



**E-CORE TECHNOLOGY (CHINA) CO., LTD.**

Application  
For  
Certification

**FCC ID: OJR-HT1051**

**Magic SoundBox Bluetooth speaker**

**Model: HT1051**  
**Additional Model: HT1051C**

**2.4GHz Transceiver**

**Report No.: 121218002SZN-001**

We hereby certify that the sample of the above item is considered to comply with the requirements of FCC Part 15, Subpart C for Intentional Radiator, mention 47 CFR [10-1-12]

Prepared and Checked by:

Approved by:

Sign on file

Jimmy Wen  
Testing Engineer

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Billy Li  
Supervisor  
Date: 18 February 2013

- The test results reported in this test report shall refer only to the sample actually tested and shall not refer or be deemed to refer to bulk from which such a sample may be said to have been obtained.
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- 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\_b

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

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## INTERTEK TESTING SERVICES

### MEASUREMENT/TECHNICAL REPORT

E-CORE TECHNOLOGY (CHINA) CO., LTD.

Model: HT1051

Additional Model: HT1051C

FCC ID: OJR-HT1051

This report concerns (check one)      Original Grant X      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 X

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 X

If no, assumed Part 15, Subpart C for intentional radiator – the new 47 CFR [10-1-12 Edition] provision.

Report prepared by:

Billy Li  
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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           |
| Cover Letter          | Certification Agreement    | agreement.pdf        |

# **INTERTEK TESTING SERVICES**

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## **EXHIBIT 1**

### **GENERAL DESCRIPTION**

## INTERTEK TESTING SERVICES

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### 1.0 General Description

#### 1.1 Product Description

The equipment under test (EUT) is a Magic SoundBox Bluetooth speaker with Bluetooth function. The EUT is powered by DC 3.7V, 1000mAh internal rechargeable Li-ion battery and can be charged by USB source. For more detail information pls. refer to the user manual.

The Model: HT1501C is the same as the Model: HT1501 in hardware aspect. The difference in model number serves as marketing strategy.

Antenna Type: Integral antenna

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

For electronic filing, the brief circuit description is saved with filename: descri.pdf.

#### 1.2 Related Submittal(s) Grants

This is an application for certification of a transceiver for the Bluetooth speaker which has Bluetooth function, and there is no corresponding unit for certification.

#### 1.3 Test Methodology

Both AC mains line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.4 (2009). Radiated emission measurement was performed in Semi-anechoic chamber and conducted emission measurement was performed in 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.

## INTERTEK TESTING SERVICES

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### 1.4 Test Facility

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



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

## INTERTEK TESTING SERVICES

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### 2.0 **System Test Configuration**

#### 2.1 Justification

The system was configured for testing in a typical fashion (as a customer would normally use it), and in the confines as outlined in ANSI C63.4 (2009).

The EUT was powered by a 3.7 V fully charged Li-ion battery charged by PC USB port and AC adapter with input of AC 120V/60Hz during the test, and only the worst case mode 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, the EUT was rotated through 360°, the antenna height was varied from 1 meter to 4 meters above the ground plane, and the antenna polarization was changed. This step by step procedure for maximizing emissions led to the data reported in Exhibit 3.

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

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

#### 2.2 EUT Exercising Software

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

#### 2.3 Special Accessories

USB cable (shielded, with two ferrite core, with Length of 1m)

#### 2.4 Equipment Modification

Any modifications installed previous to testing by E-CORE TECHNOLOGY (CHINA) 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 Kejiyuan Branch.

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## INTERTEK TESTING SERVICES

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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.                                     |
|-----------------------|--------------|-----------------------------------------------|
| Audio Line            | E-CORE       | Unshielded, Length 175cm                      |
| Audio Simulating load | N/A          | 10kΩ                                          |
| Mobile phone          | Iphone       | A1303                                         |
| Laptop                | Lenovo       | T420                                          |
| Hard disk             | Smart drive  | HD-003                                        |
| 1394 Cable            | Smart.drive  | Unshielded, Length 180cm                      |
| USB Cable             | Smart.drive  | Unshielded, Length 155cm                      |
| USB cable             | E-CORE       | Shielded, with two ferrite core, Length 100cm |

**EXHIBIT 3**  
**EMISSION RESULTS**

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### 3.0 **Emission Results**

Data is included worst-case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs and data tables of the emissions are included.

