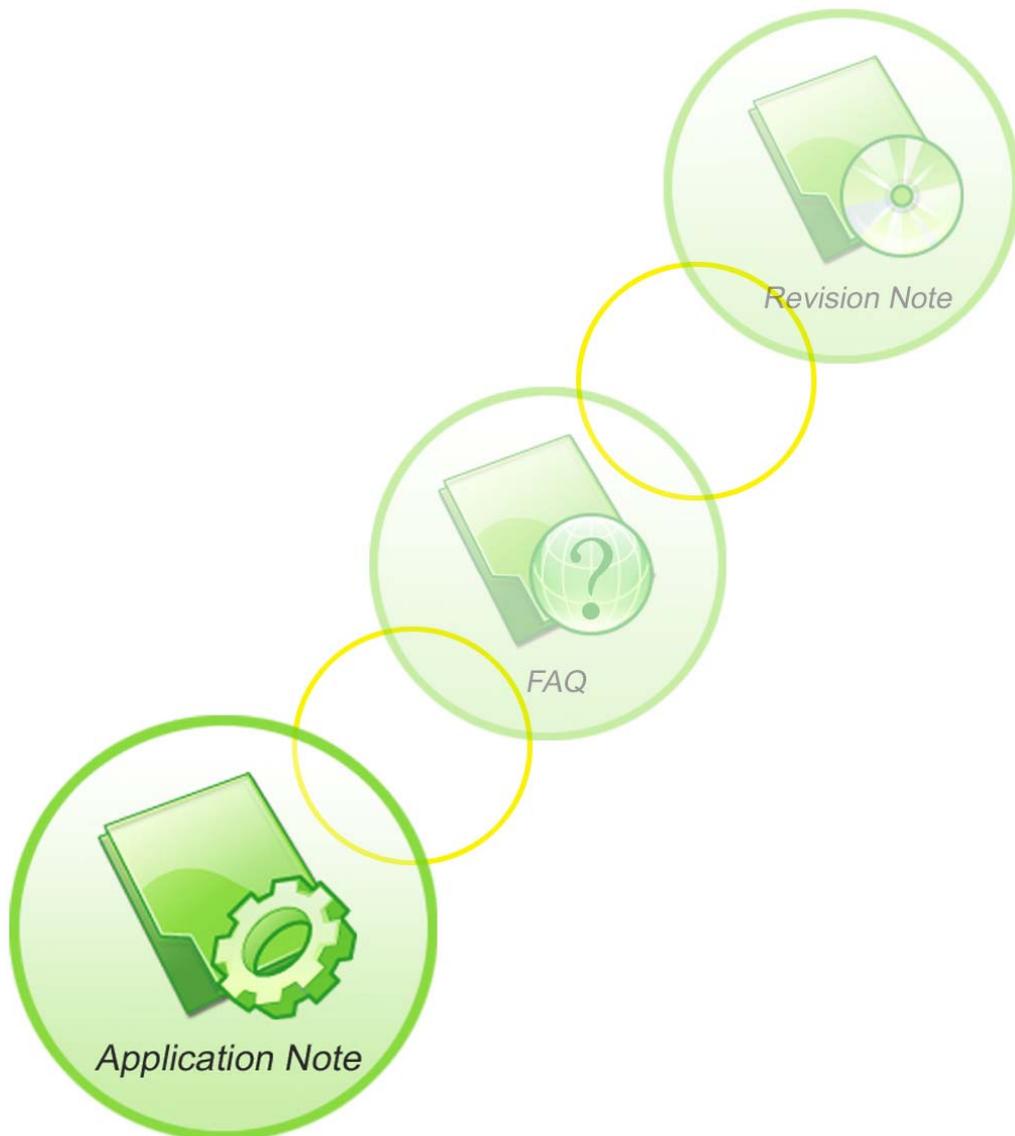




A company of SIM Tech

# SIM800C-DS\_Application Note \_V1.00



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## Version History

Date	Version	Description of change	Author
2015-7-30	1.00	Original	Yong.lu

## Scope

This document describes what SIM800C-DS is and how to start with SIM800C-DS: the totally new module which supports Dual SIM Dual Standby function.

