Antenna

YC0001AA Datasheet

Antenna Services

Version: 2.1

Date: 2020-12-11

Status: Released

Our aim is to provide customers with timely and comprehensive service. For any assistance, please contact our company headquarters:

Quectel Wireless Solutions Co., Ltd.
Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai 200233, China
Tel: +86 21 5108 6236
Email: info@quectel.com

Or our local office. For more information, please visit:
http://www.quectel.com/support/sales.htm.

For technical support, or to report documentation errors, please visit:
http://www.quectel.com/support/technical.htm
Or email to support@quectel.com.

General Notes

Quectel offers the information as a service to its customers. The information provided is based upon customers' requirements. Quectel makes every effort to ensure the quality of the information it makes available. Quectel does not make any warranty as to the information contained herein, and does not accept any liability for any injury, loss or damage of any kind incurred by use of or reliance upon the information. All information supplied herein is subject to change without prior notice.

Disclaimer

While Quectel has made efforts to ensure that the functions and features under development are free from errors, it is possible that these functions and features could contain errors, inaccuracies and omissions. Unless otherwise provided by valid agreement, Quectel makes no warranties of any kind, implied or express, with respect to the use of features and functions under development. To the maximum extent permitted by law, Quectel excludes all liability for any loss or damage suffered in connection with the use of the functions and features under development, regardless of whether such loss or damage may have been foreseeable.

Duty of Confidentiality

The Receiving Party shall keep confidential all documentation and information provided by Quectel, except when the specific permission has been granted by Quectel. The Receiving Party shall not access or use Quectel's documentation and information for any purpose except as expressly provided herein. Furthermore, the Receiving Party shall not disclose any of the Quectel's documentation and information to any third party without the prior written consent by Quectel. For any noncompliance to the above requirements, unauthorized use, or other illegal or malicious use of the documentation and information, Quectel will reserve the right to take legal action.

Copyright

About the Document

Revision History

Version	Date	Author	Note
1.0	2020-05-28	Kenny YIN	Initial
2.0	2020-06-22	Kenny YIN	Updated the specifications.
2.1	2020-12-11	Kenny YIN	Updated the antenna image in Chapter 2.

Contents

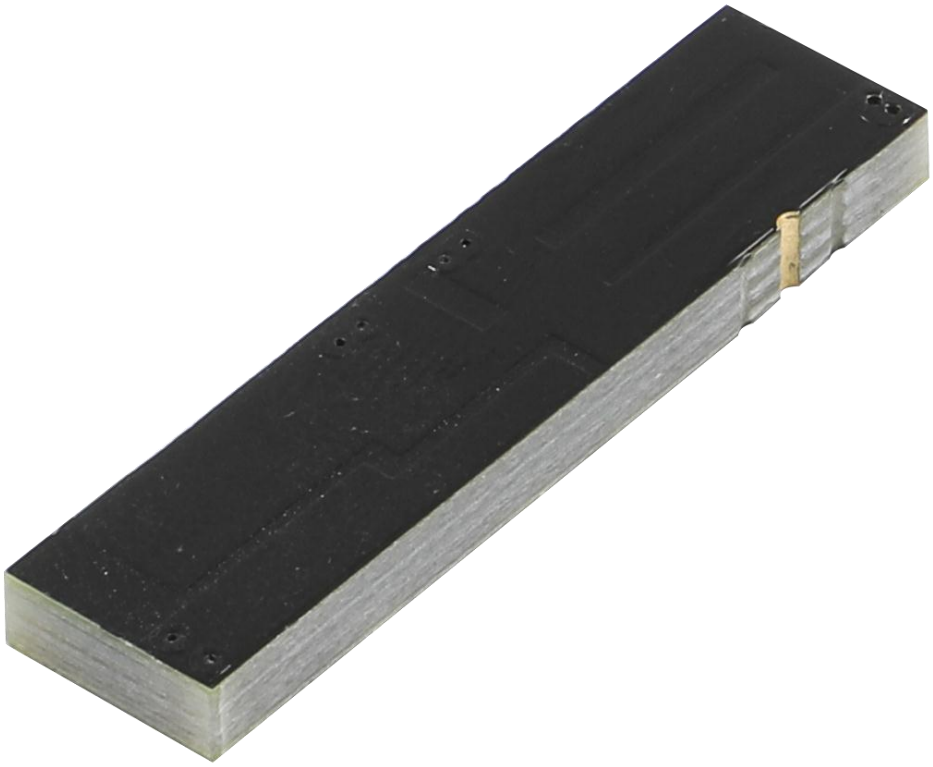
1 Product Description

The antenna is designed for superior performance，and can be widely used for wireless applications.

We provide comprehensive antenna design support such as simulation, testing and manufacturing for custom antenna solutions to meet your specific application needs.

