

EC200U&EG915U Series Audio **Application Note**

LTE Standard Module Series

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About the Document

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1 Introduction

This document introduces audio related AT commands on Quectel LTE standard EC200U series and EG915U series modules.

NOTE

Only EC200U-CN and EG915U-CN modules support TTS function.

1.1. Audio Channels

The audio channels can be switched by **AT+QAUDMOD**. See **Chapter 2.3.7** for details.

Table 1: Supported Audio Channels

| Module | Supported Audio Channels |
|---------------|--------------------------|
| EC200U Series | loudspeaker, microphone |
| EG915U Series | microphone, earpiece |

2 Description of Audio AT Commands

2.1. AT Commands Introduction

2.1.1. Definitions

- **<CR>** Carriage return character.
- **<LF>** Line feed character.
- **<...>** Parameter name. Angle brackets do not appear on 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 not given in a command, the new value equals its previous value or the default settings, unless otherwise specified.
- **Underline** Default setting of a parameter.

2.1.2. 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>**. In tables presenting commands and responses throughout this document, only the commands and responses are presented, and **<CR>** and **<LF>** are deliberately omitted.

Table 2: Type of AT Commands

| Command Type | Syntax | Description |
|-------------------|---|--|
| Test Command | AT+<cmd>=? | Test the existence of the corresponding command and give information about the type, value, or range of its parameter. |
| Read Command | AT+<cmd>? | Check the current parameter value of the corresponding command. |
| Write Command | AT+<cmd>=<p1>[,<p2>[,<p3>[...]]] | Set user-definable parameter value. |
| Execution Command | AT+<cmd> | Return a specific information parameter or perform a specific action. |

2.2. Declaration of AT Command Examples

The AT command examples in this document are provided to help you learn about how to use the AT commands introduced herein. The examples, however, should not be taken as Quectel's recommendations or suggestions about how to design a program flow or what status to set the module into. Sometimes multiple examples may be provided for one AT command. However, this does not mean that there is a correlation among these examples and that they should be executed in a given sequence.

2.3. AT Command Description

2.3.1. AT+CLVL Loudspeaker Volume Level Selection

This command selects the volume level of the internal loudspeaker of MT.

| AT+CLVL Loudspeaker Volume Level Selection | |
|---|---|
| Test Command AT+CLVL=? | Response +CLVL: (range of supported <level>s) OK |
| Read Command AT+CLVL? | Response +CLVL: <level> OK |
| Write Command AT+CLVL=<level> | Response OK Or ERROR If there is any error related to ME functionality: +CME ERROR: <err> |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect immediately. The configuration will be saved automatically. |
| Reference 3GPP TS 27.007 | |

Parameter

| | |
|----------------------|---|
| <level> | Integer type. Loudspeaker volume level with manufacturer specific range (smallest value represents the lowest sound level). Range: 0–5. Default value: 3. |
| <err> | Error codes. For more details, see Chapter 3 . |

2.3.2. AT+QAUDLOOP Control Audio Loop Test

This command enables/disables audio loop test.

| AT+QAUDLOOP Control Audio Loop Test | |
|--|--|
| Test Command AT+QAUDLOOP=? | Response +QAUDLOOP: (list of supported <enable> s) OK |
| Read Command AT+QAUDLOOP? | Response +QAUDLOOP: <enable> OK |
| Write Command AT+QAUDLOOP=<enable> | Response OK Or ERROR If there is any error related to ME functionality: +CME ERROR: <err> |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect immediately. The configuration will not be saved. |

Parameter

| | |
|-----------------------|--|
| <enable> | Integer type. Enable/disable audio loop test. 0 Disable 1 Enable |
| <err> | Error codes. For more details, see Chapter 3 . |

2.3.3. AT+QAUDRD Record Audio File

This command records the uplink or downlink sound during a voice call or records sound from local microphone in idle state and saves it to files.

