antenova

DATASHEET

Opaca

SR4L104 • IamiiANT®

Features

- Antenna for 3G, 4G and 5G bands applications
- High performance: DFI (Designed For Integration)
- Suitable for high volume manufacturing
- Supports Band 71 (617-698MHz)
- High Efficiency (helps with gaining PTCRB certification)

1. Description

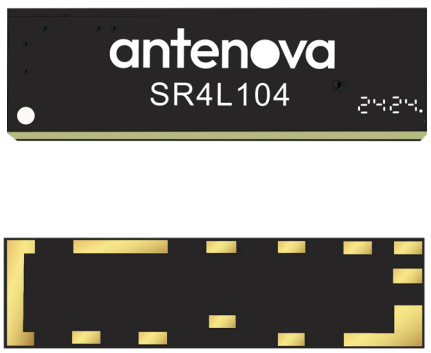
The antenna covers the most common 4G & 5G bands worldwide: B71 (617-698MHz), LTE700, GSM850, GSM900, DCS1800, PCS1900, WCDMA2100, LTE B7 (2500-2690MHz), LTE B40 (2300 – 2400MHz) and 5G B78 (3300-3800MHz). 4400-7125MHz.

2. Applications

- Remote monitoring & Telematics
- Network devices such as cellular routers
- Drone communications
- 5G Access points
- POS (Point of Sale) terminals
- M2M (Machine to Machine)
- IoT (Internet of Things)
- CCTV (Closed Circuit TV) over

3. Part number

SR4L104



4. General data

Frequency	617-960MHz 1420-1660MHz 1710-2170MHz 2300-2400MHz 2500-2700MHz 3300-4200MHz 4400-7125MHz
Polarization	Linear
Operating temperature	-40°C to 140°C
Environmental condition test	ISO16750-4 5.1.1.1/5.1.2.1/5.3.2
Impedance with matching	50 Ω
Weight	<1.5g
Antenna type	SMD
Dimensions	38.0 x 10.0 x 3.3 (mm)

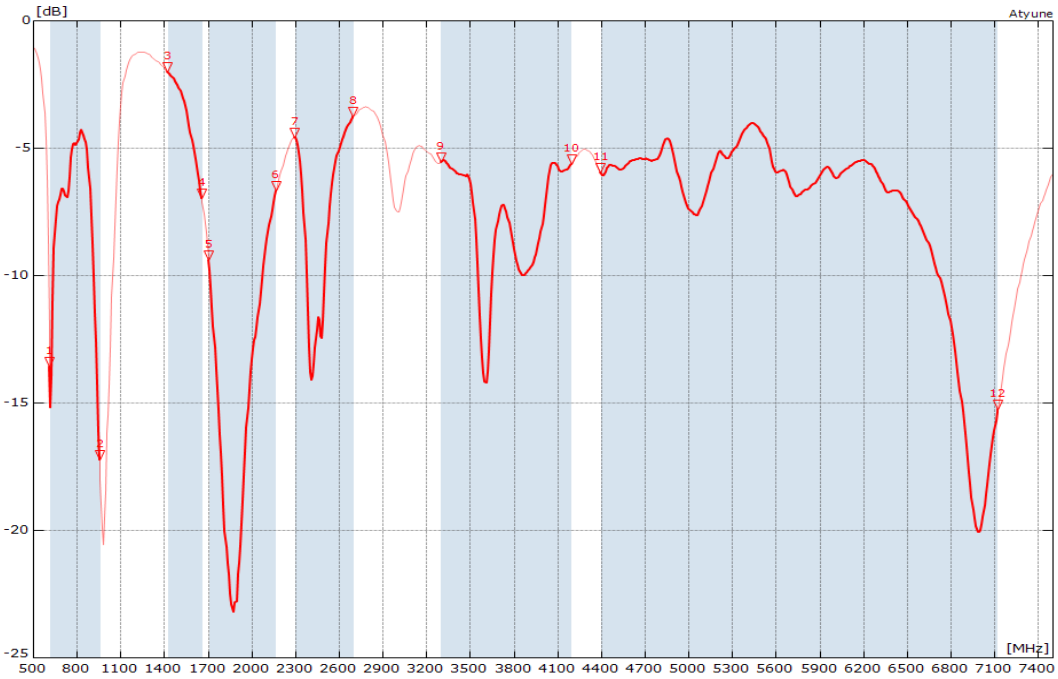
5. RF characteristics

Frequency	617-960MHz	1420-1660MHz	1710-2170MHz	2300-2400MHz	2500-2700MHz	3300-4200MHz	4400-7125MHz
Peak gain	2.4 dBi	2.5 dBi	4.5dBi	3.9dBi	4.2dBi	6.3dBi	7.5dBi
Average gain (Linear)	-2.6 dB	-4.3 dB	-1.1dB	-3.7dB	-3.0dB	-2.3dB	-2.7dB
Average efficiency	55.4 %	37.1 %	77.8%	42.4%	49.6%	58.4%	53.4%
Maximum return loss	-4.3 dB	-2.0dB	-5.4dB	-4.5dB	-3.7dB	-5.6dB	-4.1dB
Maximum VSWR	4.0:1	8.6:1	3.3:1	3.9:1	4.7:1	3.2:1	4.4:1

All data measured on Antenova's evaluation PCB

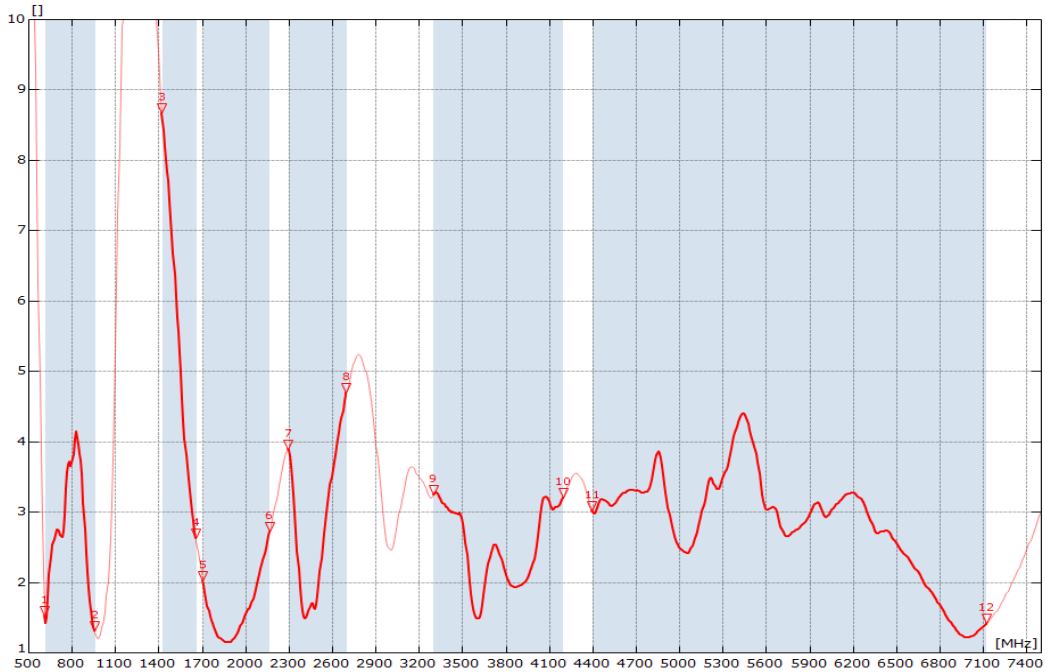
Part No. SR4L104-EVB-1

6. RF performance



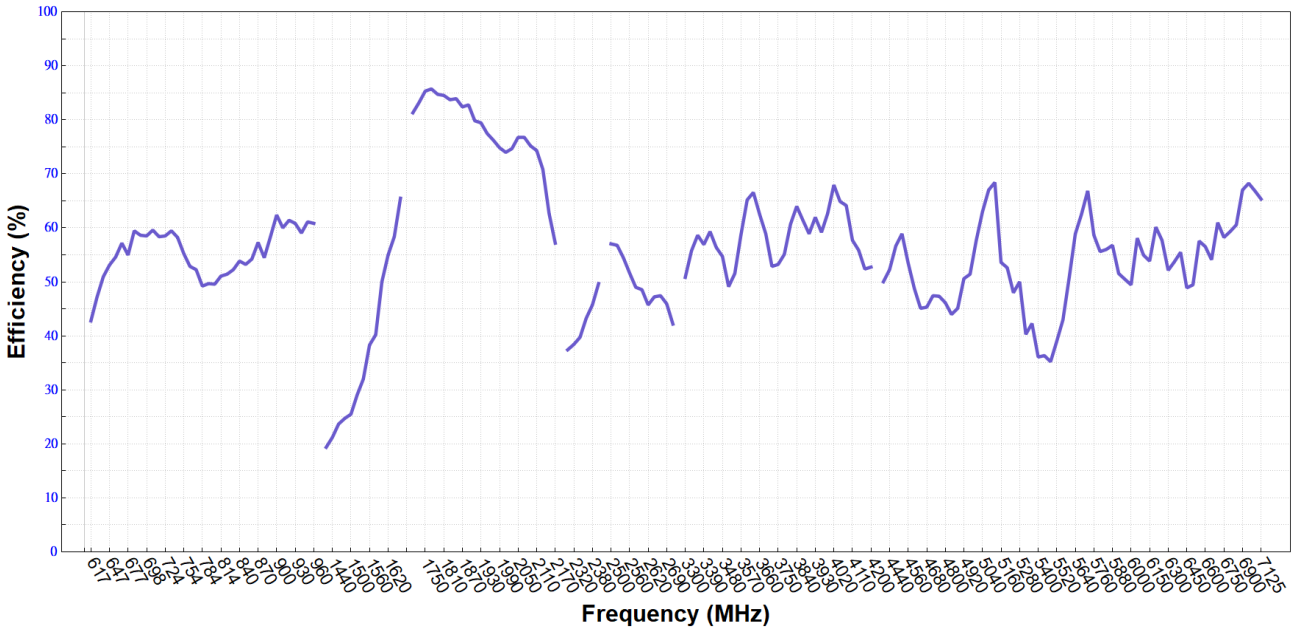
All data measured on Antenova's evaluation PCB
Part No. SR4L104-EVB-1

6.2. VSWR



All data measured on Antenova's evaluation PCB
Part No. SR4L104-EVB-1

6.3. Efficiency

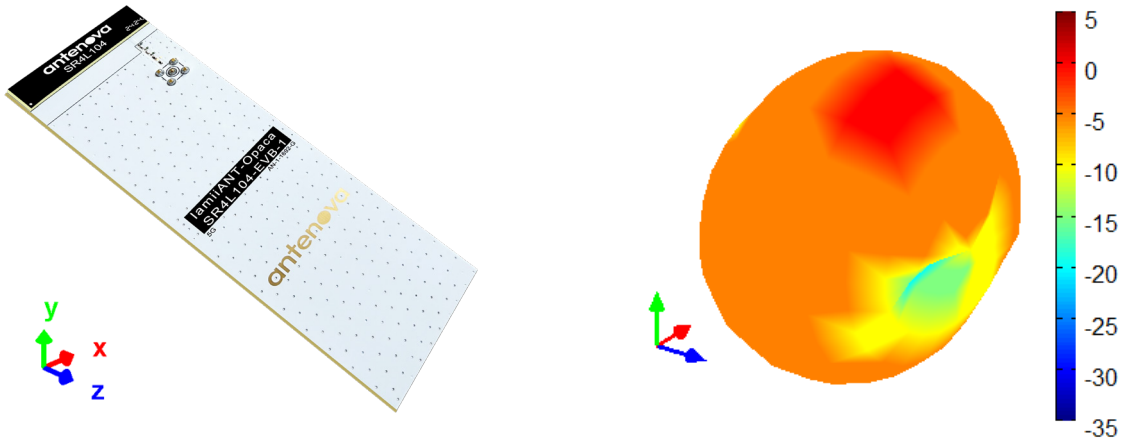


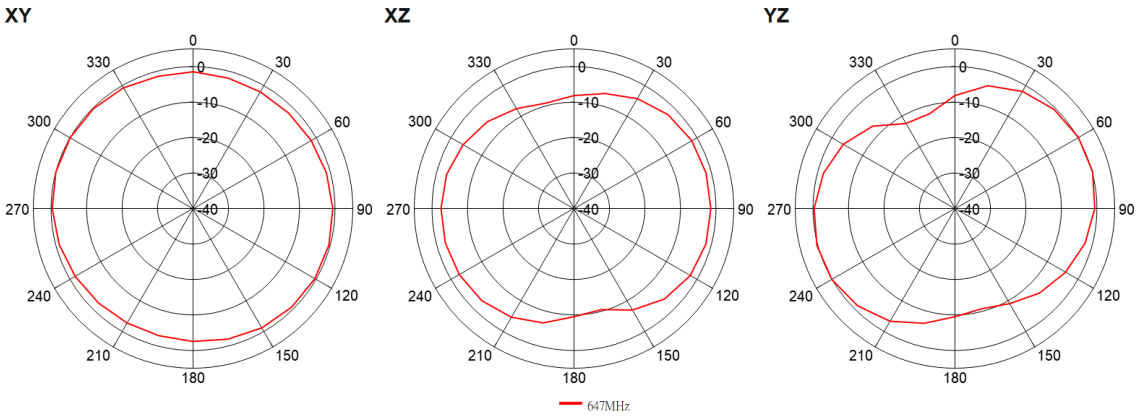
All data measured on Antenova's evaluation PCB
Part No. SR4L104-EVB-1

