

# FCC 47 CFR PART 15 SUBPART C TEST REPORT

For

MotiliCap Data Recorder

**MODEL NUMBER: MO-US-8001** 

**PROJECT NUMBER: 4791435852** 

REPORT NUMBER: 4791435852-2

FCC ID: 2ATXZMO8001

**ISSUE DATE: Jan. 06, 2025** 

Prepared for

AnX Robotica Corp.

Prepared by

UL-CCIC COMPANY LIMITED
No. 2, Chengwan Road, Suzhou Industrial Park, Suzhou 215122, China

Tel: +86 512-6808 6400 Fax: +86 512-6808 4099 Website: www.ul.com



Report No.: 4791435852 Page 2 of 94

# **Revision History**

| Rev. | Issue Date | Revisions     | Revised By |
|------|------------|---------------|------------|
| V0   | 01/06/2025 | Initial Issue |            |



# **TABLE OF CONTENTS**

| 1. AT | TESTATION OF TEST RESULTS                 | 4  |
|-------|-------------------------------------------|----|
| 2. TE | ST METHODOLOGY                            | 6  |
| 3. FA | CILITIES AND ACCREDITATION                | 6  |
| 4. CA | LIBRATION AND UNCERTAINTY                 | 7  |
| 4.1.  | MEASURING INSTRUMENT CALIBRATION          | 7  |
| 4.2.  | MEASUREMENT UNCERTAINTY                   | 7  |
| 5. EG | QUIPMENT UNDER TEST                       | 8  |
| 5.1.  | DESCRIPTION OF EUT                        | 8  |
| 5.2.  | MAXIMUM OUTPUT POWER                      | 9  |
| 5.3.  | CHANNEL LIST                              | 9  |
| 5.4.  | TEST CHANNEL CONFIGURATION                | 9  |
| 5.5.  | THE WORSE CASE POWER SETTING PARAMETER    | 9  |
| 5.6.  | DESCRIPTION OF AVAILABLE ANTENNAS         | 10 |
| 5.7.  | THE WORSE CASE CONFIGURATIONS             | 10 |
| 5.8.  | TEST ENVIRONMENT                          | 10 |
| 5.9.  | DESCRIPTION OF TEST SETUP                 | 11 |
| 5.10. | MEASURING INSTRUMENT AND SOFTWARE USED    | 13 |
| 6. ME | EASUREMENT METHODS                        | 14 |
| 7. AN | ITENNA PORT TEST RESULTS                  | 15 |
| 7.1.  | ON TIME AND DUTY CYCLE                    | 15 |
| 7.2.  | 6 dB BANDWIDTH                            | 17 |
| 7.3.  | CONDUCTED OUTPUT POWER                    | 22 |
| 7.4.  | POWER SPECTRAL DENSITY                    | 24 |
| 7.5.  | CONDUCTED BANDEDGE AND SPURIOUS EMISSIONS | 29 |
| 8. RA | ADIATED TEST RESULTS                      | 44 |
| 8.1.  | LIMITS AND PROCEDURE                      | 44 |
| 8.2.  | TEST ENVIRONMENT                          | 50 |
| 8.3.  | RESTRICTED BANDEDGE                       | 50 |
| 8.4.  | SPURIOUS EMISSIONS                        | 59 |
| 9. AN | ITENNA REQUIREMENTS                       | 94 |



Page 4 of 94

# 1. ATTESTATION OF TEST RESULTS

**Applicant Information** 

Company Name: AnX Robotica Corp.

Address: 6010 W. Spring Creek Pkwy Plano, TX 75024 USA

**Manufacturer Information** 

Company Name: Ankon Medical Technologies (Shanghai) Co., LTD.

Address: Floor 1, No. 435 Chuangiao Road, Pilot Free Trade Zone, Pudong

New Area, Shanghai 201206, China

**Factory Information** 

Company Name: Ankon Medical Technologies (Shanghai) Co., LTD.

Address: Floor 1, No. 435 Chuanqiao Road, Pilot Free Trade Zone, Pudong

New Area, Shanghai 201206, China

**EUT Description** 

Product Name: MotiliCap Data Recorder

Model Name: MO-US-8001

Series Model Name: /
Model Difference: /

Sample Number: 7903353

Data of Receipt Sample: Dec. 05, 2024

Test Date: Dec. 05, 2024~ Jan. 05, 2025

**APPLICABLE STANDARDS** 

STANDARD TEST RESULTS

CFR 47 Part 15 Subpart C PASS



Page 5 of 94

| Summary of Test Results |                                              |                                            |              |  |
|-------------------------|----------------------------------------------|--------------------------------------------|--------------|--|
| Clause                  | Test Items                                   | FCC Rules                                  | Test Results |  |
| 1                       | 6 dB Bandwidth and<br>99% Occupied Bandwidth | FCC 15.247 (a) (2)                         | PASS         |  |
| 2                       | Conducted Power                              | FCC 15.247 (b) (3)                         | PASS         |  |
| 3                       | Power Spectral Density                       | FCC 15.247 (e)                             | PASS         |  |
| 4                       | Conducted Band edge And Spurious emission    | FCC 15.247 (d)                             | PASS         |  |
| 5                       | Radiated Band edges and Spurious emission    | FCC 15.247 (d)<br>FCC 15.209<br>FCC 15.205 | PASS         |  |
| 6                       | Conducted Emission Test for AC<br>Power Port | FCC 15.207                                 | PASS         |  |
| 7                       | Antenna Requirement                          | FCC 15.203                                 | PASS         |  |

Note: The measurement result for the sample received is < Pass > according to < ANSI C63.10-2013, FCC CFR 47 Part 2, FCC CFR 47 Part 15C > when < Simple Acceptance > decision rule is applied.

| Prepared By:   | Reviewed By: |
|----------------|--------------|
| Tom Tang       | Emily Waney  |
| Tom Tang       | Emily Wang   |
| Authorized By: |              |
| Kevin Shen     |              |



Page 6 of 94

#### 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, FCC 47 CFR Part 2, FCC 47 CFR Part 15, ANSI C63.10-2013.

# 3. FACILITIES AND ACCREDITATION

| Accreditation<br>Certificate | A2LA (Certificate No.: 4829.01)  UL-CCIC COMPANY LIMITED has been assessed and proved to be in compliance with A2LA.  FCC (FCC Designation No.: CN1247)  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.  IC (IC Designation No.: 25056; CAB No.: CN0073)  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. |
|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

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.



