UniFlash v4 User Guide for mmWave Devices

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1. Quick Start Information

Support for mmWave devices in the UniFlash tool currently only exists in the standalone desktop version with version 4.1.2 and higher. At a later date, the cloud version will be available for use. The timeframe for the cloud version release is late summer 2017.

The desktop version is available at the following link: http://www.ti.com/tool/uniflash.

Currently, two deployment platforms are supported by the desktop UniFlash tool supporting mmWave devices: Windows and Linux. (A version for OS X (Apple) will be available at a later date.) Download the appropriate executable from the website above and execute the file to install the UniFlash desktop version on the target machine.

2. Desktop Version Installation

To install the UniFlash desktop tool, execute the downloaded file. The installation wizard will ask for an installation location and then the build will be installed on the target machine.

During the installation of the desktop version on a Linux platform, a dialog box may be encountered indicating that a *libudev* library was not found, and a link is provided for further troubleshooting: http://processors.wiki.ti.com/index.php/Category:CCS_UniFlash#Troubleshooting .

This link provides instructions to execute the following command on the Linux machine to resolve the error detected.

Missing libudev fix
`sudo ln -sf /lib/x86_64-linux-gnu/libudev.so.1 /lib/x86_64-linux-gnu/libudev.so.0`

Executing this command prior to starting the installed UniFlash application will resolve the identified issue.

3. Launching a Flashing Session

If the tool was not launched at the end of the installation, to start the desktop version, the desktop executable will need to be invoked. Navigate to the installation directory and invoke the executable as follows:

> Windows: double click the UniFlash short cut, or navigate to the *<uniflash install directory>/nod-webkit* directory and execute **nw.exe**.

> Linux: execute the **nw** executable file located in the *<uniflash install directory>/node-webkit* directory.

The desktop GUI will be launched.

To perform flash operations on the mmWave device, a flash session needs to be launched and configured for the target mmWave device. To start a session, one of the following approaches can be employed:

- Selecting a CCXML file listed in the device listing as shown in Figure 1.
- Loading a previously saved session. Loading a previous session will restore the previous configuration (device, connection, and settings, and specified images to flash).
- Selecting a CCXML file created by CCS. This is useful if configuration settings exist in the CCXML file beyond a simple device and connection selection. Be sure to select the serial connection since flashing of mmWave devices only occurs over this connection type.

When starting the UniFlash tool (desktop or cloud version), the screen will appear as shown in Figure 1.

TEXAS INSTRUMENTS
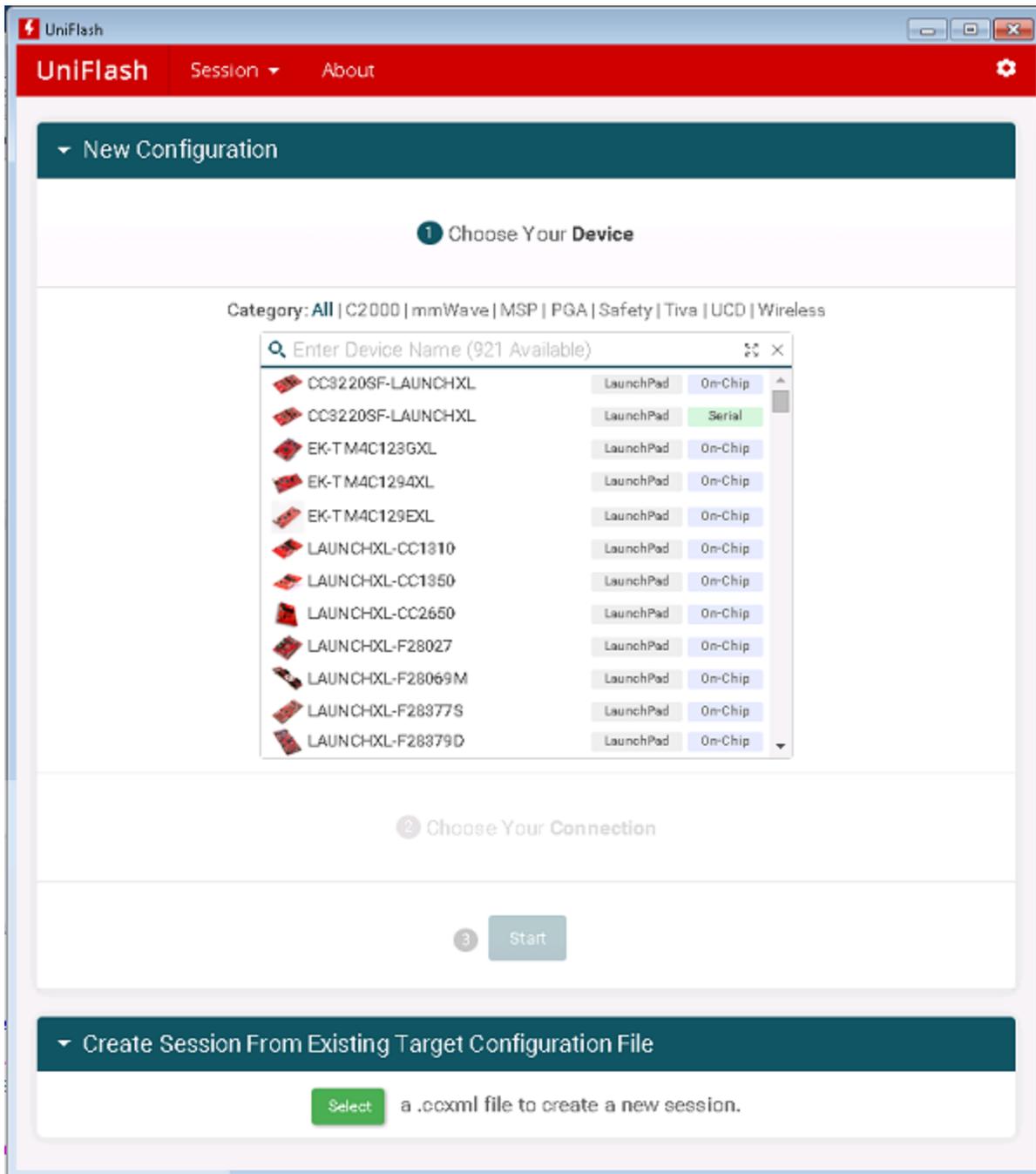
Figure 1: UniFlash Tool Device Selection Screen

