Shenzhen Hojy Wireless Co., Ltd.	Document Numbers	Product release	level
	Internal retrieval ： W668.1	1.0	topsecret
	Product name ： W668		20 page

W668 Product Manuals

NOTICE:

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 made to this equipment not expressly approved by SIMCOM may void the FCC authorization to operate this equipment.

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.

Radiofrequency radiation exposure Information:

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

Contents

1、Abstract

1.1 Goal

W668 is a 3G module based on STE M340 platform. It is a WCDMA/GSM double mode , wireless providing pronunciation and the data transfer. The document stipulates the W668 product specification for the relevance personnel designs, tests , aftersales and marketing.

1.2 Technical Terms

Terms	Description
AT	Attention Command
GPIO	General Purpose I/O
PC	Personal Computer
WCDMA	Wideband Code Division Multiple Access
UART	Universal Asynchronous Receiver/Transmitter
USIM	Universal Subscriber Identity Module

Express 1-1

1.3 References

《1424-LZN9012499_U335_Product_Overview_DESC_Rev_C》

2、Product Features

2.1 Product Features List

Platform Features

Item	Specification	Description	
1	Chipset	STE M340	
2	Frenquency	GSM	Quad-band ● E-GSM850：824 ~848MHz; 869~893MHz ● E-GSM900：880~915MHz; 925~960MHz ● DCS1800：1710~1785MHz; 1805~1880MHz ● DCS1900：1850~1910MHz; 1930~1990MHz

		WCDMA	● Band I.：1920~1980MHz; 2110~2170MHz ● Band II.：1850~1910MHz; 1930~1990MHz ● Band V.： 824~849MHz; 869~894MHz
3	Data Rate	GPRS	Multi-slot class 11
		EDGE	Multi-slot class 11
		WCDMA	Uplink：2.0M/384/64Kbps - HSUPA Downlink：7.2M/384/128Kbps - HSDPA
4	Modulation	GSM	GMSK - CS1~CS4
		EDGE	8PSK - MCS1~CS9
		WCDMA	HSUPA - 2.0M
5	RF (send)	GSM	● E-GSM900(GMSK): 33dBm±2db ● E-GSM850(8-PSK): 27dBm ±3db ● DCS1800(GMSK): 30dBm ±2db ● DCS1800(8-PSK): 26dBm +3/-4db
		WCDMA	● WCDMA: 1920~1980MHz: 27dBm+1/-3db ● WCDMA: 1850~1910MHz: 27dBm+1/-3db ● WCDMA: 824~849MHz: 27dBm+1/-3db
6	RF (receive)	GSM	● E-GSM900: -106dBm ● DCS1800: -106dBm
		WCDMA	● WCDMA: Band I: -108dBm ● WCDMA: Band II: -108dBm ● WCDMA:Band V:-108dBm
7	Flight Mode	Support the AT command set or hardware set flight mode	
8	USIM	1 Support 1.8V and 3V SIM cards 2 Support SIM Toolkit, consistent with SAT Class3, GSM 11.14 Release 9	
9	Interface	Mini-PCI-E	
10	AT Command	● Supports 3GPP TS27.005;3GPP TS27.007;ITU-T V.25ter ● Support 3GPP TS27.010 serial port multiplexer	
11	Text Masseging	1 Supports MT, MO, CB SMS 2 Supports TEXT and PDU SMS format 3 Support CSD and GPRS transmission, and supports the user default transfer mode 4 Support SMS saving to the USIM card	

