SWD021

PN: SW20301IB66

Features:

- Frequency bands from 610~6000MHz .
- SMD Compliant.
- Impedance 50 Ohm.
- Antenna for 5G / 4G / 3G/ 2G applications including MIMO systems.

Applications:

- Application of 5G/4G/3G/2G equipment.
- LTE ,NB-Iot, Cat M1.
- Portable Devices.
- Remote monitoring.
- Network Devices.
- Wearable devices.
- Autonomous/UAVs
- Smart Metering.
- Payment Terminals.

Sunnyway Technology

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1. Electrical Specifications

Standards	5G&4G&3G&2G		
Frequency range (MHz)	610~960	1400~2700	3000~6000
Peak Gain (dBi)	-1.5~2.7	0.0~7.5	0.2~6.0
Average Gain (dB)	-5.0~-1.0	-5.1~-1.7	-5.2~-1.5
VSWR	< 3.0	< 5.5	< 4.0
Return Loss	< -5.0	< -3.0	< -5.0
Efficiency (%)	31.4~77.9%	30.0~68.2%	30.5~70.9%
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 145.0*42.3mm

2. Mechanical and Environmental Specification

Mounting Type	SMD
Antenna size(mm)	42.2 (L) x10.3 (W) x 1.6 (H)
Material	PCB
Operating Temperature (˚C)	- 40 ˚C ~ + 85 ˚C
Storage Temperature(˚C)	- 40 ˚C ~ + 85 ˚C

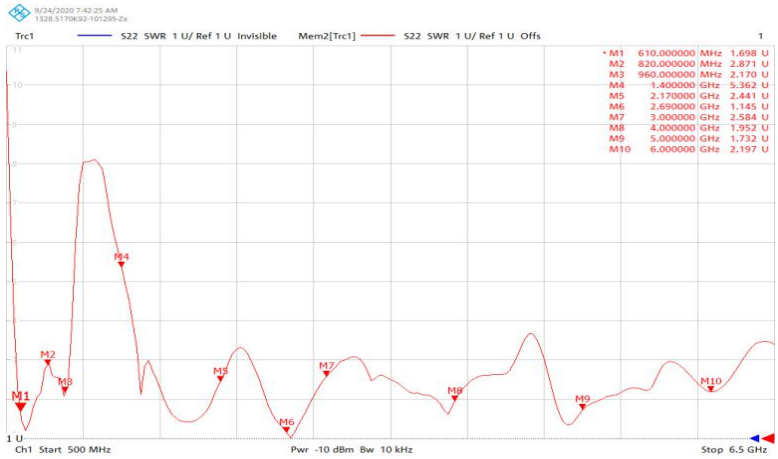
3. Antenna parameters

5G&4G&3G&2G(Board length 145mm)

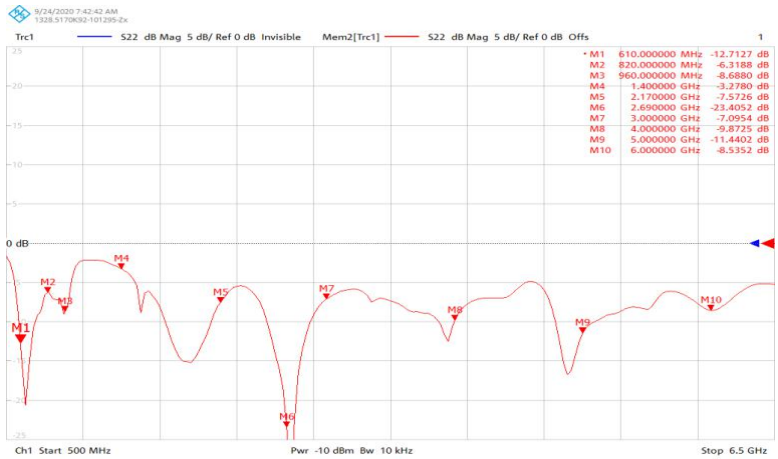
3.1 General Data

FRE (MHz)	610	820	960	1400	2170	2690	3000	4000	5000	6000
VSWR	1.7	2.9	2.2	5.4	2.4	1.2	2.6	2.0	1.7	2.2
Return Loss	-12.7	-6.3	-8.7	-3.3	-7.6	-23.4	-7.1	-9.9	-11.4	-8.5
Eff (%)	34.9	41.5	63.1	30.0	59.2	59.8	64.0	57.9	63.6	35.4
Average Gain (dB)	-4.6	-3.8	-2.0	-5.1	-2.3	-2.2	-1.9	-2.4	-2.0	-4.5

