SWD013

PN: SW20034IB66

Features:

- Frequency bands from 698~960MHz,1550~1610MHz,1710~2690MHz.
- SMD Compliant.
- Impedance 50 Ohm.
- Antenna for LTE applications including MIMO systems.
- Size 35.0 x 8.5 x 3.0 mm.

Applications:

- 2G/3G/4G Cellular antenna.
- LTE ,Nb-IoT, Cat M1,GPS&GLONASS&GALILEO&BEIDOU.
- Femto / Pico base stations.
- Portable Devices.
- Remote monitoring.
- Network Devices.
- Wearable devices.

Sunnyway Technology

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1. Electrical Specification

Standards	4G/3G/2G/NB-IoT/CAT M1/GNSS				
Frequency range(MHz)	698-960	1559	1575.42	1602	1710-2690
Peak Gain (dBi)	-2.9~1.5	3.5	3.2	2.7	-3.7~2.6
Average Gain (dB)	-7.2~-3.0	-1.9	-2.1	-2.0	-7.0~-2.0
VSWR	< 4.5	2.2	2.0	1.7	< 3.4
Return Loss	< -4.0	-8.5	-9.6	-11.6	< -5.3
Efficiency (%)	19.0~50.4%	64.5%	62.2%	63.4%	20.0~63.8%
Polarization mode	Linear				
Radiation pattern	Omni-Directional				
Output impedance (Ω)	50				
Max. Input Power(W)	5				

Note:

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

2. Mechanical and Environmental Specification

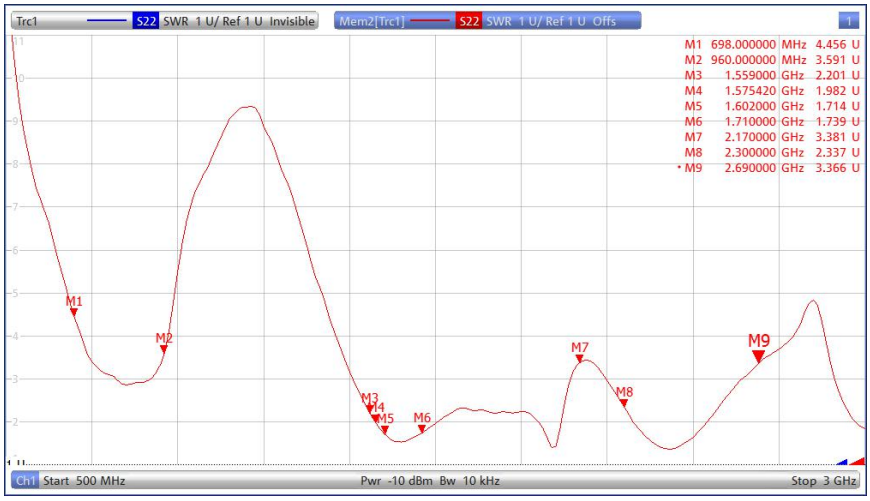
Mounting Type	SMD
Antenna size(mm)	35.0 (L) x 8.5 (W) x 3.0 (H)
Material	PCB
Operating Temperature (˚C)	- 40 ˚C ~ + 85 ˚C
Storage Temperature(˚C)	- 40 ˚C ~ + 85 ˚C

3. Antenna parameters

3.1 General Specification

FRE (MHz)	698	960	1559	1575.4	1602	1710	2170	2300	2690
VSWR	4.45	3.59	2.20	1.98	1.71	1.73	3.38	2.33	3.36
Return Loss	-3.96	-4.97	-8.52	-9.64	-11.60	-11.38	-5.29	-7.94	-5.32
Eff (%)	19.0	40.4	64.5	62.2	63.4	60.2	44.6	47.0	44.6
Average Gain(dB)	-7.2	-3.9	-1.9	-2.1	-2.0	-2.2	-3.5	-3.3	-3.5

