



## RF Exposure Evaluation Report

**APPLICANT** : Tecom Co., Ltd.  
**EQUIPMENT** : Household Burglar-Alarm and Fire Warning System Unit  
**BRAND NAME** : Cisco  
**MODEL NAME** : DLC-100  
**FCC ID** : D6XDLC100  
**FILING TYPE** : Certification  
**STANDARD** : OET Bulletin 65 Supplement C (Edition 01-01)

We, SPORTON INTERNATIONAL 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 INC., the test report shall not be reproduced except in full.

Reviewed by:

Jones Tsai / Manager

### **SPORTON INTERNATIONAL INC.**

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FCC ID : D6XDLC100

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**Revision History**

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA241855	Rev. 01	Initial issue of report	Sep. 03, 2012

## **1. Administration Data**

### **1.1. Testing Laboratory**

<b>Test Site</b>	SPORTON INTERNATIONAL INC.
<b>Test Site Location</b>	No. 52, Hwa Ya 1 <sup>st</sup> 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**

<b>Company Name</b>	Tecom Co., Ltd.
<b>Address</b>	No. 23, R&D Road 2, Science-Based Industrial Park, Hsin-Chu Taiwan

### **1.3. Manufacturer**

<b>Company Name</b>	Global Brands Manufacture (DongGuan) Ltd.
<b>Address</b>	Yue Yuan Industrial Estate, Huang Jiang Zhen, DongGuan City, GuangDong Province, China.

## 2. Description of Device Under Test (DUT)

Product Feature & Specification	
<b>DUT Type</b>	Household Burglar-Alarm and Fire Warning System Unit
<b>Brand Name</b>	Cisco
<b>Model Name</b>	DLC-100
<b>FCC ID</b>	D6XDLC100
<b>Tx Frequency</b>	GSM850 : 824.2 MHz ~ 848.8 MHz GSM1900 : 1850.2 MHz ~ 1909.8 MHz WCDMA Band V : 826.4 MHz ~ 846.6 MHz WCDMA Band II : 1852.4 MHz ~ 1907.6 MHz 802.11b/g/n : 2412 MHz ~ 2462 MHz Z-wave : 908.4Mhz LPRF : 915MHz
<b>Rx Frequency</b>	GSM850 : 869.2 MHz ~ 893.8 MHz GSM1900 : 1930.2 MHz ~ 1989.8 MHz WCDMA Band V : 871.4 MHz ~ 891.6 MHz WCDMA Band II : 1932.4 MHz ~ 1987.6 MHz 802.11b/g/n : 2412 MHz ~ 2462 MHz Z-wave : 908.4Mhz LPRF : 915MHz
<b>Antenna Type</b>	WWAN : Dipole Antenna WLAN : PIFA Antenna Z-wave : PIFA Antenna LPRF : Helical Antenna
<b>Type of Modulation</b>	GSM: GMSK GPRS: GMSK EDGE: GMSK / 8PSK WCDMA: QPSK (Uplink) HSDPA: QPSK (Uplink) HSUPA: QPSK (Uplink) 802.11b : DSSS 802.11g/n : OFDM Z-wave: FSK LPRF : GFSK
<b>DUT Stage</b>	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. RF Exposure Limit Introduction

The FCC categorizes the RF exposure limit based on the intended usage of the device and the user's awareness and ability to exercise control over his or her exposure. This is a consumer product to be used in the home, hence this device was evaluated by mobile device with general population/uncontrolled exposure condition. The definition of these category are shown as follows:

▪ **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 transmitters' 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 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.

▪ **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.

Per OET Bulletin 65, the power density limit for General Population/Uncontrolled Exposure summary here:

**Table:** Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Power Density (S) (mW/cm <sup>2</sup> )
0.3–1.34	*(100)
1.34–30	*(180/f <sup>2</sup> )
30–300	0.2
300–1500	f/1500
1500–100,000	1.0

f = frequency in MHz

\* = Plane-wave equivalent power density

#### **4. Radio Frequency Radiation Exposure Evaluation**

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 (i.e., 20 cm for this product)

For this device, the calculation is as follows:

##### **WWAN Operating frequency ≤ 1.5GHz**

Function	Antenna Gain (dBi)	Antenna Gain (numeric)	Maximum Average Power (dBm)	Maximum Average Power (mW)	Source-Based Time-Average EIRP (mW)	Source-Based Time-Average ERP (mW)	Calculated RF Exposure (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
GPRS 850, 1-slot	3.5	2.24	32.77	1892.34	529.55	322.78	0.11	0.55
GPRS 850, 2-slot	3.5	2.24	32.76	1887.99	1056.67	644.08	0.21	0.55
WCDMA Band 5	3.5	2.24	23.51	224.39	125.59	38.27	0.10	0.55