Table 2-1

2.2 Hardware Features

Based on M340 W668 platform. The hardware system block diagram is as follows,

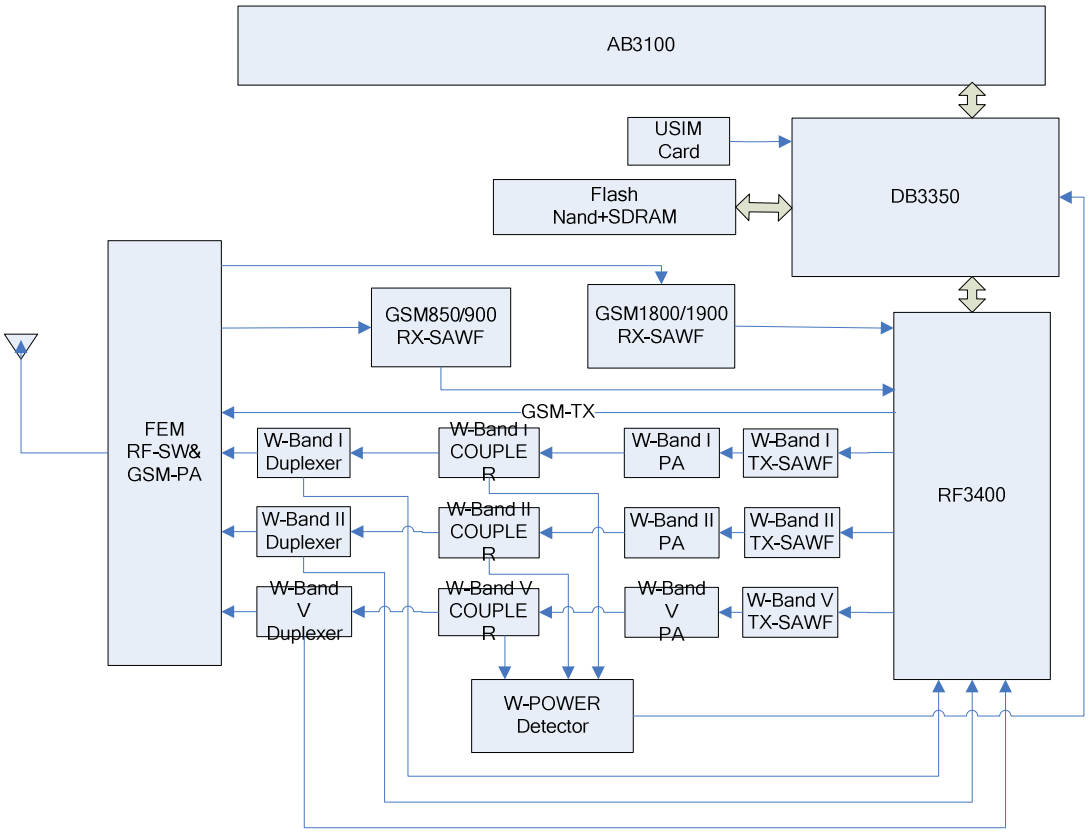

Figure 2-2

Key components description:

✧ RF: GSM and TD of the RF share the same Transceiver, including the following parts.

Transceiver: RF3400 modulates both GSM and WCDMA RF signal. It also supports 8PSK modulation of EDGE-WCDMA, HSUPA signal and modulation.

FEM：

1. From the GSM Transceiver RF signal power amplifier to support GMSK and 8PSK modes to achieve GSM-PA function;

2. Send and receive signals from various quarters of the WCDMA,managed to achieve an antenna switch function.

WCDMA-PA: a total of three chips, respectively, from the Transceiver's I, II, V-band RF for power amplification, with three operating modes and high amplification efficiency.

✧ Base Band

Digital baseband processor: The DB3350 baseband processor, the internal integration ARM926EJ, contains numbers of peripherals extensional possibilities & integrated communication DSP, to achieve the machine's control, communications protocol processing, and external interface.

Analog baseband processor: The AB3100, the corresponding control voltage for each group, using I2C interface.

2.3 Software

W668 based on T3G M340's 3G-based program, its software system block diagram below, the software is divided into three layers:

✧ Abstraction Layer

Abstract hardware processing interface to manage all hardware access, so that the upper set of software interfaces to use the sameaccess to all hardware devices, shielding a variety of hardware differences.

✧ Service processing layer

Service processes is to provide services mainly to the outer layer, such as wireless services, file system services.

✧ Application service layer

Application service is to provide AT commands and other multimedia applications.

