



Certificate No.: 3745.01

# FCC/IC - TEST REPORT

Report Number : **709502310205-00A** Date of Issue: March 13, 2024

Model : SC155-WQ2, SC155-WQ3, SC155-WQ2A, SC155-WQ2B, SC155-WQ2C, SC155-WQ3A, SC155-WQ3B, SC155-WQ3C, SC155-WQ4, SC155-WQ4A, SC155-WQ4B, SC155-WQ4C, SC155-WQ2D, SC55-WQ3D, SC155-WQ4D

Product Type : Smart Camera

Applicant : Zhejiang Lingzhu Technology Co., Ltd.

Address : Room 302, No 1 Building Huace Center, Xihu District, Hangzhou  
City, Zhejiang Province, 31000, China

Manufacturer : Zhejiang Lingzhu Technology Co., Ltd.

Address : Room 302, No 1 Building Huace Center, Xihu District, Hangzhou  
City, Zhejiang Province, 31000, China

Test Result : **n Positive**     Negative

Total pages including Appendices : 68

*TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch is a subcontractor to TÜV SÜD Product Service GmbH according to the principles outlined in ISO 17025.*

*TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch reports apply only to the specific samples tested under stated test conditions. Construction of the actual test samples has been documented. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. The manufacturer/importer is responsible to the Competent Authorities in Europe for any modifications made to the production units which result in non-compliance to the relevant regulations. TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch shall have no liability for any deductions, inferences or generalizations drawn by the client or others from TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch issued reports.*

*This report is the confidential property of the client. As a mutual protection to our clients, the public and ourselves, extracts from the test report shall not be reproduced except in full without our written approval.*



## 1 Table of Contents

|      |   |    |
|------|---|----|
| 1    | Table of Contents .....                           | 2  |
| 2    | Report Modification Record .....                  | 3  |
| 3    | Details about the Test Laboratory.....            | 3  |
| 4    | Description of the Equipment under Test.....      | 4  |
| 5    | Summary of Test Standards .....                   | 6  |
| 6    | Summary of Test Results.....                      | 7  |
| 7    | General Remarks .....                             | 8  |
| 8    | Test Setups .....                                 | 9  |
| 9    | Systems test configuration.....                   | 12 |
| 10   | Technical Requirement.....                        | 13 |
| 10.1 | Conducted Emission .....                          | 13 |
| 10.2 | Conducted peak output power and e.i.r.p.....      | 18 |
| 10.3 | 6dB bandwidth and 99% Occupied Bandwidth.....     | 19 |
| 10.4 | Power spectral density .....                      | 28 |
| 10.5 | Spurious RF conducted emissions.....              | 33 |
| 10.6 | Band edge.....                                    | 46 |
| 10.7 | Spurious radiated emissions for transmitter ..... | 55 |
| 11   | Test Equipment List .....                         | 65 |
| 12   | System Measurement Uncertainty .....              | 66 |
| 13   | Photographs of Test Set-ups .....                 | 67 |
| 14   | Photographs of EUT .....                          | 68 |



## 2 Report Modification Record

Alterations and additions to this report will be issued to the holders of each copy in the form of a complete document.

| Issue            | Description of Change | Date of Issue |
|------------------|-----------------------|---------------|
| 709502310205-00A | First Issue           | 03/13/2024    |

## 3 Details about the Test Laboratory

### Details about the Test Laboratory

#### Test Site 1

Company name: TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch  
No.16 Lane, 1951 Du Hui Road,  
Shanghai 201108,  
P.R. China

Test Firm FCC  
Registration  
Number: 820234

Designation  
number: CN1183

IC Company  
Number: 31668

CAB identifier: CN0101

Telephone: +86 21 6141 0123  
Fax: +86 21 6140 8600



## 4 Description of the Equipment under Test

### Description of the Equipment Under Test

Product: Smart Camera

PMN / HVIN / Model no.: SC155-WQ2, SC155-WQ3, SC155-WQ2A, SC155-WQ2B, SC155-WQ2C, SC155-WQ3A, SC155-WQ3B, SC155-WQ3C, SC155-WQ4, SC155-WQ4A, SC155-WQ4B, SC155-WQ4C, SC155-WQ2D, SC55-WQ3D, SC155-WQ4D

FCC ID: 2BEWXSC155

IC: 32094-SC155

Rating: 5V DC, 1.5A

RF Transmission Frequency: 802.11b/g/n-HT20: 2412~2462 MHz (Wi-Fi)  
802.11n-HT40: 2422~2452 MHz (Wi-Fi)  
2402~2480 MHz (BLE5.0)

No. of Operated Channel: 2.4GHz WIFI: 11 for 802.11b/802.11g/802.11(H20)  
7 for 802.11n(HT40)

Modulation: For 2.4GHz WIFI:  
Direct Sequence Spread Spectrum (DSSS) for 802.11b  
Orthogonal Frequency Division Multiplexing (OFDM) for 802.11g/n  
For 2.4GHz BLE:  
GFSK (1Mbps and 2Mbps)

Channel list:

| 802.11b/g/n(HT20) |          |    |          | 802.11n(HT40) |          |    |          |
|-------------------|----------|----|----------|---------------|----------|----|----------|
| Ch                | Fre(MHz) | Ch | Fre(MHz) | Ch            | Fre(MHz) | Ch | Fre(MHz) |
| 1                 | 2412     | 7  | 2442     | 3             | 2422     | 8  | 2447MHz  |
| 2                 | 2417     | 8  | 2447     | 4             | 2427     | 9  | 2452MHz  |
| 3                 | 2422     | 9  | 2452     | 5             | 2432     |    |          |
| 4                 | 2427     | 10 | 2457     | 6             | 2437     |    |          |
| 5                 | 2432     | 11 | 2462     | 7             | 2442     |    |          |
| 6                 | 2437     |    |          |               |          |    |          |



| Bluetooth Low Energy |          |    |          |    |          |    |          |
|----------------------|----------|----|----------|----|----------|----|----------|
| Ch                   | Fre(MHz) | Ch | Fre(MHz) | Ch | Fre(MHz) | Ch | Fre(MHz) |
| 0                    | 2402     | 10 | 2422     | 20 | 2442     | 30 | 2462     |
| 1                    | 2404     | 11 | 2424     | 21 | 2444     | 31 | 2464     |
| 2                    | 2406     | 12 | 2426     | 22 | 2446     | 32 | 2466     |
| 3                    | 2408     | 13 | 2428     | 23 | 2448     | 33 | 2468     |
| 4                    | 2410     | 14 | 2430     | 24 | 2450     | 34 | 2470     |
| 5                    | 2412     | 15 | 2432     | 25 | 2452     | 35 | 2472     |
| 6                    | 2414     | 16 | 2434     | 26 | 2454     | 36 | 2474     |
| 7                    | 2416     | 17 | 2436     | 27 | 2456     | 37 | 2476     |
| 8                    | 2418     | 18 | 2438     | 28 | 2458     | 38 | 2478     |
| 9                    | 2420     | 19 | 2440     | 29 | 2460     | 39 | 2480     |

Hardware Version: V1.0.1

Software Version: V1

Antenna Type: FPC Antenna

Antenna Gain: 0.48dBi

Description of the EUT: The EUT was a Smart Camera. The Smart Camera has Wi-Fi and BLE function. We tested the Smart Camera and listed the worst data in this report. This report is only for Wi-Fi.

Test sample no.: SHA-785720-1 (Conducted sample)  
SHA-785720-2 (Radiated sample)

The sample's mentioned in this report is/are submitted/ supplied/ manufactured by client. The laboratory therefore assumes no responsibility for accuracy of information on the brand name, model number, origin of manufacture, consignment or any information supplied.



## 5 Summary of Test Standards

| Test Standards                                  |  |
|---|--|
| FCC Part 15 Subpart C                           | PART 15 - RADIO FREQUENCY DEVICES<br>Subpart C - Intentional Radiators   |
| RSS-Gen Issue 5<br>Amendment 2<br>February 2021 | General Requirements for Compliance of Radio Apparatus   |
| RSS-247<br>Issue 3 August 2023                  | Digital Transmission Systems (DTSS), Frequency Hopping Systems (FHSS) and License-Exempt Local Area Network (LE-LAN) Devices |

All the test methods were according to KDB 558074 D01 15.247 Meas Guidance v05r02 and ANSI C63.10 (2013).

## 6 Summary of Test Results

| Technical Requirements                            |   |            |             |                                     |                          |                                     |
|---|---|------------|-------------|-------------------------------------|--------------------------|-------------------------------------|
| Test Condition                                    | Pages                                       | Test Site  | Test Result |                                     |                          |                                     |
|   |   |            | Pass        | Fail                                | N/A                      |                                     |
| §15.207 & RSS-GEN 8.8                             | Conducted emission AC power port            | 13-17      | Site 1      | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| §15.247 (b) (3) & RSS-247 5.4(d)                  | Conducted peak output power and e.i.r.p.    | 18         | Site 1      | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| §15.247(a)(1) & RSS-247 5.1(b)                    | 20dB bandwidth                              | ---        | ---         | <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| §15.247(a)(1) & RSS-247 5.1(b)                    | Carrier frequency separation                | ---        | ---         | <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| §15.247(a)(1)(iii) & RSS-247 5.1(d)               | Number of hopping frequencies               | ---        | ---         | <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| §15.247(a)(1)(iii) & RSS-247 5.1(d)               | Dwell Time                                  | ---        | ---         | <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| §15.247(a)(2) & RSS-247 5.2(a) & RSS-GEN 6.7      | 6dB bandwidth and 99% Occupied Bandwidth    | 19-27      | Site 1      | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| §15.247(e) & RSS-247 5.2(b)                       | Power spectral density                      | 28-32      | Site 1      | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| §15.247(d) & RSS-247 5.5                          | Spurious RF conducted emissions             | 33-45      | Site 1      | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| §15.247(d) & RSS-247 5.5                          | Band edge                                   | 46-54      | Site 1      | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| §15.247(d) & §15.209 & RSS-247 5.5 & RSS-Gen 6.13 | Spurious radiated emissions for transmitter | 55-64      | Site 1      | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| §15.203 & RSS-Gen 6.8                             | Antenna requirement                         | See note 1 |             | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |

Remark 1: N/A – Not Applicable.

Note 1: The EUT uses PCB antenna, which gain is 0.48dBi. In accordance to §15.203 and RSS-Gen 6.8, It is considered sufficiently to comply with the provisions of this section.



## 7 General Remarks

### Remarks

This submittal(s) (test report) is intended for FCC ID: 2BEWXSC155, IC: 32094-SC155 complies with Section 15.207, 15.209, 15.247 of the FCC Part 15, Subpart C Rules and RSS-247, RSS-GEN. This report is only for 2.4G Wi-Fi.

According to the client's declaration, all models are identical except for different model name only for differentiate when sold in different regions.

So model SC155-WQ3 was chosen to perform all the tests, another other models are deemed to fulfill all the requirement without further testing.

### SUMMARY:

All tests according to the regulations cited on page 5 were

n - Performed

o - **Not** Performed

The Equipment under Test

n - **Fulfills** the general approval requirements.

o - **Does not** fulfill the general approval requirements.

Sample Received Date: January 5, 2024

Testing Start Date: January 8, 2024

Testing End Date: January 30, 2024

-TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch

Reviewed by:

Prepared by:

Tested by:

Hui TONG  
Review EMC Manager

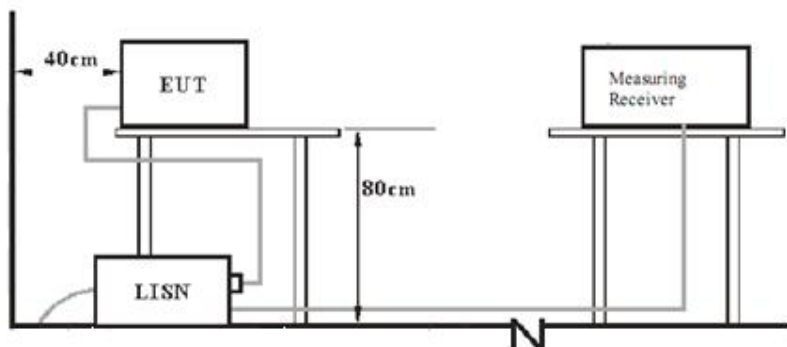
Jiaxi XU  
Project Manager

Chengjie GUO  
Test Engineer



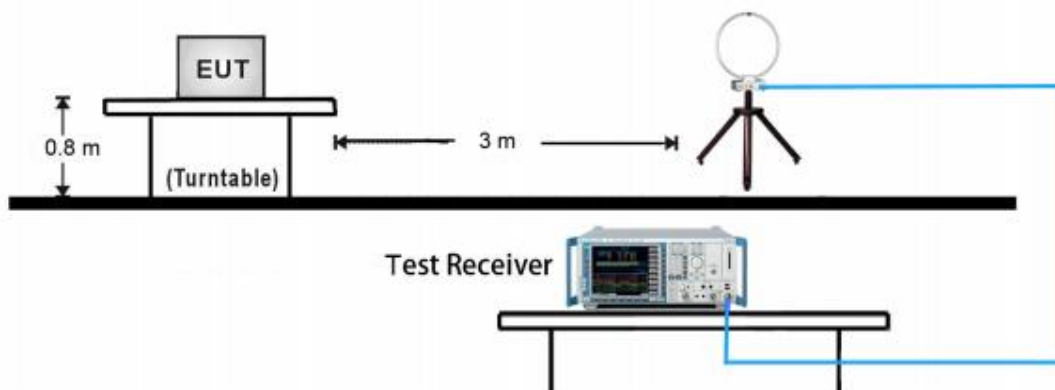
## 8 Test Setups

### 7.1 AC Power Line Conducted Emission test setups

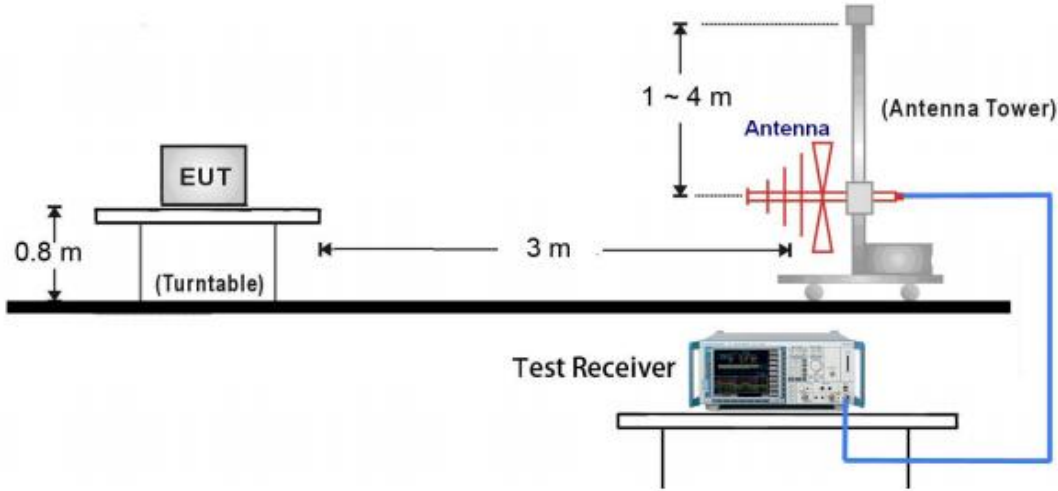


### 7.2 Radiated test setups

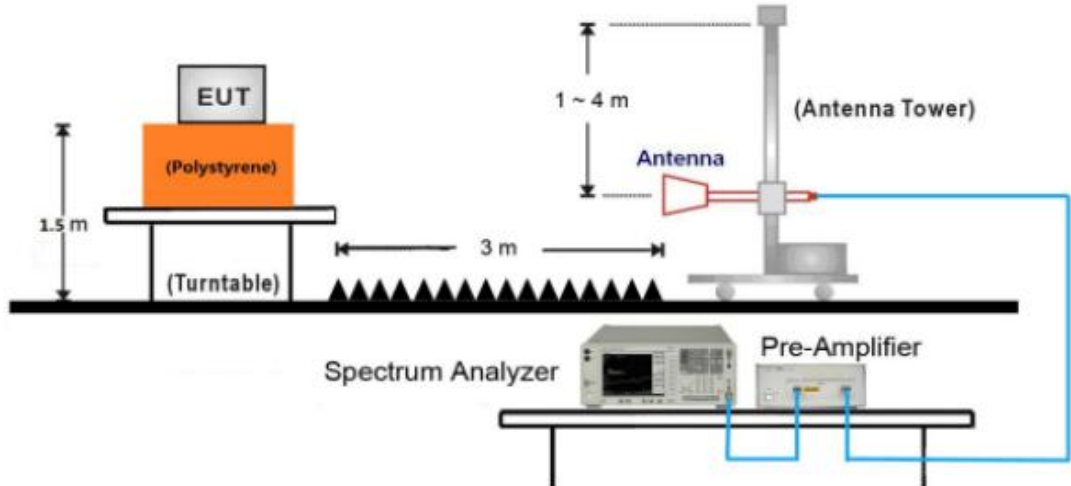
#### 9kHz ~ 30MHz Test Setup:



30MHz ~ 1GHz Test Setup:

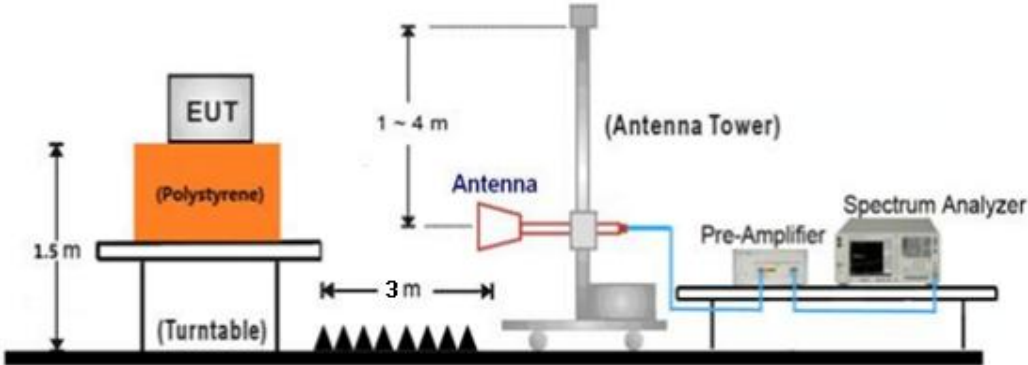


1GHz ~ 18GHz Test Setup:



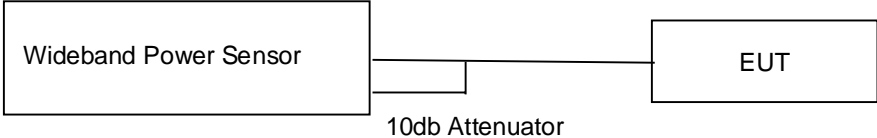


18GHz ~ 25GHz Test Setup:

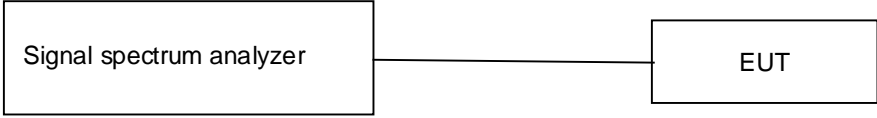


7.3 Conducted RF test setups

For Conducted peak output power



For other test items



## 9 Systems test configuration

Auxiliary Equipment Used during Test:

| DESCRIPTION   | MANUFACTURER | MODEL NO.(SHIELD) | S/N(LENGTH)     |
|---------------|--------------|-------------------|-----------------|
| Notebook      | Lenovo       | E470              | PF-OU5TS7 17/09 |
| AC/DC adapter | MLF          | MLF-A260502000UU  | --              |
| Solar panel   | --           | --                | --              |

Test software: AmebaD\_mptool\_2V1, which used to control the EUT in continues transmitting mode.

| Mode         | Tested Channel | Data Rate (Mbps) | Modulation | Index Value (Power level setting) |
|--------------|----------------|------------------|------------|-----------------------------------|
| 802.11b      | 1              | 1                | CCK        | 107                               |
|              | 6              | 1                | CCK        | 105                               |
|              | 11             | 1                | CCK        | 105                               |
| 802.11g      | 1              | 6                | OFDM       | 98                                |
|              | 6              | 6                | OFDM       | 98                                |
|              | 11             | 6                | OFDM       | 96                                |
| 802.11n HT20 | 1              | MCS0             | OFDM       | 94                                |
|              | 6              | MCS0             | OFDM       | 94                                |
|              | 11             | MCS0             | OFDM       | 92                                |
| 802.11n HT40 | 3              | MCS0             | OFDM       | 89                                |
|              | 6              | MCS0             | OFDM       | 90                                |
|              | 9              | MCS0             | OFDM       | 88                                |

The system was configured to channel 1(2412MHz), 6(2437MHz), and 11(2462MHz) for 802.11 b/g/n HT20 test and channel 3(2422MHz), 6(2437MHz), 9(2452MHz) for 802.11n (HT40).

Non-hopping mode: The system was configured to operate at a signal channel transmitting. The test software allows the configuration and operation at the worst-case duty and the highest transmit power.



