# PIC32CX-BZ3 MCHPRT3 User Guide

## PIC32CX-BZ3

Product Page Links

## Introduction

This user guide provides detailed information about using the Microchip Radio Test 3 tool (MCHPRT3) with the Microchip PIC32CX-BZ3. The MCHPRT3 enables the user to evaluate and demonstrate the RF performance, calibration and functionalities of the PIC32CX-BZ3.

**Note:** In this user guide, the MCHPRT3 tool with the PIC32 WBZ351 Curiosity Board is only shown as an example.

The MCHPRT3 is intended for development purposes. Any production test must use either a third-party production tool or users must develop their own production tool based on the MCHPRT3 CLI or DLL release.

## Features

- DLL Version – DLL Information and Firmware Support Version
- COM PORT – COM Port Information and Configuration
- Baud Rate – 115200 (Default Value)
- RF Bluetooth® – Bluetooth Low Energy RF Parameter Configuration and Information
- RF ZB – Zigbee® RF Parameter Configuration and Information
- MAC Address Information and Configuration
- IB File – Read or Save Information Block (IB) File
- Calibration Information and Configuration
- GPIO Information and Configuration

For more details, refer to Getting Started.

# Table of Contents

# 1. Quick References

## 1.1. Hardware Prerequisites

- WBZ351 Curiosity Board, EV19J06A (PIC32CX-BZ3 programmed with HUT Firmware)
- USB-A to Micro USB cable
- Test Equipment
  - Bluetooth Low Energy and Zigbee Tester (IQxel)

## 1.2. Software Prerequisites

Download the latest MCHPRT3 installer package, PIC32CX-BZ3 HUT X.X firmware and the corresponding tools from the Microchip website at www.microchip.com/MCHPRT.

- Windows® OS (version to be confirmed)
- MCHPRT3 installer package (`MCHPRT3_Setup_v1.0.x.XXXX.exe`)
- MPLAB® X IDE v6.10 or above

## 1.3. Acronyms and Abbreviations

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

| Acronyms and Abbreviations | Description |
|---|---|
| CLI | Command Line Interface |
| DLL | Dynamic Link Library |
| DUT | Device Under Test |
| GPIO | General-Purpose Input/Output |
| GUI | Graphical User Interface |
| HUT | Hardware Under Test |
| IB | Information Block |
| MCHPRT3 tool | Microchip Radio Test 3 tool |
| OTP | One-Time Programmable |
| RSSI | Received Signal Strength Indicator |

# 2. Overview

This section provides an overview of the MCHPRT3 tool setup and the components. Install the `MCHPRT3_setup_v1.0.0.XXXX.exe` tool. The MCHPRT3 tool installs by default in the `C:\Microchip\` location.

The following table provides the MCHPRT3 tool package files:

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

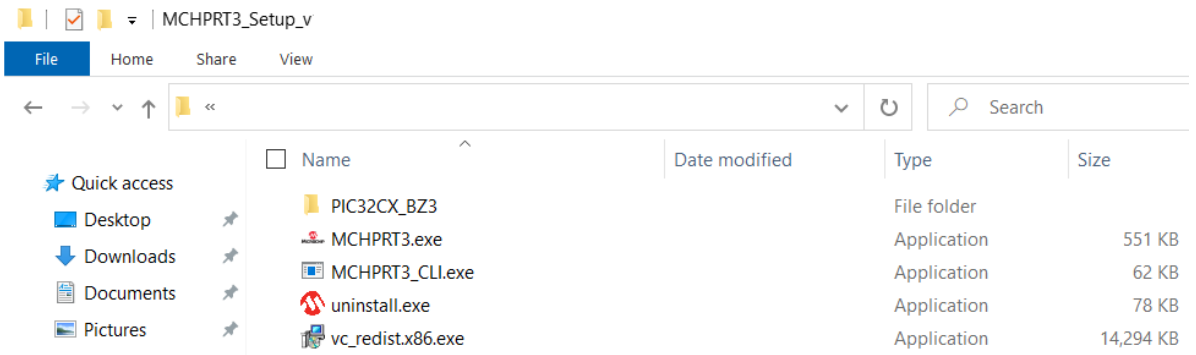
| File Name | Description |
|---|---|
| `MCHPRT3.exe` file | MCHPRT3 executable file |
| `MCHPRT3_CLI.exe` file | MCHPRT3 CLI executable file |
| `uninstall.exe` file | Uninstall the MCHPRT3 tool |
| `vc_redist.x86.exe` file | Microsoft® Visual C++ Redistributable (x86) executable file |

The following table provides the PIC32CX-BZ3 package files:

**Table 2-2.** PIC32CX-BZ3 Package Files

| File Name | | Description |
|---|---|---|
| *Examples>python3* folder | *dll_wrapper* folder | Contains conversion files between Python3 and the `PIC32CX_BZ3.dll` files |
| | *docs* folder | Contains python3 example complied HTML help file |
| | *gui_wrapper* folder | Contains individual python3 Graphical User Interface (GUI) files |
| | *gui_wrapper* folder | Python3 example programming manager file |
| | `engine.py` file | Python3 example file for the PIC32CX-BZ3 GUI |
| | `PIC32CX_BZ3_GUI.py` file | Python3 example file for the PIC32CX-BZ3 GUI |
| | `version.py` file | Version information |
| HEX file (`.hex` file) | | Hardware Under Test (HUT) firmware version file |
| `PIC32CX_BZ3.chm` | | PIC32CX-BZ3 complied HTML help file |
| `PIC32CX_BZ3.dll` file | | PIC32CX-BZ3 dynamic link library file |
| `PIC32CX_BZ3_CDECL.dll` file | | Default calling convention file for C and C++ programs |
| `PIC32CX_BZ3_CLI.dll` file | | PIC32CX-BZ3 command line dynamic link library file |
| `PIC32CX_BZ3_GUI.dll` file | | PIC32CX-BZ3 graphical user interface dynamic link library file |
| `Release_note.txt` | | Tool release note file |

**Figure 2-1.** MCHPRT3 Package Contents

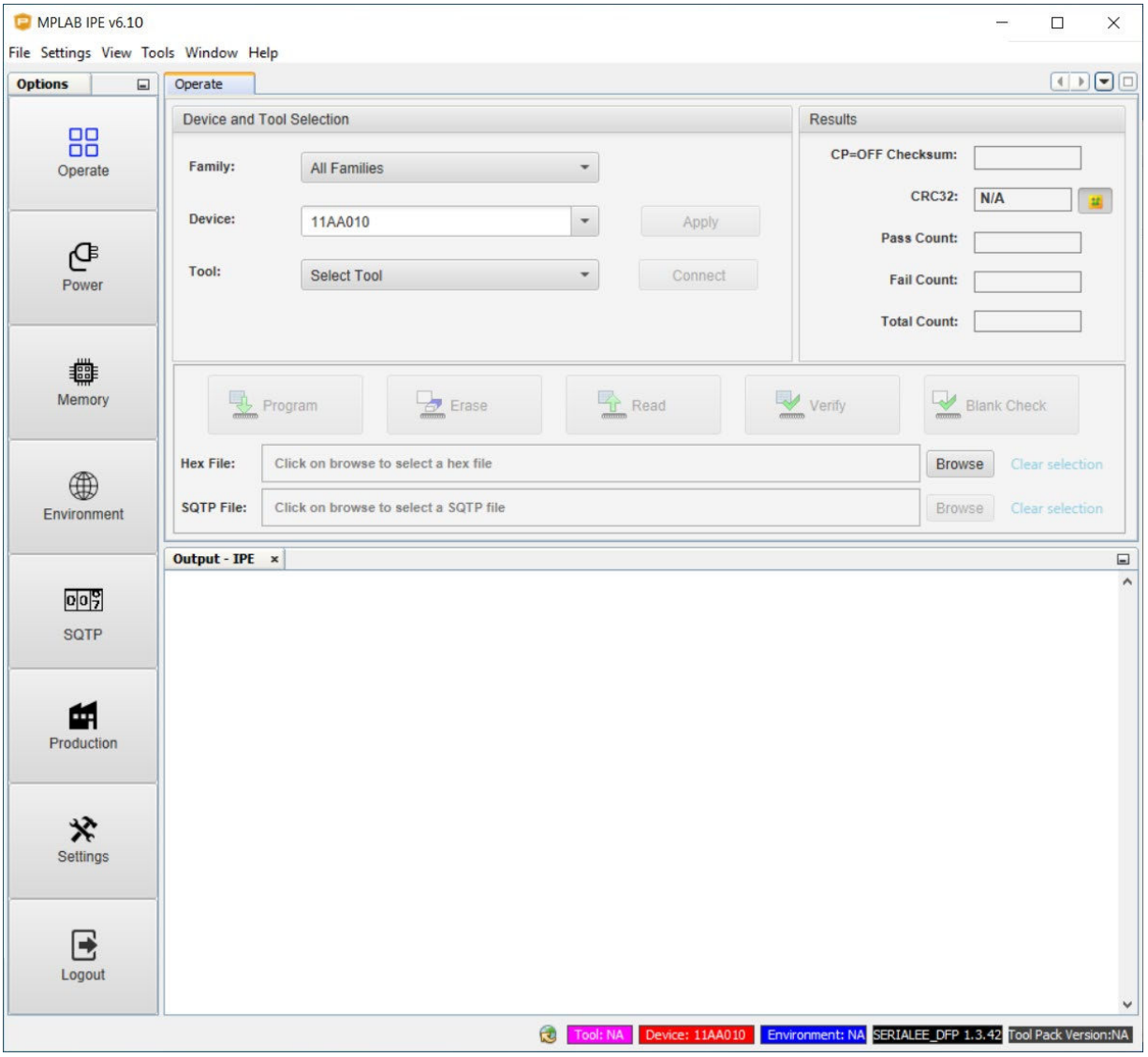


**Note:** The MCHPRT3 tool works efficiently only with the HUT firmware version that is packaged with the package.

# 3. MPLAB X IDE HUT Code Programming Process

In this demonstration, the user can program the HUT firmware to the PIC32CX-BZ3 device using a PC with the installed MPLAB Integrated Programming Environment (IPE).

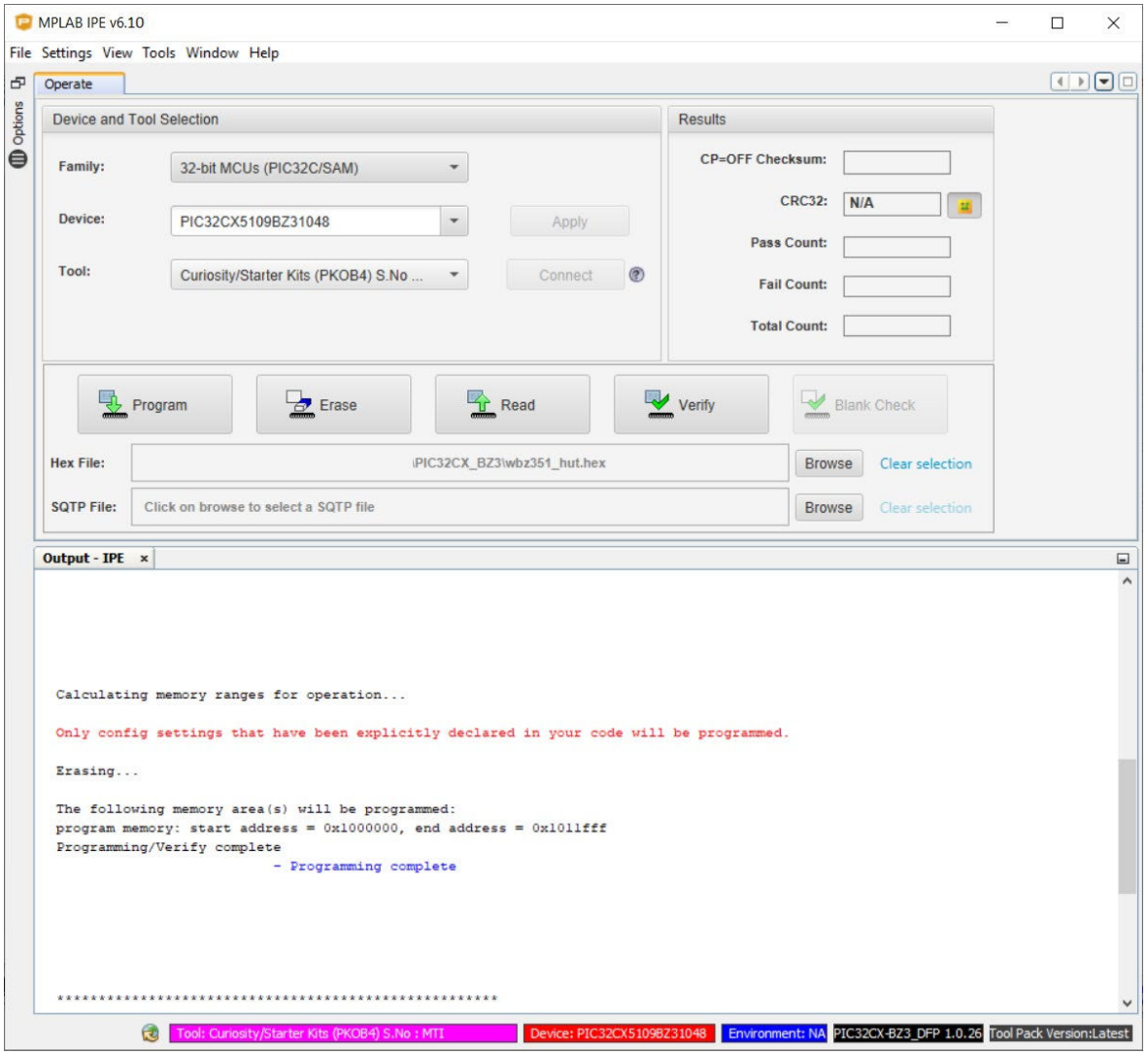
**Figure 3-1.** MPLAB X IPE




Perform the following steps for HUT firmware programming:

1. Set up the connection between the WBZ351 Curiosity Board and PC. Refer to Getting Started with MCHPRT3.
   a. Start “MPLAB X IPE”, then check for *PIC32CX5109BZ31048* in the “Device” text box. If it is not there, check the USB connection (step 1).
   b. Click **Apply**.
   c. Click **Browse** to load the `wbz351_hut.hex`, which is the PIC32CX-BZ3 HUT X.X firmware.
   d. Click **Program**, then wait one minute for the programming to complete.

**Figure 3-2.** MPLAB X IPE (Programming Complete)



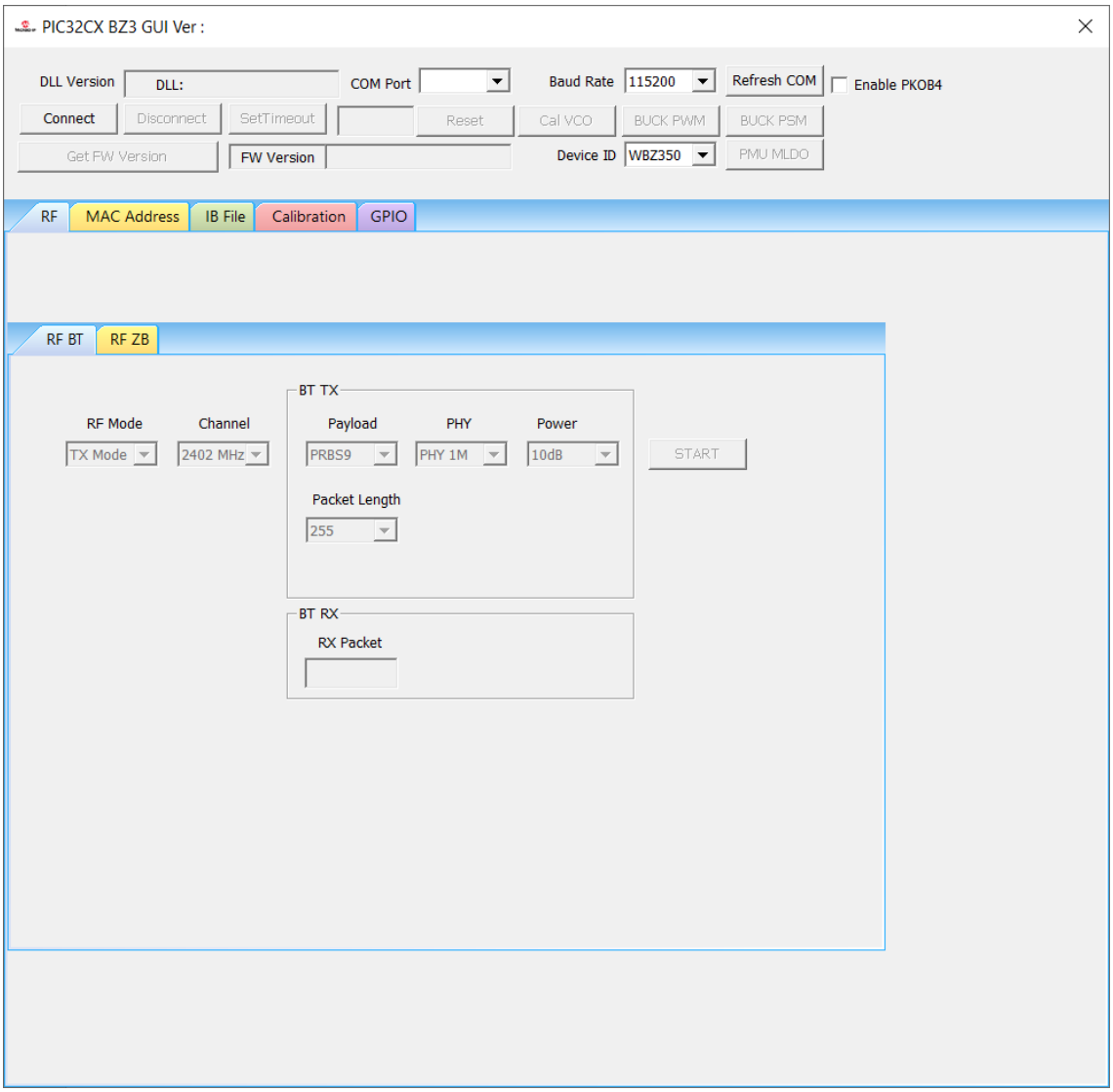

2. The PIC32CX-BZ3 is programmed with the HUT X.X firmware and ready for the test using the PIC32CX-BZ3 MCHPRT3 tool.

# 4. Getting Started

This section describes how to use the MCHPRT3 GUI to test or calibrate the PIC32CX-BZ3 with the Bluetooth Low Energy and Zigbee tester.

The following figure illustrates the MCHPRT3 for PIC32CX-BZ3 GUI with the following components:

**Figure 4-1.** PIC32CX-BZ3 GUI

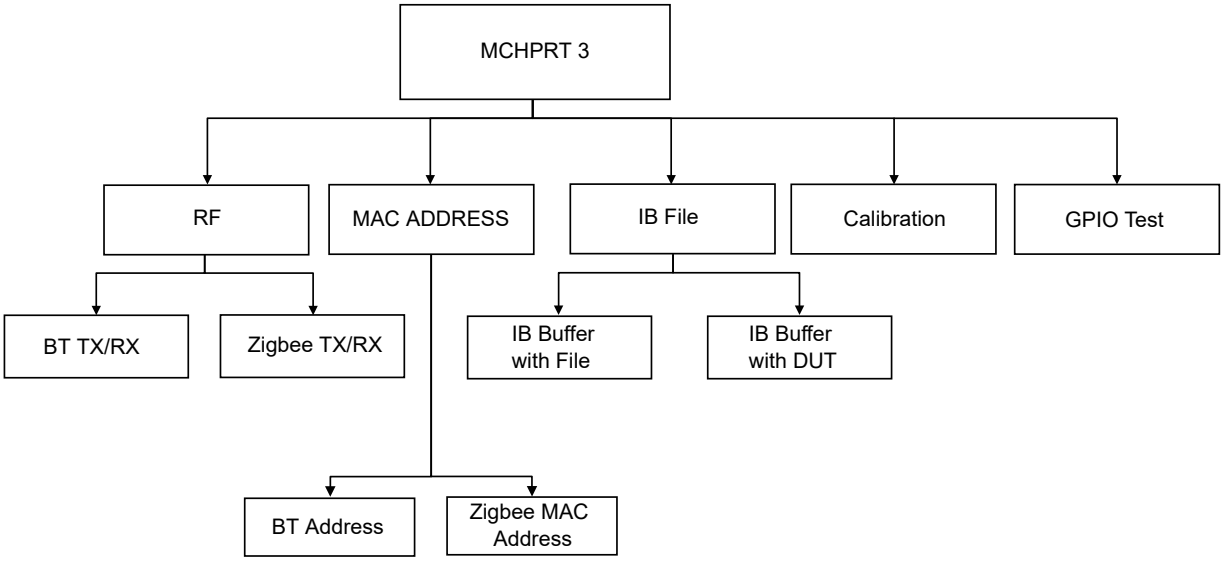


## 4.1. Getting Started with MCHPRT3

### MCHPRT3 Package Features

- RF – RF Test for Bluetooth and Zigbee TX/RX
- Calibration – TX Calibration and RX Calibration
- MAC Address – Read/Write Bluetooth Address and Zigbee MAC Address
- Information Block (IB) File – Read/Save IB File to/from Buffer and Read/Commit IB Buffer to/from DUT
- GPIO – GPIO Test Command

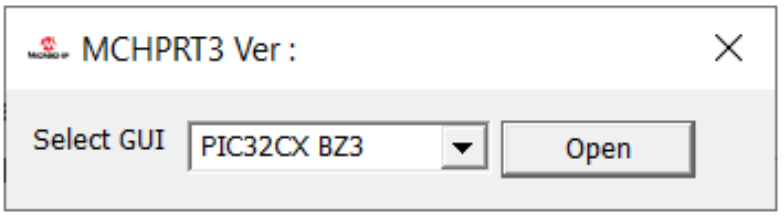
**Figure 4-2.** MCHPRT3 Block Diagram




The following are the steps to launch the MCHPRT3 tool:

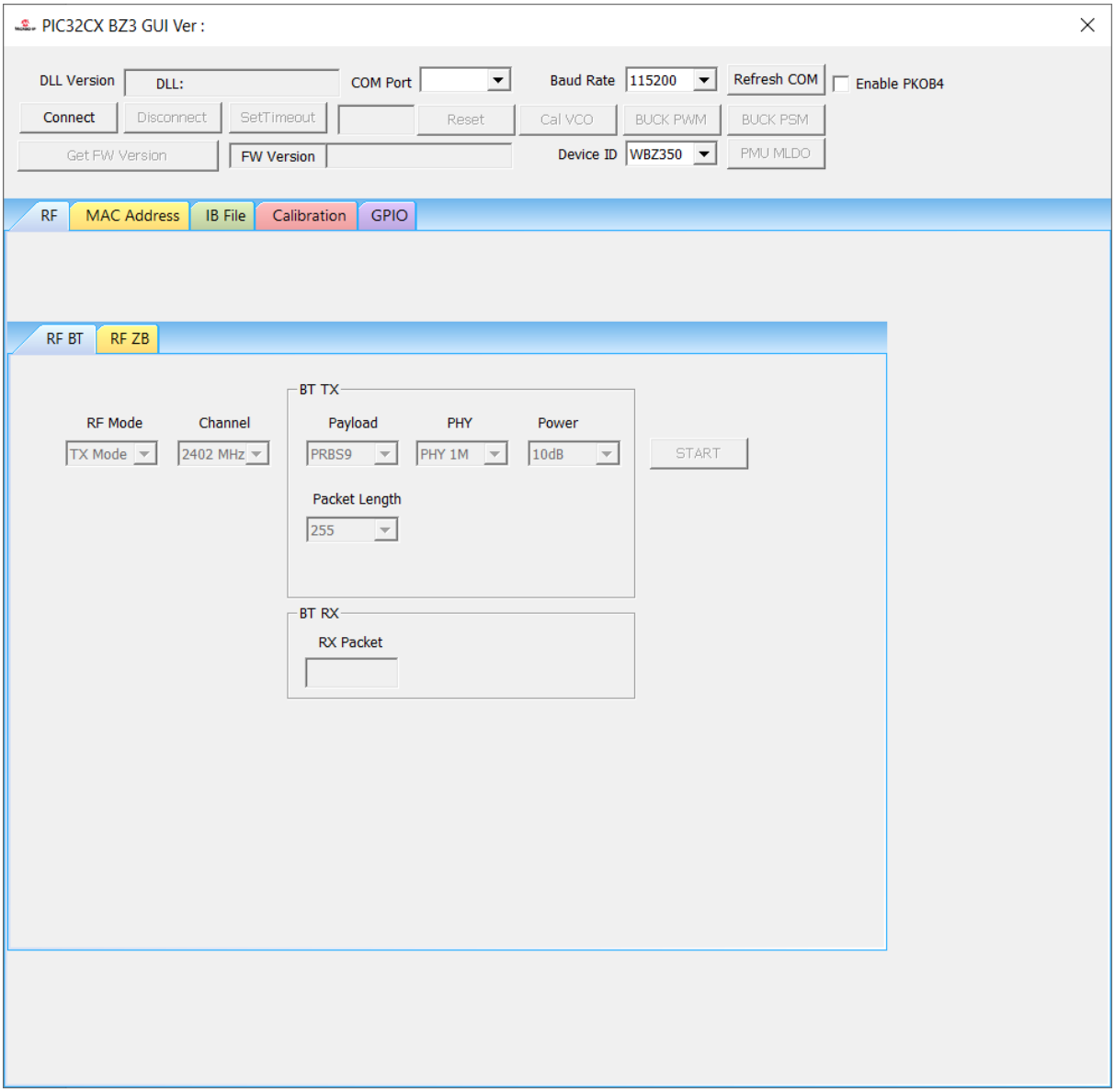
1. Double click `MCHPRT3.exe` in the directory: `C:\Microchip\MCHPRT3_Setup_v1.0.0.XXXX`; the following screen appears.

