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A76XX Series_ HTTP(S)_Application Note

LTE Module

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About Document

Version History

Version	Date	Chapter	Description
V1.00	2020.06.19		New version
V1.01	2021.07.02	All	Add support on A7678 Series
V1.02	2021.11.08	Scope	Scope description is updated

Scope

   Based on module AT command manual, this document will introduce HTTP(S) application process. Developers could understand and develop application quickly and efficiently based on this document. This document applies to A1803S Series, A1603 Series, A1601 Series and A1802 Series.

Contents

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] A76XXSeries_AT Command Manual

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;
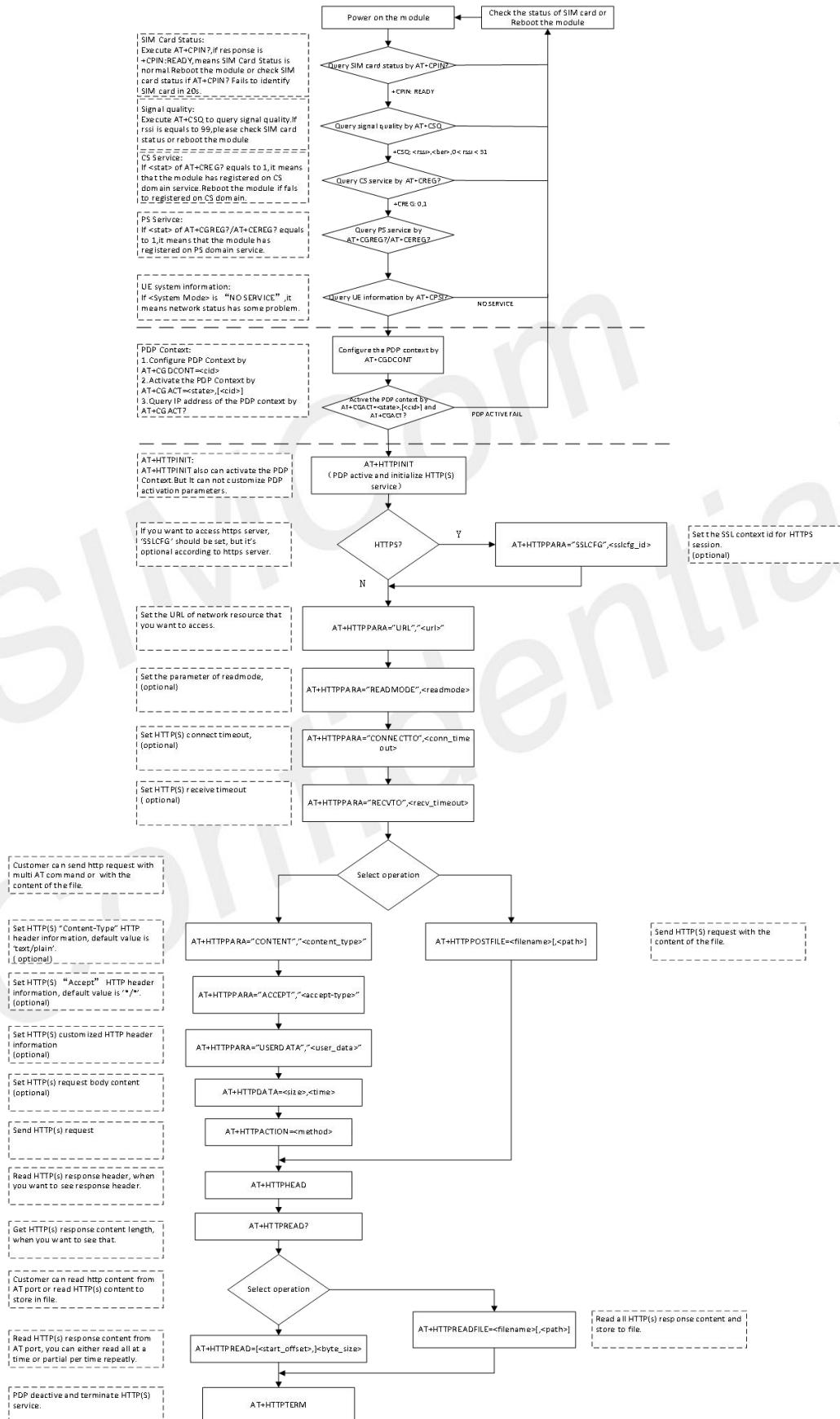
Other Conventions:
PDP(Packet Data Protocol);
FTP(File Transfer Protocol);
SSL(Secure Sockets Layer);
TLS(Transport Layer Security);

1.4 The process of Using HTTP(S) AT Commands

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 APNof 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 codereplied from HTTP(S) server.
For example, if < errcode>is 404,the URL can't be found. If < errcode>is 301,the URL is redirect, pleaserefer to A76XXSeries_AT Command Manual_V1.01.

