

Product Specification

Number: L-KLS1-GPS-F-SMD40*07*03

Name: 40*7*3 mm³
SMD Antenna

Customer: _____

Date: 2025-08-20

Customer Signature:



NINGBO KLS ELECTRONIC CO; LTD

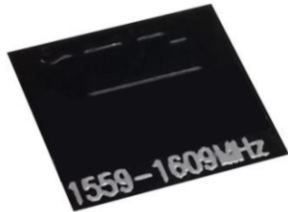
Tel : 0086-574-86828566

Fax : 0086-574-86824882

**ADD : NO. 8-1, RONGXIA RD. XIAPU SHANQIAN
INDUSTRIAL ZONE BEILUN NINGBO ZHEJIANG.**

Compi	Check	Review	Approva
Jenny	Jack.C		

Part name	40*7*3 mm ³ SMD Antenna	Date	2025-08-20
Part number	L-KLS1-GPS-F-SMD40*07*03	Edition	V1
Department		Page	2 / 14



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

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 KLS's EVK which size is 80*35mm

2. Mechanical and Environmental Specification

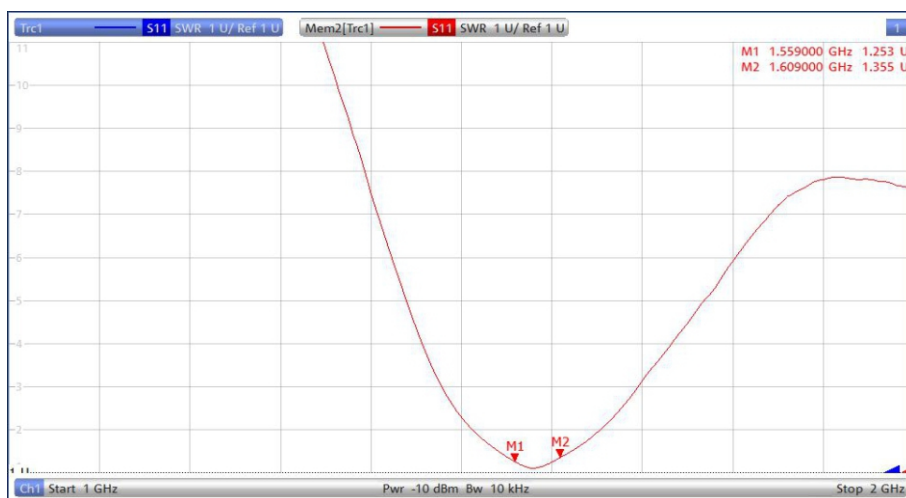
Mounting Type	SMD
Antenna size(mm)	7.0(L) x5.8 (W) x 0.4(H)
Material	PCB
Operating Temperature (°C)	- 40 °C ~ + 85 °C
Storage Temperature(°C)	- 40 °C ~ + 85 °C

