



Specifications Sheet

Object	Internal Chip Antenna	Page	1 of 8
Customer		Date	March 27, 2006
System	Bluetooth/ WLAN/Zigbee	Rev.	A
Model Name	W5I-BF-XX or W6I-BF-XX	Written by	W. I. KWAK

Electrical Specifications

Frequency Range (MHz)	2400 ~ 2500
Band Width (MHz)	100
V.S.W.R (Min)	1.9 : 1
Gain (Max)	2 ± 0.5 (dBi)
Input Impedance	50 (Ω)
Polarization	Linear

Mechanical Specifications

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

Option	
Remarks	The performance data was measured with a test board. The performance will vary in specific applications.

WINiZEN Co., Ltd.

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

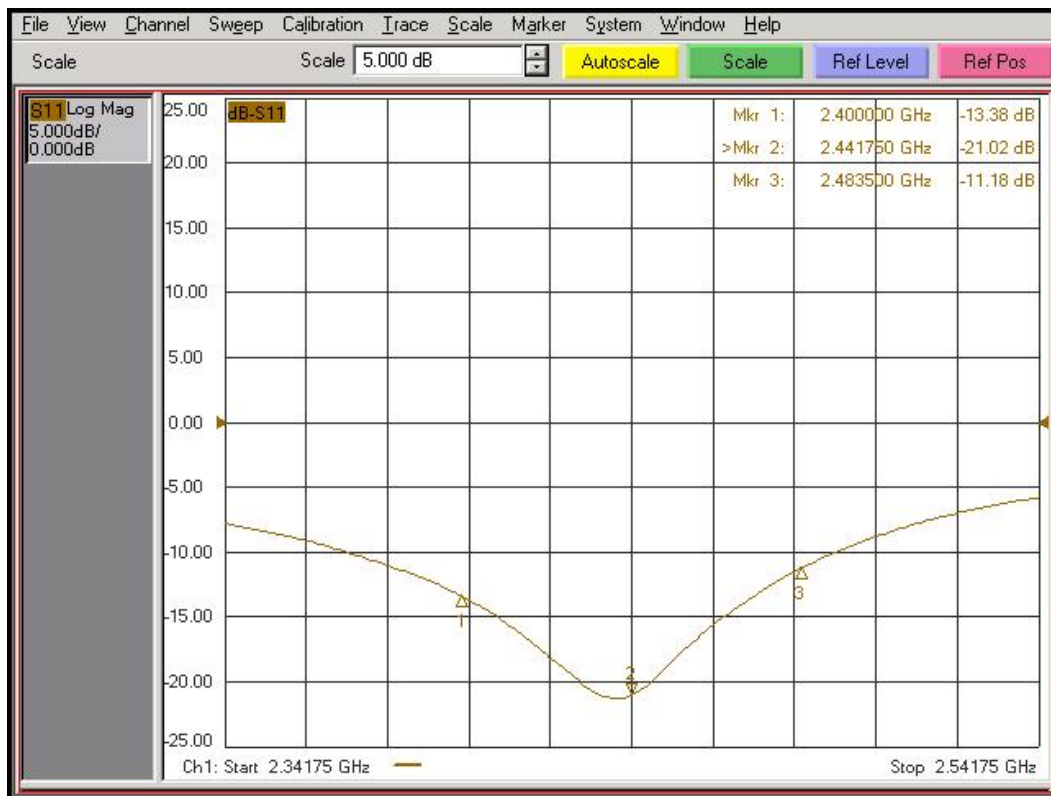


Fig 2. V.S.W.R (Agilent E8357A 300KHz~6GHz PNA Series Network Analyzer)

