

# Otodata Wireless Network, Inc. **TEST REPORT**

**SCOPE OF WORK**

Emissions Testing on Propane Monitoring Device, Model C033

**REPORT NUMBER**

105128961BOX-001.2

**ISSUE DATE**

May 10, 2023

**[REVISED DATE]**

October 10, 2023

**DOCUMENT CONTROL NUMBER**

Non-Specific Radio Report Shell Rev. October 2022  
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## EMISSIONS TEST REPORT

(FULL COMPLIANCE)

**Report Number:** 105128961BOX-001.2

**Project Number:** G105128961

**Report Issue Date:** May 10, 2023

**Report Revision Date:** October 10, 2023

**Model(s) Tested:** C033

**Model(s) Partially Tested:** None

**Model(s) Not Tested but declared equivalent by the client:** None

**Standards:** CFR47 FCC Part 15.247 Subpart C: 05/2023,  
CFR47 FCC Part 15 Subpart B: 05/2023,  
RSS-247 Issue 2 February 2017,  
ISED ICES-003 Issue 7 October 2020,  
RSS-Gen Issue 5 April 2018 +Amendment 1 March 2019

Tested by:  
Intertek Testing Services NA, Inc.  
70 Codman Hill Road  
Boxborough, MA 01719  
USA

Client:  
Otodata Wireless Network, Inc.  
1180 De Louvain Street  
West Montreal, QC H4N 1G5  
Canada

Report prepared by



Kouma Sinn / Senior Staff Engineer

Report reviewed by



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## 1 Introduction and Conclusion

The tests indicated in section 2.0 were performed on the product constructed as described in section 4.0. The remaining test sections are the verbatim text from the actual data sheets used during the investigation. These test sections include the test name, the specified test Method, a list of the actual Test Equipment Used, documentation Photos, Results and raw Data. No additions, deviations, or exclusions have been made from the standard(s) unless specifically noted.

Based on the results of our investigation, we have concluded the product tested **complies** with the requirements of the standard(s) indicated. The results obtained in this test report pertain only to the item(s) tested. Intertek does not make any claims of compliance for samples or variants which were not tested.

## 2 Test Summary

| Section | Test full name                                                                                                                                | Result           |
|---------|-----------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| 3       | Client Information                                                                                                                            | --               |
| 4       | Description of Equipment Under Test and Variant Models                                                                                        | --               |
| 5       | System Setup and Method                                                                                                                       | --               |
| 6       | Maximum Peak Output Power<br>CFR47 FCC Part 15 Subpart C:05/2023, Section 15.247 (b)(3)<br>RSS-247 Issue 2 February 2017                      | Pass             |
| 7       | 6 dB Bandwidth and Occupied Bandwidth<br>CFR47 FCC Part 15 Subpart C: 05/2022, Section 15.247 (a)(2)<br>RSS-247 Issue 2 February 2017         | Pass             |
| 8       | Maximum Power Spectral Density<br>CFR47 FCC Part 15 Subpart C: 05/2023, Section 15.247 (e)<br>RSS-247 Issue 2 February 2017                   | Pass             |
| 9       | Band Edge Compliance<br>CFR47 FCC Part 15 Subpart C: 05/2023, Section 15.247 (d)<br>RSS-247 Issue 2: 02/2017)                                 | Pass             |
| 10      | Transmitter spurious emissions<br>CFR47 FCC Part 15 Subpart C: 05/2023, Section 15.247 (d)<br>RSS-247 Issue 2 February 2017                   | Pass             |
| 11      | Digital Device and Receiver Radiated Spurious Emissions<br>CFR47 FCC Part 15 Subpart B 15.109: 05/2023,<br>ISED ICES-003 Issue 7 October 2020 | Pass             |
| ---     | AC Mains Conducted Emissions<br>FCC 47CFR Part 15.107: 05/2023<br>ISED ICES-003 Issue 7 October 2020                                          | N/A <sup>1</sup> |
| 12      | Revision History                                                                                                                              | --               |

<sup>1</sup>N/A – The EUT is battery powered.

### 3 Client Information

This EUT was tested at the request of:

**Client:** Otodata Wireless Network, Inc.  
1180 De Louvain Street  
West Montreal, QC H4N 1G5  
Canada

**Contact:** Julien Renaud  
**Telephone:** 514-673-0244  
**Email:** jrenaud@otodata.ca

### 4 Description of Equipment Under Test and Variant Models

**Manufacturer:** Otodata Wireless Network, Inc.  
1180 De Louvain Street  
West Montreal, QC H4N 1G5  
Canada

| Equipment Under Test      |                               |              |                 |
|---------------------------|-------------------------------|--------------|-----------------|
| Description               | Manufacturer                  | Model Number | Serial Number   |
| Propane Monitoring Device | Otodata Wireless Network Inc. | C033         | 55 <sup>1</sup> |
| Propane Monitoring Device | Otodata Wireless Network Inc. | C033         | 57 <sup>2</sup> |

<sup>1</sup>Emission testing sample.

<sup>2</sup>Antenna port conducted emission sample.

|                     |                         |
|---------------------|-------------------------|
| Receive Date:       | 04/24/2023 & 09/29/2023 |
| Received Condition: | Good                    |
| Type:               | Production              |

#### Description of Equipment Under Test (provided by client)

The EUT is battery powered propane monitoring device that communicates via Bluetooth (BLE, 2.4 GHz).

| Equipment Under Test Power Configuration |               |                 |                  |
|------------------------------------------|---------------|-----------------|------------------|
| Rated Voltage                            | Rated Current | Rated Frequency | Number of Phases |
| 3.6V Battery                             | 2.1 Ah        | DC              | N/A              |

#### Operating modes of the EUT:

| No. | Descriptions of EUT Exercising                                                                            |
|-----|-----------------------------------------------------------------------------------------------------------|
| 1   | The EUT was set to transmit at Low, Mid, and High channel continuous with modulation at 100 % duty cycle. |
| 2   | The EUT was set to receive mode.                                                                          |

#### Software used by the EUT:

| No. | Descriptions of EUT Exercising |
|-----|--------------------------------|
| 1   | nrfconnect-setup-4.1.1-x64.exe |
|     |                                |

| Radio/Receiver Characteristics                                                  |                                                                             |
|---------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| Frequency Band(s)                                                               | 2402-2480 MHz                                                               |
| Modulation Type(s)                                                              | GFSK                                                                        |
| Maximum Output Power                                                            | 4.25 dBm                                                                    |
| Test Channels                                                                   | Low Channel (2402 MHz)<br>Mid Channel (2440 MHz)<br>High Channel (2480 MHz) |
| Frequency Hopper: Number of Hopping Channels                                    | N/A                                                                         |
| Frequency Hopper: Channel Dwell Time                                            | N/A                                                                         |
| Frequency Hopper: Max interval between two instances of use of the same channel | N/A                                                                         |
| MIMO Information (# of Transmit and Receive antenna ports)                      | 1                                                                           |
| Equipment Type                                                                  | Standalone                                                                  |
| Antenna Type and Gain                                                           | Meander line antenna gain of 2.31 dBi.                                      |

#### Variant Models:

The following variant models were not tested as part of this evaluation, but have been identified by the manufacturer as being electrically identical models, depopulated models, or with reasonable similarity to the model(s) tested. Intertek does not make any claims of compliance for samples or variants which were not tested.

None

## 5 System Setup and Method

| Cables |                        |            |           |          |             |
|--------|------------------------|------------|-----------|----------|-------------|
| ID     | Description            | Length (m) | Shielding | Ferrites | Termination |
| --     | None                   | --         | --        | --       | --          |
| --     | USB Cable <sup>1</sup> | 2.00       | Shielded  | --       | Laptop      |

<sup>1</sup>Not part of EUT, used to accommodate the testing only.

| Support Equipment |                               |                    |               |
|-------------------|-------------------------------|--------------------|---------------|
| Description       | Manufacturer                  | Model Number       | Serial Number |
| Test Fixture      | Otodata Wireless Network Inc. | C033PLA-001        | None          |
| Laptop            | Toshiba                       | Satellite Pro C870 | 4C480038R     |

### 5.1 Method:

Configuration as required by Configuration as required by FCC Part 15 Subpart C 15.247: 05/2023, FCC Part 15 Subpart B: 05/2023, RSS 247 Issue 2: 04/2023, ISED ICES-003 Issue 7 October 2020, RSS-Gen Issue 5 April 2018 +Amendment 1 March 2019, ANSI C 63.10: 2013, ANSI C 63.4: 2014, and 558074 D0115.247Meas Guidancev05r02.

**5.2 EUT Block Diagram:**



## 6 Maximum Peak Output Power

### 6.1 Method

Tests are performed in accordance with CFR47 FCC Part 15.247, RSS-247, ANSI C63.10, and KDB 558074 D0115.247 Meas Guidancev05r02.

**TEST SITE:** Safety Lab

### 6.2 Limit:

§15.247 (b) (3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt or 30 dBm or 36 dBm EIRP.

### 6.3 Test Equipment Used:

| Asset           | Description                        | Manufacturer      | Model       | Serial      | Cal Date   | Cal Due    |
|-----------------|------------------------------------|-------------------|-------------|-------------|------------|------------|
| SAF1504'        | Weather Station                    | Davis             | Vantage Vue | MR200526013 | 01/31/2023 | 01/31/2024 |
| CBLHF2012-5M-2' | 5m 9kHz-40GHz Coaxial Cable - SET2 | Huber & Suhner    | SF102       | 252676002   | 02/25/2023 | 02/25/2024 |
| CEN001'         | DC-40GHz attenuator 20dB           | cblhf201-5-2      | C411-20     | CEN001      | 02/28/2023 | 02/28/2024 |
| ROS005-1'       | Signal and Spectrum Analyzer       | Rohde and Shwartz | FSW43       | 100646      | 11/18/2022 | 11/18/2023 |

#### Software Utilized:

| Name | Manufacturer | Version |
|------|--------------|---------|
| None | N/A          | N/A     |

### 6.4 Results:

The sample tested was found to Comply.



## 6.5 Setup Photograph:

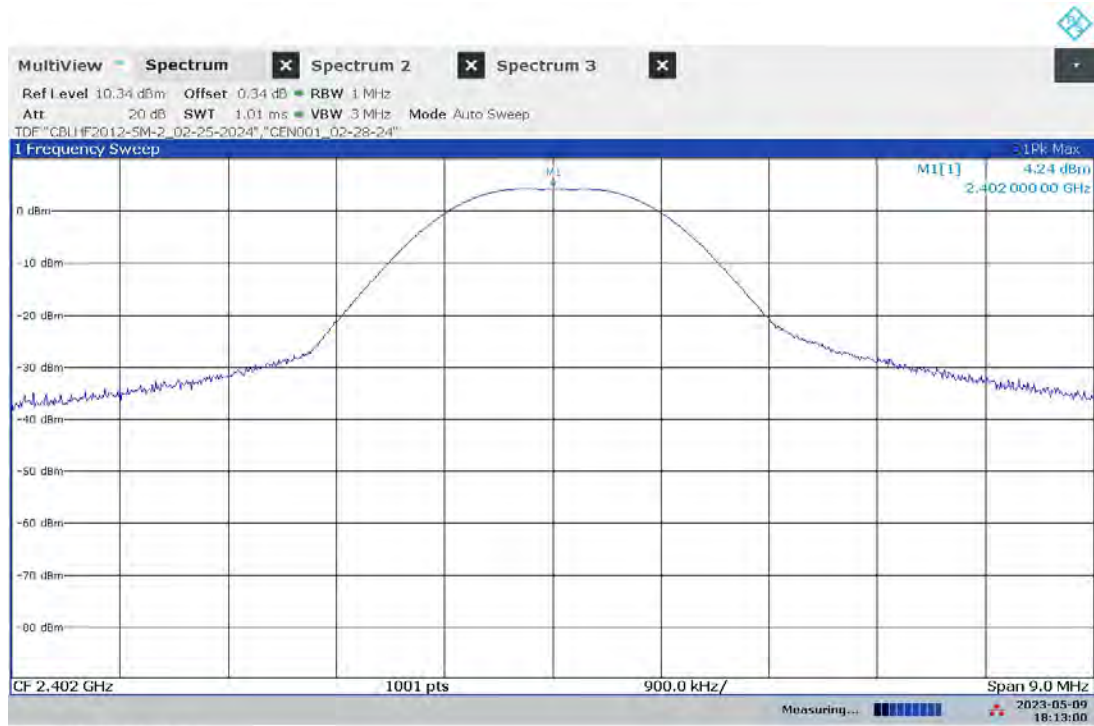


## 6.6 Test Data:

Output Power

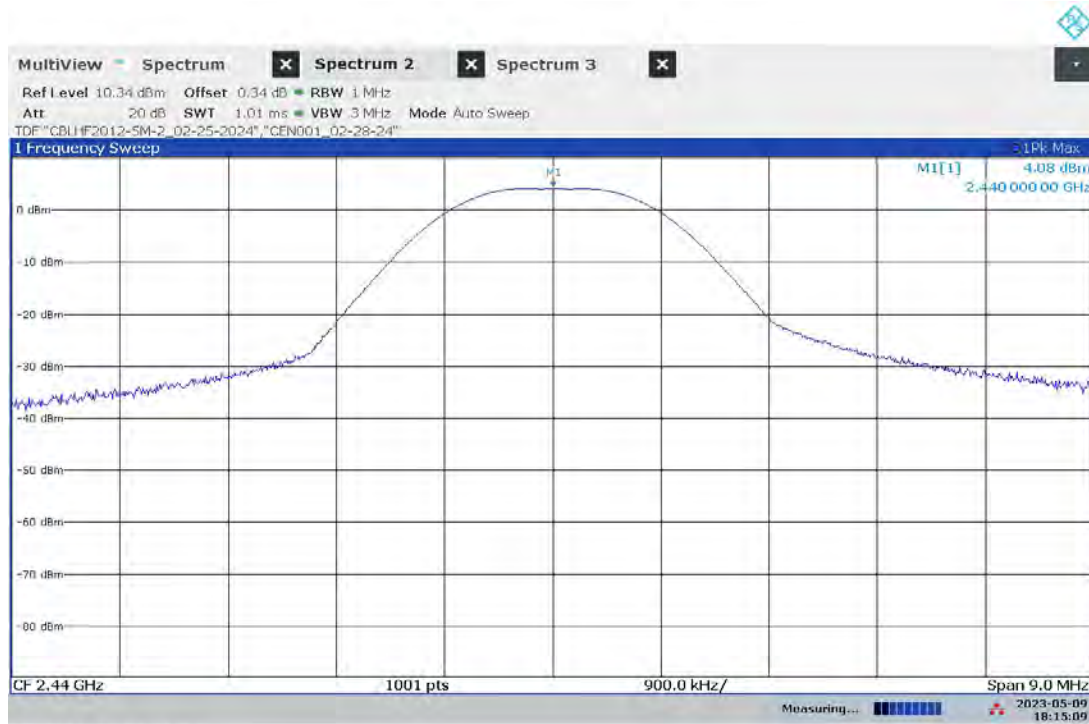
| Channels       | Conducted Power<br>(dBm) | Antenna Gain<br>(dBi) | EIRP Power<br>(dBm) | Conducted Power Limit<br>(dBm) | EIRP Power Limit<br>(dBm) |
|----------------|--------------------------|-----------------------|---------------------|--------------------------------|---------------------------|
| Low: 2402 MHz  | 4.24                     | 2.14                  | 6.38                | 30                             | 36                        |
| Mid: 2440 MHz  | 4.08                     | 2.14                  | 6.22                | 30                             | 36                        |
| High: 2480 MHz | 4.25                     | 2.14                  | 6.39                | 30                             | 36                        |

Low Channel Conducted Power



06:13:00 PM 05/09/2023

### Mid Channel Conducted Power



### High Channel Conducted Power



| Product Standard: CFR47 FCC Part 15.247, RSS-247 |                             |                                   |                  |        | Limit applied: See Report Section 6.2 |                        |                              |
|--------------------------------------------------|-----------------------------|-----------------------------------|------------------|--------|---------------------------------------|------------------------|------------------------------|
| Test Date                                        | Test Personnel/<br>Initials | Supervising Engineer/<br>Initials | Input<br>Voltage | Mode   | Atmospheric Data                      |                        |                              |
|                                                  |                             |                                   |                  |        | Temp<br>C°                            | Relative<br>Humidity % | Atmospheric<br>Pressure mbar |
| 05/09/2023                                       | Kouma Sinn <i>KPS</i>       | Vathana F. Ven <i>VSV</i>         | USB<br>Powered   | Mode 1 | 25                                    | 20                     | 1004                         |
|                                                  |                             |                                   |                  |        |                                       |                        |                              |

Deviations, Additions, or Exclusions: None

## 7 6 dB Bandwidth and Occupied Bandwidth

### 7.1 Method

Tests are performed in accordance with CFR47 FCC Part 15.247, RSS-247, and ANSI C63.10.

**TEST SITE:** EMC Lab

**The EMC Lab** has one Semi-anechoic Chamber and one Shielded Chamber. AC Mains Power is available at 120, 230, and 277 Single Phase; 208, 400, and 480 3-Phase. Large reference ground-planes are installed in the general lab area to facilitate EMC work not requiring a shielded environment.

### 7.2 Limit

FCC Part §15.247 (a) (2) Systems using digital modulation techniques may operate in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

### 7.3 Test Equipment Used:

| Asset           | Description                        | Manufacturer      | Model            | Serial    | Cal Date   | Cal Due    |
|-----------------|------------------------------------|-------------------|------------------|-----------|------------|------------|
| DAV009'         | weather station                    | Davis Instruments | 6351 Vantage VUE | DAV009    | 03/27/2023 | 03/27/2024 |
| CBLHF2012-2M-2' | 2m 9kHz-40GHz Coaxial Cable - SET2 | Huber & Suhner    | SF102            | 252675002 | 02/18/2023 | 02/18/2024 |
| CEN001'         | DC-40GHz attenuator 20dB           | cblhf201-5-2      | C411-20          | CEN001    | 02/28/2023 | 02/28/2024 |
| ROS005-1'       | Signal and Spectrum Analyzer       | Rohde and Shwartz | FSW43            | 100646    | 11/18/2022 | 11/18/2023 |

### Software Utilized:

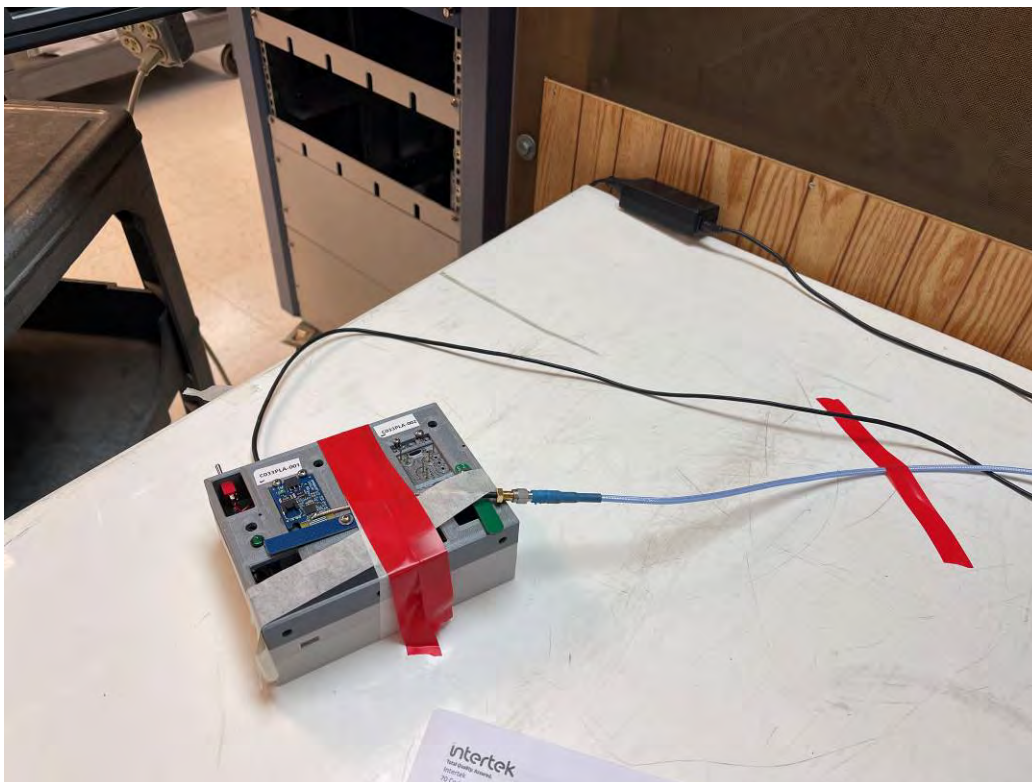
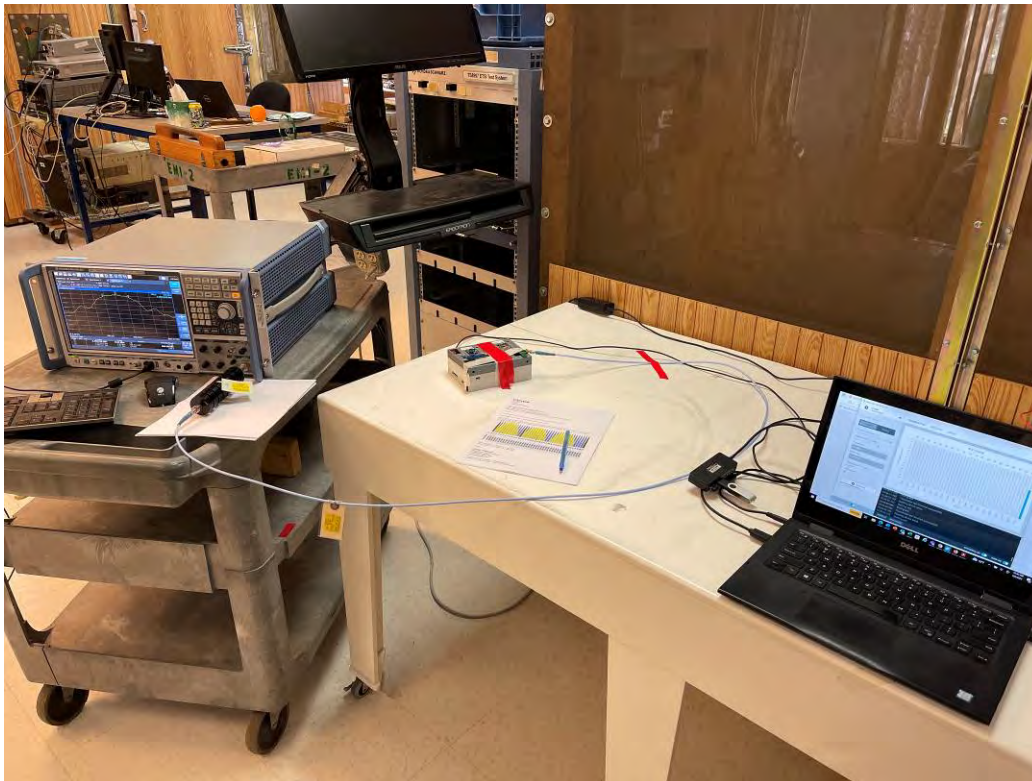
| Name | Manufacturer | Version |
|------|--------------|---------|
| None | N/A          | N/A     |

### 7.4 Results:

The sample tested was found to Comply.



## 7.5 Setup Photographs:



**7.6 Test Data:**

## DTS Bandwidth

| Frequency (MHz) | DTS Bandwidth (6 dB Bandwidth) (kHz) | DTS Bandwidth Limit (kHz) | Results    |
|-----------------|--------------------------------------|---------------------------|------------|
| 2402            | 686.30                               | $\geq 500$                | Compliance |
| 2440            | 674.30                               | $\geq 500$                | Compliance |
| 2480            | 695.30                               | $\geq 500$                | Compliance |

## Occupied Bandwidth (OBW)

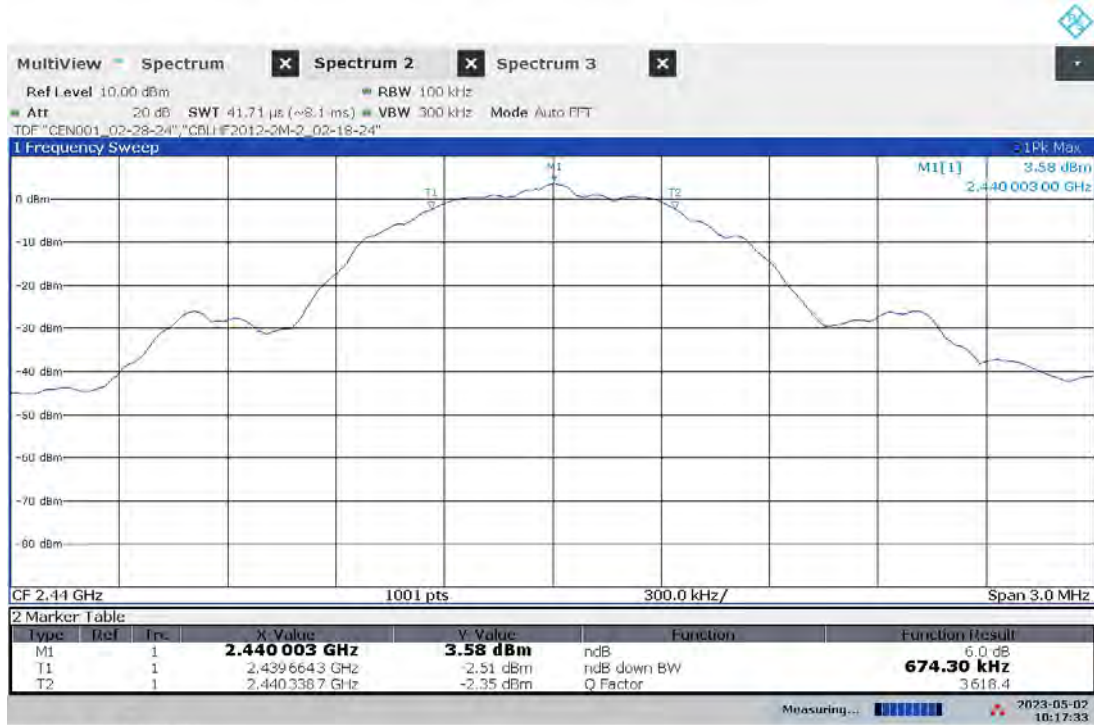
| Frequency (MHz) | Occupied Bandwidth (MHz) | Occupied Bandwidth Limit                            | Results    |
|-----------------|--------------------------|-----------------------------------------------------|------------|
| 2402            | 1.053                    | Upper and Lower Edges of OBW within 2400-2483.5 MHz | Compliance |
| 2440            | 1.053                    | Upper and Lower Edges of OBW within 2400-2483.5 MHz | Compliance |
| 2480            | 1.056                    | Upper and Lower Edges of OBW within 2400-2483.5 MHz | Compliance |

### Low Channel DTS Bandwidth



10:15:45 AM 05/02/2023

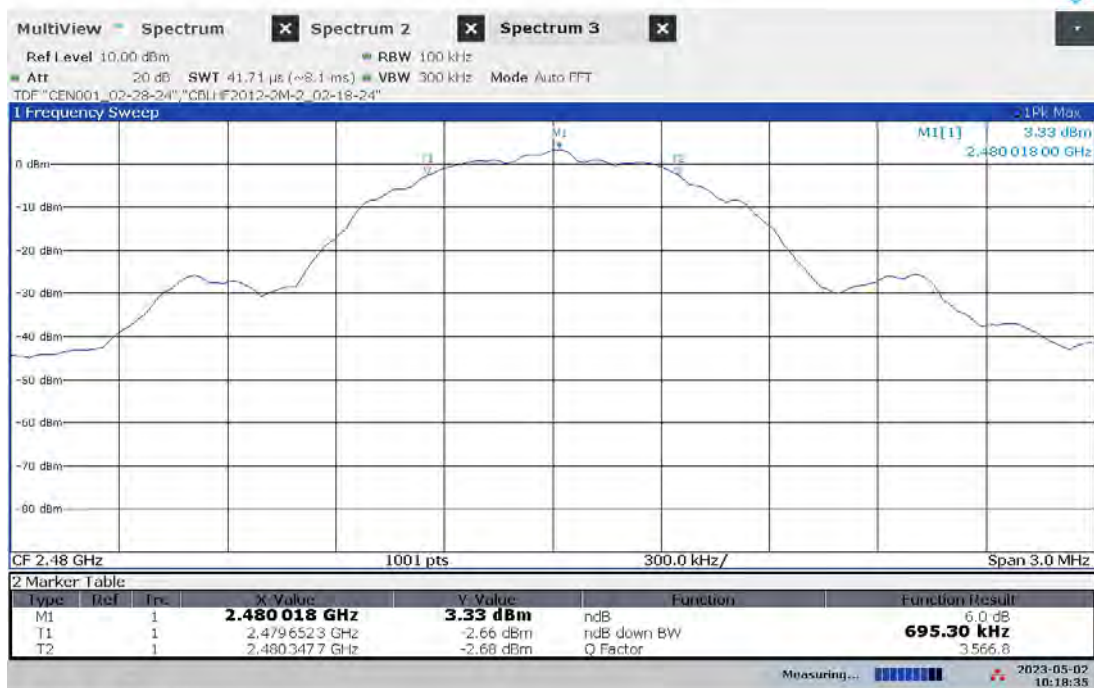
### Mid Channel DTS Bandwidth



10:17:33 AM 05/02/2023



### High Channel DTS Bandwidth



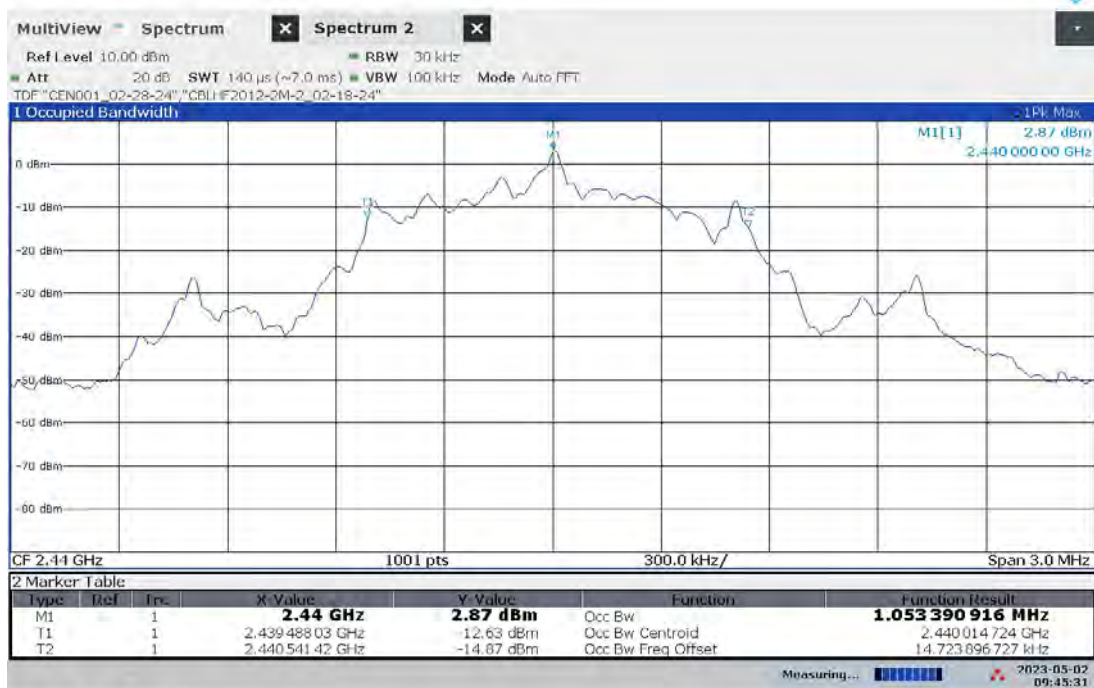
10:18:35 AM 05/02/2023

### Low Channel Occupied Bandwidth



09:36:35 AM 05/02/2023

## Mid Channel Occupied Bandwidth



09:45:32 AM 05/02/2023

## High Channel Occupied Bandwidth



09:47:04 AM 05/02/2023

| Product Standard: CFR47 FCC Part 15.247, RSS-247 |                             |                                   |                  |        | Limit applied: See Report Section 7.2 |                        |                              |
|--------------------------------------------------|-----------------------------|-----------------------------------|------------------|--------|---------------------------------------|------------------------|------------------------------|
| Test Date                                        | Test Personnel/<br>Initials | Supervising Engineer/<br>Initials | Input<br>Voltage | Mode   | Atmospheric Data                      |                        |                              |
|                                                  |                             |                                   |                  |        | Temp<br>C°                            | Relative<br>Humidity % | Atmospheric<br>Pressure mbar |
| 05/02/2023                                       | Kouma Sinn <i>KPS</i>       | Vathana F. Ven <i>VFV</i>         | USB<br>Powered   | Mode 1 | 25                                    | 33                     | 997                          |
|                                                  |                             |                                   |                  |        |                                       |                        |                              |

Deviations, Additions, or Exclusions: None

## 8 Maximum Power Spectral Density

### 8.1 Method

Tests are performed in accordance with CFR47 FCC Part 15.247, RSS-247, and ANSI C63.10, and KDB 558074 D0115.247Meas Guidancev05r02.