## 10 Technical Requirement

### 10.1 Conducted Emission

#### Test Method

1. The EUT was placed on a table, which is 0.8m above ground plane
2. The power line of the EUT is connected to the AC mains through a Artificial Mains Network (A.M.N.).
3. Maximum procedure was performed to ensure EUT compliance
4. A EMI test receiver is used to test the emissions from both sides of AC line

#### Limit

According to §15.207 & RSS-GEN 8.8, conducted emissions limit as below:

| Frequency<br>MHz | QP Limit<br>dB $\mu$ V | AV Limit<br>dB $\mu$ V |
|------------------|------------------------|------------------------|
| 0.150-0.500      | 66-56*                 | 56-46*                 |
| 0.500-5          | 56                     | 46                     |
| 5-30             | 60                     | 50                     |

Decreasing linearly with logarithm of the frequency



**Conducted Emission**

# 150k-30MHz Conducted Emission Test

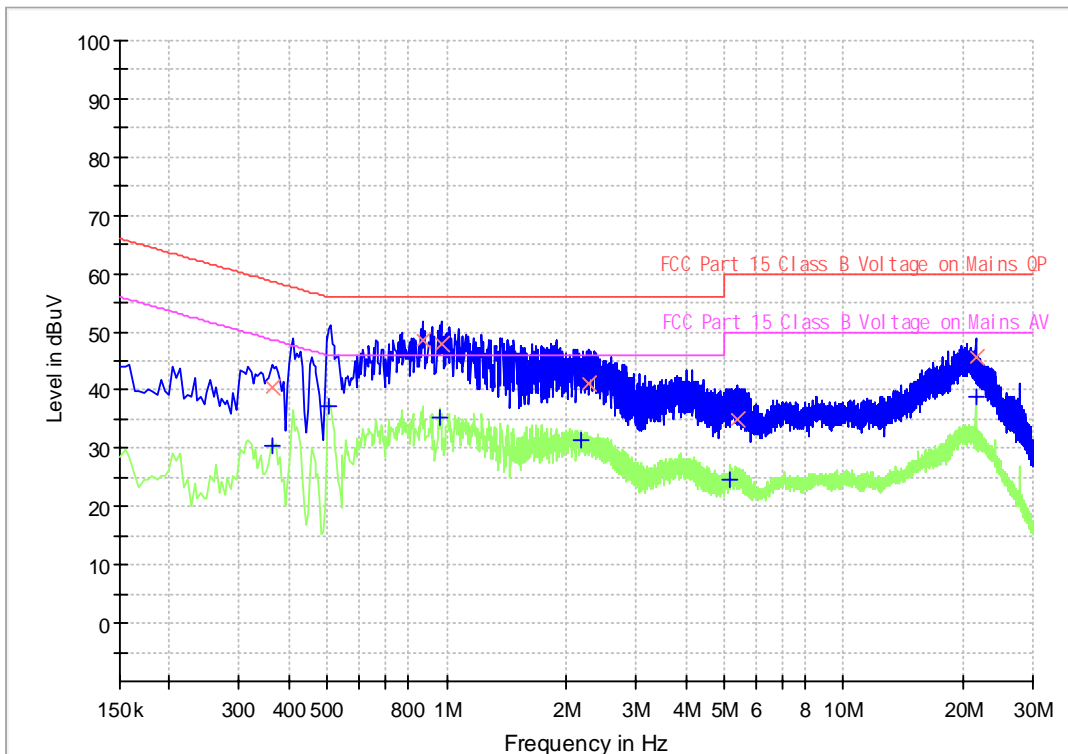
## EUT Information

|             |   |
|-------------|---|
| EUT Name:   | Smart Camera  |
| Model       | SC155-WQ3   |
| Client:     | Zhejiang Lingzhu Technology Co., Ltd  |
| Op Cond     | Power on and charging, TX_2437MHz at g mode, AC 120V/60Hz, T21.5, H43.3%, P103.4kPa |
| Operator:   | Chengjie GUO  |
| Standard    | FCC Part 15.207(a)  |
| Comment:    | Phase L   |
| Sample No.: | SHA-785720-2  |

## Scan Setup: Voltage with 2-Line-LISN pre [EMI conducted]

|                 |                          |
|-----------------|--------------------------|
| Hardware Setup: | Voltage with 2-Line-LISN |
| Receiver:       | [ESR 3]                  |
| Level Unit:     | dBuV                     |

| Subrange         | Step Size | Detectors | IF BW  | Meas. Time | Preamp |
|------------------|-----------|-----------|--------|------------|--------|
| 9 kHz - 150 kHz  | 100 Hz    | PK+       | 200 Hz | 0.02 s     | 0 dB   |
| 150 kHz - 30 MHz | 4.5 kHz   | PK+; AVG  | 9 kHz  | 0.01 s     | 0 dB   |





## Final Result

| Frequency (MHz) | QuasiPeak (dBuV) | CAverage (dBuV) | Limit (dBuV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) |
|-----------------|------------------|-----------------|--------------|-------------|-----------------|-----------------|------|------------|
| 0.361500        | ---              | 30.39           | 48.69        | 18.30       | 1000.0          | 9.000           | L1   | 19.5       |
| 0.361500        | 40.57            | ---             | 58.69        | 18.12       | 1000.0          | 9.000           | L1   | 19.5       |
| 0.505500        | ---              | 37.30           | 46.00        | 8.70        | 1000.0          | 9.000           | L1   | 19.4       |
| 0.870000        | 48.49            | ---             | 56.00        | 7.51        | 1000.0          | 9.000           | L1   | 19.5       |
| 0.960000        | ---              | 35.43           | 46.00        | 10.57       | 1000.0          | 9.000           | L1   | 19.5       |
| 0.969000        | 48.01            | ---             | 56.00        | 7.99        | 1000.0          | 9.000           | L1   | 19.5       |
| 2.184000        | ---              | 31.53           | 46.00        | 14.47       | 1000.0          | 9.000           | L1   | 19.5       |
| 2.274000        | 41.14            | ---             | 56.00        | 14.86       | 1000.0          | 9.000           | L1   | 19.5       |
| 5.176500        | ---              | 24.58           | 50.00        | 25.42       | 1000.0          | 9.000           | L1   | 19.6       |
| 5.397000        | 34.82            | ---             | 60.00        | 25.18       | 1000.0          | 9.000           | L1   | 19.6       |
| 21.502500       | ---              | 38.73           | 50.00        | 11.27       | 1000.0          | 9.000           | L1   | 20.7       |
| 21.502500       | 45.75            | ---             | 60.00        | 14.25       | 1000.0          | 9.000           | L1   | 20.7       |

Note 1: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)  
 Factor (dB) = Cable Loss (dB) + LISN Factor (dB) + 10dB Attenuator



# 150k-30MHz Conducted Emission Test

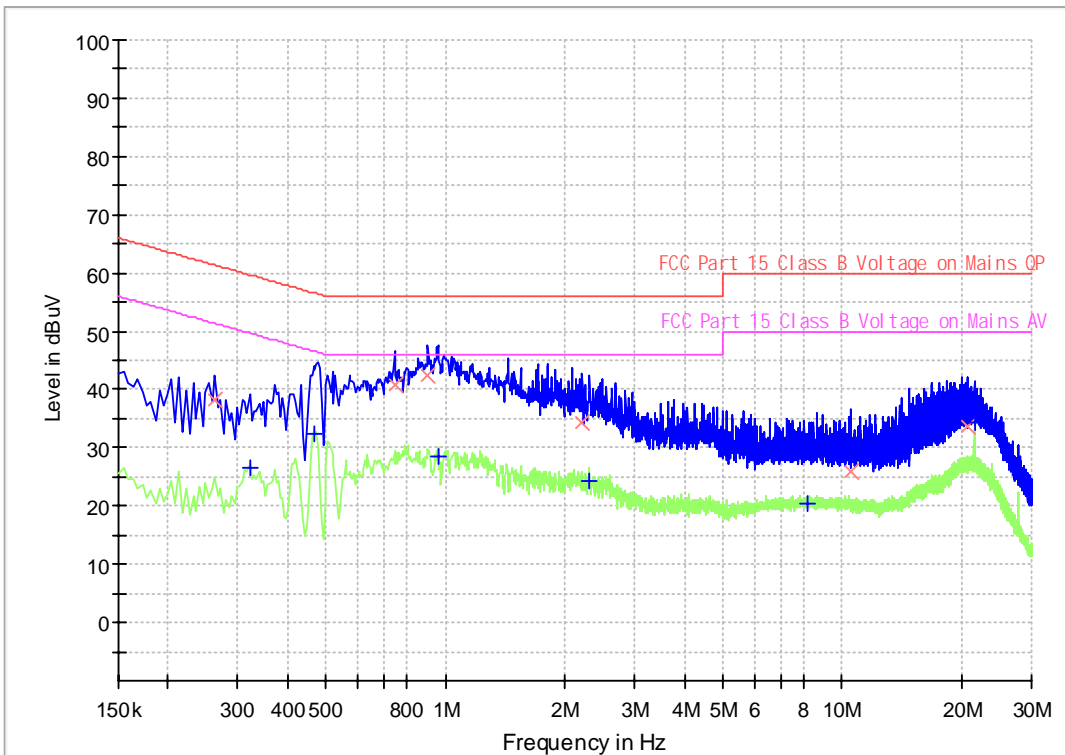
## EUT Information

EUT Name: Smart Camera  
 Model: SC155-WQ3  
 Client: Zhejiang Lingzhu Technology Co., Ltd  
 Op Cond: Power on and charging, TX\_2437MHz at g mode, AC 120V/60Hz, T21.5, H43.3%, P103.4kPa  
 Operator: Chengjie GUO  
 Standard: FCC Part 15.207(a)  
 Comment: Phase N  
 Sample No.: SHA-785720-2

## Scan Setup: Voltage with 2-Line-LISN pre [EMI conducted]

Hardware Setup: Voltage with 2-Line-LISN  
 Receiver: [ESR 3]  
 Level Unit: dBuV

| Subrange         | Step Size | Detectors | IF BW  | Meas. Time | Preamp |
|------------------|-----------|-----------|--------|------------|--------|
| 9 kHz - 150 kHz  | 100 Hz    | PK+       | 200 Hz | 0.02 s     | 0 dB   |
| 150 kHz - 30 MHz | 4.5 kHz   | PK+; AVG  | 9 kHz  | 0.01 s     | 0 dB   |







## Final Result

| Frequency (MHz) | QuasiPeak (dBuV) | CAverage (dBuV) | Limit (dBuV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) |
|-----------------|------------------|-----------------|--------------|-------------|-----------------|-----------------|------|------------|
| 0.262500        | 38.14            | ---             | 61.35        | 23.21       | 1000.0          | 9.000           | N    | 19.5       |
| 0.321000        | ---              | 26.65           | 49.68        | 23.03       | 1000.0          | 9.000           | N    | 19.5       |
| 0.465000        | ---              | 32.43           | 46.60        | 14.17       | 1000.0          | 9.000           | N    | 19.5       |
| 0.744000        | 40.71            | ---             | 56.00        | 15.29       | 1000.0          | 9.000           | N    | 19.5       |
| 0.901500        | 42.44            | ---             | 56.00        | 13.56       | 1000.0          | 9.000           | N    | 19.5       |
| 0.960000        | ---              | 28.47           | 46.00        | 17.53       | 1000.0          | 9.000           | N    | 19.5       |
| 2.215500        | 34.30            | ---             | 56.00        | 21.70       | 1000.0          | 9.000           | N    | 19.5       |
| 2.305500        | ---              | 24.15           | 46.00        | 21.85       | 1000.0          | 9.000           | N    | 19.5       |
| 8.146500        | ---              | 20.52           | 50.00        | 29.48       | 1000.0          | 9.000           | N    | 19.6       |
| 10.477500       | 26.04            | ---             | 60.00        | 33.96       | 1000.0          | 9.000           | N    | 19.7       |
| 20.625000       | 33.77            | ---             | 60.00        | 26.23       | 1000.0          | 9.000           | N    | 20.2       |
| 21.502500       | ---              | 34.29           | 50.00        | 15.71       | 1000.0          | 9.000           | N    | 20.4       |

Note 1: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)  
 Factor (dB) = Cable Loss (dB) + LISN Factor (dB) + 10dB Attenuator

## 10.2 Conducted peak output power and e.i.r.p.

### Test Method

1. Use the following spectrum analyzer settings:  
RBW > the 6 dB bandwidth of the emission being measured, VBW $\geq$ 3RBW, Span $\geq$ 3RBW  
Sweep = auto, Detector function = peak, Trace = max hold.
2. Add a correction factor to the display.
3. Use a power meter to measure the conducted peak output power.

### Limits

According to §15.247 (b) (3) & RSS-247 5.4(d), conducted peak output power limit as below:

|                                    | Frequency Range | Limit    | Limit     |
|------------------------------------|-----------------|----------|-----------|
|                                    | MHz             | W        | dBm       |
| <b>Conducted peak output power</b> | 2400-2483.5     | $\leq 1$ | $\leq 30$ |
| <b>e.i.r.p.</b>                    | 2400-2483.5     | $\leq 4$ | $\leq 36$ |

Test result as below table

| 802.11b: Antenna gain= 0.48 dBi |  |           |         |                                  |           |         |
|---------------------------------|--|-----------|---------|----------------------------------|-----------|---------|
| Frequency (MHz)                 | Conducted Peak Output Power (dBm)<br>§15.247 (b) (1) |           |         | e.i.r.p. (dBm)<br>RSS-247 5.4(d) |           |         |
|                                 | Result   | limit     | Verdict | Result                           | limit     | Verdict |
| 2412MHz                         | 21.03  | $\leq 30$ | Pass    | 21.51                            | $\leq 36$ | Pass    |
| 2437MHz                         | 21.16  | $\leq 30$ | Pass    | 21.64                            | $\leq 36$ | Pass    |
| 2462MHz                         | 21.44  | $\leq 30$ | Pass    | 21.92                            | $\leq 36$ | Pass    |

| 802.11g: Antenna gain= 0.48 dBi |  |           |         |                                  |           |         |
|---------------------------------|--|-----------|---------|----------------------------------|-----------|---------|
| Frequency (MHz)                 | Conducted Peak Output Power (dBm)<br>§15.247 (b) (1) |           |         | e.i.r.p. (dBm)<br>RSS-247 5.4(d) |           |         |
|                                 | Result   | limit     | Verdict | Result                           | limit     | Verdict |
| 2412MHz                         | 26.11  | $\leq 30$ | Pass    | 26.59                            | $\leq 36$ | Pass    |
| 2437MHz                         | 26.88  | $\leq 30$ | Pass    | 27.36                            | $\leq 36$ | Pass    |
| 2462MHz                         | 26.23  | $\leq 30$ | Pass    | 26.71                            | $\leq 36$ | Pass    |

| 802.11n(HT20): Antenna gain= 0.48 dBi |  |           |         |                                  |           |         |
|---------------------------------------|--|-----------|---------|----------------------------------|-----------|---------|
| Frequency (MHz)                       | Conducted Peak Output Power (dBm)<br>§15.247 (b) (1) |           |         | e.i.r.p. (dBm)<br>RSS-247 5.4(d) |           |         |
|                                       | Result   | limit     | Verdict | Result                           | limit     | Verdict |
| 2412MHz                               | 25.62  | $\leq 30$ | Pass    | 26.10                            | $\leq 36$ | Pass    |
| 2437MHz                               | 26.11  | $\leq 30$ | Pass    | 26.59                            | $\leq 36$ | Pass    |
| 2462MHz                               | 25.95  | $\leq 30$ | Pass    | 26.43                            | $\leq 36$ | Pass    |

| 802.11n(HT40): Antenna gain= 0.48 dBi |  |           |         |                                  |           |         |
|---------------------------------------|--|-----------|---------|----------------------------------|-----------|---------|
| Frequency (MHz)                       | Conducted Peak Output Power (dBm)<br>§15.247 (b) (1) |           |         | e.i.r.p. (dBm)<br>RSS-247 5.4(d) |           |         |
|                                       | Result   | limit     | Verdict | Result                           | limit     | Verdict |
| 2422MHz                               | 24.68  | $\leq 30$ | Pass    | 25.16                            | $\leq 36$ | Pass    |
| 2437MHz                               | 25.26  | $\leq 30$ | Pass    | 25.74                            | $\leq 36$ | Pass    |
| 2452MHz                               | 24.59  | $\leq 30$ | Pass    | 25.07                            | $\leq 36$ | Pass    |



**10.36dB bandwidth and 99% Occupied Bandwidth**

**Test Method**

1. Use the following spectrum analyzer settings:  
RBW=100K, VBW≥3RBW, Sweep = auto, Detector function = peak, Trace = max hold
2. Use the automatic bandwidth measurement capability of an instrument, may be employed using the X dB bandwidth mode with X set to 6 dB, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be ≥ 6 dB.
3. Allow the trace to stabilize, record the X dB Bandwidth value.

**Limit**

**Limit [kHz]**

≥500

**Test Method for 99 % Bandwidth**

1. Use the following spectrum analyzer settings:  
RBW=1% to 5% of the actual occupied, VBW≥3RBW, Sweep = auto, Detector function = peak, Trace = max hold
2. Use the automatic bandwidth measurement capability of an instrument, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be ≥ 6 dB.
3. Allow the trace to stabilize, record the X dB Bandwidth value.

**Limit**

**Limit [kHz]**

N/A

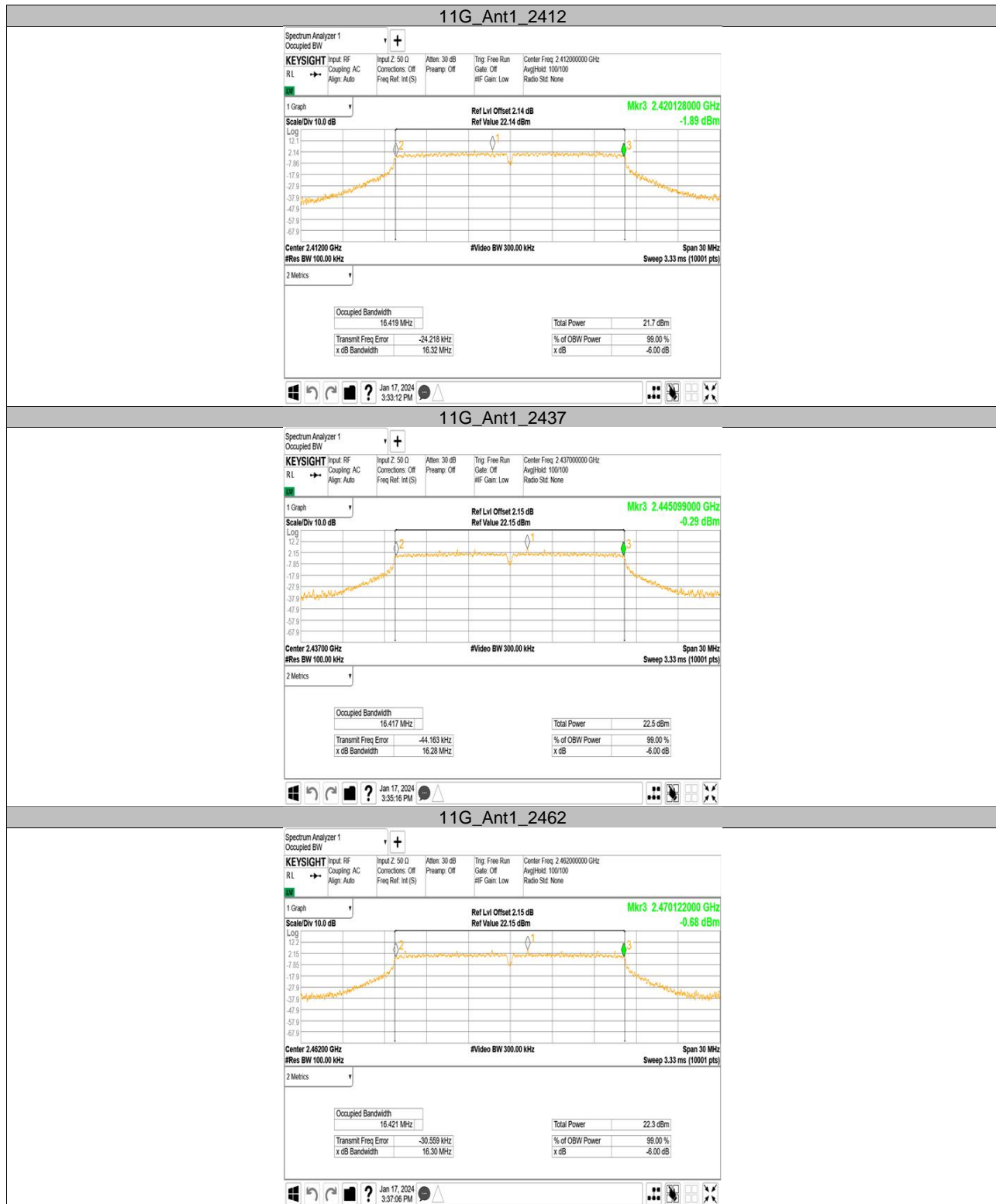
**Test result**

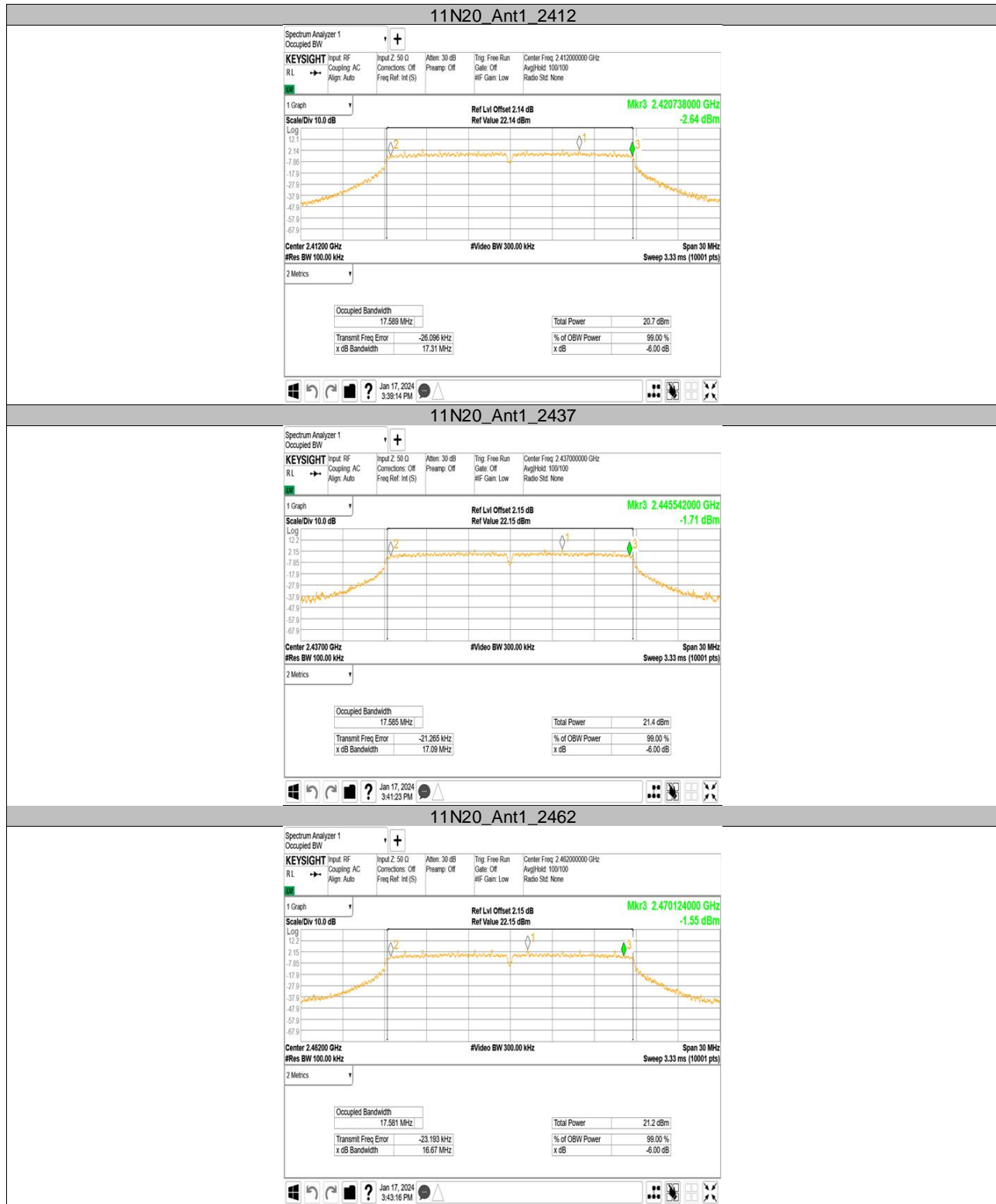
| Test Mode     | Frequency MHz | 6dB bandwidth (MHz) |       | Result  | 99% occupied bandwidth MHz |
|---------------|---------------|---------------------|-------|---------|----------------------------|
|               |               | result              | limit | verdict |                            |
| 802.11b       | 2412          | 9.093               | ≥0.5  | Pass    | 14.663                     |
|               | 2437          | 9.083               | ≥0.5  | Pass    | 14.582                     |
|               | 2462          | 9.531               | ≥0.5  | Pass    | 14.564                     |
| 802.11g       | 2412          | 16.322              | ≥0.5  | Pass    | 16.517                     |
|               | 2437          | 16.277              | ≥0.5  | Pass    | 16.507                     |
|               | 2462          | 16.301              | ≥0.5  | Pass    | 16.55                      |
| 802.11n(HT20) | 2412          | 17.307              | ≥0.5  | Pass    | 17.635                     |
|               | 2437          | 17.088              | ≥0.5  | Pass    | 17.638                     |
|               | 2462          | 16.67               | ≥0.5  | Pass    | 17.605                     |
| 802.11n(HT40) | 2422          | 35.098              | ≥0.5  | Pass    | 35.768                     |
|               | 2437          | 35.046              | ≥0.5  | Pass    | 35.852                     |
|               | 2452          | 35.052              | ≥0.5  | Pass    | 35.82                      |