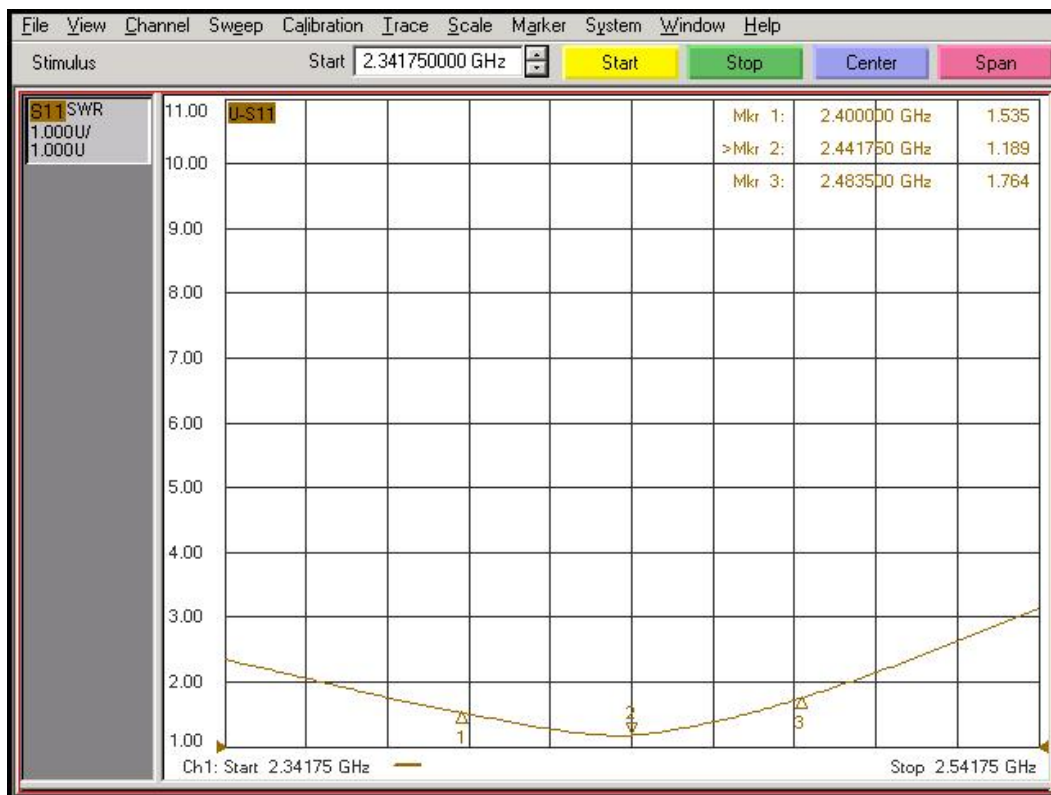


Fig 3. Measurement Configuration

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

