

User's Guide

AWRL6888 Software Getting Started Guide



Abstract

This guide covers software setup for the AWRL6888 60GHz mmWave radar sensor, including SDK installation, EVM hardware configuration, application binary flashing, and chirp configuration. The document also introduces the evaluation ecosystem: the mmWave Radar Visualizer, Radar Toolbox, and Sensing Estimator tools.

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1 Introduction

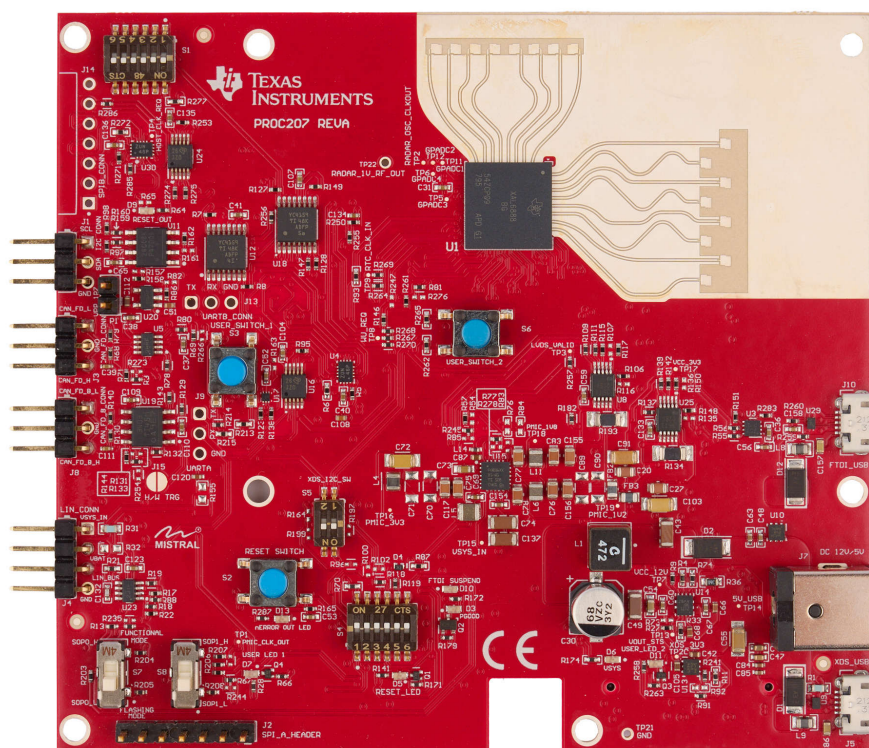


Figure 1-1. AWRL6888EVM

The AWRL6888 enables low-power 60GHz radar designs for automotive and industrial applications. This document includes links to resources to get started with the software evaluation of this radar solution.

Check out TI's technical article, [Reducing In-Cabin Sensing Complexity and Cost With a Single-Chip 60GHz mmWave Radar Sensor](#), for an overview on how 60GHz radar is used to enable low power, AI enabled in-cabin sensing.

2 Software Quickstart Guide

The following is a step-by-step overview to get the out-of-box demo running on the AWRL6888 device.

1. Install Software

To get started, install the latest version of the mmWave low-power SDK 6 and the EVM drivers:

- Latest version of mmWave-L-SDK-6
- XDS110 drivers (bundled with CCS)

2. Set Up Demo Hardware and Software

- Connect to the EVM using the micro USB port at the bottom right of the board labeled XDS_USB. **Users do not need to connect to the barrel jack.**
- Navigate to the MMWAVE-L-SDK download location and run the mmWave *Radar Visualizer*. The visualizer is located at
<MMWAVE_L_SDK6_INSTALL_DIR>\<MMWAVE_L_SDK6_INSTALL_VERSION>\tools\visualizer\visualizer.exe.

3. Flash Application Binary

- Open the *Flash* tab in the visualizer and select the COM port of the EVM. *The port is automatically detected.* If the port is not detected, look for the *XDS110 Class Application/User UART COM* port in your device manager, and select this port in the GUI. (**Note:** If you do not see the correct COM ports in the device manager, install the XDS110 drivers listed in step one – *Install Software*).
- Select the AWRL6888 from the drop down menu. *The device is automatically detected.*
- Place the device into flashing mode by setting the switches as shown in the visualizer.