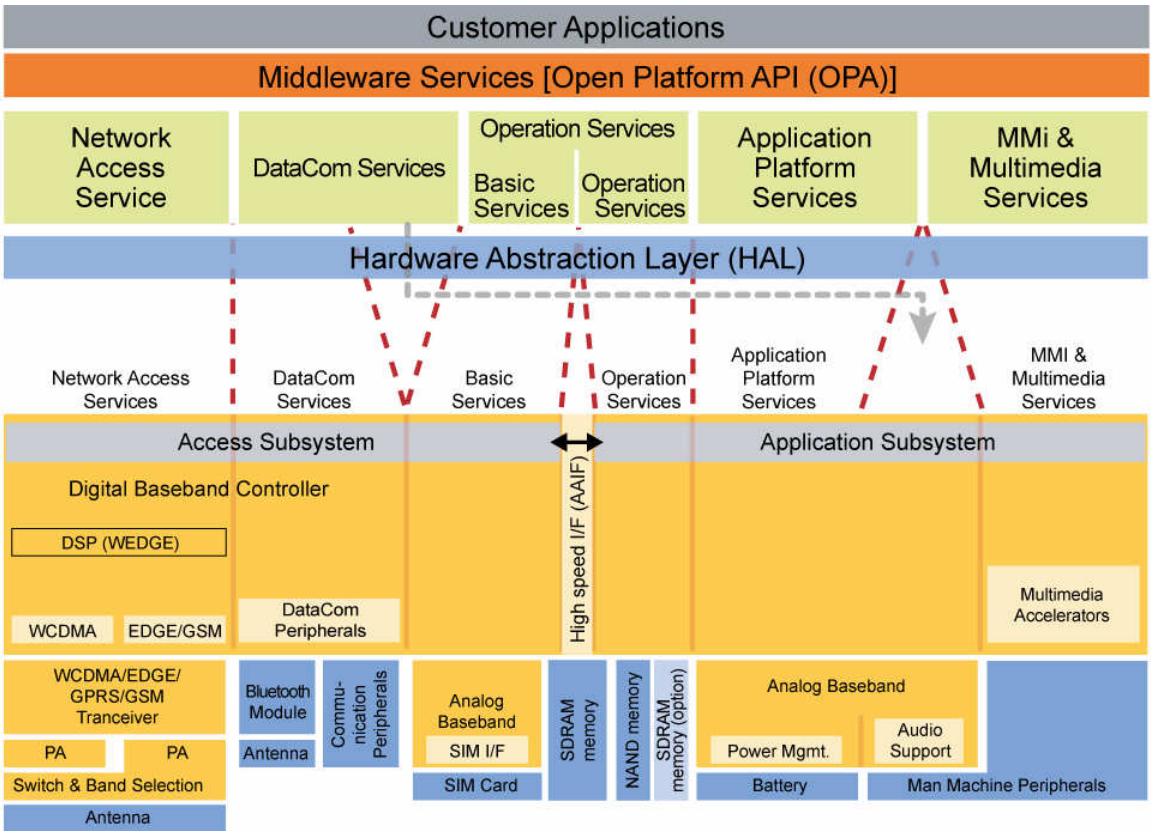
Customer Applications
Middleware Services [Open Platform API (OPA)]
Network Access Service
DataCom Services
Operation Services
Basic Services
Operation Services
Application Platform Services
MMi & Multimedia Services
Hardware Abstraction Layer (HAL)
Network Access Services
DataCom Services
Basic Services
Operation Services
Application Platform Services
MMI & Multimedia Services
Access Subsystem
Application Subsystem
Digital Baseband Controller
DSP (WEDGE)
WCDMA
EDGE/GSM
DataCom Peripherals
High speed I/F (AAIF)
Multimedia Accelerators
WCDMA/EDGE/ GPRS/GSM Tranceiver
PA
PA
Switch & Band Selection
Antenna
Bluetooth Module
Antenna
Commu-nication Peripherals
Analog Baseband
SIM I/F
SIM Card
SDRAM memory
NAND memory
SDRAM memory (option)
Analog Baseband
Power Mgmt.
Audio Support
Battery
Man Machine Peripherals

Table 2-3

3、Product Specification

3.1 External Form Structure

The Physical W668 structure dimension is: length 51 +/- 0.2 mms ; high 30 +/- 0.1 mms; thickness 0.2 mm for 4.2 +/-. The dimensions are 51 mmsX30 mmsX4.2 mms, the assembling altitude maximum is 4.2. See figure below,

