

**FCC 47 CFR PART 15 SUBPART C  
ISED RSS-247 ISSUE 3**

**TEST REPORT**

*For*

**Robotic Vacuum Cleaner**

**MODEL NUMBER: V10VIV**

**REPORT NUMBER: 4791308892-1**

**FCC ID: 2AN2O-V10VIV01**

**IC: 23317-V10VIV01**

**HVIN: V10VIV-BLM8**

**ISSUE DATE: Jun. 26, 2024**

*Prepared for*

**Beijing Roborock Technology Co., Ltd.**

*Prepared by*

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Revision History

| Rev. | Issue Date | Revisions     | Revised By |
|------|------------|---------------|------------|
| V0   | 06/25/2024 | Initial Issue |            |

### Summary of Test Results

| Test Item                                 | Clause                                        | Limit/Requirement                                                                         | Result |
|-------------------------------------------|-----------------------------------------------|-------------------------------------------------------------------------------------------|--------|
| Antenna Requirement                       | N/A                                           | FCC Part 15.203/15.247 (c)<br>RSS-GEN Clause 6.8                                          | Pass   |
| AC Power Line Conducted Emission          | ANSI C63.10-2013, Clause 6.2                  | FCC Part 15.207<br>RSS-GEN Clause 8.8                                                     | Pass   |
| Conducted Output Power                    | ANSI C63.10-2013, Clause 11.9.2.3.1           | FCC Part 15.247 (b)(3)<br>RSS-247 Clause 5.4 (d)                                          | Pass   |
| 6dB Bandwidth and 99% Occupied Bandwidth  | ANSI C63.10-2013, Clause 11.8.1               | FCC Part 15.247 (a)(2)<br>RSS-247 Clause 5.2 (a)<br>ISED RSS-Gen Clause 6.7               | Pass   |
| Power Spectral Density                    | ANSI C63.10-2013, Clause 11.10.5              | FCC Part 15.247 (e)<br>RSS-247 Clause 5.2 (b)                                             | Pass   |
| Conducted Band edge and spurious emission | ANSI C63.10-2013, Clause 11.11                | FCC Part 15.247(d)<br>RSS-247 Clause 5.5                                                  | Pass   |
| Radiated Band edge and Spurious Emission  | ANSI C63.10-2013, Clause 11.12 & Clause 11.13 | FCC Part 15.247 (d)<br>FCC Part 15.205/15.209<br>RSS-247 Clause 5.5<br>RSS-GEN Clause 8.9 | Pass   |
| Duty Cycle                                | ANSI C63.10-2013, Clause 11.6                 | None; for reporting purposes only.                                                        | Pass   |

\*This test report is only published to and used by the applicant, and it is not for evidence purpose in China.

\*The measurement result for the sample received is <Pass> according to <CFR 47 FCC PART 15 SUBPART C  
ISED RSS-247 Issue 3> when <Simple Acceptance> decision rule is applied.

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## 1. APPLICANT INFORMATION

### Applicant Information

Company Name: Beijing Roborock Technology Co., Ltd.  
Address: Room 1001, Floor 10, Building 3, Yard 17, Anju Road,  
Changping District, Beijing, P.R. China

### Manufacturer Information

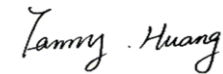
Company Name: Beijing Roborock Technology Co., Ltd.  
Address: Room 1001, Floor 10, Building 3, Yard 17, Anju Road,  
Changping District, Beijing, P.R. China

### EUT Description

Product Name: Robotic Vacuum Cleaner  
Model Name: V10VIV  
HVIN: V10VIV-BLM8  
Sample Number: 7250745-S001  
Data of Receipt Sample: May. 28, 2024  
Test Date: May. 29, 2024~ Jun. 24, 2024

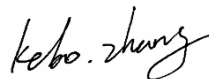
| APPLICABLE STANDARDS                                 |              |
|------------------------------------------------------|--------------|
| STANDARD                                             | TEST RESULTS |
| CFR 47 FCC PART 15 SUBPART C<br>ISED RSS-247 Issue 3 | Pass         |

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## 2. TEST METHODOLOGY

All tests were performed in accordance with the standard CFR 47 FCC PART 15 SUBPART C ISSED RSS-247 Issue 3, KDB 558074 D01 15.247 Meas Guidance v05r02, KDB 414788 D01 Radiated Test Site v01r01, CFR 47 FCC Part 2, ANSI C63.10-2013 and ISSED RSS-GEN Issue 5.

## 3. FACILITIES AND ACCREDITATION

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Accreditation Certificate | <p><b>A2LA (Certificate No.: 4102.01)</b><br/>UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been assessed and proved to be in compliance with A2LA.</p> <p><b>FCC (FCC Designation No.: CN1187)</b><br/>UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. Has been recognized to perform compliance testing on equipment subject to the Commission's Declaration of Conformity (DoC) and Certification rules</p> <p><b>ISED (Company No.: 21320)</b><br/>UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been registered and fully described in a report filed with ISED. The Company Number is 21320 and the test lab Conformity Assessment Body Identifier (CABID) is CN0046.</p> <p><b>VCCI (Registration No.: G-20192, C-20153, T-20155 and R-20202)</b><br/>UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been assessed and proved to be in compliance with VCCI, the Membership No. is 3793.<br/>Facility Name:<br/>Chamber D, the VCCI registration No. is G-20192 and R-20202<br/>Shielding Room B, the VCCI registration No. is C-20153 and T-20155</p> |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Note 1:

All tests measurement facilities use to collect the measurement data are located at Building 10, Innovation Technology Park, No. 1, Li Bin Road, Song Shan Lake Hi-Tech Development Zone Dongguan, 523808, People's Republic of China.

Note 2:

The test anechoic chamber in UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch 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.

Note 3:

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

## 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                                                                                                                           | 3.62 dB                   |
| Radiated Emission<br>(Included Fundamental Emission) (9 kHz ~ 30 MHz)                                                                         | 2.2 dB                    |
| Radiated Emission<br>(Included Fundamental Emission) (30 MHz ~ 1 GHz)                                                                         | 4.00 dB                   |
| Radiated Emission<br>(Included Fundamental Emission) (1 GHz to 26 GHz)                                                                        | 5.78 dB (1 GHz ~ 18 GHz)  |
|                                                                                                                                               | 5.23 dB (18 GHz ~ 26 GHz) |
| Duty Cycle                                                                                                                                    | ±0.028%                   |
| DTS and 99% Occupied Bandwidth                                                                                                                | ±0.0196%                  |
| Maximum Conducted Output Power                                                                                                                | ±0.686 dB                 |
| Maximum Power Spectral Density Level                                                                                                          | ±0.743 dB                 |
| Conducted Band-edge Compliance                                                                                                                | ±1.328 dB                 |
| Conducted Unwanted Emissions In Non-restricted<br>Frequency Bands                                                                             | ±0.746 dB (9 kHz ~ 1 GHz) |
|                                                                                                                                               | ±1.328dB (1 GHz ~ 26 GHz) |
| 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

|          |                        |
|----------|------------------------|
| EUT Name | Robotic Vacuum Cleaner |
| Model    | V10VIV                 |
| HVIN     | V10VIV-BLM8            |

|                      |                                                                                           |
|----------------------|-------------------------------------------------------------------------------------------|
| Frequency Range:     | 2412 MHz to 2462 MHz                                                                      |
| Type of Modulation:  | IEEE 802.11b: DSSS(CCK, DQPSK, DBPSK)<br>IEEE 802.11g/n: OFDM(64-QAM, 16-QAM, QPSK, BPSK) |
| Radio Technology:    | IEEE 802.11b/g/n HT20/n HT40                                                              |
| Normal Test Voltage: | AC 120V, 60 Hz                                                                            |



## 5.2. 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            |         |                 |

| 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            |         |                 |

## 5.3. MAXIMUM POWER

| IEEE Std. 802.11 | Frequency (MHz) | Channel Number | Maximum Conducted AVG Output Power (dBm) |
|------------------|-----------------|----------------|------------------------------------------|
| b                | 2412 ~ 2462     | 1-11[11]       | 16.98                                    |
| g                | 2412 ~ 2462     | 1-11[11]       | 13.82                                    |
| n HT20           | 2412 ~ 2462     | 1-11[11]       | 12.29                                    |
| n HT40           | 2422 ~ 2452     | 3-9[7]         | 11.45                                    |

#### 5.4. TEST CHANNEL CONFIGURATION

| IEEE Std. 802.11 | Test Channel Number                                          | Frequency                    |
|------------------|--------------------------------------------------------------|------------------------------|
| b                | CH 1(Low Channel), CH 6(MID Channel),<br>CH 11(High Channel) | 2412 MHz, 2437 MHz, 2462 MHz |
| g                | CH 1(Low Channel), CH 6(MID Channel),<br>CH 11(High Channel) | 2412 MHz, 2437 MHz, 2462 MHz |
| n HT20           | CH 1(Low Channel), CH 6(MID Channel),<br>CH 11(High Channel) | 2412 MHz, 2437 MHz, 2462 MHz |
| n HT40           | CH 3(Low Channel), CH 6(MID Channel),<br>CH 9(High Channel)  | 2422 MHz, 2437 MHz, 2452 MHz |

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

| The Worst Case Power Setting Parameter under 2400 ~ 2483.5MHz Band |                         |              |         |         |            |         |         |
|--------------------------------------------------------------------|-------------------------|--------------|---------|---------|------------|---------|---------|
| Test Software                                                      |                         | ADB          |         |         |            |         |         |
| 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 |

## 5.6. DESCRIPTION OF AVAILABLE ANTENNAS

| Ant. | Frequency (MHz) | Antenna Type | Antenna Gain (dBi) |
|------|-----------------|--------------|--------------------|
| 1    | 2400-2483.5     | PCB Antenna  | 2.11               |

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. |

## 5.7. THE WORSE CASE CONFIGURATIONS

The EUT was tested in the following configuration(s):

Controlled in test mode using a software application on the EUT supplied by customer. The application was used to enable a continuous transmission and to select the mode, test channels, bandwidth, data rates as required.

Test channels referring to section 5.4.

Maximum power setting referring to section 5.5.

802.11B mode: 1 Mbps

802.11G mode: 6 Mbps

802.11N HT20 mode: MCS0

802.11N HT40 mode: MCS0

The measured additional path loss was included in any path loss calculations for all RF cable used during tested.

## 5.8. 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            | USB        | 100cm Length    | /       |

### ACCESSORY

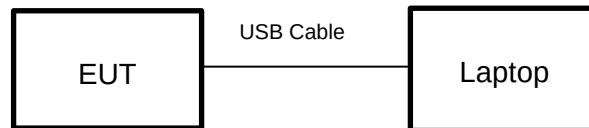
| Item | Accessory              | Brand Name | Model Name | Description                                          |
|------|------------------------|------------|------------|------------------------------------------------------|
| 1    | Empty Wash Fill Dock 1 | roborock   | EWFD26LRR  | Input: 120V~ 60Hz<br>Output: 20V $\overline{=}$ 1.5A |
| 2    | Empty Wash Fill Dock 2 | roborock   | EWFD30LRR  | Input: 120V~ 60Hz<br>Output: 20V $\overline{=}$ 1.5A |

**TEST SETUP**

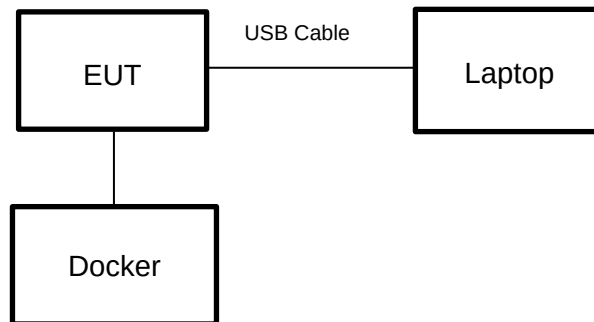
The EUT can work in an engineer mode with a software through a laptop.

**SETUP DIAGRAM FOR TESTS**

For Antenna Port Test and Radiated Test:



For Conducted Emission Test and Radiated Test:



Note: The EUT can transmit independently and be charged with a docker.

## 5.9. MEASURING INSTRUMENT AND SOFTWARE USED

| R&S TS 8997 Test System             |                 |                         |                  |              |              |
|-------------------------------------|-----------------|-------------------------|------------------|--------------|--------------|
| Equipment                           | Manufacturer    | Model No.               | Serial No.       | Last Cal.    | Due. Date    |
| Power sensor, Power Meter           | R&S             | OSP120                  | 100921           | Mar.25,2024  | Mar.24,2025  |
| Vector Signal Generator             | R&S             | SMBV100A                | 261637           | Oct.12, 2023 | Oct.11, 2024 |
| Signal Generator                    | R&S             | SMB100A                 | 178553           | Oct.12, 2023 | Oct.11, 2024 |
| Signal Analyzer                     | R&S             | FSV40                   | 101118           | Oct.12, 2023 | Oct.11, 2024 |
| Software                            |                 |                         |                  |              |              |
| Description                         | Manufacturer    |                         | Name             | Version      |              |
| For R&S TS 8997 Test System         | Rohde & Schwarz |                         | EMC 32           | 10.60.10     |              |
| Tonsend RF Test System              |                 |                         |                  |              |              |
| Equipment                           | Manufacturer    | Model No.               | Serial No.       | Last Cal.    | Due. Date    |
| Wideband Radio Communication Tester | R&S             | CMW500                  | 155523           | Oct.12, 2023 | Oct.11, 2024 |
| Wireless Connectivity Tester        | R&S             | CMW270                  | 1201.0002N75-102 | Sep.25, 2023 | Sep.24, 2024 |
| PXA Signal Analyzer                 | Keysight        | N9030A                  | MY55410512       | Oct.12, 2023 | Oct.11, 2024 |
| MXG Vector Signal Generator         | Keysight        | N5182B                  | MY56200284       | Oct.12, 2023 | Oct.11, 2024 |
| MXG Vector Signal Generator         | Keysight        | N5172B                  | MY56200301       | Oct.12, 2023 | Oct.11, 2024 |
| DC power supply                     | Keysight        | E3642A                  | MY55159130       | Oct.12, 2023 | Oct.11, 2024 |
| Temperature & Humidity Chamber      | SANMOOD         | SG-80-CC-2              | 2088             | Oct.12, 2023 | Oct.11, 2024 |
| Attenuator                          | Aglient         | 8495B                   | 2814a12853       | Oct.12, 2023 | Oct.11, 2024 |
| RF Control Unit                     | Tonscend        | JS0806-2                | 23B80620666      | Mar.25,2024  | Mar.24,2025  |
| Software                            |                 |                         |                  |              |              |
| Description                         | Manufacturer    | Name                    |                  | Version      |              |
| Tonsend SRD Test System             | Tonsend         | JS1120-3 RF Test System |                  | V3.2.22      |              |

| Conducted Emissions                   |              |           |              |              |              |
|---------------------------------------|--------------|-----------|--------------|--------------|--------------|
| Equipment                             | Manufacturer | Model No. | Serial No.   | Last Cal.    | Due Date     |
| EMI Test Receiver                     | R&S          | ESR3      | 101961       | Oct.13, 2023 | Oct.12, 2024 |
| Two-Line V-Network                    | R&S          | ENV216    | 101983       | Oct.13, 2023 | Oct.12, 2024 |
| Artificial Mains Networks             | Schwarzbeck  | NSLK 8126 | 8126465      | Oct.13, 2023 | Oct.12, 2024 |
| Software                              |              |           |              |              |              |
| Description                           |              |           | Manufacturer | Name         | Version      |
| Test Software for Conducted Emissions |              |           | Farad        | EZ-EMC       | Ver. UL-3A1  |

