



**FCC 47 CFR PART 15 SUBPART C  
ISED RSS-247 Issue 2**

**CERTIFICATION TEST REPORT**

*For*

**Smart Cordless Floor Washer**

**MODEL NUMBER: FW250100US**

**ADDITIONAL MODEL NUMBER (ONLY FOR FCC): FW25xyyyzz(xx could be 00-99 or AA-ZZ, indicate for different accessories; yy could be 00-99 indicate for different sales channels; zz could be AA-ZZ indicate for different countries)**

**PROJECT NUMBER: 4790882283**

**REPORT NUMBER: 4790882283-1**

**FCC ID: 2AV7A-FW25**

**IC: 26039-FW25**

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*Prepared for*

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## Revision History

| Rev. | Issue Date | Revisions     | Revised By |
|------|------------|---------------|------------|
| V0   | 07/17/2023 | Initial Issue |            |

## TABLE OF CONTENTS

|      |                                                |     |
|------|------------------------------------------------|-----|
| 1.   | ATTESTATION OF TEST RESULTS .....              | 4   |
| 2.   | TEST METHODOLOGY .....                         | 6   |
| 3.   | FACILITIES AND ACCREDITATION.....              | 6   |
| 4.   | CALIBRATION AND UNCERTAINTY .....              | 7   |
| 4.1. | MEASURING INSTRUMENT CALIBRATION.....          | 7   |
| 4.2. | MEASUREMENT UNCERTAINTY .....                  | 7   |
| 5.   | EQUIPMENT UNDER TEST .....                     | 8   |
| 5.1. | DESCRIPTION OF EUT.....                        | 8   |
| 5.2. | MAXIMUM OUTPUT POWER.....                      | 9   |
| 5.3. | CHANNEL LIST .....                             | 9   |
| 5.4. | TEST CHANNEL CONFIGURATION .....               | 10  |
| 5.5. | THE WORSE CASE POWER SETTING PARAMETER .....   | 10  |
| 5.6. | DESCRIPTION OF AVAILABLE ANTENNAS .....        | 11  |
| 5.7. | THE WORSE CASE CONFIGURATIONS.....             | 11  |
| 5.8. | DESCRIPTION OF TEST SETUP .....                | 12  |
| 5.9. | MEASURING INSTRUMENT AND SOFTWARE USED .....   | 14  |
| 6.   | MEASUREMENT METHODS.....                       | 16  |
| 7.   | ANTENNA PORT TEST RESULTS.....                 | 17  |
| 7.1. | ON TIME AND DUTY CYCLE .....                   | 17  |
| 7.2. | 6 dB BANDWIDTH AND 99% OCCUPIED BANDWIDTH..... | 21  |
| 7.3. | CONDUCTED OUTPUT POWER .....                   | 39  |
| 7.4. | POWER SPECTRAL DENSITY .....                   | 49  |
| 7.5. | CONDUCTED BANDEDGE AND SPURIOUS EMISSIONS..... | 59  |
| 8.   | RADIATED TEST RESULTS.....                     | 91  |
| 8.1. | LIMITS AND PROCEDURE .....                     | 91  |
| 8.2. | TEST ENVIRONMENT.....                          | 98  |
| 8.3. | RESTRICTED BANDEDGE .....                      | 98  |
| 8.4. | SPURIOUS EMISSIONS.....                        | 119 |
| 9.   | AC POWER LINE CONDUCTED EMISSIONS.....         | 188 |
| 10.  | ANTENNA REQUIREMENTS.....                      | 191 |

## 1. ATTESTATION OF TEST RESULTS

### Applicant Information

Company Name: Tineco Intelligent Technology Co.,Ltd.  
Address: No. 108 Shihu Road West, Wuzhong Zone Suzhou ,Jiangsu,China  
215128

### Manufacturer Information

Company Name: Tineco Intelligent Technology Co.,Ltd.  
Address: No. 108 Shihu Road West, Wuzhong Zone Suzhou ,Jiangsu,China  
215128

### EUT Description

Product Name: Smart Cordless Floor Washer  
Model Number: FW250100US  
Additional Model Number (Only for FCC): FW25xxyyzz (xx could be 00-99 or AA-ZZ, indicate for different accessories; yy could be 00-99 indicate for different sales channels; zz could be AA-ZZ indicate for different countries)  
Sample Number: 6177090  
Data of Receipt Sample: Jun. 14, 2023  
Date Tested: Jun. 14, 2023~ Jul. 06, 2023

| APPLICABLE STANDARDS     |              |
|--------------------------|--------------|
| STANDARD                 | TEST RESULTS |
| CFR 47 Part 15 Subpart C | PASS         |
| ISED RSS-247 Issue 2     | PASS         |
| ISED RSS-GEN Issue 5     | PASS         |

| Summary of Test Results                                                                                                                                                                                       |                                           |                                                                                                               |              |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|---------------------------------------------------------------------------------------------------------------|--------------|
| Clause                                                                                                                                                                                                        | Test Items                                | FCC Rules                                                                                                     | Test Results |
| 1                                                                                                                                                                                                             | 6dB Bandwidth and 99% Occupied Bandwidth  | FCC 15.247 (a) (2)<br>RSS-247 Clause 5.2 (a)<br>RSS-Gen Clause 6.7                                            | PASS         |
| 2                                                                                                                                                                                                             | Conducted Power                           | FCC 15.247 (b) (3)<br>RSS-247 Clause 5.4 (d)<br>RSS-Gen Clause 6.12                                           | PASS         |
| 3                                                                                                                                                                                                             | Power Spectral Density                    | FCC 15.247 (e)<br>RSS-247 Clause 5.2 (b)                                                                      | PASS         |
| 4                                                                                                                                                                                                             | Conducted Band edge And Spurious emission | FCC 15.247 (d)<br>RSS-247 Clause 5.5<br>RSS-GEN Clause 6.13                                                   | PASS         |
| 5                                                                                                                                                                                                             | Radiated Band edges and Spurious emission | FCC 15.247 (d)<br>FCC 15.209<br>FCC 15.205<br>RSS-247 Clause 5.5<br>RSS-GEN Clause 8.9<br>RSS-GEN Clause 6.13 | PASS         |
| 6                                                                                                                                                                                                             | Conducted Emission Test for AC Power Port | FCC 15.207<br>RSS-GEN Clause 8.8                                                                              | PASS         |
| 7                                                                                                                                                                                                             | Antenna Requirement                       | FCC 15.203<br>RSS-GEN Clause 6.8                                                                              | PASS         |
| Note: The measurement result for the sample received is <Pass> according to < ANSI C63.10-2013, FCC CFR 47 Part 2, FCC CFR 47 Part 15C, RSS-Gen and RSS 247> when <Accuracy Method> decision rule is applied. |                                           |                                                                                                               |              |

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Chris Zhong  
EMC&RF Lab Operations Manager

## 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with KDB 558074 D01 15.247 Meas Guidance v05r02, 414788 D01 Radiated Test Site v01r01, CFR 47 FCC Part 2, CFR 47 FCC Part 15, ANSI C63.10-2013, ISED RSS-247 Issue 2 and ISED RSS-GEN Issue 5.

## 3. FACILITIES AND ACCREDITATION

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Accreditation Certificate | <b>A2LA (Certificate No.: 4829.01)</b><br><b>UL-CCIC COMPANY LIMITED has been assessed and proved to be in compliance with A2LA.</b><br><b>FCC (FCC Designation No.: CN1247)</b><br><b>UL-CCIC COMPANY LIMITED has been recognized to perform compliance testing on equipment subject to the Commission's Declaration of Conformity (DoC) and Certification rules.</b><br><b>IC (IC Designation No.: 25056; CAB No.: CN0073)</b><br><b>UL-CCIC COMPANY LIMITED has been recognized to perform compliance testing on equipment subject to the Commission's Declaration of Conformity (DoC) and Certification rules.</b> |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Note 1: All tests measurement facilities use to collect the measurement data are located at No. 2, Chengwan Road, Suzhou Industrial Park, Suzhou 215122, China

Note 2: For below 30MHz, lab had performed measurements at test anechoic chamber and comparing to measurements obtained on an open field site. These measurements below 30MHz had been correlated to measurements performed on an OFS.

Note 3: The test anechoic chamber in UL-CCIC COMPANY LIMITED had been calibrated and compared to the open field sites and the test anechoic chamber is shown to be equivalent to or worst case from the open field site.

## 4. CALIBRATION AND UNCERTAINTY

### 4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations and is traceable to recognized national standards.

### 4.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

| Test Item                                                                                                                                     | Uncertainty          |
|-----------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| Conduction emission                                                                                                                           | 3.1dB                |
| Radiation Emission test(include Fundamental emission)<br>(9KHz-30MHz)                                                                         | 3.4dB                |
| Radiation Emission test(include Fundamental emission)<br>(30MHz-1GHz)                                                                         | 3.4dB                |
| Radiation Emission test<br>(1GHz to 26GHz)( include Fundamental emission)                                                                     | 3.5dB (1GHz-18Gz)    |
|                                                                                                                                               | 3.9dB (18GHz-26.5Gz) |
| Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2. |                      |

## 5. EQUIPMENT UNDER TEST

### 5.1. DESCRIPTION OF EUT

|                       |                                                                                                                                                                                                                                               |
|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product Name:         | Smart Cordless Floor Washer                                                                                                                                                                                                                   |
| Model No.:            | FW250100US                                                                                                                                                                                                                                    |
| Operating Frequency:  | IEEE 802.11B/G/N/AX(HT20): 2412MHz to 2462MHz<br>IEEE 802.11N(HT40): 2422MHz to 2452MHz                                                                                                                                                       |
| Type of Modulation:   | IEEE for 802.11B: DSSS (CCK, DQPSK, DBPSK)<br>IEEE for 802.11G: OFDM (64QAM, 16QAM, QPSK, BPSK)<br>IEEE for 802.11N(HT20 and HT40): OFDM (64QAM, 16QAM, QPSK, BPSK)<br>IEEE for 802.11AX20: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM) |
| Channels Step:        | Channels with 5MHz step                                                                                                                                                                                                                       |
| Test software of EUT: | RD Tool                                                                                                                                                                                                                                       |
| Antenna Type:         | PCB antenna                                                                                                                                                                                                                                   |
| Antenna Gain:         | -0.66 dBi                                                                                                                                                                                                                                     |
|                       | Note: This data is provided by customer and our lab isn't responsible for this data.                                                                                                                                                          |



## 5.2. MAXIMUM OUTPUT POWER

| Number of Transmit Chains (NTX) | IEE Std. 802.11   | Channel Number | Max AVG Conducted Power (dBm) |
|---------------------------------|-------------------|----------------|-------------------------------|
| 1                               | IEEE 802.11B      | 1-11[11]       | 14.94                         |
| 1                               | IEEE 802.11G      | 1-11[11]       | 14.18                         |
| 1                               | IEEE 802.11N HT20 | 1-11[11]       | 13.88                         |
| 1                               | IEEE 802.11N HT40 | 3-9[7]         | 12.76                         |
| 1                               | IEEE 802.11AX20   | 1-11[11]       | 13.60                         |

## 5.3. CHANNEL LIST

| Channel List for 802.11B/G/N/AX(20 MHz) |                 |         |                 |         |                 |         |                 |
|-----------------------------------------|-----------------|---------|-----------------|---------|-----------------|---------|-----------------|
| Channel                                 | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) |
| 1                                       | 2412            | 4       | 2427            | 7       | 2442            | 10      | 2457            |
| 2                                       | 2417            | 5       | 2432            | 8       | 2447            | 11      | 2462            |
| 3                                       | 2422            | 6       | 2437            | 9       | 2452            |         |                 |

| Channel List for 802.11N(40 MHz) |                 |         |                 |         |                 |         |                 |
|----------------------------------|-----------------|---------|-----------------|---------|-----------------|---------|-----------------|
| Channel                          | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) |
| 3                                | 2422            | 5       | 2432            | 7       | 2442            | 9       | 2452            |
| 4                                | 2427            | 6       | 2437            | 8       | 2447            |         |                 |

#### 5.4. TEST CHANNEL CONFIGURATION

| Test Mode         | Test Channel (MHz) |
|-------------------|--------------------|
| IEEE 802.11B      | LCH: CH01 2412     |
|                   | MCH: CH06 2437     |
|                   | HCH: CH11 2462     |
| IEEE 802.11G      | LCH: CH01 2412     |
|                   | MCH: CH06 2437     |
|                   | HCH: CH11 2462     |
| IEEE 802.11N HT20 | LCH: CH01 2412     |
|                   | MCH: CH06 2437     |
|                   | HCH: CH11 2462     |
| IEEE 802.11N HT40 | LCH: CH03 2422     |
|                   | MCH: CH06 2437     |
|                   | HCH: CH09 2452     |
| IEEE 802.11AX20   | LCH: CH01 2412     |
|                   | MCH: CH06 2437     |
|                   | HCH: CH11 2462     |

