



SYNZEN

PRODUCT DATASHEET

LEONIS | SMD Ceramic Chip Antenna | GNSS L1

Part Number / Name

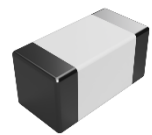
- SZC-C-3G21
- LEONIS

Description

- Passive ultra small ceramic chip antenna
- GNSS (1559-1609MHz)

Features

- GPS L1 | GALILEO E1 | GLONASS G1 | BeiDou B1
- Low Profile at only 0.8mm height
- Omnidirectional
- Dimensions: 1.6 x 0.8 x 0.8 (mm)



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Introduction

Introducing **LEONIS**, the ultimate GNSS solution for those seeking a compact and low-profile antenna. Designed with small devices and wearable applications in mind, LEONIS delivers high performance in a tiny package. LEONIS offers a perfect blend of size and functionality, making it an ideal solution for space-constrained applications where performance cannot be compromised.

- For GNSS applications (1559-1609 MHz)
- Resistant to de-tuning
- Small form factor of 1.6 x 0.8 x 0.8 (mm).
- Ideal for smaller wearable designs.
- Suitable for sealing with resin / potting compounds.

Typical Applications

- Asset Tracking
- Precision agriculture
- Smart cities
- Fleet management
- Personal Safety
- Emergency response
- Wearable Tech

General Specifications

Mechanical Specifications

| | |
|--------------------------------|----------------------|
| Part Number | SZC-C-3G21 |
| Name | LEONIS |
| Dimensions | 1.6 x 0.8 x 0.8 (mm) |
| Required Clearance area | 9.5 x 5.0 (mm) |
| Weight | <0.5g |
| Antenna Type | Surface Mount Device |
| Material | Ceramic |

Electrical / RF Specifications*

| Frequency Range (MHz) | Avg Efficiency (%) | Peak Gain (dBi) | Impedance | Polarization |
|-----------------------|--------------------|-----------------|-----------|--------------|
| 1559-1609 | >70 | 1.62 | 50Ω | Linear |

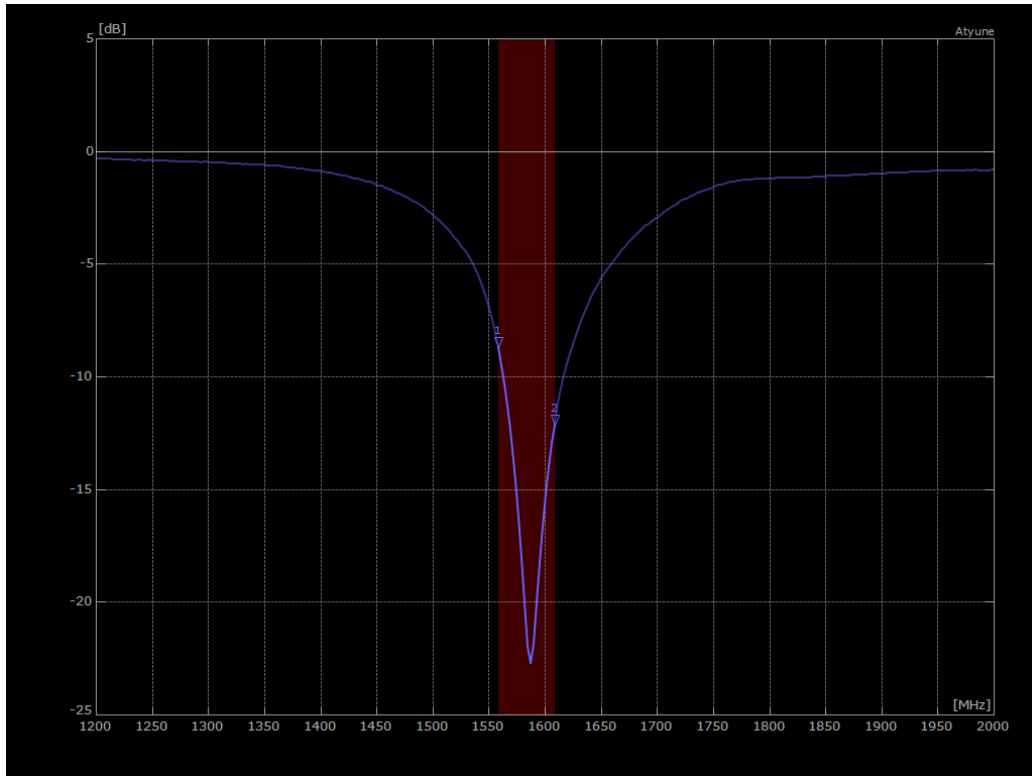
*All performance stated is measured of SZDV-C3G21 evaluation kit.

