

Product Specification

Number: L-KLS1-FRE-F-SMD20*11*1.6

Name: 20*11*1.6 mm³
SMD Antenna

Customer: _____

Date: 2025-08-20

Customer Signature:



WWW.KLSELE.COM

NINGBO KLS ELECTRONIC CO; LTD

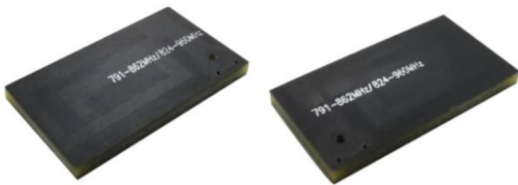
Tel : 0086-574-86828566

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	20*11*1.6 mm ³ SMD Antenna	Date	2025-08-20
Part number	L-KLS1-FRE-F-SMD20*11*1.6	Edition	V1
Department		Page	2 / 15



Features:

Frequency bands from 791 – 960 MHz

Impedance 50 Ohm.

Size 20x 11 x 1.6 mm.

Applications:

Antenna for LP-WAN applications.

Including NB-IOT, LoRa, SigFox, ISM and Weightless-P

Maintains high performance on device: DFI (Designed for Integration),

Part name	20*11*1.6 mm ³ SMD Antenna	Date	2025-08-20
Part number	L-KLS1-FRE-F-SMD20*11*1.6	Edition	V1
Department		Page	3 / 15

1. Electrical Specifications

Standards	NB2-B20	NB2-B5/B8
Frequency range (MHz)	791~862MHz	824~960MHz
Peak Gain (dBi)	0.5~2.7	0.5~2.0
Average Gain (dB)	-4.9~-2.5	-4.3~-2.7
VSWR	< 2.9	<2.6
Return Loss	< -6.2	<-7.2
Efficiency (%)	32.2~56.4	37.0~54.2
Polarization mode	Linear	Linear
Radiation pattern	Omni-Directional	Omni-Directional
Output impedance (Ω)	50	50
Max. Input Power(W)	5	5

Note:

All parameters are measured with KLS's EVK which size is 115*35mm

2. Mechanical and Environmental Specification

Mounting Type	SMD
Antenna size(mm)	20.0mm(L)X11.0mm(W)X1.6mm(H)
Material	PCB
Operating Temperature (°C)	- 40 °C ~ + 85 °C
Storage Temperature(°C)	- 40 °C ~ + 85 °C

Part name	20*11*1.6 mm ³ SMD Antenna	Date	2025-08-20
Part number	L-KLS1-FRE-F-SMD20*11*1.6	Edition	V1
Department		Page	4 / 15

3. Antenna parameters

3.1 General Data

Band	B20		B5 and B8			
FRE (MHz)	791	862	824	894	880	960
VSWR	2.5	2.9	2.2	2.5	2.1	2.6
Return Loss	-7.6	-6.2	-8.2	-7.3	-8.9	-7.2
Eff (%)	32.2	36.6	37.0	39.3	45.6	41.6
Average Gain (dB)	-4.9	-4.4	-4.3	-4.1	-3.4	-3.8

Note:

The performance is shown for two tuned variants (Tuning dependent on required bandS).

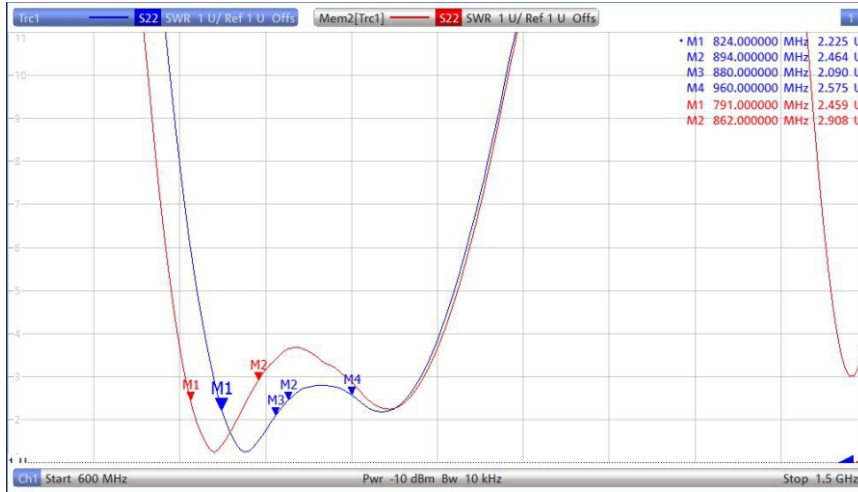
Matching circuit is used for band selection.

