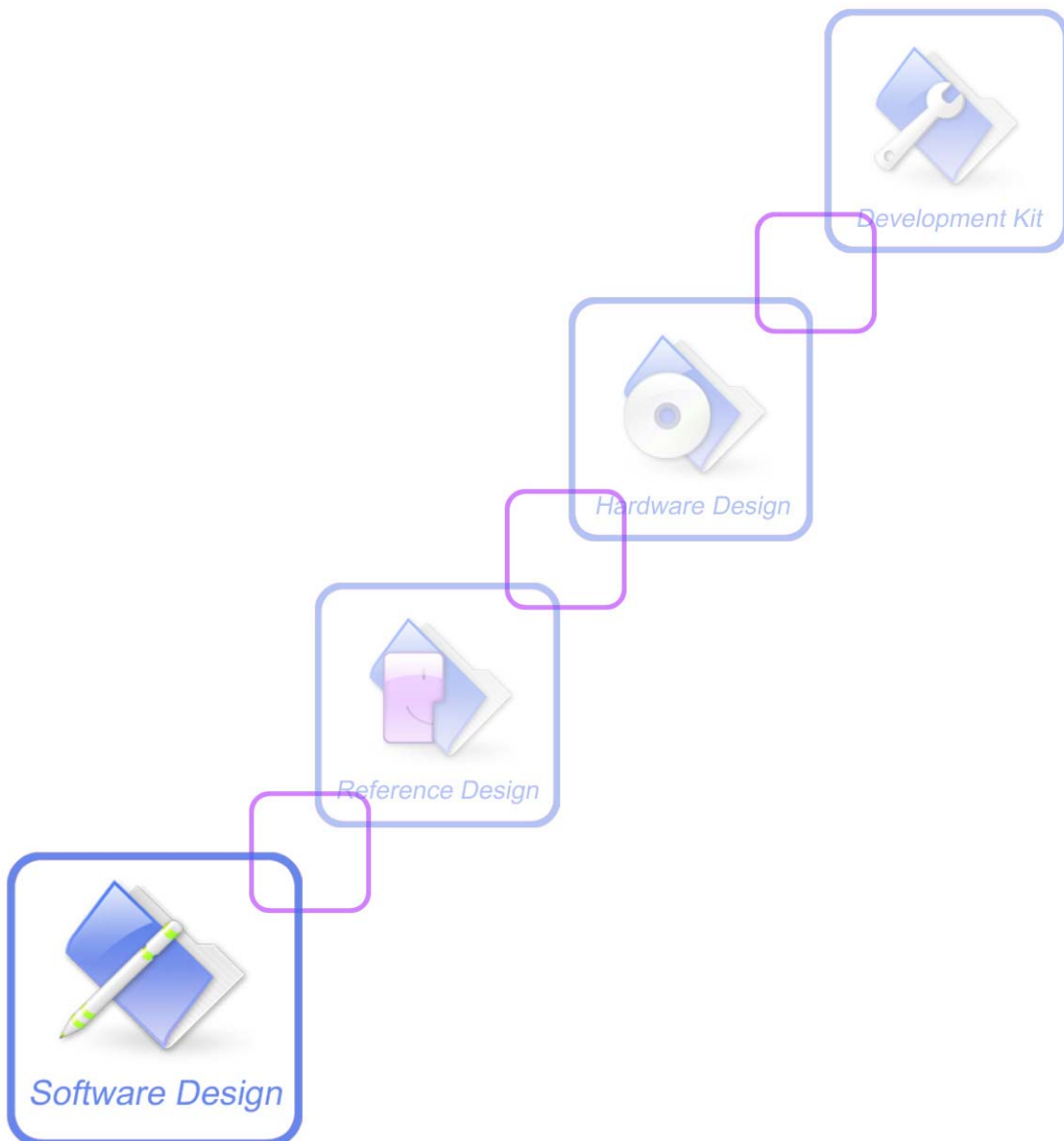




SIM800F_User Manual_ V1.00



Notes

This equipment is in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU.