6.4. Antenna pattern

6.4.1. 647MHz

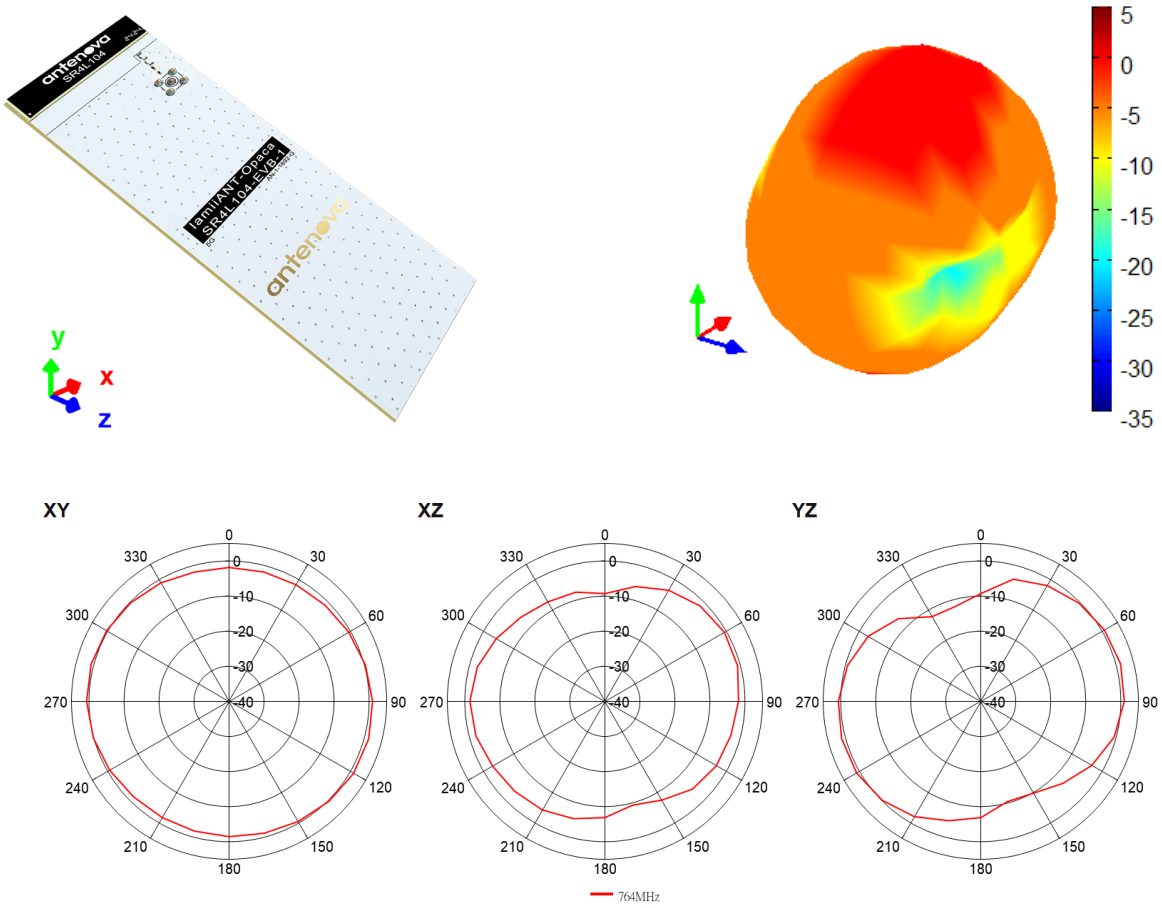
3D pattern at 647MHz





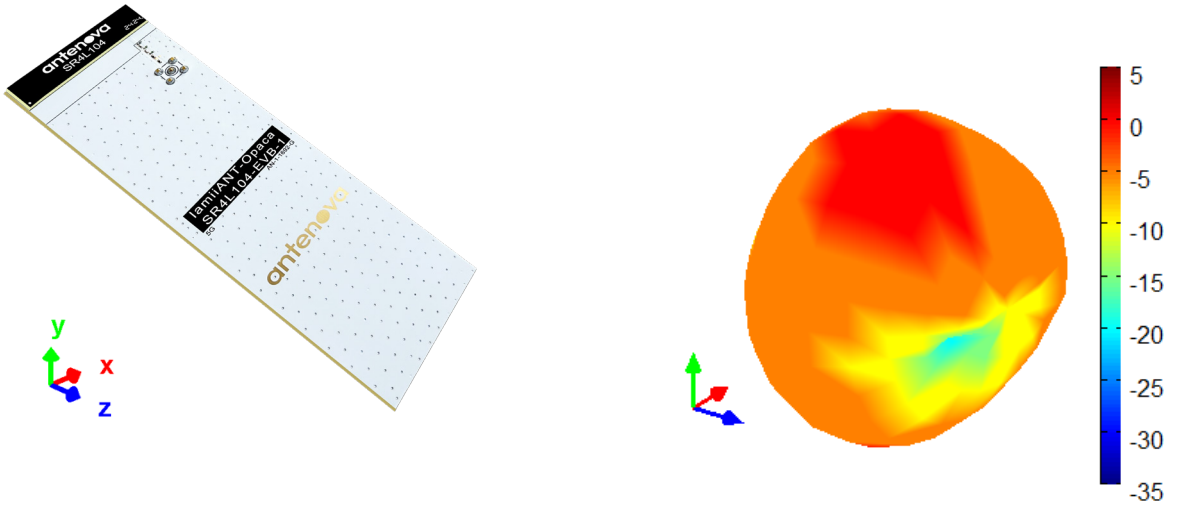
6.4.2. 764MHz

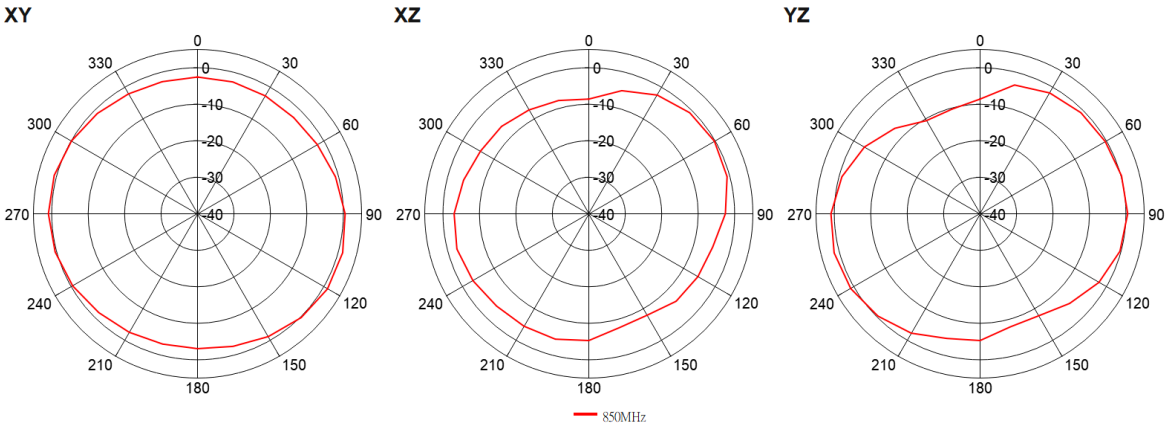
3D pattern at 764MHz



6.4.3. 850MHz

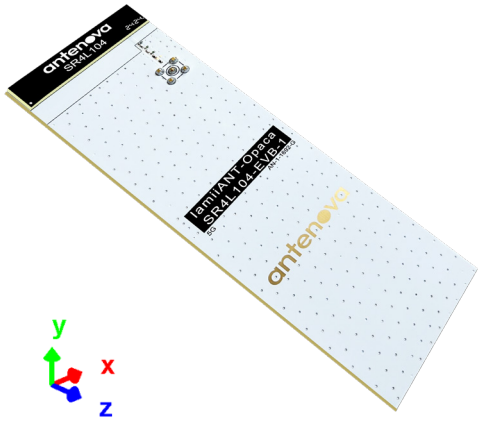
3D pattern at 850MHz

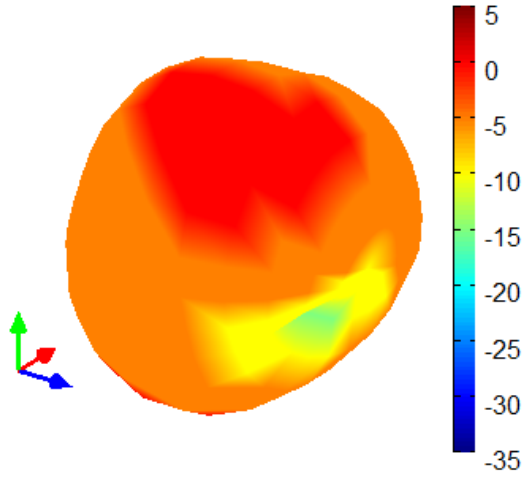


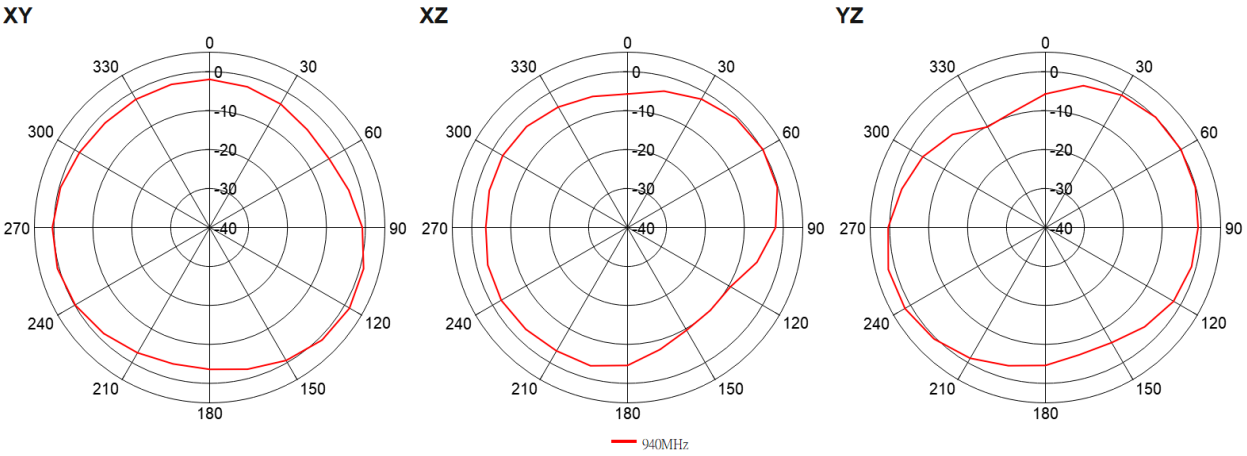


6.4.4. 940MHz

3D pattern at 940MHz

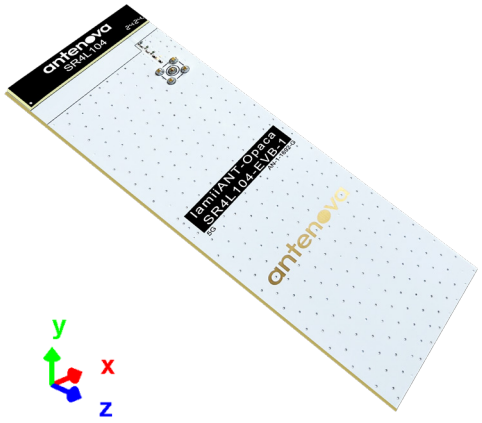


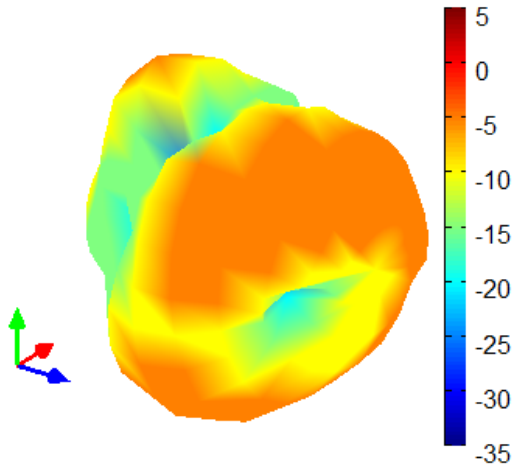


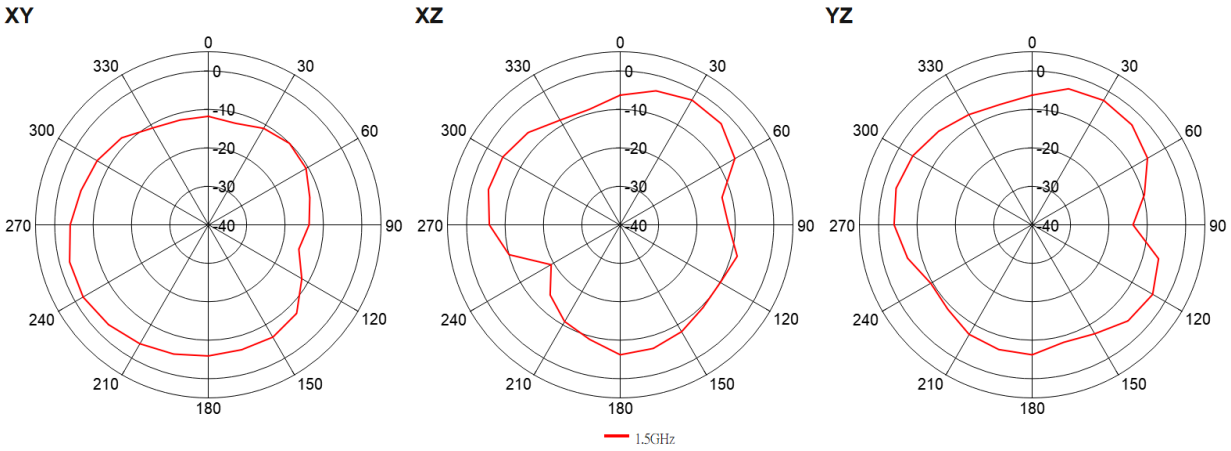


6.4.5. 1500MHz

3D pattern at 1500MHz

