A7600 Series_ HTTP(S)_Application Note

LTE Module

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About Document

Version History

<table>
<thead>
<tr>
<th>Version</th>
<th>Date</th>
<th>Chapter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>V1.00</td>
<td>2020.06.19</td>
<td></td>
<td>New version</td>
</tr>
</tbody>
</table>

Scope

This document presents the AT Command Set for SIMCom A7600 Series, including A7600XX-XXXX, A5360E, and A7670X.
Contents

About Document .................................................................................................................... 2
Version History .................................................................................................................. 2
Scope .................................................................................................................................... 2

Contents ................................................................................................................................. 3

1 Introduction ...................................................................................................................... 4
  1.1 Purpose of the document ............................................................................................... 4
  1.2 Related documents ......................................................................................................... 4
  1.3 Conventions and abbreviations ....................................................................................... 4
  1.4 The process of Using HTTP(S) AT Commands .................................................................. 5
  1.5 Error Handling ............................................................................................................... 6
    1.5.1 Executing HTTP(S) AT Commands Fails ................................................................. 6
    1.5.2 PDP Activation Fails ............................................................................................... 6
    1.5.3 Error Response of HTTP(S) Server ......................................................................... 6

2 AT Commands for HTTP(S) ............................................................................................. 7
  2.1 Overview of AT Commands for HTTP(S) ....................................................................... 7

3 HTTP(S) Examples ........................................................................................................... 8
  3.1 Access to HTTP server .................................................................................................... 8
  3.2 Access to HTTPS server ............................................................................................... 13

4 Appendix ........................................................................................................................ 18
  4.1 Summary of Error Codes ............................................................................................... 18
  4.2 Unsolicited Result Codes ............................................................................................... 19
1 Introduction

1.1 Purpose of the document

Based on module AT command manual, this document will introduce HTTP application process. Developers could understand and develop application quickly and efficiently based on this document.

1.2 Related documents


1.3 Conventions and abbreviations

In this document, the GSM engines are referred to as following term:
ME (Mobile Equipment);
MS (Mobile Station);
TA (Terminal Adapter);
DCE (Data Communication Equipment) or facsimile DCE (FAX modem, FAX board);

In application, controlling device controls the GSM engine by sending AT Command via its serial interface. The controlling device at the other end of the serial line is referred to as following term:
TE (Terminal Equipment);
DTE (Data Terminal Equipment) or plainly "the application" which is running on an embedded system;

Other Conventions:
PDP(Packet Data Protocol);
FTP(File Transfer Protocol);
SSL(Secure Sockets Layer);
TLS(Transport Layer Security);
1.4 The process of Using HTTP(S) AT Commands

- **AT+HTTPINIT**: PDP active and initialize HTTP(S) service.
  - AT+HTTPINIT also can activate the PDP Context. But it cannot customize PDP activation parameters.

- **AT+HTTPPARA**: Set parameters for HTTP(S) operations.
  - "READ MODE": Set read mode (optional).
  - "URL": Set URL of network resource to access.
  - "CONNECTTIME": Set HTTP(S) connect timeout (optional).
  - "RECVTIME": Set HTTP(S) receive timeout (optional).
  - "CONTENT": Set "Content-Type" HTTP header information, default value is "text/plain" (optional).
  - "ACCEPT": Set "Accept" HTTP header information, default value is "*/*". (optional)
  - "USERDATA": Set HTTP(S) customized HTTP header information (optional).
  - "METHOD": Set HTTP(S) request body content (optional).

- **AT+HTTPACTION**: Send HTTP(S) request.
  - "READ": Read HTTP(S) response header when you want to see response header.
  - "GET": Get HTTP(S) response content length when you want to see that.

- **AT+HTTPDATA**: Send HTTP(S) request with the content of the file.

- **AT+HTTPREADFILE**: Read all HTTP(S) response content and store to file.

- **AT+HTTPTERM**: PDP deactive and terminate HTTP(S) service.

