



RF Exposure Evaluation Report

APPLICANT : Locus Solutions
EQUIPMENT : 2G Tracker
BRAND NAME : LOCUS TRAXX
MODEL NAME : SmartTraxx go 1.0
FCC ID : AMH101004
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.

No. 101, Complex Building C, Guanlong Village, Xili Town, Nanshan District, Shenzhen, Guangdong, P.R.C.



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**Revision History**

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA3D1002	Rev. 01	Initial issue of report	Jan. 20, 2014

**1. Administration Data****1.1. Testing Laboratory**

Test Site	SPORTON INTERNATIONAL (SHENZHEN) INC.
Test Site Location	No. 101, Complex Building C, Guanlong Village, Xili Town, Nanshan District, Shenzhen, Guangdong, P.R.C. TEL:+86-755-8637-9589 FAX: +86-755-8637-9595

1.2. Applicant

Company Name	Locus Solutions
Address	14924 Corporate Rd S, Jupiter, FL 33478, USA

1.3. Manufacturer

Company Name	Shenzhen Zhenhua Communication Equipment Co., Ltd.
Address	Zhenhua Industrial Park, No.44, Tiezai Rd., Xixiang Town, BaoAn, Shenzhen, Guang Dong, China

2. Description of Equipment Under Test (EUT)

Product Feature & Specification	
EUT Type	2G Tracker
Brand Name	LOCUS TRAXX
Model Name	SmartTraxx go 1.0
FCC ID	AMH101004
Wireless Technology and Frequency Range	GSM850: 824.2 MHz ~ 848.8 MHz GSM1900: 1850.2 MHz ~ 1909.8 MHz
Mode	• GPRS
Antenna Type	WWAN: PIFA Antenna
HW Version	TK108_V11
SW Version	M6000_V1.8.9
EUT Stage	Identical Prototype

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**

Mode	GSM 850	GSM 1900
	Average power(dBm)	
GPRS (GMSK, 1 Tx slot)	33.5	30.5
GPRS (GMSK, 2 Tx slots)	32.5	29.5
GPRS (GMSK, 3 Tx slots)	30.5	27.5
GPRS (GMSK, 4 Tx slots)	30	27

4. Conducted RF Output Power (Unit: dBm)

<GSM Conducted Power>

Band GSM850	Burst Average Power (dBm)			Frame-Average Power (dBm)		
TX Channel	128	189	251	128	189	251
Frequency (MHz)	824.2	836.4	848.8	824.2	836.4	848.8
GPRS (GMSK, 1 Tx slot) – CS1	33.03	33.03	33.04	24.03	24.03	24.04
GPRS (GMSK, 2 Tx slots) – CS1	32.09	32.11	32.12	26.09	26.11	26.12
GPRS (GMSK, 3 Tx slots) – CS1	30.33	30.37	30.37	26.07	26.11	26.11
GPRS (GMSK, 4 Tx slots) – CS1	29.50	29.53	29.54	26.50	26.53	26.54

Remark: The frame-averaged power is linearly scaled the maximum burst averaged power over 8 time slots.

The calculated method are shown as below:

Frame-averaged power = Maximum burst averaged power (1 Tx Slot) - 9 dB

Frame-averaged power = Maximum burst averaged power (2 Tx Slots) - 6 dB

Frame-averaged power = Maximum burst averaged power (3 Tx Slots) - 4.26 dB

Frame-averaged power = Maximum burst averaged power (4 Tx Slots) - 3 dB

Band GSM1900	Burst Average Power (dBm)			Frame-Average Power (dBm)		
TX Channel	512	661	810	512	661	810
Frequency (MHz)	1850.2	1880	1909.8	1850.2	1880	1909.8
GPRS (GMSK, 1 Tx slot) – CS1	30.14	30.21	30.32	21.14	21.21	21.32
GPRS (GMSK, 2 Tx slots) – CS1	29.15	29.21	29.32	23.15	23.21	23.32
GPRS (GMSK, 3 Tx slots) – CS1	27.20	27.25	27.38	22.94	22.99	23.12
GPRS (GMSK, 4 Tx slots) – CS1	26.33	26.39	26.52	23.33	23.39	23.52

Remark: The frame-averaged power is linearly scaled the maximum burst averaged power over 8 time slots.

The calculated method are shown as below:

Frame-averaged power = Maximum burst averaged power (1 Tx Slot) - 9 dB

Frame-averaged power = Maximum burst averaged power (2 Tx Slots) - 6 dB

Frame-averaged power = Maximum burst averaged power (3 Tx Slots) - 4.26 dB

Frame-averaged power = Maximum burst averaged power (4 Tx Slots) - 3 dB

5. 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/f ²)	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/f ²)	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



6. Radio Frequency Radiation Exposure Evaluation

6.1. Standalone Power Density Calculations

Band	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum ERP/EIRP (W)	Average EIRP (mW)	Power Density at 20cm (mW/cm ²)	Limit (mW/cm ²)
GPRS 850 (1 Tx slot)	824.2	-1.0	33.5	1.08	223.87	0.04	0.55
GPRS 850 (2 Tx slots)	824.2	-1.0	32.5	0.86	354.81	0.07	0.55
GPRS 850 (3 Tx slots)	824.2	-1.0	30.5	0.54	334.20	0.07	0.55
GPRS 850 (4 Tx slots)	824.2	-1.0	30.0	0.48	398.11	0.08	0.55
GPRS 1900 (1 Tx slot)	1850.2	-1.0	30.5	0.89	112.20	0.02	1.00
GPRS 1900 (2 Tx slots)	1850.2	-1.0	29.5	0.71	177.83	0.04	1.00
GPRS 1900 (3 Tx slots)	1850.2	-1.0	27.5	0.45	167.49	0.03	1.00
GPRS 1900 (4 Tx slots)	1850.2	-1.0	27.0	0.40	199.53	0.04	1.00

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.