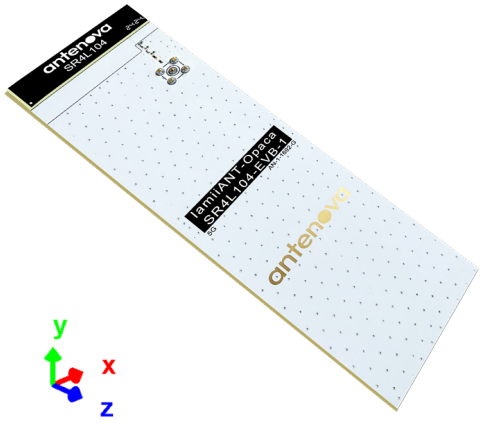


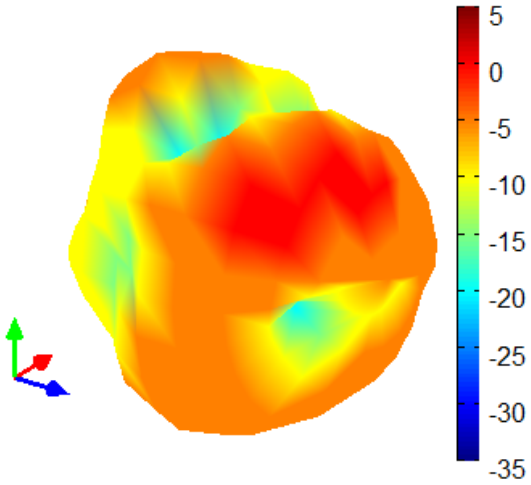


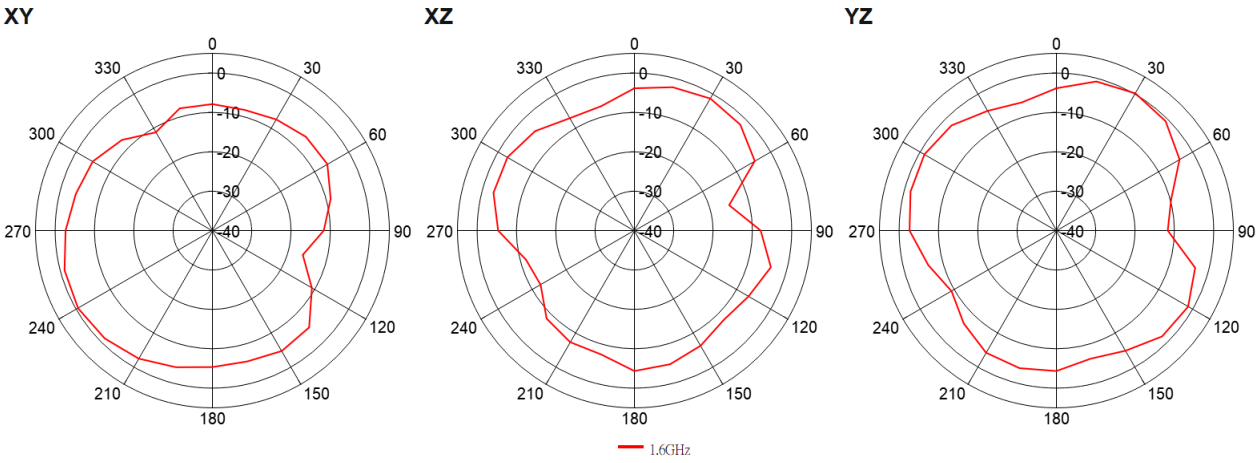


6.4.6. 1600MHz

3D pattern at 1600MHz

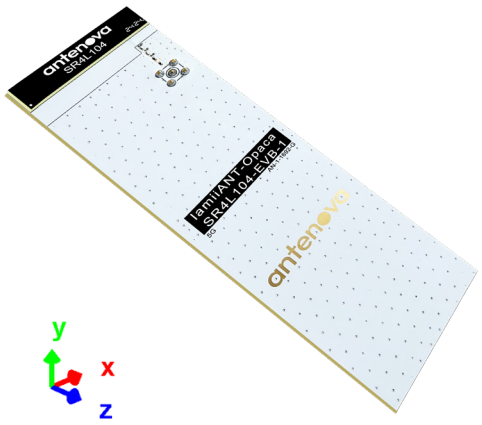


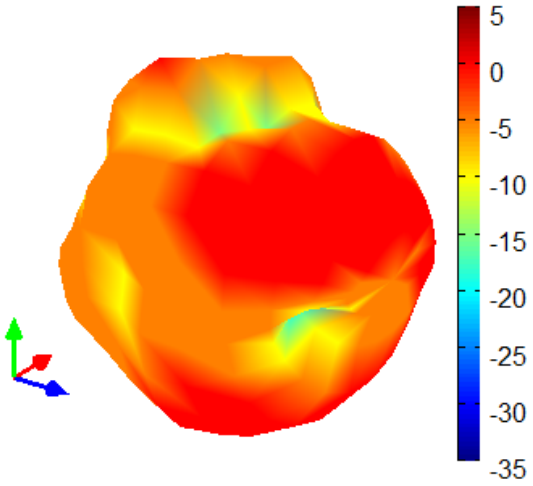


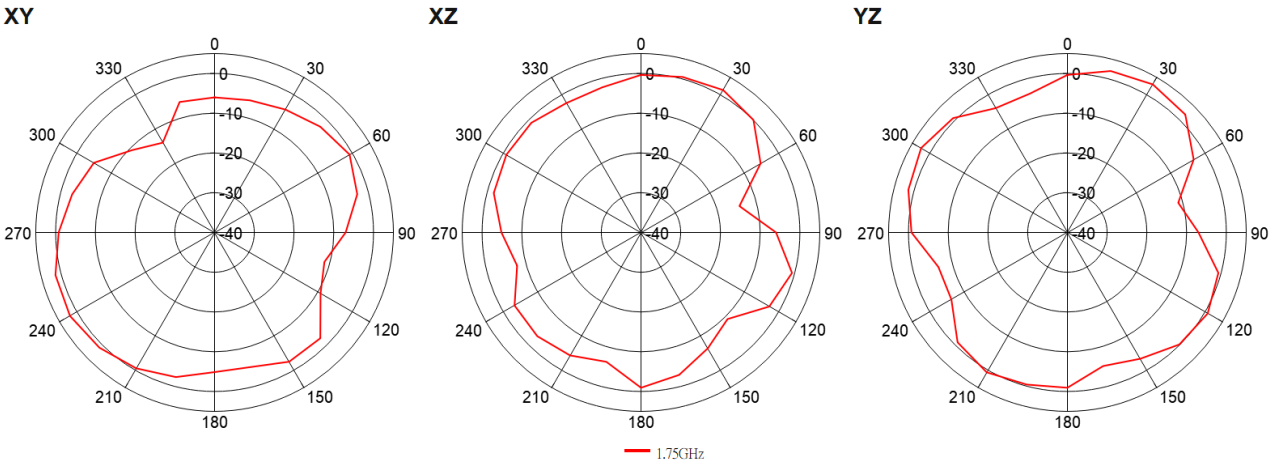


6.4.7. 1750MHz

3D pattern at 1750MHz

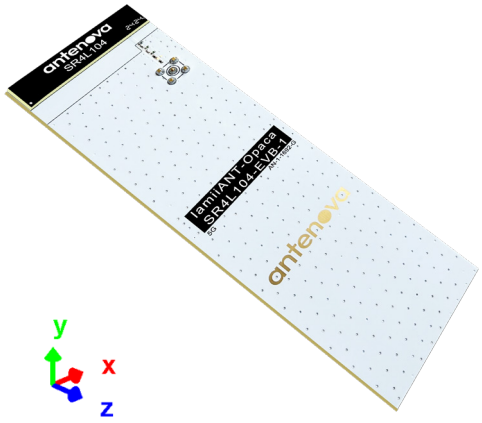


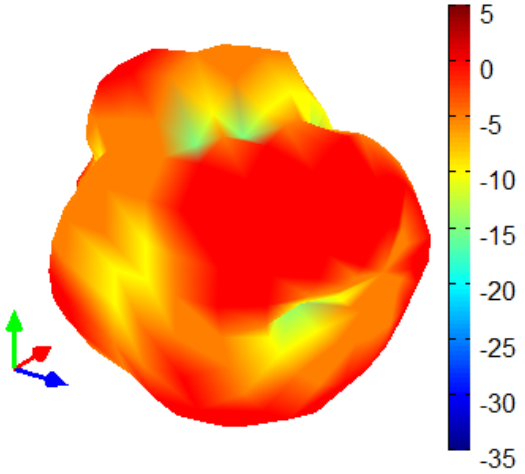


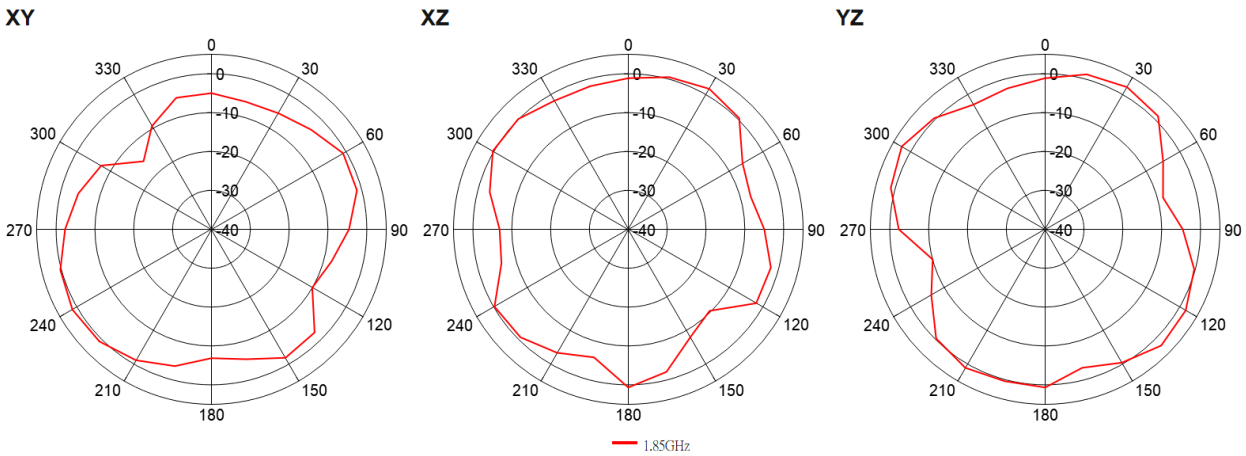


6.4.8. 1850MHz

3D pattern at 1850MHz

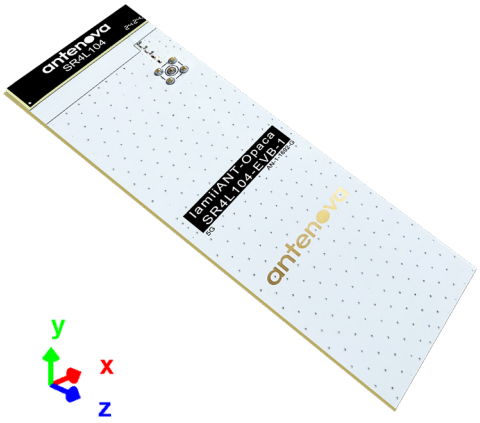


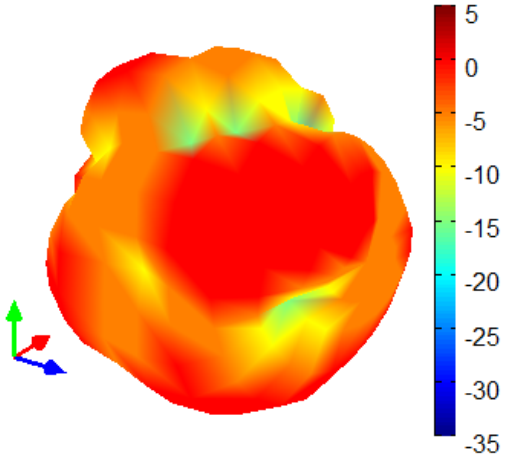


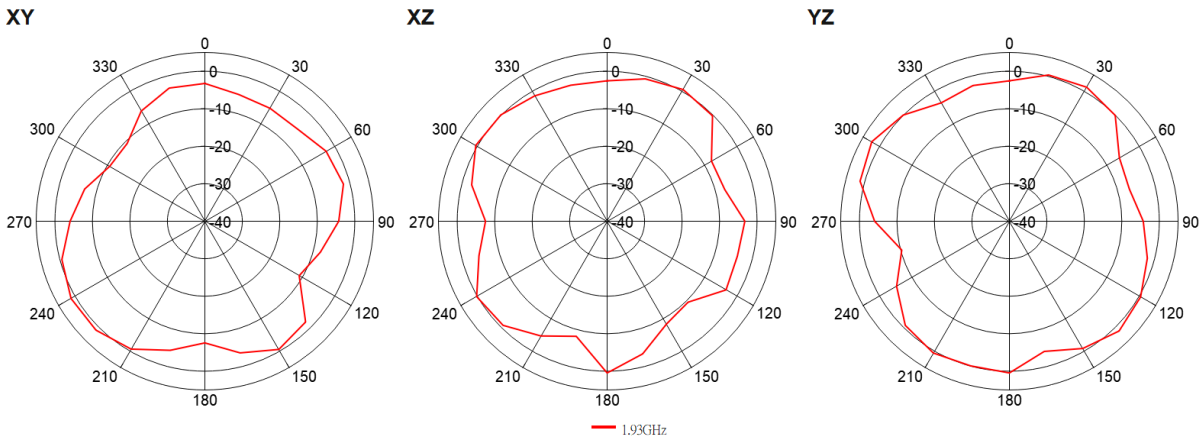