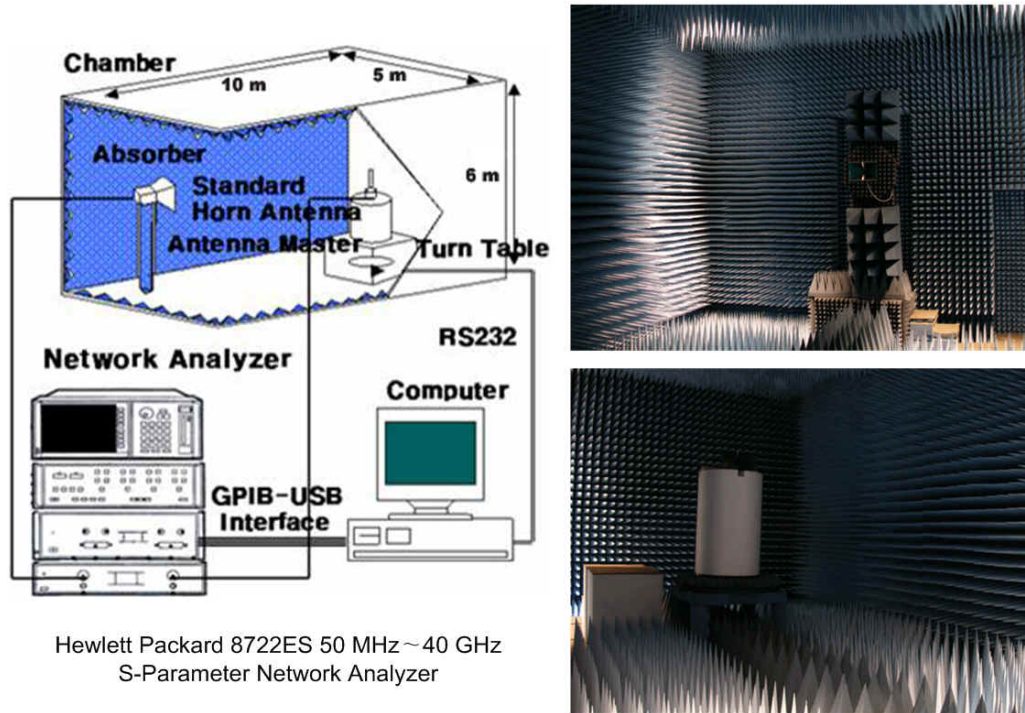
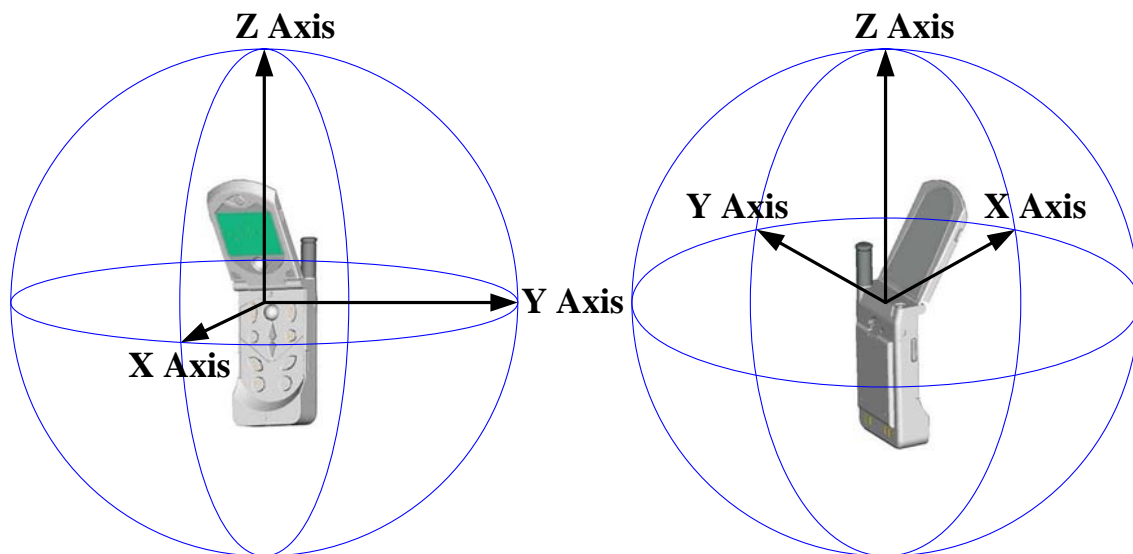


