

Author:	Sierra Wireless						Date:	December 11, 2013						
APN Content Level		BASIC	✓	INTERMEDIATE			ADVANCED			Confidentiality	Public	✓	Private	
Hardware Compatibility	Product Line		AirPrime		Series/Variant		WMPxx			Q268x, Q26Extreme				
							SL6087							
			AirLink				Fastrack Xtend GPRS			Fastrack Xtend EDGE				
							Fastrack Xtend HSPA							
Software Compatibility		Open AT Framework 2.35, 2.36, 2.37 and 2.51												



1 Version

Application Notes may be updated over their lifetime. To ensure you design with the correct version, please check the application notes page in www.sierrawireless.com for latest versions.

2 Introduction

This Application Note (APN) is provided to Sierra Wireless distributors and clients to aid more rapid development of embedded applications using the Sierra Wireless portfolio of cellular solutions. To request a new application note, contact your regional Sierra Wireless Product Marketing Manager.

3 Application Note Description

This FTP over SSL (FTPS) application note shows how to interact with an FTPS server through GPRS to perform an FTP PUT and FTP READ action. The diagram below shows the algorithm that does the FTPS transfer:

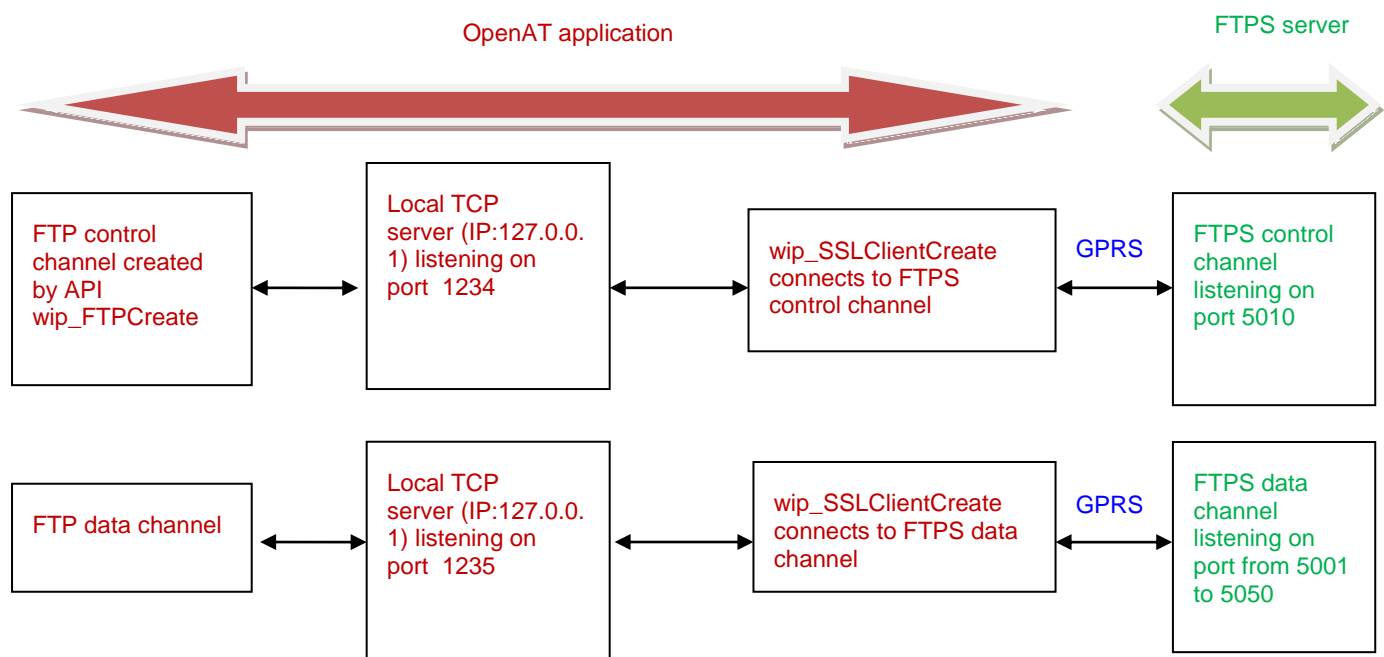


Figure 1. FTP over SSL Algorithm

Two internal TCP servers have been set up to receive the FTP protocol created from the control channel and data channel. On the other hand, two SSL clients connect towards the FTPS server control channel and data channel.