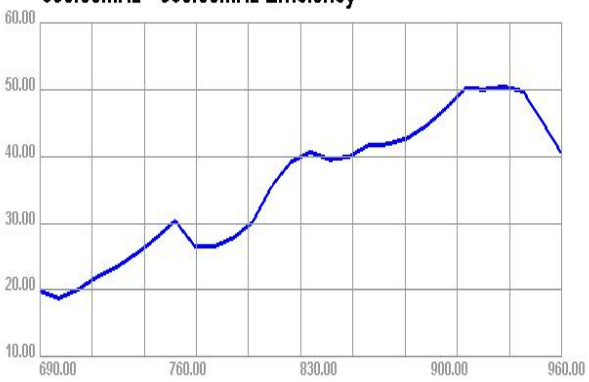
3.2 VSWR



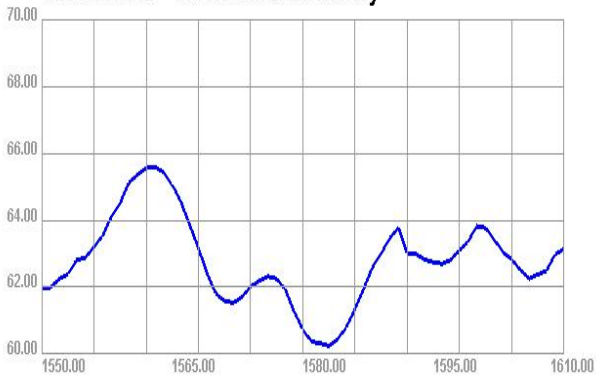
3.3 Return Loss

3.4 Efficiency

690.00MHz - 960.00MHz Efficiency



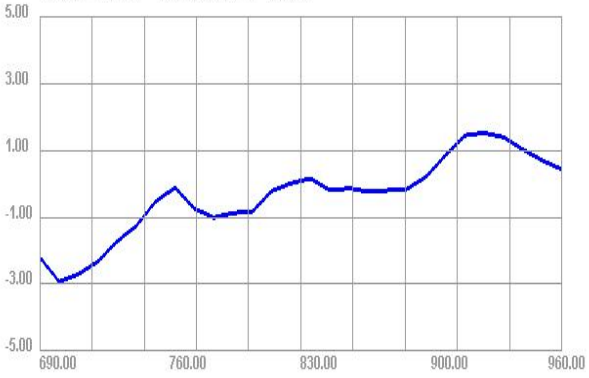
1550.00MHz - 1610.00MHz Efficiency



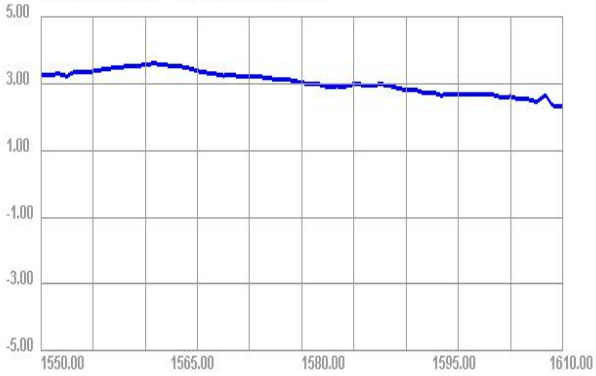
1710.00MHz - 2690.00MHz Efficiency

3.5 Gain

690.00MHz - 960.00MHz Gain



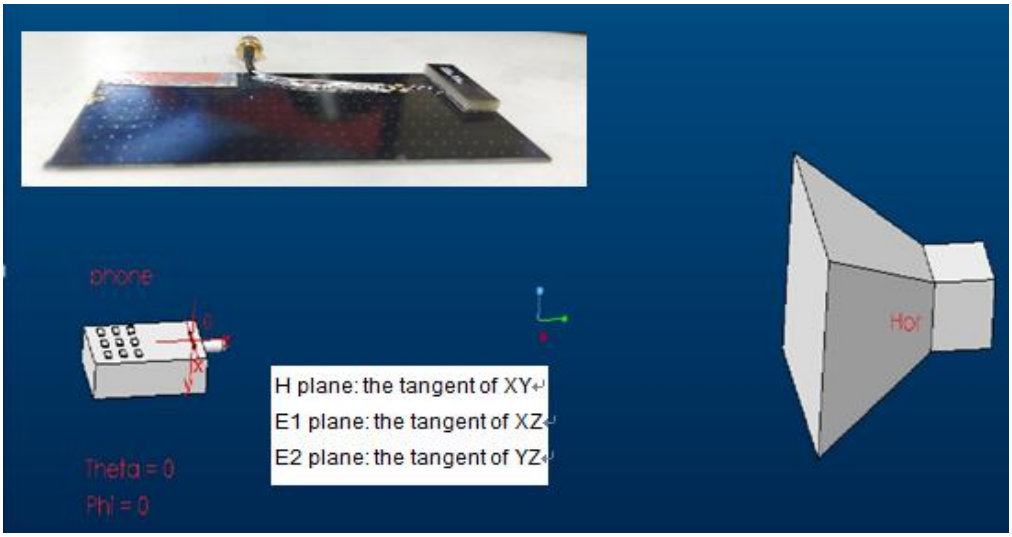
1550.00MHz - 1610.00MHz Gain

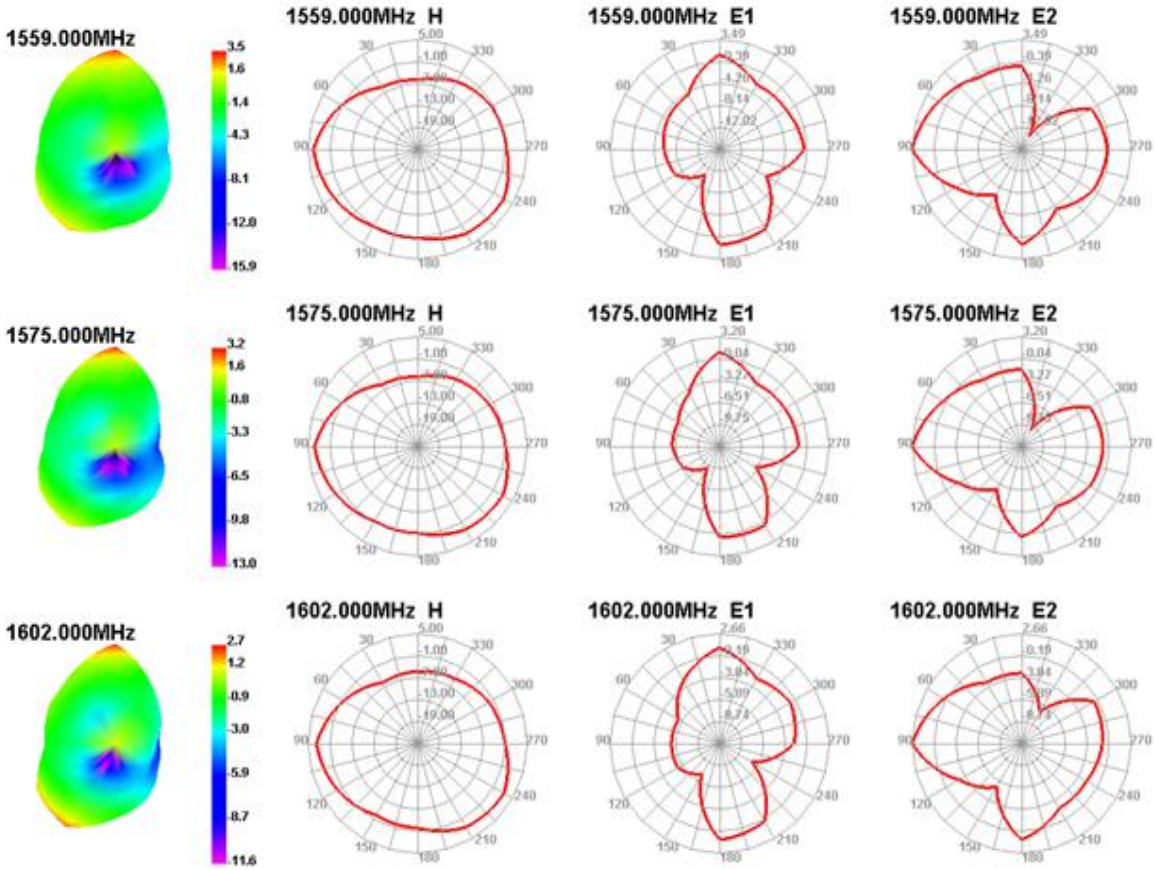


1710.00MHz - 2690.00MHz Gain

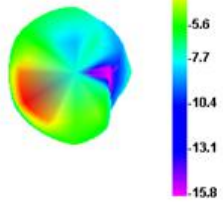
3.6 Directional pattern

Board length 110mm

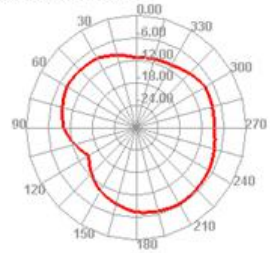




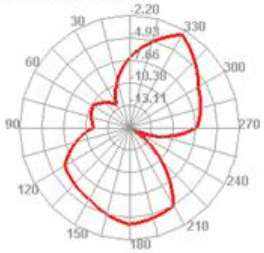
690.000MHz