6.4.9. 1930MHz

3D pattern at 1930MHz

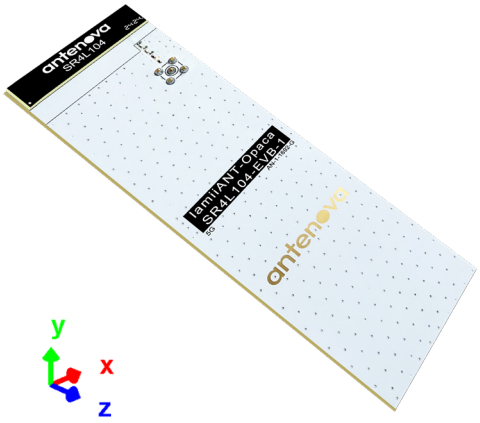


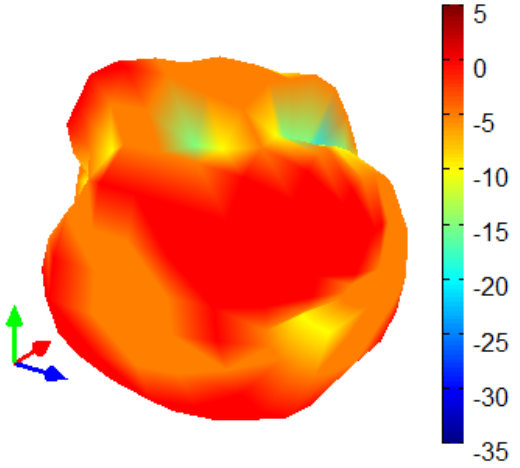


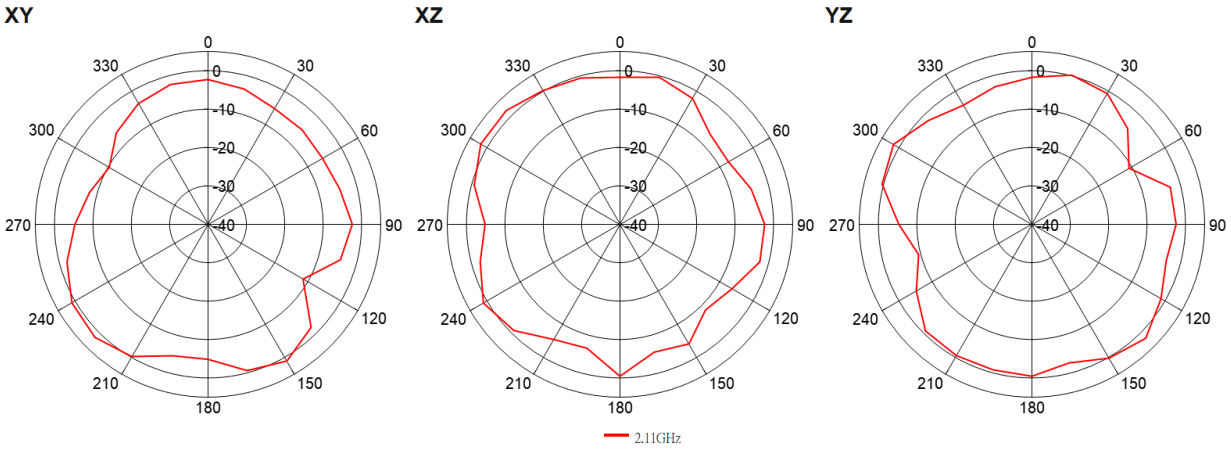


6.4.10. 2110MHz

3D pattern at 2110MHz

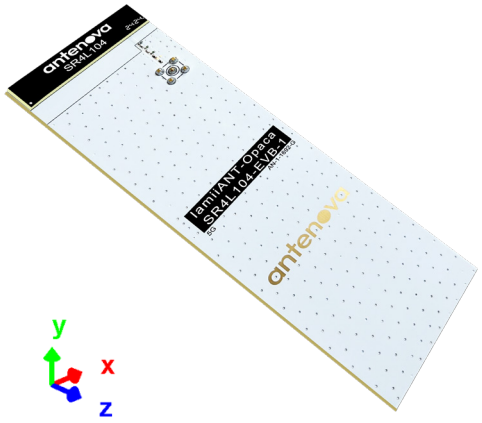


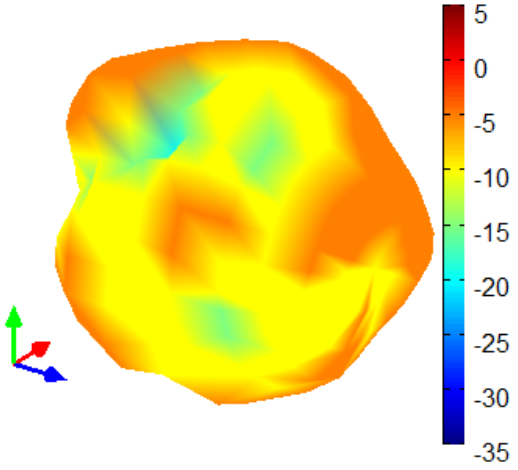


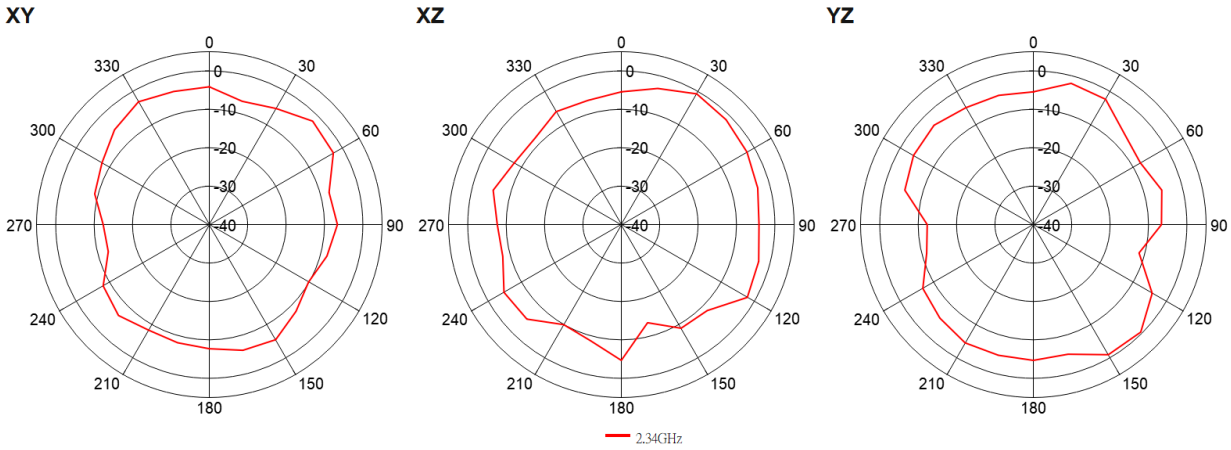


6.4.11. 2340MHz

3D pattern at 2340MHz

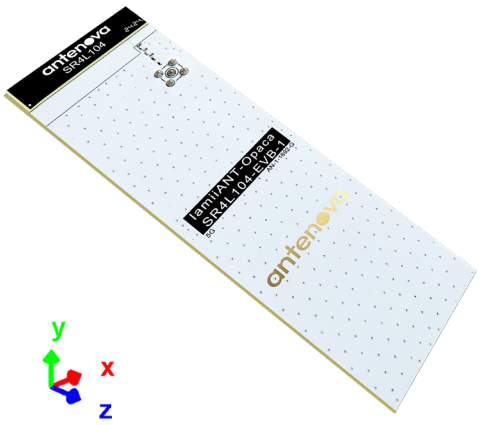


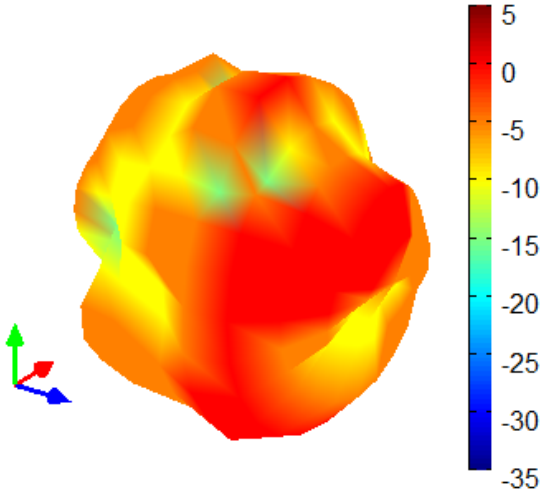


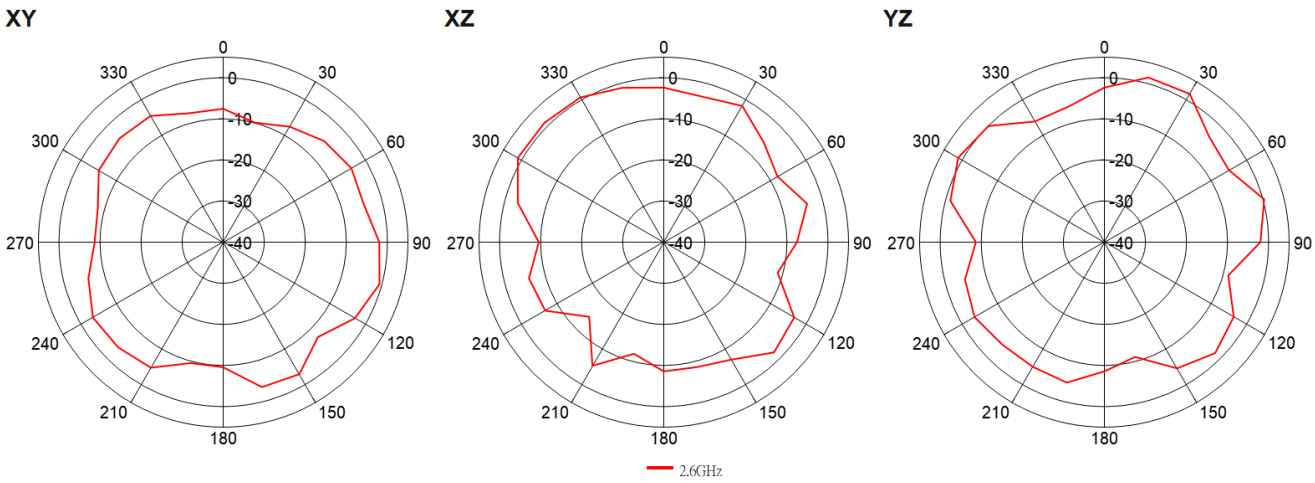


6.4.12. 2600MHz

3D pattern at 2600MHz

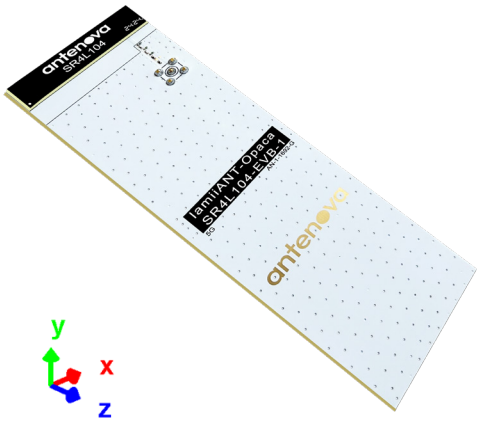


