



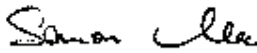
FCC PART 74, SUBPART H  
ISED C RSS-123, ISSUE 4  
TEST AND MEASUREMENT REPORT

For

**Lectrosonics, Inc.**

581 Laser Road NE, Rio Rancho, NM 87124, USA

**FCC ID: DBZSMV79**  
**IC: 8024A-SMV79**

|                                                                                                                                                |                                                                                       |
|------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| <b>Report Type:</b><br>Original Report                                                                                                         | <b>Product Type:</b><br>Wireless Microphone Transmitter                               |
| <b>Prepared By:</b> Christian McCaig<br>Test Engineer                                                                                          |  |
| <b>Report Number</b>                                                                                                                           | R1911052-74                                                                           |
| <b>Report Issue Date:</b>                                                                                                                      | 2020-01-22                                                                            |
| <b>Reviewed By:</b> Simon Ma<br>RF Supervisor                                                                                                  |  |
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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\*, NIST, 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 “\*”

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**DOCUMENT REVISION HISTORY**

| Revision Number | Report Number | Description of Revision | Date of Revision |
|-----------------|---------------|-------------------------|------------------|
| 0               | R1911052-74   | Original Report         | 2020-01-22       |

## 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: *SMV/E07-941* and *SMQV/E07-941*, *FCC ID: DBZSMV79*, *IC: 8024A-SMV79*, which henceforth is referred to as the EUT (Equipment Under Test). The EUT is a wireless microphone transmitter. The EUT operates in the frequency range: 941.525 – 951.975, 953.025 – 956.225 and 956.475 – 959.825MHz. The two EUT models were declared to be identical, and *SMV/E07-941* was selected for testing. Please refer to the manufacturer declaration of similarity letter in Appendix B of this report.

### 1.2 Mechanical Description of EUT

The (EUT) measures approximately 6 cm (L) x 5.8 cm (W) x 1.6 cm (H) and weighs approximately 105g and is powered by AA batteries.

*The data gathered are from a typical production sample provided by the Lectrosonics, Inc. with serial number: 1*

### 1.3 Objective

The following test report is prepared on behalf of *Lectrosonics, Inc.* in accordance with Part 74, Subparts H of the Federal Communications Commission rules, and ISSED RSS-123 Issue 4.

The objective is to determine compliance with Part 74 of the FCC Rules, and ISSED RSS-123 Issue 4, limits for RF output power, Modulation characteristics, Emission bandwidth, Field strength of spurious radiation and Frequency stability for low power auxiliary stations operating in the bands other than those allocated for TV broadcasting.

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

N/A

### 1.5 Test Methodology

All measurements contained in this report were conducted in accordance with ANSI/TIA-603-E-2016, ANSI C63.26-2015, 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.

| Parameter                         | Measurement uncertainty |
|-----------------------------------|-------------------------|
| Occupied Channel Bandwidth        | $\pm 5\%$               |
| RF output power, conducted        | $\pm 0.57$ dB           |
| Power Spectral Density, conducted | $\pm 1.48$ dB           |
| Unwanted Emissions, conducted     | $\pm 1.57$ dB           |
| All emissions, radiated           | $\pm 4.0$ dB            |
| AC power line Conducted Emission  | $\pm 2.0$ dB            |
| Temperature                       | $\pm 2^\circ\text{C}$   |
| Humidity                          | $\pm 5\%$               |
| DC and low frequency voltages     | $\pm 1.0\%$             |
| Time                              | $\pm 2\%$               |
| Duty Cycle                        | $\pm 3\%$               |

## 1.7 Test Facility Registrations

BACLs 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 3297.02),** 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 Accreditation Certificate Number 3297.03)** to certify

- 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 3297.01)** 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: (Innovation, Science and Economic development Canada - ISED) 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 Media Development Authority - IMDA) 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;

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## **2 EUT Test Configuration**

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### **2.1 Justification**

The EUT was configured for testing according to ANSI/TIA-603-E-2016, ANSI C63.26-2015, and KDB 971168 D01 v03r01.

### **2.2 EUT Exercise Software**

None

### **2.3 Special Equipment**

None

### **2.4 Equipment Modifications**

None

### **2.5 Local Support Equipment**

None

### **2.6 Interface Ports and Cables**

None

### 3 Summary of Test Results

| FCC & ISEDC Rules                                                 | Descriptions of Test                   | Result (s)             |
|-------------------------------------------------------------------|----------------------------------------|------------------------|
| FCC §2.1093<br>ISEDC RSS-102                                      | RF exposure                            | Compliant <sup>1</sup> |
| FCC §74.861(d)(1)<br>ISEDC RSS-123 §8.2                           | RF output power                        | Compliant              |
| FCC §2.1047<br>ISEDC RSS-123 §8.1                                 | Modulation characteristics             | Compliant              |
| FCC §2.1049<br>FCC §74.861(d)(4)(i)<br>ISEDC RSS-123 §8.2 & § 8.3 | Operating bandwidth & Emission mask    | Compliant              |
| FCC §2.1051<br>FCC §74.861(d)(4)(i)<br>ISEDC RSS-123 §8.3         | Spurious emissions at the antenna port | Compliant              |
| FCC §2.1053<br>FCC §74.861(d)(4)(i)<br>ISEDC RSS-123 §8.3         | Field strength of spurious emissions   | Compliant              |
| FCC §2.1055<br>ISEDC RSS-123 §8.2                                 | Frequency tolerance                    | Compliant              |

Note<sup>1</sup>: Please refer to report R1911052-20

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

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Please refer to report R1911052-20 for results.

## 5 FCC §74.861(d)(1) & ISEDC RSS-123 §8.2 - RF Output Power

### 5.1 Applicable Standards

According to FCC §74.861 (d) For low power auxiliary stations operating in the bands other than those allocated for TV broadcasting, the following technical requirements are imposed.

(1) For all bands except the 1435-1525 MHz band, the maximum transmitter power which will be authorized is 1 watt. In the 1435-1525 MHz band, the maximum transmitter power which will be authorized is 250 milliwatts. Licensees may accept the manufacturer's power rating; however, it is the licensee's responsibility to observe specified power limits.

According to ISEDC RSS-123 §8.2 the device shall meet the transmit power/e.r.p., authorized bandwidth and frequency stability limits for its operating bands as specified in table 1.

**Table 1 — Frequency bands, transmit power/e.r.p., authorized bandwidths and frequency stability limits**

| Frequency band (MHz) | Transmit power (W) | e.r.p. (W) | Authorized bandwidth (kHz) | Frequency stability ( $\pm$ ppm) |
|----------------------|--------------------|------------|----------------------------|----------------------------------|
| 26.10-26.48          | --                 | 1          | 200                        | 50                               |
| 88-107.5             | --                 | 1          | 200                        | 50                               |
| 150-174              | 0.05               | --         | 54                         | 50                               |
| 450-451              | --                 | 1          | 200                        | 50                               |
| 455-456              | --                 | 1          | 200                        | 50                               |
| 941.5-952            | 1                  | --         | 200                        | 20                               |
| 953-959.85           | 1                  | --         | 200                        | 20                               |
| 6930-6955            | 1                  | --         | 600                        | 10                               |
| 7100-7125            | 1                  | --         | 600                        | 10                               |

### 5.2 Test Procedure

KDB 971168 D01 v03r01

### 5.3 Test Equipment List and Details

| Manufacturer | Description        | Model  | Serial Number | Calibration Date       | Calibration Interval |
|--------------|--------------------|--------|---------------|------------------------|----------------------|
| Agilent      | Analyzer, Spectrum | E4446A | MY48250238    | 2019-06-26             | 1 year               |
| -            | 20dB attenuator    | -      | -             | Each time <sup>1</sup> | N/A                  |
| -            | RF Cable           | -      | -             | Each time <sup>1</sup> | N/A                  |

Note<sup>1</sup>: attenuator and RF 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 02 October 2018) “A2LA Policy on Metrological Traceability”.

### 5.4 Test Environmental Conditions

|                    |           |
|--------------------|-----------|
| Temperature:       | 23 °C     |
| Relative Humidity: | 45 %      |
| ATM Pressure:      | 101.2 kPa |

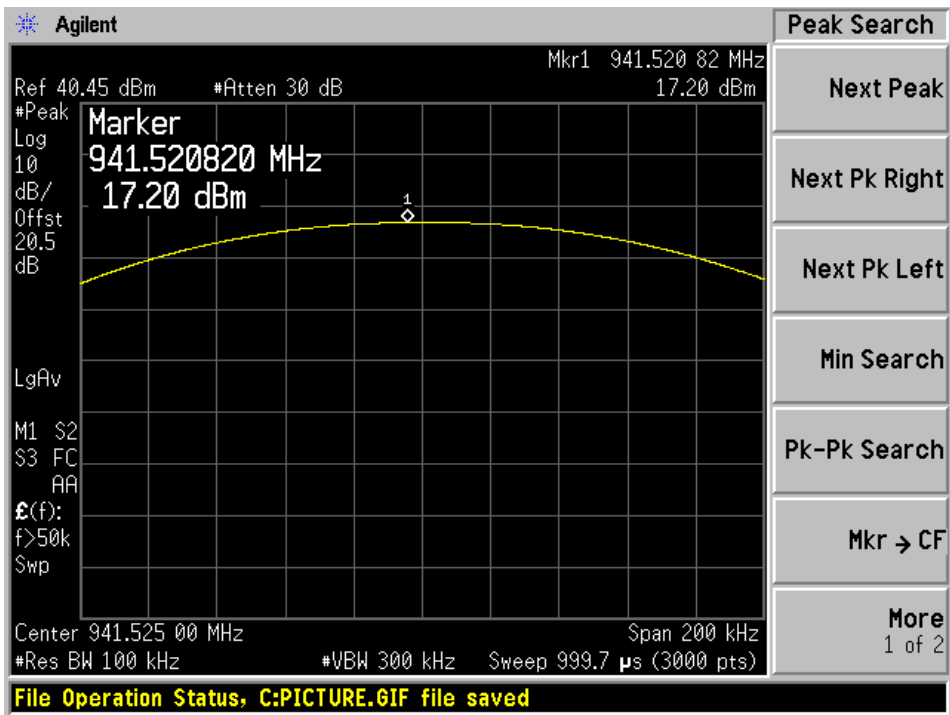
The testing was performed by Christian McCaig on 2020-01-13 at RF site.

### 5.5 Test Results

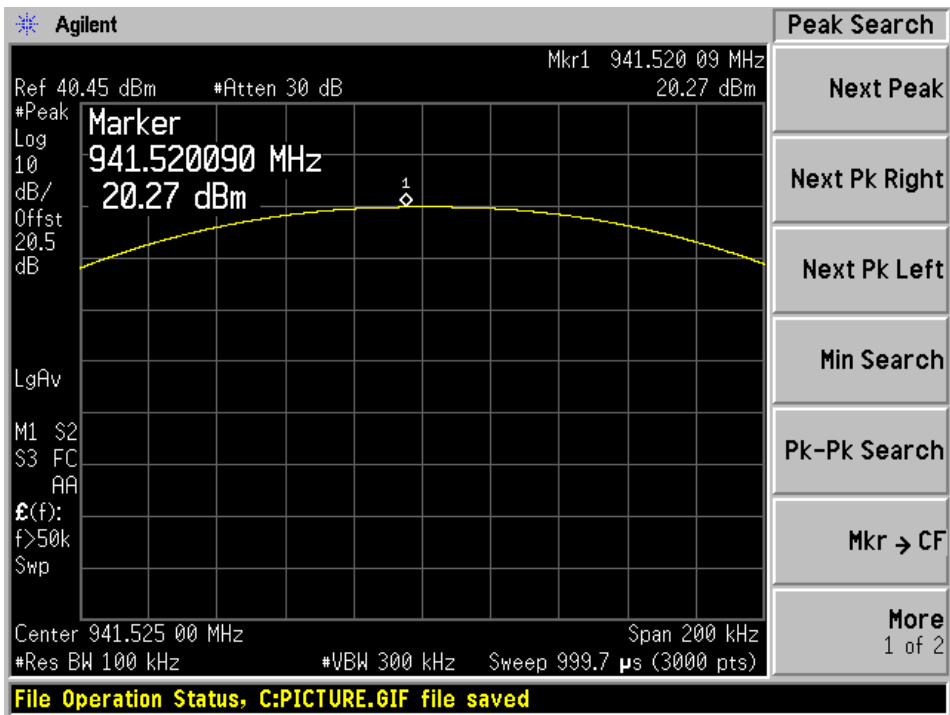
| Channel | Frequency (MHz) | Conducted Output Power (dBm) |                 | Limit (dBm) | Rated Power (dBm) |
|---------|-----------------|------------------------------|-----------------|-------------|-------------------|
|         |                 | Setting: 50 mW               | Setting: 100 mW |             |                   |
| Low     | 941.525         | 17.20                        | 20.27           | 30          | 17/20             |
| Middle  | 950.675         | 17.27                        | 20.41           | 30          | 17/20             |
| High    | 959.825         | 17.49                        | 20.55           | 30          | 17/20             |

Please refer to the following plots for details.

