**SGS-CSTC Standards Technical Services Co., Ltd.**
**Shenzhen Branch**

No. 1 Workshop, M-10, Middle section, Science & Technology Park,
Shenzhen, Guangdong, China 518057
Telephone: +86 (0) 755 2601 2053
Fax: +86 (0) 755 2671 0594
Email: ee.shenzhen@sgs.com



# RF Exposure Evaluation Report

| | |
|---|---|
| **Application No.**: | SZEM1706006756CR |
| **Applicant:** | Angee Inc. |
| **Address of Applicant:** | 1201 N ORANGE ST STE 7419, Wilmington, Delaware, United States, 19801 |
| **Manufacturer:** | SKY LIGHT Electronic (ShenZhen) Limited |
| **Address of Manufacturer:** | No. 24 Building, JinBi Industrial Area, HuangTian, BaoAn, Shenzhen, China. |
| **Factory:** | SKY LIGHT Electronic (ShenZhen) Limited |
| **Address of Factory:** | No. 24 Building, JinBi Industrial Area, HuangTian, BaoAn, Shenzhen, China. |

**Equipment Under Test (EUT):**

| | |
|---|---|
| **Product Name:** | ANGEE SECURITY |
| **Model No.:** | ANG-S13-B-00 |
| **Trade Mark:** | Angee |
| **FCC ID:** | 2ANIUANGEE-001 |
| **Standards:** | 47 CFR Part 1.1307<br>47 CFR Part 1.1310<br>KDB447498D01 General RF Exposure Guidance v06 |
| **Date of Receipt:** | 2017-08-18 |
| **Date of Test:** | 2017-08-23 to 2017-08-30 |
| **Date of Issue:** | 2017-09-30 |
| **Test Result :** | **PASS*** |

* In the configuration tested, the EUT complied with the standards specified above.

Jack Zhang
EMC Laboratory Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.
If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.

# 2 Version

| Revision Record | | | | |
|---|---|---|---|---|
| **Version** | **Chapter** | **Date** | **Modifier** | **Remark** |
| 01 | | 2017-09-30 | | Original |
| | | | | |
| | | | | |

| | | | | |
|---|---|---|---|---|
| **Authorized for issue by:** | | | | |
| | |  **Harry Wu /Project Engineer** | | |
| | |  **Eric Fu /Reviewer** | | |

# 3 Contents

# 4 General Information

## 4.1 General Description of EUT

| | |
|---|---|
| **Wifi:** | |
| Power supply: | DC5.2V, 2.5A<br>AC/DC adapter :<br>Model: ASSA65W-052250<br>Input: AC100-240V, 50/60Hz, 0.45A<br>Output: DC5.2V, 2.5A<br>Battery: DC3.7V, 5.2Ah |
| Cable: | USB cable (Unshielded, Length: 3m) |
| Type of Modulation: | IEEE for 802.11b: DSSS (CCK, DQPSK, DBPSK)<br>IEEE for 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK)<br>IEEE for 802.11n (HT20): OFDM (64QAM, 16QAM, QPSK, BPSK) |
| Operating Frequency: | IEEE 802.11b/g/n(HT20): 2422MHz to 2462MHz |
| Channel Number: | IEEE 802.11b/g, IEEE 802.11n(HT20): 11 Channels |
| Channels Step: | Channels with 5MHz step |
| Sample Type: | Mobile production |
| Antenna Type: | Integral |
| Antenna Gain: | 0dBi |
| **BLE:** | |
| Power supply: | DC5.2V, 2.5A<br>AC/DC adapter :<br>Model: ASSA65W-052250<br>Input: AC100-240V, 50/60Hz, 0.45A<br>Output: DC5.2V, 2.5A<br>Battery: DC3.7V, 5.2Ah |
| Cable: | USB cable (Unshielded, Length: 3m) |
| Frequency Range: | 2402MHz to 2480MHz |
| Bluetooth Version: | Bluetooth V4.0 BLE |
| Modulation Type: | GFSK |
| Number of Channels: | 40 |
| Antenna Type: | Integral |
| Antenna Gain: | 0 dBi |
| **433MHz:** | |
| Power supply: | DC5.2V, 2.5A<br>AC/DC adapter : |

| | |
|---|---|
| | Model: ASSA65W-052250<br>Input: AC100-240V, 50/60Hz, 0.45A<br>Output: DC5.2V, 2.5A<br>Battery: DC3.7V, 5.2Ah |
| Cable: | USB cable (Unshielded, Length: 3m) |
| Operating Frequency: | 433.92MHz |
| Channel Numbers: | 1 |
| Sample Type: | Mobile production |
| Modulation Type: | ASK |
| Antenna Type: | Integral |

## 4.2 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch

No. 1 Workshop, M-10, Middle section, Science & Technology Park, Shenzhen, Guangdong, China 518057

Telephone: +86 (0) 755 2601 2053 Fax: +86 (0) 755 2671 0594

No tests were sub-contracted.

