

## RF Test Report

regarding

**USA: CFR Title 47, Part 15.231** (Emissions)  
**Canada: ISSED RSS-210v11/GENv5** (Emissions)

for



### G6GB3

**Category: TPMS Transmitter**

Judgments:

**Aligns with 15.231/RSS-210v11**

Testing Completed: February 6, 2025



Prepared for:

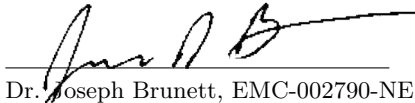
### Schrader Electronics

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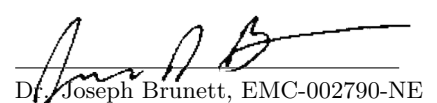
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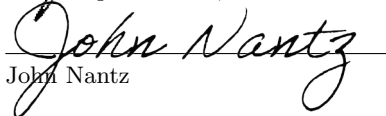
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| r0       | February 10, 2025 | Initial Release. | J. Brunett |

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## **1 Test Report Scope and Limitations**

### **1.1 Laboratory Authorization**

Test Facility description and attenuation characteristics are on file with the FCC Laboratory, Columbia, Maryland (FCC Reg. No: US5348 and US5356) and with ISED Canada, Ottawa, ON (File Ref. No: 3161A and 24249). Amber Helm Development L.C. holds accreditation under NVLAP Lab Code 200129-0.

### **1.2 Report Retention**

For equipment verified to comply with the regulations herein, the manufacturer is obliged to retain this report with the product records for the life of the product, and no less than ten years. A copy of this Report will remain on file with this laboratory until March 2035.

### **1.3 Subcontracted Testing**

This report does not contain data produced under subcontract.

### **1.4 Test Data**

This test report contains data included within the laboratory's scope of accreditation. Any data in this report that is not covered under the laboratory's scope is clearly identified.

### **1.5 Limitation of Results**

The test results contained in this report relate only to the item(s) tested. Any electrical or mechanical modification made to the test item subsequent to the test date shall invalidate the data presented in this report. Any electrical or mechanical modification made to the test item subsequent to this test date shall require reevaluation.

### **1.6 Copyright**

This report shall not be reproduced, except in full, without the written approval of Amber Helm Development L.C.

### **1.7 Endorsements**

This report shall not be used to claim product endorsement by any accrediting, regulatory, or governmental agency.

## 1.8 Test Location

The EUT was fully tested by **Amber Helm Development L.C.**, headquartered at 92723 Michigan Hwy-152, Sister Lakes, Michigan 49047 USA. Table 1.8.0 lists all sites employed herein. Specific test sites utilized are also listed in the test results sections of this report where needed.

Table 1.8.0 Test Site List.

| Description    | Location                                            | Quality Num. |
|----------------|-----------------------------------------------------|--------------|
| OATS (3 meter) | 3615 E Grand River Rd., Williamston, Michigan 48895 | OATSC        |

## 1.9 Traceability and Equipment Used

Pertinent test equipment used for measurements at this facility is listed in Table 1.9.0 . The quality system employed at Amber Helm Development L.C. has been established to ensure all equipment has a clearly identifiable classification, calibration expiry date, and that all calibrations are traceable to the SI through NIST, other recognized national laboratories, accepted fundamental or natural physical constants, ratio type of calibration, or by comparison to consensus standards. All equipment is evaluated on a cycle no greater than 12 months following laboratory validation procedures and is calibrated following manufacturer recommended intervals.

Table 1.9.0 Equipment List.

| Description          | Manufacturer/Model    | SN        | Quality Num. | Cal/Ver By / Date Due |
|----------------------|-----------------------|-----------|--------------|-----------------------|
| Spectrum Analyzer    | R & S / FSW67         | 103233    | RSFSW67      | RS / Sept-2025        |
| Biconical            | EMCO / 93110B         | 9802-3039 | BICEMCO01    | Keysight / Aug-2025   |
| Log Periodic Antenna | EMCO / 3146           | 9305-3614 | LOGEMCO01    | Keysight / Aug-2025   |
| BNC-BNC Coax         | WRTL / RG58/U         | 001       | CAB001-BLACK | AHD / March-2025      |
| 3.5-3.5MM Coax       | PhaseFlex / PhaseFlex | 001       | CAB015-PURP  | AHD / Jul-2025        |
| Quad Ridge Horn      | Singer / A6100        | C35200    | HQR1TO18S01  | Keysight / Aug-2025   |

## 2 Test Specifications and Procedures

### 2.1 Test Specification and General Procedures

The goal of Schrader Electronics is to demonstrate that the Equipment Under Test (EUT) complies with the Rules and/or Directives below. Detailed in this report are the results of testing the Schrader Electronics G6GB3 for compliance to:

| Country/Region/Manu. | Rules or Directive          | Referenced Section(s)     |
|----------------------|-----------------------------|---------------------------|
| United States        | Code of Federal Regulations | CFR Title 47, Part 15.231 |
| Canada               | ISED Canada                 | ISED RSS-210v11/GENv5     |

It has been determined that the equipment under test is subject to the rules and directives above at the date of this testing. In conjunction with these rules and directives, the following specifications and procedures are followed herein to demonstrate compliance (in whole or in part) with these regulations.

|                  |                                                                                                                                        |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| ANSI C63.4:2014  | "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz" |
| ANSI C63.10:2020 | "American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices"                                       |
| WR-ITP0102RA     | "AHD Internal Document - Radiated Emissions Test Method"                                                                               |
| WR-ITP0101LC     | "AHD Internal Document - Conducted Emissions Test Method"                                                                              |

### 3 Configuration and Identification of the Equipment Under Test

#### 3.1 Description and Declarations

The equipment under test is a UHF transmitter for automotive tire pressure monitoring. The EUT is approximately 3 x 3 x 1.5 cm in dimension, and is depicted in Figure 3.1.0 . It is powered by 3 VDC Lithium cell battery. In use, this device is permanently installed in the tire of a motor vehicle. Table 3.1.0 outlines provider declared EUT specifications.

