



SUNNYWAY

SWD006

PN: SW20012IB66

Features:

- Frequency bands : 1559-1609 MHz.
- SMD Compliant.
- Impedance 50 Ohm.
- Size 7.0 x 5.8 x 0.4 mm
- Ultra flat compact design of only 0.4mm thickness.
- Solution for all global public constellations: GPS, GLONASS, Beidou and GALILEO.



Applications:

- Trackers
- Portable Devices
- Drones
- Network Devices
- Wearable devices

Sunnyway Technology

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1. Electrical Specifications

Standards	GPS&GLONASS&GALILEO&BEIDOU
Frequency range (MHz)	1559~1609MHz
Peak Gain (dBi)	3.4~4.4
Average Gain (dB)	-2.2~-1.5
VSWR	< 1.4
Return Loss	< -16.5
Efficiency (%)	59.8~71.6
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 80*35mm

2. Mechanical and Environmental Specification

Mounting Type	SMD
Antenna size(mm)	7.0(L) x5.8 (W) x 0.4(H)
Material	PCB
Operating Temperature ($^{\circ}\text{C}$)	- 40 $^{\circ}\text{C}$ ~ + 85 $^{\circ}\text{C}$
Storage Temperature($^{\circ}\text{C}$)	- 40 $^{\circ}\text{C}$ ~ + 85 $^{\circ}\text{C}$



3. Antenna parameters

3.1 General Data

FRE (MHz)	1559	1609
VSWR	1.3	1.4
Return Loss	-19.0	-16.5
Eff (%)	71.6	61.8
Average Gain(dB)	-1.5	-2.1

3.2 VSWR



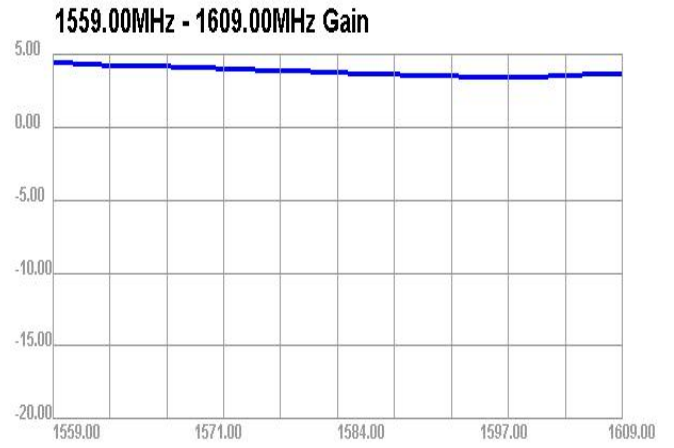
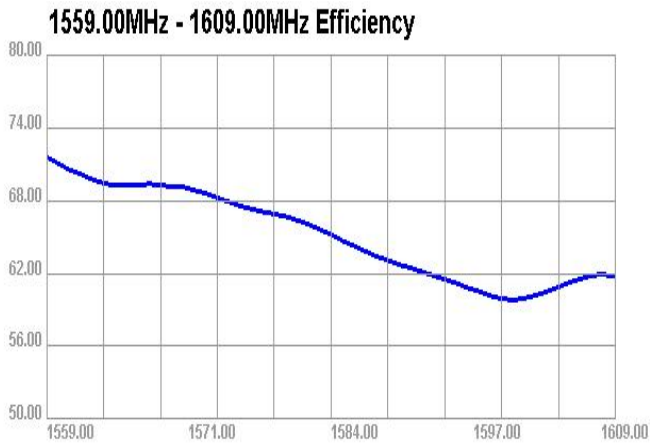
3.3 Return Loss