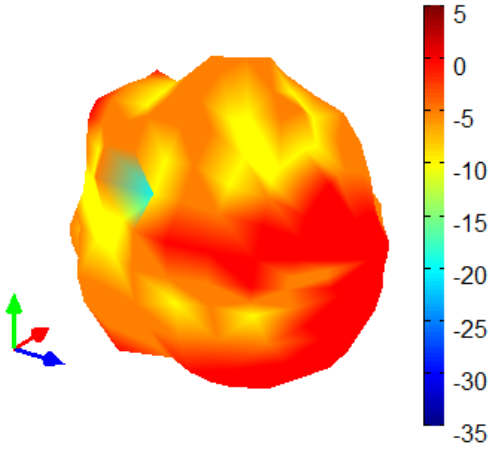


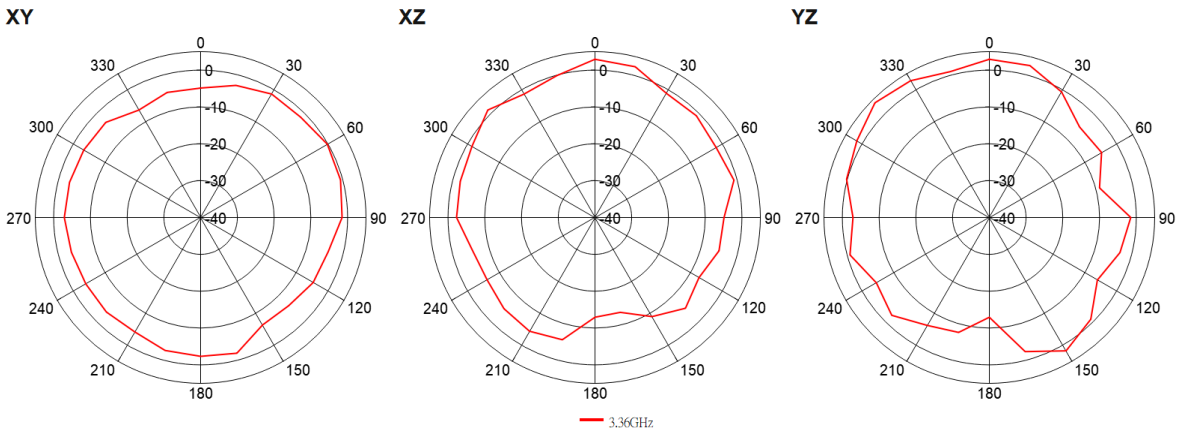


6.4.13. 3360MHz

3D pattern at 3360MHz

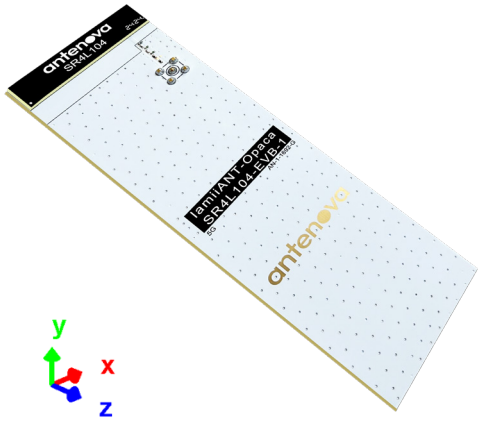


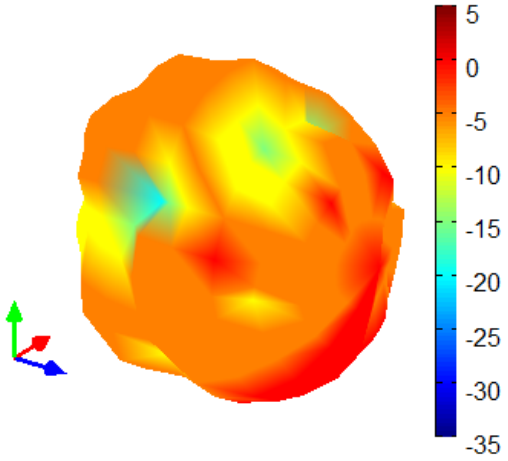


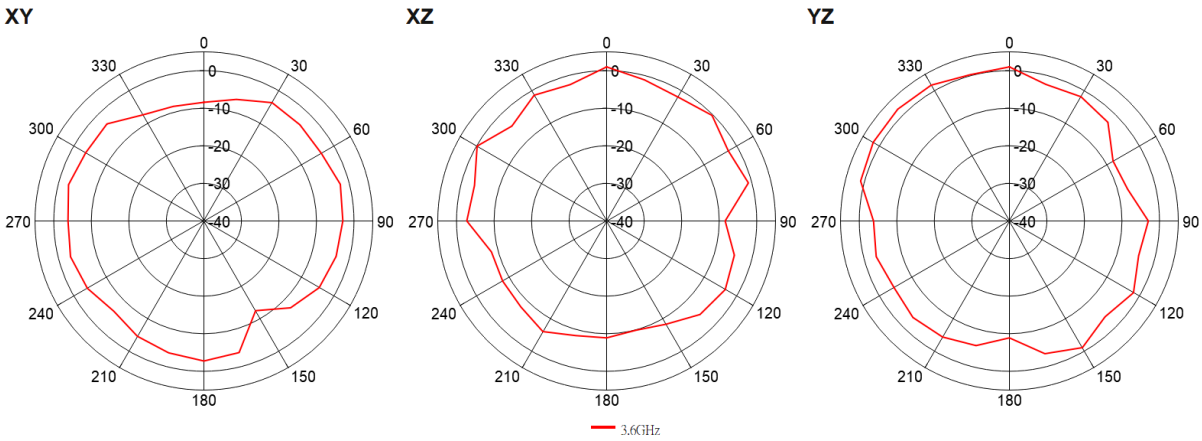


6.4.14. 3600MHz

3D pattern at 3600MHz

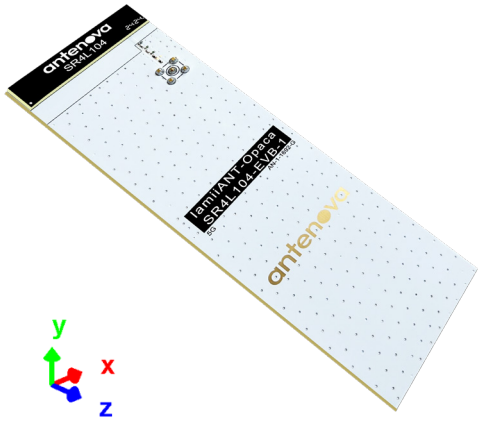


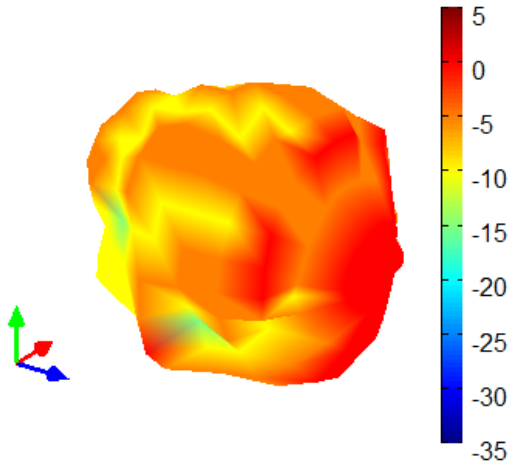


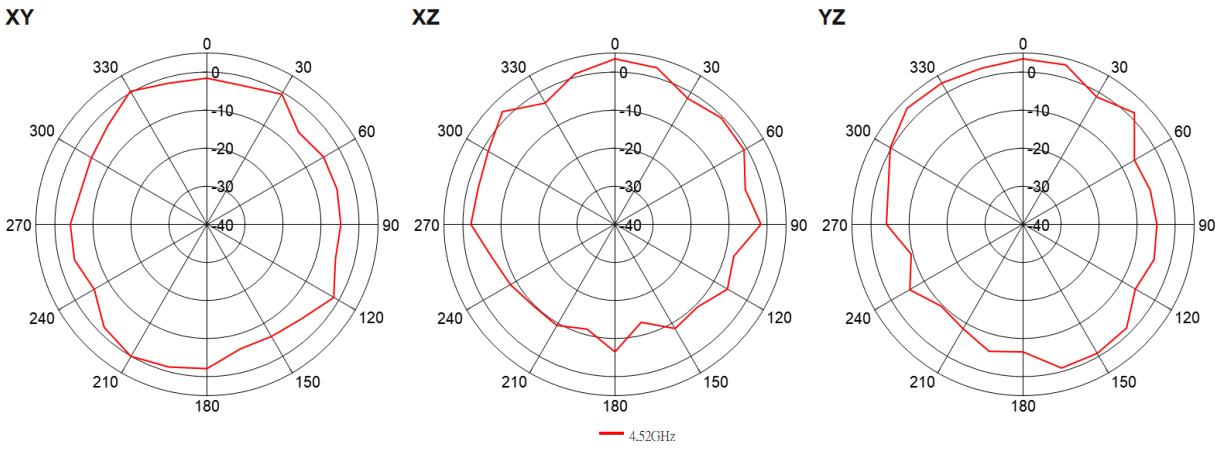


6.4.15. 4520MHz

3D pattern at 4520MHz

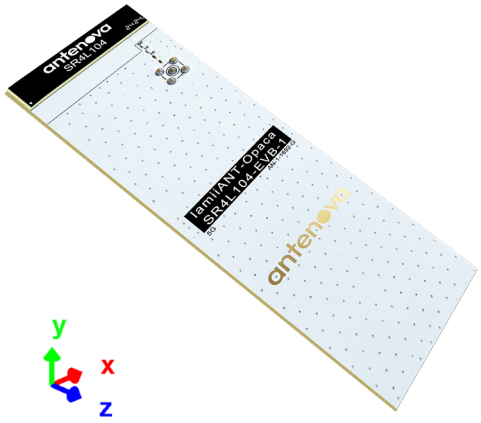


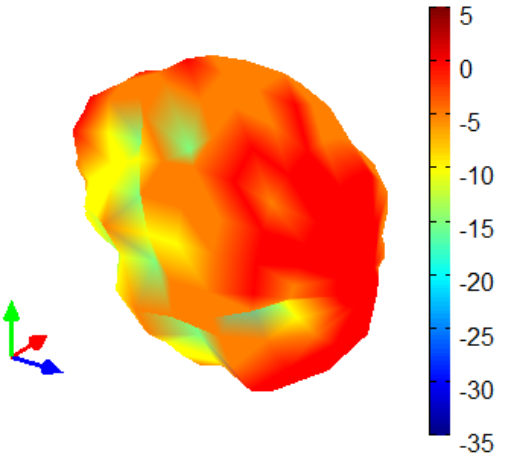


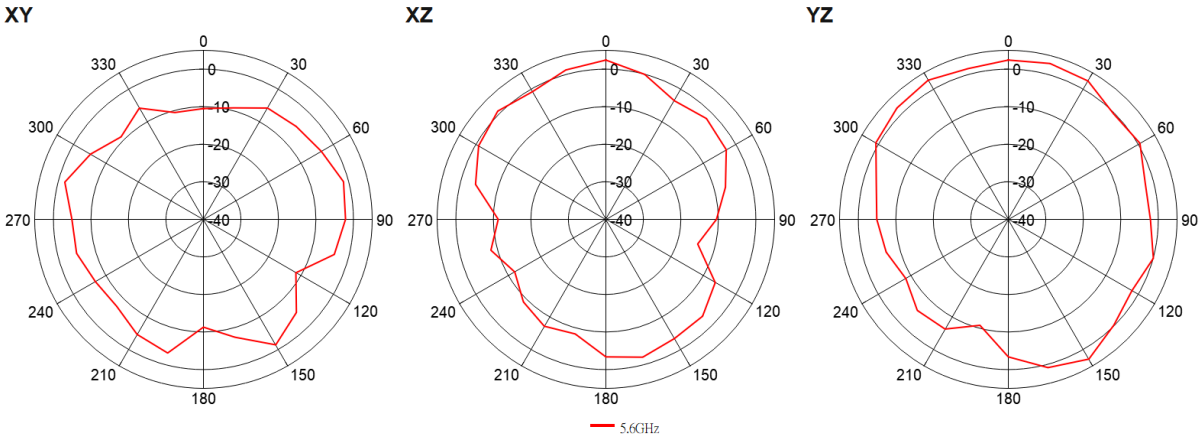