2 Product Features

- Cellular LTE
- High efficiency
- Excellent performance



3 Product Specifications

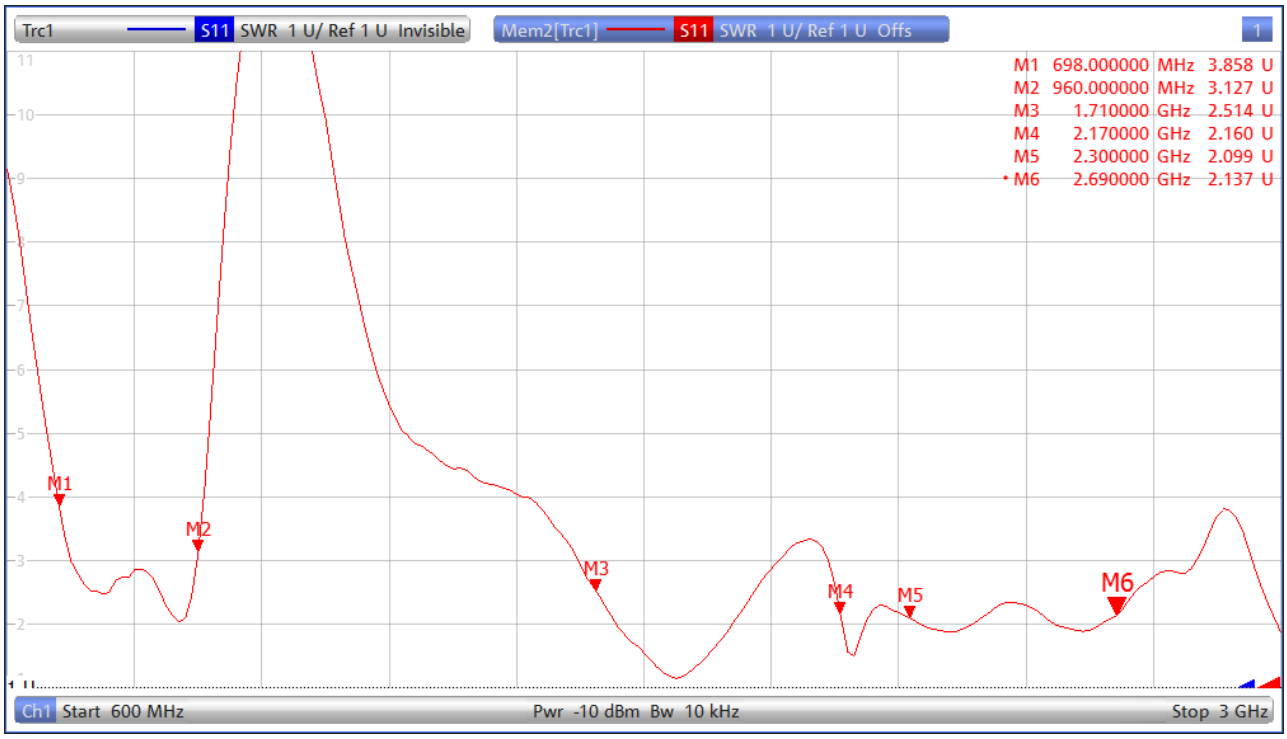
Passive Electrical Specifications	
Frequency Range (MHz)	698–960, 1710–2690
Input Impendence (Ω)	50
VSWR	≤ 4.0
Gain (dBi)	≤ 3.0
Polarization Type	Linear
Mechanical Specifications	
Antenna Size (mm)	35.0 (L) × 8.5 (W) × 3.0 (H)
carrier	FR4
Radiator	Cuprum
Connect Type	/
Working Temperature (°C)	- 40 to +85
Radome Color	Black

4 Overall Performance

4.1. Performance

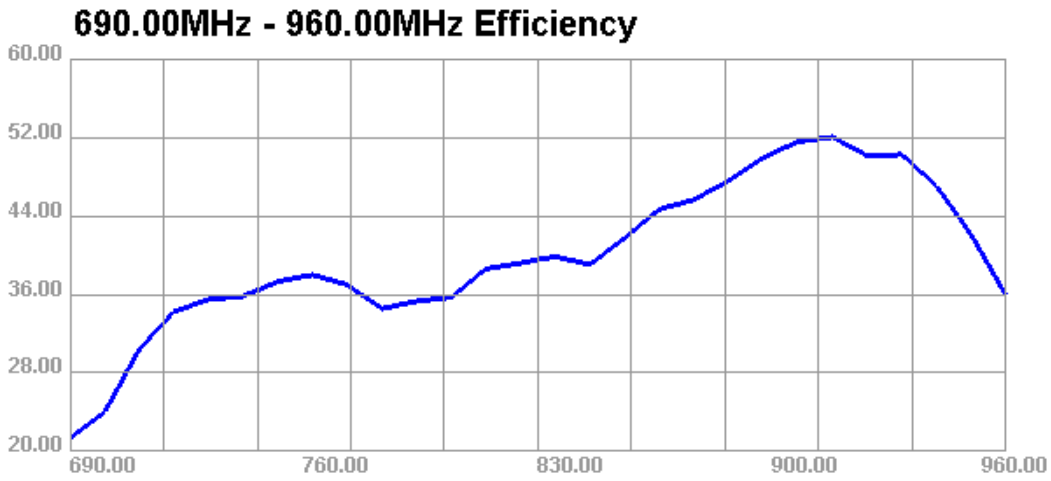
- Test Environment
  - KEYSIGHT VNA Network Analyzer E5063A 100 kHz – 6.5 GHz.
  - RayZone® 2800 Chamber 5G (FR1) SISO/MIMO, 400 MHz – 6.0 GHz.

