BC95&BC95-G&BC68

RAI Application Note

NB-IoT Module Series

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About the Document

History

Revision	Date	Author	Description
1.0	2018-06-20	Hayden WANG/ Evan WU	Initial

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1 Introduction

Quectel NB-IoT modules support RAI (Release Assistance Indication) function. Once sending data with a RAI identifier, the core network will release the RRC connection according to the identifier so as to let the module enter idle mode. In such case, the power consumption will be reduced, and the module will measure the signal strength of neighbor cells when the cell reselection function is enabled. This document mainly describes the RAI related AT commands and examples about how to use the RAI function.

This document is applicable to Quectel NB-IoT BC95, BC95-G and BC68 modules.

2 RAI Related AT Commands

The core network will release the current RRC connection immediately if either of the following RAI identifiers are set when starting an uplink data transmission:

- No further uplink or downlink data transmission is expected; or
- Only a single downlink data transmission (such as an acknowledgement or response to uplink data), and no further uplink data transmission subsequent to the uplink data transmission is expected.

2.1. RAI Related AT Commands

2.1.1. AT+NSOSTF SendTo Command with Flags (UDP Only)

This command is used to send UDP messages with flags to the remote server.

AT+NSOSTF SendTo Command with Flags (UDP Only)	
Write Command **AT+NSOSTF=<socket>,<remote_addr>,<remote_port>,<flag>,<length>,<data> [,<sequence>]**	Response **<socket>,<length>** **OK** If there is any error: **ERROR** If there is any error related ME functionality: **+CME ERROR:<err>**
Maximum Response Time	300ms

Parameter

<socket>	Integer type. Socket number returned by **AT+NSOCR**.
<remote_addr>	A dot notation IPv4 address. IP addresses can be specified in decimal, octal or hexadecimal notation.
<remote_port>	Integer type. A number in the range of 0-65535. This is the remote port on which messages will be received.

<flag>	Integer type. Specifies the type of message transmission. Values of this argument are in hex format and are formed by logical disjunction "OR" when more than one flags are set: 0 No flags 0x100 Exception Message: Send the message with high priority. Depend on whether the USIM card supports this function. 0x200 Release Indicator: indicate release after the next message 0x400 Release Indicator: indicate release after the next message has been replied to
<length>	Integer type. Decimal length of data to be sent.
<data>	Data to be transmitted in hex string format.
<sequence>	Sequence of data. Range 1-255. If it is omitted, data sent status will not be reported. If it is not omitted, when datagram is sent by RF or is discarded, then the result will be reported: **+NSOSTR:<socket>,<sequence>,<status>**
<status>	The status of datagram. 0 Error 1 Sent

NOTES

1. Only IPv4 addresses are supported for **<remote_addr>**.
2. Only hexadecimal string format is supported for **<data>** currently.
3. The maximum data length (**<length>**) is 512 bytes for BC95 module and 1358 bytes for BC95-G & BC68 modules.
4. The **<sequence>** parameter is only supported on BC95-G and BC68 modules.
5. For more details about this command, please refer to ***document [1]&[2]***.

2.1.2. AT+QLWULDATAEX Send CON/NON Messages

This command is used to send confirmable (CON) or non-confirmable (NON) messages with a RAI identifier to Huawei's IoT platform.

AT+QLWULDATAEX Send CON/NON Messages	
Write Command **AT+QLWULDATAEX=<length>,<data>,<mode> [,<seq_num>]**	Response **OK** If there is any error: **ERROR** If there is any error related to ME functionality: **+CME ERROR:<err>**
Maximum Response Time	300ms

Parameter

<length>	Integer type. Length of data sent.	
<data>	Hexadecimal format string. Maximum length of data to be sent is 512 bytes.	
<mode>	0x0000	Send a NON message
	0x0100	Send a CON message
	0x0001	Send a NON message and carry out the RELEASE auxiliary instructions
	0x0101	Send a CON message and carry out the RELEASE_AFTER_REPLY auxiliary instructions
<seq_num>	Sequence number. Range: 1-255. If non-zero **<seq_num>** is used to send CoAP data and there is CON or NON CoAP data with the same **<seq_num>** which has not been sent completely, the data to be sent will be discarded and an error will be returned.	