| Radiated Emissions                   |              |                                     |               |               |               |
|--------------------------------------|--------------|-------------------------------------|---------------|---------------|---------------|
| Equipment                            | Manufacturer | Model No.                           | Serial No.    | Last Cal.     | Due Date      |
| MXE EMI Receiver                     | KESIGHT      | N9038A                              | MY56400036    | Oct.12, 2023  | Oct.11, 2024  |
| Hybrid Log Periodic Antenna          | TDK          | HLP-3003C                           | 130959        | Aug.02, 2021  | Aug.01, 2024  |
| Preamplifier                         | HP           | 8447D                               | 2944A09099    | Oct.12, 2023  | Oct.11, 2024  |
| EMI Measurement Receiver             | R&S          | ESR26                               | 101377        | Oct.12, 2023  | Oct.11, 2024  |
| Horn Antenna                         | TDK          | HRN-0118                            | 130940        | July 20, 2021 | July 19, 2024 |
| Preamplifier                         | TDK          | PA-02-0118                          | TRS-305-00067 | Oct.12, 2023  | Oct.11, 2024  |
| Horn Antenna                         | Schwarzbeck  | BBHA9170                            | 697           | July 20, 2021 | July 19, 2024 |
| Preamplifier                         | TDK          | PA-02-2                             | TRS-307-00003 | Oct.12, 2023  | Oct.11, 2024  |
| Preamplifier                         | TDK          | PA-02-3                             | TRS-308-00002 | Oct.12, 2023  | Oct.11, 2024  |
| Loop antenna                         | Schwarzbeck  | 1519B                               | 00008         | Dec.14, 2021  | Dec.13, 2024  |
| Preamplifier                         | TDK          | PA-02-001-3000                      | TRS-302-00050 | Oct.12, 2023  | Oct.11, 2024  |
| High Pass Filter                     | Wi           | WHKX10-2700-3000-18000-40SS         | 23            | Oct.12, 2023  | Oct.11, 2024  |
| Band Reject Filter                   | Wainwright   | WRCJV8-2350-2400-2483.5-2533.5-40SS | 4             | Oct.12, 2023  | Oct.11, 2024  |
| Software                             |              |                                     |               |               |               |
| Description                          |              |                                     | Manufacturer  | Name          | Version       |
| Test Software for Radiated Emissions |              |                                     | Farad         | EZ-EMC        | Ver. UL-3A1   |

| Other Instrument           |              |           |            |              |              |
|----------------------------|--------------|-----------|------------|--------------|--------------|
| Equipment                  | Manufacturer | Model No. | Serial No. | Last Cal.    | Due Date     |
| Temperature humidity probe | OMEGA        | ITHX-SD-5 | 18470007   | Oct.21, 2023 | Oct.20, 2024 |
| Barometer                  | Yiyi         | Baro      | N/A        | Oct.19, 2023 | Oct.18, 2024 |
| Attenuator                 | Agilent      | 8495B     | 2814a12853 | Oct.12, 2023 | Oct.11, 2024 |



## 6. ANTENNA PORT TEST RESULTS

### 6.1. ON TIME AND DUTY CYCLE

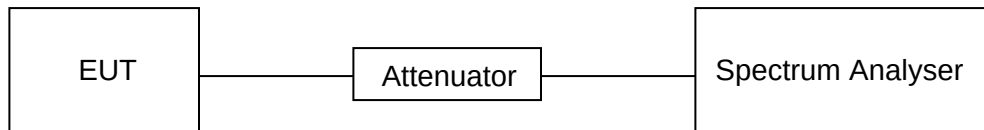
#### LIMITS

None; for reporting purposes only

#### PROCEDURE

FCC KDB 558074 Zero-Span Spectrum Analyzer Method

#### TEST SETUP



#### TEST ENVIRONMENT

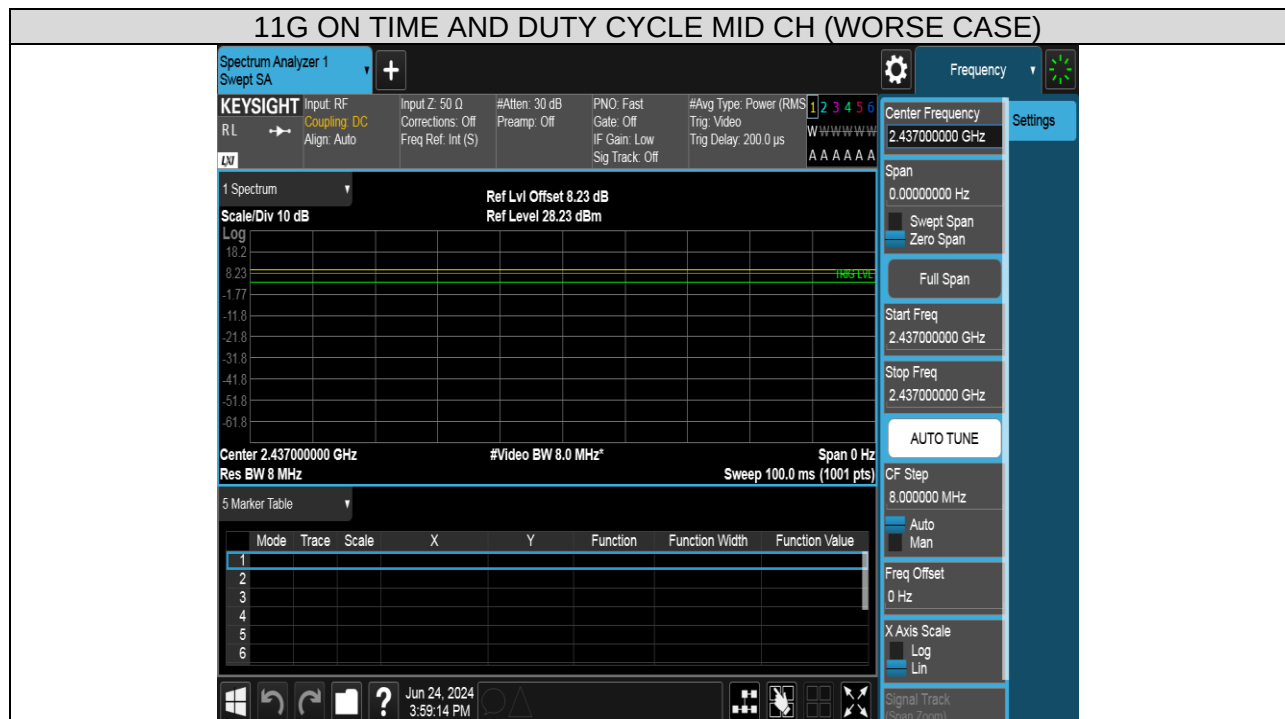
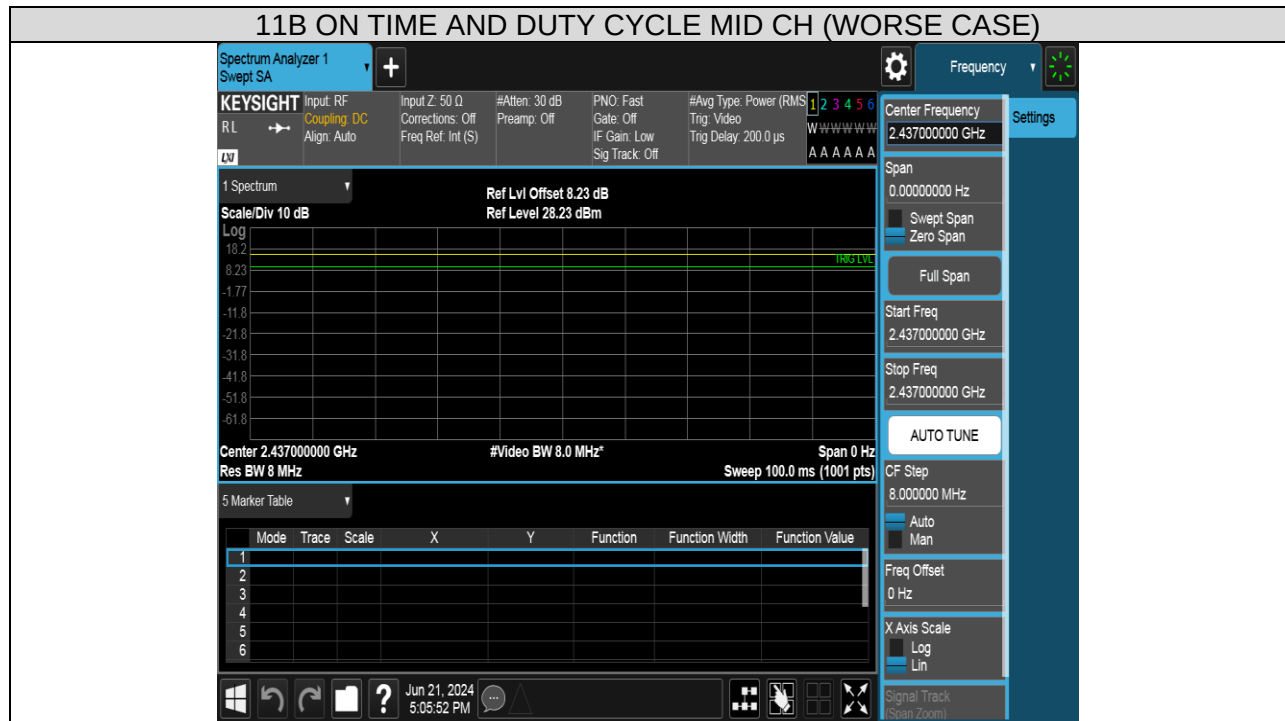
|                     |        |                   |                 |
|---------------------|--------|-------------------|-----------------|
| Temperature         | 22°C   | Relative Humidity | 56%             |
| Atmosphere Pressure | 101kPa | Test Voltage      | AC 120 V, 60 Hz |

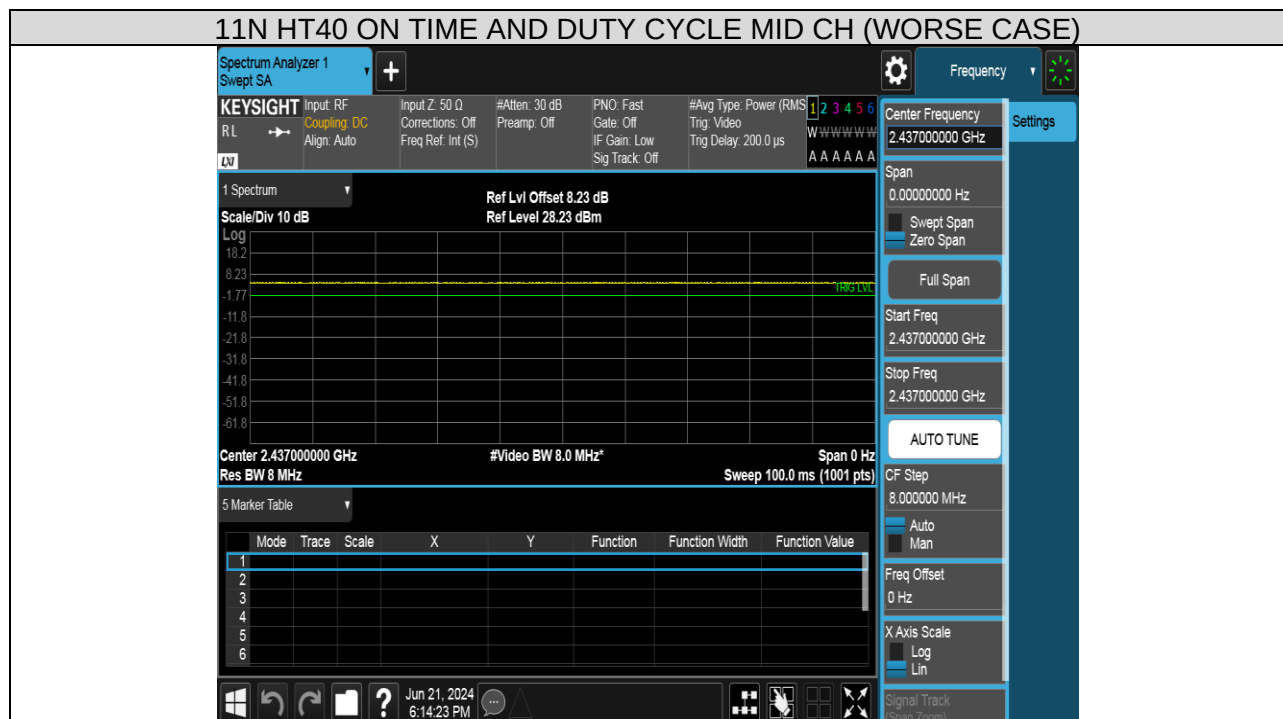
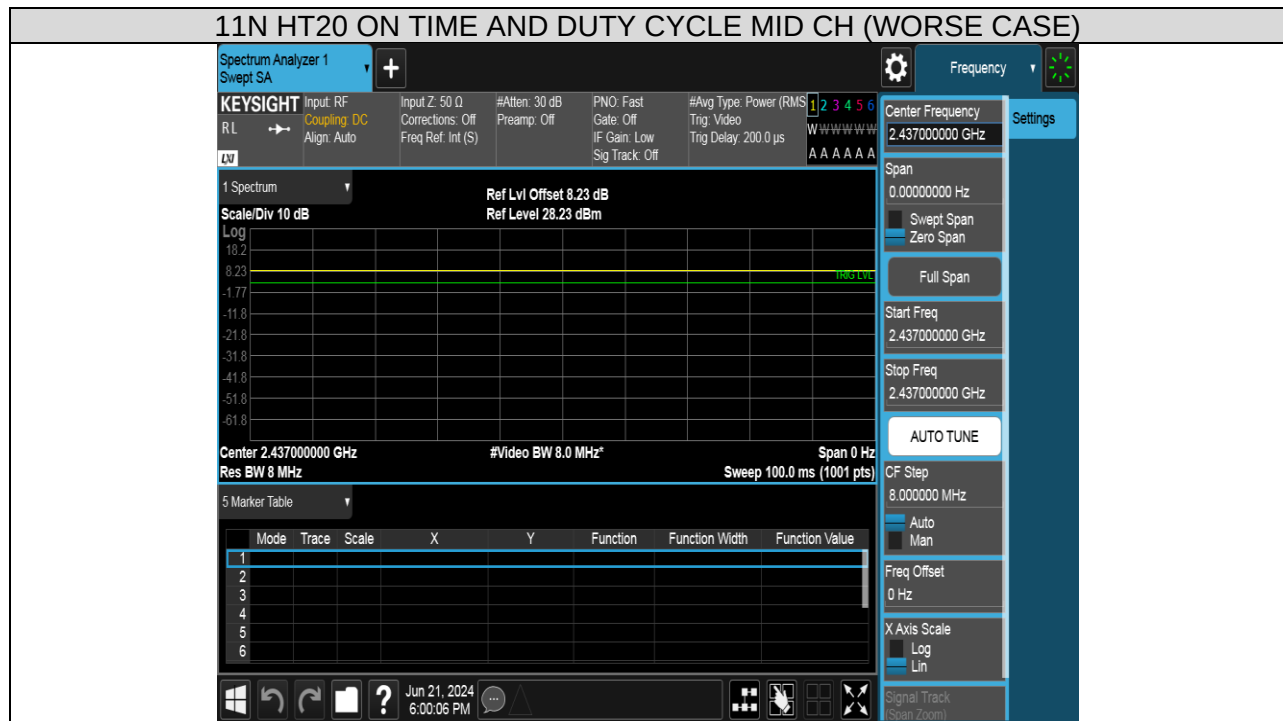
#### TEST RESULTS TABLE

| 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            |

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





## 6.2. 6 dB BANDWIDTH AND 99% OCCUPIED BANDWIDTH

### LIMITS

| FCC Part15 (15.247), Subpart C                  |                        |                             |                       |
|-------------------------------------------------|------------------------|-----------------------------|-----------------------|
| Section                                         | Test Item              | Limit                       | Frequency Range (MHz) |
| FCC 47 CFR 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.