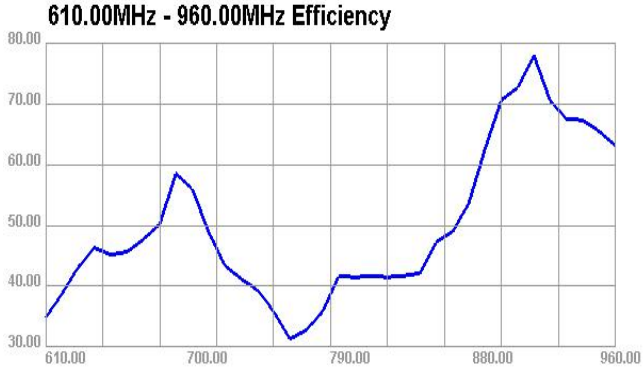
3.2 VSWR

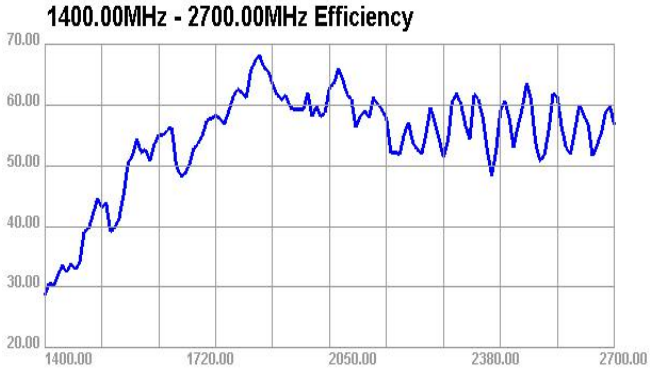


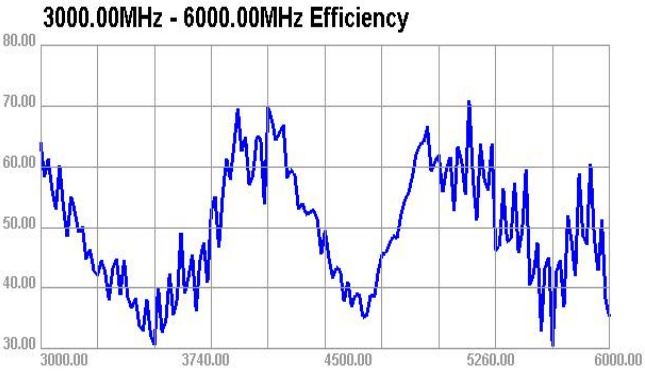
3.3 Return Loss



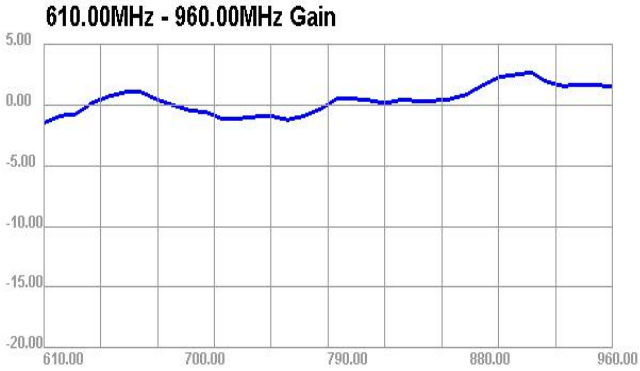
3.4 Efficiency

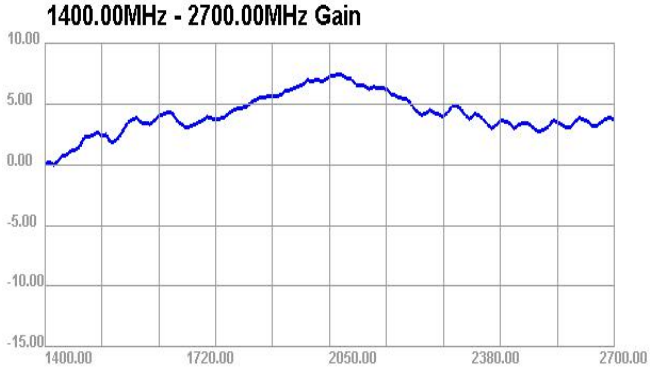


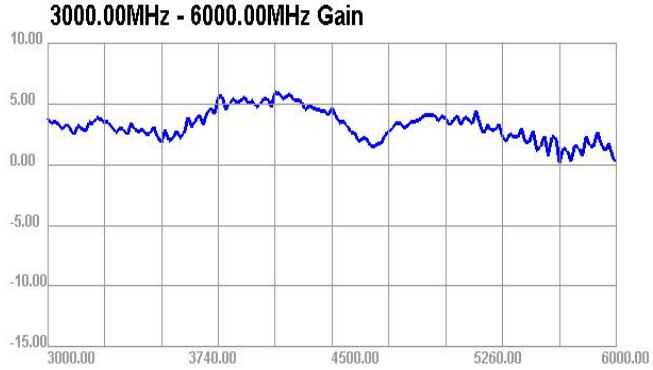




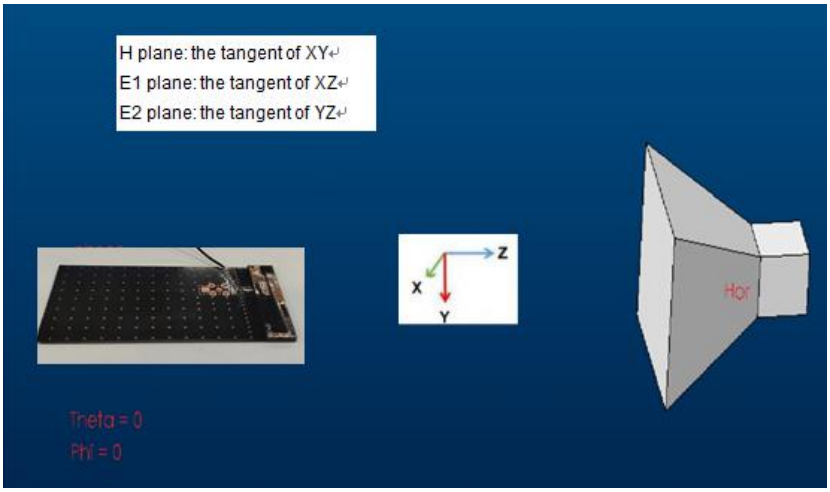
3.5 Gain

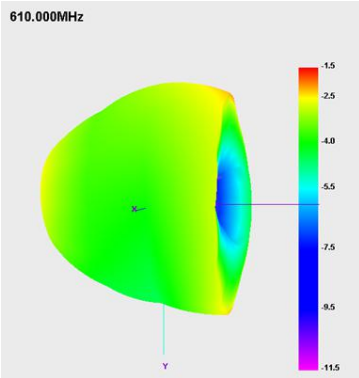


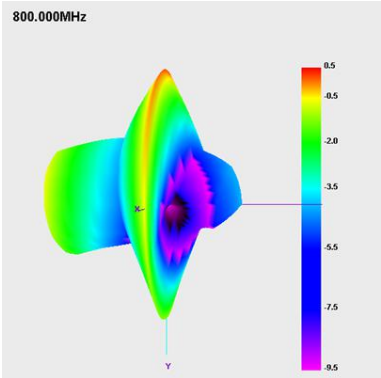


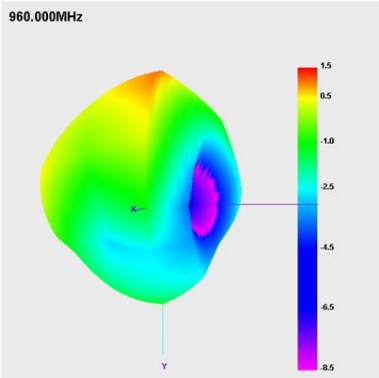


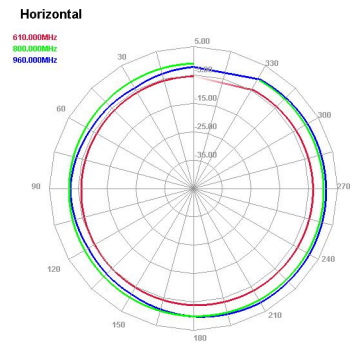
3.6 Directional pattern

