



# FCC PART 90 TEST REPORT

For

## Northfield Telecommunications, Inc. d/b/a Advanced Wireless Communications

20809 Kensington Blvd, Lakeville, Minnesota, 55044-8385, USA

**FCC ID: Q9SAWR-ERM100**

|  |   |
|--|---|
| <b>Report Type:</b><br>Original Report   | <b>Product Type:</b><br>Embedded radio module |
| <b>Test Engineer:</b> <u>Costa Dong</u>  | <i>Costa Dong</i>                             |
| <b>Report Number:</b> <u>RDG160728008-00A</u>  |   |
| <b>Report Date:</b> <u>2016-08-16</u>  |   |
| <b>Reviewed By:</b> <u>Sula Huang<br/>RF Leader</u>  | <i>Sula Huang</i>                             |
| <b>Test Laboratory:</b> Bay Area Compliant Laboratories Corp. (Dongguan)<br>No.69 Pulongcun, Puxinhu Industrial Zone,<br>Tangxia, Dongguan, Guangdong, China<br>Tel: +86-769-86858888<br>Fax: +86-769-86858891<br><a href="http://www.baclcorp.com.cn">www.baclcorp.com.cn</a> |   |

**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 Compliant Laboratories Corp.

**TABLE OF CONTENTS**

**GENERAL INFORMATION.....4**

    PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT) .....4

    OBJECTIVE .....4

    RELATED SUBMITTAL(S)/GRANT(S).....4

    TEST METHODOLOGY .....4

    TEST FACILITY .....4

**SYSTEM TEST CONFIGURATION.....5**

    DESCRIPTION OF TEST CONFIGURATION .....5

    SUPPORT EQUIPMENT LIST AND DETAILS .....5

    EXTERNAL I/O CABLE.....5

    BLOCK DIAGRAM OF TEST SETUP .....6

**SUMMARY OF TEST RESULTS .....7**

**FCC §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE) .....8**

    APPLICABLE STANDARD .....8

**FCC §2.1046 & §90.205- RF OUTPUT POWER.....10**

    APPLICABLE STANDARD .....10

    TEST PROCEDURE .....10

    TEST EQUIPMENT LIST AND DETAILS.....10

    TEST DATA .....10

**FCC §2.1047 & §90.207 - MODULATION CHARACTERISTIC .....12**

    APPLICABLE STANDARD .....12

    TEST PROCEDURE .....12

    TEST EQUIPMENT LIST AND DETAILS.....12

    TEST DATA .....12

**FCC §2.1049&§90.209 & §90.210 – OCCUPIED BANDWIDTH & EMISSION MASK.....18**

    APPLICABLE STANDARD .....18

    TEST EQUIPMENT LIST AND DETAILS.....19

    TEST PROCEDURE .....19

    TEST DATA .....19

**FCC §2.1051& §90.210 - SPURIOUS EMISSIONS AT ANTENNA TERMINALS .....26**

    APPLICABLE STANDARD .....26

    TEST EQUIPMENT LIST AND DETAILS.....26

    TEST PROCEDURE .....26

    TEST DATA .....27

**FCC §2.1053 & §90.210 - RADIATED SPURIOUS EMISSIONS .....30**

    APPLICABLE STANDARD .....30

    TEST EQUIPMENT LIST AND DETAILS.....30

    TEST PROCEDURE .....30

    TEST DATA .....31

**FCC §2.1055 & §90.213- FREQUENCY STABILITY.....33**

    APPLICABLE STANDARD .....33

    TEST EQUIPMENT LIST AND DETAILS.....33

    TEST PROCEDURE .....33

    TEST DATA .....33

**FCC §90.214 - TRANSIENT FREQUENCY BEHAVIOR.....35**  
APPLICABLE STANDARD .....35  
TEST EQUIPMENT LIST AND DETAILS.....35  
TEST PROCEDURE .....35  
TEST DATA .....36

FEMVA

## GENERAL INFORMATION

### Product Description for Equipment under Test (EUT)

The *Northfield Telecommunications, Inc. d/b/a Advanced Wireless Communications* 's product, model: *AWR-ERM100 (FCC ID: Q9SAWR-ERM100)* (the "EUT") in this report is a *Embedded radio module*, which was measured approximately: 12.1 cm (L)× 7.5cm (W)× 1.5 cm (H), rated input voltage: DC12V.

*Note: The series product, models AWR-ERM100 and AWR-ERM100s are electrically identical, the differences between them is model name, we selected AWR-ERM100 for fully testing, the details was explained in the attached declaration letter.*

*\*All measurement and test data in this report was gathered from production sample serial number: 160728008. The EUT was received on 2016-08-01.*

### Objective

This test report is prepared on behalf of *Northfield Telecommunications, Inc. d/b/a Advanced Wireless Communications* in accordance with Part 2, Part 90 of the Federal Communications Commission rules.

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

No related submittal(s).

### Test Methodology

All tests and measurements indicated in this document were performed in accordance with the Code of federal Regulations Title 47 Part 2, Sub-part J as well as the following individual parts:

Part 90 – Private Land DMR RADIO Service

Applicable Standards: TIA-603-D.

All emissions measurement was performed and Bay Area Compliant Laboratories Corp. (Dongguan). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

### Test Facility

The Test site used by Bay Area Compliant Laboratories Corp. (Dongguan) to collect test data is located on the No.69 Pulongcun, Puxinhu Industrial Zone, Tangxia, Dongguan, Guangdong, China

Test site at Bay Area Compliant Laboratories Corp. (Dongguan) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in Compliant with the requirements of Section 2.948 of the FCC Rules on February 06, 2015.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 273710. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

## SYSTEM TEST CONFIGURATION

### Description of Test Configuration

The system was configured for testing in a test mode.

### EUT Specification:

|                       |                   |
|-----------------------|-------------------|
| Frequency Band        | 450-470 MHz       |
| Modulation Mode       | FM                |
| Channel Spacing       | 6.25kHz/12.5kHz   |
| Rated RF Output Power | High: 4W, Low: 2W |

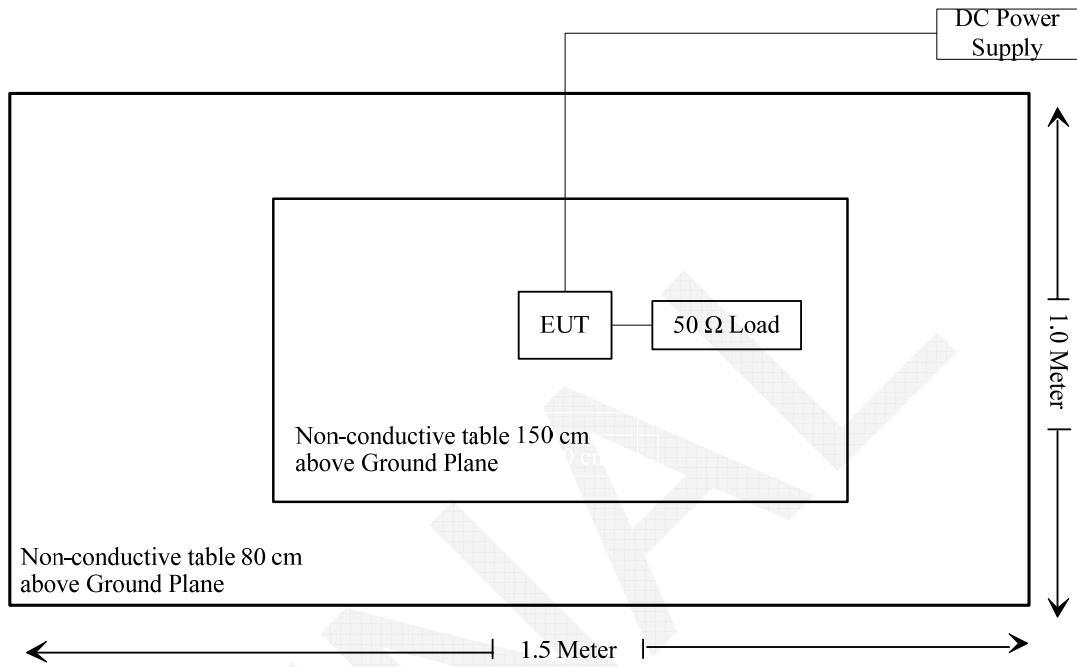
### Support Equipment List and Details

| Manufacturer   | Description         | Model   | Serial Number |
|----------------|---------------------|---------|---------------|
| Weinschel Corp | Terminal Load(100W) | 1440-3  | MD447         |
| Pro instrument | DC Power Supply     | pps3300 | N/A           |

### External I/O Cable

| Cable Description | Shielding Type | Ferrite Core | Length (m) | From Port | To              |
|-------------------|----------------|--------------|------------|-----------|-----------------|
| DC Cable          | no             | no           | 1.5        | EUT       | DC Power Supply |

### Block Diagram of Test Setup



**SUMMARY OF TEST RESULTS**

| <b>FCC Rules</b>            | <b>Description of Test</b>            | <b>Results</b> |
|-----------------------------|---------------------------------------|----------------|
| §1.1307 (b)(1),<br>§2.1091  | Maximum Permissible Exposure (MPE)    | Compliant      |
| §2.1046;§90.205             | RF Output Power                       | Compliant      |
| §2.1047;§90.207             | Modulation Characteristic             | Compliant      |
| §2.1049;§90.209;<br>§90.210 | Occupied Bandwidth & Emission Mask    | Compliant      |
| §2.1051;§90.210             | Spurious Emission at Antenna Terminal | Compliant      |
| §2.1053;§90.210             | Spurious Radiated Emissions           | Compliant      |
| §2.1055; §90.213            | Frequency Stability                   | Compliant      |
| §90.214                     | Transient Frequency Behavior          | Compliant      |

**FCC §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)**

**Applicable Standard**

According to 1.1307 (b)(1), 2.1091 systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to RF energy level in excess of the communication guidelines.

Limits for Maximum Permissible Exposure (MPE)

| Limits for Occupational/Controlled Exposure |                                   |                                   |   |  |
|---|-----------------------------------|-----------------------------------|---|--|
| Frequency Range (MHz)                       | Electric Field Strength (E) (V/m) | Magnetic Field Strength (H) (A/m) | Power Density (S) (mW/cm <sup>2</sup> ) | Averaging Time  E ,  H  or S (minutes) |
| 0.3- 3.0                                    | 614                               | 1.63                              | (100)*                                  | 6                                      |
| 3.0 - 30                                    | 1842/f                            | 4.89/f                            | (900/f <sup>2</sup> )*                  | 6                                      |
| 30-300                                      | 61.4                              | 0.163                             | 1.0                                     | 6                                      |
| 300-1500                                    | /                                 | /                                 | f/300                                   | 6                                      |
| 1500-100,000                                | /                                 | /                                 | 5                                       | 6                                      |

f = frequency in MHz;

\* = Plane-wave equivalent power density;

**MPE Calculation**

**Predication of MPE limit at a given distance**

$$S = PG/4\pi R^2$$

Where: S = power density (in appropriate units, e.g. mW/cm<sup>2</sup>);

P = power input to the antenna (in appropriate units, e.g., mW);

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);



**Calculated Data:**

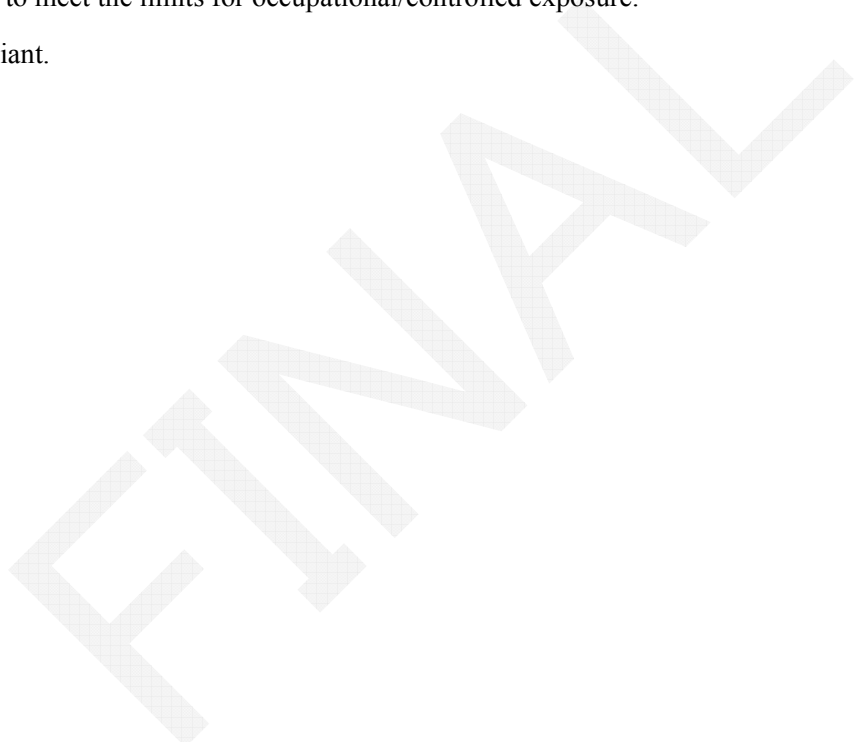
| Frequency | Max Target Output Power | Duty Cycle | Antenna Cable Loss | Typical Antenna Gain |         | Distance | Power Density      | Limit              |
|-----------|-------------------------|------------|--------------------|----------------------|---------|----------|--------------------|--------------------|
|           |                         |            |                    | dB                   | dBi     |          |                    |                    |
| MHz       | mW                      |            | dB                 | dBi                  | numeric | cm       | mW/cm <sup>2</sup> | mW/cm <sup>2</sup> |
| 450.0125  | 4100                    | 50%        | 0                  | 5                    | 3.16    | 20       | 1.3                | 1.5                |

Note: The manufacturer does not specify an antenna to be used with this device, but a typical installation has a gain up to 5 dBi.

