SYNZEN

DATASHEET

ARAKKIS | SZP-C-112/113 | Surface Mount Device | LTE + R

Features:

LTE + R : 698-2700MHz

>2.20dBi Peak Gain, >55% Efficiency
Dimensions: 30 x 7.0 x 3.3 mm
RoHs Compliant

Contents

Introduction

ARRAKIS is a compact SMD antenna engineered for 4G LTE and 5G RedCap applications. Supporting wideband coverage from 698–960 MHz, 1710–2200 MHz, 2300–2400 MHz, and 2500–2690 MHz, it delivers reliable connectivity for both existing LTE networks and the next generation of reduced capability 5G systems.

Its corner-mounted design minimizes PCB footprint while maintaining high efficiency and gain, even on compact host devices. With reduced dependency on ground plane size and full compatibility for diversity or MIMO setups, ARRAKIS provides an adaptable solution for long-term product lifecycles.

Suitable for global IoT and cellular markets, ARRAKIS is ideal for telematics, smart metering, home automation, gateways, drones, healthcare devices, POS, and OBD-II systems. It ensures robust performance today while being ready for tomorrow's RedCap networks.

Features

- Wideband coverage for 4G LTE and 5G RedCap
- Backward compatible with 3G and 2G systems
- Compact SMD corner-mounted design (30.0 × 7.0 × 3.3 mm)
- High efficiency and peak gain across global bands
- Reduced dependency on ground plane size
- Suitable for diversity and MIMO configurations
- RoHS & REACH compliant, halogen free

Applications

- Telematics and vehicle tracking
- Smart metering and energy management
- Smart city and infrastructure systems
- Gateways and IoT hubs
- Healthcare and medical monitoring devices
- Point of Sale (POS) systems
- OBD-II and automotive electronics
- Drones and UAVs
- Home automation solutions

Supported Band List

LTE 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
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		NO
46	5200	5150 – 5925		NO
47	5900	5855 – 5925		NO
48	3600	3550 – 3700		NO
50	1500	1432 – 1517		NO
51	1500	1427 – 1432		NO
65	2100	1920 – 2010	2110 – 2200	YES
66	1700	1710 – 1780	2110 – 2200[2]	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	NO

Mechanical Specifications

Parameter	
Part Number	SZP-C-1L12 / 1L13
Name	ARAKKISa/b
Dimensions (mm)	30.0 x 7.0 x 3.3
Weight (g)	<1.8
Antenna Type	SMD
Required Clearance Area	310mm²

Electrical / RF Specifications

130mm PCB					
Band	**Frequency Range (MHz)**	**Average Efficiency (%)**	**Peak Gain (dBi)**	**VSWR (worst case)**	**Impedance**
5GNR/4G LTE B5,8,12,13,14,17,18,20,26,27,28,29	698-960	>60	2.20	3.6:1	50 Ω
5GNR/4G LTE B1,2,3,4,9,23,35,39,66	1710-2200	>65	3.20	2.6:1	
5GNR/4G LTE B40	2300-2400	>55	3.15	3.2:1	
5GNR/4G LTE B7,38,41	2500-2690	>60	3.15	2.9:1	

45mm PCB					
Band	**Frequency Range (MHz)**	**Average Efficiency (%)**	**Peak Gain (dBi)**	**VSWR (worst case)**	**Impedance**
5GNR/4G LTE B5,8,12,13,14,17,18,20,26,27,28,29	698-960	>25	0.41	6.0:1	50 Ω
5GNR/4G LTE B1,2,3,4,9,23,35,39,66	1710-2200	>58	1.22	5.0:1	
5GNR/4G LTE B40	2300-2400	>55	0.40	4.0:1	
5GNR/4G LTE B7,38,41	2500-2690	>65	1.68	6.2:1	

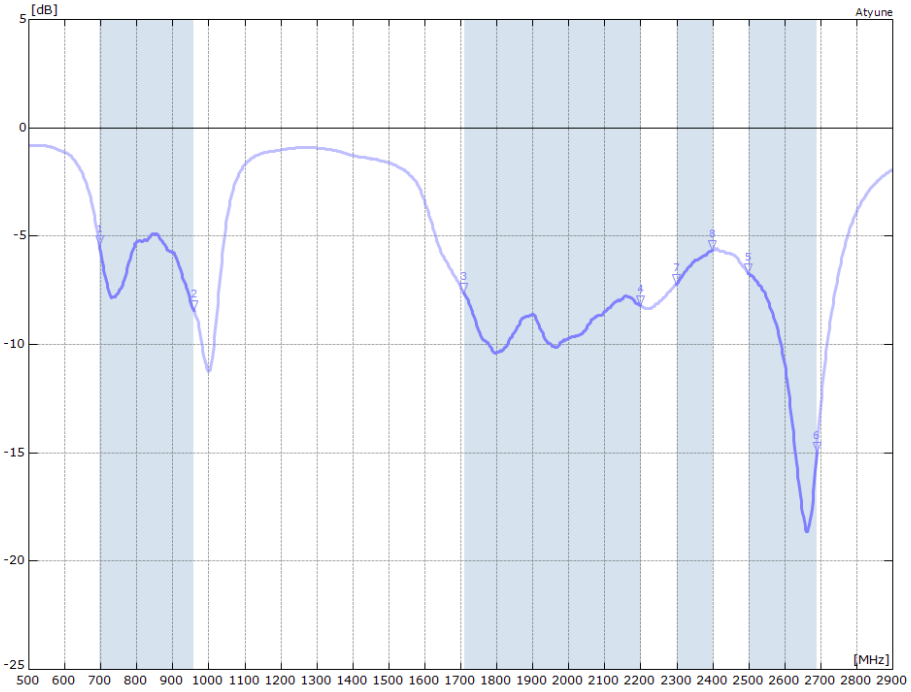
Note: The antenna performance was measured on EVK (SZDV-C-1L12)

