Appendix B – Test Results
Pay attention to the way the test numbers are setup

FT#1.1.1 - Test SDR with known RF signal: To prove the operational capability

Test Setup: You must clearly explain how you performed the test. This can be done by showing a diagram of your test setup. You can also show a picture/photo of the setup. Be specific. Explain how many times the test was performed. Using this information one should be able to replicate your test.
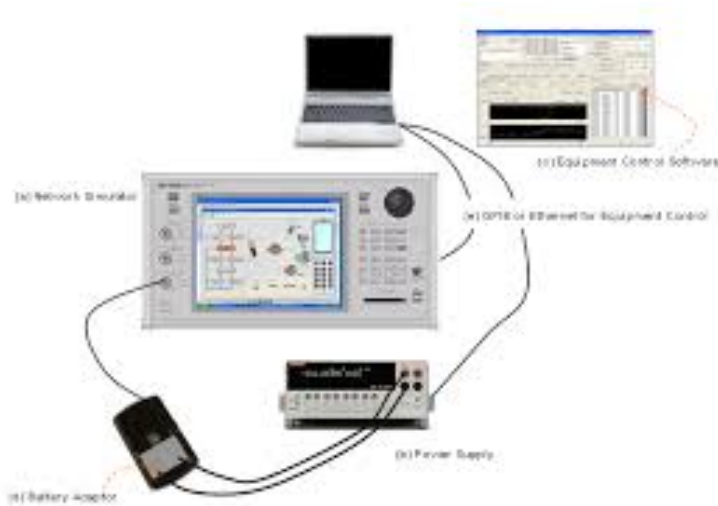

Figure 1. Set setup for….. explain….

Results: The SDR detected the frequency 104.9MHz in real time. Then FM demodulation was performed on the signal and the radio station signal was played through the speakers of the laptop.
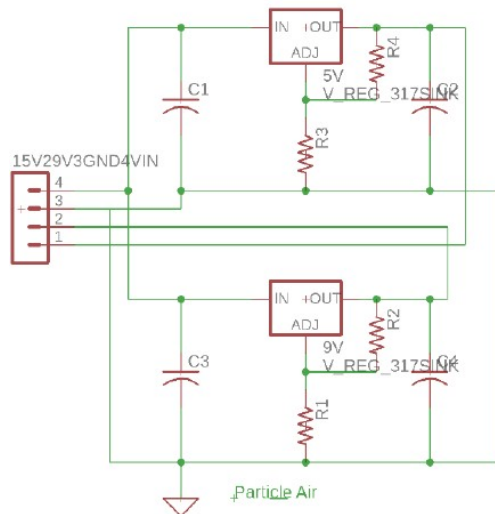

Figure 7: The schematic of the Voltage Regulator

Voltage (V)	5 Volts (V)	9 Volts (V)
1	0.3	0.3
2	1.13	1.21
3	1.19	2.09
4	2.7	2.92
5	3.65	3.77
6	4.63	4.69
7	5.11	5.66
8	5.11	6.65
9	5.11	7.63
10	5.11	8.62
11	5.11	9.58
12	5.11	9.6

Table 2: Voltage Regulator at different Voltages

Conclusion: This test shows the SDR is detecting a known signal accurately and it is possible to use it for this project.

Requirements Satisfied: ER#1

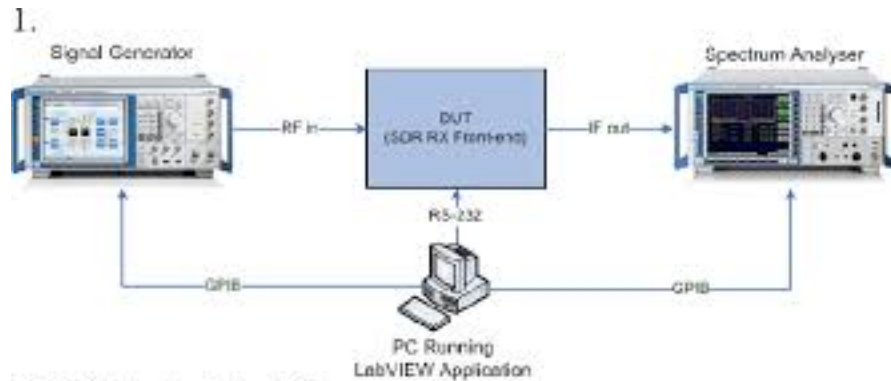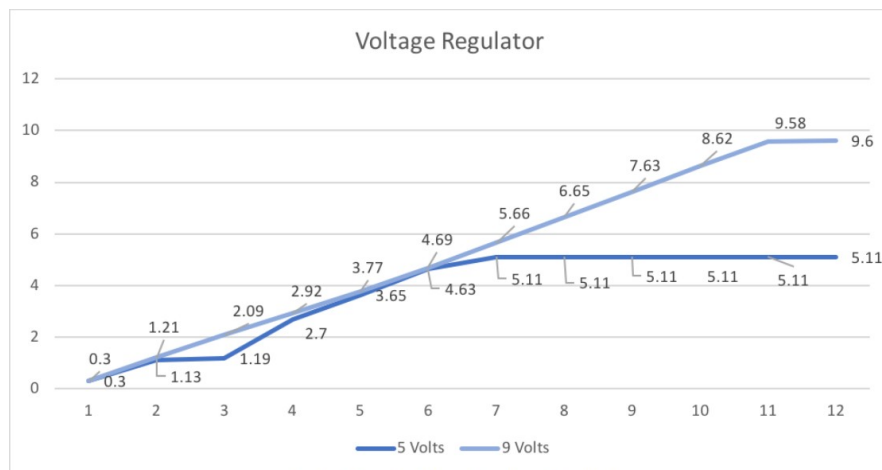FT#1.2.1- It must be ensured that the Raspberry Pi 3 and the HackRF can be interfaced together.