Radio Exposure Statement:

Using the parameters given in the above calculation, a minimum antenna to person distance of 20cm is required to meet the limits for occupational/controlled exposure.

Result: Compliant.



**FCC §2.1046 & §90.205- RF OUTPUT POWER**

**Applicable Standard**

FCC §2.1046 and §90.205.

**Test Procedure**

Conducted RF Output Power:

TIA-603-D section 2.2.1

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

Spectrum Analyzer setting:

| RBW     | VBW     |
|---------|---------|
| 100 kHz | 300 kHz |

**Test Equipment List and Details**

| Manufacturer | Description       | Model               | Serial Number | Calibration Date | Calibration Due Date |
|--------------|-------------------|---------------------|---------------|------------------|----------------------|
| R&S          | Spectrum Analyzer | FSEM                | DE31388       | 2016-05-09       | 2017-05-09           |
| AA-MCS       | Attenuator(40dB)  | CAT-50-40-200-Nm-Nf | 0602-010      | 2016-05-08       | 2017-05-08           |
| E-Microwave  | DC Blocking       | EMDCB-00036         | 0E01201047    | 2016-05-06       | 2017-05-06           |
| N/A          | Coaxial Cable     | 0.1m                | N/A           | 2016-05-06       | 2017-05-06           |

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

**Test Data**

**Environmental Conditions**

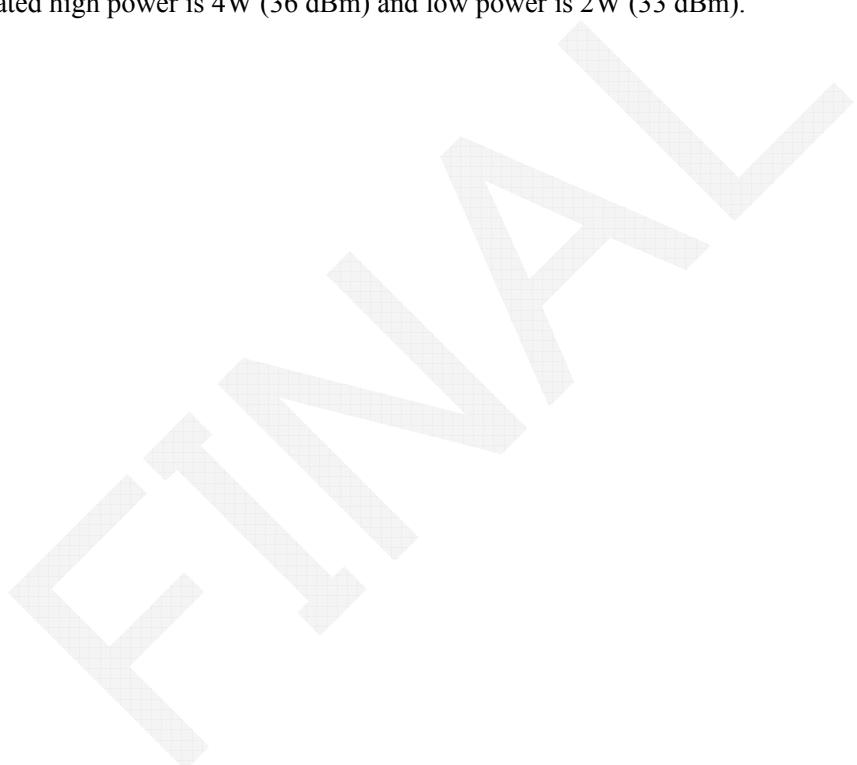
|                           |        |
|---------------------------|--------|
| <b>Temperature:</b>       | 28.4°C |
| <b>Relative Humidity:</b> | 53%    |
| <b>ATM Pressure:</b>      | 100kPa |

*The testing was performed by Costa Dong on 2016-08-05.*

*Test Result: Compliant. Please refer to following tables.*

| Modulation mode | Channel Spacing (kHz) | fc (MHz) | Conducted Output Power (W) |      | Note |
|-----------------|-----------------------|----------|----------------------------|------|------|
|                 |                       |          | High                       | Low  |      |
| FM              | 12.5                  | 450.0125 | 3.93                       | 2.01 | /    |
|                 |                       | 460.0125 | 3.95                       | 2.04 | /    |
|                 |                       | 469.9875 | 3.99                       | 1.95 | /    |
|                 | 6.25                  | 450.0125 | 3.94                       | 2.09 | /    |
|                 |                       | 460.0125 | 4.04                       | 1.97 | /    |
|                 |                       | 469.9875 | 3.99                       | 2.05 | /    |

Note: The rated high power is 4W (36 dBm) and low power is 2W (33 dBm).



## **FCC §2.1047 & §90.207 - MODULATION CHARACTERISTIC**

### **Applicable Standard**

FCC§2.1047 & §90.207:

- (a) Equipment which utilizes voice modulated communication shall show the frequency response of the audio modulating circuit over a range of 100 to 5000 Hz. for equipment which is required to have a low pass filter, the frequency response of the filter, or all of the circuitry installed between the modulation limited and the modulated stage shall be supplied.
- (b) Equipment which employs modulation limiting, a curve showing the percentage of modulation versus the modulation input voltage shall be supplied.

### **Test Procedure**

Test Method: TIA/EIA-603D 2.2.3

### **Test Equipment List and Details**

| <b>Manufacturer</b> | <b>Description</b>         | <b>Model</b>        | <b>Serial Number</b> | <b>Calibration Date</b> | <b>Calibration Due Date</b> |
|---------------------|----------------------------|---------------------|----------------------|-------------------------|-----------------------------|
| HP                  | RF Communications Test Set | 8920A               | 00 235               | 2016-05-09              | 2017-05-09                  |
| AA-MCS              | Attenuator(40dB)           | CAT-50-40-200-Nm-Nf | 0602-010             | 2016-05-08              | 2017-05-08                  |
| E-Microwave         | DC Blocking                | EMDCB-00036         | 0E01201047           | 2016-05-06              | 2017-05-06                  |
| N/A                 | Coaxial Cable              | 0.1m                | N/A                  | 2016-05-06              | 2017-05-06                  |

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

### **Test Data**

#### **Environmental Conditions**

|                           |        |
|---------------------------|--------|
| <b>Temperature:</b>       | 28.4°C |
| <b>Relative Humidity:</b> | 53%    |
| <b>ATM Pressure:</b>      | 100kPa |

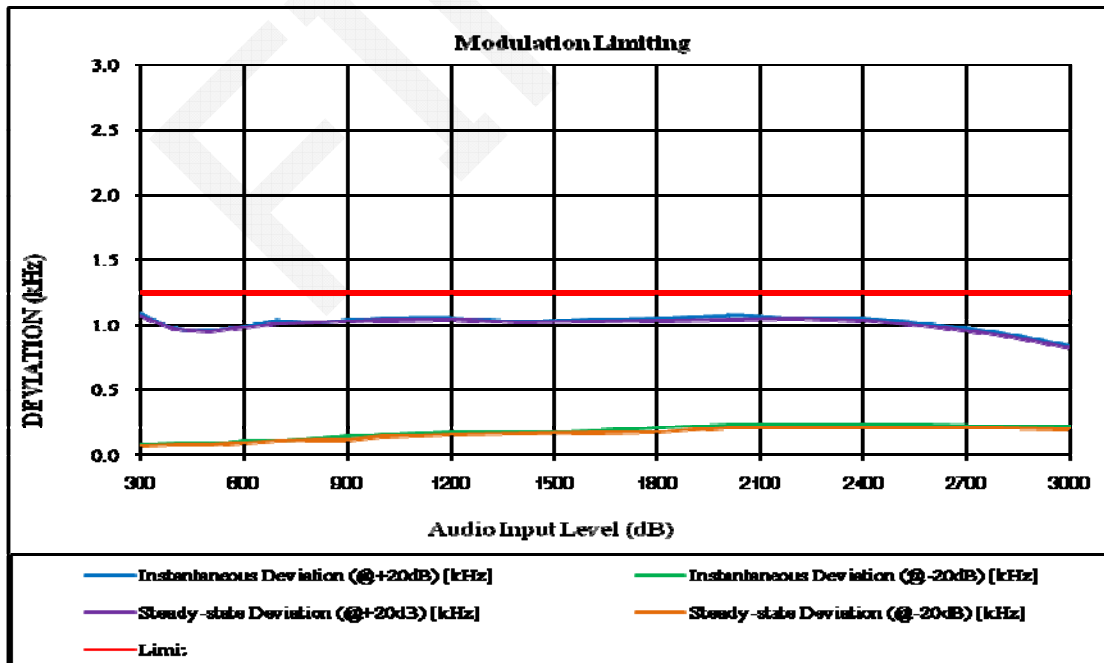
The testing was performed by Costa Dong on 2016-08-05.

Test Result: Compliant. Please refer to following table and plots.

**MODULATION LIMITING**

Carrier Frequency: 460.0125 MHz, Channel Spacing = 6.25 kHz

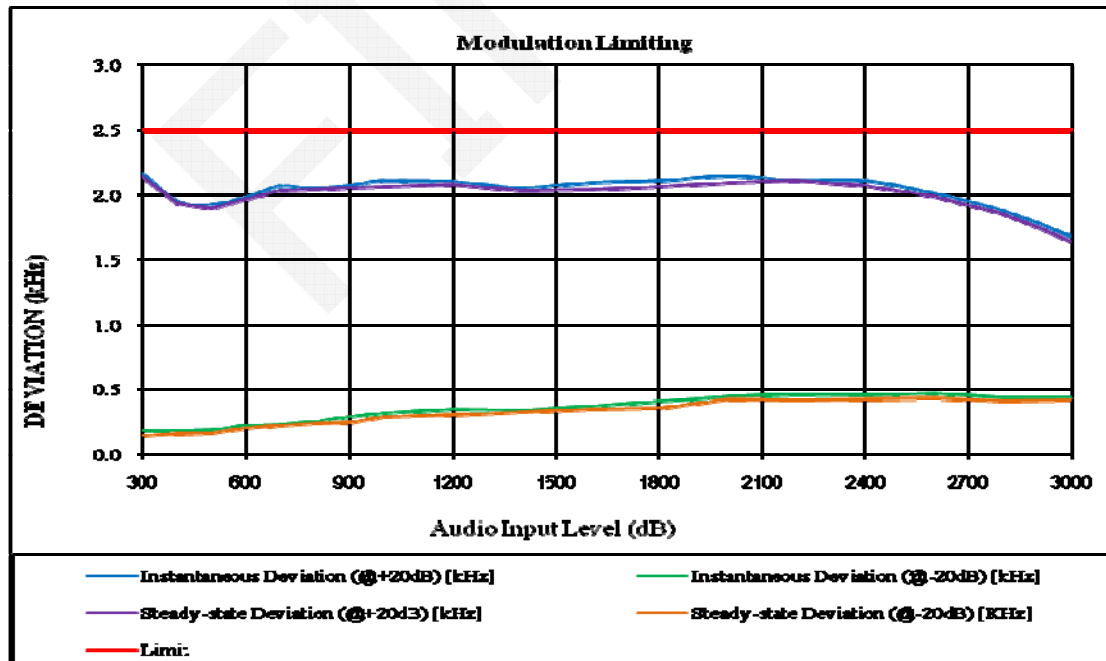
| Audio Frequency (Hz) | Instantaneous            |                          | Steady-state             |                          | Result |
|----------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------|
|                      | Deviation (@+20dB) [kHz] | Deviation (@-20dB) [kHz] | Deviation (@+20dB) [kHz] | Deviation (@-20dB) [kHz] |        |
| 300                  | 1.081                    | 0.084                    | 1.068                    | 0.072                    | Pass   |
| 400                  | 0.973                    | 0.091                    | 0.966                    | 0.078                    | Pass   |
| 500                  | 0.963                    | 0.092                    | 0.950                    | 0.08                     | Pass   |
| 600                  | 0.99                     | 0.114                    | 0.982                    | 0.10                     | Pass   |
| 700                  | 1.033                    | 0.114                    | 1.014                    | 0.11                     | Pass   |
| 800                  | 1.023                    | 0.127                    | 1.021                    | 0.116                    | Pass   |
| 900                  | 1.034                    | 0.144                    | 1.028                    | 0.121                    | Pass   |
| 1000                 | 1.049                    | 0.16                     | 1.036                    | 0.144                    | Pass   |
| 1200                 | 1.053                    | 0.175                    | 1.041                    | 0.155                    | Pass   |
| 1400                 | 1.028                    | 0.173                    | 1.018                    | 0.164                    | Pass   |
| 1600                 | 1.045                    | 0.189                    | 1.025                    | 0.173                    | Pass   |
| 1800                 | 1.051                    | 0.207                    | 1.034                    | 0.178                    | Pass   |
| 2000                 | 1.07                     | 0.223                    | 1.046                    | 0.213                    | Pass   |
| 2200                 | 1.055                    | 0.226                    | 1.055                    | 0.209                    | Pass   |
| 2400                 | 1.052                    | 0.227                    | 1.035                    | 0.211                    | Pass   |
| 2600                 | 1.008                    | 0.229                    | 0.988                    | 0.213                    | Pass   |
| 2800                 | 0.937                    | 0.22                     | 0.923                    | 0.212                    | Pass   |
| 3000                 | 0.839                    | 0.216                    | 0.821                    | 0.206                    | Pass   |



Note: For channel spacing: 6.25 kHz, the full system rated deviation is 1.25 kHz which specified by manufacturer.

