Image transmission Module User Manual

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1.Business Process

1.1.ELog

The host computer issues commands through the command channel.The AT command controls the start/stop of ELog capture, and the control module starts an FTP server to upload and update ELog configuration parameters.

The module will automatically start for importing upon power-on.The FTP server for logs is specified in the directory: data/local. This directory stores APLog and ELog (if ELog has been previously enabled). The IP address is 192.168.1.x, but the specific IP address may vary depending on the module. The port number is 200, and the username and password are blank. The host computer can access this FTP server via an FTP client to export relevant logs for analysis.

The host computer can start the FTP server (with AT command control module) for updating ELog configuration parameters via the AT command control module.(Upload permissions are available), and the specified directory is: data/lc-elog, which stores the ELog configuration parameters.

The host computer can be accessed via The FTP client uploads and updates ELog configuration parameters. The IP address is also used for logging.

Of The FTP address is on port 210, and the username and password are empty.

To obtain the log: Before testing, issue the following AT command to enable ELog.

AT^ELFUN=1

AT^ELCFGUL=1

To reproduce the problem, approximately ELog will be periodically updated approximately every 10 minutes. Once the test is complete, please immediately issue AT^ELFUN=0,closure ELog, then import ELog again.

1.2.APLog

AT^APLFUN=1: Enable APLog;
AT^APLFUN=0: Disable APLog

Guide APLog method: Refer to ELog, and place it in the same directory as ELog.

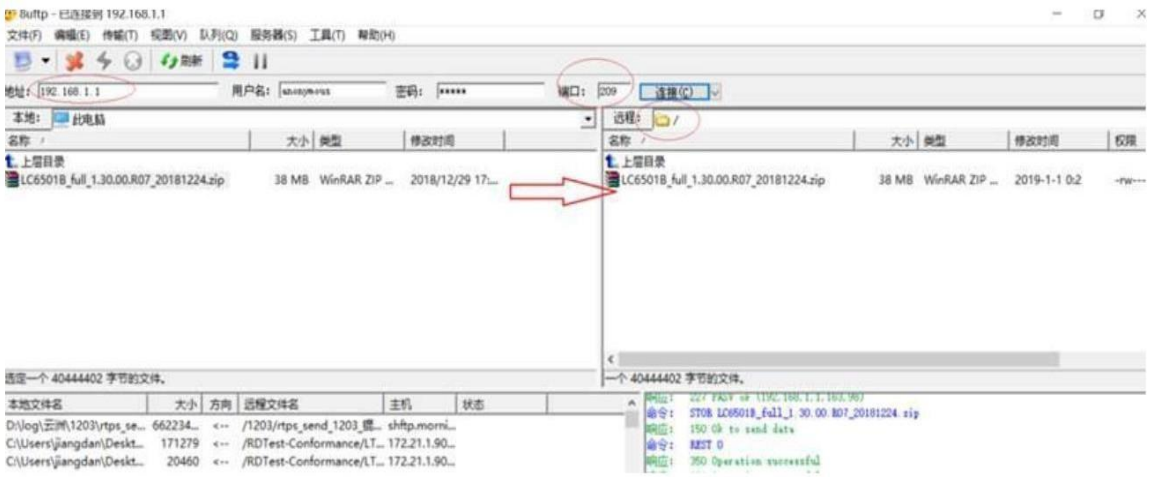
2.OTA upgrade

2.1.Upload the upgrade package file using the FTP client on your PC.

1. The upgrade package is sent to the Image transmission module via a PC. The PC requires a Windows 7 system and is not supported.XP system.

2. After powering on the Image transmission module, connect it to the computer via USB or Ethernet cable, and configure the local connection statically on the computer.IP address.

3. The PC-side FTP client uses 192.168.1.x (the module's actual IP address), port number:209 allows access to the /data/ota/ directory of the local or remote Image transmission module for uploading and downloading related files. The username and password are anonymous and empty.



2.2.Initiate OTA upgrade

1. The local end issues the upgrade command. Open the LcComTool.exe tool, open the serial port, and then in the command...Enter at^rcvr=1.
2. Control remote upgrades. Open the LcComTool.exe tool, open the serial port, and then enter at^rcvr=0, "FFFF" in the command line to control the upgrade of all remote Image transmission modules. Enter at^rcvr=0, "192.168.1.xxx" in the command line to control the upgrade of the Image transmission module with the specified IP address.
3. Observe the Image transmission module and check the status of the red and blue lights. When the blue light is on, it indicates that the upgrade was successful, and when the red light is on, it indicates that the upgrade failed.
4. The upgrade result can also be confirmed by querying the version number of the local or remote Image transmission module using the AT^ DAMR command.

2.3.OTA upgrade limitations

1. Only supports loading OTA upgrade packages onto the module via Windows 7 32/64-bit operating systems or Windows 10 64-bit operating systems.
2. The OTA upgrade package name cannot be modified; the default name is Image transmission_full_xx.(CX660X_update_xx, Image transmission_restore_xx,), where xx is the version number;
3. The OTA partition can only hold one upgrade package.
4. OTA upgrade packages can only be uploaded via FTP software tools;
5. When transmitting OTA update packages, packet loss or changes in the update package file size may cause the OTA update to fail.
6. If a module has accessed the system via ADB, it may cause OTA updates to fail.
7. The module must not lose power during the upgrade process, as power loss may cause the module to malfunction; adjacent version numbers can use upgrade packages, downgrade packages, or full packages; however, cross-version upgrades must use full packages.
8. The full package version does not support downgrading.

3.Multicast address range

The destination address of multicast messages is used Class D IP addresses,
The range is from 224.0.0.0 to 239.255.255.255.
Class D addresses cannot appear in the source IP address field of an IP packet.
The Image transmission module recommends users use multicast addresses from 224.0.0.0 to 224.0.0.255. Other multicast addresses have defaults in the Android kernel.260s limit on the effective time of multicast groups.

