BG95&BG77&BG600L Series
QCFG AT Commands Manual

LPWA Module Series

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About the Document

Revision History

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1 Introduction

This document describes the **AT+QCFG** command supported on BG95 series, BG77 and BG600L-M3 modules.

1.1. Applicable Modules

Table 1: Applicable Modules

Module Series	Model	Description
BG95	BG95-M1	Cat M1 only
	BG95-M2	Cat M1/Cat NB2
	BG95-M3	Cat M1/Cat NB2/EGPRS
	BG95-M4	Cat M1/Cat NB2, 450 MHz Supported
	BG95-M5	Cat M1/Cat NB2/EGPRS, Power Class 3
	BG95-M6	Cat M1/Cat NB2, Power Class 3
	BG95-MF	Cat M1/Cat NB2, Wi-Fi Positioning
	BG95-N1	Cat NB2 Only
BG77	BG77	Cat M1/Cat NB2
BG600L	BG600L-M3	Cat M1/Cat NB2/EGPRS

1.2. Definitions

- **<CR>** Carriage return character.
- **<LF>** Line feed character.
- **<...>** Parameter name. Angle brackets do not appear on the command line.
- **[...]** Optional parameter of a command or an optional part of TA information response. Square brackets do not appear on the command line. When an optional parameter is omitted, the new value equals to the previous value or the default settings, unless

otherwise specified.

- **Underline** Default setting of a parameter.

1.3. AT Command Syntax

All command lines must start with "**AT**" or "**at**" and end with "**<CR>**". Information responses and result codes always start and end with a carriage return character and a line feed character: **<CR><LF><response><CR><LF>**. Throughout this document, only the commands and responses are presented, while carriage return and line feed characters are deliberately omitted.

AT+QCFG implemented by BG95 series, BG77 and BG600L-M3 modules is in "Extended" syntax, as illustrated below.

- **Extended Syntax**

These commands can be operated in several modes, as following table:

Table 2: Types of AT Commands and Responses

Test Command	**AT+<cmd>=?**	This command returns the list of parameters and value ranges set by the corresponding Write Command or internal processes.
Read Command	**AT+<cmd>?**	This command returns the currently set value of the parameter or parameters.
Write Command	**AT+<cmd>=<p1>[,<p2>[,<p3>[...]]]**	This command sets the user-definable parameter values.
Execution Command	**AT+<cmd>**	This command reads non-variable parameters affected by internal processes in the module.

Multiple commands can be placed on a single line using a semi-colon (**;**) between commands. Only the first command should have **AT** prefix. Commands can be in upper or lower case.

When entering AT commands, spaces are ignored except the following cases:

- Within quoted strings, where they are preserved;
- Within an unquoted string or numeric parameter;
- Within an IP address;
- Within the AT command name up to and including a **=**, **?** or **=?**.

On input, at least a carriage return is required. A newline character is ignored so it is permissible to use carriage return/line feed pairs on the input.

If no command is entered after the **AT** token, **OK** will be returned. If an invalid command is entered, **ERROR** will be returned.

Optional parameters, unless explicitly stated, need to be provided up to the last parameter being entered.

1.4. AT Command Responses

When the AT command processor has finished processing a line, it will output **OK**, **ERROR** or **+CME ERROR: <err>** to indicate that it is ready to accept a new command. Solicited informational responses are sent before the final **OK**, **ERROR** or **+CME ERROR: <err>**.

Responses will be in the format of:

<CR><LF>+CMD1: <parameters><CR><LF>
<CR><LF>OK<CR><LF>

2 Description of AT+QCFG Commands

2.1. AT+QCFG Extended Configuration Settings

The Write Commands query and configure various settings of the module.

AT+QCFG Extended Configuration Settings	
Test Command **AT+QCFG=?**	Response **+QCFG: "nwscanmode",(**list of supported **<scan_mode>**s**),(**list of supported **<effect>**s**)** **+QCFG: "servicedomain",(**list of supported **<service>**s**),(**list of supported **<effect>**s**)** **+QCFG: "nwscanseq",(**range of supported **<scanseq>**s**),(**list of supported **<effect>**s**)** **+QCFG: "band",(**range of supported **<GSM_bandval>**s**),(**range of supported **<eMTC_bandval>**s**),(**range of supported **<NB-IoT_bandval>**s**),(**list of supported **<effect>**s**)** **+QCFG: "iotopmode",(**range of supported **<mode>**s**),(**list of supported **<effect>**s**)** **+QCFG: "celevel",(**range of supported **<level>**s**)** **+QCFG: "urc/ri/ring",(**list of supported **<typeRI>**s**),(**range of supported **<pulse_duration>**s**),(**range of supported **<active_duration>**s**),(**range of supported **<inactive_duration>**s**),(**list of supported **<ring_no_disturbing>**s**),(**range of supported **<pulse_count>**s**)** **+QCFG: "urc/ri/smsincoming",(**list of supported **<typeRI>**s**),(**range of supported **<pulse_duration>**s**),(**range of supported **<pulse_count>**s**)** **+QCFG: "urc/ri/other",(**list of supported **<typeRI>**s**),(**range of supported **<pulse_duration>**s**),(**range of supported **<pulse_count>**s**)** **+QCFG: "risignaltype",(**list of supported **<RI_signal_type>**s**)** **+QCFG: "urc/delay",(**list of supported **<enable>**s**)** **+QCFG: "ledmode"**,(list of supported **<mode>**s**)** **+QCFG: "gpio",(**list of supported **<mode>**s**),(**list of supported **<pin>**s**),(**list of supported **<dir>**s**),(**list of supported **<pull>**s**),(**list of supported **<drv>/<val>**s**),(**list of supported **<save>**s**)**

	+QCFG: "airplanecontrol",(list of supported **<airplane_control>**s**)** **+QCFG: "cmux/urcport",(**range of supported **<URC_port>**s**)** **+QCFG: "apready",(**list of supported **<n>**s**),(**list of supported **<level>**s**),(**range of supported **<internal>**s**)** **+QCFG: "nccconf",(**range of supported **<cap_val>**s**)** **+QCFG: "psm/enter",(**list of supported **<mode>**s**)** **+QCFG: "psm/urc",(**list of supported **<enable>**s**)** **+QCFG: "simeffect",(**list of supported **<mode>**s**)** **+QCFG: "snrscan",(**range of supported **<level>**s**)** **+QCFG: "nasconfig",(**range of supported **<conf_val>**s**)** **+QCFG: "apn/display",(**list of supported **<mode>**s**)** **+QCFG: "irat/timer",(**range of supported **<timer_value>**s**),(**range of supported **<alignment_value>**s) **+QCFG: "nb1/bandprior",<band_priority_seq>** **OK**
Maximum Response Time	300 ms

2.1.1. Network Related AT Commands

2.1.1.1. AT+QCFG="nwscanmode" Configure RAT(s) to be Searched

The command queries and configures the RAT(s) to be searched.