#### 5.5. THE WORSE CASE POWER SETTING PARAMETER

| The Worse Case Power Setting Parameter under 2400 ~ 2483.5MHz Band |                         |              |         |         |            |         |         |
|--------------------------------------------------------------------|-------------------------|--------------|---------|---------|------------|---------|---------|
| Test Software                                                      |                         | RD Tool      |         |         |            |         |         |
| Modulation Mode                                                    | Transmit Antenna Number | Test Channel |         |         |            |         |         |
|                                                                    |                         | NCB: 20MHz   |         |         | NCB: 40MHz |         |         |
|                                                                    |                         | CH 1         | CH 6    | CH 11   | CH 3       | CH 6    | CH 9    |
| 802.11B                                                            | 1                       | default      | default | default | /          |         |         |
| 802.11G                                                            | 1                       | default      | default | default |            |         |         |
| 802.11N HT20                                                       | 1                       | default      | default | default |            |         |         |
| 802.11N HT40                                                       | 1                       | /            |         |         | default    | default | default |
| 802.11AX20                                                         | 1                       | default      | default | default | /          |         |         |

## 5.6. DESCRIPTION OF AVAILABLE ANTENNAS

| Ant. | Frequency (MHz) | Antenna Type | Antenna Gain (dBi) |
|------|-----------------|--------------|--------------------|
| 1    | 2400-2483.5     | PCB antenna  | -0.66              |

Note: This data is provided by customer and our lab isn't responsible for this data.

| Test Mode         | Transmit and Receive Mode                    | Description                                                           |
|-------------------|----------------------------------------------|-----------------------------------------------------------------------|
| IEEE 802.11B      | <input checked="" type="checkbox"/> 1TX, 1RX | Antenna1 can be used as transmitting/receiving antenna independently. |
| IEEE 802.11G      | <input checked="" type="checkbox"/> 1TX, 1RX | Antenna1 can be used as transmitting/receiving antenna independently. |
| IEEE 802.11N HT20 | <input checked="" type="checkbox"/> 1TX, 1RX | Antenna1 can be used as transmitting/receiving antenna independently. |
| IEEE 802.11N HT40 | <input checked="" type="checkbox"/> 1TX, 1RX | Antenna1 can be used as transmitting/receiving antenna independently. |
| IEEE 802.11AX20   | <input checked="" type="checkbox"/> 1TX, 1RX | Antenna1 can be used as transmitting/receiving antenna independently. |

## 5.7. THE WORSE CASE CONFIGURATIONS

For WIFI module, the worst-case data rates as provided by the client were:

802.11B mode: 1 Mbps

802.11G mode: 6 Mbps

802.11N HT20 mode: MCS0

802.11N HT40 mode: MCS0

802.11AX20 mode: MCS0

## 5.8. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

| Item | Equipment             | Brand Name | Model Name | Description                    |
|------|-----------------------|------------|------------|--------------------------------|
| 1    | Laptop                | ThinkPad   | E590       | N/A                            |
| 2    | Fixed Frequency Board | N/A        | N/A        | Supply by Customer             |
| 3    | USB Cable             | N/A        | N/A        | Supply by UL Lab(100cm length) |

### I/O PORT

| Cable No | Port | Connector Type | Cable Type | Cable Length(m) | Remarks |
|----------|------|----------------|------------|-----------------|---------|
| 1        | N/A  | N/A            | N/A        | N/A             | N/A     |

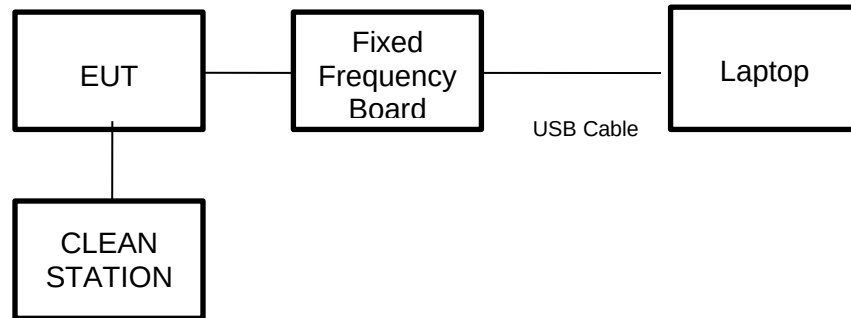
### ACCESSORY

| Item | Accessory                  | Brand Name                 | Model Name            | Description                                          |
|------|----------------------------|----------------------------|-----------------------|------------------------------------------------------|
| 1    | AC/DC ADAPTER              | Class 2 Power Supply       | MODEL: YLJX2I-T300100 | INPUT: 100-240V~50/60Hz 1.0A Max, OUTPUT:30.0V= 1.0A |
| 2    | Handheld Accessory Devices | Handheld Accessory Devices | N/A                   | Supply by Customer                                   |

Remark: Pre-testing with these accessories and Handheld Accessory Devices, only the data of the worst case is included in this report.

**TEST SETUP**

The EUT can work in an engineer mode with a software through a table PC.

**SETUP DIAGRAM FOR TESTS**

## 5.9. MEASURING INSTRUMENT AND SOFTWARE USED

| Conducted Emissions (Instrument)    |                                         |                        |                                     |            |                 |            |            |
|-------------------------------------|-----------------------------------------|------------------------|-------------------------------------|------------|-----------------|------------|------------|
| Used                                | Equipment                               | Manufacturer           | Model No.                           | Serial No. | Upper Last Cal. | Last Cal.  | Next Cal.  |
| <input checked="" type="checkbox"/> | EMI Test Receiver                       | R&S                    | ESR3                                | 126700     | 2021-12-04      | 2022-12-19 | 2023-12-18 |
| <input checked="" type="checkbox"/> | Two-Line V-Network                      | R&S                    | ENV216                              | 126701     | 2021-12-04      | 2022-12-03 | 2023-12-02 |
| Software                            |                                         |                        |                                     |            |                 |            |            |
| Used                                | Description                             |                        | Manufacturer                        | Name       | Version         |            |            |
| <input checked="" type="checkbox"/> | Test Software for Conducted disturbance |                        | R&S                                 | EMC32      | Ver. 9.25       |            |            |
| Radiated Emissions (Instrument)     |                                         |                        |                                     |            |                 |            |            |
| Used                                | Equipment                               | Manufacturer           | Model No.                           | Serial No. | Upper Last Cal. | Last Cal.  | Next Cal.  |
| <input checked="" type="checkbox"/> | Spectrum Analyzer                       | Keysight               | N9010B                              | 155727     | 2022-04-09      | 2023-04-08 | 2024-04-07 |
| <input checked="" type="checkbox"/> | EMI test receiver                       | R&S                    | ESR7                                | 221694     | 2022-05-20      | 2023-04-08 | 2024-04-07 |
| <input checked="" type="checkbox"/> | EMI test receiver                       | R&S                    | ESR26                               | 126703     | 2020-12-05      | 2022-12-03 | 2023-12-02 |
| <input checked="" type="checkbox"/> | Receiver Antenna (9kHz-30MHz)           | Schwarzbeck            | FMZB 1513                           | 155456     | 2018-06-15      | 2021-06-03 | 2024-06-02 |
| <input checked="" type="checkbox"/> | Receiver Antenna (30MHz-1GHz)           | Schwarzbeck            | VULB 9163                           | 126704     | 2019-02-15      | 2022-01-18 | 2025-01-17 |
| <input checked="" type="checkbox"/> | Receiver Antenna (1GHz-18GHz)           | R&S                    | HF907                               | 126705     | 2018-01-29      | 2022-02-28 | 2025-02-27 |
| <input checked="" type="checkbox"/> | Receiver Antenna (18GHz-26.5GHz)        | ETS                    | 3160-10                             | 155565     | 2019-01-05      | 2021-07-15 | 2024-07-14 |
| <input checked="" type="checkbox"/> | Pre-amplification (To 18GHz)            | R&S                    | SCU-18D                             | 134667     | 2021-12-04      | 2022-12-03 | 2023-12-02 |
| <input checked="" type="checkbox"/> | Pre-amplification (To 18GHz)            | Tonsend                | TAP01018050                         | 224539     | /               | 2022-10-20 | 2023-10-19 |
| <input checked="" type="checkbox"/> | Pre-amplification (To 26.5GHz)          | R&S                    | SCU-26D                             | 135391     | 2021-12-05      | 2022-12-03 | 2023-12-02 |
| <input checked="" type="checkbox"/> | Band Reject Filter                      | Wainwright             | WRCJV8-2350-2400-2483.5-2533.5-40SS | 1          | 2022-04-09      | 2023-04-08 | 2024-04-07 |
| <input checked="" type="checkbox"/> | Highpass Filter                         | Wainwright             | WHKX10-2700-3000-18000-40SS         | 2          | 2022-04-09      | 2023-04-08 | 2024-04-07 |
| <input checked="" type="checkbox"/> | Attenuator                              | Wainwright             | BW-N1-W5+                           | 3          | 2022-04-09      | 2023-04-08 | 2024-04-07 |
| <input checked="" type="checkbox"/> | Chamber A                               | Albatross              | 9*6*6                               | 126721     | 2019-05-31      | 2022-05-30 | 2025-05-29 |
| <input checked="" type="checkbox"/> | Chamber B                               | SAEMC                  | 9*6*6                               | 220350     | /               | 2022-07-03 | 2025-06-01 |
| <input checked="" type="checkbox"/> | Temperature and Humidity Datalogger     | Omega Engineering Inc. | iTHX-SD-5                           | 183135     | /               | 2022-07-20 | 2023-07-19 |
| Software                            |                                         |                        |                                     |            |                 |            |            |
| Used                                | Description                             |                        | Manufacturer                        | Name       | Version         |            |            |
| <input checked="" type="checkbox"/> | Test Software for Radiated disturbance  |                        | Tonscend                            | JS36-RSE   | 4.0.0.1         |            |            |

**Other instruments**

| Used                                | Equipment                           | Manufacturer           | Model No. | Serial No. | Upper Last Cal. | Last Cal.  | Next Cal.  |
|-------------------------------------|-------------------------------------|------------------------|-----------|------------|-----------------|------------|------------|
| <input checked="" type="checkbox"/> | Spectrum Analyzer                   | Keysight               | N9010B    | 155368     | 2022-04-09      | 2023-04-08 | 2024-04-07 |
| <input checked="" type="checkbox"/> | Attenuator                          | PASTERNAK              | PE7087-6  | 1624       | 2022-05-23      | 2023-04-08 | 2024-04-07 |
| <input checked="" type="checkbox"/> | Shielding Room                      | Albatross              | /         | 126723     | 2019-12-27      | 2022-05-30 | 2025-05-29 |
| <input checked="" type="checkbox"/> | Temperature and Humidity Datalogger | Omega Engineering Inc. | iTHX-SD-5 | 199847     | 2021-10-15      | 2022-10-14 | 2023-10-13 |

## 6. MEASUREMENT METHODS

| No. | Test Item                                     | KDB Name                                   | Section                     |
|-----|-----------------------------------------------|--------------------------------------------|-----------------------------|
| 1   | 6dB Bandwidth                                 | KDB 558074 D01 15.247 Meas Guidance v05r02 | 8.2                         |
| 2   | Conducted Output Power                        | KDB 558074 D01 15.247 Meas Guidance v05r02 | 8.3.2.2<br>(Method AVGSA-2) |
| 3   | Power Spectral Density                        | KDB 558074 D01 15.247 Meas Guidance v05r02 | 8.4<br>(Method PKPSD)       |
| 4   | Out-of-band emissions in non-restricted bands | KDB 558074 D01 15.247 Meas Guidance v05r02 | 8.5                         |
| 5   | Out-of-band emissions in restricted bands     | KDB 558074 D01 15.247 Meas Guidance v05r02 | 8.6                         |
| 6   | Band-edge                                     | KDB 558074 D01 15.247 Meas Guidance v05r02 | 8.7                         |
| 7   | Conducted Emission Test For AC Power Port     | ANSI C63.10-2013                           | 6.2                         |



## 7. ANTENNA PORT TEST RESULTS

### 7.1. ON TIME AND DUTY CYCLE

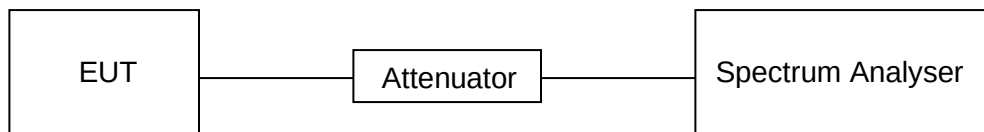
#### LIMITS

None; for reporting purposes only

#### PROCEDURE

FCC KDB 558074 Zero-Span Spectrum Analyzer Method

#### TEST SETUP



#### TEST ENVIRONMENT

|                     |          |                   |             |
|---------------------|----------|-------------------|-------------|
| Temperature         | 25.5°C   | Relative Humidity | 50.5%       |
| Atmosphere Pressure | 102.1kpa | Test Voltage      | AC120V/60Hz |

#### TEST RESULTS TABLE

| Mode         | On Time (msec) | Period (msec) | Duty Cycle x (Linear) | Duty Cycle (%) | Duty Cycle Correction Factor (db) | 1/T Minimum VBW (kHz) | Final VBW (kHz) |
|--------------|----------------|---------------|-----------------------|----------------|-----------------------------------|-----------------------|-----------------|
| 11B          | 100            | 100           | 1                     | 100            | 0                                 | 0.01                  | 0.01            |
| 11G          | 100            | 100           | 1                     | 100            | 0                                 | 0.01                  | 0.01            |
| 802.11N HT20 | 100            | 100           | 1                     | 100            | 0                                 | 0.01                  | 0.01            |
| 802.11N HT40 | 100            | 100           | 1                     | 100            | 0                                 | 0.01                  | 0.01            |
| 802.11AX20   | 100            | 100           | 1                     | 100            | 0                                 | 0.01                  | 0.01            |

Note: 1) Duty Cycle Correction Factor=10log(1/x).  
 2) Where: x is Duty Cycle (Linear)  
 3) Where: T is On Time (transmit duration)  
 4) If the duty cycle is above 98%, the Final VBW is 10Hz.

