

**Guangzhou Panyu Juda Car Audio Equipment Co., Ltd.**

Application  
For  
Certification

**FCC ID: ESX4000458**

**6.0 SOUNDBAR**

**Brand Name: AUVIO**

**Model: 4000458**

2.4GHz Transceiver

Report No.: 130529004SZN-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 [10-1-12]

Prepared and Checked by:

Approved by:

Sign on file  
Leo Lai  
Project Engineer

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Billy Li  
Supervisor  
Date: August 6, 2013

- 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.
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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

FCC ID: ESX4000458

Brand Name: AUVIO

Model: 4000458

August 6, 2013

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 [10-1-12 Edition] provision.

Report prepared by:

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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 Setup Photo	Conducted Emission	conducted photos.pdf
Test Report	Bandedge Plot	bandedge.pdf
Test Report	20dB BW Plot	bw.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	Letter of Agency	agency.pdf

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## **EXHIBIT 1**

### **GENERAL DESCRIPTION**

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### 1.0 General Description

#### 1.1 Product Description

The equipment under test (EUT) is a 6.0 SOUNDBAR with Bluetooth function. The EUT can play music through Bluetooth function or Audio Input. The EUT is operated by AC adapter (DYS602-150400W Input: AC 100-240V, 50/60Hz, Output: DC 15V, 4A). For more information, please refer to user manual.

Antenna Type: Integral antenna

Modulation Type: GFSK,  $\pi/4$  -DQPSK and 8-DPSK

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 transceiver for the 6.0 SOUNDBAR which has Bluetooth function, and there is no corresponding unit for certification.

#### 1.3 Test Methodology

Both AC mains line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.4 (2009). Radiated emission measurement was performed in Semi-anechoic chamber and conducted emission measurement was performed in shielding room. For radiated emission measurement, preliminary scans were performed in the semi-anechoic chamber only to determine the 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. All other measurements were made in accordance with the procedures in part 2 of CFR 47.

#### 1.4 Test Facility

The Semi-anechoic chamber and shielding room used to collect the radiated data and conducted data are **Intertek Testing Services Shenzhen Ltd. Kejiyuan Branch** and located at 6F, D Block, Huahan Building, Langshan Road, Nanshan District, Shenzhen, P. R. China. This test facility and site measurement data have been fully placed on file with the FCC(Registration Number: 242492).

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## **EXHIBIT 2**

### **SYSTEM TEST CONFIGURATION**



## **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 C63.4 (2009).

The EUT was powered by AC 120V/60Hz during the test.

All packets DH1, DH3 & DH5 mode in all modulation type GFSK,  $\pi/4$  -DQPSK and 8-DPSK were tested, and only the worst data was reported in this report.

For maximizing emissions, 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 reported in Exhibit 3.

The rear of unit shall be flushed with the rear of the table.

The equipment under test (EUT) was configured for testing in a typical fashion (as a customer would normally use it). The EUT was placed on a turn table, which enabled the engineer to maximize emissions through its placement in the three orthogonal axes.

#### **2.2 EUT Exercising Software**

The EUT exercise program (provided by client) used during testing was designed to exercise the various system components in a manner similar to a typical use.

#### **2.3 Special Accessories**

None

#### **2.4 Equipment Modification**

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

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

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### 2.5 Measurement Uncertainty

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

### 2.6 Support Equipment List and Description

<b>Description</b>	<b>Manufacturer</b>	<b>Model No.</b>
iPhone	Apple	A1303
Line In Cable	N/A	Unshielded, 1.5m
Aux In Cable	N/A	Unshielded, 1.1m
Coaxial Cable	N/A	Unshielded, 1.1m
Test Dummy Load	N/A	E214887 0813-8S
AC adapter	AUVIO	DYS602-150400W
Detachable AC cable	N/A	Unshielded, 1.4m
Optical Fiber	N/A	Unshielded, 5.0m
Optical Load Terminal	N/A	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). A sample calculation, configuration photographs and data tables of the emissions are included.

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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, pulse desensitization and average factors (when specified limit is in average and measurements are made with peak detectors). A sample calculation is included below.