224.0.0.0～224.0.0.255	For reserved multicast address ((Permanent group address), among which 224.0.0.0 is reserved and will not be assigned; other addresses are used by routing protocols.
224.0.1.0～231.255.255.255 233.0.0.0～238.255.255.255	Available ASM (Any Source Multicast) Multicast model) Multicast group address; valid across the entire network.
232.0.0.0～232.255.255.255	Available SSM (Source Specfic Multicast, refers to (Fixed-source multicast model) Multicast group address; valid across the entire network.
239.0.0.0～239.255.255.255	For local management multicast addresses, only within a specific local scope Valid within the enclosure

4.RNDIS network card enable configuration

RNDIS network port is enabled by default during power-on initialization;

Users can the AT^RNDISCTL command controls the enabling/disabling of the RNDIS network interface. This configuration is set once and takes effect permanently.

For The RJ45 network port patching solution allows users to reduce the impact of synchronization on the RNDIS network port by disabling it, thereby reducing the impact on the USB VCOM channel; otherwise, there may be a risk of USB VCOM channel abnormalities.

5.WEBUI

WebUI provides a web-based human-computer interface. Interface operations primarily involve manually selecting or inputting relevant parameters, configuring module nodes, and displaying the configuration status on the UI. Open Browser, UI initial addresshttp://192.168.1.12.

WEBUI not only supports configuring and querying local nodes, but also allows access to remote nodes on the network for configuring remote node parameters, querying status, or reporting information. To access a remote node, simply enter the remote node name.An IP address is sufficient, for example:http://192.168.1.66 (remote node)IP address).

6.AT interface

6.1.AT^DACS: Access Status

Command	Possible response(s)
AT^DACS=<n>	
AT^DACS?	^DACS: <n>,<state>
AT^DACS=?	^DACS: (list of supported <n>s)

Description

The command is used to set the on/off status of ^DACSI: <state>. It is initially off by default upon power-on. When enabled, the current status will be reported once. When active reporting is enabled, access nodes actively report the access status indicator after successful access; the central node is considered to have successfully accessed after successful power-on, and reports the access status only after the central node type is determined.

The query command is used to query the current reported switch status and the current access status.

The test command is used to test whether the command is supported and to query the value range of the <n> parameter.

Final result code

OK
Successful
ERROR or +CME ERROR: <err>
Command performing failed

Defined values

<n>: Integer type, representing the actively reported switch status.
0: closure
1: Open
2: Query current information
<state>: Integer type, representing the access status.
0: Not connected
1: Connected

Example

AT^DACS=1<CR><LF>
<CR><LF>^DACSI: 0<CR><LF>
<CR><LF>OK<CR><LF>
<CR><LF>^DACSI: 1<CR><LF> AT^DACS?<CR><LF>
<CR><LF>^DACS: 1,1<CR><LF>
<CR><LF>OK<CR><LF> AT^DACS=?<CR><LF>
<CR><LF>^DACS: (0-1)<CR><LF>
<CR><LF>OK<CR><LF>

6.2.AT^DRPC: Real-time configuration of connected wireless parameters

Command	Possible response(s)
AT^DRPC=<freq>,<bandwidth>,<po wer>	
AT^DRPC?	^DRPC: <freq>,<bandwidth>,<power>
AT^DRPC=?	^DRPC: (list of supported <freq>s), (list of supported <bandwidth>s)

Description

The execute command is used to set parameters in the access state and save them to NVRAM. The query command is used to query the current parameter settings.

The test command is used to test whether the command is supported and the range of values for the query parameters.

Final result code

OK
Successful
ERROR or +CME ERROR: <err>
Command performing failed

Defined values

<freq>: Integer type, representing the frequency point, in units of 100kHz, range (8060-8259, 14279-14679, 24015-24814)
<bandwidth>: Integer type, representing bandwidth
0: 1.4M
1: 3M
2: 5M
3: 10M
4: 15M (Not supported)
5:20M
<power>: "integer" type, represents the fixed power of the central node, in dBm, ranging from "-40" to "40". If it exceeds the maximum value supported by the terminal, the maximum value supported by the terminal shall prevail.

Example

AT^DRPC=24415,1,”27”<CR><LF>
<CR><LF>OK<CR><LF>
AT^DRPC?<CR><LF>
<CR><LF>^DRPC: 24415,1,”27”<CR><LF>
<CR><LF>OK<CR><LF> AT^DRPC=?<CR><LF>
<CR><LF>^DRPC: (8060-8259,14279-14679,24015-24814) ,(0-5)<CR><LF>
<CR><LF>OK<CR><LF>

6.3.AT^DRPS: Connectivity-free wireless parameter configuration

Command	Possible response(s)
AT^DRPS=<freq>,<bandwidth>,<power>	
AT^DRPS?	^DRPS: <freq>,<bandwidth>,<power>
AT^DRPS=?	^DRPS: (list of supported <freq>s), (list of supported <bandwidth>s

Description

The command is used to save the parameters toNVRAM settings will take effect after saving, powering down, and restarting. The query command is used to query the parameter settings in the current NVRAM.

The test command is used to test whether the command is supported and the range of values for the query parameters.

Final result code

OK
Successful
ERROR or +CME ERROR: <err>
Command performing failed

Defined values

<freq>: Integer type, representing the frequency point, in units of 100kHz, range (8060-8259, 14279-14679, 24015-24814)
<bandwidth>: Integer type, representing bandwidth
0: 1.4M
1: 3M
2: 5M
3: 10M
4: 15M (Not supported)
5:20M
<power>: "integer" type, represents the fixed power of the central node, in dBm, ranging from "-40" to "40". If it exceeds the maximum value supported by the terminal, the maximum value supported by the terminal shall prevail.

Example

AT^DRPS=24415,1,”27”<CR><LF>
<CR><LF>OK<CR><LF>
AT^DRPS?<CR><LF>
<CR><LF>^DRPS: 24415,1,”27”<CR><LF>
<CR><LF>OK<CR><LF> AT^DRPS=?<CR><LF>
<CR><LF>^DRPS: (8060-8259,14279-14679,24015-24814),(0-5) <CR><LF>
<CR><LF>OK<CR><LF>

6.4.AT^DSSMTP: Maximum transmit power configuration for slave nodes

Command	Possible response(s)
AT^DSSMTP=<power>	
AT^DSSMTP?	^DSSMTP: <freq>,<bandwidth>,<power>
AT^DSSMTP=?	

