



Flyport antenna report

Research Document – G05

EGR299 Students and Engineering Faculty

2012

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Introduction

As we do not have the required expensive test equipment to give us calibrated data, we simply captured the RSSI (Received Signal Strength Indication) without data throughput (signal quality). Signal quality could be tested at a later date.

Credits

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Observations – Test 1

For the test methodology, we simply let the static Flyport scan the neighborhood WiFi networks and compare the list to a win7 laptop using “inSSIDer” (a free application) giving us the values in dB, as the Flyport application shows the signal strength as an arbitrary value between 0 and 255.

When facing a high number of WiFi networks in a suburban neighborhood, the scan speed of the Flyport is too fast and the openPicus IDE does not have time to “write” all the information in the Serial Monitor window. Missing information is randomized; it could be the SSID name or any of the other captured fields.

All the antennas tested are good, including the Flyport embedded (PCB) antenna. We did not include this particular antenna because it cannot be used on our UAV in order to avoid avionics and electronics interferences.

The main difference between these external antennas is how many networks they can discover.

	<i>Square</i> <i>5cm</i>	<i>Rectangular</i> <i>10cm</i>	<i>Square</i> <i>65cm</i>	<i>Connection</i> <i>possible</i>	<i>RSSI</i> <i>inSSIDer</i>
Network 1	118	118	112	N	-84dBm
Network 2	112	112	112	N	-88dBm
Network 3	118	118	112	N	-85dBm
Network 4	112	112	112	N	-87dBm
Network 5	142	136	142	Y	-50dBm
# of discovered networks	5	7	9		

Observations – Test 2

For the test methodology, we simply used an Android smart phone acting as a tethering WiFi access point and move it to the same distance and obstructions from the static Flyport (we did not have batteries to move the Flyport).

Square 5cm antenna (a couple of inches away) unobstructed

```
Starting scan...  
EVENT: Scan Results Ready, 1 results  
** *Networks discovered: 1 ***  
1 - SSID: AndroidAP  
Network type: infrastructure  
Signal strength: 170  
Channel: 6  
Beacon: 100  
Security OPEN
```

.....

Square 5cm antenna (10m away) unobstructed

```
Starting scan...  
EVENT: Scan Results Ready, 1 results  
** *Networks discovered: 1 ***  
1 - SSID: AndroidAP  
Network type: infrastructure  
Signal strength: 136  
Channel: 6  
Beacon: 100  
Security OPEN
```

.....

Square 5cm antenna (12m away) obstructed (drywall)

```
Starting scan...  
EVENT: Scan Results Ready, 1 results  
** *Networks discovered: 1 ***  
1 - SSID: AndroidAP  
Network type: infrastructure  
Signal strength: 136  
Channel: 6  
Beacon: 100  
Security OPEN
```

.....

Square 5cm antenna (16m away) obstructed (drywall and concrete) under a CISCO access point at full power

Starting scan...
EVENT: Scan Results Ready, 1 results
** *Networks discovered: 1 ***
1 - SSID: AndroidAP
Network type: infrastructure
Signal strength: 118
Channel: 6
Beacon: 100
Security OPEN



Square 5cm antenna (20m away) obstructed (metal, glass and concrete)

Starting scan...
EVENT: Scan Results Ready, 1 results
** *Networks discovered: 1 ***
1 - SSID: AndroidAP
Network type: infrastructure
Signal strength: 112
Channel: 6
Beacon: 100
Security OPEN

Rectangular 10cm antenna (a couple of inches away) unobstructed

```
Starting scan...
EVENT: Scan Results Ready, 1 results
** *Networks discovered: 1 ***
1 - SSID: AndroidAP
Network type: infrastructure
Signal strength: 176
Channel: 6
Beacon: 100
Security OPEN
```