B20: 791 – 862MHz

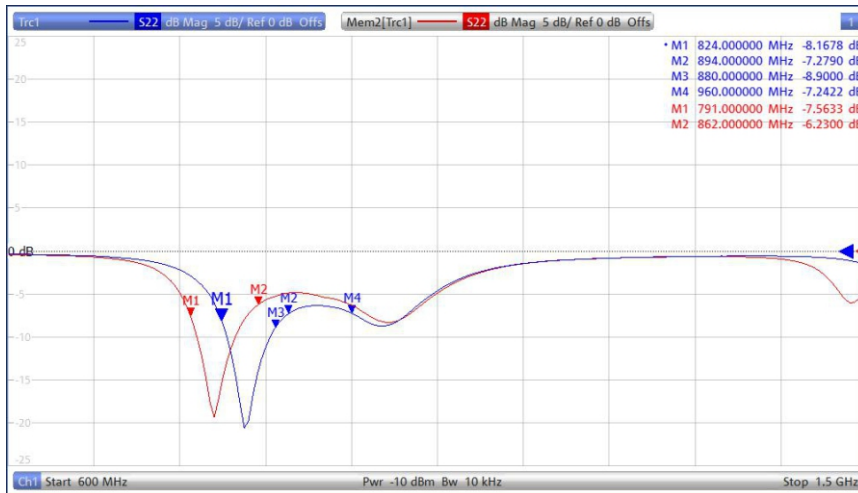
B5 and B8: 824-894MHz; 880- 960MH

Part name	20*11*1.6 mm ³ SMD Antenna	Date	2025-08-20
Part number	L-KLS1-FRE-F-SMD20*11*1.6	Edition	V1
Department		Page	5 / 15

3.2 VSWR

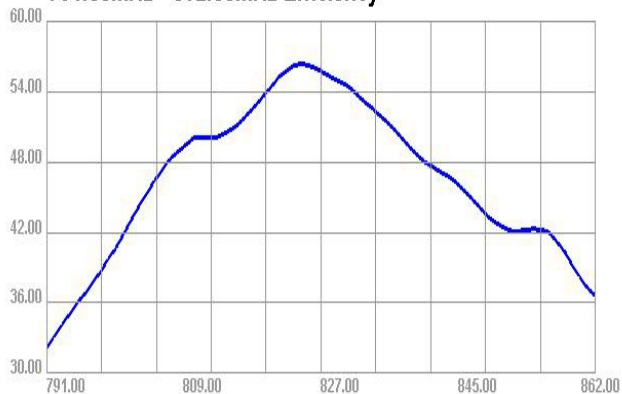


3.3 Return Loss

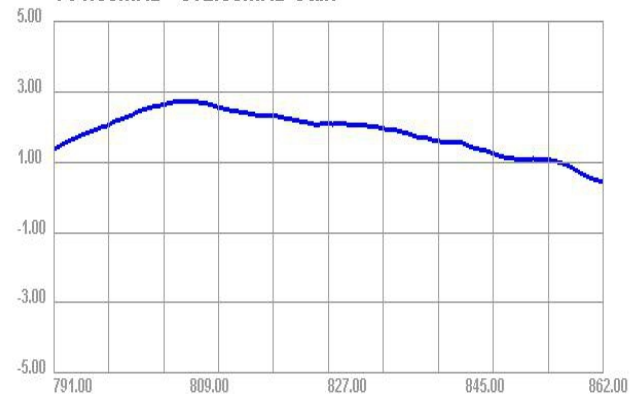


3.4 Efficiency and Gain

791.00MHz - 862.00MHz Efficiency

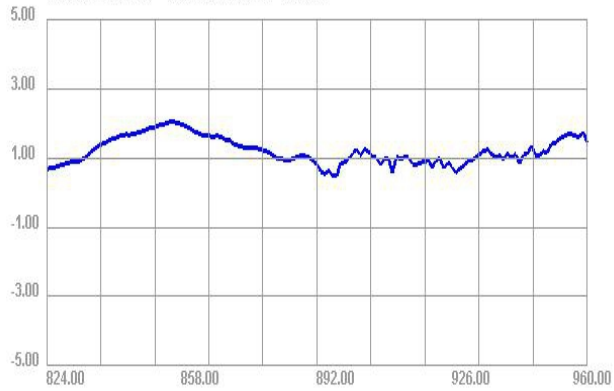


791.00MHz - 862.00MHz Gain

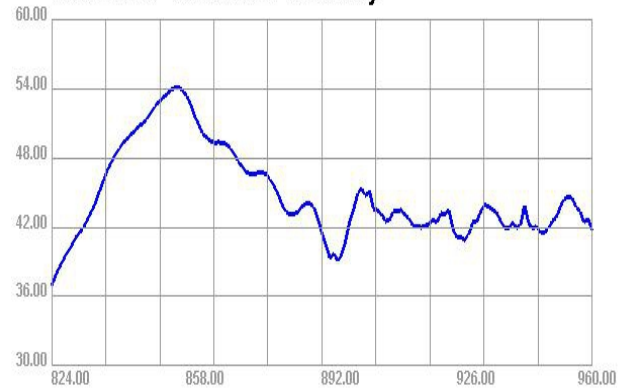


Part name	20*11*1.6 mm ³ SMD Antenna	Date	2025-08-20
Part number	L-KLS1-FRE-F-SMD20*11*1.6	Edition	V1
Department		Page	6 / 15

