Inventek Systems
Embedding Connectivity Everywhere

ISM14585-L35 BLE 5.0 SiP
B24P-W w.fl External Antenna

Preliminary Data Sheet

Table of Contents

1 PART NUMBER DETAIL DESCRIPTION

1.1 Ordering Information

Device	Description	Standard Ordering Number
B24P-W w.fl External Antenna	100mm w.fl External Antenna for the Inventek ISM14585 BLE Module	B24P-W

2 OVERVIEW

The Inventek **B24P-W** w.fl External Antenna enables customers to use the Inventek ISM14585 BLE 5.0 Module with an external antenna configuration. The B24P-W w.fl antenna is a polymer substrate antenna. The **B24P-W** w.fl External Antenna supports 2400MHz – 2500MHz frequencies.

3 FEATURES

- **B24P-W** w.fl Dimensions: 30 x 5.0 x 0.5 (mm)
- **B24P-W** w.fl Length: 100 mm
- **B24P-W** w.fl coaxial cable: 0.81 mm OD

3.1 Feature Highlights:

- Frequency Band: 2400MHz – 2500MHz frequencies
- Stable and reliable in performances
- Compact size
- RoHS compliance

3.2 Application Examples

- Industrial, Consumer, Medical, etc.
- Voice-controlled remote controls
- Beacons
- (Multi-sensor) Wearable devices
    - Fitness trackers

  - Consumer health
- Smartwatches
- Human interface devices
  - Keyboard
  - Mouse

4 DESCRIPTION

- The Inventek **B24P-W** w.fl External Antenna is specially designed for 2.4GHz applications. Based on Inventek's proprietary design and processes, this PCB antenna has excellent stability and sensitivity to consistently provide high signal reception efficiency.

- The Inventek **B24P-W** w.fl External Antenna is utilized for the Inventek **ISM14585-L35** BLE 5.0 Module and the Inventek **ISM14585-L35-EVB** Evaluation Board. Please reference the Inventek **ISM14585-L35** BLE 5.0 Module Data Sheet and the Inventek **ISM14585-L35-EVB** Evaluation Board User's Manual for additional information.

- Required Antenna Placement for the Inventek **B24P-W** w.fl External Antenna is tuned on a **1.6mm thick FR-PC material plastic**.

