

# RF Test Report

**Project Number:** 5053017**Offer Number:** SUW-202209003458**Report Number:** 5053017EMC01**Revision Level:** 1**Client:** Arccos Golf, LLC**Equipment Under Test:** Arccos Link Wearable**Product Name:** Arccos Link Pro**Model:** L3P**FCC ID:** 2ACQZ-L3P**IC:** 12164A-L3P**Applicable Standards:** FCC Part 15 Subpart C, § 15.247

RSS-247, Issue 2, February 2017

RSS-GEN, Issue 5, February 2021, Amendment 2

ANSI C63.10:2013

**Report revised on:** 07 September 2023**Test Result:** Compliant

FOR THE SCOPE OF ACCREDITATION UNDER CERTIFICATE NUMBER: 3212.01

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## 1 Summary of Test Results

| Test Description                                     | Test Specification          |                                     | Test Result              |
|------------------------------------------------------|-----------------------------|-------------------------------------|--------------------------|
| Bandwidth                                            | 15.247(a)(2)                | RSS-247 S5.2 (a)<br>RSS-GEN S6.7    | Compliant                |
| Output Power                                         | 15.247(b)(3)                | RSS-247 S5.4 (d)                    | Compliant                |
| Power Spectral Density                               | 15.247(e)                   | RSS-247 S5.2 (b)                    | Compliant                |
| Conducted Spurious Emissions<br>/ Band Edge          | 15.247(d)                   | RSS-247 S5.5                        | Compliant                |
| Emissions in Restricted<br>Frequency Bands           | 15.247(d)<br>15.205, 15.209 | RSS-247 S5.5<br>RSS-GEN S8.9, S8.10 | Compliant                |
| Band Edge Emissions in<br>Restricted Frequency Bands | 15.205, 15.209              | RSS-GEN S8.9, S8.10                 | Compliant                |
| AC Powerline Conducted<br>Emissions                  | 15.207                      | RSS-GEN S8.8                        | N/A <sup>(2)</sup>       |
| Antenna Requirement                                  | 15.203                      | RSS-GEN S6.8                        | Compliant <sup>(1)</sup> |

(1) The device uses an internal PCB trace antenna which cannot be replaced by the end user.

(2) The device under test is battery powered. Conducted Emissions is not applicable.

### 1.1 Modifications Required for Compliance

None.

## 2 General Information

### 2.1 Client Information

Company Name: Arccos Golf, LLC  
Address: 700 CANAL ST.  
City, State, Zip, Country: Stamford, Connecticut 06902, USA

### 2.2 Test Laboratory

Name: SGS North America, Inc.  
Address: 620 Old Peachtree Road NW, Suite 100  
City, State, Zip, Country: Suwanee, GA 30024, USA

Accrediting Body: A2LA  
Type of lab: Testing Laboratory  
Certificate Number: 3212.01  
CAB ID: US0186

### 2.3 General Information of EUT

Equipment Under Test: Arccos Link Wearable  
Product Name: Arccos Link Pro  
Model: L3P  
Serial Numbers: SGS ID#: SUW\_SP\_20230501689 (Conducted Sample)  
SGS ID#: SUW\_SP\_20230501620 (Radiated Sample)  
FCC ID: 2ACQZ-L3P  
IC: 12164A-L3P

Frequency Range: 2402 – 2480 MHz  
Data Modes: Bluetooth Low Energy (BLE1M) – GFSK  
Antenna: Internal PCB Trace (2.4dBi gain)

Rated Voltage: 3.7VDC  
Test Voltage: 3.7VDC

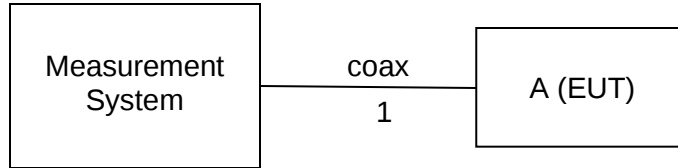
Sample Received Date: 25 May 2023  
Dates of testing: 25 May to 27 June 2023

### 2.4 Operating Modes and Conditions

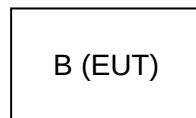
The EUT was running test mode firmware which allowed the following:

- 1) selecting low, middle, and high BLE channels.
- 2) selecting the modulation scheme as used in normal operation, but with 100% duty cycle.
- 3) Per client statement, the power level was set at 0dBm for testing.

## 2.5 EUT Connection Block Diagram – Conducted Measurements



## 2.6 EUT Connection Block Diagram – Radiated Measurements



Inside Chamber

## 2.7 System Configurations

| Device Reference | Manufacturer     | Description                        | Model Number | Serial Number               |
|------------------|------------------|------------------------------------|--------------|-----------------------------|
| A                | Arccos Golf, LLC | Arccos Link Pro (Conducted Sample) | L3P          | SGS ID#: SUW_SP_20230501689 |
| B                | Arccos Golf, LLC | Arccos Link Pro (Radiated Sample)  | L3P          | SGS ID#: SUW_SP_20230501620 |

## 2.8 Cable List

| Cable reference | Port Name         | Start             | End                 | Cable Length | Ferrite installed? | Shielded? |
|-----------------|-------------------|-------------------|---------------------|--------------|--------------------|-----------|
| 1               | Conducted RF coax | Antenna Connector | Measuring Equipment | <5cm         | N                  | N         |

### 3 Bandwidth

#### 3.1 Test Result

| Test Description         | Test Specification |                  | Test Result |
|--------------------------|--------------------|------------------|-------------|
| DTS Bandwidth (6dB)      | 15.247(a)(2)       | RSS-247 S5.2 (a) | Compliant   |
| Occupied Bandwidth (99%) | 2.1049             | RSS-GEN S6.7     | Reported    |

#### 3.2 Test Methods

The DTS 6dB bandwidth measurements were performed using the procedure from ANSI C63.10 clause 11.8.1, and the 99% occupied bandwidth measurements were performed using the procedure from ANSI C63.10 clause 6.9.3. These procedures are referenced in KDB 558074 D01 15.247 Meas Guidance v05r02.

The BLE 1Mbps data mode was used for these tests.

##### Limit

The minimum 6dB bandwidth shall be at least 500 kHz.

#### 3.3 Test Site

SGS EMC Laboratory, Suwanee, GA

##### Environmental Conditions

Temperature: 24.42 °C

Relative Humidity: 48.3 %

Atmospheric Pressure: 98.1 kPa

#### 3.4 Test Equipment

Test End Date: 23-Jun-2023

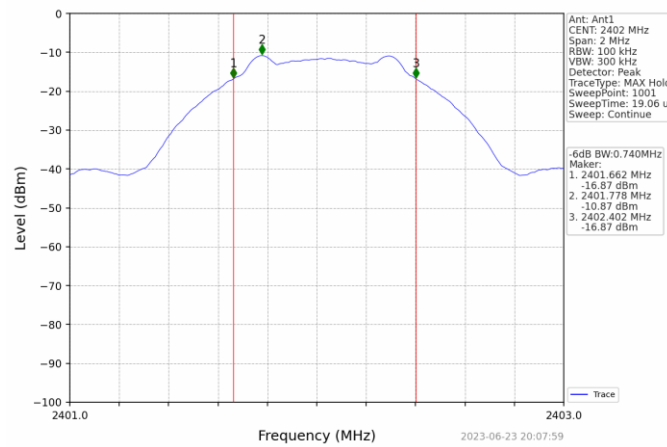
Tester: SGM

| Equipment                       | Model        | Manufacturer             | Asset   | Cal Date    | Cal Due Date |
|---------------------------------|--------------|--------------------------|---------|-------------|--------------|
| SIGNAL ANALYZER (TS8997)        | FSV30        | ROHDE & SCHWARZ          | B085749 | 7-Dec-2022  | 7-Dec-2023   |
| RF CABLE SMA TO SMA, 0.01-40GHZ | 084-0505-059 | TELEDYNE STORM MICROWAVE | 20108   | 13-Mar-2023 | 13-Mar-2024  |
| TSTPASS SWITCHBOX               | SB2          | TSTPASS                  | 23009   | CNR         | CNR          |

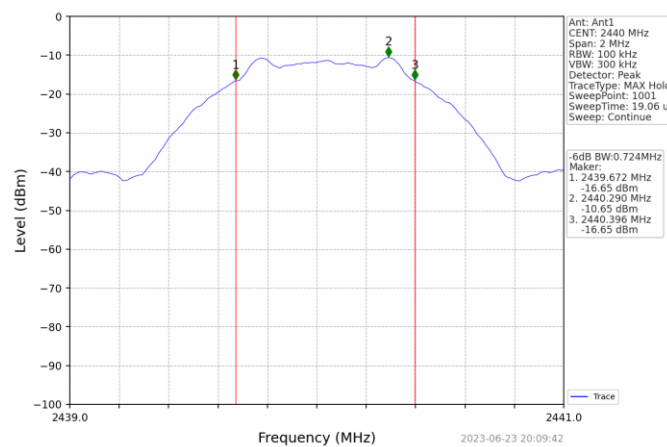
#### 3.5 Test Data – DTS Bandwidth (6dB)

| Mode | TX Type | Frequency (MHz) | ANT | 6dB Bandwidth (MHz) | Verdict Limit |
|------|---------|-----------------|-----|---------------------|---------------|
|      |         |                 |     | Result              |               |
| 1M   | SISO    | 2402            | 1   | 0.740               | >=0.5         |
|      |         | 2440            | 1   | 0.724               | >=0.5         |
|      |         | 2480            | 1   | 0.732               | >=0.5         |

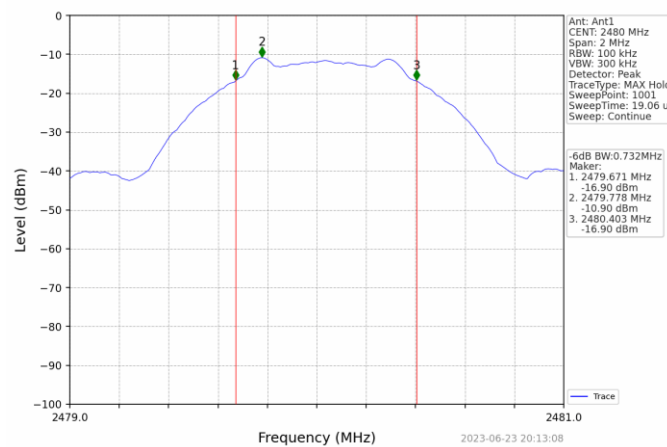
### 1M\_LCH\_2402MHz\_Ant1\_NTNV



### 1M\_MCH\_2440MHz\_Ant1\_NTNV



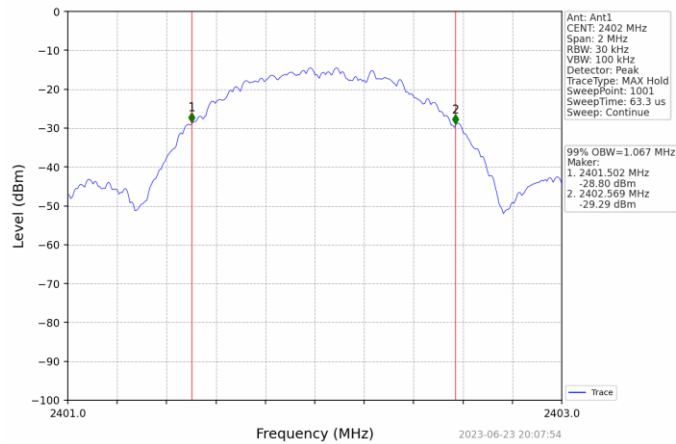
### 1M\_HCH\_2480MHz\_Ant1\_NTNV



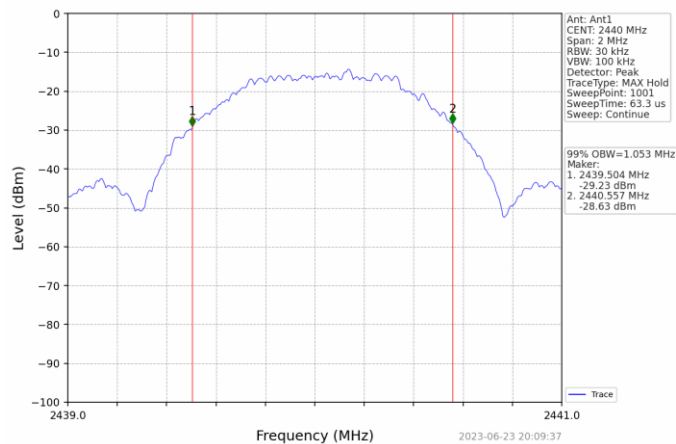
### 3.6 Test Data – 99% Occupied Bandwidth

| Mode | TX Type | Frequency (MHz) | ANT | 99% Occupied Bandwidth (MHz) |                |
|------|---------|-----------------|-----|------------------------------|----------------|
|      |         |                 |     | Result                       |                |
| 1M   | SISO    | 2402            | 1   | 1.067                        | For Report Use |
|      |         | 2440            | 1   | 1.053                        | For Report Use |
|      |         | 2480            | 1   | 1.063                        | For Report Use |

