

# **TEST REPORT**

Test Report No.: UL-RPT-RP14370604-116A

Manufacturer : Sound Devices LLC

Model No. / HVIN : 9295W

PMN : A20-MINI

**FCC ID** : 2AKLX-9295W

**ISED Certification** 

No.

IC: 22225-9295W

Technology : SRD

**Test Standard(s)** : FCC Parts 15.209(a) & 15.247;

Innovation, Science and Economic Development Canada RSS-247 Issue 2 February 2017 & RSS-Gen Issue 5 February

2021

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- 2. The results in this report apply only to the sample(s) tested.
- 3. The sample tested is in compliance with the above standard(s).
- 4. The test results in this report are traceable to the national or international standards.
- 5. Version 2.0 supersedes all previous versions.

**Date of Issue:** 02 November 2022

Checked by:

Ben Mercer Lead Project Engineer, Radio Laboratory

**Company Signatory:** 

Sarah Williams

Sarah Williams RF Operations Leader, Radio Laboratory



This laboratory is accredited by the United Kingdom Accreditation Service (UKAS). UKAS is one of the signatories to the International Laboratory Accreditation Cooperation (ILAC) Arrangement for the mutual recognition of test reports. The tests reported herein have been performed in accordance with its terms of accreditation.

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ISSUE DATE: 02 NOVEMBER 2022

# **Customer Information**

| Company Name: | Sound Devices LLC  |
|---------------|--|
| Address:      | PO Box 576,<br>E7556 State Rd 23-33,<br>Reedsburg,<br>WI 53959,<br>United States |

# **Report Revision History**

| Version<br>Number | Issue Date | Revision Details     | Revised By |
|-------------------|------------|----------------------|------------|
| 1.0               | 13/07/2022 | Initial Version      | Ben Mercer |
| 2.0               | 02/11/2022 | Updated antenna gain | Ben Mercer |

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# 1. Attestation of Test Results

# 1.1. Description of EUT

The Equipment Under Test was a professional (body-worn) miniature microphone transmitter operating in the 902 MHz to 928 MHz frequency band.

# 1.2. General Information

| Specification Reference:  | 47CFR15.247  |
|---------------------------|--|
| Specification Title:      | Code of Federal Regulations Volume 47 (Telecommunications):<br>Part 15 Subpart C (Intentional Radiators) – Section 15.247    |
| Specification Reference:  | 47CFR15.209  |
| Specification Title:      | Code of Federal Regulations Volume 47 (Telecommunications):<br>Part 15 Subpart C (Intentional Radiators) – Section 15.209    |
| Specification Reference:  | RSS-Gen Issue 5 February 2021  |
| Specification Title:      | General Requirements for Compliance of Radio Apparatus   |
| Specification Reference:  | RSS-247 Issue 2 February 2017  |
| Specification Title:      | Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices |
| Site Registration:        | FCC: 685609, ISEDC: 20903  |
| FCC Lab. Designation No.: | UK2011   |
| ISEDC CABID:              | UK0001   |
| Location of Testing:      | Unit 3 Horizon, Wade Road, Kingsland Business Park, Basingstoke, Hampshire, G24 8AH, United Kingdom                          |
| Test Dates:               | 14 June 2022 to 17 June 2022   |

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# 1.3. Summary of Test Results

| FCC Reference<br>(47CFR)      | ISED Canada<br>Reference         | Measurement                              | Result   |
|-------------------------------|----------------------------------|--|----------|
| Part 15.247(a)(2)             | RSS-Gen 6.7 /<br>RSS-247 5.2(a)  | Transmitter Minimum 6 dB Bandwidth       | <b>②</b> |
| N/A                           | RSS-Gen 6.7                      | Transmitter 99% Occupied Bandwidth       | <b>②</b> |
| Part 15.247(b)(3)             | RSS-Gen 6.12 /<br>RSS-247 5.4(d) | Transmitter Maximum Peak Output Power    | <b>②</b> |
| Part 15.247(e)                | RSS-247 5.2(b)                   | Transmitter Power Spectral Density       | <b>②</b> |
| Part 15.247(d) /<br>15.209(a) | RSS-Gen 6.13 /<br>RSS-247 5.5    | Transmitter Radiated Emissions           | <b>②</b> |
| Part 15.247(d) /<br>15.209(a) | RSS-Gen 6.13 /<br>RSS-247 5.5    | Transmitter Band Edge Radiated Emissions | <b>②</b> |
| Key to Results                |                                  |  |          |

#### = Complied = Did not comply

## 1.4. Deviations from the Test Specification

For the measurements contained within this test report, there were no deviations from, additions to, or exclusions from the test specification identified above.

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# 2. Summary of Testing

# 2.1. Facilities and Accreditation

The test site and measurement facilities used to collect data are located at Unit 3 Horizon, Wade Road, Kingsland Business Park, Basingstoke, Hampshire, RG24 8AH, United Kingdom. The following table identifies which facilities were utilised for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

| Site 1  | X |
|---------|---|
| Site 2  |   |
| Site 17 | X |

UL International (UK) Ltd is accredited by UKAS. The tests reported herein have been performed in accordance with its terms of accreditation.

