**Molex's class-leading 2.4/5GHz standalone antennas combine ground-plane-independent design with high-radiation efficiency to give customers better connectivity and reduced development time for wireless devices**

# 2.4/5 GHz Standalone Antennas, RoHS-compliant, Halogen-free

47950 2.4/5 GHz Standalone Antennas, 34.90 by 9.00mm (1.37 by 0.34") and 35.90 by 15.90mm (1.41 by 0.61") variants

Key to any wireless applications that impact the most critical design variables such as power efficiency, antenna coverage and radio-link quality is the antenna's Total Radiation Efficiency. Molex's 2.4 and 5GHz dual-band, standalone antennas offer customers maximum radiation efficiencies over a wide range of wireless applications, with the convenience of easy-to-use and easy integration features.

Molex's series 47950 antennas include the small footprint 34.5 by 9.00mm version that delivers 75% minimum total efficiency in the 2.4GHz band, with a minimum of 60% in the 5GHz band. The hallmark of this product is its small footprint, since it fits into many wireless devices easily. The larger 35.9 by 15.90mm version antenna is for applications that require the highest level of RF performance. It gives an efficiency of at least 80% in the 2.4GHz band with a 70% minimum in the 5GHz band. These products can be used in wireless applications including †Wi-Fi access points, consumer electronics, telemedicine devices and more.

Another important feature of Molex's 2.4/5GHz standalone antenna is its dipole-style design which makes it independent from the PCB dimensions used in the wireless application. Molex's 2.4/5GHz standalone antennas are ground-independent and can be applied in any device without the constraints and concerns of PCB grounding or PCB ground-induced radiation.

Molex's 2.4 and 5GHz standalone antennas are very easy to use. Simply peel off the poly-flexible adhesive tape on the underside of antenna and stick the latter on any desired location within the device casing. Then mount the *UFL-type coaxial connector (located at the end of the micro-coaxial cable) to the device radio and the antenna is ready to use.

For more information visit our website at:
www.molex.com/link/standard_antennas.html

*Typical 2.4 / 5 GHz Standalone Antennas with 100.0mm (3.94") micro-coaxial cable*

## FEATURES AND BENEFITS

- Ground-plane-independent design significantly reduces costs and engineering resources needed to tune and optimize ground-plane-dependent antennas
- High-radiation efficiency 34.9 by 9.00 mm (1.37 by 0.34") version antenna offers Total Efficiency values of 75% minimum in the 2.4GHz band and 60% minimum in the 5GHz band
- Higher radiation efficiency 35.9 by 15.90 mm (1.41 by 0.61") version antenna offers Total Efficiency values of 80% minimum in the 2.4 GHz band and 70% minimum in the 5GHz band
- Poly-flexible, double-sided adhesive tape on antenna enables easy peel-and-stick mounting anywhere within the device casing
- Robust coaxial cable to flexi-antenna with Pull Force of over 18.0N ensures maximum reliability of antenna
- Choice of several miniature coaxial cable length options provides for maximum flexibility for antenna placement in the wireless device

## SPECIFICATIONS

### Reference Information

Packaging: Tray
Mates With: highlighted item to
  Micro-coaxial SMT Jack
  (Part Number: 73412-0110)
Use With:
  Use With: Any Wi-Fi radio device
Designed In: mm
RoHS: Yes
Halogen Free: Yes
Glow Wire Compliant: No

### Electrical Specifications

(2.4 GHz) include:
  f_start (MHz): 2400
  f_end (MHz): 2483.5
  Return Loss S11 (dB): Refer table
  Total Eff. (dB): Refer table
  Peak Gain (dBi): Refer table
  Polarization: Linear
  Input Impedance (Ohms): 50
(5 GHz) include:
  f_start (MHz): 4900
  f_end (MHz): 5900
  Return Loss S11 (dB): Refer table
  Total Eff. (dB): Refer table
  Peak Gain (dBi): Refer table
  Polarization: Linear
  Input Impedance (Ohms): 50

### Mechanical

Pull Force: > 18.0N (4.05 lb force)