5 ISM14585-L35 SoC & SiP BLOCK DIAGRAMS

5.1 DIALOG DA14585 Radio w/Audio I/F SoC

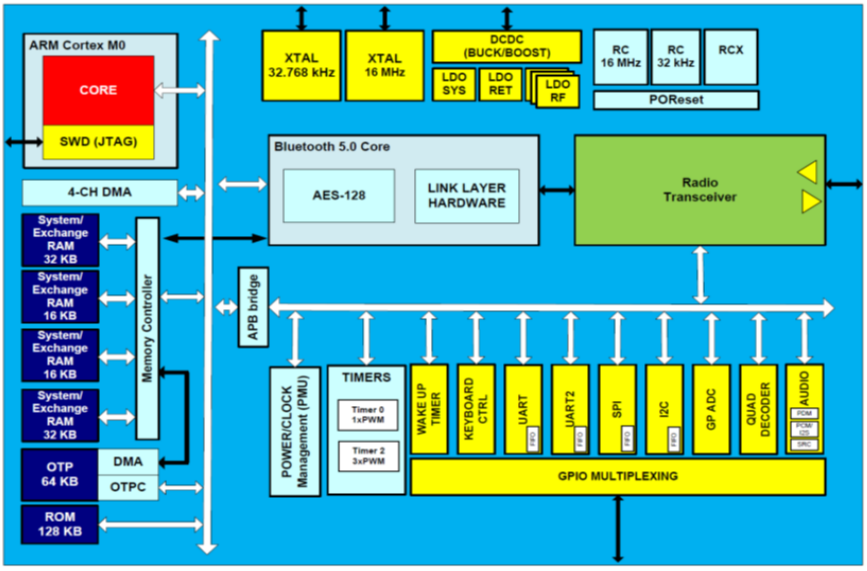


Figure 1 Dialog DA14585 SoC Block Diagram

5.2 INVENTEK ISM14585-L35 SiP Module & B24P-W w.fl Antenna

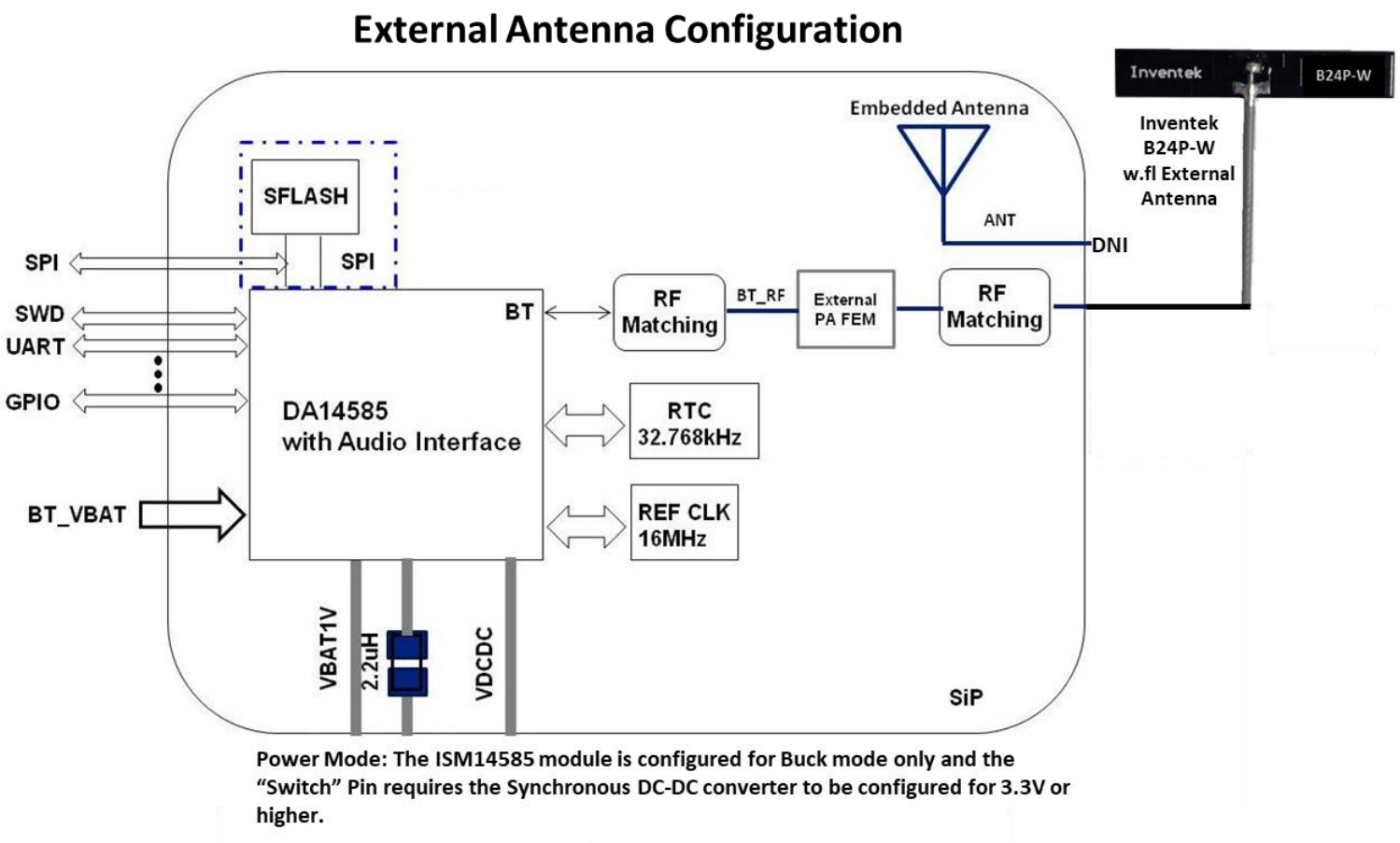


Figure 2 Inventek ISM14585-L35 SiP Block Diagram

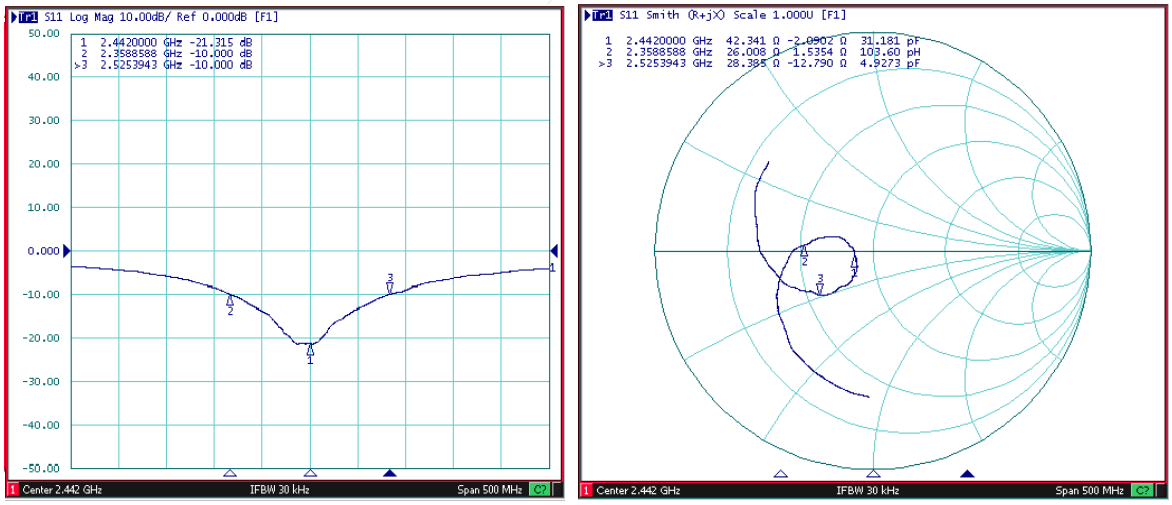
- UART Universal synchronous/asynchronous receiver transmitters