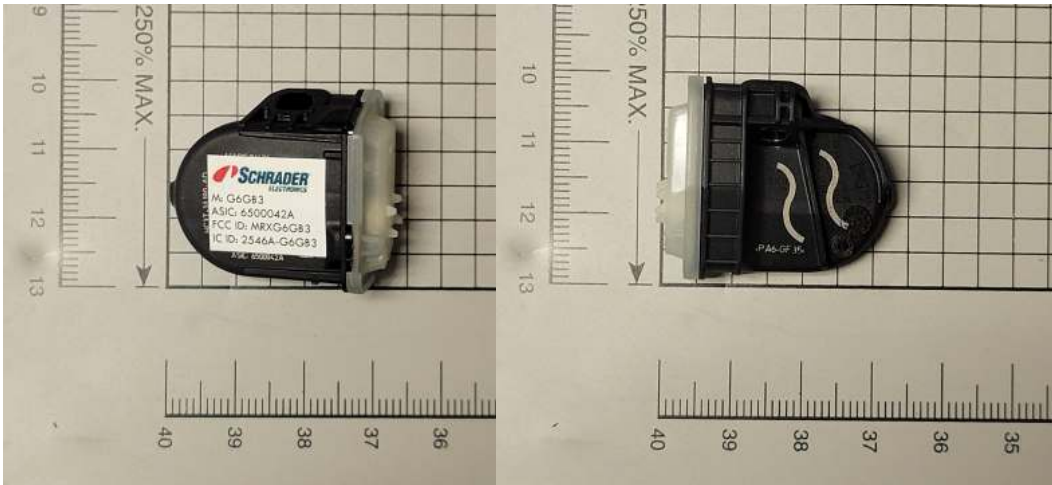


Figure 3.1.0 Photos of EUT.

Table 3.1.0 EUT Declarations.

| General Declarations |                  |
|----------------------|------------------|
| Equipment Type:      | TPMS Transmitter |
| Country of Origin:   | Not Declared     |
| Nominal Supply:      | 3 VDC            |
| Oper. Temp Range:    | Not Declared     |
| Frequency Range:     | 315 MHz±120 kHz  |
| Antenna Dimension:   | Not Declared     |
| Antenna Type:        | PCB Edge Plated  |
| Antenna Gain:        | Not Declared     |
| Number of Channels:  | 1                |
| Channel Spacing:     | Not Applicable   |
| Alignment Range:     | Not Declared     |
| Type of Modulation:  | FSK + ASK        |
| United States        |                  |
| FCC ID Number:       | MRXG6GB3         |
| Classification:      | DSC              |
| Canada               |                  |
| IC Number:           | 2456A-G6GB3      |
| Classification:      | Other            |

### 3.1.1 EUT Configuration

The EUT is configured for testing as depicted in Figure 3.1.1 .

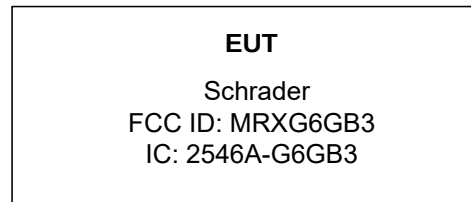


Figure 3.1.1 EUT Test Configuration Diagram.

### 3.1.2 Modes of Operation

This device is capable of three key modes of operation. Upon manually activated LF interrogation (through the use of special LF tool), the EUT responds with a transmission containing a number of frames used to configure the device with the vehicle (LEARN MODE). When the EUT is placed in the vehicle tire and the vehicle drives, it can, in the worst case, periodically transmit where the duration of each transmission is always less than 1 second and the silent period between transmissions is at least 30 times the duration of the transmission, and never less than 10 seconds (ROLL MODE). (See duty cycle table and operational description exhibit for details.) In the case of an emergency condition (delta Pressure), the EUT will transmit tire pressure and temperature information throughout the duration of the condition.

### 3.1.3 Variants

There is only a single variant of the EUT, as tested.

### 3.1.4 Test Samples

Three samples in total were provided; two normal operating samples (SN A, SN B) capable of being placed into testing modes via LF tools, and one sample easily dismantled for photos (SN C).

### 3.1.5 Functional Exerciser

Normal operating EUT functionality was verified by observation of transmitted signal.

### 3.1.6 Modifications Made

There were no modifications made to the EUT by this laboratory.

### 3.1.7 Production Intent

The EUT appears to be a production ready sample.

### 3.1.8 Declared Exemptions and Additional Product Notes

The EUT is permanently installed in a transportation vehicle. As such, digital emissions are exempt from US and Canadian digital emissions regulations (per FCC 15.103(a) and IC correspondence on ICES-003).

## 4 Emissions

### 4.1 General Test Procedures

#### 4.1.1 Radiated Test Setup and Procedures

Radiated electromagnetic emissions from the EUT are first pre-scanned in our screen room. Spectrum and modulation characteristics of all emissions are recorded. Instrumentation, including spectrum analyzers and other test equipment as detailed in Section 1.8 are employed. After pre-scan, emission measurements are made on the test site of record. If the EUT connects to auxiliary equipment and is table or floor standing, the configurations prescribed in relevant test standards are followed. Alternatively, a layout closest to normal use (as declared by the provider) is employed if the resulting emissions appear to be worst-case in such a configuration. See Figure 4.1.1 . All intentionally radiating elements that are not fixed-mounted in use are placed on the test table lying flat, on their side, and on their end (3-axes) and the resulting worst case emissions are recorded. If the EUT is fixed-mounted in use, measurements are made with the device oriented in the manner consistent with installation and then emissions are recorded. If the EUT exhibits spurious emissions due to internal receiver circuitry, such emissions are measured with an appropriate carrier signal applied.

