# RF Exposure Evaluation Report

| | |
|---|---|
| **Application No.**: | GZCR2108020814AT |
| **Applicant:** | PAX TECHNOLOGY LIMITED |
| **Address of Applicant:** | Room 2416, 24/F., Sun Hung Kai Centre, 30 Harbour, Hong Kong, China |
| **Manufacturer:** | PAX Computer Technology(Shenzhen) Co., Ltd. |
| **Address of Manufacturer:** | 4/F, No.3 Building, Software Park, Second Central Science-Tech Road, High-Tech industrial Park, Shenzhen, Guangdong, P.R.C. |

**Equipment Under Test (EUT):**

| | |
|---|---|
| **EUT Name:** | Smart Kiosk |
| **Model No.:** | SK700 |
| **Trade Mark:** | PAX |
| **Standards:** | 47 CFR PART 1.1310 |
| | 47 CFR PART 2.1091 |
| | 447498 D01 General RF Exposure Guidance v06 |
| **Date of Receipt:** | 2021-06-21 |
| **Date of Test:** | 2021-06-29 to 2021-08-25 |
| **Date of Issue:** | 2021-08-27 |
| **Test Result :** | **PASS*** |

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

Kobe Jian
EMC Laboratory Manager

# 2 Version

| Revision Record | | | | |
|---|---|---|---|---|
| **Version** | **Chapter** | **Date** | **Modifier** | **Remark** |
| 01 | | 2021-08-27 | | Original |
| | | | | |
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|---|---|---|---|---|
| **Authorized for issue by:** | | | | |
| | |  **Curry Wu/Project Engineer** | | |
| | |  **Ricky Liu/Reviewer** | | |

# 3 Contents

# 4 General Information

## 4.1 General Description of EUT

| | |
|---|---|
| Power supply: | AC100-240V, 50/60Hz, 65W Max |
| Cable(s): | AC power cable: 1m unshielded cable without ferrite core |
| Firmware Version: | V0.0.0.X |
| Hardware Version: | SK700 |
| Sample NO.: | 2190000239 |
| For BT: | |
| Operation Frequency: | 2402MHz to 2480MHz |
| Bluetooth Version: | V5.0 Dual mode |
| Modulation Type: | GFSK, pi/4DQPSK, 8DPSK |
| Number of Channels: | 79 |
| Channel Spacing: | 1MHz |
| Spectrum Spread Technology: | Frequency Hopping Spread Spectrum(FHSS) |
| Antenna Type: | PIFA Antenna |
| Antenna Gain: | 1.5dBi |
| For BLE: | |
| Operation Frequency: | 2402MHz to 2480MHz |
| Bluetooth Version: | V5.0 Dual mode |
| Data Rate: | 1Mbps, 2Mbps |
| Modulation Type: | GFSK |
| Number of Channels: | 40 |
| Channel Spacing: | 2MHz |
| Antenna Type: | PIFA Antenna |
| Antenna Gain: | 1.5dBi |
| For 2.4G WIFI | |
| Operation Frequency: | 802.11b/g/n(HT20): 2412MHz to 2462MHz |
| Modulation Type: | 802.11b: DSSS (CCK, DQPSK, DBPSK) |
| | 802.11g/n: OFDM (64QAM, 16QAM, QPSK, BPSK) |
| Number of Channels: | 802.11b/g/n(HT20):11 |
| Channel Spacing: | 5MHz |
| Antenna Type: | PIFA Antenna |
| Antenna Gain: | 1.5dBi |