To start a new session, select the mmWave device to be flashed from device list shown.

mmWave filter tip
Clicking "mmWave" on the line labelled Category above the device listing will filter the list to only display the family of supported mmWave devices (see Figure 2). Alternatively, typing the name of the device in the search bar above the device list also filters the list in real-time.
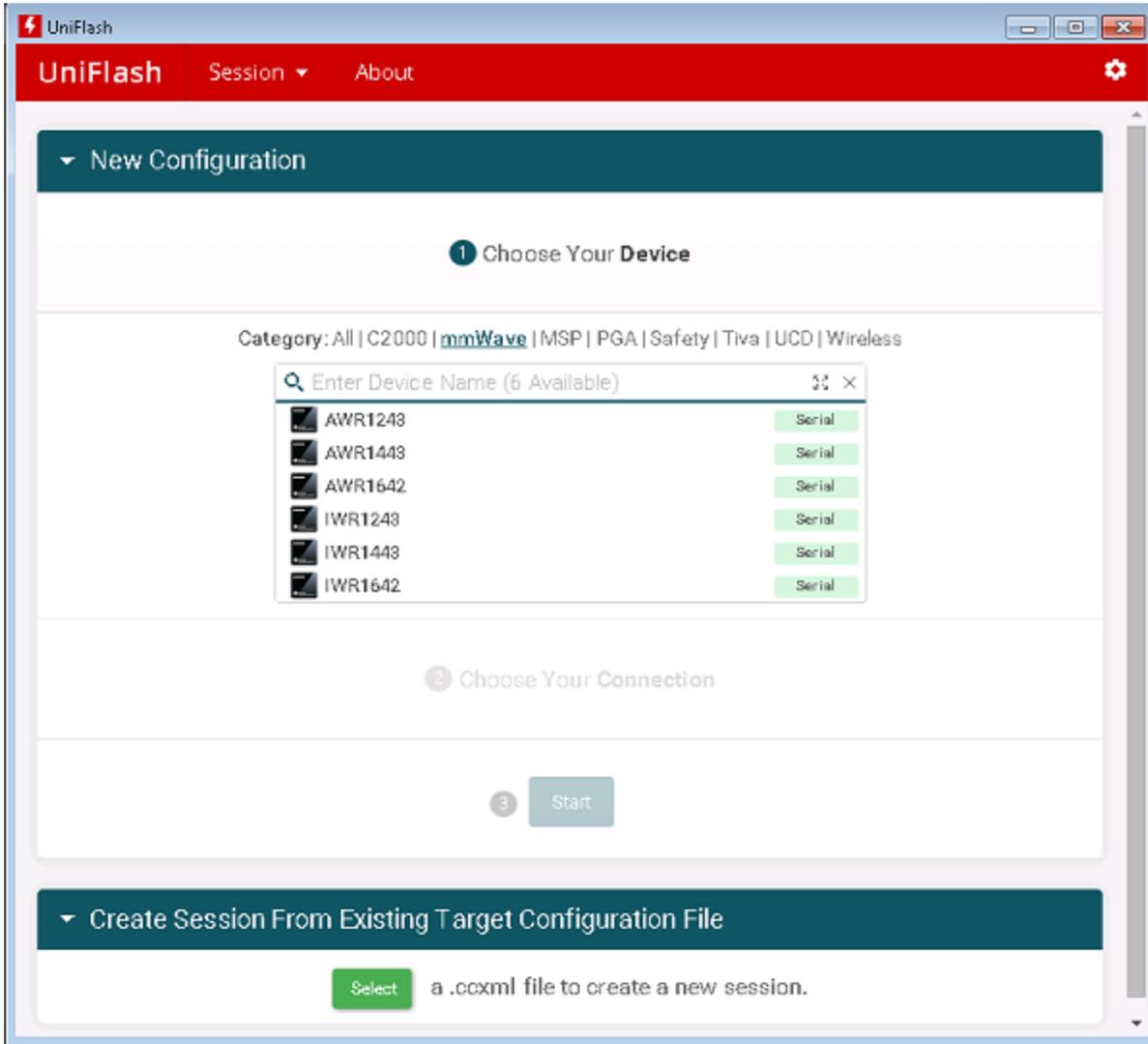
Figure 2: mmWave Device Filtered in UniFlash Device List

After selecting the mmWave device, click on the **Start** button to start the session.

