

## Introduction

This user guide provides detailed information on using the Microchip Radio Test 3 tool (MCHPRT3 tool) with the Microchip WILCS02\_WINCS02. The MCHPRT3 tool enables users to evaluate and demonstrate the Radio Frequency (RF) performance and functionalities of the WILCS02\_WINCS02.

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## 1. Quick References

### 1.1. Reference Documentation

- *WILCS02 Family Data Sheet* ([DS70005557](#))
- *WINCS02 Family Data Sheet* ([DS70005577](#))
- *WILCS02IC and WINCS02IC Programming and Calibration User's Guide* ([DS50003815](#))

### 1.2. Hardware Prerequisites

- WILCS02\_WINCS02 Device ([WILCS02IC](#) and [WINCS02IC](#))
- Wi-Fi<sup>®</sup> Tester (for example, Litepoint IQxel)

### 1.3. Software Prerequisites

- Windows 10
- Microchip Radio Test 3 Tool Installer Package ([MCHPRT3](#))

### 1.4. Acronyms and Abbreviations

**Table 1-1.** Acronyms and Abbreviations

| Acronyms and Abbreviations | Description                                  |
|----------------------------|--|
| CCA                        | Clear Channel Assessment                     |
| CLI                        | Command Line Interface                       |
| DLL                        | Dynamic Link Library                         |
| EVM                        | Error Vector Magnitude                       |
| GI                         | Guard Interval                               |
| GUI                        | Graphical User Interface                     |
| LNA                        | Low Noise Amplifier                          |
| MCHPRT3                    | Microchip Radio Tool Third Generation        |
| PDREF                      | Peak Detector Reference Voltage/Bias Voltage |
| RSSI                       | Received Signal Strength Indicator           |
| TSSI                       | Transmitted Signal Strength Indicator        |

## 2. MCHPRT3 Tool and WILCS02\_WINCS02 Package Components

This section provides an overview of the MCHPRT3 tool and the WILCS02\_WINCS02 package components.

**Note:** The recommendation is to use the Windows® 10 operating system for the MCHPRT3 tool setup.

The following table outlines the details of the MCHPRT3 tool package files:

**Table 2-1.** MCHPRT3 Tool Package Files

| File Name              | Description  |
|------------------------|--|
| MCHPRT3.exe file       | MCHPRT3 executable file                                    |
| MCHPRT3_CLI.exe file   | MCHPRT3 CLI executable file                                |
| uninstall.exe file     | Uninstall the MCHPRT3 tool                                 |
| vc_redist.x86.exe file | Microsoft Visual C++ Redistributable (x86) executable file |

The following table outlines the details of the WILCS02\_WINCS02 package files:

**Table 2-2.** WILCS02\_WINCS02 Package Files

| File Name                      | Description  |
|--------------------------------|--|
| release_note.txt               | Description the modify history log                     |
| Examples folder                | Example file for customer reference                    |
| WILCS02_WINCS02.chm            | WILCS02_WINCS02 compiled HTML help file                |
| WILCS02_WINCS02.dll file       | WILCS02_WINCS02 dynamic link library file              |
| WILCS02_WINCS02_CDECL.dll file | Default calling convention file for C and C++ programs |

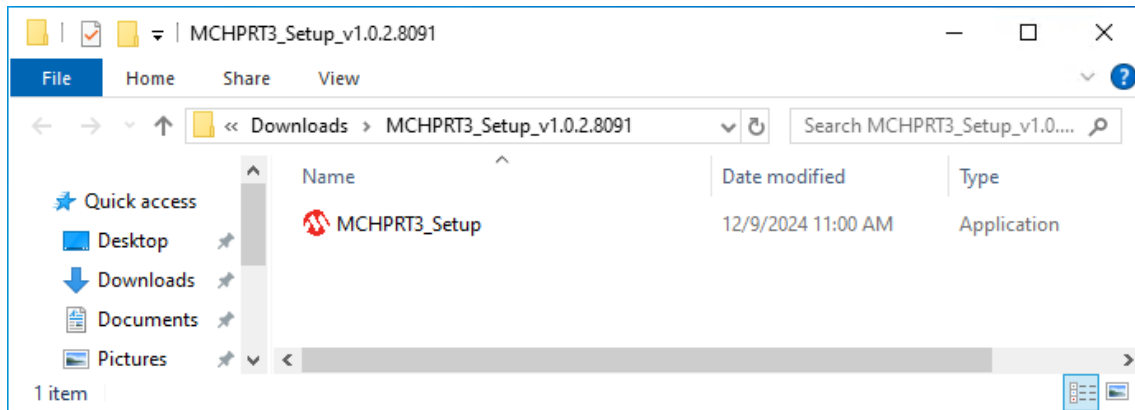
### 3. Installing MCHPRT3 Tool

This section provides step-by-step instructions for installing the MCHPRT3 tool on a Windows operating system. The following are the steps to complete the installation:

**Note:** To download the setup file, go to [MCHPRT3—Microchip Radio Tool Third Generation](#).

1. Extract the MCHPRT3\_Setup\_v1.0.2.8091.zip.

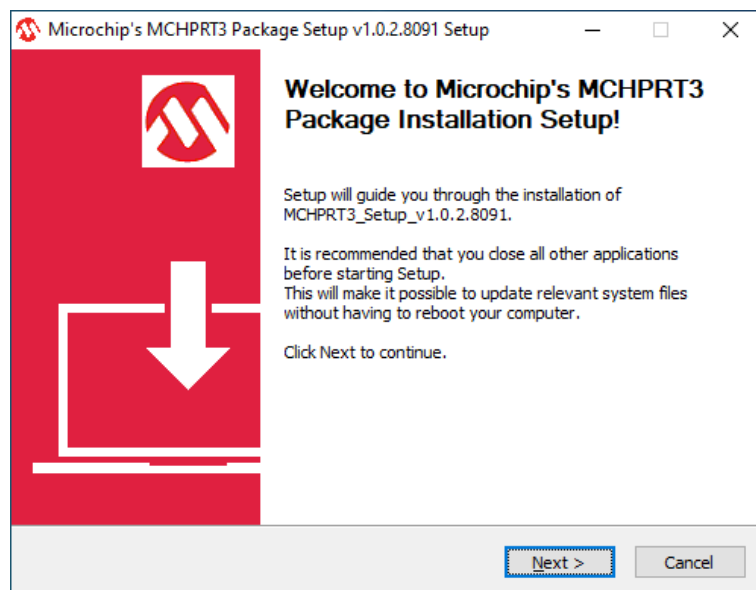
Figure 3-1. MCHPRT3 Setup File



**Note:** The version number provided here is for reference. For the most up-to-date version, refer to the MCHPRT3 page.

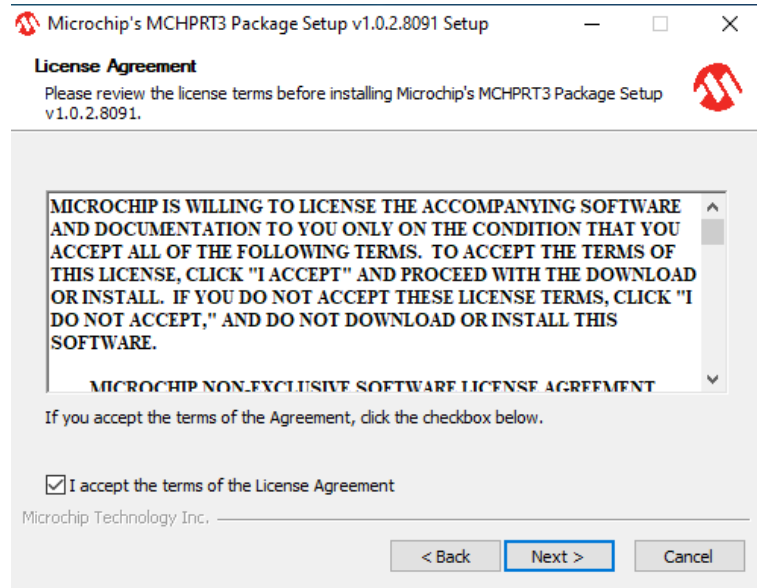
2. Execute the MCHPRT3\_Setup.exe. The following screen appears:
  1. Click **Next** to continue the installation procedure.

Figure 3-2. MCHPRT3 Setup Welcome Screen



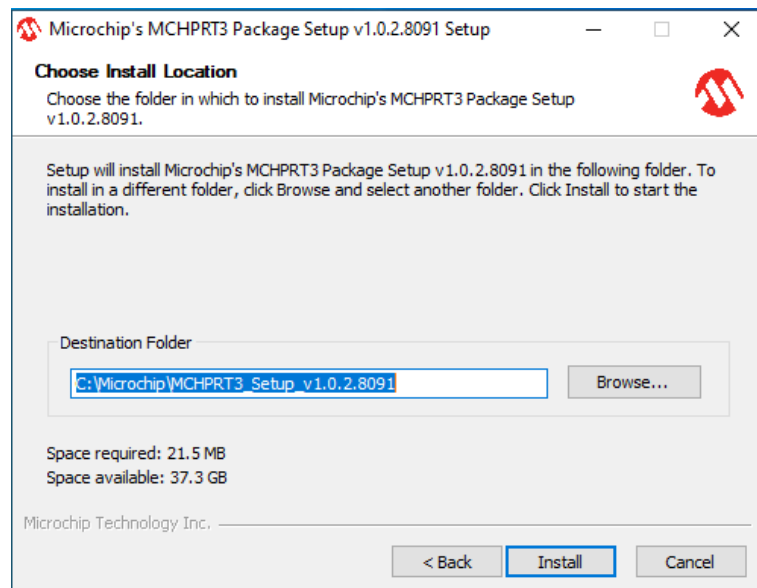
3. Check "I accept the terms of the License Agreement".
  1. Click **Next** to continue.

Figure 3-3. License Agreement Screen



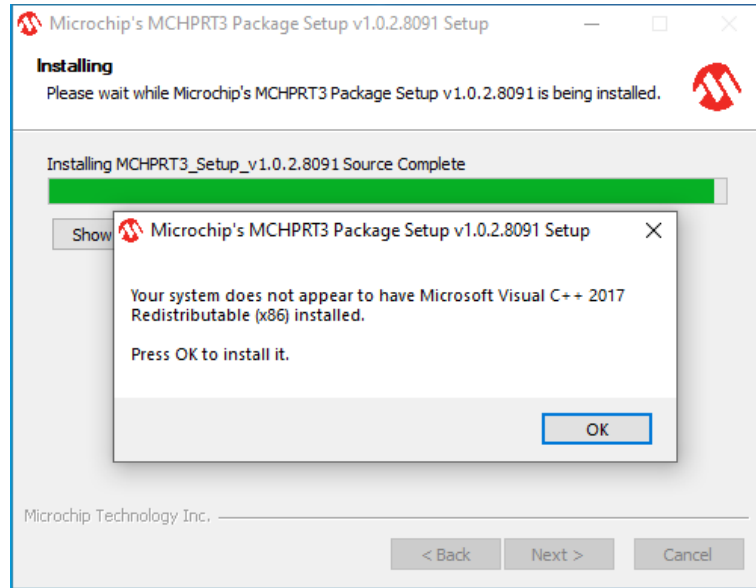
4. Click **Browse** to change the destination folder to the desired location, then click **Install** to continue the installation procedure.
  1. By default, the MCHPRT3 tool installs the package in the C:\Microchip\ folder.

Figure 3-4. Destination Folder Selection Screen



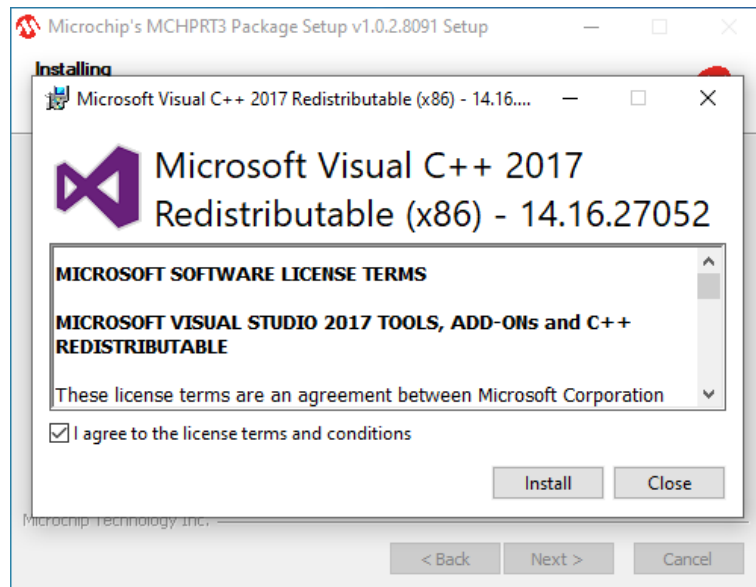
5. If the system does not have the "Microsoft Visual C++ Redistributable for Visual Studio 2015, 2017, and 2019" installed, the following screen appears.
  1. Click **OK** to install it.

**Figure 3-5.** Microsoft Visual C++ Redistributable Installation Prompt



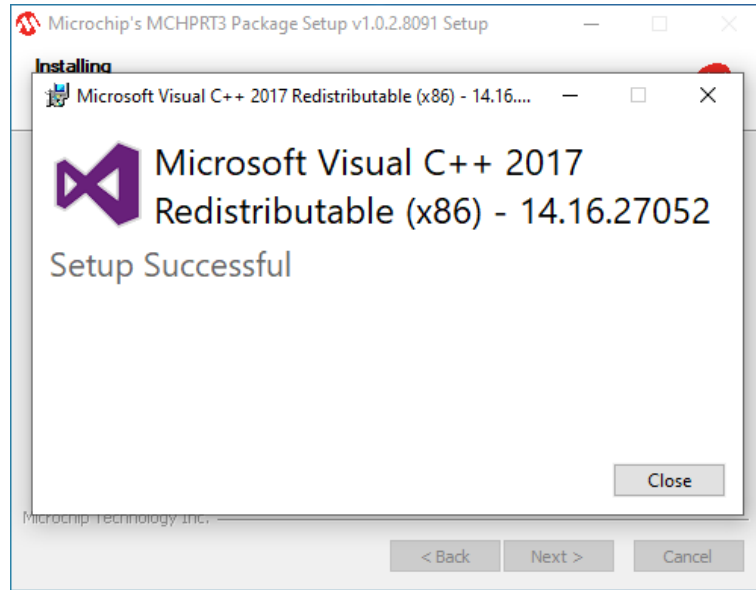
6. Check "I accept the license terms and conditions" and click **Install** to continue.

