FCC RF Exposure Test Report

Report No.	:	**W7L-P23050004-1SA01**
Applicant	:	**PAX Technology Limited**
Address	:	**Room 2416, 24/F., Sun Hung Kai Centre, 30 Harbour, Hong Kong China**
Product	:	**Smart Desktop Terminal**
FCC ID	:	**V5PA8500**
Brand	:	**PAX**
Model No.	:	**A8500P, A8500N**
Standards	:	**FCC Part 2 (Section 2.1091)** **KDB 447498 D01 General RF Exposure Guidance v06**
Sample Received Date	:	**May. 5, 2023**
Date of Testing	:	**May. 5, 2023 ~ May. 29, 2023**

CERTIFICATION: The above equipment have been tested by **BV 7LAYERS COMMUNICATIONS TECHNOLOGY (SHENZHEN) CO., LTD.**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's SAR characteristics under the conditions specified in this report. It should not be reproduced except in full, without the written approval of our laboratory. The client should not use it to claim product certification, approval, or endorsement by A2LA or any government agencies.

Prepared By : Jerry Chen / Engineer

Approved By : Luke Lu / Manager

Table of Contents

Release Control Record

Report No.	Reason for Change	Date Issued
W7L-P23050004-1SA01	Initial release	Jun. 14, 2023

1. Description of Equipment Under Test

Product:	Smart Desktop Terminal
Brand Name:	PAX
Model Name:	A8500P, A8500N
FCC ID:	V5PA8500
Tx Frequency Bands (Unit: MHz)	WLAN : 2412 ~ 2462, 5180 ~ 5240, 5260 ~ 5320, 5500 ~ 5700, 5745 ~ 5825 Bluetooth : 2402 ~ 2480 NFC : 13.56
Uplink Modulations	802.11b : DSSS 802.11a/g/n/ac : OFDM Bluetooth : GFSK, π/4-DQPSK, 8-DPSK NFC : ASK
Antenna Type	WLAN: PIFA Antenna
EUT Stage	Production Unit

Note:

1. The above EUT information is declared by manufacturer and for more detailed features description please refers to the manufacturer's specifications or User's Manual.
2. This report refers to the data of W7L-P23050004SA01 (FCC ID: V5PA85004G), the difference of (FCC ID: V5PA85004G) and (FCC ID: V5PA8500) is changing FCC ID and (FCC ID: V5PA8500) remove WWAN components (Modules & Antennas). This report verify power. The result of power is similar and lower. So this report doesn't update any data

3. The difference of A8500N and A8500P is on below:

Object	A8500P	A8500N
Printer	Support	NO support
Adapter 1	Model Name : SW-0396A I/P: 100-240Vac,800mA, O/P: 9.0Vdc, 1000mA	Model Name: SW-0983 I/P: 100-240Vac, 500mA, O/P: 5.0Vdc,2000mA
Adapter 2	Model Name: G024A090100ZZUD I/P: 100-240Vac,800mA, O/P: 9.0Vdc, 1000mA	Model Name: GLH50E2000HW I/P: 100-240Vac, 500mA, O/P: 5.0Vdc,2000mA
LCD Panel 1	Supplier : Hubei Yiou Electronics Co., Ltd Model Name: YH-500BSC046C0-19A00-PTM0 Specifications : 5.0 inch/ 720*RGB*1280 Pixel	
LCD Panel 2	Supplier : Shenzhen Hongzhan Optoelectronics Co., Ltd Model Name: F6050812B-04 Specifications :5.0 inch/ 720*RGB*1280 Pixel	
Automatic operating voltage	Minimum voltage: 8.55V	Minimum voltage: 5.25V
	Normal voltage: 9V	Normal voltage: 5V
	Maximum voltage: 9.9V	Maximum voltage: 4.75V
Note：When the operating voltage changes, It does not affect RF baseband module		

List of Accessory:

A8500N

ACCESSORIES	BRAND	MANUFACTURER	MODEL	SPECIFICATION
AC Adapter 1	PAX	XIAMEN KELI ELECTRONICS Co.,Ltd.	SW-0983	I/P: 100-240Vac, 0.5A, O/P: 5.0Vdc, 2A
AC Adapter 2	PAX	Shenzhen Sorghum Red Electronic Technology Co., Ltd	GLH50E2000HW	I/P: 100-240Vac, 0.4A, O/P: 5.0Vdc, 2A
USB Cable	N/A	N/A	N/A	Signal Line,1.0meter

A8500P

ACCESSORIES	BRAND	MANUFACTURER	MODEL	SPECIFICATION
AC Adapter 1	PAX	XIAMEN KELI ELECTRONICS Co.,Ltd.	SW-0396A	I/P: 100-240Vac, 0.5A, O/P: 9.0Vdc, 1A
AC Adapter 2	PAX	Shenzhen Sorghum Red Electronic Technology Co., Ltd	G024A090100ZZ UD	I/P: 100-240Vac, 0.8A, O/P: 9.0Vdc, 1A

2. MPE(Maximum Permissible Exposure) Assessment

2.1 Introduction

According to 47 CFR §2.1091, a mobile device is defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 cm is normally maintained between the transmitting antenna and the body of the user or nearby persons. In this context, the term "fixed location" means that the device is physically secured at one location and is not able to be easily moved to another location. Transmitting devices designed to be used by consumers or workers that can be easily re-located, such as wireless devices associated with a personal computer, are considered to be mobile devices if they meet the 20 cm separation requirement. The limits to be used for MPE evaluation are specified in §1.1310. All unlicensed personal communications service (PCS) devices and unlicensed NII devices shall be subject to the limits for general population/uncontrolled exposure.

