# RF Exposure Evaluation Declaration

| | | |
|---|---|---|
| Product Name | : | GSM/GPRS Module |
| Model No. | : | SIM840W |
| FCC ID | : | UDV-2011062001 |

| | | |
|---|---|---|
| Applicant | : | Shanghai SIMCom Ltd. |
| Address | : | SIM Technology Building,No.633, Jinzhong Road, Changning District, Shanghai, P.R. China |

| | | |
|---|---|---|
| Date of Receipt | : | 28/06/2011 |
| Issued Date | : | 03/07/2011 |
| Report No. | : | 116S085R-RF-US |
| Report Version | : | V2.2 |

# Test Report Certification

Issued Date : 03/07/2011
Report No. : 116S085R-RF-US

QuieTek

| | | |
|---|---|---|
| Product Name | : | GSM/GPRS Module |
| Applicant | : | Shanghai SIMCom Ltd. |
| Address | : | SIM Technology Building,No.633, Jinzhong Road, Changning District, Shanghai, P.R. China |
| Manufacturer | : | Shanghai SIMCom Ltd. |
| Address | : | SIM Technology Building,No.633, Jinzhong Road, Changning District, Shanghai, P.R. China |
| Model No. | : | SIM840W |
| FCC ID | : | UDV-2011062001 |
| EUT Voltage | : | MIN: 3.4V, NOR: 3.7V, MAX: 4.5V |
| Trade Name | : | SIMCom |
| Applicable Standard | : | FCC OET 65 |
| Test Result | : | Complied |
| Performed Location | : | Suzhou EMC Laboratory<br>No.99 Hongye Rd., Suzhou Industrial Park Loufeng<br>Hi-Tech Development Zone., Suzhou, China<br>TEL: +86-512-6251-5088 / FAX: +86-512-6251-5098<br>FCC Registration Number: 800392 |

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Approved By : Marlin Chen
(Engineering Supervisor: Marlin Chen)

## Laboratory Information

We, **QuieTek Corporation**, are an independent EMC and safety consultancy that was established the whole facility in our laboratories. The test facility has been accredited/accepted(audited or listed) by the following related bodies in compliance with ISO 17025, EN 45001 and specified testing scope:

| | | |
|---|---|---|
| **Taiwan R.O.C.** | **:** | **BSMI, NCC, TAF** |
| **Germany** | **:** | **TUV Rheinland** |
| **Norway** | **:** | **Nemko, DNV** |
| **USA** | **:** | **FCC, NVLAP** |
| **Japan** | **:** | **VCCI** |

The related certificate for our laboratories about the test site and management system can be downloaded from QuieTek Corporation's Web Site : http://www.quietek.com/tw/ctg/cts/accreditations.htm
The address and introduction of QuieTek Corporation's laboratories can be founded in our Web site : http://www.quietek.com/
If you have any comments, Please don't hesitate to contact us. Our contact information is as below:

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NVLAP Lab Code : 200347-0

Testing Laboratory 1313

**LinKou Testing Laboratory :**
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NVLAP Lab Code: 200533-0

Testing Laboratory 0914

**Suzhou (China) Testing Laboratory :**
No. 99 Hongye Rd., Suzhou Industrial Park Loufeng Hi-Tech Development Zone., Suzhou,China.
TEL : +86-512-6251-5088 / FAX : +86-512-6251-5098 E-Mail : service@quietek.com

NVLAP Lab Code : 200743-0

Testing Laboratory 1596

## 1.1. EUT Description

| | |
|---|---|
| Product Name | GSM/GPRS Module |
| Brand Name | SIMCom |
| Model No. | SIM840W |
| Working Voltage | MIN: 3.4V, NOR: 3.7V, MAX: 4.5V |
| Support Band | GSM850/PCS1900 |
| Tx Frequency Range | GSM 850: 824MHz to 849MHz<br>PCS 1900: 1850MHz to 1910MHz |
| Rx Frequency Range | GSM 850: 869MHz to 894MHz<br>PCS 1900: 1930MHz to 1990MHz |
| GPRS Class | 12 |
| Type of modulation | GMSK |
| Antenna Type | Connector |
| Peak Antenna Gain | 3dBi |

## 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/cm2) | Average Time (Minutes) |
|---|---|---|---|---|
| (A) Limits for Occupational/ Control Exposures | | | | |
| 300-1500 | -- | -- | F/300 | 6 |
| 1500-100,000 | -- | -- | 5 | 6 |
| (B) Limits for General Population/ Uncontrolled Exposures | | | | |
| 300-1500 | -- | -- | F/1500 | 6 |
| 1500-100,000 | -- | -- | 1 | 30 |

F= Frequency in MHz

Friis Formula

Friis transmission formula: Pd = (Pout*G)/(4*pi*r2)

Where

Pd = power density in mW/cm2

Pout = 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/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℃and 78％ RH.

## 2.3. Test Result of RF Exposure Evaluation

| | | |
|---|---|---|
| Product | : | GSM/GPRS Module |
| Test Item | : | RF Exposure Evaluation |
| Test Site | : | AC-6 |

### 2.3.1. Conducted Power Analysis

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 | -9 dB | -6 dB | -4.25 dB | -3 dB |

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

Table 2

| Frequency Band | Modulation | Timeslots | Avg. Burst Power (dBm) | Time based average power (Calculated) |
|---|---|---|---|---|
| GPRS850 | GMSK | 1 | **32.30** | 23.30 |
| GPRS850 | GMSK | 2 | 30.75 | 24.75 |
| GPRS850 | GMSK | 3 | 29.12 | 24.87 |
| GPRS850 | GMSK | 4 | 28.64 | **25.64** |
| GPRS1900 | GMSK | 1 | **29.42** | 20.42 |
| GPRS1900 | GMSK | 2 | 28.07 | 22.07 |
| GPRS1900 | GMSK | 3 | 26.10 | 21.85 |
| GPRS1900 | GMSK | 4 | 25.70 | **22.70** |

**Antenna Gain:**

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 3dBi for 824~894MHz band; 3dBi for 1850~1990MHz band.

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

| Test Mode | Frequency Band (MHz) | Maximum Output Power to Antenna (mW) | Power Density at R = 20 cm (mW/cm2) | MPE Limit ($mW/cm^2$) |
|---|---|---|---|---|
| GPRS850 | 824~849 | 366.4 | 0.15 | 0.55 |
| GPRS1900 | 1850~1910 | 186.2 | 0.07 | 1.00 |