The device complies with RF specifications when the device used at 20cm from your body.

General Notes

SIMCom offers this information as a service to its customers, to support application and engineering efforts that use the products designed by SIMCom. The information provided is based upon requirements specifically provided to SIMCom by the customers. SIMCom has not undertaken any independent search for additional relevant information, including any information that may be in the customer's possession. Furthermore, system validation of this product designed by SIMCom within a larger electronic system remains the responsibility of the customer or the customer's system integrator. All specifications supplied herein are subject to change.

WARNING:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) This device must accept any interference received, including interference that may cause undesired operation. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

RF Exposure Statement:

FCC Caution

- (1) Exposure to Radio Frequency Radiation. This equipment must be installed and operated in accordance with

provided instructions and the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be collocated or operating in conjunction with any other antenna or transmitter. End-users and installers must be provided with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance.

(2) Any changes or modifications not expressly approved by the grantee of this device could void the user's authority to operate the equipment.

(3) This Transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

(4) Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user authority to operate the equipment.

(5) The modules FCC ID is not visible when installed in the host, or

(6) If the host is marketed so that end users do not have straight forward commonly used methods for access to remove the module so that the FCC ID of the module is visible; then an additional permanent label referring to the enclosed module: Contains Transmitter Module FCC ID: 2AJYU-8BVA101 or Contains FCC ID: 2AJYU-8BVA101 must be used.

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1. SIM800F Description

1.1. Summarize

SIM800F designed by SIMCom is a quad band module which supports GSM/GPRS. The baseband circuit is based on MTK and RF circuit is based on RFMD. It works at quad bands-----GSM850, EGSM900, DCS1800, and PCS1900. CPU clock is based on 26MHz crystal. The main IC includes MT6261 and RF7198.

1.2. Feature

- Quad-Band 850/900/1800/1900MHz
- GPRS multi-slot class 12/10
- GPRS mobile station class B
- Compliant to GSM phase 2/2+
 - Class 4 (2 W @ 850/900 MHz)
 - Class 1 (1 W @ 1800/1900MHz)
- Dimensions: 24*24*3 mm
- Weight: 3.1 g
- Control via AT commands (3GPP TS 27.007, 27.005 and SIMCom enhanced AT Commands)
- Supply voltage range 3.6~4.2 V
- Low power consumption
- Operation temperature:-30~80°C
- 68 SMT pads include
 - Interface to external SIM 3V/1.8V
 - Analog audio interface
 - RTC backup
 - Serial interface
 - USB interface
 - Keypad interface
 - LCD interface
 - Antenna pad
 - PCM
 - GPIO
 - ADC