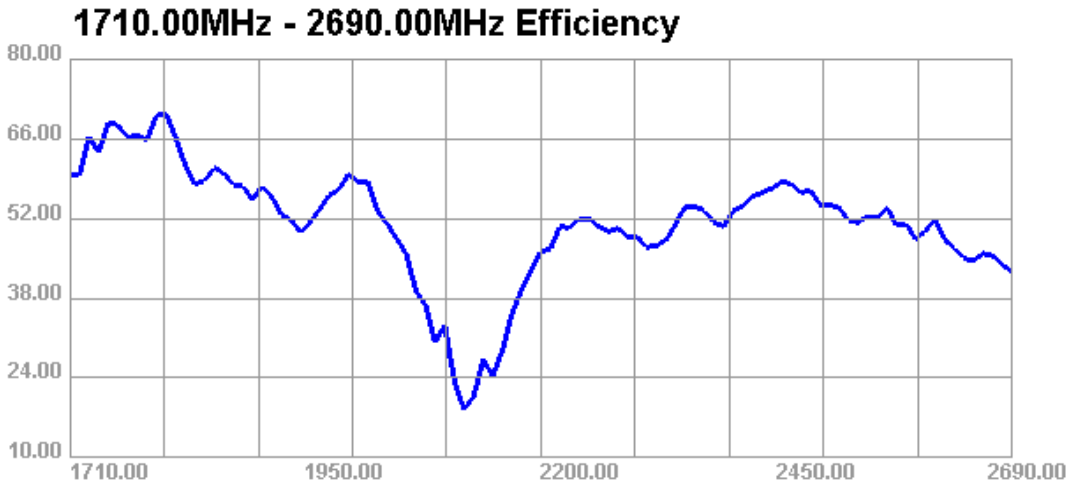
- VSWR



Frequency (MHz)	698	960	1710	2170	2300	2690
VSWR	3.85	3.12	2.51	2.16	2.09	2.13

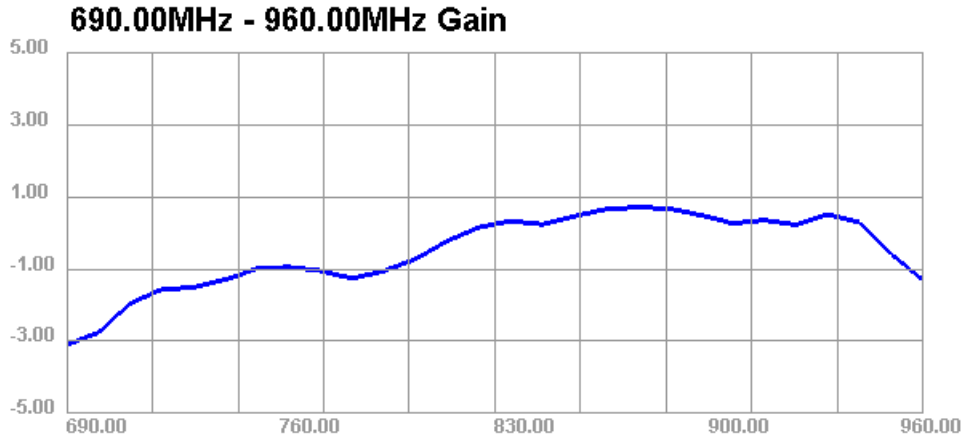
- Efficiency

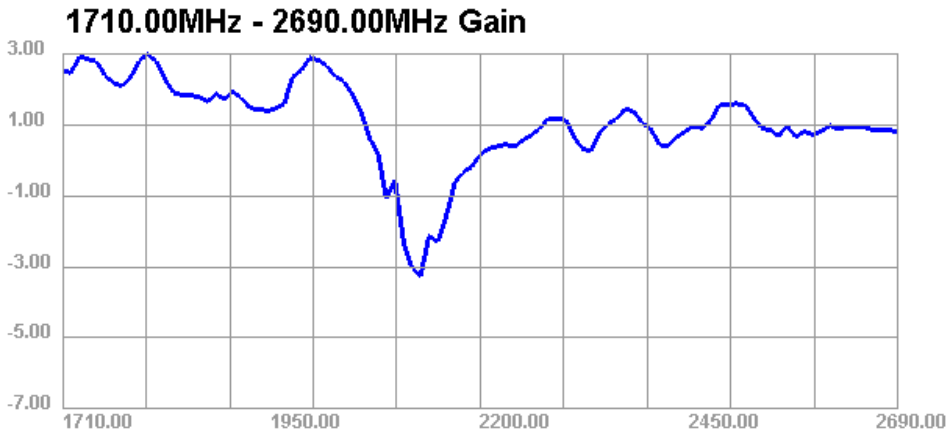




Frequency (MHz)	698	960	1710	2170	2300	2690
Efficiency (%)	21.4	36.0	59.8	35.3	48.8	42.7