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## INTERTEK TESTING SERVICES

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### 3.1 Radiated Test Results

A sample calculation, configuration photographs and data tables of the emissions are included.

#### 3.1.1 Field Strength Calculation

The field strength is calculated by adding the reading on the Spectrum Analyzer to the factors associated with preamplifiers (if any), antennas, cables, pulse desensitization and average factors (when specified limit is in average and measurements are made with peak detectors). A sample calculation is included below.

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

Where

- FS = Field Strength in dB $\mu$ V/m
- RA = Receiver Amplitude (including preamplifier) in dB $\mu$ V
- CF = Cable Attenuation Factor in dB
- AF = Antenna Factor in dB
- AG = Amplifier Gain in dB
- PD = Pulse Desensitization in dB
- AV = Average Factor in -dB

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

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

Assume a receiver reading of 62.0 dB $\mu$ V is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted. The pulse desensitization factor of the spectrum analyzer was 0 dB, and the resultant average factor was -10 dB. The net field strength for comparison to the appropriate emission limit is 32 dB $\mu$ V/m. This value in dB $\mu$ V/m was converted to its corresponding level in  $\mu$ V/m.

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

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

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

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

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

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

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

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

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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  
457.070 MHz

Judgement: Passed by 3.2 dB

#### **TEST PERSONNEL:**

*Sign on file*

Jimmy Wen, Testing Engineer  
*Typed/Printed Name*

18 February 2013  
*Date*

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## INTERTEK TESTING SERVICES

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Applicant: E-CORE TECHNOLOGY (CHINA) CO., LTD. Date of Test: 18 February 2013

Model: HT1051

Sample: 1/1

Worst Case Operating Mode: Transmit with charging by PC

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   | 54.250          | 33.4                 | 20.0              | 14.6                | 28.0                     | 40.0                       | -12.0       |
| Horizontal   | 457.070         | 53.7                 | 20.0              | 9.1                 | 42.8                     | 46.0                       | -3.2        |
| Horizontal   | 533.430         | 45.0                 | 20.0              | 7.6                 | 32.6                     | 46.0                       | -13.4       |
| Vertical     | 55.221          | 32.6                 | 20.0              | 14.6                | 27.2                     | 40.0                       | -12.8       |
| Vertical     | 59.650          | 32.5                 | 20.0              | 14.9                | 27.4                     | 40.0                       | -12.6       |
| Vertical     | 76.781          | 20.1                 | 20.0              | 19.5                | 19.6                     | 40.0                       | -20.4       |

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  
4960.000 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 21.3 dB

#### **TEST PERSONNEL:**

*Sign on file*

Jimmy Wen, Testing Engineer  
*Typed/Printed Name*

18 February 2013  
*Date*

## INTERTEK TESTING SERVICES

Applicant: E-CORE TECHNOLOGY (CHINA) CO., LTD. Date of Test: 18 February 2013  
Model: HT1051  
Sample: 1/1  
Worst Case Operating Mode: Transmit with charging by PC

Table 2

### Radiated Emissions

(2402MHz)

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m (dBμV/m) | Peak Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|--------------------|---------------------------|-------------|
| Horizontal   | 2402.000        | 93.9           | 36.7              | 28.5                | 85.7               | 114.0                     | -28.3       |
| Horizontal   | 4804.000        | 60.5           | 36.7              | 28.5                | 52.3               | 74.0                      | -21.7       |
| Horizontal   | 7206.000        | 43.2           | 36.1              | 33.1                | 40.2               | 74.0                      | -33.8       |