## 1. Introduction

SIM800C-DS supports Dual SIM Dual Standby function. There is only one modem (one BB/one RF) managing two SIM cards at the same time.

The network behaviors of the two SIM cards are totally independent. The Idle Services on both SIM cards are in parallel (paging reception, reselection...) which means that the two SIM cards can register to different network operators. And cell selection/cell reselection/paging monitoring can be observed on the two SIM cards.

Also module is able to do CS/PS calls on any of the two SIM cards. But only one connection (CS/PS) at a time AND no activity on other SIM is possible (either idle or not connected).

The main difference between SIM800C and SIM800C-DS:

- 1) Protocol stack is duplicated on SIM800C-DS.
- 2) New module creation for hardware SIM swap management on SIM800C-DS: DSCV.
- 3) New AT commands to change default SIM card: AT+CDSDS.
- 4) New AT commands to write IMEI for the second SIM card: AT+SIMEIDS.
- 5) Some URC on the SIM card inserted to the second slot are appended with "DS" to indicate TE that this URC is from the second SIM card.

## 2. New AT Command

Command	Description
AT+CDSDS	Select Default SIM
AT+SIMEIDS	Modify the second SIM card's IMEI
AT+CSQDS	Query the signal quality of both SIM cards
AT+CREGDS	Query the network registration status of both SIM cards
AT+CGREGDS	Query the GPRS registration status of both SIM cards
AT+CGATTDS	Query the GPRS attachment status of both SIM cards

### 2.1. AT+CDSDS Select default SIM

AT+CDSDS Select Default SIM	
Test Command <b>AT+CDSDS=?</b>	<p>Response</p> <p><b>+CDSDS:</b> (list of supported &lt;SIM&gt;s)</p> <p><b>OK</b></p> <p>Parameter</p> <p>See Write Command</p>
Read Command <b>AT+CDSDS?</b>	<p>Response</p> <p><b>+CDSDS:</b> &lt;default SIM card&gt;,&lt;the status of first SIM card&gt;,&lt;the status of second SIM card&gt;</p> <p><b>OK</b></p> <p>Parameters</p> <p>&lt;default SIM card&gt; "SIM1" default SIM card is the first SIM card "SIM2" default SIM card is the second SIM card</p> <p>&lt;the status of first SIM card&gt; 0 The first SIM card is removed. 1 The first SIM card is inserted.</p> <p>&lt;the status of second SIM card&gt; 0 The second SIM card is removed. 1 The second SIM card is inserted.</p>
Write Command <b>AT+CDSDS=&lt;SIM&gt;</b>	<p>Response</p> <p>Select the default SIM card.</p> <p><b>OK</b></p> <p>Parameters</p> <p>&lt;SIM&gt; 1 select the first SIM card 2 select the second SIM card</p>
Reference	Note

## 2.2. AT+SIMEIDS Modify the second SIM card's IMEI

AT+SIMEIDS Modify the second SIM card's IMEI	
Read Command <b>AT+SIMEIDS?</b>	<p>Response</p> <p><b>+SIMEIDS:&lt;IMEI&gt;</b></p> <p><b>OK</b></p> <p>Parameters</p> <p>See Write Command</p>
Write Command <b>AT+SIMEIDS=&lt;IMEI&gt;</b>	<p>Response</p> <p>Write the second SIM card's IMEI.</p> <p><b>OK</b></p> <p>Parameters</p> <p><b>&lt;IMEI&gt;</b> 14 or 15 digits IMEI.</p>
Reference	Note