**Figure 4-3.** Start-Up Window of the MCHPRT3 Tool




2. From the “Select GUI” drop-down list, select *PIC32CX-BZ3.*
3. Click **Open** to launch the PIC32CX-BZ3 window (see the following figure).

**Figure 4-4.** PIC32CX-BZ3 GUI




Description of each component:

- Buttons on the top:
  - **Connect/Disconnect** – Connects or disconnects the PIC32CX-BZ3
  - **Reset** – Reset the PIC32CX-BZ3
  - **Refresh COM** – Update the list of connected com port
  - **Cal. VCO** – VCO calibration
  - **BUCK PWM** – Switch the power mode into DC-DC (Buck) mode
  - **PMU MLDO** – Switch the power mode into MLDO mode
  - **Get FW Version** – Obtain the firmware version from the sample
  - **Device ID** – Select the appropriate part number that is connecting to the tool
    - For connecting the WBZ351 Module/PIC32CX5109BZ31048, select *WBZ351*.

    - For connecting the WBZ350 Module/PIC32CX5109BZ31032, select *WBZ350*.
  - **Enable PKOB4** – Only needed to check if the user is using the WBZ350 Curiosity Board
- RF for Bluetooth and Zigbee – Settings of RF mode, channel and TX parameter for RF test
  - BT – TX setting of payload, PHY (data rate), MPA/LPA (PA setting), packet length and power step (power level). RX – number of RX packet.
  - Zigbee – TX settings of packet type, MPA/LPA (PA setting), power level, delay time between each packet and packet number. RX – setting of RX data rate and number of RX packet.
- Calibration – Complete TX and RX calibration flow. The user can save calibration info to file or commit to NVM type Flash or OTP.
  - TX Calibration – Perform TX calibration flow to adjust transmitted power and output frequency to target.
  - RX Calibration – Perform RX calibration flow to obtain RX IQ, RSSI to corresponding received power and so on.
- MAC Address – Read/write address
  - Bluetooth address and Zigbee MAC address
- Information Block (IB) File
  - Read IB file to IB buffer/save IB buffer to IB file
  - Read DUT to IB buffer/commit IB buffer to DUT
- GPIO – Test GPIO for selected Port, Pin, In/Out and Level
  - Start GPIO – Initialize GPIO for test
  - GPIO Command – Execute GPIO test command for selected Port, Pin, In/Out and Level
  - Stop GPIO – Stop GPIO test

## 4.2. Getting Started with MCHPRT3 PIC32CX-BZ3 GUI

Program the sample before using the MCHPRT3 tool. For more details on the HUT code programming process, refer to MPLAB X IDE HUT Code Programming Process .

To run an RF test on the PIC32 WBZ351 Curiosity Board, perform the following procedure:

1. Connect the Micro USB in the Curiosity Board to the PC.
2. Check whether the jumper for the current measurement was inserted or not.
3. Run `MCHPRT3.exe`.
4. From the “Select GUI” drop-down list, select *PIC32CX-BZ3*.
5. Click **Open** to launch the PIC32CX-BZ3 window.
6. Select the respective “COM PORT” (check device manager in PC). A different USB-to-UART serial converter requires the corresponding driver; install accordingly.
7. Baud Rate - *115200* (default value).
8. Click **Connect**.
9. Click **Reset** to reset the device. The PIC32 WBZ351 Curiosity Board is ready for RF Test, Calibration and MAC Address Programming.

**Figure 4-5.** PIC32 WBZ351 Curiosity Board USB Connection

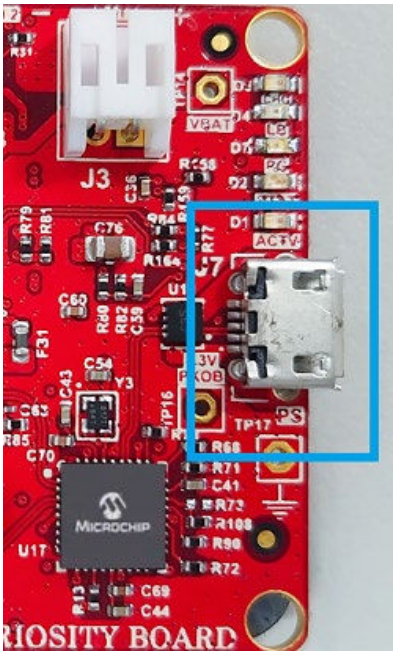
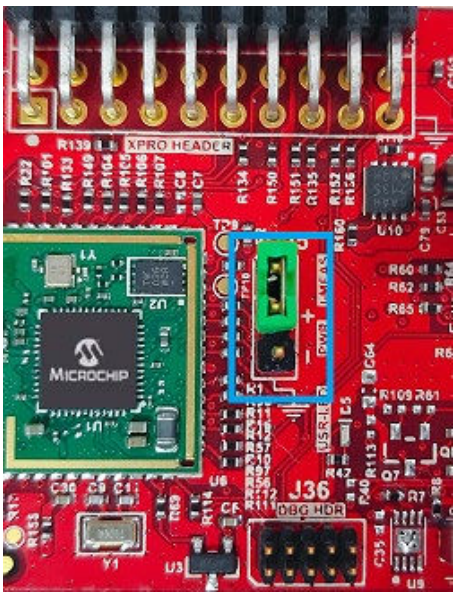



**Figure 4-6.** Current Measurement Jumper on PIC32 WBZ351 Curiosity Board




## 4.3. MCHPRT3 PIC32CX-BZ2 GUI Demonstration

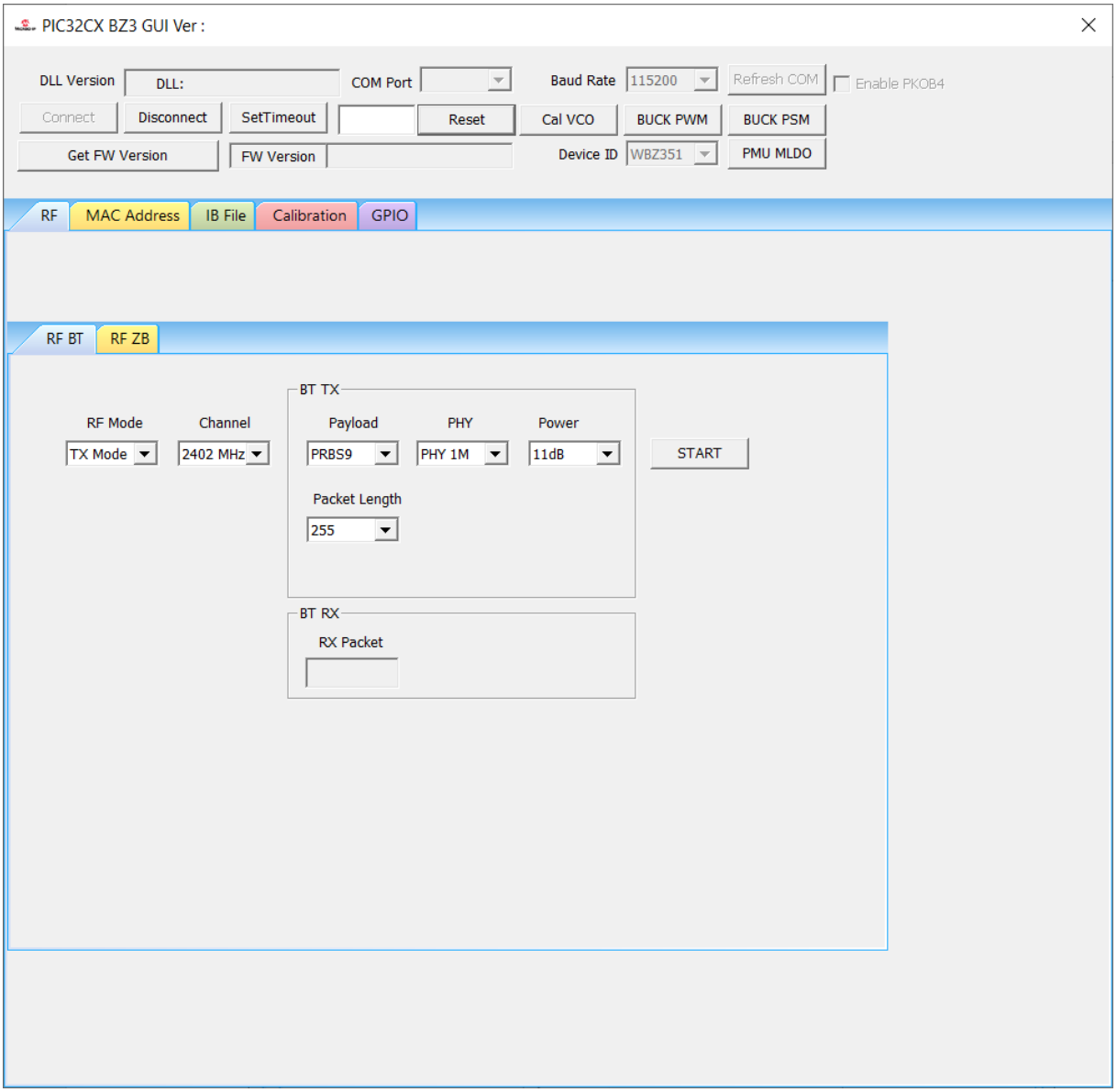
### 4.3.1. Bluetooth RF Test Demonstration

In this demonstration, the user can transmit Bluetooth Low Energy packets, enter RX mode and Test mode with the PIC32CX-BZ3 by using the MCHPRT3.

Perform the following steps for the demonstration of the Bluetooth RF TX modulation test:

1. Set up the connection between the PIC32 WBZ351 Curiosity Board and PC. For more details, refer to Getting Started with MCHPRT3.
2. In the **RF BT** tab, perform the following steps:
   a. From the “RF Modes” drop-down list, select *TX Mode*.
   b. From the “Channel” drop-down list, select *2402 MHz* for channel 37.
   c. From the “Payload” drop-down list, select *PRBS9* (default value).
   d. From the “PHY” drop-down list, select the *Data Rate* (1M,2M, S=2 and S=8), for example, select *PHY 1M*.
   e. From the “Power” drop-down list, select the *Output Power*, for example, select *11 dB*.
   f. From the “Packet Length” drop-down list, select the *Packet Length (0-255)*, for example, *255* (default value).
3. Click **START** to transmit the Bluetooth Low Energy packet.