Page 7 of 94

# 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                                                                                           |
| DTS Bandwidth                                                          | 1.9%                                                                                            |
| Maximum Conducted Output Power                                         | 1.3dB                                                                                           |
| Maximum Power Spectral Density Level                                   | 1.5dB                                                                                           |
| Band-edge Compliance                                                   | 1.9%                                                                                            |
| Unwanted Emissions in Non-restricted Freq Bands                        | 9kHz-30MHz: ±0.90dB<br>30MHz-1GHz: ±1.5 dB<br>1GHz-12.75GHz: ±1.9dB<br>12.75GHz-26.5GHz: ±2.1dB |
| Radiation Emission test (include Fundamental emission) (9kHz-30MHz)    | 3.4dB                                                                                           |
| Radiation Emission test (include Fundamental emission) (30MHz-1GHz)    | 3.4dB                                                                                           |
| Radiation Emission test (1GHz to 26GHz) (include Fundamental emission) | 3.5dB (1GHz-18GHz)                                                                              |
| Note: This uncertainty represents an expanded unc                      | 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.



Report No.: 4791435852 Page 8 of 94

# 5. EQUIPMENT UNDER TEST

# 5.1. DESCRIPTION OF EUT

| Equipment:                | MotiliCap Data Recorder                                                              |                |  |
|---------------------------|--------------------------------------------------------------------------------------|----------------|--|
| Model Name:               | MO-US-8001                                                                           |                |  |
| Technology:               | Bluetooth - Low Ener                                                                 | ду             |  |
| Transmit Frequency Range: | 2402 MHz ~ 2480 MHz                                                                  |                |  |
| Modulation:               | GFSK                                                                                 |                |  |
| Data Rate:                | LE 1M                                                                                | 1 Mbps         |  |
| Dala Kale.                | LE 2M                                                                                | 2 Mbps         |  |
| Test Software of EUT:     | IPOP V4.1 (manufact                                                                  | turer declare) |  |
| Antenna Type:             | Chip Antenna                                                                         |                |  |
|                           | 4.3 dBi                                                                              |                |  |
| Antenna Gain:             | Note: This data is provided by customer and our lab isn't responsible for this data. |                |  |



Page 9 of 94

# **5.2. MAXIMUM OUTPUT POWER**

| Bluetooth Mode | Frequency (MHz) | Channel Number | Max Output Power(dBm) |
|----------------|-----------------|----------------|-----------------------|
| BLE 1M         | 2402-2480       | 0-39[40]       | -0.69                 |
| BLE 2M         | 2402-2480       | 0-39[40]       | -0.68                 |

# 5.3. CHANNEL LIST

| Channel | Frequency<br>(MHz) | Channel | Frequency<br>(MHz) | Channel | Frequency<br>(MHz) | Channel | Frequency<br>(MHz) |
|---------|--------------------|---------|--------------------|---------|--------------------|---------|--------------------|
| 0       | 2402               | 11      | 2424               | 22      | 2446               | 33      | 2468               |
| 1       | 2404               | 12      | 2426               | 23      | 2448               | 34      | 2470               |
| 2       | 2406               | 13      | 2428               | 24      | 2450               | 35      | 2472               |
| 3       | 2408               | 14      | 2430               | 25      | 2452               | 36      | 2474               |
| 4       | 2410               | 15      | 2432               | 26      | 2454               | 37      | 2476               |
| 5       | 2412               | 16      | 2434               | 27      | 2456               | 38      | 2478               |
| 6       | 2414               | 17      | 2436               | 28      | 2458               | 39      | 2480               |
| 7       | 2416               | 18      | 2438               | 29      | 2460               | /       | /                  |
| 8       | 2418               | 19      | 2440               | 30      | 2462               | /       | /                  |
| 9       | 2420               | 20      | 2442               | 31      | 2464               | /       | /                  |
| 10      | 2422               | 21      | 2444               | 32      | 2468               | /       | /                  |

# 5.4. TEST CHANNEL CONFIGURATION

| Test Mode | Test Channel   |       | Frequency |
|-----------|----------------|-------|-----------|
|           | Low Channel    | CH 0  | 2402MHz   |
| GFSK      | Middle Channel | CH 19 | 2440MHz   |
|           | High Channel   | CH 39 | 2480MHz   |

# 5.5. THE WORSE CASE POWER SETTING PARAMETER

| The Worse Case Power Setting Parameter under 2400 ~ 2483.5MHz Band |                  |              |         |         |
|--------------------------------------------------------------------|------------------|--------------|---------|---------|
| Test S                                                             | oftware          | IPOP V4.1    |         |         |
| Modulation Type                                                    | Transmit Antenna | Test Channel |         |         |
| Modulation Type                                                    | Number           | LCH          | MCH     | HCH     |
| GFSK                                                               | 1                | default      | default | default |



Page 10 of 94

## 5.6. DESCRIPTION OF AVAILABLE ANTENNAS

| Ant. | Frequency (MHz) | Antenna Type | Antenna Gain (dBi) |
|------|-----------------|--------------|--------------------|
| 1    | 2400-2483.5     | Chip Antenna | 4.3 dBi            |

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

| Test Mode | Transmit and Receive Mode | Description                                                           |
|-----------|---------------------------|-----------------------------------------------------------------------|
| BLE 1M    | ⊠1TX, 1RX                 | Antenna1 can be used as transmitting/receiving antenna independently. |
| BLE 2M    | ⊠1TX, 1RX                 | Antenna1 can be used as transmitting/receiving antenna independently. |

# 5.7. THE WORSE CASE CONFIGURATIONS

For BLE module, the product only supports 1 Mbps and 2 Mbps, both the two data rate were tested and the test result was recorded in this report.

