

# RF EXPOSURE REPORT



Report No.: 18070631-FCC-H

|                                                                                                                                      |                                                                                                                                                                    |                                                                                       |
|--------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Applicant                                                                                                                            | Monoprice, Inc.                                                                                                                                                    |                                                                                       |
| Product Name                                                                                                                         | Bluetooth Speaker System                                                                                                                                           |                                                                                       |
| Model No.                                                                                                                            | 33394                                                                                                                                                              |                                                                                       |
| Serial No.                                                                                                                           | 33393, Soundstage3<br>(Note: All models have same circuits diagram, PCB Layout, construction and rated power, only different was model name and appearance color.) |                                                                                       |
| Test Standard                                                                                                                        | FCC 2.1091                                                                                                                                                         |                                                                                       |
| Test Date                                                                                                                            | June 23 to July 01, 2018                                                                                                                                           |                                                                                       |
| Issue Date                                                                                                                           | July 02, 2018                                                                                                                                                      |                                                                                       |
| Test Result                                                                                                                          | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail                                                                                             |                                                                                       |
| Equipment complied with the specification <input checked="" type="checkbox"/>                                                        |                                                                                                                                                                    |                                                                                       |
| Equipment did not comply with the specification <input type="checkbox"/>                                                             |                                                                                                                                                                    |                                                                                       |
|                                                   |                                                                                 |  |
| Aaron Liang<br>Test Engineer                                                                                                         | David Huang<br>Checked By                                                                                                                                          |                                                                                       |
| This test report may be reproduced in full only<br>Test result presented in this test report is applicable to the tested sample only |                                                                                                                                                                    |                                                                                       |

Issued by:

**SIEMIC (SHENZHEN-CHINA) LABORATORIES**

Zone A, Floor 1, Building 2 Wan Ye Long Technology Park

South Side of Zhoushi Road, Bao' an District, Shenzhen, Guangdong China 518108

Phone: +86 0755 2601 4629801 Email: [China@siemic.com.cn](mailto:China@siemic.com.cn)

## Laboratories Introduction

SIEMIC, headquartered in the heart of Silicon Valley, with superior facilities in US and Asia, is one of the leading independent testing and certification facilities providing customers with one-stop shop services for Compliance Testing and Global Certifications.



In addition to testing and certification, SIEMIC provides initial design reviews and compliance management throughout a project. Our extensive experience with China, Asia Pacific, North America, European, and International compliance requirements, assures the fastest, most cost effective way to attain regulatory compliance for the global markets.

### Accreditations for Conformity Assessment

| Country/Region | Scope                              |
|----------------|------------------------------------|
| USA            | EMC, RF/Wireless, SAR, Telecom     |
| Canada         | EMC, RF/Wireless, SAR, Telecom     |
| Taiwan         | EMC, RF, Telecom, SAR, Safety      |
| Hong Kong      | RF/Wireless, SAR, Telecom          |
| Australia      | EMC, RF, Telecom, SAR, Safety      |
| Korea          | EMI, EMS, RF, SAR, Telecom, Safety |
| Japan          | EMI, RF/Wireless, SAR, Telecom     |
| Singapore      | EMC, RF, SAR, Telecom              |
| Europe         | EMC, RF, SAR, Telecom, Safety      |

|             |                |
|-------------|----------------|
| Test Report | 18070631-FCC-H |
| Page        | 3 of 10        |

This page has been left blank intentionally.

## CONTENTS

|                                                           |   |
|-----------------------------------------------------------|---|
| 1. REPORT REVISION HISTORY.....                           | 5 |
| 2. CUSTOMER INFORMATION .....                             | 5 |
| 3. TEST SITE INFORMATION .....                            | 5 |
| 4. EQUIPMENT UNDER TEST (EUT) INFORMATION .....           | 6 |
| 5. FCC §2.1091 - MAXIMUM PERMISSIBLE EXPOSURE (MPE) ..... | 7 |
| 6.1 APPLICABLE STANDARD.....                              | 7 |
| 6.2 TEST RESULT .....                                     | 8 |

## 1. Report Revision History

| Report No.     | Report Version | Description | Issue Date    |
|----------------|----------------|-------------|---------------|
| 18070631-FCC-H | NONE           | Original    | July 02, 2018 |
|                |                |             |               |
|                |                |             |               |
|                |                |             |               |
|                |                |             |               |
|                |                |             |               |

## 2. Customer information

|                  |                                                         |
|------------------|---------------------------------------------------------|
| Applicant Name   | Monoprice, Inc.                                         |
| Applicant Add    | 11701 6th St., Rancho Cucamonga, CA 91730, United State |
| Manufacturer     | Monoprice, Inc.                                         |
| Manufacturer Add | 11701 6th St., Rancho Cucamonga, CA 91730, United State |

## 3. Test site information

|                      |                                                                                                                                              |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| Lab performing tests | SIEMIC (Shenzhen-China) LABORATORIES                                                                                                         |
| Lab Address          | Zone A, Floor 1, Building 2 Wan Ye Long Technology Park<br>South Side of Zhoushi Road, Bao' an District, Shenzhen, Guangdong China<br>518108 |
| FCC Test Site No.    | 535293                                                                                                                                       |
| IC Test Site No.     | 4842E-1                                                                                                                                      |
| Test Software        | Labview of SIEMIC version 2.0                                                                                                                |