## TEST GRAPHS

### 11B ON TIME AND DUTY CYCLE MID CH (WORSE CASE)



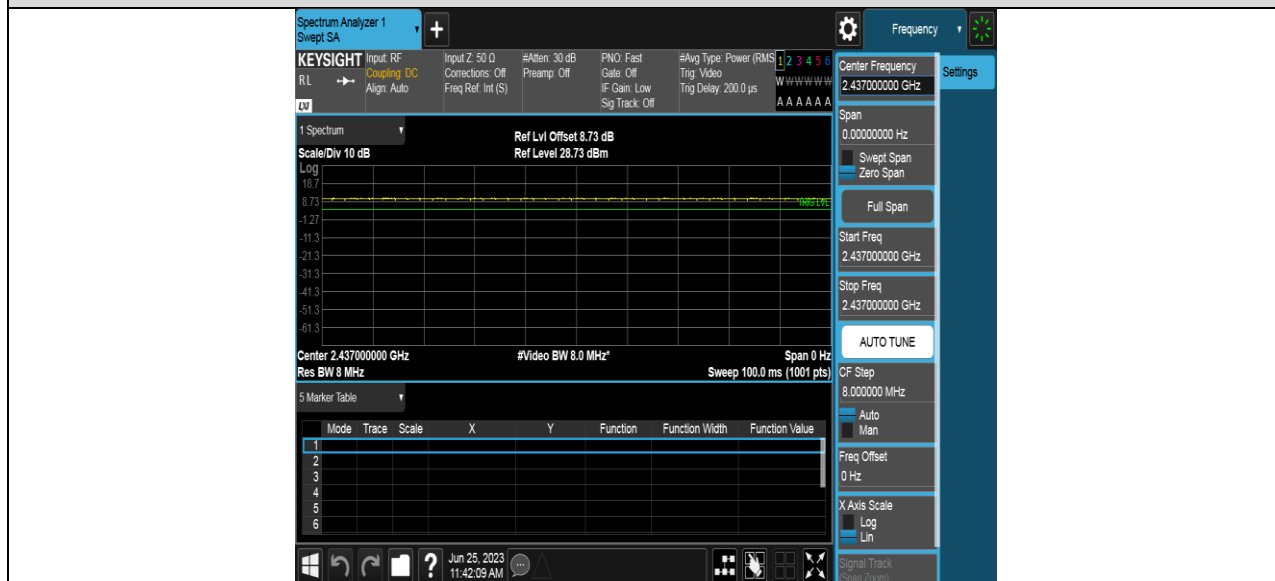
### 11G ON TIME AND DUTY CYCLE MID CH (WORSE CASE)



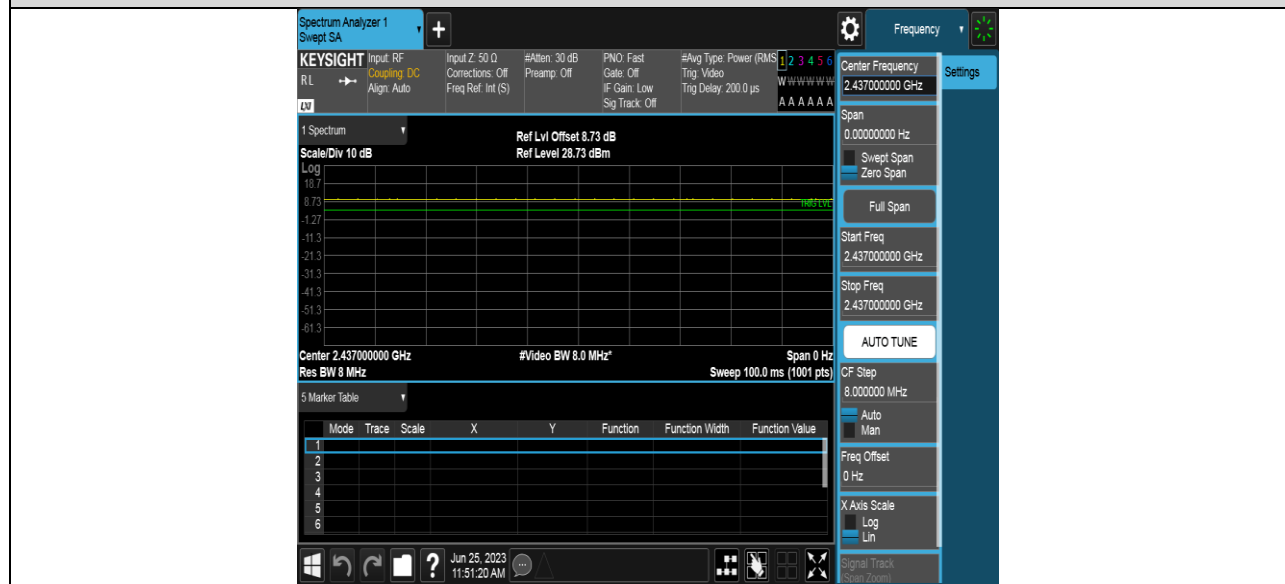
### 11N HT20 ON TIME AND DUTY CYCLE MID CH (WORSE CASE)



### 11N HT40 ON TIME AND DUTY CYCLE MID CH (WORSE CASE)



### 11AX20 ON TIME AND DUTY CYCLE MID CH (WORSE CASE)



## 7.2. 6 dB BANDWIDTH AND 99% OCCUPIED BANDWIDTH

### LIMITS

| FCC Part15 (15.247) Subpart C, ISSED RSS-Gen     |                         |                             |                       |
|--------------------------------------------------|-------------------------|-----------------------------|-----------------------|
| Section                                          | Test Item               | Limit                       | Frequency Range (MHz) |
| CFR 47 FCC 15.247(a)(2)<br>ISSED RSS-247 5.2 (a) | 6dB Bandwidth           | $\geq 500\text{kHz}$        | 2400-2483.5           |
| ISSED RSS-Gen Clause 6.7                         | 99 % Occupied Bandwidth | For reporting purposes only | 2400-2483.5           |

### TEST PROCEDURE

Refer to ANSI C63.10-2013 clause 11.8 for DTS bandwidth and clause 6.9 for Occupied Bandwidth.

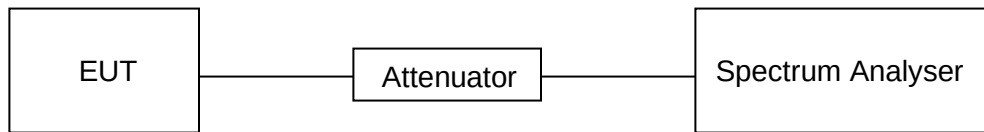
Connect the EUT to the spectrum analyser and use the following settings:

|                  |                                                                                                           |
|------------------|-----------------------------------------------------------------------------------------------------------|
| Center Frequency | The centre frequency of the channel under test                                                            |
| Detector         | Peak                                                                                                      |
| RBW              | For 6 dB Bandwidth: 100 kHz<br>For 99 % Occupied Bandwidth: 1 % to 5 % of the occupied bandwidth          |
| VBW              | For 6 dB Bandwidth: $\geq 3 \times \text{RBW}$<br>For 99 % Occupied Bandwidth: $\geq 3 \times \text{RBW}$ |
| Trace            | Max hold                                                                                                  |
| Sweep            | Auto couple                                                                                               |

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

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

### TEST SETUP



### TEST ENVIRONMENT

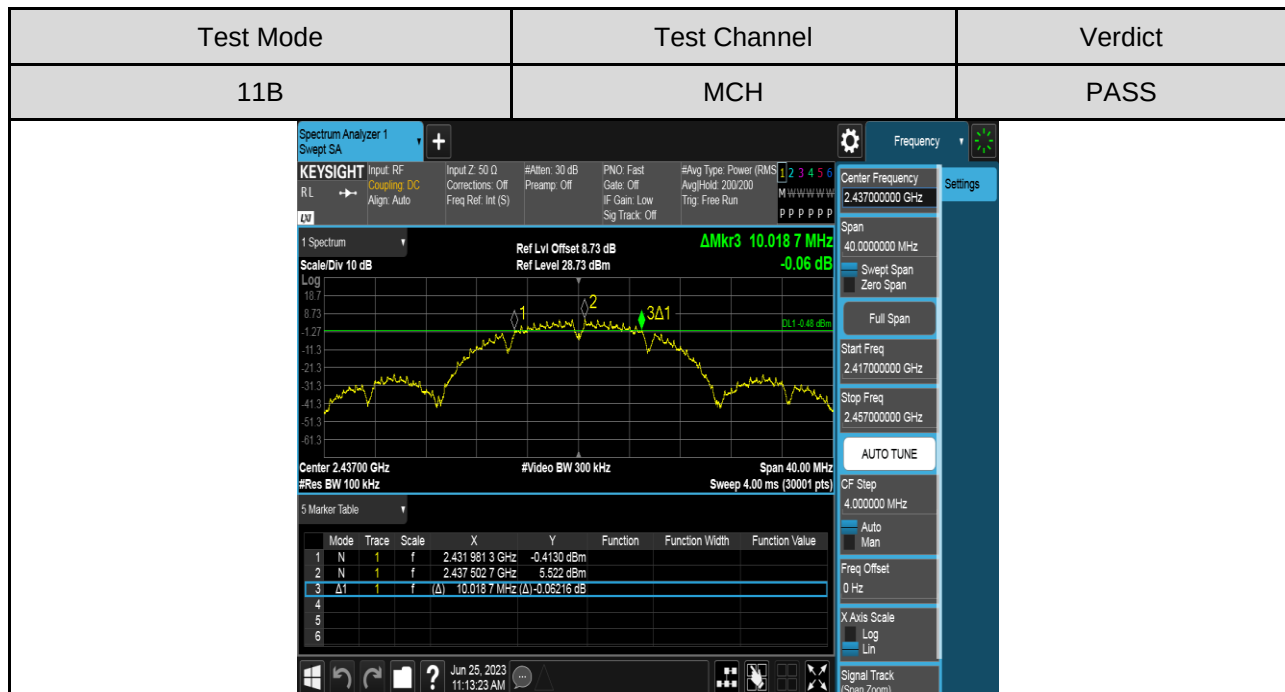
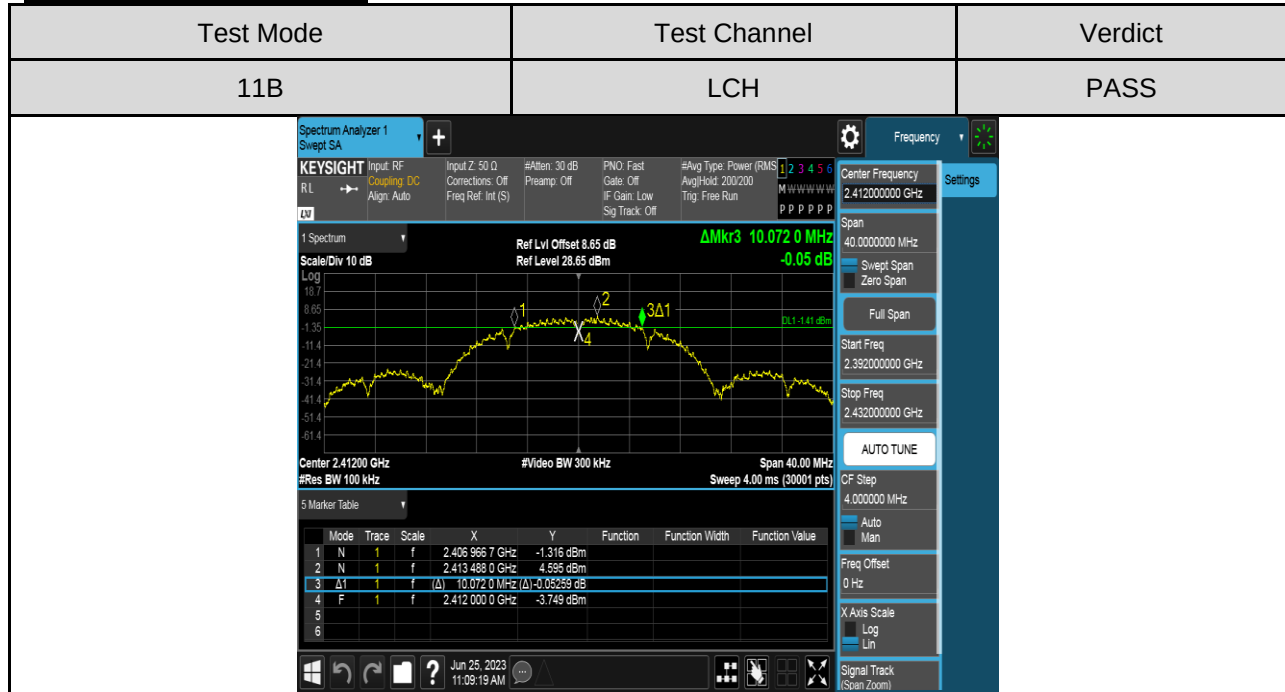
|                     |          |                   |             |
|---------------------|----------|-------------------|-------------|
| Temperature         | 25.5°C   | Relative Humidity | 50.5%       |
| Atmosphere Pressure | 102.1kpa | Test Voltage      | AC120V/60Hz |