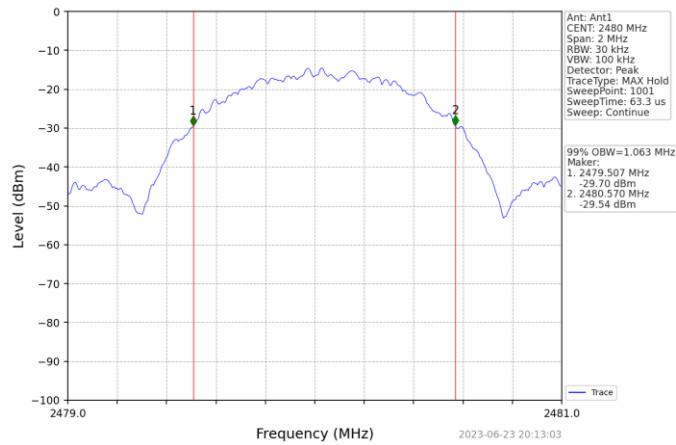
1M\_LCH\_2402MHz\_Ant1\_NTNV



1M\_MCH\_2440MHz\_Ant1\_NTNV



### 1M\_HCH\_2480MHz\_Ant1\_NTNV



## 4 Output Power

### 4.1 Test Result

| Test Description                  | Test Specification |                  | Test Result |
|-----------------------------------|--------------------|------------------|-------------|
| Fundamental Emission Output Power | 15.247(b)(3)       | RSS-247 S5.4 (d) | Compliant   |

### 4.2 Test Method

Fundamental maximum peak conducted output power measurements were performed using the method described in ANSI C63.10:2013 clause 11.9.1.1. This procedure is referenced in KDB 558074 D01 15.247 Meas Guidance v05r02.

The BLE 1Mbps data mode was used for this test.

#### Limit

For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. For using antennas with greater than 6dBi of gain, the limit is reduced in dB by the amount the gain exceeds 6dBi (e.g. for a 7.4dBi antenna, the limit is reduced from 30dBm to 28.6dBm). Also, the e.i.r.p. shall not exceed 4 Watts (36 dBm) based on RSS-247 S5.4 (d).

### 4.3 Test Site

SGS EMC Laboratory, Suwanee, GA

#### Environmental Conditions

Temperature: 24.42 °C  
Relative Humidity: 48.3 %  
Atmospheric Pressure: 98.1 kPa

### 4.4 Test Equipment

Test End Date: 23-Jun-2023

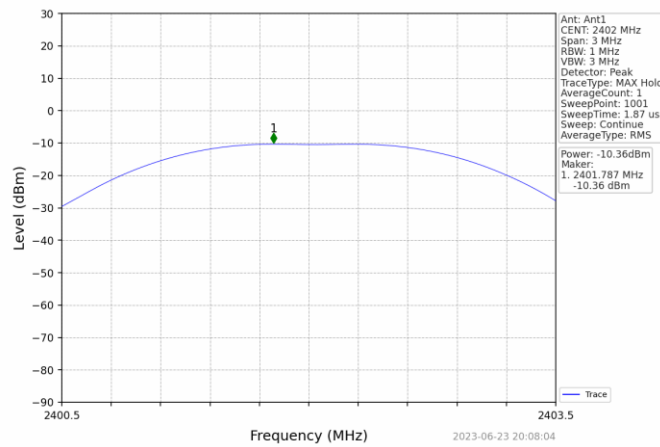
Tester: SGM

| Equipment                       | Model        | Manufacturer             | Asset   | Cal Date    | Cal Due Date |
|---------------------------------|--------------|--------------------------|---------|-------------|--------------|
| SIGNAL ANALYZER (TS8997)        | FSV30        | ROHDE & SCHWARZ          | B085749 | 7-Dec-2022  | 7-Dec-2023   |
| RF CABLE SMA TO SMA, 0.01-40GHZ | 084-0505-059 | TELEDYNE STORM MICROWAVE | 20108   | 13-Mar-2023 | 13-Mar-2024  |
| TSTPASS SWITCHBOX               | SB2          | TSTPASS                  | 23009   | CNR         | CNR          |

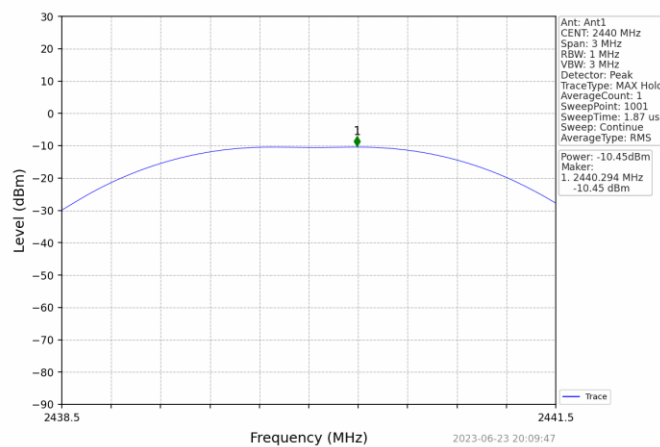
### 4.5 Test Data

| Mode                                | TX Type | Frequency (MHz) | Maximum Peak Conducted Output Power (dBm) |       | Verdict |
|-------------------------------------|---------|-----------------|-------------------------------------------|-------|---------|
|                                     |         |                 | ANT1                                      | Limit |         |
| 1M                                  | SISO    | 2402            | -10.36                                    | <=30  | Pass    |
|                                     |         | 2440            | -10.45                                    | <=30  | Pass    |
|                                     |         | 2480            | -10.54                                    | <=30  | Pass    |
| Note1: Antenna Gain: Ant1: 2.20dBi; |         |                 |                                           |       |         |

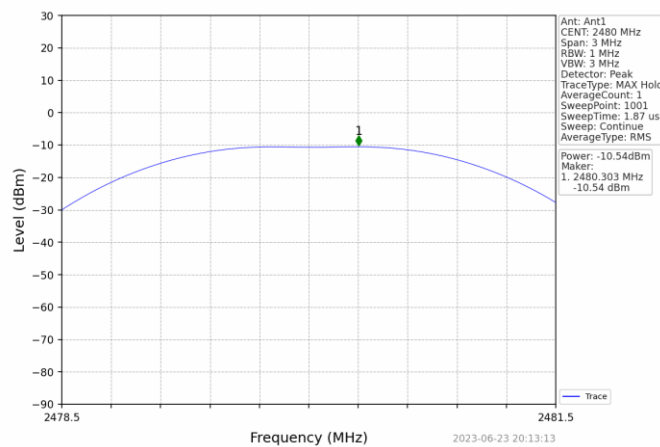
### 1M\_LCH\_2402MHz\_Ant1\_NTNV



### 1M\_MCH\_2440MHz\_Ant1\_NTNV



### 1M\_HCH\_2480MHz\_Ant1\_NTNV



## 5 Power Spectral Density

### 5.1 Test Result

| Test Description       | Test Specification |                  | Test Result |
|------------------------|--------------------|------------------|-------------|
| Power Spectral Density | 15.247(e)          | RSS-247 S5.2 (b) | Compliant   |

### 5.2 Test Method

Peak power spectral density measurements were performed using the procedures from ANSI C63.10: 2013 clause 11.10.2. These procedures are referenced in KDB 558074 D01 15.247 Meas Guidance v05r02.

The BLE 1Mbps data mode was used for this test.

#### Limit

The maximum limit is 8 dBm / 3 kHz.

### 5.3 Test Site

SGS EMC Laboratory, Suwanee, GA

#### Environmental Conditions

Temperature: 24.42 °C

Relative Humidity: 48.3 %

Atmospheric Pressure: 98.1 kPa

### 5.4 Test Equipment

Test End Date: 23-Jun-2023

Tester: SGM

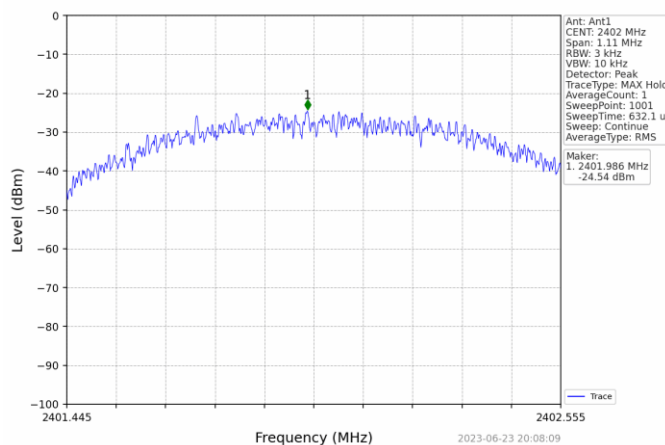
| Equipment                       | Model        | Manufacturer             | Asset   | Cal Date    | Cal Due Date |
|---------------------------------|--------------|--------------------------|---------|-------------|--------------|
| SIGNAL ANALYZER (TS8997)        | FSV30        | ROHDE & SCHWARZ          | B085749 | 7-Dec-2022  | 7-Dec-2023   |
| RF CABLE SMA TO SMA, 0.01-40GHZ | 084-0505-059 | TELEDYNE STORM MICROWAVE | 20108   | 13-Mar-2023 | 13-Mar-2024  |
| TSTPASS SWITCHBOX               | SB2          | TSTPASS                  | 23009   | CNR         | CNR          |

### 5.5 Test Data

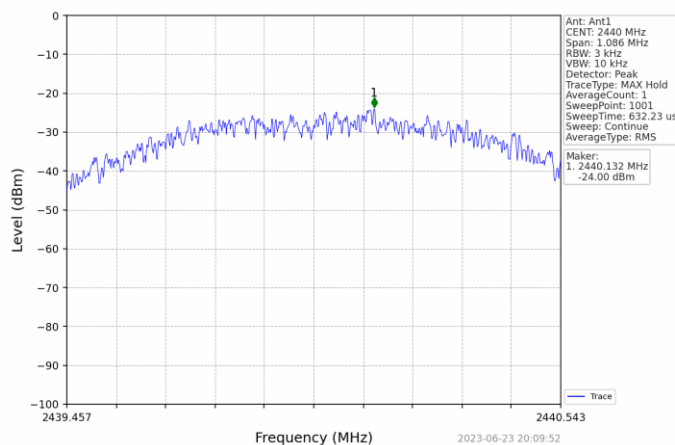
| Mode | TX Type | Frequency (MHz) | Maximum PSD (dBm/3kHz) |       | Verdict |
|------|---------|-----------------|------------------------|-------|---------|
|      |         |                 | ANT1                   | Limit |         |
| 1M   | SISO    | 2402            | -24.54                 | <=8   | Pass    |
|      |         | 2440            | -24.00                 | <=8   | Pass    |
|      |         | 2480            | -24.38                 | <=8   | Pass    |

Note1: Antenna Gain: Ant1: 2.20dBi;

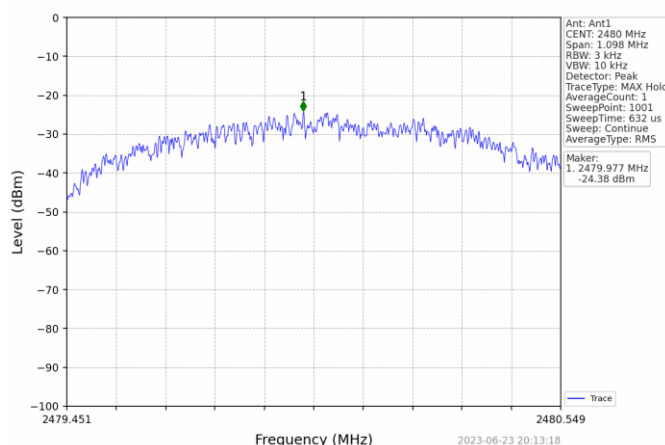
### 1M\_LCH\_2402MHz\_Ant1\_NTNV



### 1M\_MCH\_2440MHz\_Ant1\_NTNV



### 1M\_HCH\_2480MHz\_Ant1\_NTNV



## 6 Conducted Spurious Emissions / Band Edge

### 6.1 Test Result

| Test Description                           | Test Specification |              | Test Result |
|--------------------------------------------|--------------------|--------------|-------------|
| Conducted Spurious and Band Edge Emissions | 15.247(d)          | RSS-247 S5.5 | Compliant   |

### 6.2 Test Method

Conducted band edge and spurious band emissions in non-restricted frequency bands were measured using the method defined in ANSI C63.10 clause 11.11. This procedure is referenced in KDB 558074 D01 15.247 Meas Guidance v05r02.