## 2.2. Methods and Procedures

| Reference: | ANSI C63.10-2013   |
|------------|--|
| Title:     | American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices   |
| Reference: | KDB 558074 D01 15.247 Meas Guidance v05r02, April 2, 2019  |
| Title:     | Guidance for Compliance Measurements on Digital Transmission System, Frequency Hopping Spread Spectrum System, and Hybrid System Devices Operating Under Section 15.247 of the FCC Rules |

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## 2.3. Measurement Uncertainty & Decision Rule

#### **Overview**

No measurement or test can ever be perfect and the imperfections give rise to error of measurement in the results. Consequently the result of a measurement is only an approximation to the value of the measurand (the specific quantity subject to measurement) and is only complete when accompanied by a statement of the uncertainty of the approximation.

The expression of uncertainty of a measurement result allows realistic comparison of results with reference values and limits given in specifications and standards.

#### **Decision Rule**

The decision rule applied is based upon the accuracy method criteria. The measurement uncertainty is met and the result is considered in conformance with the requirement criteria if the observed value is within the prescribed limit.

#### **Measurement Uncertainty**

The reported expanded uncertainties below are based on a standard uncertainty multiplied by an appropriate coverage factor such that a confidence level of approximately 95% is maintained. For the purposes of this document "approximately" is interpreted as meaning "effectively" or "for most practical purposes".

| Measurement Type            | Range              | Confidence<br>Level (%) | Calculated<br>Uncertainty |
|-----------------------------|--------------------|-------------------------|---------------------------|
| Minimum 6 dB Bandwidth      | 902 MHz to 928 MHz | 95%                     | ±4.59 %                   |
| 99% Occupied Bandwidth      | 902 MHz to 928 MHz | 95%                     | ±3.92 %                   |
| Maximum Peak Output Power   | 902 MHz to 928 MHz | 95%                     | ±1.13 dB                  |
| Power Spectral Density      | 902 MHz to 928 MHz | 95%                     | ±1.13 dB                  |
| Radiated Spurious Emissions | 9 kHz to 30 MHz    | 95%                     | ±5.32 dB                  |
| Radiated Spurious Emissions | 30 MHz to 1 GHz    | 95%                     | ±3.30 dB                  |
| Radiated Spurious Emissions | 1 GHz to 9.3 GHz   | 95%                     | ±2.94 dB                  |

The methods used to calculate the above uncertainties are in line with those recommended within the various measurement specifications. Where measurement specifications do not include guidelines for the evaluation of measurement uncertainty the published guidance of the appropriate accreditation body is followed.

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# 2.4. Test and Measurement Equipment

# **Test Equipment Used for Conducted Tests**

| Asset<br>No. | Instrument                 | Manufacturer    | Type No. | Serial No. | Date<br>Calibration<br>Due | Cal.<br>Interval<br>(Months) |
|--------------|----------------------------|-----------------|----------|------------|----------------------------|------------------------------|
| M2071        | Thermohygrometer           | Testo           | 608-H1   | 45258132   | 08 Dec 2022                | 12                           |
| M2077        | Test Receiver              | Rhode & Schwarz | ESW44    | 102026     | 15 Feb 2023                | 12                           |
| G217350      | Vector Signal<br>Generator | Rhode & Schwarz | SMM100A  | 101777     | 04 Apr 2025                | 36                           |
| A3118        | Attenuator                 | AtlanTecRF      | AN18-10  | 237378#2   | Calibrated<br>Before use   | -                            |

## <u>Test Equipment Used for Transmitter Radiated Emissions Tests</u>

| Asset<br>No. | Instrument       | Manufacturer    | Type No.                         | Serial No.  | Date<br>Calibration<br>Due | Cal.<br>Interval<br>(Months) |
|--------------|------------------|-----------------|----------------------------------|-------------|----------------------------|------------------------------|
| K0001        | 3m RSE Chamber   | Rainford EMC    | N/A                              | N/A         | 06 Sep 2022                | 12                           |
| M2040        | Thermohygrometer | Testo           | 608-H1                           | 45124934    | 09 Dec 2022                | 12                           |
| M2044        | Test Receiver    | Rohde & Schwarz | ESU26                            | 100122      | 29 Apr 2023                | 12                           |
| A3154        | Pre Amplifier    | Com Power       | PAM-103                          | 18020012    | 24 Aug 2022                | 12                           |
| A3155        | Pre Amplifier    | Com Power       | PAM-118A                         | 18040037    | 24 Aug 2022                | 12                           |
| A3179        | Pre Amplifier    | Agilent         | 8449B                            | 3008A00934  | 24 Aug 2022                | 12                           |
| A3198        | Antenna          | ETS-Lindgren    | 6502                             | 00221887    | 12 Aug 2022                | 12                           |
| A3138        | Antenna          | Schwarzbeck     | BBHA 9120<br>B                   | 00702       | 27 Aug 2022                | 12                           |
| A3139        | Antenna          | Schwarzbeck     | HWRD750                          | 00027       | 27 Aug 2022                | 12                           |
| A2467        | High Pass Filter | Wainwright      | WHJE5-920-<br>1000-4000-<br>60EE | 2           | 01 Nov 2022                | 12                           |
| A3093        | High Pass Filter | AtlanTecRF      | AFH-03000                        | 18051800077 | 27 Jan 2023                | 12                           |
| A3095        | High Pass Filter | AtlanTecRF      | AFH-07000                        | 18051600012 | 27 Mar 2023                | 12                           |
| K0017        | 3m RSE Chamber   | Rainford        | N/A                              | N/A         | 26 Oct 2022                | 12                           |
| M2003        | Thermohygrometer | Testo           | 608-H1                           | 45046641    | 09 Dec 2022                | 12                           |
| A2916        | Attenuator       | AtlanTecRF      | AN18W5-10                        | 832827#1    | 26 Jan 2023                | 12                           |
| M1995        | Test Receiver    | Rohde & Schwarz | ESU40                            | 100428      | 12 Oct 2022                | 12                           |
| A490         | Antenna          | Chase           | CBL6111A                         | 1590        | 14 Sep 2022                | 12                           |