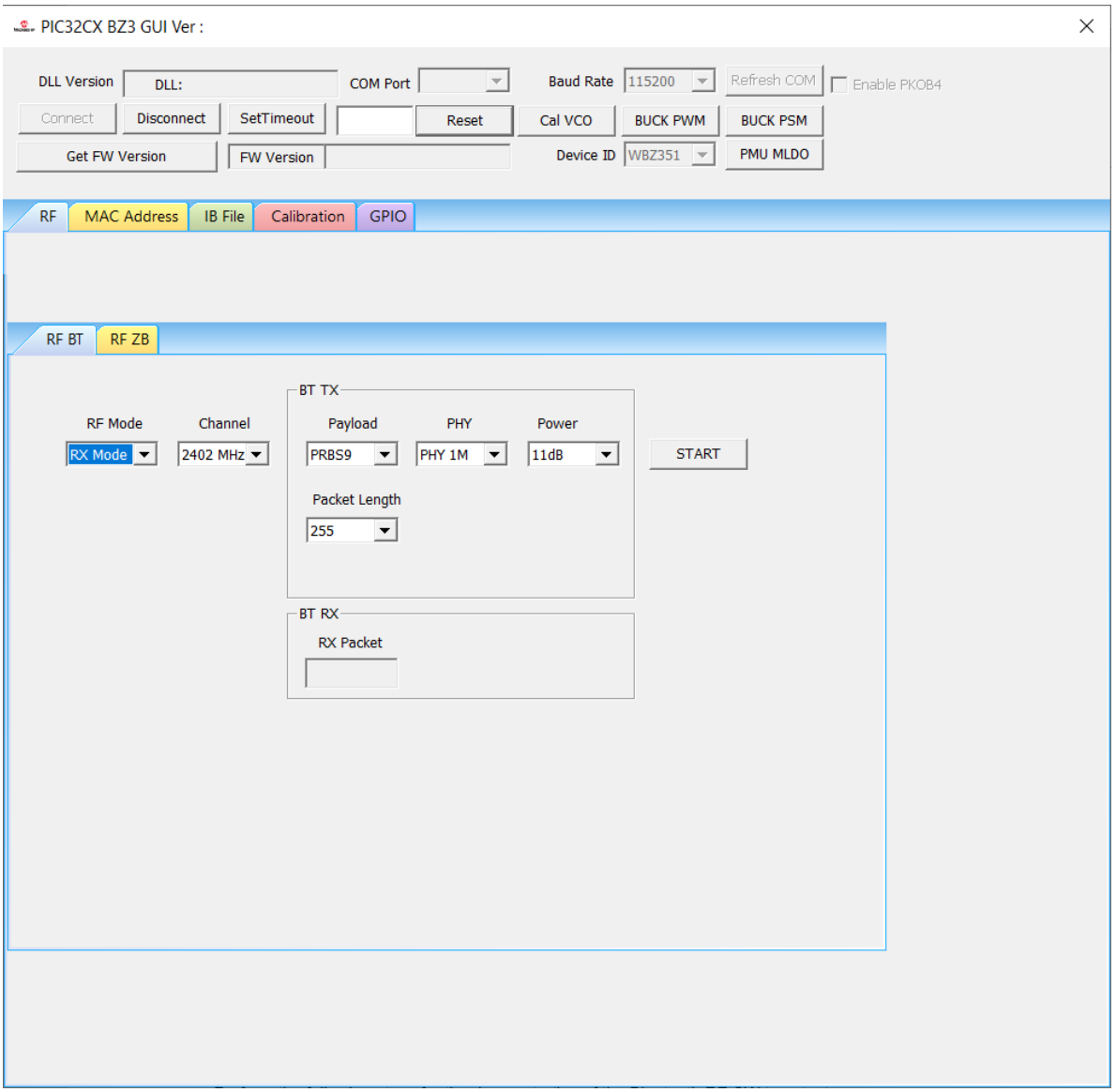
**Figure 4-7.** MCHPRT3 PIC32CX-BZ3 GUI for Bluetooth RF TX Modulation Test Demonstration




Perform the following steps for the demonstration of the Bluetooth RF RX mode:

1. Set up the connection between the PIC32 WBZ351 Curiosity Board and PC. For more details, refer to Getting Started with MCHPRT3.
2. In the **RF BT** tab, perform the following steps:
   a. From the “RF mode” drop-down list, select *RX Mode*.
   b. From the “Channel” drop-down list, select *2402 MHz* for channel 37.
3. Click **START** to receive the Bluetooth Low Energy packet. The number of received packets is shown in the drop-down list, “RX Packet”.

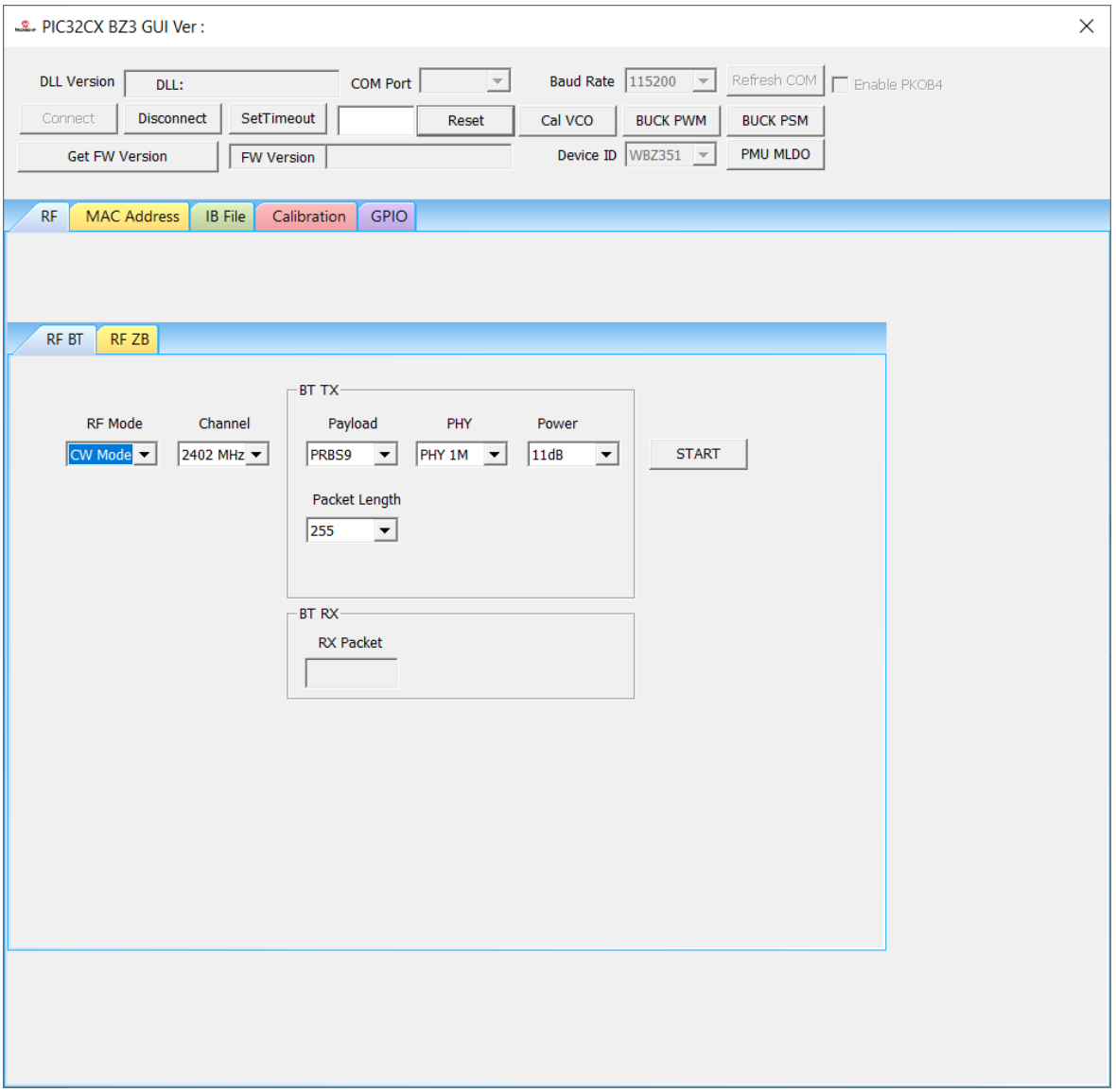
**Figure 4-8.** MCHPRT3 PIC32CX-BZ3 GUI for Bluetooth RF RX Mode Demonstration




Perform the following steps for the demonstration of the Bluetooth RF CW tone test:

1. Set up the connection between the PIC32 WBZ451 Curiosity Board and PC. For more details, refer to Getting Started with MCHPRT3.
2. In the **RF BT** tab, perform the following steps:
   - From the “RF Modes” drop-down list, select *CW Mode*.
   - From the “Channel” drop-down list, select *2402 MHz* for channel 37.
   - From the “Power” drop-down list, select the *Output Power*, for example, select *11 dB*.
3. Click **START** to transmit the CW tone at the selected channel.

**Figure 4-9.** MCHPRT3 PIC32CX-BZ3 GUI for Bluetooth RF CW Mode Demonstration

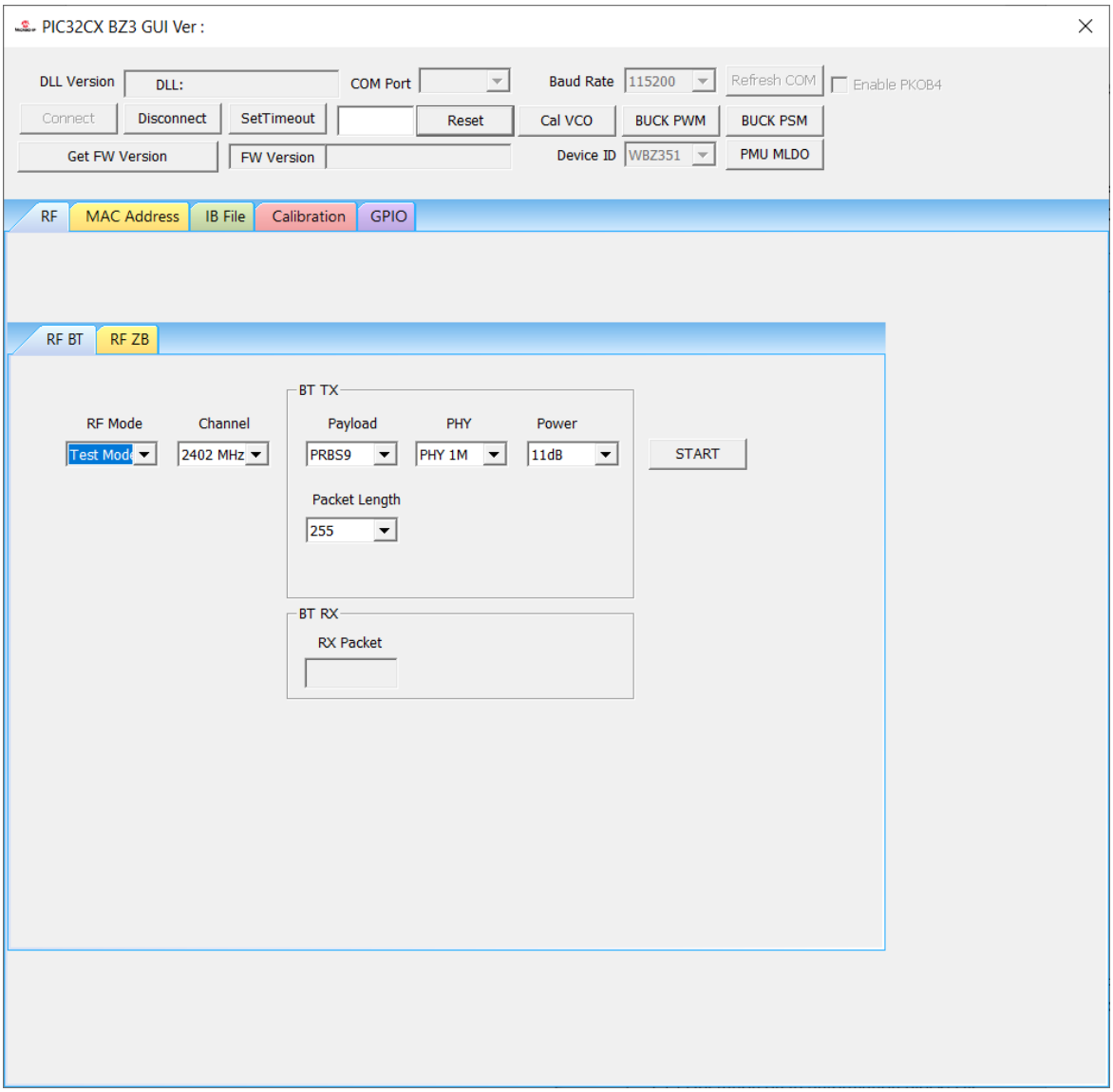



Perform the following steps for the demonstration of the Bluetooth Low Energy Test mode:

1. For the Bluetooth Low Energy Test mode, the sample must contain the following connection:
   - HCI_TXD (PA5 from the module)
   - HCI_RXD (PA6 from the module)
   - VDD (connect with external power supply)
   - Ground
2. Use the USB-to-UART serial converter to make the connection between the sample and PC by connecting the HCI_TXD, HCI_RXD and ground with the converter.
3. Power the sample with 3.3V supply.
4. Select the respective **COM PORT** (the COM port with the converter) in MCHPRT3.
5. In the **RF BT** tab, perform the following steps:
   a. From the “RF mode” drop-down list, select *Test Mode*.

