RF MEASUREMENT REPORT

FCC ID:	Q9DASIN0308
Applicant:	Hewlett Packard Enterprise Company
Product:	HPE Aruba User Experience Sensor
Model No.:	ASIN0308
Trademark:	Hewlett Packard Enterprise
FCC Classification:	Unlicensed National Information Infrastructure (NII)
FCC Rule Part(s):	Part 15 Subpart E (Section 15.407)
Result:	Complies
Received Date:	2025-04-08
Test Date:	2025-05-14 ~ 2025-07-23

Reviewed By: Jame Yuan

Approved By: Robin Wu

ACCREDITED
TESTING LABORATORY
CERTIFICATE #3628.01

The test results relate only to the samples tested.

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in KDB789033. Test results reported herein relate only to the item(s) tested.

The test report shall not be reproduced except in full without the written approval of MRT Technology (Suzhou) Co., Ltd.

Revision History

Report No.	Version	Description	Issue Date	Note
R25S1034045-U204	V01	Initial Report	2025-10-14	Valid

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1. General Information

1.1. Applicant

Hewlett Packard Enterprise Company

6280 America Center Drive, San Jose CA 95002, United States

1.2. Manufacturer

Hewlett Packard Enterprise Company

6280 America Center Drive, San Jose CA 95002, United States

1.3. Testing Facility

☒	**Test Site – MRT Suzhou Laboratory**
	Laboratory Location (Suzhou - Wuzhong) D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China **Laboratory Location (Suzhou - SIP)** 4b Building, Liando U Valley, No.200 Xingpu Rd., Shengpu Town, Suzhou Industrial Park, China **Laboratory Location (Suzhou - Wujiang)** Building 1, No.1 Xingdong Road, Wujiang, Suzhou, Jiangsu, People's Republic of China
	Laboratory Accreditations
	A2LA: 3628.01 CNAS: L10551 FCC: CN1166 ISED: CN0001 VCCI: ☐R-20025 ☐G-20034 ☐C-20020 ☐T-20020 ☐R-20141 ☐G-20134 ☐C-20103 ☐T-20104
☐	**Test Site – MRT Shenzhen Laboratory**
	Laboratory Location (Shenzhen) 1G, Building A, Junxiangda Building, Zhongshanyuan Road West, Nanshan District, Shenzhen, China
	Laboratory Accreditations
	A2LA: 3628.02 CNAS: L10551 FCC: CN1284 ISED: CN0105
☐	**Test Site – MRT Taiwan Laboratory**
	Laboratory Location (Taiwan) No. 38, Fuxing 2nd Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)
	Laboratory Accreditations
	TAF: 3261 FCC: 291082, TW3261 ISED: TW3261

1.4. Product Information

Product Name	HPE Aruba User Experience Sensor
Model No.	ASIN0308
Serial No.	CNTJMNV02J (Conducted) CNTJMNV004 (Radiated)
Software Version	25.438.42 (r851417 WLTEST)
Wi-Fi Specification	802.11a/b/g/n/ac/ax/be
Bluetooth Specification	BLE only
ZigBee Specification	802.15.4
GNSS Specification	GPS, BDS, GLONASS, Galileo
3GPP Specification	GSM 850/ PCS 1900 WCDMA Band II/ IV/V LTE Band 2/4/5/7/12/13/25/26/38/41
Antenna Specification	Refer to Section 1.7
Power Type	AD/DC adapter input or PoE Injector Input
Integrated Modular Information	
Specification	Modular Name: LTE Module Model Number: EG21-G Manufacturer: Quectel FCC ID: XMR201906EG21G
Accessory	
AC/DC Adapter	Model No.: WB-12G12R Input: 100-240V ~ 50/60Hz, 0.3A Max Output: 12.0V⎓1.0A, 12.0W

Remarks:

1. The information of the EUT (Equipment Under Test) was provided by the manufacturer. The accuracy, completeness, and validity of the information are solely the responsibility of the manufacturer.
2. AC/DC Adapter was selected to perform all RF testing.

1.5. Radio Specification under Test

Frequency Range	UNII-1: 5150 ~ 5250 MHz UNII-2A: 5250 ~ 5350 MHz UNII-2C: 5470 ~ 5725 MHz UNII-3: 5725 ~ 5850 MHz	
Type of Modulation	802.11a/n/ac: OFDM 802.11ax/be: OFDMA	
Data Rate	802.11a: 6/9/12/18/24/36/48/54Mbps 802.11n: up to 300Mbps 802.11ac: up to 1733.3Mbps 802.11ax: up to 2402Mbps 802.11be: up to 2882.4Mbps	
Channel Puncturing Function	☐ Supported	☒ Unsupported
Support RU	☒ Full RU	☐ Partial RU

1.6. Working Frequencies

802.11a/n-HT20/ac-VHT20/ax-HE20/be-EHT20

Channel	Frequency	Channel	Frequency	Channel	Frequency
36	5180 MHz	40	5200 MHz	44	5220 MHz
48	5240 MHz	52	5260 MHz	56	5280 MHz
60	5300 MHz	64	5320 MHz	100	5500 MHz
104	5520 MHz	108	5540 MHz	112	5560 MHz
116	5580 MHz	120	5600 MHz	124	5620 MHz
128	5640 MHz	132	5660 MHz	136	5680 MHz
140	5700 MHz	144	5720 MHz	149	5745 MHz
153	5765 MHz	157	5785 MHz	161	5805 MHz
165	5825 MHz	--	--	--	--

802.11n-HT40/ac-VHT40/ax-HE40/be-EHT40

Channel	Frequency	Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz	54	5270 MHz
62	5310 MHz	102	5510 MHz	110	5550MHz
118	5590 MHz	126	5630 MHz	134	5670 MHz
142	5710 MHz	151	5755 MHz	159	5795 MHz

802.11ac-VHT80/ax-HE80/be-EHT80

Channel	Frequency	Channel	Frequency	Channel	Frequency
42	5210 MHz	58	5290 MHz	106	5530 MHz
122	5610 MHz	138	5690 MHz	155	5775 MHz

802.11ac-VHT160/ax-HE160/be-EHT160

Channel	Frequency	Channel	Frequency	Channel	Frequency
50	5250 MHz	114	5570 MHz	--	--

1.7. Antenna Details

Antenna Type	Frequency Band (MHz)	T_X Paths	Uncorrelated Gain (dBi)	Correlated Gain (dBi)
Dipole Antenna	2400 ~ 2483.5	2	1.80	4.80
	5150 ~ 5350	2	2.51	4.36
	5470 ~ 5725	2	2.33	4.44
	5725 ~ 5895	2	2.11	5.02
	5925 ~ 7125	2	2.98	4.96

Notes:

1. The EUT supports Cyclic Delay Diversity (CDD) and Beam Forming modes.
2. All antenna information is provided by the manufacturer.
3.The detailed calculation method of directional gain refers to antenna specification provided by the applicant.

2. Test Configuration

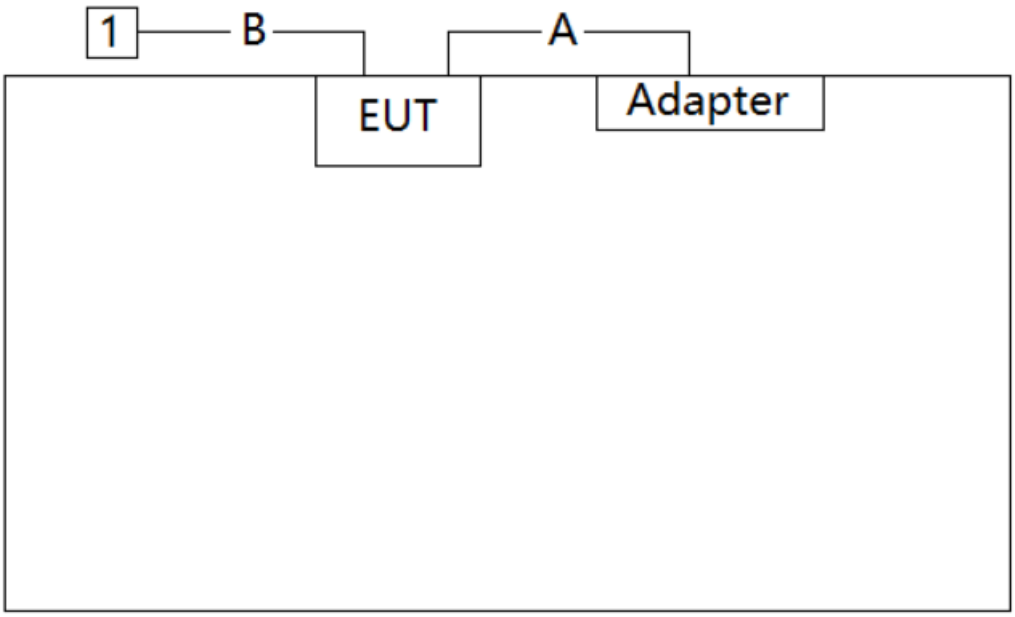
2.1. Test Mode

CDD Mode
Mode 1: Transmit by 802.11a_N_{SS}=1 (6Mbps)
Mode 2: Transmit by 802.11ac-VHT20_N_{SS}=1 (MCS0)
Mode 3: Transmit by 802.11ac-VHT40_N_{SS}=1 (MCS0)
Mode 4: Transmit by 802.11ac-VHT80_N_{SS}=1 (MCS0)
Mode 5: Transmit by 802.11ac-VHT160_N_{SS}=1 (MCS0)
Mode 6: Transmit by 802.11ax-HE20_N_{SS}=1 (MCS0)
Mode 7: Transmit by 802.11ax-HE40_N_{SS}=1 (MCS0)
Mode 8: Transmit by 802.11ax-HE80_N_{SS}=1 (MCS0)
Mode 9: Transmit by 802.11ax-HE160_N_{SS}=1 (MCS0)
Mode 10: Transmit by 802.11be-EHT20_N_{SS}=1 (MCS0)
Mode 11: Transmit by 802.11be-EHT40_N_{SS}=1 (MCS0)
Mode 12: Transmit by 802.11be-EHT80_N_{SS}=1 (MCS0)
Mode 13: Transmit by 802.11be-EHT160_N_{SS}=1 (MCS0)
Notes: 1. All modes of operation and data rates were investigated, so all RF test requirements shall be executed at the worst data rate. 2. For beamforming operation, manufacturer automatically backs power down based on a 10log(N_{ANT}) factor based on CDD power. Therefore, only the CDD mode was evaluated in this report. 3. 802.11n and 802.11ac have same modulation type and same power value, so we only show 802.11ac test data in report.

2.2. Test System Connection Diagram

The device was tested per the guidance ANSI C63.10-2020 was used to reference the appropriate EUT setup for radiated emissions testing and AC line conducted testing.

Connection Diagram



Cable Type		Cable Description	Length
A	Power Cable	Non shielded	2.0m
B	LAN Cable	Non shielded	> 10m
Product		Manufacturer	Model No.
1	Notebook	ThinkPad	Gen5 E14

2.3. Test Software

The test utility software used during testing was “IPOP”, and commands were provided by manufacturer.

Note: Final power setting please refer to operational description.

2.4. Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC Part 15.407
- KDB 789033 D02v02r01
- KDB 662911 D01v02r01
- ANSI C63.10-2020
- ANSI C63.10-2020/Cor1-2023
- ANSI C63.10a-2024

2.5. Test Environment Condition

Ambient Temperature	15 ~ 35°C
Relative Humidity	20 ~ 75%RH

3. Antenna Requirements

Excerpt from §15.203 of the FCC Rules/Regulations:

"An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can 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 shall be considered sufficient to comply with the provisions of this section."

- The antenna of the device is **permanently attached.**
- There are no provisions for connection to an external antenna.

Conclusion:

The unit complies with the requirement of §15.203.

4. Measuring Instrument

Instrument	Manufacturer	Model No.	Asset No.	Cali. Interval	Cali. Due Date	Test Site
EMI Test Receiver	R&S	ESR3	MRTSUE06185	1 year	2025-12-05	SIP-AC3
Thermohygrometer	testo	608-H1	MRTSUE06619	1 year	2025-10-16	SIP-AC3
TRILOG Antenna	Schwarzbeck	VULB 9168	MRTSUE06646	1 year	2025-07-29	SIP-AC3
Preamplifier	EMCI	EMC012645SE	MRTSUE06642	1 year	2026-01-05	SIP-AC3
Signal Analyzer	Keysight	N9010B	MRTSUE06603	1 year	2025-09-05	SIP-AC3
Horn Antenna	R&S	HF907	MRTSUE06611	1 year	2025-07-07 2026-06-20	SIP-AC3
Anechoic Chamber	RIKEN	SIP-AC3	MRTSUE06782	1 year	2025-12-19	SIP-AC3
Preamplifier	EMCI	EMC184045SE	MRTSUE06602	1 year	2025-10-08	SIP-AC3
Horn Antenna	Schwarzbeck	BBHA 9170	MRTSUE06599	1 year	2025-09-08	SIP-AC3
Active Loop Antenna	Schwarzbeck	FMZB 1519-60 D	MRTSUE07075	1 year	2025-11-19	SIP-AC3
Cable	HUBER+SUHNER	SF106	MRTSUE06873	1 year	2025-12-19	SIP-AC3
Two-Line V-Network	R&S	ENV216	MRTSUE06003	1 year	2026-04-29	SIP-SR2
EMI Test Receiver	R&S	ESR3	MRTSUE06612	1 year	2026-04-29	SIP-SR2
Four-Line V-Network	R&S	ENV432	MRTSUE06614	1 year	2025-10-13	SIP-SR2
Thermohygrometer	testo	608-H1	MRTSUE06621	1 year	2025-10-29	SIP-SR2
Shielding Room	MIX-BEP	SIP-SR2	MRTSUE06949	5 years	2029-10-13	SIP-SR2
USB Power Sensor	Keysight	U2021XA	MRTSUE06596	1 year	2025-07-23 2026-07-14	SIP-TR1
Signal Analyzer	Keysight	N9010B	MRTSUE07036	1 year	2026-01-21	SIP-TR1
Temperature Chamber	BAOYT	BYG-408CS	MRTSUE06847	1 year	2026-01-21	SIP-TR1
Thermohygrometer	testo	608-H1	MRTSUE11022	1 year	2025-10-16	SIP-TR1
Attenuator	MVE	MVE2213	MRTSUE11111	1 year	2025-08-01	SIP-TR1

Software	Version	Function
e3	230711	EMI Test Software
Agilent Power Analyzer/Agilent Power Panel	V R03.09.00	Power
Controller_MF 7802BS	1.02	RE Antenna & Turntable

5. Decision Rules and Measurement Uncertainty

5.1. Decision Rules

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4: 2012 Clause 8.2.

(Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)

5.2. Measurement Uncertainty

Where relevant, the following test uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k = 2.

AC Conducted Emission Measurement
The maximum measurement uncertainty is evaluated as: 9kHz~150kHz: 3.58dB 150kHz~30MHz: 3.20dB
Radiated Emission Measurement
The maximum measurement uncertainty is evaluated as: Coaxial: 9kHz~30MHz: 2.35dB Coplanar: 9kHz~30MHz: 2.37dB Horizontal: 30MHz~200MHz: 3.47dB 200MHz~1GHz: 4.17dB 1GHz~40GHz: 4.97dB Vertical: 30MHz~200MHz: 4.07dB 200MHz~1GHz: 5.28dB 1GHz~40GHz: 4.84dB
Spurious Emissions, Conducted
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 2.5dB
Output Power
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 1.5dB
Power Spectrum Density
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 2.5dB
Occupied Bandwidth
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 3.2%

6. Test Result

6.1. Summary

FCC Section(s)	Test Description	Test Condition	Verdict
15.407(a)	26dB Bandwidth	Conducted	Pass
15.407(e)	6dB Bandwidth		Pass
15.407(a)(1)(iv), (2), (3)(i)	Maximum Conducted Output Power		Pass
15.407(h)(1)	Transmit Power Control		Pass
15.407(g)	Frequency Stability		Pass
15.407(a)(1)(iv), (2), (3)(i), (13)	Peak Power Spectral Density		Pass
15.407(h)(2)	Dynamic Frequency Selection (DFS)		Pass Note 3
15.407(b)(1), (2), (3), (4)(i)	Undesirable Emissions	Radiated	Pass
15.205, 15.209 15.407(b)(8), (9), (10)	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)		Pass
15.207	AC Conducted Emissions 150kHz - 30MHz	Line Conducted	Pass

Notes:

1. The analyzer plots shown in this section were captured using a correction table to account for cable and attenuator losses in the system connecting the EUT to the analyzer across relevant frequencies.
2. For radiated emission test, every axis (X, Y, Z) was also verified. The test results shown in the following sections represent the worst-case emissions.
3. DFS report refers to R25S1034045-U205.

6.2. 26dB & 99% Bandwidth Measurement

6.2.1. Test Limit

N/A

6.2.2. Test Procedure

KDB 789033 D02 v02r01 - Section II - C.1 (26 dB Bandwidth)

KDB 789033 D02 v02r01 - Section II - D (99% Bandwidth)

6.2.3. Test Setting

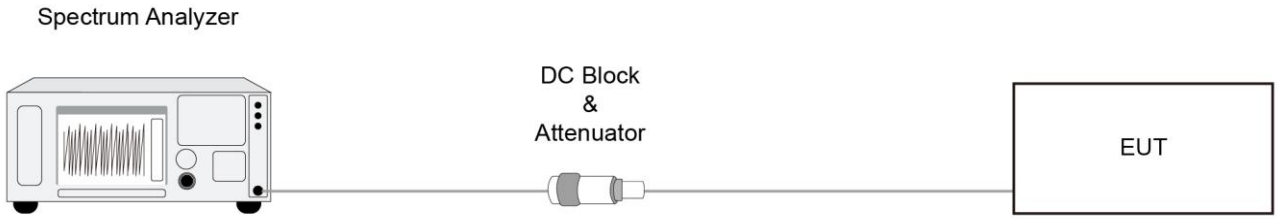
26dB Bandwidth

1. The analyzers' automatic bandwidth measurement capability was used to perform the 26dB bandwidth
2. RBW = approximately 1% of the emission bandwidth.
3. VBW > RBW
4. Detector = Peak.
5. Trace mode = max hold.
6. 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%.

99% Bandwidth

1. Set center frequency to the nominal EUT channel center frequency.
2. RBW = 1% to 5% of the OBW
3. VBW ≥ 3 × RBW
4. Span = 1.5 times to 5 times the OBW
5. Detector = peak
6. Trace mode = max hold
7. Allow the trace to stabilize
8. Use the 99% power bandwidth function of the instrument.

6.2.4. Test Setup



6.2.5. Test Result

Refer to Appendix A.2.

6.3. 6dB Bandwidth Measurement

6.3.1. Test Limit

The minimum 6dBbandwidth shall be at least 500 kHz.

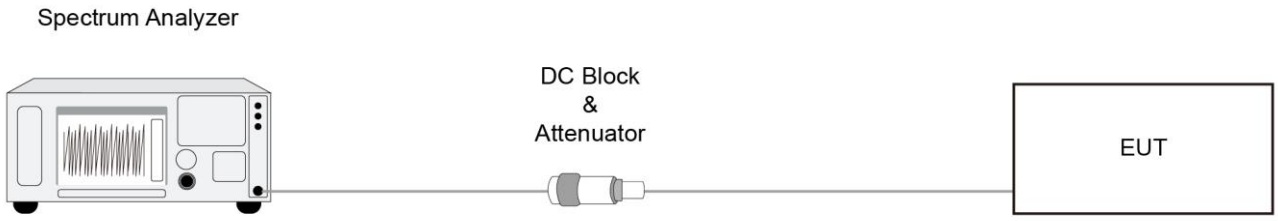
6.3.2. Test Procedure

KDB 789033 D02 v02r01 - Section II - C.2

6.3.3. Test Setting

1. Set center frequency to the nominal EUT channel center frequency.
2. RBW = 100 kHz.
3. VBW ≥ 3 × RBW.
4. Detector = Peak.
5. Trace mode = max hold.
6. Sweep = auto couple.
7. Allow the trace to stabilize.
8. 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.

6.3.4. Test Setup



6.3.5. Test Result

Refer to Appendix A.3.

6.4. Output Power Measurement

6.4.1. Test Limit

For the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W 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 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz.

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W (30dBm).

If transmitting antennas of directional gain greater than 6dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

6.4.2. Test Procedure

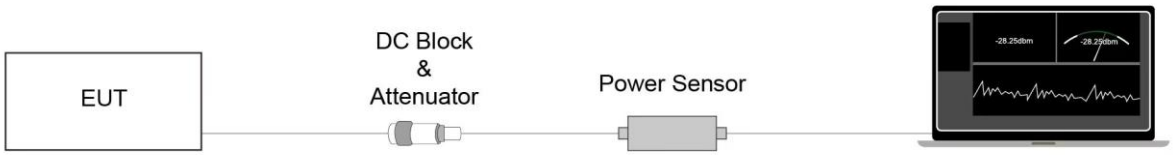
KDB 789033 D02 v02r01 - Section II - E.3.b (Method PM-G)

6.4.3. Test Setting

<u>Average Power Measurement</u>

Average power measurements were performed only when the EUT was transmitting at its maximum power control level using a broadband power meter with a pulse sensor. The power meter implemented triggering and gating capabilities which were set up such that power measurements were recorded only during the ON time of the transmitter.

6.4.4. Test Setup



6.4.5. Test Result

Refer to Appendix A.4.

6.5. Transmit Power Control Measurement

6.5.1. Test Limit

The U-NII device is required to have the capability to operate at least 6 dB below the mean EIRP value of 30 dBm.

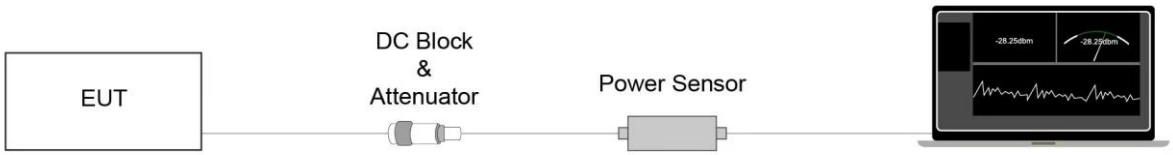
6.5.2. Test Procedure

KDB 789033 D02 v02r01 - Section II - E.3.b (Method PM-G)

6.5.3. Test Setting

Average power measurements were performed only when the EUT was transmitting at its maximum power control level using a broadband power meter with a pulse sensor. The power meter implemented triggering and gating capabilities which were set up such that power measurements were recorded only during the ON time of the transmitter. The trace was averaged over 100 traces to obtain the final measured average power.

6.5.4. Test Setup



6.5.5. Test Result

Device supports TPC mechanism, details refer to the operational description.

6.6. Power Spectral Density Measurement

6.6.1. Test Limit

For the band 5.15-5.25 GHz, 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.

If transmitting antennas of directional gain greater than 6dBi are used, the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

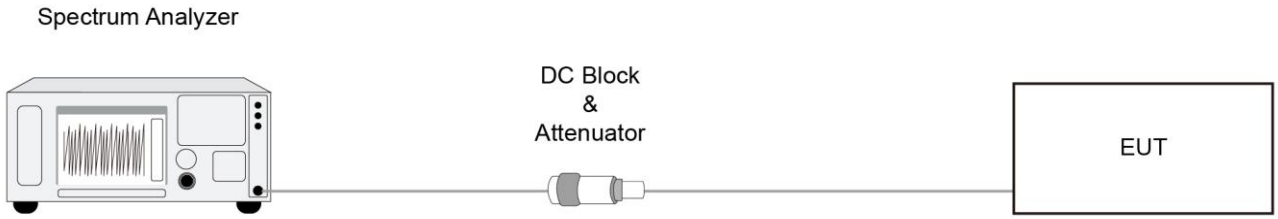
6.6.2. Test Procedure

KDB 789033 D02 v02r01 - Section II - F

6.6.3. Test Setting

1. Analyzer was set to the center frequency of the UNII channel under investigation
2. Span was set to encompass the entire 26dB EBW of the signal.
3. RBW = 1MHz (510kHz, if measurement bandwidth of Maximum PSD is specified in 500 kHz)
4. VBW = 3 × RBW
5. Number of sweep points ≥ 2 × (span / RBW)
6. Detector = power averaging (Average)
7. Sweep time = auto
8. Trigger = free run
9. Trace average at least 100 traces in power averaging (rms) mode; however, the number of traces to be averaged shall be increased above 100 as needed to ensure that the average accurately represents the true average over the on and off periods of the transmitter.
10. Use the peak search function on the instrument to find the peak of the spectrum and record its value.
11. Add 10*log(1/x), where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times (because the measurement represents an average over both the on and off times of the transmission). For example, add 10*log(1/0.25) = 6 dB if the duty cycle is 25 percent.

6.6.4. Test Setup



6.6.5. Test Result

Refer to Appendix A.5.

6.7. Frequency Stability Measurement

6.7.1. Test Limit

Manufactures 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.

6.7.2. Test Procedure

Frequency Stability Under Temperature Variations:

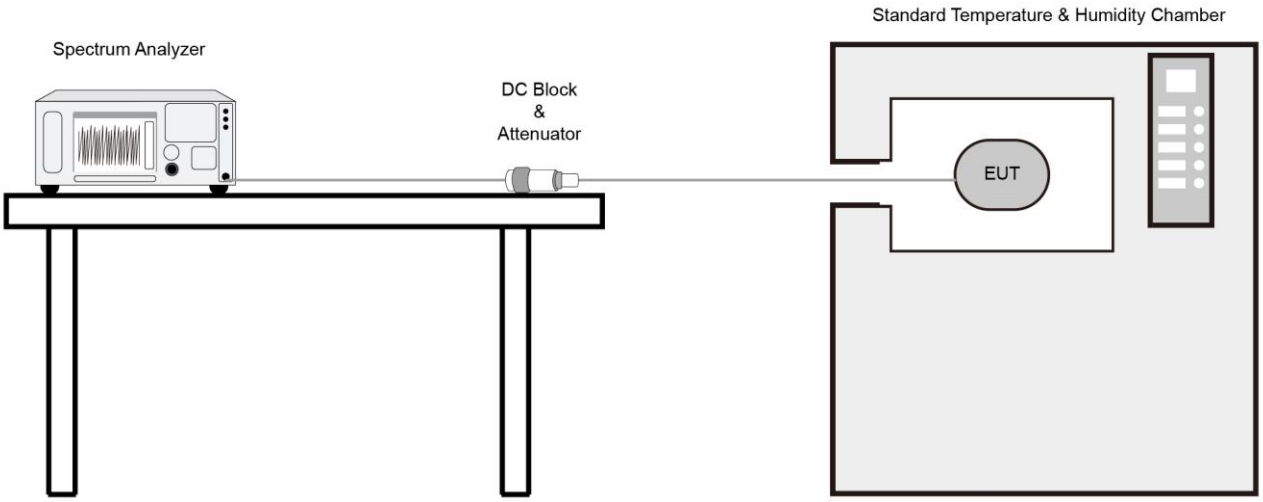
The equipment under test was connected to an external AC or DC power supply and input rated voltage. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. The EUT was placed inside the temperature chamber. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 20°C operating frequency as reference frequency. Turn EUT off and set the chamber temperature to highest. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10°C decreased per stage until the lowest temperature reached.