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# **Test and Measurement Equipment (continued)**

# <u>Test Equipment Used for Transmitter Band Edge Radiated Emissions Tests</u>

| Asset<br>No. | Instrument       | Manufacturer    | Type No.  | Serial No. | Date<br>Calibration<br>Due | Cal.<br>Interval<br>(Months) |
|--------------|------------------|-----------------|-----------|------------|----------------------------|------------------------------|
| K0001        | 5m RSE Chamber   | Rainford EMC    | N/A       | N/A        | 06 Sep 2022                | 12                           |
| M2040        | Thermohygrometer | Testo           | 608-H1    | 45124934   | 09 Dec 2022                | 12                           |
| M2044        | Test Receiver    | Rohde & Schwarz | ESU26     | 100122     | 29 Apr 2023                | 12                           |
| A3154        | Pre Amplifier    | Com Power       | PAM-103   | 18020012   | 24 Aug 2022                | 12                           |
| A2523        | Attenuator       | AtlanTecRF      | AN18W5-10 | 832827#1   | 27 Jan 2023                | 12                           |
| A553         | Antenna          | Chase           | CBL6111A  | 1593       | 23 Nov 2022                | 12                           |

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# 3. Equipment Under Test (EUT)

# 3.1. Identification of Equipment Under Test (EUT)

| Brand Name:                 | A20-MINI        |
|-----------------------------|-----------------|
| Model Name or Number / PMN: | 9295W           |
| Test Sample Serial Number:  | GE9922068000    |
| Hardware Version / HVIN:    | 5               |
| Firmware Version:           | 5.00.C1         |
| FCC ID:                     | 2AKLX-9295W     |
| ISED Certification Number:  | IC: 22225-9295W |

# 3.2. Modifications Incorporated in the EUT

No modifications were applied to the EUT during testing.

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# 3.3. Additional Information Related to Testing

| Tested Technology:        | Short Range Device ( | Short Range Device (Digital Transmission System) |         |  |
|---------------------------|----------------------|--|---------|--|
| Power Supply Requirement: | Nominal              | Nominal 3.6 VDC                                  |         |  |
| Type of Unit:             | Transceiver          | Transceiver                                      |         |  |
| Modulation:               | COFDM                | COFDM  |         |  |
| Data Rate                 | 1.339 Mbps           | 1.339 Mbps                                       |         |  |
| Maximum Output Power:     | 18.1 dBm             | 18.1 dBm   |         |  |
| Transmit Frequency Range: | 902 MHz to 928 MHz   | 902 MHz to 928 MHz                               |         |  |
| Transmit Channels Tested: | Channel ID           | Channel ID Channel Frequency (MHz)               |         |  |
|                           | Bottom               | Bottom 902.400                                   |         |  |
|                           | Middle               |  | 915.000 |  |
|                           | Тор                  |  | 927.600 |  |

# 3.4. Description of Available Antennas

The radio utilizes an external whip antenna with the maximum gain stated below:

| Frequency Range (MHz) | Antenna Gain (dBi) |
|-----------------------|--------------------|
| 902-928               | 3.47               |

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# 3.5. Description of Test Setup

# **Support Equipment**

The following support equipment was used to exercise the EUT during testing:

| Description:          | Laptop PC       |
|-----------------------|-----------------|
| Brand Name:           | Dell            |
| Model Name or Number: | Precision M6800 |
| Serial Number:        | 86BSM12         |

| Description:          | Lavaliere Microphone |  |
|-----------------------|----------------------|--|
| Brand Name:           | Not marked or stated |  |
| Model Name or Number: | VT506WA-1934         |  |
| Serial Number:        | Not marked or stated |  |

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#### **Operating Modes**

The EUT was tested in the following operating mode(s):

 Continuously transmitting at maximum power with a modulated carrier on bottom, middle and top channels as required.