Description

The command is used to save the parameters toNVRAM settings will take effect after saving, powering down, and restarting. The query command is used to query the parameter settings in the current NVRAM.

The test command is used to test whether the command is supported and the range of values for the query parameters.

Final result code

OK
Successful
ERROR or +CME ERROR: <err>
Command performing failed

Defined values

<power>: "integer" type, maximum transmit power of the node, in dBm, ranging from "-40" to "40". If it exceeds the maximum value supported by the terminal, the maximum value supported by the terminal shall prevail.

Example

AT^DSSMTP="-10"<CR><LF>
<CR><LF>OK<CR><LF> AT^DSSMTP?<CR><LF>
<CR><LF>”-10”<CR><LF>
<CR><LF>OK<CR><LF> AT^DSSMTP=?<CR><LF>
<CR><LF>OK<CR><LF>

6.5.AT^DRPR: Wireless Parameter Reporting

Command	Possible response(s)
AT^DRPR=<n>	
AT^DRPR?	^DRPR: <n>
AT^DRPR=?	^DRPR: (list of supported <n>s)

Description

The command ^DRPRI is used to configure the local wireless parameter reporting.

<index>,<earfcn>,<cell_id>,<rssi>,<pathloss>,<rsrp>,<rsrq>,<snr>,<distance>,<tx_power>,<dl_throughput_total_tbs>,<ul_thrpughput_total_tbs>,<dlsch_tb_error_pThe on/off states of <er>, <mcs>, <rb_num>, <wide_cqi>, <dlsch_tb_error_per_total>, <Max_Snr>, <Min_Snr>, and <dl_total_tbs_g_rnti> are set. They are initially off by default upon power-on. This switch is only effective when the local machine is acting as an access node; for central nodes, even if the switch is on, no active reporting will occur.

The query command is used to query the current parameter settings.

The test command is used to test whether the command is supported and the range of values for the query parameters.

Final result code

OK

Successful

ERROR or +CME ERROR: <err>

Command performing failed

Defined values

<n>: Integer type, representing the actively reported switch status.

0: closure

1: Open

2: Query current information

<index>: Integer type, representing the port index number.

1: Port 1

2: Port 2

<earfcn>: Integer type, frequency information of the measurement results.

<cell_id>: Integer type, cell information of the measurement result.

<rssi>: string type, RSSI measurement value, dBm, formatted as "±value" (excluding "0") "-141" to "-44": RSSI measurement value

+32767: Invalid value

<pathloss>: Integer type, path loss value, dBm 0 to 191: Road loss value

32767: Invalid value

<rsrp>: string type, RSRP measurement value, dBm, formatted as "±value" (excluding "0") "-141" to "-44": RSRP measurement value

+32767: Invalid value

<rsrq>: string type, RSRQ measurement value, dBm, formatted as "±value" (excluding "0"). The actual value needs to be divided by...

10 processing

"-196" to "-30": RSRQ measurement value

+32767: Invalid value

<snr>: string type, SNR measurement value. Format is "±value" (excluding "0"). "-50" to "+50": SNR measurement value

+32767: Invalid value

<`distance >`: Integer type, distance to the peer node, in meters, value range [0, 5000].

<tx_power >: string type, transmission power, unit dBm, format is "±value" (excluding "0") "-50" to "+50": transmission power

+32767: Invalid value

<dl_throughput_total_tbs >: integer type, downlink throughput information, total TB size within the reporting period, in bytes, range [0, 12000000]

<`ul_thrpughput_total_tbs`: Integer type, uplink throughput information, total TB size within the reporting period, in bytes, range [0, 12000000].

<dlsch_tb_error_per >: integer type, percentage of bit errors within the reporting period, range

[0,100]

<mcs>: MCS, value range [0, 29]

<rb_num>: The number of RBs, ranging from [6, 100].

<wide_cqi>: Wideband CQI, value range [1, 15]

<dlsch_tb_error_per_total>: The percentage of total bit errors reported after entering connection mode, ranging from [0, 100].

<Max_Snr>: The maximum snr within 10000ms, with a value range of [-40, 40].

<Min_Snr>: The minimum snr within 10000ms, with a value range of [-40, 40].

<dl_total_tbs_g_rnti>: integer type, total_tbsize of the multicast packets.

Example

AT^DRPR=1<CR><LF>
<CR><LF>OK<CR><LF> AT^DRPR?<CR><LF>
<CR><LF>^DRPR: 1<CR><LF>
<CR><LF>OK<CR><LF>
<CR><LF>^DRPRI:
1,1000,16,"-46",20,"-60","-195","0",4000,"-36",10000000,5000000,10,15,3,15,
50,"+30","-25",15000<CR><LF>
<CR><LF>^DRPRI:
2,1000,16,"-106",115,"-100","-194","+20",4000,"-36",10000000,5000000,10,15,3,15,
50,"+35","-30",15000<CR><LF>AT^DRPR=?<CR><LF>
<CR><LF>^DRPR: (0-1)<CR><LF>
<CR><LF>OK<CR><LF>

6.6.AT^DAPR: All access nodes report wireless parameters

Command	Possible response(s)
AT^DAPR=<n>	
AT^DAPR?	^DAPR: <n>
AT^DAPR=?	^DAPR: (list of supported <n>s)

Description

The command is executed by the central node to set and report the wireless parameters of the connected nodes: ^DAPRI: <IPv6 address>,<index>,<rssi>,<pathloss>,<rsrp>,<rsrq>,<snr>,<distance>,<tx_power>,<dl_throughput_total_tbs>,<ul_throughput_total_tbs>,<dlsch_tb_error_per>,<dlsch

The on/off status of <tb_error_per_total>, <Max_Snr>, <Min_Snr>, and <dl_total_tbs_g_rnti> is set, and is initially off by default upon startup.

The query command is used to query the current parameter settings.

The test command is used to test whether the command is supported and the range of values for the query parameters.