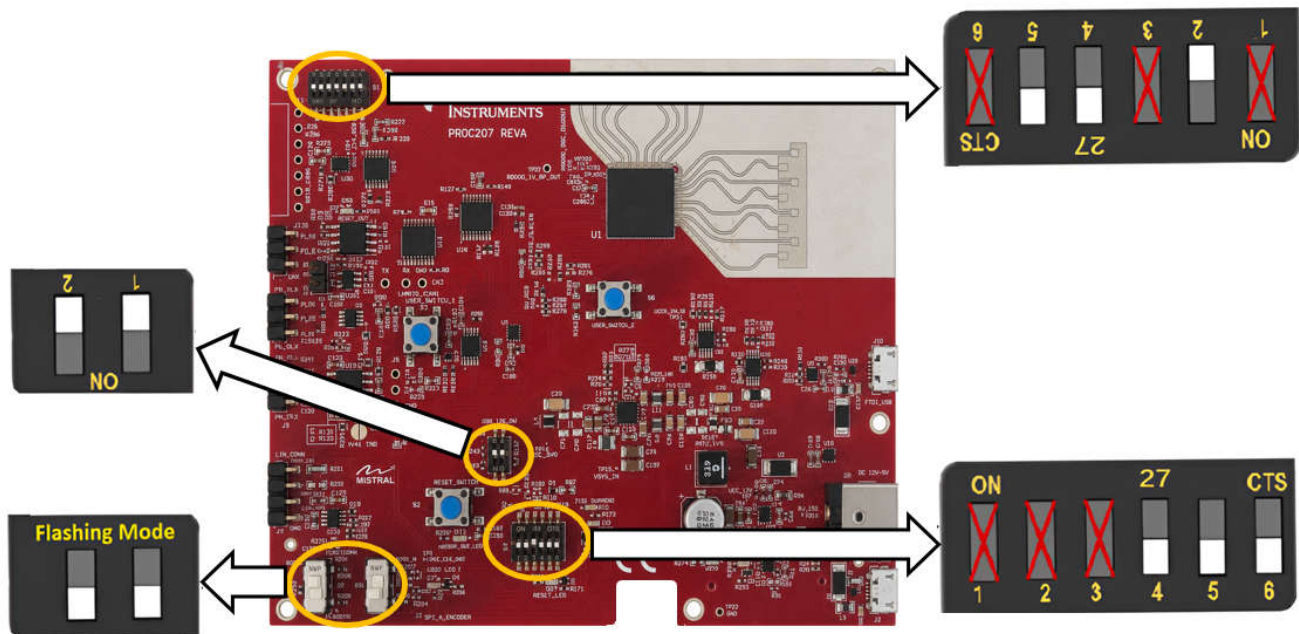


Figure 2-1. Flashing Mode Switch Settings

- Press the *Reset* switch/button to register the SOP settings. The *Reset* button is labeled as RESET SWITCH.
- Press *Switch Settings Confirmed* in the visualizer.

SWITCH SETTINGS CONFIRMED

Figure 2-2. Confirm Switch Settings Button

- f. Select the desired device binary. The *Range-Doppler Image* (`mmwave_demo.release.appimage`) is the out-of-box binary. Custom binaries can be uploaded in this location.

4 Image Flash

☒ Range-Doppler Image

☐ Custom Image

`mmwave_demo.release.appimage`

 Upload

FLASH

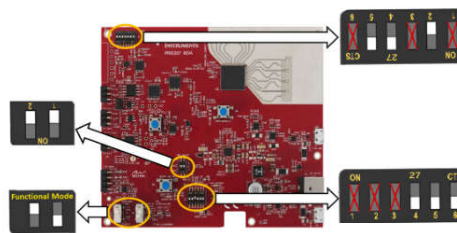
BACK

START OVER

Figure 2-3. Image Flash Options

- g. Select the *Flash* button. Upon a successful flash, a message is sent that flashing completed successfully.

Flash was successful. Change the switch state as per the image below and reset to start using the device.



Move to **Configuration Dashboard**

Figure 2-4. Successful Flash

- h. Change the switch state as per the settings shown in the visualizer at this stage; this places the device into functional mode. Then press the *Reset* switch/button to register the SOP settings. (**Note:** For more help on device setup, see the *Switch Settings* section of the [AWRL6844/IWRL6844 Evaluation Module User's Guide](#)).

