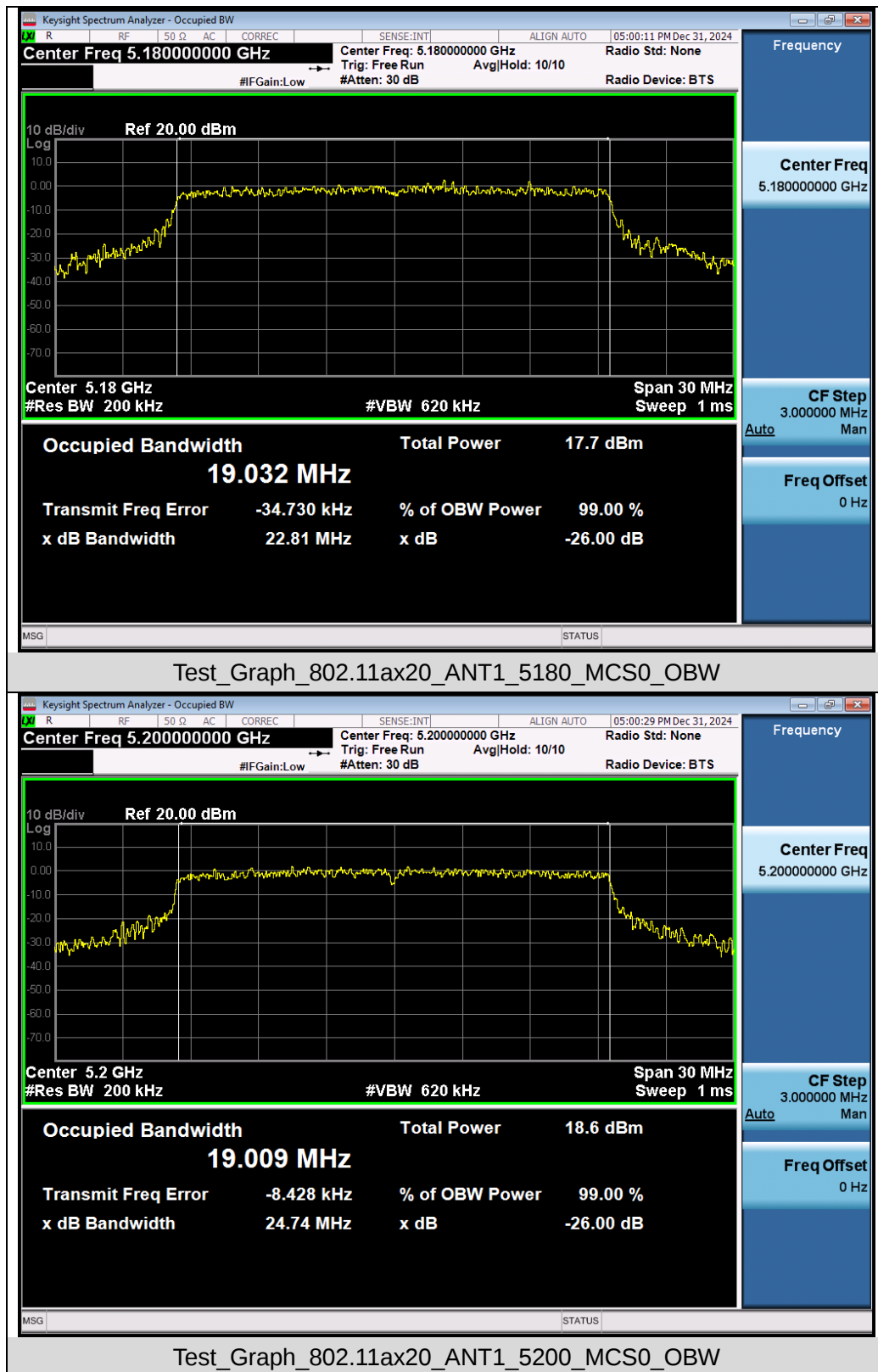


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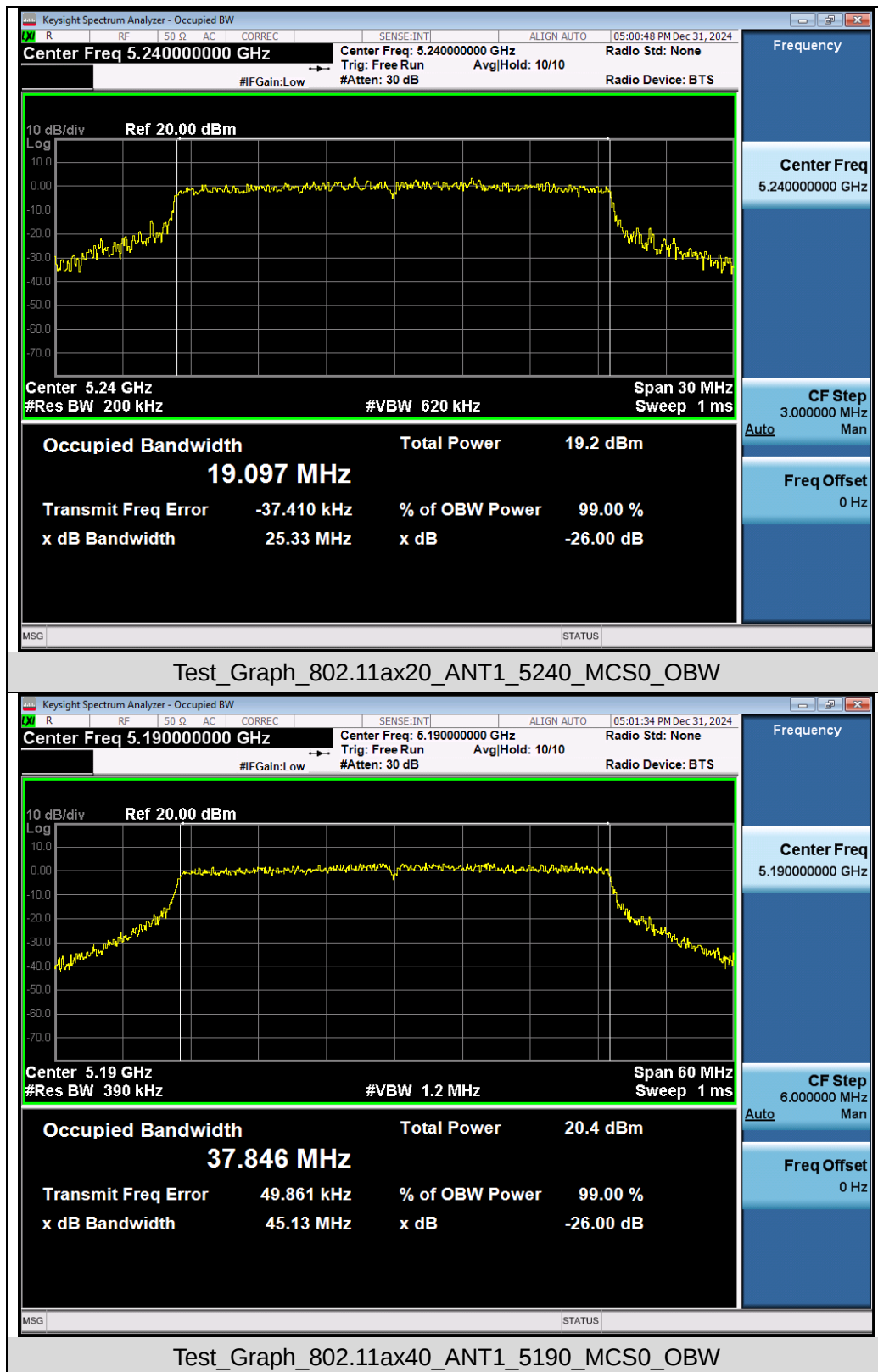