Rectangular 10cm antenna (10m away) unobstructed

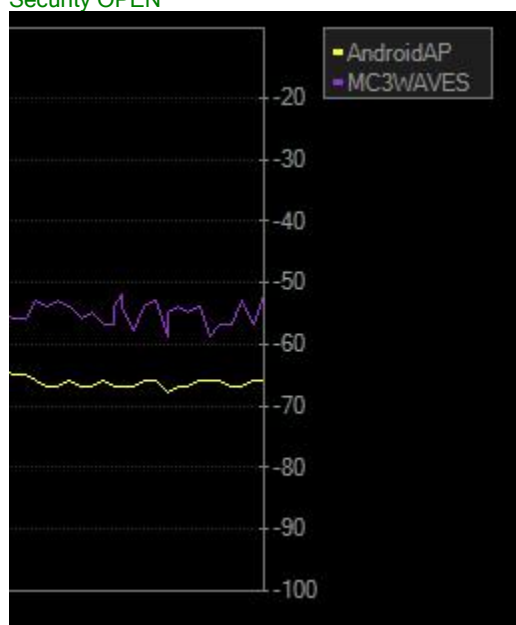
```
Starting scan...
EVENT: Scan Results Ready, 1 results
** *Networks discovered: 1 ***
1 - SSID: AndroidAP
Network type: infrastructure
Signal strength: 136
Channel: 6
Beacon: 100
Security OPEN
```

Rectangular 10cm antenna (12m away) obstructed (drywall)

```
Starting scan...
EVENT: Scan Results Ready, 1 results
** *Networks discovered: 1 **
1 - SSID: AndroidAP
Network type: infrastructure
Signal strength: 136
Channel: 6
Beacon: 100
Security OPEN
```

**Rectangular 10cm antenna (16m away) obstructed (drywall and concrete) under a CISCO access point
at full power**

Starting scan...
EVENT: Scan Results Ready, 1 results
** *Networks discovered: 1 ***
1 - SSID: AndroidAP
Network type: infrastructure
Signal strength: 124
Channel: 6
Beacon: 100
Security OPEN



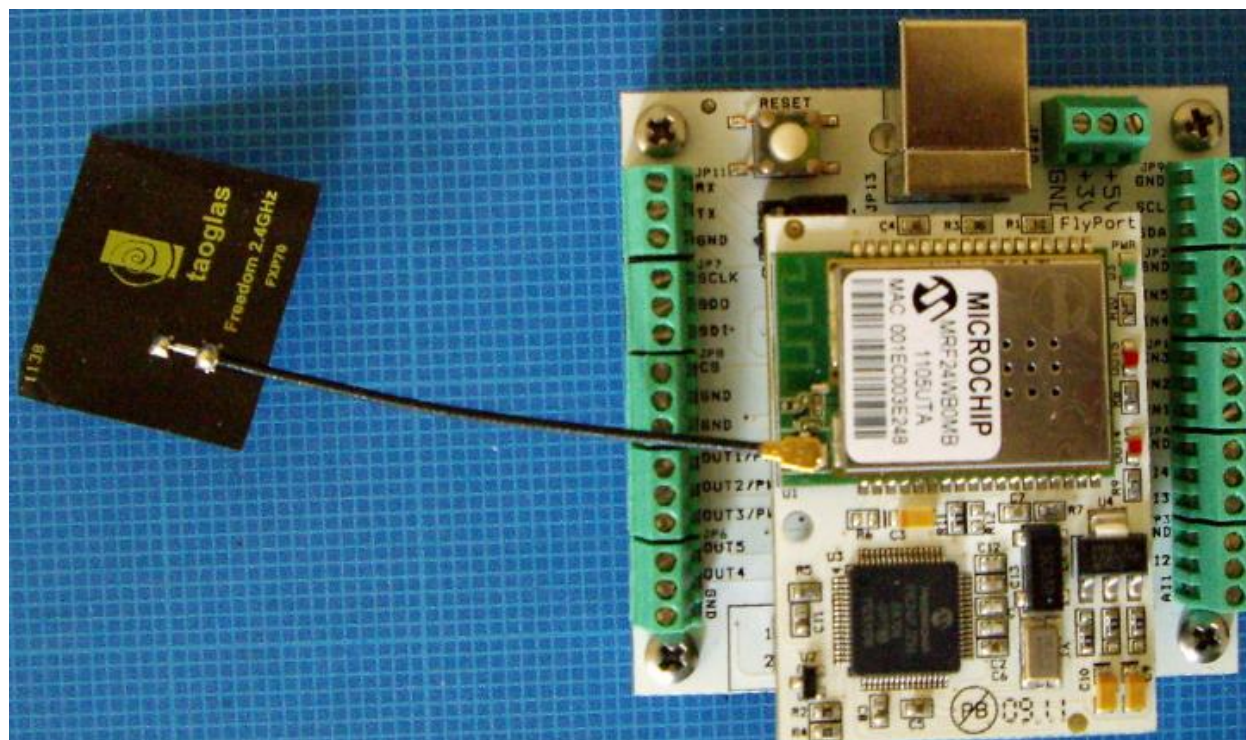
Rectangular 10cm antenna (20m away) obstructed (metal, glass and concrete)