Environmental

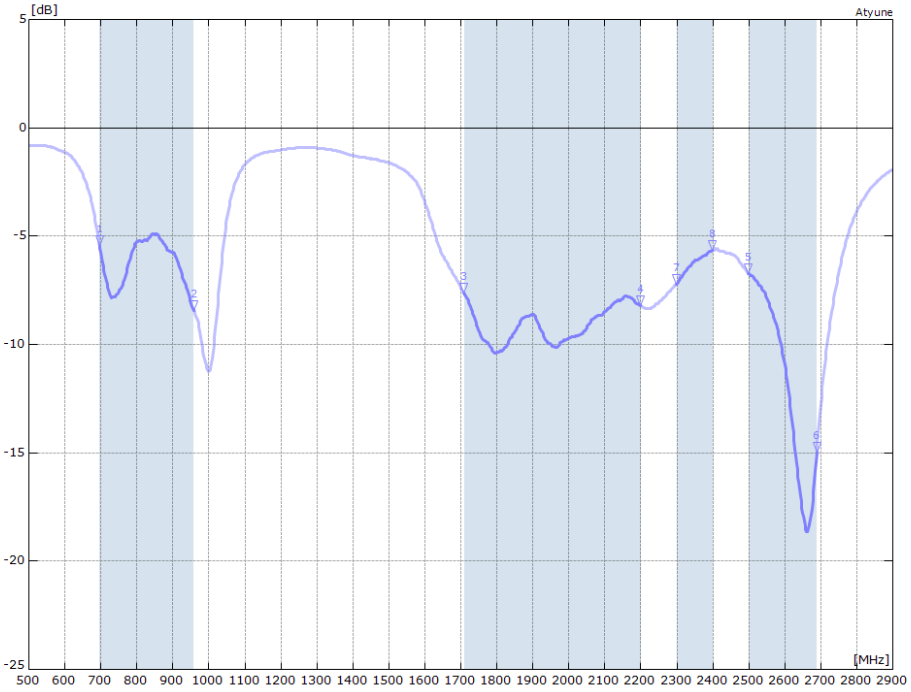
Parameter	
Operational Temperature	-40 to +125°C
Storage Temperature	-10 to +40°C
Relative Humidity (Storage)	65±20% RH
Moisture Sensitivity	1
RoHs and REACH compliant	Yes

