RF MEASUREMENT REPORT

FCC ID:	2BH7FRE405BE
Applicant:	TP-Link Systems Inc.
Product:	BE6500 Wi-Fi 7 Range Extender, BE6300 Wi-Fi 7 Range Extender
Model No.:	RE405BE, RE403BE
Brand Name:	tp-link
FCC Classification:	Digital Transmission System (DTS)
FCC Rule Part(s):	Part 15 Subpart C (Section 15.247)
Result:	Complies
Received Date:	2025-01-10
Test Date:	2025-01-14 ~ 2025-02-24

Reviewed By: Kevin Guo

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 ANSI C63.10-2013. 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
R25S1019019-U201	V01	Initial Report	2025-04-22	Valid

CONTENTS

Description Page

1. General Information 5

1.1. Applicant 5
1.2. Manufacturer 5
1.3. Testing Facility 5
1.4. Product Information 6
1.5. Radio Specification under Test 7
1.6. Working Frequencies 7
1.7. Antenna Details 8

2. Test Configuration 9

2.1. Test Mode 9
2.2. Test System Connection Diagram 10
2.3. Test Software 10
2.4. Applied Standards 11
2.5. Test Environment Condition 11

3. Antenna Requirements 12

4. Measuring Instrument 13

5. Decision Rules and Measurement Uncertainty 14

5.1. Decision Rules 14
5.2. Measurement Uncertainty 14

6. Test Result 15

6.1. Summary 15
6.2. 6dB Bandwidth Measurement 16
6.2.1. Test Limit 16
6.2.2. Test Procedure 16
6.2.3. Test Setting 16
6.2.4. Test Setup 16
6.2.5. Test Result 16
6.3. Output Power Measurement 17
6.3.1. Test Limit 17
6.3.2. Test Procedure 17
6.3.3. Test Setting 17
6.3.4. Test Setup 17
6.3.5. Test Result 17
6.4. Power Spectral Density Measurement 18
6.4.1. Test Limit 18

6.4.2. Test Procedure 18
6.4.3. Test Setting 18
6.4.4. Test Setup 18
6.4.5. Test Result 19
6.5. Conducted Band Edge and Out-of-Band Emissions Measurement 20
6.5.1. Test Limit 20
6.5.2. Test Procedure 20
6.5.3. Test Setting 20
6.5.4. Test Setup 21
6.5.5. Test Result 21
6.6. Radiated Spurious Emission Measurement 22
6.6.1. Test Limit 22
6.6.2. Test Procedure 22
6.6.3. Test Setting 22
6.6.4. Test Setup 24
6.6.5. Test Result 25
6.7. Radiated Restricted Band Edge Measurement 26
6.7.1. Test Limit 26
6.7.2. Test Procedure 27
6.7.3. Test Setting 27
6.7.4. Test Setup 28
6.7.5. Test Result 28
6.8. AC Conducted Emissions Measurement 29
6.8.1. Test Limit 29
6.8.2. Test Setup 29
6.8.3. Test Result 29

Appendix A – Test Result 30

A.1 Duty Cycle Test Result 30
A.2 6dB Bandwidth Test Result 32
A.3 Output Power Test Result 37
A.4 Power Spectral Density Test Result 38
A.5 Conducted Band Edge and Out-of-Band Emissions Test Result 55
A.6 Radiated Spurious Emission Test Result 88
A.7 Radiated Restricted Band Edge Test Result 98
A.8 AC Conducted Emissions Test Result 198

Appendix B – Test Setup Photograph 202

Appendix C – EUT Photograph 203

1. General Information

1.1. Applicant

TP-Link Systems Inc.

10 Mauchly, Irvine, CA 92618

1.2. Manufacturer

TP-Link Systems Inc.

10 Mauchly, Irvine, CA 92618

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	BE6500 Wi-Fi 7 Range Extender, BE6300 Wi-Fi 7 Range Extender
Model No.	RE405BE, RE403BE
EUT Identification No.	20250110Sample#02 (Conducted) 20250110Sample#01 (Radiated)
Wi-Fi Specification	802.11a/b/g/n/ac/ax/be
Antenna Information	Refer to section 1.7
Operating Temperature	0 ~ 40 °C
Power Type	AC 100-240V~50/60Hz

Notes:

1. The information of EUT was provided by the manufacturer, and the accuracy of the information shall be the responsibility of the manufacturer.
2. The differences between the two products are the name and model No.

1.5. Radio Specification under Test

Frequency Range	802.11b/g/n-HT20/ax-HE20/be-EHT20: 2412 ~ 2462MHz 802.11n-HT40/ax-HE40/be-EHT40: 2422 ~ 2452MHz	
Channel Number	802.11b/g/n-HT20/ax-HE20/be-EHT20: 11 802.11n-HT40/ax-HE40/be-EHT40: 7	
Type of Modulation	802.11b: DSSS 802.11g/n: OFDM 802.11ax/be: OFDMA	
Data Rate	802.11b: 1/2/5.5/11Mbps 802.11g: 6/9/12/18/24/36/48/54Mbps 802.11n: up to 300Mbps 802.11ax: up to 573.6Mbps 802.11be: up to 688Mbps	
Channel Puncturing Function	☐ Supported	☒ Unsupported
Support RU	☒ Full RU	☐ Partial RU

1.6. Working Frequencies

802.11b/g/n-HT20/ax-HE20/be-EHT20

Channel	Frequency	Channel	Frequency	Channel	Frequency
01	2412 MHz	02	2417 MHz	03	2422 MHz
04	2427 MHz	05	2432 MHz	06	2437 MHz
07	2442 MHz	08	2447 MHz	09	2452 MHz
10	2457 MHz	11	2462 MHz	--	--

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

Channel	Frequency	Channel	Frequency	Channel	Frequency
03	2422 MHz	04	2427 MHz	05	2432 MHz
06	2437 MHz	07	2442 MHz	08	2447 MHz
09	2452 MHz	--	--	--	--

1.7. Antenna Details

Antenna Type	Frequency Band (MHz)	T_X Paths	Antenna Gain (dBi)				Beamforming Directional Gain (dBi)	CDD Directional Gain (dBi)	
			Ant 0	Ant 1	Ant 2	Ant 3		For Power	For PSD
Dipole	2400 ~ 2483.5	2	3.89	2.51	--	--	5.49	2.61	5.49
	5150 ~ 5250	4	5.43	4.20	2.71	1.48	8.41	2.55	8.41
	5250 ~ 5350	4	4.95	4.16	2.88	1.84	8.04	2.36	8.04
	5470 ~ 5725	4	5.11	5.41	3.22	2.90	8.52	2.77	8.52
	5725 ~ 5850	4	5.24	4.71	3.38	2.50	7.92	2.30	7.92

Note 1: The device supports CDD Mode and Beamforming Mode, details refer to the table as below.

Note 2: The device supports 2 N_{SS} for 2.4GHz Wi-Fi, supports 4 N_{SS} for 5GHz Wi-Fi and power level is the same of spatial multiplexing. The worst case is N_{SS}=1.

Note 3: For CDD Mode, directional gain is calculated as follows.

For Power measurements: the max directional gain = $10 \log[(10^{G1/10} + 10^{G2/10} + \ldots + 10^{GN/10}) / N_{ANT}]$

For PSD measurements: the max directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2 / N_{ANT}]$.

Note 4: For Beamforming Mode, the directional is calculated as follows.

the max directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2 / N_{ANT}]$.

Note 5: The information as above is from the antenna report.

Test Mode	Tx Paths	CDD Mode	Beamforming Mode
802.11b/g (DTS)	2	√	×
802.11n/ax/be (DTS)	2	√	√
802.11a (NII)	4	√	×
802.11n/ac/ax/be (NII)	4	√	√

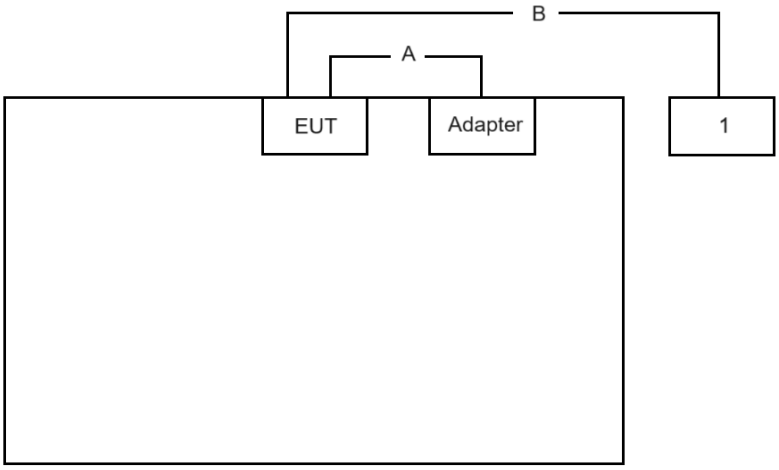
2. Test Configuration

2.1. Test Mode

CDD Mode
Mode 1: Transmit by 802.11b_N_{SS}=1 (1Mbps)
Mode 2: Transmit by 802.11g_N_{SS}=1 (6Mbps)
Mode 3: Transmit by 802.11n-HT20_N_{SS}=1 (MCS0)
Mode 4: Transmit by 802.11n-HT40_N_{SS}=1 (MCS0)
Mode 5: Transmit by 802.11ax-HE20_N_{SS}=1 (MCS0)
Mode 6: Transmit by 802.11ax-HE40_N_{SS}=1 (MCS0)
Mode 7: Transmit by 802.11be-EHT20_N_{SS}=1 (MCS0)
Mode 8: Transmit by 802.11be-EHT40_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 CDD mode, this device supports 2 N_{SS} and power level is the same of spatial multiplexing. The worst case is N_{SS}=1. 3. For Beamforming operation, the manufacturer automatically reduces power based on a factor calculated as the difference between the beamforming directional gain and the CDD directional power gain. Thus, only the CDD mode was evaluated in this report.

2.2. Test System Connection Diagram

The device was tested per the guidance ANSI C63.10: 2013 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	1.5 m
B	LAN Cable	Non shielded, Cat.5e	> 10.0 m
Product		Manufacturer	Model No.
1	Notebook	Lenovo	E430C

2.3. Test Software

The test utility software used during testing was “QSPR”, and the version was 5.0-00202.
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 15.247
- KDB 558074 D01v05r02
- KDB 662911 D01v02r01
- ANSI C63.10-2013

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	MRTSUE07111	1 year	2025-04-18	WJ-AC2
EXA Signal Analyzer	Keysight	N9010B	MRTSUE07147	1 year	2025-04-28	WJ-AC2
Active Loop Antenna	Schwarzbeck	FMZB 1519-60 D	MRTSUE07076	1 year	2025-11-19	WJ-AC2
TRILOG Broad Band Antenna	Schwarzbeck	VULB 9163	MRTSUE07097	1 year	2025-04-24	WJ-AC2
Horn Antenna	EMCI	DRH18-E	MRTSUE07105	1 year	2025-05-12	WJ-AC2
Broadband Horn Antenna	Schwarzbeck	BBHA 9170	MRTSUE07100	1 year	2025-04-24	WJ-AC2
Preamplifier	EMCI	EMC118A45SE	MRTSUE07102	1 year	2025-04-11	WJ-AC2
Preamplifier	EMCI	EMC184045SE	MRTSUE07103	1 year	2025-04-14	WJ-AC2
Thermohygrometer	testo	608-H1	MRTSUE11315	1 year	2025-06-24	WJ-AC2
Thermohygrometer	testo	608-H1	MRTSUE11332	1 year	2025-06-24	WJ-AC2
Anechoic Chamber	TDK	WJ-AC2	MRTSUE07117	1 year	2025-05-14	WJ-AC2
EXA Signal Analyzer	Keysight	N9010B	MRTSUE07148	1 year	2025-05-11	WJ-AC1
Horn Antenna	ETS	3117	MRTSUE06257	1 year	2025-09-08	WJ-AC1
Preamplifier	EMCI	EMC001330	MRTSUE06643	1 year	2025-05-14	WJ-AC1
Thermohygrometer	testo	608-H1	MRTSUE11314	1 year	2025-06-24	WJ-AC1
Thermohygrometer	testo	608-H1	MRTSUE11333	1 year	2025-06-24	WJ-AC1
Anechoic Chamber	TDK	WJ-AC1	MRTSUE07115	1 year	2025-05-17	WJ-AC1
EMI Test Receiver	R&S	ESR3	MRTSUE07112	1 year	2025-04-21	WJ-SR5
Two-Line V-Network	R&S	ENV216	MRTSUE07201	1 year	2025-05-26	WJ-SR5
Thermohygrometer	testo	608-H1	MRTSUE11317	1 year	2025-06-24	WJ-SR5
Shielding Room	TDK	WJ-SR5	MRTSUE07127	N/A	N/A	WJ-SR5
USB Power Sensor	Keysight	U2021XA	MRTSUE07141	1 year	2025-03-23	WJ-SR2
EXA Signal Analyzer	Keysight	N9010B	MRTSUE07147	1 year	2025-04-28	WJ-SR2
Attenuator	MVE	MVE2213	MRTSUE11075	1 year	2025-06-05	WJ-SR2
Thermohygrometer	testo	608-H1	MRTSUE11330	1 year	2025-06-24	WJ-SR2
Shielding Room	TDK	WJ-SR2	MRTSUE07124	N/A	N/A	WJ-SR2

Software	Version	Function
e3	230711	EMI Test Software
CONTROLLER CO3000	v 1.03.02	RE Antenna & Turntable
Agilent Power Panel	V 3.9	Power

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: 2.61dB Coplanar: 9kHz~30MHz: 2.62dB Horizontal: 30MHz~200MHz: 3.79dB 200MHz~1GHz: 3.91dB 1GHz~40GHz: 4.99dB Vertical: 30MHz~200MHz: 4.06dB 200MHz~1GHz: 5.21dB 1GHz~40GHz: 4.90dB
Spurious Emissions, Conducted
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 2.2dB
Output Power
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 1.4dB
Power Spectrum Density
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 2.2dB
Occupied Bandwidth
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 2.7%

6. Test Result

6.1. Summary

FCC Section(s)	Test Description	Test Condition	Verdict
15.247(a)(2)	6dB Bandwidth	Conducted	Pass
15.247(b)(3)	Output Power		Pass
15.247(e)	Power Spectral Density		Pass
15.247(d)	Band Edge / Out-of-Band Emissions		Pass
15.205 15.209	General Field Strength (Restricted Bands and Radiated Emission)	Radiated	Pass
15.207	AC Conducted Emissions 150kHz - 30MHz	Line Conducted	Pass

Notes:

1. The analyzer plots shown in this section were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables and attenuators used as part of the system to connect the EUT to the analyzer at all frequencies of interest.
2. For radiated emission tests, every axis (X, Y, Z) was also verified. The test results shown in the following sections represent the worst-case emissions.

