



**SUNNYWAY**

**SWD002**

**PN: SW20008IB66**



**Sunnyway Technology**

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## 1. Electrical Specifications

Standards	4G&3G&2G	
Frequency range(MHz)	698~960MHz	1710~2690MHz
Peak Gain (dBi)	-1.6~2.4dBi	-0.3~3.5dBi
Average Gain (dB)	-4.3~-1.8dB	-4.1~-1.7dB
VSWR	< 4.0	< 2.5
Return Loss	< -4.6	< -7.3
Efficiency (%)	37.2~66.3%	39.1~67.9%
Polarization mode	Linear	Linear
Radiation pattern	Omni-Directional	Omni-Directional
Output impedance ( $\Omega$ )	50	50
Max. Input Power(W)	25	25

**Note:**

All parameters are measured with Sunnyway's EVK which size is 115\*65mm

## 2. Mechanical and Environmental Specification

Mounting Type	SMD
Antenna size(mm)	35.0 (L) x 8.5 (W) x 3.0 (H)
Material	PCB
Operating Temperature (°C)	- 40 °C ~ + 85 °C
Storage Temperature(°C)	- 40 °C ~ + 85 °C

### 3. Antenna parameters

<b>FRE (MHz)</b>	<b>698</b>	<b>960</b>	<b>1710</b>	<b>2170</b>	<b>2300</b>	<b>2690</b>
<b>VSWR</b>	3.85	3.12	2.51	2.16	2.09	2.13
<b>Return Loss</b>	-4.62	-5.75	-7.32	-8.79	-9.00	-8.82
<b>Eff (%)</b>	37.2	38.2	56.5	39.1	65.5	56.4
<b>Average Gain(dB)</b>	-4.3	-4.2	-2.5	-4.1	-1.8	-2.5



## VSWR

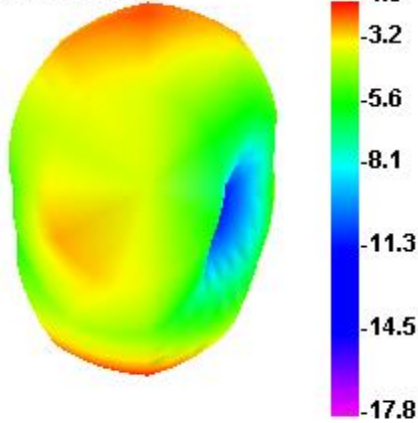


## Return Loss

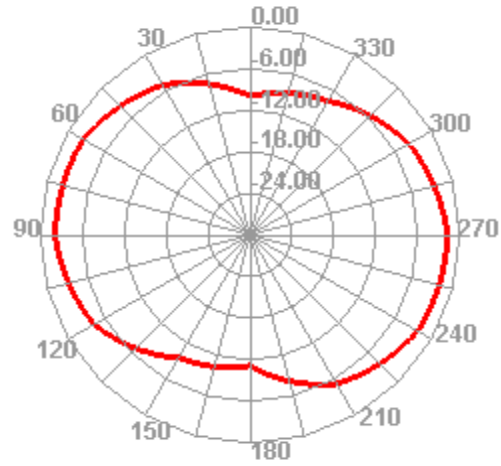
## Directional pattern

- Board length 110mm

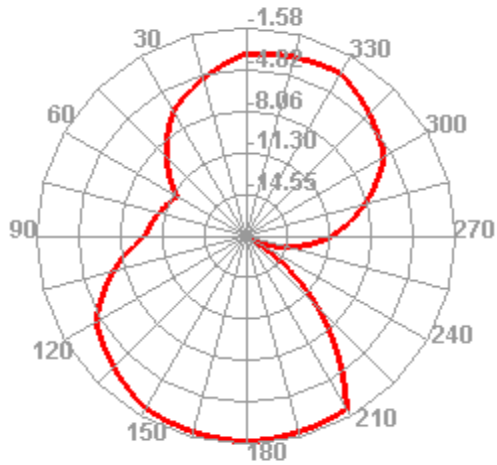
**690.000MHz**



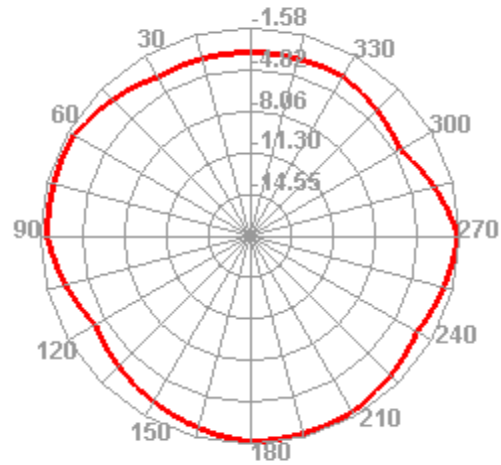
**690.000MHz H**



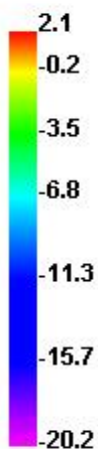
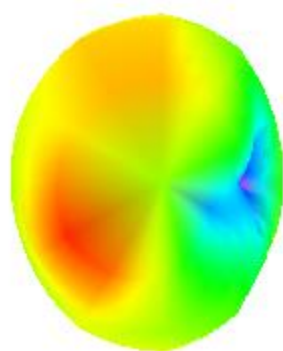
**690.000MHz E1**