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

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
- PD = Pulse Desensitization in dB
- AV = Average Factor 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:

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

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 pulse desensitization factor of the spectrum analyzer was 0 dB, and the resultant average factor was -10 dB. The net field strength for comparison to the appropriate emission limit is 32 dB $\mu$ V/m. This value in dB $\mu$ V/m was converted to its corresponding level in  $\mu$ V/m.

$$\begin{aligned} RA &= 62.0 \text{ dB}\mu\text{V} \\ AF &= 7.4 \text{ dB} \\ CF &= 1.6 \text{ dB} \\ AG &= 29.0 \text{ dB} \\ PD &= 0 \text{ dB} \\ AV &= -10 \text{ dB} \\ FS &= 62 + 7.4 + 1.6 - 29 + 0 + (-10) = 32 \text{ dB}\mu\text{V/m} \end{aligned}$$

$$\text{Level in } \mu\text{V/m} = \text{Common Antilogarithm } [(32 \text{ dB}\mu\text{V/m})/20] = 39.8 \mu\text{V/m}$$

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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  
101.295 MHz

Judgement: Passed by 11.4 dB

#### **TEST PERSONNEL:**

*Sign on file*

Leo Lai Project Engineer  
*Typed/Printed Name*

June 6, 2013  
*Date*

## INTERTEK TESTING SERVICES

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Applicant: Guangzhou Panyu Juda Car Audio Equipment Co., Ltd.

Date of Test: June 6, 2013

Model: 4000458

Sample: 1/1

Worst Case Operating Mode: Transmit

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	101.295	44.0	20.0	8.1	32.1	43.5	-11.4
Horizontal	150.280	30.3	20.0	15.4	25.7	43.5	-17.8
Horizontal	242.430	28.7	20.0	16.4	25.1	46.0	-20.9
Vertical	100.862	41.4	20.0	8.1	29.5	43.5	-14.0
Vertical	140.580	29.6	20.0	16.9	26.5	43.5	-17.0
Vertical	250.675	26.4	20.0	18.1	24.5	46.0	-21.5

- 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.

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### 3.1.4 Transmitter Spurious Emissions (Radiated)

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

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  
4804 MHz

Judgement: Passed by 9.7 dB

#### ***TEST PERSONNEL:***

*Sign on file*

Leo Lai Project Engineer  
*Typed/Printed Name*

June 6, 2013  
*Date*



## INTERTEK TESTING SERVICES

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Applicant: Guangzhou Panyu Juda Car Audio Equipment Co., Ltd.

Date of Test: June 6, 2013

Model: 4000458

Sample: 1/1

Worst Case Operating Mode: Transmit

Table 2

### Radiated Emissions

(2402MHz)

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	2402.000	107.8	36.7	28.5	99.6	114.0	-14.4
Vertical	4804.000	72.5	36.7	28.5	64.3	74.0	-9.7
Vertical	7206.000	54.1	36.1	33.1	51.1	74.0	-22.9

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	2402.000	107.8	36.7	28.5	22.5	77.1	94.0	-16.9
Vertical	4804.000	72.5	36.7	28.5	22.5	41.8	54.0	-12.2
Vertical	7206.000	54.1	36.1	33.1	22.5	28.6	54.0	-25.4

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: Leo Lai

## INTERTEK TESTING SERVICES

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Applicant: Guangzhou Panyu Juda Car Audio Equipment Co., Ltd.

Date of Test: June 6, 2013

Model: 4000458

Sample: 1/1

Worst Case Operating Mode: Transmit

Table 3

### Radiated Emissions

(2441MHz)

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	2441.000	105.8	36.7	28.5	97.6	114.0	-16.4
Vertical	4882.000	69.6	36.7	28.5	61.4	74.0	-12.6
Vertical	7323.000	54.2	36.1	33.1	51.2	74.0	-22.8

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	2441.000	105.8	36.7	28.5	22.5	75.1	94.0	-18.9
Vertical	4882.000	69.6	36.7	28.5	22.5	38.9	54.0	-15.1
Vertical	7323.000	54.2	36.1	33.1	22.5	28.7	54.0	-25.3

- 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: Leo Lai

## INTERTEK TESTING SERVICES

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Applicant: Guangzhou Panyu Juda Car Audio Equipment Co., Ltd.