4. Send Chirp Configuration

Move to the *Configuration Dashboard* tab in the visualizer.

- a. First confirm the COM ports and baud rate is correct.
- b. Under *Configuration Selection*, select a preset configuration or upload a custom configuration by pressing the *Upload* button. The 8TX 8RX TDM configuration is the default configuration.

Configuration Selection

☒

Select Preset Configuration*

Profile_8Tx8Rx_TDM

☐

Profile_8Tx8Rx_TDM

☐

profile_8T8R_tdm_clutter_removal.cfg

 Upload

Send Config to Device

Figure 2-5. Configuration Selection

- c. Select *Send Config to device*. (**Note:** CLI output can be seen in the bottom right pane).

5. View Plots

Once the commands are set, the visualizer opens the *Plots* tab and displays real-time visualizations of radar data.

Plots

Frame Counter

698

Points Detected

3

Average Power

⚡ -- mW

Plot Selection

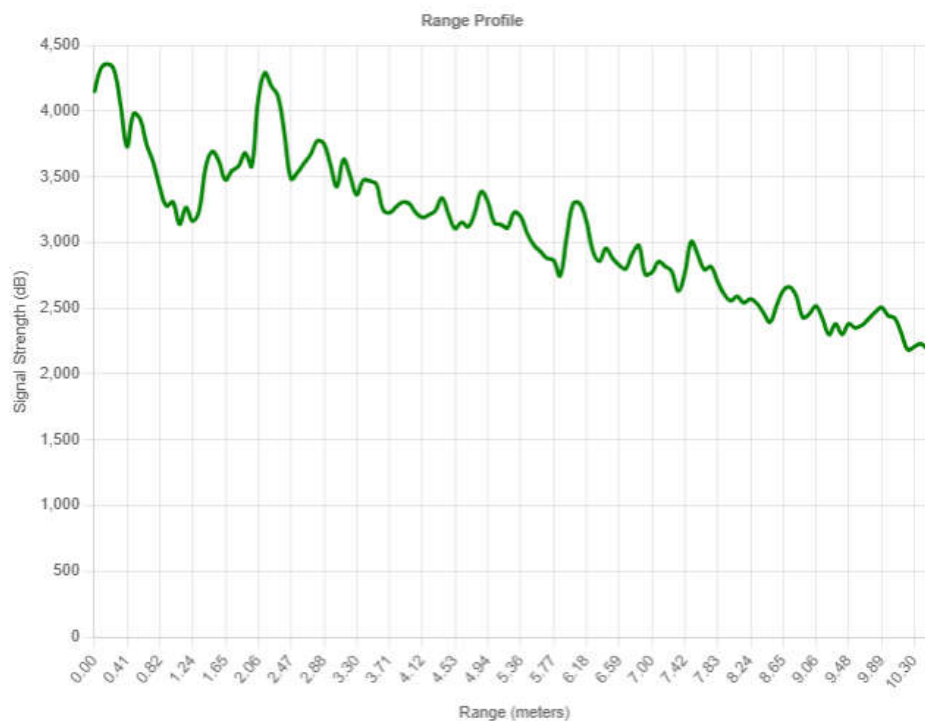
☐ Pause

Figure 2-6. Radar Data Visualization

3 Software Evaluation Flow

The mmWave radar products have an ecosystem of resources to help users with RF evaluation, application performance evaluation, and software design.

3.1 About Radar Evaluation

There are three major components to TI's radar demonstrations. These are the chirp configurations, device binary, and visualizer. A general evaluation workflow is as follows:

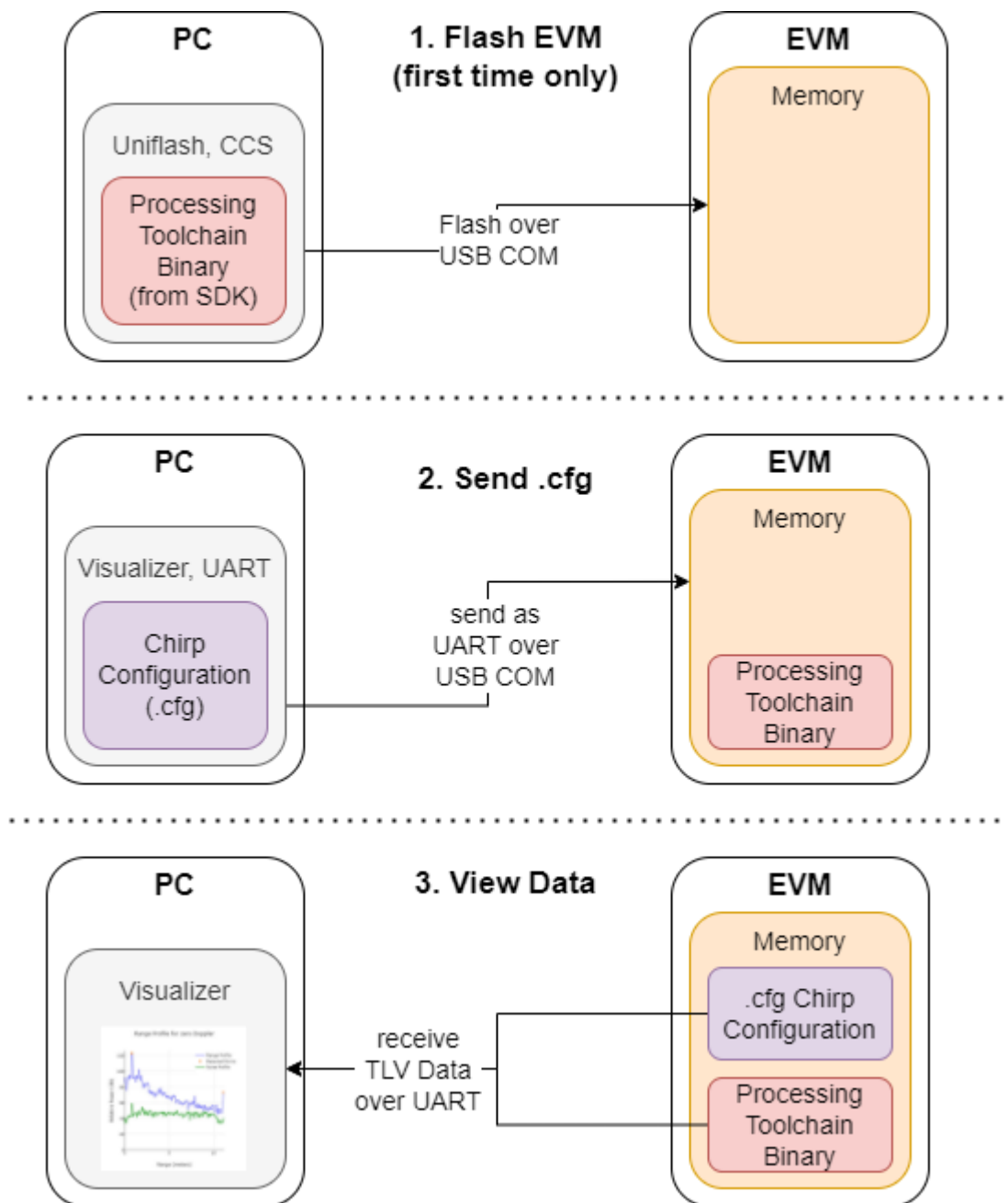


Figure 3-1. Three Steps for Evaluation

Chirp Configuration

Fundamentally, mmWave FMCW radars transmit pulses called *chirps*, which after reflected off of a target, can be used to determine the range, velocity, and azimuth of the target.

