



FCC PART 74, SUBPART H  
ISED RSS-210, ISSUE 9, ANNEX G  
TEST AND MEASUREMENT REPORT

For

**Lectrosonics, Inc.**

581 Laser Road NE Rio Rancho, NM 87124, USA

**FCC ID: DBZDCHT  
IC: 8024A-DCHT**

<b>Report Type:</b> Original Report	<b>Product Type:</b> Digital Wireless Microphone Transmitter
Prepared By: <u>Vincent Licata</u>	
Report Number: <u>R1805223-74</u>	
Report Date: <u>2018-07-02</u>	
Reviewed By: <u>Jin Yang</u>	
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Note: This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. This report must not be used by the customer to claim product certification, approval, or endorsement by A2LA\* or any agency of the Federal Government. \* This report may contain data that are not covered by the A2LA accreditation and are marked with an asterisk \*\* (Rev.3)

## TABLE OF CONTENTS

<b>1</b>	<b>GENERAL DESCRIPTION .....</b>	<b>5</b>
1.1	PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT) .....	5
1.2	MECHANICAL DESCRIPTION OF EUT .....	5
1.3	OBJECTIVE .....	5
1.4	RELATED SUBMITTAL(S)/GRANT(S).....	5
1.5	TEST METHODOLOGY .....	5
1.6	MEASUREMENT UNCERTAINTY.....	6
1.7	TEST FACILITY REGISTRATIONS .....	6
1.8	TEST FACILITY ACCREDITATIONS.....	6
<b>2</b>	<b>EUT TEST CONFIGURATION.....</b>	<b>9</b>
2.1	JUSTIFICATION .....	9
2.2	EUT EXERCISE SOFTWARE.....	9
2.3	DUTY CYCLE CORRECTION FACTOR .....	9
2.4	SPECIAL EQUIPMENT .....	9
2.5	EQUIPMENT MODIFICATIONS .....	9
2.6	LOCAL SUPPORT EQUIPMENT.....	10
2.7	INTERFACE PORTS AND CABLES .....	10
<b>3</b>	<b>SUMMARY OF TEST RESULTS.....</b>	<b>11</b>
<b>4</b>	<b>FCC §2.1093 &amp; ISED RSS-102 - RF EXPOSURE .....</b>	<b>12</b>
<b>5</b>	<b>ISED RSS-GEN §6.8 - ANTENNA REQUIREMENTS.....</b>	<b>13</b>
5.1	APPLICABLE STANDARDS .....	13
5.2	ANTENNA DESCRIPTION .....	13
<b>6</b>	<b>FCC §74.861(E) (1) &amp; ISED RSS-210 G.3.1 - RF OUTPUT POWER .....</b>	<b>14</b>
6.1	APPLICABLE STANDARDS .....	14
6.2	TEST PROCEDURE .....	14
6.3	TEST EQUIPMENT LIST AND DETAILS .....	14
6.4	TEST ENVIRONMENTAL CONDITIONS.....	14
6.5	TEST RESULTS .....	15
<b>7</b>	<b>FCC §74.861(E) (5) (7) &amp; ISED RSS-210 G.3.2, G.3.4 - OCCUPIED BANDWIDTH &amp; EMISSION MASK</b>	<b>16</b>
7.1	APPLICABLE STANDARDS .....	16
7.2	TEST PROCEDURE .....	16
7.3	TEST EQUIPMENT LIST AND DETAILS .....	16
7.4	TEST ENVIRONMENTAL CONDITIONS.....	17
7.5	TEST RESULTS .....	17
<b>8</b>	<b>FCC §74.861(E) (7) &amp; ISED RSS-210 G.3.4 - CONDUCTED SPURIOUS EMISSIONS AT ANTENNA PORT</b>	<b>21</b>
8.1	APPLICABLE STANDARDS .....	21
8.2	TEST PROCEDURE .....	21
8.3	TEST EQUIPMENT LIST AND DETAILS .....	21
8.4	TEST ENVIRONMENTAL CONDITIONS.....	22
8.5	TEST RESULTS .....	22
<b>9</b>	<b>FCC §74.861(E) (7) &amp; ISED RSS-210 G.3.4 - FIELD STRENGTH OF SPURIOUS RADIATION .....</b>	<b>25</b>
9.1	APPLICABLE STANDARDS .....	25
9.2	TEST PROCEDURE .....	25
9.3	TEST EQUIPMENT LIST AND DETAILS .....	26
9.4	TEST ENVIRONMENTAL CONDITIONS.....	26
9.5	TEST RESULTS .....	27

<b>10</b>	<b>FCC §74.861(E) (4) &amp; ISED RSS-210 G.3.3 - FREQUENCY STABILITY .....</b>	<b>28</b>
10.1	APPLICABLE STANDARDS .....	28
10.2	TEST PROCEDURE .....	28
10.3	TEST EQUIPMENT LIST AND DETAILS .....	29
10.4	TEST ENVIRONMENTAL CONDITIONS .....	29
10.5	TEST RESULTS .....	30
<b>11</b>	<b>EXHIBIT A - FCC &amp; ISED EQUIPMENT LABELING REQUIREMENTS.....</b>	<b>37</b>
11.1	FCC ID LABEL REQUIREMENTS.....	37
11.2	IC LABEL REQUIREMENTS .....	37
11.3	LABEL CONTENTS AND LOCATION.....	38
<b>12</b>	<b>EXHIBIT B - EUT PHOTOGRAPHS.....</b>	<b>39</b>
<b>13</b>	<b>EXHIBIT C (INFORMATIVE) - A2LA ELECTRICAL TESTING CERTIFICATE .....</b>	<b>40</b>

**DOCUMENT REVISION HISTORY**

<b>Revision Number</b>	<b>Report Number</b>	<b>Description of Revision</b>	<b>Date of Revision</b>
0	R1805223-74	Original Report	2018-06-15
1	R1805223-74	Updated Page 11, 29	2018-07-02

## 1 General Description

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### 1.1 Product Description for Equipment Under Test (EUT)

This test and measurement report has been compiled on behalf of *Lectrosonics, Inc.* and their product model: *DCHT, FCC ID: DBZDCHT, IC: 8024A-DCHT* which henceforth is referred to as the EUT (Equipment Under Test). The EUT is a Digital wireless microphone transmitter.

The EUT operates in the frequency range: 470.1-607.95 MHz.

### 1.2 Mechanical Description of EUT

The EUT measures approximately 8 cm (L) x 6.2 cm (W) x 1.9 cm (H) and weighs approximately 0.185 kg.

*The data gathered are from a typical production sample provided by the Lectrosonics, Inc. with serial number: 2*

### 1.3 Objective

The following type approved report is prepared on behalf of *Lectrosonics, Inc.* in accordance with Part 74, Subparts H of the Federal Communications Commission rules, Issue 5 of the Industry Canada RSS-Gen General Requirements and Information for the Certification of Radio Apparatus and Issue 9 of Industry Canada RSS-210, License-Exempt, Low-Power Radio Apparatus Operating in the Television Bands.

The objective is to determine compliance with Part 74 of the FCC Rules, Industry Canada RSS-Gen and Industry Canada RSS-210 Standard, limits for RF output power, Modulation characteristics, Emission bandwidth, Field strength of spurious radiation and Frequency stability for license-exempt, low-power radio apparatus operating in the television bands.

### 1.4 Related Submittal(s)/Grant(s)

N/A

### 1.5 Test Methodology

All measurements contained in this report were conducted in accordance with FCC KDB 971168 D01 Power Meas License Digital Systems v03r01, and EN 300 422-1 v1.4.2 Electromagnetic compatibility and Radio Spectrum Matters; Wireless microphones in the 25MHz to 3GHz frequency range.

All tests were performed at Bay Area Compliance Laboratories Corp.

## 1.6 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in the field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on CISPR16-4-2:2011, The Treatment of Uncertainty in EMC Measurements, the values ranging from  $\pm 2.0$  dB for Conducted Emissions tests and  $\pm 4.0$  dB for Radiated Emissions tests are the most accurate estimates pertaining to uncertainty of EMC measurements at BACL Corp.

## 1.7 Test Facility Registrations

BACL's test facilities that are used to perform Radiated and Conducted Emissions tests are currently recognized by the Federal Communications Commission as Accredited with NIST Designation Number US1129.

BACL's test facilities that are used to perform Radiated and Conducted Emissions tests are currently registered with Industry Canada under Registration Numbers: 3062A-1, 3062A-2, and 3062A-3.

BACL is a Chinese Taipei Bureau of Standards Metrology and Inspection (BSMI) validated Conformity Assessment Body (CAB), under Appendix B, Phase I Procedures of the APEC Mutual Recognition Arrangement (MRA). BACL's BSMI Lab Code Number is: SL2-IN-E-1002R

BACL's test facilities that are used to perform AC Line Conducted Emissions, Telecommunications Line Conducted Emissions, Radiated Emissions from 30 MHz to 1 GHz, and Radiated Emissions from 1 GHz to 6 GHz are currently recognized as Accredited in accordance with the Voluntary Control Council for Interference [VCCI] Article 15 procedures under Registration Number A-0027.

## 1.8 Test Facility Accreditations

Bay Area Compliance Laboratories Corp. (BACL) is:

**A- An independent, 3<sup>rd</sup>-Party, Commercial Test Laboratory accredited to ISO/IEC 17025:2005 by A2LA (Test Laboratory Accreditation Certificate Number 3279.02)**, in the fields of: Electromagnetic Compatibility and Telecommunications. Unless noted by an Asterisk (\*) in the Compliance Matrix (See Section 3 of this Test Report), BACL's ISO/IEC 17025:2005 Scope of Accreditation includes all of the Test Method Standards and/or the Product Family Standards detailed in this Test Report..