AT+QCFG="nwscanmode" Configure RAT(s) to be Searched	
Write Command **AT+QCFG="nwscanmode"[,<scan_mode>[,<effect>]]**	Response If the optional parameters are omitted, the command queries the current setting. **+QCFG: "nwscanmode",<scan_mode>** **OK** If any of the optional parameters is specified, the command configures the RAT(s) to be searched. **OK** If there is an error related to ME functionality: **+CME ERROR: <err>** If there is any other error: **ERROR**

Maximum Response Time	300 ms
Characteristics	**<effect>** determines when will the command take effect. The configurations are saved automatically.

Parameter

<scan_mode>	Integer type. RAT(s) to be searched. 0 Automatic (GSM and LTE) 1 GSM only 3 LTE only
<effect>	Integer type. When to take effect. 0 Take effect after the module reboots 1 Take effect immediately
<err>	Integer type. Error code. Refer to ***Chapter 3*** for details.

NOTE

This command is valid only on BG95-M3, BG95-M5 and BG600L-M3 modules.

2.1.1.2. AT+QCFG="servicedomain" Configure Service Domain

The command queries and configures the registered service domain.

AT+QCFG="servicedomain"	**Configure Service Domain**
Write Command **AT+QCFG="servicedomain"[,<service>[,<effect>]]**	Response If the optional parameters are omitted, the command queries the current setting. **+QCFG: "servicedomain",<service>** **OK** If any of the optional parameters is specified, the command configures the service domain to be registered. **OK** If there is an error related to ME functionality: **+CME ERROR: <err>** If there is any other error: **ERROR**

Maximum Response Time	300 ms
Characteristics	**<effect>** determines when will the command take effect. The configurations are saved automatically.

Parameter

<service>	Integer type. Service domain. 1 PS only 2 CS & PS
<effect>	Integer type. When to take effect. 0 Take effect after the module reboots 1 Take effect immediately
<err>	Integer type. Error code. Refer to ***Chapter 3*** for details.

2.1.1.3. AT+QCFG="nwscanseq" Configure RATs Searching Sequence

The command queries and configures the searching sequence of RATs.

AT+QCFG="nwscanseq" Configure RATs Searching Sequence	
Write Command **AT+QCFG="nwscanseq"[,<scanseq>[,effect]]**	Response If the optional parameters are omitted, the command queries the current setting. **+QCFG: "nwscanseq",<scanseq>** **OK** If any of the optional parameters is specified, the command configures the RAT searching sequence. **OK** If there is an error related to ME functionality: **+CME ERROR: <err>** If there is any other error: **ERROR**
Maximum Response Time	300 ms
Characteristics	**<effect>** determines when will the command take effect. The configurations are saved automatically.

Parameter

<scanseq>	Integer type. RATs search sequence. (e.g.: 020301 stands for eMTC → NB-IoT → GSM) 00 Automatic (eMTC → NB-IoT → GSM) 01 GSM 02 eMTC 03 NB-IoT
<effect>	Integer type. When to take effect. 0 Take effect after the module reboots 1 Take effect immediately
<err>	Integer type. Error code. Refer to ***Chapter 3*** for details.

NOTES

1. The command is invalid on BG95-M1 and BG95-N1 modules.
2. GSM RAT is valid only on BG95-M3, BG95-M5 and BG600L-M3 modules.

2.1.1.4. AT+QCFG="band" Configure Frequency Band

The command queries and configures the frequency bands to be searched.

AT+QCFG="band" Configure Frequency Band	
Write Command **AT+QCFG="band"[,<GSM_bandval>,<eMTC_bandval>,<NB-IoT_bandval>[,<effect>]]**	Response If the optional parameters are omitted, the command queries the current setting. **+QCFG: "band",<GSM_bandval>,<eMTC_bandval>,<NB-IoT_bandval>** **OK** If any of the optional parameters is specified, the command configures the frequency bands to be searched. **OK** If there is an error related to ME functionality: **+CME ERROR: <err>** If there is any other error: **ERROR**
Maximum Response Time	300 ms
Characteristics	**<effect>** determines when will the command take effect. The configurations are saved automatically.