Fig 4. Axis Definitions (Antenna Center)

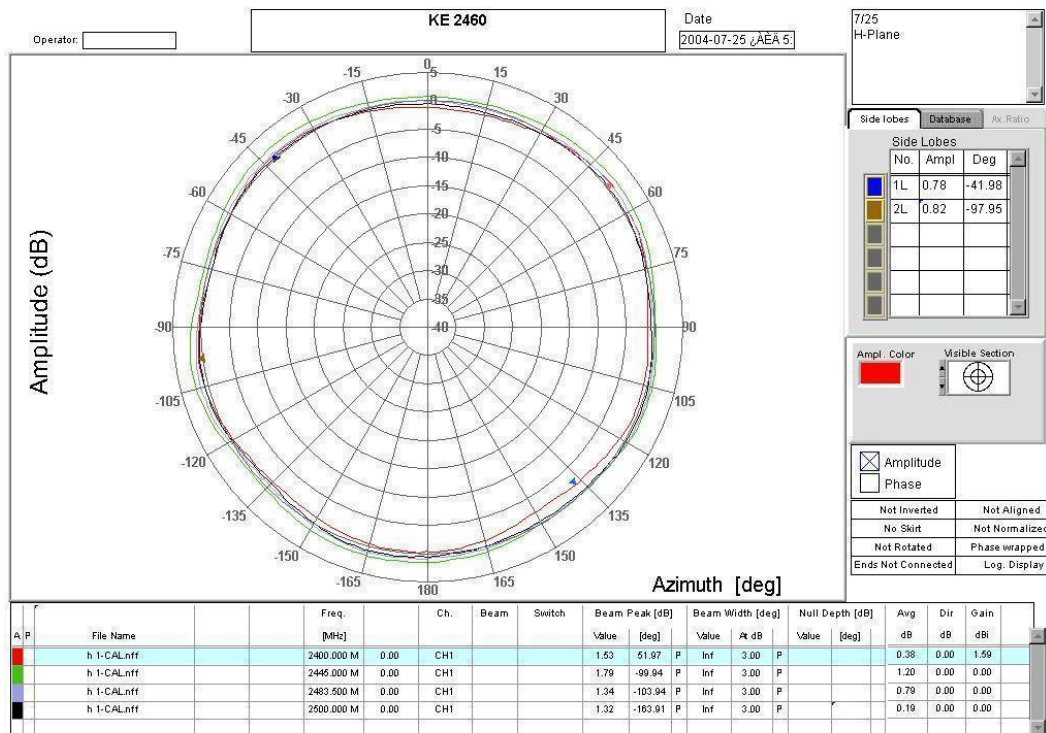


a. Azimuth Pattern : XY Plane ; Horn Antenna Polarization : Vertical

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

Fig 5. Gain Patterns

a. Azimuth Pattern



b. Elevation Pattern

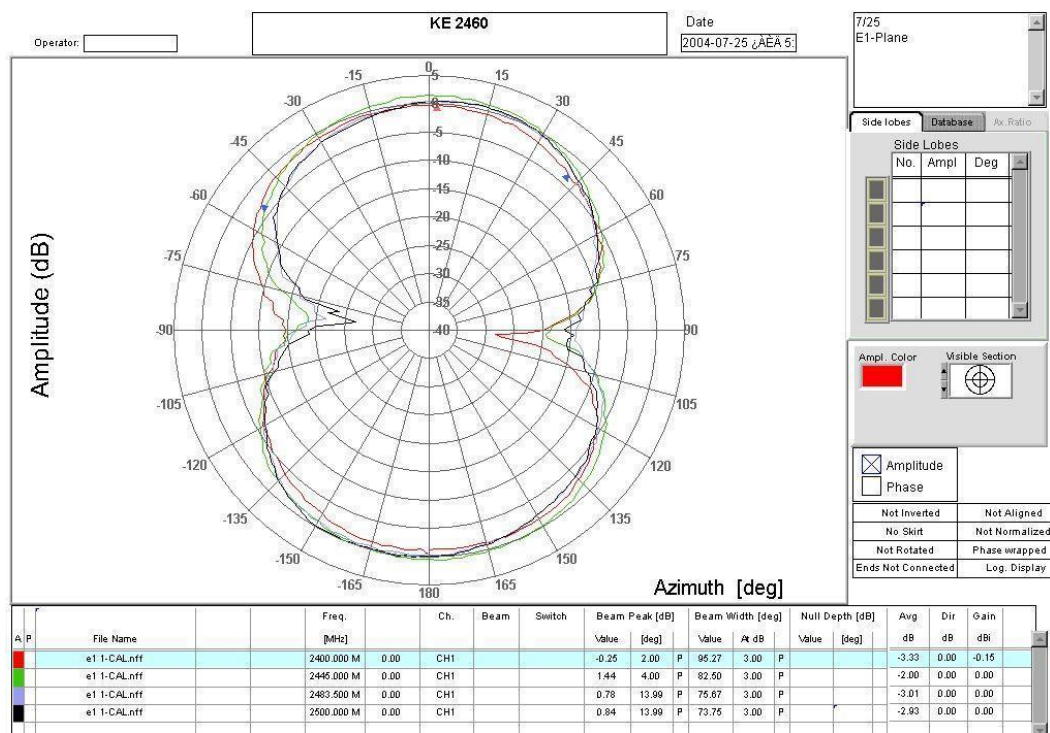
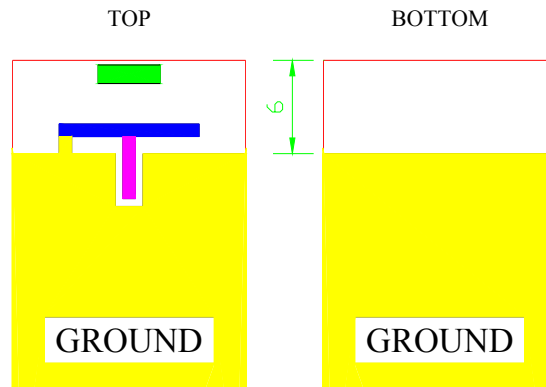


