

# CC3220 SimpleLink™ Wi-Fi® and Internet of Things Solution, a Single-Chip Wireless MCU

## Getting Started Guide



Literature Number: SWRU461B  
February 2017–Revised June 2018

<b>Preface</b> .....	<b>3</b>
<b>1 Download and Installation</b> .....	<b>4</b>
1.1 CC3220 Software Development Kit (SDK) .....	4
1.2 Service Pack .....	4
1.3 UniFlash Tool.....	4
1.4 Serial Terminal .....	6
1.5 Pin Mux Tool .....	7
1.6 XDS110 Driver Installation.....	7
1.7 Debugger/IDE.....	10
1.7.1 CCS .....	10
1.7.2 IAR .....	12
1.7.3 GCC.....	12
1.8 Operating Systems.....	12
1.8.1 TI-RTOS .....	12
1.8.2 FreeRTOS.....	12
<b>2 Execute your First Application</b> .....	<b>13</b>
2.1 CCS .....	14
2.1.1 Import and Configure Project .....	14
2.1.2 Recompilation for Other Device Variants .....	17
2.2 IAR .....	17
2.3 GCC.....	17
2.4 Download the Application .....	18
2.4.1 Image Creation for Secure Device (CC3220S and CC3220SF) .....	22
2.4.2 Image Creation for Nonsecure Device (CC3220) .....	27
2.5 Launching the Application.....	29
2.6 Using the Application .....	30
<b>3 Use the Debugger/IDE</b> .....	<b>34</b>
3.1 Prerequisites .....	34
3.2 Development Formatting for SFLASH .....	34
3.3 CCS .....	35
3.3.1 Rebuild the SimpleLink™ Library for Debug Configuration.....	35
3.3.2 Download and Debug the WLAN Station Example .....	36
3.4 IAR .....	39
3.5 GCC.....	39
<b>Revision History</b> .....	<b>40</b>

## Preface

---

---

---

This guide is intended to assist users in the initial setup and demonstration of running their first sample application for the CC3220, CC3220S, and CC3220SF SimpleLink™ Wi-Fi® and Internet of Things Solution, a Single-Chip Wireless MCU from Texas Instruments™. The guide explains how to install the software development kit (SDK) and various other tools required to get started with the first application.

### Trademarks

SimpleLink, Texas Instruments, Code Composer Studio are trademarks of Texas Instruments.

*Bluetooth* is a registered trademark of Bluetooth SIG.

IAR Embedded Workbench is a registered trademark of IAR Systems AB.

Linux is a registered trademark of Linux Foundation.

Microsoft is a registered trademark of Microsoft Corporation.

Wi-Fi is a registered trademark of Wi-Fi alliance.

All other trademarks are the property of their respective owners.

### Introduction

This preliminary release of the Getting Started guide is focused on the Code Composer Studio™ (CCS) IDE.

For detailed IAR instructions, refer to:

`<sdk-installation-path>\docs\cc3220\CC3220_SDK_IAR_project_setup_guide.html`

GCC is currently not supported.

The CC3220 device is part of the SimpleLink microcontroller (MCU) platform, which consists of Wi-Fi, *Bluetooth*® low energy, Sub-1 GHz, and host MCUs. All share a common, easy-to-use development environment with a single core software development kit (SDK) and rich tool set. A one-time integration of the SimpleLink platform lets you add any combination of devices from the portfolio into your design. The ultimate goal of the SimpleLink platform is to achieve 100 percent code reuse when your design requirements change. For more information, visit [www.ti.com/simplelink](http://www.ti.com/simplelink).

### Prerequisites

The user is expected to have the following:

- CC3220S-LAUNCHXL or CC3220SF-LAUNCHXL
- An 802.11b/g/n (2.4-GHz) Wireless Access Point (AP)
- A computer running Microsoft® Windows 7

## Download and Installation

### 1.1 CC3220 Software Development Kit (SDK)

- Download the following software at [CC3220 SDK package](#).
- Run the installer by double-clicking on the CC3220 SDK installer.
- Read and accept the license agreement to proceed.
- Choose the desired path to place the package (else default is chosen).
- Proceed with the installation and click Finish once done.

### 1.2 Service Pack

If the board is not already flashed with the service pack for SDK <version>, the latest service pack for SDK <version> must be flashed on the CC3220 wireless MCU. The most updated service pack is available under <sdk-installation>\tools\cc32xx\_tools\servicepack-cc3x20. To program the service pack with an UniFlash, the binary file (.bin) must be loaded to the *Files/Service Pack*.

### 1.3 UniFlash Tool

UniFlash is a stand-alone tool used to program on-chip flash memory on TI MCUs and onboard flash memory for Sitara processors. The tool lets the developer download application image, service pack, and other files on the serial flash of the CC3220 device. It also enables the creation of OTA (Over-The-Air) images.

1. Download the Image Creator tool from <http://www.ti.com/tool/uniflash>.
2. Run the installer by double-clicking on it. Click Next to continue, as shown in [Figure 1-1](#).

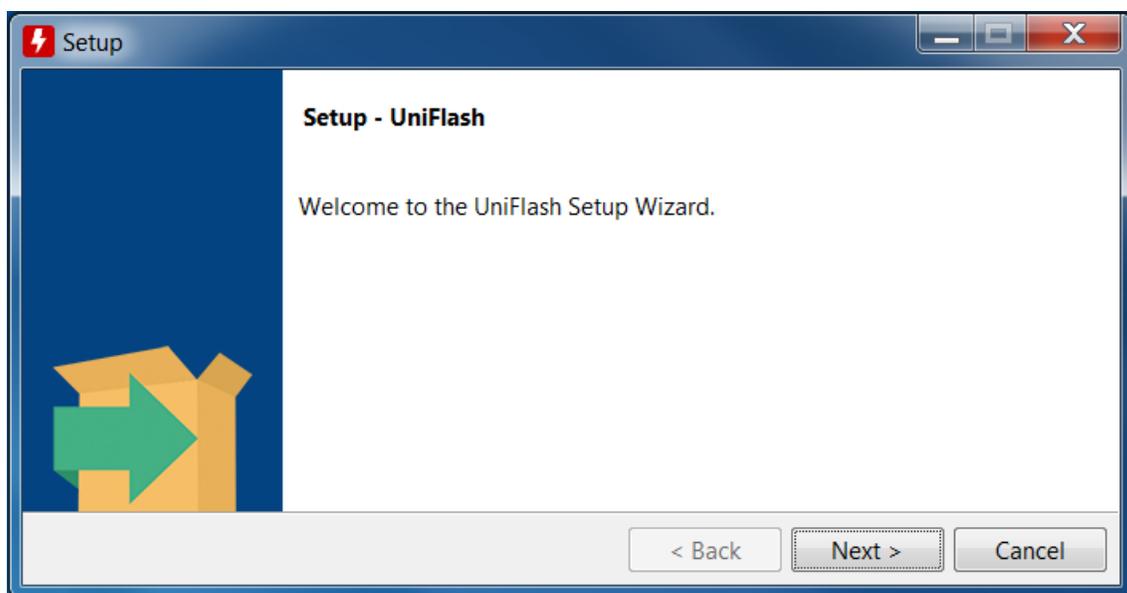
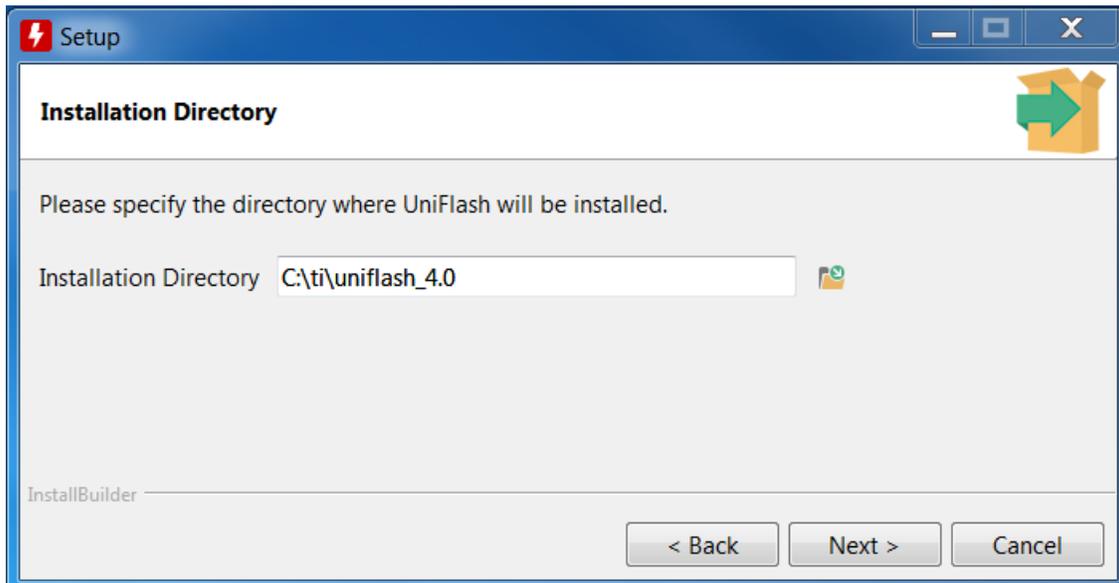


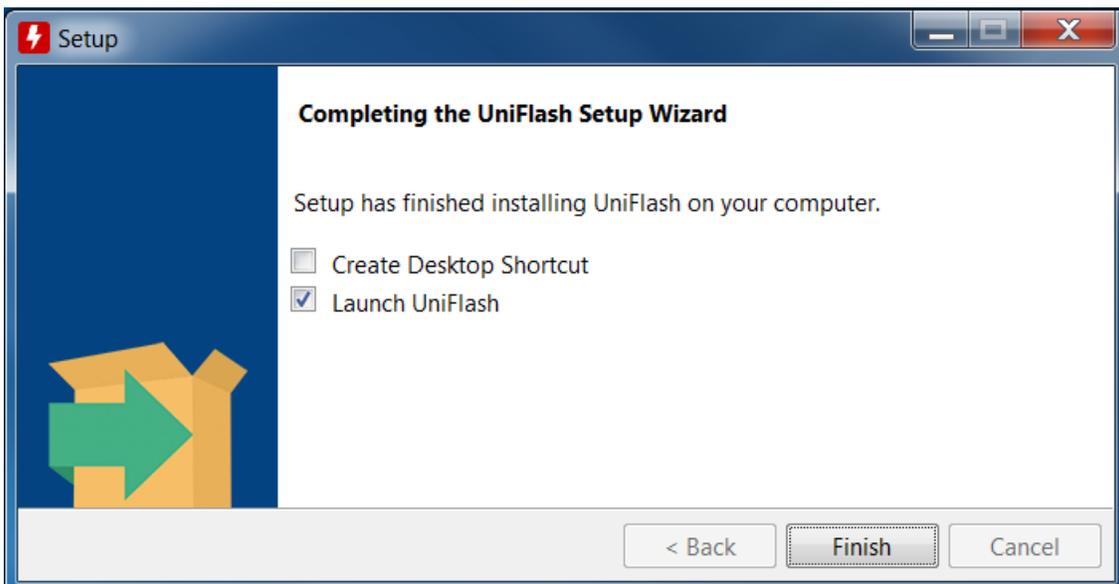
Figure 1-1. Install UniFlash

3. Choose the desired path in the Installation Directory field to place the package as shown in [Figure 1-2](#), else the default is chosen.



**Figure 1-2. Select Install Path**

4. Proceed with the installation, and when done click Finish as shown in [Figure 1-3](#).



**Figure 1-3. Complete Installation**

## 1.4 Serial Terminal

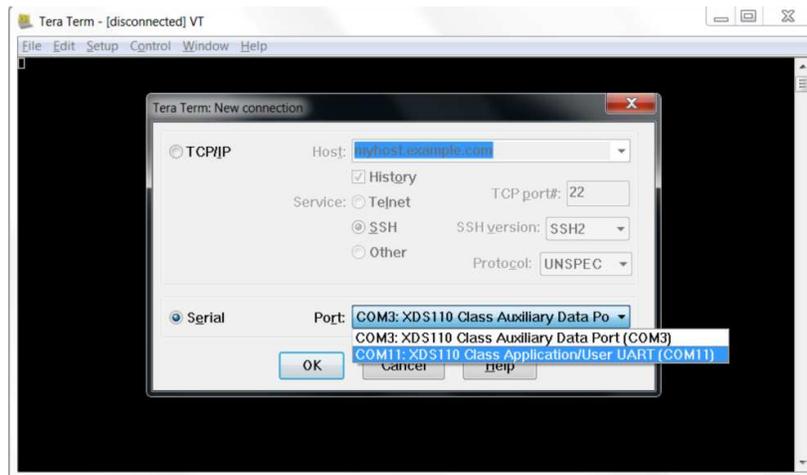
Many sample applications come with UART support for printing the debug information or the status of any operation. Some applications require user's input through UART, so it is advised to install a serial terminal application. Tera Term is used for demonstration here.

1. Download Tera Term and install as described in the instructions.
2. Run the Tera Term application.
3. Select the Serial Port, then COM11: XDS110 Class Application/User UART (COM11), as shown in [Figure 1-4](#). Click OK to continue.

---

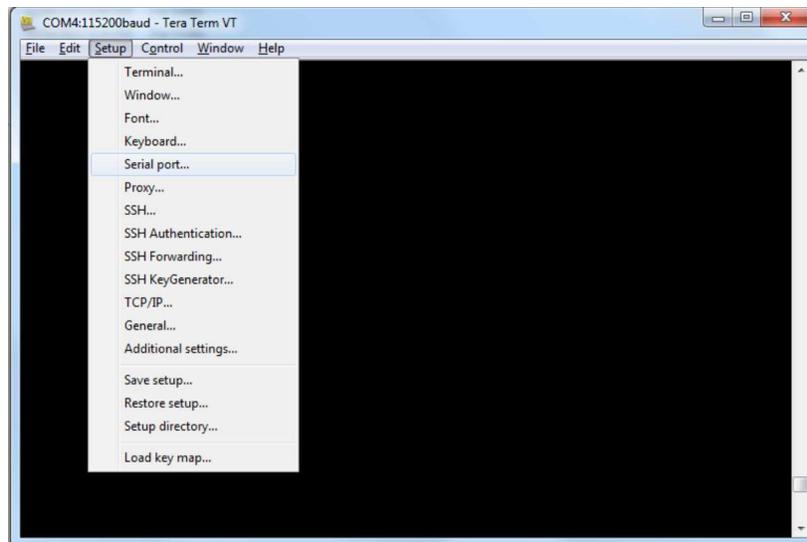
**NOTE:** Install the XDS110 drivers for the PC to enumerate these ports for serial terminal. See [Section 1.6](#) for installation of the XDS110 drivers.