Parameter

<GSM_bandval>	A hexadecimal value that specifies the GSM frequency band. If it is set to 0, it means not to change GSM frequency band (e.g.: 0x0a = 0x02(GSM1800)+ 0x08(GSM1900)). 0 No change 0x1 EGSM900 0x2 DCS1800 0x4 GSM850 0x8 PCS1900 0xF All of the supported bands above
<eMTC_bandval>	A hexadecimal value that specifies the eMTC frequency band. If it is set to 0, it means not to change the frequency band. (e.g.: 0x15 = 0x01(LTE B1) + 0x04(LTE B3) + 0x10(LTE B5)) 0 No change 0x1 (BAND_PREF_LTE_BAND1) LTE B1 0x2 (BAND_PREF_LTE_BAND2) LTE B2 0x4 (BAND_PREF_LTE_BAND3) LTE B3 0x8 (BAND_PREF_LTE_BAND4) LTE B4 0x10 (BAND_PREF_LTE_BAND5) LTE B5 0x80 (BAND_PREF_LTE_BAND8) LTE B8 0x800 (BAND_PREF_LTE_BAND12) LTE B12 0x1000 (BAND_PREF_LTE_BAND13) LTE B13 0x20000 (BAND_PREF_LTE_BAND18) LTE B18 0x40000 (BAND_PREF_LTE_BAND19) LTE B19 0x80000 (BAND_PREF_LTE_BAND20) LTE B20 0x1000000 (BAND_PREF_LTE_BAND25) LTE B25 0x2000000 (BAND_PREF_LTE_BAND26) LTE B26 0x4000000 (BAND_PREF_LTE_BAND27) LTE B27 0x8000000 (BAND_PREF_LTE_BAND28) LTE B28 0x40000000 (BAND_PREF_LTE_BAND31) LTE B31 0x20000000000000000 (BAND_PREF_LTE_BAND66) LTE B66 0x800000000000000000 (BAND_PREF_LTE_BAND72 LTE B72 0x1000000000000000000 (BAND_PREF_LTE_BAND73) LTE B73 0x100000000000000000000 (BAND_PREF_LTE_BAND85) LTE B85
<NB-IoT_bandval>	A hexadecimal value that specifies the NB-IoT frequency band. If it is set to 0, it means not to change the frequency band. (e.g.: 0x15 = 0x01(LTE B1) + 0x04(LTE B3) + 0x10(LTE B5)) 0 No change 0x1 (BAND_PREF_LTE_BAND1) LTE B1 0x2 (BAND_PREF_LTE_BAND2) LTE B2 0x4 (BAND_PREF_LTE_BAND3) LTE B3 0x8 (BAND_PREF_LTE_BAND4) LTE B4 0x10 (BAND_PREF_LTE_BAND5) LTE B5

	0x80 (BAND_PREF_LTE_BAND8)	LTE B8
	0x800 (BAND_PREF_LTE_BAND12)	LTE B12
	0x1000 (BAND_PREF_LTE_BAND13)	LTE B13
	0x20000 (BAND_PREF_LTE_BAND18)	LTE B18
	0x40000 (BAND_PREF_LTE_BAND19)	LTE B19
	0x80000 (BAND_PREF_LTE_BAND20)	LTE B20
	0x1000000 (BAND_PREF_LTE_BAND25)	LTE B25
	0x8000000 (BAND_PREF_LTE_BAND28)	LTE B28
	0x40000000 (BAND_PREF_LTE_BAND31)	LTE B31
	0x20000000000000000 (BAND_PREF_LTE_BAND66)	LTE B66
	0x400000000000000000 (BAND_PREF_LTE_BAND71)	LTE B71
	0x800000000000000000 (BAND_PREF_LTE_BAND72)	LTE B72
	0x1000000000000000000 (BAND_PREF_LTE_BAND73)	LTE B73
	0x10000000000000000000 (BAND_PREF_LTE_BAND85)	LTE B85
<effect>	Integer type. When to take effect. 0 Take effect after the module reboots 1 Take effect immediately	
<err>	Integer type. Error code. Refer to ***Chapter 3*** for details.	

NOTES

1. For the specific bands supported by each model, see corresponding specifications of the modules.
   - **<GSM_bandval>** is valid only on BG95-M3, BG95-M5 and BG600L-M3 modules.
   - **<eMTC_bandval>** is invalid on BG95-N1 module.
   - **<NB-IoT_bandval>** is invalid on BG95-M1 module.
   - LTE B31/B72/B73 is valid on BG95-M4 module only.
2. The value setting of **<eMTC_bandval>** when all eMTC bands are intended to be searched:
   - 0x100182000000004F0E189F for BG95-M4
   - 0x100002000000000F0E189F for BG77, BG600L-M3 and other BG95 series modules
3. The value setting of **<NB-IoT_bandval>** when all NB-IoT bands are intended to be searched:
   - 0x10018200000000490E189F for BG95-M4
   - 0x10004200000000090E189F for BG77, BG600L-M3 and other BG95 series modules

2.1.1.5. AT+QCFG="iotopmode" Configure Network Category to be Searched under LTE RAT

The command queries and configures the network category to be searched under LTE RAT.

AT+QCFG="iotopmode" Configure Network Category to be Searched under LTE RAT	
Write Command **AT+QCFG="iotopmode"[,<mode>[,<effect>]]**	Response If the optional parameters are omitted, the command queries the current setting. **+QCFG: "iotopmode",<mode>**

	OK If any of the optional parameters is specified, the command configures the network category to be searched under LTE RAT. **OK** If there is an error related to ME functionality: **+CME ERROR: <err>** If there is any other error: **ERROR**
Maximum Response Time	300 ms
Characteristics	**<effect>** determines when will the command take effect. The configurations are saved automatically.

Parameter

<mode>	Integer type. Network category to be searched under LTE RAT. 0 eMTC 1 NB-IoT 2 eMTC and NB-IoT
<effect>	Integer type. When to take effect. 0 Take effect after the module reboots 1 Take effect immediately
<err>	Integer type. Error code. Refer to ***Chapter 3*** for details.

NOTE

This command is invalid on BG95-M1 and BG95-N1 modules.

2.1.1.6. AT+QCFG="celevel" Query NB-IoT Coverage Enhancement Level

The command queries NB-IoT coverage enhancement level.

AT+QCFG="celevel" Query NB-IoT Coverage Enhancement Level	
Write Command **AT+QCFG="celevel"**	Response **+QCFG: "celevel",<level>** **OK**

	If there is an error related to ME functionality: **+CME ERROR: <err>** If there is any other error: **ERROR**
Maximum Response Time	300 ms
Characteristics	/

Parameter

<level>	Integer type. NB-IoT coverage enhancement level. 0 CE level 0 1 CE level 1 2 CE level 2
<err>	Integer type. Error code. Refer to ***Chapter 3*** for details.

2.1.1.7. AT+QCFG="nccconf" Configure NB-IoT Features

The command queries and configures NB-IoT features.