Final result code

OK
Successful
ERROR or +CME ERROR: <err>
Command performing failed

Defined values

<n>: Integer type, representing the actively reported switch status.
0: closure
1: Open
2: Query current information
<IPv6 address>: string type, the IP address of the connected node, consisting of 16 groups of numbers (0-255), separated by '.', in the format: a1.a2.a3.a4.a5.a6.a7.a8.a9.a10.a11.a12.a13.a14.a15.a16
<index>: Integer type, representing the port index number.
1: Port 1
2: Port 2
<rssi>: string type, RSSI measurement value, dBm, formatted as "±value" (excluding "0") "-141" to "-44": RSSI measurement value
+32767: Invalid value
<pathloss>: Integer type, path loss value, dBm 0 to 191:Road loss value
32767: Invalid value
<rsrp>: string type, RSRP measurement value, dBm, formatted as "±value" (excluding "0") "-141" to "-44": RSRP measurement value
+32767: Invalid value
<rsrq>: string type, RSRQ measurement value, dBm, formatted as "±value" (excluding "0"), the actual value needs to be divided by...
10. Processing
"-196" to "-30": RSRQ measurement value
+32767: Invalid value
<snr>: string type, SNR measurement value. Format is "±value" (excluding "0"). "-50" to "+50":

SNR measurement value

+32767: Invalid value

<`distance >`: Integer type, distance to the peer node, in meters, value range [0, 5000].

<tx_power >: string type, transmission power, unit dBm, format is "±value" (excluding "0") "-50" to "+50": transmission power

+32767: Invalid value

<dl_throughput_total_tbs >: integer type, downlink throughput information, total TB size within the reporting period, in bytes, range [0, 12000000]

<`ul_thrpughput_total_tbs`: Integer type, uplink throughput information, total TB size within the reporting period, in bytes, range [0, 12000000].

<dlsch_tb_error_per >: integer type, percentage of bit errors within the reporting period, range [0,100]

<mcs>: MCS, value range [0, 29]

<rb_num>: The number of RBs, ranging from [6, 100].

<wide_cqi>: Wideband CQI, value range [1, 15]

<dlsch_tb_error_per_total>: The percentage of total bit errors reported after entering connection mode, ranging from [0, 100].

<Max_Snr>: The maximum snr within 10000ms, with a value range of [-40, 40].

<Min_Snr>: The minimum snr within 10000ms, with a value range of [-40, 40].

<dl_total_tbs_g_rnti>: integer type, total_tbsize of the multicast packets.

Example:

AT^DAPR=1<CR><LF>
<CR><LF>OK<CR><LF> AT^DAPR?<CR><LF>
<CR><LF>^DAPR: 1<CR><LF>
<CR><LF>OK<CR><LF>
<CR><LF>^DAPRI:
"1.2.3.4.0.0.0.0.1.2.3.4.200.201.202.203",1,"-46",20,"-60","-195","0",4000,"-36
",10000000,5000000,10,15,3,15, 50,"+30","-25",16000<CR><LF>
<CR><LF>^DAPRI:
"1.2.3.4.0.0.0.0.1.2.3.4.200.201.202.203",2,"-106",115,"-100","-194","+20",4000
,"-36",10000000,5000000,10,15,3,15,50,"+35","-30",16000<CR><LF>AT^DAPR=?<CR><LF>
<CR><LF>^DAPR: (0-1)<CR><LF>
<CR><LF>OK<CR><LF>

6.7.AT^DAOCNDI: User band configuration

Command	Possible response(s)
AT^DAOCNDI=<band_bitmap>	
AT^DAOCNDI?	^DAOCNDI: <band_bitmap>
AT^DAOCNDI=?	

Description

The execute command is used to set the operating frequency band information of the self-organizing network communication device. The settings will take effect after a power cycle. The query command is used to query the operating frequency band information of the self-organizing network communication device.

The test command is used to test whether the command is supported.

Final result code

OK
Successful
ERROR or +CME ERROR: <err>
Command performing failed

Defined values

<band_bitmap>: string type (without double quotes), in hexadecimal format, the rightmost bit is the least significant bit (LSB/bit0).

Bit0: 800MHz band
Bit2: 1.4GHz band
Bit3: 2.4GHz band

Example

AT^DAOCNDI=0D<CR><LF>// Set band as 800M/1.4G/2.4G
<CR><LF>OK<CR><LF>
AT^DAOCNDI=01<CR><LF>// Set band as 800M
<CR><LF>OK<CR><LF> AT^DAOCNDI?<CR><LF>
<CR><LF>^DAOCNDI: 0D<CR><LF>
<CR><LF>OK<CR><LF> AT^DAOCNDI=?<CR><LF>
<CR><LF>OK<CR><LF>

6.8.AT^DDTC: Device Type Configuration

Command	Possible response(s)
AT^DDTC=<type>	
AT^DDTC?	^DDTC:<type>,<working type>
AT^DDTC=?	^DDTC:(list of supported <type>s)

Description

The command is used to set the type of self-organizing network communication devices. It needs to be set before powering on (+CFUN=1). Powering on (+CFUN=1) requires this setting.It will take effect later. When the terminal's working device type is determined, it will proactively report ^DDTCI:<type>,<working type>.

The query command is used to query information about the type of communication devices in an ad hoc network. The test command is used to test whether the command is supported.

Final result code

OK
Successful
ERROR or +CME ERROR: <err>
Command performing failed

Defined values

<type>: integer type, representing the device type
0: automatic
1: Central Node
2: Access Node
<working type>: Integer type, representing the current actual working equipment type.
0: automatic
1: Central Node
2: Access Node

Example AT^DDTC=0<CR><LF>
<CR><LF>OK<CR><LF> AT^DDTC?<CR><LF>
<CR><LF>^DDTC: 0,0<CR><LF>
<CR><LF>OK<CR><LF>
<CR><LF>^DDTCI: 0,1<CR><LF> AT^DDTC=?<CR><LF>
<CR><LF>^DDTC: (0-2)<CR><LF>
<CR><LF>OK<CR><LF>

6.9.AT^DAPI: Access Key Configuration

Command	Possible response(s)
AT^DAPI=<password_id>	
AT^DAPI?	^DAPI: <password_id>
AT^DAPI=?	