Environmental Specifications

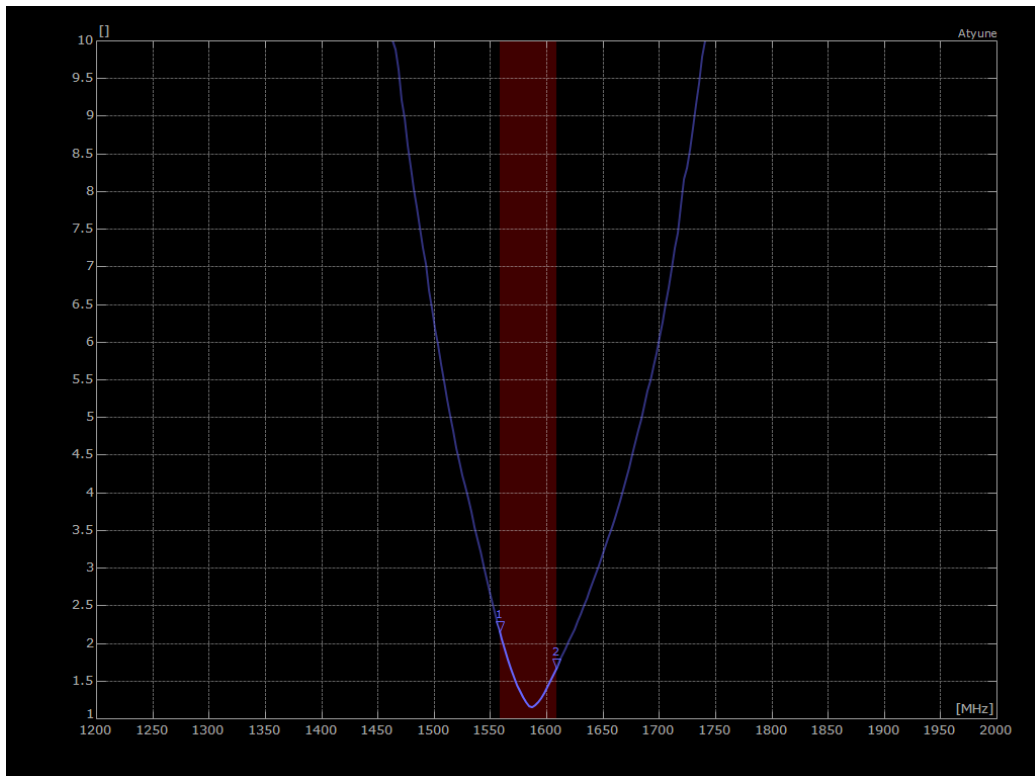
| | |
|---|------------------|
| Operational Temperature | -40 to +125 (°C) |
| Storage Temperature | -10 to +40 (°C) |
| Relative Humidity | ≤75% |
| Moisture Sensitivity Level (MSL) | 1 |
| RoHs & REACH compliant | Yes |

