**6. Testing**

In this section, several test mechanisms are applied to the prototype to verify that it has met the functional requirements and the design constraints mentioned in section 3. This section also proves how our prototype provides the solution to the problem stated in section 1.

**6.1. Functional Testing**

Functional testing is part of black box testing that tests the system functionalities without inspecting the internal process. The test ensures that the functional requirements of the system has been met.

**6.2. Connectivity Testing**

The connectivity test measures the time it takes for a connection to pass data between two certain components in the system. The whole tests were done in the same environment, internet connection and around the same time.

The test is done through several steps:

* Between Arduino and NodeMCU
* Between NodeMCU and Firebase
* Between Application and Firebase
* Between Website and Firebase

6.2.1. Between Arduino and NodeMCU

To test the serial connection to and from Arduino and NodeMCU

6.2.2. Between NodeMCU and Firebase

To test the internet connection to and from NodeMCU and Firebase in several data sizes

6.2.3. Between Application and Firebase

To test internet connection to and from Application and Firebase in several data sizes

6.2.4. Between Website and Firebase

To test internet connection to and from Application and Firebase in several data sizes

**6.3. Outdoor Testing**

ParQU is a system that should be able to be implemented outdoor in a real parking area. As an initial test to verify that our sensors are able to withstand the harsh environments of being outdoors in Qatar University and satisfy its purpose, we tested the Ultrasonic Sensor outdoors to check the availability of a parking spot.

Where to put the sensor?

**6.4. Acceptance Testing**

**6.5. Design Constraints Evaluation**