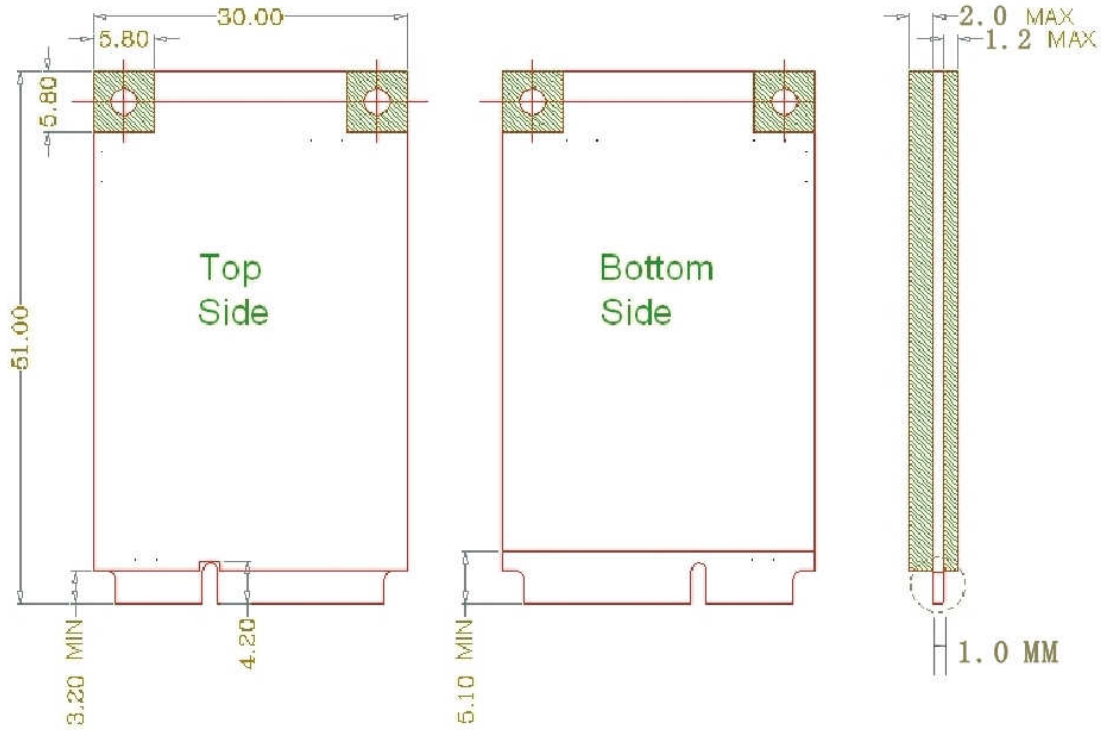

Figure 3-1

3.2 Interface Description

3.2.1 Interface definition

Through the standard MINI-PCIe interfaces, W668 hardware can connect with external systems, external systems through the W668's software interface module communication with the W668, W668 used to provide 3G wireless communications. To describe conveniently, we call the external system to the host system.

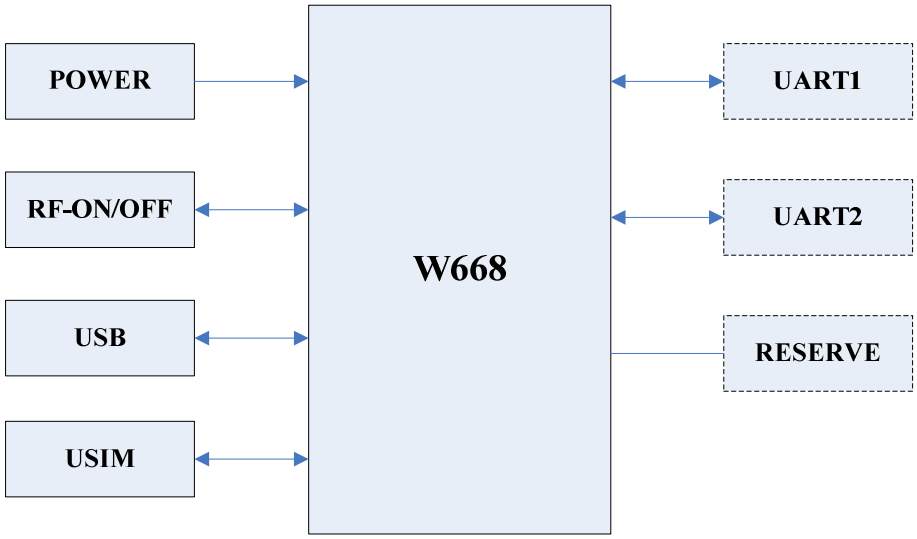

Table 3-2

W668's interface, as shown above, the interface is divided into the following categories:

✧ Ower Interface

✧ RF Swift Interface

✧ USIM Interface

✧ 2 UART interfaces reserved for test points

✧ Spare interface

3.2.2 PIN definition

W668 with the host system connection 52PINS pin defined as follows:

W668 Mini PCI Express PIN Define			
PIN #	**standard description**	**W688 pin description**	**Additional Description**
1	WAKE#	NC	No Connect
2	3.3Vaux	VCC_3V3	3.3V DC supply rail from the PC side.
3	COEX1	NC	No Connect
4	GND	GND	Mini Card ground.
5	COEX2	NC	No Connect.
6	1.5V	NC	No Connect
7	CLKREQ#	NC	No Connect
8	UIM_PWR	UIM_PWR	Power source for external UIM/SIM.
9	GND	GND	Mini Card ground.
10	UIM_DATA	UIM_DATA	External UIM/SIM data signal.