#### 5.8. TEST ENVIRONMENT

| Environment Parameter | Selected Values During Tests |           |  |
|-----------------------|------------------------------|-----------|--|
| Relative Humidity     | 55 ~ 65%                     |           |  |
| Atmospheric Pressure: | 101kPa                       |           |  |
| Temperature           | TN                           | 23 ~ 28°C |  |
|                       | VL                           | N/A       |  |
| Voltage:              | VN                           | DC 7.6V   |  |
|                       | VH                           | N/A       |  |

Note: VL= Lower Extreme Test Voltage

VN= Nominal Voltage

VH= Upper Extreme Test Voltage

TN= Normal Temperature



Page 11 of 94

# 5.9. DESCRIPTION OF TEST SETUP

# **SUPPORT EQUIPMENT**

| Item | Equipment             | Brand Name | Model Name | Description        |
|------|-----------------------|------------|------------|--------------------|
| 1    | Laptop                | ThinkPad   | E580       | Supplied by UL Lab |
|      | Fixed Frequency Board | /          | /          | Supplied by UL Lab |

# **I/O PORT**

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

# **ACCESSORY**

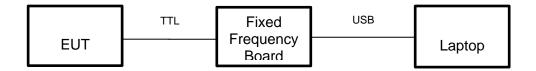
| Item | Accessory | Brand Name | Model Name | Description |
|------|-----------|------------|------------|-------------|
| 1    | /         | /          | /          | /           |



**TEST SETUP** 

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

# **SETUP DIAGRAM FOR TESTS**





Page 13 of 94

# 5.10. MEASURING INSTRUMENT AND SOFTWARE USED

|                         | Conducted Emissions Test (Instrument)  |                  |                   |                                     |               |                         |            |            |  |
|-------------------------|----------------------------------------|------------------|-------------------|-------------------------------------|---------------|-------------------------|------------|------------|--|
| Used                    | Equipment                              | Manufacturer     |                   | del No.                             | Serial No.    | Upper Last Cal.         | Last Cal.  | Next Cal.  |  |
| $\checkmark$            | EMI Test Receiver                      | R&S              | Е                 | SR3                                 | 126700        | 2023-11-25              | 2024-11-02 | 2025-11-01 |  |
| <b>V</b>                | Two-Line V-Network                     | R&S              | ΕN                | IV216                               | 126701        | 2023-11-25              | 2024-11-02 | 2025-11-01 |  |
|                         |                                        | Cond             | ucted             | Emissio                             | ons Test (So  | ftware)                 |            |            |  |
| Used                    | Desc                                   | ription          |                   | Man                                 | ufacturer     | Name                    | Version    |            |  |
| <b>V</b>                | Software for Condu                     | cted Emissions   | Test              |                                     | R&S           | EMC32                   | 9.25.00    |            |  |
|                         |                                        | Radia            | ated E            | mission                             | s Test (Instr | ument)                  |            |            |  |
| Used                    | Equipment                              | Manufacturer     | Mod               | del No.                             | Serial No.    | Upper Last Cal.         | Last Cal.  | Next Cal.  |  |
| <b>V</b>                | EMI test receiver                      | R&S              | Е                 | SR7                                 | 222993        | 2023-04-08              | 2024-03-23 | 2025-03-22 |  |
| $\overline{\checkmark}$ | EMI test receiver                      | R&S              | ES                | SR26                                | 126703        | 2023-11-25              | 2024-11-02 | 2025-11-01 |  |
| V                       | Spectrum Analyzer                      | R&S              | FS'               | V3044                               | 222992        | 2023-04-08              | 2024-03-23 | 2025-03-22 |  |
| V                       | Receiver Antenna<br>(9kHz-30MHz)       | Schwarzbeck      | FMZ               | ß 1513                              | 155456        | 2021-06-03              | 2024-05-27 | 2027-05-26 |  |
| <b>V</b>                | Receiver Antenna (30MHz-1GHz)          | Schwarzbeck      | VUL               | B 9168                              | 171952        | 2021-07-05              | 2024-07-04 | 2027-07-03 |  |
| V                       | Receiver Antenna<br>(1GHz-18GHz)       | R&S              | Н                 | F907                                | 126705        | 2019-01-27              | 2022-02-28 | 2025-02-27 |  |
| V                       | Receiver Antenna<br>(18GHz-26.5GHz)    | Schwarzbeck      | BBHA9170          |                                     | 126706        | 2019-02-29              | 2022-02-28 | 2025-02-27 |  |
| V                       | Pre-amplification<br>(To 18GHz)        | Tonscned         | TAP01018050       |                                     | 224539        | 2023-10-10              | 2024-10-10 | 2025-10-09 |  |
| V                       | Pre-amplification<br>(To 18GHz)        | R&S              | SCU-18D           |                                     | 134667        | 2023-11-25              | 2024-11-02 | 2025-11-01 |  |
| V                       | Pre-amplification<br>(To 26.5GHz)      | R&S              | SC                | U-26D                               | 135391        | 2023-11-25              | 2024-11-02 | 2025-11-01 |  |
| V                       | Band Reject Filter                     | Wainwright       | 2375<br>2485<br>4 | CGV12-<br>5-2400-<br>5-2510-<br>0SS | 1             | 2023-12-18              | 2024-12-17 | 2025-12-16 |  |
| V                       | High Pass Filter                       | COM-MW           |                   | 3-3-18G-<br>01                      | 2             | 2023-12-18              | 2024-12-17 | 2025-12-16 |  |
|                         |                                        | Rad              | iated             | Emissio                             | ns Test (Soft | tware)                  |            | _          |  |
| Used                    | Desc                                   | ription          |                   | Man                                 | ufacturer     | Name                    | Version    |            |  |
| $\overline{\checkmark}$ | ☑ Software for Radiated Emissions Test |                  |                   | To                                  | nscend        | JS32-RE                 | 5.0.0.2    |            |  |
|                         |                                        | Α                | ntenn             | a Port Te                           | est (Instrume | ent)                    |            |            |  |
| Used                    | Equipment                              | Manufacturer     | Mod               | del No.                             | Serial No.    | Upper Last Cal.         | Last Cal.  | Next Cal.  |  |
| $\overline{\checkmark}$ | Spectrum Analyzer                      | Keysight         | N9                | 010B                                | 155368        | 2023-04-08              | 2024-03-23 | 2025-03-22 |  |
| V                       | Power Meter                            | MWT              | MW100-RFCB        |                                     | 221694        | 2023-04-08              | 2024-03-23 | 2025-03-22 |  |
| <b>V</b>                | Attenuator                             | PASTERNACK       |                   |                                     | 1624          | 2023-04-08              | 2024-03-23 | 2025-03-22 |  |
|                         |                                        | -                | Anteni            | na Port 1                           | Test (Softwa  | re)                     |            |            |  |
| Used                    | Desc                                   | ription          |                   | Man                                 | ufacturer     | Name                    | Version    |            |  |
| V                       | Software for Ar                        | ntenna Port Test |                   | To                                  | nscend        | JS1120-3 Test<br>System | V3.2.22    |            |  |