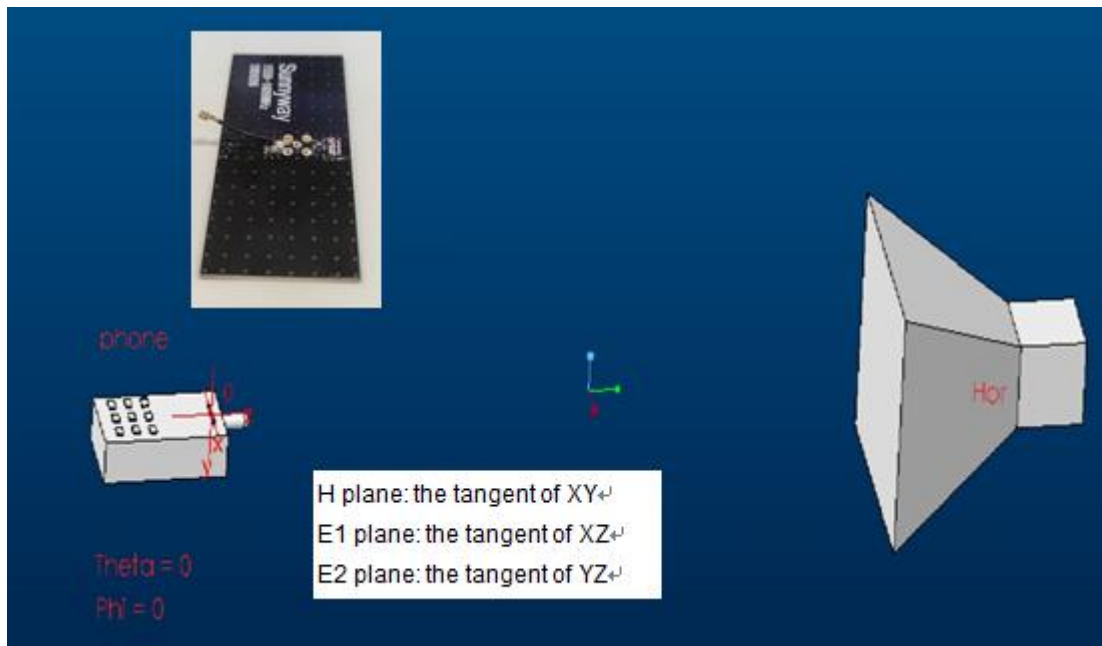


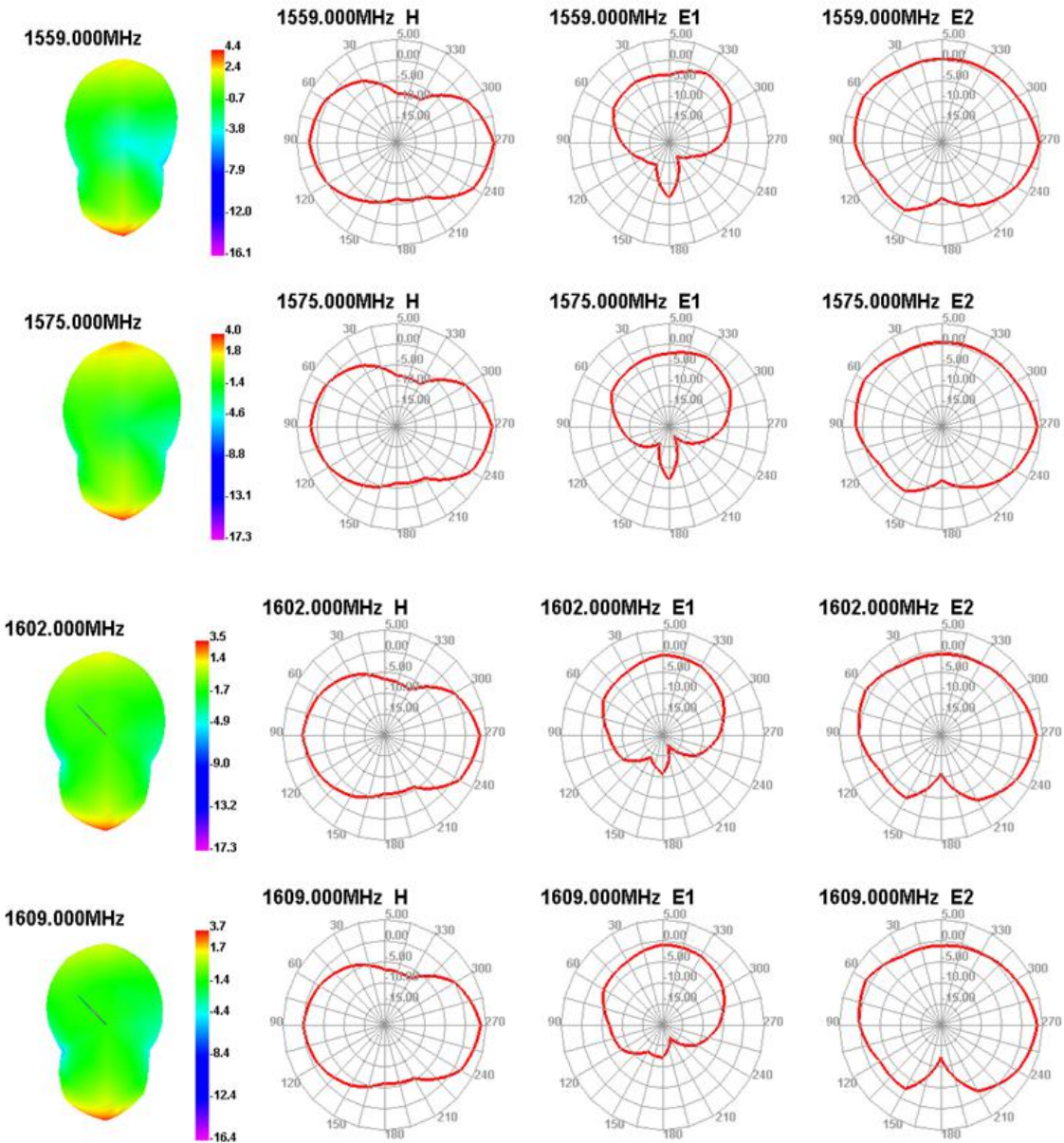
3.4 Efficiency and Gain

Board length 80mm



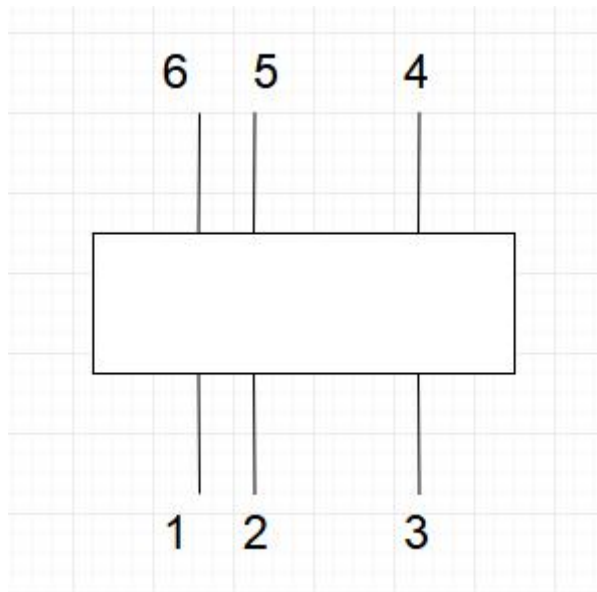
3.5 Directional pattern





4. Schematic symbol and Pin definition

The pin assignment for the SWD006 antenna are as follows. The antenna has 6 pins and 4 work. And another pins are designed for mechanical strength.