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Average Factor (-dB) | Net at 3m (dBμV/m) | Average Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|----------------------|--------------------|------------------------------|-------------|
| Horizontal   | 2402.000        | 93.9           | 36.7              | 28.5                | 30.1                 | 55.6               | 94.0                         | -38.4       |
| Horizontal   | 4804.000        | 60.5           | 36.7              | 28.5                | 30.1                 | 22.2               | 54.0                         | -31.8       |
| Horizontal   | 7206.000        | 43.2           | 36.1              | 33.1                | 30.1                 | 10.1               | 54.0                         | -43.9       |

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: Jimmy Wen

TRF No.: FCC 15C\_TX\_b  
FCC ID: OJR-HT1051  
Report No.: 121218002SZN-001

## INTERTEK TESTING SERVICES

Applicant: E-CORE TECHNOLOGY (CHINA) CO., LTD.  
Model: HT1501  
Sample: 1/1  
Worst Case Operating Mode: Transmit with charging by PC

Date of Test: 18 February 2013

Table 3

### Radiated Emissions

(2441MHz)

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m (dBμV/m) | Peak Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|--------------------|---------------------------|-------------|
| Horizontal   | 2441.000        | 91.8           | 36.7              | 28.5                | 83.6               | 114.0                     | -30.4       |
| Horizontal   | 4882.000        | 60.5           | 36.7              | 28.5                | 52.3               | 74.0                      | -21.7       |
| Horizontal   | 7323.000        | 43.3           | 36.1              | 33.1                | 40.3               | 74.0                      | -33.7       |

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Average Factor (-dB) | Net at 3m (dBμV/m) | Average Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|----------------------|--------------------|------------------------------|-------------|
| Horizontal   | 2441.000        | 91.8           | 36.7              | 28.5                | 30.1                 | 53.5               | 94.0                         | -40.5       |
| Horizontal   | 4882.000        | 60.5           | 36.7              | 28.5                | 30.1                 | 22.2               | 54.0                         | -31.8       |
| Horizontal   | 7323.000        | 43.3           | 36.1              | 33.1                | 30.1                 | 10.2               | 54.0                         | -43.8       |

- 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: Jimmy Wen

TRF No.: FCC 15C\_TX\_b  
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Report No.: 121218002SZN-001

## INTERTEK TESTING SERVICES

Applicant: E-CORE TECHNOLOGY (CHINA) CO., LTD. Date of Test: 18 February 2013  
Model: HT1051  
Sample: 1/1  
Worst Case Operating Mode: Transmit with charging by PC

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) | Limit at 3m (dB $\mu$ V/m) | Margin (dB) |
|--------------|-----------------|----------------------|-------------------|---------------------|--------------------------|----------------------------|-------------|
| Horizontal   | 2480.000        | 92.4                 | 36.7              | 28.6                | 84.3                     | 114.0                      | -29.7       |
| Horizontal   | 4960.000        | 60.8                 | 36.7              | 28.6                | 52.7                     | 74.0                       | -21.3       |
| Horizontal   | 7440.000        | 43.4                 | 36.1              | 33.4                | 40.7                     | 74.0                       | -33.3       |

| 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) |
|--------------|-----------------|----------------------|-------------------|---------------------|----------------------|--------------------------|------------------------------------|-------------|
| Horizontal   | 2480.000        | 92.4                 | 36.7              | 28.6                | 30.1                 | 54.2                     | 94.0                               | -39.8       |
| Horizontal   | 4960.000        | 60.8                 | 36.7              | 28.6                | 30.1                 | 22.6                     | 54.0                               | -31.4       |
| Horizontal   | 7440.000        | 43.4                 | 36.1              | 33.4                | 30.1                 | 10.6                     | 54.0                               | -43.4       |

Notes: 1. Peak Detector Data unless otherwise stated.

