MPE REPORT

REPORT NUMBER: I11GC0114-FCC-MPE

ON

Type of Equipment: Cellular Radio Module

Type of Designation: TR-900

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
June, 20, 2011

Signature

He Guili
Director

FCC ID:	QPB-TR9000311
Report Date:	2011-6-20
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.

CONTENTS

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:

Name:	Li Guoqing
Position:	Engineer
Department:	Department of EMC test
Date:	2011-06-20
Signature:	李国庆

Technical responsibility for area of testing:

Name:	Zou Dongyi
Position:	Manager
Department:	Department of EMC test
Date:	2011-06-20
Signature:	邹东义

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
Tel:	+86 10 68094053
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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:	iWOW Connections Pte Ltd
Address:	1 Lorong 2 Toa Payoh #04-01 Yellow Pages Building
	Singapore 319637
Country:	Singapore
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Fax:	+65 6748 2668
Contact:	Lee Yao Chiang
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1.4.2 Manufacturer (if different from applicant in section 1.4.1)

Name:	--
Address:	--

1.4.3 Manufactory (if different from applicant in section 1.4.1)

Name:	--
Address:	--

2 Test Item

2.1 General Information

Manufacturer: iWOW Connections Pte Ltd
Name: Cellular Radio Module
Model Number: TR-900
Serial Number: I4010 D01
Production Status: Product
Receipt date of test item: 2011-03-02

2.2 Outline of EUT

EUT is a cellular Radio Module suporting GSM and GPRS of 850/1900. 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	TR-900	I4010 D01	None
B	adapter	--	--	--	None
C	battery	--	--	--	None
D	Earphone	--	--	--	None
E	Antenna	--	--	--	None

Cables:

Item	Cable Type	Manufacturer	Length	Shield	Quantity	Remarks
1	DC cable on Adapter	--	--	--	--	None

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

2.5 Other Information

HW Version: P1

SW Version: AU001.2.0.0

Antenna information (provided by applicant):
Typical Antenna Gain：0 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 GSM mode:

ARFCN	Peak output power 1 slot [dBm]
128	30.45
190	32.83
251	30.81
512	28.09
661	28.32
810	29.48

Test Results for GPRS mode:

ARFCN	Peak output power 4 slot [dBm]
128	26.44
190	30.30
251	26.82
512	28.06
661	29.52
810	29.43

Summary:

Time slot No.	Frequency band	Maximum power (dBm)	Channel	Frequency (MHz)	Duty cycle
1	<1 GHz	32.83	190	836.6	0.125
	>1 GHz	29.48	810	1909.8	0.125
4	<1 GHz	30.30	190	836.6	0.5
	>1 GHz	29.52	661	1880.0	0.5

4.3 Calculation Information

From the antenna specifications provided by the applicant, the typical antenna gain is 0 dBi.

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):

The peak conducted output power of DUT in Cellular band is 30.30 dBm for 4 slots and 32.83 dBm for 1 slot. Take the worst case as an example, in which an antenna with 0 dBi gain is used. The resulted power density at a distance of 20 cm can be deducted as follows:

For 4 slots:

EIRP = 30.30 + 0 = 30.30 dBm = 1072 mW

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

= 1072*0.5/($4*\pi*20^2$) = 0.107 mW/cm^2

where DutyCycle is 0.5 for GPRS operation (the worst case) and R is 20 cm.

For 1 slot:

EIRP = 32.83 + 0 = 32.83 dBm = 1919 mW

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

= 1919*0.125/($4*\pi*20^2$) = 0.048 mW/cm^2

where DutyCycle is 0.125 for GPRS operation (the worst case) and R is 20 cm.

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

Power $density_{max}$ =0.107 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):

The peak conducted output power of DUT in PCS band is 29.52 dBm for 4 slots and 29.48 dBm for 1 slot. Take the worst case as an example, in which an antenna with 0 dBi gain is used. The resulted ERP can be expressed as follows:

For 4 slots:

ERP = 29.52 + 0 –2.15 = 27.37 dBm (0.545 W) < 3 W

For 1 slot:

ERP = 29.48 + 0 –2.15 = 27.33 dBm (0.541 W) < 3 W

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