Description

The configuration command is used to configure self-organizing network devices.PASSWORD ID. The changes take effect after a power cycle. The query command is used to retrieve the PASSWORD ID of ad hoc network devices.

The test command is used to test whether the command is supported.

Final result code

OK
Successful
ERROR or +CME ERROR: <err>
Command performing failed

Defined values

<password_id>: string type, in HEX format, data maximum 32 bytes (HEX string 64 characters)

Example AT^DAPI=”30313233FBFA”<CR><LF>
<CR><LF>OK<CR><LF> AT^DAPI?<CR><LF>
<CR><LF>^DAPI: “30313233FBFA”<CR><LF>
<CR><LF>OK<CR><LF> AT^DAPI=?<CR><LF>
<CR><LF>OK<CR><LF>

6.10.AT^DIPAN: Query the list of all access node IP addresses

Command	Possible response(s)
AT^DIPAN	^DIPAN: <m>[,<IP Type>,<IP address_1>[,IP address_2>,...[,<IP address_m>]]]
AT^DIPAN=?	

Description

The command is used to query information about currently reachable nodes. When the information about currently reachable nodes changes, the modem actively reports it.

^DIPANI: <m>[,<IP Type>,<IP address_1>[,IP address_2>,...[,<IP address_m>]]]

The test command is used to test whether the command is supported.

Final result code

OK

Successful

ERROR or +CME ERROR: <err>

Command performing failed Unsolicited result code

^DIPANI: <m>[,<IP Type>,<IP address_1>[,IP address_2>,...[,<IP address_m>]]]

Defined values

<m>: integer type, representing the number of reachable nodes.

<IP type>: integer type, indicating the IP address type

0: IPV4

1: IPv6

`<IP address>`: string type, the IP address of the reachable node. If `<IP type>` is IPv6, `<IP address>` consists of 16 groups of numbers (0-255), separated by '.', in the format: a1.a2.a3.a4.a5.a6.a7.a8.a9.a10.a11.a12.a13.a14.a15.a16; If `<IP type>` is IPv4, `<IP address>` consists of 4 groups of numbers (0-255), separated by '.', in the format: a1.a2.a3.a4. Example

AT^DIPAN<CR><LF>

<CR><LF>^DIPAN: 0<CR><LF>

<CR><LF>OK<CR><LF>

<CR><LF>^DIPANI: 1, 1,"1.2.3.4.0.0.0.0.1.2.3.4.200.201.202.203"<><CR><LF>

<CR><LF>^DIPANI: 2,1, "1.2.3.4.0.0.0.0.1.2.3.4.200.201.202.203",

"1.2.3.4.0.0.0.0.1.2.3.4.200.201.202.204"<><CR><LF> AT^DIPAN<CR><LF>

<CR><LF>^DIPAN: 2, 1,"1.2.3.4.0.0.0.0.1.2.3.4.200.201.202.203",

"1.2.3.4.0.0.0.0.1.2.3.4.200.201.202.204"<CR><LF>

<CR><LF>OK<CR><LF> AT^DIPAN=?<CR><LF>

<CR><LF>OK<CR><LF>

6.11.AT^DSTC: TDD Uplink/Downlink Configuration

Command	Possible response(s)
AT^DSTC=<conf>	
AT^DSTC?	^DSTC: <conf>
AT^DSTC=?	^DSTC: (list of supported <conf>s)

Description

The execute command is used to set parameters; the settings will take effect after powering off and restarting. The query command is used to query the current parameter settings.

The test command is used to test whether the command is supported and the range of values for the query parameters.

Final result code

OK
Successful
ERROR or +CME ERROR: <err>
Command performing failed

Defined values

<conf>: Integer type, representing TDD config settings.
0: config0 (2D3U)
1: config1 (3D2U) (Long-distance mode not supported)
2: config2 (4D1U) (Long-distance mode not supported) 3: config3 (1D4U)

Example

AT^DSTC=0<CR><LF>
<CR><LF>OK<CR><LF> AT^DSTC?<CR><LF>
<CR><LF>^DSTC:0<CR><LF>
<CR><LF>OK<CR><LF> AT^DSTC=?<CR><LF>
<CR><LF>^DSTC: (0-3)<CR><LF>
<CR><LF>OK<CR><LF>

6.12.AT^DUBR: COM-UART baud rate configuration

Command	Possible response(s)
AT^DUBR=<rate>	
AT^DUBR?	^DUBR: <rate>
AT^DUBR=?	^DUBR: (list of supported <rate>s)

Description

The execute command is used to set the COM-UART port baud rate parameters. The settings will

take effect after power-down and restart. The query command is used to query the current parameter settings.

The test command is used to test whether the command is supported and the range of values for the query parameters.

Final result code

OK
Successful
ERROR or +CME ERROR: <err>
Command performing failed

Defined values

<rate>: Integer type, representing the UART port baud rate parameter, with the following value range:

1200:	1200	byte/s
2400:	2400	byte/s
4800:	4800	byte/s
9600:	9600	byte/s
19200:	19200	byte/s
28800:	28800	byte/s
38400:	38400	byte/s
57600:	57600	byte/s
115200	115200	bytes/s

Example

AT^DUBR=57600<CR>
<CR><LF>OK<CR><LF>
AT^DUBR?<CR><LF>
<CR><LF>^DUBR: 57600<CR><LF>
<CR><LF>OK<CR><LF> AT^DUBR=?<CR>
<CR><LF>^DUBR: (1200,2400,4800,9600,19200,28800,38400,57600, 115200) <CR><LF>
<CR><LF>OK<CR><LF>

6.13.AT^DCIAC: Encryption Algorithm Selection Configuration

Command	Possible response(s)
AT^DCIAC=<arith>	
AT^DCIAC?	^DCIAC: <arith>
AT^DCIAC=?	^DCIAC: (list of supported <arith>s)

Description

The execute command is used to set the encryption and integrity protection algorithms. The settings will take effect after powering down and restarting. The query command is used to query the current parameter settings.