RF Characteristics

S₁₁

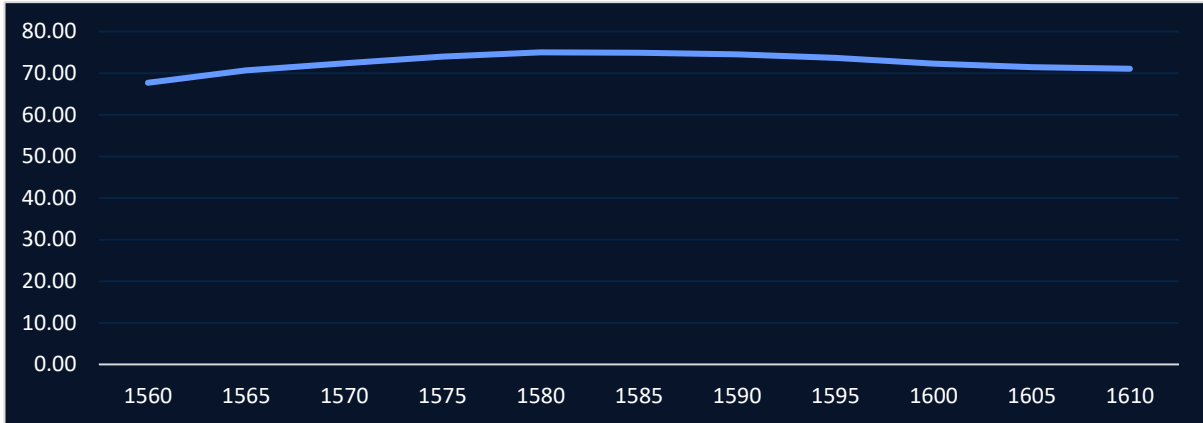


VSWR

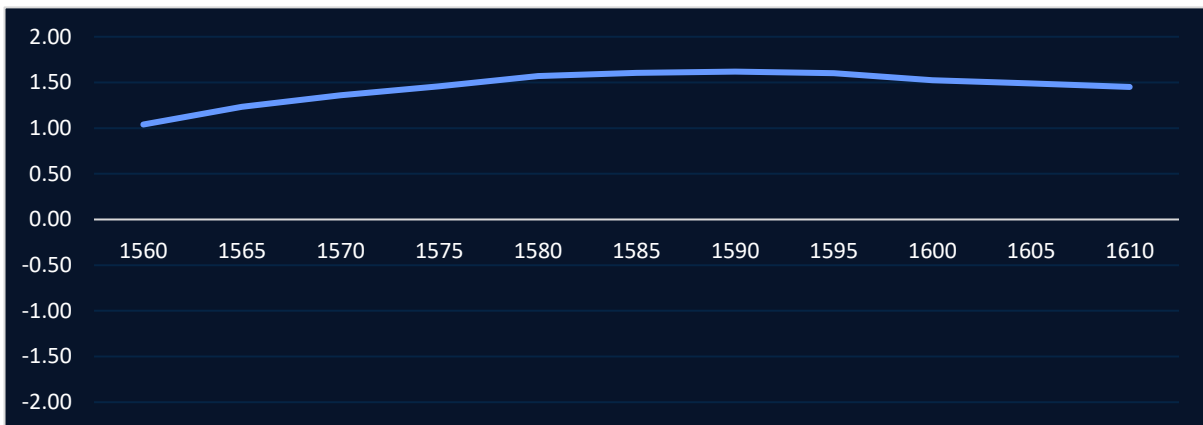


Performance

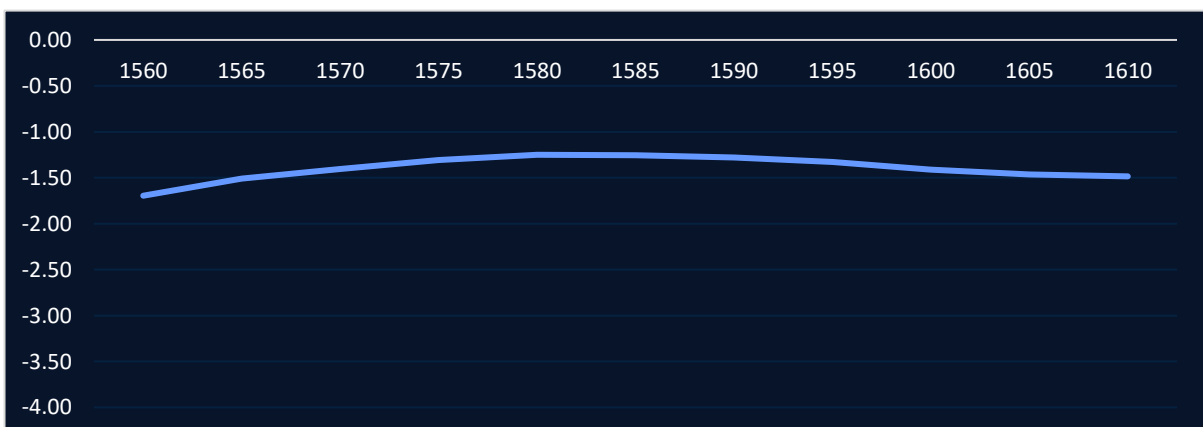
Efficiency



Peak Gain



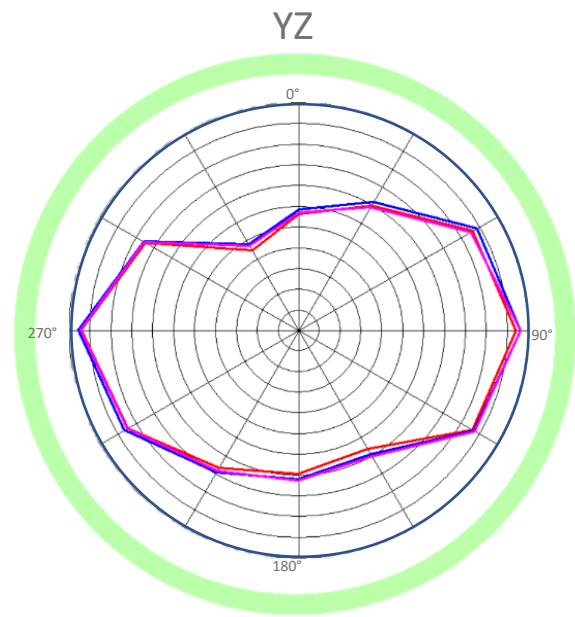
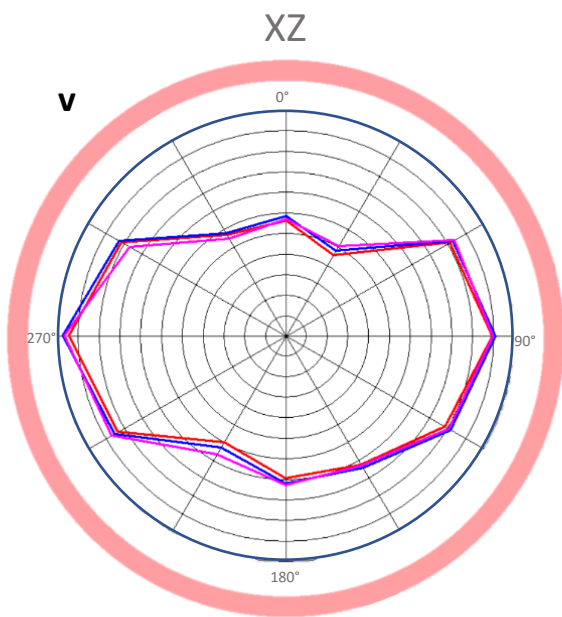
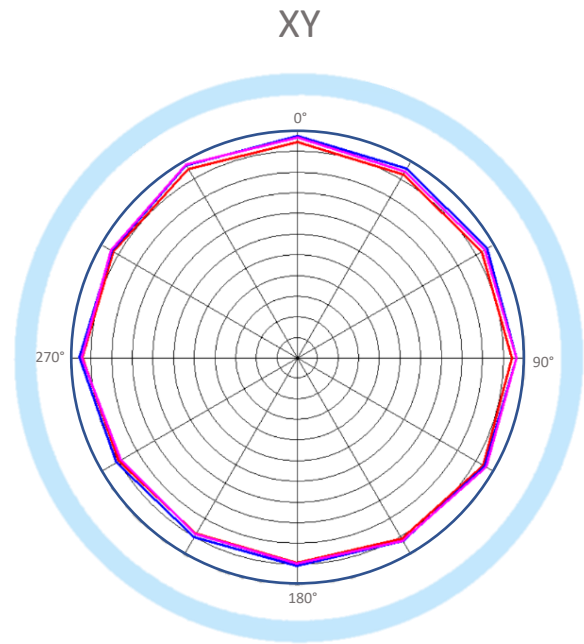
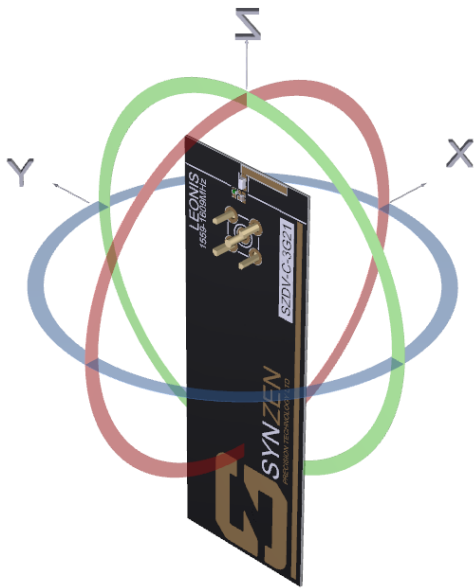
Average Gain