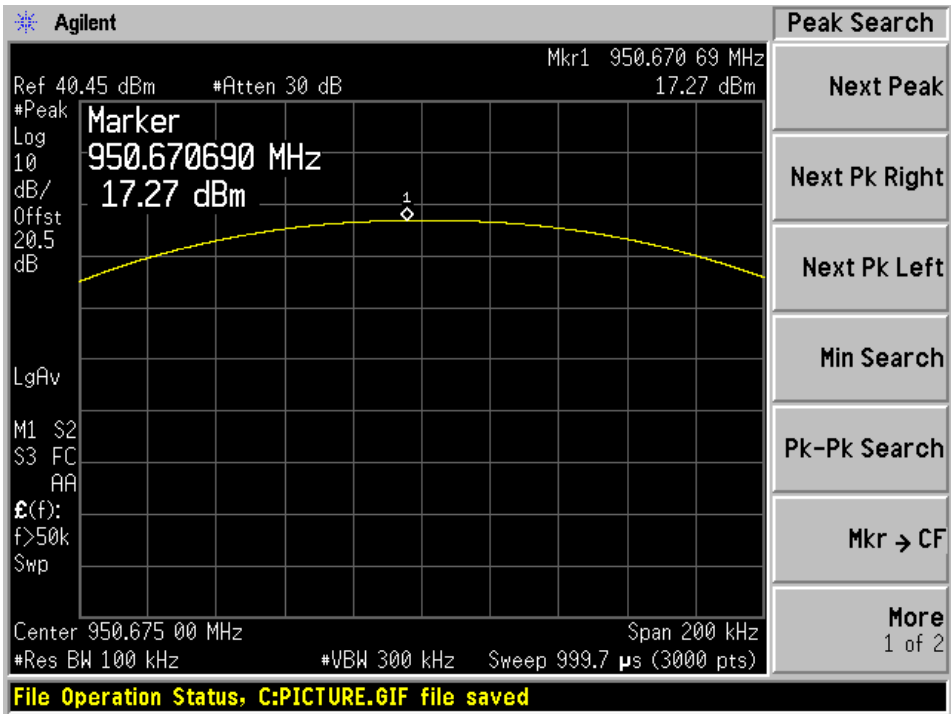
Low Channel 941.525 MHz (50 mW)



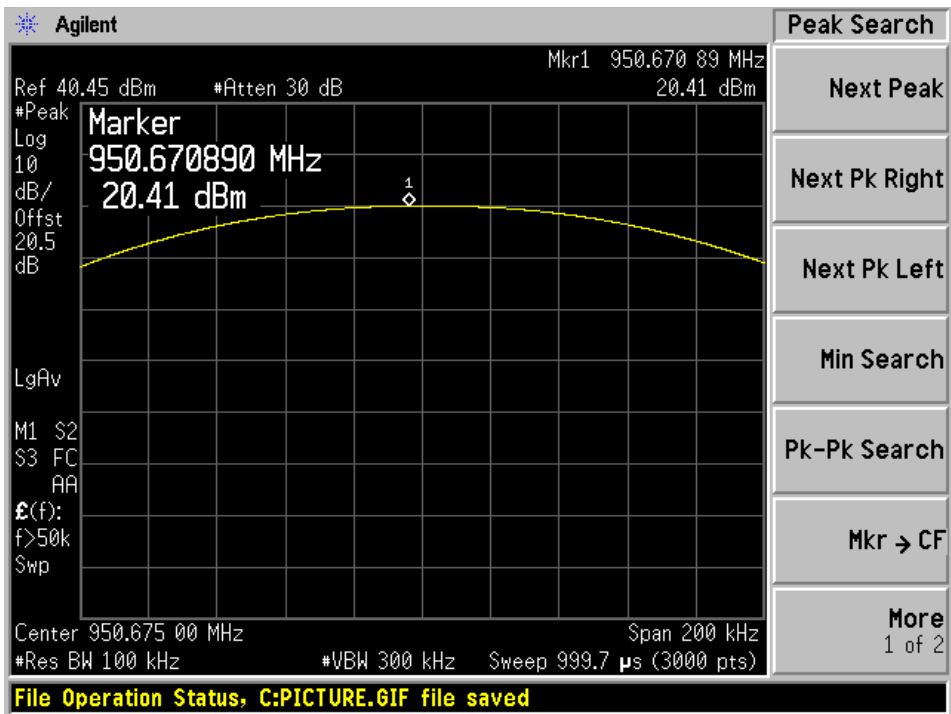
Low Channel 941.525 MHz (100 mW)



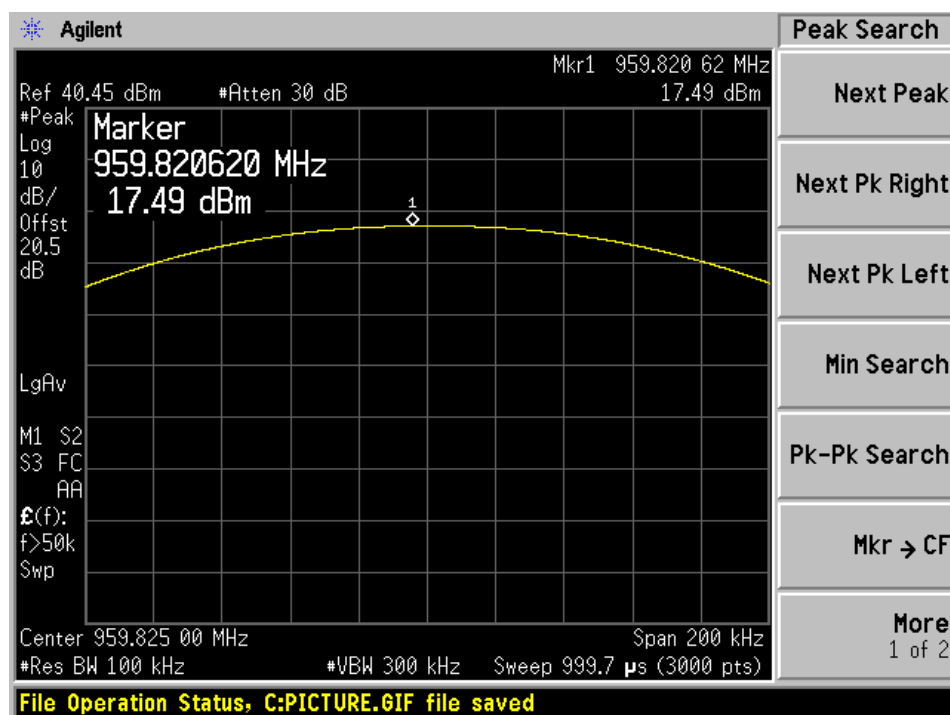
Middle Channel 950.625 MHz (50 mW)



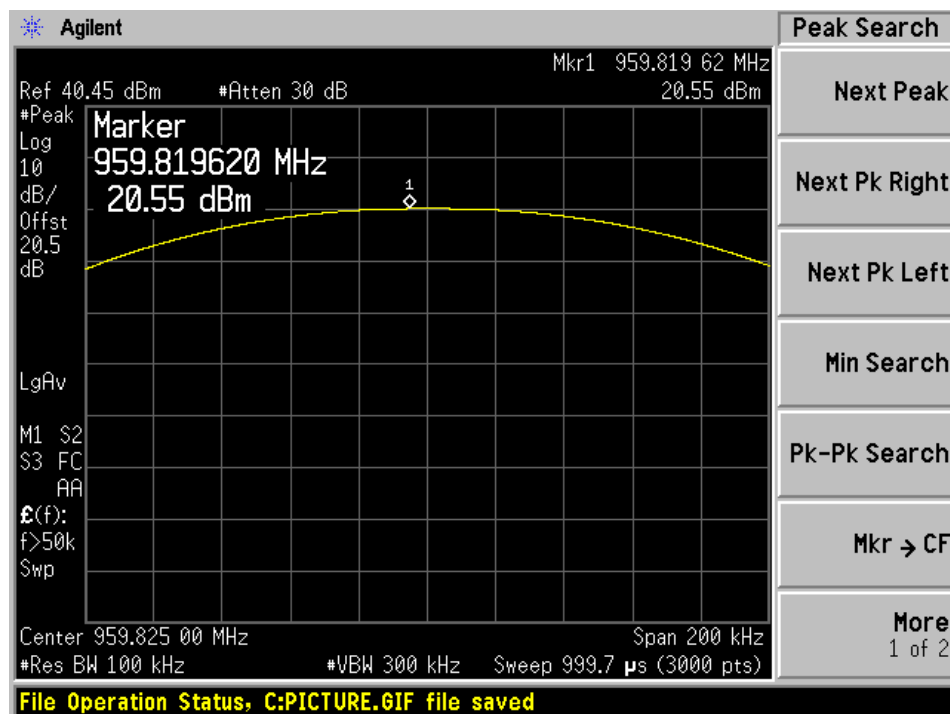
Middle Channel 950.625 MHz (100 mW)



## High Channel 959.825 MHz (50 mW)



## High Channel 959.825 MHz (100 mW)



## 6 FCC §2.1049, §74.861(d)(4)(i) & ISEDC RSS123 §8.2 , §8.3 - Occupied Bandwidth & Emission Mask

### 6.1 Applicable Standards

FCC §2.1049

According to FCC §74.861 (d) (4) (i):

(4)(i) For the 653-657 MHz, 941.5-944 MHz, 944-952 MHz, 952.850-956.250 MHz, 956.45-959.85 MHz, 1435-1525 MHz, 6875-6900 MHz and 7100-7125 MHz bands, 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. 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).

According to ISEDC RSS123 §8.2:

**Table 1 — Frequency bands, transmit power/e.r.p., authorized bandwidths and frequency stability limits**

| Frequency band (MHz) | Transmit power (W) | e.r.p. (W) | Authorized bandwidth (kHz) | Frequency stability (± ppm) |
|----------------------|--------------------|------------|----------------------------|-----------------------------|
| 26.10-26.48          | --                 | 1          | 200                        | 50                          |
| 88-107.5             | --                 | 1          | 200                        | 50                          |
| 150-174              | 0.05               | --         | 54                         | 50                          |
| 450-451              | --                 | 1          | 200                        | 50                          |
| 455-456              | --                 | 1          | 200                        | 50                          |
| 941.5-952            | 1                  | --         | 200                        | 20                          |
| 953-959.85           | 1                  | --         | 200                        | 20                          |
| 6930-6955            | 1                  | --         | 600                        | 10                          |
| 7100-7125            | 1                  | --         | 600                        | 10                          |

According to ISEDC RSS123 §8.3 Clause c. devices operating in frequency bands 941.5-952 MHz, 953-959.85 MHz, 6930-6955 MHz and 7100-7125 MHz shall have the transmitter's unwanted emissions meet the requirements in sections 8.3 and 8.4 of ETSI EN 300 422-1.

