RF Exposure Evaluation Report

APPLICANT	**: Kodiak Networks Inc**
EQUIPMENT	**: Carbonado – Wifi Device**
BRAND NAME	**: Carbonado**
MODEL NAME	**: UA400**
Marketing NAME	**: Carbonado**
FCC ID	**: RTKU400**
FILING TYPE	**: Certification**
STANDARD	**: OET Bulletin 65 Supplement C (Edition 01-01)**

We, SPORTON INTERNATIONAL (KUNSHAN) INC., would like to declare that the device has been evaluated in accordance with FCC OET Bulletin 65 Supplement C (Edition 01-01), and pass the limit. Without written approval of SPORTON INTERNATIONAL (KUNSHAN) INC., the test report shall not be reproduced except in full.

Reviewed by:

Jones Tsai

Jones Tsai / Manager

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Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA322101	Rev. 01	Initial issue of report	Mar. 15, 2013

1. RF Exposure Introduction

Requirements

Three different categories of transmitters are defined by the FCC in OET Bulletin 65. These categories are fixed installation, mobile and portable and are defined as follows:

▪ **Fixed installation:**

Fixed location means that the device, including its antenna, is physically secured at a permanent location and is not able to be easily moved to another location. Additionally, distance to humans form the antenna is maintained to at least 2 meters.

▪ **Mobile Devices:**

A mobile device is defined as a transmitting device designed to be used in other than fixed locations and to be generally used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter's radiating structures and the body of the user or nearby persons. Transmitters designed to be used by consumers or workers that can be easily re-located, such as a wireless modem operating in a laptop computer, are considered mobile devices if they meet the 20 centimeter separation requirement. The FCC rules for evaluating mobile devices for RF compliance are found in 47 CFR 2.1091.

▪ **Portable Devices:**

A portable device is defined as a transmitting device designed to be used so that the radiating structure(s) of the device is/are within 20 centimeters of the body of the user. Portable device requirements are found in Section 2.1093 of the FCC's Rules (47 CFR 2.1093)

The FCC also categorizes the use of the device as based upon the user's awareness and ability to exercise control over his or her exposure. The two categories defined are Occupational/Controlled Exposure and General Population/Uncontrolled Exposure. These two categories are defined as follows:

▪ **Occupational/controlled Exposure:**

In general, occupational/controlled exposure limits are applicable to situation in which persons are exposed as a consequence of their employment, who have been made fully aware of the potential for exposure. Awareness of the potential for RF exposure in a workplace or similar environment can be provided through specific training as part of a RF safety program. If appropriate, warning signs and labels can also be used to establish such awareness by providing prominent information on the risk of potential exposure and instructions on methods to minimize such exposure risks.

▪ **General Population/Uncontrolled Exposure:**

The general population / uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity. Warning labels placed on low-power consumer devices such as cellular telephones are not considered sufficient to allow the device to be considered under the occupational/controlled category, and the general population/uncontrolled exposure limits apply to these devices.

2. Administration Data

2.1 Testing Laboratory

Test Site	SPORTON INTERNATIONAL (KUNSHAN) INC.
Test Site Location	No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P.R.C. TEL: +86-0512-5790-0158 FAX: +86-0512-5790-0958

2.2 Applicant

Company Name	Kodiak Networks Inc
Address	1501 10th St #130 Plano, TX 75074, United States

2.3 Manufacturer

Company Name	Shenzhen Power Idea Technology Limited
Address	1401A, Section B, Bin hai zhi Chuang tower, Wen xin 5 Road, Nan Shan, Shen Zhen city, PRC

3. General Information

3.1 Description of Device Under Test (DUT)

Product Feature & Specification	
DUT Type	Carbonado – Wifi Device
Brand Name	Carbonado
Model Name	UA400
Marketing Name	Carbonado
FCC ID	RTKU400
Tx Frequency	Bluetooth: 2402 MHz ~ 2480 MHz WLAN: 2412 MHz ~ 2462 MHz
Rx Frequency	Bluetooth: 2402 MHz ~ 2480 MHz WLAN: 2412 MHz ~ 2462 MHz
Antenna Type	Monopole Antenna
HW Version	P920_MB_V0.3
SW Version	Android 2.3.7
Type of Modulation	Bluetooth BDR (1Mbps) : GFSK Bluetooth EDR (2Mbps) :π/4-DQPSK Bluetooth EDR (3Mbps) : 8-DPSK 802.11b : DSSS (DBPSK / DQPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)
DUT Stage	Identical Prototype

