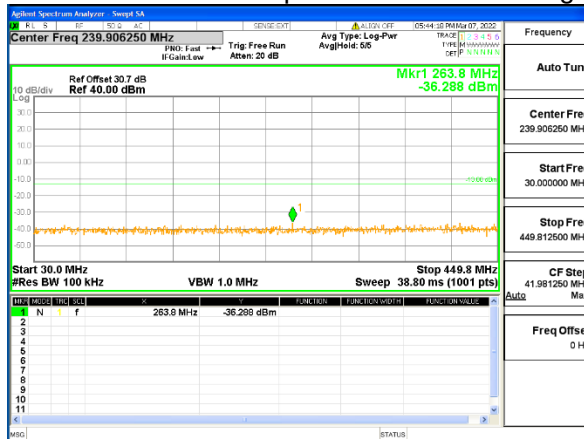
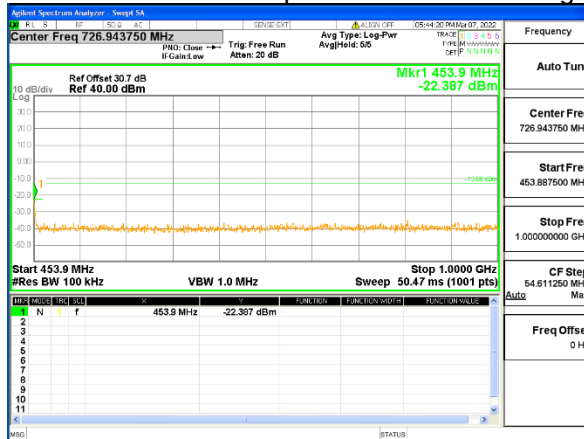


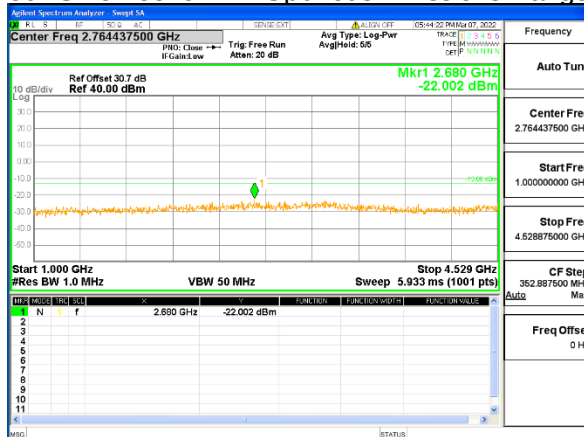
### 450PS 452.8875 MHz Spurious Emissions Range 3



### 450PS 452.8875 MHz Spurious Emissions Range 4



### 450PS 452.8875 MHz Spurious Emissions Range 5



## Noise Figure

|                                                                                                                              |                                                                               |                           |               |
|------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|---------------------------|---------------|
| Governing Doc                                                                                                                | FCC Part 90.219                                                               | Room Temperature (°C)     |               |
| Test Procedure                                                                                                               | ANSI/TIA-603- E; FCC KDB 935210 D05, v01r03                                   | Relative Humidity (%)     |               |
| Test Location                                                                                                                | Richmond                                                                      | Barometric Pressure (kPa) |               |
| Test Engineer                                                                                                                | Jeremy Lee                                                                    | Date                      | March 7, 2022 |
| EUT Voltage                                                                                                                  | <input checked="" type="checkbox"/> DC <input type="checkbox"/> 120VAC @ 60Hz |                           |               |
| Test Equipment Used                                                                                                          | Manufacturer                                                                  | Model                     | Serial Number |
| Signal Generator                                                                                                             | Keysight                                                                      | N5172B                    | MY53050270    |
| Spectrum Analyzer                                                                                                            | Keysight                                                                      | N9010A                    | MY50520285    |
| Calibration date                                                                                                             | Oct 9, 2021                                                                   | Calibration due           | Oct 9, 2023   |
| Frequency Range:                                                                                                             | <input checked="" type="checkbox"/> 2 times of the passband on each band      |                           |               |
| Detector:                                                                                                                    | <input checked="" type="checkbox"/> Average                                   |                           |               |
| RBW:                                                                                                                         | <input checked="" type="checkbox"/> 910 kHz                                   |                           |               |
| Type of Facility:                                                                                                            | <input checked="" type="checkbox"/> Tabletop                                  |                           |               |
| Distance:                                                                                                                    | <input checked="" type="checkbox"/> Direct                                    |                           |               |
| Noise Figure on each band is less than the 9 dB required.                                                                    |                                                                               |                           |               |
| Compliant <input checked="" type="checkbox"/> Non-Compliant <input type="checkbox"/> Not Applicable <input type="checkbox"/> |                                                                               |                           |               |

