CHAPTER FOUR

4.0 TESTING

Using various type of appliances like standing fan, mobile phone charger, laptops charger it was gladding that there was not interference between the modules.

Once power is on by connecting the device to the mains the LED light will ON and the Bluetooth module start to blink waiting to pair up with the phone and after the connection the blinking status change and ready to send and receive data. But before connecting to the phone, download the Arduino iot project app on Playstore and configure the switches in respect to the pinout of your code then you can connect.

4.1 Testing the Range

As it has been known that the range of a Bluetooth module ranges from up to 100meters which is also about 330feet and the factors that affect it are:

1. Physical obstacle like walls, furniture, and other objects can reduce the range.

2. Interference from other wireless devices can interfere with the Bluetooth signals.

3. Device power which possibly might be low can cause lower or reduction in the range.

Once connection is successful, the application switches can control the appliances. The detail of this device can be changed only by the programmer which is one of it advantage i.e it cannot be easily hacked.

4.2 Results
The following are the results observed in executing the project. These results are for a perfectly observed in two possible environment. Variation may happen due to change in environment which

must naturally occur and the changes bringing in modification in the system for more suitable automation.

The environment where the there are a lot of barriers and obstacle and also a plain environment where there is no obstacle was also used for the testing and result. And from the figure below it will be seen that there is going to be a difference in connection in both case that is where there are obstacle like walls and in a plain environment.
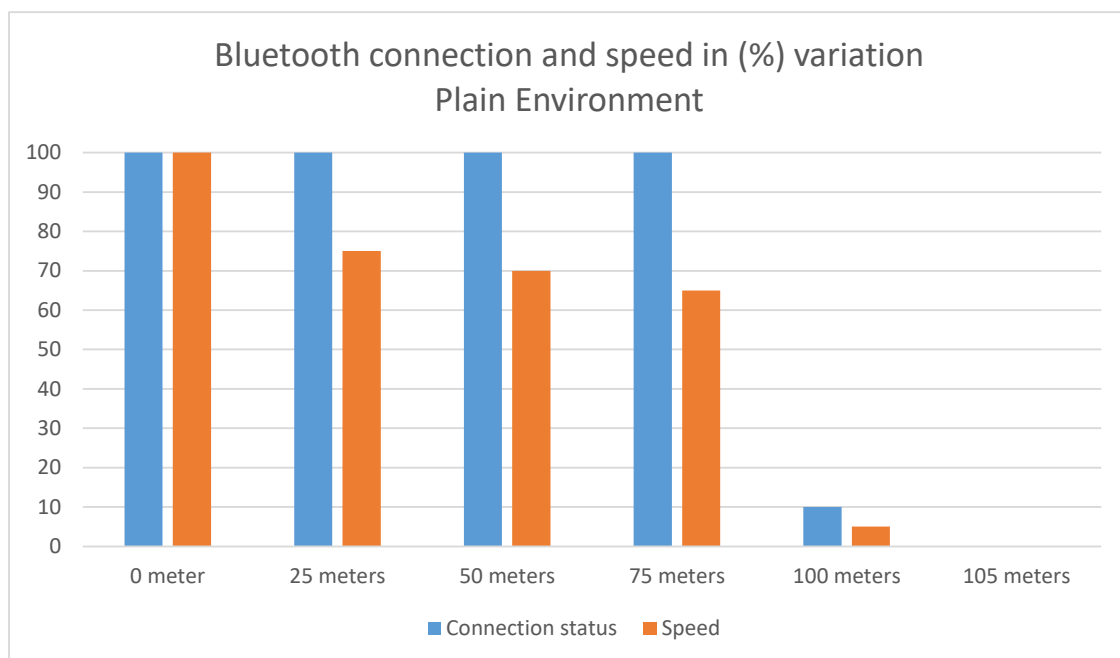