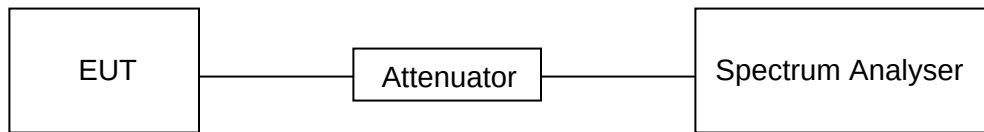
Connect the EUT to the spectrum analyser and use the following settings:

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

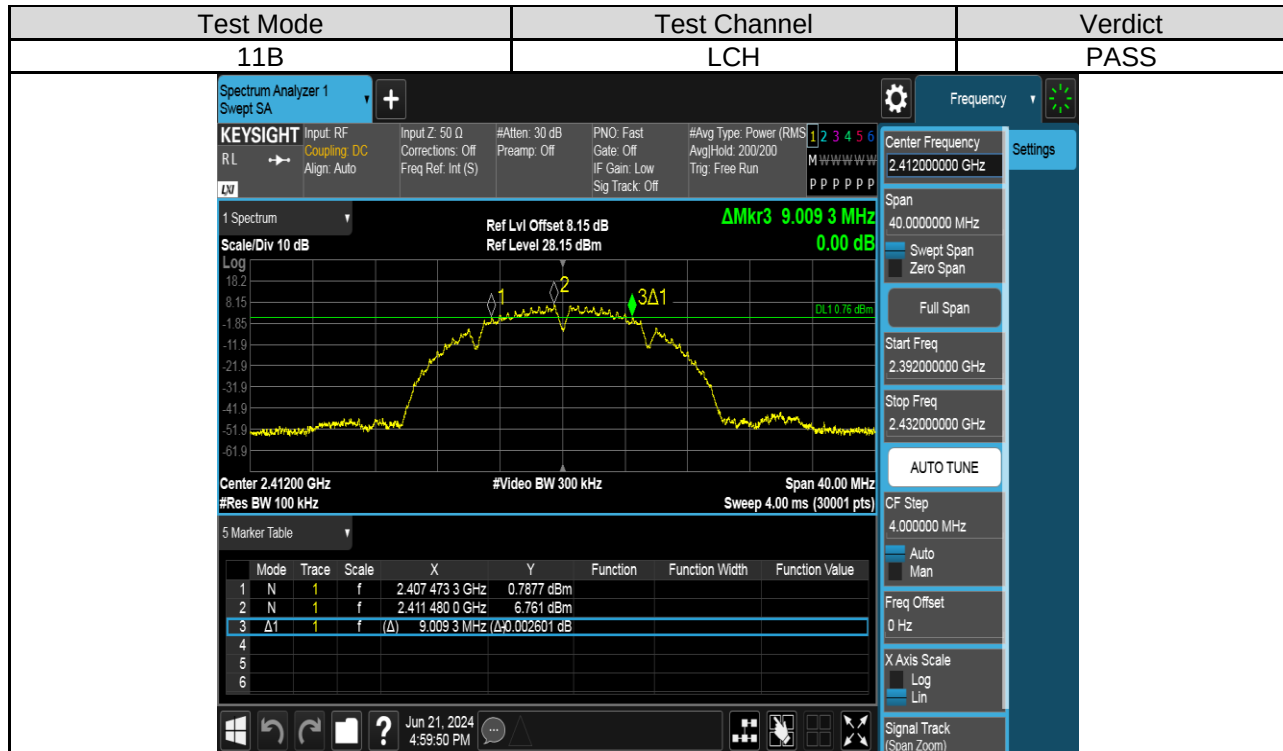
|                     |        |                   |                 |
|---------------------|--------|-------------------|-----------------|
| Temperature         | 22°C   | Relative Humidity | 56%             |
| Atmosphere Pressure | 101kPa | Test Voltage      | AC 120 V, 60 Hz |

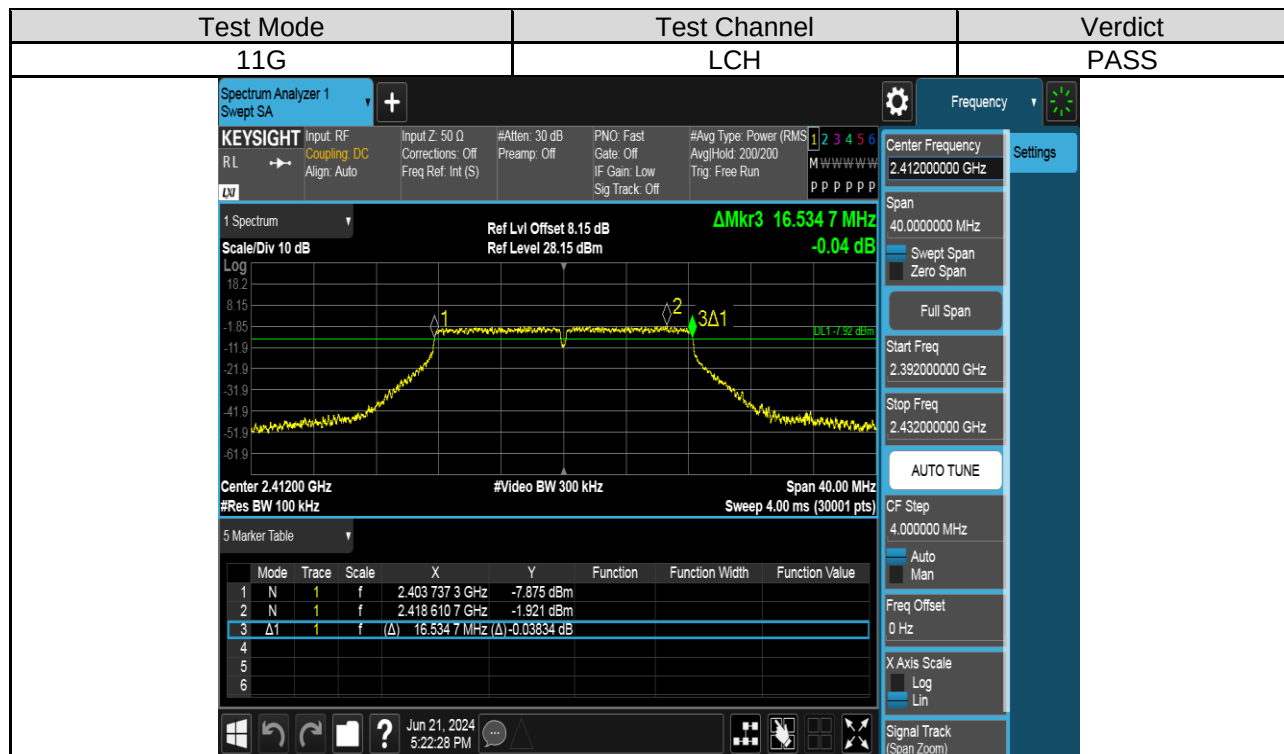
### TEST RESULTS TABLE

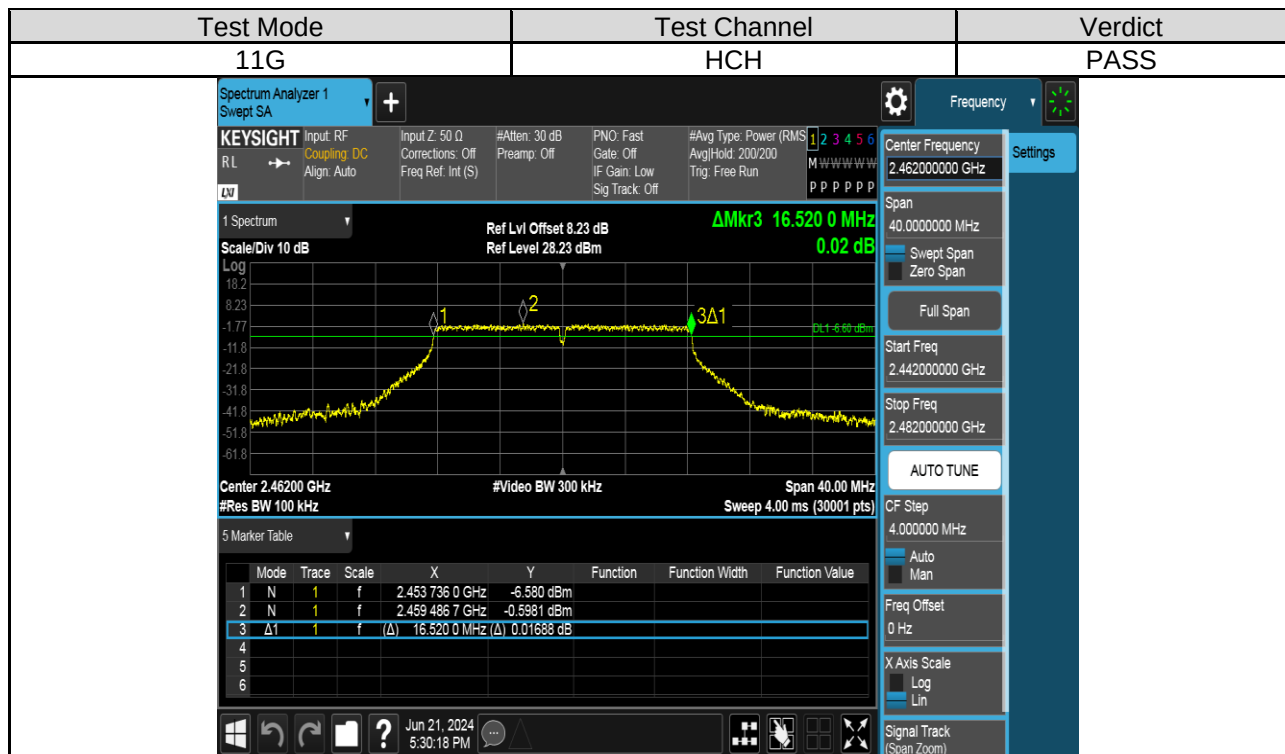
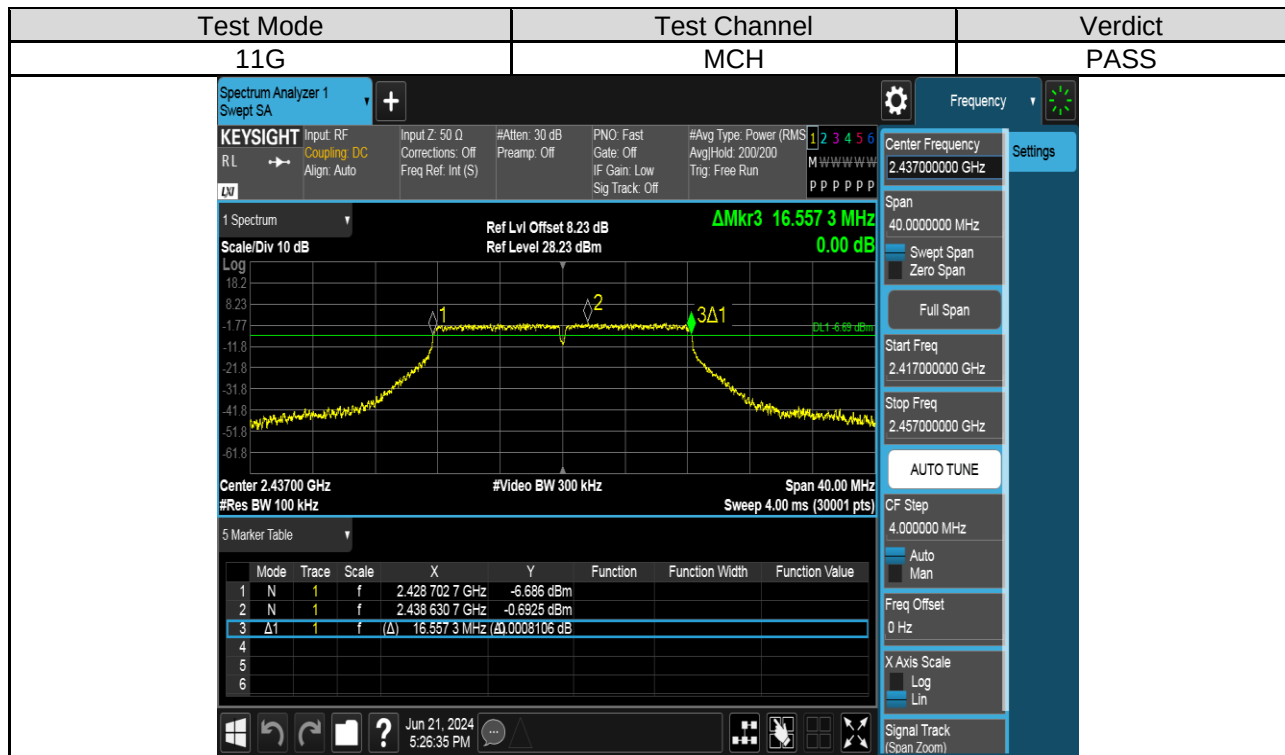
| Test Mode | Test Channel | 6dB bandwidth (MHz) | 99% bandwidth (MHz) | Result |
|-----------|--------------|---------------------|---------------------|--------|
| 11B       | LCH          | 9.0093              | 13.246              | Pass   |
|           | MCH          | 8.5773              | 13.176              | Pass   |
|           | HCH          | 8.5773              | 13.186              | Pass   |
| 11G       | LCH          | 16.5347             | 16.581              | Pass   |
|           | MCH          | 16.5573             | 16.573              | Pass   |
|           | HCH          | 16.5200             | 16.585              | Pass   |
| 11N HT20  | LCH          | 17.7600             | 17.738              | Pass   |
|           | MCH          | 17.7267             | 17.729              | Pass   |
|           | HCH          | 17.7560             | 17.737              | Pass   |
| 11N HT40  | LCH          | 36.4187             | 36.212              | Pass   |
|           | MCH          | 36.3973             | 36.176              | Pass   |
|           | HCH          | 36.4293             | 36.216              | Pass   |

