

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

**CERTIFICATION TEST REPORT**

*For*

**Coffee Maker**

**MODEL NUMBER: CM917A**

**PROJECT NUMBER: 4790755906**

**REPORT NUMBER: 4790755906-1**

**FCC ID: 2A9ZYCM917A-RD**

**IC: 29974-CM917ARD**

**HVIN: Coffee maker-RD**

**ISSUE DATE: Mar. 06, 2023**

*Prepared for*

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Revision History

| Rev. | Issue Date | Revisions     | Revised By |
|------|------------|---------------|------------|
| V0   | 03/06/2023 | Initial Issue |            |

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## 1. ATTESTATION OF TEST RESULTS

### Applicant Information

Company Name: Ningbo Borine Electric Appliance Co., Ltd.  
Address: 77, Dagang Sixth Road, Xinqi Beilun District Ningbo Zhejiang  
315800 CHINA

### Manufacturer Information

Company Name: Ningbo Borine Electric Appliance Co., Ltd.  
Address: 77, Dagang Sixth Road, Xinqi Beilun District Ningbo Zhejiang  
315800 CHINA

### EUT Description

Product Name: Coffee Maker  
Model Name: CM917A  
Additional No.: /  
Model Difference: /  
Sample Number: 5817459  
Data of Receipt Sample: Feb. 24, 2023  
Test Date: Feb. 25, 2023~ Mar. 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         |
| Remark:<br>1) 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> when <Accuracy Method> decision rule is applied. |                                           |                                                                                                               |              |

Prepared By:

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Tom Tang

Reviewed By:

*Leon Wu*

Leon Wu

Authorized By:

*Chris Zhong*

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                                                                                                                                           |
| Maximum Conduct Output Power                                                                                                                  | $\pm 1.3\text{dB}$                                                                                                                              |
| DTS Bandwidth                                                                                                                                 | $\pm 1.9\%$                                                                                                                                     |
| Maximum Conducted Output Power                                                                                                                | $\pm 0.69\text{dB}$                                                                                                                             |
| Maximum Power Spectral Density Level                                                                                                          | $\pm 1.5\text{ dB}$                                                                                                                             |
| Band-edge Compliance                                                                                                                          | $\pm 1.9\%$                                                                                                                                     |
| Unwanted Emissions in Non-restricted Freq Bands                                                                                               | 9kHz-30MHz: $\pm 0.90\text{dB}$<br>30MHz-1GHz: $\pm 1.5\text{ dB}$<br>1GHz-12.75GHz: $\pm 1.9\text{dB}$<br>12.75GHz-26.5GHz: $\pm 2.1\text{dB}$ |
| 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-18GHz)                                                                                                                              |
|                                                                                                                                               | 3.9dB (18GHz-26.5GHz)                                                                                                                           |
| 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:         | Coffee Maker                                                                                                                                              |
| Model No.:            | CM917A                                                                                                                                                    |
| Operating Frequency:  | IEEE 802.11B/G/N(HT20): 2412MHz to 2462MHz                                                                                                                |
| 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: OFDM (64QAM, 16QAM, QPSK, BPSK) |
| Channels Step:        | Channels with 5MHz step                                                                                                                                   |
| Sample Type:          | Fixed production                                                                                                                                          |
| Test software of EUT: | AmebaZ2_mptool (manufacturer declare)                                                                                                                     |
| Antenna Type:         | PCB Antenna                                                                                                                                               |
| Antenna Gain:         | 2.45 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]       | 16.93                         |
| 1                               | IEEE 802.11G      | 1-11[11]       | 16.86                         |
| 1                               | IEEE 802.11N HT20 | 1-11[11]       | 15.97                         |

## 5.3. CHANNEL LIST

| Channel List for 802.11B/G/N(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            |         |                 |

#### 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     |

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

| The Worst Case Power Setting Parameter under 2400 ~ 2483.5MHz Band |                         |                |      |       |            |      |      |
|--------------------------------------------------------------------|-------------------------|----------------|------|-------|------------|------|------|
| Test Software                                                      |                         | AmebaZ2_mptool |      |       |            |      |      |
| 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                       | 84             | 86   | 83    | /          |      |      |
| 802.11G                                                            | 1                       | 99             | 101  | 98    |            |      |      |
| 802.11N HT20                                                       | 1                       | 95             | 97   | 94    |            |      |      |

## 5.6. DESCRIPTION OF AVAILABLE ANTENNAS

| Ant. | Frequency (MHz) | Antenna Type  | Antenna Gain (dBi) |
|------|-----------------|---------------|--------------------|
| 1    | 2400-2483.5     | Patch Antenna | 2.45               |

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. |

## 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

## 5.8. TEST ENVIRONMENT

| Environment Parameter | Selected Values During Tests |           |
|-----------------------|------------------------------|-----------|
| Relative Humidity     | 55 ~ 65%                     |           |
| Atmospheric Pressure: | 1025Pa                       |           |
| Temperature           | TN                           | 23 ~ 28°C |
| Voltage:              | VL                           | N/A       |
|                       | VN                           | AC 120V   |
|                       | VH                           | N/A       |

Note: VL= Lower Extreme Test Voltage

VN= Nominal Voltage

VH= Upper Extreme Test Voltage

TN= Normal Temperature

## 5.9. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

| Item | Equipment | Brand Name | Model Name | Description |
|------|-----------|------------|------------|-------------|
| 1    | Laptop    | ThinkPad   | E590       | /           |

### I/O PORT

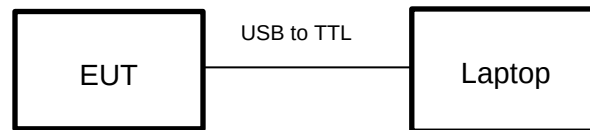
| Cable No | Port | Connector Type | Cable Type | Cable Length(m) | Remarks |
|----------|------|----------------|------------|-----------------|---------|
| 1        | USB  | USB to TTL     | USB        | 100cm Length    | /       |

### ACCESSORY

| Item | Accessory | Brand Name | Model Name | Description |
|------|-----------|------------|------------|-------------|
| 1    | /         | /          | /          | /           |

**TEST SETUP**

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

**SETUP DIAGRAM FOR TESTS**

## 5.10. 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      | 2022-12-03 | 2023-12-02 |
| <input checked="" type="checkbox"/> | Two-Line V-Network                      | R&S          | ENV216                           | 126701     | 2021-12-04      | 2022-12-03 | 2023-12-02 |
| <input checked="" type="checkbox"/> | Artificial Mains Networks               | R&S          | ENY81                            | 126712     | 2021-10-12      | 2022-10-09 | 2023-10-08 |
| 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"/> | EMI test receiver                       | R&S          | ESR7                             | 222993     | /               | 2022-05-20 | 2023-05-19 |
| <input checked="" type="checkbox"/> | EMI test receiver                       | R&S          | ESR26                            | 126703     | 2021-12-04      | 2022-12-03 | 2023-12-02 |
| <input checked="" type="checkbox"/> | Spectrum Analyzer                       | R&S          | FSV3044                          | 222992     | /               | 2022-05-27 | 2023-05-26 |
| <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     | 2019-01-19      | 2022-01-18 | 2025-01-17 |
| <input checked="" type="checkbox"/> | Receiver Antenna (1GHz-18GHz)           | R&S          | HF907                            | 126705     | 2019-01-27      | 2022-02-28 | 2025-02-27 |
| <input checked="" type="checkbox"/> | Receiver Antenna (18GHz-26.5GHz)        | Schwarzbeck  | BBHA9170                         | 126706     | 2019-02-29      | 2022-02-28 | 2025-02-27 |
| <input checked="" type="checkbox"/> | Pre-amplification (To 18GHz)            | Tonscnd      | TAP01018050                      | 224539     | /               | 2022-10-20 | 2023-10-19 |
| <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 26.5GHz)          | R&S          | SCU-26D                          | 135391     | 2021-12-04      | 2022-12-03 | 2023-12-02 |
| <input checked="" type="checkbox"/> | Band Reject Filter                      | Wainwright   | WRCGV12-2375-2400-2485-2510-40SS | 1          | 2021-05-09      | 2022-05-08 | 2023-05-07 |
| <input checked="" type="checkbox"/> | High Pass Filter                        | COM-MW       | ZBF13-3-18G-01                   | 2          | 2021-05-09      | 2022-05-08 | 2023-05-07 |
| Software                            |                                         |              |                                  |            |                 |            |            |
| Used                                | Description                             |              | Manufacturer                     | Name       |                 | Version    |            |
| <input checked="" type="checkbox"/> | Test Software for Radiated disturbance  |              | Tonscnd                          | TS+        |                 | Ver. 2.5   |            |
| <input checked="" type="checkbox"/> | Test Software for Radiated disturbance  |              | Chinese-EMC                      | RE_RSE     |                 | Ver. 3.03  |            |
| 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     | 2021-05-09      | 2022-04-09 | 2023-04-08 |
| <input checked="" type="checkbox"/> | Power Meter                             | MWT          | MW100-RFCB                       | 221694     | /               | 2022-05-23 | 2023-05-22 |
| <input checked="" type="checkbox"/> | Attenuator                              | PASTERNAK    | PE7087-6                         | 1624       | /               | 2022-05-23 | 2023-05-22 |

## 6. MEASUREMENT METHODS

| No. | Test Item                                        | KDB Name                                      | Section                     |
|-----|--------------------------------------------------|-----------------------------------------------|-----------------------------|
| 1   | 6dB Bandwidth and<br>99% Occupied Bandwidth      | KDB 558074 D01 15.247<br>Meas Guidance v05r02 | 8.2                         |
| 2   | Output Power                                     | KDB 558074 D01 15.247<br>Meas Guidance v05r02 | 8.3.2.3<br>(Method AVGSA-2) |
| 3   | Power Spectral Density                           | KDB 558074 D01 15.247<br>Meas Guidance v05r02 | 8.4<br>(Method PKPSD)       |
| 4   | Out-of-band emissions in non-restricted<br>bands | KDB 558074 D01 15.247<br>Meas Guidance v05r02 | 8.5                         |
| 5   | Out-of-band emissions in restricted<br>bands     | KDB 558074 D01 15.247<br>Meas Guidance v05r02 | 8.6                         |
| 6   | Band-edge                                        | KDB 558074 D01 15.247<br>Meas Guidance v05r02 | 8.7                         |
| 7   | Conducted Emission Test for AC Power<br>Port     | ANSI C63.10-2013                              | 6.2                         |

## 7. ANTENNA PORT TEST RESULTS

### 7.1. ON TIME AND DUTY CYCLE

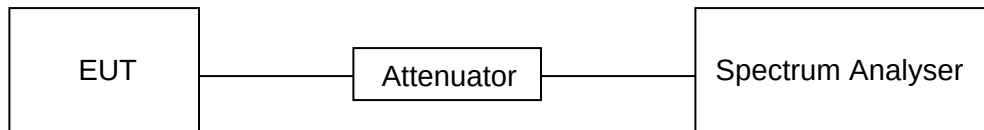
#### LIMITS

None; for reporting purposes only

#### PROCEDURE

FCC KDB 558074 Zero-Span Spectrum Analyzer Method

#### TEST SETUP



#### TEST ENVIRONMENT

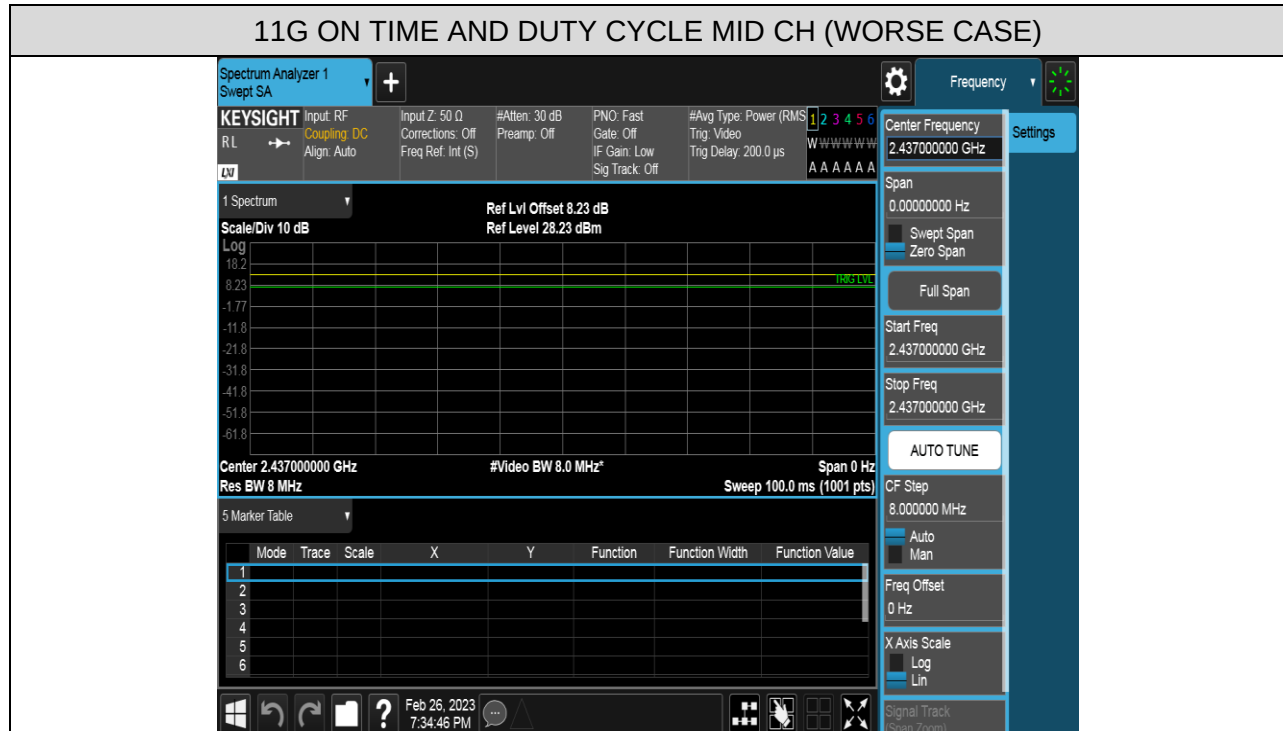
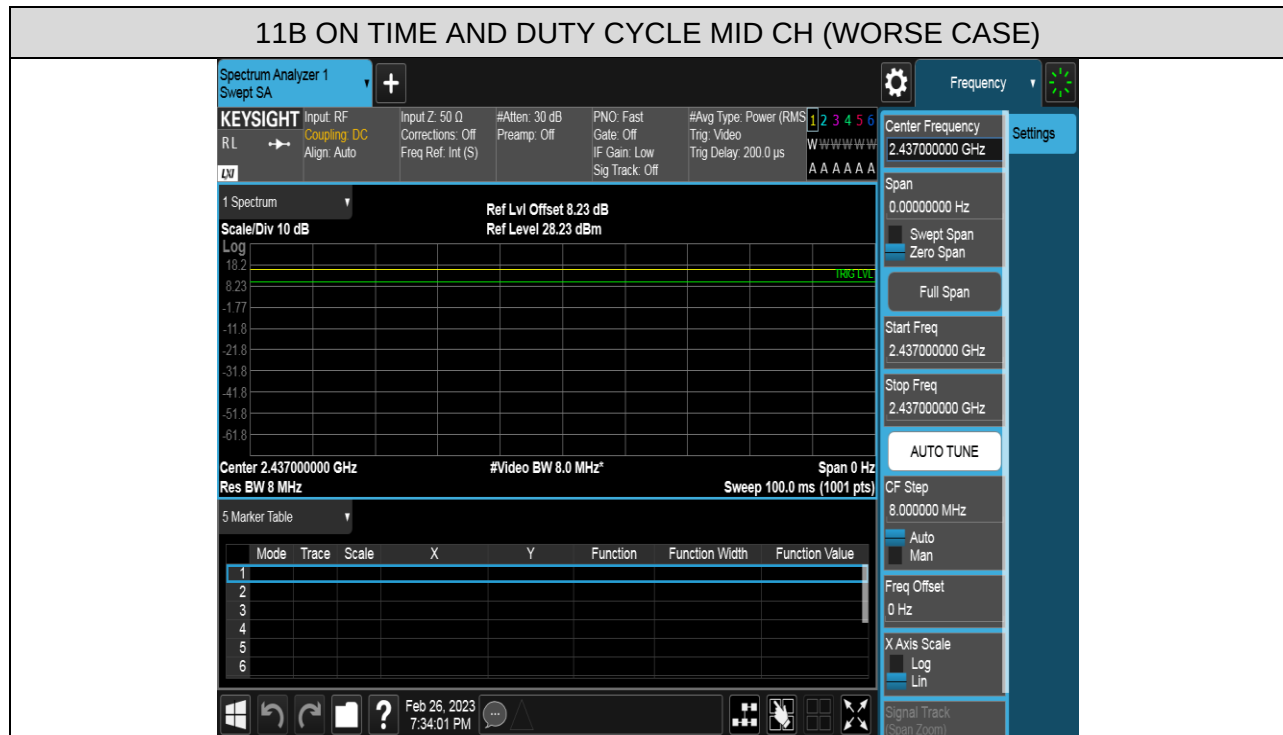
|                     |        |                   |         |
|---------------------|--------|-------------------|---------|
| Temperature         | 22°C   | Relative Humidity | 56%     |
| Atmosphere Pressure | 101kPa | Test Voltage      | AC 120V |