Fig 6. Antenna Mounting & PCB pad design

1. 공통 사항

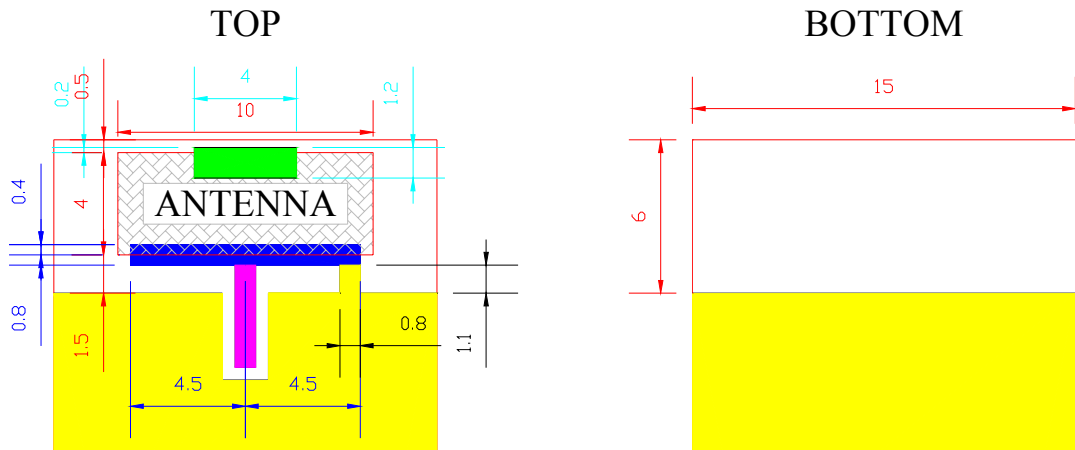
- 1) **Blue:** Signal, Ground와 전기적으로 연결되고 안테나 고정을 위한 Soldering PAD.
- 2) **Red:** Antenna Signal 라인.
50 ohm 설계 필요함 (Coplanar Waveguide로 설계)
선로 중간에 "π" matching 회로 설계.
- 3) **Green:** 안테나 고정을 위한 Dummy Soldering PAD.
- 4) **Yellow:** PCB상의 ground.
- 5) **White:** Ground가 없는 부분.
안테나가 장착되는 Top면을 제외하고 다른 모든 layer는 bottom면과 동일하게 설계.
안테나는 PCB의 정 중앙이 아닌 좌우측으로 수평 이동하여 배치할 수도 있음 (가급적 ground와 이격할 것).