#### **Configuration and Peripherals**

The EUT was tested in the following configuration(s):

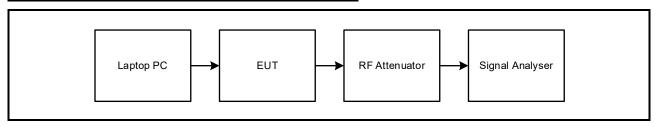
- Controlled in test mode using a software application on the laptop PC supplied by the customer. The application was used to enable a continuous transmission and to select the test channels as required. The customer supplied a document containing the setup instructions 'Set-Up\_Instructions\_v5.5.pdf. The laptop PC was connected to the EUT via USB-C cable.
- The power setting was set to 40 mW.
- Radiated emissions tests were performed with the EUT in the worst case orientation/position with respect to the emission levels. A lavaliere microphone was connected to the EUT.
- The EUT was powered from 3 x 1.5 V AAA alkaline batteries.
- The external whip antenna was removed to enable conducted measurements.

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## **Test Setup Diagrams**

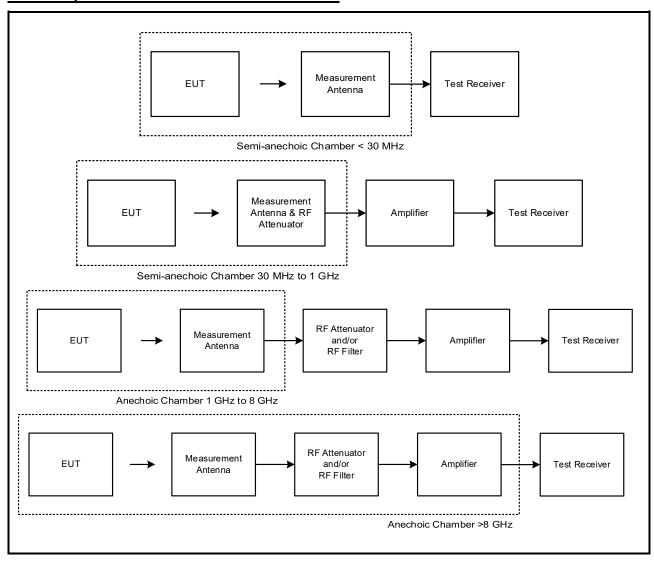
## **Conducted Tests:**

## **Test Setup for all Transmitter Conducted RF Tests**



## **Radiated Tests:**

## **Test Setup for Transmitter Radiated Emissions:**



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## 4. Test Results

# 4.1. Transmitter Minimum 6 dB Bandwidth

## **Test Summary:**

| Test Engineer:             | Jose Bayona  | Test Date: | 17 June 2022 |
|----------------------------|--------------|------------|--------------|
| Test Sample Serial Number: | GE9922068000 |            |              |

| FCC Reference:         | Part 15.247(a)(2)   |
|------------------------|---|
| ISED Canada Reference: | RSS-Gen 6.7 / RSS-247 5.2(a)                                      |
| Test Method Used:      | FCC KDB 558074 Section 8.2 referencing ANSI C63.10 Section 11.8.1 |

#### **Environmental Conditions:**

| Temperature (°C):      | 23 |
|------------------------|----|
| Relative Humidity (%): | 46 |

## Note(s):

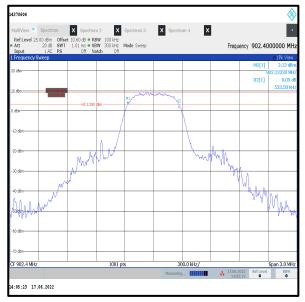
- 6 dB DTS bandwidth tests were performed using a test receiver in accordance with ANSI C63.10 Section 11.8.1 Option 1 measurement procedure. The test receiver resolution bandwidth was set to 100 kHz and video bandwidth 300 kHz. A peak detector was used, sweep time was set to auto and the trace mode was Max Hold. The DTS bandwidth was measured at 6 dB down from the peak of the signal.
- 2. The test receiver was connected to the RF port on the EUT using suitable attenuation and RF cable.

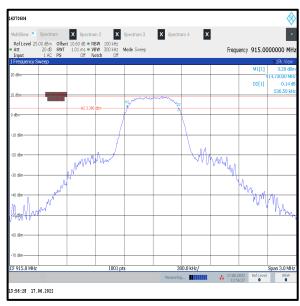
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## **Transmitter Minimum 6 dB Bandwidth (continued)**

## Results:

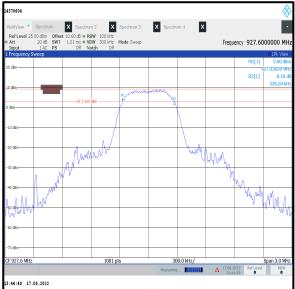
| Channel | 6 dB Bandwidth<br>(kHz) | Limit<br>(kHz) | Margin<br>(kHz) | Result   |
|---------|-------------------------|----------------|-----------------|----------|
| Bottom  | 533.500                 | ≥500           | 33.500          | Complied |
| Middle  | 536.500                 | ≥500           | 36.500          | Complied |
| Тор     | 536.500                 | ≥500           | 36.500          | Complied |