#### TEST RESULTS TABLE

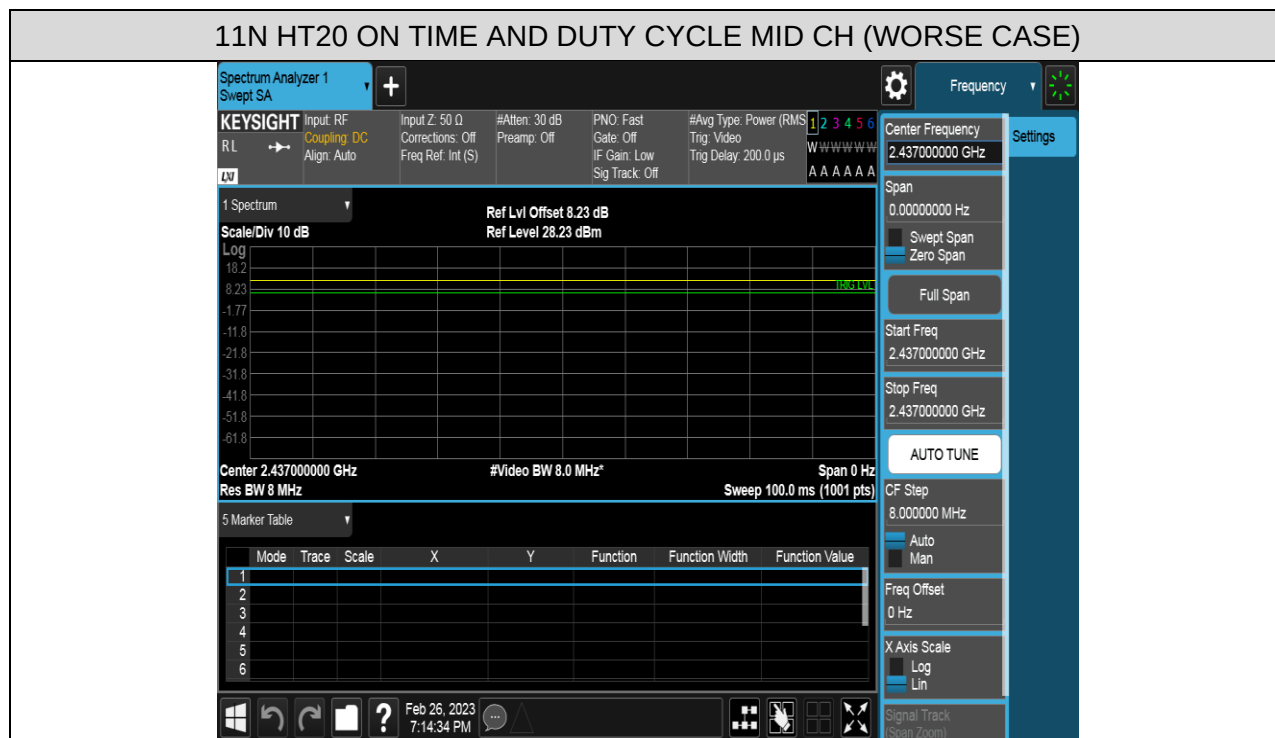
| Mode         | On Time (msec) | Period (msec) | Duty Cycle x (Linear) | Duty Cycle (%) | Duty Cycle Correction Factor (db) | 1/T Minimum VBW (kHz) | Final VBW (kHz) |
|--------------|----------------|---------------|-----------------------|----------------|-----------------------------------|-----------------------|-----------------|
| 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            |

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



### 11N HT20 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                  |                         |                             |                       |
|-------------------------------------------------|-------------------------|-----------------------------|-----------------------|
| Section                                         | Test Item               | Limit                       | Frequency Range (MHz) |
| CFR 47 FCC 15.247(a)(2)<br>ISED RSS-247 5.2 (a) | 6dB Bandwidth           | $\geq 500\text{kHz}$        | 2400-2483.5           |
| ISED 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.

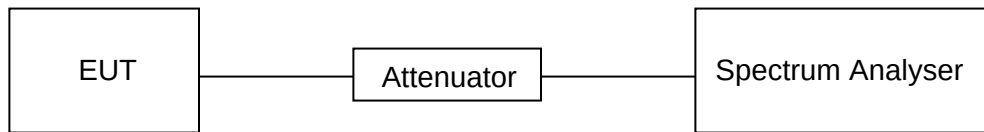
Connect the EUT to the spectrum analyser and use the following settings:

|                  |                                                                                                           |
|------------------|-----------------------------------------------------------------------------------------------------------|
| 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

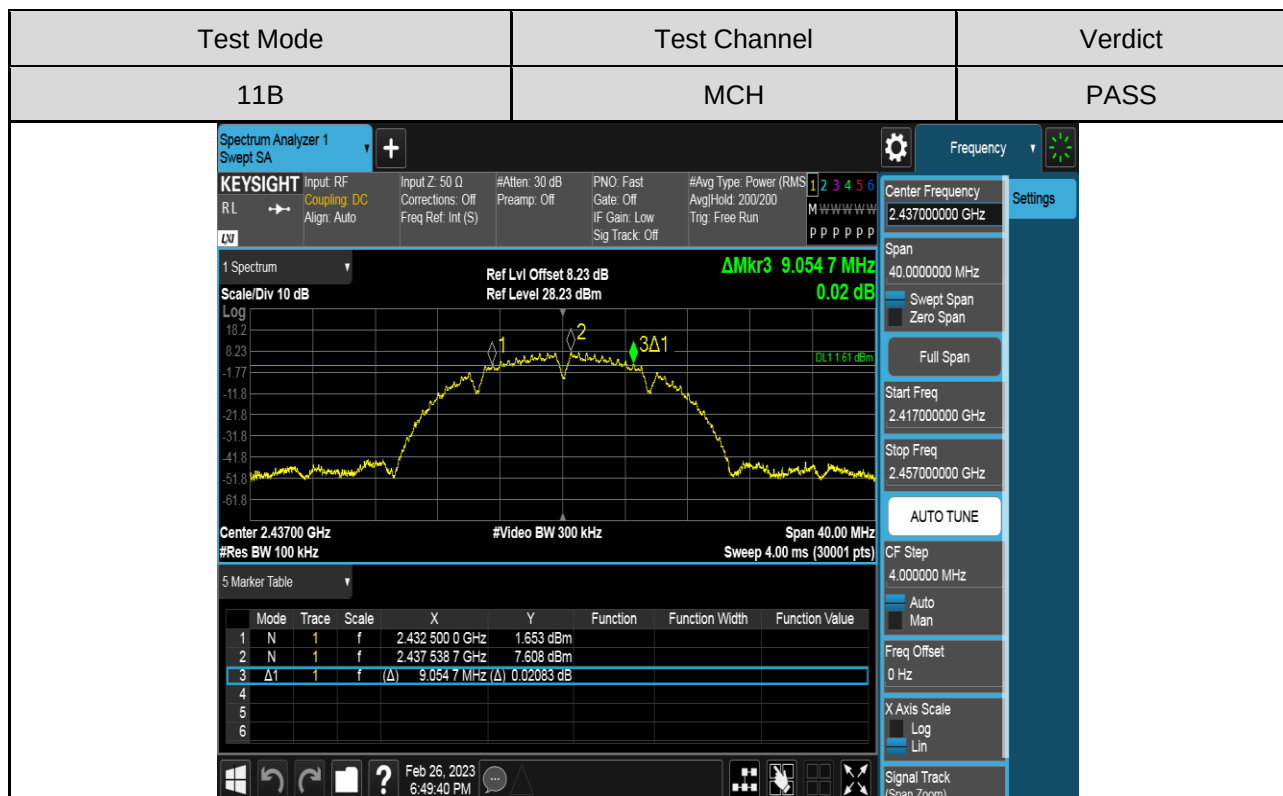
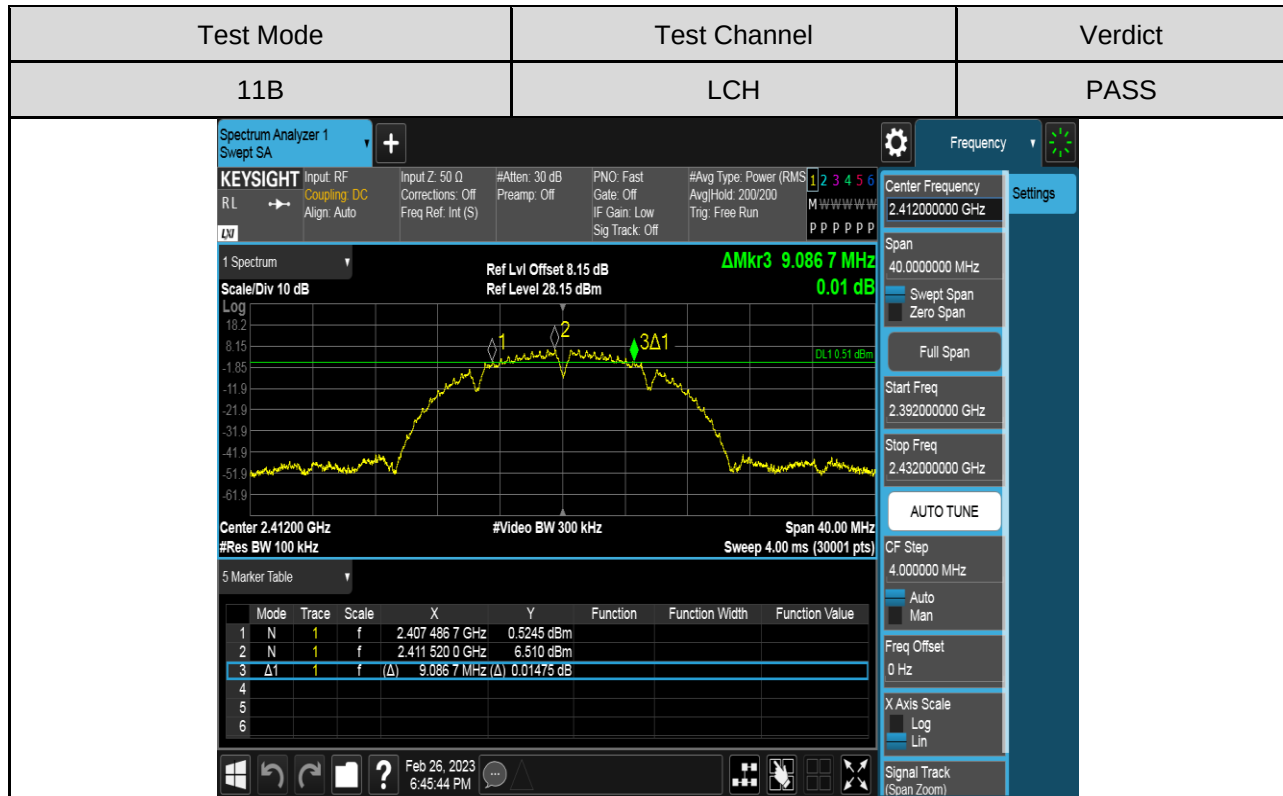
|                     |        |                   |         |
|---------------------|--------|-------------------|---------|
| Temperature         | 22°C   | Relative Humidity | 56%     |
| Atmosphere Pressure | 101kPa | Test Voltage      | AC 120V |

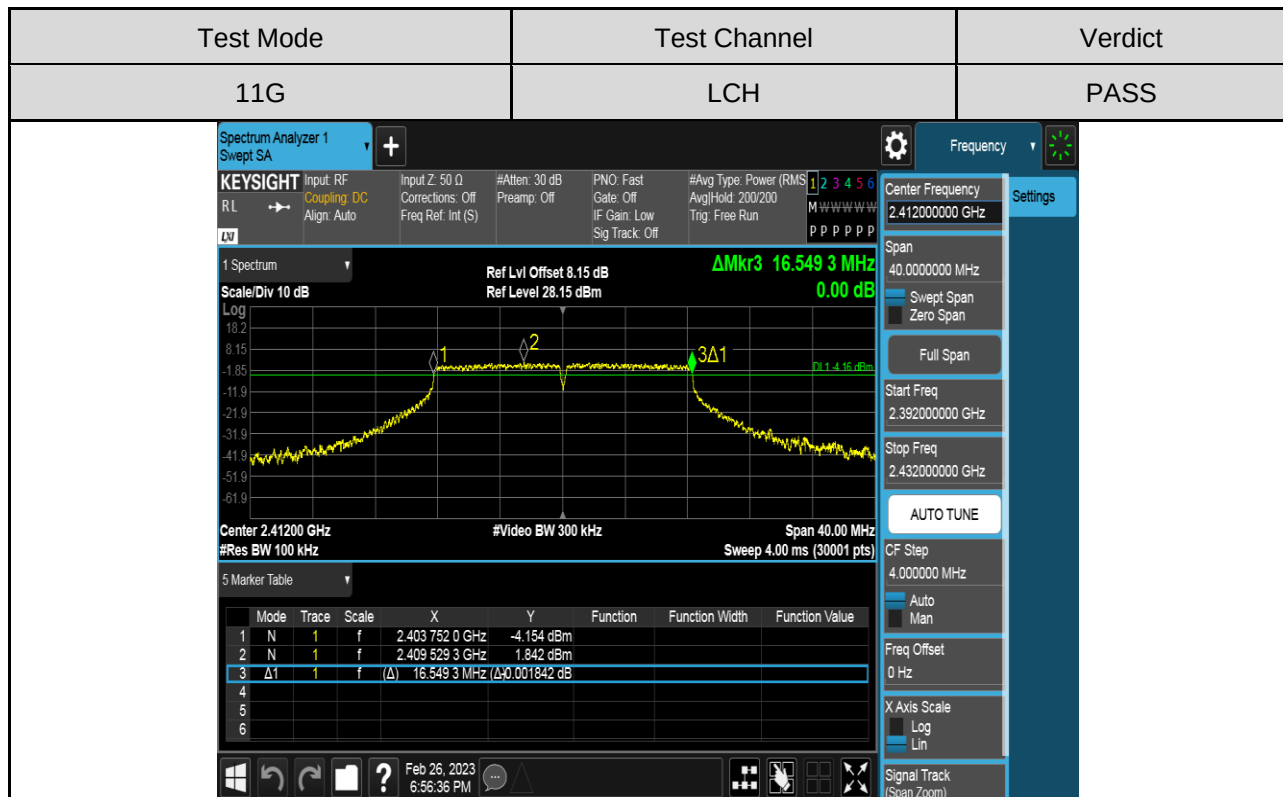
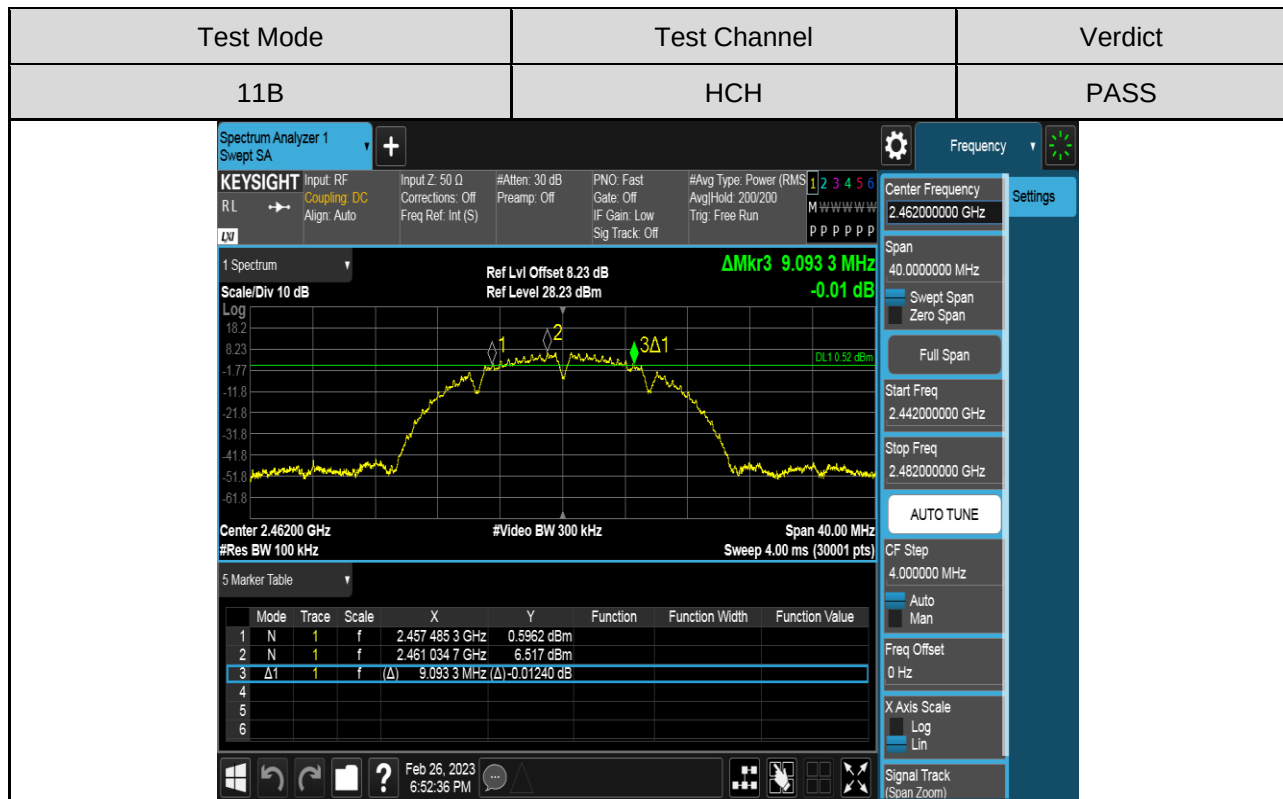
### TEST RESULTS TABLE