Figure 13 Bluetooth connection and speed in (%) variation in a plain environment

The Figure above shows that in a plain environment the speed and the connection of the Bluetooth to the mobile device is much stronger. From the graph the blue bar shows the data for connection status while the brown bar show the speed status against percentage axis. It is vividly clear that even at 0 to 75 percentage level the connection is still intact because of the absence of barrier but when it reach 100 percentage which is the limit for the Bluetooth module there is connection break and the speed will drastically reduce.
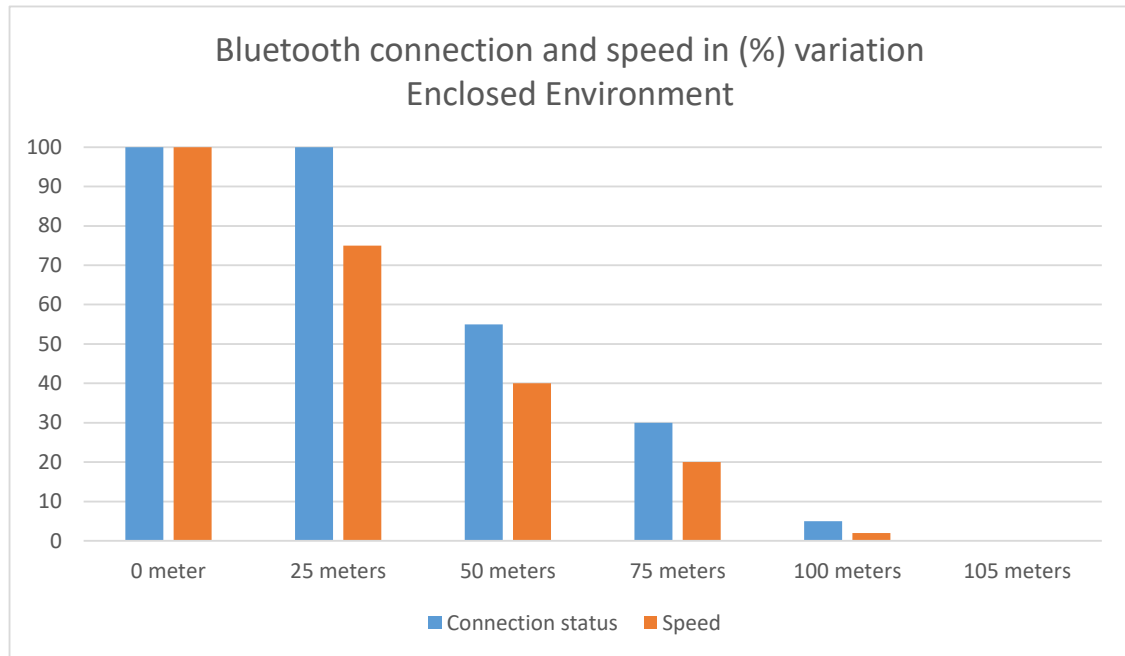
Figure 14 Bluetooth connection and speed in (%) variation in a enclosed environment

The Figure above shows that in a enclosed environment the speed and the connection of the Bluetooth to the mobile device is weaker compared to plain or outdoor environment. From the graph the blue bar shows the data for connection status while the brown bar show the speed status against percentage axis. It is vividly clear that even at 0 to 75 percentage level the connection is still intact but fading off as the mobile device move farther away from the module because of the presence of barrier and when it reach 100 percentage which is the limit for the Bluetooth module there is a heavy connection break and the speed is extremely slow.

4.3 Bill of Engineering Measurement and Estimation

S\N	Quantity	Item	Unit Price	Subtotal Price
1	1	CASING	2500	2500
	2	5v power supply	3000	3000
	1	Arduino UNO	15000	15000
	1	AC cable	1,500	1500
	5 Channels	Relays	5000	5000
	1	Ferro Board	1000	1000
	1	Bluetooth module	8000	8000
	2	2 way 1 gang switch	1200	2400
	2	Lamp holder	500	1000
	5	Male/Female Pin header	200	1000
	lots	Connecting Wire	1000	1000
	pack	Lead	1500	1500
		Led (optional)		
	lots	Hot glue	1000	1000
	2	13A Sockets	500	1000
		Miscellaneous		15000
		Construction		10000
		Total		**#69,900**