## 6.2 Test Procedure

The OBW is according to KDB 971168 D01 v03r01

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

## 6.3 Test Equipment List and Details

| Manufacturer    | Description                | Model  | Serial Number | Calibration Date       | Calibration Interval |
|-----------------|----------------------------|--------|---------------|------------------------|----------------------|
| Rohde & Schwarz | Spectrum Analyzer          | FSQ26  | 200749        | 2019-11-07             | 2 years              |
| Agilent         | Spectrum Analyzer          | E4446A | MY48250238    | 2019-06-26             | 1 year               |
| HP              | RF Communications Test Set | 8920A  | 3438A05338    | 2018-01-09             | 25 months            |
| HP              | Modulation Analyzer        | 8901A  | 2026A00847    | 2019-01-24             | 2 years              |
| Krohn-Hite      | Active Dual Channel Filter | 3940   | 3212          | 2019-10-24             | 1 year               |
| Agilent         | Function Generator         | 33220A | MY43004878    | 2019-01-09             | 2 years              |
| HP              | TIMS                       | 4934A  | 3737U15141    | 2019-01-18             | 1 year               |
| -               | 20dB attenuator            | -      | -             | Each time <sup>1</sup> | N/A                  |
| -               | RF Cable                   | -      | -             | 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 02 October 2018) "A2LA Policy on Metrological Traceability".*

## 6.4 Test Environmental Conditions

|                    |           |
|--------------------|-----------|
| Temperature:       | 22 °C     |
| Relative Humidity: | 37 %      |
| ATM Pressure:      | 101.7 kPa |

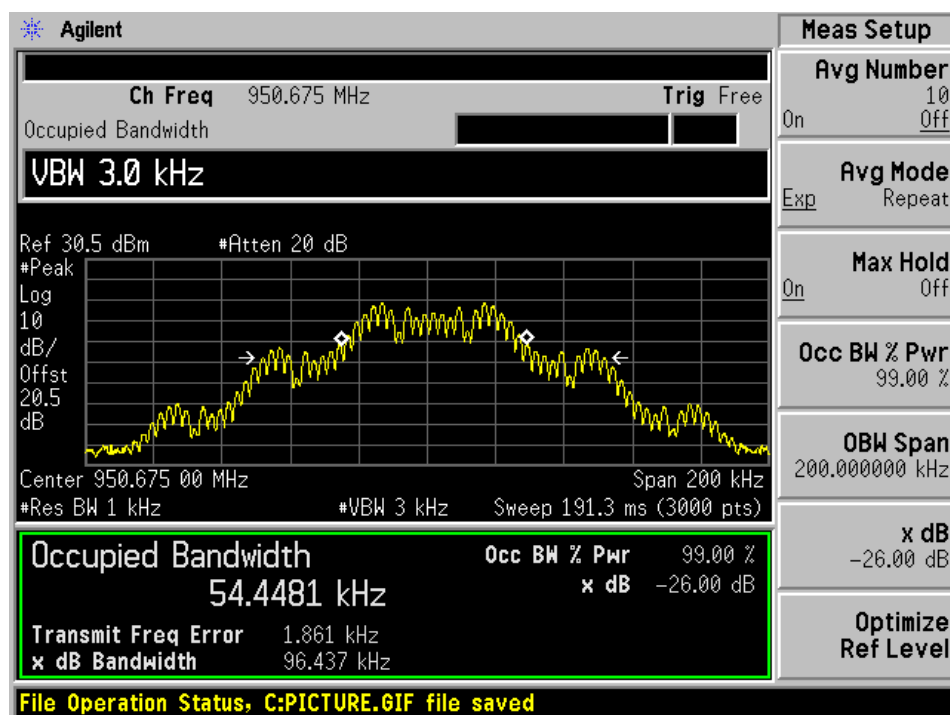
The testing was performed by Christian McCaig on 2020-01-13 and 2020-01-15 at RF site.

## 6.5 Test Results

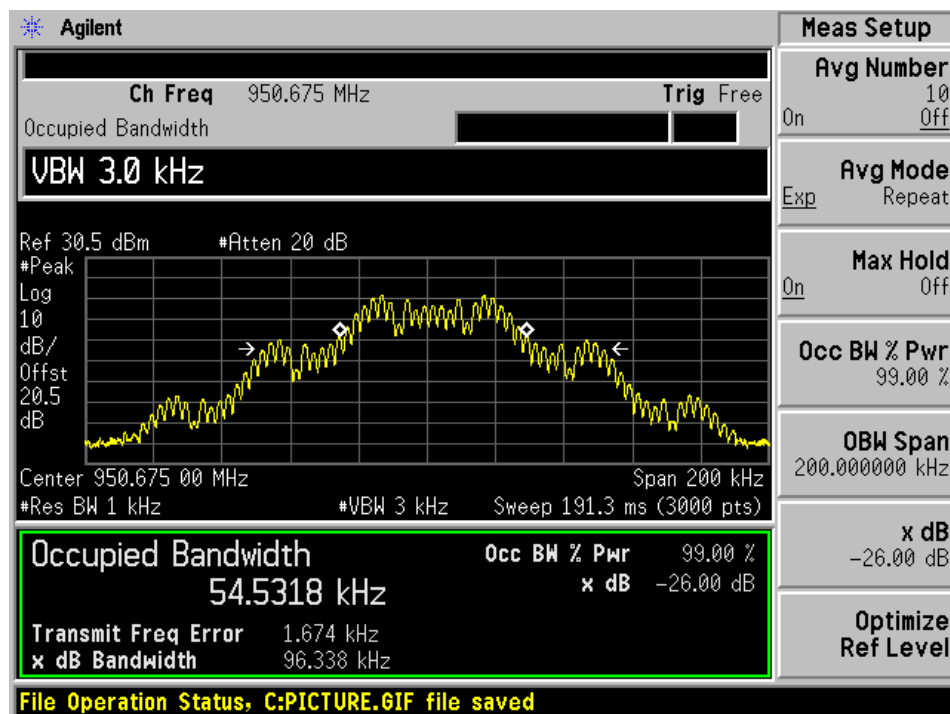
| Center Frequency (MHz) | 99% Bandwidth (kHz) | Limit (kHz) | Result | Power Setting |
|------------------------|---------------------|-------------|--------|---------------|
| 950.675                | 54.45               | 200         | Pass   | Low (50 mW)   |
| 950.675                | 54.53               | 200         | Pass   | High (100 mW) |

Please refer to the following plots for detailed test results

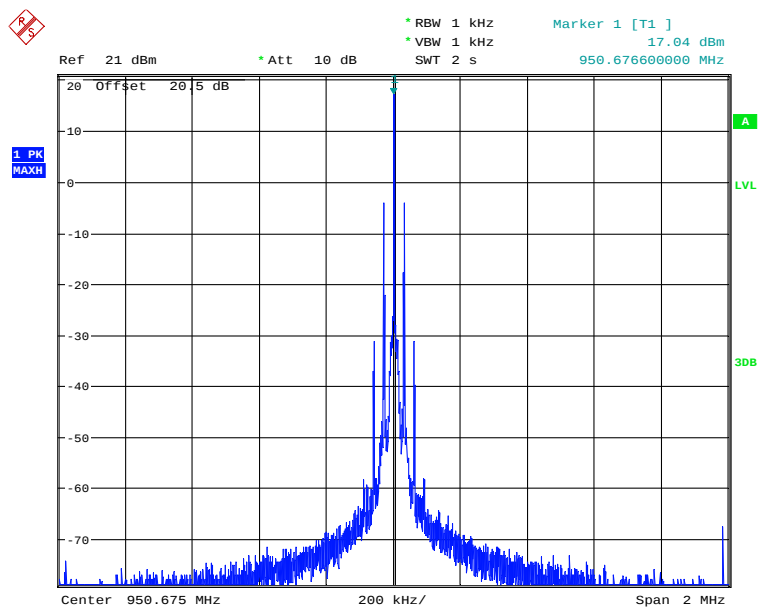
## 99% Emission Bandwidth @ 50 mW



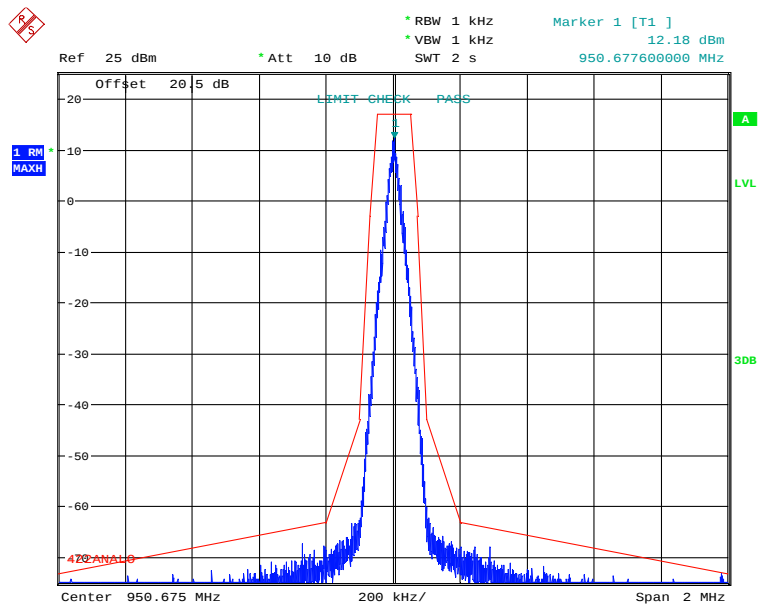
## 99% Emission Bandwidth @ 100 mW

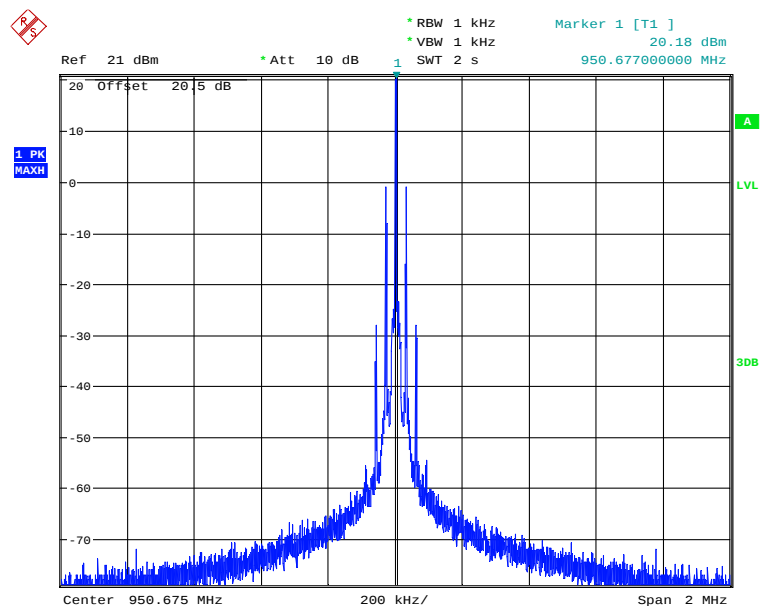
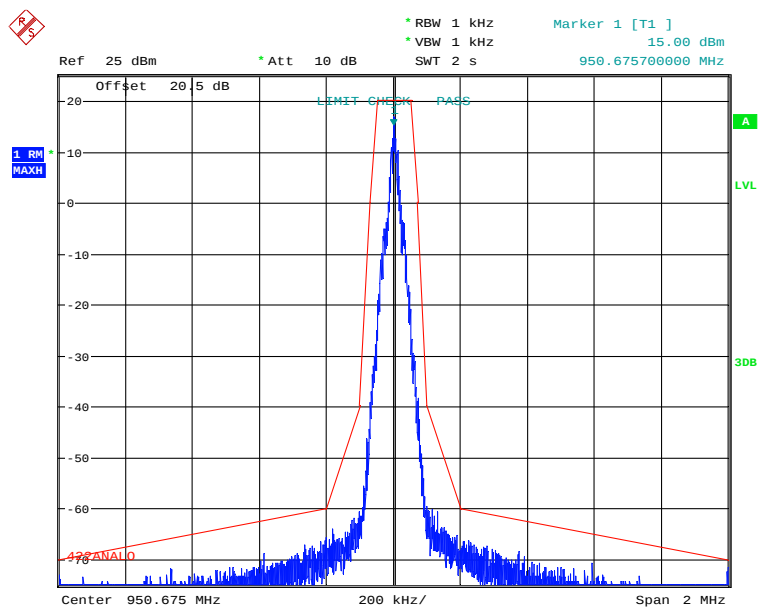