Report No.: 4791435852 Page 14 of 94

# 6. MEASUREMENT METHODS

| No. | Test Item                                     | KDB Name                                      | Section |
|-----|-----------------------------------------------|-----------------------------------------------|---------|
| 1   | 6 dB Bandwidth and<br>99% Occupied Bandwidth  | KDB 558074 D01 15.247 Meas<br>Guidance v05r02 | 8.2     |
| 2   | Output Power                                  | KDB 558074 D01 15.247 Meas<br>Guidance v05r02 | 8.3.1.3 |
| 3   | Power Spectral Density                        | KDB 558074 D01 15.247 Meas<br>Guidance v05r02 | 8.4     |
| 4   | Out-of-band emissions in non-restricted bands | KDB 558074 D01 15.247 Meas<br>Guidance v05r02 | 8.5     |
| 5   | Out-of-band emissions in restricted bands     | KDB 558074 D01 15.247 Meas<br>Guidance v05r02 | 8.6     |
| 6   | Band-edge                                     | KDB 558074 D01 15.247 Meas<br>Guidance v05r02 | 8.7     |
| 7   | Conducted Emission Test for AC Power Port     | ANSI C63.10-2013                              | 6.2     |



Page 15 of 94

#### 7. ANTENNA PORT TEST RESULTS

#### 7.1. ON TIME AND DUTY CYCLE

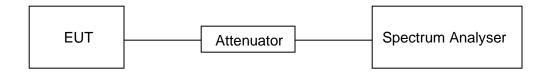
#### **LIMITS**

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      | DC 7.6V |

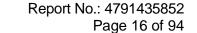
#### **TEST RESULTS TABLE**

| Mode   | On<br>Time<br>(msec) | Period<br>(msec) | Duty<br>Cycle<br>x<br>(Linear) | Duty<br>Cycle<br>(%) | Duty Cycle<br>Correction<br>Factor<br>(db) | 1/T<br>Minimum<br>VBW<br>(kHz) | Final<br>VBW<br>(kHz) |
|--------|----------------------|------------------|--------------------------------|----------------------|--------------------------------------------|--------------------------------|-----------------------|
| BLE 1M | 100                  | 100              | 1                              | 100                  | 0                                          | 0.01                           | 0.01                  |
| BLE 2M | 100                  | 100              | 1                              | 100                  | 0                                          | 0.01                           | 0.01                  |

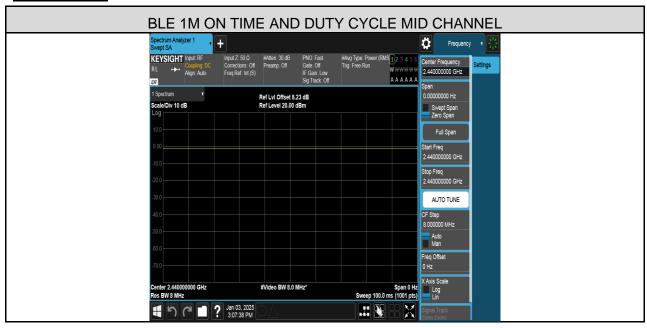
Note: 1) Duty Cycle Correction Factor=10log(1/x).

2) Where: x is Duty Cycle (Linear)

3) Where: T is On Time (transmit duration)











Page 17 of 94

# 7.2. 6 dB BANDWIDTH

#### **LIMITS**

| FCC Part15 (15.247), Subpart C                |               |           |             |  |  |
|-----------------------------------------------|---------------|-----------|-------------|--|--|
| Section Test Item Limit Frequency Range (MHz) |               |           |             |  |  |
| FCC 47 CFR 15.247(a)(2)                       | 6dB Bandwidth | >= 500kHz | 2400-2483.5 |  |  |

#### **TEST PROCEDURE**

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

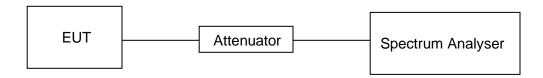
Connect the EUT to the spectrum analyser and use the following settings:

| Center Frequency | The centre frequency of the channel under test                                             |
|------------------|--------------------------------------------------------------------------------------------|
| Frequency Span   | Peak                                                                                       |
| Detector         | For 6 dB Bandwidth: 100 kHz For 99% Occupied Bandwidth: 1% to 5% of the occupied bandwidth |
| RBW              | For 6 dB Bandwidth: ≥3 × RBW<br>For 99% Occupied Bandwidth: ≥3 × RBW                       |
| VBW              | Max hold                                                                                   |
| 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.