---



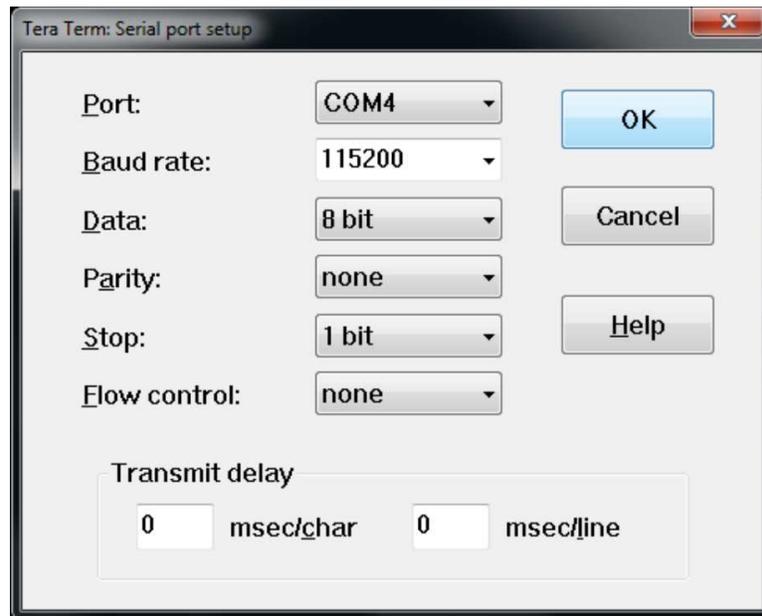
**Figure 1-4. Select Serial Port**

4. Go to Setup → Serial port, as shown in [Figure 1-5](#).



**Figure 1-5. Set up Serial Port**

- Configure the setting as shown in [Figure 1-6](#). Click OK to continue.



**Figure 1-6. Configure Settings**

## 1.5 Pin Mux Tool

TI recommends installing the [Pin Mux Tool](#), although it is not required to get started with your sample application. This tool helps to configure the pin mux setting for your application. All the provided sample applications already contain the required pin mux file (output of this tool). The latest version of this tool can be downloaded from <http://www.ti.com/tool/PINMUXTOOL>. For more information on this tool, see [http://processors.wiki.ti.com/index.php/TI\\_PinMux\\_Tool\\_v4](http://processors.wiki.ti.com/index.php/TI_PinMux_Tool_v4).

For older versions of this tool, the CC3220 device may not be listed explicitly under the supported devices. If that is the case, choose the CC3200 device from the drop-down menu to generate the same output files required by the CC3220 device.

## 1.6 XDS110 Driver Installation

XDS110 drivers must be installed before one can use the debugger or the Image Creator tool. It also enumerates the serial terminal port, which can be used to print the debug messages over UART. The XDS drivers can be obtained from the [http://processors.wiki.ti.com/index.php/XDS\\_Emulation\\_Software\\_Package#XDS110\\_Reset\\_Download](http://processors.wiki.ti.com/index.php/XDS_Emulation_Software_Package#XDS110_Reset_Download). Do the following steps for the installation.

- Run the installer in administrator mode and click Next, as shown in [Figure 1-7](#).

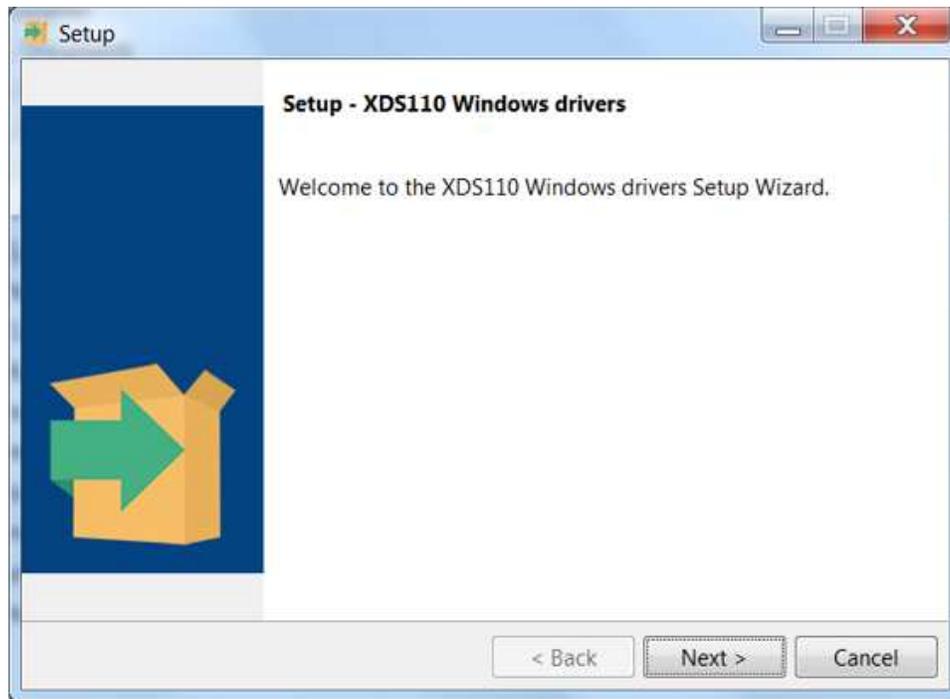


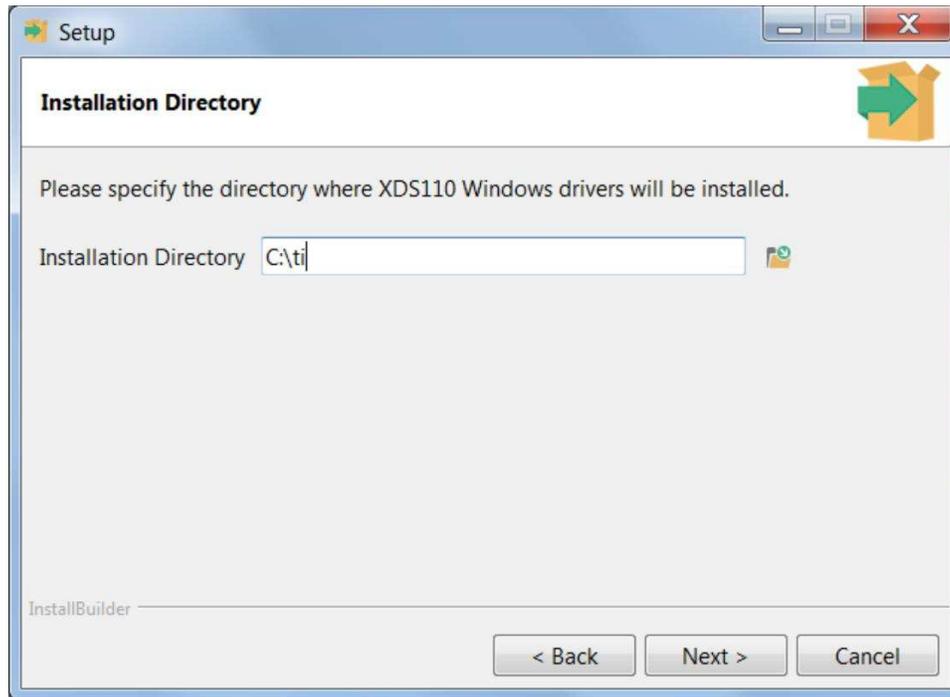
Figure 1-7. Set up XDS110

2. Read and accept the License Agreement and click Next, as shown in [Figure 1-8](#).



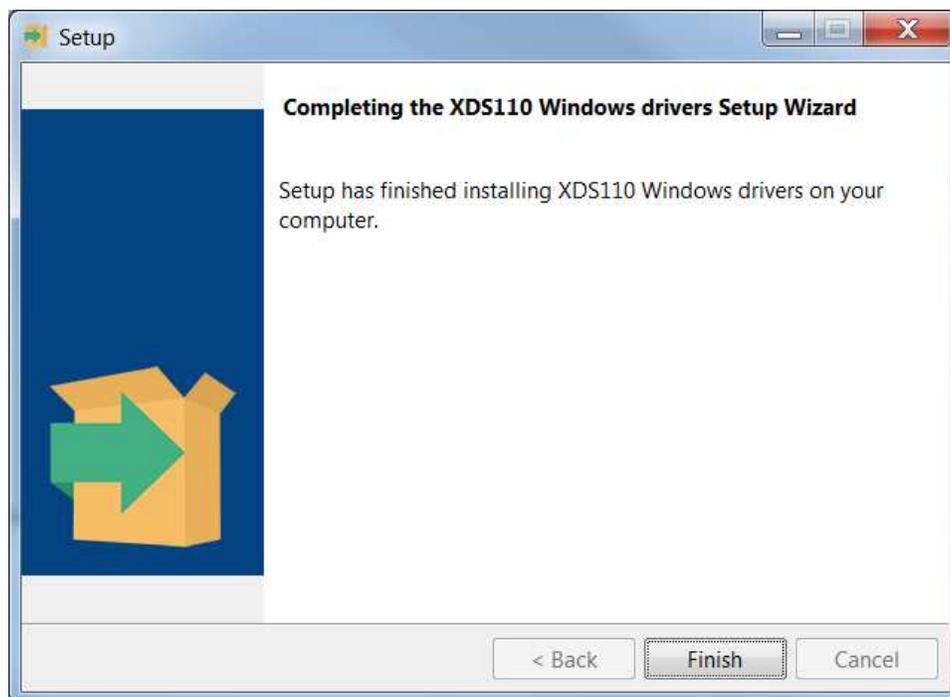
Figure 1-8. License Agreement

- Specify the installation path in the Installation Directory field, as shown in [Figure 1-9](#) (default is C:\ti), and proceed with the installation.



**Figure 1-9. Select Install Path**

- Click Finish when installation is done, as shown in [Figure 1-10](#).



**Figure 1-10. Complete Installation**

## 1.7 Debugger/IDE

The following debugger/IDE can be used to download and debug the application image.

### 1.7.1 CCS

The latest CCS installer can be downloaded from <http://www.ti.com/tool/ccstudio>. CCS is a free tool from TI, lets developers work with various TI devices. The SDK supports CCS version 7.0 or later.

1. Double-click on the installer and follow the instruction to install this tool
2. Make sure to select the SimpleLink Wireless MCUs option for processor support, as shown in [Figure 1-11](#). Click Next to continue.

**NOTE:** If CCS is already installed for other processors (and not for SimpleLink wireless MCU), then the installer must run again and select the SimpleLink Wireless MCUs option for processor support this time. The rest of the installation steps will remain the same as for a new installation:

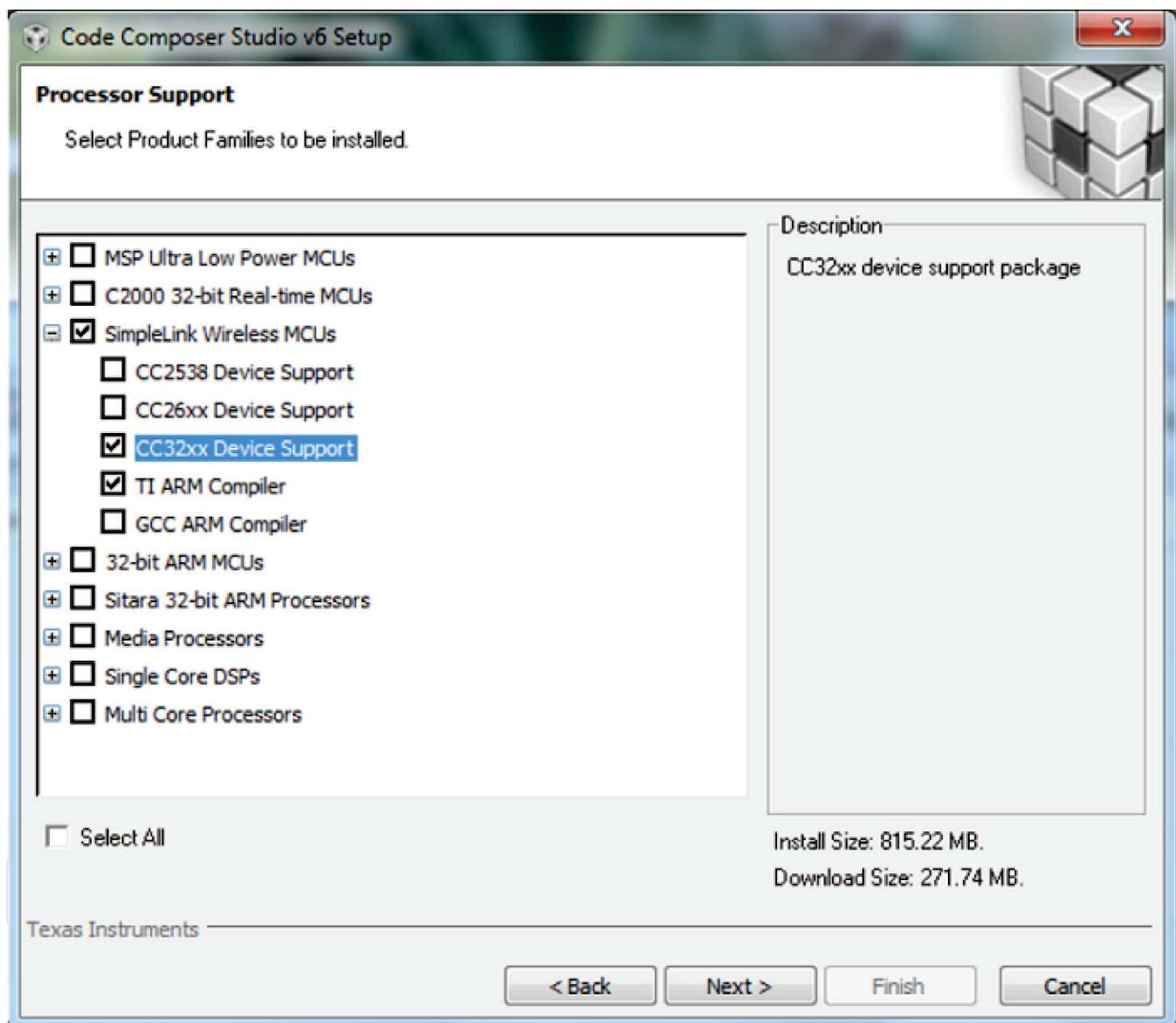


Figure 1-11. Set up CCS

### 1.7.1.1 CCS Linux Patch for CC3220 Device Variants

In case the Linux® version of CCS is being used and the CC3220 variant is not listed within the target devices, the following patch should be applied:

1. Copy the content of the `<sdk-installation-path>\tools\ccs_patch\ccs\` folder into `<ccs_installation_dir>\ccs_base`.
2. Click to merge the folders with existing ones when prompted.
3. If working with a 64-bit version of CCS on Linux, delete the `libFlashCC3220SF.so` file in the `<ccs_installation_dir\ccs_base\DebugServer\bin\` folder and rename `libFlashCC3220SF_64bit.so` to `libFlashCC3220SF.so`.

The future version of CCS might not need this patch. See the Release Notes (in html format) inside `<sdk-installation-path>`.

After successful patching, the device variant would be listed for CCS, as shown in [Figure 1-12](#).