**Figure 3-6.** Microsoft Visual C++ Redistributable License Agreement Screen



7. Click **Close** to continue.

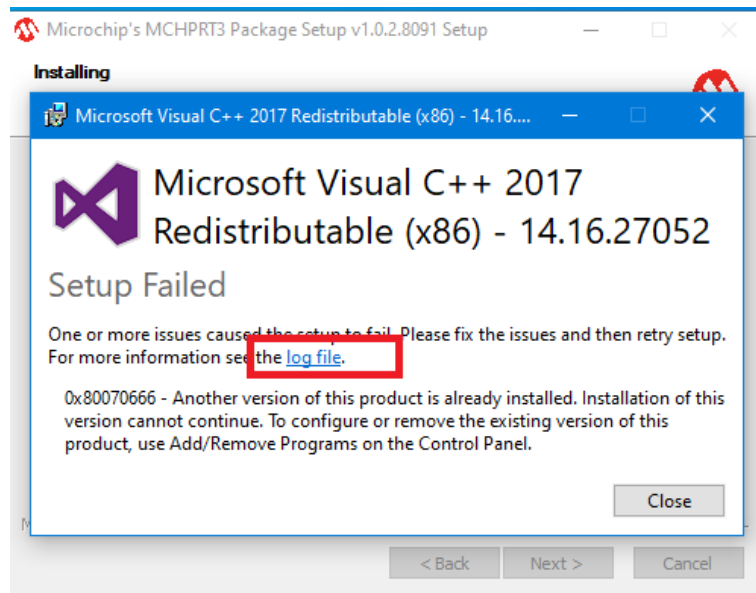
Figure 3-7. Microsoft Visual C++ Redistributable Installation Complete Screen



**Note:**

If an error occurs when installing the Microsoft Visual C++ 2017 Redistributable (x86) - 14.16.27052, click the log file link as shown below.

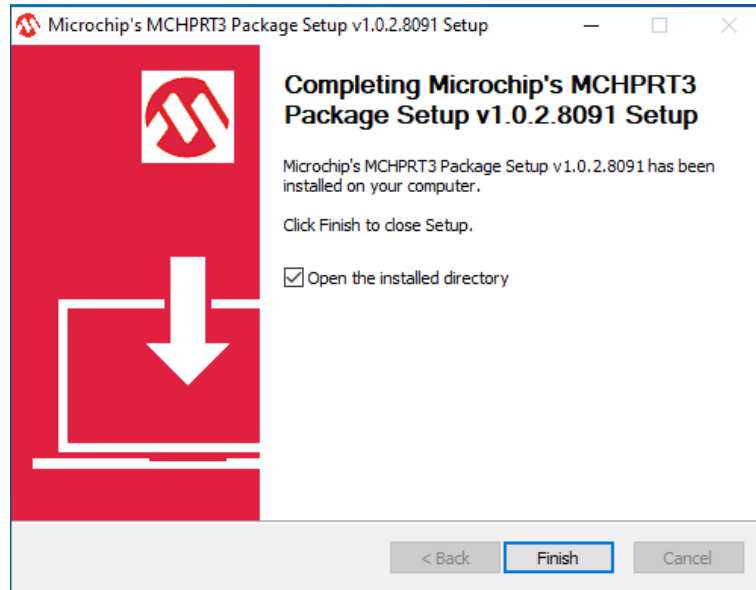
Figure 3-8. Microsoft Visual C++ Setup Failed



If the last line in the log file content is "Error 0x80070666: Cannot install a product when a newer version is installed," it means that your system may already have a higher version installed. Therefore, it is fine to use the tool.

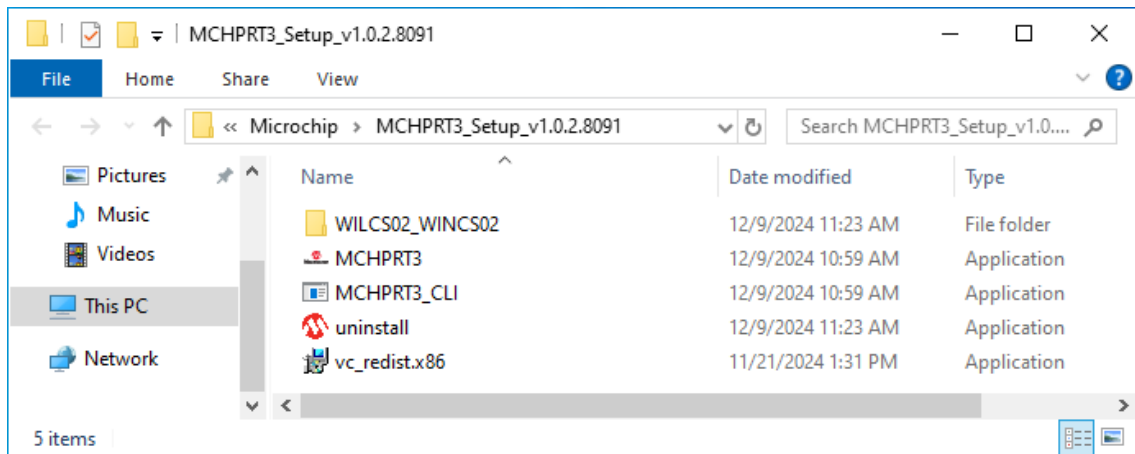
8. Check "Open the installed directory" and click **Finish** to continue.

Figure 3-9. Installation Complete Screen



9. The file browser opens with the install directory.

Figure 3-10. Installed Directory in File Browser

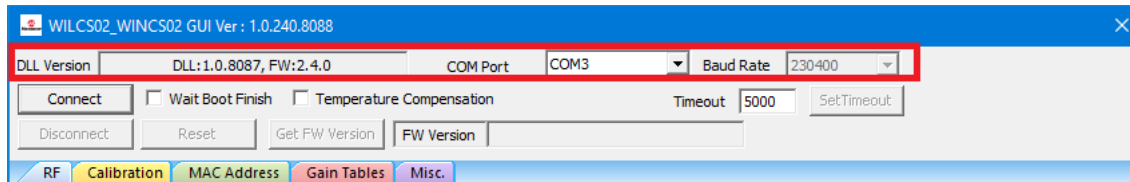


## 4. Testing and Calibrating WILCS02\_WINCS02 with Wi-Fi® Tester Using MCHPRT3 Tool

This chapter provides details about using the MCHPRT3 tool to test or calibrate the WILCS02\_WINCS02 with Wi-Fi® Tester. This chapter also demonstrates the process of updating the parameters using the MCHPRT3 tool.

**Note:** Ensure the DLL support firmware version matches the WILCS02\_WINCS02, and the COM port connection supports the 230400 baud rate.

Figure 4-1. DLL Version and COM Port Information

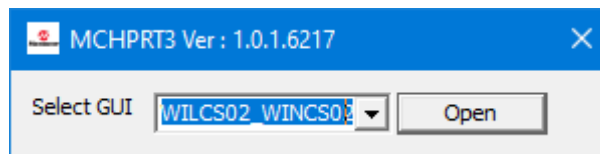


### 4.1. Getting Started with MCHPRT3 Tool GUI for the WILCS02\_WINCS02

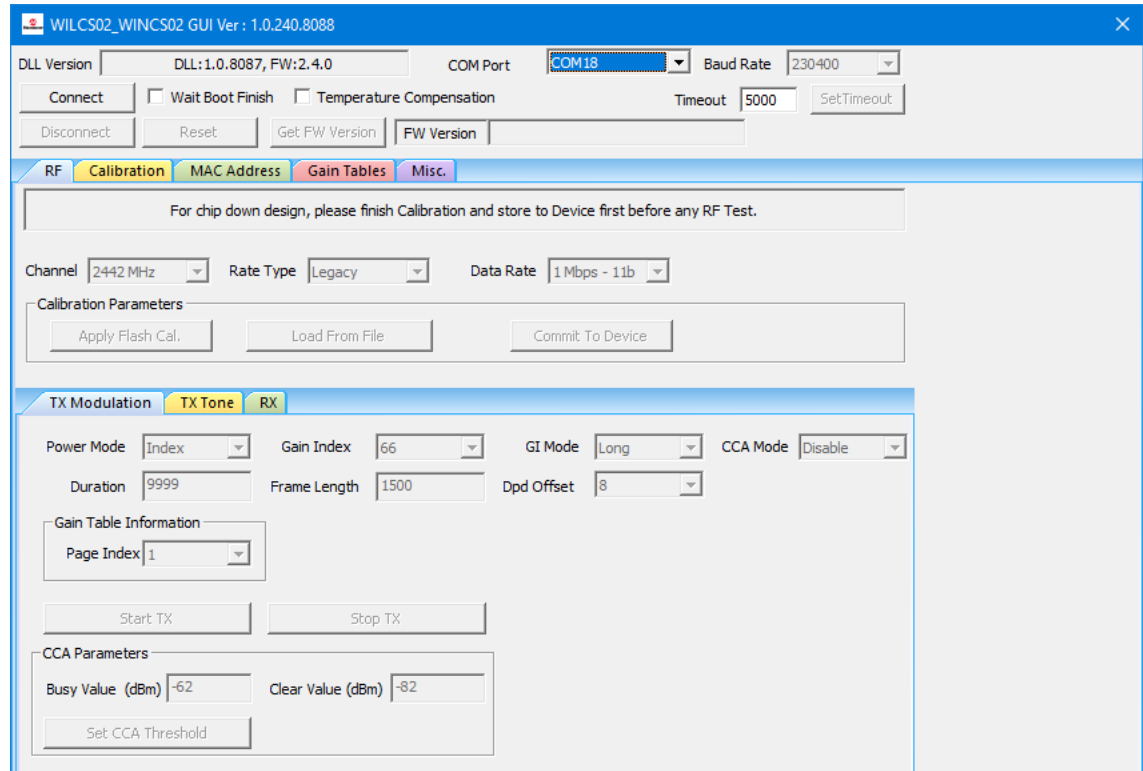
The following are the steps to launch the MCHPRT3 tool:

1. Double click the MCHPRT3 .exe file to launch the MCHPRT3 tool.
2. From the “Select GUI” drop-down list, select WILCS02\_WINCS02.
3. Click **Open** to launch the WILCS02\_WINCS02 window (see the following figure).

Figure 4-2. Start-Up Window of the MCHPRT3 Tool

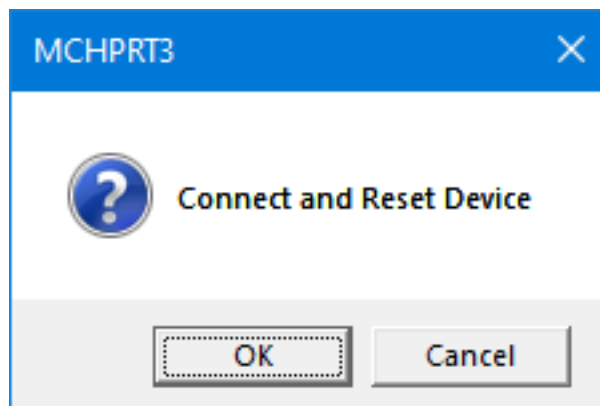


4. The WILCS02\_WINCS02 window is divided into the following sections (see the following figure):
  - **RF tab:** Provides settings to perform the RF TX Modulation, TX Tone, RX Test
  - **Calibration tab:** Complete TX and RX Calibration flow
  - **MAC Address tab:** Read/Write Wi-Fi® Address
  - **Gain Tables tab:** Process Gain Table relate function
  - **Misc. tab:** Process others, example Post Cal

**Figure 4-3.** Start-up Window of the WILCS02\_WINCS02 GUI Tool

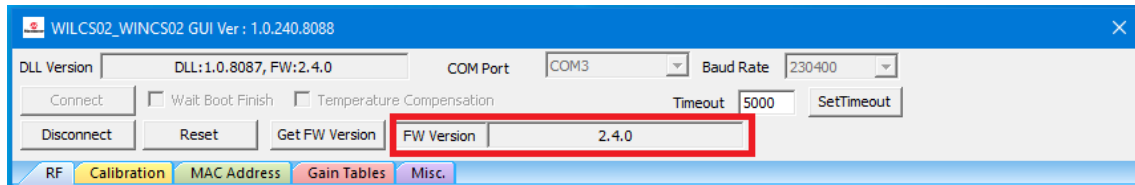
## 4.2. Connect WILCS02\_WINCS02 Device

1. Select the respective “COM port”.
2. Enter the “Timeout” value as 5000 (default value) and click **SetTimeout**  
**Note:** This value must be greater than 5000 milliseconds.
3. Check the “Wai Boot Finish” when powering ON the WILCS02\_WINCS02 before pressing the “Connect” button. By default, the “Wai Boot Finish” is disabled.  
**Note:** The time between powering ON and pressing the “Connect” button must be shorter than the WILCS02\_WINCS02 boot sequence time.
4. Check the “Temperature Compensation” field if the test temperature is not at room temperature. By default, the Temperature Compensation is disabled.
5. Click **Connect** to connect the UART of the WILCS02\_WINCS02 (see the following figure).

**Figure 4-4.** Connect Device

- Click **OK** in the pop-up window to Reset the WILCS02\_WINCS02 device. The firmware version appears instantly (see the following figure).

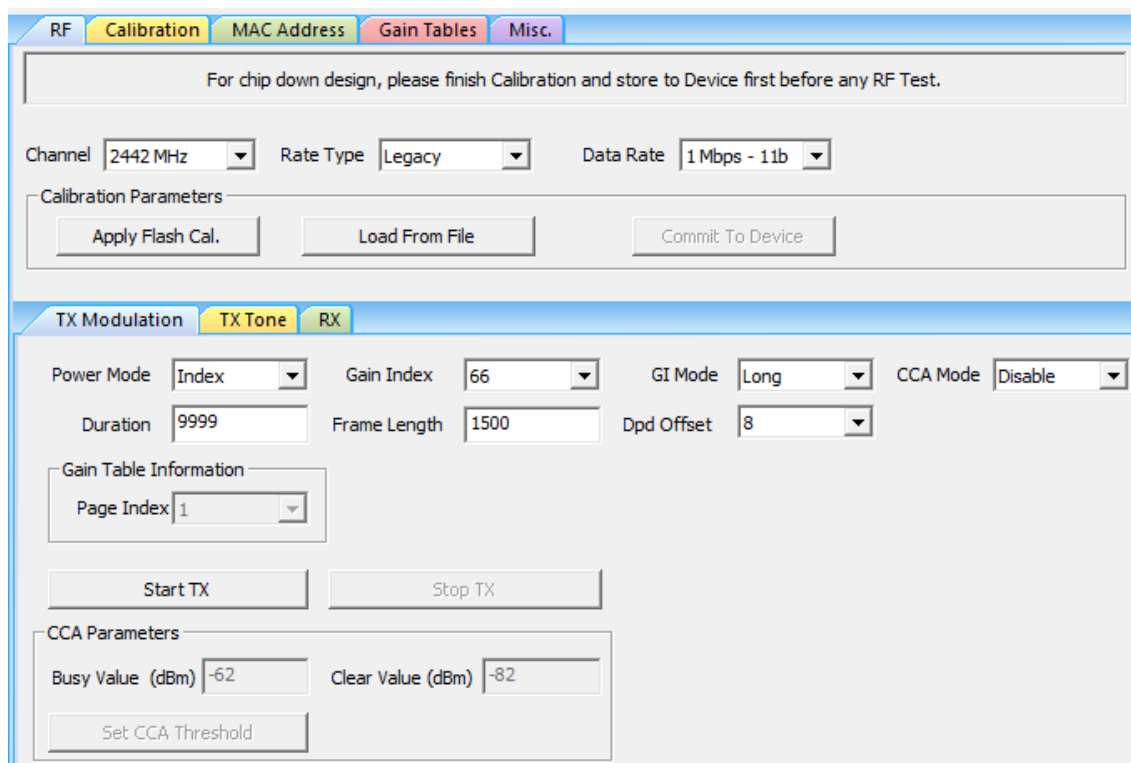
**Figure 4-5.** Firmware Version



### 4.3. RF TX Modulation Test Demonstration

In this demonstration, the user can transmit Wi-Fi® standard packets with the WILCS02\_WINCS02. Perform the following steps for the demonstration of the RF TX modulation test:

**Figure 4-6.** RF TX Modulation Test



- In the **RF** tab, perform the following steps:
  - From the "Channel" drop-down list, select *2442 MHz* for channel 7.
  - From the "Rate Type" drop-down list, select *Legacy* for 11b and 11g mode or *MCS* for 11n mode.
  - From the "Data Rate" drop-down list, select *1 Mbps - 11b* for 11b mode and 1 Mbps.
  - Load From File:** Load the calibration file (.cfg file) and click **Commit To Device**, if necessary.
  - Apply Flash Cal. :** If the calibration file is loaded and committed to Flash, click **Apply Flash Cal.** to apply the calibration parameters in Flash.
- In the **TX Modulation** tab, perform the following steps:

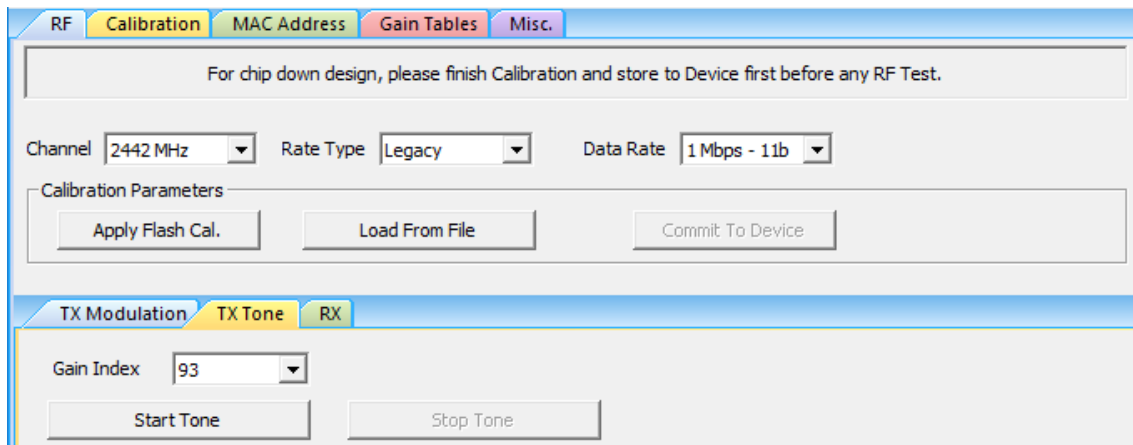
- a. From the “Power Mode” drop-down list, select *Index* for manual input gain index, *TPC Once* for enabling TPC.
  - Select the “Gain Index” value from 0-115.
  - From the “Power Mode” drop-down list, select *TPC Once* to read values from gain table for the transmission.
- b. Retain the “Duration” as 9999 (default value).
- c. Retain the “Frame Length” as 1500 (default value).
- d. From the “GI Mode” drop-down list, select *Long* for long GI and *Short* for short GI.
- e. Retain the “CCA Mode” as *Disable* (default value).
  - Enter the “Busy Value (dBm)” when “CCA Mode” is *Enable* (-62 is default value).
  - Enter the “Clear Value (dBm)” when “CCA Mode” is *Enable* (-82 is default value).
  - Click **Set CCA Threshold** to change the CCA threshold value, if necessary.
- f. Click **Start TX** to transmit Wi-Fi packets as configured parameter. Use the Wi-Fi tester to verify the transmitting packets.
- g. Click **Stop TX** to stop the transmission.

#### 4.4. RF TX Tone Test Demonstration

In this demonstration, the user can transmit single tone on the WILCS02\_WINCS02. Perform the following steps for the demonstration of the transmission:

1. In the **RF** tab, from the “Channel” drop-down list, select *2442 MHz* for channel 7.
2. In the **TX Tone** tab, select gain index from 0 to 255.
3. Click Start Tone to transmit single tone as configured in step 1 and 2. Use the Wi-Fi® tester to verify the transmitting single tone.
4. Click **Stop Tone** to stop the transmission.

**Figure 4-7.** RF TX Tone Test Demonstration



#### 4.5. RF RX Test Demonstration

In this demonstration, the user can receive Wi-Fi® packets on the WILCS02\_WINCS02. perform the following step for receiving Wi-Fi Packets.

Figure 4-8. RF RX Test Demonstration

For chip down design, please finish Calibration and store to Device first before any RF Test.

Channel: 2442 MHz | Rate Type: Legacy | Data Rate: 1 Mbps - 11b

Calibration Parameters

Apply Flash Cal. | Load From File | Commit To Device

RX

Start RX | Stop RX | Get RSSI | RSSI Value | Clear RX Count | Get RX Count

RX Count Information

|         | 1 Mbps  | 2 Mbps  | 5.5 Mbps | 11 Mbps | 6 Mbps | 9 Mbps | 12 Mbps | 18 Mbps | 24 Mbps | 36 Mbps |
|---------|---------|---------|----------|---------|--------|--------|---------|---------|---------|---------|
| Total   | 0       | 0       | 0        | 0       | 0      | 0      | 0       | 0       | 0       | 0       |
| Success | 0       | 0       | 0        | 0       | 0      | 0      | 0       | 0       | 0       | 0       |
|         | 48 Mbps | 54 Mbps | MCS0     | MCS1    | MCS2   | MCS3   | MCS4    | MCS5    | MCS6    | MCS7    |
| Total   | 0       | 0       | 0        | 0       | 0      | 0      | 0       | 0       | 0       | 0       |
| Success | 0       | 0       | 0        | 0       | 0      | 0      | 0       | 0       | 0       | 0       |

1. In the **RF** tab, perform the following steps:
  - a. From the “Channel” drop-down list, select *2442 MHz* for channel 7.
  - b. From the “Rate Type” drop-down list, select *Legacy* for 11b and 11g Mode, *MCS* for 11n mode or *ALL - RX Only* for all data rates.
  - c. From the “Data Rate” drop-down list, select *1 Mbps - 11b* for 11b Mode and 1 Mbps.
2. In the **RX** tab, perform the following steps:
  - a. Click **Start RX** to receive Wi-Fi packets as configured in step 1. Use IQxel Wi-Fi tester or other tools to send the Wi-Fi packets to the WILCS02\_WINCS02 device.
  - b. Click **Stop RX** to stop receiving the Wi-Fi packets.
  - c. Click **Get RX Count**. The “RX Count Information” table shows the received Wi-Fi packets.
  - d. Click **Clear RX Count** to Reset RX Count Information.
  - e. Repeat the above steps for a new RX test.
  - f. Click **Get RSSI** to read the RSSI value.

## 4.6. Calibration Flow Demonstration

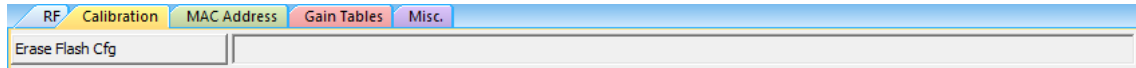
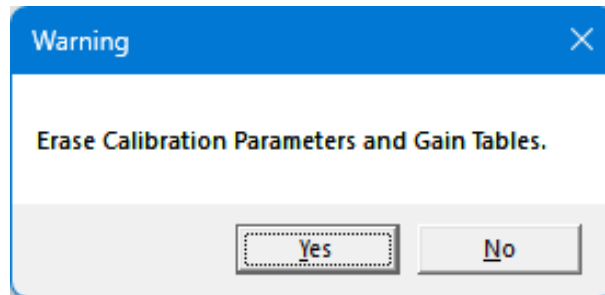
Figure 4-9. Calibration Flow Demonstration

The screenshot displays the WILCS02\_WINCS02 GUI with the following details:

- Header:** WILCS02\_WINCS02 GUI Ver: 1.0.240.8088
- Configuration:** DLL Version: 1.0.8087, FW:2.4.0; COM Port: COM3; Baud Rate: 230400.
- Buttons:** Connect, Wait Boot Finish, Temperature Compensation, Timeout: 5000, SetTimeout, Disconnect, Reset, Get FW Version, FW Version: 2.4.0.
- Tabs:** RF, Calibration (selected), MAC Address, Gain Tables, Misc.
- 0. Erase Flash Cfg**
- 0. Calibration Condition:** Channel : 2442 MHz, Rate Type : MCS, Data Rate : MCS7, Duration : 9999, Frame Lenth : 1500
- 1.0 Start TX Calibration**
  - sdAdcTemp25c, sdAdcVdd3p3v
  - 1.1.1 First Tune, 1.1.2 Input Power, 1.1.3 Check First Tune Result
  - 1.2.1 Second Tune, 1.2.2 Input Power, 1.2.3 Check Second Tune Result
  - 1.3.1 Third Tune, 1.3.2 Input Power, 1.3.3 Check Third Tune Result
  - 1.4.1 Last Measure Power, 1.4.2 Read Base TX Gain Index
- 1.5.1 Read TSSI and PDREF 1** (TSSI, PDREF, 1.5.2 Input Power, 1.5.3 Input EVM, 1.5.4 Set Power 1)
- 1.6.1 Read TSSI and PDREF 2** (TSSI, PDREF, 1.6.2 Input Power, 1.6.3 Input EVM, 1.6.4 Set Power 2)
- 1.7.1 Read TSSI and PDREF 3** (TSSI, PDREF, 1.7.2 Input Power, 1.7.3 Input EVM, 1.7.4 Set Power 3)
- 1.8.1 Read TSSI and PDREF 4** (TSSI, PDREF, 1.8.2 Input Power, 1.8.3 Input EVM, 1.8.4 Set Power 4)
- 1.9.1 Read TSSI and PDREF 5** (TSSI, PDREF, 1.9.2 Input Power, 1.9.3 Input EVM, 1.9.4 Set Power 5)
- 1.10.1 Read TSSI and PDREF 6** (TSSI, PDREF, 1.10.2 Input Power, 1.10.3 Input EVM, 1.10.4 Set Power 6)
- 1.11.1 Read TSSI and PDREF 7** (TSSI, PDREF, 1.11.2 Input Power, 1.11.3 Input EVM, 1.11.4 Set Power 7)
- 1.12 Stop TX Calibration** (rateCond)
- 2.0 Start RX Calibration** (Count)
- 2.1 Read RSSI (-20 dBm)** (RSSI, LNA)
- 2.2 Read RSSI (-35 dBm)** (RSSI, LNA)
- 2.3 Read RSSI (-45 dBm)** (RSSI, LNA)
- 2.4 Read RSSI (-50 dBm)** (RSSI, LNA)
- 2.5 Read RSSI (-65 dBm)** (RSSI, LNA)
- 2.6 Stop RX Calibration** (GainCorr)
- 3. Set Params**
- 4. Test Rate Cond Prepare**
  - 4.1.1 Test Rate Cond Start CH 1, 4.1.2 Input Power, 4.1.3 Input EVM, 4.1.4 Set Power 1
  - 4.2.1 Test Rate Cond Start CH 13, 4.2.2 Input Power, 4.2.3 Input EVM, 4.2.4 Set Power 13
  - 4.3 Test Rate Cond Check Result
- 5. Commit: Result To Device**
- 6. Save Result To File**

In this demonstration, the user can calibrate TX parameters and RX parameters of the WILCS02\_WINCS02. Perform the following steps for the demonstration of the calibration flow:

1. Connect the RF connector on the WILCS02\_WINCS02 to the Wi-Fi® tester (IQxel or others) to measure the RF power from the WILCS02\_WINCS02.
2. Check the cable loss between the WILCS02\_WINCS02 connector to the Wi-Fi tester. Enter the cable loss or RF power offset into the Wi-Fi tester.
3. Set the Wi-Fi tester to receive the Wi-Fi packets that are transmitted from the WILCS02\_WINCS02.
4. In the **Calibration** tab, the button "Erase Flash Cfg" will erase the device calibration parameters and gain tables. Use it carefully. It will show the following message after pressing this button.

**Figure 4-10.** Calibration Tab**Figure 4-11.** Warning

5. In the **Calibration** tab, perform the following steps to start a new calibration:
  - a. To initiate the new TX calibration, click on the **1.0 Start TX Calibration** button and wait for the `sdAdcTemp25c` and `sdAdcVdd3p3v` values to appear on the GUI.

**Figure 4-12.** Start TX Calibration

- b. Click on **1.1.1 First Tune** button.
  - Wait for the “1.1.2 Input Power” and “1.1.3 Check First Tune Result” buttons to enable.
  - Read the RF Power on the Wi-Fi tester.
  - Enter the measured RF power from the Wi-Fi tester in “1.1.2 Input Power”.
  - Click on **1.1.3 Check First Tune Result** button.
  - Wait for the result to appear on the GUI.

**Figure 4-13.** First Tune

- Go to step 5.c when result is “need tune”.
  - Go to step 5.e when result is “no need tune”.
- c. Click on **1.2.1 Second Tune** button.
    - Wait for the “1.2.2 Input Power” and “1.2.3 Check Second Tune Result” buttons to enable.
    - Read the RF power on the Wi-Fi tester.
    - Enter the measured RF power from the Wi-Fi tester in “1.2.2 Input Power”.
    - Click on **1.2.3 Check Second Tune Result** button.
    - Wait for the result to appear on the GUI.

**Figure 4-14.** Second Tune

- Go to step 5.d when result is “need tune”.
  - Go to step 5.e when result is “no need tune”.
- d. Click on **1.3.1 Third Tune** button.
 

**Note:** This step is almost not necessary.

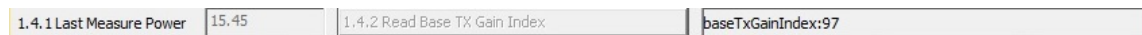
- Wait for the “1.3.2 Input Power” and “1.3.3 Check Third Tune Result” buttons to enable.
- Read the RF power on the Wi-Fi tester.
- Enter the measured RF power from the Wi-Fi tester in “1.3.2 Input Power”.
- Click on **1.3.3 Check Second Tune Result** button.
- Wait for the result to appear on the GUI.

Figure 4-15. Third Tune



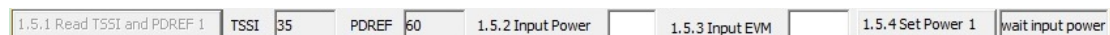
- e. Click on **1.4.2 Read Base TX Gain Index** button.

Figure 4-16. Read Base TX Gain Index



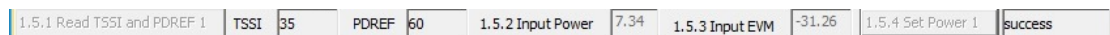
- Wait for the `baseTxGainIndex` to appear on the GUI.
- f. Click on **1.5.1 Read TSSI and PDREF 1** button.
- Wait for the “TSSI” and “PDREF” values to appear on the GUI.

Figure 4-17. Read TSSI and PDREF 1



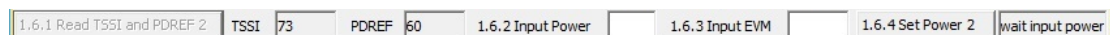
- Read the RF Power on the Wi-Fi tester.
- Enter the measured RF Power from the Wi-Fi tester in “1.5.2 Input Power”
- Read the RF EVM on the Wi-Fi tester.
- Enter the measured RF EVM from the Wi-Fi tester in “1.5.3 Input EVM”
- Click on **1.5.4 Set Power 1** button.
- Wait for result to appear as success.