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



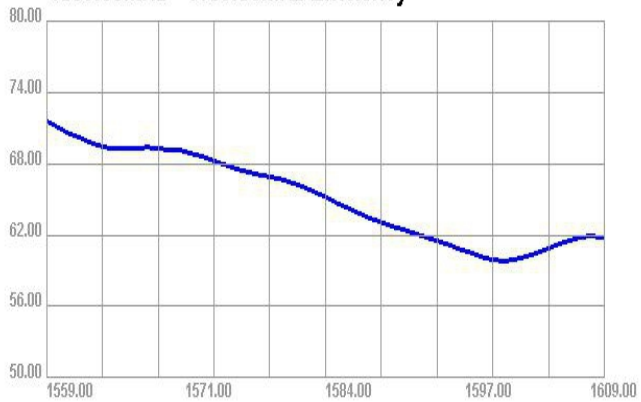
3.3 Return Loss



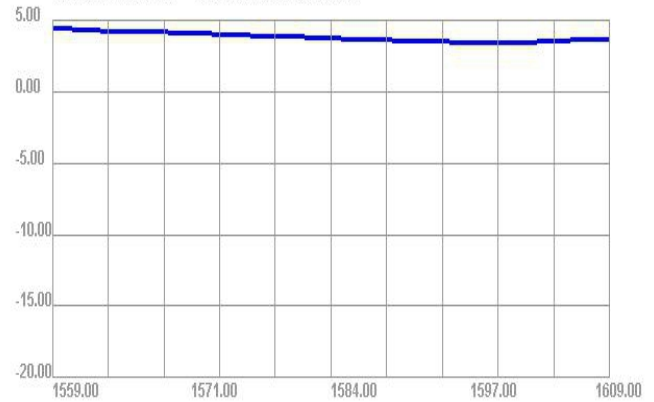
3.4 Efficiency and Gain

Board length 80mm

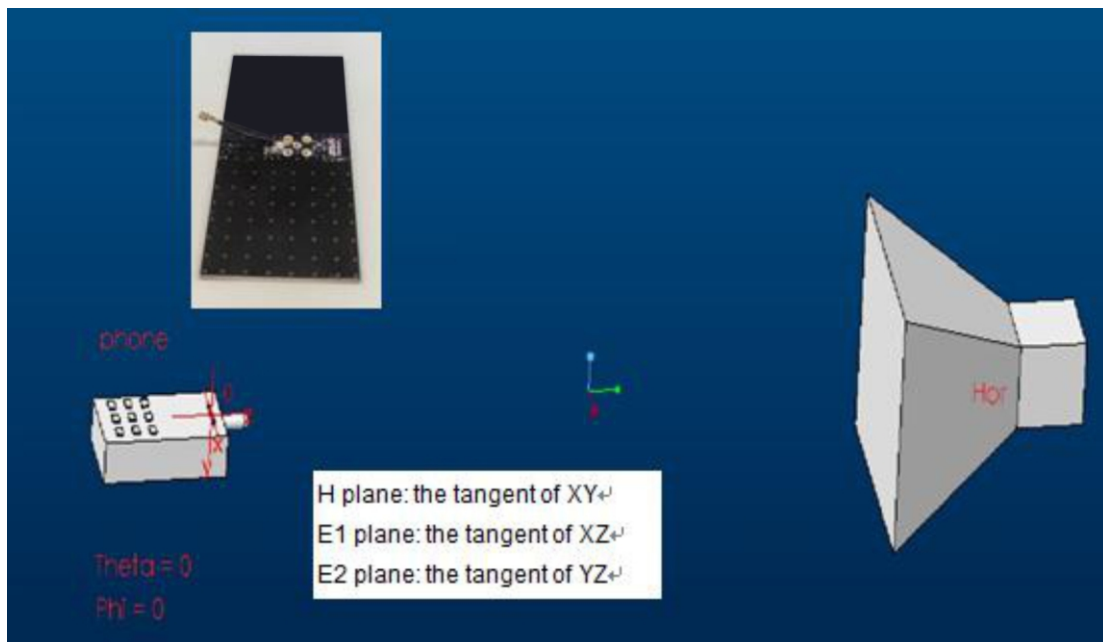
1559.00MHz - 1609.00MHz Efficiency



1559.00MHz - 1609.00MHz Gain

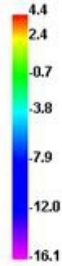


3.5 Directional pattern

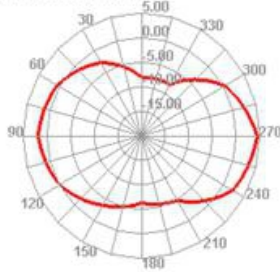


Part name	40*7*3 mm ³ SMD Antenna	Date	2025-08-20
Part number	L-KLS1-GPS-F-SMD40*07*03	Edition	V1
Department		Page	6 / 14