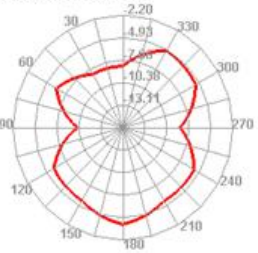
690.000MHz H



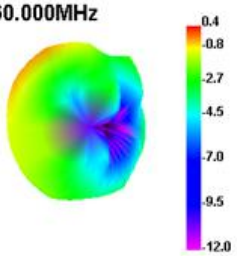
690.000MHz E1



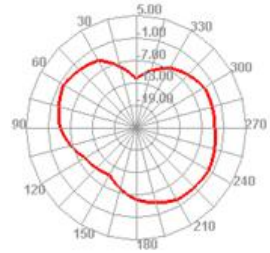
690.000MHz E2



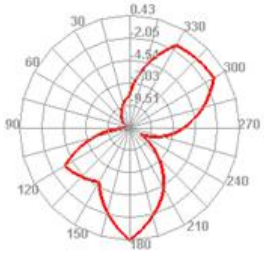
960.000MHz



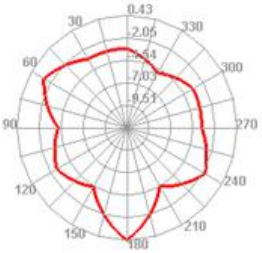
960.000MHz H



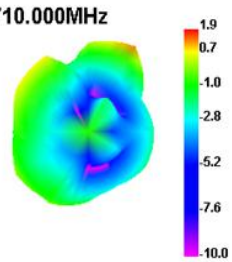
960.000MHz E1



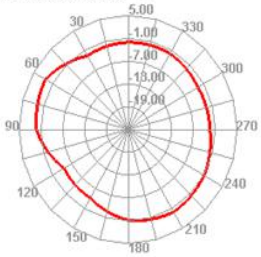
960.000MHz E2



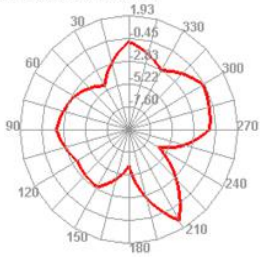
1710.000MHz



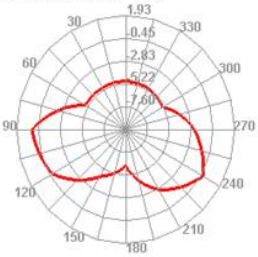
1710.000MHz H



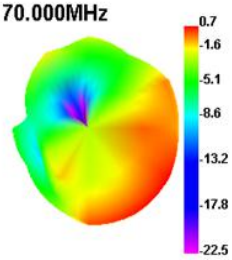
1710.000MHz E1



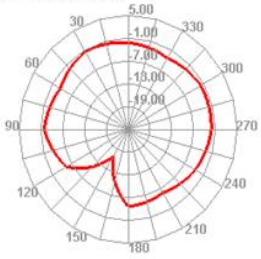
1710.000MHz E2



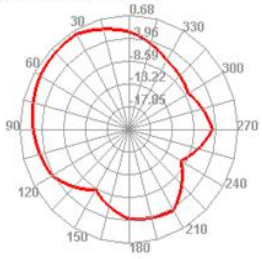
2170.000MHz



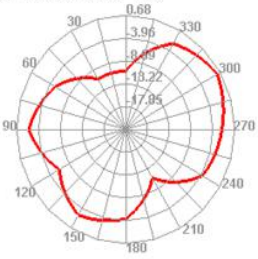