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

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

4. Horn antenna is used for the emission over 1000MHz.

Test Engineer: Jimmy Wen

## INTERTEK TESTING SERVICES

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### 3.2 Conducted Emission at Mains Terminal

#### 3.2.1 Conducted Emissions Configuration Photograph

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

#### 3.2.2 Conducted Emissions

Worst Case Neutral-Conducted Configuration  
At

0.846 MHz

Judgement: Passed by 10.1 dB margin

#### **TEST PERSONNEL:**

*Sign on file*

Jimmy Wen, Testing Engineer  
*Typed/Printed Name*

18 February 2013  
*Date*

## INTERTEK TESTING SERVICES

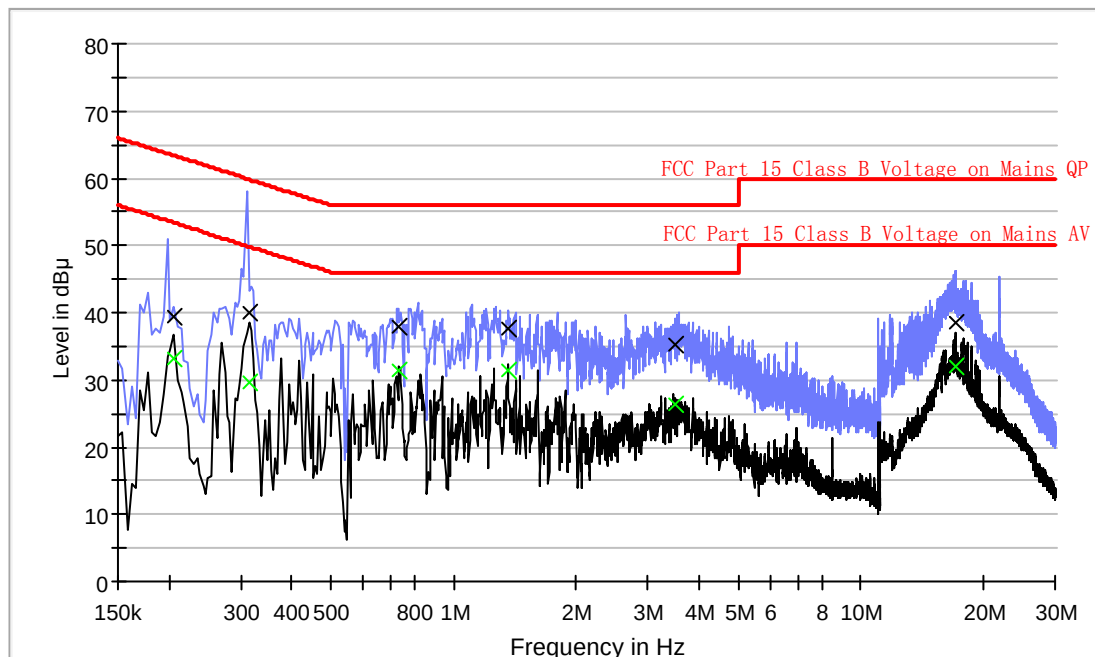
Applicant: E-CORE TECHNOLOGY (CHINA) CO., LTD. Date of Test: 18 February 2013

Model: HT1051

Sample: 1/1

Worst Case Operating Mode: Transmit with charging

### Conducted Emission Test - FCC



### Result Table QP

| Frequency (MHz) | QuasiPeak (dB μ V) | Line | Corr. (dB) | Margin (dB) | Limit (dB μ V) |
|-----------------|--------------------|------|------------|-------------|----------------|
| 0.206           | 39.4               | L    | 9.6        | 24.0        | 63.4           |
| 0.314           | 40.0               | L    | 9.6        | 19.9        | 59.9           |
| 0.734           | 37.8               | L    | 9.6        | 18.2        | 56.0           |
| 1.358           | 37.7               | L    | 9.7        | 18.3        | 56.0           |
| 3.502           | 35.5               | L    | 9.7        | 20.5        | 56.0           |
| 17.162          | 38.8               | L    | 10.4       | 21.2        | 60.0           |