Starting scan...
EVENT: Scan Results Ready, 1 results
** *Networks discovered: 1 ***
1 - SSID: AndroidAP
Network type: infrastructure
Signal strength: 112
Channel: 6
Beacon: 100
Security OPEN

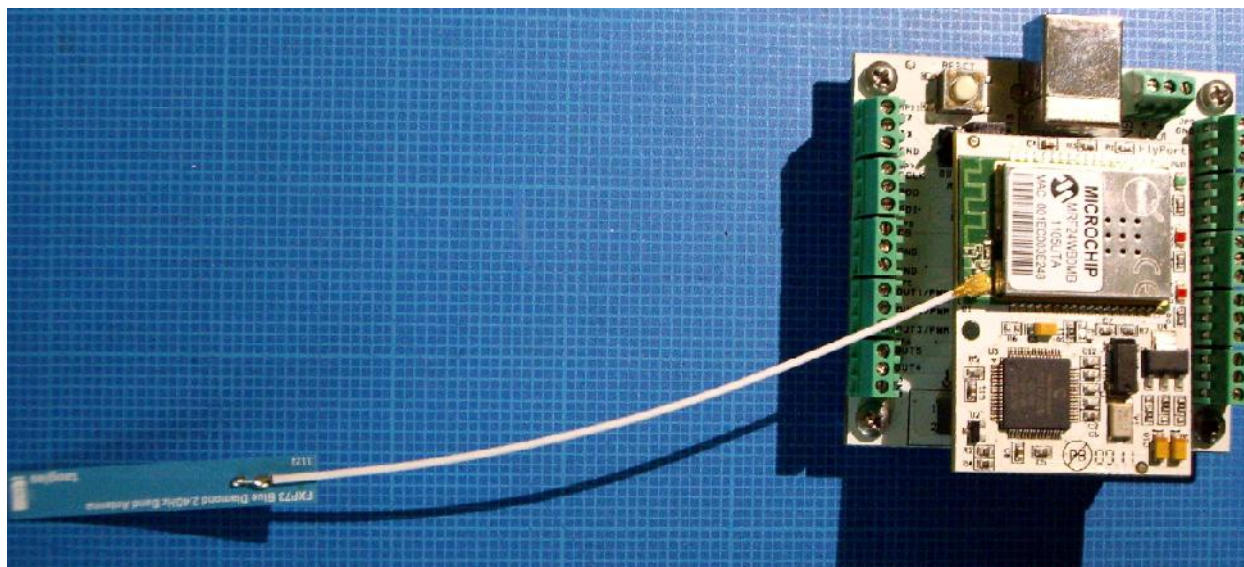
Results

The rectangular antenna seems to perform slightly better. Signal quality, rather than strength, will be more important when we measure throughput. Multipath propagation could lead us to good signal strength with poor signal quality and ending up with high error rates. Obstructions could lead us to poor signal strength with an acceptable signal quality.