| AT+QAUDRD Record Audio File | |
|--|---|
| Test Command AT+QAUDRD=? | Response +QAUDRD: (list of supported of <state>s),<file_name>,(list of supported <format>s),(list of supported <dlink>s) OK |
| Read Command AT+QAUDRD? | Response +QAUDRD: <state> OK |
| Write Command AT+QAUDRD=<control>[,<file_name>][,<format>][,<dlink>]] | Response OK Or ERROR If there is any error related to ME functionality: +CME ERROR: <err> |
| Maximum Response Time | 300 ms |
| Characteristics | / |

Parameter

| | |
|-------------|---|
| <state> | Integer type. Module state. 0 Module is not recording sound 1 Module is recording sound |
| <control> | Integer type. Stop or start recording. 0 Stop recording 1 Start recording |
| <file_name> | String type. Name of the recorded audio file, including file path, file name and file suffix. The default path is <i>UFS</i> :. |
| <format> | Integer type. Format of the file. It is specified by the file suffix. 13 WAV_PCM16 |
| <dlink> | Integer type. Record the uplink or downlink sound. 0 Record uplink sound 1 Record downlink sound |
| <err> | Error codes. For more details, see Chapter 3 . |

NOTE

1. If the name and format of the recording file are the same with that of an existing file or an unknown error occurs, URC **+QAUDRIND: 0,1** will be reported.
2. If current recording is interrupted by other audio tasks, URC **+QAUDRIND: 0,6** will be reported.
3. If there is no space available for recording, URC **+QAUDRIND: 0,3** will be reported.
4. The module supports both uplink and downlink audio recording, but asynchronously.
5. Recording downlink sound is prohibited in non-calling mode; recording uplink sound is prohibited in calling mode.

Table 3: The Description of <code> in URC +QAUDRIND: 0,<code>

| <code> | Meaning |
|--------|----------------------------------|
| 0 | Saved |
| 1 | Unknown error |
| 3 | No space for recording |
| 6 | Interrupted by other audio tasks |

Example

```

AT+QAUDRD=1,"A.wav",13,0 //Record the uplink sound in WAV format and store it in UFS:.
OK
AT+QAUDRD=0 //Stop recording.
OK
AT+QAUDRD=1,"B.wav",13,1 //Record the downlink sound in WAV format during the call and store
it in UFS:.
OK
AT+QAUDRD=0 //Stop recording.
OK
    
```

2.3.4. AT+QPSND Play Audio File to Far-End or Near-End

This command plays local audio file to far-end or near-end.

AT+QPSND Play Audio File to Far-End or Near-End

| | |
|--------------|--|
| Test Command | Response |
| AT+QPSND=? | +QPSND: (list of supported <control>s),<file_name>,(list of supported <repeat>s),(list of supported <ulmute>s),(list of |

| | |
|---|--|
| | supported <dlmute>s) |
| | OK |
| Read Command AT+QPSND? | Response +QPSND: <state> OK |
| Write Command AT+QPSND=<control>,<file_name>,<repeat>[,<ulmute>[,<dlmute>]] | Response OK Or ERROR If there is any error related to ME functionality: +CME ERROR: <err> When the playback is completed: +QPSND: 0 |
| Maximum Response Time | 300 ms |
| Characteristics | / |

Parameter

| | |
|--------------------------|---|
| <state> | Integer type. Module state. 0 Module is not playing the file 1 Module is playing the file |
| <control> | Integer type. Stop or start playing. 0 Stop playing 1 Start playing |
| <file_name> | String type. Name of local audio file, including file path, file name and file suffix. The default path is <i>UFS</i> : |
| <repeat> | Integer type. Play the file once or repeatedly. 0 Play only once 1 Play repeatedly |
| <ulmute> | Integer type. Mute or not mute uplink. 0 Mute 1 Not mute |
| <dlmute> | Integer type. Mute or not mute downlink. 0 Mute 1 Not mute |
| <err> | Error codes. For more details, see Chapter 3 . |

NOTE

1. The module only supports 8 kHz linear and single-wave mono format when playing the uplink audio.
2. Playing downlink sound is prohibited in calling mode; Playing uplink sound is prohibited in non-calling mode.
3. `<ulmute>` and `<dlmute>` cannot be set to 0 or 1 simultaneously.

