



## iWorld LLC

Application  
For  
Certification

**FCC ID: 2ALSO-IWHAMUI**

**Bluetooth Audio car kit**

**Model: WBTCK**

**Brand name: iWorld**

**2.4GHz Transceiver**

**Report No.: 170323036GZU-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 [10-01-15]

Prepared and Checked by:

Approved by:

### **Sign on file**

*Vincent Chen*  
Engineer

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*Kidd Yang*  
Senior Project Engineer  
Date: April 06, 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.
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- 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\_c**

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

Block E, No.7-2 Guang Dong Software Science Park, Caipin Road, Guangzhou Science City, GETDD Guangzhou, China

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# INTERTEK TESTING SERVICES

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## MEASUREMENT/TECHNICAL REPORT

**iWorld LLC - MODEL:  
WBTCK**

**Brand name: iWorld**

**FCC ID: 2ALSO-IWHAMUI**

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 [10-01-15 Edition] provision.

Report prepared by:

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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	Confidentiality Letter	request.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 Bluetooth Audio car kit. The EUT was powered by DC 3.7V lithium battery and charged by DC 5V USB port. For more detail information pls. refer to the user manual.

Bluetooth Version: 3.0+EDR

Antenna Type: Integral antenna

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

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 transmitter for the Bluetooth Audio car kit of 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 C63.10 (2013). Radiated emission measurement was performed in Semi-anechoic chamber and conducted emission measurement was performed in shield 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 shield room used to collect the radiated data and conducted data are **Intertek Testing Services Shenzhen Ltd. Guangzhou Branch** and located at Block E, No.7-2 Guang Dong Software Science Park, Caipin Road, Guangzhou Science City, GETDD Guangzhou, China. This test facility and site measurement data have been fully placed on file with the FCC (Registration Number: 549654).

**EXHIBIT 2**

**SYSTEM TEST CONFIGURATION**

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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 a fully charged DC 3.7V lithium battery which was charged by Notebook or AC Adapter (Notebook and AC Adapter with AC 120V, 60Hz input) during the test, only the worst case was reported.

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

For maximizing emissions, the EUT was rotated through 360°, the EUT was placed on the styrene turntable with 0.8m up to 1GHz and 1.5 m above 1GHz. The antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters. Radiated emissions are taken at three meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance.

The rear of unit was 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

No special accessories used.

#### 2.4 Equipment Modification

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

No modifications were installed by Intertek Testing Services Shenzhen Ltd Guangzhou 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

Description	Manufacturer	Model No.
iPod	Apple	A1446
USB cable	Shenzhen Xhonest Electronics Co.,Ltd	Un-shielded, Length 50cm
3.5mm connector plug	Shenzhen Xhonest Electronics Co.,Ltd	N/A
Adapter	SONY	AC-0400-CN
PC	HP	CNG811095F
Speaker	N/A	N/A

**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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## 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.

$$RA = 62.0 \text{ dB}\mu\text{V}$$

$$AF = 7.4 \text{ dB}$$

$$CF = 1.6 \text{ dB}$$

$$AG = 29.0 \text{ dB}$$

$$PD = 0 \text{ dB}$$

$$AV = -10 \text{ dB}$$

$$FS = 62 + 7.4 + 1.6 - 29 + 0 + (-10) = 32 \text{ dB}\mu\text{V/m}$$

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

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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  
420.005 MHz

Judgement: Passed by 8.3 dB

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

*Sign on file*

Vincent Chen Engineer  
*Typed/Printed Name*

March 31, 2017  
*Date*

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## INTERTEK TESTING SERVICES

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Applicant: iWorld LLC

Date of Test: March 31, 2017

Model: WBTCK

Sample: 1/1

Worst Case Operating Mode: BT Link with AC adapter

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	113.755	33.4	20.0	16.7	30.1	43.5	-13.4
Horizontal	359.982	40.1	20.0	10.5	30.6	46.0	-15.4
Horizontal	420.005	44.2	20.0	13.5	37.7	46.0	-8.3
Vertical	36.780	26.3	20.0	16.4	22.7	40.0	-17.3
Vertical	51.840	39.6	20.0	4.9	24.5	40.0	-15.5
Vertical	540.240	44.4	20.0	10.4	34.8	46.0	-11.2

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)

Worst Case Radiated Emission  
at  
9764.000 MHz

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.

