



## APPENDIX J

### : ANTENNA SPECIFICATION



## Specifications Sheet

<b>Object</b>	Internal Chip Antenna	<b>Page</b>	1 of 8
<b>Customer</b>	WINiZEN	<b>Date</b>	November 12, 2005
<b>System</b>	Bluetooth/ WLAN/ Zigbee	<b>Rev.</b>	A
<b>Model Name</b>	W5I-BF-XX	<b>Written by</b>	W. I. KWAK

### Electrical Specifications

<b>Frequency Range ( MHz )</b>	2400 ~ 2500
<b>Band Width ( MHz )</b>	100
<b>V.S.W.R ( Min )</b>	1.9 : 1
<b>Gain ( Max )</b>	$2 \pm 0.5$ ( dBi )
<b>Input Impedance</b>	50 ( $\Omega$ )
<b>Polarization</b>	Linear

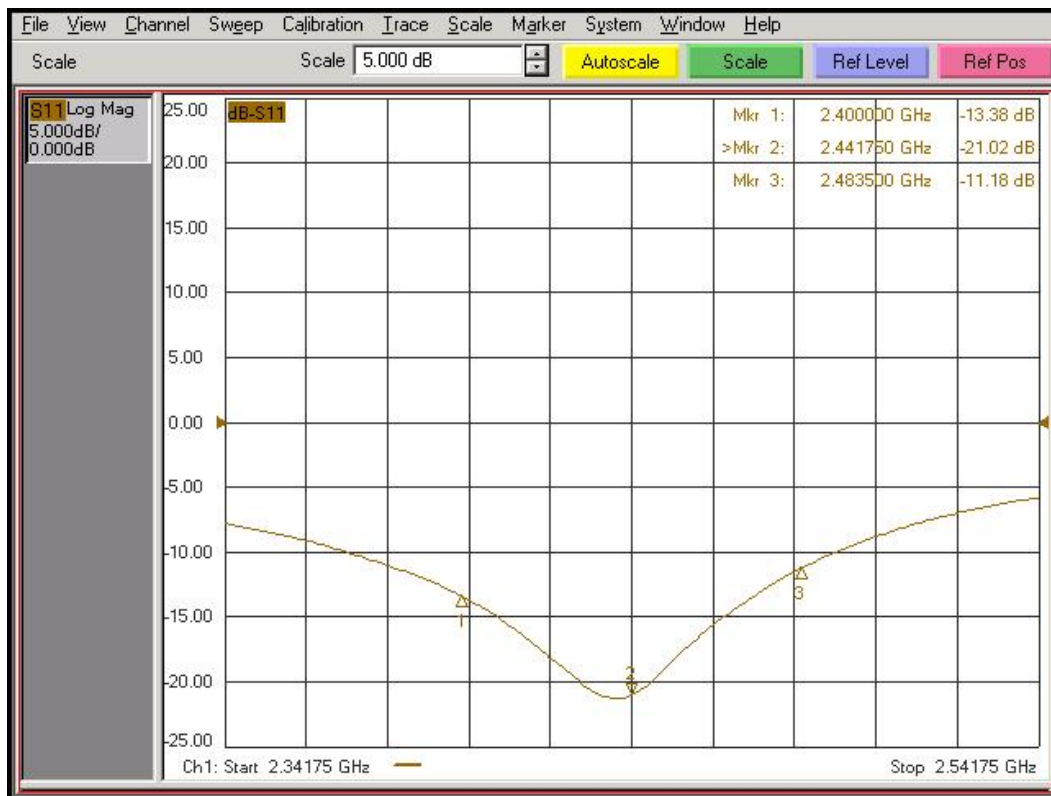
### Mechanical Specifications

<b>Antenna Size ( Width x Length x Height )</b>	10 × 4 × 1.2 mm
<b>Weight</b>	N / A
<b>Radiator Material</b>	Copper
<b>Operation Temperature</b>	- 30 ~ 90 ( $^{\circ}\text{C}$ )
<b>Operation Humidity</b>	10 ~ 90 ( % )