6.2. 6dB Bandwidth Measurement

6.2.1. Test Limit

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

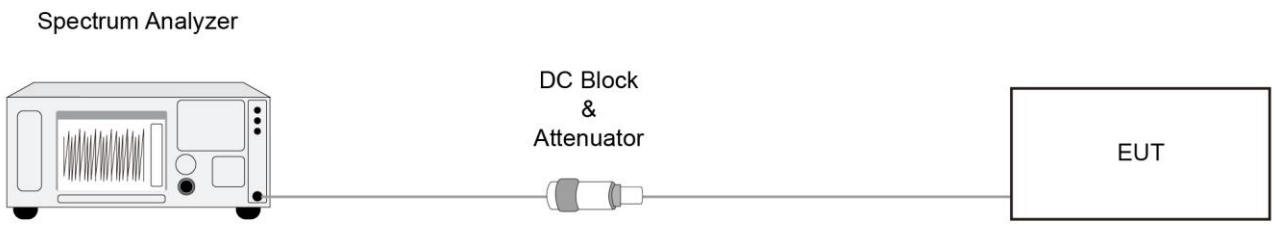
6.2.2. Test Procedure

ANSI C63.10 - 2013 - Section 11.8

6.2.3. Test Setting

1. The Spectrum's automatic bandwidth measurement capability was used to perform the 6dB bandwidth measurement. The "X" dB bandwidth parameter was set to X = 6. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. Set 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.

6.2.4. Test Setup



6.2.5. Test Result

Refer to Appendix A.2.

6.3. Output Power Measurement

6.3.1. Test Limit

The maximum output power shall be less 1 Watt (30dBm).

The conducted output power limit specified in paragraph FCC Part 15.247(b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs FCC Part 15.247(b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

6.3.2. Test Procedure

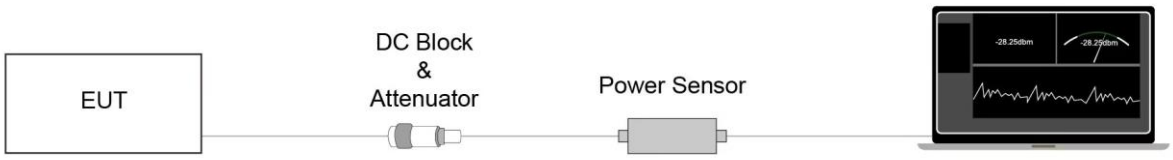
ANSI C63.10 - 2013 - Section 11.9.2.3.2

6.3.3. Test Setting

Average Power Measurement

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.

6.3.4. Test Setup



6.3.5. Test Result

Refer to Appendix A.3.

6.4. Power Spectral Density Measurement

6.4.1. Test Limit

The maximum permissible power spectral density is 8dBm in any 3 kHz band.

The same method of determining the conducted output power shall be used to determine the power spectral density.

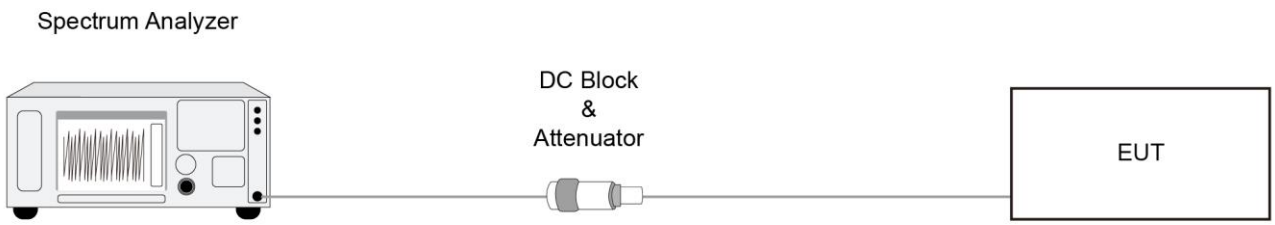
6.4.2. Test Procedure

ANSI C63.10 - 2013 - Section 11.10.5

6.4.3. Test Setting

1. Measure the duty cycle (x) of the transmitter output signal.
2. Set instrument center frequency to DTS channel center frequency.
3. Set span to at least 1.5 times the OBW.
4. RBW = 10 kHz.
5. VBW = 30 kHz.
6. Detector = RMS.
7. Ensure that the number of measurement points in the sweep ≥ 2 x span/RBW.
8. Sweep time = auto couple.
9. Don’t use sweep triggering. Allow sweep to “free run”.
10. Employ trace averaging (RMS) mode over a minimum of 100 traces.
11. Use the peak marker function to determine the maximum amplitude level.
12. Add 10 log (1/x), where x is the duty cycle measured in step (a, to the measured PSD to compute the average PSD during the actual transmission time. If measured value exceeds requirement specified by regulatory agency, then reduce RBW (but no less than 3 kHz) and repeat (note that this may require zooming in on the emission of interest and reducing the span to meet the minimum measurement point requirement as the RBW is reduced).

6.4.4. Test Setup



6.4.5. Test Result

Refer to Appendix A.4.

6.5. Conducted Band Edge and Out-of-Band Emissions Measurement

6.5.1. Test Limit

The limit for out-of-band spurious emissions at the band edge is 30dB below the fundamental emission level, as determined from the in-band power measurement of the DTS channel performed in a 100 kHz bandwidth per the PSD procedure.

6.5.2. Test Procedure

ANSI C63.10-2013 - Section 11.11

6.5.3. Test Setting

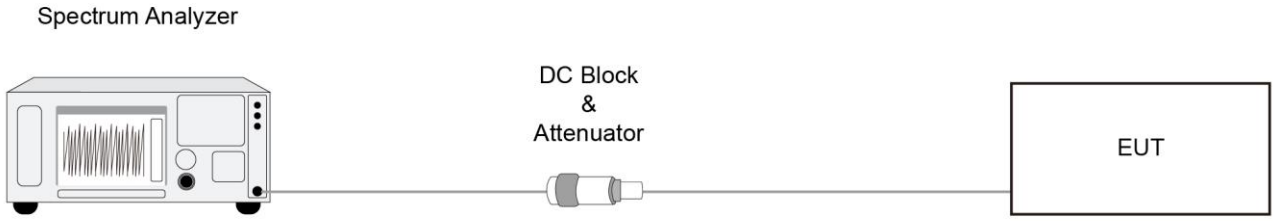
Reference level measurement

1. Set instrument center frequency to DTS channel center frequency
2. Set the span to ≥ 1.5 times the DTS bandwidth
3. Set the RBW = 100 kHz
4. Set the VBW ≥ 3 x RBW
5. Detector = peak
6. Sweep time = auto couple
7. Trace mode = max hold
8. Allow trace to fully stabilize

Emission level measurement

1. Set the center frequency and span to encompass frequency range to be measured
2. RBW = 100kHz
3. VBW = 300kHz
4. Detector = Peak
5. Trace mode = max hold
6. Sweep time = auto couple
7. The trace was allowed to stabilize

6.5.4. Test Setup



6.5.5. Test Result

Refer to Appendix A.5.

6.6. Radiated Spurious Emission Measurement

6.6.1. 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

6.6.2. Test Procedure

ANSI C63.10 - 2013 - Section 11.11 & 11.12

ANSI C63.10 - 2013 - Section 6.3 (General Requirements)

ANSI C63.10 - 2013 - Section 6.4 (Standard test method below 30MHz)

ANSI C63.10 - 2013 - Section 6.5 (Standard test method above 30MHz to 1GHz)

ANSI C63.10 - 2013 - Section 6.6 (Standard test method above 1GHz)

6.6.3. 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

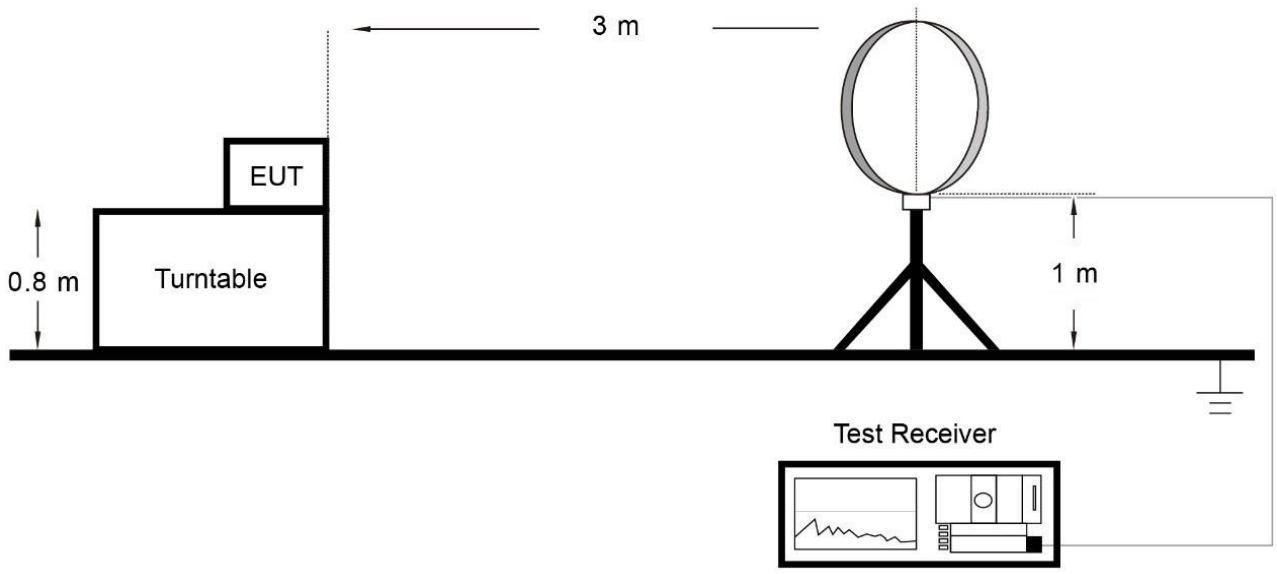
Average Measurements above 1GHz (Method VB)

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

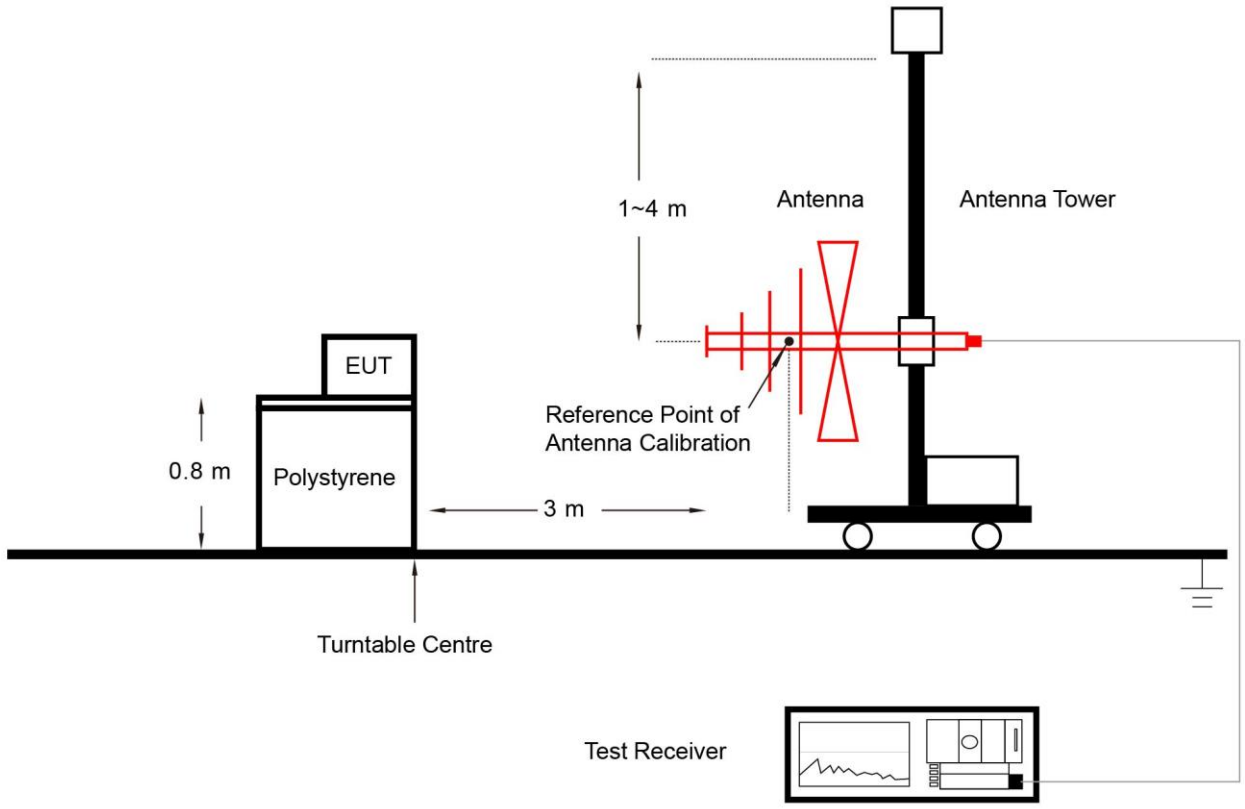
   If the EUT duty cycle is < 98%, set VBW ≥ 1/T. T is the minimum transmission duration.
4. As an alternative, the instrument may be set to linear detector mode. Ensure that video filtering is applied in linear voltage domain (rather than in a log or dB domain). Some instruments require linear display mode in order to accomplish this. Others have a setting for Average-VBW Type, which can be set to "Voltage" regardless of the display mode
5. Detector = Peak
6. Sweep time = Auto
7. Trace mode = Max hold
8. Trace was allowed to stabilize