Figure 4-18. Set Power Success



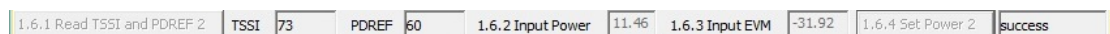
- g. Click on **1.6.1 Read TSSI and PDREF 2** button.
- Wait for “TSSI” and “PDREF” values to appear on the GUI.

Figure 4-19. Read TSSI and PDREF 2



- Read the RF Power on the Wi-Fi tester.
- Enter the measured RF Power from the Wi-Fi tester in “1.6.2 Input Power”.
- Read the RF EVM on the Wi-Fi tester.
- Enter the measured RF EVM from the Wi-Fi tester in “1.6.3 Input EVM”.
- Click on **1.6.4 Set Power 2** button.
- Wait for result to appear as success.

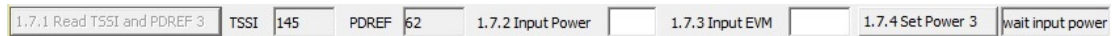
Figure 4-20. Set Power 2 Success



- h. Click on **1.7.1 Read TSSI and PDREF 3** button.

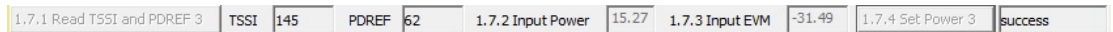
- Wait for “TSSI” and “PDREF” values to appear on the GUI.

**Figure 4-21.** Read TSSI and PDREF 3



- Read the RF Power on the Wi-Fi tester.
- Enter the measured RF Power from the Wi-Fi tester in “1.7.2 Input Power”.
- Read the RF EVM on the Wi-Fi tester.
- Enter the measured RF EVM from the Wi-Fi tester in “1.7.3 Input EVM”.
- Click on **1.7.4 Set Power 3** button.
- Wait for result to appear as success.

**Figure 4-22.** Set Power 3 Success



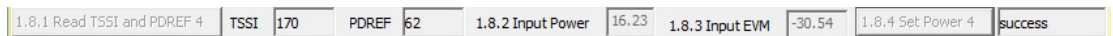
- Click on **1.8.1 Read TSSI and PDREF 4** button.
  - Wait for “TSSI” and “PDREF” values to appear on the GUI.

**Figure 4-23.** Read TSSI and PDREF 4



- Read the RF Power on the Wi-Fi tester.
- Enter the measured RF Power from the Wi-Fi tester in “1.8.2 Input Power”.
- Read the RF EVM on the Wi-Fi tester.
- Enter the measured RF EVM from the Wi-Fi tester in “1.8.3 Input EVM”.
- Click on **1.8.4 Set Power 4** button.
- Wait for the result to appear as success.

**Figure 4-24.** Set Power 4 Success



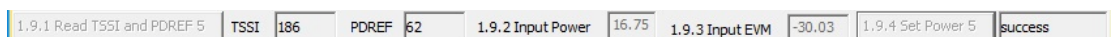
- Click on **1.9.1 Read TSSI and PDREF 5** button.

**Figure 4-25.** Read TSSI and PDREF 5



- Wait for “TSSI” and “PDREF” values to appear on the GUI.
- Read the RF Power on the Wi-Fi tester.
- Enter the measured RF Power from the Wi-Fi tester in “1.9.2 Input Power”.
- Read the RF EVM on the Wi-Fi tester.
- Enter the measured RF EVM from the Wi-Fi tester in “1.9.3 Input EVM”.
- Click on **1.9.4 Set Power 5** button
- Wait for the result to appear as success.

**Figure 4-26.** Set Power 5 Success



- Click on **1.10.1 Read TSSI and PDREF 6** button.

**Figure 4-27. Read TSSI and PDREF 6**

|                              |      |     |       |    |                    |  |                  |  |                    |                  |
|------------------------------|------|-----|-------|----|--------------------|--|------------------|--|--------------------|------------------|
| 1.10.1 Read TSSI and PDREF 6 | TSSI | 244 | PDREF | 63 | 1.10.2 Input Power |  | 1.10.3 Input EVM |  | 1.10.4 Set Power 6 | wait input power |
|------------------------------|------|-----|-------|----|--------------------|--|------------------|--|--------------------|------------------|

- Wait for “TSSI” and “PDREF” values to appear on the GUI.
- Read the RF Power on the Wi-Fi tester.
- Enter the measured RF Power from the Wi-Fi tester in “1.10.2 Input Power”.
- Read the RF EVM on the Wi-Fi tester.
- Enter the measured RF EVM from the Wi-Fi tester in “1.10.3 Input EVM”.
- Click on **1.10.4 Set Power 6** button.
- Wait for the result to appear as success.

**Figure 4-28. Set Power 6 Success**

|                              |      |     |       |    |                    |       |                  |        |                    |         |
|------------------------------|------|-----|-------|----|--------------------|-------|------------------|--------|--------------------|---------|
| 1.10.1 Read TSSI and PDREF 6 | TSSI | 244 | PDREF | 63 | 1.10.2 Input Power | 18.23 | 1.10.3 Input EVM | -26.38 | 1.10.4 Set Power 6 | success |
|------------------------------|------|-----|-------|----|--------------------|-------|------------------|--------|--------------------|---------|

- I. Click on **1.11.1 Read TSSI and PDREF 7** button.
  - Wait for “TSSI” and “PDREF” values to appear on the GUI.

**Figure 4-29. Read TSSI and PDREF 7**

|                              |      |     |       |    |                    |  |                  |  |                    |                  |
|------------------------------|------|-----|-------|----|--------------------|--|------------------|--|--------------------|------------------|
| 1.11.1 Read TSSI and PDREF 7 | TSSI | 330 | PDREF | 64 | 1.11.2 Input Power |  | 1.11.3 Input EVM |  | 1.11.4 Set Power 7 | wait input power |
|------------------------------|------|-----|-------|----|--------------------|--|------------------|--|--------------------|------------------|

- Read the RF Power on the Wi-Fi tester.
- Enter the measured RF Power from the Wi-Fi tester in “1.11.2 Input Power”.
- Read the RF EVM on the Wi-Fi tester.
- Enter the measured RF EVM from the Wi-Fi tester in “1.11.3 Input EVM”.
- Click on **1.11.4 Set Power 7** button.
- Wait for the result to appear as success.

**Figure 4-30. Set Power 7 Success**

|                              |      |     |       |    |                    |       |                  |        |                    |         |
|------------------------------|------|-----|-------|----|--------------------|-------|------------------|--------|--------------------|---------|
| 1.11.1 Read TSSI and PDREF 7 | TSSI | 330 | PDREF | 64 | 1.11.2 Input Power | 20.27 | 1.11.3 Input EVM | -19.79 | 1.11.4 Set Power 7 | success |
|------------------------------|------|-----|-------|----|--------------------|-------|------------------|--------|--------------------|---------|

- m. Click on **1.12 Stop TX Calibration** button.
  - Wait for the “rateCond” to appear on the GUI.

**Figure 4-31. Stop TX Calibration**

|                          |          |   |         |
|--------------------------|----------|---|---------|
| 1.12 Stop TX Calibration | rateCond | 1 | success |
|--------------------------|----------|---|---------|

- n. Click on **2.0 Start RX Calibration** button to start the RX calibration.
  - Wait for the result to appear as success.

**Figure 4-32. Start RX Calibration**

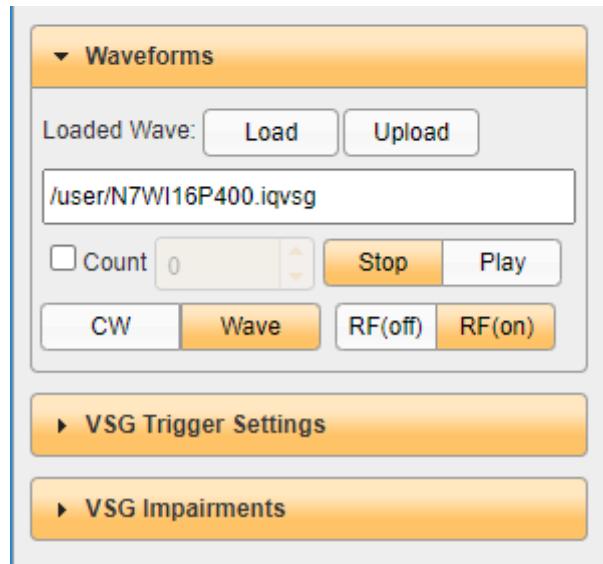
|                          |       |   |         |
|--------------------------|-------|---|---------|
| 2.0 Start RX Calibration | Count | 0 | success |
|--------------------------|-------|---|---------|

**Note:**

The user can choose their own Wi-Fi tester tool. In this case, the IQxel Wi-Fi tester tool is shown only as an example. Change the “Power Level” setting for different scenarios in the following steps using the same IQxel Wi-Fi tester tool.

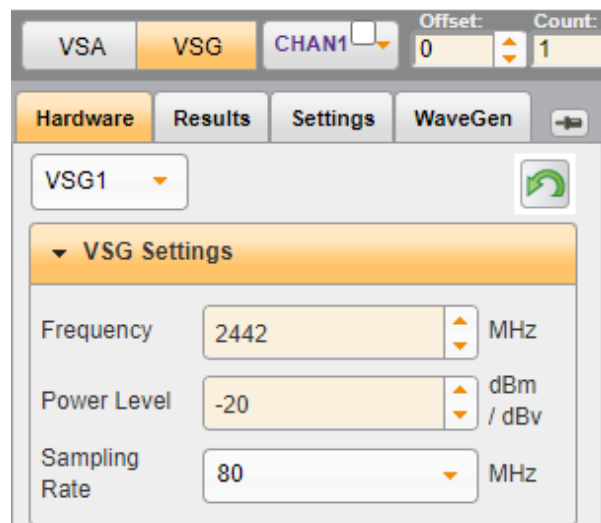
Set the Wi-Fi tester to transmit Wi-Fi MCS7 packets at 2442 MHz and -20 dBm power level that will be received by WILCS02\_WINCS02.

**Figure 4-33.** IQxel Wi-Fi tester



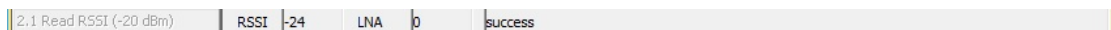
- o. Read RSSI (-20 dBm)
  - Set -20 dBm power level in the Wi-Fi tester.

**Figure 4-34.** -20 dBm power level



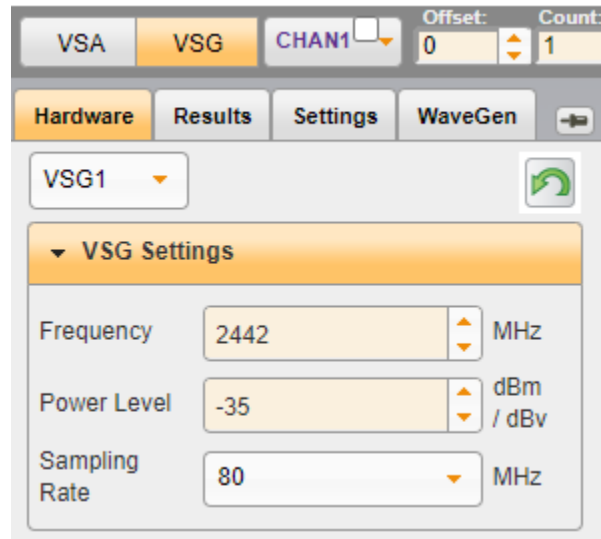
- Click on **2.1 Read RSSI (-20 dBm)** button.
- Wait for “RSSI” and “LNA” values to appear on the GUI.

**Figure 4-35.** Read RSSI and LNA



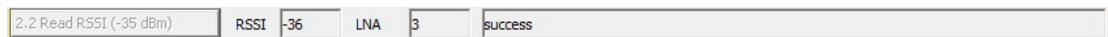
- p. Read RSSI (-35 dBm)
- Set -35 dBm power level in the Wi-Fi tester.

**Figure 4-36.** -35 dBm Power Level



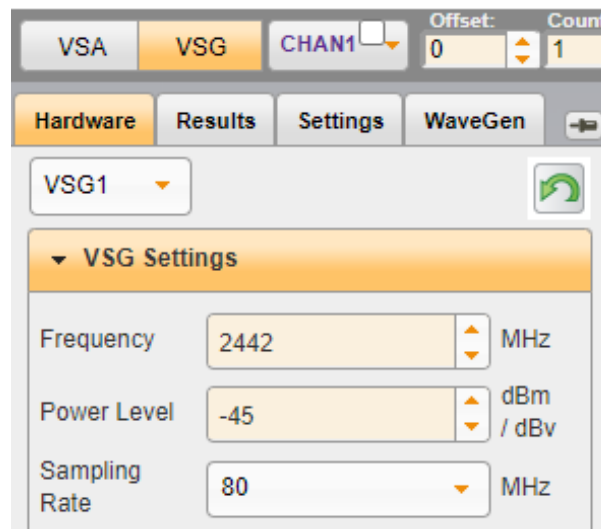
- Click on **2.2 Read RSSI (-35 dBm)** button.
- Wait for "RSSI" and "LNA" values to appear on the GUI.

**Figure 4-37.** Read RSSI and LNA



- q. Read RSSI (-45 dBm)
- Set -45 dBm power level in the Wi-Fi tester.

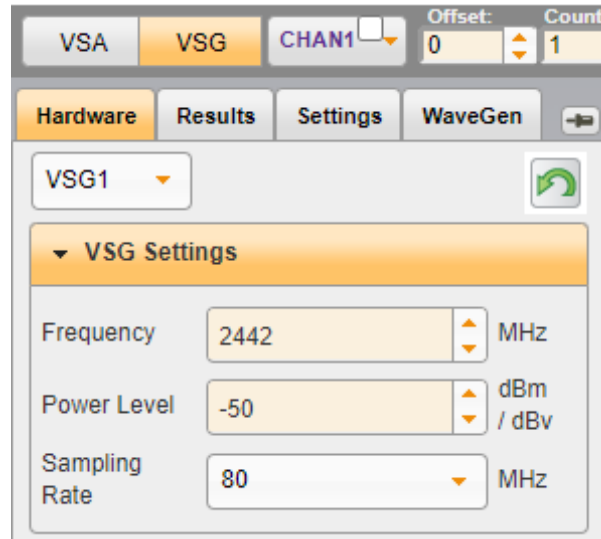
**Figure 4-38.** -45 dBm Power Level



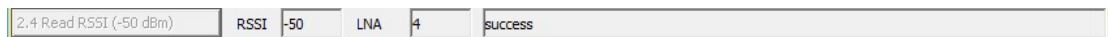
- Click on **2.3 Read RSSI (-45 dBm)** button.
- Wait for "RSSI" and "LNA" values to appear on the GUI.