2170.000MHz H



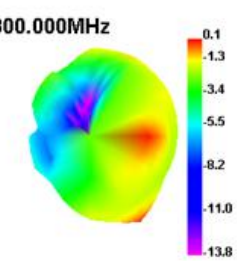
2170.000MHz E1



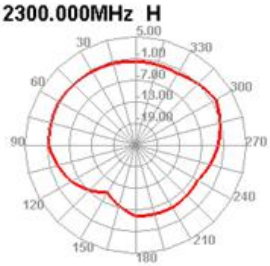
2170.000MHz E2



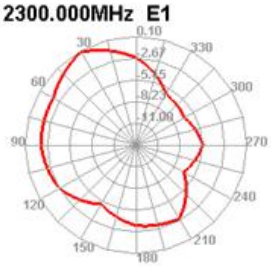
2300.000MHz



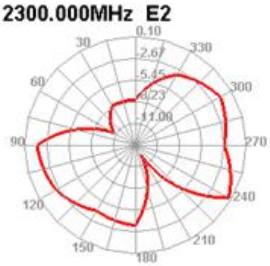
2300.000MHz H



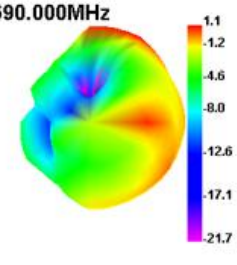
2300.000MHz E1



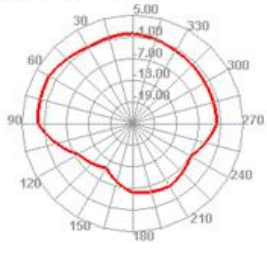
2300.000MHz E2



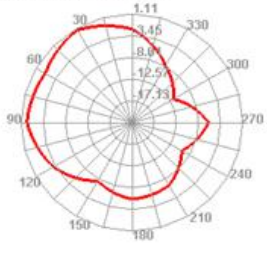
2690.000MHz



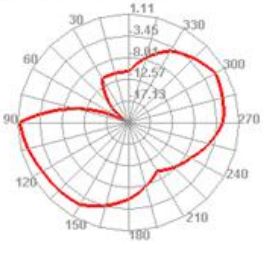
2690.000MHz H



2690.000MHz E1



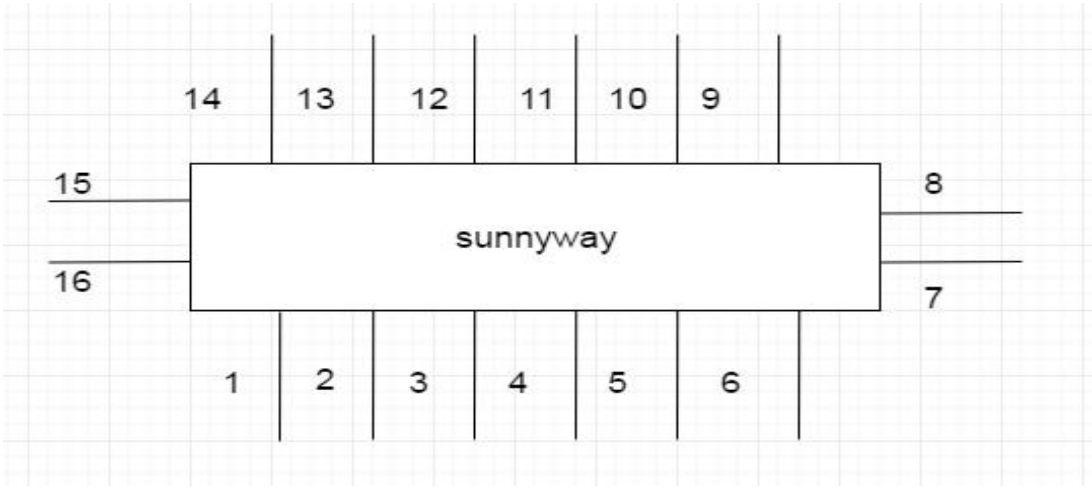
2690.000MHz E2



4. Schematic symbol and Pin definition

The pin assignment for the SWD013 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)