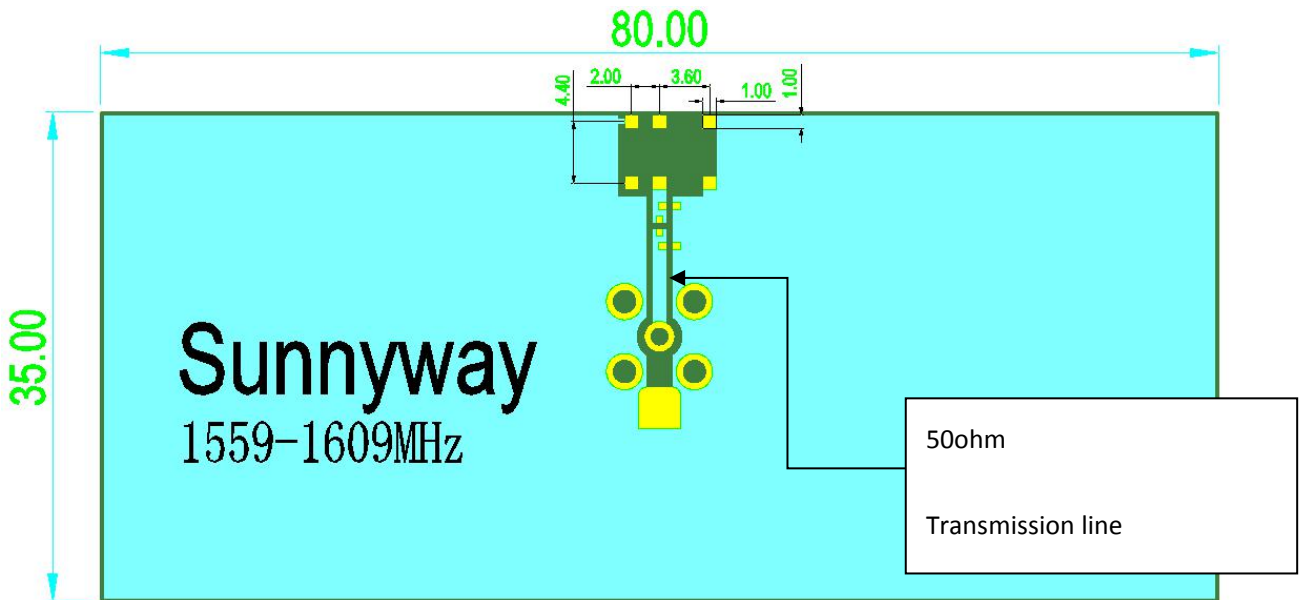
Pin No.	Description
2	Feed
3,4,6	Grounding
1,5	Not used (Mechanical only)



5. Transmission Line

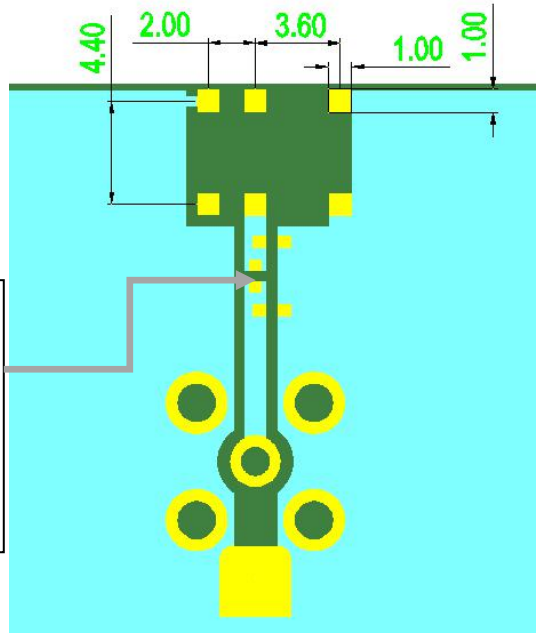
The characteristic impedance of all transmission lines shall be designed as 50 Ω.

- 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



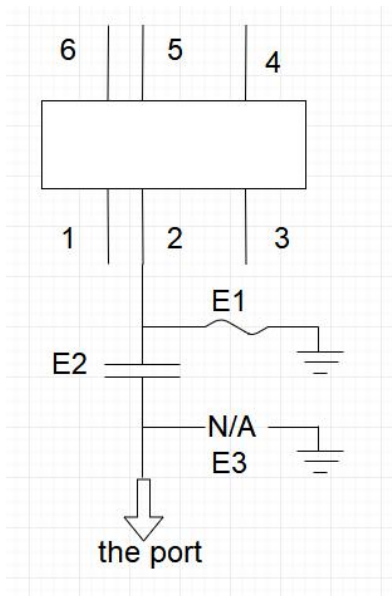


6. Matching circuit



0402 capacitor for frequency tuning. Value: typically 2.2PF, best determined for each integration