Radiated Performance – 2D

2D Polar Plot 1559 - 1609MHz

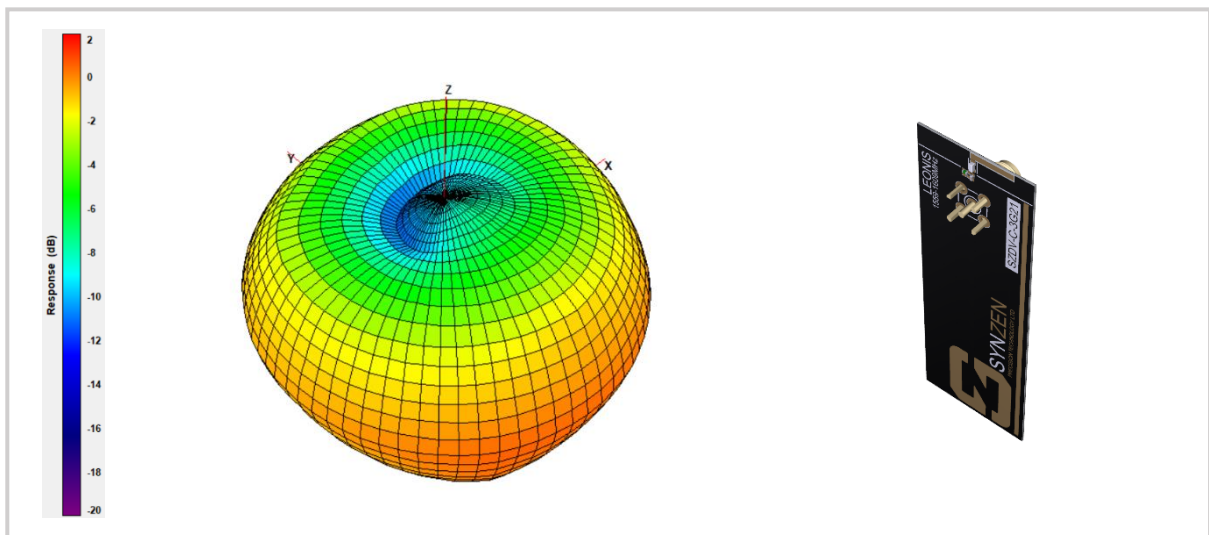
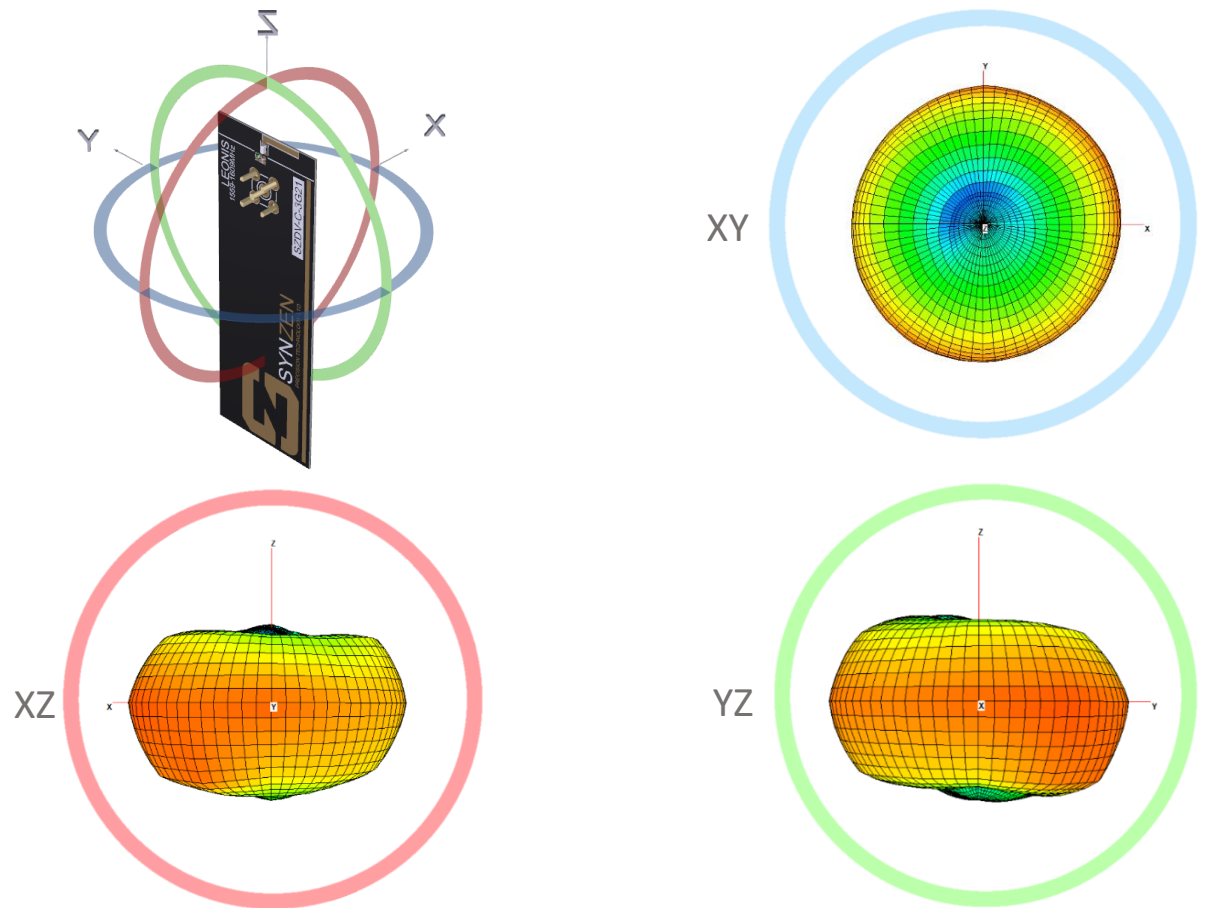
The data shown was measured on Synzen EVK (SZDV-C-3G21)