The test command is used to test whether the command is supported and the range of values

for the query parameters.

Final result code

OK
Successful
ERROR or +CME ERROR: <err>
Command performing failed

Defined values

<arith>: Integer type, representing the encryption and integrity protection algorithm, with the following value range:
0: none ciphering and integrality 1: SNOW3G
2: AES
3: ZUC

Example

AT^DCIAC=2<CR>
<CR><LF>OK<CR><LF>
AT^DCIAC?<CR><LF>
<CR><LF>^DCIAC: 2<CR><LF>
<CR><LF>OK<CR><LF> AT^DCIAC=?<CR>
<CR><LF>^DCIAC: (0-3) <CR><LF>
<CR><LF>OK<CR><LF>

6.14.AT^DFHC: Frequency hopping switch control

Command	Possible response(s)
AT^DFHC=<n>	
AT^DFHC?	^DFHC: <n>
AT^DFHC=?	^DFHC: (list of supported <n>s)

Description

The execute command is used to set frequency hopping parameters. The settings will take effect after power-down and restart. The query command is used to query the current parameter settings.
The test command is used to test whether the command is supported and the range of values for the query parameters.

Final result code

OK
Successful
ERROR or +CME ERROR: <err>
Command performing failed

Defined values
<n>: Integer type, representing the frequency hopping function setting.
0Disable frequency hopping function

1: Enable frequency hopping function

Example

AT^DFHC=0<CR><LF>
<CR><LF>OK<CR><LF>
AT^DFHC?<CR><LF>
<CR><LF>^DFHC:0<CR><LF>
<CR><LF>OK<CR><LF> AT^DFHC=?<CR><LF>
<CR><LF>^DFHC: (0-1)<CR><LF>
<CR><LF>OK<CR><LF>

6.15.AT^ELFUN: ELog Function Configuration

Command	Possible response(s)
AT^ELFUN=<mode>	
AT^ELFUN?	^ELFUN : <mode>
AT^ELFUN=?	^ELFUN : (list of supported <mode>s)

Description

Execute commands for switchingThe Elog module.
The query command is used to query.Elog switch status.
The test command is used to test whether the command is supported and the range of values for the query parameters.

Response	result
OK	Successful
ERROR or +CME ERROR: <err>	Command performing failed

Defined values

<mode>: integer type 0: Close ELOG module 1: Open ELOG module
Example

AT^ELFUN=0<CR><LF>
<CR><LF>OK<CR><LF> AT^ELFUN?<CR><LF>
<CR><LF>^ ELFUN:0<CR><LF>
<CR><LF>OK<CR><LF> AT^ELFUN=?<CR><LF>
<CR><LF>^ELFUN: (0-1)<CR><LF>
<CR><LF>OK<CR><LF>

6.16.AT^APLFUN:APLog Function Configuration

Command	Possible response(s)
AT^APLFUN=<n>	
AT^APLFUN?	^APLFUN: <n>
AT^APLFUN=?	^APLFUN: (list of supported <n>s)

Description

The command is used to toggle the AP LOG function on and off.

Final result code

OK

Successful
ERROR or +CME ERROR: <err>
Command performing failed

Defined values

<n>: Integer type, representing the fast frequency hopping function setting.
0: Disable AP LOG function
1: Enable AP LOG function

Example

AT^APLFUN=0<CR><LF>
<CR><LF>OK<CR><LF> AT^APLFUN?<CR><LF>
<CR><LF>^APLFUN:0<CR><LF>
<CR><LF>OK<CR><LF> AT^ APLFUN=?<CR><LF>
<CR><LF>^APLFUN(0-1)<CR><LF>
<CR><LF>OK<CR><LF>

6.17.AT^NETIFCFG: Device IP address configuration

Set command AT^NETIFCFG =<selif>,<master_ipaddress>[, <sub_ip addresses>]	Set command is used to set the network card interface type and primary ip address and slave ip address. select current network card interface. Response: OK If error is related to ME functionality: +CME ERROR: 100 Parameter: <selif >: integer of the selected network card type 0: reserved 1: Retain 2: Set the module IP address <master_ip address > string of network card interface's ip address, module IP address <sub_ip addresses> String of network card interface's IP address, slave device IP address, reserved and unused.
Read command AT^NETIFCFG?	Response: ^NETIFCFG :<0 >,<ip_address>,<ip_address> ^NETIFCFG:<1>,<ip_address>,<ip_address> ^NETIFCFG:<2>,<ip_address>,<ip_address> OK
	Parameter See set command
Test command AT^NETIFCFG =?	Response: ^NETIFCFG: (list of supported < selif >s) OK Parameter See set command Example ^NETIFCFG:(0,1,2) OK
Reference	
Note	

6.18.AT^DGMR: Version lookup

Command	Possible response(s)
AT^ DGMR?	^DGMR:<Version Number>

Description

The query command is used to retrieve the version information of the current module.

Response	result
OK	Successful
ERROR or +CME ERROR: <err>	Command performing failed

Example

AT^DGMR?<CR><LF>
<CR><LF>^ DGMR: Image transmission_1.20.00.R11 <CR><LF>
<CR><LF>OK<CR><LF

6.19.AT^POWERCTL: Active power-off restart switch

Set Command AT^POWERCTL=<value>	Set command is used to reboot os Response: OK If error is related to ME functionality: +CME ERROR: 100 Parameter: <value>: integer of the reboot os, only one value 1
Test Command AT^POWERCTL=?	Response: ^POWERCTL: (list of supported < vlaue >) OK Parameter See set command Example ^POWERCTL:1 OK

Description

The command is used to restart the module.