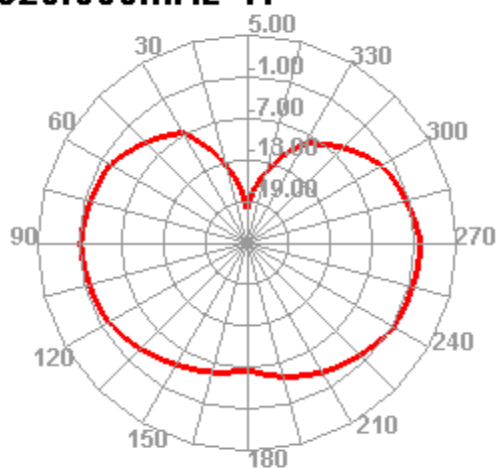
**690.000MHz E2**



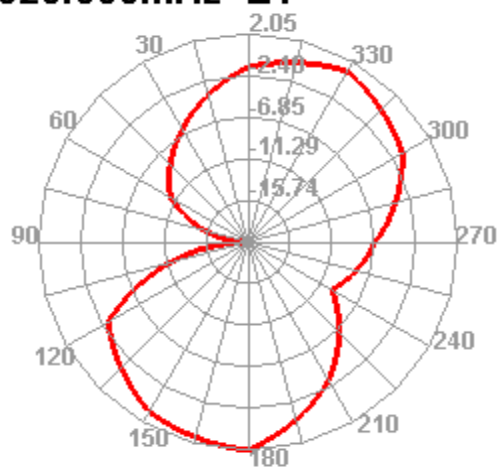
**820.000MHz**



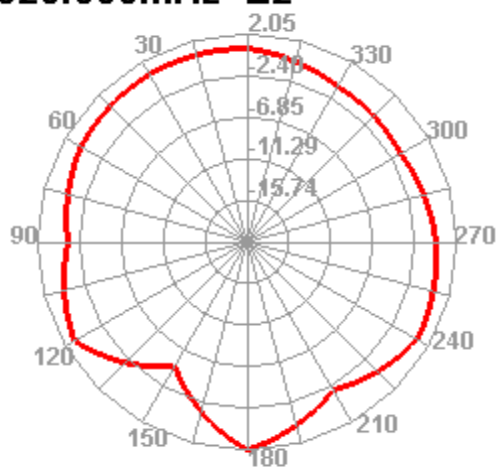
**820.000MHz H**



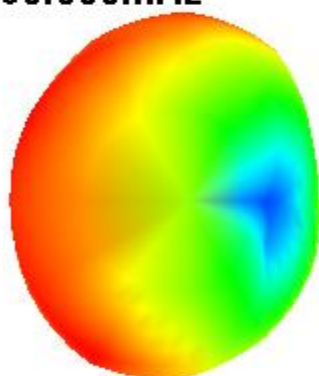
**820.000MHz E1**



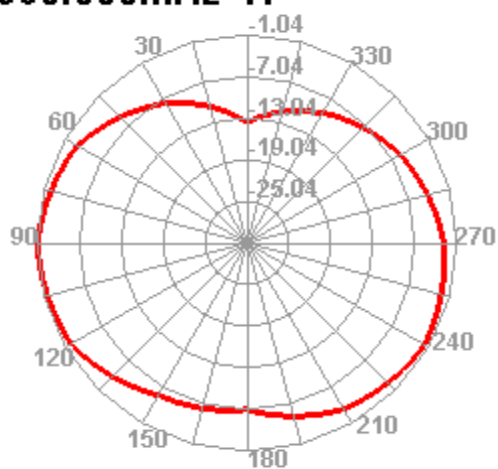
**820.000MHz E2**

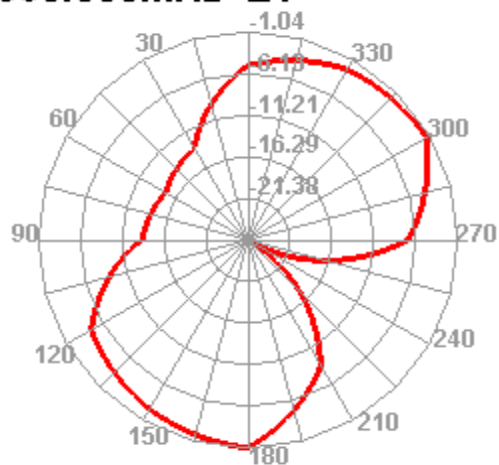
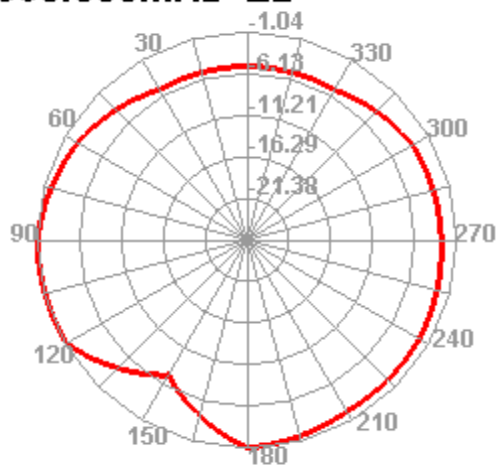
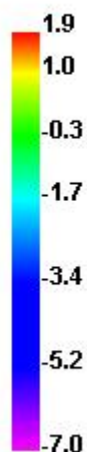
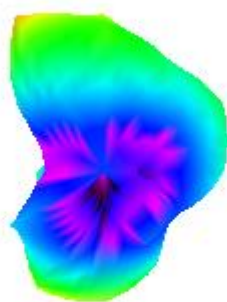
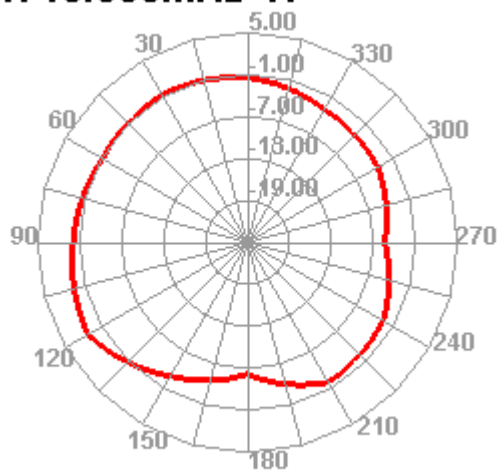
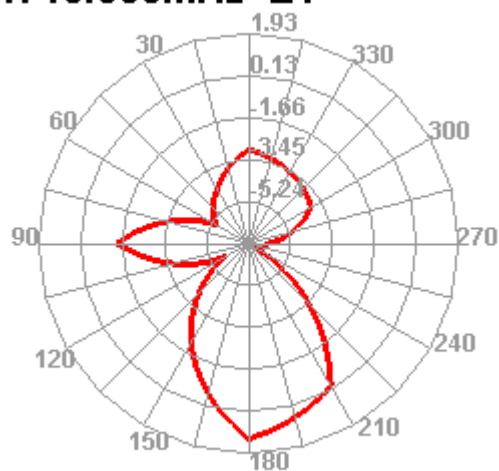
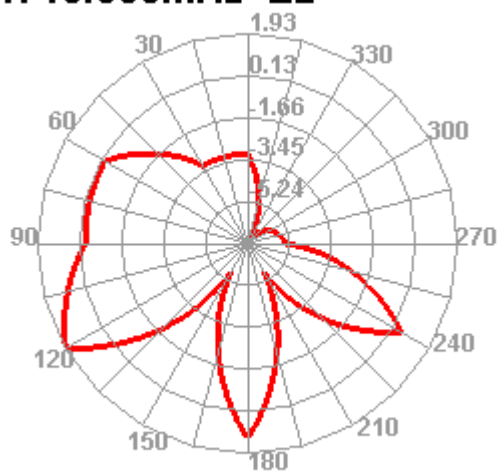