6.4.16. 5600MHz

3D pattern at 5600MHz

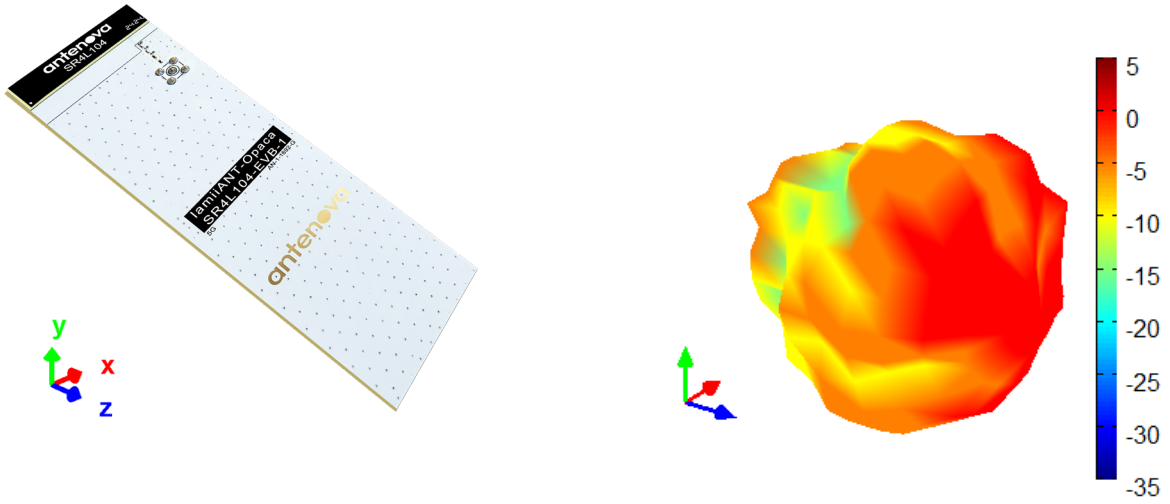


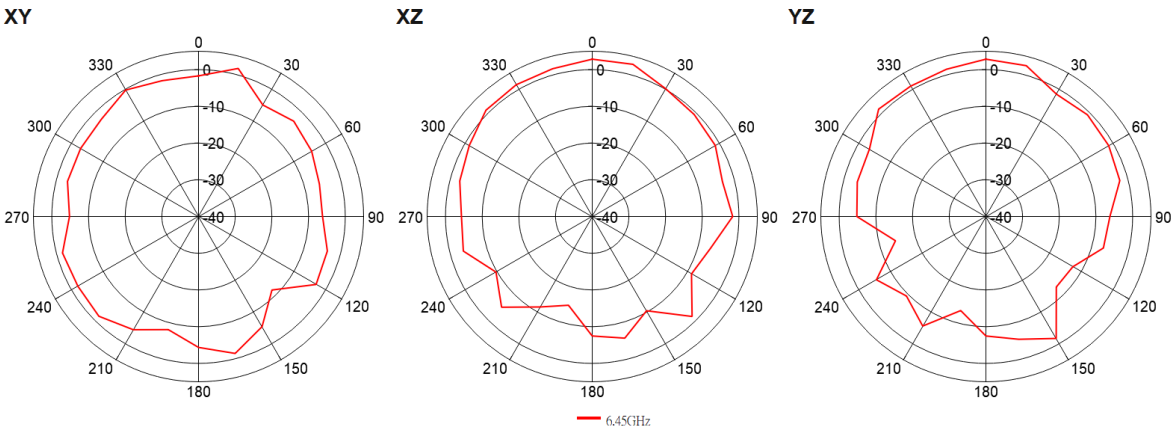




6.4.17. 6450MHz

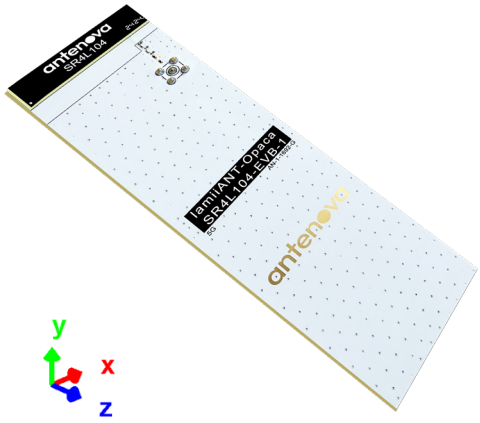
3D pattern at 6450MHz

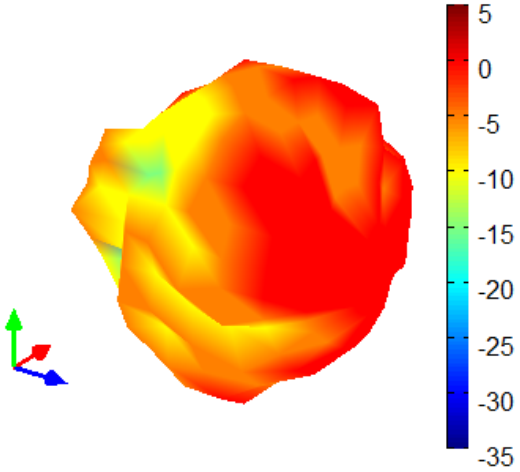


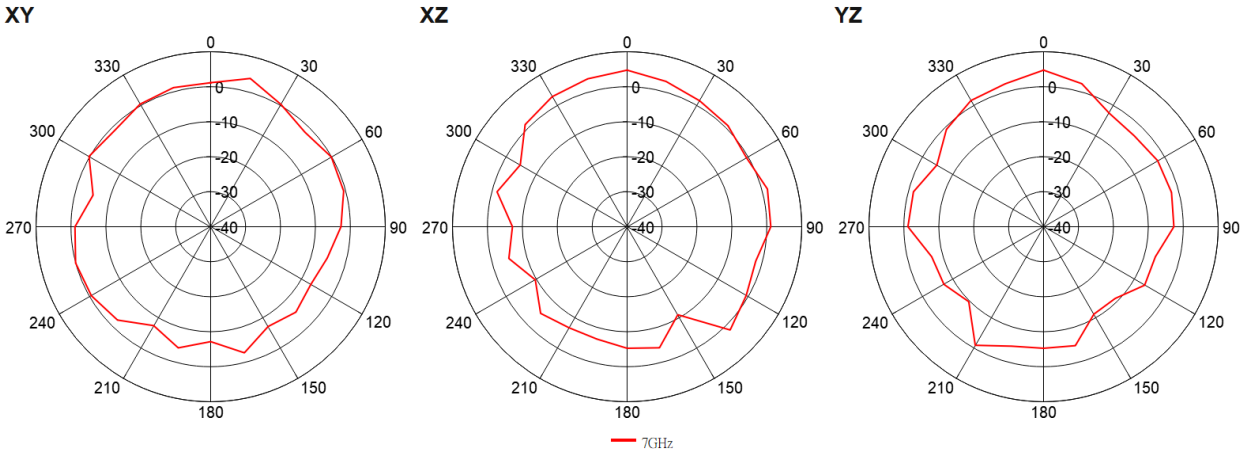


6.4.18. 7000MHz

3D pattern at 7000MHz



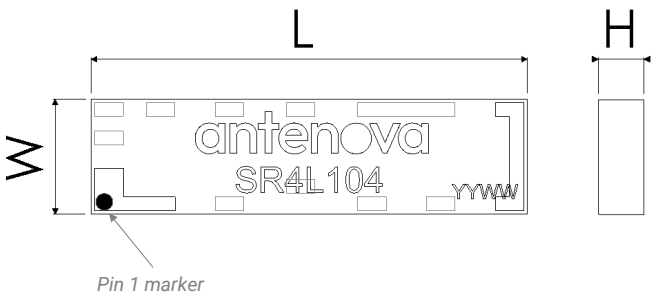




7. Antenna dimensions

7.1. Dimensions Assembled

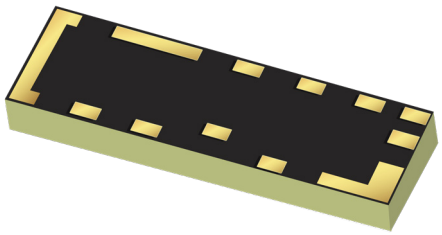
Top view

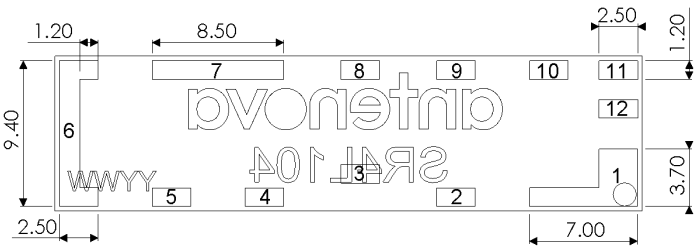


L	W	H
Length	Width	Height
38.0 ± 0.1	10.0 ± 0.1	3.3 ± 0.2

All dimensions in (mm)

