

# RF Exposure Evaluation Report

APPLICANT : PAX Technology Limited  
EQUIPMENT : UNATTENDED PAYMENT TERMINAL  
BRAND NAME : PAX  
MODEL NAME : IM25  
FCC ID : V5PIM254GBW  
STANDARD : 47 CFR Part 2.1091  
FCC KDB 447498 D01 v06

The product evaluation date was started from Jun. 27, 2024 and completed on Jun. 27, 2024. We, Sporton International Inc. (Shenzhen), would like to declare that the device has been evaluated in accordance with 47 CFR Part 2.1091 and FCC KDB 447498 D01 v06, and pass the limit. Without written approval of Sporton International Inc. (Shenzhen), the test report shall not be reproduced except in full.



Approved by: Si Zhang

**Sporton International Inc. (Shenzhen)**

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People's Republic of China



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**Revision History**

<b>REPORT NO.</b>	<b>VERSION</b>	<b>DESCRIPTION</b>	<b>ISSUED DATE</b>
FA452701	Rev. 01	Initial issue of report.	Jul. 04, 2024



## 1. Administration Data

### 1.1. Testing Laboratory

Sporton International Inc. (Shenzhen) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.01.

Testing Laboratory			
Test Firm	Sporton International Inc. (Shenzhen)		
Test Site Location	1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055 People's Republic of China TEL: +86-755-86379589 FAX: +86-755-86379595		
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.
	SAR01-SZ	CN1256	421272

Applicant	
Company Name	PAX Technology Limited
Address	Room 2416, 24/F., Sun Hung Kai Centre, 30 Harbour Road, Wanchai, Hong Kong

Manufacturer	
Company Name	PAX Computer Technology (Shenzhen) Co., Ltd.
Address	Room 701, PAX Technology Building, Shanxia Community, Pinghu Sub-district, Longgang District, Shenzhen, China

**2. Description of Equipment Under Test (EUT)**

Product Feature & Specification	
EUT Type	UNATTENDED PAYMENT TERMINAL
Brand Name	PAX
Model Name	IM25
FCC ID	V5PIM254GBW
Wireless Technology and Frequency Range	WCDMA Band II: 1850 MHz ~ 1910 MHz WCDMA Band IV: 1710 MHz ~ 1755 MHz WCDMA Band V: 824 MHz ~ 849 MHz LTE Band 2 : 1850 MHz ~ 1910 MHz LTE Band 4 : 1710 MHz ~ 1755 MHz LTE Band 5 : 824 MHz ~ 849 MHz LTE Band 12 : 699 MHz ~ 716 MHz LTE Band 13 : 777 MHz ~ 787 MHz LTE Band 17: 704 MHz ~ 716 MHz LTE Band 66 : 1710 MHz ~ 1780 MHz LTE Band 71: 663 MHz ~ 698 MHz WLAN 2.4GHz Band: 2412 MHz ~ 2462 MHz WLAN 5.2GHz Band: 5180 MHz ~ 5240 MHz WLAN 5.3GHz Band: 5260 MHz ~ 5320 MHz WLAN 5.5GHz Band: 5500 MHz ~ 5700 MHz WLAN 5.8GHz Band: 5745 MHz ~ 5825 MHz Bluetooth: 2402 MHz ~ 2480 MHz NFC : 13.56 MHz
Mode	RMC 12.2Kbps HSDPA HSUPA DC-HSDPA HSPA+(16QAM uplink is not supported) LTE: QPSK, 16QAM WLAN 2.4GHz 802.11b/g/n HT20 WLAN 5GHz 802.11a/n HT20/HT40 WLAN 5GHz 802.11ac VHT20/VHT40/VHT80 Bluetooth BR/EDR/LE NFC:ASK
Antenna Type	WWAN: Ant1/2: Dipole Antenna Ant3: Cable Antenna WLAN/Bluetooth: FPC Antenna NFC: FPC Antenna
HW Version	NA
SW Version	NA
EUT Stage	Production Unit

**Remark:**

1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
2. There are three WWAN Antennas for optional, Ant.1 (SWA2241), Ant.2 (SWA2241C01) and Ant.3 (YJ086S.300294.S01), the detail gain value please refers to following gain table.