2.2 RF Radiation Exposure Limits

According to 47 CFR §1.1310, the criteria listed in below table shall be used to evaluate the environmental impact of human exposure to RF radiation as specified in §1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of §2.1093.

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Averaging Time (min)
(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 – 100000	-	-	5	6
(B) Limits for General Population / Uncontrolled Exposures				
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 – 100000	-	-	1.0	30

Limits for maximum permissible exposure (MPE)

Notes:

1. f = frequency in MHz
2. Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided they are made aware of the potential for exposure.
3. General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

2.3 MPE Assessment Method

Calculations can be made to predict RF field strength and power density levels around typical RF sources. For example, in the case of a single radiating antenna, a prediction for power density in the far-field of the antenna can be made by use of the general Equations below. This equation is generally accurate in the far-field of an antenna but will over-predict power density in the near field, where they could be used for making a "worst case" or conservative prediction.

$$\text{Power Density (S)} = \frac{PG}{4\pi R^2} = \frac{EIRP}{4\pi R^2}$$

Where
S = Power Density, unit in mW/cm^2
P = Power input to the antenna, unit in mW
G = Power gain of the antenna in the direction of interest relative to an isotropic radiator
R = Distance to the center of radiation of the antenna, unit in cm
EIRP = Effective isotropically radiated power

2.4 MPE Calculation for Standalone Operations

The manufacturer expects that the radiated component of this device will not close to the human body during normal usage and the warning statement was also stated in the user instruction. Since the transmitting antenna will be kept at least 20 cm away from the human body, the MPE level is calculated based on this condition and the result is listed in below table.

CALCULATION FOR MAXIMUM E.I.R.P

Band	Antenna Gain (dBi)	Maximum Power (dBm)	Average EIRP (mW)	Power Density (mW/cm^2)	Limit (mW/cm^2)	Power Density / Limit	Result (PASS / FAIL)
Bluetooth EDR	0.9	9.5	10.965	0.002	1.000	0.002	Pass
Bluetooth LE 1M	0.9	8.5	8.710	0.002	1.000	0.002	Pass
Bluetooth LE 2M	0.9	8.5	8.710	0.002	1.000	0.002	Pass
2.4GHz WLAN	0.9	21.5	173.780	0.035	1.000	0.035	Pass
5.2GHz WLAN	2.6	15.5	64.565	0.013	1.000	0.013	Pass
5.3GHz WLAN	2.6	15.0	57.544	0.011	1.000	0.011	Pass
5.5GHz WLAN	2.6	15.0	57.544	0.011	1.000	0.011	Pass
5.8GHz WLAN	2.6	16.0	72.444	0.014	1.000	0.014	Pass

Band	E-field strength (dBuV/m)	E-field strength (V/m)	Average EIRP (mW)	Power Density (mW/cm^2)	Limit (mW/cm^2)	Result (PASS / FAIL)
NFC	61.76	0.001225	0.00045	0.00000008955	0.979	Pass

$$\mathrm{EIRP} = p_t \times g_t = (E \times d)^2 / 30$$

where

p_t is the transmitter output power in watts
g_t is the numeric gain of the transmitting antenna (dimensionless)
E is the electric field strength in V/m
d is the measurement distance in meters (m)

$$\mathrm{ERP} = \mathrm{EIRP}/1.64 = (E \times d)^2 / (30 \times 1.64) = (E \times d)^2 / 49.2$$

2.5 CONCLUSION OF SIMULTANEOUS TRANSMITTER

Both of the WLAN and BT can transmit simultaneously, the formula of calculated the MPE is:

CPD1/LPD1+CPD2/LPD2+……etc. < 1
CPD = Calculation power density
LPD = Limit of power density

Band	Antenna Gain (dBi)	Maximum Tune up Power (dBm)	Average EIRP (mW)	Power Density (mW/cm^2)	Power Density / Limit	Σ(Power Density / Limit)	Limit	Result
WLAN	0.9	21.5	173.780	0.035	0.035	0.037	1.000	PASS
BT	0.9	9.5	10.965	0.002	0.002			

Remark: NFC can't simultaneously transmit with other transmitters.

Summary:
Since the ERP (effective radiated power) operated at < 1.5 GHz is less than 1.5 watts and > 1.5 GHz is less than 3 watts, the routine environmental evaluation is not required, and the MPE result calculated for this device complies with the MPE limit as specified in 47 CFR §1.1310.

3. Information on the Testing Laboratories

We, BV 7LAYERS COMMUNICATIONS TECHNOLOGY (SHENZHEN) CO., LTD., were founded in 2015 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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The road map of all our labs can be found in our web site also.

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