



# RF Exposure Evaluation Report

**APPLICANT** : Mobile Devices Ingénierie  
**EQUIPMENT** : Telematics embedded system  
**BRAND NAME** : Mobile Devices Ingenierie  
**MODEL NAME** : C4DONGLE-3GNA-WBT  
**MARKETING NAME** : C4DONGLE-3GNA-WBT  
**FCC ID** : A6G-C4DONGLE3G  
**STANDARD** : 47 CFR Part 2.1091

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

Reviewed by: Eric Huang / Deputy Manager

Approved by: Jones Tsai / Manager

**SPORTON INTERNATIONAL (SHENZHEN) INC.**

**1F & 2F, Building A, Morning Business Center, No. 4003 ShiGu Rd., Xili Town,  
Nanshan District, Shenzhen, Guangdong, P. R. China**



## Table of Contents

<b>1. ADMINISTRATION DATA .....</b>	<b>4</b>
1.1. Testing Laboratory .....	4
<b>2. DESCRIPTION OF EQUIPMENT UNDER TEST (EUT) .....</b>	<b>5</b>
<b>3. MAXIMUM RF AVERAGE OUTPUT POWER AMONG PRODUCTION UNITS .....</b>	<b>6</b>
<b>4. RF EXPOSURE LIMIT INTRODUCTION .....</b>	<b>7</b>
<b>5. RADIO FREQUENCY RADIATION EXPOSURE EVALUATION .....</b>	<b>8</b>
5.1. Standalone Power Density Calculation .....	8
5.2. Collocated Power Density Calculation .....	9



**Revision History**

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA571402	Rev. 01	Initial issue of report	Aug. 21, 2015



**1. Administration Data**

**1.1. Testing Laboratory**

Testing Laboratory	
Test Site	SPORTON INTERNATIONAL (SHENZHEN) INC.
Test Site Location	1F & 2F, Building A, Morning Business Center, No. 4003 ShiGu Rd., Xili Town, Nanshan District, Shenzhen, Guangdong, P. R. China TEL: +86-755-8637-9589 FAX: +86-755-8637-9595

Applicant	
Company Name	Mobile Devices Ingénierie
Address	100 Avenue de Stalingrad 94800 Villejuif FRANCE

Manufacturer	
Company Name	Mobile Devices Ingénierie
Address	100 Avenue de Stalingrad 94800 Villejuif FRANCE



## 2. Description of Equipment Under Test (EUT)

Product Feature & Specification	
EUT Type	Telematics embedded system
Brand Name	Mobile Devices Ingenierie
Model Name	C4DONGLE-3GNA-WBT
Marketing Name	C4DONGLE-3GNA-WBT
FCC ID	A6G-C4DONGLE3G
IMEI Code	354676055000409
Wireless Technology and Frequency Range	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 WLAN 2.4GHz Band: 2412 MHz ~ 2462 MHz Bluetooth: 2402 MHz ~ 2480 MHz
Mode	<ul style="list-style-type: none"><li>• GPRS/EGPRS</li><li>• RMC 12.2Kbps Rel 99</li><li>• HSDPA</li><li>• HSUPA</li><li>• 802.11b/g/n HT20/HT40</li><li>• Bluetooth v3.0+EDR, Bluetooth v4.0 LE</li></ul>
Antenna Type	WWAN: PIFA Antenna WLAN: Chip Antenna Bluetooth: Chip Antenna
HW Version	SAP00266
SW Version	V1944
EUT Stage	Production Unit
<b>Remark:</b> <ol style="list-style-type: none"><li>1. This device supports GRPS/EGPRS mode up to multi-slot class10.</li><li>2. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.</li></ol>	

### 3. Maximum RF average output power among production units

Mode	GSM 850	GSM 1900
	Average power(dBm)	
GPRS (GMSK, 1 Tx slot)	32.00	29.50
GPRS (GMSK, 2 Tx slots)	32.00	29.50
EDGE (8PSK, 1 Tx slot)	26.50	25.50
EDGE (8PSK, 2 Tx slots)	26.50	25.50