Frequency Stability Under Voltage Variations:

Set chamber temperature to 20°C. Use a variable AC power supply / DC power source to power the EUT and set the voltage to rated voltage. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency.

Reduce the input voltage to specify extreme voltage variation (±15%) and endpoint, recordthe maximum frequency change.

6.7.3. Test Setup



6.7.4. Test Result

Refer to Appendix A.6.

6.8. Radiated Spurious Emission Measurement

6.8.1. Test Limit

All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR must not exceed the limits shown in Table per Section 15.209.

FCC Part 15 Subpart C Paragraph 15.209		
Frequency [MHz]	Field Strength [μV/m]	Measured Distance [Meters]
0.009 - 0.490	2400/F (kHz)	300
0.490 - 1.705	24000/F (kHz)	30
1.705 - 30	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

6.8.2. Test Procedure

KDB 789033 D02 v02r01 - Section II - G

6.8.3. Test Setting

Table 1 - RBW as a function of frequency

Frequency	RBW
9 ~ 150 kHz	200 ~ 300 Hz
0.15 ~ 30 MHz	9 ~ 10 kHz
30 ~ 1000 MHz	100 ~ 120 kHz
> 1000MHz	1MHz

Quasi-Peak Measurements below 1GHz

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. Span was set greater than 1MHz
3. RBW = as specified in Table 1
4. Detector = CISPR quasi-peak
5. Sweep time = auto couple
6. Trace was allowed to stabilize

Peak Measurements above 1GHz

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = Peak
5. Sweep time = Auto couple
6. Trace mode = Max hold
7. Trace was allowed to stabilize

Average Measurements above 1GHz (Method VB)

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW; if the EUT is configured to transmit with duty cycle ≥ 98%, set VBW = 10Hz

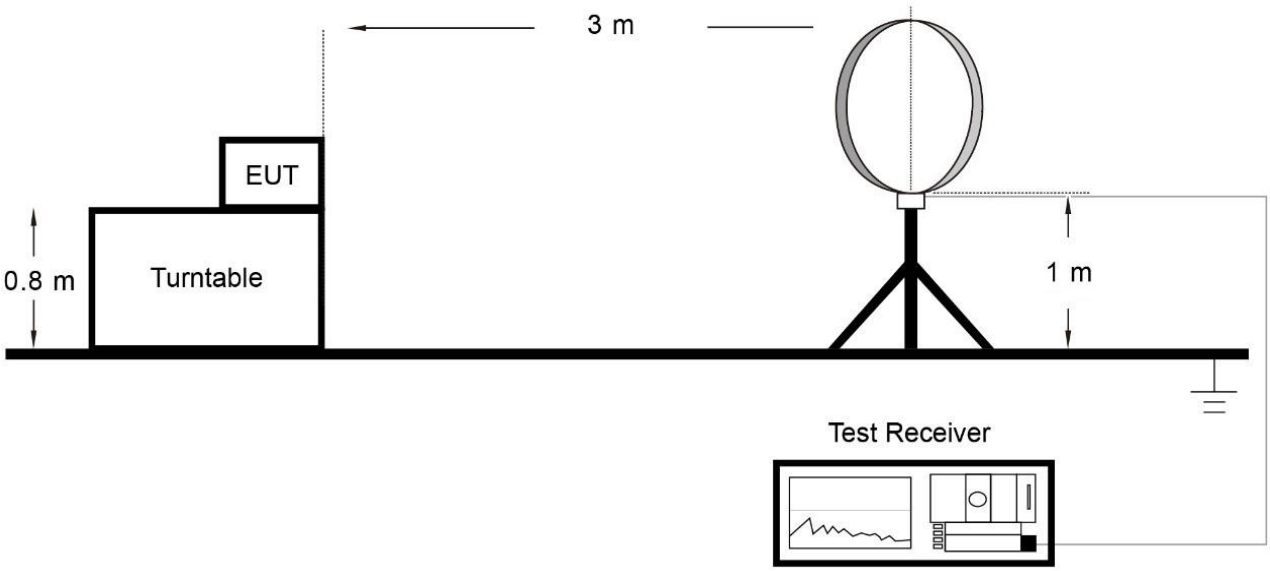
If the EUT duty cycle is < 98%, set VBW ≥ 1/T. T is the minimum transmission duration.

802.11a	0.68kHz	802.11ac-VHT20	0.75kHz	802.11ac-VHT40	1.5kHz
802.11ac-VHT80	3kHz	802.11ac-VHT160	5.6kHz	802.11ax-HE20	1kHz
802.11ax-HE40	1.8kHz	802.11ax-HE80	3.3kHz	802.11ax-HE160	5.6kHz
802.11be-EHT20	0.91kHz	802.11be-EHT40	1.8kHz	802.11be-EHT80	3.3kHz
802.11be-EHT160	5.6kHz	--	--	--	--

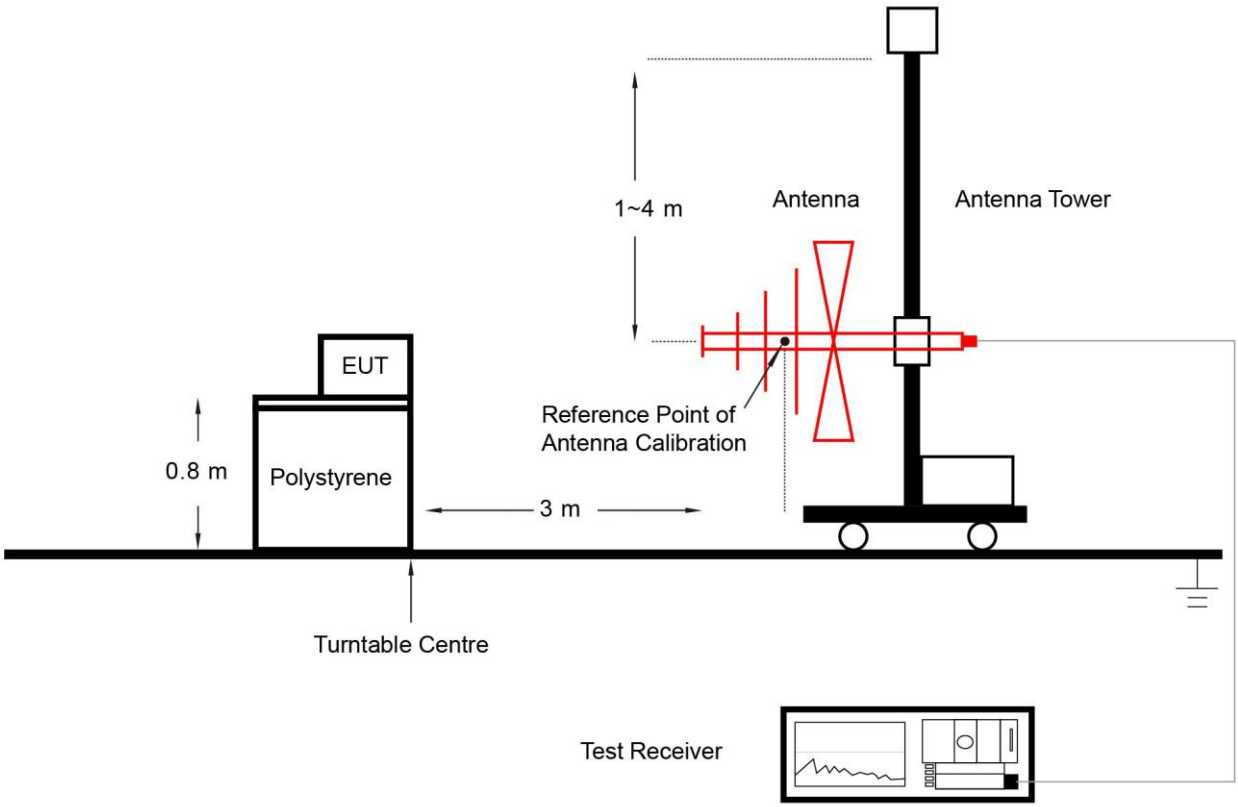
4. Detector = Peak
5. Sweep time = Auto
6. Trace mode = Max hold
7. Trace was allowed to stabilize

6.8.4. Test Setup

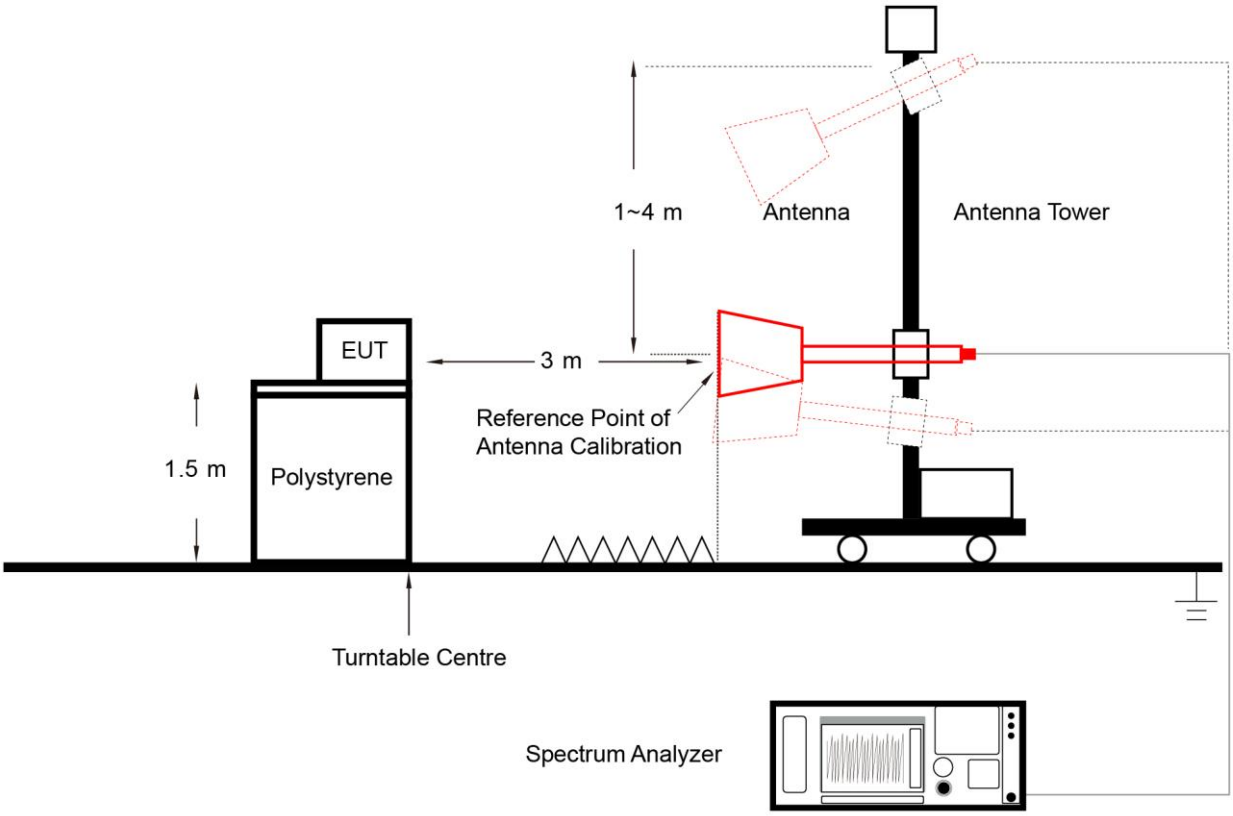
Below 30MHz Test Setup:



Below 1GHz Test Setup:



Above 1GHz Test Setup:



6.8.5. Test Result

Refer to Appendix A.7.

6.9. Radiated Restricted Band Edge Measurement

6.9.1. Test Limit

For 15.205 requirement:

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a) of FCC part 15, must also comply with the radiated emission limits specified in Section 15.209(a).

Frequency (MHz)	Frequency (MHz)	Frequency (MHz)	Frequency (GHz)
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1] 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	([2])
13.36 - 13.41	--	--	--

For 15.407(b) requirement:

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 in the 5.725-5.85 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.

Refer to KDB 789033 D02 v02r01 - Section II - G.2.c as specified in § 15.407(b), emissions above 1000 MHz that are outside of the restricted bands are subject to a maximum emission limit of -27 dBm/MHz (or -17 dBm/MHz as specified in § 15.407(b)(4)). However, an out-of-band emission that complies with both the peak and average limits of § 15.209 is not required to satisfy the -27 dBm/MHz or -17 dBm/MHz maximum emission lim it.All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47CFR must not exceed the limits shown in Table per Section 15.209.