Example

```
AT+QPSND=1,"A.wav",0,0,1 //Play a .wav file which is stored in UFS once.
OK
```

```
+QPSND: 0
AT+QPSND=1,"A.wav",0,1,0 //Play a .wav file to far-end once when a call is ongoing.
OK
```

```
+QPSND: 0
```

2.3.5. AT+QAUDPLAY Play Local Audio File to Near-End

This command plays local audio file to near-end.

AT+QAUDPLAY Play Local Audio File to Near-End

| | |
|--|---|
| Test Command AT+QAUDPLAY=? | Response +QAUDPLAY: <file_name>,(list of supported <state>s) OK |
| Read Command AT+QAUDPLAY? | Response +QAUDPLAY: <state> OK |
| Write Command AT+QAUDPLAY=<file_name>,<repeat> | Response OK Or ERROR If there is any error related to ME functionality: +CME ERROR: <err> When the playback is completed: +QAUDPLAY: 0 |
| Maximum Response Time | 300 ms |

| | |
|-----------------|---|
| Characteristics | The command takes effects immediately. The configurations will not be saved. |
|-----------------|---|

Parameter

| | |
|--------------------------|---|
| <state> | Integer type. Module state. 0 Module is not playing audio 1 Module is playing audio |
| <file_name> | String type. Name of local audio file, including file path, file name and file suffix. File path must be <i>UFS</i> : |
| <repeat> | Integer type. Play the file once or repeatedly. 0 Play only once 1 Play repeatedly |
| <err> | Error codes. For more details, see Chapter 3 . |

NOTE

1. If an unknown error occurs, the module reports URC **+QAUDPIND: 0,1**.
2. If current playing is interrupted by other audio tasks, the module reports URC **+QAUDPIND: 0,6**.

2.3.6. AT+QAUDSTOP Stop Playing Media File

This command stops playing media file.

| AT+QAUDSTOP Stop Playing Media File | |
|---|---|
| Test Command AT+QAUDSTOP=? | Response OK |
| Execution Command AT+QAUDSTOP | Response OK Or ERROR If there is any error related to ME functionality: +CME ERROR: <err> |
| Maximum Response Time | 300 ms |
| Characteristics | / |

Parameter

| | |
|--------------------|---|
| <err> | Error codes. For more details, see Chapter 3 . |
|--------------------|---|

2.3.7. AT+QAUDMOD Set Audio Mode

This command sets the audio mode required for the connected device.

| AT+QAUDMOD Set Audio Mode | |
|---|---|
| Test Command AT+QAUDMOD=? | Response +QAUDMOD: (range of supported <mode>s) OK |
| Read command AT+QAUDMOD? | Response +QAUDMOD: <mode> OK |
| Write Command AT+QAUDMOD=<mode> | Response OK Or ERROR If there is any error related to ME functionality: +CME ERROR: <err> |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect on next sound action. The configuration will not be saved. |

Parameter

| | |
|---------------------|--|
| <mode> | Integer type. The current audio mode. 0 Handset 1 Headset 2 Loudspeaker |
| <err> | Error codes. For more details, see Chapter 3 . |

NOTE

Parameters such as echo canceller, noise suppressor, digital gain and calibration are different in different audio modes.

2.3.8. AT+QIIC IIC Read/Write

This command reads from or writes to the IIC register from peripheral devices.

| AT+QIIC IIC Read/Write | |
|--|---|
| Test Command AT+QIIC=? | Response +QIIC: (list of supported <rw>s),(list of supported <device>s),(range of supported <addr>s),(list of supported <bytes>s),(range of supported <value>s) OK |
| Write Command AT+QIIC=<rw>,<device>,<addr>,<bytes>[,<value>] | Response If <rw>=0, optional parameter should be specified: OK Or ERROR If <rw>=1, optional parameter should be omitted: +QIIC: <value> OK Or ERROR If there is any error related to ME functionality: +CME ERROR: <err> |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect immediately. The configurations will not be saved. |