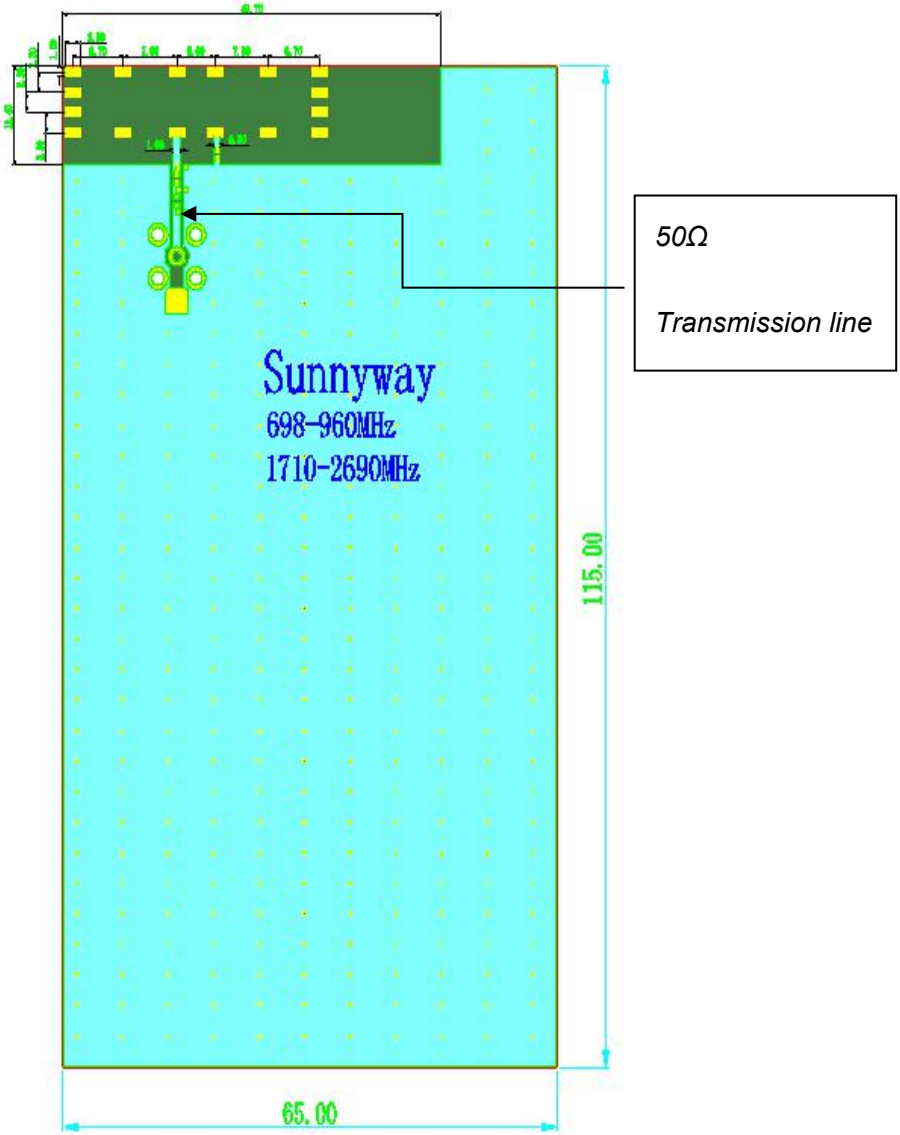
5. Transmission Line

The characteristic impedance of all transmission lines shall be designed as 50 Ω.

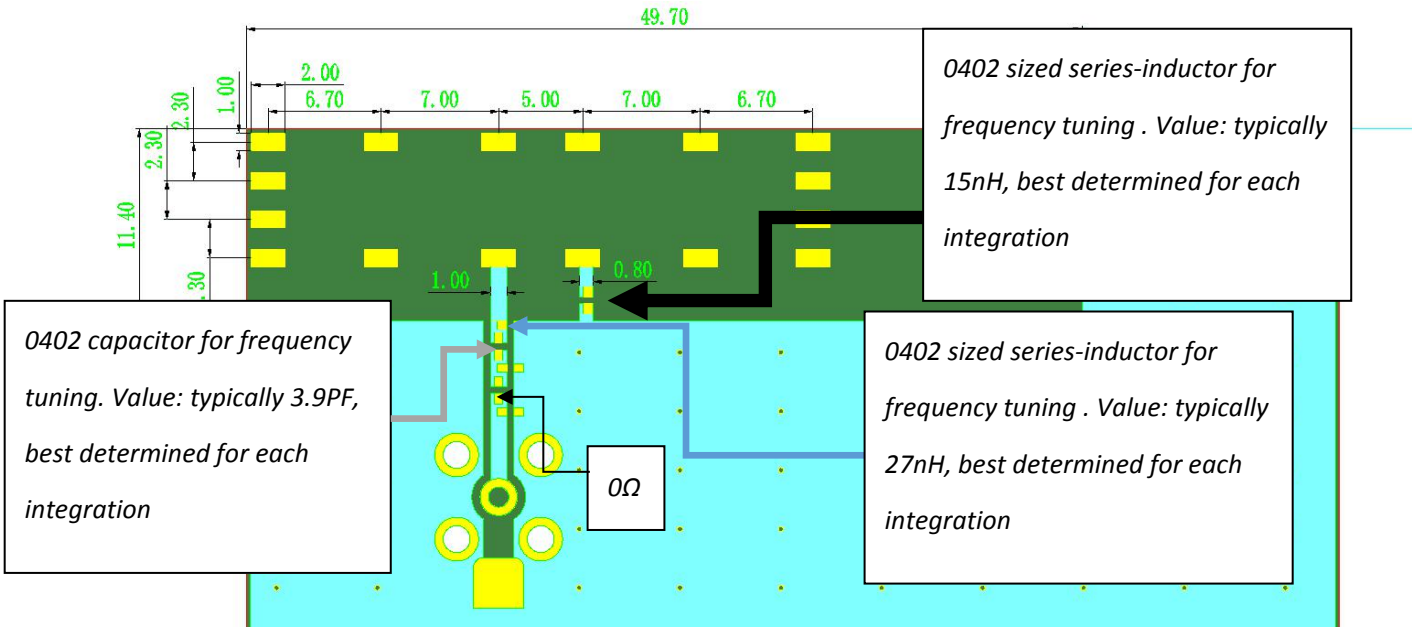
• The length of the transmission lines should be kept to as short as possible