All data which the two TCP servers received will be forwarded to the SSL library. As a result, all FTP data will be encrypted and sent through GPRS to the FTPS server and vice versa.

4 Custom AT Commands

The following AT commands are included in the Open AT application:

AT Command Syntax

AT+FTPS="<GPRS_APN>","<GPRS_USERNAME>","<GPRS_PASSWORD>","<FTP_IP>","<FTP_USER>","<FTP_PASSWORD>","<FTP_PORT>"

Parameters	Values	Description
GPRS_APN	string	Access point name
GPRS_USERNAME	string	User name for GPRS
GPRS_PASSWORD	string	Password for GPRS
FTP_IP	string	The IP address of the FTPS server
FTP_USER	string	FTPS login name
FTP_PASSWORD	string	FTPS password
FTP_PORT	Integer	Listening port of the FTPS server

AT Command Syntax

AT+FTPSEND="<Number of Kbytes>"

Description

This command is used to send a file called "data.txt" to the FTPS server. The content of this file is stored in the buffer[] array which is inside entry_point.c

Parameters	Values	Description
Number of Kbytes	Integer	Size of data (in Kbytes) to be sent to FTPS server

AT Command Syntax

AT+FTPREAD

Description

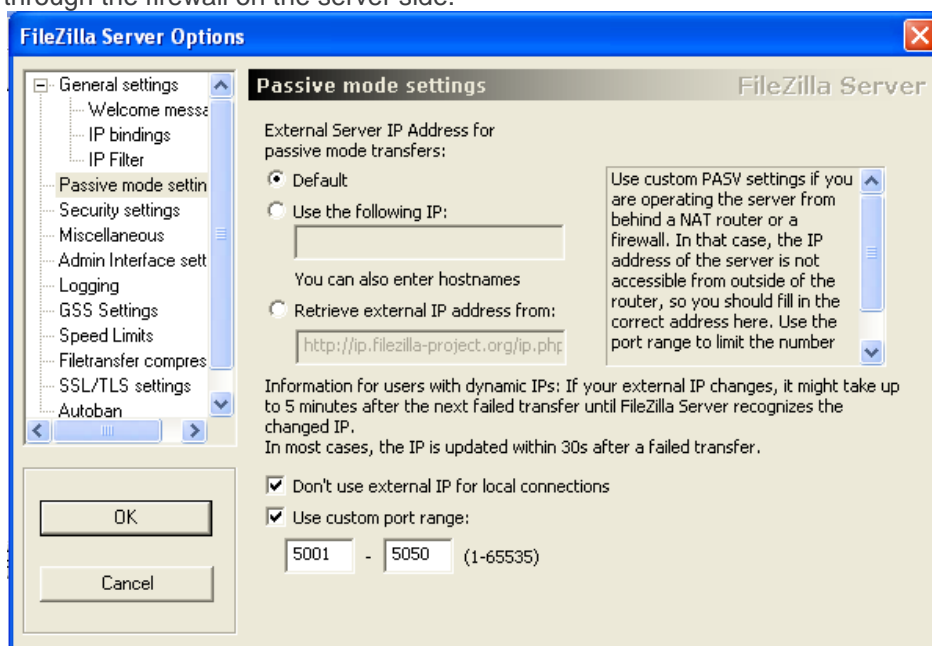
This command is used to read the file "data.txt" in the FTPS server.