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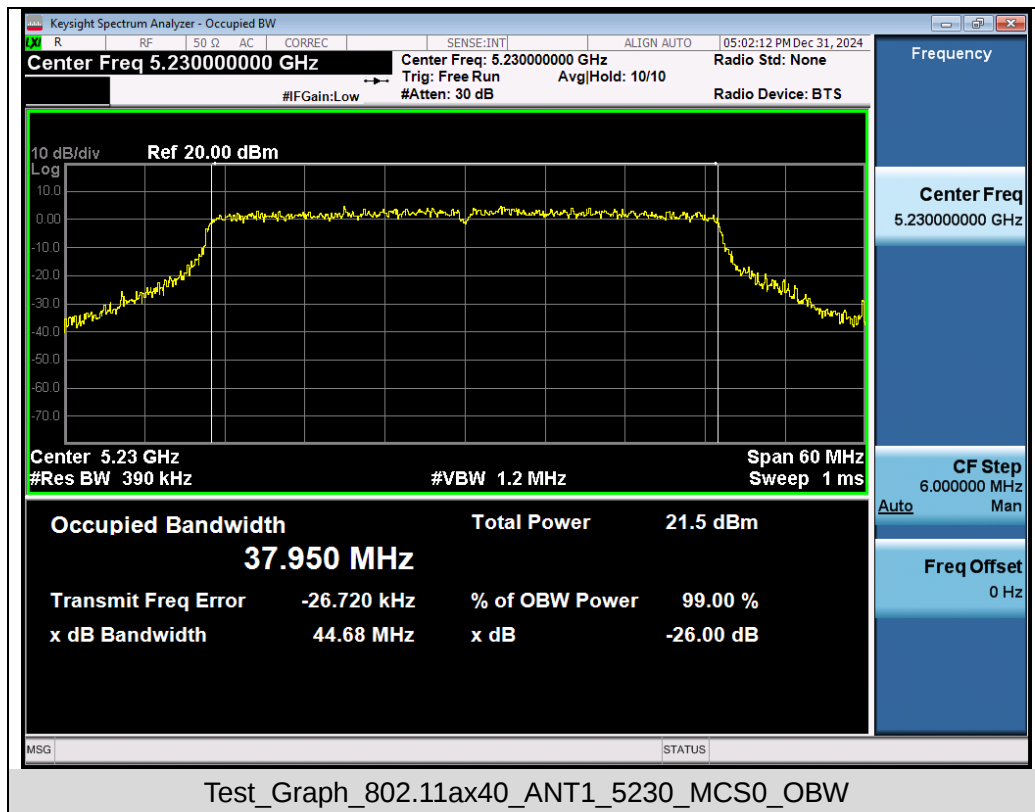
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