NOTES

1. For the BC95 module, **<mode>**=0x0001 and **<mode>**=0x0101 are only supported in B657SP5 or later versions.
2. If sending a CON message, the next CON/NON message should be sent only after a status indication of the current sent message is received.
3. The **<seq_num>** parameter is only supported on BC95-G and BC68 modules.
4. For more details about this command, please refer to ***document [1]&[2]***.

3 Examples

3.1. Send UDP Messages with a Flag

Execute the **AT+CSCON=1** command to enable URC reporting function, which can be used to indicate whether the flag takes effect.

```
[13:38:08:105]AT+CSCON=1                                    //Enable URC reporting function.
[13:38:08:121]OK
[13:38:08:344]
[13:38:08:344]+CSCON:0
[13:38:24:470]AT+NSOCR=DGRAM,17,1234,1                      //Create a UDP socket.
[13:38:24:502]0

[13:38:24:518]OK
[13:38:28:717]AT+NSOSTF=0,220.180.239.212,8052,0x400,2,AB30 //Send a messages with 0x400 flag.
[13:38:28:765]0,2

[13:38:28:765]OK
[13:38:29:340]
[13:38:29:340]+CSCON:1
[13:38:29:611]
[13:38:29:611]+NSONMI:0,2                                   //Once receiving the downlink
                                                            message, the RRC connection will
                                                            be immediately released.
[13:38:29:931]
[13:38:29:931]+CSCON:0
[13:38:37:244]AT+NSORF=0,512
[13:38:37:276]0,220.180.239.212,8052,2,AB30,0               //Read downlink message.

[13:38:37:307]OK
[13:38:56:275]AT+NSOSTF=0,220.180.239.212,8052,0x200,2,AB30 //Send a message with 0x200 flag.
[13:38:56:323]0,2

[13:38:56:339]OK
[13:38:58:782]
[13:38:58:782]+CSCON:1                                      //Set up a RRC connection and start
```

```
                                                    sending the message.
[13:38:59:086]
[13:38:59:086]+CSCON:0                              //After the message is sent, the
                                                    RRC connection will be
                                                    immediately released.
```

3.2. Send CoAP CON/NON Messages

Execute the **AT+CSCON=1** command to enable URC reporting function, which can be used to indicate whether the RAI identifier takes effect.

```
[14:17:35:307]AT+CSCON=1                            //Enable URC reporting function.
[14:17:35:322]OK
[14:17:45:876]
[14:17:45:876]+CSCON:0
[14:17:53:301]AT+NCDP?
[14:17:53:301]+NCDP:180.101.147.115,5683            //Server address of Huawei's IoT Platform.

[14:17:53:333]OK
[14:18:03:920]AT+QLWULDATAEX=3,AA34BB,0x0001 //Send a NON CoAP message with 0x0001 flag.
[14:18:05:404]OK
[14:18:05:532]
[14:18:05:532]+CSCON:1                              //Set up a RRC connection and start sending the
                                                      message
[14:18:05:947]
[14:18:05:947]+CSCON:0                              //After the message is sent, the RRC connection
                                                    will be immediately released.

[14:21:06:880]AT+QLWULDATAEX=3,AA34BB,0x0101 //Send a CON CoAP message with 0x0101 flag.
[14:21:06:911]OK
[14:21:07:933]
[14:21:07:933]+CSCON:1                              //Set up a RRC connection and start sending
                                                      data.
[14:21:08:221]
[14:21:08:221]+QLWULDATASTATUS:4                    //The CON CoAP message is acknowledged by
                                                    the platform.
[14:21:09:179]
[14:21:09:179]+CSCON:0                              //After the message is sent, the RRC connection
                                                    will be immediately released.
```

4 Appendix A References

Table 1: Reference Documents

SN	Document	Description
[1]	Quectel_BC95_AT_Commands_Manual	BC95 AT commands manual
[2]	Quectel_BC95-G&BC68_AT_Commands_Manual	BC95-G&BC68 AT commands manual

Table 2: Terms and Abbreviations

Abbreviation	Description
CoAP	Constrained Application Protocol
RAI	Release Assistance Indication
RRC	Radio Resource Control
UDP	User Datagram Protocol
URC	Unsolicited Result Code