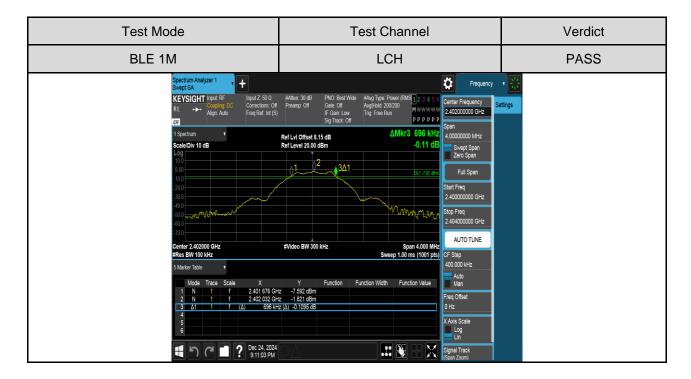
#### **TEST ENVIRONMENT**

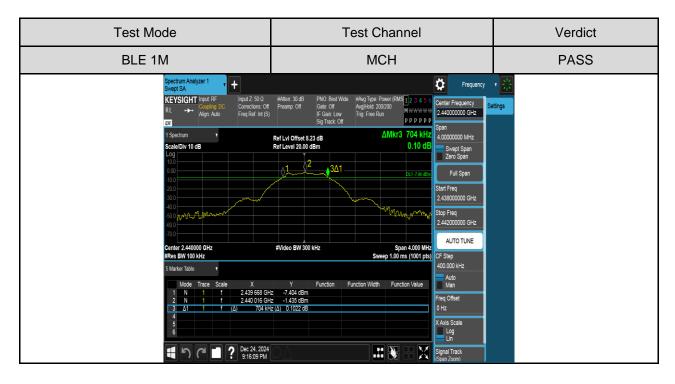
| Temperature         | 22°C   | Relative Humidity | 56%     |
|---------------------|--------|-------------------|---------|
| Atmosphere Pressure | 101kPa | Test Voltage      | DC 7.6V |

# **TEST RESULTS TABLE**

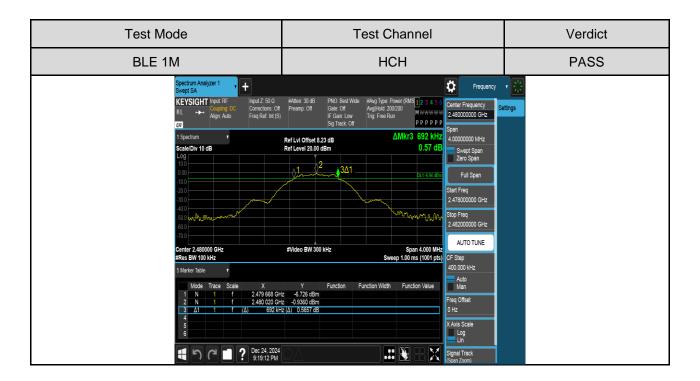
| Test Mode | Test Channel | 6dB bandwidth<br>(MHz) | Result |
|-----------|--------------|------------------------|--------|
|           | LCH          | 0.696                  | Pass   |
| BLE 1M    | MCH          | 0.704                  | Pass   |
|           | HCH          | 0.692                  | Pass   |
|           | LCH          | 1.260                  | Pass   |
| BLE 2M    | MCH          | 1.132                  | Pass   |
|           | HCH          | 1.180                  | Pass   |

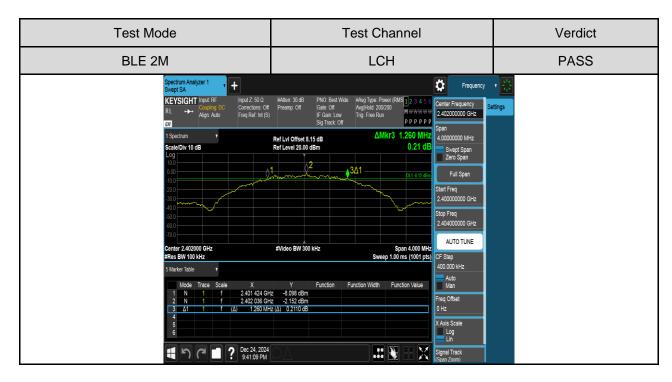


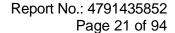




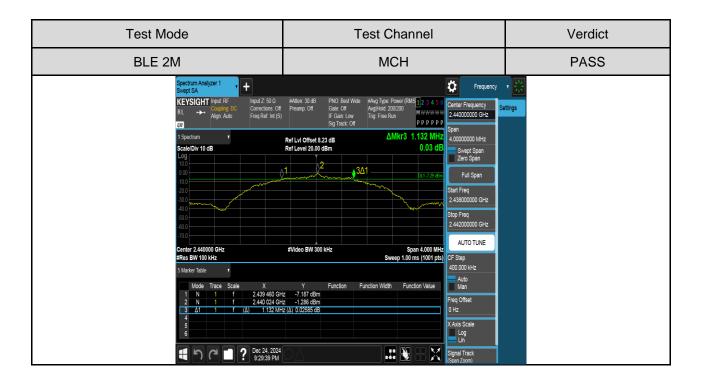


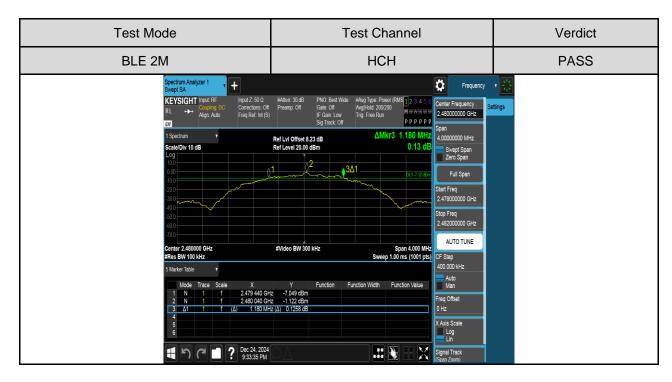












Page 22 of 94

# 7.3. CONDUCTED OUTPUT POWER

#### **LIMITS**

| FCC Part15 (15.247), Subpart C                |              |                 |             |  |
|-----------------------------------------------|--------------|-----------------|-------------|--|
| Section Test Item Limit Frequency Range (MHz) |              |                 |             |  |
| FCC 15.247(b)(3)                              | 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.

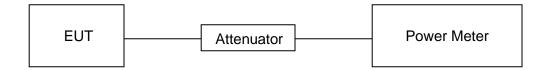
Measure the power of each channel.

PK Detector used for PK result.

