



Report No.: SZ13010048S02



# RF EXPOSURE

# EVALUATION REPORT

Issued to

**ZTE Corporation**

For

**WCDMA wireless data terminal**

Model Name : ZTE MW3736  
 Trade Name : ZTE 中兴  
 Brand Name : ZTE 中兴  
 FCC ID : Q78-MW3736  
 Standard : FCC Oet65 Supplement C Jun.2001  
 47CFR 2.1091  
 KDB447498 D01 General RF  
 Exposure Guidance v05  
 Test date : 2013-1-25 to 2013-3-28  
 Issue date : 2013-5-28

**Shenzhen MORLAB Communication Technology Co., Ltd.**



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## DIRECTORY

- 1. TESTING LABORATORY.....3**
- 1.1. Identification of the Responsible Testing Laboratory ..... 3**
- 1.2. Identification of the Responsible Testing Location ..... 3**
- 1.3. Accreditation Certificate ..... 3**
- 2. TECHNICAL INFORMATION .....4**
- 2.1. Identification of Applicant ..... 4**
- 2.2. Identification of Manufacturer ..... 4**
- 2.3. Equipment Under Test (EUT)..... 4**
- 2.3.1. Photographs of the EUT ..... 4**
- 2.3.2. Identification of all used EUT ..... 4**
- 2.4. Applied Reference Documents ..... 5**
- 2.5. Test Environment and Conditions ..... 5**
- 3. DEVICE CATEGORY AND RF EXPOSURE LIMIT .....6**
- 4. MEASUREMENT OF CONDUCTED OUTPUT POWER ..... 7**
- 5. RF EXPOSURE EVALUATION .....9**

| Change History |              |                   |
|----------------|--------------|-------------------|
| Issue          | Date         | Reason for change |
| 1.0            | May 28, 2013 | First edition     |
|                |              |                   |

## **1. Testing Laboratory**

### **1.1. Identification of the Responsible Testing Laboratory**

Company Name: Shenzhen Morlab Communications Technology Co., Ltd.  
Department: Morlab Laboratory  
Address: FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China 518101  
Responsible Test Lab Manager: Mr. Shu Luan  
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### **1.2. Identification of the Responsible Testing Location**

Name: Shenzhen Morlab Communications Technology Co., Ltd.  
Morlab Laboratory  
Address: FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China 518101  
FCC Registration Number: 695796

### **1.3. Accreditation Certificate**

Accredited Testing Laboratory: No. CNAS L3572

## 2. Technical Information

Note: the following data is based on the information by the applicant.

### 2.1. Identification of Applicant

Company Name: ZTE Corporation  
Address: ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park, Nanshan District, Shenzhen, Guangdong, P.R.China

### 2.2. Identification of Manufacturer

Company Name: ZTE Corporation  
Address: ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park, Nanshan District, Shenzhen, Guangdong, P.R.China

### 2.3. Equipment Under Test (EUT)

Model Name: ZTE MW3736  
Trade Name: ZTE 中兴  
Brand Name: ZTE 中兴  
Hardware Version: MW3736\_V1AMB\_B  
Software Version: N/A  
Frequency Bands: GSM 850MHz / PCS 1900MHz;  
WCDMA 850MHz/1900MHz;  
Modulation Mode: GSM/GPRS: GMSK;  
WCDMA/HSDPA/HSUPA: QPSK;  
Multislot Class: GPRS: Class 12, EDGE: N/A  
3GPP version: Release 6  
Antenna type: External Monopole Antenna

#### 2.3.1. Photographs of the EUT

Please see for photographs of the EUT External and Internal Photos

#### 2.3.2. Identification of all used EUT

The EUT identity consists of numerical and letter characters, the letter character indicates the test sample, and the following two numerical characters indicate the software version of the test sample.

| EUT Identity | Hardware Version | Software Version |
|--------------|------------------|------------------|
| 1#           | MW3736_V1AMB_B   | N/A              |