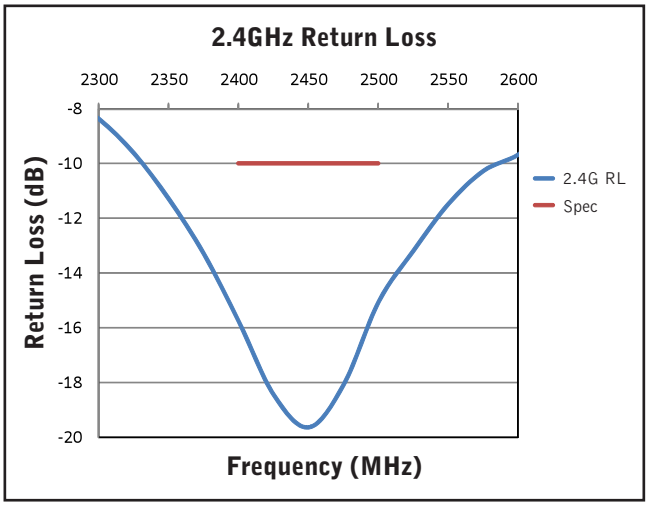
### Physical

Thickness: 0.10mm (0.004")
Operating Temperature: -30 to +75°C

*Use with: Surface-mount, micro-coaxial Jack (Molex Part Number: 73412-0110). Refer to datasheet literature (Order No. 987650-3242) for more details.
† Wi-Fi is a registered trademarks of the Wi-Fi Alliance

# 2.4/5 GHz Standalone Antennas, RoHS-compliant, Halogen-free

## Return Loss



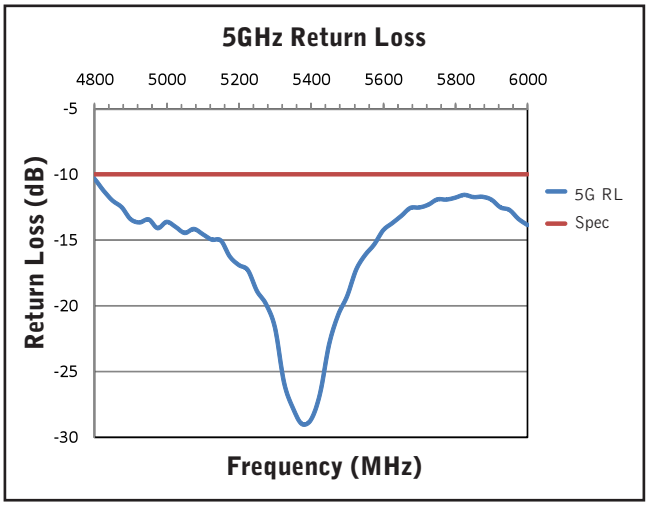
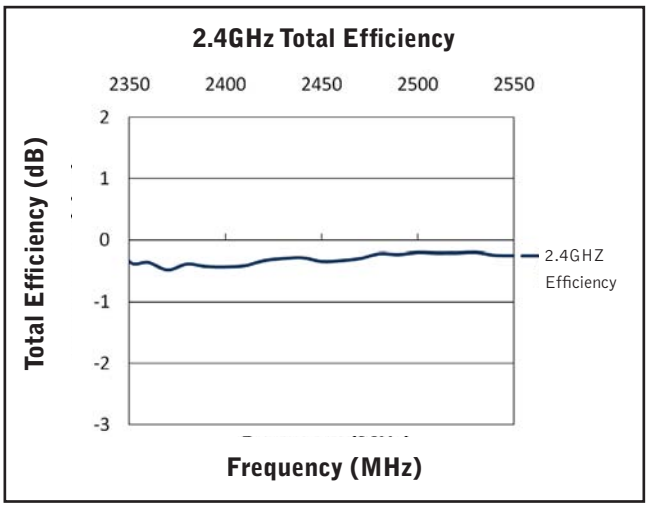




*Figure 1: Antenna Return Loss (S11) for 2.4 and 5 GHz measured on a 1mm-thick plate of PC/ABS material*