6. Click **START** to enter the Bluetooth test mode, then click **Disconnect** in the GUI. Disconnect the UART interface from the DUT while keeping the power supply, then connect it with the Bluetooth tester.

**Figure 4-10.** MCHPRT3 PIC32CX-BZ3 GUI for Bluetooth Test Mode Connecting with Bluetooth Tester Demonstration



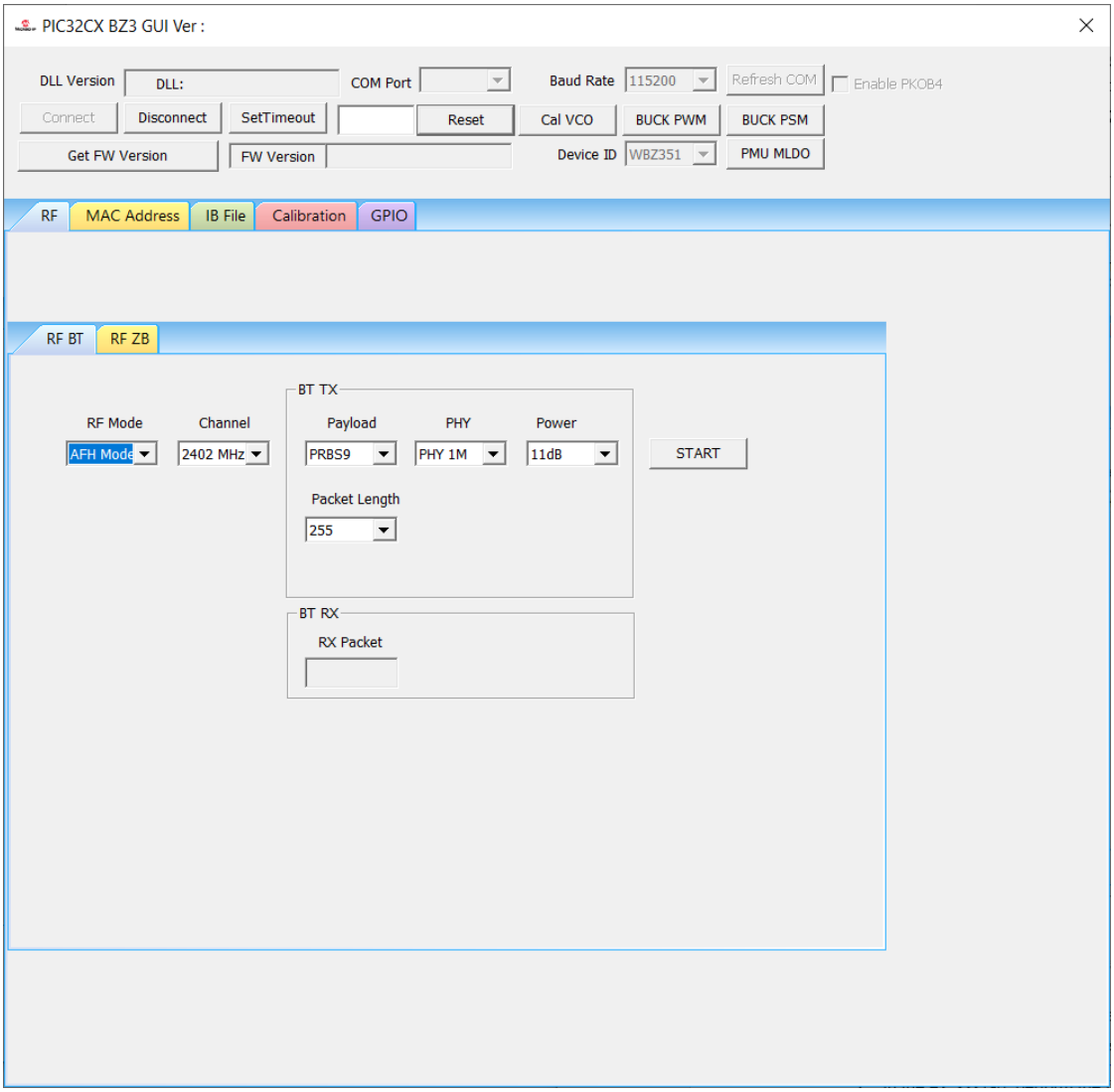

Perform the following steps for the demonstration of the Bluetooth Low Energy Adaptivity Frequency Hopping (AFH) packet transmission:

3. Set up the connection between the PIC32 WBZ351 Curiosity Board and PC. For more details, refer to Getting Started with MCHPRT3.
4. In the **RF BT** tab, perform the following steps:
   a. From the “RF mode” drop-down list, select *AFH Mode*.
   b. From the “Payload” drop-down list, select *PRBS9* (default value).
   c. From the “PHY” drop-down list, select the *Data Rate* (1M,2M, S=2 and S=8), for example, select *PHY 1M*.
   d. From the “RF mode” drop-down list, select the *Output Power*, for example, select *11 dB*.

e. From the “Packet Length” drop-down list, select the *Packet Length (0-255)*, for example, *255* (default value).

3. Click **START** to transmit the Bluetooth Low Energy packet with adaptivity frequency hopping.

**Figure 4-11.** MCHPRT3 PIC32CX-BZ3 GUI for Bluetooth Adaptivity Frequency Hopping (AFH) TX Test Demonstration




### 4.3.2. Zigbee RF Test Demonstration

In this demonstration, the user can transmit Zigbee packets, enter RX mode and CW mode with the PIC32CX-BZ3 by using the MCHPRT3.

Perform the following steps for the demonstration of the Zigbee packet transmission:

1. Set up the connection between the PIC32 WBZ351 Curiosity Board and PC. For more details, refer to Getting Started with MCHPRT3.
2. In the **RF ZB** tab, perform the following steps:
   a. From the “RF Modes” drop-down list, select *TX Mode*.
   b. From the “Channel” drop-down list, select *2405 MHz* for channel 11.

c. From the “Packet Type” drop-down list, select *Packet Type* as *General* (default value) or *Smallest*.

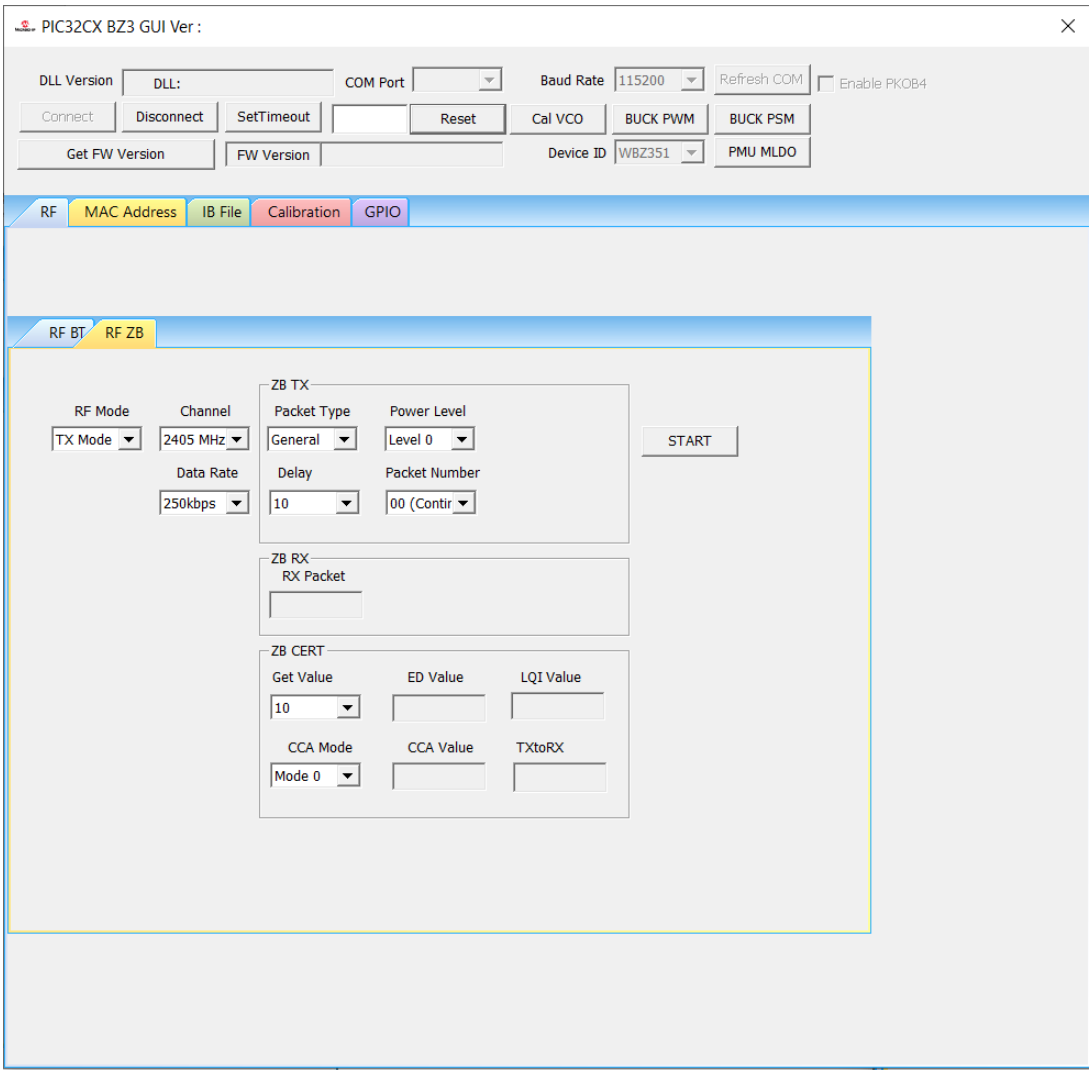
d. From the “Power Level” drop-down list, select *Level 0*.
**Note:** Level 0: Uncalibrated maximum transmit power from the device, i.e., the output power would be varied between devices. This Level 0 is provided only for testing purpose. For calibrated power level, Level 1 (11 dBm) to Level 15 (-3 dBm), 1 dBm power step per level.

e. From the “Delay Time” drop-down list, select the *Packet Delay Time (00-250)* (the default value is *10*).

f. From the “Packet Number” drop-down list, select the *Number of Transmitting Packet (00-250)* (the default value is *00, Continuous Packet Transmission*).

3. Click **START** to transmit the Zigbee packet.
**Note:** The “Data Rate” must be set at 250 Kbps, and the “Delay Time” must be 10 for the standard Zigbee packet stream.