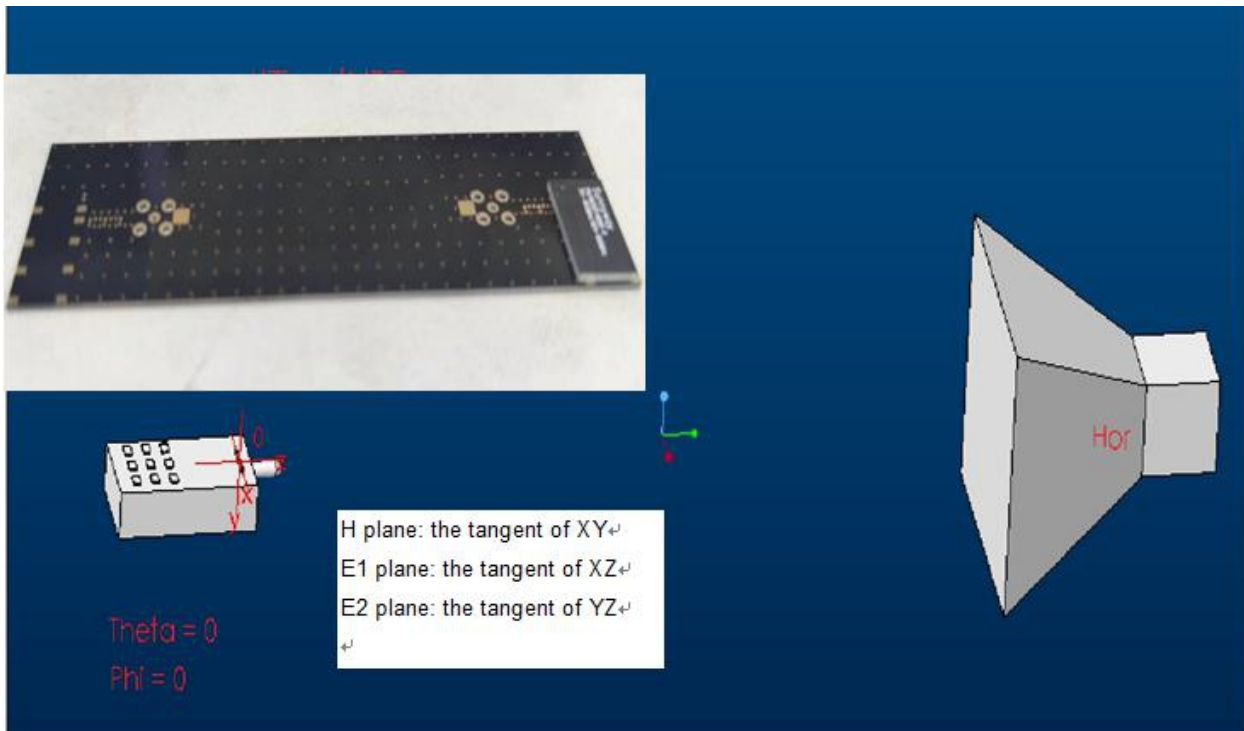
824.00MHz - 960.00MHz Gain



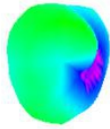
824.00MHz - 960.00MHz Efficiency



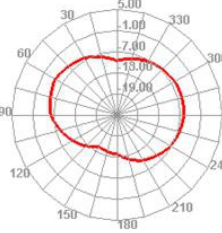
3.5 Directional pattern



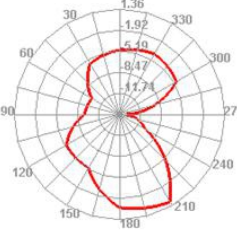
791.000MHz



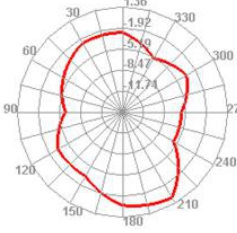
791.000MHz H



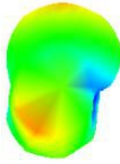
791.000MHz E1



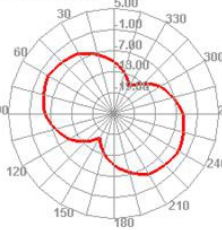
791.000MHz E2



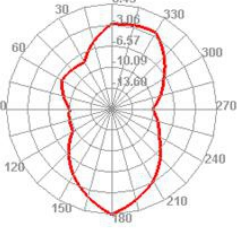
862.000MHz



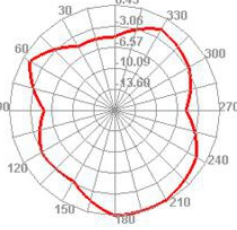
862.000MHz H



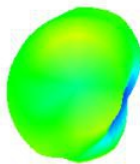
862.000MHz E1



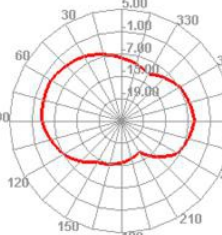
862.000MHz E2



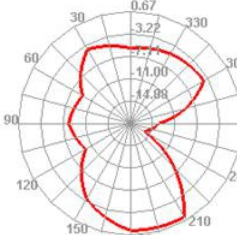
824.000MHz



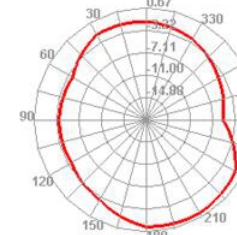
824.000MHz H



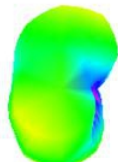
824.000MHz E1



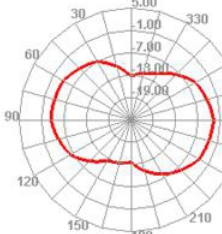
824.000MHz E2



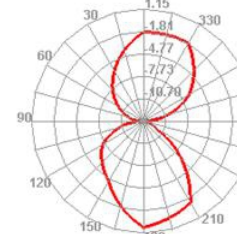
880.000MHz