- SPI Serial Peripheral Interface
- I2C Inter-Integrated Circuit
- GPIO General-purpose input/output
- SWD Serial Wire Debug

6 Electrical Specification

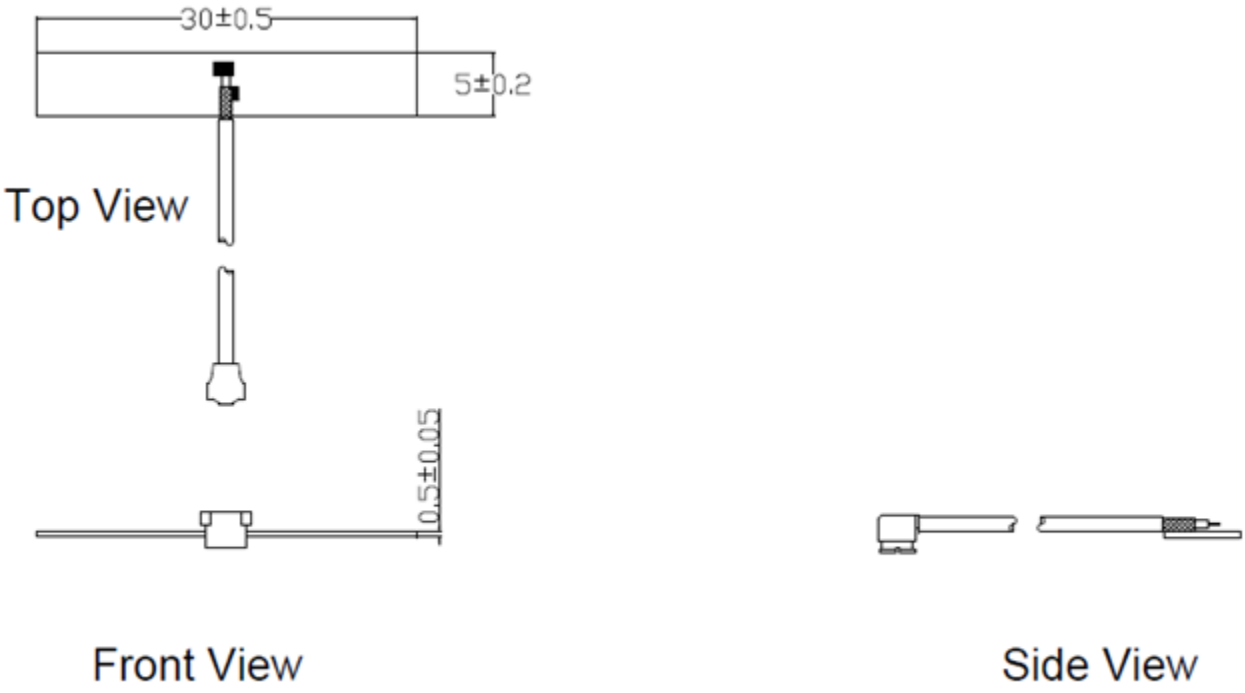
Characteristics		Specifications	Unit
Outline Dimensions		30 x 5.0 x 0.5	mm
Center Frequency		2442	MHz
Bandwidth		100 Min	MHz
VSWR		2max	
Impedance		50	Ω
Polarization		Linear Polarization	
Gain	Peak Gain	3.2 (typical)	dBi
	Efficiency	79 (typical)	%