Fig 1: Test setup Block Diagram

Results: The Raspberry Pi and SDR were connected to a 5V 4A power pack and were supplied enough power to turn on.

Graph 1: Graph of Voltage Regulator Threshold

Conclusion: This test ensures our device can be powered by battery.

Requirements Satisfied: ER#2,3,6

FT#1.3.1- The SBC must be interfaced with the SDR and both must be operational with DC power supply.

Test Setup: You must clearly explain how you performed the test. This can be done by showing a diagram of your test setup. You can also show a picture/photo of the setup. Be specific. Explain how many times the test was performed. Using this information one should be able to replicate your test.

Results: The SBC and SDR were interfaced and while both were being battery powered a known drone signal was successfully detected.
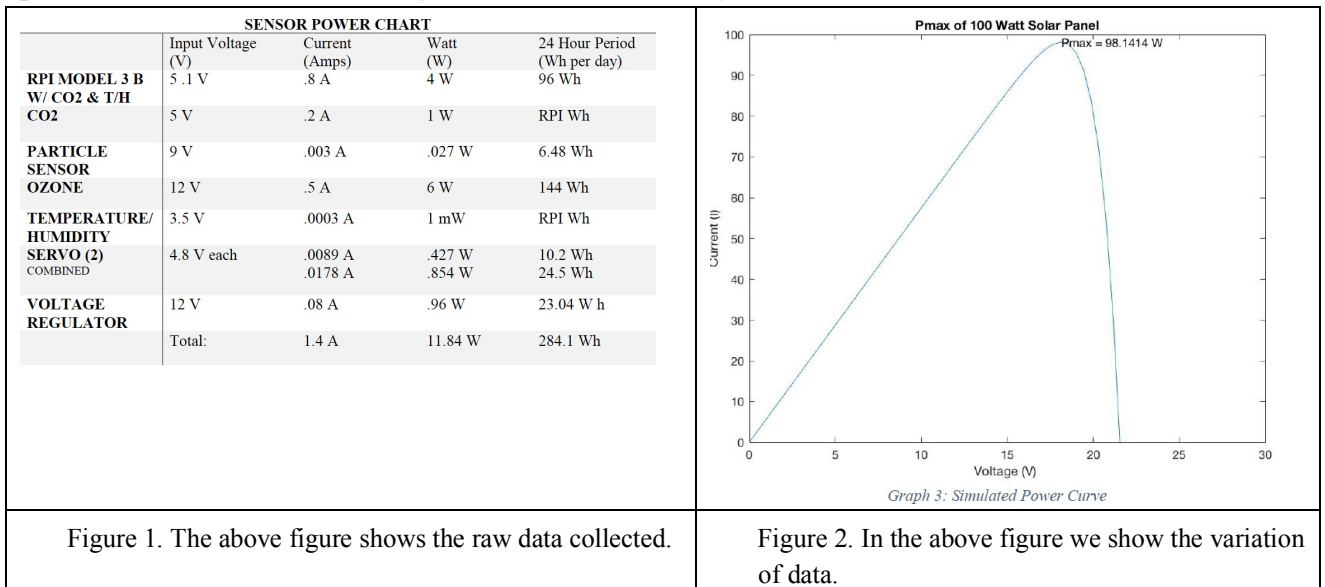
SENSOR POWER CHART				
	Input Voltage (V)	Current (Amps)	Watt (W)	24 Hour Period (Wh per day)
RPI MODEL 3 B W/ CO2 & T/H	5 .1 V	.8 A	4 W	96 Wh
CO2	5 V	.2 A	1 W	RPI Wh
PARTICLE SENSOR	9 V	.003 A	.027 W	6.48 Wh
OZONE	12 V	.5 A	6 W	144 Wh
TEMPERATURE/ HUMIDITY	3.5 V	.0003 A	1 mW	RPI Wh
SERVO (2) COMBINED	4.8 V each	.0089 A .0178 A	.427 W .854 W	10.2 Wh 24.5 Wh
VOLTAGE REGULATOR	12 V	.08 A	.96 W	23.04 W h
	Total:	1.4 A	11.84 W	284.1 Wh

Graph 3: Simulated Power Curve

Figure 1. The above figure shows the raw data collected.	Figure 2. In the above figure we show the variation of data.

Conclusion: The SBC and SDR together can correctly detect a known signal while being powered via DC batter

Requirements Satisfied: ER#2,3,6

Test Summary

MR#	Marketing Requirement Summary	ER#	Engineering Requirement Summary	Test#	Test Summery	Test Results	Pass/ Fail
1	The System must use solar power	1	The system uses at 20W solar power	FT#1.1.1*	The solar panel max. power test	Solar panel generates about 18.5 W of power	Pass
1	The System must use solar power	2	The system uses at 20W solar power	FT#1.2.1	The solar panel can supply minimum of 120 mA	Using different loads the solar panel can supply minimum of 120 mA	Pass
1	The System must use solar power	3	The system uses a 12V, 12000mAh battery	FT#1.3.1	The battery voltage check	The battery voltage was measured to be about 11.8V	Pass
2	The wireless data transmission must have a minimum range of 400 meters	3	Use a WiFi Tranceiver	FT#2.3.1	WiFi Check	The indoor WiFi range was measured to be about 100 m	Fail
2	The wireless data transmission must have a minimum range of 400 meters	4	Use a WiFi Tranceiver	FT#2.4.1	WiFi Check	The outdoor WiFi range was measured to be about 500 m	Pass

- Pay attention to the numbering scheme.