## TEST GRAPHS

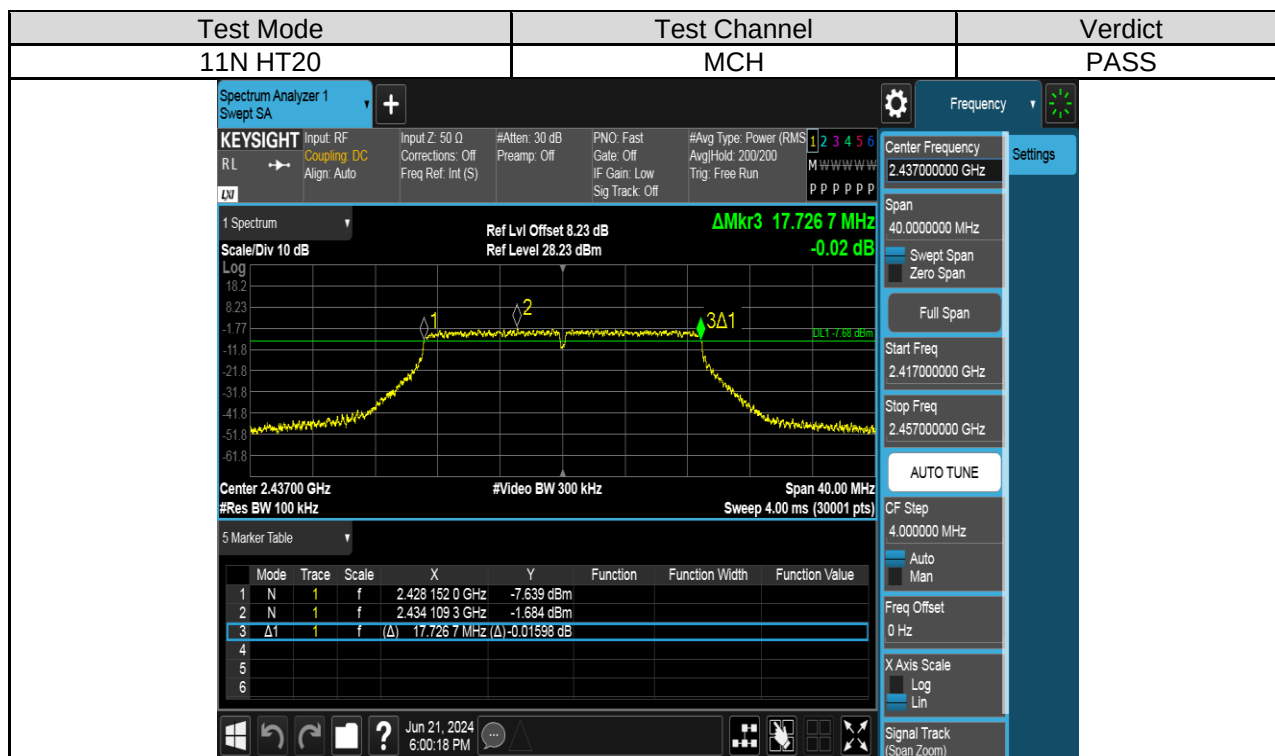
### 6dB Bandwidth

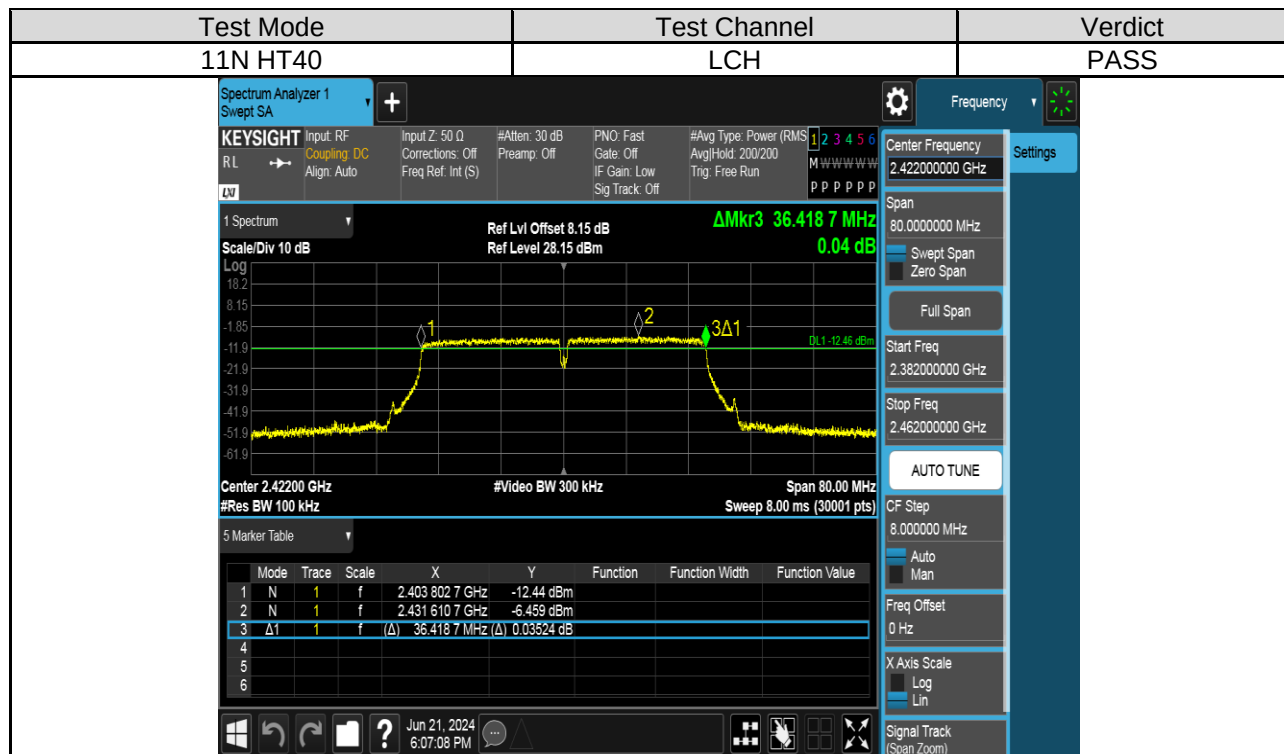
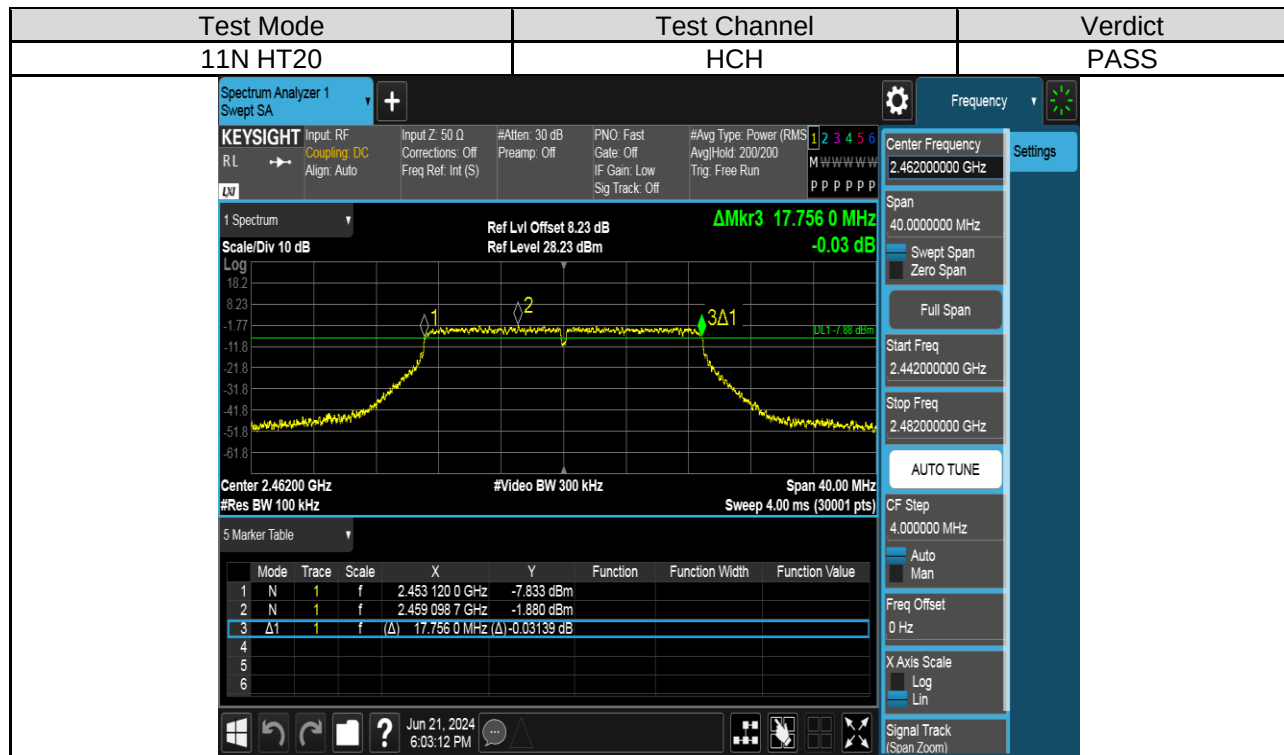


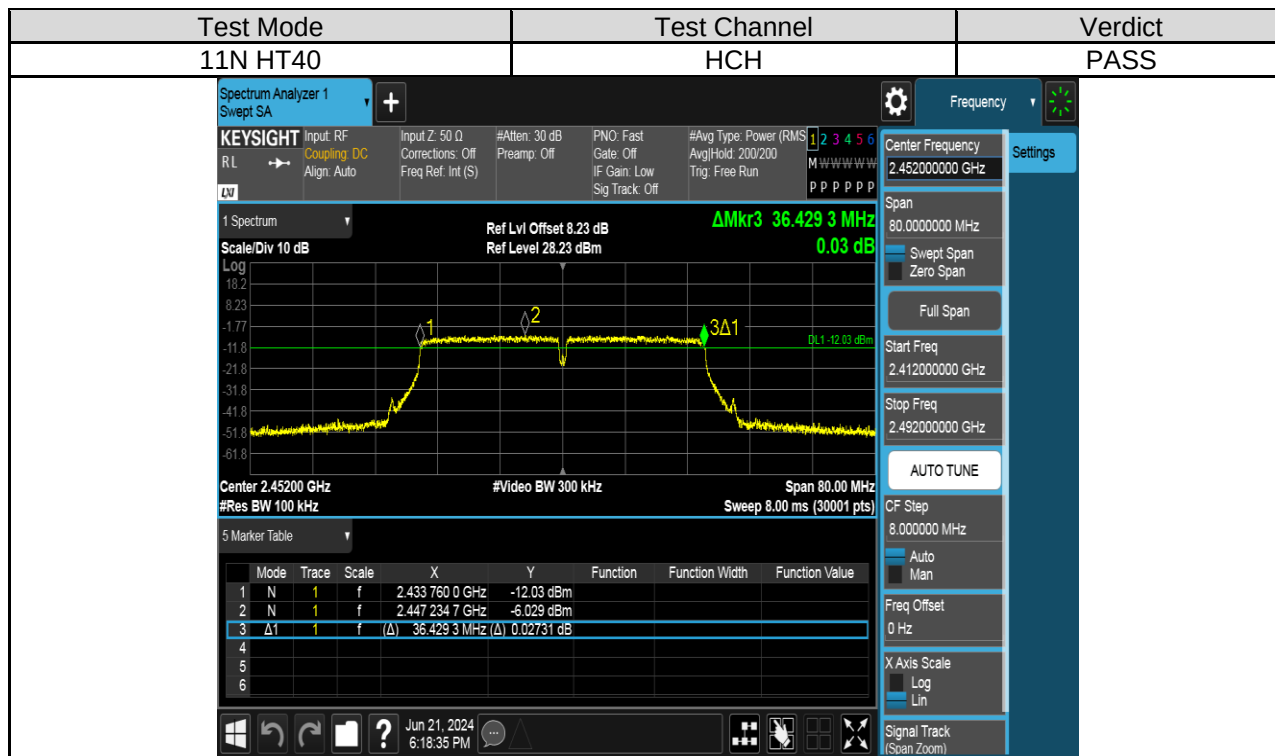
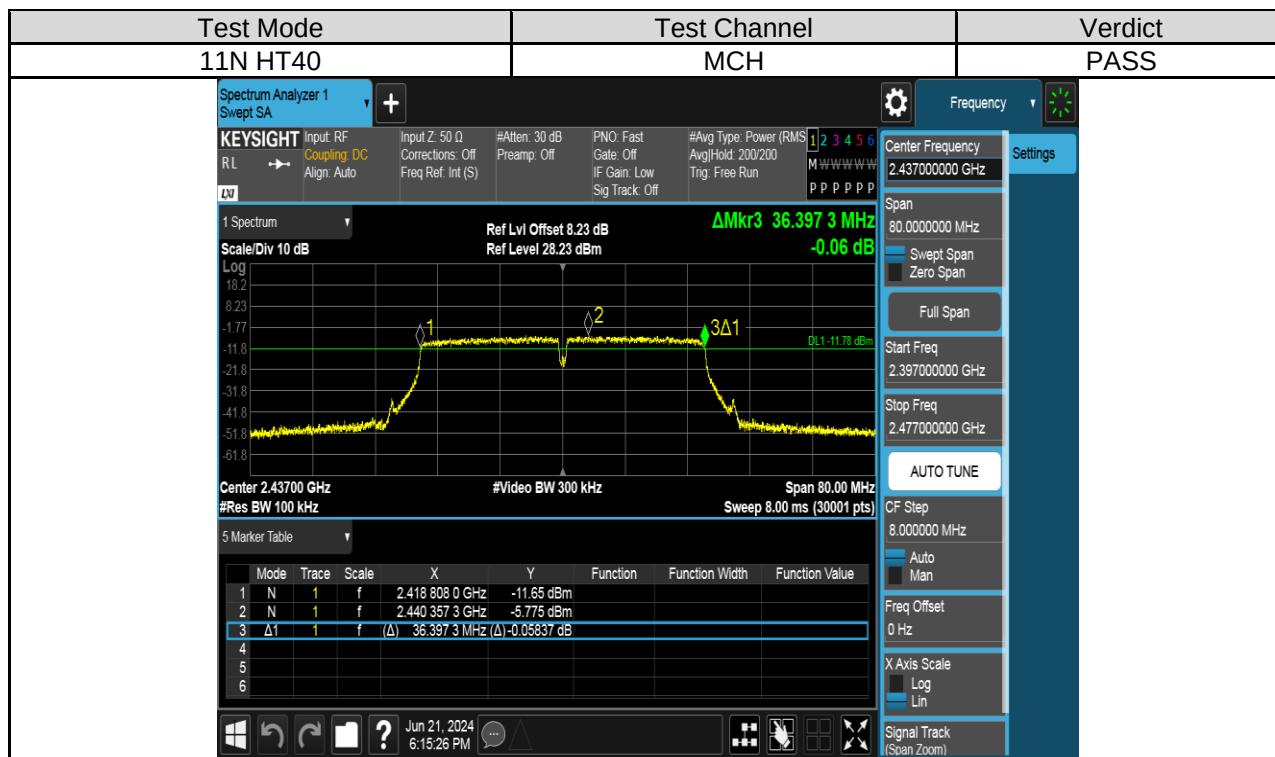






