



SYNZEN

PRODUCT DATASHEET

ARCALIS | SMD Ceramic Chip Antenna | NB-IoT / LTE

Part Number / Name

- SZP-C-3L33
- ARCALIS

Description

- Ultra small chip antenna
- NB-IoT / LTE (698-2690MHz)

Features

- NB-IoT | 4G LTE
- Low Profile at only 1.7mm height
- Omnidirectional
- Dimensions: 23.0 x 9.6 x 1.7 (mm)



Contents

Introduction	3
General Specifications.....	3
Supported Band List.....	5
RF Characteristics.....	6
Performance	7
Radiated Performance – 2D.....	8
Radiated Performance 3D – 880MHZ	9
Radiated Performance 3D - 1880MHz	10
Radiated Performance 3D - 2550MHz	11
Mechanical.....	12
Antenna Pinout.....	13
PCB Layout Requirements.....	14
Evaluation Kit	14
Evaluation Kit Schematic.....	16
Soldering	17
Packaging	18
Environmental.....	19



Introduction

Introducing ARCALIS, a state-of-the-art Surface-mounted NB-IoT/LTE antenna, tailored specifically for 4G LTE and global cellular applications. This sleek unit is impressively sized at just 23.0 x 9.6 x 1.7mm, representing the perfect blend of form and function.

ARCALIS's avant-garde design offers a much-needed deviation from conventional antennas which tend to require more space and often lack adaptability. It caters perfectly to the demands of today's wireless device manufacturers who are keen on enhancing their product's capabilities.

- For NB-IoT/LTE applications (698-2690 MHz)
- Resistant to de-tuning
- Small form factor of 23 x 9.6 x 1.7 (mm).
- Ideal for smaller wearable designs.
- Suitable for sealing with resin / potting compounds.

Compact Design: ARCALIS promises top-notch 4G LTE and NB-IoT connectivity in a minimalist form, making it a perfect match for devices where space is at a premium.

Choose ARCALIS – where groundbreaking innovation meets compact design, heralding the future of antenna technology.

Typical Applications

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



Mechanical Specifications

Part Number	SZP-C-3L33
Name	ARCALIS
Dimensions	23.0 x 9.6 x 1.7 (mm)
Required Clearance area	23.0 x 12.0 (mm)
Weight	<2g
Antenna Type	Surface Mount Device
Material	FR4

Electrical / RF Specifications*

Band	Frequency Range (MHz)	Avg Efficiency (%)	Peak Gain (dBi)	Impedance	Polarization
NB-IoT / 4G LTE B5,8,12,13,14,17,18,20,26,27,28,29	698-960	>40	1.30	50Ω	Linear
NB-IoT / 4G LTE B1,2,3,4,9,23,35,39,66	1710-2200	>60	3.31		
4G LTE B40	2300-2400	>70	2.80		
4G LTE B7,38,41	2500-2690	>45	1.88		

*All performance stated is measured of SZDV-C-3L33 evaluation kit.

Environmental Specifications

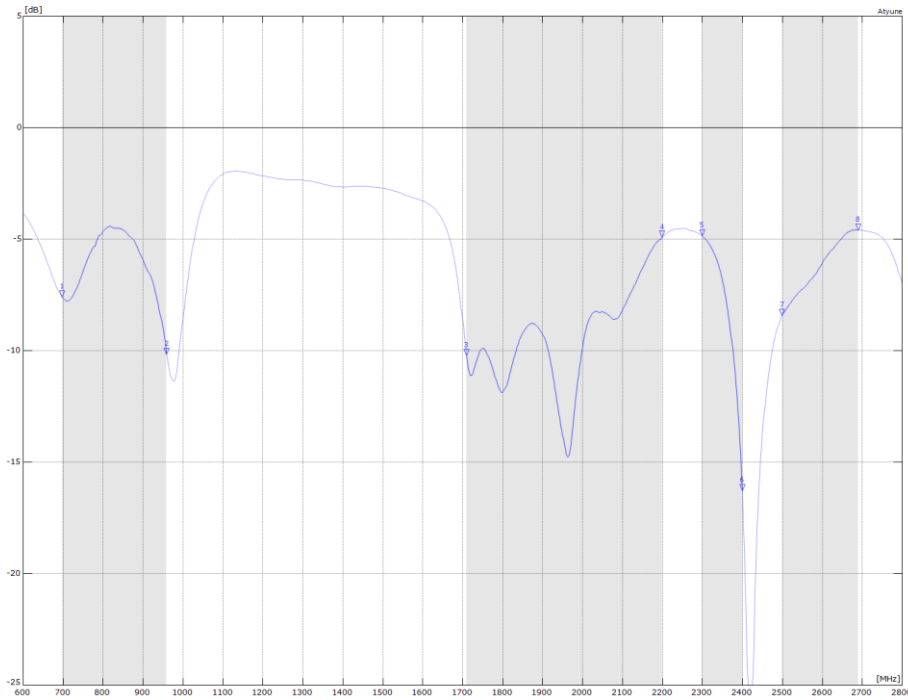
Operational Temperature	-40 to +125 (°C)
Storage Temperature	-10 to +40 (°C)
Relative Humidity	≤75%
Moisture Sensitivity Level (MSL)	1
RoHs & REACH compliant	Yes