## Test setup

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Description of test set-up:</p> <p>Based on FCC KDB 935210 D05 Indus Booster Basic Meas v01r03: 2019, the system maximum gain and the noise density is measured. Measurements were performed within the EUT's passband.</p> <p>The noise figure is then calculated by <math>NF = NP - Gain + KTB \text{ Noise}</math>; where</p> <p>NP is in band noise power per Herz,</p> <p>Gain is measured at the maximum noise frequency with -55 dBm input signal in UL.</p> <p>KTB Noise is 174dB/Hz at room temperature.</p> <p>The EUT was set to <b>Operation Mode #1 with configuration Mode #1.</b></p> |
| <pre> graph LR     SA[Spectrum Analyzer] --- AH[airHost]     AH --- C(( ))     C --- EUT[EUT]     EUT --- T[50 Ohm Terminator]                 </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

## Results

| Test Band | Gain<br>(dB) | kTB<br>(dBm/Hz) | Measured Value<br>(dBm/Hz) | Noise Figure<br>(dB) |
|-----------|--------------|-----------------|----------------------------|----------------------|
| 800PS     | 93.82        | -174            | -76.66                     | 3.52                 |
| 700PS     | 93.80        | -174            | -77.28                     | 2.92                 |
| 450PS     | 92.66        | -174            | -77.91                     | 3.43                 |

### **Frequency Stability**

The hdHost and hd37 are synchronized to the same reference clock. Therefore there is no frequency error after down and up frequency conversion are performed.

The frequency stability check is not applicable to the EUT.

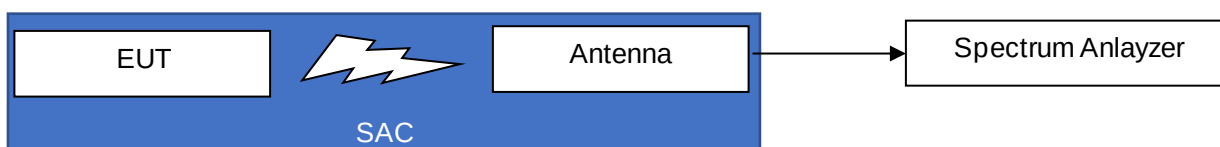
## Radiated Emissions - Enclosure

|                                                                                                                              |                                                                                                                                                                           |                           |               |
|------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|---------------|
| Governing Doc                                                                                                                | FCC Part 2.1053,<br>FCC Part 90.210<br>& FCC Part 90.219                                                                                                                  | Room Temperature (°C)     |               |
| Test Procedure                                                                                                               | ANSI TIA-603-D                                                                                                                                                            | Relative Humidity (%)     |               |
| Test Location                                                                                                                | Richmond                                                                                                                                                                  | Barometric Pressure (kPa) |               |
| Test Engineer                                                                                                                |                                                                                                                                                                           | Date                      | March 7, 2022 |
| EUT Voltage                                                                                                                  | <input checked="" type="checkbox"/> DC <input type="checkbox"/> 120VAC @ 60Hz                                                                                             |                           |               |
| Test Equipment Used                                                                                                          | Manufacturer                                                                                                                                                              | Model                     | Identifier    |
| Spectrum Analyzer                                                                                                            | KeySight                                                                                                                                                                  | N9038A                    | 702           |
| Broadband Antenna                                                                                                            | Sunol                                                                                                                                                                     | JB1                       | 371           |
| Loop Antenna                                                                                                                 | ComPower                                                                                                                                                                  | AL-130                    | 241           |
| Horn Antenna                                                                                                                 | A.H Systems                                                                                                                                                               | SAS-571                   | 227C          |
| RF Preamplifier                                                                                                              | Agilent                                                                                                                                                                   | 8449B                     | 273           |
| EMC Shielded Enclosure                                                                                                       | USC                                                                                                                                                                       | USC-26                    | 374           |
| Note1) NCR = No Calibration Required, but NSA was done at 2016.                                                              |                                                                                                                                                                           |                           |               |
| Frequency Range:                                                                                                             | <input checked="" type="checkbox"/> 9kHz-30MHz <input checked="" type="checkbox"/> 30-1000MHz <input checked="" type="checkbox"/> 1-18GHz                                 |                           |               |
| Detector:                                                                                                                    | <input checked="" type="checkbox"/> Peak (for Prescan) <input checked="" type="checkbox"/> Quasi-Peak(for Formal) <input checked="" type="checkbox"/> Average(for Formal) |                           |               |
| RBW/VBW:                                                                                                                     | <input checked="" type="checkbox"/> 9/30kHz <input checked="" type="checkbox"/> 120/300kHz <input checked="" type="checkbox"/> 1/3MHz                                     |                           |               |
| Type of Facility:                                                                                                            | <input checked="" type="checkbox"/> SAC <input type="checkbox"/> FSOATS <input type="checkbox"/> in-situ                                                                  |                           |               |
| Distance:                                                                                                                    | <input checked="" type="checkbox"/> 3meter <input type="checkbox"/> 10meter <input type="checkbox"/> 1meter                                                               |                           |               |
| Arrangement of EUT:                                                                                                          | <input checked="" type="checkbox"/> Table-top only <input type="checkbox"/> Floor-standing only <input type="checkbox"/> Rack Mounted                                     |                           |               |
| Compliant <input checked="" type="checkbox"/> Non-Compliant <input type="checkbox"/> Not Applicable <input type="checkbox"/> |                                                                                                                                                                           |                           |               |