FCC Part 15 Subpart C Paragraph 15.209		
Frequency [MHz]	Field Strength [μV/m]	Measured Distance [Meters]
0.009 - 0.490	2400/F (kHz)	300
0.490 - 1.705	24000/F (kHz)	30
1.705 - 30	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

6.9.2. Test Procedure

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6.9.3. Test Setting

Peak Field Strength Measurements

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

Average Field Strength Measurements

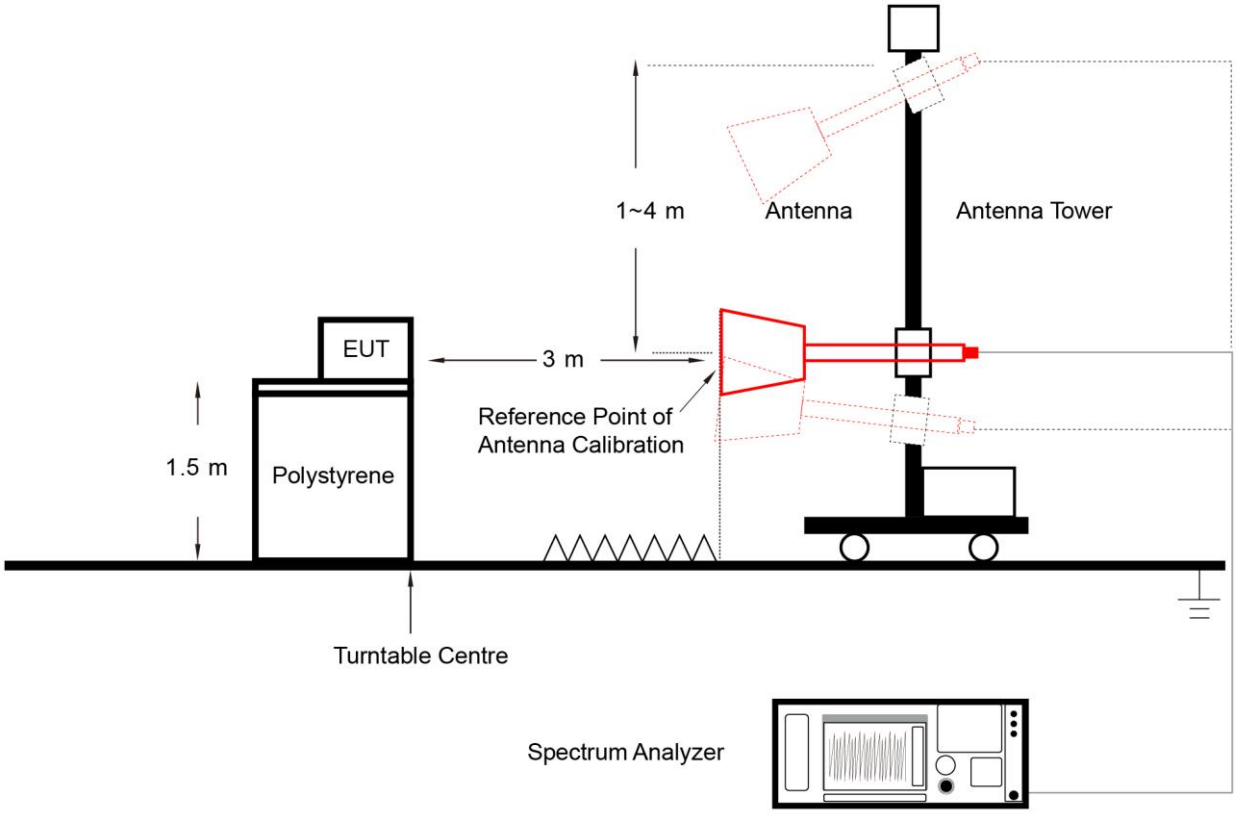
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW; If the EUT is configured to transmit with duty cycle ≥ 98%, set VBW = 10 Hz.

If the EUT duty cycle is < 98%, set VBW ≥ 1/T. T is the minimum transmission duration.

802.11a	0.68kHz	802.11ac-VHT20	0.75kHz	802.11ac-VHT40	1.5kHz
802.11ac-VHT80	3kHz	802.11ac-VHT160	5.6kHz	802.11ax-HE20	1kHz
802.11ax-HE40	1.8kHz	802.11ax-HE80	3.3kHz	802.11ax-HE160	5.6kHz
802.11be-EHT20	0.91kHz	802.11be-EHT40	1.8kHz	802.11be-EHT80	3.3kHz
802.11be-EHT160	5.6kHz	--	--	--	--

4. Detector = Peak
5. Sweep time = auto
6. Trace mode = max hold
7. Trace was allowed to stabilize

6.9.4. Test Setup



6.9.5. Test Result

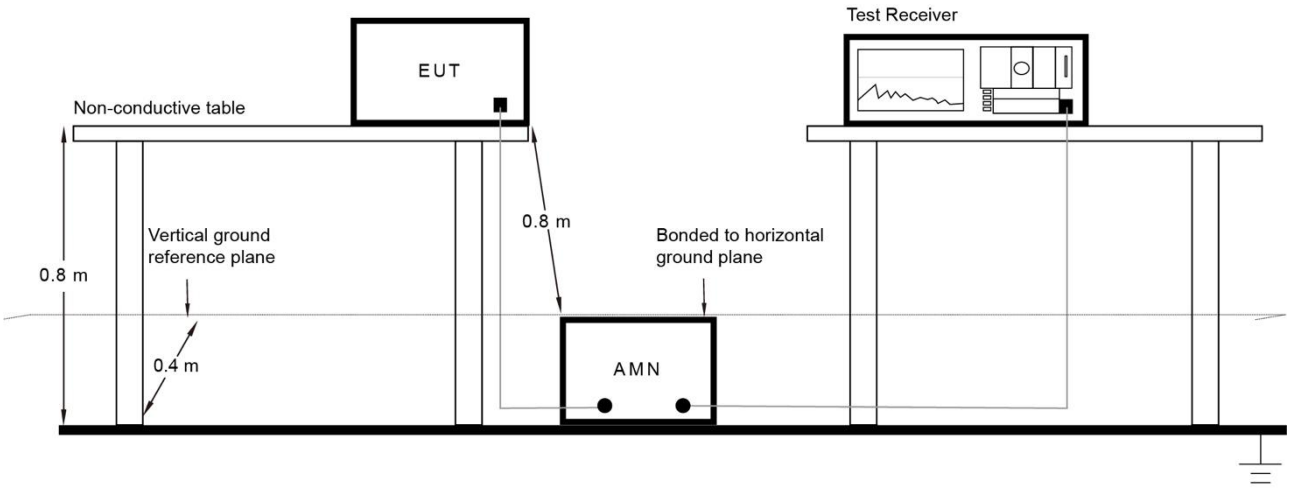
Refer to Appendix A.8.

6.10. AC Conducted Emissions Measurement

6.10.1. Test Limit

FCC Part 15.207 Limits		
Frequency (MHz)	QP (dBμV)	AV (dBμV)
0.15 - 0.50	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30	60	50
Note 1: The lower limit shall apply at the transition frequencies. Note 2: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz.		

6.10.2. Test Setup



6.10.3. Test Result

Refer to Appendix A.9.

Appendix A – Test Result

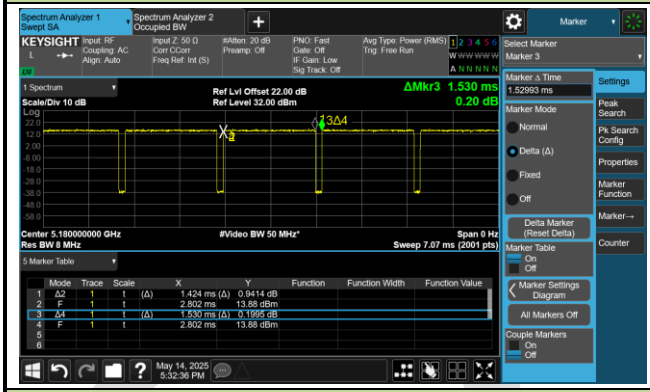
A.1 Duty Cycle Test Result

Test Site	SIP-TR1	Test Engineer	Alan Yu
Test Date	2025-05-14		

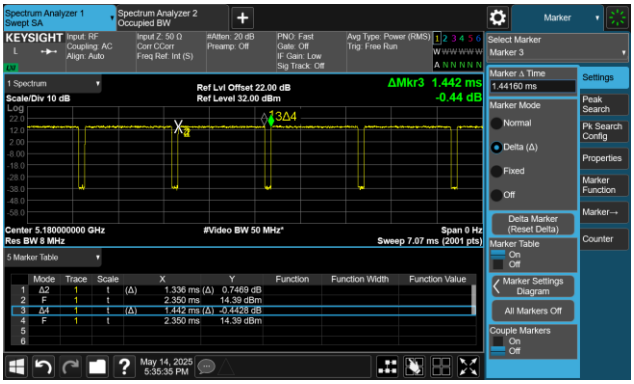
Test Mode	Duty Cycle	Test Mode	Duty Cycle
802.11a	93.07%	802.11ax-HE80	74.19%
802.11ac-VHT20	92.65%	802.11ax-HE160	63.38%
802.11ac-VHT40	86.59%	802.11be-EHT20	90.78%
802.11ac-VHT80	76.34%	802.11be-EHT40	84.18%
802.11ac-VHT160	64.48%	802.11be-EHT80	74.70%
802.11ax-HE20	90.20%	802.11be-EHT160	64.05%
802.11ax-HE40	84.20%	--	--

Duty Cycle (T = Transmission Duration)

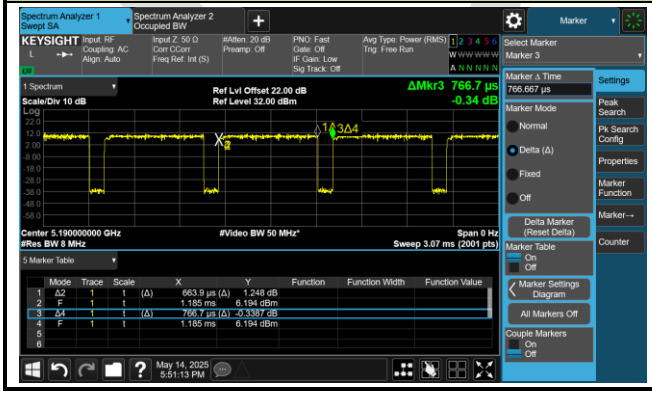
802.11a (T = 1.424ms)



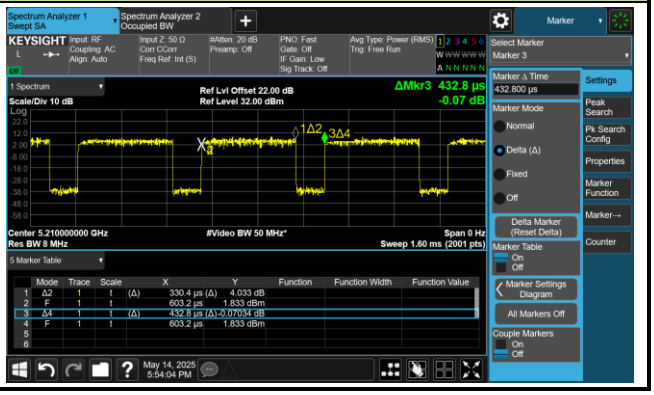
802.11ac-VHT20 (T = 1.336ms)



802.11ac-VHT40 (T = 663.9μs)

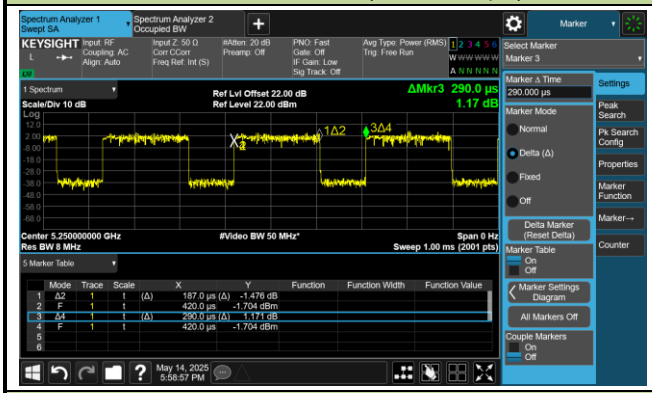


802.11ac-VHT80 (T = 330.4μs)

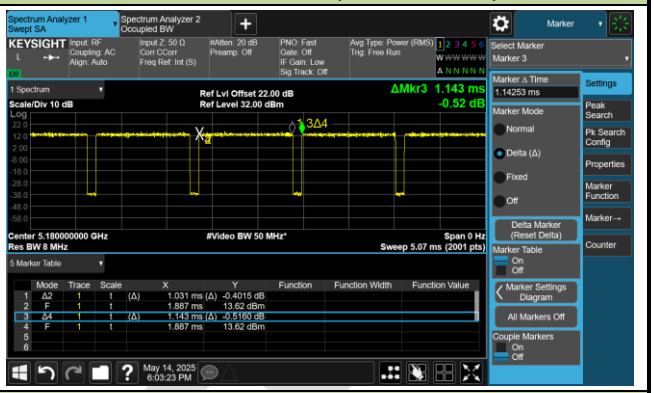


Duty Cycle (T = Transmission Duration)

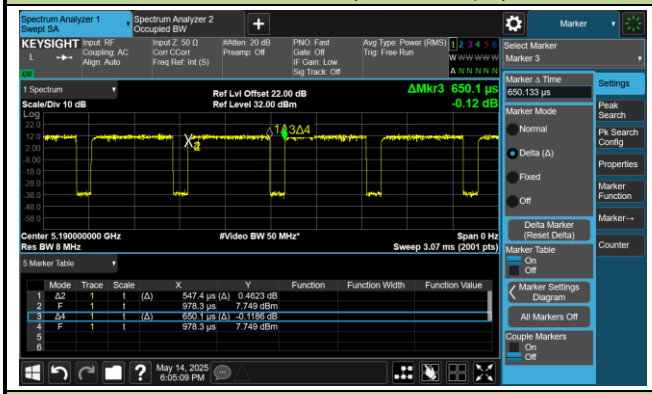
802.11ac-VHT160 (T = 187.0μs)