- Gain

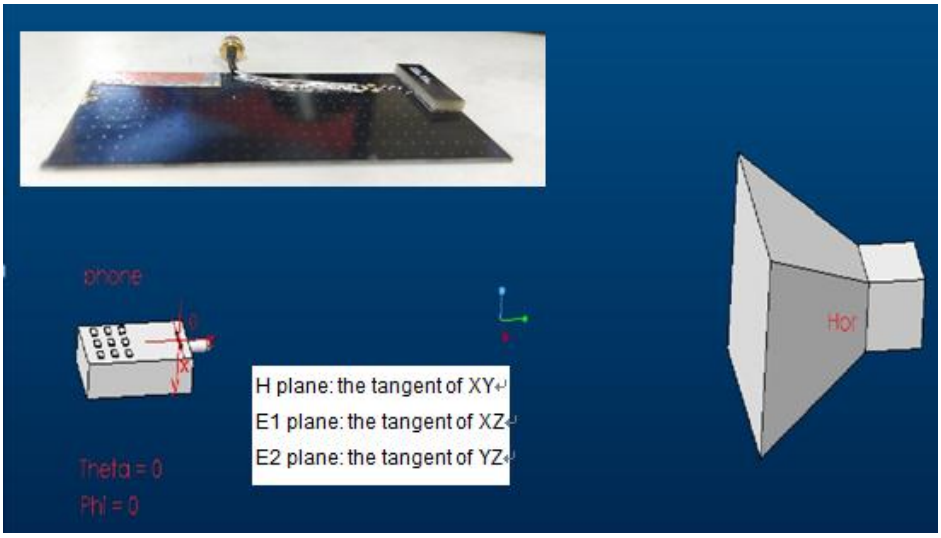


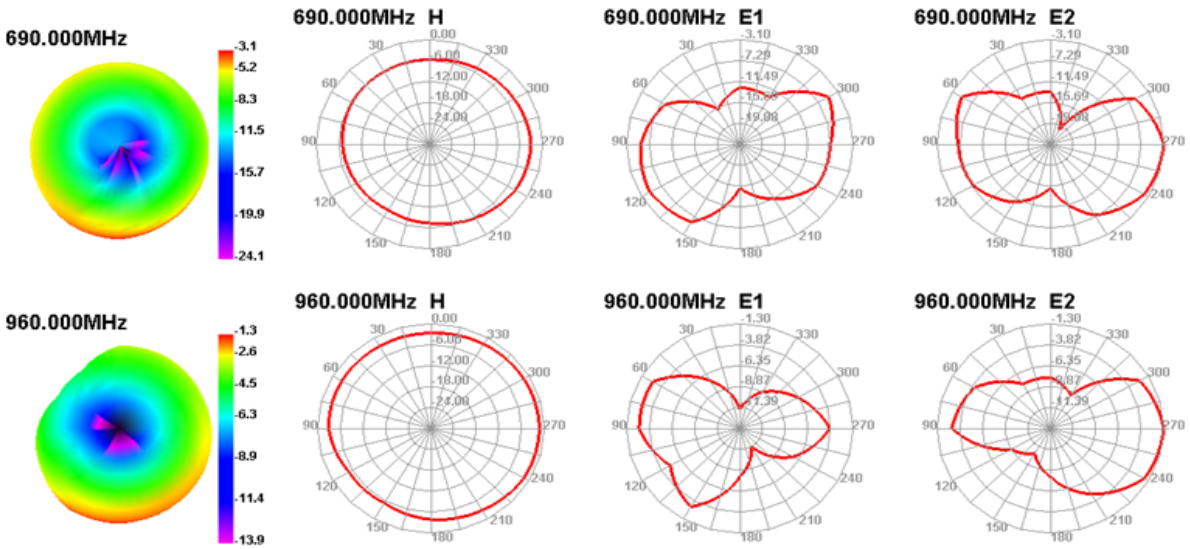


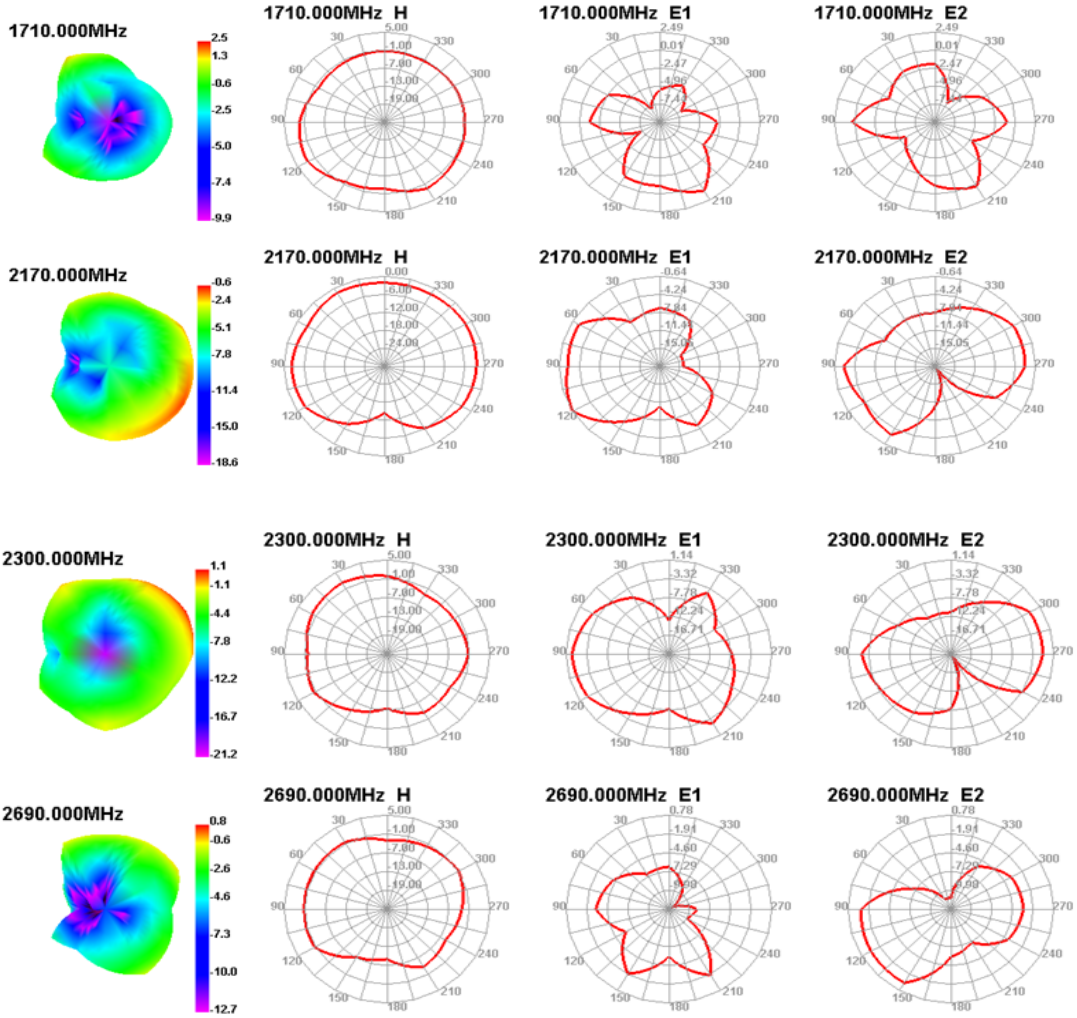
Frequency (MHz)	698	960	1710	2170	2300	2690
Gain	-2.73	-1.20	1.97	-1.54	1.33	0.95

- Radiation Patterns

  Board length 110 mm

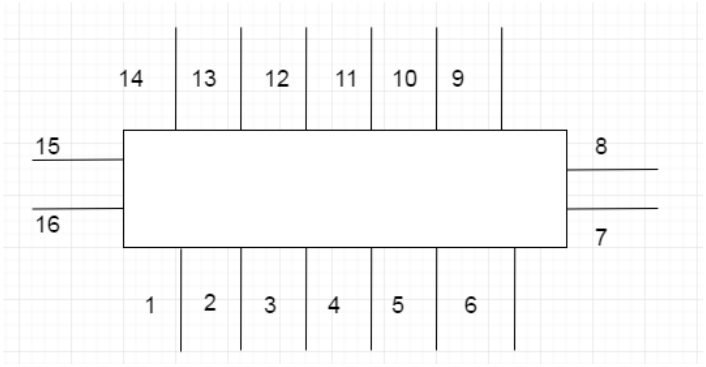





1710.000MHz
2.5
1.3
-0.6
-2.5
-5.0
-7.4
-9.9
1710.000MHz H
1710.000MHz E1
1710.000MHz E2
2170.000MHz
-0.6
-2.4
-5.1
-7.8
-11.4
-15.0
-18.6
2170.000MHz H
2170.000MHz E1
2170.000MHz E2
2300.000MHz
1.1
-1.1
-4.4
-7.8
-12.2
-16.7
-21.2
2300.000MHz H
2300.000MHz E1
2300.000MHz E2
2690.000MHz
0.8
-0.6
-2.6
-4.6
-7.3
-10.0
-12.7
2690.000MHz H
2690.000MHz E1
2690.000MHz E2

4.2. Schematic Symbol and Pin Definition

The pin assignment for the antenna are as follows. The antenna has 16 pins and only two work. All other pins are designed for mechanical strength.

