



Getting Started Guide

Interference Lab

Overview

This lab demonstrates interference detection and mitigation techniques on mmWave devices. This lab requires two EVMs, one to be set up as the interferer running continuously at a fixed frequency of 78GHz, and the other to be set up as the victim which runs the interference mitigation demo. The demo running on the victim EVM is configured to chirp, process and transmit data over UART. This uses the mmWave out of box demo, with the addition of interference mitigation support. To configure and receive data from the victim EVM, it is connected to a PC running the [Interference mmWave Demo Visualizer](#). The interferer EVM starts to transmit a continuous wave signal as soon as it is turned on. It does not need to be configured and does not output any data. Hence, it does not need to be connected to the PC. The lab is supported for AWR1642BOOST and AWR1843BOOST, and either can be used as the interferer and victim EVM, in any combination.

Requirements

Hardware and Requirements

Two EVMs are required for this lab. One will be the interferer EVM, the other the victim EVM. This lab supports AWR1642BOOST and AWR1843BOOST, either can be used as the interferer or the victim in any combination without any restrictions.

Item	Details
Device	2x(AWR1843BOOST) or 2x(AWR1642BOOST) or 1x(AWR1843BOOST + AWR1642BOOST)
Computer	PC with Windows 7 or 10. If a laptop is used, please use the 'High Performance' power plan in Windows.
Micro USB Cable	1x Micro USB cable for mmwave sensor (interferer EVM need not be connected to PC after flashing)
Power Supply	2x 5V, >3A with 2.1-mm barrel jack (center positive). One for the interferer EVM and one for the victim EVM.

Software Requirements

Tool	Version	Required For	Download Link
TI mmWave SDK	3.5.0.4	Compilation of device application for different device variants.	TI mmWave SDK 3.5.0.4 and all the related tools are

			required to be installed as specified in the mmWave SDK release notes.
Uniflash	Latest	Quickstart Firmware	Download offline tool or use cloud version
Google Chrome	Latest	Recommended browser for mmWave Demo Visualizer	
TI Cloud Agent	Latest	Required for mmWave Demo Visualizer	Can be downloaded here .
TI Cloud Agent bridge	Latest	Required for mmWave Demo Visualizer	Chrome extension . Firefox add-on also available.
Interference mmWave Demo Visualizer	Latest	Required for a GUI view of configurations and outputs.	Available online here .

Quickstart

The quickstart guide will cover setting up the EVMs, flashing firmware, and running the demo.

1. Setup the EVM for Flashing Mode

- For xWR1xxx: follow the instructions for [Hardware Setup of xWRXXXXBOOST for Flashing Mode](#)

2. Flash the EVM using Uniflash

To experiment with interference mitigation, an interferer EVM and a victim EVM running corresponding software are needed.

Flash the binary associated with the EVM platform listed below using UniFlash. Follow the instructions for [using UniFlash](#):

For flashing the interferer EVM:

Platform	BIN Name	Location
16xx	xwr16xx_interferer.bin	<MMWAVE_AUTOMOTIVE_TOOLBOX_INSTALL_DIR>\interference_lab\interferer\
18xx	xwr18xx_interferer.bin	<MMWAVE_AUTOMOTIVE_TOOLBOX_INSTALL_DIR>\interference_lab\interferer\

For flashing the victim EVM:

Platform	BIN Name	Location
16xx	xwr16xx_intf_demo.bin	<MMWAVE_AUTOMOTIVE_TOOLBOX_INSTALL_DIR>\victim\xwr16xx\mmw\
18xx	xwr18xx_intf_demo.bin	<MMWAVE_AUTOMOTIVE_TOOLBOX_INSTALL_DIR>\victim\xwr18xx\mmw\

3. Setup the EVM for Functional Mode

- For 16xx and 18xx: Follow the instructions for [Hardware Setup of IWRXXXXBOOST for Functional Mode](#)

- Note that if the interferer binary is flashed on the interferer EVM, the interferer will start transmitting as soon as it is put in functional mode, and will only stop transmitting when turned off or put in flashing mode.

4. Running the Lab

- Place the interferer and victim EVM in boresight of each other.
- The interferer EVM will start transmitting as soon as it is powered on, without any need of being connected to the PC. To stop the interferer EVM, it either needs to be switched off or put in flashing mode.
- Connect the victim EVM to the PC running [Interference mmWave Demo Visualizer](#). This offers all the functionality offered by mmWave demo visualizer along with interference mitigation support.
- For steps to connect the visualizer to the EVM, go to help->view README.md in the interference mmWave Demo Visualizer page.
- Under plot selection, check “Noise Profile”. Interference mitigation has significant impact on this graph, visible under the plots tab.
- Check or uncheck the “Interference Mitigation” configuration under scene selection and send the configuration to the device.