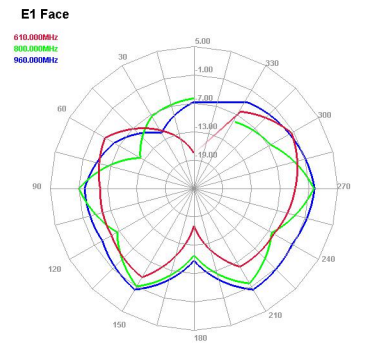


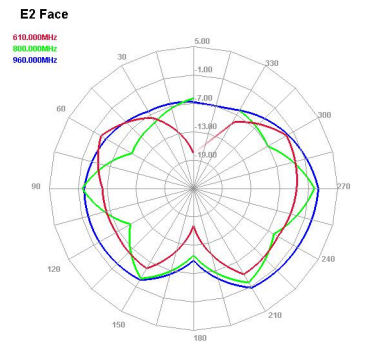


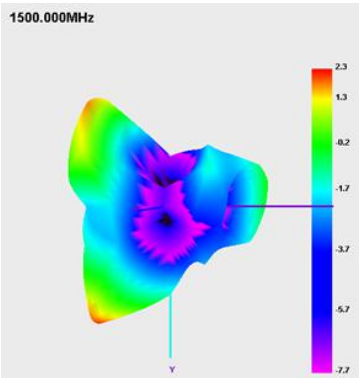


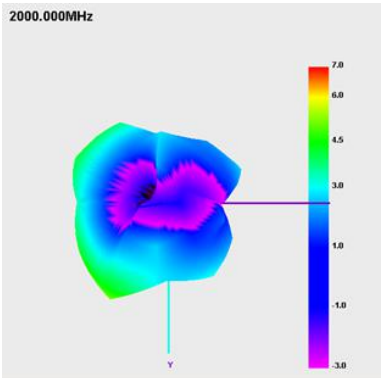


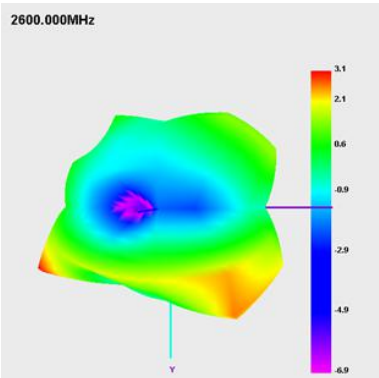


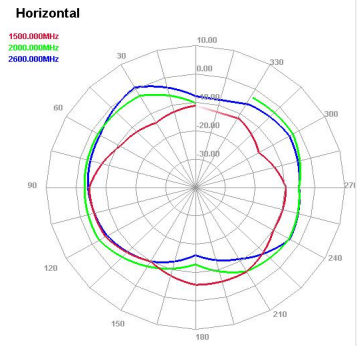


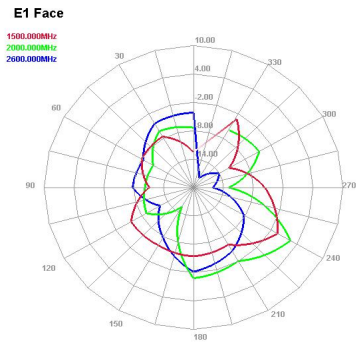


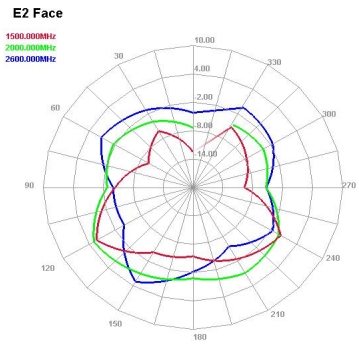


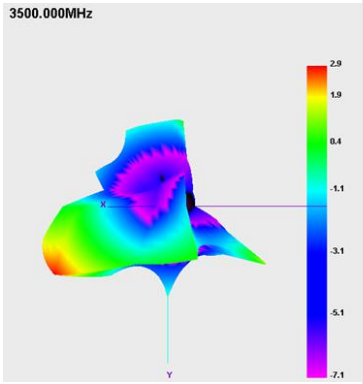


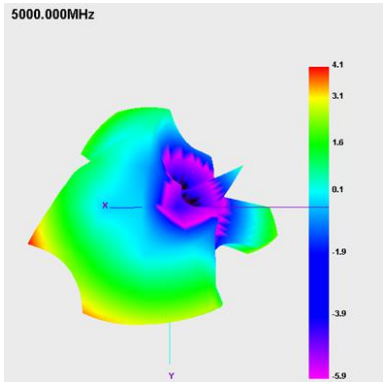


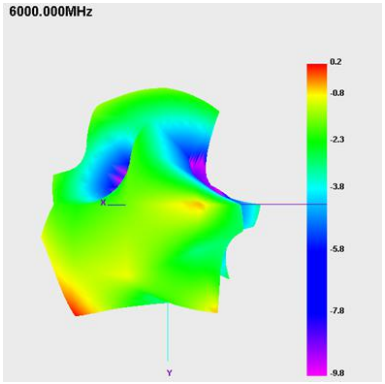

Horizontal
1500.000MHz
2000.000MHz
2600.000MHz

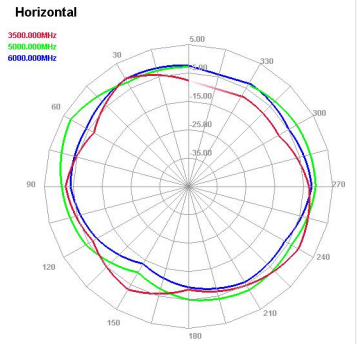