**TEST SITE:** Safety Lab

### 8.2 Limit

§15.247 (e) For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

### 8.3 Test Equipment Used:

| Asset           | Description                        | Manufacturer      | Model       | Serial      | Cal Date   | Cal Due    |
|-----------------|------------------------------------|-------------------|-------------|-------------|------------|------------|
| SAF1504'        | Weather Station                    | Davis             | Vantage Vue | MR200526013 | 01/31/2023 | 01/31/2024 |
| CBLHF2012-5M-2' | 5m 9kHz-40GHz Coaxial Cable - SET2 | Huber & Suhner    | SF102       | 252676002   | 02/25/2023 | 02/25/2024 |
| CEN001'         | DC-40GHz attenuator 20dB           | cblhf201-5-2      | C411-20     | CEN001      | 02/28/2023 | 02/28/2024 |
| ROS005-1'       | Signal and Spectrum Analyzer       | Rohde and Shwartz | FSW43       | 100646      | 11/18/2022 | 11/18/2023 |

#### Software Utilized:

| Name | Manufacturer | Version |
|------|--------------|---------|
| None | N/A          | N/A     |

### 8.4 Results:

The sample tested was found to Comply.

## 8.5 Setup Photograph:





## 8.6 Test Data:

### Peak Power Spectral Density

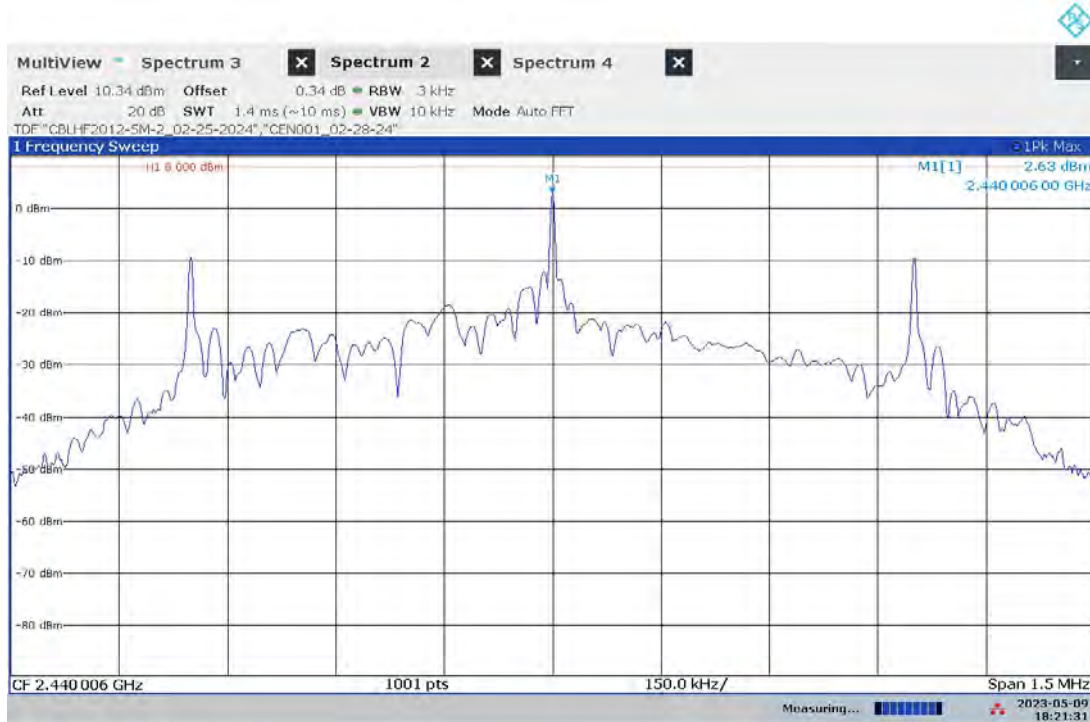
| Channels       | Peak Power Spectral Density (dBm) | Limit (dBm) |
|----------------|-----------------------------------|-------------|
| Low: 2402 MHz  | 2.84                              | 8           |
| Mid: 2440 MHz  | 2.63                              | 8           |
| High: 2480 MHz | 2.78                              | 8           |

### Low Channel Peak Power Spectral Density



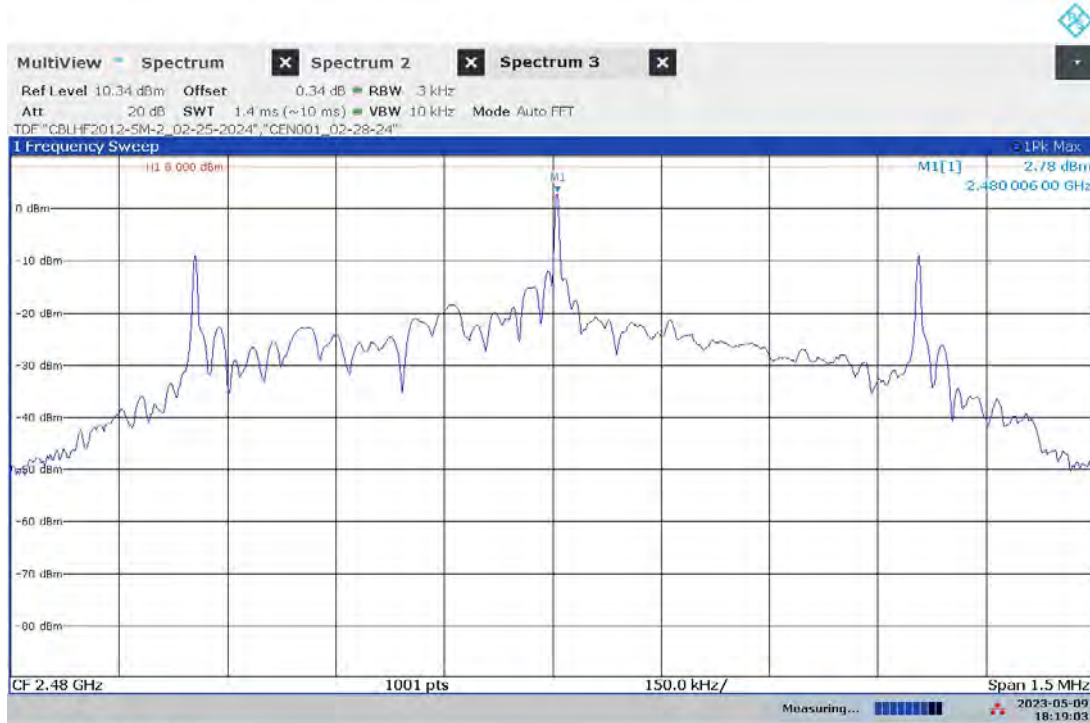
06:23:45 PM 05/09/2023

### Mid Channel Peak Power Spectral Density



06:21:31 PM 05/09/2023

### High Channel Peak Power Spectral Density



06:19:03 PM 05/09/2023



| Product Standard: CFR47 FCC Part 15.247, RSS-247 |                             |                                   |                  |        | Limit applied: See Report Section 8.2 |                        |                              |
|--------------------------------------------------|-----------------------------|-----------------------------------|------------------|--------|---------------------------------------|------------------------|------------------------------|
| Test Date                                        | Test Personnel/<br>Initials | Supervising Engineer/<br>Initials | Input<br>Voltage | Mode   | Atmospheric Data                      |                        |                              |
|                                                  |                             |                                   |                  |        | Temp<br>C°                            | Relative<br>Humidity % | Atmospheric<br>Pressure mbar |
| 05/09/2023                                       | Kouma Sinn <i>KPS</i>       | Vathana F. Ven <i>VFV</i>         | USB<br>Powered   | Mode 1 | 25                                    | 20                     | 1004                         |
|                                                  |                             |                                   |                  |        |                                       |                        |                              |

## 9 Band Edge Compliance

### 9.1 Method

Tests are performed in accordance with FCC Part 15 Subpart C 15.247, RSS 247, and ANSI C 63.10.

**TEST SITE:** 10m ALSE

**The 10m ALSE** is 13m (Length) x 21m (Depth) x 10m (Height) with the effective size in terms of space from the tips of the absorber is 12m (Length) x 20m (Depth) x 8.5m (Height). This chamber achieves broadband performance using a unique arrangement of hybrid and ferrite tile absorber. This chamber has a built in 3m diameter turntable (Embedded type). The metal structure of the table makes electrical connection around the entire circumference of the turntable to the ground plane with a metal brush type connection. The turntable is located on one end of the chamber and the antennas are mounted 3 and 10 meters away at the other end of the chamber on the adjustable an Antenna Mast. The antenna mast is a non-conductive bore sighted type with remote control of antenna height and polarization. The Antenna Mast and the turntable can be remotely controlled through the controller located in the adjacent Control room. A Styrofoam table 80 cm high is used for table-top equipment.

### 9.2 Limit

15.247 (d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator 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 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 paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c))

### 9.3 Test Equipment Used:

| Asset    | Description                             | Manufacturer     | Model                | Serial      | Cal Date   | Cal Due    |
|----------|-----------------------------------------|------------------|----------------------|-------------|------------|------------|
| 145-420' | Receiver to floor cable                 | Utiflex          | UFB311A-2-0591-70070 | 145-420     | 02/18/2023 | 02/18/2024 |
| 145-422' | 10Amp Pre-amp to under floor            | Utiflex          | UFB311A-0-2756-70070 | 145-422     | 02/18/2023 | 02/18/2024 |
| 145-408' | 10m Chamber - 3m Track B In-floor Cable | Huber + Suhner   | sucoflex 106-11000mm | 001         | 07/19/2023 | 07/19/2024 |
| IW002'   | 2 meter Armored cable                   | Insulated Wire   | 2800-NPS             | 002         | 10/11/2022 | 10/11/2023 |
| DAV006'  | Weather Station                         | Davis            | 6250                 | MS191218071 | 02/21/2022 | 02/21/2024 |
| ETS005'  | 1-18GHz horn antenna                    | ETS-Lindgren     | 3117                 | 00218279    | 10/12/2023 | 10/12/2023 |
| ROS011'  | EMI Test Receiver                       | Rohde & Schwartz | ESW44                | 103296      | 06/28/2023 | 06/28/2024 |

#### Software Utilized:

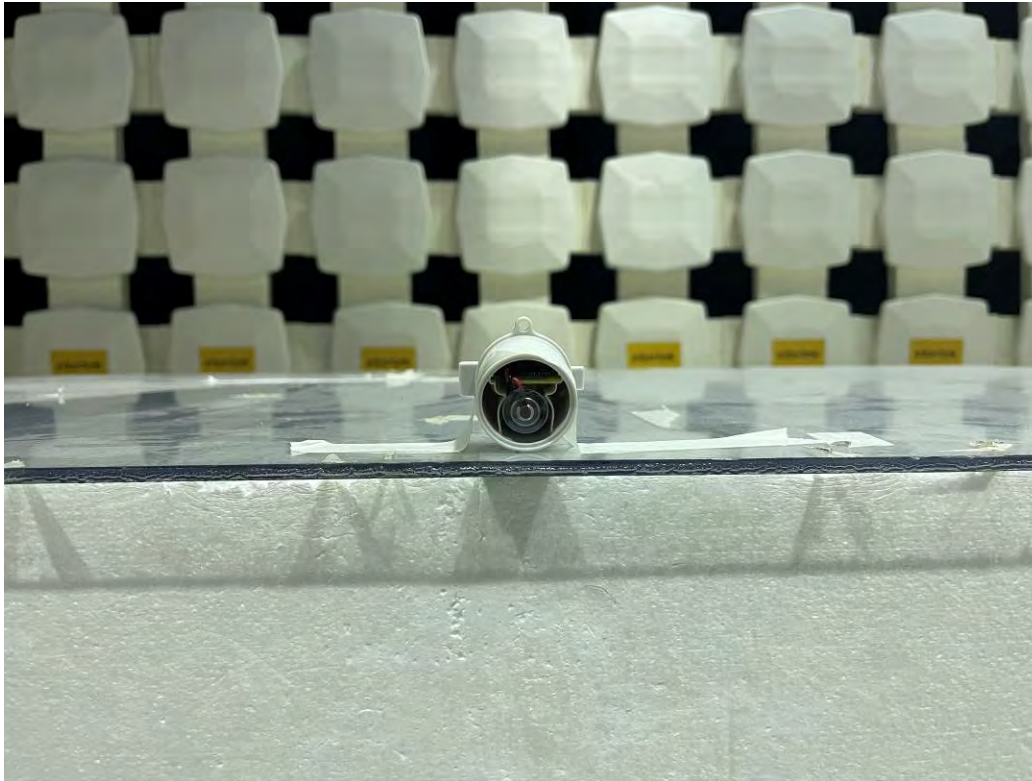
| Name | Manufacturer | Version |
|------|--------------|---------|
| None | --           | --      |

### 9.4 Results:

The sample tested was found to Comply.

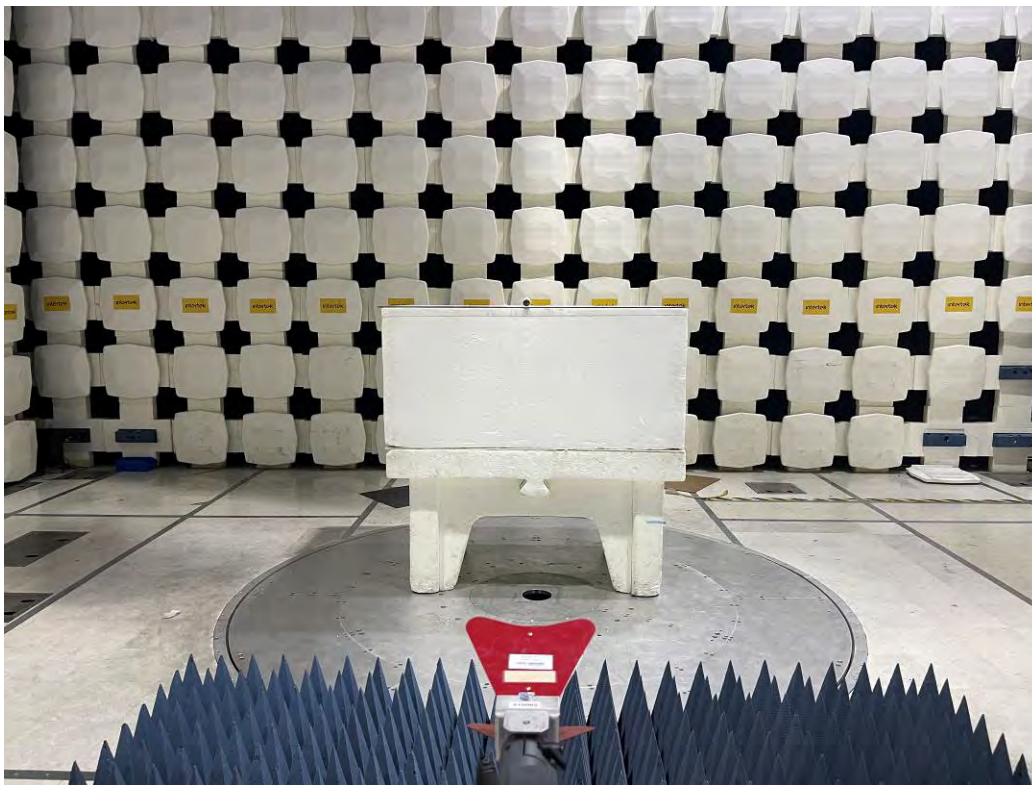
## 9.5 Setup Photographs:

Back side





Long Side



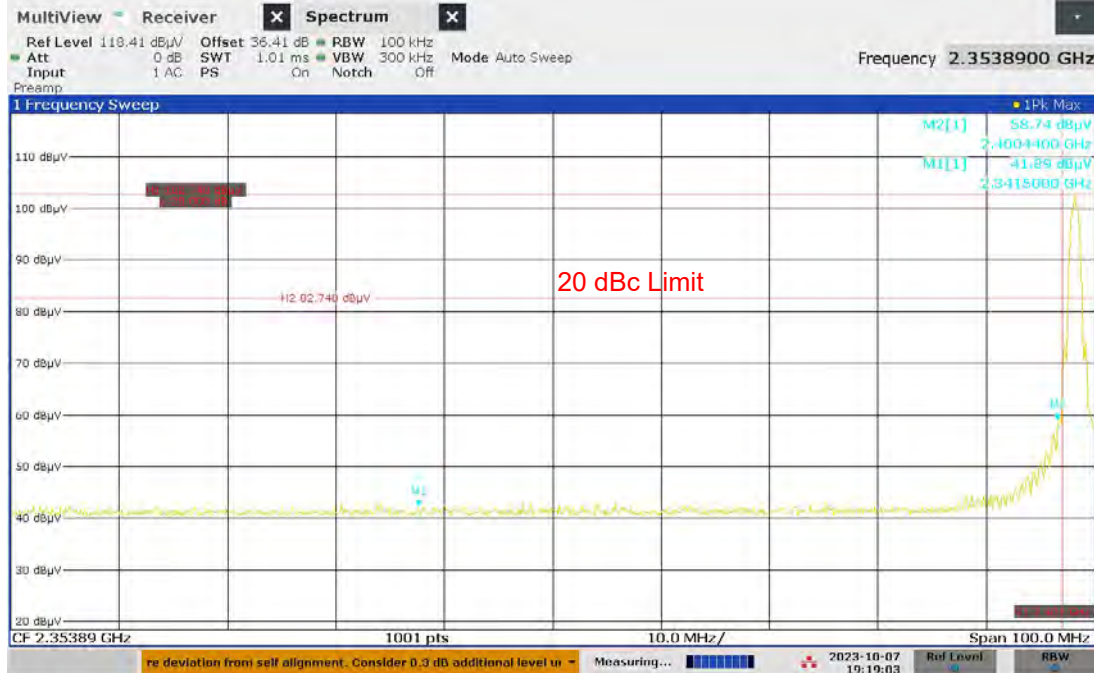
Short Side



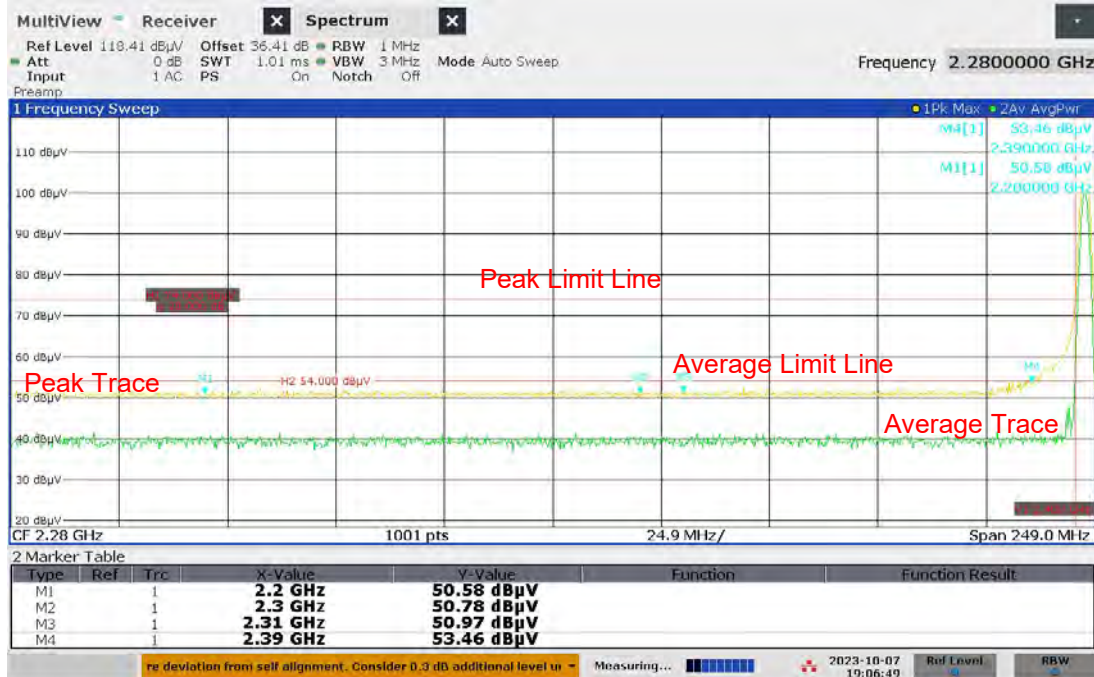


## 9.6 Test Data:

Lower Band Edge at 3m distance (Long Side, Horizontal Polarity – Worst-case), 100 kHz RBW



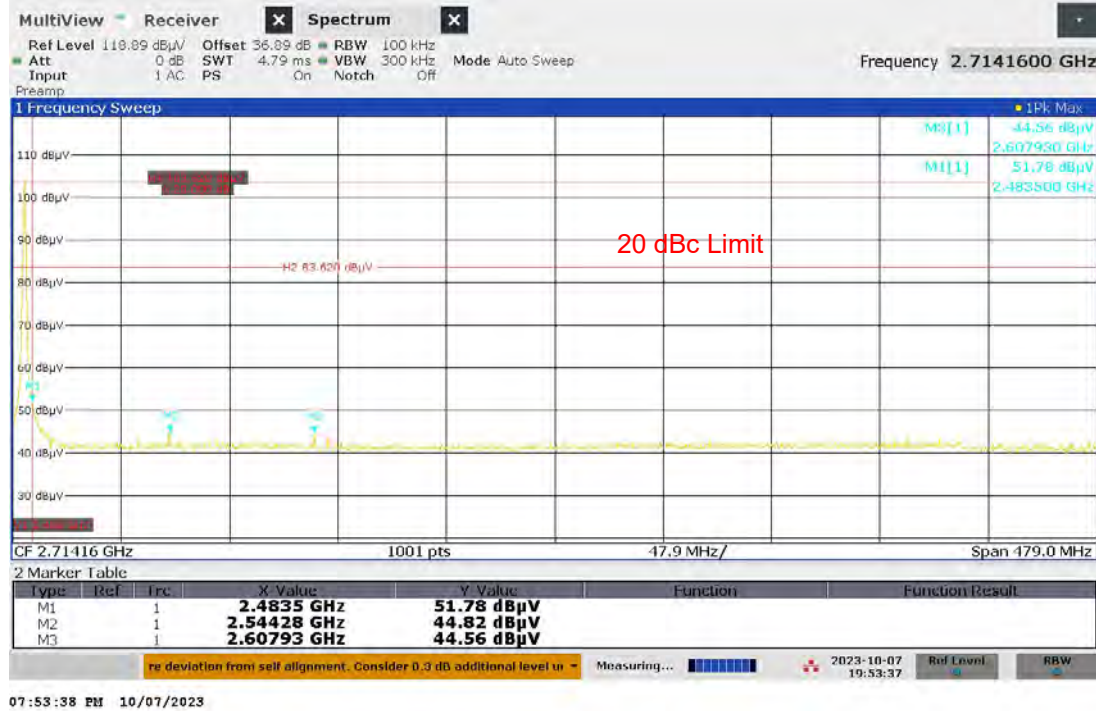
Lower Band Edge at 3m distance (Long Side, Horizontal Polarity – Worst-case), 1 MHz RBW



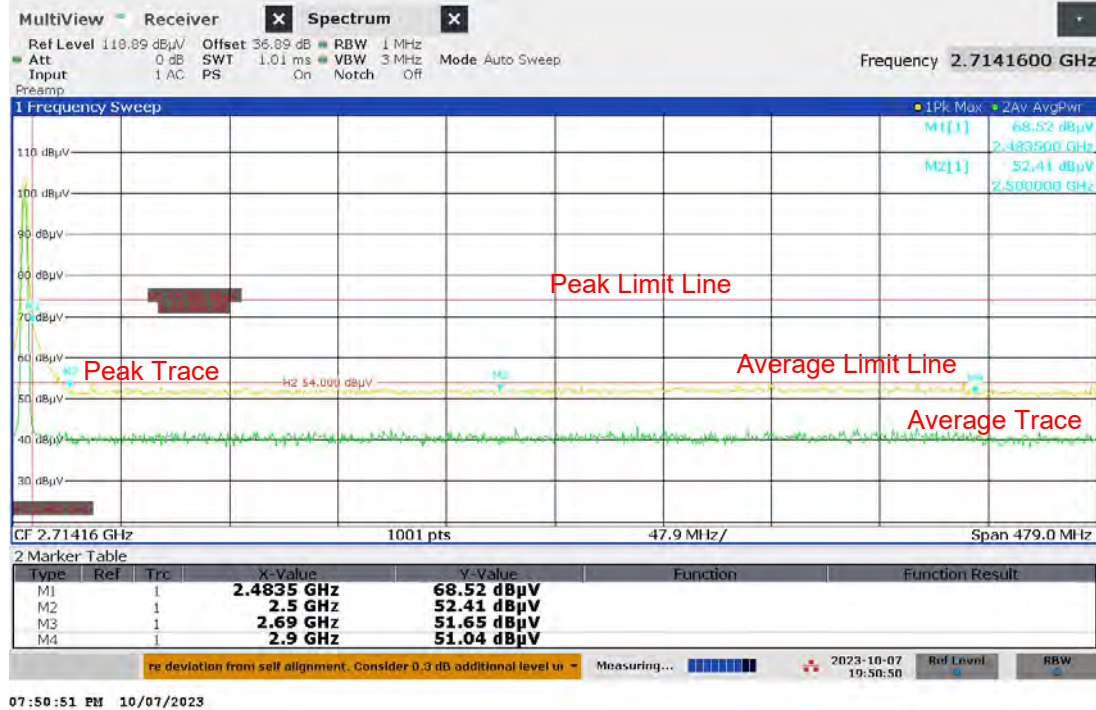
Notes: Antenna factor and cable loss compensate internally as dB off-set.



Upper Band Edge at 3m distance (Long Side, Horizontal Polarity – Worst-case), 100 kHz RBW



Upper Band Edge at 3m distance (Long Side, Horizontal Polarity – Worst-case), 1 MHz RBW



Notes: Antenna factor and cable loss compensate internally as dB off-set.

| Product Standard: CFR47 FCC Part 15.247, RSS-247 |                             |                                   |                  |        | Limit applied: See Report Section 9.2 |                        |                              |
|--------------------------------------------------|-----------------------------|-----------------------------------|------------------|--------|---------------------------------------|------------------------|------------------------------|
| Test Date                                        | Test Personnel/<br>Initials | Supervising Engineer/<br>Initials | Input<br>Voltage | Mode   | Atmospheric Data                      |                        |                              |
|                                                  |                             |                                   |                  |        | Temp<br>C°                            | Relative<br>Humidity % | Atmospheric<br>Pressure mbar |
| 10/07/2023                                       | Kouma Sinn <i>KPS</i>       | Vathana F. Ven <i>VSV</i>         | USB<br>Powered   | Mode 1 | 24                                    | 49                     | 1001                         |

Deviations, Additions, or Exclusions: None

## 10 Transmitter spurious emissions

### 10.1 Method

Tests are performed in accordance with FCC Part 15 Subpart C 15.247, FCC Part 15 Subpart B, RSS 247, ISSED ICES 003, ANSI C 63.10, and ANSI C 63.4.

**TEST SITE:** Safety Lab and 10m ALSE

**The 10m ALSE** is 13m (Length) x 21m (Depth) x 10m (Height) with the effective size in terms of space from the tips of the absorber is 12m (Length) x 20m (Depth) x 8.5m (Height). This chamber achieves broadband performance using a unique arrangement of hybrid and ferrite tile absorber. This chamber has a built in 3m diameter turntable (Embedded type). The metal structure of the table makes electrical connection around the entire circumference of the turntable to the ground plane with a metal brush type connection. The turntable is located on one end of the chamber and the antennas are mounted 3 and 10 meters away at the other end of the chamber on the adjustable an Antenna Mast. The antenna mast is a non-conductive bore sighted type with remote control of antenna height and polarization. The Antenna Mast and the turntable can be remotely controlled through the controller located in the adjacent Control room. A Styrofoam table 80 cm high is used for table-top equipment.