BACL's ISO/IEC 17025:2005 Scope of Accreditation includes a comprehensive suite of EMC Emissions, EMC Immunity, Radio, RF Exposure, Safety and wireline Telecommunications test methods applicable to a wide range of product categories. These product categories include Central Office Telecommunications Equipment [including NEBS - Network Equipment Building Systems], Unlicensed and Licensed Wireless and RF devices, Information Technology Equipment (ITE); Telecommunications Terminal Equipment (TTE); Medical Electrical Equipment; Industrial, Scientific and Medical Test Equipment; Professional Audio and Video Equipment; Industrial and Scientific Instruments and Laboratory Apparatus; Cable Distribution Systems, and Energy Efficient Lighting.

**B- A Product Certification Body accredited to ISO/IEC 17065:2012 by A2LA (Product Certification Body**  
- - For the USA (Federal Communications Commission):

- 1- All Unlicensed radio frequency devices within FCC Scopes A1, A2, A3, and A4;
- 2- All Licensed radio frequency devices within FCC Scopes B1, B2, B3, and B4;
- 3- All Telephone Terminal Equipment within FCC Scope C.

- For the Canada (Industry Canada):

- 1- All Scope 1-Licence-Exempt Radio Frequency Devices;
- 2- All Scope 2-Licensed Personal Mobile Radio Services;
- 3- All Scope 3-Licensed General Mobile & Fixed Radio Services;
- 4- All Scope 4-Licensed Maritime & Aviation Radio Services;
- 5- All Scope 5-Licensed Fixed Microwave Radio Services
- 6- All Broadcasting Technical Standards (BETS) in the Category I Equipment Standards List.

For Singapore (Info-Communications Development Authority (IDA)):

- 1 All Line Terminal Equipment: All Technical Specifications for Line Terminal Equipment – Table 1 of IDA MRA Recognition Scheme: 2011, Annex 2
2. All Radio-Communication Equipment: All Technical Specifications for Radio-Communication Equipment – Table 2 of IDA MRA Recognition Scheme: 2011, Annex 2

- For the Hong Kong Special Administrative Region:

- 1 All Radio Equipment, per KHCA 10XX-series Specifications;
- 2 All GMDSS Marine Radio Equipment, per HKCA 12XX-series Specifications;
- 3 All Fixed Network Equipment, per HKCA 20XX-series Specifications.

- For Japan:

- 1 MIC Telecommunication Business Law (Terminal Equipment):
  - All Scope A1 - Terminal Equipment for the Purpose of Calls;
  - All Scope A2 - Other Terminal Equipment
- 2 Radio Law (Radio Equipment):
  - All Scope B1 - Specified Radio Equipment specified in Article 38-2-2, paragraph 1, item 1 of the Radio Law
  - All Scope B2 - Specified Radio Equipment specified in Article 38-2-2, paragraph 1, item 2 of the Radio Law
  - All Scope B3 - Specified Radio Equipment specified in Article 38-2-2, paragraph 1, item 3 of the Radio Law

**C- A Product Certification Body accredited to ISO/IEC 17065:2012 by A2LA (Product Certification Body Accreditation Certificate Number 3279.01)** to certify Products to USA's Environmental Protection Agency (EPA) ENERGY STAR Product Specifications for:

- 1 Electronics and Office Equipment:
  - for Telephony (ver. 3.0)
  - for Audio/Video (ver. 3.0)
  - for Battery Charging Systems (ver. 1.1)
  - for Set-top Boxes & Cable Boxes (ver. 4.1)
  - for Televisions (ver. 6.1)
  - for Computers (ver. 6.0)
  - for Displays (ver. 6.0)
  - for Imaging Equipment (ver. 2.0)
  - for Computer Servers (ver. 2.0)
- 2 Commercial Food Service Equipment
  - for Commercial Dishwashers (ver. 2.0)
  - for Commercial Ice Machines (ver. 2.0)
  - for Commercial Ovens (ver. 2.1)
  - for Commercial Refrigerators and Freezers
- 3 Lighting Products
  - For Decorative Light Strings (ver. 1.5)
  - For Luminaires (including sub-components) and Lamps (ver. 1.2)
  - For Compact Fluorescent Lamps (CFLs) (ver. 4.3)
  - For Integral LED Lamps (ver. 1.4)
- 4 Heating, Ventilation, and AC Products

- for Residential Ceiling Fans (ver. 3.0)
- for Residential Ventilating Fans (ver. 3.2)

5 Other

- For Water Coolers (ver. 3.0)

**D. A NIST Designated Phase-I and Phase-II Conformity Assessment Body (CAB) for the following economies and regulatory authorities under the terms of the stated MRAs/Treaties:**

- Australia: ACMA (Australian Communication and Media Authority) – APEC Tel MRA -Phase I;
- Canada: (Industry Canada - IC) Foreign Certification Body – FCB – APEC Tel MRA -Phase I & Phase II;
- Chinese Taipei (Republic of China – Taiwan):
  - o BSMI (Bureau of Standards, Metrology and Inspection) APEC Tel MRA -Phase I;
  - o NCC (National Communications Commission) APEC Tel MRA -Phase I;
- European Union:
  - o EMC Directive 2014/30/EU US-EU EMC & Telecom MRA CAB (NB)
  - o Radio Equipment (RE) Directive 2014/53/EU US-EU EMC & Telecom MRA CAB (NB)
  - o Low Voltage Directive (LVD) 2014/35/EU
- Hong Kong Special Administrative Region: (Office of the Telecommunications Authority – OFTA) APEC Tel MRA -Phase I & Phase II
- Israel – US-Israel MRA Phase I
- Republic of Korea (Ministry of Communications - Radio Research Laboratory) APEC Tel MRA -Phase I
- Singapore: (Infocomm Development Authority - IDA) APEC Tel MRA -Phase I & Phase II;
- Japan: VCCI - Voluntary Control Council for Interference US-Japan Telecom Treaty VCCI Side Letter
- USA:
  - o ENERGY STAR Recognized Test Laboratory – US EPA
  - o Telecommunications Certification Body (TCB) – US FCC;
  - o Nationally Recognized Test Laboratory (NRTL) – US OSHA
- Vietnam: APEC Tel MRA -Phase I;

## 2 EUT Test Configuration

### 2.1 Justification

The EUT was configured for testing according to KDB 971168 D01 v03r01.

### 2.2 EUT Exercise Software

None

### 2.3 Duty Cycle Correction Factor

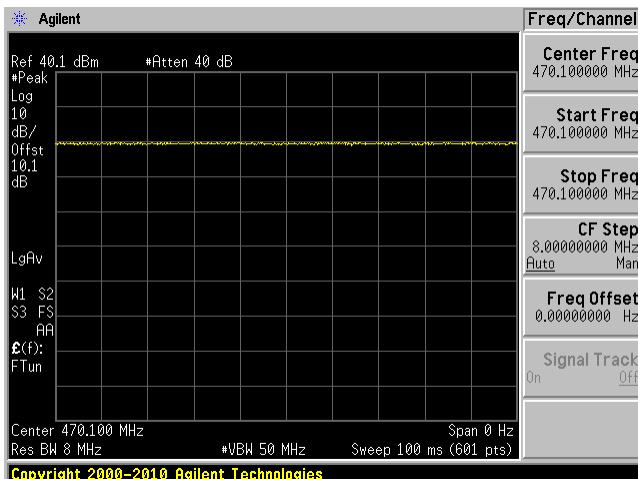
Frequency (MHz)	Total On Time (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)
470.100	100	100	100	0.00

Duty Cycle = On Time (ms) / Period (ms)

Duty Cycle Correction Factor (dB) =  $10 * \log(1/\text{Duty Cycle})$

Please refer to the following plots.

Duty Cycle



### 2.4 Special Equipment

There were no special accessories were required, included, or intended for use with EUT during these tests.

### 2.5 Equipment Modifications

No modifications were made to the EUT.

## **2.6 Local Support Equipment**

None

## **2.7 Interface Ports and Cables**

None

### 3 Summary of Test Results

FCC & ISED Rules	Descriptions of Test	Result (s)
FCC §2.1093, ISED RSS-102	RF exposure	Compliant <sup>1</sup>
FCC §74.861(e)(1), ISED RSS-210 G.3.1	RF output power	Compliant
ISED RSS-Gen §6.8	Transmit Antenna	Compliant
FCC §74.861(e)(3), ISED RSS-210 G.3.5	Modulation characteristics	Not applicable <sup>2</sup>
FCC §74.861(e)(5)(7), ISED RSS-210 G.3.2 & G.3.4	Operating bandwidth & Emission mask	Compliant
FCC §74.861(e)(7)	Spurious emissions at the antenna port	Compliant
FCC §74.861(e)(7), ISED RSS-210 G.3.4	Field strength of spurious emissions	Compliant
FCC §74.861(e)(4), ISED RSS-210 G.3.3	Frequency Tolerance	Compliant

Note 1: Please refer to report R1805223-SAR

Note 2: Not applicable: The EUT only supports digital modulation (8PSK).

## **4 FCC §2.1093 & ISED RSS-102 - RF Exposure**

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Please refer to report R1805223-SAR for results.

## 5 ISEDC RSS-Gen §6.8 - Antenna Requirements

### 5.1 Applicable Standards

According to ISEDC RSS-Gen §6.8: Transmit Antenna

The applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna. The test report shall demonstrate the compliance of the transmitter with the limit for maximum equivalent isotropically radiated power (e.i.r.p.) specified in the applicable RSS, when the transmitter is equipped with any antenna type, selected from this list. For expediting the testing, measurements may be performed using only the antenna with highest gain of each combination of transmitter and antenna type, with the transmitter output power set at the maximum level. However, the transmitter shall comply with the applicable requirements under all operational conditions and when in combination with any type of antenna from the list provided in the test report (and in the notice to be included in the user manual, provided below).

When measurements at the antenna port are used to determine the RF output power, the effective gain of the device's antenna shall be stated, based on a measurement or on data from the antenna's manufacturer.

The test report shall state the RF power, output power setting and spurious emission measurements with each antenna type that is used with the transmitter being tested.