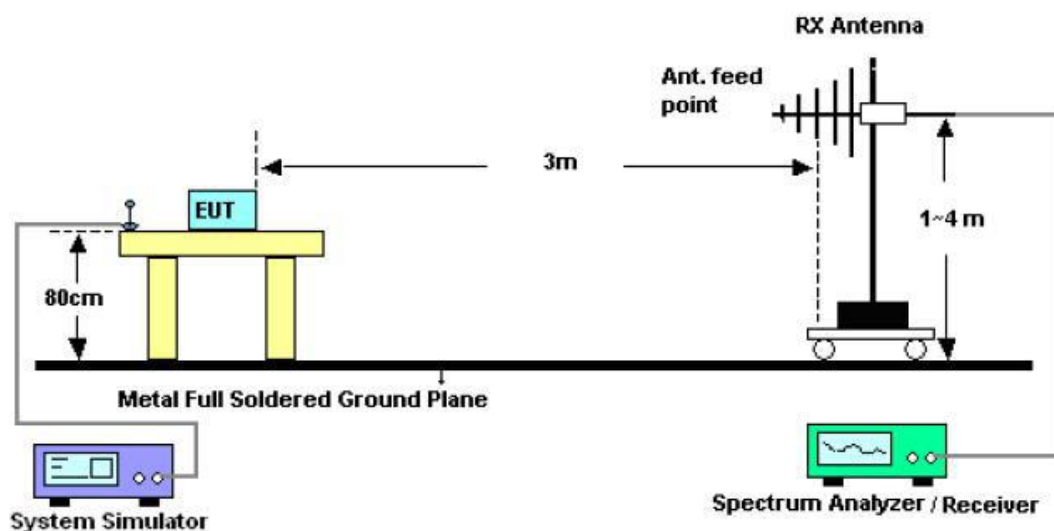
## Test setup

### Description of test set-up:

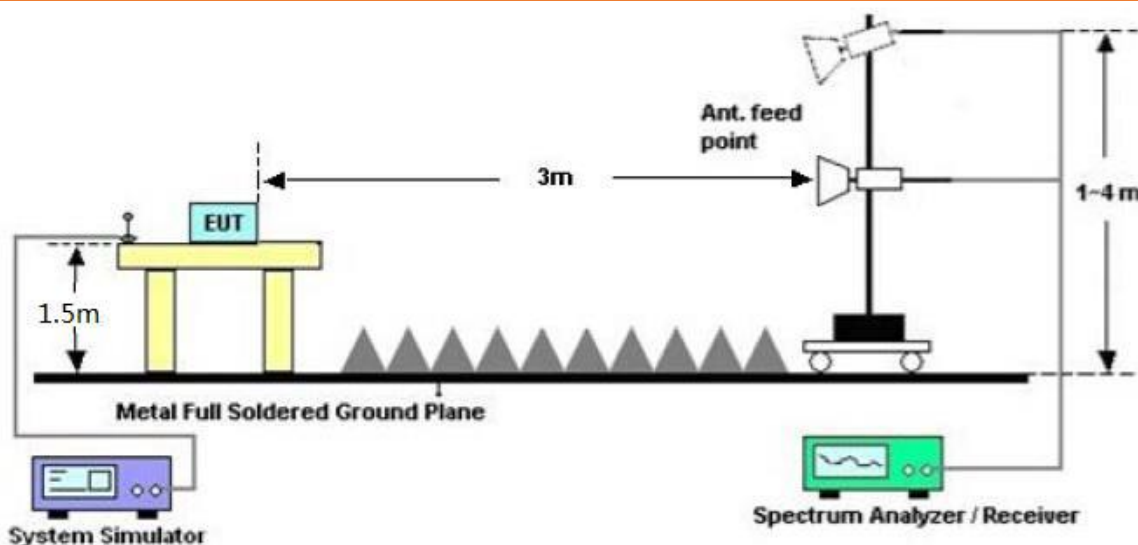
The EUT was placed on a nonconducting platform (i.e., an “EUT support table”), of nominal size 1 m by 1.5 m, whose top surface is nominally 80 cm above the reference ground plane. The EUT was set up on 3 meters away from the EUT. The EUT was set continually on its Radio, 5W Max., which was downlinked from hdHost. And the output of RF was terminated via 30dB attenuator, for rejecting the high power of carrier. The lowest, middle and highest channels were used for measuring of all radiated spurious emissions . The EUT was set to **Operation Mode #1 with configuration Mode #1.**



- Radiated Emission 30 to 1,000MHz, with JB-1



- Radiated Emission 1 to 18GHz, with SAS-571



### Measurement Procedure

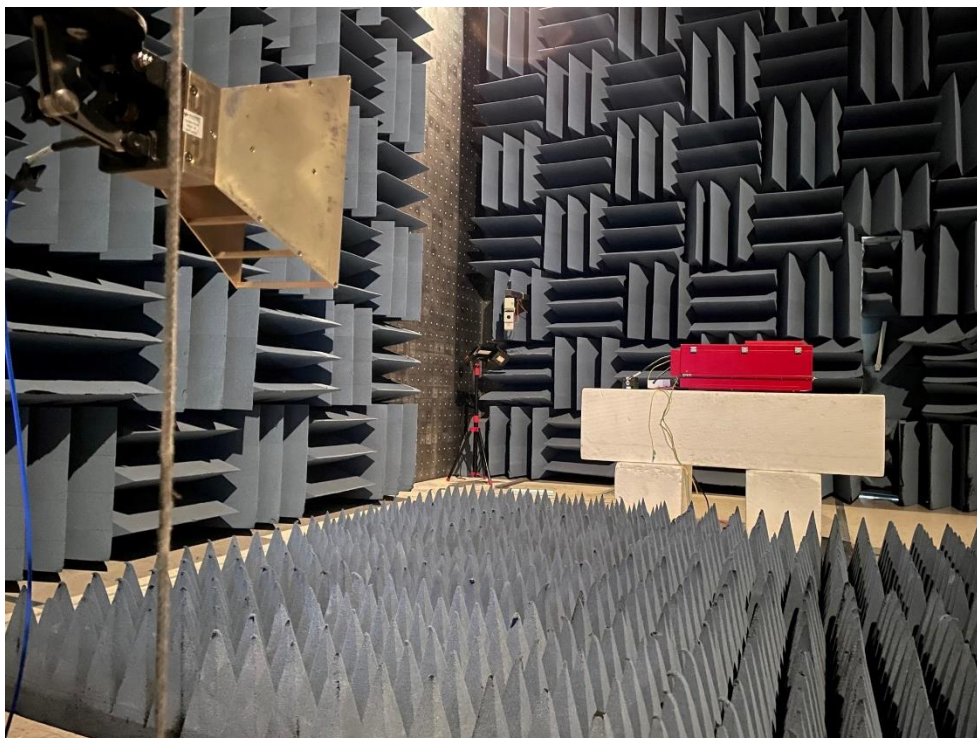
Testing was performed in accordance with the test standard(s) referenced in the test summary section of this report. The Equipment Under Test (EUT) was configured based upon the requirements of the applicable test standard. Initially, the primary emission frequencies are identified by positioning a broadband receive antenna three meter from the EUT.