- **AT+CPIN**: Query SIM card status by AT+CPIN?
- **AT+CREG**: Query CS service by AT+CREG?
- **AT+CGREG**: Query PS service by AT+CGREG?
- **AT+CP command**: Query UE information by AT+CP command.
- **AT+CGDCONT**: Configure the PDP context by AT+CGDCONT.
- **AT+CGACT**: Active the PDP context by AT+CGACT=<state>,[<cid>]

**Signal Quality**: Execute AT+CSQ to query signal quality. If rssi is equals to 99, please check SIM card status or reboot the module.

**CS Service**: If <stat> of AT+CREG? equals to 1, it means that the module has registered on CS domain service. Reboot the module if false to register on CS domain.

**PS Service**: If <stat> of AT+CGREG?/AT+CEREG? equals to 1, it means that the module has registered on PS domain service.

**SIM Card Status**: Execute AT+CPIN?, if response is +CPIN: READY, means SIM Card Status is normal. Reboot the module or check SIM card status if AT+CPIN? Fails to identify SIM card in 20s.

**UE System Information**: If <System Mode > is "NO SERVICE", it means network status has some problem.
1.5 Error Handling

1.5.1 Executing HTTP(S) AT Commands Fails

When executing HTTP(S) AT commands, if ERROR response is received from the module, please check whether the U(SIM) card is inserted and whether it is +CPIN: READY returned when executing AT+CPIN?.

1.5.2 PDP Activation Fails

If it is failed to activate a PDP context with AT+CGACT command, please check the following configurations:
1. Query the PS domain status by AT+CGREG? and make sure the PS domain has been registered.
2. Query the PDP context parameters by AT+CGDCONT? and make sure the APN of the specified PDP context has been set.
3. Make sure the specified PDP context ID is neither used by PPP nor activated by AT+CGACT command.
If all above configurations are correct, but activating the PDP context by AT+CGACT command still fails, please reboot the module to resolve this issue. After rebooting the module, please check the configurations mentioned above for at least.

1.5.3 Error Response of HTTP(S) Server

When the <errcode> of +HTTPACTION: <method>,<errcode>,<datalen> or +HTTPPOSTFILE: <errcode>,<datalen> is not 200, it indicates an error code replied from HTTP(S) server.
For example, if <errcode> is 404, the URL can't be found. If <errcode> is 301, the URL is redirect, please refer to A7600 Series_AT Command Manual_V1.01.
# 2 AT Commands for HTTP(S)

## 2.1 Overview of AT Commands for HTTP(S)

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AT+HTTPINIT</td>
<td>Start HTTP service</td>
</tr>
<tr>
<td>AT+HTTPTERM</td>
<td>Stop HTTP Service</td>
</tr>
<tr>
<td>AT+HTTPPARA</td>
<td>Set HTTP Parameters value</td>
</tr>
<tr>
<td>AT+HTTPACTION</td>
<td>HTTP Method Action</td>
</tr>
<tr>
<td>AT+HTTPHEAD</td>
<td>Read the HTTP Header Information of Server Response</td>
</tr>
<tr>
<td>AT+HTTPREAD</td>
<td>Read the response information of HTTP Server</td>
</tr>
<tr>
<td>AT+HTTPDATA</td>
<td>Input HTTP Data</td>
</tr>
<tr>
<td>AT+HTTPPOSTFILE</td>
<td>Send HTTP Request to HTTP(S) server by File</td>
</tr>
<tr>
<td>AT+HTTPREADFILE</td>
<td>Receive HTTP Response Content to a file</td>
</tr>
</tbody>
</table>
3 HTTP(S) Examples

Before all HTTP(S) related operations, we should ensure the following:
Ensure network is available:

```
AT+CSQ
+CSQ: 23,0

OK

AT+CREG?
+CREG: 0,1

OK

AT+CGREG?
+CGREG: 0,1

OK

AT+CPSI?
+CPSI:
LTE,Online,460-00,0x333C,39589680,308,EUT
RAN-BAND3,1350,5,0,54,0,22

OK

// In WCDMA/GSW, you need to continue to execute the following instructions

AT+CGDCONT=cid,"ip","APN"
OK

AT+CGACT=1,cid
OK

AT+CGACT=?
+CGACT: 1,1

OK
```