Carrier Frequency: 460.0125 MHz, Channel Spacing = 12.5 kHz

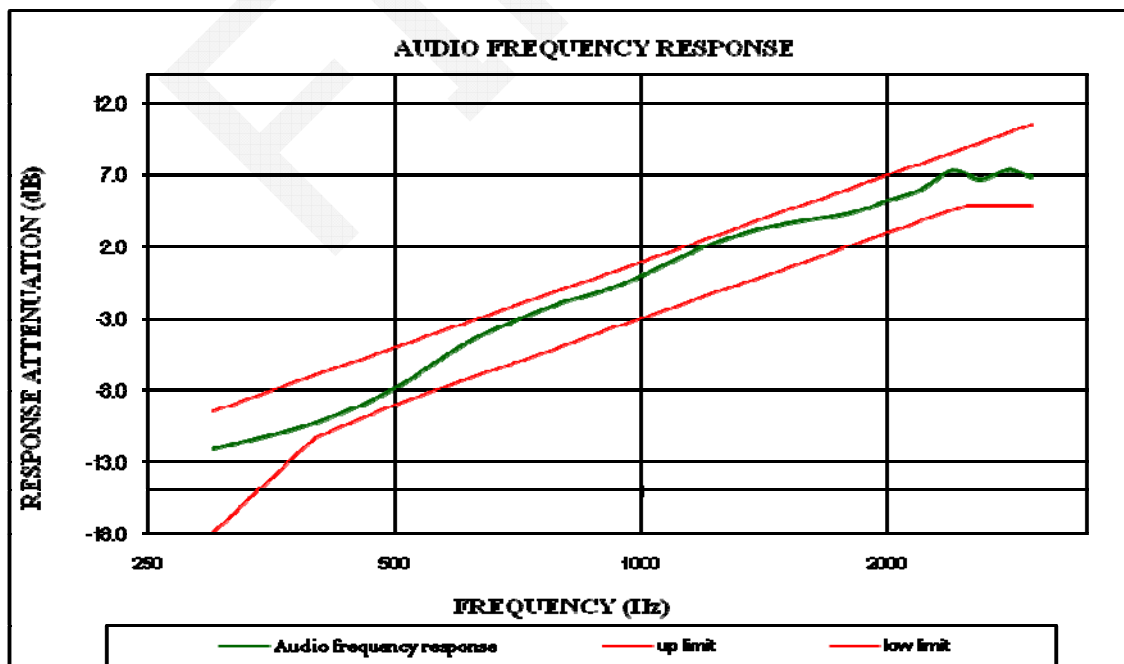
| Audio Frequency (Hz) | Instantaneous            |                          | Steady-state             |                          | Limit [kHz] |
|----------------------|--------------------------|--------------------------|--------------------------|--------------------------|-------------|
|                      | Deviation (@+20dB) [kHz] | Deviation (@-20dB) [kHz] | Deviation (@+20dB) [kHz] | Deviation (@-20dB) [kHz] |             |
| 300                  | 2.163                    | 0.177                    | 2.142                    | 0.14                     | 2.5         |
| 400                  | 1.953                    | 0.181                    | 1.939                    | 0.157                    | 2.5         |
| 500                  | 1.927                    | 0.19                     | 1.902                    | 0.167                    | 2.5         |
| 600                  | 1.983                    | 0.227                    | 1.966                    | 0.205                    | 2.5         |
| 700                  | 2.071                    | 0.236                    | 2.036                    | 0.225                    | 2.5         |
| 800                  | 2.055                    | 0.259                    | 2.043                    | 0.24                     | 2.5         |
| 900                  | 2.072                    | 0.296                    | 2.057                    | 0.247                    | 2.5         |
| 1000                 | 2.108                    | 0.324                    | 2.069                    | 0.296                    | 2.5         |
| 1200                 | 2.102                    | 0.356                    | 2.08                     | 0.312                    | 2.5         |
| 1400                 | 2.056                    | 0.35                     | 2.034                    | 0.329                    | 2.5         |
| 1600                 | 2.096                    | 0.379                    | 2.047                    | 0.352                    | 2.5         |
| 1800                 | 2.108                    | 0.418                    | 2.07                     | 0.36                     | 2.5         |
| 2000                 | 2.149                    | 0.446                    | 2.093                    | 0.428                    | 2.5         |
| 2200                 | 2.112                    | 0.457                    | 2.11                     | 0.424                    | 2.5         |
| 2400                 | 2.109                    | 0.456                    | 2.077                    | 0.43                     | 2.5         |
| 2600                 | 2.012                    | 0.467                    | 1.987                    | 0.438                    | 2.5         |
| 2800                 | 1.879                    | 0.44                     | 1.851                    | 0.418                    | 2.5         |
| 3000                 | 1.677                    | 0.439                    | 1.643                    | 0.421                    | 2.5         |



**Audio Frequency Response**

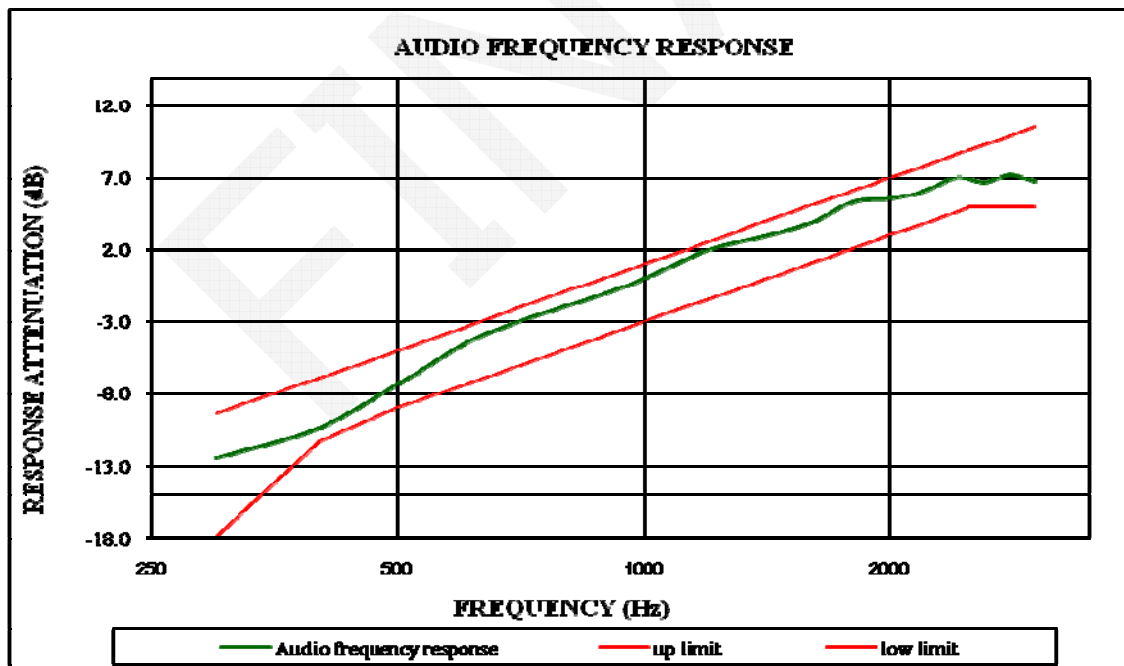
Carrier Frequency: 460.0125 MHz, Channel Spacing = 6.25 kHz, high power level

| Audio Frequency | Response Attenuation |
|-----------------|----------------------|
| Hz              | dB                   |
| 300             | -12.06               |
| 400             | -10.22               |
| 500             | -7.89                |
| 600             | -5.01                |
| 700             | -3.14                |
| 800             | -1.88                |
| 900             | -1.02                |
| 1000            | 0.00                 |
| 1200            | 2.08                 |
| 1400            | 3.29                 |
| 1600            | 3.91                 |
| 1800            | 4.37                 |
| 2000            | 5.23                 |
| 2200            | 6.04                 |
| 2400            | 7.28                 |
| 2600            | 6.69                 |
| 2800            | 7.32                 |
| 3000            | 6.87                 |



Carrier Frequency: 460.0125 MHz, Channel Spacing = 12.5 kHz, high power level

| Audio Frequency | Response Attenuation |
|-----------------|----------------------|
| Hz              | dB                   |
| 300             | -12.46               |
| 400             | -10.45               |
| 500             | -7.36                |
| 600             | -4.55                |
| 700             | -2.99                |
| 800             | -1.97                |
| 900             | -1.05                |
| 1000            | 0.00                 |
| 1200            | 1.98                 |
| 1400            | 2.88                 |
| 1600            | 3.81                 |
| 1800            | 5.30                 |
| 2000            | 5.51                 |
| 2200            | 6.03                 |
| 2400            | 7.01                 |
| 2600            | 6.71                 |
| 2800            | 7.19                 |
| 3000            | 6.75                 |

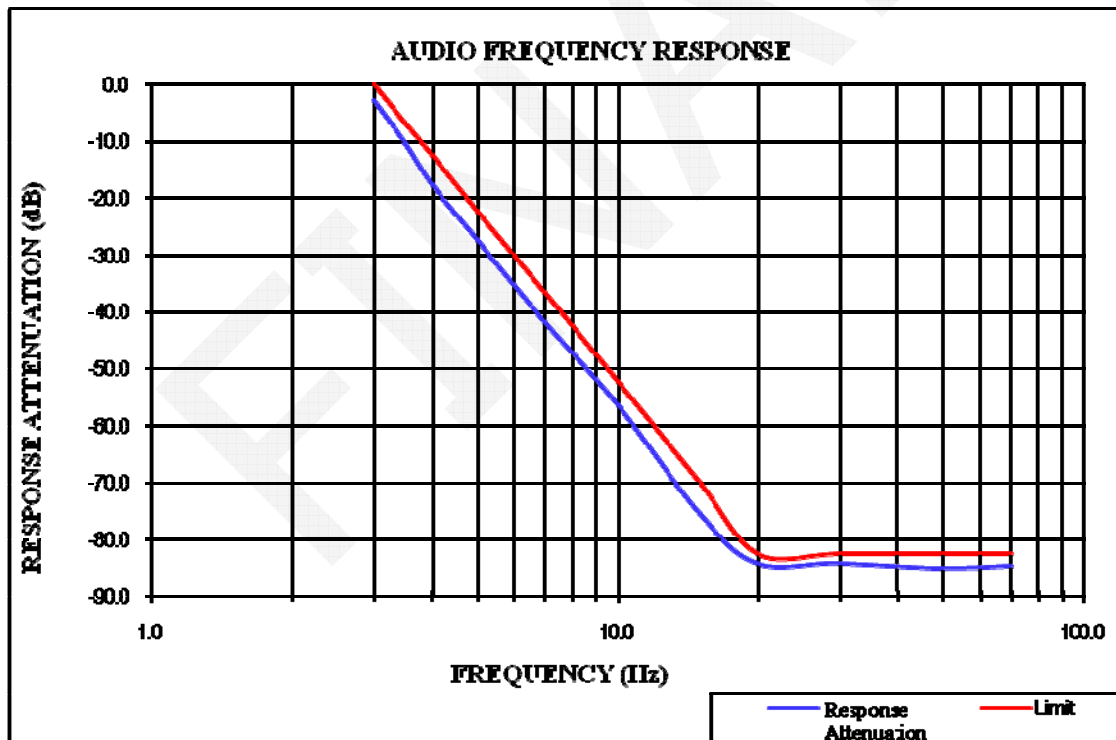




**Audio Frequency Low Pass Filter Response**

Carrier Frequency: 460.0125 MHz, Channel Spacing = 12.5 kHz, high power level

| Audio Frequency | Response Attenuation | Limit |
|-----------------|----------------------|-------|
| kHz             | dB                   | dB    |
| 3.0             | -2.7                 | 0.0   |
| 3.5             | -10.1                | -6.7  |
| 4.0             | -17.7                | -12.5 |
| 5.0             | -27.3                | -22.2 |
| 7.0             | -42.0                | -36.8 |
| 10.0            | -56.4                | -52.3 |
| 15.0            | -75.6                | -69.9 |
| 20.0            | -84.3                | -82.5 |
| 30.0            | -84.2                | -82.5 |
| 50.0            | -85.0                | -82.5 |
| 70.0            | -84.7                | -82.5 |