Scans were made with an EMC Analyzer, controlled by EMC Test Software, Tile7!, from 30kHz to 18GHz with the receiver in the peak mode. The receiver IF bandwidth was 9kHz, 120 kHz or 1MHz as appropriate for the frequency and scan step was about 30kHz. To ensure that the maximum emission at each discrete frequency of interest is observed, the receive antenna is varied in height from one to four meters and rotated to produce horizontal and vertical polarities while the turntable is rotated to determine the worst emitting configuration. Under 30MHz was only tested at 1meter height and Antenna was changed both polarization, Horizontal and Vertical. Measurements were then made using CISPR quasi peak when the peak readings were within 10dB of the limit line. The numerical results are included herein to demonstrate compliance.

### Test Result

The output of EUT was set to 1 Watt(+30dBm), the PASS level of Spurious is:  $43 + 10\log(P) = 43 + 10\log(1) = 43\text{dB}$  attenuation = -13dBm Since of radiated measurement was performed at 3 meters, the limit line was converted to dBuV/m using the formulas ad outlined in KDB 971168: -13 dBm ERP = 84.38 dBuV/m at 3 meters. Spurious Emission level (dBuV/m) = Detected level (dBuV) + Path Loss(dB) + Antenna Factor (dB/m) - Preamplifier's Gain (dB)