### Measurement Uncertainty

| Measurement             | Frequency Range | Expanded Uncertainty (k=2) | Ucisp  |
|-------------------------|-----------------|----------------------------|--------|
| Radiated Emissions, 10m | 30-1000 MHz     | 4.6dB                      | 6.3 dB |
| Radiated Emissions, 3m  | 30-1000 MHz     | 5.3 dB                     | 6.3 dB |
| Radiated Emissions, 3m  | 1-6 GHz         | 4.5 dB                     | 5.2 dB |
| Radiated Emissions, 3m  | 6-15 GHz        | 5.2 dB                     | 5.5 dB |
| Radiated Emissions, 3m  | 15-18 GHz       | 5.0 dB                     | 5.5 dB |
| Radiated Emissions, 3m  | 18-40 GHz       | 5.0 dB                     | 5.5 dB |

As shown in the table above our radiated emissions  $U_{lab}$  is less than the corresponding  $U_{CISPR}$  reference value in CISPR 16-4-2 Table 1, hence the compliance of the product is only based on the measured value, and no measurement uncertainty correction is required, based on CISPR 22 and CISPR 11 (for 2006 and later revisions) Clause 11.

### Sample Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF - AG$$

Where

- FS = Field Strength in dB $\mu$ V/m
- RA = Receiver Amplitude (including preamplifier) in dB $\mu$ V
- CF = Cable Attenuation Factor in dB
- AF = Antenna Factor in dB
- AG = Amplifier Gain in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows.

Assume a receiver reading of 52.0 dB $\mu$ V is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving a field strength of 32 dB $\mu$ V/m. This value in dB $\mu$ V/m was converted to its corresponding level in  $\mu$ V/m.

$$RA = 52.0 \text{ dB}\mu\text{V}$$

$$AF = 7.4 \text{ dB/m}$$

$$CF = 1.6 \text{ dB}$$

$$AG = 29.0 \text{ dB}$$

$$FS = 32 \text{ dB}\mu\text{V/m}$$

To convert from dB $\mu$ V to  $\mu$ V or mV the following was used:

$$UF = 10^{(NF / 20)} \text{ where } UF = \text{Net Reading in } \mu\text{V}$$

$$NF = \text{Net Reading in dB}\mu\text{V}$$

### Example:

$$FS = RA + AF + CF - AG = 52.0 + 7.4 + 1.6 - 29.0 = 32.0$$

$$UF = 10^{(32 \text{ dB}\mu\text{V} / 20)} = 39.8 \mu\text{V/m}$$

Alternately, when BAT-EMC Emission Software is used, the "Level" includes all losses and gains and is compared directly in the "Margin" column to the "Limit". The "Correction" includes Antenna Factor, Preamp, and Cable Loss. These are already accounted for in the "Level" column.

### TEST SITE: EMC Lab

**The EMC Lab** has one Semi-anechoic Chamber and one Shielded Chamber. AC Mains Power is available at 120, 230, and 277 Single Phase; 208, 400, and 480 3-Phase. Large reference ground-planes are installed in the general lab area to facilitate EMC work not requiring a shielded environment.

## 10.2 Test Equipment Used:

Test equipment used for antenna port conducted measurement

| Asset           | Description                        | Manufacturer      | Model       | Serial      | Cal Date   | Cal Due    |
|-----------------|------------------------------------|-------------------|-------------|-------------|------------|------------|
| SAF1504'        | Weather Station                    | Davis             | Vantage Vue | MR200526013 | 01/31/2023 | 01/31/2024 |
| CBLHF2012-5M-2' | 5m 9kHz-40GHz Coaxial Cable - SET2 | Huber & Suhner    | SF102       | 252676002   | 02/25/2023 | 02/25/2024 |
| CEN001'         | DC-40GHz attenuator 20dB           | cblhf201-5-2      | C411-20     | CEN001      | 02/28/2023 | 02/28/2024 |
| ROS005-1'       | Signal and Spectrum Analyzer       | Rohde and Shwartz | FSW43       | 100646      | 11/18/2022 | 11/18/2023 |

Test equipment used for radiated emissions from 30-1000 MHz

| Asset    | Description                             | Manufacturer         | Model                | Serial      | Cal Date   | Cal Due    |
|----------|-----------------------------------------|----------------------|----------------------|-------------|------------|------------|
| DAV006'  | Weather Station                         | Davis                | 6250                 | MS191218071 | 02/21/2023 | 02/21/2024 |
| ROS011'  | EMI Test Receiver                       | Rohde & Schwartz     | ESW44                | 103296      | 06/28/2023 | 06/28/2024 |
| PRE10'   | 30-1000MHz pre-amp                      | ITS                  | PRE10                | PRE10       | 02/17/2023 | 02/17/2024 |
| 145145'  | Broadband Hybrid Antenna 30 MHz - 3 GHz | Sunol Sciences Corp. | JB3                  | A122313     | 06/23/2023 | 06/23/2024 |
| HS003'   | 10m under floor cable                   | Huber-Schuner        | 10m-1                | HS003       | 02/18/2023 | 02/18/2024 |
| 145-424' | 9kHz to 40GHz Cable                     | Huber and Suhner     | Sucoflex             | 145-424     | 02/18/2023 | 02/18/2024 |
| HS001'   | DC-18GHz cable 1.5m long                | Huber & Suhner       | SucoFlex 106A        | HS001       | 01/25/2023 | 01/25/2024 |
| 145-420' | Receiver to floor cable                 | Utiflex              | UFB311A-2-0591-70070 | 145-420     | 02/18/2023 | 02/18/2024 |

### Software Utilized:

| Name    | Manufacturer | Version     |
|---------|--------------|-------------|
| BAT-EMC | Nexio        | 2022.0.27.0 |

Test equipment used for radiated emissions from 1-13 GHz

| Asset    | Description                             | Manufacturer     | Model                | Serial      | Cal Date   | Cal Due    |
|----------|-----------------------------------------|------------------|----------------------|-------------|------------|------------|
| 145-420' | Receiver to floor cable                 | Utiflex          | UFB311A-2-0591-70070 | 145-420     | 02/18/2023 | 02/18/2024 |
| 145-422' | 10Amp Pre-amp to under floor            | Utiflex          | UFB311A-0-2756-70070 | 145-422     | 02/18/2023 | 02/18/2024 |
| 145-408' | 10m Chamber - 3m Track B In-floor Cable | Huber + Suhner   | sucoflex 106-11000mm | 001         | 07/19/2023 | 07/19/2024 |
| IW002'   | 2 meter Armored cable                   | Insulated Wire   | 2800-NPS             | 002         | 10/11/2022 | 10/11/2023 |
| DAV006'  | Weather Station                         | Davis            | 6250                 | MS191218071 | 02/21/2022 | 02/21/2024 |
| ETS005'  | 1-18GHz horn antenna                    | ETS-Lindgren     | 3117                 | 00218279    | 10/12/2023 | 10/12/2023 |
| ROS011'  | EMI Test Receiver                       | Rohde & Schwartz | ESW44                | 103296      | 06/28/2023 | 06/28/2024 |
| PRE12'   | Pre-amplifier                           | Com Power        | PAM-118A             | 18040117    | 12/17/2022 | 12/17/2023 |
| REA004'  | 3GHz High Pass Filter                   | Reactel, Inc     | 7HSX-3G/18G-S11      | 06-1        | 02/14/2023 | 02/14/2024 |
| REA008'  | band reject filter 2.4GHz               | Reactel, Inc     | 12RX7-2441.75-x140 S | 17-01       | 07/19/2023 | 07/19/2024 |

Test equipment used for radiated emissions from 13-25 GHz

| Asset           | Description                        | Manufacturer      | Model       | Serial      | Cal Date   | Cal Due    |
|-----------------|------------------------------------|-------------------|-------------|-------------|------------|------------|
| CBLHF2012-5M-2' | 5m 9kHz-40GHz Coaxial Cable - SET2 | Huber & Suhner    | SF102       | 252676002   | 02/25/2023 | 02/25/2024 |
| CBLHF2012-2M-2' | 2m 9kHz-40GHz Coaxial Cable - SET2 | Huber & Suhner    | SF102       | 252675002   | 02/18/2023 | 02/18/2024 |
| 145108'         | EMI Test Receiver (20Hz - 40GHz)   | Rohde & Schwarz   | ESIB40      | 100209      | 06/23/2022 | 06/23/2023 |
| ETS004'         | 18-40GHz horn antenna              | ets004            | 3116C       | 00218579    | 02/23/2023 | 02/23/2024 |
| DAV006'         | Weather Station                    | Davis             | 6250        | MS191218071 | 02/21/2022 | 02/21/2024 |
| ETS002'         | 1-18GHz DRG Horn Antenna           | ETS Lindgren      | 3117        | 00143260    | 09/27/2022 | 09/27/2023 |
| ROS005-1'       | Signal and Spectrum Analyzer       | Rohde and Shwartz | FSW43       | 100646      | 11/18/2022 | 11/18/2023 |
| PRE9'           | 100MHz-40GHz Preamp                | MITEQ             | NSP4000-NFG | 1260417     | 09/23/2022 | 09/23/2023 |

### Software Utilized:

| Name               | Manufacturer | Version     |
|--------------------|--------------|-------------|
| EMI Boxborough.xls | Intertek     | 08/27/2010  |
| BAT-EMC            | Nexio        | 2022.0.27.0 |



**10.3 Results:**

The sample tested was found to Comply.

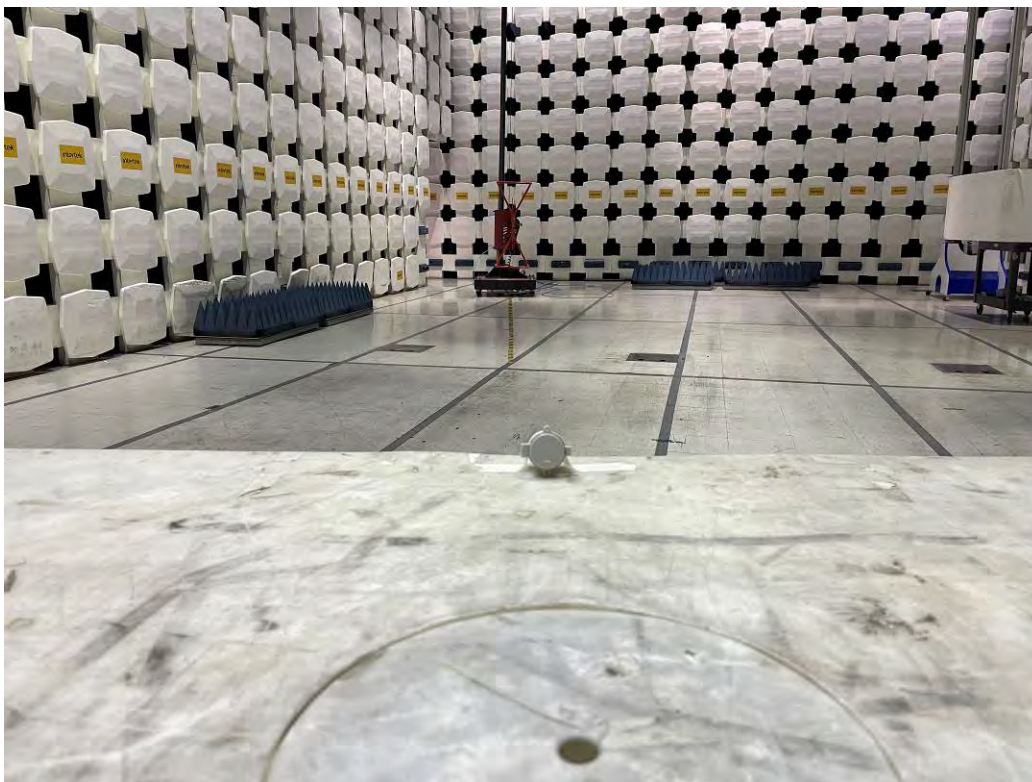
15.247 (d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided 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 paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c))

#### 10.4 Setup Photographs:

Antenna Port Conducted Emission Test Setup

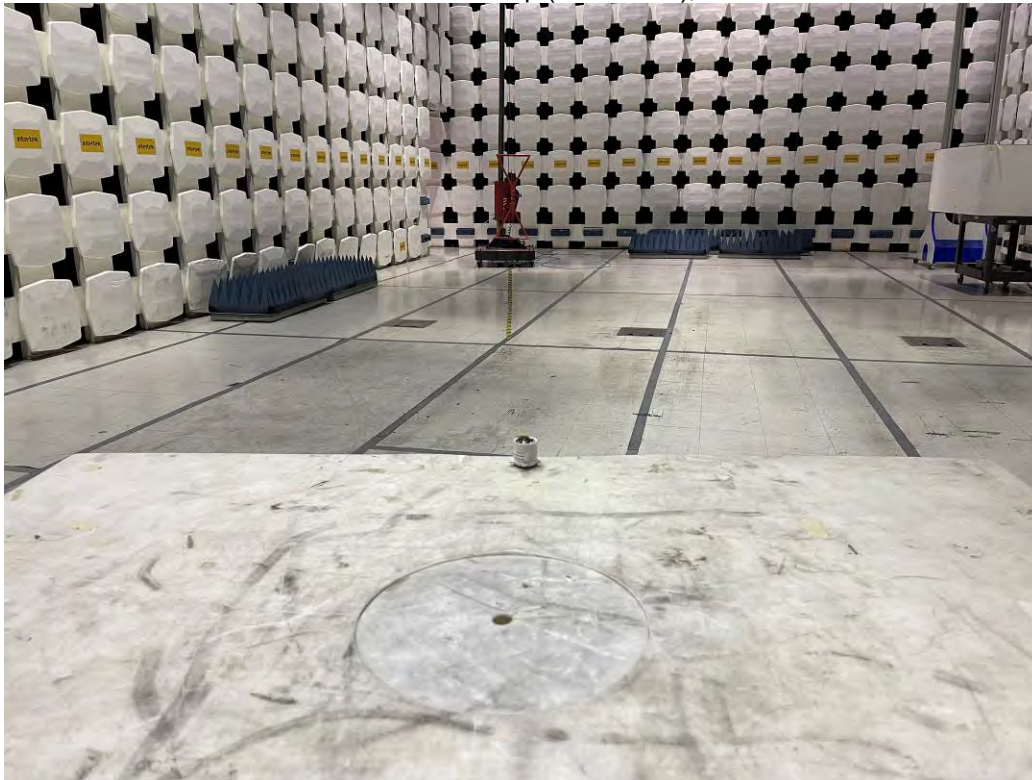


Radiated Emission Test Setup (Back Side), 30-1000 MHz

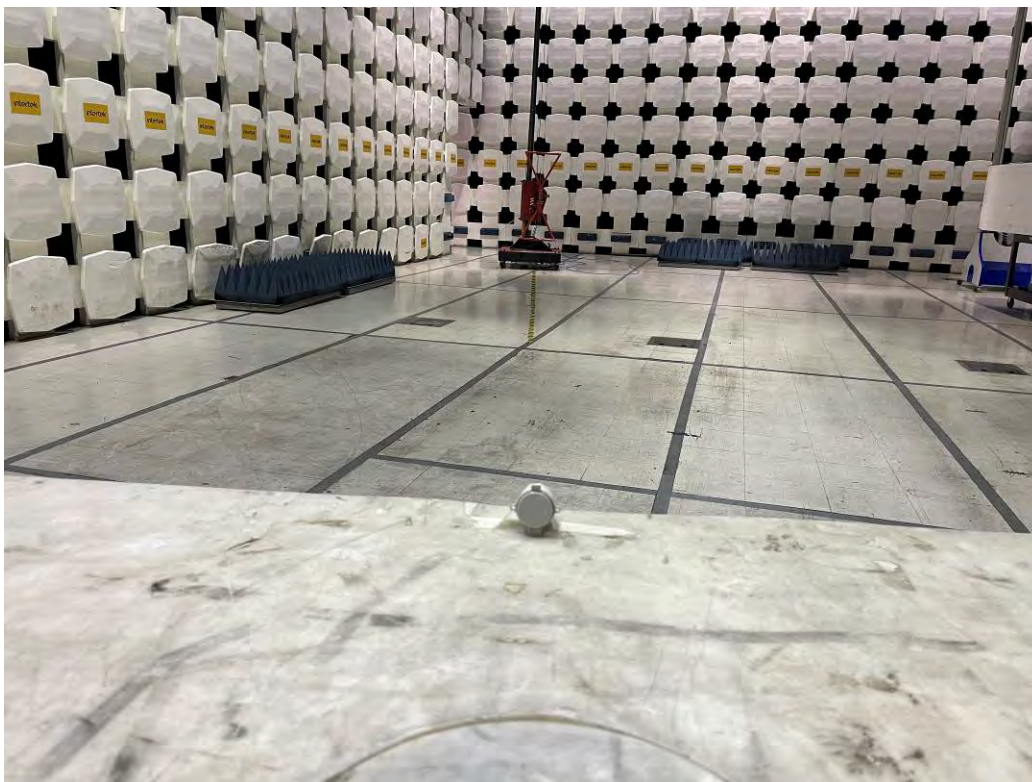
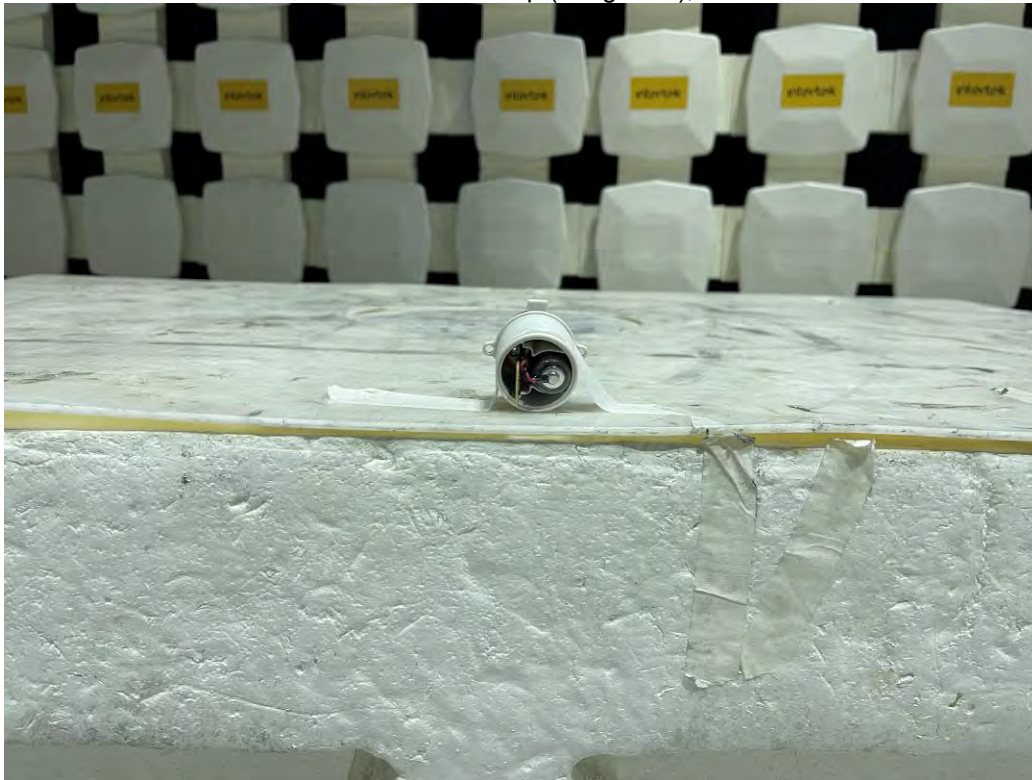