**960.000MHz**

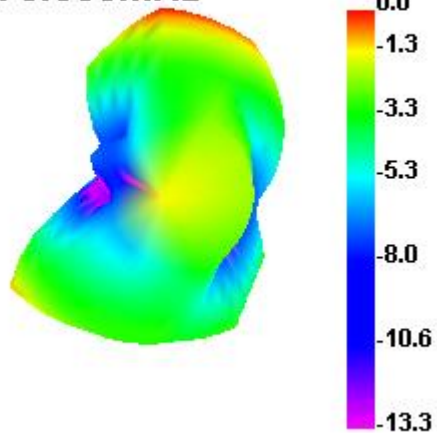


**960.000MHz H**

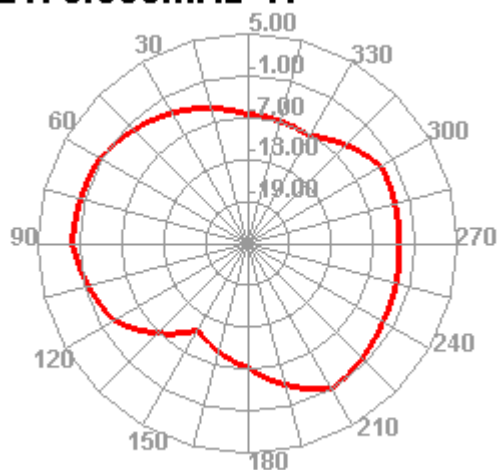


**960.000MHz E1****960.000MHz E2****1710.000MHz****1710.000MHz H****1710.000MHz E1****1710.000MHz E2**

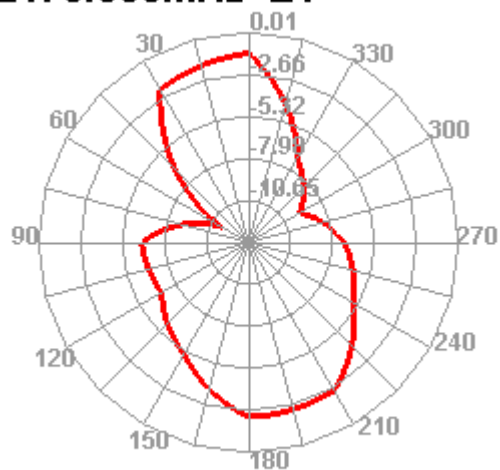
**2170.000MHz**



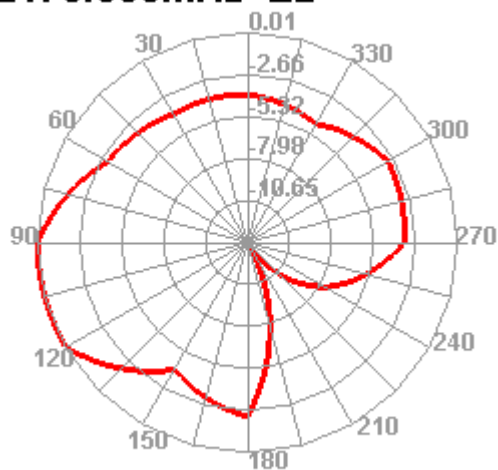
**2170.000MHz H**



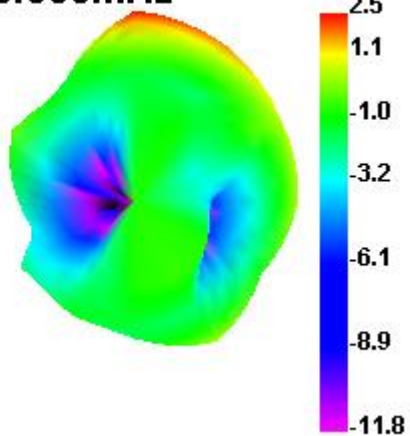
**2170.000MHz E1**



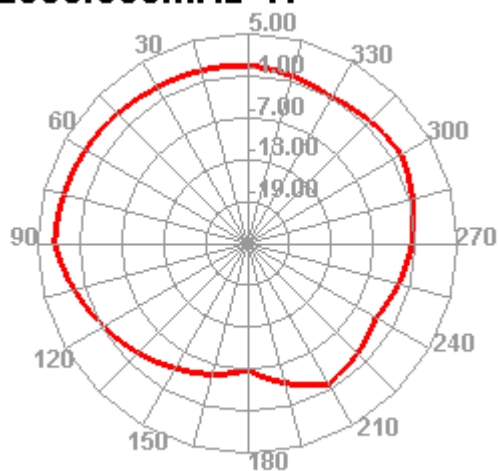
**2170.000MHz E2**



**2300.000MHz**

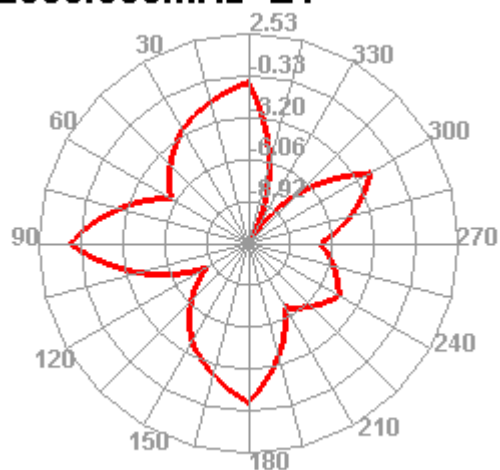


**2300.000MHz H**

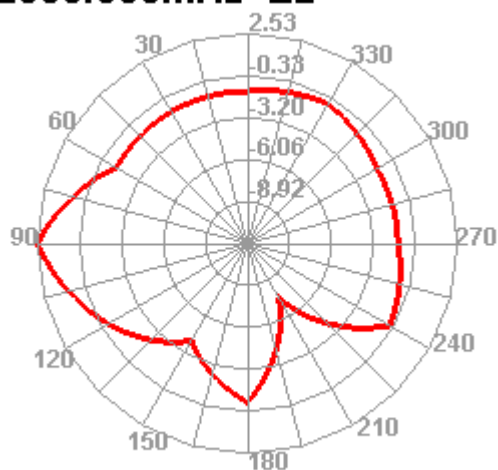