#### **Bottom Channel**

**Middle Channel** 



**Top Channel** 

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## 4.2. Transmitter 99% Occupied Bandwidth

#### **Test Summary:**

| Test Engineer:             | Jose Bayona  | Test Date: | 17 June 2022 |
|----------------------------|--------------|------------|--------------|
| Test Sample Serial Number: | GE9922068000 |            |              |

| FCC Reference:         | N/A         |
|------------------------|-------------|
| ISED Canada Reference: | RSS-Gen 6.7 |
| Test Method Used:      | RSS-Gen 6.7 |

## **Environmental Conditions:**

| Temperature (°C):      | 23 |
|------------------------|----|
| Relative Humidity (%): | 46 |

#### Note(s):

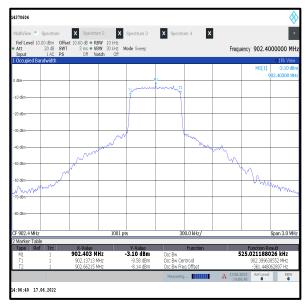
- 1. The 99% emission bandwidth was measured using the test receiver's occupied bandwidth function. The resolution bandwidth was set in the range of 1% to 5% of the occupied bandwidth and the video bandwidth set to 3 times the resolution bandwidth. The span was set to capture all products of the modulation process including emission skirts.
- 2. The test receiver's resolution bandwidth was set to 10 kHz and video bandwidth 30 kHz. A peak detector was used, sweep time was set to auto and the trace mode was Max Hold. The span was set to 3 MHz.
- 3. The test receiver was connected to the RF port on the EUT using suitable attenuation and RF cable.

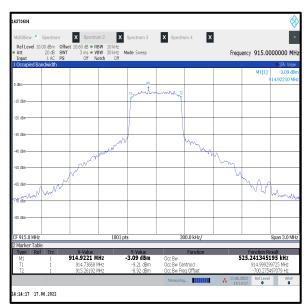
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## **Transmitter 99% Occupied Bandwidth (continued)**

## **Results:**

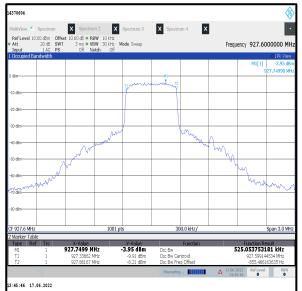
| Channel | 99% Occupied Bandwidth<br>(kHz) |
|---------|---------------------------------|
| Bottom  | 525.021                         |
| Middle  | 525.241                         |
| Тор     | 525.054                         |





#### **Bottom Channel**

**Middle Channel** 



**Top Channel** 

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## 4.3. Transmitter Maximum Peak Output Power

#### **Test Summary:**

| Test Engineer:             | Jose Bayona  | Test Date: | 17 June 2022 |
|----------------------------|--------------|------------|--------------|
| Test Sample Serial Number: | GE9922068000 |            |              |

| FCC Reference:         | Part 15.247(b)(3)   |
|------------------------|---|
| ISED Canada Reference: | RSS-Gen 6.12 / RSS-247 5.4(d)   |
| Test Method Used:      | FCC KDB 558074 Section 8.3.1.1 referencing ANSI C63.10 Section 11.9.1.1 |

#### **Environmental Conditions:**

| Temperature (°C):      | 23 |
|------------------------|----|
| Relative Humidity (%): | 46 |

#### Note(s):

- 1. 1. Conducted power tests were performed using a signal analyser in accordance with ANSI C63.10 Section 11.9.1.1 with the RBW ≥ DTS bandwidth procedure.
- 2. The signal analyser resolution bandwidth was set to 1 MHz and video bandwidth of 3 MHz. A peak detector was used, sweep time was set to auto and trace mode was Max Hold. The span was set to 5 MHz. A marker was placed at the peak of the signal and the results recorded in the tables below.
- The signal analyser was connected to the RF port on the EUT using suitable attenuation and RF cable. An RF level offset was entered on the signal analyser to compensate for the loss of the attenuator and RF cable.
- 4. The conducted power was added to the declared antenna gain to obtain the EIRP.

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# **Transmitter Maximum Peak Output Power (continued)**

# Results:

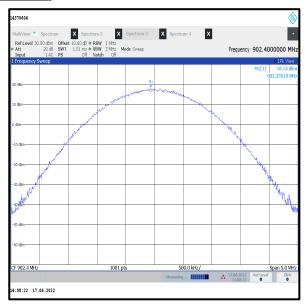
| Channel | Conducted<br>Peak Power<br>(dBm) | Conducted Peak<br>Power Limit<br>(dBm) | Margin<br>(dB) | Result   |
|---------|----------------------------------|--|----------------|----------|
| Bottom  | 18.1                             | 30.0                                   | 11.9           | Complied |
| Middle  | 17.7                             | 30.0                                   | 12.3           | Complied |
| Тор     | 17.8                             | 30.0                                   | 12.2           | Complied |