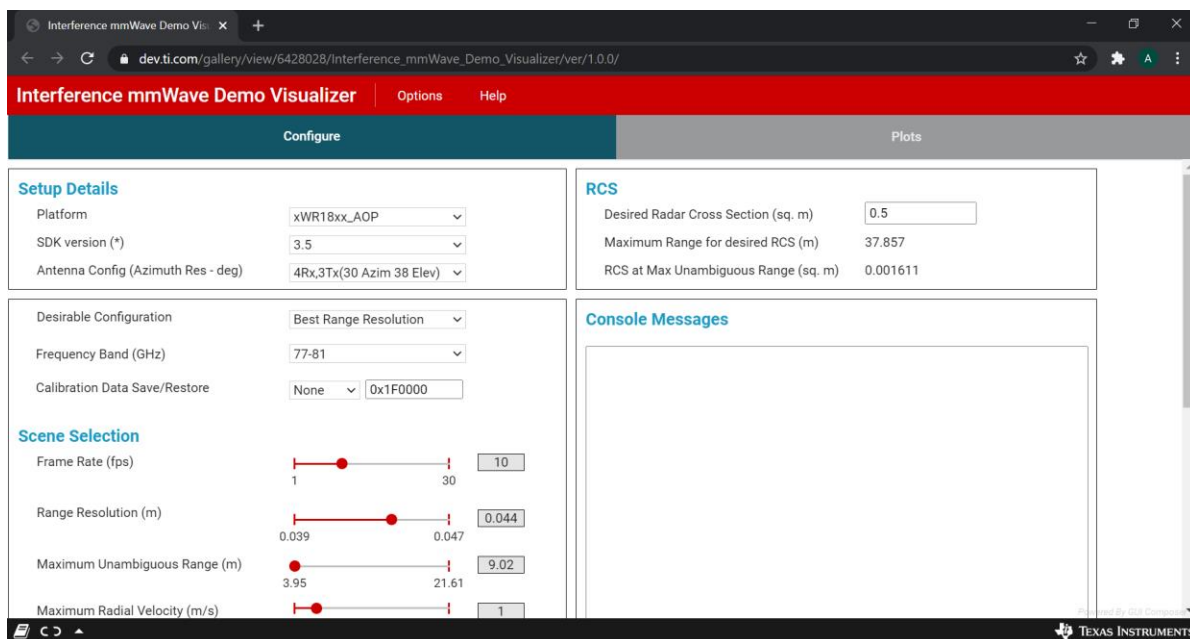


Fig. 1: Interference mmWave Demo Visualizer

Scene Selection

Frame Rate (fps) 1 30 10

Range Resolution (m) 0.039 0.047 0.044

Maximum Unambiguous Range (m) 3.95 21.61 9.02

Maximum Radial Velocity (m/s) 0.32 4.98 1

Radial Velocity Resolution (m/s) 0.13 0.13

☒ Interference Mitigation

Fig. 2: Interference mitigation checkbox under scene selection

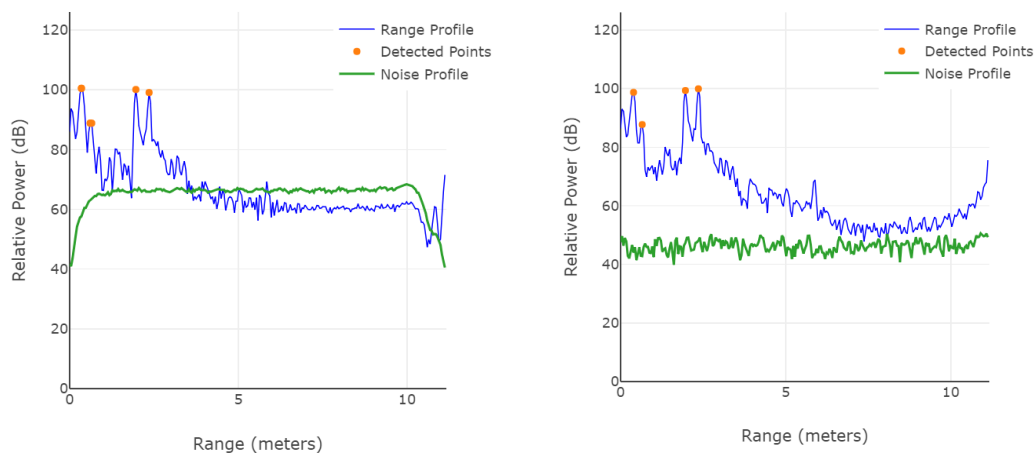


Fig. 3: Range and noise profile under plots tab in presence of interferer with interference mitigation disabled(left) and enabled(right)

Appendix

- Refer Release Notes for limitation and known issues.
- Refer Developer's Guide for details of the design of this lab, including details on the interference configuration and algorithms.
- Refer to [this](#) application note for theoretical details on interference mitigation with AWR devices.