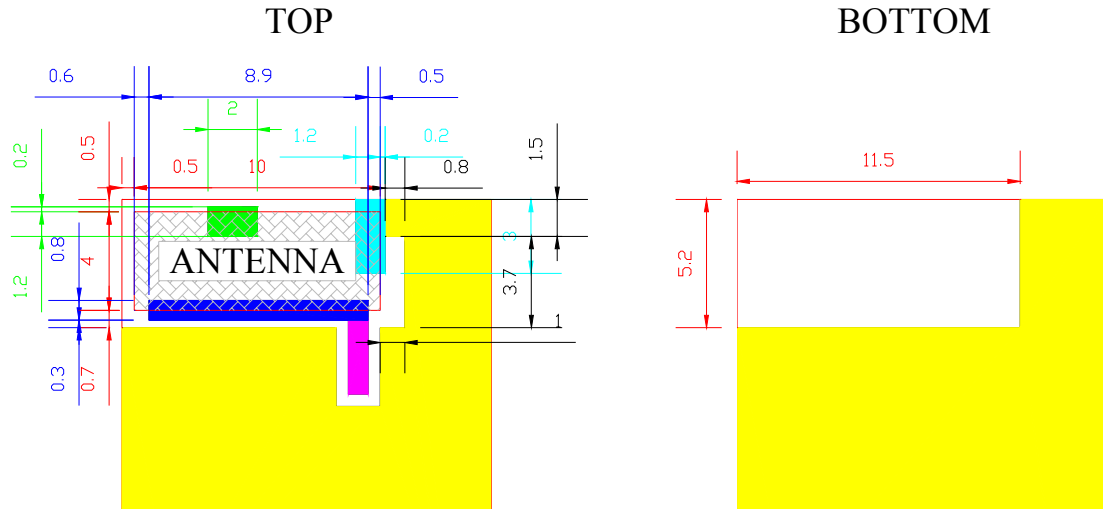
< Example >

2. PCB상에서 안테나 위치 및 ground 배치에 따른 설계 option.

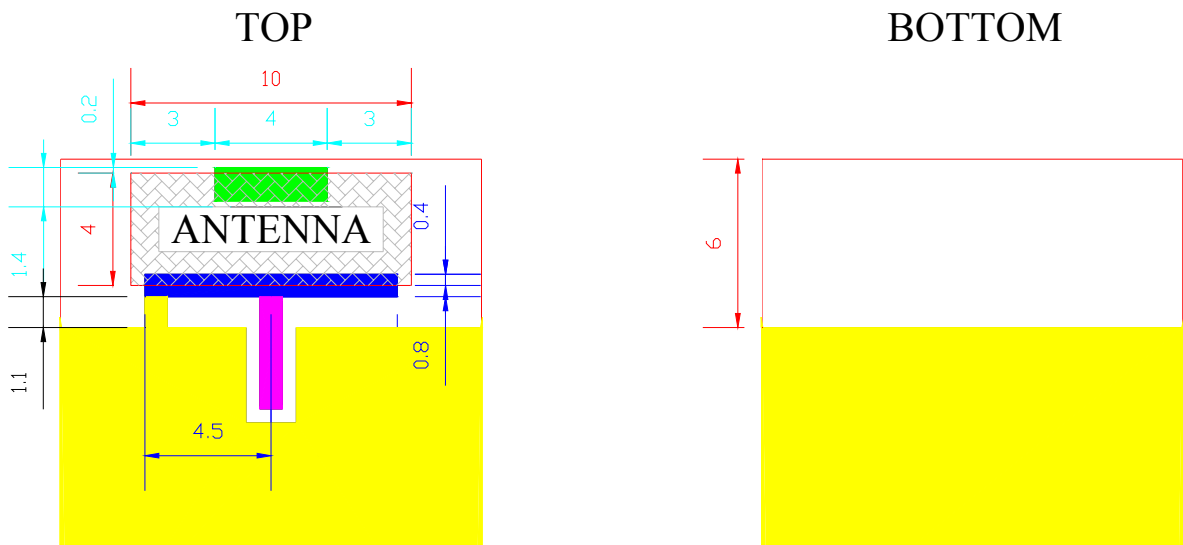
- 1) **W5I-BF-LS :** PCB 상단 왼쪽 편에 안테나가 위치하고 안테나 주변에 그라운드 거의 없는 경우.



- 2) **W5I-BF-LD** : PCB 상단 왼쪽에 안테나가 위치하고 안테나 오른쪽에 그라운드가 불가피하게 형성된 경우.

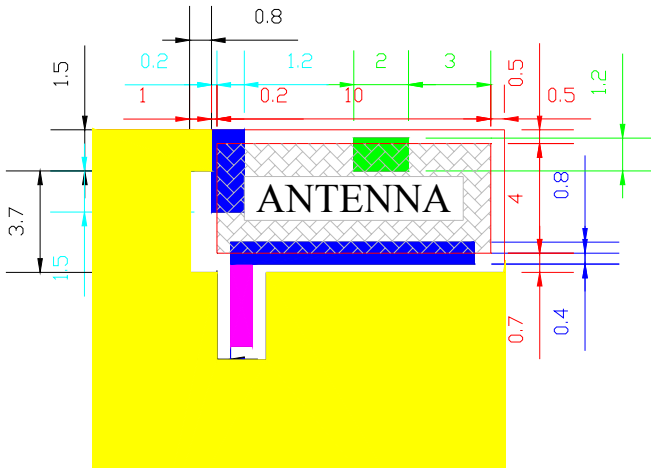


- 3) **W5I-BF-RS** : PCB 상단 오른쪽 편에 안테나가 위치하고 안테나 주변에 그라운드 가 거의 없는 경우.



