

**FAMOSA**

Application For Certification

**FCC ID: 2AM38-800010942**

URBAN SURF 18 V USA

Model: 800010942-38402

Report No.: SZHH01175991-001

We hereby certify that the sample of the above item is considered to comply with the requirements of FCC Part 15, Subpart C for Intentional Radiator, mention 47 CFR [10-1-16]

Prepared and Checked by:

Approved by:

Sign on file

Terry Tang  
Senior Engineer

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Kidd Yang  
Senior Project Engineer  
Date: September 18, 2017

- The test results reported in this test report shall refer only to the sample actually tested and shall not refer or be deemed to refer to bulk from which such a sample may be said to have been obtained.
- This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to copy or distribute this report. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results referenced from this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program.
- For Terms And Conditions of the services, it can be provided upon request.
- The evaluation data of the report will be kept for 3 years from the date of issuance.

TRF No.: FCC 15C\_TX\_b

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## INTERTEK TESTING SERVICES

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### LIST OF EXHIBITS

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**INTERTEK TESTING SERVICES**

**MEASUREMENT/TECHNICAL REPORT**

**FAMOSA**

**Model: 800010942-38402**

**FCC ID: 2AM38-800010942**

This report concerns (check one:)      Original Grant       Class II Change

Equipment Type: DXX - Part 15 Low Power Communication Device Transmitter

Deferred grant requested per 47 CFR 0.457(d)(1)(ii)?      Yes       No

If yes, defer until: \_\_\_\_\_  
date

Company Name agrees to notify the Commission by: \_\_\_\_\_  
date

of the intended date of announcement of the product so that the grant can be issued on that date.

Transition Rules Request per 15.37?      Yes       No

If no, assumed Part 15, Subpart C for intentional radiator – the new 47 CFR [10-1-16 Edition] provision.

Report prepared by:

Terry Tang

**Intertek Testing Services Shenzhen Ltd. Longhua Branch**

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# INTERTEK TESTING SERVICES

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## INTERTEK TESTING SERVICES

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List of attached file

| Exhibit type          | File Description           | Filename            |
|-----------------------|----------------------------|---------------------|
| Test Report           | Test Report                | report.pdf          |
| Test Setup Photo      | Radiated Emission          | radiated photos.pdf |
| Test Report           | Bandedge Plot              | bandedge.pdf        |
| Test Report           | 20dB BW Plot               | bw.pdf              |
| Test Report           | Timing Plot                | af.pdf              |
| External Photo        | External Photo             | external photos.pdf |
| Internal Photo        | Internal Photo             | internal photos.pdf |
| Block Diagram         | Block Diagram              | block.pdf           |
| Schematics            | Circuit Diagram            | circuit.pdf         |
| Operation Description | Technical Description      | descri.pdf          |
| ID Label/Location     | Label Artwork and Location | label.pdf           |
| User Manual           | User Manual                | manual.pdf          |
| Cover Letter          | Confidentiality Letter     | request.pdf         |
| Cover Letter          | Letter of Agency           | agency.pdf          |

# **INTERTEK TESTING SERVICES**

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## **EXHIBIT 1**

### **GENERAL DESCRIPTION**

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## INTERTEK TESTING SERVICES

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### 1.0 General Description

#### 1.1 Product Description

The Equipment under Test (EUT) is a control unit for the URBAN SURF 18 V USA model: 800010942-38402 operating at 2.4GHz band. It is powered by DC 3.0V (2 x 1.5V AAA batteries).

Antenna Type: Integral antenna

Type of modulation: GFSK modulation

For electronic filing, the brief circuit description is saved with filename: descri.pdf.

#### 1.2 Related Submittal(s) Grants

This is an application for certification of a control unit for the URBAN SURF 18 V USA and corresponding receiver unit associated with this EUT is exempted from the certification.

#### 1.3 Test Methodology

Radiated emission measurements were performed according to the procedures in ANSI C63.10 (2013). Radiated Emission measurement was performed in a Semi-anechoic chamber. Preliminary scans were performed in the Semi-anechoic chamber only to determine worst case modes. All Radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the "**Justification Section**" of this Application.