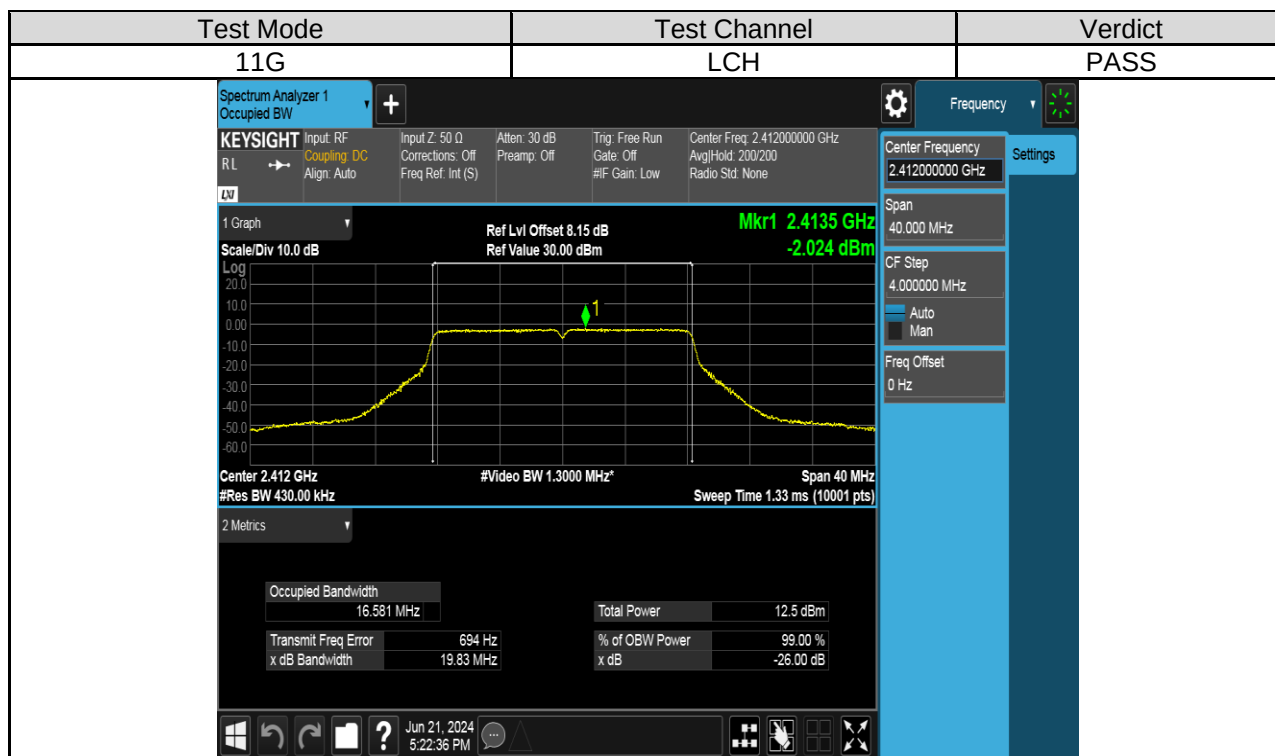


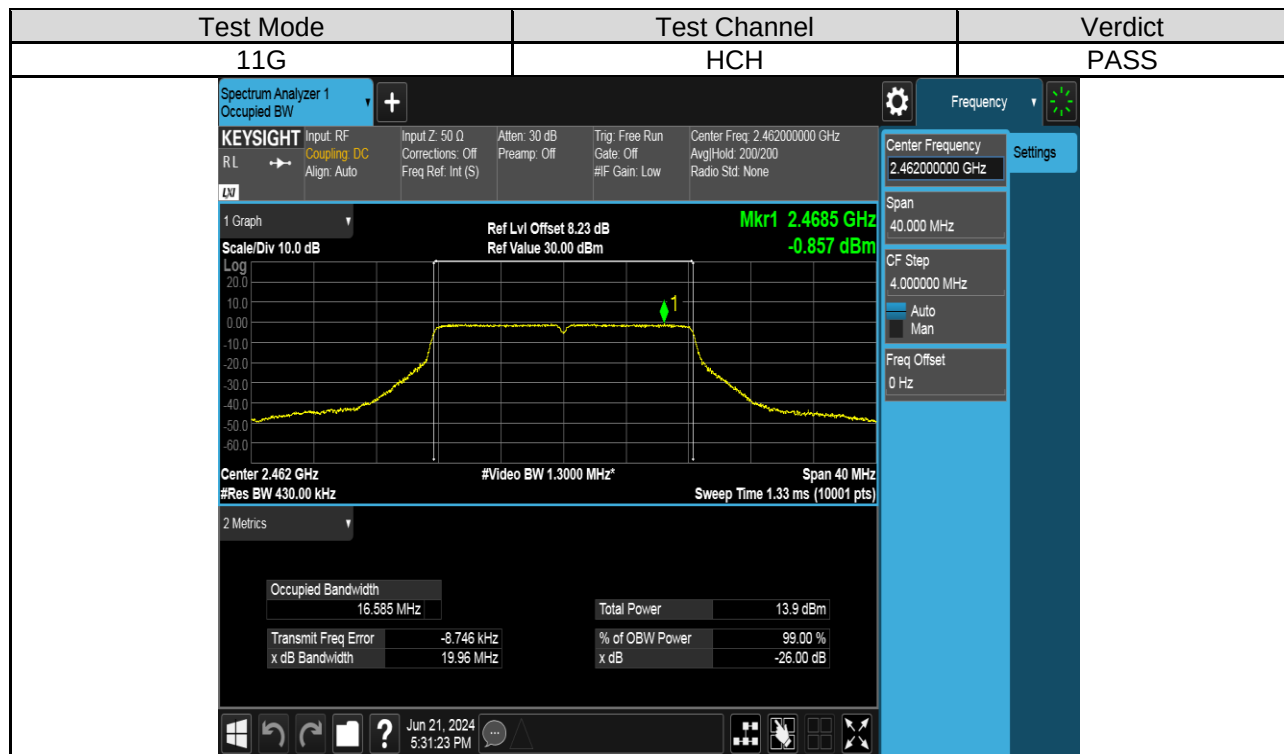
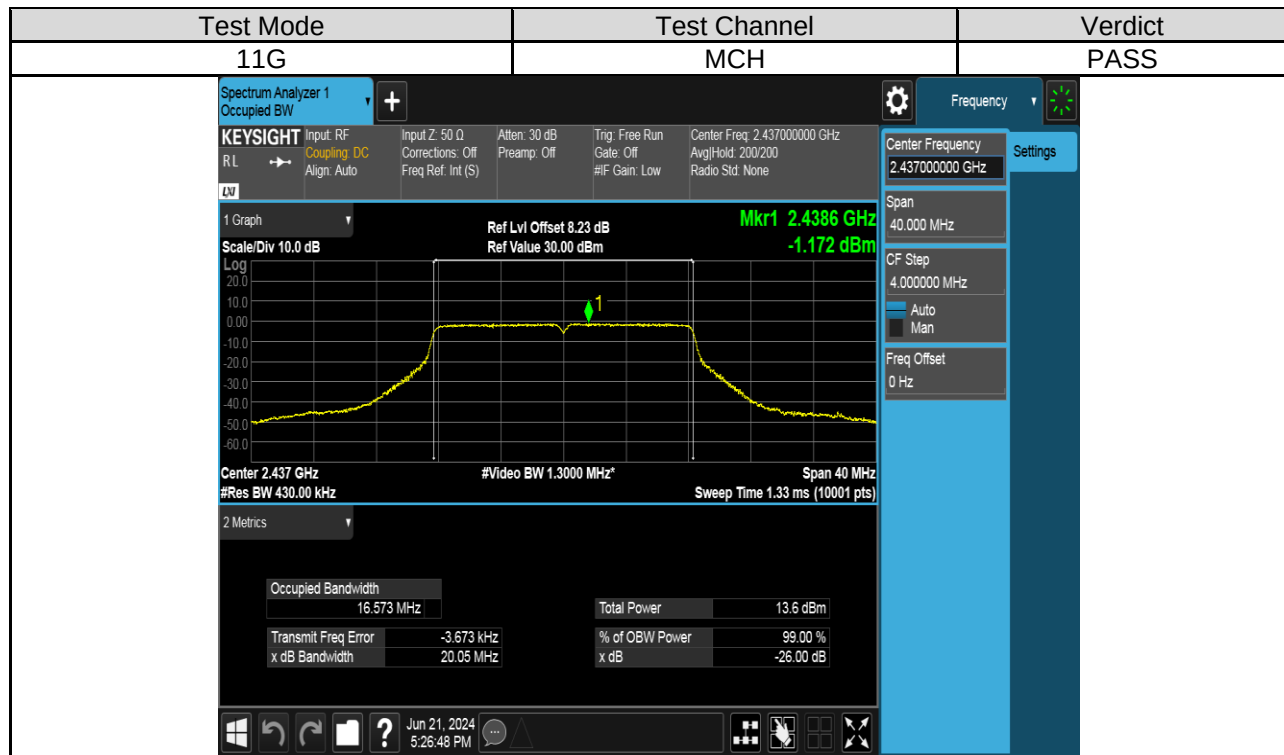


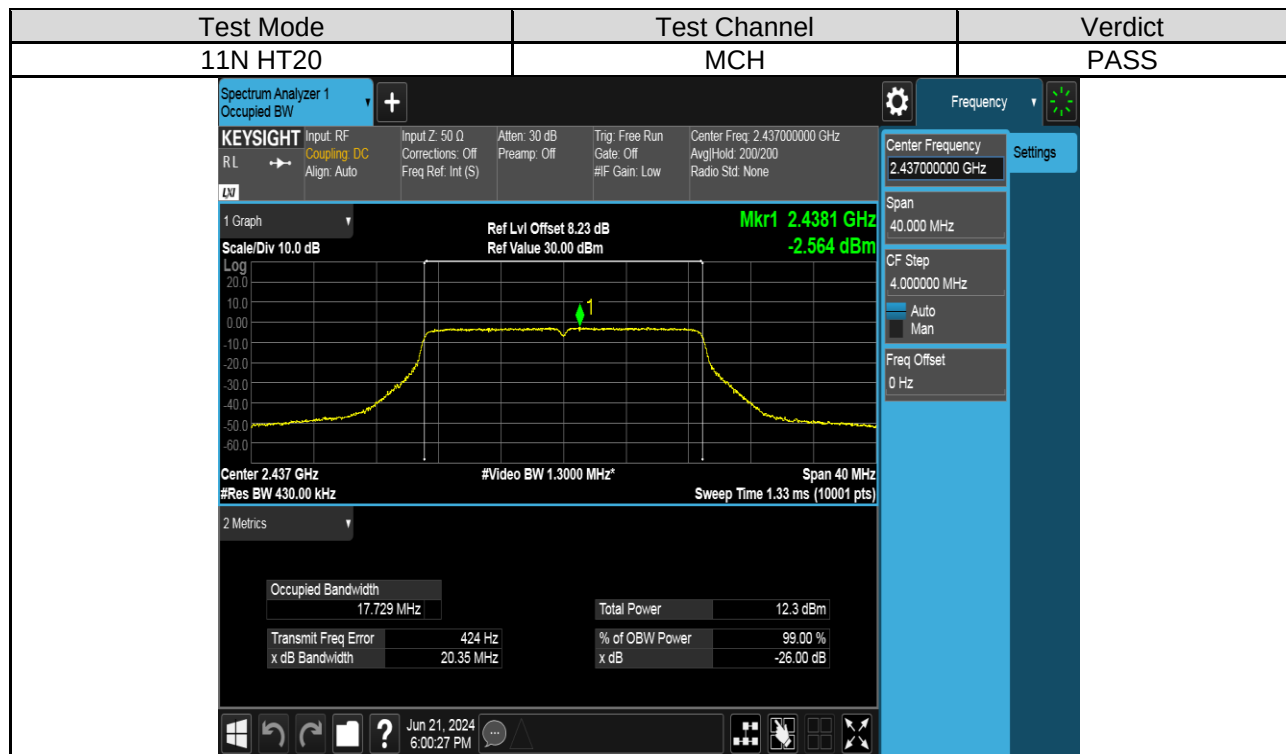
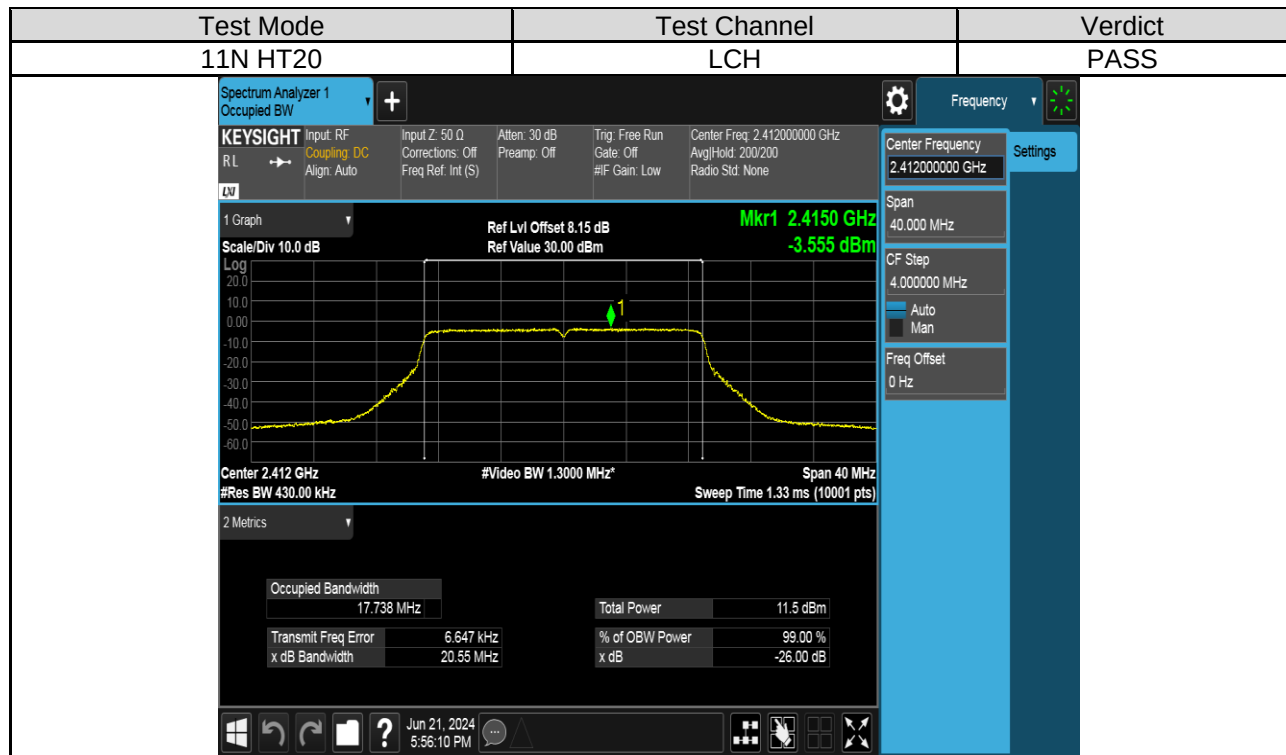


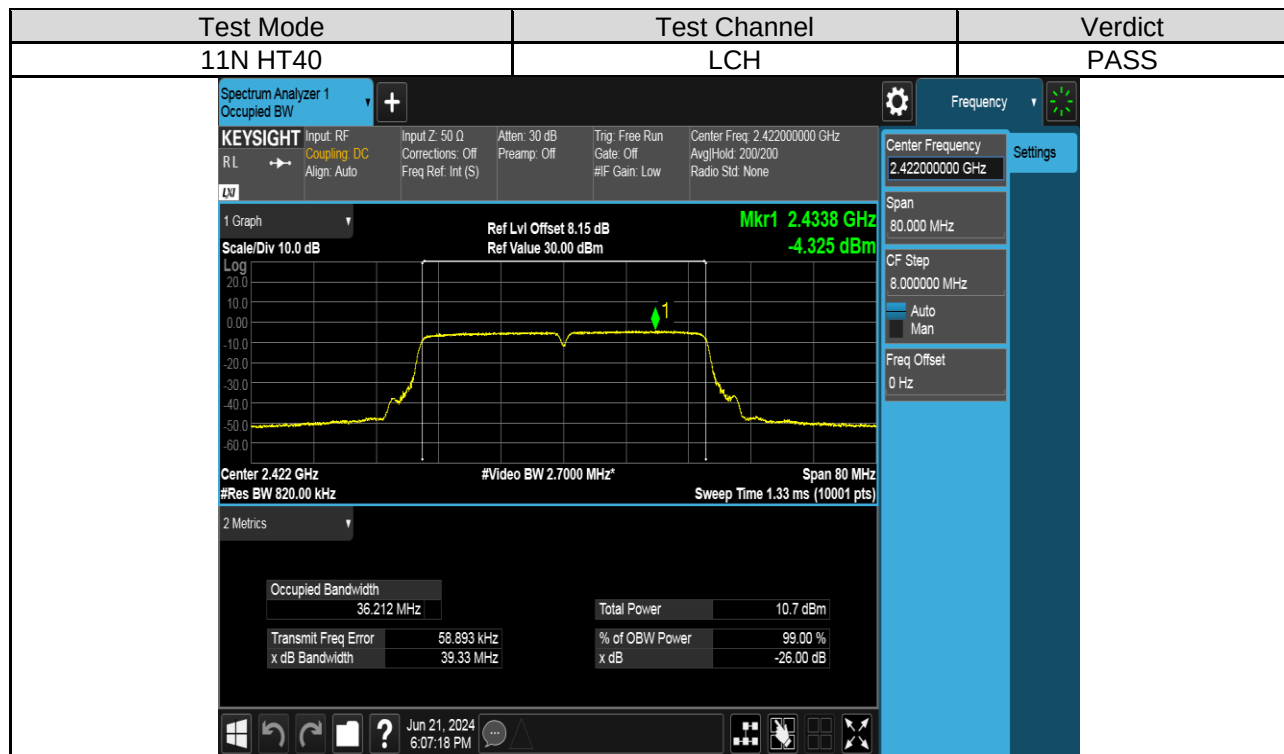
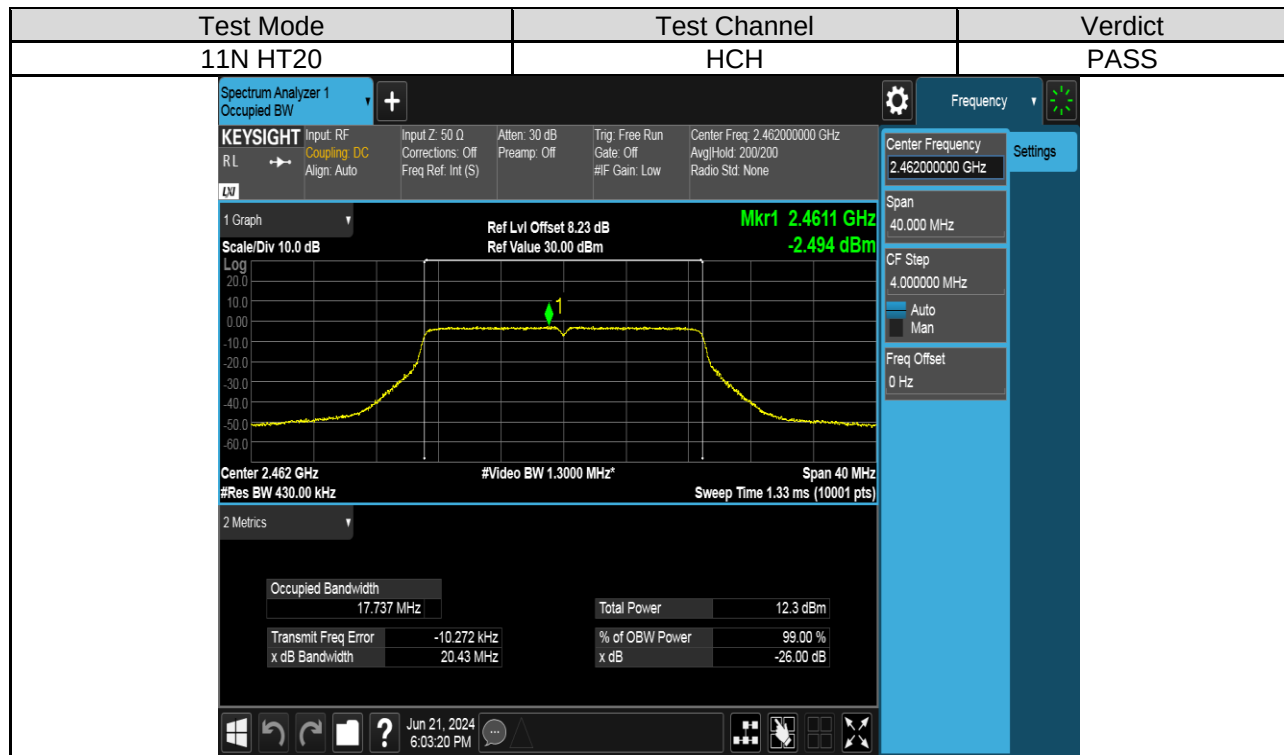
## 99% Bandwidth