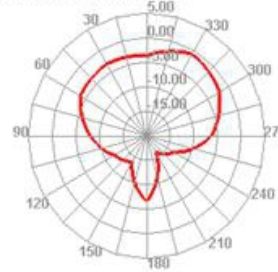
1559.000MHz



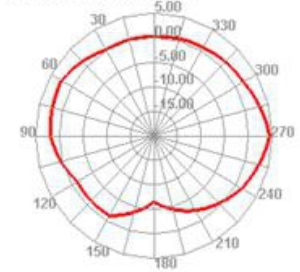
1559.000MHz H



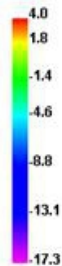
1559.000MHz E1



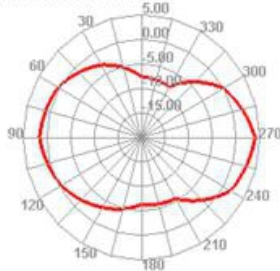
1559.000MHz E2



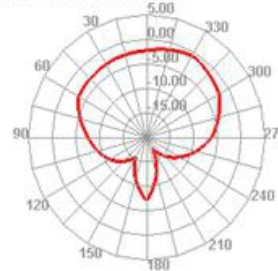
1575.000MHz



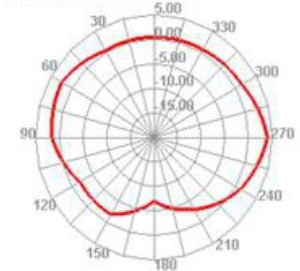
1575.000MHz H



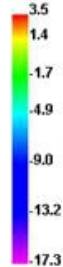
1575.000MHz E1



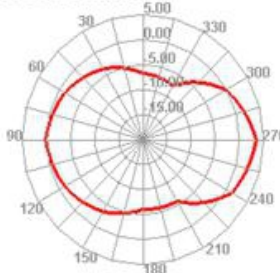
1575.000MHz E2



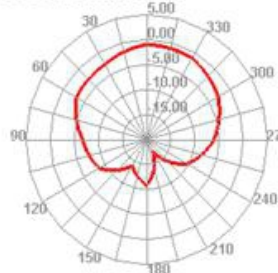
1602.000MHz



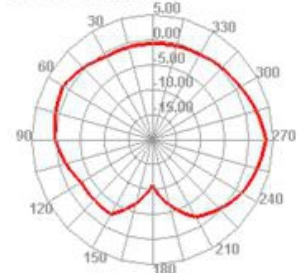
1602.000MHz H



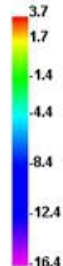
1602.000MHz E1



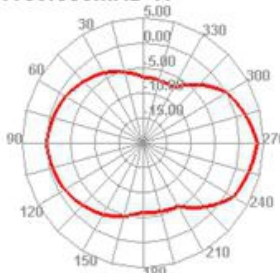
1602.000MHz E2



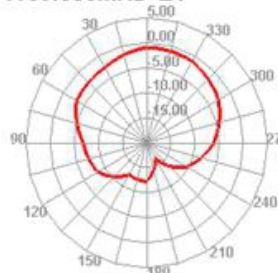
1609.000MHz



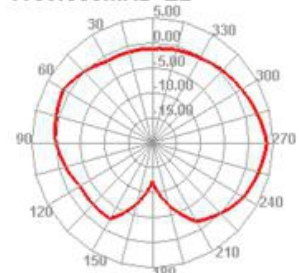
1609.000MHz H



1609.000MHz E1



1609.000MHz E2

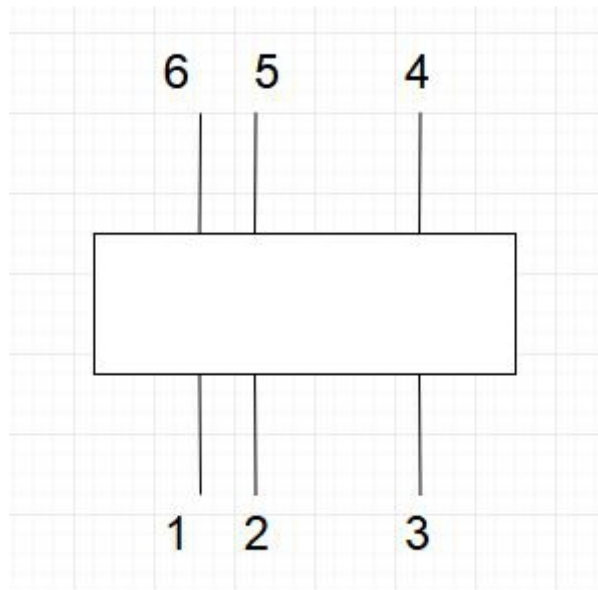


Part name	40*7*3 mm ³ SMD Antenna	Date	2025-08-20
Part number	L-KLS1-GPS-F-SMD40*07*03	Edition	V1
Department		Page	7 / 14

4. Schematic symbol and Pin definition

The pin assignment for the L-KLS1-GPS-F-SMD40*07*03 antenna are as follows. The antenna has 6 pins and 4 work. And another pins are designed for mechanical strength.