#### 1.4 Test Facility

The Semi-anechoic chamber used to collect the radiated data is **Intertek Testing Services Shenzhen Ltd. Longhua Branch** and located at 1F/2F, Building B, QiaoAn Scientific Technology Park, Shangkeng Community, Guanhu Subdistrict, Longhua District, Shenzhen, P.R. China. This test facility and site measurement data have been fully placed on file with File Number: CN1188.

# **INTERTEK TESTING SERVICES**

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## **EXHIBIT 2**

### **SYSTEM TEST CONFIGURATION**

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## INTERTEK TESTING SERVICES

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### 2.0 System Test Configuration

#### 2.1 Justification

The system was configured for testing in a typical fashion (as a customer would normally use it), and in the confines as outlined in ANSI C63.10 (2013).

The EUT was powered by two new DC 1.5V AAA batteries. Only the worst case data was reported.

For maximizing emissions below 30 MHz, the EUT was rotated through 360°, the centre of the loop antenna was placed 1 meter above the ground, and the antenna polarization was changed. For maximizing emission at and above 30 MHz, the EUT was rotated through 360°, the antenna height was varied from 1 meter to 4 meters above the ground plane, and the antenna polarization was changed. This step by step procedure for maximizing emissions led to the data report in Exhibit 3.0.

The unit was operated standalone and placed in the centre of the turntable.

The equipment under test (EUT) was configured for testing in a typical fashion (as a customer would normally use it). The EUT was mounted to a plastic stand if necessary and placed on the polystyrene turntable, which enabled the engineer to maximize emissions through its placement in the three orthogonal axes.

#### 2.2 EUT Exercising Software

There was no special software to exercise the device.

#### 2.3 Special Accessories

No special accessories used.

#### 2.4 Equipment Modification

Any modifications installed previous to testing by FAMOSA will be incorporated in each production model sold / leased in the United States.

No modifications were installed by Intertek Testing Services Shenzhen Ltd. Longhua Branch.

#### 2.5 Measurement Uncertainty

When determining the test conclusion, the Measurement Uncertainty of test has been considered.

#### 2.6 Support Equipment List and Description

N/A

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**EXHIBIT 3**  
**EMISSION RESULTS**

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### 3.0 Emission Results

Data is included worst-case configuration (the configuration which resulted in the highest emission levels).

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## INTERTEK TESTING SERVICES

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### 3.1 **Radiated Test Results**

A sample calculation, configuration photographs and data tables of the emissions are included.

#### 3.1.1 Field Strength Calculation

The field strength is calculated by adding the reading on the Spectrum Analyzer to the factors associated with preamplifiers (if any), antennas, cables (when specified limit is in average and measurements are made with peak detectors). A sample calculation is included below.

$$FS = RA + AF + CF - AG$$

Where            FS = Field Strength in dB $\mu$ V/m  
                    RA = Receiver Amplitude (including preamplifier) in dB $\mu$ V  
                    CF = Cable Attenuation Factor in dB  
                    AF = Antenna Factor in dB  
                    AG = Amplifier Gain in dB

In the radiated emission table which follows, the reading shown on the data table may reflect the preamplifier gain. An example of the calculations, where the reading does not reflect the preamplifier gain, follows:

$$FS = RA + AF + CF - AG$$

Assume a receiver reading of 62.0 dB $\mu$ V is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted. The net field strength for comparison to the appropriate emission limit is 42 dB $\mu$ V/m. This value in dB $\mu$ V/m was converted to its corresponding level in  $\mu$ V/m.

RA = 62.0 dB $\mu$ V  
AF = 7.4 dB  
CF = 1.6 dB  
AG = 29.0 dB  
FS = 62 + 7.4 + 1.6 - 29 = 42 dB $\mu$ V/m

Level in  $\mu$ V/m = Common Antilogarithm [(42 dB $\mu$ V/m)/20] = 125.9  $\mu$ V/m

## INTERTEK TESTING SERVICES

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### 3.1.2 Radiated Emission Configuration Photograph

For electronic filing, the worst case radiated emission configuration photograph is saved with filename: radiated photos. pdf.