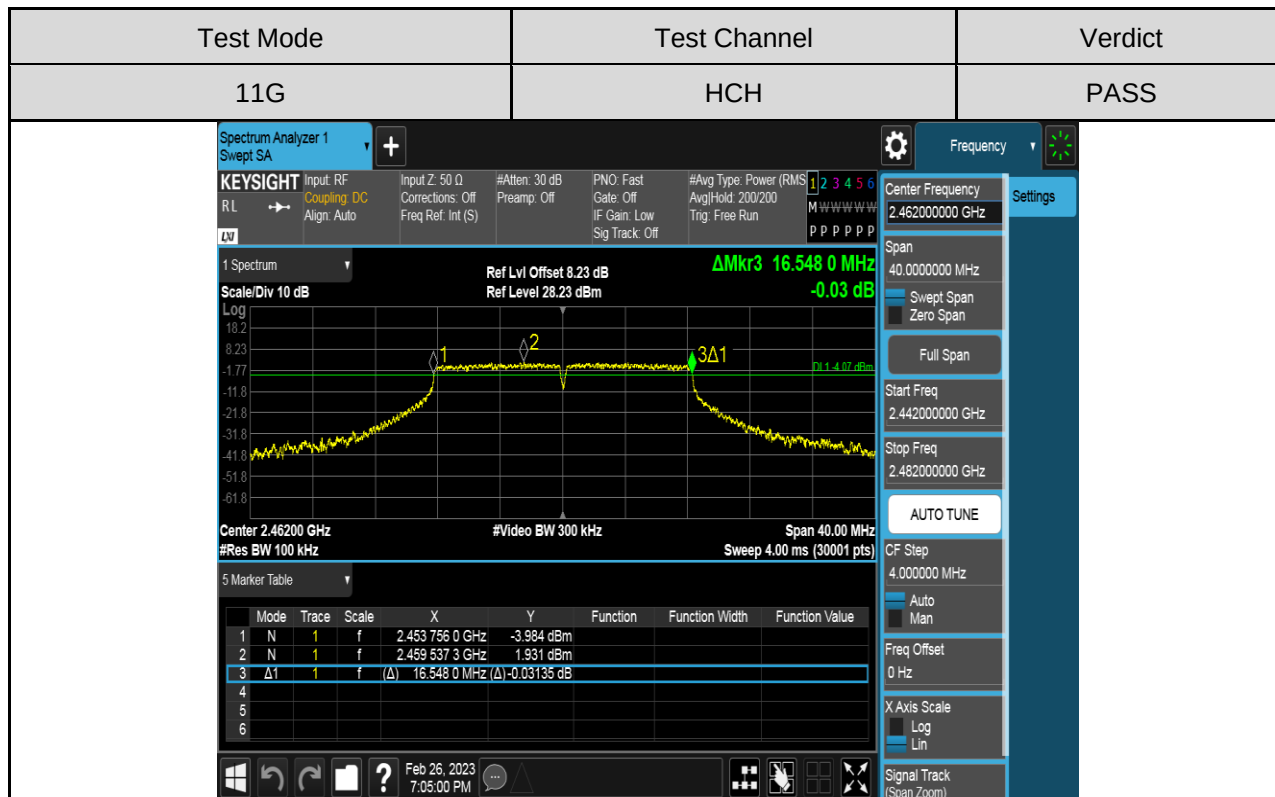
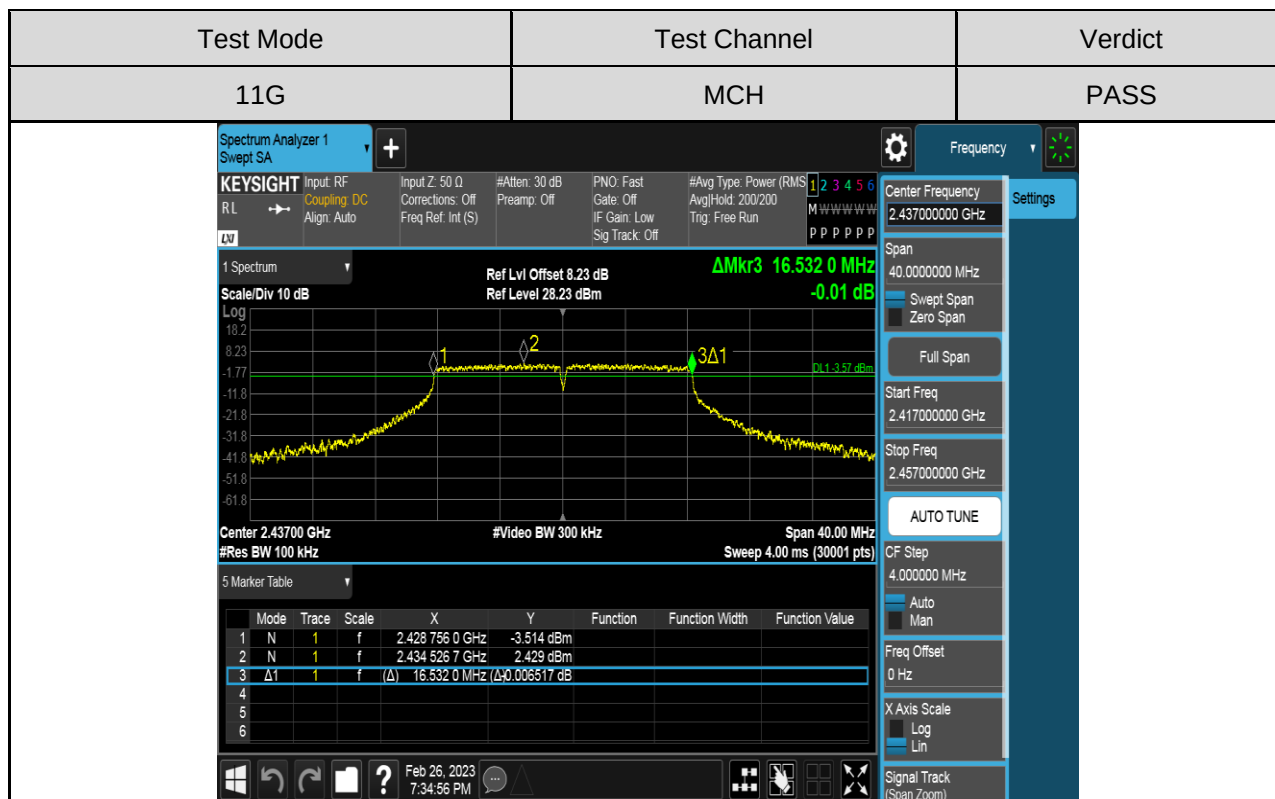
| Test Mode | Test Channel | 6dB bandwidth (MHz) | 99% bandwidth (MHz) | Result |
|-----------|--------------|---------------------|---------------------|--------|
| 11B       | LCH          | 9.0867              | 14.046              | Pass   |
|           | MCH          | 9.0547              | 14.027              | Pass   |
|           | HCH          | 9.0933              | 14.133              | Pass   |
| 11G       | LCH          | 16.5493             | 16.601              | Pass   |
|           | MCH          | 16.5320             | 16.595              | Pass   |
|           | HCH          | 16.5480             | 16.609              | Pass   |
| 11N HT20  | LCH          | 17.7707             | 17.797              | Pass   |
|           | MCH          | 17.7000             | 17.783              | Pass   |
|           | HCH          | 17.7773             | 17.793              | Pass   |

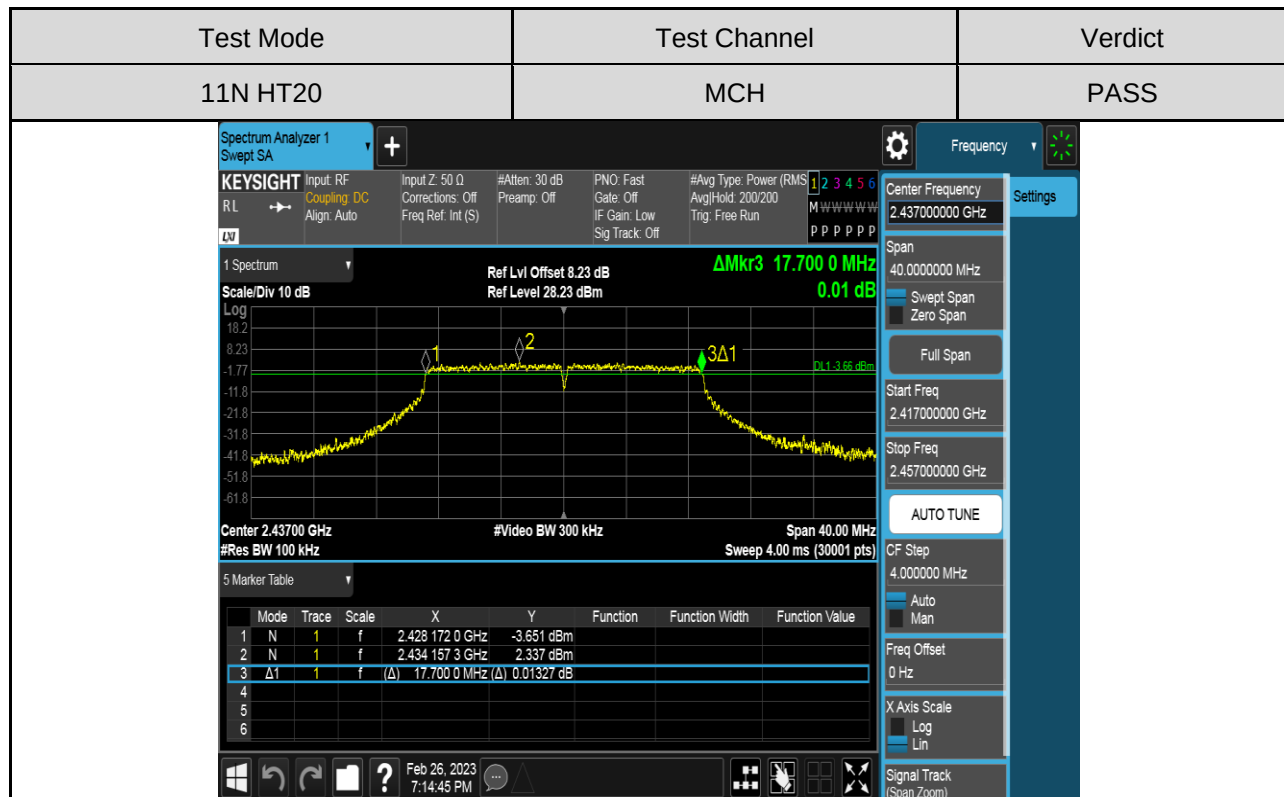
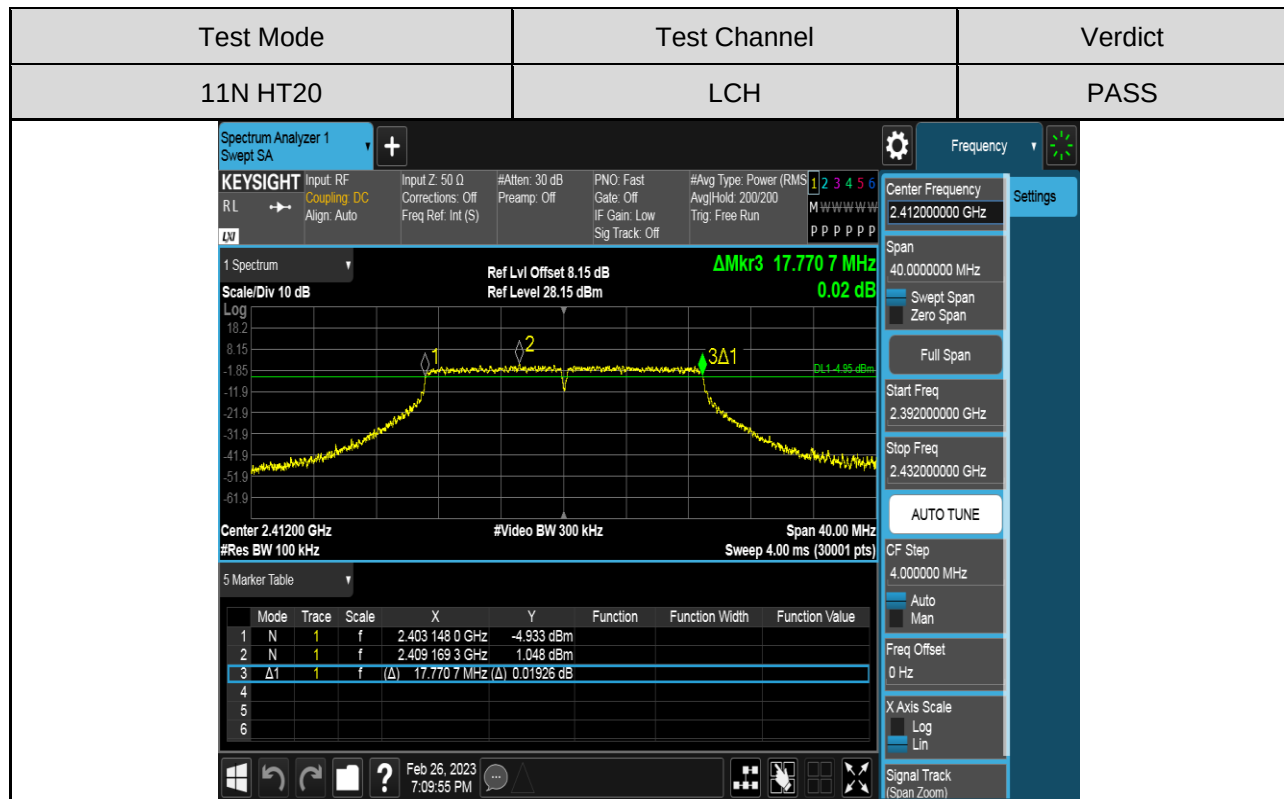
## TEST GRAPHS