Parameter

| | |
|----------|---|
| <rw> | Integer type. Write Command or Read Command. 0 Write Command 1 Read Command |
| <device> | Hex integer type. 7-bit slave device address. Range: 0–0xFF. Currently only support ALC5616 device address 0x1B and NAU88C10 device address 0x1A. |
| <addr> | Hex integer type. Register address. Range: 0–0xFFFF. |
| <bytes> | Integer type. 1 Read/write one byte 2 Read/write two bytes |
| <value> | Hex integer type. Data value. Range: 0–0xFFFF. |
| <err> | Error codes. For more details, see Chapter 3 . |

Example

```

AT+QIIC=1,0x1B,0x27,1 //Read 1-byte content of the register's location: slave address:
                        0x1B, register address: 0x27.
+QIIC: 0x21

OK
AT+QIIC=0,0x1B,0x27,1,0x21 //Write 1-byte content of the register's location: slave address:
                              0x1B, register address:0x27, date value: 0x21.

OK
    
```

2.3.9. AT+QTTS Play Text

This command plays text.

| AT+QTTS Play Text | |
|---|--|
| Test Command AT+QTTS=? | Response +QTTS: (range of supported <mode>s), <text> OK |
| Read Command AT+QTTS? | Response +QTTS: <status> OK |
| Write Command AT+QTTS=<mode>[,<text>] | Response OK Or ERROR If there is any error related to ME functionality: +CME ERROR: <err> When the text playback is completed: +QTTS: 0 |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect immediately. The configurations will not be saved. |

Parameter

| | |
|-----------------------|--|
| <mode> | Integer type. Start/stop playing. It also indicates <text> format. Range: 0–2. 0 Stop playing, and <text> can be omitted. 1 Start playing, and <text> uses UCS2 encoding. 2 Start playing, and <text> is string type, usually ASCII characters, and is GBK encoding in Chinese. |
| <text> | String type. Text to be played. The text format depends on <mode> . Maximum length: 548 bytes. |
| <status> | Integer type. Status of the TTS player. 0 Idle 1 Busy |
| <err> | Error codes. For more details, see Chapter 3 . |

NOTE

1. The module supports playing text with this command during a non-call mode.
2. Text playing will be terminated during a call.
3. The module supports both text and audio playing, but asynchronously.

Example

```

AT+QTTS=? //Test command.
+QTTS: (0-2),<text>

OK
AT+QTTS=1,"6B228FCE4F7F752879FB8FDC6A215757" //Play a UCS2 string.
OK

+QTTS: 0
AT+QTTS=2,"hello world" //Play an ASCII string.
OK

+QTTS: 0
AT+QTTS=0 //Stop playing.
OK
    
```

2.3.10. AT+QWTTTS Play/Send Text to Far-End

This command plays or sends text to far-end during a call.

| AT+QWTTTS Play/Send Text to Far-End | |
|---|---|
| Test Command AT+QWTTTS=? | Response +QWTTTS: (list of supported <ulmute>s),(list of supported <dlmute>s),(range of supported <mode>s), <text> OK |
| Read Command AT+QWTTTS? | Response +QWTTTS: <status> OK |
| Write Command AT+QWTTTS=<ulmute>,<dlmute>,<mode>[,<text>] | Response OK Or ERROR If there is any error related to ME functionality: +CME ERROR: <err> When the text playing is completed: +QWTTTS: 0 |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect immediately. The configurations will not be saved. |

Parameter

| | |
|-----------------------|--|
| <ulmute> | Integer type. Not mute the uplink. 1 Not mute |
| <dlmute> | Integer type. Mute the downlink. 0 Mute |
| <mode> | Integer type. Start/stop playing. It also indicates <text> format. 0 Stop playing, and <text> can be ignored. 1 Start playing, and <text> uses UCS2 encoding. 2 Start playing, and <text> is string type, usually ASCII characters, and is GBK encoding in Chinese. |
| <text> | String type. Text to be played. The text format depends on <mode> . Maximum length: 548 bytes. |
| <status> | Integer type. Status of the TTS player. |

| | |
|-------|---|
| 0 | Idle |
| 1 | Busy |
| <err> | Error codes. For more details, see Chapter 3 . |

NOTE

+QWTTTS: 4111 means that TTS playing is interrupted by a call.

