

# Foshan Lanchiya Digital Technology Co.,Ltd.

## TEST REPORT

**SCOPE OF WORK**

FCC TESTING—EIFFEL TWS, NOXPK

**REPORT NUMBER**

180604021SZN-001

**ISSUE DATE**

**[REVISED DATE]**

JUNE 15, 2018

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**Foshan Lanchiya Digital Technology Co.,Ltd.**

Application  
For  
Certification

**FCC ID: P4L0EIF1806****Bluetooth Speaker**

**Model: Eiffel TWS**  
**Brand Name: LANCHIYA**

**Additional Model: NOXPK**  
**Brand Name: AVGO**

2.4GHz Transceiver

Report No.: 180604021SZN-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 [10-1-17]

Prepared and Checked by:

Approved by:

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*Surel Guo*  
Engineer

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*Kidd Yang*  
Technical Supervisor  
Date: June 15, 2018

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

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**LIST OF EXHIBITS***INTRODUCTION*

<i>EXHIBIT 1:</i>	General Description
<i>EXHIBIT 2:</i>	System Test Configuration
<i>EXHIBIT 3:</i>	Emission Results
<i>EXHIBIT 4:</i>	Equipment Photographs
<i>EXHIBIT 5:</i>	Product Labelling
<i>EXHIBIT 6:</i>	Technical Specifications
<i>EXHIBIT 7:</i>	Instruction Manual
<i>EXHIBIT 8:</i>	Miscellaneous Information
<i>EXHIBIT 9:</i>	Confidentiality Request
<i>EXHIBIT 10:</i>	Test Equipment List

**MEASUREMENT/TECHNICAL REPORT**

Foshan Lanchiya Digital Technology Co.,Ltd.

Model: Eiffel TWS

Additional Model: NOXPK

FCC ID: P4L0EIF1806

This report concerns (check one): Original Grant  Class II Change Equipment Type: DXX - Part 15 Low Power Communication Device TransmitterDeferred grant requested per 47 CFR 0.457(d)(1)(ii)? Yes  No If yes, defer until: \_\_\_\_\_  
dateCompany 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 [10-1-17 Edition] provision.

Report prepared by:

Surel Guo  
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**Table of Contents**

1.0 General Description.....	7
1.1 Product Description .....	7
1.2 Related Submittal(s) Grants .....	7
1.3 Test Methodology.....	7
1.4 Test Facility .....	8
2.0 System Test Configuration .....	10
2.1 Justification .....	10
2.2 EUT Exercising Software.....	10
2.3 Special Accessories .....	10
2.4 Equipment Modification .....	10
2.5 Measurement Uncertainty .....	11
2.6 Support Equipment List and Description .....	11
3.0 Emission Results.....	13
3.1 Radiated Test Results .....	14
3.1.1 Field Strength Calculation.....	14
3.1.2 Radiated Emission Configuration Photograph.....	15
3.1.3 Radiated Emissions.....	15
3.1.4 Transmitter Spurious Emissions .....	17
3.2 Conducted Emission at Mains Termination.....	21
3.2.1 Conducted Emissions Configuration Photograph .....	21
3.2.2 Conducted Emissions .....	21
4.0 Equipment Photographs .....	25
5.0 Product Labelling .....	27
6.0 Technical Specifications .....	29
7.0 Instruction Manual .....	31
8.0 Miscellaneous Information .....	33
8.1 Bandedge Plot .....	34
8.2 Discussion of Pulse Desensitization .....	36
8.3 Transmitter Duty Cycle Calculation.....	37
8.4 Emissions Test Procedures .....	38
9.0 Confidentiality Request .....	41
10.0 Test Equipment List.....	43

**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**

## 1.0 General Description

### 1.1 Product Description

The equipment under test (EUT) is a Bluetooth Speaker with BT 4.2+EDR function operating in 2402-2480MHz. The EUT is powered by rechargeable battery (DC3.7V) which can be charged by USB port (DC 5V). Insert the AUX cable to the AUX input port when the power is on or insert the AUX cable to the AUX input port then power on, the speaker will switch to AUX IN mode automatically. The NFC tag is passive. For more detail information pls. refer to the user manual.