The device does not utilize BLE 2Mbps data mode, so only BLE 1Mbps mode was tested.

#### Limit

Because the maximum peak conducted output power was used to determine compliance with the output power limits, the limit in any 100 kHz band outside of the authorized band is 20 dB below the maximum in-band peak level.

### 6.3 Test Site

SGS EMC Laboratory, Suwanee, GA

#### Environmental Conditions

Temperature: 24.42 °C  
Relative Humidity: 48.3 %  
Atmospheric Pressure: 98.1 kPa

### 6.4 Test Equipment

Test End Date: 23-Jun-2023

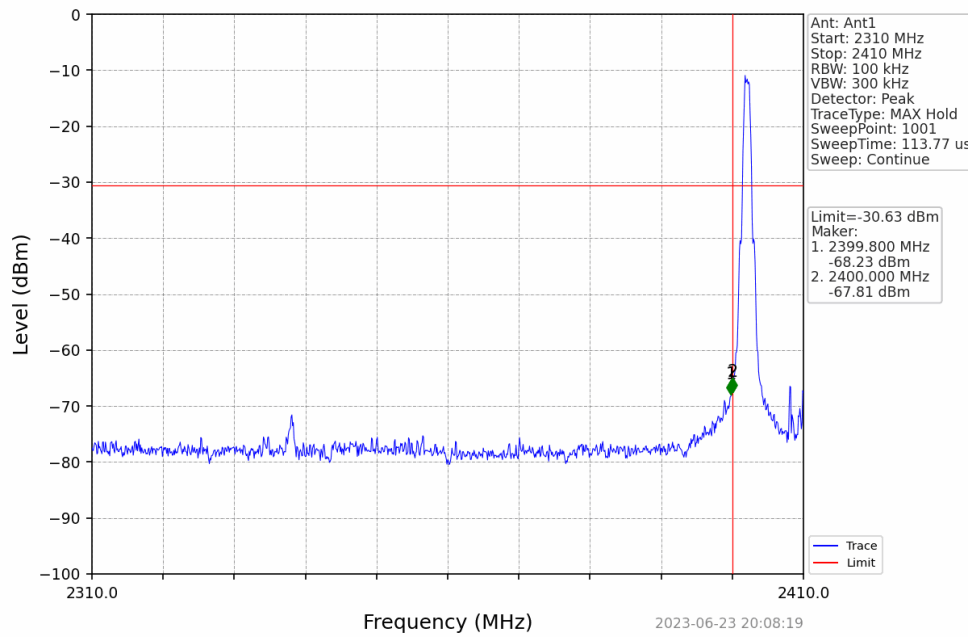
Tester: SGM

| Equipment                       | Model        | Manufacturer             | Asset   | Cal Date    | Cal Due Date |
|---------------------------------|--------------|--------------------------|---------|-------------|--------------|
| SIGNAL ANALYZER (TS8997)        | FSV30        | ROHDE & SCHWARZ          | B085749 | 7-Dec-2022  | 7-Dec-2023   |
| RF CABLE SMA TO SMA, 0.01-40GHZ | 084-0505-059 | TELEDYNE STORM MICROWAVE | 20108   | 13-Mar-2023 | 13-Mar-2024  |
| TSTPASS SWITCHBOX               | SB2          | TSTPASS                  | 23009   | CNR         | CNR          |

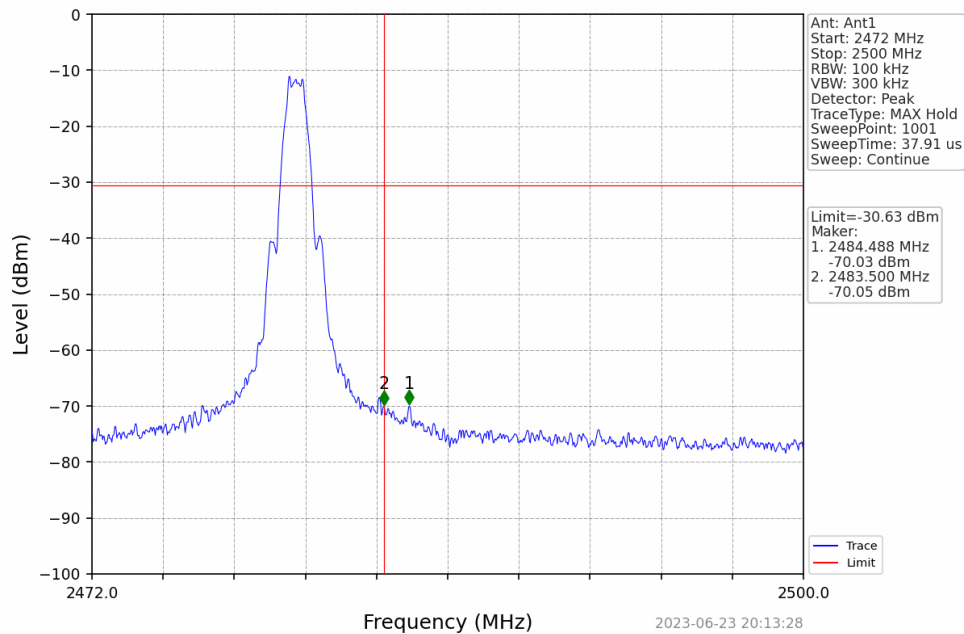
### 6.5 Test Data – DTS Band Edge

| Mode                                                                                                                                                    | TX Type | Frequency (MHz) | ANT | Level of Reference (dBm) | Limit (dBm) | Verdict |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-----------------|-----|--------------------------|-------------|---------|
| 1M                                                                                                                                                      | SISO    | 2402            | 1   | -10.63                   | -30.63      | Pass    |
|                                                                                                                                                         |         | 2440            | 1   | -10.63                   | -30.63      | Pass    |
|                                                                                                                                                         |         | 2480            | 1   | -10.63                   | -30.63      | Pass    |
| Note1: Refer to RSS-247 Issue 2 section 5.5 and ANSI C63.10-2013, the channel contains the maximum PSD level was used to establish the reference level. |         |                 |     |                          |             |         |

## 1M\_LCH\_2402MHz\_Ant1\_NTNV

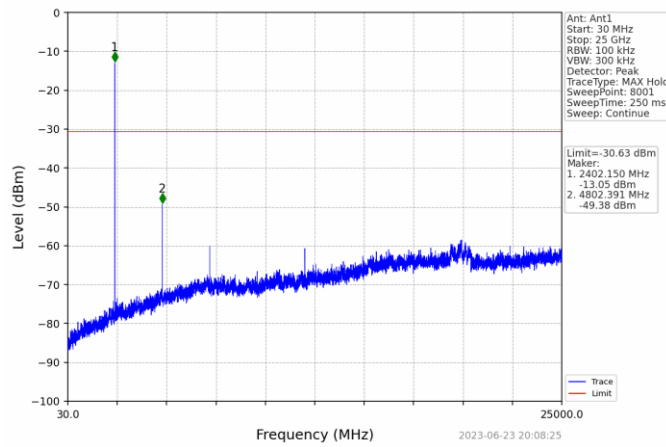


## 1M\_HCH\_2480MHz\_Ant1\_NTNV

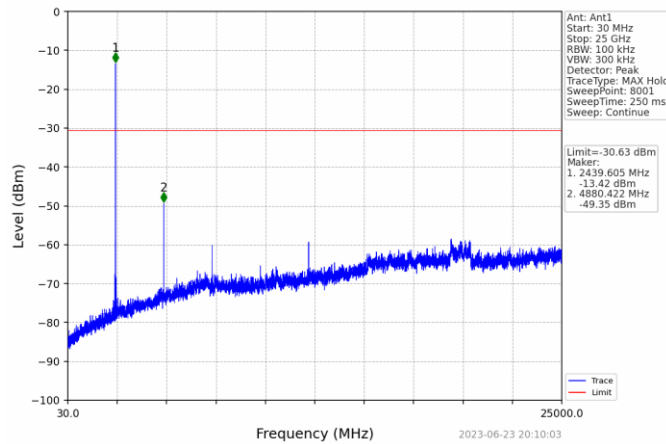


## 6.6 Test Data – DTS Conducted Spurious Emissions

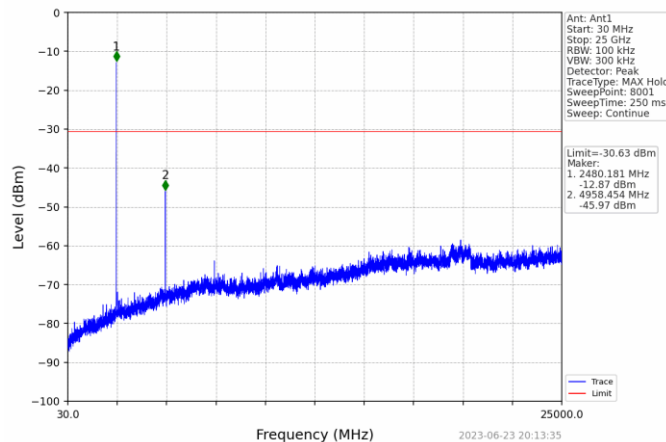
1M\_LCH\_2402MHz\_Ant1\_NTNV



1M\_MCH\_2440MHz\_Ant1\_NTNV



1M\_HCH\_2480MHz\_Ant1\_NTNV



## 7 Emissions in Restricted Frequency Bands

### 7.1 Test Result

| Test Description                        | Test Specification          |                                     | Test Result |
|-----------------------------------------|-----------------------------|-------------------------------------|-------------|
| Emissions in Restricted Frequency Bands | 15.247(d)<br>15.205, 15.209 | RSS-247 S5.5<br>RSS-GEN S8.9, S8.10 | Compliant   |

### 7.2 Test Method

Radiated emissions in restricted frequency bands were measured using methods defined in ANSI C63.10 clause 11.12. These procedures are referenced in KDB 558074 D01 15.247 Meas Guidance v05r02.

Low, middle, and high channels were investigated – the device was commanded to continuously transmit on channels 0, 19 and 39.

Test distances for radiated tests:

- 9k to 30 MHz – Near field prescan to determine if there were any emissions
- 30 to 1000 MHz - The EUT to measurement antenna distance was 3 meters
- 1 to 18 GHz - The EUT to measurement antenna distance was 3 meters
- 18 to 26 GHz - The EUT to measurement antenna distance was 3 meters

Limits within restricted bands of operation:

| Frequency      | Limits <sup>(1)</sup> |                     | Peak Limits<br>dBuV/m |
|----------------|-----------------------|---------------------|-----------------------|
|                | Microvolts/m          | dBuV/m              |                       |
| 30 - 88 MHz    | 100                   | 40 <sup>(2)</sup>   | --                    |
| 88 - 216 MHz   | 150                   | 43.5 <sup>(2)</sup> | --                    |
| 216 - 960 MHz  | 200                   | 46 <sup>(2)</sup>   | --                    |
| 960 - 1000 MHz | 500                   | 54 <sup>(2)</sup>   | --                    |
| 1 - 40 GHz     | 500                   | 54 <sup>(3)</sup>   | 74                    |

(1) These limits are applicable to emissions outside of the intentional transmit frequency band.