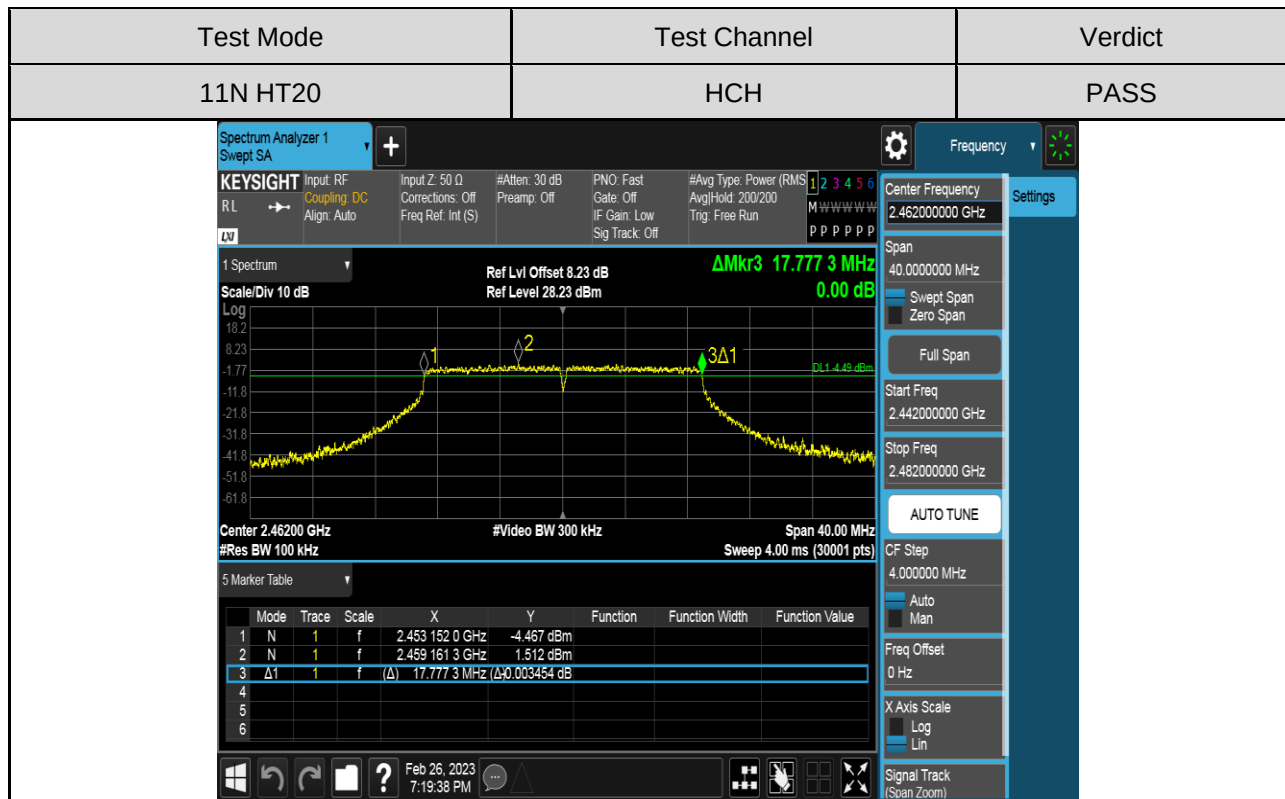
### 6dB Bandwidth



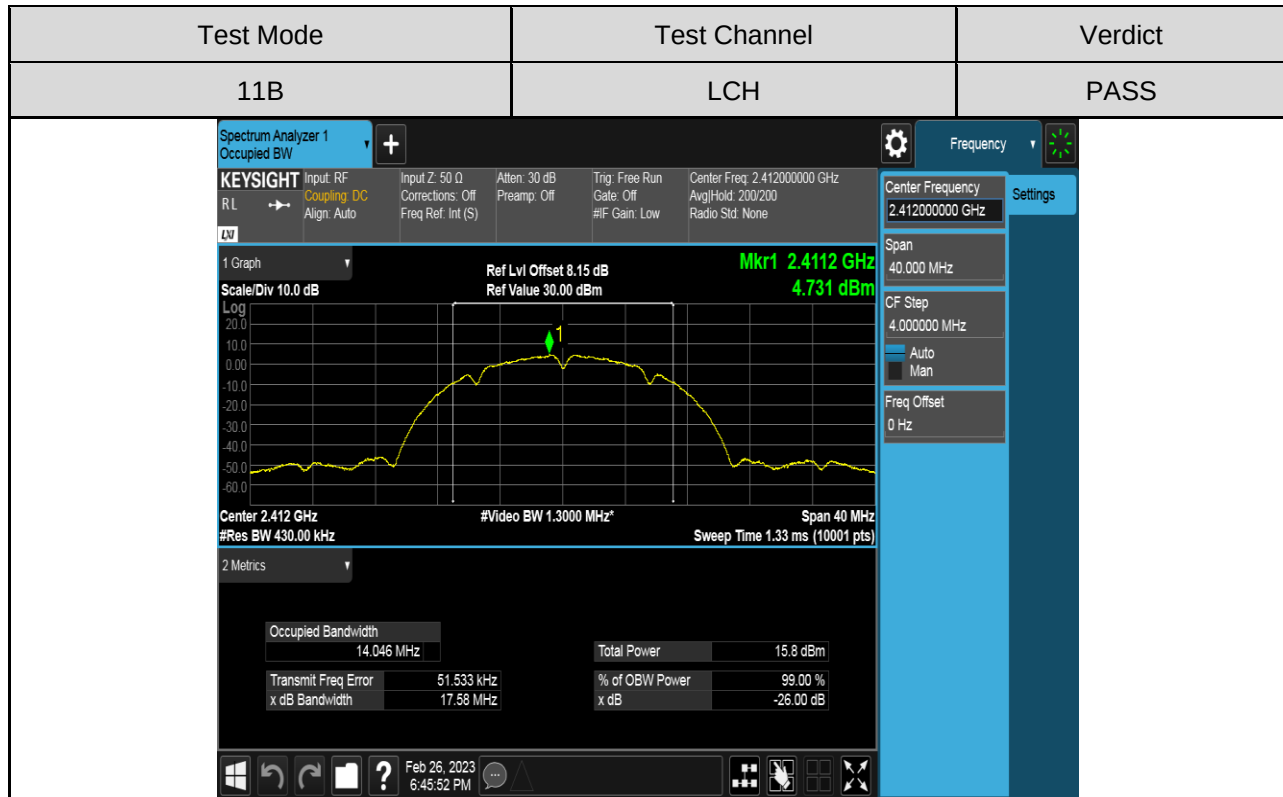


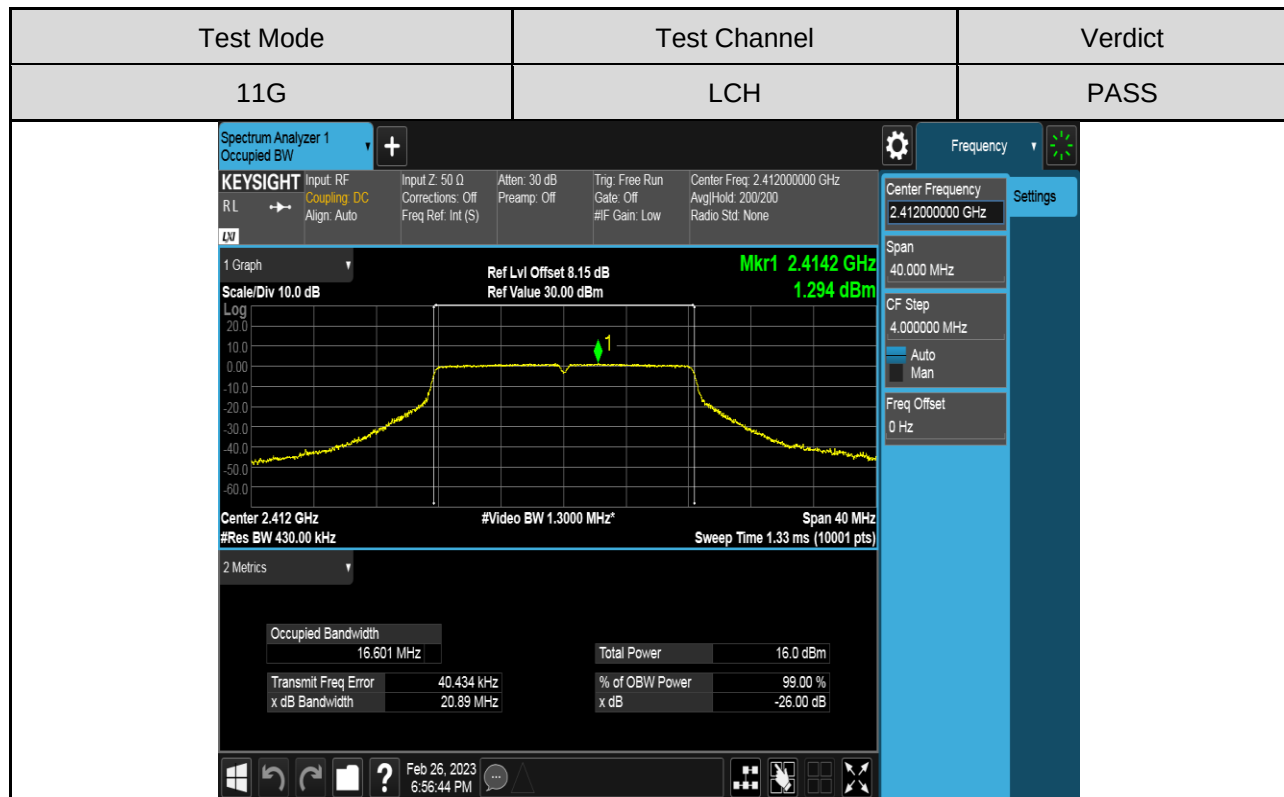
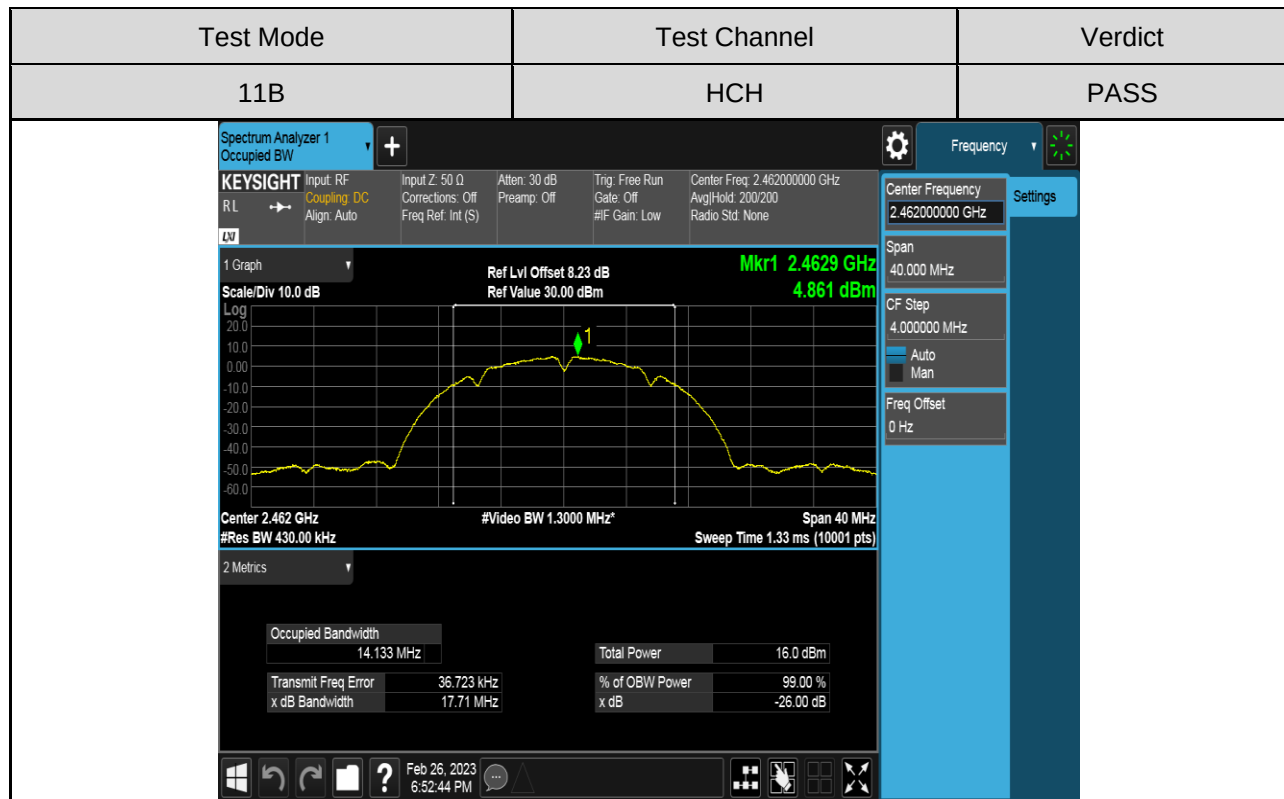


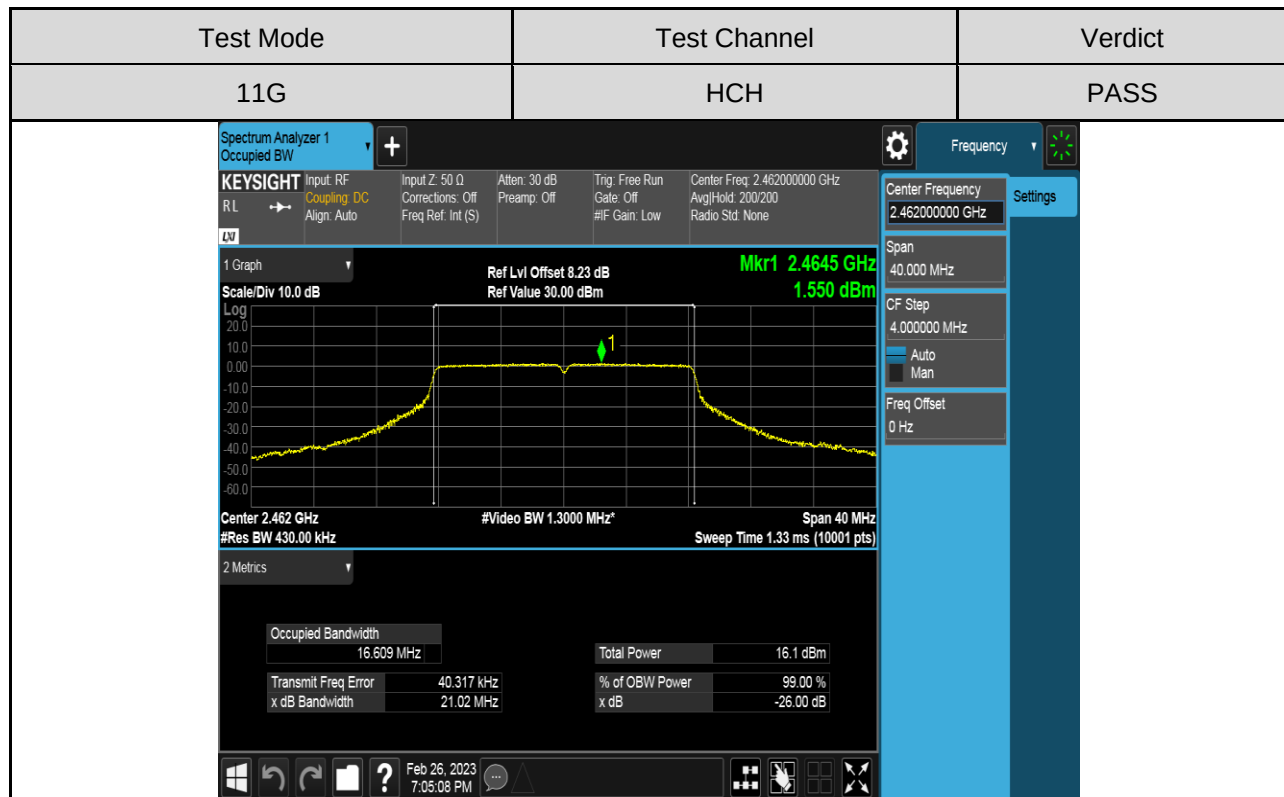
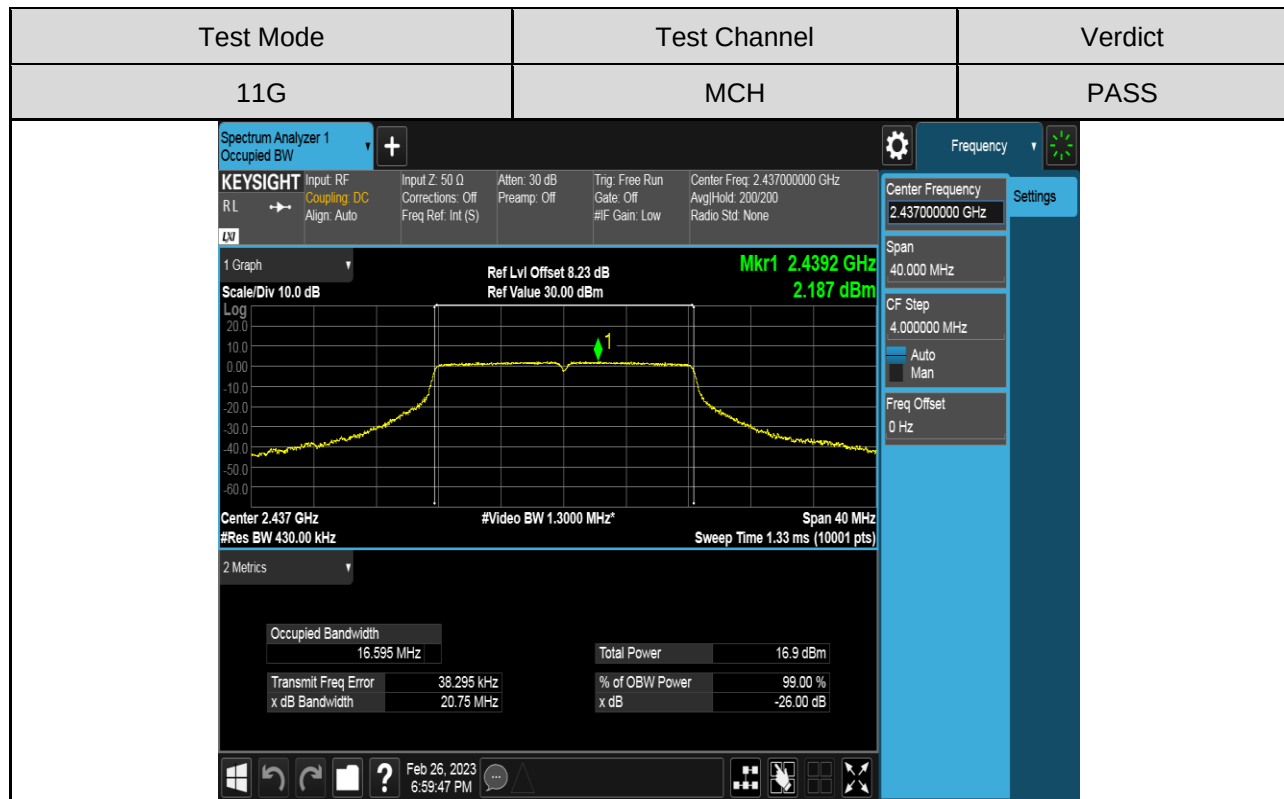


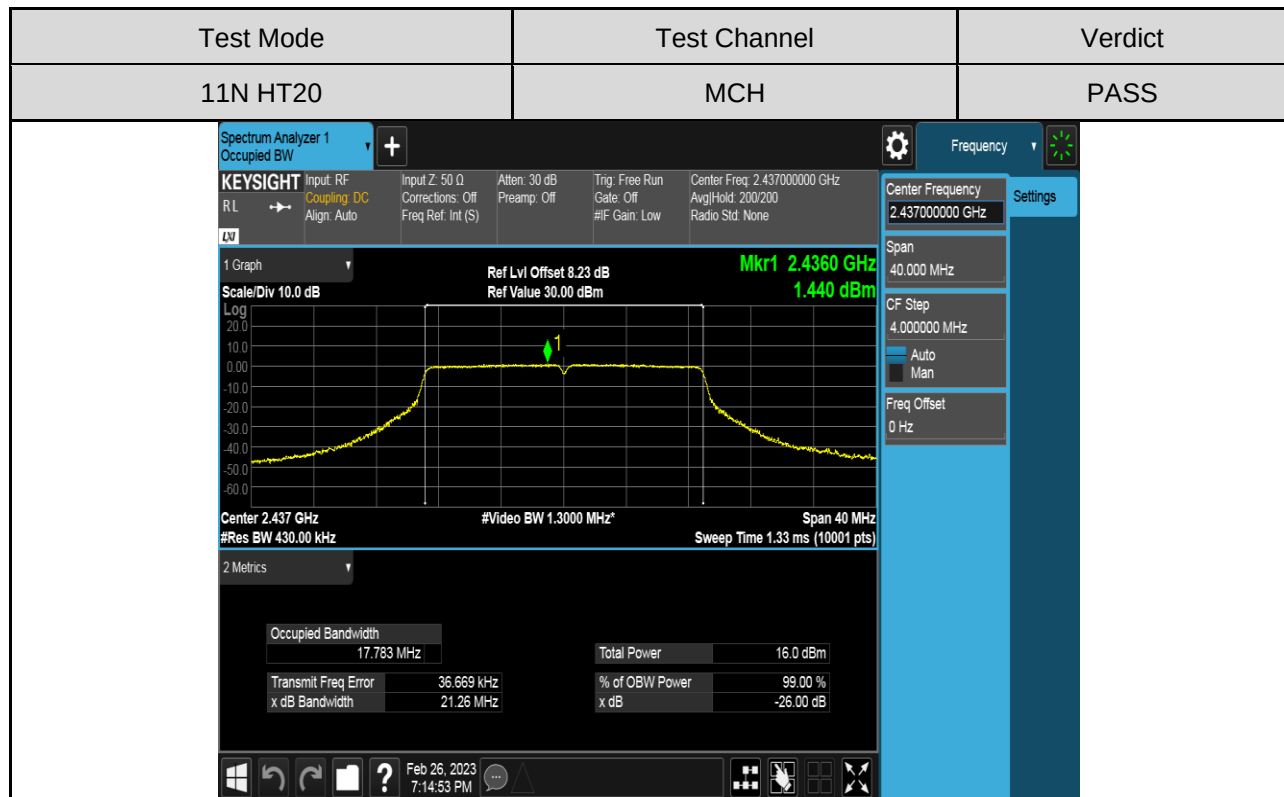
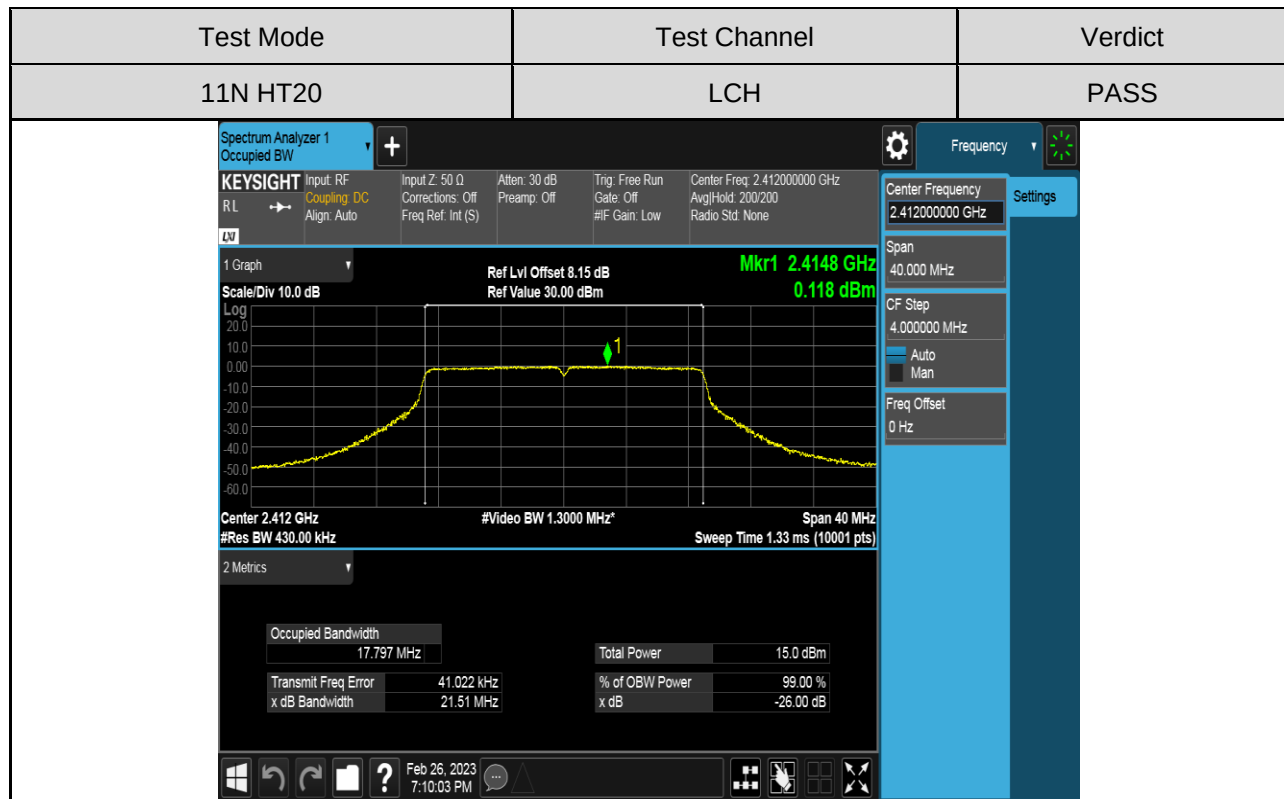