All other pins are used for mechanical strength.

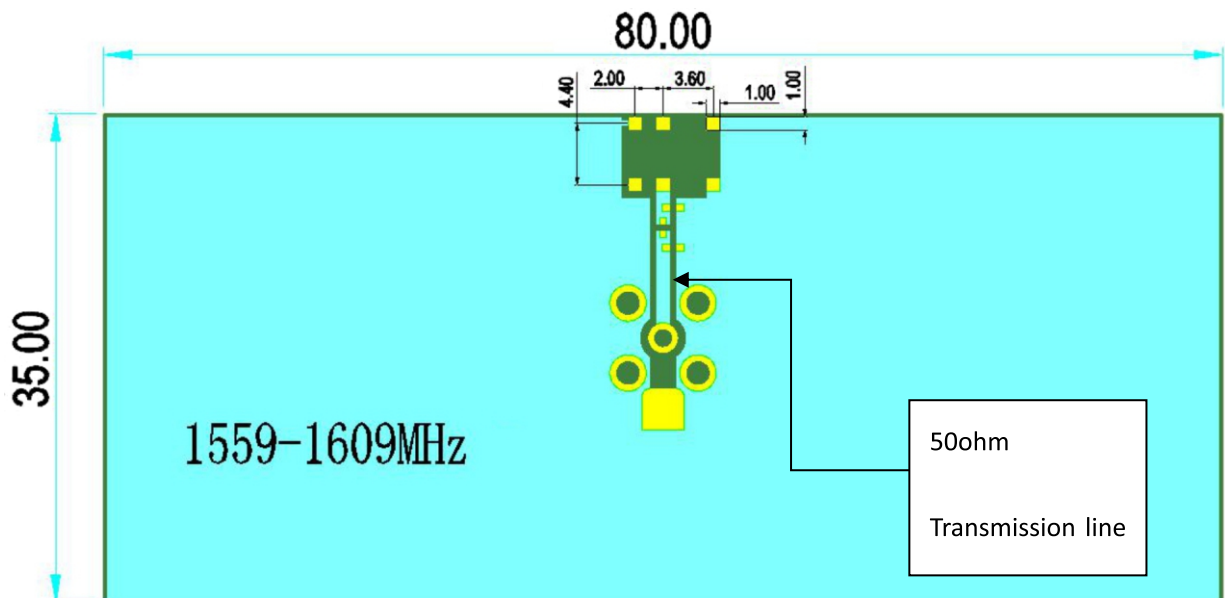


Pin No.	Description
2	Feed
3,4,6	Grounding
1,5	Not used (Mechanical only)

5. Transmission Line

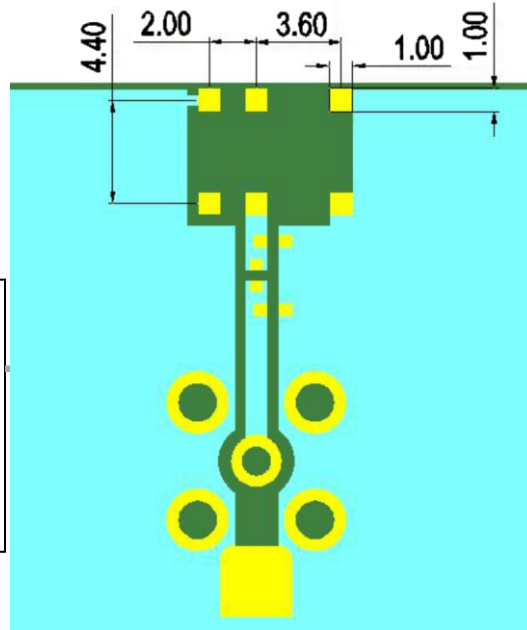
The characteristic impedance of all transmission lines shall be designed as 50 Ω .