The antenna requires a matching circuit that must be optimized for each product. The matching circuit will require up to three 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	N/A	N/A
E2	Capacitor	2.2PF
E3	N/A	N/A

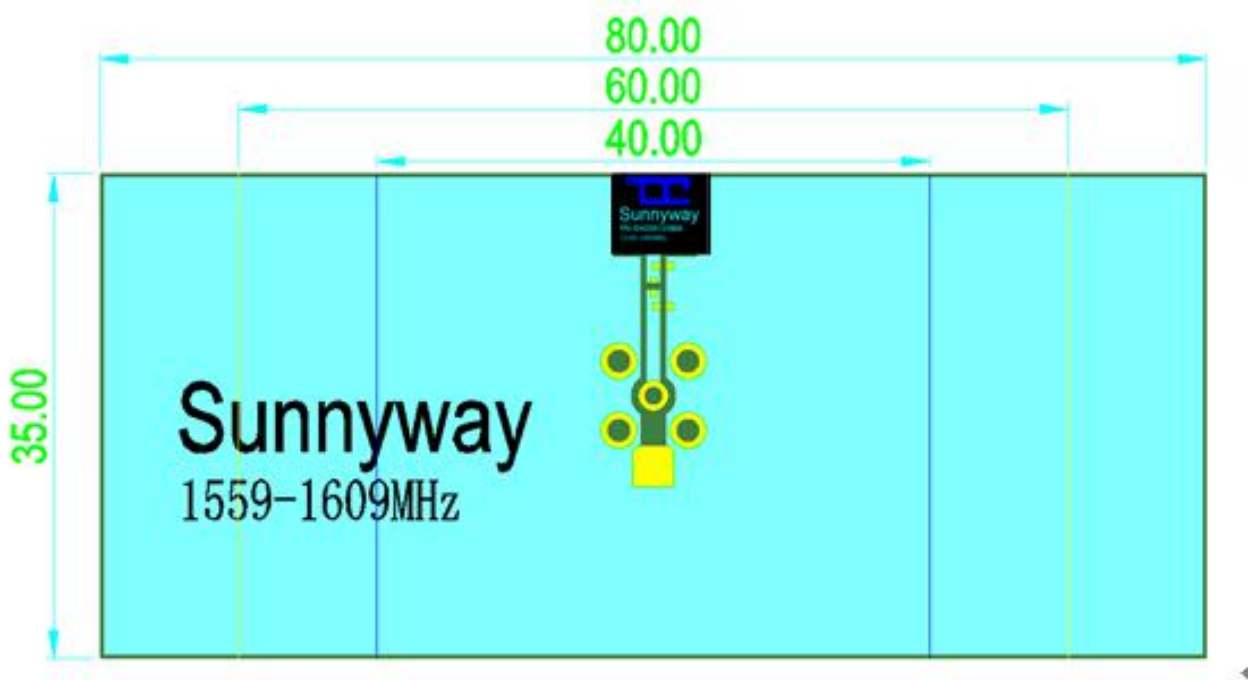


7. Host PCB Requirement

The printed circuit board of the host must ensure that the antenna clearance area meets the antenna specifications.

Whichever the host PCB size used, the antenna should be placed ideally on the host PCB's longest edge at the center.