## **TEST ENVIRONMENT**

| Temperature         | 22°C   | Relative Humidity | 56%     |
|---------------------|--------|-------------------|---------|
| Atmosphere Pressure | 101kPa | Test Voltage      | DC 7.6V |

#### **TEST SETUP**





Report No.: 4791435852 Page 23 of 94

# **TEST RESULTS TABLE**

| Test Mode | Toot Channel | Maximum Conducted Output Power (PK) | LIMIT |
|-----------|--------------|-------------------------------------|-------|
|           | Test Channel | dBm                                 | dBm   |
|           | LCH          | -1.59                               | 30    |
| BLE 1M    | MCH          | -1.15                               | 30    |
|           | HCH          | -0.69                               | 30    |
|           | LCH          | -1.61                               | 30    |
| BLE 2M    | MCH          | -1.15                               | 30    |
|           | HCH          | -0.68                               | 30    |



# 7.4. POWER SPECTRAL DENSITY

#### **LIMITS**

| FCC Part15 (15.247), Subpart C                |                        |             |             |
|-----------------------------------------------|------------------------|-------------|-------------|
| Section Test Item Limit Frequency Range (MHz) |                        |             |             |
| FCC §15.247 (e)                               | 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:

| <del>ootaa go.</del> |                                                |  |
|----------------------|------------------------------------------------|--|
| Center Frequency     | The centre frequency of the channel under test |  |
| Detector             | Peak                                           |  |
| RBW                  | 3 kHz ≤ RBW ≤100 kHz                           |  |
| VBW                  | ≥3 × RBW                                       |  |
| Span                 | 1.5 x DTS bandwidth                            |  |
| Trace                | Max hold                                       |  |
| Sweep time           | Auto couple.                                   |  |

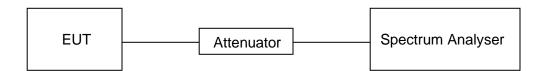
Allow trace to fully stabilize and use the peak marker function to determine the maximum amplitude level within the RBW.

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

#### **TEST ENVIRONMENT**

| Temperature         | 22°C   | Relative Humidity | 56%     |
|---------------------|--------|-------------------|---------|
| Atmosphere Pressure | 101kPa | Test Voltage      | DC 7.6V |

#### **TEST SETUP**



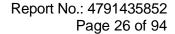
Form-ULID-008536-14 V3.0



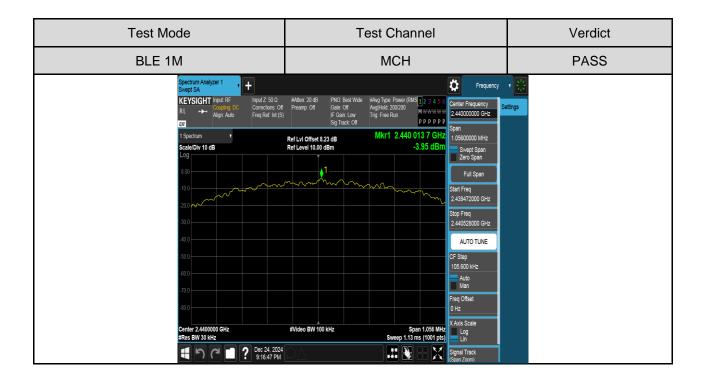
#### **TEST RESULTS TABLE**

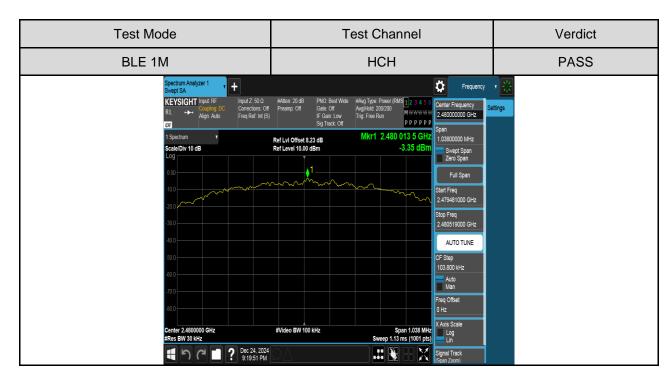
| Test Mode | Test Channel | Maximum Peak power spectral density<br>(dBm/30kHz) | Result |
|-----------|--------------|----------------------------------------------------|--------|
|           | LCH          | -3.46                                              | Pass   |
| BLE 1M    | MCH          | -3.95                                              | Pass   |
|           | HCH          | -3.35                                              | Pass   |
|           | LCH          | -4.27                                              | Pass   |
| BLE 2M    | MCH          | -3.84                                              | Pass   |
|           | HCH          | -3.06                                              | Pass   |