Bottom view



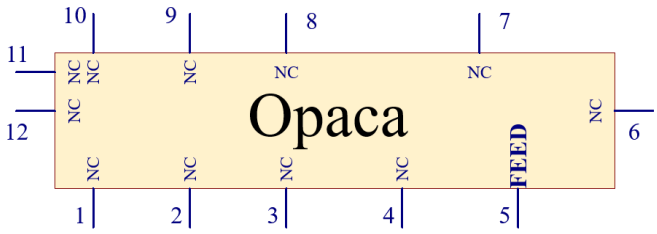


1,6,7 copper pads are varied by different size (mm)
2,3,4,5,8,9,10,11,12 copper pads: 1.2 x 2.5 (mm)

8. Schematic symbol and pin definition

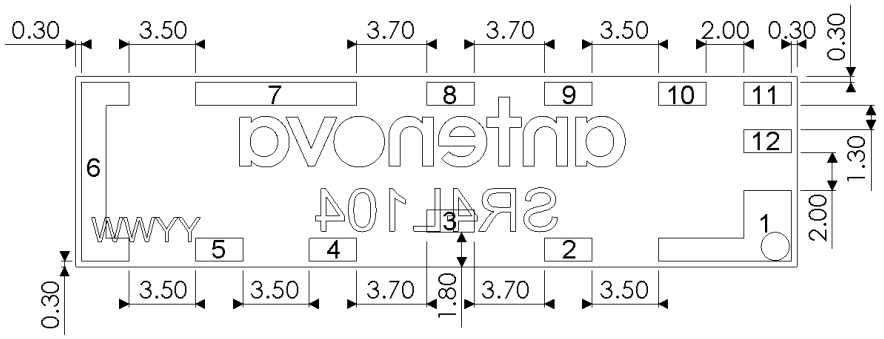
The circuit symbol for the antenna is shown below. The antenna has 12 pins with only 1 as functional. All other pins are for mechanical strength.

Pin	Description
5	Feed
Others	Not used (Mechanical only)



9. Host PCB footprint

The recommended host PCB footprint is below.



1,6,7 copper pads are varied by different size (mm)
2,3,4,5,8,9,10,11,12 copper pads: 1.2 x 2.5 (mm)

10. Electrical interface

10.1. Transmission line

All transmission lines should be designed to have a characteristic impedance of 50Ω.

- The length of each transmission lines should be kept to a minimum
- All other parts of the RF system like transceivers, power amplifiers, etc, should also be designed to have a 50 Ω impedance

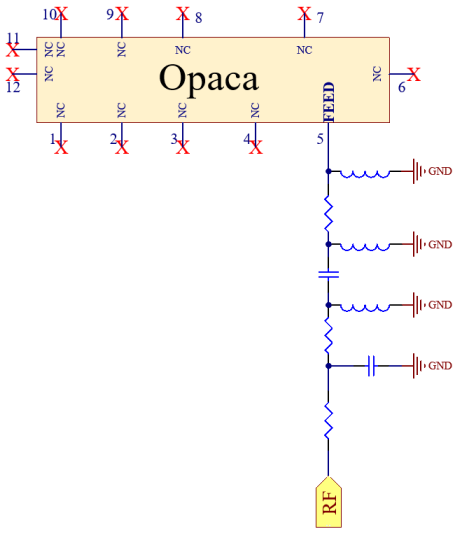
A co-planar transmission line can be designed using an online transmission line calculator tool, such as:

https://blog.antenova.com/rf-transmission-line-calculator

The PCB thickness, copper thickness and substrate dielectric constant are entered, then the tool calculates the transmission line width and gaps on either side of the track to give a 50 Ω impedance.

10.2. Matching circuit

The antenna requires a matching circuit that must be optimized for each product. The matching circuit will require up to eight 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 should be placed close to the antenna feed to ensure it is optionally effective in tuning the antenna.

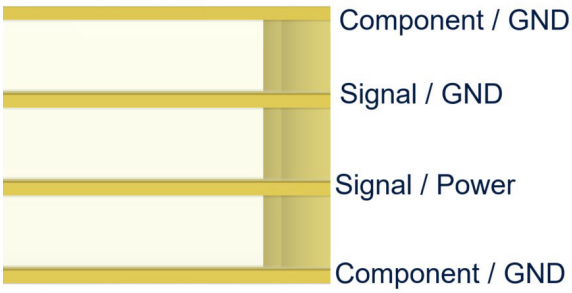


11. Antenna integration guide

We recommend the following during the design phase to maximise antenna performance and minimize noise:

- Minimum 4 layer PCB
- Route signals and power internally where possible
- Flood all layers with ground
- Knit ground on all layers together with plenty of vias

Follow placement guidance carefully, in addition Antenova provide technical support to help you through all stages of your design. Register for an account on https://ask.antenova.com/ to access technical support.

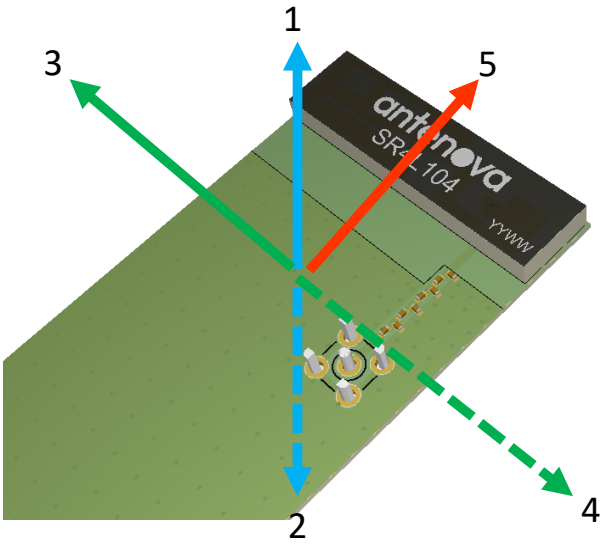


11.1. Antenna placement

The antenna requires clearance ideally in 5 spatial directions in antenna area as shown below.

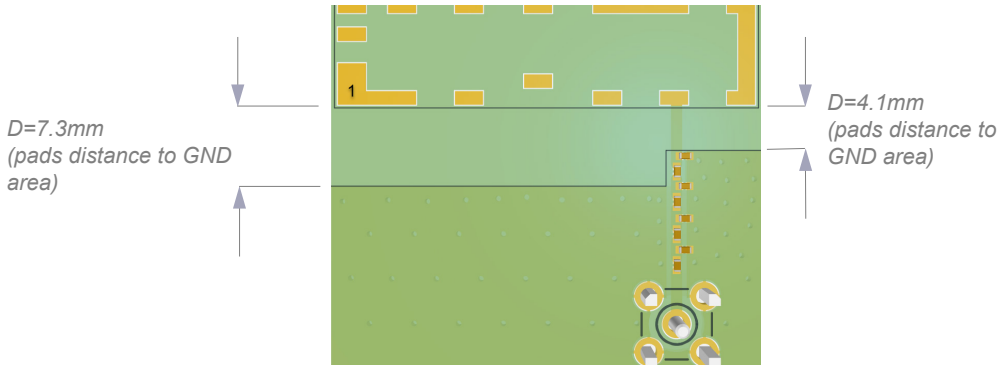
The Antenova placement tool can be used to advise on antenna placement, see:

https://blog.antenova.com/intelligent-antenna-selection-and-placement-tool-antenova



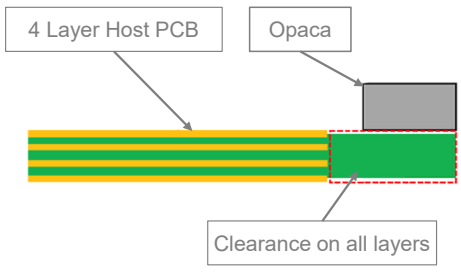
11.2. Host PCB Layout

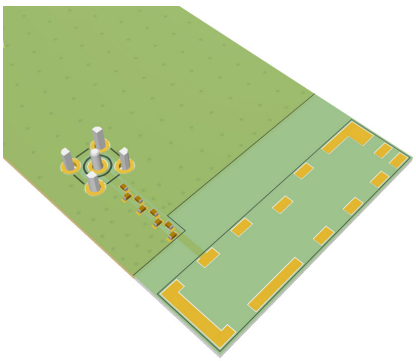
The host PCB must be designed using the PCB footprint shown with the correct clearances. An example of the PCB layout shows the antenna footprint. Please note this clearance area is critical to the performance of the antenna and must be applied through all layers of the PCB.



11.3. Host PCB Clearance

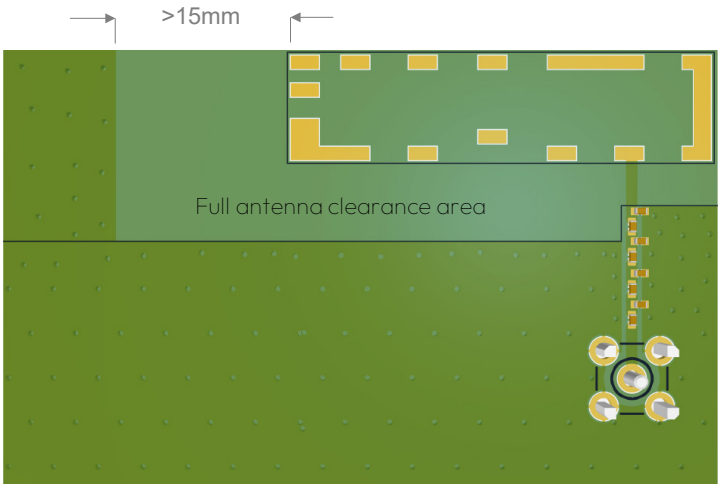
The host PCB must be designed using the PCB footprint shown with the correct clearances. An example of the PCB layout shows the antenna footprint. Please note this clearance area is critical to the performance of the antenna and must be applied through all layers of the PCB.