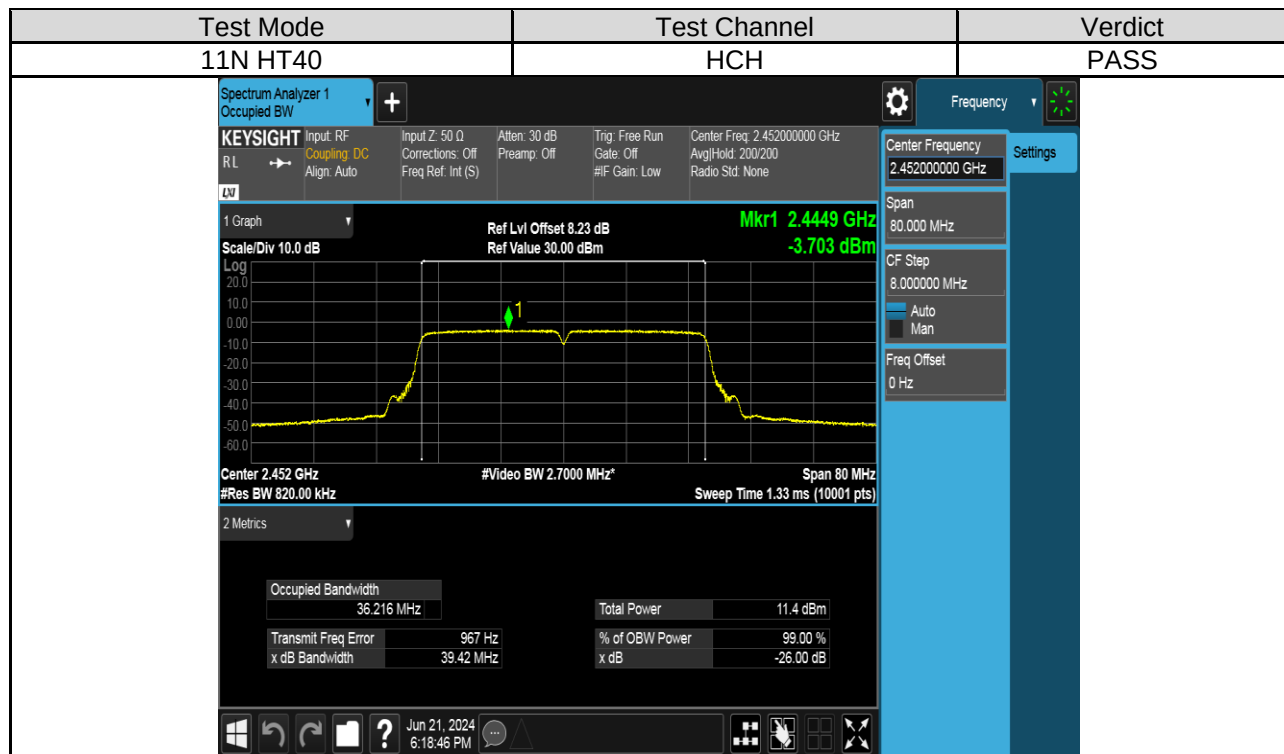
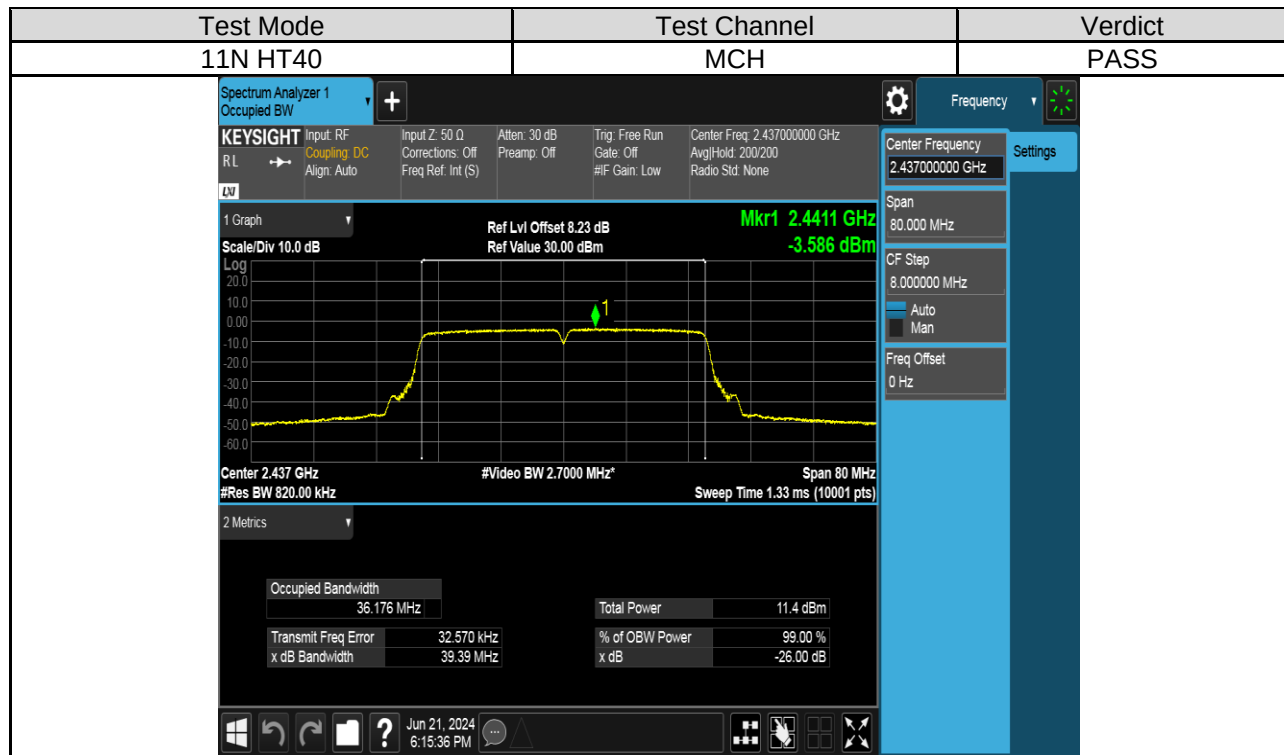












### 6.3. CONDUCTED OUTPUT POWER

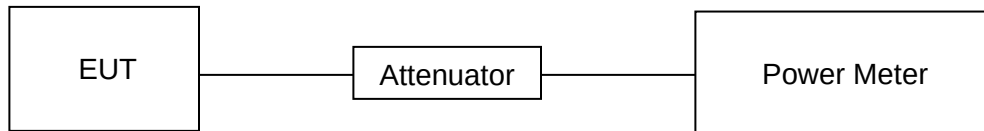
#### LIMITS

| 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

Place the EUT on the table and set it in the transmitting mode.  
Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the Power sensor.  
Measure the power of each channel.  
AVG Detector used for AVG result.

#### TEST SETUP



### TEST ENVIRONMENT

|                     |        |                   |                 |
|---------------------|--------|-------------------|-----------------|
| Temperature         | 22°C   | Relative Humidity | 56%             |
| Atmosphere Pressure | 101kPa | Test Voltage      | AC 120 V, 60 Hz |

### 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          | 15.86                         | 0                 | 15.86                               | 30    |
|           | MCH          | 16.73                         | 0                 | 16.73                               | 30    |
|           | HCH          | 16.98                         | 0                 | 16.98                               | 30    |
| 11G       | LCH          | 12.53                         | 0                 | 12.53                               | 30    |
|           | MCH          | 13.63                         | 0                 | 13.63                               | 30    |
|           | HCH          | 13.82                         | 0                 | 13.82                               | 30    |
| 11N HT20  | LCH          | 11.46                         | 0                 | 11.46                               | 30    |
|           | MCH          | 12.35                         | 0                 | 12.35                               | 30    |
|           | HCH          | 12.29                         | 0                 | 12.29                               | 30    |
| 11N HT40  | LCH          | 10.69                         | 0                 | 10.69                               | 30    |
|           | MCH          | 11.43                         | 0                 | 11.43                               | 30    |
|           | HCH          | 11.45                         | 0                 | 11.45                               | 30    |

## 6.4. 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

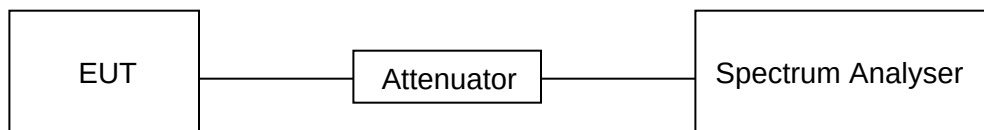
Refer to FCC KDB 558074, connect the UUT to the spectrum analyser and use the following settings:

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



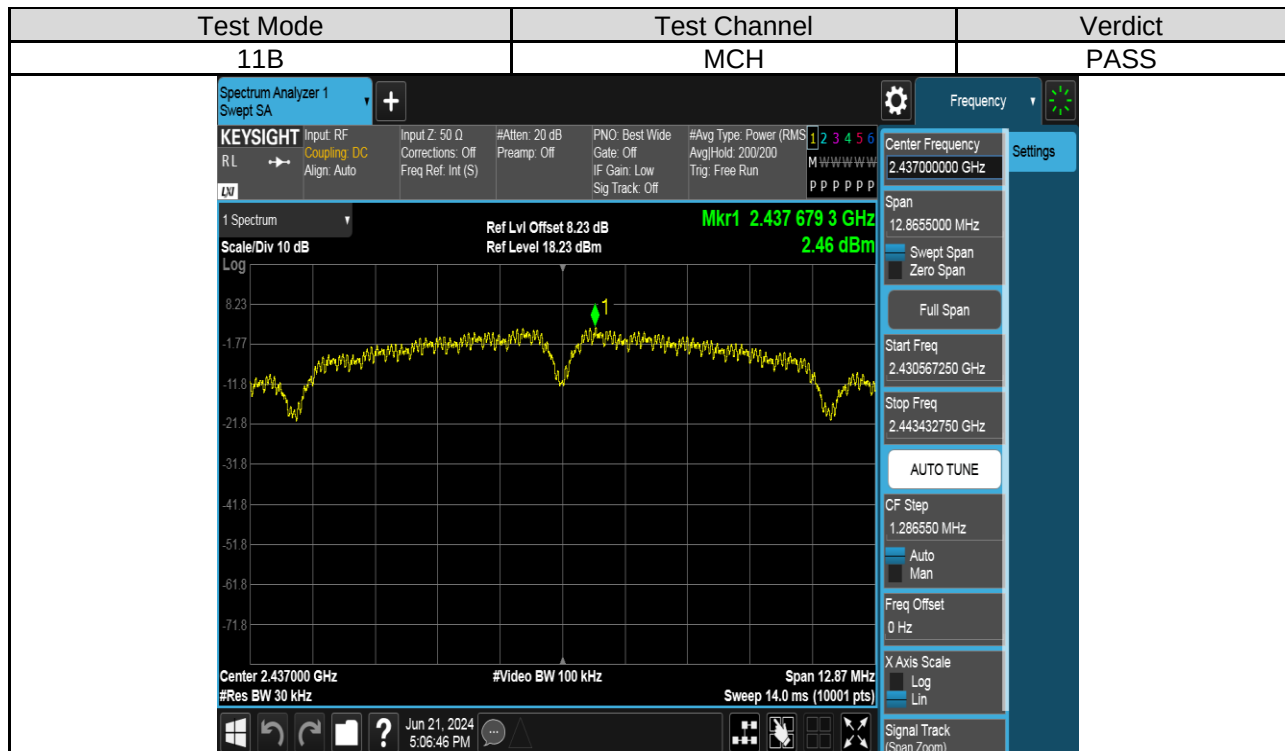
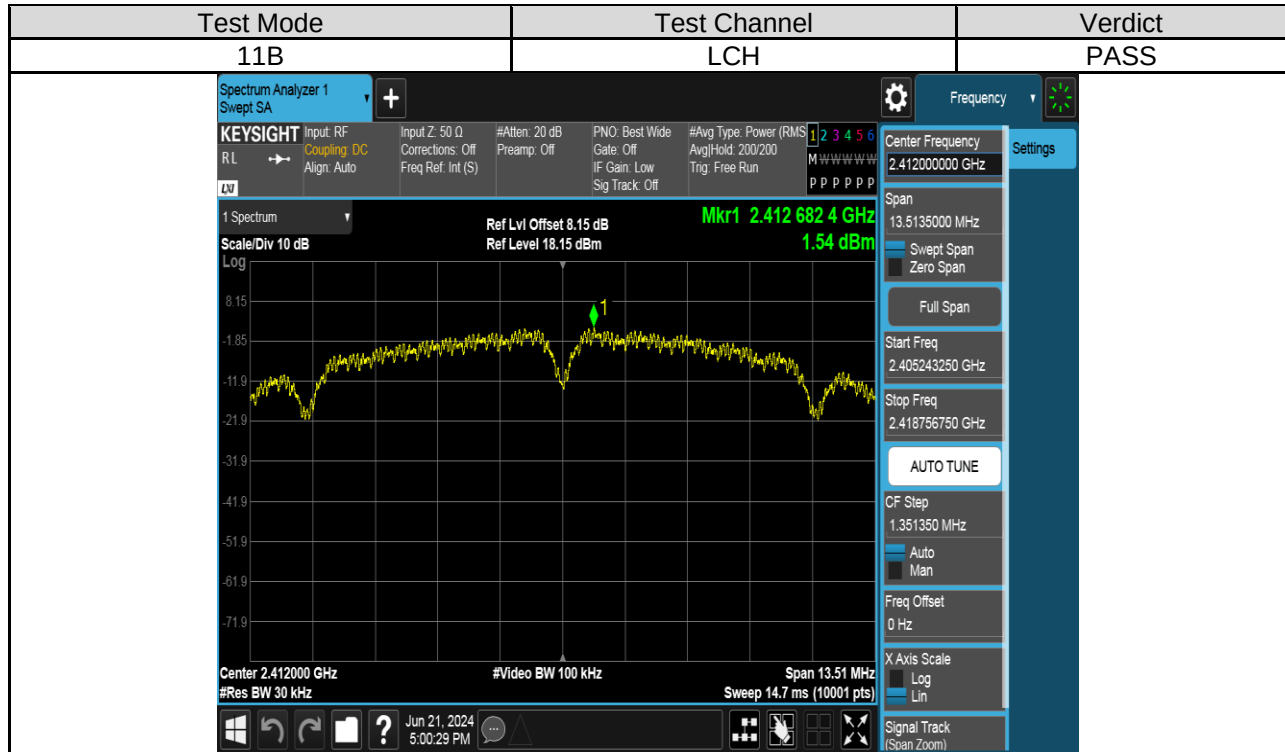
**TEST ENVIRONMENT**