2 ATCommands for HTTP(S)

2.1 Overview of AT Commands for HTTP(S)

Command	Description
AT+HTTPINIT	Start HTTP service
AT+HTTPTERM	Stop HTTP Service
AT+HTTPPARA	Set HTTP Parameters value
AT+HTTPACTION	HTTP Method Action
AT+HTTPHEAD	Read the HTTP Header Information of Server Respons
AT+HTTPREAD	Read the response information of HTTP Server
AT+HTTPDATA	Input HTTP Data
AT+HTTPPOSTFILE	Send HTTP Request to HTTP(S) server by File
AT+HTTPREADFILE	Receive HTTP Response Content to a file

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-BAND3,1350,5,0,0,54,0,22

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	
	//set the URL which will be accessed, for HTTP, the request URL begins with "HTTP://"
AT+HTTPPARA="URL","http://opinion.people. com.cn/GB/n1/2018/0815/c1003-30228758.html "	
OK	
AT+HTTPACTION=0	//send HTTP GET request
OK	//22505 is the length of HTTP response information
+HTTPACTION: 0,200,22505	
AT+HTTPHEAD	//read the HTTP response header
+HTTPHEAD: 387	//387 is the length of response header

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   // Content-Length indicates the length of HTTP response information is 22505 bytes
Accept-Ranges: bytes

OK
//read the response information of HTTP server, the length to read is 500 bytes

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-tra nsitional.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" content="utf-8" />
<meta content="all" name="robots" />
<title>人民日报钟声：牢记历史是为了更好开创未来--观点--人民网</title>
<meta name="keywords" content="" />
<meta name="description" content="   日方 应在正确对待历史?
+HTTPREAD: 0

AT+HTTPTERM   //stop HTTP Service
OK

Send HTTP POST Request

AT+HTTPINIT   //start HTTP service, activate PDP context
OK
AT+HTTPPARA="URL","http://api.efxnow.com/   //set the URL which will be accessed, for HTTP, the
DEMOWebServices2.8/Service.asmx/Echo?"   request URL begins with "HTTP://"
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	
AT+HTTPPARA="URL","http://opinion.people.c om.cn/GB/n1/2018/0815/c1003-30228758.html"	
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"   //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 the HTTP server response header information.

+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=A374BCFD28DFEEAF0BA0C4EEAC7
7B0B0:FG=1; expires=Thu, 31-Dec-37 23:55:55
GMT;   max-age=2147483647;   path=/;
domain=.baidu.com
Set-Cookie:
BIDUPSID=A374BCFD28DFEEAF0BA0C4EEAC
77B0B0; 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"   //read the HTTP server response content to a file named readbaidu.dat, saved to local storage

OK

+HTTPREADFILE: 0
AT+HTTPTERM   //stop HTTP Service
OK

3.2 Access to HTTPS server

Send HTTPS GET Requst

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=0	// send HTTPS GET request
OK	
+HTTPACTION: 0,200,52060	//52060 is the length of HTTPS response information
AT+HTTPHEAD	//read HTTPS response header .
+HTTPHEAD: 390	//390 is the length of HTTPS response hreader

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;p
adding:22px 25px 0 25px;border:1px solid

#e3e3e3;width:843px}.main .sui-dialog-cardsett
ing{opacity:.98;filter:alpha(opacity=98);positio
n:absolute;border:none;display:none;_height:1
86px}.sui-dialog-cardsetting{opacity:.98!import
ant;filter:alpha(opacity=98)!important;border:n
one!important}.sui-dialog-cardsetting .sui-dialo
g-title{height:42px;line-height:42px;text-indent:
21px}.s-cardsetting-content   .s-mod-item
b,.sui-dialog-cardsetting .sui-dialog-c