Supported Band List

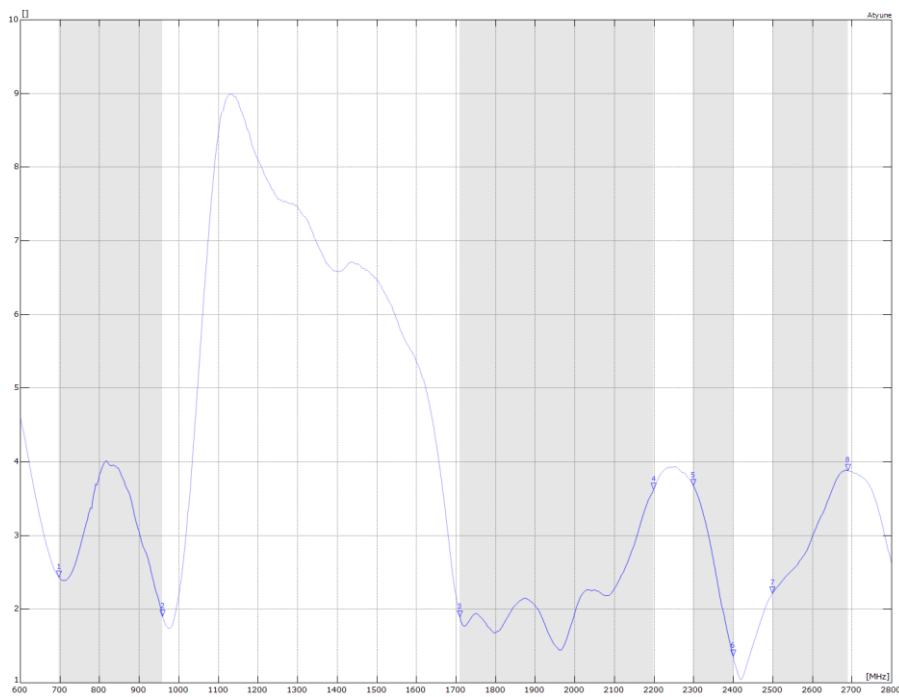
Band	Frequency Band	Uplink(MHz)	Downlink (MHz)	Supported
1	2100	1920-1980	2110-2170	YES
2	1900	1850-1910	1930-1990	YES
3	1800	1710-1785	1805-1880	YES
4	1700	1710-1755	2110-2155	YES
5	850	824-849	869-894	YES
7	2600	2500-2570	2620-2690	YES
8	900	880-915	925-960	YES
9		1749.9-1784.9	1844.9-1879.9	YES
10	1700	1710-1770	2110-2170	YES
11	1500	1427.9-1447.9	1475.9-1495.9	NO
12	700	699-716	729-746	YES
13	700	777-787	746-756	YES
14	700	788-798	758-768	YES
17	700	704-716	734-746	YES
18	850	815-830	860-875	YES
19	850	830-845	875-890	YES
20	800	832-862	791-821	YES
21	1500	1447.9-1462.9	1495.9-1510.9	NO
22	3500	3410-3490	3510-3590	NO
24	1600	1626.5-1660.5	1525-1559	NO
25	1900	1850-1915	1930-1995	YES
26	850	814-849	859-894	YES
27	800	807-824	852-869	YES
28	700	703-748	758-803	YES
29	700	N/A	717-728	YES
30	2300	2305-2315	2350-2360	YES
31		452.5-457.5	462.5-467.5	NO
32	1500	N/A	1452-1496	NO
33	2100	1900-1920		YES
34	2100	2010-2025		YES
35	1900	1850-1910		YES
36	1900	1930-1990		YES
37		1910-1930		YES
38	2600	2570-2620		YES
39	1900	1880-1920		YES
40	2300	2300-2400		YES
41	2500	2496-2690		YES
42	3500	3400-3600		NO
43	3700	3600-3800		NO
44	700	703-803		YES
45	1500	1447-1467		YES
46	5200	5150-5925		NO
47	5900	5855-5925		NO
48	3600	3550-3700		NO
50	1500	1430-1517		NO
51	1500	1427-1432		NO
65	2100	1920-2010	2110-2200	YES
66	1700	1710-1780	2110-2200	YES
67	700	N/A	738-758	YES
68	700	698-728	753-783	YES
69	2600	N/A	2570-2620	YES
70	2000	1695-1710	1995-2020	YES
71		663-698	617-652	NO
74		1427-1518		NO
77		3300-4200		NO
78		3300-3800		NO
79		4400-5000		NO
85		698-716	728-746	YES