Example

```

AT+QWTTTS=? //Test command
+QWTTTS: (1),(0),(0-2),<text>

OK
AT+QWTTTS=1,0,1,"6B228FCE4F7F752879FB8FDC6A215757" //Play a UCS2 string and send it to
//Play a UCS2 string and send it to far-end during a call
OK
+QWTTTS: 0
AT+QWTTTS=1,0,2,"hello world" //Play an ASCII string and send it
//Play an ASCII string and send it to far-end during a call
OK
+QWTTTS: 0 //The text play is completed
AT+QWTTTS=1,0,0 //Stop playing
OK
    
```

2.3.11. AT+QTTSETUP Set Parameters for TTS

This command sets the TTS speed or adjusts the volume.

AT+QTTSETUP Set Parameters for TTS

| | |
|---|--|
| Test Command AT+QTTSETUP=? | Response +QTTSETUP: (list of supported <mode>s),(list of supported <ID>s),(range of supported <value>s) OK |
| Read Command AT+QTTSETUP? | Response OK |
| Write Command AT+QTTSETUP=<mode>,<ID>[,<value>] | Response If <mode>=1 , optional parameter should be specified: OK |

| | |
|-----------------------|---|
| | <p>Or ERROR</p> <p>If <mode>=2, optional parameter should be omitted: +QTTSETUP: 2,<ID>,<value></p> <p>OK</p> <p>Or ERROR</p> <p>If there is any error related to ME functionality: +CME ERROR: <err></p> |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect immediately. The configurations will not be saved. |

Parameter

| | |
|----------------------|--|
| <mode> | Integer type. Write command or read command. 1 Write Command 2 Read Command |
| <ID> | Integer type. Speed or volume. 1 Speed 2 Volume |
| <value> | Integer type. Speed or volume value. If <mode>=2 , <value> is omitted in Write Command, which means to read the current speed or volume value. Speed Range: -32768 to 32767. Default value: 0. Volume Range: -32768 to 32767. Default value: 0. |
| <err> | Error codes. For more details, see Chapter 3 . |

Example

```

AT+QTTSETUP=? //Test command.
+QTTSETUP: (1,2),(1,2),(-32768-32767)

OK
AT+QTTSETUP=1,2,0 //Set the volume to 0.
OK
    
```

2.3.12. AT+QAUDPASW Select Audio PA Type

This command selects audio PA type.

| AT+QAUDPASW Select Audio PA Type | |
|---|---|
| Test Command AT+QAUDPASW=? | Response +QAUDPASW: (list of supported <n>s) OK |
| Read Command AT+QAUDPASW? | Response +QAUDPASW: <n> OK |
| Write Command AT+QAUDPASW=<n> | Response OK Or ERROR If there is any error related to ME functionality: +CME ERROR: <err> |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect after the module is rebooted. The configuration will be saved automatically. |

Parameter

| | |
|-------|---|
| <n> | Integer type. PA type. 0 AB type 1 D type |
| <err> | Error codes. For more details, see Chapter 3 . |

2.3.13. AT+QAUDSW Select Codec

This command selects the built-in codec or the external one.

| AT+QAUDSW Select Codec | |
|------------------------------------|--|
| Test Command AT+QAUDSW=? | Response +QAUDSW: (list of supported<n>s) OK |
| Read Command AT+QAUDSW? | Response +QAUDSW: <n> |

| | |
|---|---|
| | OK |
| Write Command AT+QAUDSW=<n> | Response OK Or ERROR If there is any error related to ME functionality: +CME ERROR: <err> |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect after the module is rebooted. The configuration will be saved automatically. |
| Reference 3GPP TS 27.007 | |

Parameter

| | |
|--------------------|---|
| <n> | Integer type. 0 External codec 1 Built-in codec |
| <err> | Error codes. For more details, see Chapter 3 . |

