

**Zound Industries International AB**

Application  
For  
Certification

**FCC ID: 2AAGF-MONITOR****Bluetooth Headphone****Model: MONITOR BLUETOOTH****Brand name: Marshall****2.4GHz Transceiver****Report No.: 161025028SZN-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 [10-1-15]

Prepared and Checked by:

Approved by:

Sign on file

*Robert Li*  
Senior Project Engineer

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*Kidd Yang*  
Senior Project Engineer  
Date: January 03, 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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- The evaluation data of the report will be kept for 3 years from the date of issuance.

TRF No.: FCC 15C\_TX\_b

**Intertek Testing Services Shenzhen Ltd. Kejiyuan Branch**  
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# INTERTEK TESTING SERVICES

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# INTERTEK TESTING SERVICES

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## MEASUREMENT/TECHNICAL REPORT

### Zound Industries International AB - MODEL: MONITOR BLUETOOTH

Brand name: Marshall

FCC ID: 2AAGF-MONITOR

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 [10-1-15 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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**INTERTEK TESTING SERVICES**

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**EXHIBIT 1**

**GENERAL DESCRIPTION**

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TRF No.: FCC 15C\_TX\_b  
FCC ID: 2AAGF-MONITOR  
Report No.: 161025028SZN-001

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## 1.0 General Description

### 1.1 Product Description

The equipment under test (EUT) is a Bluetooth Headphone. The EUT was powered by the fully-charged DC 3.7V, 680mAh new rechargeable battery which was charged by USB port (DC 5V). For more detail information pls. refer to the user manual.

Bluetooth Version: 4.0, 2.1+ 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 transceiver for the Bluetooth Headphone BT2.1+EDR, and for the BT 4.0 BLE mode was tested and demonstrated in report 161025028SZN-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 shield room used to collect the conducted data is **Intertek Testing Services Shenzhen Ltd. Kejiyuan Branch** and located at 6F, Block D, 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).

The Semi-anechoic chamber used to collect the radiated data is **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).

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### EXHIBIT 2

### SYSTEM TEST CONFIGURATION

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TRF No.: FCC 15C\_TX\_b  
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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 the fully-charged DC 3.7V new rechargeable battery which was charged by an AC/DC adaptor or PC with input of AC 120V, 60Hz during the test.

All packets DH1, DH3 & DH5 mode in modulation type GFSK,  $\pi/4$ DQPSK, 8DPSK were tested, 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 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 Zound Industries International AB 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

Description	Manufacturer	Model No.
USB Cable	Zound	Unshielded, Length 104cm
Head phone	Zound	MONITOR BLUETOOTH
Aux In cable	Zound	Unshielded, Length 125cm
AC/DC adaptor (Provided by Intertek)	TP-Link	T050100-2A3 (Input: AC 100-240V, 50/60Hz, 0.3A Output: DC 5.0V, 1.0A)
Desktop (Provided by Intertek)	HP	COMPAQ

**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.

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

Where

FS = Field Strength in dB $\mu$ V/m

RA = Receiver Amplitude (including preamplifier) in dB $\mu$ V

CF = Cable Attenuation Factor in dB

AF = Antenna Factor in dB

AG = Amplifier Gain in dB

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

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

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

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

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

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

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

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

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

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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  
355.92 MHz

Judgement: Passed by 17.7 dB

### **TEST PERSONNEL:**

*Sign on file*

Robert Li Senior Project Engineer  
Typed/Printed Name

December 26, 2016

*Date*

# INTERTEK TESTING SERVICES

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Applicant: Zound Industries International AB

Date of Test: December 26, 2016

Model: MONITOR BLUETOOTH

Worst Case Operating Mode: BT Link and Charging via 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	257.460	32.4	20.0	12.3	24.7	46.0	-21.3
Horizontal	355.920	24.4	20.0	23.9	28.3	46.0	-17.7
Horizontal	466.500	19.1	20.0	28.1	27.2	46.0	-18.8
Vertical	31.940	34.2	20.0	7.5	21.7	40.0	-18.3
Vertical	47.945	30.6	20.0	9.6	20.2	40.0	-19.8
Vertical	257.756	15.1	20.0	28.1	23.2	46.0	-22.8

NOTES: 1. Quasi-Peak detector is used except for others stated.

2. All measurements were made at 3 meters. Harmonic emissions not detected at the 3-meter distances were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3-meter.