Emission Mask-1, 950.675 MHz @ 50 mW



Emission Mask-2, 950.675 MHz @ 50 mW



**Emission Mask-1, 950.675 MHz @ 100 mW****Emission Mask-2, 950.675 MHz @ 100 mW**

## 7 FCC §74.861(d)(4)(i) & ISEDC RSS-123 §8.3 - Conducted Spurious Emissions at Antenna Port

### 7.1 Applicable Standards

According to FCC §74.861 (d) (4) (i):

For the 653-657 MHz, 941.5-944 MHz, 944-952 MHz, 952.850-956.250 MHz, 956.45-959.85 MHz, 1435-1525 MHz, 6875-6900 MHz and 7100-7125 MHz bands, 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. 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).

According to RSS-123 §8.3 Clause c. devices operating in frequency bands 941.5-952 MHz, 953-959.85 MHz, 6930-6955 MHz and 7100-7125 MHz shall have the transmitter's unwanted emissions meet the requirements in sections 8.3 and 8.4 of ETSI EN 300 422-1

### 7.2 Test Procedure

KDB 971168 D01 v03r01 and 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 |
|--------------|--------------------|--------|---------------|------------------------|----------------------|
| Agilent      | Analyzer, Spectrum | E4446A | MY48250238    | 2019-06-26             | 1 year               |
| -            | 20dB attenuator    | -      | -             | Each time <sup>1</sup> | N/A                  |
| -            | RF Cable           | -      | -             | 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 02 October 2018) "A2LA Policy on Metrological Traceability".

## 7.4 Test Environmental Conditions

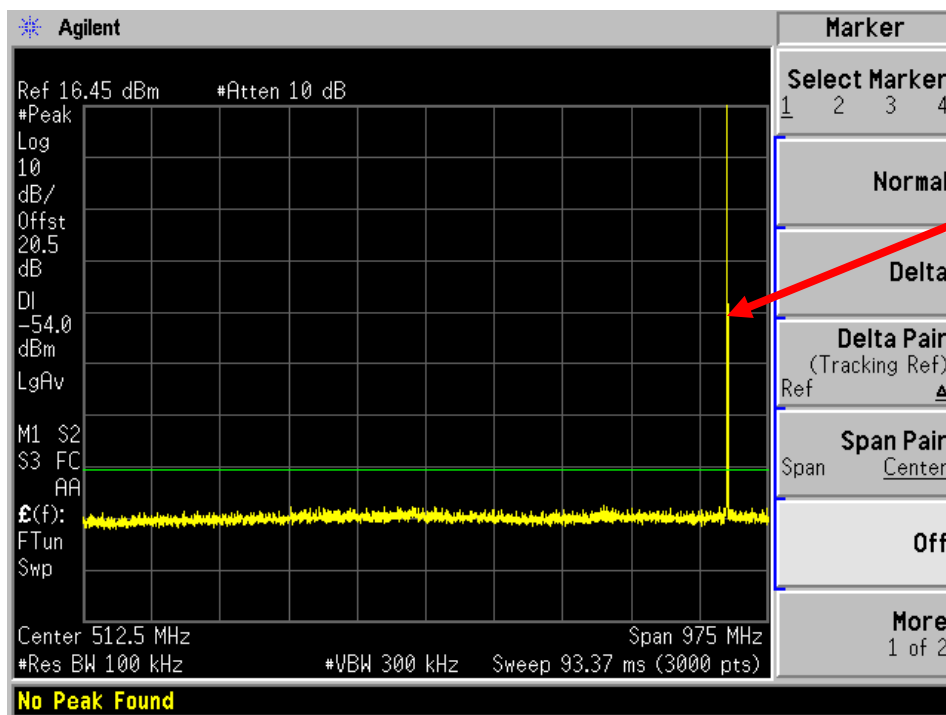
|                           |           |
|---------------------------|-----------|
| <b>Temperature:</b>       | 23 °C     |
| <b>Relative Humidity:</b> | 45 %      |
| <b>ATM Pressure:</b>      | 101.2 kPa |

*The testing was performed by Christian McCaig on 2020-01-13 at RF site.*

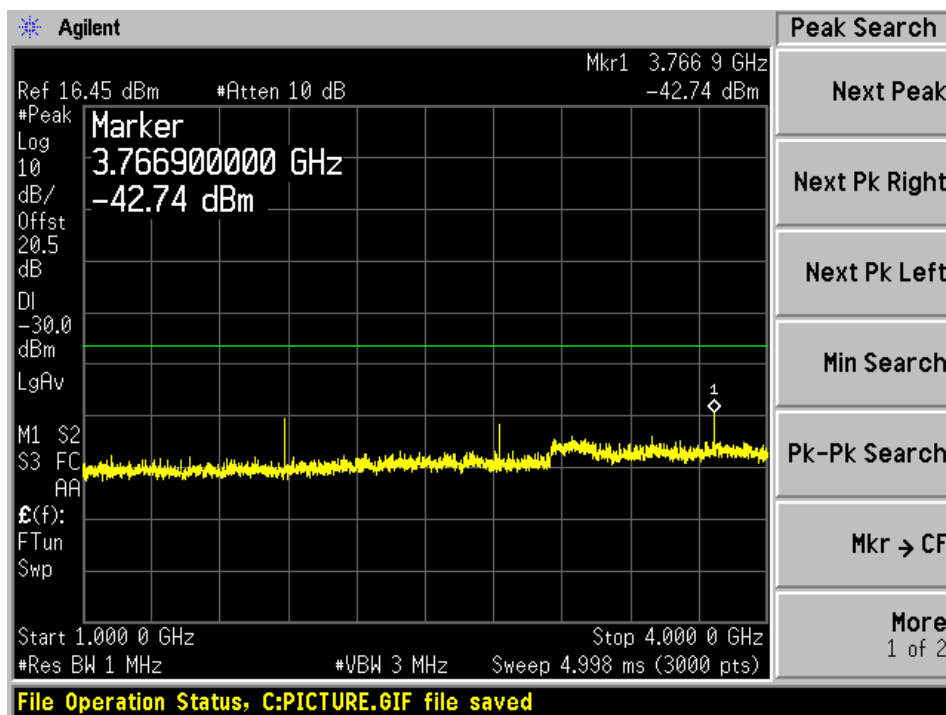
## 7.5 Test Results

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.