RF Characteristics

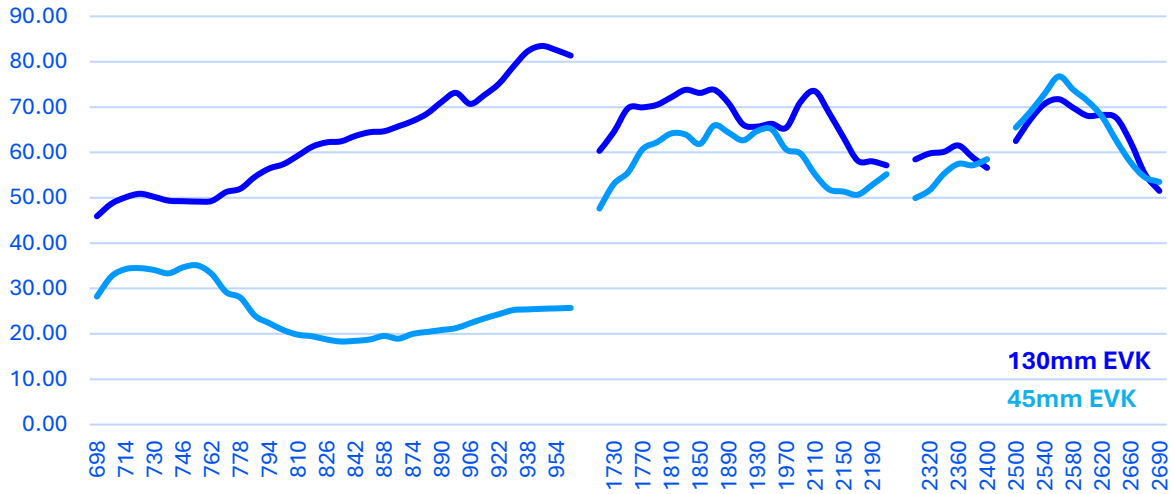
Return loss



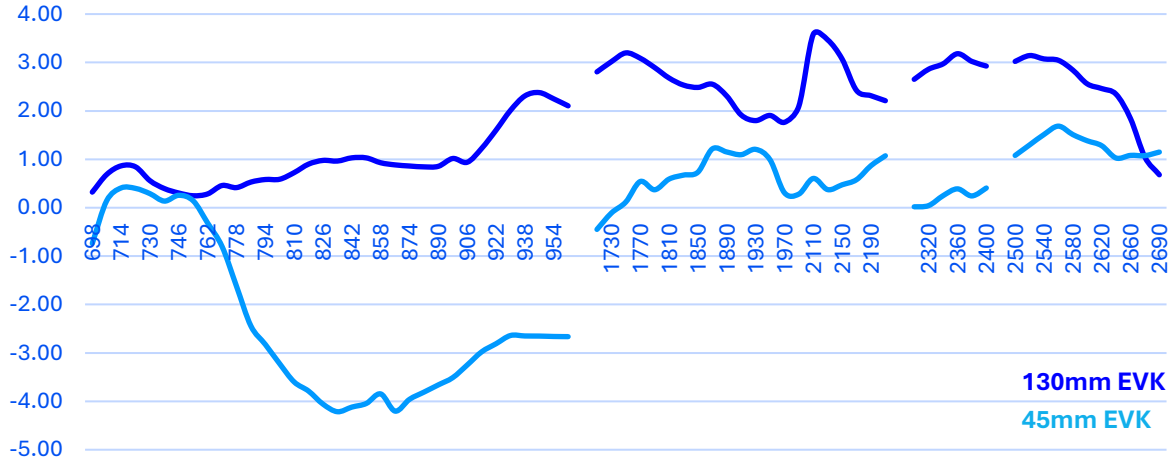
VSWR



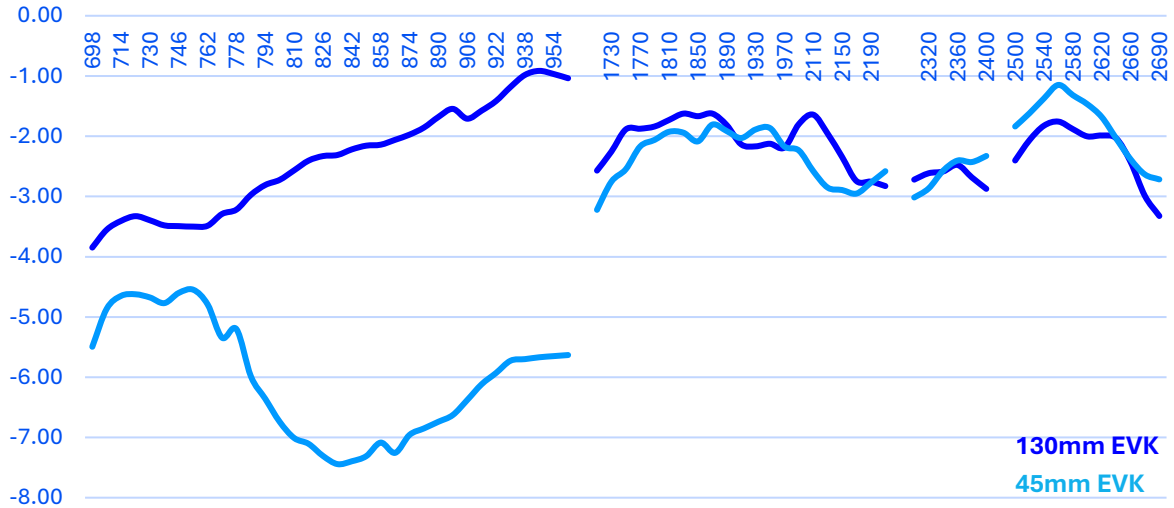
Efficiency



Peak Gain



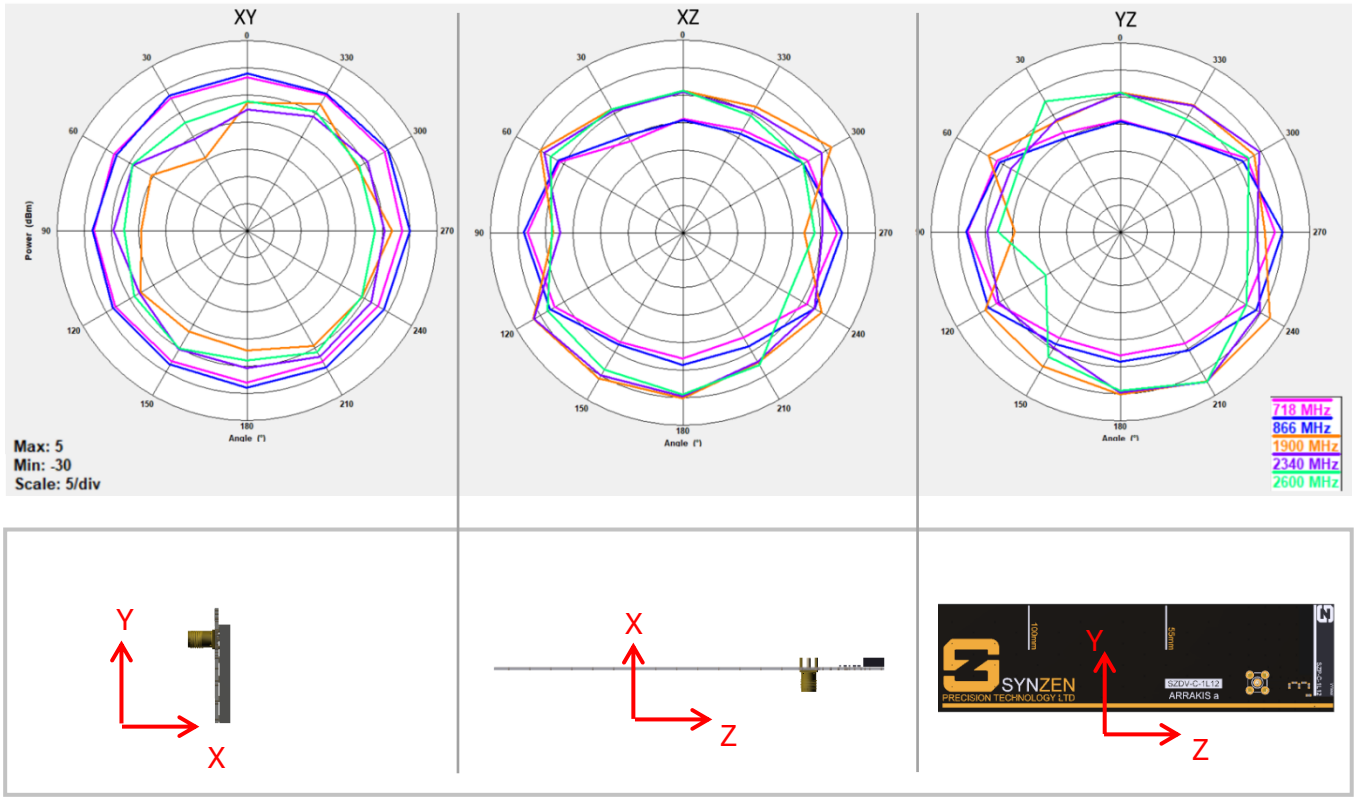
Average Gain



RF Radiation Patterns

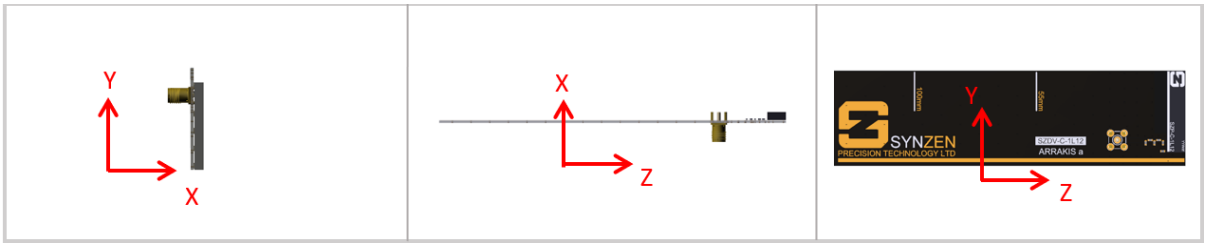
2D Polar Plot

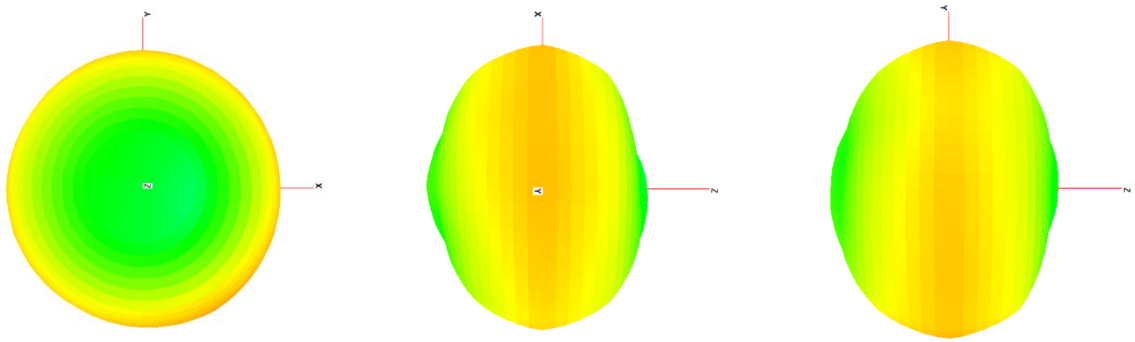
The data shown was measured on Synzen DVK (SZDV-C-1L12)