(2) Quasi-peak limit

(3) Average limit

### 7.3 Test Site

3m Absorber Lined Shielded Enclosure (ALSE), Suwanee, GA

|                          |            |          |
|--------------------------|------------|----------|
| Environmental Conditions | 30-1000MHz | 1-26GHz  |
| Temperature:             | 23.7 °C    | 23.3 °C  |
| Relative Humidity:       | 41.4 %     | 42.9 %   |
| Atmospheric Pressure:    | 97.6 kPa   | 98.0 kPa |

### 7.4 Test Equipment

30-1000MHz

Test End Date: 30-May-2023

Tester: ZH

| Equipment                                 | Model           | Manufacturer             | Asset   | Cal Date    | Cal Due Date |
|-------------------------------------------|-----------------|--------------------------|---------|-------------|--------------|
| ANTENNA, BILOG                            | JB6             | SUNOL                    | B079689 | 26-May-2022 | 26-May-2024  |
| N to N RF Cable                           | EM-B810NM-276   | ECHELON                  | 23007   | 31-Mar-2023 | 31-Mar-2024  |
| N-FEMALE TO N-MALE RF CABLE               | EM-B810NMNF-118 | ECHELON                  | 23010   | 1-May-2023  | 1-May-2024   |
| RF CABLE NM TO NM, 0.01-18GHZ             | 90-088-079      | TELEDYNE STORM MICROWAVE | 20134   | 14-Mar-2023 | 14-Mar-2024  |
| RF CABLE RIGHT ANGLE NM TO NM, 0.01-18GHZ | 90-076-020      | TELEDYNE STORM MICROWAVE | 20132   | 13-Mar-2023 | 13-Mar-2024  |
| LOW NOISE AMPLIFIER                       | ZKL-2+          | MINI-CIRCUITS            | B079800 | 14-Sep-2022 | 14-Sep-2023  |
| EMI TEST RECEIVER                         | ESW44           | ROHDE & SCHWARZ          | 22032   | 24-Nov-2022 | 24-Nov-2023  |

Software: TILE 7 software profile "RE 30-1000MHz 3m Tile7 221014" dated 14 Oct 2022

## 1-18GHz

Test End Date: 31-May-2023

Tester: LM

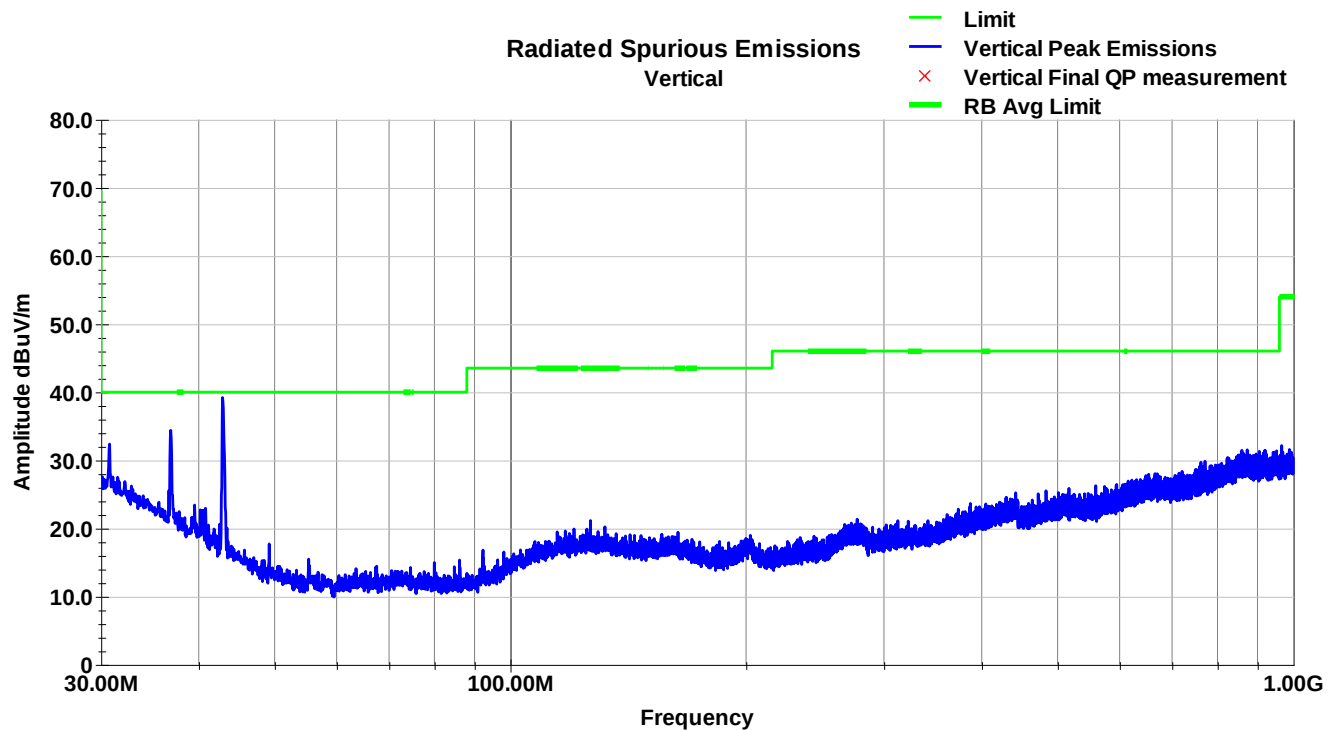
| Equipment                                 | Model         | Manufacturer             | Asset   | Cal Date    | Cal Due Date |
|-------------------------------------------|---------------|--------------------------|---------|-------------|--------------|
| ANTENNA, DRG HORN (MEDIUM)                | 3117          | ETS LINDGREN             | B079691 | 15-Aug-2022 | 15-Aug-2024  |
| N to N RF Cable                           | EM-B810NM-276 | ECHELON                  | 23007   | 31-Mar-2023 | 31-Mar-2024  |
| RF CABLE RIGHT ANGLE NM TO NM, 0.01-18GHZ | 90-076-020    | TELEDYNE STORM MICROWAVE | 20132   | 13-Mar-2023 | 13-Mar-2024  |
| LOW NOISE AMPLIFIER                       | TS-PR18       | ROHDE & SCHWARZ          | 15003   | 3-Oct-2022  | 3-Oct-2023   |
| EMI TEST RECEIVER                         | ESW44         | ROHDE & SCHWARZ          | 22032   | 24-Nov-2022 | 24-Nov-2023  |

Software: TILE 7 software profile "RE 1-18GHz 3m Tile7 220307" dated 07 March 2022

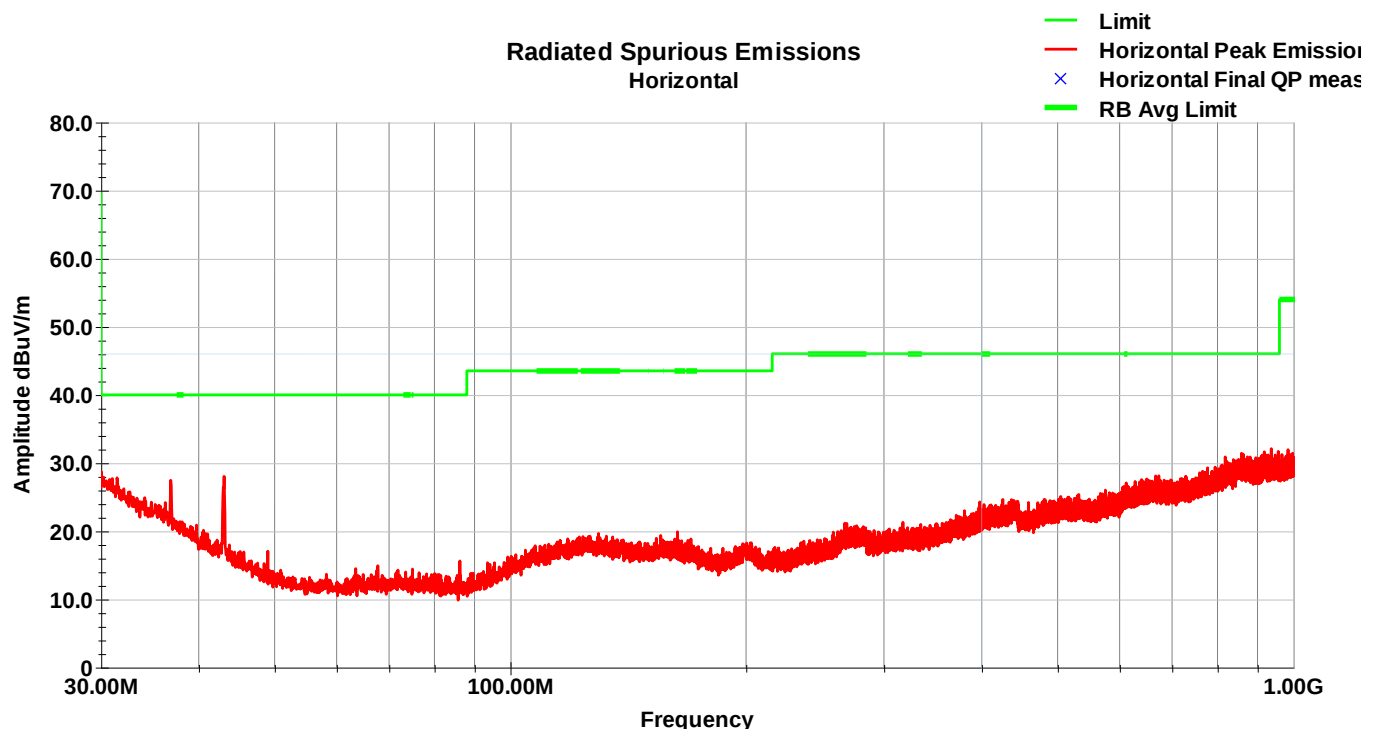
## 7.5 Test Data

Between 30-1000MHz, there was no significant deviation with respect to axis or channel.

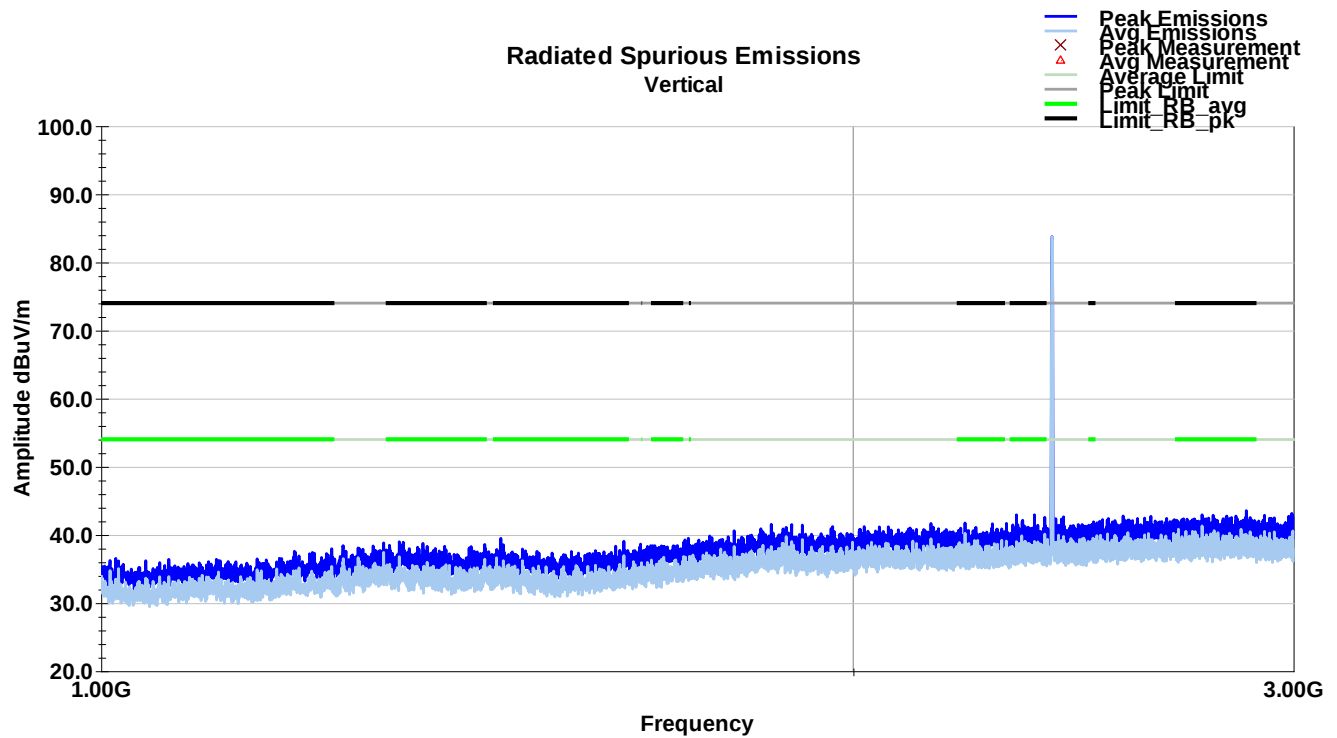
Vertical Radiated Spurious Emissions – 30-1000MHz (Mid Channel)