**Figure 4-39. Read RSSI and LNA**

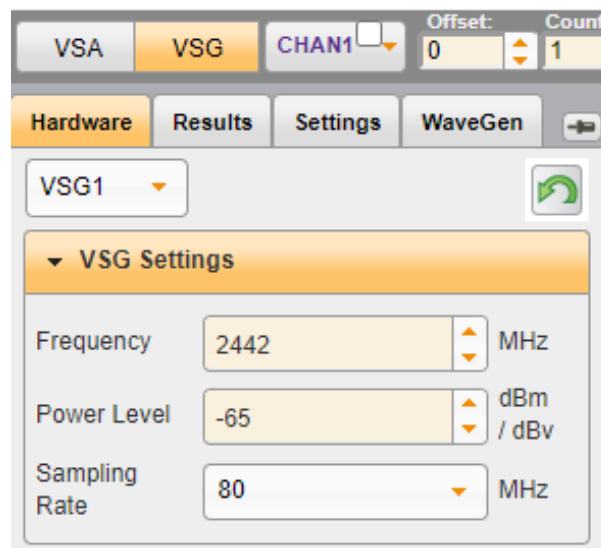
- r. Read RSSI (-50 dBm)
- Set -50 dBm power level in the Wi-Fi tester.

**Figure 4-40. -50 dBm Power Level**

- Click on **2.4 Read RSSI (-50 dBm)** button.
- Wait for “RSSI” and “LNA” values to appear on the GUI.

**Figure 4-41. Read RSSI and LNA**

- s. Read RSSI (-65 dBm)
- Set -65 dBm power level in the Wi-Fi tester.

**Figure 4-42. -65 dBm Power Level**

- Click on **2.5 Read RSSI (-65 dBm)** button.
- Wait for “RSSI” and “LNA” values to appear on the GUI.

**Figure 4-43.** Read RSSI and LNA

|                         |      |     |     |   |         |
|-------------------------|------|-----|-----|---|---------|
| 2.5 Read RSSI (-65 dBm) | RSSI | -63 | LNA | 7 | success |
|-------------------------|------|-----|-----|---|---------|

- t. Click on **2.6 Stop RX Calibration** button.
- If the LNA sequence does not match 0, 3, 4, 7 Go to step 5.o.
  - If the RSSI sequence does not match -20 > -35 > -45 > -50 > -65 Go to step 5.o.

**Figure 4-44.** Stop RX Calibration

|                         |      |     |     |   |         |
|-------------------------|------|-----|-----|---|---------|
| 2.1 Read RSSI (-20 dBm) | RSSI | -24 | LNA | 0 | success |
| 2.2 Read RSSI (-35 dBm) | RSSI | -36 | LNA | 3 | success |
| 2.3 Read RSSI (-45 dBm) | RSSI | -45 | LNA | 4 | success |
| 2.4 Read RSSI (-50 dBm) | RSSI | -50 | LNA | 4 | success |
| 2.5 Read RSSI (-65 dBm) | RSSI | -63 | LNA | 7 | success |

- Wait for “GainCorr” value to appear on the GUI.

**Figure 4-45.** Read GainCorr

|                         |          |   |   |    |   |    |    |         |
|-------------------------|----------|---|---|----|---|----|----|---------|
| 2.6 Stop RX Calibration | GainCorr | 2 | 0 | -4 | 0 | -1 | -4 | success |
|-------------------------|----------|---|---|----|---|----|----|---------|

- u. Click on **3. Set Params** button.
- Wait for the result to appear as success.

**Figure 4-46.** Set Params

|               |         |
|---------------|---------|
| 3. Set Params | success |
|---------------|---------|

- v. Click on **4. Test Rate Cond Prepare** button.
- Wait for the result to appear as success.

**Figure 4-47.** Test Rate Cond Prepare

|                           |         |
|---------------------------|---------|
| 4. Test Rate Cond Prepare | success |
|---------------------------|---------|

- w. Click on **4.1.1 Test Rate Cond Start CH 1** button.

**Figure 4-48.** Test Rate Cond Start CH 1

|                                 |                   |  |                 |  |                   |         |
|---------------------------------|-------------------|--|-----------------|--|-------------------|---------|
| 4.1.1 Test Rate Cond Start CH 1 | 4.1.2 Input Power |  | 4.1.3 Input EVM |  | 4.1.4 Set Power 1 | success |
|---------------------------------|-------------------|--|-----------------|--|-------------------|---------|

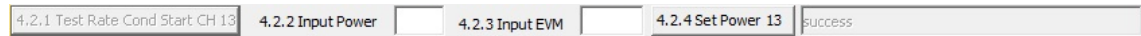
- Read the RF Power on the Wi-Fi tester.
- Enter the measured RF Power from the Wi-Fi tester in “4.1.2 Input Power”.
- Read the RF EVM on the Wi-Fi tester.
- Enter the measured RF EVM from the Wi-Fi tester in “4.1.3 Input EVM”.
- Click on **4.1.4 Set Power 1** button.
- Wait for the result to appear as success.

**Figure 4-49.** Set Power 1 Success

|                                 |                   |       |                 |        |                   |         |
|---------------------------------|-------------------|-------|-----------------|--------|-------------------|---------|
| 4.1.1 Test Rate Cond Start CH 1 | 4.1.2 Input Power | 16.52 | 4.1.3 Input EVM | -30.85 | 4.1.4 Set Power 1 | success |
|---------------------------------|-------------------|-------|-----------------|--------|-------------------|---------|

- x. Click on **4.2.1 Test Rate Cond Start CH 13** button.

**Figure 4-50.** Test Rate Cond Start CH 13



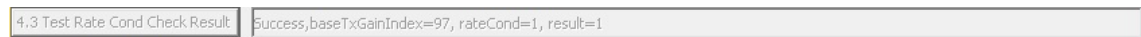
- Read the RF Power on the Wi-Fi tester.
- Enter the measured RF Power from the Wi-Fi tester in “4.2.2 Input Power”.
- Read the RF EVM on the Wi-Fi tester.
- Enter the measured RF EVM from the Wi-Fi tester in “4.2.3 Input EVM”.
- Click on **4.2.4 Set Power 13** button.
- Wait for the result to appear as success.

**Figure 4-51.** Set Power 13 Success



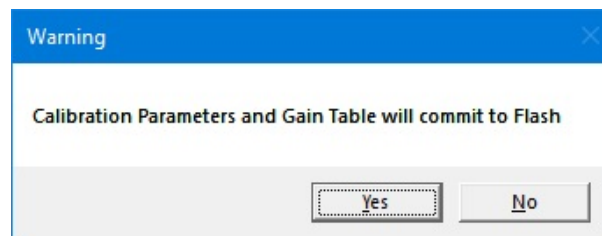
- y. Click on **4.3 Test Rate Cond Check Result** button.

**Figure 4-52.** Test Rate Cond Check Result



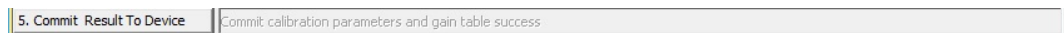
- If the result is not 1, go to step [5.w](#)
- i. Click on **5. Commit Result To Device** button.

**Figure 4-53.** Commit Result To Device

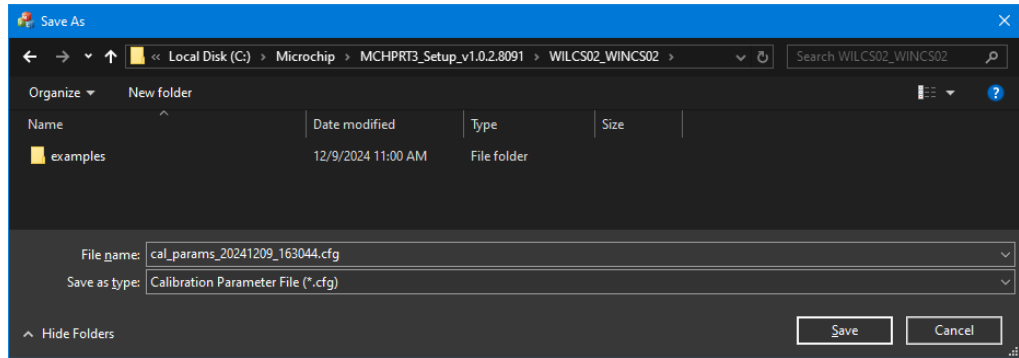


- Press **Yes** button.
- Wait for the calibration parameters to be written to the device.
- Wait for the gain table to be written to the device.

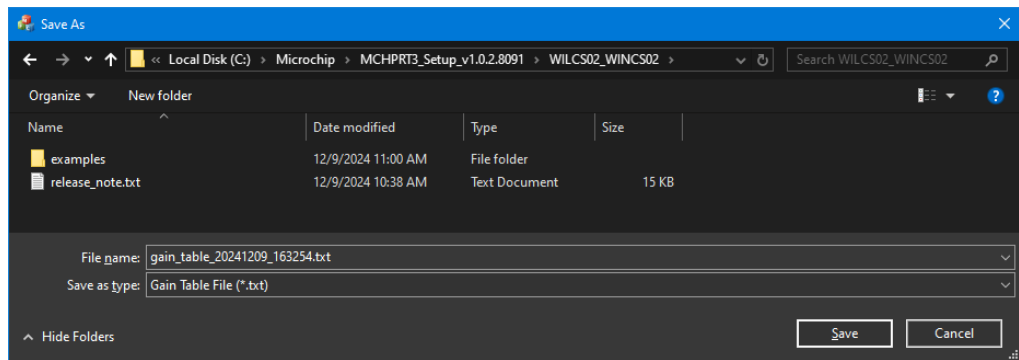
**Figure 4-54.** Commit Result To Device



- ii. Click on **6. Save Result To File** button.
- To save calibration parameters to a file, follow these steps:
    - a. Open the screen below.
    - b. Input the file name.
    - c. Click the **Save** button to save the calibration parameters to the file.

**Figure 4-55. Save Result To File**

- To save the gain table to a file, follow these steps:
  - a. Open the screen.
  - b. Input the file name.
  - c. Click on the **Save** button to save the gain table to the file.

**Figure 4-56. Save Gain Table to the File**

6. Save Result To File | C:\Microchip\MCHPRT3\_Setup\_v1.0.2.8091\WILCS02\_WINCS02\cal\_params\_20241209\_163044.cfg;C:\Microchip\MCHPRT3\_Setup\_v1.0.2.

Figure 4-57. Calibration GUI

WILCS02\_WINCS02 GUI Ver: 1.0.240.8088

DLL Version: DLL: 1.0.8087, FW: 2.4.0    COM Port: COM3    Baud Rate: 230400

Connect     Wait Boot Finish     Temperature Compensation    Timeout: 5000    SetTimeout

Disconnect    Reset    Get FW Version    FW Version: 2.4.0

RF    Calibration    MAC Address    Gain Tables    Misc.

Erase Flash Cfg

0. Calibration Condition    Channel : 2442 MHz, Rate Type : MCS, Data Rate : MCS7, Duration : 9999, Frame Length : 1500

1.0 Start TX Calibration    sdAdcTemp25c: 585    sdAdcVdd3p3v: 366    success

1.1.1 First Tune    1.1.2 Input Power: 10.9    1.1.3 Check First Tune Result: need tune

1.2.1 Second Tune    1.2.2 Input Power: 15.45    1.2.3 Check Second Tune Result: no need tune

1.3.1 Third Tune    1.3.2 Input Power:    1.3.3 Check Third Tune Result:

1.4.1 Last Measure Power: 15.45    1.4.2 Read Base TX Gain Index: baseTxGainIndex:97

|                              |      |     |       |    |                    |       |                  |        |                    |         |
|------------------------------|------|-----|-------|----|--------------------|-------|------------------|--------|--------------------|---------|
| 1.5.1 Read TSSI and PDREF 1  | TSSI | 35  | PDREF | 60 | 1.5.2 Input Power  | 7.34  | 1.5.3 Input EVM  | -31.26 | 1.5.4 Set Power 1  | success |
| 1.6.1 Read TSSI and PDREF 2  | TSSI | 73  | PDREF | 60 | 1.6.2 Input Power  | 11.46 | 1.6.3 Input EVM  | -31.92 | 1.6.4 Set Power 2  | success |
| 1.7.1 Read TSSI and PDREF 3  | TSSI | 145 | PDREF | 62 | 1.7.2 Input Power  | 15.27 | 1.7.3 Input EVM  | -31.49 | 1.7.4 Set Power 3  | success |
| 1.8.1 Read TSSI and PDREF 4  | TSSI | 170 | PDREF | 62 | 1.8.2 Input Power  | 16.23 | 1.8.3 Input EVM  | -30.54 | 1.8.4 Set Power 4  | success |
| 1.9.1 Read TSSI and PDREF 5  | TSSI | 186 | PDREF | 62 | 1.9.2 Input Power  | 16.75 | 1.9.3 Input EVM  | -30.03 | 1.9.4 Set Power 5  | success |
| 1.10.1 Read TSSI and PDREF 6 | TSSI | 244 | PDREF | 63 | 1.10.2 Input Power | 18.23 | 1.10.3 Input EVM | -26.38 | 1.10.4 Set Power 6 | success |
| 1.11.1 Read TSSI and PDREF 7 | TSSI | 330 | PDREF | 64 | 1.11.2 Input Power | 20.27 | 1.11.3 Input EVM | -19.79 | 1.11.4 Set Power 7 | success |

1.12 Stop TX Calibration    rateCond: 1

2.0 Start RX Calibration    Count: 0    success

|                         |      |     |     |   |         |
|-------------------------|------|-----|-----|---|---------|
| 2.1 Read RSSI (-20 dBm) | RSSI | -24 | LNA | 0 | success |
| 2.2 Read RSSI (-35 dBm) | RSSI | -36 | LNA | 3 | success |
| 2.3 Read RSSI (-45 dBm) | RSSI | -45 | LNA | 4 | success |
| 2.4 Read RSSI (-50 dBm) | RSSI | -50 | LNA | 4 | success |
| 2.5 Read RSSI (-65 dBm) | RSSI | -63 | LNA | 7 | success |

2.6 Stop RX Calibration    GainCorr: 2    0    -4    0    -1    -4    success

3. Set Params    success

4. Test Rate Cond Prepare    success

|                                  |                   |       |                 |        |                    |         |
|----------------------------------|-------------------|-------|-----------------|--------|--------------------|---------|
| 4.1.1 Test Rate Cond Start CH 1  | 4.1.2 Input Power | 16.52 | 4.1.3 Input EVM | -30.85 | 4.1.4 Set Power 1  | success |
| 4.2.1 Test Rate Cond Start CH 13 | 4.2.2 Input Power | 16.90 | 4.2.3 Input EVM | -29.19 | 4.2.4 Set Power 13 | success |

4.3 Test Rate Cond Check Result: success, baseTxGainIndex=97, rateCond=1, result=1

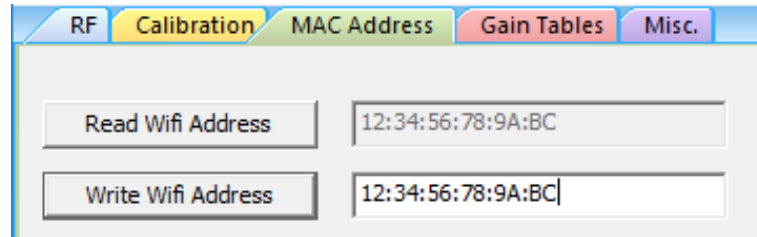
5. Commit Result To Device    Commit calibration parameters and gain table success

6. Save Result To File    C:\Microchip\MCHPRT3\_Setup\_v1.0.2.8091\WILCS02\_WINCS02\cal\_params\_20241209\_163044.cfgC:\Microchip\MCHPRT3\_Setup\_v1.0.2.