E1 Face
1500.000MHz
2000.000MHz
2600.000MHz

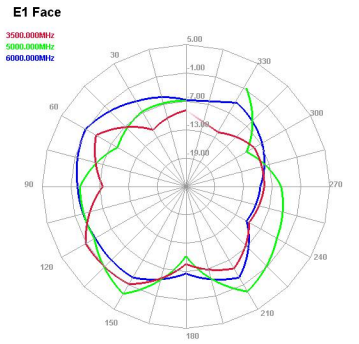

E2 Face
1500.000MHz
2000.000MHz
2600.000MHz

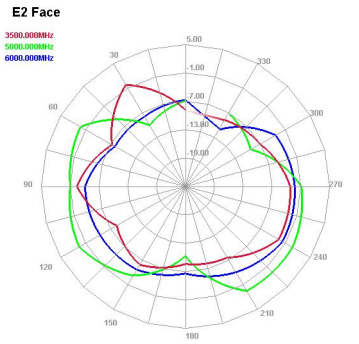

3500.000MHz


5000.000MHz


6000.000MHz


Horizontal
3500.000MHz
5000.000MHz
6000.000MHz


E1 Face
3500.000MHz
5000.000MHz
6000.000MHz

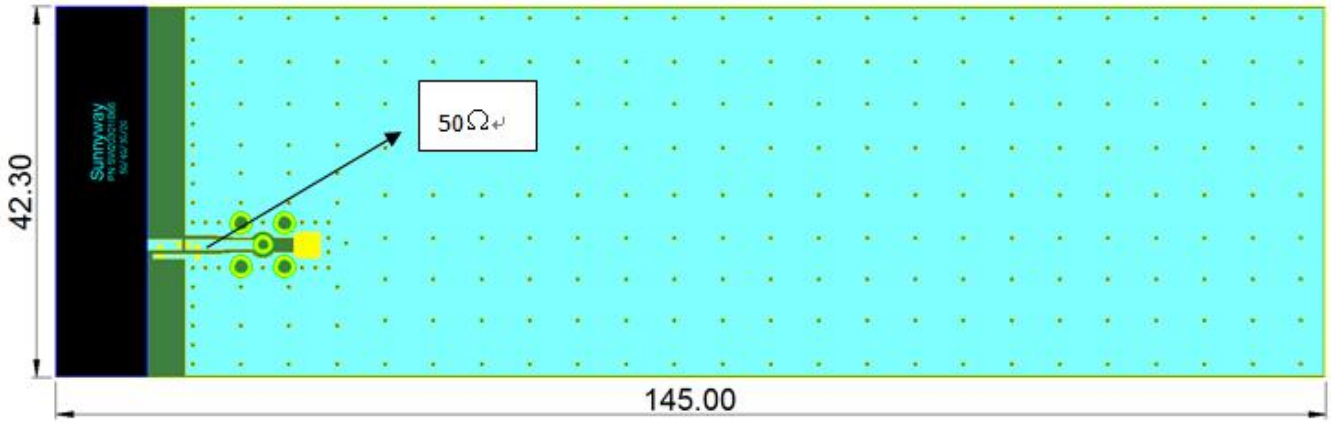

E2 Face
3500.000MHz
5000.000MHz
6000.000MHz

4. Transmission Line

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

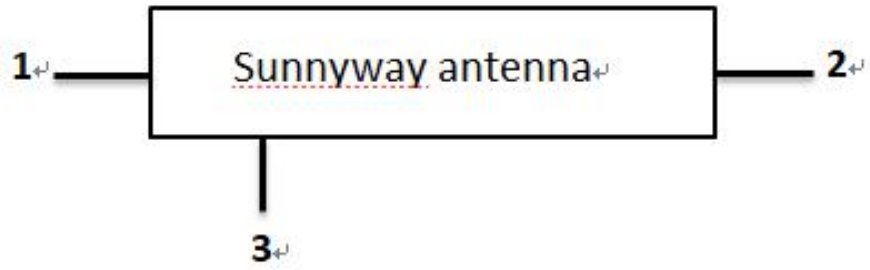