Judgement: Passed by 13.6 dB

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

*Sign on file*

Vincent Chen Engineer  
*Typed/Printed Name*

March 31, 2017  
*Date*

## INTERTEK TESTING SERVICES

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Applicant: iWorld LLC

Date of Test: March 31, 2017

Model: WBTCK

Sample: 1/1

Worst Case Operating Mode: Transmitting with AC adapter

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)
Horizontal	2402.000	95.9	36.7	28.1	87.3	114.0	-26.7
Horizontal	4804.000	54.4	36.7	35.5	53.2	74.0	-20.8
Horizontal	7206.000	56.4	36.1	36.5	56.8	74.0	-17.2
Horizontal	9608.000	59.5	36.2	37.0	60.3	74.0	-13.7

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)
Horizontal	2402.000	95.9	36.7	28.1	22.5	64.8	94.0	-29.2
Horizontal	4804.000	54.4	36.7	35.5	22.5	30.7	54.0	-23.3
Horizontal	7206.000	56.4	36.1	36.5	22.5	34.3	54.0	-19.7
Horizontal	9608.000	59.5	36.2	37.0	22.5	37.8	54.0	-16.2

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: Vincent Chen

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TRF No.: FCC 15C\_TX\_c  
FCC ID: 2ALSO-IWHAMUI

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## INTERTEK TESTING SERVICES

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Applicant: iWorld LLC

Date of Test: March 31, 2017

Model: WBTCK

Sample: 1/1

Worst Case Operating Mode: Transmitting with AC adapter

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)
Horizontal	2441.000	95.8	36.7	28.1	87.2	114.0	-26.8
Horizontal	4882.000	54.5	36.7	35.5	53.3	74.0	-20.7
Horizontal	7323.000	55.7	36.1	37.2	56.8	74.0	-17.2
Horizontal	9764.000	59.6	36.2	37.0	60.4	74.0	-13.6

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)
Horizontal	2441.000	95.8	36.7	28.1	22.5	64.7	94.0	-29.3
Horizontal	4882.000	54.5	36.7	35.5	22.5	30.8	54.0	-23.2
Horizontal	7323.000	55.7	36.1	37.2	22.5	34.3	54.0	-19.7
Horizontal	9764.000	59.6	36.2	37.0	22.5	37.9	54.0	-16.1

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: Vincent Chen

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TRF No.: FCC 15C\_TX\_c  
FCC ID: 2ALSO-IWHAMUI

# INTERTEK TESTING SERVICES

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Applicant: iWorld LLC

Date of Test: March 31, 2017

Model: WBTCK

Sample: 1/1

Worst Case Operating Mode: Transmitting with AC adapter

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)
Horizontal	2480.000	95.7	36.7	28.1	87.1	114.0	-26.9
Horizontal	4960.000	54.2	36.7	35.5	53.0	74.0	-21.0
Horizontal	7440.000	55.6	36.1	37.2	56.7	74.0	-17.3
Horizontal	9920.000	57.7	36.3	38.9	60.3	74.0	-13.7

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)
Horizontal	2480.000	95.7	36.7	28.1	22.5	64.6	94.0	-29.4
Horizontal	4960.000	54.2	36.7	35.5	22.5	30.5	54.0	-23.5
Horizontal	7440.000	55.6	36.1	37.2	22.5	34.2	54.0	-19.8
Horizontal	9920.000	57.7	36.3	38.9	22.5	37.8	54.0	-16.2

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: Vincent Chen

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TRF No.: FCC 15C\_TX\_c  
FCC ID: 2ALSO-IWHAMUI