RF Characteristics

S11



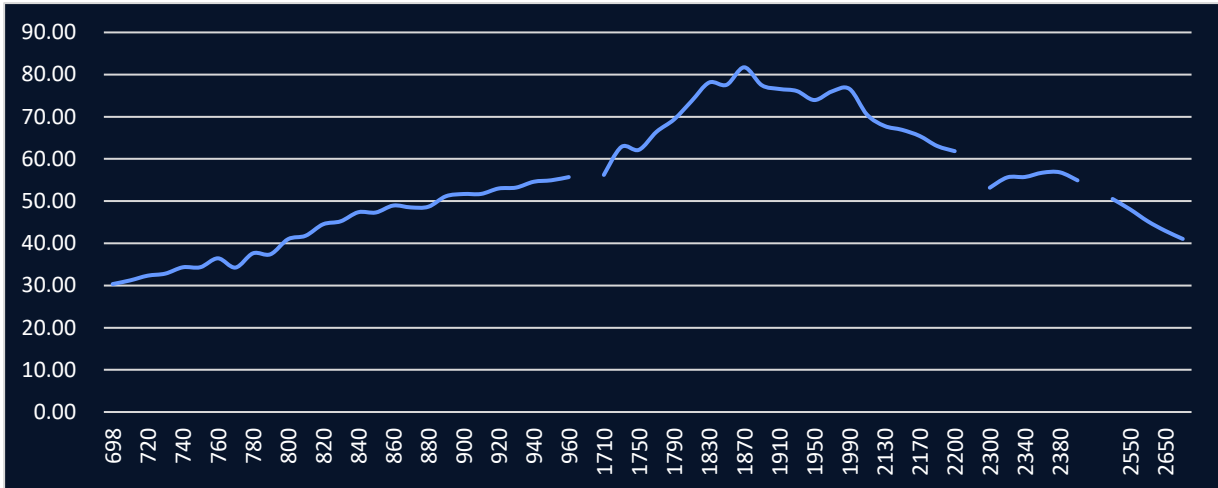
VSWR



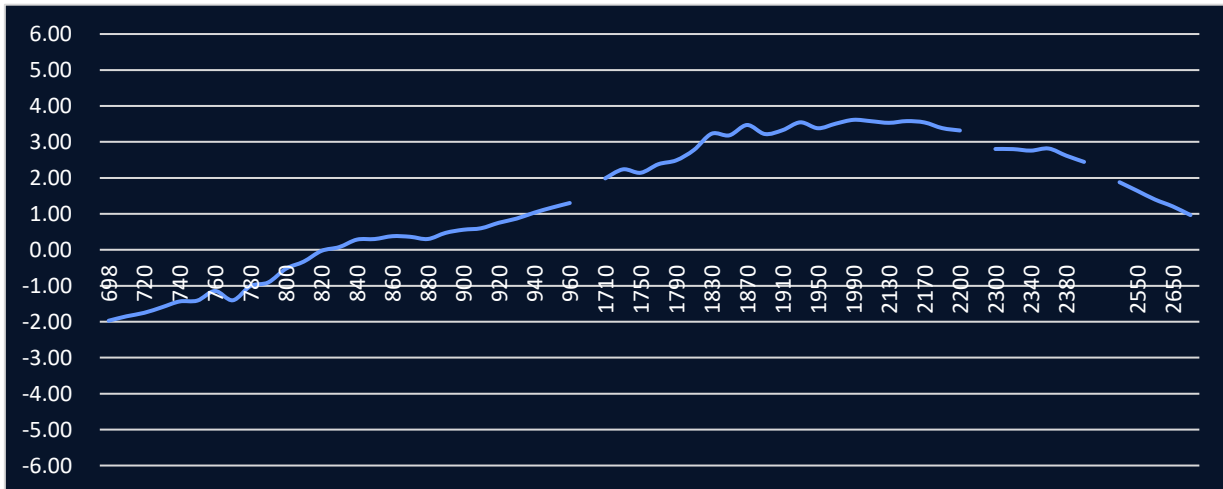


Performance

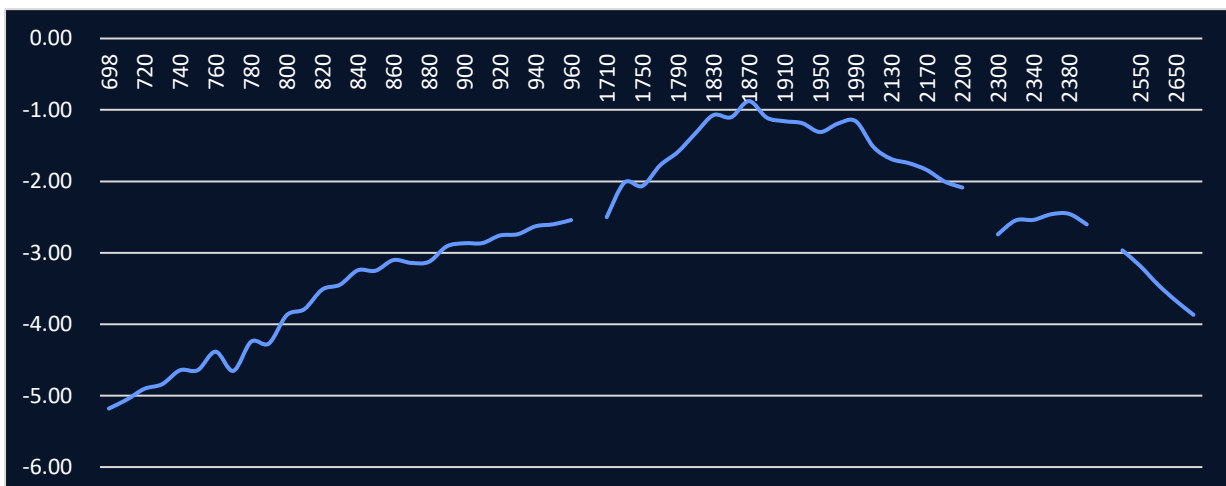
Efficiency



Peak Gain



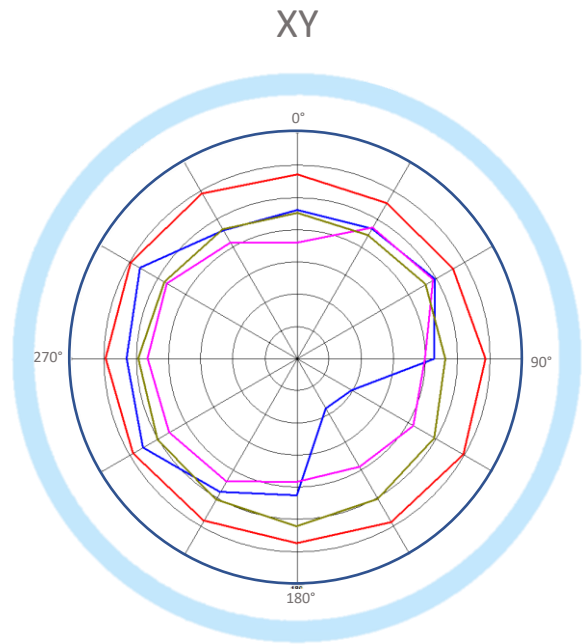
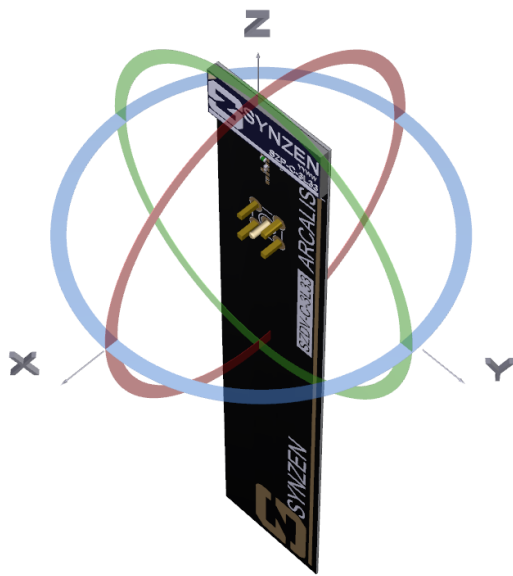
Average Gain



Radiated Performance – 2D

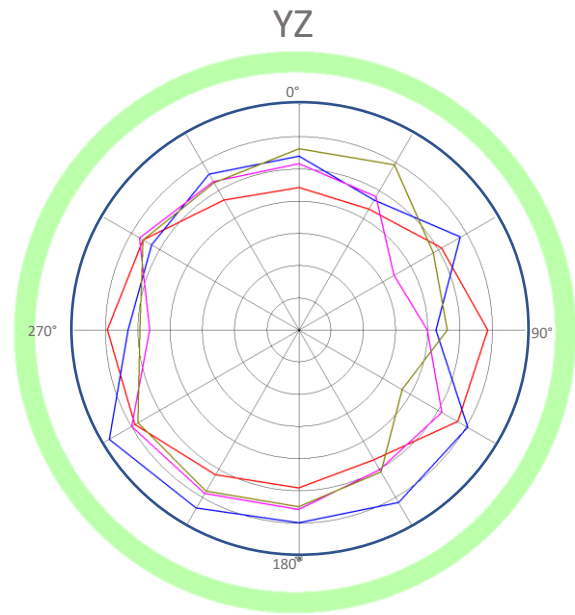
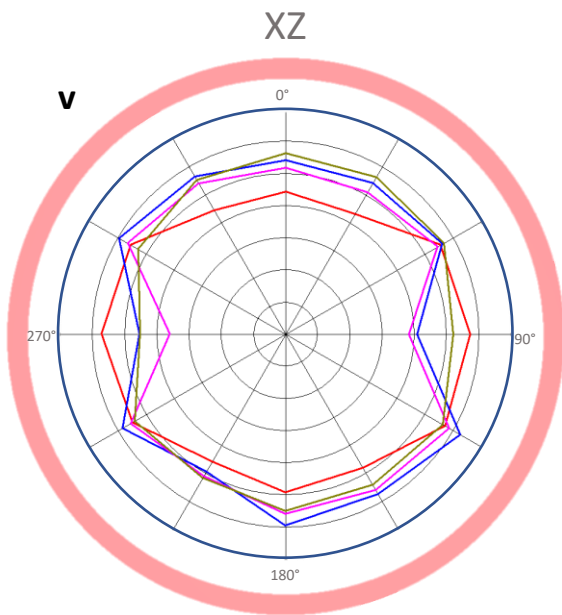
2D Polar Plot 698 - 2690MHz