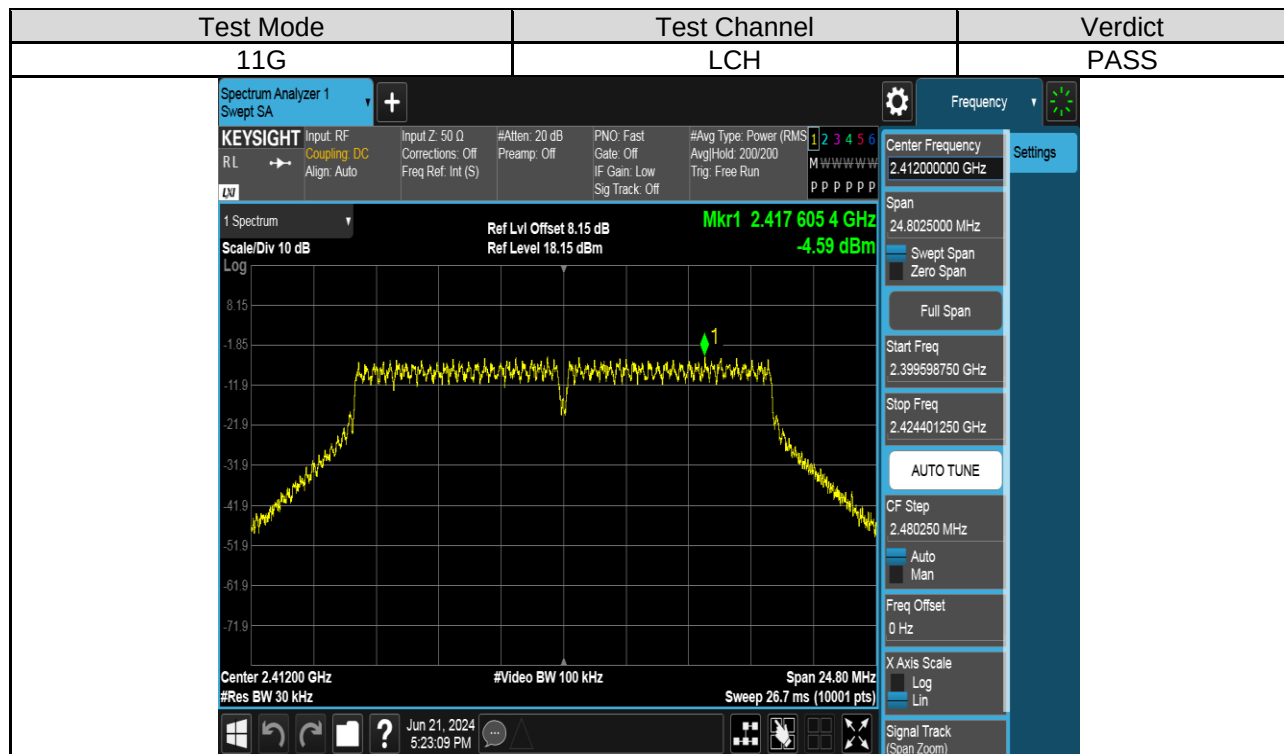
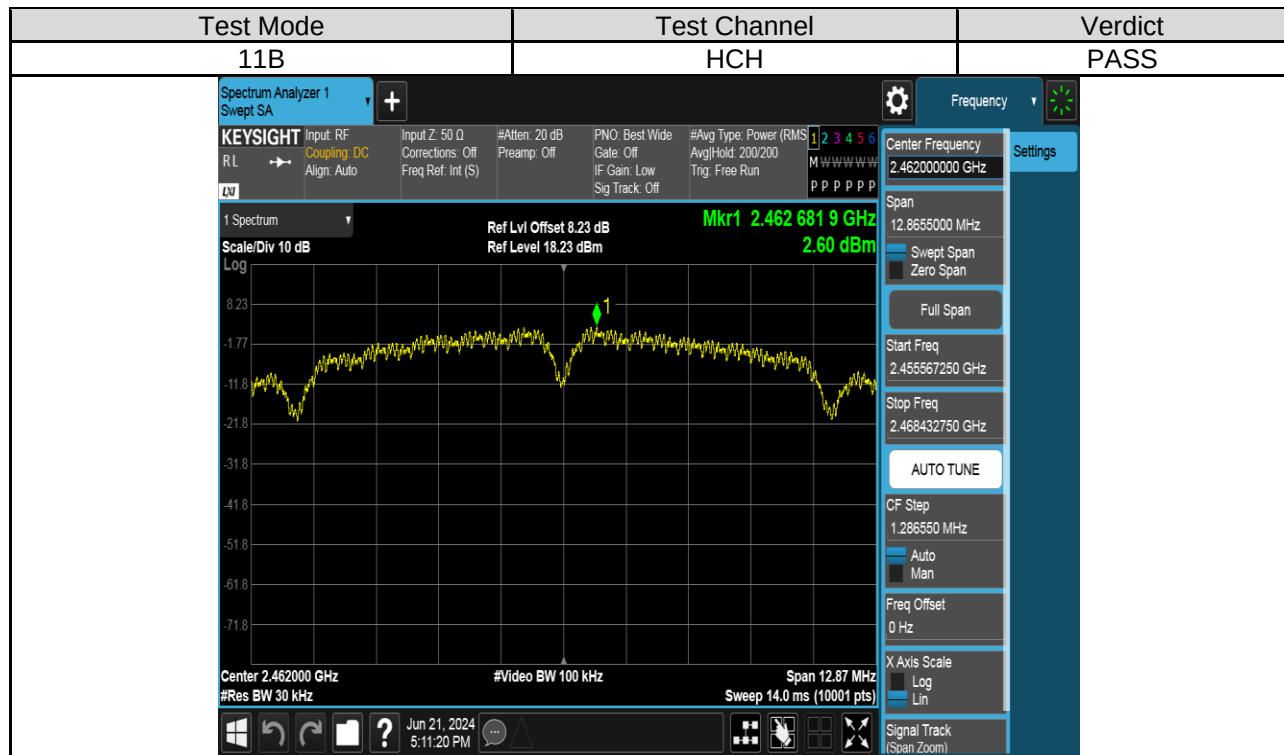
|                     |        |                   |                 |
|---------------------|--------|-------------------|-----------------|
| Temperature         | 22°C   | Relative Humidity | 56%             |
| Atmosphere Pressure | 101kPa | Test Voltage      | AC 120 V, 60 Hz |

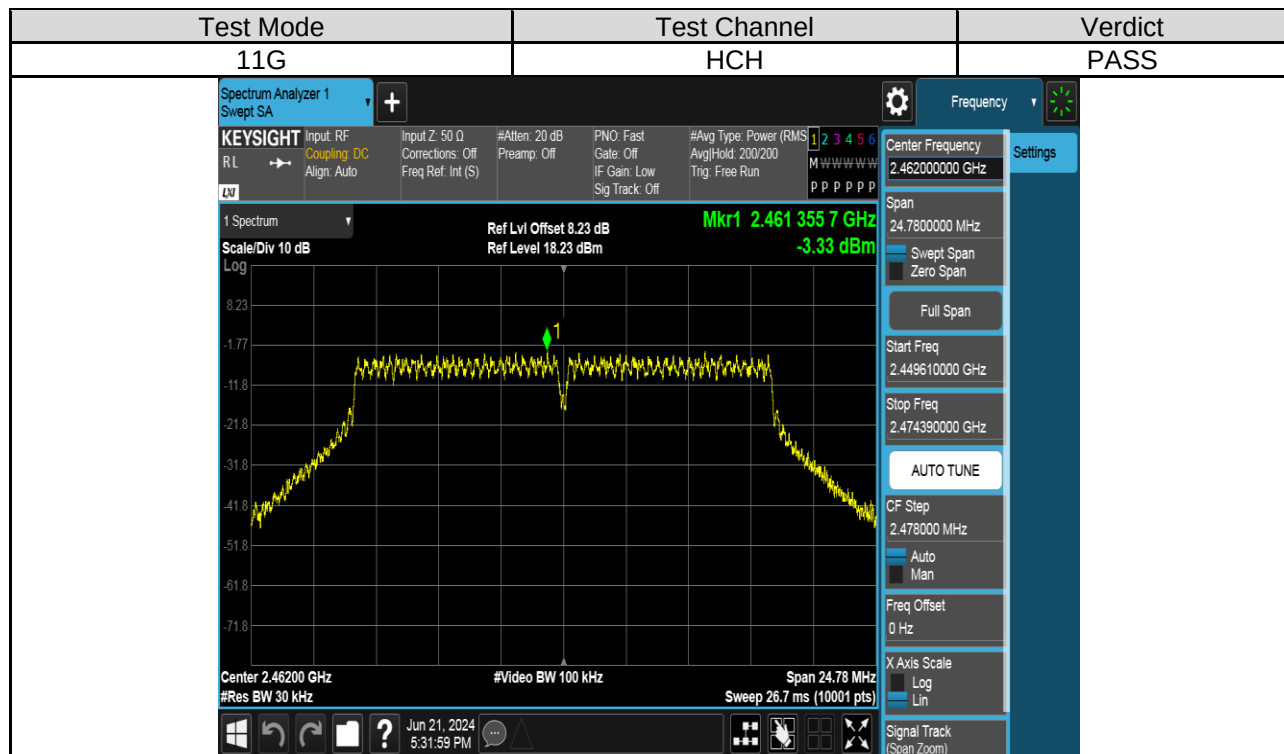
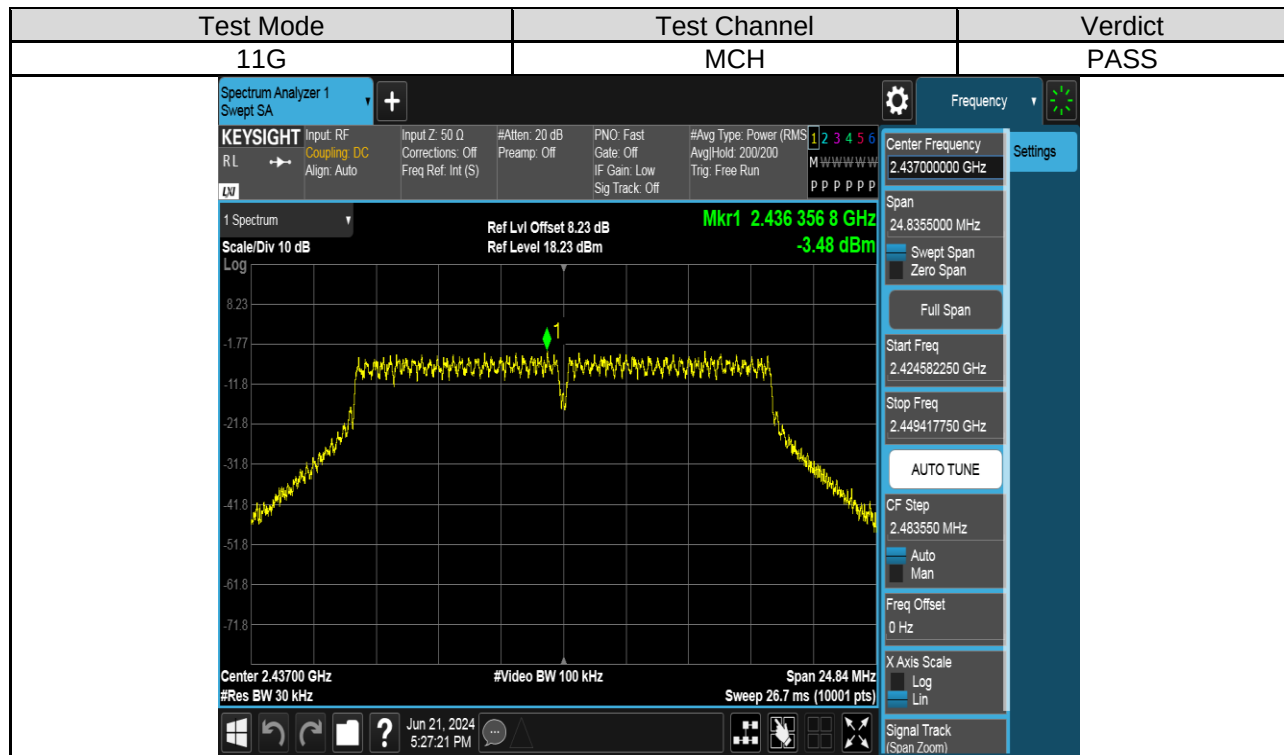
**TEST RESULTS TABLE**

| Test Mode | Test Channel | Maximum Peak power spectral density (dBm/30kHz) | Result |
|-----------|--------------|-------------------------------------------------|--------|
| 11B       | LCH          | 1.54                                            | Pass   |
|           | MCH          | 2.46                                            | Pass   |
|           | HCH          | 2.60                                            | Pass   |
| 11G       | LCH          | -4.59                                           | Pass   |
|           | MCH          | -3.48                                           | Pass   |
|           | HCH          | -3.33                                           | Pass   |
| 11N HT20  | LCH          | -5.02                                           | Pass   |
|           | MCH          | -4.20                                           | Pass   |
|           | HCH          | -4.18                                           | Pass   |
| 11N HT40  | LCH          | -8.98                                           | Pass   |
|           | MCH          | -8.31                                           | Pass   |
|           | HCH          | -8.48                                           | Pass   |