## Efficiency



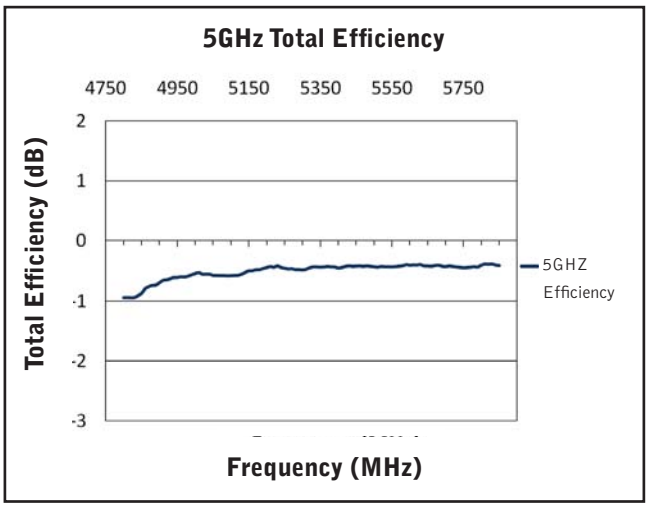




*Figure 2: Antenna Total Efficiency (including Mismatch Loss) for 2.4 and 5 GHz measured on a 1mm-thick plate of PC/ABS material*

# 2.4/5 GHz Standalone Antennas, RoHS-compliant, Halogen-free

## Radiation Plots 2.4 GHz

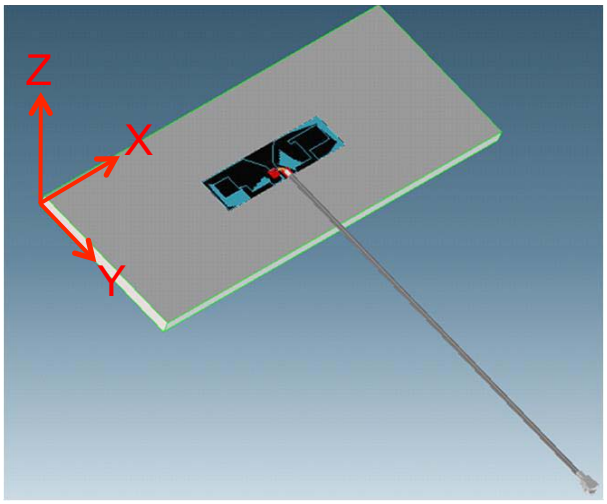



*Figure 3a: Antenna on a 1mm-thick PC/ABS material plate*

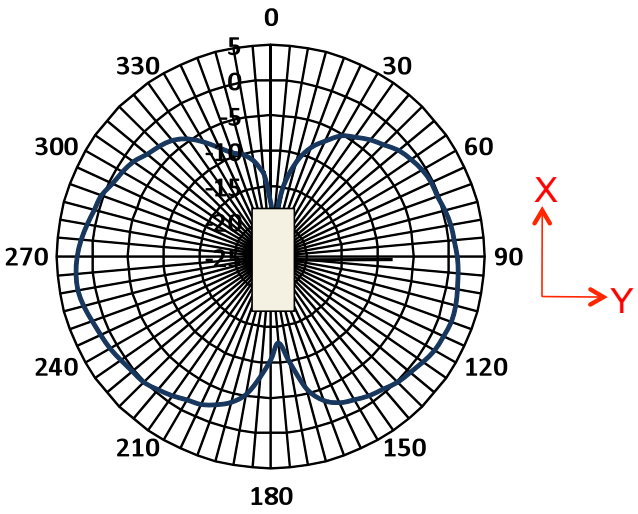



*Figure 3b: Radiation diagram of X-Y plane showing combined polarizations at 2.45 GHz*

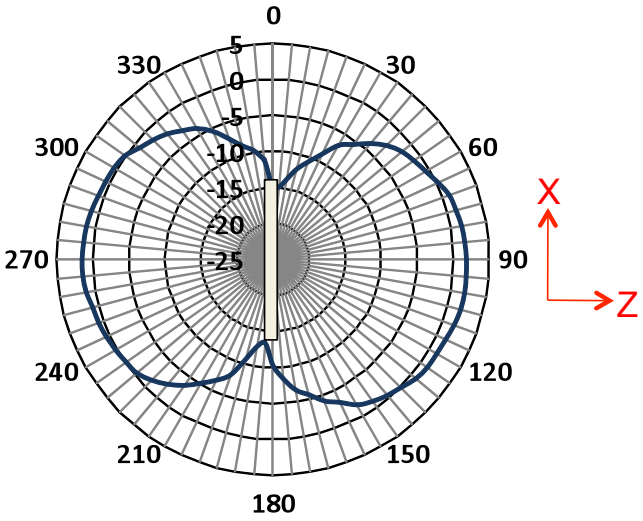



*Figure 3c: Radiation diagram of X-Z plane showing combined polarizations at 2.45 GHz*