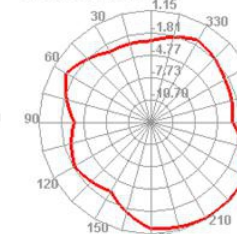
880.000MHz H



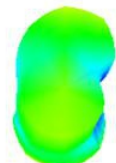
880.000MHz E1



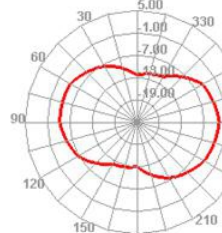
880.000MHz E2



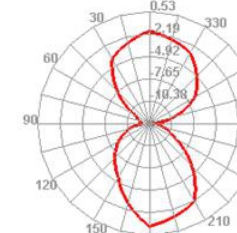
894.000MHz



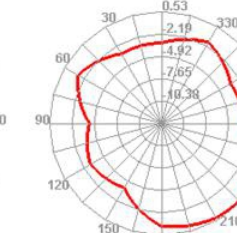
894.000MHz H



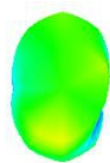
894.000MHz E1



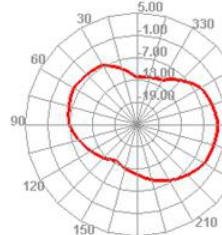
894.000MHz E2



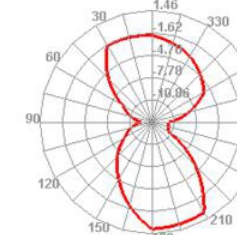
960.000MHz



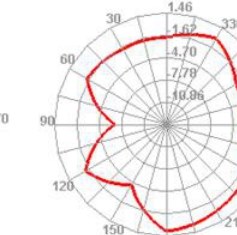
960.000MHz H



960.000MHz E1



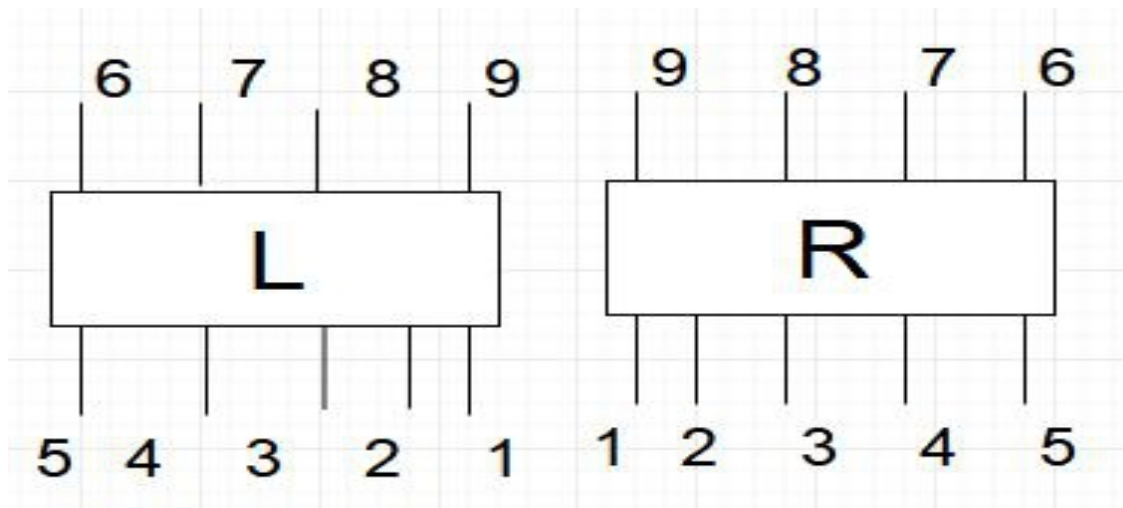
960.000MHz E2



Part name	20*11*1.6 mm ³ SMD Antenna	Date	2025-08-20
Part number	L-KLS1-FRE-F-SMD20*11*1.6	Edition	V1
Department		Page	8 / 15

4. Schematic symbol and Pin definition

The pin assignment for the L-KLS1-FRE-F-SMD20*11*1.6 antenna are as follows. The antenna has 9 pins and only two work. All other pins are designed for mechanical strength. All other pins are used for mechanical strength.