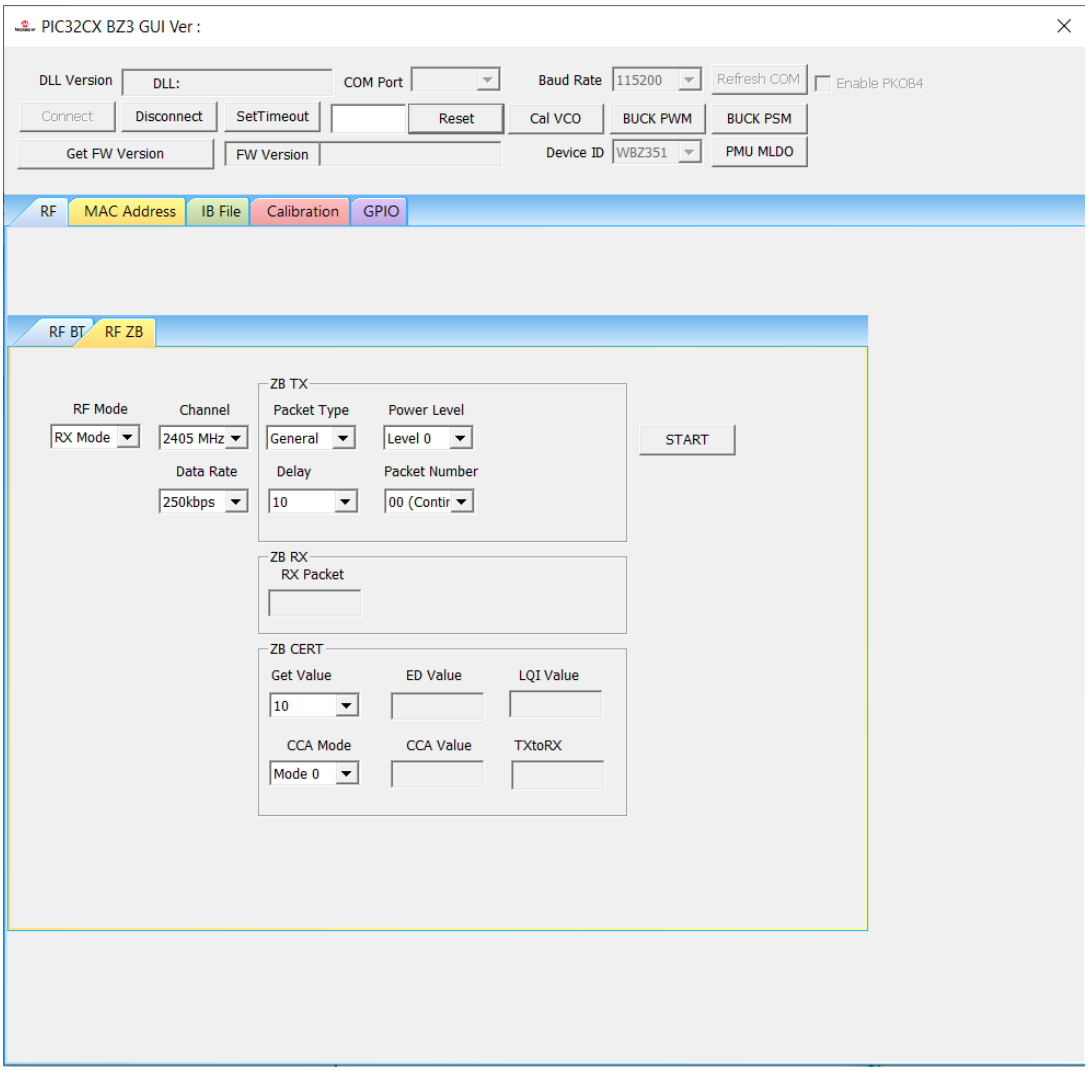
**Figure 4-12.** MCHPRT3 PIC32CX-BZ3 GUI for Zigbee RF TX Modulation Test Demonstration




Perform the following steps for the demonstration of the Zigbee RX mode:

1. Set up the connection between the PIC32 WBZ351 Curiosity Board and PC. For more details, refer to Getting Started with MCHPRT3.
2. In the **RF ZB** tab, perform the following steps:
   a. From the “RF Modes” drop-down list, select *RX Mode*.
   b. From the “Channel” drop-down list, select *2405 MHz* for channel 11.
   c. From the “RX Data Rate” drop-down list, select *Data Rate* (250K, 500K, 1M and 2M), for example, select *250K*.
3. Click **START** to receive the Zigbee packet. The total number of received packets are available under the “RX Packet” drop-down list.

**Figure 4-13.** MCHPRT3 PIC32CX-BZ3 GUI for Zigbee RF RX Mode Demonstration



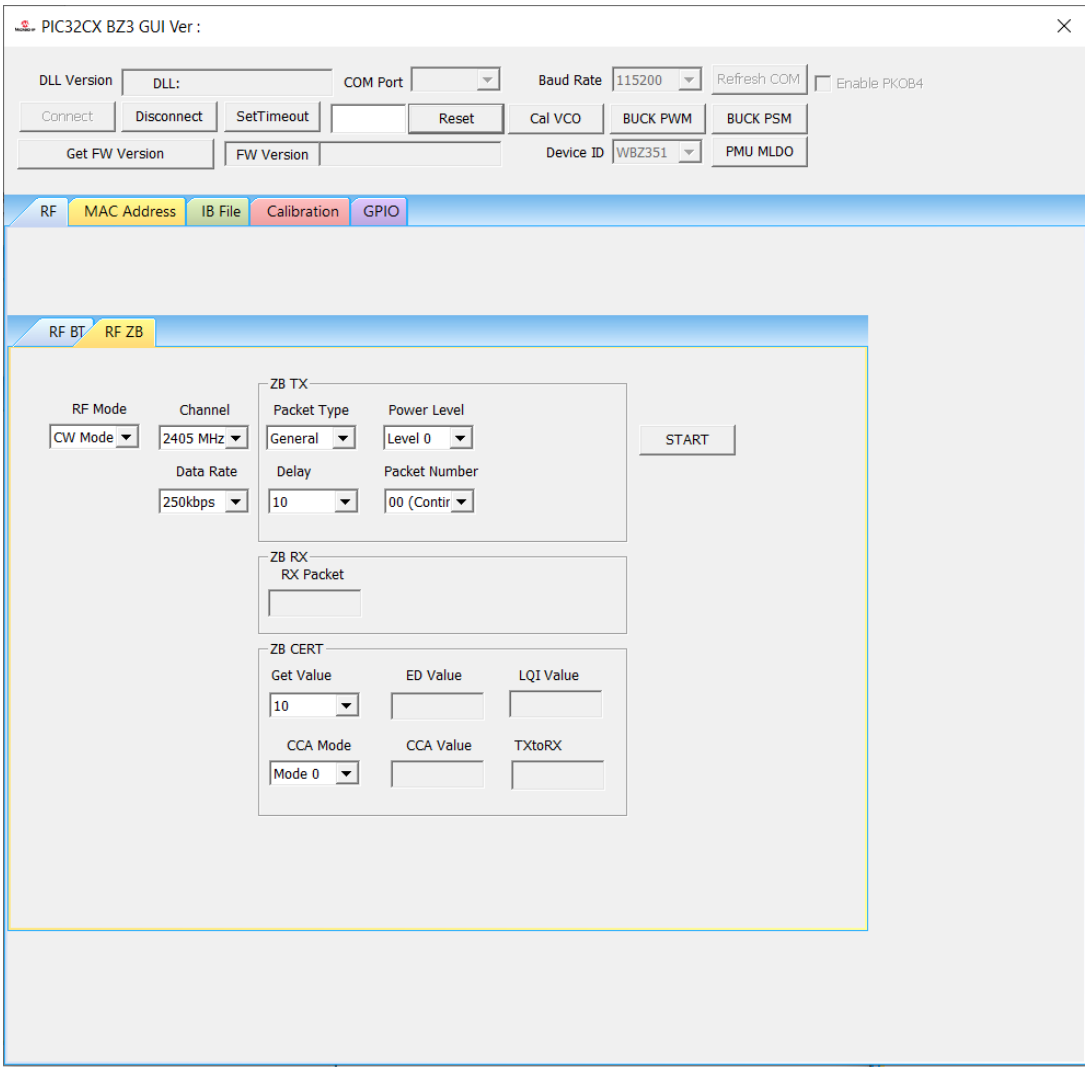

Perform the following steps for the demonstration of the Zigbee CW mode to transmit CW tone:

1. Set up the connection between the PIC32 WBZ351 Curiosity Board and PC. For more details, refer to Getting Started with MCHPRT3.
2. In the **RF ZB** tab, perform the following steps:
   a. From the “RF mode” drop-down list, select *CW Mode*.

b. From the “Channel” drop-down list, select *2405 MHz* for channel 11.
c. From the “Power Level” drop-down list, select *Level 0*.

3. Click **START** to transmit the CW tone.

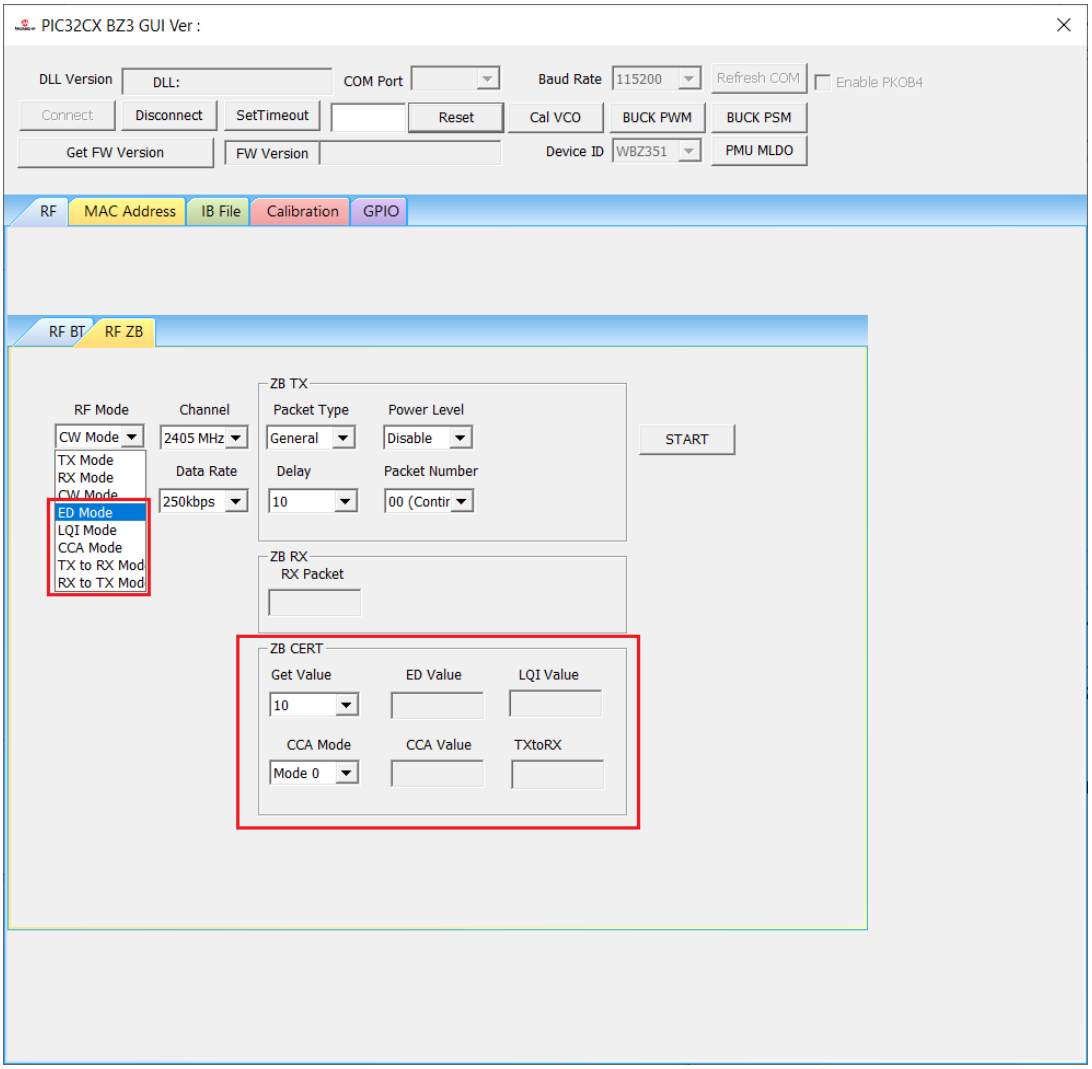
**Figure 4-14.** MCHPRT3 PIC32CX-BZ3 GUI for Zigbee CW Mode Demonstration



**ED mode**, **LQI mode**, **CCA mode**, **TX to RX mode** and **RX to TX mode**, as well as the area of **ZB CERT** are used in Zigbee PHY certification.