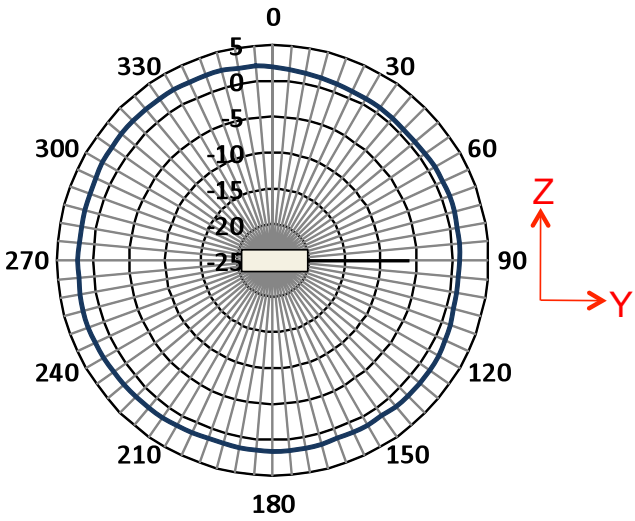



*Figure 3d: Radiation diagram of Z-Y plane showing combined polarizations at 2.45 GHz*

## Radiation Plots 5 GHz

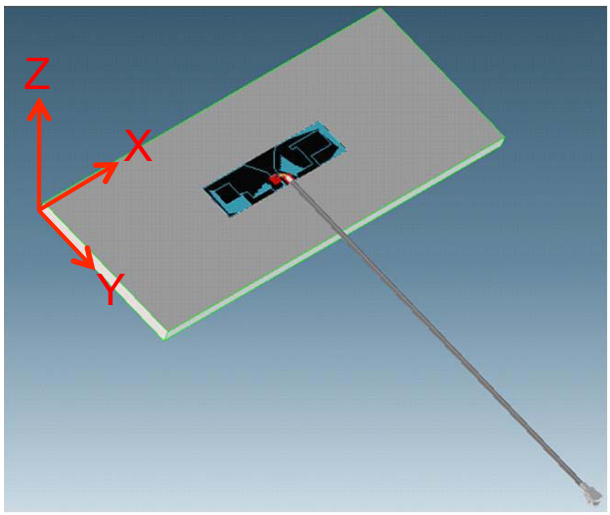



*Figure 3e: Antenna on a 1mm-thick PC/ABS material plate*

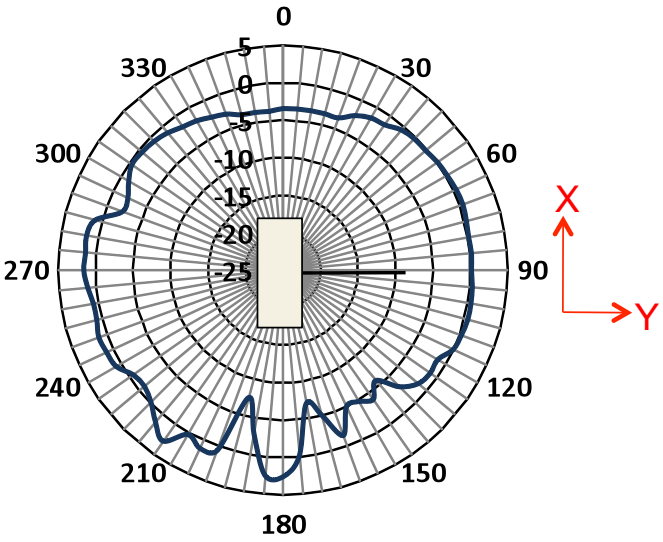



*Figure 3f: Radiation diagram of X-Y plane showing combined polarizations at 5.45 GHz*

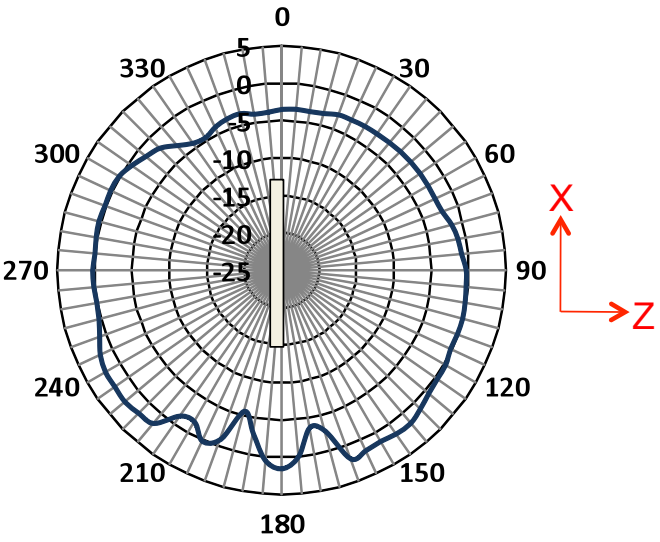



*Figure 3g: Radiation diagram of X-Z plane showing combined polarizations at 5.45 GHz*