AT+QCFG="nccconf" Configure NB-IoT Features	
Write Command **AT+QCFG="nccconf"[,<cap_val>]**	Response If the optional parameter is omitted, the command queries the current setting. **+QCFG: "nccconf",<cap_val>** **OK** If the optional parameter is specified, the command configures NB-IoT features. **OK** If there is an error related to ME functionality: **+CME ERROR: <err>** If there is any other error: **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect after the module reboots. The configuration are saved automatically.

Parameter

<cap_val>	Hexadecimal value. If any bit is set to 1, it means the corresponding feature is enabled, otherwise it is disabled. The NB-IoT features are as follows: Bit 0 Enable or disable the use of EMM_CP_CIOT Bit 1 Enable or disable the use of EMM_UP_CIOT Bit 2 Enable or disable the use of EMM_S1_U Bit 3 Enable or disable the use of EMM_ER_WITHOUT_PDN Bit 4 Enable or disable the use of EMM_HC_CP_CIOT Bit 5 Enable or disable the use of EMM_SMS_ONLY Bit 6 Enable or disable the use of EMM_PNB_CP_CIOT Bit 7 Enable or disable the use of EMM_PNB_UP_CIOT Bit 8 Enable or disable the use of EMM_EPCO_CIOT
<err>	Integer type. Error code. Refer to ***Chapter 3*** for details.

2.1.1.8. AT+QCFG="psm/enter" Trigger the Module into PSM Immediately

The command queries and configures whether to trigger the module into PSM immediately after the RRC connection release is received.

When **<mode>**=1, the module skips active timer (T3324) and enters PSM immediately after the RRC connection release is received.

AT+QCFG="psm/enter" Trigger the Module into PSM Immediately	
Write Command **AT+QCFG="psm/enter"[,<mode>]**	Response If the optional parameter is omitted, the command queries the current setting. **+QCFG: "psm/enter",<mode>** **OK** If the optional parameter is specified, the command configures whether to trigger the module into PSM immediately after the RRC connection release is received. **OK** If there is an error related to ME functionality: **+CME ERROR: <err>** If there is any other error: **ERROR**
Maximum Response Time	300 ms

Characteristics	The command takes effect immediately. The configuration is not saved.

Parameter

<mode>	Integer type. Whether to trigger the module into PSM immediately. 0 Enter PSM after T3324 expires 1 Enter PSM immediately after RRC connection release is received.
<err>	Integer type. Error code. Refer to ***Chapter 3*** for details.

NOTE

When **AT+QCFG="psm/urc",1** and **AT+QCFG="psm/enter",1** are executed at the same time, there will be a possibility that the URC **+QPSMTIMER** cannot be outputted because the module enters PSM immediately.

2.1.1.9. AT+QCFG="simeffect" Enable/Disable RAT Search Order Stored in (U)SIM Cards

The command enables/disables the RAT search order stored in (U)SIM cards and queries the current setting.

AT+QCFG="simeffect" Enable/Disable RAT Search Order Stored in (U)SIM Cards	
Write Command **AT+QCFG="simeffect"[,<mode>]**	Response If the optional parameter is omitted, the command queries the current setting. **+QCFG: "simeffect",<mode>** **OK** If the optional parameter is specified, the command enables/disables RAT search order stored in (U)SIM cards: **OK** If there is an error related to ME functionality: **+CME ERROR: <err>** If there is any other error: **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect after the module reboots. The configuration are saved automatically.

Parameter

<mode>	Integer type. Enable/disable the RAT search order stored in (U)SIM cards. 0 Disable 1 Enable
<err>	Integer type. Error code. Refer to ***Chapter 3*** for details.

2.1.1.10. AT+QCFG="nasconfig" Configure NAS Related Parameters

The command queries and configures NAS related parameters.

AT+QCFG="nasconfig" Configure NAS Related Parameters	
Write Command **AT+QCFG="nasconfig"[,<conf_val>]**	Response If the optional parameter is omitted, the command queries the current setting. **+QCFG: "nasconfig",<conf_val>** **OK** If the optional parameter is specified, the command configures NAS related parameters. **OK** If there is an error related to ME functionality: **+CME ERROR: <err>** If there is any other error: **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect after the module reboots. The configuration are saved automatically.

Parameter

<conf_val>	Hexadecimal value. If any bit is set to 1, it means the corresponding feature is enabled, otherwise it is disabled. The NAS related parameters are as follows: Bit 0 Enable or disable the use of NAS_SIGNALLING_PRIORITY Bit 1 Enable or disable the use of NMO_I_BEHAVIOUR Bit 2 Enable or disable the use of ATTACH_WITH_IMSI Bit 3 Enable or disable the use of MINIMUM_PERIODIC_SEARCH_TIMER Bit 4 Enable or disable the use of EXTENDED_ACCESS_BARRING Bit 5 Enable or disable the use of TIMER_T3245_BEHAVIOUR

	Bit 6	Enable or disable the use of OVERRIDE_NAS_SIGNALLING_LOW_PRIORITY
	Bit 7	Enable or disable the use of OVERRIDE_EXTENDED_ACCESS_BARRING
	Bit 8	Enable or disable the use of FAST_FIRST_HIGHER_PRIORITY_PLMN_SEARCH
	Bit 9	Enable or disable the use of EUTRA_DISABLING_ALLOWED_FOR_EMM_CAUSE_15
	Bit 10	Enable or disable the use of SM_RETRY_WAIT_TIME
	Bit 11	Enable or disable the use of SM_RETRY_AT_RAT_CHANGE
	Bit 12	Enable or disable the use of DEFAULT_DCN_ID
	Bit 13	Enable or disable the use of EXCEPTION_DATA_REPORTING_ALLOWED
	Bit 14	Enable or disable the use of LIGHT_CONNECTION
<err>	Integer type. Error code. Refer to ***Chapter 3*** for details.	

2.1.1.11. AT+QCFG="apn/display" Enable/Disable Showing of Allocated APN

The command enables/disables showing of the allocated APN and queries the current setting. When **<mode>**=1, the allocated APN is showed in the response of **AT+CGDCONT?** (see ***document [1]*** for details).