2.3.14. AT+QICMIC Set Uplink Gains of Microphone

This command sets the uplink gains of the microphone.

| AT+QICMIC Set Uplink Gains of Microphone | |
|--|---|
| Test Command AT+QICMIC=? | Response +QICMIC: (range of supported <txgain>s),(range of supported <txdgain>s) OK |
| Read Command AT+QICMIC? | Response +QICMIC: <txgain>,<txdgain> OK |
| Write Command AT+QICMIC=<txgain>[,<txdgain>] | Response OK Or ERROR If there is any error related to ME functionality: |

| | |
|-----------------------|---|
| | +CME ERROR: <err> |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect on next call. The configurations will not be saved. |

Parameter

| | |
|------------------------|--|
| <txgain> | Integer type. Uplink analog gain. Range: 0–7. Default value might be different in different audio modes. |
| <txdgain> | Integer type. Uplink digital gain. Range: 0–15. Default value might be different in different audio modes. |
| <err> | Error codes. For more details, see Chapter 3 . |

2.3.15. AT+QICSIDET Set Side Tone Gain in Current Mode

This command sets the side tone gain value in the current mode.

| AT+QICSIDET Set Side Tone Gain in Current Mode | |
|---|---|
| Test Command AT+QICSIDET=? | Response +QICSIDET: (range of supported <st_gain>s) OK |
| Read Command AT+QICSIDET? | Response +QICSIDET: <st_gain> OK |
| Write Command AT+QICSIDET=<st_gain> | Response OK Or ERROR If there is any error related to ME functionality: +CME ERROR: <err> |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect on next call. The configuration will not be saved. |

Parameter

| | |
|------------------------|--|
| <st_gain> | Integer type. The configured side tone gain in current mode. Range: 0–15. Default value might be different in different audio modes. |
| <err> | Error codes. For more details, see Chapter 3 . |

NOTE

This command is valid only after audio loop test is disabled by **AT+QAUDLOOP** (see **Chapter 2.3.2**).

2.3.16. AT+QLDTMF Play/Stop Playing Local DTMF

This command plays or stops playing a local DTMF string.

| AT+QLDTMF Play/Stop Playing Local DTMF | |
|---|---|
| Test Command AT+QLDTMF=? | Response +QLDTMF: (range of supported <n>s),(list of supported <DTMF_string>s) OK |
| Write Command AT+QLDTMF=<n>,<DTMF_string>[,<y>] | Response OK Or ERROR If there is any error related to ME functionality: +CME ERROR: <err> When the playback is completed: +QLDTMF: 5 |
| Execution Command AT+QLDTMF | Response OK |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect immediately. The configurations will not be saved. |

Parameter

| | |
|----------------------------|--|
| <n> | Integer type. Play time and mute time of each DTMF. Range: 1–1000. Unit: 0.01 second when <y>=1 , or 0.1 second when <y> is not set. |
| <DTMF_string> | String type. DTMF string. Separated by comma. Maximum length: 39 characters (including the comma). DTMF format: 0–9, *, #, A–D. The string should be enclosed in quotation marks ("..."). |
| <y> | Integer type. Determine the unit of <n> . If <y> is omitted, the unit of <n> is 0.1 second. If <y> is specified to 1, the unit of <n> is 0.01 second. |
| <err> | Error codes. For more details, see Chapter 3 . |

Example

```

AT+QLDTMF=? //Test command.
+QLDTMF: (1-1000),(0-9,*,#,A-D)

OK
AT+QLDTMF=2,"A,B,1,2,#" //Play "A,B,1,2,#", play time & mute time is respectively 200 ms.

OK
AT+QLDTMF //Stop playing.

OK
    
```

2.3.17. AT+QWDTMF Play/Send DTMF Tones to Far-End

This command plays or sends DTMF tones to far-end.