5 Examples

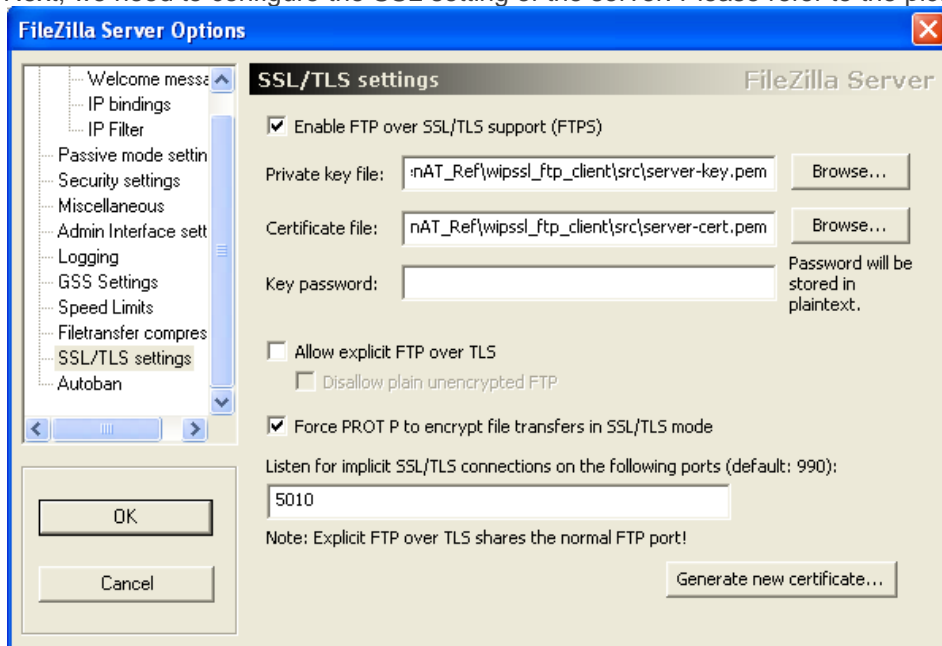
5.1 FTPS Server Setup

Our test is based on FileZilla server version 0.9.25 beta. Please notice that for FTPS transfer, only passive mode is supported in this sample application.

1. Firstly, we need to set up the port range for the data channel. Please make sure those ports can pass through the firewall on the server side.



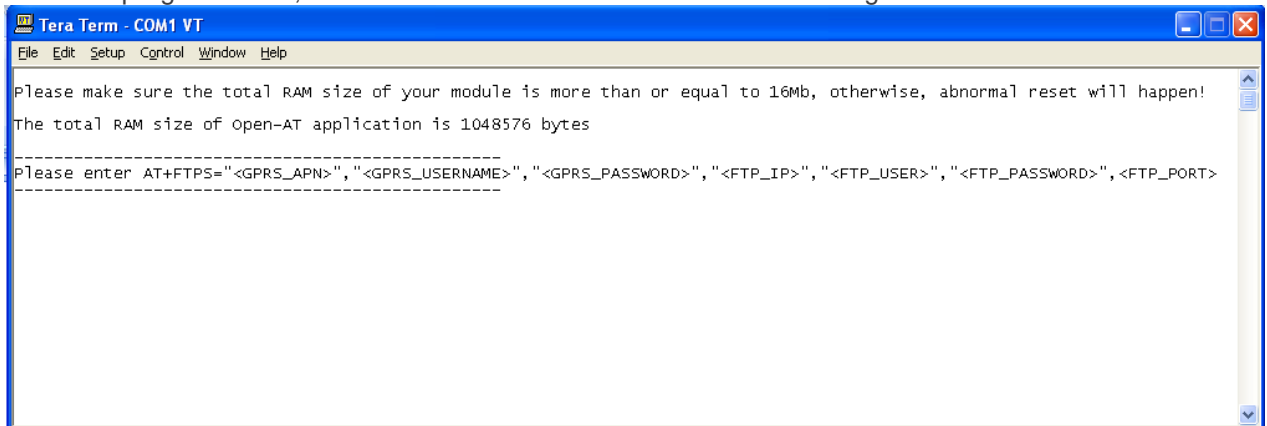
2. Next, we need to configure the SSL setting of the server. Please refer to the picture below.