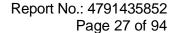




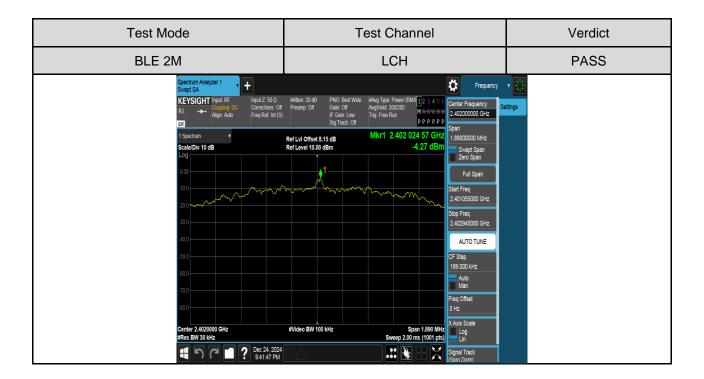


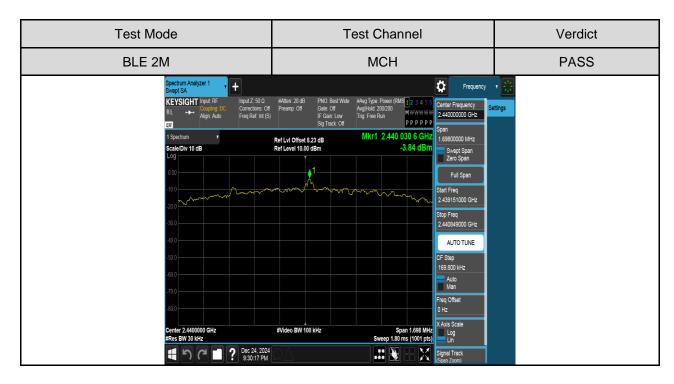




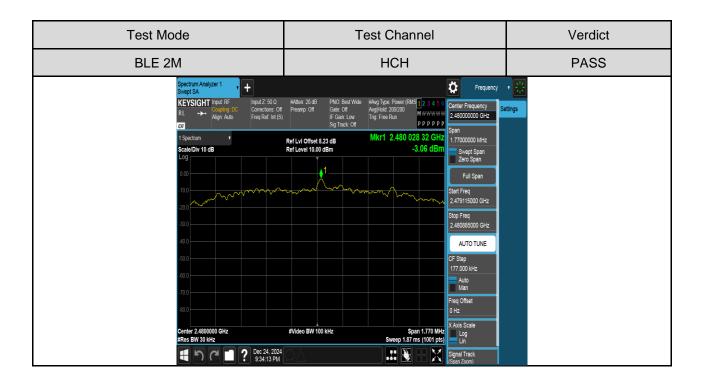


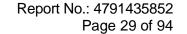














# 7.5. CONDUCTED BANDEDGE AND SPURIOUS EMISSIONS

#### **LIMITS**

| FCC Part15 (15.247), Subpart C |                                           |                                                                                                                         |  |
|--------------------------------|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|--|
| Section Test Item Limit        |                                           |                                                                                                                         |  |
| FCC §15.247 (d)                | Conducted Bandedge and Spurious Emissions | 20 dB below that in the 100 kHz<br>bandwidth within the band that<br>contains the highest level of the<br>desired power |  |

## **TEST PROCEDURE**

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

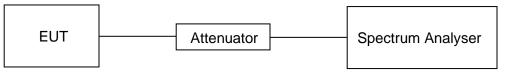
| octings.         |                                                |
|------------------|------------------------------------------------|
| Center Frequency | The centre frequency of the channel under test |
| Detector         | Peak                                           |
| RBW              | 100 kHz                                        |
| VBW              | ≥3 × RBW                                       |
| Span             | 1.5 x 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                | 100 kHz                                                                       |
| VBW                | ≥3 × RBW                                                                      |
| measurement points | ≥span/RBW                                                                     |
| Trace              | Max hold                                                                      |
| Sweep time         | Auto couple.                                                                  |

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

#### **TEST SETUP**



Form-ULID-008536-14 V3.0



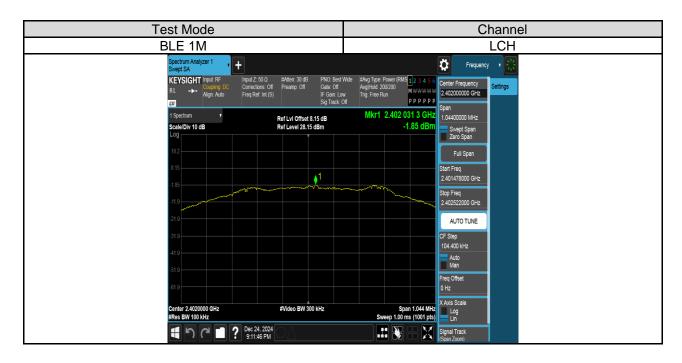
#### **TEST ENVIRONMENT**

| Temperature         | 22°C   | Relative Humidity | 56%     |
|---------------------|--------|-------------------|---------|
| Atmosphere Pressure | 101kPa | Test Voltage      | DC 7.6V |

#### PART 1: REFERENCE LEVEL MEASUREMENT

#### **TEST RESULTS TABLE**

| Test Mode | Test Channel | Result[dBm] |
|-----------|--------------|-------------|
|           | LCH          | -1.85       |
| BLE 1M    | MCH          | -1.53       |
|           | HCH          | -1.31       |
|           | LCH          | -1.84       |
| BLE 2M    | MCH          | -1.34       |
|           | HCH          | -0.87       |





















Report No.: 4791435852 Page 34 of 94

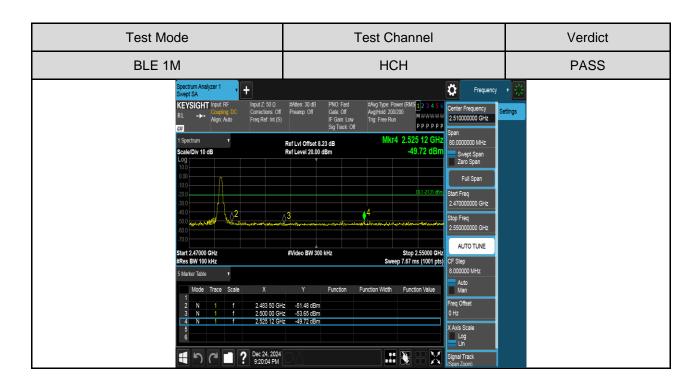
# **PART 2: CONDUCTED BANDEDGE**

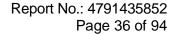
# **TEST RESULTS TABLE**

| Test Mode | Test Channel | Result                  | Verdict |
|-----------|--------------|-------------------------|---------|
| BLE 1M    | LCH          | Refer to the Test Graph | PASS    |
| BLE IIVI  | HCH          | Refer to the Test Graph | PASS    |
| BLE 2M    | LCH          | Refer to the Test Graph | PASS    |
| DLE ZIVI  | HCH          | Refer to the Test Graph | PASS    |