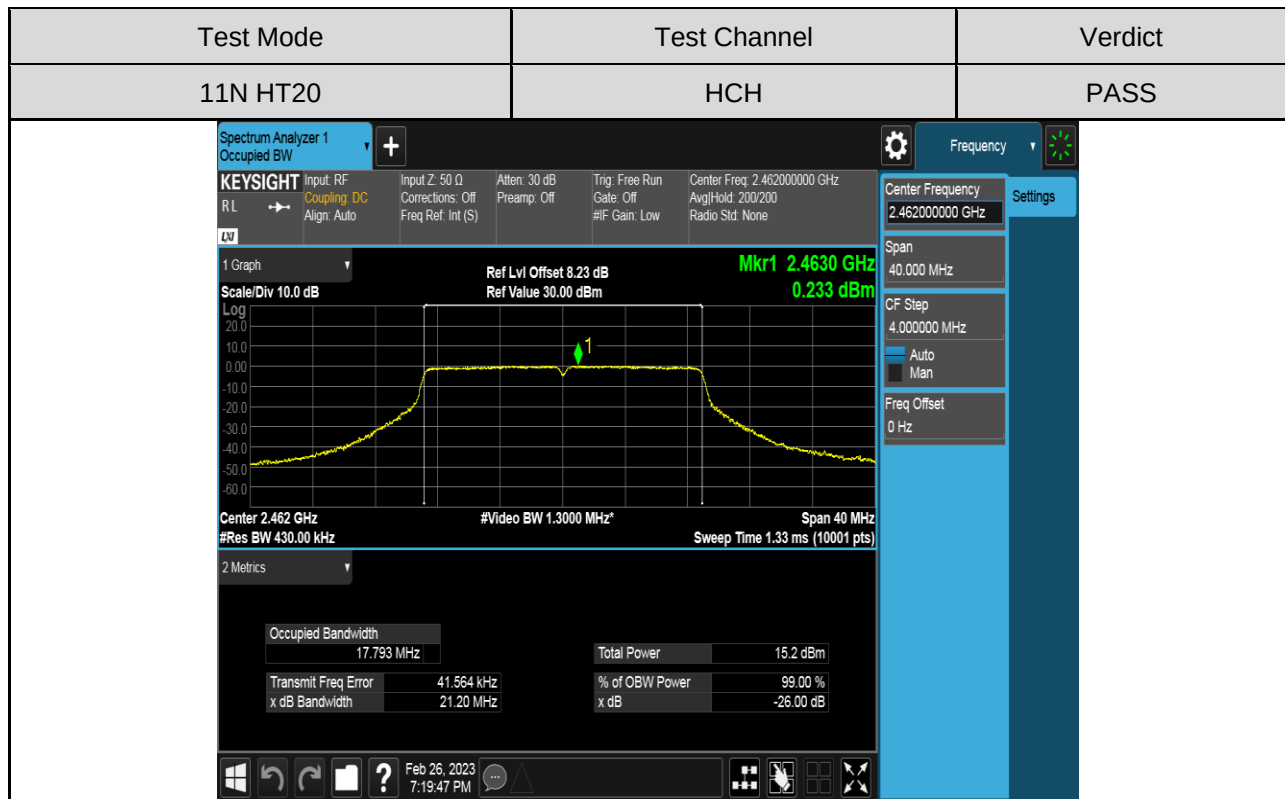
### 99% Bandwidth











### 7.3. CONDUCTED OUTPUT POWER

#### LIMITS

| FCC Part15 (15.247), Subpart C                                  |              |                 |                       |
|-----------------------------------------------------------------|--------------|-----------------|-----------------------|
| 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

Refer to FCC KDB 558074 clause 8.3.2.3 Measurement using a power meter (PM).

Method AVGPM is a measurement using an RF average power meter, as follows:

a) As an alternative to spectrum analyzer or EMI receiver measurements, measurements may be performed using a wideband RF power meter with a thermocouple detector or equivalent if all of the conditions listed below are satisfied:

1) The EUT is configured to transmit continuously, or to transmit with a constant duty cycle.

2) At all times when the EUT is transmitting, it shall be transmitting at its maximum power control level.

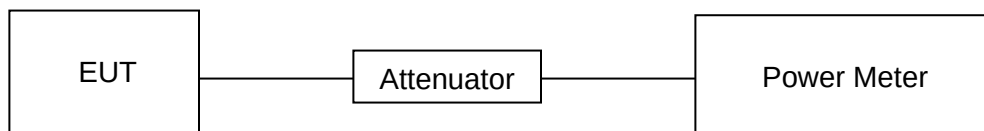
3) The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five.

b) If the transmitter does not transmit continuously, measure the duty cycle, D, of the transmitter output signal as described in 11.6.

c) Measure the average power of the transmitter. This measurement is an average over both the ON and OFF periods of the transmitter.

d) Adjust the measurement in dBm by adding  $[10 \log (1 / D)]$ , where D is the duty cycle.

#### TEST SETUP



**TEST ENVIRONMENT**

|                     |        |                   |         |
|---------------------|--------|-------------------|---------|
| Temperature         | 22°C   | Relative Humidity | 56%     |
| Atmosphere Pressure | 101kPa | Test Voltage      | AC 120V |

**TEST RESULTS TABLE**

| Test Mode | Test Channel | Measurement Output Power (AV) | 10log(1/x) Factor | Maximum Conducted Output Power (AV) | LIMIT |
|-----------|--------------|-------------------------------|-------------------|-------------------------------------|-------|
|           |              | dBm                           | dBm               | dBm                                 | dBm   |
| 11B       | LCH          | 15.83                         | 0                 | 15.83                               | 30    |
|           | MCH          | 16.93                         | 0                 | 16.93                               | 30    |
|           | HCH          | 15.98                         | 0                 | 15.98                               | 30    |
| 11G       | LCH          | 15.95                         | 0                 | 15.95                               | 30    |
|           | MCH          | 16.86                         | 0                 | 16.86                               | 30    |
|           | HCH          | 16.03                         | 0                 | 16.03                               | 30    |
| 11N HT20  | LCH          | 14.99                         | 0                 | 14.99                               | 30    |
|           | MCH          | 15.97                         | 0                 | 15.97                               | 30    |
|           | HCH          | 15.18                         | 0                 | 15.18                               | 30    |

## 7.4. POWER SPECTRAL DENSITY

### LIMITS

| FCC Part15 (15.247), Subpart C          |                        |             |                       |
|-----------------------------------------|------------------------|-------------|-----------------------|
| Section                                 | Test Item              | Limit       | Frequency Range (MHz) |
| FCC §15.247 (e)<br>ISED RSS-247 5.2 (b) | Power Spectral Density | 8 dBm/3 kHz | 2400-2483.5           |

### TEST PROCEDURE

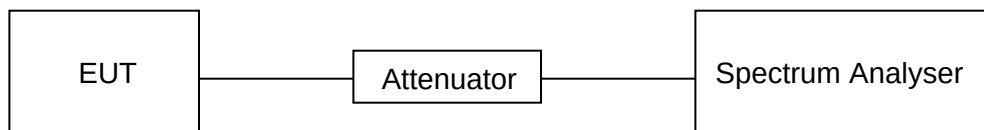
Refer to FCC KDB 558074, connect the UUT to the spectrum analyser and use the following settings:

|                  |                                                      |
|------------------|------------------------------------------------------|
| Center Frequency | The centre frequency of the channel under test       |
| Detector         | Peak                                                 |
| RBW              | $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$ |
| VBW              | $\geq 3 \times \text{RBW}$                           |
| Span             | $1.5 \times \text{DTS bandwidth}$                    |
| Trace            | Max hold                                             |
| Sweep time       | Auto couple.                                         |

Allow trace to fully stabilize and use the peak marker function to determine the maximum amplitude level within the RBW.

If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

### TEST SETUP



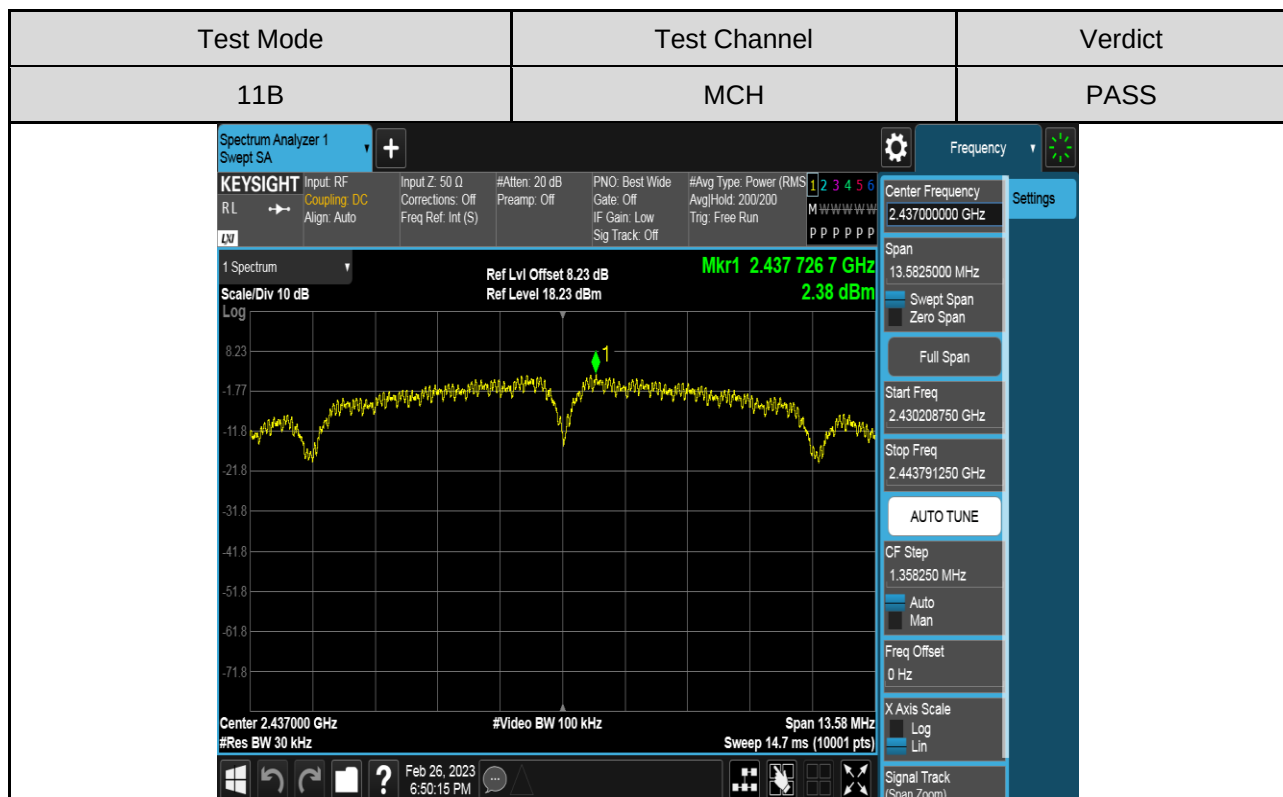
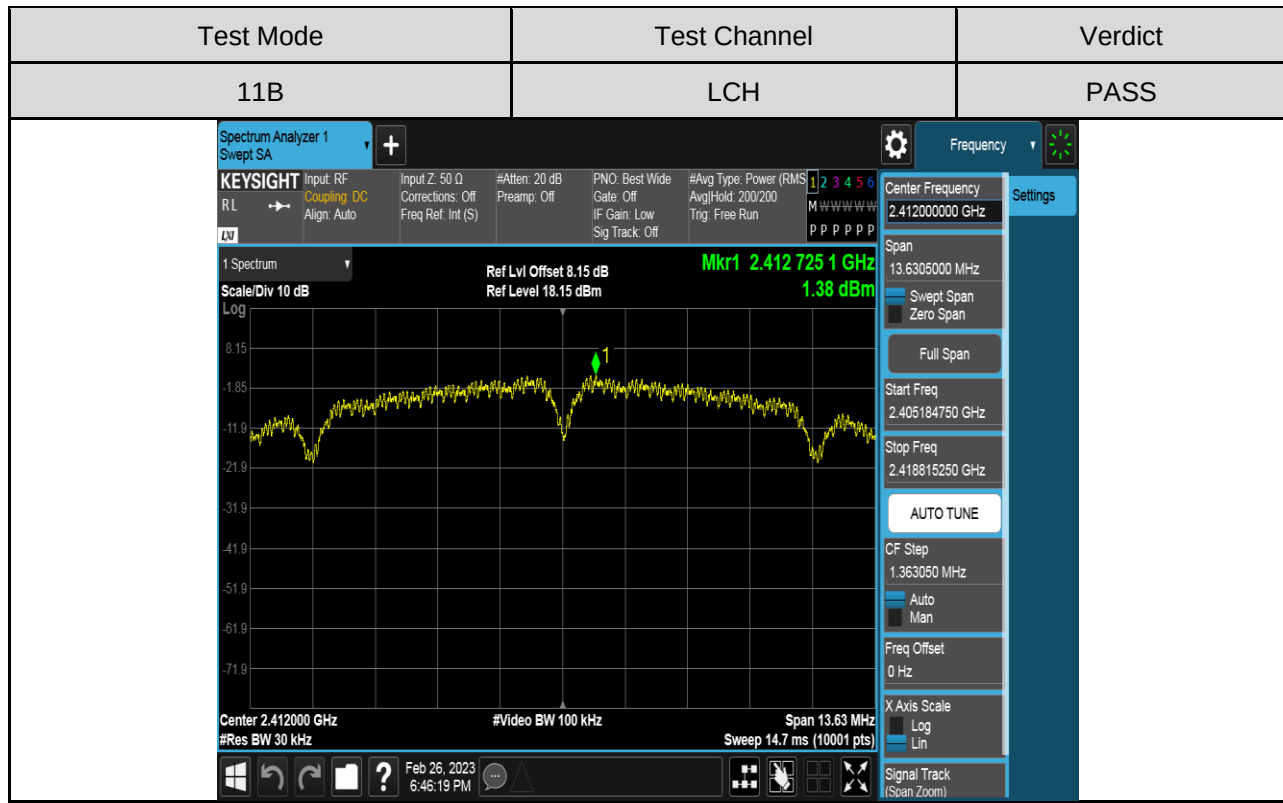
**TEST ENVIRONMENT**