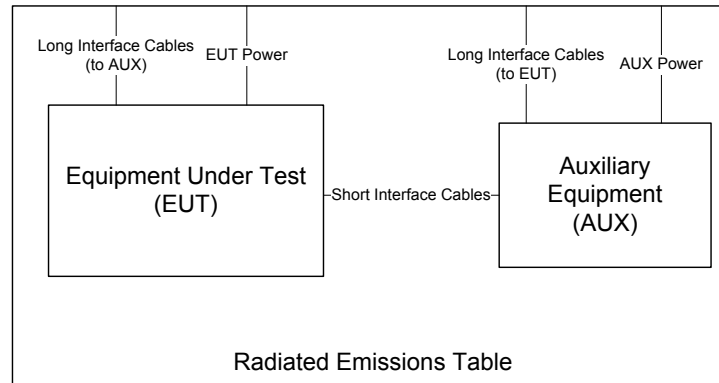


Figure 4.1.1 Radiated Emissions Diagram of the EUT.

For devices with intentional emissions below 30 MHz, a shielded loop antenna and/or E-field and H-Field broadband probes are used depending on the regulation. Shielded loops are placed at a 1 meter receive height at the desired measurement distance. For exposure in this band, 10cm diameter single-axis broadband probes meeting the requirements of ISSED RSS-102.NS.MEAS are employed. Measurements are repeated and summed over three axes, and the entire frequency range is measured with and without the EUT transmitting.

Emissions between 30 MHz and 1 GHz are measured using calibrated broadband antennas. For both horizontal and vertical polarizations, the test antenna is raised and lowered from 1 to 4 m in height until a maximum emission level is detected. The EUT is then rotated through 360° in azimuth until the highest emission is detected. The test antenna is then raised and lowered one last time from 1 to 4 m and the worst case value is recorded. Emissions above 1 GHz are characterized using standard gain or broadband ridge-horn antennas on our OATS with a 4 × 5 m rectangle of ECCOSORB absorber covering the OATS ground screen and a 1.5m table height. Care is taken to ensure that test receiver resolution and video bandwidths meet the regulatory requirements, and that the emission bandwidth of the EUT is not reduced. Photographs of the test setup employed are depicted in Figure 4.1.1 .

Where regulations allow for direct measurement of field strength, power values (dBm) measured on the test receiver / analyzer are converted to dBμV/m at the regulatory distance, using

$$E_{dist} = 107 + P_R + K_A - K_G + K_E - C_F$$

where  $P_R$  is the power recorded on spectrum analyzer, in dBm,  $K_A$  is the test antenna factor in dB/m,  $K_G$  is the combined pre-amplifier gain and cable loss in dB,  $K_E$  is duty correction factor (when applicable) in dB, and  $C_F$  is a distance conversion (employed only if limits are specified at alternate distance) in dB. This field strength value is then compared with the regulatory limit. If effective isotropic radiated power (EIRP) is computed, it is computed as

$$EIRP(dBm) = E_{3m}(dB\mu V/m) - 95.2.$$

When presenting data at each frequency, the highest measured emission under all possible EUT orientations (3-axes) is reported.



Figure 4.1.1 Radiated Emissions Test Setup Photograph(s).

#### **4.1.2 Power Supply Variation**

Tests at extreme supply voltages are made if required by the procedures specified in the test standard, and results of this testing are detailed in this report.

In the case the EUT is designed for operation from a battery power source, the extreme test voltages are evaluated over the range specified in the test standard; no less than  $\pm 10\%$  of the nominal battery voltage declared by the manufacturer. For all battery operated equipment, worst case intentional and spurious emissions are re-checked employing a new (fully charged) battery.

4.2 Intentional Emissions

4.2.1 Fundamental Emission Pulsed Operation

**Test Setup & Procedure** The test equipment and facilities were setup in accordance with the standards and procedures listed in Section 2.1. Environmental conditions were set at the appropriate temperature and thermal balance was checked with a thermocouple based probe. Duty cycle is reported for all relevant modes of operation. The test equipment employed includes RSFSW6701, LOGEMCO01.

**Measurement Results** The details and results of testing the EUT are summarized in Table 4.2.1 . Plots showing the measurements made to obtain these values are provided in Figure 4.2.1 .

Table 4.2.1 Fundamental Emission Pulsed Operation.