• The length of the transmission lines should be kept to as short as possible

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



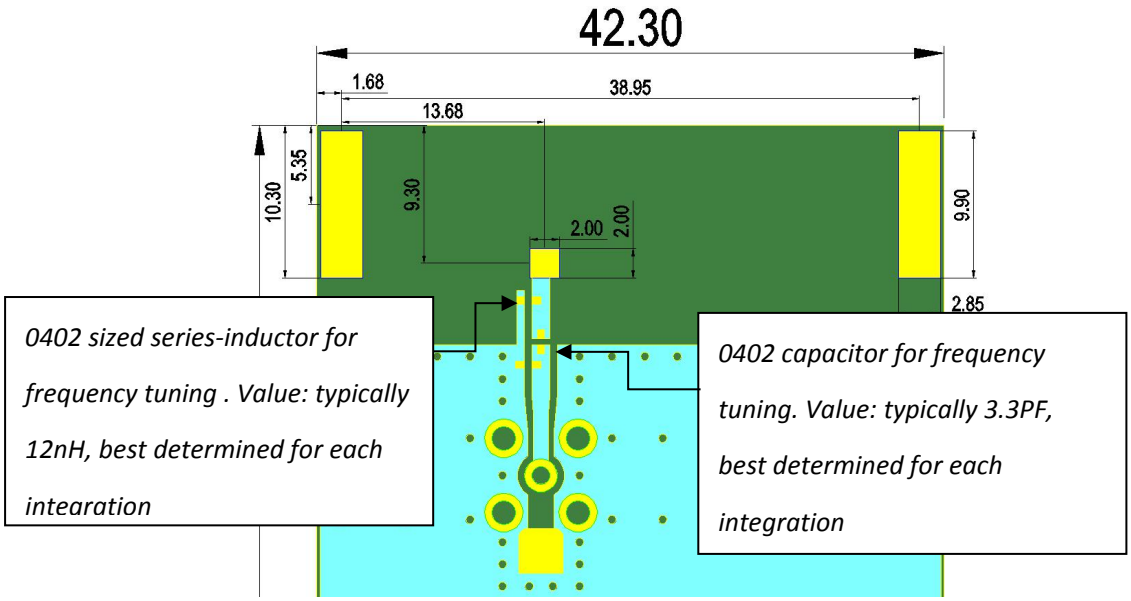
5. Schematic symbol and Pin definition

The pin assignment for the SWD021 antenna are as follows. The antenna has 3 pins and only one work. All other pins are designed for mechanical strength.

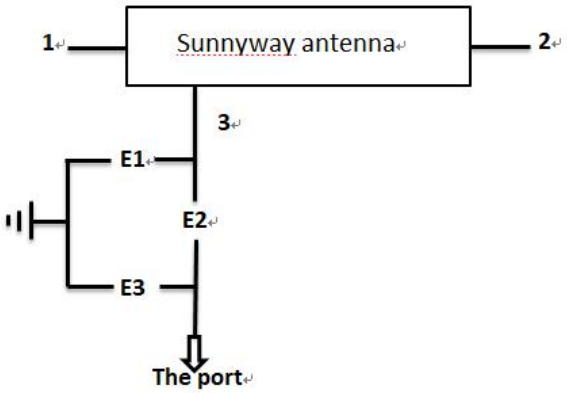


Pin No.	Description
3	Feed
1/2	Not used (Mechanical only)

6. Matching circuit



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.