## 2.4. Applied Reference Documents

Leading reference documents for testing:

| No. | Identity   | Document Title  |
|-----|--|---|
| 1   | <b>47 CFR§2.1091</b>   | Radiofrequency Radiation Exposure Evaluation: Mobilee Devices   |
| 2   | <b>FCC OET<br/>Bulletin 65<br/>(Edition 97-01),<br/>Supplement C<br/>(Edition 01-01)</b> | Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields |
| 3   | <b>KDB 447498 D01</b>  | General RF Exposure Guidance v05  |

## 2.5. Test Environment and Conditions

|                          |  |
|--------------------------|--|
| Normal Temperature (NT): | 20 ... 25 °C   |
| Relative Humidity:       | 30 ... 75 %  |
| Air Pressure:            | 980 ... 1020 hPa   |
| Test frequency:          | GSM 850MHz ; PCS 1900MHz<br>WCDMA 850MHz; WCDMA1900MHz;  |
| Operation mode:          | Call established   |
| Power Level:             | GSM 850 MHz Maximum output power(level 5)<br>PCS 1900 MHz Maximum output power(level 0)<br>WCDMA Maximum output power(All up bits) |

During power measurement test, EUT is in Traffic Mode (Channel Allocated) at Normal Voltage Condition.

The Absolute Radio Frequency Channel Number (ARFCN) is allocated to 125, 190 and 251 respectively in the case of GSM 850 MHz, or to 512, 661 and 810 respectively in the case of PCS 1900 MHz ,or to 9262, 9400 and 9538 respectively in the case of WCDMA 1900MHz, or to 4132, 4175 and 4233 respectively in the case of WCDMA 850MHz. The EUT is commanded to operate at maximum transmitting power.

### 3. Device Category and RF Exposure Limit

Refer user manual this device is a WCDMA wireless data module, Based on the FCC OET Bulletin 65 Supplement C and 47CFR 2.1091, this device belongs to mobile device category with General Population/Uncontrolled exposure. The definition of the category as following:

#### Mobile Derives:

CFR Title 47 § 2.1091(b)

A mobile device is defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons. In this context, the term "fixed location" means that the device is physically secured at one location and is not able to be easily moved to another location. Transmitting devices designed to be used by consumers or workers that can be easily re-located, such as wireless devices associated with a personal computer, are considered to be mobile devices if they meet the 20 centimeter separation requirement.

#### General Population/Uncontrolled exposure

FCC OET Bulletin 65 (Edition 97-01), Supplement C, Section 1;

The general population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity. Warning labels placed on low-power consumer devices such as cellular telephones are not considered sufficient to allow the device to be considered under the occupational/controlled category, and the general population/uncontrolled exposure limits apply to these devices.

### RF Exposure 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 <sup>2</sup> ) | Averaging Time  E  <sup>2</sup> ,  H  <sup>2</sup> or S (minutes) |
|-----------------------|-----------------------------------|-----------------------------------|---|---|
| 0.3-1.34              | 614                               | 1.63                              | (100)*                                  | 30  |
| 1.34-30               | 824/f                             | 2.19/f                            | (180/f <sup>2</sup> )*                  | 30  |
| 30-300                | 27.5                              | 0.073                             | 0.2                                     | 30  |
| 300-1500              | --                                | --                                | f/1500                                  | 30  |
| 1500-100,000          | --                                | --                                | 1.0                                     | 30  |