|             |                     |                                                                             |                            |                    |                                 |                        |                        |                                                                                                                                                                                       |                     |                 |      |                |  |
|-------------|---------------------|-----------------------------------------------------------------------------|----------------------------|--------------------|---------------------------------|------------------------|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-----------------|------|----------------|--|
|             |                     |                                                                             |                            |                    |                                 |                        |                        |                                                                                                                                                                                       |                     | Test Date:      |      | 5-Feb-25       |  |
|             |                     |                                                                             |                            |                    |                                 |                        |                        |                                                                                                                                                                                       |                     | Test Engineer:  |      | J. Brunett     |  |
|             |                     |                                                                             |                            |                    |                                 |                        |                        |                                                                                                                                                                                       |                     | EUT:            |      | Schrader G6GB3 |  |
|             |                     |                                                                             |                            |                    |                                 |                        |                        |                                                                                                                                                                                       |                     | EUT Mode:       |      | See Table      |  |
|             |                     |                                                                             |                            |                    |                                 |                        |                        |                                                                                                                                                                                       |                     | Meas. Distance: |      | 10 cm          |  |
| FCC/IC      |                     |                                                                             |                            |                    |                                 |                        |                        |                                                                                                                                                                                       |                     |                 |      |                |  |
| R0          | Test Freq.<br>(MHz) | EUT Test Mode                                                               | Overall Transmission       |                    |                                 | Max. Frame Length (ms) | Min. Frame Period (ms) | Internal Frame Characteristics                                                                                                                                                        | Computed Duty Cycle |                 |      |                |  |
|             |                     |                                                                             | Min. Repetition Rate (sec) | Max. No. of Frames | Total Transmission Length (sec) |                        |                        |                                                                                                                                                                                       | Frame Encoding      | (%)             | (dB) |                |  |
| R1          | 315                 | Roll Mode – PERIODIC TX, see Figure 4.2.1(ii)                               | 15.15                      | 4                  | 0.332                           | 8.290                  | 106.9                  | In worst case the EUT transmits 4 FSK frames every 15.1 seconds, with a transmission of one 8.29 ms FSK frame in any given 106.9 ms window.                                           | 8.3                 | -21.6           |      |                |  |
| R2          | 315                 | LEARN Mode – MANUAL ACTIV. , see Figure 4.2.1(i)                            | Single                     | 9 ASK + 4 FSK      | 0.920                           | 8.280                  | 59.8                   | In worst case the EUT transmits 9 ASK + 4 FSK frames after activation, with transmission of two 8.26 ms 50% Duty Cycle ASL frames, or one 8.28 ms frame in any given 100.0 ms window. | 8.3                 | -21.6           |      |                |  |
| #           | C1                  | C2                                                                          | C3                         | C4                 | C5                              | C6                     | C7                     | C8                                                                                                                                                                                    | C9                  | C10             |      |                |  |
| (ROW)<br>R2 | (COLUMN)<br>C10     | NOTE:<br>Example Calculation: (2 x 8.26 ms x 50%) / 100 ms = 8.3 % on-time. |                            |                    |                                 |                        |                        |                                                                                                                                                                                       |                     |                 |      |                |  |



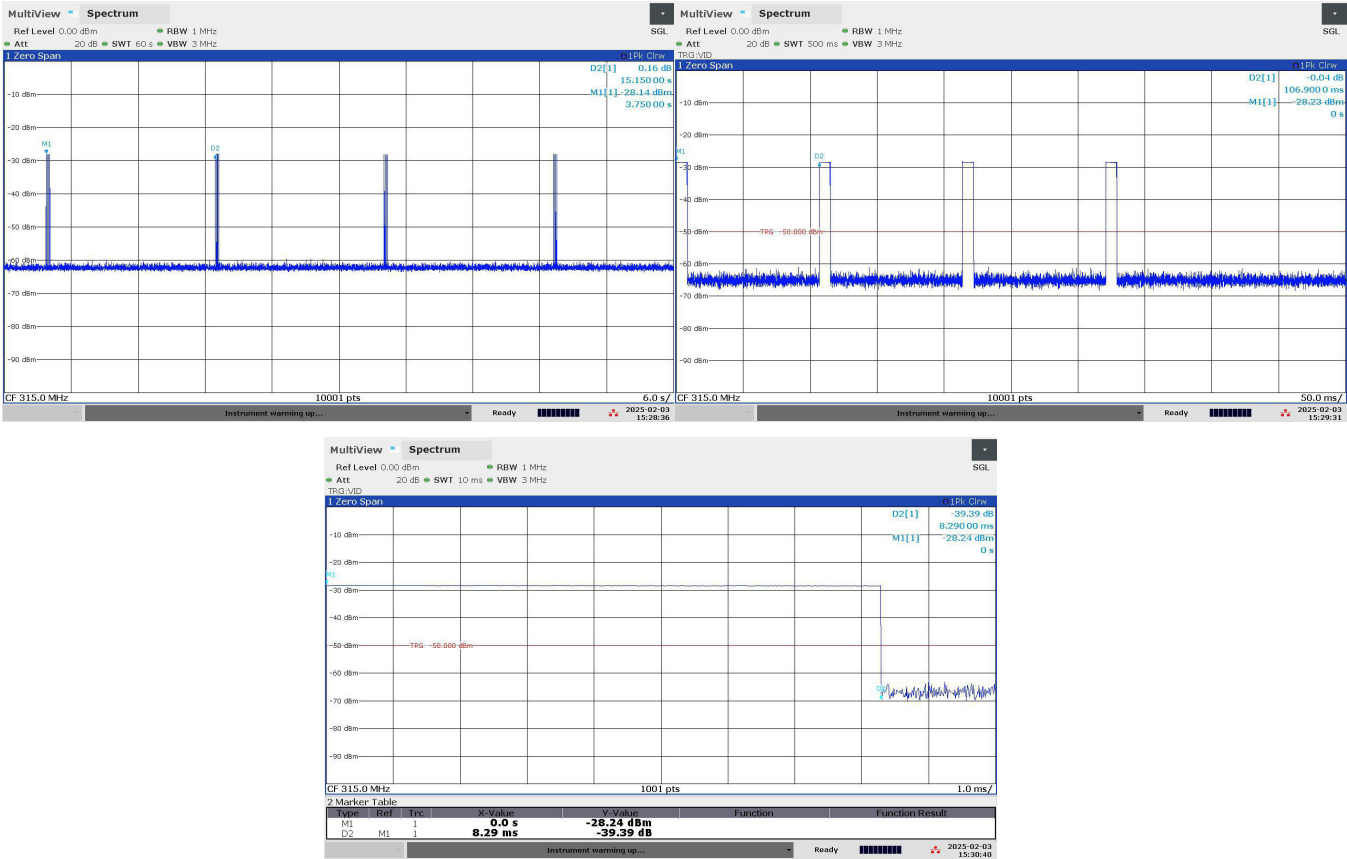


Figure 4.2.1 (ii) Fundamental Emission Pulsed Operation.