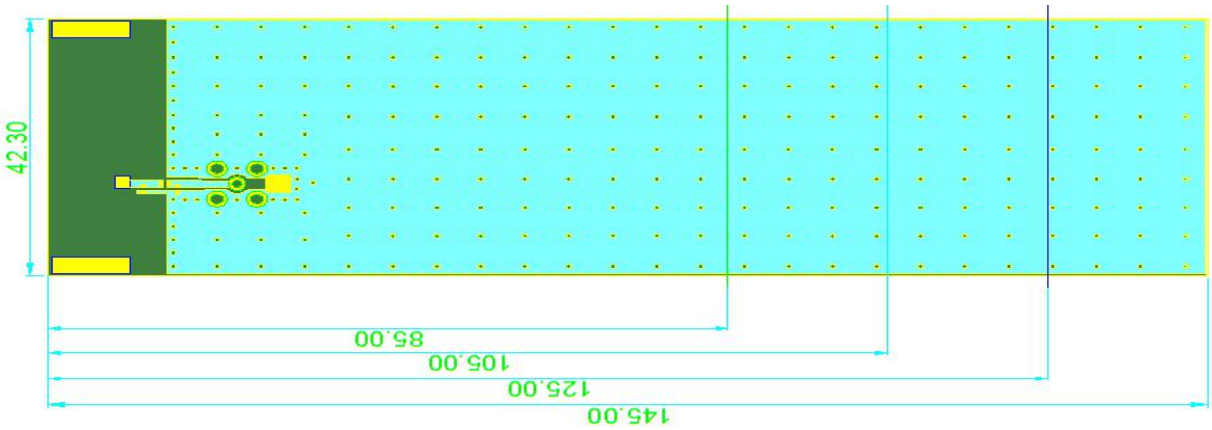


Pin No.	Type	Value
E1	Inductor	12nH
E2	Capacitor	3.3pF
E3	N/A	N/A

7. 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.

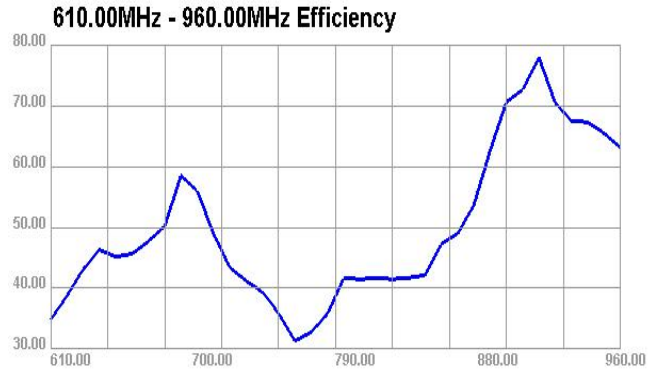
Take antenna efficiency measurement results on different GND sizes as an example:

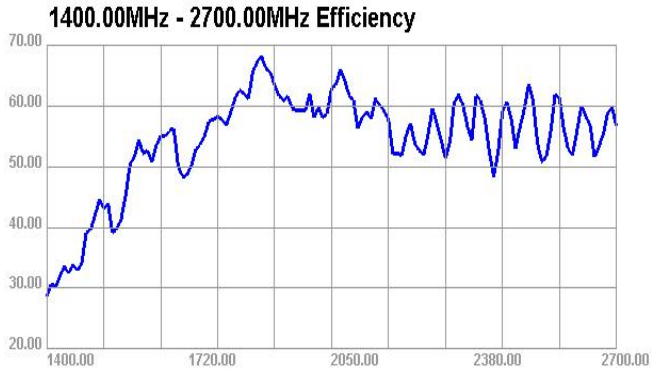


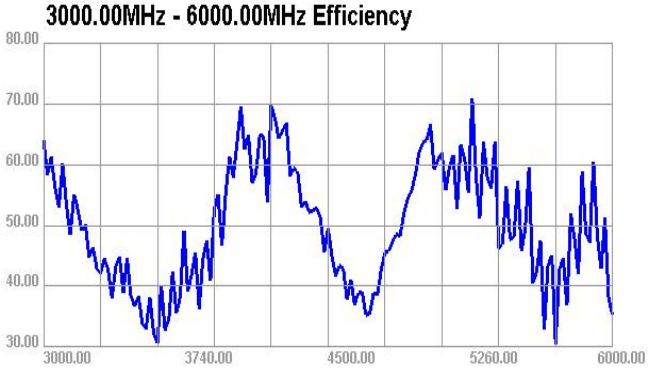
Passive Efficiency vs. PCB length

All results measured in Sunnyway's anechoic chamber

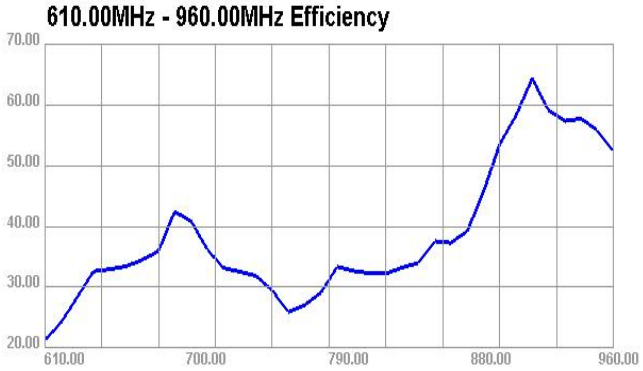
7.1 Board length 145mm

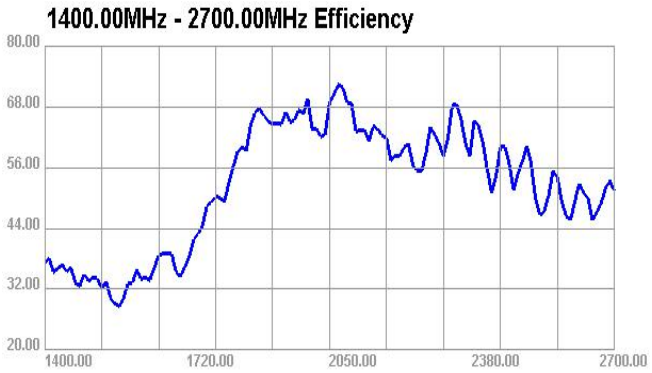


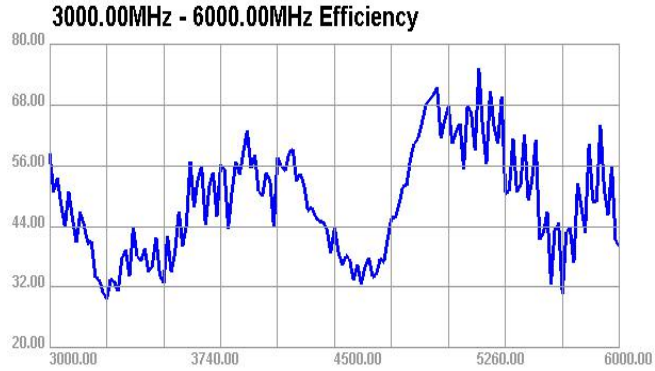




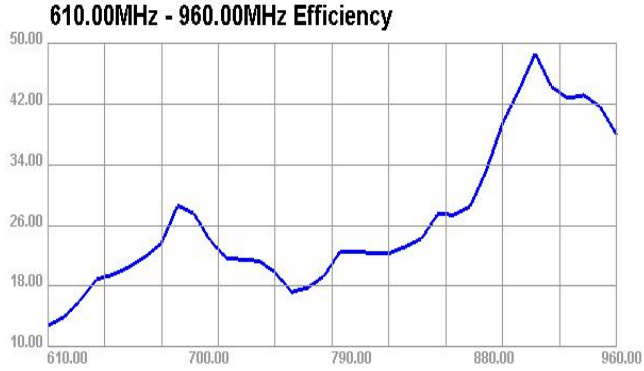
7.2 Board length 125mm