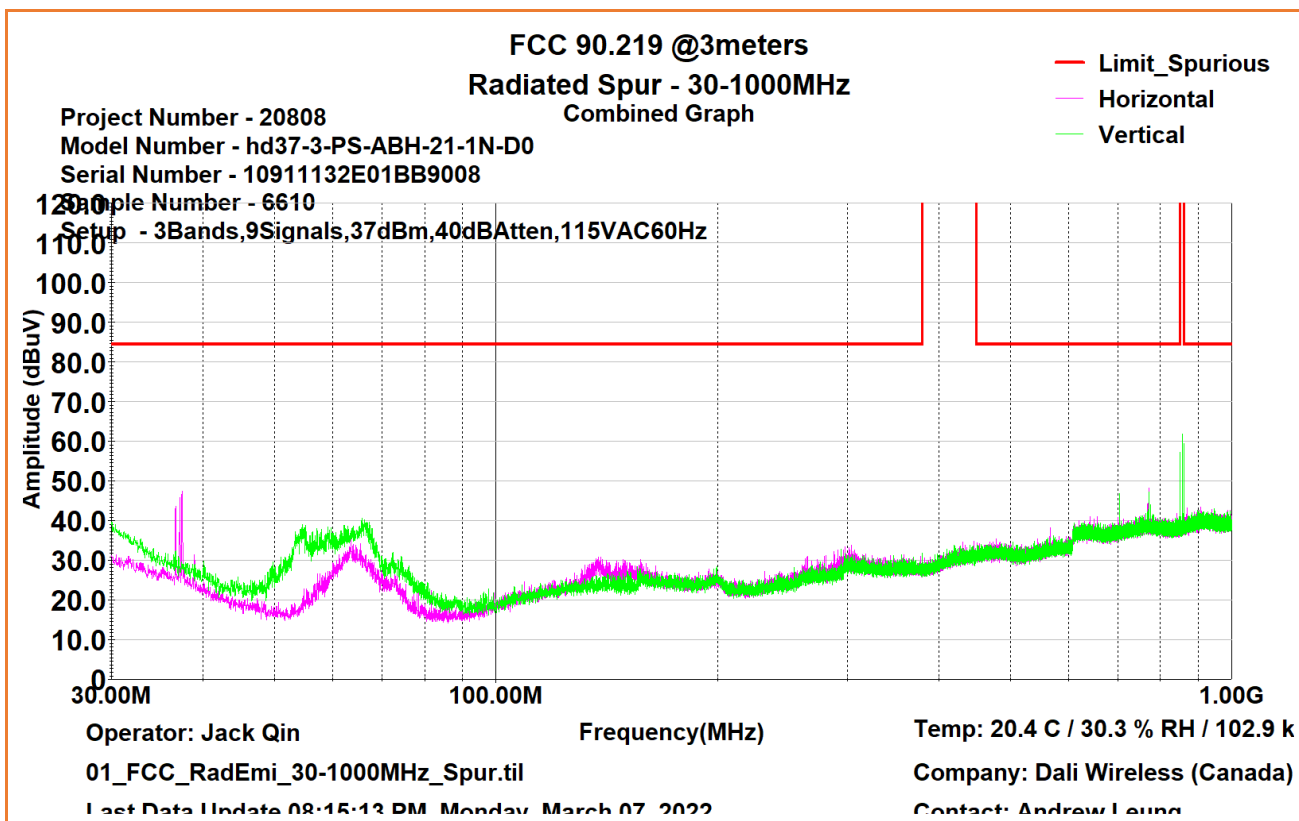
**Test setup picture:**



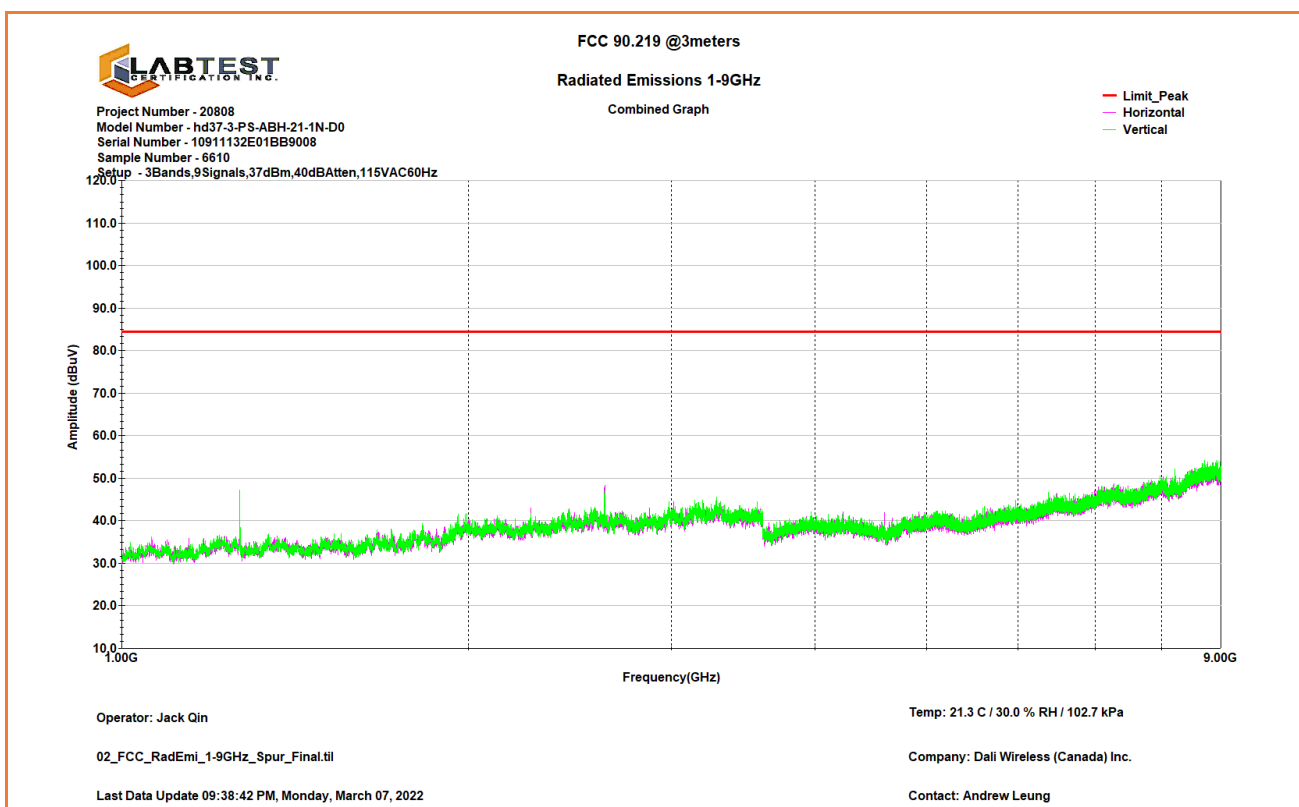
**Graphical Representation for Emission - Radiated 30kHz to 30MHz**

Spectrum was scanned manually from 30kHz to 30MHz. No automated plot is available for this frequency range. No spurious emissions from the product were detectable

**Graphical Representation for Emission - Radiated 30MHz to 1GHz**



### Graphical Representation for Emission - Radiated 1 to 9GHz



### Table Representation for Emission - Radiated 30MHz to 9GHz

No Emissions were measured. All emissions detected, other than the fundamental, were related to the Digital Mode circuitry. No Transmitter Spurious Emissions were detectable and are greater than 20dB below the limit line.