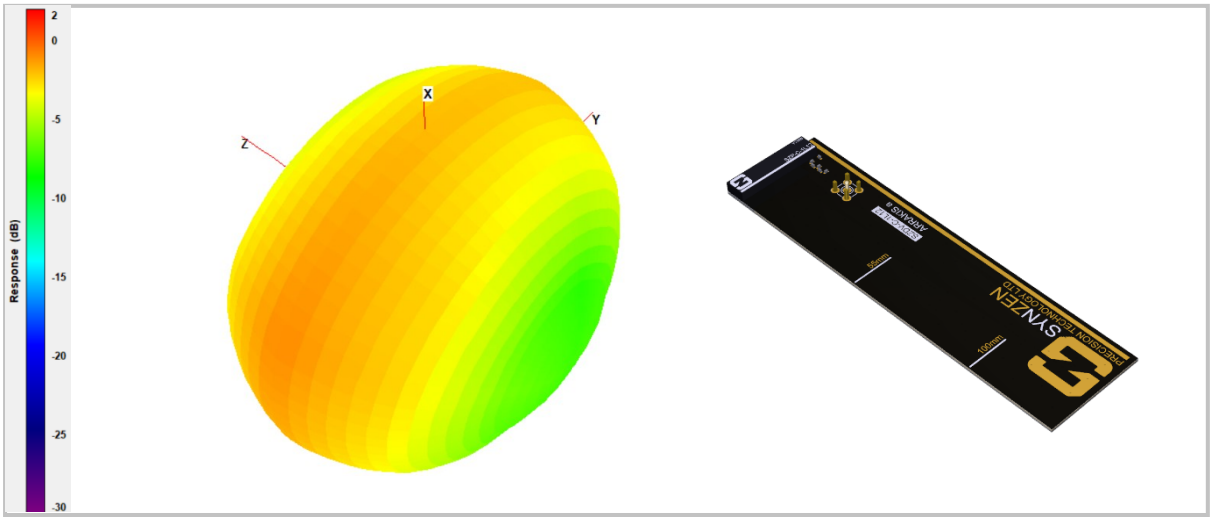


3D Radiation Patterns at 714MHz

The data shown was measured on Synzen DVK (SZDV-C-1L12).

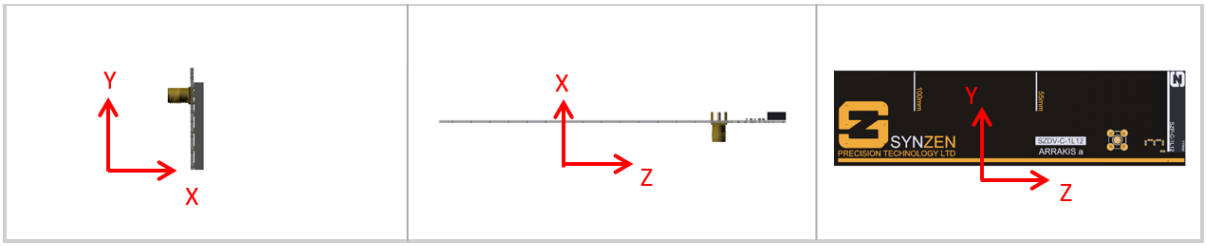


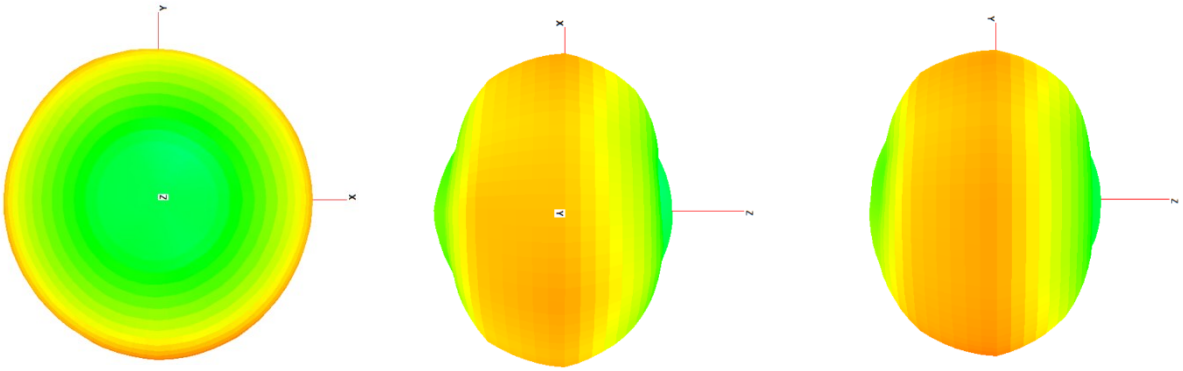


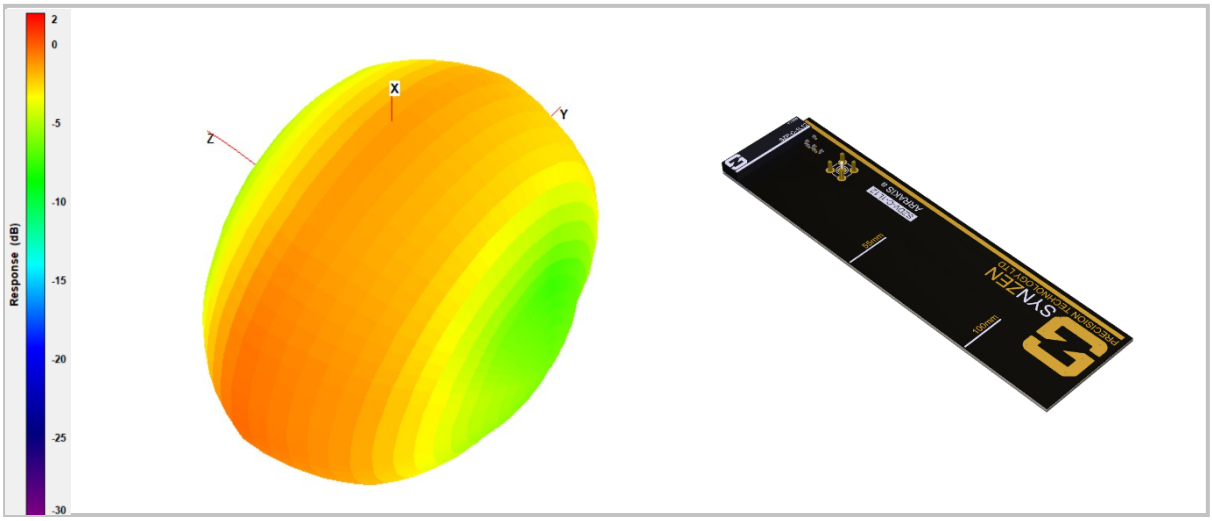


3D Radiation Patterns at 870MHz

The data shown was measured on Synzen DVK (SZDV-C-1L12).