• Any other part of the RF system, such as transceiver, power amplifiers, etc., shall also be designed with an impedance of 50 Ω

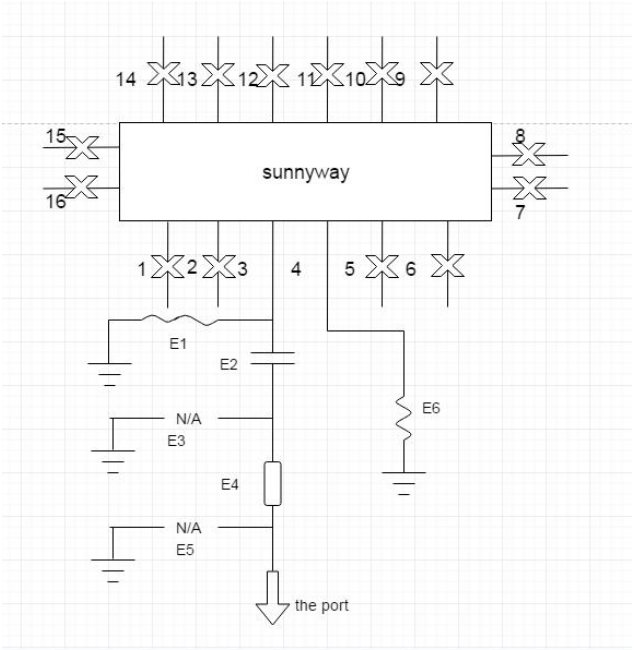
• All dimensions are in mm



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.