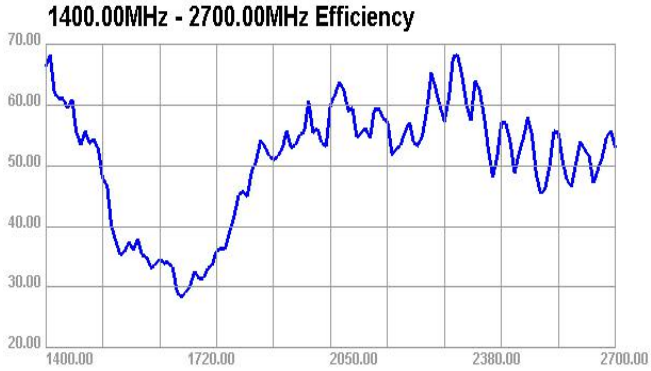


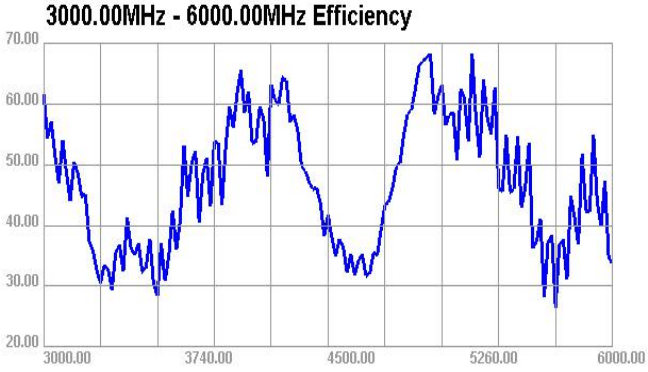




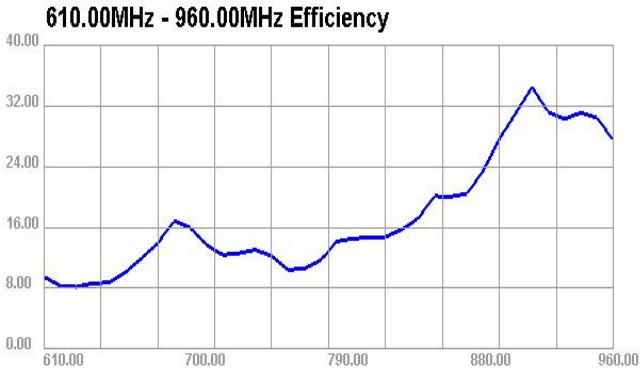
7.3 Board length 105mm

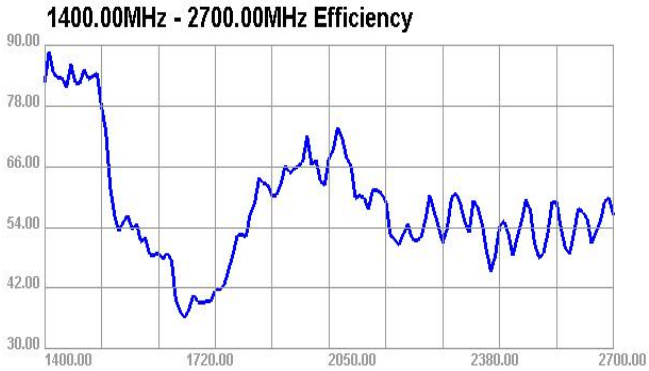


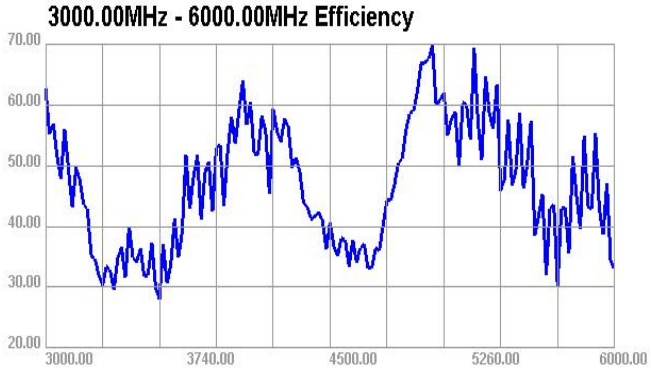




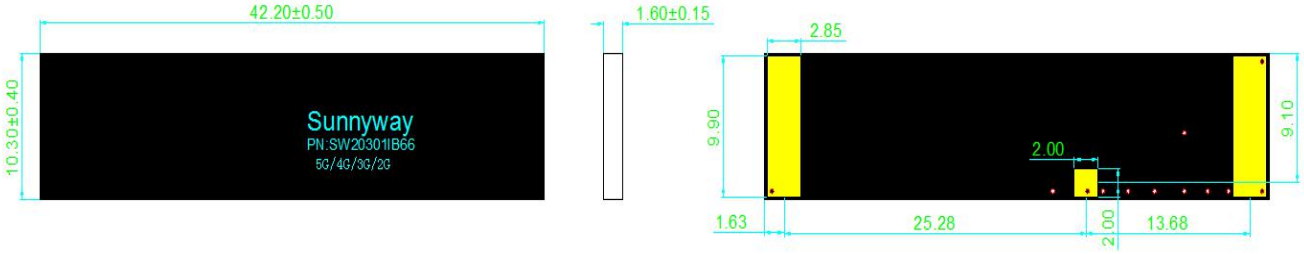
7.4 Board length 85mm

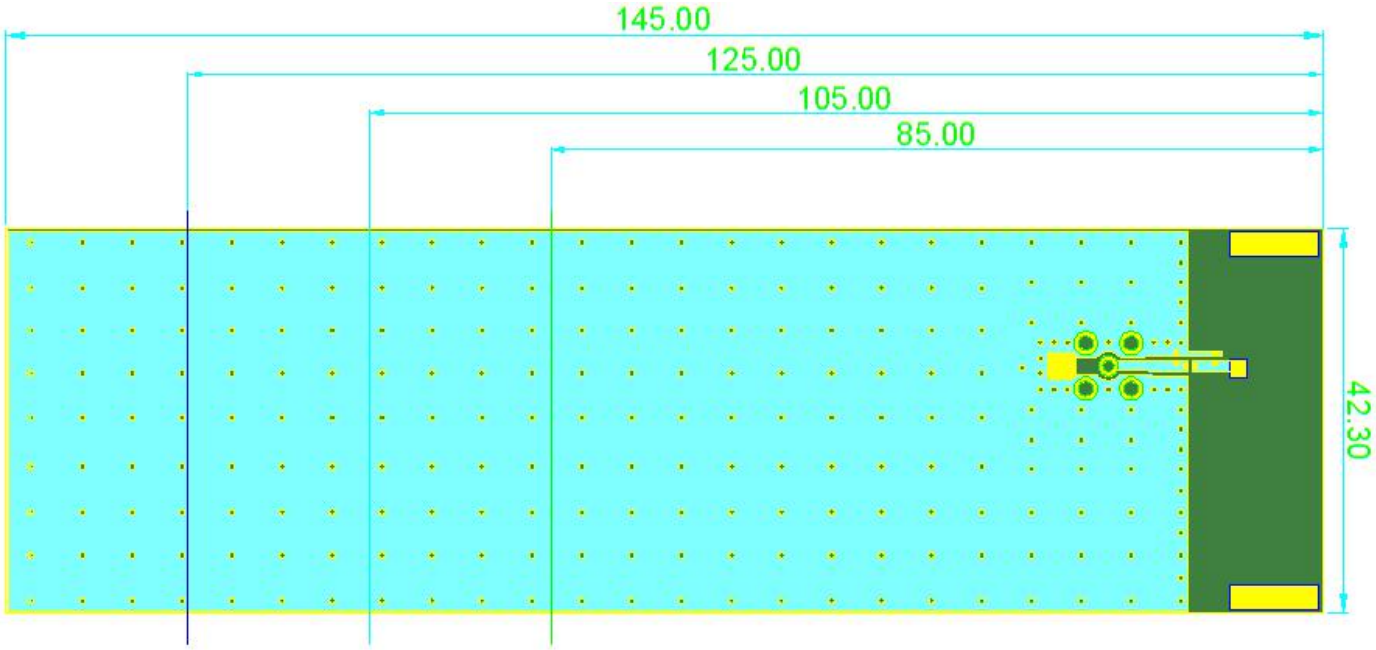






8. Antenna Drawings





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