The data shown was measured on Synzen EVK (SZDV-C-3L33)



882
1870
2360
2660

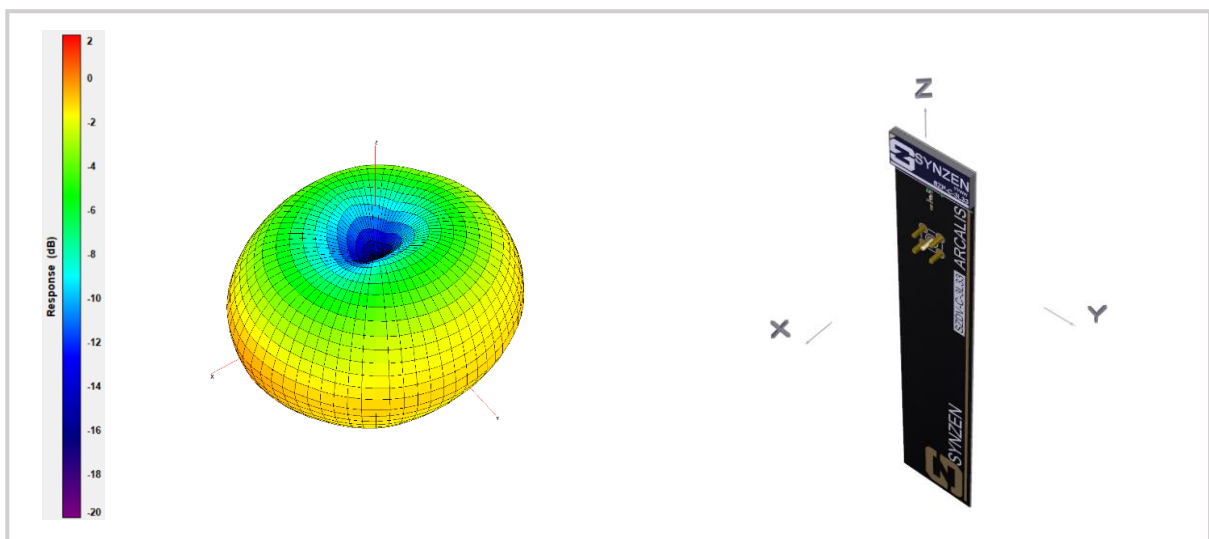
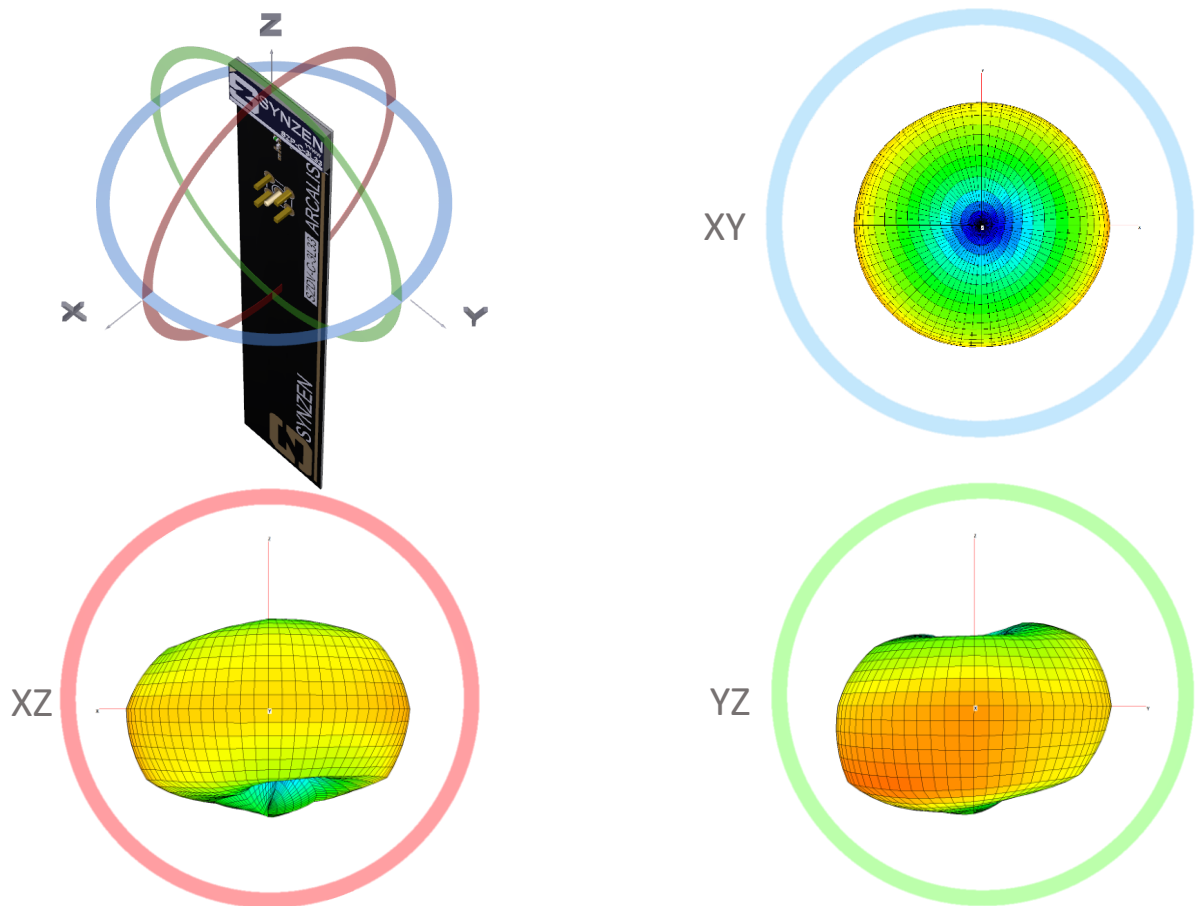
Max: 5
Min: -30
Scale: 5/div