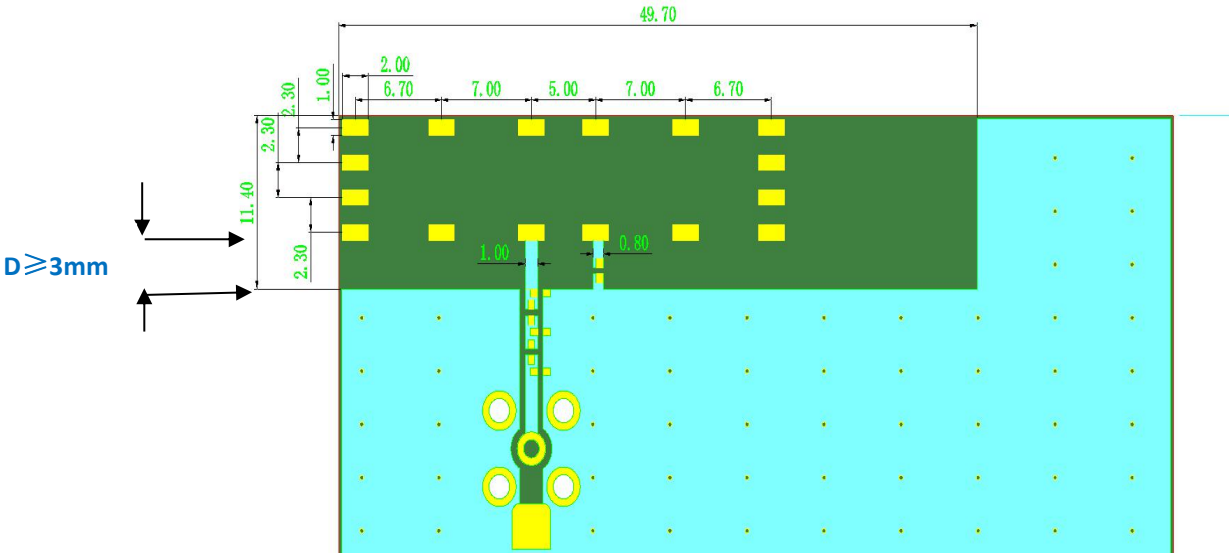


	Type	Value
E1	Inductor	27nH
E2	Capacitor	*3.9Pf*
E3	N/A	N/A
E4	Rsistance	0Ω
E5	N/A	N/A
E6	Inductor	*15nH*

7. Host PCB Requirement

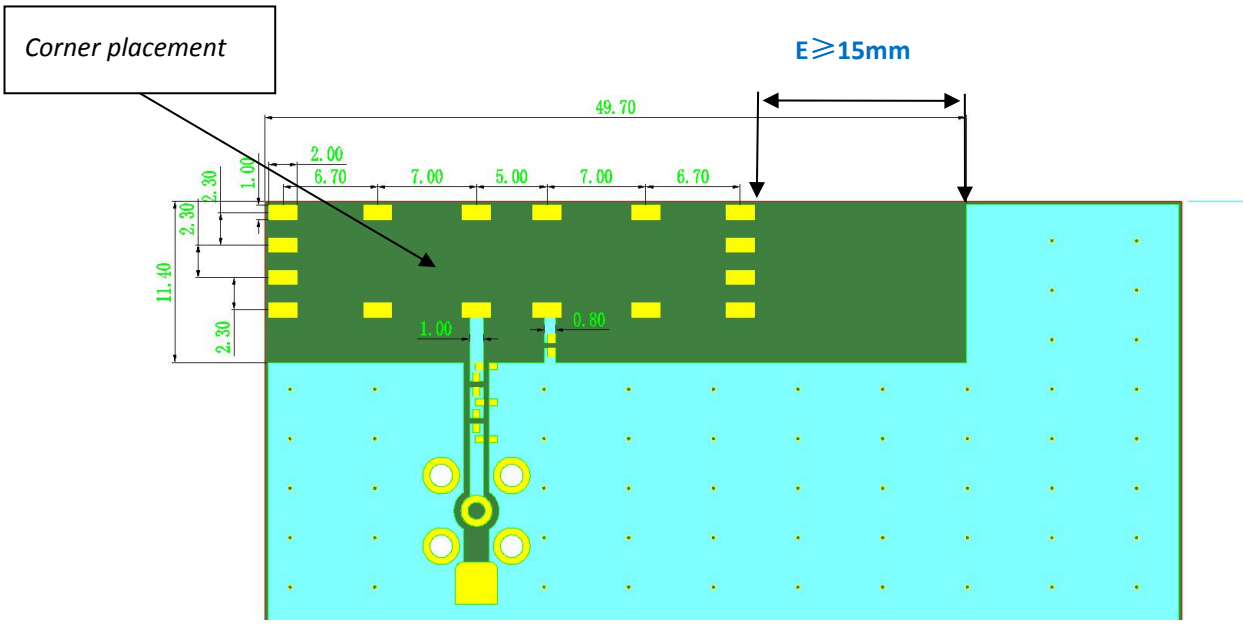
The printed circuit board of the host must ensure that the antenna clearance area meets the antenna specifications. It is suggested that putting the antenna in the corner of the PCB.