3. Negative value in the margin column shows emission below limit.

4. All emissions are below the QP limit.

## INTERTEK TESTING SERVICES

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### 3.1.4 Transmitter Spurious Emissions (Radiated)

Worst Case Radiated Emission  
at  
9920.000 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 11.1 dB

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

*Sign on file*

Robert Li Senior Project Engineer  
*Typed/Printed Name*

November 20, 2016  
*Date*

# INTERTEK TESTING SERVICES

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Applicant: Zound Industries International AB

Date of Test: November 20, 2016

Model: MONITOR BLUETOOTH

Worst Case Operating Mode: Transmitting and Charging via 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)
Vertical	2402.000	107.2	36.7	28.1	98.6	114.0	-15.4
Vertical	4804.000	58.2	36.7	35.5	57.0	74.0	-17.0
Vertical	7206.000	59.6	36.1	36.5	60.0	74.0	-14.0
Vertical	9608.000	61.1	36.2	37.0	61.9	74.0	-12.1

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	2402.000	107.2	36.7	28.1	22.5	76.1	94.0	-17.9
Vertical	4804.000	58.2	36.7	35.5	22.5	34.5	54.0	-19.5
Vertical	7206.000	59.6	36.1	36.5	22.5	37.5	54.0	-16.5
Vertical	9608.000	61.1	36.2	37.0	22.5	39.4	54.0	-14.6

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: Robert Li

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TRF No.: FCC 15C\_TX\_b

FCC ID: 2AAGF-MONITOR

Report No.: 161025028SZN-001

## INTERTEK TESTING SERVICES

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Applicant: Zound Industries International AB

Date of Test: November 20, 2017

Model: MONITOR BLUETOOTH

Worst Case Operating Mode: Transmitting and Charging via 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)
Vertical	2441.000	109.0	36.7	28.1	100.4	114.0	-13.6
Vertical	4882.000	57.3	36.7	35.5	56.1	74.0	-17.9
Vertical	7323.000	59.2	36.1	37.2	60.3	74.0	-13.7
Vertical	9764.000	61.9	36.2	37.0	62.7	74.0	-11.3

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	109.0	36.7	28.1	22.5	77.9	94.0	-16.1
Vertical	4882.000	57.3	36.7	35.5	22.5	33.6	54.0	-20.4
Vertical	7323.000	59.2	36.1	37.2	22.5	37.8	54.0	-16.2
Vertical	9764.000	61.9	36.2	37.0	22.5	40.2	54.0	-13.8

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: Robert Li

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TRF No.: FCC 15C\_TX\_b

FCC ID: 2AAGF-MONITOR

Report No.: 161025028SZN-001

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## INTERTEK TESTING SERVICES

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Applicant: Zound Industries International AB

Date of Test: November 20, 2017

Model: MONITOR BLUETOOTH

Worst Case Operating Mode: Transmitting and Charging via 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)
Vertical	2480.000	108.7	36.7	28.1	100.1	114.0	-13.9
Vertical	4960.000	56.6	36.7	35.5	55.4	74.0	-18.6
Vertical	7440.000	60.6	36.1	37.2	61.7	74.0	-12.3
Vertical	9920.000	60.3	36.3	38.9	62.9	74.0	-11.1

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	108.7	36.7	28.1	22.5	77.6	94.0	-16.4
Vertical	4960.000	56.6	36.7	35.5	22.5	32.9	54.0	-21.1
Vertical	7440.000	60.6	36.1	37.2	22.5	39.2	54.0	-14.8
Vertical	9920.000	60.3	36.3	38.9	22.5	40.4	54.0	-13.6

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: Robert Li

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TRF No.: FCC 15C\_TX\_b

FCC ID: 2AAGF-MONITOR

Report No.: 161025028SZN-001

## 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

0.838 MHz

Judgement: Passed by 26.4 dB margin

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

*Sign on file*

Robert Li Senior Project Engineer  
*Typed/Printed Name*

November 05, 2016  
*Date*

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Applicant: Zound Industries International AB