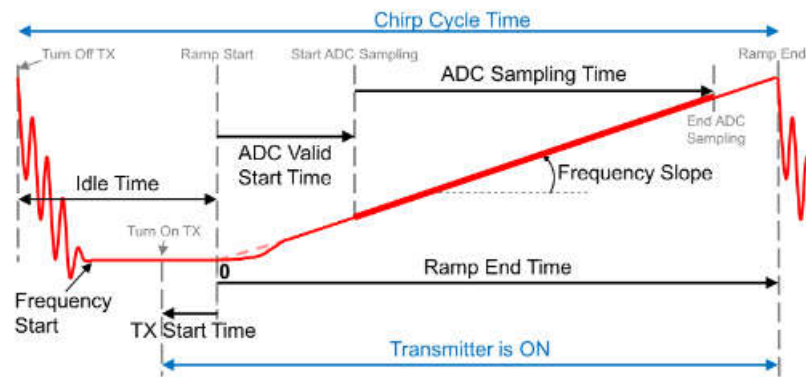


Figure 3-2. Configuration Diagram

By tuning the physical characteristics (such as frequency slope and number of chirps), the range, resolution, and power consumption of radar can be optimized. TI mmWave radar devices store chirp characteristics in *Chirp Configuration* files. The chirp configuration file can also contain parameters for algorithmic and application-specific modifications. Chirp configurations are uploaded to the device over a UART at runtime, allowing for chirp and demo modifications without needing to re-flash the device with a new binary.

Application Binary

Raw data from these reflected chirps are processed on-device by a signal chain on the *application binary*. This firmware is flashed onto the device and processes raw radar data into real-time position and velocity information. Application-specific binaries targeted for specific applications, such as child presence detection, can be found in the [Radar Toolbox](#) in the TI Resource Explorer. Once processed, the device begins sending this real-time position and velocity information in the TLV format over UART to the user's computer to be visualized.

Visualizers

Visually verifying the output of radar in real-time is useful for evaluation. Visualizers can take the UART output of the EVM and render the point cloud and classification information in 3D space. A general-purpose visualizer is found in the [MMWAVE-L-SDK](#) and an application-specific visualizer can be found in the [Radar Toolbox](#).

3.2 More Resources

Radar Toolbox

In TI Resource Explorer, users can find the [Radar Toolbox](#) which houses getting started information, software documentation, and example software demos for a range of industrial, personal electronics, and automotive applications. Once a user has the SDK out-of-box demo running, the [Radar Toolbox](#) is the next step to finding radar software for the desired project.

Sensing Estimator

The [Sensing Estimator](#) tool can be used to estimate the range and resolution of a provided configuration. Navigate to the *Advanced Chirp Design and Tuning* tab and paste the desired configuration to get started.

