APPLICATION NOTE:

Upgrading the Firmware on the SX-ULPGN Using Over-the-Air (OTA) Method

142-00211-140

REVISION HISTORY

Rev. No.	Date	Revision by	Comments
1.00	2016.09.28	S. Khan	Initial version

Reference Material

The SX-ULPGN is based on the Qualcomm QCA4010 reference design. The firmware image programmed in the SX-ULPGN is a Silex created binary image based on the Software SDK provided by Qualcomm on their developer network (QDN). All of the SDK documentation is available on QDN. Before reading this document, you should have downloaded the QCA4010 SDK User Guide (Document Number: 80-YA116-3) from:
https://developer.qualcomm.com/download/qca4010/qca4010-sdk-user-guide.pdf

The following sections are taken from section 3.9 of the above document with some modifications and exceptions that Silex has found to be required, and that are incorrect in the current version of above document as of the time of writing this document.

OTA Firmware Upgrade

The Over-The-Air (OTA) firmware upgrade feature allows upgrading firmware over WLAN connection. This feature is available on the development kit. Multiple approaches can be adopted to download firmware from the OTA server to the Wi-Fi module. The OTA server is a server setup by the user where the new firmware file is available for download by the SX-ULPGN client.

This section describes the TFTP-based OTA firmware update procedures on the development kit. More approaches will be supported in future (e.g. HTTP). More information on how to setup a TFTP OTA server on Ubuntu Linux is described here:
https://help.ubuntu.com/community/TFTP

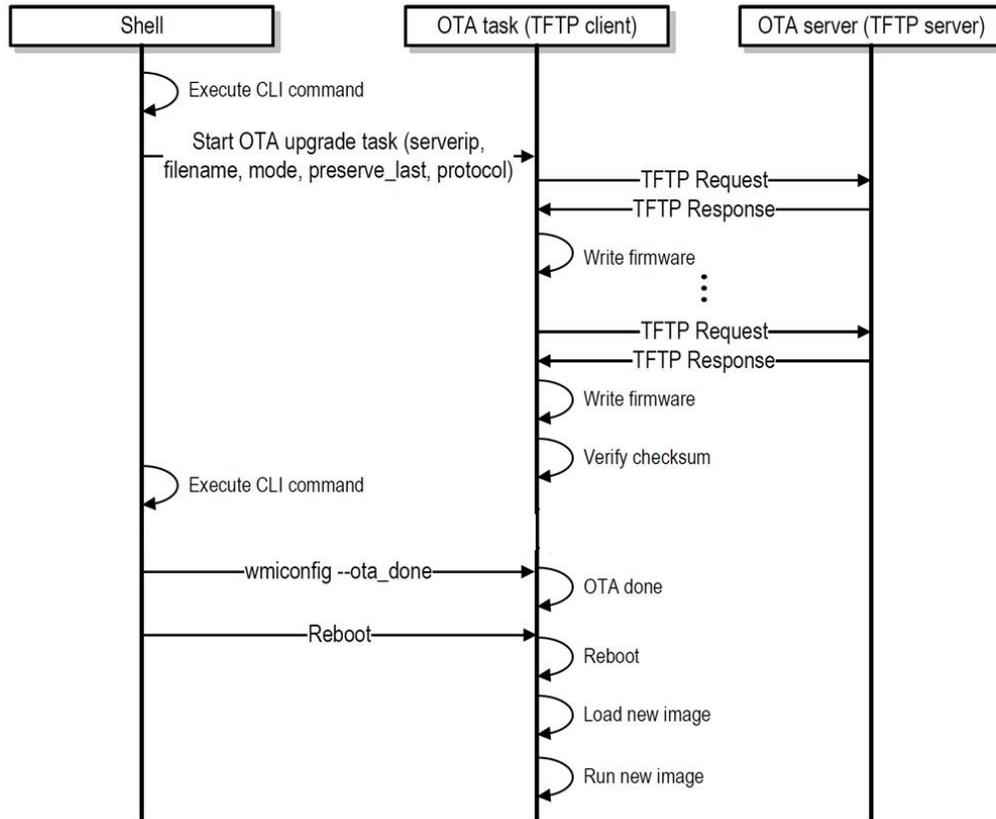## TFTP OTA Firmware Upgrade Method

OTA firmware upgrade is triggered by the following method:

- Run OTA upgrade command from shell

After the firmware upgrade is triggered:
1. The OTA firmware upgrade module creates a TFTP client task to download firmware from the OTA server
2. Partition selection and image checksum validation for the downloaded image are internally performed by the firmware.
3. When a wmiconfig `ota_done` command is issued, the OTA session is closed
4. Reboot the development kit.

During the reboot process, the nvram initialization module checks for the latest firmware and tries loading the firmware. If successful, the QCA4010 will run from the latest image from the flash; otherwise the QCA4010 runs image 0.

Figure 1: OTA Firmware Upgrade Process

OTA Firmware Upgrade Procedure

Procedure	1. Upload the image file to the OTA server and start the server. 2. Connect a PC to the development kit via console port and connect the development kit to the OTA server over WLAN. Make sure the IP addresses are within the same subnet. 3. Run command **wmiconfig --ota_upgrade** from the Wi-Fi module shell to trigger firmware upgrade. 4. Run command wmiconfig --ota_done from the Wi-Fi module shell to close the OTA session. 5. Reboot Wi-Fi module and check the firmware version of the running image.	
Syntax	**wmiconfig --ota_upgrade <OTA-server-ip> <file-name> <mode> <preserve_last> <protocol>**	
Parameters	*<OTA-server-ip>*	OTA server IP address
	<file-name>	File name
	<mode>	0 = Firmware/hostless OTA download 1 = Host OTA download
	<preserve_last>	0 = Allow overwriting the current partition for OTA download. 1 = Do not allow overwriting the current partition for OTA download. <mode=1> and <preserve_last=1> are not supported.
	<protocol>	Protocol type 0 = TFTP. Currently only TFTP is supported.

Close OTA session

Procedure	After OTA image is authenticated or validated, run wmiconfig --ota_done to close the OTA session. After that, the host/application can reboot from the new image.
Syntax	**wmiconfig --ota_done 1**
Parameters	1 (See Note Below)

Note: The `ota_done` command in the Qualcomm document incorrectly mentions that there are no parameters, however, Silex has found out that the parameter "1" is required after the `ota_done` command to make the OTA firmware upgrade process complete successfully.

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