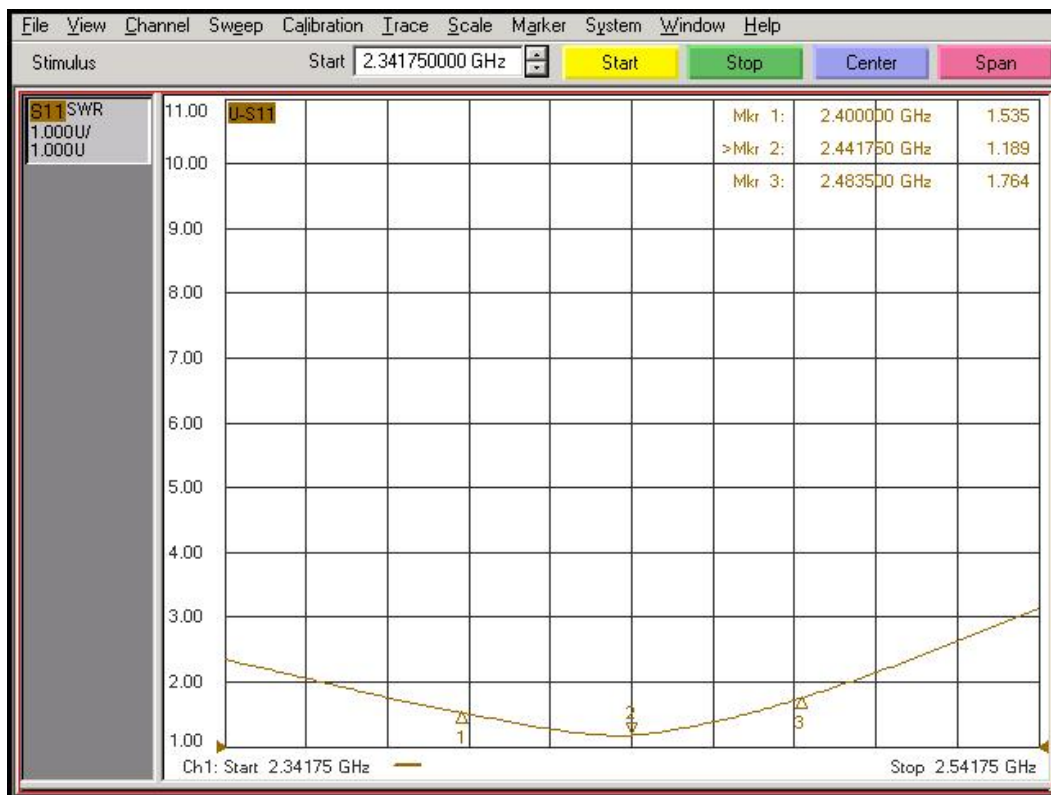
<b>Option</b>	
<b>Remarks</b>	The performance data measured with a test board in free-space. The performance will vary in specific applications.