11	REFCLK-	NC	No Connect
12	UIM_CLK	UIM_CLK	External UIM/SIM clock signal.
13	REFCLK+	NC	No Connect
14	UIM_RESET	UIM_RESET	External UIM/SIM reset signal.
15	GND	GND	Mini Card ground.
16	UIM_Vpp	NC	No Connect
17	Reserved	NC	No Connect
18	GND	GND	Mini Card ground.
19	Reserved	NC	No Connect
20	W_DISABLE#	W_DISABLE_N	For close wireless communications
21	GND	GND	Mini Card ground.
22	PERST#	PERST#	Force a hardware reset on the card.
23	PERn0	NC	No Connect
24	3.3Vaux/NC	NC	No Connect
25	PERp0	NC	No Connect
26	GND	GND	Mini Card ground.
27	GND	GND	Mini Card ground.
28	1.5V	NC	No Connect
29	GND	GND	Mini Card ground.
30	SMB_CLK	NC	No Connect
31	PETn0	NC	No Connect
32	SMB_DATA	NC	No Connect
33	PETp0	NC	No Connect
34	GND	GND	Mini Card ground.
35	GND	GND	Mini Card ground.
36			
37	GND	GND	GND
38			
39	3.3Vaux	VCC_3V3	3.3V DC supply rail from the PC side.
40	CPUSB#	GND	GND
41	3.3Vaux	VCC_3V3	3.3V DC supply rail from the PC side.
42	LED_WWAN#	LED_WWAN	Active-low LED signal for indicating the state of the card.
43	GND	GND	GND
44	LED_WLAN#	NC	No Connect.
45	Reserved	NC	No Connect.
46	LED_WPAN#	NC	No Connect.

47	Reserved	NC	No Connect.
48	1.5V	NC	No Connect
49	Reserved	NC	No Connect
50	GND	GND	Mini Card Ground
51	Reserved	NC	No Connect
52	3.3Vaux	VCC_3V3	3.3V DC supply rail from the PC side.

3.3 Interface Application

3.3.1 Power Interface

W668 single power supply. The rated working voltage is 3.3V.

◆ Work Mode

According to the system's status and power differences, W668 work modules as shown in Table 3-2.

Woke Mode	Desceiption
Work Mode	System is in state of telecommunication services. telecommunication services are being processed.
Standby Mode	The system is ready, waiting to enter service mode, sleep mode or off mode
Sleep Mode	Parts of the system is turned off. This state is the lowest power consumption.

Express 3-4

◆ Pin Definition

W668 is part of the system set up four special power as the Vcc inputpins, 14 ground pin GND, 1 RF switch input signal and an LEDindicator signal. See Table 3-3.

Signal Name	Properties	Pin position	Description	Parameters
VCC_3V3	Power	2,,39,41,52	DC power input	3.3V
GND	Ground	4,9,15,18,21,26,27,29, 34, 35,37,40,43,50	Group	
W_DISABLE_IN	Input	20	Close RF to enter the sleep	
LED	Output	42	LED indicates the working status	

Express 3-5

◆ PIN Definition

W668's mini-PCI-E interface with 3.3V power supply. It automatic conversion by the module internal power supply voltage to the . USBDB and USBDM differential lines for data transmission, as shown in Table 3-5.

Signal Name	Properties	Pin position	Description	Parameters
USBDP	Input/ Output	38	USB differential data lines	
USBDM	Input/ Output	36	USB differential data lines	

Express 3-6

3.3.3 RF Switch Interface

W668 use 2 ways for RF wake-up mechanism to close or open. One is with AT command and control and the other is with the hardware switch.

◆ Pin Definition

W668 define the following control on the hardware interface: when the external input to the pin is low, e.g. to ground, the PIN began to process part of the work to shutting down the radio, so that the device goes to sleep mode.

Signal Name	Properties	Pin position	Description	Parameters
W_DISABLE_N	Output	20	RF control is working or not. And then go to sleep.	

Express 3-7

3.3.4 USIM Interface

W668 provides a SIM card interface, supporting 1.8V and 3.0V, the ICcard is compatible with ISO7816 standards.

◆ PIN definition

USIM card pin definition USIM_POWER, USIM_DATA, USIM_CLK, USIM_RST,, as shown in Table 3-8.