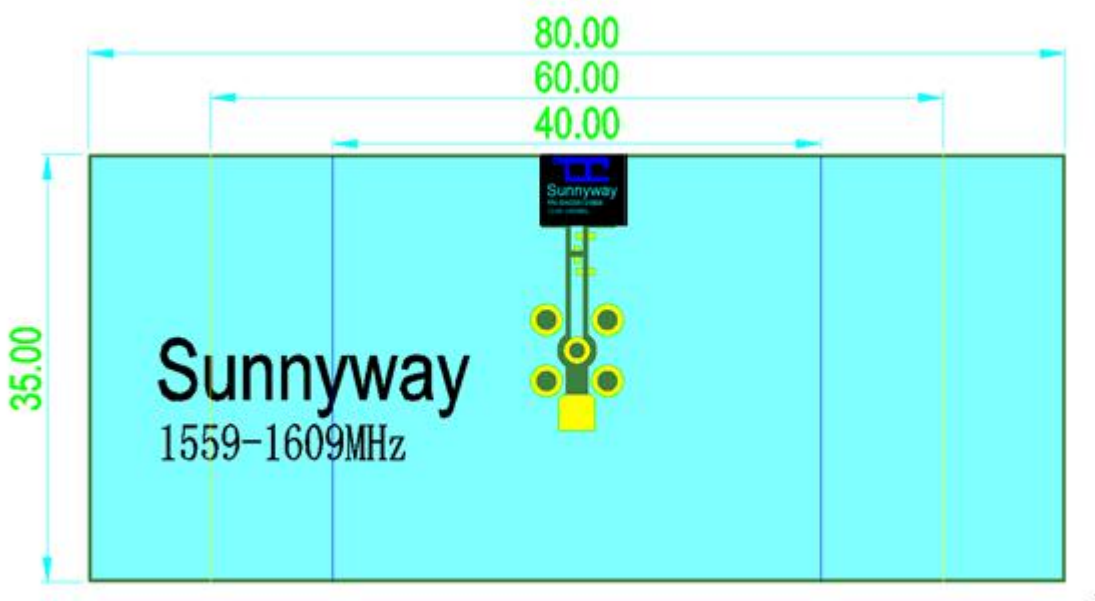
An example of a PCB layout shown as below:





8. Host PCB Size

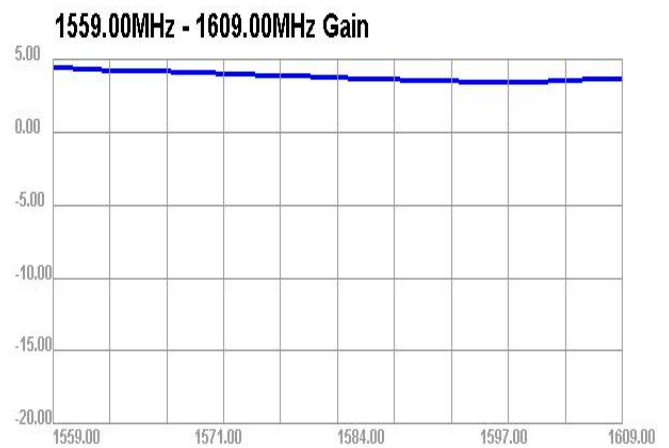
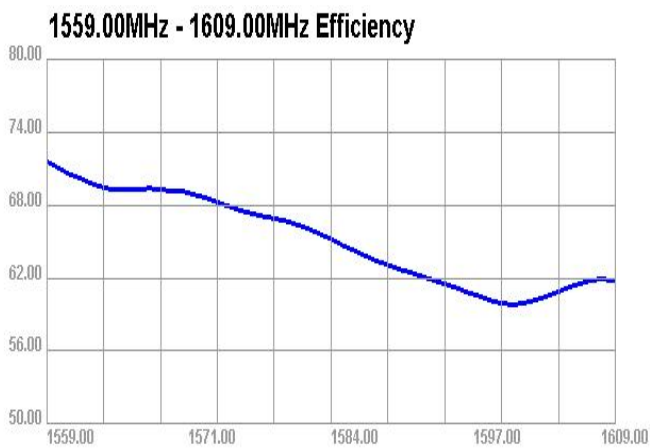
The minimum recommended host PCB size to be used is 40 x 20 (mm). Below is the antenna performance vs PCB length.