3. Now the FTPS server should be ready to listen on port 5010.

5.2 Client Side

1. When the program starts, the UART1 of the module will show the following:



```

Tera Term - COM1 VT
File Edit Setup Control Window Help

Please make sure the total RAM size of your module is more than or equal to 16Mb, otherwise, abnormal reset will happen!
The total RAM size of Open-AT application is 1048576 bytes

-----
Please enter AT+FTPS="<GPRS_APN>","<GPRS_USERNAME>","<GPRS_PASSWORD>","<FTP_IP>","<FTP_USER>","<FTP_PASSWORD>","<FTP_PORT>"
-----

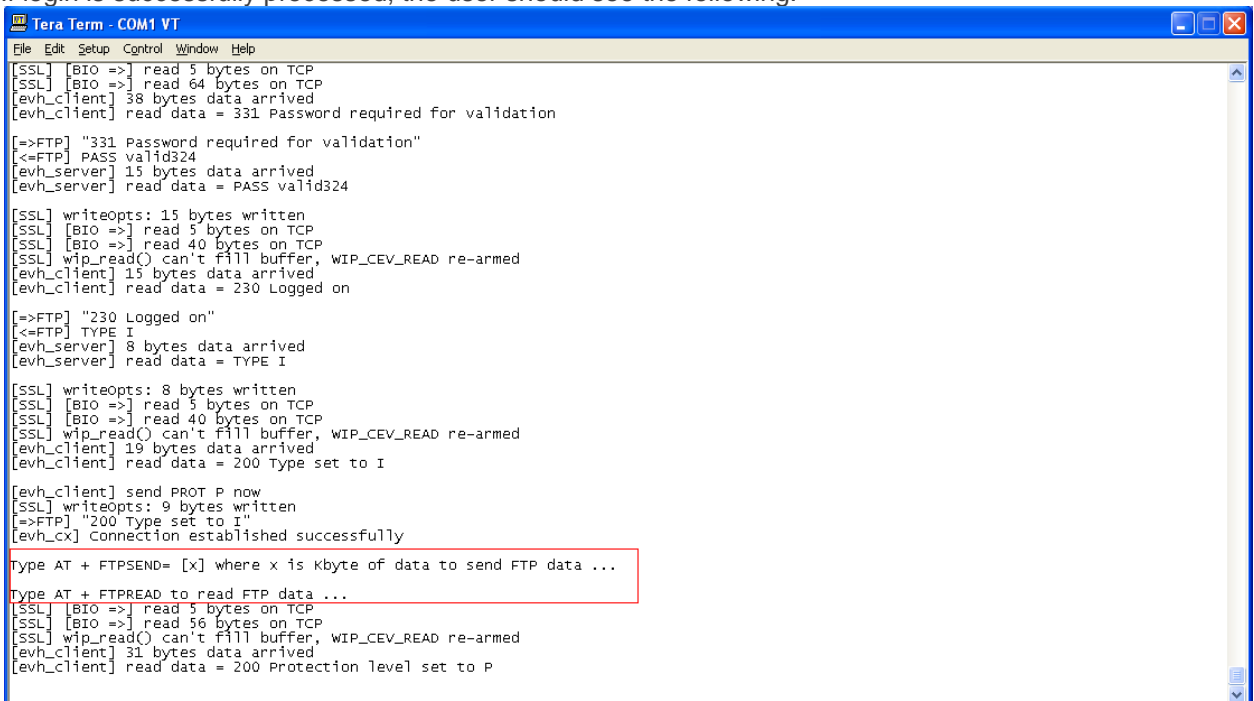
```

This is to set up the GPRS connection information and the FTPS server information. For example, the user can input:

```
AT+FTPS= "mobile.three.com.hk", "", "", "123.123.123.123", "user", "password", 5010
```

After network registration, the module will connect to GPRS and log in to the FTPS.

