RF Exposure Evaluation Declaration

Product Name : GNSS receiver

Model No. :   i80 WXYZ

FCC ID: SY4-A01004

Applicant : Shanghai Huace Navigation Technology LTD.
Address   : Building C,599 Gaojing Road,Qingpu District,Shanghai，

Date of Receipt : 2015-03-12

Issued Date : 2015-05-10

Report No. : UL41320150312CE/FCC002-6

Report Version : V1.0

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Product Name :	GNSS receiver
Applicant :	Shanghai Huace Navigation Technology LTD
Address :	Building C,599 Gaojing Road,Qingpu District,Shanghai
Manufacturer :	Shanghai Huace Navigation Technology LTD.
Address :	Building C,599 Gaojing Road,Qingpu District,Shanghai
Model No. :	i80 WXYZ
Model Description:	See Part1 Note.
EUT Voltage	Extreme Low:8 V, Nominal:12 V, Extreme High:36V
Brand Name :	
Applicable Standard :	FCC's Rules(47 C.F.R. § 1.1310 and 2.1091)
Test Result :	Complied
Performed Location :	Unilab (Shanghai) Co., Ltd.
	FCC 2.948 register number is 714465
	No.1350, Lianxi Road, Pudong New District, Shangha, China
	TEL:+86-21-5027-5125/FAX:+86-21-5027-5126-876

Tested By :

Jeffrey. wang

(Test Engineer: Jeffrey Wang)

Reviewed By :

Forest Cao

(Senior Engineer: Forest Cao)

Approved By :

Eva wang

(Supervisor: Eva Wang)

1. EUT Description

Product Name:	GNSS receiver
Model Name:	i80 WXYZ
Hardware Version:	V1.3
Software Version:	V1.1.8
RF Exposure Environment:	Uncontrolled
GPRS/ EGPRS	
Support Band:	GSM 850/GSM 1900
GPRS Class:	12
Tx Frequency Range:	GSM 850: 824.2MHz to 848.8MHz GSM 1900: 1850.2MHz to 1909.8MHz
Rx Frequency Range:	GSM 850: 869.2MHz to 893.8MHz GSM 1900: 1930.2MHz to 1989.8MHz
Type of modulation:	GPRS for GMSK EDGE for 8PSK
Antenna Type:	Connector
Antenna Peak Gain:	GSM 850: 5dBi GSM 1900: 5dBi
UMTS	
Support Band:	WCDMA Band II / V
Tx Frequency Range:	WCDMA Band II: 1852.4MHz ~1907.6MHz WCDMA Band V: 826.4MHz ~846.6MHz
Rx Frequency Range:	WCDMA Band II: 1932.4MHz ~1987.6MHz WCDMA Band V: 871.4MHz ~891.6MHz
Type of modulation:	WCDMA(UMTS): QPSK
Antenna Type:	Connector
Antenna Peak Gain:	WCDMA Band II / V: 5.0dBi
Bluetooth	
Frequency Range:	2402MHz~2480MHz
Carrier Frequency of Each Channel	2402+N*1MHz(N=0~78)
Type of Modulation:	GFSK, π/4-DQPSK, 8-DPSK
Channel Separation:	1MHz
Channel Number:	79
Antenna Type:	Internal
Antenna Peak Gain:	1.0dBi

WIFI	
Frequency Range:	2412MHz~2462MHz
Type of Modulation:	DSSS(BPSK/QPSK/CCK) OFDM(BPSK/QPSK/16QAM/64QAM) MIMO-OFDM(BPSK/QPSK/16QAM/64QAM)
Channel Number:	11
Antenna Type:	Internal
Antenna Peak Gain:	1.0dBi
Radio	
Tx Frequency Range:	403MHz to 473MHz
Rx Frequency Range:	403MHz to 473MHz
Type of modulation:	4FSK,GMSK
Antenna Type:	Connector
Antenna Peak Gain:	3.0dBi
Component	
AC Adapter	Input: AC 100-240V 50/60Hz
	Output: DC 12V 2A

Note: Model i80 WXYZ, W is variable, it indicated A-Z or 0-9 or blank, X is variable, it indicated A-Z or 0-9 or blank，Y is variable, it indicated A-Z, 0-9 or blank. Z is variable, it indicated A-Z, 0-9 or blank. due to sales purpose in different countries or regions. The internal PCB design are no difference，but only distinct in colours and model names. This test model name is i80.

2. RF Exposure Evaluation

2.1 Limits

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)

LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency Range(MHz)	Electric Filed Strength (V/m)	Magnetic Filed Strength (A/m)	Power Density (mW/cm^2)	Average Time (Minutes)
(A)Limits for Occupation/Control Exposures				
300-1500	--	--	F/300	6
1500-100,000	--	--	5	6
(B)Limits for General Occupation/UnControlled Exposures				
300-1500	--	--	F/1500	6
1500-100,000	--	--	1	30

F= Frequency in MHz

Friis Formula

Friis transmission formula: $P_d = (P_{out}*G)/(4*Pi*R^2)$

Where

P_d = power density in mW/cm^2

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

Pi = 3.1416

R = distance between observation point and center of the radiator in cm

Pd id the limit of MPE, 1 mW/cm^2 . If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

2.2.Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

The temperature and related humidity: 22℃and 65％ RH.

2.3.Test Result of RF Exposure Evaluation

This device is evaluated by mobile device with general population/uncontrolled exposure condition

For this device, the calculation is using the most conservative values, and the results are as follows:

Test Mode	ERP (dBm)	EIRP (dBm)	Peak EIRP (mW)	Average EIRP (mW)	Calculated RF Exposure at d = 20cm (mW/cm^2)	MPE Limit (mW/cm^2)
GSM850	33.53	36.68	2254.24	283.79	0.06	0.55
GSM1900	/	32.16	1644.37	207.01	0.04	1.00
EDGE850	28.27	30.42	1101.54	138.68	0.03	0.55
EDGE1900	/	28.53	712.85	89.74	0.02	1.00

The frame-averaged power calculated method are shown as below:
Average EIRP=Peak EIRP-9dB
Duty cycle=12.5%

Test Mode	ERP (dBm)	EIRP (dBm)	Peak EIRP (mW)	Average EIRP (mW)	Calculated RF Exposure at d = 20cm (mW/cm^2)	MPE Limit (mW/cm^2)
WCDMA Band V	24.99	27.14	517.61	517.61	0.11	0.55
WCDMA Band II	/	25.98	396.28	396.28	0.08	1.00

Duty cycle = 100%

Test Mode	ERP (dBm)	EIRP (dBm)	Peak EIRP (mW)	Average EIRP (mW)	Calculated RF Exposure at d = 50cm (mW/cm^2)	MPE Limit (mW/cm^2)
Radio	30.14	32.29	1694.3	1694.3	0.054	0.27

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 0.5 m normally can be maintained between the user and the device.
Duty cycle = 100%

Test Mode	Antenna Gain (dBi)	Maximum Output Power (dBm)	EIRP (dBm)	Peak EIRP (mW)	Average EIRP (mW)	Calculated RF Exposure at d = 20cm (mW/cm^2)	MPE Limit (mW/cm^2)
WIFI 2.4G	1.0	15.29	16.29	42.56	42.56	0.008	1.00
BT	1.0	8.60	9.60	9.12	9.12	0.002	1.00

Duty cycle = 100%

This device comply with RF exposure limit.