Radiated Performance – 3D

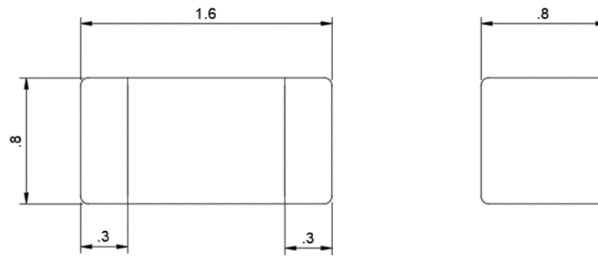
3D Radiation Pattern at 1575MHz

The data shown was measured on Synzen EVK (SZDV-C-3G21). The frequency point shown here is 1575MHz.



Mechanical

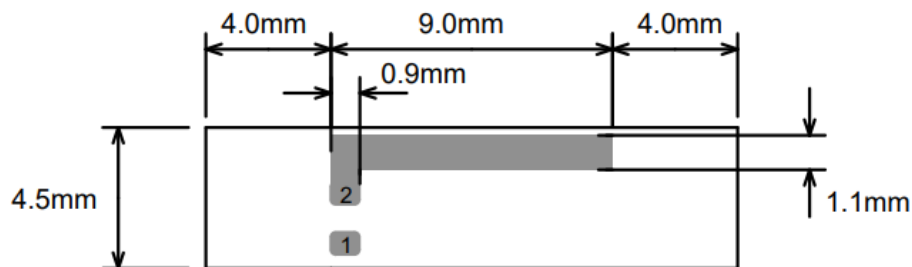
Antenna Mechanical Drawing



All dimensions in mm

Required Host PCB Footprint

The host PCB requires the footprint shown below. PCB library files and DXF is available from our website <https://synzen.com.tw/pages/search-all-products>



PADS 1, 2 = 1.0 x 0.8

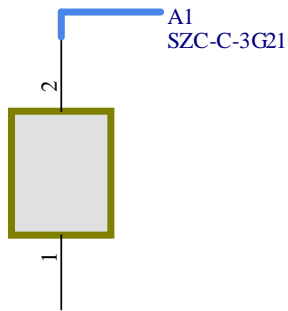
■ COPPER

ALL DIMENSIONS IN MM

Antenna Pinout

SZC-C-3G21 Schematic Symbol

The schematic symbol for the antenna is shown below with a description of each pin.

