Radio Frequency Exposure Report

On Behalf of

gridComm Pte Ltd

71 Ayer Rajah Crescent Unit 03-23 Singapore 139951

Product Name:	**PLC-RF DIN RAIL MODEM**
Model/Type No.:	**GC9838-LR**
FCC ID:	**2ALW7-GC9838LR**
Prepared By:	**Shenzhen Hongcai Testing Technology Co., Ltd.** 1st-3rd Floor, Building C, Shuanghuan Xin Yi Dai Hi-Tech Industrial Park, No.8 Baoqing Road, Baolong Industrial Zone, Longgang District, Shenzhen, Guangdong, China Tel: +86-755-86337020 Fax:+86-755-86337028
Report Number:	HCT17DR094E-2
Tested Date:	April 11~27, 2017
Issued Date:	April 27, 2017
Tested By:	Jerry Zhao/

Reviewed By: Owen.Yang
EMC Technical Supervisor

Approved By: Tony Wu
EMC Technical Manager

TABLE OF CONTENTS

Shenzhen Hongcai Testing Technology Co.,Ltd.
1st—3rd Floor, Building C,Shuanghuan Xin Yi Dai Hi—Tech Industrial Park, No.8 Baoqing Road, Baolong Industrial Zone, Longgang District, Shenzhen City, P.R.China 518053
Tel : +86 755 86337020(60Lines) Fax : +86 755 86337028 Web : www.hct-test.com

1 - GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant:	gridComm Pte Ltd
Address of Applicant:	71 Ayer Rajah Crescent Unit 03-23 Singapore 139951
Manufacturer:	Shenzhen Ju Yang Electronics Technology Co. Ltd.
Address of Manufacturer:	Room 384, FuYong Information Building, BaoAn District, ShenZhen City

General Description of E.U.T

Items	Description
EUT Description:	PLC-RF DIN RAIL MODEM
Model No.:	GC9838-LR
Trade Mark:	gridComm
Supplementary Model:	N/A
Frequency Band:	902MHz~928MHz
Modulation Type:	FSK
Channel Spacing:	500KHz
Number of Channels:	53 Channels
Antenna Type:	Terminal Antenna
Antenna Gain:	2.5dBi
Power Rating:	Input: AC 100~240V, 0.05A, 2W Output: AC 100~240V

Remark:* *The test data gathered are from the production sample provided by the manufacturer.*

Shenzhen Hongcai Testing Technology Co.,Ltd.
1st—3rd Floor, Building C,Shuanghuan Xin Yi Dai Hi—Tech Industrial Park, No.8 Baoqing Road, Baolong Industrial Zone, Longgang District, Shenzhen City, P.R.China 518053
Tel : +86 755 86337020(60Lines) Fax : +86 755 86337028 Web : www.hct-test.com

1.2 Objective

The objective of the following report is used to demonstrate that EUT operated in a manner that ensures the public is not exposed to radio frequency energy levels in excess of the relative provisions of FCC 47CFR Part 1.1307

1.3 General Description of Test

Items	Description
EUT Frequency band	☐ FHSS: 2.400GHz ~ 2.483GHz ☐ WLAN: 2.400GHz ~ 2.483GHz ☐ WLAN: 5.18GHz ~ 5.32GHz / 5.50GHz ~ 5.70GHz ☐ WLAN: 5.745GHz ~ 5825GHz ☒Others: 902-928MHz
Device category	☐Portable (<20cm separation) ☒Mobile (>20cm separation) ☐Others _____
Exposure classification	☐Occupational/Controlled exposure (S = 5mW/cm2) ☒General Population/Uncontrolled exposure (S=1mW/cm^2) ☐Others: _____
Antenna diversity	☒Single antenna ☐Multiple antennas: ☐Tx diversity ☐Rx diversity ☐Tx/Rx diversity
Max. output power	-9.71dBm(0.107mW)
Antenna gain (Max)	2.5dBi (Numeric gain:1.78)
Evaluation applied	☒MPE Evaluation ☐SAR Evaluation
Note: *1. The maximum output power is* -9.71dBm at 902MHz *(with 1.78 numeric antenna gain.)* *2. For mobile or fixed location transmitters, no SAR consideration applied. The minimum separation generally be used is at least 20 cm, even if the calculations indicate that the MPE distance would be lesser.*	