4.2.2 Fundamental Emission Bandwidth

**Test Setup & Procedure** The test equipment and facilities were setup in accordance with the standards and procedures listed in Section 2.1. Environmental conditions were set at the appropriate temperature and thermal balance was checked with a thermocouple based probe. Emission bandwidth (EBW) of the EUT is measured with the device placed in the test mode(s) with the shortest available frame length and minimum frame spacing. The 20 dB EBW is measured as the max-held peak-detected signal when the IF bandwidth is greater than or equal to 1% of the receiver span. For complex modulations other than ASK and FSK, the 99% emission bandwidth per IC test procedures has a different result, and is also reported. The test equipment employed includes RSFSW6701, LOGEMCO01.

**Measurement Results** The details and results of testing the EUT are summarized in Table 4.2.2 . Plots showing the measurements made to obtain these values are provided in Figure 4.2.2 .

Table 4.2.2 Fundamental Emission Bandwidth.

|                 |  |                     |                        |                        |  |                  |  |
|-----------------|--|---------------------|------------------------|------------------------|--|------------------|--|
| <b>Detector</b> |  | <b>IF Bandwidth</b> | <b>Video Bandwidth</b> | <b>Test Date:</b>      |  | 3-Feb-25         |  |
| Pk              |  | 10 kHz              | 100 kHz                | <b>Test Engineer:</b>  |  | J. Brunett       |  |
|                 |  |                     |                        | <b>EUT:</b>            |  | Schrader G6GB3   |  |
|                 |  |                     |                        | <b>EUT Mode:</b>       |  | Normal Operating |  |
|                 |  |                     |                        | <b>Meas. Distance:</b> |  | 10 cm            |  |

|          |                 |                                                                                     |                 |                 |               |    |           |
|----------|-----------------|-------------------------------------------------------------------------------------|-----------------|-----------------|---------------|----|-----------|
| FCC/IC   |                 |                                                                                     |                 |                 |               |    |           |
| R0       | Mode            | Center Frequency (MHz)                                                              | 20 dB EBW (kHz) | EBW Limit (kHz) | 99% OBW (kHz) |    | Pass/Fail |
| R1       | ASK+FSK (LEARN) | 315.00                                                                              | 124.800         | 787.500         | 240.500       |    | Pass      |
| R2       |                 |                                                                                     |                 |                 |               |    |           |
| #        | C1              | C2                                                                                  | C3              | C4              | C5            | C7 | C8        |
| (ROW) R0 | (COLUMN) C7     | NOTE:<br>Accumulated BW if multiple RF channels otherwise max BW of single channel. |                 |                 |               |    |           |

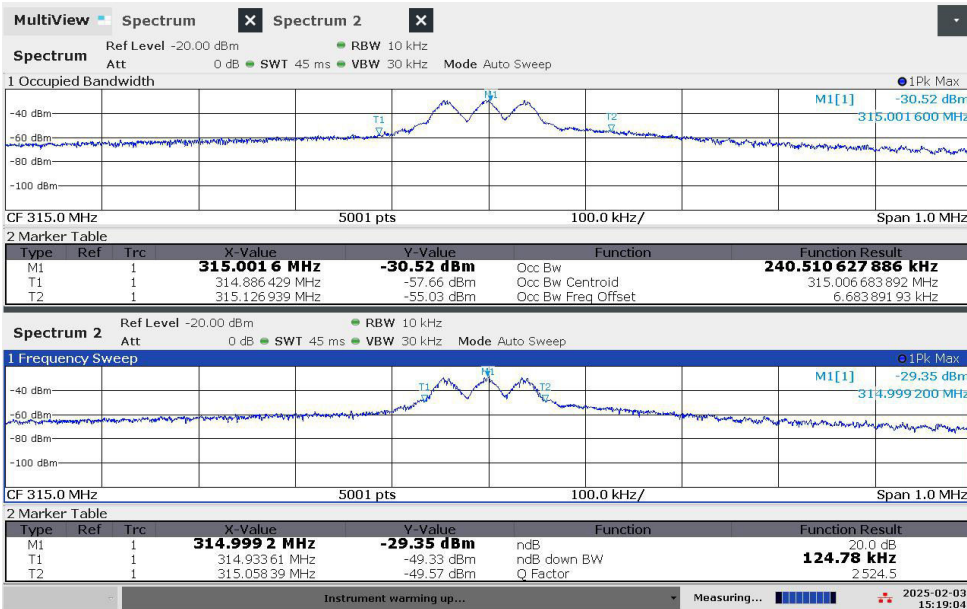


Figure 4.2.2 Fundamental Emission Bandwidth.

### 4.2.3 Fundamental Emission Field Strength

**Test Setup & Procedure** The test equipment and facilities were setup in accordance with the standards and procedures listed in Section 2.1. Environmental conditions were set at the appropriate temperature and thermal balance was checked with a thermocouple based probe. Fundamental emissions are measured at the regulatory distance on our OATS. The test equipment employed includes RSFSW6701, LOGEMCO01.

