

# CL32 antenna preliminary study report

Prepared by Steven Chang

8/18/2003

**.Purpose: To study the effect when right\_side antenna shifted to right and the laptop system noise effect.**

**.R\_side antenna:**

**(1)Antenna electrical specification:**

A.2.4 ~ 2.5GHz:peak gain 3 dBi, average gain -5 dBi ,VSWR 2.0 。

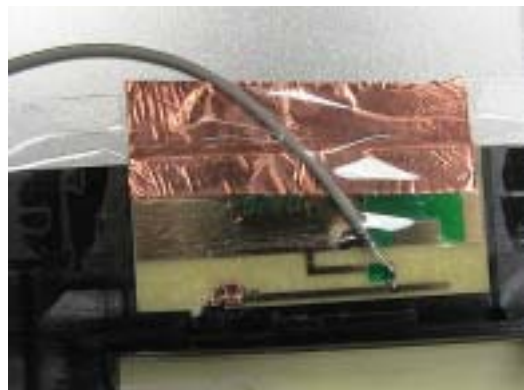
B.5.15 ~ 5.35GHz: peak gain 6 dBi, average gain -5 dBi ,VSWR 2.5。

**(2) cable: junkosha cable diameter 1.13mm,323 mm,black.**

**(3)Antenna type:**

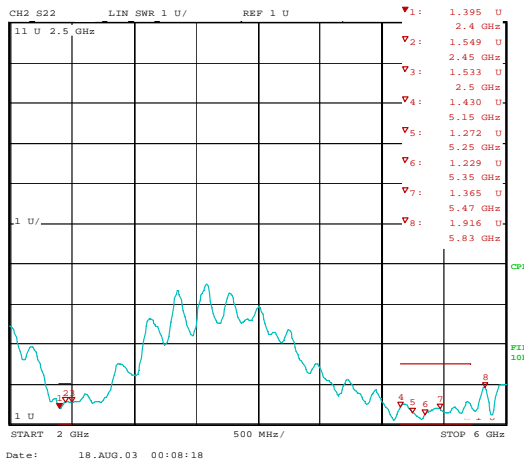
**A. Metal PIFA**

**B.PCB IFA**

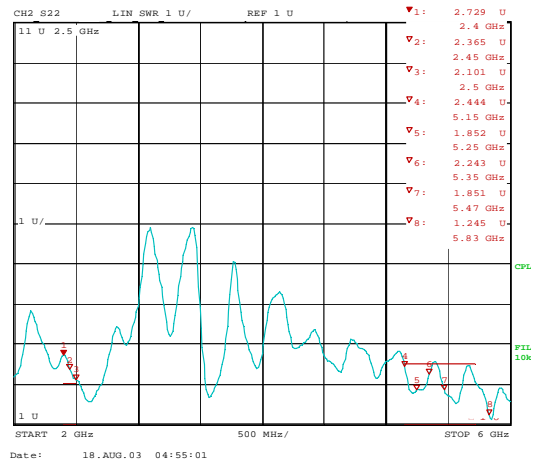


#### (4)Antenna VSWR

##### A. Metal PIFA



##### B. PCB IFA



	2.4GHz	2.45GHz	2.5GHz	5.15GHz	5.25GHz	5.35GHz
<b>Metal PIFA</b>	<b>1.4</b>	<b>1.55</b>	<b>1.53</b>	<b>1.43</b>	<b>1.27</b>	<b>1.23</b>
<b>PCB IFA</b>	<b>2.73</b>	<b>2.36</b>	<b>2.1</b>	<b>2.44</b>	<b>1.85</b>	<b>2.24</b>

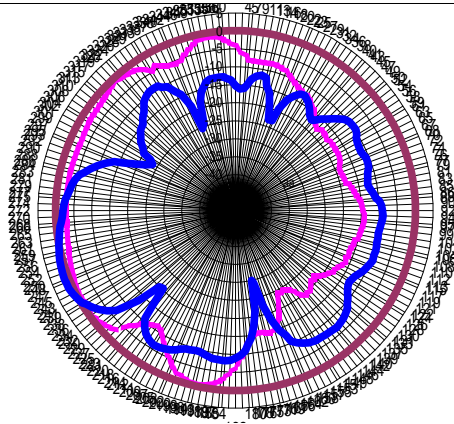
#### (5)Antenna average Gain:

	2.4GHz	2.45GHz	2.5GHz	5.15GHz	5.25GHz	5.35GHz
<b>Metal PIFA</b>	-3.14	-3.4	-3.58	-4.5	-4.56	-4.26
<b>PCB IFA</b>	-3.8	-3.9	-4.23	-4.8	-5.2	-5.4

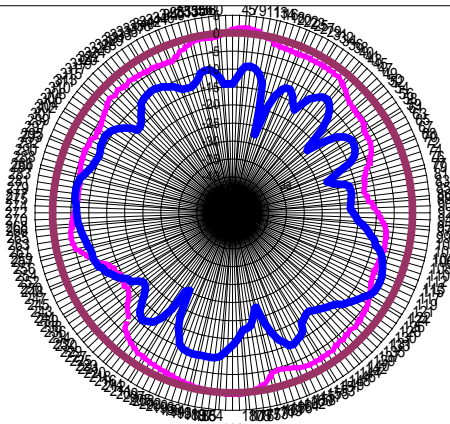
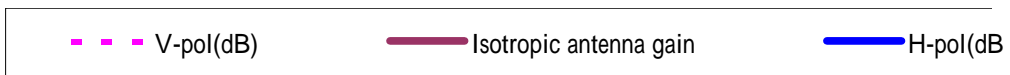
#### (6) Antenna pattern

##### A. @2.45GHz

Metal Antenna -@2.45GHz

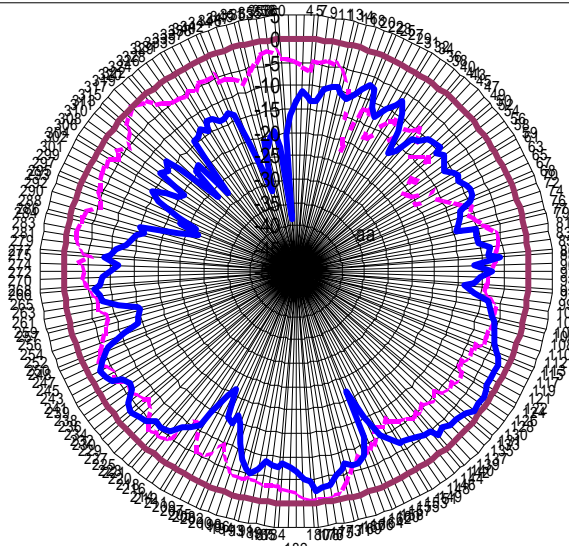
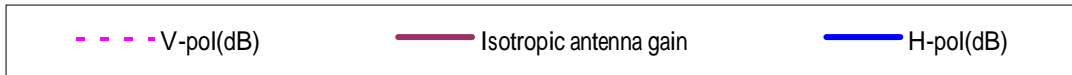


PCB Antenna -@2.45GHz

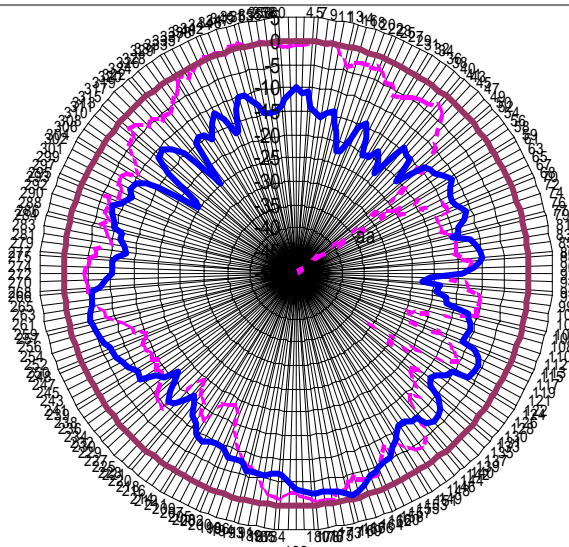
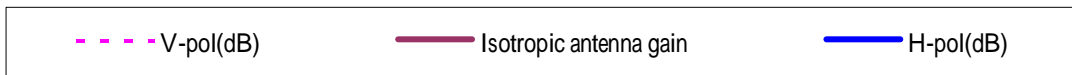