6.6.4. Test Setup

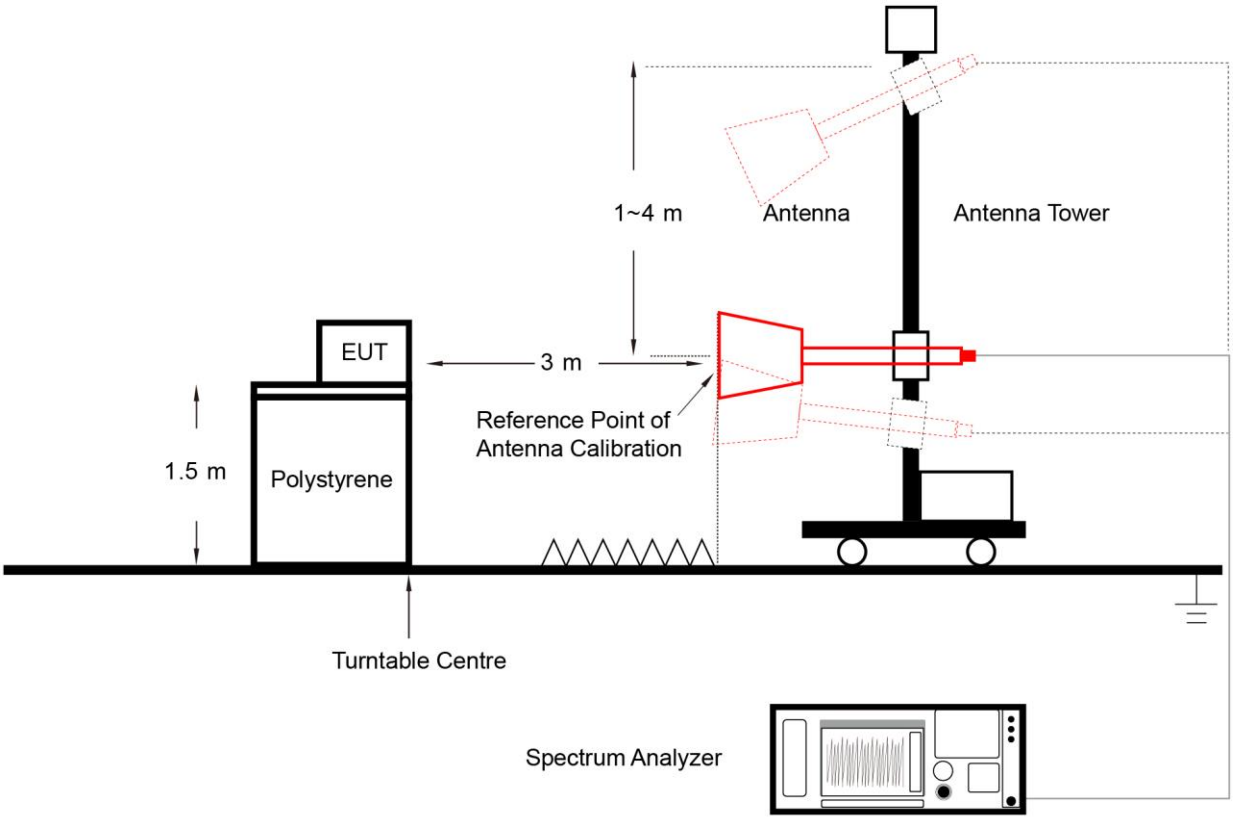
Below 30MHz Test Setup:



Below 1GHz Test Setup:



Above 1GHz Test Setup:



6.6.5. Test Result

Refer to Appendix A.6.

6.7. Radiated Restricted Band Edge Measurement

6.7.1. 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	--	--	--

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

6.7.2. Test Procedure

ANSI C63.10-2013 Section 6.3 & 6.6 & 11.13

6.7.3. Test Setting

Peak Field Strength Measurements

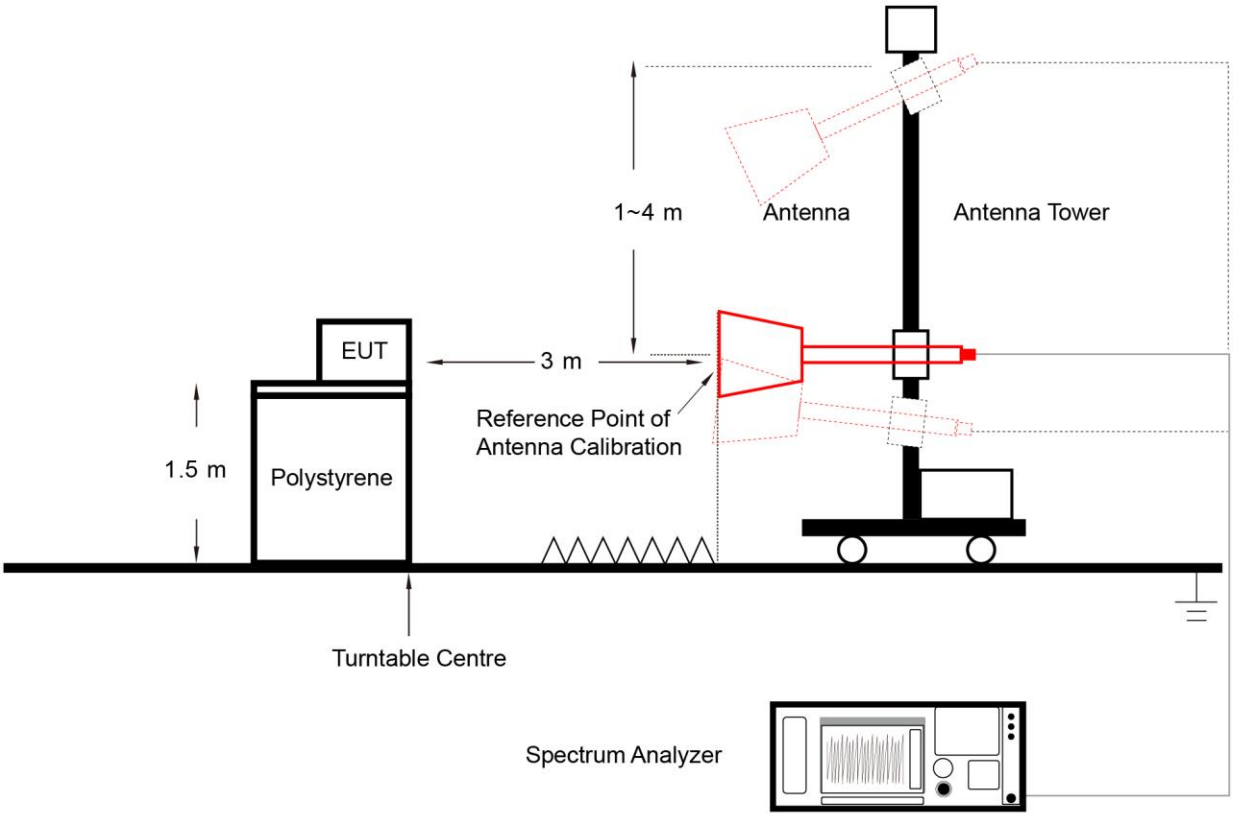
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

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.
4. As an alternative, the instrument may be set to linear detector mode. Ensure that video filtering is applied in linear voltage domain (rather than in a log or dB domain). Some instruments require linear display mode in order to accomplish this. Others have a setting for Average-VBW Type, which can be set to "Voltage" regardless of the display mode
5. Detector = Peak
6. Sweep time = auto
7. Trace mode = max hold
8. Allow max hold to run for at least 50 times (1/duty cycle) traces

6.7.4. Test Setup



6.7.5. Test Result

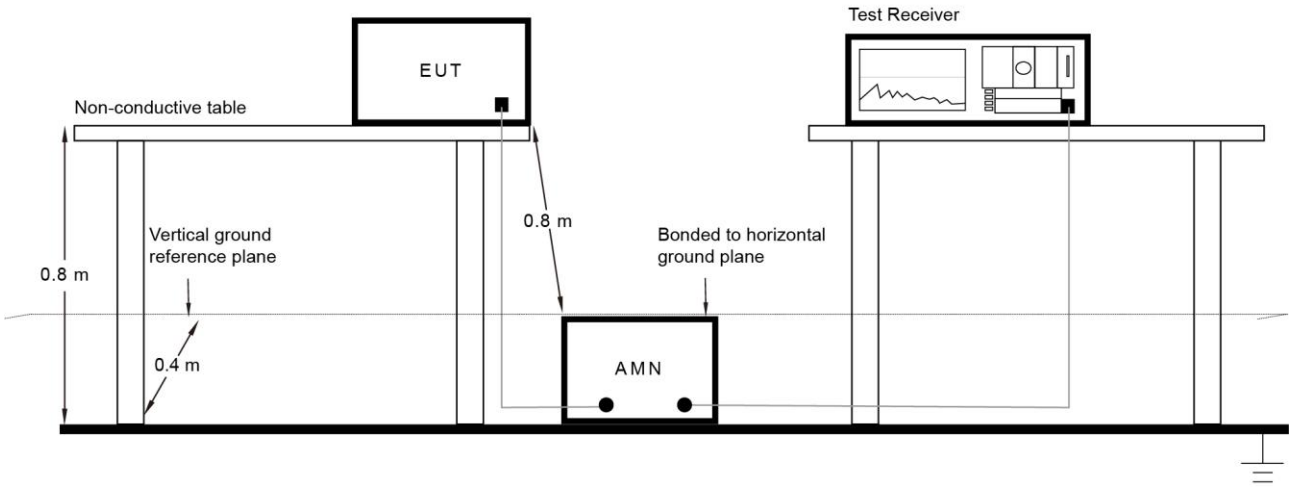
Refer to Appendix A.7.

6.8. AC Conducted Emissions Measurement

6.8.1. Test Limit

FCC Part 15 Subpart C Paragraph 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.		

6.8.2. Test Setup



6.8.3. Test Result

Refer to Appendix A.8.

Appendix A – Test Result

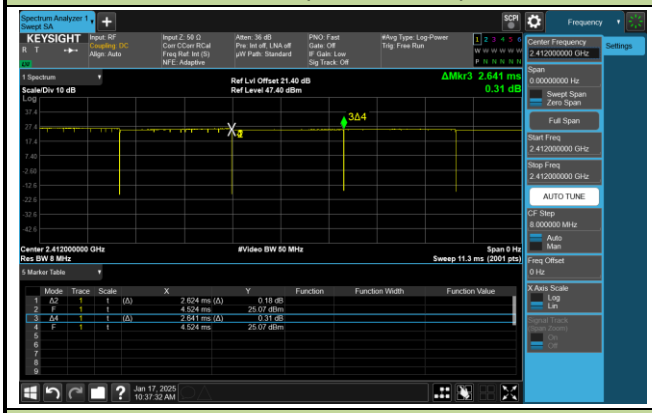
A.1 Duty Cycle Test Result

Test Site	WJ-SR2	Test Engineer	Simon Lu
Test Date	2025-01-17		

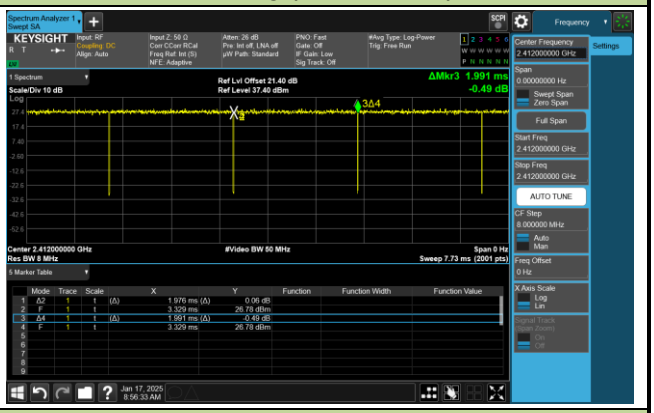
Test Mode	Duty Cycle
802.11b	99.35%
802.11g	99.25%
802.11n-HT20	99.40%
802.11n-HT40	99.38%
802.11ax-HE20	98.55%
802.11ax-HE40	98.55%
802.11be-EHT20	98.32%
802.11be-EHT40	98.33%

Duty Cycle (T = Transmission Duration)

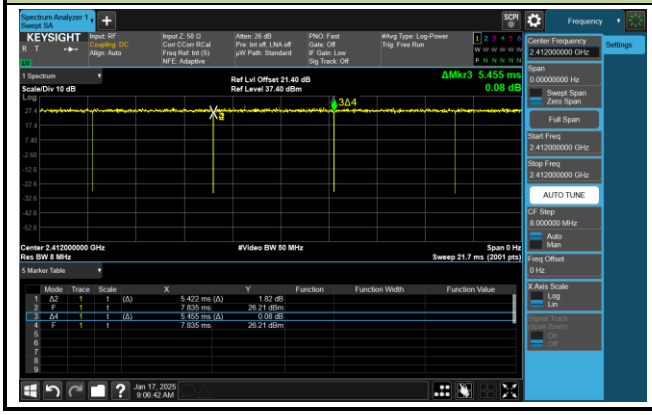
802.11b (T = 2.624ms)