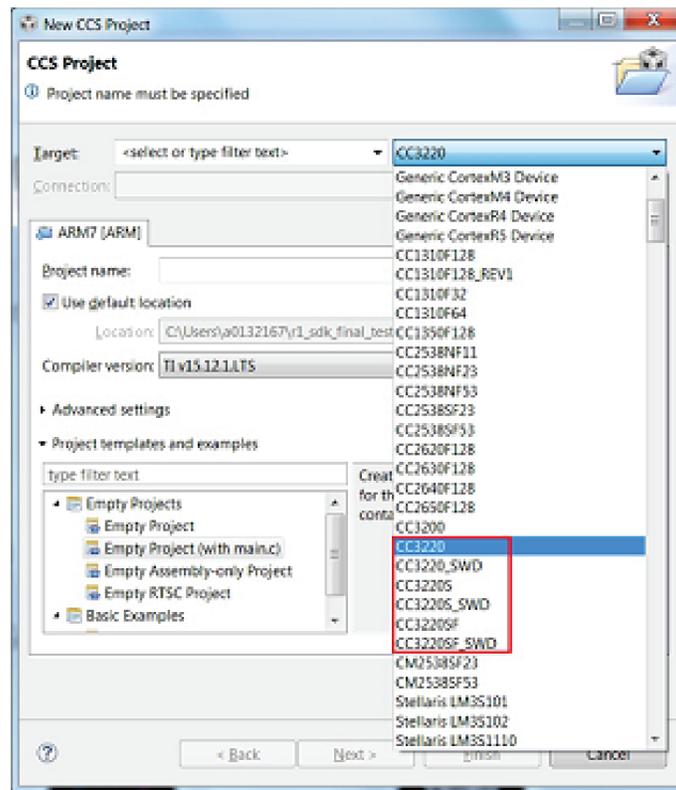


Figure 1-12. Device Variant for CCS

## 1.7.2 IAR

The developer is responsible for buying the license for the IAR Embedded Workbench® tool. A trial version can be downloaded from <https://www.iar.com/iar-embedded-workbench/#!?device=CC3220&architecture=ARM>.

Double-click on the installer and follow the instruction to install this tool. For detailed IAR setup instruction, see `<sdk-installation-path>\docs\simplelink_mcu_sdk\Quick_Start_Guide.html`.

## 1.7.3 GCC

For detailed GCC setup instruction, please refer to `<sdk-installationpath>\docs\simplelink_mcu_sdk\Quick_Start_Guide.html`

## 1.8 Operating Systems

The CC3220 SDK currently supports TI-RTOS and FreeRTOS. Each real-time kernel port consists of three files that contain the core kernel components and are common to every port, and one or more files that are specific to a particular microcontroller and/or compiler. Each directory contains files specific to a particular compiler (CCS, GCC, and IAR).

### 1.8.1 TI-RTOS

TI-RTOS for SimpleLink solutions is already installed in the latest CCS releases (see [Section 1.7.1](#)). IAR users can install the TI-RTOS Support Package as a separate installer (see below).

#### 1.8.1.1 Install TI-RTOS as a Separate Installer

The latest TI-RTOS support package for SimpleLink devices can be downloaded and installed from <http://www.ti.com/tool/ti-rtos>.

### 1.8.2 FreeRTOS

The following are the instructions to add the FreeRTOS support.

1. Download FreeRTOS official version 9 from <https://sourceforge.net/projects/freertos/files/latest/download?source=files>.
2. Install the software under `C:/`
3. Copy the content of the patch (CCS, GCC, and IAR folders), and paste it at `C:/FreeRTOSv9.0.0/FreeRTOS/Source/portable`.
4. Modify the FreeRTOS directory name from `FreeRTOSv9.0.0` to `FreeRTOSv9.0.0a`

For IAR users, there is a manual fix that need to be done on top of the project , please change the following:

1. Right click on the project.
2. Select **Linker** from the category on the left.
3. Go to the **Library** tab.
4. Select the checkbox **Override default program entry**
5. Select **Entry symbol** and enter **resetISR** in the text box.

---

---

## Execute your First Application

---

---

The SDK supports the following device variants:

- CC3220 – Base variant
- CC3220S – CC3220 + MCU security
- CC3220SF – CC3220S + internal flash

The SDK is packed with precompiled binaries for several networking and peripheral examples. By default, the sample applications are built for the CC3220SF variant. The user can easily compile the same applications for the other variants just by selecting them in the project properties. See [Section 2.1](#) to compile the sample application for the required device variant.

This document uses *Network Terminal* as the reference application. The Network Terminal application provides a CLI (command line interface over UART connection) that lets users activate basic SimpleLink operations such as triggering a WLAN scan, connecting to a local access point (or setting an access point or Wi-Fi-Direct connection), and performing networking services such as PING, MDNS, or data transfer over TCP/UDP sockets. The application also enables configuration of Wake-On-WLAN filters and scan policy and lets the user put the device in a transceiver mode for testing TX and RX operations.

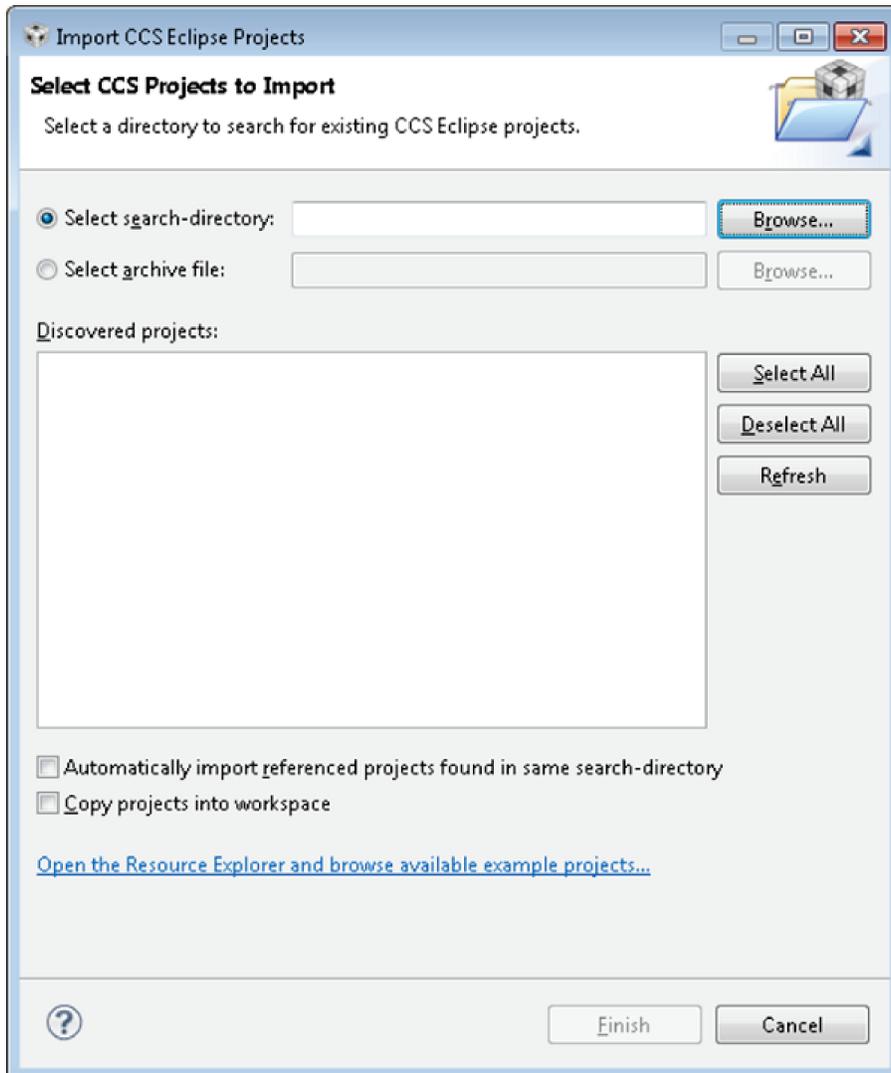
This example uses a real-time operating system (TI-RTOS or FreeRTOS). The following instructions will use the CC3220SF device and TI-RTOS, but can be easily changed to other combination, by:

- Selecting the CC3220S device-specific directory (CC3220S\_LAUNCHXL instead of CC3220SF\_LAUNCHXL)  
or
- Selecting sample project for FreeRTOS (for example, network\_terminal\_CC3220SF\_LAUNCHXL\_freertos\_ccs instead of network\_terminal\_CC3220SF\_LAUNCHXL\_tirtos\_ccs)

## 2.1 CCS

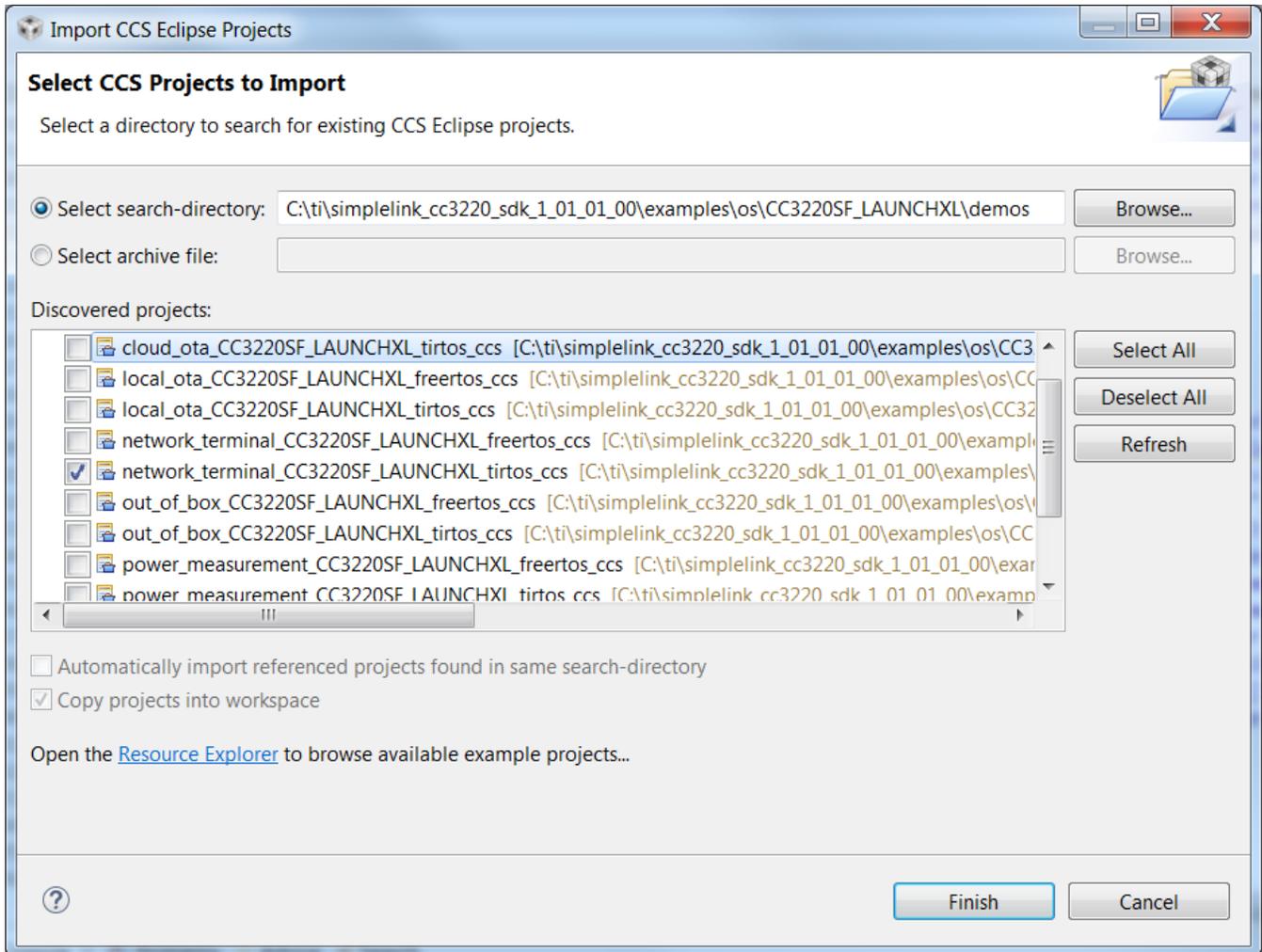
### 2.1.1 Import and Configure Project

1. Open CCS.
2. Choose Project → Import CCS Eclipse Projects from the menu.
3. Select the Browse button in the Import CCS Eclipse Projects dialog, as shown in [Figure 2-1](#), and select the directory <sdk-installation-path>\examples\os\CC3220SF\_LAUNCHXL\demos (use relative path of CC3220S if needed).



**Figure 2-1. Select CCS Projects to Import**

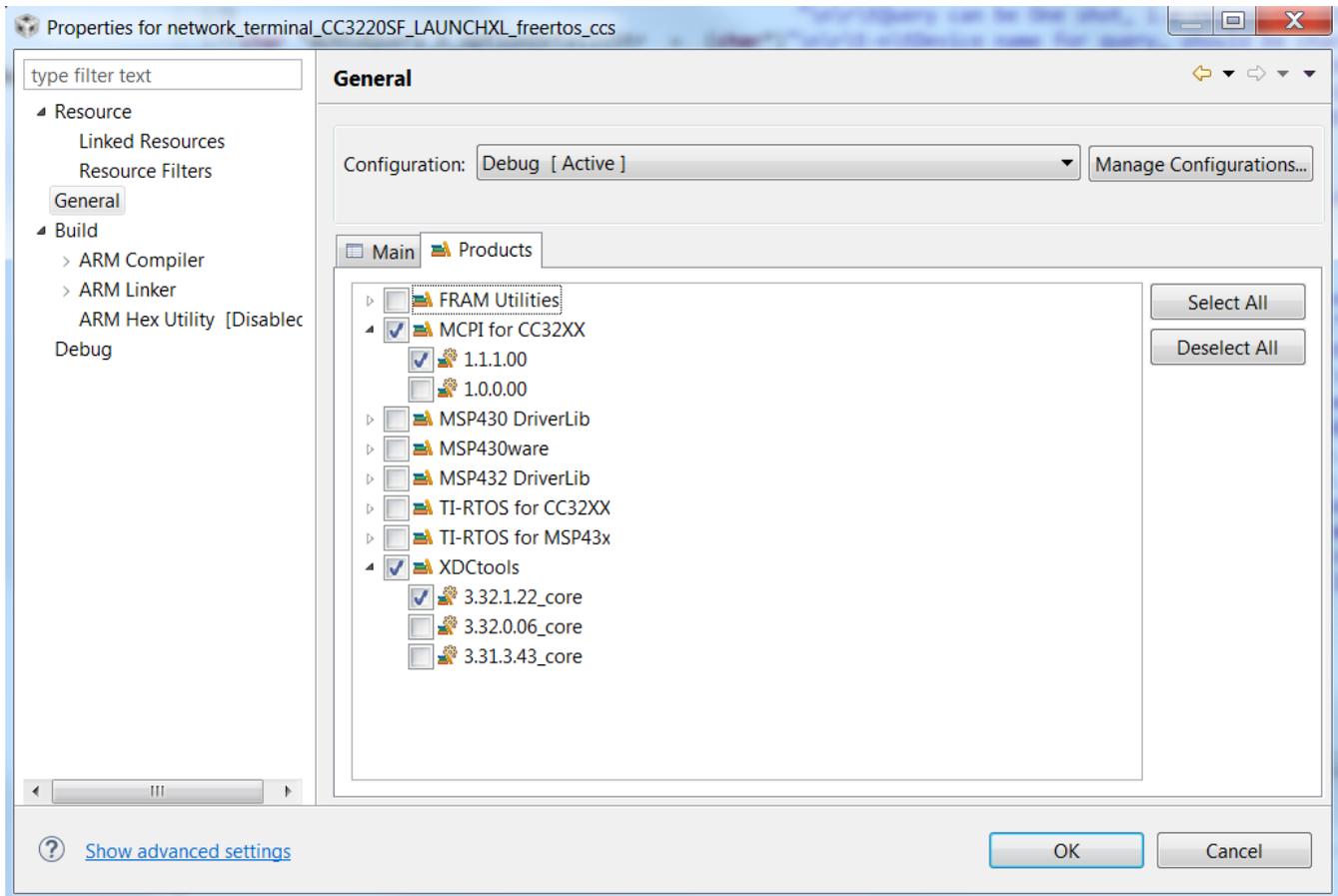
4. Select the `network_terminal_CC3220SF_LAUNCHXL_tirtos_ccs` project and click Finish (this will automatically import also the dependent `tirtos_builds_CC3220SF_LAUNCHXL_custom_ccs` project), as shown in [Figure 2-2](#). For any library import (such as `simplink` or `driverlib`), do not check the Copy projects into workspace checkbox. This breaks the link from the libraries to their dependencies. The network terminal project is automatically copied to the workspace.