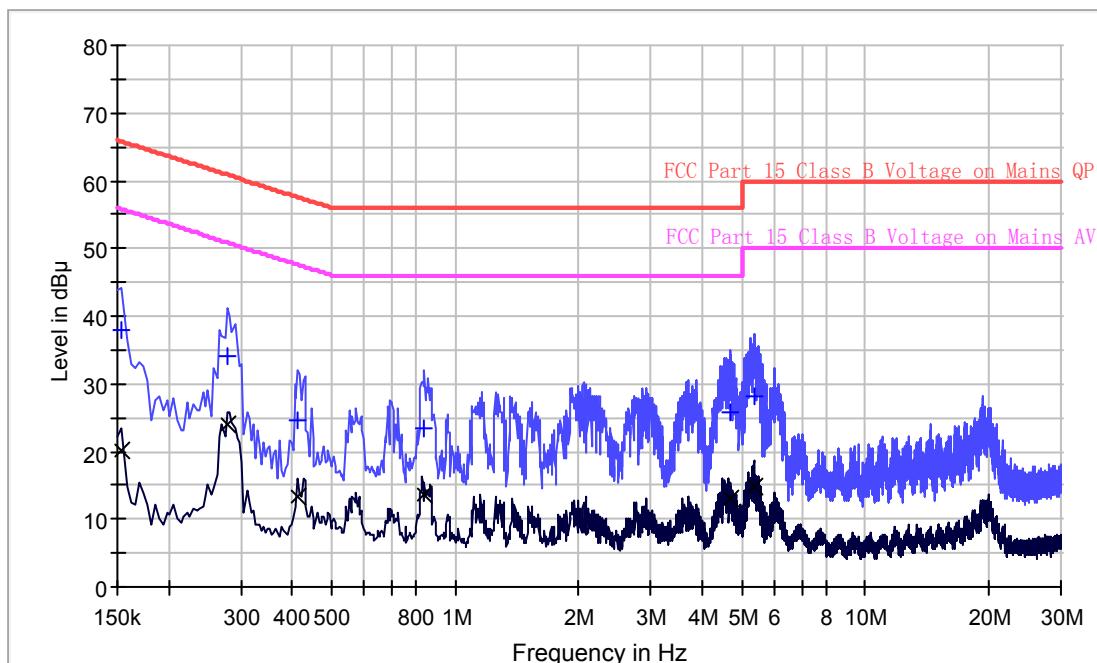
Date of Test: November 05, 2016

Model: MONITOR BLUETOOTH

Worst Case Operating Mode: BT Link and Charging via Adapter

Phase: Live

## Conducted Emission Test - FCC



### Limit and Margin QP

Frequency (MHz)	QuasiPeak (dB $\mu$ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V)
0.154000	37.8	L1	9.6	28.0	65.8
0.278000	34.2	L1	9.7	26.7	60.9
0.414000	24.7	L1	9.7	32.9	57.6
0.842000	23.3	L1	9.7	32.7	56.0
4.678000	25.8	L1	9.8	30.2	56.0
5.362000	28.1	L1	9.8	31.9	60.0

### Limit and Margin AV

Frequency (MHz)	Average (dB $\mu$ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V)
0.154000	20.0	L1	9.6	35.8	55.8
0.278000	23.9	L1	9.7	27.0	50.9
0.414000	13.2	L1	9.7	34.4	47.6
0.842000	13.6	L1	9.7	32.4	46.0
4.678000	13.2	L1	9.8	32.8	46.0
5.362000	14.9	L1	9.8	35.1	50.0

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Applicant: Zound Industries International AB