For licence-exempt equipment with detachable antennas, the user manual shall also contain the following notice in a conspicuous location:

This radio transmitter [enter the device's ISED certification number] has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

Immediately following the above notice, the manufacturer shall provide a list of all antenna types which can be used with the transmitter, indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna type.

### 5.2 Antenna Description

Two antennas are included with the transmitter, and are shipped from the factory pre-cut and fully assembled. Each antenna covers three blocks. The chart below is the frequency ranges for each antenna. The maximum gain of both antennas is 2.15 dBi.

Block	Frequency Range (MHz)	Cap Color	Antenna	Gain (dBi)
470	470.100-495.600	Black	AMM19	2.15
19	486.400-511.900	Black	AMM19	2.15
20	512.000-537.500	Black	AMM19	2.15
21	537.600-563.100	Red	AMM22	2.15
22	563.200-588.700	Red	AMM22	2.15
23	588.800-607.950	Red	AMM22	2.15

## 6 FCC §74.861(e) (1) & ISED RSS-210 G.3.1 - RF Output Power

### 6.1 Applicable Standards

According to FCC §74.861 (e) (1): the power may not exceed the following values:

- (i) 54-72, 76-88, and 174-216 MHz bands—50 mW EIRP
- (ii) 470-608 and 614-698 MHz bands—250 mW Conducted power
- (iii) 600 MHz duplex gap: 20 mW EIRP

As per ISED RSS-210 Issue 9, G.3.1:

470-608 MHz and 614-698 MHz bands 250 mW e.i.r.p

### 6.2 Test Procedure

KDB 971168 D01 v03r01

### 6.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Interval
ETS- Lindgren	Power Sensor	7002-006	160097	2016-12-05	2 years
-	20dB attenuator	-	-	Each time <sup>1</sup>	N/A

Note<sup>1</sup>: attenuator included in the test set-up will be checked each time before testing.

**Statement of Traceability:** **BACL Corp.** attests that all of the calibrations on the equipment items listed above were traceable to NIST or to another internationally recognized National Metrology Institute (NMI), and were compliant with A2LA Policy P102 (dated 09 June 2016) "A2LA Policy on Metrological Traceability".

### 6.4 Test Environmental Conditions

Temperature:	22 °C
Relative Humidity:	45 %
ATM Pressure:	101.2 kPa

The testing was performed by Vincent Licata on 2018-05-23 at RF site.

## 6.5 Test Results

Channel	Frequency (MHz)	Conducted Output Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limits* (dBm)	Rated Power (mW/dBm)
Low	470.100	16.53	2.15	18.68	24	50/17
		13.45	2.15	15.60	24	25/14
		9.40	2.15	11.55	24	10/10
Middle	539.025	16.40	2.15	18.55	24	50/17
		13.54	2.15	15.69	24	25/14
		9.48	2.15	11.63	24	10/10
High	607.950	16.55	2.15	18.70	24	50/17
		13.40	2.15	15.55	24	25/14
		9.51	2.15	11.66	24	10/10

\*Note: the limit 24 dBm is conducted power for the FCC and e.i.r.p for ISED. The device is compliant with both conducted power and e.i.r.p limit.

## 7 FCC §74.861(e) (5) (7) & ISED RSS-210 G.3.2, G.3.4 - Occupied Bandwidth & Emission Mask

### 7.1 Applicable Standards

According to FCC §74.861 (e) (5) (7):

The operating bandwidth shall not exceed 200 kHz.

Digital emissions within the band from one megahertz below to one megahertz above the carrier frequency shall comply with the emission mask in section 8.3.2.2 (Figure 4) of the European Telecommunications Institute Standard ETSI EN 300 422-1 v1.4.2 (2011-08), Electromagnetic compatibility and Radio spectrum Matters (ERM); Wireless microphones in the 25 MHz to 3 GHz frequency range; part 1: Technical characteristics and methods of measurement. Beyond one megahertz below and above the carrier frequency, emissions shall comply with the limits specified in section 8.4 of ETSI EN 300 422-1 v1.4.2 (2011-08). As per ISED RSS-210 Issue 9, G.3.2:

The occupied bandwidth for low-power radio apparatus shall not exceed the authorized bandwidth specified in Table G1, which is 200 kHz for 470-608MHz and 614-698MHz.

As per ISED RSS-210 Issue 9, G.3.4:

The transmitter unwanted emissions shall meet the requirements in sections 8.3 and 8.4 of ETSI EN 300 422-1 V1.4.2 (2011-08), *Electromagnetic compatibility and radio spectrum matters (ERM); Wireless microphones in the 25 MHz to 3 GHz frequency range; Part 1: Technical characteristics and methods of measurement*.

### 7.2 Test Procedure

The OBW is according to KDB 971168 D01 v03r01

The Emission mask is according to sections 8.3 of ETSI EN 300 422-1 V1.4.2 (2011-08).

### 7.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Interval
Rohde & Schwarz	Spectrum Analyzer	FSQ26	200749	2017-06-08	2 years
-	20dB attenuator	-	-	Each time <sup>1</sup>	N/A

Note<sup>1</sup>: attenuator included in the test set-up will be checked each time before testing.

**Statement of Traceability:** **BACL Corp.** attests that all of the calibrations on the equipment items listed above were traceable to NIST or to another internationally recognized National Metrology Institute (NMI), and were compliant with A2LA Policy P102 (dated 09 June 2016) "A2LA Policy on Metrological Traceability".

## 7.4 Test Environmental Conditions

<b>Temperature:</b>	22 °C
<b>Relative Humidity:</b>	45 %
<b>ATM Pressure:</b>	101.2 kPa

*The testing was performed by Vincent Licata on 2018-05-24 and 2018-06-12 at RF site.*

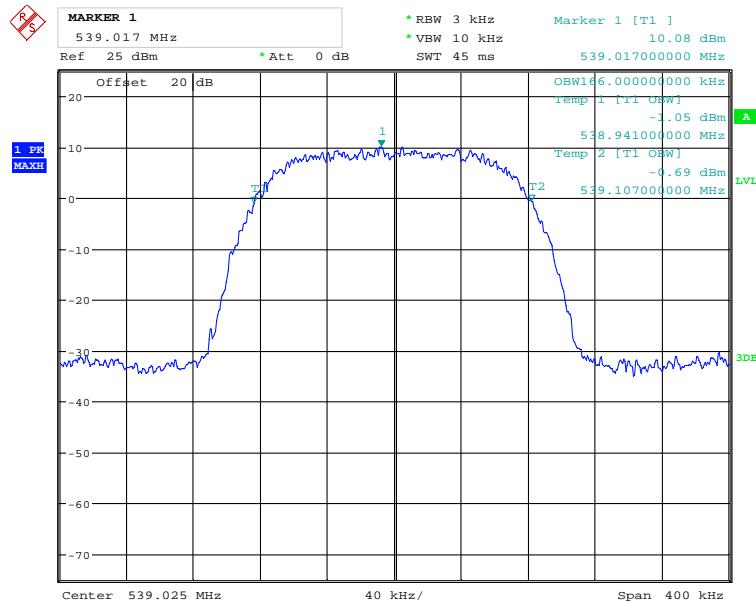
## 7.5 Test Results

Center Frequency (MHz)	99% Bandwidth (kHz)	Limit (kHz)	Result	Power Setting
539.025	166	200	Pass	High (50 mW)
539.025	166	200	Pass	Low (10 mW)

*Please refer to the following plots for detailed test results*

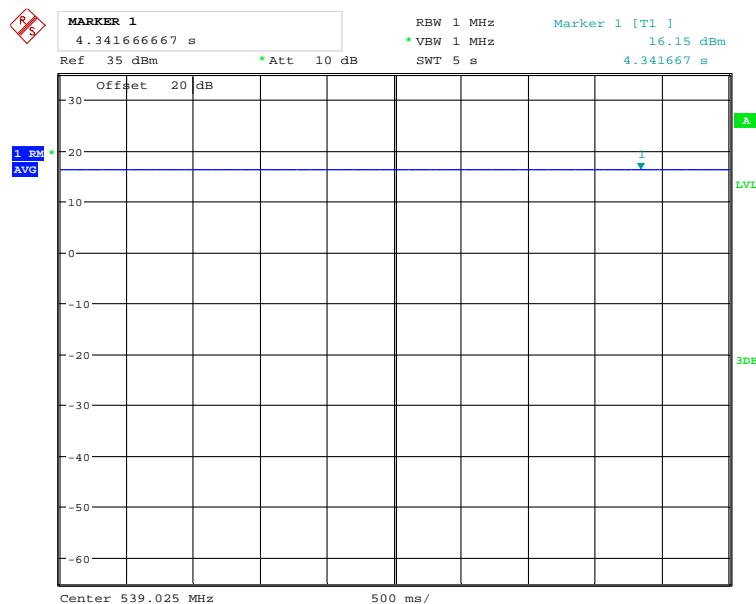
## (50 mW power setting)

