



**Sky Wing Communication Electronics CO., LTD.**

Application  
For  
Certification

**FCC ID: WSGKSBTAP**

**BLUETOOTH TRANSMITTER**

**Model: AIRLINE ADAPTOR**

**Brand name: KitSound**

**2.4GHz Transceiver**

**Report No.: 161223008SZN-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**

*Jackson Yang*  
Engineer

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*Kidd Yang*  
Senior Project Engineer  
Date: January 11, 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.  
Phone: 86-20-8213 9688 Fax: 86-20-3205 7538 Website: [www.china.intertek-etlsemko.com](http://www.china.intertek-etlsemko.com)

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## INTERTEK TESTING SERVICES

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**INTERTEK TESTING SERVICES**

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**MEASUREMENT/TECHNICAL REPORT**

**Sky Wing Communication Electronics CO., LTD. - MODEL:  
AIRLINE ADAPTOR**

**Brand name: KitSound**

**FCC ID: WSGKSBTAP**

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

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

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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.

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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.

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Report prepared by:

Jackson Yang  
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  
Phone: 86-20-8213 9688  
Fax: 86-20-3205 7538

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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	Confidentiality Letter	request.pdf
Cover Letter	Letter of Agency	agency.pdf

**EXHIBIT 1**  
**GENERAL DESCRIPTION**

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## 1.0 General Description

### 1.1 Product Description

The equipment under test (EUT) is a BLUETOOTH TRANSMITTER. 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.

Antenna Type: PCB 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 TRANSMITTER 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 shielding room used to collect the radiated data and conducted data are are **EMTEK (Shenzhen) Co., Ltd** and located at Bldg. 69, Majialong Industry Zone, Nanshan District, Shenzhen, Guangdong, 518052, China. This test facility and site measurement data have been fully placed on file with the FCC (Registration Number: 406365).

**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 Sky Wing Communication Electronics CO., LTD. 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	A1421
USB cable	N/A	Un-shielded, Length 83cm
AUX Line	N/A	un-shielded, 24cm
Adapter	TP-LINK	T050100-2A3
PC	HP	CNG811095F

**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 dB $\mu$ V  
AF = 7.4 dB  
CF = 1.6 dB  
AG = 29.0 dB  
PD = 0 dB  
AV = -10 dB  
FS = 62 + 7.4 + 1.6 - 29 + 0 + (-10) = 32 dB $\mu$ V/m

Level in  $\mu$ V/m = Common Antilogarithm [(32 dB $\mu$ V/m)/20] = 39.8  $\mu$ 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  
466.015 MHz

Judgement: Passed by 6.1 dB

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

*Sign on file*

Jackson Yang Engineer  
*Typed/Printed Name*

January 7, 2017  
*Date*

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## INTERTEK TESTING SERVICES

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Applicant: Sky Wing Communication Electronics CO., LTD.  
Date of Test: January 7, 2017  
Model: AIRLINE ADAPTOR  
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	314.695	36.1	20.0	16.7	32.8	46.0	-13.2
Horizontal	339.430	43.2	20.0	10.5	33.7	46.0	-12.3
Horizontal	466.985	41.9	20.0	13.5	35.4	46.0	-10.6
Vertical	31.455	34.5	20.0	16.4	30.9	40.0	-9.1
Vertical	36.305	43.5	20.0	4.9	28.4	40.0	-11.6
Vertical	466.015	49.5	20.0	10.4	39.9	46.0	-6.1

- 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.

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### 3.1.4 Transmitter Spurious Emissions (Radiated)

Worst Case Radiated Emission  
at  
2441.000 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 12.2 dB

#### **TEST PERSONNEL:**

*Sign on file*

Jackson Yang Engineer  
*Typed/Printed Name*

January 7, 2017  
*Date*



## INTERTEK TESTING SERVICES

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Applicant: Sky Wing Communication Electronics CO., LTD.  
Date of Test: January 7, 2017  
Model: AIRLINE ADAPTOR  
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	107.4	36.7	28.1	98.8	114.0	-15.2
Horizontal	4804.000	61.4	36.7	35.5	60.2	74.0	-13.8
Horizontal	7206.000	60.7	36.1	36.5	61.1	74.0	-12.9
Horizontal	9608.000	60.0	36.2	37.0	60.8	74.0	-13.2