To load a previously saved session, click on the Session drop-down menu in the top-left corner of the tool screen, beside the UniFlash title, and select "Load Session" as shown in Figure 3. Locate the previously saved session file in the browsing dialog window and click Open. The tool will load the session configuration, presenting the Program view as shown in Figure 4 of the next section. Note that if the width of the tool is sufficiently narrowed, UniFlash will appear across the top of the red band at the top of the window. A drop-down menu will appear on the top right, from where Sessions can be loaded or saved.
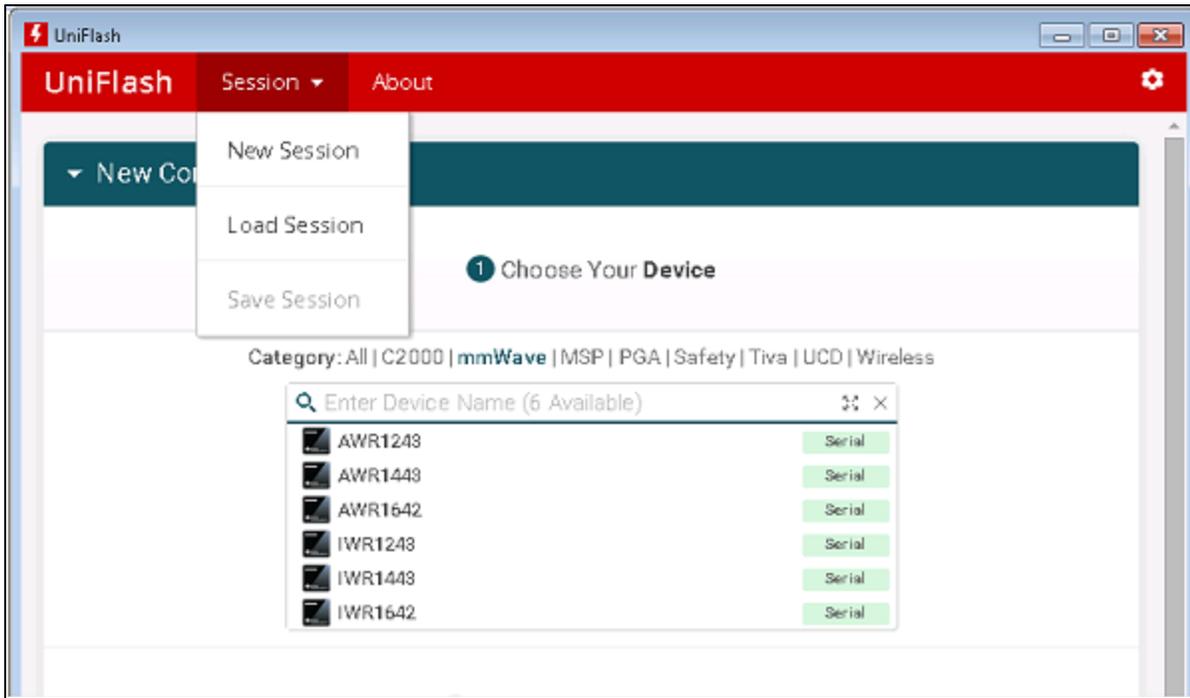
Figure 3: UniFlash Session menu for loading/saving sessions

A new session is needed any time a different device needs to be flashed. The Session drop-down menu can be used to create a new session without restarting the UniFlash tool.

4. Flashing a Device

After clicking the **Start** button, or loading a previous session, the main UniFlash screen shown in Figure 4 is displayed. The device AWR1443 was selected for the session shown.
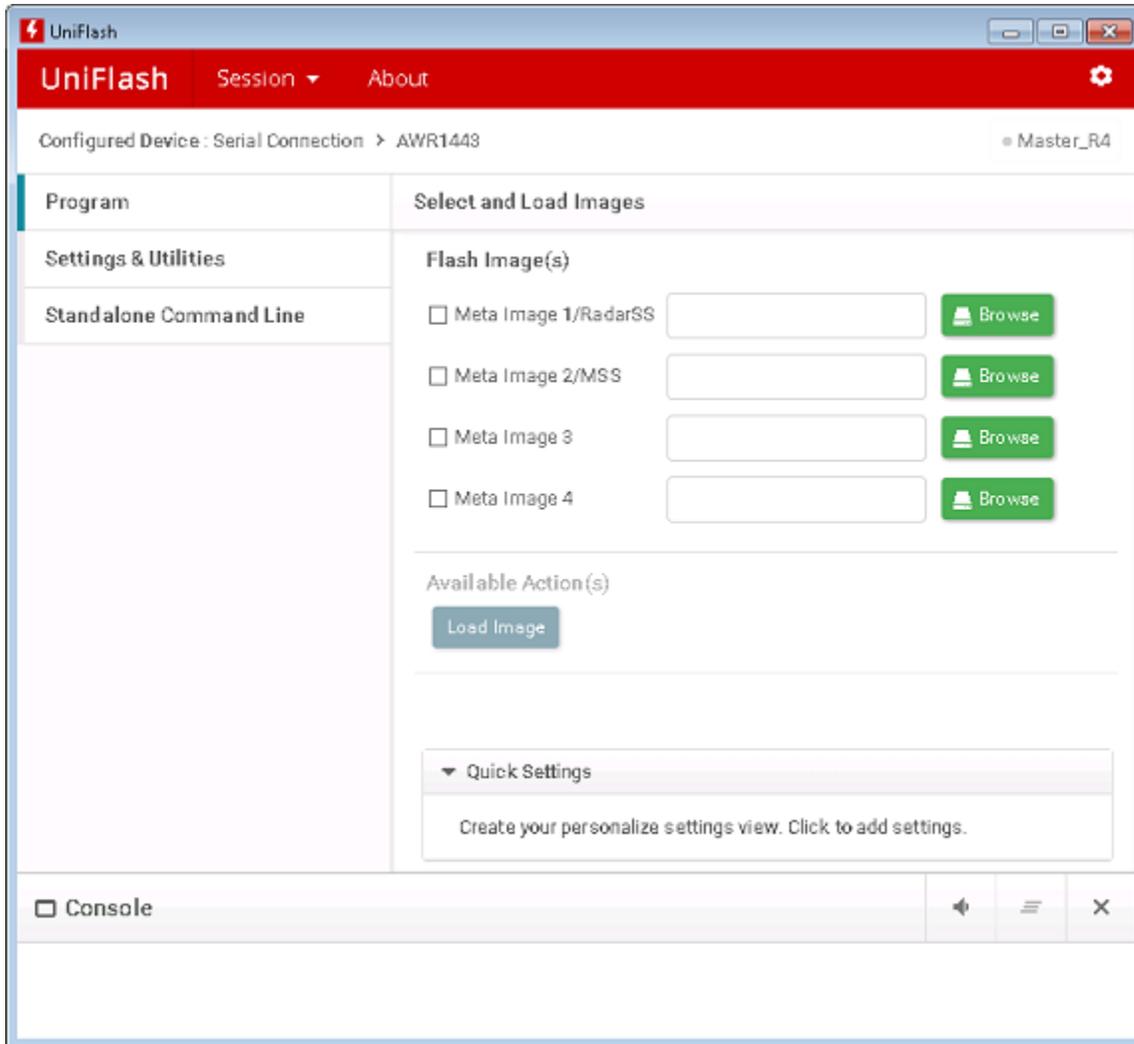
Figure 4: UniFlash main screen Program view for AWR1443 device

On the left hand side of the main screen are various views available for selection to flash the device selected. The purpose of each view is outlined below, and further elaborated upon in the sections to follow:

1. Program view – this is where the files to be flashed to the device are specified. The files should be formatted for mmWave devices (typically ending with the extension *.bin*).