Date of Test: June 6, 2013

Model: 4000458

Sample: 1/1

Worst Case Operating Mode: Transmit

Table 4

### Radiated Emissions

(2480MHz)

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	2480.000	106.9	36.7	28.6	98.8	114.0	-15.2
Vertical	4960.000	69.5	36.7	28.6	61.4	74.0	-12.6
Vertical	7440.000	54.6	36.1	33.4	51.9	74.0	-22.1

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	2480.000	106.9	36.7	28.6	22.5	76.3	94.0	-17.7
Vertical	4960.000	69.5	36.7	28.6	22.5	38.9	54.0	-15.1
Vertical	7440.000	54.6	36.1	33.4	22.5	29.4	54.0	-24.6

- 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: Leo Lai

## INTERTEK TESTING SERVICES

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### 3.2 Conducted Emission at Mains Terminal

#### 3.2.1 Conducted Emissions Configuration Photograph

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

#### 3.2.2 Conducted Emissions

Worst Case Neutral-Conducted Configuration  
At

0.162 MHz

Judgement: Passed by 22.7 dB margin

#### **TEST PERSONNEL:**

*Sign on file*

Leo Lai Project Engineer  
*Typed/Printed Name*

June 6, 2013  
*Date*

# INTERTEK TESTING SERVICES

Applicant: Guangzhou Panyu Juda Car Audio Equipment Co., Ltd.

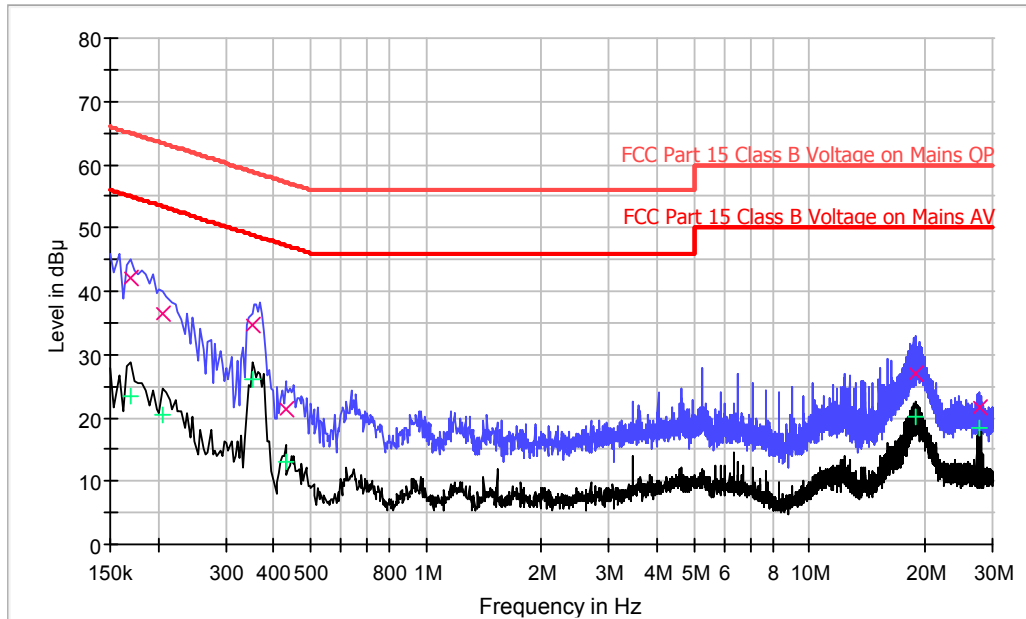
Date of Test: June 6, 2013

Model: 4000458

Sample: 1/1

Worst Case Operating Mode: Transmit

## Conducted Emission Test - FCC



### Result Table QP

Frequency (MHz)	QuasiPeak (dB µ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.170000	42.0	L1	9.6	23.0	65.0
0.206000	36.6	L1	9.6	26.8	63.4
0.354000	34.6	L1	9.6	24.3	58.9
0.430000	21.3	L1	9.6	36.0	57.3
18.918000	27.0	L1	10.0	33.0	60.0
27.650000	21.5	L1	10.2	38.5	60.0

### Result Table AV

Frequency (MHz)	Average (dB µ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.170000	23.4	L1	9.6	31.6	55.0
0.206000	20.3	L1	9.6	33.1	53.4
0.354000	26.1	L1	9.6	22.8	48.9
0.430000	12.9	L1	9.6	34.4	47.3
18.918000	20.1	L1	10.0	29.9	50.0
27.650000	18.5	L1	10.2	31.5	50.0

## INTERTEK TESTING SERVICES

Applicant: Guangzhou Panyu Juda Car Audio Equipment Co., Ltd.