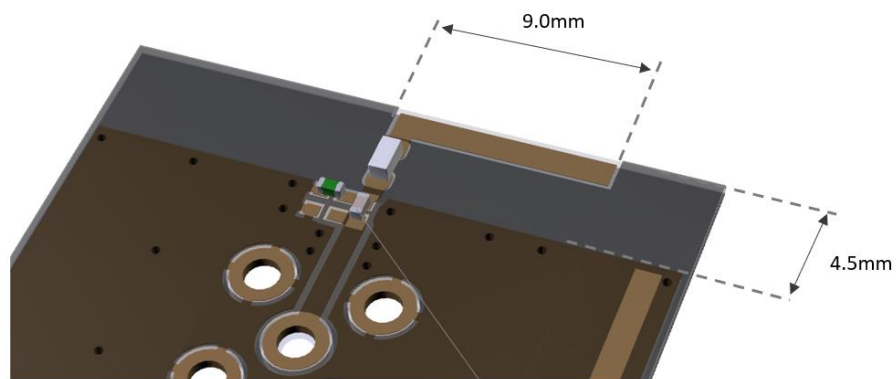


| Pin | Description |
|-----|----------------------------|
| 1 | RF Feed |
| 2 | Mechanical / Trace Section |

PCB Layout Requirements

Placement

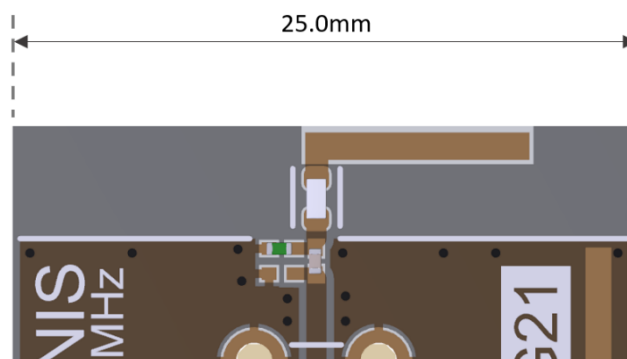
The antenna is designed to function placed at the PCB edge with clearance either side to the PCB ends.



Matching Network Components must be close to the antenna.
Transmission line should be kept as short possible to the RF port.

Required Clearance

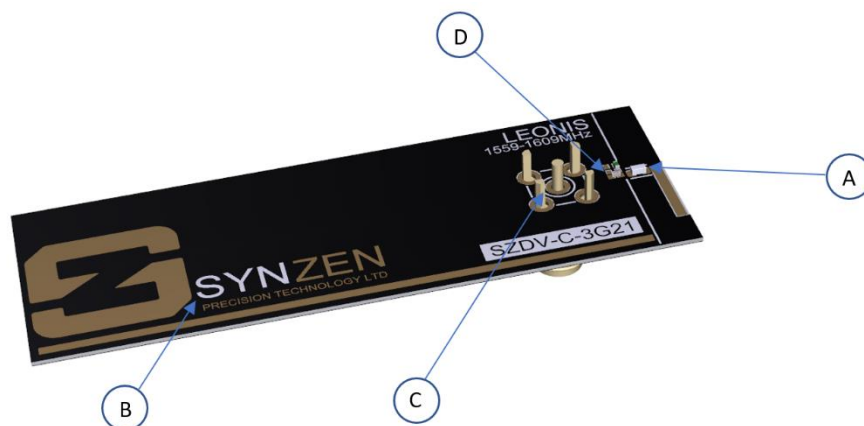
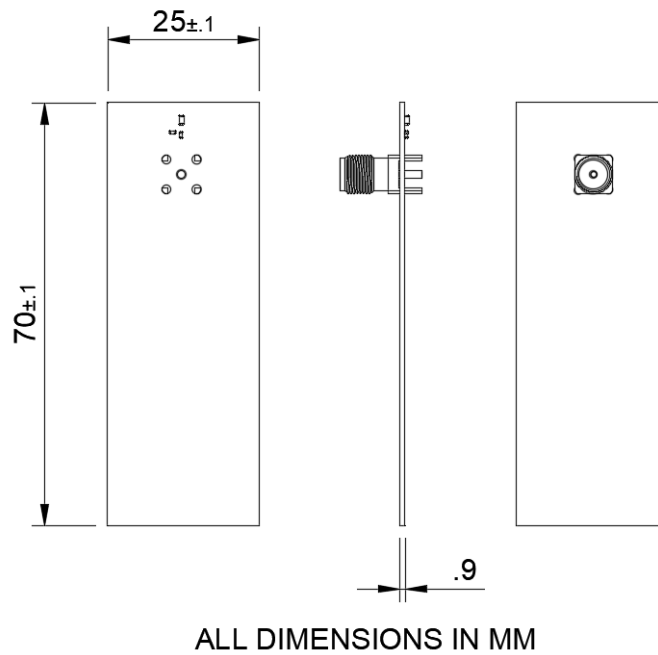
A clearance is required through all PCB layers. Adjacent copper to either side should be a minimum of $\geq 4\text{mm}$ distance, ask Synzen for advice on placement and use our free support service for optimal performance.