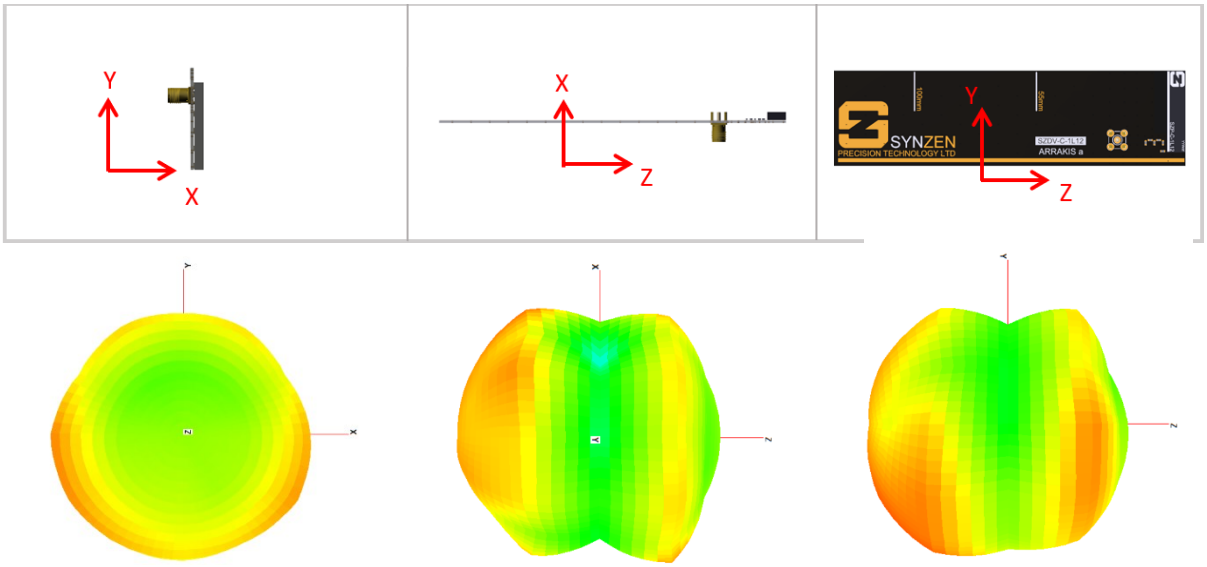


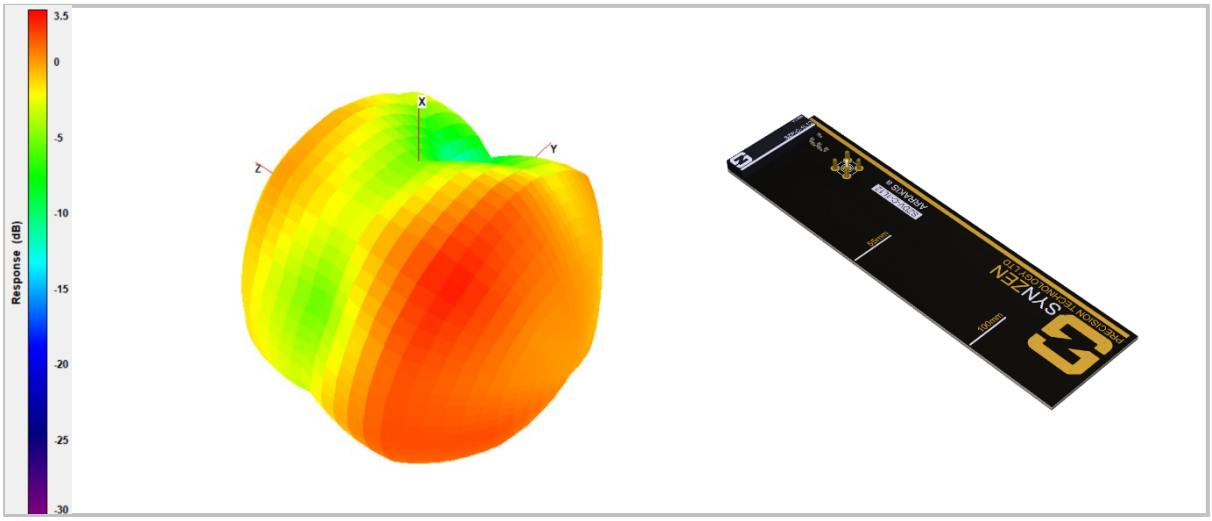




3D Radiation Patterns at 1880MHz

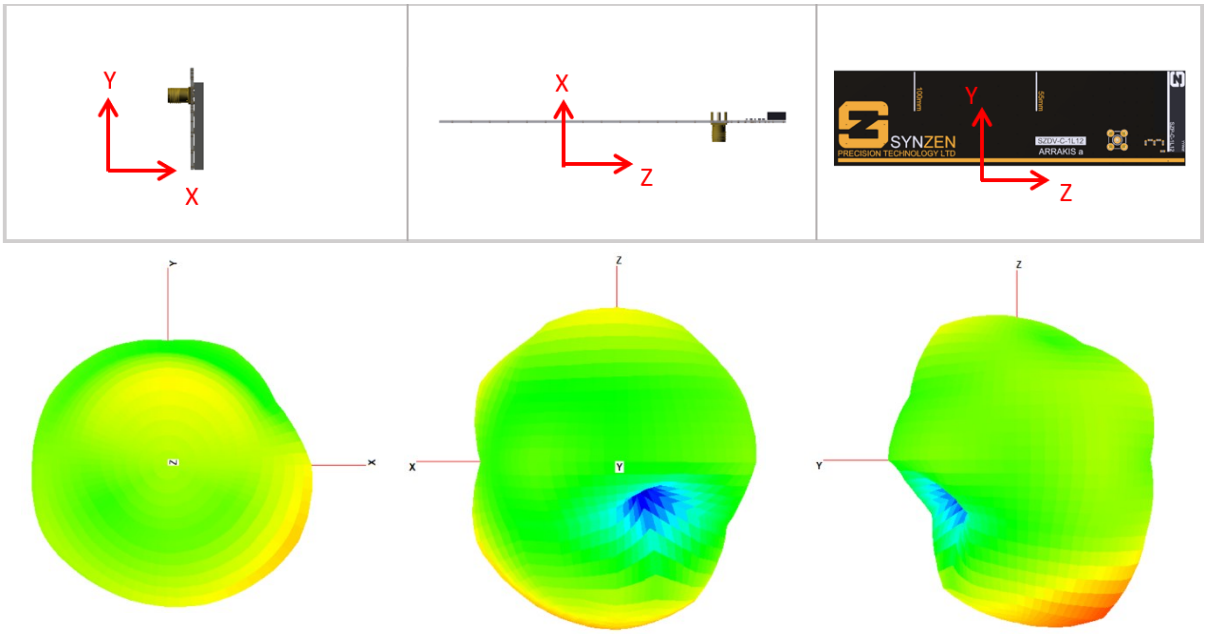
The data shown was measured on Synzen DVK (SZDV-C-1L12).