- 4) **W5I-BF-RD** : PCB 상단 오른쪽에 안테나가 위치하고 안테나 왼쪽에 그라운드가 불가피하게 형성된 경우

TOP



BOTTOM

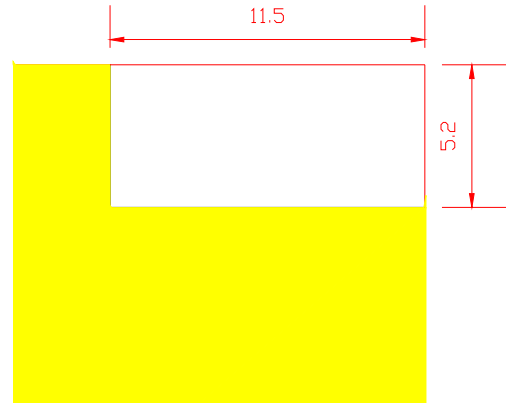
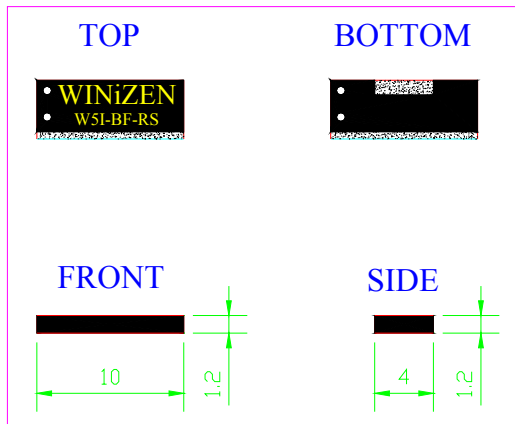
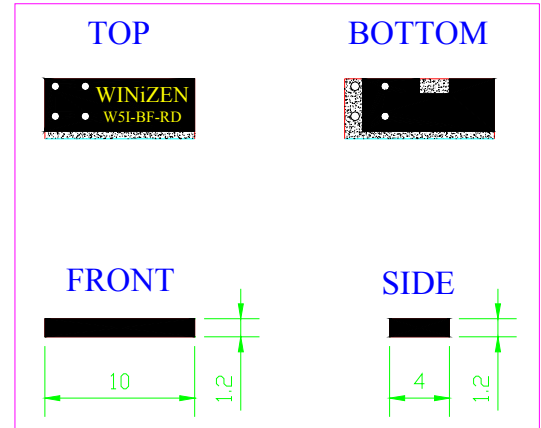




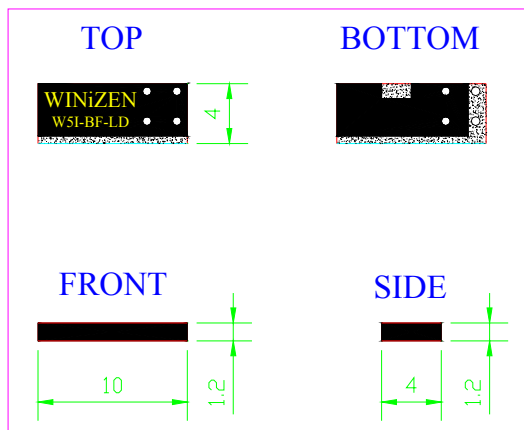
Fig 7. Antenna Mechanical



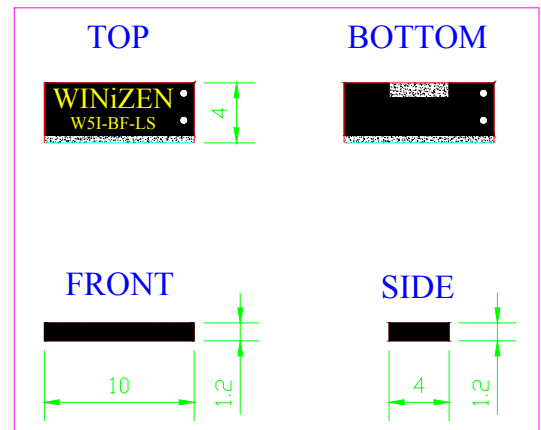
<BF-RS series>



<BF-RD series>



<BF-LD series>



<BF-LS series>

Notes: When an external antenna is required via the I-PEX MHF RF connector, the on board PCB antenna will be disconnected.

b. on-board PCB antenna.



Fig 15.

Notes: The onboard antenna is designed with tiny space which affects the signal performance. If the onboard antenna does not satisfy user's application, please use other external antenna.

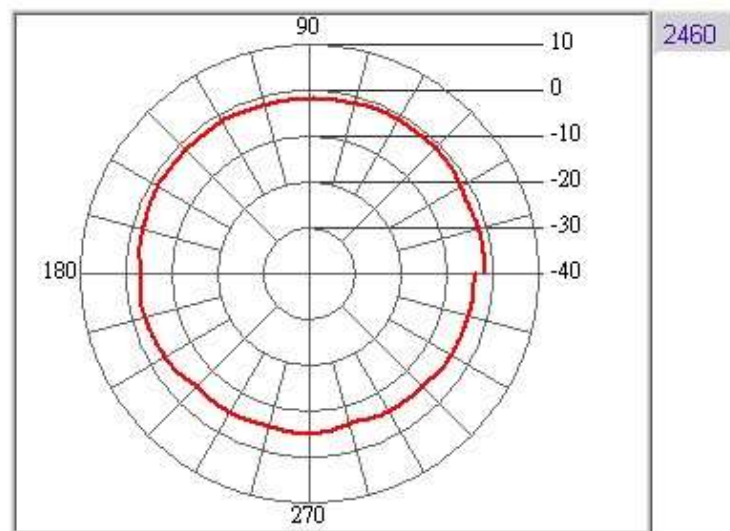


Fig 16.