1.3. Pin

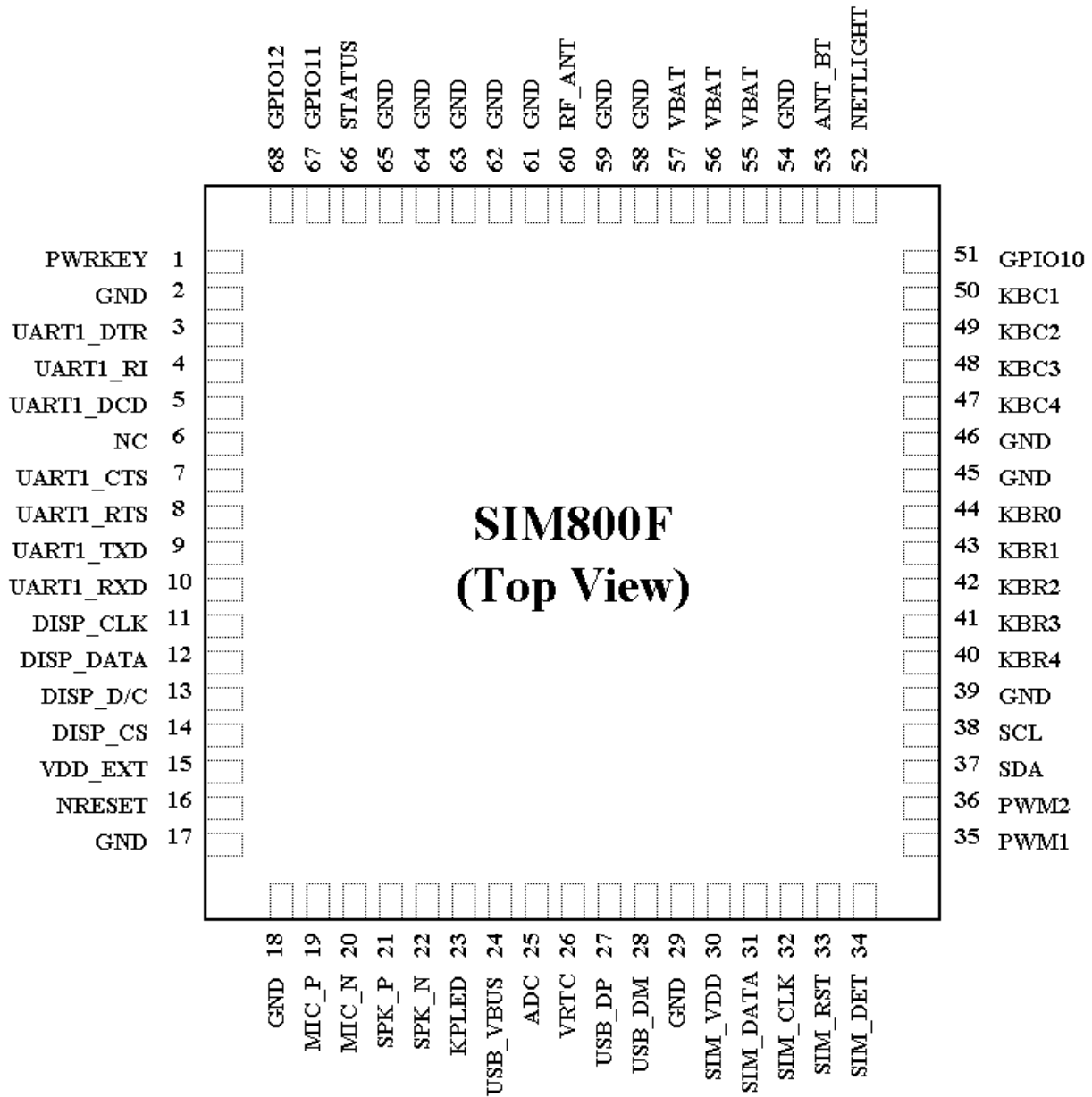


Figure 1: SIM800F pin out diagram (Top view)