3.1 Access to HTTP server

// Send HTTP GET Request

```
AT+HTTPINIT
// start HTTP service, activate PDP context
```
OK

OK

AT+HTTPACTION=0
OK

+HTTPACTION: 0,200,22505

AT+HTTPHEAD
+HTTPHEAD: 387

HTTP/1.1 200 OK
Server: nginx
Content-Type: text/html
Connection: close
Date: Thu, 16 Aug 2018 05:13:36 GMT
Powered-By-ChinaCache: MISS from 06053423gG.15
ETag: W/"5b7379f5-57e9"
Last-Modified: Wed, 15 Aug 2018 00:55:17 GMT
Expires: Thu, 16 Aug 2018 05:18:36 GMT
Vary: Accept-Encoding
X-Cache-Hits: 14
Content-Length: 22505

CC_CACHE: TCP_REFRESH_HIT
Accept-Ranges: bytes

OK

AT+HTTPREAD=0,500
OK

+HTTPREAD: 500

<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN" "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml">
<head>
<meta http-equiv="content-type" content="text/html;charset=GB2312"/>
<meta http-equiv="Content-Language"/>
Send HTTP POST Request

AT+HTTPINIT OK //start HTTP service, activate PDP context
AT+HTTPPARAM "URL","http://api.efxnow.com/DEMOWebServices2.8/Service.asmx/Echo?" OK
AT+HTTPDATA=18,1000 //send data to post, the length is 18 bytes
DOWNLOAD Message=helloworld OK
AT+HTTPACTION=1 //send HTTP POST request
OK

+HTTPACTION: 1,500,30
AT+HTTPHEAD
+HTTPHEAD: 258 HTTP/1.1 500 Internal Server Error
Cache-Control: private
Content-Type: text/plain; charset=utf-8
Server: Microsoft-IIS/7.0
X-AspNet-Version: 2.0.50727
X-Powered-By: ASP.NET
Date: Mon, 20 Aug 2018 04:18:58 GMT
Connection: close
Content-Length: 30

OK
AT+HTTPREAD=0,30 OK

+HTTPREAD: 30
Request format is invalid:
+HTTPREAD: 0
AT+HTTPTERM
OK

Send HTTP HEAD Request

AT+HTTPINIT //start HTTP service, activate PDP context
OK
OK
AT+HTTPACTION=2 //send a HEAD request to server to only get header of HTTP response
OK

+HTTPACTION: 2,200,387

+HTTP_PEER_CLOSED //server disconnect
AT+HTTPHEAD
+HTTPHEAD: 387

HTTP/1.1 200 OK
Server: nginx
Content-Type: text/html
Connection: close
Vary: Accept-Encoding
Powered-By-ChinaCache: MISS from 06053423gG.15
ETag: W/"5b7379f5-57e9"
Last-Modified: Wed, 15 Aug 2018 00:55:17 GMT
Content-Length: 22505
X-Cache-Hits: 14
Date: Thu, 16 Aug 2018 10:58:00 GMT
Expires: Thu, 16 Aug 2018 11:03:00 GMT
CC_CACHE: TCP_REFRESH_HIT
Accept-Ranges: bytes

OK
AT+HTTPTERM //stop HTTP Service
OK

POSTFILE to HTTP server and read HTTP response content to a file

AT+HTTPINIT //start HTTP service, activate PDP context
OK
AT+HTTPPARA="URL","http://www.baidu.com"
OK
AT+HTTPPOSTFILE="getbaidu.txt",1
OK