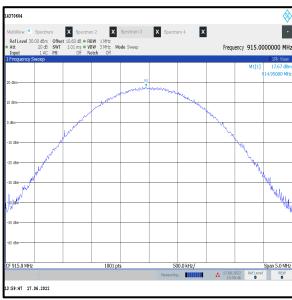
| Channel | Conducted<br>Peak Power<br>(dBm) | Measured<br>Antenna Gain<br>(dBi) | EIRP<br>(dBm) | De Facto<br>EIRP Limit<br>(dBm) | Margin<br>(dB) | Result   |
|---------|----------------------------------|-----------------------------------|---------------|---------------------------------|----------------|----------|
| Bottom  | 18.1                             | 3.47                              | 21.6          | 36.0                            | 14.4           | Complied |
| Middle  | 17.7                             | 3.47                              | 21.2          | 36.0                            | 14.8           | Complied |
| Тор     | 17.8                             | 3.47                              | 21.3          | 36.0                            | 14.7           | Complied |

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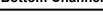
## **Transmitter Maximum Peak Output Power (continued)**

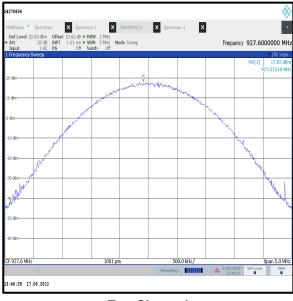
## **Results:**





#### **Bottom Channel**





**Top Channel** 

**Middle Channel** 

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## 4.4. Transmitter Power Spectral Density

#### **Test Summary:**

| Test Engineer:             | Jose Bayona  | Test Date: | 17 June 2022 |
|----------------------------|--------------|------------|--------------|
| Test Sample Serial Number: | GE9922068000 |            |              |

| FCC Reference:         | Part 15.247(e)  |
|------------------------|---|
| ISED Canada Reference: | RSS-247 5.2(b)  |
| Test Method Used:      | FCC KDB 558074 Section 8.4 referencing<br>ANSI C63.10 Section 11.10.2 |

## **Environmental Conditions:**

| Temperature (°C):      | 23 |
|------------------------|----|
| Relative Humidity (%): | 46 |

#### Note(s):

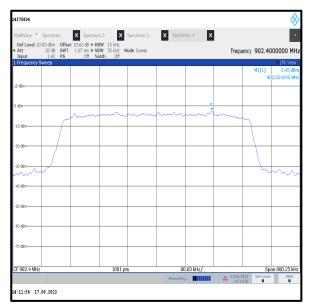
- 1. Transmitter Power Spectral Density tests were performed using a signal analyser in accordance with ANSI C63.10 Section 11.10.2.
- 2. The signal analyser resolution bandwidth was set to 10 kHz and video bandwidth 30 kHz. A Peak detector was used, sweep time was set to auto and the trace mode was Max Hold. The span was set to 1.5 times the measured DTS bandwidth. A marker was placed at the peak of the signal and the results recorded in the table below.
- 3. The signal analyser was connected to the RF port on the EUT using suitable attenuation and RF cable. An RF level offset was entered on the signal analyser to compensate for the loss of the attenuator and RF cable.

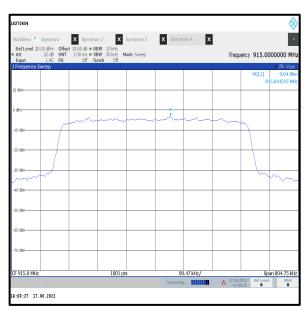
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## **Transmitter Power Spectral Density (continued)**

## Results:

| Channel | PSD<br>(dBm / 10 kHz) | Limit<br>(dBm / 3 kHz) | Margin<br>(dB) | Result   |
|---------|-----------------------|------------------------|----------------|----------|
| Bottom  | -2.4                  | 8.0                    | 10.4           | Complied |
| Middle  | -3.0                  | 8.0                    | 11.0           | Complied |
| Тор     | -3.0                  | 8.0                    | 11.0           | Complied |





#### **Bottom Channel**

Middle Channel



**Top Channel** 

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## 4.5. Transmitter Radiated Emissions <1 GHz

#### **Test Summary:**

| Test Engineer:             | John Ferdinand | Test Dates: | 15 June 2022 to<br>16 June 2022 |
|----------------------------|----------------|-------------|---------------------------------|
| Test Sample Serial Number: | GE9922068000   |             |                                 |

| FCC Reference:         | Parts 15.247(d) & 15.209(a)      |
|------------------------|----------------------------------|
| ISED Canada Reference: | RSS-Gen 6.13 / RSS-247 5.5       |
| Test Method Used:      | ANSI C63.10 Sections 6.3 and 6.5 |
| Frequency Range        | 9 kHz to 1000 MHz                |

#### **Environmental Conditions:**

| Temperature (°C):      | 23 to 24 |
|------------------------|----------|
| Relative Humidity (%): | 43 to 44 |