**Figure 2-2. Select wlan\_station Projects**

**NOTE:** By default, for all reference examples the option to copy a project to the workspace is enforced in CCS, because CCS copies the application-specific files to the workspace location. Any modification done to these files is reflected only in the copied versions (not in the original files in the SDK installation directory). To remove this enforcement, delete the `.ccsimportspec` from the folder of the project.

5. Select the `tirtos_builds_CC3220SF_LAUNCHXL_custom_ccs` project in Project Explorer, and select Project → Properties from the menu. Under General, select the RTSC tab, as shown in Figure 2-3. Make sure the latest versions of XDCtools and MCPI for CC32XX solutions are selected. Verify the same is configured for `network_terminal_CC3220SF_LAUNCHXL_freertos_ccs`.



**Figure 2-3. Select tirtos\_config Project**

6. Select the `network_terminal_CC3220SF_LAUNCHXL_freertos_ccs` project and build it.
7. Right-click on the project (Project Explorer → `network_terminal_CC3220SF_LAUNCHXL_freertos_ccs`) and click on rebuild project.
8. The preceding steps will generate the application binaries under `<workspace>network_terminal_CC3220SF_LAUNCHXL_tirtos_ccs`:
  - `.out` – to be used when downloading with the CCS debugger.
  - `.bin` – to be used when programming with the Uniflash.
 In addition, the folder will include the target map file and the compiled object files.
9. See Section 2.4 to download the application using the Image Creator tool.
10. See Chapter 3 to execute the application from the debugger.

---

**NOTE:** By default, the application is compiled for the CC3220SF variant. To build the application for other device variants (CC3220 and CC3220S), see Section 2.1.2.

---

### 2.1.2 Recompilation for Other Device Variants

1. Right-click on the project and select Properties.
2. Select the required device variant under General → Main → Variant, as shown in Figure 2-4.

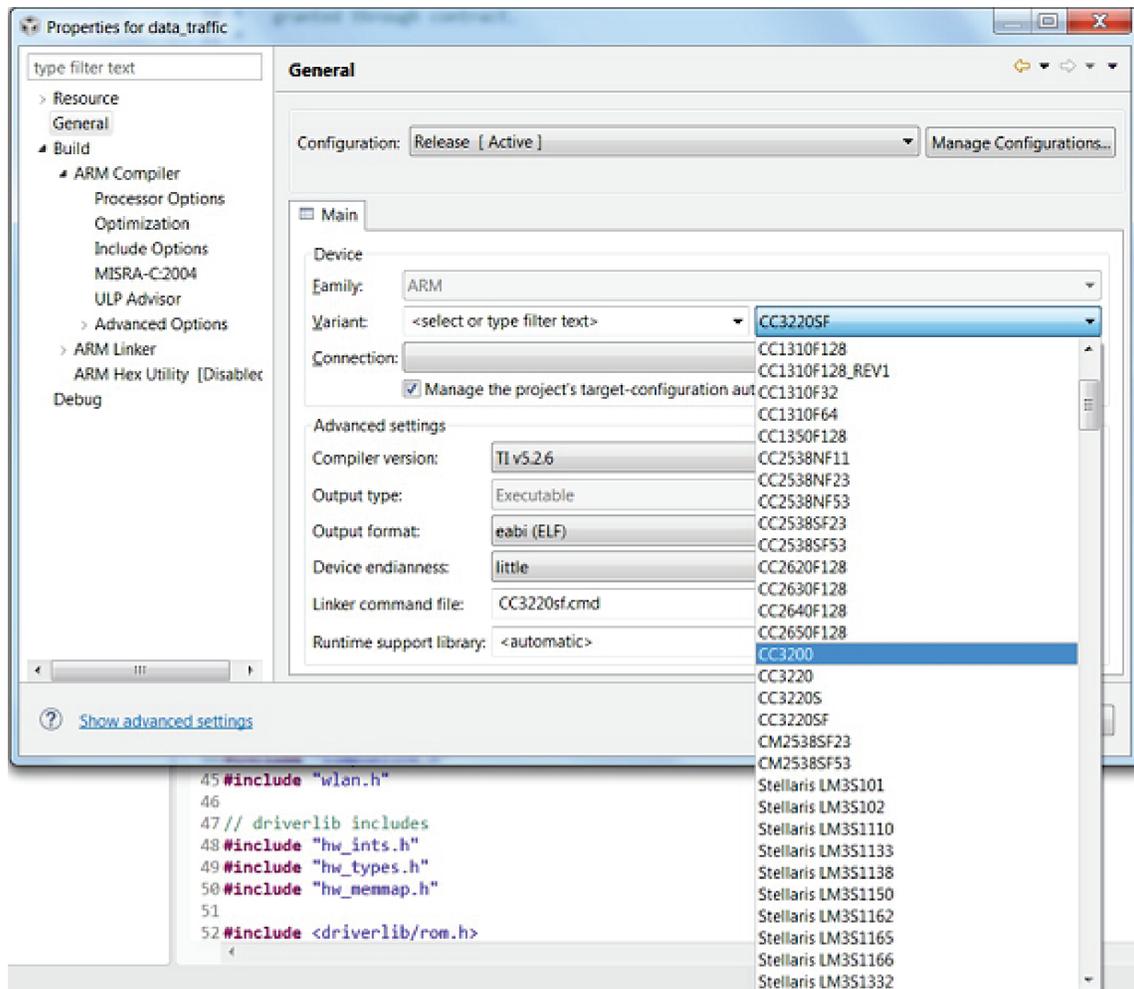


Figure 2-4. Select Device Variant

3. Click OK.

## 2.2 IAR

See [<sdk-installation-path>\docs\simplelink\\_mcu\\_sdk\Quick\\_Start\\_Guide.html](#)

## 2.3 GCC

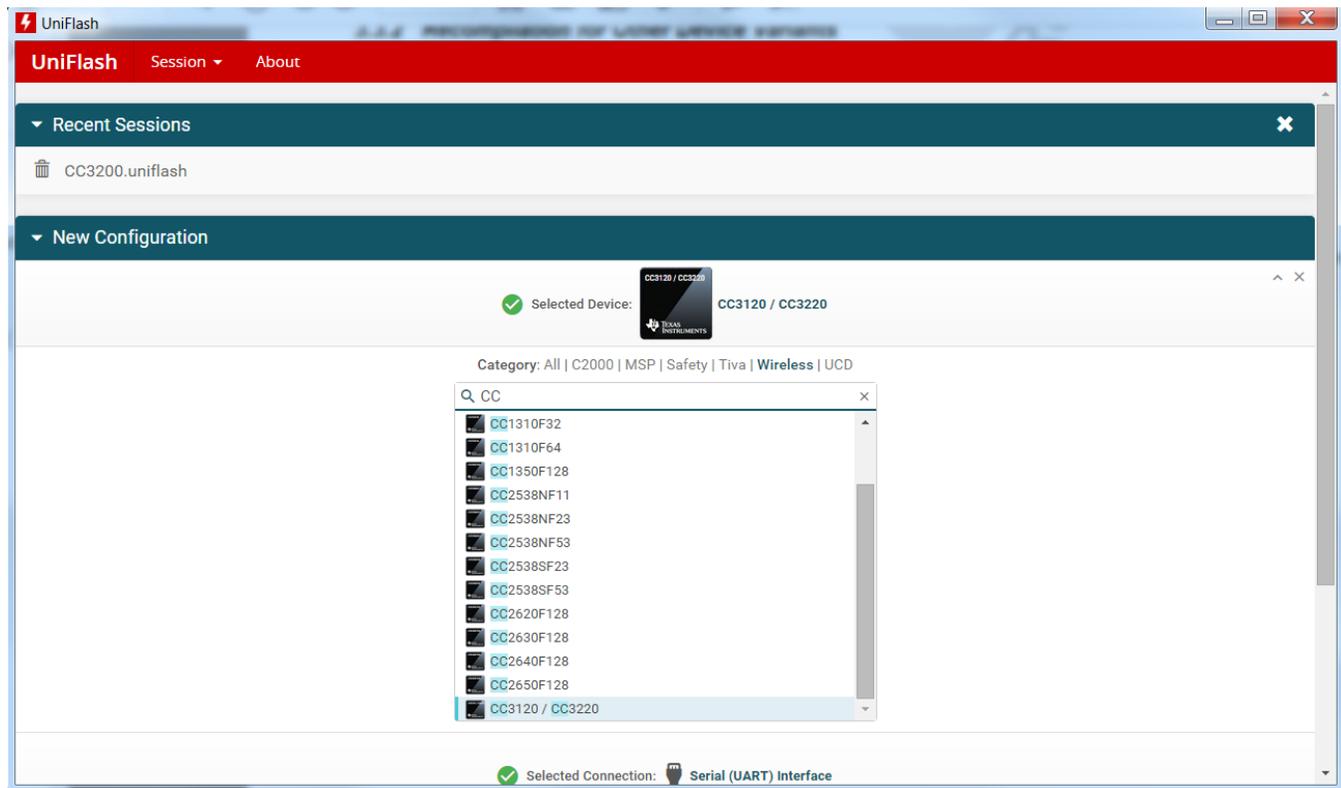
See [<sdk-installation-path>\docs\simplelink\\_mcu\\_sdk\Quick\\_Start\\_Guide.html](#)

## 2.4 Download the Application

You can program any application to the SFLASH using the UniFlash tool. For a CC3220SF device, the application will be copied to the internal flash at the next device boot.

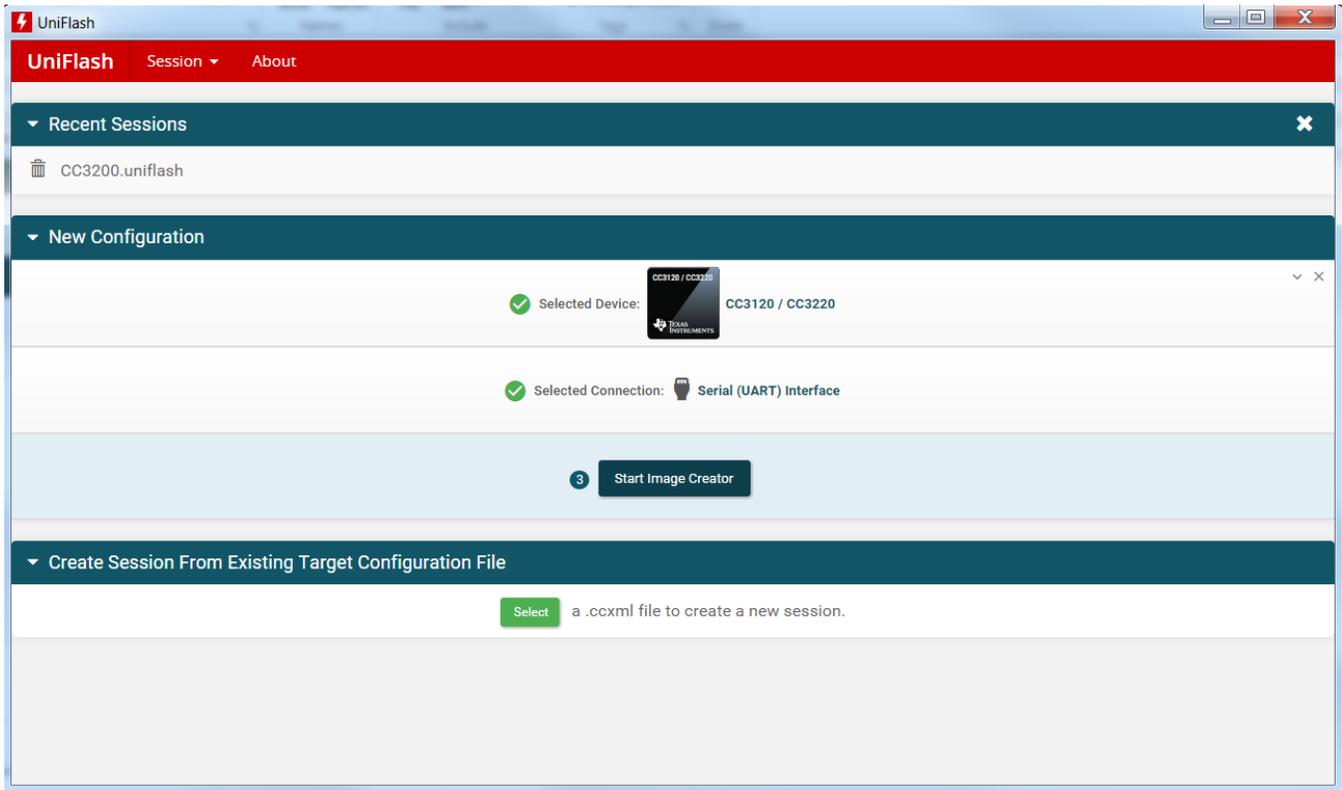
Do the procedure that follows to flash the Network Terminal application.

1. Run the UniFlash tool.
2. Select **CC3120 / CC3220** from the list of devices (you may type **CC3...** to the search tab to filter out other devices). See [Figure 2-5](#).