1.4. Dimension

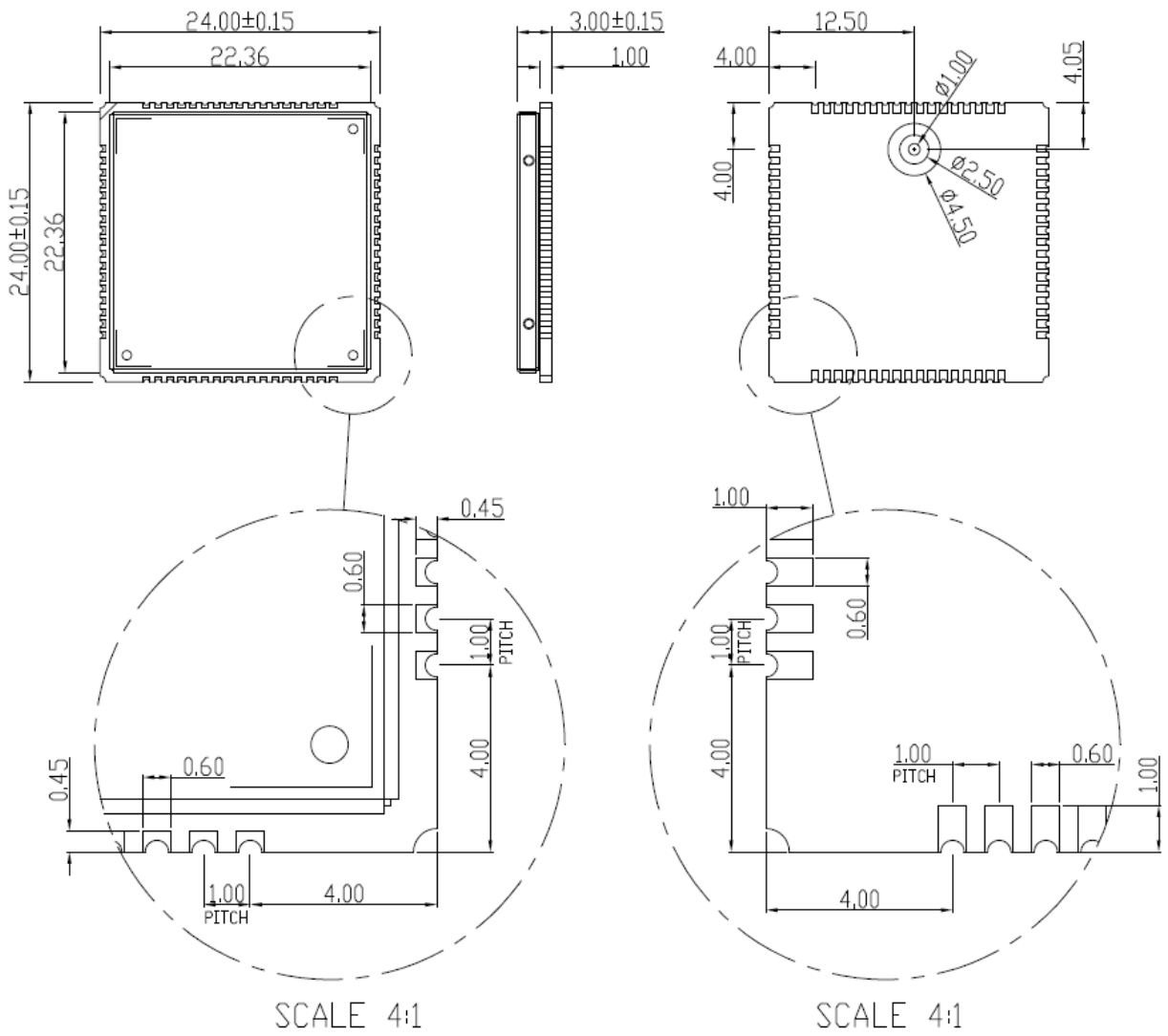


Figure 2: Dimention

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2. Detail Block Diagram

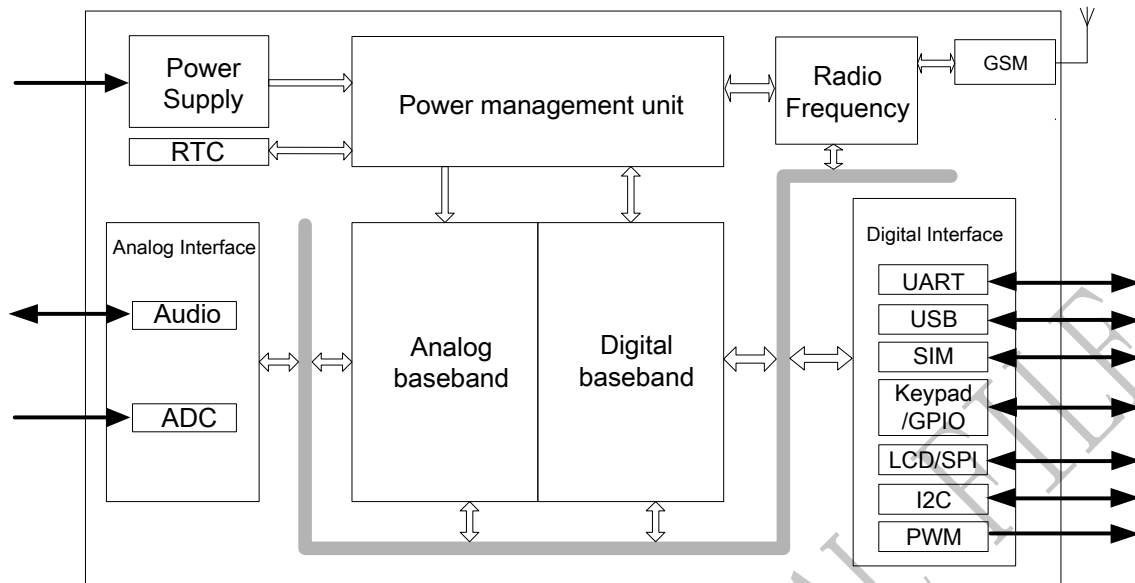


Figure 3: Block diagram of SIM800F

3. Electrical and Reliability Characteristics

3.1. Absolute Maximum Ratings

The absolute maximum ratings stated in following table are stress ratings under non-operating conditions. Stresses beyond any of these limits will cause permanent damage to SIM800F.

Table 1: Absolute maximum ratings

| Symbol | Parameter | Min | Typ | Max | Unit |
|------------------|----------------------|-----|-----|-----|------------------|
| V _{BAT} | Power supply voltage | - | - | 4.5 | V |
| V _{BUS} | - | - | 30 | V | V _{BUS} |
| I _I * | Input current | - | - | 8 | mA |
| I _O * | Output current | - | - | 8 | mA |

*These parameters are for digital interface pins, such as keypad, GPIO, I²C, UART, LCD and DEBUG.

3.2. Digital Interface Characteristics

Table 2: Digital interface characteristics

| Symbol | Parameter | Min | Typ | Max | Unit |
|-----------------|--------------------------|------|-----|-----|------|
| I _{IH} | High-level input current | 2.1 | - | 3.1 | V |
| I _{IL} | Low-level input current | -0.3 | - | 0.7 | V |

| | | | | | |
|----------|--------------------------|-----|---|-----|---|
| V_{OH} | High-level input voltage | 2.4 | - | - | V |