Peak gain: -1dBi, Average gain: -3dBi

c. External antenna via soldered RF cable.

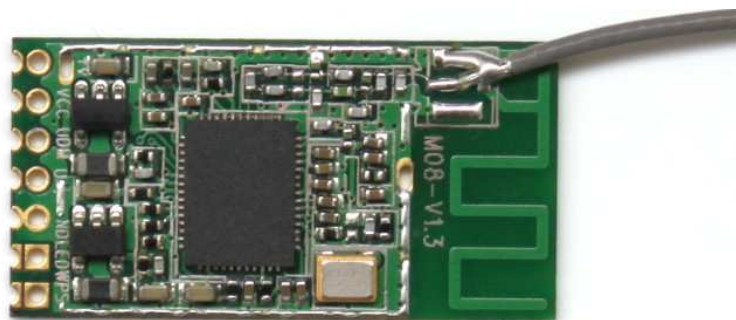


Fig 17.



Patterns taken with Model N2420 mounted on 90mm x 90mm x 2.2mm thick, ABS Plastic sheet using 1.6mm double sided tape.

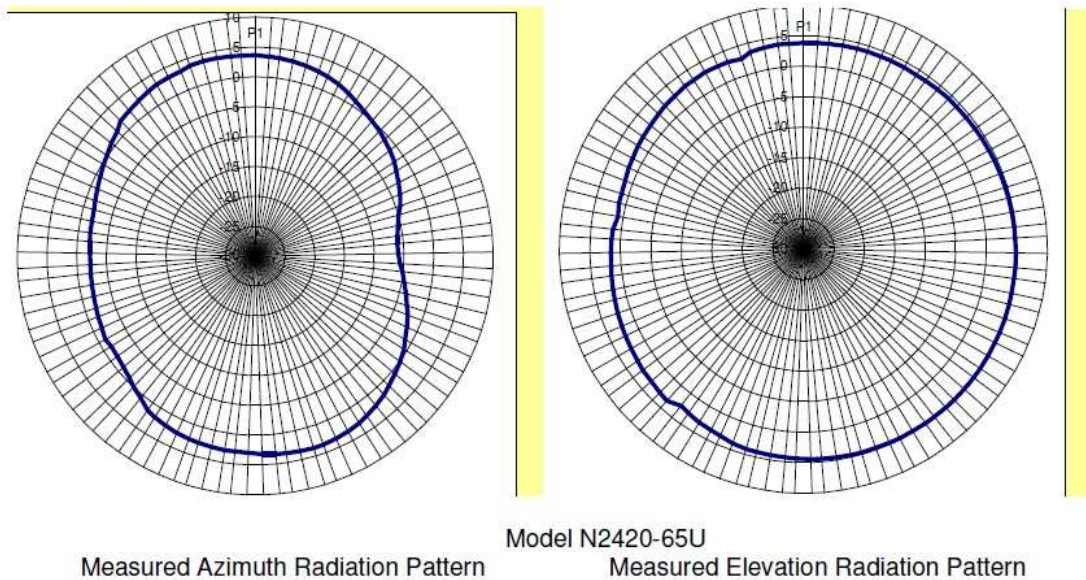


Figure 18: A recommended antenna (Airgain P/N:N2420) and its radiation pattern

2.3 Software and system Information

Operation System	CPU Supplier	Driver
Linux 2.4/2.6	ARM, MIPSII	Available
Windows XP/Vista/7/8	X86 Platform	Available
Windows CE 5.0/6.0	ARM, MIPSII	Available
Mac OS X 10.3~10.8	N/A	Available
Android 4.1	N/A	Available

Notes: The chipset manufacturer has initiated different kind of software, please describe detail requirements for better selection.

2.4. Design Concerns:

2.4.1 Power supply:

- 1) The input power can be 5.0VDC or 3.3VDC, please mentioned it when place an order.
- 2) The operation current of 5.0VDC power input will be different with that of 3.3V power input. The external power shall be well designed with enough capacity.
- 3) Should 3.3VDC power be selected, please be sure it's clean with low ripple; otherwise, the EMI or RF performance might be deteriorated.

2.4.2 Using pin headers:

- 1) The pins can be less than 7 pins, but the VCC, UD-, UD+, GND must be applied for