Passive Efficiency vs. PCB length

All results measured in Sunnyway's anechoic chamber

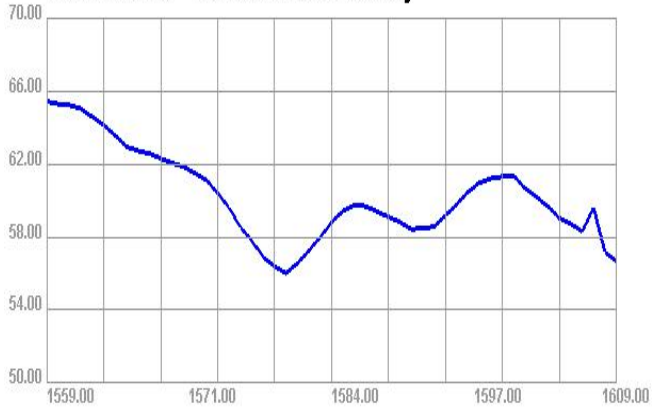
Board length 80mm



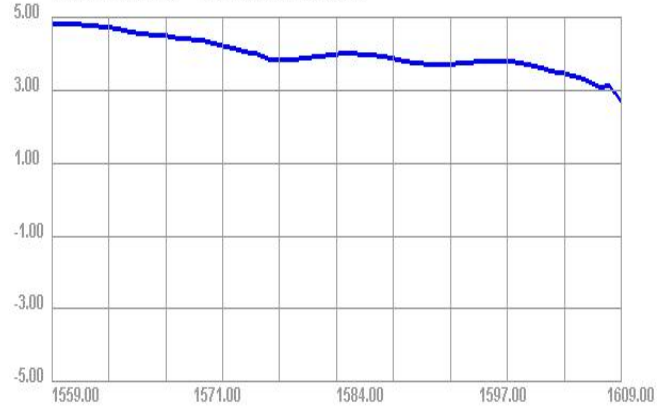


Board length 60mm

1559.00MHz - 1609.00MHz Efficiency

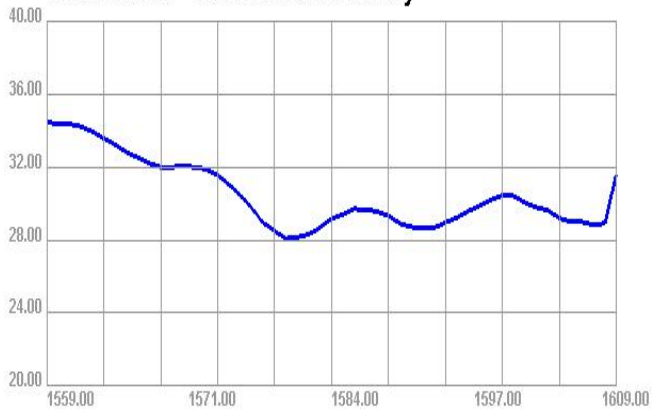


1559.00MHz - 1609.00MHz Gain

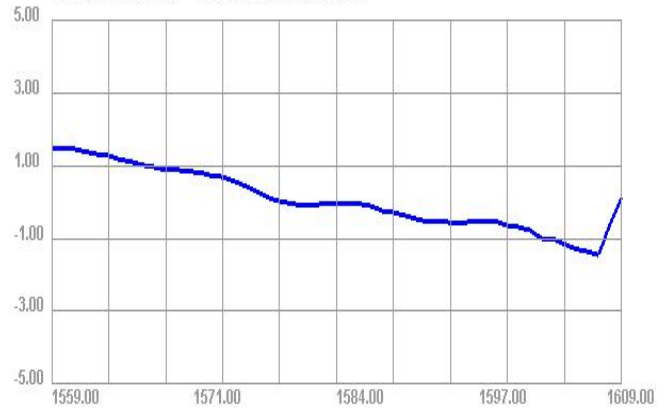


Board length 40mm

1559.00MHz - 1609.00MHz Efficiency