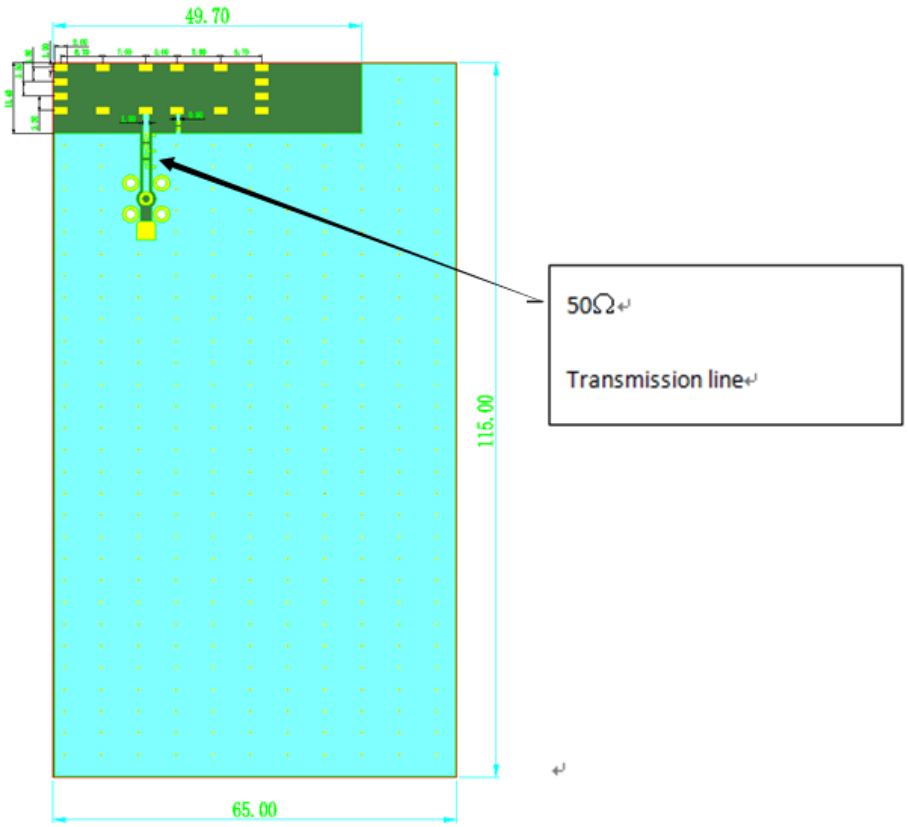


Pin No.	Description
3	Feed
4	Return/GND
1, 2, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16	Not used (Mechanical only)