### 3.1.3 Radiated Emissions

The data on the following page lists the significant emission frequencies, the limit and the margin of compliance. Numbers with a minus sign are below the limit.

Worst Case Radiated Emission  
at  
81.44 MHz

Judgement: Passed by 12.0 dB

#### **TEST PERSONNEL:**

*Sign on file*

Terry Tang, Senior Engineer  
*Typed/Printed Name*

July 26, 2017  
*Date*

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## INTERTEK TESTING SERVICES

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Applicant: FAMOSA

Date of Test: July 26, 2017

Model: 800010942-38402

Sample: 1/1

Worst Case Operating Mode: Transmitting(2408MHz)

Table 1

### Radiated Emissions

| Polarization | Frequency (MHz) | Reading (dB $\mu$ V) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m (dB $\mu$ V/m) | Limit at 3m (dB $\mu$ V/m) | Margin (dB) |
|--------------|-----------------|----------------------|-------------------|---------------------|--------------------------|----------------------------|-------------|
| Horizontal   | 50.450          | 23.4                 | 20.0              | 17.9                | 21.3                     | 40.0                       | -18.7       |
| Horizontal   | 300.540         | 19.9                 | 20.0              | 16.0                | 15.9                     | 46.0                       | -30.1       |
| Horizontal   | 785.410         | 30.3                 | 20.0              | 23.6                | 33.9                     | 46.0                       | -12.1       |
| Vertical     | 60.470          | 24.7                 | 20.0              | 17.6                | 22.3                     | 40.0                       | -17.7       |
| Vertical     | 81.440          | 30.8                 | 20.0              | 17.2                | 28.0                     | 40.0                       | -12.0       |
| Vertical     | 400.500         | 23.5                 | 20.0              | 15.4                | 18.9                     | 46.0                       | -27.1       |

- NOTES:
1. Quasi-Peak detector is used except for others stated.
  2. All measurements were made at 3 meters. Harmonic emissions not detected at the 3-meter distances were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3-meter.
  3. Negative value in the margin column shows emission below limit.
  4. All emissions are below the QP limit.

## INTERTEK TESTING SERVICES

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### 3.1.4 Transmitter Spurious Emissions (Radiated)

The data on the following page lists the significant emission frequencies, the limit and the margin of compliance. Numbers with a minus sign are below the limit.

Worst Case Radiated Emission  
at  
4880.0 MHz

Judgement: Passed by 15.5 dB

#### **TEST PERSONNEL:**

*Sign on file*

Terry Tang, Senior Engineer  
*Typed/Printed Name*

July 26, 2017  
*Date*

## INTERTEK TESTING SERVICES

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Applicant: FAMOSA  
 Date of Test: July 26, 2017  
 Model: 800010942-38402  
 Sample: 1/1  
 Worst Case Operating Mode: Transmitting

Table 2

### Radiated Emissions

(2408.000MHz)

| Polarization | Frequency (MHz) | Reading (dB $\mu$ V) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m (dB $\mu$ V/m) | Peak Limit at 3m (dB $\mu$ V/m) | Margin (dB) |
|--------------|-----------------|----------------------|-------------------|---------------------|--------------------------|---------------------------------|-------------|
| Vertical     | 2408.000        | 90.1                 | 36.7              | 28.5                | 81.9                     | 114.0                           | -32.1       |
| Vertical     | 4816.000        | 59.6                 | 36.7              | 34.6                | 57.5                     | 74.0                            | -16.5       |
| Vertical     | 7224.000        | 59.8                 | 36.1              | 33.1                | 56.8                     | 74.0                            | -17.2       |

| Polarization | Frequency (MHz) | Reading (dB $\mu$ V) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Average Factor (-dB) | Net at 3m (dB $\mu$ V/m) | Average Limit at 3m (dB $\mu$ V/m) | Margin (dB) |
|--------------|-----------------|----------------------|-------------------|---------------------|----------------------|--------------------------|------------------------------------|-------------|
| Vertical     | 2408.000        | 90.1                 | 36.7              | 28.5                | 24.1                 | 57.8                     | 94.0                               | -36.2       |
| Vertical     | 4816.000        | 59.6                 | 36.7              | 34.6                | 24.1                 | 33.4                     | 54.0                               | -20.6       |
| Vertical     | 7224.000        | 59.8                 | 36.1              | 33.1                | 24.1                 | 32.7                     | 54.0                               | -21.3       |