B. @5.15GHz

### Metal antenna -@5.25GHz



### PCB antenna -@5.25GHz



#### . Left\_side antenna:

##### (1)Antenna electrical specification:

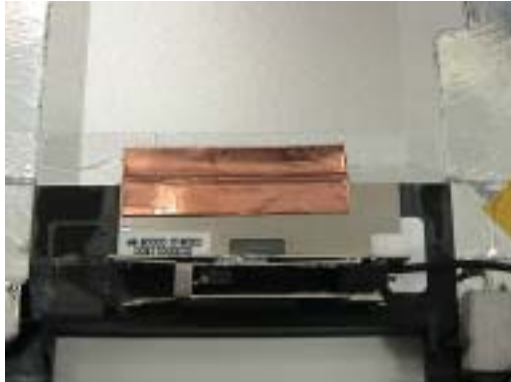
A.2.4 ~ 2.5GHz: peak gain 3 dBi, average gain -5 dBi ,VSWR 2.0 。

B.5.15 ~ 5.35GHz: peak gain 6 dBi, average gain -5 dBi ,VSWR 2.5。

(2) cable: junkosha cable diameter 1.13mm,460 mm,Gray

(3)Antenna type:

**B. Metal PIFA**

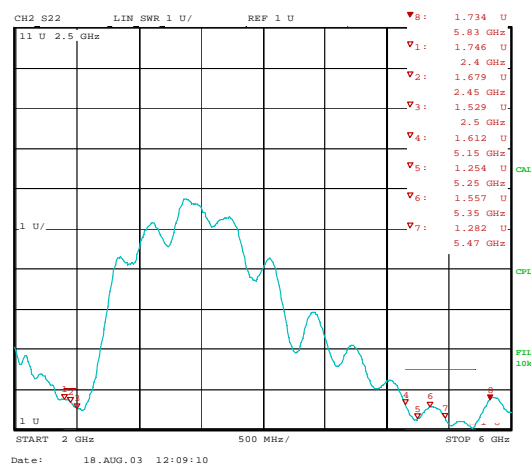


**B.PCB IFA**

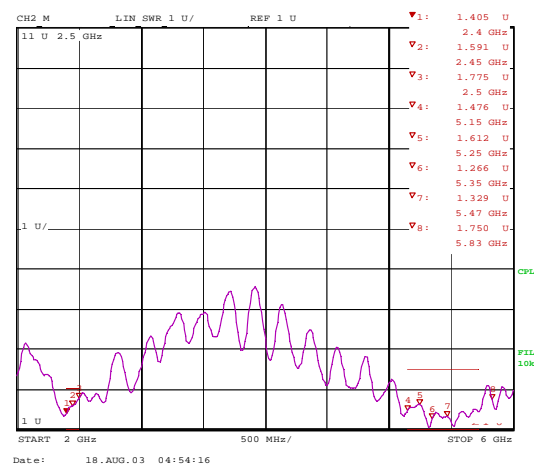


(4) Antenna VSWR

**A. Metal PIFA**



**B. PCB IFA**



	<b>2.4GHz</b>	<b>2.45GHz</b>	<b>2.5GHz</b>	<b>5.15GHz</b>	<b>5.25GHz</b>	<b>5.35GHz</b>
<b>Metal PIFA</b>	<b>1.75</b>	<b>1.68</b>	<b>1.53</b>	<b>1.61</b>	<b>1.25</b>	<b>1.55</b>
<b>PCB IFA</b>	<b>1.40</b>	<b>1.59</b>	<b>1.77</b>	<b>1.47</b>	<b>1.61</b>	<b>1.26</b>

(5) Antenna Gain:

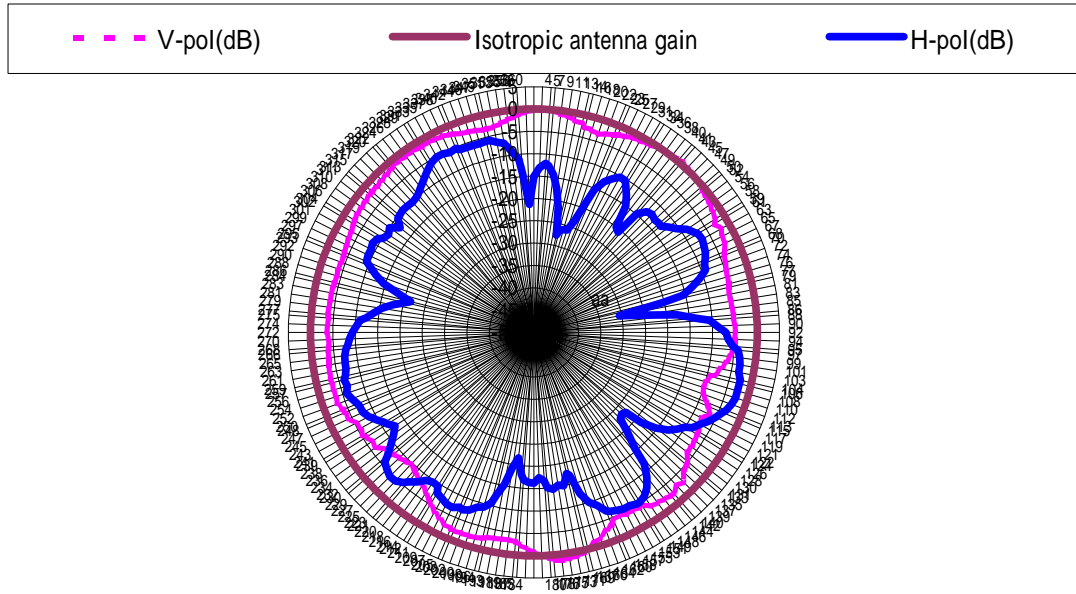
	2.4GHz	2.45GHz	2.5GHz	5.15GHz	5.25GHz	5.35GHz
Metal PIFA	-2.95	-2.51	-2.13	-4.32	-4.53	-4.35
PCB IFA	-3.8	-4.1	-3.6	-4.86	-5.2	-5.05