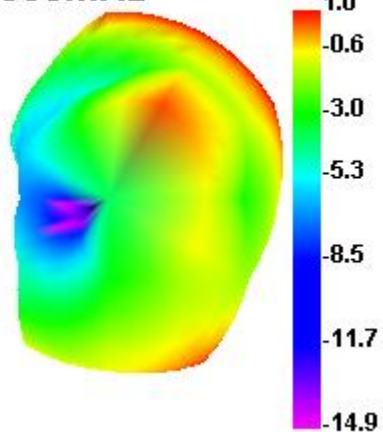
**2300.000MHz E1**



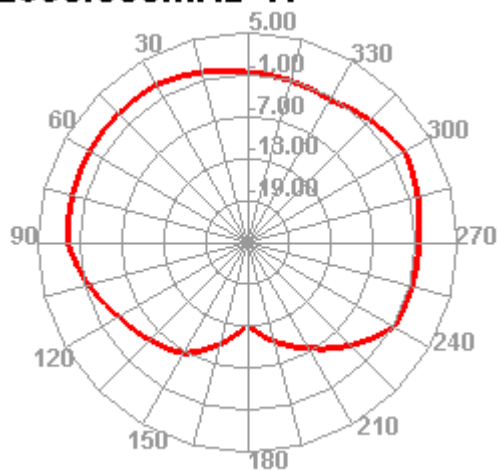
**2300.000MHz E2**



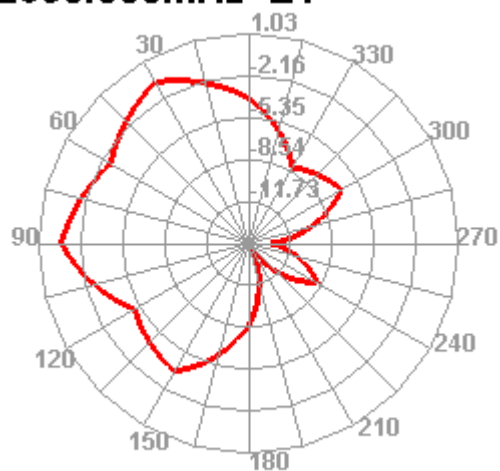
**2690.000MHz**



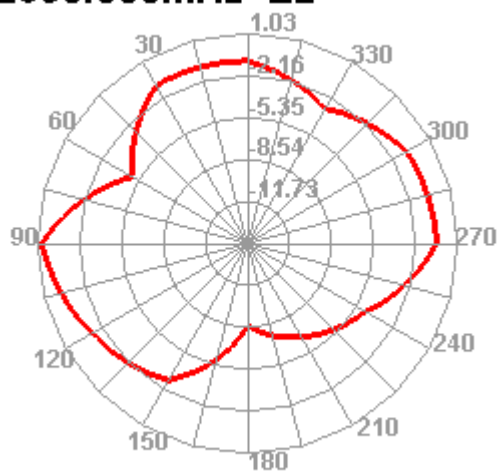
**2690.000MHz H**



**2690.000MHz E1**

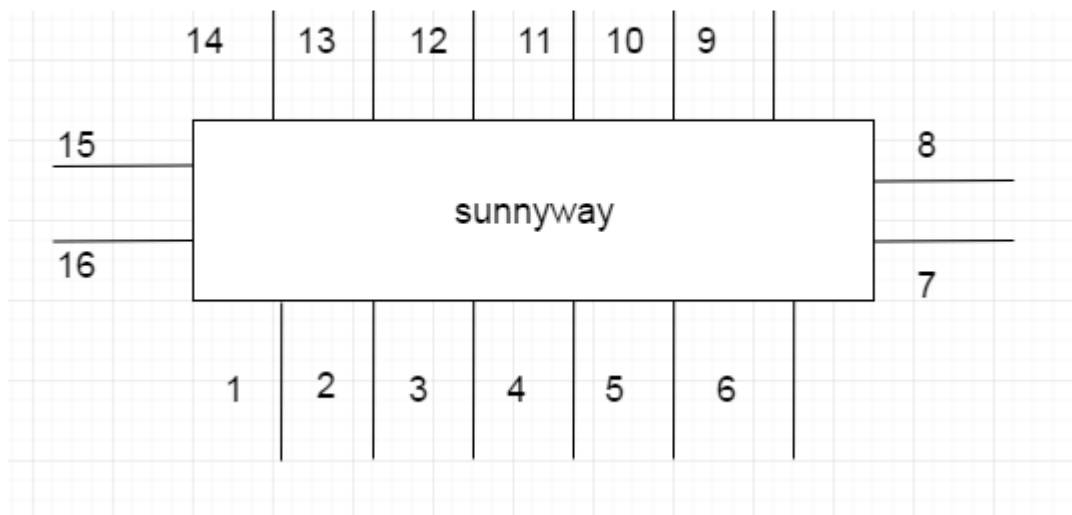


**2690.000MHz E2**



## 4. Schematic symbol and Pin definition

The pin assignment for the SWD002 antenna are as follows. The antenna has 16 pins and only two work. All other pins are designed for mechanical strength.