2. *Settings & Utilities* view – this is where the serial port that is connected to the device is specified. This view also allows for the selection of whether or not to format the flash during download of the images (and is recommended), or whether or not to format the device without flashing images to it. For more information on the settings, clicking **More Info** to the top-right will display additional information on each setting.
   Beside the **More Info** option is the **Pin Option** button. This option allows selection of settings parameters which will appear on the *Program* view under <u>Quick Settings</u>. This view and the settings can be saved by saving the session through the Session drop-down menu in the top left of the tool. The session can be later reloaded with the same look and configuration the next time that the desktop UniFlash tool is invoked.

3. *Standalone Command Line* view – Often in production line environment, a command line interface (CLI) is desirable for flashing devices from within the context of an automation environment. After the tool has been configured (setting up the serial port, whether

or not to format the flash before the image download, and selecting the image files), by selecting this view, a standalone UniFlash command-line interface package can be generated with those settings. Following the unzipping of this package, everything required to run the tool on the command line is extracted, including the files that were specified for flashing.

4. 1. Console

Any status messages are provided in the Console window located at the bottom of the UniFlash tool main screen (see Figure 4). Errors during the flashing of the device will appear as messages in red text, and a red dialog box will be presented. Successfully completed operations are presented in green text.

Figure 5 show the console output captured from the successful flashing of an image to an AWR1642 device.

Successful AWR1642 Console output
[4/24/2017, 4:36:37 PM] [INFO] CortexR4_0: Initialization complete.
[4/24/2017, 4:36:37 PM] [INFO] CortexR4_0: Flashing process starting...
[4/24/2017, 4:36:37 PM] [INFO] CortexR4_0: Connecting to COM Port COM37...
[4/24/2017, 4:36:37 PM] [INFO] CortexR4_0: Reset connection to device
[4/24/2017, 4:36:37 PM] [INFO] CortexR4_0: Set break signal
[4/24/2017, 4:36:38 PM] [INFO] CortexR4_0: Connection to COM port succeeded. Flashing can proceed.
[4/24/2017, 4:36:38 PM] [INFO] CortexR4_0: Reading device version info...
[4/24/2017, 4:36:38 PM] [INFO] CortexR4_0: ** 1 files specified for flashing.
[4/24/2017, 4:36:38 PM] [INFO] CortexR4_0: Checking file D:/mylocal/mmWave/images/xwr16xx/xwr16xx_mmw_demo.bin for correct header for AWR1642.
[4/24/2017, 4:36:38 PM] [INFO] CortexR4_0: AWR1642 device, fileType=META_IMAGE1 detected -> OK
[4/24/2017, 4:36:39 PM] [INFO] CortexR4_0: !! Files are valid for AWR1642.
[4/24/2017, 4:36:39 PM] [INFO] CortexR4_0: Format on download was specified. Formatting SFLASH storage...
[4/24/2017, 4:36:39 PM] [INFO] CortexR4_0: -->Erasing storage [SFLASH]
[4/24/2017, 4:36:39 PM] [INFO] CortexR4_0: -->Sending Erase command to device...
[4/24/2017, 4:36:39 PM] [SUCCESS] CortexR4_0: -->Erase storage completed successfully!
[4/24/2017, 4:36:39 PM] [INFO] CortexR4_0: Downloading [META_IMAGE1] size [412100]
[4/24/2017, 4:37:41 PM] [INFO] CortexR4_0: SUCCESS!! File type META_IMAGE1 downloaded successfully to SFLASH.
[4/24/2017, 4:37:41 PM] [INFO] CortexR4_0: Disconnecting from device on COM port COM37...
[4/24/2017, 4:37:41 PM] [INFO] CortexR4_0: Flashing instance clean-up initiated...
[4/24/2017, 4:37:42 PM] [INFO] CortexR4_0: Instance deinitialized!
[4/24/2017, 4:37:42 PM] [SUCCESS] Program Load completed successfully.

Figure 5: Sample Console Output for successful AWR1642 UniFlash execution

4. 2. Program View - Images to Flash to the Device

Choose an image to flash by clicking the **Browse** button or the box beside the file labels. The labels beside each file box indicate the type of file which should be specified. This is critical for devices which employ META Images (META_FILE1, META_FILE2, META_FILE3 and META_FILE4). For other devices, the ordering of files is not important. Figure 6 shows the selection of 2 images to be flashed to an AWR1443 device.