## APPENDIX A: ISO 17025:2005 Accreditation Certificate



# CERTIFICATE OF ACCREDITATION

### ANSI-ASQ National Accreditation Board

500 Montgomery Street, Suite 625, Alexandria, VA 22314, 877-344-3044

This is to certify that

**Labtest Certification, Inc.**  
**3128, 20800 Westminster HWY**  
**Richmond B.C. V6V 2W3**

has been assessed by ANAB  
and meets the requirements of international standard

**ISO/IEC 17025:2005**

while demonstrating technical competence in the field of

**TESTING**

Refer to the accompanying Scope of Accreditation for information regarding the types of tests to which this accreditation applies.

AT-2033

Certificate Number

  
ANAB Approval

Certificate Valid: 08/07/2017-03/04/2018  
Version No. 004 Issued: 08/07/2017



This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005.  
This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated April 2017).



## SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

**Labtest Certification, Inc.**  
3128, 20800 Westminster HWY  
Richmond, B.C. V6V 2W3  
Kavinder Dhillon Ruben Ugarte Phone: 604-247-0444  
kdhillon@labtestcert.com rubenUgarte@labtestcert.com  
www.labtestcert.com

### TESTING

Valid to: **March 4, 2018**

Certificate Number: **A-T-2033**

#### Testing performed in support of FCC DoC and Certification approval procedures

| Type of Device Examples                                                                               | Scope of Accreditation                                                                        | Supporting FCC Guidance | Comments |
|-------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------|----------|
| Unintentional Radiators (FCC Part 15, Subpart B)                                                      | • ANSI C63.4-2014                                                                             |                         |          |
| Industrial, Scientific, and Medical Equipment (FCC Part 18)                                           | • FCC MP-5, (February 1986)                                                                   |                         |          |
| • Consumer ISM equipment                                                                              |                                                                                               |                         |          |
| Intentional Radiators (FCC Part 15 Subpart C)                                                         | • ANSI C63.10-2013                                                                            |                         |          |
| UPCS (FCC Part 15, Subpart D)                                                                         | • ANSI C63.17-2013                                                                            |                         |          |
| • Unlicensed Personal Communication Systems devices                                                   |                                                                                               |                         |          |
| U-NII without DFS Intentional Radiators (FCC Part 15, Subpart E)                                      | • ANSI C63.10-2013                                                                            | KDB Publication 789033  |          |
| • Unlicensed National Information Infrastructure Devices (U-NII without DFS)                          |                                                                                               |                         |          |
| U-NII with DFS Intentional Radiators (FCC Part 15 Subpart E)                                          | • FCC KDB Publication 905462 D02 UNII DFS Compliance Procedures New Rules v01 (April 8, 2016) |                         |          |
| • Unlicensed National Information Infrastructure U-NII Devices with Dynamic Frequency Selection (DFS) |                                                                                               |                         |          |
| UWB Intentional Radiators (FCC Part 15, Subpart F)                                                    | • ANSI C63.10-2013                                                                            |                         |          |
| • Ultra-wideband Operation                                                                            |                                                                                               |                         |          |
| BPL Intentional Radiators (FCC Part 15, Subpart G)                                                    | • ANSI C63.10-2013                                                                            |                         |          |
| • Access Broadband Over Power Line (Access BPL)                                                       |                                                                                               |                         |          |
| White Space Device Intentional Radiators (FCC Part 15, Subpart H)                                     | • ANSI C63.10-2013                                                                            |                         |          |
| • White Space Devices                                                                                 |                                                                                               |                         |          |

Version 003 Issued: 08/07/2017

[www.anab.org](http://www.anab.org)