Radiated Emission Test Setup (Short Side), 30-1000 MHz

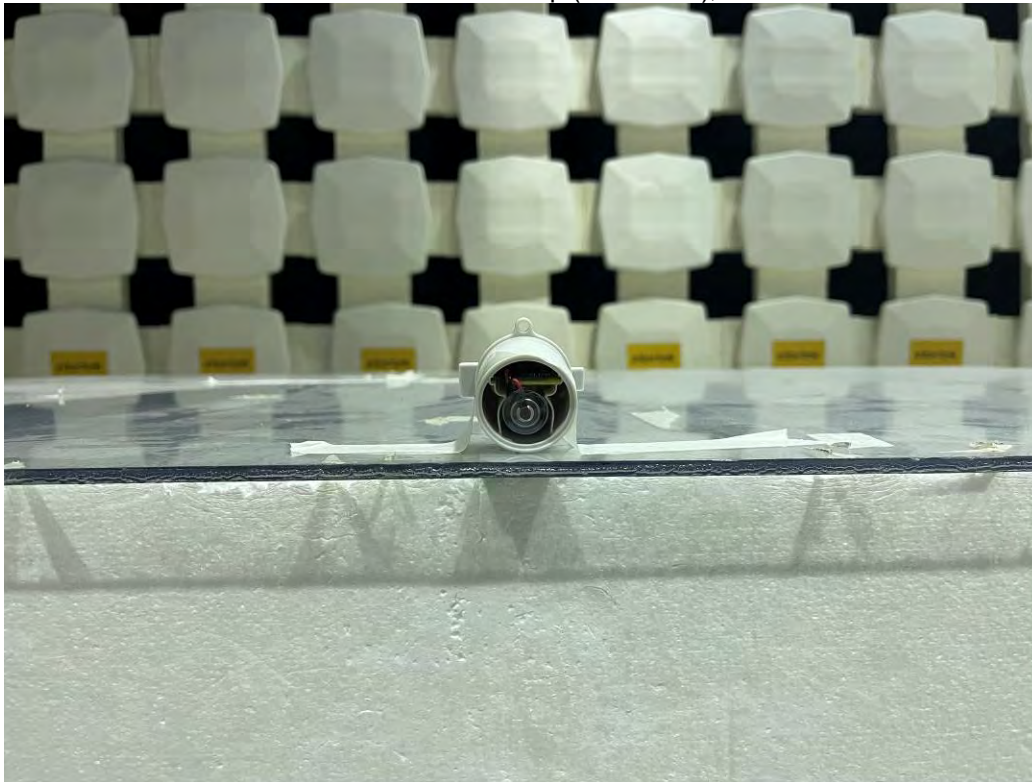


Radiated Emission Test Setup (Long Side), 30-1000 MHz

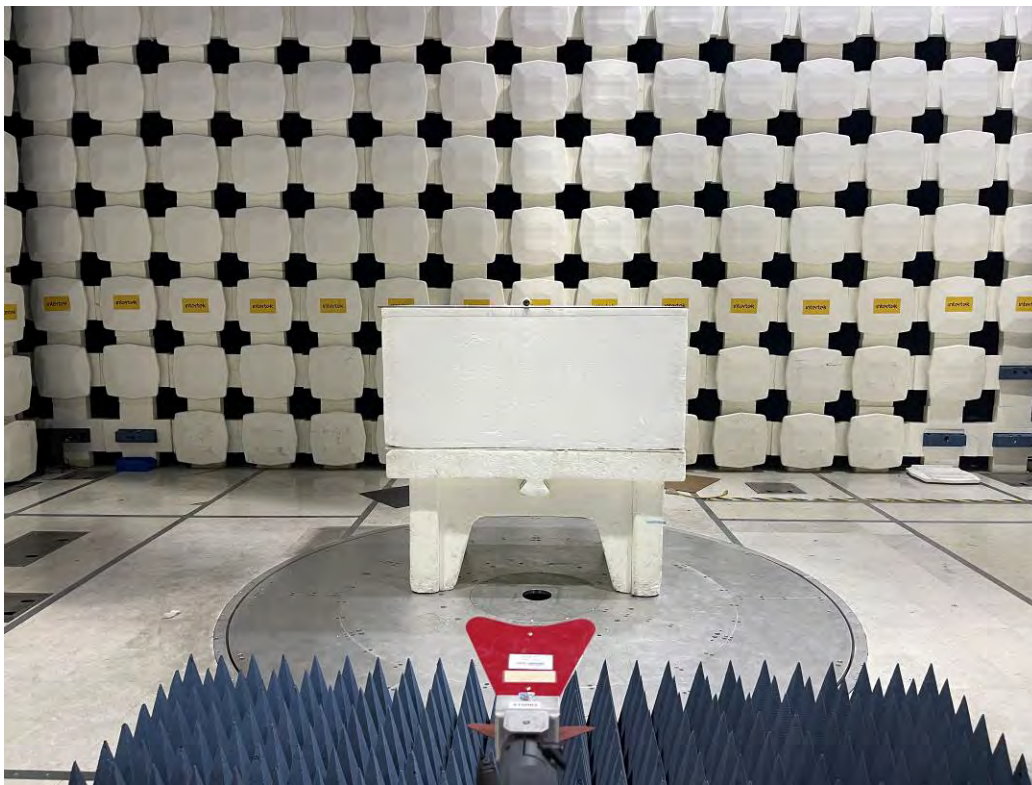




Radiated Emission Test Setup (Back Side), 1-13 GHz

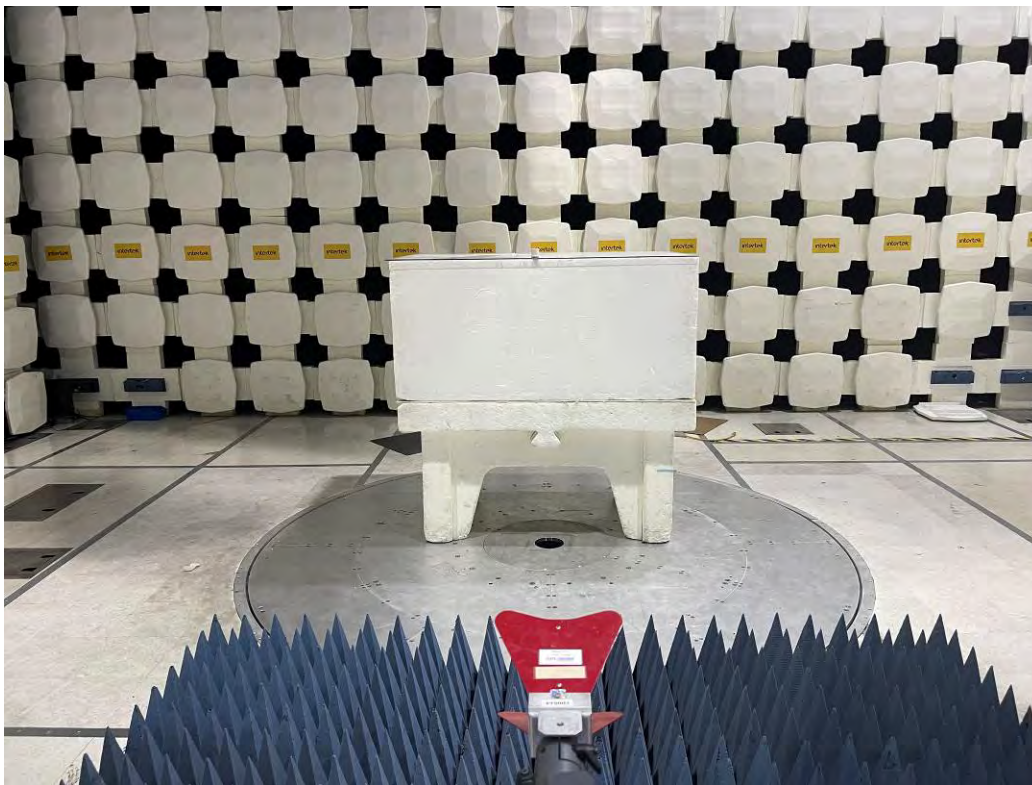


Radiated Emission Test Setup (Long Side), 1-13 GHz

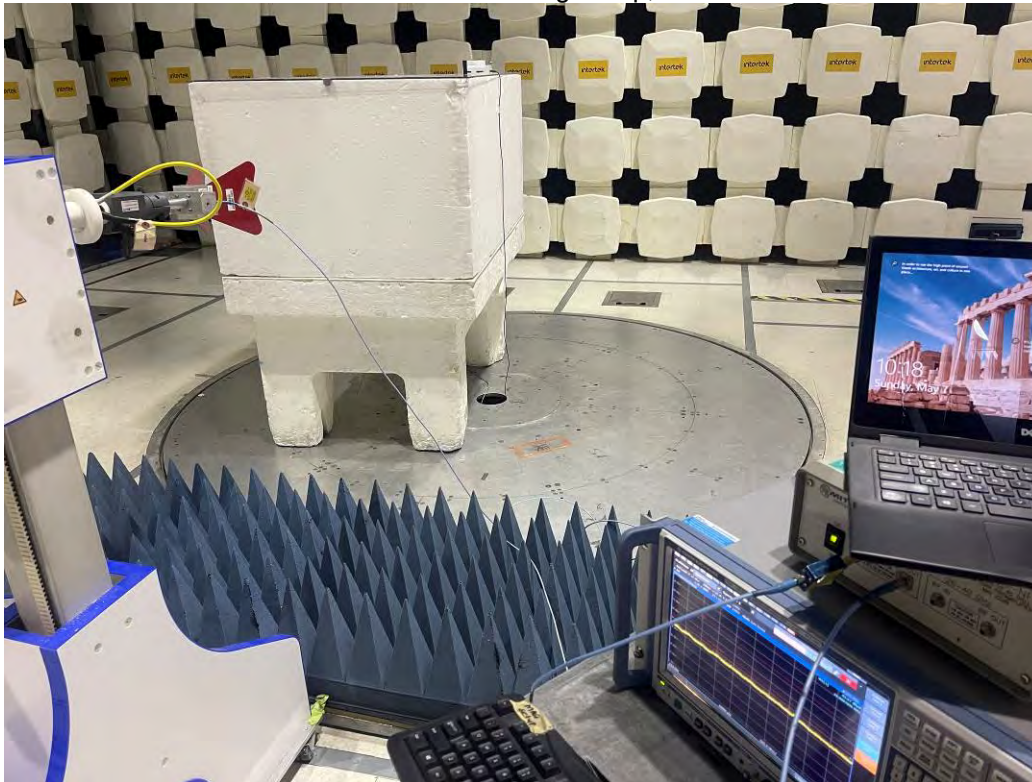




Radiated Emission Test Setup (Short Side), 1-13 GHz

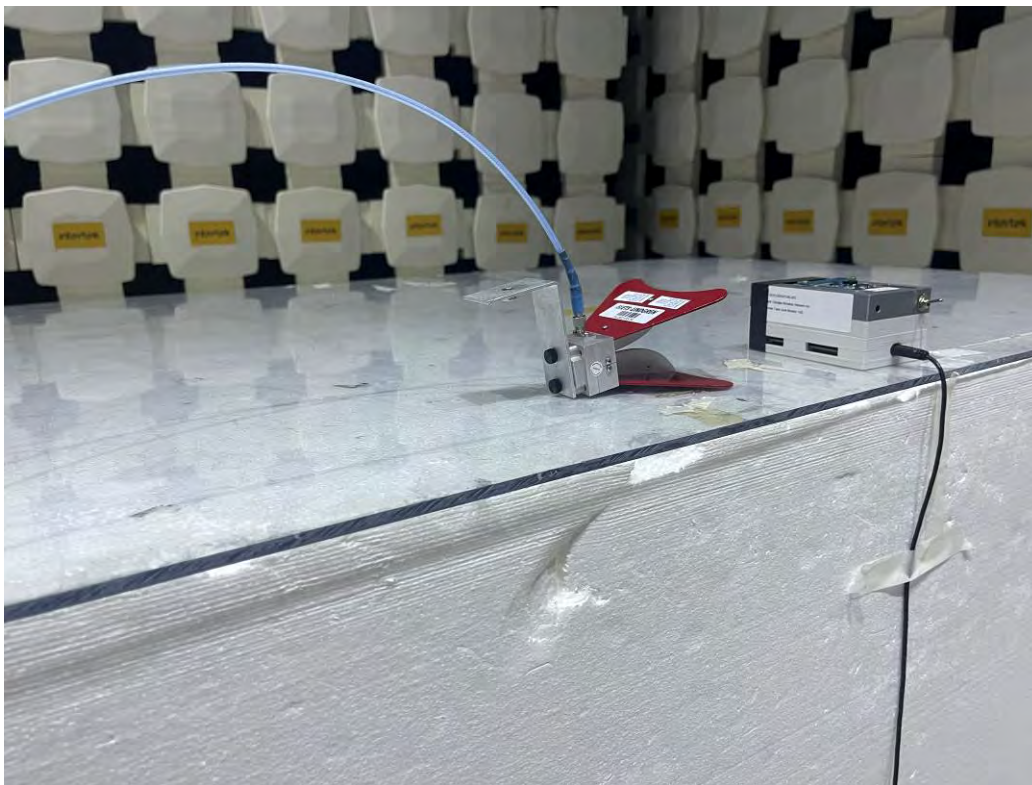


Radiated Emission Testing Setup, 13-18 GHz





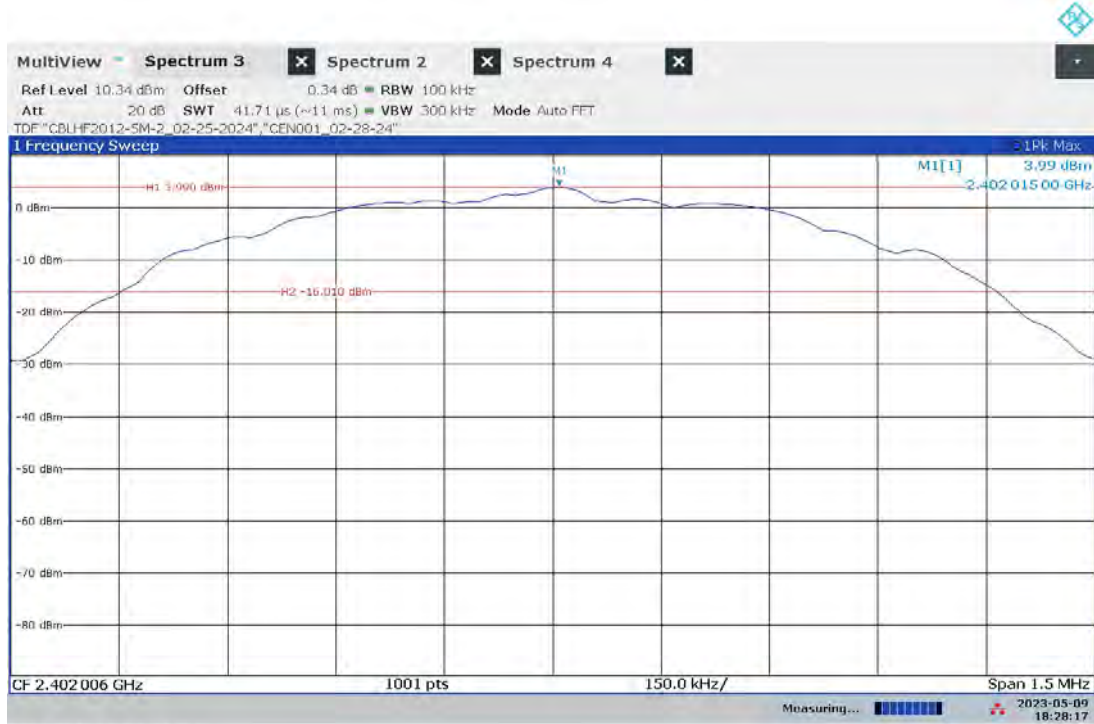
Radiated Emission Manual Testing Setup, 18-25 GHz





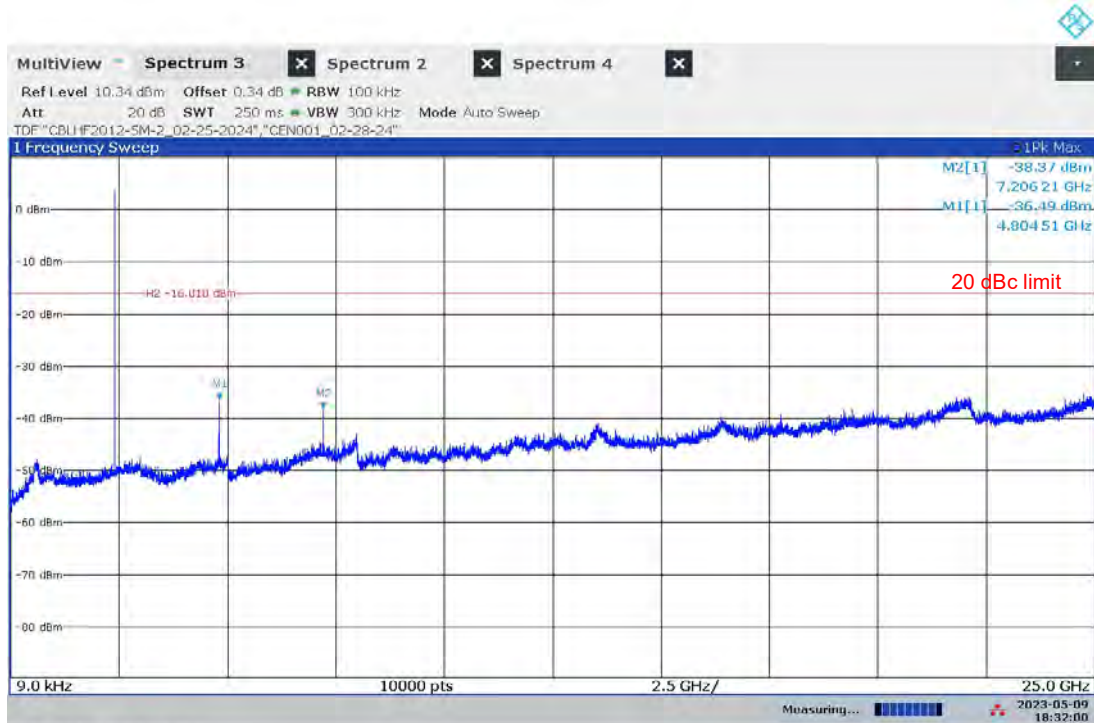
## 10.5 Plots/Data:

### Low Channel 20 dBc Conducted Limit



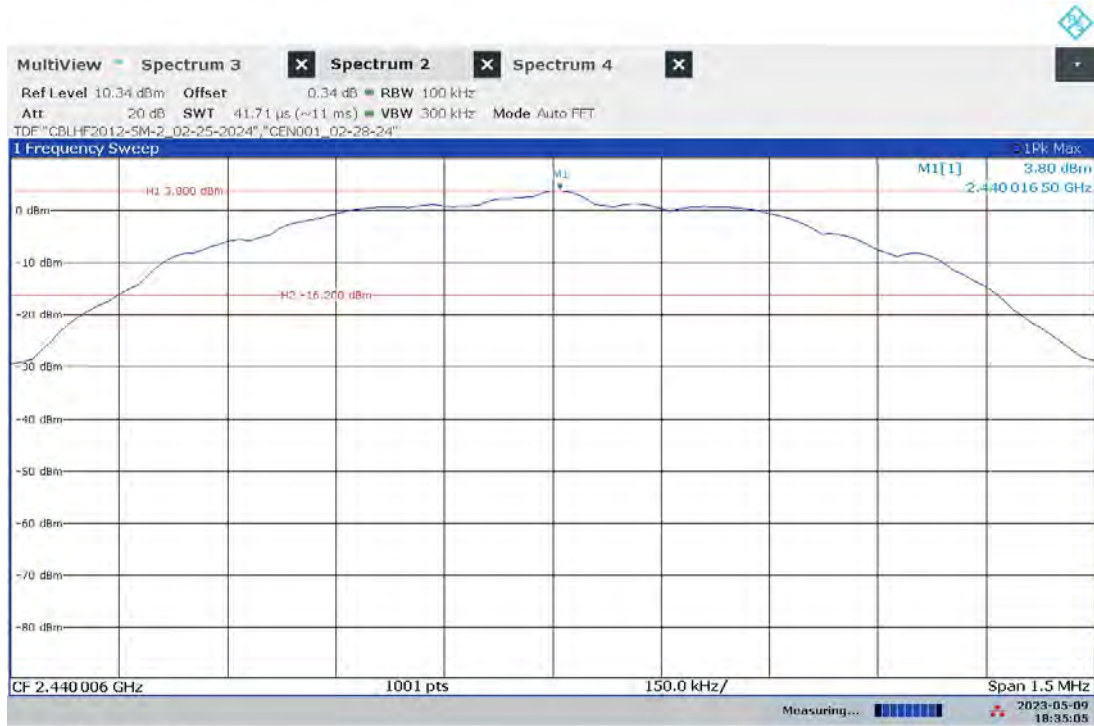
06:28:17 PM 05/09/2023

### Low Channel Antenna Port Conducted Emission From 9 kHz-25 GHz



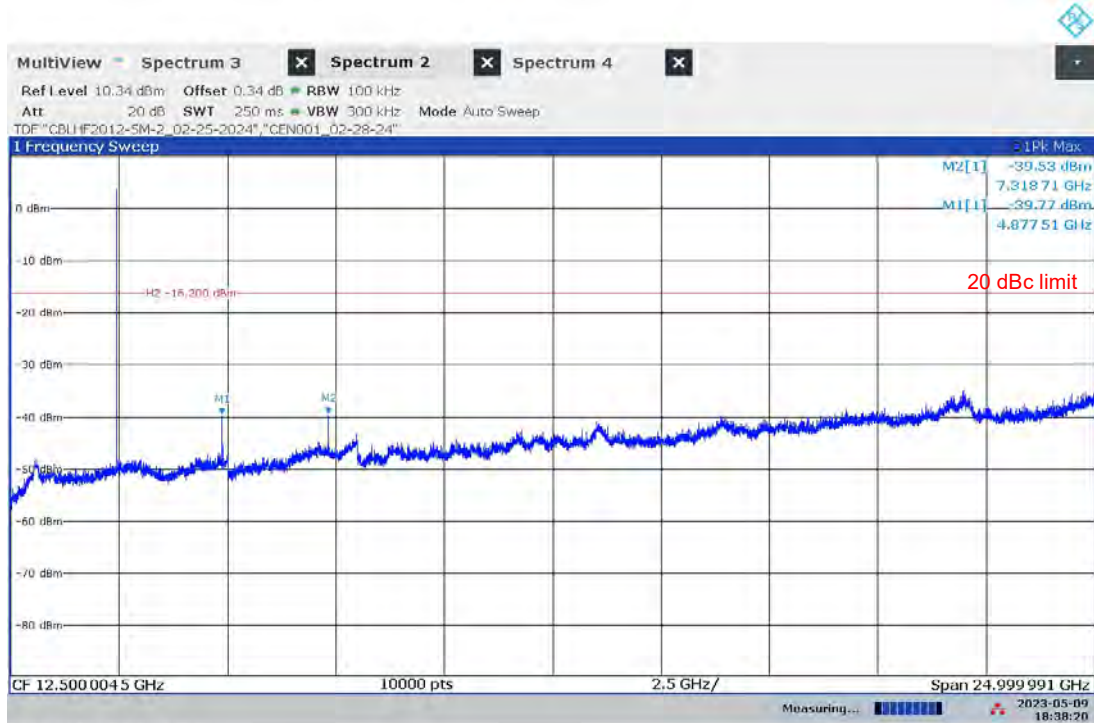
06:32:00 PM 05/09/2023

## Mid Channel 20 dBc Conducted Limit



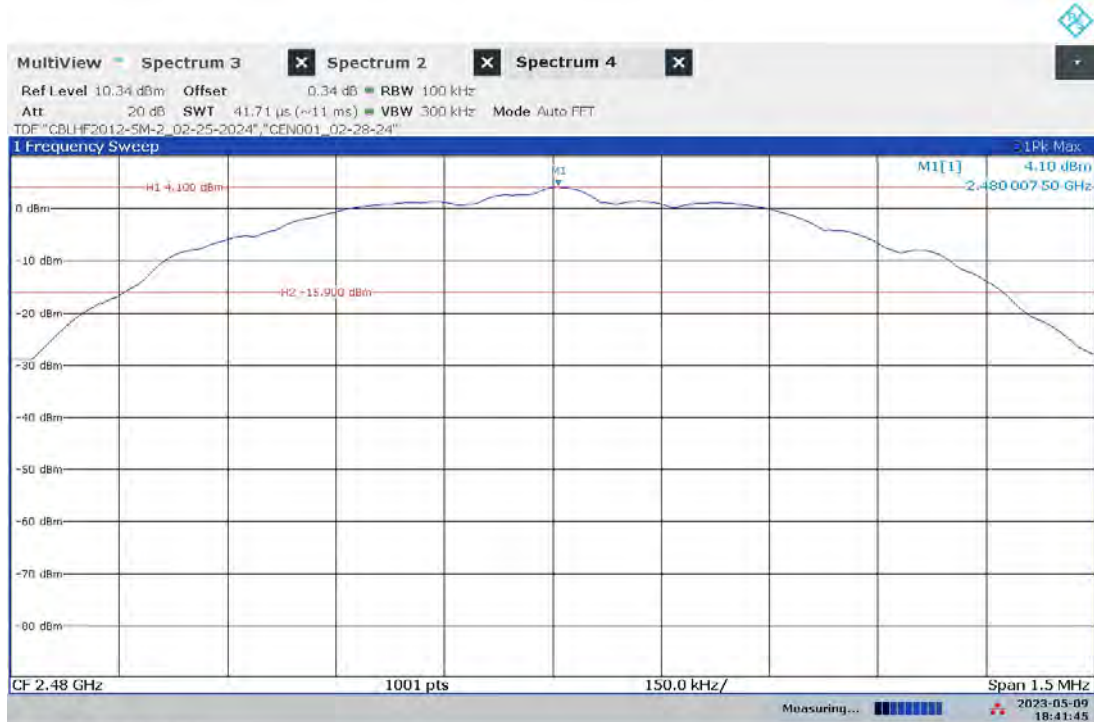
06:35:06 PM 05/09/2023

## Mid Channel Antenna Port Conducted Emission From 9 kHz-25 GHz



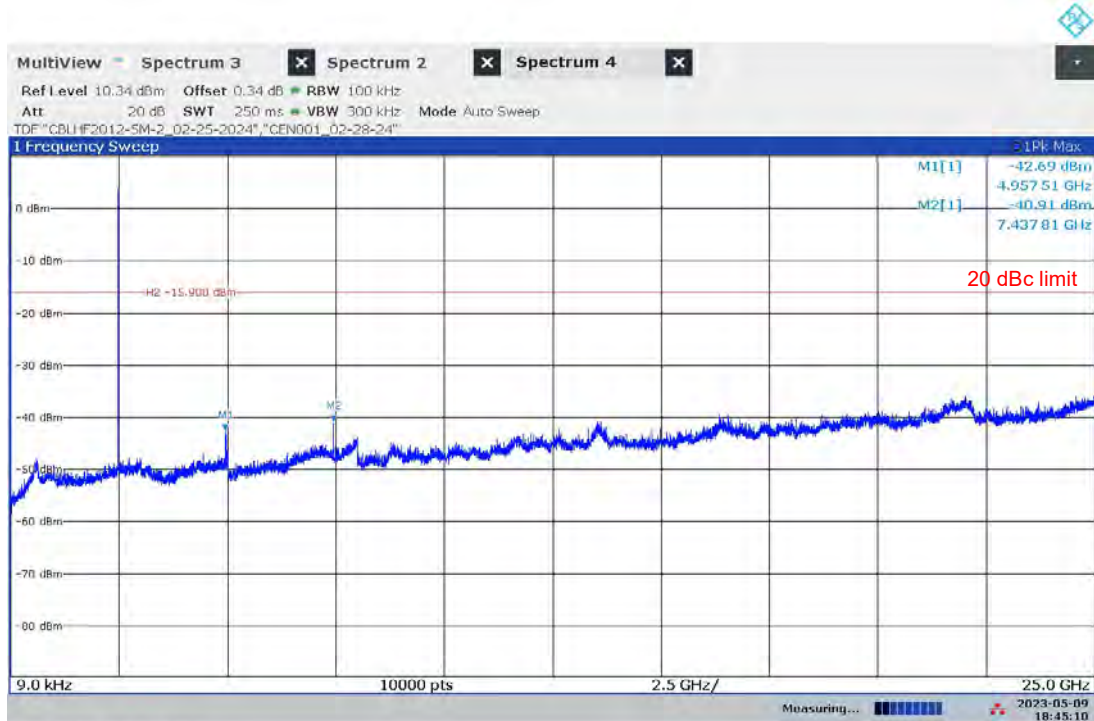
06:38:20 PM 05/09/2023

### High Channel 20 dBc Conducted Limit



06:41:45 PM 05/09/2023

### High Channel Antenna Port Conducted Emission From 9 kHz-25 GHz



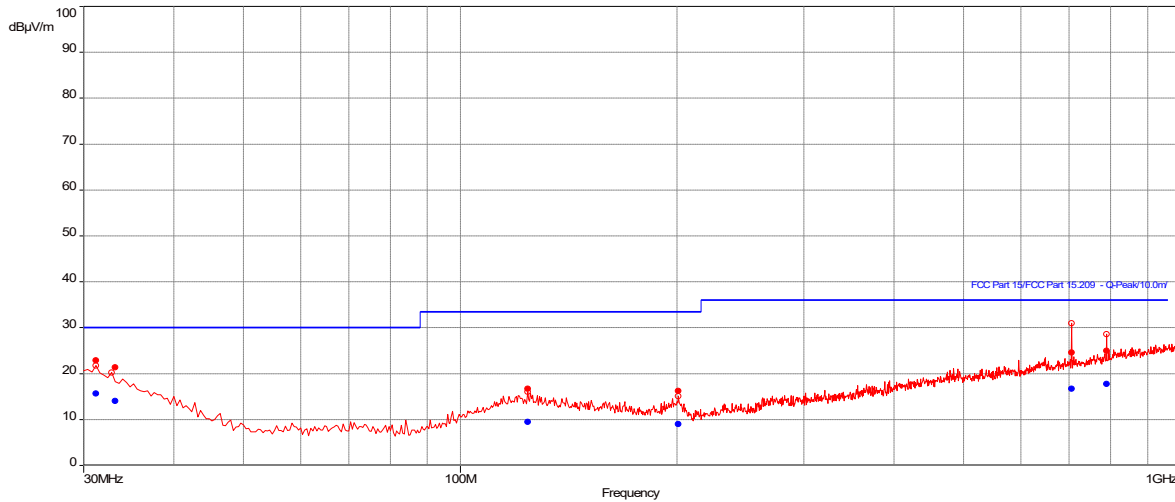
06:45:10 PM 05/09/2023

**Low Channel Radiated Emissions, 30-1000 MHz [EUT on its back]**

**Test Information:**

|                           |                                                |
|---------------------------|------------------------------------------------|
| Date and Time             | 10/1/2023 11:00:33 AM                          |
| Client and Project Number | Otodata                                        |
| Engineer                  | Kouma Sinn                                     |
| Temperature               | 24 C                                           |
| Humidity                  | 45 %                                           |
| Atmospheric Pressure      | 1013 mbar                                      |
| Comments                  | Scan 5: Low Channel (Back Side), RE 30-1000MHz |

**Graph:**



**Results:**

**QuasiPeak (PASS) (6)**

| Frequency (MHz) | Level (dBrV/m) | Limit (dBrV/m) | Margin (dB) | Azimuth (°) | Height (m) | Pol.       | RBW       | RBW  | Correction (dB) |
|-----------------|----------------|----------------|-------------|-------------|------------|------------|-----------|------|-----------------|
| 31.308          | 15.70          | 30.00          | -14.30      | 245.60      | 2.95       | Vertical   | 120000.00 | 120k | -13.17          |
| 33.286          | 14.11          | 30.00          | -15.89      | 287.60      | 1.67       | Vertical   | 120000.00 | 120k | -14.60          |
| 123.892         | 9.53           | 33.50          | -23.97      | 162.50      | 4.00       | Vertical   | 120000.00 | 120k | -18.27          |
| 200.944         | 9.02           | 33.50          | -24.48      | 120.90      | 1.67       | Vertical   | 120000.00 | 120k | -19.19          |
| 706.028         | 16.77          | 36.00          | -19.23      | 329.10      | 2.53       | Vertical   | 120000.00 | 120k | -8.87           |
| 789.146         | 17.81          | 36.00          | -18.19      | 79.30       | 3.36       | Horizontal | 120000.00 | 120k | -7.46           |

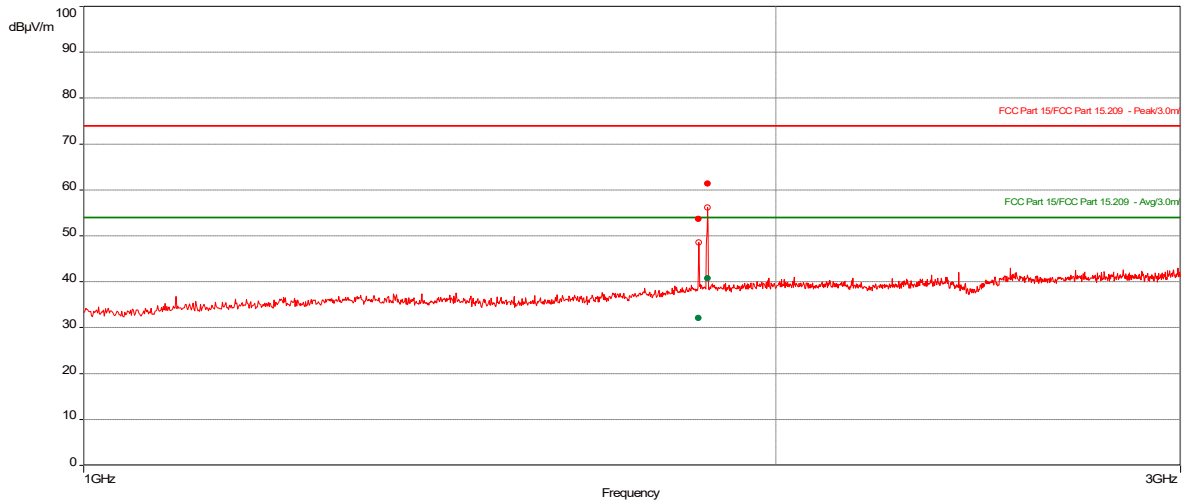


**Low Channel Radiated Emissions, 1-3 GHz [EUT on its back]**

**Test Information:**

|                           |                                            |
|---------------------------|--------------------------------------------|
| Date and Time             | 10/7/2023 11:32:52 AM                      |
| Client and Project Number | Otodata                                    |
| Engineer                  | Kouma Sinn                                 |
| Temperature               | 24 C                                       |
| Humidity                  | 49 %                                       |
| Atmospheric Pressure      | 1001 mbar                                  |
| Comments                  | Scan 26: Tx Low (Back Side), RE 1 to 3 GHz |

**Graph:**



**Results:**

**Peak (PASS) (2)**

| Frequency (MHz) | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Azimuth (°) | Height (m) | Pol.     | RBW        | RBW | Correction (dB) |
|-----------------|----------------|----------------|-------------|-------------|------------|----------|------------|-----|-----------------|
| 1851.4          | 53.69          | 74.00          | -20.31      | 269.30      | 1.44       | Vertical | 1000000.00 | 1M  | -5.39           |
| 1867.55         | 61.45          | 74.00          | -12.55      | 74.20       | 1.00       | Vertical | 1000000.00 | 1M  | -5.16           |

**Average (PASS) (2)**

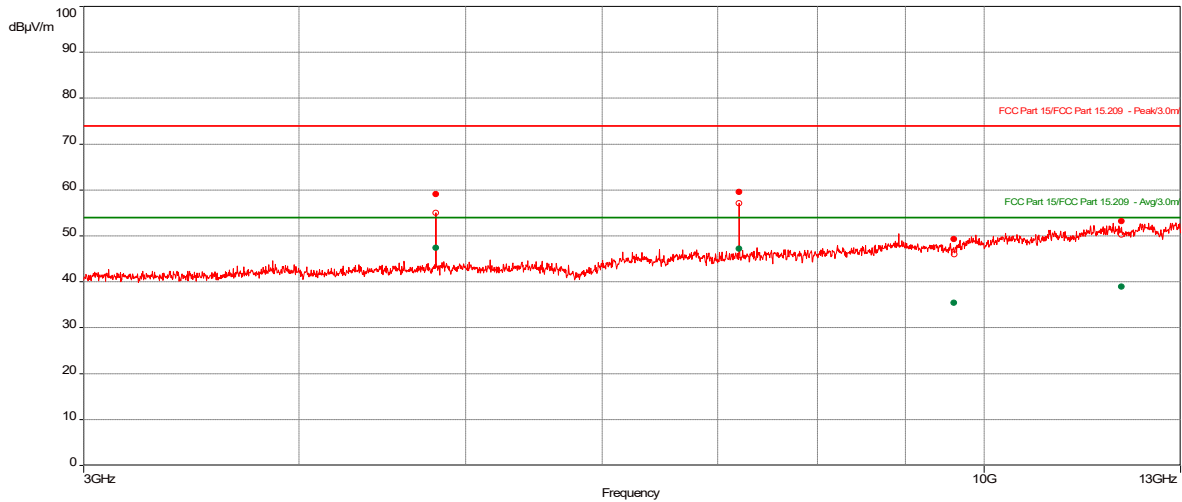
| Frequency (MHz) | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Azimuth (°) | Height (m) | Pol.     | RBW        | RBW | Correction (dB) |
|-----------------|----------------|----------------|-------------|-------------|------------|----------|------------|-----|-----------------|
| 1851.4          | 32.12          | 54.00          | -21.88      | 269.30      | 1.44       | Vertical | 1000000.00 | 1M  | -5.39           |
| 1867.55         | 40.75          | 54.00          | -13.25      | 74.20       | 1.00       | Vertical | 1000000.00 | 1M  | -5.16           |

Low Channel Radiated Emissions, 3-13 GHz [EUT on its back]

**Test Information:**

|                           |                                             |
|---------------------------|---------------------------------------------|
| Date and Time             | 10/1/2023 2:29:32 PM                        |
| Client and Project Number | Otodata                                     |
| Engineer                  | Kouma Sinn                                  |
| Temperature               | 24 C                                        |
| Humidity                  | 45 %                                        |
| Atmospheric Pressure      | 1013 mbar                                   |
| Comments                  | Scan 12: Tx Low (Back Side), RE 3 to 13 GHz |

**Graph:**



**Results:**

Peak (PASS) (4)

| Frequency (MHz) | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Azimuth (°) | Height (m) | Pol.       | RBW        | RBW | Correction (dB) |
|-----------------|----------------|----------------|-------------|-------------|------------|------------|------------|-----|-----------------|
| 4804.55         | 59.09          | 74.00          | -14.91      | 176.80      | 1.00       | Vertical   | 1000000.00 | 1M  | 0.01            |
| 7206            | 59.59          | 74.00          | -14.41      | 0.00        | 3.44       | Horizontal | 1000000.00 | 1M  | 4.32            |
| 9605.05         | 49.37          | 74.00          | -24.63      | 360.00      | 4.00       | Horizontal | 1000000.00 | 1M  | 6.77            |
| 12012.4         | 53.23          | 74.00          | -20.77      | 0.00        | 1.00       | Vertical   | 1000000.00 | 1M  | 10.67           |

Average (PASS) (4)