6 dB Bandwidth







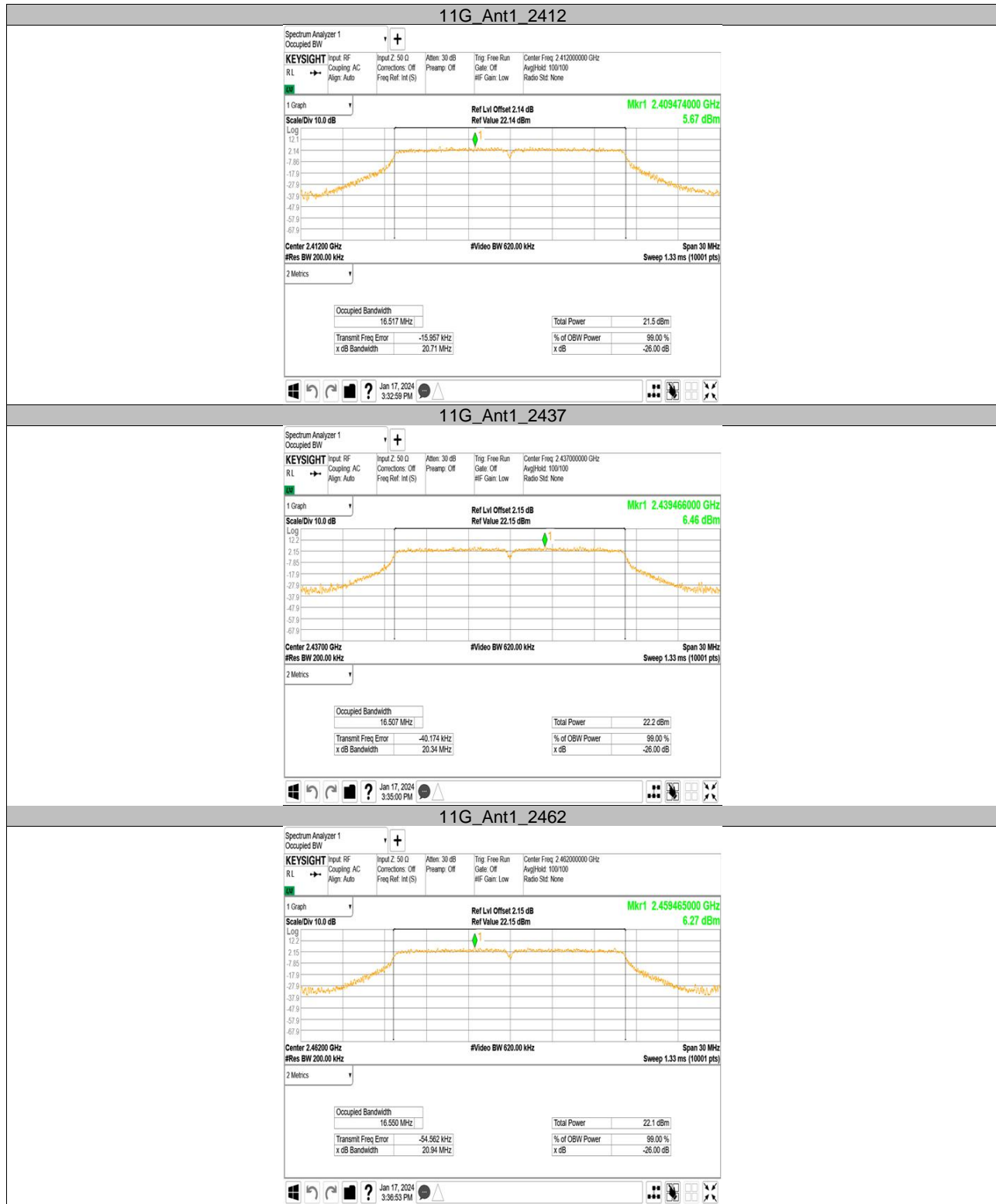


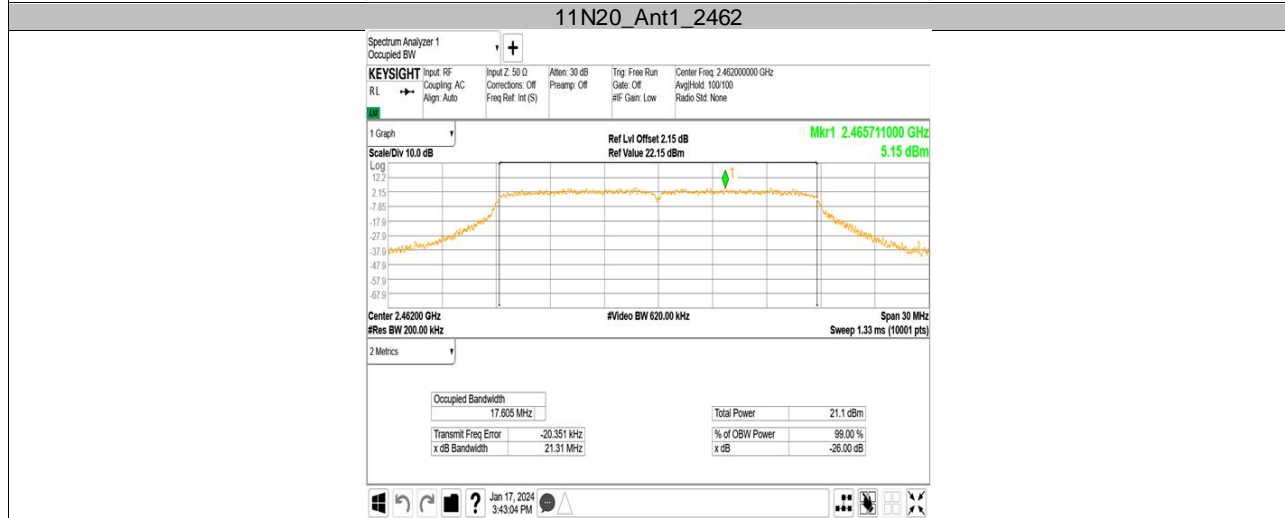
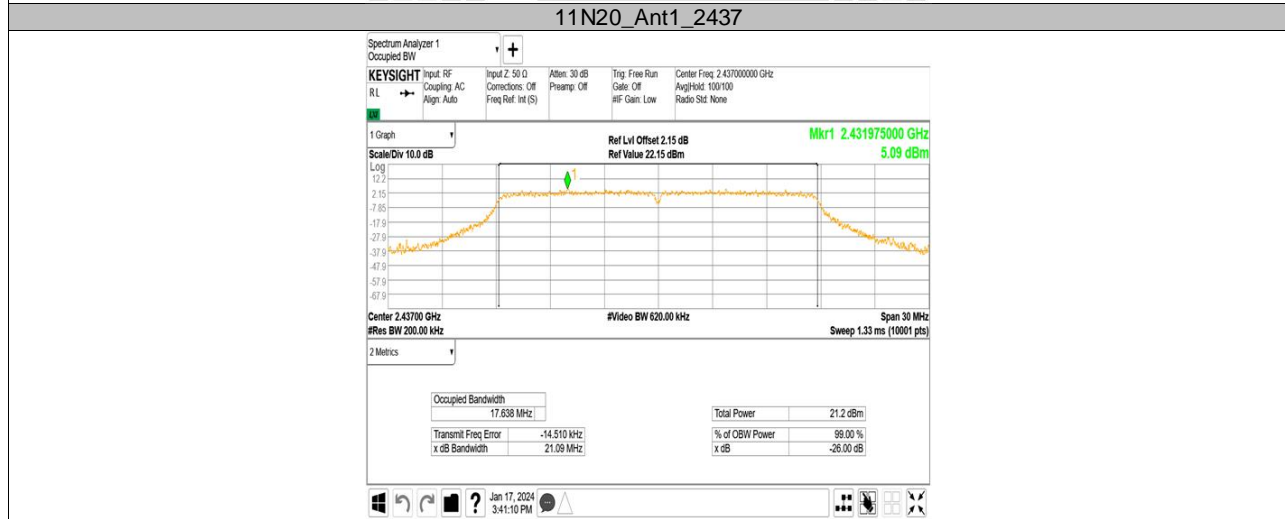
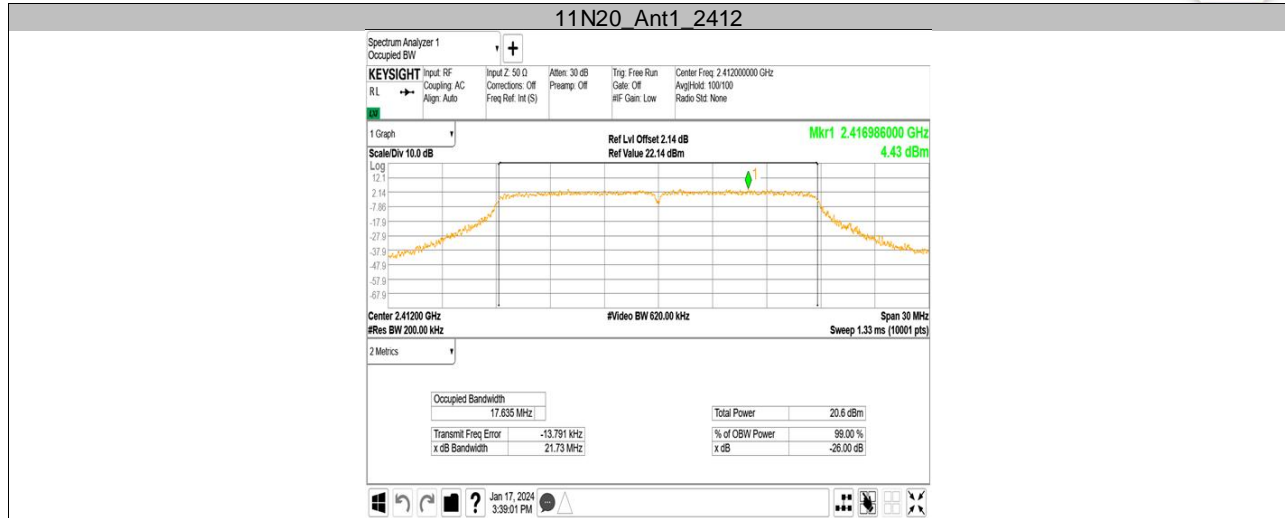


99% Bandwidth













### 10.4 Power spectral density

#### Test Method

This procedure shall be used if maximum peak conducted output power was used to demonstrate compliance:

1. Set analyzer center frequency to DTS channel center frequency.  
RBW=3kHz, VBW≥3RBW, Span=1.5 times DTS bandwidth, Detector=Peak, Sweep=auto, Trace= max hold.
2. Allow trace to fully stabilize, use the peak marker function to determine the maximum amplitude level within the RBW.
3. Repeat above procedures until other frequencies measured were completed.

#### Limit

Limit [dBm]

≤8

Test result  
802.11 b

| Frequency<br>MHz       | Power spectral<br>density<br>dBm/3kHz | Result |
|------------------------|---------------------------------------|--------|
| Low channel 2412MHz    | -4.44                                 | Pass   |
| Middle channel 2437MHz | -5.15                                 | Pass   |
| High channel 2462MHz   | -5.38                                 | Pass   |

802.11 g

| Frequency<br>MHz       | Power spectral<br>density<br>dBm | Result |
|------------------------|----------------------------------|--------|
| Low channel 2412MHz    | -8.03                            | Pass   |
| Middle channel 2437MHz | -8.57                            | Pass   |
| High channel 2462MHz   | -8.57                            | Pass   |

802.11 n (HT20)

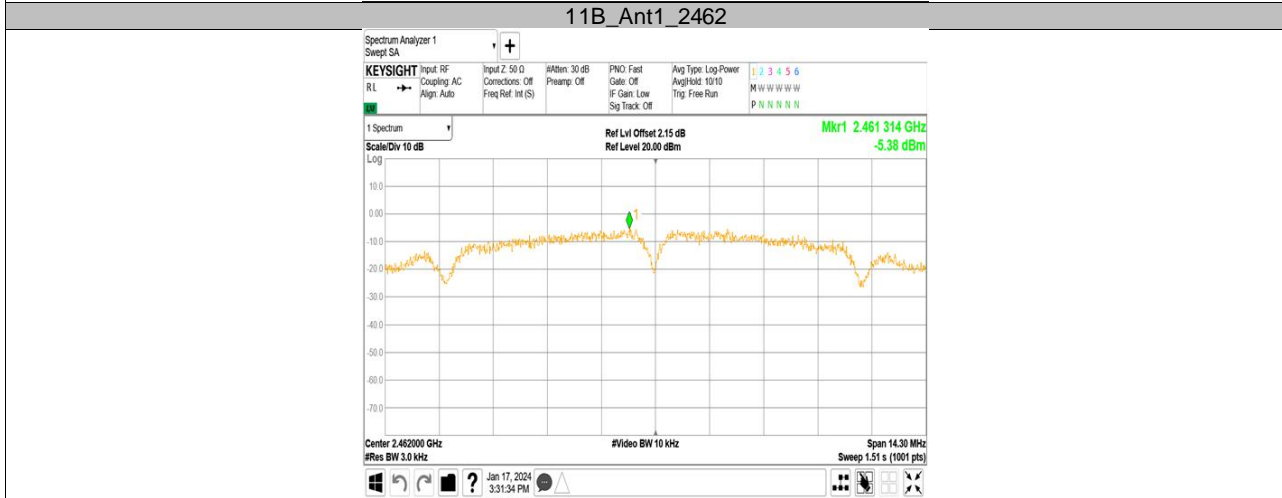
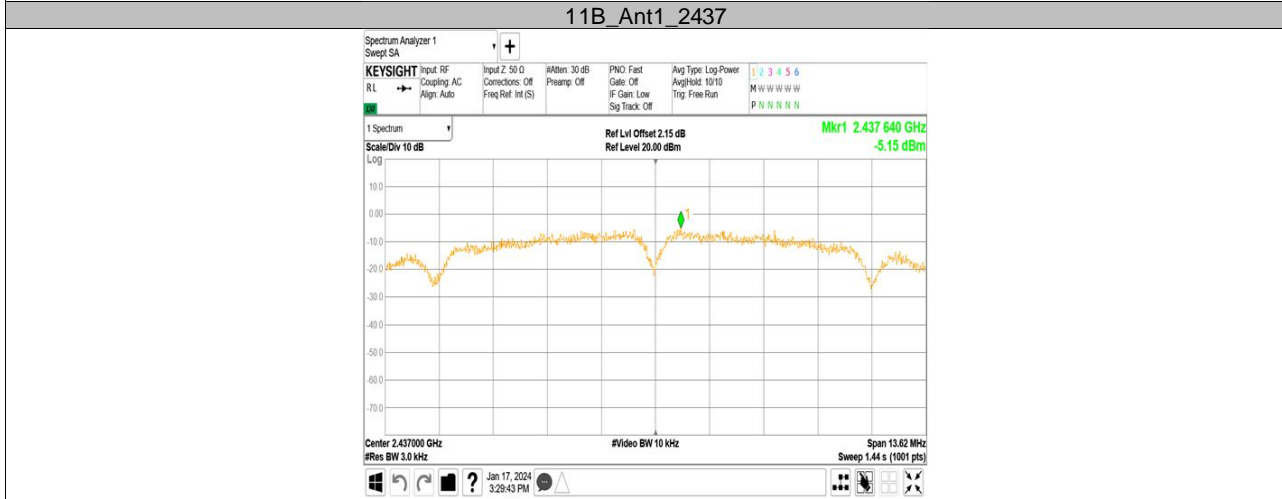
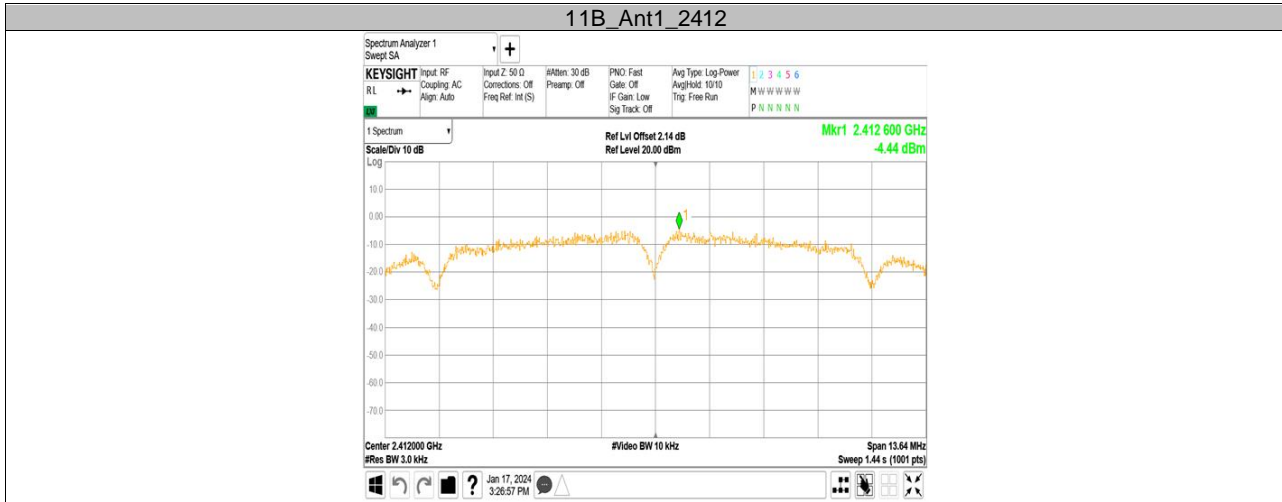
| Frequency<br>MHz       | Power spectral<br>density<br>dBm | Result |
|------------------------|----------------------------------|--------|
| Low channel 2412MHz    | -10.52                           | Pass   |
| Middle channel 2437MHz | -8.86                            | Pass   |
| High channel 2462MHz   | -9.49                            | Pass   |

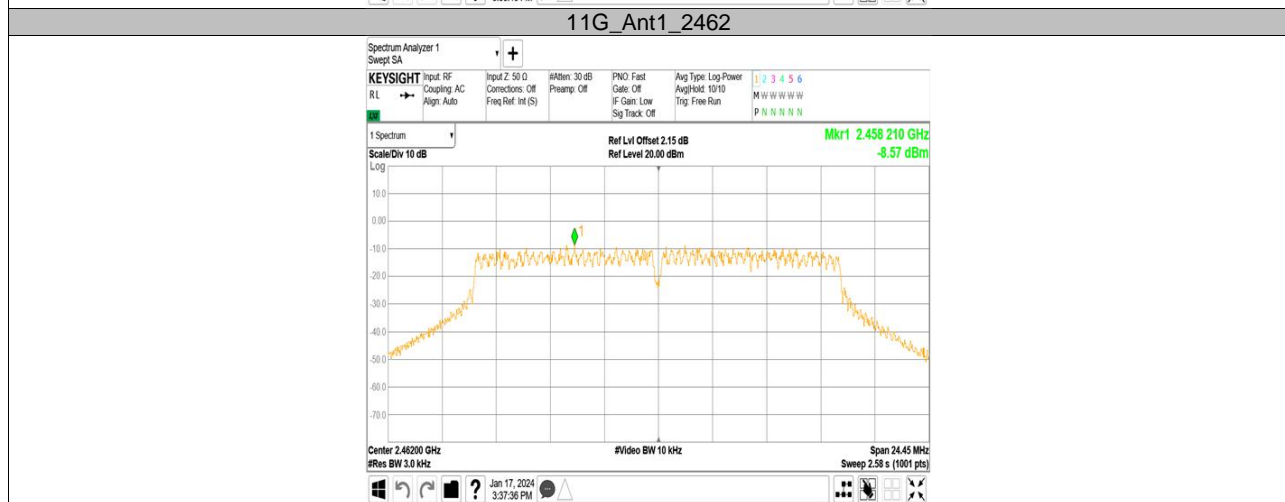
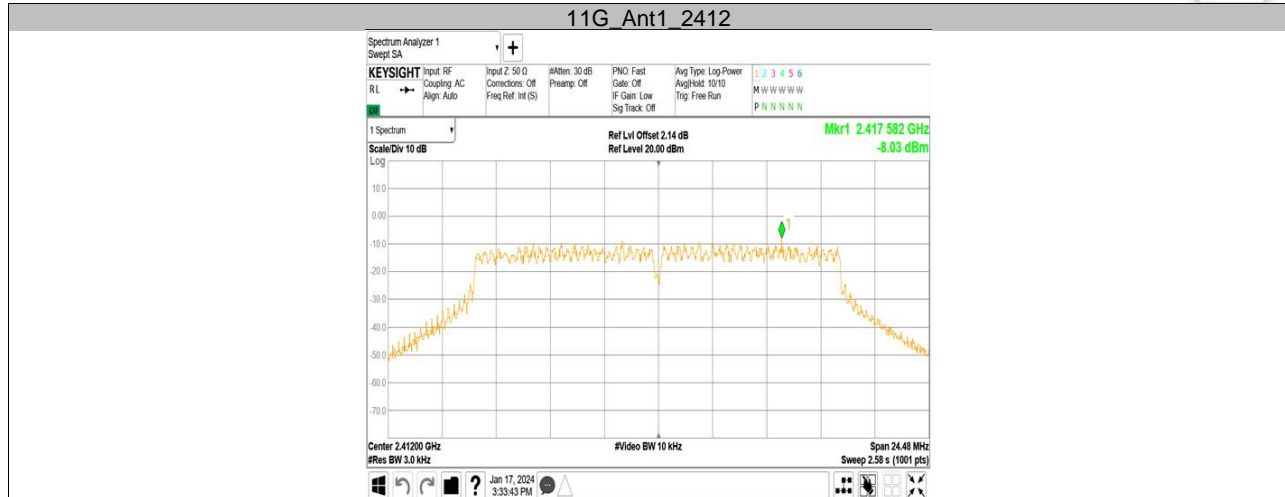
802.11 n (HT40)