Signal Name	Properties	Pin position	Description	Parameters
USIM_POWER	Output	8	USIM card Power supply	1.8V/3V
USIM_DATA	Input/ Output	10	USIM card data	
USIM_CLK	Output	12	Usim card clock	
USIM_RST	Output	14	Usim card reset signal	

Express 3-8

4、Mechanical Properties

4.1 Mini-PCI-E

W668 uses a 52pin Goldfinger to connect to devices. The thickness of goldfinger is 1.0 ± 0.2mm. The spacing is 0.2mm. The dimensions is conpliant to standard mini-PCI-Einterface specification.

4.2 RF connector

RF antenna connector includes a connector and cable to match.W668's RF connector is murata's MM9329-2700 with the size specifications below:

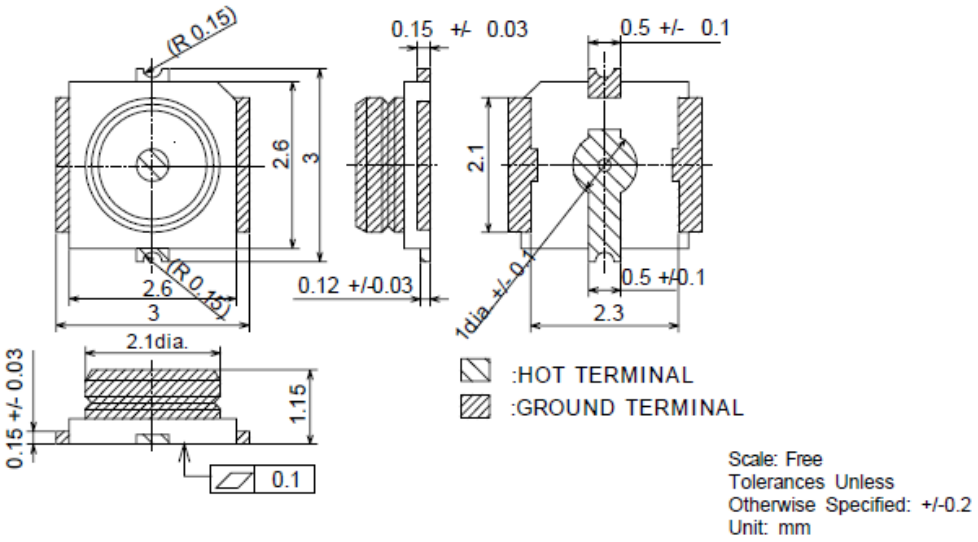

Figure 4-1

4.2.1 Antenna cable

And W668 RF cable connectors to match a lot of kinds. customers can choose according to actual situation.

5、Electrical Characteristics

5.1 Limits voltage range

Parameters	Min	Rating	Max	Units
V3.3_IN	-0.3	3.3	3.5	V
V3.3_IN_REV	-0.3	3.3	3.5	V
VSIM	-0.3	1.8/3.0	1.8/3.0+0.3	V

Table 5-1

5.2 Operating voltage range

3.3~3.5V

5.3 Current.

Current:

Standby：＜3mA

5.4 RF indicator

5.4.1 GSM/GPRS/EDGEF indicator

◆ Frequency

E-GSM900 TX: 880-915MHz RX: 925-960MHz

DCS1800 TX: 1710-1785MHz RX: 1805-1880MHz

◆ Transmitter Indicator

A) Transmitting Carrier Peak Power

POWER CONTROL LEVEL	E-GSM900(dBm)			DCS1800 (dBm)		
	tandard value（dBm）	Calibration range	Limits	tandard value（dBm）	Calibration range	Limits
0				30	±0.2	±0.3
1				28	±0.2	±2
2				26	±0.2	±2
3				24	±0.2	±2
4				22	±0.2	±2
5	33	±0.2	±0.3	20	±0.2	±2
6	31	±0.2	±2	18	±0.2	±2
7	29	±0.2	±2	16	±0.2	±2
8	27	±0.2	±2	14	±0.2	±2

9	25	±0.2	±2	12	±0.2	±2
10	23	±0.2	±2	10	±0.2	±2
11	21	±0.2	±2	8	±0.3	±2
12	19	±0.2	±2	7	±0.4	±2
13	17	±0.2	±2	6	±0.5	±2
14	15	±0.2	±2	5	±0.5	±2
15	13	±0.2	±2	3	±0.8	±2
16	11	±0.2	±2			
17	9	±0.2	±2			
18	7	±0.4	±2			
19	5	±0.5	±2			

Table 6-1

B) Launch of The Carrier Frequency

Emergency provisions of conventional GSM power / time maskrequirements of Figure 5-1 frame, the provisions on access to emergency power / time mask requirements box shown in Figure 5-2.