| | |
|---|---|
| For 5G WIFI | |
| Operation Frequency (20MHz): | U-NII-1: 5180-5240MHz;<br>U-NII-2A: 5260-5320MHz;<br>U-NII-2C: 5500-5700MHz;<br>U-NII-3: 5745-5825MHz |
| Operation Frequency (40MHz): | U-NII-1: 5190-5230MHz;<br>U-NII-2A: 5270-5310MHz;<br>U-NII-2C: 5510-5670MHz;<br>U-NII-3: 5755-5795MHz |
| Operation Frequency (80MHz): | U-NII-1: 5210MHz;<br>U-NII-2A: 5290MHz;<br>U-NII-2C: 5530-5610MHz;<br>U-NII-3: 5775MHz |
| Modulation Type: | 802.11a: OFDM (64QAM, 16QAM, QPSK, BPSK);<br>802.11n: OFDM (BPSK, QPSK, 16QAM, 64QAM);<br>802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM) |
| Channel Spacing: | 802.11a/n(HT20)/ac(HT20): 20MHz;<br>802.11n(HT40)/ac(HT40): 40MHz;<br>802.11ac(HT80): 80MHz |
| DFS Function: | Slave without Radar detection |
| TPC Function: | Without TPC function |
| Antenna Type: | PIFA Antenna |
| Antenna Gain: | 1.5dBi |
| For WCDMA: | |
| Operation Frequency Band: | UMTS FDD Band II/IV/V |
| Modulation Type: | QPSK for WCDMA |
| Supported Channel Bandwidth: | 5MHz for WCDMA |
| UMTS Power Class: | Level 3 |
| Antenna Type: | PIFA antenna |
| Antenna Gain: | WCDMA band II: 0.8dBi; band IV: 0.8dBi; band V: 0.5dBi |
| For LTE: | |
| LTE Operation Frequency Band: | LTE FDD Band 2, 4, 5, 12, 13, 17 |
| Modulation Type: | QPSK, 16QAM |
| LTE Power Class: | Level 3 |
| Antenna Type: | PIFA Antenna |
| Antenna Gain: | LTE band 2: 0.8dBi; band 4: 0.8dBi; band 5: 0.5dBi; band 12: 0.5dBi; band 13: 0.5dBi; band 17: 0.5dBi; |

## 4.2 Test Location

All tests were performed at:
SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou Branch EMC Laboratory,
198 Kezhu Road, Scientech Park, Guangzhou Economic & Technology Development District,
Guangzhou, China 510663
Tel: +86 20 82155555 Fax: +86 20 82075059

## 4.3 Test Facility

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

● **NVLAP (Lab Code: 200611-0)**

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP/NIST). NVLAP Code: 200611-0.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

● **ACMA**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory can also perform testing for the Australian/New Zealand Regulatory Compliance Mark (RCM).

● **SGS UK(Certificate No.: 32), SGS-TUV SAARLAND and SGS-FIMKO**

Have approved SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory as a supplier of EMC TESTING SERVICES and SAFETY TESTING SERVICES.

● **CNAS (Lab Code: L0167)**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been assessed and in compliance with CNAS-CL01:2018 accreditation criteria for testing laboratories (identical to ISO/IEC 17025:2017 General Requirements) for the Competence of Testing Laboratories.

● **FCC Recognized Accredited Test Firm(Registration No.: 486818)**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been accredited and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Designation Number: CN5016, Test Firm Registration Number: 486818.

● **ISED (Registration No.: 4620B, CAB identifier: CN0052)**

SGS-CSTC Standards Technical Services Co., Ltd., has been registered by Innovation Science and Economic Development Canada for Wireless Device Testing laboratories to test to Canadian radio

equipment requirements. Registration No. 4620B, CAB identifier: CN0052.

● **VCCI (Registration No.: R-12460, C-12584, G-20107 and T-11179)**

The 10m Semi-anechoic chamber, 966 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.: R-12460, C-12584, G-20107 and T-11179 respectively.

● **CBTL (Lab Code: TL129)**

SGS-CSTC Standards Technical Services Co., Ltd., E&E Laboratory has been assessed and fully comply with the requirements of ISO/IEC 17025:2017, the Basic Rules, IECEE 01 and Rules of procedure IECEE 02, and the relevant IECEE CB-Scheme Operational documents.

## 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.

### 4.1.3 EUT RF Exposure Evaluation

**For Stand alone:**

**For BT:**

Antenna Gain: 1.5dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.41 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

| Frequency (MHz) | Max Conducted Output Power (dBm) | Output Power to Antenna (mW) | Power Density at R = 20 cm ($mW/cm^2$) | Limit ($mW/cm^2$) | MPE ratio | Result |
|---|---|---|---|---|---|---|
| 2402 | 8.60 | 7.24 | 0.0020 | 1.0000 | 0.0020 | PASS |

Note: Refer to report No. GZCR210802081401 for EUT test Max Conducted Output Power value.
The distance r (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.