## FCC §2.1049&§90.209 & §90.210 – OCCUPIED BANDWIDTH & EMISSION MASK

### Applicable Standard

FCC §2.1049, §90.209 and §90.210

| Applicable Emission Masks |   |  |
|---------------------------|---|--|
| Frequency band (MHz)      | Mask for equipment with audio low pass filter | Mask for equipment without audio low pass filter |
| Below 25                  | A or B  | A or C   |
| 25-50                     | B   | C  |
| 72-76                     | B   | C  |
| 150-174                   | B, D, or E                                    | C, D or E  |
| 150 paging only           | B   | C  |
| 220-222                   | F   | F  |
| 421-512                   | B, D, or E                                    | C, D, or E                                       |
| 450 paging only           | B   | G  |
| 806-809/851-854           | B   | H  |
| 809-824/854-869           | B   | G  |
| 896-901/935-940           | I   | J  |
| 902-928                   | K   | K  |
| 929-930                   | B   | G  |
| 4940-4990 MHz             | L or M  | L or M   |
| 5850-5925                 |   |  |
| All other bands           | B   | C  |

**Emission Mask D**—12.5 kHz channel bandwidth equipment. For transmitters designed to operate with a 12.5 kHz channel bandwidth, any emission must be attenuated below the power (P) of the highest emission contained within the authorized bandwidth as follows:

- (1) On any frequency from the center of the authorized bandwidth  $f_0$  to 5.625 kHz removed from  $f_0$ : Zero dB.
- (2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in kHz) of more than 5.625 kHz but no more than 12.5 kHz: At least  $7.27(fd - 2.88 \text{ kHz})$  dB.
- (3) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in kHz) of more than 12.5 kHz: At least  $50 + 10 \log (P)$  dB or 70 dB, whichever is the lesser attenuation.
- (4) The reference level for showing Compliant with the emission mask shall be established using a resolution bandwidth sufficiently wide (usually two or three times the channel bandwidth) to capture the true peak emission of the equipment under test. In order to show Compliant with the emission mask up to and including 50 kHz removed from the edge of the authorized bandwidth, adjust the resolution bandwidth to 100 Hz with the measuring instrument in a peak hold mode. A sufficient number of sweeps must be measured to insure that the emission profile is developed. If video filtering is used, its bandwidth must not be less than the instrument resolution bandwidth. For emissions beyond 50 kHz from the edge of the authorized bandwidth, see paragraph (o) of this section. If it can be shown that use of the above instrumentation settings do not accurately represent the true interference potential of the equipment under test, an alternate procedure may be used provided prior Commission approval is obtained.

**Test Equipment List and Details**

| Manufacturer | Description                | Model               | Serial Number | Calibration Date | Calibration Due Date |
|--------------|----------------------------|---------------------|---------------|------------------|----------------------|
| R&S          | Spectrum Analyzer          | FSEM                | DE31388       | 2016-05-09       | 2017-05-09           |
| HP           | RF Communications Test Set | 8920A               | 00 235        | 2016-05-09       | 2017-05-09           |
| AA-MCS       | Attenuator(40dB)           | CAT-50-40-200-Nm-Nf | 0602-010      | 2016-05-08       | 2017-05-08           |
| E-Microwave  | DC Blocking                | EMDCB-00036         | 0E01201047    | 2016-05-06       | 2017-05-06           |
| N/A          | Coaxial Cable              | 0.1m                | N/A           | 2016-05-06       | 2017-05-06           |

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

**Test Procedure**

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

**Test Data**

**Environmental Conditions**

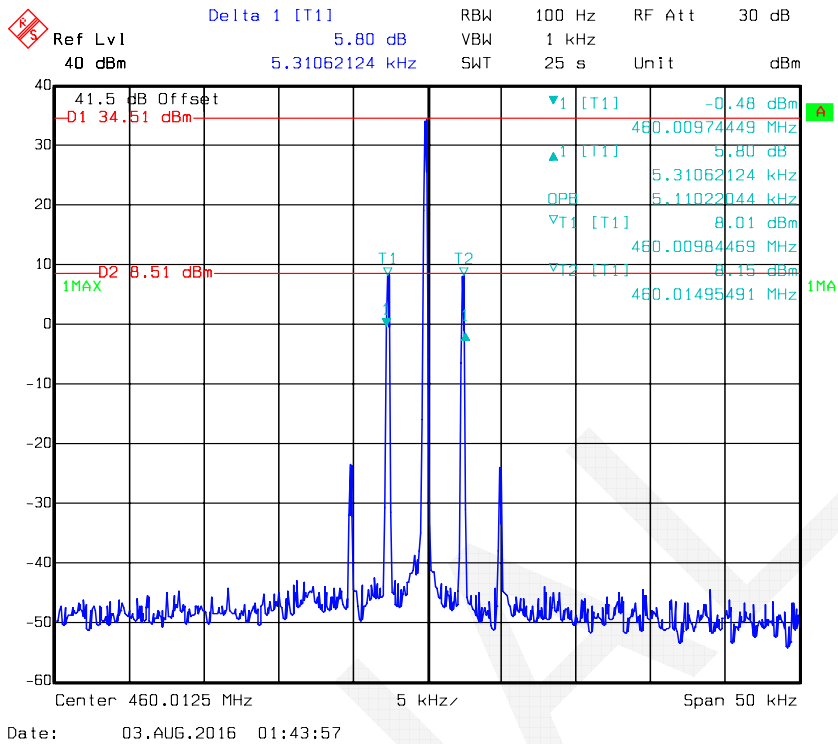
|                           |               |
|---------------------------|---------------|
| <b>Temperature:</b>       | 27.2~29.5 °C  |
| <b>Relative Humidity:</b> | 46~63 %       |
| <b>ATM Pressure:</b>      | 99.4~100.2kPa |

*The testing was performed by Costa Dong from 2016-08-02 to 2016-08-10.*

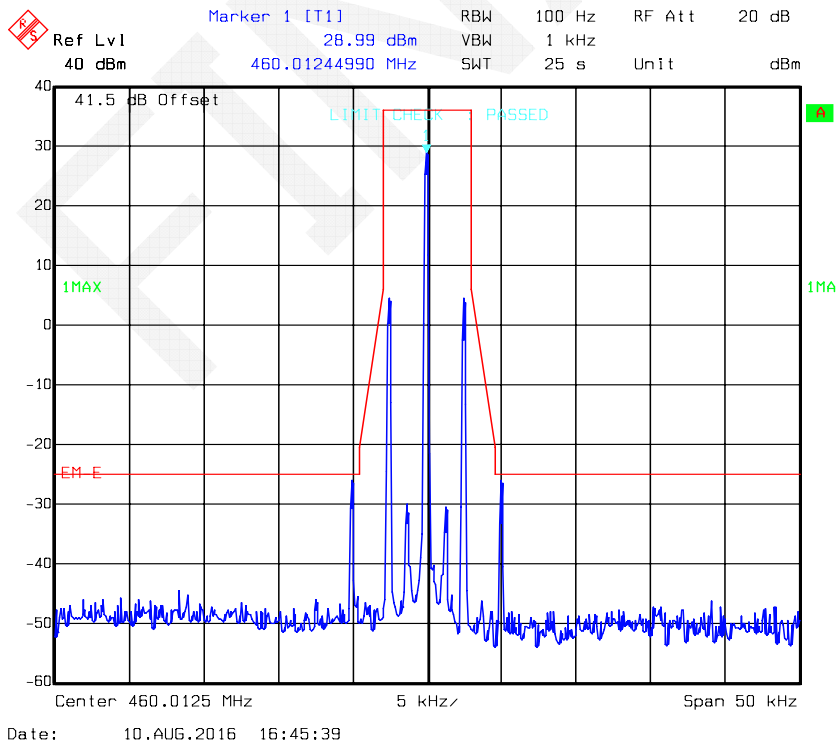
*Test Result: Compliant. Please refer to the following tables and plots.*

| Modulation Mode | Channel Spacing (kHz) | $f_c$    | 99% Occupied Bandwidth | 26 dB Bandwidth | Power Level |
|-----------------|-----------------------|----------|------------------------|-----------------|-------------|
|                 |                       | (MHz)    | (kHz)                  | (kHz)           |             |
| FM              | 6.25                  | 460.0125 | 5.11                   | 5.31            | High        |
|                 | 12.5                  |          | 5.31                   | 10.32           |             |
|                 | 6.25                  |          | 5.11                   | 5.31            | Low         |
|                 | 12.5                  |          | 5.31                   | 10.32           |             |
|                 | 6.25                  | 453.2125 | 5.11                   | 5.31            | High        |
|                 | 12.5                  |          | 5.31                   | 10.32           |             |
|                 | 6.25                  |          | 5.11                   | 5.31            | Low         |
|                 | 12.5                  |          | 5.31                   | 10.32           |             |

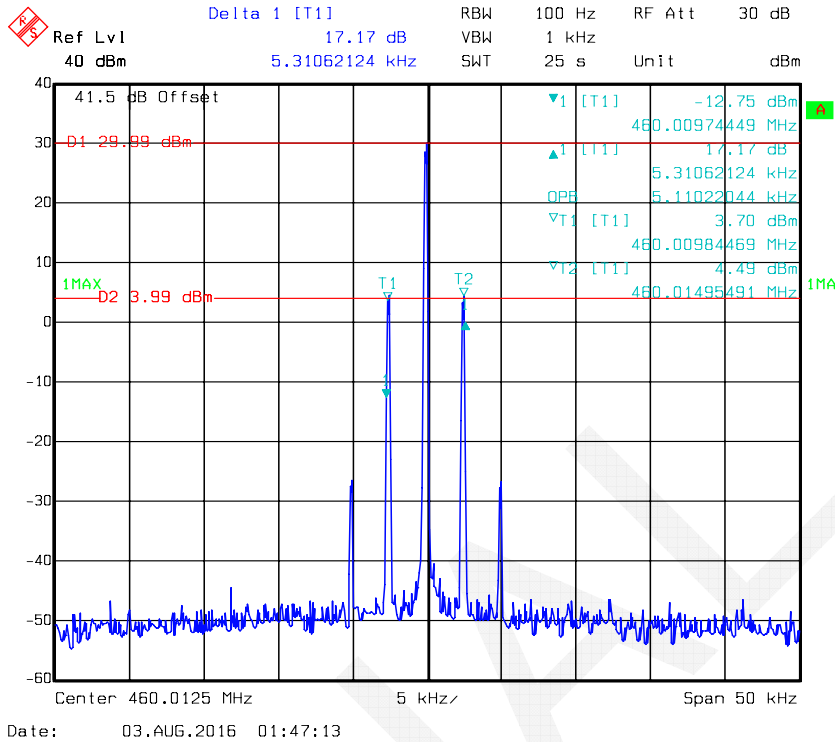
**Occupied Bandwidth – 6.25 kHz 460.0125 MHz, High Power Level**



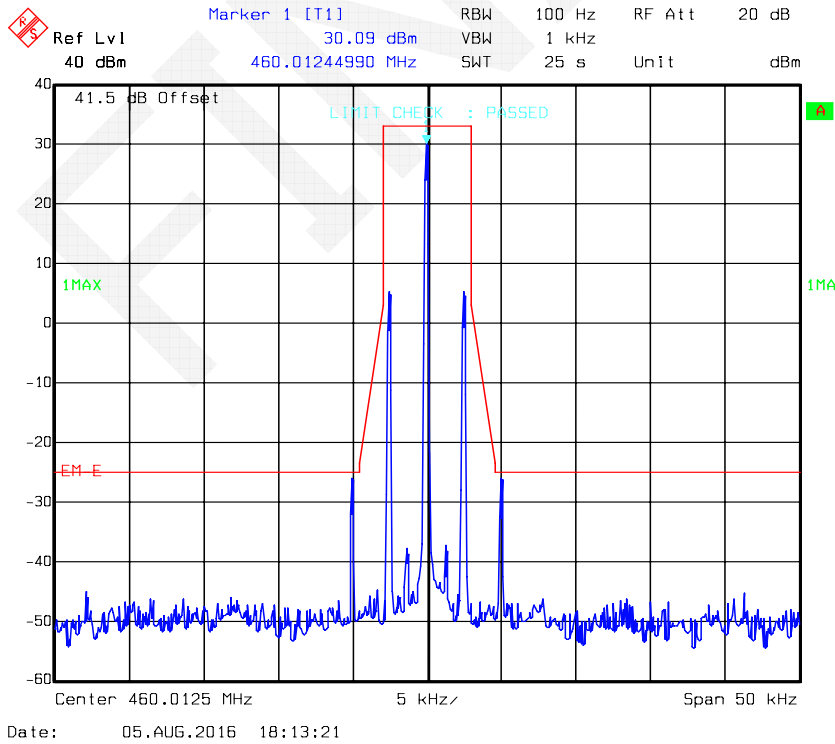
**Emission Mask - Type D**



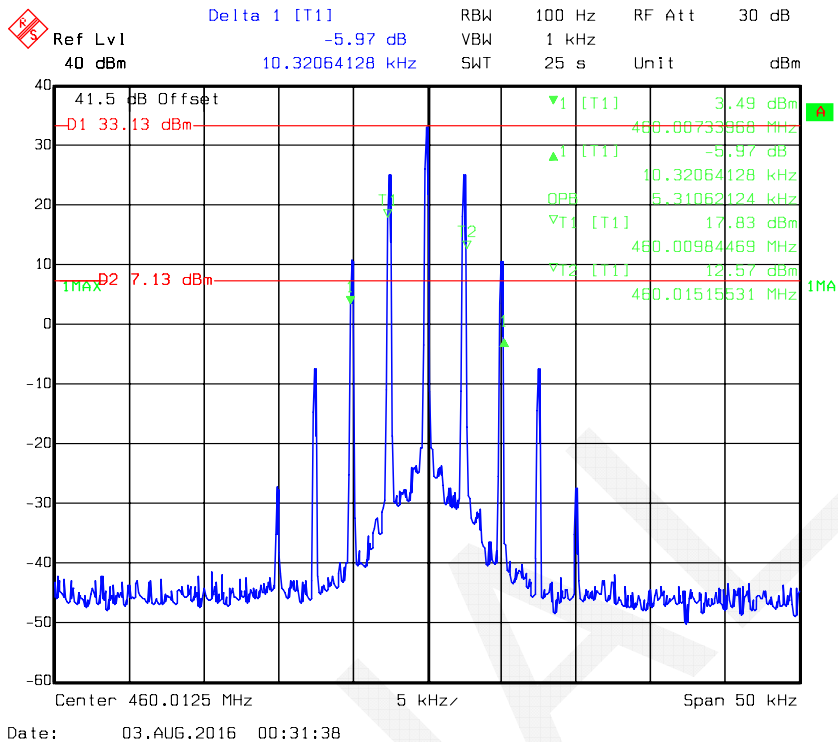
**Occupied Bandwidth -6.25 kHz 460.0125 MHz, Low Power Level**