#### Note(s):

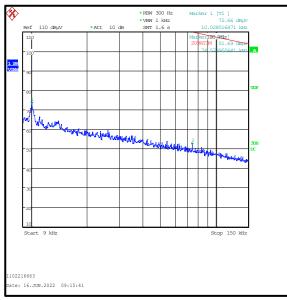
- 1. The emission at 915.0 MHz shown on the 30 MHz to 1 GHz plot is the EUT fundamental.
- 2. The final measured value, for the given emission, in the table below incorporates the calibrated antenna factor and cable loss.
- 3. Measurements below 30 MHz were performed in a semi-anechoic chamber (Asset Number K0001) at 3 metres. The EUT was placed at a height of 80 cm above the reference ground plane in the centre of the chamber turntable. Limits below 30 MHz are specified at a test distance of 30 metres, whilst below 0.49 MHz they are specified at a test distance of 300 metres. However, as specified by FCC Section 15.31 (f)(2), measurements may be performed at a closer distance and the measured level corrected to the specified measurement distance by using the square of an inverse linear distance extrapolation factor (40dB/decade).
- 4. Measurements between 30 MHz to 1 GHz were performed in a semi-anechoic chamber (Asset Number K0017) at a distance of 3 metres. The EUT was placed at a height of 80 cm above the reference ground plane in the centre of the chamber turntable. Maximum emission levels were determined by height searching the measurement antenna over the range 1 metre to 4 metres.
- The preliminary scans showed similar emission levels below 1 GHz, for each channel of operation. Therefore final radiated emissions measurements were performed with the EUT set to the middle channel only.
- The emissions observed between 9 kHz to 30 MHz on the pre-scan plots were investigated and found to be ambient emissions.
- 7. The plots below display an incorrect job number.

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## **Transmitter Radiated Emissions (continued)**

## **Results:**

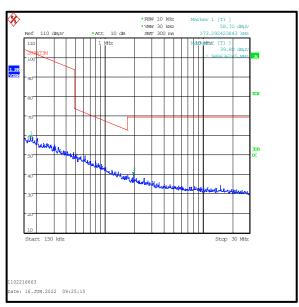
| Frequency<br>(MHz) | Antenna<br>Polarity | Level<br>(dBμV/m) | Limit<br>(dBμV/m) | Margin<br>(dB) | Result   |
|--------------------|---------------------|-------------------|-------------------|----------------|----------|
| 500.000            | Vertical            | 26.4              | 46.0              | 19.6           | Complied |
| 549.998            | Vertical            | 24.2              | 46.0              | 21.8           | Complied |
| 614.196            | Vertical            | 26.2              | 46.0              | 19.8           | Complied |



9 kHz to 150 kHz / peak detector / measured in a semi-anechoic chamber at 3 metres



30 MHz to 1 GHz / peak detector / measured in a semianechoic chamber at 3 metres



150 kHz to 30 MHz / peak detector / in a semianechoic chamber at 3 metres

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## 4.6. Transmitter Radiated Emissions >1 GHz

#### **Test Summary:**

| Test Engineer:             | John Ferdinand | Test Date: | 15 June 2022 |
|----------------------------|----------------|------------|--------------|
| Test Sample Serial Number: | GE9922068000   |            |              |

| FCC Reference:         | Parts 15.247(d) & 15.209(a)      |
|------------------------|----------------------------------|
| ISED Canada Reference: | RSS-Gen 6.13 & 8.9 / RSS-247 5.5 |
| Test Method Used:      | ANSI C63.10 Sections 6.3 and 6.6 |
| Frequency Range        | 1 GHz to 9.3 GHz                 |

#### **Environmental Conditions:**

| Temperature (°C):      | 23 |
|------------------------|----|
| Relative Humidity (%): | 44 |

#### Note(s):

- 1. The final measured value, for the given emission, in the table below incorporates the calibrated antenna factor and cable loss.
- 2. All other emissions shown on the pre-scan plots were investigated and found to be ambient, >20 dB below the applicable limit or below the measurement system noise floor.
- 3. Measurements above 1 GHz were performed in a semi-anechoic chamber (Asset Number K0001) at a distance of 3 metres. The EUT was placed at a height of 1.5 m above the reference ground plane in the centre of the chamber turntable. Maximum emission levels were determined by height searching the measurement antenna over the range 1 metre to 4 metres.
- 4. Pre-scans were performed and a marker placed on the highest measured level of the appropriate plot. The test receiver resolution bandwidth was set to 1 MHz and video bandwidth 3 MHz. The sweep time was set to auto. Peak and average measurements were performed with their respective detectors during the pre-scan measurements.
- 5. \*In accordance with ANSI C63.10 Section 6.6.4.3, Note 1, if the peak measured value complies with the average limit, it is unnecessary to perform an average measurement.
- 6. \*\* -30 dBc limit.
- 7. The plots below display an incorrect job number.

