



### **Company Information**

<b>Company Name</b>	Qorvo USA	<b>Date Submitted</b>	06/17/2025
<b>Project Title</b>	Heterodyne Front-End Module/SDR Platform Enhancement (Qorvo Radio2)	<b>Planned Starting Semester</b>	Fall 2025

### **Senior Design Project Description**

#### **Personnel**

Typical teams will have 4-6 students, with engineering disciplines assigned based on the anticipated Scope of the Project.

Please provide your estimate of staffing in the below table. The Senior Design Committee will adjust as appropriate based on scope and discipline skills.

<b>Discipline</b>	<b>Number</b>	<b>Discipline</b>	<b>Number</b>
Mechanical	1	Electrical	2
Computer	2	Systems	

#### **Company and Project Overview:**

Qorvo supplies innovative semiconductor solutions that make a better world possible. Qorvo's connectivity and power technology maximize efficiency in consumer electronics and a broad range of commercial and defense applications. The Company combines product and technology leadership, systems-level expertise, and global manufacturing scale to solve its customers' most complex technical challenges.

Students will design and build a radio frequency front end module capable of both transmitting and receiving within the 2.4GHz – 2.5GHz frequency allocation reserved for unlicensed Industrial-Scientific-Medical (ISM band) applications. In conjunction with UNC Charlotte/Qorvo Software Defined Radio (QORVO\_RADIO developed in 2024-2025) the module will be used to control multiple remote devices using various protocols.

#### **Project Requirements:**

The transmit/receive module will be developed by Charlotte students as an extension to the previously developed Software Defined Radio project. In addition to the new T/R module, a suitable display and enclosure for the remotely controlled devices will be required. As before, the finished hardware will remain with the University to promote RF education. However, we



anticipate the project will showcase some of Qorvo's latest technology, so key elements of the project are to be organized as a reference design that can be incorporated into other applications.



### **Expected Deliverables/Results:**

- Build hardware and verify functionality demonstrating control of multiple remote devices using at least two different protocols (802.11, 802.15, Zigbee, Thread, Matter, etc.).
- Reference Design Package:
  - Circuit description and theory of operation
  - Schematic
  - Link to PCB fabrication documents
  - Bill of Materials
  - Construction and assembly notes
- SDR System Documentation
  - Steps to install programs and operate the module
  - Create source code repository containing:
    - Software needed to operate the module and SDR platform.
    - HDL Code
    - Schematics
    - Assembly Drawings
    - Bill of Materials
    - Summary of Analysis
    - Design Review Documentation

### **Disposition of Deliverables at the End of the Project:**

Students are graded based on their display and presentation of their team's work product. It is mandatory that they exhibit at the Expo, so if the work product was tested at the supporter's location, it must be returned to campus for the Expo. It is also a mandatory part of this Program that the Industry supporter attend the 2 expos to grade their team's performance. After the expo, the team and supporter should arrange the handover of the work product to the industry supporter. This handover must be concluded within 7 days of the Expo.

### **List here any specific skills, requirements, specific courses, knowledge needed or suggested (If none please state none):**

- Interest in Modern RF/Communication Systems
- Experience using PCB Layout tools