Note: f = frequency in MHz

\* = Plane-wave equivalent power density

## 4. Measurement Of Conducted Output Power

### 1. WCDMA Conducted average output power

| Item       | band    | WCDMA 850 |       |       | WCDMA 1900 |       |       |
|------------|---------|-----------|-------|-------|------------|-------|-------|
|            | ARFCN   | 4132      | 4175  | 4233  | 9262       | 9400  | 9538  |
|            | subtest | dBm       |       |       | dBm        |       |       |
| 5.2(WCDMA) | non     | 23.49     | 23.27 | 23.25 | 23.35      | 23.19 | 23.15 |
| HSDPA      | 1       | 23.38     | 23.19 | 23.22 | 23.33      | 23.07 | 23.13 |
|            | 2       | 23.35     | 23.17 | 23.21 | 23.31      | 23.05 | 23.33 |
|            | 3       | 22.85     | 22.67 | 22.75 | 22.82      | 22.58 | 22.65 |
|            | 4       | 22.87     | 22.68 | 22.73 | 22.80      | 22.57 | 22.91 |
| HSUPA      | 1       | 23.37     | 23.16 | 23.21 | 23.29      | 23.05 | 23.11 |
|            | 2       | 21.33     | 21.17 | 21.23 | 21.31      | 21.07 | 21.15 |
|            | 3       | 22.38     | 22.18 | 22.22 | 22.22      | 22.06 | 22.13 |
|            | 4       | 21.32     | 21.19 | 21.25 | 21.27      | 21.05 | 21.09 |
|            | 5       | 23.36     | 23.16 | 23.19 | 23.28      | 23.03 | 23.09 |

### 2. GSM Conducted peak output power

| Band     | Channel | Frequency (MHz) | Output Power (dBm) |
|----------|---------|-----------------|--------------------|
| GSM 850  | 128     | 824.2           | 32.28              |
|          | 190     | 836.6           | 32.23              |
|          | 251     | 848.8           | 32.01              |
| PCS 1900 | 512     | 1850.2          | 29.22              |
|          | 661     | 1880.0          | 29.05              |
|          | 810     | 1909.8          | 29.46              |

### 3. GPRS Mode Conducted peak output power

| Band     | Channel | Frequency (MHz) | Output Power(dBm) |        |        |        |
|----------|---------|-----------------|-------------------|--------|--------|--------|
|          |         |                 | Slot 1            | Slot 2 | Slot 3 | Slot 4 |
| GSM 850  | 128     | 824.2           | 30.26             | 29.07  | 28.08  | 27.01  |
|          | 190     | 836.6           | 30.23             | 29.58  | 28.06  | 26.95  |
|          | 251     | 848.8           | 30.08             | 29.56  | 28.30  | 26.33  |
| PCS 1900 | 512     | 1850.2          | 28.14             | 26.56  | 26.36  | 25.70  |
|          | 661     | 1880.0          | 27.70             | 26.21  | 26.23  | 25.15  |
|          | 810     | 1909.8          | 28.77             | 27.22  | 26.43  | 25.37  |

## 4. EGPRS Mode Conducted peak output power

| Band     | Channel | Frequency (MHz) | Output Power(dBm) |        |        |        |
|----------|---------|-----------------|-------------------|--------|--------|--------|
|          |         |                 | Slot 1            | Slot 2 | Slot 3 | Slot 4 |
| GSM 850  | 128     | 824.2           | 32.03             | 29.78  | 28.85  | 27.51  |
|          | 190     | 836.6           | 31.89             | 29.51  | 28.76  | 27.65  |
|          | 251     | 848.8           | 31.66             | 29.63  | 28.59  | 27.73  |
| PCS 1900 | 512     | 1850.2          | 28.95             | 27.56  | 26.36  | 26.16  |
|          | 661     | 1880.0          | 28.81             | 27.25  | 26.23  | 26.13  |
|          | 810     | 1909.8          | 30.09             | 28.29  | 27.33  | 27.25  |

Timeslot consignations:

| No. Of Slots      | Slot 1   | Slot 2   | Slot 3   | Slot 4   |
|-------------------|----------|----------|----------|----------|
| Slot Consignation | 1Up4Down | 2Up2Down | 3Up2Down | 4Up1Down |
| Duty Cycle        | 1:8      | 1:4      | 1:2.67   | 1:2      |
| Correct Factor    | -9.00dB  | -6.02dB  | -4.26dB  | -3.01dB  |

## 5. RF Exposure Evaluation

Assumed use distance from EUT to Human, **20 cm** separation distance warning is required. In this section, the power density at 20 cm location is calculated to examine if it is lower than the limit.

