MPE REPORT

REPORT NUMBER: I11GC0275-FCC-MPE-2

ON

Type of Equipment: PremierWave XC

Type of Designation: PremierWave XC

Manufacturer: iWOW Connections Pte Ltd

ACCORDING TO

FCC CFR 47, Part 2, FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS
Section 2.1091 Radiofrequency radiation exposure evaluation: mobile devices

China Telecommunication Technology Labs.

Month date, year
Mar, 6, 2012

Signature

He Guili
Director

FCC ID:	R68PWXC
Report Date:	2012-3-6
Test Firm Name:	China Telecommunication Technology Labs
Registration Number:	840587

Statement

The report is a Maximum Permissible Exposure evaluation report according to FCC CFR part 2.1091.

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1 General Information

1.1 Notes

The MPE report was carried out on a sample equipment to demonstrate limited compliance with FCC CFR 47 Part 2.1091.

The test results of this report relate exclusively to the item(s) tested as specified in section 2.

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1.2 Editor

Editor of this test report:

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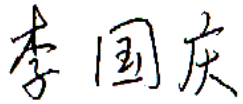
Signature:	

Technical responsibility for area of testing:

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Department:	Department of EMC test
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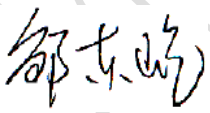
Signature:	

1.3 Testing Laboratory information

1.3.1 Location

Name:	China Telecommunication Technology Labs.
Address:	No. 11, Yue Tan Nan Jie, Xi Cheng District BEIJING P. R. CHINA, 100045
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1.3.2 Details of accreditation status

Accredited by:	DATech Deutsche Akkreditierungsstelle Technik in der TGA GmbH（German Accreditation Body for Technology in the TGA）
Lab number:	DA7130
DAR Registration number:	DAT-PL-162/04-01
Standard:	ISO/IEC 17025:2005

1.3.3 Test location, where different from section 1.3.1

Name:	------
Address:	------

1.4 Details of applicant or manufacturer

1.4.1 Applicant

Name:	Lantronix, Inc.
Address:	167 Technology Drive. Irvine, CA 92618 USA
Country:	USA
Telephone:	949-453-7133
Fax:	949-453-3995
Contact:	Walton Leung
Telephone:	949-453-7133
Email:	walton.leung@lantronix.com

1.4.2 Manufacturer (if different from applicant in section 1.4.1)

Name:	iWOW Connections Pte Ltd
Address:	1 Lorong 2 Toa Payoh #04-01 Yellow Pages Building Singapore 319637

1.4.3 Manufactory (if different from applicant in section 1.4.1)

Name:	iWOW Connections Pte Ltd
Address:	1 Lorong 2 Toa Payoh #04-01 Yellow Pages Building Singapore 319637

2 Test Item

2.1 General Information

Manufacturer: iWOW Connections Pte Ltd
Name: PremierWave XC
Model Number: PremierWave XC
Serial Number: 355292020252775
Production Status: Product
Receipt date of test item: 2011-05-04

2.2 Outline of EUT

EUT is a cellular Radio Module suporting GPRS of 850/900/1800/1900. For GPRS, its multi-slot class is 12 with maximum 4 up slots.

2.3 Modifications Incorporated in EUT

The EUT has not been modified from what is described by the brand name and unique type identification stated above.

2.4 Equipment Configuration

Equipment configuration list:

Item	Generic Description	Manufacturer	Type	Serial No.	Remarks
A	GSM Module	iWOW Connections Pte Ltd	PremierWave XC	355292020252775	None
B	adapter	Click Technology (SHEN ZHEN) CO.LTD	CPS012A120100*	--	None
C	battery	--	--	--	None
D	Earphone	--	--	--	None
E	Antenna	--	--	--	None

Cables:

Item	Cable Type	Manufacturer	Length	Shield	Quantity	Remarks
1	DC cable on Adapter	Unknown	170	No	1	None

Note: the EUT has no adaptor, battery, earphone and cable.

2.5 Other Information

HW Version: --

SW Version: --

Antenna information (provided by applicant):

Typical Antenna Gain:
band 850 MHz: Antenna Gain= 0.08 dBi
band 1900 MHz: Antenna Gain= 4.42 dBi

3 Summary of Results

A brief summary of the tests carried out is shown as following.

Specification Clause	Name of Test	Result
2.1091	MPE	Pass
Note: --		

4 Results

4.1 Applicable Standards

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 0.2m normally can be maintained between the user and the device.