6.1 Return Loss & Smith Chart

Return Loss (S11) Smith Chart(S11)

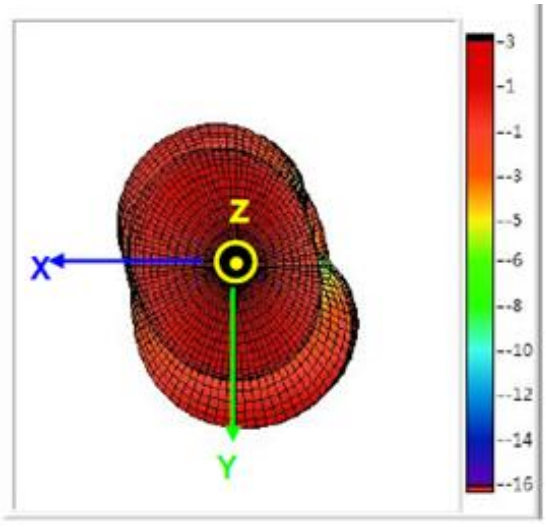


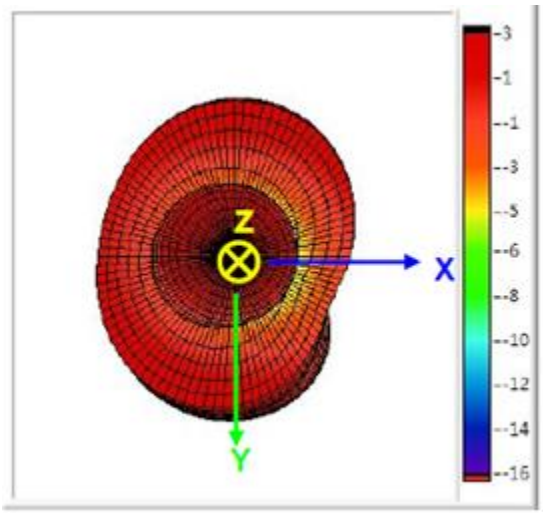
7 Antenna Dimensions (unit: mm)

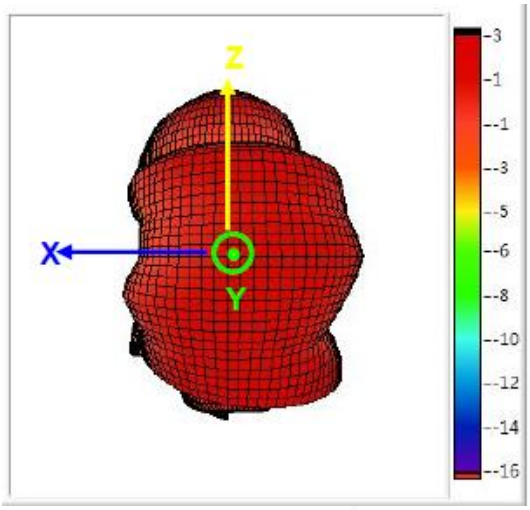


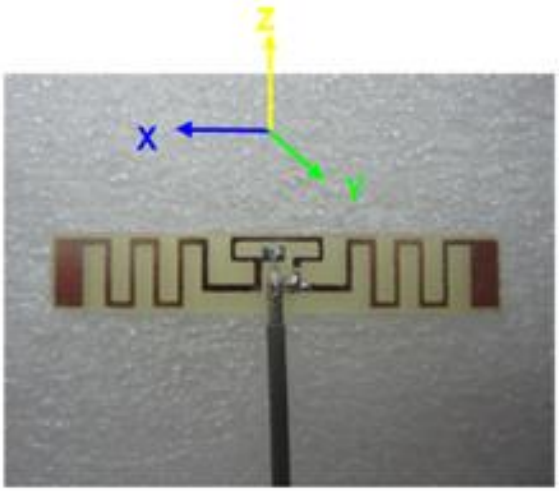
8 Radiation Pattern

8.1 3D Gain Pattern (Radiation Pattern at 2442 MHz)