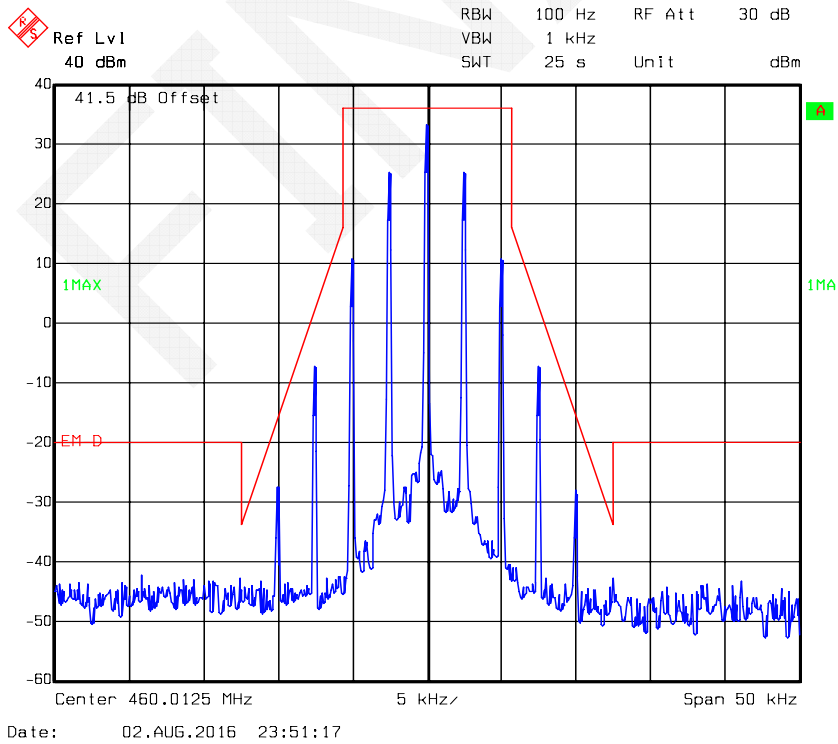
**Emission Mask - Type D**



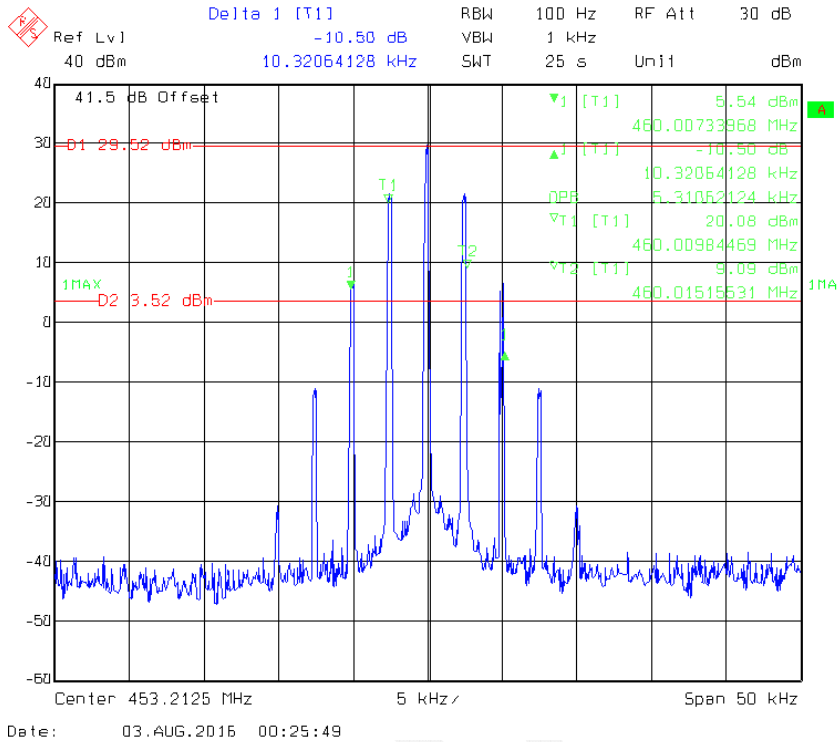
**Occupied Bandwidth – 12.5 kHz 460.0125 MHz, High Power Level**



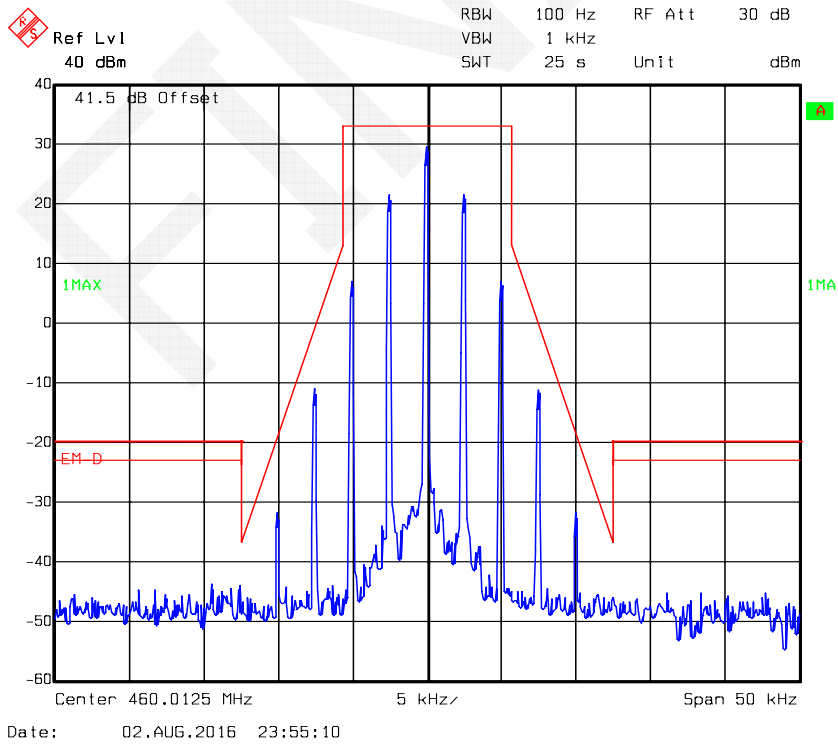
**Emission Mask - Type D**



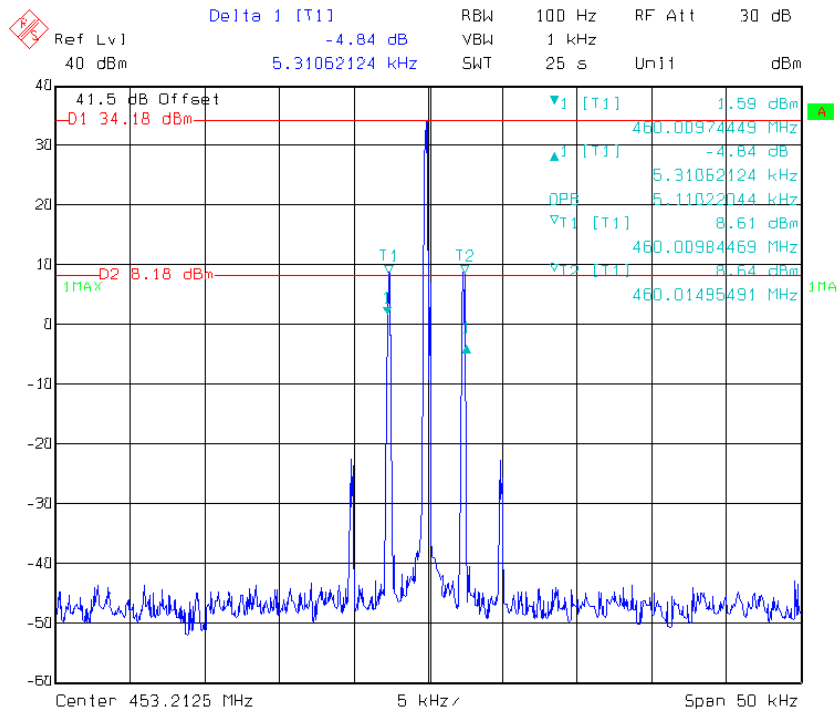
**Occupied Bandwidth -12.5 kHz 460.0125 MHz, Low Power Level**