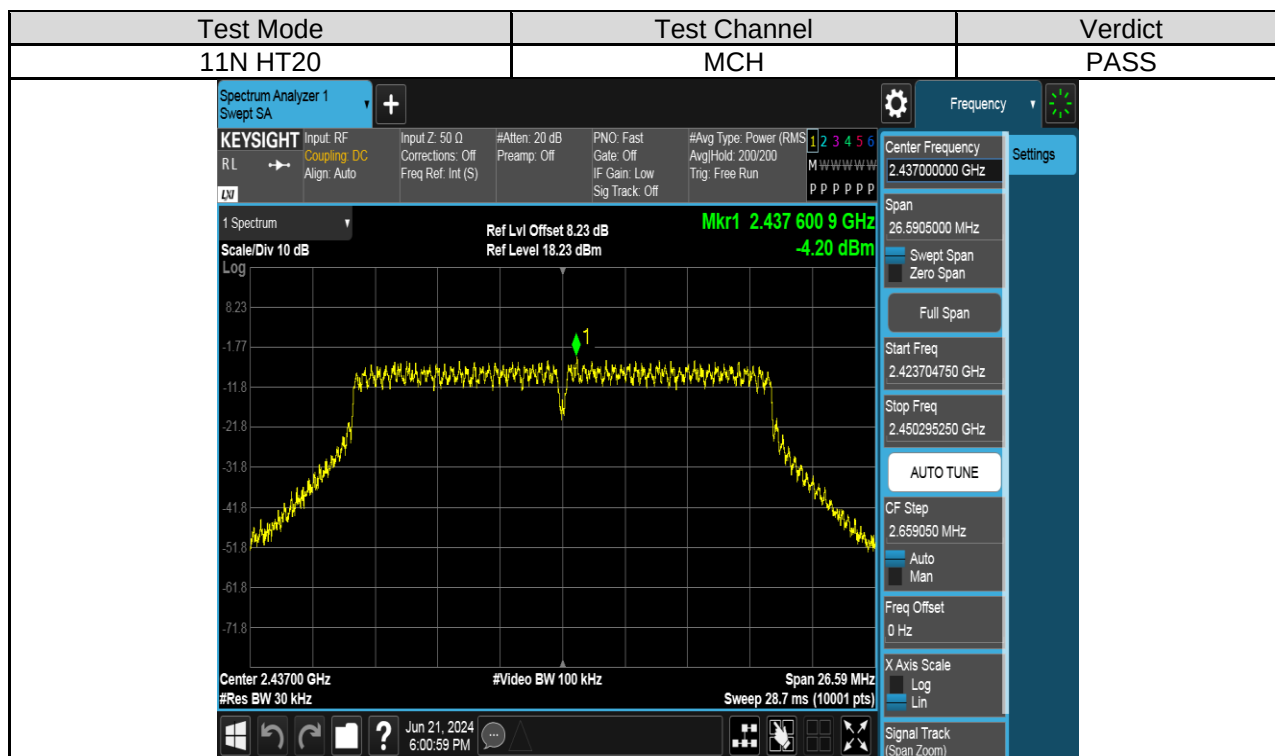
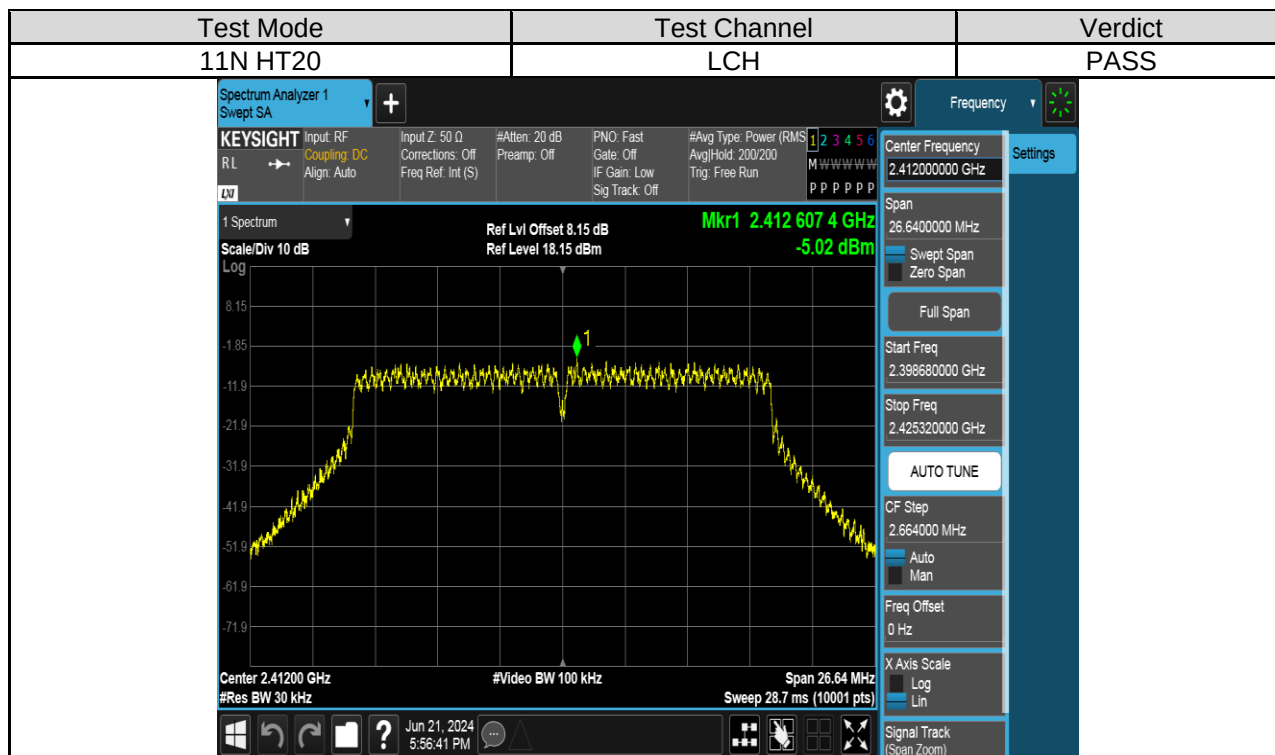
### TEST GRAPHS

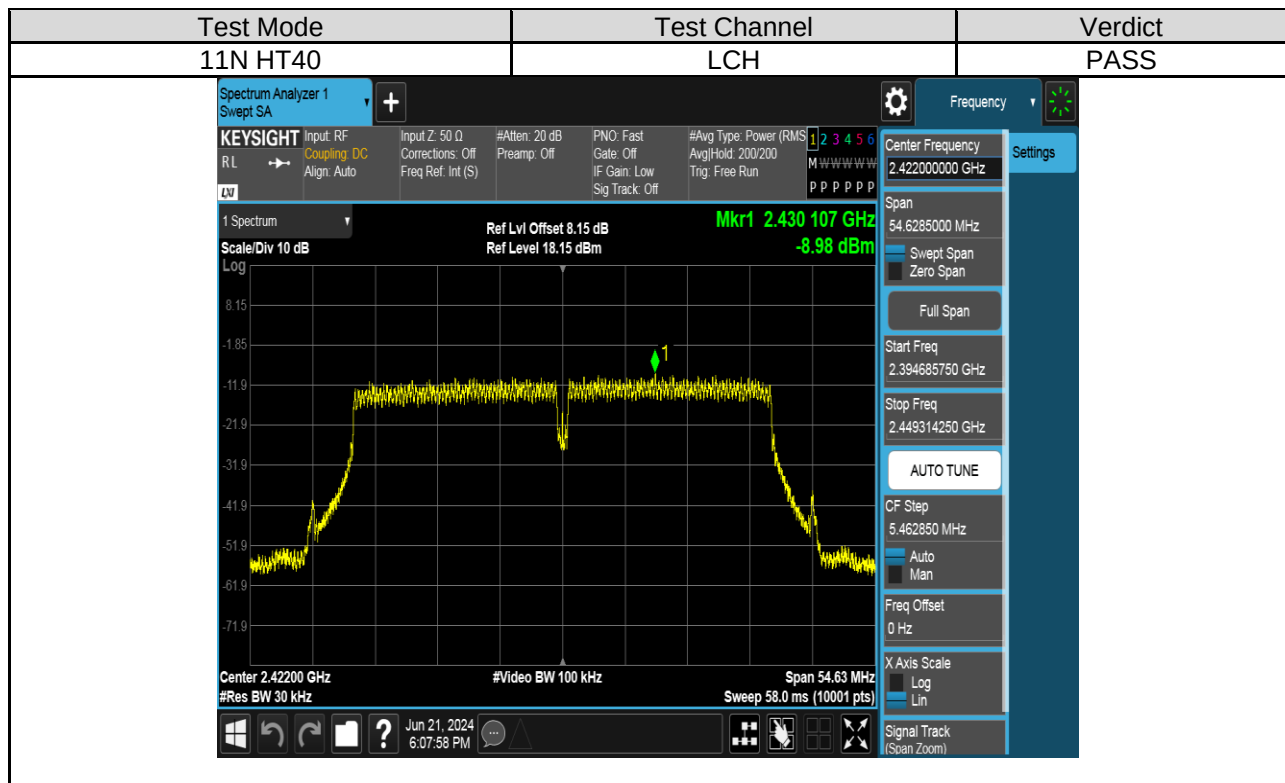
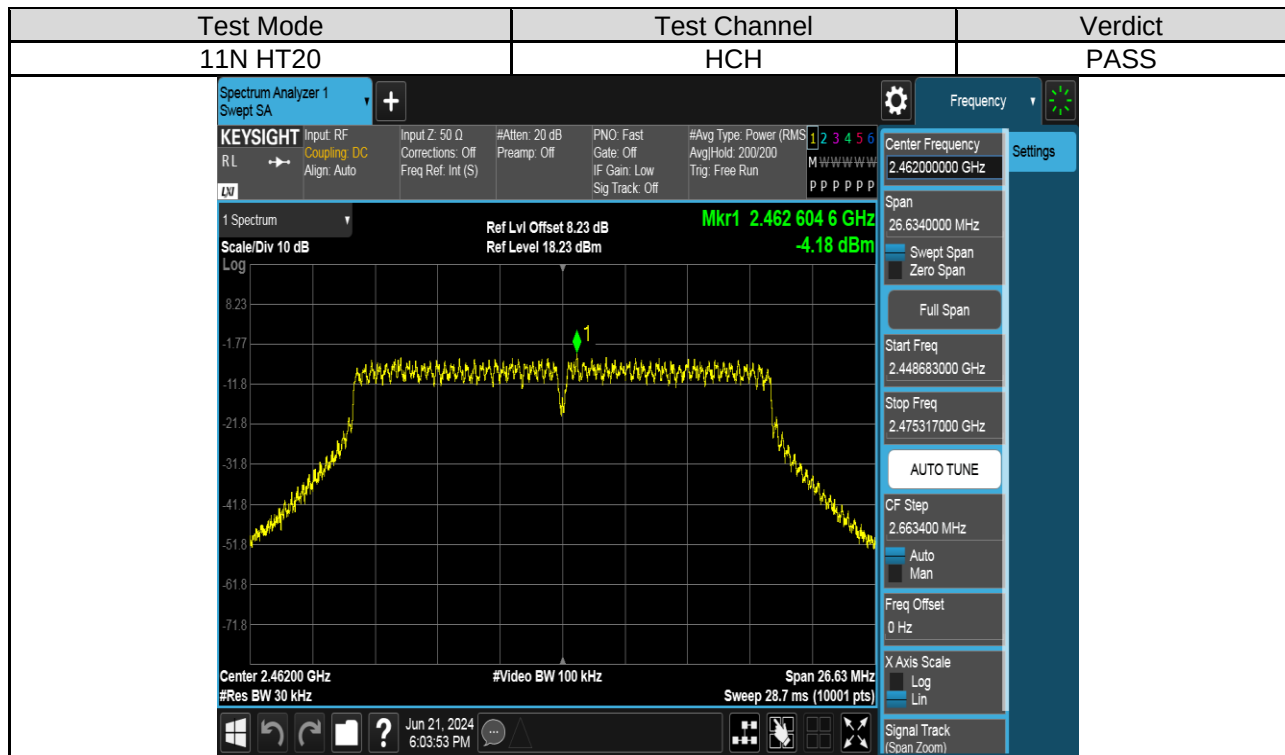


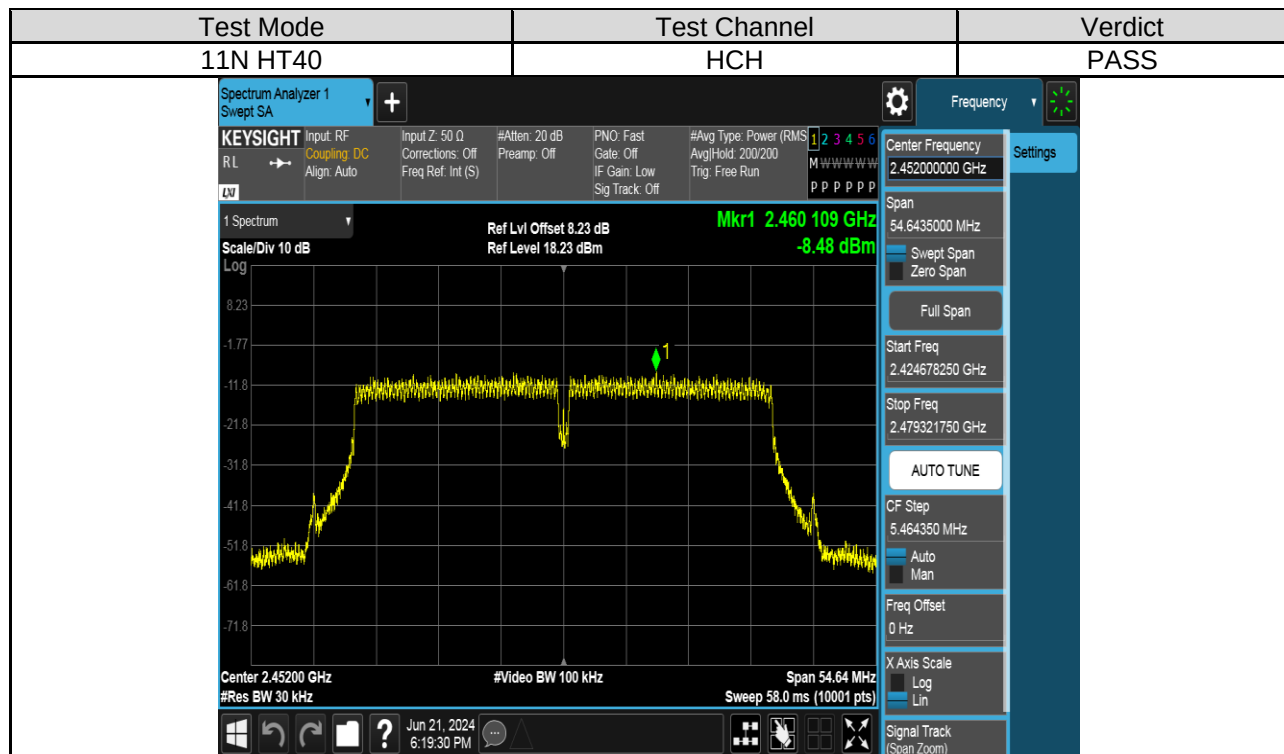












## 6.5. CONDUCTED BANDEDGE AND SPURIOUS EMISSIONS

### 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:

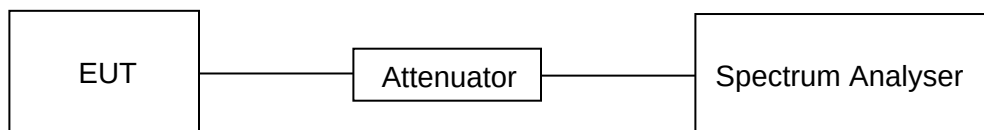
|                  |                                                |
|------------------|------------------------------------------------|
| Center Frequency | The centre frequency of the channel under test |
| Detector         | Peak                                           |
| RBW              | 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 | $\geq \text{span/RBW}$                                                        |
| 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 120 V, 60 Hz |

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

| Test Mode | Test Channel | Result[dBm] |
|-----------|--------------|-------------|
| 11B       | LCH          | 6.68        |
|           | MCH          | 7.56        |
|           | HCH          | 7.72        |
| 11G       | LCH          | -1.85       |
|           | MCH          | -0.75       |
|           | HCH          | -0.47       |
| 11N HT20  | LCH          | -2.64       |
|           | MCH          | -1.70       |
|           | HCH          | -1.48       |
| 11N HT40  | LCH          | -6.33       |
|           | MCH          | -5.74       |
|           | HCH          | -5.90       |

# TEST GRAPHS