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

3.2 Applied Standard

The Specific Absorption Rate (SAR) testing specification, method, and procedure for this device is in accordance with the following standards:

- FCC OET Bulletin 65 Supplement C (Edition 01-01)
- FCC KDB 447498 D01 v05

4. RF Exposure Evaluation

4.1 Maximum RF output power among production units

Maximum Target Average Power for Production Unit (dBm)					
Mode / Band	IEEE 802.11				
	a	b	g	n-HT20	n-HT40
2.4 GHz WLAN		8.0	7.0	5.0	5.0

Maximum Target Average Power for Production Unit (dBm)			
Mode / Band	Bluetooth		
	1Mbps (GFSK)	2Mbps (π/4-DQPSK)	3Mbps (8-DPSK)
Bluetooth	4.0	2.0	2.0

4.2 Conducted RF Output Power (Unit: dBm)

Channel	Frequency	2.4GHz 802.11b RF Power (dBm)			
		DSSS Data Rate			
		1 Mbps	2 Mbps	5.5 Mbps	11 Mbps
CH 01	2412 MHz	7.90	7.62	7.47	7.88
CH 06	2437 MHz	6.86	6.81	7.24	7.25
CH 11	2462 MHz	6.82	6.80	6.78	6.75

Channel	Frequency	802.11g Average Power (dBm)							
		OFDM Data Rate							
		6 Mbps	9 Mbps	12 Mbps	18 Mbps	24 Mbps	36 Mbps	48 Mbps	54 Mbps
CH 01	2412 MHz	6.08	6.03	6.03	6.07	6.01	5.92	6.01	5.93
CH 06	2437 MHz	4.98	4.94	4.97	5.02	4.95	4.85	4.84	4.87
CH 11	2462 MHz	5.03	5.01	5.00	5.03	4.98	4.92	4.92	4.91

Channel	Frequency	WLAN 2.4GHz Band 802.11n-HT20 Average Power (dBm)							
		OFDM Data Rate							
		6.5 Mbps	13 Mbps	19.5 Mbps	26 Mbps	39 Mbps	52 Mbps	58.5 Mbps	65 Mbps
CH 01	2412 MHz	4.10	4.08	4.09	4.07	4.09	4.09	4.05	4.08
CH 06	2437 MHz	2.93	2.94	2.95	2.97	2.98	2.95	2.98	3.02
CH 11	2462 MHz	3.06	2.99	3.05	3.04	3.04	3.01	3.04	3.03

Channel	Frequency	WLAN 2.4GHz Band 802.11n-HT40 Average Power (dBm)							
		OFDM Data Rate							
		13.5 Mbps	27 Mbps	40.5 Mbps	54 Mbps	81 Mbps	108 Mbps	121.5 Mbps	135 Mbps
CH 03	2422 MHz	4.08	3.95	4.07	3.94	3.96	3.90	3.93	3.86
CH 06	2437 MHz	3.45	3.78	3.69	3.63	3.62	3.58	3.60	3.52
CH 09	2452 MHz	2.61	3.01	2.87	2.83	2.78	2.77	2.76	2.74

Channel	Frequency	Bluetooth Average Power (dBm)								
		Data Rate								
		DH1	DH3	DH5	2DH1	2DH3	2DH5	3DH1	3DH3	3DH5
CH 00	2402	1.86	1.61	1.91	-0.21	-0.44	-0.57	-0.31	-0.61	-0.60
CH 39	2441	2.99	2.76	2.93	0.88	0.27	0.70	1.01	0.32	0.70
CH 78	2480	0.58	0.37	0.44	-1.45	-2.30	-1.93	-1.49	-2.22	-1.92

4.3 Radio Frequency Radiation Exposure Evaluation

Wireless Interface	Max Power (dBm)	mW	Test Distance (mm)	Frequency (GHz)	Exclusion thresholds
Bluetooth	4	2.51	5	2.48	0.79
WLAN 2.4GHz	8	6.31	5	2.462	1.98

Note:

1. Per KDB 447498 D01 v05, the 1-g and 10-g SAR test exclusion thresholds for 100MHz to 6GHz at test separation distances ≤50mm are determined by:

   [(*max. power of channel, including tune-up tolerance, mW*) / (*min. test separation distance, mm*)] · [√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR

   - f(GHz) is the RF channel transmit frequency in GHz
   - Power and distance are rounded to nearest mW and mm before calculation
   - The result is rounded to one decimal place for comparison

Conclusion: According to KDB 447498 D01v05 exclusion thresholds is 0.79 for Bluetooth and 1.98 for WLAN are < 3, RF exposure evaluation are not required.