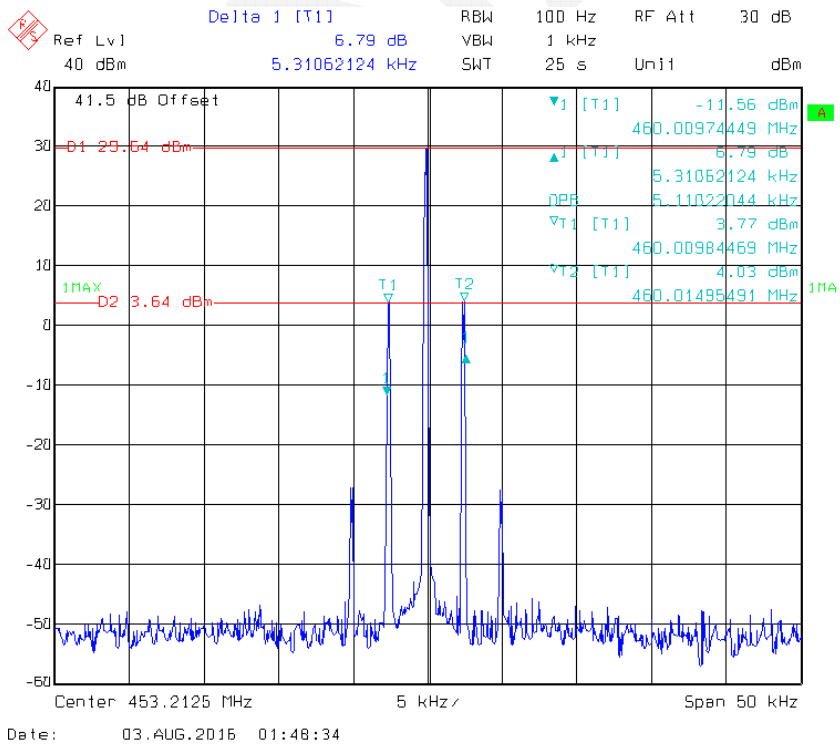
**Emission Mask - Type D**



**Occupied Bandwidth –6.25 kHz 453.2125 MHz, High Power Level**

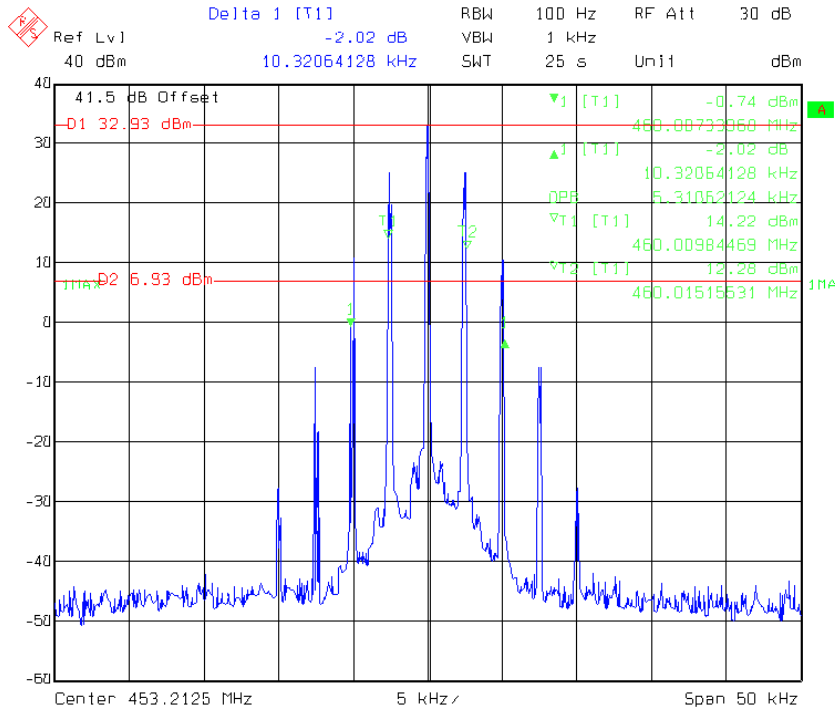


**Occupied Bandwidth –6.25 kHz 453.2125 MHz, Low Power Level**

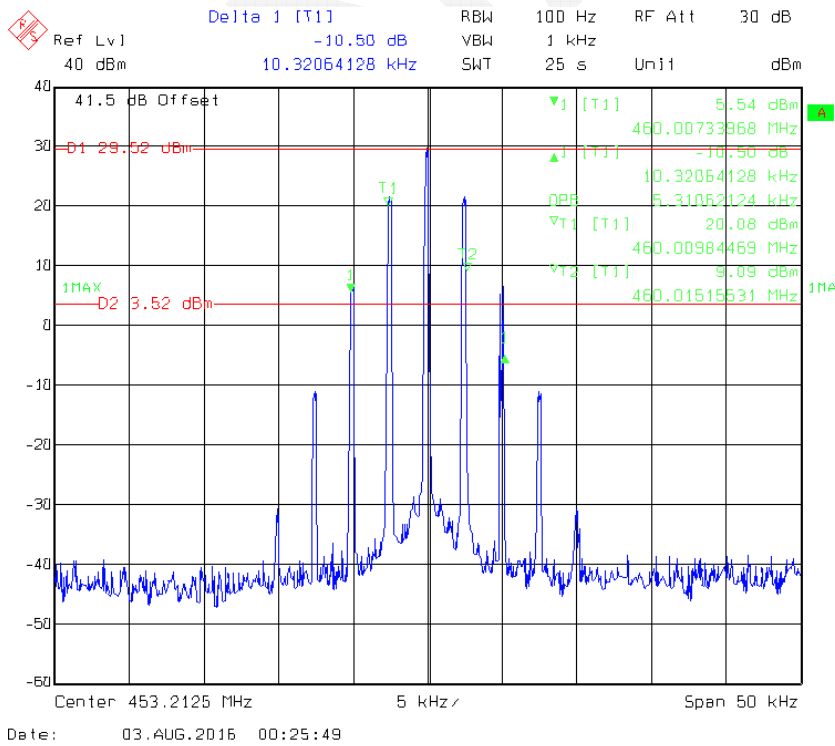




**Occupied Bandwidth -12.5 kHz, 453.2125 MHz, High Power Level**



**Occupied Bandwidth -12.5 kHz, 453.2125 MHz, Low Power Level**



## FCC §2.1051& §90.210 - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

### Applicable Standard

**Emission Mask D**—12.5 kHz channel bandwidth equipment. For transmitters designed to operate with a 12.5 kHz channel bandwidth, any emission must be attenuated below the power (P) of the highest emission contained within the authorized bandwidth as follows:

- (1) On any frequency from the center of the authorized bandwidth  $f_0$  to 5.625 kHz removed from  $f_0$ : Zero dB.
- (2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency ( $f_d$  in kHz) of more than 5.625 kHz but no more than 12.5 kHz: At least  $7.27(f_d - 2.88 \text{ kHz})$  dB.
- (3) On any frequency removed from the center of the authorized bandwidth by a displacement frequency ( $f_d$  in kHz) of more than 12.5 kHz: At least  $50 + 10 \log(P)$  dB or 70 dB, whichever is the lesser attenuation.
- (4) The reference level for showing Compliant with the emission mask shall be established using a resolution bandwidth sufficiently wide (usually two or three times the channel bandwidth) to capture the true peak emission of the equipment under test. In order to show Compliant with the emission mask up to and including 50 kHz removed from the edge of the authorized bandwidth, adjust the resolution bandwidth to 100 Hz with the measuring instrument in a peak hold mode. A sufficient number of sweeps must be measured to insure that the emission profile is developed. If video filtering is used, its bandwidth must not be less than the instrument resolution bandwidth. For emissions beyond 50 kHz from the edge of the authorized bandwidth, see paragraph (o) of this section. If it can be shown that use of the above instrumentation settings do not accurately represent the true interference potential of the equipment under test, an alternate procedure may be used provided prior Commission approval is obtained.

### Test Equipment List and Details

| Manufacturer | Description       | Model               | Serial Number | Calibration Date | Calibration Due Date |
|--------------|-------------------|---------------------|---------------|------------------|----------------------|
| R&S          | Spectrum Analyzer | FSEM                | 831259/019    | 2016-05-09       | 2017-05-09           |
| AA-MCS       | Attenuator(40dB)  | CAT-50-40-200-Nm-Nf | 0602-010      | 2016-05-08       | 2017-05-08           |
| E-Microwave  | DC Blocking       | EMDCB-00036         | 0E01201047    | 2016-05-06       | 2017-05-06           |
| N/A          | Coaxial Cable     | 0.1m                | N/A           | 2016-05-06       | 2017-05-06           |

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

### Test Procedure

Adjust the spectrum analyzer for the following settings:

- 1) Resolution Bandwidth = 100 kHz for spurious emissions below 1 GHz, and 1 MHz for spurious emissions above 1 GHz.
- 2) Video Bandwidth  $\geq 3$  times the resolution bandwidth.
- 3) Sweep Speed  $\leq 2000$  Hz per second.
- 4) Detector Mode = mean or average power.

**Test Data**

**Environmental Conditions**

|                           |        |
|---------------------------|--------|
| <b>Temperature:</b>       | 28.4°C |
| <b>Relative Humidity:</b> | 53%    |
| <b>ATM Pressure:</b>      | 100kPa |

*The testing was performed by Costa Dong on 2016-08-05.*

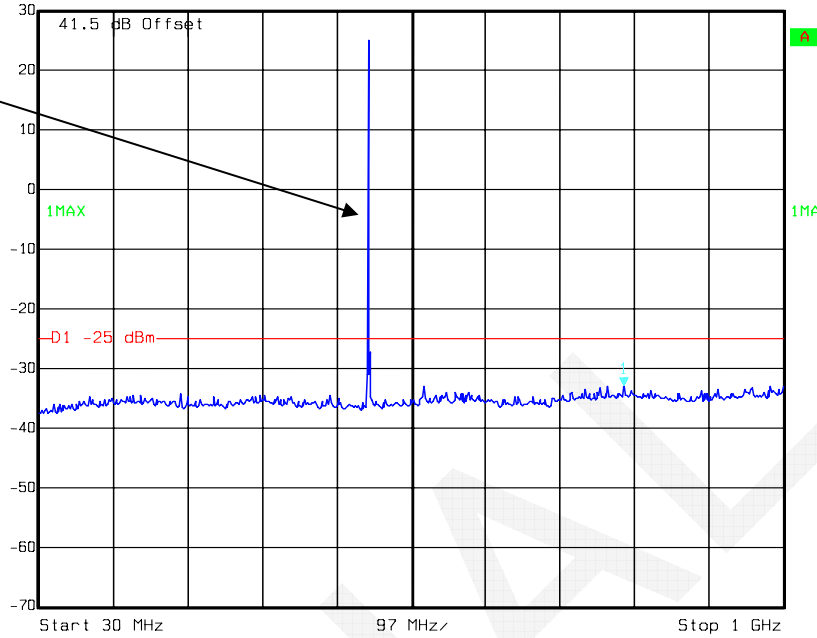
Note: For conducted spurious emissions were tested at high rated power, which was the worst case.

FEMVA

### 460.0125 MHz – FM Mode, 6.25 kHz

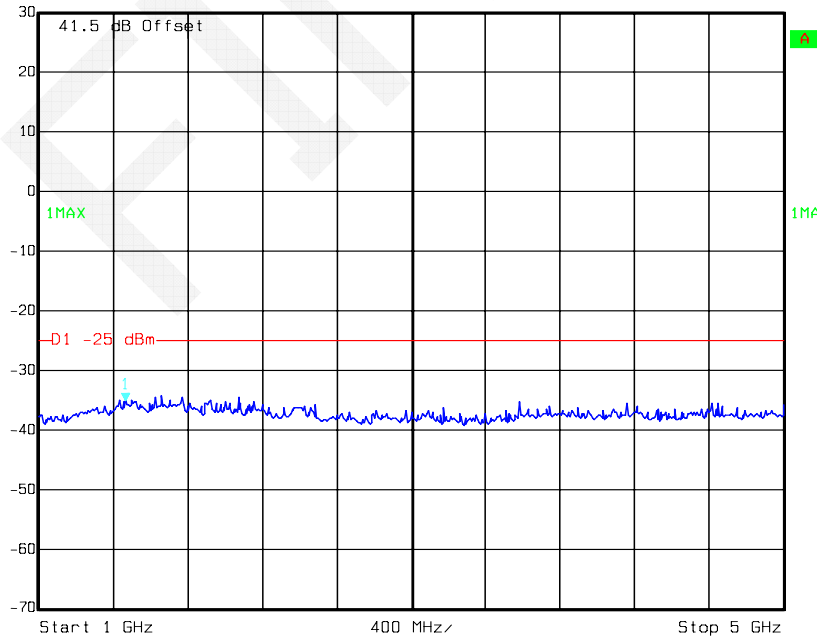
Ref Lvl 30 dBm  
Marker 1 [T1] -32.88 dBm  
792.00400802 MHz  
RBW 100 kHz  
RF Att 10 dB  
VBW 300 kHz  
SWT 245 ms  
Unit dBm

Fundamental with notch filter




Date: 05.AUG.2016 18:22:26

Ref Lvl 30 dBm  
Marker 1 [T1] -35.04 dBm  
1.46492986 GHz  
RBW 1 MHz  
RF Att 0 dB  
VBW 3 MHz  
SWT 10 ms  
Unit dBm

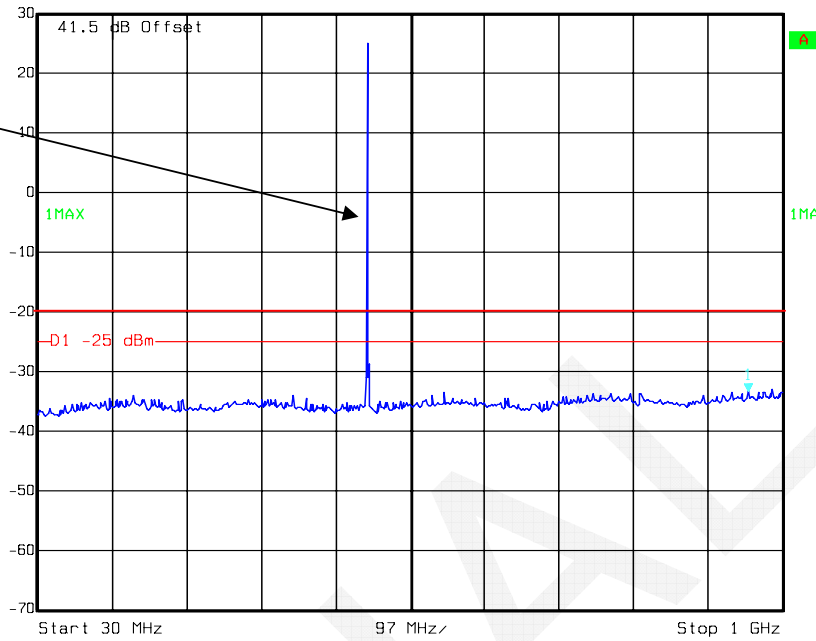


Date: 05.AUG.2016 18:24:33

**460.0125 MHz FM Mode, 12.5 kHz**

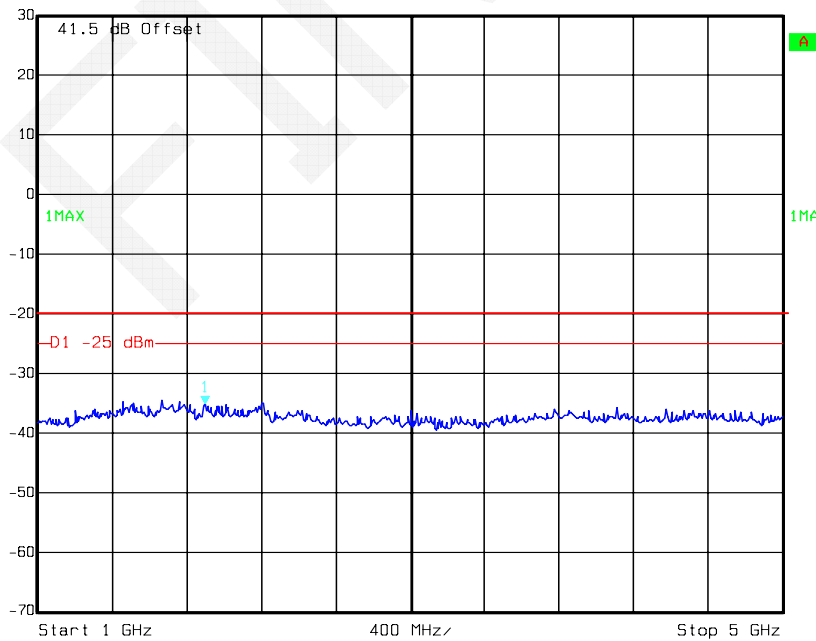
|   |         |                  |     |         |        |       |
|---|---------|------------------|-----|---------|--------|-------|
|  | Ref Lvl | Marker 1 [T1]    | RBW | 100 kHz | RF Att | 10 dB |
|   | 30 dBm  | -33.50 dBm       | VBW | 300 kHz |        |       |
|   |         | 955.29058116 MHz | SWT | 245 ms  | Unit   | dBm   |