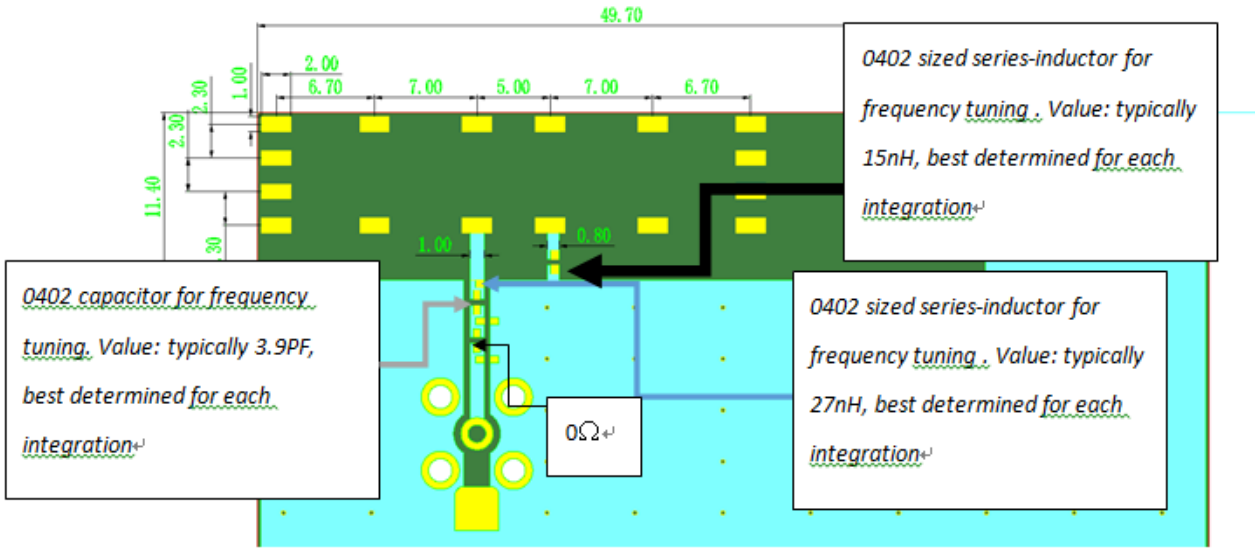
4.3. Transmission Line

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

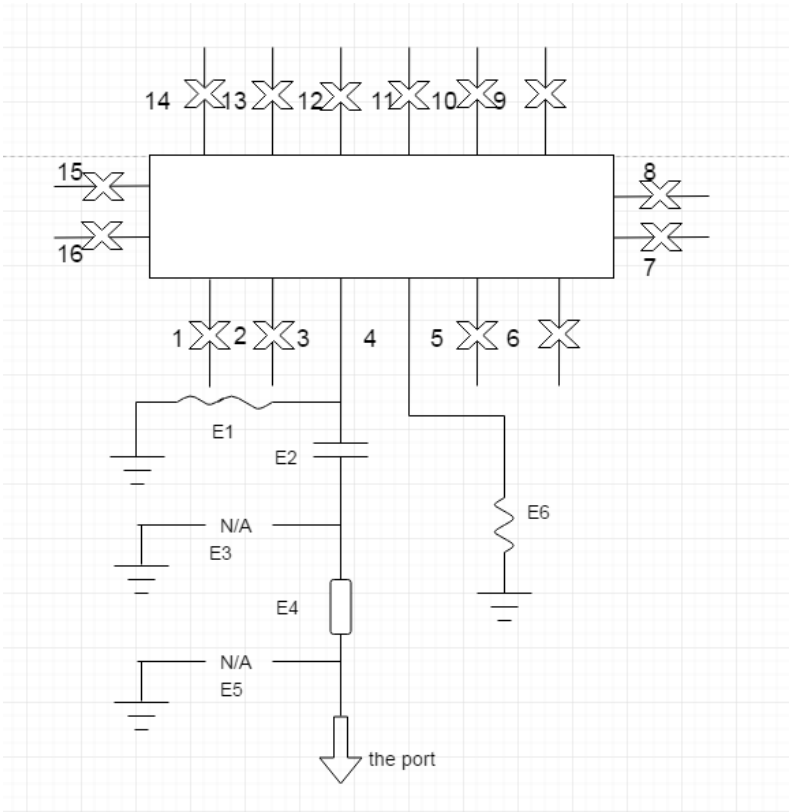
- The length of the transmission lines should be kept to as short as possible
- Any other part of the RF system, such as transceiver, power amplifiers, etc., shall also be designed with an impedance of 50 Ω.



4.4. Matching Circuit



The antenna requires a matching circuit that must be optimized for each product. The matching circuit will require up to six 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.

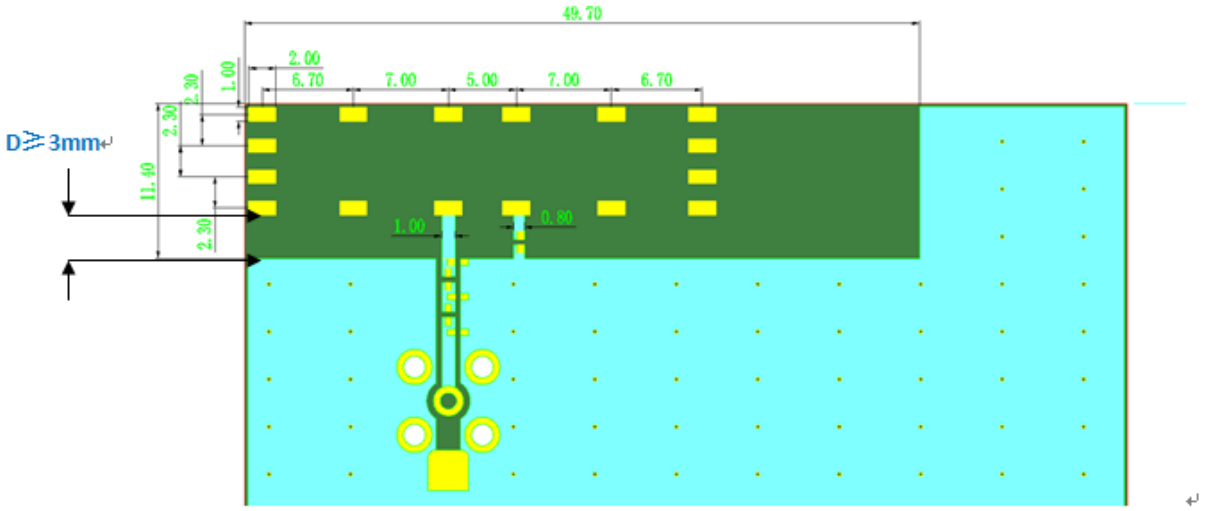


	Type	Value
E1	Inductor	27 nH
E2	Capacitor	3.9 pF
E3	N/A	N/A
E4	Capacitance	0 Ω
E5	N/A	N/A
E6	Inductor	15 nH

4.5. Host PCB Requirement

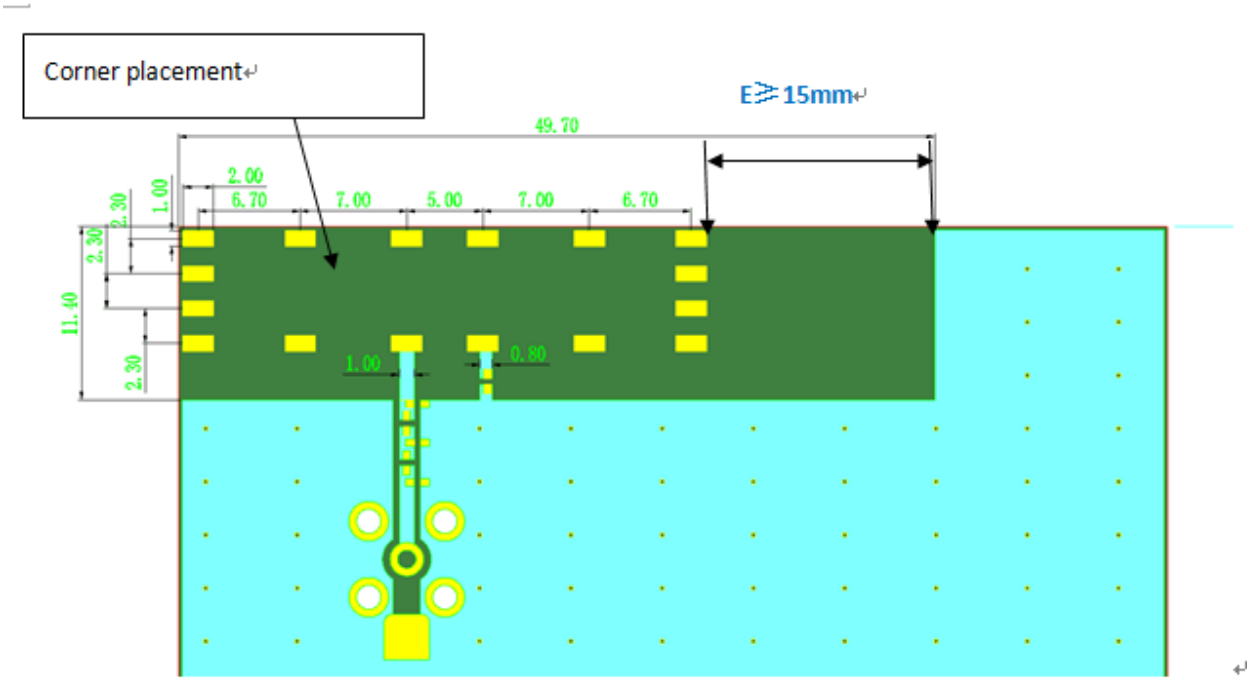
The printed circuit board of the host must ensure that the antenna clearance area meets the antenna specifications. It is suggested that putting the antenna in the corner of the PCB.