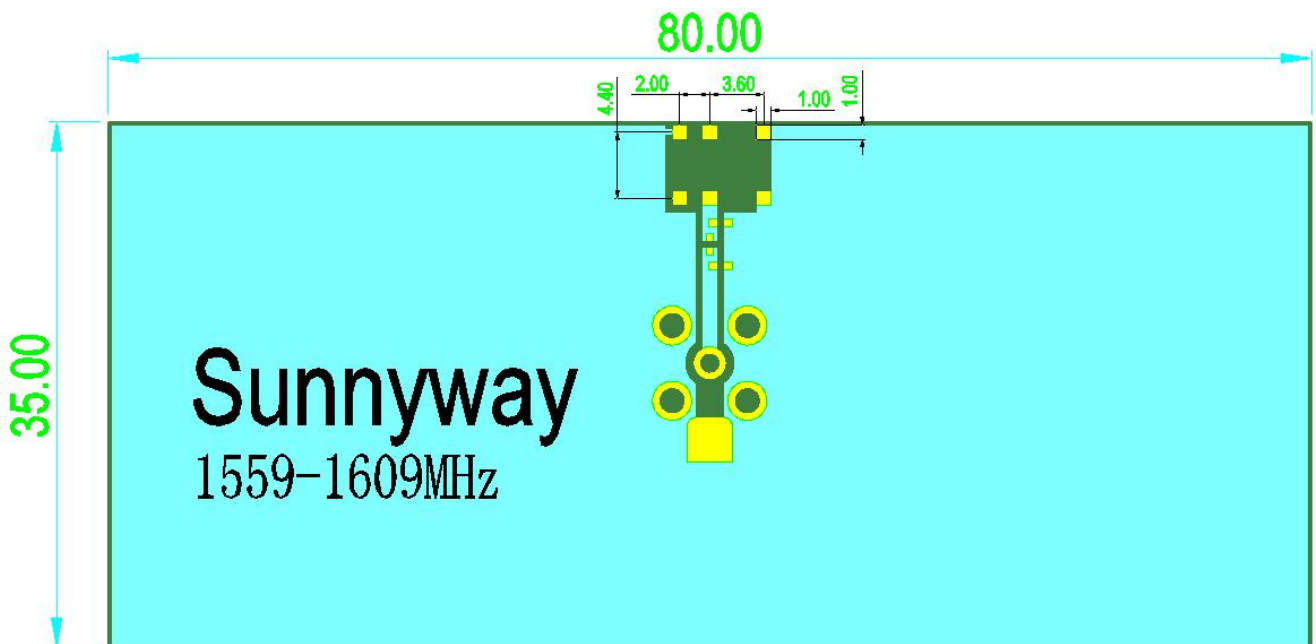
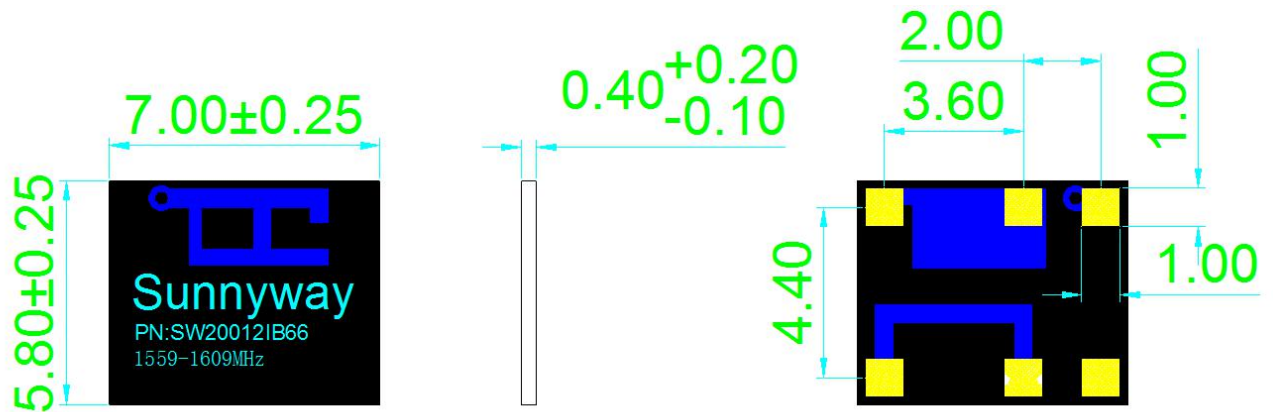


1559.00MHz - 1609.00MHz Gain





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 (Tsmín)	150°C
	Temperature Max (Tsmáx)	180°C
	Time (tsmín to tsmáx)	120seconds max
REFLOW	Temperature (TL)	210°C
	Total Time above TL (TL)	50seconds max
PEAK	Temperature (Tp)	260°C
	Time(Tp)	10seconds max
RAMP-DOWN	Rate	5°C/second max

11. Reflow Profile