Shenzhen Hongcai Testing Technology Co.,Ltd.
1st—3rd Floor, Building C,Shuanghuan Xin Yi Dai Hi—Tech Industrial Park, No.8 Baoqing Road, Baolong Industrial Zone, Longgang District, Shenzhen City, P.R.China 518053
Tel : +86 755 86337020(60Lines) Fax : +86 755 86337028 Web : www.hct-test.com

1.4 Human Exposure Assessment Results

Calculation

Given $E = \frac{\sqrt{30 \times P \times G}}{d}$ & $S = \frac{E^2}{3770}$

Where E = *Field Strength in Volts / meter*
P = *Power in Watts*
G = *Numeric antenna gain*
d = *Distance in meters*
S = *Power Density in milliwatts / square centimeter*

Combining equations and re-arranging the terms to express the distance as a function of the remaining variables yields:

$$S = \frac{30 \times P \times G}{3770 d^2}$$

Changing to units of mW and cm, using:

P (mW) = P (W) / 1000 and
*d (cm) =100 * d (m)*

Yields

$$S = \frac{30 \times (P/1000) \times G}{3770 \times (d/100)^2} = 0.0796 \times \frac{P \times G}{d^2}$$ ***Equation 1***

Where d = *distance in cm*
P = *Power in mW*
G = *Numeric antenna gain*
S = *Power Density in* mW/cm^2

EUT parameter (data from the separate report)	
Given $E = \frac{\sqrt{30 \times P \times G}}{d}$ & $S = \frac{E^2}{3770}$	Where G: numerical gain of transmitting antenna; TP: Transmitted power in watt; d: distance from the transmitting antenna in meter
Max average output power in Watt (TP)	-9.71dBm(0.107mW)
Antenna gain (G)	2.5dBi (Numeric gain:1.78)
Exposure classification	S=1mW/cm^2
Minimum distance in meter (d) (from transmitting structure to the human body)	20cm (0.2m)

Shenzhen Hongcai Testing Technology Co.,Ltd.
1st—3rd Floor, Building C,Shuanghuan Xin Yi Dai Hi—Tech Industrial Park, No.8 Baoqing Road, Baolong Industrial Zone, Longgang District, Shenzhen City, P.R.China 518053
Tel : +86 755 86337020(60Lines) Fax : +86 755 86337028 Web : www.hct-test.com

Yields

$$S = \frac{30xPxG}{3770d^2}, \quad P=0.000107W, G=1.78, d=0.2$$

$S=0.000038mW/cm^2$

Or

$$d=\sqrt{\frac{30xPxG}{3770S}}, \quad S=1, P=0.00013W, G=1.78$$

$d=0.0014m$

Conclusion:

$S=0.00004mW/cm^2$ is significant lower than the General Population Exposure Power Density Limit $1mW/cm^2$ or except the distance when human body proximity to the antenna is less than 0.14 cm then will reach the General Population Exposure Power Density Limit

(For mobile or fixed location transmitters, the maximum power density is 1.0 mW / cm^2 even if the calculation indicates that the power density would be larger.)

Shenzhen Hongcai Testing Technology Co.,Ltd.
1st—3rd Floor, Building C,Shuanghuan Xin Yi Dai Hi—Tech Industrial Park, No.8 Baoqing Road, Baolong Industrial Zone, Longgang District, Shenzhen City, P.R.China 518053
Tel : +86 755 86337020(60Lines) Fax : +86 755 86337028 Web : www.hct-test.com