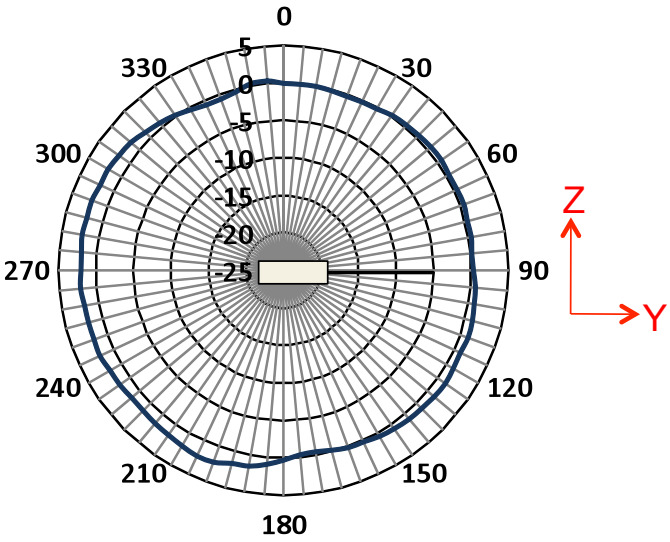



*Figure 3h: Radiation diagram of Z-Y plane showing combined polarizations at 5.45 GHz*

## APPLICATIONS

- Telecommunication Applications
  - Wireless Wi-Fi access points
  - Wireless Wi-Fi routers
  - Wi-Fi devices
  - Wireless LAN (WLAN)
  - IEEE 802.11b/g/n devices
- Industrial Applications
  - Machine-to-machine (M2M) communications
  - Smart meters
  - 2.4 GHz §ZigBee IEEE 802.15.4 devices
  - 2.4 GHz and 5 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 devices
- Automotive Applications
  - ‡Bluetooth devices
  - Infotainment systems
  - Mobile hotspots
- Medical Applications
  - Telemedicine- and telehealth devices