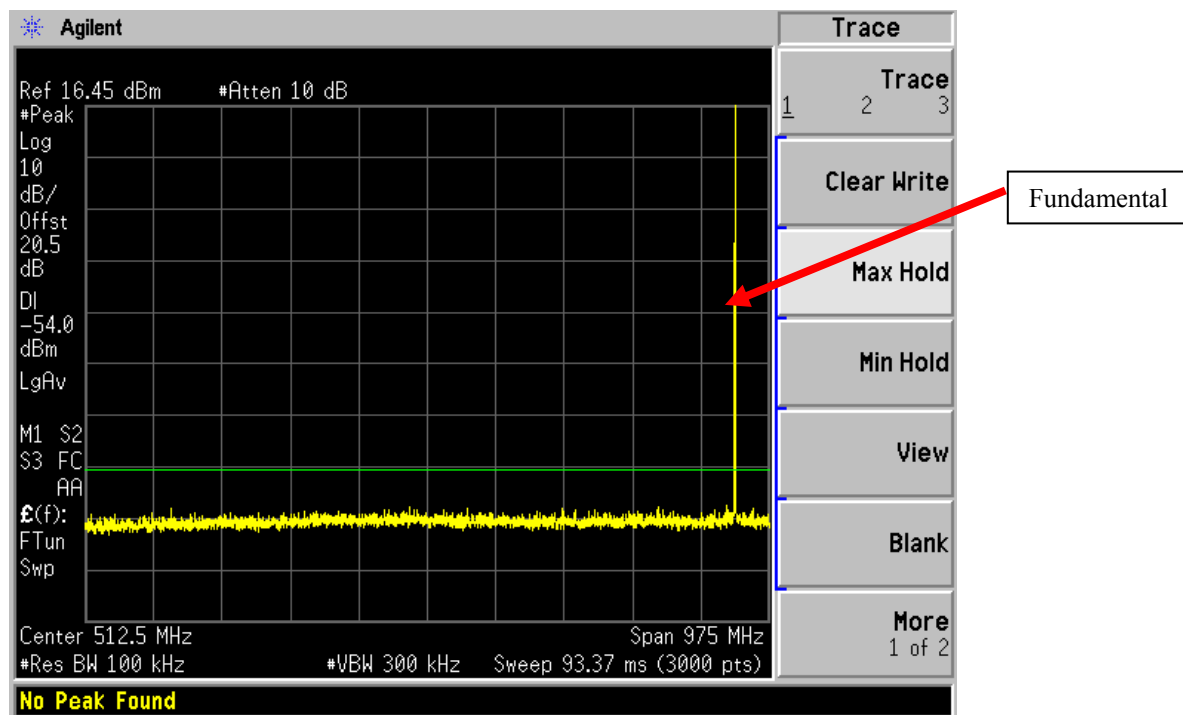
## Low Channel 941.525 MHz SE\_1



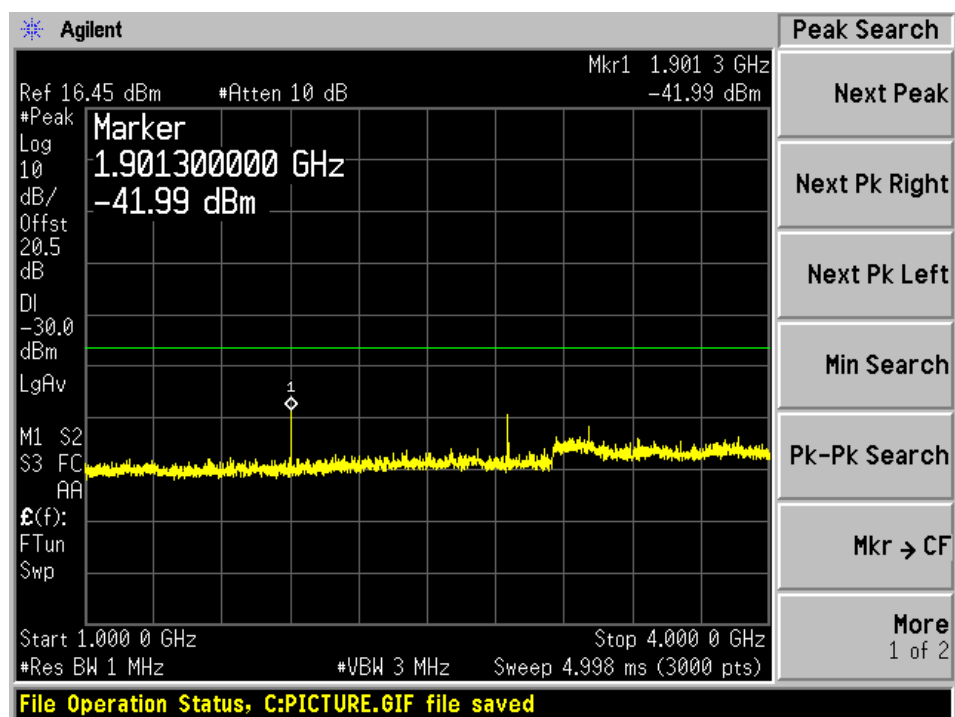
## Low Channel 941.525 2 MHz SE\_2



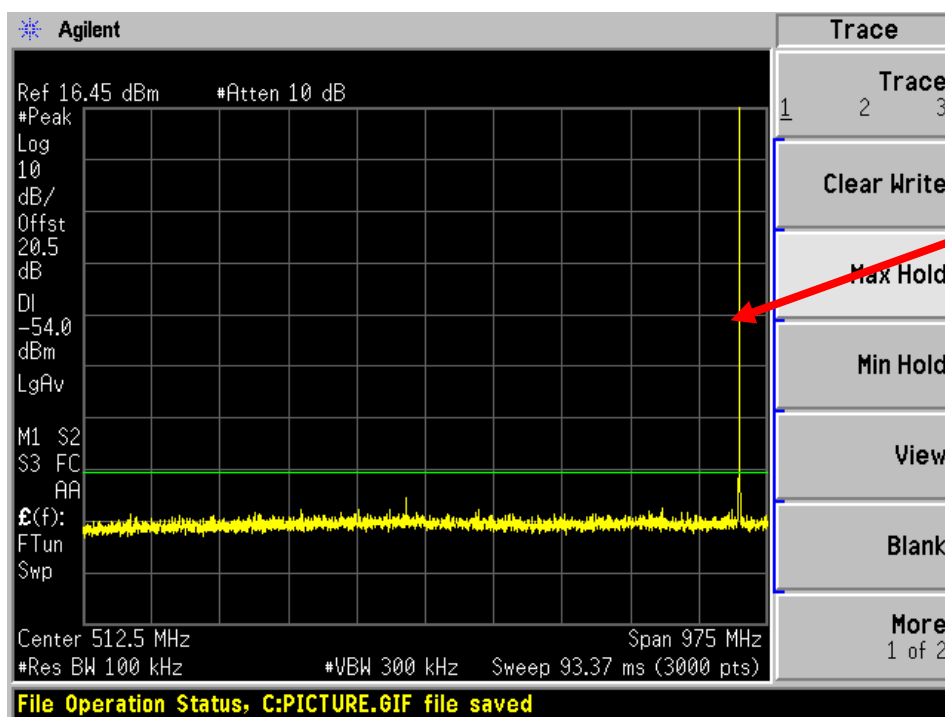
## Middle Channel 950.675 MHz SE\_1



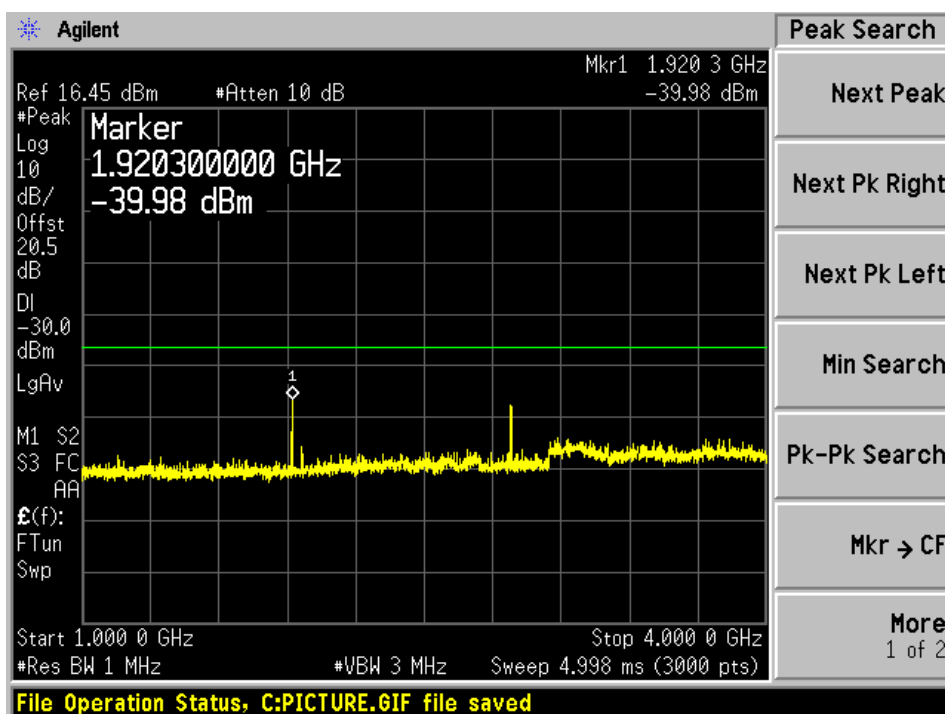
## Middle Channel 950.675 MHz SE\_2



## High Channel 959.825 MHz SE\_1



## High Channel 959.825 MHz SE\_2



## 8 FCC §74.861(d) (4)(i) & ISEDC RSS-123 §8.3 - Field Strength of Spurious Radiation

### 8.1 Applicable Standards

According to FCC §74.861 (d) (4) (i):

For the 653-657 MHz, 941.5-944 MHz, 944-952 MHz, 952.850-956.250 MHz, 956.45-959.85 MHz, 1435-1525 MHz, 6875-6900 MHz and 7100-7125 MHz bands, 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. 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).

According to RSS-123 §8.3 Clause c. devices operating in frequency bands 941.5-952 MHz, 953-959.85 MHz, 6930-6955 MHz and 7100-7125 MHz shall have the transmitter's unwanted emissions meet the requirements in sections 8.3 and 8.4 of ETSI EN 300 422-1

### 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 |
|--------------------|--------------------|-----------|----------------------------|------------------------|----------------------|
| Rhode & Schwarz    | Signal Analyzer    | FSV40     | 1321.3008K3<br>9-101203-UW | 2019-08-06             | 1 year               |
| Sunol Science Corp | System Controller  | SC99V     | 011003-1                   | N/R                    | N/A                  |
| Sunol Sciences     | Biconi-Log Antenna | JB1       | A013105-3                  | 2018-02-26             | 2 years              |
| Agilent            | Pre Amplifier      | 8447D     | 2944A10187                 | 2019-04-11             | 1 year               |
| HP                 | Pre-Amplifier      | 8449B     | 3147A00400                 | 2019-05-20             | 1 year               |
| Sunol Sciences     | Horn Antenna       | DRH-118   | A052704                    | 2019-04-02             | 2 years              |
| A.R.A.             | Horn Antenna       | DRG-118/A | 1132                       | 2018-02-13             | 2 years              |
| HP                 | Signal Generator   | 83650B    | 3614A00276                 | 2019-04-12             | 1 year               |
| -                  | RF Cable           | -         | -                          | Each time <sup>1</sup> | N/A                  |
| COM-POWER          | Dipole Antenna     | AD-100    | 721033DB1,<br>2, 3, 4      | 2019-03-06             | 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 02 October 2018) "A2LA Policy on Metrological Traceability".

## 8.4 Test Environmental Conditions

|                           |           |
|---------------------------|-----------|
| <b>Temperature:</b>       | 22 °C     |
| <b>Relative Humidity:</b> | 40 %      |
| <b>ATM Pressure:</b>      | 101.4 kPa |

The testing was performed by Christian McCaig from 2020-01-13 at 5 meter chamber 3.

## 8.5 Test Results

Pre-scanned both SMV/E07-941 and SMQV/E07-941, and SMV/E07-941 was the worst case. Therefore, SMV/E07-941 was selected for formal testing.

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

TX Middle channel (950.675 MHz) at the maximum output power:

| Freq.<br>(MHz) | S.A.<br>Amp.<br>(dBμV) | Table<br>Azimuth<br>(Degrees) | Test Antenna   |                | Substitution   |                        |                              |                       | Absolute<br>Level<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) |
|----------------|------------------------|-------------------------------|----------------|----------------|----------------|------------------------|------------------------------|-----------------------|----------------------------|----------------|----------------|
|                |                        |                               | Height<br>(cm) | Polar<br>(H/V) | Freq.<br>(MHz) | S.G.<br>Level<br>(dBm) | Antenna<br>Gain<br>(dBd/dBi) | Cable<br>Loss<br>(dB) |                            |                |                |
| 3802.7         | 56.63                  | 15                            | 155            | H              | 3802.7         | -41.81                 | 10.249                       | 2.06                  | -33.621                    | -30            | -3.621         |
| 3802.7         | 49.41                  | 90                            | 170            | V              | 3802.7         | -48.76                 | 10.296                       | 2.06                  | -40.524                    | -30            | -10.524        |
| 2852.025       | 52.97                  | 360                           | 120            | H              | 2852.025       | -50.91                 | 10.249                       | 1.75                  | -42.411                    | -30            | -12.411        |
| 2852.025       | 49.73                  | 0                             | 100            | V              | 2852.025       | -53.64                 | 10.296                       | 1.75                  | -45.094                    | -30            | -15.094        |
| 1901.35        | 57.44                  | 360                           | 140            | H              | 1901.35        | -52.49                 | 10.249                       | 1.3                   | -43.541                    | -30            | -13.541        |
| 1901.35        | 51.45                  | 250                           | 300            | V              | 1901.35        | -58.56                 | 10.296                       | 1.3                   | -49.564                    | -30            | -19.564        |
| 704            | 29.17                  | 0                             | 100            | H              | 704            | -71.43                 | 0                            | 0.65                  | -72.08                     | -54            | -18.08         |
| 704            | 29.08                  | 0                             | 100            | V              | 704            | -71.8                  | 0                            | 0.65                  | -72.45                     | -54            | -18.45         |
| 550            | 28.75                  | 0                             | 100            | H              | 550            | -73.84                 | 0                            | 0.55                  | -74.39                     | -54            | -20.39         |
| 550            | 28.69                  | 0                             | 100            | V              | 550            | -73.98                 | 0                            | 0.55                  | -74.53                     | -54            | -20.53         |

## 9 FCC §2.1055 & ISEDC RSS-123 §8.2 - Frequency Stability

### 9.1 Applicable Standards

According to §2.1055 and RSS-123 §8.2 the device shall meet the transmit power/e.r.p., authorized bandwidth and frequency stability limits for its operating bands as specified in table 1.