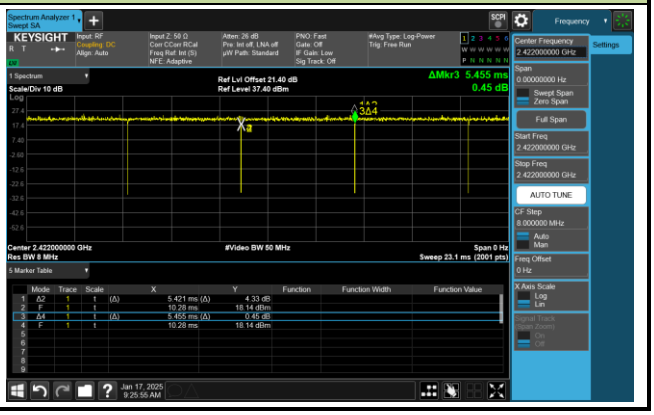
802.11g (T = 1.976ms)

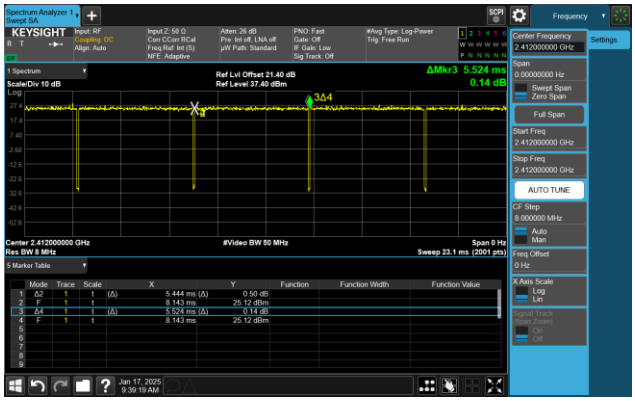
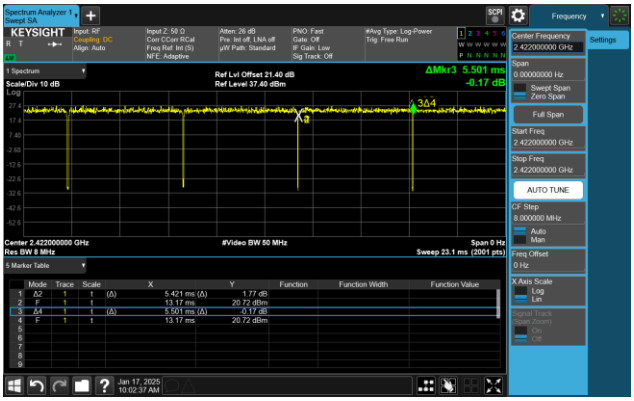
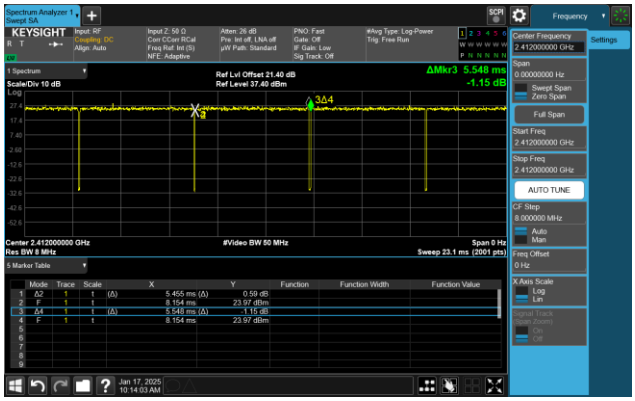
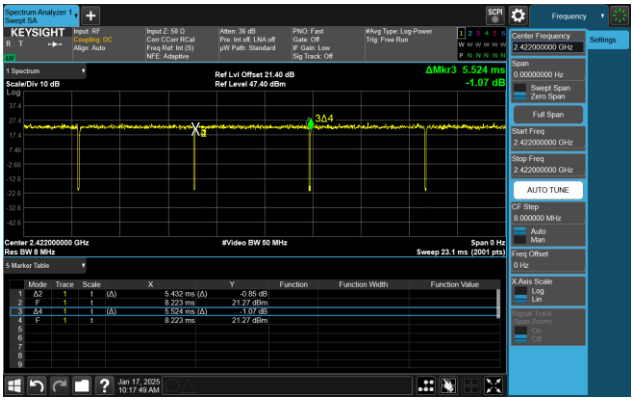


802.11n-HT20 (T = 5.422ms)



802.11n-HT40 (T = 5.421ms)



Duty Cycle (T = Transmission Duration)	
802.11ax-HE20 (T = 5.444ms)	802.11ax-HE40 (T = 5.421ms)
	
802.11be-EHT20 (T = 5.455ms)	802.11be-EHT40 (T = 5.432ms)
	

A.2 6dB Bandwidth Test Result

Test Site	WJ-SR2	Test Engineer	Simon Lu
Test Date	2025-01-25		

Test Mode	Data Rate / MCS	Channel No.	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)
11b	1Mbps	01	2412	7.061	≥ 0.5
11b	1Mbps	06	2437	7.091	≥ 0.5
11b	1Mbps	11	2462	7.136	≥ 0.5
11g	6Mbps	01	2412	15.15	≥ 0.5
11g	6Mbps	06	2437	15.07	≥ 0.5
11g	6Mbps	11	2462	15.13	≥ 0.5
11n-HT20	MCS0	01	2412	15.14	≥ 0.5
11n-HT20	MCS0	06	2437	15.13	≥ 0.5
11n-HT20	MCS0	11	2462	15.06	≥ 0.5
11n-HT40	MCS0	03	2422	32.62	≥ 0.5
11n-HT40	MCS0	06	2437	35.14	≥ 0.5
11n-HT40	MCS0	09	2452	35.35	≥ 0.5
11ax-HE20	MCS0	01	2412	17.53	≥ 0.5
11ax-HE20	MCS0	06	2437	15.35	≥ 0.5
11ax-HE20	MCS0	11	2462	16.57	≥ 0.5
11ax-HE40	MCS0	03	2422	36.49	≥ 0.5
11ax-HE40	MCS0	06	2437	32.57	≥ 0.5
11ax-HE40	MCS0	09	2452	31.50	≥ 0.5
11be-EHT20	MCS0	01	2412	13.84	≥ 0.5
11be-EHT20	MCS0	06	2437	18.27	≥ 0.5
11be-EHT20	MCS0	11	2462	18.02	≥ 0.5
11be-EHT40	MCS0	03	2422	36.37	≥ 0.5
11be-EHT40	MCS0	06	2437	33.86	≥ 0.5
11be-EHT40	MCS0	09	2452	33.56	≥ 0.5

802.11b 6dB Bandwidth

Channel 01 (2412MHz)

Channel 06 (2437MHz)

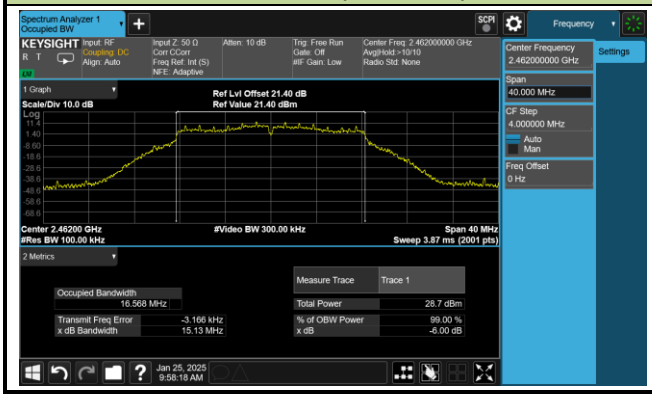
Channel 11 (2462MHz)

802.11g 6dB Bandwidth

Channel 01 (2412MHz)

Channel 06 (2437MHz)

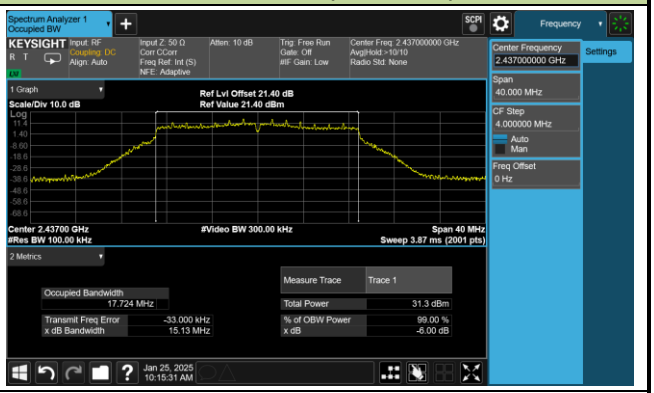
Channel 11 (2462MHz)



802.11n-HT20 6dB Bandwidth

Channel 01 (2412MHz)

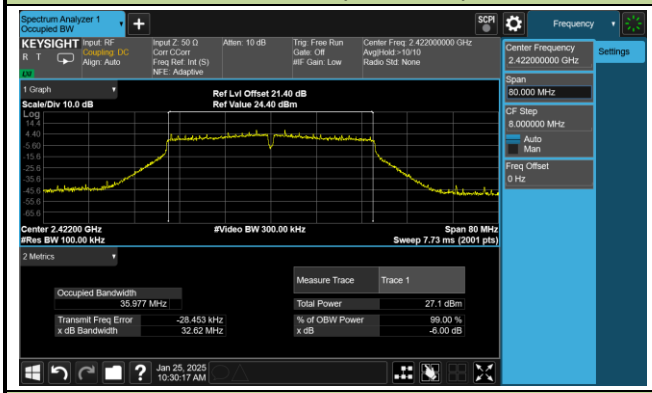
Channel 06 (2437MHz)



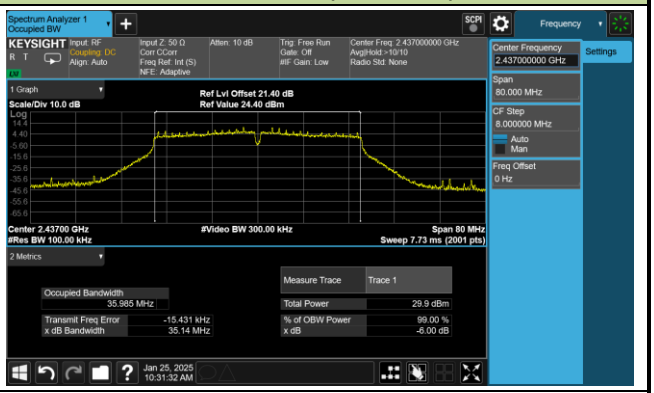
Channel 11 (2462MHz)

802.11n-HT40 6dB Bandwidth

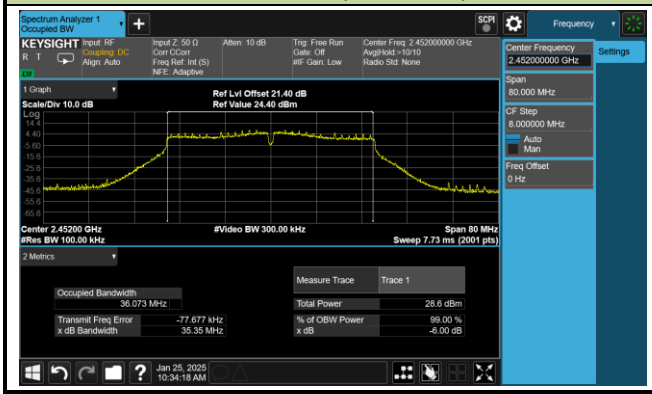
Channel 03 (2422MHz)



Channel 06 (2437MHz)

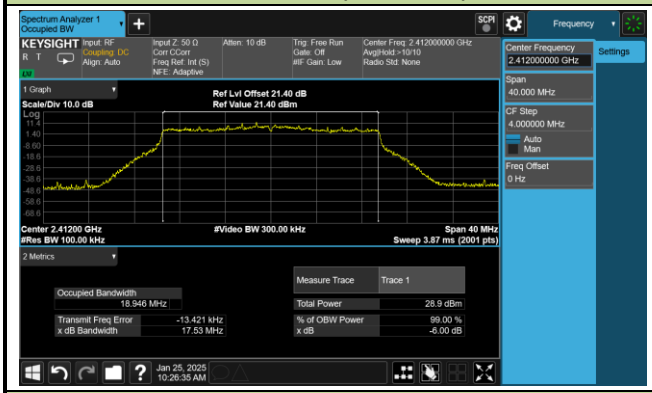


Channel 09 (2452MHz)

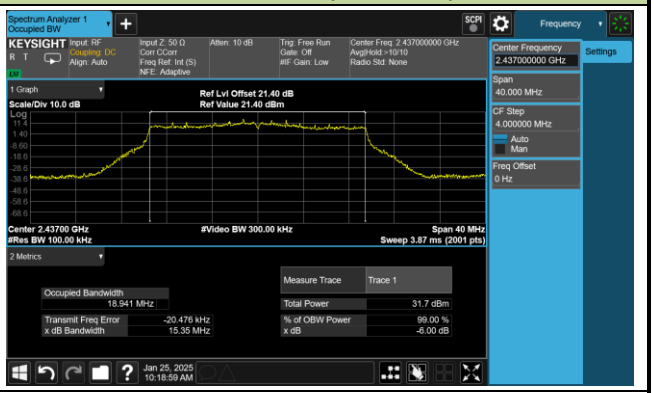


802.11ax-HE20 6dB Bandwidth

Channel 01 (2412MHz)