(a) Limits for Occupational / Controlled Exposure

Frequency Range [MHz]	Electric Field Strength (E) [V/m]	Magnetic Field Strength (H) [A/m]	Power Density (S) [mW/cm^2]	Averaging Times $\|E\|^2$, $\|H\|^2$ or S [miniutes]
0.3 – 3.0	614	1.63	(100)*	6
3.0 – 30	1824/f	4.89/f	(900/f)*	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 Exposure

Frequency Range [MHz]	Electric Field Strength (E) [V/m]	Magnetic Field Strength (H) [A/m]	Power Density (S) [mW/cm^2]	Averaging Times $\|E\|^2$, $\|H\|^2$ or S [miniutes]
0.3 – 1.34	614	1.63	(100)*	30
1.34 – 30	824/f	2.19/f	(180/f)*	30
30 – 300	27.5	0.073	0.2	30
300 – 1500	--	--	F/1500	30
1500 - 100000	--	--	1.0	30

Note: f=frequency in MHz; *Plane-wave equivalent power density

For the DUT, the limits for General Population / Uncontrolled Exposure are applicable.

4.2 Conducted RF Power Output

Test Results for GPRS mode:

ARFCN	Peak output power [dBm] 1 slot	Peak output power [dBm] 2 slot	Peak output power [dBm] 3 slot	Peak output power [dBm] 4 slot
128	32.13	29.24	26.99	25.95
190	33.90	31.79	30.31	29.64
251	31.41	28.81	26.93	26.09
512	30.48	29.60	28.10	26.85
661	31.05	30.44	28.97	27.68
810	30.96	30.56	29.14	27.97

Summary:

Time slot No.	Frequency band	Maximum power (dBm)	Channel	Frequency (MHz)	Duty cycle
1	<1 GHz	33.90	190	836.6	0.125
	>1 GHz	31.05	661	1880.0	0.125
2	<1 GHz	31.79	190	836.6	0.25
	>1 GHz	30.56	810	1909.8	0.25
3	<1 GHz	30.31	190	836.6	0.375
	>1 GHz	29.14	810	1909.8	0.375
4	<1 GHz	29.64	190	836.6	0.5
	>1 GHz	27.97	810	1909.8	0.5

4.3 Calculation Information

From the antenna specifications provided by the applicant, the typical antenna gain is 0.08 dBi for 850MHz band and 4.42 dBi for 1900MHz band.

So for conservative evaluation consideration, only maximum power of each frequency band based on the tighter limits respectively are used to calculate the boundary power density.

Based on the FCC OET Bulletin 65 Supplement C and 47 CFR §2.1091, the DUT is evaluated as a mobile device.

4.4 Evaluation Result

(1) Operation in cellular band (824 – 849 MHz):

Take the worst case as an example, in which an antenna with 0.08 dBi gain is used. The resulted power density at a distance of 20 cm can be deducted as follows:

Time slot No.	Maximum power conducted (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (mW)	Duty Cycle	Power Density (mW/cm^2)
1	33.90	0.08	33.98	2454.71	0.125	0.062
2	31.79	0.08	31.87	1510.08	0.25	0.077
3	30.31	0.08	30.39	1073.99	0.375	0.082
4	29.64	0.08	29.72	920.45	0.5	0.093

Note:

EIRP = Maximum power conducted (dBm)+ Antenna Gain (dBi),

Power Density = EIRP*Duty Cycle/($4\pi R^2$),

R=20cm

Considering the worse case of above two modes, we can get:

Power $density_{max}$ =0.093 mW/cm^2

The MPE limit for General Population/Uncontrolled Exposure is shown in the FCC OET Bulletin 65 Supplement C and can be calculated as follows:

MPE limit = 836.6/1500 = 0.56 mW/cm^2

As we can see the resulted power density is below the MPE limit, therefore the DUT in Cellular band is compliant with the FCC rules on RF exposure.

(2) Operation in PCS band (1850 – 1910 MHz):

Take the worst case as an example, in which an antenna with 4.42 dBi gain is used. The resulted ERP can be expressed as follows:

Time slot No.	Maximum power conducted (dBm)	Antenna Gain (dBi)	ERP (dBm)	ERP (mW)
1	31.05	4.42	33.32	2147.83
2	30.56	4.42	32.83	1918.67
3	29.14	4.42	31.41	1383.57
4	27.97	4.42	30.24	1056.82

Note:

ERP = Maximum power conducted (dBm)+ Antenna Gain (dBi) - 2.15dB

The FCC OET Bulletin 65 Supplement C states that mobile devices identified in 47 CFR §2.1091 that operate at frequencies above 1.5 GHz with an ERP of 3.0 watts or more are required to perform routine environmental evaluation for RF exposure prior to equipment authorization or use; otherwise, they are categorically excluded.

As we can see this resulted ERP is below 3 W, therefore routine environmental evaluation for RF exposure prior to equipment authorization or use for the DUT in PCS band is categorically excluded.

Note: The tighter limits are used for low and high band in above tables.

The End of this Report