2. If login is successfully processed, the user should see the following:



```

Tera Term - COM1 VT
File Edit Setup Control Window Help

[SSL] [BIO =>] read 5 bytes on TCP
[SSL] [BIO =>] read 64 bytes on TCP
[evh_client] 38 bytes data arrived
[evh_client] read data = 331 Password required for validation

[=>FTP] "331 Password required for validation"
[<=FTP] PASS valid324
[evh_server] 15 bytes data arrived
[evh_server] read data = PASS valid324

[SSL] writeopts: 15 bytes written
[SSL] [BIO =>] read 5 bytes on TCP
[SSL] [BIO =>] read 40 bytes on TCP
[SSL] wip_read() can't fill buffer, WIP_CEV_READ re-armed
[evh_client] 15 bytes data arrived
[evh_client] read data = 230 Logged on

[=>FTP] "230 Logged on"
[<=FTP] TYPE I
[evh_server] 8 bytes data arrived
[evh_server] read data = TYPE I

[SSL] writeopts: 8 bytes written
[SSL] [BIO =>] read 5 bytes on TCP
[SSL] [BIO =>] read 40 bytes on TCP
[SSL] wip_read() can't fill buffer, WIP_CEV_READ re-armed
[evh_client] 19 bytes data arrived
[evh_client] read data = 200 Type set to I

[evh_client] send PROT P now
[SSL] writeopts: 9 bytes written
[=>FTP] "200 Type set to I"
[evh_cx] Connection established successfully

Type AT + FTPSEND= [x] where x is kbyte of data to send FTP data ...
Type AT + FTPREAD to read FTP data ...
[SSL] [BIO =>] read 5 bytes on TCP
[SSL] [BIO =>] read 56 bytes on TCP
[SSL] wip_read() can't fill buffer, WIP_CEV_READ re-armed
[evh_client] 31 bytes data arrived
[evh_client] read data = 200 Protection level set to P

```

3. Now the user can type **AT+FTPSSEND=[Number of Kbytes]** to send the file (data.txt) and **AT+FTPREAD** to read the file(data.txt).

6 Package Deliverables

This application note is delivered as a single compressed zip archive as follows:

Filename	Description
AirPrime and AirLink - FTP Over SSL - Application Note - Rev4.0.zip	The zip file includes this application note, the source code of this sample application, the server key file and the server certificate file.

6.1 Documentation

Filename	Description
AirPrime and AirLink - FTP Over SSL - Application Note - Rev4.0.pdf	FTP over SSL application note

6.2 Software

Filename	Description
src\appli.c	source code
src\cfg_gprs.c	source code
src\entry_point.c	source code
src\keys.c	source code
src\server-cert.pem	FTPS Server private key file
src\server-key.pem	FTPS Server certificate file

7 Software Compatibility Matrix

Firmware	Open AT Framework	Libraries
FW 7.45	Open AT Framework 2.35	Internet 5.41.0.201102280815 Security 1.5.0.201102282015
FW 7.46	Open AT Framework 2.36	Internet 5.42.0.201108100923 Security 1.5.0.201108111447
FW 7.47	Open AT Framework 2.37	Internet 5.43.3.201212250709 Security 1.5.0.201108111447
FW 7.51	Open AT Framework 2.51	Internet 5.54.0.201206011257 Security 1.16.0.201206041340

Note: This application note is not applicable to software packages later than Open AT Framework 2.51.

8 Important Note

1. For the FTPS sample application, please make sure the Internet Library and the SSL function in the extended commercial features of the target module has been enabled. For details, please refer to the **AT+WCFM** command in the AT command user guide.
2. If you see the following error message during the connection to the FTPS,

```

@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@
@@      WARNING! SSL VERIFICATION FAILURE      @@
@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@