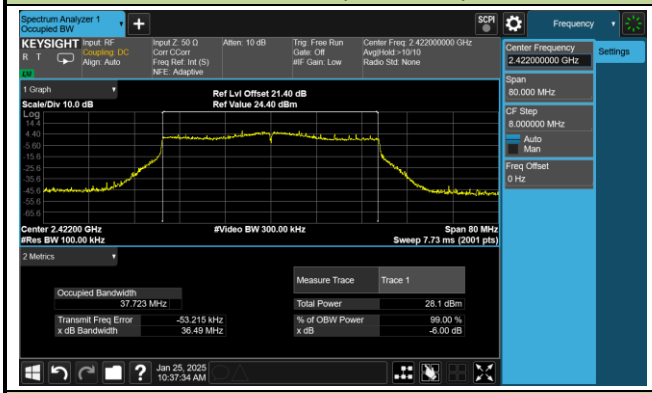
Channel 06 (2437MHz)



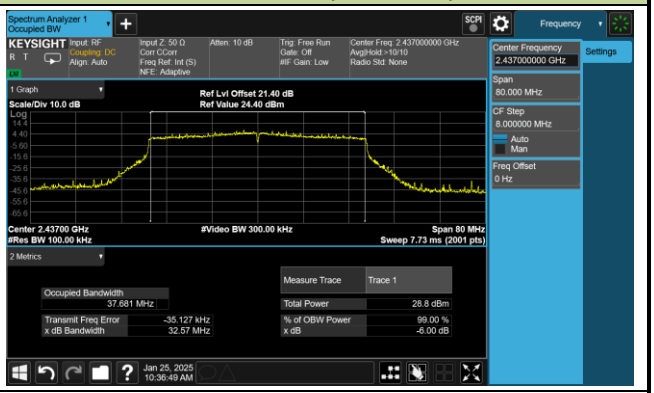
Channel 11 (2462MHz)

802.11ax-HE40 6dB Bandwidth

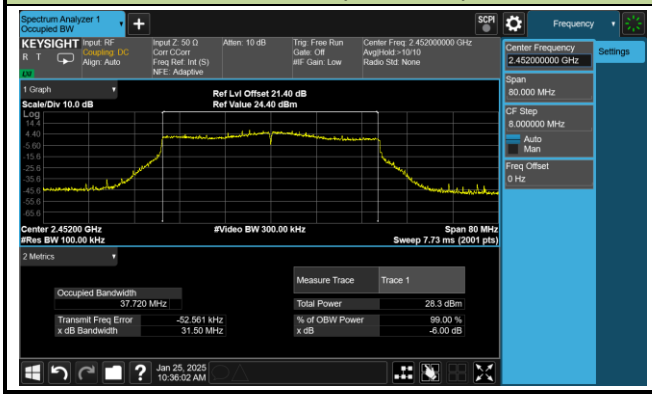
Channel 03 (2422MHz)



Channel 06 (2437MHz)

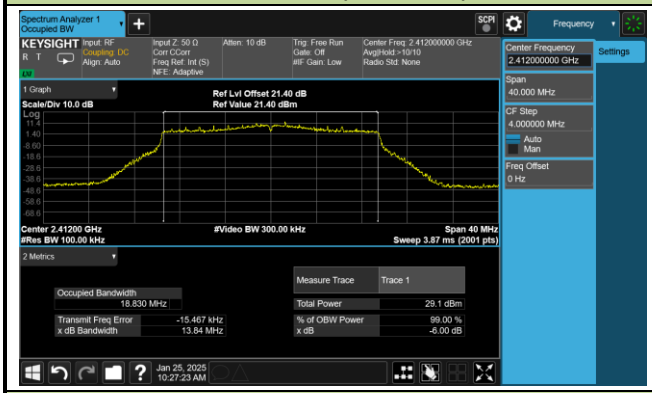


Channel 09 (2452MHz)

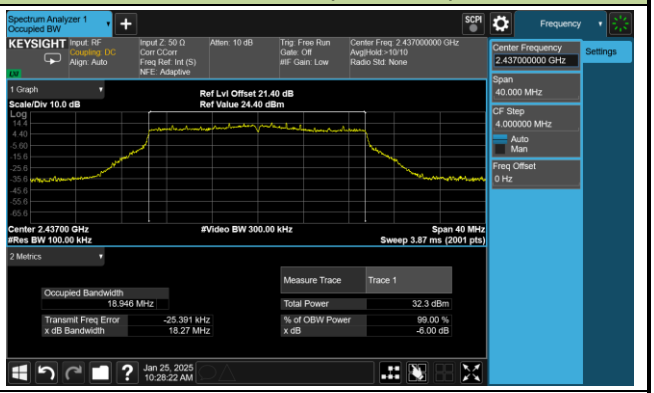


802.1be-EHT20 6dB Bandwidth

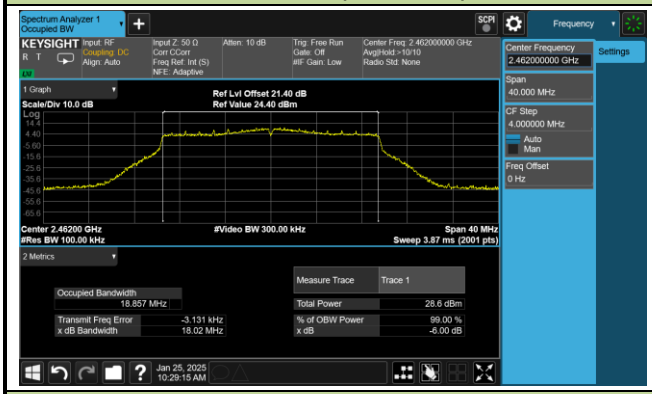
Channel 01 (2412MHz)



Channel 06 (2437MHz)

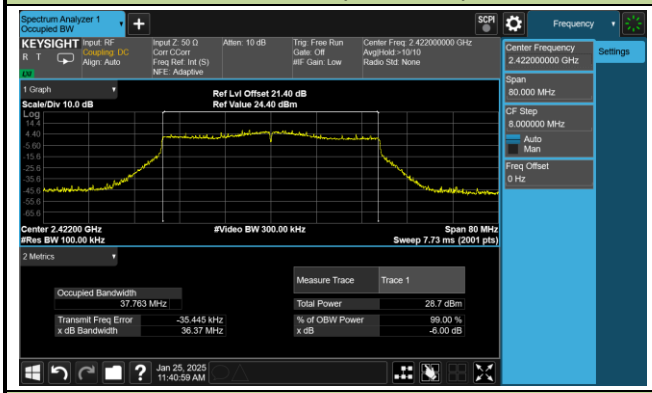


Channel 11 (2462MHz)

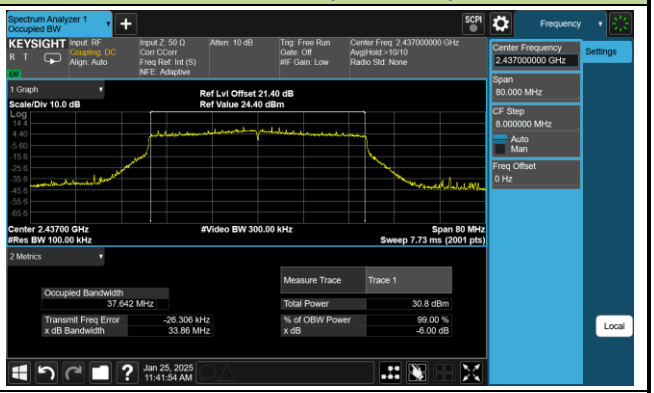


802.11be-EHT40 6dB Bandwidth

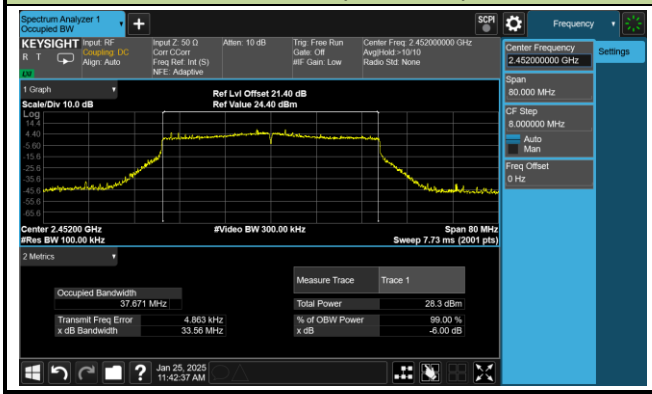
Channel 03 (2422MHz)



Channel 06 (2437MHz)



Channel 09 (2452MHz)



A.3 Output Power Test Result

Test Site	WJ-SR2	Test Engineer	Simon Lu
Test Date	2025-01-14 ~ 2025-01-19	Test Mode	CDD Mode

Test Mode	Data Rate / MCS	Channel No.	Freq. (MHz)	Average Power (dBm)		Total Average Power (dBm)	Limit (dBm)
				Ant 0	Ant 1		
11b	1Mbps	01	2412	22.98	23.63	26.33	≤ 30.00
11b	1Mbps	06	2437	24.42	24.61	27.53	≤ 30.00
11b	1Mbps	11	2462	23.07	23.39	26.24	≤ 30.00
11g	6Mbps	01	2412	23.96	23.73	26.86	≤ 30.00
11g	6Mbps	06	2437	24.24	24.63	27.45	≤ 30.00
11g	6Mbps	11	2462	21.63	22.29	24.98	≤ 30.00
11n-HT20	MCS0	01	2412	21.88	22.98	25.48	≤ 30.00
11n-HT20	MCS0	06	2437	24.22	24.52	27.38	≤ 30.00
11n-HT20	MCS0	10	2457	24.47	24.02	27.26	≤ 30.00
11n-HT20	MCS0	11	2462	21.27	21.82	24.56	≤ 30.00
11n-HT40	MCS0	03	2422	20.15	20.37	23.27	≤ 30.00
11n-HT40	MCS0	06	2437	22.36	22.94	25.67	≤ 30.00
11n-HT40	MCS0	09	2452	20.87	20.89	23.89	≤ 30.00
11ax-HE20	MCS0	01	2412	21.81	22.56	25.21	≤ 30.00
11ax-HE20	MCS0	06	2437	24.30	24.57	27.45	≤ 30.00
11ax-HE20	MCS0	10	2457	22.75	22.69	25.73	≤ 30.00
11ax-HE20	MCS0	11	2462	20.01	20.22	23.13	≤ 30.00
11ax-HE40	MCS0	03	2422	20.40	21.02	23.73	≤ 30.00
11ax-HE40	MCS0	06	2437	21.15	21.92	24.56	≤ 30.00
11ax-HE40	MCS0	09	2452	20.78	21.12	23.96	≤ 30.00
11be-EHT20	MCS0	01	2412	21.43	21.97	24.72	≤ 30.00
11be-EHT20	MCS0	06	2437	24.37	24.52	27.46	≤ 30.00
11be-EHT20	MCS0	10	2457	22.16	22.37	25.28	≤ 30.00
11be-EHT20	MCS0	11	2462	20.44	20.58	23.52	≤ 30.00
11be-EHT40	MCS0	03	2422	20.53	21.16	23.87	≤ 30.00
11be-EHT40	MCS0	06	2437	22.72	23.42	26.09	≤ 30.00
11be-EHT40	MCS0	09	2452	20.72	21.32	24.04	≤ 30.00

Note: Total Average Power (dBm) = $10*\log\{10^{(\text{Ant 0 Average Power}/10)} + 10^{(\text{Ant 1 Average Power}/10)}\}$ (dBm).