AT+QCFG="apn/display" Enable/Disable Showing of Allocated APN	
Write Command **AT+QCFG="apn/display"[,<mode>]**	Response If the optional parameters are omitted, the command queries the current setting. **+QCFG: "apn/display",<mode>** **OK** If any of the optional parameters is specified, the command enables/disables showing of the allocated APN. **OK** If there is an error related to ME functionality: **+CME ERROR: <err>** If there is any other error: **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is not saved.

Parameter

<mode>	Integer type. Enable/disable showing of the allocated APN. 0 Disable 1 Enable
<err>	Integer type. Error code. Refer to ***Chapter 3*** for details.

2.1.1.12. AT+QCFG="irat/timer" Configure High-Priority RAT Search Timer

The command queries and configures the high-priority RAT search timer. If the module is in a low-priority RAT, it attempts to obtain services on high-priority RAT periodically, and the interval is **<timer_value>**.

AT+QCFG="irat/timer" Configure High-Priority RAT Search Timer	
Write Command **AT+QCFG="irat/timer"[,<timer_value>[,<alignment_value>]]**	Response If the optional parameters are omitted, the command queries the current setting. **+QCFG: "irat/timer",<timer_value>,<alignment_value>** **OK** If any of the optional parameters is specified, the command configures the high-priority RAT search timer. **OK** If there is an error related to ME functionality: **+CME ERROR: <err>** If there is any other error: **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect after the module reboots. The configurations are saved automatically.

Parameter

<timer_value>	Integer type. Timeout value for high-priority RAT searching. Range: 5–300. Default value: 60. Unit: min.
<alignment_value>	Integer type. This parameter specifies an interval before eDRX paging when a scan should begin. Range: 5–20. Default value: 20. Unit: min.
<err>	Integer type. Error code. Refer to ***Chapter 3*** for details.

2.1.1.13. AT+QCFG="nb1/bandprior" Configure Band Scan Priority under NB-IoT

The command queries and configures the band scan priority under NB-IoT.

AT+QCFG="nb1/bandprior"	Configure Band Scan Priority under NB-IoT
Write Command **AT+QCFG="nb1/bandprior"[,<band_priority_seq>]**	Response If the optional parameter is omitted, the command queries the current setting. **+QCFG: "nb1/bandprior",<band_priority_seq>** **OK** If the optional parameter is specified, the command configures the band scan priority under NB-IoT. **OK** If there is an error related to ME functionality: **+CME ERROR: <err>** If there is any other error: **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect after the module reboots. The configurations are saved automatically.

Parameter

<band_priority_seq>	NB-IoT bands in hex string.	
	01	Band 1
	02	Band 2
	03	Band 3
	04	Band 4
	05	Band 5
	08	Band 8
	0C	Band 12
	0D	Band 13
	12	Band 18
	13	Band 19
	14	Band 20
	19	Band 25
	1C	Band 28
	1F	Band 31
	42	Band 66

	47	Band 71
	48	Band 72
	49	Band 73
	55	Band 85
<err>	Integer type. Error code. Refer to ***Chapter 3*** for details.	

NOTES

1. This command is invalid on BG95-M1 module.
2. Bands 31, 72 and 73 are valid on BG95-M4 module only.

2.1.2. Platform related AT Commands

2.1.2.1. AT+QCFG="urc/ri/ring" Configure MAIN_RI Behavior in Case of RING URC

The command queries and configures the behavior of MAIN_RI pin when the URC **RING** is presented to indicate an incoming call. **AT+QCFG="urc/ri/ring"**, **AT+QCFG="urc/ri/smsincoming"** and **AT+QCFG="urc/ri/other"** control the behavior of MAIN_RI pin when a URC is reported. MAIN_RI is active low.

The sum of **<active_duration>** and **<inactive_duration>** determines the interval time of **RING** indications when a call is coming.

AT+QCFG="urc/ri/ring" Configure MAIN_RI Behavior in Case of RING URC	
Write Command **AT+QCFG="urc/ri/ring"[,<typeRI>[,<pulse_duration>[,<active_duration>[,<inactive_duration>[,<ring_no_disturbing>[,<pulse_count>]]]]]]**	Response If the optional parameters are omitted, the command queries the current setting. **+QCFG: "urc/ri/ring",<typeRI>,<pulse_duration>,<active_duration>,<inactive_duration>,<ring_no_disturbing>,<pulse_count>** **OK** If any of the optional parameters is specified, the command configures the behavior of MAIN_RI pin when the URC **RING** is presented. **OK** If there is an error related to ME functionality: **+CME ERROR: <err>** If there is any other error:

	ERROR
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations are saved automatically.

Parameter

<typeRI>	String type. The behavior of MAIN_RI pin when URCs are presented. "off" No change. MAIN_RI keeps inactive (high). "pulse" Pulse. Pulse width is determined by **<pulse_duration>**. "always" Change to active. MAIN_RI behavior can be restored to inactive by **AT+QRIR** (see ***document [1]*** for details). "auto" When **RING** is presented to indicate an incoming call, MAIN_RI changes to active and keeps active. When the ring of the incoming call ends, either answering or hanging up the incoming call changes MAIN_RI to inactive. "wave" When **RING** is presented to indicate an incoming call, MAIN_RI outputs a square wave. Both **<active_duration>** and **<inactive_duration>** are used to set the square wave. When the ring of incoming call ends, either answering or hanging up the incoming call changes the ring indicator to inactive.
<pulse_duration>	Integer type. The width of pulse. Range: 1–2000. Default: 120. Unit: ms. This parameter is valid only when **<typeRI>**="pulse".
<active_duration>	Integer type. The active duration of square wave. Range: 1–10000. Default: 1000. Unit: ms. This parameter is valid only when **<typeRI>**="wave".
<inactive_duration>	Integer type. The inactive duration of square wave. Range: 1–10000. Default: 5000. Unit: ms. This parameter is valid only when **<typeRI>**="wave".
<ring_no_disturbing>	String type. Set whether the MAIN_RI behavior could be disturbed. This parameter is valid only when **<typeRI>**="auto" or "wave". For example, when **<typeRI>**="wave", if the square wave needs not to be disturbed by other URCs (including SMS related URCs), then **<ring_no_disturbing>** should be set to "on". "off" MAIN_RI behavior can be disturbed by other URCs when the behavior is caused by an incoming call ringing. "on" MAIN_RI behavior cannot be disturbed by other URCs when the behavior is caused by an incoming call ringing.
<pulse_count>	Integer type. The count of pulse. This parameter is valid only when **<typeRI>**="pulse". Range: 1–5. Default: 1. The interval time between two pulses is equal to **<pulse_duration>**.
<err>	Integer type. Error code. Refer to ***Chapter 3*** for details.