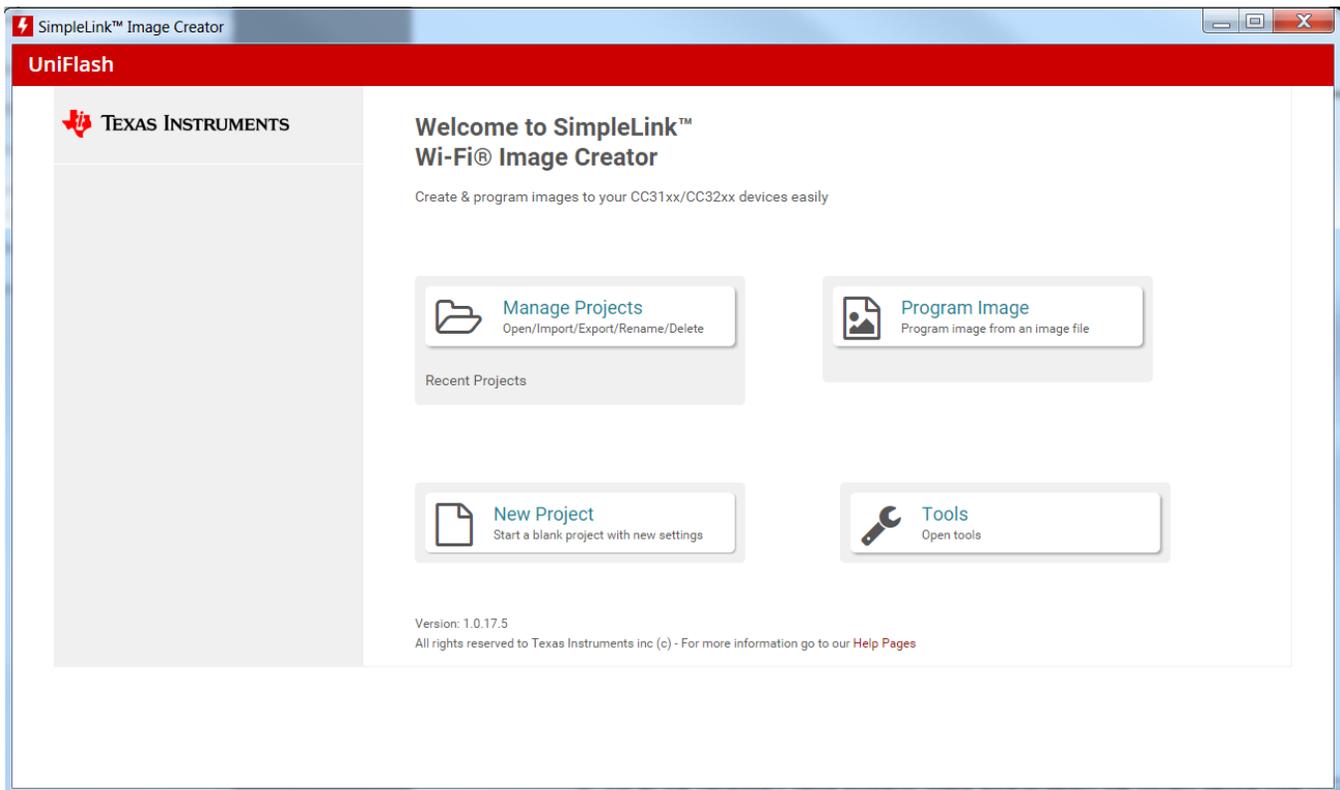
**Figure 2-5. UniFlash – Select Device**

3. Select Start Image Creator (see [Figure 2-6](#)).



**Figure 2-6. UniFlash – Start Image Creator**

4. Click on New Project, as shown in [Figure 2-7](#).



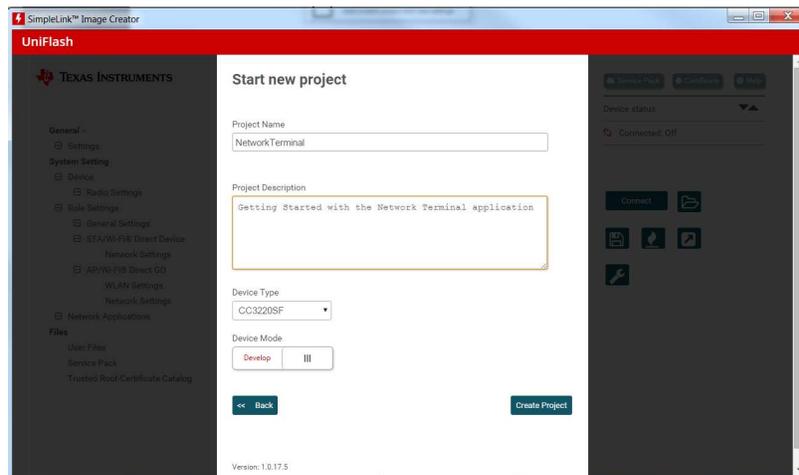
**Figure 2-7. New Project**

5. Fill all the necessary fields properly. Make sure to select the correct device type (CC3220 for CC3220 and CC3220S device, CC3220SF for CC3220SF device) and click on Create Project, as shown in [Figure 2-8](#).

---

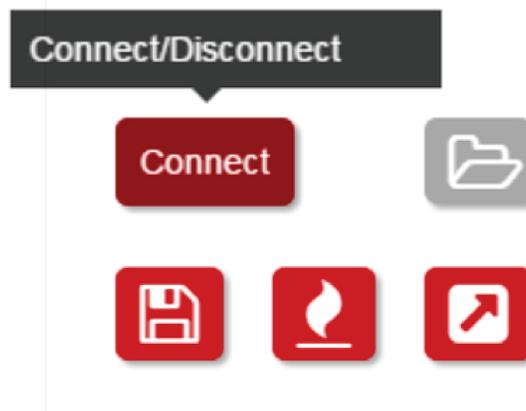
**NOTE:** Although not required for the first step of this Getting Started guide (which uses a programmable image), TI recommends putting the device in Development mode to allow JTAG operation so the image can be loaded by an IDE (described in [Chapter 3](#)).

---



**Figure 2-8. Create Project**

6. Click the Connect button, as shown in [Figure 2-9](#). Make sure the serial terminal is not connected to the device. Also, the SOP[2..0] configuration must be 010.



**Figure 2-9. Connect and Disconnect**

7. Once connected, click the Service Pack icon at the lower left.

---

**NOTE:** Flashing the service pack is not mandatory to develop the format of the device. However, if the example to be debugged requires the service pack, the service pack can be programmed with the development formatting.

---

8. Browse and select the service pack installed in [Section 1.2](#).

### 2.4.1 Image Creation for Secure Device (CC3220S and CC3220SF)

1. Click on Trusted Root-Certificate Catalog on the lower-left side.
2. Uncheck the Use default Trusted Root-Certificate Catalog checkbox and select Source File (.lst) and Signature Source File (.lst.signed.bin), available at <sdk-installation>\tools\certificate-playground, as shown in [Figure 2-10](#).

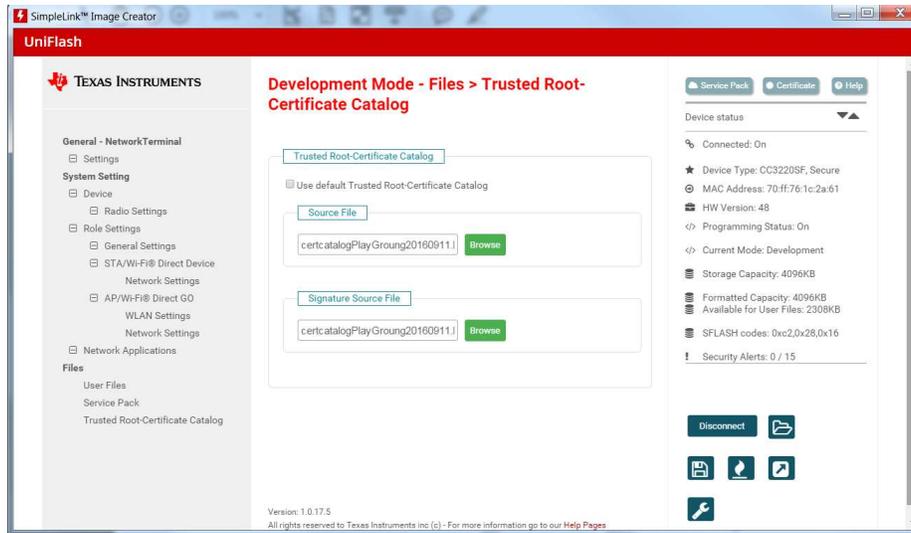


Figure 2-10. Certificate Store

3. Select the User Files icon on lower-left side and click the Add File icon, as shown in [Figure 2-11](#).

### Files > User Files

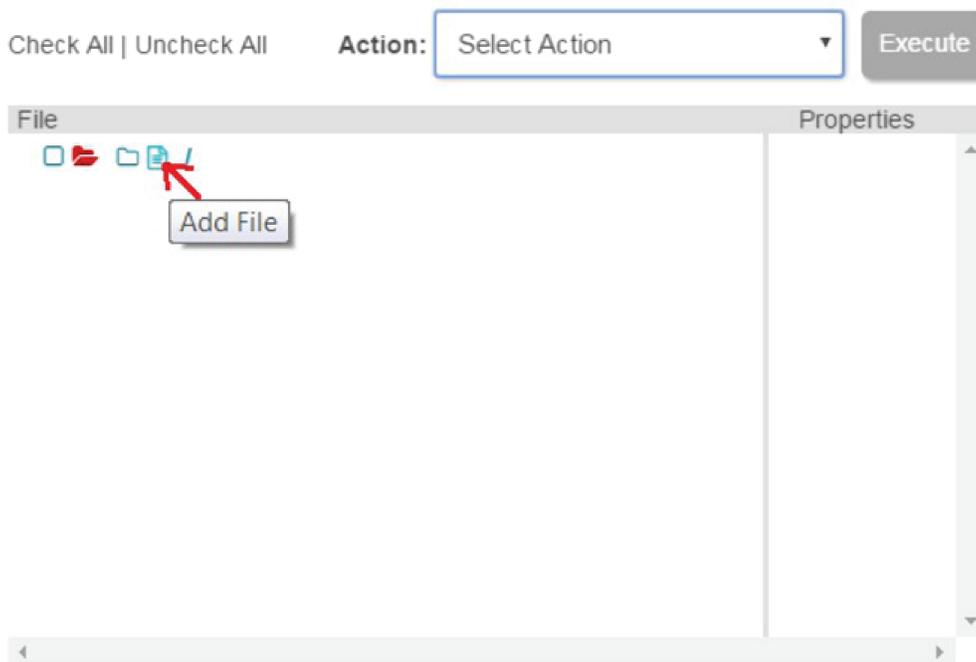
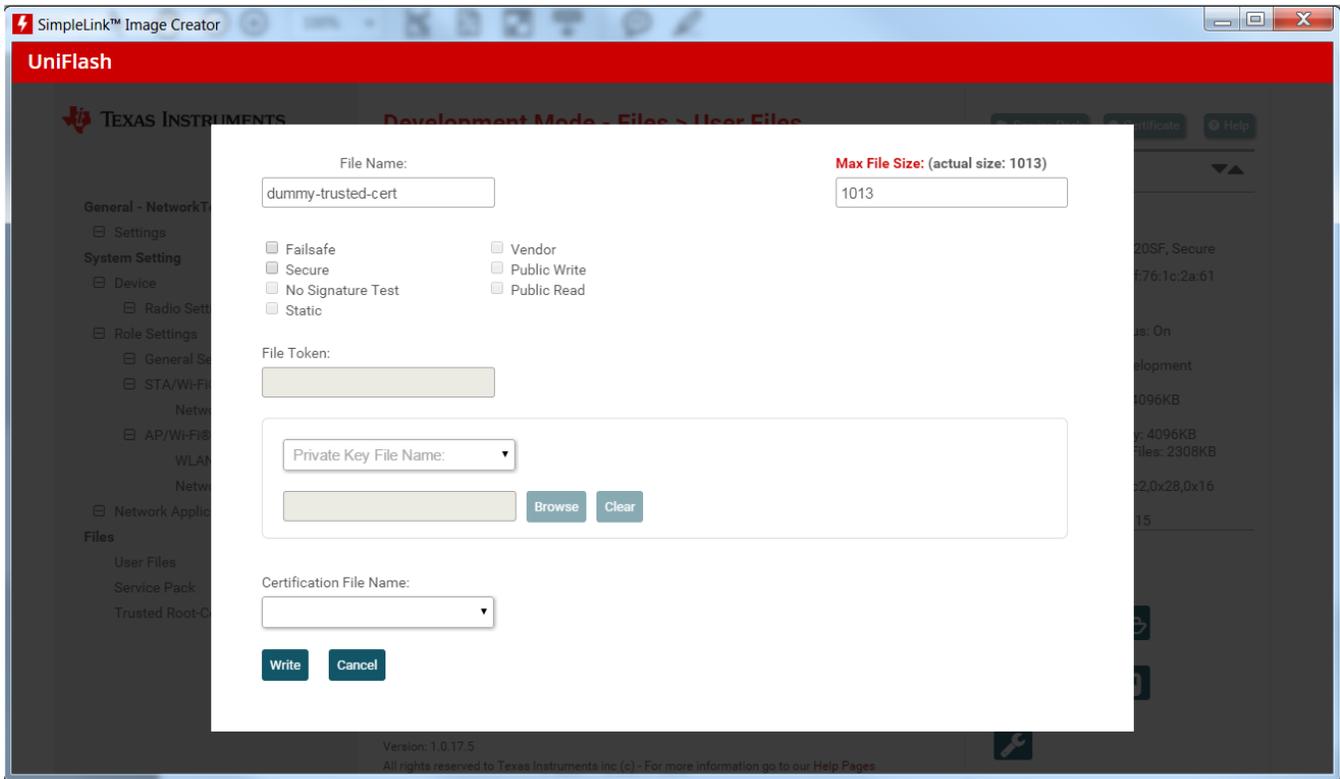


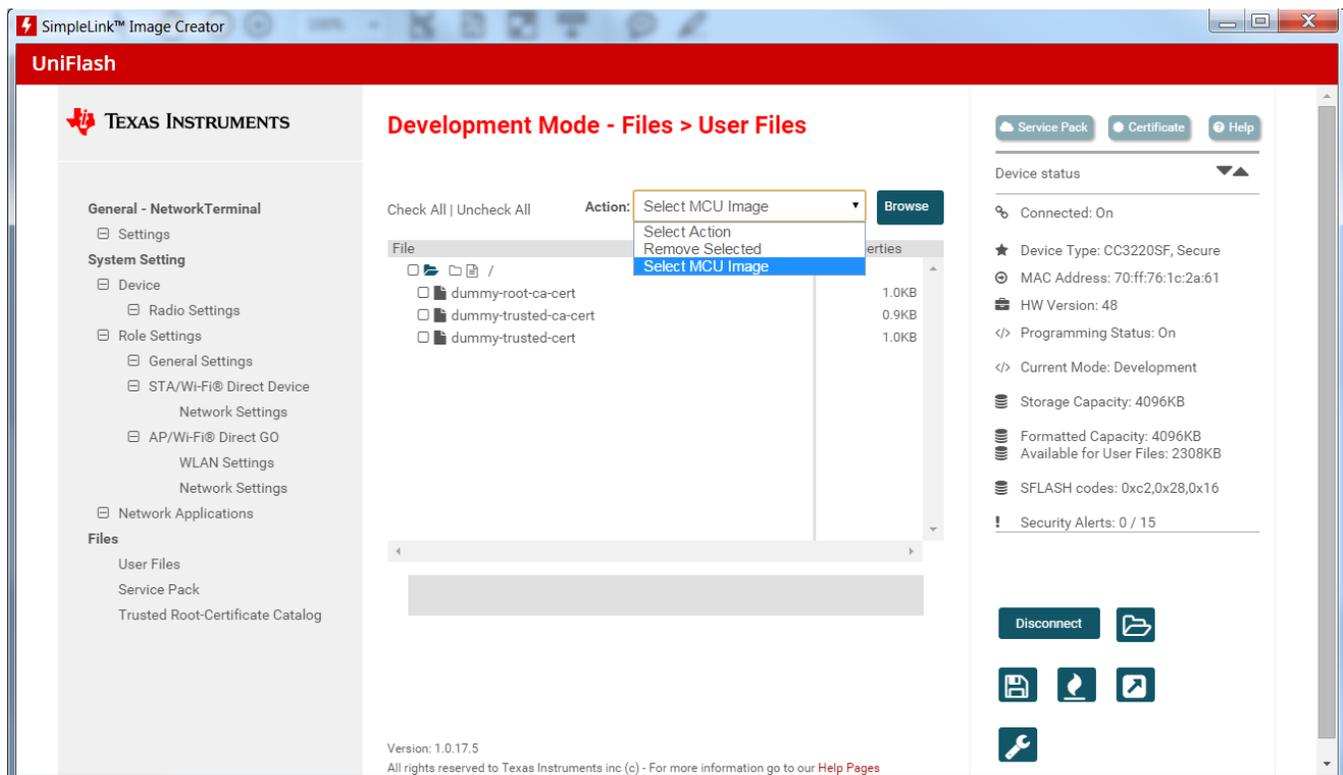
Figure 2-11. Add File

4. Select the following certificate files from `<sdk-installation>\tools\certificate-playground` and click Write, as shown in [Figure 2-12](#). Repeat this operation for each certificate file (that composes a chain of trust):
  - dummy-root-ca-cert
  - dummy-trusted-ca-cert
  - dummy-trusted-cert