- Notes:
1. Peak detector Data unless otherwise stated.
  2. All measurements were made at 3 meter. Harmonic emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3-meter.
  3. Negative value in the margin column shows emission below limit.
  4. Horn antenna is used for the emission over 1000MHz.

Test Engineer: Terry Tang

## INTERTEK TESTING SERVICES

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Applicant: FAMOSA  
 Date of Test: July 26, 2017  
 Model: 800010942-38402  
 Sample: 1/1  
 Worst Case Operating Mode: Transmitting

Table 3

### Radiated Emissions

(2440.000MHz)

| Polarization | Frequency (MHz) | Reading (dB $\mu$ V) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m (dB $\mu$ V/m) | Peak Limit at 3m (dB $\mu$ V/m) | Margin (dB) |
|--------------|-----------------|----------------------|-------------------|---------------------|--------------------------|---------------------------------|-------------|
| Vertical     | 2440.000        | 89.8                 | 36.7              | 28.6                | 81.7                     | 114.0                           | -32.3       |
| Vertical     | 4880.000        | 60.0                 | 36.7              | 35.2                | 58.5                     | 74.0                            | -15.5       |
| Vertical     | 7320.000        | 59.1                 | 36.1              | 33.1                | 56.1                     | 74.0                            | -17.9       |

| Polarization | Frequency (MHz) | Reading (dB $\mu$ V) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Average Factor (-dB) | Net at 3m (dB $\mu$ V/m) | Average Limit at 3m (dB $\mu$ V/m) | Margin (dB) |
|--------------|-----------------|----------------------|-------------------|---------------------|----------------------|--------------------------|------------------------------------|-------------|
| Vertical     | 2440.000        | 89.8                 | 36.7              | 28.6                | 24.1                 | 57.6                     | 94.0                               | -36.4       |
| Vertical     | 4880.000        | 60.0                 | 36.7              | 35.2                | 24.1                 | 34.4                     | 54.0                               | -19.6       |
| Vertical     | 7320.000        | 59.1                 | 36.1              | 33.1                | 24.1                 | 32.0                     | 54.0                               | -22.0       |

- Notes:
1. Peak detector Data unless otherwise stated.
  2. All measurements were made at 3 meter. Harmonic emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3-meter.
  3. Negative value in the margin column shows emission below limit.
  4. Horn antenna is used for the emission over 1000MHz.

Test Engineer: Terry Tang

## INTERTEK TESTING SERVICES

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Applicant: FAMOSA  
 Date of Test: July 26, 2017  
 Model: 800010942-38402  
 Sample: 1/1  
 Worst Case Operating Mode: Transmitting

Table 4

### Radiated Emissions

(2470.000MHz)

| Polarization | Frequency (MHz) | Reading (dB $\mu$ V) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m (dB $\mu$ V/m) | Peak Limit at 3m (dB $\mu$ V/m) | Margin (dB) |
|--------------|-----------------|----------------------|-------------------|---------------------|--------------------------|---------------------------------|-------------|
| Vertical     | 2470.000        | 88.2                 | 36.7              | 28.9                | 80.4                     | 114.0                           | -33.6       |
| Vertical     | 4940.000        | 58.4                 | 36.7              | 35.6                | 57.3                     | 74.0                            | -16.7       |
| Vertical     | 7410.000        | 59.5                 | 36.1              | 33.1                | 56.5                     | 74.0                            | -17.5       |