- **ED mode:** This mode is for Zigbee PHY test item TP/154/PHY/RECEIVE-06, which is a test for the DUT is capable of reporting Energy Detection (ED) values with the proper monotonicity and linearity requirements. Due to the limit on the ED value register, the range of ED value shows in MCHPRT3 would not be the same as the request of Zigbee PHY test plan. It is accepted to give another ED value with the same requested received power range. In our Zigbee PHY certification, ED value would be 16 for -76 dBm and 56 to 57 for -36 dBm received power.
  **Note:** ED value could be converted into RSSI by this formula: RSSI = ED value -94.
- **LQI mode:** This mode is for Zigbee PHY test item TP/154/PHY/RECEIVE-07, which is a test for the DUT capable of reporting Link Quality Indicator (LQI).
- **CCA mode**: This mode is for Zigbee PHY test item TP/154/PHY/RECEIVE-08, which is a test for the DUT capable of reporting on channel traffic by at least 1 of the 3 Clear Channel Assessment (CCA) methods (modes) at the CCA ED threshold specified in the Zigbee PHY test plan.
- **TX to RX mode**: This is for Zigbee PHY test item TP/154/PHY/TURNAROUND-TIME-02, which is a test for the DUT that has a TX-to-RX turnaround time less than or equal to the TX-to-RX turnaround time specified in the Zigbee PHY test plan.
- **RX to TX mode**: This is for Zigbee PHY test item TP/154/PHY/TURNAROUND-TIME-01, which is a test for the DUT that has a RX-to-TX turnaround time that meets the RX-to-TX turnaround time specified in the Zigbee PHY test plan.

**Figure 4-15.** MCHPRT3 PIC32CX-BZ3 GUI for Zigbee PHY Test



### 4.3.3. Calibration Flow Demonstration

In this demonstration, the user can calibrate TX parameters and RX parameters of the PIC32CX-BZ3 using a PC with the installed MCHPRT3 tool. The calibration step could be checked in the “Cal. Flow Status” in the Calibration page.

Perform the following steps for the demonstration of the calibration flow (see the following figure):

1. Set up the connection between the PIC32 WBZ351 Curiosity Board and PC. For more details, refer to Getting Started with MCHPRT3.
2. Connect the u.FL connecter on the PIC32CX-BZ3 to the Bluetooth/Zigbee tester (IQxel or others) to measure the RF power from the PIC32CX-BZ3.
3. Check the cable loss between the PIC32CX-BZ3 u.FL connecter to the Bluetooth/Zigbee tester.
4. MLDO is the preferred mode of calibration. Click **PMU MLDO** to use the MLDO mode to perform calibration.

> **⚠ CAUTION** OTP is limited in memory of 4k, and it can only be calibrated 10 to 15 times.

5. Click **Start Cal.** to start the new calibration.
6. Click **Freq. Start** in Cal. step 1. Freq., the DUT transmits the Bluetooth Low Energy packet at 2440 MHz.
7. Check the carrier frequency at the tester, then click **Freq. decrease** or **Freq. increase** to change the carrier frequency.
8. Once the carrier frequency is close to 2440 MHz, click **Freq. Done.**
9. Click **IQ Cal. Start**. in Cal. step 2. RX IQ.
10. Generate 2424 MHz CW tone from the test equipment at -50 dBm including cable loss by using the tester, then feed it into DUT and click **IQ -50 Tune**.
11. Generate 2426 MHz CW tone from the test equipment at -50 dBm including cable loss by using the tester, then click **IQ Main Tune**.
12. Repeat steps 11 if required by MCHPRT3, clicking **IQ -40 Tune** with generating 2424 MHz CW tone at -40 dBm by using the tester and clicking **IQ -30 Tune** with generating 2424 MHz CW tone at -30 dBm by using the tester.
13. Click **IQ Cal. Done**.
14. Click **TX P1 Start** in Cal. step 3. RF TX, enter the power level shown in the tester with the cable loss, then click **TX P1 Tune**.
15. Click **TX P2 Start** in Cal. step 3. RF TX, enter the power level shown in the tester with the cable loss, then click **TX P2 Tune**.
16. Click **TX P3 Start** in Cal. step 3. RF TX, enter the power level shown in the tester with the cable loss, then click **TX P3 Tune.**
17. Click **TX P4 Start** in Cal. step 3. RF TX, enter the power level shown in the tester with the cable loss, then click **TX P4 Tune.**
18. Click **TX P5 Start** in Cal. step 3. RF TX, enter the power level shown in the tester with the cable loss, then click **TX P5 Tune**.
19. Click **TX P6 Start** in Cal. step 3. RF TX, enter the power level shown in the tester with the cable loss, then click **TX P6 Tune**.
20. Click **ED Cal. Init.**, generate 2440 MHz CW tone at -70 dBm including cable loss by using the tester **ED Cal. Trim** in Cal. step 4. ED.

21. Click **ED Cal. Done**.
22. Click **Save Cal. Data** in Cal. step 5. Save data to save the calibration data into the file and the DUT.

**Figure 4-16.** MCHPRT3 PIC32CX-BZ3 GUI for Calibration Flow Demonstration

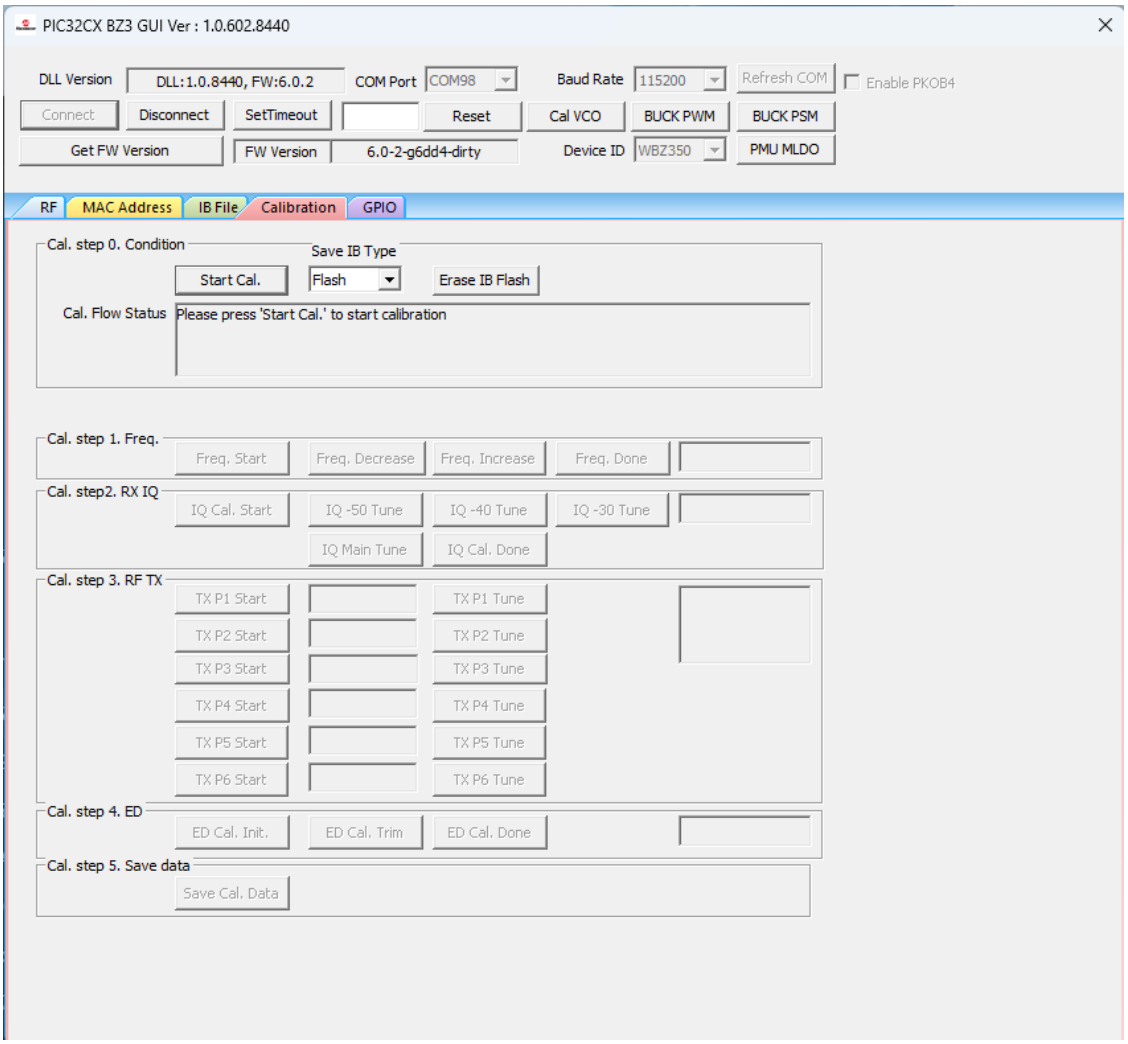
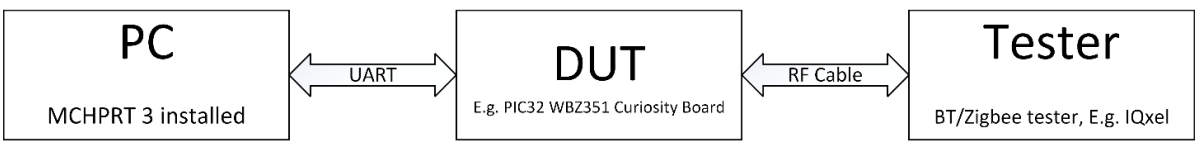
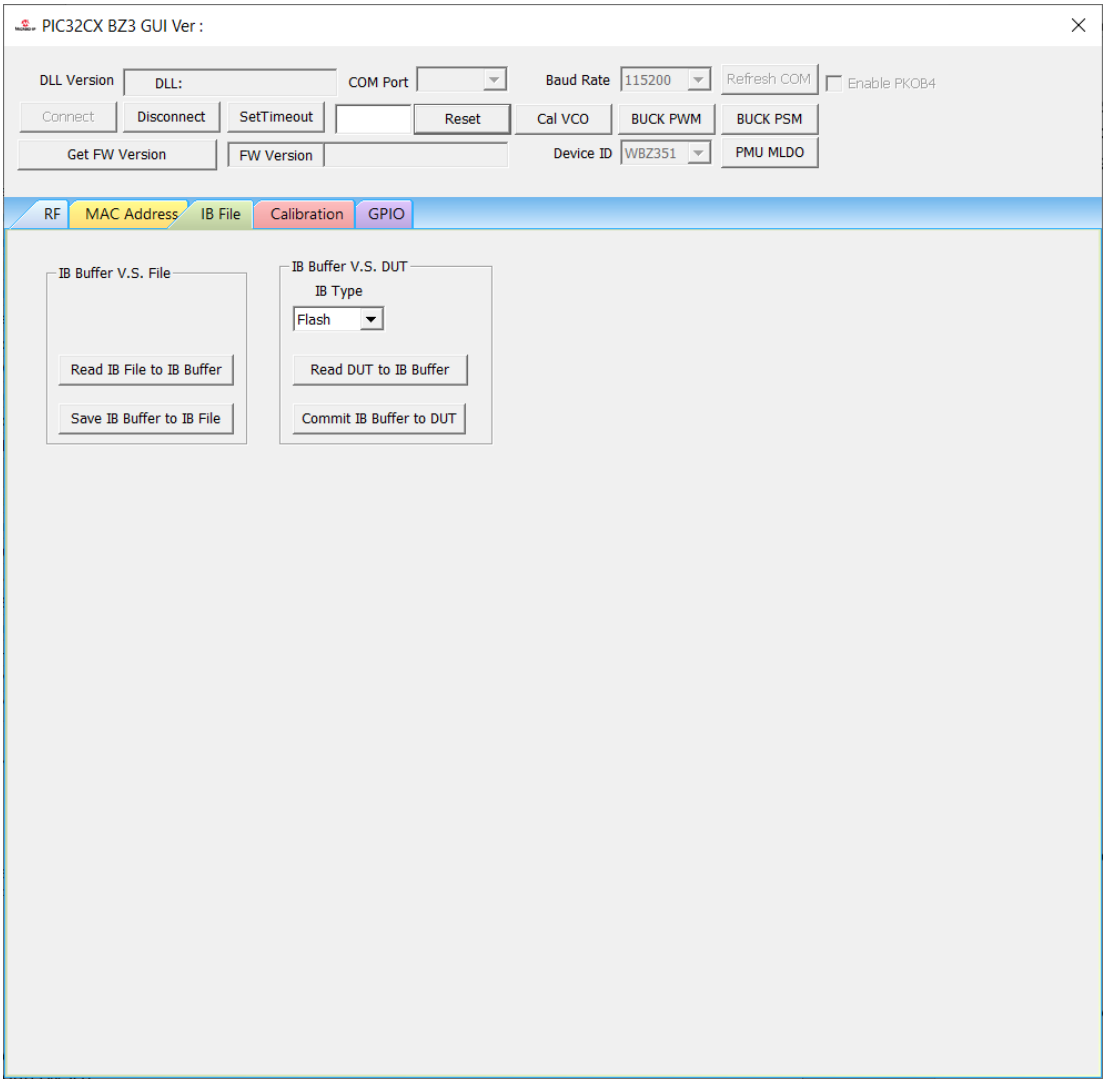