Radiated Performance 3D – 880MHz

3D Radiation Pattern at 880MHz

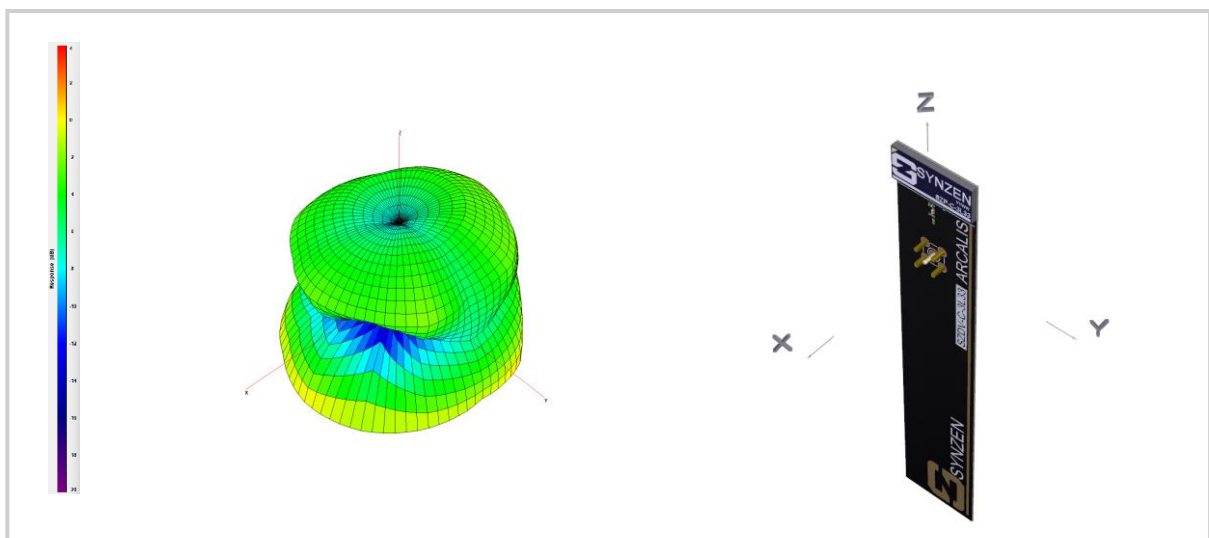
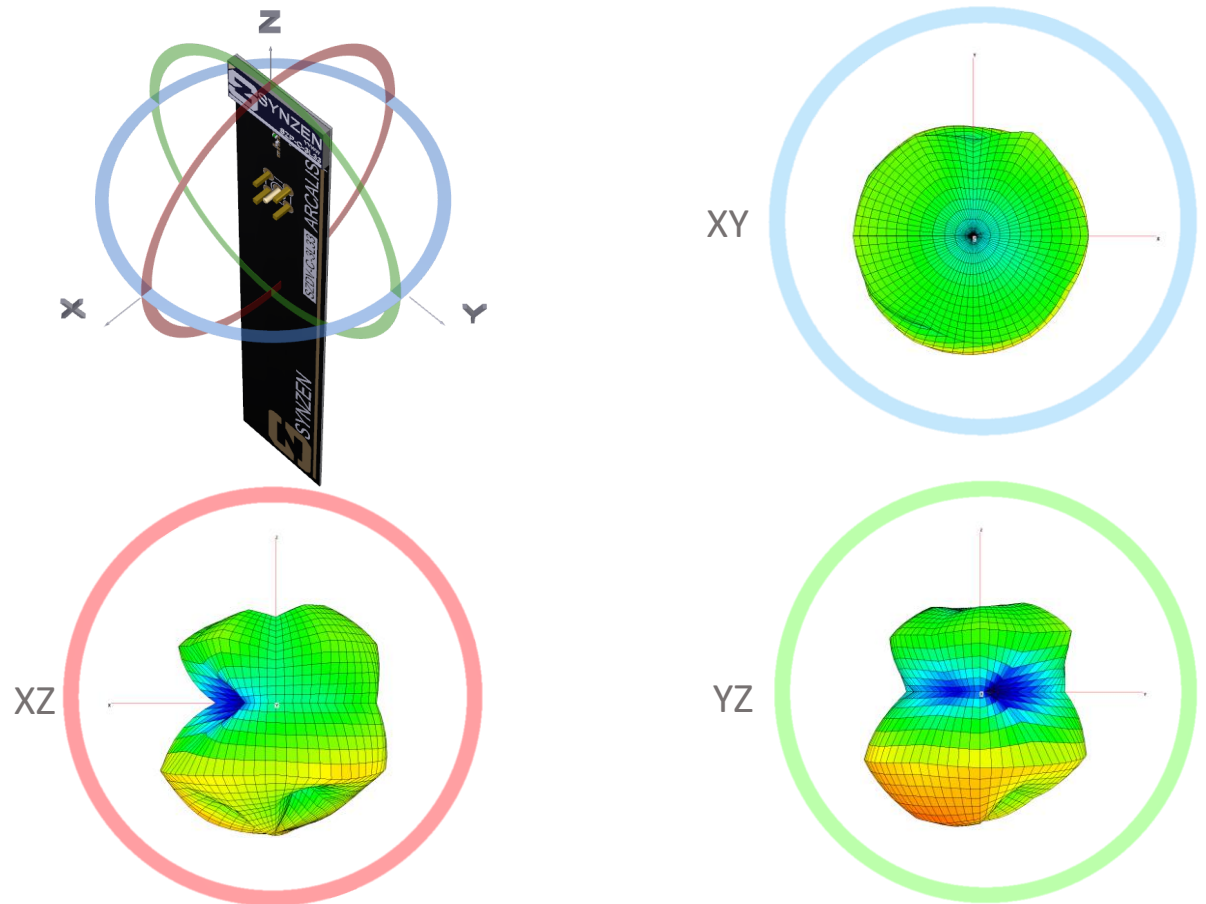
The data shown was measured on Synzen EVK (SZDV-C-3L33)



