



Global Product Certification
EMC-EMF Safety Approvals

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FCC RF Exposure Report

Report Number: M160508-3 Rev 1.0

Test Sample: Card Processor
Model Number: CP6100
FCC ID 2AIKG-CP6100

Tested For: Vix Technology

Date of Issue: 20 September 2016

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Contents

Table of Contents

1	INTRODUCTION.....	4
2	EXPOSURE EVALUATION FOR MOBILE DEVICE.....	4
3	GENERAL INFORMATION	4
4	TEST SAMPLE DESCRIPTION and TEST SETUP DETAILS	5
5	MAXIMUM PERMISSIBLE EXPOSURE (MPE) LIMITS	5
6	RF EXPOSURE EVALUATION	6
7	CONCLUSION	7

FCC RF Exposure Evaluation Report

Report Number: M160508-3 REV 1.0

Test Sample: Card Processor
Model Number: CP6100
Serial Number: Not marked
Manufacturer: Vix Technology

FCC ID: 2AIKG-CP6100


Tested for: Vix Technology
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Test Standard/s: **FCC KDB 447498 D01 General RF Exposure Guidance v6**
Mobile and Portable Devices RF Exposure Procedures and
Equipment Authorization Policies.

FCC Title 47, Part 2.1091, Part 1.1310

Result of Test: **Card Processor model CP6100 complies with the requirement
of KDB 447498 D01 and with FCC Title 47, Part 2.1091, Part
1.1310**

Test Date: 20 September 2016

Test Engineer: 
Emad Mansour
EMC/EMR/SAR Engineer
M.Sc. in Telecommunication

Authorised Signature: 
Chris Zombolas
Technical Director
EMC Technologies Pty Ltd

1 INTRODUCTION

This report shows the Maximum permissible exposure (MPE) on Card Processor model CP6100, in accordance with the Federal Communications Commission (FCC) regulations as detailed in KDB 447498 D01,

The test sample was provided by the Client. The conclusion herein is based on the information provided by the client.

2 EXPOSURE EVALUATION FOR MOBILE DEVICE

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 centimeters is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons.

Radio frequency radiation exposure evaluation for mobile devices as defined by (47 CFR §2.1091).

3 GENERAL INFORMATION

(Information supplied by the Client)

The Equipment Under Test (EUT) was identified as follows:

Test Sample:	Card Processor
Model Number:	CP6100
Manufacturer:	Vix Technology
Radio Module:	Contactless Card Reader
Operating frequency (MHz):	13.56
EIRP*	54 μ W
WLAN Module:	
FCC ID	VZFSWN26MA
Operating frequency (MHz):	2412 – 2462
Output Power	35 mW
Antenna Model	FXP70
Antenna Gain	5 dBi
Bluetooth dongle:	
FCC ID	QOQBLED112
Max. E.I.R.P	1.11 mW
Operating frequency (MHz):	2402 – 2480
Wireless Module:	
FCC ID	QIPPLS8-US
Model	PLS8-US
Antenna Model	FXUB63
Antenna Gain	5 dBi

*For EIRP value refers to test report M160508-1 issued by EMC Technologies, field strength measured at 10m was 72.13 dB μ V/m.

4 TEST SAMPLE DESCRIPTION and TEST SETUP DETAILS

(Information supplied by the Client)

The device was intended to be used by Transport operators for fare collection. The device is typically installed inside the transport vehicle for use by passengers to tag ON and tag OFF with their travel card.

5 MAXIMUM PERMISSIBLE EXPOSURE (MPE) LIMITS

The criteria listed in table 1 shall be used to evaluate the environmental impact of human exposure to radiofrequency (RF) radiation

Table 1:

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	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	30

f = frequency in MHz

* = Plane-wave equivalent power density

6 RF EXPOSURE EVALUATION

The MPE was evaluated at 25 cm to show compliance with the power density listed in table 1, as the power density at 20 cm exceeds the limit.