- 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

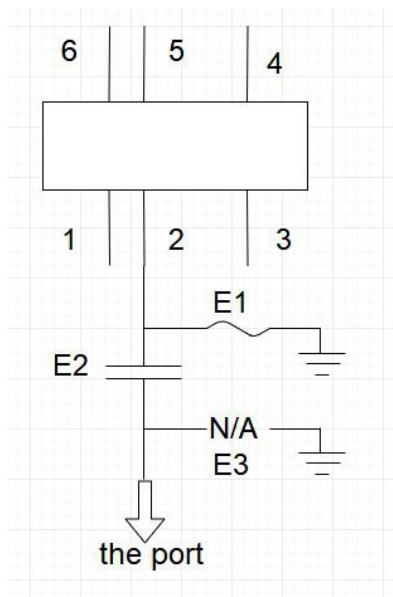


6. Matching circuit

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

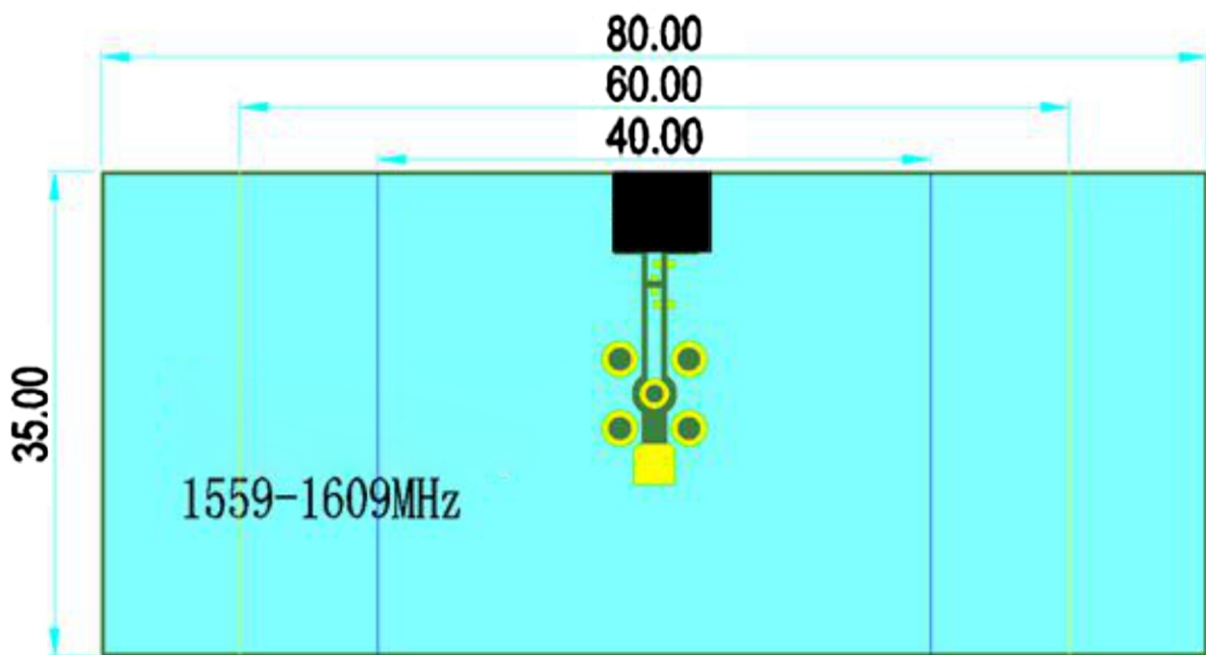
Part name	40*7*3 mm ³ SMD Antenna	Date	2025-08-20
Part number	L-KLS1-GPS-F-SMD40*07*03	Edition	V1
Department		Page	10 / 14