## Occupied Bandwidth



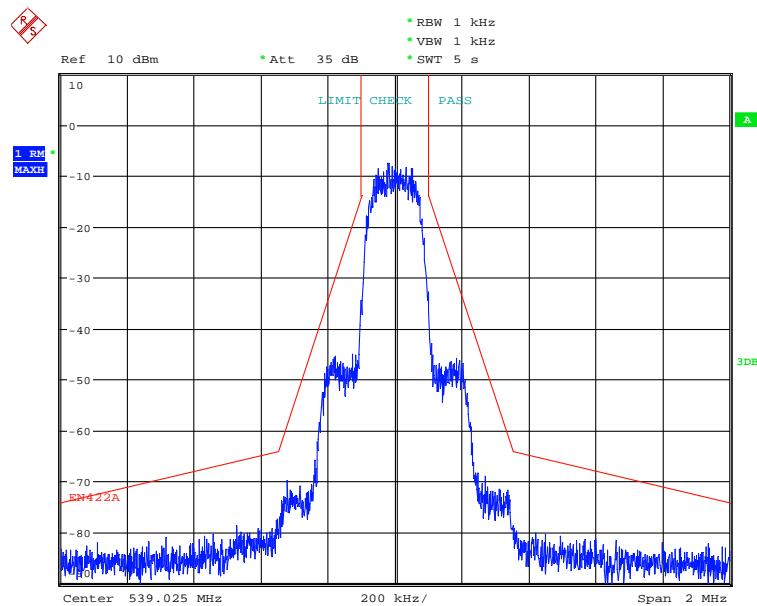
Date: 24.MAY.2018 13:51:36

## Emission Mask 1



Date: 24.MAY.2018 14:30:44

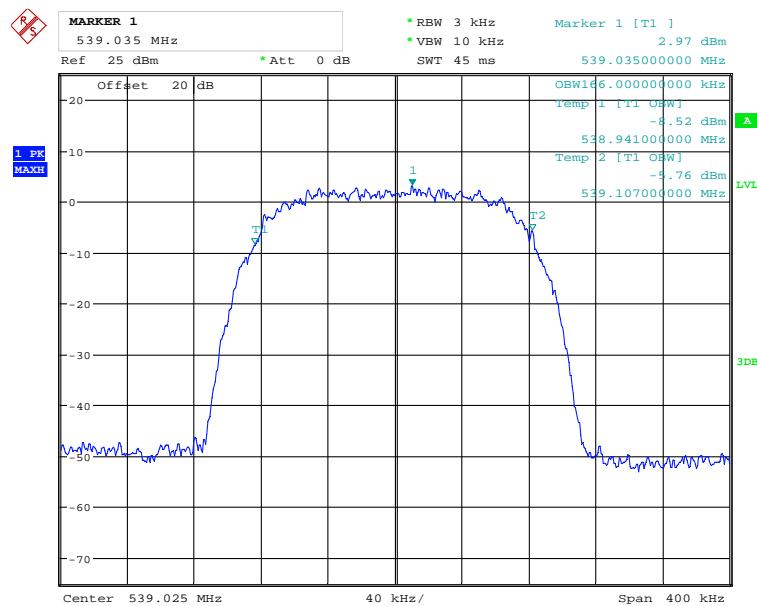
## Emission Mask 2



Date: 12.JUN.2018 10:07:37

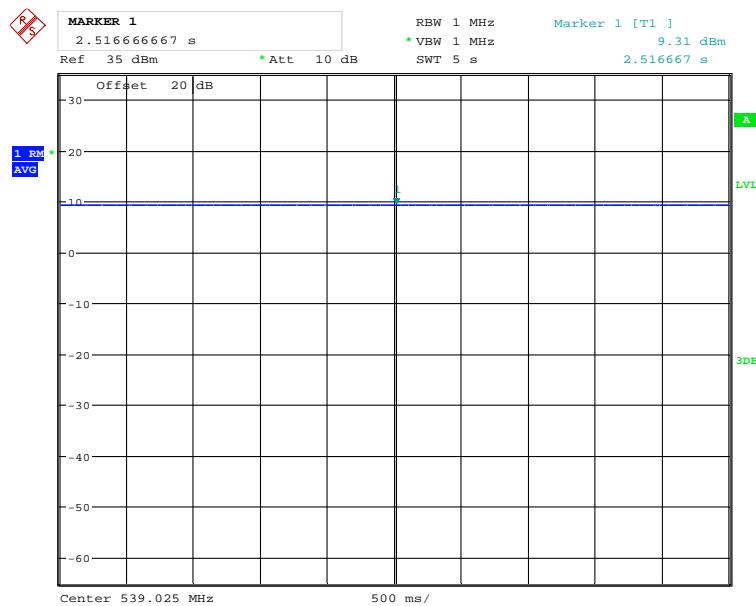
## (10 mW power setting)

## Occupied Bandwidth



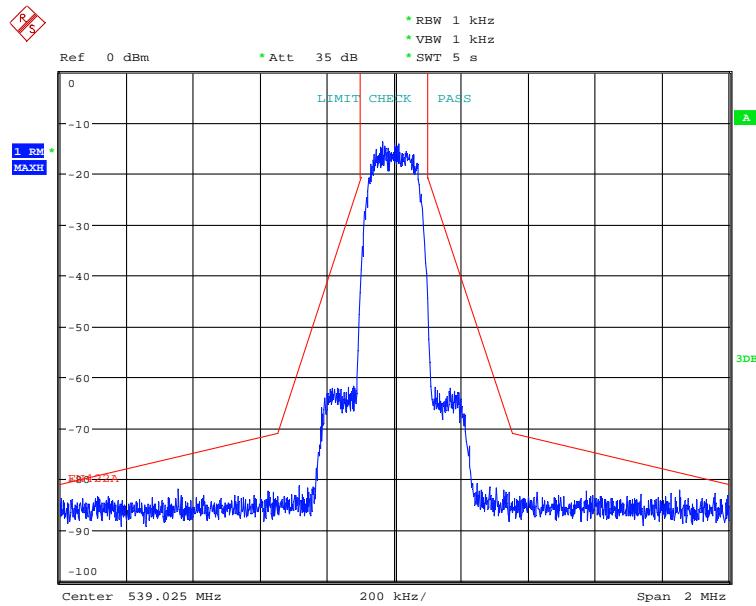
Date: 24.MAY.2018 13:52:39

## Emission Mask 1



Date: 24.MAY.2018 14:31:26

## Emission Mask 2



Date: 12.JUN.2018 10:09:23

## 8 FCC §74.861(e) (7) & ISED RSS-210 G.3.4 - Conducted Spurious Emissions at Antenna Port

### 8.1 Applicable Standards

According to FCC §74.861 (e) (7):

Analog emissions within the band from one megahertz below to one megahertz above the carrier frequency shall comply with the emission mask in section 8.3.1.2 of the European Telecommunications Institute Standard ETSI EN 300 422-1 v1.4.2 (2011-08), Electromagnetic compatibility and Radio spectrum Matters (ERM); Wireless microphones in the 25 MHz to 3 GHz frequency range; part 1: Technical characteristics and methods of measurement. Digital emissions within the band from one megahertz below to one megahertz above the carrier frequency shall comply with the emission mask in section 8.3.2.2 (Figure 4) of the European Telecommunications Institute Standard ETSI EN 300 422-1 v1.4.2 (2011-08), Electromagnetic compatibility and Radio spectrum Matters (ERM); Wireless microphones in the 25 MHz to 3 GHz frequency range; part 1: Technical characteristics and methods of measurement. Beyond one megahertz below and above the carrier frequency, emissions shall comply with the limits specified in section 8.4 of ETSI EN 300 422-1 v1.4.2 (2011-08). The requirements of this paragraph (e)(7) shall not apply to applications for certification of equipment in these bands until nine months after release of the Commission's Channel Reassignment Public Notice, as defined in §73.3700(a)(2) of this chapter.

As per ISED RSS-210 Issue 9, G.3.4:

The transmitter unwanted emissions shall meet the requirements in sections 8.3 and 8.4 of ETSI EN 300 422-1 V1.4.2 (2011-08), *Electromagnetic compatibility and radio spectrum matters (ERM); Wireless microphones in the 25 MHz to 3 GHz frequency range; Part 1: Technical characteristics and methods of measurement*.

### 8.2 Test Procedure

KDB 971168 D01 v03r01 and ETSI EN 300 422-1 V1.4.2 (2011-08).

### 8.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Interval
Agilent	Spectrum Analyzer	E4440A	US45303156	2018-02-26	1 year
Rohde & Schwarz	Spectrum Analyzer	FSQ26	200749	2017-06-08	2 years
-	20dB attenuator	-	-	Each time <sup>1</sup>	N/A

Note<sup>1</sup>: attenuator included in the test set-up will be checked each time before testing.

**Statement of Traceability:** **BACL Corp.** attests that all of the calibrations on the equipment items listed above were traceable to NIST or to another internationally recognized National Metrology Institute (NMI), and were compliant with A2LA Policy P102 (dated 09 June 2016) "A2LA Policy on Metrological Traceability".

## 8.4 Test Environmental Conditions

<b>Temperature:</b>	22 °C
<b>Relative Humidity:</b>	45 %
<b>ATM Pressure:</b>	101.2 kPa

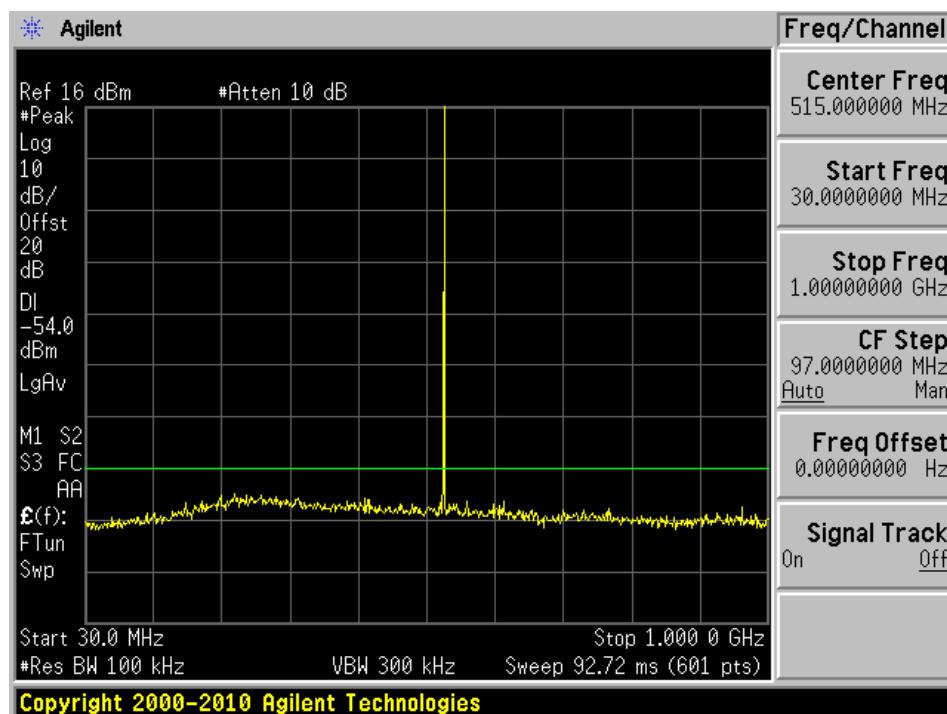
*The testing was performed by Vincent Licata on 2018-05-16 and 2018-05-24 at RF site.*