## 2.3. AT+CSQDS Query the signal quality of both SIM cards

AT+CSQDS Query the signal quality of both SIM cards															
Execution Command <b>AT+CSQDS</b>	<p>Response</p> <p><b>+CSQ: &lt;rssi&gt;,&lt;ber&gt;</b></p> <p><b>+CSQDS: &lt;rssi&gt;,&lt;ber&gt;</b></p> <p><b>OK</b></p> <p>If error is related to ME functionality:</p> <p><b>+CME ERROR: &lt;err&gt;</b></p> <p>Execution Command returns received signal strength indication &lt;rssi&gt; and channel bit error rate &lt;ber&gt; from the ME. Test Command returns values supported by the TA.</p> <p>Parameters</p> <p><b>&lt;rssi&gt;</b></p> <table border="0"> <tr> <td>0</td> <td>-115 dBm or less</td> </tr> <tr> <td>1</td> <td>-111 dBm</td> </tr> <tr> <td>2...30</td> <td>-110... -54 dBm</td> </tr> <tr> <td>31</td> <td>-52 dBm or greater</td> </tr> <tr> <td>99</td> <td>not known or not detectable</td> </tr> </table> <p><b>&lt;ber&gt;</b> (in percent):</p> <table border="0"> <tr> <td>0...7</td> <td>As RXQUAL values in the table in GSM 05.08 [20] subclause 7.2.4</td> </tr> <tr> <td>99</td> <td>Not known or not detectable</td> </tr> </table>	0	-115 dBm or less	1	-111 dBm	2...30	-110... -54 dBm	31	-52 dBm or greater	99	not known or not detectable	0...7	As RXQUAL values in the table in GSM 05.08 [20] subclause 7.2.4	99	Not known or not detectable
0	-115 dBm or less														
1	-111 dBm														
2...30	-110... -54 dBm														
31	-52 dBm or greater														
99	not known or not detectable														
0...7	As RXQUAL values in the table in GSM 05.08 [20] subclause 7.2.4														
99	Not known or not detectable														

Reference 3GPP TS 27.007 [13]	Note This AT command is not controlled by AT+CDSDS. <b>+CSQ</b> : Always return the signal quality of SIM1. <b>+CSQDS</b> : Always return the signal quality of SIM2.
----------------------------------	--

## 2.4. AT+CREGDS Query the network registration status of both SIM cards

### AT+CREGDS Query the network registration status of both SIM cards

Read Command <b>AT+CREGDS?</b>	<p>Response</p> <p>TA returns the status of result code presentation and an integer &lt;stat&gt; which shows whether the network has currently indicated the registration of the ME. Location information elements &lt;lac&gt; and &lt;ci&gt; are returned only when &lt;n&gt;=2 and ME is registered in the network.</p> <p><b>+CREG</b>: &lt;n&gt;,&lt;stat&gt;[,&lt;lac&gt;,&lt;ci&gt;] <b>+CREGDS</b>: &lt;n&gt;,&lt;stat&gt;[,&lt;lac&gt;,&lt;ci&gt;]</p> <p><b>OK</b></p> <p>If error is related to ME functionality: <b>+CME ERROR</b>: &lt;err&gt;</p> <p>Parameters</p> <p>&lt;n&gt;</p> <ul style="list-style-type: none"> <li>0 Disable network registration unsolicited result code</li> <li>1 Enable network registration unsolicited result code +CREG: &lt;stat&gt;</li> <li>2 Enable network registration unsolicited result code with location information +CREG: &lt;stat&gt;[,&lt;lac&gt;,&lt;ci&gt;]</li> </ul> <p>&lt;stat&gt;</p> <ul style="list-style-type: none"> <li>0 Not registered, ME is not currently searching a new operator to register to</li> <li>1 Registered, home network</li> <li>2 Not registered, but ME is currently searching a new operator to register to</li> <li>3 Registration denied</li> <li>4 Unknown</li> <li>5 Registered, roaming</li> </ul> <p>&lt;lac&gt; String type (string should be included in quotation marks); two byte location area code in hexadecimal format</p> <p>&lt;ci&gt; String type (string should be included in quotation marks); two byte cell ID in hexadecimal format</p>
Reference 3GPP TS 27.007 [13]	Note This AT command is not controlled by AT+CDSDS.