#### 4. Equipment under Test (EUT) Information

|                               |                                                                                                                                                                    |
|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description of EUT:           | Bluetooth Speaker System                                                                                                                                           |
| Main Model:                   | 33394                                                                                                                                                              |
| Serial Model:                 | 33393, Soundstage3<br>(Note: All models have same circuits diagram, PCB Layout, construction and rated power, only different was model name and appearance color.) |
| Equipment Category :          | DSS                                                                                                                                                                |
| Antenna Gain:                 | Bluetooth/BLE: 0dBi                                                                                                                                                |
| Antenna Type:                 | PCB antenna                                                                                                                                                        |
| Input Power:                  | N/A                                                                                                                                                                |
| Trade Name :                  | Monoprice, IIIP                                                                                                                                                    |
| FCC ID:                       | 2ADDH-SOUNDSTAGE3                                                                                                                                                  |
| Type of Modulation:           | Bluetooth: GFSK, $\pi/4$ DQPSK, 8DPSK<br>BLE: GFSK                                                                                                                 |
| RF Operating Frequency (ies): | Bluetooth& BLE: 2402-2480 MHz                                                                                                                                      |
| Number of Channels:           | Bluetooth: 79CH<br>BLE: 40CH                                                                                                                                       |
| Port:                         | Please refer to the user' s manual                                                                                                                                 |
| Date EUT received:            | June 22, 2018                                                                                                                                                      |
| Test Date(s):                 | June 23 to July 01, 2018                                                                                                                                           |

## 5. FCC §2.1091 - Maximum Permissible exposure (MPE)

### 6.1 Applicable Standard

According to §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission' s guidelines.

According to §1.1310 and §2.1091 RF exposure is calculated.

Limits for General Population/Uncontrolled Exposure

| Limits for General Population/Uncontrolled Exposure |                               |                               |                                     |                          |
|-----------------------------------------------------|-------------------------------|-------------------------------|-------------------------------------|--------------------------|
| Frequency Range (MHz)                               | Electric Field Strength (V/m) | Magnetic Field Strength (A/m) | Power Density (mW/cm <sup>2</sup> ) | Averaging Time (minutes) |
| 0.3-1.34                                            | 614                           | 1.63                          | *(100)                              | 30                       |
| 1.34-30                                             | 824/f                         | 2.19/f                        | *(180/f <sup>2</sup> )              | 30                       |
| 30-300                                              | 27.5                          | 0.073                         | 0.2                                 | 30                       |
| 300-1500                                            | /                             | /                             | f/1500                              | 30                       |
| 1500-100,000                                        | /                             | /                             | 1.0                                 | 30                       |

f = frequency in MHz

\* = Plane-wave equivalent power density

## 6.2 Test Result

### Bluetooth:

| Type         | Test mode  | CH   | Freq (MHz) | Conducted Power (dBm) | Tune Up Power (dBm) |
|--------------|------------|------|------------|-----------------------|---------------------|
| Output power | GFSK       | Low  | 2402       | 2.898                 | 3±1                 |
|              |            | Mid  | 2441       | 3.379                 | 3±1                 |
|              |            | High | 2480       | 3.110                 | 3±1                 |
|              | π /4 DQPSK | Low  | 2402       | 2.105                 | 3±1                 |
|              |            | Mid  | 2441       | 3.169                 | 3±1                 |
|              |            | High | 2480       | 2.739                 | 3±1                 |
|              | 8DPSK      | Low  | 2402       | 2.308                 | 3±1                 |
|              |            | Mid  | 2441       | 3.459                 | 3±1                 |
|              |            | High | 2480       | 3.996                 | 3±1                 |

Predication of MPE limit at a given distance

$$S = \frac{PG}{4\pi R^2}$$

Where: S = power density (in appropriate units, e.g. mW/cm<sup>2</sup>)

P = power input to the antenna (in appropriate units, e.g., mW).

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain.

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

For the antenna manufacturer provide only used limited to ERP/EIRP or radiated spurious emission test. The MPE evaluation as below:

Maximum output power at antenna input terminal: 4(dBm)

Maximum output power at antenna input terminal: 2.512(mW)

Prediction distance: >20 (cm)

Predication frequency: 2480(MHz) High frequency

Antenna Gain (typical): 0(dBi)

The worst case is power density at predication frequency at 20 cm: 0.0005(mW/cm<sup>2</sup>)



MPE limit for general population exposure at prediction frequency: 1.0(mW/cm<sup>2</sup>)

0.0005(mW/cm<sup>2</sup>) < 1 (mW/cm<sup>2</sup>)

**BLE:**

| Type         | Test mode | CH   | Freq (MHz) | Conducted Power (dBm) | Tune Up Power (dBm) |
|--------------|-----------|------|------------|-----------------------|---------------------|
| Output power | GFSK      | Low  | 2402       | 0.96                  | 1±1                 |
|              |           | Mid  | 2440       | 1.99                  | 1±1                 |
|              |           | High | 2480       | 1.34                  | 1±1                 |

Predication of MPE limit at a given distance

$$S = \frac{PG}{4\pi R^2}$$

Where: S = power density (in appropriate units, e.g. mW/cm<sup>2</sup>)

P = power input to the antenna (in appropriate units, e.g., mW).

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain.

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

For the antenna manufacturer provide only used limited to ERP/EIRP or radiated spurious emission test. The MPE evaluation as below:

Maximum output power at antenna input terminal: 2(dBm)

Maximum output power at antenna input terminal: 1.585(mW)

Prediction distance: >20 (cm)

Predication frequency: 2440(MHz) Middle frequency

Antenna Gain (typical): 0(dBi)

The worst case is power density at predication frequency at 20 cm: 0.0003(mW/cm<sup>2</sup>)

MPE limit for general population exposure at prediction frequency: 1.0(mW/cm<sup>2</sup>)

0.0003(mW/cm<sup>2</sup>) < 1 (mW/cm<sup>2</sup>)

**Result: Pass**