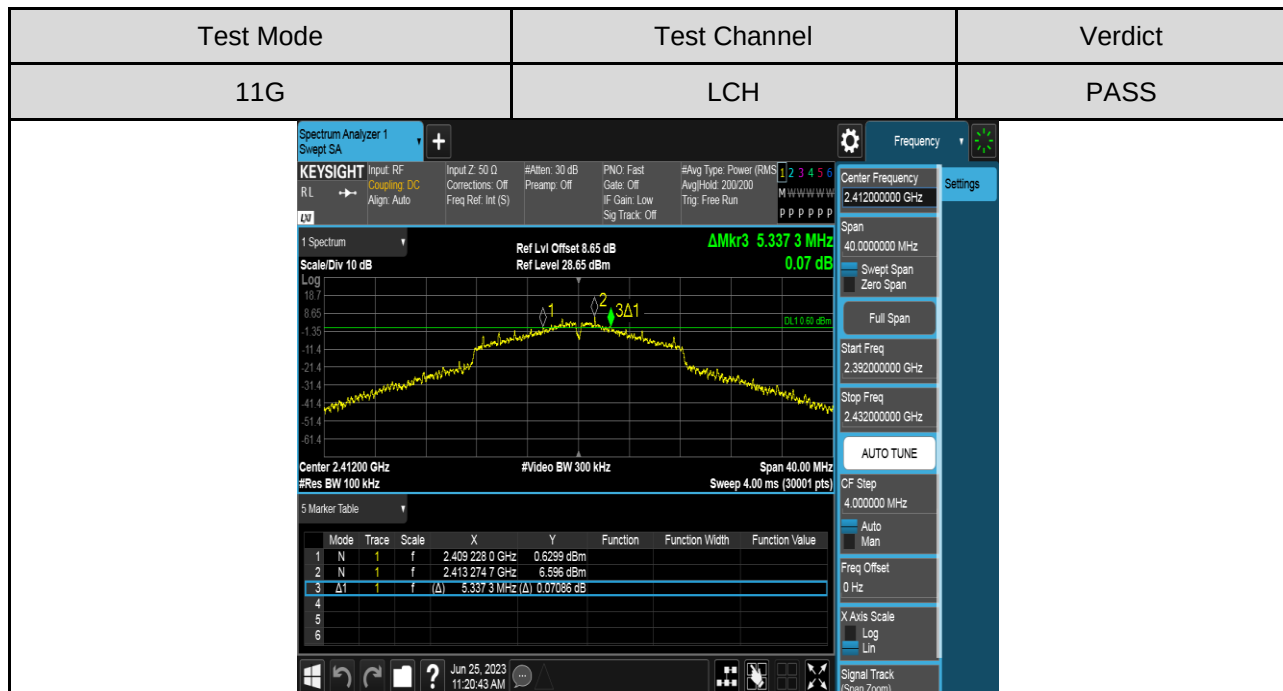
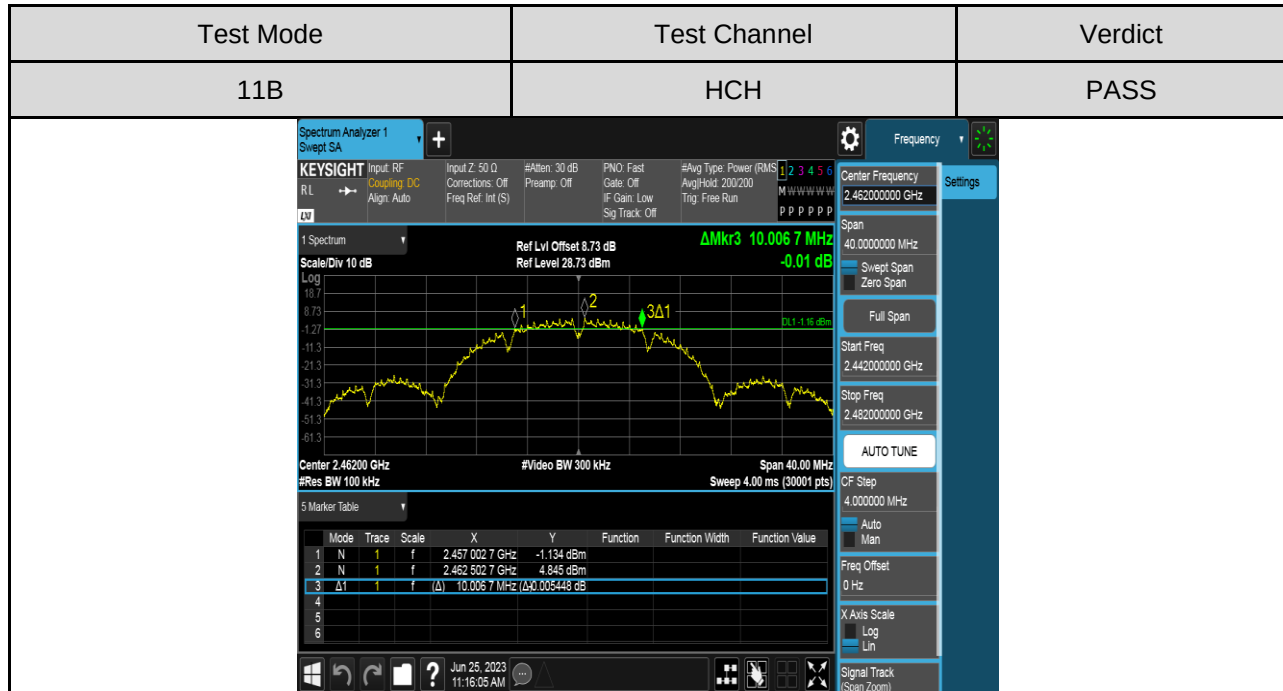
### TEST RESULTS TABLE

| Test Mode | Test Channel | 6dB bandwidth (MHz) | 99% bandwidth (MHz) | Result |
|-----------|--------------|---------------------|---------------------|--------|
| 11B       | LCH          | 10.072              | 15.869              | Pass   |
|           | MCH          | 10.019              | 15.688              | Pass   |
|           | HCH          | 10.007              | 15.614              | Pass   |
| 11G       | LCH          | 5.337               | 15.601              | Pass   |
|           | MCH          | 6.351               | 15.518              | Pass   |
|           | HCH          | 6.308               | 15.505              | Pass   |
| 11N HT20  | LCH          | 7.541               | 16.693              | Pass   |
|           | MCH          | 5.380               | 16.590              | Pass   |
|           | HCH          | 7.528               | 16.602              | Pass   |
| 11N HT40  | LCH          | 10.069              | 33.550              | Pass   |
|           | MCH          | 7.907               | 33.210              | Pass   |
|           | HCH          | 7.613               | 33.500              | Pass   |
| 11AX20    | LCH          | 14.901              | 19.119              | Pass   |
|           | MCH          | 15.272              | 19.055              | Pass   |
|           | HCH          | 18.576              | 19.034              | Pass   |

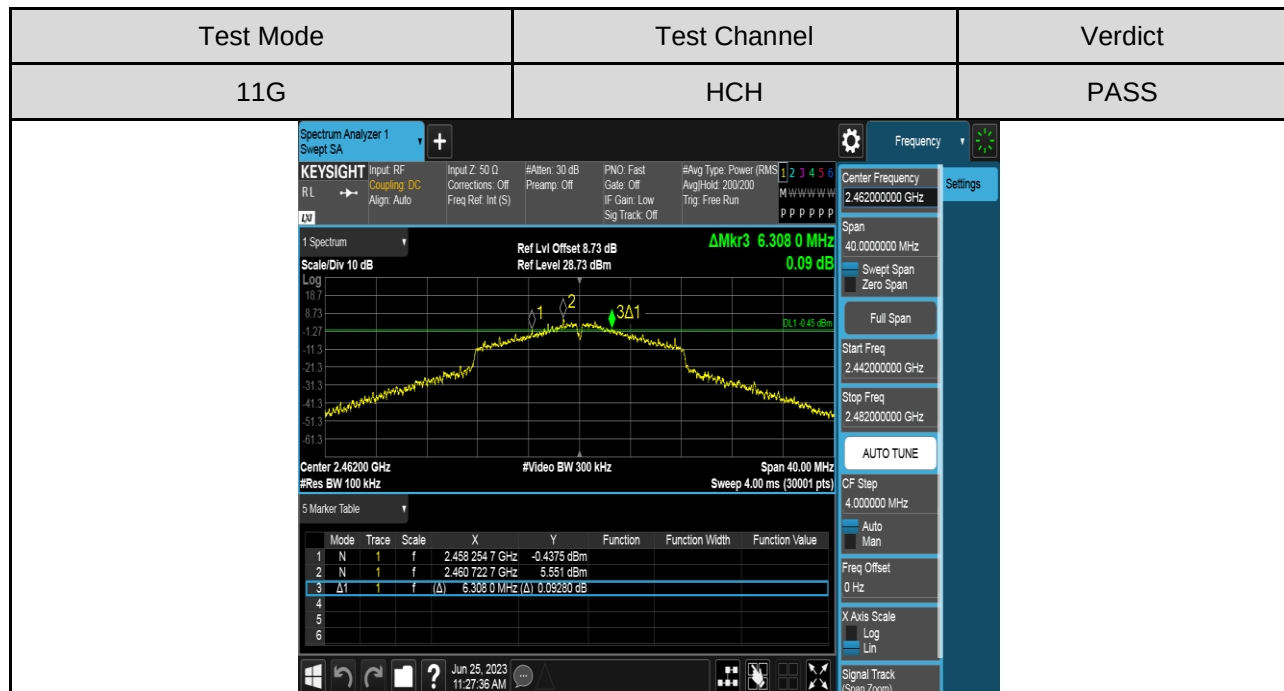
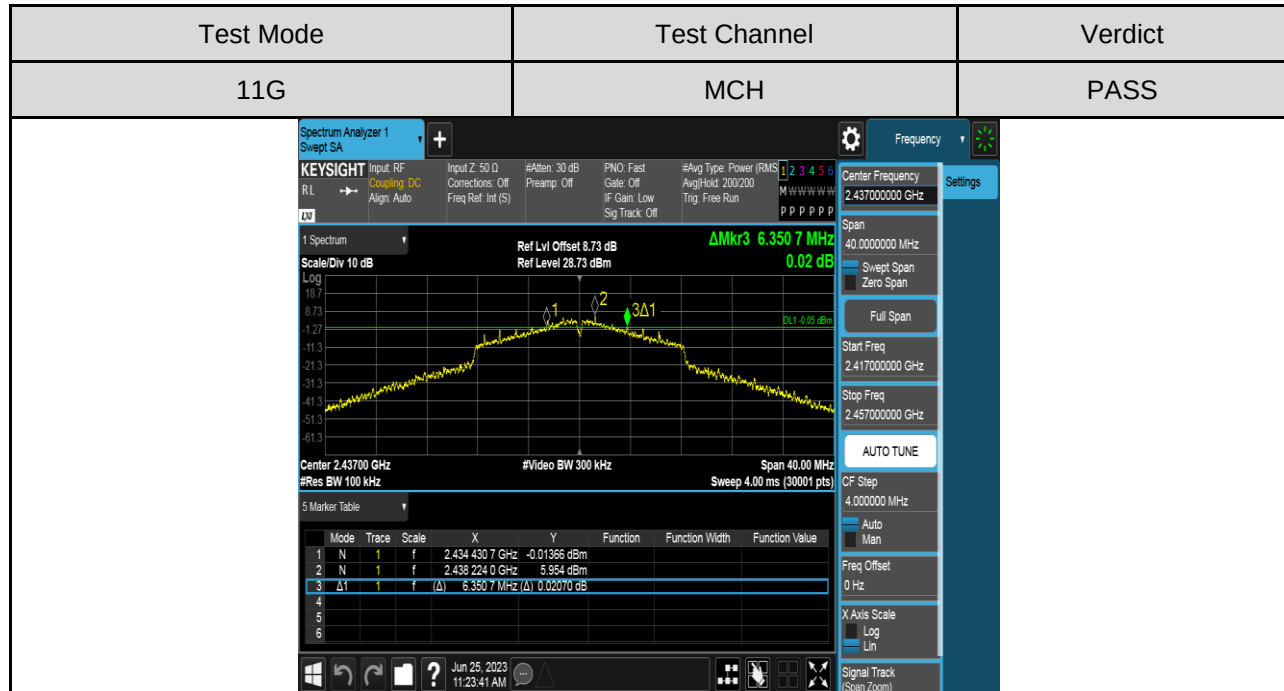
## TEST GRAPHS

