RF Exposure Evaluation Report

APPLICANT	**:**	**Green Packet Berhad, Taiwan**
EQUIPMENT	**:**	**TDD-LTE Band 41 Outdoor CPE**
BRAND NAME	**:**	**Green Packet**
MODEL NAME	**:**	**OD-235**
FCC ID	**:**	**W9V-OD235-GP**
STANDARD	**:**	**47 CFR Part 2.1091**

We, SPORTON INTERNATIONAL INC., would like to declare that the device has been evaluated in accordance with 47 CFR Part 2.1091, and pass the limit. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by: Eric Huang / Deputy Manager

Approved by: Jones Tsai / Manager

Testing Laboratory
1190

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Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA412439	Rev. 01	Initial issue of report	Mar. 25, 2014

1. Administration Data

1.1. Testing Laboratory

Test Site	SPORTON INTERNATIONAL INC.
Test Site Location	No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL: +886-3-327-3456 FAX: +886-3-328-4978

1.2. Applicant

Company Name	Green Packet Berhad, Taiwan
Address	6F, No.21, Lane 583, Rueiguang Rd. Neihu District, Taipei City 11492, Taiwan

1.3. Manufacturer

Company Name	Green Packet Berhad, Taiwan
Address	6F, No.21, Lane 583, Rueiguang Rd. Neihu District, Taipei City 11492, Taiwan

2. Description of Equipment Under Test (EUT)

Product Feature & Specification	
EUT Type	TDD-LTE Band 41 Outdoor CPE
Brand Name	Green Packet
Model Name	OD-235
FCC ID	W9V-OD235-GP
Integrated Module	Brand Name: TDD-LTE Band 41 Module Model Name: SQTD4041
Wireless Technology and Frequency Range	LTE Band 41: 2498.5 MHz ~ 2687.5 MHz
Mode	• LTE: QPSK, 16QAM
Antenna Type	Patch Array Antenna
HW Version	miniPCI e, LTE module: WLTCS-101_V02 main: WLTQS-103_V01
SW Version	01.01.02.003
EUT Stage	Production Unit

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

3. Maximum RF average output power among production units

LTE Band 41				
Average power(dBm)				
Modulation	BW (MHz)	RB size	Target MPR	Target Power
QPSK	20	≤ 18	0	23.0
QPSK	20	> 18	0	23.0
16QAM	20	≤ 18	0	23.0
16QAM	20	> 18	0	23.0
QPSK	15	≤ 16	0	23.0
QPSK	15	> 16	0	23.0
16QAM	15	≤ 16	0	23.0
16QAM	15	> 16	0	23.0
QPSK	10	≤ 12	0	23.0
QPSK	10	> 12	0	23.0
16QAM	10	≤ 12	0	23.0
16QAM	10	> 12	0	23.0
QPSK	5	≤ 8	0	23.0
QPSK	5	> 8	0	23.0
16QAM	5	≤ 8	0	23.0
16QAM	5	> 8	0	23.0

The table below summarized necessary items addressed in KDB 941225 D05 v02.

FCC ID	W9V-OD235-GP
EUT	TDD-LTE Band 41 Outdoor CPE
Operating Frequency Range of each LTE transmission band	LTE Band 41: 2498.5 MHz ~ 2687.5 MHz
Channel Bandwidth	LTE Band 41: 5MHz, 10MHz, 15MHz, 20MHz

Transmission (H, M, L) channel numbers and frequencies in each LTE band

LTE Band 41

	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	39675	2498.5	39700	2501	39725	2503.5	39750	2506
M	40620	2593	40620	2593	40620	2593	40620	2593
H	41565	2687.5	41540	2685	41515	2682.5	41490	2680

uplink modulations used	QPSK, and 16QAM
LTE Voice / Data requirements	Data only
LTE MPR permanently built-in by design	Yes, per 3GPP TS 36.101 v11.0.0

Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3

Modulation	Channel bandwidth / Transmission bandwidth (RB)						MPR (dB)
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2

LTE A-MPR	In the base station simulator configuration, Network Setting value is set to NS_01 to disable A-MPR during SAR testing.
Base station simulator used for Testing	Anritsu MT8820C

4. RF Exposure Limit Introduction

According to ANSI/IEEE C95.1-1992, the criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio frequency (RF) radiation as specified in §1.1310.

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/f2)	6
30-300	61.4	0.163	1.0	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/f2)	30
30-300	27.5	0.073	0.2	30
300-1500			f/1500	30
1500-100,000			1.0	30

The MPE was calculated at 20 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

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

Where:
S = Power Density
P = Output Power at Antenna Terminals
G = Gain of Transmit Antenna (linear gain)
R = Distance from Transmitting Antenna

5. Radio Frequency Radiation Exposure Evaluation

5.1. Standalone Power Density Calculations

Band	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum EIRP (dBm)	Maximum EIRP (W)	Average EIRP (mW)	Power Density at 20cm (mW/cm2)	Limit (mW/cm2)
LTE Band 41	2498.5	11.0	23.0	34.000	2.512	2511.886	0.500	1.000

Note: For conservativeness, the lowest uplink frequency of each band is used to determine the MPE limit of that band

Conclusion:

According to 47 CFR §2.1091, the RF exposure analysis concludes that the RF Exposure is FCC compliant.