2.1.2.2. AT+QCFG="urc/ri/smsincoming" Configure MAIN_RI Behavior in Case of Incoming SMS URCs

The command queries and configures the behavior of MAIN_RI pin when related incoming message URCs are presented. Incoming message URCs include **+CMTI**, **+CMT**, **+CDS**, and **+CBM**.

AT+QCFG="urc/ri/smsincoming" Configure MAIN_RI Behavior in Case of Incoming SMS URCs	
Write Command **AT+QCFG="urc/ri/smsincoming"[,<typeRI>[,<pulse_duration>[,<pulse_count>]]]**	Response If the optional parameters are omitted, the command queries the current setting. **+QCFG: "urc/ri/smsincoming",<typeRI>,<pulse_duration>,<pulse_count>** **OK** If any of the optional parameters is specified, the command configures the MAIN_RI behavior when incoming SMS URCs are presented. **OK** If there is an error related to ME functionality: **+CME ERROR: <err>** If there is any other error: **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations are saved automatically.

Parameter

<typeRI>	String type. MAIN_RI behavior when URCs are presented. "off" No change. MAIN_RI keeps inactive (high). "pulse" Pulse. Pulse width is determined by **<pulse_duration>**. "always" Change to active. MAIN_RI behavior can be restored to inactive by **AT+QRIR**.
<pulse_duration>	Integer type. The width of pulse. Range: 1–2000. Default: 120. Unit: ms. This parameter is valid only when **<typeRI>**=“pulse”.
<pulse_count>	Integer type. The count of pulse. It is valid only when **<typeRI>**="pulse". Range: 1–5. Default: 1. The interval time between two pulses is equal to **<pulse_duration>**.

<err>	Integer type. Error code. Refer to ***Chapter 3*** for details.

2.1.2.3. AT+QCFG="urc/ri/other" Configure MAIN_RI Behavior in Case of Other URCs

The command queries and configures the behavior of MAIN_RI pin when other URCs are presented.

AT+QCFG="urc/ri/other" Configure MAIN_RI Behavior in Case of Other URCs	
Write Command **AT+QCFG="urc/ri/other"[,<typeRI>[,<pulse_duration>[,<pulse_count>]]]**	Response If the optional parameters are omitted, the command queries the current setting. **+QCFG: "urc/ri/other",<typeRI>,<pulse_duration>,<pulse_count>** **OK** If any of the optional parameters is specified, the command configures the MAIN_RI behavior when other URCs are presented. **OK** If there is an error related to ME functionality: **+CME ERROR: <err>** If there is any other error: **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations are saved automatically.

Parameter

<typeRI>	String type. MAIN_RI behavior when URCs are presented. "off" No change. MAIN_RI keeps inactive (high). "pulse" Pulse. Pulse width determined by **<pulse_duration>**.
<pulse_duration>	Integer type. The width of pulse. Range: 1–2000. Default: 120. Unit: ms. This parameter is valid only when **<typeRI>**=“pulse”.
<pulse_count>	Integer type. The count of pulse. This parameter is valid only when **<typeRI>**=“pulse”. Range: 1–5. Default: 1. The interval time between two pulses is equal to **<pulse_duration>**.
<err>	Integer type. Error code. Refer to ***Chapter 3*** for details.

2.1.2.4. AT+QCFG="risignaltype" Configure MAIN_RI Signal Output Carrier

The command queries and configures the MAIN_RI signal output carrier.

AT+QCFG="risignaltype" Configure MAIN_RI Signal Output Carrier	
Write Command **AT+QCFG="risignaltype",[<RI_signal_type>]**	Response If the optional parameter is omitted, the command queries the current setting. **+QCFG: "risignaltype",<RI_signal_type>** **OK** If the optional parameter is specified, the command configures the MAIN_RI signal output carrier. **OK** If there is an error related to ME functionality: **+CME ERROR: <err>** If there is any other error: **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations are saved automatically.

Parameter

<RI_signal_type>	String type. MAIN_RI signal output carrier.	
	"respective"	MAIN_RI behavior on the port where URC is presented. For example, if URC is presented on UART port, it is a physical ring indication signal. If URC is presented on USB modem port, it is a virtual ring indication signal. **AT+QURCCFG="urcport"** can get the port on which URC is presented, and see ***document [1]*** for details of the AT command.
	"physical"	No matter on which port the URC is presented, it only causes the behavior of physical ring indication signal.
<err>	Integer type. Error code. Refer to ***Chapter 3*** for details.	

2.1.2.5. AT+QCFG="urc/delay" When to Output URC

The command queries and configures when to output the URC.

AT+QCFG="urc/delay" When to Output URC	
Write Command **AT+QCFG="urc/delay"[,<enable>]**	Response If the optional parameter is omitted, the command queries the current setting. **+QCFG: "urc/delay",<enable>** **OK** If the optional parameter is specified, the command configures when to output the URC. **OK** If there is an error related to ME functionality: **+CME ERROR: <err>** If there is any other error: **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations are saved automatically.

Parameter

<enable>	Integer type. When to output the URC. 0 Output URC when ring indication pulse starts. 1 Output URC when ring indication pulse ends (effective only when **<typeRI>**="pulse". Refer to **AT+QCFG="urc/ri/ring"**, **AT+QCFG="urc/ri/smsincoming"** and **AT+QCFG="urc/ri/other"** for more details).
<err>	Integer type. Error code. Refer to ***Chapter 3*** for details.

2.1.2.6. AT+QCFG="ledmode" Configure NET_STATUS Output Mode

The command queries and configures the output mode of NET_STATUS pin.