**Comments and Explanations:**

1. The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.
2. The maximum RF output tune up power, antenna gain also the safe distance used for evaluate RF exposure were declared by manufacturer.



**Antenna Gain:**

WWAN Band	Ant1(SWA2241) Gain (dBi)	Ant2(SWA2241C01) Gain (dBi)	Ant3(YJ086S.300294.S01) Gain (dBi)
WCDMA Band II	2.01	-0.3	2.3
WCDMA Band IV	3.61	0.85	2.3
WCDMA Band V	1.33	0.87	1.1
LTE Band 2	2.01	-0.3	2.3
LTE Band 4	3.61	0.85	2.3
LTE Band 5	1.33	0.87	1.1
LTE Band 12	1	0.5	1.1
LTE Band 13	1	0.5	1.1
LTE Band 17	1	0.5	1.1
LTE Band 66	3.61	0.85	2.3
LTE Band 71	1	0.5	1.1

WIFI	Gain (dBi)
Bluetooth	-1.83
WLAN 2.4GHz	-1.83
WLAN 5.2GHz	3.06
WLAN 5.3GHz	3.19
WLAN 5.5GHz	2.87
WLAN 5.8GHz	2.68



**3. Maximum RF average output tune up power among production units**

**<WCDMA>**

Mode		Maximum Average power(dBm)
WCDMA	Band II	24.5
	Band IV	24.5
	Band V	24.5

**<LTE>**

Mode		Maximum Average power(dBm)
LTE	Band 2	24.0
	Band 4	24.0
	Band 5	24.0
	Band 12	24.0
	Band 13	24.0
	Band 17	24.0
	Band 66	24.0
	Band 71	24.0

**<2.4GHz WLAN >**

Mode		Maximum Average Power (dBm)
2.4GHz	802.11b	16.0
	802.11g	16.0
	802.11n-HT20	16.0

**<Bluetooth>**

Mode		Maximum Average power(dBm)
Bluetooth	EDR	8.0
	LE	4.0



<5GHz WLAN >

Mode		Maximum Average Power (dBm)
5.2GHz	802.11a	15.5
	802.11n-HT20	15.5
	802.11n-HT40	14.0
	802.11ac-VHT20	15.5
	802.11ac-VHT40	14.0
	802.11ac-VHT80	11.0
5.3GHz	802.11a	15.5
	802.11n-HT20	15.5
	802.11n-HT40	14.0
	802.11ac-VHT20	15.5
	802.11ac-VHT40	14.0
	802.11ac-VHT80	12.0
5.5GHz	802.11a	15.5
	802.11n-HT20	15.5
	802.11n-HT40	14.0
	802.11ac-VHT20	15.5
	802.11ac-VHT40	14.0
	802.11ac-VHT80	11.0
5.8GHz	802.11a	15.5
	802.11n-HT20	16.0
	802.11n-HT40	15.0
	802.11ac-VHT20	16.0
	802.11ac-VHT40	15.0
	802.11ac-VHT80	12.0



**4. RF Exposure Limit Introduction**

According to ANSI/IEEE C95.1-1992, the criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio frequency (RF) radiation as specified in §1.1310.

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

The MPE was calculated at 20 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

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

Where:

S = Power Density

P = Output Power at Antenna Terminals

G = Gain of Transmit Antenna (linear gain)