+HTTPPOSTFILE: 200,14615
AT+HTTPHEAD

+HTTPHEAD: 773
HTTP/1.1 200 OK
Accept-Ranges: bytes
Cache-Control: no-cache
Connection: Keep-Alive
Content-Length: 14615
Content-Type: text/html
Date: Thu, 13 Sep 2018 05:14:30 GMT
Etag: "5b8641dc-3917"
Last-Modified: Wed, 29 Aug 2018 06:49:00 GMT
P3p: CP=" OTI DSP COR IVA OUR IND COM ";
Pragma: no-cache
Server: BWS/1.1
Set-Cookie: BAIDUID=A374BCFD28DFEEAF0BA0C4EEAC77B0B0; expires=Thu, 31-Dec-37 23:55:55 GMT; max-age=2147483647; path=/; domain=.baidu.com
Set-Cookie: BIDUPSID=A374BCFD28DFEEAF0BA0C4EEAC77B0B0; expires=Thu, 31-Dec-37 23:55:55 GMT; max-age=2147483647; path=/; domain=.baidu.com
Set-Cookie: PSTM=1536815670; expires=Thu, 31-Dec-37 23:55:55 GMT; max-age=2147483647; path=/; domain=.baidu.com
Vary: Accept-Encoding
X-Ua-Compatible: IE=Edge,chrome=1
OK
AT+HTTPREADFILE="readbaidu.dat"
OK

+HTTPREADFILE: 0
AT+HTTPTERM
OK
3.2 Access to HTTPS server

Send HTTPS GET Request

```
AT+HTTPINIT
OK
AT+HTTPPARA="URL","https://ss0.bdstatic.com/static/mancard/css/card_min_dee38e45.css"
OK
AT+HTTPACTION=0
OK

+HTTPACTION: 0,200,52060
// 52060 is the length of HTTPS response information

AT+HTTPHEAD
+HTTPHEAD: 390
// 390 is the length of HTTPS response header

HTTP/1.1 200 OK
Server: bfe/1.0.8.13-sslpool-patch
Date: Thu, 16 Aug 2018 11:38:08 GMT
Content-Type: text/css
Content-Length: 52060
Connection: close
ETag: "5a323f72-cb5c"
Last-Modified: Thu, 14 Dec 2017 09:08:02 GMT
Expires: Sat, 18 Aug 2018 09:50:53 GMT
Age: 2425635
Accept-Ranges: bytes
Cache-Control: max-age=2592000
Vary: Accept-Encoding
Ohc-Response-Time: 1 0 0 0 0 0

OK
AT+HTTPREAD=0,500
// read the response information of HTTPS server, the length to read is 500 bytes

OK
+HTTPREAD: 500
```

.s-cardsetting{position:relative;text-align:left;padding:22px 25px 0 25px;border:1px solid
AT+HTTPINIT
OK

AT+HTTPPARA="URL","https://pv.csdn.net/csdnbi"
OK

AT+HTTPDATA=465,1000
DOWNLOAD

["headers":{"component":"enterprise","datatype":"track","version":"v1"},"body":"
]
OK

AT+HTTPACTION=1
OK

+HTTPACTION: 1,200,2
// 2 is the length of HTTPS response information

+HTTP_PEER_CLOSED

+HTTPHEAD
Server: openresty
HTTP/1.1 200 OK
Date: Mon, 20 Aug 2018 03:20:30 GMT
Content-Type: application/octet-stream
Connection: close
Set-Cookie: uuid_tt_dd=10_37481894210-1534735230305-44
5993; Expires=Thu, 01 Jan 2025 00:00:00 GMT;
Path=/; Domain=.csdn.net;
Set-Cookie: dc_session_id=10_1534735230305.501284;
Expires=Thu, 01 Jan 2025 00:00:00 GMT;
Path=/; Domain=.csdn.net;

OK
AT+HTTPREAD=0,10  //read the response information of HTTPS server, the length to read is 10 bytes
OK

+HTTPREAD: 2  //ok is the content of HTTPS response information, 2 bytes
OK
+HTTPREAD: 0
AT+HTTPTERM  //stop HTTP Service
OK

Send HTTPS HEAD Request

AT+HTTPINIT  //start HTTP service, activate PDP context
OK
AT+HTTPPARA="URL","https://ss0.bdstatic.com/5aV1bjqh_Q23odCf/static/mancard/css/card_min_dee38e45.css"
OK
AT+HTTPACTION=2  // send HTTPS HEAD request
OK

+HTTPACTION: 2,200,390  // 390 is the length of HTTPS response header
+HTTP_PEER_CLOSED
AT+HTTPHEAD
+HTTPHEAD: 390  //read HTTPS response header.