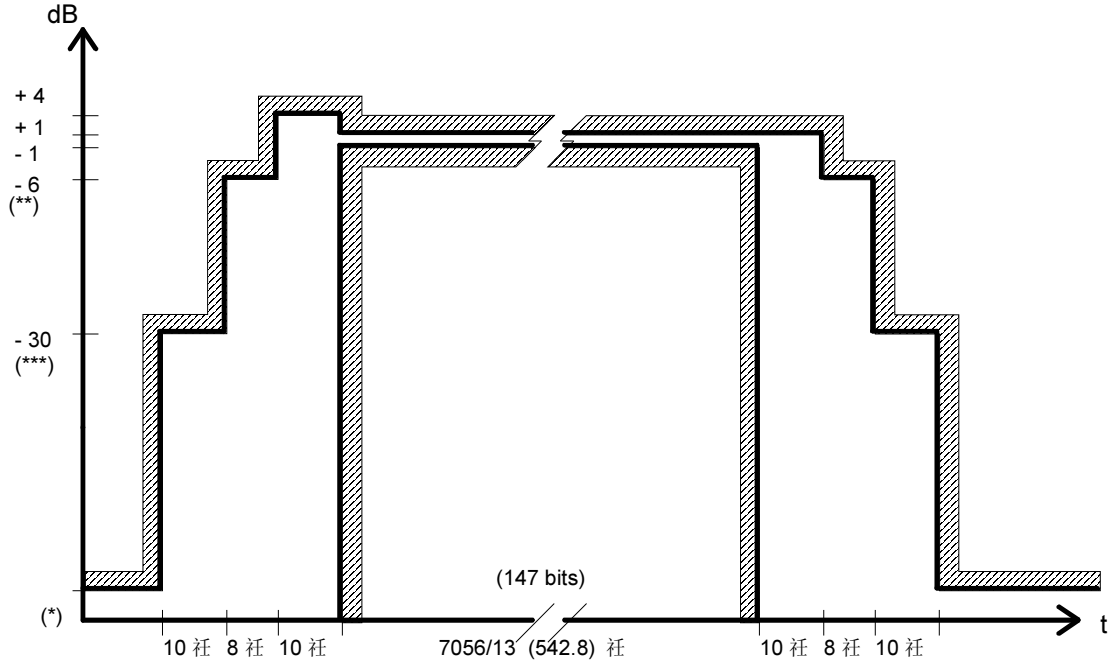

Figure 5-1

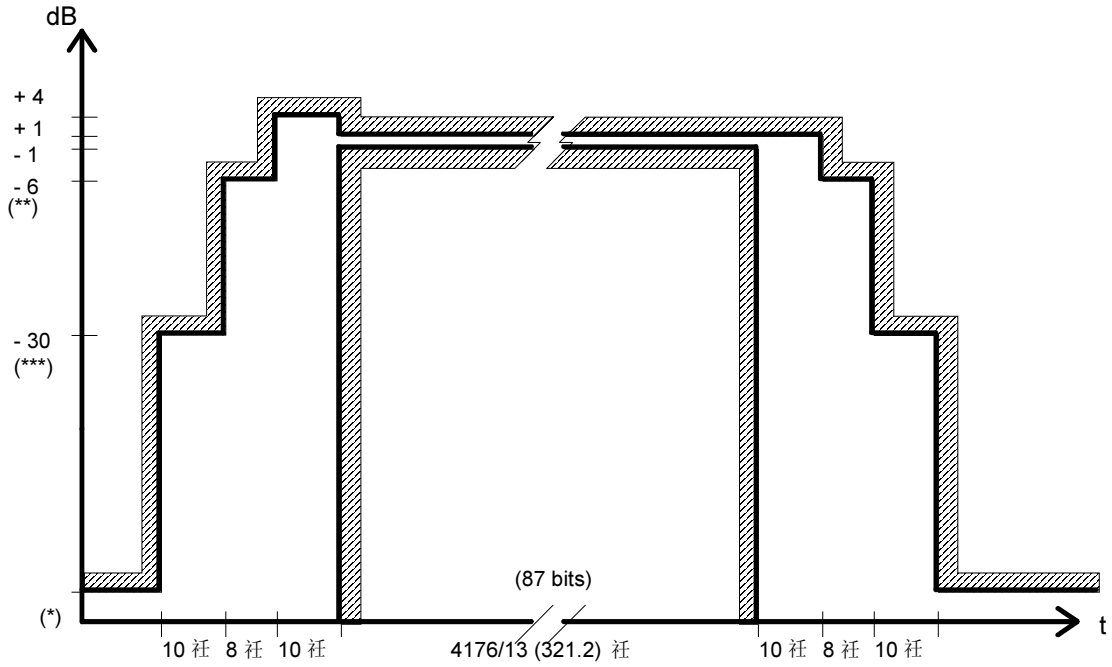

Figure 5-2

C) Modulation Spectrum

Power level （dBm）	Offset at the specified maximum relative level （dB）							
	100KHz	200KHz	250KHz	400KHz	600～<1200 KHz	1200～<1800 KHz	1800～<6000 KHz	6000 KHz
	Measurement bandwidth 30KHz						Measurement bandwidth100KHz	
>43	+0.5	-30	-33	-60	-70	-73	-75	-80
41	+0.5	-30	-33	-60	-68	-71	-73	-80
39	+0.5	-30	-33	-60	-66	-69	-71	-80
37	+0.5	-30	-33	-60	-64	-67	-69	-80
35	+0.5	-30	-33	-60	-62	-65	-67	-80
<33	+0.5	-30	-33	-60	-60	-63	-65	-80

Express 6-2

D) Switch Spectrum

Power control level	wer level （dBm）	Different from the carrier frequency offset at the maximum power （dBm）			
		400KHz	600KHz	1200KHz	1800KHz
0	43	-9	-21	-21	-24
1	41	-11	-21	-21	-24

2	39	-13	-21	-21	-24
3	37	-15	-21	-21	-24
4	35	-17	-21	-21	-24
5	33	-19	-21	-21	-24
6	31	-21	-23	-23	-26
7	29	-23	-25	-25	-28
8	27	-23	-26	-27	-30
9	25	-23	-26	-29	-32
10	23	-23	-26	-31	-34
≥11	21	-23	-26	-32	-36

Express 6-3

E) Fquency Tolerance

Fquency Tolerance < 0.1ppm。

F) Phase Tolerance

RMS for each burst is less than 5 °. The maximum peak of each burst phase error should not exceed 20 °.

G) Conducted Spurious Emissions

Measurement Bandwidth

Frequency Band	Frequency Deviation		Measurement Bandwidth	Video Bandwidth
100kHz~50MHz	—		10kHz	30kHz
50~500MHz	—		100kHz	300kHz