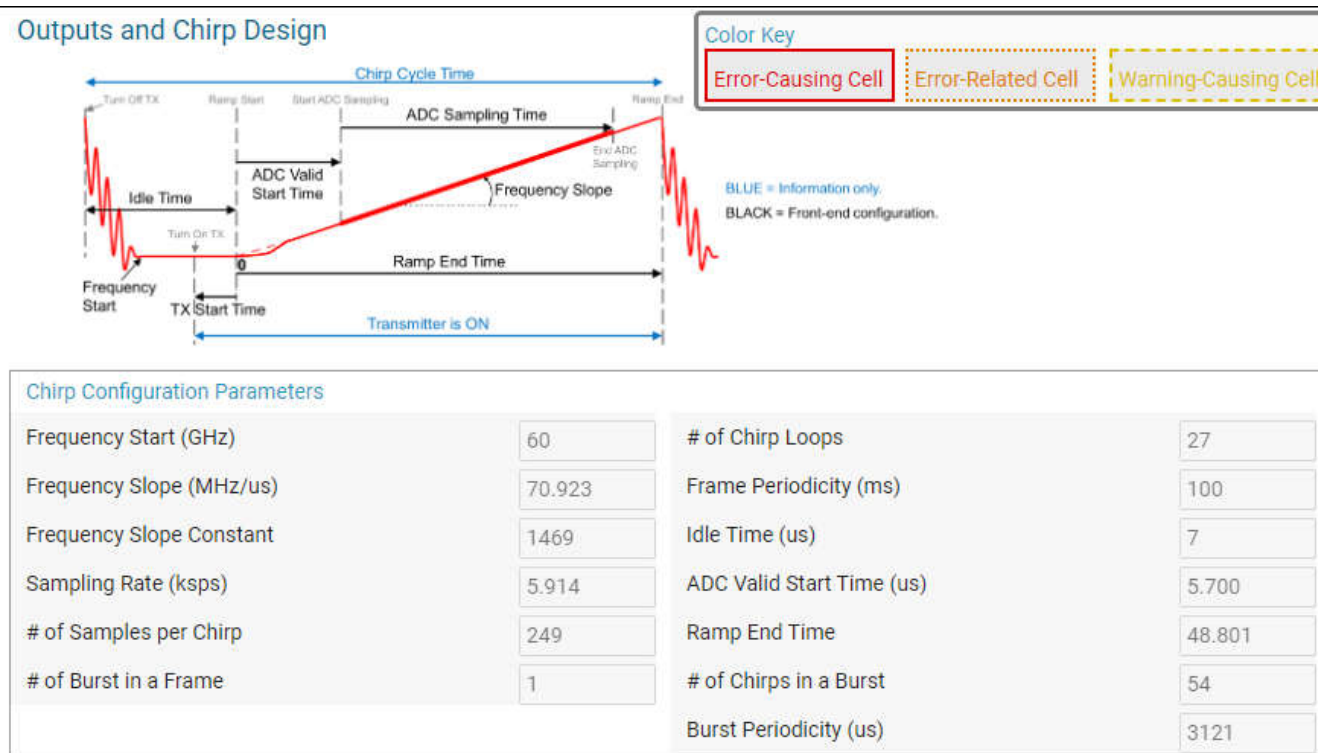


Figure 3-3. Sensing Estimator

Users can also estimate the power consumption of a given configuration in the *Power Estimator* tab pictured below.

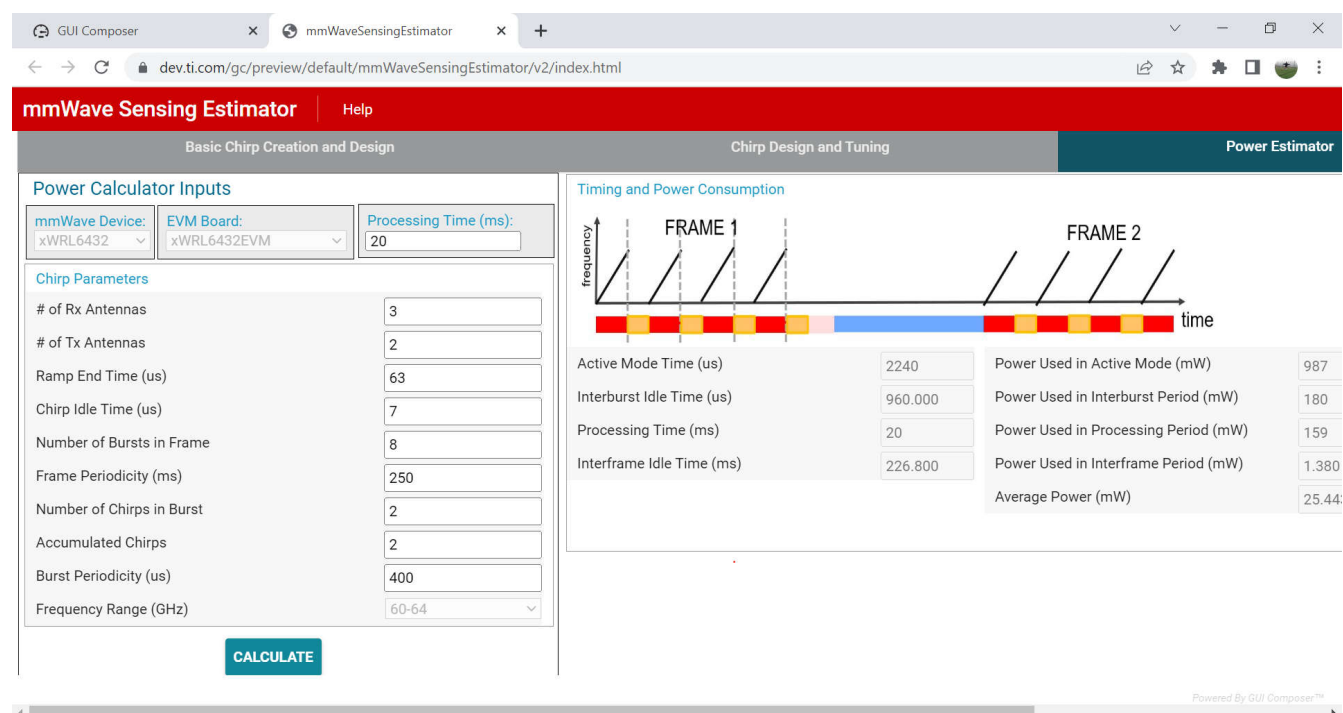


Figure 3-4. Power Estimator

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