Response	result
OK	Successful
ERROR or +CME ERROR: <err>	Command performing failed

Example

AT^POWERCTL=1<CR><LF>
<CR><LF>OK<CR><LF>

6.20.AT^RCVR: OTA (Over-The-Air) Upgrade Management

Set command AT^RCVR=<value>, <"IP">	Set command is used to control device OTA start Response: OK If error is related to ME functionality: +CME ERROR: 100 Parameter: < value>: integer of the device OTA start <"IP">:remote device IP address, if <value> is 1, no set <"ip">0,”FFFF”: control remote all device OTA start 0, "xxx.xxx.xxx.xxx":control remote in one IP device OTA start 1:control in usb connected devices OTA start
Read command AT^RCVR?	Response: <value> OK Parameter See set command
Test command AT^RCVR =?	Response: ^RCVR: (list of supported < value >s) OK Parameter See set command Example ^RCVR:(0,1) OK
Reference	
Note	

Description

Execution commands are used for modulesOTA upgrade initiated.

Response	result
OK	Successful
ERROR or +CME ERROR: <err>	Command performing failed

Example
AT^RCVR=0,”FFFF”<CR><LF>
<CR><LF>OK<CR><LF>

6.21.AT^DAMR: Device software version information query

Set command AT^DAMR=<value>,<“IP">	Set command is used to get local or remotesoft devices version information Response: ^DAMR:"xxx _xxx_xxx" OK If error is related to ME functionality: +CME ERROR: 100 Parameter: < value>: integer of the get soft version information <"IP"> : remote device IP address, if <value> is 1,no set <"IP"> 0,xxx.xxx.xxx.xxx: get remote in one IP device soft version information 1: get in usb connected device soft version information
Test command	Response:

AT^DAMR=?	^DAMR: (list of supported < value >s) OK Parameter See set command Example ^DAMR:(0,1) OK
Reference	
Note	

Description

The command is used to read the module's version number.

Response	result
OK	Successful
ERROR or +CME ERROR: <err>	Command performing failed

Example

AT^DAMR=1<CR><LF>
<CR><LF>^DAMR: Image transmission_1.20.00.R11 <CR><LF>
<CR><LF>OK<CR><LF>

6.22.AT^DSONMCS: Modulation rate level setting.

Command	Possible response(s)
AT^DSONMCS=<Mode>,[,<Mcs>]	
AT^DSONMCS?	^DSONMCS: <Mode>,<Mcs>
AT^DSONMCS=?	^DSONMCS: (list of supported <Mode>s),(list of supported <Mcs>s)

Description

The configuration command is used to set the MCS index value switch and the index value. If it is not enabled, the MCS value cannot be changed; if the MCS switch is enabled, the MCS index value can be set, takes effect immediately, and is saved to NVRAM for permanent effect. The default switch is off.

The query command retrieves the current settings.

The test command is used to test the settings that the command supports.

NOTE: This command can only be issued on the master node.
Final result code

OK
Successful.
ERROR or +CME ERROR: <err>
Command performing failed.

Defined values

<Mode>: Integer type, indicates the MCS index value function setting, which is disabled by default.
0:Turn off settings
1: Open the settings function

<Mcs>: Integer type, representing the MCS index value. Values range from 0 to 27. The default value is 27.

Example

AT^DSONMCS=1,5<CR><LF>
<CR><LF>OK<CR><LF> AT^DSONMCS?<CR><LF>
<CR><LF>^DSONMCS:1, 5<CR><LF>
<CR><LF>OK<CR><LF>AT^DSONMCS =?<CR><LF>
<CR><LF>^DSONMCS: (0-1),(0-27)<CR><LF>
<CR><LF>OK<CR><LF>

6.23.AT^DLF: Operating frequency lock configuration

Command	Possible response(s)
AT^DLF=<lock_type>[,<freq>]	
AT^DLF?	^DLF: <lock_type>[,<freq>]
AT^DLF=?	^DLF: (list of supported< ; lock_type>s)，(list of supported lock <freq>s)

Description

The executed command is used to control the user to set the frequency locking information, and the setting value is saved to...In NVRAM, entering and exiting flight takes effect. The query command is used to query the parameter settings in the current NVRAM.
The test command is used to test whether the command is supported and the range of values for the query parameters.

Final result code

OK
Successful
ERROR or +CME ERROR: <err>
Command performing failed

Defined values

<LockType>: Integer type, indicating the user-defined setting to lock a specified frequency.
0: Do not lock the frequency or unlock the locked frequency.
1: Lock onto a specified frequency
<Freq>: integer type,This indicates the frequency point, in units of 100kHz, with a range of (8060-8259, 14279-14679, 24015-248140).

Example

AT^DLF=1,14350<CR><LF>
<CR><LF>OK<CR><LF>
AT^DLF?<CR><LF>
<CR><LF>^DLF: 1, 14350<CR><LF>
<CR><LF>OK<CR><LF> AT^DLF=?<CR><LF>
<CR><LF>^ DLF: (0-1), (8060-8259,14279-14679,24015-24814)<CR><LF>
<CR><LF>OK<CR><LF>

6.24.AT^DSONSBR: Operating frequency band range configuration

Command	Possible response(s)
AT^DSONSBR=<band>,<earfcn_start>,<earfcn_end>[,<band>,<earfcn_start>,<earfcn_end>[,<band>,<earfcn_start>,<earfcn_end>]...]	
AT^DSONSBR?	^DSONSBR: <band>,<earfcn_start>,<earfcn_end>[,<band>,<earfcn_start>,<earfcn_end>[,<band>,<earfcn_start>,<earfcn_end>]…]
AT^DSONSBR=?	^DSONSBR: <band>,(list of supported <earfcn>s), <band>,(list of supported <earfcn>s),...

Description

The execution command configures the frequency range of each sub-band and saves it to NVRAM, taking effect upon entering and exiting flight. The query command queries the current configuration of the range of each sub-band.
The test command is used to test whether the command is supported and the range of frequency points that can be configured for each sub-band.