Multiple files are specified through the 4 different entries found on the *Program* view. Only the images with their check boxes checked will be flashed.
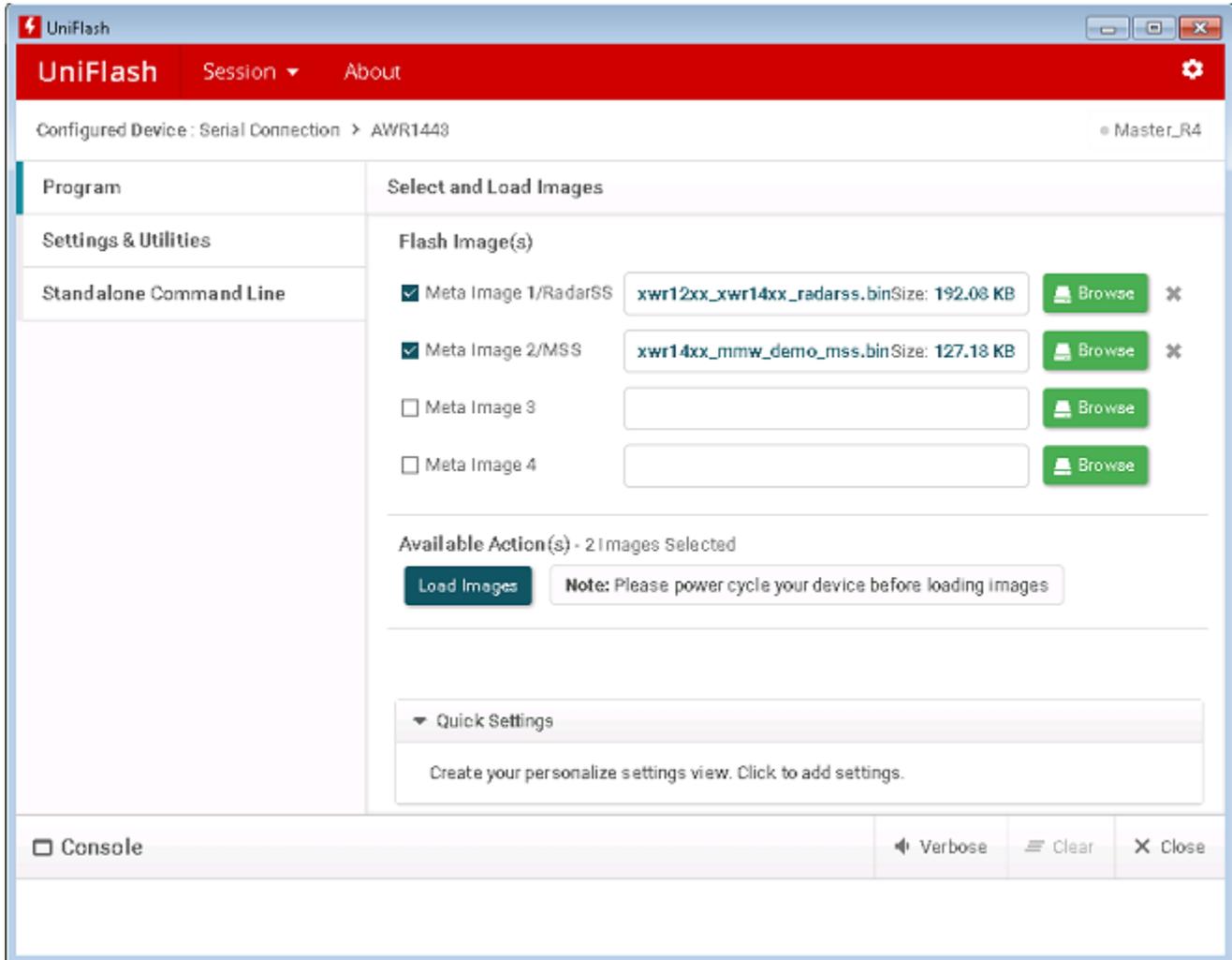

Figure 6: Image Selected for Flashing for AWR1443

Following the selection of a file for download, the **Load Image** button will become clickable.

> **Load Image note**
> Before clicking this button, the device must be power-cycled and connected to the serial port specified as COMPort in the *Settings & Utilities* view (refer to the next section).
>
> Please ensure that the device is configured in the correct mode for flashing operations[SOP5].
>
> The device must be power-cycled before the first click of the **Load Image** button, and between subsequent re-flashing of the device.

4. 3. Settings & Utilities view

In the *Settings & Utilities* view, settings for the flashing operation can be configured. The settings are displayed with default values and should be reviewed carefully before flashing the device. Figure 7 depicts the *Settings & Utilities* view for the AWR1443 device.
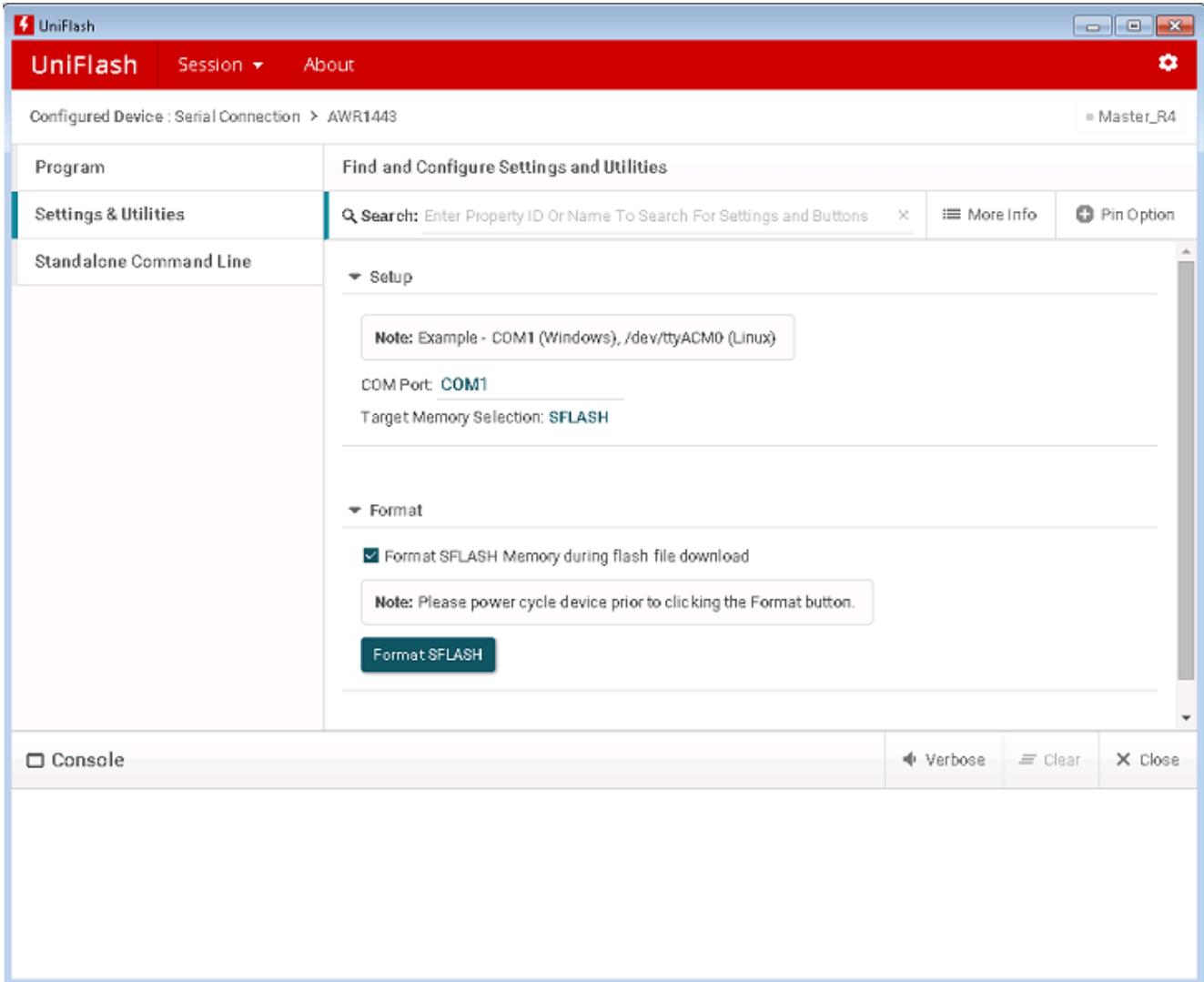