**WINiZEN Co., Ltd.**

**Fig 1. Return Loss** (Agilent E8357A 300KHz~6GHz PNA Series Network Analyzer)

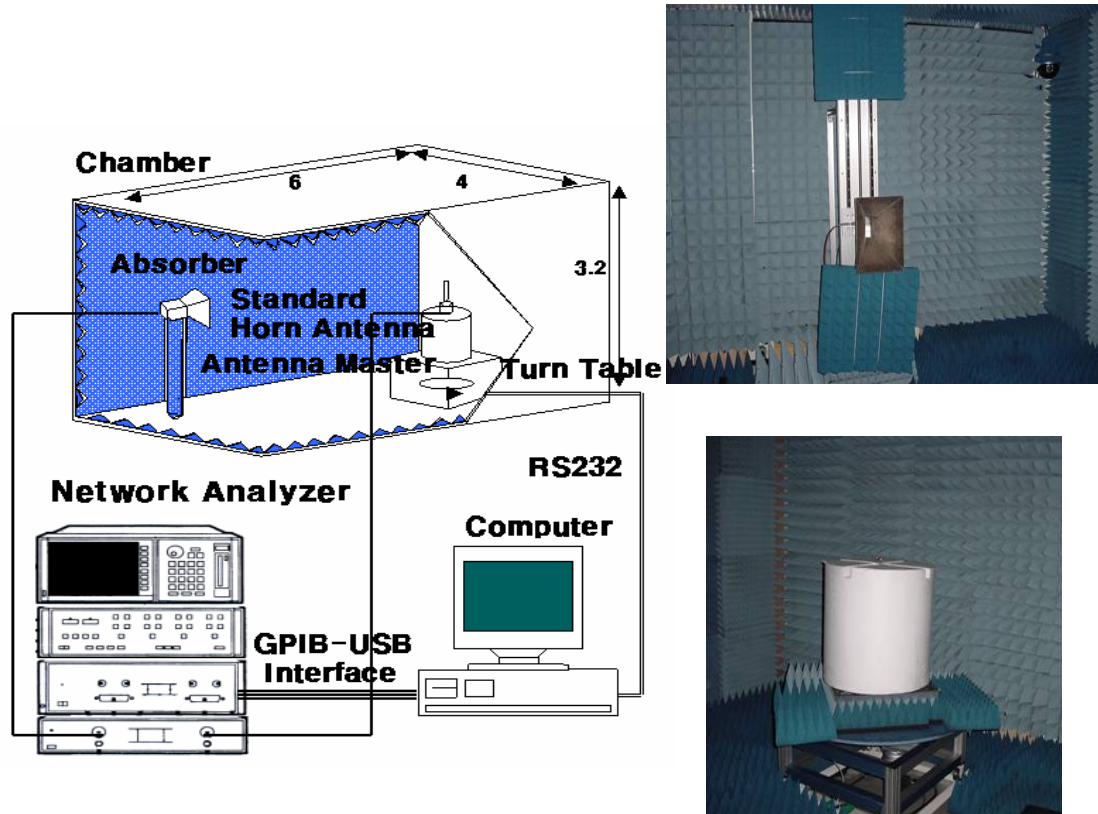


**Fig 2. V.S.W.R** (Agilent E8357A 300KHz~6GHz PNA Series Network Analyzer)

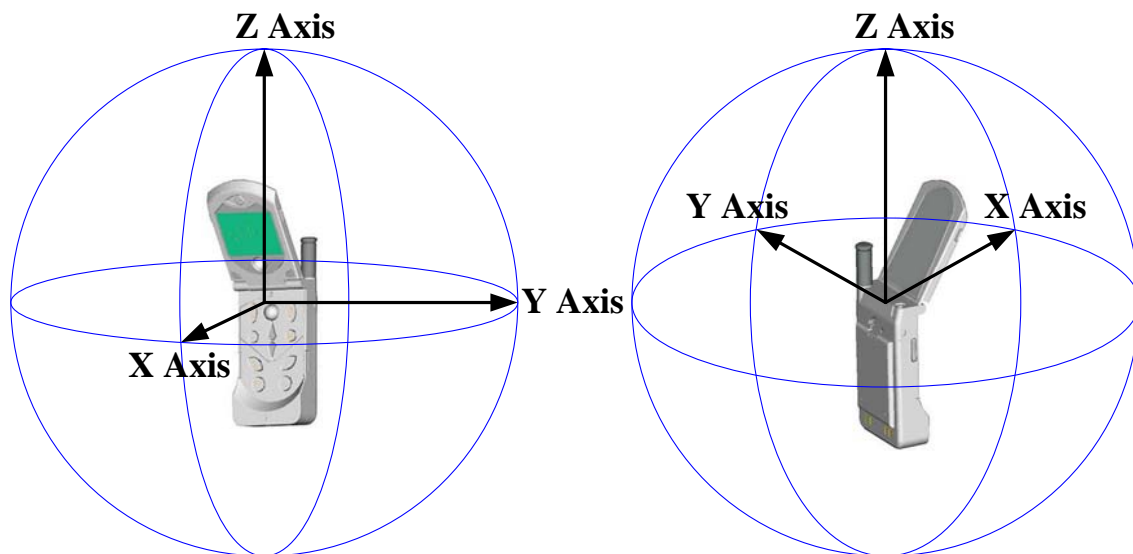


**Fig 3. Measurement Configuration**

(Hewlett Packard 8722ES 50 MHz ~ 40 GHz S-Parameter Network Analyzer)