Antenna Type: Integral antenna

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

Antenna Gain: 0dBi Max

Bluetooth Version: BT 4.2 (without BLE)

The Model: NOXPK is the same as the Model: Eiffel TWS in hardware aspect (circuitry and electrical, mechanical and physical construction), the only differences are the appearance, trade name and model no. for trading purpose.

Model No.	Trade Name
Eiffel TWS	LANCHIYA
NOXPK	AVGO

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 Bluetooth Speaker which has Bluetooth function (4.2 without BLE), and related report for FCC SDoc is subjected to report number: 180604021SZN-002.

### 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 used to collect the radiated data and conducted data are **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 the FCC (Registration Number: CN1188).

**EXHIBIT 2****SYSTEM TEST CONFIGURATION**

## 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 rechargeable battery (DC3.7V) which was charged by an adapter with AC 120V/60Hz input during the test, only the worst data was reported in this report.

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

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 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 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 turntable, 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 Foshan Lanchiya Digital Technology 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 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**

<b>Description</b>	<b>Manufacturer</b>	<b>Model No.</b>
iPod	Apple	A1367
Adaptor	DNS	Model: AC69S20 Input: AC 100-240V, 50/60Hz, 0.6A Output: DC 5V, 1A
USB Cable	Foshan Lanchiya	Unshielded, 0.6cm

## EXHIBIT 3

### EMISSION RESULTS

### 3.0 Emission Results

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

### 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.

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

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

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

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

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

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

$$FS = 62 + 7.4 + 1.6 - 29 + 0 = 42 \text{ dB}\mu\text{V/m}$$

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

### 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  
115.845 MHz

Judgement: Passed by 13.5dB

***TEST PERSONNEL:***

*Sign on file*

Surel Guo, Engineer  
*Typed/Printed Name*

14 June 2018

*Date*

Applicant: Foshan Lanchiya Digital Technology Co.,Ltd.  
Date of Test: 14 June 2018 Model: Eiffel TWS  
Worst Case Operating Mode: Charging+BT Link

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	120.695	38.2	20.0	9.4	27.6	43.5	-15.9
Horizontal	221.090	33.9	20.0	12.6	26.5	46.0	-19.5
Horizontal	949.560	21.2	20.0	27.8	29.0	46.0	-17.0
Vertical	52.795	37.5	20.0	8.5	26.0	40.0	-14.0
Vertical	115.845	40.5	20.0	9.5	30.0	43.5	-13.5
Vertical	228.850	32.3	20.0	13.0	25.3	46.0	-20.7

- 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.

### 3.1.4 Transmitter Spurious Emissions (Radiated)

Worst Case Radiated Emission  
at  
7440.000 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 11.4 dB

**TEST PERSONNEL:**

*Sign on file*

Surel Guo, Engineer  
*Typed/Printed Name*

14 June,2018  
*Date*

Applicant: Foshan Lanchiya Digital Technology Co.,Ltd.  
Date of Test: 14 June 2018 Model: Eiffel TWS  
Worst Case Operating Mode: Transmitting

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	100.1	36.7	28.1	91.5	114.0	-22.5
Horizontal	4804.000	58.0	36.7	35.5	56.8	74.0	-17.2
Horizontal	7206.000	57.1	36.1	36.5	57.5	74.0	-16.5
Horizontal	9608.000	57.2	36.2	37.0	58.0	74.0	-16.0

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	100.1	36.7	28.1	22.5	69.0	94.0	-25.0
Horizontal	4804.000	58.0	36.7	35.5	22.5	34.3	54.0	-19.7
Horizontal	7206.000	57.1	36.1	36.5	22.5	35.0	54.0	-19.0
Horizontal	9608.000	57.2	36.2	37.0	22.5	35.5	54.0	-18.5

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: Surel Guo

Applicant: Foshan Lanchiya Digital Technology Co.,Ltd.  
 Date of Test: 14 June 2018 Model: Eiffel TWS  
 Worst Case Operating Mode: Transmitting