Figure 7: Settings & Utilities View

The settings are split into two subsections: Setup and Format. The details of the settings associated with each are presented below. After the settings are configured, the images can be flashed to the mmWave device using the **Load Image** button on the *Program* view.

4. 3. 1. Setup

4. 3. 1. 1. COM Port

The serial port to which the device is connected should be specified in the "COM Port" field, where COM1 is shown by default. Example COM port names are provided as a reference of the expected formatting. Please update the COM port appropriately to reflect which port is connected to the device to be flashed.

4. 3. 1. 2. Target Memory Selection

This option, when available for the selected device as depicted in Figure 8, specifies to where the selected images will be loaded. Select **SFL**

ASH for loading the images to the flash memory of the device, or select **SRAM** to write the images to the on-device SRAM.
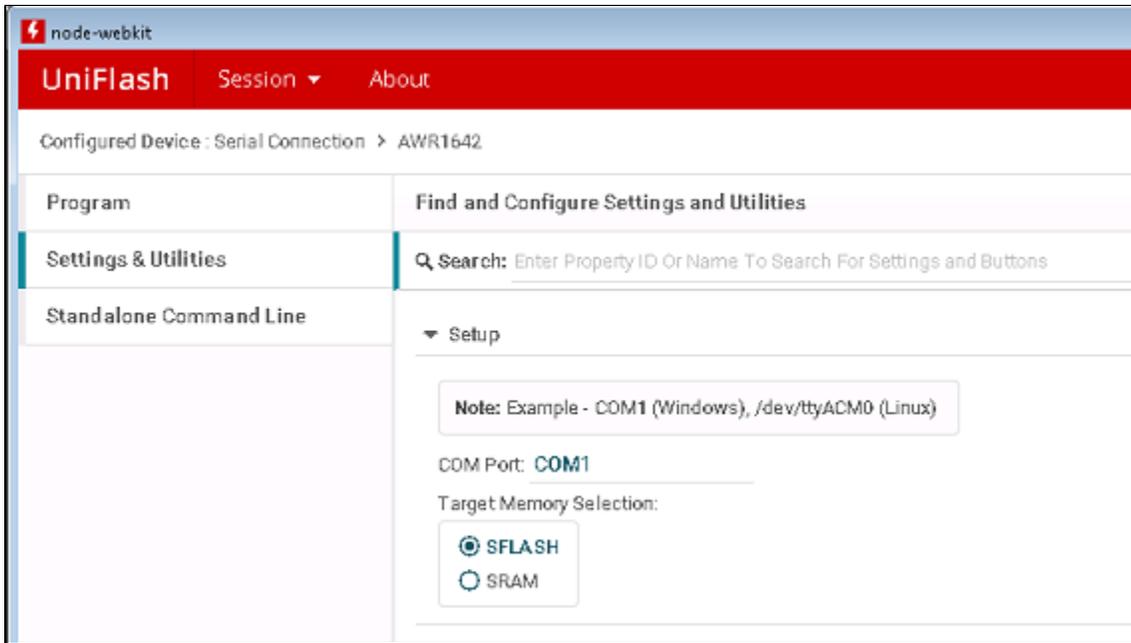

Figure 8: AWR1642 Target Memory Selection Settings

4. 3. 2. Format

4. 3. 2. 1. Format SFLASH Memory during flash file download

This checkbox is used to format the flash on the device before downloading the images. If the box is checked, the flash will be formatted prior to download of the images. If the box is not checked, then the device flash will not be formatted. It is recommended that this box remain checked.

4. 3. 2. 2. Format SFLASH Button

Clicking this button with the correct COM port specified for the COMPort field will format the flash on the device, without downloading any images.

The device should be power-cycled before this command line is executed and should be power-cycled before any subsequent flashing operation. Please ensure that the device is configured in the correct mode for flashing operations[SOP5].

4. 3. 3. Quick Settings Setup

Any commonly used settings can be pinned to the Quick Settings section of the *Program* view discussed earlier.