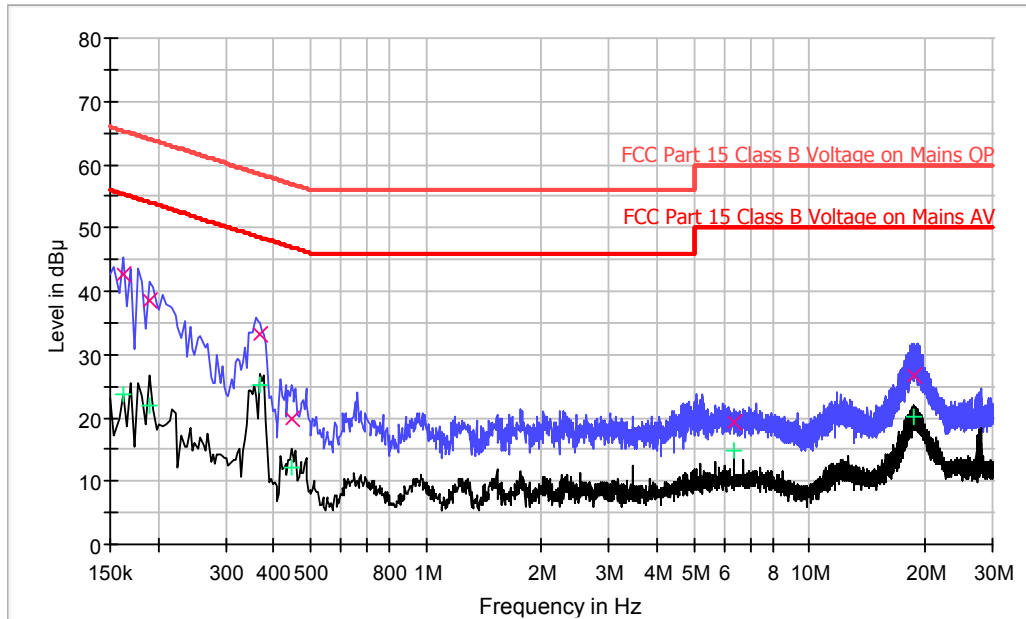
Date of Test: June 6, 2013

Model: 4000458

Sample: 1/1

Worst Case Operating Mode: Transmit

### Conducted Emission Test - FCC



#### Result Table QP

Frequency (MHz)	QuasiPeak (dB μ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.162000	42.7	N	9.6	22.7	65.4
0.190000	38.6	N	9.6	25.4	64.0
0.370000	33.2	N	9.6	25.3	58.5
0.446000	20.0	N	9.6	36.9	56.9
6.374000	19.1	N	9.9	40.9	60.0
18.754000	26.6	N	10.1	33.4	60.0

#### Result Table AV

Frequency (MHz)	Average (dB μ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.162000	23.7	N	9.6	31.7	55.4
0.190000	21.8	N	9.6	32.2	54.0
0.370000	25.1	N	9.6	23.4	48.5
0.446000	12.2	N	9.6	34.7	46.9
6.374000	14.8	N	9.9	35.2	50.0
18.754000	20.2	N	10.1	29.8	50.0

**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.



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**INTERTEK TESTING SERVICES**

**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.

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**INTERTEK TESTING SERVICES**

**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.

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**INTERTEK TESTING SERVICES**

**EXHIBIT 8**

**MISCELLANEOUS INFORMATION**

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### 8.0 Miscellaneous Information

This miscellaneous information includes details of the measured bandedge, the test procedure and calculation of factor such as pulse desensitization.



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## 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: bandedge.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 Measurement

Bandedge compliance is determined by applying marker-delta method, i.e (Bandedge Plot).