A.4 Power Spectral Density Test Result

Test Site	WJ-SR2	Test Engineer	Simon Lu
Test Date	2025-01-17 ~ 2025-01-18		

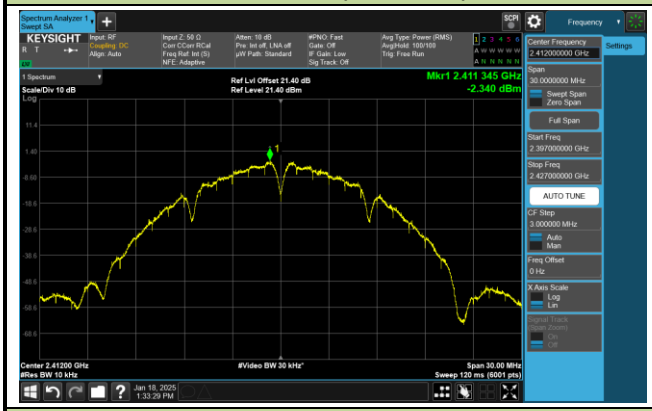
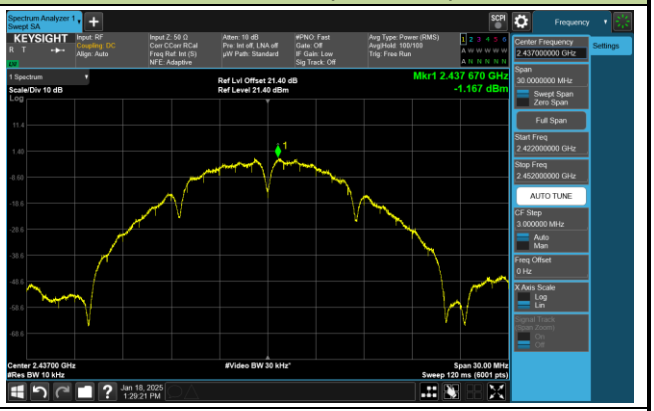
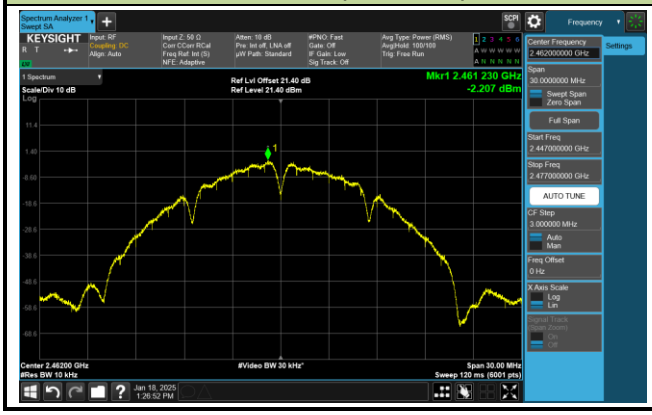
Test Mode	Data Rate/ MCS	Channel No.	Freq. (MHz)	PSD (dBm/ 10kHz)		Duty Cycle (%)	10*log (1/x)	Total PSD (dBm/10kHz)	Limit (dBm/3kHz)
				Ant 0	Ant 1				
11b	1Mbps	01	2412	-2.340	-2.218	99.35	0.03	0.732	≤ 8.00
11b	1Mbps	06	2437	-1.167	-0.056	99.35	0.03	2.434	≤ 8.00
11b	1Mbps	11	2462	-2.207	-2.394	99.35	0.03	0.711	≤ 8.00
11g	6Mbps	01	2412	-2.862	-2.705	99.25	0.03	0.228	≤ 8.00
11g	6Mbps	06	2437	-1.183	-1.958	99.25	0.03	1.457	≤ 8.00
11g	6Mbps	11	2462	-4.211	-4.152	99.25	0.03	-1.171	≤ 8.00
11n-HT20	MCS0	01	2412	-2.826	-3.387	99.40	0.03	-0.087	≤ 8.00
11n-HT20	MCS0	06	2437	-2.393	-1.390	99.40	0.03	1.148	≤ 8.00
11n-HT20	MCS0	11	2462	-4.645	-4.268	99.40	0.03	-1.442	≤ 8.00
11n-HT40	MCS0	03	2422	-9.415	-9.093	99.38	0.03	-6.241	≤ 8.00
11n-HT40	MCS0	06	2437	-7.322	-6.253	99.38	0.03	-3.744	≤ 8.00
11n-HT40	MCS0	09	2452	-9.077	-9.143	99.38	0.03	-6.100	≤ 8.00
11ax-HE20	MCS0	01	2412	-5.016	-5.231	98.55	0.06	-2.112	≤ 8.00
11ax-HE20	MCS0	06	2437	-1.598	-2.222	98.55	0.06	1.111	≤ 8.00
11ax-HE20	MCS0	11	2462	-6.839	-6.991	98.55	0.06	-3.904	≤ 8.00
11ax-HE40	MCS0	03	2422	-8.669	-9.694	98.55	0.06	-6.141	≤ 8.00
11ax-HE40	MCS0	06	2437	-9.572	-8.386	98.55	0.06	-5.928	≤ 8.00
11ax-HE40	MCS0	09	2452	-10.071	-9.349	98.55	0.06	-6.685	≤ 8.00
11be-EHT20	MCS0	01	2412	-5.234	-5.805	98.32	0.07	-2.500	≤ 8.00
11be-EHT20	MCS0	06	2437	-2.599	-2.492	98.32	0.07	0.465	≤ 8.00
11be-EHT20	MCS0	11	2462	-6.287	-6.469	98.32	0.07	-3.367	≤ 8.00
11be-EHT40	MCS0	03	2422	-8.381	-9.347	98.33	0.07	-5.827	≤ 8.00
11be-EHT40	MCS0	06	2437	-8.170	-6.694	98.33	0.07	-4.359	≤ 8.00
11be-EHT40	MCS0	09	2452	-9.013	-8.924	98.33	0.07	-5.958	≤ 8.00

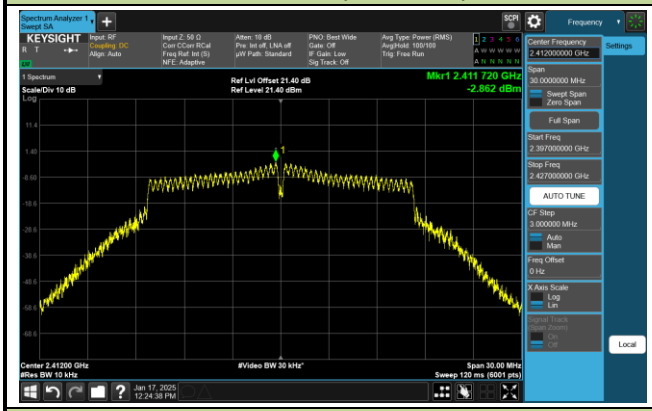
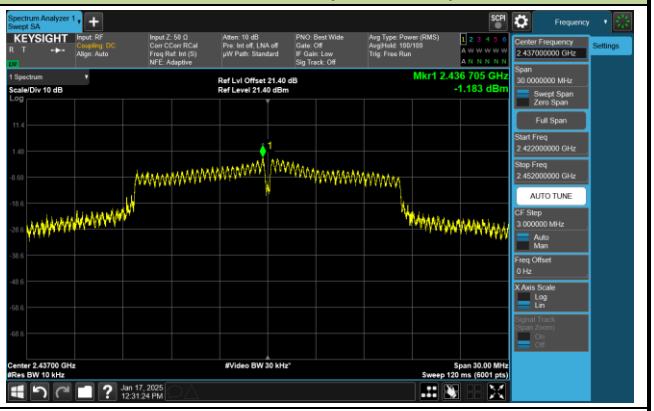
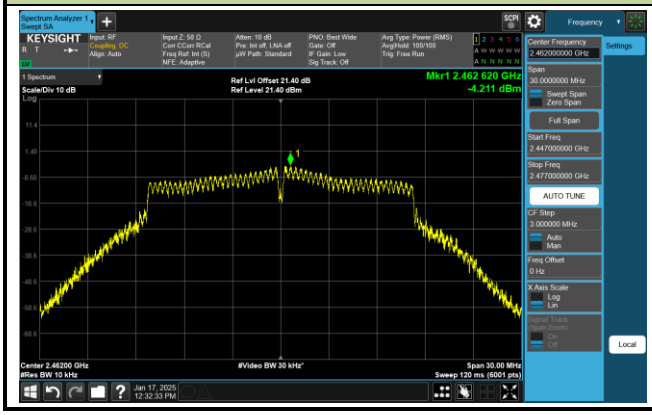
Note 1:

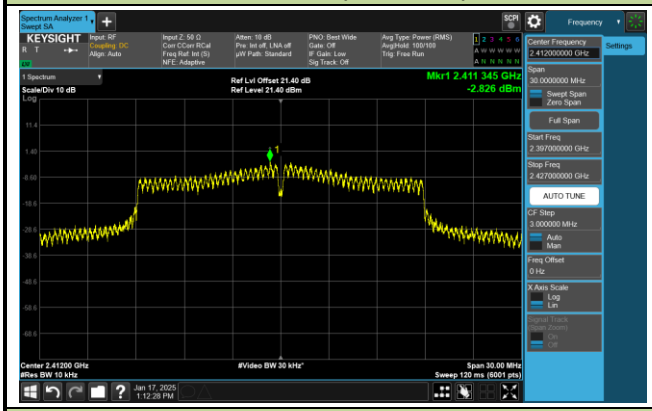
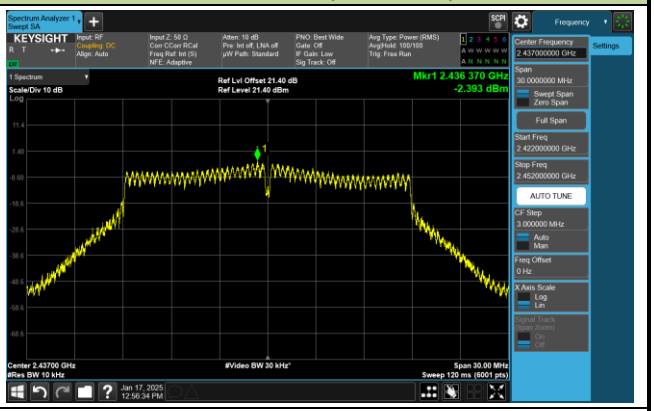
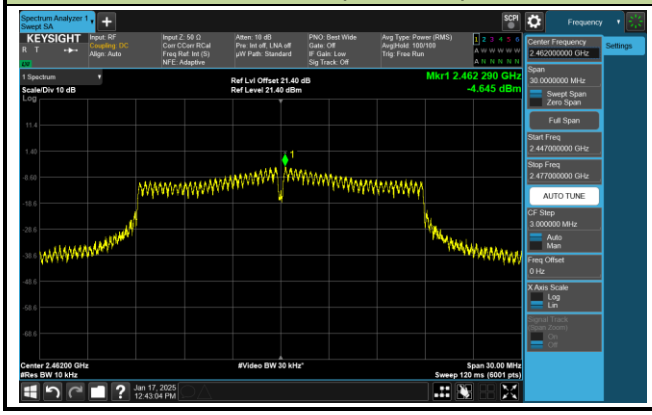
When EUT duty cycle ≥ 98%, Total PSD (dBm / 10kHz) = 10*log {$10^{(\text{Ant 0 PSD}/10)}$ + $10^{(\text{Ant 1 PSD}/10)}$} (dBm / 10kHz).

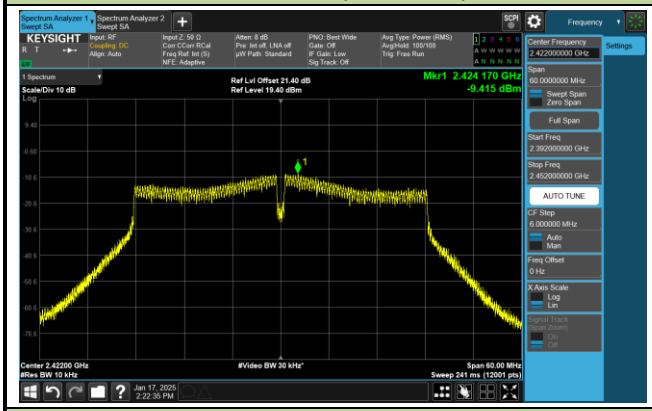
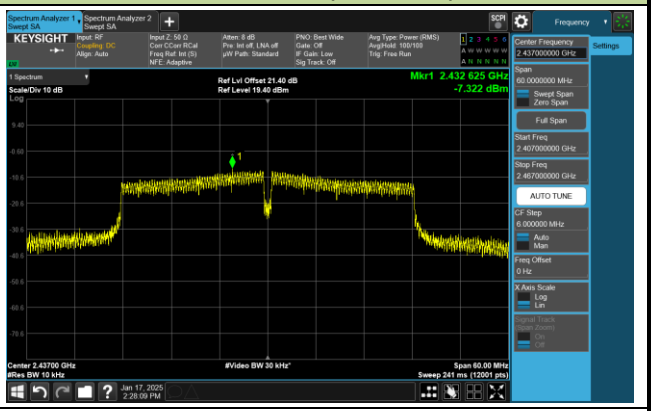
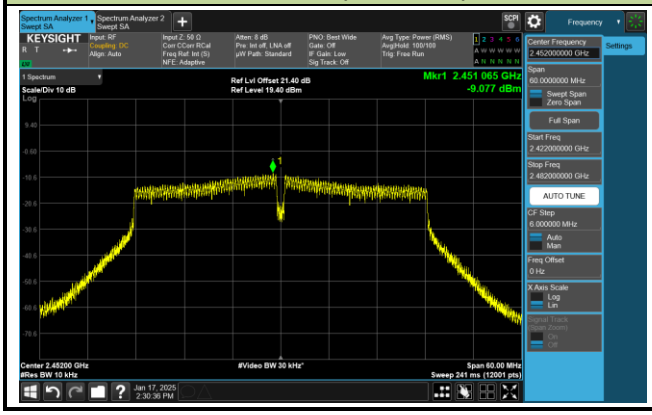
When EUT duty cycle < 98%, Total PSD (dBm / 10kHz) = 10*log {$10^{(\text{Ant 0 PSD}/10)}$ + $10^{(\text{Ant 1 PSD}/10)}$} (dBm / 10kHz) + 10*log (1/Duty Cycle).

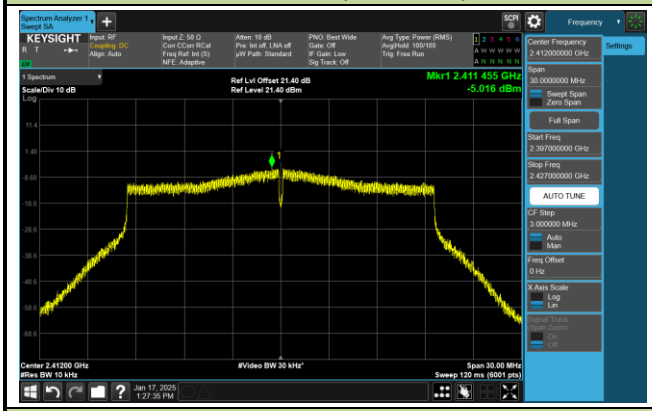
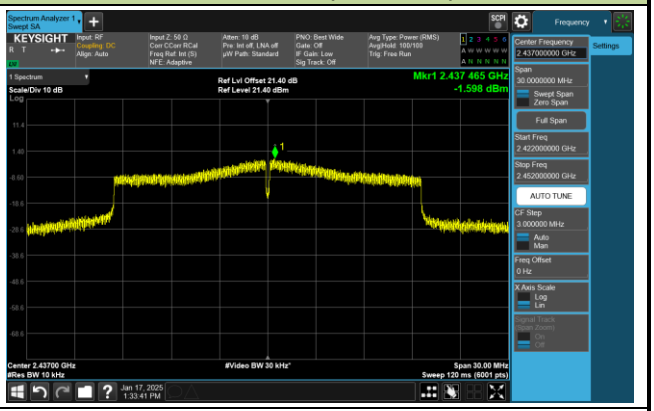
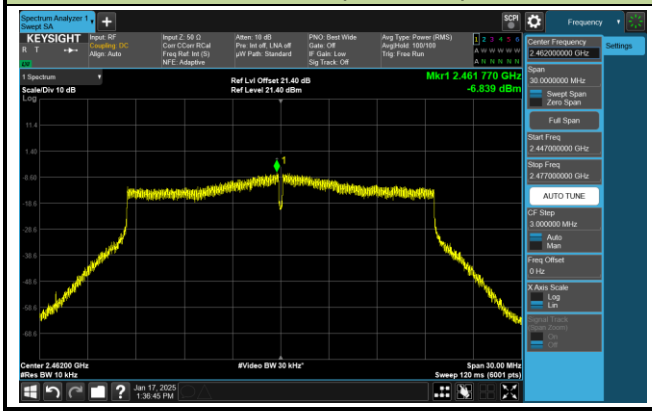
Note 2: Limit (dBm/3kHz) = 8 dBm/3kHz.