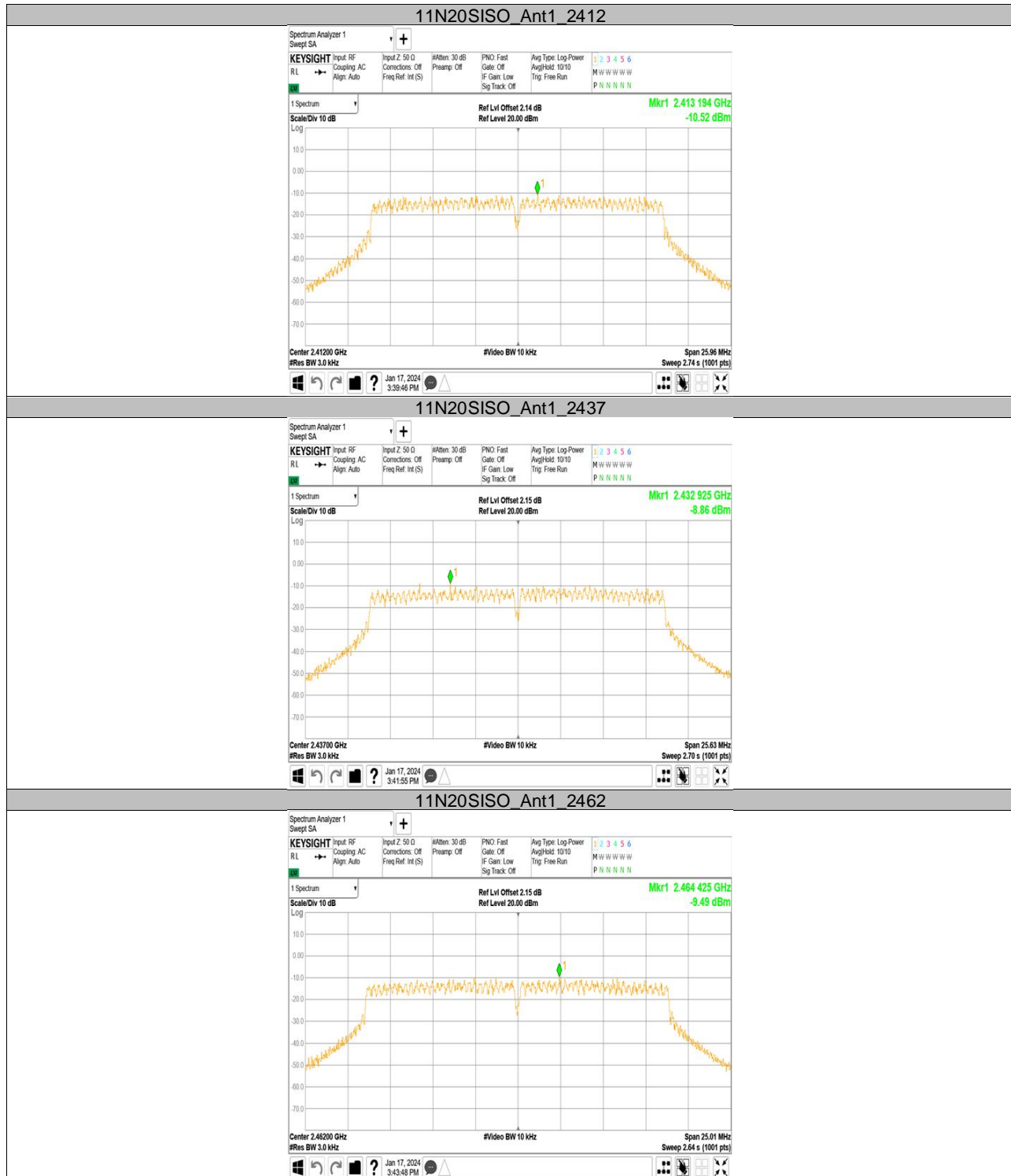
| Frequency<br>MHz       | Power spectral<br>density<br>dBm | Result |
|------------------------|----------------------------------|--------|
| Low channel 2422MHz    | -13.71                           | Pass   |
| Middle channel 2437MHz | -13.32                           | Pass   |
| High channel 2452MHz   | -13.06                           | Pass   |

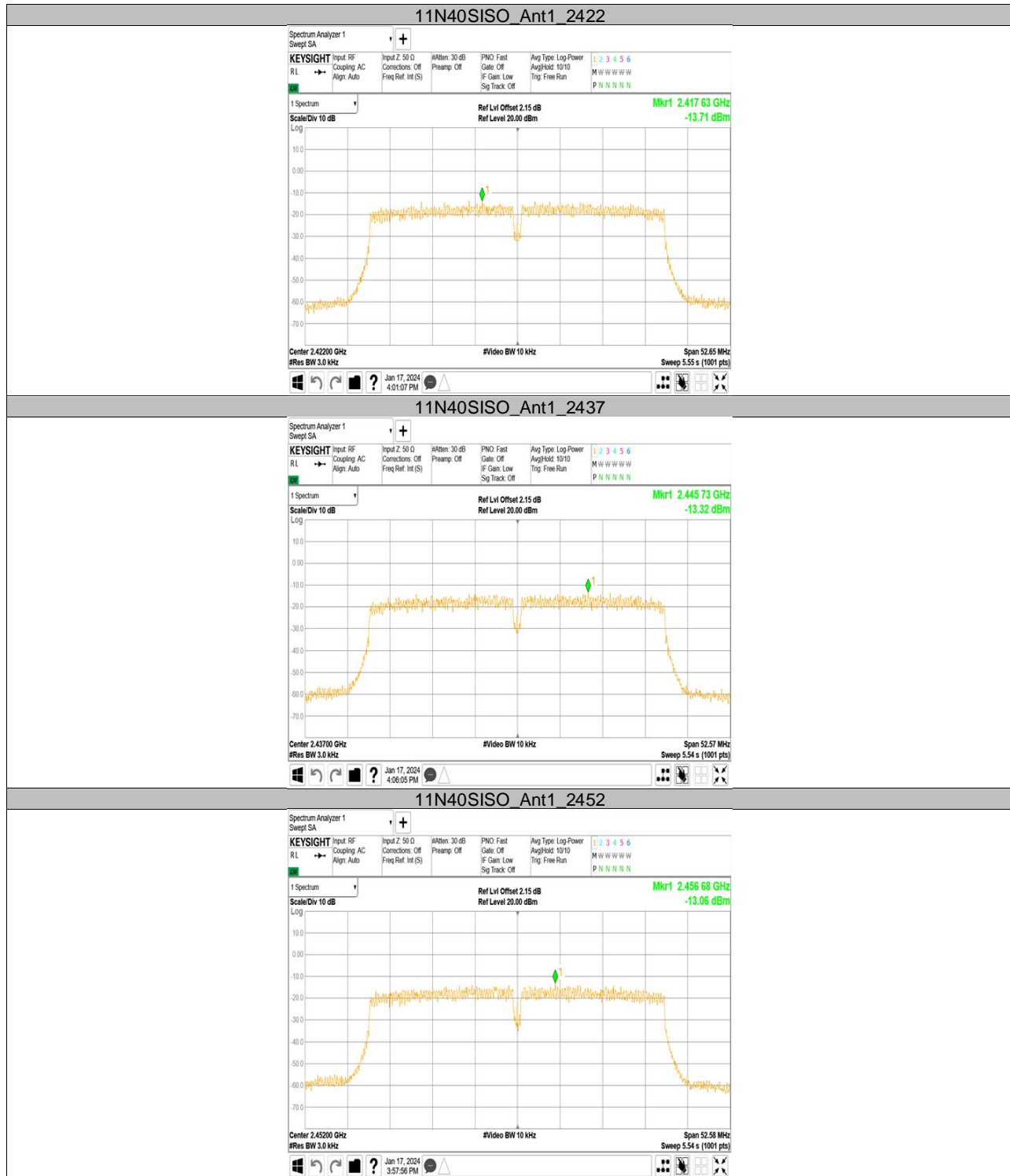


### Power spectral density













## 10.5 Spurious RF conducted emissions

### Test Method

1. Establish a reference level by using the following procedure:
  - a. Set RBW=100 kHz. VBW≥3RBW. Detector =peak, Sweep time = auto couple, Trace mode = max hold.
  - b. Allow trace to fully stabilize, use the peak marker function to determine the maximum PSD level.
2. Use the maximum PSD level to establish the reference level.
  - a. Set the center frequency and span to encompass frequency range to be measured.
  - b. Use the peak marker function to determine the maximum amplitude level. Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) are attenuated by at least the minimum requirements, report the three highest emissions relative to the limit.
3. Repeat above procedures until other frequencies measured were completed.

### Limit

| Frequency Range<br>MHz | Limit (dBc) |
|------------------------|-------------|
| 30-25000               | -20         |



**Spurious RF conducted emissions**

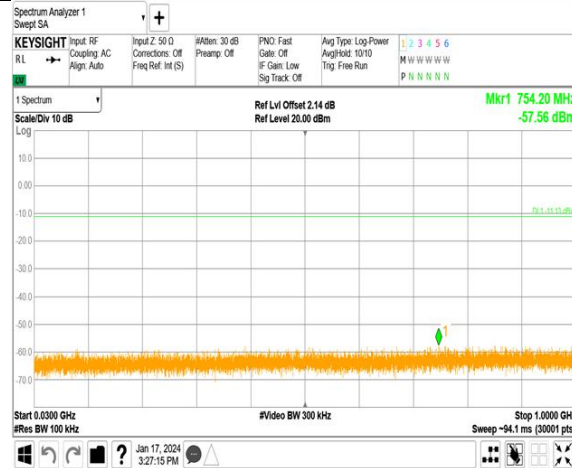
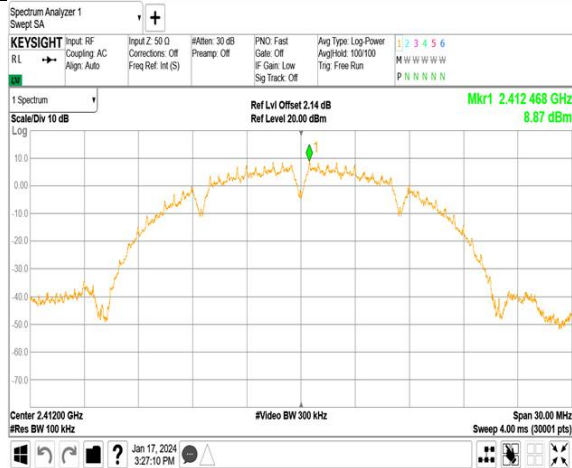
802.11 B

Out-of-Band Emissions

Channel 1 (2412MHz)

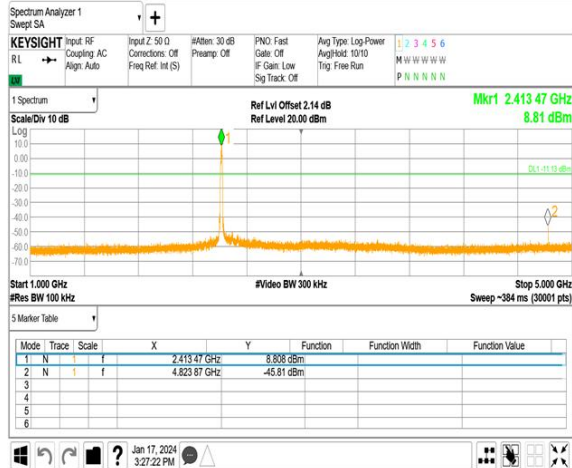
Reference point

Spurious Emission (30MHz – 1GHz)



Spurious Emission (1GHz – 5GHz)

Spurious Emission (5GHz – 26.5GHz)

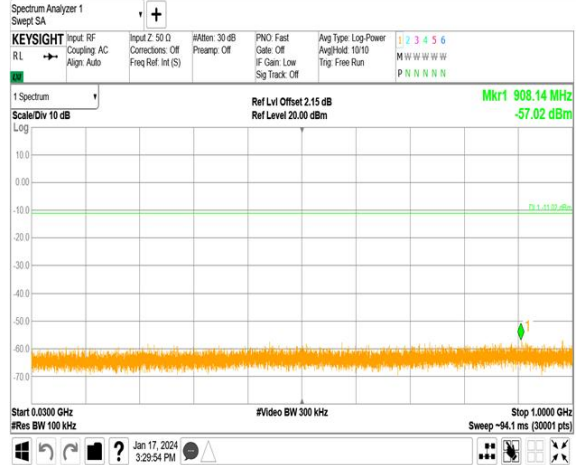




### Out-of-Band Emissions Channel 6 (2437MHz)

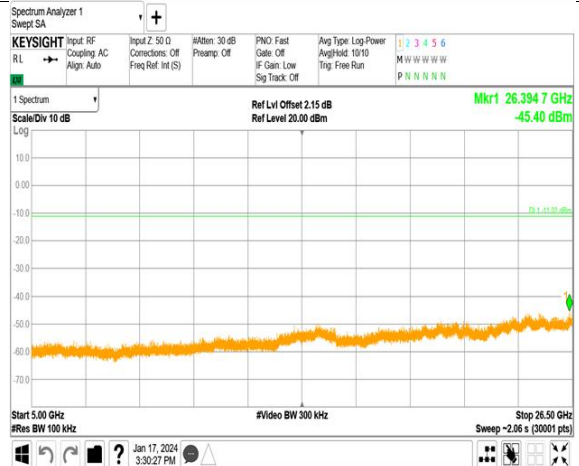
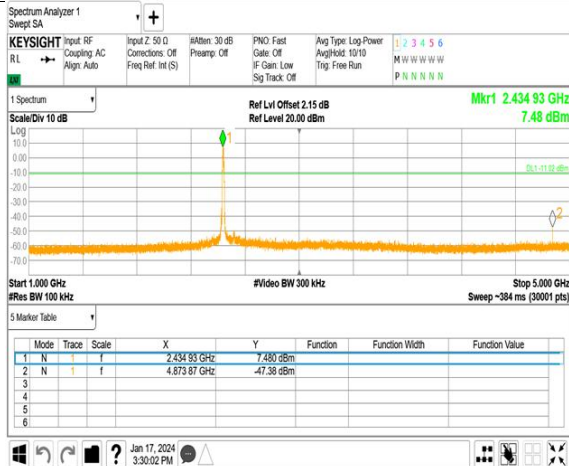
#### Reference point

#### Spurious Emission (30MHz – 1GHz)



#### Spurious Emission (1GHz –5GHz)

#### Spurious Emission (5GHz –26.5GHz)

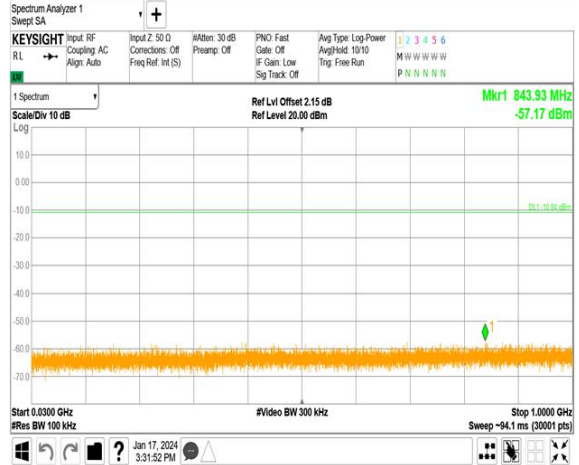
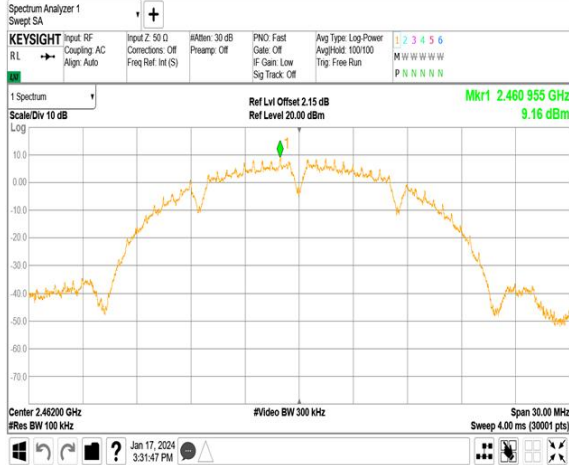




Out-of-Band Emissions  
Channel 11 (2462MHz)

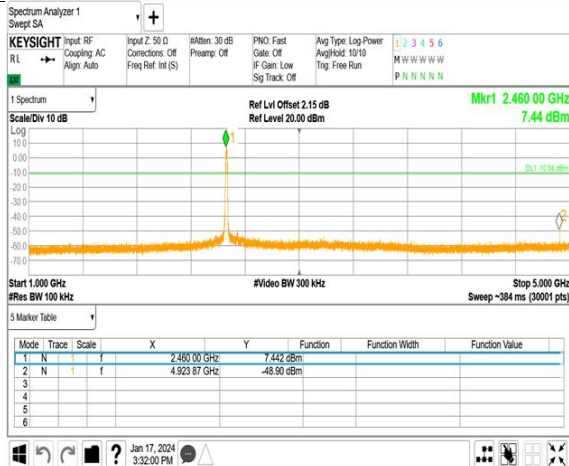
Reference point

Spurious Emission (30MHz – 1GHz)



Spurious Emission (1GHz –5GHz)

Spurious Emission (5GHz –26.5GHz)





802.11 G

Out-of-Band Emissions  
Channel 1 (2412MHz)

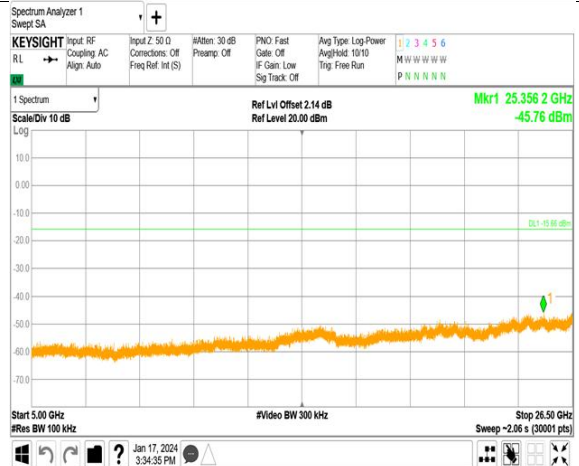
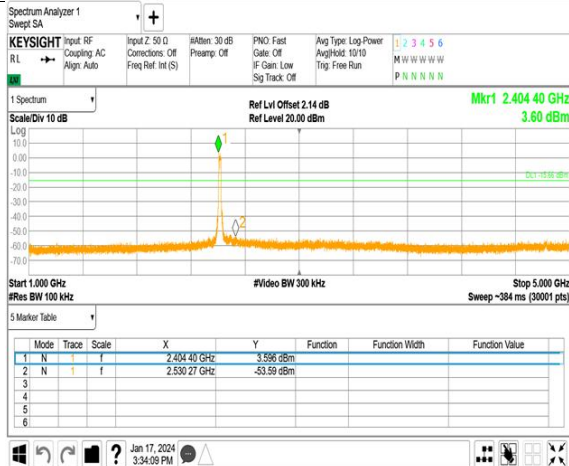
Reference point

Spurious Emission (30MHz – 1GHz)



Spurious Emission (1GHz –5GHz)

Spurious Emission (5GHz –26.5GHz)

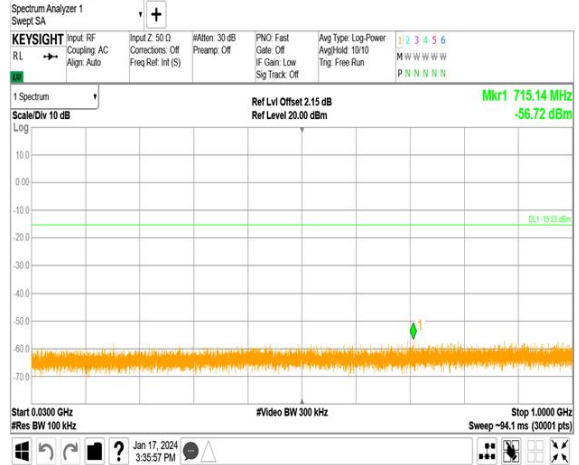
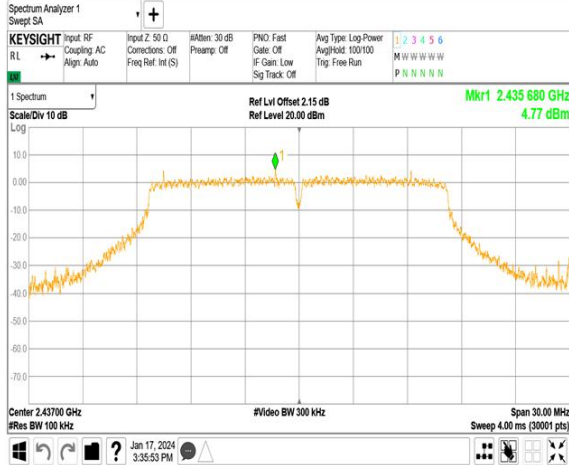