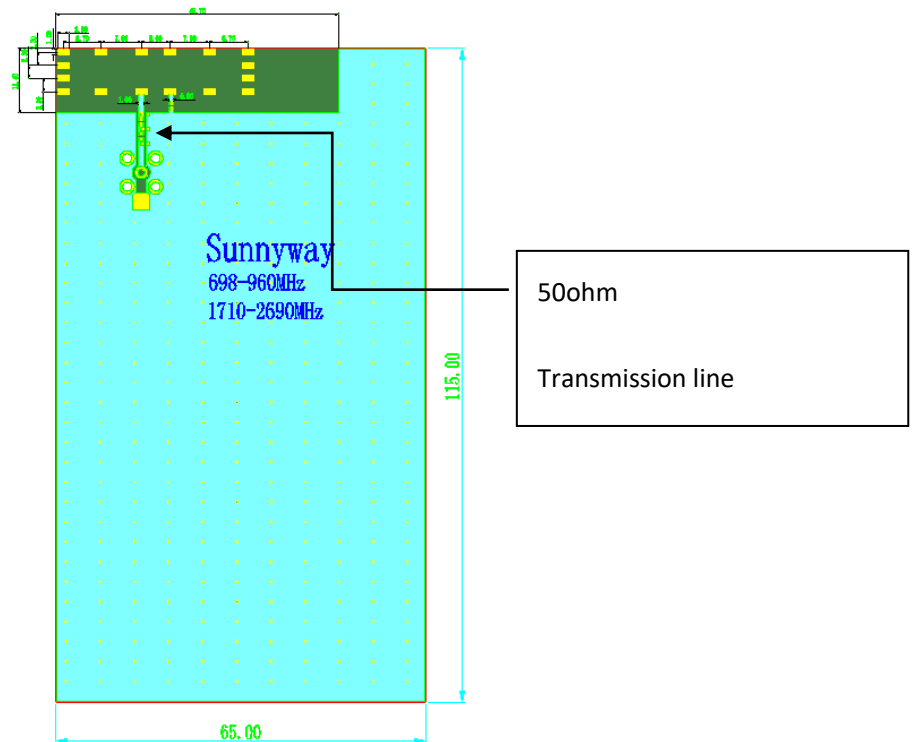
Pin No.	Description
3	Feed
4	Return/GND
1,2,5,6,7,8,9,10,11,12,13,14,15,16	Not used (Mechanical only)



## 5. Transmission Line

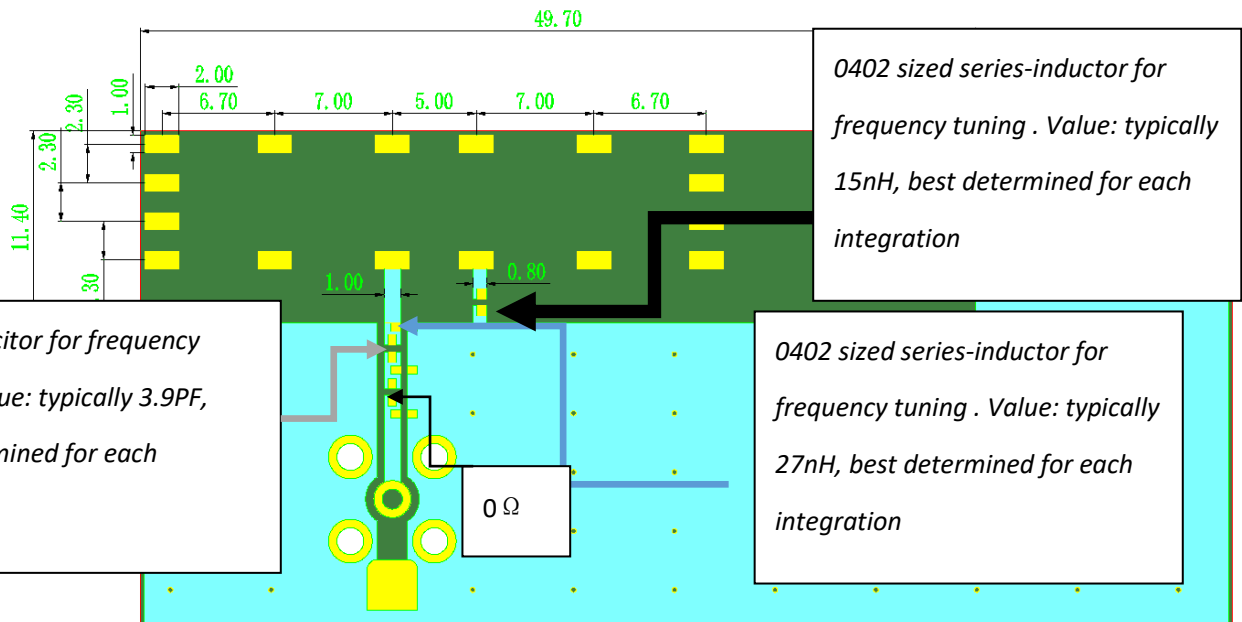
The characteristic impedance of all transmission lines shall be designed as 50  $\Omega$ .