AT+QCFG="ledmode" Configure NET_STATUS Output Mode	
Write Command **AT+QCFG="ledmode"[,<mode>]**	Response If the optional parameter is omitted, the command queries the current setting. **+QCFG: "ledmode",<mode>** **OK**

	If the optional parameter is specified, the command configures the output mode of NET_STATUS. **OK** If there is an error related to ME functionality: **+CME ERROR: <err>** If there is any other error: **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations are saved automatically.

Parameter

<mode>	Integer type. Output mode of NET_STATUS pin. 0 Flicker mode. 1 Output high level when attaching to the network; and low level in other conditions. 3 Set NET_STATUS pin as a customization mode.
<err>	Integer type. Error code. Refer to ***Chapter 3*** for details.

Example

```
AT+QCFG="ledmode",1          //Set the NET_STATUS mode.
OK
AT+QCFG="ledmode"            //Query the current configuration.
+QCFG: "ledmode",1

OK
```

2.1.2.7. AT+QCFG="gpio" Configure GPIO Status

The command queries and configures the GPIO status.

AT+QCFG="gpio" Configure GPIO Status	
Write Command Query the formats of the command. **AT+QCFG="gpio"**	Response **+QCFG: "gpio",<mode>,<pin>[,[<dir>,<pull>,<drv>]/[<val>][,<save>]]** **OK**
Write Command **AT+QCFG="gpio",<mode>,<pin>[[,<di**	Response If **<mode>**=2, then all optional parameters should be omitted.

r>,<pull>,<drv>]/[<val>][,<save>]]	**+QCFG: "gpio",<val>** OK If **<mode>**=1, then **<val>** should be omitted. **OK** If **<mode>**=3, then **<dir>**, **<pull>** and **<drv>** should be omitted. **OK** If there is an error related to ME functionality: **+CME ERROR: <err>**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. **<save>** determines whether the configuration will be saved. When **<save>**=1, the configurations are saved and remain valid after the module reboots.

Parameter

<mode>	Integer type. Command mode. 1 Initialize GPIO status 2 Query GPIO status 3 Configure GPIO status
<pin>	Integer type. GPIO pin number. BG95 series module supports the following pin numbers: Pin No. Pin Name 25 GPIO1 26 GPIO2 64 GPIO3 (Not supported on BG95-MF) 65 GPIO4 (Not supported on BG95-MF) 66 GPIO5 85 GPIO6 86 GPIO7 87 GPIO8 88 GPIO9 BG77 supports the following pin numbers: Pin No. Pin Name 1 GPIO1 8 GPIO2 9 GPIO3 33 GPIO4

	40 GPIO5 57 GPIO6 63 GPIO7 BG600L-M3 supports the following pin numbers: Pin No. Pin Name 9 GPIO1 10 GPIO2 11 GPIO3 12 GPIO4 53 GPIO5 54 GPIO6
<dir>	Integer type. GPIO pin direction. 0 Input 1 Output
<pull>	Integer type. GPIO pin pull type. 0 No pull 1 Pull the GPIO down 2 Keep the GPIO as it is 3 Pull the GPIO up
<drv>	Integer type. GPIO pin drive strength. 0 2 mA 1 4 mA 2 6 mA 3 8 mA 4 10 mA 5 12 mA 6 14 mA 7 16 mA
<val>	Integer type. The value read from or write to a GPIO. 0 Low level 1 High level
<save>	Integer type. Whether to save the configurations. 0 Not save 1 Save
<err>	Integer type. Error code. Refer to ***Chapter 3*** for details.

NOTE

<save> is valid only when **<mode>** is 1 or 3.

2.1.2.8. AT+QCFG="airplanecontrol" Enable/Disable Airplane Mode Control via W_DISABLE#

The command enables/disables airplane mode control via the W_DISABLE# pin and queries the current setting. If the function is enabled, the module enters the airplane mode when the pin is pulled down and enters normal mode when the pin is pulled up. Also, it outputs related URC before entering or exiting the airplane mode.

AT+QCFG="airplanecontrol" Enable/Disable Airplane Mode Control via W_DISABLE#	
Write Command **AT+QCFG="airplanecontrol"[,<airplane_control>]**	Response If the optional parameter is omitted, the command queries the current setting. **+QCFG: "airplanecontrol",<airplane_control>,<airplane_status>** **OK** If the optional parameter is specified, the command configures whether to enable the airplane mode controlled by W_DISABLE# pin: **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations are saved automatically.

Parameter

<airplane_control>	Integer type. Enable/disable airplane mode control via W_DISABLE# pin. 0 Disable 1 Enable
<airplane_status>	Integer type. The current status. 0 In normal mode 1 In airplane mode

NOTE

The status of the W_DISABLE# pin may affect the validity of **AT+CFUN**. When airplane mode control via W_DISABLE# is enabled and the pin is pulled down, the module enters airplane mode no matter in which status **AT+CFUN** is, and also the module's functionality level cannot be switched with **AT+CFUN**.

Example

```
AT+QCFG="airplanecontrol",1          //Enable airplane mode control via W_DISABLE#
OK
//Pull down W_DISABLE# pin
+QIND: "airplanestatus",1            //URC indicating the module will enter airplane mode
AT+QCFG="airplanecontrol"            //Query the current setting of airplane mode and its control method
+QCFG: "airplanestatus",1,1          //Airplane mode control via W_DISABLE# is enabled and the module
                                     is in airplane mode currently

OK
//Pull up W_DISABLE# pin
+QIND: "airplanestatus",0            //The module exits from airplane mode
AT+QCFG="airplanecontrol"            //Query the current setting of airplane mode and its control method
+QCFG: "airplanestatus",1,0          //Airplane mode control via W_DISABLE# is enabled and the module
                                     is in normal mode currently

OK
```

2.1.2.9. AT+QCFG="cmux/urcport" Configure Output Port of URCs in MUX Mode

The command queries and configures the output port of URCs in MUX mode.