## 4.7. MAC Address Programming

In this demonstration, set the MAC address of the Wi-Fi® interfaces of the WILCS02\_WINCS02. In the **MAC Address** tab, perform the following steps for MAC Address programming:

1. Click the **Read Wi-Fi Address** button to read the Wi-Fi address.
2. Enter the Wi-Fi address to write the Wi-Fi address, for example, 12 : 34 : 56 : 78 : 9A : BC, then click the **Write Wi-Fi Address** button.

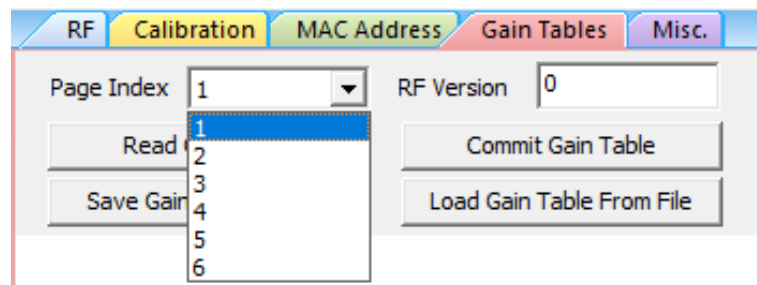
**Figure 4-58.** MAC Address Programming

## 4.8. Gain Tables Demonstration

In this demonstration, users can edit the gain tables of the WILCS02\_WINCS02. The gain tables are the power settings stored in Flash of the WILCS02\_WINCS02 to control the TX power in application firmware. The “Page Index” value ranges from 1-6, and users can store the gain tables information in the “Page Index” for the respective Flash.

### Steps for Gain Tables Demonstration

1. From the “Page Index” drop-down list, select a value ranging from 1-6 to read or write for the gain table.

**Figure 4-59.** Page Index

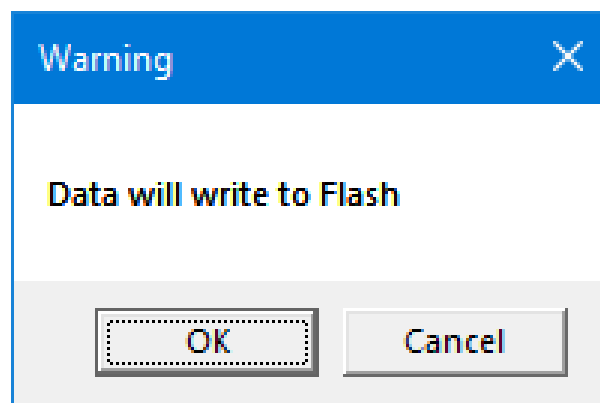
2. Click the **Read Gain Table** button to read the gain table. The gain table content will display on the GUI.

Figure 4-60. Read Gain Table

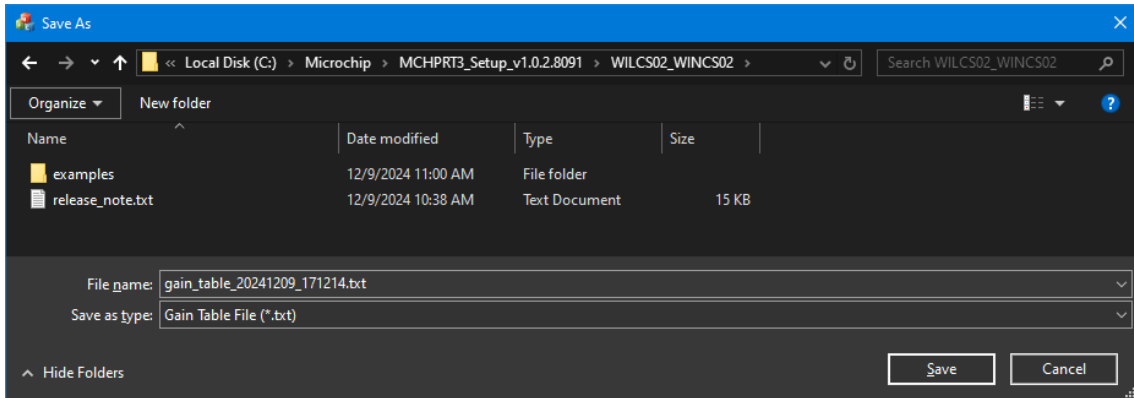
| Packet Type | Data Rate | Non Band Edge Power Target (dBm) | Band Edge Power Target (dBm) |
|-------------|-----------|----------------------------------|------------------------------|
| 11b,        | 1,        | 16.75,                           | 16.75,                       |
| 11b,        | 2,        | 16.75,                           | 16.75,                       |
| 11b,        | 5.5,      | 16.75,                           | 16.75,                       |
| 11b,        | 11,       | 16.75,                           | 16.75,                       |
| 11g,        | 6,        | 17.25,                           | 17.25,                       |
| 11g,        | 9,        | 17.25,                           | 17.25,                       |
| 11g,        | 12,       | 17.25,                           | 17.25,                       |
| 11g,        | 18,       | 17.25,                           | 17.25,                       |
| 11g,        | 24,       | 17.5,                            | 17.5,                        |
| 11g,        | 36,       | 17.25,                           | 17.25,                       |
| 11g,        | 48,       | 17.5,                            | 17.5,                        |
| 11g,        | 54,       | 17,                              | 17,                          |
| 11n,        | MCS0,     | 16.5,                            | 14.5,                        |
| 11n,        | MCS1,     | 17.25,                           | 15.25,                       |
| 11n,        | MCS2,     | 17.25,                           | 15.25,                       |
| 11n,        | MCS3,     | 17.25,                           | 15.25,                       |
| 11n,        | MCS4,     | 17.25,                           | 15.25,                       |
| 11n,        | MCS5,     | 16.75,                           | 15,                          |
| 11n,        | MCS6,     | 17,                              | 15.25,                       |
| 11n,        | MCS7,     | 17,                              | 15.25,                       |

3. Enter a value for "RF Version" and click the **Commit Gain Table** button. Click the **OK** button to write the gain table to the device.

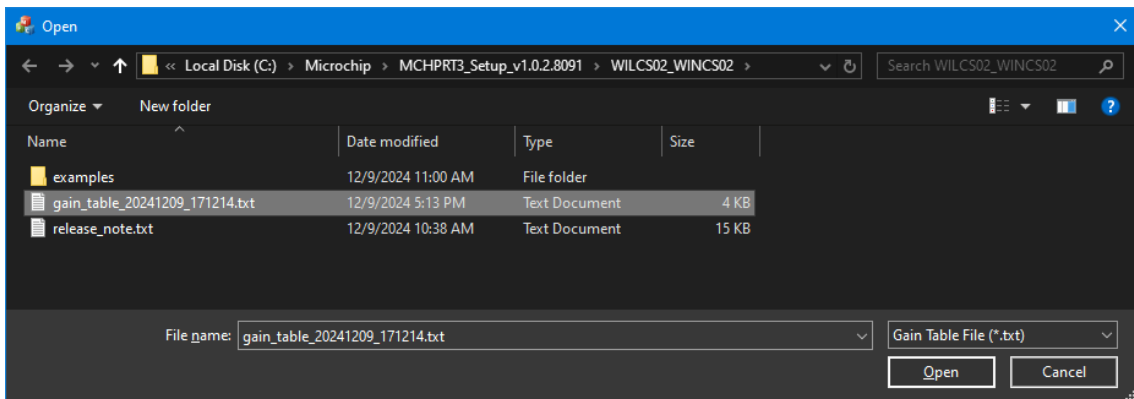
Figure 4-61. Writing to Gain Table



4. Click the **Save Gain Table To File** button to save the gain table for backup and editing. Users can edit the saved gain table text file if they need to modify the gain settings.

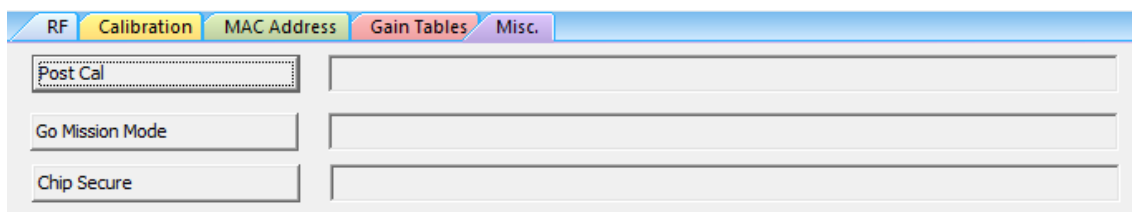
**Figure 4-62.** Saving the Gain Table

5. Click the **Load Gain Table From File** button to load the gain table.

**Figure 4-63.** Loading the Gain Table

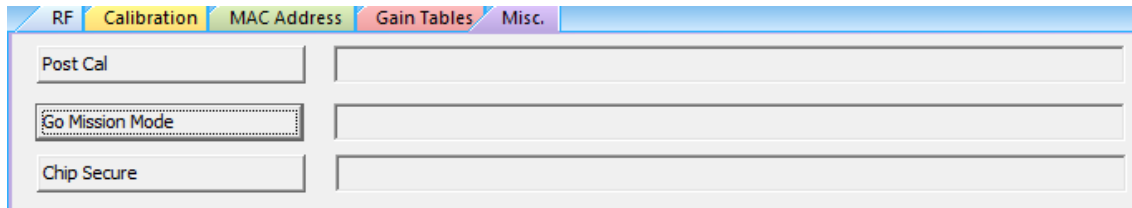
## 4.9. Post Cal

In this demonstration, run the “Post Cal” mode for different RF connectors of the WILCS02\_WINCS02. Click the **Post Cal** button to execute it.

**Figure 4-64.** Post Cal

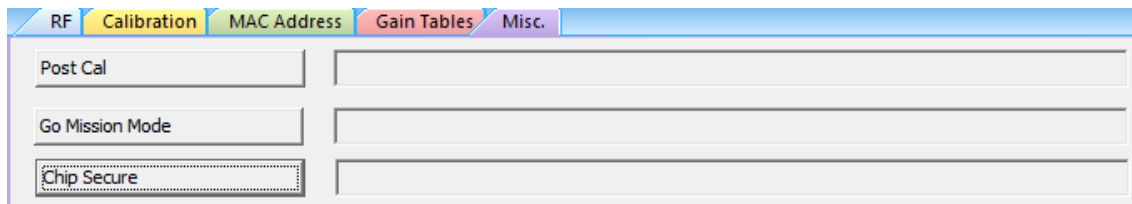
## 4.10. Go Mission Mode

In this demonstration, the user can run the “Go Mission Mode” to switch to Mission Mode from Hut Mode on the next Restart. Click **Go Mission Mode** button to execute it.

**Figure 4-65.** Go Mission Mode

### 4.11. Chip Secure

In this demonstration, run the “Chip Secure” to secure the chip. Click the **Chip Secure** button to execute it.

**Figure 4-66.** Chip Secure

## 5. WILCS02\_WINCS02 Dynamic Link Library (DLL) Gain Table Information

This chapter describes the WILCS02\_WINCS02 gain table information and explains how to modify the gain table.

### 5.1. Gain Table Example

The WILCS02\_WINCS02 gain table is a text-based file that can be opened or edited using any text editor. The following rules apply to a gain table file:

- “;;;” indicates a comment for the entire line.
- If the first character is “;”, the row contains file information.  
**Note:** Do not modify this row.
- If the first character is blank, the row contains the Gain Table information. The power target values can be modified, but no other information or format must be altered.
  - Gain Table information power target values range from 0-25 dBm, with 0.25 dB per step.  
**Note:** If any information in the gain table is unavailable, the entire group of information is considered invalid.

Figure 5-1. Gain Table Example

```

gain_table_20241209_171214.txt - Notepad
File Edit Format View Help
;;;=====
;;; WILCS02_WINCS02 DLL Gain Tables Information;
;Save File Date      : 2024/12/09 17:13:03
;Save DLL Version    : 1.0.8087, Support HUT Version : 2.4.0
;File Format Version : 0
;;;=====
;;;
;;;*****
Table Format Version : 0;
NVM Type           : Flash;
Page Index         : 1;
Country Code       : GEN;
Operating Channels  : 2412, 2417, 2422, 2427, 2432, 2437, 2442, 2447, 2452, 2457, 2462;
Band Edge Channels : 2412;
RF Version         : 7;
;;;+-----+-----+-----+-----+
;;;| Packet Type | Data Rate | Non Band Edge | Band Edge |
;;;|             |           | Power Target (dBm) | Power Target (dBm) |
;;;+-----+-----+-----+-----+
;;;| 11b,        | 1,        | 16.75,        | 16.75,    | ;
;;;| 11b,        | 2,        | 16.75,        | 16.75,    | ;
;;;| 11b,        | 5.5,     | 16.75,        | 16.75,    | ;
;;;| 11b,        | 11,       | 16.75,        | 16.75,    | ;
;;;+-----+-----+-----+-----+
;;;| 11g,        | 6,        | 17.25,        | 17.25,    | ;
;;;| 11g,        | 9,        | 17.25,        | 17.25,    | ;
;;;| 11g,        | 12,       | 17.25,        | 17.25,    | ;
;;;| 11g,        | 18,       | 17.25,        | 17.25,    | ;
;;;| 11g,        | 24,       | 17.5,         | 17.5,     | ;
;;;| 11g,        | 36,       | 17.25,        | 17.25,    | ;
;;;| 11g,        | 48,       | 17.5,         | 17.5,     | ;
;;;| 11g,        | 54,       | 17,           | 17,       | ;
;;;+-----+-----+-----+-----+
;;;| 11n,        | MCS0,     | 16.5,         | 14.5,     | ;
;;;| 11n,        | MCS1,     | 17.25,        | 15.25,    | ;
;;;| 11n,        | MCS2,     | 17.25,        | 15.25,    | ;
;;;| 11n,        | MCS3,     | 17.25,        | 15.25,    | ;
;;;| 11n,        | MCS4,     | 17.25,        | 15.25,    | ;
;;;| 11n,        | MCS5,     | 16.75,        | 15,       | ;
;;;| 11n,        | MCS6,     | 17,           | 15.25,    | ;
;;;| 11n,        | MCS7,     | 17,           | 15.25,    | ;
;;;+-----+-----+-----+-----+
<----->
Ln 1, Col 1  100%  Windows (CRLF)  UTF-8
    
```

## 6. WILCS02\_WINCS02 Command Line Interface (CLI) Information

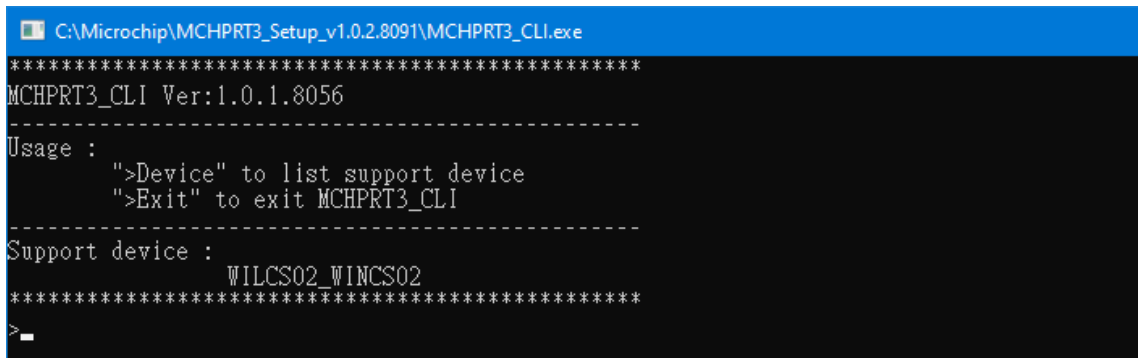
This chapter describes the Command Line Interface (CLI) information of the WILCS02\_WINCS02.