**Table 1 — Frequency bands, transmit power/e.r.p., authorized bandwidths and frequency stability limits**

| Frequency band (MHz) | Transmit power (W) | e.r.p. (W) | Authorized bandwidth (kHz) | Frequency stability ( $\pm$ ppm) |
|----------------------|--------------------|------------|----------------------------|----------------------------------|
| 26.10-26.48          | --                 | 1          | 200                        | 50                               |
| 88-107.5             | --                 | 1          | 200                        | 50                               |
| 150-174              | 0.05               | --         | 54                         | 50                               |
| 450-451              | --                 | 1          | 200                        | 50                               |
| 455-456              | --                 | 1          | 200                        | 50                               |
| 941.5-952            | 1                  | --         | 200                        | 20                               |
| 953-959.85           | 1                  | --         | 200                        | 20                               |
| 6930-6955            | 1                  | --         | 600                        | 10                               |
| 7100-7125            | 1                  | --         | 600                        | 10                               |

### 9.2 Test Procedure

According to FCC 2.1055, (a) the frequency stability shall be measured with variation of ambient temperature as follows:

- (1) From  $-30^{\circ}$  to  $+50^{\circ}$  centigrade for all equipment except that specified in paragraphs (a) (2) and (3) of this section.
- (2) From  $-20^{\circ}$  to  $+50^{\circ}$  centigrade for equipment to be licensed for use in the Maritime Services under part 80 of this chapter, except for Class A, B, and S Emergency Position Indicating Radiobeacons (EPIRBS), and equipment to be licensed for use above 952 MHz at operational fixed stations in all services, stations in the Local Television Transmission Service and Point-to-Point Microwave Radio Service under part 21 of this chapter, equipment licensed for use aboard aircraft in the Aviation Services under part 87 of this chapter, and equipment authorized for use in the Family Radio Service under part 95 of this chapter.
- (3) From  $0^{\circ}$  to  $+50^{\circ}$  centigrade for equipment to be licensed for use in the Radio Broadcast Services under part 73 of this chapter.

(b) Frequency measurements shall be made at the extremes of the specified temperature range and at intervals of not more than  $10^{\circ}$  centigrade through the range. A period of time sufficient to stabilize all of the components of the oscillator circuit at each temperature level shall be allowed prior to frequency measurement. The short term transient effects on the frequency of the transmitter due to keying (except for broadcast transmitters) and any heating element cycling normally occurring at each ambient temperature level also shall be shown. Only the

portion or portions of the transmitter containing the frequency determining and stabilizing circuitry need be subjected to the temperature variation test.

(d) The frequency stability shall be measured with variation of primary supply voltage as follows:

(2) For hand carried, battery powered equipment, reduce primary supply voltage to the battery operating end point which shall be specified by the manufacturer.

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

### 9.3 Test Equipment List and Details

| Manufacturer    | Description           | Model  | Serial Number              | Calibration Date       | Calibration Interval |
|-----------------|-----------------------|--------|----------------------------|------------------------|----------------------|
| Rhode & Schwarz | Signal Analyzer       | FSV40  | 1321.3008K3<br>9-101203-UW | 2019-08-06             | 1 year               |
| Tenney          | Environmental Chamber | TUJR   | 27445-06                   | 2019-03-26             | 1 year               |
| KEPCO           | DC Source             | 25-10M | H1334526                   | Cal. Not Required      | N/A                  |
| -               | 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 02 October 2018) "A2LA Policy on Metrological Traceability".*

### 9.4 Test Environmental Conditions

|                    |           |
|--------------------|-----------|
| Temperature:       | 23 °C     |
| Relative Humidity: | 45 %      |
| ATM Pressure:      | 101.2 kPa |

The testing was performed by Christian McCaig 2020-01-14 at RF site.

## 9.5 Test Results

Fc=950.675 MHz:

Varying temperature:

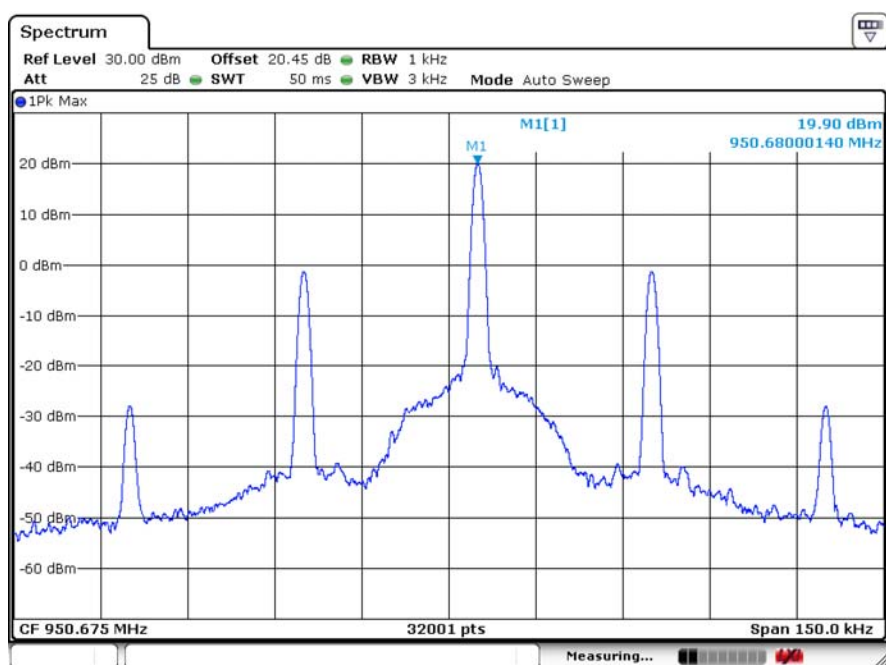
| Temperature (°C) | Measured Frequency (MHz) | Channel Frequency (MHz) | Frequency Tolerance (ppm) | Limit (± ppm) |
|------------------|--------------------------|-------------------------|---------------------------|---------------|
| -20 (Note)       | -                        | -                       | -                         | 20            |
| -10              | 950.6800014              | 950.675                 | -5.26                     | 20            |
| 0                | 950.6798842              | 950.675                 | -5.14                     | 20            |
| 10               | 950.6792936              | 950.675                 | -4.52                     | 20            |
| 20               | 950.6771702              | 950.675                 | -2.28                     | 20            |
| 30               | 950.6746625              | 950.675                 | 0.36                      | 20            |
| 40               | 950.6715970              | 950.675                 | 3.58                      | 20            |
| 50               | 950.6700923              | 950.675                 | 5.16                      | 20            |

Note: EUT shut off at -20°C

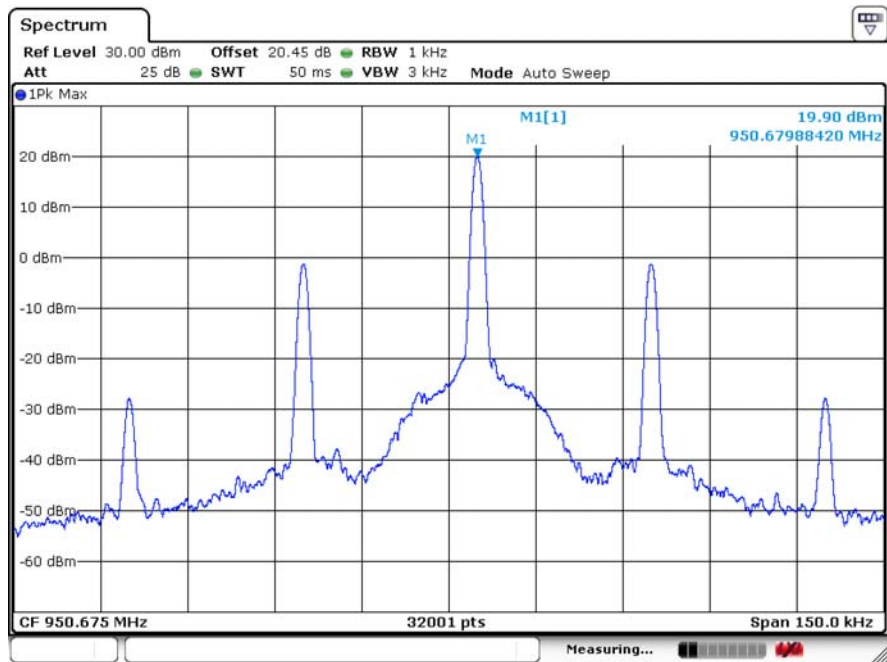
Varying supply voltage:

| Voltage       | Measured Frequency (MHz) | Channel Frequency (MHz) | Frequency Tolerance (ppm) | Limit (± ppm) |
|---------------|--------------------------|-------------------------|---------------------------|---------------|
| Low (1.275 V) | 950.6769640              | 950.675                 | -2.07                     | 20            |
| High (1.5 V)  | 950.6771093              | 950.675                 | -2.22                     | 20            |