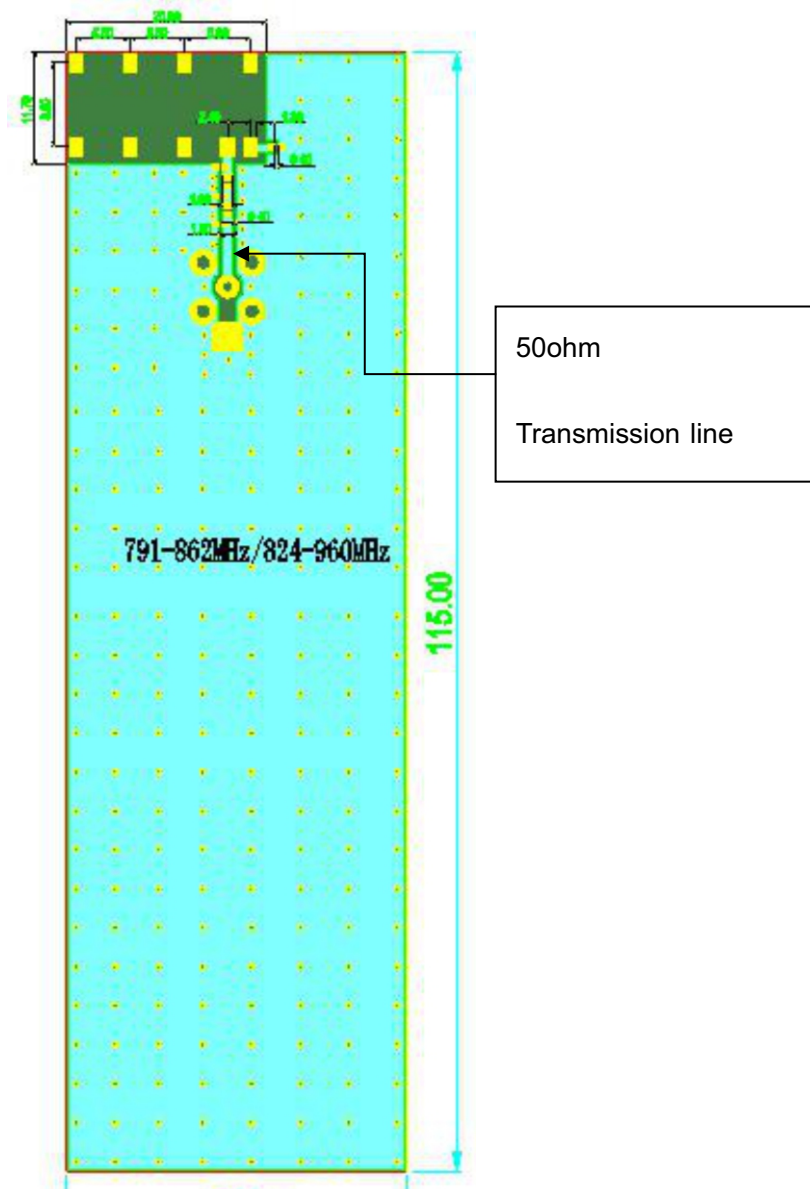
Pin No.	Description
2	Feed
1	Band Select (B.SEL)
3,4,5,6,7,8,9	Not used (Mechanical only)

Part name	20*11*1.6 mm ³ SMD Antenna	Date	2025-08-20
Part number	L-KLS1-FRE-F-SMD20*11*1.6	Edition	V1
Department		Page	9 / 15

5. Transmission Line

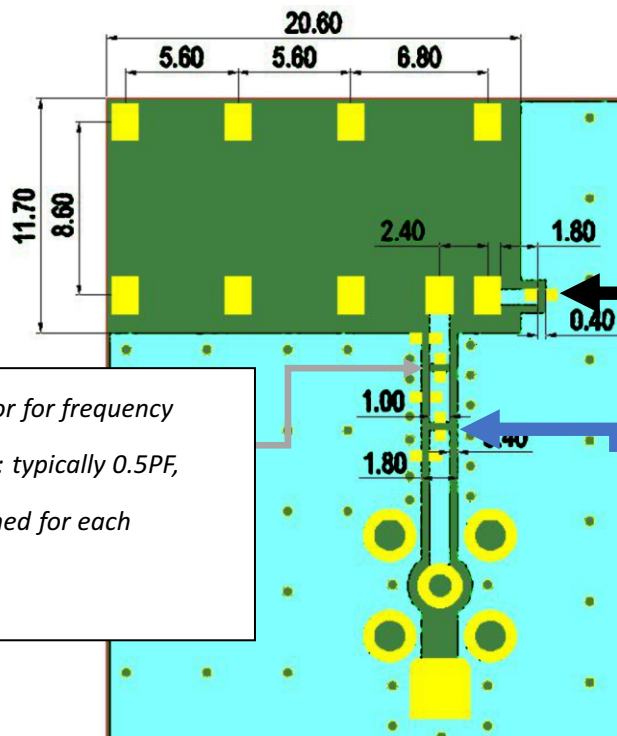
The characteristic impedance of all transmission lines shall be designed as 50 Ω .