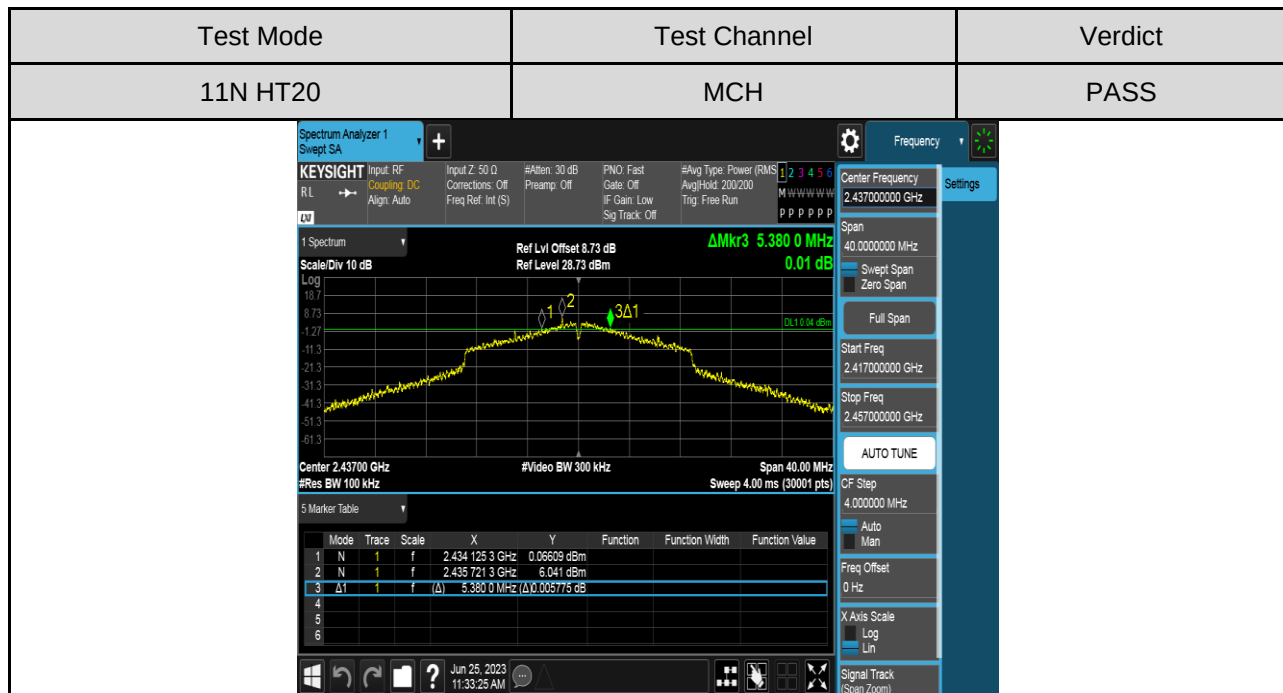
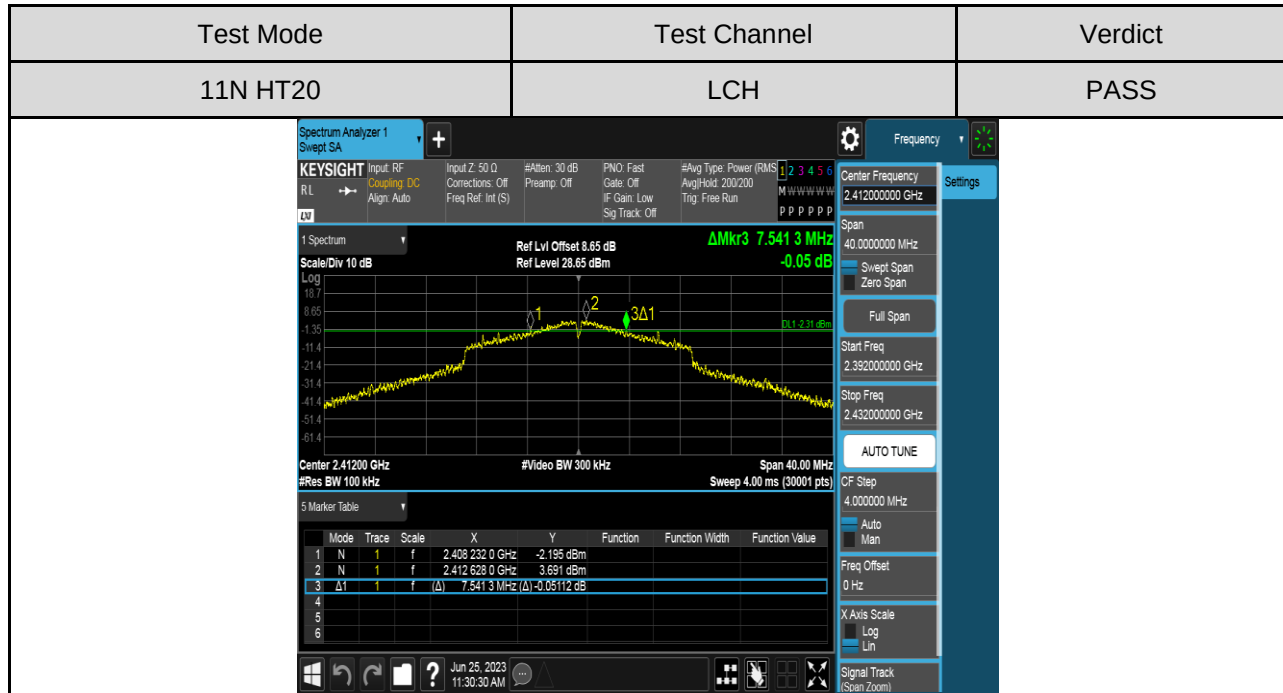
### For 6dB Bandwidth Part:

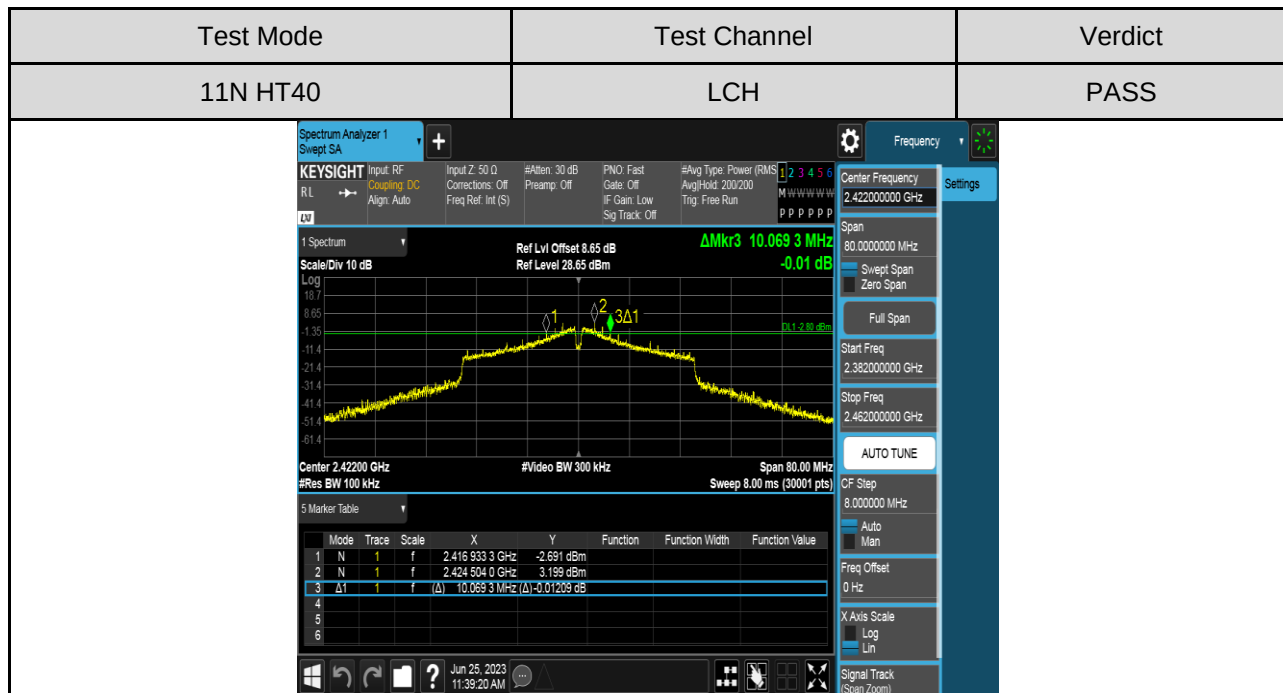
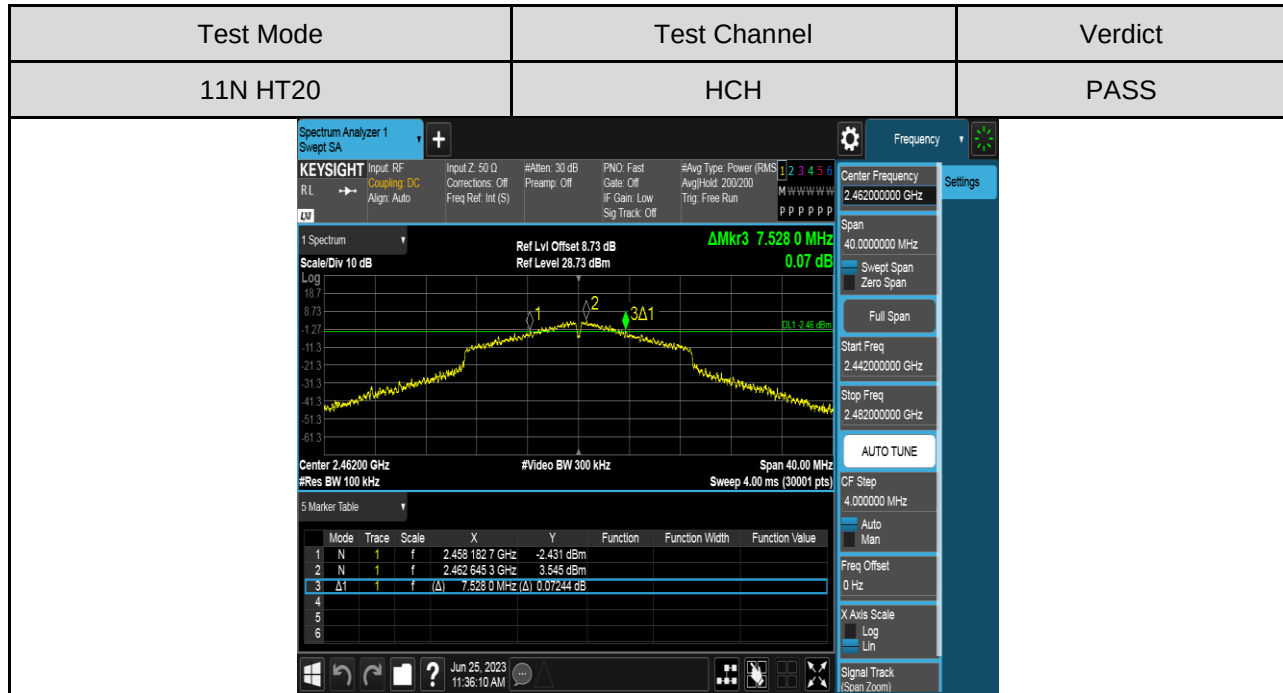