### Result Table AV

| Frequency (MHz) | Average (dB μ V) | Line | Corr. (dB) | Margin (dB) | Limit (dB μ V) |
|-----------------|------------------|------|------------|-------------|----------------|
| 0.206           | 33.1             | L    | 9.6        | 20.3        | 53.4           |
| 0.314           | 29.7             | L    | 9.6        | 20.2        | 49.9           |
| 0.734           | 31.7             | L    | 9.6        | 14.3        | 46.0           |
| 1.358           | 31.6             | L    | 9.7        | 14.4        | 46.0           |
| 3.502           | 25.9             | L    | 9.7        | 21.1        | 46.0           |
| 17.162          | 32.3             | L    | 10.4       | 17.7        | 50.0           |

TRF No.: FCC 15C\_TX\_b

FCC ID: OJR-HT1051

Report No.: 121218002SZN-001

## INTERTEK TESTING SERVICES

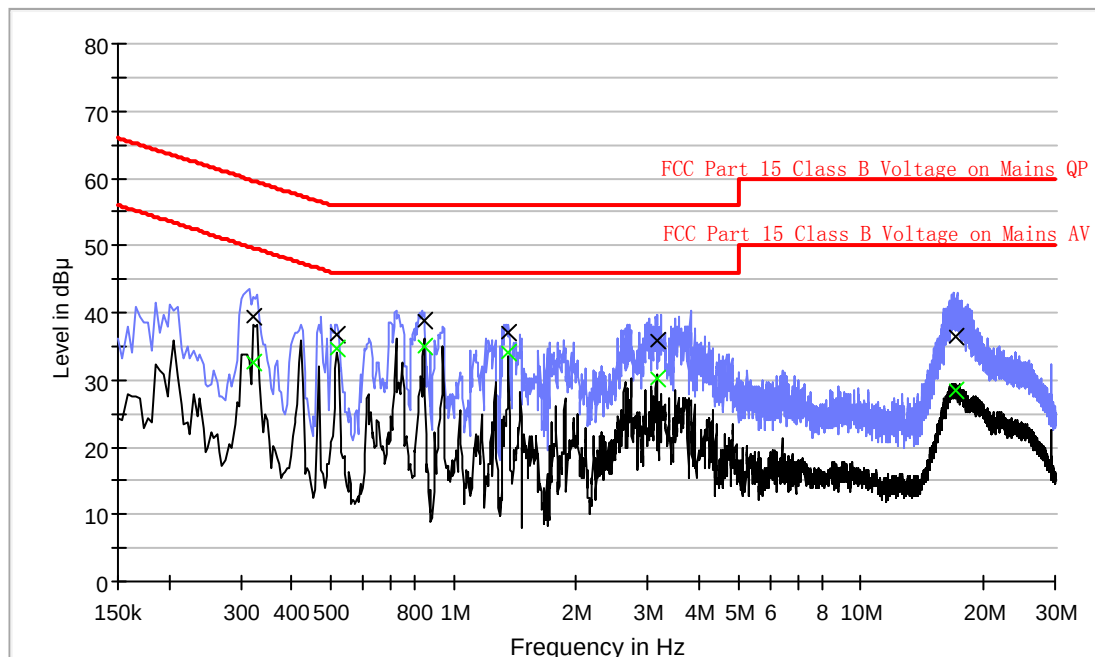
Applicant: E-CORE TECHNOLOGY (CHINA) CO., LTD. Date of Test: 18 February 2013

Model: HT1051

Sample: 1/1

Worst Case Operating Mode: Transmit with charging

### Conducted Emission Test - FCC



#### Result Table QP

| Frequency (MHz) | QuasiPeak (dB μ V) | Line | Corr. (dB) | Margin (dB) | Limit (dB μ V) |
|-----------------|--------------------|------|------------|-------------|----------------|
| 0.322           | 39.1               | N    | 9.6        | 20.6        | 59.7           |
| 0.518           | 36.5               | N    | 9.6        | 19.5        | 56.0           |
| 0.846           | 37.9               | N    | 9.8        | 18.1        | 56.0           |
| 1.362           | 37.1               | N    | 9.8        | 18.9        | 56.0           |
| 3.146           | 35.7               | N    | 9.7        | 20.3        | 56.0           |
| 17.190          | 36.5               | N    | 10.4       | 23.5        | 60.0           |