To do this, click on the **Pin Options** button at the end of search filter line as shown in Figure 9. A column of "+" buttons will appear to allow for customization of the quick settings. Once completed, the Quick Settings section on the *Program* view will display the specified settings.
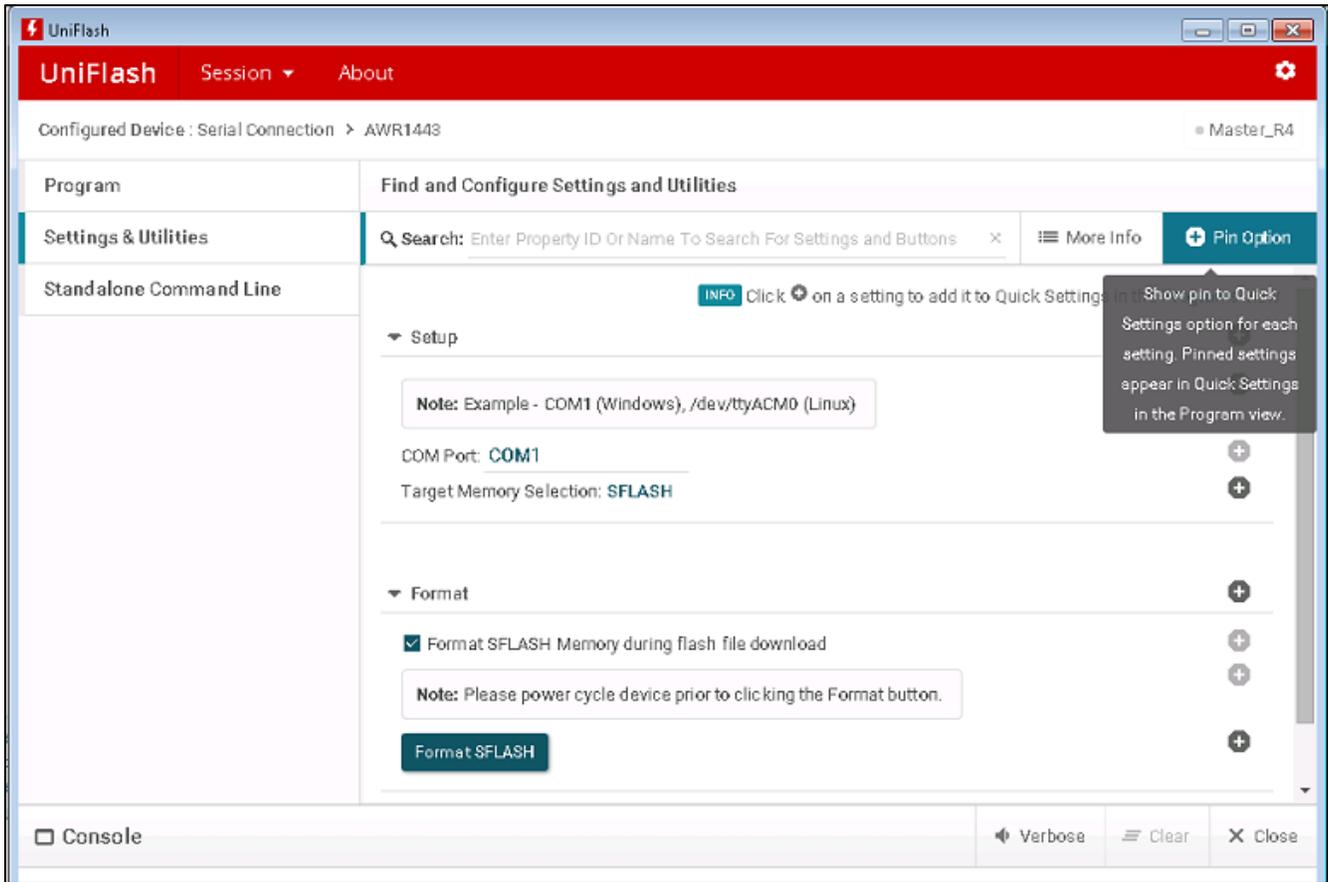
Figure 9: Pin Option Settings on the Settings & Utilities view

These settings can be saved for future use by saving the session through the Session drop-down menu at the top-left of the UniFlash tool.

4. 4. Standalone Command Line Tool Generation

Often in production line environment, a command line interface is desirable for flashing devices from within the context of an automation environment. This feature of the UniFlash v4 tool is tailor made for this use case.

After selection of the image(s) to be flashed and configuration of the flash settings, the S*tandalone Command Line* view can be chosen to generate a CLI package. Figure 10 displays this view. Click **Generate Package** and a zip file will be created. This zip file contains all of the necessary files required for the specified deployment platform in order to flash the mmWave device from a command line.

While the cloud version of UniFlash can be used to generate command-line interface packages for all supported deployment platforms, the offline (desktop) version of the tool can only generate a command-line package for the current platform. This is to say, for example, that the Windows desktop version of the UniFlash tool can only generate Windows command-line packages, and Linux desktop UniFlash versions can only generate Linux command-line packages.
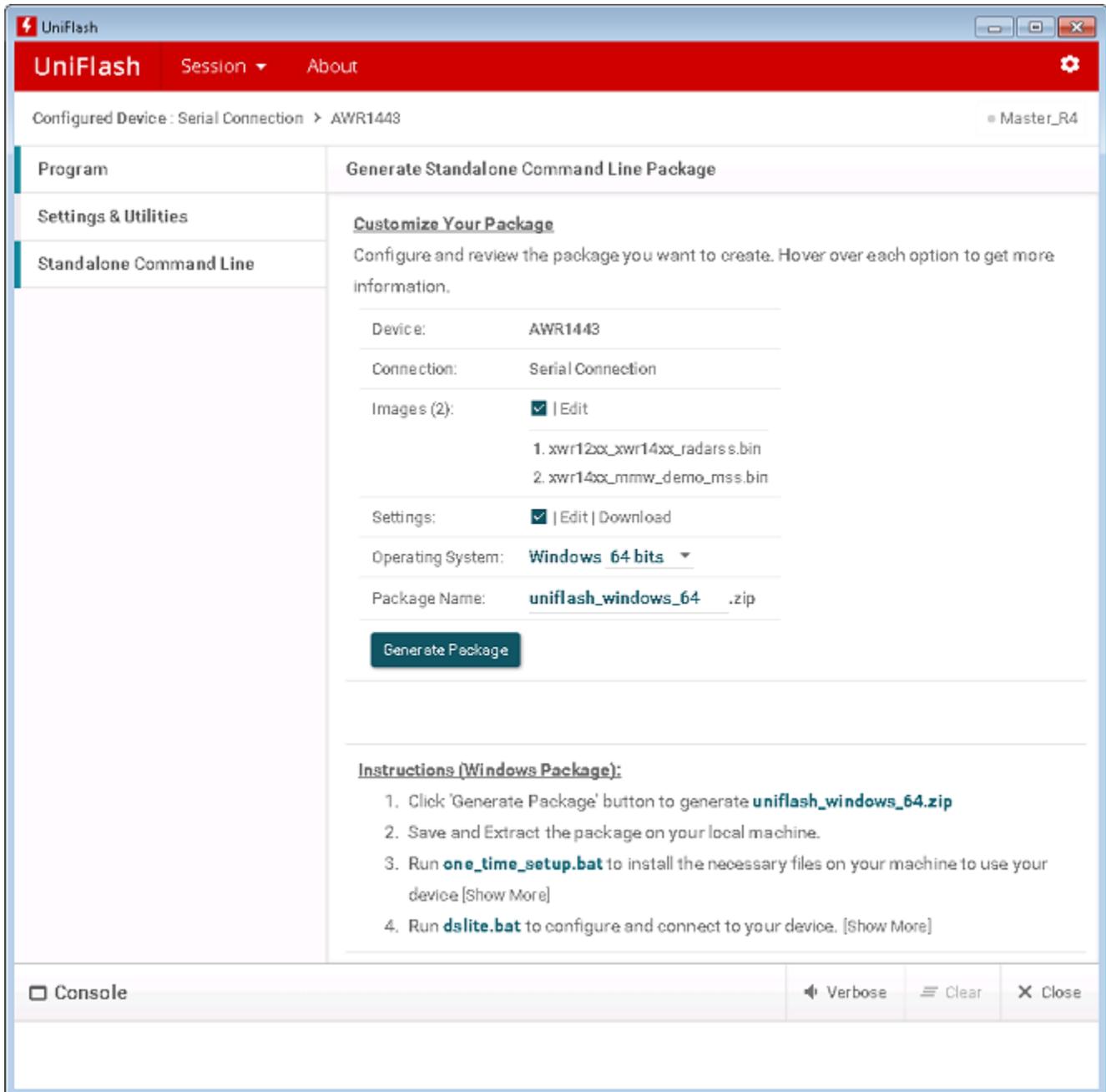