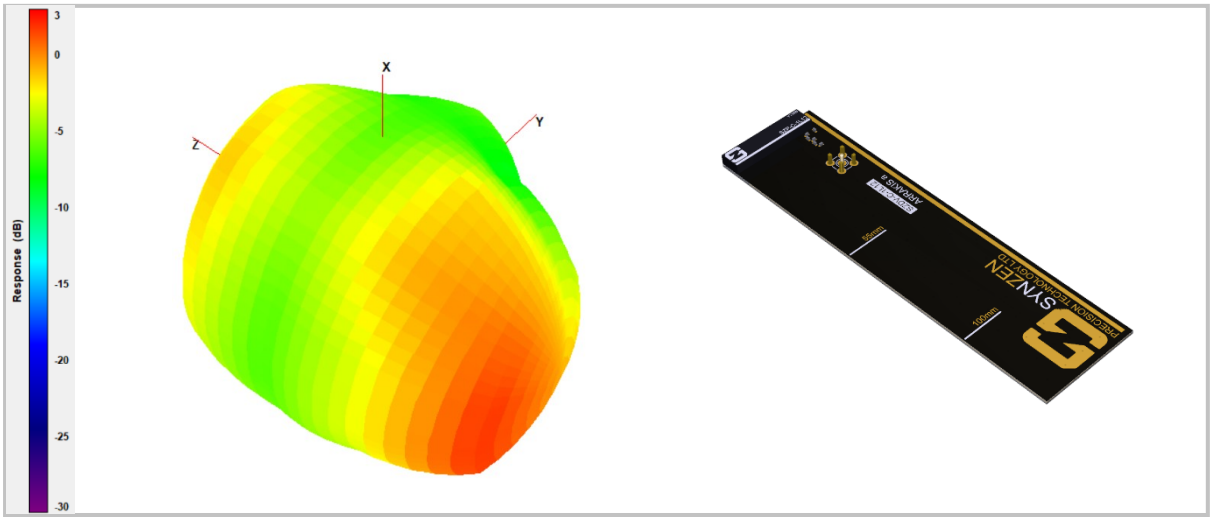




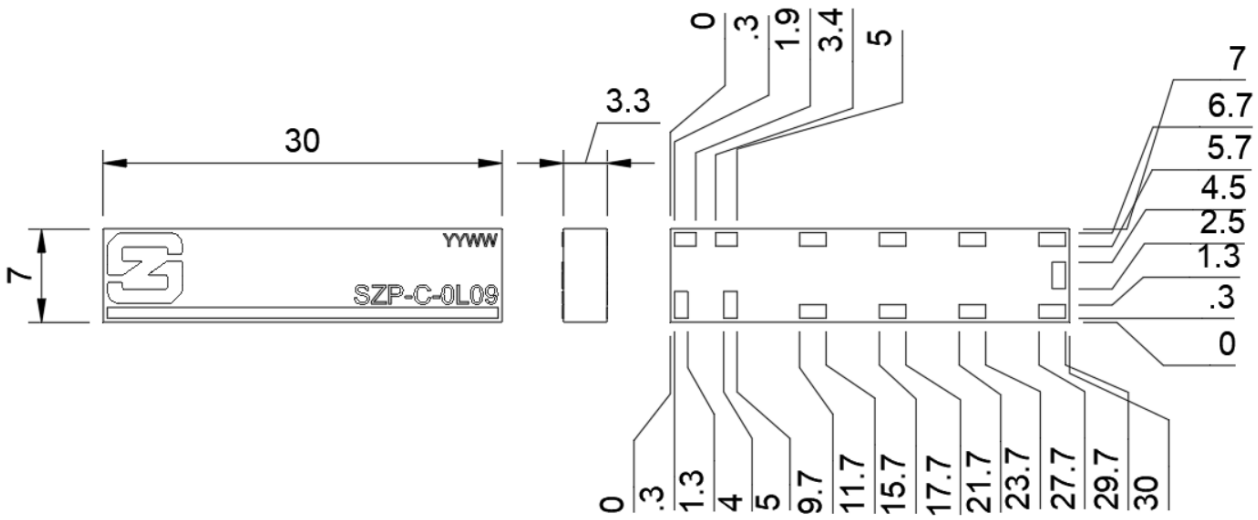
3D Radiation Patterns at 2600MHz

The data shown was measured on Synzen DVK (SZDV-C-1L12).



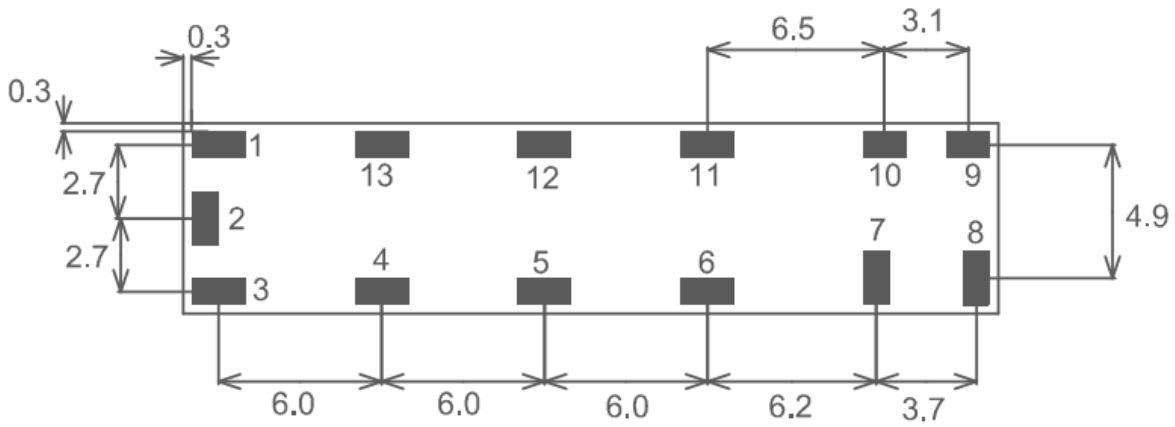


Mechanical Drawing



PCB Footprint

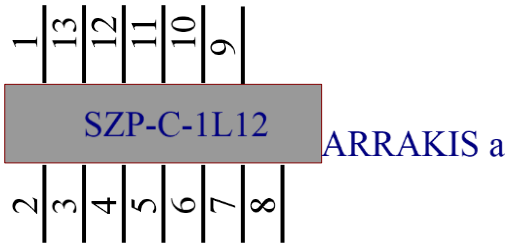
The host PCB requires the footprint shown below. PCB library files and DXF is available from our website www.synzen.com.tw/products.