## 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 Conducted Configuration  
At

11.566 MHz

Judgement: Passed by 22.4 dB margin

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

*Sign on file*

Vincent Chen Engineer  
*Typed/Printed Name*

March 31, 2017  
*Date*

# INTERTEK TESTING SERVICES

Applicant: iWorld LLC

Date of Test: March 31, 2017

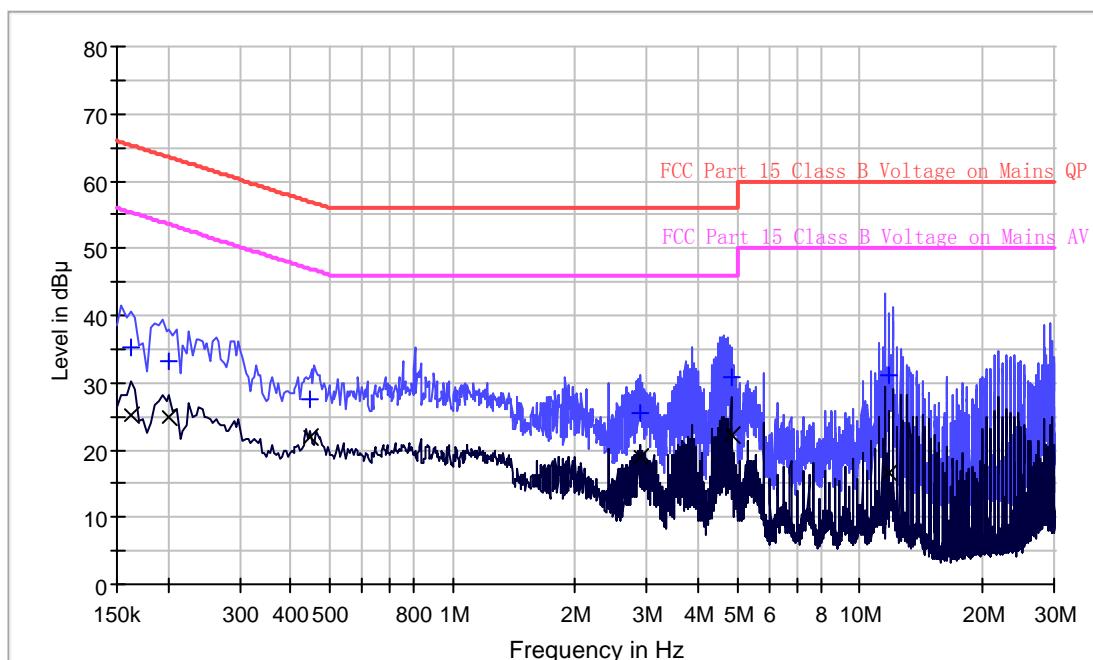
Model: WBTCK

Sample: 1/1

Worst Case Operating Mode: BT Link with AC adapter

Phase: Live

## Conducted Emission Test - FCC



## Result Table QP

Frequency (MHz)	QuasiPeak (dB $\mu$ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V)
0.162	35.2	L	9.6	30.2	65.4
0.202	33.2	L	9.7	30.3	63.5
0.446	27.4	L	9.7	29.5	56.9
2.894	25.6	L	9.7	30.4	56.0
4.826	30.9	L	9.8	25.1	56.0
11.826	31.0	L	10.0	29.0	60.0

## Result Table AV

Frequency (MHz)	Average (dB $\mu$ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V)
0.162	25.2	L	9.6	30.2	55.4
0.202	24.8	L	9.7	28.7	53.5
0.446	22.0	L	9.7	24.9	46.9
2.894	18.9	L	9.7	27.1	46.0
4.826	22.4	L	9.8	23.6	46.0
11.826	16.5	L	10.0	33.5	50.0