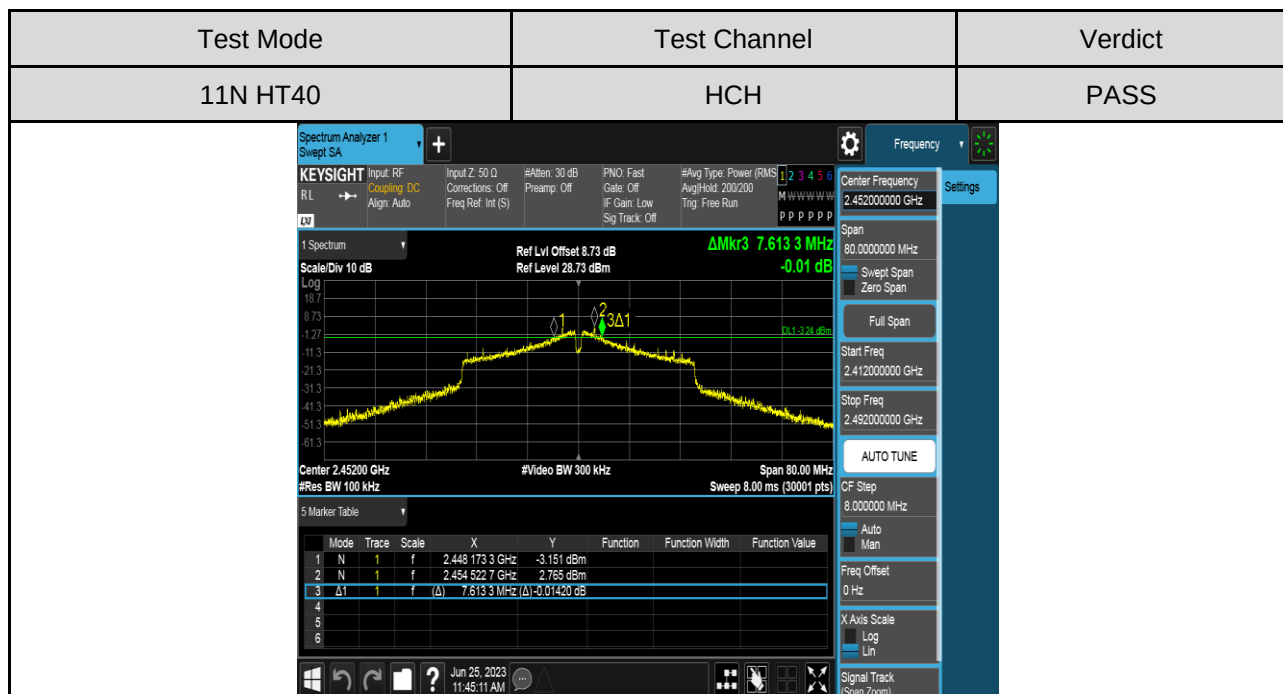
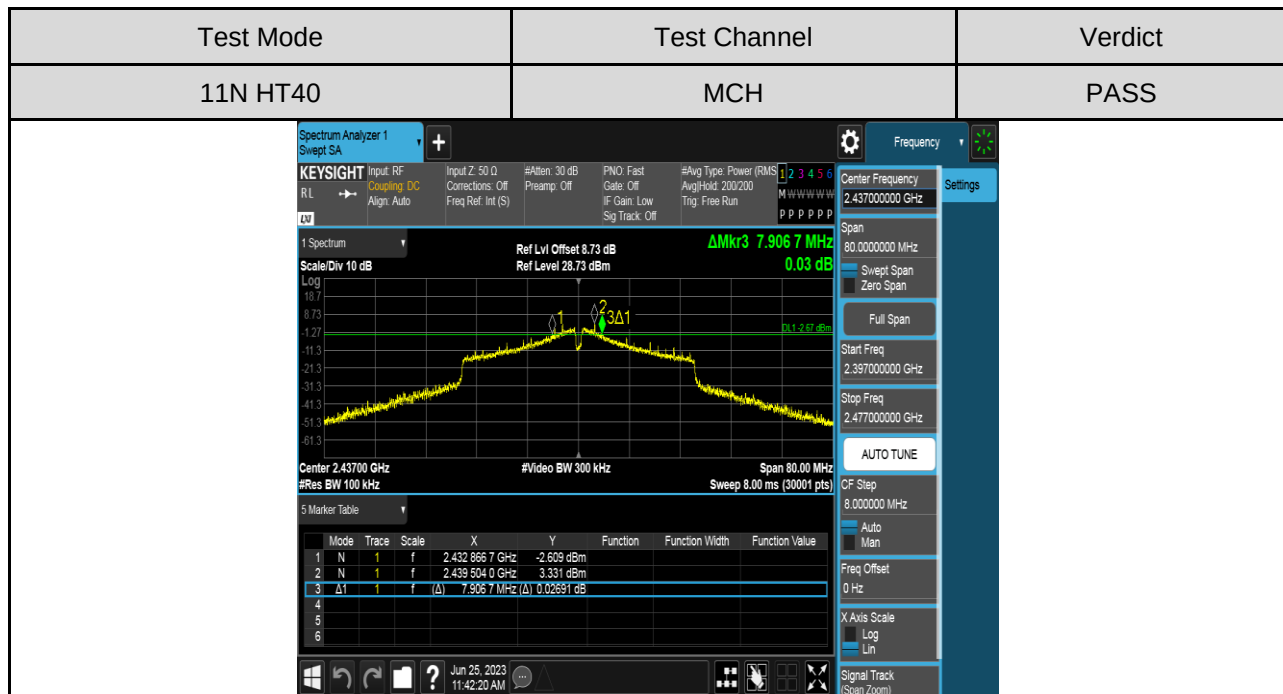


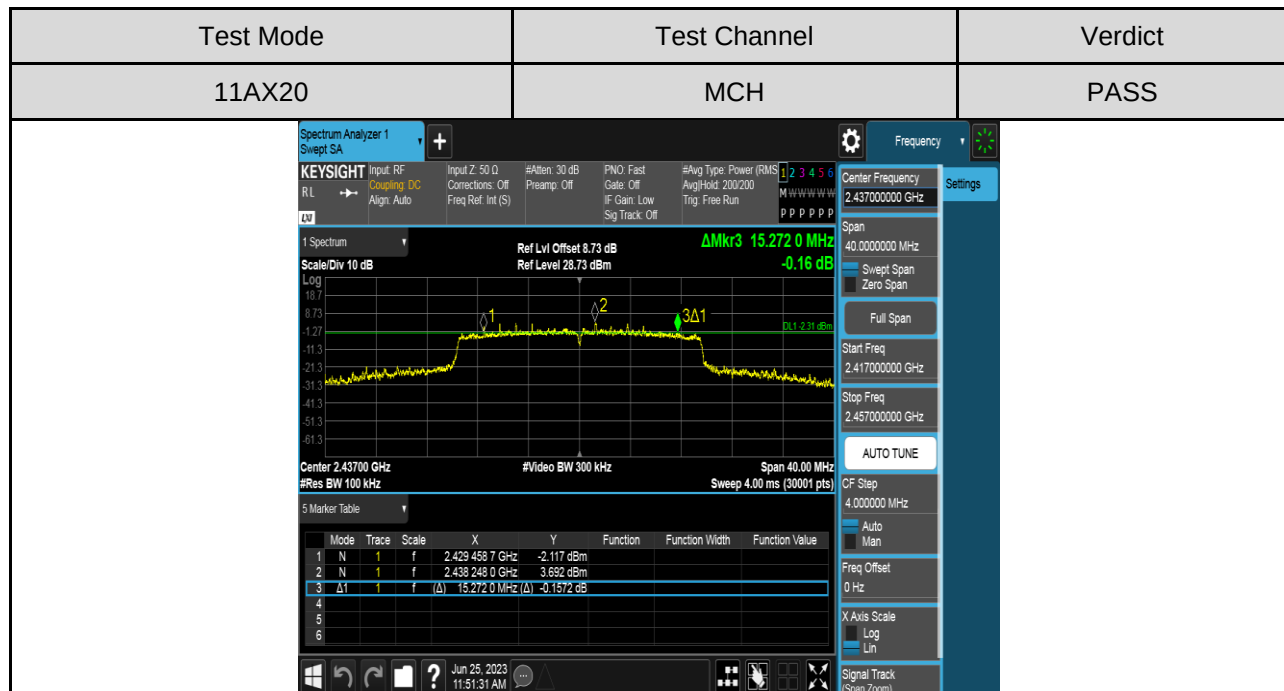
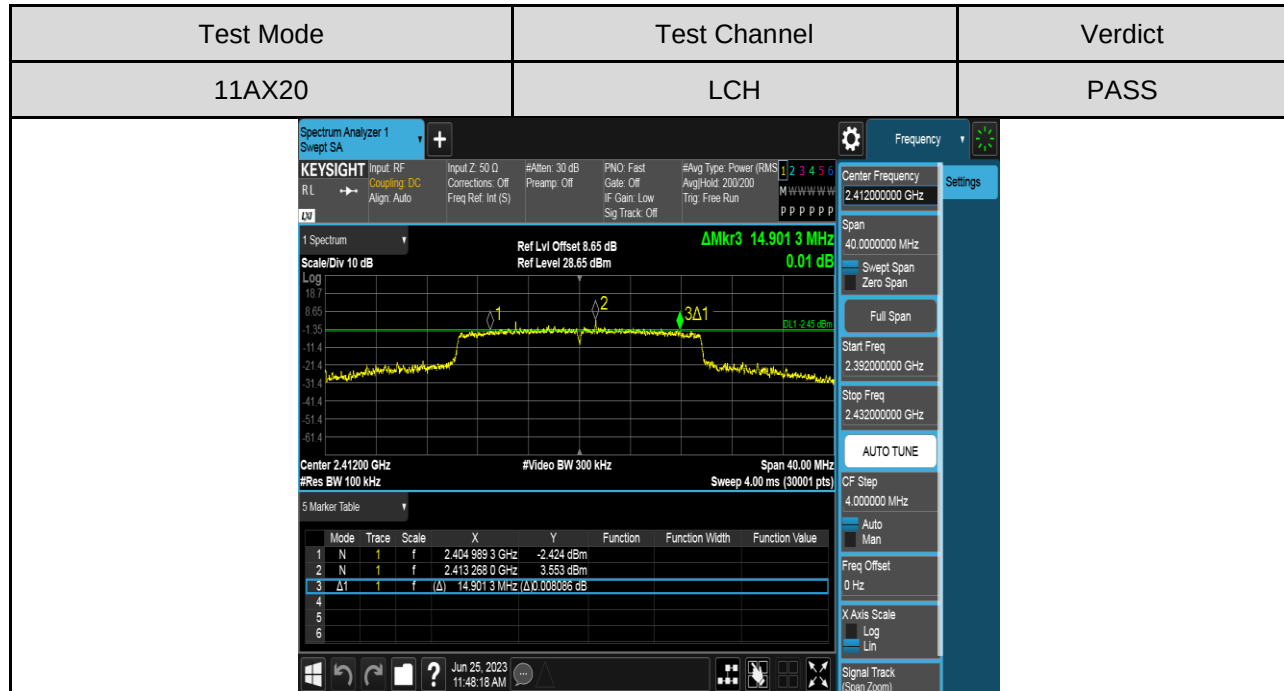