**Measurement Results** The details and results of testing the EUT are summarized in Table 4.2.3 .

Table 4.2.3 Fundamental Emission Field Strength.

|                |           |                  |       |       |     |     |               |     |       |       |              |      |        |       |        |          |           |           |      |                     |                                           |      |        |      |       |       |           |         |      |       |      |
|----------------|-----------|------------------|-------|-------|-----|-----|---------------|-----|-------|-------|--------------|------|--------|-------|--------|----------|-----------|-----------|------|---------------------|-------------------------------------------|------|--------|------|-------|-------|-----------|---------|------|-------|------|
|                |           | EUT Modes: a1 CW |       |       |     |     |               |     |       |       |              |      |        |       |        | a5       |           |           |      |                     |                                           |      |        |      |       |       |           |         |      |       |      |
|                |           |                  |       |       |     |     |               |     |       |       |              |      |        |       |        | a6       |           |           |      |                     |                                           |      |        |      |       |       |           |         |      |       |      |
| Test Date(s):  |           | 02/05/25         |       |       |     |     |               |     |       |       |              |      |        |       |        | a7       |           |           |      |                     |                                           |      |        |      |       |       |           |         |      |       |      |
| Test Engineer: |           | J. Brunett       |       |       |     |     |               |     |       |       |              |      |        |       |        | a8       |           |           |      |                     |                                           |      |        |      |       |       |           |         |      |       |      |
|                |           |                  |       |       |     |     |               |     |       |       |              |      |        |       |        |          |           |           |      |                     |                                           |      |        |      |       |       |           |         |      |       |      |
| R0             | Frequency |                  | Site  |       |     |     | EUT           |     |       |       | Test Antenna |      |        |       | Cable  | Receiver |           |           |      | Field Strength @ DR |                                           |      |        |      |       | EIRP  |           | Details |      |       |      |
|                | Start     | Stop             | Temp. | Table | MR  | DR  | N/F           | CF  | Mode  | Volt. | Dim          | Pol. | Ant.   | Dim.  | Ka     | Kg       | Rx Power  | Bandwidth | Pk   | Avg                 | RBW                                       | VBW  | Meas.  | Pk   | Limit | Calc. | Qpk / Avg | Limit   | Pk   | Calc. | Pass |
|                |           |                  | ( C ) | Angle |     |     |               |     | see   | (V)   | cm           |      | Height |       |        |          |           | Pk        |      |                     |                                           |      |        | USA  | CAN   | Calc. | Limit     | USA     | CAN  |       | Fail |
|                | MHz       | MHz              | %     | deg   |     |     |               | dB  | table |       |              | H/V  | m      | cm    | dB/m   | dB       | dBm       | MHz       |      |                     |                                           |      | dBuV/m |      |       |       |           |         | dBm  | dB    |      |
| R1             | SETUP     |                  | OATSC |       |     |     | Sensata G6GB3 |     |       |       | LOGEMCO01    |      |        |       | CAB001 |          | RSFSV3001 |           |      |                     | H-POL - END, V-POL SIDE Worst Case Orient |      |        |      |       |       |           |         |      |       |      |
| R2             | 315.0     | 315.0            | 3/66  | 45.0  | 3.0 | 3.0 |               | 0.0 | a1    | 3.0   | 3.0          | H    | 1.0    | 100.0 | 14.1   | -0.1     |           |           | 0.12 | 0.30                | 74.9                                      | 87.6 | 87.6   | 53.3 | 67.6  | 67.6  | -20.2     |         | 12.7 |       |      |
| R3             | 315.0     | 315.0            | 3/66  | 90.0  | 3.0 | 3.0 |               | 0.0 | a1    | 3.0   | 3.0          | V    | 1.8    | 100.0 | 14.1   | -0.1     |           |           | 0.12 | 0.30                | 71.2                                      | 87.6 | 87.6   | 49.6 | 67.6  | 67.6  | -23.9     |         | 16.4 |       |      |
| R4             |           |                  |       |       |     |     |               |     |       |       |              |      |        |       |        |          |           |           |      |                     |                                           |      |        |      |       |       |           |         |      |       |      |
| #              | C1        | C2               | C3    | C4    | C5  | C6  | C7            | C8  | C9    | C10   | C11          | C12  | C13    | C14   | C15    | C16      | C17       | C18       | C19  | C20                 | C21                                       | C22  | C23    | C24  | C25   | C26   | C27       | C28     | C29  |       |      |

(ROW)

(COLUMN)

NOTE:

R0

C5

MR is Measurement Range, which is reduced from DR to achieve necessary SNR.

R0

C6

DR is the regulatory Desired Range measurement distance.

R0

C7

N/F is Near-Field / Far-Field distance computed for max of EUT Antenna Dimension (C10) computed above 1 GHz.

R0

C8

CF is computed using a 20 dB/decade Decay Rate.

R0

C17/18

When E-field or EIRP is reported directly from Spectrum Analyzer, Antenna Factors and Cable losses are included directly in SA settings and Pr is not reported.

4.3 Unintentional Emissions

4.3.1 Transmit Chain Spurious Emissions

The results for the measurement of transmit chain spurious emissions at the nominal voltage and temperature are provided in Table 4.3.1 .

Table 4.3.1 Transmit Chain Spurious Emissions.

