



MPE TEST REPORT

No. ECIT-2013-0118-MPE

For

Client : eSky Wireless Inc.

Production : GPS Tracker

Model Name : ES110

Hardware Version: ES110_MB_H103

Software Version: 130412V110ATGDGST40

Issued date: 2013-8-12

FCC ID: YR8ES110

Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of ECIT Shanghai.

Test Laboratory:

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1. Test Laboratory

1.1. Testing Location

Company Name: ECIT Shanghai, East China Institute of Telecommunications
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1.2. Project data

Project Leader: Liu Jianquan
Testing Start Date: Aug 12, 2013
Testing End Date: Aug 12, 2013

1.3. Signature

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(Reviewed this test report)

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2. Client Information

2.1. Applicant Information

Company Name: eSky Wireless Inc.
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Country: China
Telephone: +86-512-6299-7696
Postal Code: 215000
Contact Ping Huang

2.2. Manufacturer Information

Company Name: eSky Wireless Inc.
Address /Post: 22-303,328 Xinghu Street,Suzhou,China
Country: China
Telephone: +86-512-6299-7696
Postal Code: 215000
Contact Ping Huang



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

3.1. About EUT

EUT Description	GSM (GPRS) /GPS quad-band GPS tracker
Model name	ES110
GSM Frequency Band	GSM835/GSM1900
Antenna Type	Internal Antenna
FCC ID:	YR8ES110

Note: Photographs of EUT are shown in ANNEX A of this test report.

3.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version:
S1	IMEI:865439000270380	ES110_MB_H103	130412V110ATGDGST40

*EUT ID: is used to identify the test sample in the lab internally.

Note: the EUT has no earphone.

3.3. Internal Identification of AE used during the test

AE ID*	Description	Model	SN	Manufacturer
AE1	N/A	N/A	N/A	N/A
AE2	N/A	N/A	N/A	N/A

*AE ID: is used to identify the test sample in the lab internally.

4. Reference Documents

4.1. Applicable Standards

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 ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS, Oct 1,2011

Section 2.1091 Radiofrequency radiation exposure evaluation: mobile devices, Oct 1,2011

4.2. Test Limits

Systems operating under the provisions 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.

Limits for Occupational / Controlled Exposure

Frequency Range [MHz]	Electric Field Strength [V/m]	Magnetic Field Strength (H) [A/m]	Power Density (S) [mW/cm ²]	Averaging Times E ² , H ² or S [minutes]
0.3 – 3.0	614	1.63	(100)*	6
3.0 – 30	1824/f	4.89/f	(900/f)*	6
30 – 300	61.4	0.163	1.0	6
300 – 1500	--	--	F/300	6
1500 - 100000	--	--	5	6

Limits for General Population / Uncontrolled Exposure

Frequency Range [MHz]	Electric Field Strength [V/m]	Magnetic Field Strength (H) [A/m]	Power Density (S) [mW/cm ²]	Averaging Times 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)*	30
30 – 300	27.5	0.073	0.2	30
300 – 1500	--	--	F/1500	30
1500 - 100000	--	--	1.0	30

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

For the DUT, the limits for General Population / Uncontrolled Exposure are applicable.

5. Test Results

5.1. Conducted PF Power Output

Table 5.1: The Conducted Power For GPRS

835MHz GPRS 1TS	Conducted Power (dBm)		
	Channel 128 (824.2MHz)	Channel 190 (836.6MHz)	Channel 251 (848.8MHz)
	33.0	32.7	32.9
1900MHz GPRS 1TS	Conducted Power (dBm)		
	Channel 512 (1850.2MHz)	Channel 661 (1880MHz)	Channel 810 (1909.8MHz)
	28.7	29.5	29.3

Table 5.2: Tolerance Power For GPRS

835MHz GPRS 1TS	Conducted Power (dBm)		
	Channel 128 (824.2MHz)	Channel 190 (836.6MHz)	Channel 251 (848.8MHz)
	31.0~33.0	31.0~33.0	31.0~33.0
1900MHz GPRS 1TS	Conducted Power (dBm)		
	Channel 512 (1850.2MHz)	Channel 661 (1880MHz)	Channel 810 (1909.8MHz)
	28.3~30.3	28.3~30.3	28.3~30.3

5.2. Calculation Information

From the antenna specifications provided by the applicant, the antenna gain is 2 dBi in GSM 835MHz and GSM 1900MHz.

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.

Based on the FCC KDB 447498 D01 and 47 CFR §2.1091, the DUT is evaluated as a mobile device.



5.3. Result of GSM835

Test Results: MPE Limit Calculation: the EUT's operating frequencies @ 824.2 – 848.8 MHz; as per the original test report the highest power is GSM835, Middle channel 190. The maximum tune up procedure power is 33.0 dBm . The maximum gain is 2dBi. The resulted power density at a distance of 20cm can be deducted as follows:

$$\text{EIRP}=33.0+2 =35.0 \text{ dBm}=3162.28 \text{ mW}$$

$$\text{Power Density}=\text{EIRP}*\text{Duty Cycle}/(4\pi R^2)=3162.28*0.024/(4*\pi *20^2)=0.015 \text{ mW/cm}^2$$

Where Duty Cycle is 0.024 and R is 20cm.

The MPE limit for Occupational/Controlled Exposure is shown in the FCC KDB 447498 D01 and 47 CFR §2.1091, can be calculated as follows:

$$\text{MPE limit} = 824.2/1500 = 0.549 \text{ mW/cm}^2$$

As we can see the resulted power density is below the MPE limit, therefore the DUT in this band is compliant with the FCC rules on RF exposure.

5.4. Result of GSM1900

Test Results: MPE Limit Calculation: the EUT's operating frequencies @ 1850.2 – 1909.8 MHz; as per the original test report the highest power is GSM1900, Middle channel 661. The maximum tune up procedure power is 30.3 dBm . The maximum gain is 2 dBi. The resulted power density at a distance of 20cm can be deducted as follows:

$$\text{EIRP}=30.3+2=32.3 \text{ dBm}=1698.24 \text{ mW}$$

$$\text{Power Density}=\text{EIRP}*\text{Duty Cycle}/(4\pi R^2)=1698.24*0.024/(4*\pi *20^2)=0.008 \text{ mW/cm}^2$$

Where Duty Cycle is 0.024 and R is 20cm.

The MPE limit for Occupational/Controlled Exposure is shown in the FCC KDB 447498 D01 and 47 CFR §2.1091, can be calculated as follows:

$$\text{MPE limit} = 1 \text{ mW/cm}^2$$

As we can see the resulted power density is below the MPE limit, therefore the DUT in this band is compliant with the FCC rules on RF exposure.

Note: $\pi=3.1416$

ES110 maximum turn/transmit time among all situations is less than 42 bursts/ 1 second, each burst is 577us length.

$$\text{Duty Cycle}=42 \text{ bursts}*0.577\text{ms}/1000\text{ms}=2.4\%$$

So the product is under the MPE limits. All is pass.

*****END OF REPORT*****