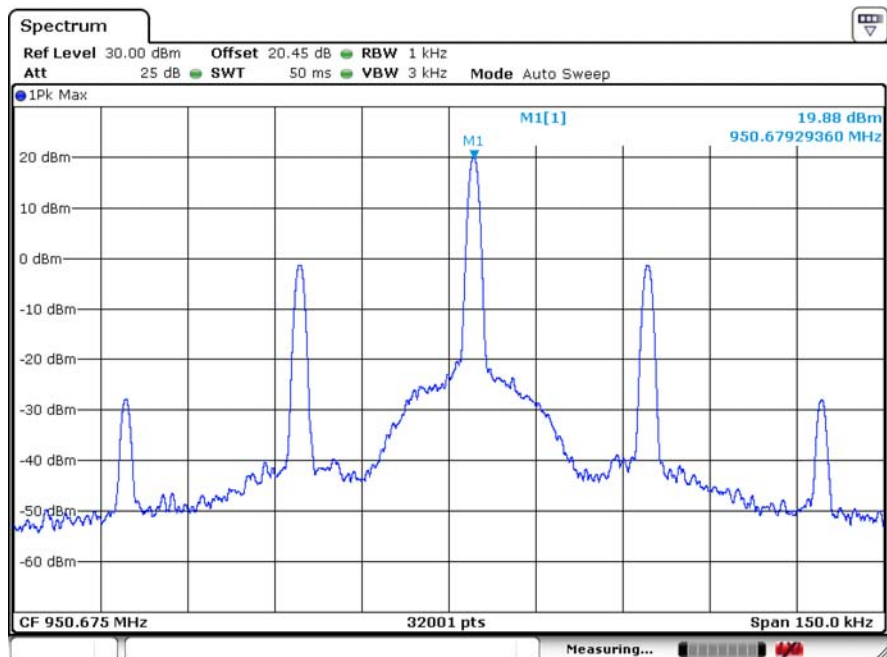
-10 °C



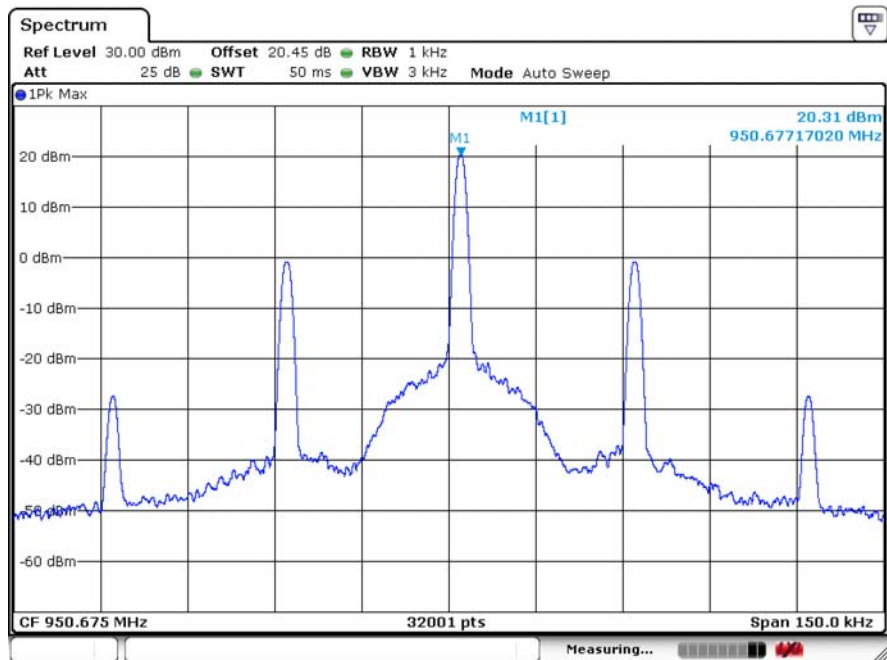
0 °C



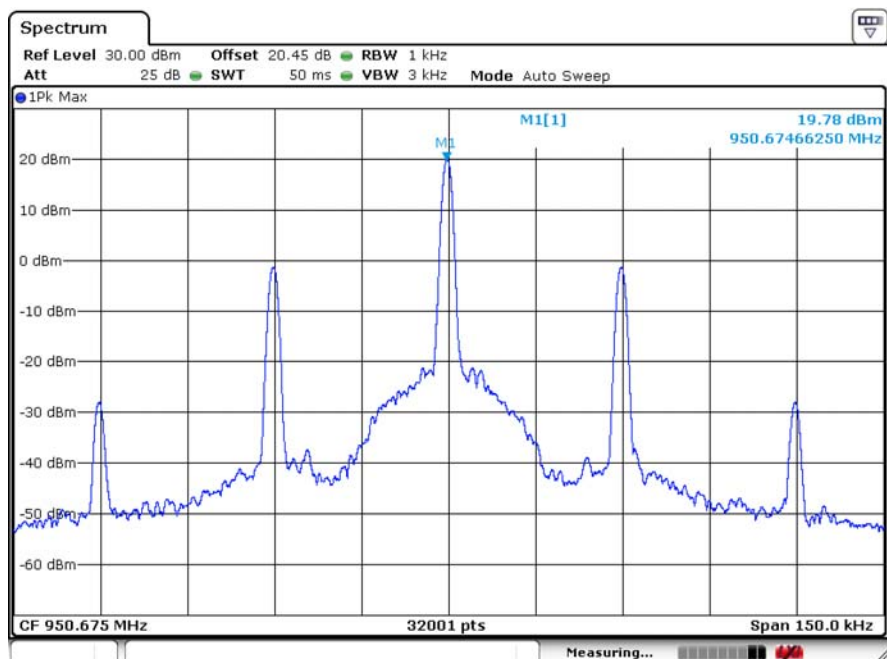
10 °C



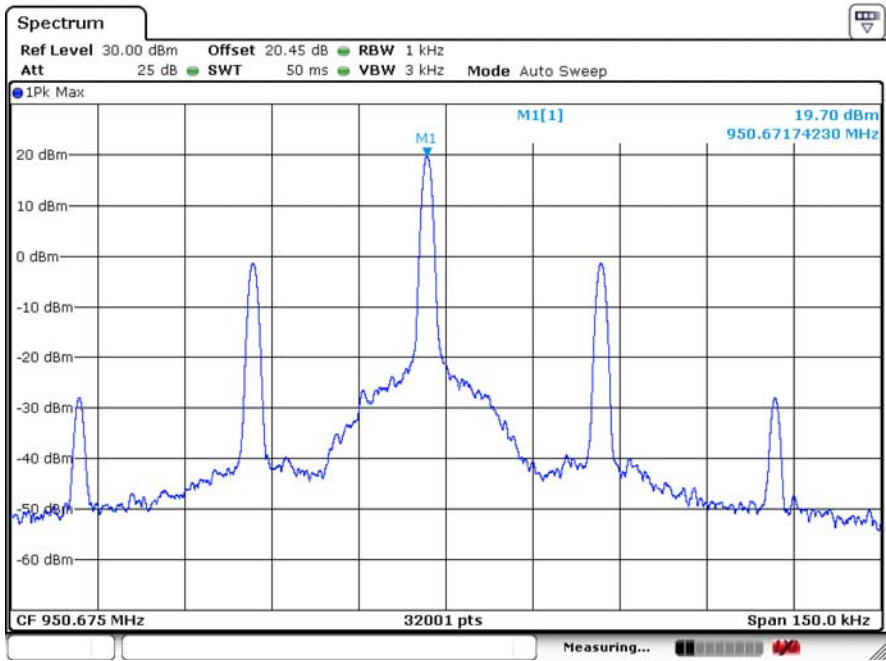
20 °C



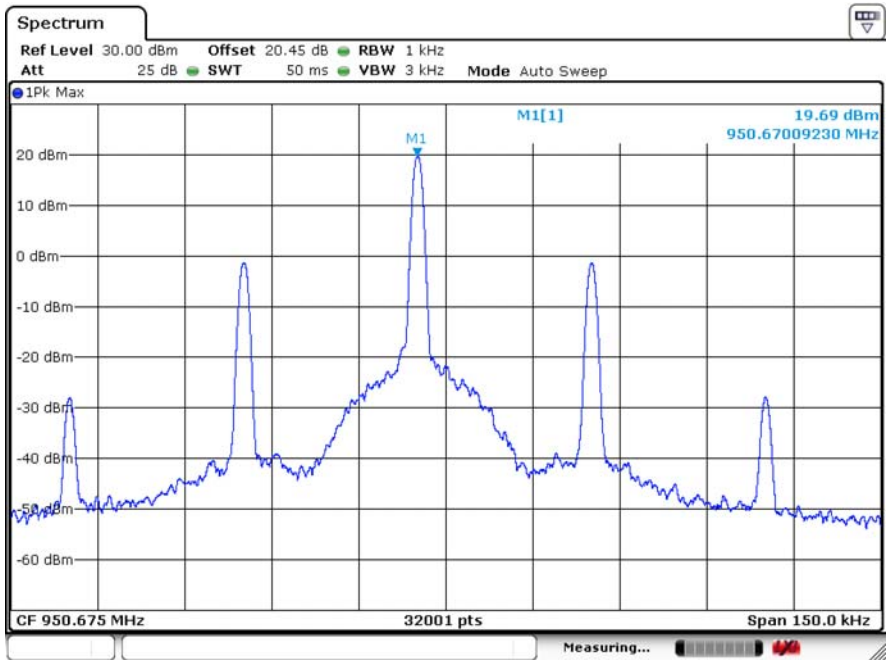
30 °C



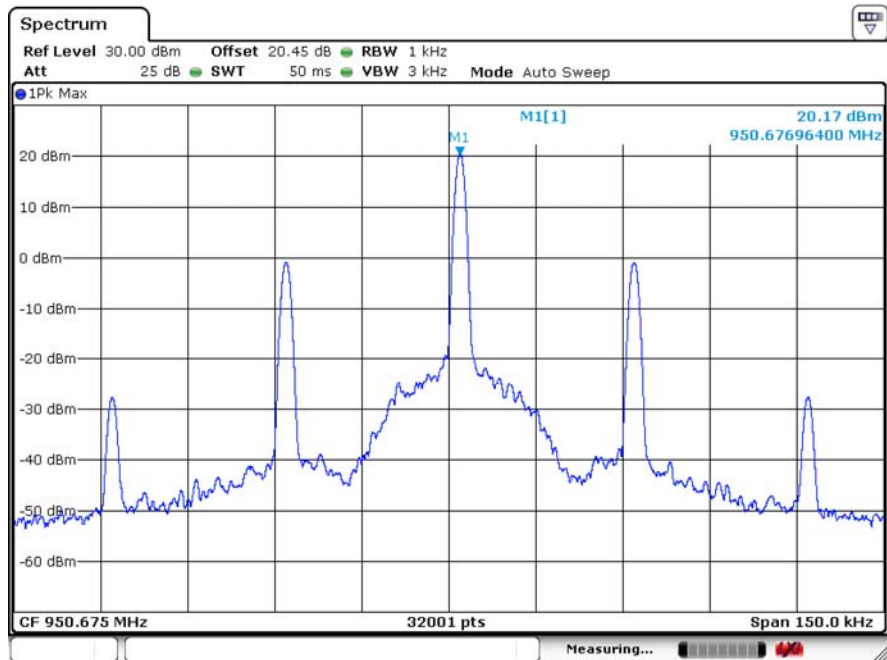
40 °C



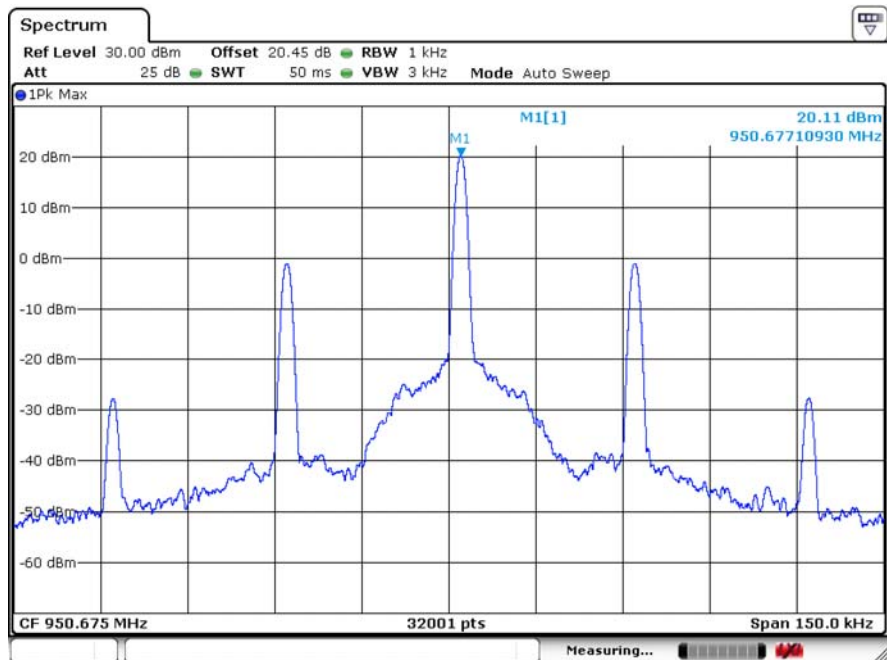
50 °C



## Low Voltage



## High Voltage



## 10 FCC §2.1047 & ISEDC RSS-123 §8.1 - Modulation Characteristic

### 10.1 Applicable Standards

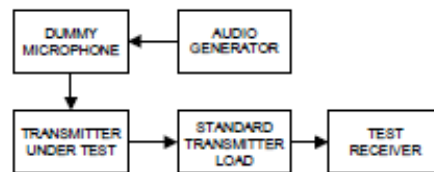
According to FCC §2.1047(a):

Voice modulated communication equipment. A curve or equivalent data showing the frequency response of the audio modulating circuit over a range of 100 to 5000 Hz shall be submitted. For equipment required to have an audio low-pass filter, a curve showing the frequency response of the filter, or of all circuitry installed between the modulation limiter and the modulated stage shall be submitted.

According to ISEDC RSS-123 §8.1 Equipment employing frequency modulation (FM) shall have the frequency deviation not exceed  $\pm 75$  kHz.

### 10.2 Test Procedure

#### Modulation Characteristic:



- a) Connect the equipment as illustrated.
- b) Adjust the transmitter per the manufacturer's procedure for full rated system deviation.
- c) Set the test receiver to measure peak positive deviation. Set the audio bandwidth for  $\leq 0.25$  Hz to  $\geq 15,000$  Hz. Turn the de-emphasis function off.
- d) Apply a 1000 Hz modulating signal to the transmitter from the audio frequency generator, and adjust the level to obtain 60% of full rated system deviation.
- e) Increase the level from the audio frequency generator by 20 dB in one step (rise time between the 10% and 90% points shall be 0.1 second maximum).
- f) Measure both the instantaneous and steady-state deviation at and after the time of increasing the audio input level.
- g) With the level from the audio frequency generator held constant at the level obtained in step e), slowly vary the audio frequency from 300 Hz to 3000 Hz and observe the steady-state deviation. Record the maximum deviation.
- h) Set the test receiver to measure peak negative deviation and repeat steps d) through g).
- i) The values recorded in steps g) and h) are the modulation limiting.