An example of a PCB layout shown as below:



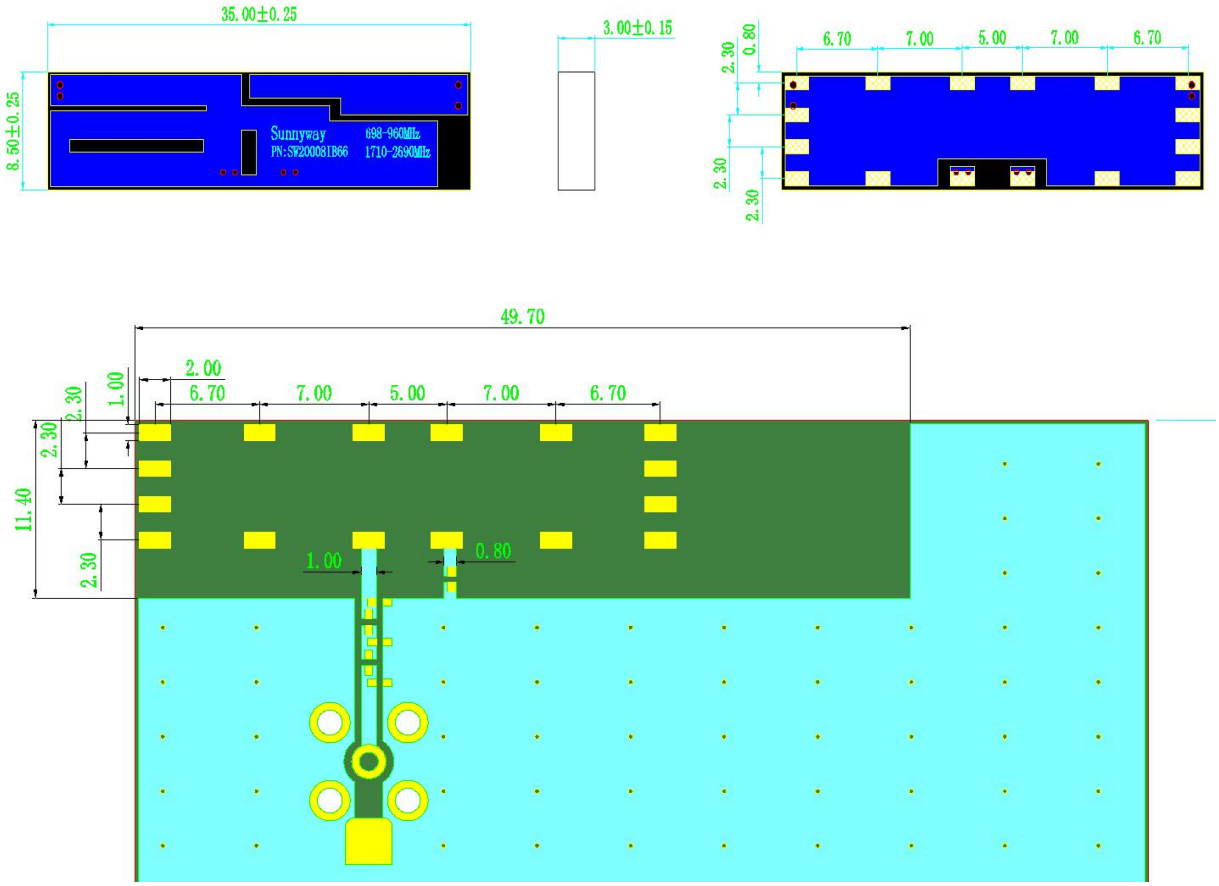
Gap D is required from the edge of the antenna to the ground plane. This should be maintained along the edge of the antenna placement, **minimum value is 3mm**.

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



8.Antenna Drawing

All dimensions are in mm



9. Soldering Temperature

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

10. Reflow Profile