| V_{OL} | Low-level input voltage | - | - | 0.4 | V |

* These parameters are for digital interface pins, such as keypad, GPIO, I²C, UART, LCD, PWMs and DEBUG.

3.3. SIM Card Interface Characteristics

Table 3: SIM card interface characteristics

| Symbol | Parameter | Min | Typ | Max | Unit |
|----------|---------------------------|------|-----|------|------|
| I_{IH} | High-level input current | -1 | - | 1 | uA |
| I_{IL} | Low-level input current | -1 | - | 1 | uA |
| V_{IH} | High-level input voltage | 1.4 | - | - | V |
| | | 2.4 | - | - | V |
| V_{IL} | Low-level input voltage | - | - | 0.27 | V |
| | | - | - | 0.4 | V |
| V_{OH} | High-level output voltage | 1.62 | - | - | V |
| | | 2.7 | - | - | V |
| V_{OL} | Low-level output voltage | - | - | 0.36 | V |
| | | - | - | 0.4 | V |

3.4. SIM_VDD Characteristics

Table 4: SIM_VDD characteristics

| Symbol | Parameter | Min | Typ | Max | Unit |
|--------|----------------|------|------|------|------|
| V_o | Output voltage | 2.70 | 2.80 | 2.90 | V |
| I_o | Output current | - | - | 50 | mA |

3.5. VRTC Characteristics

Table 5: VRTC characteristics

| Symbol | Parameter | Min | Typ | Max | Unit |
|---------------|---------------------|-----|-----|-----|------|
| V_{RTC-IN} | VRTC input voltage | | 2.8 | | V |
| I_{RTC-IN} | VRTC input current | - | 3 | - | uA |
| $V_{RTC-OUT}$ | VRTC output voltage | - | 2.8 | - | V |
| $I_{RTC-OUT}$ | VRTC output current | - | | 2 | mA |