**Figure 2-12. Select Certificate File**

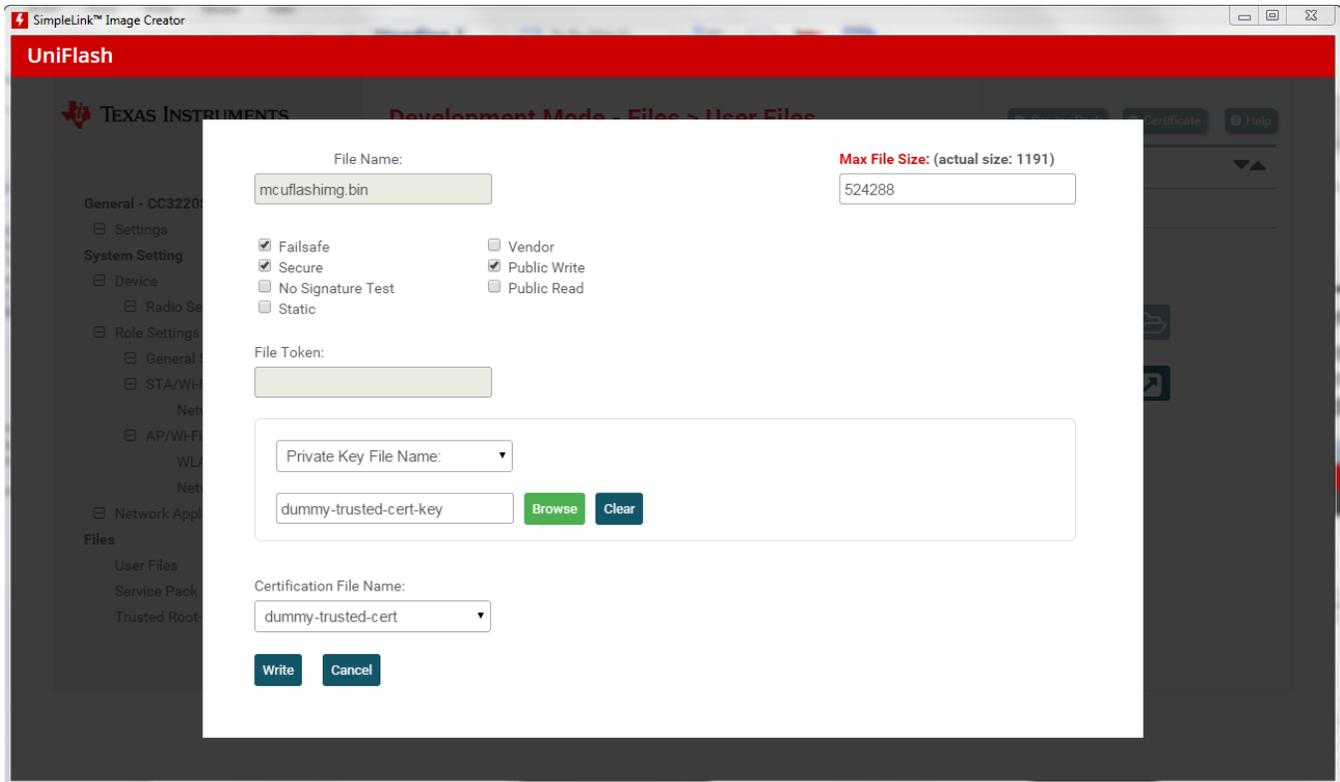
5. Select Select MCU Image from the drop-down menu, as shown in Figure 2-13.



**Figure 2-13. Select MCU Image**

6. Click Browse and select the application image (<workspace>\network\_terminal\_CC3220SF\_LAUNCHXL\_tirtos\_ccs\Debug\network\_terminal\_CC3220SF\_LAUNCHXL\_tirtos\_ccs.bin) to flash.

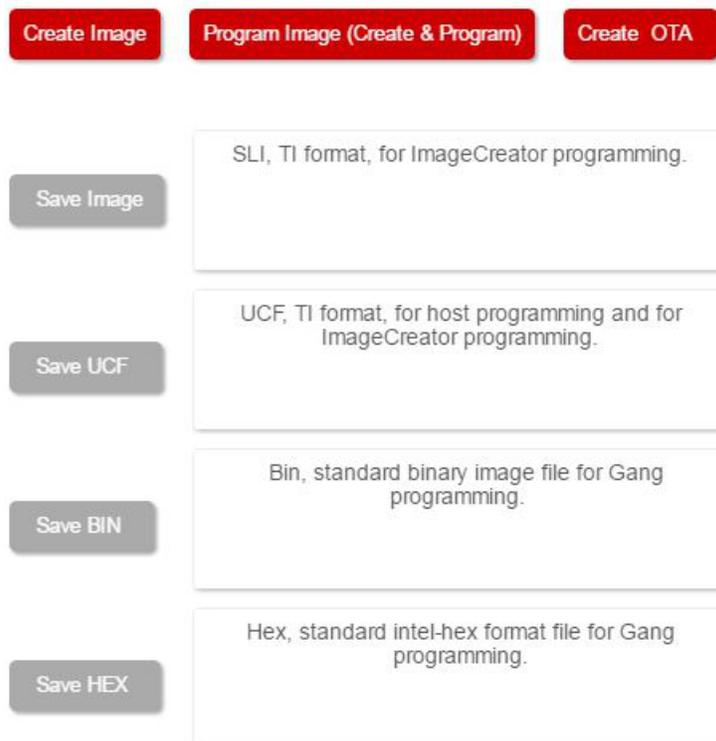
7. Make sure the **Secure**, **Failsafe** and **Public Write** checkboxes are checked, and select the other files.
  - Select Private Key File Name from the drop-down menu and browse the dummy-trusted-cert-key file available at `<sdk-installation>\tools\cc32xx_tools\certificate-playground`. Select the available certificate filename from the Certification File Name drop-down menu, as shown in [Figure 2-14](#), and click Write.



**Figure 2-14. Select Certificate Filename**

8. Browse and select the service pack installed in [Section 1.2](#).
9. Click on the  icon.

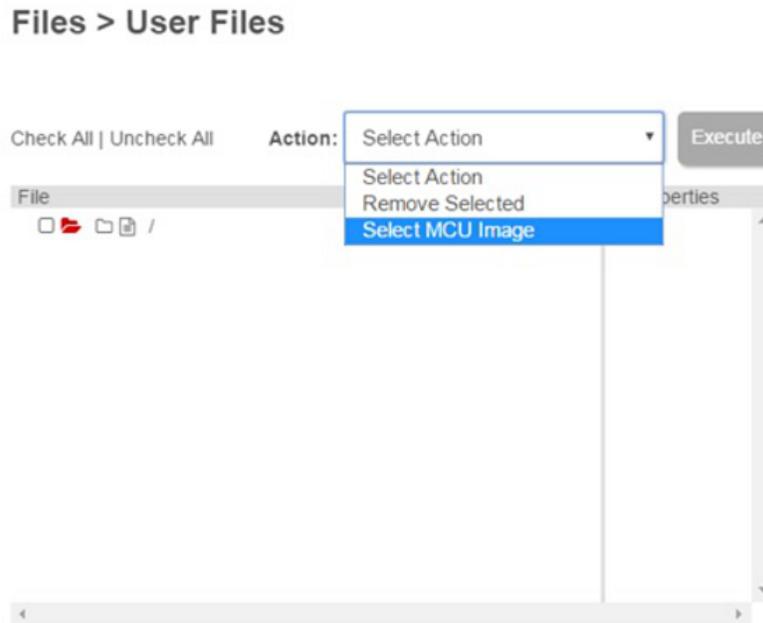
10. Click on Program Image (Create & Program), as shown in [Figure 2-15](#). This step might take a minute.



**Figure 2-15. Generate Image**

### 2.4.2 Image Creation for Nonsecure Device (CC3220)

1. Click on User Files icon on bottom left.
2. Select Select MCU Image from the Action drop-down menu, as shown in [Figure 2-16](#).



**Figure 2-16. Select MCU Image**

3. Click Browse and select the application image to flash

4. Uncheck the Secure checkbox. No other parameter needs to be updated. Click Write, as shown in Figure 2-17.

File Name:

Max File Size: (actual size: 73664)

Failsafe       Vendor  
 Secure             Public Write  
 No Signature Test     Public Read  
 Static

File Token:

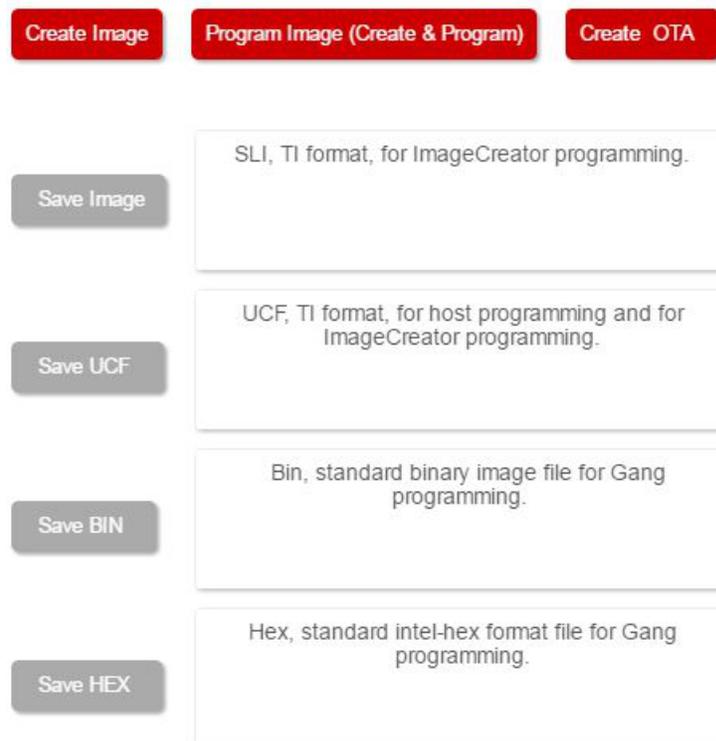
Private Key File Name:

Certification File Name:

Figure 2-17. Save Image

5. Click on the  icon.

- Click on Program Image (Create & Program), as shown in [Figure 2-18](#). This step might take a minute.



**Figure 2-18. Generate Image**

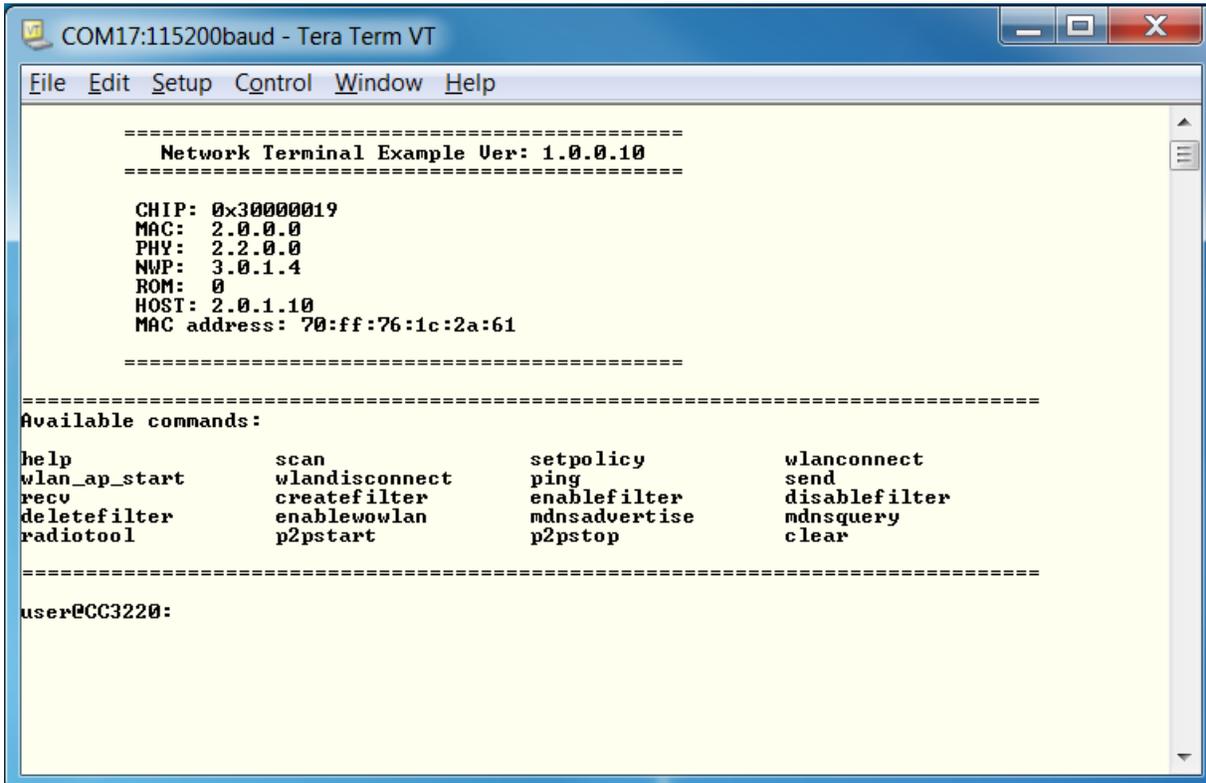
## 2.5 Launching the Application

Once the image programming is complete, the application can be launched.

- Open serial terminal and connect to the device port (as described in [Section 1.4](#)).
- Press the Reset button on the LaunchPad development kit. During the boot process, the new image will be detected and loaded to CC3220 internal memory (RAM in case of CC3220R and CC3220S, or flash in case of CC3220SF) and will be executed.