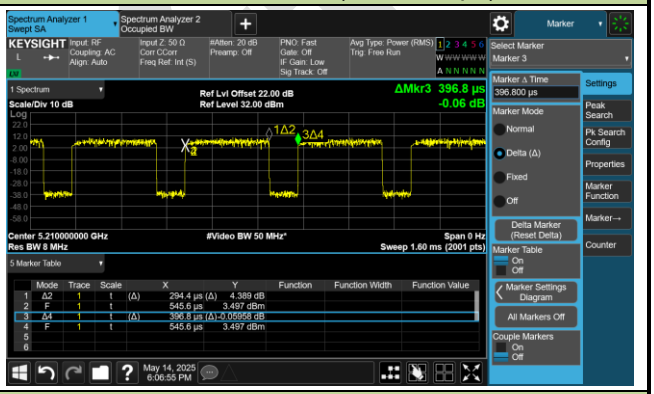
802.11ax-HE20 (T = 1.031ms)



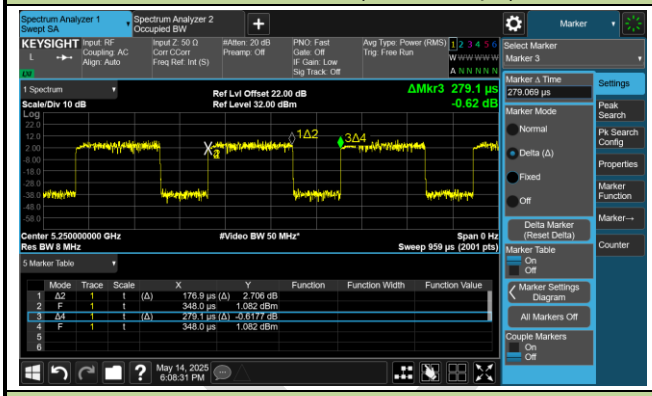
802.11ax-HE40 (T = 547.4μs)



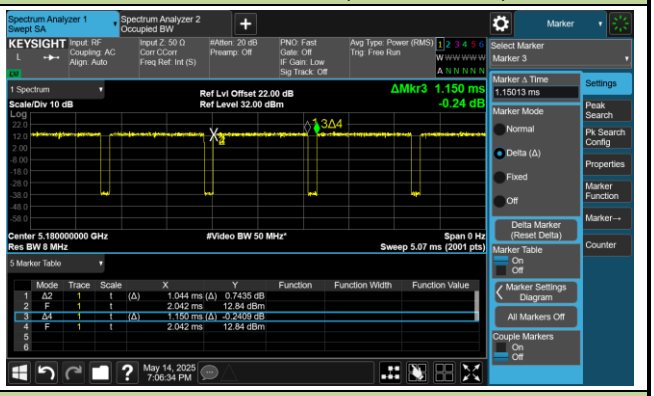
802.11ax-HE80 (T = 294.4μs)



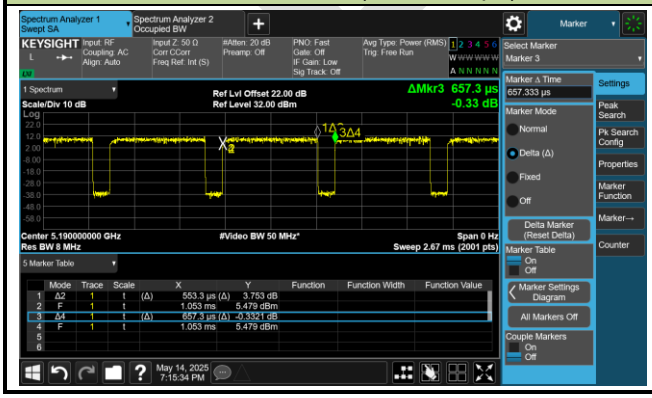
802.11ax-HE160 (T = 176.9μs)



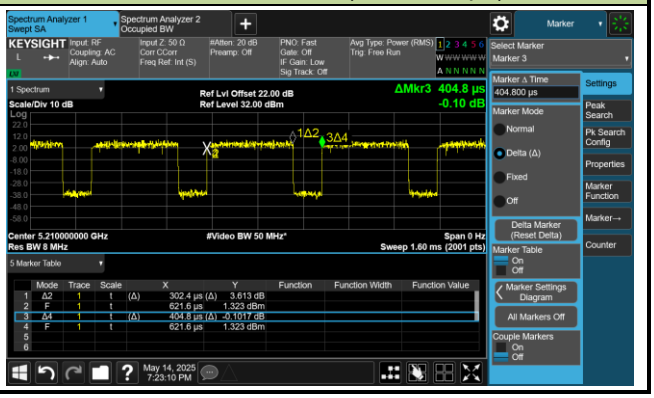
802.11be-EHT20 (T = 1.044ms)

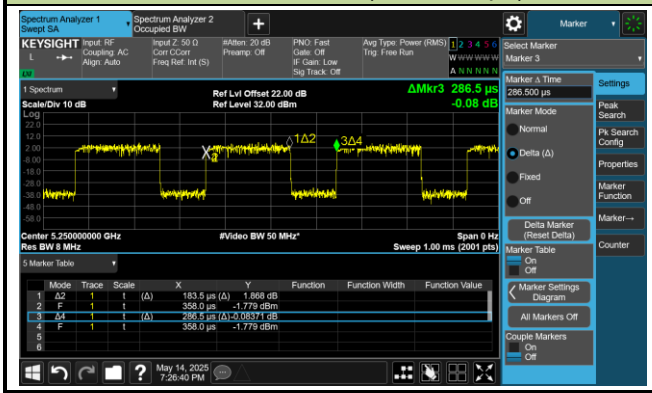


802.11be-EHT40 (T = 553.3μs)



802.11be-EHT80 (T = 302.4μs)



Duty Cycle (T = Transmission Duration)	
802.11be-EHT160 (T = 183.5μs)	
	

A.2 26dB Bandwidth Test Result

Test Site	SIP-TR1	Test Engineer	Alan Yu
Test Date	2025-05-14 ~ 2025-05-19		

Test Mode	Data Rate/ MCS	Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
11a	6Mbps	36	5180	21.14	16.808
11a	6Mbps	44	5220	27.67	17.127
11a	6Mbps	48	5240	28.58	17.194
11a	6Mbps	52	5260	29.26	17.448
11a	6Mbps	60	5300	28.77	17.282
11a	6Mbps	64	5320	26.71	17.091
11a	6Mbps	100	5500	22.80	16.779
11a	6Mbps	116	5580	29.37	17.166
11a	6Mbps	140	5700	20.95	16.592
11a	6Mbps	144	5720	24.09	16.882
11a	6Mbps	149	5745	25.13	17.167
11a	6Mbps	157	5785	25.71	16.973
11a	6Mbps	165	5825	28.16	17.207
11ac-VHT20	MCS0	36	5180	27.10	18.002
11ac-VHT20	MCS0	44	5220	28.57	18.104
11ac-VHT20	MCS0	48	5240	22.06	17.823
11ac-VHT20	MCS0	52	5260	25.48	18.177
11ac-VHT20	MCS0	60	5300	31.23	18.379
11ac-VHT20	MCS0	64	5320	24.90	18.027
11ac-VHT20	MCS0	100	5500	21.25	17.822
11ac-VHT20	MCS0	116	5580	25.33	18.180
11ac-VHT20	MCS0	140	5700	20.93	17.723
11ac-VHT20	MCS0	144	5720	24.28	18.078
11ac-VHT20	MCS0	149	5745	22.69	17.906
11ac-VHT20	MCS0	157	5785	21.82	17.891
11ac-VHT20	MCS0	165	5825	21.79	17.900

Test Mode	Data Rate/ MCS	Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
11ac-VHT40	MCS0	38	5190	39.71	36.161
11ac-VHT40	MCS0	46	5230	58.25	36.566
11ac-VHT40	MCS0	54	5270	55.32	36.727
11ac-VHT40	MCS0	62	5310	39.79	36.219
11ac-VHT40	MCS0	102	5510	39.86	36.144
11ac-VHT40	MCS0	110	5550	48.72	36.512
11ac-VHT40	MCS0	134	5670	39.87	36.315
11ac-VHT40	MCS0	142	5710	43.23	36.357
11ac-VHT40	MCS0	151	5755	41.31	36.352
11ac-VHT40	MCS0	159	5795	46.75	36.465
11ac-VHT80	MCS0	42	5210	81.04	75.548
11ac-VHT80	MCS0	58	5290	80.90	75.617
11ac-VHT80	MCS0	106	5530	80.35	75.569
11ac-VHT80	MCS0	122	5610	80.98	75.641
11ac-VHT80	MCS0	138	5690	80.22	75.565
11ac-VHT80	MCS0	155	5775	80.93	75.673
11ac-VHT160	MCS0	50	5250	164.30	154.760
11ac-VHT160	MCS0	114	5570	163.90	154.590
11ax-HE20	MCS0	36	5180	21.12	19.009
11ax-HE20	MCS0	44	5220	28.90	19.150
11ax-HE20	MCS0	48	5240	27.54	19.154
11ax-HE20	MCS0	52	5260	27.80	19.103
11ax-HE20	MCS0	60	5300	27.70	19.156
11ax-HE20	MCS0	64	5320	22.52	18.983
11ax-HE20	MCS0	100	5500	20.83	18.969
11ax-HE20	MCS0	116	5580	28.35	19.181
11ax-HE20	MCS0	140	5700	20.90	18.907
11ax-HE20	MCS0	144	5720	22.74	18.912
11ax-HE20	MCS0	149	5745	26.08	19.138
11ax-HE20	MCS0	157	5785	30.04	19.133
11ax-HE20	MCS0	165	5825	28.97	19.056

Test Mode	Data Rate/ MCS	Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
11ax-HE40	MCS0	38	5190	40.29	37.593
11ax-HE40	MCS0	46	5230	50.78	37.815
11ax-HE40	MCS0	54	5270	54.95	37.889
11ax-HE40	MCS0	62	5310	40.12	37.634
11ax-HE40	MCS0	102	5510	39.77	37.617
11ax-HE40	MCS0	110	5550	39.95	37.604
11ax-HE40	MCS0	134	5670	39.95	37.639
11ax-HE40	MCS0	142	5710	42.77	37.667
11ax-HE40	MCS0	151	5755	40.09	37.738
11ax-HE40	MCS0	159	5795	48.87	37.717
11ax-HE80	MCS0	42	5210	80.12	76.940
11ax-HE80	MCS0	58	5290	80.61	77.051
11ax-HE80	MCS0	106	5530	80.70	76.947
11ax-HE80	MCS0	122	5610	80.68	77.042
11ax-HE80	MCS0	138	5690	95.40	77.139
11ax-HE80	MCS0	155	5775	95.81	77.222
11ax-HE160	MCS0	50	5250	164.60	156.090
11ax-HE160	MCS0	114	5570	165.10	156.080
11be-EHT20	MCS0	36	5180	23.90	19.018
11be-EHT20	MCS0	44	5220	25.64	19.172
11be-EHT20	MCS0	48	5240	29.78	19.110
11be-EHT20	MCS0	52	5260	29.07	19.189
11be-EHT20	MCS0	60	5300	29.93	19.203
11be-EHT20	MCS0	64	5320	26.09	19.114
11be-EHT20	MCS0	100	5500	21.17	18.972
11be-EHT20	MCS0	116	5580	31.56	19.316
11be-EHT20	MCS0	140	5700	21.13	18.929
11be-EHT20	MCS0	144	5720	26.83	19.078
11be-EHT20	MCS0	149	5745	24.20	19.040
11be-EHT20	MCS0	157	5785	28.39	19.121
11be-EHT20	MCS0	165	5825	28.09	19.142

Test Mode	Data Rate/ MCS	Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
11be-EHT40	MCS0	38	5190	40.40	37.611
11be-EHT40	MCS0	46	5230	47.33	37.920
11be-EHT40	MCS0	54	5270	66.98	38.030
11be-EHT40	MCS0	62	5310	40.34	37.665
11be-EHT40	MCS0	102	5510	40.16	37.593
11be-EHT40	MCS0	110	5550	49.69	37.696
11be-EHT40	MCS0	134	5670	40.87	37.720
11be-EHT40	MCS0	142	5710	50.01	37.850
11be-EHT40	MCS0	151	5755	49.97	37.822
11be-EHT40	MCS0	159	5795	49.87	37.846
11be-EHT80	MCS0	42	5210	81.40	77.088
11be-EHT80	MCS0	58	5290	81.72	77.187
11be-EHT80	MCS0	106	5530	81.44	76.850
11be-EHT80	MCS0	122	5610	90.88	77.158
11be-EHT80	MCS0	138	5690	88.74	77.406
11be-EHT80	MCS0	155	5775	90.61	77.249
11be-EHT160	MCS0	50	5250	165.40	156.220
11be-EHT160	MCS0	114	5570	166.00	156.040

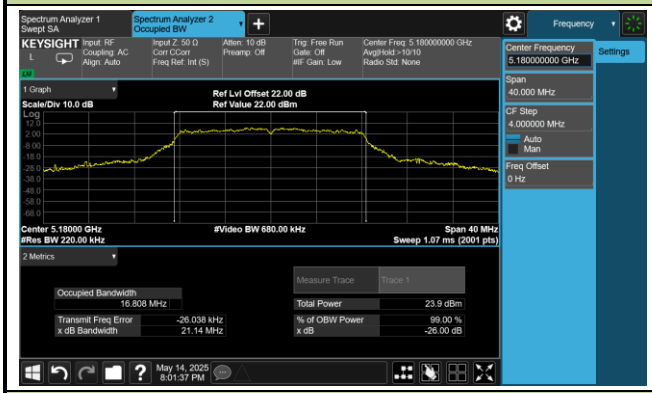
Test Mode	Data Rate/ MCS	Channel No.	Frequency (MHz)	F_H (MHz)	Limit (MHz)
802.11a	6Mbps	48	5240	5248.60	< 5250
802.11ac-VHT20	MCS0	48	5240	5248.91	< 5250
802.11ac-VHT40	MCS0	46	5230	5248.28	< 5250
802.11ac-VHT80	MCS0	42	5210	5247.77	< 5250
802.11ax-HE20	MCS0	48	5240	5249.58	< 5250
802.11ax-HE40	MCS0	46	5230	5248.91	< 5250
802.11ax-HE80	MCS0	42	5210	5248.47	< 5250
802.11be-EHT20	MCS0	48	5240	5249.56	< 5250
802.11be-EHT40	MCS0	46	5230	5248.96	< 5250
802.11be-EHT80	MCS0	42	5210	5248.54	< 5250

Note: F_H = Centre frequency + 99% OBW / 2.