- 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



Part name	20*11*1.6 mm ³ SMD Antenna	Date	2025-08-20
Part number	L-KLS1-FRE-F-SMD20*11*1.6	Edition	V1
Department		Page	10 / 15

6. Matching circuit



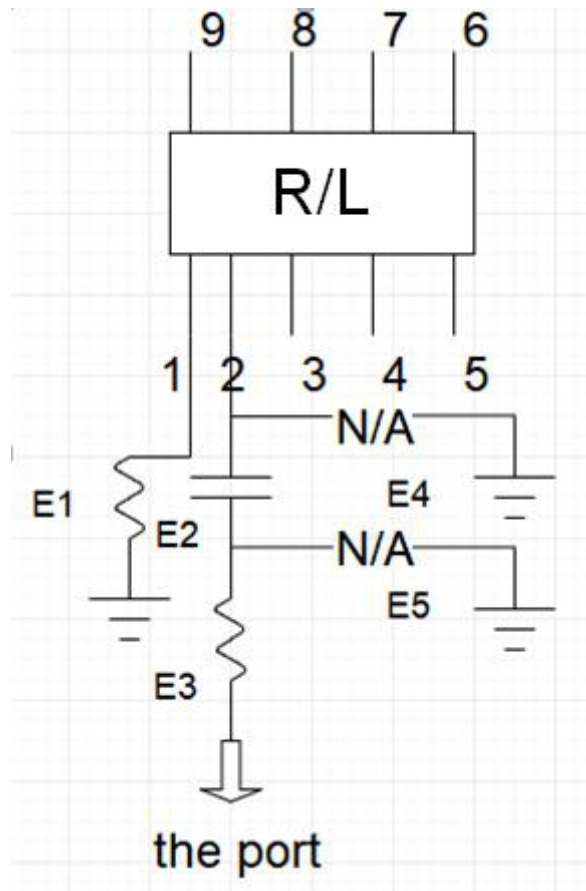
0402 capacitor for frequency tuning. Value: typically 0.5PF, best determined for each integration

0402 sized series-inductor for Band Select. Value: typically 7.5nH, best for B20; typically 6.2nH, best for B5 and B8.

0402 sized series-inductor for frequency tuning. Value: typically 22nH, 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 five 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.

Part name	20*11*1.6 mm ³ SMD Antenna	Date	2025-08-20
Part number	L-KLS1-FRE-F-SMD20*11*1.6	Edition	V1
Department		Page	11 / 15



B.SEL (Band Selection pin component)

Frequency band	Type	Value
E1	B20	Inductor
	B5, B8	Inductor

	Type	Value
E2	Capacitor	0.5Pf
E3	Inductor	22nH
E4	N/A	N/A
E5	N/A	N/A

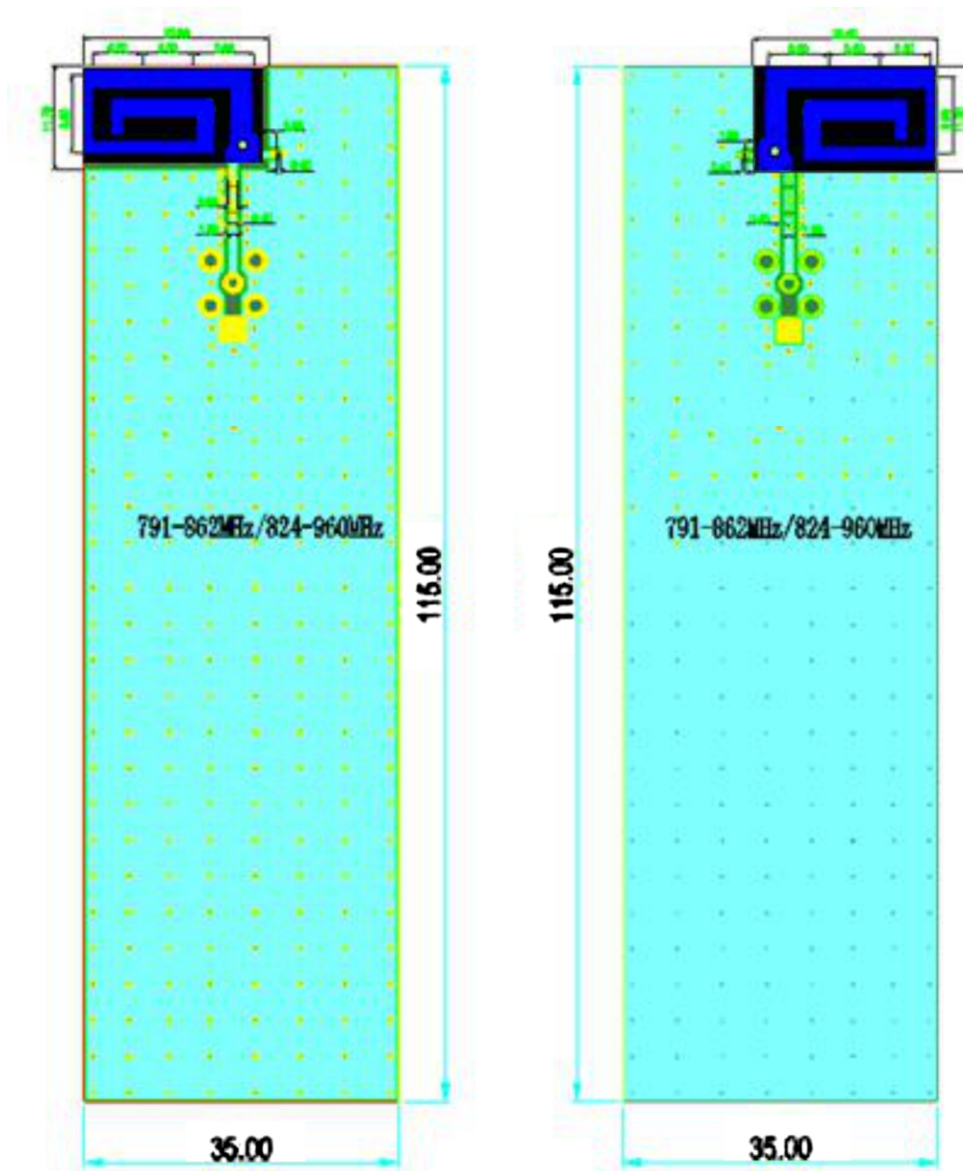
Part name	20*11*1.6 mm ³ SMD Antenna	Date	2025-08-20
Part number	L-KLS1-FRE-F-SMD20*11*1.6	Edition	V1
Department		Page	12 / 15