Final result code

OK
Successful
ERROR or +CME ERROR: <err>
Command performing failed

Defined values

<band>: integer type, subband number

64: BAND64
65: BAND65
66: BAND66
<earfcn_start>: Integer type, starting frequency point number, the value range is related to the sub-frequency band, and its value must not exceed [value missing].
<earfcn_end>BAND64: 24015-24814
BAND65: 8060-8259
BAND66: 14279-14679
<earfcn_end>: Integer type, end frequency number, the value range is related to the sub-frequency band, and its value cannot be less than
<earfcn_start>BAND64: 24015-24814
BAND65: 8060-8259
BAND66: 14279-14679

Example

AT^DSONSBR=64,24020,24800,66,14280,14470<CR><LF>
<CR><LF>OK<CR><LF> AT^DSONSBR?<CR><LF>
<CR><LF>^DSONSBR: 64,24020,24800,66,14280,14470<CR><LF>
<CR><LF>OK<CR><LF> AT^DSONSBR=?<CR><LF>
<CR><LF>^DSONSBR: 64,(24015-24814),65,(8060-8259),66,(14279-14679), <CR><LF>
<CR><LF>OK<CR><LF>

6.25.AT^DHCPSET: DHCP service switch configuration

Set command AT^DHCPSET=<mode>	The `set` command is used to open/close the DHCP service. The `persist.sys.dhcp.mode` command is used to set the DHCP on/off switch value. Response OK If error: +CME ERROR: 100 Parameter <mode>: Integer 0: close DHCP 1: open DHCP Server as Master node, Client as Slave node 2: open DHCP Client as Master node, Client as Slave node Example: AT^DHCPSET=0<CR><LF> //close DHCP <CR><LF>OK<CR><LF> AT^DHCPSET=1 //open DHCP Server-M, Client-S <CR><LF>OK<CR><LF> AT^DHCPSET=2 //open DHCP Client-M, Client-S <CR><LF>OK<CR><LF>
Read command AT^DHCPSET?	Response: <CR><LF> ^DHCPSET: <n> <CR><LF>OK Parameter See set command
Test command AT^DHCPSET=?	Response: ^ DHCPSET: (list of supported <mode>s) OK Parameter See set command example: <CR><LF> ^DHCPSET: (1,2,3) <CR><LF>
Note	defaultThe DHCP service is not running. Allow users to configure automatic IP address acquisition or manual IP address configuration.

6.26.AT^DHDRSET: DHCP service IP range configuration

Set command AT^DHDRSET=”value”	The `set` command is used to set the DHCP IP range as the DHCP server. The command `persist.sys.dhcp.iprange` is used to set the DHCP IP range value. Response OK If error: +CME ERROR: 100 Parameter <value>: string DHCP_DEFAULT_RANGE : 0.0.0.0:255.255.255.255 Others Example: AT^DHDRSET=”DHCP_DEFAULT_RANGE”<CR><LF> // DHCP_DEFAULT_RANGE :0.0.0.0:255.255.255.255 <CR><LF>OK<CR><LF> AT^DHDRSET=”192.168.1.11:192.168.1.49”<CR><LF> <CR><LF>OK<CR><LF>
Read command AT^DHDRSET?	Response: ^DHDRSET: "DHCP_DEFAULT_RANGE" Parameter See set command
Test command AT^DHDRSET=?	Response: ^DHDRSET: (list of supported <mode>s) OK Parameter See set command example: <CR><LF> ^DHDRSET: (0.0.0.0:255.255.255.255) <CR><LF>
Note	defaultThe DHCP service is not running. When a user configures the system to obtain an IP address automatically, the DHCP server follows the configured IP address range. Assignments will be made around the area.

6.27.AT^RNDISCTL: USB RNDIS network adapter enable switch configuration

Set command AT^RNDISCTL =<operation>	Set command is used to enable(up) or disable(down) the rndis0 network card. Response: OK If error is related to ME functionality: +CME ERROR: 100 Parameter: <operation>: string of operation on rndis0network card. down: Close rndis0 up: Open rndis0
Read command AT^RNDISCTL?	Response: ^RNDISCTL: down ^RNDISCTL: up OK Parameter See set command
Test command AT^RNDISCTL=?	Response: ^RNDISCTL: (down,up) OK Parameter See set command
Reference	
Note	

6.28.AT^MACCFG: Private MAC Address Configuration

Command	Possible response(s)
AT^ MACCFG =<selif>[,<mac addresses>]	
AT^ MACCFG?	^MACCFG :<0 >,<mac_address> ^MACCFG :<1 >,<mac_address>
AT^MACCFG =?	^ MACCFG: (list of supported < selif >s)

Description

The command is used to set the MAC address (note that after setting AT^MACCFG = 0, you need to manually restart the system).

The query command is used to query the MAC address of the current module.

The test command is used to test whether the command is supported and the range of values for the query parameters.

Response	result
OK	Successful
ERROR or +CME ERROR: <err>	Command performing failed

Defined values

< selif >: integer of default or configured by at command 0:default mac address
1:at config mac address

[,<mac addresses>]: MAC address
If `<selif>` is 0, the MAC address does not need to be set; if `<selif>` is 1, the MAC address needs to be set.

Example

AT^MACCFG =0
<CR><LF>OK<CR><LF>
AT^ MACCFG =1,“CA.01.00.00:1B:07”
<CR><LF>OK<CR><LF> AT^ MACCFG?<CR><LF>
<CR><LF>^ MACCFG:1,“CA.01.00.00:1B:07”<CR><LF>
<CR><LF>OK<CR><LF> AT^ MACCFG =?<CR><LF>
<CR><LF>^ MACCFG: (0-1),[hex mac address]<CR><LF>
<CR><LF>OK<CR><LF>

6.29.AT^UARTSEND: UART0 channel IP data transmission configuration

Command	Possible response(s)
AT^UARTSEND=”value”	

Description

Data is sent to a device with a specified IP address via AT commands on UART0. The entire AT command is sent as a whole, and the total length of the AT command does not exceed 1024 bytes.

Response	result
OK	Successful
ERROR or +CME ERROR: <err>	Command performing failed

Defined values

"value": "ip:test" ip:remote ip address test：data need to be sent

Example

AT^UARTSEND=”192.168.1.11:AABBCCDD”<CR><LF>
<CR><LF>OK<CR><LF> AT^UARTSEND?<CR><LF>
<CR><LF>ERROR<CR><LF> AT^UARTSEND=?<CR><LF>
<CR><LF>ERROR<CR><LF>