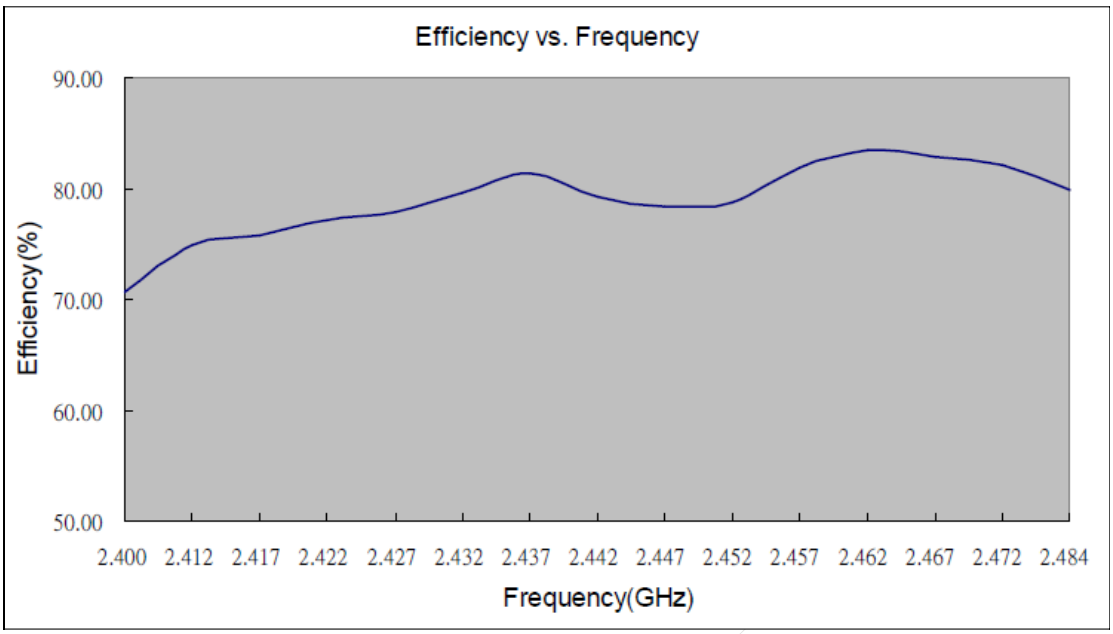




8.2 Efficiency Table

Frequency (MHz)	2.400	2.412	2.417	2.422	2.427	2.432	2.437	2.442	2.447	2.452	2.457	2.462	2.467	2.472	2.484
Efficiency (dB)	-1.51	-1.26	-1.21	-1.13	-1.09	-0.99	-0.90	-1.01	-1.06	-1.04	-0.87	-0.79	-0.82	-0.86	-0.98
Efficiency (%)	70.63	74.82	75.68	77.09	77.80	79.62	81.28	79.25	78.34	78.70	81.85	83.37	82.79	82.04	79.80
Gain (dBi)	2.76	2.96	3.02	3.05	3.15	3.24	3.32	3.26	3.23	3.26	3.42	3.55	3.56	3.58	3.48