R = Distance from Transmitting Antenna

## **5. Radio Frequency Radiation Exposure Evaluation**

### **5.1. Standalone Power Density Calculation**

Band	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum EIRP (dBm)	Average EIRP (mW)	Power Density at 20cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Power Density / Limit
WCDMA Band 2	1852.4	2.30	24.50	26.800	478.630	0.095	1.000	0.095
WCDMA Band 4	1712.4	3.61	24.50	28.110	647.143	0.129	1.000	0.129
WCDMA Band 5	826.4	1.33	24.50	25.830	382.825	0.076	0.551	<b>0.138</b>
LTE Band 2	1850.7	2.30	24.00	26.300	426.580	0.085	1.000	0.085
LTE Band 4	1710.7	3.61	24.00	27.610	576.766	0.115	1.000	0.115
LTE Band 5	824.7	1.33	24.00	25.330	341.193	0.068	0.550	0.124
LTE Band 12	699.7	1.10	24.00	25.100	323.594	0.064	0.466	0.138
LTE Band 13	779.5	1.10	24.00	25.100	323.594	0.064	0.520	0.124
LTE Band 17	706.5	1.10	24.00	25.100	323.594	0.064	0.471	0.137
LTE Band 66	1710.7	3.61	24.00	27.610	576.766	0.115	1.000	0.115
LTE Band 71	706.5	1.10	24.00	25.100	323.594	0.064	0.471	0.137
Bluetooth	2402.0	-1.83	8.00	6.170	4.140	0.001	1.000	<b>0.001</b>
2.4GHz WLAN	2412.0	-1.83	16.00	14.170	26.122	0.005	1.000	<b>0.005</b>
5.2GHz WLAN	5180.0	3.06	15.50	18.560	71.779	0.014	1.000	0.014
5.3GHz WLAN	5260.0	3.19	15.50	18.690	73.961	0.015	1.000	0.015
5.5GHz WLAN	5500.0	2.87	15.50	18.370	68.707	0.014	1.000	0.014
5.8GHz WLAN	5745.0	2.68	16.00	18.680	73.790	0.015	1.000	<b>0.015</b>
NFC	13.6			-27.940	0.002	0.0000003	0.979	<b>0.0000003</b>

**Note:**

1. For conservativeness, the lowest frequency of each band is used to determine the MPE limit of that band.
2. Chose the maximum RF output tune up power of all antennas among same frequency WWAN/WLAN bands and the maximum antenna gain to perform MPE calculation conservatively.
3. NFC maximum EIRP power calculate from NFC E-Field level from RF test report which can be referred to Sproton No: FR452701D.
  - 1) This device maximum E-Field level is 67.29dBuV/m at 3m, so the EIRP power is -27.94dBm(0.002mW).
  - 2) Pout EIRP (dBm) = Field Strength of Fundamental (dBuV/m) - 95.23 (dB)



5.2. Collocated Power Density Calculation

WWAN Power Density / Limit	Bluetooth Power Density / Limit	NFC Power Density / Limit	$\Sigma$ (Power Density / Limit) of WWAN + Bluetooth+NFC
0.138	0.001	0.0000003	0.139
WWAN Power Density / Limit	WLAN 2.4GHz Power Density / Limit	NFC Power Density / Limit	$\Sigma$ (Power Density / Limit) of WWAN + WLAN 2.4GHz+NFC
0.138	0.005	0.0000003	0.143
WWAN Power Density / Limit	WLAN 5GHz Power Density / Limit	NFC Power Density / Limit	$\Sigma$ (Power Density / Limit) of WWAN + WLAN 5GHz+NFC
0.138	0.015	0.0000003	0.153

Note:

- For collocation analysis, WCDMA Band 5 is chosen for summation due to the highest (power density/limit) among all WWAN Band modes.
- According to the EUT characteristic, NFC can transmit simultaneously with other Radios.
- According to the EUT characteristic, WLAN and Bluetooth cannot transmit simultaneously, WLAN 2.4GHz and WLAN 5GHz cannot transmit simultaneously
- $\Sigma$ (Power Density / Limit): This is a summation of [(power density for each transmitter/antenna included in the simultaneous transmission)/ (corresponding MPE limit)], for WWAN + Bluetooth&WLAN 2.4GHz& WLAN 5GHz +NFC.
- Considering all transmitter of the EIRP performance listed in the table above, the aggregated (power density /limit) is smaller than 1, and collocated transmitters is compliant.

Conclusion:

According to 47 CFR §2.1091, the RF exposure analysis concludes that the RF Exposure is FCC compliant.

-----THE END-----