

**The smallest on-ground antenna of its kind, Molex's 2.4 GHz SMD antenna requires no ground clearance and offers significant PCB real-estate savings**

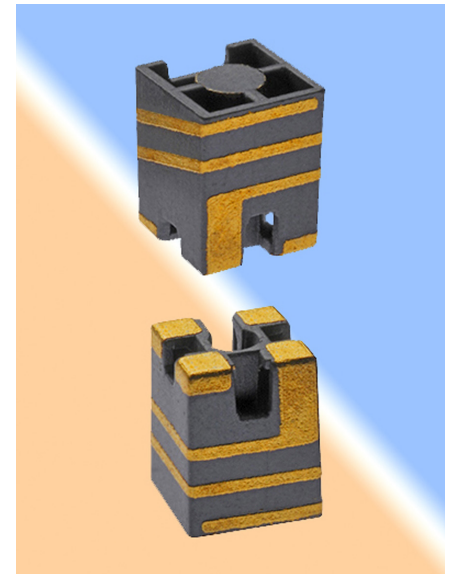
Developed with the power and precision of Laser Direct Structuring (LDS) technology, Molex's 2.4 GHz SMD on-ground antenna is the smallest on-ground MID (Molded Interconnect Device) antenna in the market. The lightweight Molded Interconnect Device (MID) chip antenna weighs only 0.03g and is used in portable electronic devices based on Bluetooth\*, Wi-Fi\*\*, ZIGBEE† and other wireless standards. These devices include tablet PCs, headsets, smart meters and more. Measuring only 3.00mm by 3.00mm by 4.00mm (0.118" by 0.118" by 0.157") and used on one side of the PCB, the antenna allows board makers to realize significant PCB real estate savings by leaving the ground layers in the PCB intact while freeing up space on the reverse side of the PCB for other component assemblies.

This monopole antenna has an omni-directional radiation pattern and requires only simple stripline matching on the PCB, without the need for discrete components. It is fully compatible with SMD and reflow processes and usable as a stand-alone device without the need for cable connection. Besides offering good thermal properties, the LCP body of the antenna provides a higher mechanical strain tolerance than ceramic ones.

Visit our website at [www.molex.com/link/SMD\\_antenna.html](http://www.molex.com/link/SMD_antenna.html) for more information.

**2.4 GHz Surface Mount Device (SMD) On-ground Antenna**

**47948 2.4 GHz SMD On-ground Antenna**



*Smallest On-ground Molded Interconnect Device (MID) Antenna*

**FEATURES AND BENEFITS**

- Valuable PCB real estate savings on both sides of the PCB with the use of this miniature antenna
- No removal of ground layers from beneath the antenna is needed
- Consistent antenna RF performance with the application of Laser Direct Structuring (LDS) - a technology known for its excellent precision, performance and repeatability
- The high-temperature base material and the metal plating technology employed allows the antenna to endure reflow temperatures - an ideal condition for a standard SMT process
- The product is halogen-free and RoHS-compliant

**SPECIFICATIONS**

**Reference Information**

Packaging: Tape on reel  
 Reference Platform:  
 100mm by 40mm (3.91" by 1.57")  
 Designed In: mm  
 RoHS: Yes  
 Halogen Free: Yes  
 Ground Clearance: None needed  
 SMD Compatible: Yes

**Electrical**

RF Power (Watt): 2  
 Frequency (MHz): 2400 to 2483.5  
 Return Loss - S11 (dB): < -9  
 Average Total Efficiency (%): > 70  
 Peak Gain (dBi): 3.0  
 Polarization: Linear  
 Input Impedance (Ohms): 50

**Mechanical**

Peeling Force: 1N (0.225 lb force)

**Physical**

Dimension:  
 3.00mm by 3.00mm by 4.00 mm  
 (0.118" by 0.118" by 0.157")  
 Housing:  
 LCP-LDS, Vectra E840ILDS,  
 40% mineral-filled LDS grade  
 Flammability: UL 94V-0  
 Plating:  
 Hatched Area —  
 0.1µm (4µ") Gold (Au) min.  
 MID Plane —  
 2.0µm (8µ") Nickel (Ni) min.  
 Underplating —  
 12µm (472µ") Copper min.  
 Operating Temperature: -35 to +85°C  
 Storage Temperature: -40 to +85°C

\*Bluetooth is a registered trademark of Bluetooth SIG  
 \*\*Wi-Fi is a registered trademarks of the Wi-Fi Alliance  
 †ZIGBEE is a registered trademark of trademark of ZigBee Alliance

## PRODUCT FEATURES

- In the left diagram below, four SMD pads are shown. Three dummy pads are to be attached to the PCB for strong mechanical bonding while the remaining signal SMD pad connects to the radio transceiver circuit on the PCB
- In the right diagram below, the pick-and-place feature of the antenna works with a standard vacuum nozzle for component assembly operations