Mode	WCDMA Band V	WCDMA Band II
	average power(dBm)	
RMC 12.2Kbps	23.50	23.00
HSDPA Subtest-1	23.00	22.50
HSDPA Subtest-2	22.00	21.50
HSDPA Subtest-3	22.00	21.50
HSDPA Subtest-4	21.50	21.00
HSUPA Subtest-1	22.00	21.50
HSUPA Subtest-2	20.00	19.50
HSUPA Subtest-3	21.00	20.50
HSUPA Subtest-4	20.50	20.00
HSUPA Subtest-5	22.50	22.00

Mode		Maximum Average Power (dBm)
2.4GHz	802.11b	12.50
	802.11g	11.50
	802.11n-HT20	11.50
	802.11n-HT40	11.50
Bluetooth v3.0+EDR		11.50
Bluetooth v4.0 LE		8.50



### 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 <sup>2</sup> )	Averaging time (minutes)
<b>(A) Limits for Occupational/Controlled Exposures</b>				
0.3-3.0	614	1.63	*(100)	6
3.0-30	1842/f	4.89/f	*(900/f <sup>2</sup> )	6
30-300	61.4	0.163	1.0	6
300-1500			f/300	6
1500-100,000			5	6
<b>(B) Limits for General Population/Uncontrolled Exposure</b>				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f <sup>2</sup> )	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 Calculation

Band	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum ERP/EIRP (W)	Maximum output power Limit (W)	Average EIRP (mW)	Power Density at 20cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Power Density / Limit
GPRS 850 (1 Tx slot)	824.2	0.0	32.0	32.00	1.58	199.53	0.040	0.549	0.072
GPRS 850 (2 Tx slots)	824.2	0.0	32.0	32.00	1.58	398.11	0.079	0.549	0.144
EGPRS 850 (1 Tx slot)	824.2	0.0	26.5	26.50	0.45	56.23	0.011	0.549	0.020
EGPRS 850 (2 Tx slots)	824.2	0.0	26.5	26.50	0.45	112.20	0.022	0.549	0.041
GPRS 1900 (1 Tx slot)	1850.2	0.8	29.5	30.30	1.07	134.90	0.027	1.000	0.027
GPRS 1900 (2 Tx slots)	1850.2	0.8	29.5	30.30	1.07	269.15	0.054	1.000	0.054
EGPRS 1900 (1 Tx slot)	1850.2	0.8	25.5	26.30	0.43	53.70	0.011	1.000	0.011
EGPRS 1900 (2 Tx slots)	1850.2	0.8	25.5	26.30	0.43	107.15	0.021	1.000	0.021
WCDMA Band V	826.4	0.0	23.5	23.50	0.22	223.87	0.045	0.551	0.081
WCDMA Band II	1852.4	0.8	23.0	23.80	0.24	239.88	0.048	1.000	0.048
WLAN2.4GHz	2412.0	0.2	12.5	12.70	0.02	18.62	0.004	1.000	0.004
Bluetooth	2402.0	0.2	11.5	11.70	0.01	14.79	0.003	1.000	0.003

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





**5.2. Collocated Power Density Calculation**

Mode	Frequency	Power Density / Limit	GPRS850 (2 TX slots) Power Density / Limit	$\Sigma$ (Power Density / Limit) of WWAN+WLAN/Bluetooth
WLAN2.4GHz	2412MHz ~ 2462MHz	0.004	0.144	0.148
Bluetooth	2402MHz ~ 2480MHz	0.003		

**Note:**

1. For collocation analysis, GPRS850 (2TX slot) is chosen for summation due to the highest (power density/limit) among all WWAN wireless modes.
2. WLAN and Bluetooth share the same antenna, and cannot transmit simultaneously.
3.  $\Sigma$ (Power Density / Limit): This is a summation of [(power density for each transmitter/antenna included in the simultaneous transmission)/ (corresponding MPE limit)], for WWAN + WLAN/Bluetooth.
4. Considering the WWAN collocation with the WLAN/Bluetooth transmitter of the EIRP performance listed in the table above, the aggregated (power density /limit) is smaller than 1, and MPE of 2collocated transmitters is compliant

**Conclusion:**

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