- The length of the transmission lines should be kept to as short as possible
- Any other part of the RF system, such as transceiver, power amplifiers, etc., shall also be designed with an impedance of 50  $\Omega$

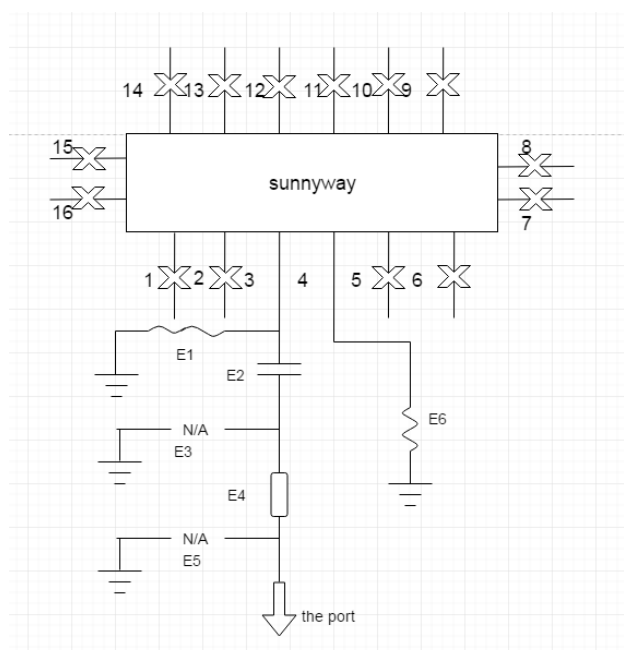




## 6. Matching circuit



The antenna requires a matching circuit that must be optimized for each product. The matching circuit will require up to six components and the following circuit should be designed into the host PCB. Not all components may be required but should be included as a precaution. The matching network must be placed close to the antenna feed to ensure it is more effective in tuning the antenna.



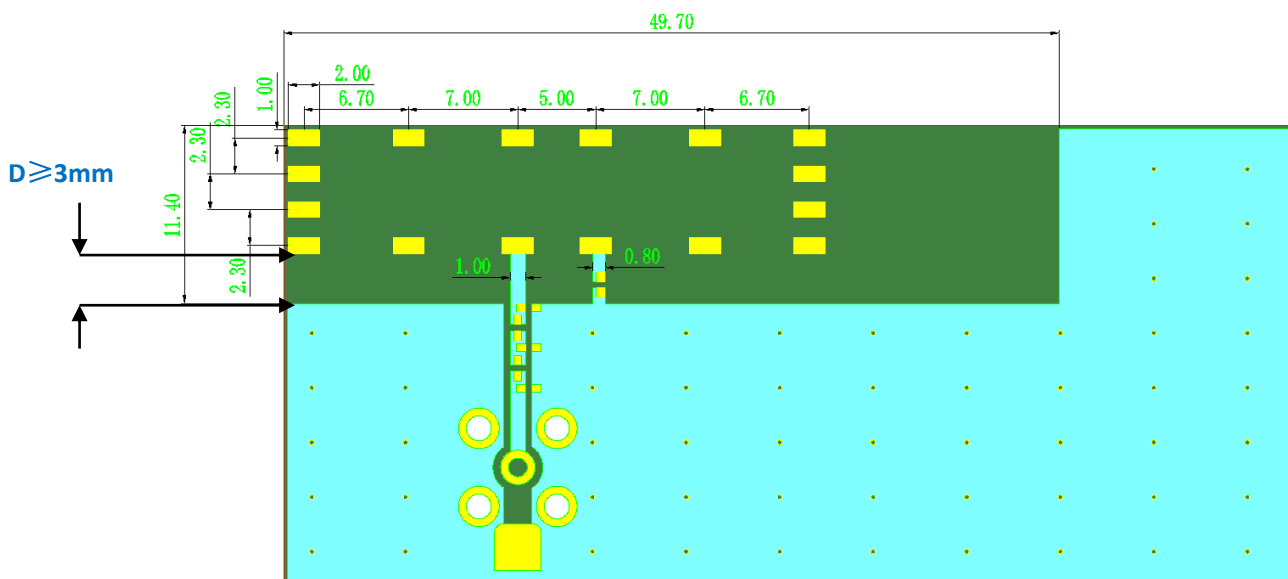


Type		Value
E1	Inductor	27nH
E2	Capacitor	3.9Pf
E3	N/A	N/A
E4	Capacitance	0Ω
E5	N/A	N/A
E6	Inductor	15nH

## 7. Host PCB Requirement

The printed circuit board of the host must ensure that the antenna clearance area meets the antenna specifications. It is suggested that putting the antenna in the corner of the PCB.

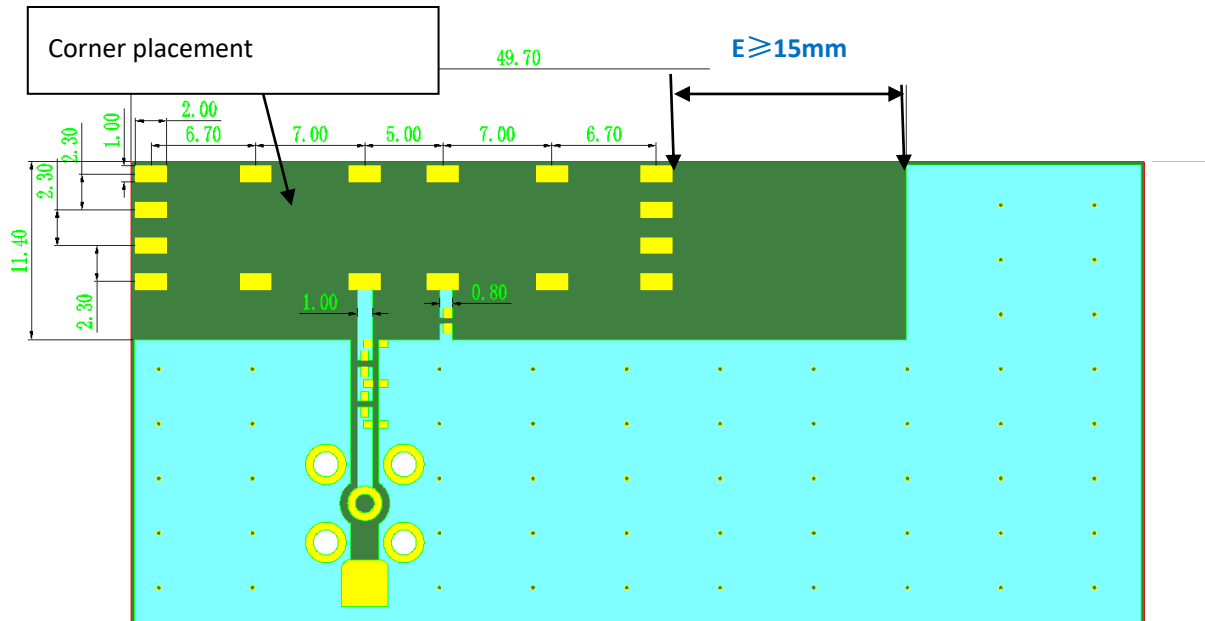
An example of a PCB layout shown as below:





**Gap D** is required from the edge of the antenna to the ground plane. This should be maintained along the edge of the antenna placement, **minimum value is 3mm**.