Radiated Performance 3D - 1880MHz

3D Radiation Pattern at 1880MHz

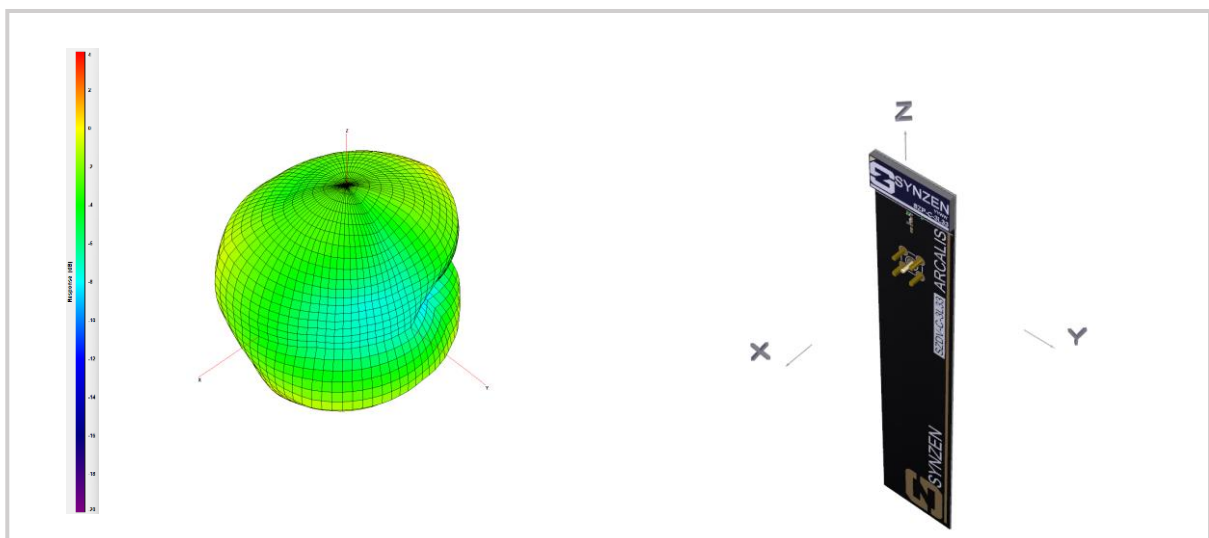
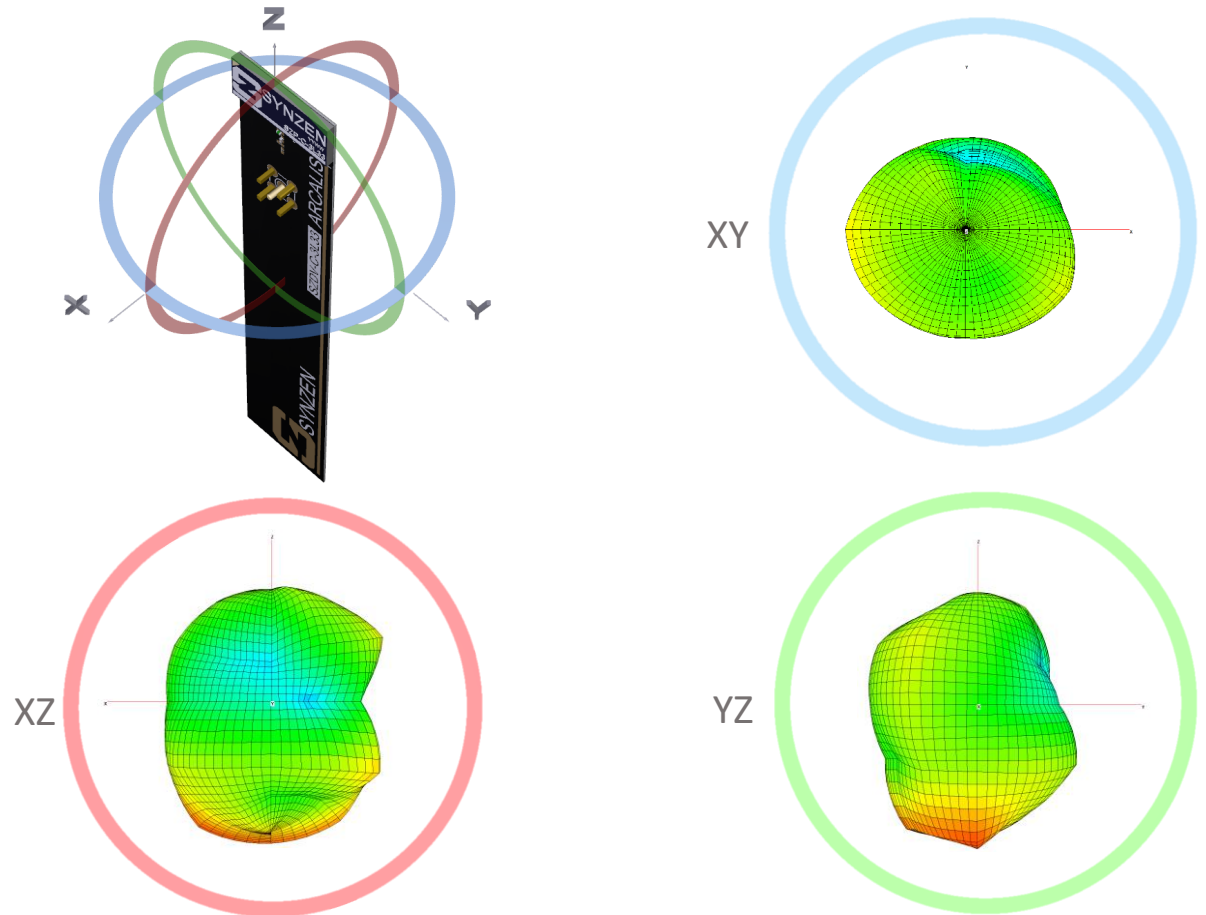
The data shown was measured on Synzen EVK (SZDV-C-3L33)