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# **Transmitter Radiated Emissions (continued**

## **Results: Bottom Channel**

| Frequency<br>(MHz) | Antenna<br>Polarity | Peak Level<br>(dBμV/m) | Limit<br>(dBμV/m) | Margin<br>(dB) | Result   |
|--------------------|---------------------|------------------------|-------------------|----------------|----------|
| 1804.758           | Vertical            | 36.5                   | 68.6**            | 32.1           | Complied |
| 2706.988           | Vertical            | 52.1                   | 54.0*             | 1.9            | Complied |

# **Results: Middle Channel**

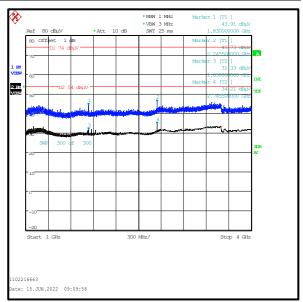
| Frequency<br>(MHz) | Antenna<br>Polarity | Peak Level<br>(dBμV/m) | Limit<br>(dBμV/m) | Margin<br>(dB) | Result   |
|--------------------|---------------------|------------------------|-------------------|----------------|----------|
| 1830.039           | Vertical            | 37.8                   | 72.7**            | 34.9           | Complied |
| 2745.180           | Vertical            | 50.4                   | 54.0*             | 3.6            | Complied |

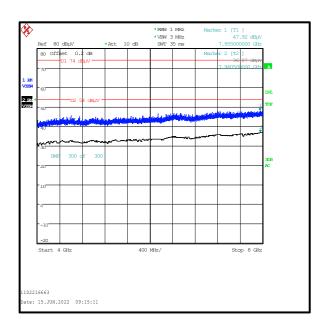
## **Results: Top Channel**

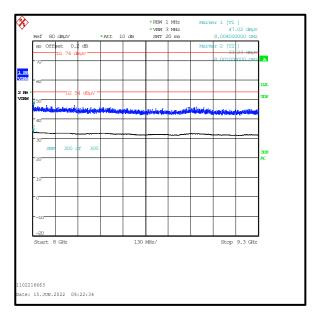
| Frequency<br>(MHz) | Antenna<br>Polarity | Peak Level<br>(dBμV/m) | Limit<br>(dBμV/m) | Margin<br>(dB) | Result   |
|--------------------|---------------------|------------------------|-------------------|----------------|----------|
| 1855.203           | Vertical            | 35.8                   | 66.2**            | 30.4           | Complied |
| 2783.328           | Vertical            | 50.6                   | 54.0*             | 3.4            | Complied |

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## **Transmitter Radiated Emissions (continued)**







Note: These plots are prescans and for indication purposes only. For final measurements, see accompanying tables.

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## 4.7. Transmitter Band Edge Radiated Emissions

#### **Test Summary:**

| Test Engineer:             | John Ferdinand | Test Date: | 15 June 2022 |
|----------------------------|----------------|------------|--------------|
| Test Sample Serial Number: | GE9922068000   |            |              |

| FCC Reference:         | Parts 15.247(d) & 15.209(a) |
|------------------------|-----------------------------|
| ISED Canada Reference: | RSS-Gen 6.13 / RSS-247 5.5  |
| Test Method Used:      | ANSI C63.10 Section 6.10    |

#### **Environmental Conditions:**

| Temperature (°C):      | 23 |
|------------------------|----|
| Relative Humidity (%): | 44 |

#### Note(s):

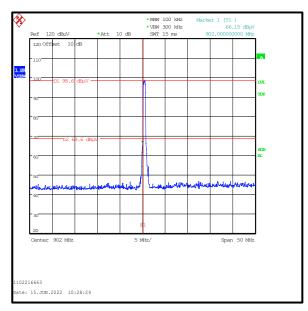
- 1. The final measured value, for the given emissions, in the tables below incorporates the calibrated antenna factor and cable loss.
- 2. As both band edges are adjacent to non-restricted bands, only peak measurements are required. The test receiver resolution bandwidth was set to 100 kHz and video bandwidth 300 kHz. A peak detector was used, sweep time was set to auto and trace mode was Max Hold. The test receiver was left to sweep for a sufficient length of time in order to maximise the carrier level and out-of-band emissions. A marker and corresponding reference level line were placed on the peak of the carrier. A marker was placed on the band edge spot frequencies and a second marker placed on the highest emission level in the adjacent band (where a higher level emission was present). Marker frequencies and levels were recorded.

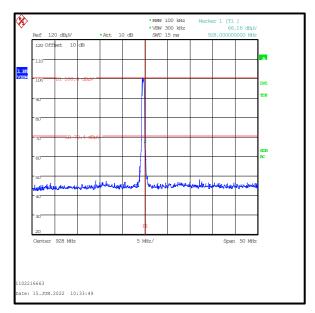
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# **Transmitter Band Edge Radiated Emissions (continued)**

## Results:

| Frequency<br>(MHz) | Peak Level<br>(dBµV/m) | -30 dBc Limit<br>(dBµV/m) | Margin<br>(dB) | Result   |
|--------------------|------------------------|---------------------------|----------------|----------|
| 902.000            | 66.2                   | 68.6                      | 2.4            | Complied |
| 928.000            | 66.2                   | 70.4                      | 4.2            | Complied |





**Lower Band Edge / Bottom Channel** 

**Upper Band Edge / Top Channel** 

--- END OF REPORT ---

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