(6)  
Antenna

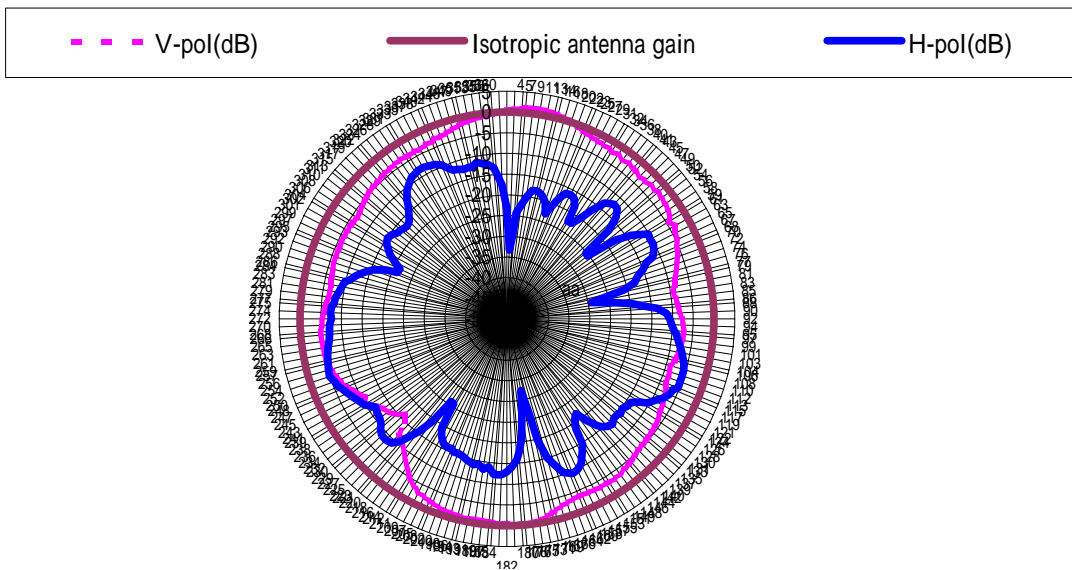
pattern

A. @ 2.45GHz

Metal antenna -@2.45GHz

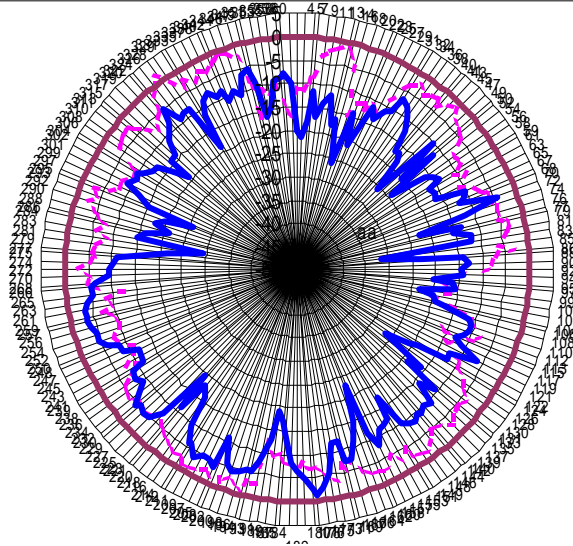
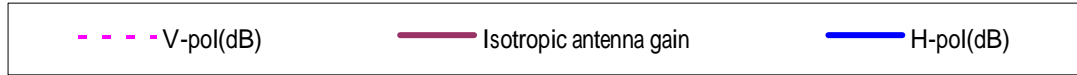


PCB antenna -@2.45GHz

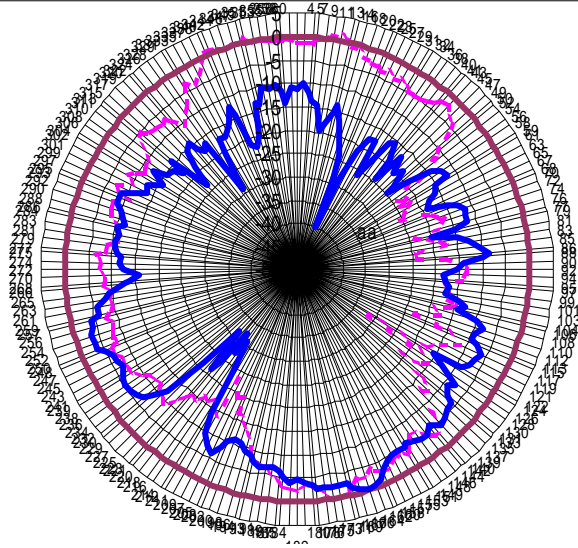


## B. @5.25GHz

### Metal antenna -@5.25GHz



**PCB antenna -@5.25GHz**



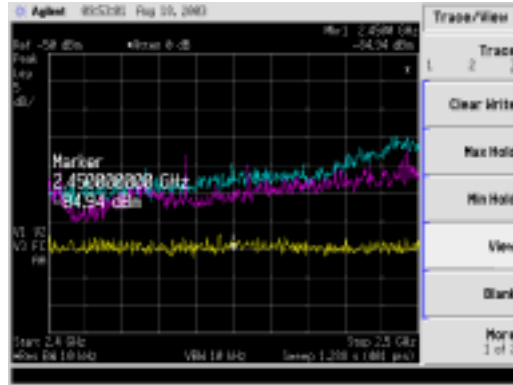


## .Antenna and system noise measurement:

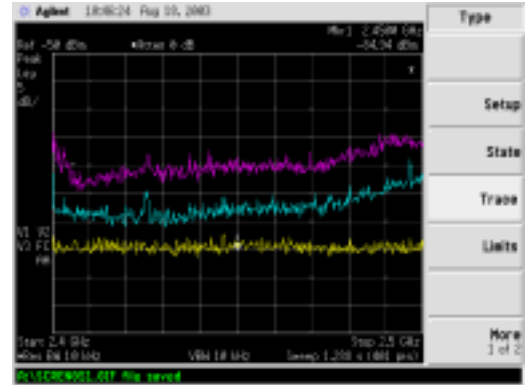
Reference  $-50\text{dBm}$ , 5 db/div,VBW 10KHz