*Wireless Wi-Fi access points*

*Wireless Wi-Fi router*

*Mobile gaming devices*

# 2.4/5 GHz Standalone Antennas, RoHS-compliant, Halogen-free

## ORDERING INFORMATION

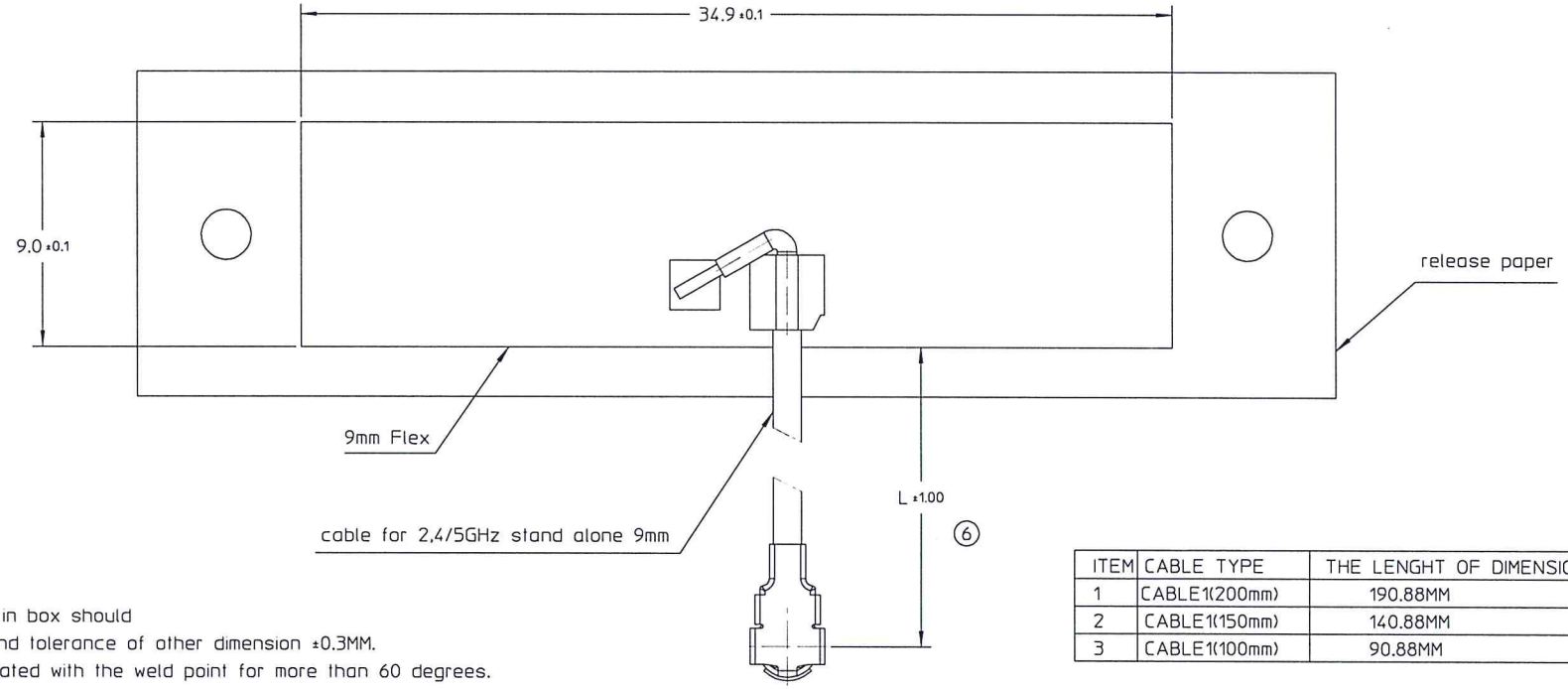
| Order No. | Flexi-Antenna Dimensions | Miniature Coaxial Cable Lengths (mm/inches) | Frequency Range (GHz) | Return Loss S11 (db) | Peak Gain (dBi) | Total Efficiency (%) |
|---|---|---|---|---|---|---|
| 47950-0001 | 34.90 by 9.00mm (1.37" by 0.34") | 100.0mm (3.94") | 2.4 - 2.5 | < -10 | 3.0 | > 75 |
| | | | 4.8 - 5.85 | | 4.6 | > 70 |
| 47950-1001 | | 150.0mm (5.91") | 2.4 - 2.5 | | 3.0 | > 75 |
| | | | 4.8 - 5.85 | < -6 | 2.7 | > 60 |
| | | | 5.0 - 5.85 | < -10 | 3.7 | > 70 |
| 47950-2001 | | 200.0mm (7.87") | 2.4 - 2.5 | | 2.9 | > 75 |
| | | | 4.8 - 5.85 | | 5.9 | > 70 |
| 47950-0011 | 35.90 by 15.90mm (1.41" by 0.61") | 100.0mm (3.94") | 2.4 - 2.5 | | 2.6 | > 80 |
| | | | 4.8 - 5.85 | | 4.4 | > 75 |
| 47950-1011 | | 150.0mm (5.91") | 2.4 - 2.5 | | 3.0 | > 80 |
| | | | 4.8 - 5.85 | | 4.8 | > 70 |
| 47950-2011 | | 200.0mm (7.87") | 2.4 - 2.5 | | 3.4 | > 80 |
| | | | 4.8 - 5.85 | | 5.5 | > 75 |

‡Bluetooth is a registered trademark of Bluetooth SIG
§ZIGBEE is a registered trademark of trademark of ZigBee Alliance



Order No. 987650-5892

Printed in USA/KC/2011.06




| ITEM | CABLE TYPE | THE LENGHT OF DIMENSION "L" |
|---|---|---|
| 1 | CABLE1(200mm) | 190.88MM |
| 2 | CABLE1(150mm) | 140.88MM |
| 3 | CABLE1(100mm) | 90.88MM |

NOTE:
1.The dimesndion with tolerance in box should
be controled by flex supplier and tolerance of other dimension ±0.3MM.
2.The cable line can not be rotated with the weld point for more than 60 degrees.