### Out-of-Band Emissions Channel 6 (2437MHz)

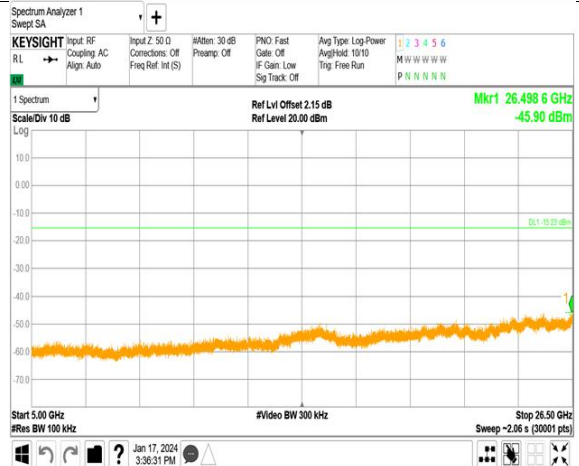
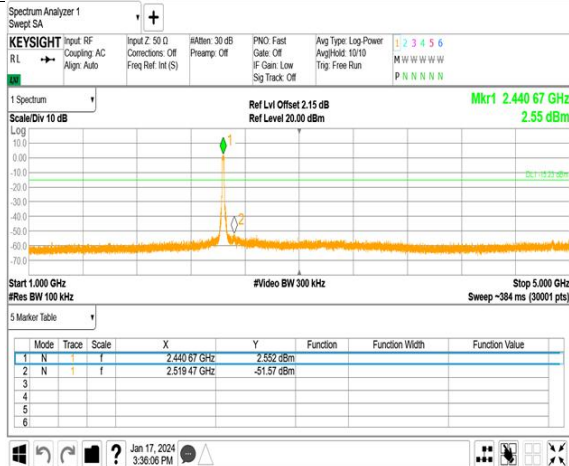
#### Reference point

#### Spurious Emission (30MHz – 1GHz)



#### Spurious Emission (1GHz –5GHz)

#### Spurious Emission (5GHz –26.5GHz)

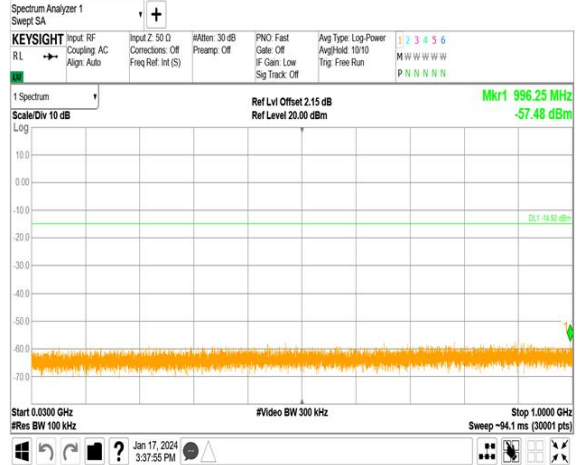
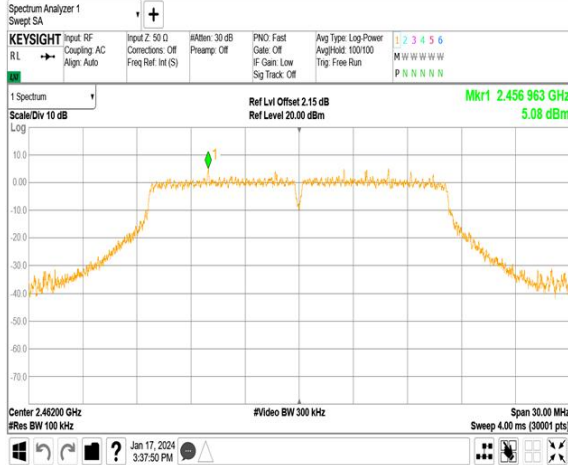




### Out-of-Band Emissions Channel 11 (2462MHz)

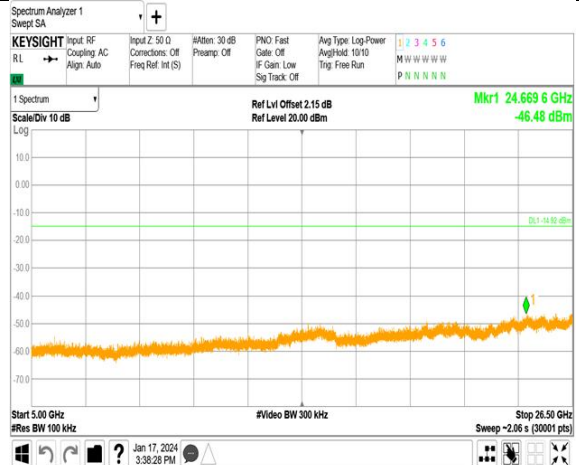
#### Reference point

#### Spurious Emission (30MHz – 1GHz)



#### Spurious Emission (1GHz –5GHz)

#### Spurious Emission (5GHz –26.5GHz)



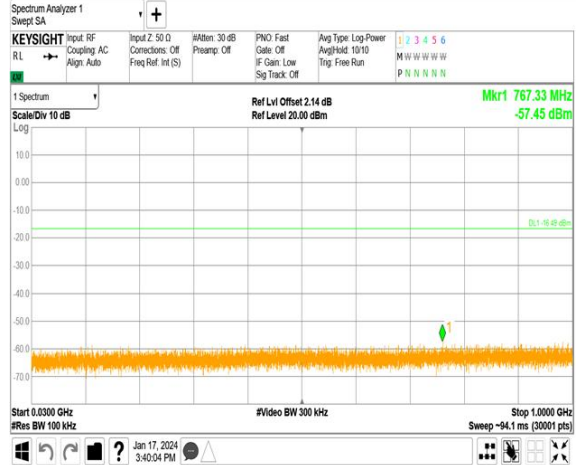


802.11 N HT20  
Out-of-Band Emissions  
Channel 1 (2412MHz)

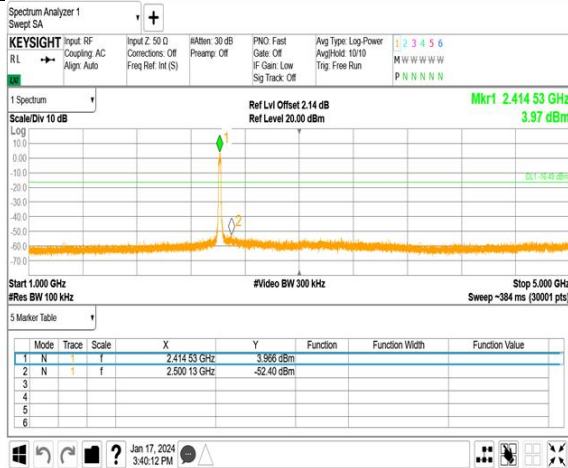
Reference point



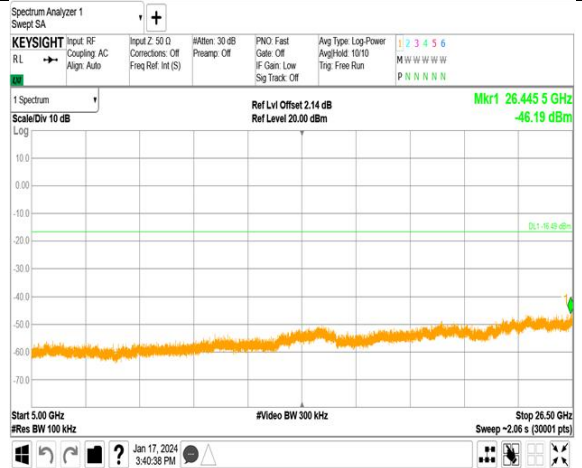
Spurious Emission (30MHz – 1GHz)



Spurious Emission (1GHz –5GHz)



Spurious Emission (5GHz –26.5GHz)

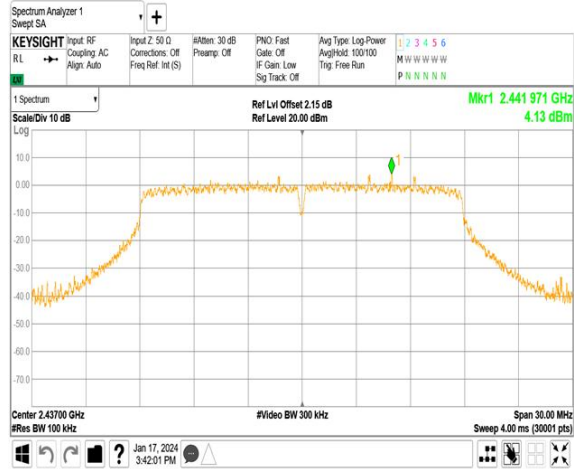




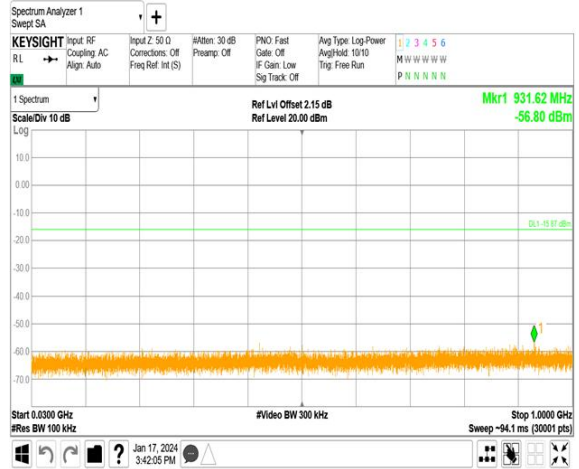


### Out-of-Band Emissions Channel 6 (2437MHz)

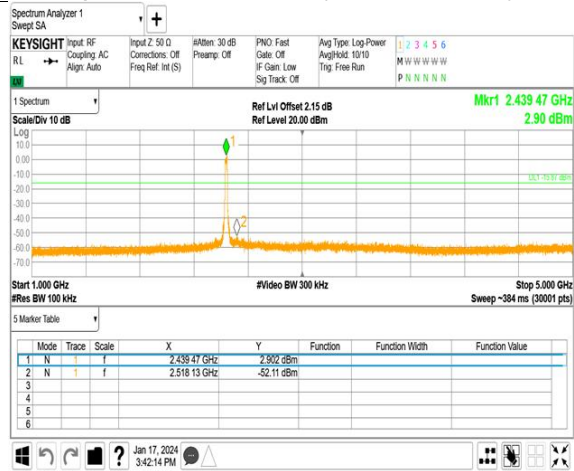
#### Reference point



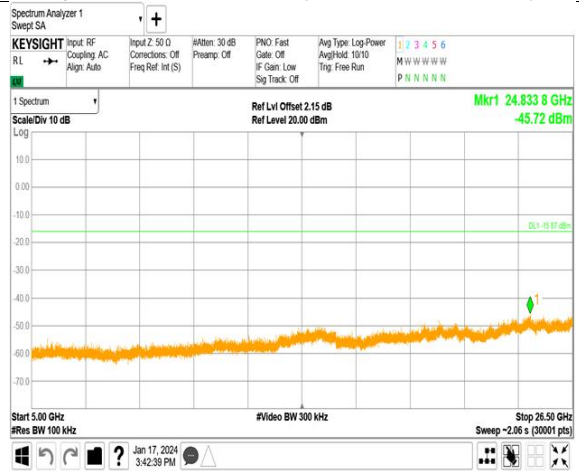
#### Spurious Emission (30MHz – 1GHz)



#### Spurious Emission (1GHz –5GHz)



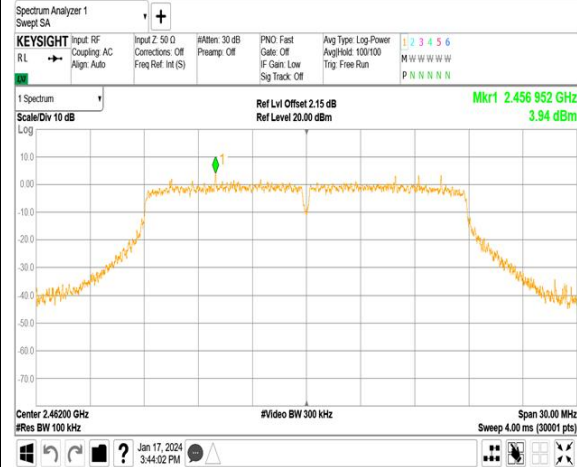
#### Spurious Emission (5GHz –26.5GHz)



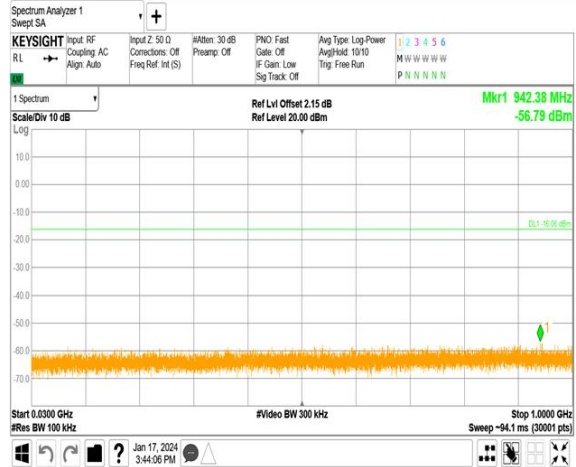


### Out-of-Band Emissions Channel 11 (2462MHz)

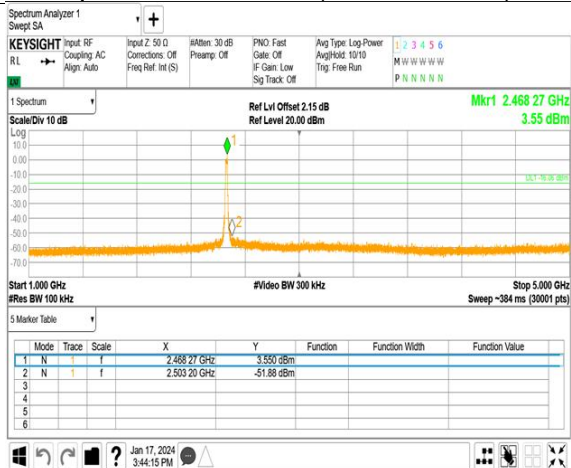
#### Reference point



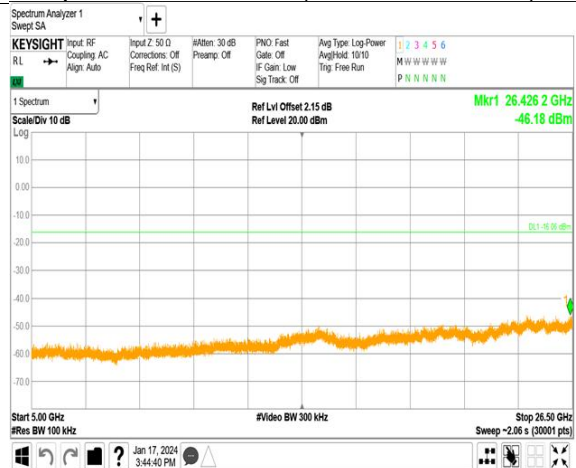
#### Spurious Emission (30MHz – 1GHz)



#### Spurious Emission (1GHz –5GHz)



#### Spurious Emission (5GHz –26.5GHz)



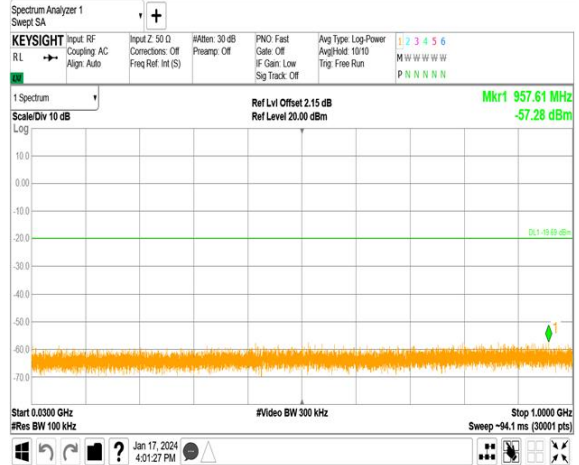


802.11 N HT40  
Out-of-Band Emissions  
Channel 1 (2422MHz)

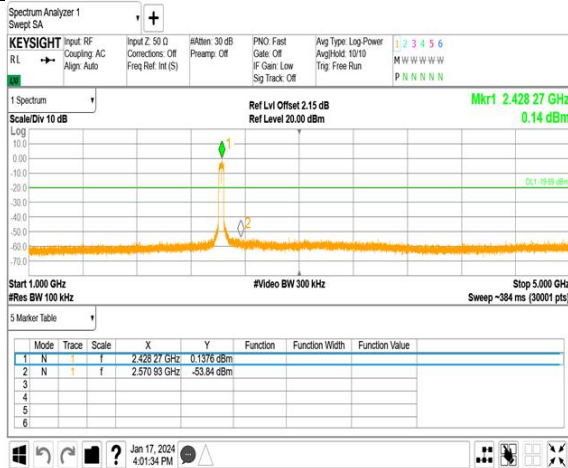
Reference point



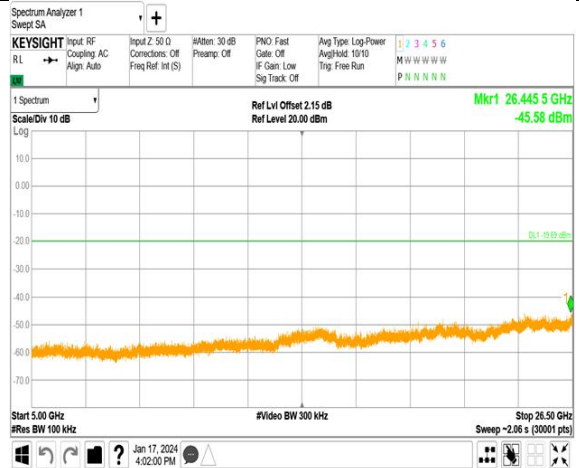
Spurious Emission (30MHz – 1GHz)



Spurious Emission (1GHz –5GHz)



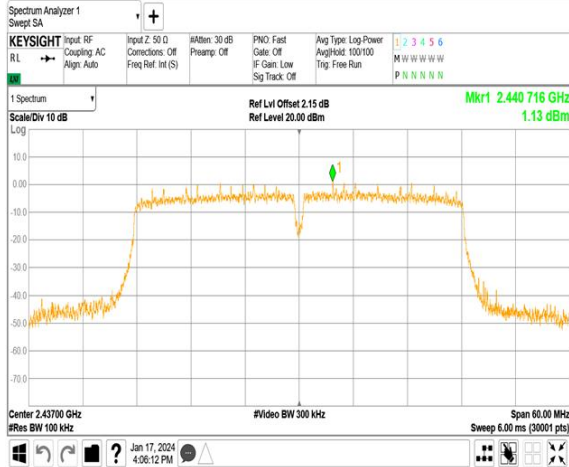
Spurious Emission (5GHz –26.5GHz)



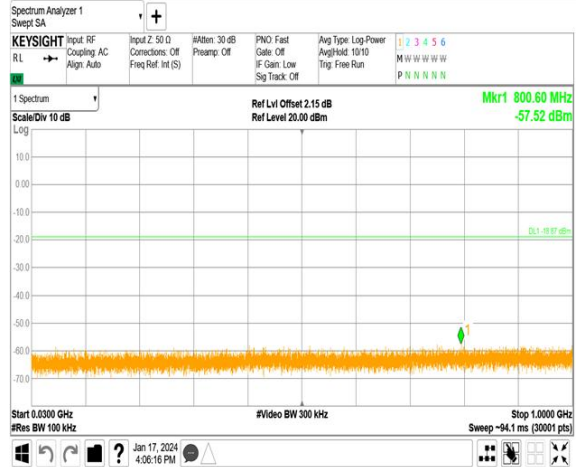


### Out-of-Band Emissions Channel 6 (2437MHz)

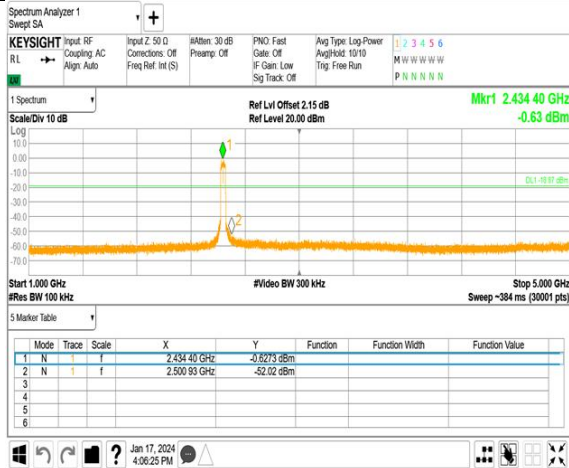
#### Reference point



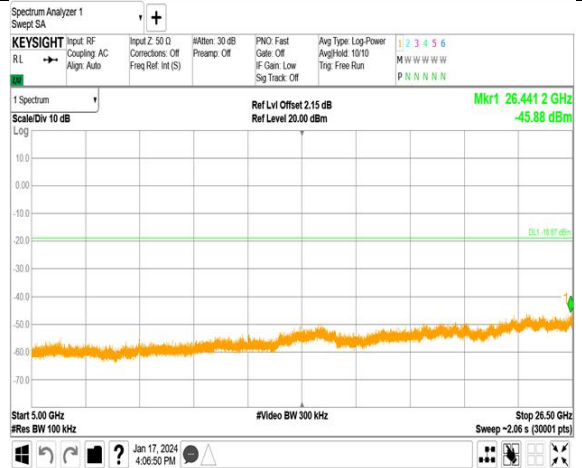
#### Spurious Emission (30MHz – 1GHz)



#### Spurious Emission (1GHz –5GHz)



#### Spurious Emission (5GHz –26.5GHz)



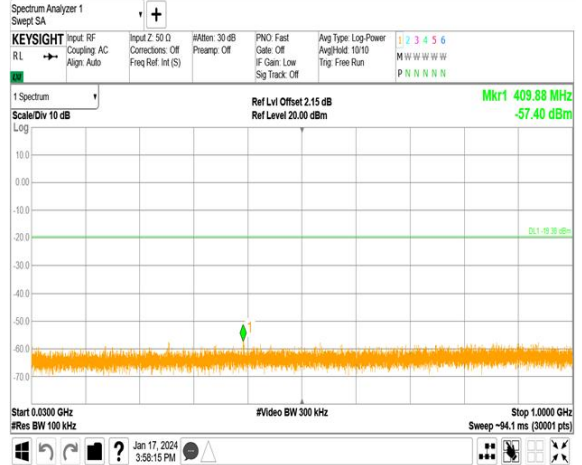


### Out-of-Band Emissions Channel 9 (2452MHz)

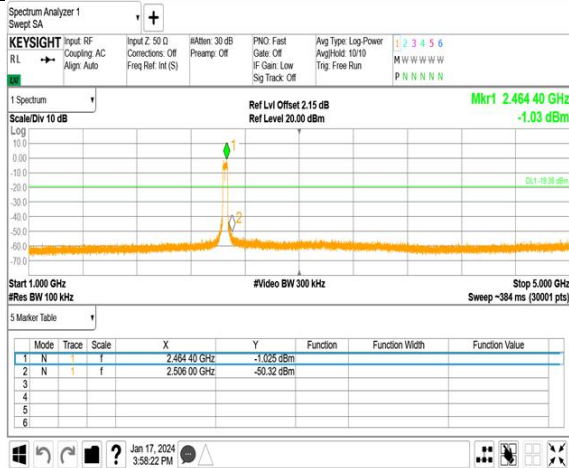
#### Reference point



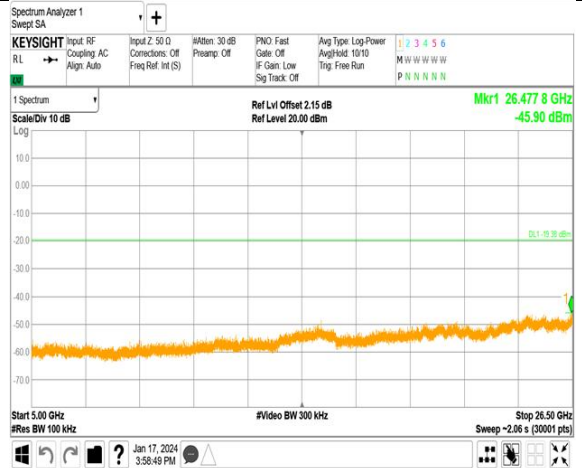
#### Spurious Emission (30MHz – 1GHz)



#### Spurious Emission (1GHz –5GHz)



#### Spurious Emission (5GHz –26.5GHz)





## 10.6 Band edge

### Test Method

- 1 Use the following spectrum analyzer settings:  
Span = wide enough to capture the peak level of the in-band emission and all spurious  
RBW = 100 kHz, VBW ≥ RBW, Sweep = auto, Detector function = peak, Trace = max hold.
- 2 Allow the trace to stabilize, use the peak and delta measurement to record the result.
- 3 The level displayed must comply with the limit specified in this Section.