$$S = \frac{PG}{4\pi R^2}$$

Where:

S = power density

P = output power (W)

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = Separation distance between radiator and human body (m)

And the calculation result as following:

| Band<br>(MHz) | Frequency<br>(MHz) | Antenna Gain |           | Conducted<br>Average<br>Power(dBm) | Conducted<br>Average<br>Power(mW) | Time-averagin<br>g EIRP(mW) | Calculated to<br>ERP(mW) | Calculated<br>P.D<br>(mW/cm2) | Limit<br>(mW/cm2) |
|---------------|--------------------|--------------|-----------|------------------------------------|-----------------------------------|-----------------------------|--------------------------|-------------------------------|-------------------|
|               |                    | (dBi)        | (Numeric) |                                    |                                   |                             |                          |                               |                   |
| GSM<br>850    | 824.2              | 3.0          | 2         | 23.28                              | 212.81                            | 424.62                      | 258.82                   | 0.08                          | 0.549             |
| EGPRS<br>850  | 824.2              | 3.0          | 2         | 23.03                              | 200.91                            | 400.87                      | 244.34                   | 0.08                          | 0.549             |
| WCDMA<br>850  | 826.4              | 3.0          | 2         | 23.49                              | 223.36                            | 445.66                      | 271.64                   | 0.09                          | 0.551             |

| Band          | Frequenc<br>y (MHz) | Antenna Gain |           | Conducted<br>Average<br>Power(dBm) | Conducted<br>Average<br>Power(mW) | Time-averaging<br>EIRP(mW) | Calculated to<br>ERP(mW) | Calculated<br>P.D<br>(mW/cm2) | Limit<br>(mW/cm2) |
|---------------|---------------------|--------------|-----------|------------------------------------|-----------------------------------|----------------------------|--------------------------|-------------------------------|-------------------|
|               |                     | (dBi)        | (Numeric) |                                    |                                   |                            |                          |                               |                   |
| GSM<br>1900   | 1909.8              | 5.0          | 3.16      | 20.46                              | 111.17                            | 351.56                     | 214.29                   | 0.07                          | 1.000             |
| EGPRS<br>1900 | 1909.8              | 5.0          | 3.16      | 21.09                              | 128.53                            | 406.44                     | 247.74                   | 0.08                          | 1.000             |
| WCDMA<br>1900 | 1852.4              | 5.0          | 3.16      | 23.35                              | 216.27                            | 683.91                     | 416.87                   | 0.14                          | 1.000             |

Note: 1. per KDB412172 D01 the relationship between ERP and EIRP as following:

$$\text{ERP} = \text{EIRP} - 2.15 \text{ dB}$$

Note: 2. Correct Factor =  $10 \cdot \log(\text{Duty Cycle})$

Note: 3. Average Power = Peak Power + Correct Factor

Note: 4. The AV value of Slot 1 is really the worst case of output power on EGPRS mode

**Result:**

Per CFR Title 47 § 2.1091(c); Mobile devices that operate in the Cellular Radiotelephone Service, the Personal Communications Services, the Satellite Communications Services, the General Wireless Communications Service, the Wireless Communications Service, the Maritime Services and the Specialized Mobile Radio Service authorized under subpart H of part 22 of this chapter, parts 24, 25, 26 and 27 of this chapter, part 80 of this chapter (ship earth stations devices only) and part 90 of this chapter are subject to routine environmental evaluation for RF exposure prior to equipment authorization or use if they operate at frequencies of 1.5 GHz or below and their effective radiated power (ERP) is 1.5 watts or more, or if they operate at frequencies above 1.5 GHz and their ERP is 3 watts or more.

EUT source-based time averaged ERP < 1.5W for RF operating frequency  $\leq 1.5\text{GHz}$ , and EUT source-based time averaged ERP < 3W for RF operating frequency  $> 1.5\text{GHz}$ , routine evaluation of MPE is not required; and the MPE calculation results show that the EUT complies with the FCC RF exposure limit.