## 2.6 Using the Application

If the CC3220 device successfully completes all steps, the serial output appears as shown in [Figure 2-19](#).



```

=====
Network Terminal Example Ver: 1.0.0.10
=====

CHIP: 0x30000019
MAC: 2.0.0.0
PHY: 2.2.0.0
NWP: 3.0.1.4
ROM: 0
HOST: 2.0.1.10
MAC address: 70:ff:76:1c:2a:61

=====

Available commands:

help          scan          setpolicy     wlanconnect
wlan_ap_start wlan_disconnect ping          send
recv         createfilter  enablefilter  disablefilter
deletefilter enablewlan    mDNSadvertise mDNSquery
radiotool    p2pstart     p2pstop      clear

=====

user@CC3220:

```

**Figure 2-19. Serial Output: Network Terminal**

1. Now the user can type any of the menu commands. Typing a command will show its usage format. See [Figure 2-20](#) for a **scan** example.

```

COM17:115200baud - Tera Term VT
File Edit Setup Control Window Help
NWP: 3.0.1.4
ROM: 0
HOST: 2.0.1.10
MAC address: 70:ff:76:1c:2a:61
=====
Available commands:
help          scan          setpolicy    wlanconnect
wlan_ap_start wlan_disconnect ping          send
recv         createfilter enablefilter disablefilter
deletefilter enablewlan    mDNSadvertise mDNSquery
radiotool    p2pstart     p2pstop      clear
=====
user@CC3220:scan
Usage:
  scan [-help] [-n <number of AP to scan>]

Description:
  Scan for available APs. Maximum 30 APs can be listed.

  -n      Maximum number of Scan results to show
  -help   Display this help

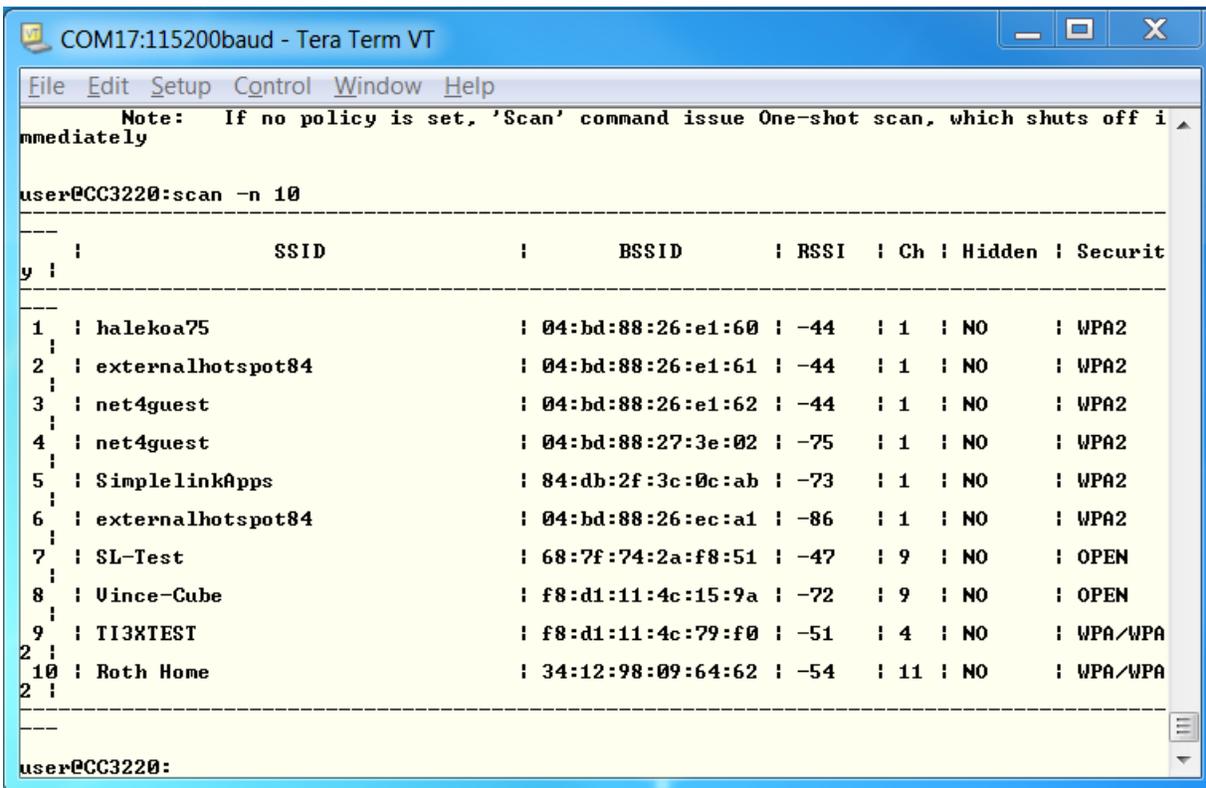
Note:    If no policy is set, 'Scan' command issue One-shot scan, which shuts off i
mmediately

user@CC3220:

```

Figure 2-20. Serial Output: Scan Usage

2. [Figure 2-21](#) shows a successful scan execution (after typing `scan -n 10`).



```

COM17:115200baud - Tera Term VT
File Edit Setup Control Window Help
Note: If no policy is set, 'Scan' command issue One-shot scan, which shuts off i
mmediately
user@CC3220:scan -n 10
-----
y |          SSID          |      BSSID      | RSSI | Ch | Hidden | Securit
y |-----|-----|-----|----|---|-----|-----|
1 | halekoa75              | 04:bd:88:26:e1:60 | -44  | 1  | NO     | WPA2
2 | externalhotspot84     | 04:bd:88:26:e1:61 | -44  | 1  | NO     | WPA2
3 | net4guest              | 04:bd:88:26:e1:62 | -44  | 1  | NO     | WPA2
4 | net4guest              | 04:bd:88:27:3e:02 | -75  | 1  | NO     | WPA2
5 | SimplelinkApps        | 84:db:2f:3c:0c:ab | -73  | 1  | NO     | WPA2
6 | externalhotspot84     | 04:bd:88:26:ec:a1 | -86  | 1  | NO     | WPA2
7 | SL-Test                | 68:7f:74:2a:f8:51 | -47  | 9  | NO     | OPEN
8 | Uince-Cube            | f8:d1:11:4c:15:9a | -72  | 9  | NO     | OPEN
9 | TI3XTEST              | f8:d1:11:4c:79:f0 | -51  | 4  | NO     | WPA/WPA
2 |
10 | Roth Home              | 34:12:98:09:64:62 | -54  | 11 | NO     | WPA/WPA
2 |
-----
user@CC3220:

```

**Figure 2-21. Serial Output: Scan Execution**

- Continue and explore the Network Terminal available commands. Typing **help** will show the list of available commands, as shown in [Figure 2-22](#).

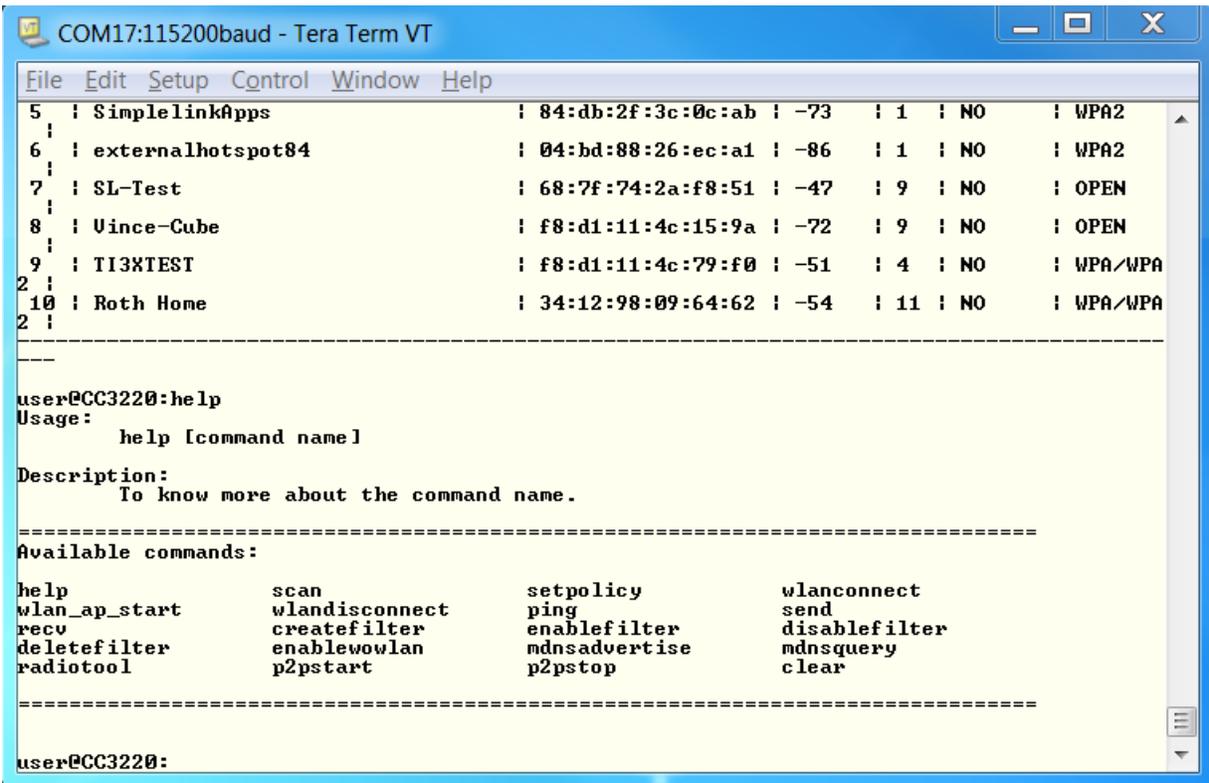


Figure 2-22. Serial Output: Help

## Use the Debugger/IDE

---

---

The CC3220 SDK supports CCS 6.2.0, IAR 7.50, and GCC IDE/compiler. This section assumes that the application has been configured and rebuilt according to the requirement.

### 3.1 Prerequisites

- Ensure that the selected device variant is one of the CC3220, CC3220S, or CC3220SF devices, which should be listed under the Properties → General → Variant drop-down menu. If not, see [Section 1.7.1.1](#) for patching the IDE to display these device variants on the CCS version of Linux.
- To debug the secure devices, the SFLASH should be development formatted to enable the JTAG connectivity. See [Section 3.2](#).
- If you are downloading the image from the debugger rather than debugging the image loaded by bootloader or UniFlash tool, ensure the following:
  - For the CC3220SF variant, define `__SF_DEBUG__` in the list of predefined symbols and recompile the application. Predefined symbols for various IDEs are located at:
    - CCS: Project → Properties → Build → ARM Compiler → Predefined Symbols
    - IAR: Project → Options → C/C++ Compiler → Preprocessor → Defined Symbols
    - GCC: Add `CFLAGS+=-D__SF_DEBUG` in the makefile.  
This flag will add a header to the application binary that instructs the bootloader to use the internal flash image rather than override it with an image from the serial flash.
- Ensure that the SOP[2..0] configuration on the LaunchPad is set to:
  - 010 for 4-wire JTAG
  - 001 for 2-wire SWD

---

**NOTE:** Regardless of whether debugging in JTAG or SWD mode, for the development format of SFLASH, the SOP mode must be 010. To debug through SWD, change the SOP to 001 after development formatting.

---

### 3.2 Development Formatting for SFLASH

When debugging for secure variants, the device must be put into development mode (using the UniFlash). If this was not done before, repeat the procedure in [Section 2.4](#) to program the SFLASH but make sure that the device is set to “Develop” mode. Follow the Image Creation for Secure Device. The MCU image can be eliminated from the procedure. When using the Develop mode, the MAC address of the device must be programmed. The UniFlash tool does this automatically by reading the MAC address after the device is connected and then programming the same value; however, this requires the user to connect to the device first and then program the image.

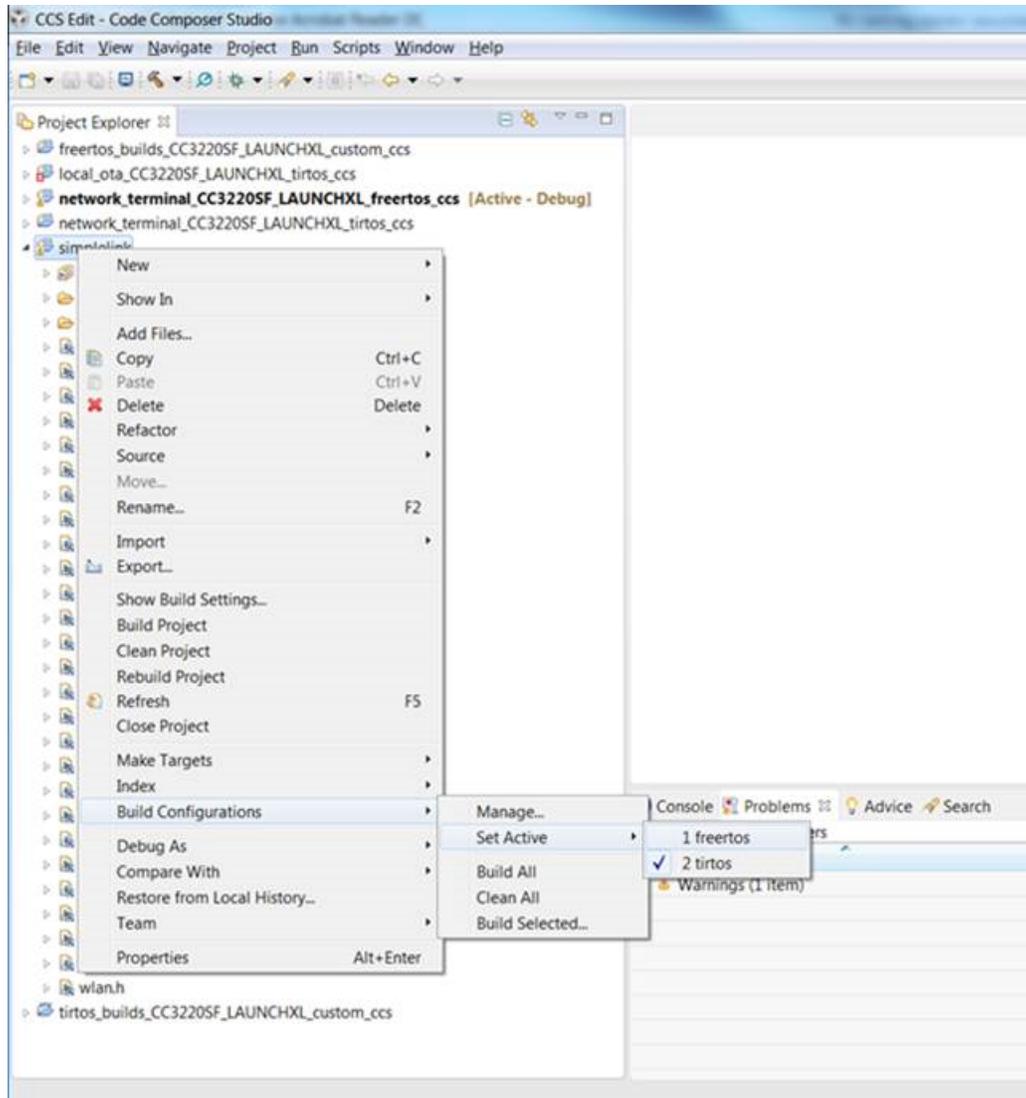
### 3.3 CCS

#### 3.3.1 Rebuild the SimpleLink™ Library for Debug Configuration

The SimpleLink library is already compiled for both FreeRTOS and TI-RTOS (both archive files are available in corresponding directories under `<sdk-installation-path>\source\ti\drivers\netwif\ccs`).

If from any reason the SimpleLink library must be rebuilt, the Build Configuration must be specified for the right OS (as seen in [Figure 3-1](#)).

1. Choose the relevant debug configuration (os\_debug for getting started with WLAN station) from Project → Build Configurations → Set Active, as shown in [Figure 3-1](#).