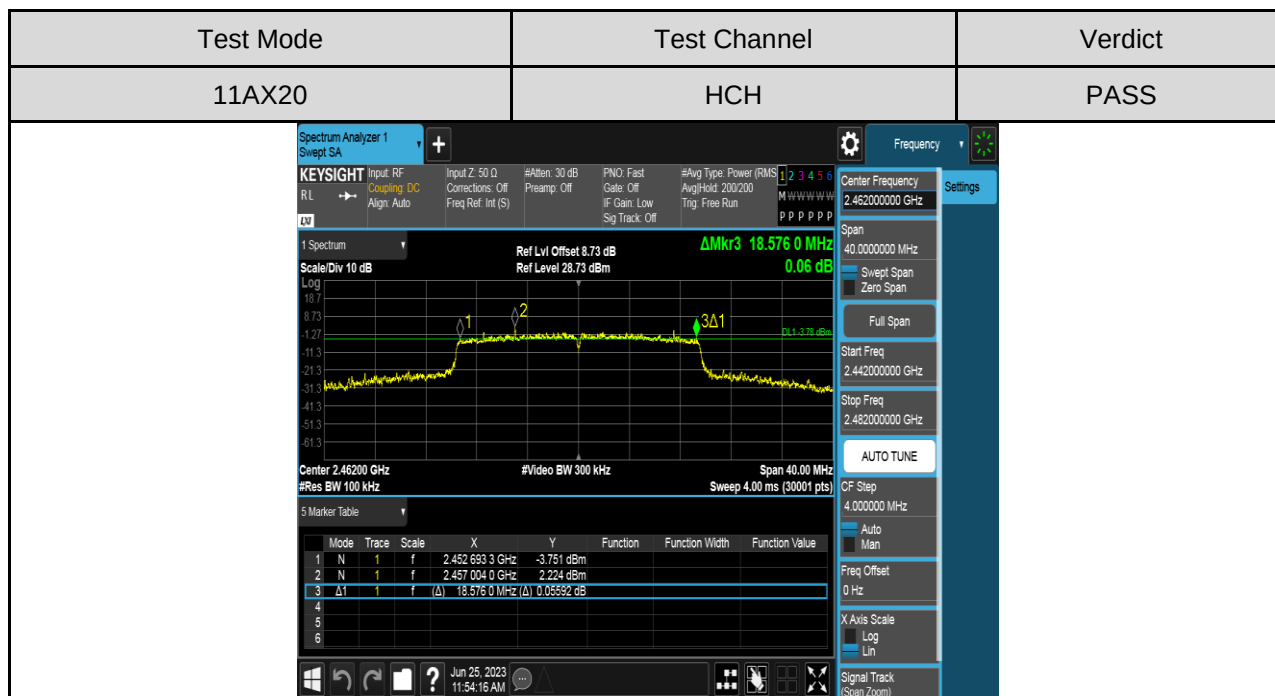




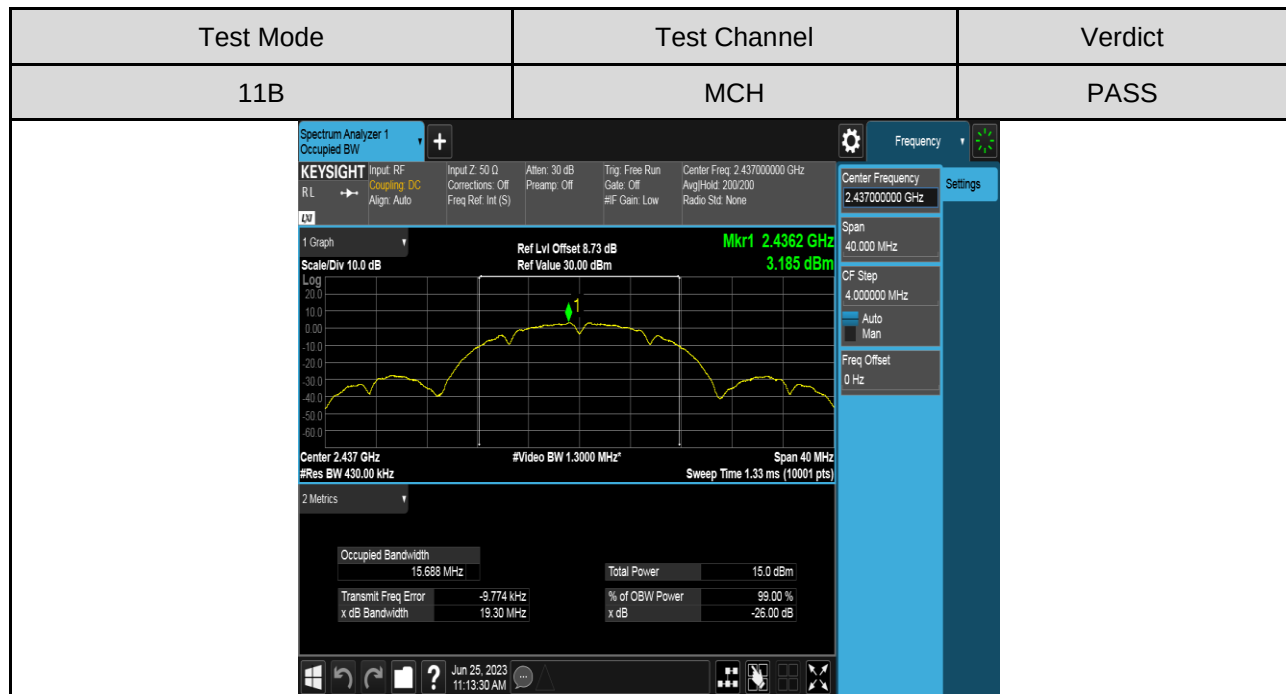
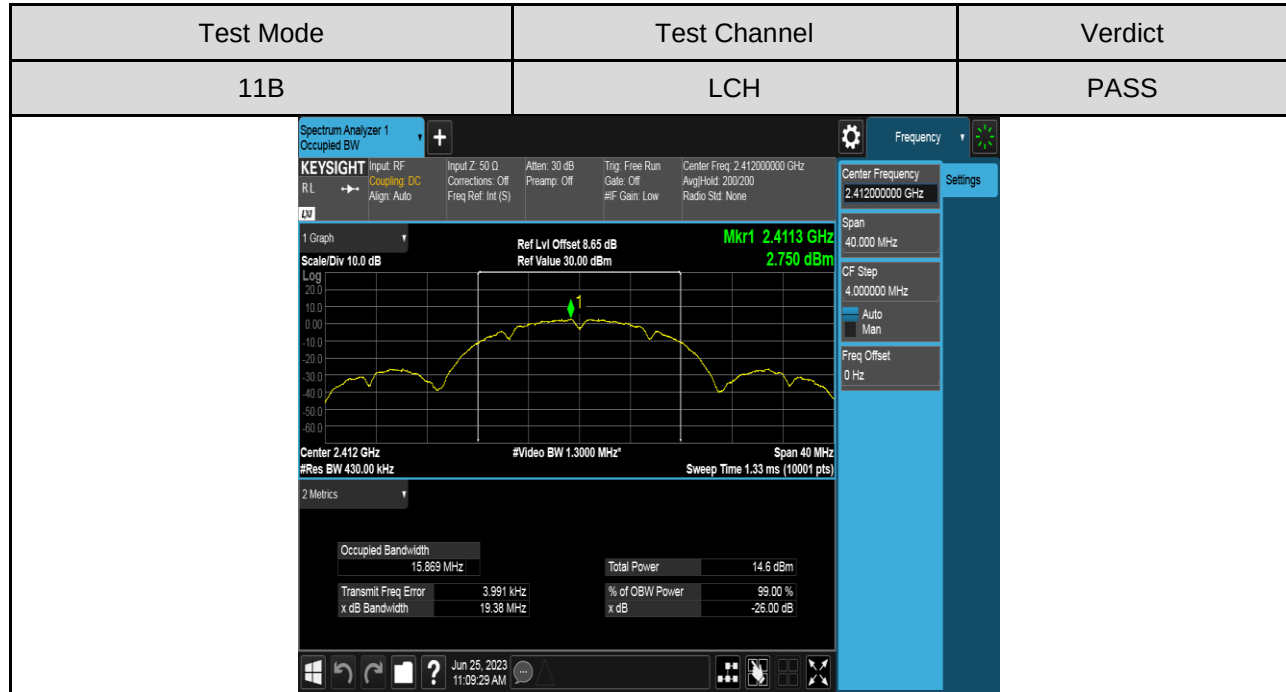


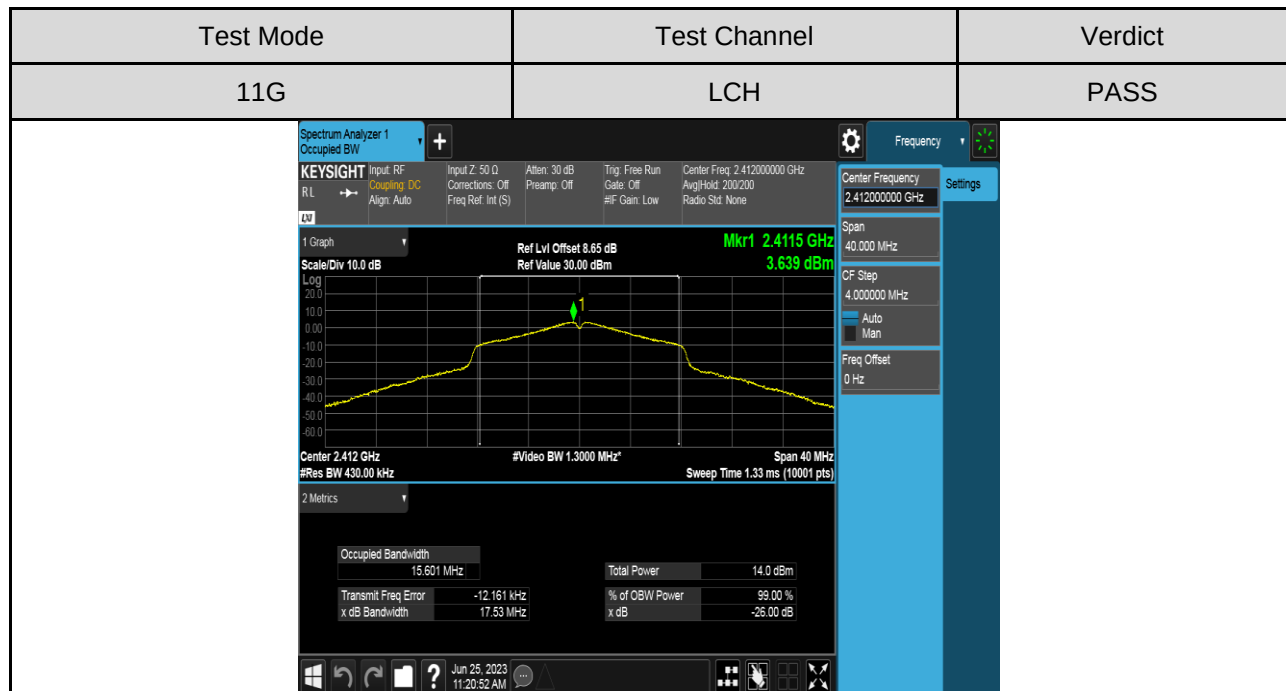
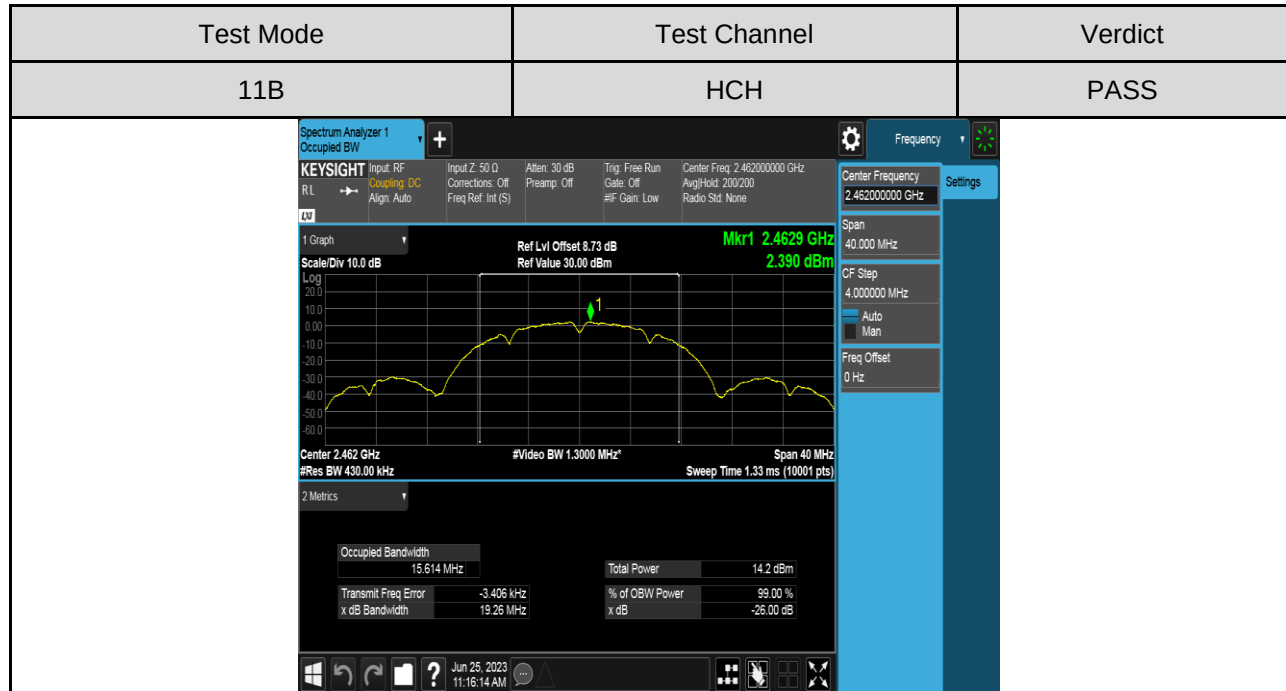