+HTTPREAD: 0

AT+HTTPTERM	//stop HTTP Service
OK	

Send HTTPS POST Requst

AT+HTTPINIT	//start HTTP service, activate PDP context
OK	
AT+HTTPPARA="URL","https://pv.csdn.net/csd nbi"	//set the URL which will be accessed, for HTTPS, the request URL begins with "HTTPS://"
OK	
AT+HTTPDATA=465,1000	//send data to post, the length is 465 bytes
DOWNLOAD	//prompt string which indicates you can input data here

[{"headers":{"component":"enterprise","dataty
pe":"track","version":"v1"},"body":"{\"re\":\"ui
d=merry1996&ref=https%3A%2F%2Fpassport.c
sdn.net%2Faccount%2Fverify%3Bjsessionid%
3D7895A57BC64CE8616517F558940FD913.tom
cat2&pid=www&mod=&con=&ck=-&curl=https
%3A%2F%2Fwww.csdn.net%2F&session_id=1
0_1534696351647.160829&tos=12&referrer=htt
ps%3A%2F%2Fpassport.csdn.net%2Faccount
%2Fverify%3Bjsessionid%3D7895A57BC64CE8
616517F558940FD913.tomcat2&user_name=me
rry1996&type=pv\"}"}]

OK	
AT+HTTPACTION=1	//send HTTPS post request
OK	
+HTTPACTION: 1,200,2	// 2 is the length of HTTPS response information
+HTTP_PEER_CLOSED	
AT+HTTPHEAD	//read HTTPS response header .
+HTTPHEAD: 377	
HTTP/1.1 200 OK	
Server: openresty	
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,
OK	2 bytes
+HTTPREAD: 0	
AT+HTTPTERM	//stop HTTP Service
OK	

Send HTTPS HEAD Requst

AT+HTTPINIT	//start HTTP service, activate PDP context
OK	
AT+HTTPPARA="URL",”https://ss0.bdstatic.co m/5aV1bjqh_Q23odCf/static/mancard/css/card_ min_dee38e45.css”	//set the URL which will be accessed, for HTTPS, the request URL begins with "HTTPS://"
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	//read HTTPS response header .
+HTTPHEAD: 390	

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

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

OK

AT+HTTPTERM   //stop HTTP Service

OK

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 .

+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=A374BCFD28DFEEAF0BA0C4EEAC7

7B0B0:FG=1; expires=Thu, 31-Dec-37 23:55:55

GMT;   max-age=2147483647;   path=/;

domain=.baidu.com

Set-Cookie:

BIDUPSID=A374BCFD28DFEEAF0BA0C4EEAC

77B0B0; 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
AT+HTTPTERM   //stop HTTP Service
OK

4 Appendix

4.1 Summary of Error Codes

<statuscode>	Meaning
100	Continue
101	Switching Protocols
200	OK
201	Created
202	Accepted
203	Non-Authoritative Information
204	No Content
205	Reset Content
206	Partial Content
300	Multiple Choices
301	Moved Permanently
302	Found
303	See Other
304	Not Modified
305	Use Proxy
307	Temporary Redirect
400	Bad Request
401	Unauthorized
402	Payment Required
403	Forbidden
404	Not Found
405	Method Not Allowed
406	Not Acceptable
407	Proxy Authentication Required
408	Request Timeout
409	Conflict
410	Gone
411	Lenth Required
412	Precondition Failed

413	Request Entity Too Large
414	Request-URI Too Large
415	Unsupported Media Type
416	Requested range not satisfiable
417	Expectation Failed
500	Internal Server Error
501	Not Implemented
502	Bad Gateway
503	Service Unavailable
504	Gateway timeout
505	HTTP Version not supported
600	Not HTTP PDU
601	Network Error
602	No memory
603	DNS Error
604	Stack Busy

4.2 Unsolicited Result Codes

URC	Meaning
+HTTP_PEER_CLOSED	It's a notification message. While received, it means the connection has been closed by server.
+HTTP_NONET_EVENT	It's a notification message. While received, it means now the network is unavailable.

<errcode>	Meaning
0	Success
701	Alert state
702	Unknown error
703	Busy
704	Connection closed error
705	Timeout
706	Receive/send socket data failed
707	File not exists or other memory error
708	Invalid parameter
709	Network error
710	start a new ssl session failed

711	Wrong state
712	Failed to create socket
713	Get DNS failed
714	Connect socket failed
715	Handshake failed
716	Close socket failed
717	No network error
718	Send data timeout
719	CA missed