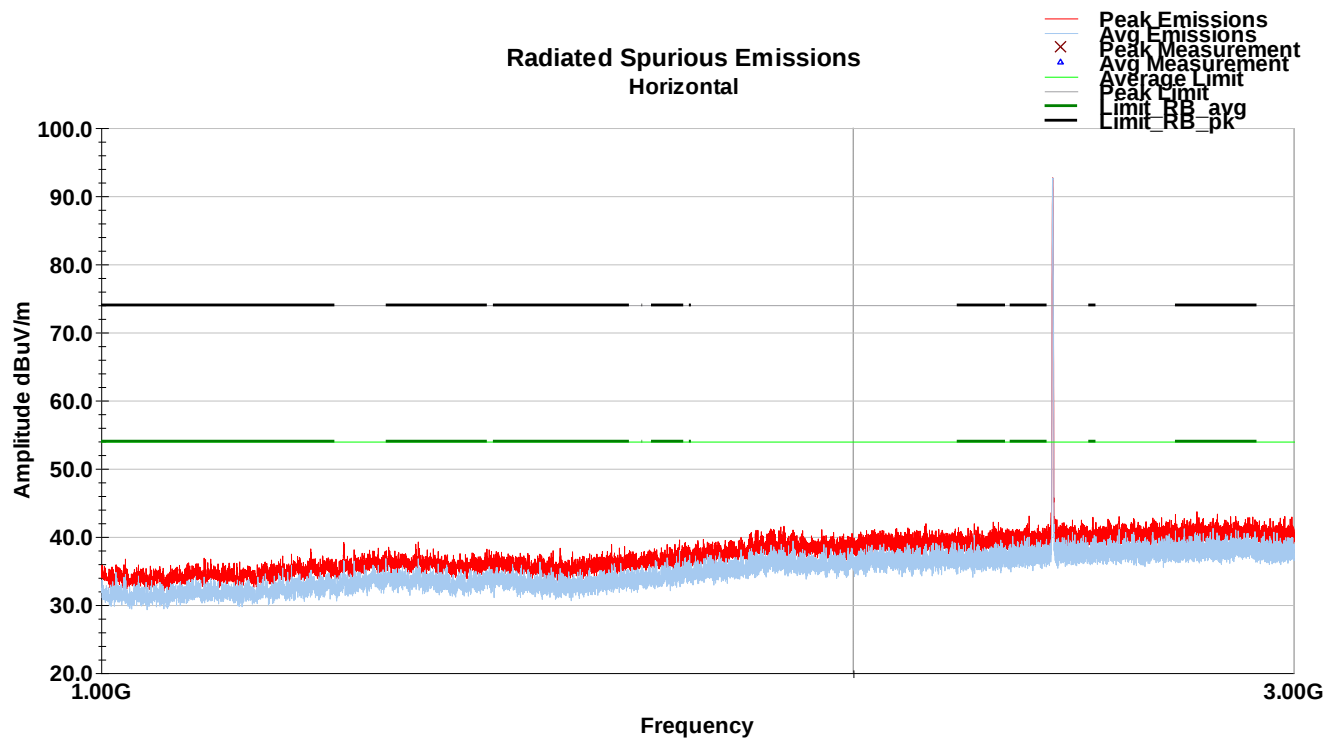
Horizontal Radiated Spurious Emissions – 30-1000MHz (Mid Channel)



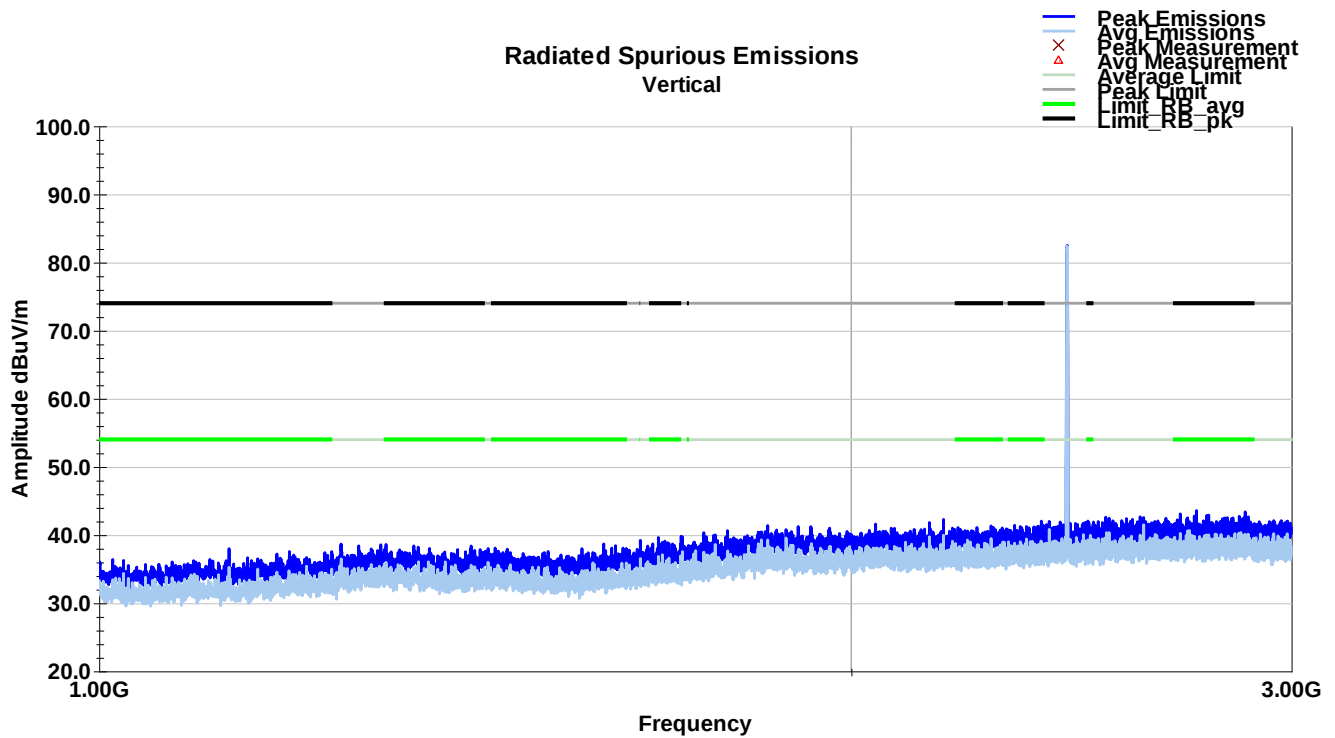
### Vertical Radiated Spurious Emissions – 1-3GHz (Low Channel) – X-Axis



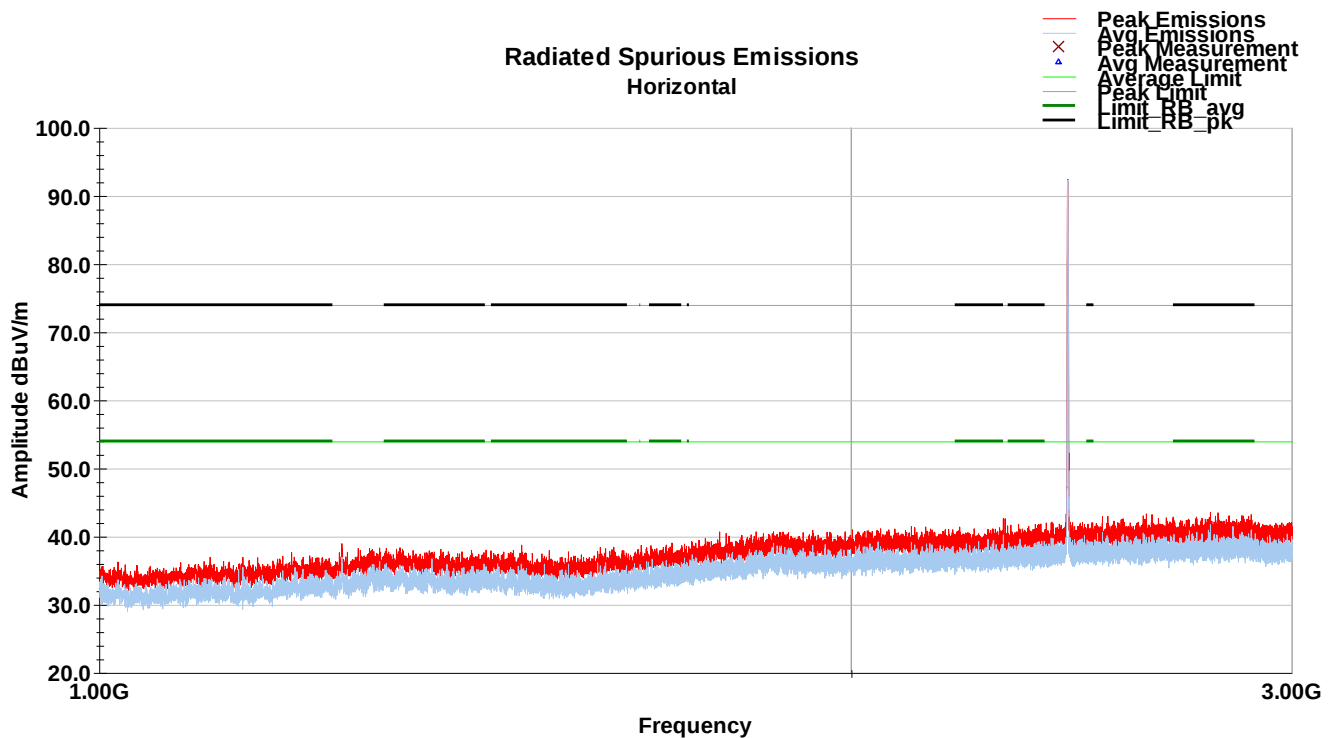
### Horizontal Radiated Spurious Emissions – 1-3GHz (Low Channel) – X-Axis



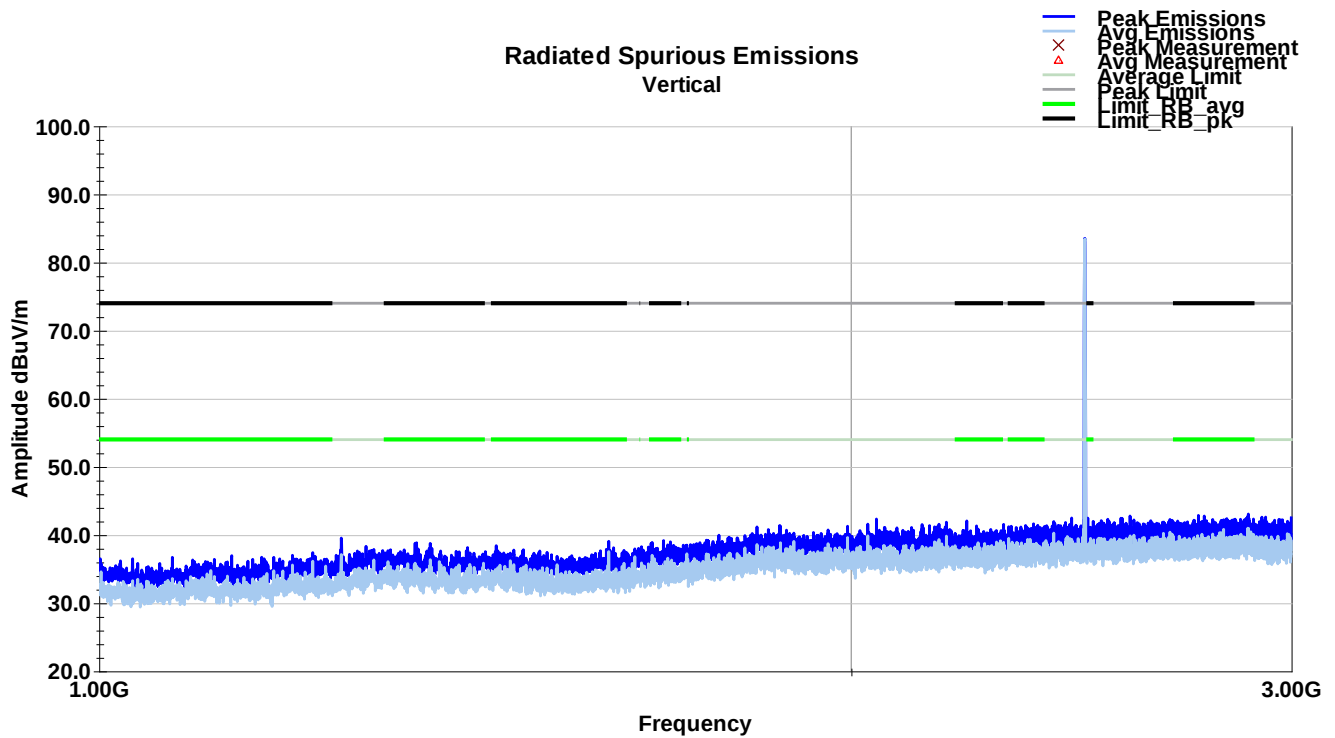
### Vertical Radiated Spurious Emissions – 1-3GHz (Mid Channel) – X-Axis