+CREG: Always return the network registration status of SIM1.  
 +CREGDS: Always return the network registration status of SIM2.

## 2.5. AT+CGREGDS Query the GPRS registration status of both SIM cards

AT+CGREGDS Query the GPRS registration status of both SIM cards	
Read Command AT+CGREGDS?	Response +CGREG: <n>,<stat>[,<lac>,<ci>] +CGREGDS: <n>,<stat>[,<lac>,<ci>]  <b>OK</b> If error is related to ME functionality: +CME ERROR: <err>
	Parameters <n> 0 Disable network registration unsolicited result code 1 Enable network registration unsolicited result code +CGREG: <stat> 2 Enable network registration and location information unsolicited result code +CGREG: <stat>[,<lac>,<ci>]  <stat> 0 Not registered, ME is not currently searching an operator to register to. The GPRS service is disabled, the UE is allowed to attach for GPRS if requested by the user. 1 Registered, home network. 2 Not registered, but ME is currently trying to attach or searching an operator to register to. The GPRS service is enabled, but an allowable PLMN is currently not available. The UE will start a GPRS attach as soon as an allowable PLMN is available. 3 Registration denied The GPRS service is disabled, the UE is not allowed to attach for GPRS if it is requested by the user. 4 Unknown 5 Registered, roaming <lac> String type (string should be included in quotation marks); two byte location area code in hexadecimal format (e.g. "00C3" equals 195 in decimal) <ci> String type (string should be included in quotation marks); two bytes cell ID in hexadecimal format
Reference 3GPP TS 27.007 [13]	Note This AT command is not controlled by AT+CDSDS.

	<p><b>+CGREG:</b> Always return GPRS registration status of SIM1.</p> <p><b>+CGREGDS:</b> Always return GPRS registration status of SIM2.</p>
--	---

## 2.6. AT+CGATTDS Query the GPRS attachment status of both SIM cards

AT+CGATTDS Query the GPRS attachment status of both SIM cards	
Read Command AT+CGATTDS?	<p>Response</p> <p><b>+CGATT:</b> &lt;state&gt;</p> <p><b>+CGATTDS:</b> &lt;state&gt;</p> <p><b>OK</b></p>
	<p>Parameter</p> <p><b>&lt;state&gt;</b>            Indicates the state of GPRS attachment</p> <p>                          0    Detached</p> <p>                          1    Attached</p> <p>                          Other values are reserved</p>
Reference	<p>Note</p> <p>This AT command is not controlled by AT+CDSDS.</p> <p><b>+CGATT:</b> Always return the GPRS attachment status of SIM1.</p> <p><b>+CGATTDS:</b> Always return the GPRS attachment status of SIM2.</p>

### 3. URC Rule

In SIM800C-DS, Some URCs related to the second SIM card (inserted to SIM slot 2) will be appended with “DS”. For example:

Incoming call notification from SIM 1: RING  
 Incoming call notification from SIM 2: RINGDS

But there is no “DS” appended if the URC is reported by AT read command or AT test command. For example:

```
AT+CDSDS=1
OK
AT+CDSDS?
+CDSDS: SIM1,1,1
```

```
OK
AT+CPIN?
+CPIN: READY
```

```
OK
AT+CDSDS=2
OK
AT+CDSDS?
+CDSDS: SIM2,1,1
```

```
OK
AT+CPIN?
+CPIN: READY
```

```
OK
```

#### 3.1. URC may appended with “DS”

Here is a list shows which URC may be appended with “DS”:

