

# RF Exposure Evaluation Declaration

Product Name : GIS Data collector

Model No. : MG838+(E761) , MG858(E761D)

Applicant : Beijing Unistrong Science&Technology Co.,Ltd.

Address : 204 Building,#10 Jiuxianqiao North Road,Chaoyang  
District,Beijing,PRC .

Date of Receipt : 15/05/2013

Issued Date : 20/05/2013

Report No. : ZZ20130512001-2

Report Version : V1.0

The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standard through the calibration of the equipment and evaluated measurement uncertainty herein.

The test report shall not be reproduced except in full without the written approval of ZTE Corporation.

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# RF Exposure Evaluation Declaration

Issued Date : 24/05/2013  
Report No. : ZZ20130512001-2

Product Name : GIS Data collector

Applicant : Beijing Unistrong Science&Technology Co.,Ltd.

Address : 204 Building,#10 Jiuxianqiao North Road,Chaoyang District,Beijing,PRC.

Manufacturer : Beijing Unistrong Science&Technology Co.,Ltd.

Address : 204 Building,#10 Jiuxianqiao North Road,Chaoyang District,Beijing,PRC .

Model No. : MG838+(E761), MG858(E761D)

Model Difference: All models are identical except the GPS locator [MG838+(E761) for GPS, MG858(E761D) for GPS and GLONASS]. The model under test is MG838+(E761) and the test results are applicable to the other.

EUT Voltage MIN: 3.6V, NOR: 3.8V, MAX: 4.2V

Brand Name : UniStrong

Applicable Standard : FCC OET Bulletin 65 Supplement C (Edition 01-01)  
RSS-102 Issue 4 March 2010

Test Result : Complied

Performed Location : ZTE Corporation  
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## 1. EUT Description

Product Name:	GIS Data collector
Model Name:	MG838+(E761)
Hardware Version:	V0.5
Software Version:	V1.0_B1.0_R02.00.06.00
RF Exposure Environment:	Uncontrolled
<b>Bluetooth</b>	
Frequency Range:	2400MHz~2483.5MHz
Type of Modulation:	GFSK(1M) Π/4-DQPSK(2M) 8-DPSK(3M)
Channel Separation:	1MHz
Channel Number:	79
Antenna Type:	Internal
Antenna Peak Gain:	0.5dBi
<b>WIFI</b>	
Frequency Range:	2400MHz~2483.5MHz
Type of Modulation:	DSSS(BPSK/QPSK/CCK) OFDM(BPSK/QPSK/16QAM/64QAM)
Channel Separation:	5MHz
Channel Number:	13
Antenna Type:	Internal
Antenna Peak Gain:	1.0dBi
<b>GPRS</b>	
Support Band:	GSM850/PCS1900
GPRS Class:	12
Tx Frequency Range:	GSM 850: 824 ~ 835 MHz PCS 1900: 1850 ~ 1865 MHz
Rx Frequency Range:	GSM 850: 869 ~ 880 MHz PCS 1900: 1930 ~ 1945 MHz
Type of modulation:	GMSK for GPRS
Antenna Type:	Internal
Antenna Peak Gain:	GSM 850: -2.0dBi DCS 1900: -0.5dBi
<b>Component</b>	
AC Adapter:	Model Name:P12USB050200
	Input: AC 100-240V 50/60Hz
	Output: DC 5V/2A

## 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 <sup>2</sup> )	Average Time (Minutes)
<b>(A) Limits for Occupation/Control Exposures</b>				
300-1500	--	--	F/300	6
1500-100,000	--	--	5	6
<b>(B) Limits for General Occupation/UnControlled Exposures</b>				
300-1500	--	--	F/1500	6
1500-100,000	--	--	1	30

F= Frequency in MHz

Friis Formula

Friis transmission formula:  $P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot r^2)$

Where

$P_d$  = power density in mW/cm<sup>2</sup>

$P_{out}$  = 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

$P_d$  is the limit of MPE, 1 mW/cm<sup>2</sup>. 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: 18°C and 78% RH.

### 2.3. Test Result of RF Exposure Evaluation

### 2.3.1. Conducted Power Analysis

#### GPRS850/1900

Table 1: Duty Cycle of TDMA Signal

No. of timeslots	1	2	3	4
Duty Cycle	1:8	1:4	1:2.66	1:2
Timebased avg. power compared to slotted avg. power	-9dB	-6dB	-4.25dB	-3dB

The following table shows the conducted power measured and time based average power calculated:

Frequency Band	Modulation	Timeslots	Avg. Burst Power (dBm)	Time based average power(Calculated)
GPRS850	GMSK	1	31.56	22.56
GPRS 850	GMSK	2	30.76	24.76
GPRS 850	GMSK	3	29.26	25.01
GPRS 850	GMSK	4	28.74	25.44
GPRS1900	GMSK	1	27.42	18.42
GPRS 1900	GMSK	2	27.01	21.01
GPRS 1900	GMSK	3	26.18	21.93
GPRS 1900	GMSK	4	25.88	22.88

#### BT & Wi-Fi:

Bluetooth		
Channel	Frequency (MHz)	Peak power (dBm)
0	2402	0.24
39	2441	0.37
78	2480	0.45
802.11b		
Channel	Frequency (MHz)	Peak power (dBm)
1	2412	4.07
7	2442	4.18
13	2472	4.26
802.11g		
Channel	Frequency (MHz)	Peak power (dBm)
1	2412	4.74

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7	2442	4.99
13	2472	5.35

**Antenna Gain:**

Antenna Gain: The maximum Gain measured in fully anechoic chamber is -2dBi for 824~894MHz GSM850 band; -0.5dBi for 1850~1990MHz PCS1900 band; 0.5dBi for 2400~2483.5 MHz BT band. 1.0dBi for 2400~2483.5 MHz Wi-Fi band.

**Output Power into Antenna & RF Exposure Evaluation Distance:**

Test Mode	Frequency Band (MHz)	Maixmum Output Power to Antenna(mW)	Power Density at R = 20cm (mW/cm <sup>2</sup> )	MPE Limit (mW/cm)
GPRS850	824~894	349.95	0.044	0.55
GPRS1900	1850~1990	194.09	0.034	1.00
BT	2400~2483.5	1.11	0.0002	1.00
Wi-Fi(802.11b)	2400~2483.5	3.08	0.0006	1.00
Wi-Fi(802.11g)	2400~2483.5	3.13	0.0006	1.00