| ITEM | PART NAME | PN |
|---|---|---|
| 1 | CABLE1 for 2,4/5GHz stand alone (200mm) | 479500005 |
| | CABLE1 for 2,4/5GHz stand alone (150mm) | 479500004 |
| | CABLE1 for 2,4/5GHz stand alone (100mm) | 479500003 |
| 2 | FLEX1 for 2,4/5GHz stand 9mm | 479500002 |
| 3 | 2,4/5GHz stand alone 9mm assy(CABLE100MM) | 479500001 |
| | 2,4/5GHz stand alone 9mm assy(CABLE150MM) | 479501001 |
| | 2,4/5GHz stand alone 9mm assy(CABLE200MM) | 479502001 |

ENTER DESCRIPTION
EC NO:ABU2016-0025
DRWN:Zlrao 2015/09/09
CH'KD:Jack Shi 2015/09/09
APPR:Chris Yu 2015/09/09
DESCRIPTION
E
REV

QUALITY SYMBOLS
F_A=0
F_C=0
F_P=0

GENERAL TOLERANCES (UNLESS SPECIFIED)

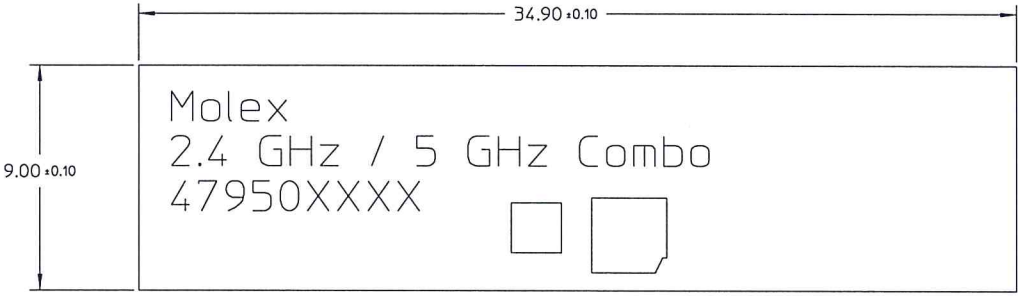
| | mm | INCH |
|---|---|---|
| 4 PLACES | ± | ± |
| 3 PLACES | ± | ± |
| 2 PLACES | ± | ± |
| 1 PLACE | ± | ± |
| ANGULAR ± | ° | |

DRAFT WHERE APPLICABLE MUST REMAIN WITHIN DIMENSIONS

DIMENSION STYLE
SCALE 5:1
DESIGN UNITS MM
THIRD ANGLE PROJECTION
DRAWN BY DATE Zlrao 2015/09/09
CHECKED BY DATE Jack Shi 2015/09/09
APPROVED BY DATE Chris Yu 2015/09/09
TITLE 2,4/5GHz stand alone 9mm Ant
molex MOLEX INCORPORATED
MATERIAL NO. SEE TABLE
DOCUMENT NO. SD-47950-001
SHEET NO. 2 OF 2
SIZE A3

| Molex | | | | | Customer:Bostom | | | DRAWING LOCATION | CHANGE DESCRIPTION | AFFECTED DEPT |
|---|---|---|---|---|---|---|---|---|---|---|
| DRAWING NO. | REV. | ECN NO. | DATE | P/N | P/N. | 3D REV | 2D REV | | | |
| SD-47950-001 | C | ABU2012-0079 | 2013/05/27 | 479500001 | - | - | - | ALL | Simply assy dims for SD drawings | AQP/ME/RF/PE/POP |
| SD-47950-001 | D | ABU2014-0051 | 2014/02/21 | 479500001 | - | - | - | ALL | CHANGE 150MM/200MM FLEX P/N | AQP/ME/RF/PE/POP |
| SD-47950-001 | E | ABU2016-0025 | 2015/09/09 | 479500001 | | | | ALL | Change PSA material from 3M966 to 3M9077 | AQP/ME/RF/PE/POP |

NOTE:
1.Material: Flex 34.9mm * 9mm
Thickness:
PSA: 3M9077
PI: 50um
Base Copper: 18~20um
2.COVER COAT: BLACK.