EUT Modes: a1 CW

a5

a2

a6

Test Date(s): 02/06/25 a3

a7

Test Engineer: J. Nantz a4

a8

| R0    | Frequency    |             | Temp.<br>( C )<br>Hum.<br>%                                                                                                                                     | Table<br>Angle<br>deg | Site  |     |     |     | EUT                  |              |           |             | Test Antenna        |            |            |      | Cable                                   | Receiver                      |       |                      |      | Field Strength @ DR                |      |       |       |                                                  |       | EIRP |     | Details |  |  |  |  |  |  |  |  |  |
|-------|--------------|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-------|-----|-----|-----|----------------------|--------------|-----------|-------------|---------------------|------------|------------|------|-----------------------------------------|-------------------------------|-------|----------------------|------|------------------------------------|------|-------|-------|--------------------------------------------------|-------|------|-----|---------|--|--|--|--|--|--|--|--|--|
|       | Start<br>MHz | Stop<br>MHz |                                                                                                                                                                 |                       | MR    | DR  | N/F | CF  | Mode<br>see<br>table | Volt.<br>(V) | Dim<br>cm | Pol.<br>H/V | Ant.<br>Height<br>m | Dim.<br>cm | Ka<br>dB/m |      | Rx Power<br>P <sub>k</sub>   Avg<br>dBm | Bandwidth<br>RBW   VBW<br>MHz | Meas. | P <sub>k</sub> Limit |      | Q <sub>pk</sub> / Avg Limit        |      | Calc. | Limit | Calc.                                            | Limit |      |     |         |  |  |  |  |  |  |  |  |  |
|       |              |             |                                                                                                                                                                 |                       |       |     |     |     |                      |              |           |             |                     |            |            |      |                                         |                               |       | USA                  | CAN  | USA                                | CAN  |       |       |                                                  |       |      |     |         |  |  |  |  |  |  |  |  |  |
|       |              |             |                                                                                                                                                                 |                       |       |     |     |     |                      |              |           |             |                     |            |            |      |                                         |                               |       |                      |      |                                    |      |       |       |                                                  |       |      |     |         |  |  |  |  |  |  |  |  |  |
|       | MHz          |             |                                                                                                                                                                 |                       | m     |     |     |     |                      |              |           |             |                     |            |            |      |                                         |                               |       | dBuV/m               |      | dBuV/m                             |      |       |       | dBm                                              |       |      |     |         |  |  |  |  |  |  |  |  |  |
| R1    | SETUP        |             |                                                                                                                                                                 |                       | OATSC |     |     |     | #NAME?               |              |           |             | LOGEMCO01           |            |            |      | CAB001                                  | RSFSV3001                     |       |                      |      |                                    |      |       |       | NOTES: H-POL - FLAT, V-POL END Worst Case Orient |       |      |     |         |  |  |  |  |  |  |  |  |  |
| R2    | 630.0        | 630.0       | 3/66                                                                                                                                                            | 220.0                 | 3.0   | 3.0 |     | 0.0 | a1                   | 3.0          | 2.0       | H           | 1.0                 | 100.0      | 10.5       | -0.1 |                                         | 0.12                          | 0.30  | 37.2                 | 67.6 | 67.6                               | 15.6 | 47.6  | 47.6  | -58.0                                            |       | 30.4 |     |         |  |  |  |  |  |  |  |  |  |
| R3    | 630.0        | 630.0       | 3/66                                                                                                                                                            | 100.0                 | 3.0   | 3.0 |     | 0.0 | a1                   | 3.0          | 2.0       | V           | 1.0                 | 100.0      | 10.5       | -0.1 |                                         | 0.12                          | 0.30  | 28.2                 | 67.6 | 67.6                               | 6.6  | 47.6  | 47.6  | -67.0                                            |       | 39.4 |     |         |  |  |  |  |  |  |  |  |  |
| R4    | 945.0        | 945.0       | 3/66                                                                                                                                                            | 220.0                 | 3.0   | 3.0 |     | 0.0 | a1                   | 3.0          | 2.0       | H           | 1.0                 | 100.0      | 16.7       | -0.2 |                                         | 0.12                          | 0.30  | 36.5                 | 67.6 | 67.6                               | 14.9 | 47.6  | 47.6  | -58.7                                            |       | 31.1 |     |         |  |  |  |  |  |  |  |  |  |
| R5    | 945.0        | 945.0       | 3/66                                                                                                                                                            | 180.0                 | 3.0   | 3.0 |     | 0.0 | a1                   | 3.0          | 2.0       | V           | 1.0                 | 100.0      | 16.7       | -0.2 |                                         | 0.12                          | 0.30  | 27.8                 | 67.6 | 67.6                               | 6.2  | 47.6  | 47.6  | -67.4                                            |       | 39.8 |     |         |  |  |  |  |  |  |  |  |  |
| R6    | SETUP        |             |                                                                                                                                                                 |                       | OATSC |     |     |     | #NAME?               |              |           |             | HQR1TO18S01         |            |            |      | CAB015                                  | RSFSV3001                     |       |                      |      | NOTES: max all orientations of EUT |      |       |       |                                                  |       |      |     |         |  |  |  |  |  |  |  |  |  |
| R7    | 1260.0       | 1260.0      | 3/66                                                                                                                                                            | all                   | 3.0   | 3.0 | 0.2 | 0.0 | a1                   | 3.0          | 2.0       | H/V         | all                 | 15.0       | 21.5       | -2.8 |                                         | 1.00                          | 3.00  | 40.6                 | 74.0 | 74.0                               | 19.0 | 54.0  | 54.0  | -54.6                                            |       | 33.4 |     |         |  |  |  |  |  |  |  |  |  |
| R8    | 1575.0       | 1575.0      | 3/66                                                                                                                                                            | all                   | 3.0   | 3.0 | 0.2 | 0.0 | a1                   | 3.0          | 2.0       | H/V         | all                 | 15.0       | 25.2       | -3.2 |                                         | 1.00                          | 3.00  | 39.8                 | 74.0 | 74.0                               | 18.2 | 54.0  | 54.0  | -55.4                                            |       | 34.2 |     |         |  |  |  |  |  |  |  |  |  |
| R9    | 1890.0       | 1890.0      | 3/66                                                                                                                                                            | all                   | 3.0   | 3.0 | 0.3 | 0.0 | a1                   | 3.0          | 2.0       | H/V         | all                 | 15.0       | 27.9       | -3.6 |                                         | 1.00                          | 3.00  | 39.1                 | 74.0 | 74.0                               | 17.5 | 54.0  | 54.0  | -56.1                                            |       | 34.9 |     |         |  |  |  |  |  |  |  |  |  |
| R10   | 2205.0       | 2205.0      | 3/66                                                                                                                                                            | all                   | 3.0   | 3.0 | 0.3 | 0.0 | a1                   | 3.0          | 2.0       | H/V         | all                 | 15.0       | 29.7       | -4.0 |                                         | 1.00                          | 3.00  | 44.0                 | 74.0 | 74.0                               | 22.4 | 54.0  | 54.0  | -51.2                                            |       | 30.0 |     |         |  |  |  |  |  |  |  |  |  |
| R11   | 2520.0       | 2520.0      | 3/66                                                                                                                                                            | all                   | 3.0   | 3.0 | 0.4 | 0.0 | a1                   | 3.0          | 2.0       | H/V         | all                 | 15.0       | 30.9       | -4.3 |                                         | 1.00                          | 3.00  | 47.3                 | 74.0 | 74.0                               | 25.7 | 54.0  | 54.0  | -47.9                                            |       | 26.7 |     |         |  |  |  |  |  |  |  |  |  |
| R12   | 2835.0       | 2835.0      | 3/66                                                                                                                                                            | all                   | 3.0   | 3.0 | 0.4 | 0.0 | a1                   | 3.0          | 2.0       | H/V         | all                 | 15.0       | 31.6       | -4.7 |                                         | 1.00                          | 3.00  | 44.8                 | 74.0 | 74.0                               | 23.2 | 54.0  | 54.0  | -50.4                                            |       | 29.2 |     |         |  |  |  |  |  |  |  |  |  |
| R13   | 3150.0       | 3150.0      | 3/66                                                                                                                                                            | all                   | 3.0   | 3.0 | 0.5 | 0.0 | a1                   | 4.0          | 2.0       | H/V         | all                 | 15.0       | 31.8       | -5.0 |                                         | 1.00                          | 3.00  | 46.1                 | 74.0 | 74.0                               | 24.5 | 54.0  | 54.0  | -49.1                                            |       | 27.9 |     |         |  |  |  |  |  |  |  |  |  |
| R14   |              |             |                                                                                                                                                                 |                       |       |     |     |     |                      |              |           |             |                     |            |            |      |                                         |                               |       |                      |      |                                    |      |       |       |                                                  |       |      |     |         |  |  |  |  |  |  |  |  |  |
| #     | C1           | C2          | C3                                                                                                                                                              | C4                    | C5    | C6  | C7  | C8  | C9                   | C10          | C11       | C12         | C13                 | C14        | C15        | C16  | C17                                     | C18                           | C19   | C20                  | C21  | C22                                | C23  | C24   | C25   | C26                                              | C27   | C28  | C29 |         |  |  |  |  |  |  |  |  |  |
| (ROW) | (COLUMN)     |             | NOTE:                                                                                                                                                           |                       |       |     |     |     |                      |              |           |             |                     |            |            |      |                                         |                               |       |                      |      |                                    |      |       |       |                                                  |       |      |     |         |  |  |  |  |  |  |  |  |  |
| R0    | C5           |             | MR is Measurement Range, which is reduced from DR to achieve necessary SNR.                                                                                     |                       |       |     |     |     |                      |              |           |             |                     |            |            |      |                                         |                               |       |                      |      |                                    |      |       |       |                                                  |       |      |     |         |  |  |  |  |  |  |  |  |  |
| R0    | C6           |             | DR is the regulatory Desired Range measurement distance.                                                                                                        |                       |       |     |     |     |                      |              |           |             |                     |            |            |      |                                         |                               |       |                      |      |                                    |      |       |       |                                                  |       |      |     |         |  |  |  |  |  |  |  |  |  |
| R0    | C7           |             | N/F is Near-Field / Far-Field distance computed for max of EUT Antenna Dimension (C10) computed above 1 GHz.                                                    |                       |       |     |     |     |                      |              |           |             |                     |            |            |      |                                         |                               |       |                      |      |                                    |      |       |       |                                                  |       |      |     |         |  |  |  |  |  |  |  |  |  |
| R0    | C8           |             | CF is computed using a 20 dB/decade Decay Rate.                                                                                                                 |                       |       |     |     |     |                      |              |           |             |                     |            |            |      |                                         |                               |       |                      |      |                                    |      |       |       |                                                  |       |      |     |         |  |  |  |  |  |  |  |  |  |
| R0    | C17/18       |             | When E-field or EIRP is reported directly from Spectrum Analyzer, Antenna Factors and Cable losses are included directly in SA settings and Pr is not reported. |                       |       |     |     |     |                      |              |           |             |                     |            |            |      |                                         |                               |       |                      |      |                                    |      |       |       |                                                  |       |      |     |         |  |  |  |  |  |  |  |  |  |
| R0    | C21          |             | Max values measured were highest level from EUT or background noise.                                                                                            |                       |       |     |     |     |                      |              |           |             |                     |            |            |      |                                         |                               |       |                      |      |                                    |      |       |       |                                                  |       |      |     |         |  |  |  |  |  |  |  |  |  |

