中国认可
国际互认
检测
TESTING
CNAS L4963

MPE REPORT

Report No. 2017SAR347

FCC ID:	O9YJH01
Applicant:	Spireon Inc
Product:	GPS Tracker
Model:	JG-H
HW Version:	Bobcat-H_V1.2.1/Jaguar_V11
SW Version:	M7601_V2.0.6
Issue Date:	2017-07-12

Prepared by: 王威 Wang Wei Reviewed by: 陈强 Chen Qiang Approved by: 殷小明 Yin Xiaoming (Technical Manager)

Remark: This report details the results of the testing carried out on the samples specified in this report, the results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. The report shall not be reproduced except in full, without written approval of the Company.

Applicable Standard	**FCC RULES 47 CFR2.1091:** Radiofrequency radiation exposure evaluation: mobile device
Test Results	Pass

Change History

Version	Change Contents	Author	Date
V1.0	First edition	Wang Wei	2017-07-12

Note: The last version will be invalid automatically while the new version is issued.

CONTENTS:

1. Test Laboratory

1.1 Testing Location:

Company: Shanghai Tejet Communications Technology Co., Ltd Testing Center.
Address: Room 6205-6208, Building 6, No.399 Cailun Rd. Zhangjiang Hi-Tech Park, Shanghai, China
Post Code : 210203
Tel: +86-21-61650880
Fax: +86-21-61650881
Website: www.tejet.cn

1.2 Laboratory Environment

Temperature 20° C～ 25 ° C
Relative humidity 20%～70%

1.3 Testing date

Test start date：2017-07-10
Test end date： 2017-07-12

2. Client Information

2.1 Applicant information

Company Name:	Spireon Inc
Address:	035 Lakeside Centre Way, Suite 125 Knoxville, TN 37922
Contact :	Edward Suski
Email:	esuski@spireon.com
Tel:	(949)-328-0383
Fax:	/

2.2 Manufacturer Information

Company Name:	Kayamatics Limited
Address:	Room 1206, Trend Center, 29 Cheung Lee Street, Chai Wan, HK
Contact :	Ian Chan
Email:	info@kayamatics.com
Tel:	+852 3460 4153
Fax:	/

3.Equipment Under Test (EUT) and Accessory Equipment (AE)

3.1 Information of EUT

Device type	Initial model	
Product name	GPS Tracker	
Device operation configuration:		
IMEI or S/N	35378206*******	
Operating mode(s):	GSM850/1900	
	WCDMA BAND II/V	
Test modulation	(GSM)GMSK,WCDMA(QPSK)	
GPRS Operation Class	A	
GPRS Multislot Class	12	
EDGE Multislot Class	/	
Operating frequency range(s):	Band	Tx(MHz)
	GSM850	824.2～848.8
	GSM1900	1850.2～1909.8
	WCDMA BAND II	1852.4～1907.6
	WCDMA BAND V	826.4～846.6
Power class	GSM850: 4,test with power level 5	
	GSM1900: 1,test with power level 0	
	WCDMA BAND II: 3,test with maximum out power	
	WCDMA BAND V: 3,test with maximum out power	

4. Reference Documents

4.1 Reference Documents for testing

The MPE report was carried out on a sample equipment to demonstrate limited compliance with FCC CFR 47 Part 2.1091.
The limits standard is based on the Council Recommendation 1999/519/EC.
FCC CFR 47, Part 2, FREQUENCY ALLOCATION AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS, Oct 1, 2011
Section 2.1091 Radiofrequency radiation exposure evaluation: mobile device, Oct 1, 2011

4.2 RF Exposure Limit

Systems operating under the provision of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 0.2m normally can be maintained between the user and the device.

Table 1. *FCC Limits for Maximum Permissible Exposure (MPE)*

(B) Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes)
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

f = frequency in MHz *Plane-wave equivalent power density

The maximum permissible exposure for GSM850/1900/WCDMA BAND II/V is.