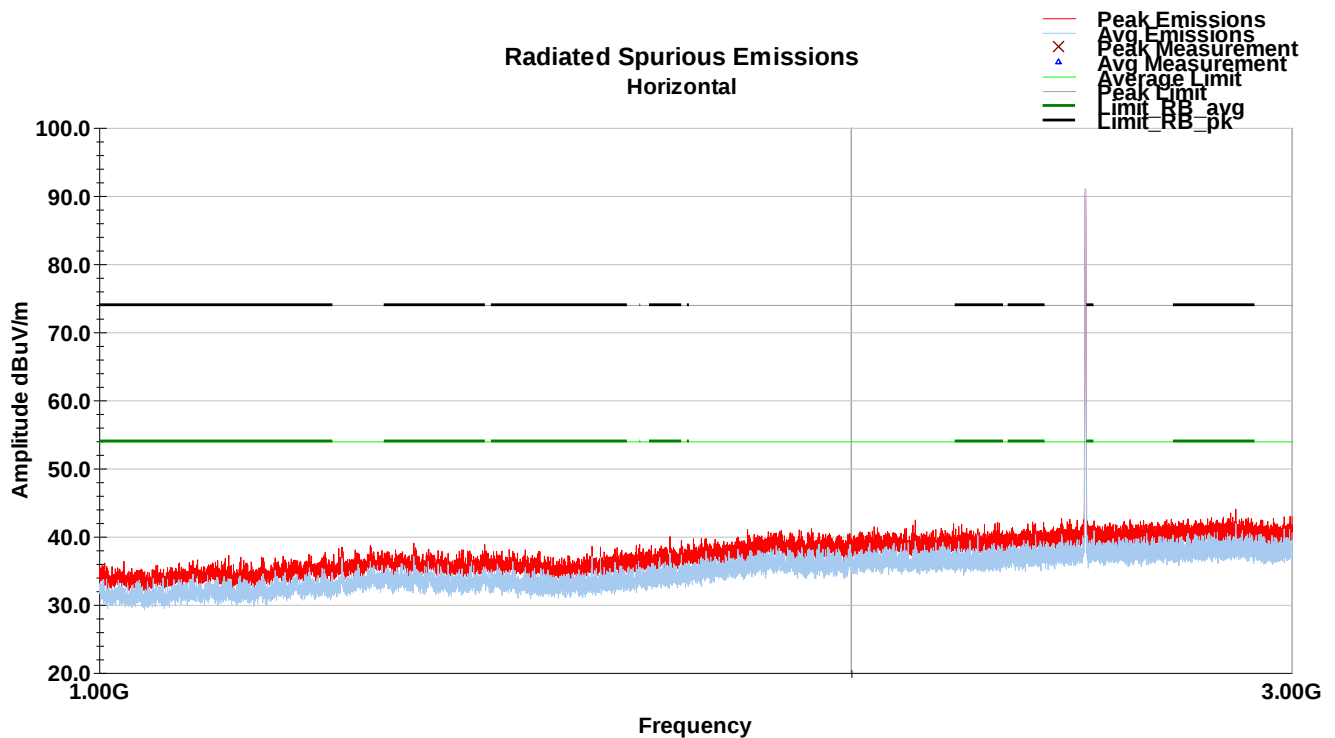
### Horizontal Radiated Spurious Emissions – 1-3GHz (Mid Channel) – X-Axis



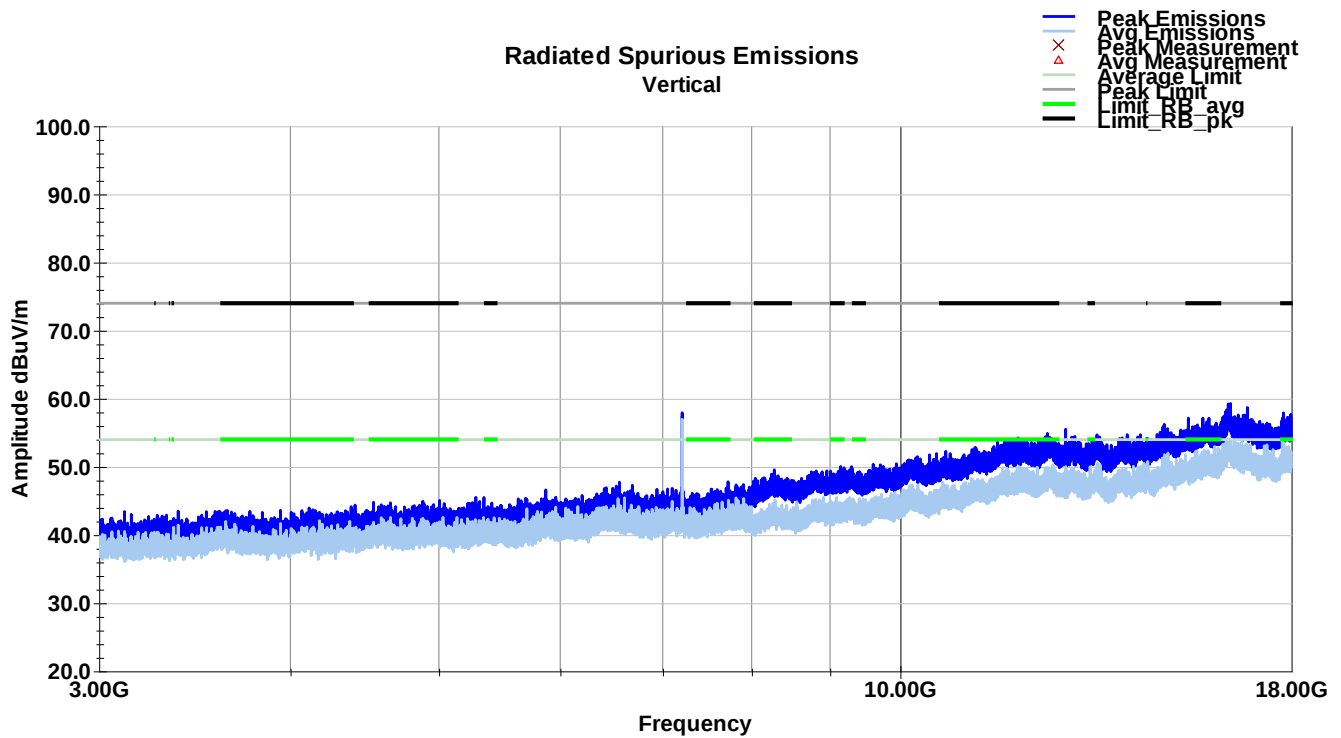
### Vertical Radiated Spurious Emissions – 1-3GHz (High Channel) – X-Axis



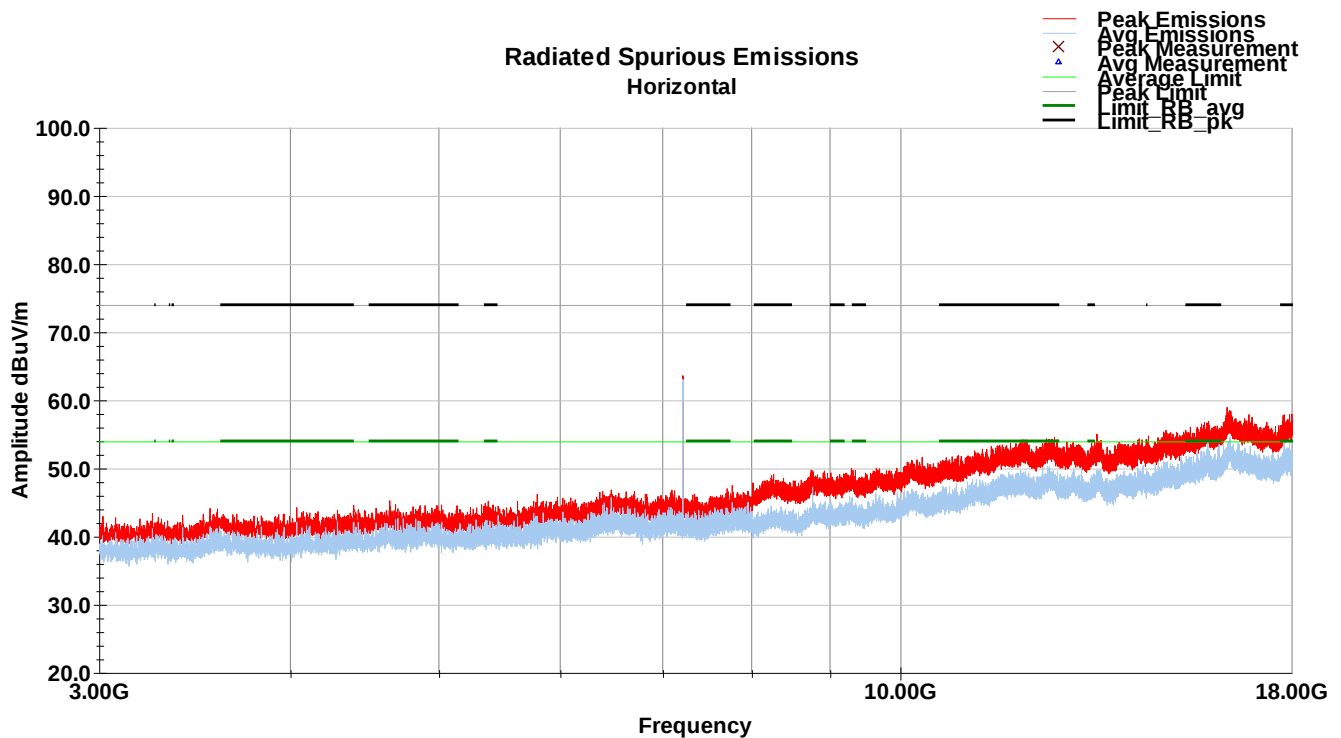
### Horizontal Radiated Spurious Emissions – 1-3GHz (High Channel) – X-Axis



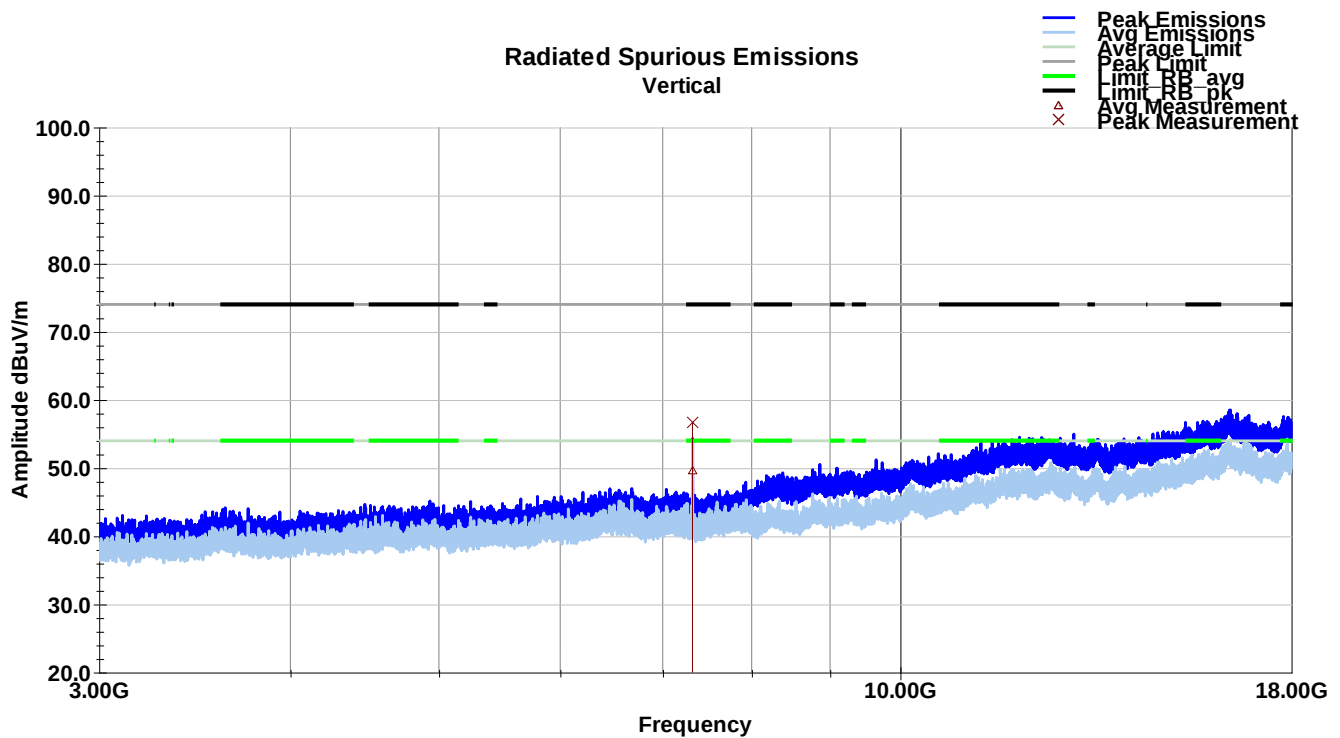
### Vertical Radiated Spurious Emissions – 3-18GHz (Low Channel) – X-Axis