**For BLE:**

Antenna Gain: 1.5dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.41 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

| Frequency (MHz) | Max Conducted Output Power (dBm) | Output Power to Antenna (mW) | Power Density at R = 20 cm ($mW/cm^2$) | Limit ($mW/cm^2$) | MPE ratio | Result |
|---|---|---|---|---|---|---|
| 2402 | 6.85 | 4.84 | 0.0015 | 1.0000 | 0.0015 | PASS |

Note: Refer to report No. GZCR210802081402 for EUT test Max Conducted Output Power value.
The distance r (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.

**For 2.4G WIFI:**

Antenna Gain: 1.5dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.41 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

| Frequency (MHz) | Max Conducted Output Power (dBm) | Output Power to Antenna (mW) | Power Density at R = 20 cm ($mW/cm^2$) | Limit ($mW/cm^2$) | MPE ratio | Result |
|---|---|---|---|---|---|---|
| 2437 | 15.86 | 38.55 | 0.0108 | 1.0000 | 0.0108 | PASS |

Note: Refer to report No. GZCR210802081403 for EUT test Max Conducted Output Power value.
The distance r (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.

**For 5G:**

Antenna Gain: 1.5dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.41 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

| Frequency (MHz) | Max Conducted Output Power (dBm) | Output Power to Antenna (mW) | Power Density at R = 20 cm ($mW/cm^2$) | Limit ($mW/cm^2$) | MPE ratio | Result |
|---|---|---|---|---|---|---|
| 5500 | 12.19 | 16.56 | 0.0047 | 1.0000 | 0.0047 | PASS |

Note: Refer to report No. GZCR210802081404 for EUT test Max Conducted Output Power value.
The distance r (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.

**For WCDMA:**

Antenna Gain: 0.8dBi for band 2, 4; 0.5dBi for band 5

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.20 for band 2, 4; 1.12 for band 5 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

| Operation Band | Max Conducted Output Power (dBm) | Output Power to Antenna (mW) | Power Density at R = 20 cm ($mW/cm^2$) | Limit ($mW/cm^2$) | MPE ratio | Result |
|---|---|---|---|---|---|---|
| 2 | 24 | 251.19 | 0.0601 | 1.0000 | 0.0601 | PASS |
| 4 | 23 | 199.53 | 0.0477 | 1.0000 | 0.0477 | PASS |
| 5 | 23 | 199.53 | 0.0445 | 0.5509 | 0.0808 | PASS |

Note: Refer to report No. GZCR210802081406 for EUT test Max Conducted Output Power value.
The distance r (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.

**For LTE:**

Antenna Gain: 0.8dBi for band 2, 4; 0.5dBi for band 5, 12, 13, 17

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.20 for band 2, 4; 1.12 for band 5, 12, 13, 17 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

| Operation Band | Max Conducted Output Power (dBm) | Output Power to Antenna (mW) | Power Density at R = 20 cm ($mW/cm^2$) | Limit ($mW/cm^2$) | MPE ratio | Result |
|---|---|---|---|---|---|---|
| 2 | 24 | 251.19 | 0.0601 | 1.0000 | 0.0601 | PASS |
| 4 | 23 | 199.53 | 0.0477 | 1.0000 | 0.0477 | PASS |
| 5 | 23 | 199.53 | 0.0445 | 0.5509 | 0.0808 | PASS |
| 12 | 23 | 199.53 | 0.0445 | 0.4665 | 0.0954 | PASS |
| 13 | 23 | 199.53 | 0.0445 | 0.5197 | 0.0856 | PASS |
| 17 | 23 | 199.53 | 0.0445 | 0.4710 | 0.0945 | PASS |

Note: Refer to report No. GZCR210802081407 for EUT test Max Conducted Output Power value.

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

**For Maximum Simultaneous Transmission:**

| Operation mode | MPE ratio | Limit | Result |
|---|---|---|---|
| BT+WCDMA | 0.0828 | 1.0000 | PASS |
| BT+LTE | 0.0974 | 1.0000 | PASS |
| WIFI+WCDMA | 0.0916 | 1.0000 | PASS |
| WIFI+LTE | 0.1062 | 1.0000 | PASS |

Remark:

1. For the operation mode above, BT refers to maximum power of classical BT and BLE, and WIFI refers to the maximum power in 2.4G band and 5GHz band. In this case, power for classical BT is greater than BLE, and WIFI in 2.4GHz band is greater than that in 5GHz band, therefore, the maximum ones were taken for final MPE ratio consideration.
2. For WCDMA & LTE, the maximum power including tune up was taken into consideration.

- End of the Report -