## 2.4 GHz Surface Mount Device (SMD) On-ground Antenna

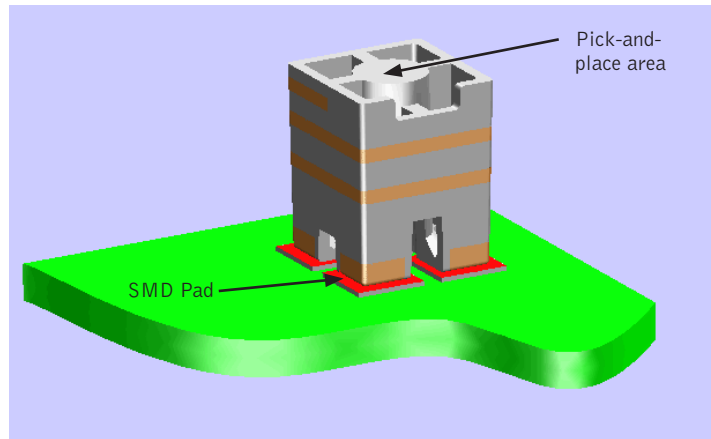
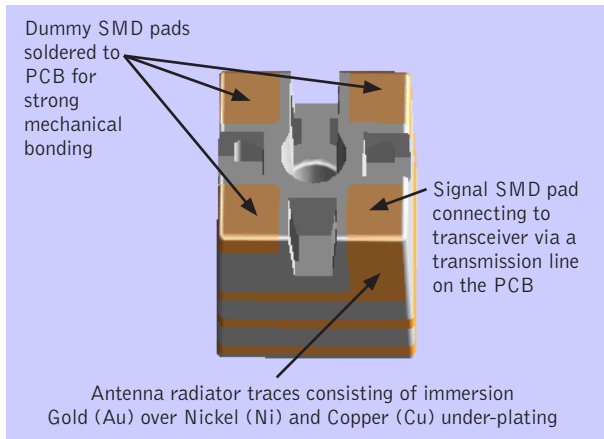


Illustration showing the plated SMD pads of the 2.4GHz SMD On-ground antenna base

Illustration showing the 2.4GHz SMD On-ground antenna mounted onto a PCB

## RF PERFORMANCE

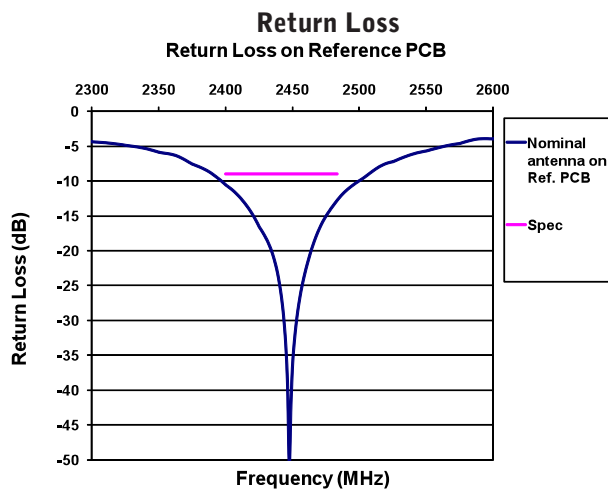


Figure 1: Return Loss ( $S_{11}$ ) as measured on reference board

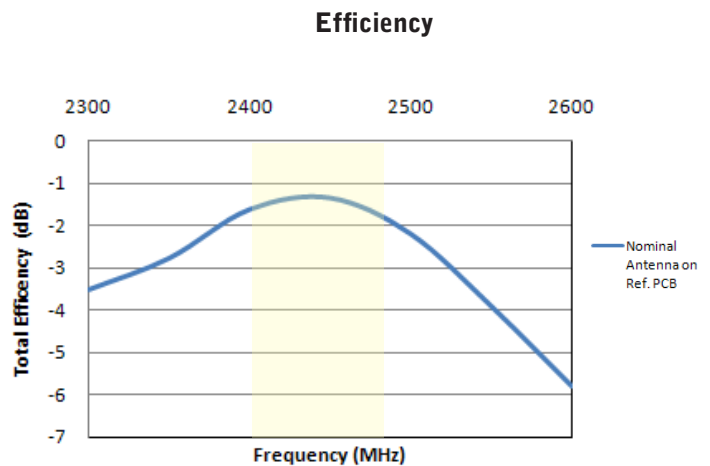


Figure 2: Total Efficiency (including Mismatch losses) as measured on reference board

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### Radiation Plots

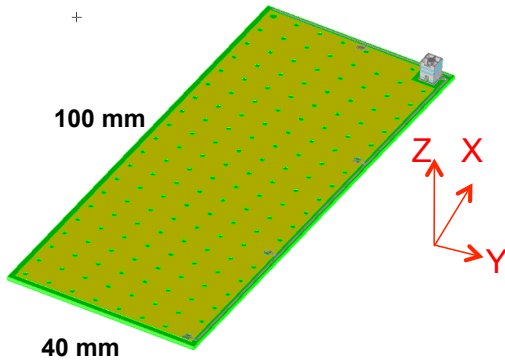


Figure 3a: Antenna on a 100mm by 40mm reference board with full ground on the reverse side of the board