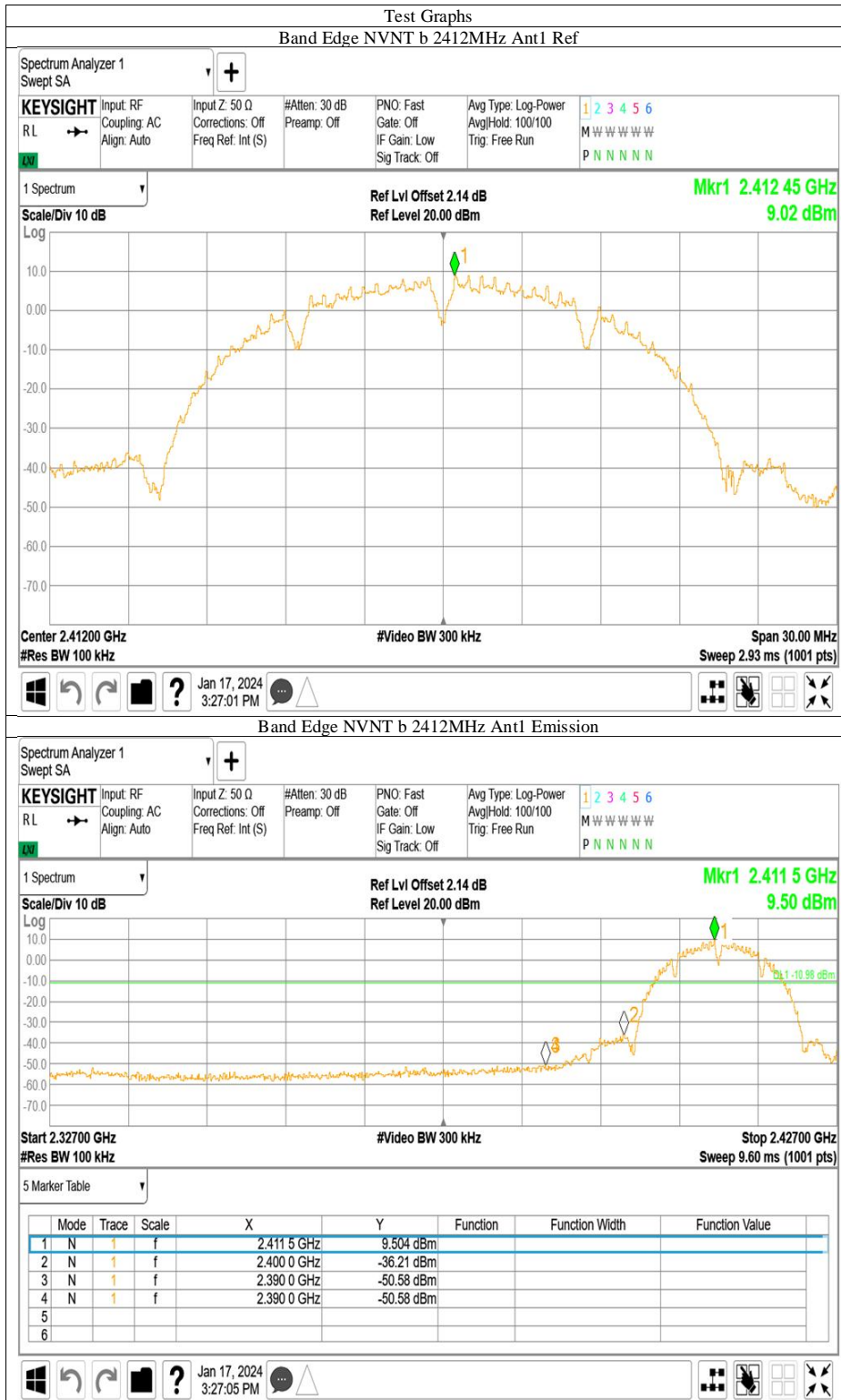
### Limit

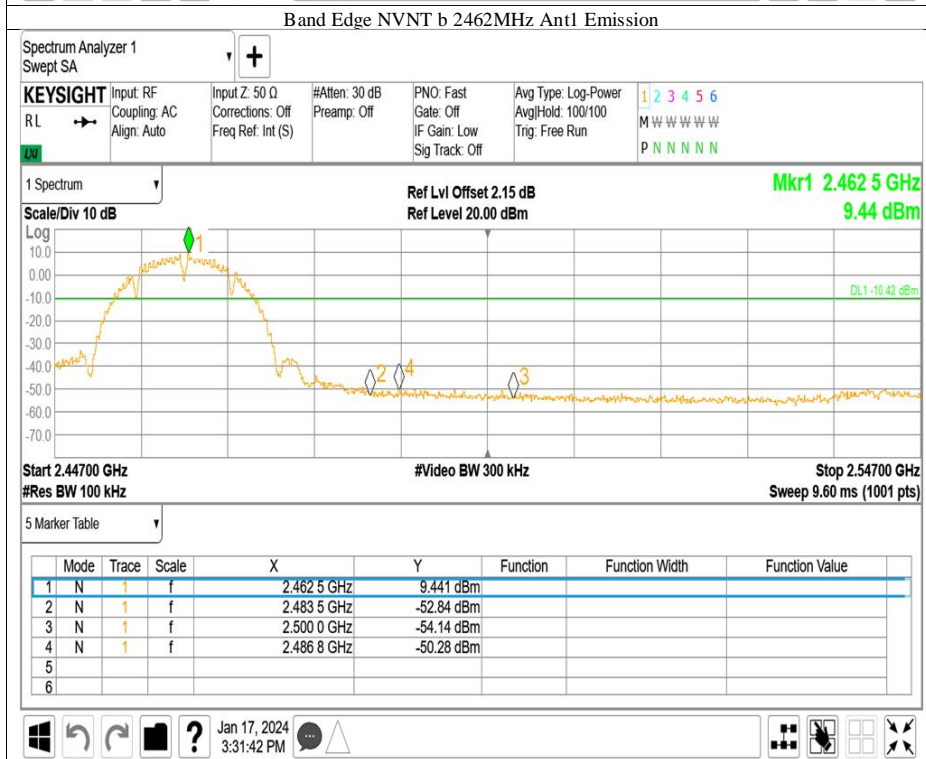
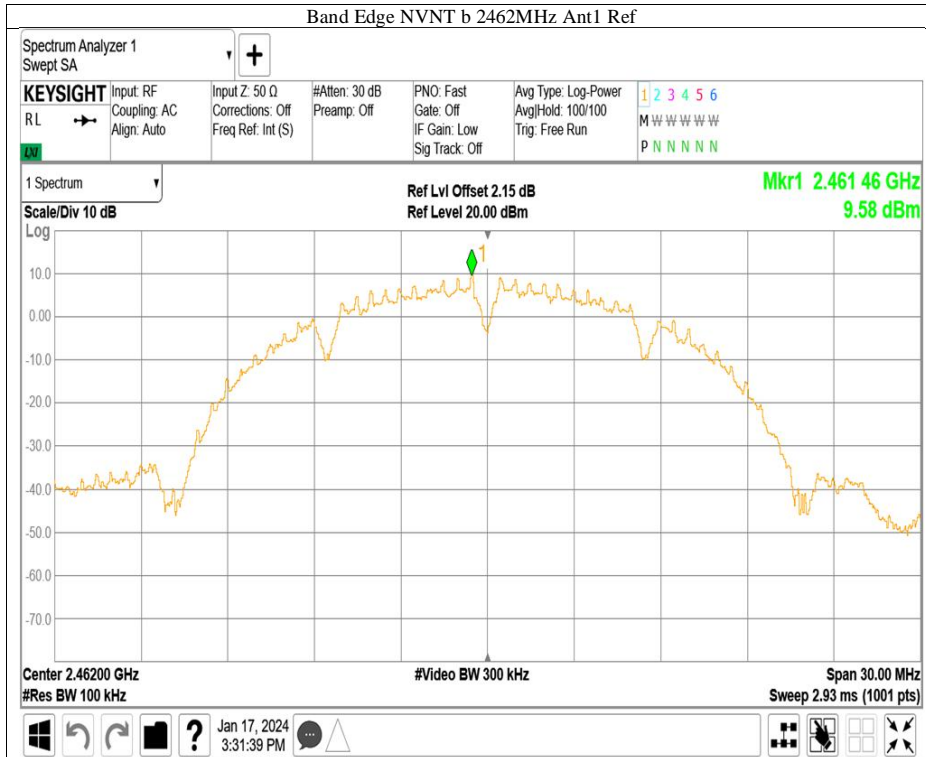
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under § 15.247(b)(3) and RSS-247 section 5.4(d), the attenuation required shall be 30 dB instead of 20 dB.

| Frequency Range<br>MHz | Limit (dBc) |
|------------------------|-------------|
| 30-25000               | -20         |

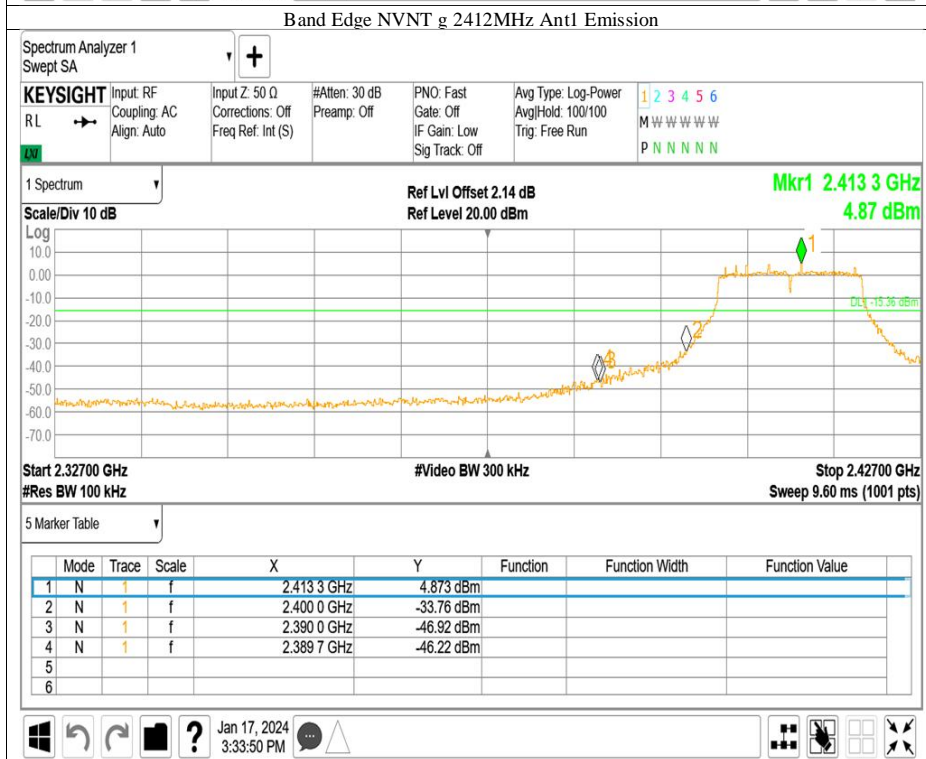
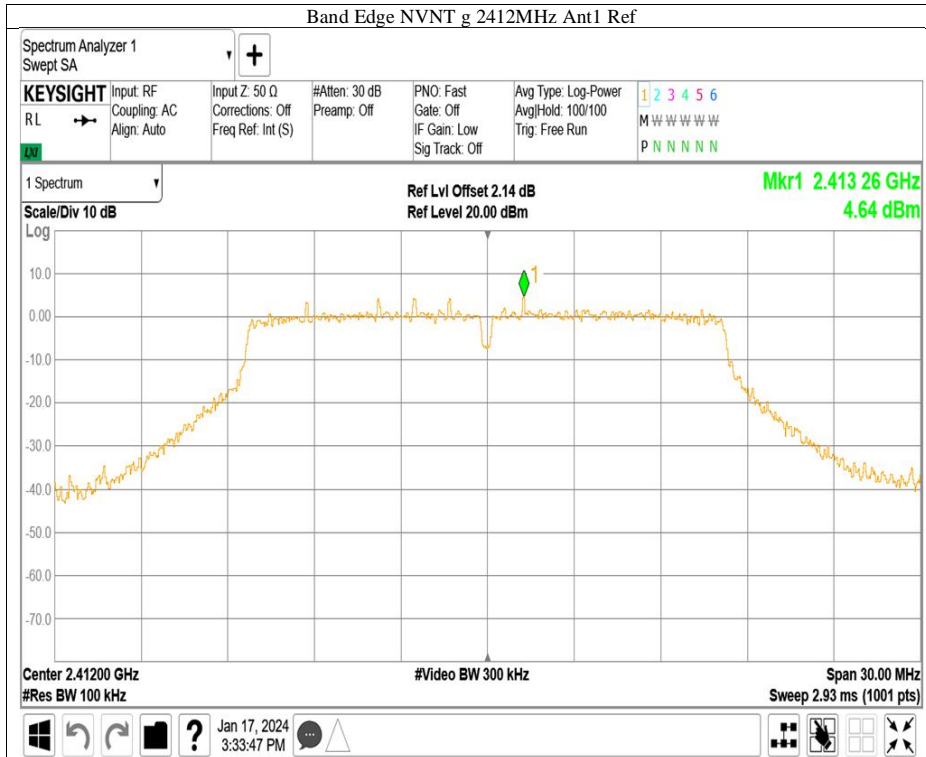


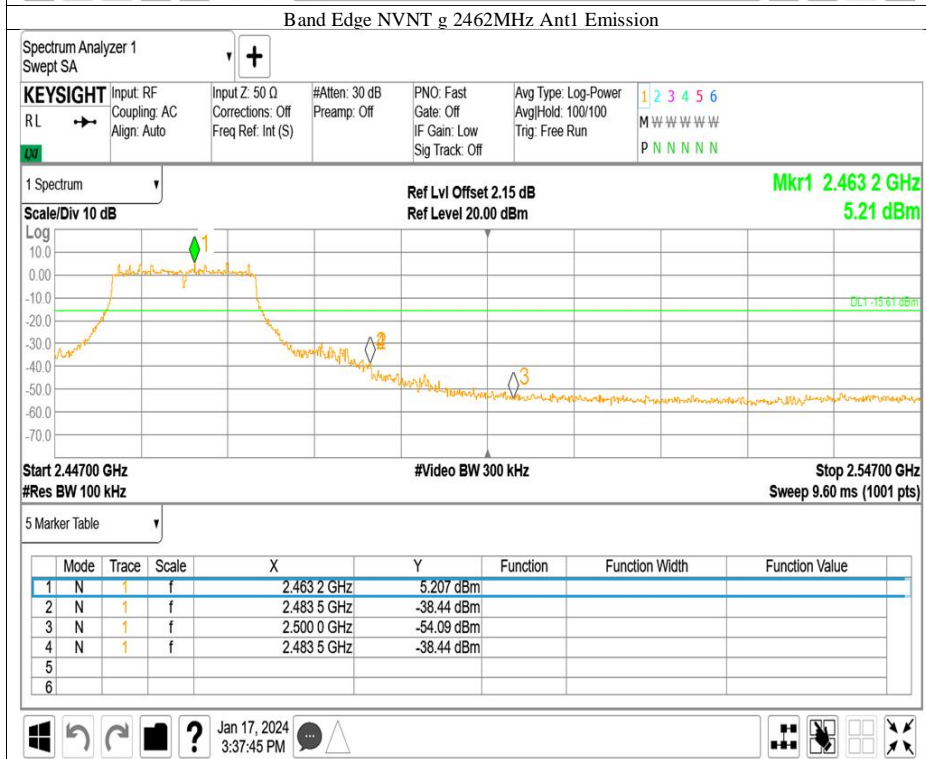
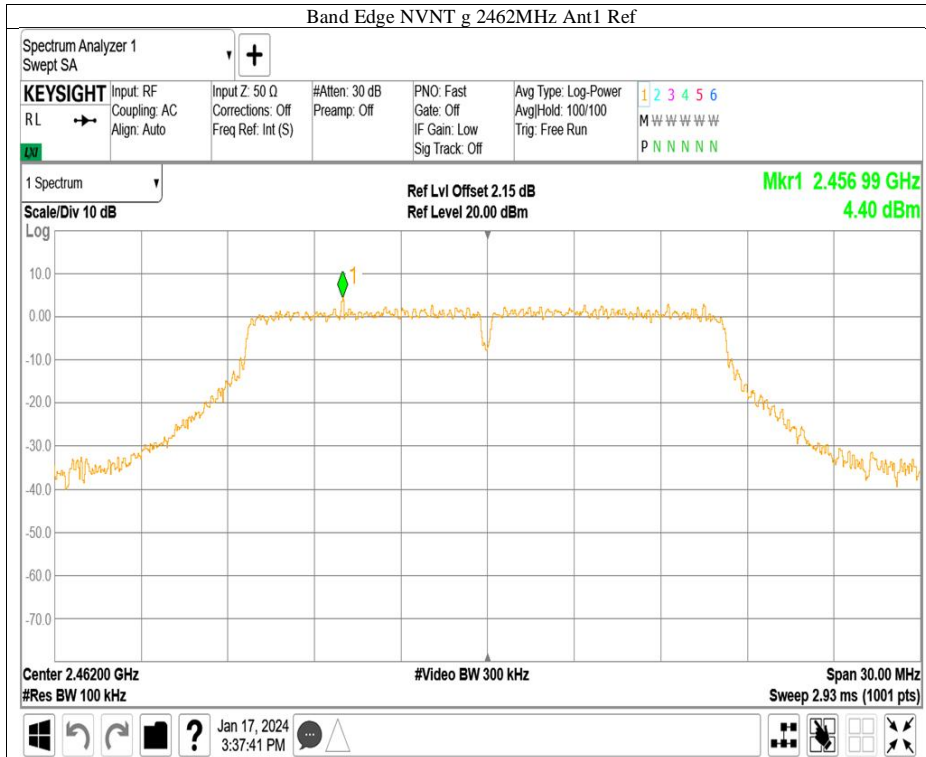
Test result