**Fig 4. Axis Definitions (Antenna Center)**

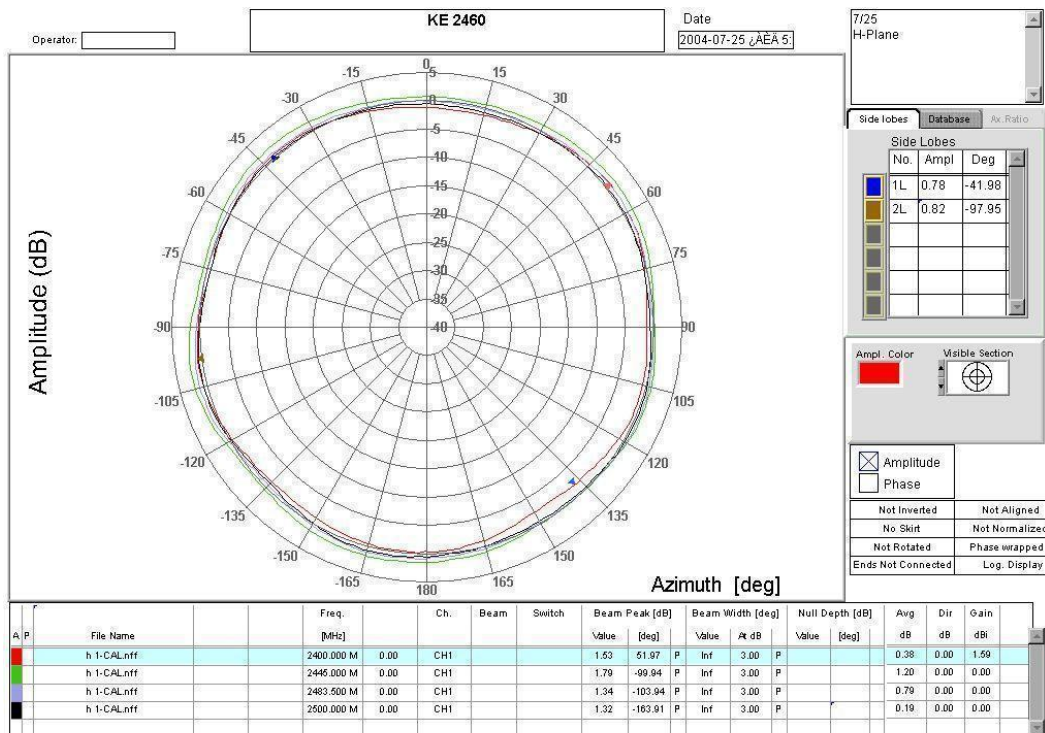


a. Azimuth Pattern : XY Plane ; Horn Antenna Polarization : Vertical

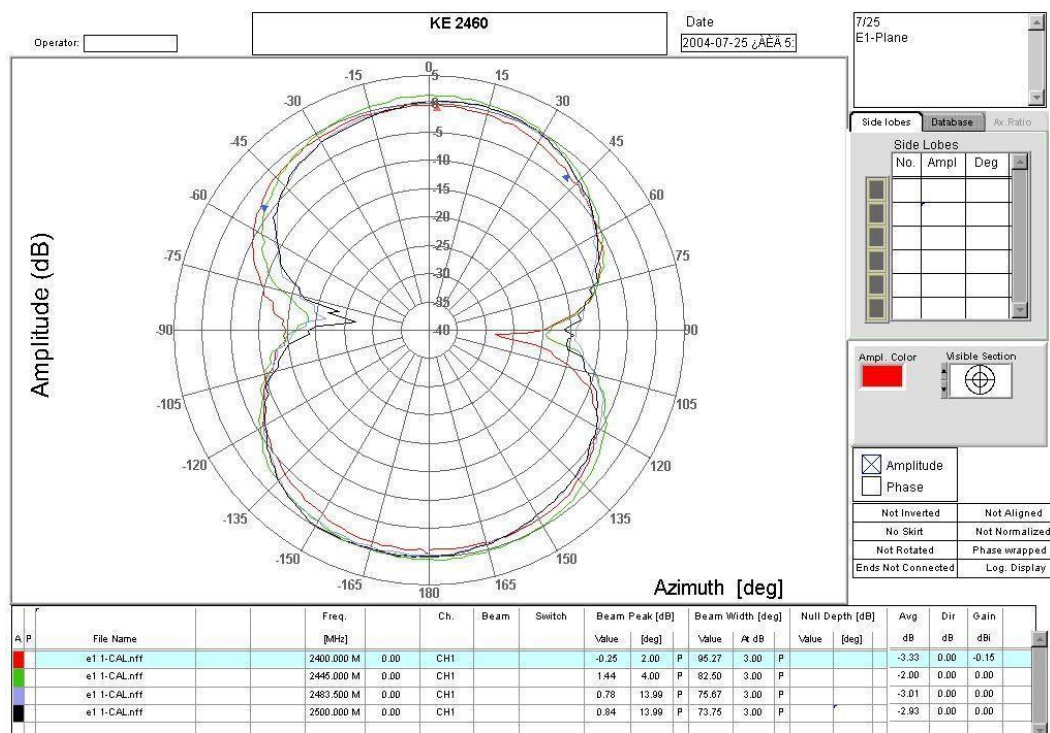
b. Elevation Pattern : XZ Plane ; Horn Antenna Polarization : Horizontal