#### Result Table AV

| Frequency (MHz) | Average (dB μ V) | Line | Corr. (dB) | Margin (dB) | Limit (dB μ V) |
|-----------------|------------------|------|------------|-------------|----------------|
| 0.322           | 32.6             | N    | 9.6        | 17.1        | 49.7           |
| 0.518           | 34.8             | N    | 9.6        | 11.2        | 46.0           |
| 0.846           | 35.9             | N    | 9.8        | 10.1        | 46.0           |
| 1.361           | 34.2             | N    | 9.8        | 11.8        | 46.0           |
| 3.146           | 30.3             | N    | 9.7        | 15.7        | 46.0           |
| 17.190          | 28.5             | N    | 10.4       | 21.5        | 50.0           |

TRF No.: FCC 15C\_TX\_b

FCC ID: OJR-HT1051

Report No.: 121218002SZN-001

## **INTERTEK TESTING SERVICES**

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### **EXHIBIT 4**

### **EQUIPMENT PHOTOGRAPHS**



## INTERTEK TESTING SERVICES

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### 4.0 Equipment Photographs

For electronic filing, the photographs of the tested EUT are saved with filename: external photos.pdf & internal photos.pdf.

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## **INTERTEK TESTING SERVICES**

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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.

## **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**



## INTERTEK TESTING SERVICES

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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

$$\begin{aligned} &= 85.7 \text{ dB}\mu\text{v/m} - 42.91 \text{ dB} \\ &= 42.79 \text{ dB}\mu\text{v/m} \end{aligned}$$

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

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

$$\begin{aligned} &= 84.3 \text{ dB}\mu\text{v/m} - 58.88 \text{ dB} \\ &= 25.42 \text{ dB}\mu\text{v/m} \end{aligned}$$

The resultant field strength meets the general radiated emission limit in section 15.209, which does not exceed 74dB $\mu$ v/m (Peak Limit) and 54dB $\mu$ v/m (Average Limit).

## INTERTEK TESTING SERVICES

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### 8.1 Bandedge Plot (cont'd)

Pursuant to FCC part 15 Section 15.215(c), the 20dB bandwidth of the emission was contained within the frequency band designated (mentioned as above) which the EUT operated. The effects, if any, from frequency sweeping, frequency hopping, other modulation techniques and frequency stability over excepted variations in temperature and supply voltage were considered.

Figure 8.1 Bandwidth

## INTERTEK TESTING SERVICES

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### 8.2 Discussion of Pulse Desensitization

Pulse desensitivity is not applicable for this device. The effective period ( $T_{\text{eff}}$ ) is approximately 625 $\mu$ 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 (BT version: 2.1+EDR), transmitter ON time is dependent of packet type (DH1, DH3 and DH5) and packet length (single-slot and multi-slot). The maximum transmitter ON time for the Bluetooth is 625μs.

Each TX and RX time slot is 625μs in length. A TDD scheme is used where master and slave alternately transmit. For one period for a pseudo-random hopping through all 79 RF channels, for DH5:

Time of 1 hopset (5 TX slots + 1 RX slot) =  $0.625 \text{ ms} \times 6 = 3.75 \text{ ms}$

Time of 1 cycle =  $3.75 \text{ ms} \times 79 = 296.25 \text{ ms}$

Average factor =  $20 \log (3.125 / 100) = -30.1 \text{ dB}$

## 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 C63.4 - 2009.

The transmitting equipment under test (EUT) is placed on a wooden turntable which is four feet in diameter and approximately one meter in height above the ground plane. During the radiated emissions test, the turntable is rotated and any cables leaving the EUT are manipulated to find the configuration resulting in maximum emissions. The EUT is adjusted through all three orthogonal axes to obtain maximum emission levels. The antenna height and polarization are varied during the testing to search for maximum signal levels.