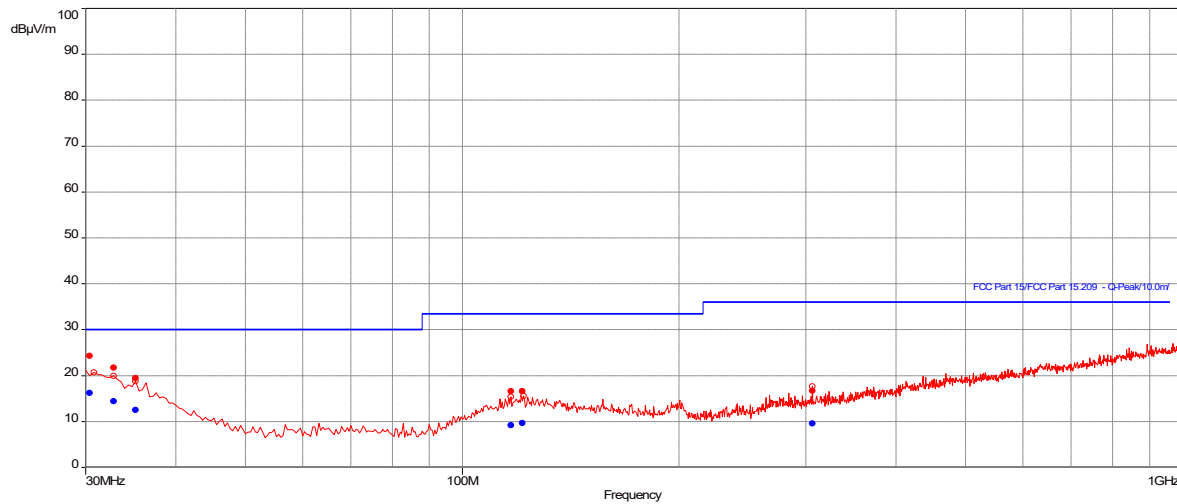
| Frequency (MHz) | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Azimuth (°) | Height (m) | Pol.       | RBW        | RBW | Correction (dB) |
|-----------------|----------------|----------------|-------------|-------------|------------|------------|------------|-----|-----------------|
| 4804.55         | 47.40          | 54.00          | -6.60       | 176.80      | 1.00       | Vertical   | 1000000.00 | 1M  | 0.01            |
| 7206            | 47.29          | 54.00          | -6.71       | 0.00        | 3.44       | Horizontal | 1000000.00 | 1M  | 4.32            |
| 9605.05         | 35.48          | 54.00          | -18.52      | 360.00      | 4.00       | Horizontal | 1000000.00 | 1M  | 6.77            |
| 12012.4         | 38.98          | 54.00          | -15.02      | 0.00        | 1.00       | Vertical   | 1000000.00 | 1M  | 10.67           |

Low Channel Radiated Emissions, 30-1000 MHz [EUT on its short side]

**Test Information:**

|                           |                                                 |
|---------------------------|-------------------------------------------------|
| Date and Time             | 10/1/2023 10:34:33 AM                           |
| Client and Project Number | Otodata                                         |
| Engineer                  | Kouma Sinn                                      |
| Temperature               | 24 C                                            |
| Humidity                  | 45 %                                            |
| Atmospheric Pressure      | 1013 mbar                                       |
| Comments                  | Scan 4: Low Channel (Short Side), RE 30-1000MHz |

**Graph:**



**Results:**

QuasiPeak (PASS) (6)

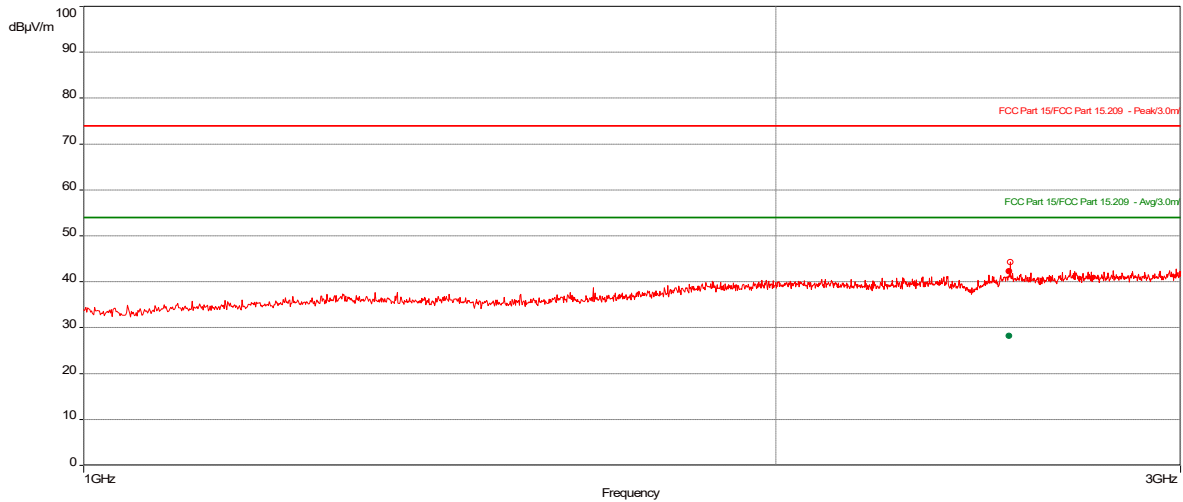
| Frequency (MHz) | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Azimuth (°) | Height (m) | Pol.       | RBW       | RBW  | Correction (dB) |
|-----------------|----------------|----------------|-------------|-------------|------------|------------|-----------|------|-----------------|
| 30.446          | 16.24          | 30.00          | -13.76      | 121.00      | 3.36       | Horizontal | 120000.00 | 120k | -12.68          |
| 32.752          | 14.50          | 30.00          | -15.50      | 224.80      | 1.67       | Vertical   | 120000.00 | 120k | -14.23          |
| 35.224          | 12.56          | 30.00          | -17.44      | 225.30      | 4.00       | Vertical   | 120000.00 | 120k | -16.02          |
| 116.776         | 9.22           | 33.50          | -24.28      | 204.30      | 3.79       | Vertical   | 120000.00 | 120k | -18.64          |
| 121.288         | 9.67           | 33.50          | -23.83      | 121.00      | 4.00       | Horizontal | 120000.00 | 120k | -18.38          |
| 306.58          | 9.60           | 36.00          | -26.40      | 328.90      | 4.00       | Vertical   | 120000.00 | 120k | -17.60          |

Low Channel Radiated Emissions, 1-3 GHz [EUT on its short side]

**Test Information:**

|                           |                                             |
|---------------------------|---------------------------------------------|
| Date and Time             | 10/7/2023 11:57:24 AM                       |
| Client and Project Number | Otodata                                     |
| Engineer                  | Kouma Sinn                                  |
| Temperature               | 24 C                                        |
| Humidity                  | 49 %                                        |
| Atmospheric Pressure      | 1001 mbar                                   |
| Comments                  | Scan 28: Tx Low (Short Side), RE 1 to 3 GHz |

**Graph:**



**Results:**

Peak (PASS) (1)

| Frequency (MHz) | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Azimuth (°) | Height (m) | Pol.     | RBW        | RBW | Correction (dB) |
|-----------------|----------------|----------------|-------------|-------------|------------|----------|------------|-----|-----------------|
| 2526.75         | 42.34          | 74.00          | -31.66      | 347.70      | 3.58       | Vertical | 1000000.00 | 1M  | -3.52           |

Average (PASS) (1)

| Frequency (MHz) | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Azimuth (°) | Height (m) | Pol.     | RBW        | RBW | Correction (dB) |
|-----------------|----------------|----------------|-------------|-------------|------------|----------|------------|-----|-----------------|
| 2526.75         | 28.29          | 54.00          | -25.71      | 347.70      | 3.58       | Vertical | 1000000.00 | 1M  | -3.52           |

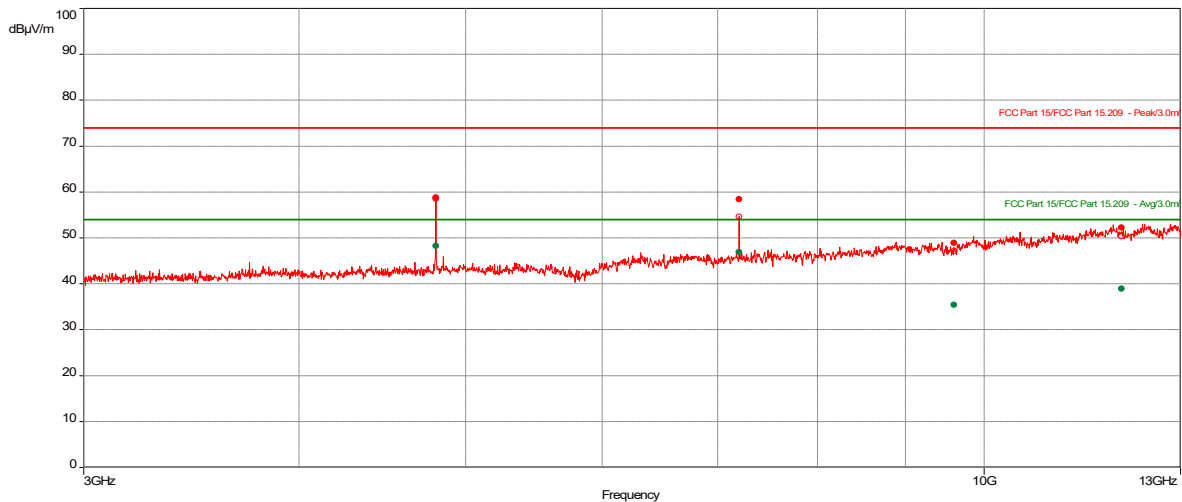


Low Channel Radiated Emissions, 3-13 GHz [EUT on its short side]

**Test Information:**

|                           |                                              |
|---------------------------|----------------------------------------------|
| Date and Time             | 10/1/2023 2:01:36 PM                         |
| Client and Project Number | Otodata                                      |
| Engineer                  | Kouma Sinn                                   |
| Temperature               | 24 C                                         |
| Humidity                  | 45 %                                         |
| Atmospheric Pressure      | 1013 mbar                                    |
| Comments                  | Scan 11: Tx Low (Short Side), RE 3 to 13 GHz |

**Graph:**



**Results:**

Peak (PASS) (4)

| Frequency (MHz) | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Azimuth (°) | Height (m) | Pol.       | RBW        | RBW | Correction (dB) |
|-----------------|----------------|----------------|-------------|-------------|------------|------------|------------|-----|-----------------|
| 4803.5          | 58.88          | 74.00          | -15.12      | 357.30      | 1.00       | Vertical   | 1000000.00 | 1M  | 0.01            |
| 7205.25         | 58.51          | 74.00          | -15.49      | 357.70      | 4.00       | Horizontal | 1000000.00 | 1M  | 4.32            |
| 9604.25         | 48.95          | 74.00          | -25.05      | 0.00        | 4.00       | Vertical   | 1000000.00 | 1M  | 6.77            |
| 12013.25        | 52.34          | 74.00          | -21.66      | 176.90      | 3.44       | Horizontal | 1000000.00 | 1M  | 10.67           |

Average (PASS) (4)

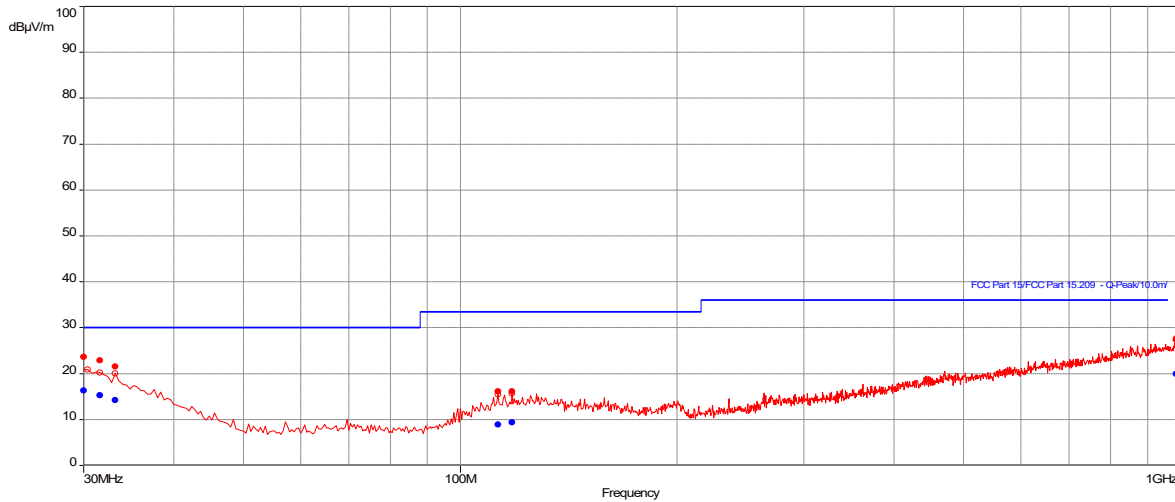
| Frequency (MHz) | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Azimuth (°) | Height (m) | Pol.       | RBW        | RBW | Correction (dB) |
|-----------------|----------------|----------------|-------------|-------------|------------|------------|------------|-----|-----------------|
| 4803.5          | 48.30          | 54.00          | -5.70       | 357.30      | 1.00       | Vertical   | 1000000.00 | 1M  | 0.01            |
| 7205.25         | 46.94          | 54.00          | -7.06       | 357.70      | 4.00       | Horizontal | 1000000.00 | 1M  | 4.32            |
| 9604.25         | 35.51          | 54.00          | -18.49      | 0.00        | 4.00       | Vertical   | 1000000.00 | 1M  | 6.77            |
| 12013.25        | 38.94          | 54.00          | -15.06      | 176.90      | 3.44       | Horizontal | 1000000.00 | 1M  | 10.67           |

Low Channel Radiated Emissions, 30-1000 MHz [EUT on its long side]

**Test Information:**

|                           |                                                |
|---------------------------|------------------------------------------------|
| Date and Time             | 10/1/2023 11:26:14 AM                          |
| Client and Project Number | Otodata                                        |
| Engineer                  | Kouma Sinn                                     |
| Temperature               | 24 C                                           |
| Humidity                  | 45 %                                           |
| Atmospheric Pressure      | 1013 mbar                                      |
| Comments                  | Scan 6: Low Channel (Long Side), RE 30-1000MHz |

**Graph:**



**Results:**

QuasiPeak (PASS) (6)

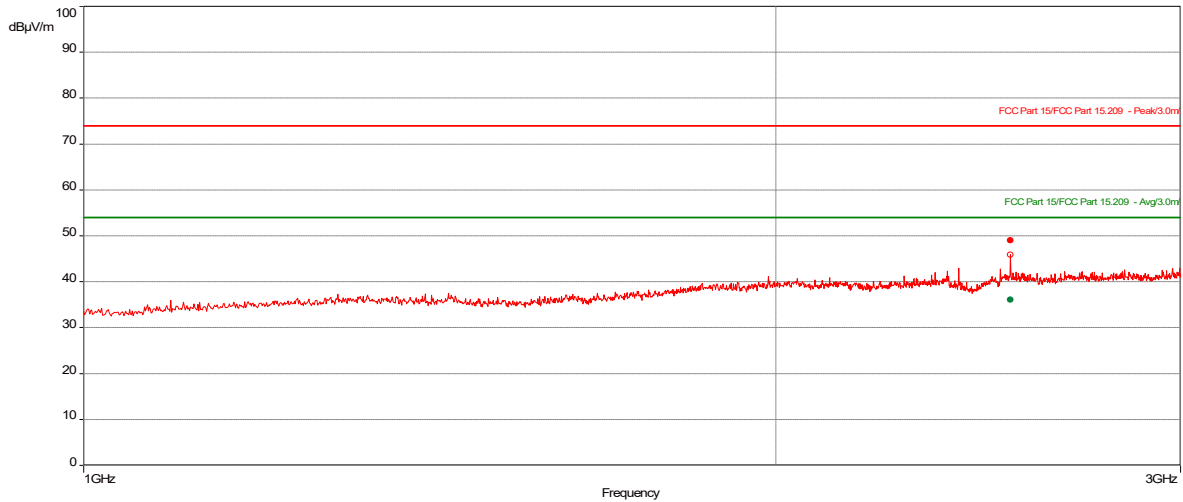
| Frequency (MHz) | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Azimuth (°) | Height (m) | Pol.       | RBW       | RBW  | Correction (dB) |
|-----------------|----------------|----------------|-------------|-------------|------------|------------|-----------|------|-----------------|
| 30.108          | 16.36          | 30.00          | -13.64      | 16.60       | 1.00       | Horizontal | 120000.00 | 120k | -12.56          |
| 31.726          | 15.32          | 30.00          | -14.68      | 79.00       | 4.00       | Vertical   | 120000.00 | 120k | -13.54          |
| 33.122          | 14.27          | 30.00          | -15.73      | 350.00      | 1.67       | Vertical   | 120000.00 | 120k | -14.47          |
| 112.818         | 8.92           | 33.50          | -24.58      | 183.60      | 1.00       | Vertical   | 120000.00 | 120k | -19.18          |
| 118.138         | 9.38           | 33.50          | -24.12      | 141.80      | 1.00       | Vertical   | 120000.00 | 120k | -18.49          |
| 986.776         | 20.00          | 43.48          | -23.48      | 308.00      | 1.00       | Horizontal | 120000.00 | 120k | -4.18           |

Low Channel Radiated Emissions, 1-3 GHz [EUT on its long side]

**Test Information:**

|                           |                                            |
|---------------------------|--------------------------------------------|
| Date and Time             | 10/7/2023 11:47:24 AM                      |
| Client and Project Number | Otodata                                    |
| Engineer                  | Kouma Sinn                                 |
| Temperature               | 24 C                                       |
| Humidity                  | 49 %                                       |
| Atmospheric Pressure      | 1001 mbar                                  |
| Comments                  | Scan 27: Tx Low (Long Side), RE 1 to 3 GHz |

**Graph:**



**Results:**

Peak (PASS) (1)

| Frequency (MHz) | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Azimuth (°) | Height (m) | Pol.       | RBW        | RBW | Correction (dB) |
|-----------------|----------------|----------------|-------------|-------------|------------|------------|------------|-----|-----------------|
| 2530            | 49.09          | 74.00          | -24.91      | 269.40      | 1.44       | Horizontal | 1000000.00 | 1M  | -3.53           |

Average (PASS) (1)

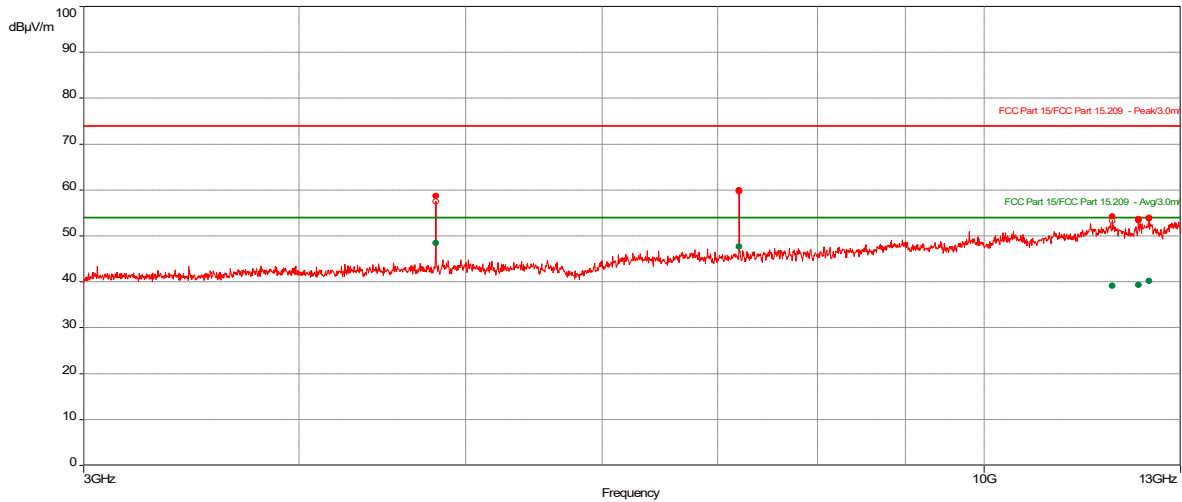
| Frequency (MHz) | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Azimuth (°) | Height (m) | Pol.       | RBW        | RBW | Correction (dB) |
|-----------------|----------------|----------------|-------------|-------------|------------|------------|------------|-----|-----------------|
| 2530            | 36.14          | 54.00          | -17.86      | 269.40      | 1.44       | Horizontal | 1000000.00 | 1M  | -3.53           |

Low Channel Radiated Emissions, 3-13 GHz [EUT on its long side]

**Test Information:**

|                           |                                             |
|---------------------------|---------------------------------------------|
| Date and Time             | 10/1/2023 2:59:53 PM                        |
| Client and Project Number | Otodata                                     |
| Engineer                  | Kouma Sinn                                  |
| Temperature               | 24 C                                        |
| Humidity                  | 45 %                                        |
| Atmospheric Pressure      | 1013 mbar                                   |
| Comments                  | Scan 13: Tx Low (long Side), RE 3 to 13 GHz |

**Graph:**



**Results:**

Peak (PASS) (5)

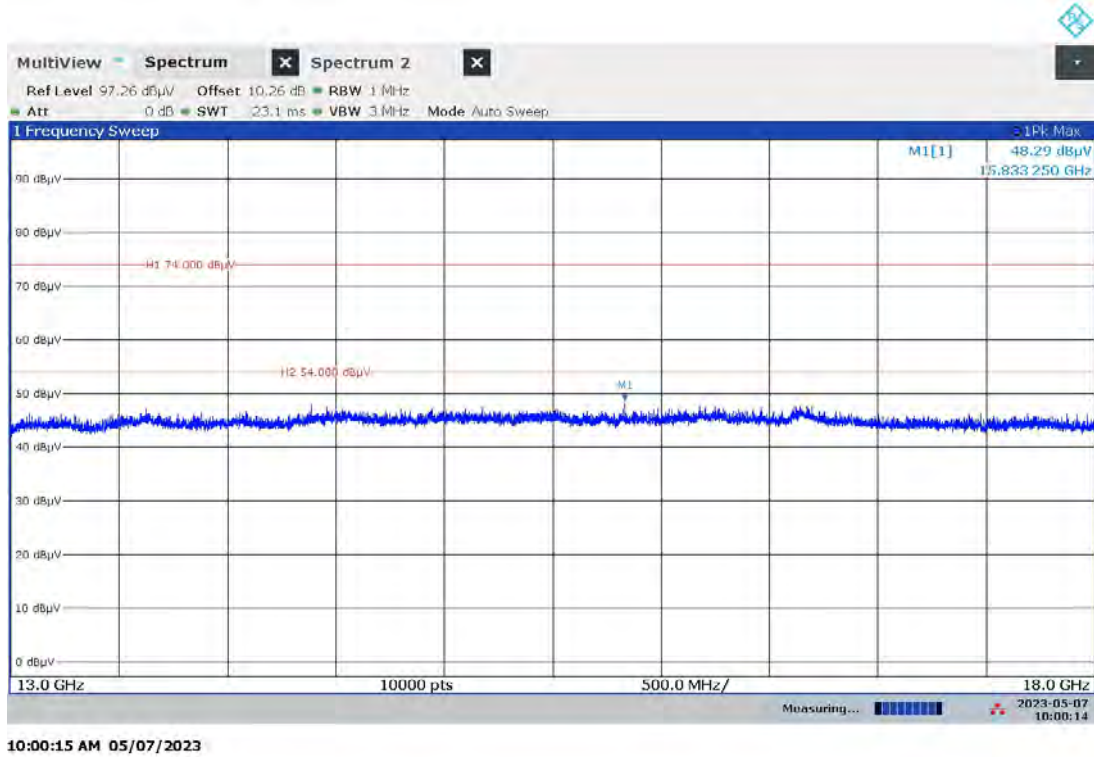
| Frequency (MHz) | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Azimuth (°) | Height (m) | Pol.       | RBW        | RBW | Correction (dB) |
|-----------------|----------------|----------------|-------------|-------------|------------|------------|------------|-----|-----------------|
| 4804.45         | 58.73          | 74.00          | -15.27      | 0.00        | 1.00       | Vertical   | 1000000.00 | 1M  | 0.01            |
| 7205.2          | 59.97          | 74.00          | -14.03      | 357.50      | 1.00       | Vertical   | 1000000.00 | 1M  | 4.32            |
| 11866           | 54.27          | 74.00          | -19.73      | 0.00        | 3.44       | Horizontal | 1000000.00 | 1M  | 10.82           |
| 12291.5         | 53.46          | 74.00          | -20.54      | 357.60      | 3.44       | Horizontal | 1000000.00 | 1M  | 11.44           |
| 12461.2         | 53.81          | 74.00          | -20.19      | 360.00      | 3.44       | Horizontal | 1000000.00 | 1M  | 11.66           |

Average (PASS) (5)

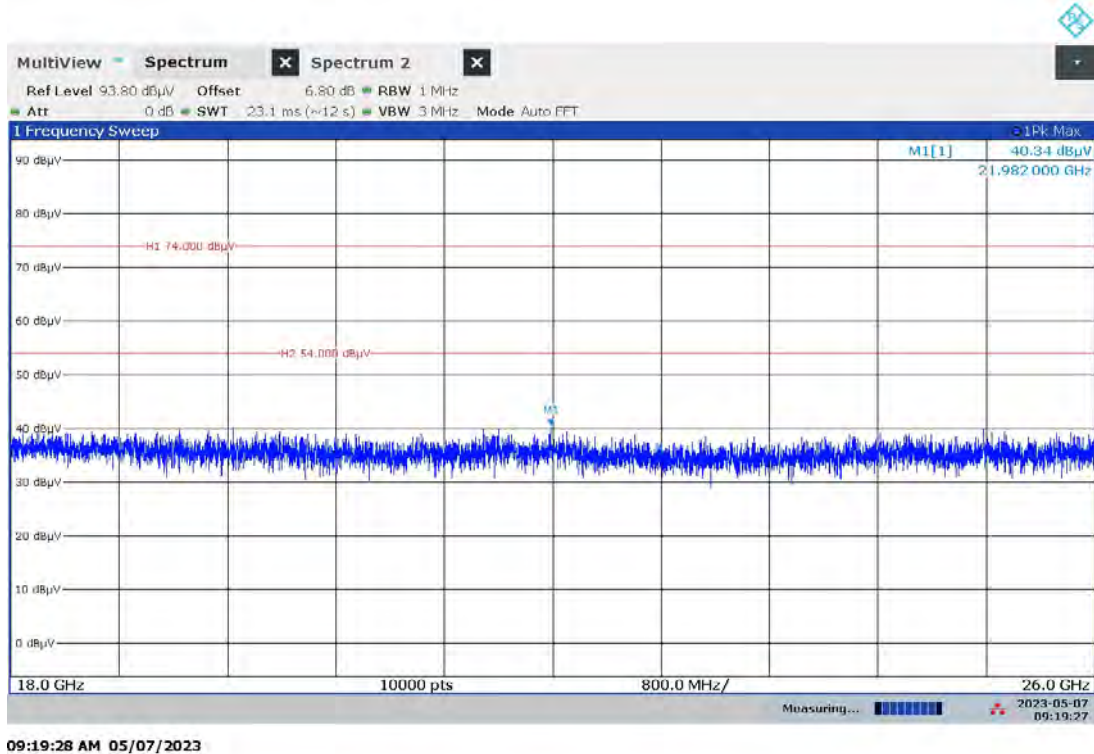
| Frequency (MHz) | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Azimuth (°) | Height (m) | Pol.       | RBW        | RBW | Correction (dB) |
|-----------------|----------------|----------------|-------------|-------------|------------|------------|------------|-----|-----------------|
| 4804.45         | 48.49          | 54.00          | -5.51       | 0.00        | 1.00       | Vertical   | 1000000.00 | 1M  | 0.01            |
| 7205.2          | 47.68          | 54.00          | -6.32       | 357.50      | 1.00       | Vertical   | 1000000.00 | 1M  | 4.32            |
| 11866           | 39.21          | 54.00          | -14.79      | 0.00        | 3.44       | Horizontal | 1000000.00 | 1M  | 10.82           |
| 12291.5         | 39.40          | 54.00          | -14.60      | 357.60      | 3.44       | Horizontal | 1000000.00 | 1M  | 11.44           |
| 12461.2         | 40.22          | 54.00          | -13.78      | 360.00      | 3.44       | Horizontal | 1000000.00 | 1M  | 11.66           |



Low Channel Radiated Emissions, 13-18 GHz [EUT on all axis] at 2m



Low Channel Radiated Emissions, 18-26 GHz [EUT on all axis] at 10cm

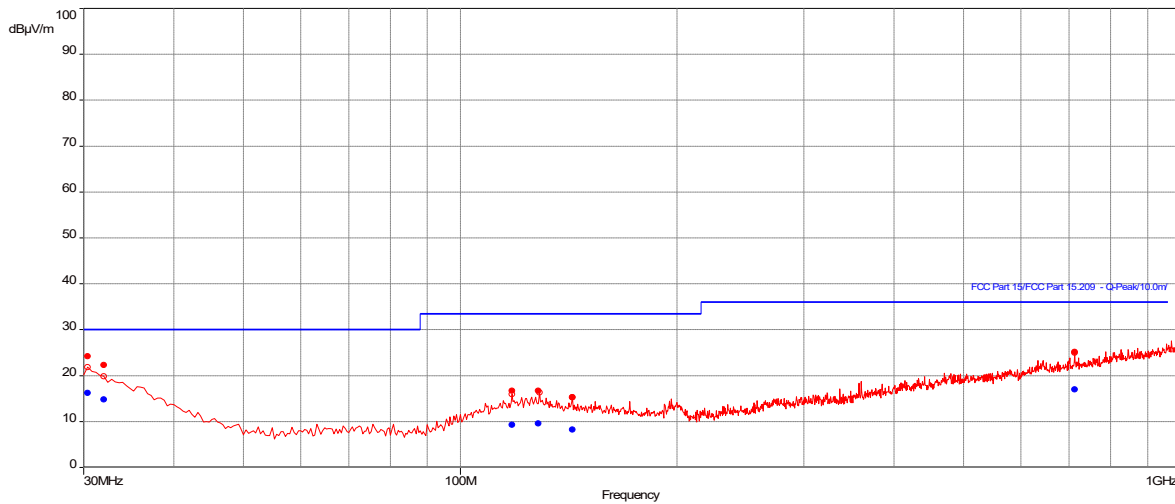


**Mid Channel Radiated Emissions, 30-1000 MHz [EUT on its back]**

**Test Information:**

|                           |                                                |
|---------------------------|------------------------------------------------|
| Date and Time             | 10/1/2023 9:40:04 AM                           |
| Client and Project Number | Otodata                                        |
| Engineer                  | Kouma Sinn                                     |
| Temperature               | 24 C                                           |
| Humidity                  | 45 %                                           |
| Atmospheric Pressure      | 1013 mbar                                      |
| Comments                  | Scan 2: Mid Channel (Back Side), RE 30-1000MHz |