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	103.2	36.7	28.1	94.6	114.0	-19.4
Horizontal	4882.000	55.8	36.7	35.5	54.6	74.0	-19.4
Horizontal	7323.000	58.5	36.1	37.2	59.6	74.0	-14.4
Horizontal	9764.000	57.5	36.2	37.0	58.3	74.0	-15.7

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	2441.000	103.2	36.7	28.1	22.5	72.1	94.0	-21.9
Horizontal	4882.000	55.8	36.7	35.5	22.5	32.1	54.0	-21.9
Horizontal	7323.000	58.5	36.1	37.2	22.5	37.1	54.0	-16.9
Horizontal	9764.000	57.5	36.2	37.0	22.5	35.8	54.0	-18.2

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: Surel Guo

Applicant: Foshan Lanchiya Digital Technology Co.,Ltd.  
 Date of Test: 14 June 2018 Model: Eiffel TWS  
 Worst Case Operating Mode: Transmitting

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	105.3	36.7	28.1	96.7	114.0	-17.3
Horizontal	4960.000	52.3	36.7	35.5	51.1	74.0	-22.9
Horizontal	7440.000	61.5	36.1	37.2	62.6	74.0	-11.4
Horizontal	9920.000	55.9	36.3	38.9	58.5	74.0	-15.5

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)
Horizontal	2480.000	105.3	36.7	28.1	22.5	74.2	94.0	-19.8
Horizontal	4960.000	52.3	36.7	35.5	22.5	28.6	54.0	-25.4
Horizontal	7440.000	61.5	36.1	37.2	22.5	40.1	54.0	-13.9
Horizontal	9920.000	55.9	36.3	38.9	22.5	36.0	54.0	-18.0

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: Surel Guo

### 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

1.340 MHz

Judgement: Passed by 3.0 dB margin

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

*Sign on file*

Surel Guo, Engineer  
*Typed/Printed Name*

08 June 2018

*Date*

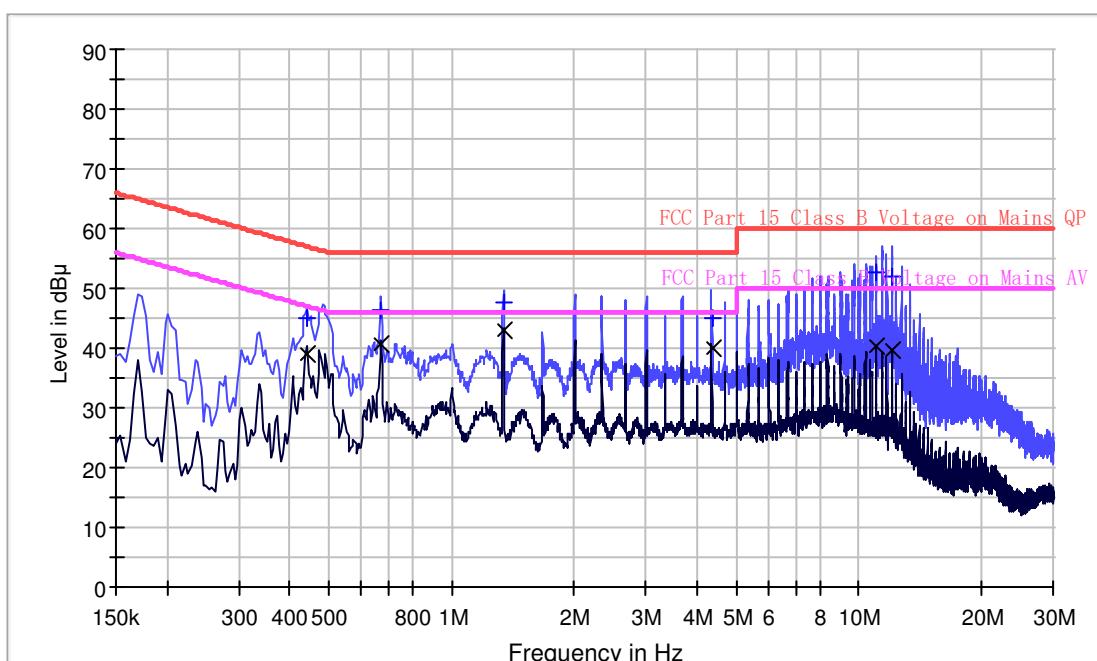
Company: Foshan Lanchiya Digital Technology Co.,Ltd.