#### **(i) Lower channel 2402MHz:**

Peak Resultant field strength = Fundamental emissions (peak value) – delta  
from the bandedge plot

$$\begin{aligned} &= 99.6\text{dB}\mu\text{v/m} - 50.70 \text{ dB} \\ &= 48.90 \text{ dB}\mu\text{v/m} \end{aligned}$$

#### **(ii) Upper channel 2480MHz:**

Peak Resultant field strength = Fundamental emissions (peak value) – delta  
from the bandedge plot

$$\begin{aligned} &= 98.8 \text{ dB}\mu\text{v/m} - 52.36 \text{ dB} \\ &= 46.44 \text{ dB}\mu\text{v/m} \end{aligned}$$

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

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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  $625\mu\text{s}$  for Bluetooth. With a resolution bandwidth (3dB) of 1MHz, so the pulse desensitivity factor is 0dB.

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### 8.3 Transmitter Duty Cycle Calculation, FCC Rule 15.35(b, c)

Based on the Bluetooth Specification Version 2.1+EDR, transmitter ON time is independent of packet type (DH1, DH3 and DH5) and packet length

Channel hop rate = 800 hops/second (AFH Mode)

Adjusted channel hop rate for DH5 mode = 133.33 hops/second

Time per channel hop =  $1 / 133.33 \text{ hops/second} = 7.5 \text{ ms}$

Time to cycle through all channels =  $7.5 \times 20 \text{ channels} = 150 \text{ ms}$

Number of times transmitter hits on one channel =  $100 \text{ ms} / 150 \text{ ms} = 1 \text{ time(s)}$

Worst case dwell time = 7.5 ms

Duty cycle connection factor =  $20\log_{10}(7.5\text{ms} / 100\text{ms}) = -22.5 \text{ dB}$

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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 C63.4 - 2009.

The transmitting equipment under test (EUT) is placed on a wooden turntable which is four feet in diameter and approximately one meter 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.

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.

Detector function for conducted emissions is in QP & AV mode and IFBW setting is 9 kHz from the frequency band 150 kHz to 30MHz.

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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 C63.4 - 2009.

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. Above 1000 MHz, a resolution bandwidth of 1 MHz is used.

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.

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**EXHIBIT 9**  
**TEST EQUIPMENT LIST**

## INTERTEK TESTING SERVICES

### 9.0 Test Equipment List

Equipment No.	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due Date
SZ061-03	BiConiLog Antenna	ETS	3142C	00066460	30-Jun-12	30-Jun-13
SZ185-01	EMI Receiver	R&S	ESCI	100547	12-Mar-13	12-Mar-14
SZ061-08	Horn Antenna	ETS	3115	00092346	3-Nov-12	3-Nov-13
SZ061-06	Active Loop Antenna	Electro-Metrics	EM-6876	217	13-May-13	13-May-14
SZ061-07	Pyramidal Horn Antenna	ETS	3160-09	00083067	16-Feb-12	16-Aug-13
SZ056-03	Spectrum Analyzer	R&S	FSP 30	101148	12-Mar-13	12-Mar-14
SZ181-04	Preamplifier	Agilent	8449B	3008A02474	12-Mar-13	12-Mar-14
SZ188-01	Anechoic Chamber	ETS	RFD-F/A-100	4102	2-Mar-13	2-Mar-14
SZ062-02	RF Cable	RADIALL	RG 213U	--	26-Feb-13	26-Aug-13
SZ062-12	RF Cable	RADIALL	R288531262	--	26-Feb-13	26-Aug-13
SZ062-19	RF Cable	HUBER+SUHNER	SF104	--	26-Feb-13	26-Aug-13
SZ067-04	Notch Filter	Micro-Tronics	BRM50702-02	--	21-May-13	21-May-14
SZ185-02	EMI Test Receiver	R&S	ESCI	100692	5-Nov-12	5-Nov-13
SZ187-01	Two-Line V-Network	R&S	ENV216	100072	5-Nov-12	5-Nov-13
SZ187-02	Two-Line V-Network	R&S	ENV216	100073	5-Nov-12	5-Nov-13
SZ188-03	Shielding Room	ETS	RFD-100	4100	10-Sep-12	10-Sep-13