### Fig 5. Gain Patterns

### a. Azimuth Pattern



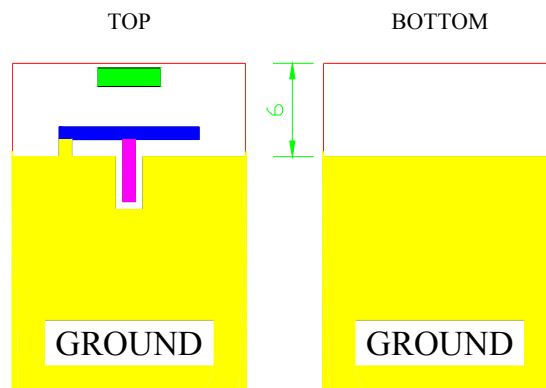
### b. Elevation Pattern



**Fig 6. Antenna Mounting & PCB Design**

### 1. Notes

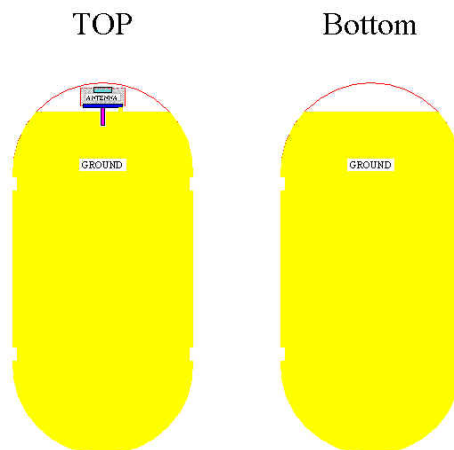
- 1) **Blue:** Signal, Ground PAD. Both signal line and ground are to connect here.
- 2) **Red:** Antenna signal line.  
Need to be 50 ohm (Recommend Coplanar Waveguide).  
Insert " $\pi$ " matching circuit between the line.
- 3) **Green:** Dummy soldering PAD.
- 4) **Yellow:** Ground.
- 5) **White:** Non-ground area.  
Except for the Top layer, all layers need to be same as the Bottom layer.  
Antenna location can be left side or right side of the PCB (Place the antenna as far as possible from copper, metals, and any interfering components.)



< Example >

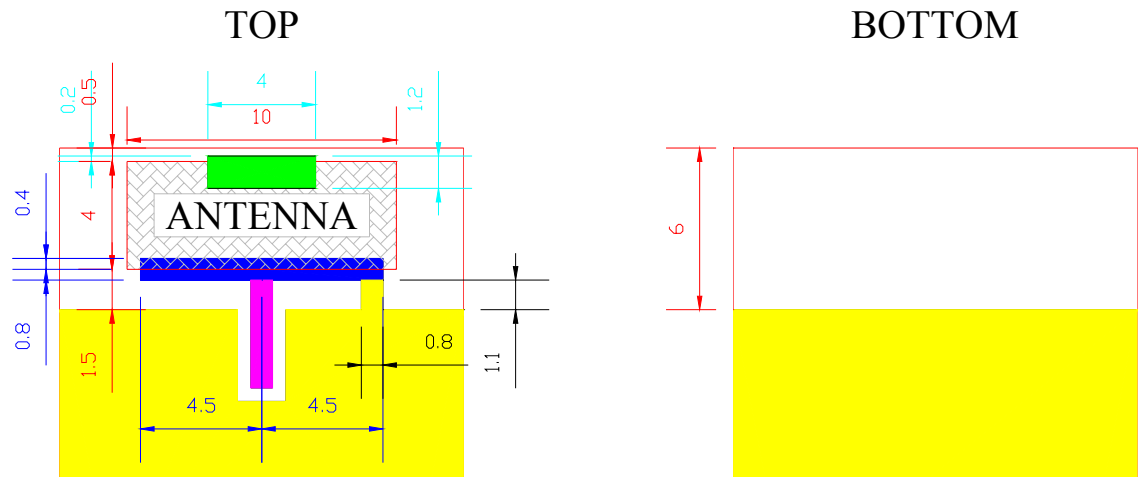
### 2. PCB Design Options depending on the Ground Condition and the Antenna Location