## Audio Frequency Response

- a) Connect the equipment as illustrated.
- b) Set the test receiver to measure peak positive deviation. Set the audio bandwidth for  $\leq 50$  Hz to  $\geq 15,000$  Hz. Turn the de-emphasis function off.
- c) Adjust the transmitter per the manufacturer's procedure for full rated system deviation.
- d) Apply a 1000 Hz tone and adjust the audio frequency generator to produce 20% of the rated system deviation.
- e) Set the test receiver to measure rms deviation and record the deviation reading as  $DEV_{FREQ}$
- f) Set the audio frequency generator to the desired test frequency between 300 Hz and 3000 Hz.
- g) Record the test receiver deviation reading as  $DEV_{FREQ}$ .
- h) Calculate the audio frequency response at the present frequency as:

$$audio\ frequency\ response = 20 \log_{10} \left( \frac{DEV_{FREQ}}{DEV_{REF}} \right)$$

- i) Repeat steps f) through h) for all the desired test frequencies.

## 10.3 Test Equipment List and Details

| Manufacturer | Description                | Model | Serial Number | Calibration Date | Calibration Interval |
|--------------|----------------------------|-------|---------------|------------------|----------------------|
| HP           | RF Communications Test Set | 8920A | 3438A05338    | 2018-01-09       | 25 months            |
| HP           | Modulation Analyzer        | 8901A | 2026A00847    | 2019-01-24       | 2 years              |
| -            | RF Cable                   | -     | -             | -                | Each time            |

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 02 October 2018) "A2LA Policy on Metrological Traceability".

## 10.4 Test Environmental Conditions

|                    |           |
|--------------------|-----------|
| Temperature:       | 23 °C     |
| Relative Humidity: | 37 - 40 % |
| ATM Pressure:      | 101.7 kPa |

The testing was performed by Christian McCaig on 2020-01-15 at RF site.

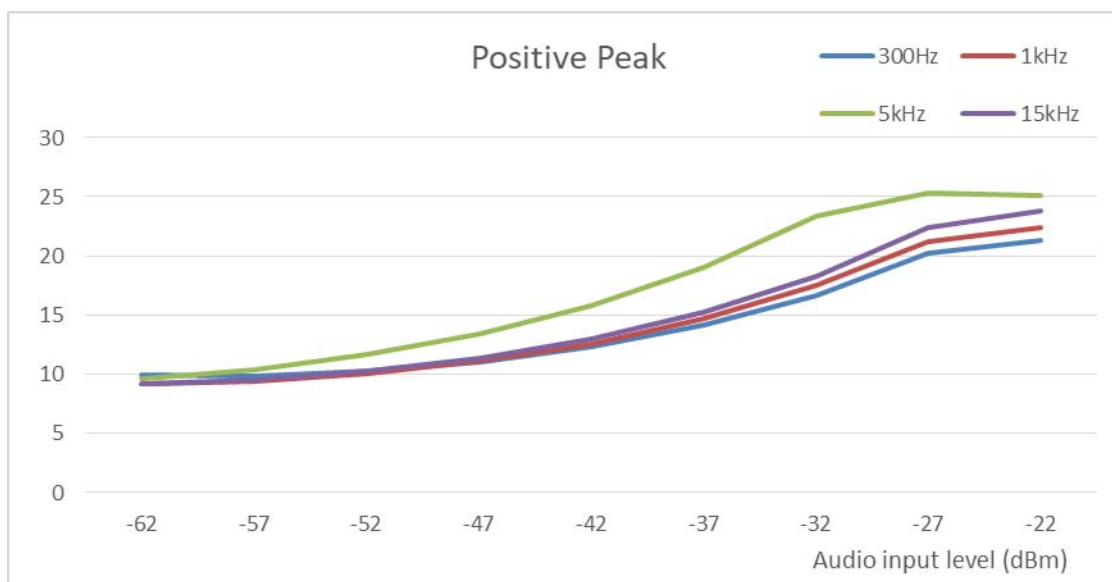
## 10.5 Test Results

### MODULATION LIMITING

Carrier Frequency: 950.675 MHz

Positive Peak

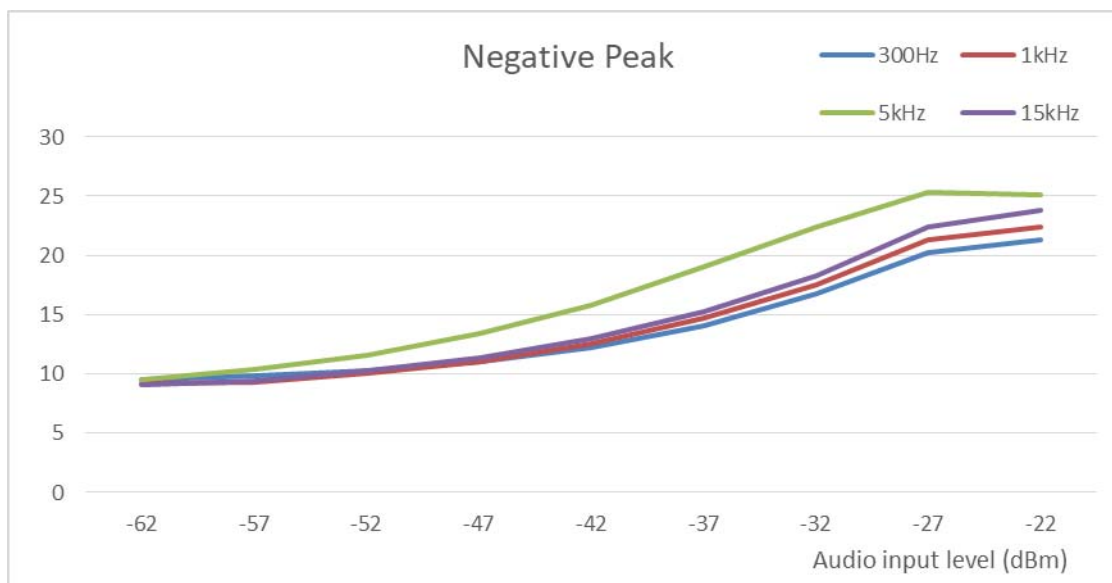
| AF Level (dBm) | AF Frequency (Hz)/Peak Deviation (kHz) |         |         |          | Limit (kHz) |
|----------------|----------------------------------------|---------|---------|----------|-------------|
|                | 300 Hz                                 | 1000 Hz | 5000 Hz | 15000 Hz |             |
| -62            | 9.97                                   | 9.15    | 9.6     | 9.21     | ±75         |
| -57            | 9.87                                   | 9.43    | 10.38   | 9.48     | ±75         |
| -52            | 10.29                                  | 10.05   | 11.63   | 10.3     | ±75         |
| -47            | 11.04                                  | 11.08   | 13.36   | 11.39    | ±75         |
| -42            | 12.33                                  | 12.56   | 15.75   | 12.95    | ±75         |
| -37            | 14.15                                  | 14.66   | 19.02   | 15.23    | ±75         |
| -32            | 16.7                                   | 17.52   | 23.4    | 18.3     | ±75         |
| -27            | 20.23                                  | 21.24   | 25.34   | 22.38    | ±75         |
| -22            | 21.33                                  | 22.39   | 25.11   | 23.82    | ±75         |



Carrier Frequency: 950.675 MHz

Negative Peak

| AF Level<br>(dBm) | AF Frequency (Hz)/Peak Deviation (kHz) |         |         |          | Limit<br>(kHz) |
|-------------------|----------------------------------------|---------|---------|----------|----------------|
|                   | 300 Hz                                 | 1000 Hz | 5000 Hz | 15000 Hz |                |
| -62               | 9.52                                   | 9.13    | 9.52    | 9.06     | ±75            |
| -57               | 9.83                                   | 9.33    | 10.31   | 9.43     | ±75            |
| -52               | 10.3                                   | 10.03   | 11.57   | 10.21    | ±75            |
| -47               | 11.02                                  | 11.06   | 13.35   | 11.37    | ±75            |
| -42               | 12.24                                  | 12.55   | 15.73   | 12.95    | ±75            |
| -37               | 14.09                                  | 14.67   | 19.07   | 15.24    | ±75            |
| -32               | 16.73                                  | 17.51   | 22.38   | 18.31    | ±75            |
| -27               | 20.28                                  | 21.26   | 25.33   | 22.42    | ±75            |
| -22               | 21.28                                  | 22.36   | 25.06   | 23.82    | ±75            |



## Audio Frequency Response, Middle Channel

| AF Frequency (Hz) | Frequency Deviation (kHz) | AF Response (dB) |
|-------------------|---------------------------|------------------|
| 100               | 3.92                      | -0.04            |
| 200               | 3.93                      | -0.02            |
| 300               | 3.93                      | -0.02            |
| 400               | 3.93                      | -0.02            |
| 500               | 3.93                      | -0.02            |
| 600               | 3.93                      | -0.02            |
| 700               | 3.94                      | 0.00             |
| 800               | 3.94                      | 0.00             |
| 900               | 3.94                      | 0.00             |
| 1000              | 3.95                      | 0.02             |
| 1200              | 3.96                      | 0.04             |
| 1400              | 3.97                      | 0.07             |
| 1600              | 3.98                      | 0.09             |
| 1800              | 3.98                      | 0.09             |
| 2000              | 3.99                      | 0.11             |
| 2200              | 4.01                      | 0.15             |
| 2400              | 4.02                      | 0.17             |
| 2600              | 4.03                      | 0.20             |
| 2800              | 4.04                      | 0.22             |
| 3000              | 4.05                      | 0.24             |
| 3250              | 4.06                      | 0.26             |
| 3500              | 4.07                      | 0.28             |
| 3750              | 4.08                      | 0.30             |
| 4000              | 4.09                      | 0.32             |
| 4250              | 4.1                       | 0.35             |
| 4500              | 4.11                      | 0.37             |
| 4750              | 4.12                      | 0.39             |
| 5000              | 4.13                      | 0.41             |

Note: AF Response =  $20 \cdot \log$  (Measured Frequency Deviation/Frequency Deviation at 1 kHz)

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## **11 Annex A (Normative) - EUT Photographs**

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Please refer to the following exhibits:

Exhibit- EUT Test Setup Photographs

Exhibit- EUT External Photographs

Exhibit- EUT Internal Photographs

## 12 Annex B (Informative) – Manufacturer Declaration of Similarity



P.O. Box 15900 - Rio Rancho, NM - 87174 - USA  
Phone: (800)821-1121 or (505)892-4501 - Fax: (505)892-6243  
web: [www.lectrosonics.com](http://www.lectrosonics.com) - email: [sales@lectrosonics.com](mailto:sales@lectrosonics.com)

### DECLARATION OF SIMILARITY

January 16, 2020

To:  
Bay Area Compliance Laboratories Corp.  
1274 Anvilwood Ave.  
Sunnyvale, CA 94089  
Phone: 408-732-9162, Fax: 408-732-9164  
<http://www.baclcorp.com>

Dear Sir or Madam:

We, Lectrosonics, Inc. hereby declare that product:

model: SMQV/E07-941

is electrically identical with the same electromagnetic emissions and electromagnetic compatibility characteristics as product:

model: SMV/E07-941

tested by BACL, the results of which are featured in BACL project: *R1911052*.

A description of the differences between the tested model and those that are declared similar are as follows:

The SMV/E07-941 model is powered by one AA battery; the SMQV/E07-941 model is powered by two AA batteries wired in parallel. Because it uses only one battery, the width of the SMV/E07-941 case is truncated by 13 mm on one side but the layout of connectors and controls is identical in both products.

Please contact me should there be need for any additional clarification or information.

Best Regards,

Robert Cummings, V.P. Engineering  
Lectrosonics, Inc.  
581 Laser Rd.  
Rio Rancho, NM 87124

## 13 Annex C (Normative) - A2LA Electrical Testing Certificate



Please follow the web link below for a full ISO 17025 scope

<https://www.a2la.org/scopepdf/3297-02.pdf>

--- END OF REPORT ---