| AT+QWDTMF Play/Send DTMF Tones to Far-End | |
|--|--|
| Test Command AT+QWDTMF=? | Response +QWDTMF: (list of supported <ulmute>s),(list of supported <dlmute>s),(list of supported <DTMF_string>s),(range of supported <duration>s) OK |
| Write Command AT+QWDTMF=<ulmute>,<dlmute>,<DTMF_string>,<duration> | Response OK Or ERROR If there is any error related to ME functionality: +CME ERROR: <err> When the playback is completed: |

| | |
|---|---|
| | +QWDTMF: 5 |
| Write Command AT+QWDTMF=<ulmute>,<dlmute>,<value> | Response OK Or ERROR If there is any error related to ME functionality: +CME ERROR: <err> When the playback is completed: +QWDTMF: 5 |
| Execution Command AT+QWDTMF | Response OK |
| Maximum Response Time | 300 ms |
| Characteristics | / |

Parameter

| | |
|----------------------------|---|
| <ulmute> | Integer type. Not mute uplink. 1 Not mute uplink |
| <dlmute> | Integer type. Mute downlink. 0 Mute downlink |
| <DTMF_string> | String type. DTMF tones. Separated by comma. Maximum length: 39 characters (including the comma). DTMF format: 0–9, *, #, A–D. The string should be enclosed in quotation marks ("..."). |
| <duration> | Play and mute time. Range: 500–1000. Unit: ms. |
| <value> | String type. Combinations of DTMF tone, play time and mute time, separated by comma. DTMF tone Range: 0–9, *, #, A–D. No comma needed between two tones. Play time Range: 100–1000. Unit: ms. Mute time Range: 100–1000. Unit: ms. For example, "AB,500,500,DCD,100,1000" means AB tones, 500 ms play time, 500 ms mute time; DCD tones, 100 ms play time, 1000 ms mute time. |
| <err> | Error codes. For more details, see Chapter 3 . |

Example

```

AT+QWDTMF=? //Test command.
+QWDTMF: (1),(0),(0-9,*,#,A-D),(500-1000)

OK
AT+QWDTMF=1,0,"1,2,3,A,B",500 //Play 1, 2, 3, A, B DTMF, with play time
    
```

```

OK                                     and mute time respectively 500 ms.
AT+QWDTMF                             //Stop playing.
OK
    
```

2.3.18. AT+QLTONE Play Local Customized Tones

This command plays a local customized tone.

| AT+QLTONE Play Local Customized Tones | |
|--|--|
| Test Command AT+QLTONE=? | Response +QLTONE: (list of supported <mode>s),(range of supported <frequency>s),(range of supported <period_on>s),(range of supported <period_off>s),(range of supported <duration>s) OK |
| Write Command AT+QLTONE=<mode>[,<frequency>,<period_on>,<period_off>,<duration>] | Response OK Or ERROR If there is any error related to ME functionality: +CME ERROR: <err> When the playback is completed: +QLTONE: 0 |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect immediately. The configurations will not be saved. |

Parameter

| | |
|---------------------------|---|
| <mode> | Integer type. Stop or start playing. 0 Stop playing 1 Start playing |
| <frequency> | Integer type. Tone's frequency. Range: 50–3500. Unit: Hz. |
| <period_on> | Integer type. Tone's play time. Range: 1–1000. Unit: ms. |
| <period_off> | Integer type. Tone's mute time. Range: 1–1000. Unit: ms. |
| <duration> | Integer type. Tone's total time. Range: 1–15300000. Unit: ms. |
| <err> | Error codes. For more details, see Chapter 3 . |

Example

```

AT+QLTONE=? //Test Command
+QLTONE: (0,1),(50-3500),(1-1000),(1-1000),(1-15300000)

OK
AT+QLTONE=1,1000,200,300,3000 //Play a 1000 Hz tone, with play time 200 ms and mute time
300 ms. Total time is 3000 ms.

OK

+QLTONE: 0
AT+QLTONE=0 //Stop playing.
OK
    
```

2.3.19. AT+QLTONEX Play Local Customized Tones

This command plays a local customized tone.

| AT+QLTONEX Play Local Customized Tones | |
|--|--|
| Test Command AT+QLTONEX=? | Response +QLTONEX: (list of supported <mode>s),<tone_list>,(range of supported <duration>s) OK |
| Write Command AT+QLTONEX=<mode>[,<tone_list>,<duration>] | Response OK Or ERROR If there is any error related to ME functionality: +CME ERROR: <err> When the playback is completed: +QLTONEX: 0 |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect immediately. The configurations will not be saved. |