## 8.5 Test Results

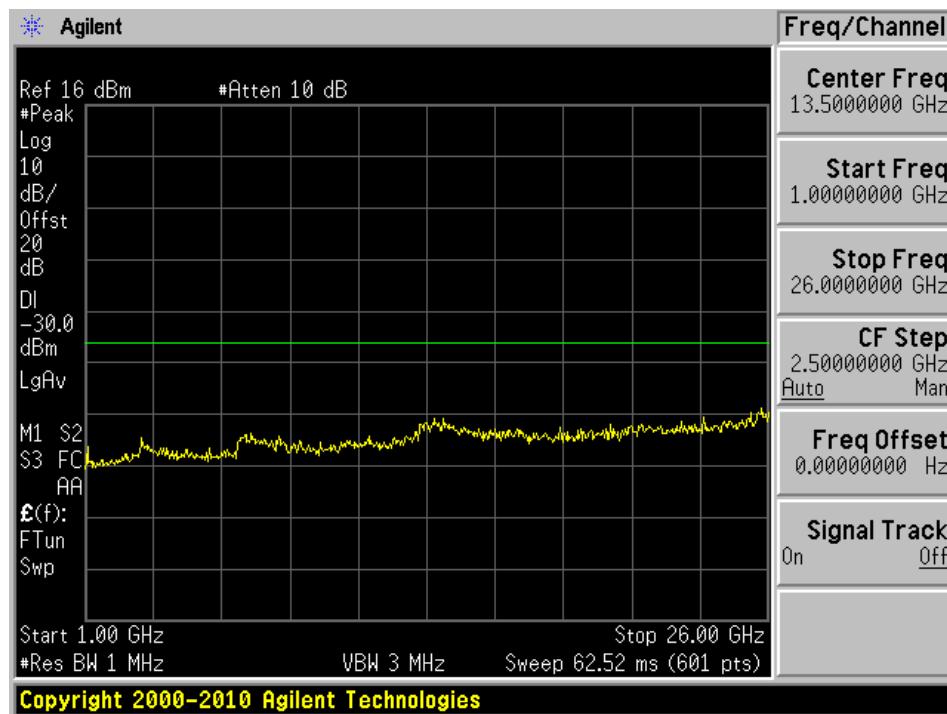
Please refer to the following table plots for detailed test results, testing was done at the highest power setting and limits from ETSI EN 300 422-1 v1.4.2 (2011-08), Electromagnetic compatibility and radio spectrum matters (ERM); Wireless microphones in the 25 MHz to 3 GHz frequency range; Part 1: Technical characteristics and methods of measurement were used for worst case limits.

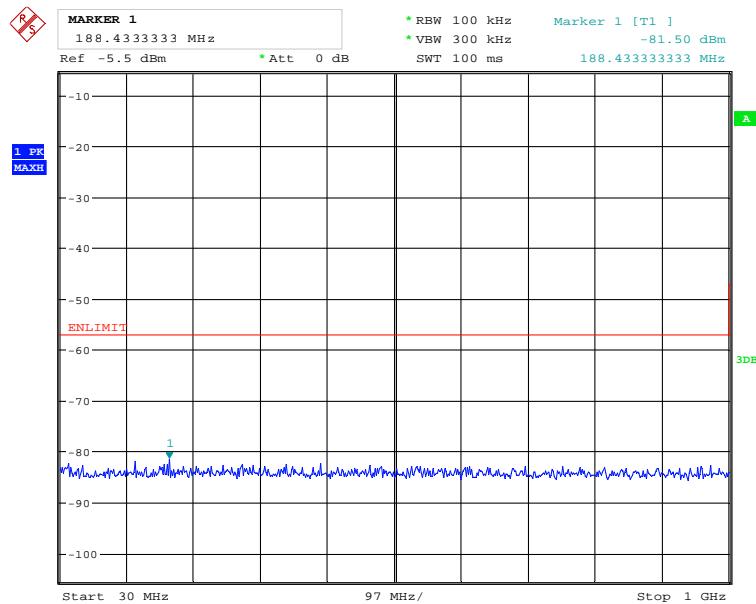
539.025 MHz:

30 MHz to 1 GHz

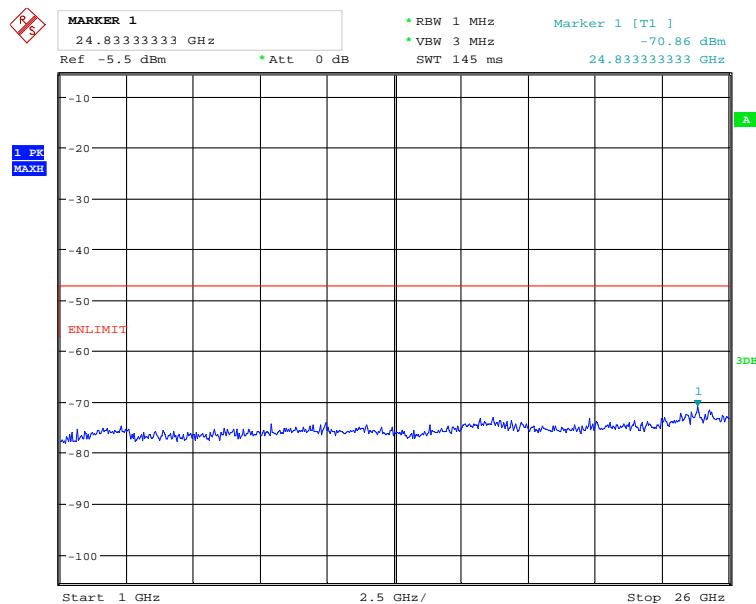


1 GHz to 26 GHz



**Standby:****30 MHz to 1 GHz**

Date: 24.MAY.2018 13:46:59

**1 GHz to 26 GHz**

Date: 24.MAY.2018 13:47:52

## 9 FCC §74.861(e) (7) & ISED RSS-210 G.3.4 - Field Strength of Spurious Radiation

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### 9.1 Applicable Standards

According to FCC §74.861 (e) (7):

Analog emissions within the band from one megahertz below to one megahertz above the carrier frequency shall comply with the emission mask in section 8.3.1.2 of the European Telecommunications Institute Standard ETSI EN 300 422-1 v1.4.2 (2011-08), Electromagnetic compatibility and Radio spectrum Matters (ERM); Wireless microphones in the 25 MHz to 3 GHz frequency range; part 1: Technical characteristics and methods of measurement. Digital emissions within the band from one megahertz below to one megahertz above the carrier frequency shall comply with the emission mask in section 8.3.2.2 (Figure 4) of the European Telecommunications Institute Standard ETSI EN 300 422-1 v1.4.2 (2011-08), Electromagnetic compatibility and Radio spectrum Matters (ERM); Wireless microphones in the 25 MHz to 3 GHz frequency range; part 1: Technical characteristics and methods of measurement. Beyond one megahertz below and above the carrier frequency, emissions shall comply with the limits specified in section 8.4 of ETSI EN 300 422-1 v1.4.2 (2011-08). The requirements of this paragraph (e)(7) shall not apply to applications for certification of equipment in these bands until nine months after release of the Commission's Channel Reassignment Public Notice, as defined in §73.3700(a)(2) of this chapter.

As per ISED RSS-210 Issue 9, G.3.4:

The transmitter unwanted emissions shall meet the requirements in sections 8.3 and 8.4 of ETSI EN 300 422-1 V1.4.2 (2011-08), *Electromagnetic compatibility and radio spectrum matters (ERM); Wireless microphones in the 25 MHz to 3 GHz frequency range; Part 1: Technical characteristics and methods of measurement*.

### 9.2 Test Procedure

KDB 971168 D01 v03r01 and ETSI EN 300 422-1 V1.4.2 (2011-08).

### 9.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Interval
Agilent	Analyzer, Spectrum	E4446A	MY48250238	2018-05-08	1 year
Sunol Science Corp	System Controller	SC99V	011003-1	N/R	N/A
Sunol Sciences	Antenna, Biconi-Log	JB1	A013105-3	2018-02-26	2 years
Agilent	Amplifier, Pre	8447D	2944A10187	2018-04-02	1 year
HP	Pre-Amplifier	8449B	3147A00400	2018-02-02	1 year
Sunol Sciences	Antenna, Horn	DRH-118	A052704	2017-03-27	2 years
A.R.A.	Antenna, Horn	DRG-118/A	1132	2018-02-13	2 years
Rohde & Schwarz	Generator, Signal	SMIQ03	849192/0085	2016-07-29	2 years
-	RF Cable	-	-	Each time <sup>1</sup>	N/A
COM-POWER	Antenna, Dipole	AD-100	721033DB1, 2, 3, 4	2017-2-13	2 years
Rohde & Schwarz	Receiver, EMI Test	ESCI 1166.5950.03	100338	2016-06-24	2 years

Note<sup>1</sup>: cable included in the test set-up will be checked each time before testing.

**Statement of Traceability:** **BACL Corp.** attests that all of the calibrations on the equipment items listed above were traceable to NIST or to another internationally recognized National Metrology Institute (NMI), and were compliant with A2LA Policy P102 (dated 09 June 2016) "A2LA Policy on Metrological Traceability".

### 9.4 Test Environmental Conditions

<b>Temperature:</b>	22 °C
<b>Relative Humidity:</b>	40 %
<b>ATM Pressure:</b>	101.0 kPa

The testing was performed by Vincent Licata on 2018-05-29 at 5 meter chamber 3.