3.6. Current Consumption (VBAT = 3.8V)

Table 6: Current consumption

| Symbol | Parameter | Conditions | Value | Unit | | |
|----------------------------|----------------------|---|----------------------|--------|-----|----|
| I _{VRTC} | VRTC current | VBAT disconnects. Backup battery is 3 V | 2 | uA | | |
| I _{VBAT} | VBAT current | Power down mode | 50 | uA | | |
| | | Sleep mode | BS-PA-MFRMS=9 | 1.0 | mA | |
| | | | BS-PA-MFRMS=5 | 1.2 | | |
| | | | BS-PA-MFRMS=2 | 1.8 | | |
| | | Idle mode | GSM 850 | 19 | mA | |
| | | | EGSM 900 | | | |
| | | | DCS 1800 | | | |
| | | | PCS 1900 | | | |
| | | Voice call | GSM 850 EGSM 900 | PCL=5 | 250 | mA |
| | | | | PCL=12 | 110 | |
| | | | | PCL=19 | 76 | |
| | | | DCS 1800 PCS 1900 | PCL=0 | 168 | |
| | | | | PCL=7 | 89 | |
| | | | | PCL=15 | 76 | |
| | | Data mode GPRS(1Rx,1Tx) | GSM 850 EGSM 900 | PCL=5 | 240 | mA |
| | | | | PCL=12 | 110 | |
| | | | | PCL=19 | 83 | |
| | | | DCS 1800 PCS 1900 | PCL=0 | 170 | mA |
| | | | | PCL=7 | 95 | |
| | | | | PCL=15 | 80 | |
| | | Data mode GPRS(4Rx,1Tx) | GSM 850 EGSM 900 | PCL=5 | 270 | mA |
| | | | | PCL=12 | 150 | |
| | | | | PCL=19 | 120 | |
| | | | DCS 1800 PCS 1900 | PCL=0 | 205 | mA |
| PCL=7 | 130 | | | | | |
| PCL=15 | 115 | | | | | |
| Data mode GPRS(3Rx,2Tx) | GSM 850 EGSM 900 | PCL=5 | 440 | mA | | |
| | | PCL=12 | 185 | | | |
| | | PCL=19 | 130 | | | |
| | DCS 1800 PCS 1900 | PCL=0 | 300 | mA | | |
| | | PCL=7 | 155 | | | |
| | | PCL=15 | 122 | | | |
| I _{VBAT-peak} | Peak current | During Tx burst | 2 | A | | |

3.7. Electro-Static Discharge

SIM800F is an ESD sensitive component, so more attention should be paid to the procedure of handling and packaging. The ESD test results are shown in the following table.

Table 7: The ESD characteristics (Temperature: 25°C, Humidity: 45 %)

| Pin | Contact discharge | Air discharge |
|-------------------------|-------------------|---------------|
| VBAT | ±6KV | ±12KV |
| GND | ±6KV | ±12KV |
| RXD, TXD | ±2KV | ±8KV |
| Antenna port | ±5KV | ±10KV |
| SPK_P/SPK_N/MIC_P/MIC_N | ±2KV | ±5KV |
| PWRKEY | ±2KV | ±8KV |

4. Radio Characteristics

4.1. Module RF Output Power

The following table shows the module conducted output power, it is followed by the 3GPP TS 05.05 technical specification requirement.

Table 8: SIM800F GSM 900 and GSM 850 conducted RF output power

| GSM850、EGSM900 | | | |
|----------------|----------------------------|-------------------------------|---------|
| PCL | Nominal output power (dBm) | Tolerance (dB) for conditions | |
| | | Normal | Extreme |
| 5 | 33 | ±2 | ±2.5 |
| 6 | 31 | ±3 | ±4 |
| 7 | 29 | ±3 | ±4 |
| 8 | 27 | ±3 | ±4 |
| 9 | 25 | ±3 | ±4 |
| 10 | 23 | ±3 | ±4 |
| 11 | 21 | ±3 | ±4 |
| 12 | 19 | ±3 | ±4 |
| 13 | 17 | ±3 | ±4 |
| 14 | 15 | ±3 | ±4 |
| 15 | 13 | ±3 | ±4 |
| 16 | 11 | ±5 | ±6 |

| | | | |
|-------|---|----|----|
| 17 | 9 | ±5 | ±6 |
| 18 | 7 | ±5 | ±6 |
| 19-31 | 5 | ±5 | ±6 |