Note) In any cases, antenna placement at the edge of the lengths of the PCB is recommended. Choose an option which best fits you among the following.



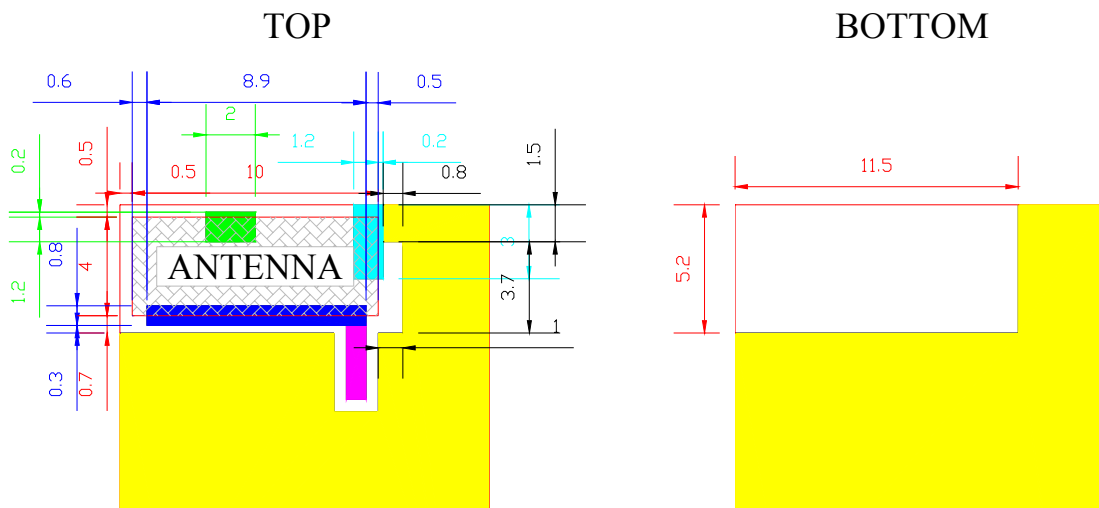
### 1) W5I-BF-LS

(Antenna location: Top-left side of the PCB. No ground on each side of the antenna)



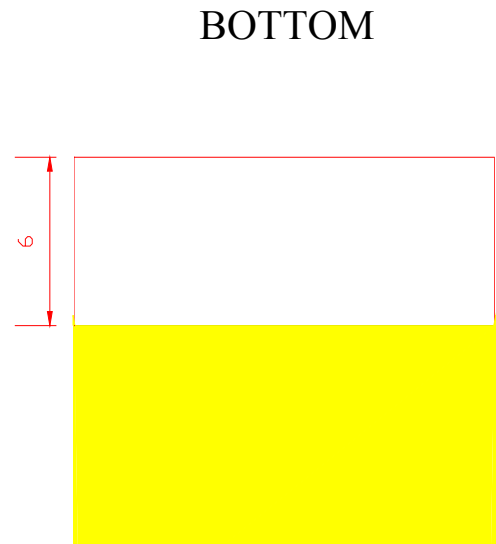
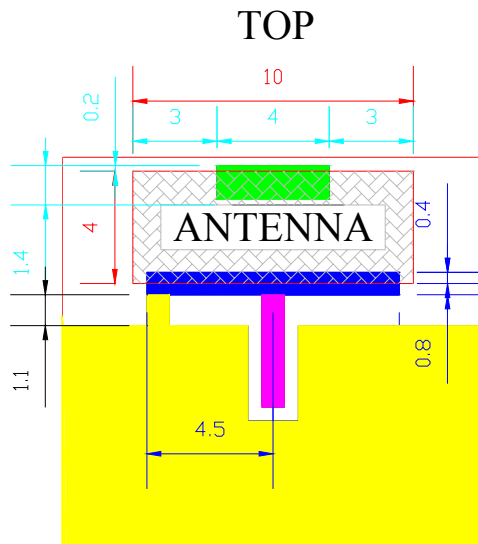
### 2) W5I-BF-LD