5 Measurement Uncertainty and Accreditation Documents

The maximum values of measurement uncertainty for the laboratory test equipment and facilities associated with each test are given in the table below. This uncertainty is computed for a 95.45% confidence level based on a coverage factor of  $k = 2$ .

Table 5.0.0 Measurement Uncertainty.

| Measured Parameter                                 | Measurement Uncertainty <sup>†</sup>                            |
|----------------------------------------------------|-----------------------------------------------------------------|
| Radio Frequency                                    | $\pm(f_{Mkr}/10^7 + RBW/10 + (SPN/(PTS - 1))/2 + 1 \text{ Hz})$ |
| Conducted Emm. Amplitude                           | ±1.9 dB                                                         |
| Radiated Emm. Amplitude ( $f < 30 \text{ MHz}$ )   | ±3.1 dB                                                         |
| Radiated Emm. Amplitude (30 – 200 MHz)             | ±4.0 dB                                                         |
| Radiated Emm. Amplitude (200 – 1000 MHz)           | ±5.2 dB                                                         |
| Radiated Emm. Amplitude ( $f > 1000 \text{ MHz}$ ) | ±3.7 dB                                                         |

<sup>†</sup>Ref: CISPR 16-4-2:2011+A1:2014



Figure 5.0.0 Accreditation Documents