An example of a PCB layout shown as below:



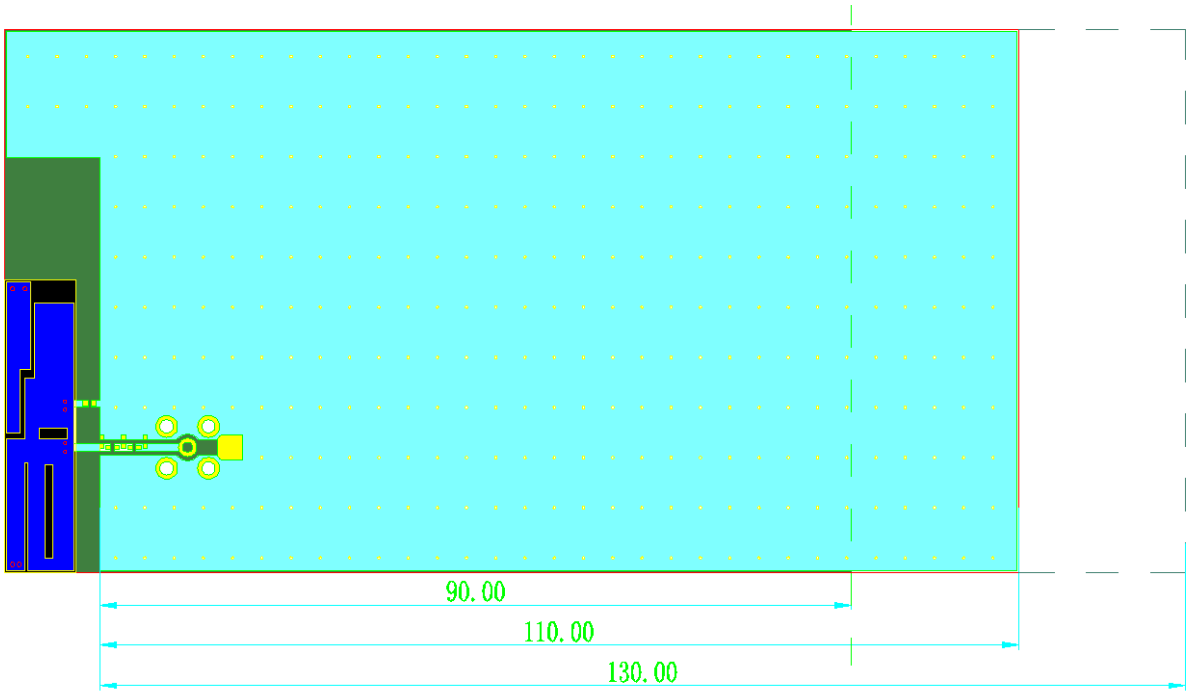
Gap D is required from the edge of the antenna to the ground plane. This should be maintained along the edge of the antenna placement, **minimum value is 3 mm**.

Gap E is required from the edge of the antenna to the ground plane or PCB traces, **minimum value is 15 mm.**



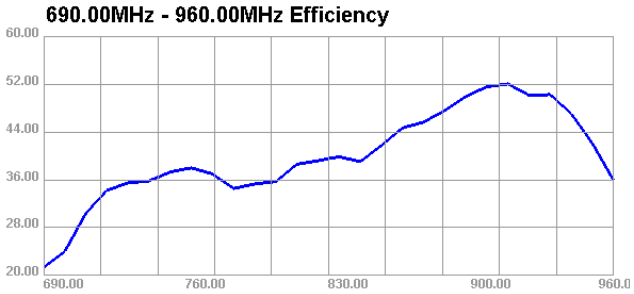
4.6. Host PCB Size

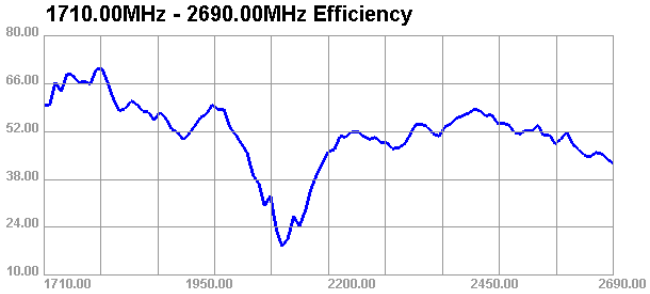
The performance of the low frequency section depends on the length of the ground plane. Reducing GND length will directly impact on the performance of low frequency band.
Take antenna efficiency measurement results on different GND sizes as an example:



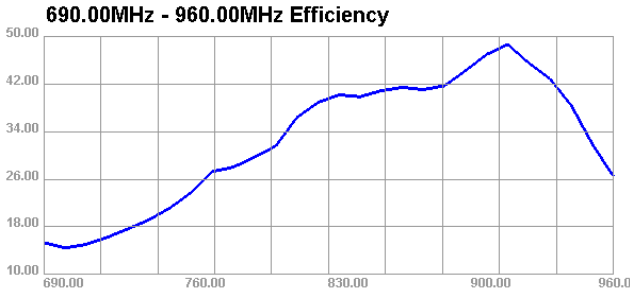
Passive Efficiency vs. PCB length
All results measured in Quectel's anechoic chamber