**Figure 3-1. Select Debug Configuration**

2. Compile the SimpleLink library for the selected configuration.
3. Rebuild the application.

### 3.3.2 Download and Debug the WLAN Station Example

1. To differ the debug application from the one programmed to the flash, it is possible to make a simple change to the application name before it is rebuilt. The application name is defined in “network\_terminal.h” - see in [Figure 3-2](#). The change will be reflected in the first lines of the serial output.

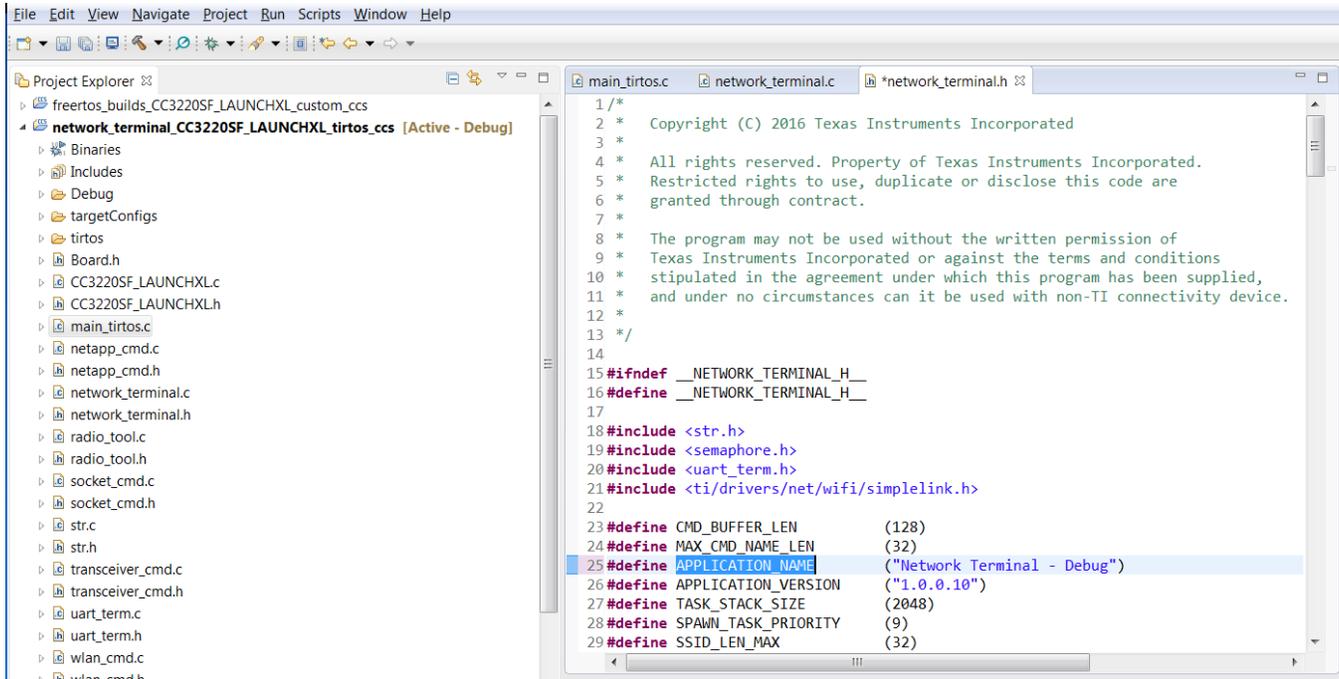
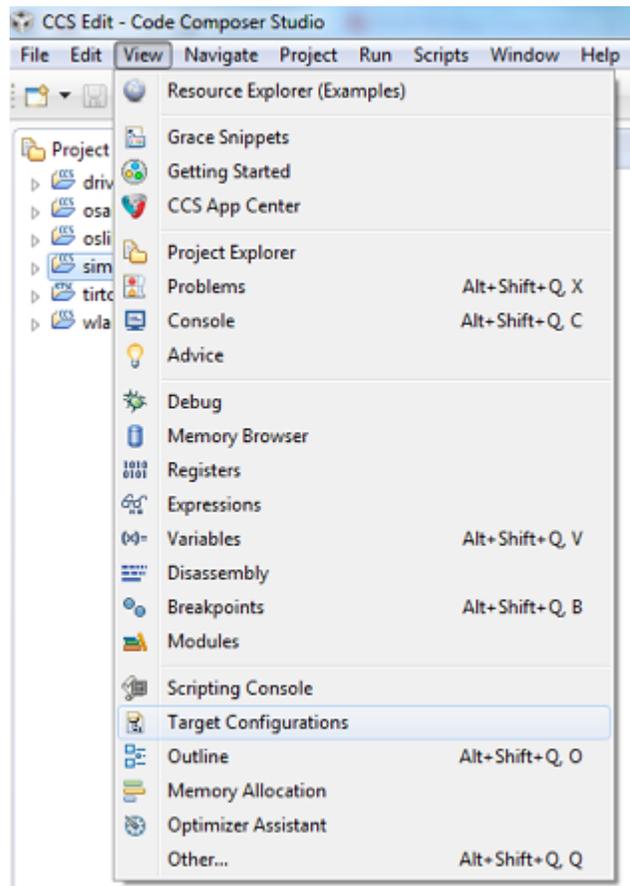
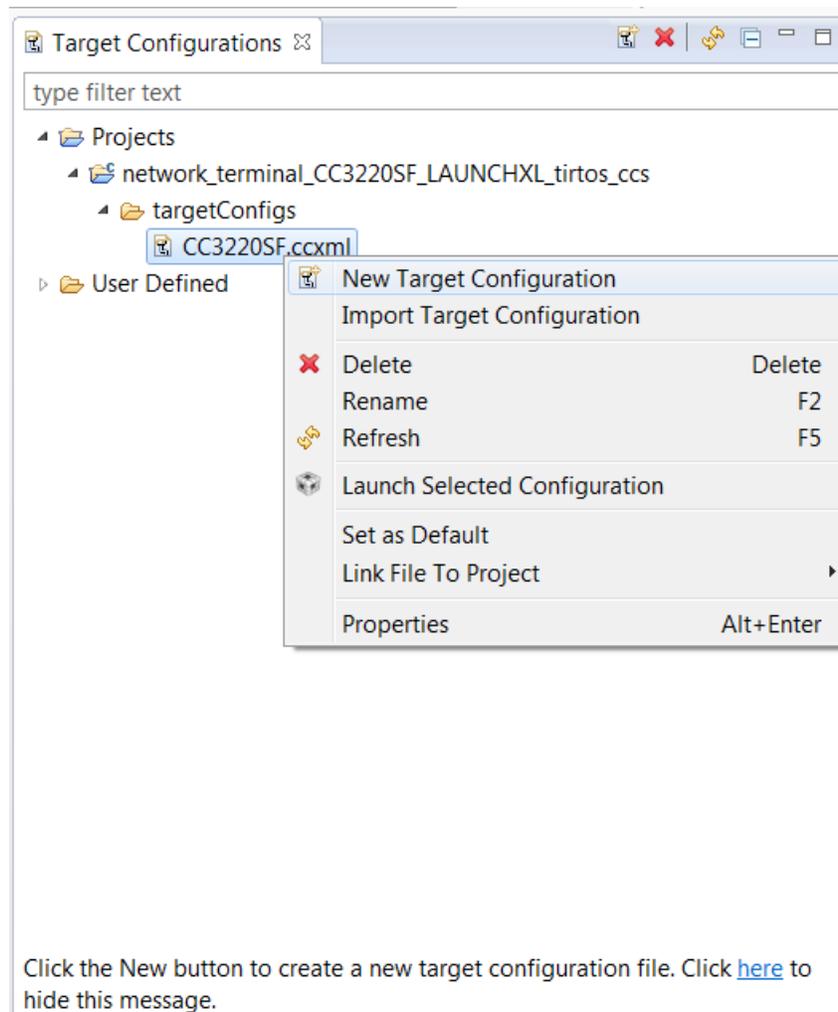


Figure 3-2. Application Name Definition

- By default, the target configuration is defined by the application project imported in [Section 2.1.1](#). Navigate to View → Target Configurations, as shown in [Figure 3-3](#), to verify that the correct configuration is selected (see [Figure 3-4](#)).



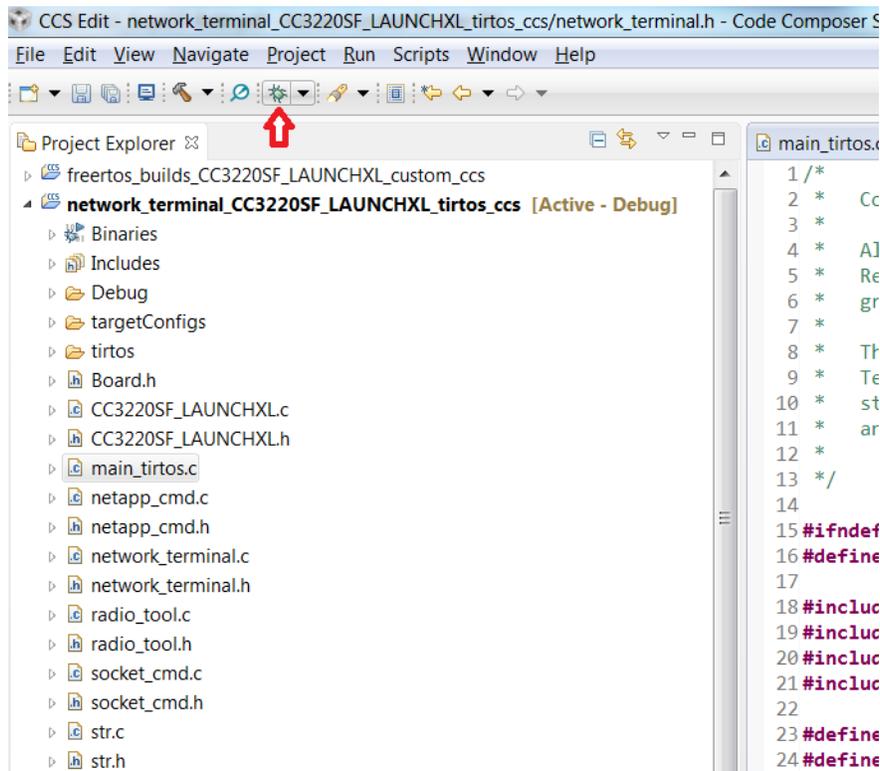
**Figure 3-3. View Target Configurations**



**Figure 3-4. Select Target Configuration**

3. Set this new configuration as the default by right-clicking on the filename and selecting Set as Default (see [Figure 3-4](#)).
4. Launch serial terminal and configure it as specified in [Section 1.4](#).

5. Launch the application. Select the `network_terminal_CC3220SF_LAUNCHXL_tirtos_ccs` project in Project Explorer and click on the debug icon, as shown in [Figure 3-5](#), to download code to the device and begin debugging. Press F8 to begin execution.



**Figure 3-5. Debug Network Terminal**

6. Follow instruction in [Section 2.6](#).

### 3.4 IAR

See `<sdk-installation-path>\docs\cc3220\CC3220_SDK_IAR_project_setup_guide.html`.

### 3.5 GCC

GCC is not supported in the demos of this release.

---

## Revision History

### Changes from A Revision (December 2017) to B Revision Page

---

- Updated CC3220 SDK package URL..... 4
-

## IMPORTANT NOTICE FOR TI DESIGN INFORMATION AND RESOURCES

Texas Instruments Incorporated ("TI") technical, application or other design advice, services or information, including, but not limited to, reference designs and materials relating to evaluation modules, (collectively, "TI Resources") are intended to assist designers who are developing applications that incorporate TI products; by downloading, accessing or using any particular TI Resource in any way, you (individually or, if you are acting on behalf of a company, your company) agree to use it solely for this purpose and subject to the terms of this Notice.

TI's provision of TI Resources does not expand or otherwise alter TI's applicable published warranties or warranty disclaimers for TI products, and no additional obligations or liabilities arise from TI providing such TI Resources. TI reserves the right to make corrections, enhancements, improvements and other changes to its TI Resources.

You understand and agree that you remain responsible for using your independent analysis, evaluation and judgment in designing your applications and that you have full and exclusive responsibility to assure the safety of your applications and compliance of your applications (and of all TI products used in or for your applications) with all applicable regulations, laws and other applicable requirements. You represent that, with respect to your applications, you have all the necessary expertise to create and implement safeguards that (1) anticipate dangerous consequences of failures, (2) monitor failures and their consequences, and (3) lessen the likelihood of failures that might cause harm and take appropriate actions. You agree that prior to using or distributing any applications that include TI products, you will thoroughly test such applications and the functionality of such TI products as used in such applications. TI has not conducted any testing other than that specifically described in the published documentation for a particular TI Resource.

You are authorized to use, copy and modify any individual TI Resource only in connection with the development of applications that include the TI product(s) identified in such TI Resource. NO OTHER LICENSE, EXPRESS OR IMPLIED, BY ESTOPPEL OR OTHERWISE TO ANY OTHER TI INTELLECTUAL PROPERTY RIGHT, AND NO LICENSE TO ANY TECHNOLOGY OR INTELLECTUAL PROPERTY RIGHT OF TI OR ANY THIRD PARTY IS GRANTED HEREIN, including but not limited to any patent right, copyright, mask work right, or other intellectual property right relating to any combination, machine, or process in which TI products or services are used. Information regarding or referencing third-party products or services does not constitute a license to use such products or services, or a warranty or endorsement thereof. Use of TI Resources may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

TI RESOURCES ARE PROVIDED "AS IS" AND WITH ALL FAULTS. TI DISCLAIMS ALL OTHER WARRANTIES OR REPRESENTATIONS, EXPRESS OR IMPLIED, REGARDING TI RESOURCES OR USE THEREOF, INCLUDING BUT NOT LIMITED TO ACCURACY OR COMPLETENESS, TITLE, ANY EPIDEMIC FAILURE WARRANTY AND ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, AND NON-INFRINGEMENT OF ANY THIRD PARTY INTELLECTUAL PROPERTY RIGHTS.

TI SHALL NOT BE LIABLE FOR AND SHALL NOT DEFEND OR INDEMNIFY YOU AGAINST ANY CLAIM, INCLUDING BUT NOT LIMITED TO ANY INFRINGEMENT CLAIM THAT RELATES TO OR IS BASED ON ANY COMBINATION OF PRODUCTS EVEN IF DESCRIBED IN TI RESOURCES OR OTHERWISE. IN NO EVENT SHALL TI BE LIABLE FOR ANY ACTUAL, DIRECT, SPECIAL, COLLATERAL, INDIRECT, PUNITIVE, INCIDENTAL, CONSEQUENTIAL OR EXEMPLARY DAMAGES IN CONNECTION WITH OR ARISING OUT OF TI RESOURCES OR USE THEREOF, AND REGARDLESS OF WHETHER TI HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

You agree to fully indemnify TI and its representatives against any damages, costs, losses, and/or liabilities arising out of your non-compliance with the terms and provisions of this Notice.

This Notice applies to TI Resources. Additional terms apply to the use and purchase of certain types of materials, TI products and services. These include; without limitation, TI's standard terms for semiconductor products (<http://www.ti.com/sc/docs/stdterms.htm>), [evaluation modules](#), and [samples](http://www.ti.com/sc/docs/sampterm.htm) (<http://www.ti.com/sc/docs/sampterm.htm>).

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265  
Copyright © 2018, Texas Instruments Incorporated