Detector function for radiated emissions is in peak mode. Average readings, when required, are taken by measuring the duty cycle of the equipment under test and subtracting the corresponding amount in dB from the measured peak readings.

The frequency range scanned is from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or 40 GHz, whichever is lower.

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

## 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 C63.4 - 2009.

The IF bandwidth used for measurement of radiated signal strength was 10 kHz for emission below 30 MHz and 120 kHz for emission from 30 MHz to 1000 MHz. Where pulsed transmissions of short enough pulse duration warrant, a greater bandwidth is selected according to the recommendations of Hewlett Packard Application Note 150-2. Above 1000 MHz, a resolution bandwidth of 1 MHz is used.

Transmitter measurements are normally conducted at a measurement distance of three meters. However, to assure low enough noise floor in the restricted bands and above 1 GHz, signals are acquired at a distance of one meter or less. All measurements are extrapolated to three meters using inverse scaling, but those measurements taken at a closer distance are so marked.

## **INTERTEK TESTING SERVICES**

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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: Confidential request.pdf.

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## **INTERTEK TESTING SERVICES**

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### **EXHIBIT 10**

### **TEST EQUIPMENT LIST**

## INTERTEK TESTING SERVICES

### 10.0 Test Equipment List

| Equipment No. | Equipment              | Manufacturer    | Model No.    | Serial No. | Cal. Date | Due Date  |
|---------------|------------------------|-----------------|--------------|------------|-----------|-----------|
| SZ061-03      | BiConiLog Antenna      | ETS             | 3142C        | 00066460   | 30-Jun-12 | 30-Jun-13 |
| SZ185-01      | EMI Receiver           | R&S             | ESCI         | 100547     | 11-Mar-12 | 11-Mar-13 |
| SZ061-08      | Horn Antenna           | ETS             | 3115         | 00092346   | 11-Jul-12 | 11-Jul-13 |
| SZ061-06      | Active Loop Antenna    | Electro-Metrics | EM-6876      | 217        | 11-Mar-12 | 11-Mar-13 |
| SZ056-03      | Spectrum Analyzer      | R&S             | FSP 30       | 101148     | 11-Mar-12 | 11-Mar-13 |
| SZ181-04      | Preamplifier           | Agilent         | 8449B        | 3008A02474 | 11-Mar-12 | 11-Mar-13 |
| SZ188-01      | Anechoic Chamber       | ETS             | RFD-F/A-100  | 4102       | 03-Mar-12 | 03-Mar-13 |
| SZ062-02      | RF Cable               | RADIALL         | RG 213U      | --         | 17-Sep-12 | 17-Mar-13 |
| SZ062-06      | RF Cable               | RADIALL         | 0.04-26.5GHz | --         | 17-Sep-12 | 17-Mar-13 |
| SZ062-12      | RF Cable               | RADIALL         | 0.04-26.5GHz | --         | 17-Sep-12 | 17-Mar-13 |
| SZ067-04      | Notch Filter           | Micro-Tronics   | BRM5070 2-02 | --         | 15-Jul-12 | 15-Jul-13 |
| SZ185-02      | EMI Test Receiver      | R&S             | ESCI         | 100692     | 05-Nov-12 | 05-Nov-13 |
| SZ187-01      | Two-Line V-Network     | R&S             | ENV216       | 100072     | 05-Nov-12 | 05-Nov-13 |
| SZ187-02      | Two-Line V-Network     | R&S             | ENV216       | 100073     | 05-Nov-12 | 05-Nov-13 |
| SZ188-03      | Shielding Room         | ETS             | RFD-100      | 4100       | 16-Sep-10 | 16-Sep-13 |
| SZ061-07      | Pyramidal Horn Antenna | ETS             | 3160-09      | 00083067   | 8-Sep-12  | 8-Mar-13  |