## 9.5 Test Results

EUT was configured to the highest power setting on worst case channel.

### TX High channel 607.95 MHz

Freq. (MHz)	S.A. Amp. (dB $\mu$ V)	Table Azimuth (Degrees)	Test Antenna		Substitution				Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (cm)	Polar (H/V)	Freq. (MHz)	S.G. Level (dBm)	Antenna Gain (dB)	Cable Loss (dB)			
1042.7	49.13	0	100	H	1042.7	-61.06	6.097	0.42	-55.383	-30	-25.383
1042.7	48.89	0	100	V	1042.7	-62.01	6.097	0.42	-56.333	-30	-26.333
1215.9	48.51	0	100	H	1215.9	-60.91	6.796	0.45	-54.564	-30	-24.564
1215.9	48.6	0	100	V	1215.9	-61.03	6.796	0.45	-54.684	-30	-24.684
661.31	30.28	0	100	H	661.31	-71.66	0	0.3	-71.96	-54	-17.96
661.31	30.81	0	100	V	661.31	-71.28	0	0.3	-71.58	-54	-17.58
114.09	30.55	0	100	H	114.09	-76.38	0	0.1	-76.48	-54	-22.48
114.09	31.96	0	100	V	114.09	-75.06	0	0.1	-75.16	-54	-21.16

### Standby mode:

Freq. (MHz)	S.A. Amp. (dB $\mu$ V)	Table Azimuth (Degrees)	Test Antenna		Substitution				Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (cm)	Polar (H/V)	Freq. (MHz)	S.G. Level (dBm)	Antenna Gain (dB)	Cable Loss (dB)			
1042.7	48.79	0	100	H	1042.7	-61.4	6.097	0.42	-55.723	-47	-8.723
1042.7	48.93	0	100	V	1042.7	-61.97	6.097	0.42	-56.293	-47	-9.293
661.31	30.14	0	100	H	661.31	-71.8	0	0.3	-72.1	-57	-15.1
661.31	30.41	0	100	V	661.31	-71.68	0	0.3	-71.98	-57	-14.98
114.09	30.33	0	100	H	114.09	-76.6	0	0.1	-76.7	-57	-19.7
114.09	31.67	0	100	V	114.09	-75.35	0	0.1	-75.45	-57	-18.45

## **10 FCC §74.861(e) (4) & ISED RSS-210 G.3.3 - Frequency Stability**

### **10.1 Applicable Standards**

According to FCC §74.861 (e) (4):

The frequency tolerance of the transmitter shall be 0.005 percent

As per ISED RSS-210 Issue 9, G.3.3:

The frequency stability of equipment shall comply with the limits specified in Table G1, which is  $\pm 50$  ppm.

### **10.2 Test Procedure**

According to RSS- Gen issue 5 Section 6.11, frequency stability is a measure of frequency drift due to temperature and supply voltage variations with reference to the frequency measurement at an appropriate reference temperature and the rated supply voltage.

Unless specified otherwise in the RSS that is applicable to the device, the reference temperature for transmitters is  $+20^{\circ}\text{C}$ .

A hand-held device that is only capable of operating using internal batteries shall be tested using a new battery without any further requirement to vary the supply voltage. Alternatively, an external supply voltage can be used and set at the batter nominal voltage, and again at the battery operating end point voltage which must be specified by the equipment manufacturer.

The operating carrier frequency shall be set up in accordance with the manufacturer's published operation and instruction manual prior to the commencement of these tests. No adjustment of any frequency-determining circuit element shall be made subsequent to this initial set-up.

With the transmitter installed in an environment test chamber, the unmodulated carrier frequency shall be measured under the conditions specified below. A sufficient stabilization period at each temperature shall be used prior to each frequency measurement. The following temperatures and supply voltage ranges apply, unless specified otherwise in the applicable RSS.

- a) At temperature of  $-30^{\circ}\text{C}$ ,  $+20^{\circ}\text{C}$  and  $+50^{\circ}\text{C}$ , and at the manufacturer's rated supply voltage; and
- b) At a temperature of  $+20^{\circ}\text{C}$  and at  $\pm 15$  percent of the manufacturer's rated supply voltage.

If the frequency stability limits are only met at a different temperature range than specified in (a), the frequency stability requirement will be deemed met if the transmitter is automatically inhibited from operating outside this different temperature range and the published equipment operating characteristics are revised to reflect this different temperature range.

If an unmodulated carrier is not available, the measurement method shall be described in the test report.

### 10.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Interval
Rohde & Schwarz	Spectrum Analyzer	FSQ26	200749	2017-06-08	2 years
Tenney	Chamber, Environmental	TUJR	27445-06	2017-10-02	1 year
KEPCO	Source, DC	25-10M	H1334526	Cal. Not Required	N/A
Fluke	Digital Multi-meter	189	89920092	2018-03-22	1 year
-	20dB attenuator	-	-	Each time <sup>1</sup>	N/A
-	RF Cable	-	-	Each time <sup>1</sup>	N/A

Note<sup>1</sup>: cable and attenuator included in the test set-up will be checked each time before testing.

**Statement of Traceability:** **BACL Corp.** attests that all of the calibrations on the equipment items listed above were traceable to NIST or to another internationally recognized National Metrology Institute (NMI), and were compliant with A2LA Policy P102 (dated 09 June 2016) "A2LA Policy on Metrological Traceability".

### 10.4 Test Environmental Conditions

Temperature:	23 °C
Relative Humidity:	43 %
ATM Pressure:	101.1 kPa

The testing was performed by Vincent Licata on 2018-05-24 at RF site.

## 10.5 Test Results

### 539.025 MHz:

Varying temperature:

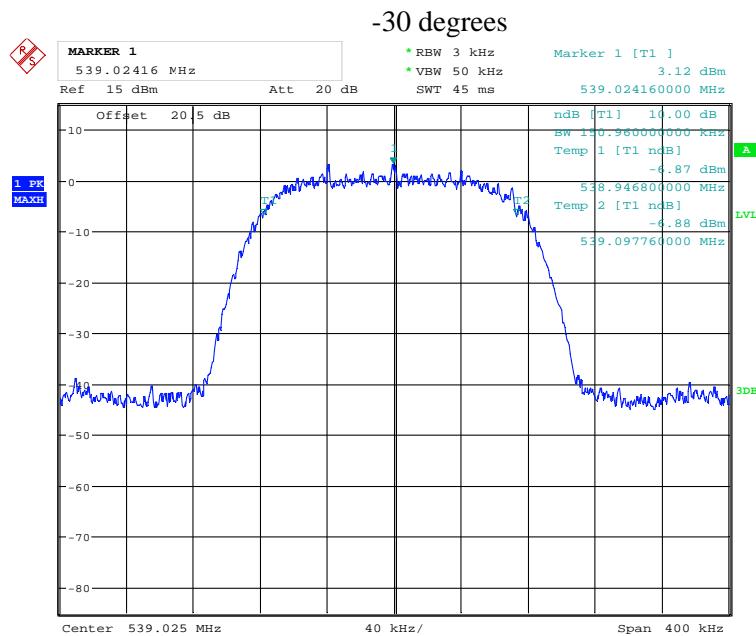
Temperature (°C)	Measured Frequency (MHz)	Channel Frequency (MHz)	Frequency Tolerance (ppm)	Limits (+/-ppm)
-30	539.02228	539.025	-5.046148138	50
-20	539.02436	539.025	-1.187328974	50
-10	539.02538	539.025	0.704976578	50
0	539.02394	539.025	-1.966513612	50
10	539.02208	539.025	-5.417188442	50
20	539.0235	539.025	-2.782802282	50
30	539.02502	539.025	0.037104031	50
40	539.02352	539.025	-2.745698252	50
50	539.0252	539.025	0.371040304	50

Varying supply voltage:

Voltage	Measured Frequency (MHz)	Channel Frequency (MHz)	Frequency Tolerance (ppm)	Limits (+/-ppm)
2.55 V	539.02534	539.025	0.630768517	50
3.45 V	539.02348	539.025	-2.819906312	50

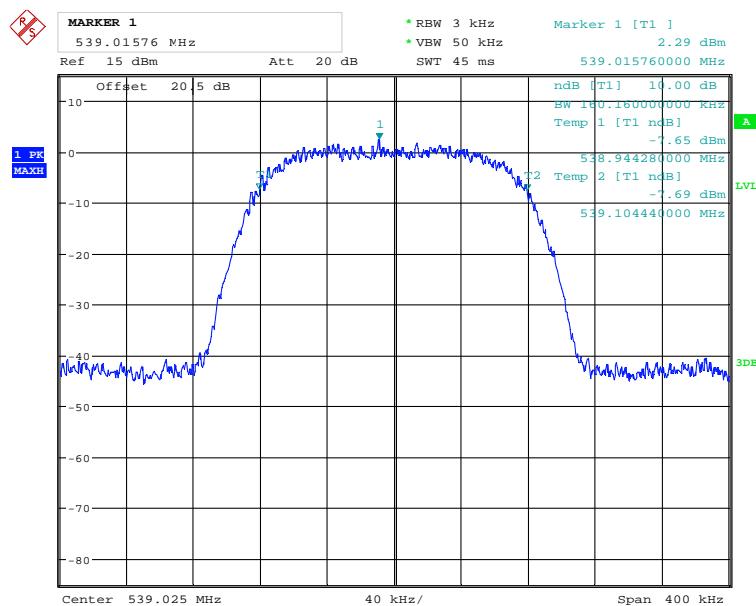
Please refer to plots for detailed test results.