Evaluation Kit

SZDV-C-3G21 Evaluation Kit

The SZDV-C-3G21 evaluation kit is a PCBA with the antenna (SZP-C-3G21) fitted and optimised with a matching network. Connection to the antenna is made using the fitted female SMA connector.

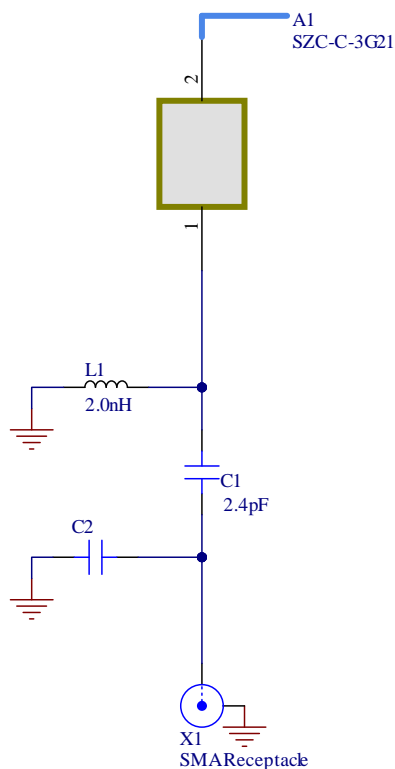


| | |
|---|---------------------|
| A | SZC-C-3G21 (LEONIS) |
| B | Host PCB |
| C | SMA Connector |
| D | Matching Circuit |

Evaluation Kit Schematic

Evaluation Kit Matching Circuit

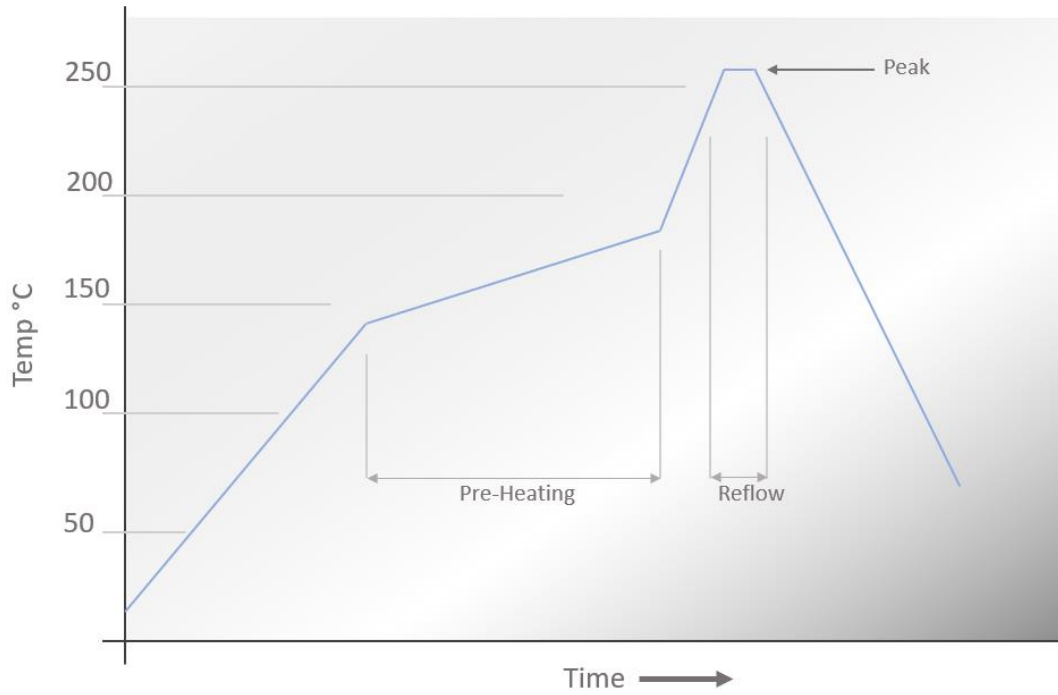
The circuit of the EVK kit along with the BOM is shown below. The matching network topology should be used on the device host PCB although the matching values will be dependent on the host PCB and device environment. Synzen provide a matching service to optimise your device to ensure the best performance, please contact sales@synzen.com.tw for more information.



| Designator | Component Type | Value | Size | Manufacturing Part No. |
|------------|----------------|--------|------|------------------------|
| A1 | Antenna | LEONIS | - | SZC-C-3G21 |
| C1 | Capacitor | 2.4pF | 0402 | |
| L1 | Inductor | 2.0nH | 0402 | |
| C2 | NA | DNP | 0402 | Not Fitted |
| J1 | SMA Connector | | - | ct-sab04x (Joymax) |