HTTP/1.1 200 OK
Server: bfe/1.0.8.13-sslpool-patch
Date: Thu, 16 Aug 2018 11:46:22 GMT
Content-Type: text/css
Content-Length: 52060
Connection: close
ETag: "5a323f72-cb5c"
Last-Modified: Thu, 14 Dec 2017 09:08:02 GMT
### POSTFILE to HTTPS server and read HTTPS response content to a file

**AT+HTTPINIT**  
//start HTTP service, activate PDP context

**OK**

**AT+HTTPPARA="URL","https://www.baidu.com"**  
//set server URL

**OK**

**AT+HTTPPOSTFILE="getbaidu.txt",1**  
//access server and send file getbaidu.txt to server

**OK**

**+HTTPPOSTFILE: 200,14615**

**AT+HTTPHEAD**  
//read HTTPS response header.

**HTTP/1.1 200 OK**

Accept-Ranges: bytes

Cache-Control: no-cache

Connection: Keep-Alive

Content-Length: 14615

Content-Type: text/html

Date: Thu, 13 Sep 2018 05:14:30 GMT

Etag: "5b8641dc-3917"

Last-Modified: Wed, 29 Aug 2018 06:49:00 GMT

P3p: CP=" OTI DSP COR IVA OUR IND COM ",

Pragma: no-cache

Server: BWS/1.1

Set-Cookie: BAIDUID=A374BCFD28DFEEAF0BA0C4EEAC77B0B0; expires=Thu, 31-Dec-37 23:55:55 GMT; max-age=2147483647; path=/; domain=.baidu.com

Set-Cookie: BIDUPSID=A374BCFD28DFEEAF0BA0C4EEAC77B0B0; expires=Thu, 31-Dec-37 23:55:55 GMT; max-age=2147483647; path=/; domain=.baidu.com

---

Expires: Sat, 18 Aug 2018 09:50:53 GMT

Age: 2426129

Accept-Ranges: bytes

Cache-Control: max-age=2592000

Vary: Accept-Encoding

OHC-Response-Time: 1 0 0 0 0 0
Set-Cookie: PSTM=1536815670; expires=Thu, 31-Dec-37 23:55:55 GMT;
max-age=2147483647; path=/; domain=.baidu.com
Vary: Accept-Encoding
X-Ua-Compatible: IE=Edge,chrome=1

OK
AT+HTTPREADFILE="readbaidu.dat"
OK
AT+HTTPTERM //stop HTTP Service
OK
## 4 Appendix