Fundamental with notch filter



Date: 05.AUG.2016 18:23:30

|   |         |                |     |       |        |      |
|---|---------|----------------|-----|-------|--------|------|
|  | Ref Lvl | Marker 1 [T1]  | RBW | 1 MHz | RF Att | 0 dB |
|   | 30 dBm  | -35.23 dBm     | VBW | 3 MHz |        |      |
|   |         | 1.89779559 GHz | SWT | 10 ms | Unit   | dBm  |



Date: 05.AUG.2016 18:24:43

## FCC §2.1053 & §90.210 - RADIATED SPURIOUS EMISSIONS

### Applicable Standard

FCC §2.1053 and §22.359 and §90.210

### Test Equipment List and Details

| Manufacturer          | Description               | Model       | Serial Number      | Calibration Date | Calibration Due Date |
|-----------------------|---------------------------|-------------|--------------------|------------------|----------------------|
| HP                    | Signal Generator          | 1026        | 320408             | 2015-11-23       | 2016-11-22           |
| R&S                   | EMI Test Receiver         | ESCI        | 100224             | 2016-08-03       | 2017-08-02           |
| Sunol Sciences        | Antenna                   | JB3         | A060611-3          | 2014-11-06       | 2017-11-05           |
| HP                    | Amplifier                 | 8447E       | 2434A02181         | 2015-09-01       | 2016-09-01           |
| Agilent               | Spectrum Analyzer         | E4440A      | SG43360054         | 2015-11-23       | 2016-11-22           |
| ETS-Lindgren          | Horn Antenna              | 3115        | 9808-5557          | 2015-09-06       | 2018-09-06           |
| Mini-Circuit          | Amplifier                 | ZVA-213-S+  | 054201245          | 2016-02-19       | 2017-02-19           |
| Ducommun Technologies | Horn Antenna              | ARH-4223-02 | 1007726-01<br>1304 | 2014-06-16       | 2017-06-15           |
| EMCO                  | Adjustable Dipole Antenna | 3121C       | 9109-753           | N/A              | N/A                  |
| N/A                   | Coaxial Cable             | 14m         | N/A                | 2016-05-06       | 2017-05-06           |
| N/A                   | Coaxial Cable             | 8m          | N/A                | 2016-05-06       | 2017-05-06           |
| Mini-Circuits         | HIGH PASS FILTER          | BHP-550+    | YZU15801121        | 2016-05-06       | 2017-05-06           |
| Weinschel Corp        | Terminal Load(100W)       | 1440-3      | MD447              | /                | /                    |

\* **Statement of Traceability:** Bay Area Compliant Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

### Test Procedure

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load, which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to tenth harmonic of the fundamental frequency was investigated.

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

For part 90:

Spurious emissions in dB =  $10 \log_{10}(\text{TXpwr in Watts}/0.001)$ -the absolute level

Spurious attenuation limit in dB =  $50+10 \log_{10}(\text{power out in Watts})$  for EUT with a 12.5 kHz channel bandwidth.

**Test Data**

**Environmental Conditions**

|                           |         |
|---------------------------|---------|
| <b>Temperature:</b>       | 30.6°C  |
| <b>Relative Humidity:</b> | 51%     |
| <b>ATM Pressure:</b>      | 99.6kPa |

The testing was performed by Costa Dong on 2016-08-05.

Test Mode: Transmitting-High power level is the worst case.

**FM Mode-6.25kHz:**

| Frequency (MHz)                | Polar (H/V) | Receiver Reading (dBμV) | Substituted Method |                        |                 | Absolute Level (dBm) | Limit (dBm) | Margin (dB) |
|--------------------------------|-------------|-------------------------|--------------------|------------------------|-----------------|----------------------|-------------|-------------|
|                                |             |                         | S.G. Level (dBm)   | Antenna Gain (dBd/dBi) | Cable Loss (dB) |                      |             |             |
| <b>Frequency: 460.0125 MHz</b> |             |                         |                    |                        |                 |                      |             |             |
| 920.025                        | H           | 33.12                   | -40.7              | 0.0                    | 1.0             | -41.7                | -25.0       | 16.7        |
| 920.025                        | V           | 36.74                   | -33.8              | 0.0                    | 1.0             | -34.8                | -25.0       | 9.8         |
| 1380.038                       | H           | 41.23                   | -59.3              | 8.8                    | 1.4             | -51.9                | -25.0       | 26.9        |
| 1380.038                       | V           | 42.52                   | -57.8              | 8.8                    | 1.4             | -50.4                | -25.0       | 25.4        |
| 1840.050                       | H           | 38.58                   | -61.2              | 11.4                   | 1.3             | -51.1                | -25.0       | 26.1        |
| 1840.050                       | V           | 42.05                   | -57.8              | 11.4                   | 1.3             | -47.7                | -25.0       | 22.7        |
| 2300.063                       | H           | 34.70                   | -61.5              | 11.2                   | 2.3             | -52.6                | -25.0       | 27.6        |
| 2300.063                       | V           | 36.39                   | -59.4              | 11.2                   | 2.3             | -50.5                | -25.0       | 25.5        |
| 2760.075                       | H           | 38.56                   | -59                | 13.1                   | 2.3             | -48.2                | -25.0       | 23.2        |
| 2760.075                       | V           | 39.92                   | -58.4              | 13.1                   | 2.3             | -47.6                | -25.0       | 22.6        |
| 3220.088                       | H           | 39.73                   | -57.7              | 13.6                   | 2.2             | -46.3                | -25.0       | 21.3        |
| 3220.088                       | V           | 41.77                   | -54.9              | 13.6                   | 2.2             | -43.5                | -25.0       | 18.5        |
| 3680.100                       | H           | 35.52                   | -59.4              | 14.0                   | 2.3             | -47.7                | -25.0       | 22.7        |
| 3680.100                       | V           | 40.22                   | -54.3              | 14.0                   | 2.3             | -42.6                | -25.0       | 17.6        |

**FM Mode-12.5kHz:**

| Frequency (MHz)                | Polar (H/V) | Receiver Reading (dB $\mu$ V) | Substituted Method |                        |                 | Absolute Level (dBm) | Limit (dBm) | Margin (dB) |
|--------------------------------|-------------|-------------------------------|--------------------|------------------------|-----------------|----------------------|-------------|-------------|
|                                |             |                               | S.G. Level (dBm)   | Antenna Gain (dBd/dBi) | Cable Loss (dB) |                      |             |             |
| <b>Frequency: 460.0125 MHz</b> |             |                               |                    |                        |                 |                      |             |             |
| 920.025                        | H           | 35.68                         | -38.2              | 0.0                    | 1               | -39.2                | -20.0       | 19.2        |
| 920.025                        | V           | 38.78                         | -31.8              | 0.0                    | 1               | -32.8                | -20.0       | 12.8        |
| 1380.038                       | H           | 41.70                         | -58.8              | 8.8                    | 1.4             | -51.4                | -20.0       | 31.4        |
| 1380.038                       | V           | 42.82                         | -57.5              | 8.8                    | 1.4             | -50.1                | -20.0       | 30.1        |
| 1840.050                       | H           | 38.68                         | -61.1              | 11.4                   | 1.3             | -51.0                | -20.0       | 31.0        |
| 1840.050                       | V           | 41.73                         | -58.1              | 11.4                   | 1.3             | -48.0                | -20.0       | 28.0        |
| 2300.063                       | H           | 34.57                         | -61.7              | 11.2                   | 2.3             | -52.8                | -20.0       | 32.8        |
| 2300.063                       | V           | 35.87                         | -59.9              | 11.2                   | 2.3             | -51.0                | -20.0       | 31.0        |
| 2760.075                       | H           | 39.24                         | -58.4              | 13.1                   | 2.3             | -47.6                | -20.0       | 27.6        |
| 2760.075                       | V           | 39.80                         | -58.6              | 13.1                   | 2.3             | -47.8                | -20.0       | 27.8        |
| 3220.088                       | H           | 39.48                         | -58                | 13.6                   | 2.2             | -46.6                | -20.0       | 26.6        |
| 3220.088                       | V           | 40.96                         | -55.7              | 13.6                   | 2.2             | -44.3                | -20.0       | 24.3        |
| 3680.100                       | H           | 36.27                         | -58.7              | 14.0                   | 2.3             | -47.0                | -20.0       | 27.0        |
| 3680.100                       | V           | 40.32                         | -54.2              | 14.0                   | 2.3             | -42.5                | -20.0       | 22.5        |

Note1: The unit of Antenna Gain is dBd for frequency below 1GHz, and the unit of Antenna Gain is dBi for frequency above 1GHz.

Note2: Absolute Level = SG Level - Cable loss + Antenna Gain  
Margin = Limit-Absolute Level



## FCC §2.1055 & §90.213- FREQUENCY STABILITY

### Applicable Standard

FCC §2.1055, §90.213

### Test Equipment List and Details

| Manufacturer | Description                   | Model No.           | Serial No.  | Calibration Date | Calibration Due Date |
|--------------|-------------------------------|---------------------|-------------|------------------|----------------------|
| R&S          | Spectrum Analyzer             | FSP 38              | 100478      | 2015-11-23       | 2016-11-22           |
| Dongzhixu    | High Temperature Test Chamber | DP1000              | 201105083-4 | 2015-09-10       | 2016-09-09           |
| UNI-T        | Multimeter                    | UT39A               | M130199938  | 2016-04-10       | 2017-04-10           |
| AA-MCS       | Attenuator(40dB)              | CAT-50-40-200-Nm-Nf | 0602-010    | 2016-05-08       | 2017-05-08           |
| E-Microwave  | DC Blocking                   | EMDCB-00036         | 0E01201047  | 2016-05-06       | 2017-05-06           |
| N/A          | Coaxial Cable                 | 0.1m                | N/A         | 2016-05-06       | 2017-05-06           |

\* **Statement of Traceability:** Bay Area Compliant Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

### Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to DC power supply and the RF output was connected to a frequency counter via feed-through attenuators. The EUT was placed inside the temperature chamber. The power leads and RF output cable exited the chamber through an opening made for the purpose.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the counter.

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

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

### Test Data

#### Environmental Conditions

|                           |        |
|---------------------------|--------|
| <b>Temperature:</b>       | 28.4°C |
| <b>Relative Humidity:</b> | 53 %   |
| <b>ATM Pressure:</b>      | 100kPa |

*The testing was performed by Costa Dong on 2016-08-05.*

Test Mode: Transmitting

| Reference Frequency: 460.0125 MHz, 6.25 kHz, Limit: 1.0 ppm |                 |            |                 |
|---|-----------------|------------|-----------------|
| Temperature   | Voltage         | Reading    | Frequency Error |
| °C  | V <sub>DC</sub> | MHz        | ppm             |
| -30   | 12              | 460.012581 | 0.18            |
| -20   |                 | 460.012549 | 0.11            |
| -10   |                 | 460.012562 | 0.13            |
| 0   |                 | 460.012428 | -0.16           |
| 10  |                 | 460.012445 | -0.12           |
| 20  |                 | 460.012518 | 0.04            |
| 30  |                 | 460.012439 | -0.13           |
| 40  |                 | 460.012590 | 0.20            |
| 50  |                 | 460.012576 | 0.17            |
| 25  |                 | 13.8       | 460.012418      |
|   | 10.2            | 460.012550 | 0.11            |

| Reference Frequency: 460.0125 MHz, 12.5 kHz, Limit: 2.5 ppm |                 |            |                 |
|---|-----------------|------------|-----------------|
| Temperature   | Voltage         | Reading    | Frequency Error |
| °C  | V <sub>DC</sub> | MHz        | ppm             |
| -30   | 12              | 460.012437 | -0.14           |
| -20   |                 | 460.012375 | -0.27           |
| -10   |                 | 460.012392 | -0.23           |
| 0   |                 | 460.012619 | 0.26            |
| 10  |                 | 460.012607 | 0.23            |
| 20  |                 | 460.012464 | -0.08           |
| 30  |                 | 460.012447 | -0.12           |
| 40  |                 | 460.012484 | -0.03           |
| 50  |                 | 460.012470 | -0.07           |
| 25  |                 | 13.8       | 460.012596      |
|   | 10.2            | 460.012359 | -0.31           |