## 4.3 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

• **CNAS (No. CNAS L2929)**

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

• **A2LA (Certificate No. 3816.01)**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

• **VCCI**

The 10m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-823, R-4188, T-1153 and C-2383 respectively.

• **FCC –Designation Number: CN1178**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

• **Industry Canada (IC)**

Two 3m Semi-anechoic chambers and the 10m Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-1, 4620C-2, 4620C-3.

## 4.4 Deviation from Standards

None.

## 4.5 Abnormalities from Standard Conditions

None.

## 4.6 Other Information Requested by the Customer

None.

# 5 RF Exposure Evaluation

## 5.1 RF Exposure Compliance Requirement

### 5.1.1 Limits

According to FCC Part1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in part1.1307(b)

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

| Frequency range (MHz) | Electric field strength (V/m) | Magnetic field strength (A/m) | Power density ($mW/cm^2$) | Averaging time (minutes) |
|---|---|---|---|---|
| **(A) Limits for Occupational/Controlled Exposures** | | | | |
| 0.3–3.0 | 614 | 1.63 | *(100) | 6 |
| 3.0–30 | 1842/f | 4.89/f | *($900/f^2$) | 6 |
| 30–300 | 61.4 | 0.163 | 1.0 | 6 |
| 300–1500 | | | f/300 | 6 |
| 1500–100,000 | | | 5 | 6 |
| **(B) Limits for General Population/Uncontrolled Exposure** | | | | |
| 0.3–1.34 | 614 | 1.63 | *(100) | 30 |
| 1.34–30 | 824/f | 2.19/f | *($180/f^2$) | 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

Friis Formula

Friis transmission formula: Pd = (Pout*G)/(4* Pi * R 2)

Where

Pd = power density in mW/cm2

Pout = output power to antenna in mW

G = gain of antenna in linear scale

Pi = 3.1416

R = distance between observation point and center of the radiator in cm

Pd id the limit of MPE, 1 mW/cm2 . If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

### 5.1.2 Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

### 5.1.3 EUT RF Exposure Evaluation

Antenna Gain: 0dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

**BLE:**

| Channel | Frequency (MHz) | Max Conducted Peak Output Power (dBm) | Output Power to Antenna (mW) | Power Density at R = 20 cm ($mW/cm^2$) | Limit ($mW/cm^2$) | Result |
|---|---|---|---|---|---|---|
| Lowest | 2402 | 8.45 | 7.00 | 0.002 | 1.0 | PASS |

Note: Refer to report No. SZEM170600675605 for EUT test Max Conducted Peak Output Power value.

The distance r (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.

**WIFI 2.4G:**

1.Test in CCK modulation (802.11b)

| Channel | Frequency (MHz) | Max Conducted Peak Output Power (dBm) | Output Power to Antenna (mW) | Power Density at R = 20 cm ($mW/cm^2$) | Limit ($mW/cm^2$) | Result |
|---|---|---|---|---|---|---|
| Middle | 2437 | 21.97 | 157.40 | 0.031 | 1.0 | PASS |

2. Test in OFDM modulation (802.11g)

| Channel | Frequency (MHz) | Max Conducted Peak Output Power (dBm) | Output Power to Antenna (mW) | Power Density at R = 20 cm ($mW/cm^2$) | Limit ($mW/cm^2$) | Result |
|---|---|---|---|---|---|---|
| Middle | 2437 | 21.34 | 136.14 | 0.027 | 1.0 | PASS |

3. Test in OFDM modulation (802.11 n (HT20))

| Channel | Frequency (MHz) | Max Conducted Peak Output Power (dBm) | Output Power to Antenna (mW) | Power Density at R = 20 cm ($mW/cm^2$) | Limit ($mW/cm^2$) | Result |
|---|---|---|---|---|---|---|
| Middle | 2437 | 26.07 | 404.58 | 0.080 | 1.0 | PASS |

Note: Refer to report No. SZEM170600675602 for EUT test Max Conducted Peak Output Power value.

The distance r (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.

**433MHz:**

| Channel | Frequency (MHz) | Max Field Strength (dBuV/m) | Output Power to Antenna (mW) | Power Density at R = 20 cm ($mW/cm^2$) | Limit ($mW/cm^2$) | Result |
|---|---|---|---|---|---|---|
| Middle | 433.92 | 90.22 | 0.0021 | $4.18x10^{-7}$ | 0.29 | PASS |

Note: Refer to report No. SZEM170600675603 for EUT test Max Field Strength value.

The distance r (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.

**Simultaneous transmission:**

| | WiFi | 433MHz | Sum | Limit | Result |
|---|---|---|---|---|---|
| MPE Ratio | 0.31 | $1.4410^{-6}$ | 0.31 | 1 | PASS |

The Bluetooth and WiFI could not transmit simultaneously.

According to 447498 D01, Simultaneous transmission MPE test exclusion applies when the sum of the MPE ratios for all simultaneously transmitting antennas incorporated in a host device is ≤ 1.0.