##### **WWAN Operating frequency > 1.5GHz**

Function	Antenna Gain (dBi)	Antenna Gain (numeric)	Maximum Average Power (dBm)	Maximum Average Power (mW)	Source-Based Time-Average EIRP (mW)	Calculated RF Exposure (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
GPRS 1900 1-slot	1.7	1.48	29.88	972.75	179.85	0.04	1.00
GPRS 1900 2-slot	1.7	1.48	29.85	966.05	357.22	0.07	1.00
WCDMA Band 2	1.7	1.48	23.23	210.38	77.79	0.06	1.00

**Operated in WLAN2.4G 802.11b mode <Chain 0>:**

Channel Number	Frequency (MHz)	Antenna Gain (dBi)	Antenna Gain (numeric)	Maximum Average Power (dBm)	Maximum Average Power (mW)	Average EIRP (mW)	Calculated RF Exposure (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
1	2412	3.90	2.45	18.45	69.98	171.79	0.03	1.00
6	2437	3.90	2.45	17.96	62.52	153.46	0.03	1.00
11	2462	3.90	2.45	17.70	58.88	144.54	0.03	1.00

**Operated in WLAN2.4G 802.11g mode <Chain 0>:**

Channel Number	Frequency (MHz)	Antenna Gain (dBi)	Antenna Gain (numeric)	Maximum Average Power (dBm)	Maximum Average Power (mW)	Average EIRP (mW)	Calculated RF Exposure (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
1	2412	3.90	2.45	14.35	27.23	66.83	0.01	1.00
6	2437	3.90	2.45	16.67	46.45	114.02	0.02	1.00
11	2462	3.90	2.45	13.13	20.56	50.47	0.01	1.00

**Operated in WLAN2.4G 802.11n (BW 20MHz) mode <Chain 0>:**

Channel Number	Frequency (MHz)	Antenna Gain (dBi)	Antenna Gain (numeric)	Maximum Average Power (dBm)	Maximum Average Power (mW)	Average EIRP (mW)	Calculated RF Exposure (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
1	2412	3.90	2.45	13.53	22.54	55.34	0.01	1.00
6	2437	3.90	2.45	16.71	46.88	115.08	0.02	1.00
11	2462	3.90	2.45	12.71	18.66	45.81	0.01	1.00

**Operated in WLAN2.4G 802.11n (BW 20MHz) mode <Chain 1>:**

Channel Number	Frequency (MHz)	Antenna Gain (dBi)	Antenna Gain (numeric)	Maximum Average Power (dBm)	Maximum Average Power (mW)	Average EIRP (mW)	Calculated RF Exposure (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
1	2412	0.90	1.23	13.07	20.28	24.95	0.00	1.00
6	2437	0.90	1.23	16.66	46.34	57.02	0.01	1.00
11	2462	0.90	1.23	12.88	19.41	23.88	0.00	1.00



Operated in WLAN2.4G 802.11n (BW 20MHz) mode <Chain 0+1>:

Channel Number	Frequency (MHz)	Antenna Gain (dBi)	Antenna Gain (numeric)	Maximum Average Power (dBm)	Maximum Average Power (mW)	Average EIRP (mW)	Calculated RF Exposure (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
1	2412	3.90	2.45	15.17	32.89	80.72	0.02	1.00
6	2437	3.90	2.45	19.74	94.19	231.21	0.05	1.00
11	2462	3.90	2.45	14.71	29.58	72.61	0.01	1.00

Operated in WLAN2.4G 802.11n (BW 40MHz) mode <Chain 0+1>:

Channel Number	Frequency (MHz)	Antenna Gain (dBi)	Antenna Gain (numeric)	Maximum Average Power (dBm)	Maximum Average Power (mW)	Average EIRP (mW)	Calculated RF Exposure (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
3	2422	3.90	2.45	14.57	28.64	70.31	0.01	1.00
6	2437	3.90	2.45	16.77	47.53	116.68	0.02	1.00
9	2452	3.90	2.45	15.18	32.96	80.91	0.02	1.00

Operated in Z-Wave mode

Frequency (MHz)	EIRP Peak Output Power (dBm)	EIRP Peak Output Power (mW)	Calculated RF Exposure (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
908.4	5.72	3.73	0.00	0.61

Operated in LPRF mode

Frequency (MHz)	EIRP Peak Output Power (dBm)	EIRP Peak Output Power (mW)	Calculated RF Exposure (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
915	2.98	1.99	0.00	0.61

**For WWAN and WLAN Transmit Simultaneously**

WWAN Max. Power Density (GSM850, GPRS 10)	WLAN Max. Power Density	WWAN Freq. Dependent MPE Limits	WLAN Freq. Dependent MPE Limits	Sum of the MPE Ratios	MPE Ratio Limit
0.21	0.05	0.55	1.0	0.43	1.0

**Conclusion:**

Per part 2.1091(c), EUT source-based time-averaged ERP < 1.5W for RF operating frequency <= 1.5GHz, EUT source-based time-averaged EIRP < 3W for RF operating frequency > 1.5GHz, routine evaluation of MPE is not required; MPE calculation is sufficient to show compliance. The MPE calculation results indicate that the DUT complies with the RF exposure limit of FCC OET Bulletin 65 Supplement C (Edition 01-01).