7. Host PCB Requirement

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

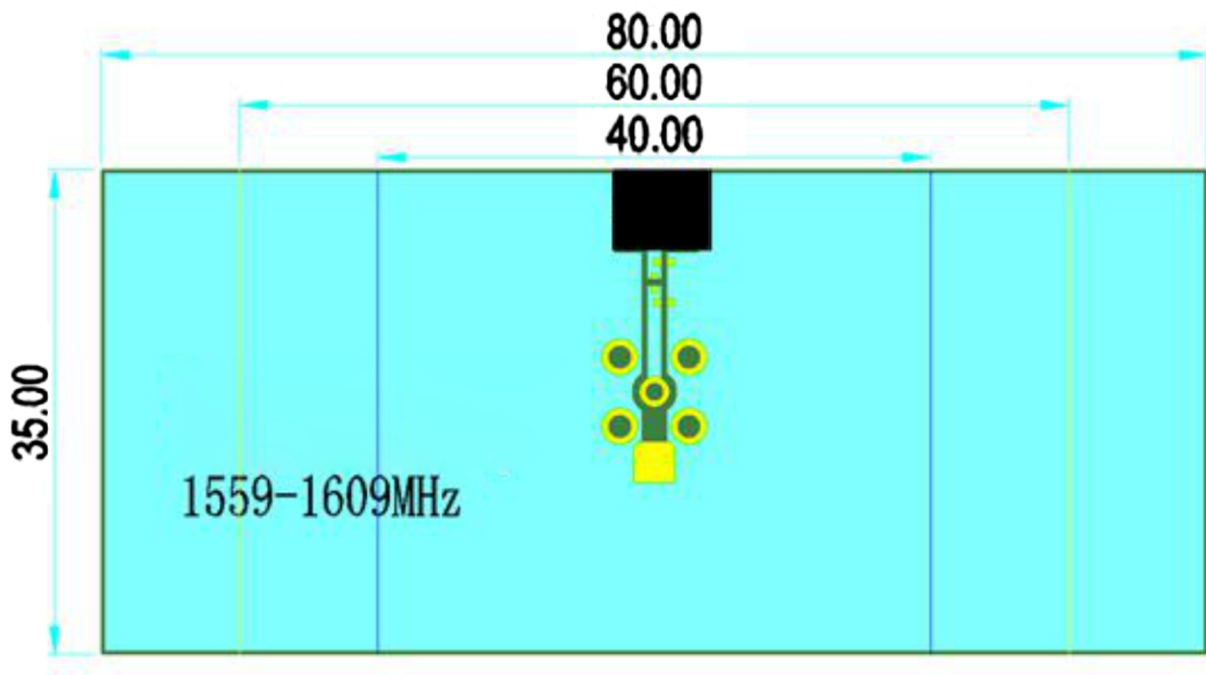
Whichever the host PCB size used, the antenna should be placed ideally on the host PCB's longest edge at the center.

An example of a PCB layout shown as below:



8. Host PCB Size

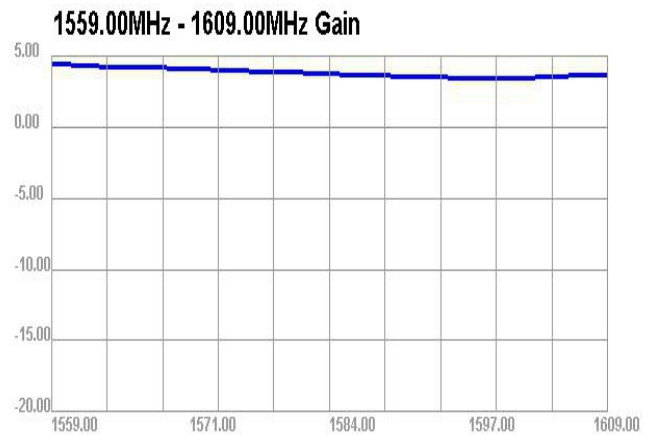
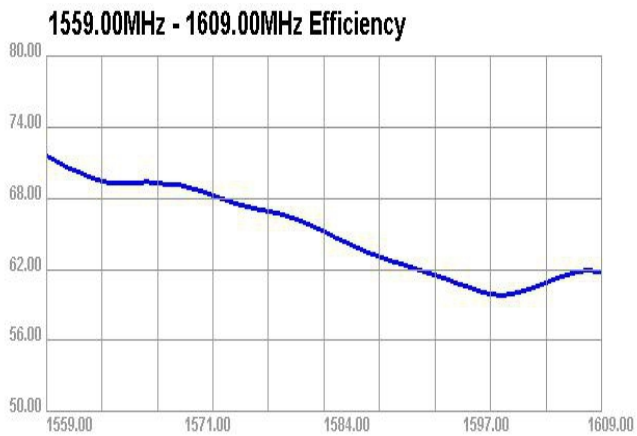
The minimum recommended host PCB size to be used is 40 x 20 (mm). Below is the antenna performance vs PCB length.