	URC on SIM slot 1	URC on SIM slot 2
AT Commands According to GSM07.07	RING	RINGDS
	MO RING	MO RINGDS
	MO CONNECTED	MO CONNECTEDDS
	+CCWA:	+CCWADS:
	+CLCC:	+CLCCDS:

	+CLIP:	+CLIPDS:
	+COLP:	+COLPDS:
	+CPIN:	+CPINDS:
	+CR:	+CRDS:
	+CRING:	+CRINGDS
	+CREG:	+CREGDS:
	+CGREG:	+CGREGDS:
	+CSSI:	+CSSIDS:
	+CSSU:	+CSSUDS:
AT Commands According to GSM07.05	+CMTI:	+CMTIDS:
	+CMT:	+CMTDS:
	+CDS:	+CDSDS:
AT Commands for SIM Application Toolkit	+STKPCI:	+STKPCIDS:
AT Commands Special for SIMCom	+CSMINS:	+CSMINSDS:
	+CDRIND:	+CDRINDDS:
	+CSQN:	+CSQNDS:
	Call Ready	Call Ready DS

## 4. SIM800C-DS Use Cases

### 4.1. Outgoing call on second SIM card

Outgoing call on second SIM card	
AT+CDSDS? +CDSDS: SIM1,1,1  OK	Query the current SIM card in use.
AT+CDSDS=2 OK	Select SIM card in SIM slot 2
AT+CDSDS? +CDSDS: SIM2,1,1  OK	Query the current SIM card in use to make sure the SIM resection is ok.
ATD10086; OK	Dial a number.
AT+CLCC +CLCC: 1,0,0,0,0,"10086",129,""  OK	
ATH OK	Hang up the Call

### 4.2. Incoming call on second SIM card

Incoming call on second SIM card	
AT+CLIP=1 OK	Enable CLIP urc
AT+CDSDS? +CDSDS: SIM1,1,1  OK	Query the current SIM card in use.
RINGDS  +CLIPDS: "10086",129,"",,"",0	
AT+CDSDS=2 OK	Select SIM card in SIM slot 2

AT+CDSDS? +CDSDS: SIM2,1,1  OK	Query the current SIM card in use to make sure the SIM resection is ok.
ATA OK	Answer the call
AT+CLCC +CLCC: 1,0,0,0,0,"10086",129,""  OK	
ATH OK	Hang up the Call

### 4.3. Some Special Cases

Some special cases:

- 1) Module can not respond to the call dialed to SIM2 if SIM1 is in calling process.
- 2) Module can not dial another call out with SIM2 if SIM1 is in calling process.
- 3) Module can not send out a SMS with SIM2 if SIM1 is in calling process.

## 5. Different AT Commands

### 5.1. AT+CMGS

SIM800C-DS does not support sending message by phonebook index or name.

### 5.2. AT+CMSS

SIM800C-DS does not support sending message from storage.

### 5.3. AT+CPMS

SIM800C-DS	SIM800
<p>AT+CPMS=? +CPMS: ("SM","ME","MT"),("SM","ME","MT"),( "SM","ME","MT")  OK</p>	<p>AT+CPMS=? +CPMS: ("SM","ME","SM_P","ME_P","MT"),("S M","ME","SM_P","ME_P","MT"),("SM" ,"ME","SM_P","ME_P","MT")  OK</p>
<p><b>Difference</b></p>	<p>SIM800C-DS supports three modes: "SM","ME","MT". SIM800 supports "SM","ME","SM_P","ME_P","MT" modes.</p>

## Appendix

### A. Related Documents

SN	Document name	Remark
[1]	SIM800 Series_AT Command Manual	
[2]	SIM800C-DS_Hardware Design	

### B. Terms and Abbreviations

Abbreviations	Description
DS	Dual SIM
DSDS	Dual SIM Dual Standby
BB	Baseband
RF	Radio Frequency
CS	Circuit Switch
PS	Packet Switch
IMEI	International Mobile Equipment Identity
URC	Unsolicited Result Code

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