### (1) run the test program

Metal PIFA antenna



PCB IFA antenna

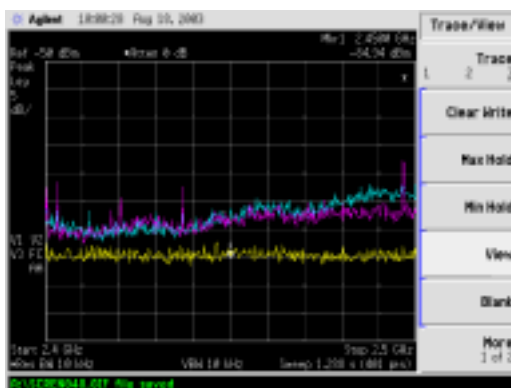


Yellow Line: Noise floor  
Blue Line: Main ANT only  
Purple Line: Aux ANT only

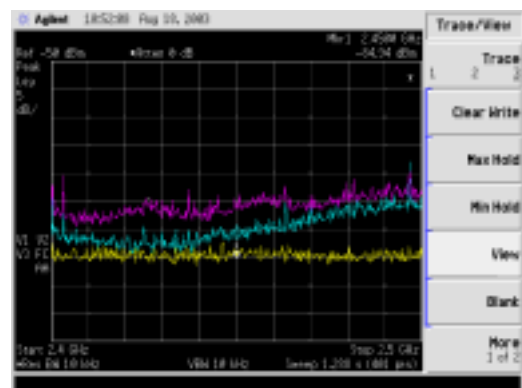
### (2) performance optimized mode

→ Power options ->always on

Metal PIFA antenna



PCB IFA antenna



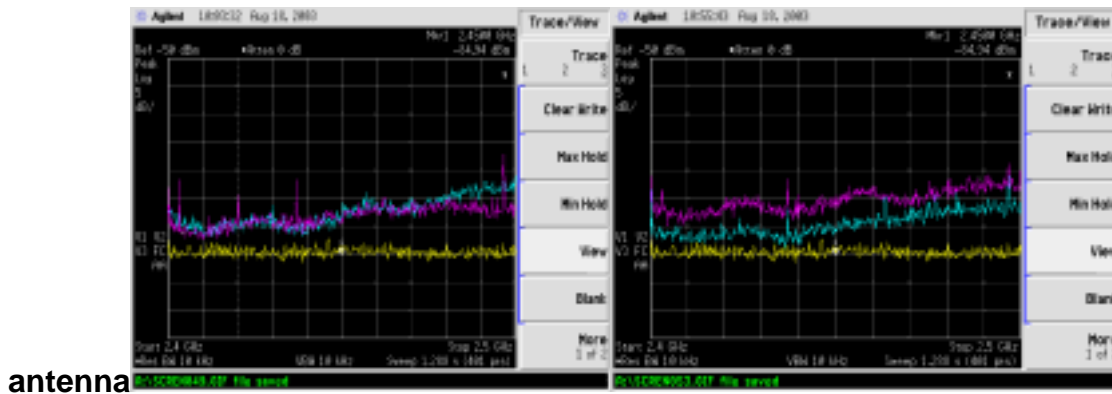
Yellow Line: Noise floor  
Blue Line: Main ANT only  
Purple Line: Aux ANT only

### (3) battery optimized mode

→ Power options ->portable/laptop

Metal PIFA antenna

PCB IFA



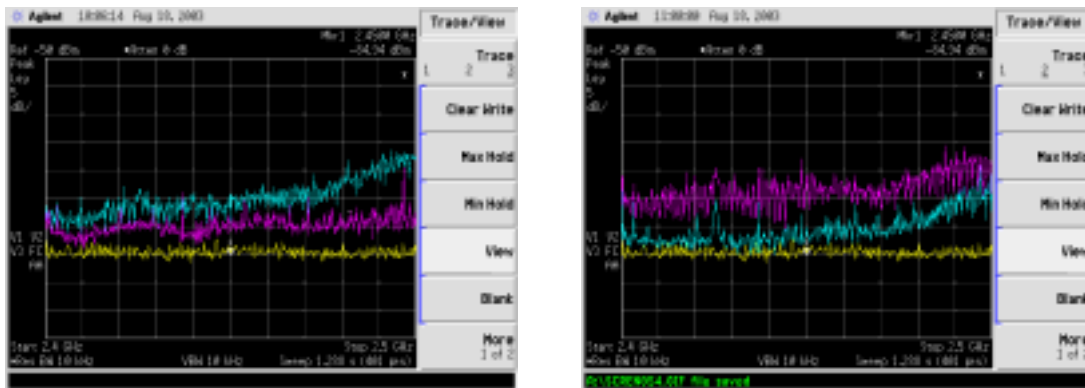
Yellow Line: Noise floor  
Blue Line: Main ANT only  
Purple Line: Aux ANT only

### (4) run a 3D screensaver

→ 3D-pipe

Metal PIFA

PCB IFA



Yellow Line: Noise floor  
Blue Line: Main ANT only  
Purple Line: Aux ANT only