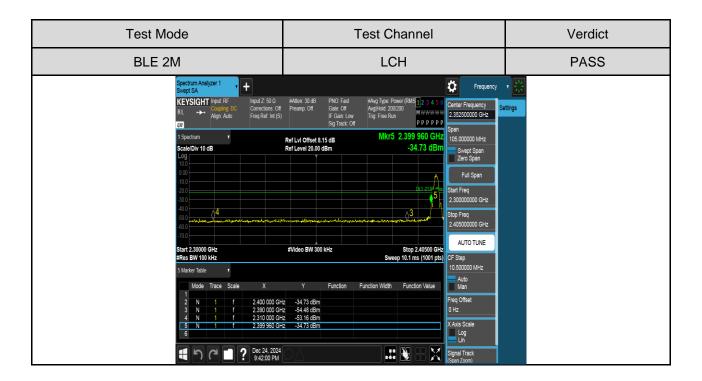


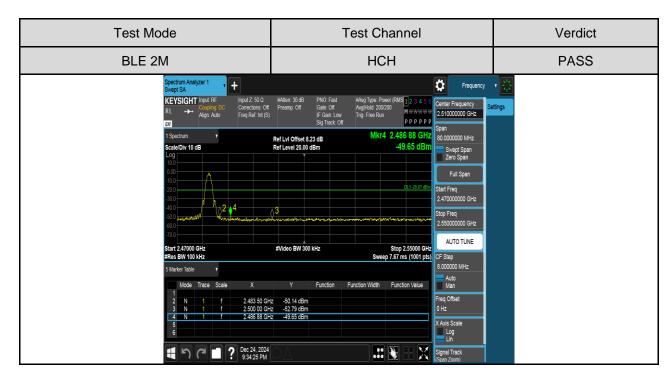














Report No.: 4791435852 Page 37 of 94

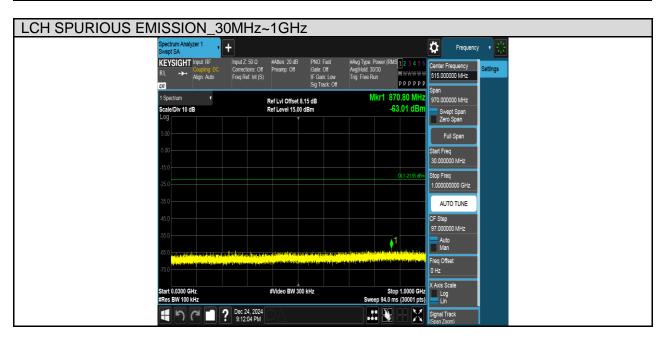
# PART 3: CONDUCTED SPURIOUS EMISSION

# **TEST RESULTS TABLE**

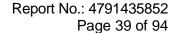
| Test Mode | Test Channel | Result                  | Verdict |
|-----------|--------------|-------------------------|---------|
|           | LCH          | Refer to the Test Graph | PASS    |
| BLE 1M    | MCH          | Refer to the Test Graph | PASS    |
|           | HCH          | Refer to the Test Graph | PASS    |
|           | LCH          | Refer to the Test Graph | PASS    |
| BLE 2M    | MCH          | Refer to the Test Graph | PASS    |
|           | HCH          | Refer to the Test Graph | PASS    |



| Test Mode | Channel | Verdict |
|-----------|---------|---------|
| BLE 1M    | LCH     | PASS    |

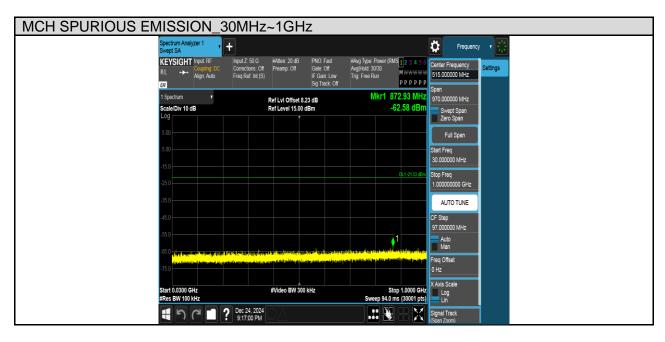


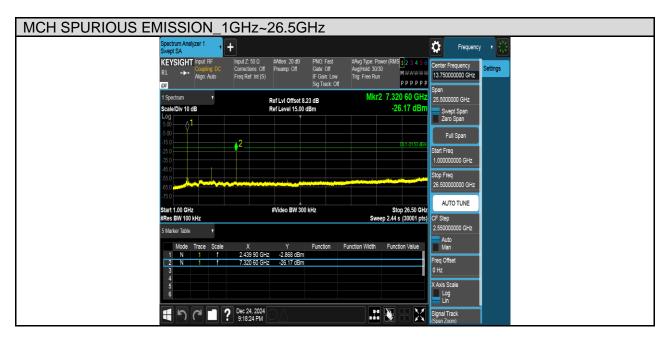


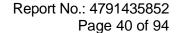




| Test Mode | Channel | Verdict |
|-----------|---------|---------|
| BLE 1M    | MCH     | PASS    |

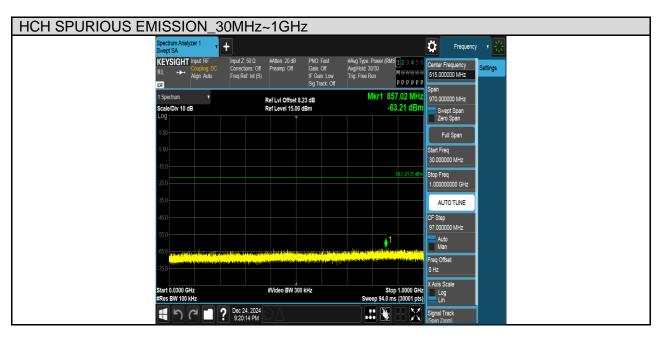


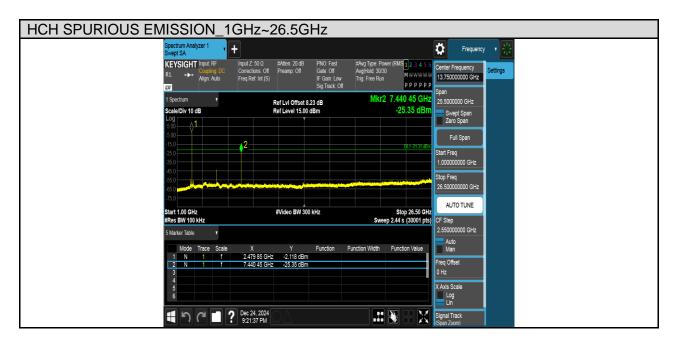


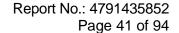




| Test Mode | Channel | Verdict |
|-----------|---------|---------|
| BLE 1M    | HCH     | PASS    |









| Test Mode | Channel | Verdict |
|-----------|---------|---------|
| BLE 2M    | LCH     | PASS    |