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)
Horizontal	2402.000	107.4	36.7	28.1	22.5	76.3	94.0	-17.7
Horizontal	4804.000	61.4	36.7	35.5	22.5	37.7	54.0	-16.3
Horizontal	7206.000	60.7	36.1	36.5	22.5	38.6	54.0	-15.4
Horizontal	9608.000	60.0	36.2	37.0	22.5	38.3	54.0	-15.7

- 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: Jackson Yang

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TRF No.: FCC 15C\_TX\_c  
FCC ID: WSGKSBTAP

## INTERTEK TESTING SERVICES

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Applicant: Sky Wing Communication Electronics CO., LTD.  
 Date of Test: January 7, 2017  
 Model: AIRLINE ADAPTOR  
 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	110.4	36.7	28.1	101.8	114.0	-12.2
Horizontal	4882.000	61.4	36.7	35.5	60.2	74.0	-13.8
Horizontal	7323.000	58.1	36.1	37.2	59.2	74.0	-14.8
Horizontal	9764.000	60.6	36.2	37.0	61.4	74.0	-12.6

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	110.4	36.7	28.1	22.5	79.3	94.0	-14.7
Horizontal	4882.000	61.4	36.7	35.5	22.5	37.7	54.0	-16.3
Horizontal	7323.000	58.1	36.1	37.2	22.5	36.7	54.0	-17.3
Horizontal	9764.000	60.6	36.2	37.0	22.5	38.9	54.0	-15.1

- 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: Jackson Yang

## INTERTEK TESTING SERVICES

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Applicant: Sky Wing Communication Electronics CO., LTD.  
 Date of Test: January 7, 2017  
 Model: AIRLINE ADAPTOR  
 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	110.3	36.7	28.1	101.7	114.0	-12.3
Horizontal	4960.000	60.0	36.7	35.5	58.8	74.0	-15.2
Horizontal	7440.000	57.1	36.1	37.2	58.2	74.0	-15.8
Horizontal	9920.000	58.0	36.3	38.9	60.6	74.0	-13.4

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	110.3	36.7	28.1	22.5	79.2	94.0	-14.8
Horizontal	4960.000	60.0	36.7	35.5	22.5	36.3	54.0	-17.7
Horizontal	7440.000	57.1	36.1	37.2	22.5	35.7	54.0	-18.3
Horizontal	9920.000	58.0	36.3	38.9	22.5	38.1	54.0	-15.9

- 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: Jackson Yang

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TRF No.: FCC 15C\_TX\_c  
 FCC ID: WSGKSBTAP

## 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

0.770 MHz

Judgement: Passed by 8.8 dB margin

#### **TEST PERSONNEL:**

*Sign on file*

Jackson Yang Engineer  
*Typed/Printed Name*

December 29, 2016  
*Date*

## INTERTEK TESTING SERVICES

Applicant: Sky Wing Communication Electronics CO., LTD.