| Polarization | Frequency (MHz) | Reading (dB $\mu$ V) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Average Factor (-dB) | Net at 3m (dB $\mu$ V/m) | Average Limit at 3m (dB $\mu$ V/m) | Margin (dB) |
|--------------|-----------------|----------------------|-------------------|---------------------|----------------------|--------------------------|------------------------------------|-------------|
| Vertical     | 2470.000        | 88.2                 | 36.7              | 28.9                | 24.1                 | 56.3                     | 94.0                               | -37.7       |
| Vertical     | 4940.000        | 58.4                 | 36.7              | 35.6                | 24.1                 | 33.2                     | 54.0                               | -20.8       |
| Vertical     | 7410.000        | 59.5                 | 36.1              | 33.1                | 24.1                 | 32.4                     | 54.0                               | -21.6       |

- Notes: 1. Peak detector Data unless otherwise stated.
2. All measurements were made at 3 meter. Harmonic emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3-meter.
3. Negative value in the margin column shows emission below limit.
4. Horn antenna is used for the emission over 1000MHz.

Test Engineer: Terry Tang

**INTERTEK TESTING SERVICES**

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**EXHIBIT 4**  
**EQUIPMENT PHOTOGRAPHS**

## INTERTEK TESTING SERVICES

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### 4.0 Equipment Photographs

For electronic filing, the photographs of the tested EUT are saved with filename: external photos.pdf & internal photos.pdf.

**EXHIBIT 5**  
**PRODUCT LABELLING**

## INTERTEK TESTING SERVICES

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### 5.0 **Product Labelling**

For electronic filing, the FCC ID label artwork and the label location are saved with filename: label.pdf.

# **INTERTEK TESTING SERVICES**

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## **EXHIBIT 6**

### **TECHNICAL SPECIFICATIONS**

## INTERTEK TESTING SERVICES

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### 6.0 Technical Specifications

For electronic filing, the block diagram and schematics of the tested EUT are saved with filename: block.pdf and circuit.pdf respectively.

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**INTERTEK TESTING SERVICES**

**EXHIBIT 7**

**INSTRUCTION MANUAL**

## INTERTEK TESTING SERVICES

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### 7.0 **Instruction Manual**

For electronic filing, a preliminary copy of the Instruction Manual is saved with filename: manual.pdf.

This manual will be provided to the end-user with each unit sold/leased in the United States.

**INTERTEK TESTING SERVICES**

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**EXHIBIT 8**

**MISCELLANEOUS INFORMATION**

## INTERTEK TESTING SERVICES

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### 8.0 Miscellaneous Information

This miscellaneous information includes details of the measured bandedge and the test procedure.

## INTERTEK TESTING SERVICES

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### 8.1 Bandedge Plot

For electronic filing, the plot shows the fundamental emission when modulated is saved with filename: be.pdf. From the plot, the field strength of any emissions outside of the specified frequency band are attenuated to the general radiated emission limits in section 15.209. It fulfils the requirement of 15.249(d).

#### Peak and Average Measurement

Restricted-band band-edge tests shall be performed as radiated measurements, i.e (Band-edge Plot).

#### **(i) Lower channel 2408.000MHz:**

| Polarization | Frequency (MHz) | Reading (dB $\mu$ V) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m (dB $\mu$ V/m) | Peak Limit at 3m (dB $\mu$ V/m) | Margin (dB) |
|--------------|-----------------|----------------------|-------------------|---------------------|--------------------------|---------------------------------|-------------|
| Vertical     | 2400.000        | 37.1                 | 36.7              | 29.1                | 29.5                     | 74.0                            | -44.5       |

| Polarization | Frequency (MHz) | Reading (dB $\mu$ V) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m (dB $\mu$ V/m) | AV Limit at 3m (dB $\mu$ V/m) | Margin (dB) |
|--------------|-----------------|----------------------|-------------------|---------------------|--------------------------|-------------------------------|-------------|
| Vertical     | 2400.000        | 30.4                 | 36.7              | 29.1                | 22.8                     | 54.0                          | -31.2       |