PADS 1,2,3,4,5,6,7,8,11,12,13 = 2.0 x 1.0
PADS 9,10 = 1.6 x 1.0
ALL DIMENSIONS IN MM

Antenna Pinout

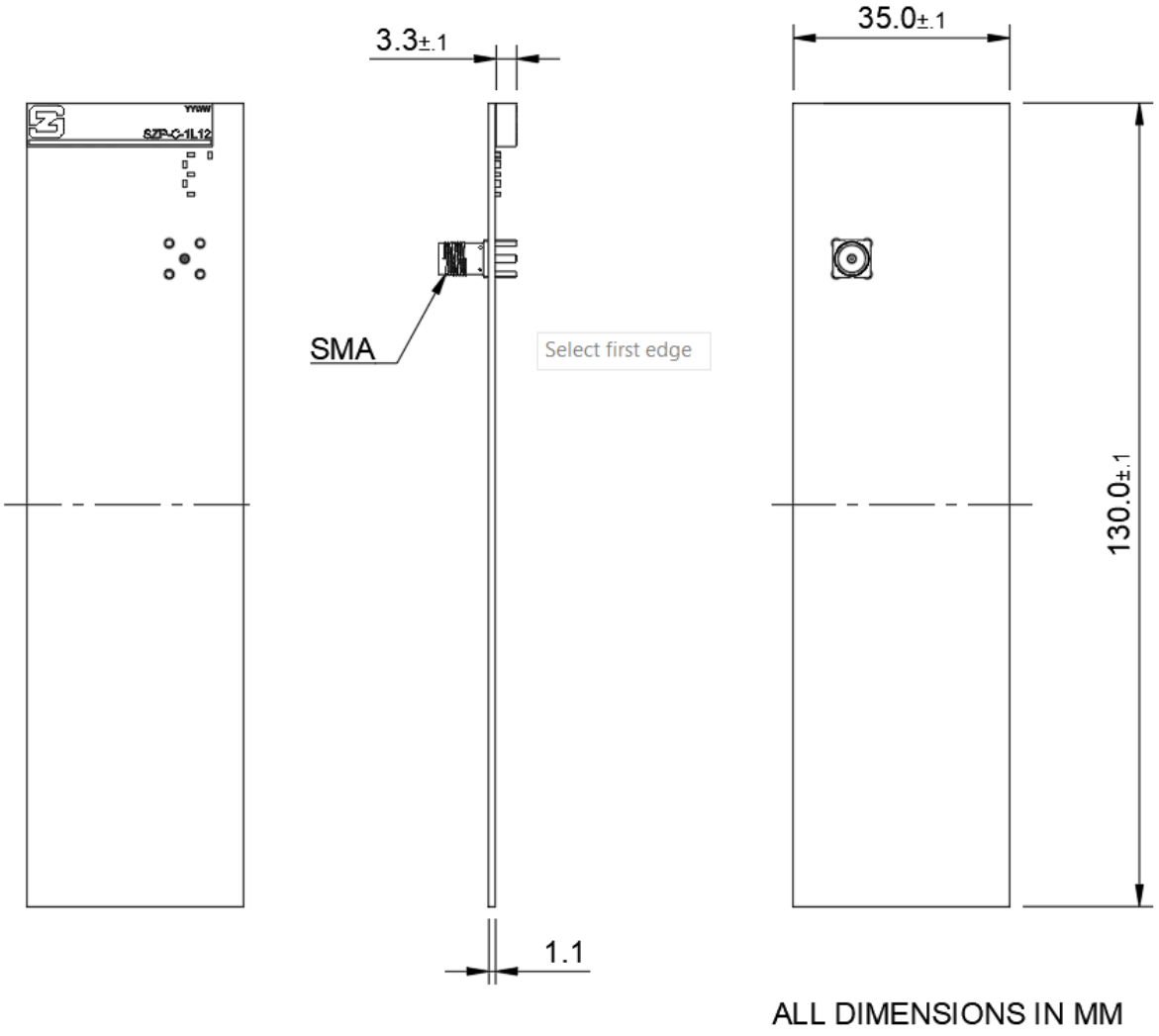
The schematic symbol for the antenna is shown below with a description of each pin.



Pin	Description
1,2,3,4,5,6,9,10,11,12,13	Not used (Mechanical support)
7	Feed to Matching network
8	Tuning Return

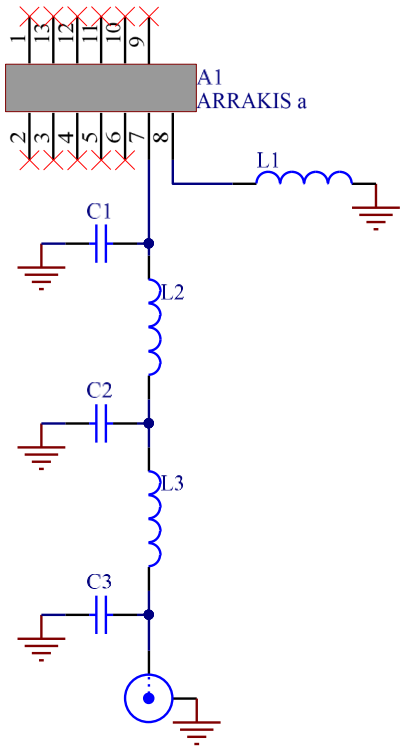
Evaluation Kit

The SZDV-C-1L12 development kit is a PCBA with the LTE antenna (SZP-C-1L12) fitted and optimised with a matching network. Connection to the antenna is made using the fitted female SMA connector.



Evaluation Kit Matching Circuit

The circuit of the DEV 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.

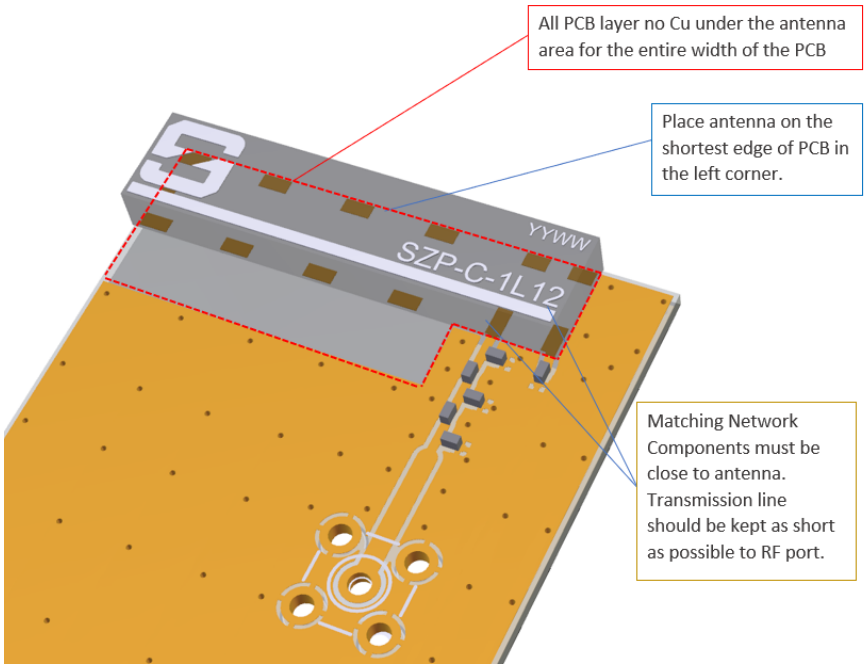


Designator	Component Type	Value	Size	Manufacturing Part No.
A1	Antenna	ARRAKIS a	-	SZP-C-1L12
L1	Inductor	5.6nH	0402	LQG15HS5N6H02D
C2, C3, C1	NA	DNP	0402	Do Not Place
L2	Capacitor	2.0pF	0402	GJM1555C1H2R0WB01D
L3	Inductor	3.0nH	0402	LQG15HS3N0C02D
J1	SMA Connector	-	-	ACE solution A3SAFTST135