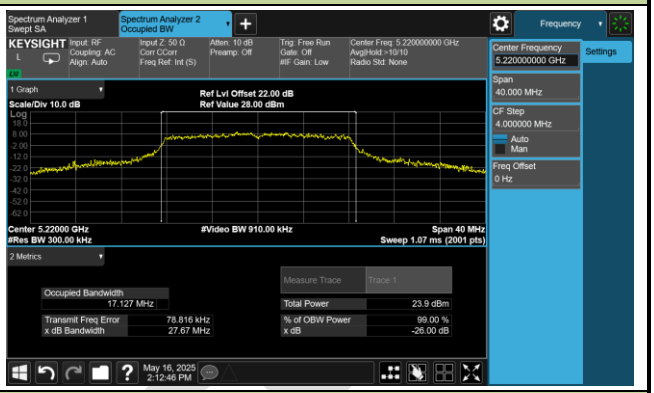
For example, 802.11a 5240MHz, F_H = 5240 MHz + 17.194 MHz / 2 = 5248.60 MHz.

802.11a 26dB Bandwidth & 99% Bandwidth

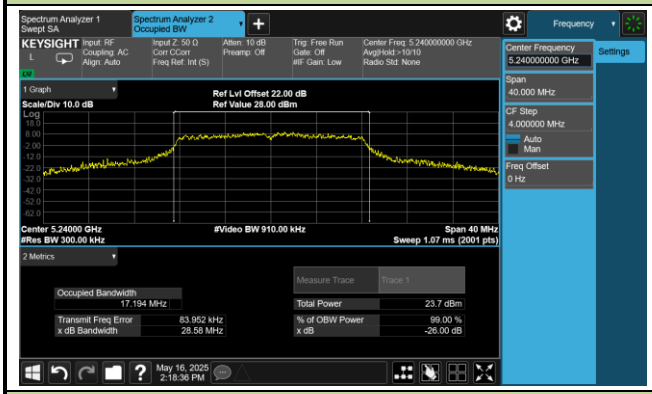
Channel 36 (5180MHz)



Channel 44 (5220MHz)

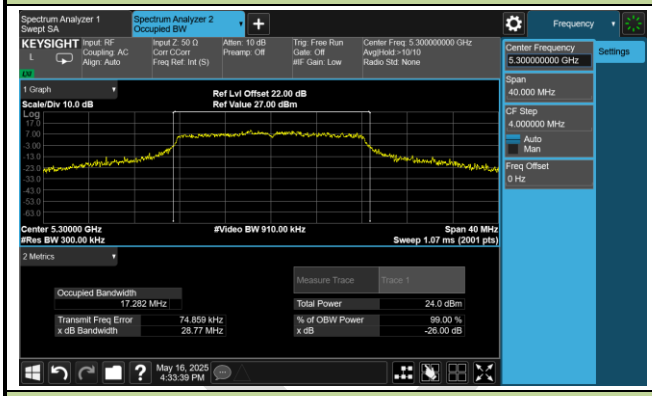


Channel 48 (5240MHz)



Channel 52 (5260MHz)

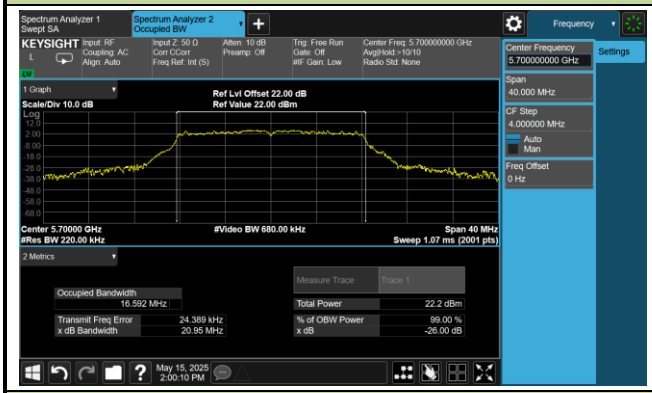
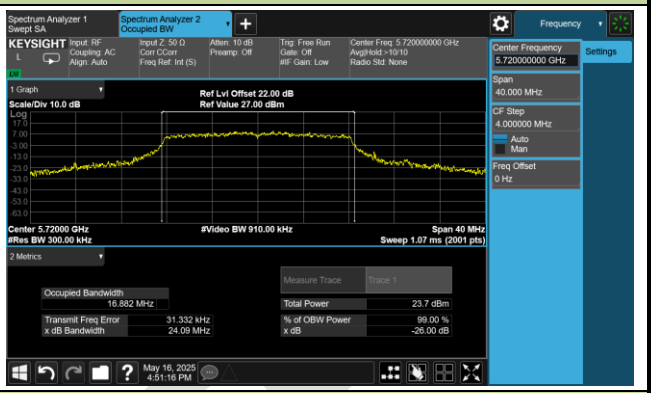
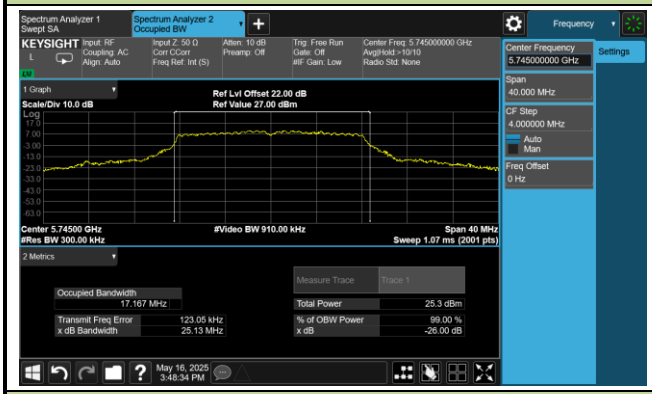
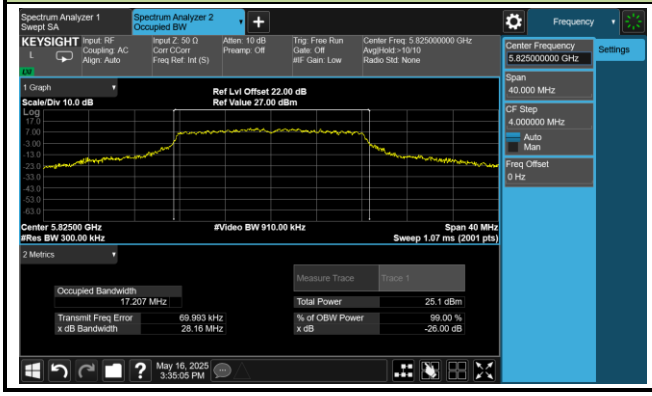
Channel 60 (5300MHz)



Channel 64 (5320MHz)

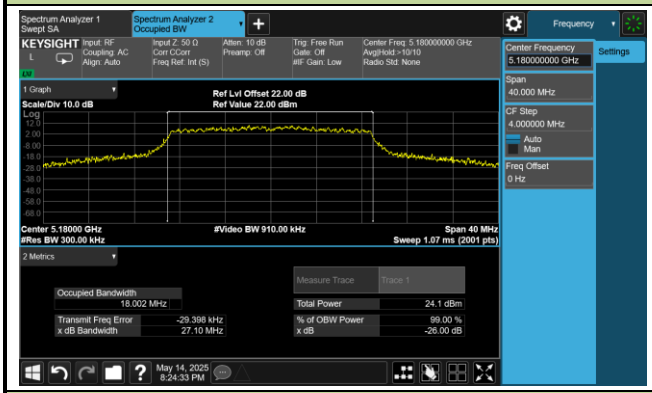
Channel 100 (5500MHz)

Channel 116 (5580MHz)

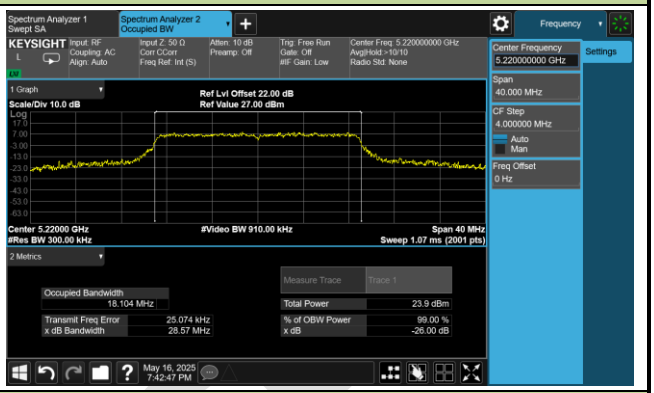
802.11a 26dB Bandwidth & 99% Bandwidth	
Channel 140 (5700MHz)	Channel 144(5720MHz)
	
Channel 149 (5745MHz)	Channel 157 (5785MHz)
	
Channel 165 (5825MHz)	
	

802.11ac-VHT20 26dB Bandwidth & 99% Bandwidth

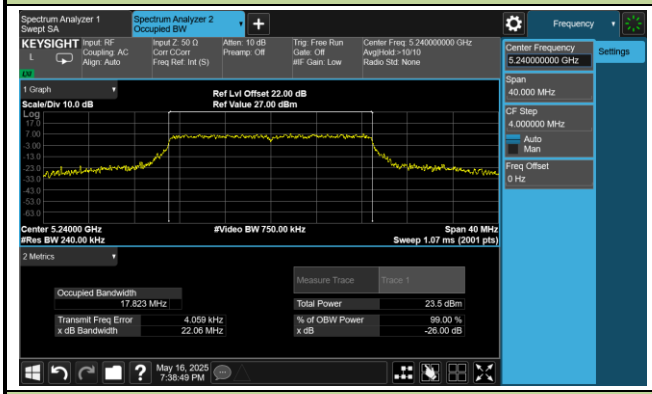
Channel 36 (5180MHz)



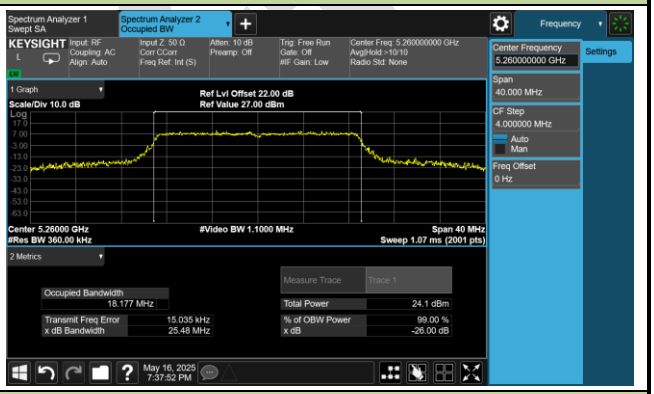
Channel 44 (5220MHz)



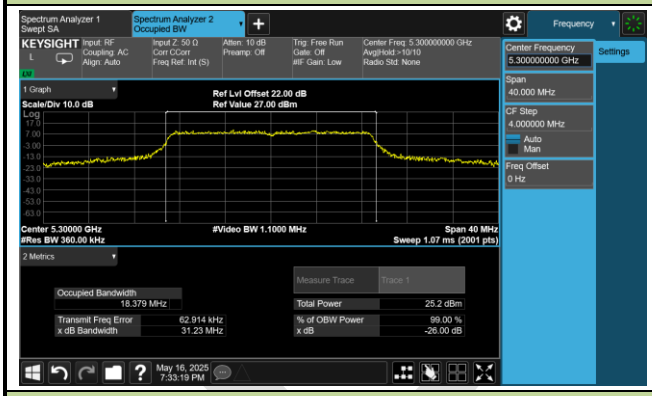
Channel 48 (5240MHz)



Channel 52 (5260MHz)

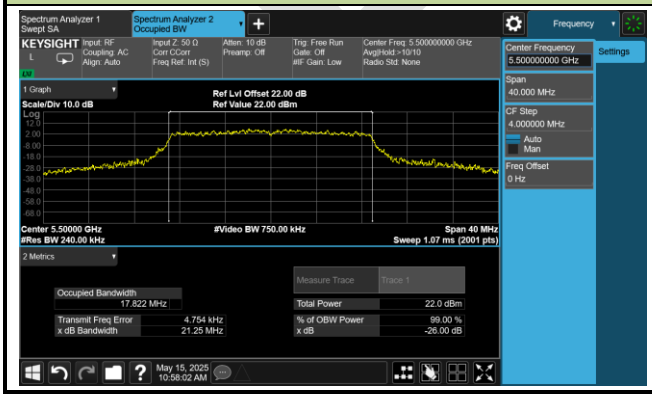


Channel 60 (5300MHz)