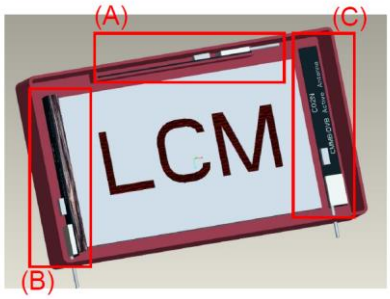
8.3 Efficiency vs. Frequency



9 PCB Antenna Installation Guide

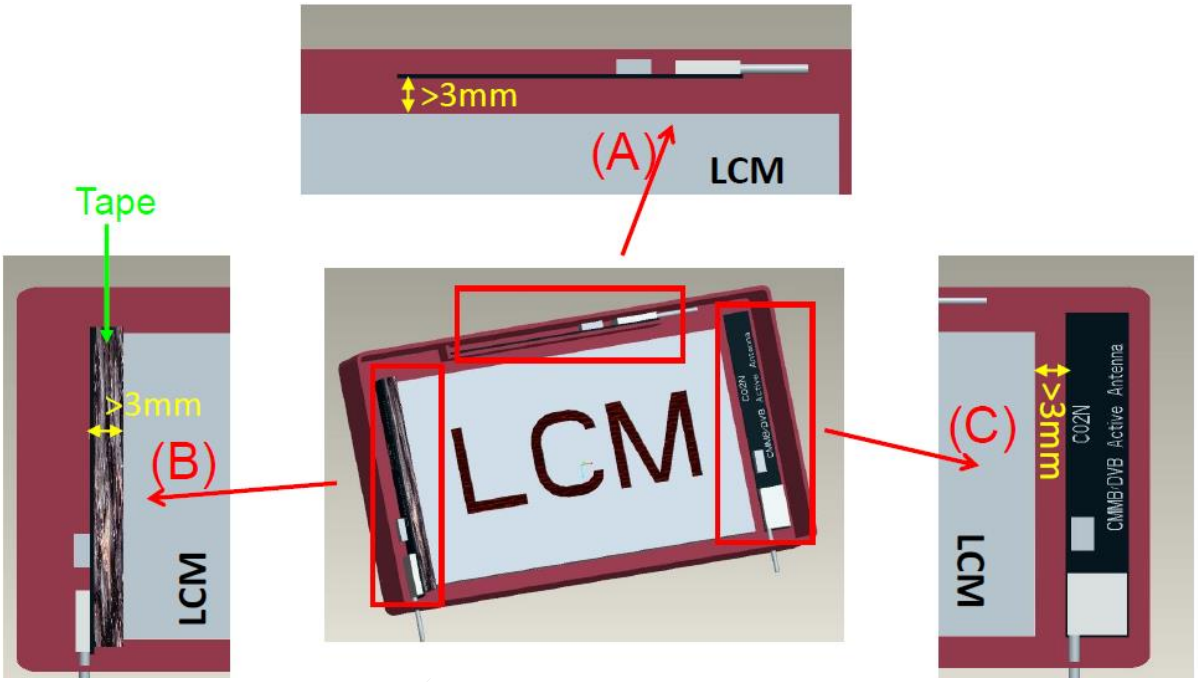
9.1 Location

- Always stay away from any metallic objects to avoid de-tuning
- Avoid overlapping the PCB directly on any metal substrate and/or LCD monitor
- For example, in location (A), (B), and (C) as illustrated with the Liquid Crystal Module (LCM), display:

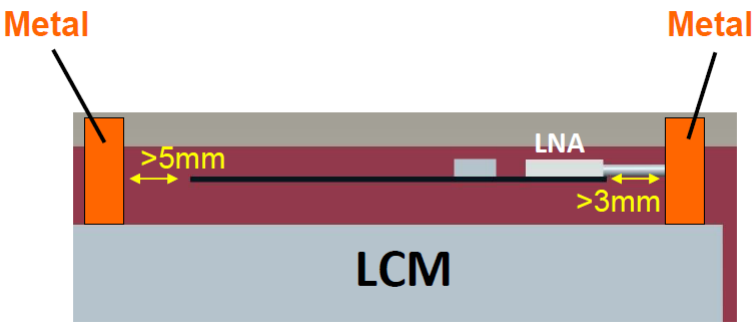


9.2 Placement

- Antennas should be placed >3mm away from any metal and/or LCD/LCM
- For the ease of installation, a >3mm thick tape or foam can be used to separate the antenna from the metal and/or LCD/LCM:

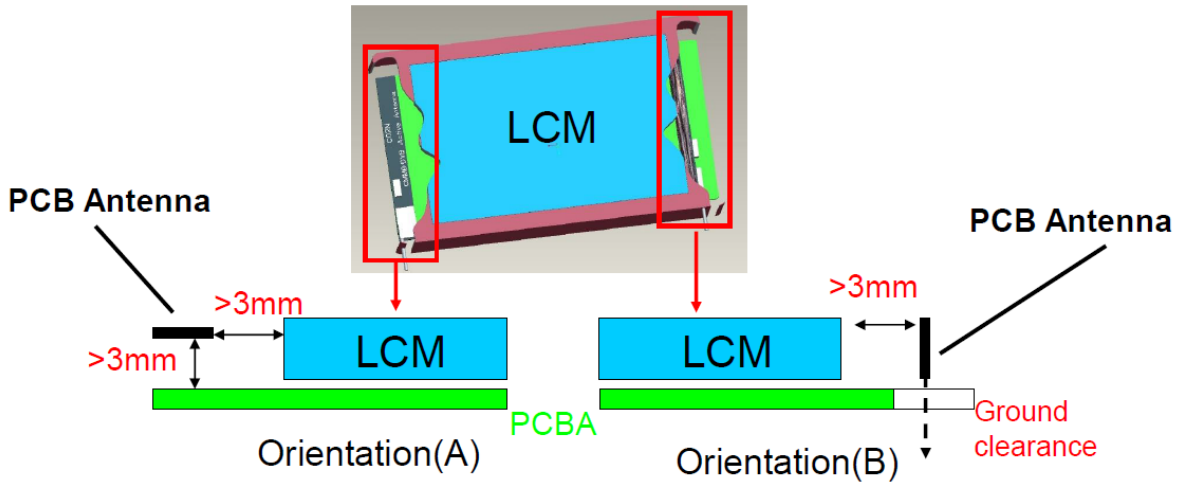


- When there are metal objects on the sides of the PCB antenna, make sure to keep a distance of 3mm from one end and 5mm from another end:

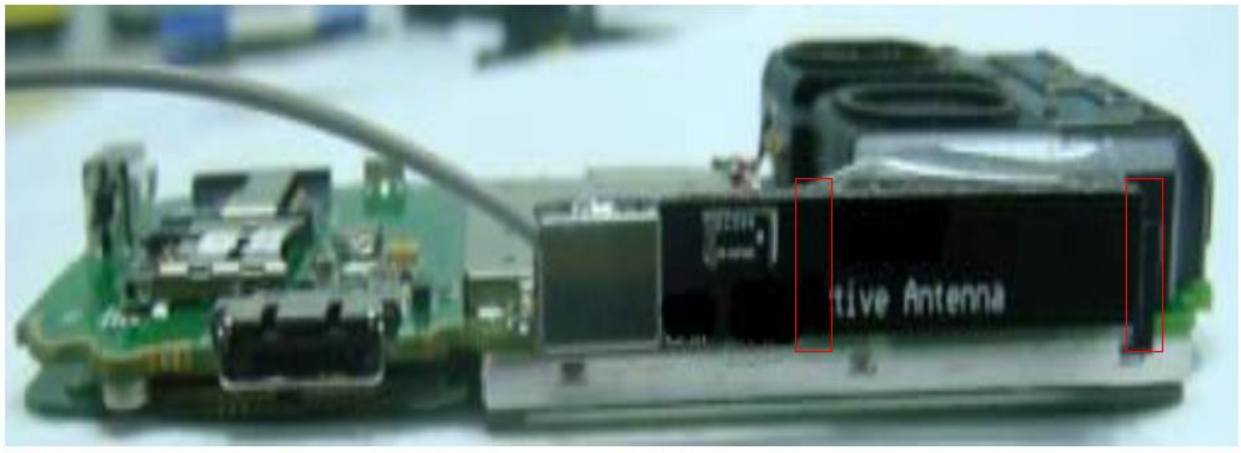


9.3 Case Study – PCBA Positioned Underneath

- For Orientation(A), the PCB antenna should be >3mm away from the LCM/LCD and PCBA
- For Orientation(B), the PCB antenna should be >3mm away from the LCM/LCD and PCBA, and adding ground clearance on the PCBA



- Another option is to make a rib or fixture to locate the PCB antenna on the side of the unit, to simplify production:



10 REVISION CONTROL

Document: **B24P-W**	w.fl External Antenna for the ISM14585-L35 BLE 5.0 Module
External Release	DOC-DS-B24P-W-2.0

Date	Author	Revision	Comment
8/10/2018	AS	1.0	Preliminary
3/24/20	AS	2.0	Antenna Placement & Location, Section 9

11 CONTACT INFORMATION

Inventek Systems
2 Republic Road
Billerica Ma, 01862
Tel: 978-667-1962
Sales@inventeksys.com
www.inventeksys.com