Table 9: SIM800F DCS 1800 and PCS 1900 conducted RF output power

| DCS1800、PCS1900 | | | |
|-----------------|----------------------------|-------------------------------|---------|
| PCL | Nominal output power (dBm) | Tolerance (dB) for conditions | |
| | | Normal | Extreme |
| 0 | 30 | ±2 | ±2.5 |
| 1 | 28 | ±3 | ±4 |
| 2 | 26 | ±3 | ±4 |
| 3 | 24 | ±3 | ±4 |
| 4 | 22 | ±3 | ±4 |
| 5 | 20 | ±3 | ±4 |
| 6 | 18 | ±3 | ±4 |
| 7 | 16 | ±3 | ±4 |
| 8 | 14 | ±3 | ±4 |
| 9 | 12 | ±4 | ±5 |
| 10 | 10 | ±4 | ±5 |
| 11 | 8 | ±4 | ±5 |
| 12 | 6 | ±4 | ±5 |
| 13 | 4 | ±4 | ±5 |
| 14 | 2 | ±5 | ±6 |
| 15 | 0 | ±5 | ±6 |

For the module’s output power, the following is should be noted:

At GSM900 and GSM850 band, the module is a class 4 device, so the module’s output power should not exceed 33dBm, and at the maximum power level, the output power tolerance should not exceed +/-2dB under normal condition and +/-2.5dB under extreme condition.

At DCS1800 and PCS1900 band, the module is a class 1 device, so the module’s output power should not exceed 30dBm, and at the maximum power level, the output power tolerance should not exceed +/-2dB under normal condition and +/-2.5dB under extreme condition.

4.2. Module RF Receive Sensitivity

The following table shows the module’s conducted receive sensitivity, it is tested under static condition.

Table 10: SIM800F conducted RF receive sensitivity

| Frequency | Receive sensitivity (Typical) | Receive sensitivity(Max) |
|-----------|-------------------------------|--------------------------|
| GSM850 | -108dBm | -106dBm |
| EGSM900 | -108dBm | -106dBm |
| DCS1800 | -108dBm | -106dBm |
| PCS1900 | -108dBm | -106dBm |

4.3. Module Operating Frequencies

The following table shows the module's operating frequency range; it is followed by the 3GPP TS 05.05 technical specification requirement.

Table 11: SIM800F operating frequencies

| Frequency | Receive | Transmit |
|-----------|----------------|----------------|
| GSM850 | 869 ~ 894MHz | 824 ~ 849 MHz |
| EGSM900 | 925 ~ 960MHz | 880 ~ 915MHz |
| DCS1800 | 1805 ~ 1880MHz | 1710 ~ 1785MHz |
| PCS1900 | 1930 ~ 1990MHz | 1850 ~ 1910MHz |

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Website: www.simcomm2m.com

SIMCOM CONFIDENTIAL FILE

FCC Statement

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation.

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

The modular can be installed or integrated in mobile or fix devices only. This modular cannot be installed in any portable device.

FCC Radiation Exposure Statement

This modular complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. This modular must be installed and operated with a minimum distance of 20 cm between the radiator and user body.

If the FCC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following: "Contains Transmitter Module FCC ID: 2AJYU-8BVA101 Or Contains FCC ID: 2AJYU-8BVA101"

When the module is installed inside another device, the user manual of the host must contain below warning statements;

1. This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
 - (1) This device may not cause harmful interference.
 - (2) This device must accept any interference received, including interference that may cause undesired operation.
2. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

The devices must be installed and used in strict accordance with the manufacturer's instructions as described in the user documentation that comes with the product.

Any company of the host device which install this modular with Single modular approval should perform the test of radiated emission and spurious emission according to FCC part 15C : 15.247 and 15.209 requirement, Only if the test result comply with FCC part 15C : 15.247 and 15.209 requirement, then the host can be sold legally.