**Graph:**



**Results:**

**QuasiPeak (PASS) (6)**

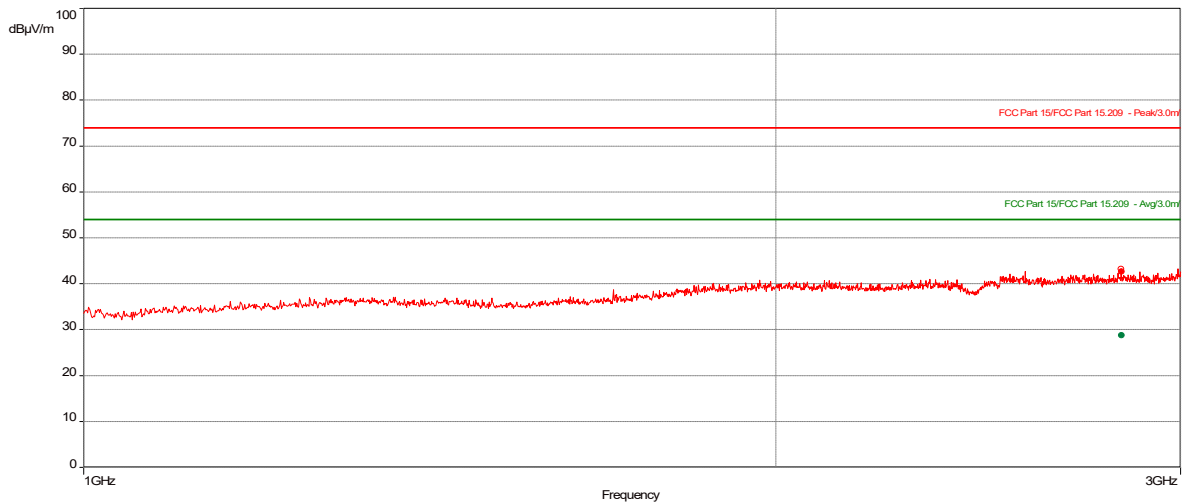
| Frequency (MHz) | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Azimuth (°) | Height (m) | Pol.       | RBW       | RBW  | Correction (dB) |
|-----------------|----------------|----------------|-------------|-------------|------------|------------|-----------|------|-----------------|
| 30.502          | 16.24          | 30.00          | -13.76      | 350.50      | 1.00       | Vertical   | 120000.00 | 120k | -12.71          |
| 32.138          | 14.86          | 30.00          | -15.14      | 308.90      | 2.51       | Horizontal | 120000.00 | 120k | -13.87          |
| 118.168         | 9.36           | 33.50          | -24.14      | 203.70      | 1.00       | Horizontal | 120000.00 | 120k | -18.49          |
| 128.572         | 9.58           | 33.50          | -23.92      | 0.00        | 3.35       | Horizontal | 120000.00 | 120k | -18.37          |
| 143.302         | 8.31           | 33.50          | -25.19      | 79.30       | 1.67       | Vertical   | 120000.00 | 120k | -19.53          |
| 713.02          | 17.00          | 36.00          | -19.00      | 225.20      | 3.80       | Vertical   | 120000.00 | 120k | -8.74           |

**Mid Channel Radiated Emissions, 1-3 GHz [EUT on its back]**

**Test Information:**

|                           |                                            |
|---------------------------|--------------------------------------------|
| Date and Time             | 10/7/2023 11:16:38 AM                      |
| Client and Project Number | Otodata                                    |
| Engineer                  | Kouma Sinn                                 |
| Temperature               | 24 C                                       |
| Humidity                  | 49 %                                       |
| Atmospheric Pressure      | 1001 mbar                                  |
| Comments                  | Scan 25: Tx Mid (Back Side), RE 1 to 3 GHz |

**Graph:**



**Results:**

**Peak (PASS) (1)**

| Frequency (MHz) | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Azimuth (°) | Height (m) | Pol.     | RBW        | RBW | Correction (dB) |
|-----------------|----------------|----------------|-------------|-------------|------------|----------|------------|-----|-----------------|
| 2828.4          | 42.73          | 74.00          | -31.27      | 34.90       | 2.51       | Vertical | 1000000.00 | 1M  | -3.32           |

**Average (PASS) (1)**

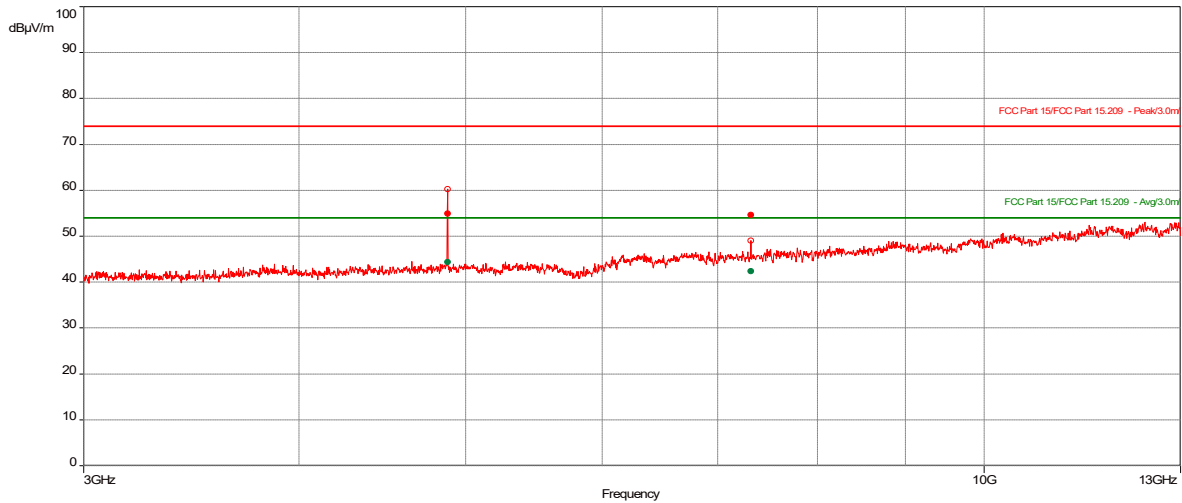
| Frequency (MHz) | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Azimuth (°) | Height (m) | Pol.     | RBW        | RBW | Correction (dB) |
|-----------------|----------------|----------------|-------------|-------------|------------|----------|------------|-----|-----------------|
| 2828.4          | 28.78          | 54.00          | -25.22      | 34.90       | 2.51       | Vertical | 1000000.00 | 1M  | -3.32           |

Mid Channel Radiated Emissions, 3-13 GHz [EUT on its back]

**Test Information:**

|                           |                                             |
|---------------------------|---------------------------------------------|
| Date and Time             | 10/1/2023 3:59:06 PM                        |
| Client and Project Number | Otodata                                     |
| Engineer                  | Kouma Sinn                                  |
| Temperature               | 24 C                                        |
| Humidity                  | 45 %                                        |
| Atmospheric Pressure      | 1013 mbar                                   |
| Comments                  | Scan 15: Tx Mid (Back Side), RE 3 to 13 GHz |

**Graph:**



**Results:**

Peak (PASS) (2)

| Frequency (MHz) | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Azimuth (°) | Height (m) | Pol.       | RBW        | RBW | Correction (dB) |
|-----------------|----------------|----------------|-------------|-------------|------------|------------|------------|-----|-----------------|
| 4879.55         | 54.93          | 74.00          | -19.07      | 176.90      | 3.44       | Horizontal | 1000000.00 | 1M  | 0.17            |
| 7319.3          | 54.63          | 74.00          | -19.37      | 360.00      | 4.00       | Horizontal | 1000000.00 | 1M  | 4.46            |

Average (PASS) (2)

| Frequency (MHz) | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Azimuth (°) | Height (m) | Pol.       | RBW        | RBW | Correction (dB) |
|-----------------|----------------|----------------|-------------|-------------|------------|------------|------------|-----|-----------------|
| 4879.55         | 44.42          | 54.00          | -9.58       | 176.90      | 3.44       | Horizontal | 1000000.00 | 1M  | 0.17            |
| 7319.3          | 42.36          | 54.00          | -11.64      | 360.00      | 4.00       | Horizontal | 1000000.00 | 1M  | 4.46            |

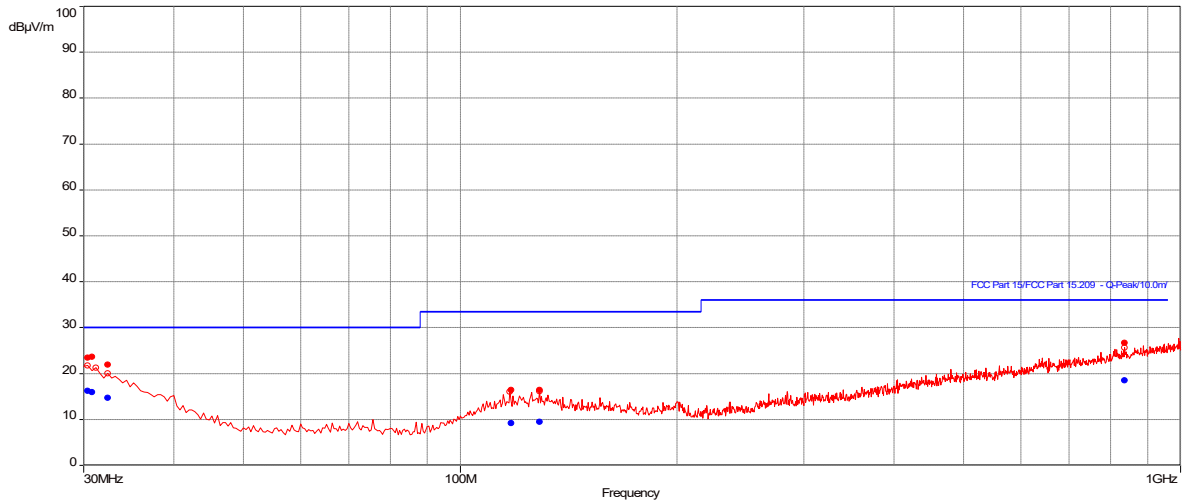


**Mid Channel Radiated Emissions, 30-1000 MHz [EUT on its short side]**

**Test Information:**

|                           |                                                 |
|---------------------------|-------------------------------------------------|
| Date and Time             | 10/1/2023 9:12:00 AM                            |
| Client and Project Number | Otodata                                         |
| Engineer                  | Kouma Sinn                                      |
| Temperature               | 24 C                                            |
| Humidity                  | 45 %                                            |
| Atmospheric Pressure      | 1013 mbar                                       |
| Comments                  | Scan 1: Mid Channel (Short Side), RE 30-1000MHz |

**Graph:**



**Results:**

**QuasiPeak (PASS) (6)**

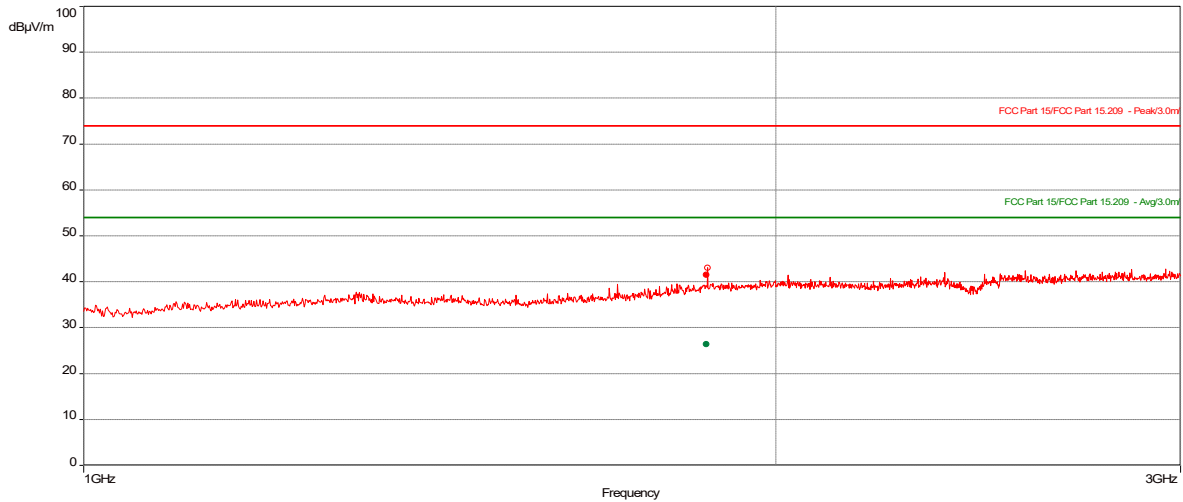
| Frequency (MHz) | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Azimuth (°) | Height (m) | Pol.       | RBW       | RBW  | Correction (dB) |
|-----------------|----------------|----------------|-------------|-------------|------------|------------|-----------|------|-----------------|
| 30.298          | 16.24          | 30.00          | -13.76      | 16.50       | 3.79       | Vertical   | 120000.00 | 120k | -12.63          |
| 30.996          | 15.93          | 30.00          | -14.07      | 308.80      | 2.52       | Vertical   | 120000.00 | 120k | -12.90          |
| 32.334          | 14.72          | 30.00          | -15.28      | 37.50       | 3.80       | Horizontal | 120000.00 | 120k | -13.98          |
| 117.518         | 9.22           | 33.50          | -24.28      | 162.10      | 4.00       | Horizontal | 120000.00 | 120k | -18.56          |
| 128.818         | 9.55           | 33.50          | -23.95      | 350.10      | 2.09       | Horizontal | 120000.00 | 120k | -18.40          |
| 836.168         | 18.58          | 36.00          | -17.42      | 16.60       | 1.00       | Vertical   | 120000.00 | 120k | -6.57           |

**Mid Channel Radiated Emissions, 1-3 GHz [EUT on its short side]**

**Test Information:**

|                           |                                             |
|---------------------------|---------------------------------------------|
| Date and Time             | 10/7/2023 10:56:01 AM                       |
| Client and Project Number | Otodata                                     |
| Engineer                  | Kouma Sinn                                  |
| Temperature               | 24 C                                        |
| Humidity                  | 49 %                                        |
| Atmospheric Pressure      | 1001 mbar                                   |
| Comments                  | Scan 23: Tx Mid (Short Side), RE 1 to 3 GHz |

**Graph:**



**Results:**

**Peak (PASS) (1)**

| Frequency (MHz) | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Azimuth (°) | Height (m) | Pol.     | RBW        | RBW | Correction (dB) |
|-----------------|----------------|----------------|-------------|-------------|------------|----------|------------|-----|-----------------|
| 1865.95         | 41.51          | 74.00          | -32.49      | 347.90      | 4.00       | Vertical | 1000000.00 | 1M  | -5.18           |

**Average (PASS) (1)**

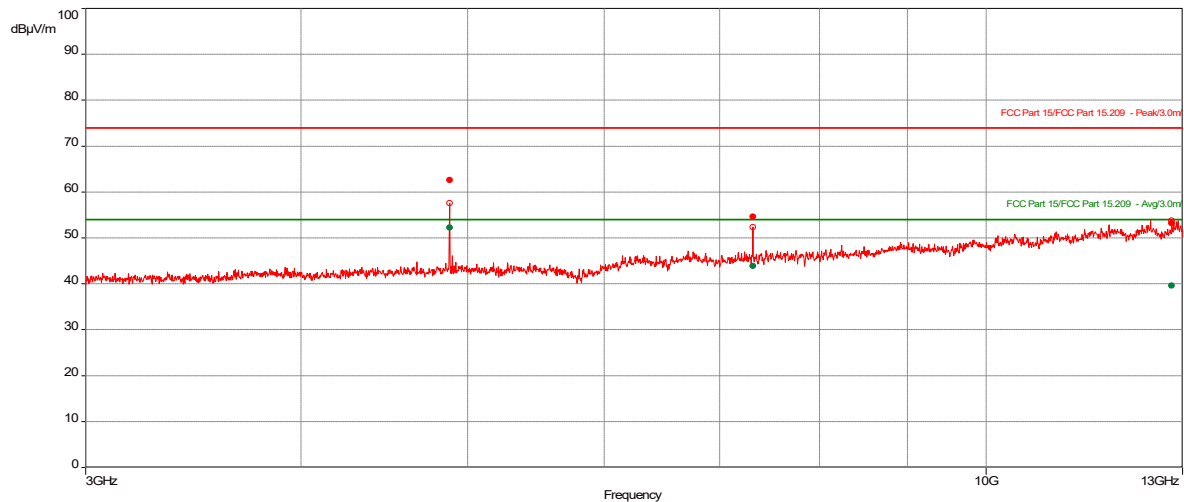
| Frequency (MHz) | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Azimuth (°) | Height (m) | Pol.     | RBW        | RBW | Correction (dB) |
|-----------------|----------------|----------------|-------------|-------------|------------|----------|------------|-----|-----------------|
| 1865.95         | 26.42          | 54.00          | -27.58      | 347.90      | 4.00       | Vertical | 1000000.00 | 1M  | -5.18           |

**Mid Channel Radiated Emissions, 3-13 GHz [EUT on its short side]**

**Test Information:**

|                           |                                              |
|---------------------------|----------------------------------------------|
| Date and Time             | 10/1/2023 4:15:16 PM                         |
| Client and Project Number | Otodata                                      |
| Engineer                  | Kouma Sinn                                   |
| Temperature               | 24 C                                         |
| Humidity                  | 45 %                                         |
| Atmospheric Pressure      | 1013 mbar                                    |
| Comments                  | Scan 16: Tx Mid (Short Side), RE 3 to 13 GHz |

**Graph:**



**Results:**

**Peak (PASS) (3)**

| Frequency (MHz) | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Azimuth (°) | Height (m) | Pol.       | RBW        | RBW | Correction (dB) |
|-----------------|----------------|----------------|-------------|-------------|------------|------------|------------|-----|-----------------|
| 4879.5          | 62.62          | 74.00          | -11.38      | 176.80      | 3.44       | Horizontal | 1000000.00 | 1M  | 0.17            |
| 7320.15         | 54.65          | 74.00          | -19.35      | 357.20      | 3.44       | Horizontal | 1000000.00 | 1M  | 4.46            |
| 12814.35        | 53.22          | 74.00          | -20.78      | 0.00        | 4.00       | Vertical   | 1000000.00 | 1M  | 12.57           |

**Average (PASS) (3)**

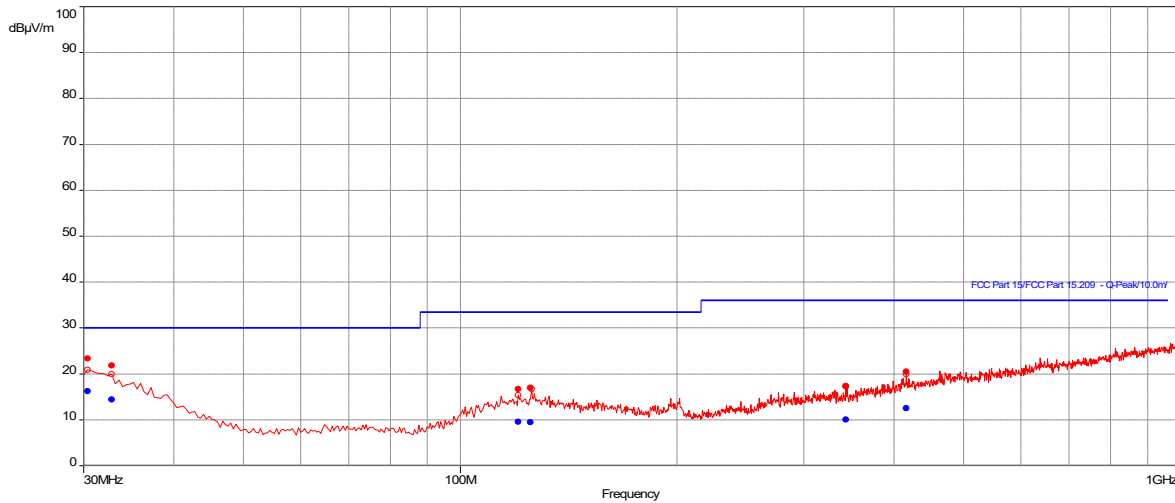
| Frequency (MHz) | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Azimuth (°) | Height (m) | Pol.       | RBW        | RBW | Correction (dB) |
|-----------------|----------------|----------------|-------------|-------------|------------|------------|------------|-----|-----------------|
| 4879.5          | 52.30          | 54.00          | -1.70       | 176.80      | 3.44       | Horizontal | 1000000.00 | 1M  | 0.17            |
| 7320.15         | 43.90          | 54.00          | -10.10      | 357.20      | 3.44       | Horizontal | 1000000.00 | 1M  | 4.46            |
| 12814.35        | 39.65          | 54.00          | -14.35      | 0.00        | 4.00       | Vertical   | 1000000.00 | 1M  | 12.57           |

**Mid Channel Radiated Emissions, 30-1000 MHz [EUT on its long side]**

**Test Information:**

|                           |                                                |
|---------------------------|------------------------------------------------|
| Date and Time             | 10/1/2023 10:05:08 AM                          |
| Client and Project Number | Otodata                                        |
| Engineer                  | Kouma Sinn                                     |
| Temperature               | 24 C                                           |
| Humidity                  | 45 %                                           |
| Atmospheric Pressure      | 1013 mbar                                      |
| Comments                  | Scan 3: Mid Channel (Long Side), RE 30-1000MHz |

**Graph:**



**Results:**

**QuasiPeak (PASS) (6)**

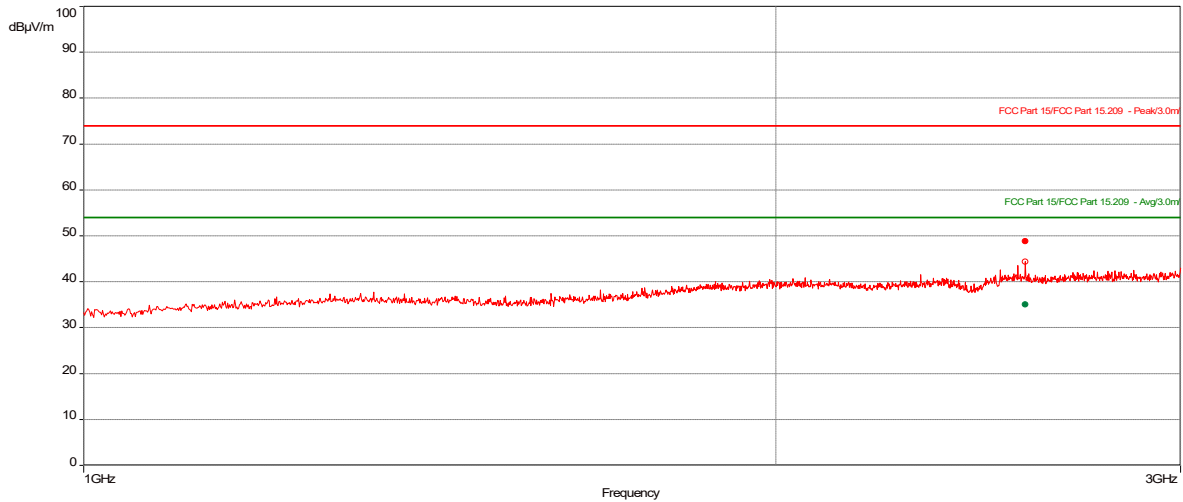
| Frequency (MHz) | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Azimuth (°) | Height (m) | Pol.       | RBW       | RBW  | Correction (dB) |
|-----------------|----------------|----------------|-------------|-------------|------------|------------|-----------|------|-----------------|
| 30.454          | 16.24          | 30.00          | -13.76      | 100.10      | 1.66       | Horizontal | 120000.00 | 120k | -12.69          |
| 32.77           | 14.50          | 30.00          | -15.50      | 203.70      | 4.00       | Vertical   | 120000.00 | 120k | -14.24          |
| 120.592         | 9.61           | 33.50          | -23.89      | 120.80      | 4.00       | Horizontal | 120000.00 | 120k | -18.38          |
| 125.288         | 9.53           | 33.50          | -23.97      | 120.80      | 4.00       | Vertical   | 120000.00 | 120k | -18.24          |
| 343.238         | 10.09          | 36.00          | -25.91      | 100.10      | 2.52       | Vertical   | 120000.00 | 120k | -17.12          |
| 416.12          | 12.59          | 36.00          | -23.41      | 287.70      | 2.95       | Vertical   | 120000.00 | 120k | -14.59          |

## Mid Channel Radiated Emissions, 1-3 GHz [EUT on its long side]

### Test Information:

|                           |                                            |
|---------------------------|--------------------------------------------|
| Date and Time             | 10/7/2023 11:06:20 AM                      |
| Client and Project Number | Otodata                                    |
| Engineer                  | Kouma Sinn                                 |
| Temperature               | 24 C                                       |
| Humidity                  | 49 %                                       |
| Atmospheric Pressure      | 1001 mbar                                  |
| Comments                  | Scan 24: Tx Mid (Long Side), RE 1 to 3 GHz |

### Graph:



### Results:

#### Peak (PASS) (1)

| Frequency (MHz) | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Azimuth (°) | Height (m) | Pol.       | RBW        | RBW | Correction (dB) |
|-----------------|----------------|----------------|-------------|-------------|------------|------------|------------|-----|-----------------|
| 2568.05         | 48.84          | 74.00          | -25.16      | 269.20      | 1.44       | Horizontal | 1000000.00 | 1M  | -3.61           |

#### Average (PASS) (1)

| Frequency (MHz) | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Azimuth (°) | Height (m) | Pol.       | RBW        | RBW | Correction (dB) |
|-----------------|----------------|----------------|-------------|-------------|------------|------------|------------|-----|-----------------|
| 2568.05         | 35.06          | 54.00          | -18.94      | 269.20      | 1.44       | Horizontal | 1000000.00 | 1M  | -3.61           |

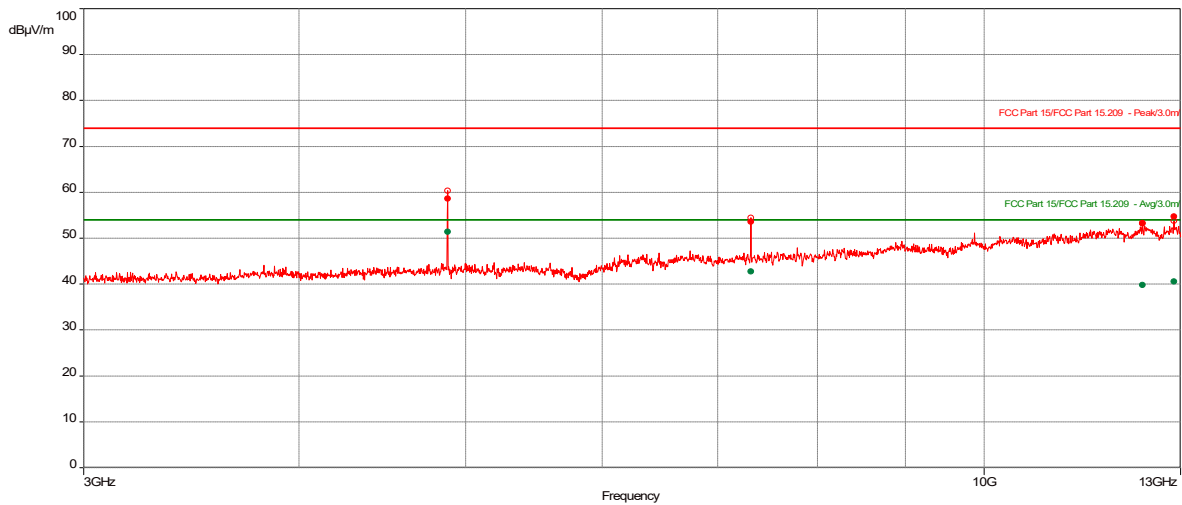


**Mid Channel Radiated Emissions, 3-13 GHz [EUT on its long side]**

**Test Information:**

|                           |                                             |
|---------------------------|---------------------------------------------|
| Date and Time             | 10/1/2023 3:32:34 PM                        |
| Client and Project Number | Otodata                                     |
| Engineer                  | Kouma Sinn                                  |
| Temperature               | 24 C                                        |
| Humidity                  | 45 %                                        |
| Atmospheric Pressure      | 1013 mbar                                   |
| Comments                  | Scan 14: Tx Mid (long Side), RE 3 to 13 GHz |

**Graph:**



**Results:**

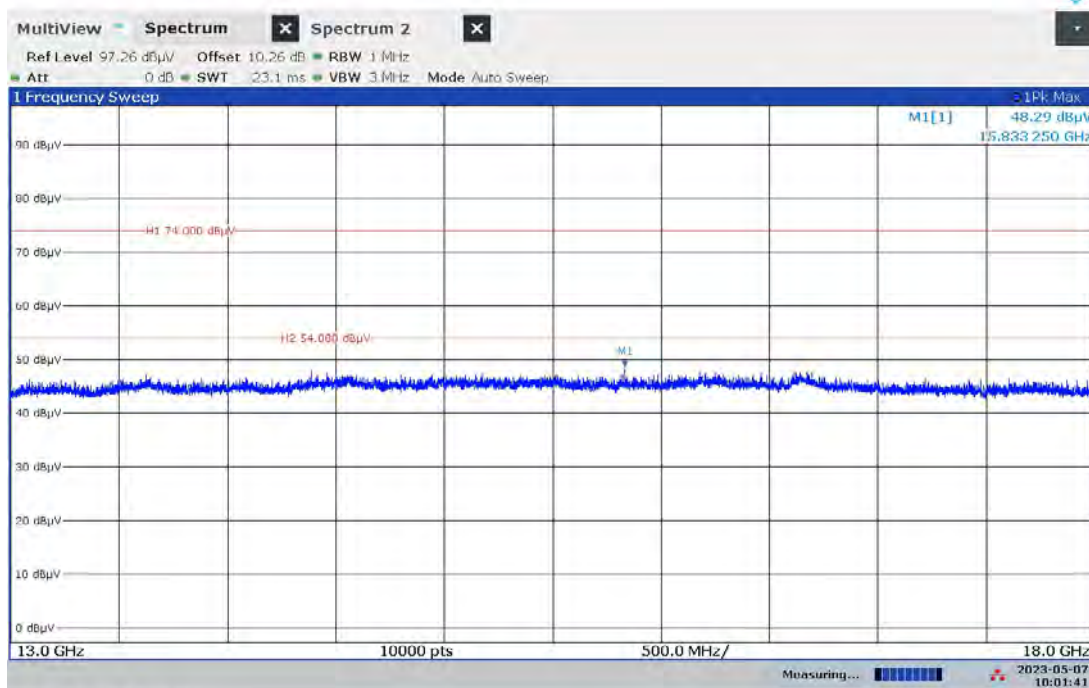
**Peak (PASS) (4)**

| Frequency (MHz) | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Azimuth (°) | Height (m) | Pol.     | RBW        | RBW | Correction (dB) |
|-----------------|----------------|----------------|-------------|-------------|------------|----------|------------|-----|-----------------|
| 4880.1          | 58.66          | 74.00          | -15.34      | 176.60      | 3.44       | Vertical | 1000000.00 | 1M  | 0.17            |
| 7319.55         | 53.66          | 74.00          | -20.34      | 357.30      | 1.00       | Vertical | 1000000.00 | 1M  | 4.46            |
| 12356.85        | 53.24          | 74.00          | -20.76      | 0.00        | 3.44       | Vertical | 1000000.00 | 1M  | 11.54           |
| 12890.5         | 54.78          | 74.00          | -19.22      | 360.00      | 4.00       | Vertical | 1000000.00 | 1M  | 12.84           |