ENTER DESCRIPTION
EC NO:ABU2016-0025
DRWN:Zlrao 2015/09/09
CH'KD:Jack Shi 2015/09/09
APPR:Chris Yu 2015/09/09
DESCRIPTION
E
REV

QUALITY SYMBOLS
F_A=0
F_C=0
F_B=0

GENERAL TOLERANCES (UNLESS SPECIFIED)

| | mm | INCH |
|---|---|---|
| 4 PLACES | ± | ± |
| 3 PLACES | ± | ± |
| 2 PLACES | ± | ± |
| 1 PLACE | ± | ± |
| ANGULAR ± ° | | |

DRAFT WHERE APPLICABLE MUST REMAIN WITHIN DIMENSIONS

DIMENSION STYLE

SCALE 5:1 | DESIGN UNITS MM | THIRD ANGLE PROJECTION

DRAWN BY DATE: Jack Shi 2015/09/09
CHECKED BY DATE: Zlrao 2015/09/09
APPROVED BY DATE: Chris Yu 2015/09/09
MATERIAL NO.: see the table of sheet2

TITLE: 2.4/5GHz stand alone 9mm Ant

MOLEX INCORPORATED

DOCUMENT NO.: SD-47950-001
SHEET NO.: 1 OF 2

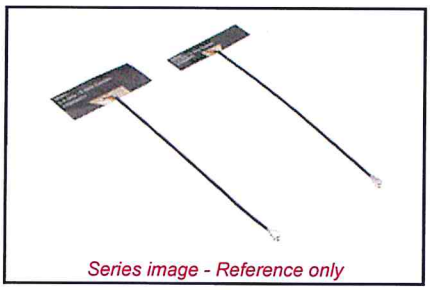
SIZE A3

molex
one company > a world of innovation

This document was generated on 03/29/2016

**PLEASE CHECK WWW.MOLEX.COM FOR LATEST PART INFORMATION**

**Part Number:** 0479502011
**Status:** Active
**Overview:** Standard Antennas
**Description:** 2.4GHz / 5GHz Wi-Fi* Stand Alone Antenna, 16.00mm Width, Cable Length 200.00mm



*Series image - Reference only*

**Documents:**

3D Model
Drawing (PDF)
Packaging Specification PK-47950-001 (PDF)
RoHS Certificate of Compliance (PDF)
Product Literature (PDF)

| | |
|---|---|
| **General** | |
| Product Family | Antennas |
| Series | 47950 |
| Component Type | Stand Alone Antenna with Cable |
| Mates With | 73412-0110 Microcoaxial RF, 50 Ohm |
| Overview | Standard Antennas |
| Product Literature Order No | 987650-5892 |
| Product Name | 2.4 GHz SMD Stand Alone |
| Type | Wi-Fi* Antenna |
| UPC | 884982682054 |
| **Physical** | |
| Cable Length | 200.00mm |
| Depth | 0.10mm |
| Length | 35.90mm |
| Mounting Style | Adhesive |
| Net Weight | 0.800/g |
| Packaging Type | Tray |
| Polarization | Linear |
| Radiation Pattern | Omnidirectional |
| Width | 15.90mm |
| **Electrical** | |
| Band#1 F_End (MHz) | 2483.5 |
| Band#1 F_Start (MHz) | 2400 |
| Band#2 F_End (MHz) | 5900 |
| Band#2 F_Start (MHz) | 4800 |
| Electrical Connectivity | Cable |
| Impedance | 50# |
| Number of Bands | 2 |
| Peak Gain (dBi) | 2.6 @ 2.4G, 4.4 @ 5G |
| Return Loss - S11 (dB) | < -10, < -9 |
| Total Efficiency | >75% @ 5G, >80% @ 2.4G |
| **Material Info** | |
| **Reference - Drawing Numbers** | |
| Packaging Specification | PK-47950-001 |
| Sales Drawing | SD-47950-011 |

*Wi-Fi is a registered trademark of the Wi-Fi Alliance

**EU ELV**
**Not Relevant**

**EU RoHS** | **China RoHS**
**Compliant**

**REACH SVHC**
Not Contained Per -ED/79/2015 (17 December 2015)

**Halogen-Free Status**
**Low-Halogen**

**Need more information on product environmental compliance?**

Email productcompliance@molex.com
Please visit the Contact Us section for any non-product compliance questions.

| | |
|---|---|
| China ROHS | Green Image |
| ELV | Not Relevant |

**Search Parts in this Series**
47950 Series

This document was generated on 03/29/2016

**PLEASE CHECK WWW.MOLEX.COM FOR LATEST PART INFORMATION**