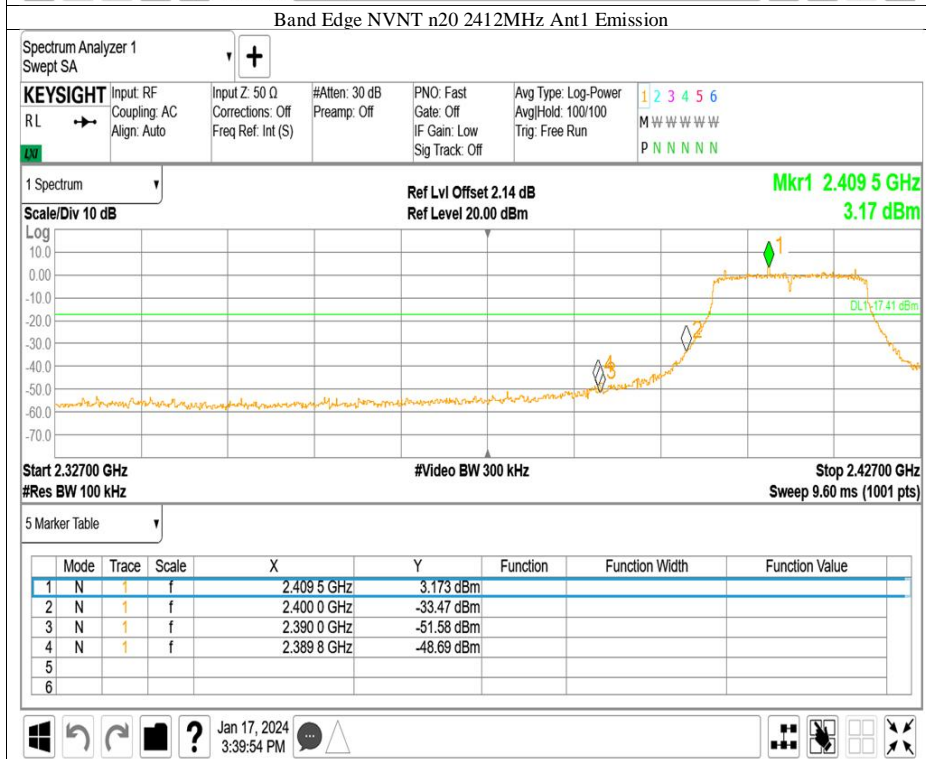
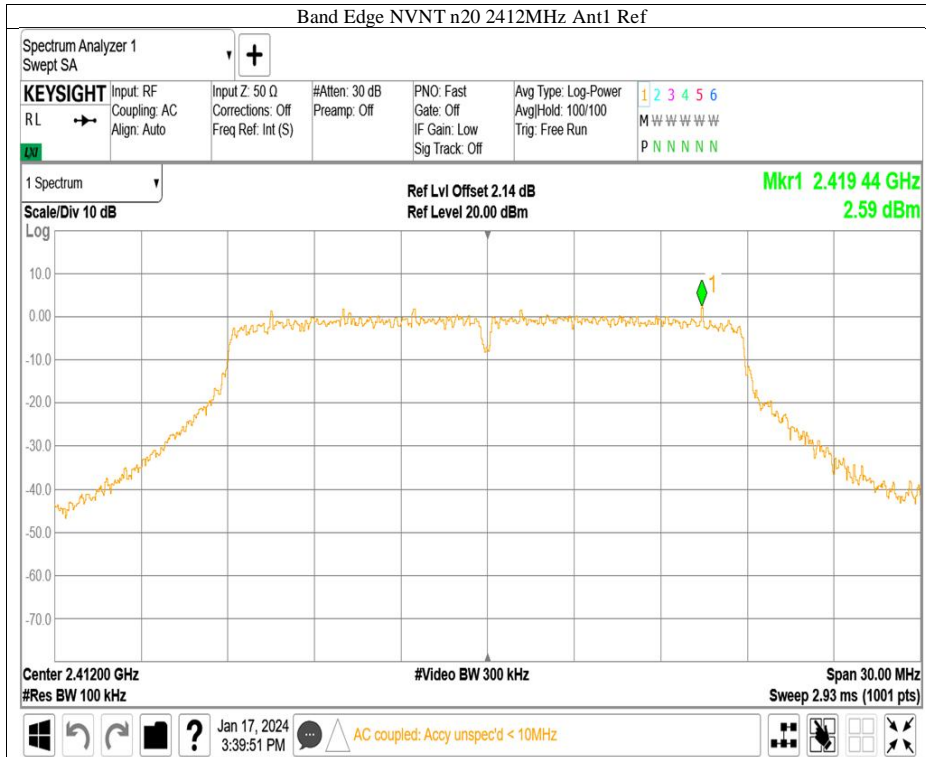


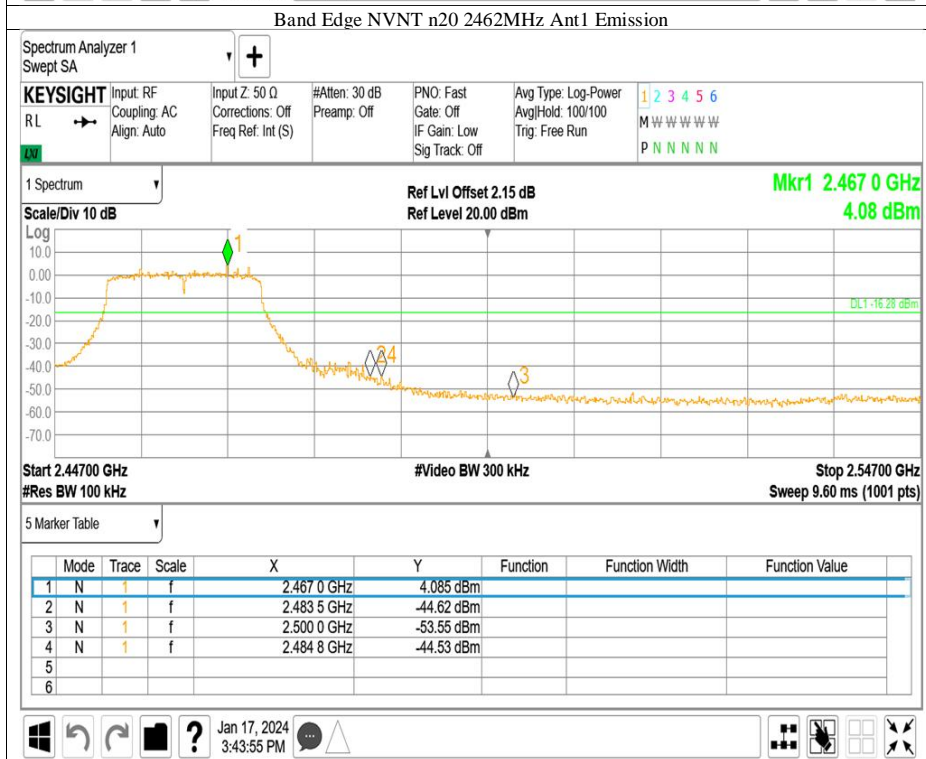
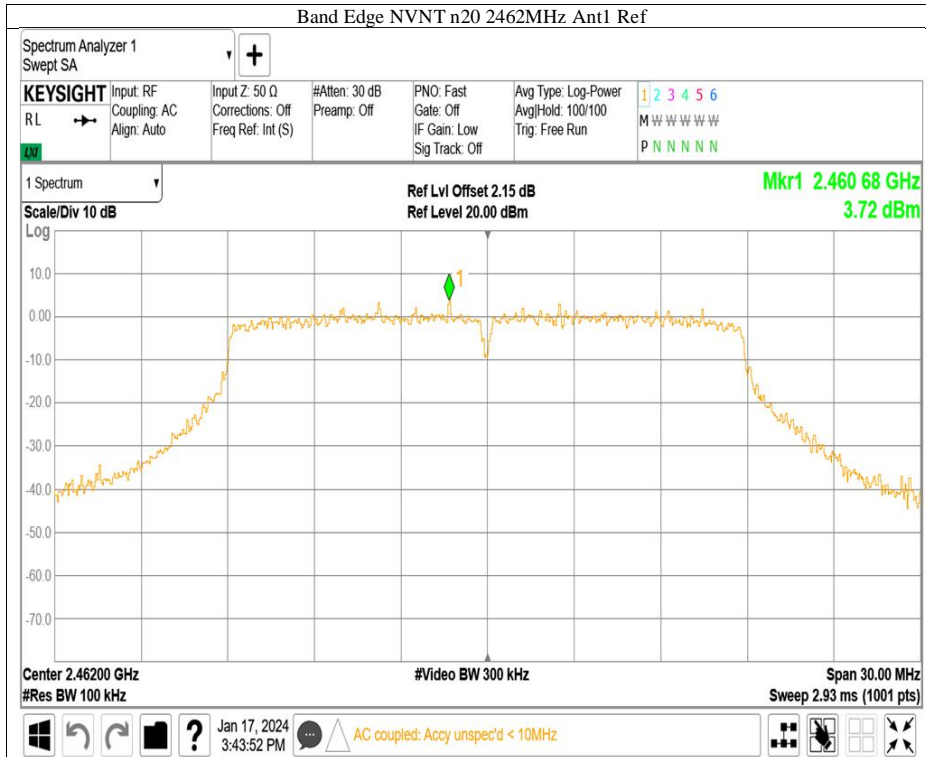


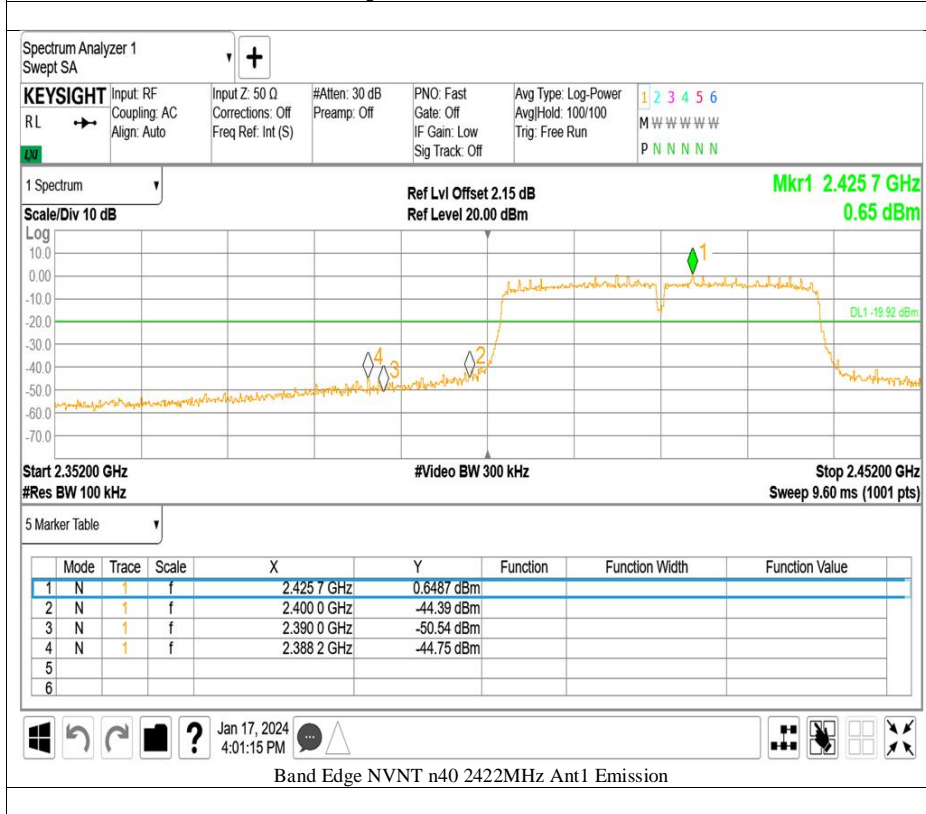
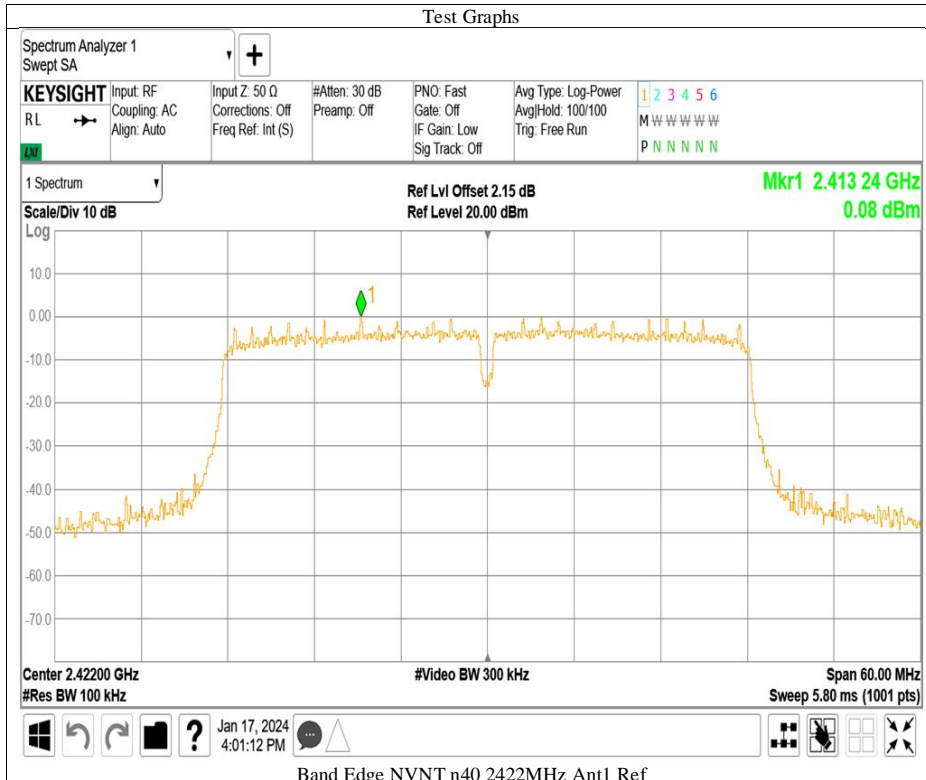


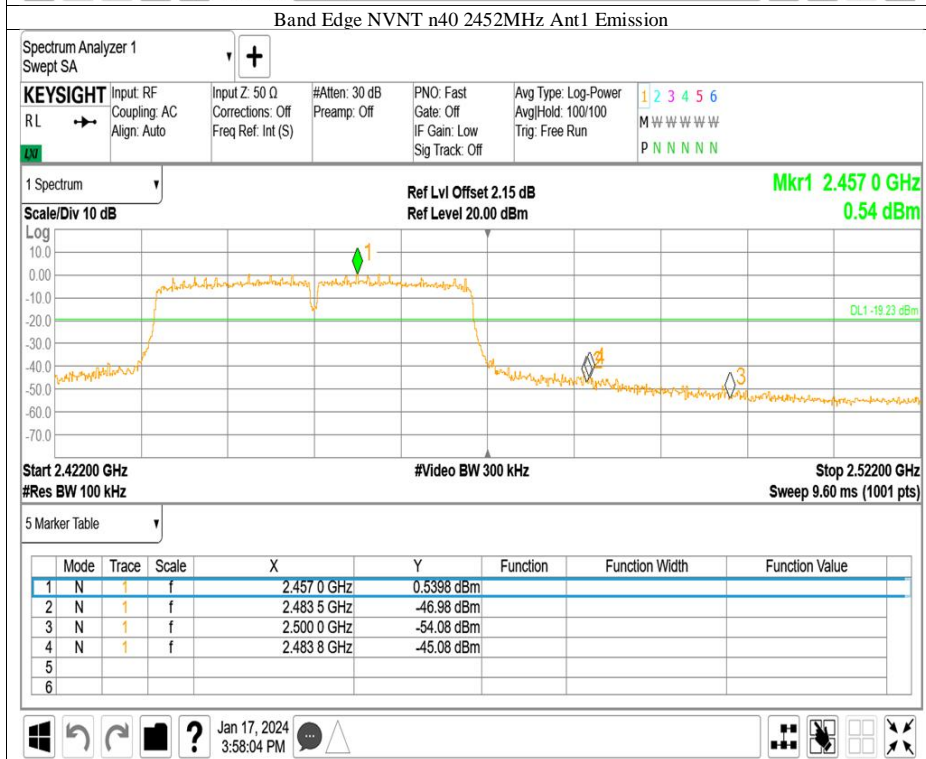
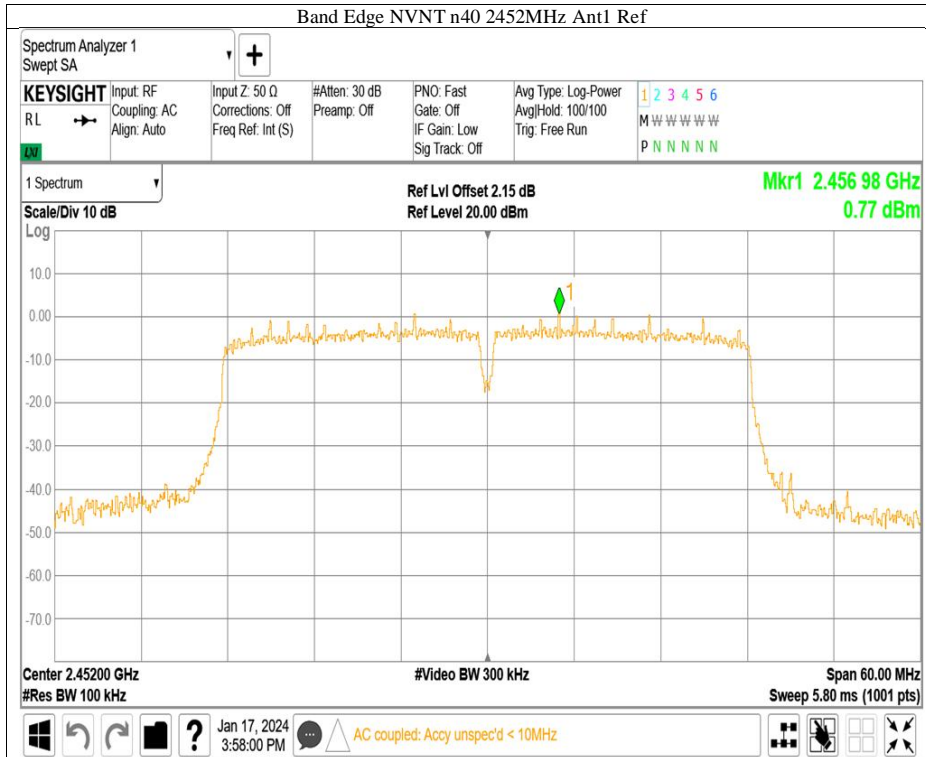












## 10.7 Spurious radiated emissions for transmitter

### Test Method

1. The EUT was placed on a turn table which is 1.5m above ground plane for above 1GHz and 0.8m above ground for below 1GHz at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference – receiving antenna, which was mounted on the top of a variable – height antenna tower.
3. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. Use the following spectrum analyzer settings According to C63.10:

#### For Below 1GHz

Use the following spectrum analyzer settings:

Span = wide enough to capture the peak level of the in-band emission and all spurious  
RBW = 100 kHz to 120 kHz, VBW $\geq$ RBW for peak measurement, Sweep = auto, Detector function = peak, Trace = max hold.

#### For Peak unwanted emissions Above 1GHz:

Span = wide enough to capture the peak level of the in-band emission and all spurious  
RBW = 1MHz, VBW $\geq$ RBW for peak measurement, Sweep = auto, Detector function = peak, Trace = max hold.

#### Procedures for average unwanted emissions measurements above 1000 MHz

- a) RBW = 1MHz.
- b) VBW  $\geq$  [3  $\times$  RBW].
- c) Detector = RMS (power averaging), if [span / (# of points in sweep)]  $\leq$  RBW / 2. Satisfying this condition can require increasing the number of points in the sweep or reducing the span. If the condition is not satisfied, then the detector mode shall be set to peak.
- d) Averaging type = power (i.e., rms) (As an alternative, the detector and averaging type may be set for linear voltage averaging. Some instruments require linear display mode to use linear voltage averaging. Log or dB averaging shall not be used.)
- e) Sweep time = auto.
- f) Perform a trace average of at least 100 traces if the transmission is continuous. If the transmission is not continuous, then the number of traces shall be increased by a factor of 1 / D, where D is the duty cycle. For example, with 50% duty cycle, at least 200 traces shall be averaged. (If a specific emission is demonstrated to be continuous—i.e., 100% duty cycle—then rather than turning ON and OFF with the transmit cycle, at least 100 traces shall be averaged.)
- g) If tests are performed with the EUT transmitting at a duty cycle less than 98%, then a correction factor shall be added to the measurement results prior to comparing with the emission limit, to compute the emission level that would have been measured had the test been performed at 100% duty cycle. The correction factor is computed as follows:



- 1) If power averaging (rms) mode was used in the preceding step e), then the correction factor is  $[10 \log (1 / D)]$ , where D is the duty cycle. For example, if the transmit duty cycle was 50%, then 3 dB shall be added to the measured emission levels.
- 2) If linear voltage averaging mode was used in the preceding step e), then the correction factor is  $[20 \log (1 / D)]$ , where D is the duty cycle. For example, if the transmit duty cycle was 50%, then 6 dB shall be added to the measured emission levels.
- 3) If a specific emission is demonstrated to be continuous (100% duty cycle) rather than turning ON and OFF with the transmit cycle, then no duty cycle correction is required for that emission.

**Limit**

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under § 15.247(b)(3) and RSS 247 section 5.4(d), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in § 15.209(a) and RSS-Gen is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a) and RSS-Gen section 8.9, must also comply with the radiated emission limits specified in § 15.209(a) and RSS-Gen section 8.10.

| Frequency<br>MHz | Field Strength<br>µV/m | Field Strength<br>dBµV/m | Detector | Measurement distance<br>meters |
|------------------|------------------------|--------------------------|----------|--------------------------------|
| 0.009-0.490      | 2400/F(kHz)            | 48.5-13.8                | AV       | 300                            |
| 0.490-1.705      | 24000/F(kHz)           | 33.8-23.0                | QP       | 30                             |
| 1.705-30         | 30                     | 29.5                     | QP       | 30                             |
| 30-88            | 100                    | 40                       | QP       | 3                              |
| 88-216           | 150                    | 43.5                     | QP       | 3                              |
| 216-960          | 200                    | 46                       | QP       | 3                              |
| 960-1000         | 500                    | 54                       | QP       | 3                              |
| Above 1000       | 500                    | 54                       | AV       | 3                              |
| Above 1000       | 5000                   | 74                       | PK       | 3                              |

Note 1:  $\text{Limit } 3\text{m(dB}\mu\text{V/m)} = \text{Limit } 300\text{m(dB}\mu\text{V/m)} + 40\text{Log}(300\text{m}/3\text{m})$  (Below 30MHz)  
 Note 2:  $\text{Limit } 3\text{m(dB}\mu\text{V/m)} = \text{Limit } 30\text{m(dB}\mu\text{V/m)} + 40\text{Log}(30\text{m}/3\text{m})$  (Below 30MHz)





**Spurious radiated emissions for transmitter**

According to C63.10, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement, so AV emission value did not show in below table if the peak value complies with average limit. The only worse case test result is listed in the report.