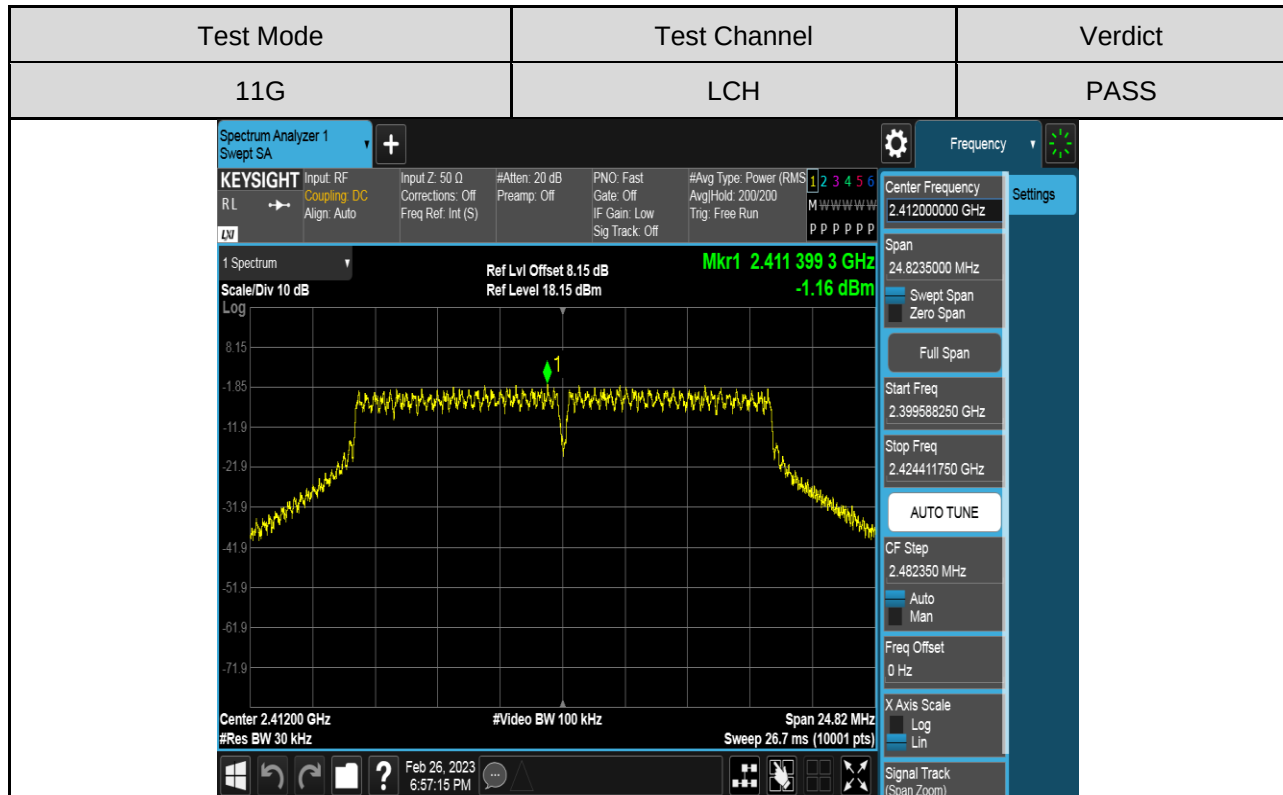
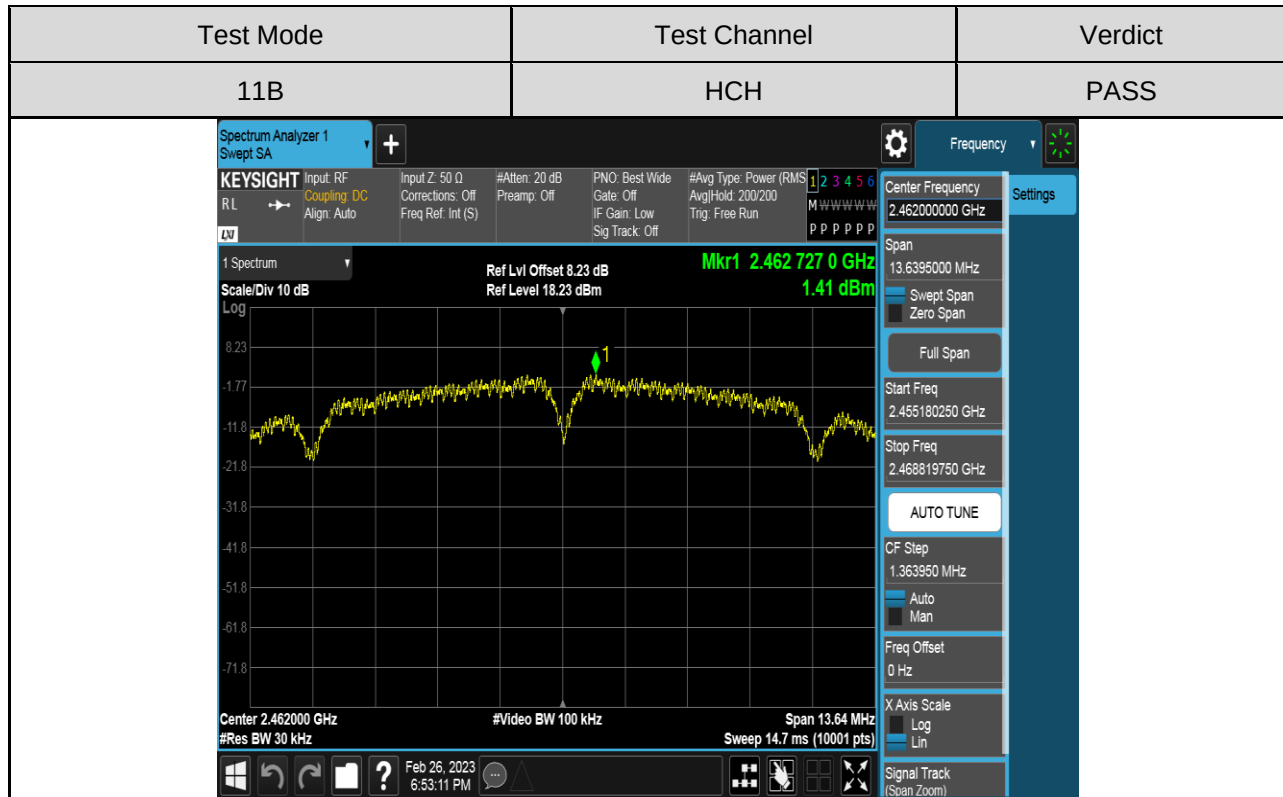
|                     |        |                   |         |
|---------------------|--------|-------------------|---------|
| Temperature         | 22°C   | Relative Humidity | 56%     |
| Atmosphere Pressure | 101kPa | Test Voltage      | AC 120V |

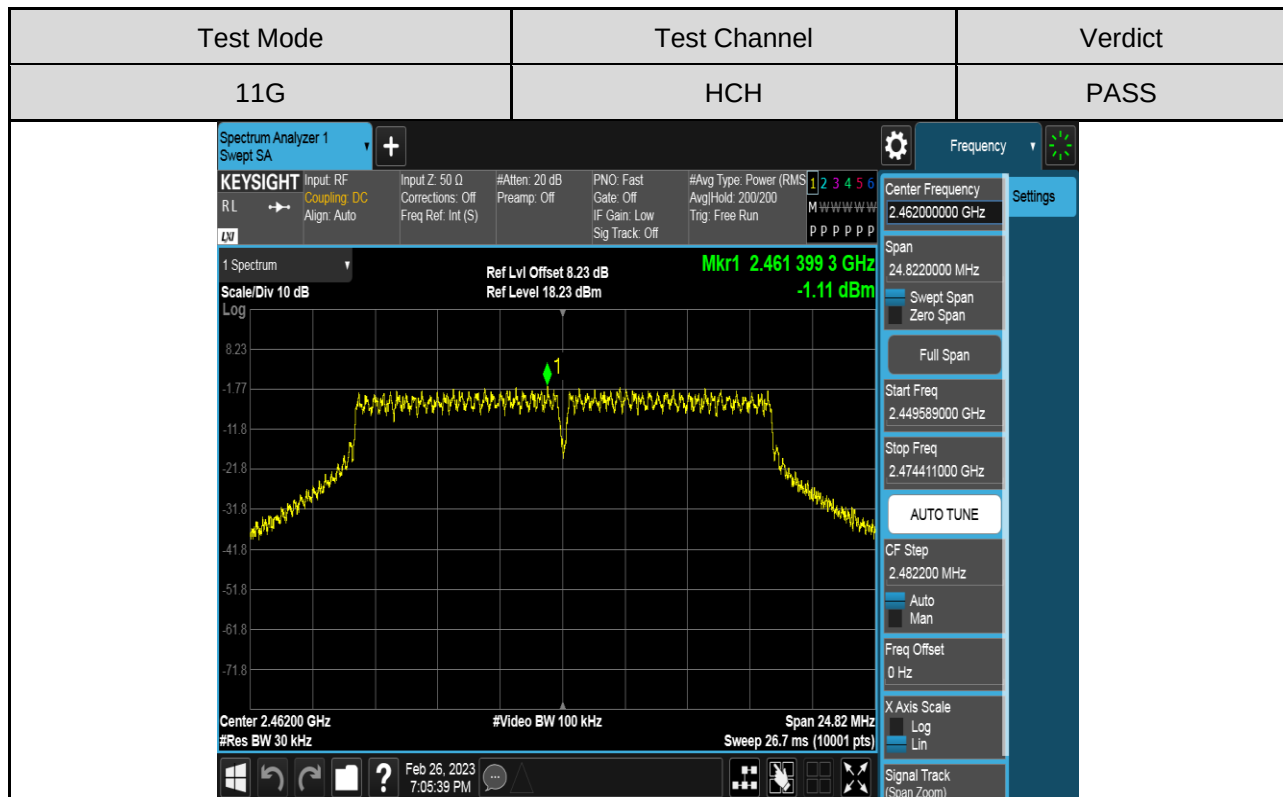
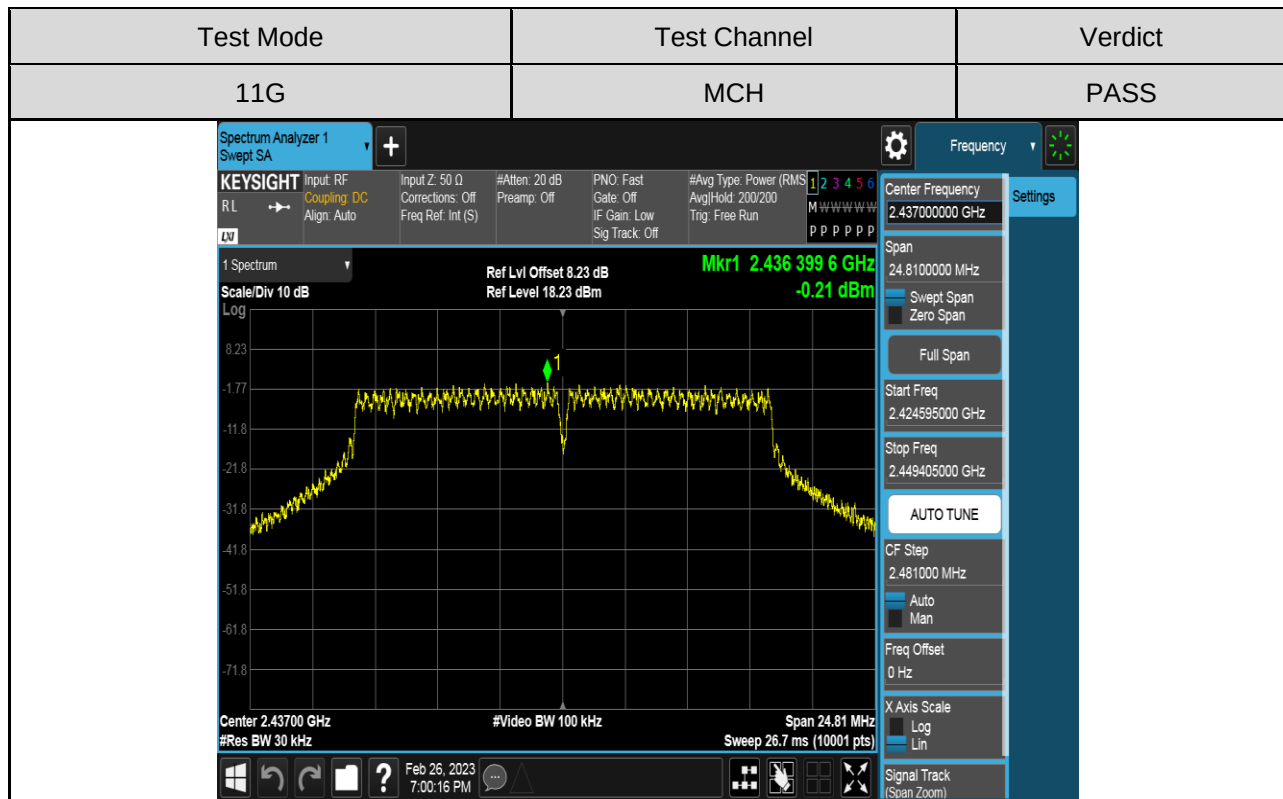
**TEST RESULTS TABLE**

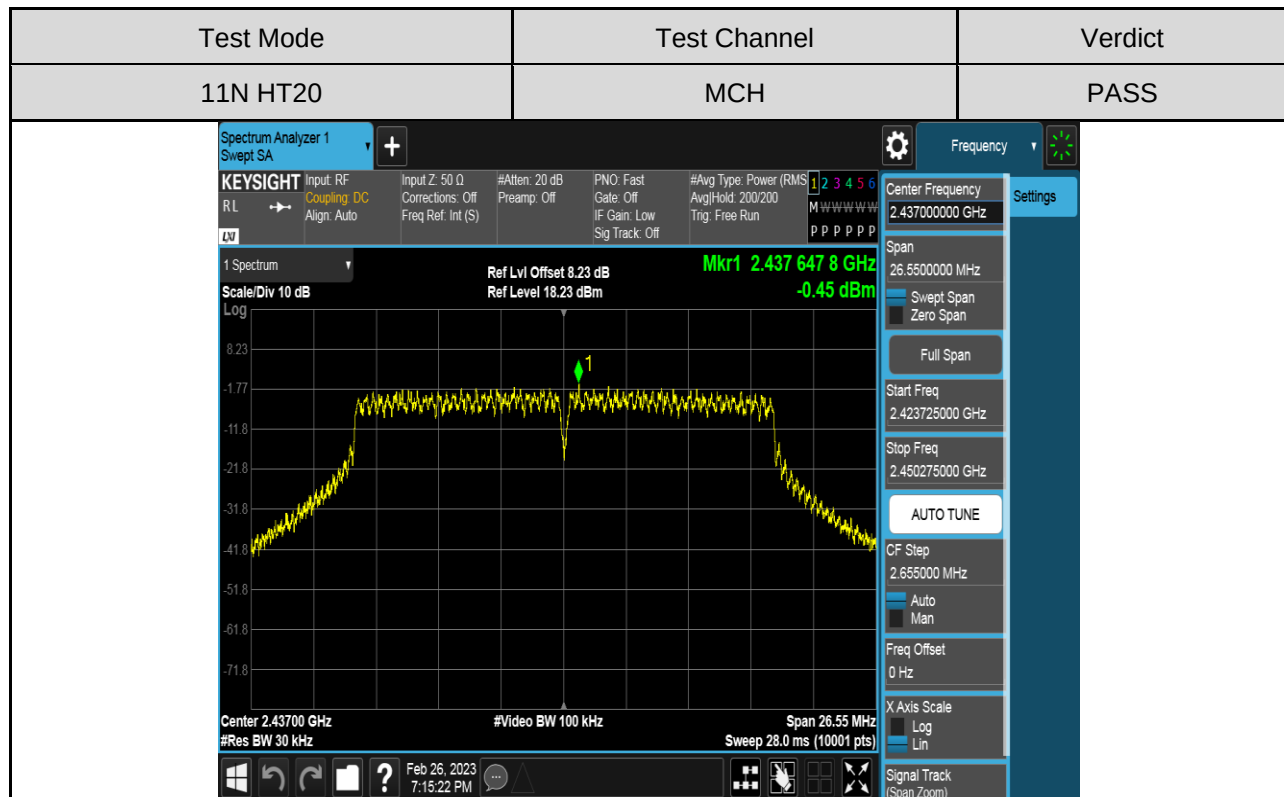
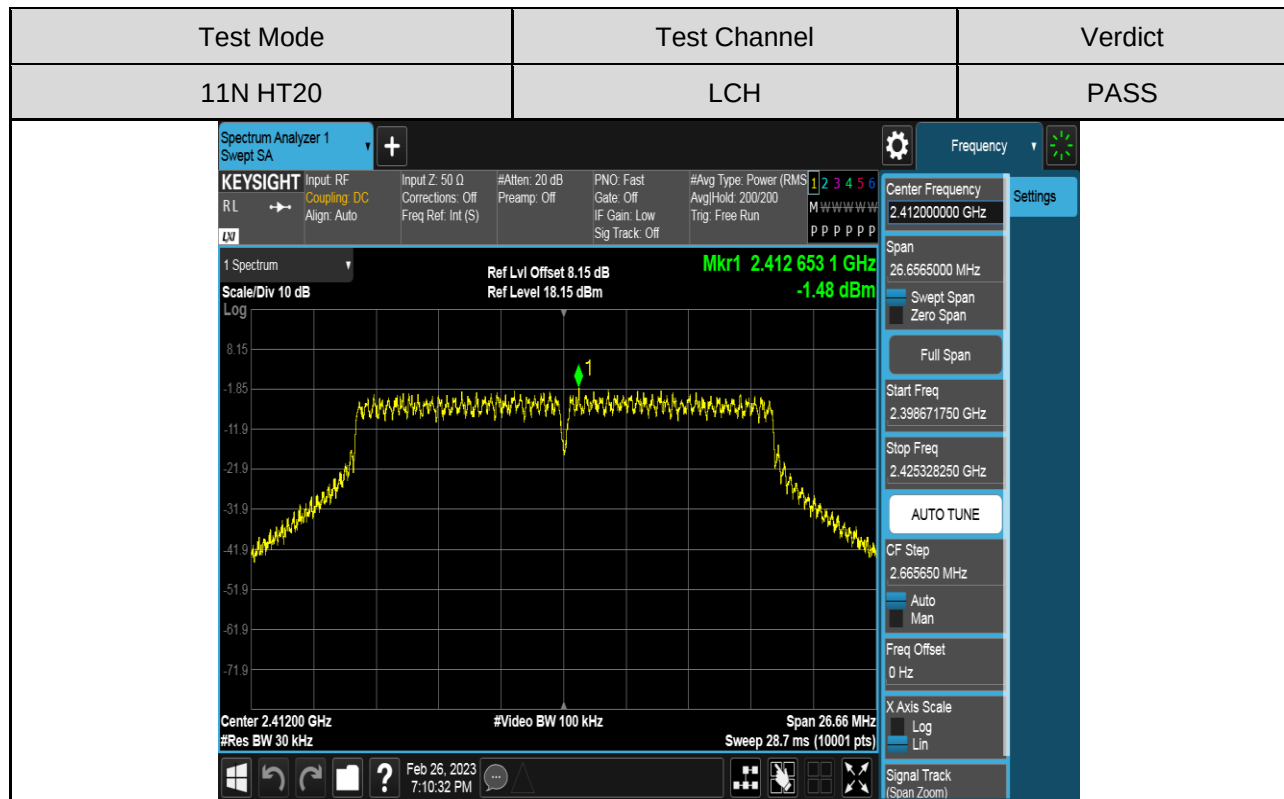
| Test Mode | Test Channel | Maximum Peak power spectral density (dBm/30kHz) | Result |
|-----------|--------------|-------------------------------------------------|--------|
| 11B       | LCH          | 1.38                                            | Pass   |
|           | MCH          | 2.38                                            | Pass   |
|           | HCH          | 1.41                                            | Pass   |
| 11G       | LCH          | -1.16                                           | Pass   |
|           | MCH          | -0.21                                           | Pass   |
|           | HCH          | -1.11                                           | Pass   |
| 11N HT20  | LCH          | -1.48                                           | Pass   |
|           | MCH          | -0.45                                           | Pass   |
|           | HCH          | -1.33                                           | Pass   |