Passive Efficiency vs. PCB length

All results measured in Sunnyway's anechoic chamber

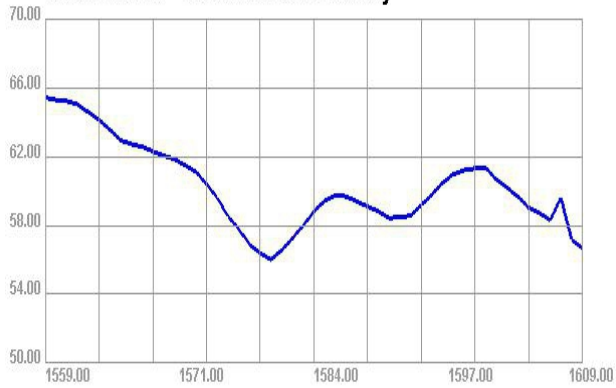
Board length 80mm



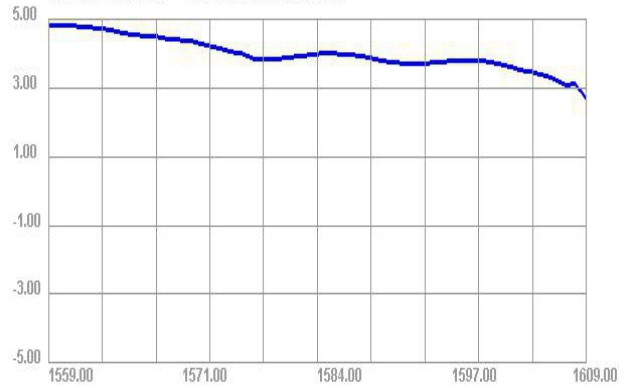
Part name	40*7*3 mm ³ SMD Antenna	Date	2025-08-20
Part number	L-KLS1-GPS-F-SMD40*07*03	Edition	V1
Department		Page	12 / 14

