

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.

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
Bluetooth	
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
WIFI	
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
GPRS	
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
Component	
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 Field Strength (V/m)	Magnetic Field 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: $P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot r^2)$

Where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

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

P_d is the limit of MPE, 1 mW/cm². 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

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)	Maximum Output Power to Antenna(mW)	Power Density at R = 20cm (mW/cm ²)	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