TRF No.: FCC 15C\_TX\_c  
FCC ID: 2ALSO-IWHAMUI

# INTERTEK TESTING SERVICES

Applicant: iWorld LLC

Date of Test: March 31, 2017

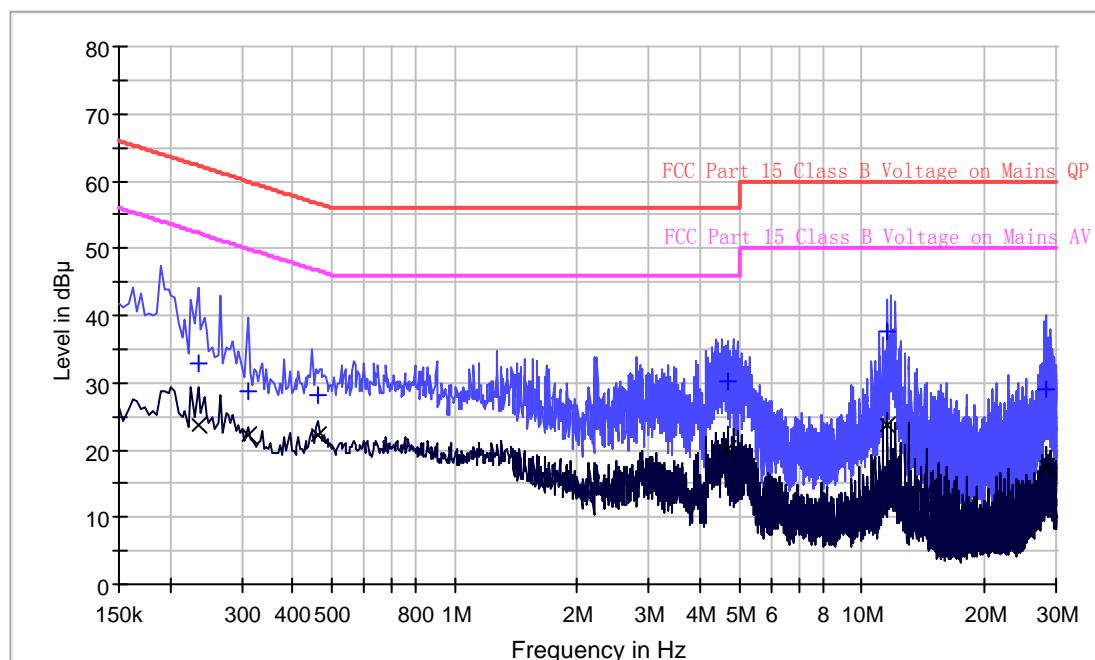
Model: WBTCK

Sample: 1/1

Worst Case Operating Mode: BT Link with AC adapter

Phase: Neutral

## Conducted Emission Test - FCC



### Result Table QP

Frequency (MHz)	QuasiPeak (dB $\mu$ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V)
0.234	32.9	N	9.7	29.4	62.3
0.310	28.7	N	9.7	31.3	60.0
0.462	28.1	N	9.7	28.6	56.7
4.694	30.2	N	9.8	25.8	56.0
11.566	37.6	N	10.0	22.4	60.0
28.430	29.0	N	10.8	31.0	60.0

### Result Table AV

Frequency (MHz)	Average (dB $\mu$ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V)
0.234	23.8	N	9.7	28.5	52.3
0.310	22.2	N	9.7	27.8	50.0
0.462	22.1	N	9.7	24.6	46.7
4.694	20.1	N	9.8	25.9	46.0
11.566	23.6	N	10.0	26.4	50.0
28.430	17.5	N	10.8	32.5	50.0

TRF No.: FCC 15C\_TX\_c  
FCC ID: 2ALSO-IWHAMUI

**INTERTEK TESTING SERVICES**

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**EXHIBIT 4**

**EQUIPMENT PHOTOGRAPHS**

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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**

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**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**

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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**

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**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**

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**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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### 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:**

$$\begin{aligned}\text{Peak Resultant field strength} &= \text{Fundamental emissions (peak value)} - \text{delta from the bandedge plot} \\ &= 87.3 \text{ dB}\mu\text{V/m} - 46.9 \text{ dB} \\ &= 40.4 \text{ dB}\mu\text{V/m}\end{aligned}$$

$$\begin{aligned}\text{Average Resultant field strength} &= \text{Fundamental emissions (average value)} - \text{delta from the bandedge plot} \\ &= 64.8 \text{ dB}\mu\text{V/m} - 46.9 \text{ dB} \\ &= 17.9 \text{ dB}\mu\text{V/m}\end{aligned}$$

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

$$\begin{aligned}\text{Peak Resultant field strength} &= \text{Fundamental emissions (peak value)} - \text{delta from the bandedge plot} \\ &= 87.1 \text{ dB}\mu\text{V/m} - 51.5 \text{ dB} \\ &= 35.6 \text{ dB}\mu\text{V/m}\end{aligned}$$

$$\begin{aligned}\text{Average Resultant field strength} &= \text{Fundamental emissions (average value)} - \text{delta from the bandedge plot} \\ &= 64.6 \text{ dB}\mu\text{V/m} - 51.5 \text{ dB} \\ &= 13.1 \text{ dB}\mu\text{V/m}\end{aligned}$$

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).