Parameter

| | |
|------------------------------|--|
| <mode> | Integer type. Stop or start playing. 0 Stop playing 1 Start playing |
| <tone_list> | String Type. Setting of the tone to be played. Format: " <frequency_min>,<frequency_max>,<period_on>,<period_off>,<tone_num> " |
| <frequency_min> | Integer type. The minimum frequency of tone to be played. Range: 50–3500. Unit: Hz. |
| <frequency_max> | Integer type. The maximum frequency of tone to be played. Range: 50–3500. Unit: Hz. |
| <period_on> | Integer type. Tone’s play time. Range: 1–1000. Unit: ms. |
| <period_off> | Integer type. Tone’s mute time. Range: 1–1000. Unit: ms. |
| <tone_num> | Integer type. Number of the tone to be played. Range: 0–4. |
| <duration> | Integer type. Tone’s total time. Range: 10–65535. Unit: ms. |
| <err> | Error codes. For more details, see Chapter 3 . |

Example

```

AT+QLTONE=?
+QLTONE: (0,1),<tone_list>,(10-65535)

OK
AT+QLTONE=1,"500,1000,400,400,1","300,800,600,600,0",4000
//Play a tone between 500–1000 Hz with play time and mute time respectively 400 ms; Play a tone
  between 300–800 Hz with play time and mute time respectively 600 ms. Loop the tones until the total
  time reaches the set 4000 ms.

OK

+QLTONE: 0
AT+QLTONE=0 //Stop playing.

OK
    
```

2.3.20. AT+QTONEDT Enable/Disable DTMF Detection

This command enables or disables DTMF detection. If this function is enabled, DTMF tones sent by the other side will be detected and reported on the assigned serial port.

| AT+QTONEDT Enable/Disable DTMF Detection | |
|--|---|
| Test Command AT+QTONEDT=? | Response +QTONEDT: (list of supported <enable>s) OK |
| Read Command AT+QTONEDT? | Response +QTONEDT: <enable> |

| | |
|---|---|
| | OK |
| Write Command AT+QTONEDT=<enable> | Response OK Or ERROR If there is any error related to ME functionality: +CME ERROR: <err> |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect immediately. The configurations will not be saved. |

Parameter

| | |
|-----------------------|--|
| <enable> | Integer type. Enable or disable DTMF detection. 0 Disable 1 Enable |
| <err> | For more details, see Chapter 3 . |

NOTE

DTMF characters - ASCII:

| DTMF | ASCII | DTMF | ASCII |
|------|-------|------|-------|
| 0 | 48 | 8 | 56 |
| 1 | 49 | 9 | 57 |
| 2 | 50 | A | 65 |
| 3 | 51 | B | 66 |
| 4 | 52 | C | 67 |
| 5 | 53 | D | 68 |
| 6 | 54 | * | 42 |
| 7 | 55 | # | 35 |

3 Error Codes

Table 4: Error Codes of +CME ERROR: <err>

| Code of <err> | Meaning |
|---------------|---|
| 901 | Audio unknown error |
| 902 | Audio invalid parameters <ulmute> and <dlmute>, or null characters played |
| 903 | Audio operation not supported: playing TTS in non-call status |
| 904 | Audio device busy |

4 Appendix Reference

Table 5: Terms and Abbreviations

| Abbreviation | Description |
|--------------|--|
| ASCII | American Standard Code for Information Interchange |
| GBK | Chinese Internal Code Specification |
| IIC | Inter-Integrated Circuit |
| ME | Mobile Equipment |
| MIC | Microphone |
| MSC | Mobile Switching Center |
| MT | Mobile Termination |
| PA | Power Amplifier |
| PCM | Pulse Code Modulation |
| TA | Terminal Adapter |
| TTS | Text To Speech |
| UFS | User File System |
| URC | Unsolicited Result Code |