### 6.1. WILCS02\_WINCS02 CLI Example

The WILCS02\_WINCS02 CLI is a part of the MCHPRT3 tool installer.

1. Double click MCHPRT3\_CLI.exe to run the CLI.

Figure 6-1. Command Line Interface

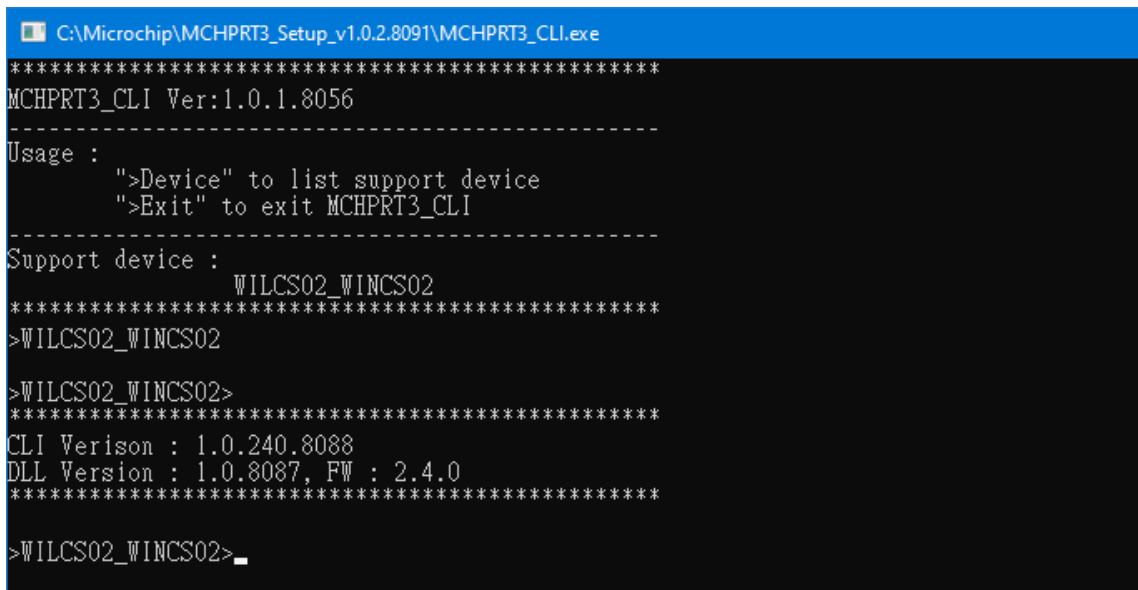


```

C:\Microchip\MCHPRT3_Setup_v1.0.2.8091\MCHPRT3_CLI.exe
*****
MCHPRT3_CLI Ver:1.0.1.8056
-----
Usage :
    ">Device" to list support device
    ">Exit" to exit MCHPRT3_CLI
-----
Support device :
                WILCS02_WINCS02
*****
>_
  
```

2. To test the WILCS02\_WINCS02, enter the "WILCS02\_WINCS02".

Figure 6-2. Command Line Interface

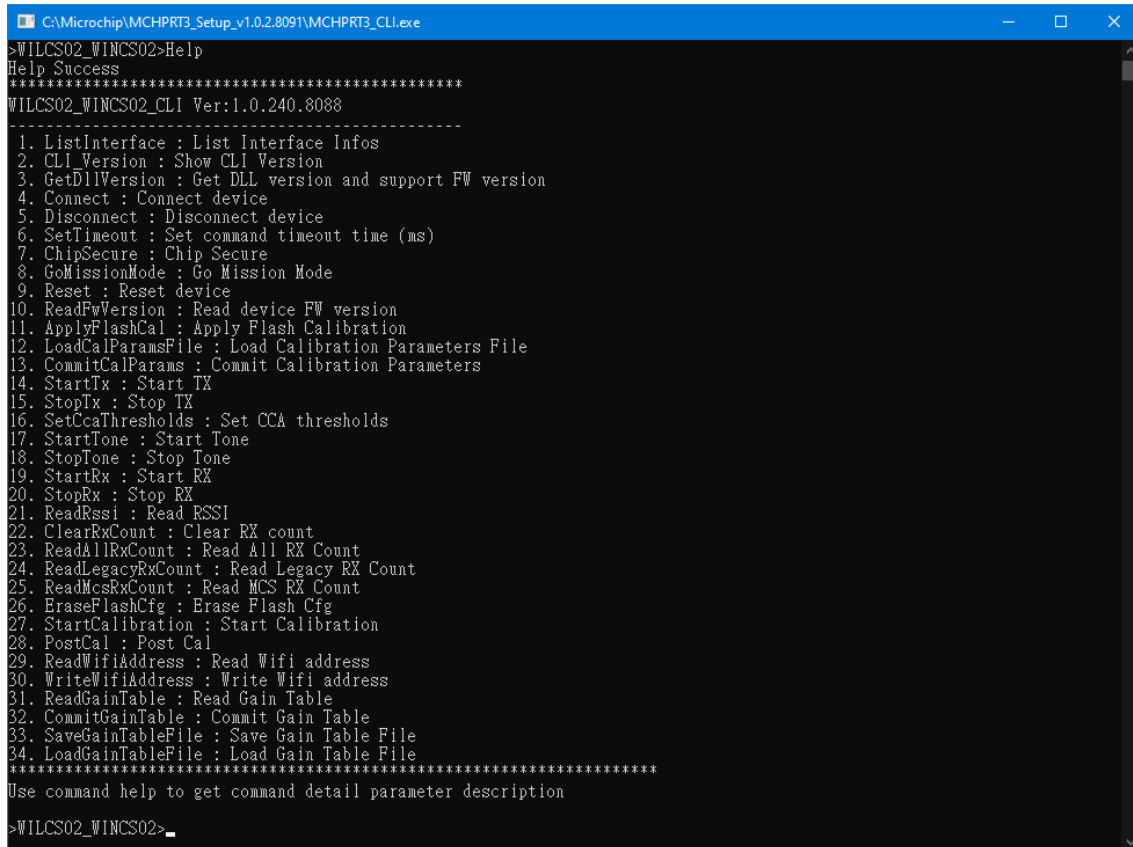


```

C:\Microchip\MCHPRT3_Setup_v1.0.2.8091\MCHPRT3_CLI.exe
*****
MCHPRT3_CLI Ver:1.0.1.8056
-----
Usage :
    ">Device" to list support device
    ">Exit" to exit MCHPRT3_CLI
-----
Support device :
                WILCS02_WINCS02
*****
>WILCS02_WINCS02
>WILCS02_WINCS02>
*****
CLI Verison : 1.0.240.8088
DLL Version : 1.0.8087, FW : 2.4.0
*****
>WILCS02_WINCS02>_
  
```

3. Enter "Help" to browse CLI help manual.

Figure 6-3. Command Line Interface



```

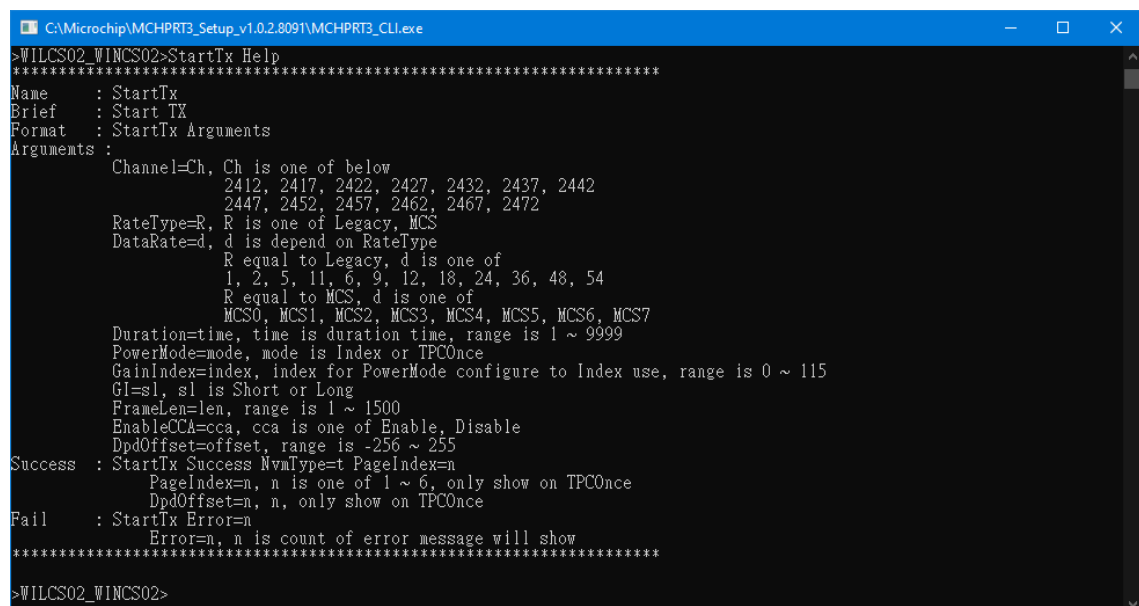
C:\Microchip\MCHPRT3_Setup_v1.0.2.8091\MCHPRT3_CLI.exe
>WILCS02_WINCS02>Help
Help Success
*****
WILCS02_WINCS02_CLI Ver:1.0.240.8088
-----
1. ListInterface : List Interface Infos
2. CLI_Version : Show CLI Version
3. GetDllVersion : Get DLL version and support FW version
4. Connect : Connect device
5. Disconnect : Disconnect device
6. SetTimeout : Set command timeout time (ms)
7. ChipSecure : Chip Secure
8. GoMissionMode : Go Mission Mode
9. Reset : Reset device
10. ReadFwVersion : Read device FW version
11. ApplyFlashCal : Apply Flash Calibration
12. LoadCalParamsFile : Load Calibration Parameters File
13. CommitCalParams : Commit Calibration Parameters
14. StartTx : Start TX
15. StopTx : Stop TX
16. SetCcaThresholds : Set CCA thresholds
17. StartTone : Start Tone
18. StopTone : Stop Tone
19. StartRx : Start RX
20. StopRx : Stop RX
21. ReadRssi : Read RSSI
22. ClearRxCount : Clear RX count
23. ReadAllRxCount : Read All RX Count
24. ReadLegacyRxCount : Read Legacy RX Count
25. ReadMcsRxCount : Read MCS RX Count
26. EraseFlashCfg : Erase Flash Cfg
27. StartCalibration : Start Calibration
28. PostCal : Post Cal
29. ReadWifiAddress : Read Wifi address
30. WriteWifiAddress : Write Wifi address
31. ReadGainTable : Read Gain Table
32. CommitGainTable : Commit Gain Table
33. SaveGainTableFile : Save Gain Table File
34. LoadGainTableFile : Load Gain Table File
*****
Use command help to get command detail parameter description

>WILCS02_WINCS02>_

```

- For example, enter “StartTx Help” to browse the CLI StartTx Help manual.

Figure 6-4. Command Line Interface



```

C:\Microchip\MCHPRT3_Setup_v1.0.2.8091\MCHPRT3_CLI.exe
>WILCS02_WINCS02>StartTx Help
*****
Name      : StartTx
Brief     : Start TX
Format    : StartTx Arguments
Arguments :
  Channel=Ch, Ch is one of below
              2412, 2417, 2422, 2427, 2432, 2437, 2442
              2447, 2452, 2457, 2462, 2467, 2472
  RateType=R, R is one of Legacy, MCS
  DataRate=d, d is depend on RateType
              R equal to Legacy, d is one of
              1, 2, 5, 11, 6, 9, 12, 18, 24, 36, 48, 54
              R equal to MCS, d is one of
              MCS0, MCS1, MCS2, MCS3, MCS4, MCS5, MCS6, MCS7
  Duration=time, time is duration time, range is 1 ~ 9999
  PowerMode=mode, mode is Index or TPCOnce
  GainIndex=index, index for PowerMode configure to Index use, range is 0 ~ 115
  GI=sl, sl is Short or Long
  FrameLen=len, range is 1 ~ 1500
  EnableCCA=cca, cca is one of Enable, Disable
  DpdOffset=offset, range is -256 ~ 255
Success   : StartTx Success NvalType=t PageIndex=n
              PageIndex=n, n is one of 1 ~ 6, only show on TPCOnce
              DpdOffset=n, n, only show on TPCOnce
Fail      : StartTx Error=n
              Error=n, n is count of error message will show
*****
>WILCS02_WINCS02>

```

## 7. WILCS02\_WINCS02 Python 3 Information

This chapter describes the Python 3 example information of the WILCS02\_WINCS02. For more details, refer to the `Python3_Example.chm`.

Refer to the example code in the WILCS02\_WINCS02 package example folder, which provides details on how to use the `WILCS02_WINCS02.dll` file with the Python language to control the WILCS02\_WINCS02.

### 7.1. Python 3.11.1 Environment

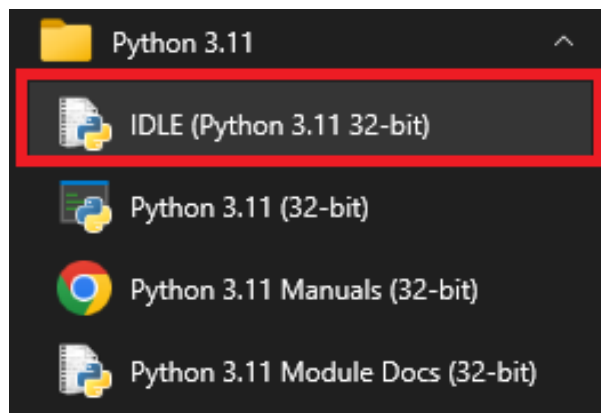
Python Environment : [Python 3.11.1](#) (tags/v3.11.1:a7a450f, Dec 6 2022, 19:43:28) [MSC v.1934 32 bit (Intel)] on win32).

### 7.2. Steps to Run the Python 3.11 Environment

The following are the steps to run the Python 3.11 environment:

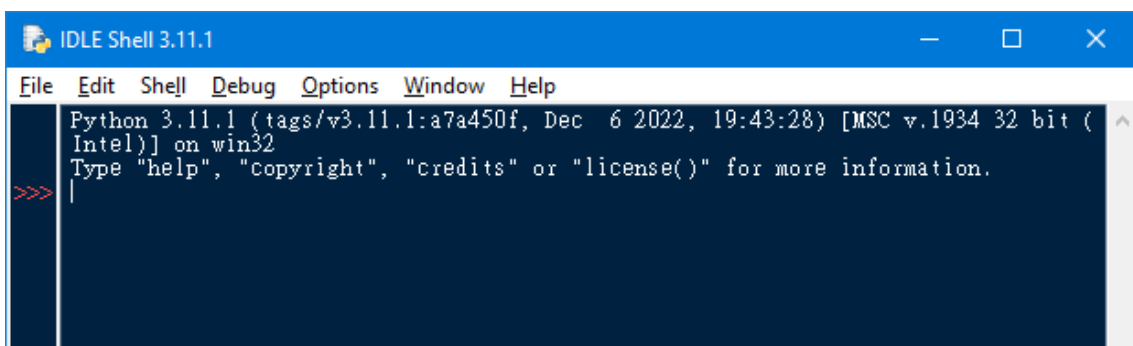
1. Open **IDLE (Python 3.11 32-bit)** in the **Python 3.11** folder from the PC **Start** menu.