BAND	**The** maximum permissible exposure
GSM850	**0.55 W/ m^2**
GSM1900	**1 W/ m^2**
WCDMA BAND II	**1 W/ m^2**
WCDMA BAND V	**0.55 W/ m^2**

5. Friis Formula

Friis transmission formula : Pd = (Pout*G) *DutyFactor / (4*Pi*r^2)
where
Pd = power density in **mW/cm^2**
Pout = output power to antenna in m**W**
G = gain of antenna in linear scale
Pi = **3.1416**
R = distance between observation point and center of the radiator in **cm**
Pd is the limit of MPE. If we know the maximum Gain of the antenna and the total power input to the antenna, through the calculation, we will know the MPE value at distance 20cm.
Of GPRS 4TS Duty Factor=4/8.3
Of WCDMA Duty Factor=1

6. Classification

The product under normal use condition is at least 20cm away from the body of the user.

So, this device is classified as Mobile Device.

7. Test Results

7.1 Conducted Power Results

GSM850	Conducted output power(dBm)		
	low	middle	high
	CH128	CH189	CH251
	824.2MHz	836.6MHz	848.6MHz
GPRS 4 TX-slot result	29.15	29.27	29.42
Maximum Target power	30.5		

GSM1900	Conducted output power(dBm)		
	low	middle	high
	CH512	CH661	CH810
	1850.2MHz	1880MHz	1909.8MHz
GPRS 4 TX-slot result	25.63	25.82	25.24
Maximum Target power	26.5		

WCDMA BAND II	Conducted Output power(dBm)		
	low	middle	high
	CH9262	CH9400	CH9538
	1852.4MHz	1800MHz	1907.6MHz
12.2kbps RMC	22.33	22.36	22.14
Maximum Target power	23.5		

WCDMA BAND V	Conducted Output power(dBm)		
	low	middle	high
	CH4132	CH4183	CH4233
	826.4 MHz	836.6MHz	846.6MHz
12.2kbps RMC	22.17	22.42	22.31
Maximum Target power	23.5		

From the antenna specifications provide by the applicant, the antenna gain -1.5 dBi in GSM and WCDMA.
So for conservative evaluation consideration, only maximum power of each frequency band based on the tighter limits respectively are used to calculate the boundary power density.

7.2 Output Power Into Antenna & RF Exposure value at distance 20cm

Frequency band	Antenna Gain (dBi)	Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Duty fator	The maximum sourced based time-averaged transmit power(mW)	Calculated RF Exposure	Limit (mW/ cm²)
GSM850 (GPRS 4up)	-1.5	0.71	30.5	1122.02	0.48	540.73	0.08	**0.55**
GSM1900 (GPRS 4up)	-1.5	0.71	26.5	446.68	0.48	215.27	0.03	**1**
WCDMA BAND II	-1.5	0.71	23.5	223.87	1	223.87	0.032	**1**
WCDMA BAND V	-1.5	0.71	23.5	223.87	1	223.87	0.032	**0.55**

For GSM850 , Pd = (Pout*G) *DutyFactor / (4*Pi*r^2)
= (1122.02*0.71)*0.48/(4*3.1416*20^2)
=0.08**(mW/ cm²)**
For GSM1900 , Pd = (Pout*G) *DutyFactor / (4*Pi*r^2)
= (446.68*0.71)*0.48/(4*3.1416*20^2)
= 0.03**(mW/ cm²)**
For WCDMA BAND II , Pd = (Pout*G) *DutyFactor / (4*Pi*r^2)
= (223.87*0.71)*1/(4*3.1416*20^2)
=0.032**(mW/ cm²)**
For WCDMA BAND V , Pd = (Pout*G) *DutyFactor / (4*Pi*r^2)
= (223.87*0.71)*1/(4*3.1416*20^2)
= 0.032**(mW/ cm²)**

So the limit is kept.

ANNEX A: EUT Photograph

EUT

ANNEX B: Test Instruments

No.	Name	Type	S/N	Calibration Date	Valid Period
01	BTS	CMU200	121464	Oct 28st, 2016	One year

ANNEX C: Measurement Uncertainty

Expanded uncertainty (confidence interval of 95 %)（k=2）	0.4 dB

----------END OF REPORT----------