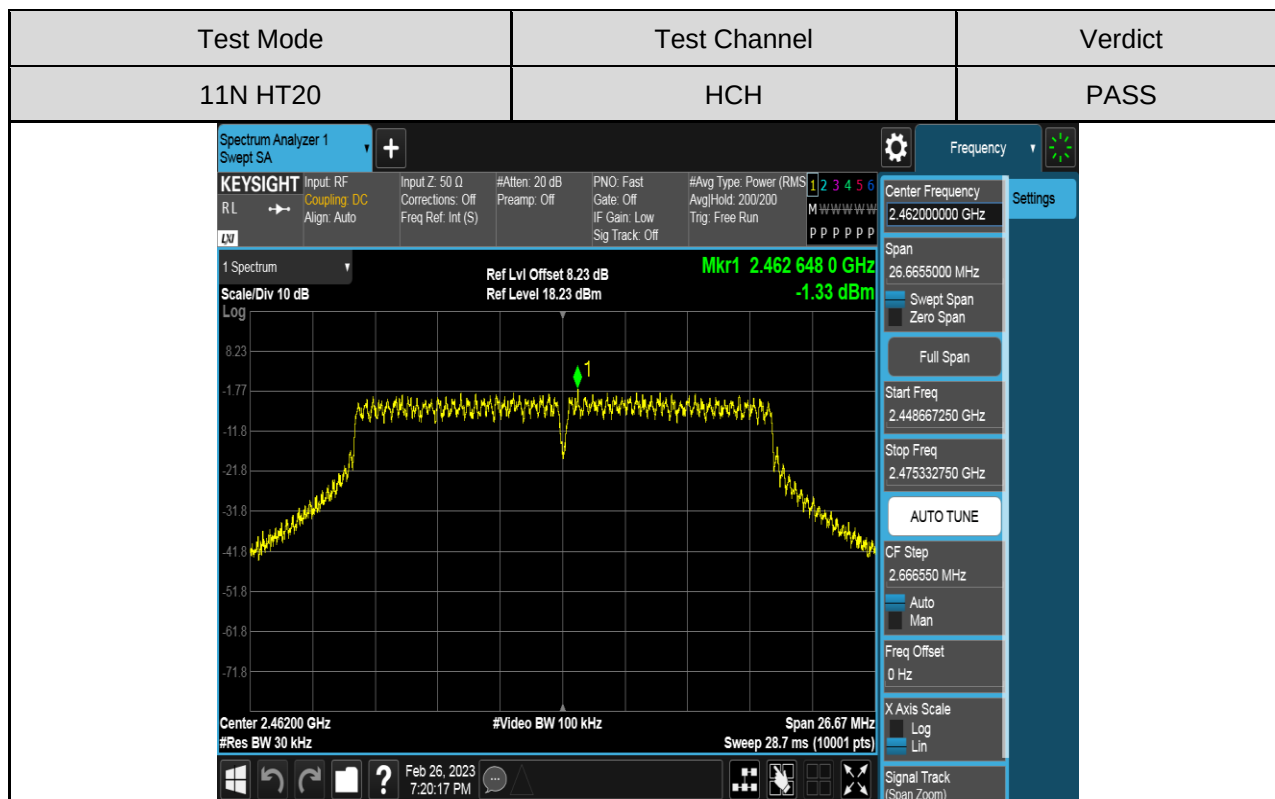
### TEST GRAPHS











## 7.5. CONDUCTED BANDEDGE AND SPURIOUS EMISSIONS

### LIMITS

| FCC Part15 (15.247), Subpart C                               |                                                 |                                                                                                                      |
|--------------------------------------------------------------|-------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| Section                                                      | Test Item                                       | Limit                                                                                                                |
| FCC §15.247 (d)<br>RSS-247 Clause 5.5<br>RSS-GEN Clause 6.13 | Conducted<br>Bandedge and<br>Spurious Emissions | 30 dB below that in the 100 kHz bandwidth<br>within the band that contains the highest<br>level of the desired power |

### TEST PROCEDURE

Refer to FCC KDB 558074, connect the UUT to the spectrum analyser and use the following settings:

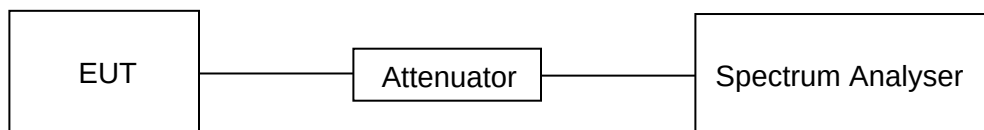
|                  |                                                |
|------------------|------------------------------------------------|
| Center Frequency | The centre frequency of the channel under test |
| Detector         | Peak                                           |
| RBW              | 100K                                           |
| VBW              | $\geq 3 \times \text{RBW}$                     |
| Span             | $1.5 \times \text{DTS bandwidth}$              |
| Trace            | Max hold                                       |
| Sweep time       | Auto couple.                                   |

Use the peak marker function to determine the maximum PSD level.

|                    |                                                                               |
|--------------------|-------------------------------------------------------------------------------|
| Span               | Set the center frequency and span to encompass frequency range to be measured |
| Detector           | Peak                                                                          |
| RBW                | 100K                                                                          |
| VBW                | $\geq 3 \times \text{RBW}$                                                    |
| measurement points | $\geq \text{span}/\text{RBW}$                                                 |
| Trace              | Max hold                                                                      |
| Sweep time         | Auto couple.                                                                  |

Use the peak marker function to determine the maximum amplitude level.

### TEST SETUP



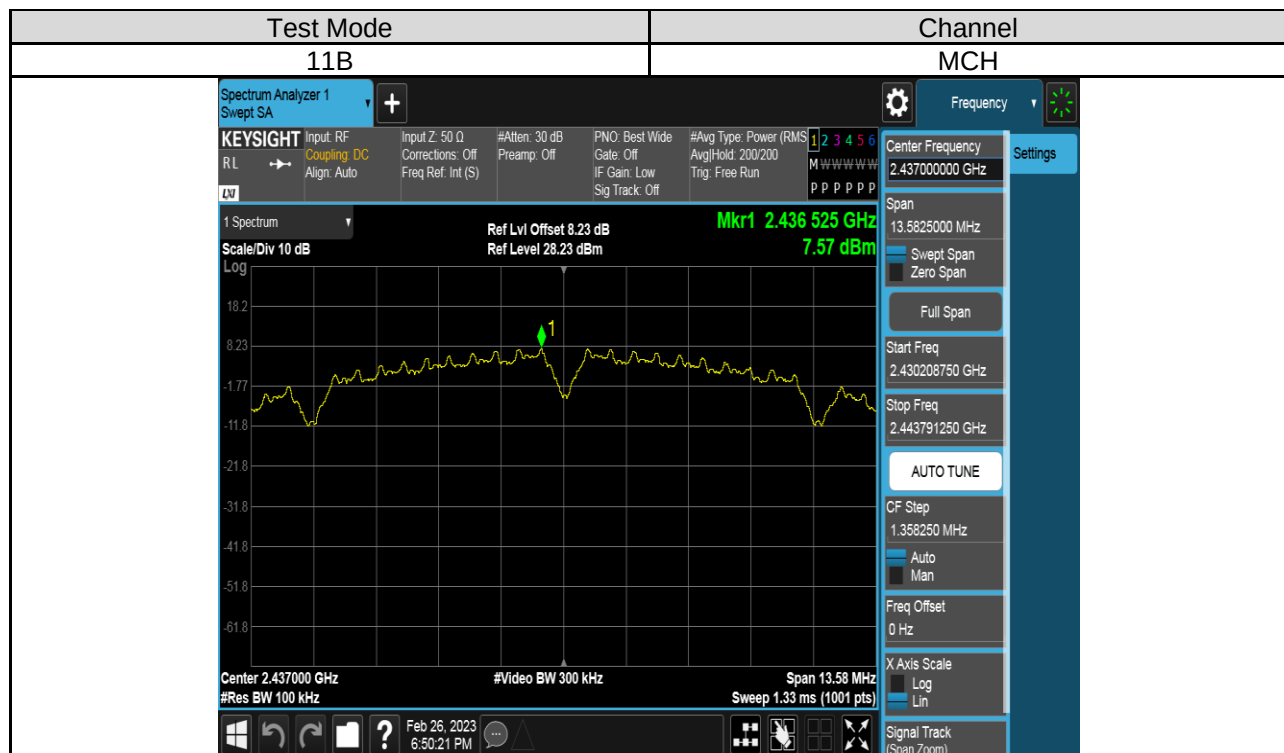
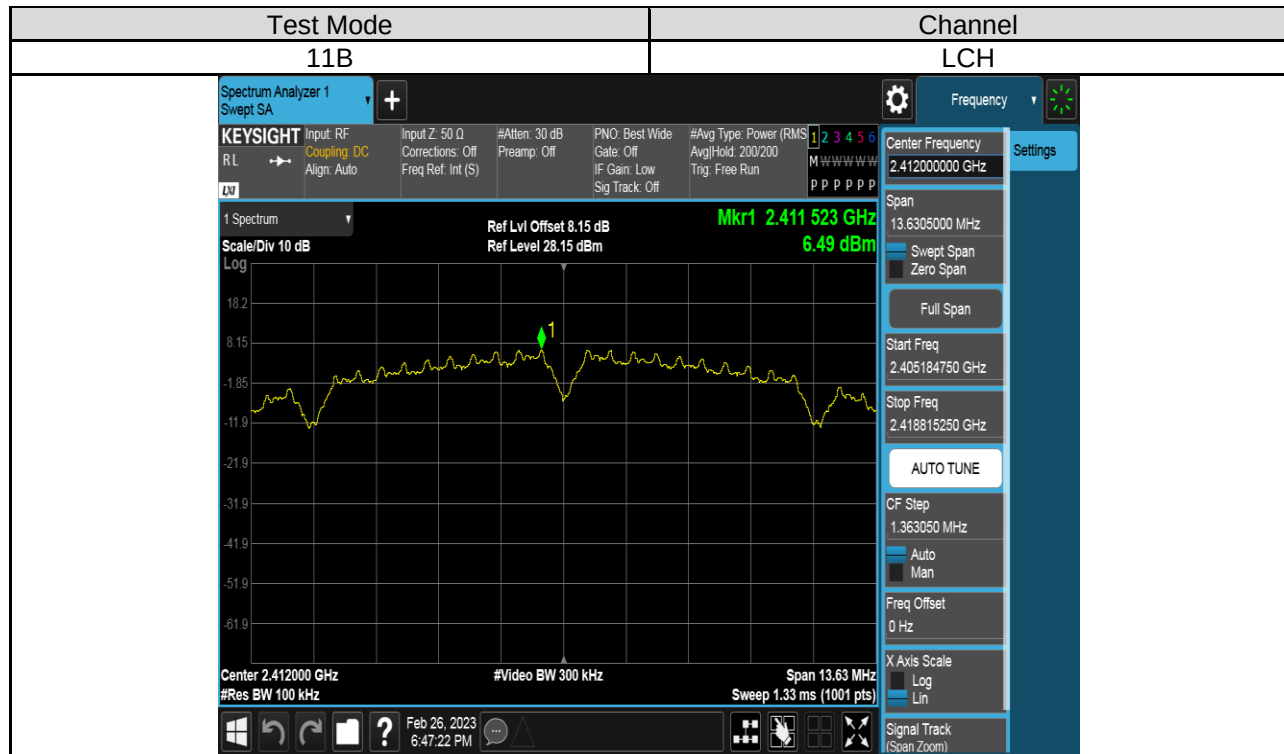
**TEST ENVIRONMENT**

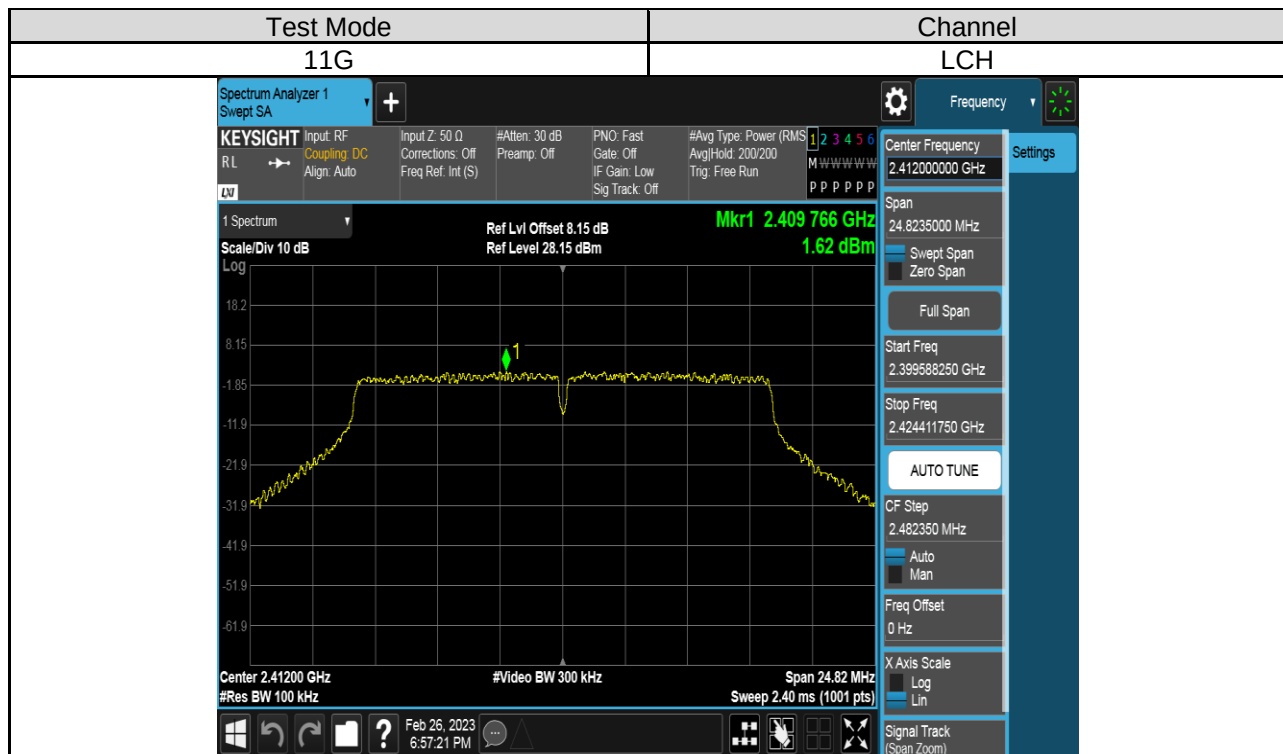
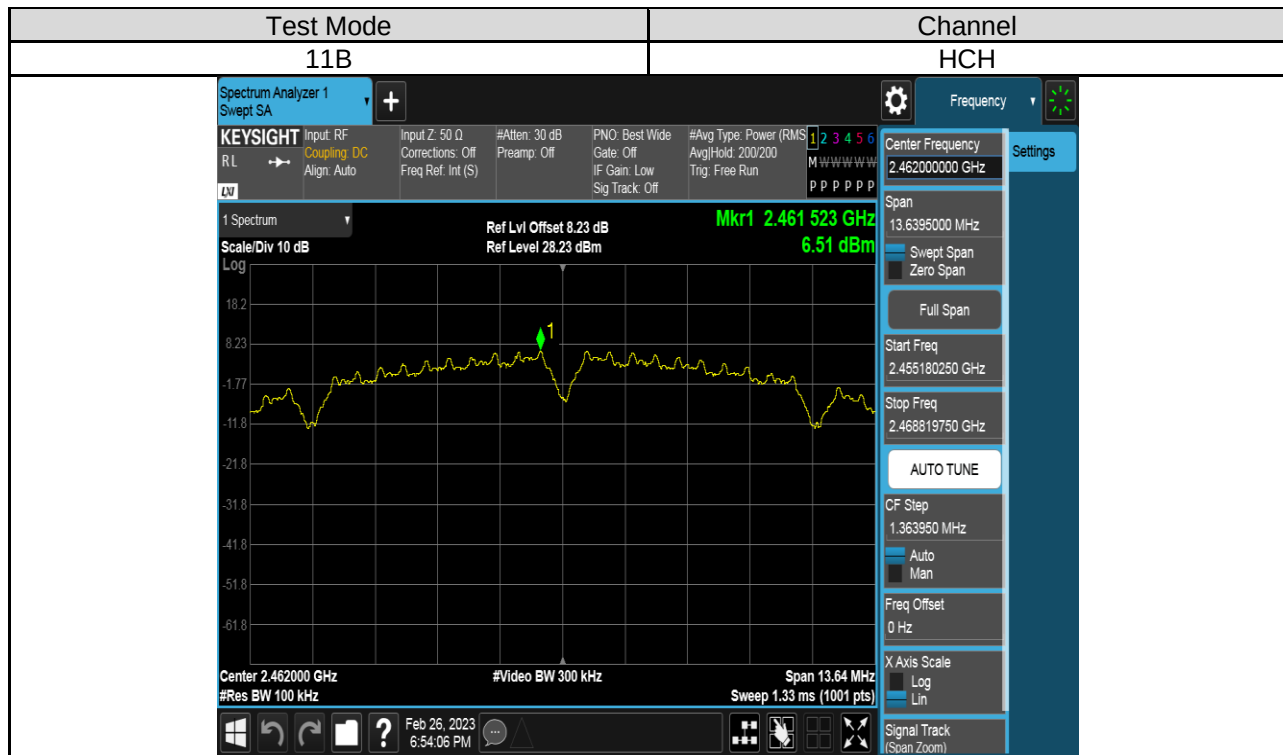
|                     |        |                   |         |
|---------------------|--------|-------------------|---------|
| Temperature         | 22°C   | Relative Humidity | 56%     |
| Atmosphere Pressure | 101kPa | Test Voltage      | AC 120V |