## FCC §90.214 - TRANSIENT FREQUENCY BEHAVIOR

### Applicable Standard

Regulations: FCC §90.214

Test method: ANSI/TIA-603-D 2010, section 2.2.19.3

### Test Equipment List and Details

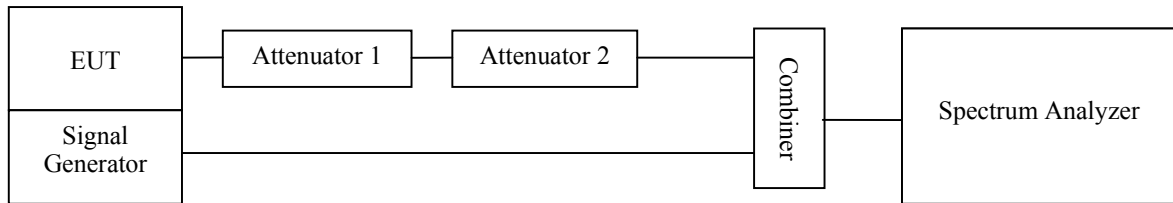
| Manufacturer           | Description            | Model No.                   | Serial No. | Calibration Date | Calibration Due Date |
|------------------------|------------------------|-----------------------------|------------|------------------|----------------------|
| R&S                    | Spectrum Analyzer      | FSEM                        | DE31388    | 2016-05-09       | 2017-05-09           |
| HP                     | Signal Generator       | E4422B                      | MY41000355 | 2015-11-23       | 2016-11-22           |
| Cheng Du<br>Ou Li Tong | Two way power splitter | EMPD-T-<br>2-10-1000        | OE01201041 | 2016-05-06       | 2017-05-06           |
| AA-MCS                 | Attenuator(40dB)       | CAT-50-<br>40-200-<br>Nm-Nf | 0602-010   | 2016-05-08       | 2017-05-08           |
| E-Microwave            | DC Blocking            | EMDCB-<br>00036             | 0E01201047 | 2016-05-06       | 2017-05-06           |

\* Statement of Traceability: Bay Area Compliant Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

### Test Procedure

- a) Connect the EUT and test equipment as shown on the following block diagram.
- b) Set the Spectrum Analyzer to measure FM deviation, and tune the RF frequency to the transmitter assigned frequency.
- c) Set the signal generator to the assigned transmitter frequency and modulate it with a 1 kHz tone at  $\pm 12.5$  kHz deviation and set its output level to -100dBm.
- d) Turn on the transmitter.
- e) Supply sufficient attenuation via the RF attenuator to provide an input level to the Spectrum Analyzer that is 40 dB below the maximum allowed input power when the transmitter is operating at its rated power level. Note this power level on the Spectrum Analyzer as  $P_0$ .
- f) Turn off the transmitter.
- g) Adjust the RF level of the signal generator to provide RF power equal to  $P_0$ . This signal generator RF level shall be maintained throughout the rest of the measurement.
- h) Remove the attenuation 1, so the input power to the Spectrum Analyzer is increased by 30 dB when the transmitter is turned on.
- i) Adjust the vertical amplitude control of the spectrum analyzer to display the 1000 Hz at  $\pm 4$  divisions vertically centered on the display. Set trigger mode of the Spectrum Analyzer to "Video", and tune the "trigger level" on suitable level. Then set the "trigger offset" to -10ms for turn on and -15ms for turn off.
- j) Turn on the transmitter and the transient wave will be captured on the screen of Spectrum Analyzer. Observe the stored display. The instant when the 1 kHz test signal is completely suppressed is considered to be  $t_{on}$ . The trace should be maintained within the allowed divisions during the period  $t_1$  and  $t_2$ .

k) Then turn off the transmitter, and another transient wave will be captured on the screen of Spectrum Analyzer. The trace should be maintained within the allowed divisions during the period  $t_3$ .



**Test Data**

**Environmental Conditions**

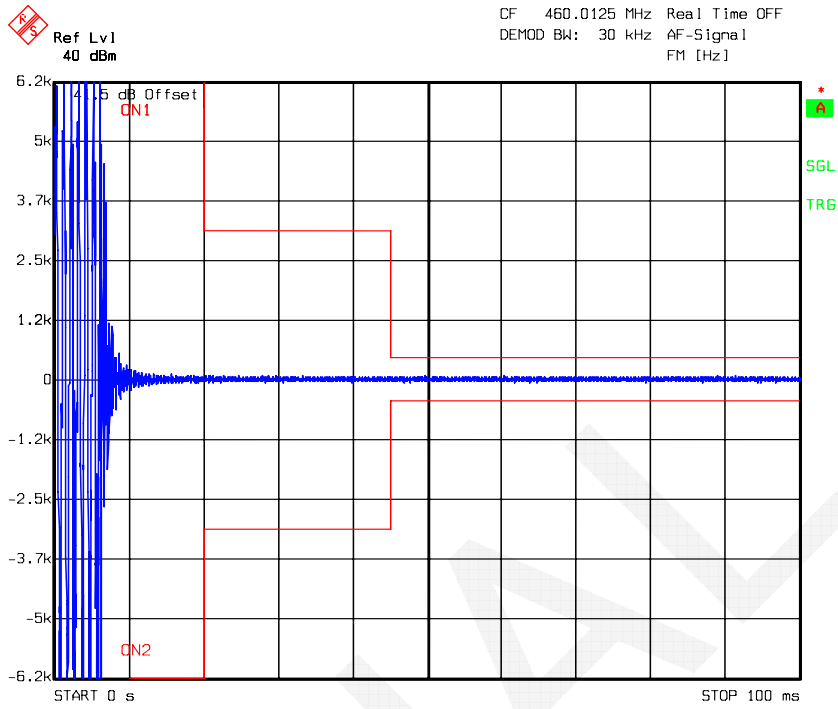
|                           |        |
|---------------------------|--------|
| <b>Temperature:</b>       | 28.6°C |
| <b>Relative Humidity:</b> | 51 %   |
| <b>ATM Pressure:</b>      | 100kPa |

*The testing was performed by Costa Dong on 2016-08-10.*

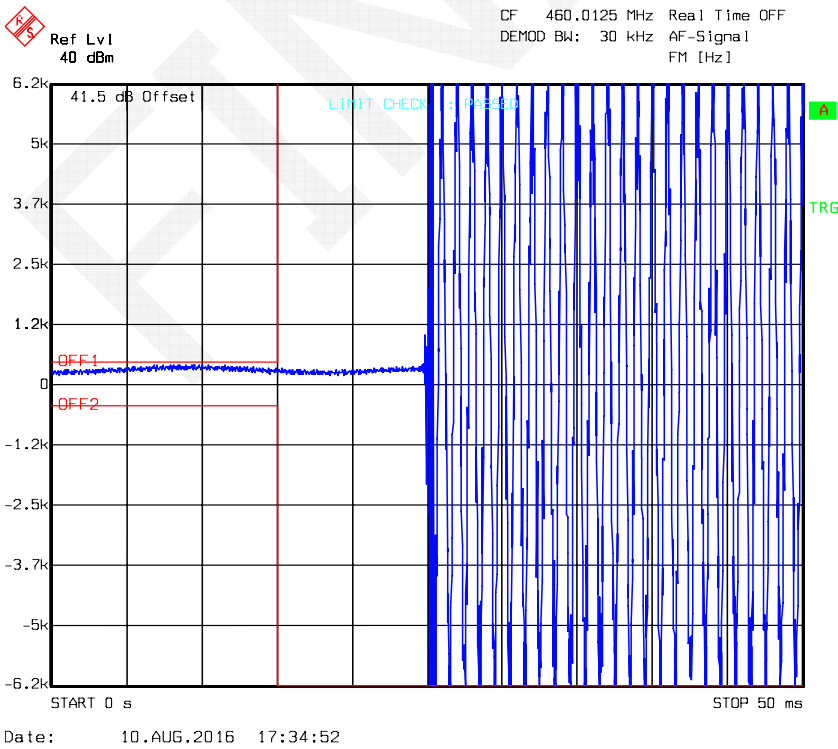
| Channel Spacing (kHz) | Transient Period (ms) | Maximum frequency difference | Result |
|-----------------------|-----------------------|------------------------------|--------|
| 12.5                  | <10( $t_1$ )          | ± 12.5 kHz                   | Pass   |
|                       | <25( $t_2$ )          | ± 6.25 kHz                   |        |
|                       | <10( $t_3$ )          | ± 12.5 kHz                   |        |
| 6.25                  | <10( $t_1$ )          | ± 6.25 kHz                   | Pass   |
|                       | <25( $t_2$ )          | ± 3.125 kHz                  |        |
|                       | <10( $t_3$ )          | ± 6.25 kHz                   |        |

Please refer to the following plots.

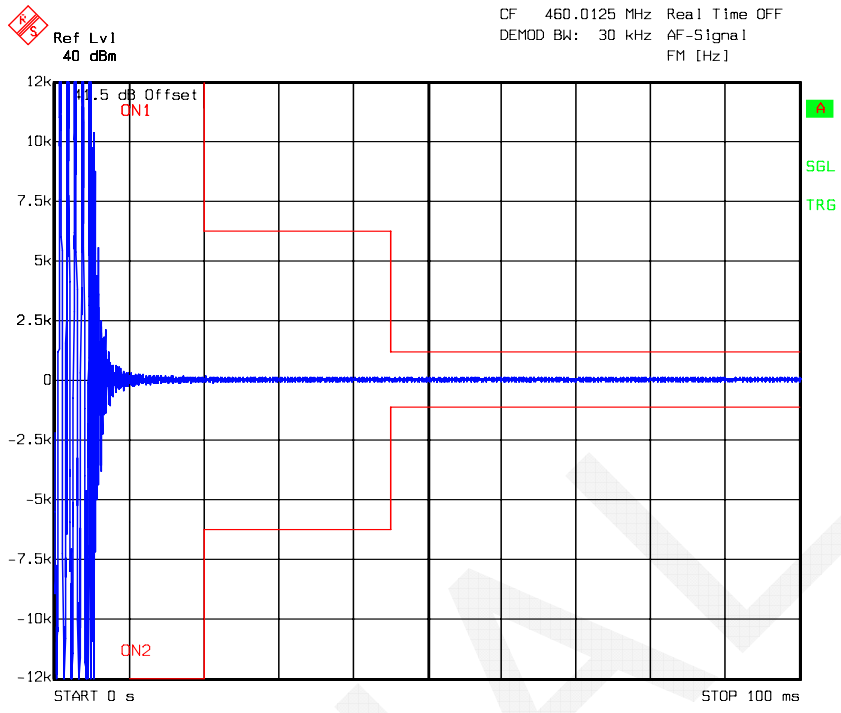
### Turn on – 460.0125MHz, FM Mode, Channel Spacing: 6.25 kHz



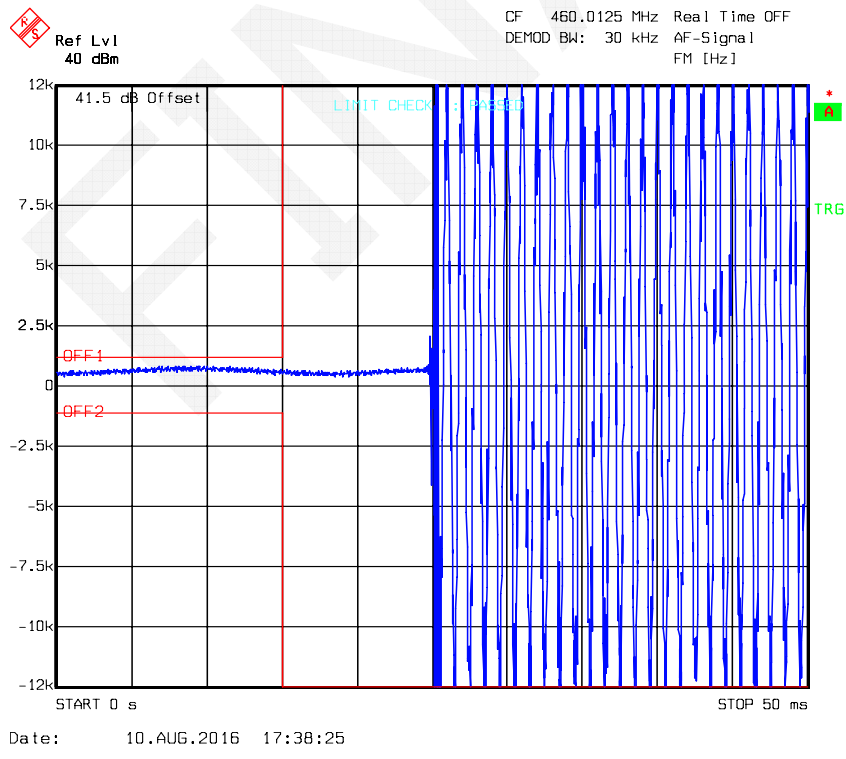
### Turn off – 460.0125MHz, FM Mode, Channel Spacing: 6.25 kHz



**Turn on – 4460.0125MHz, FM Mode, Channel Spacing: 12.5 kHz**



**Turn off – 460.0125MHz, FM Mode, Channel Spacing: 12.5 kHz**



\*\*\*\* END OF REPORT \*\*\*\*