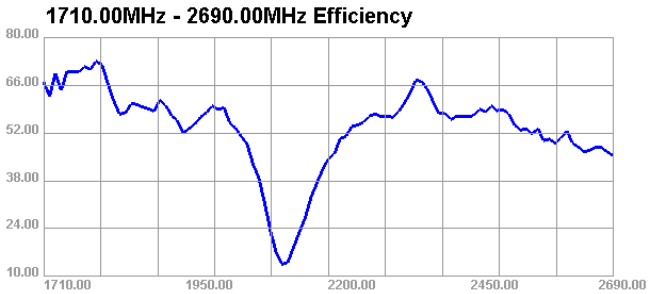
Board length 110mm



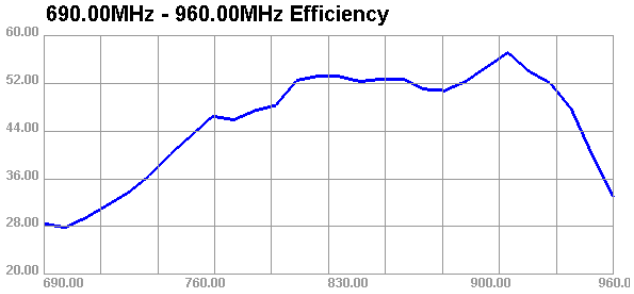


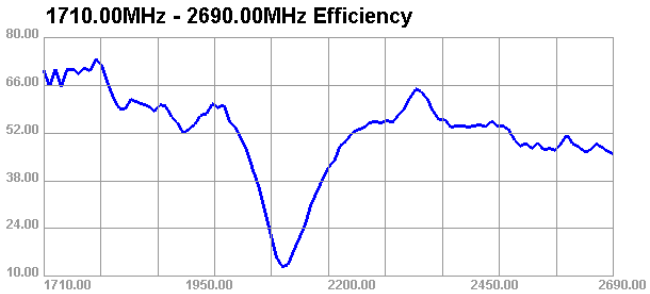
Board length 90 mm



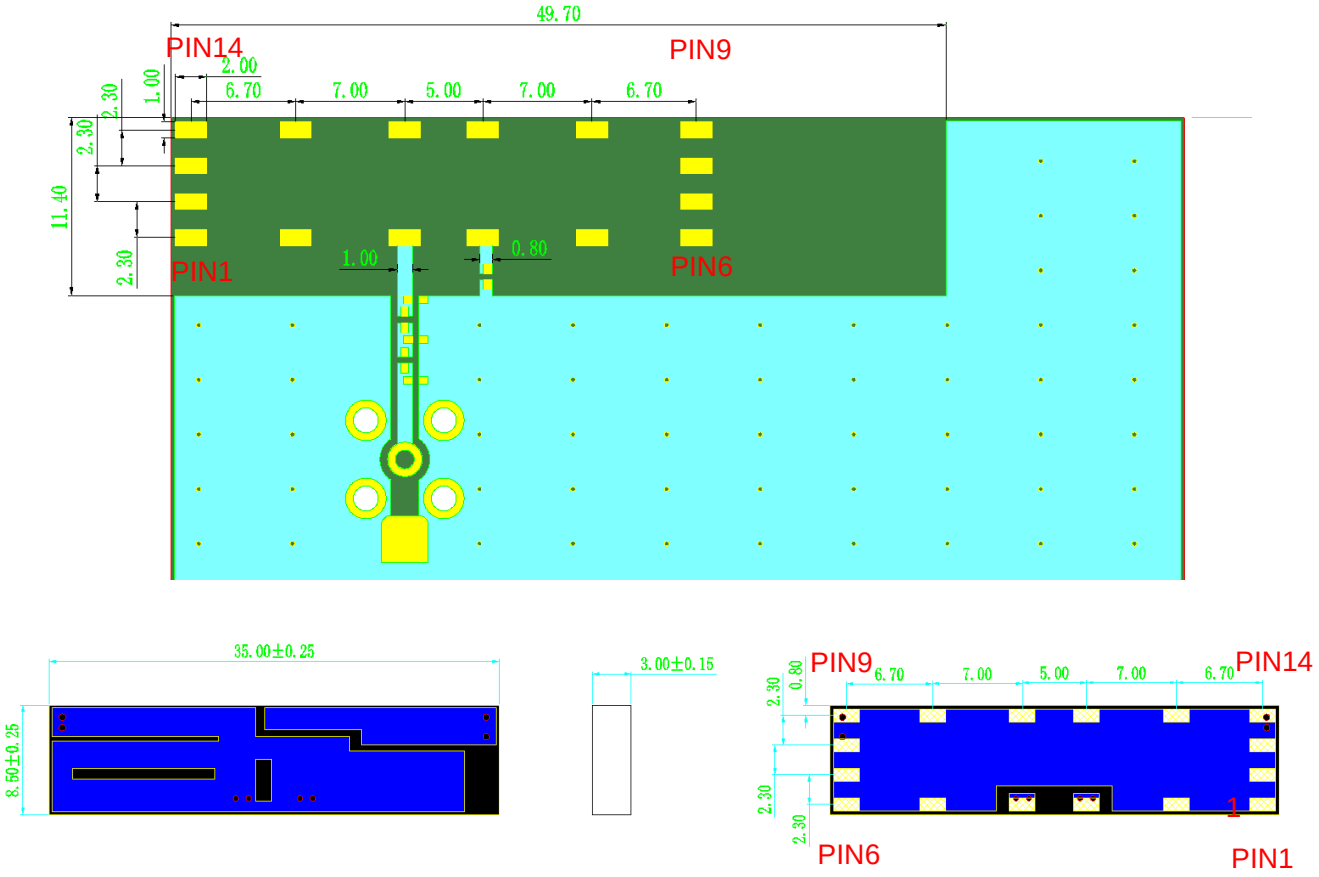


Board length 130 mm





5 Product Size



Please contact us for any unmarked size information.

6 Soldering Temperature

Phase	Profile Features	PB-Free Assembly (Max.)
RAMP-UP	Avg. Ramp-up Rate (Tsmax to Tp)	3 °C/second (max.)
PREHEAT	Temperature Min (Tsmin) Temperature Max (Tsmax) Time (TSmin to Tsmax)	150 °C 180 °C 120 seconds max.
REFLOW	Temperature (TL) Total Time above TL(tl)	210 °C 50 seconds max.
PEAK	Temperature (Tp) Time (tp)	260 °C 10 seconds max.
RAMP-DOWN	Rate	5 °C/second max

7 Reflow Profile