Date of Test: December 29, 2016

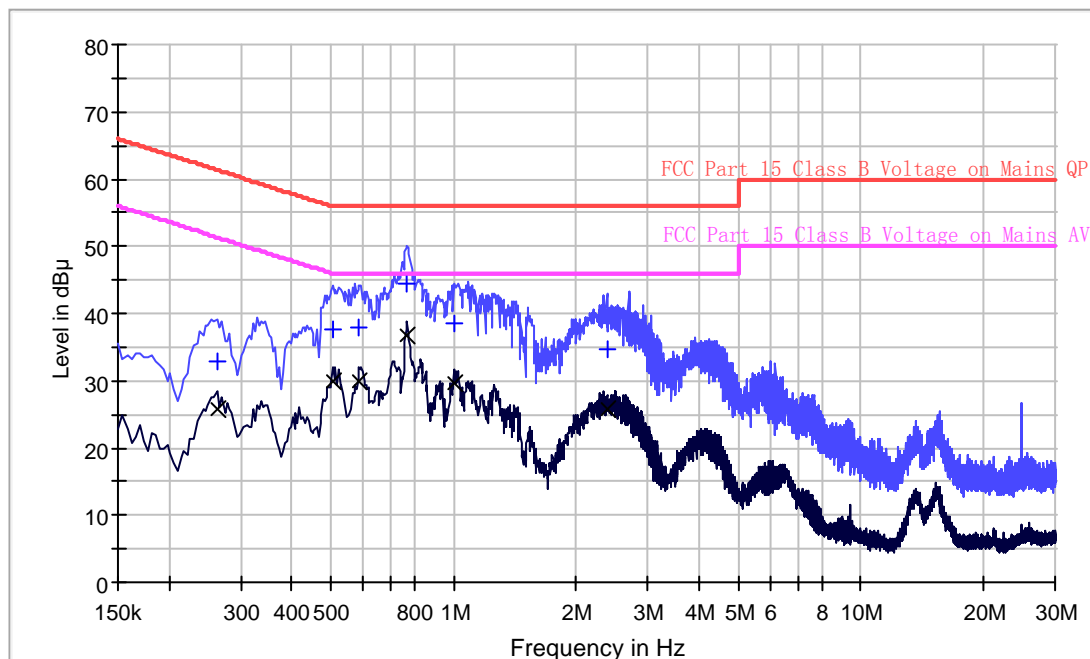
Model: AIRLINE ADAPTOR

Sample: 1/1

Worst Case Operating Mode: BT Link with AC adapter

Phase: Live

### Conducted Emission Test - FCC



### Result Table QP

Frequency (MHz)	QuasiPeak (dBμV)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.262	32.8	L	9.7	28.6	61.4
0.506	37.5	L	9.7	18.5	56.0
0.586	38.0	L	9.7	18.0	56.0
0.770	44.4	L	9.7	11.6	56.0
1.002	38.5	L	9.7	17.5	56.0
2.374	34.8	L	9.7	21.2	56.0

### Result Table AV

Frequency (MHz)	Average (dBμV)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.262	25.7	L	9.7	25.7	51.4
0.506	29.9	L	9.7	16.1	46.0
0.586	30.0	L	9.7	16.0	46.0
0.770	36.8	L	9.7	9.2	46.0
1.002	29.6	L	9.7	16.4	46.0
2.374	25.6	L	9.7	20.4	46.0

TRF No.: FCC 15C\_TX\_c

FCC ID: WSGKSBTAP

## INTERTEK TESTING SERVICES

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Applicant: Sky Wing Communication Electronics CO., LTD.

Date of Test: December 29, 2016

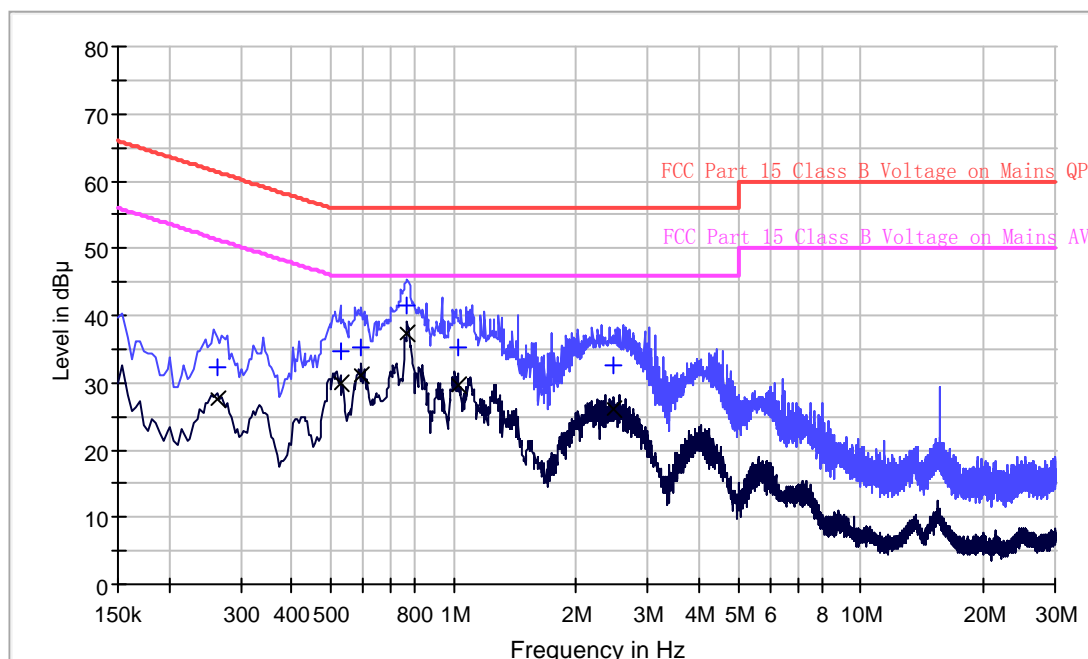
Model: AIRLINE ADAPTOR

Sample: 1/1

Worst Case Operating Mode: BT Link with AC adapter

Phase: Neutral

### Conducted Emission Test - FCC



### Result Table QP

Frequency (MHz)	QuasiPeak (dBμV)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.262	32.3	N	9.7	29.1	61.4
0.526	34.8	N	9.7	21.2	56.0
0.594	35.3	N	9.7	20.7	56.0
0.770	41.5	N	9.7	14.5	56.0
1.022	35.2	N	9.7	20.8	56.0
2.482	32.5	N	9.7	23.5	56.0