Page 1 of 8



**Testing performed in support of FCC DoC and Certification approval procedures**

| Type of Device Examples                                                                                                                                                          | Scope of Accreditation                       | Supporting FCC Guidance                          | Comments                                                                                 |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|--------------------------------------------------|------------------------------------------------------------------------------------------|
| Commercial Mobile Services (FCC Licensed Radio Service Equipment)<br>•Part 22 (cellular)<br>•Part 24<br>•Part 25 (non-microwave)<br>•Part 27                                     | • ANSI/TIA-603-D<br>• TIA-102.CAAA-D         | KDB Publication 971168                           |                                                                                          |
| General Mobile Radio Services (FCC Licensed Radio Service Equipment)<br>•Part 22 (non-cellular)<br>•Part 90 (non-microwave)<br>•Part 95<br>•Part 97<br>•Part 101 (non-microwave) | • ANSI/TIA-603-D<br>• TIA-102.CAAA-D         |                                                  | Microwave Frequencies, as used in this part, refers to frequencies of 890 MHz and above. |
| Citizens Broadband Radio Services (FCC Licensed Radio Service Equipment)<br>•Part 96                                                                                             | • ANSI/TIA-603-D<br>• TIA-102.CAAA-D         | KDB Publication 971168                           |                                                                                          |
| Maritime and Aviation Radio Services (FCC Licensed Radio Service Equipment)<br>•Part 80<br>•Part 87                                                                              | • ANSI/TIA-603-D                             |                                                  |                                                                                          |
| Microwave and Millimeter Bands Radio Services (FCC Licensed Radio Service Equipment)<br>•Part 25<br>•Part 74<br>•Part 90 (90Y, 90Z, D SRC)<br>•Part 101                          | • ANSI/TIA-603-D<br>• TIA-102.CAAA-D         |                                                  |                                                                                          |
| Broadcast Radio Services (FCC Licensed Radio Service Equipment)<br>•Part 73<br>•Part 74 (non-microwave)                                                                          | • ANSI/TIA-603-D<br>• TIA-102.CAAA-D         |                                                  |                                                                                          |
| RF Exposure<br>•Devices subject to SAR requirements                                                                                                                              | • IEEE Std 1528™-2013                        | KDB Publication 865664<br>KDB Publication 447498 |                                                                                          |
| Hearing Aid Compatibility (Part 20)<br>•HAC for Commercial mobile services                                                                                                       | • ANSI C63.19-2007; or<br>• ANSI C63.19-2011 |                                                  |                                                                                          |



**Testing performed in support of FCC DoC and Certification approval procedures**

| Type of Device Examples                                                                                                                 | Scope of Accreditation                                                                                                                                                                                                                                                                                                                  | Supporting FCC Guidance | Comments |
|-----------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|----------|
| Signal Boosters (Part 20)<br>• Wideband Consumer signal boosters<br>• Provider-specific signal boosters<br>• Industrial signal boosters | <ul style="list-style-type: none"> <li>FCC KDB Publication 935210 D03 Signal Booster Measurements v04 (February 12, 2016)</li> <li>FCC KDB Publication 935210 D04 Provider Specific Booster Measurements v02 (February 12, 2016)</li> <li>FCC KDB Publication 935210 D05 Indus Booster Basic Meas v01r01 (February 12, 2016)</li> </ul> |                         |          |

**Electromagnetic Compatibility (EMC)**

| Test Method                      | Test Specification(s)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Range           | Comments |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|----------|
| Unintentional Radiators          | ANSI C63.4-2003<br>ANSI C63.4-2009                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                 |          |
| Radiated and Conducted Emissions | ANSI C63.4:2014;<br>FCC O STMP-05 (1986); ICES-001(2006);<br>ICES-002(2013);<br>ICES-003(2016);<br>ICES-005(2009);<br>CISPR 16-1-1(2015); CISPR 16-1-2(2014);<br>CISPR 16-1-3(2006); CISPR 16-2-1(2014);<br>CISPR 16-2-2(2010); CISPR 16-2-3(2014);<br>CISPR 16-2-5(2008); CISPR 16-4-2(2014);<br>EN 55016-1-1(2010);<br>EN 55016-1-2(2014);<br>EN 55016-1-3(2006);<br>EN 55016-1-4(2010);<br>EN 55016-2-1(2014);<br>EN 55016-2-2(2011);<br>EN 55016-2-3(2014);<br>EN 55016-4-2(2014); CISPR 11(2012);<br>EN 55011(2013);<br>AS/NZS CISPR 11(2013); KN 11 (RRA<br>Announce 2015-110, Dec, 03, 2015);<br>VCCI V-3 (up to 6 GHz); VCCI V-5;<br>CNS 13438 | 9 kHz to 40 GHz |          |



**END OF REPORT**

Page 87 of 87