Date of Test: June 08, 2018

Model: Eiffel TWS

Operating Mode: Charging+BT Link

Phase: Live

**Conducted Emission Test - FCC****Result Table QP**

Frequency (MHz)	QuasiPeak (dB <sub>1</sub> IV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB <sub>1</sub> IV)
0.442000	44.8	9.000	L1	9.7	12.2	57.0
0.670000	46.4	9.000	L1	9.7	9.6	56.0
1.340000	47.8	9.000	L1	9.7	8.2	56.0
4.361000	45.2	9.000	L1	9.8	10.8	56.0
11.042000	52.6	9.000	L1	9.9	7.4	60.0
12.050000	51.9	9.000	L1	10.0	8.1	60.0

**Result Table AV**

Frequency (MHz)	Average (dB <sub>1</sub> IV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB <sub>1</sub> IV)
0.442000	39.1	9.000	L1	9.7	7.9	47.0
0.670000	40.7	9.000	L1	9.7	5.3	46.0
1.340000	43.0	9.000	L1	9.7	3.0	46.0
4.361000	39.8	9.000	L1	9.8	6.2	46.0
11.042000	40.2	9.000	L1	9.9	9.8	50.0
12.050000	39.6	9.000	L1	10.0	10.4	50.0

Test Engineer: Surel Guo

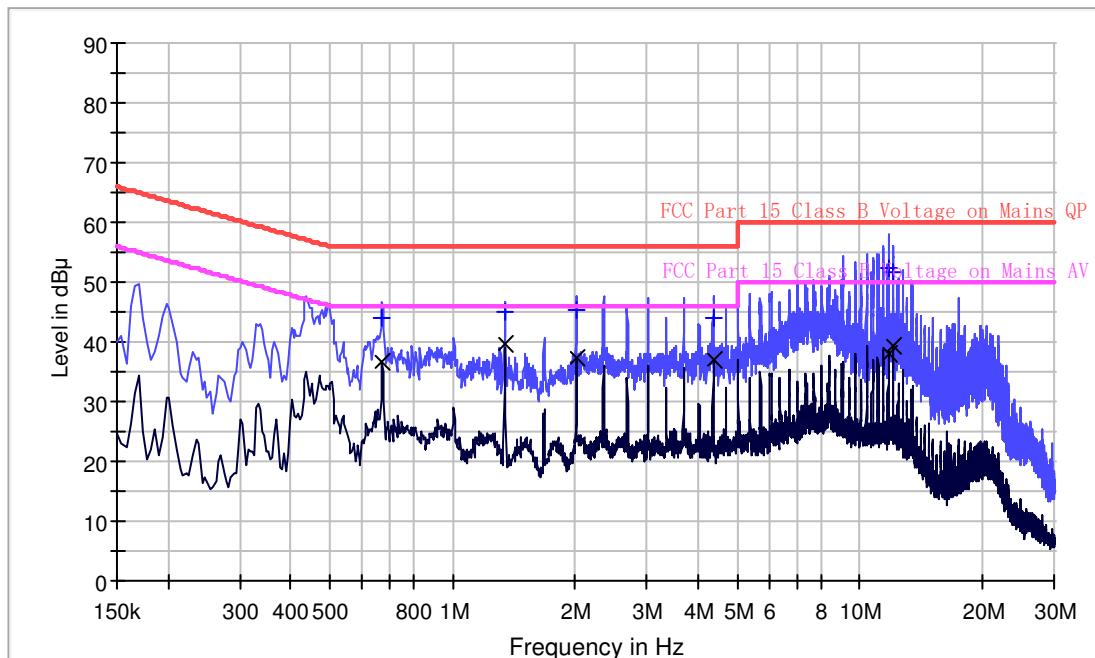
Company: Foshan Lanchiya Digital Technology Co.,Ltd.