#### **(ii) Upper channel 2470.000MHz:**

| Polarization | Frequency (MHz) | Reading (dB $\mu$ V) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m (dB $\mu$ V/m) | Peak Limit at 3m (dB $\mu$ V/m) | Margin (dB) |
|--------------|-----------------|----------------------|-------------------|---------------------|--------------------------|---------------------------------|-------------|
| Vertical     | 2483.500        | 43.8                 | 36.8              | 29.3                | 36.3                     | 74.0                            | -37.7       |

| Polarization | Frequency (MHz) | Reading (dB $\mu$ V) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m (dB $\mu$ V/m) | AV Limit at 3m (dB $\mu$ V/m) | Margin (dB) |
|--------------|-----------------|----------------------|-------------------|---------------------|--------------------------|-------------------------------|-------------|
| Vertical     | 2483.500        | 37.9                 | 36.8              | 29.3                | 30.4                     | 54.0                          | -23.6       |

The resultant field strength meets the general radiated emission limit in section 15.209, which does not exceed 74dB $\mu$ V/m (Peak Limit) and 54dB $\mu$ V/m (Average Limit).

## INTERTEK TESTING SERVICES

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### 8.1 Bandedge Plot (cont'd)

Pursuant to FCC part 15 Section 15.215(c), the 20dB bandwidth of the emission was contained within the frequency band designated (mentioned as above) which the EUT operated. The effects, if any, from frequency sweeping, frequency hopping, other modulation techniques and frequency stability over excepted variations in temperature and supply voltage were considered.

Figure 8.1 Bandwidth

## INTERTEK TESTING SERVICES

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### 8.2 Discussion of Pulse Desensitization

Pulse desensitivity is not applicable for this device. The effective period ( $T_{\text{eff}}$ ) is approximately 985.5us for a digital "1" bit, as shown in the plots of Exhibit 8.3. With a resolution bandwidth (3 dB) of 100 kHz, the pulse desensitivity factor was 0 dB.

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## INTERTEK TESTING SERVICES

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### 8.3 Calculation of Average Factor

Averaging factor in dB =  $20 \log$  (duty cycle)

The specification for output field strengths in accordance with the FCC rules specify measurements with an average detector. During testing, a spectrum analyzer incorporating a peak detector was used. Therefore, a reduction factor can be applied to the resultant peak signal level and compared to the limit for measurement instrumentation incorporating an average detector.

The time period over which the duty cycle is measured is 100 milliseconds, or the repetition cycle, whichever is a shorter time frame. The worst case (highest percentage on) duty cycle is used for the calculation. The duty cycle is measured by placing the spectrum analyzer in zero scan (receiver mode) and linear mode at maximum bandwidth (3 MHz at 3 dB down) and viewing the resulting time domain signal output from the analyzer on a Tektronix oscilloscope. The oscilloscope is used because of its superior time base and triggering facilities.

A plot of the worst-case duty cycle as detected in this manner are saved with filename: af.pdf

The duty cycle is simply the on-time divided by the period:

The duration of one cycle = 15.7101ms  
Effective period of the cycle = 985.5us = 0.9855ms

DC =  $0.9855\text{ms} / 15.7101\text{ms} = 0.0627$  or 6.27%

Therefore, the averaging factor is found by  $20 \log_{10} 0.0627 = -24.1\text{dB}$

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## INTERTEK TESTING SERVICES

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### 8.4 Emissions Test Procedures

The following is a description of the test procedure used by Intertek Testing Services in the measurements of transmitters operating under Part 15, Subpart C rules.

The test set-up and procedures described below are designed to meet the requirements of ANSI C63.10 - 2013.

The transmitting equipment under test (EUT) is placed on a styrene turntable which is four feet in diameter and approximately 0.8 meter up to 1GHz and 1.5 meter above 1GHz in height above the ground plane. During the radiated emissions test, the turntable is rotated and any cables leaving the EUT are manipulated to find the configuration resulting in maximum emissions. The EUT is adjusted through all three orthogonal axes to obtain maximum emission levels. The antenna height and polarization are varied during the testing to search for maximum signal levels.