Figure 10: Standalone Command Line Generation View

After extraction of the package from the zip file, the file "*dslite.bat*" can be run in a MS-DOS prompt or "*dslite.sh*" can be run at the Linux prompt to execute a flashing session. The *dslite.[bat,sh]* file is located in the root directory of the extracted command-line package. The file contains the command line with the configuration specified in the UniFlash tool at the time of command-line package generation. For the interested, the GENERATED_COMMAND variable in the *dslite.bat* file or the line containing "DSLite" in *dslite.sh* can be viewed to see the command used to invoke the tool.

Note: Please ensure that the device has been power-cycled and that the serial port indicated for the command-line package is connected to the device prior to execution of the *dslite.[bat,sh]* file. Also, please ensure that the device is configured in the correct mode for flashing operations [SOP5].

4. 4. 1. Command Line Interface Arguments

The UniFlash tool can be used to generate standalone command-line interface packages as described in the above section. To access the CLI, go to the root directory of the extracted command-line package and locate the DSLite startup script (*dslite.bat* for Windows and *dslite.sh* for Linux/OSX).

The *dslite.[bat,sh]* file can be invoked with different configuration parameters than those defined at the time of the command-line package generation. The syntax for the configuration parameters specified on the command line are outlined below.

---

dslite command line options

```
dslite --mode serial --config=<ccxml-file> [options] [<flash-file1>,XX
<flash-file2>,YY ...]
```

---

where *XX* and *YY* are values in the image type names, META_FILEXX and META_FILEYY. The valid options are defined in Table 1 below:

Option	Description
-c [--config] arg	Configuration (ccxml) file
-l [--load-settings] arg	Apply the settings specified in the file, in the format as generated by the UniFlash GUI
-s [--setting] id=val	Override a specific setting of "id" with the value "val". This option may be specified multiple times. Valid "id" values: • COMPort • DownloadFormat - indicates whether or not to format the flash before downloading files to the device. The default value is true. Example settngs: -s COMPort=COM37 or -s DownloadFormat=true/false or -s COMport=/dev/ttyACM1 -s DownloadFormat=true/false
-e [--verbose]	Outputs progress messages to the console
-r [--core] arg (default=0)	Zero-based index of the core to communicate with for flashing. *For xWR16xx devices, this option is required and must be set to 1.* i.e. -r 1
-f [--flash]	Load the file(s) specified at the end of the command line to the flash. Each file name must be followed by a number in the range of 1-4 with no duplicates, and in increasing value order. File 1 should precede File 2, which should precede File 4, as an example. This is important for devices which use META FILE formatted files (such as xWR16xx devices).

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-h [--help]	Prints a help message for the command line interface tool. Additional options will be displayed, however, only use the options displayed above for mmWave devices.

Table 1: Standalone Command Line Options

In the *dslite.[bat,sh]* file, a command line is comprised of these parameters, invoking the "*DSLite*" application.

If the flash on the device should be formatted without any downloading images, this is supported through the following command line. Note that the option "-b" must not be combined with option "-f".

Format Flash only command

```
dslite --mode serial --config=ccxml-file -s COMPort=/dev/ttyACM1 -b
Format
```

The device must be power-cycled before this command line is executed and must be power-cycled before any subsequent flashing operation.

The *dslite.[bat.sh]* file may be invoked from any scripting language. For complex scripting situations to invoke "DSLite", please refer to the information found here: http://processors.wiki.ti.com/index.php/UniFlash_v4_Quick_Guide#Scripting

5. Known Limitations

The following limitations exist with the desktop UniFlash tool for mmWave devices.

1. The cancel button does not work – an ongoing operation cannot be stopped. The cancel button will not be clickable until the issue is resolved in the next UniFlash release. However, the tool should time-out on any error-producing situation. (UNIFLASH-751)

2. For Linux generated command-line interface packages, an additional step is required to ensure proper execution of the command-line tool. The script *one_time_setup.sh* located in the UniFlash command-line package root directory must be executed (UNIFLASH-754)

3. Occasionally, messages from a previous flashing execution run may be seen in the UniFlash GUI. A work-around is in place, however, information messages may still be buffered from the previous operation (UNIFLASH-749)

6. Defect Reporting and Logging

If a bug has been encountered with the UniFlash tool, please report the bug to TI, in the e2eforum located here: https://e2e.ti.com/support/development_tools/code_composer_studio/

6. 1. Debug information to capture

When reporting the issue, please send the logs as requested at the following link. The link specifies how to capture additional information useful for debugging issues within UniFlash.

http://processors.wiki.ti.com/index.php/UniFlash_v4_Quick_Guide#Defect_Reporting_and_Logging