**Average (PASS) (4)**

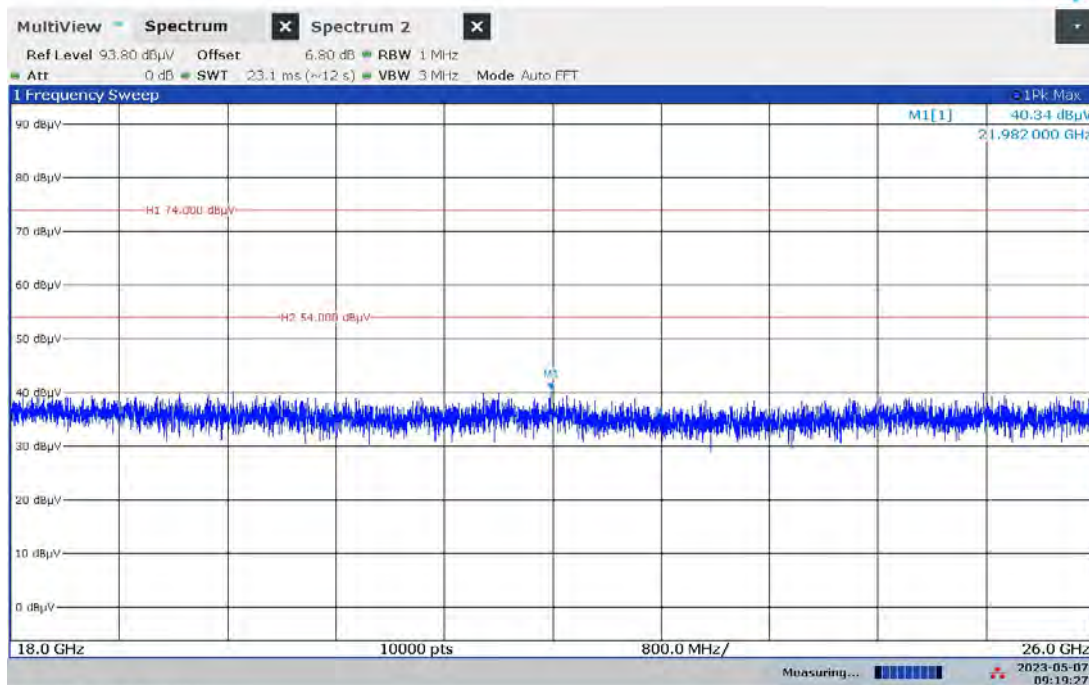
| Frequency (MHz) | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Azimuth (°) | Height (m) | Pol.     | RBW        | RBW | Correction (dB) |
|-----------------|----------------|----------------|-------------|-------------|------------|----------|------------|-----|-----------------|
| 4880.1          | 51.45          | 54.00          | -2.55       | 176.60      | 3.44       | Vertical | 1000000.00 | 1M  | 0.17            |
| 7319.55         | 42.74          | 54.00          | -11.26      | 357.30      | 1.00       | Vertical | 1000000.00 | 1M  | 4.46            |
| 12356.85        | 39.80          | 54.00          | -14.20      | 0.00        | 3.44       | Vertical | 1000000.00 | 1M  | 11.54           |
| 12890.5         | 40.58          | 54.00          | -13.42      | 360.00      | 4.00       | Vertical | 1000000.00 | 1M  | 12.84           |

## Mid Channel Radiated Emissions, 13-18 GHz [EUT on all axis] at 2 m



10:01:42 AM 05/07/2023

## Mid Channel Radiated Emissions, 18-26 GHz [EUT on all axis] at 10 cm



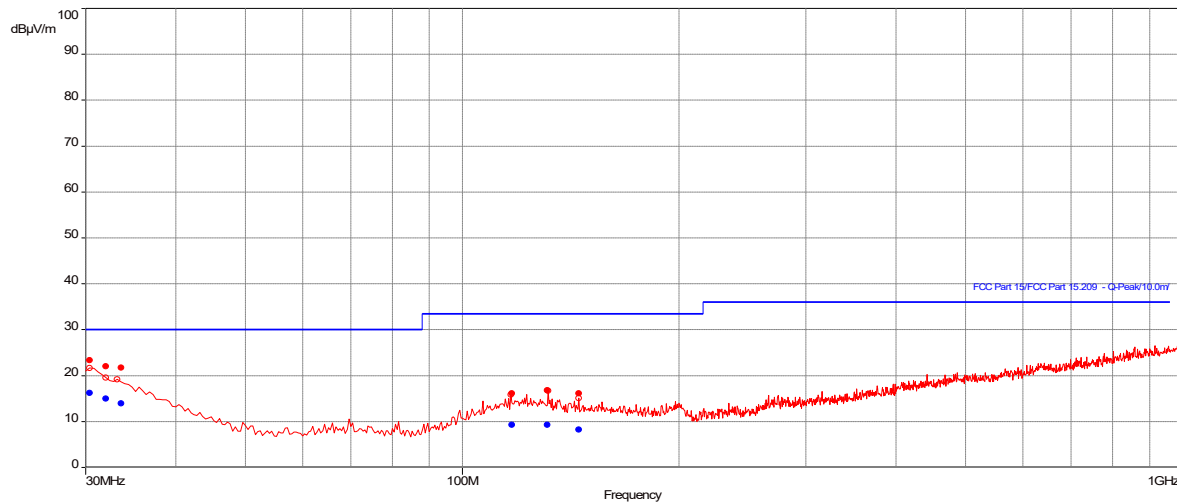
09:19:28 AM 05/07/2023

### High Channel Radiated Emissions, 30-1000 MHz [EUT on its back]

**Test Information:**

|                           |                                                 |
|---------------------------|-------------------------------------------------|
| Date and Time             | 10/1/2023 12:23:30 PM                           |
| Client and Project Number | Otodata                                         |
| Engineer                  | Kouma Sinn                                      |
| Temperature               | 24 C                                            |
| Humidity                  | 45 %                                            |
| Atmospheric Pressure      | 1013 mbar                                       |
| Comments                  | Scan 8: High Channel (Back Side), RE 30-1000MHz |

**Graph:**



**Results:**

**QuasiPeak (PASS) (6)**

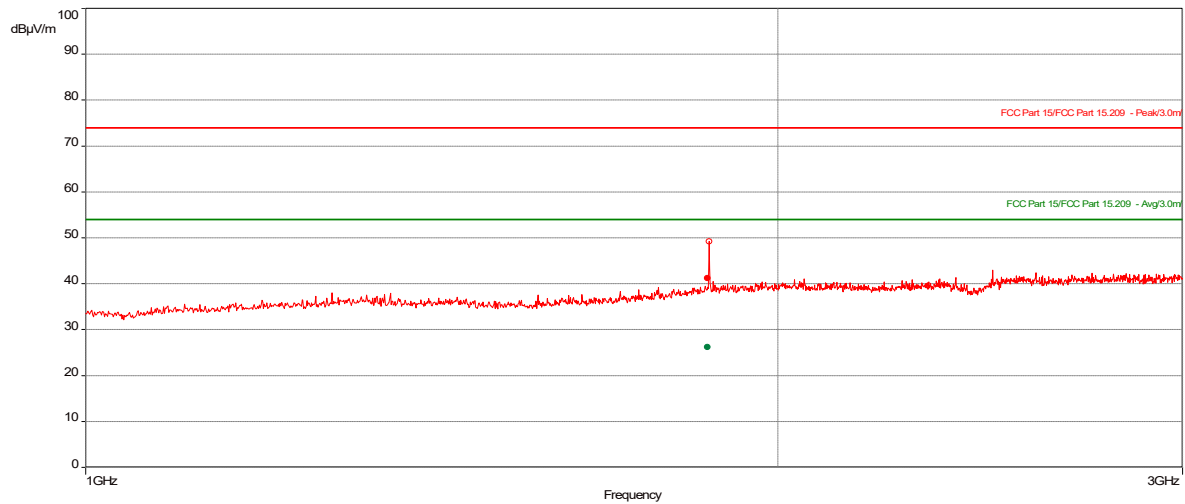
| Frequency (MHz) | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Azimuth (°) | Height (m) | Pol.       | RBW       | RBW  | Correction (dB) |
|-----------------|----------------|----------------|-------------|-------------|------------|------------|-----------|------|-----------------|
| 30.484          | 16.27          | 30.00          | -13.73      | 16.60       | 4.00       | Vertical   | 120000.00 | 120k | -12.70          |
| 32.012          | 15.00          | 30.00          | -15.00      | 349.90      | 1.00       | Horizontal | 120000.00 | 120k | -13.80          |
| 33.44           | 14.03          | 30.00          | -15.97      | 360.00      | 3.36       | Horizontal | 120000.00 | 120k | -14.72          |
| 117.172         | 9.28           | 33.50          | -24.22      | 246.10      | 3.79       | Vertical   | 120000.00 | 120k | -18.59          |
| 131.366         | 9.36           | 33.50          | -24.14      | 79.20       | 3.37       | Horizontal | 120000.00 | 120k | -18.43          |
| 145.284         | 8.24           | 33.50          | -25.26      | 79.30       | 4.00       | Vertical   | 120000.00 | 120k | -19.61          |

**High Channel Radiated Emissions, 1-3 GHz [EUT on its back]**

**Test Information:**

|                           |                                             |
|---------------------------|---------------------------------------------|
| Date and Time             | 10/7/2023 10:18:12 AM                       |
| Client and Project Number | Otodata                                     |
| Engineer                  | Kouma Sinn                                  |
| Temperature               | 24 C                                        |
| Humidity                  | 49 %                                        |
| Atmospheric Pressure      | 1001 mbar                                   |
| Comments                  | Scan 20: Tx High (Back Side), RE 1 to 3 GHz |

**Graph:**



**Results:**

**Peak (PASS) (1)**

| Frequency (MHz) | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Azimuth (°) | Height (m) | Pol.     | RBW        | RBW | Correction (dB) |
|-----------------|----------------|----------------|-------------|-------------|------------|----------|------------|-----|-----------------|
| 1863.6          | 41.23          | 74.00          | -32.77      | 113.10      | 1.00       | Vertical | 1000000.00 | 1M  | -5.21           |

**Average (PASS) (1)**

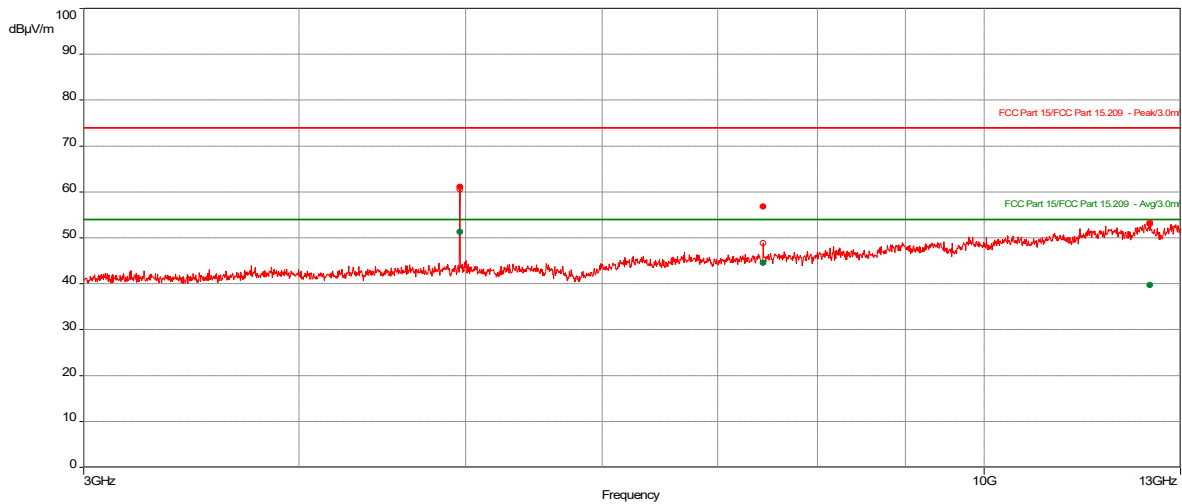
| Frequency (MHz) | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Azimuth (°) | Height (m) | Pol.     | RBW        | RBW | Correction (dB) |
|-----------------|----------------|----------------|-------------|-------------|------------|----------|------------|-----|-----------------|
| 1863.6          | 26.27          | 54.00          | -27.73      | 113.10      | 1.00       | Vertical | 1000000.00 | 1M  | -5.21           |

**High Channel Radiated Emissions, 3-13 GHz [EUT on its back]**

**Test Information:**

|                           |                                              |
|---------------------------|----------------------------------------------|
| Date and Time             | 10/7/2023 9:49:14 AM                         |
| Client and Project Number | Otodata                                      |
| Engineer                  | Kouma Sinn                                   |
| Temperature               | 24 C                                         |
| Humidity                  | 49 %                                         |
| Atmospheric Pressure      | 1001 mbar                                    |
| Comments                  | Scan 19: Tx High (Back Side), RE 3 to 13 GHz |

**Graph:**



**Results:**

**Peak (PASS) (3)**

| Frequency (MHz) | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Azimuth (°) | Height (m) | Pol.       | RBW        | RBW | Correction (dB) |
|-----------------|----------------|----------------|-------------|-------------|------------|------------|------------|-----|-----------------|
| 4959.55         | 61.10          | 74.00          | -12.90      | 357.90      | 1.00       | Horizontal | 1000000.00 | 1M  | 0.39            |
| 7440.75         | 56.86          | 74.00          | -17.14      | 357.70      | 4.00       | Horizontal | 1000000.00 | 1M  | 4.68            |
| 12476.35        | 53.07          | 74.00          | -20.93      | 0.00        | 1.00       | Vertical   | 1000000.00 | 1M  | 11.68           |

**Average (PASS) (3)**

| Frequency (MHz) | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Azimuth (°) | Height (m) | Pol.       | RBW        | RBW | Correction (dB) |
|-----------------|----------------|----------------|-------------|-------------|------------|------------|------------|-----|-----------------|
| 4959.55         | 51.32          | 54.00          | -2.68       | 357.90      | 1.00       | Horizontal | 1000000.00 | 1M  | 0.39            |
| 7440.75         | 44.59          | 54.00          | -9.41       | 357.70      | 4.00       | Horizontal | 1000000.00 | 1M  | 4.68            |
| 12476.35        | 39.77          | 54.00          | -14.23      | 0.00        | 1.00       | Vertical   | 1000000.00 | 1M  | 11.68           |

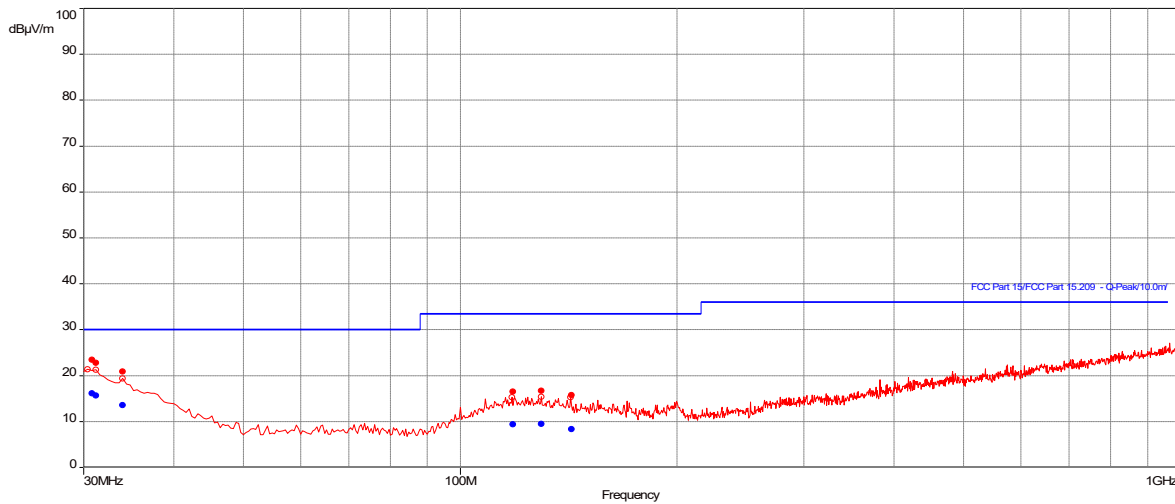


**High Channel Radiated Emissions, 30-1000 MHz [EUT on its short side]**

**Test Information:**

|                           |                                                  |
|---------------------------|--------------------------------------------------|
| Date and Time             | 10/1/2023 11:53:49 AM                            |
| Client and Project Number | Otodata                                          |
| Engineer                  | Kouma Sinn                                       |
| Temperature               | 24 C                                             |
| Humidity                  | 45 %                                             |
| Atmospheric Pressure      | 1013 mbar                                        |
| Comments                  | Scan 7: High Channel (Short Side), RE 30-1000MHz |

**Graph:**



**Results:**

**QuasiPeak (PASS) (6)**

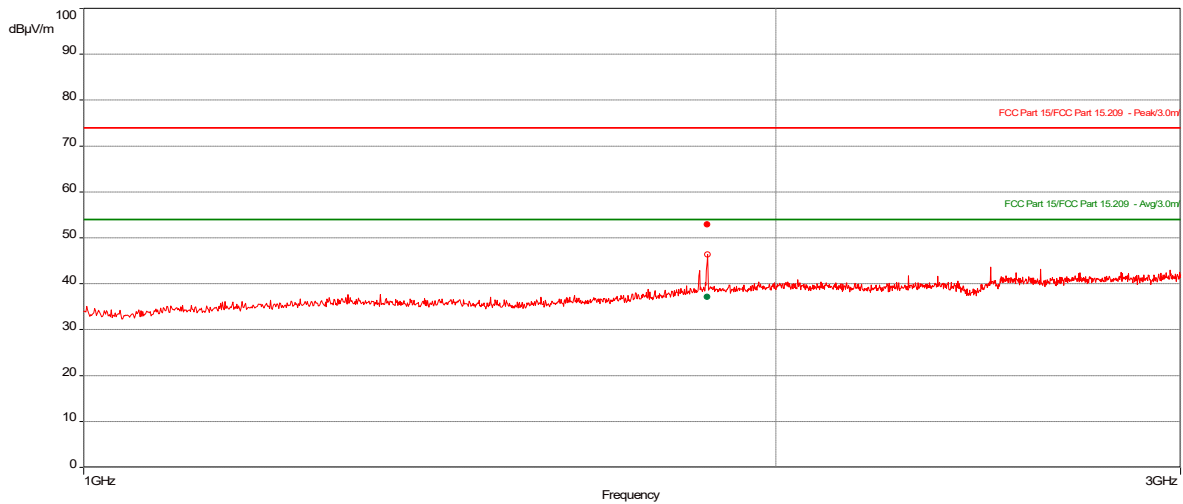
| Frequency (MHz) | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Azimuth (°) | Height (m) | Pol.       | RBW       | RBW  | Correction (dB) |
|-----------------|----------------|----------------|-------------|-------------|------------|------------|-----------|------|-----------------|
| 30.634          | 16.20          | 30.00          | -13.80      | 328.80      | 2.53       | Vertical   | 120000.00 | 120k | -12.76          |
| 31.35           | 15.72          | 30.00          | -14.28      | 329.20      | 1.67       | Vertical   | 120000.00 | 120k | -13.20          |
| 33.916          | 13.61          | 30.00          | -16.39      | 360.00      | 4.00       | Horizontal | 120000.00 | 120k | -15.10          |
| 118.258         | 9.39           | 33.50          | -24.11      | 183.30      | 4.00       | Horizontal | 120000.00 | 120k | -18.48          |
| 129.798         | 9.55           | 33.50          | -23.95      | 245.90      | 3.80       | Vertical   | 120000.00 | 120k | -18.41          |
| 142.814         | 8.39           | 33.50          | -25.11      | 225.30      | 3.38       | Horizontal | 120000.00 | 120k | -19.48          |

**High Channel Radiated Emissions, 1-3 GHz [EUT on its short side]**

**Test Information:**

|                           |                                              |
|---------------------------|----------------------------------------------|
| Date and Time             | 10/7/2023 10:42:38 AM                        |
| Client and Project Number | Otodata                                      |
| Engineer                  | Kouma Sinn                                   |
| Temperature               | 24 C                                         |
| Humidity                  | 49 %                                         |
| Atmospheric Pressure      | 1001 mbar                                    |
| Comments                  | Scan 22: Tx High (Short Side), RE 1 to 3 GHz |

**Graph:**



**Results:**

**Peak (PASS) (1)**

| Frequency (MHz) | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Azimuth (°) | Height (m) | Pol.       | RBW        | RBW | Correction (dB) |
|-----------------|----------------|----------------|-------------|-------------|------------|------------|------------|-----|-----------------|
| 1867.35         | 52.98          | 74.00          | -21.02      | 152.10      | 3.05       | Horizontal | 1000000.00 | 1M  | -5.16           |

**Average (PASS) (1)**

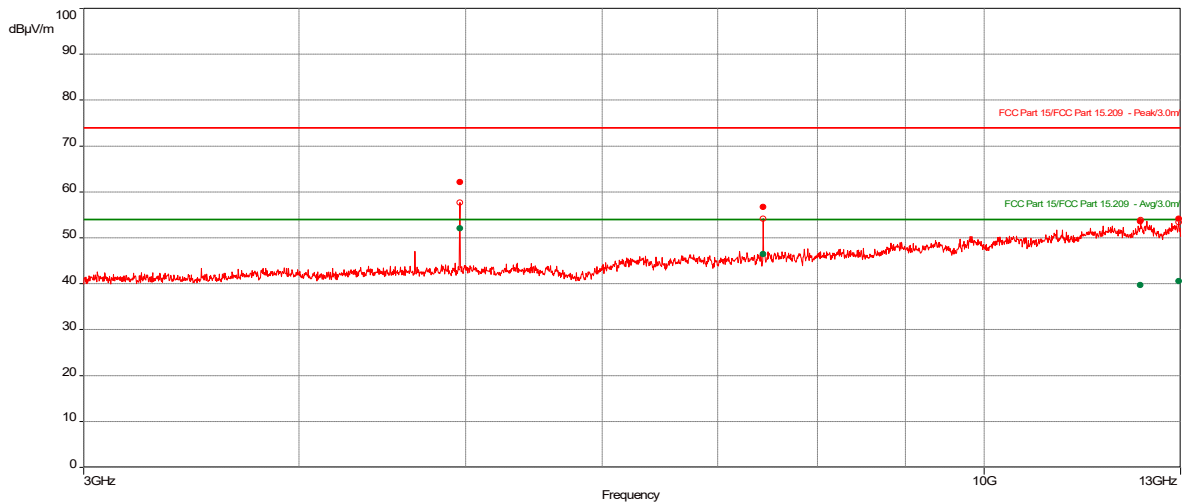
| Frequency (MHz) | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Azimuth (°) | Height (m) | Pol.       | RBW        | RBW | Correction (dB) |
|-----------------|----------------|----------------|-------------|-------------|------------|------------|------------|-----|-----------------|
| 1867.35         | 37.18          | 54.00          | -16.82      | 152.10      | 3.05       | Horizontal | 1000000.00 | 1M  | -5.16           |

High Channel Radiated Emissions, 3-13 GHz [EUT on its short side]

**Test Information:**

|                           |                                               |
|---------------------------|-----------------------------------------------|
| Date and Time             | 10/7/2023 8:55:39 AM                          |
| Client and Project Number | Otodata                                       |
| Engineer                  | Kouma Sinn                                    |
| Temperature               | 24 C                                          |
| Humidity                  | 49 %                                          |
| Atmospheric Pressure      | 1001 mbar                                     |
| Comments                  | Scan 17: Tx High (Short Side), RE 3 to 13 GHz |

**Graph:**



**Results:**

Peak (PASS) (4)

| Frequency (MHz) | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Azimuth (°) | Height (m) | Pol.       | RBW        | RBW | Correction (dB) |
|-----------------|----------------|----------------|-------------|-------------|------------|------------|------------|-----|-----------------|
| 4960.5          | 62.20          | 74.00          | -11.80      | 360.00      | 3.44       | Horizontal | 1000000.00 | 1M  | 0.39            |
| 7440.05         | 56.78          | 74.00          | -17.22      | 0.00        | 3.44       | Horizontal | 1000000.00 | 1M  | 4.68            |
| 12323.25        | 53.61          | 74.00          | -20.39      | 360.00      | 1.00       | Horizontal | 1000000.00 | 1M  | 11.48           |
| 12967.5         | 54.23          | 74.00          | -19.77      | 176.80      | 4.00       | Vertical   | 1000000.00 | 1M  | 13.07           |

Average (PASS) (4)

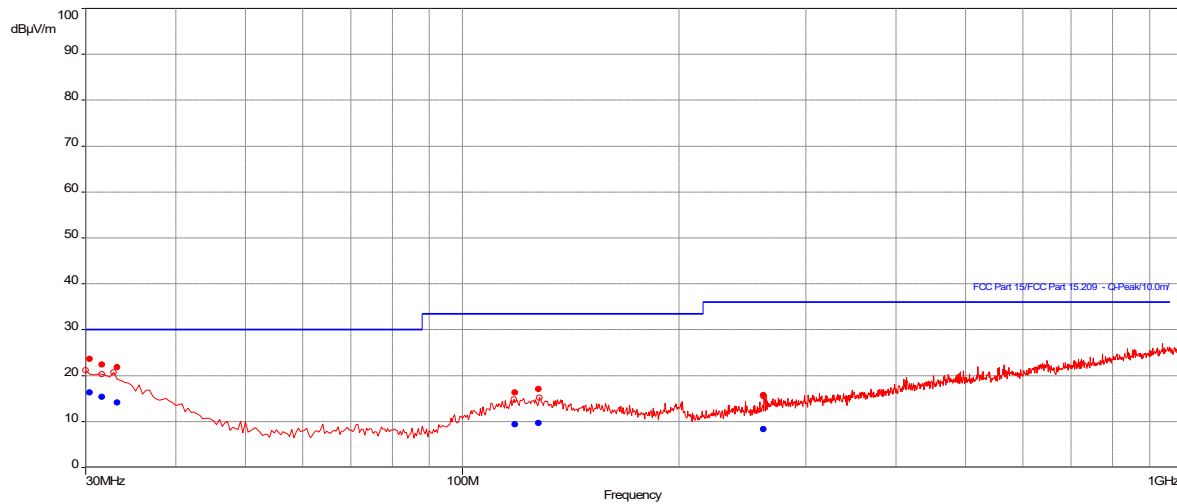
| Frequency (MHz) | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Azimuth (°) | Height (m) | Pol.       | RBW        | RBW | Correction (dB) |
|-----------------|----------------|----------------|-------------|-------------|------------|------------|------------|-----|-----------------|
| 4960.5          | 52.11          | 54.00          | -1.89       | 360.00      | 3.44       | Horizontal | 1000000.00 | 1M  | 0.39            |
| 7440.05         | 46.53          | 54.00          | -7.47       | 0.00        | 3.44       | Horizontal | 1000000.00 | 1M  | 4.68            |
| 12323.25        | 39.76          | 54.00          | -14.24      | 360.00      | 1.00       | Horizontal | 1000000.00 | 1M  | 11.48           |
| 12967.5         | 40.55          | 54.00          | -13.45      | 176.80      | 4.00       | Vertical   | 1000000.00 | 1M  | 13.07           |

**High Channel Radiated Emissions, 30-1000 MHz [EUT on its long side]**

**Test Information:**

|                           |                                                 |
|---------------------------|-------------------------------------------------|
| Date and Time             | 10/1/2023 12:47:07 PM                           |
| Client and Project Number | Otodata                                         |
| Engineer                  | Kouma Sinn                                      |
| Temperature               | 24 C                                            |
| Humidity                  | 45 %                                            |
| Atmospheric Pressure      | 1013 mbar                                       |
| Comments                  | Scan 9: High Channel (Long Side), RE 30-1000MHz |

**Graph:**



**Results:**

**QuasiPeak (PASS) (6)**

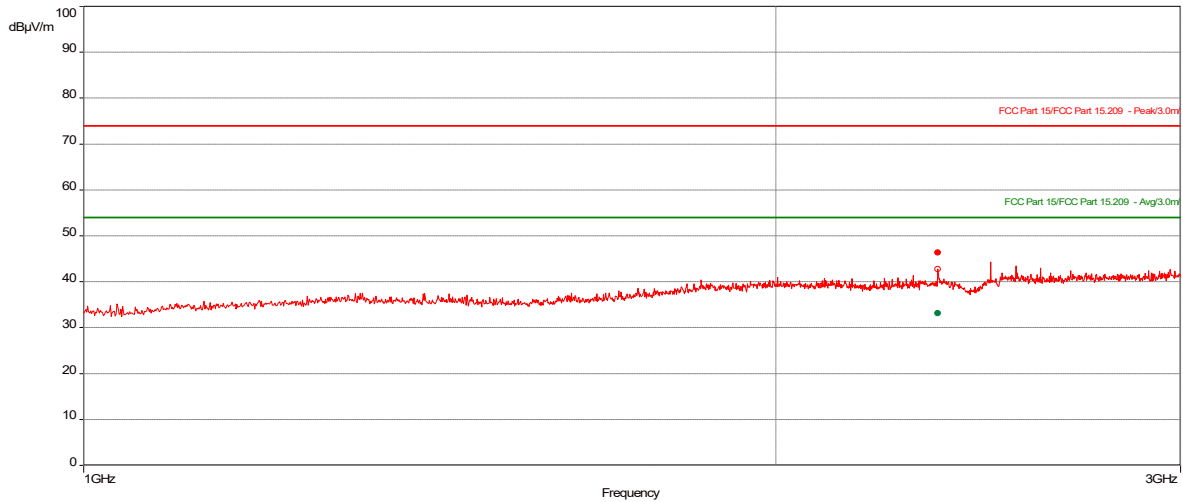
| Frequency (MHz) | Level (dBrV/m) | Limit (dBrV/m) | Margin (dB) | Azimuth (°) | Height (m) | Pol.       | RBW       | RBW  | Correction (dB) |
|-----------------|----------------|----------------|-------------|-------------|------------|------------|-----------|------|-----------------|
| 30.294          | 16.33          | 30.00          | -13.67      | 287.40      | 3.79       | Vertical   | 120000.00 | 120k | -12.63          |
| 31.636          | 15.39          | 30.00          | -14.61      | 183.30      | 4.00       | Vertical   | 120000.00 | 120k | -13.46          |
| 33.232          | 14.20          | 30.00          | -15.80      | 266.30      | 1.00       | Horizontal | 120000.00 | 120k | -14.55          |
| 118.27          | 9.40           | 33.50          | -24.10      | 308.00      | 2.93       | Vertical   | 120000.00 | 120k | -18.47          |
| 127.604         | 9.66           | 33.50          | -23.84      | 360.00      | 2.08       | Horizontal | 120000.00 | 120k | -18.33          |
| 262.1           | 8.36           | 36.00          | -27.64      | 79.30       | 3.38       | Horizontal | 120000.00 | 120k | -19.04          |