Detector function for radiated emissions is in peak mode. Average readings, when required, are taken by measuring the duty cycle of the equipment under test and subtracting the corresponding amount in dB from the measured peak readings. A detailed description for the calculation of the average factor can be found in Exhibit 8.3.

The frequency range scanned is from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or 40 GHz, whichever is lower.

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### 8.4 Emissions Test Procedures (cont'd)

The EUT is warmed up for 15 minutes prior to the test.

AC power to the unit is varied from 85% to 115% nominal and variation in the fundamental emission field strength is recorded. If battery powered, a new, fully charged battery is used.

Conducted measurements are made as described in ANSI C63.10 - 2013.

The IF bandwidth used for measurement of radiated signal strength was 10 kHz for emission below 30 MHz and 120 kHz for emission from 30 MHz to 1000 MHz. Where pulsed transmissions of short enough pulse duration warrant, a greater bandwidth is selected according to the recommendations of Hewlett Packard Application Note 150-2. A discussion of whether pulse desensitivity is applicable to this unit is included in this report (See Exhibit 8.2). Above 1000 MHz, a resolution bandwidth of 1 MHz is used, RBW 3MHz used for fundamental emission.

Transmitter measurements are normally conducted at a measurement distance of three meters. However, to assure low enough noise floor in the restricted bands and above 1 GHz, signals are acquired at a distance of one meter or less. All measurements are extrapolated to three meters using inverse scaling, but those measurements taken at a closer distance are so marked.

**INTERTEK TESTING SERVICES**

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**EXHIBIT 9**  
**CONFIDENTIALITY REQUEST**

## INTERTEK TESTING SERVICES

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### 9.0 Confidentiality Request

For electronic filing, the confidentiality request of the tested EUT is saved with filename: request.pdf.

# INTERTEK TESTING SERVICES

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## EXHIBIT 10 TEST EQUIPMENT LIST

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## INTERTEK TESTING SERVICES

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### 10.0 Test Equipment List

| Equipment No. | Equipment              | Manufacturer    | Model No.    | Serial No. | Cal. Date   | Due Date    |
|---------------|------------------------|-----------------|--------------|------------|-------------|-------------|
| SZ061-12      | BiConiLog Antenna      | ETS             | 3142E        | 00166158   | 09-Sep-2016 | 09-Sep-2017 |
| SZ185-01      | EMI Receiver           | R&S             | ESCI         | 100547     | 9-Feb-2017  | 9-Feb-2018  |
| SZ061-09      | Horn Antenna           | ETS             | 3115         | 00092346   | 27-Oct-2016 | 27-Oct-2017 |
| SZ061-07      | Pyramidal Horn Antenna | ETS             | 3160-09      | 00083067   | 16-Mar-2017 | 16-Mar-2018 |
| SZ061-06      | Active Loop Antenna    | Electro-Metrics | EM-6876      | 217        | 26-May-2017 | 26-May-2018 |
| SZ056-06      | Spectrum Analyzer      | R&S             | FSV40        | 101101     | 7-Jul-2017  | 7-Jul-2018  |
| SZ181-04      | Preamplifier           | Agilent         | 8449B        | 3008A02474 | 9-Feb-2017  | 9-Feb-2018  |
| SZ188-01      | Anechoic Chamber       | ETS             | RFD-F/A-100  | 4102       | 16-Jan-2017 | 16-Jan-2019 |
| SZ062-02      | RF Cable               | RADIALL         | RG 213U      | --         | 8-Jul-2017  | 8-Jan-2018  |
| SZ062-05      | RF Cable               | RADIALL         | 0.04-26.5GHz | --         | 16-Mar-2017 | 16-Sep-2017 |
| SZ062-12      | RF Cable               | RADIALL         | 0.04-26.5GHz | --         | 16-Mar-2017 | 16-Sep-2017 |
| SZ067-04      | Notch Filter           | Micro-Tronics   | BRM50702-02  | --         | 14-Jun-2017 | 14-Jun-2018 |