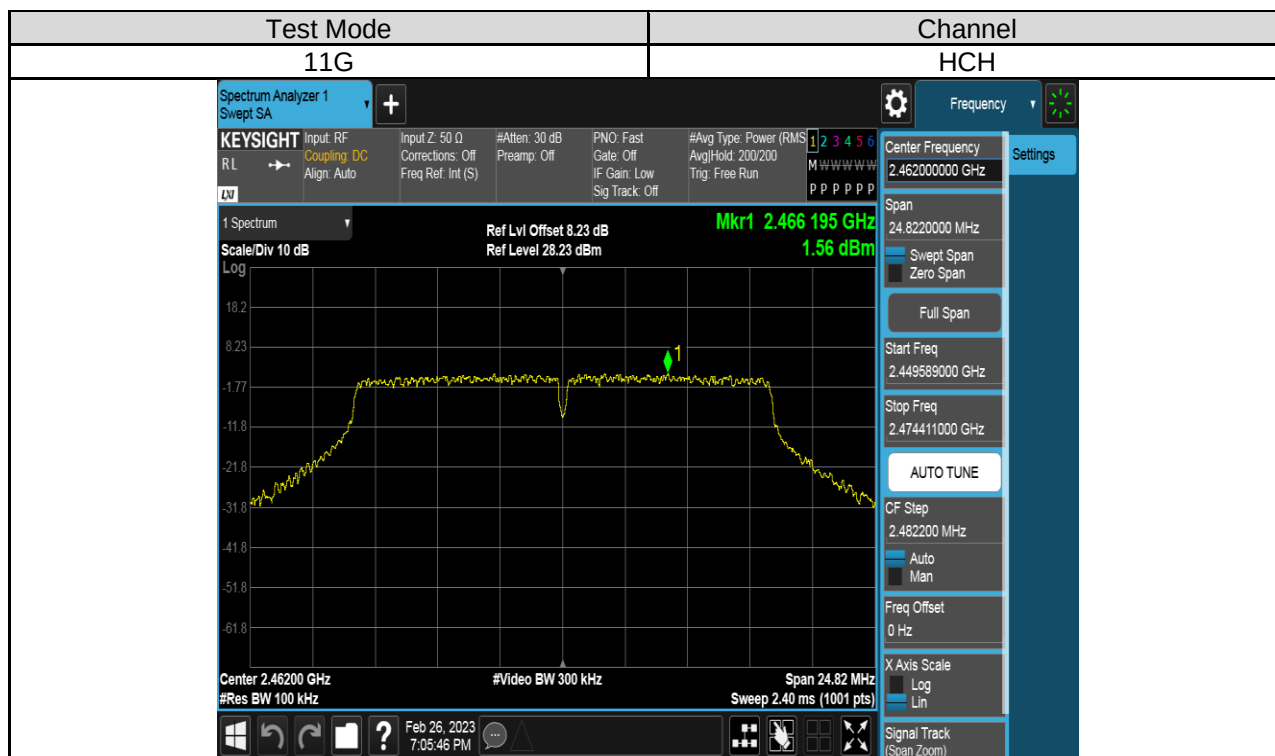
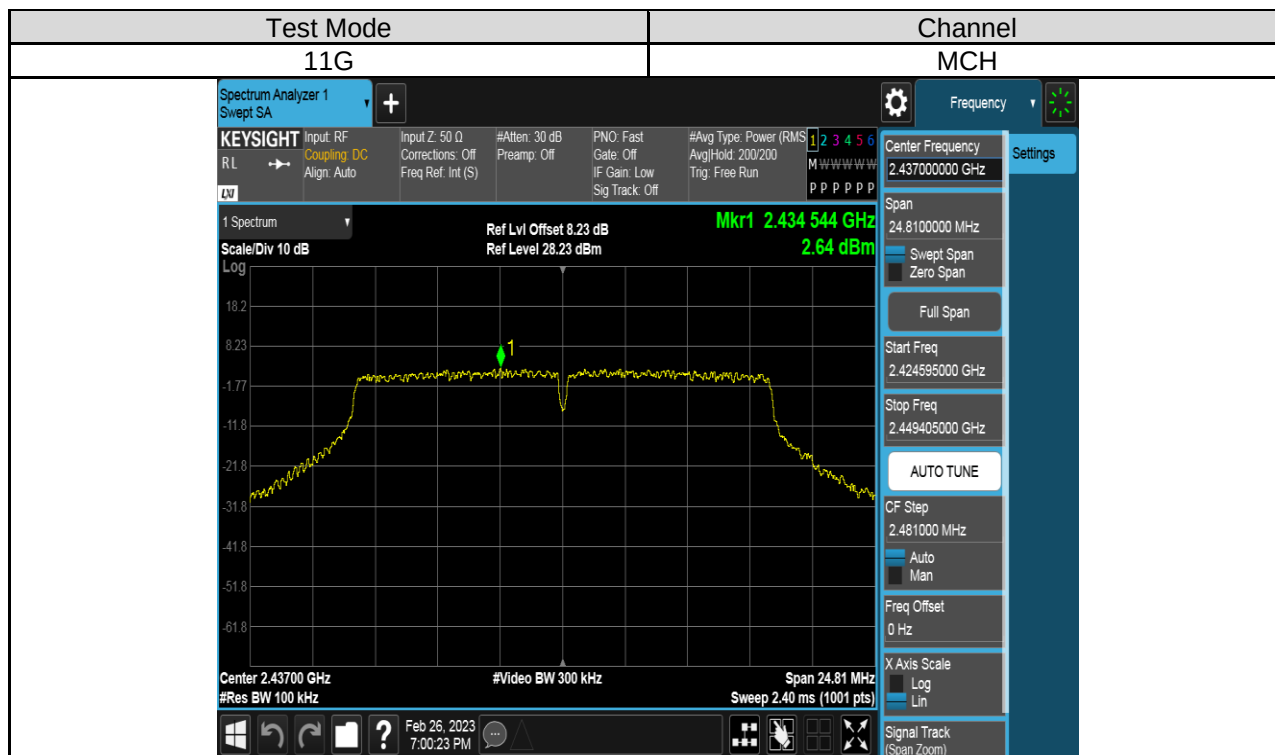
**PART 1: REFERENCE LEVEL MEASUREMENT****TEST RESULTS TABLE**

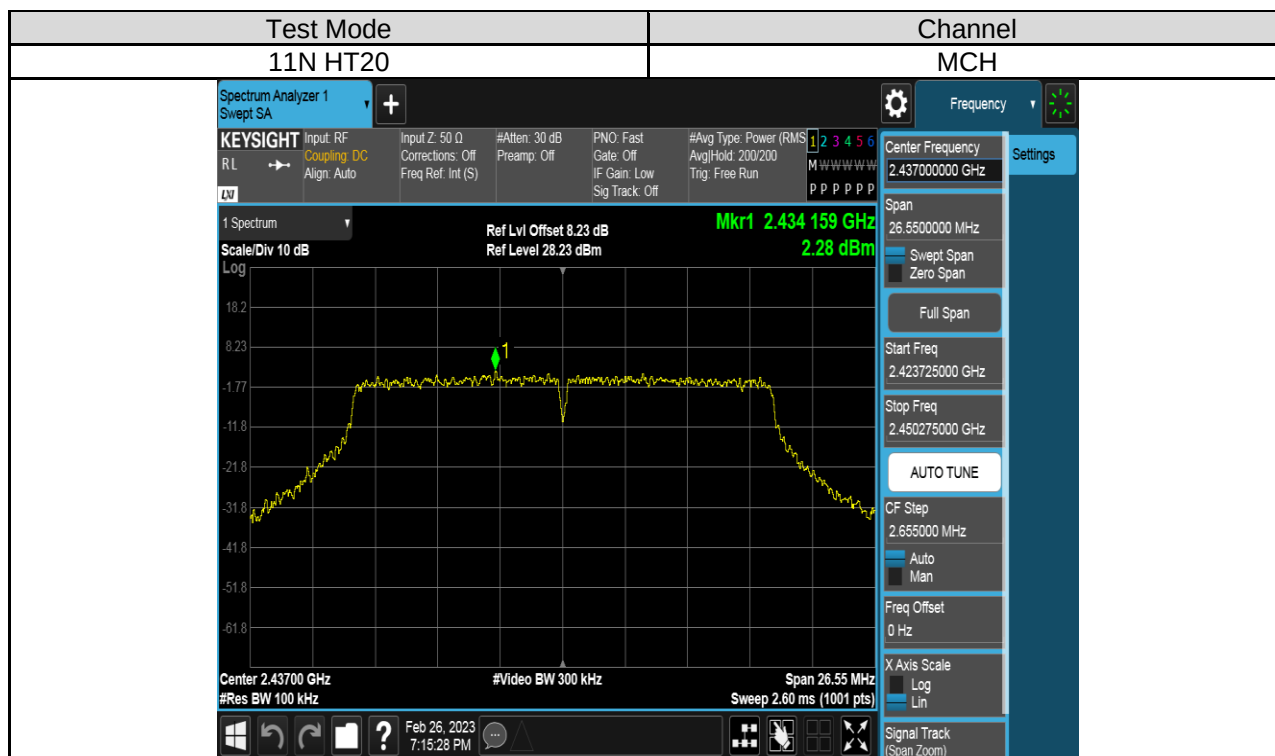
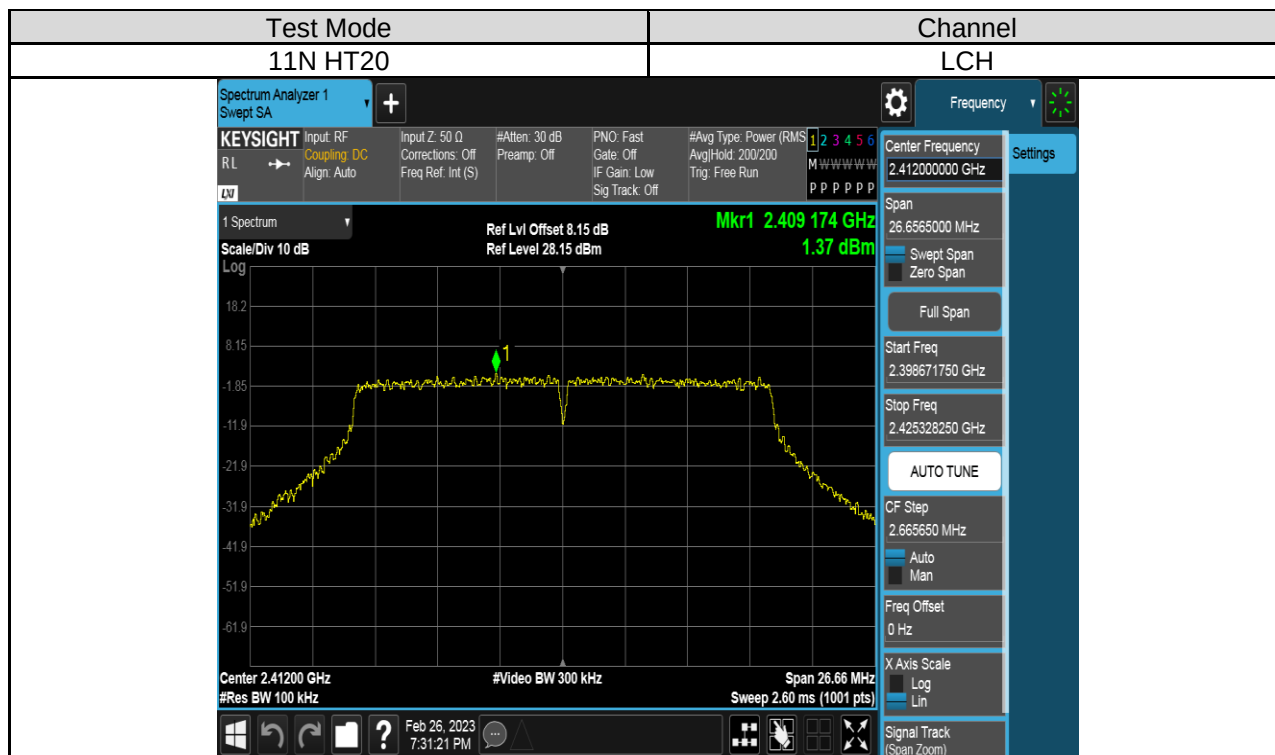
| Test Mode | Test Channel | Result[dBm] |
|-----------|--------------|-------------|
| 11B       | LCH          | 6.49        |
|           | MCH          | 7.57        |
|           | HCH          | 6.51        |
| 11G       | LCH          | 1.62        |
|           | MCH          | 2.64        |
|           | HCH          | 1.56        |
| 111N HT20 | LCH          | 1.37        |
|           | MCH          | 2.28        |
|           | HCH          | 1.32        |

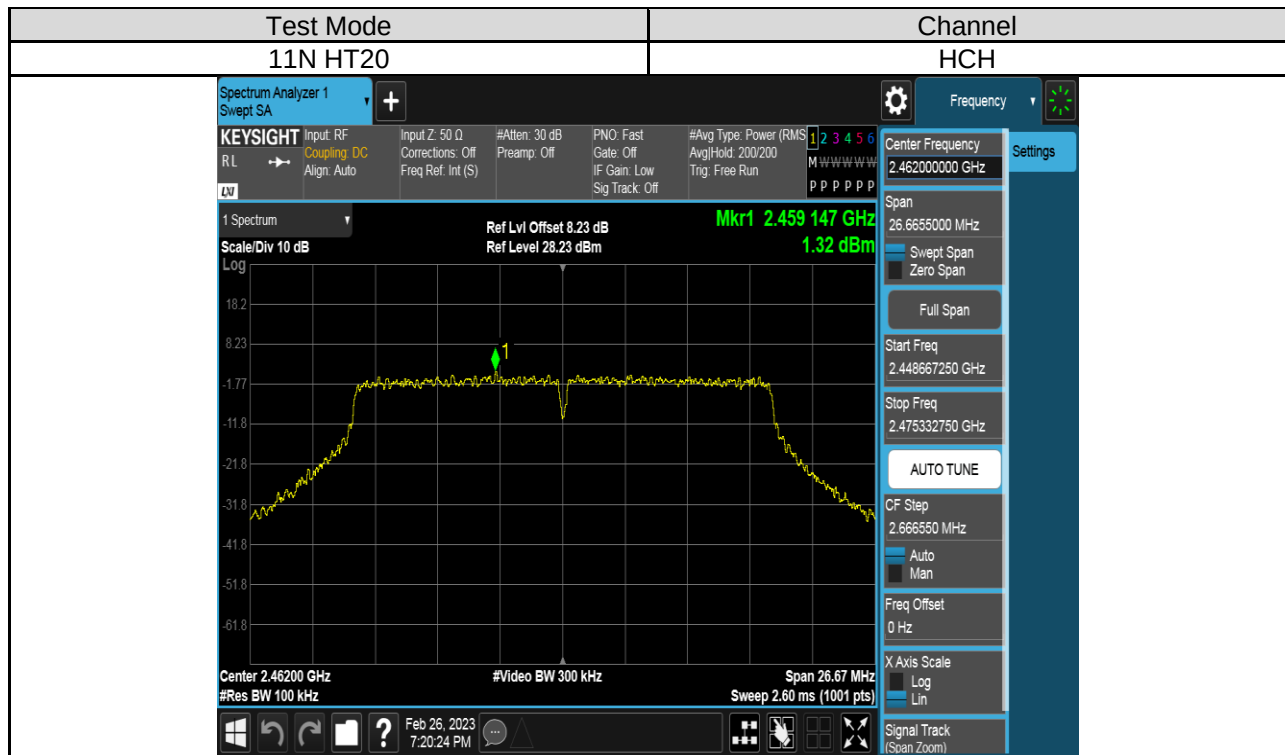
## TEST GRAPHS











**PART 2: CONDUCTED BANDEDGE****TEST RESULTS TABLE**

| Test Mode | Test Channel | Result                  | Verdict |
|-----------|--------------|-------------------------|---------|
| 11B       | LCH          | Refer to the Test Graph | PASS    |
|           | HCH          | Refer to the Test Graph | PASS    |
| 11G       | LCH          | Refer to the Test Graph | PASS    |
|           | HCH          | Refer to the Test Graph | PASS    |
| 11N HT20  | LCH          | Refer to the Test Graph | PASS    |
|           | HCH          | Refer to the Test Graph | PASS    |

### TEST GRAPHS