500MHz ~ 12.75GHz, Does not contain the following and the corresponding transmit and receive frequency bands P-GSM890 ~ 915 and 935 ~ 960MHz, DCS1710 ~ 1785 and 1805 ~ 1880MHz	From the phase Should be the Launch Band	0~10MHz	100 kHz	300 kHz
		≥10MHz	300 kHz	1MHz
		≥20MHz	1MHz	3MHz
		≥30MHz	3MHz	3MHz
P-GSM：890~915MHz E-GSM：880~915MHz	From the	1.8~6.0MHz	30kHz	100 kHz

DCS：1710~1785MHz	carrier frequency	>6.0MHz	100kHz	300kHz

Express 6-3

Technical Requirements

Frequency Range	Spurious Power Levels （dBm）	
	E-GSM 850/900MHz	DCS 1800/PCS1900MHz
0.1 – 1000MHz	-36	-36
1000 – 12750MHz	-30	-30

Express 6-3

◆ Receiver Index

Static Reference Sensitivity Is As Follows:

E-GSM900 < -106dBm (BER <2.4%)

DCS1800 < -106dBm (BER <2.4%)

5.4.2 WCDMA RF Index

◆ Operating Frequency Range

Band I：2110~2170MHz

Band II：1930~1990MHz

Band V：869~894 MHz

◆ Transmitter Indicators Index

A) Output Power

Max output power: 27dBm +1dB /-3dB

Min output power:≤-49dBm

B）Adjacent Channel Leakage Power Ratio

C) EVM Tolerance

D) Stray Radiation

◆ Receiver Index

A) Reference sensitivity

B) Maximum input level

C) ACS adjacent channel selectivity

D) Blocking characteristics...

E) Spurious response

6、Evironmental Characteristics

6.1 Temperature

W668 work or storage temperature required to achieve the following criteria:

Parameters	Min	Rating	Max	Units
Operating Temperature	-20	+25	+70	℃
Storage Temperature	-45	---	+85	℃

Express 6-1

6.2 Humidity

W668 requires relative humidity of 5 to 95% relative humidity, non-condensing surface.

7、Validation test