**Transmitting spurious emission test result as below:**

| Test mode:802.11B (2412MHz) |                        |                |             |          |              |
|-----------------------------|------------------------|----------------|-------------|----------|--------------|
| Frequency MHz               | Measure Level (dBuV/m) | Limit (dBuV/M) | Margin (dB) | Detector | Polarization |
| 2383.89                     | 48.72                  | 74.00          | 25.28       | PK       | Hoirznotal   |
| 4823.86                     | 49.06                  | 74.00          | 24.94       | PK       | Hoirznotal   |
| 2382.43                     | 46.47                  | 74.00          | 27.53       | PK       | Vertical     |
| 4823.86                     | 47.35                  | 74.00          | 26.65       | PK       | Vertical     |

| Test mode:802.11B (2437MHz) |                        |                |             |          |              |
|-----------------------------|------------------------|----------------|-------------|----------|--------------|
| Frequency MHz               | Measure Level (dBuV/m) | Limit (dBuV/M) | Margin (dB) | Detector | Polarization |
| 4873.73                     | 47.63                  | 74.00          | 26.37       | PK       | Hoirznotal   |
| 4873.65                     | 46.16                  | 74.00          | 27.84       | PK       | Vertical     |

| Test mode:802.11B (2462MHz) |                        |                |             |          |              |
|-----------------------------|------------------------|----------------|-------------|----------|--------------|
| Frequency MHz               | Measure Level (dBuV/m) | Limit (dBuV/M) | Margin (dB) | Detector | Polarization |
| 2483.56                     | 51.73                  | 74.00          | 22.27       | PK       | Hoirznotal   |
| 4924.16                     | 46.52                  | 74.00          | 27.48       | PK       | Hoirznotal   |
| 2483.57                     | 53.83                  | 74.00          | 20.17       | PK       | Vertical     |
| 2663.77                     | 46.58                  | 73.00          | 26.42       | PK       | Vertical     |
| 4924.16                     | 47.37                  | 74.00          | 26.63       | PK       | Vertical     |



| Test mode:802.11g (2412MHz) |                        |                |             |          |              |
|-----------------------------|------------------------|----------------|-------------|----------|--------------|
| Frequency MHz               | Measure Level (dBuV/m) | Limit (dBuV/M) | Margin (dB) | Detector | Polarization |
| 2387.33                     | 60.96                  | 74.00          | 13.04       | PK       | Hoirznotal   |
| 2387.33                     | 46.32                  | 54.00          | 7.68        | AV       | Hoirznotal   |
| 4823.75                     | 46.68                  | 74.00          | 27.32       | PK       | Hoirznotal   |
| 2388.20                     | 60.42                  | 74.00          | 13.58       | PK       | Vertical     |
| 2389.20                     | 46.07                  | 54.00          | 7.93        | AV       | Vertical     |
| 4823.67                     | 47.72                  | 74.00          | 26.28       | PK       | Vertical     |

| Test mode:802.11g (2437MHz) |                        |                |             |          |              |
|-----------------------------|------------------------|----------------|-------------|----------|--------------|
| Frequency MHz               | Measure Level (dBuV/m) | Limit (dBuV/M) | Margin (dB) | Detector | Polarization |
| 4873.85                     | 46.77                  | 74.00          | 27.23       | PK       | Hoirznotal   |
| 4873.89                     | 47.18                  | 74.00          | 26.82       | PK       | Vertical     |

| Test mode:802.11g (2462MHz) |                        |                |             |          |              |
|-----------------------------|------------------------|----------------|-------------|----------|--------------|
| Frequency MHz               | Measure Level (dBuV/m) | Limit (dBuV/M) | Margin (dB) | Detector | Polarization |
| 2488.20                     | 54.50                  | 74.00          | 19.50       | PK       | Hoirznotal   |
| 2488.20                     | 41.82                  | 54.00          | 12.18       | AV       | Hoirznotal   |
| 4924.38                     | 46.92                  | 74.00          | 27.08       | PK       | Hoirznotal   |
| 2483.67                     | 58.31                  | 74.00          | 15.69       | PK       | Vertical     |
| 2483.67                     | 46.87                  | 54.00          | 7.13        | AV       | Vertical     |
| 4924.98                     | 46.53                  | 74.00          | 27.47       | PK       | Vertical     |



| Test mode:802.11n20 (2412MHz) |                        |                |             |          |              |
|-------------------------------|------------------------|----------------|-------------|----------|--------------|
| Frequency MHz                 | Measure Level (dBuV/m) | Limit (dBuV/M) | Margin (dB) | Detector | Polarization |
| 2389.89                       | 64.24                  | 74.00          | 9.76        | PK       | Hoirznotal   |
| 2389.89                       | 50.47                  | 54.00          | 3.53        | AV       | Hoirznotal   |
| 4823.73                       | 46.22                  | 74.00          | 27.78       | PK       | Hoirznotal   |
| 2387.31                       | 61.49                  | 74.00          | 12.51       | PK       | Vertical     |
| 2387.31                       | 52.72                  | 54.00          | 1.28        | AV       | Vertical     |
| 4824.13                       | 49.74                  | 74.00          | 24.26       | PK       | Vertical     |

| Test mode:802.11n20 (2437MHz) |                        |                |             |          |              |
|-------------------------------|------------------------|----------------|-------------|----------|--------------|
| Frequency MHz                 | Measure Level (dBuV/m) | Limit (dBuV/M) | Margin (dB) | Detector | Polarization |
| 4874.23                       | 47.58                  | 74.00          | 26.42       | PK       | Hoirznotal   |
| 4873.79                       | 46.72                  | 74.00          | 27.28       | PK       | Vertical     |

| Test mode:802.11n20 (2462MHz) |                        |                |             |          |              |
|-------------------------------|------------------------|----------------|-------------|----------|--------------|
| Frequency MHz                 | Measure Level (dBuV/m) | Limit (dBuV/M) | Margin (dB) | Detector | Polarization |
| 2483.61                       | 64.73                  | 74.00          | 9.27        | PK       | Hoirznotal   |
| 2483.61                       | 51.29                  | 54.00          | 2.71        | AV       | Hoirznotal   |
| 4943.85                       | 46.13                  | 74.00          | 27.87       | PK       | Hoirznotal   |
| 2483.81                       | 55.16                  | 74.00          | 18.84       | PK       | Vertical     |
| 2483.81                       | 45.72                  | 54.00          | 8.28        | AV       | Vertical     |
| 4943.85                       | 46.53                  | 74.00          | 27.47       | PK       | Vertical     |



| Test mode:802.11n40 (2422MHz) |                        |                |             |          |              |
|-------------------------------|------------------------|----------------|-------------|----------|--------------|
| Frequency MHz                 | Measure Level (dBuV/m) | Limit (dBuV/M) | Margin (dB) | Detector | Polarization |
| 2385.78                       | 58.53                  | 74.00          | 15.47       | PK       | Hoirznotal   |
| 2385.78                       | 45.10                  | 54.00          | 8.90        | AV       | Hoirznotal   |
| 2389.15                       | 57.61                  | 74.00          | 16.39       | PK       | Hoirznotal   |
| 2389.15                       | 46.50                  | 54.00          | 7.50        | AV       | Hoirznotal   |
| 4849.93                       | 41.83                  | 74.00          | 32.17       | PK       | Hoirznotal   |
| 2385.84                       | 50.58                  | 74.00          | 23.42       | PK       | Vertical     |
| 4839.16                       | 40.92                  | 74.00          | 33.08       | PK       | Vertical     |

| Test mode:802.11n40 (2437MHz) |                        |                |             |          |              |
|-------------------------------|------------------------|----------------|-------------|----------|--------------|
| Frequency MHz                 | Measure Level (dBuV/m) | Limit (dBuV/M) | Margin (dB) | Detector | Polarization |
| 4875.12                       | 46.93                  | 74.00          | 27.07       | PK       | Hoirznotal   |
| 4875.12                       | 46.03                  | 74.00          | 27.97       | PK       | Vertical     |

| Test mode:802.11n40 (2452MHz) |                        |                |             |          |              |
|-------------------------------|------------------------|----------------|-------------|----------|--------------|
| Frequency MHz                 | Measure Level (dBuV/m) | Limit (dBuV/M) | Margin (dB) | Detector | Polarization |
| 2483.86                       | 61.38                  | 74.00          | 12.62       | PK       | Hoirznotal   |
| 2483.86                       | 50.12                  | 54.00          | 3.88        | AV       | Hoirznotal   |
| 4905.72                       | 46.22                  | 74.00          | 27.78       | PK       | Hoirznotal   |
| 2483.58                       | 54.51                  | 74.00          | 19.49       | PK       | Vertical     |
| 2483.58                       | 45.97                  | 54.00          | 8.03        | AV       | Vertical     |
| 4905.72                       | 48.19                  | 74.00          | 25.81       | PK       | Vertical     |

Remark:

- (1) Emission level= Original Receiver Reading + Correct Factor
- (2) Correct Factor = Antenna Factor + Cable Loss -Amplifier gain
- (3) Margin = limit – Corrected Reading



The worst case of Radiated Emission below 1GHz:

## 30-1000MHz Radiated Emission

### EUT Information

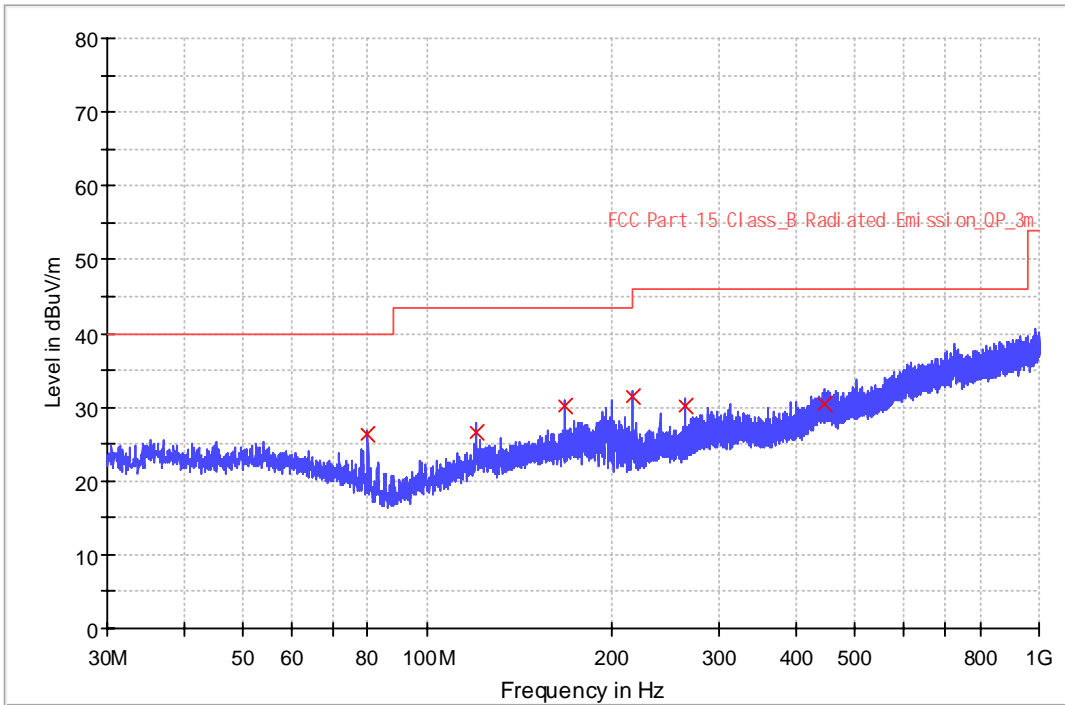
EUT Name: Smart Camera  
 Model: SC155-WQ3  
 Client: Zhejiang Lingzhu Technology Co., Ltd  
 Op Cond: Power on and charging, TX\_2437MHz at g mode, AC 120V/60Hz, T20.2, 41.4%, P103.3kPa  
 Operator: Chengjie GUO  
 Test Spec: FCC Part 15.209(a)  
 Comment: Horizontal  
 Sample No: SHA-785720-2

### Sweep Setup: RE\_VULB9168\_pre\_Cont\_30-1000 [EMI radiated]

Hardware Setup: RE\_VULB9168  
 Receiver: [ESR 3]  
 Level Unit: dBuV/m

| Subrange       | Step Size | Detectors | Bandwidth | Sweep Time | Preamp |
|----------------|-----------|-----------|-----------|------------|--------|
| 30 MHz - 1 GHz | 48.5 kHz  | PK+       | 120 kHz   | 0.2 s      | 20 dB  |

RE\_VULB9168\_pre\_Cont\_30-1000





### Limit and Margin

| Frequency (MHz) | QuasiPeak (dBuV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB) | Margin - QPK (dB) |
|-----------------|--------------------|-----------------|-----------------|-------------|-----|---------------|------------|-------------------|
| 79.960000       | 26.4               | 1000.0          | 120.000         | 214.0       | H   | 142.0         | 15.8       | 13.6              |
| 119.960000      | 26.6               | 1000.0          | 120.000         | 231.0       | H   | 111.0         | 18.1       | 16.9              |
| 168.000000      | 30.1               | 1000.0          | 120.000         | 186.0       | H   | 231.0         | 20.4       | 13.4              |
| 215.960000      | 31.4               | 1000.0          | 120.000         | 127.0       | H   | 54.0          | 17.5       | 12.1              |
| 264.000000      | 30.2               | 1000.0          | 120.000         | 198.0       | H   | 151.0         | 20.1       | 15.8              |
| 445.920000      | 30.4               | 1000.0          | 120.000         | 199.0       | H   | 217.0         | 25.8       | 15.6              |

(continuation of the "Limit and Margin" table from column 16 ...)

| Frequency (MHz) | Limit - QPK (dBuV/m) | Comment |
|-----------------|----------------------|---------|
| 79.960000       | 40.0                 |         |
| 119.960000      | 43.5                 |         |
| 168.000000      | 43.5                 |         |
| 215.960000      | 43.5                 |         |
| 264.000000      | 46.0                 |         |
| 445.920000      | 46.0                 |         |

Note 1: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Note 2: The test trace is same as the ambient noise and the amplitude of the emissions are attenuated more than 20dB below the permissible (the test frequency range: 9kHz ~ 30MHz, 18GHz ~ 25GHz), therefore no data appear in the report.



# 30-1000MHz Radiated Emission

## EUT Information

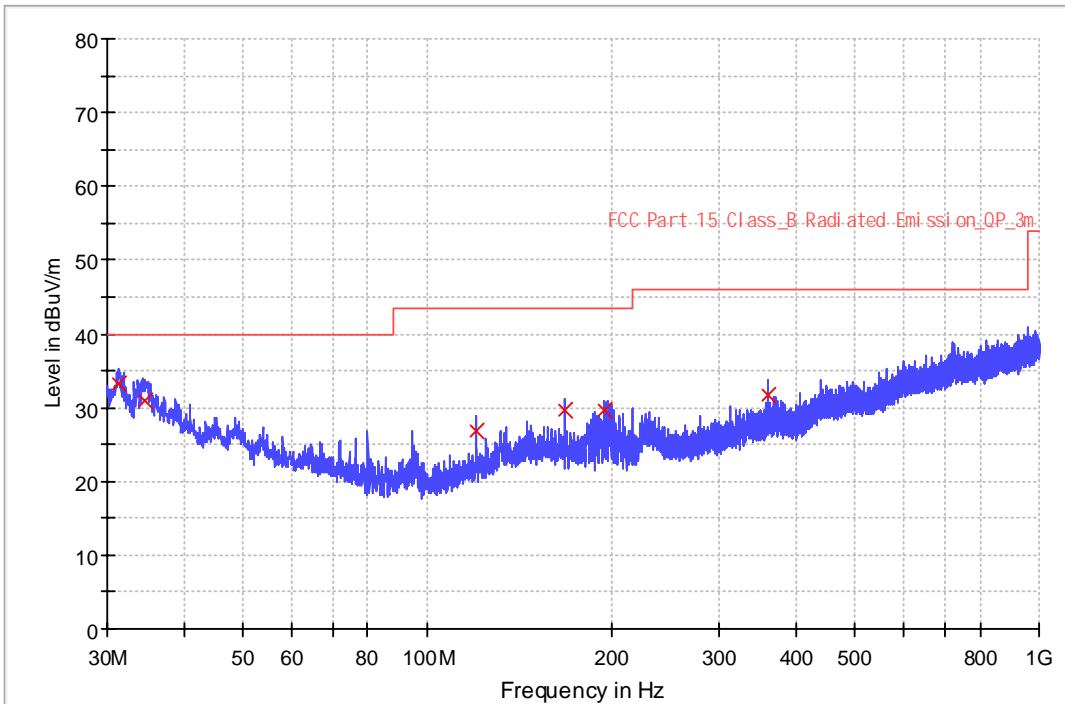
EUT Name: Smart Camera  
 Model: SC155-WQ3  
 Client: Zhejiang Lingzhu Technology Co., Ltd  
 Op Cond: Power on and charging, TX\_2437MHz at g mode, AC 120V/60Hz,  
 Operator: Chengjie GUO  
 Test Spec: FCC Part 15.209(a)  
 Comment: Vertical  
 Sample No: SHA-785720-2

## Sweep Setup: RE\_VULB9168\_pre\_Cont\_30-1000 [EMI radiated]

Hardware Setup: RE\_VULB9168  
 Receiver: [ESR 3]  
 Level Unit: dBuV/m

| Subrange       | Step Size | Detectors | Bandwidth | Sweep Time | Preamp |
|----------------|-----------|-----------|-----------|------------|--------|
| 30 MHz - 1 GHz | 48.5 kHz  | PK+       | 120 kHz   | 0.2 s      | 20 dB  |

RE\_VULB9168\_pre\_Cont\_30-1000





### Limit and Margin

| Frequency (MHz) | QuasiPeak (dBuV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB) | Margin - QPK (dB) |
|-----------------|--------------------|-----------------|-----------------|-------------|-----|---------------|------------|-------------------|
| 31.320000       | 33.2               | 1000.0          | 120.000         | 132.0       | V   | 153.0         | 19.3       | 6.8               |
| 34.600000       | 31.0               | 1000.0          | 120.000         | 118.0       | V   | 213.0         | 19.4       | 9.0               |
| 119.960000      | 26.9               | 1000.0          | 120.000         | 137.0       | V   | 143.0         | 18.1       | 16.6              |
| 168.000000      | 29.6               | 1000.0          | 120.000         | 109.0       | V   | 124.0         | 20.4       | 13.9              |
| 194.600000      | 29.7               | 1000.0          | 120.000         | 188.0       | V   | 231.0         | 18.2       | 13.9              |
| 360.000000      | 31.7               | 1000.0          | 120.000         | 126.0       | V   | 86.0          | 23.0       | 14.3              |

(continuation of the "Limit and Margin" table from column 16 ...)

| Frequency (MHz) | Limit - QPK (dBuV/m) | Comment |
|-----------------|----------------------|---------|
| 31.320000       | 40.0                 |         |
| 34.600000       | 40.0                 |         |
| 119.960000      | 43.5                 |         |
| 168.000000      | 43.5                 |         |
| 194.600000      | 43.5                 |         |
| 360.000000      | 46.0                 |         |

Note 1: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Note 2: The test trace is same as the ambient noise and the amplitude of the emissions are attenuated more than 20dB below the permissible (the test frequency range: 9kHz ~ 30MHz, 18GHz ~ 25GHz), therefore no data appear in the report.





## 11 Test Equipment List

List of Test Instruments  
Test Site1

|    | DESCRIPTION                          | MANUFACTURER       | MODEL NO. | SERIAL NO. | CAL. DATE | CAL. DUE DATE |
|----|--------------------------------------|--------------------|-----------|------------|-----------|---------------|
| C  | Signal spectrum analyzer             | Agilent            | N9020B    | MY59050168 | 2023-2-10 | 2024-2-9      |
|    | Wideband power sensor                | Rohde & Schwarz    | NRP-Z81   | 105903     | 2023-2-10 | 2024-2-9      |
|    | 10dB Attenuator                      | Aeroflex Weinschel | CG-4689   | 93459      | 2023-2-10 | 2024-2-9      |
| RE | EMI Test Receiver                    | Rohde & Schwarz    | ESR3      | 101906     | 2023-8-1  | 2024-7-31     |
|    | Signal Analyzer                      | Rohde & Schwarz    | FSV40     | 101091     | 2023-8-1  | 2024-7-31     |
|    | Trilog Super Broadband Test Antenna  | Schwarzbeck        | VULB 9168 | 961        | 2021-9-23 | 2024-9-22     |
|    | Double-ridged waveguide horn antenna | Rohde & Schwarz    | HF907     | 102868     | 2021-3-15 | 2024-3-14     |
|    | Pre-amplifier                        | Rohde & Schwarz    | SCU-18D   | 19006451   | 2023-8-1  | 2024-7-31     |
|    | Loop antenna                         | Rohde & Schwarz    | HFH2-Z2   | 100443     | 2023-6-15 | 2024-6-14     |
|    | Double Ridged Horn Antenna           | ETS-Lindgren       | 3116C     | 00246076   | 2023-7-7  | 2026-7-6      |
| CE | 3m Semi-anechoic chamber             | TDK                | 9X6X6     | ----       | 2021-5-8  | 2024-5-7      |
|    | EMI Test Receiver                    | Rohde & Schwarz    | ESR3      | 101907     | 2023-8-1  | 2024-7-31     |
|    | LISN                                 | Rohde & Schwarz    | ENV216    | 101924     | 2023-8-1  | 2024-7-31     |

| Measurement Software Information |              |                 |           |
|----------------------------------|--------------|-----------------|-----------|
| Test Item                        | Software     | Manufacturer    | Version   |
| C                                | MTS 8310     | MWRfTest        | 3.0.0.0   |
|                                  | Power Viewer | Rohde & Schwarz | V 11.0    |
| RE                               | EMC 32       | Rohde & Schwarz | V10.50.40 |
| CE                               | EMC 32       | Rohde & Schwarz | V9.15.03  |

**C - Conducted RF tests**

- Conducted peak output power
- 6dB bandwidth and 99% Occupied Bandwidth
- Power spectral density\*
- Spurious RF conducted emissions
- Band edge



## 12 System Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:

| Items                                    | Extended Uncertainty   |
|--|--|
| Conducted Disturbance at Mains Terminals | 150kHz to 30MHz, LISN, 3.16dB  |
| Radiated Disturbance                     | 30MHz to 1GHz, 5.03dB (Horizontal)<br>5.12dB (Vertical)<br>1GHz to 18GHz, 5.49dB<br>18GHz to 40GHz, 5.63dB |
| Carrier power conducted measurement      | 50MHz~18GHz, 1.238dB   |
| Spurious Emission Conducted Measurement  | 9kHz ~40GHz, 1.224dB   |

### Measurement Uncertainty Decision Rule:

Determination of conformity with the specification limits is based on the decision rule according to IEC Guide 115: 2021, clause 4.4.3 and 4.5.1.



## 13 Photographs of Test Set-ups

Refer to the < Test Setup photos >.



## 14 Photographs of EUT

Refer to the < External Photos > & < Internal Photos >.

-----End of Test Report-----