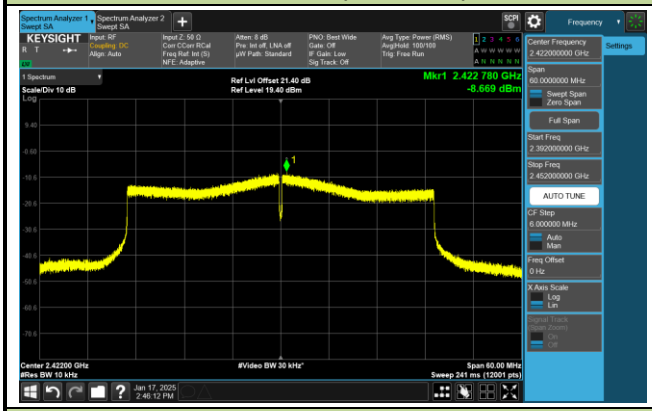
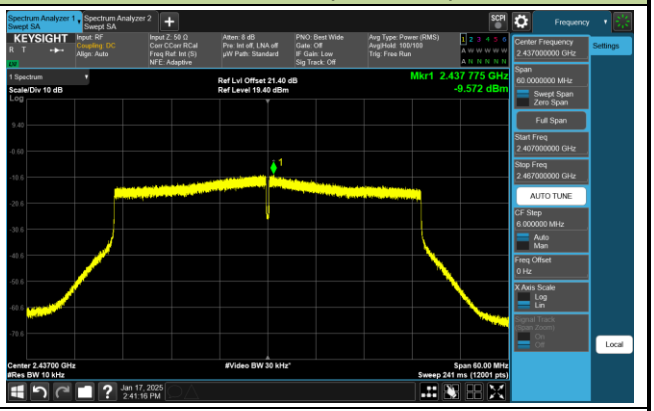
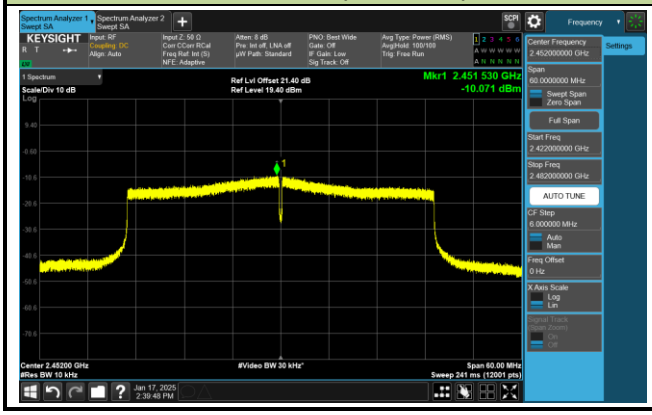
802.11b - AVGPSD - Ant 0	
Channel 01 (2412MHz)	Channel 06 (2437MHz)
	
Channel 11 (2462MHz)	
	

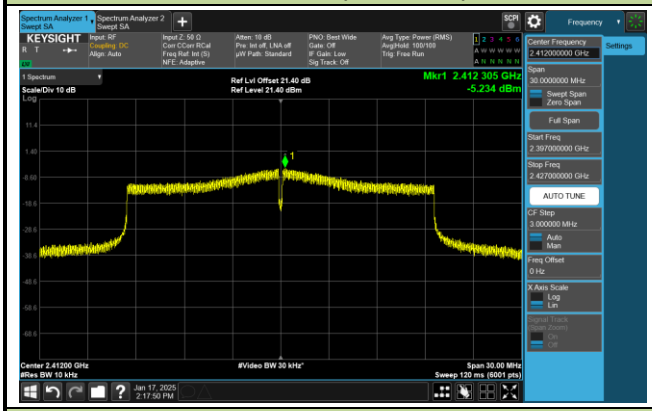
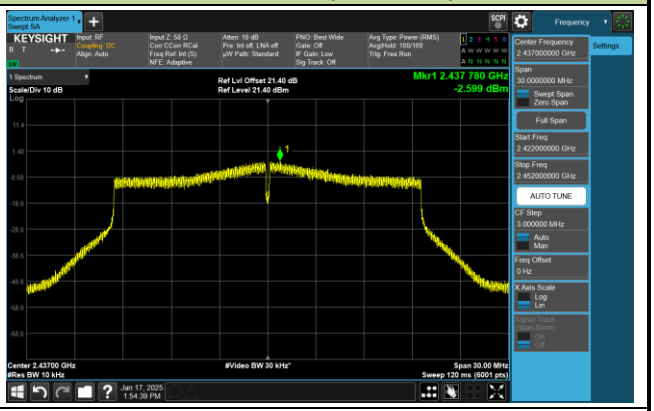
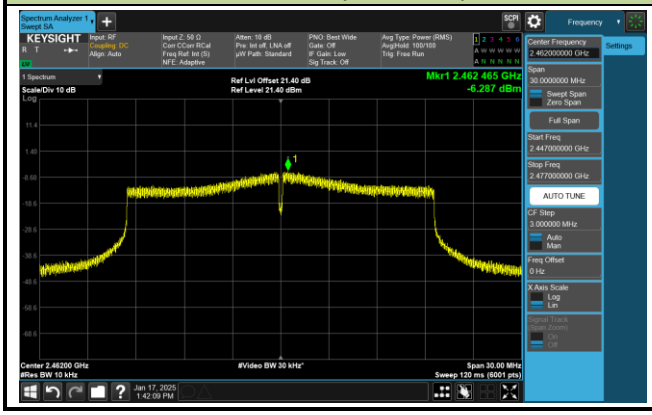
802.11g - AVGPSD - Ant 0	
Channel 01 (2412MHz)	Channel 06 (2437MHz)
	
Channel 11 (2462MHz)	
	

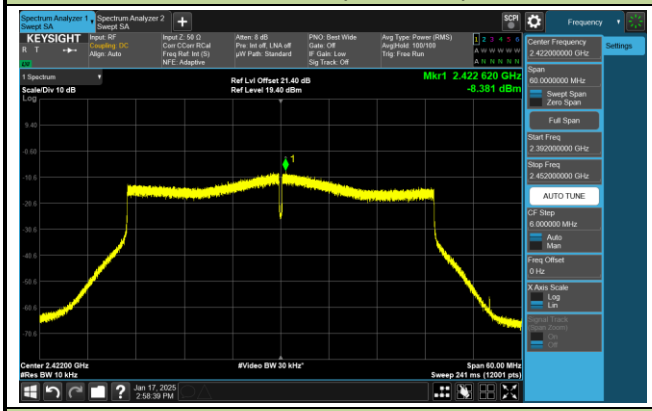
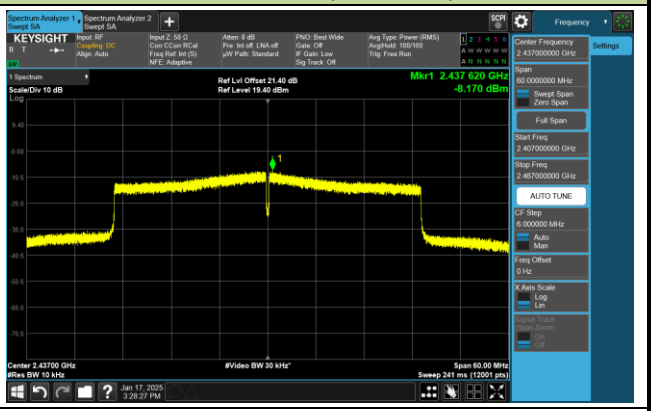
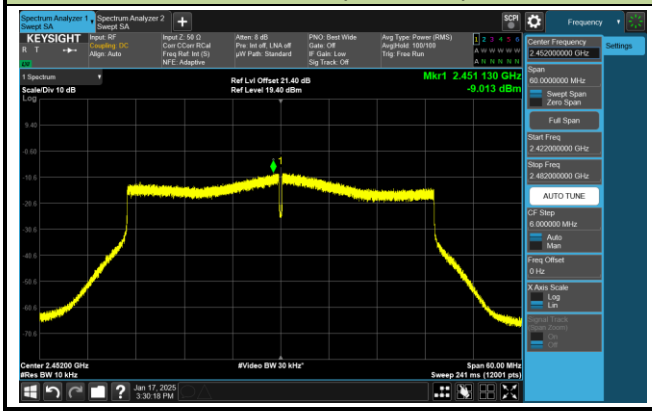
802.11n-HT20 - AVGPSD - Ant 0	
Channel 01 (2412MHz)	Channel 06 (2437MHz)
	
Channel 11 (2462MHz)	
	

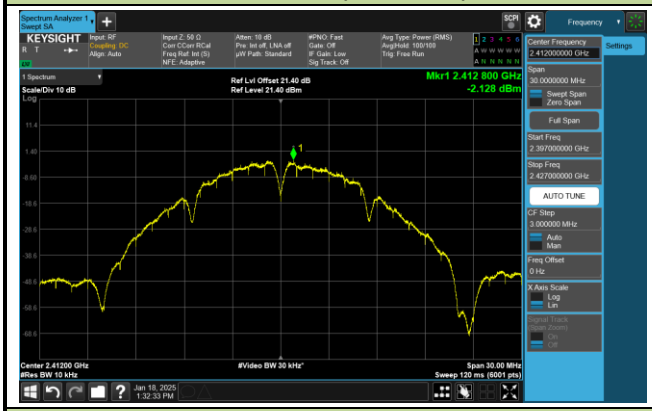
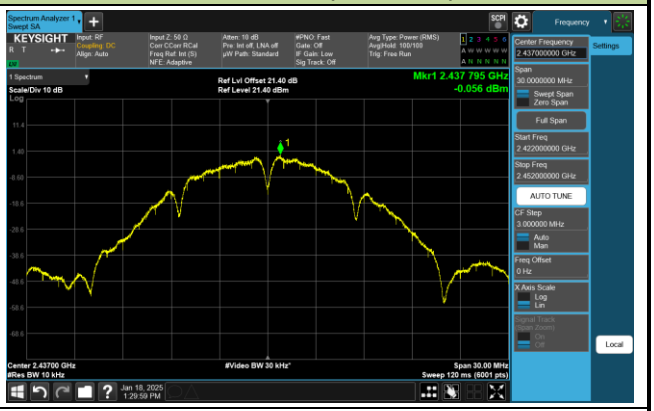
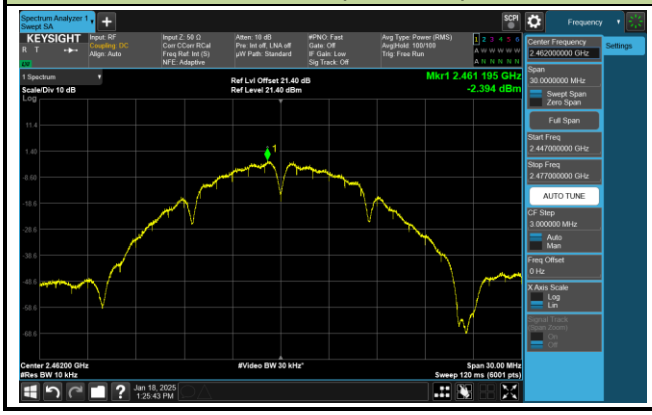
802.11n-HT40 - AVGPSD - Ant 0	
Channel 03 (2422MHz)	Channel 06 (2437MHz)
	
Channel 09 (2452MHz)	
	