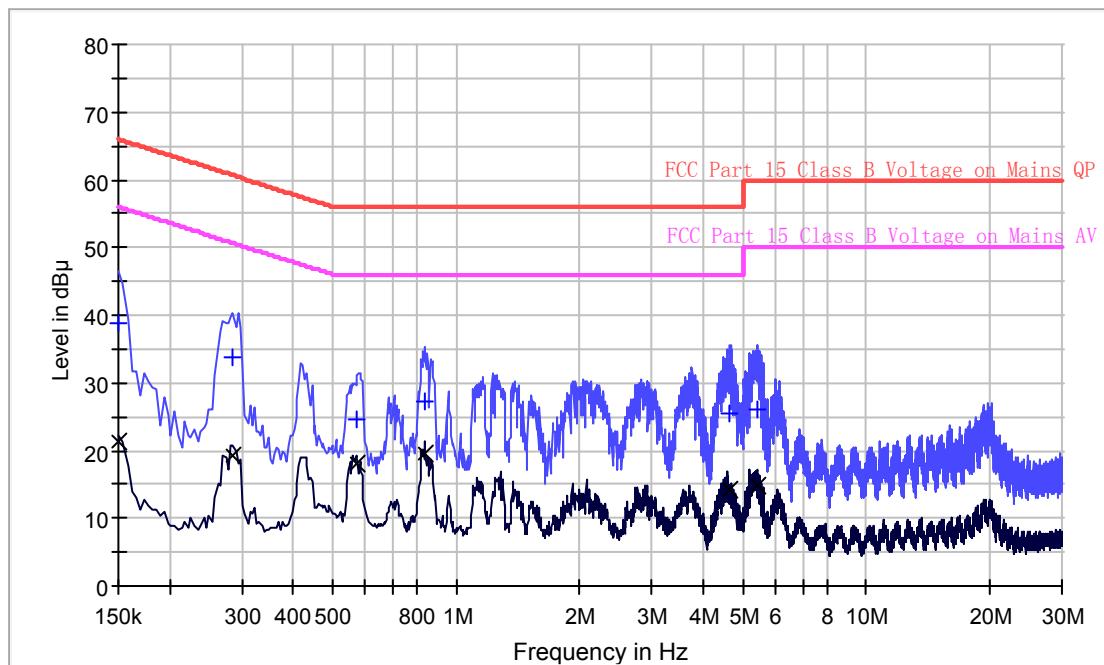
Date of Test: November 05, 2016

Model: MONITOR BLUETOOTH

Worst Case Operating Mode: BT Link and Charging via Adapter

Phase: Neutral

## Conducted Emission Test - FCC



### Limit and Margin QP

Frequency (MHz)	QuasiPeak (dB μ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.150000	38.9	N	9.6	27.1	66.0
0.286000	33.8	N	9.7	26.8	60.6
0.574000	24.6	N	9.7	31.4	56.0
0.838000	27.4	N	9.7	28.6	56.0
4.662000	25.5	N	9.8	30.5	56.0
5.418000	26.1	N	9.8	33.9	60.0

### Limit and Margin AV

Frequency (MHz)	CAverage (dB μ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.150000	21.2	N	9.6	34.8	56.0
0.286000	19.4	N	9.7	31.2	50.6
0.574000	18.0	N	9.7	28.0	46.0
0.838000	19.6	N	9.7	26.4	46.0
4.662000	14.1	N	9.8	31.9	46.0
5.418000	14.9	N	9.8	35.1	50.0

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Report No.: 161025028SZN-001

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**EXHIBIT 4**

**EQUIPMENT PHOTOGRAPHS**

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TRF No.: FCC 15C\_TX\_b  
FCC ID: 2AAGF-MONITOR  
Report No.: 161025028SZN-001

## 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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**EXHIBIT 5**

**PRODUCT LABELLING**

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TRF No.: FCC 15C\_TX\_b  
FCC ID: 2AAGF-MONITOR  
Report No.: 161025028SZN-001

## 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**

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TRF No.: FCC 15C\_TX\_b  
FCC ID: 2AAGF-MONITOR  
Report No.: 161025028SZN-001

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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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**EXHIBIT 7**

**INSTRUCTION MANUAL**

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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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**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:**

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

$$\begin{aligned} &= 98.6 \text{ dB}\mu\text{V/m} - 46.6 \text{ dB} \\ &= 52.0 \text{ dB}\mu\text{V/m} \end{aligned}$$

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

$$\begin{aligned} &= 76.1 \text{ dB}\mu\text{V/m} - 46.6 \text{ dB} \\ &= 29.5 \text{ dB}\mu\text{V/m} \end{aligned}$$

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

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

$$\begin{aligned} &= 100.1 \text{ dB}\mu\text{V/m} - 50.4 \text{ dB} \\ &= 49.7 \text{ dB}\mu\text{V/m} \end{aligned}$$

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

$$\begin{aligned} &= 77.6 \text{ dB}\mu\text{V/m} - 50.4 \text{ dB} \\ &= 27.2 \text{ dB}\mu\text{V/m} \end{aligned}$$

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.

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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, 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 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 C63.10 - 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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### **EXHIBIT10**

### **TEST EQUIPMENT LIST**

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### 10.0 Test Equipment List

For Conducted Emission Test

Equipment No.	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due Date
SZ062-12	RF Cable	RADIALL	0.04-26.5GHz	--	30-Jun-2016	30-Dec-2016
SZ185-02	EMI Test Receiver	R&S	ESCI	100692	01-Nov-2016	01-Nov-2017
SZ187-01	Two-Line V-Network	R&S	ENV216	100072	01-Nov-2016	01-Nov-2017
SZ188-03	Shielding Room	ETS	RFD-100	4100	17-Aug-2016	17-Aug-2018

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For Radiated Emission test

Equipment No.	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due Date
EE089	EMI Test Receiver	Rohde & Schwarz	ESU	1302.600 5.26	17-May-2016	17-May-2017
EE040	Pre-Amplifier	HP	8447F	2944A07 999	17-May-2016	17-May-2017
EE043	Bilog Antenna	Schwarzbeck	VULB916 3	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	BBHA917 0399	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	LNA26G4 0-40	J1013131 028001	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

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