**For 99% Bandwidth Part:**

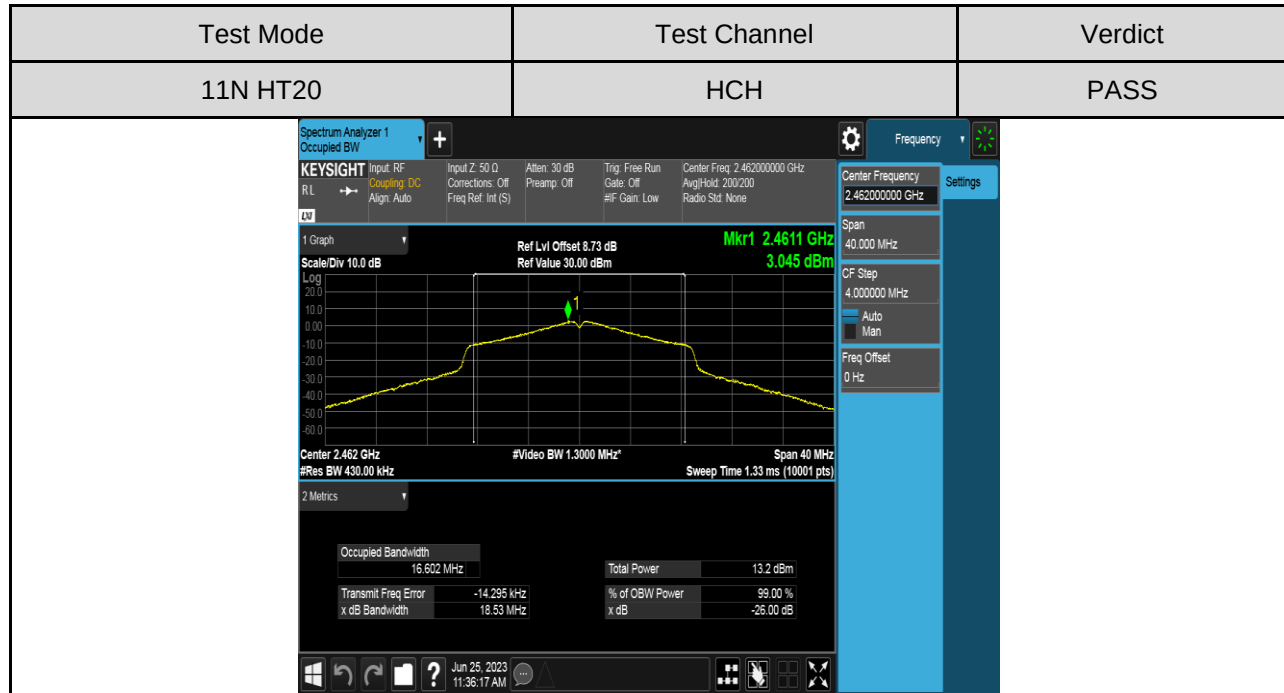


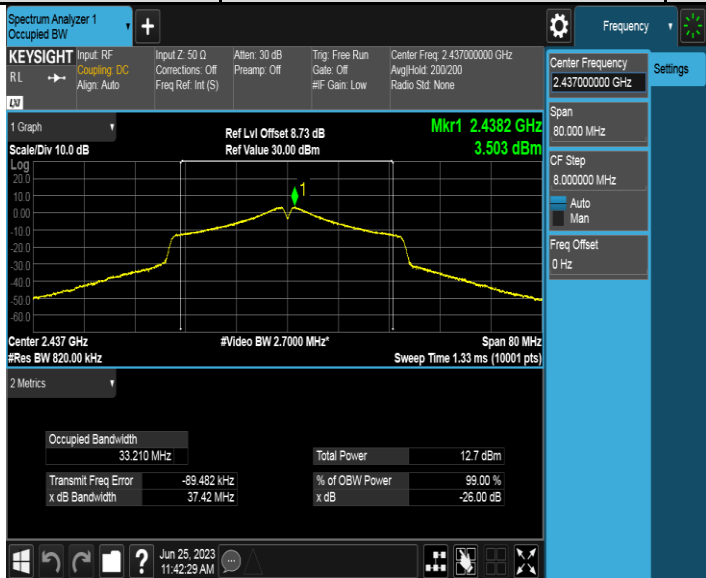


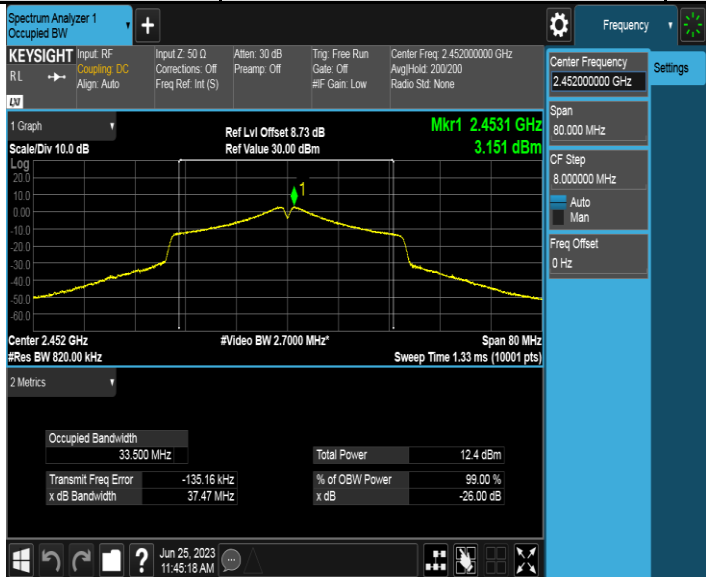




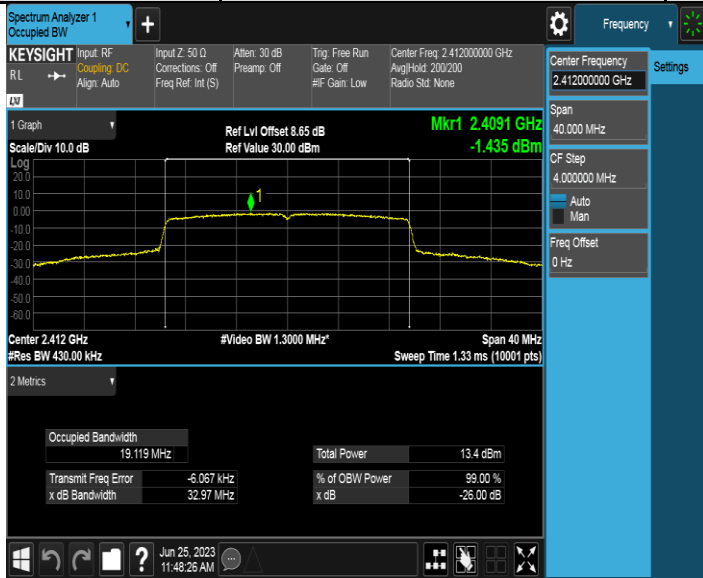




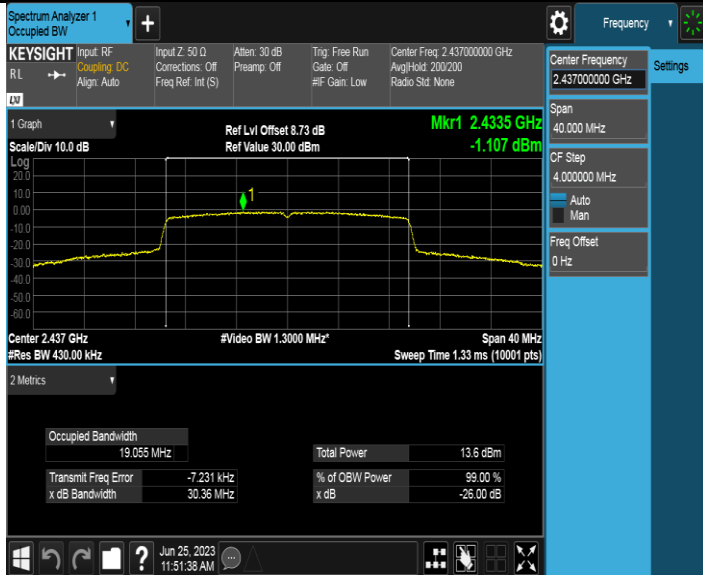
| Test Mode                                                                          | Test Channel | Verdict |
|------------------------------------------------------------------------------------|--------------|---------|
| 11N HT40                                                                           | MCH          | PASS    |
|  |              |         |

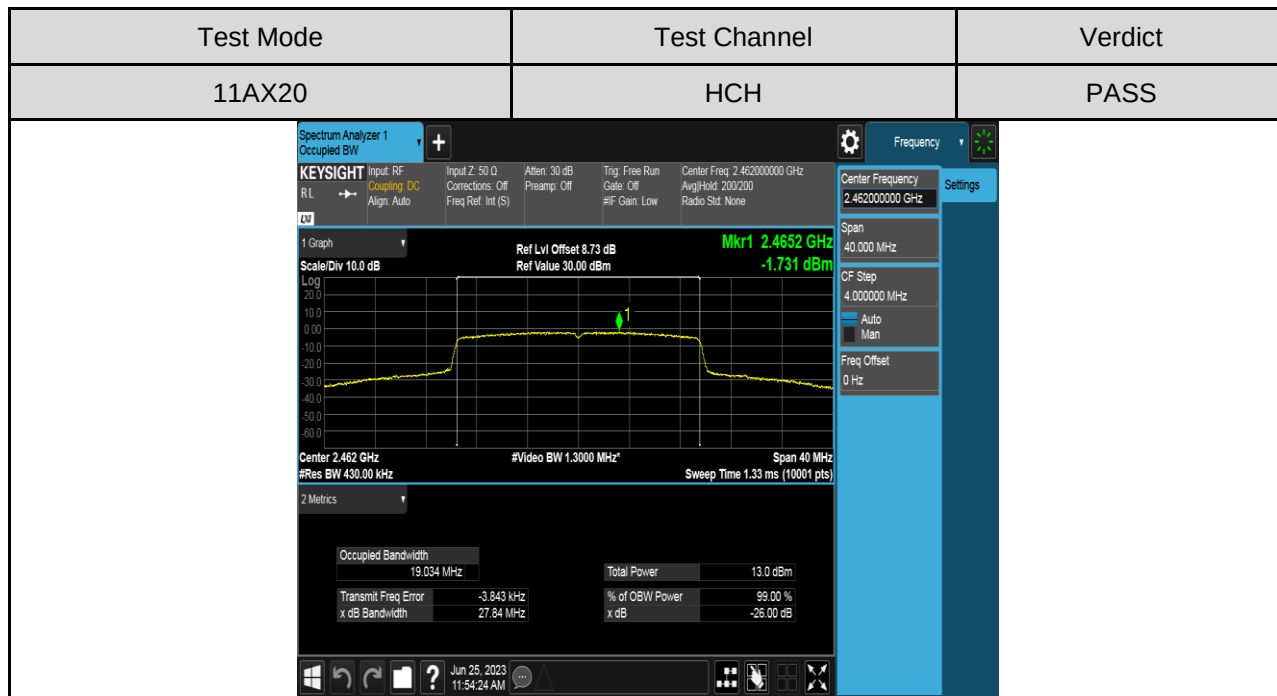
| Test Mode                                                                            | Test Channel | Verdict |
|--------------------------------------------------------------------------------------|--------------|---------|
| 11N HT40                                                                             | HCH          | PASS    |
|  |              |         |

| Test Mode | Test Channel | Verdict |
|-----------|--------------|---------|
| 11AX20    | LCH          | PASS    |



| Test Mode | Test Channel | Verdict |
|-----------|--------------|---------|
| 11AX20    | MCH          | PASS    |





### 7.3. CONDUCTED OUTPUT POWER

#### LIMITS

| FCC Part15 (15.247) Subpart C, RSS-Gen                          |              |                 |                       |
|-----------------------------------------------------------------|--------------|-----------------|-----------------------|
| Section                                                         | Test Item    | Limit           | Frequency Range (MHz) |
| FCC 15.247(b)(3)<br>ISED RSS-247 5.4 (d)<br>RSS-Gen Clause 6.12 | Output Power | 1 watt or 30dBm | 2400-2483.5           |

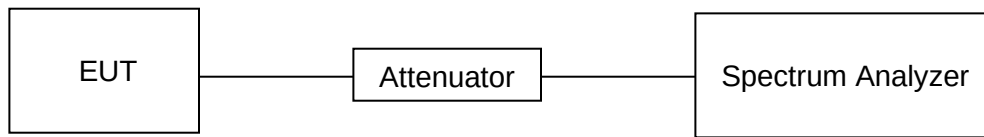
#### TEST PROCEDURE

Method AVGSA-2 uses trace averaging across ON and OFF times of the EUT transmissions, followed by

duty cycle correction. The procedure for this method is as follows:

- a) Measure the duty cycle D of the transmitter output signal as described in 11.6.
- b) Set span to at least 1.5 times the OBW.
- c) Set RBW = 1% to 5% of the OBW, not to exceed 1 MHz.
- d) Set VBW  $\geq [3 \times \text{RBW}]$ .
- e) Number of points in sweep  $\geq [2 \times \text{span} / \text{RBW}]$ . (This gives bin-to-bin spacing  $\leq \text{RBW} / 2$ , so that narrowband signals are not lost between frequency bins.)
- f) Sweep time = auto.
- g) Detector = RMS (i.e., power averaging), if available. Otherwise, use the sample detector mode.
- h) Do not use sweep triggering. Allow the sweep to “free run.”
- i) 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 such that the average accurately represents the true average over the ON and OFF periods of the transmitter.
- j) Compute power by integrating the spectrum across the OBW of the signal using the instrument’s band power measurement function with band limits set equal to the OBW band edges. If the instrument does not have a band power function, then sum the spectrum levels (in power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.
- k) Add  $[10 \log (1 / D)]$ , where D is the duty cycle, to the measured power 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  $[10 \log (1/0.25)] = 6 \text{ dB}$  if the duty cycle is 25%.

### TEST SETUP



### TEST ENVIRONMENT

|                     |          |                   |             |
|---------------------|----------|-------------------|-------------|
| Temperature         | 25.5°C   | Relative Humidity | 50.5%       |
| Atmosphere Pressure | 102.1kpa | Test Voltage      | AC120V/60Hz |

### TEST RESULTS TABLE

| Test Mode | Test Channel | Maximum Conducted Output Power (AV) | LIMIT |
|-----------|--------------|-------------------------------------|-------|
|           |              | dBm                                 | dBm   |
| 11B       | LCH          | 14.63                               | 30    |
|           | MCH          | 14.94                               | 30    |
|           | HCH          | 14.19                               | 30    |
| 11G       | LCH          | 13.95                               | 30    |
|           | MCH          | 14.18                               | 30    |
|           | HCH          | 13.49                               | 30    |
| 11N HT20  | LCH          | 13.59                               | 30    |
|           | MCH          | 13.88                               | 30    |
|           | HCH          | 13.22                               | 30    |
| 11N HT40  | LCH          | 12.60                               | 30    |
|           | MCH          | 12.76                               | 30    |
|           | HCH          | 12.36                               | 30    |
| 11AX20    | LCH          | 13.36                               | 30    |
|           | MCH          | 13.60                               | 30    |
|           | HCH          | 12.98                               | 30    |

Remark:

- 1) For all the test results has been adjusted the duty cycle factor.
- 2) For Correction Factor is refer to the result in section 7.1



### TEST GRAPHS