Board length 60mm

1559.00MHz - 1609.00MHz Efficiency

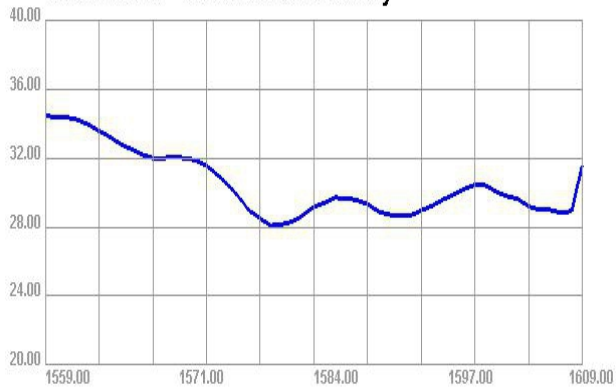


1559.00MHz - 1609.00MHz Gain

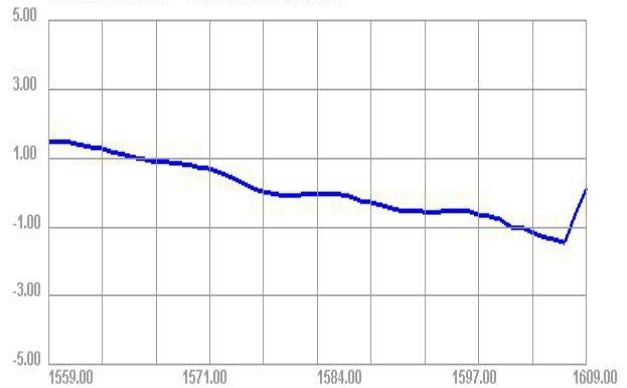


Board length 40mm

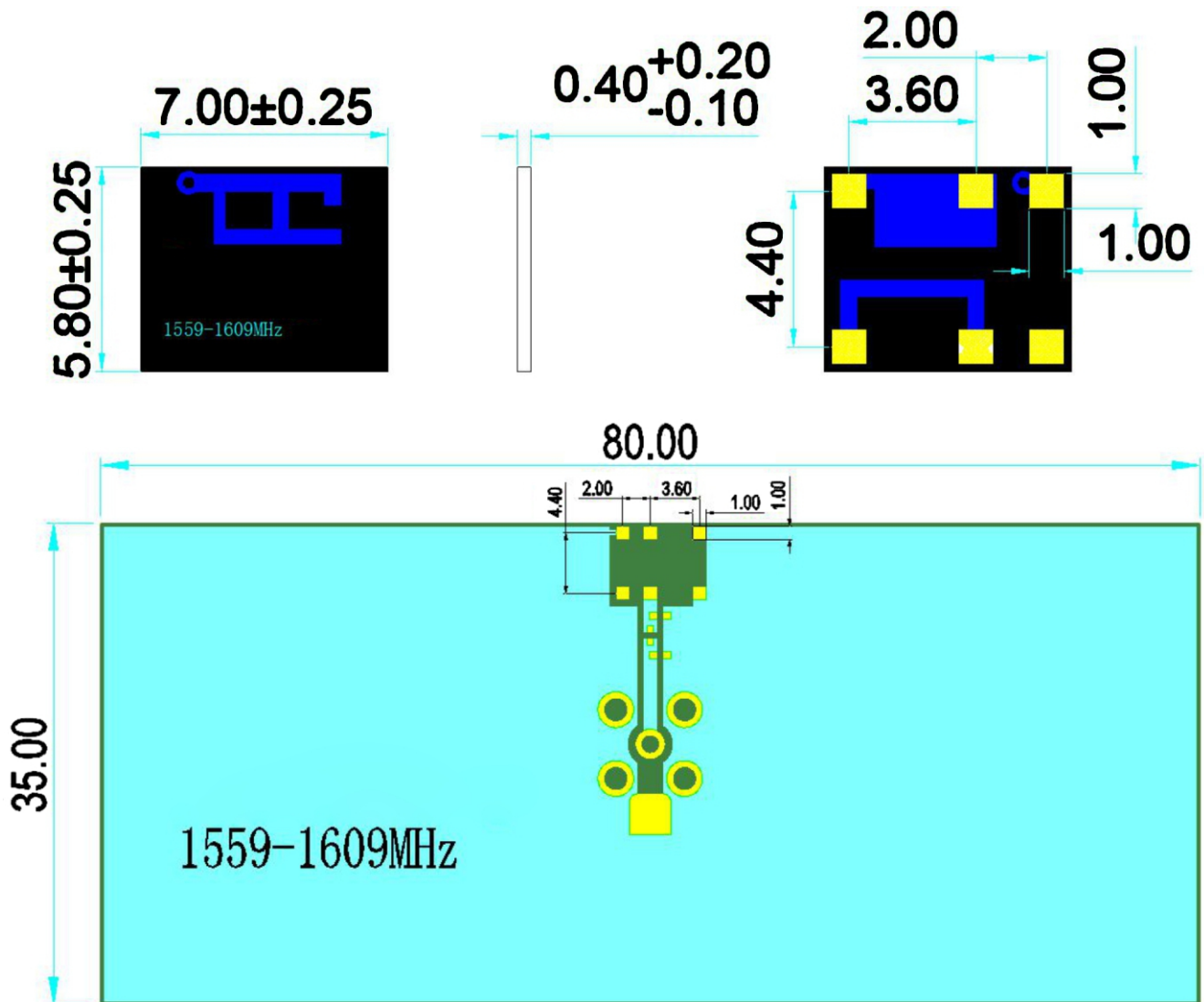
1559.00MHz - 1609.00MHz Efficiency



1559.00MHz - 1609.00MHz Gain



9. Antenna Drawings



10. Soldering Temperature

PHASE	PROFILE FEATURES	PB-Free Assembly(max.)
RAMP-UP	Avg.Ramp-up Rate (T _{smax} to T _p)	3°C/second(max.)
PREHEAT	Temperature Min (T _{smin})	150°C
	Temperature Max (T _{smax})	180°C
	Time (t _{smin} to t _{smax})	120seconds max
REFLOW	Temperature (T _L)	210°C
	Total Time above T _L (T _L)	50seconnds max
PEAK	Temperature (T _p)	260°C
	Time(T _p)	10seconnds max
RAMP-DOWN	Rate	5°C/second max

11. Reflow Profile