539.025 MHz:



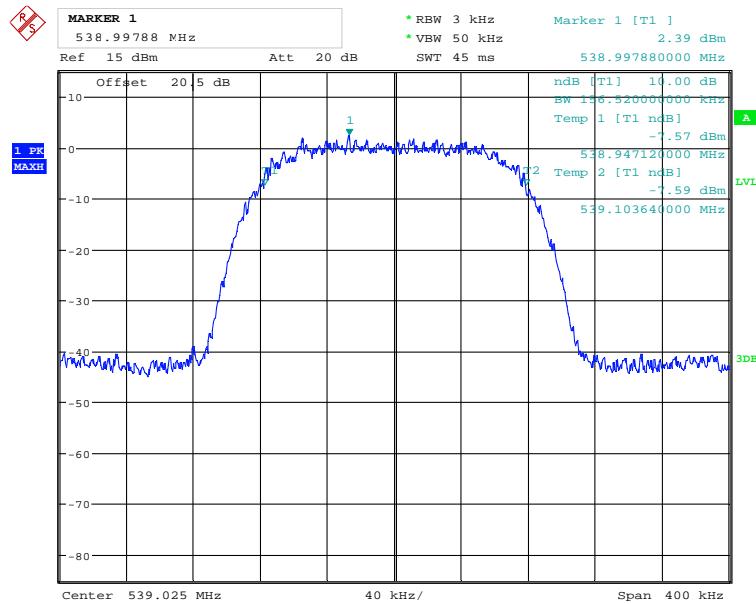
Date: 24.MAY.2018 09:55:31

-20 degrees



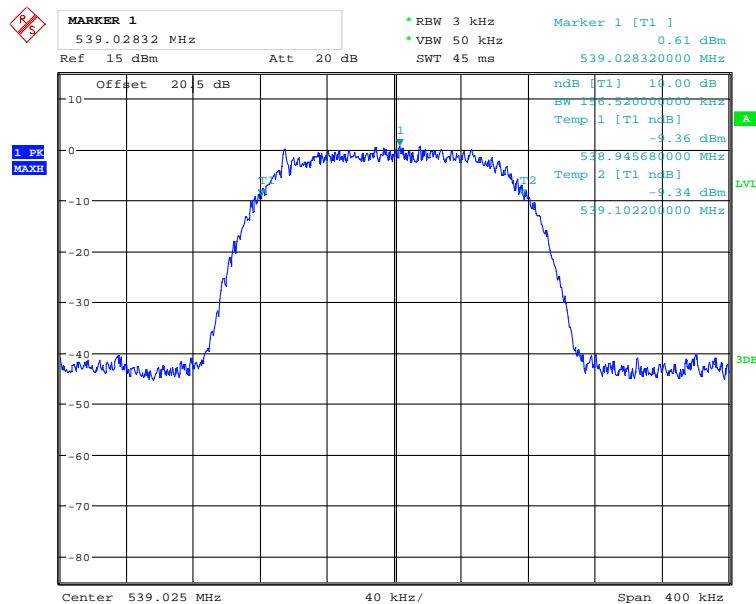
Date: 24.MAY.2018 10:06:44

-10 degrees



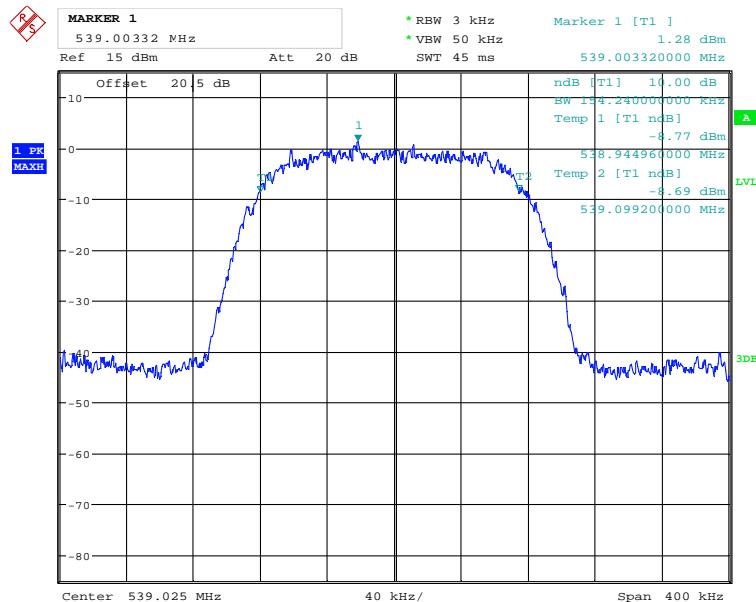
Date: 24.MAY.2018 10:13:17

0 degrees



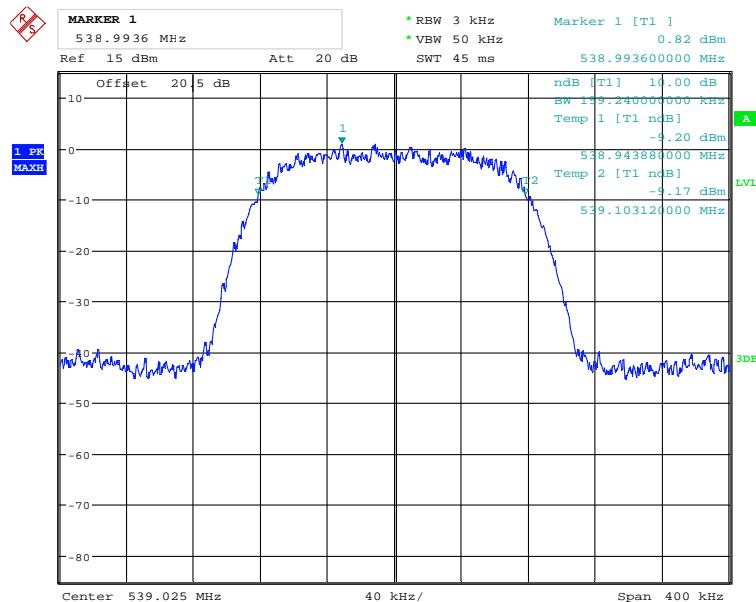
Date: 24.MAY.2018 10:34:37

10 degrees



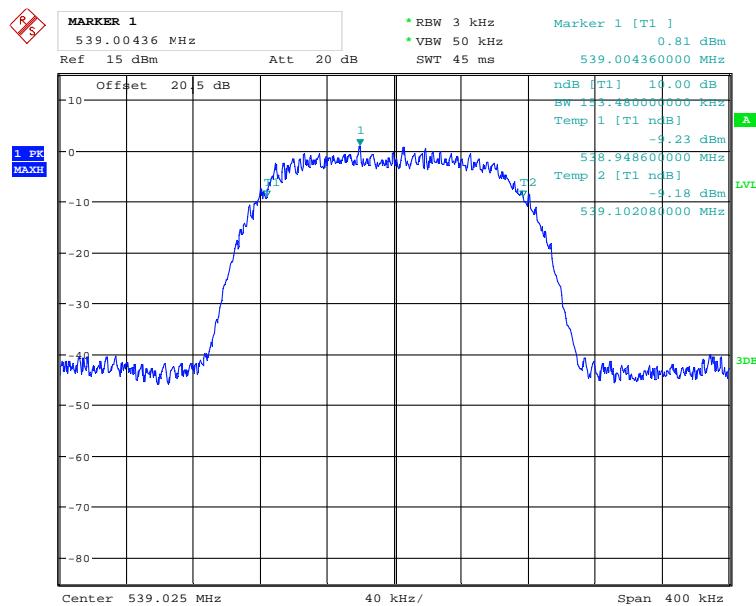
Date: 24.MAY.2018 10:48:29

### 20 degrees Nominal Voltage



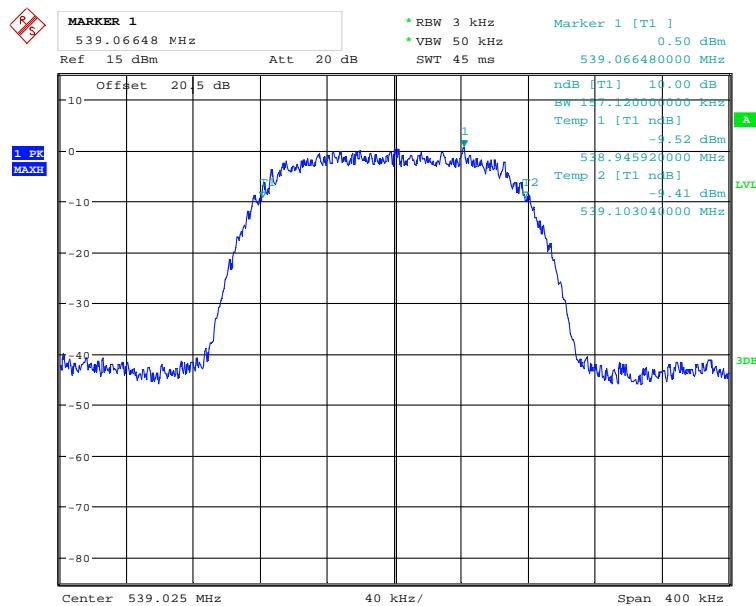
Date: 24.MAY.2018 11:02:15

## 20 degrees Low Voltage



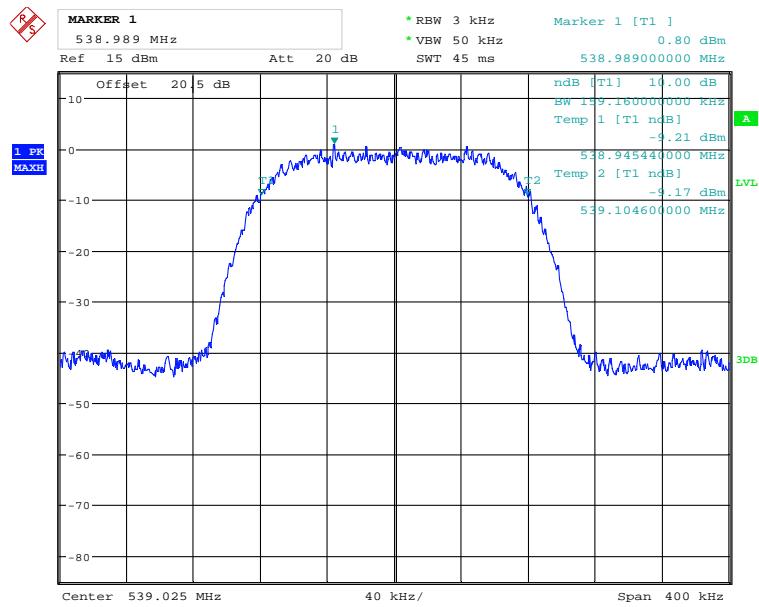
Date: 24.MAY.2018 11:03:21

## 20 degrees High Voltage



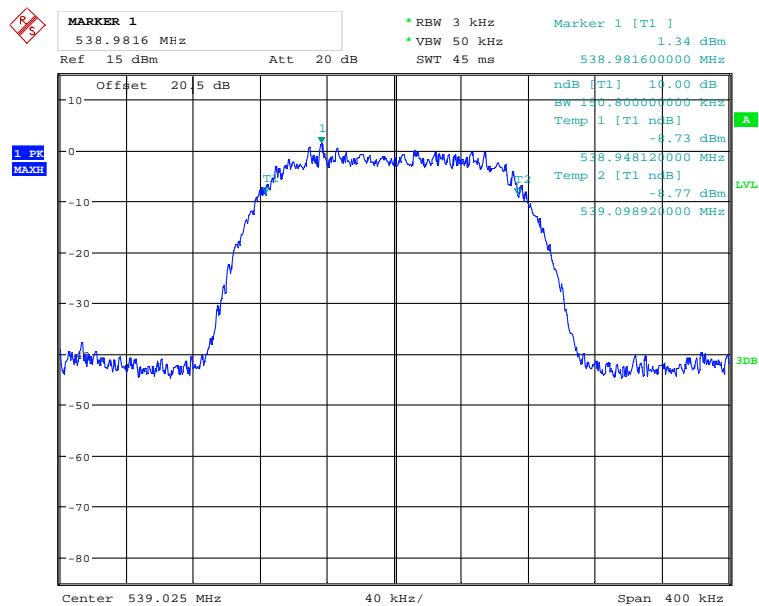
Date: 24.MAY.2018 11:02:53

30 degrees



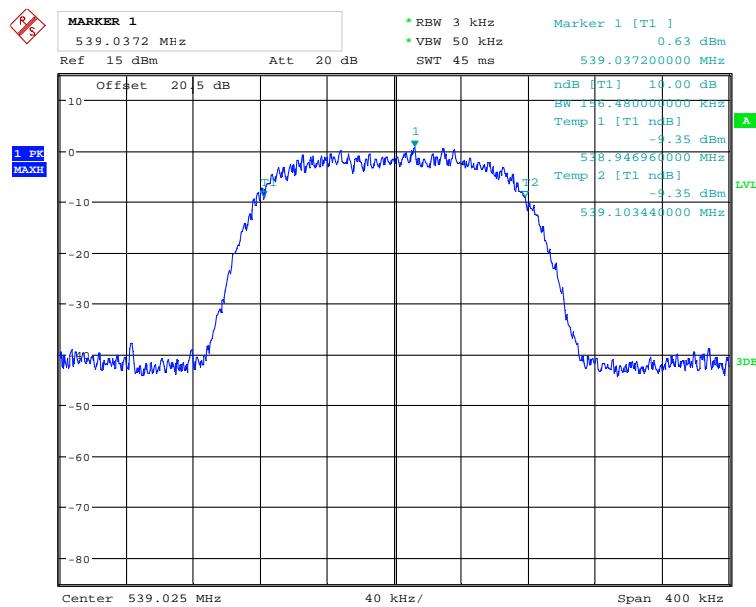
Date: 24.MAY.2018 11:20:35

40 degrees



Date: 24.MAY.2018 11:28:47

50 degrees



Date: 24.MAY.2018 11:38:57

## **11 Exhibit A - FCC & ISED Equipment Labeling Requirements**

### **11.1 FCC ID Label Requirements**

**As per FCC §2.925,**

(a) Each equipment covered in an application for equipment authorization shall bear a nameplate or label listing the following:

(1) FCC Identifier consisting of the two elements in the exact order specified in §2.926. The FCC Identifier shall be preceded by the term FCC ID in capital letters on a single line, and shall be of a type size large enough to be legible without the aid of magnification.

Example: FCC ID: XXX123

Where: XXX—Grantee Code, 123—Equipment Product Code

**As per FCC §15.19,**

(a) In addition to the requirements in part 2 of this chapter, a device subject to certification, or verification shall be labeled as follows:

(3) All other devices shall bear the following statement in a conspicuous location on the device:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

(4) Where a device is constructed in two or more sections connected by wires and marketed together, the statement specified above is required to be affixed only to the main control unit. If the EUT is integrated within another device then a label affixed to the host shall also state, “Contains FCC ID: XXXXXX”

(5) When the device is so small or for such use that it is not practicable to place the statement specified under paragraph (a) of this section on it, the information required by this paragraph shall be placed in a prominent location in the instruction manual or pamphlet supplied to the user or, alternatively, shall be placed on the container in which the device is marketed. However, the FCC identifier or the unique identifier, as appropriate, must be displayed on the device.

### **11.2 IC Label Requirements**

As per IC RSP-100 Section 3.1, the certification number shall appear as follows:

IC: XXXXXX-YYYYYYYY

Where:

- The letters “IC:” indicate that this is an Innovation, Science and Economic Development Canada’s certification number, but they are not part of the certification number. XXXXXXYYYYYYYYYYYY is the ISED certification number.
- XXXXXX is the CN assigned by Innovation, Science and Economic Development Canada. Newly assigned CNs will be made up of five numeric characters (e.g. “20001”) whereas existing CNs may consist of up to five numeric characters followed by an alphabetic character (e.g. “21A” or “15589J”).
- YYYYYYYYYYYY is the Unique Product Number (UPN) assigned by the applicant, made up of a maximum of 11 alphanumeric characters.

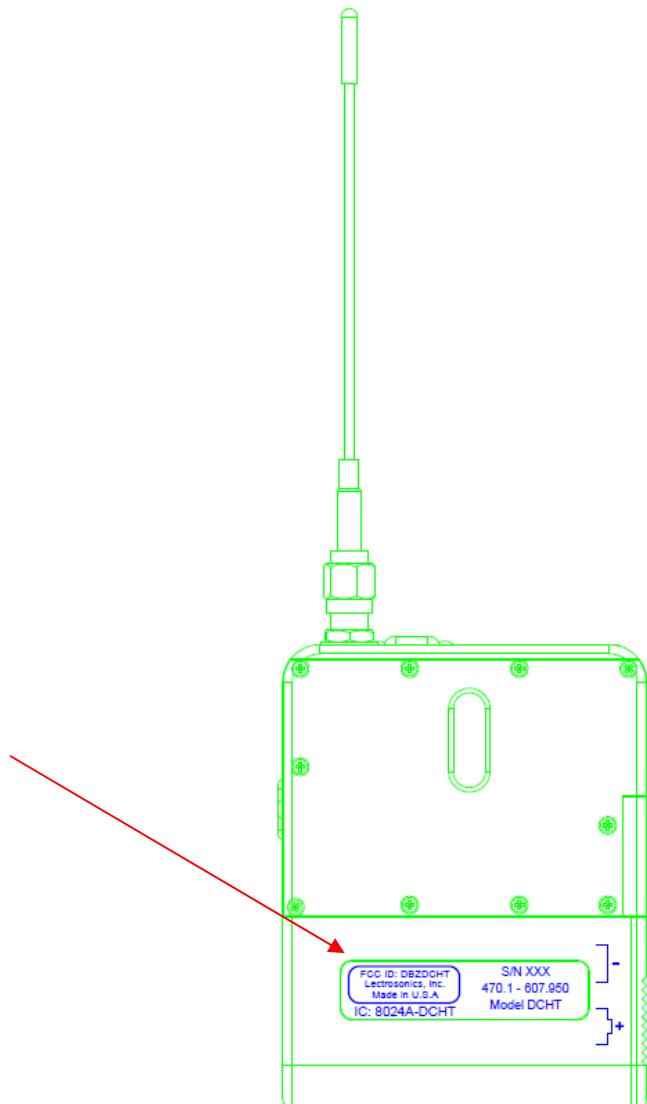
- The CN and UPN are limited to capital alphabetic characters (A-Z) and numerals (0-9) only. The use of punctuation marks or other symbols, including “wildcard” characters, is not permitted.
- The HVIN may contain punctuation marks or symbols but they shall not represent any indeterminate (“wildcard”) characters.

As per RSS-Gen §4.1 Equipment Labeling:

In addition to complying with the applicable RSSs and RSP-100, each unit of a product model (i.e. of a radio apparatus) shall meet the labeling requirements set out in this section prior to being marketed in Canada or imported into Canada.

If the dimensions of the product are extremely small or it is not practical to place the label or marking on the product, and if electronic labeling cannot be implemented, the label shall be placed in a prominent location in the user manual supplied with the product, as agreed upon with ISED prior to the certification application. The user manual may be in an electronic format; if it is not supplied to the user, the user manual must be readily available.

### 11.3 Label Contents and Location



## **12 Exhibit B - EUT Photographs**

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Please see attachments:

Appendix B – EUT Test Setup Photographs

Appendix C – EUT External Photographs

Appendix D – EUT Internal Photographs

## 13 Exhibit C (Informative) - A2LA Electrical Testing Certificate



### Accredited Laboratory

A2LA has accredited

### BAY AREA COMPLIANCE LABORATORIES CORP.

Sunnyvale, CA

for technical competence in the field of

### Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 General requirements for the competence of testing and calibration laboratories. This laboratory also meets the requirements of any additional program requirements in the Electrical field. 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 8 January 2009).



Presented this 30th day of August 2016.

A handwritten signature in black ink.

President and CEO  
For the Accreditation Council  
Certificate Number 3297.02  
Valid to September 30, 2018  
Revised November 14, 2016

For the tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.

--- END OF REPORT ---