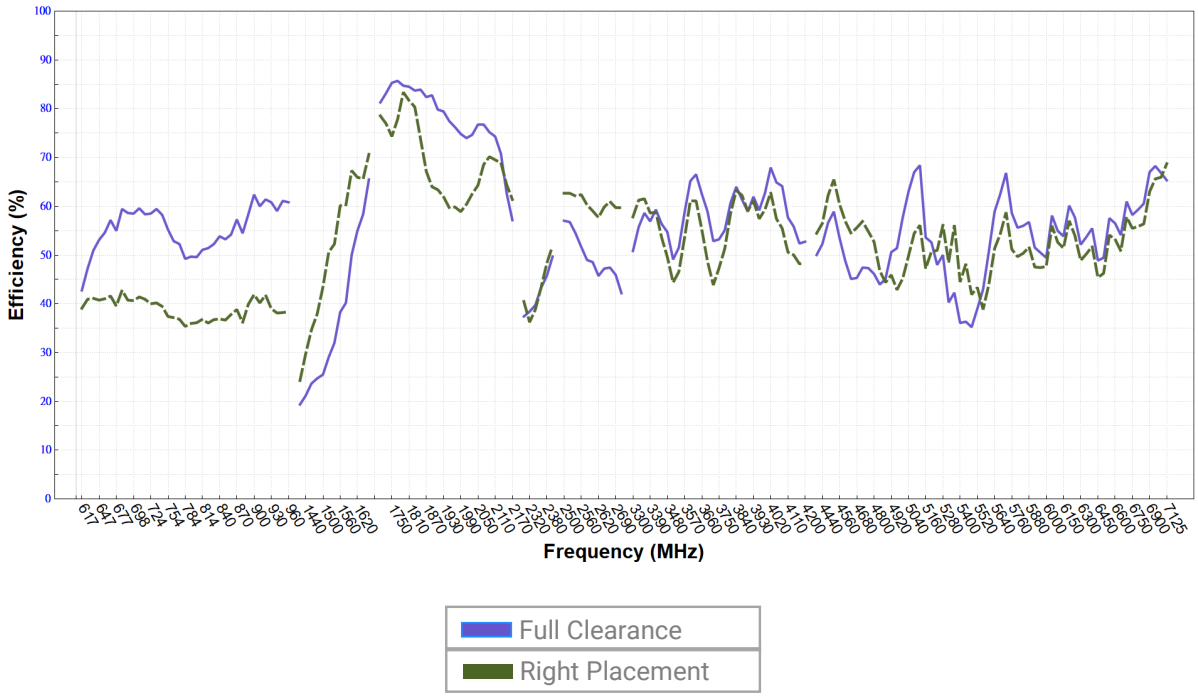


Below shows the antenna footprint and clearance through all layers on the PCB. Only the antenna pads and connections to feed are present within this clearance area.

For best performance, the antenna should have no copper to the right and left of the antenna (beyond the clearance area). If the antenna is placed in the right-hand corner, then at minimum a 15mm gap is required on the left side of the antenna, as shown in the image. It is not recommended to place the antenna in the left-hand corner of a PCB.



Right Placement

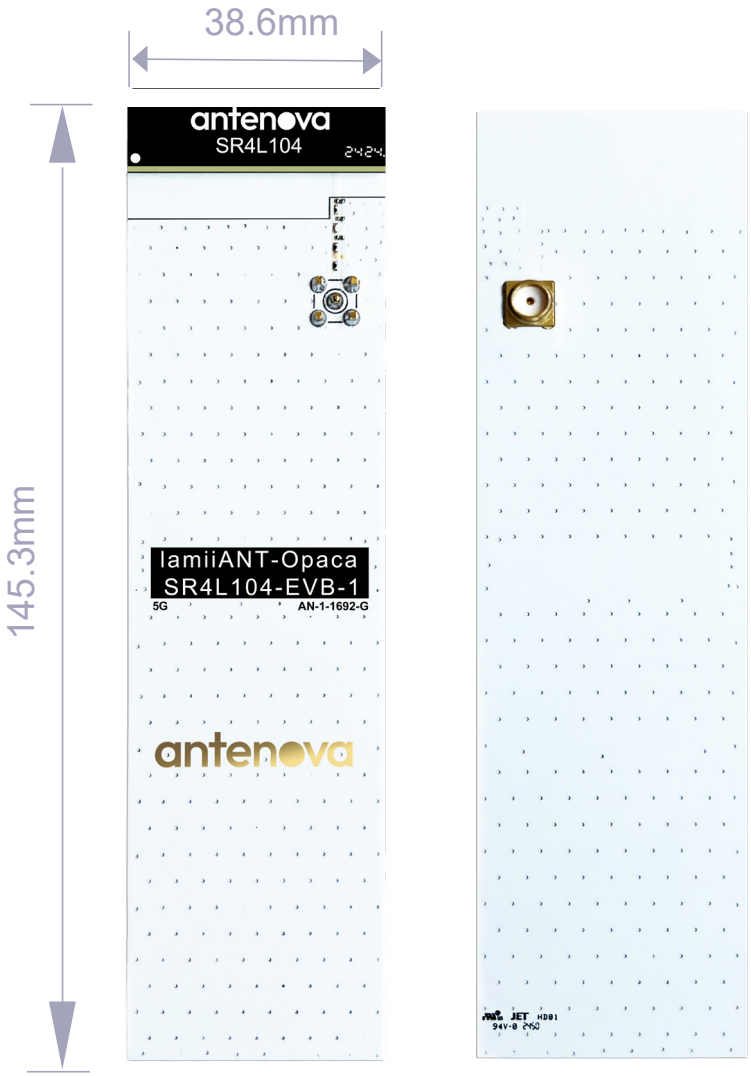


12. Reference board

A reference board is used for evaluating the antenna SR4L104 and it includes a SMA female connector. (Part number SR4L104-EVB-1)

To order a reference board

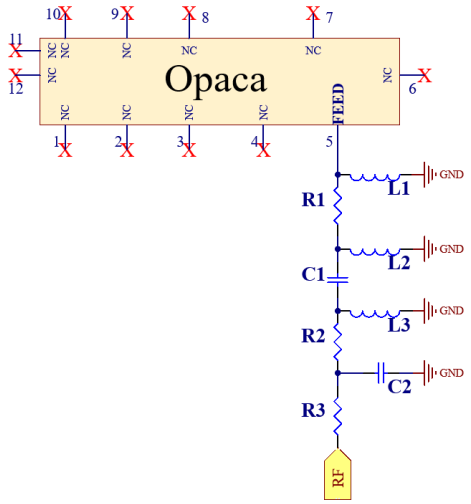
please see antenova.com



Top view Back view

12.1. Reference board matching circuit

Designator	Type	Value	Description
L1	Inductor	27nH	Murata LQG15 series
L2	Inductor	18nH	Murata LQG15 series
L3	Inductor	12nH	Murata LQG15 series
C1	Capacitor	2.4pF	Murata GJM15 series
C2	Not Fitted	Not Fitted	Not Fitted
R1	Resistor	0 ohm	Non-specific (0402)
R2	Resistor	0 ohm	Non-specific (0402)
R3	Resistor	0 ohm	Non-specific (0402)



13. Soldering

This antenna is suitable for lead free soldering. The reflow profile should be adjusted to suit the device, oven and solder paste, while observing the following conditions:

- For leaded soldering, the maximum temperature should not exceed 240 °C.
- For lead free soldering, a maximum temperature of 255 °C for no more than 20 seconds is permitted.
- The antenna should not be exposed to temperatures exceeding 120°C more than 3 times during the soldering process.

14. Hazardous material regulation conformance

The antenna has been tested to conform to RoHS and REACH requirements. A certificate of conformance is available from Antenova's website.

15. Packaging

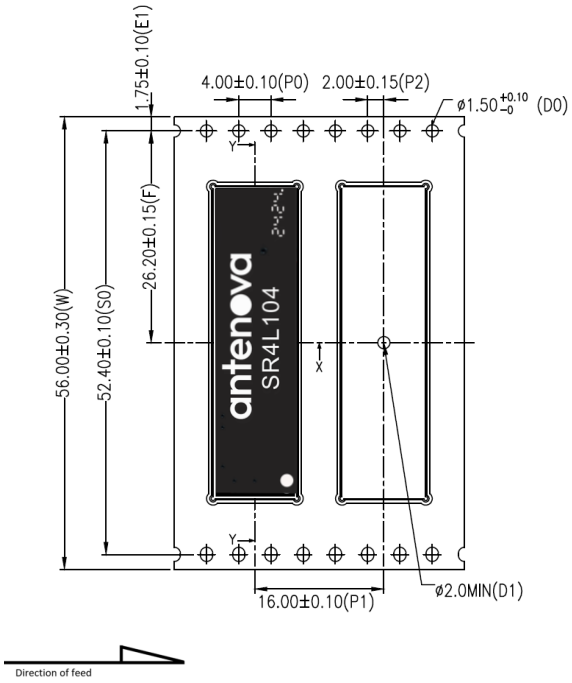
15.1. Optimal storage conditions

Temperature	-10°C to 40°C
Humidity	Less than 75% RH
Shelf life	24 Months
Storage place	Away from corrosive gas and direct sunlight
Packaging	Reels should be stored in unopened sealed manufacturer's plastic packaging.
MSL level	1

Note: Storage of open reels of antennas is not recommended due to possible oxidization of pads on antennas. If short term storage is necessary, then it is highly recommended that the bag containing the antenna reel is re-sealed and stored in conditions as described in the table above .

The shelf life of the antenna is 2 years provided the factory seal on the package has not been broken.

15.2. Tape characteristics



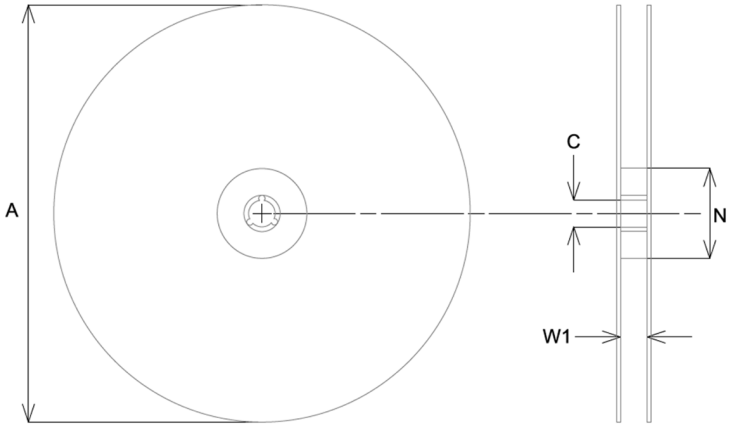
P0	P1	P2	D0
4.00 ± 0.10	16.00 ± 0.10	2.00 ± 0.15	1.50 ± 0.10/-0

E1	F	W
1.75 ± 0.10	26.20 ± 0.15	56.00 ± 0.30

All dimensions in (mm)

Quantity	Leading space	Trailing space
1000 pcs / reel	30 blank antenna holders	30 blank antenna holder

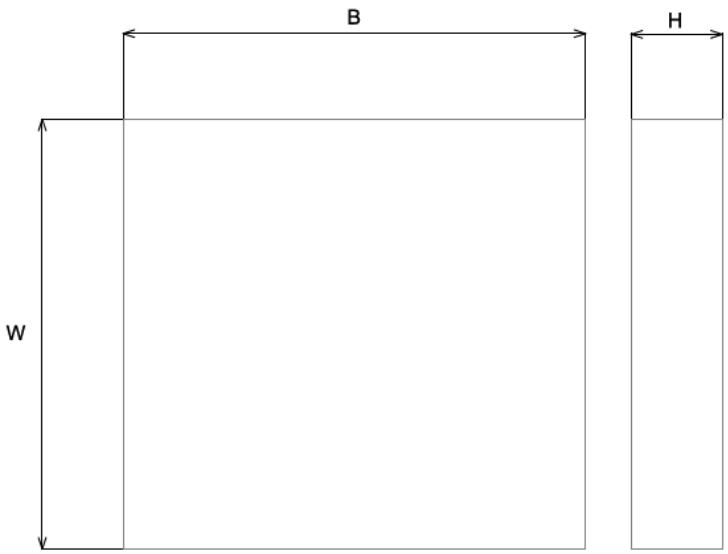
15.3. Reel Dimensions



A	C	N	W1
330 ± 2.0	13.0 + 0.5/-0.2	100.0 ± 0.5	56.4 + 2.0/-0

All dimensions in (mm)

15.4. Box Dimensions



Width (W)	Breadth (B)	Height (H)
350mm	355mm	70mm

15.5. Bag properties

Reels are supplied in protective plastic packaging.

15.6. Reel label information

Quality statements

Antenova's products conform to REACH and RoHS legislation. For our statements regarding these and other quality standards, please see antenova.com

Datasheet version

1.01 release 28 Feb 2025

antenova

Antenna design, integration and test resources

Product designers – the details contained in this datasheet will help you to complete your embedded antenna design. Please follow our technical advice carefully to obtain optimum antenna performance.

We aim to support our customers to create high performance wireless products. You will find a wealth of design resources, calculators and case studies to aid your design on our website.

Antenova's design laboratories are equipped with the latest antenna design tools and test chambers. We provide antenna design, test and technical integration services to help you complete your design and obtain the required certifications.

If you cannot find the antenna you require in our product range, please contact us to discuss creating a custom antenna to meet your exact requirements.

Share knowledge with RF Experts around the world

ask.antenova is a global forum for designers and engineers working with wireless technology

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