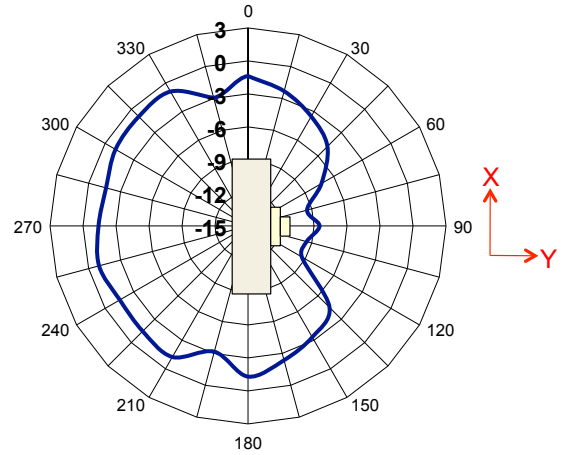


Figure 3b: Radiation diagram of X-Y plane shows combined polarizations as measured on reference board

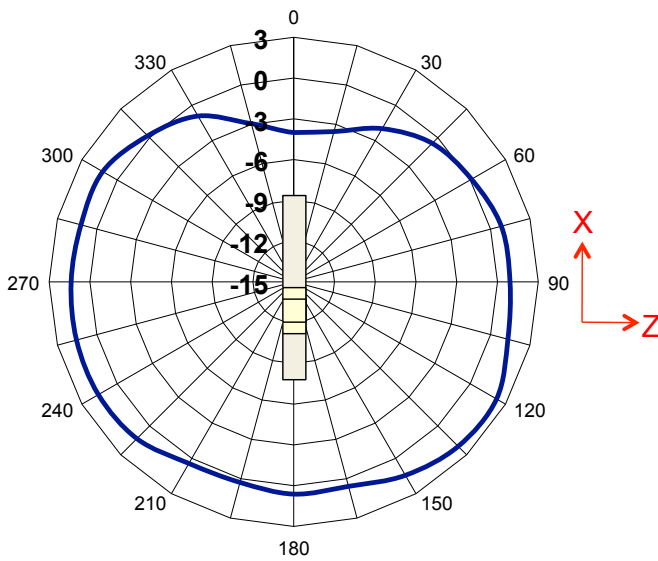


Figure 3c: Radiation diagram of X-Z plane shows combined polarizations as measured on reference board

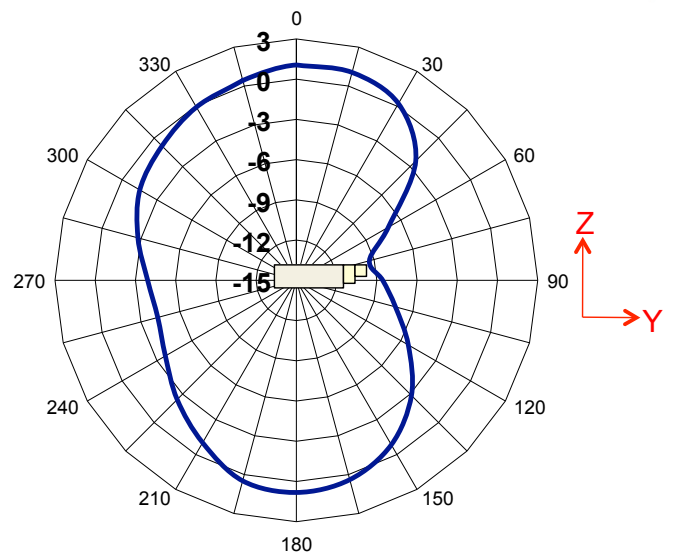


Figure 3d: Radiation diagram of Z-Y plane shows combined polarizations as measured on reference board

## APPLICATIONS

- Telecommunication Applications
  - Bluetooth devices
  - Headsets
  - Notebooks and netbooks
  - Smart Phones
  - Tablet PCs
  - WiFi devices
  - Wireless LAN (WLAN)
  - IEEE 802.11b/g/n devices
- Industrial Applications
  - Machine-to-machine (M2M) communications
  - Smart meters
  - Lighting controls
  - ZigBee IEEE 802.15.4 devices
  - 2.4 GHz Industrial, Scientific and Medical (ISM) band systems and wireless devices
- Consumer Electronics (CE) Applications
  - Cameras
  - Mobile gaming devices
  - Personal navigation devices
  - Wireless internet TV and Audio
- Automotive Applications
  - Bluetooth devices
  - Infotainment systems
- Medical Applications
  - Telemedicine and Telehealth devices



Tablet PCs



Smart meters



Car Infotainment systems

## 2.4 GHz Surface Mount Device (SMD) On-ground Antenna



Wireless headsets

## ORDERING INFORMATION

Order No.	Mounting Configuration
47948-0001	SMD