7. Host PCB Requirement

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

No matter how big the main circuit board is, the antenna is best placed on the shortest side of the main circuit board, in the corner. The left / right antennas are placed in the corresponding corner of the PCB:

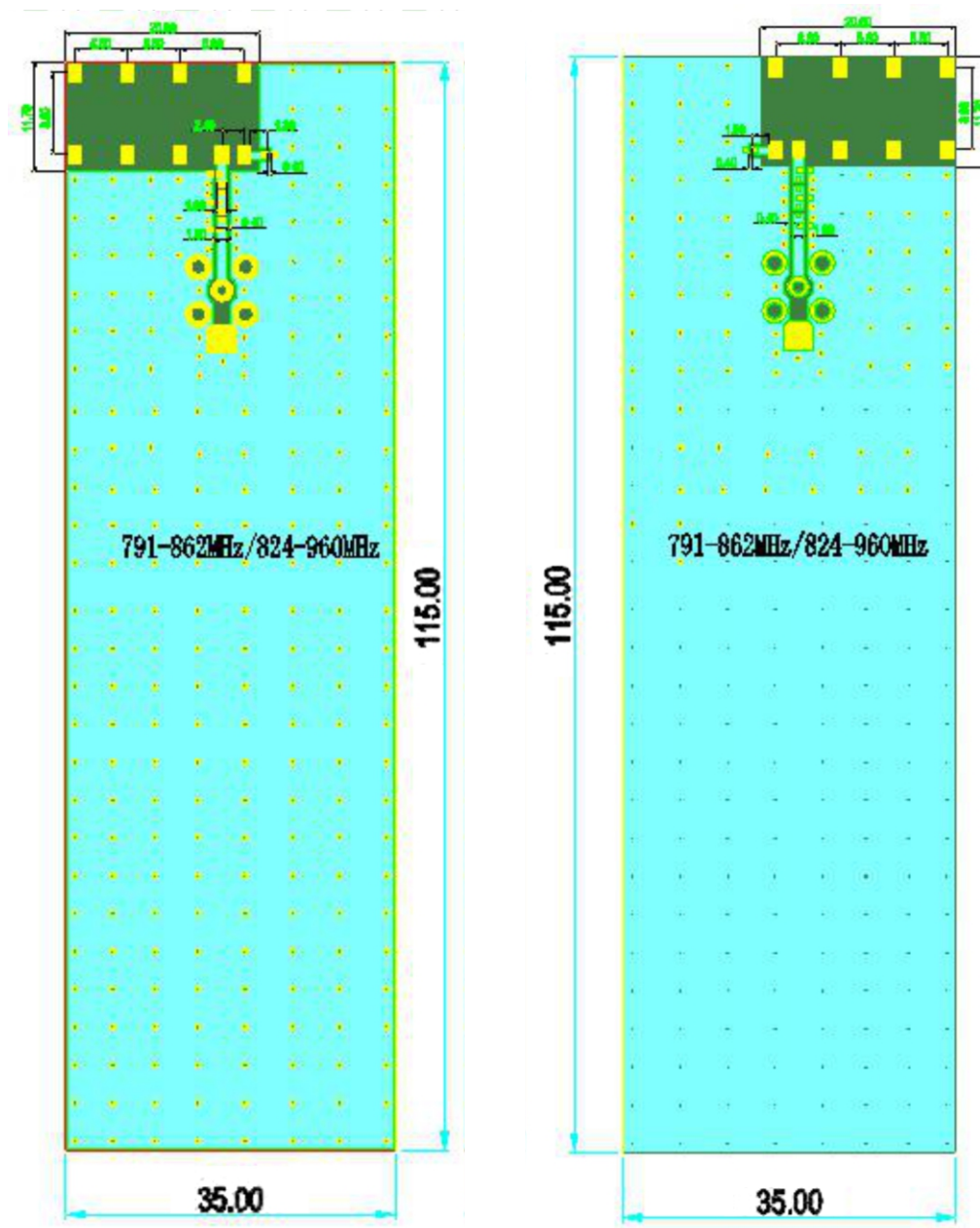
An example of a PCB layout shown as below:



Part name	20*11*1.6 mm ³ SMD Antenna	Date	2025-08-20
Part number	L-KLS1-FRE-F-SMD20*11*1.6	Edition	V1
Department		Page	13 / 15

8. Host PCB Size

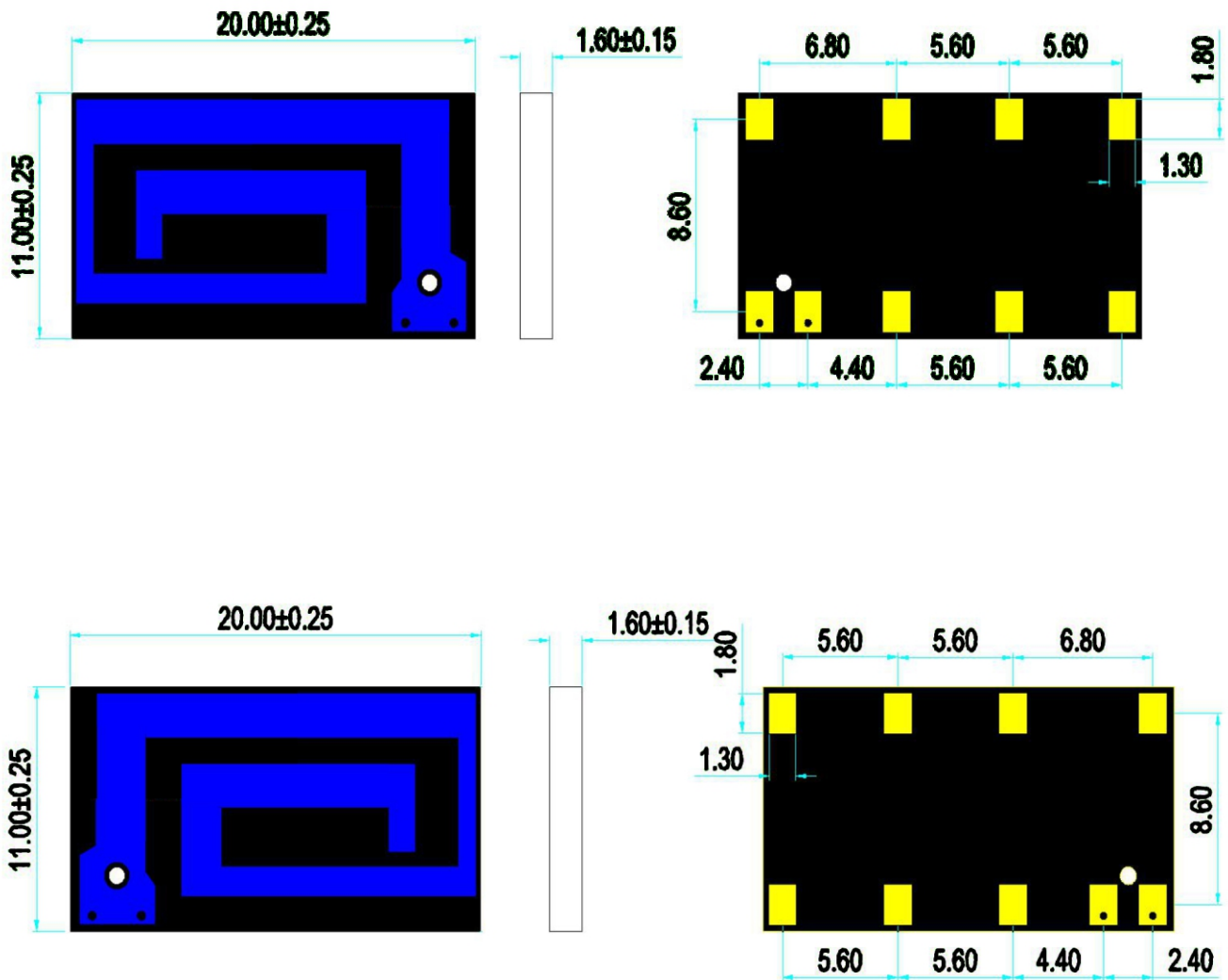
The minimum recommended host PCB size to be used is 115 x 35 (mm). Below is the antenna dimension.



Part name	20*11*1.6 mm ³ SMD Antenna	Date	2025-08-20
Part number	L-KLS1-FRE-F-SMD20*11*1.6	Edition	V1
Department		Page	14 / 15

9. Antenna Drawings

All dimensions are in mm



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