(Antenna location: Top-left side of the PCB. Ground: Right side of the antenna)



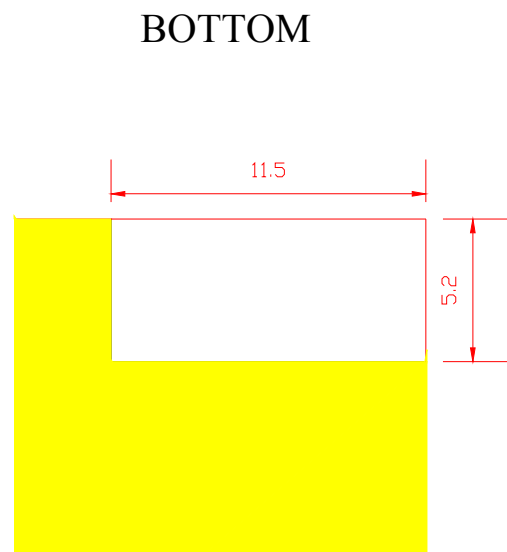
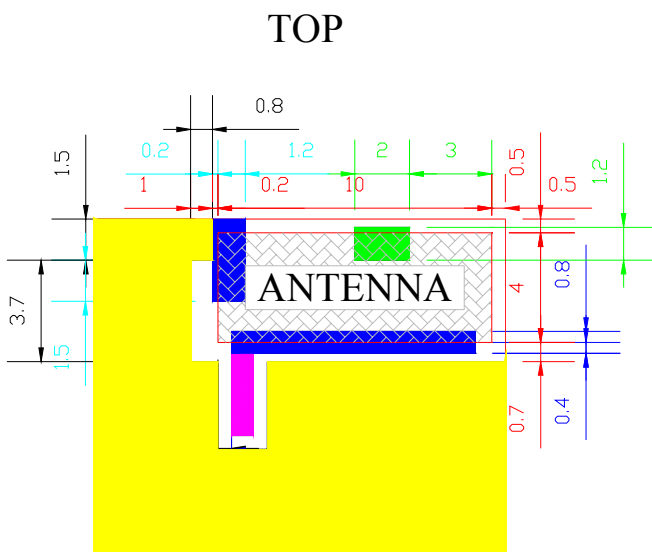
### 3) W5I-BF-RS

(Antenna location: Top-right side of the PCB. No ground on each side of the antenna)



### 4) W5I-BF-RD

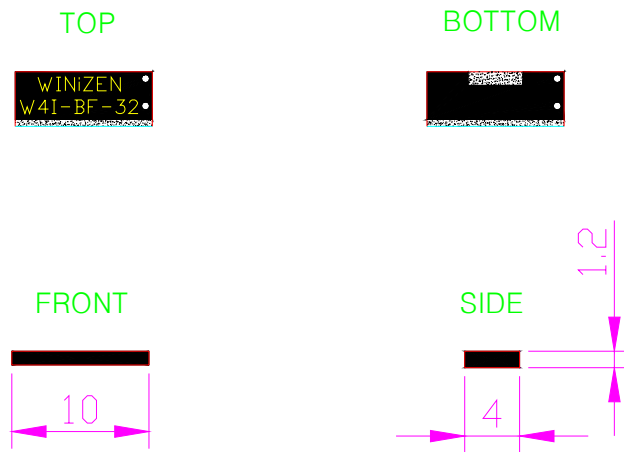
(Antenna location: Top-right side of the PCB. Ground: Left side of the antenna)







**Fig 7. Antenna Mechanical**



< W5I-BF-LS/RS >