**High Channel Radiated Emissions, 1-3 GHz [EUT on its long side]**

**Test Information:**

|                           |                                             |
|---------------------------|---------------------------------------------|
| Date and Time             | 10/7/2023 10:32:29 AM                       |
| Client and Project Number | Otodata                                     |
| Engineer                  | Kouma Sinn                                  |
| Temperature               | 24 C                                        |
| Humidity                  | 49 %                                        |
| Atmospheric Pressure      | 1001 mbar                                   |
| Comments                  | Scan 21: Tx High (Long Side), RE 1 to 3 GHz |

**Graph:**



**Results:**

**Peak (PASS) (1)**

| Frequency (MHz) | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Azimuth (°) | Height (m) | Pol.       | RBW        | RBW | Correction (dB) |
|-----------------|----------------|----------------|-------------|-------------|------------|------------|------------|-----|-----------------|
| 2351.95         | 46.42          | 74.00          | -27.58      | 113.10      | 1.44       | Horizontal | 1000000.00 | 1M  | -4.38           |

**Average (PASS) (1)**

| Frequency (MHz) | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Azimuth (°) | Height (m) | Pol.       | RBW        | RBW | Correction (dB) |
|-----------------|----------------|----------------|-------------|-------------|------------|------------|------------|-----|-----------------|
| 2351.95         | 33.17          | 54.00          | -20.83      | 113.10      | 1.44       | Horizontal | 1000000.00 | 1M  | -4.38           |

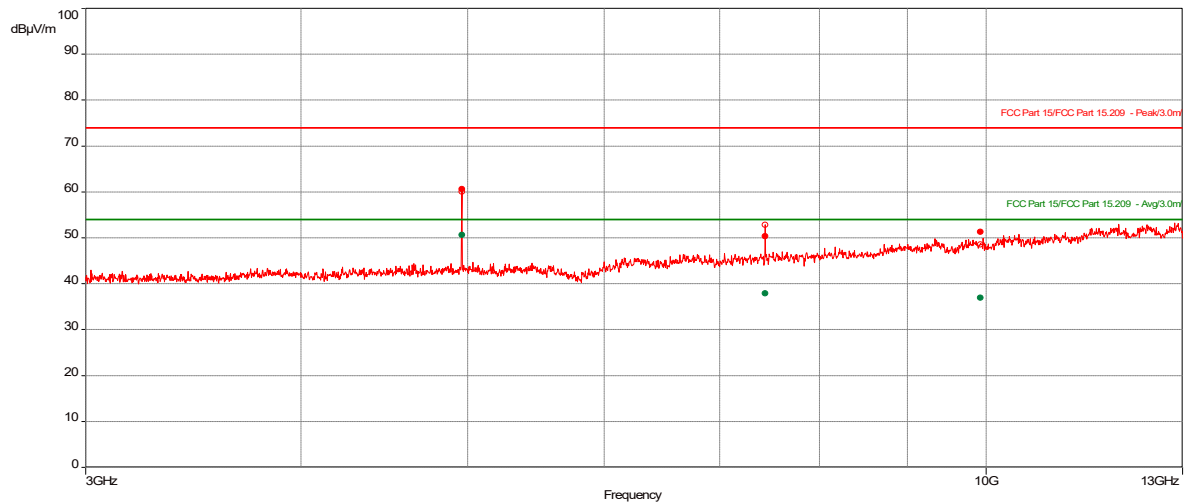


High Channel Radiated Emissions, 3-13 GHz [EUT on its long side]

**Test Information:**

|                           |                                              |
|---------------------------|----------------------------------------------|
| Date and Time             | 10/7/2023 9:25:28 AM                         |
| Client and Project Number | Otodata                                      |
| Engineer                  | Kouma Sinn                                   |
| Temperature               | 24 C                                         |
| Humidity                  | 49 %                                         |
| Atmospheric Pressure      | 1001 mbar                                    |
| Comments                  | Scan 18: Tx High (Long Side), RE 3 to 13 GHz |

**Graph:**



**Results:**

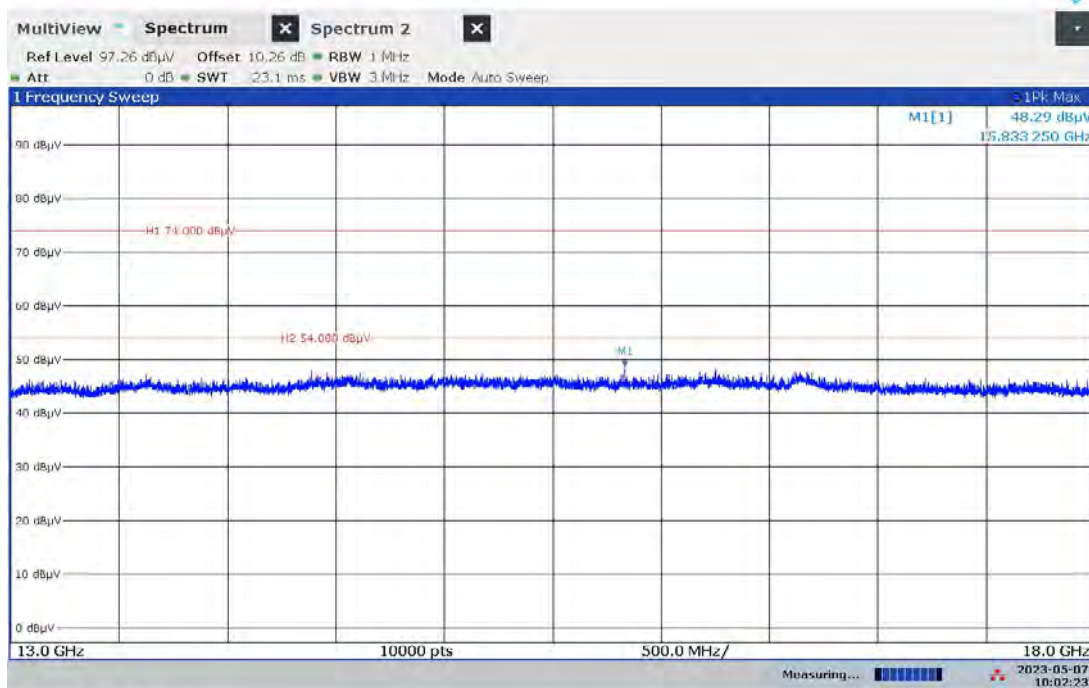
Peak (PASS) (3)

| Frequency (MHz) | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Azimuth (°) | Height (m) | Pol.     | RBW        | RBW | Correction (dB) |
|-----------------|----------------|----------------|-------------|-------------|------------|----------|------------|-----|-----------------|
| 4959.55         | 60.62          | 74.00          | -13.38      | 360.00      | 1.00       | Vertical | 1000000.00 | 1M  | 0.39            |
| 7439.8          | 50.41          | 74.00          | -23.59      | 357.50      | 3.44       | Vertical | 1000000.00 | 1M  | 4.68            |
| 9922.95         | 51.34          | 74.00          | -22.66      | 0.00        | 4.00       | Vertical | 1000000.00 | 1M  | 7.43            |

Average (PASS) (3)

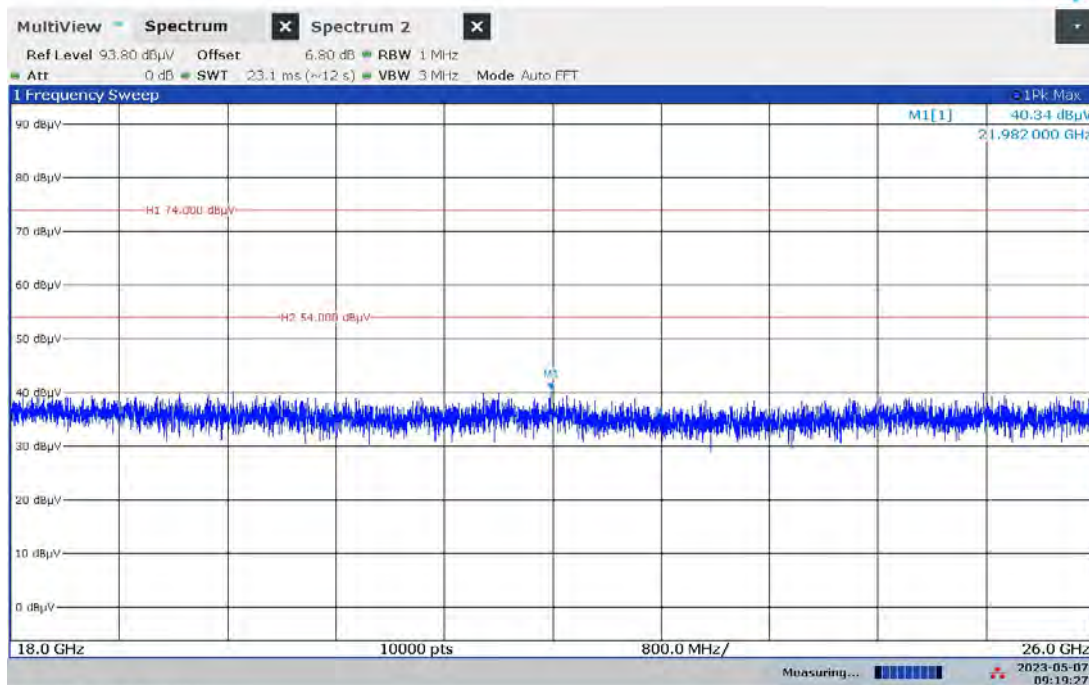
| Frequency (MHz) | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Azimuth (°) | Height (m) | Pol.     | RBW        | RBW | Correction (dB) |
|-----------------|----------------|----------------|-------------|-------------|------------|----------|------------|-----|-----------------|
| 4959.55         | 50.71          | 54.00          | -3.29       | 360.00      | 1.00       | Vertical | 1000000.00 | 1M  | 0.39            |
| 7439.8          | 37.98          | 54.00          | -16.02      | 357.50      | 3.44       | Vertical | 1000000.00 | 1M  | 4.68            |
| 9922.95         | 36.95          | 54.00          | -17.05      | 0.00        | 4.00       | Vertical | 1000000.00 | 1M  | 7.43            |

High Channel Radiated Emissions, 13-18 GHz [EUT on all axis] at 2 m



10:02:23 AM 05/07/2023

High Channel Radiated Emissions, 18-26 GHz [EUT on all axis] at 10 cm



09:19:28 AM 05/07/2023

# Intertek

Report Number: 105128961BOX-001.2

Issued: 05/10/2023  
Revised: 10/10/2023

| Product Standard: CFR47 FCC Part 15.247, RSS-247 |                             |                                   |                    |        | Limit applied: See Report Section 10.2 |                        |                              |
|--------------------------------------------------|-----------------------------|-----------------------------------|--------------------|--------|----------------------------------------|------------------------|------------------------------|
| Test Date                                        | Test Personnel/<br>Initials | Supervising Engineer/<br>Initials | Input<br>Voltage   | Mode   | Atmospheric Data                       |                        |                              |
|                                                  |                             |                                   |                    |        | Temp<br>C°                             | Relative<br>Humidity % | Atmospheric<br>Pressure mbar |
| 05/07/2023                                       | Vathana F. Ven<br>VSV       | Kouma Sinn KPS                    | USB<br>Powered     | Mode 1 | 24                                     | 27                     | 1005                         |
| 05/09/2023                                       | Kouma Sinn KPS              | Vathana F. Ven VSV                | USB<br>Powered     | Mode 1 | 25                                     | 20                     | 1004                         |
| 10/01/2023                                       | Kouma Sinn KPS              | Vathana F. Ven VSV                | Battery<br>Powered | Mode 1 | 24                                     | 45                     | 1013                         |
| 10/07/2023                                       | Kouma Sinn KPS              | Vathana F. Ven VSV                | Battery<br>Powered | Mode 1 | 24                                     | 49                     | 1001                         |

Deviations, Additions, or Exclusions: None

## 11 Digital Device and Receiver Radiated Spurious Emissions

### 11.1 Method

Tests are performed in accordance with FCC Part 15 Subpart B, ISED ICES-003, and ANSI C 63.4.

**TEST SITE:** 10m ALSE

**The 10m ALSE** is 13m (Length) x 21m (Depth) x 10m (Height) with the effective size in terms of space from the tips of the absorber is 12m (Length) x 20m (Depth) x 8.5m (Height). This chamber achieves broadband performance using a unique arrangement of hybrid and ferrite tile absorber. This chamber has a built in 3m diameter turntable (Embedded type). The metal structure of the table makes electrical connection around the entire circumference of the turntable to the ground plane with a metal brush type connection. The turntable is located on one end of the chamber and the antennas are mounted 3 and 10 meters away at the other end of the chamber on the adjustable an Antenna Mast. The antenna mast is a non-conductive bore sighted type with remote control of antenna height and polarization. The Antenna Mast and the turntable can be remotely controlled through the controller located in the adjacent Control room. A Styrofoam table 80 cm high is used for table-top equipment.

### Measurement Uncertainty

| Measurement             | Frequency Range | Expanded Uncertainty (k=2) | Ucisp  |
|-------------------------|-----------------|----------------------------|--------|
| Radiated Emissions, 10m | 30-1000 MHz     | 4.6dB                      | 6.3 dB |
| Radiated Emissions, 3m  | 30-1000 MHz     | 5.3 dB                     | 6.3 dB |
| Radiated Emissions, 3m  | 1-6 GHz         | 4.5 dB                     | 5.2 dB |
| Radiated Emissions, 3m  | 6-15 GHz        | 5.2 dB                     | 5.5 dB |
| Radiated Emissions, 3m  | 15-18 GHz       | 5.0 dB                     | 5.5 dB |
| Radiated Emissions, 3m  | 18-40 GHz       | 5.0 dB                     | 5.5 dB |

As shown in the table above our radiated emissions  $U_{lab}$  is less than the corresponding  $U_{CISPR}$  reference value in CISPR 16-4-2 Table 1, hence the compliance of the product is only based on the measured value, and no measurement uncertainty correction is required, based on CISPR 22 and CISPR 11 (for 2006 and later revisions) Clause 11.

### Sample Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF - AG$$

Where

- FS = Field Strength in dB $\mu$ V/m
- RA = Receiver Amplitude (including preamplifier) in dB $\mu$ V
- CF = Cable Attenuation Factor in dB
- AF = Antenna Factor in dB
- AG = Amplifier Gain in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows.

Assume a receiver reading of 52.0 dB $\mu$ V is obtained. The antenna factor of 7.4 dB and cable factor of

1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving a field strength of 32 dB $\mu$ V/m. This value in dB $\mu$ V/m was converted to its corresponding level in  $\mu$ V/m.

RA = 52.0 dB $\mu$ V

AF = 7.4 dB/m

CF = 1.6 dB

AG = 29.0 dB

FS = 32 dB $\mu$ V/m

To convert from dB $\mu$ V to  $\mu$ V or mV the following was used:

UF =  $10^{(NF / 20)}$  where UF = Net Reading in  $\mu$ V

NF = Net Reading in dB $\mu$ V

#### Example:

FS = RA + AF + CF – AG = 52.0 + 7.4 + 1.6 – 29.0 = 32.0

UF =  $10^{(32 \text{ dB}\mu\text{V} / 20)} = 39.8 \mu\text{V/m}$

Alternately, when BAT-EMC Emission Software is used, the “Level” includes all losses and gains and is compared directly in the “Margin” column to the “Limit”. The “Correction” includes Antenna Factor, Preamp, and Cable Loss. These are already accounted for in the “Level” column.

## 11.2 Limit

§15.109 Radiated emission limits.

The field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values.

| Frequency of emission (MHz) | Field strength (microvolts/meter) | Field strength (dB $\mu$ V/m) |
|-----------------------------|-----------------------------------|-------------------------------|
| 30-88                       | 100                               | 40.00                         |
| 88-216                      | 150                               | 43.52                         |
| 216-960                     | 200                               | 46.02                         |
| Above 960                   | 500                               | 54.00                         |



**11.3 Test Equipment Used:**

Test equipment used for radiated emissions from 30-1000 MHz

| Asset    | Description                             | Manufacturer         | Model                | Serial      | Cal Date   | Cal Due    |
|----------|-----------------------------------------|----------------------|----------------------|-------------|------------|------------|
| DAV006'  | Weather Station                         | Davis                | 6250                 | MS191218071 | 02/21/2023 | 02/21/2024 |
| ROS011'  | EMI Test Receiver                       | Rohde & Schwartz     | ESW44                | 103296      | 06/28/2023 | 06/28/2024 |
| PRE10'   | 30-1000MHz pre-amp                      | ITS                  | PRE10                | PRE10       | 02/17/2023 | 02/17/2024 |
| 145145'  | Broadband Hybrid Antenna 30 MHz - 3 GHz | Sunol Sciences Corp. | JB3                  | A122313     | 06/23/2023 | 06/23/2024 |
| HS003'   | 10m under floor cable                   | Huber-Schuner        | 10m-1                | HS003       | 02/18/2023 | 02/18/2024 |
| 145-424' | 9kHz to 40GHz Cable                     | Huber and Suhner     | Sucoflex             | 145-424     | 02/18/2023 | 02/18/2024 |
| HS001'   | DC-18GHz cable 1.5m long                | Huber & Suhner       | SucoFlex 106A        | HS001       | 01/25/2023 | 01/25/2024 |
| 145-420' | Receiver to floor cable                 | Utiflex              | UFB311A-2-0591-70070 | 145-420     | 02/18/2023 | 02/18/2024 |

**Software Utilized:**

| Name    | Manufacturer | Version     |
|---------|--------------|-------------|
| BAT-EMC | Nexio        | 2022.0.27.0 |

Test equipment used for radiated emissions from 1-13 GHz

| Asset    | Description                             | Manufacturer     | Model                | Serial      | Cal Date   | Cal Due    |
|----------|-----------------------------------------|------------------|----------------------|-------------|------------|------------|
| 145-420' | Receiver to floor cable                 | Utiflex          | UFB311A-2-0591-70070 | 145-420     | 02/18/2023 | 02/18/2024 |
| 145-422' | 10Amp Pre-amp to under floor            | Utiflex          | UFB311A-0-2756-70070 | 145-422     | 02/18/2023 | 02/18/2024 |
| 145-408' | 10m Chamber - 3m Track B In-floor Cable | Huber + Suhner   | sucoflex 106-11000mm | 001         | 07/19/2023 | 07/19/2024 |
| IW002'   | 2 meter Armored cable                   | Insulated Wire   | 2800-NPS             | 002         | 10/11/2022 | 10/11/2023 |
| DAV006'  | Weather Station                         | Davis            | 6250                 | MS191218071 | 02/21/2022 | 02/21/2024 |
| ETS005'  | 1-18GHz horn antenna                    | ETS-Lindgren     | 3117                 | 00218279    | 10/12/2023 | 10/12/2023 |
| ROS011'  | EMI Test Receiver                       | Rohde & Schwartz | ESW44                | 103296      | 06/28/2023 | 06/28/2024 |
| PRE12'   | Pre-amplifier                           | Com Power        | PAM-118A             | 18040117    | 12/17/2022 | 12/17/2023 |

**Software Utilized:**

| Name    | Manufacturer | Version     |
|---------|--------------|-------------|
| BAT-EMC | Nexio        | 2022.0.27.0 |

**11.4 Results:**

The sample tested was found to Comply.

## 11.5 Setup Photographs:

30-1000 MHz Test Setup





1-13 GHz Test Setup



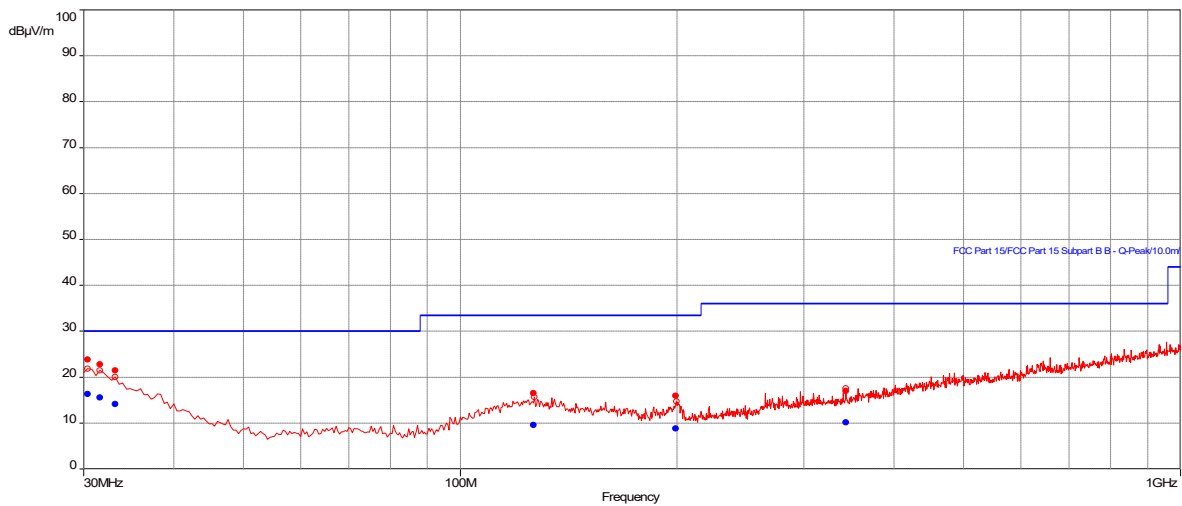
## 11.6 Plots/Data:

### Radiated Emissions From 30-1000 MHz in Receive Mode

#### Test Information:

|                           |                                                    |
|---------------------------|----------------------------------------------------|
| Date and Time             | 10/1/2023 1:16:26 PM                               |
| Client and Project Number | Otodata                                            |
| Engineer                  | Kouma Sinn                                         |
| Temperature               | 24 C                                               |
| Humidity                  | 45 %                                               |
| Atmospheric Pressure      | 1013 mbar                                          |
| Comments                  | Scan 10: Rx Mid Channel Short Side), RE 30-1000MHz |

#### Graph:



#### Results:

##### QuasiPeak (PASS) (6)

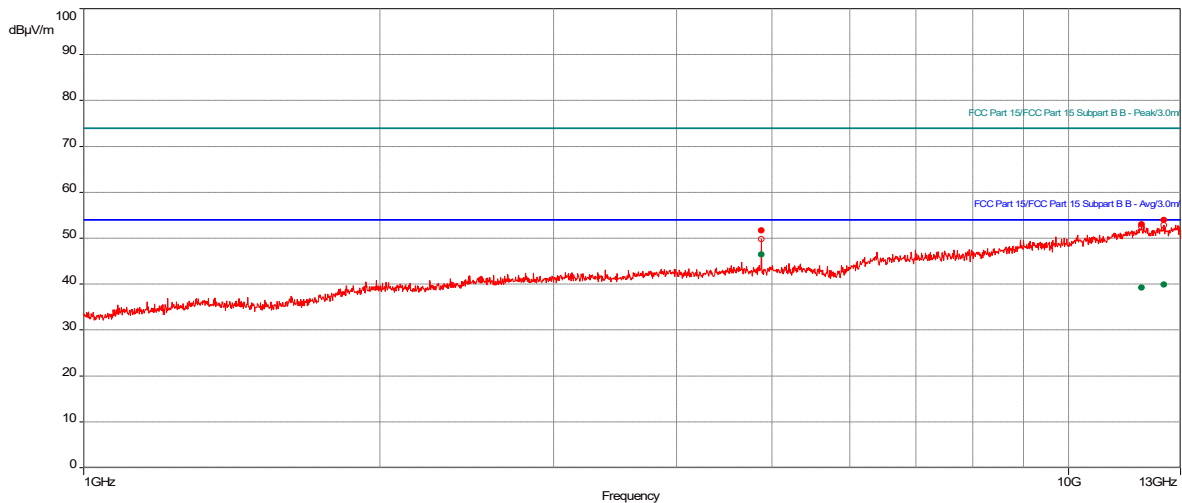
| Frequency (MHz) | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Azimuth (°) | Height (m) | Pol.       | RBW       | RBW  | Correction (dB) |
|-----------------|----------------|----------------|-------------|-------------|------------|------------|-----------|------|-----------------|
| 30.358          | 16.34          | 30.00          | -13.66      | 120.30      | 4.00       | Horizontal | 120000.00 | 120k | -12.65          |
| 31.45           | 15.61          | 30.00          | -14.39      | 120.80      | 3.81       | Horizontal | 120000.00 | 120k | -13.29          |
| 33.296          | 14.17          | 30.00          | -15.83      | 204.30      | 1.67       | Vertical   | 120000.00 | 120k | -14.60          |
| 126.404         | 9.61           | 33.50          | -23.89      | 183.30      | 4.00       | Vertical   | 120000.00 | 120k | -18.28          |
| 199.366         | 8.86           | 33.50          | -24.64      | 350.20      | 1.67       | Vertical   | 120000.00 | 120k | -19.10          |
| 343.044         | 10.17          | 36.00          | -25.83      | 141.90      | 3.36       | Horizontal | 120000.00 | 120k | -17.12          |

Radiated Emissions From 1-13 GHz in Receive Mode

**Test Information:**

|                           |                                              |
|---------------------------|----------------------------------------------|
| Date and Time             | 10/7/2023 2:02:02 PM                         |
| Client and Project Number | Otodata                                      |
| Engineer                  | Kouma Sinn                                   |
| Temperature               | 24 C                                         |
| Humidity                  | 49 %                                         |
| Atmospheric Pressure      | 1001 mbar                                    |
| Comments                  | Scan 29: Rx Mid (Short Side), RE 1 to 13 GHz |

**Graph:**



**Results:**

Peak (PASS) (3)

| Frequency (MHz) | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Azimuth (°) | Height (m) | Pol.       | RBW        | RBW | Correction (dB) |
|-----------------|----------------|----------------|-------------|-------------|------------|------------|------------|-----|-----------------|
| 4878.05         | 51.73          | 74.00          | -22.27      | 0.00        | 3.94       | Horizontal | 1000000.00 | 1M  | 0.17            |
| 11873.85        | 53.02          | 74.00          | -20.98      | 0.00        | 1.00       | Vertical   | 1000000.00 | 1M  | 10.80           |
| 12505.65        | 54.00          | 74.00          | -20.00      | 360.00      | 1.00       | Vertical   | 1000000.00 | 1M  | 11.72           |

Average (PASS) (3)

| Frequency (MHz) | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Azimuth (°) | Height (m) | Pol.       | RBW        | RBW | Correction (dB) |
|-----------------|----------------|----------------|-------------|-------------|------------|------------|------------|-----|-----------------|
| 4878.05         | 46.49          | 54.00          | -7.51       | 0.00        | 3.94       | Horizontal | 1000000.00 | 1M  | 0.17            |
| 11873.85        | 39.27          | 54.00          | -14.73      | 0.00        | 1.00       | Vertical   | 1000000.00 | 1M  | 10.80           |
| 12505.65        | 39.98          | 54.00          | -14.02      | 360.00      | 1.00       | Vertical   | 1000000.00 | 1M  | 11.72           |



# Intertek

Report Number: 105128961BOX-001.2

Issued: 05/10/2023  
Revised: 10/10/2023

| Product Standard: FCC Part 15 Subpart B, ISED ICES-003 |                             |                                   |                    |        | Limit applied: All Class B<br>Pretest Verification w/BB source: Yes |                        |                              |
|--------------------------------------------------------|-----------------------------|-----------------------------------|--------------------|--------|---------------------------------------------------------------------|------------------------|------------------------------|
| Test Date                                              | Test Personnel/<br>Initials | Supervising Engineer/<br>Initials | Input<br>Voltage   | Mode   | Atmospheric Data                                                    |                        |                              |
|                                                        |                             |                                   |                    |        | Temp<br>C°                                                          | Relative<br>Humidity % | Atmospheric<br>Pressure mbar |
| 10/01/2023                                             | Kouma Sinn <i>KPS</i>       | Vathana F. Ven <i>VSV</i>         | Battery<br>Powered | Mode 2 | 24                                                                  | 45                     | 1013                         |
| 10/01/2023                                             | Kouma Sinn <i>KPS</i>       | Vathana F. Ven <i>VSV</i>         | Battery<br>Powered | Mode 2 | 24                                                                  | 49                     | 1001                         |
|                                                        |                             |                                   |                    |        |                                                                     |                        |                              |

Deviations, Additions, or Exclusions: None

## 12 Revision History

| Revision Level | Date       | Report Number      | Prepared By    | Reviewed By    | Notes                                                 |
|----------------|------------|--------------------|----------------|----------------|-------------------------------------------------------|
| 0              | 05/10/2023 | 105128961BOX-001   | KPS <i>KPS</i> | VFV <i>VFV</i> | Original Issue                                        |
| 1              | 07/24/2023 | 105128961BOX-001.1 | KPS <i>KPS</i> | VFV <i>VFV</i> | Added notes in block in EUT block diagram section     |
| 2              | 10/10/2023 | 105128961BOX-001.2 | KPS <i>KPS</i> | VFV <i>VFV</i> | Re-tested radiated emissions without the test fixture |
|                |            |                    |                |                |                                                       |
|                |            |                    |                |                |                                                       |
|                |            |                    |                |                |                                                       |