Radiated Performance 3D - 2550MHz

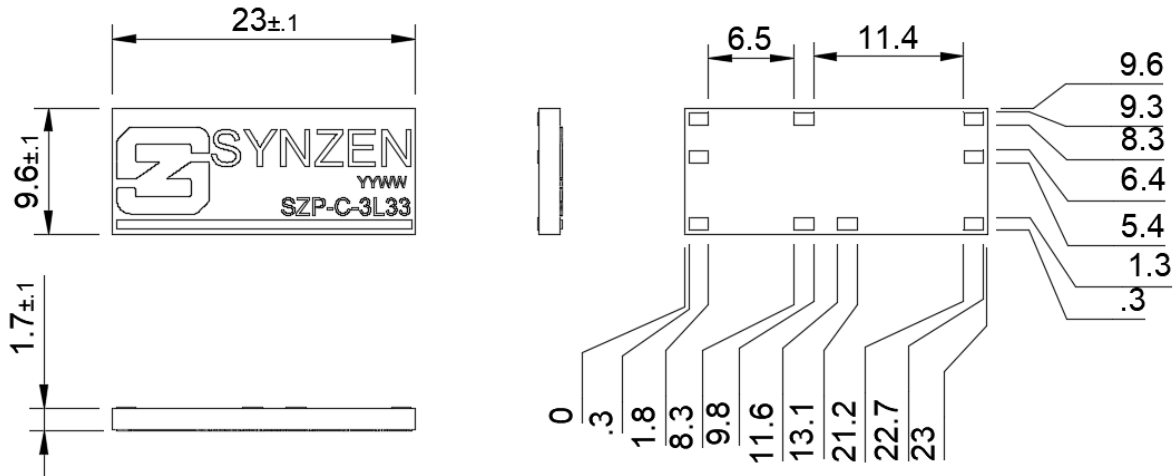
3D Radiation Pattern at 2550MHz

The data shown was measured on Synzen EVK (SZDV-C-3L33)



Mechanical

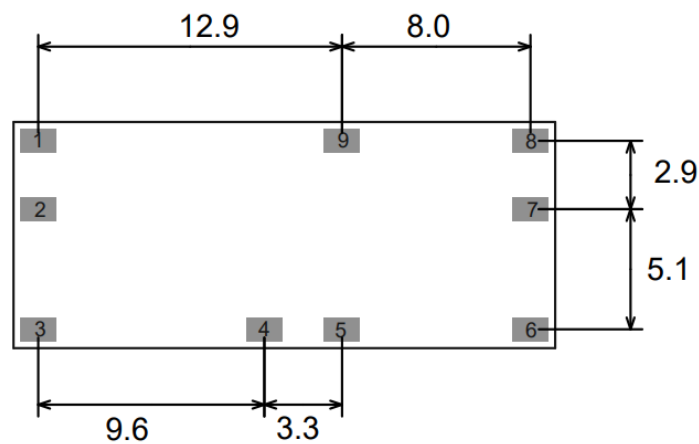
Antenna Mechanical Drawing



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>

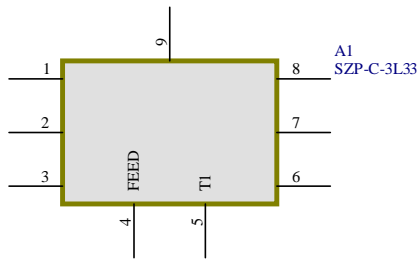


ALL PADS = 1.5 x 1.0
ALL DIMENSIONS IN MM

Antenna Pinout

SZP-C-3L33 Schematic Symbol

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

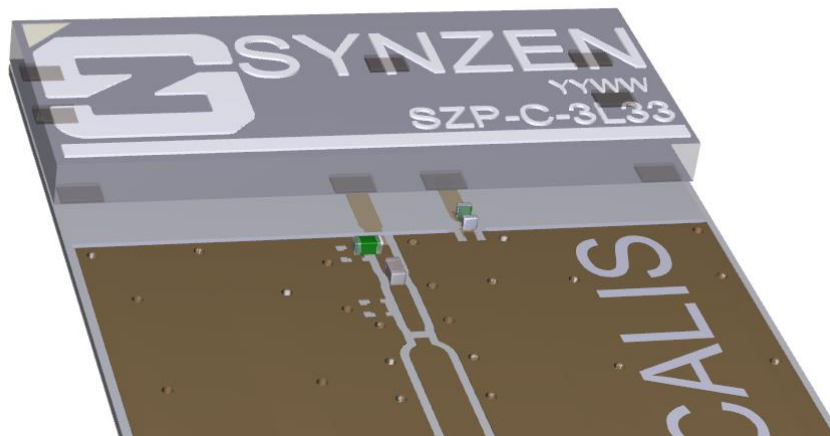


Pin	Description
4	RF Feed
5	Tuning component to GND

PCB Layout Requirements

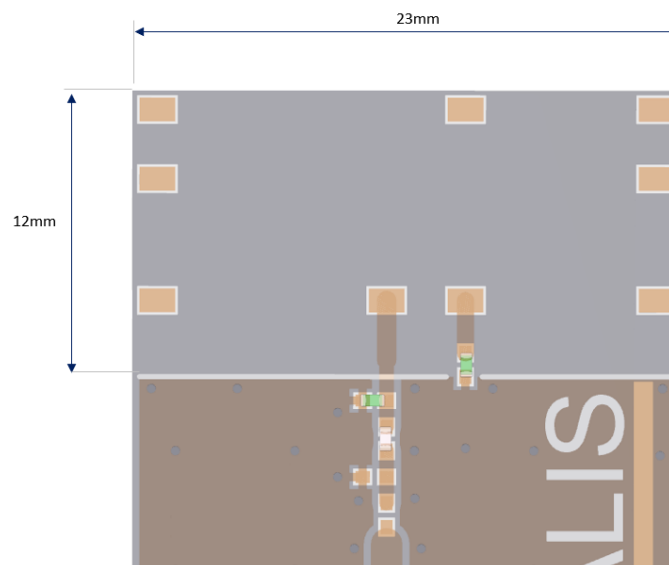
Placement

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



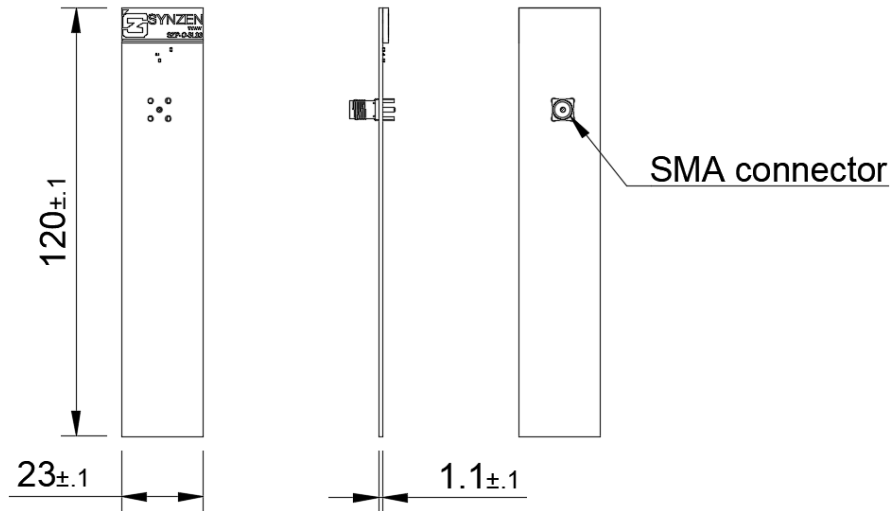
Required Clearance

Clearance is required through all PCB layers. Adjacent copper to either side should be a minimum of $\geq 10\text{mm}$ distance, ask Synzen for advice on placement and use our free support service for optimal performance.