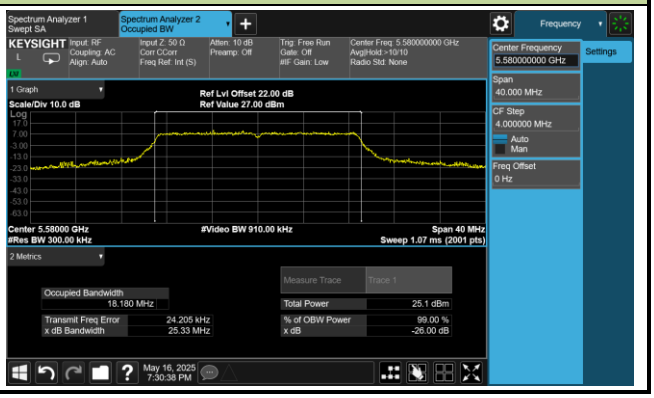


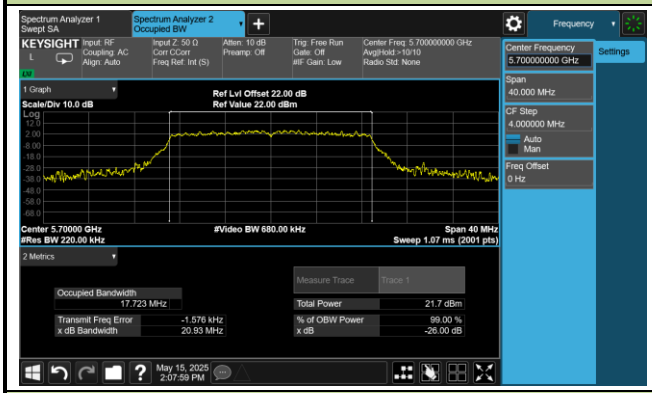
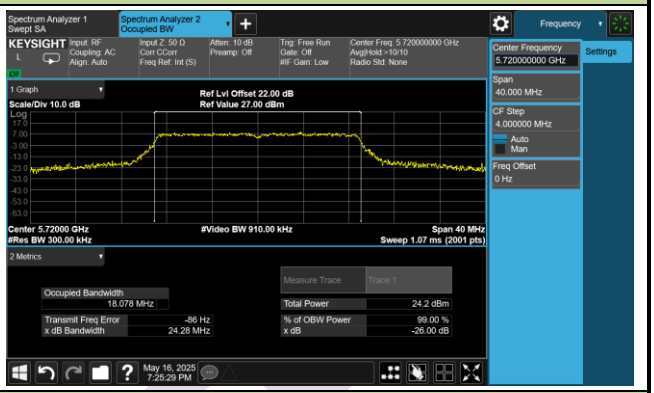
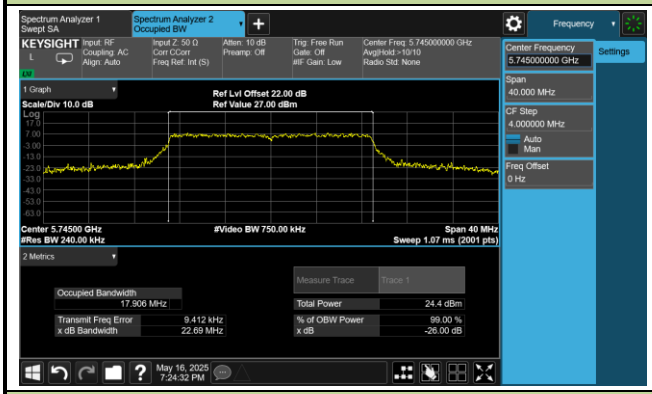
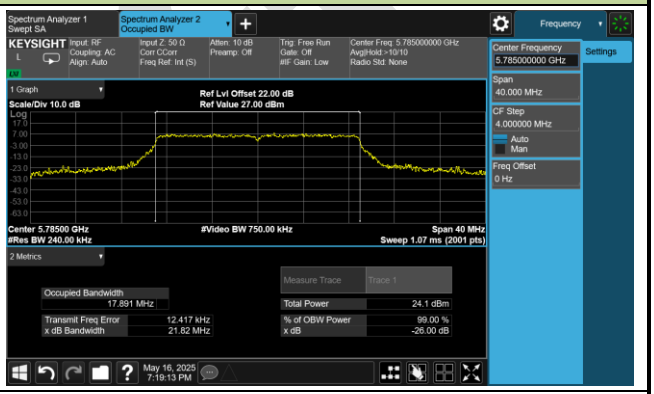
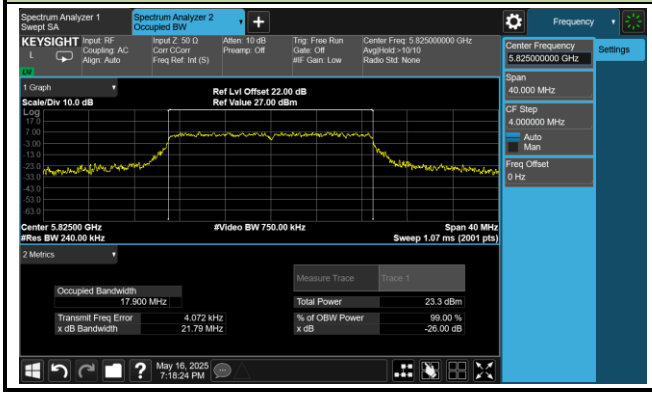
Channel 64 (5320MHz)

Channel 100 (5500MHz)



Channel 116 (5580MHz)

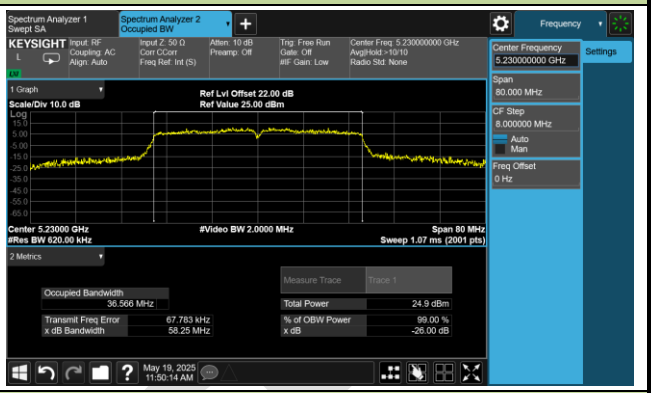


802.11ac-VHT20 26dB Bandwidth & 99% Bandwidth	
Channel 140 (5700MHz)	Channel 144(5720MHz)
	
Channel 149 (5745MHz)	Channel 157 (5785MHz)
	
Channel 165 (5825MHz)	
	

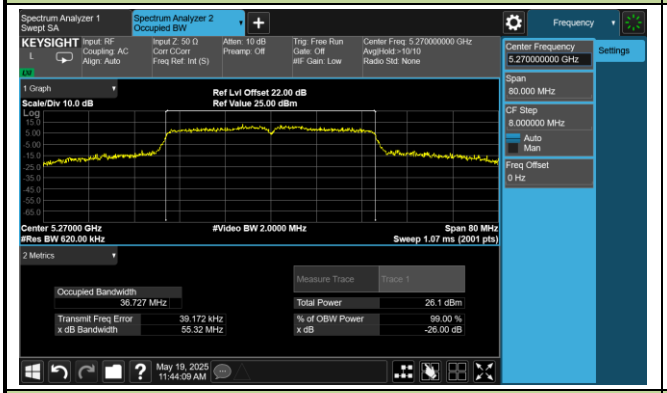
802.11ac-VHT40 26dB Bandwidth & 99% Bandwidth

Channel 38 (5190MHz)

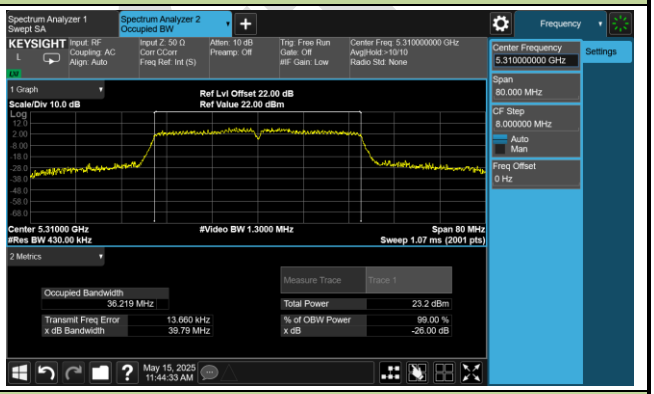
Channel 46 (5230MHz)



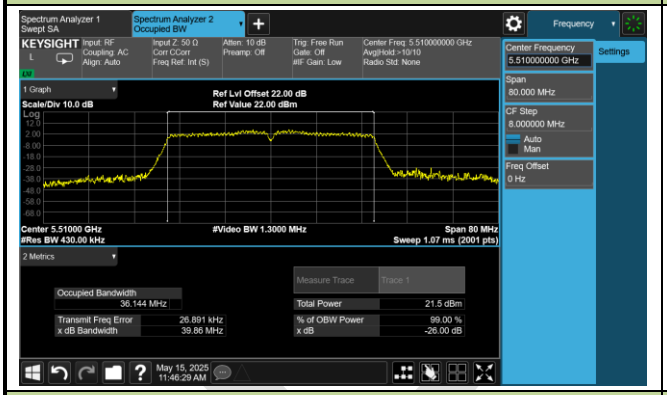
Channel 54 (5270MHz)



Channel 62 (5310MHz)

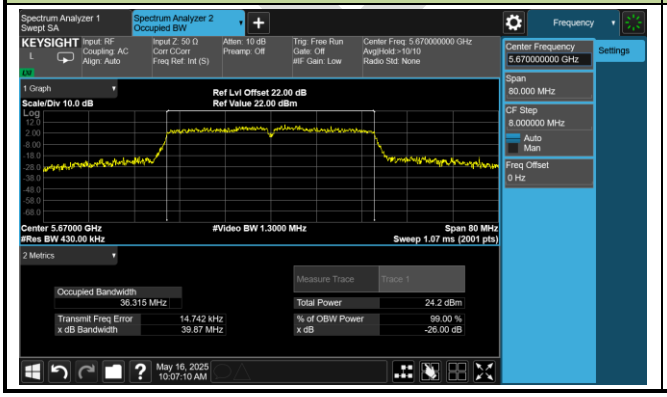


Channel 102 (5510MHz)

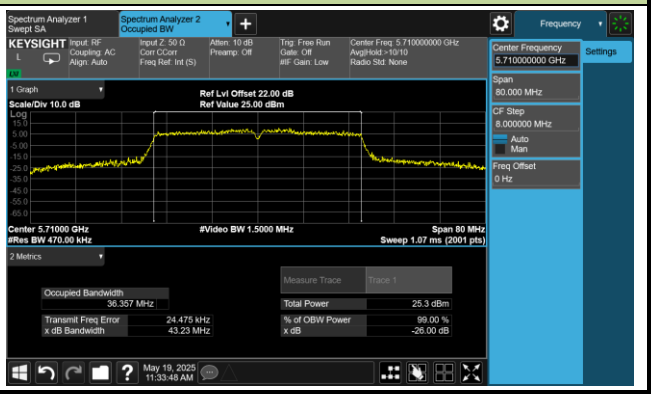


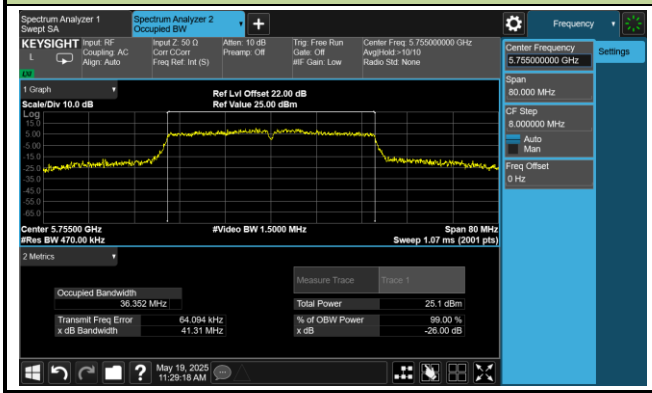
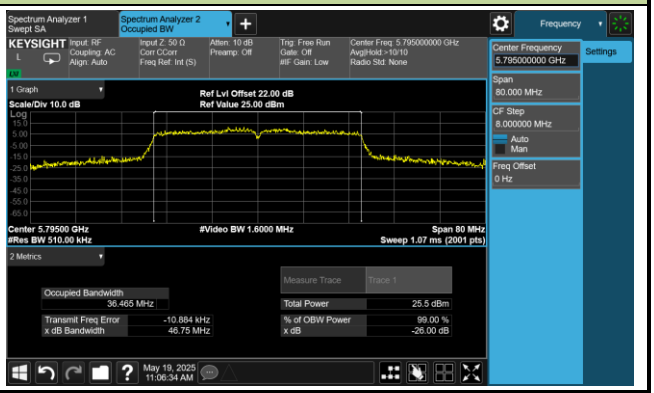
Channel 110 (5550MHz)