Date of Test: June 08, 2018

Model: Eiffel TWS

Operating Mode: Charging+BT Link

Phase: Neutral

**Conducted Emission Test - FCC****Result Table QP**

Frequency (MHz)	QuasiPeak (dB $\mu$ /V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ /V)
0.670000	43.8	9.000	N	9.7	12.2	56.0
1.342000	45.1	9.000	N	9.7	10.9	56.0
2.014000	45.4	9.000	N	9.7	10.6	56.0
4.366000	44.0	9.000	N	9.8	12.0	56.0
11.742000	52.3	9.000	N	10.0	7.7	60.0
12.078000	51.7	9.000	N	10.0	8.3	60.0

**Result Table AV**

Frequency (MHz)	Average (dB $\mu$ /V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ /V)
0.670000	36.6	9.000	N	9.7	9.4	46.0
1.342000	39.6	9.000	N	9.7	6.4	46.0
2.014000	37.3	9.000	N	9.7	8.7	46.0
4.366000	36.9	9.000	N	9.8	9.1	46.0
11.742000	38.0	9.000	N	10.0	12.0	50.0
12.078000	39.4	9.000	N	10.0	10.6	50.0

Test Engineer: Surel Guo

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

## 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**

## 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

## 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**

## 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.

## EXHIBIT 8

### MISCELLANEOUS INFORMATION

## 8.0 Miscellaneous Information

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

## 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 fulfills 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

$$\begin{aligned} &= 91.5 \text{ dB}\mu\text{v/m} - 38.8 \text{ dB} \\ &= 52.7 \text{ dB}\mu\text{v/m} \end{aligned}$$

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

$$\begin{aligned} &= 69.0 \text{ dB}\mu\text{v/m} - 38.8 \text{ dB} \\ &= 30.2 \text{ dB}\mu\text{v/m} \end{aligned}$$

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

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

$$\begin{aligned} &= 96.7 \text{ dB}\mu\text{v/m} - 57.9 \text{ dB} \\ &= 38.8 \text{ dB}\mu\text{v/m} \end{aligned}$$

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

$$\begin{aligned} &= 74.2 \text{ dB}\mu\text{v/m} - 57.9 \text{ dB} \\ &= 16.3 \text{ dB}\mu\text{v/m} \end{aligned}$$

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).

**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

## 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.

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

Based on the Bluetooth Specification Version 4.2 (without BLE), 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 =  $20\log_{10}(7.5\text{ms} / 100\text{ms}) = -22.5 \text{ dB}$

## 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.

**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 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.

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

## 9.0 Confidentiality Request

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



Total Quality. Assured.

Test Report

Intertek Report No.: 180604021SZN-001

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

**10.0 Test Equipment List**

Equipment No.	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due Date
SZ061-12	BiConiLog Antenna	ETS	3142E	00166158	20-Sep-2017	20-Sep-2018
SZ185-01	EMI Receiver	R&S	ESCI	100547	24-Jan-2018	24-Jan-2019
SZ061-08	Horn Antenna	ETS	3115	00092346	20-Sep-2017	20-Sep-2018
SZ061-06	Active Loop Antenna	Electro-Metrics	EM-6876	217	11-May-2018	11-May-2019
SZ056-03	Spectrum Analyzer	R&S	FSP 30	101148	5-Jun-2018	5-Jun-2019
SZ181-04	Preamplifier	Agilent	8449B	3008A02474	24-Jan-2018	24-Jan-2019
SZ188-01	Anechoic Chamber	ETS	RFD-F/A-100	4102	16-Jan-2017	16-Jan-2019
SZ062-02	RF Cable	RADIALL	RG 213U	--	5-Jan-2018	5-Jul-2018
SZ062-05	RF Cable	RADIALL	0.04-26.5GHz	--	6-Mar-2018	6-Sep-2018
SZ062-12	RF Cable	RADIALL	0.04-26.5GHz	--	6-Mar-2018	6-Sep-2018
SZ067-04	Notch Filter	Micro-Tronics	BRM5070 2-02	--	5-Jun-2018	5-Jun-2019
SZ185-02	EMI Receiver	R & S	ESCI	100692	30-Oct-2017	30-Oct-2018
SZ187-01	LISN	R & S	ENV216	100072	30-Oct-2017	30-Oct-2018
SZ188-03	Shielding Room	ETS	RFD-100	4100	16-Jan-2017	16-Jan-2019