### Horizontal Radiated Spurious Emissions – 3-18GHz (Low Channel) – X-Axis



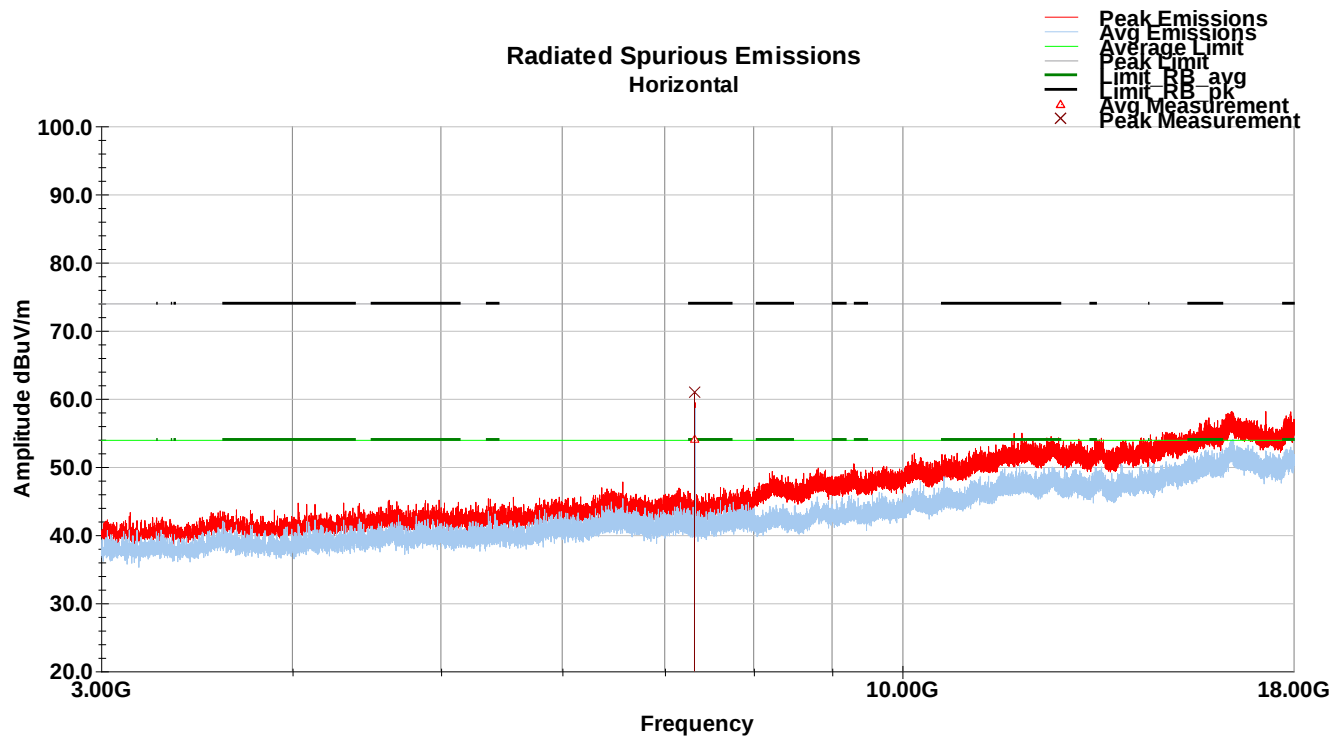
# Vertical Radiated Spurious Emissions – 3-18GHz (Mid Channel) – X-Axis



| Frequency<br>MHz                    | Raw Pk<br>dBuV | Polarity<br>(V/H) | Azimuth<br>(degrees) | Height<br>(cm) | AF<br>(dB/m) | Loss<br>(dB) | Amp<br>(dB) | Final Pk<br>dBuV/m | Limit<br>dBuV/m | Margin<br>dB |
|-------------------------------------|----------------|-------------------|----------------------|----------------|--------------|--------------|-------------|--------------------|-----------------|--------------|
| 7319.44                             | 59.8           | V                 | 353.0                | 218.0          | 35.5         | 3.4          | 42.0        | 56.7               | 74.0            | -17.3        |
| Final Pk = Raw Pk + AF + Loss - Amp |                |                   |                      |                |              |              |             |                    |                 |              |
| Margin = Final Pk - Limit           |                |                   |                      |                |              |              |             |                    |                 |              |

| Frequency<br>MHz                      | Raw Avg<br>dBuV | Polarity<br>(V/H) | Azimuth<br>(degrees) | Height<br>(cm) | AF<br>(dB/m) | Loss<br>(dB) | Amp<br>(dB) | Final Avg<br>dBuV/m | Limit<br>(dBuV/m) | Margin<br>(dB) |
|---------------------------------------|-----------------|-------------------|----------------------|----------------|--------------|--------------|-------------|---------------------|-------------------|----------------|
| 7319.44                               | 52.8            | V                 | 353.0                | 218.0          | 35.5         | 3.4          | 42.0        | 49.7                | 54.0              | -4.3           |
| Final Avg = Raw Avg + AF + Loss - Amp |                 |                   |                      |                |              |              |             |                     |                   |                |
| Margin = Final Avg - Limit            |                 |                   |                      |                |              |              |             |                     |                   |                |

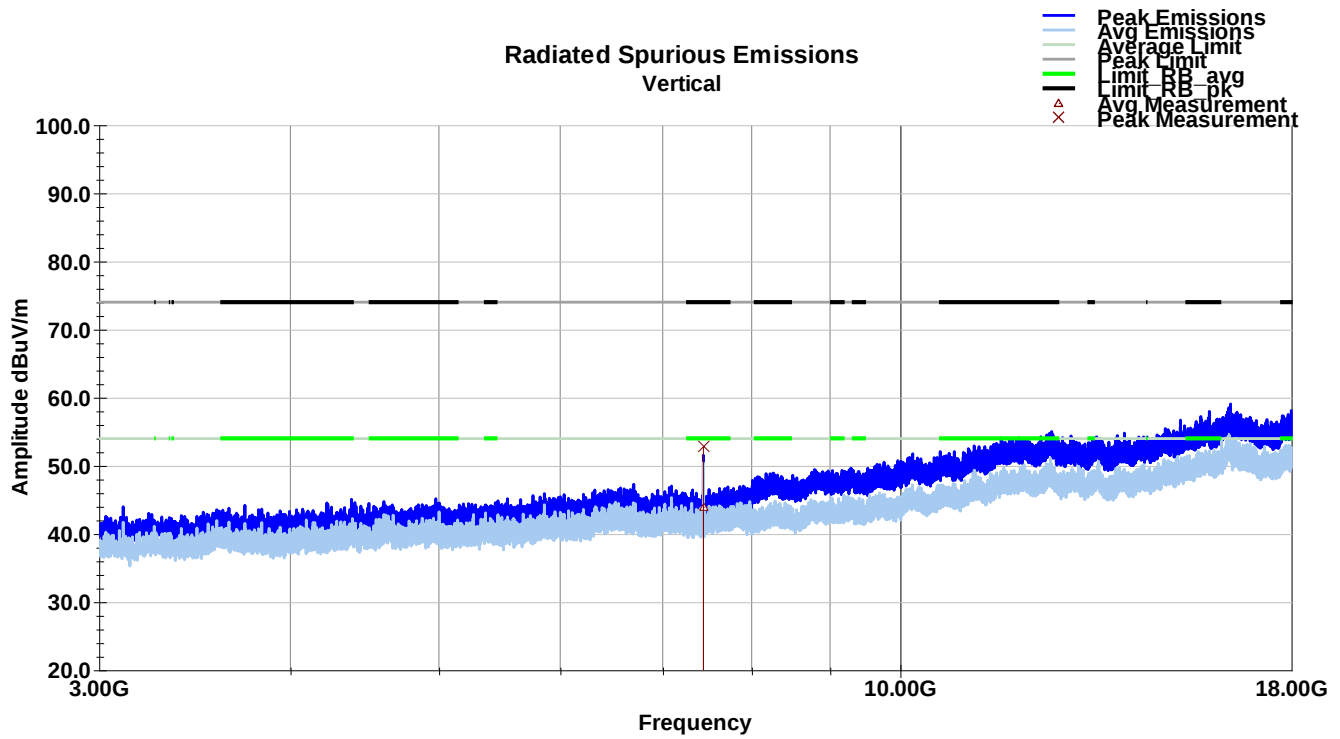
## Horizontal Radiated Spurious Emissions – 3-18GHz (Mid Channel) – X-Axis



| Frequency<br>MHz                    | Raw Pk<br>dBuV | Polarity<br>(V/H) | Azimuth<br>(degrees) | Height<br>(cm) | AF<br>(dB/m) | Loss<br>(dB) | Amp<br>(dB) | Final Pk<br>dBuV/m | Limit<br>dBuV/m | Margin<br>dB |
|-------------------------------------|----------------|-------------------|----------------------|----------------|--------------|--------------|-------------|--------------------|-----------------|--------------|
| 7319.32                             | 63.9           | H                 | 329.0                | 100.0          | 35.5         | 3.4          | 42.0        | 60.9               | 74.0            | -13.1        |
| Final Pk = Raw Pk + AF + Loss - Amp |                |                   |                      |                |              |              |             |                    |                 |              |
| Margin = Final Pk - Limit           |                |                   |                      |                |              |              |             |                    |                 |              |

| Frequency<br>MHz                      | Raw Avg<br>dBuV | Polarity<br>(V/H) | Azimuth<br>(degrees) | Height<br>(cm) | AF<br>(dB/m) | Loss<br>(dB) | Amp<br>(dB) | Avg Value<br>dBuV/m | Limit<br>(dBuV/m) | Margin<br>(dB) |
|---------------------------------------|-----------------|-------------------|----------------------|----------------|--------------|--------------|-------------|---------------------|-------------------|----------------|
| 7319.32                               | 57.0            | H                 | 329.0                | 100.0          | 35.5         | 3.4          | 42.0        | 53.9                | 54.0              | -0.1           |
| Final Avg = Raw Avg + AF + Loss - Amp |                 |                   |                      |                |              |              |             |                     |                   |                |
| Margin = Final Avg - Limit            |                 |                   |                      |                |              |              |             |                     |                   |                |

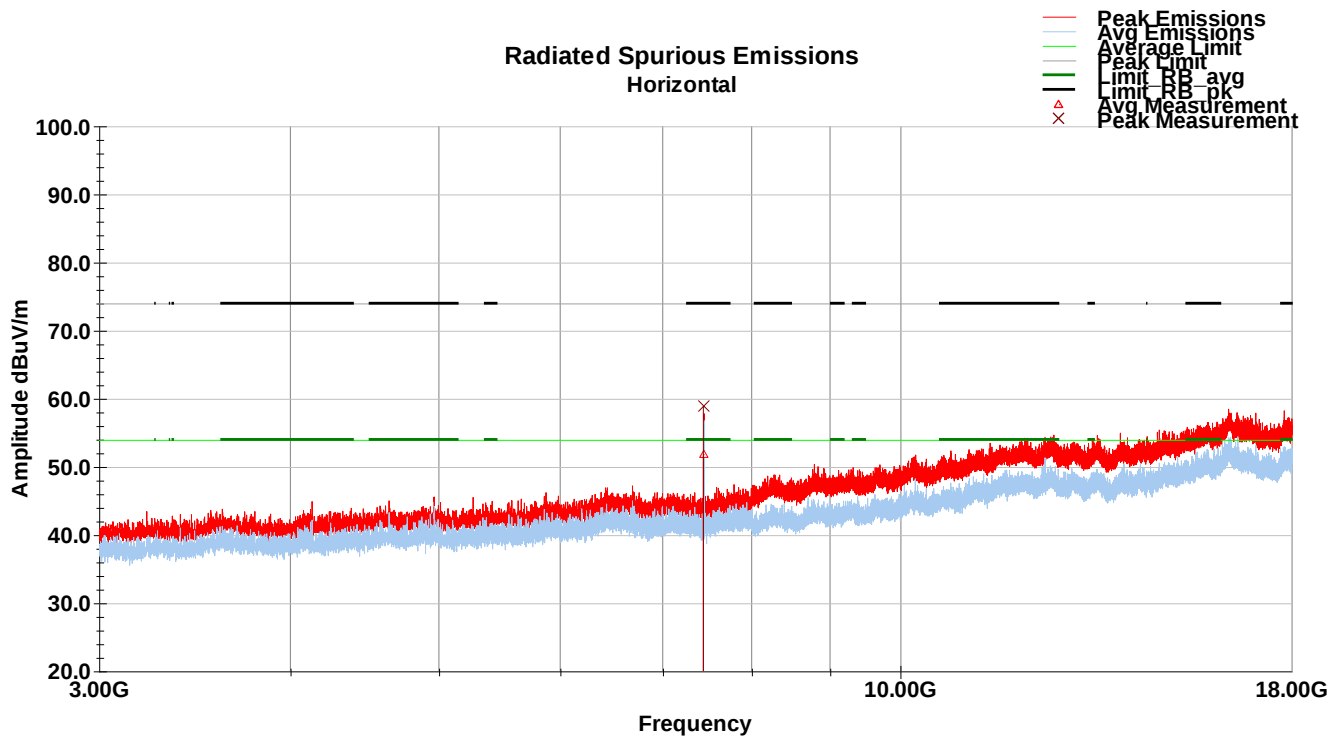
### Vertical Radiated Spurious Emissions – 3-18GHz (High Channel) – X-Axis