Figure 7-1. Python IDLE



2. The following figure illustrates the "IDLE" window of "Python 3.11".

Figure 7-2. IDLE



3. Go to **File > Open** and choose the `WILCS02_WINCS02_GUI.py` file.

Figure 7-3. Opening WILCS02\_WINCS02\_GUI.py

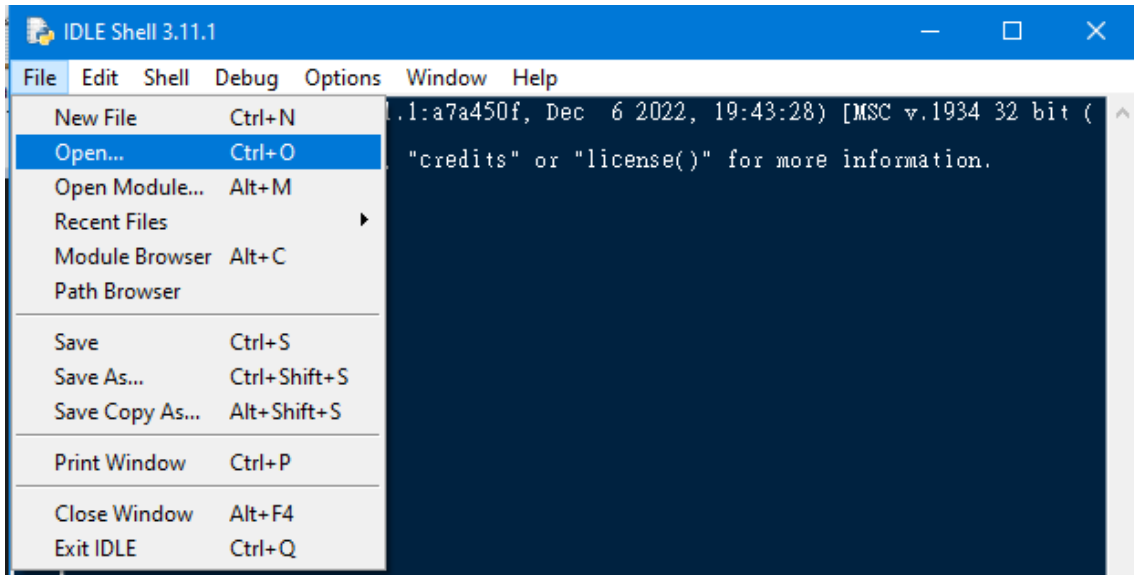
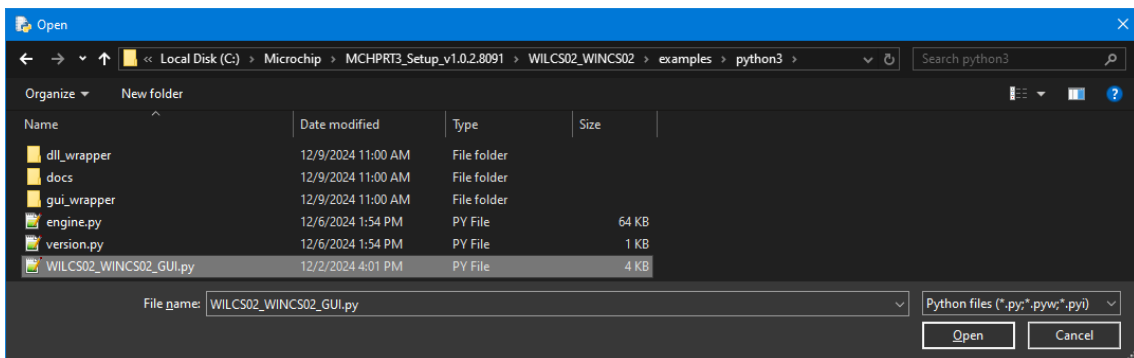
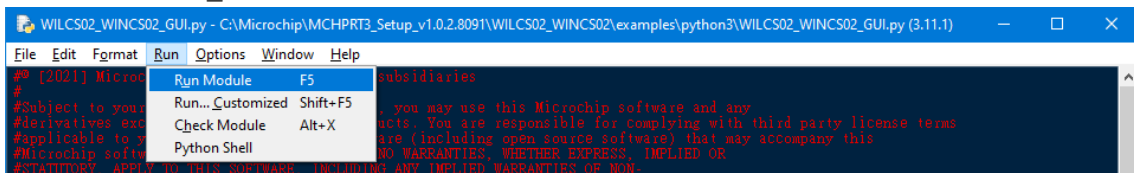


Figure 7-4. Opening WILCS02\_WINCS02\_GUI.py



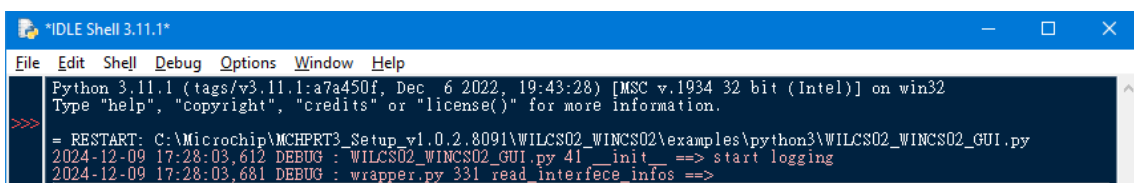
4. Go to Run>Run Module to execute the WILCS02\_WINCS02.py file.

Figure 7-5. WILCS02\_WINCS02.py



5. The "Python 3.11" shell window displays the following message:

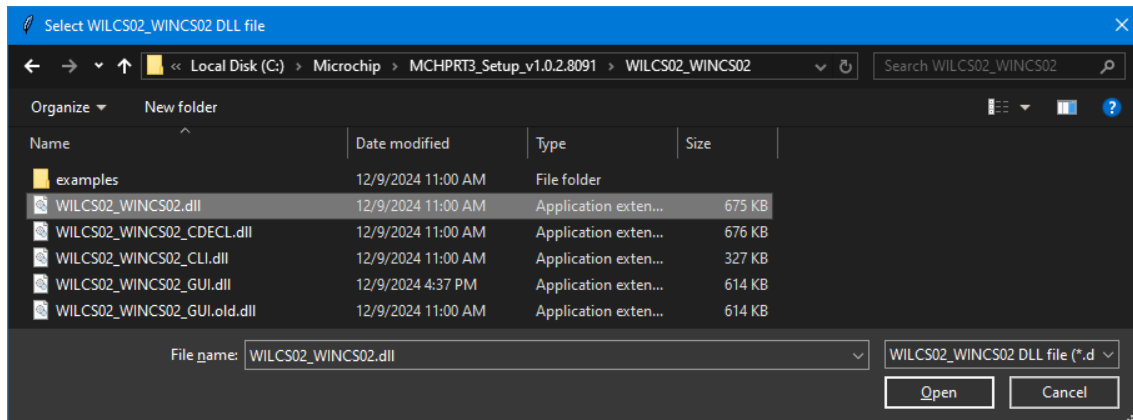
Figure 7-6. Check Run WILCS02\_WINCS02.py Status



**Note:** If the shell window displays an error message, check if the source code is from the original MCHPRT3\_Setup.exe installation folder.

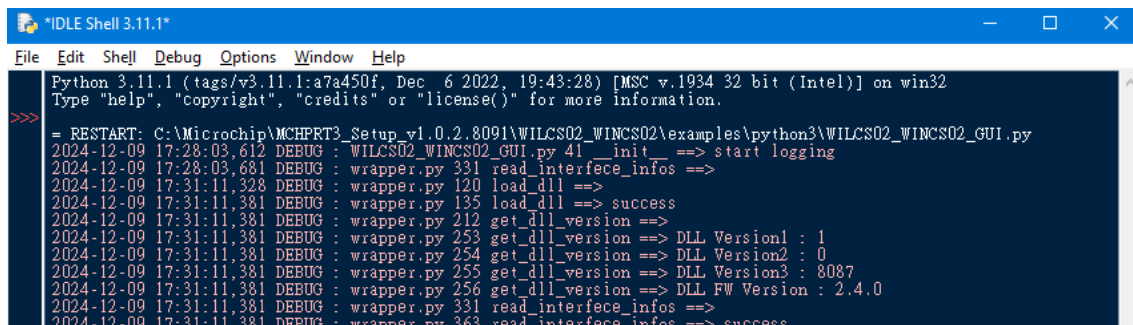
6. Select the WILCS02\_WINCS02.dll file to load the library and run the example code.

**Figure 7-7.** WILCS02\_WINCS02.dll



7. The following figure illustrates the Python shell window. After successfully loading the WILCS02\_WINCS02.dll file, the Python shell window displays the .dll file version. In the Python shell window, users can reference the GUI run process to design a tool for themselves.

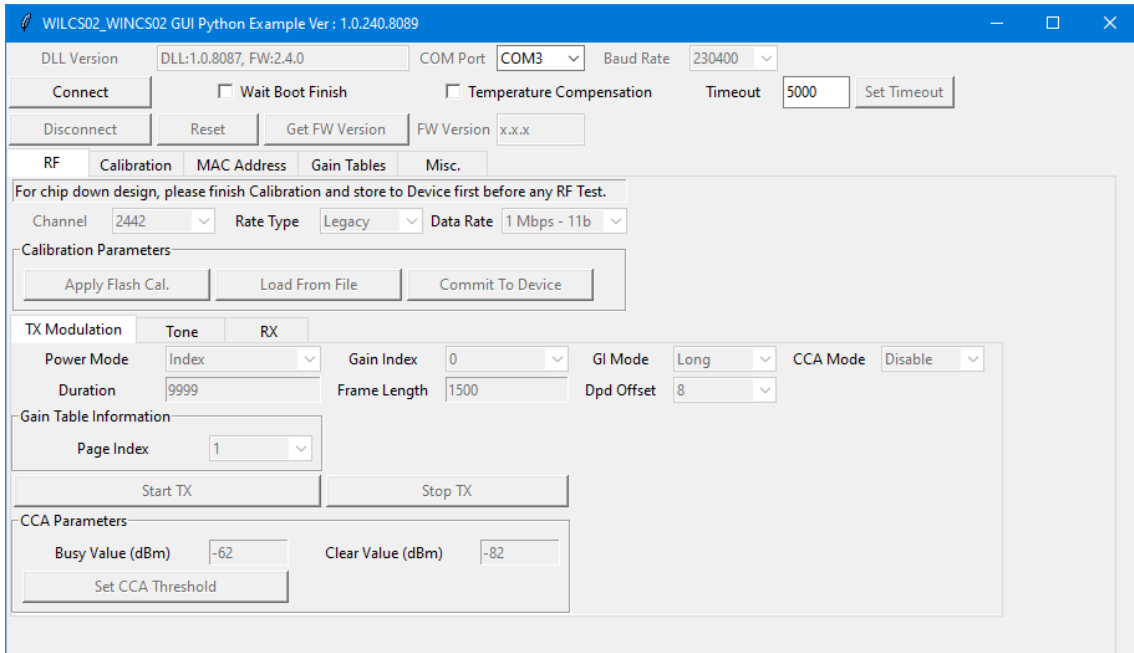
**Figure 7-8.** Successful Loading of WILCS02\_WINCS02.dll



8. The following figure illustrates the WILCS02\_WINCS02 GUI Python example.
 

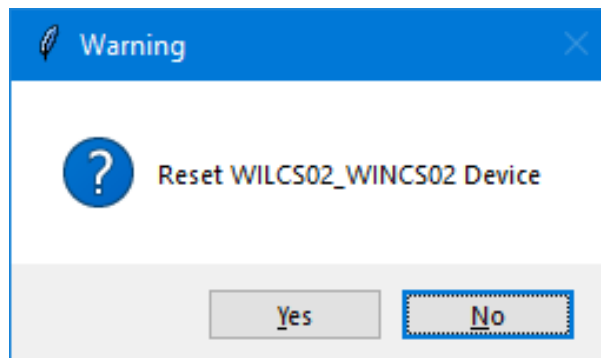
**Note:** Check if the version matches the device HUT code firmware version.
9. Select the device connect "COM Port" and click **Connect** to connect the WILCS02\_WINCS02 device.

Figure 7-9. Python Example GUI



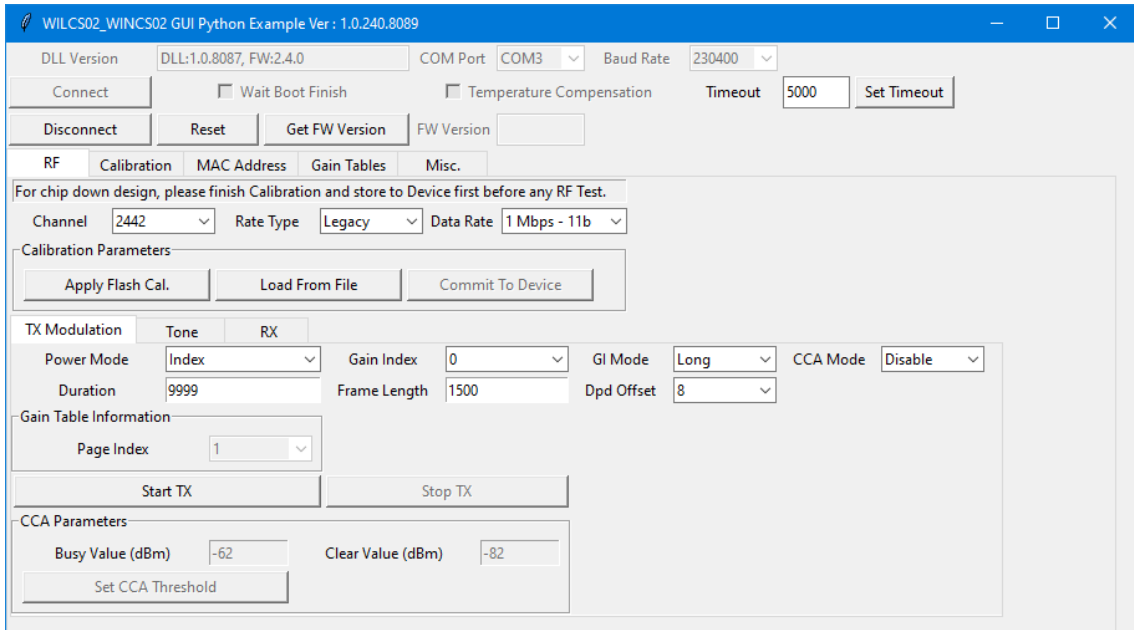
10. The following warning pop-up window appears after connecting the WILCS02\_WINCS02 device. Click **Yes** to Reset the WILCS02\_WINCS02 device.

Figure 7-10. Warning



11. After a successful connection, the following WILCS02\_WINCS02 GUI Python example window appears.

Figure 7-11. Python Example GUI



## 8. Document Revision History

The document revision history describes the changes that were implemented in the document. The changes are listed by revision, starting with the most current publication.

| Revision | Date    | Section  | Description      |
|----------|---------|----------|------------------|
| A        | 06/2025 | Document | Initial revision |

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ISBN: 979-8-3371-1390-6

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