### 4.1 Summary of Error Codes

<table>
<thead>
<tr>
<th>Status Code</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>Continue</td>
</tr>
<tr>
<td>101</td>
<td>Switching Protocols</td>
</tr>
<tr>
<td>200</td>
<td>OK</td>
</tr>
<tr>
<td>201</td>
<td>Created</td>
</tr>
<tr>
<td>202</td>
<td>Accepted</td>
</tr>
<tr>
<td>203</td>
<td>Non-Authoritative Information</td>
</tr>
<tr>
<td>204</td>
<td>No Content</td>
</tr>
<tr>
<td>205</td>
<td>Reset Content</td>
</tr>
<tr>
<td>206</td>
<td>Partial Content</td>
</tr>
<tr>
<td>300</td>
<td>Multiple Choices</td>
</tr>
<tr>
<td>301</td>
<td>Moved Permanently</td>
</tr>
<tr>
<td>302</td>
<td>Found</td>
</tr>
<tr>
<td>303</td>
<td>See Other</td>
</tr>
<tr>
<td>304</td>
<td>Not Modified</td>
</tr>
<tr>
<td>305</td>
<td>Use Proxy</td>
</tr>
<tr>
<td>307</td>
<td>Temporary Redirect</td>
</tr>
<tr>
<td>400</td>
<td>Bad Request</td>
</tr>
<tr>
<td>401</td>
<td>Unauthorized</td>
</tr>
<tr>
<td>402</td>
<td>Payment Required</td>
</tr>
<tr>
<td>403</td>
<td>Forbidden</td>
</tr>
<tr>
<td>404</td>
<td>Not Found</td>
</tr>
<tr>
<td>405</td>
<td>Method Not Allowed</td>
</tr>
<tr>
<td>406</td>
<td>Not Acceptable</td>
</tr>
<tr>
<td>407</td>
<td>Proxy Authentication Required</td>
</tr>
<tr>
<td>408</td>
<td>Request Timeout</td>
</tr>
<tr>
<td>409</td>
<td>Conflict</td>
</tr>
<tr>
<td>410</td>
<td>Gone</td>
</tr>
<tr>
<td>411</td>
<td>Lenth Required</td>
</tr>
<tr>
<td>412</td>
<td>Precondition Failed</td>
</tr>
<tr>
<td>413</td>
<td>Request Entity Too Large</td>
</tr>
<tr>
<td>Code</td>
<td>Meaning</td>
</tr>
<tr>
<td>-------</td>
<td>--------------------------------------</td>
</tr>
<tr>
<td>414</td>
<td>Request-URI Too Large</td>
</tr>
<tr>
<td>415</td>
<td>Unsupported Media Type</td>
</tr>
<tr>
<td>416</td>
<td>Requested range not satisfiable</td>
</tr>
<tr>
<td>417</td>
<td>Expectation Failed</td>
</tr>
<tr>
<td>500</td>
<td>Internal Server Error</td>
</tr>
<tr>
<td>501</td>
<td>Not Implemented</td>
</tr>
<tr>
<td>502</td>
<td>Bad Gateway</td>
</tr>
<tr>
<td>503</td>
<td>Service Unavailable</td>
</tr>
<tr>
<td>504</td>
<td>Gateway timeout</td>
</tr>
<tr>
<td>505</td>
<td>HTTP Version not supported</td>
</tr>
<tr>
<td>600</td>
<td>Not HTTP PDU</td>
</tr>
<tr>
<td>601</td>
<td>Network Error</td>
</tr>
<tr>
<td>602</td>
<td>No memory</td>
</tr>
<tr>
<td>603</td>
<td>DNS Error</td>
</tr>
<tr>
<td>604</td>
<td>Stack Busy</td>
</tr>
</tbody>
</table>

### 4.2 Unsolicited Result Codes

<table>
<thead>
<tr>
<th>URC</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>+HTTP_PEER_CLOSED</td>
<td>It's a notification message. While received, it means the connection has been closed by server.</td>
</tr>
<tr>
<td>+HTTP_NONET_EVENT</td>
<td>It's a notification message. While received, it means now the network is unavailable.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>&lt;errcode&gt;</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Success</td>
</tr>
<tr>
<td>701</td>
<td>Alert state</td>
</tr>
<tr>
<td>702</td>
<td>Unknown error</td>
</tr>
<tr>
<td>703</td>
<td>Busy</td>
</tr>
<tr>
<td>704</td>
<td>Connection closed error</td>
</tr>
<tr>
<td>705</td>
<td>Timeout</td>
</tr>
<tr>
<td>706</td>
<td>Receive/send socket data failed</td>
</tr>
<tr>
<td>707</td>
<td>File not exists or other memory error</td>
</tr>
<tr>
<td>708</td>
<td>Invalid parameter</td>
</tr>
<tr>
<td>709</td>
<td>Network error</td>
</tr>
<tr>
<td>710</td>
<td>start a new ssl session failed</td>
</tr>
<tr>
<td>711</td>
<td>Wrong state</td>
</tr>
<tr>
<td>Code</td>
<td>Error Description</td>
</tr>
<tr>
<td>------</td>
<td>----------------------------</td>
</tr>
<tr>
<td>712</td>
<td>Failed to create socket</td>
</tr>
<tr>
<td>713</td>
<td>Get DNS failed</td>
</tr>
<tr>
<td>714</td>
<td>Connect socket failed</td>
</tr>
<tr>
<td>715</td>
<td>Handshake failed</td>
</tr>
<tr>
<td>716</td>
<td>Close socket failed</td>
</tr>
<tr>
<td>717</td>
<td>No network error</td>
</tr>
<tr>
<td>718</td>
<td>Send data timeout</td>
</tr>
<tr>
<td>719</td>
<td>CA missed</td>
</tr>
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