| Frequency<br>MHz                    | Raw Pk<br>dBuV | Polarity<br>(V/H) | Azimuth<br>(degrees) | Height<br>(cm) | AF<br>(dB/m) | Loss<br>(dB) | Amp<br>(dB) | Final Pk<br>dBuV/m | Limit<br>dBuV/m | Margin<br>dB |
|-------------------------------------|----------------|-------------------|----------------------|----------------|--------------|--------------|-------------|--------------------|-----------------|--------------|
| 7441.00                             | 56.1           | V                 | 267.0                | 137.0          | 35.5         | 3.3          | 42.1        | 52.8               | 74.0            | -21.2        |
| Final Pk = Raw Pk + AF + Loss - Amp |                |                   |                      |                |              |              |             |                    |                 |              |
| Margin = Final Pk - Limit           |                |                   |                      |                |              |              |             |                    |                 |              |

| Frequency<br>MHz                      | Raw Avg<br>dBuV | Polarity<br>(V/H) | Azimuth<br>(degrees) | Height<br>(cm) | AF<br>(dB/m) | Loss<br>(dB) | Amp<br>(dB) | Final Avg<br>dBuV/m | Limit<br>(dBuV/m) | Margin<br>(dB) |
|---------------------------------------|-----------------|-------------------|----------------------|----------------|--------------|--------------|-------------|---------------------|-------------------|----------------|
| 7441.00                               | 47.3            | V                 | 267.0                | 137.0          | 35.5         | 3.3          | 42.1        | 44.0                | 54.0              | -10.0          |
| Final Avg = Raw Avg + AF + Loss - Amp |                 |                   |                      |                |              |              |             |                     |                   |                |
| Margin = Final Avg - Limit            |                 |                   |                      |                |              |              |             |                     |                   |                |

## Horizontal Radiated Spurious Emissions (High Channel) – X-Axis



| Frequency<br>MHz                    | Raw Pk<br>dBuV | Polarity<br>(V/H) | Azimuth<br>(degrees) | Height<br>(cm) | AF<br>(dB/m) | Loss<br>(dB) | Amp<br>(dB) | Final Pk<br>dBuV/m | Limit<br>dBuV/m | Margin<br>dB |
|-------------------------------------|----------------|-------------------|----------------------|----------------|--------------|--------------|-------------|--------------------|-----------------|--------------|
| 7439.32                             | 62.2           | H                 | 331.0                | 100.0          | 35.5         | 3.3          | 42.1        | 58.9               | 74.0            | -15.1        |
| Final Pk = Raw Pk + AF + Loss - Amp |                |                   |                      |                |              |              |             |                    |                 |              |
| Margin = Final Pk - Limit           |                |                   |                      |                |              |              |             |                    |                 |              |

| Frequency<br>MHz                      | Raw Avg<br>dBuV | Polarity<br>(V/H) | Azimuth<br>(degrees) | Height<br>(cm) | AF<br>(dB/m) | Loss<br>(dB) | Amp<br>(dB) | Avg Value<br>dBuV/m | Limit<br>(dBuV/m) | Margin<br>(dB) |
|---------------------------------------|-----------------|-------------------|----------------------|----------------|--------------|--------------|-------------|---------------------|-------------------|----------------|
| 7439.32                               | 55.1            | H                 | 331.0                | 100.0          | 35.5         | 3.3          | 42.1        | 51.9                | 54.0              | -2.1           |
| Final Avg = Raw Avg + AF + Loss - Amp |                 |                   |                      |                |              |              |             |                     |                   |                |
| Margin = Final Avg - Limit            |                 |                   |                      |                |              |              |             |                     |                   |                |

Note: No discernable emissions detected to 26 GHz

## 8 Band Edge Emissions in Restricted Frequency Bands

### 8.1 Test Result

| Test Description                                  | Test Specification |                    | Test Result |
|---------------------------------------------------|--------------------|--------------------|-------------|
| Band Edge Emissions in Restricted Frequency Bands | 15.205, 15.209     | RSS-GEN S8.9, 8.10 | Compliant   |

### 8.2 Test Method

Field strength measurements were performed at the restricted band edges of 2390MHz and 2483.5MHz. Measurements were made using the conducted methods defined in ANSI C63.10: 2013 clause 11.12.2. The measurements were converted to a radiated field strength equivalent using the equations defined in that section. Both peak and average measurements were performed at the antenna port. These procedures are referenced in KDB 558074 D01 15.247 Meas Guidance v05r02.

The device does not utilize BLE 2Mbps data mode, so only BLE 1Mbps mode was tested.

### 8.3 Test Site

SGS EMC Laboratory, Suwanee, GA

#### Environmental Conditions

Temperature: 24.42 °C  
Relative Humidity: 48.3 %  
Atmospheric Pressure: 98.1 kPa

### 8.4 Test Equipment

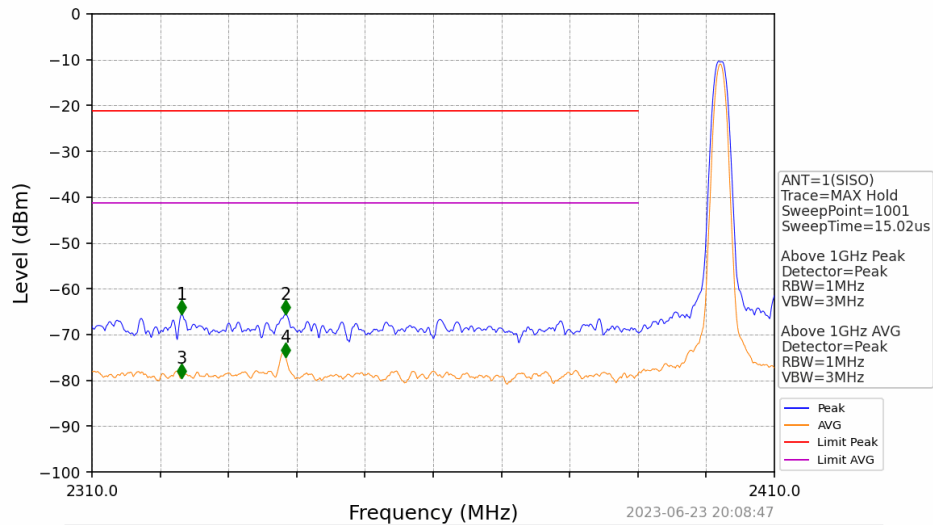
Test End Date: 23-Jun-2023

Tester: SGM

| Equipment                       | Model        | Manufacturer             | Asset   | Cal Date    | Cal Due Date |
|---------------------------------|--------------|--------------------------|---------|-------------|--------------|
| SIGNAL ANALYZER (TS8997)        | FSV30        | ROHDE & SCHWARZ          | B085749 | 7-Dec-2022  | 7-Dec-2023   |
| RF CABLE SMA TO SMA, 0.01-40GHZ | 084-0505-059 | TELEDYNE STORM MICROWAVE | 20108   | 13-Mar-2023 | 13-Mar-2024  |
| TSTPASS SWITCHBOX               | SB2          | TSTPASS                  | 23009   | CNR         | CNR          |

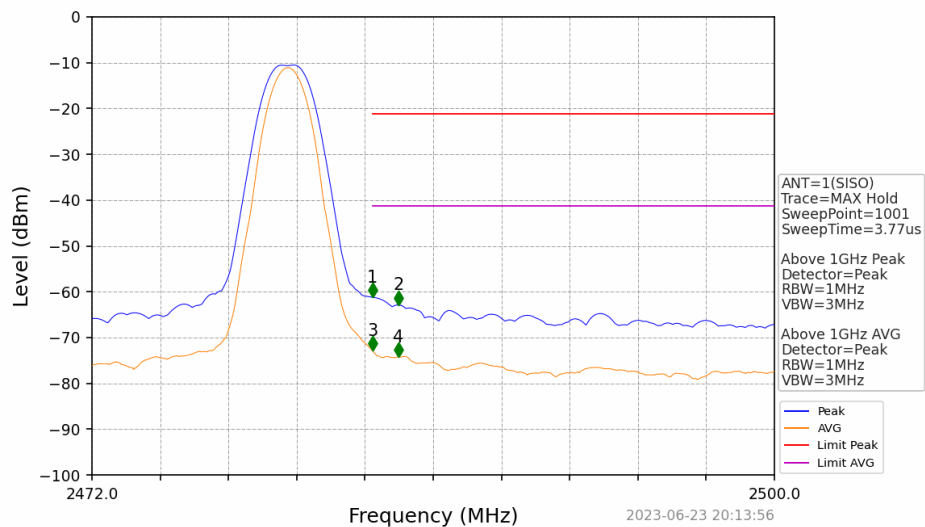
## 8.5 Test Data

### 1M\_LCH\_2402MHz\_Ant1\_NTNV



| No | Frequency (MHz) | Level (dBm) | Limit (dBm) | Margin (dB) | Status | Remark | No | Frequency (MHz) | Level (dBm) | Limit (dBm) | Margin (dB) | Status | Remark |
|----|-----------------|-------------|-------------|-------------|--------|--------|----|-----------------|-------------|-------------|-------------|--------|--------|
| 1  | 2323.100        | -65.58      | -21.20      | 42.18       | Pass   | Peak   | 3  | 2323.100        | /           | -21.20      | /           | /      | AVG    |
| 2  | 2338.400        | -65.60      | -21.20      | 42.20       | Pass   | Peak   | 4  | 2338.400        | /           | -21.20      | /           | /      | AVG    |

### 1M\_HCH\_2480MHz\_Ant1\_NTNV



| No | Frequency (MHz) | Level (dBm) | Limit (dBm) | Margin (dB) | Status | Remark | No | Frequency (MHz) | Level (dBm) | Limit (dBm) | Margin (dB) | Status | Remark |
|----|-----------------|-------------|-------------|-------------|--------|--------|----|-----------------|-------------|-------------|-------------|--------|--------|
| 1  | 2483.508        | -61.18      | -21.20      | 37.78       | Pass   | Peak   | 3  | 2483.508        | /           | -21.20      | /           | /      | AVG    |
| 2  | 2484.572        | -62.89      | -21.20      | 39.49       | Pass   | Peak   | 4  | 2484.572        | /           | -21.20      | /           | /      | AVG    |

## 9 Measurement Uncertainty

The measurement uncertainty figures are calculated in accordance with TR 100 028-1 [2] and correspond to an expansion factor (coverage factor)  $k = 2$  (which provides confidence levels of 95.45 % in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian)).

| Parameter                                     | Expanded Uncertainty for Normal k factor equal to 2 |                           |
|-----------------------------------------------|-----------------------------------------------------|---------------------------|
|                                               | Required                                            | Laboratory Actual         |
| Radio Frequency                               | $\pm 1 \times 10^{-5}$                              | $\pm 9.8 \times 10^{-8}$  |
| total RF power, conducted                     | $\pm 1.5$ dB                                        | $\pm 1.2$ dB              |
| RF power density, conducted                   | $\pm 3$ dB                                          | $\pm 0.7$ dB              |
| spurious emissions, conducted                 | $\pm 3$ dB                                          | $\pm 2.1$ dB              |
| all emissions, radiated                       | $\pm 6$ dB                                          | $\pm 4.8$ dB              |
| temperature                                   | $\pm 1^{\circ}\text{C}$                             | $\pm 0.5^{\circ}\text{C}$ |
| humidity                                      | $\pm 5$ %                                           | $\pm 3.5\%$               |
| DC and low frequency voltages                 | $\pm 3$ %                                           | $\pm 0.4\%$               |
| Conducted disturbance at mains port using AMN | $\pm 3.4$ dB                                        | $\pm 2.5$ dB              |

## 10 Revision History

| Revision Level | Description of changes                                          | Revision Date     |
|----------------|-----------------------------------------------------------------|-------------------|
| 0              | Initial release                                                 | 12 July 2023      |
| 1              | Updated Antenna Gain from 2.2 dBi to 2.4 dBi per antenna sheet. | 07 September 2023 |
|                |                                                                 |                   |
|                |                                                                 |                   |
|                |                                                                 |                   |
|                |                                                                 |                   |
|                |                                                                 |                   |
|                |                                                                 |                   |
|                |                                                                 |                   |