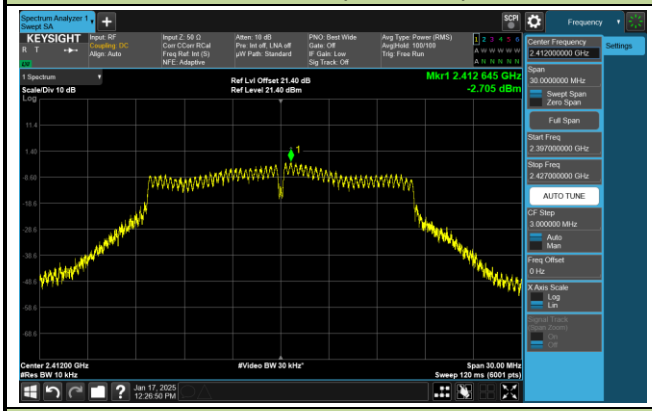
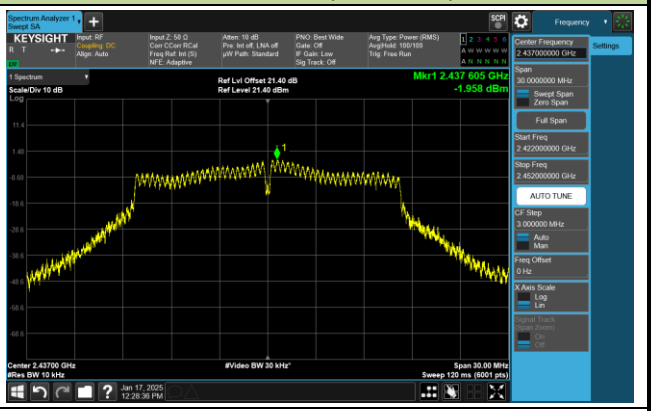
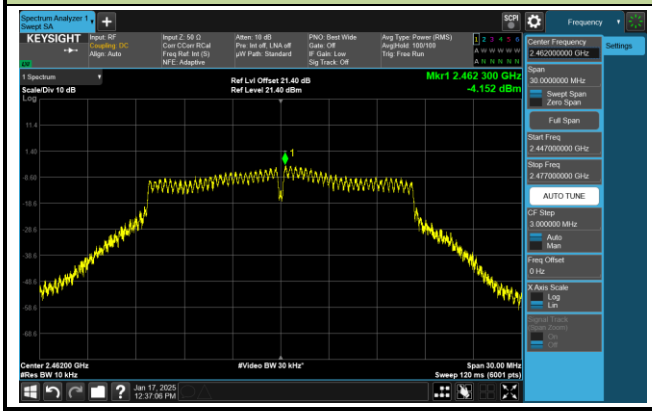
802.11ax-HE20 - AVGPSD - Ant 0	
Channel 01 (2412MHz)	Channel 06 (2437MHz)
	
Channel 11 (2462MHz)	
	

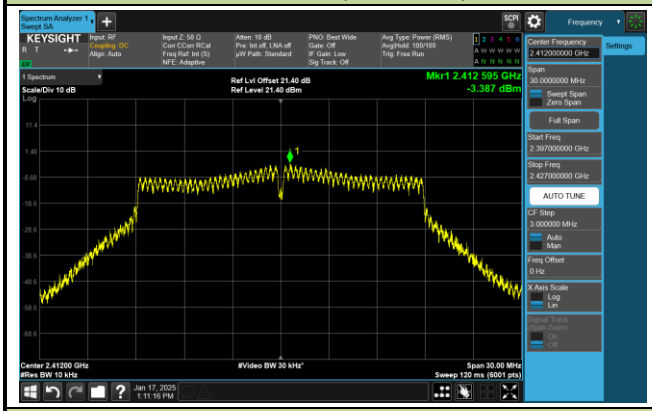
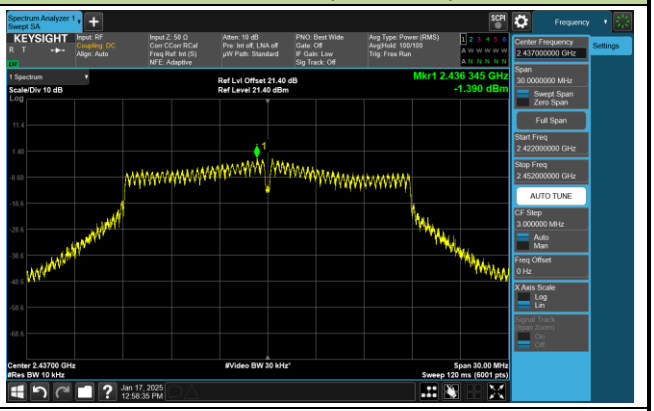
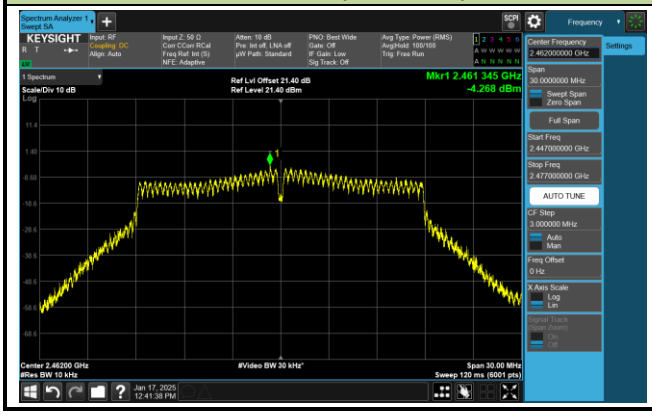
802.11ax-HE40 - AVGPSD - Ant 0	
Channel 03 (2422MHz)	Channel 06 (2437MHz)
	
Channel 09 (2452MHz)	
	

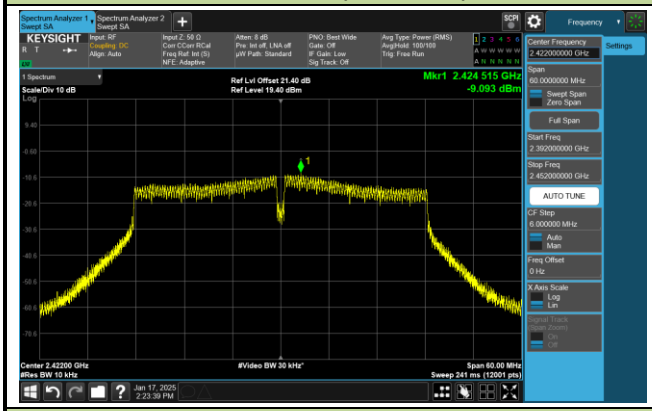
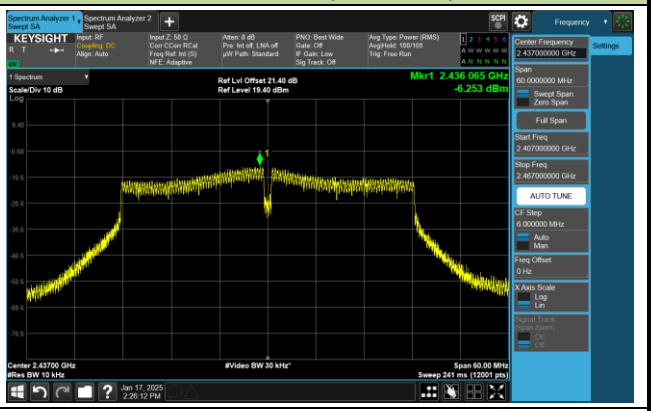
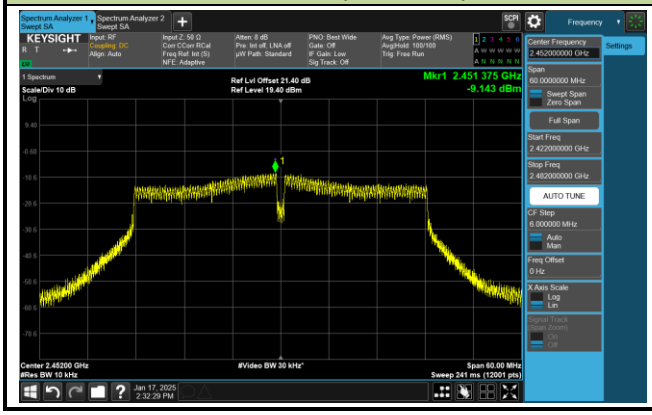
802.11be-EHT20 - AVGPSD - Ant 0	
Channel 01 (2412MHz)	Channel 06 (2437MHz)
	
Channel 11 (2462MHz)	
	

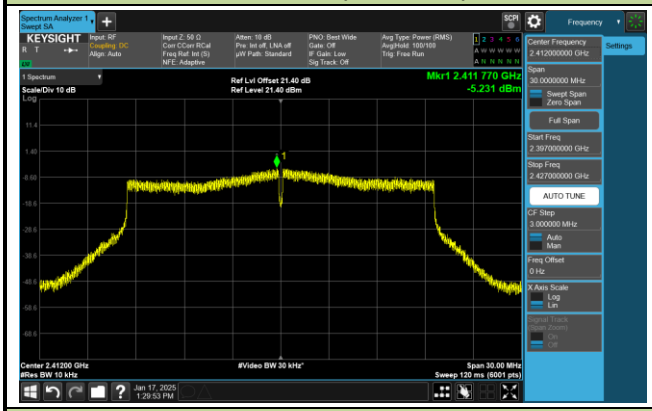
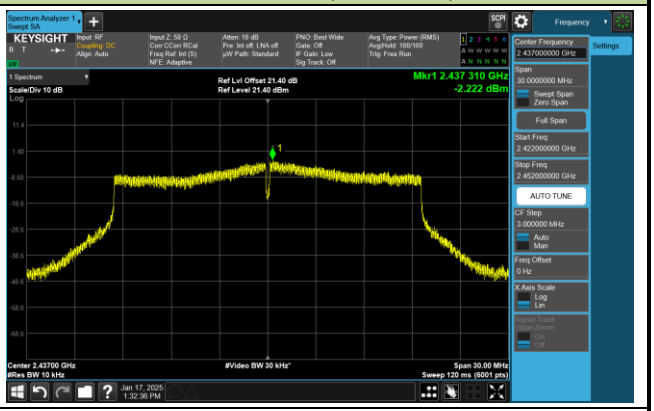
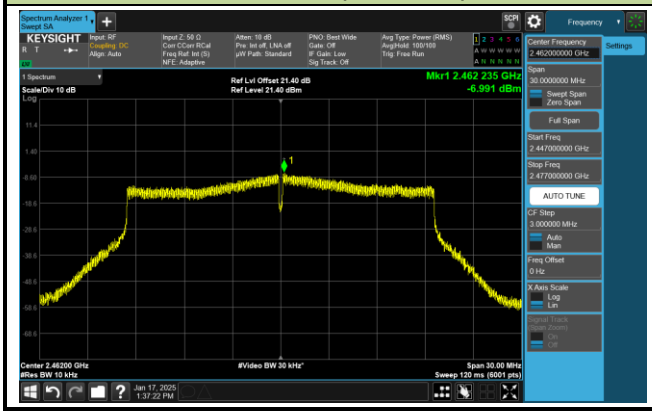
802.11be-EHT40 - AVGPSD - Ant 0	
Channel 03 (2422MHz)	Channel 06 (2437MHz)
	
Channel 09 (2452MHz)	
	

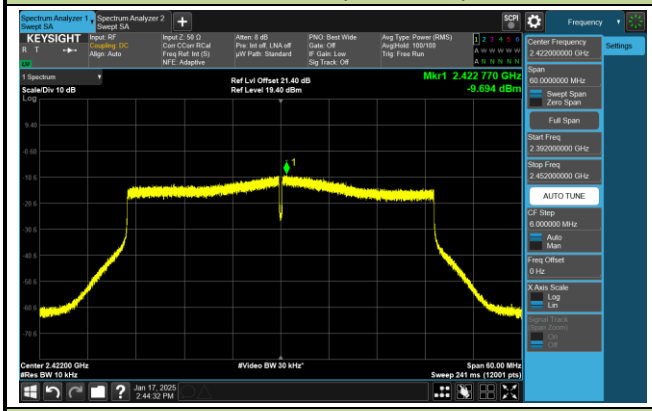
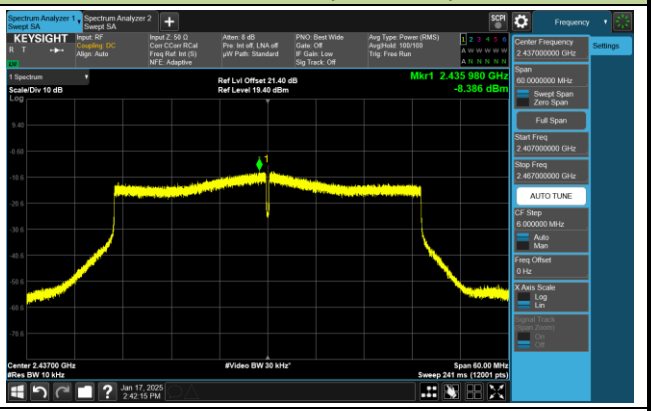
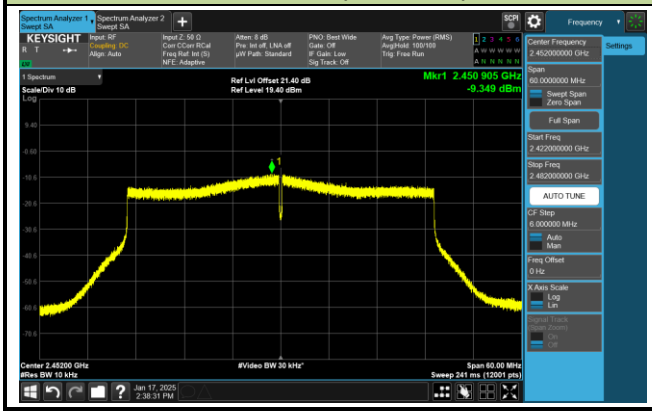
802.11b - AVGPSD - Ant 1	
Channel 01 (2412MHz)	Channel 06 (2437MHz)
	
Channel 11 (2462MHz)	
	

802.11g - AVGPSD - Ant 1	
Channel 01 (2412MHz)	Channel 06 (2437MHz)
	
Channel 11 (2462MHz)	
	

802.11n-HT20 - AVGPSD - Ant 1	
Channel 01 (2412MHz)	Channel 06 (2437MHz)
	
Channel 11 (2462MHz)	
	

802.11n-HT40 - AVGPSD - Ant 1	
Channel 03 (2422MHz)	Channel 06 (2437MHz)
	
Channel 09 (2452MHz)	
	

802.11ax-HE20 - AVGPSD - Ant 1	
Channel 01 (2412MHz)	Channel 06 (2437MHz)
	
Channel 11 (2462MHz)	
	

802.11ax-HE40 - AVGPSD - Ant 1	
Channel 03 (2422MHz)	Channel 06 (2437MHz)
	
Channel 09 (2452MHz)