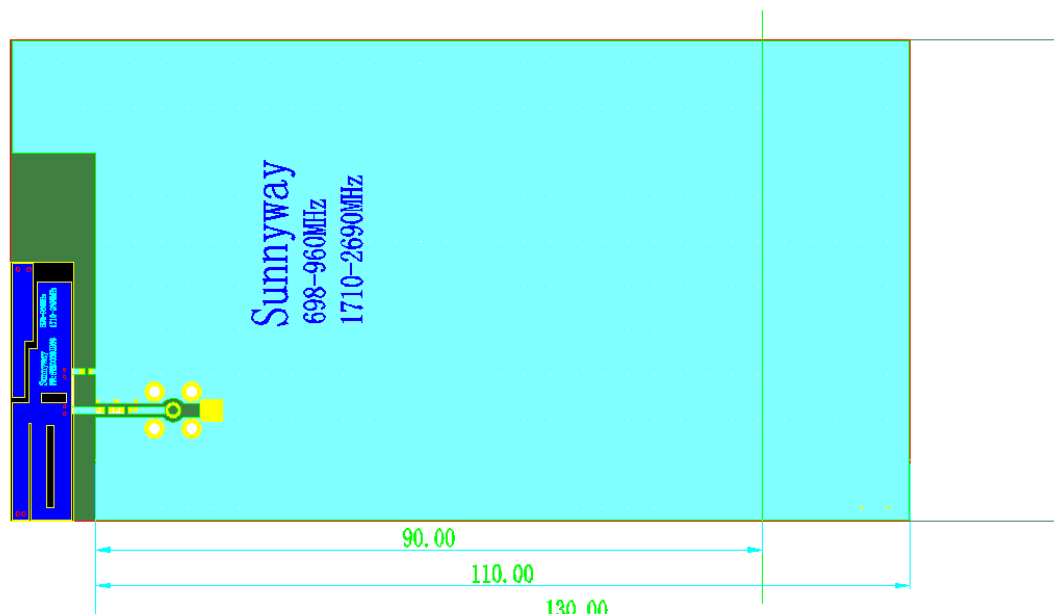
**Gap E** is required from the edge of the antenna to the ground plane or PCB traces, **minimum value is 15mm**.



## 8. Host PCB Size

The performance of the low frequency section depends on the length of the ground plane. Reducing GND length will directly impact on the performance of low frequency band.

Take antenna efficiency measurement results on different GND sizes as an example:

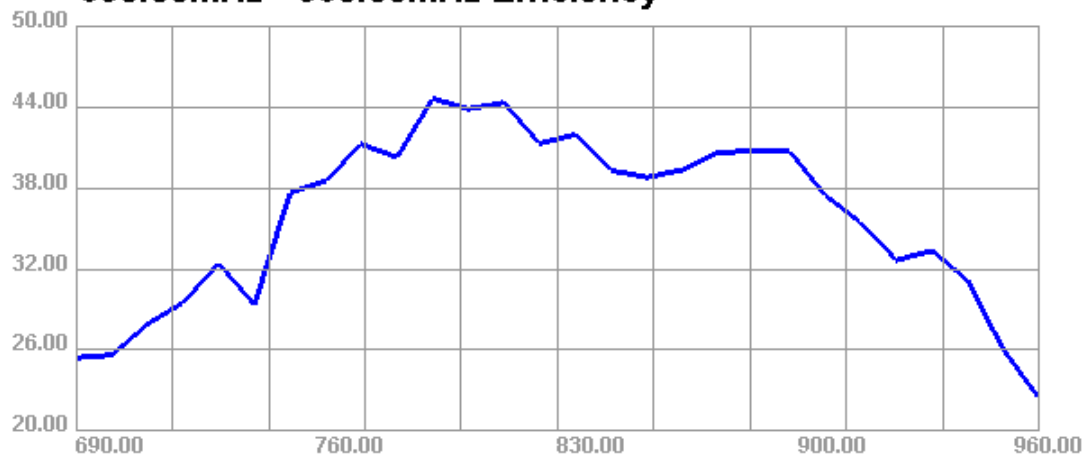


### 1710.00MHz - 2690.00MHz Efficiency



### ● Board length 90mm

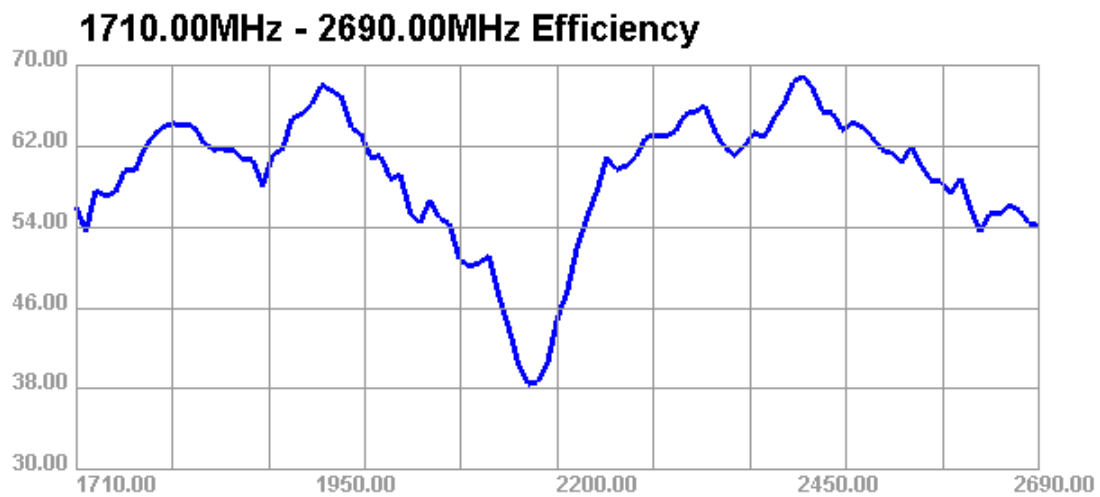
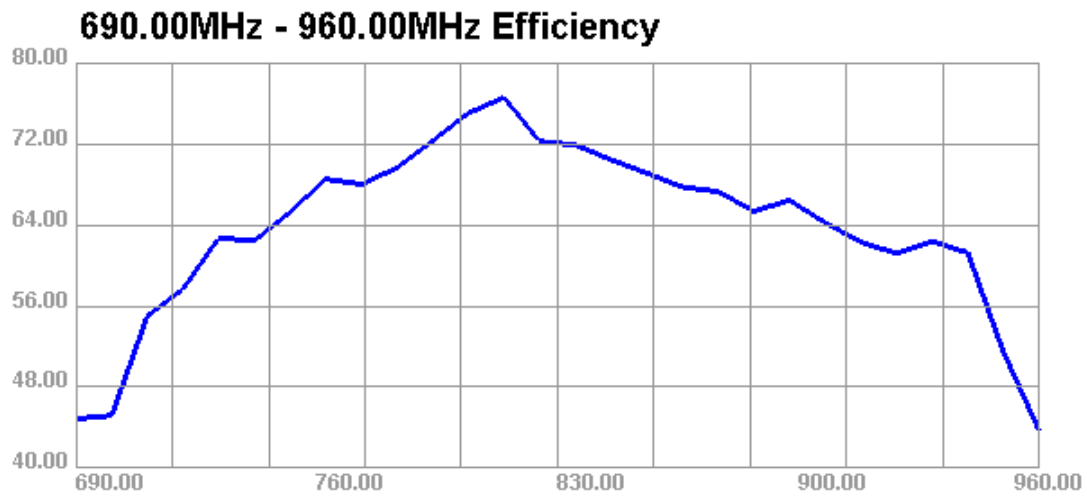
#### 690.00MHz - 960.00MHz Efficiency



#### 1710.00MHz - 2690.00MHz Efficiency



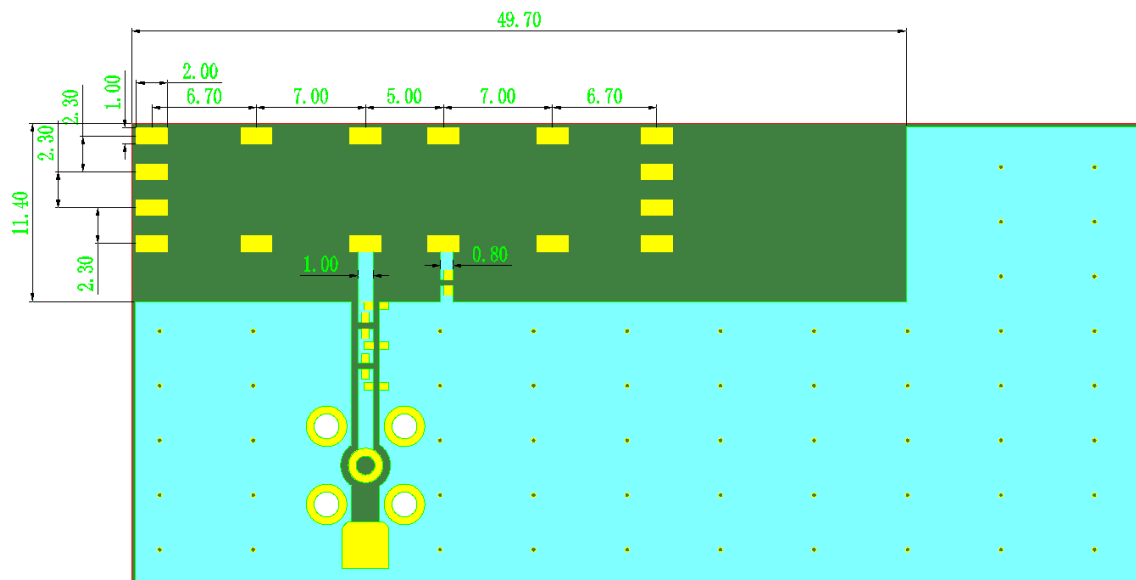
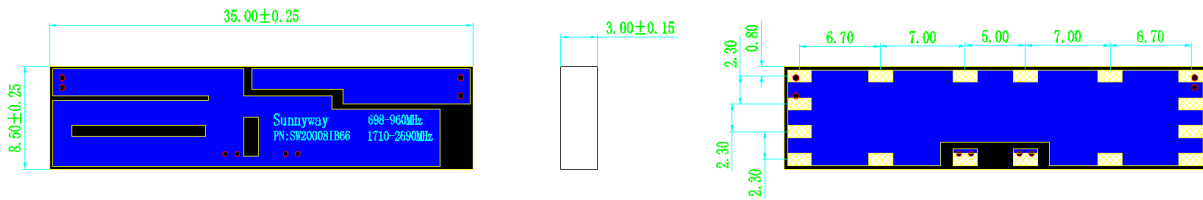
- Board length 130mm







## 9. Antenna Drawings





## 10. Soldering Temperature

PHASE	PROFILE FEATURES	PB-Free Assembly(max.)
RAMP-UP	Avg.Ramp-up Rate(Tsmax to Tp)	3°C/second(max.)
PREHEAT	Temperature Min(Tsmin)	150°C
	Temperature Max(Tsmax)	180°C
	Time(tsmin to tsmax)	120seconds max
REFLOW	Temperature(TL)	210°C
	Total Time above TL(tl)	50seconnds max
PEAK	Temperature(Tp)	260°C
	Time(tp)	10seconnds max
RAMP-DOWN	Rate	5°C/second max

## 11. Reflow Profile