**Figure 4-17.** Calibration Setup



### 4.3.4. Operation on IB (Information Block) File

**Figure 4-18.** MCHPRT3 PIC32CX-BZ3 GUI for IB (Information Block) File Operation




The user can perform the following in the **IB File** tab:

- Read the IB(1) File to IB Buffer(2).
- Save IB Buffer into the IB File.
- From the “IB Type” drop-down list, select *Flash* (default value).
- Read the IB from DUT into the IB Buffer.
- Commit the IB Buffer into DUT – the IB is stored in the Flash.

**Note:**

1. Use the Information Block (IB) to store various types of calibration and system configuration information.
2. The IB Buffer is a temporary PC location for the Information Block (IB).

### 4.3.5. MAC Address Programming

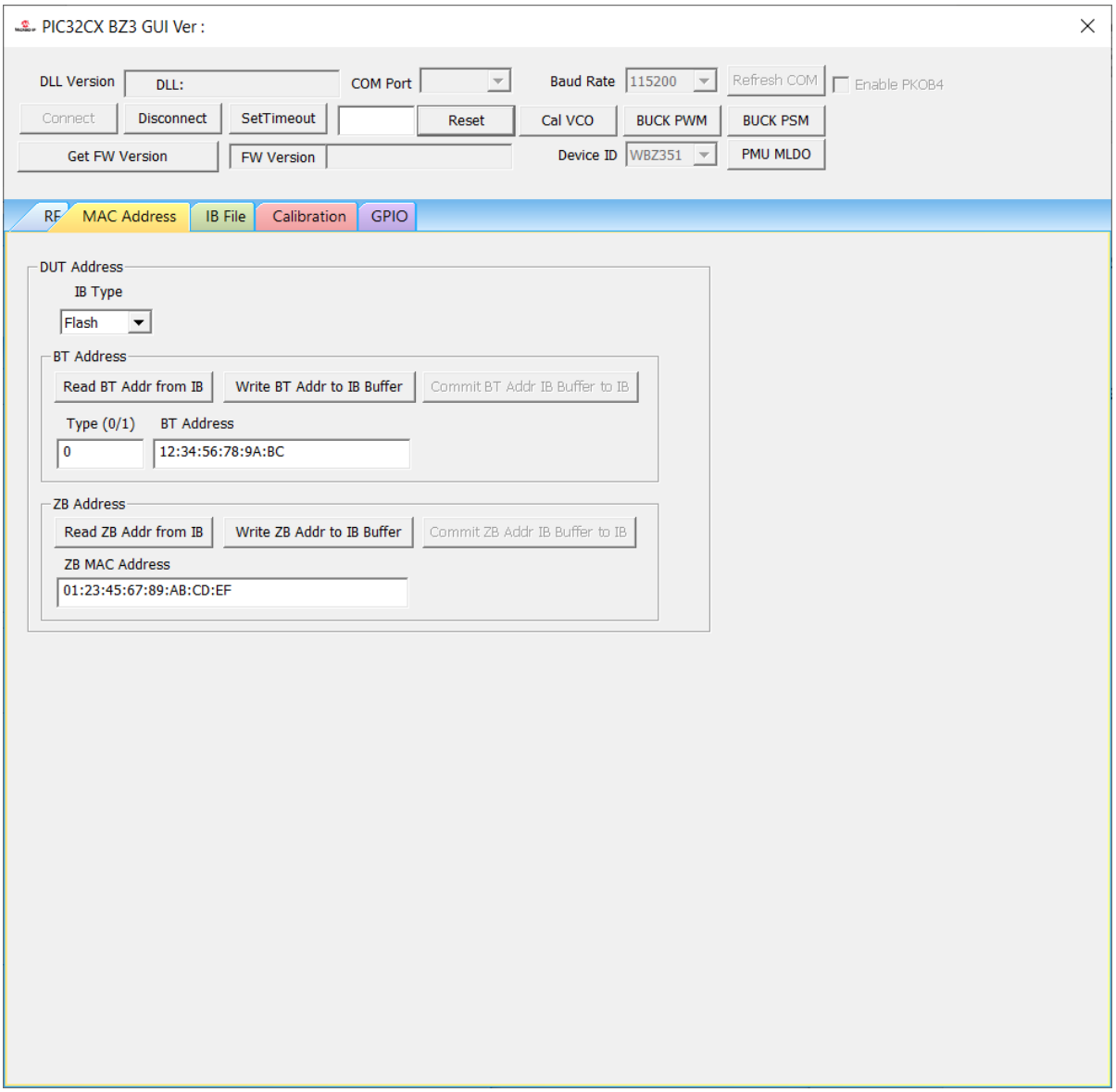
In this demonstration, the user can set the Bluetooth Address and Zigbee MAC Address of the PIC32CX-BZ3 using a PC with the MCHPRT3 tool installed.

In the **MAC Address** tab, perform the following steps for MAC Address programming:

1. From the **IB Type** drop-down list, select *Flash* (default value).
2. To read the Bluetooth address from the IB, click **Read BT Addr from IB**.
3. To write the Bluetooth address:
   a. Click **Write BT Addr to IB Buffer**.
   b. Click **Commit BT Addr IB Buffer to IB**.
4. To read the Zigbee MAC address from IB, click **Read ZB Addr from IB**.
5. To write Zigbee MC address:
   a. Click **Write ZB Addr to IB Buffer**.
   b. Click **Commit ZB Addr IB Buffer to IB**.

It is recommended to write all the calibration parameters into Flash during the initial calibration. After confirming the correct calibration and MAC address, write them into OTP memory.

**Figure 4-19.** MCHPRT3 PIC32CX-BZ3 GUI for MAC Address Programming



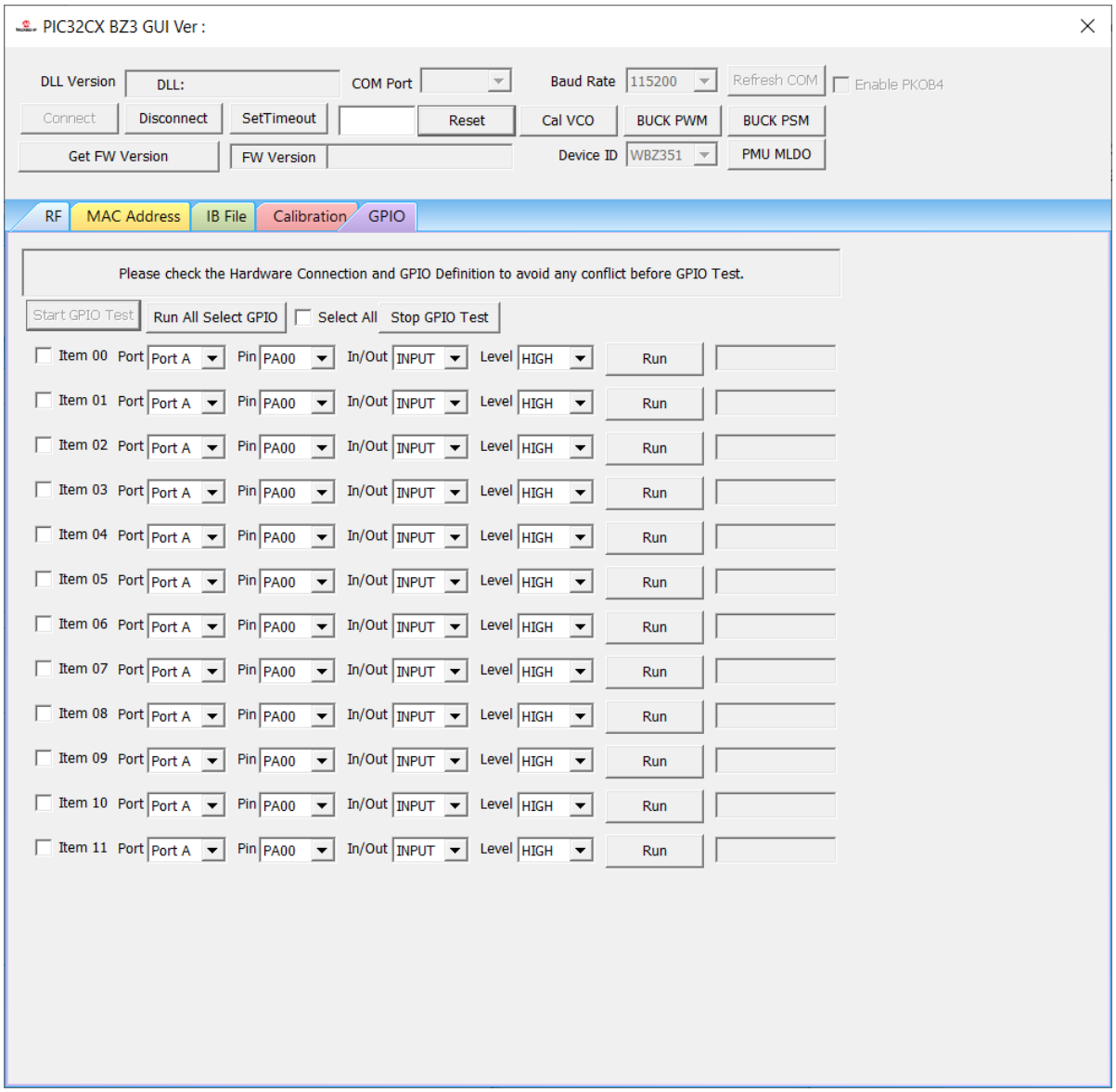

### 4.3.6. GPIO Demonstration

In this demonstration, the user can configure or test the GPIO of the PIC32CX-BZ3 using a PC with the installed MCHPRT3 tool.

In the **GPIO** tab, perform the following steps for the GPIO demonstration (see the following figure):

1. Click **Start GPIO Test** to initiate the GPIO settings for configuration or test.
2. Select "*Port*, *Pin*, *In/Out* and *Level* to configure or test the GPIO pins.
3. Click **Run** to apply the GPIO configuration.
4. Repeat step 2 and 3 to perform a new GPIO configuration or test.
5. Click **Stop GPIO Test** to stop the GPIO settings for configuration or test.
6. Check the checkbox on each item to perform multiple GPIO configurations. Click **Run All Select GPIO** to apply all the selected GPIO configuration.

**Figure 4-20.** MCHPRT3 PIC32CX-BZ3 GUI GPIO Demonstration



# 5. Document Revision History

**Table 5-1.** 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 |
|---|---|---|---|
| B | 12/2025 | Calibration Flow Demonstration | Updated the image and the corresponding demonstration steps |
| A | 01/2024 | Document | Initial revision |

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