AT+QCFG="cmux/urcport" Configure Output Port of URCs in MUX Mode	
Write Command **AT+QCFG="cmux/urcport"[,<URC_port>]**	Response If the optional parameter is omitted, the command queries the current setting. **+QCFG: "cmux/urcport",<URC_port>** **OK** If the optional parameter is specified, the command configures the output port of URCs in MUX mode. **OK** If there is an error related to ME functionality: **+CME ERROR: <err>** If there is any other error: **ERROR**
Maximum Response Time	300 ms

Characteristics	The command takes effect immediately. The configurations are saved automatically.

Parameter

<URC_port>	Integer type. Output port of URCs in MUX mode. 0 All ports 1 Virtual port 1 2 Virtual port 2 3 Virtual port 3 4 Virtual port 4
<err>	Integer type. Error code. Refer to ***Chapter 3*** for details.

2.1.2.10. AT+QCFG="apready" Configure AP_READY Behavior

The command queries and configures the behavior of AP_READY pin. An external MCU can change the AP_READY pin level as needed.

When there is a URC to be reported, if the AP_READY pin level is invalid, the URC is buffered first, and the AP_READY pin level will be detected periodically with the configured detection period. The URC will be output when the AP_READY pin level becomes valid. The pulse signal generated on the MAIN_RI pin can still be output according to the configured mode, and the pulse signal will not be buffered.

AT+QCFG="apready" Configure AP_READY Behavior	
Write Command **AT+QCFG="apready"[,<n>[,<level>,[<interval>]]]**	Response If the optional parameters are omitted, the command queries the current setting. **+QCFG: "apready",<n>,<level>,<interval>** **OK** If any of the optional parameters is specified, the command configures the AP_READY behavior. **OK** If there is an error related to ME functionality: **+CME ERROR: <err>** If there is any other error: **ERROR**
Maximum Response Time	300 ms

Characteristics	The command takes effect immediately. The configurations are saved automatically.

Parameter

<n>	Integer type. Enable/disable the AP_READY pin for AP sleep state detection. 0 Disable 1 Enable
<level>	Integer type. Valid level of AP_READY. The parameter is valid only when the AP_READY detection function is enabled. 0 Low level 1 High level
<interval>	Integer type. Detection period. Range: 100–3000. Default value: 500. Unit: ms. This parameter is valid only when the AP_READY detection function is enabled.
<err>	Integer type. Error code. Refer to ***Chapter 3*** for details.

NOTES

1. Maximally 15 URCs can be buffered. When the number of URC exceeds 15, the oldest one in the buffer will be cleared to store the new URC.
2. The **RING** URC is buffered only once for each call process.

2.1.2.11. AT+QCFG="psm/urc" Enable/Disable PSM Entering Indication

The command enables/disables the output of the URC **+QPSMTIMER: <TAU_timer>,<T3324_timer>** which is used to indicate the TAU duration and active time duration for the module's PSM, and queries the current setting.

When PSM function is enabled and RRC connection release is received, the active timer (T3324) will be started, and the indication URC will be reported.

AT+QCFG="psm/urc" Enable/Disable PSM Entering Indication	
Write Command **AT+QCFG="psm/urc"[,<enable>]**	Response If the optional parameter is omitted, the command queries the current setting. **+QCFG: "psm/urc",<enable>** **OK** If the optional parameter is specified, the command configures whether to enable the PSM entering indication. **OK**

	If there is an error related to ME functionality: **+CME ERROR: <err>** If there is any other error: **ERROR**
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations are saved automatically.

Parameter

<enable>	Integer type. Enable/disable the output of PSM entering indication URC **+QPSMTIMER: <TAU_timer>,<T3324_timer>**. If enabled, the URC will be reported when RRC connection release is received. 0 Disable 1 Enable
<err>	Integer type. Error code. Refer to ***Chapter 3*** for details.

3 Summary of CME ERROR Codes

Final result code **+CME ERROR: <err>** indicates an error related to mobile equipment or network. The operation is similar to **ERROR** result code.

Table 3: Summary of CME ERROR Codes

<err>	Meaning
0	Phone failure
1	No connection to phone
2	Phone-adaptor link reserved
3	Operation not allowed
4	Operation not supported
5	PH-SIM PIN required
6	PH-FSIM PIN required
7	PH-FSIM PUK required
10	(U)SIM not inserted
11	(U)SIM PIN required
12	(U)SIM PUK required
13	(U)SIM failure
14	(U)SIM busy
15	(U)SIM wrong
16	Incorrect password
17	(U)SIM PIN2 required
18	(U)SIM PUK2 required

20	Memory full
21	Invalid index
22	Not found
23	Memory failure
24	Text string too long
25	Invalid characters in text string
26	Dial string too long
27	Invalid characters in dial string
30	No network service
31	Network timeout
32	Network not allowed - emergency calls only
40	Network personalization PIN required
41	Network personalization PUK required
42	Network subset personalization PIN required
43	Network subset personalization PUK required
44	Service provider personalization PIN required
45	Service provider personalization PUK required
46	Corporate personalization PIN required
47	Corporate personalization PUK required

4 Appendix A References

Table 4: Related Document

SN	Document Name	Remark
[1]	Quectel_BG95&BG77&BG600L_Series_AT_Commands_Manual	AT commands manual of BG95 series, BG77 and BG600L-M3 modules

Table 5: Terms and Abbreviations

Abbreviation	Description
APN	Access Point Name
CE	Coverage Enhancement
CS	Circuit Switched
eDRX	extended Discontinuous Reception
EGPRS	Enhanced General Packet Radio Service
eMTC	enhanced Machine-Type Communication
GPIO	General-Purpose Input/Output
GSM	Global System for Mobile Communications
LED	Light Emitting Diode
LTE	Long-Term Evolution
ME	Mobile Equipment
MUX	Multiplexing
NAS	Non-Access Stratum
NB-IoT	Narrowband Internet of Things

PS	Packet Switched
PSM	Power Saving Mode
RAT	Radio Access Technology
RRC	Radio Resource Control
SMS	Short Message Service
TA	Terminal Adapter
TAU	Tracking Area Update
UE	User Equipment
URC	Unsolicited Result Code
(U)SIM	(Universal) Subscriber Identity Module