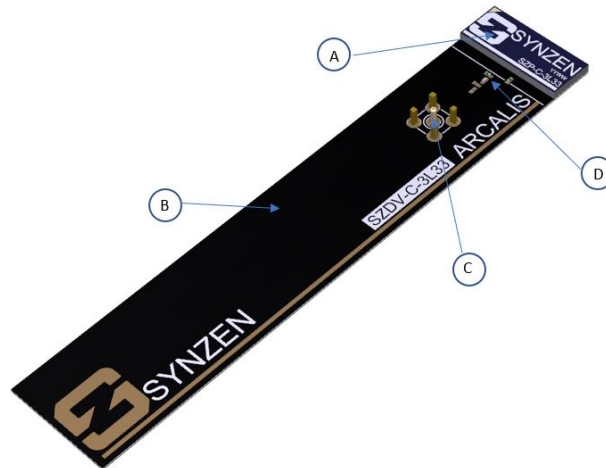


SZDV-C-3L33 Evaluation Kit

The SZDV-C-3L33 evaluation kit is a PCBA with the antenna (SZP-C-3L33) fitted and optimised with a matching network. Connection to the antenna is made using the fitted female SMA connector.



ALL DIMENSIONS IN MM

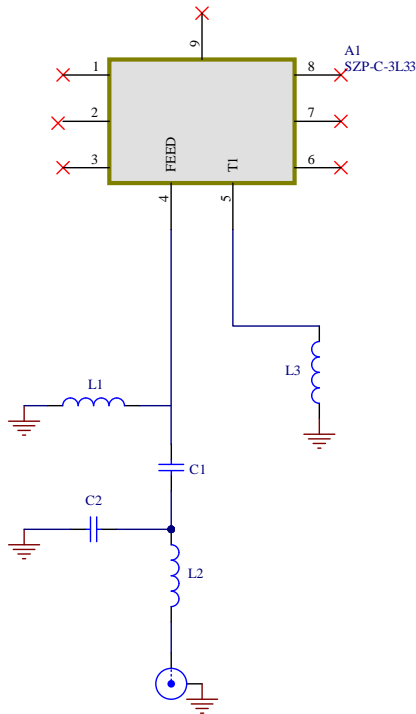


A	SZP-C-3G33 (ARCALIS)
B	Host PCB
C	SMA Connector
D	Matching Circuit

Evaluation Kit Schematic

Evaluation Kit Matching Circuit

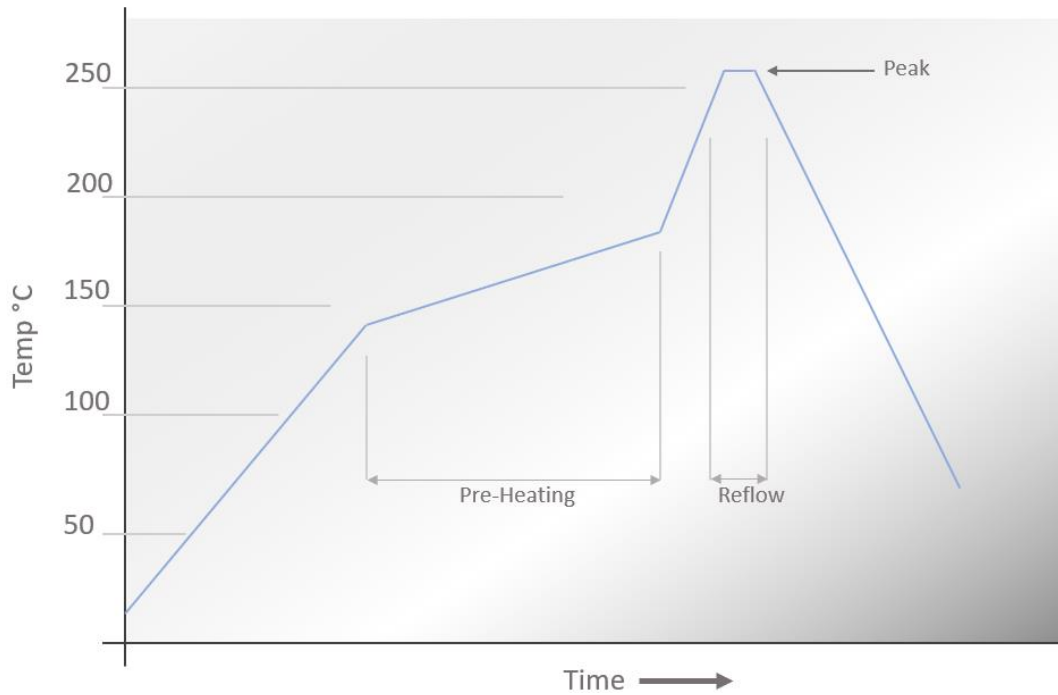
The circuit of the EVK kit along with the BOM is shown below. The matching network topology should be used on the device host PCB although the matching values will be dependent on the host PCB and device environment. Synzen provide a matching service to optimise your device to ensure the best performance,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



Designator	Component Type	Value	Size	Manufacturing Part No.
A1	Antenna	ARCALIS	-	SZP-C-3L33
L2	Inductor	0R	0402	Non-specific part
C1	Capacitor	3.9pF	0402	GJM1555C1H3R9WB01D
L1	Inductor	27nH	0402	LQG15HS27NH02D
C2	NA	DNP	0402	Not Fitted
L3	Inductor	5.1nH	0402	LQG15HS5N1C02D
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

Environmental

Material Regulation

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



Synzen Precision Technology Ltd makes no warranties based on the accuracy or completeness of the contents of this document and reserves the right to make changes to specifications and product descriptions at any time without notice. Synzen reserves all rights to this document and the information contained herein. Reproduction use or disclosure to third parties without express permission is strictly prohibited.