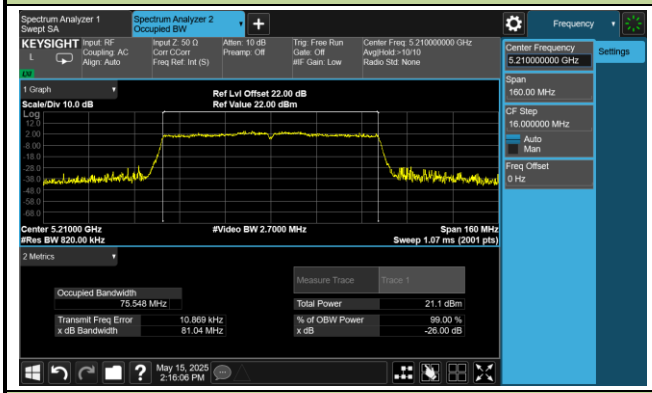
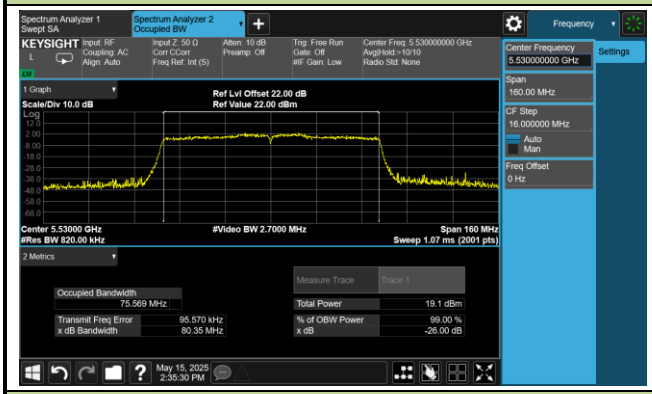
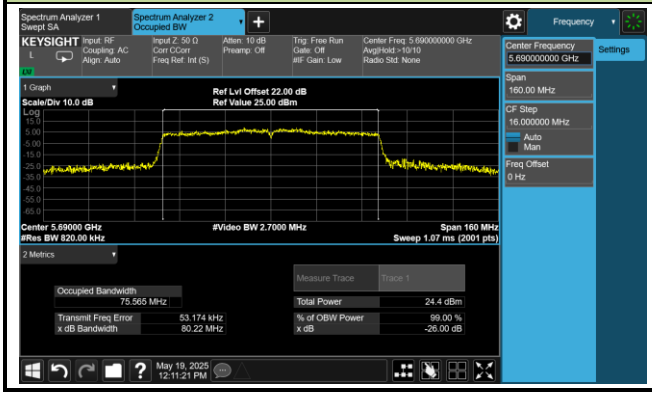
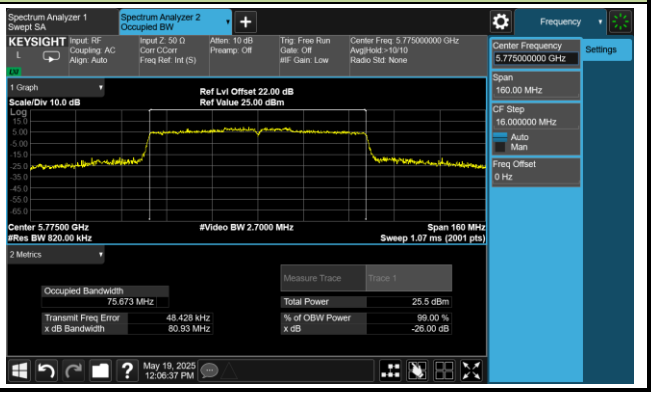
Channel 134 (5670MHz)

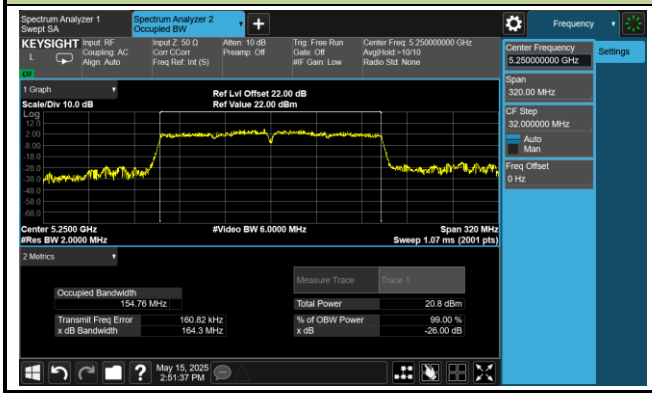
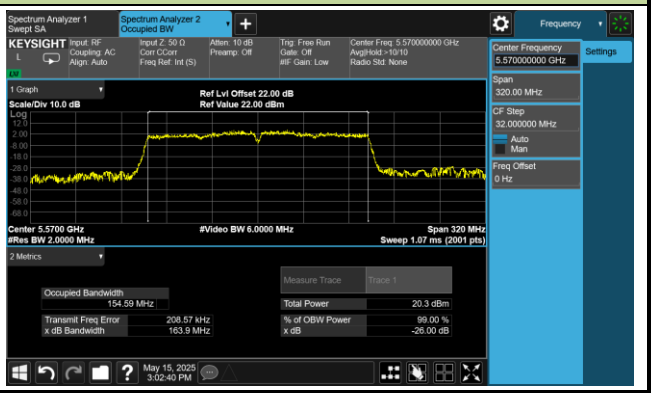


Channel 142(5710MHz)



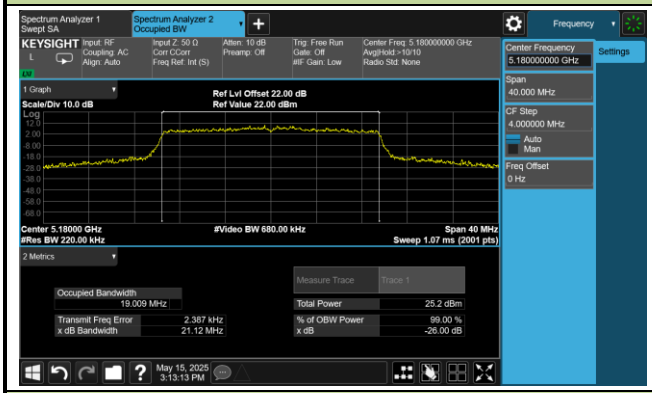
802.11ac-VHT40 26dB Bandwidth & 99% Bandwidth	
Channel 151 (5755MHz)	Channel 159 (5795MHz)
	

802.11ac-VHT80 26dB Bandwidth & 99% Bandwidth	
Channel 42 (5210MHz)	Channel 58 (5290MHz)
	
Channel 106 (5530MHz)	Channel 122 (5610MHz)
	
Channel 138 (5690MHz)	Channel 155 (5775MHz)
	

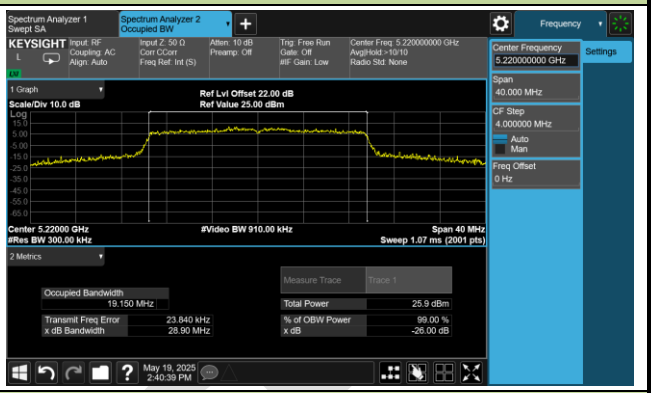
802.11ac-VHT160 26dB Bandwidth & 99% Bandwidth	
Channel 50 (5250MHz)	Channel 114 (5570MHz)
	

802.11ax-HE20 26dB Bandwidth & 99% Bandwidth

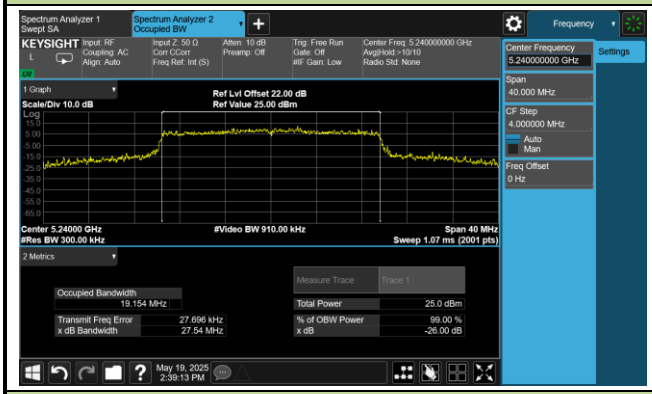
Channel 36 (5180MHz)



Channel 44 (5220MHz)

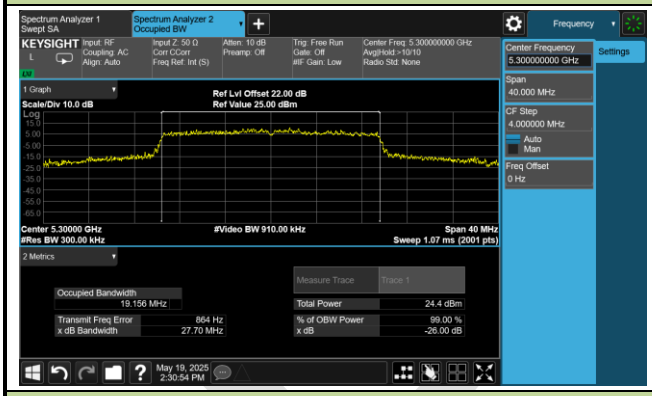


Channel 48 (5240MHz)



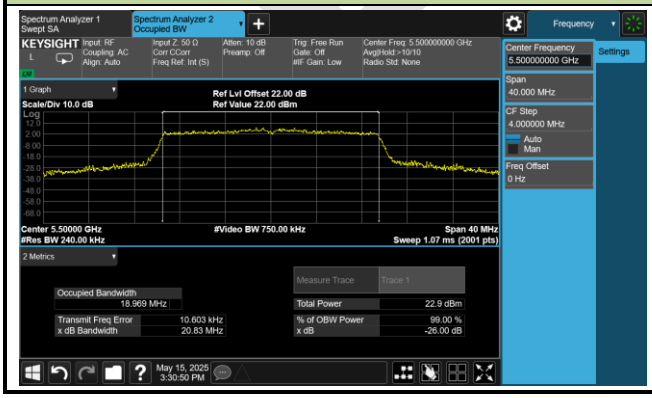
Channel 52 (5260MHz)

Channel 60 (5300MHz)

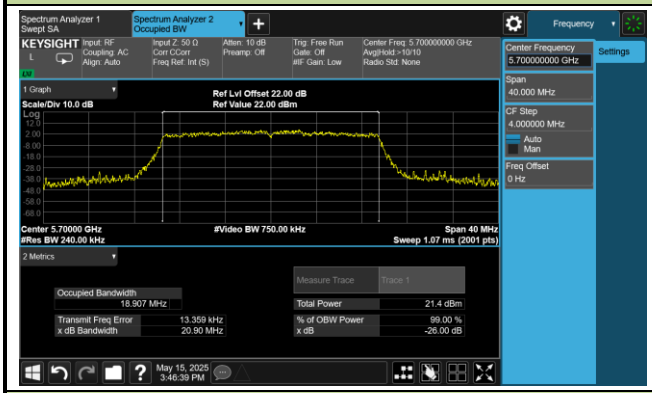
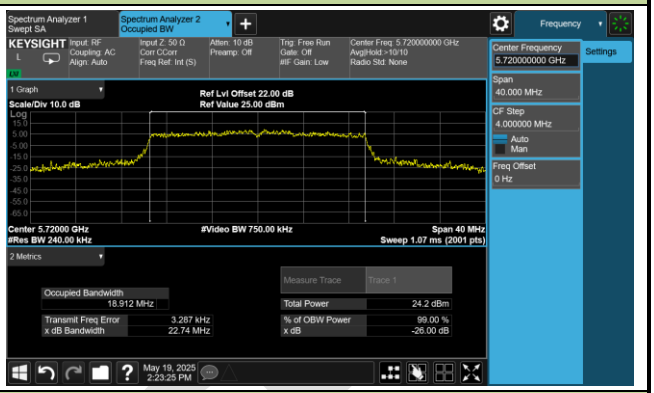
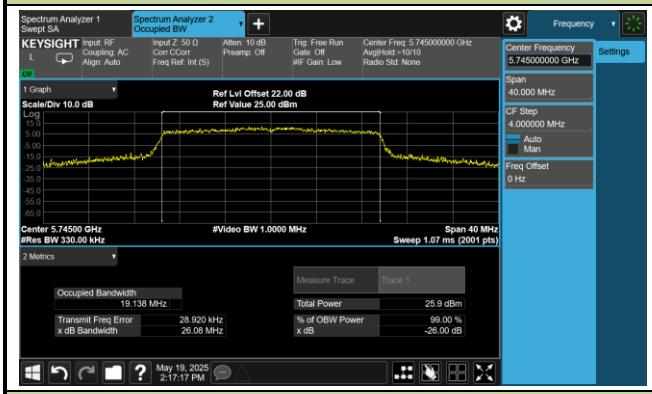
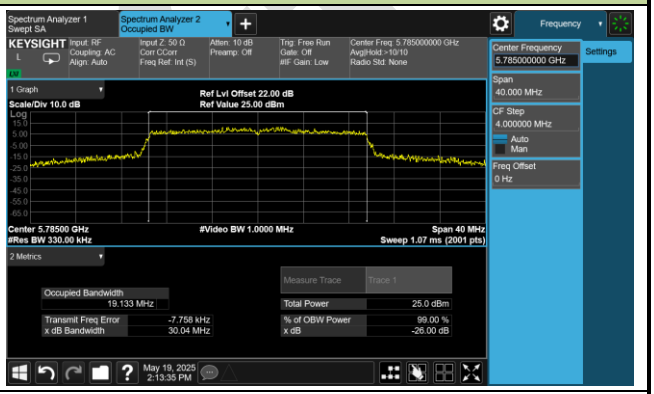


Channel 64 (5320MHz)

Channel 100 (5500MHz)



Channel 116 (5580MHz)

802.11ax-HE20 26dB Bandwidth & 99% Bandwidth	
Channel 140 (5700MHz)	Channel 144(5720MHz)
	
Channel 149 (5745MHz)	Channel 157 (5785MHz)
	
Channel 165 (5825MHz)	