Soldering

Reflow Profile

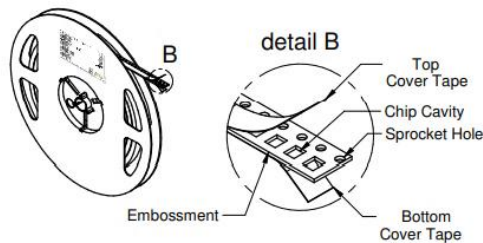
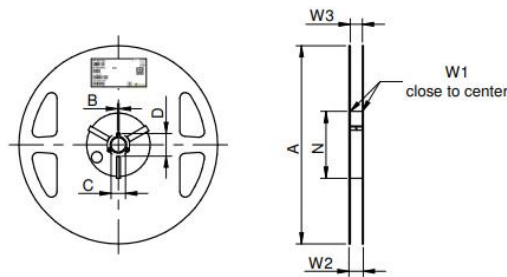
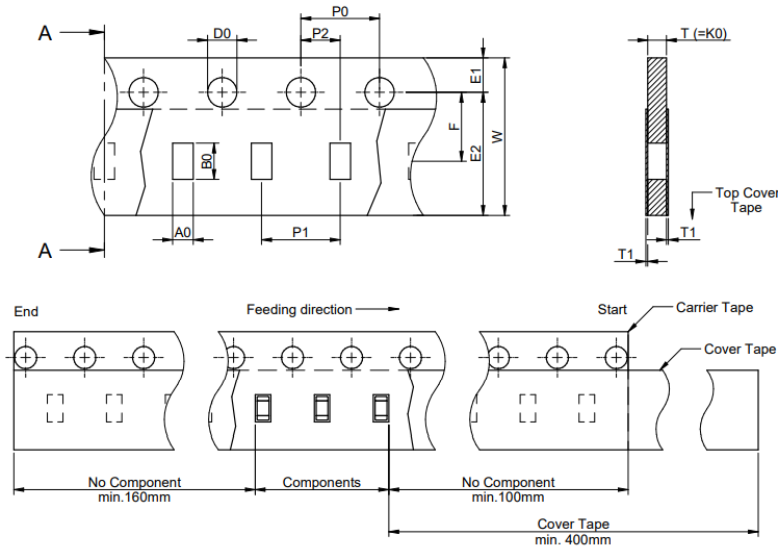


| | | |
|-------------------------|-------------|-------------------|
| Pre-Heating | 130 - 180°C | 50 to 190 seconds |
| Reflow | >220 °C | 50 to 160 seconds |
| Peak Temperature | 260 °C | 15 to 45 seconds |

Packaging

Tape and Reel

| | | A0 | B0 | W | T | T1 | P0 | P1 | P2 | D0 | E1 | E2 | F | Tape Type 1a | VPE / packaging unit |
|-----------|------------|------|------|------------|------|------|------|------|-------|-------------|------|------|-------|--------------|----------------------|
| tolerance | Tolerances | typ. | typ. | +0.3/ -0.1 | typ. | max. | ±0.1 | | +0.05 | +0.1 / -0.0 | ±0.1 | min. | ±0.05 | | pcs. |
| size | 0603 | 1.05 | 1.85 | 8.00 | 0.95 | 0.10 | 4.00 | 4.00 | 2.00 | 1.50 | 1.75 | 6.25 | 3.50 | Paper | 4000 |

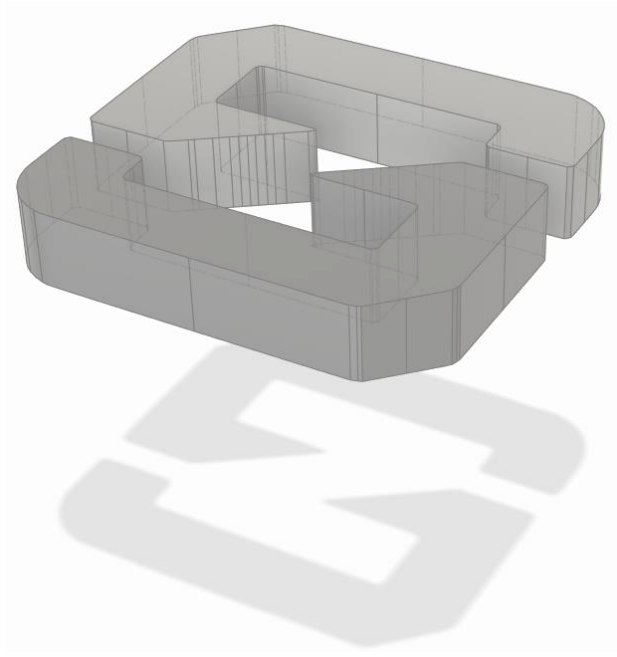


| A (mm) | B (mm) | C (mm) | D (mm) | N (mm) | W1 (mm) | W2 (mm) | W3 (mm) | W3 (mm) | Material |
|--------|--------|--------|--------|--------|---------|---------|---------|---------|---------------------------|
| ± 2.0 | min. | min. | min. | min. | +1.5 | max. | min. | max. | Polystyrene/ Polyurethane |
| 178 | 1.5 | 12.8 | 20.2 | 50 | 8.4 | 14.4 | 7.9 | 10.9 | |

Environmental

Material Regulation

The antenna has been tested to conform to RoHS requirements. A certificate of conformance is available upon request.



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