### Result Table AV

Frequency (MHz)	Average (dBμV)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.262	27.4	N	9.7	24.0	51.4
0.526	29.9	N	9.7	16.1	46.0
0.594	31.0	N	9.7	15.0	46.0
0.770	37.2	N	9.7	8.8	46.0
1.022	29.6	N	9.7	16.4	46.0
2.482	26.2	N	9.7	19.8	46.0

**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.

**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.

**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**

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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

$$\begin{aligned} &= 98.8 \text{ dB}\mu\text{v/m} - 47.3 \text{ dB} \\ &= 51.5 \text{ dB}\mu\text{v/m} \end{aligned}$$

Average Resultant field strength = Fundamental emissions (average value) – delta from the bandedge plot

$$\begin{aligned} &= 76.3 \text{ dB}\mu\text{V/m} - 47.3 \text{ dB} \\ &= 29.0 \text{ dB}\mu\text{V/m} \end{aligned}$$

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

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

$$\begin{aligned} &= 101.7 \text{ dB}\mu\text{v/m} - 59.4 \text{ dB} \\ &= 42.3 \text{ dB}\mu\text{v/m} \end{aligned}$$

Average Resultant field strength = Fundamental emissions (average value) – delta from the bandedge plot

$$\begin{aligned} &= 79.2 \text{ dB}\mu\text{V/m} - 59.4 \text{ dB} \\ &= 19.8 \text{ dB}\mu\text{V/m} \end{aligned}$$

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

## INTERTEK TESTING SERVICES

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

Based on the Bluetooth Specification Version 3.0, 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 =  $1 / 133.33 \text{ hops/second} = 7.5 \text{ ms}$

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

## 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, 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.

## INTERTEK TESTING SERVICES

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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**

## 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.



**EXHIBIT 10  
TEST EQUIPMENT LIST**

## INTERTEK TESTING SERVICES

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### 10. Test Equipment List

Equipment No.	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due Date
EE089	EMI Test Receiver	Rohde & Schwarz	ESU	1302.6005 .26	17-May-2016	17-May-2017
EE040	Pre-Amplifier	HP	8447F	2944A079 99	17-May-2016	17-May-2017
EE043	Bilog Antenna	Schwarzbeck	VULB9163	142	17-May-2016	17-May-2017
EE147	Cable	Schwarzbeck	AK9513	ACRX1	17-May-2016	17-May-2017
EE169	Cable	Rosenberger	N/A	FP2RX2	17-May-2016	17-May-2017
EE168	Cable	Schwarzbeck	AK9513	CRPX1	29-May-2016	29-May-2017
EE170	Cable	Schwarzbeck	AK9513	CRRX2	29-May-2016	29-May-2017
EE096	Pre-Amplifier	A.H.	PAM-0126	1415261	17-May-2016	17-May-2017
EE094	Horn Antenna	Schwarzbeck	BBHA 9120	707	29-May-2016	29-May-2017
EE097	Cable	H+B	0.5M SF104- 26.5	289147/4	29-May-2016	29-May-2017
EE100	Cable	H+B	3M SF104- 26.5	295838/4	29-May-2016	29-May-2017
EE101	Cable	H+B	6M SF104- 26.5	295840/4	29-May-2016	29-May-2017
EE095	Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170 399	17-May-2016	17-May-2017
EE343	EMI Test Receiver	Rohde & Schwarz	FSV40	132.1- 3008K39- 100967- AP	29-May-2016	29-May-2017
EE240	Pre-Amplifier	Lunar EM	LNA26G40 -40	J10131310 28001	17-May-2016	17-May-2017
EE234	Horn Antenna	AHS/USA	SAS-573	184	17-May-2016	17-May-2017
EE312	Cable	A.H	SAC-40G- 1	414	17-May-2016	17-May-2017
EE313	Cable	A.H	SAC-40G- 1	413	17-May-2016	17-May-2017
EE023	Test Receiver	Rohde & Schwarz	ESCS30	879	29-May-2016	29-May-2017
EE145	L.I.S.N.	Rohde & Schwarz	ENV216	590	29-May-2016	29-May-2017
EE022	AMN	ROHDE & SCHWARZ	B-1492-9	856	26-Jun-2016	26-Jun-2017