Integration

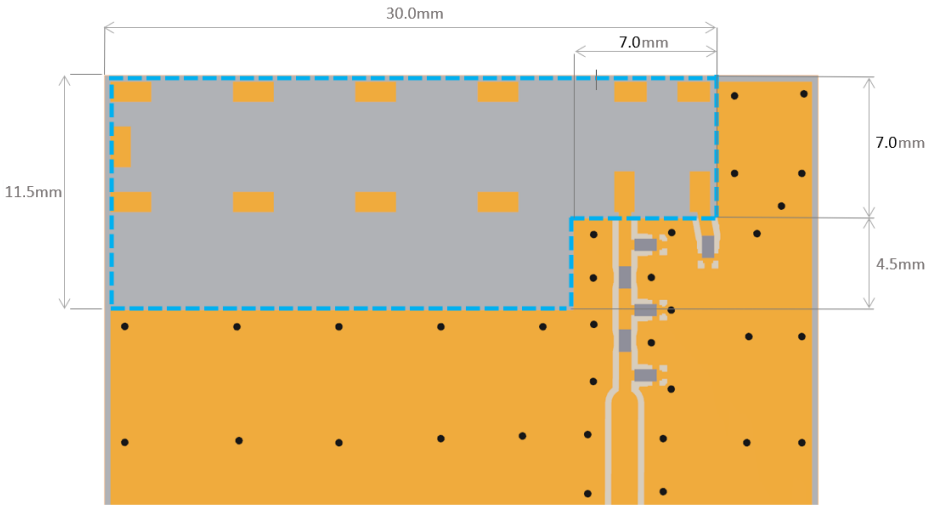
Placement

The antenna is designed to function placed at the left side corner of the host PCB. For a right-hand side version see ARRAKIS b (SZP-C-1L13).

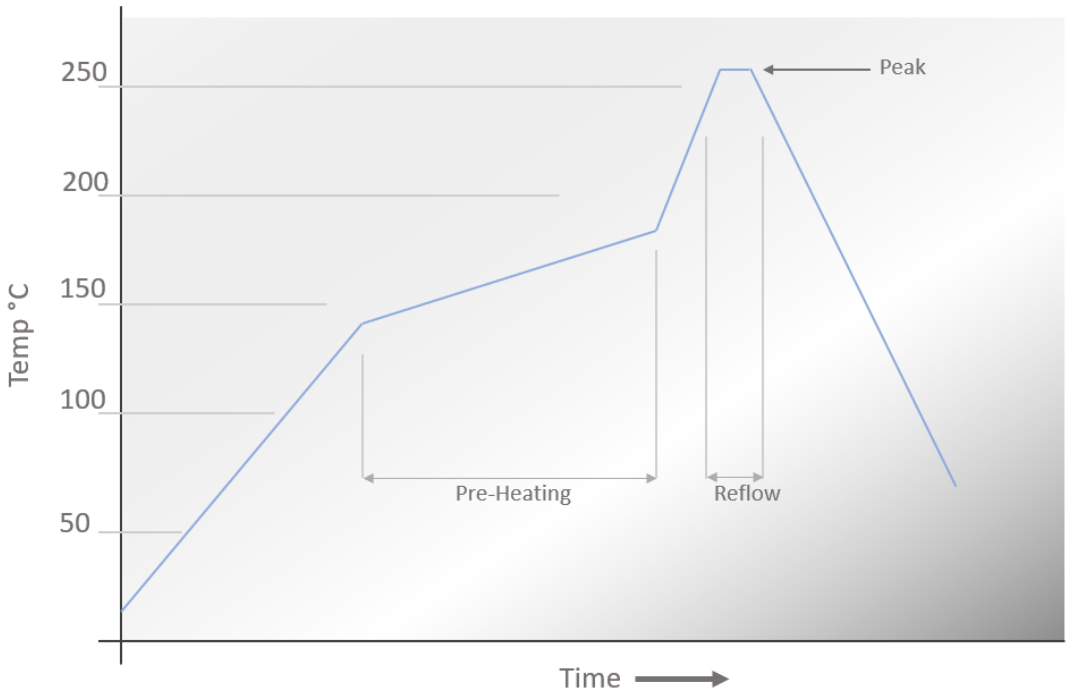


Clearance

A clearance is required through all PCB layers for the precise area shown. No components must be placed within this area otherwise RF coupling from the antenna to any conductor will occur reducing performance significantly. Also, any components such as battery or display must also avoid this area.



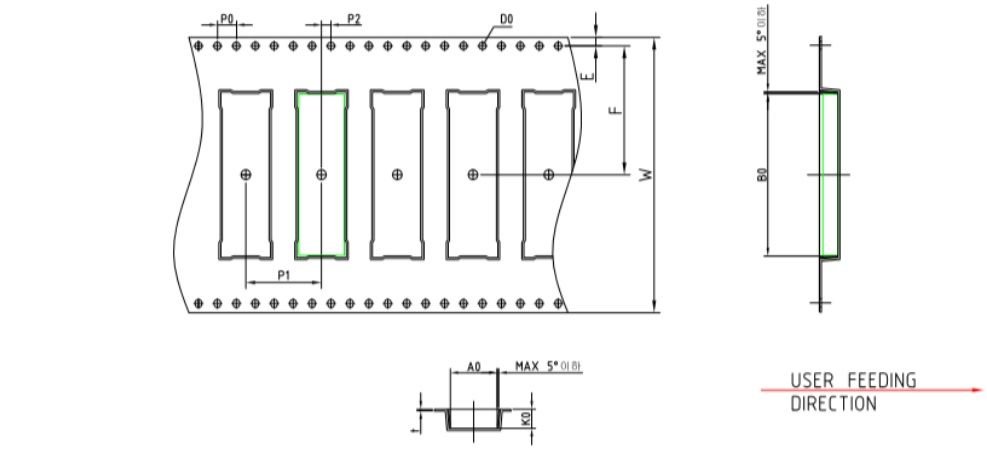
Reflow Profile



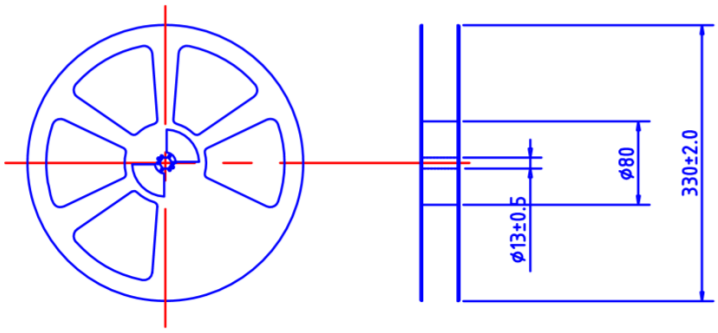
Pre-Heating	130 - 180°C	50 to 190 seconds
Reflow	>220 °C	50 to 160 seconds
Peak Temperature	260 °C	15 to 45 seconds

Packaging

Tape and Reel



1. 10 sprocket hole pitch cumulative tolerance ±0.2
2. Camber not to exceed 1mm in 100mm.
3. Ao and Bo measured on a plane 0.1mm above the bottom of the pocket
4. Ko measured from a plane on the inside bottom of the pocket to the top surface of the carrier.



ANTI-STATIC

REEL DIMENSION	Type	Color	Size	Hub
	PS	Black	ø330	ø80

Material Regulation

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

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