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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 expected 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 ( $T_{eff}$ ) is approximately 625 $\mu$ 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 3.0+EDR, and worst case AFH mode, transmitter ON time is independent of packet type (DH5) and packet length, the AFH mode Duty cycle connection factor as below:

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 hops/second = 7.5 ms

Time to cycle through all channels = 7.5 x 20 channels = 150 ms

Number of times transmitter hits on one channel = 100 ms / 150 ms = 1 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 C63.10 (2013).

The transmitting equipment under test (EUT) is placed on a styrene turntable which is four feet in diameter, up to 1GHz 0.8m and above 1GHz 1.5m 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 adjust 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 C63.10 (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. Above 1000 MHz, a resolution bandwidth of 1 MHz (RBW 3MHz for fundamental emission) 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**

**CONFIDENTIALITY REQUEST**

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### 9.0 Confidentiality Request

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

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**EXHIBIT 10**  
**TEST EQUIPMENT LIST**

# INTERTEK TESTING SERVICES

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## 10. Test Equipment List

### Radiated Emission

Equipment No.	Equipment	Model	Manufacturer	Cal. Due date (MM-DD-YYYY)	Calibration Interval
EM030-04	3m Semi-Anechoic Chamber	9×6×6 m <sup>3</sup>	ETS•LINDGREN	5/9/2017	1Y
EM031-02	EMI Test Receiver (9 kHz~7 GHz)	R&S ESR7	R&S	6/7/2017	1Y
EM031-03	Signal and Spectrum Analyzer (10 Hz~40 GHz)	R&S FSV40	R&S	6/3/2017	1Y
EM011-04	Loop antenna (9 kHz-30 MHz)	HFH2-Z2	R&S	6/6/2017	1Y
EM061-03	TRILOG Super Broadband test Antenna (30 MHz-1.5 GHz) (TX)	VULB 9161	SCHWARZBECK	6/6/2017	1Y
EM033-01	TRILOG Super Broadband test Antenna(30 MHz-3 GHz) (RX)	VULB 9163	SCHWARZBECK	9/8/2017	1Y
EM033-02	Bouble-Ridged Waveguide Horn Antenna (800 MHz-18 GHz)(RX)	R&S HF907	R&S	6/6/2017	1Y
EM033-03	High Frequency Antenna & preamplifier(18 GHz~26.5 GHz) (RX)	R&S SCU-26	R&S	4/1/2017	1Y
EM033-04	High Frequency Antenna & preamplifier (26 GHz-40 GHz)	R&S SCU-40	R&S	4/1/2017	1Y
EM031-02-01	Coaxial cable(9 kHz-1 GHz)	N/A	R&S	5/30/2017	1Y
EM033-02-02	Coaxial cable(1 GHz-18 GHz)	N/A	R&S	5/30/2017	1Y
EM033-04-02	Coaxial cable(18 GHz~40 GHz)	N/A	R&S	4/1/2017	1Y
EM022-03	2.45 GHz Filter	BRM50702	Micro-Tronics	5/9/2017	1Y

### Conducted emission at the mains terminals

Equipment No.	Equipment	Model	Manufacturer	Cal. Due date (MM-DD-YYYY)	Calibration Interval
EM080-05	EMI receiver	ESCI	R&S	7/26/2017	1Y
EM006-05	LISN	ENV216	R&S	9/18/2017	1Y
EM006-06	LISN	ENV216	R&S	9/18/2017	1Y
EM006-06-01	Coaxial cable	/	R&S	4/11/2017	1Y
EM004-04	EMC shield Room	8m×3m×3m	Zhongyu	1/23/2018	1Y

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FCC ID: 2ALSO-IWHAMUI