The following formula was used to calculate the power density at 20 cm and 25 cm

$$S = \frac{P * G}{4\pi R^2}$$

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

Where

(S): Power density (mW/cm^2)

(P): Output power at antenna terminal (mW)

(G): Gain (ratio)

(R): Minimum test separation distance (20 cm)

Table 2: Evaluation at 20 cm for the cellular Wireless Module

Technology	Frequency Band	Power	Manufacture tolerance	Gain	EIRP	EIRP	Duty Cycle	Flux Density at 20 cm	Flux Density limit	
	MHz	dBm	dB	dBi	dBm	(mW)	%	mW/cm ²	mW/cm ²	(%)
LTE 700	706.5	23	0.5	5	28.5	707.95	100.00	0.1409	0.471	29.92%
LTE 850	824.7	23	0.5	5	28.5	707.95	100.00	0.1409	0.55	25.62%
LTE 1700	1719.7	23	0.5	5	28.5	707.95	100.00	0.1409	1.00	14.09%
LTE 1900	1850.7	23	0.5	5	28.5	707.95	100.00	0.1409	1.00	14.09%
UMTS 850	826.4	24	0.5	5	29.5	891.25	100.00	0.1774	0.551	32.20%
UMTS 1700	1712.4	24	0.5	5	29.5	891.25	100.00	0.1774	1.00	17.74%
UMTS 1900	1852.4	24	0.5	5	29.5	891.25	100.00	0.1774	1.00	17.74%
GSM 850	824.2	33	0.5	5	38.5	7079.46	50.00	0.7046	0.549	128.34%
GSM 1900	1850.2	30	0.5	5	35.5	3548.13	50.00	0.3531	1.00	35.31%

Table 3: Evaluation at 25 cm for the cellular Wireless Module

Technology	Frequency Band	Power	Manufacture tolerance	Gain	EIRP	EIRP	Duty Cycle	Flux Density at 20 cm	Flux Density limit	
	MHz	dBm	dB	dBi	dBm	(mW)	%	mW/cm ²	mW/cm ²	(%)
LTE 700	706.5	23	0.5	5	28.5	707.95	100.00	0.0902	0.471	19.15%
LTE 850	824.7	23	0.5	5	28.5	707.95	100.00	0.0902	0.55	16.40%
LTE 1700	1719.7	23	0.5	5	28.5	707.95	100.00	0.0902	1.00	9.02%
LTE 1900	1850.7	23	0.5	5	28.5	707.95	100.00	0.0902	1.00	9.02%
UMTS 850	826.4	24	0.5	5	29.5	891.25	100.00	0.1135	0.551	20.61%
UMTS 1700	1712.4	24	0.5	5	29.5	891.25	100.00	0.1135	1.00	11.35%
UMTS 1900	1852.4	24	0.5	5	29.5	891.25	100.00	0.1135	1.00	11.35%
GSM 850	824.2	33	0.5	5	38.5	7079.46	50.00	0.4509	0.549	82.13%
GSM 1900	1850.2	30	0.5	5	35.5	3548.13	50.00	0.2260	1.00	22.60%

Table 4: Simulations transmission evaluation at 25 cm

Technology	Frequency Band	Power	Manufacture tolerance	Gain	EIRP	EIRP	Duty Cycle	Flux Density at 20 cm	Flux Density limit	
	MHz	dBm	dB	dBi	dBm	(mW)	%	mW/cm ²	mW/cm ²	(%)
cardless	13.56	-	-	-	-	0.054	100	0.0069	0.979	0.70%
WLAN	2450	15	-	5	20	100.00	100	0.0127	1.00	1.27%
GSM 850	824.2	33	0.5	5	38.5	7079.46	50	0.4509	0.549	82.13%
BT	2450	-	-	-	0.45	1.11	100	0.0001	1.00	0.01%
Total percentage of the limit at 25 cm										84.12%

*worst case from the cellular wireless module used for simulations transmission evaluation
The percentage of the limit for all the power densities at 25 cm is 84.12% of the general public limit.

7 CONCLUSION

Card Processor model CP6100 complies with the requirement of KDB 447498 D01 and with FCC Title 47, Part 2.1091 and Part 1.1310 in mobile exposure condition for a separation distance of more than 25 cm.