```

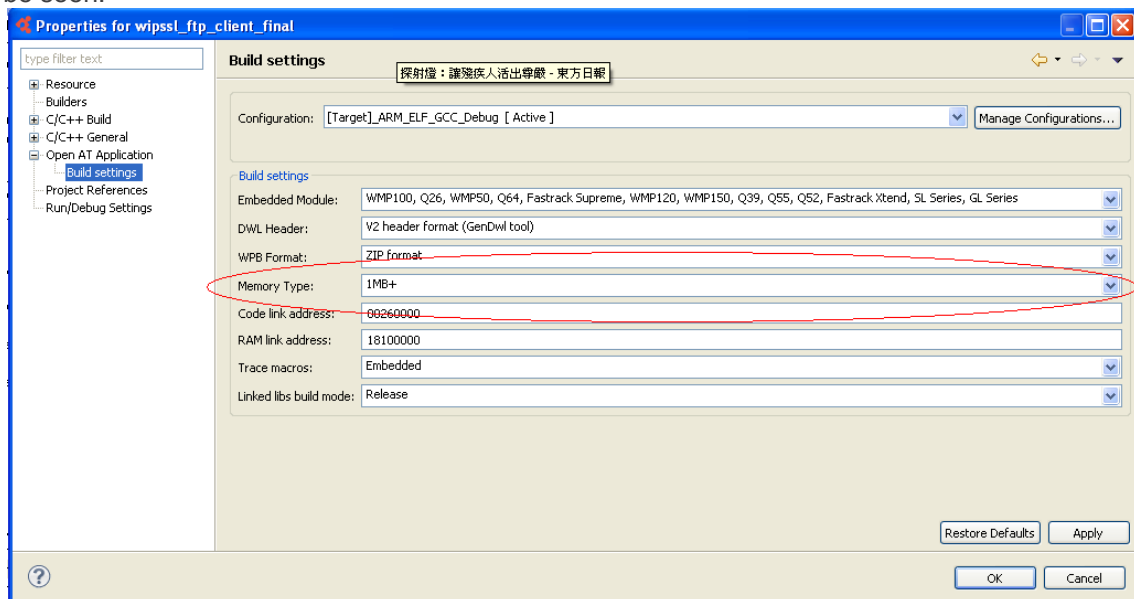
Failure reason: X509_V_ERR_CERT_NOT_YET_VALID

[SSL] SSL_ERROR_SSL

[SSL] Serious connection error 1 (SSL state==0)

This is due to the invalid date of the certificate from the module side. The valid date is between "Dec 14 16:32:17 2006 GMT" to "Dec 11 16:32:17 2016 GMT". So please adjust the real time clock of the module using the **AT+CCLK** command. For example, the user can send **AT+CCLK="11/03/10, 17:33:00"** to overcome this problem.

3. When building the program, please choose the Memory type to be 1MB+, otherwise, abnormal reset will be seen.



Note: The total RAM size of the module must be greater than 8Mb.

9 Support

For direct clients: contact your Sierra Wireless FAE

For distributor clients: contact your distributor FAE

For distributors: contact your Sierra Wireless FAE

10 Document History

Version	Date	History
001	August 12, 2011	Creation
2.0	December 13, 2011	Updated the document header
3.0	January 06, 2012	Added SL6087 in the list of supported modules
4.0	December 11, 2013	Updated section 7 Software Compatibility Matrix

11 Legal Notice

Important Notice

Due to the nature of wireless communications, transmission and reception of data can never be guaranteed. Data may be delayed, corrupted (i.e., have errors) or be totally lost. Although significant delays or losses of data are rare when wireless devices such as the Sierra Wireless modem are used in a normal manner with a well-constructed network, the Sierra Wireless modem should not be used in situations where failure to transmit or receive data could result in damage of any kind to the user or any other party, including but not limited to personal injury, death, or loss of property. Sierra Wireless accepts no responsibility for damages of any kind resulting from delays or errors in data transmitted or received using the Sierra Wireless modem, or for failure of the Sierra Wireless modem to transmit or receive such data.

Safety and Hazards

Do not operate the Sierra Wireless modem in areas where cellular modems are not advised without proper device certifications. These areas include environments where cellular radio can interfere such as explosive atmospheres, medical equipment, or any other equipment which may be susceptible to any form of radio interference. The Sierra Wireless modem can transmit signals that could interfere with this equipment. Do not operate the Sierra Wireless modem in any aircraft, whether the aircraft is on the ground or in flight. In aircraft, the Sierra Wireless modem **MUST BE POWERED OFF**. When operating, the Sierra Wireless modem can transmit signals that could interfere with various onboard systems.

Note: Some airlines may permit the use of cellular phones while the aircraft is on the ground and the door is open. Sierra Wireless modems may be used at this time.

The driver or operator of any vehicle should not operate the Sierra Wireless modem while in control of a vehicle. Doing so will detract from the driver or operator's control and operation of that vehicle. In some states and provinces, operating such communications devices while in control of a vehicle is an offence.

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