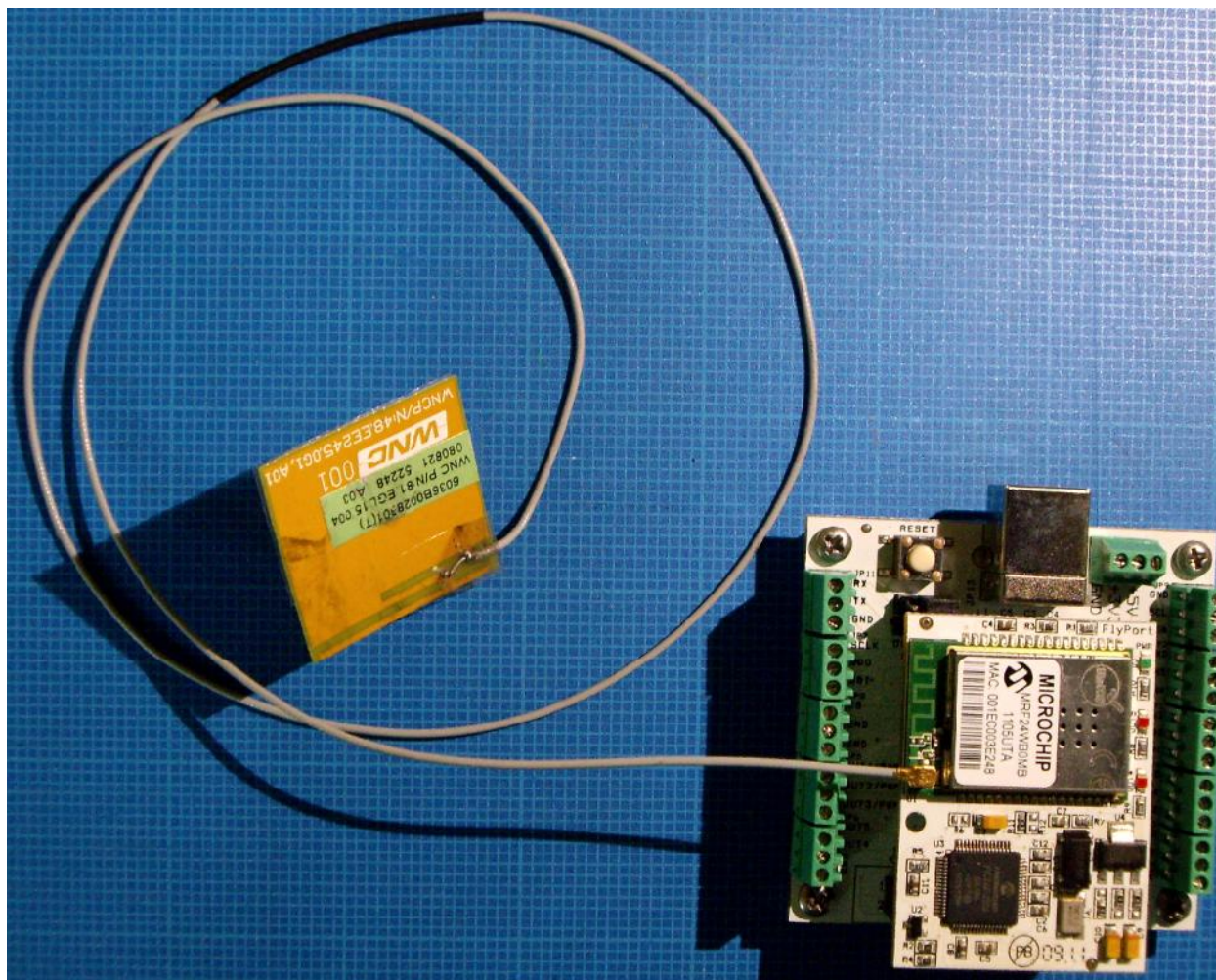
External square antenna with a 5cm length lead used in tests 1 and 2



External rectangular antenna with a 10cm length lead used in tests 1 and 2



External square antenna with a 65cm length lead used in test 1 only



Sources for high performance magnetic field antennas

Square 5cm lead: FXP70 Freedom 2.4GHz

Taoglas part number: FXP70.07.0053A

Rectangular 10cm lead: FXP73 Blue Diamond 2.4GHz

Taoglas part number: FXP73.07.0100A

Square 65cm lead: This is a replacement antenna for the Toshiba X200 laptop (requires 3 antennas)

WNC part number: 48EE245.005.A01



Montgomery County
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