

Operational Description

The product is short-range device operating in the 2.4 GHz ISM band and utilizes a SMT Bluetooth Module using a BlueCore CSR8670 BGA. It designed to communicate between TV and a wireless stereo speaker or headphones.

This module complies with Bluetooth specification version 4.1. The communication mode is bi-directional and uses FHSS on 79 channels spaced by 1000 kHz with an output power of up to +8 dBm. Initial carrier tolerance is +/- 75KHz, with a carrier drift of +/- 40KHz.

There is a common ground layer on the board with copper pour on RF side with traces to a UFL-type connector for the antenna.

The antenna is a 2.4 and 5GHz dual-band, standalone internal antenna (1.37 x 0.34" footprint) with micro-coaxial connector that includes a ground plane independent design.

Summary RF Specifications are:

- RF Specifications at Basic Rate

No.	Parameter	Condition	Min.	Typ.	Max.	Unit
1	Frequency range	-	2.4	-	2.4835	GHz
2	Output Power	Normal/Extreme	4	8	-	dBm
3						
4	20dB bandwidth	Longest packet (1,3 or 5 slot)		915	1000	KHz
5	Adjacent channel power	$\pm 2\text{MHz}$		-38	-20	dBm
		$\geq \pm 3\text{MHz}$		-47	-40	dBm
6	Modulation Characteristics	$\Delta F_{1\text{avg}}$	140	163	175	KHz
		$\Delta F_{2\text{max}}$	115	147	-	KHz
		$\Delta F_{2\text{avg}}/\Delta F_{1\text{avg}}$	80	94	-	%
7	Initial Carrier Frequency Tolerance	DH1 packet	-75	-	75	KHz
8	Carrier Frequency Drift	Longest packet (DH5)	-40	-	40	KHz
9	Sensitivity level (BER $\leq 0.1\%$)	Single slot (DH1)	-	-84	-75	dBm
		/ Multi slot (DH3,DH5)				
10	Maximum Input Level (BER $\leq 0.1\%$)	-	-20	> 0	-	dBm

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

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

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



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

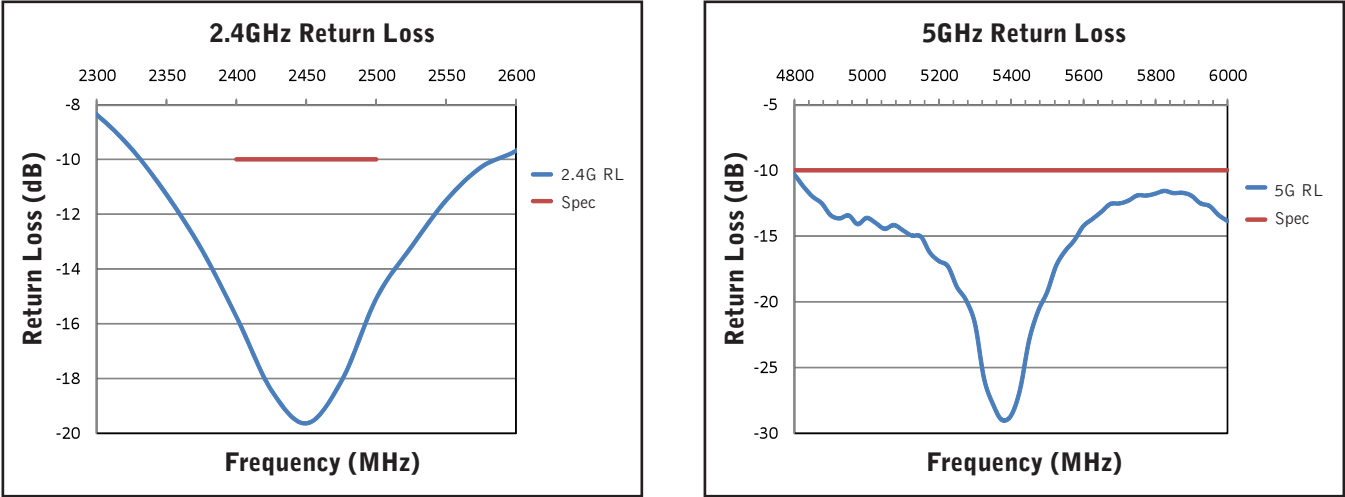


Figure 1: Antenna Return Loss (S11) for 2.4 and 5 GHz measured on a 1mm-thick plate of PC/ABS material

Efficiency

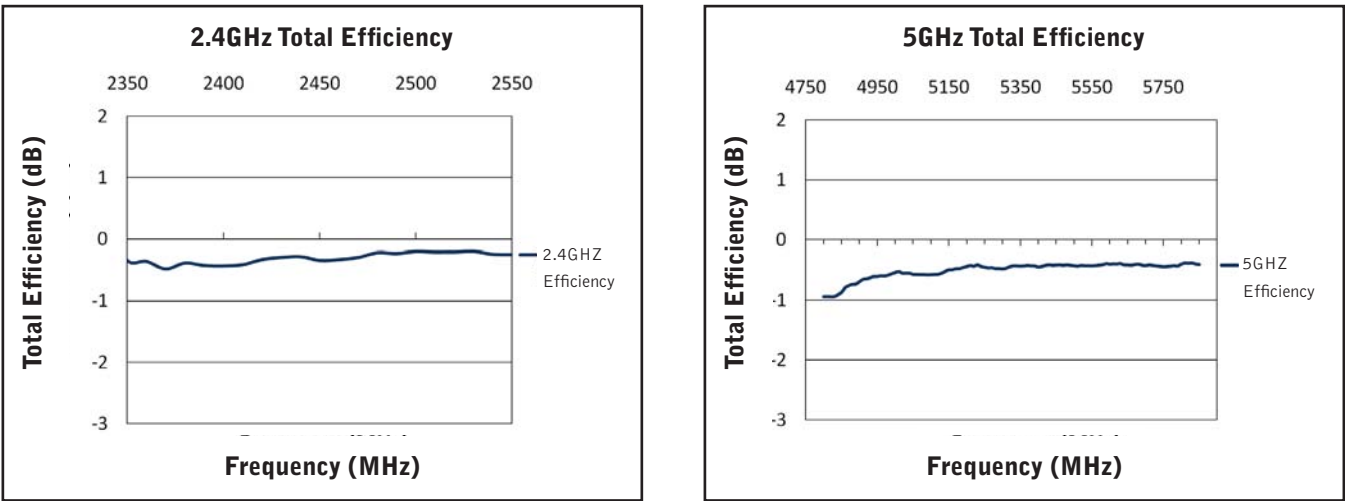


Figure 2: Antenna Total Efficiency (including Mismatch Loss) for 2.4 and 5 GHz measured on a 1mm-thick plate of PC/ABS material

2.4/5 GHz Standalone
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Radiation Plots 2.4 GHz

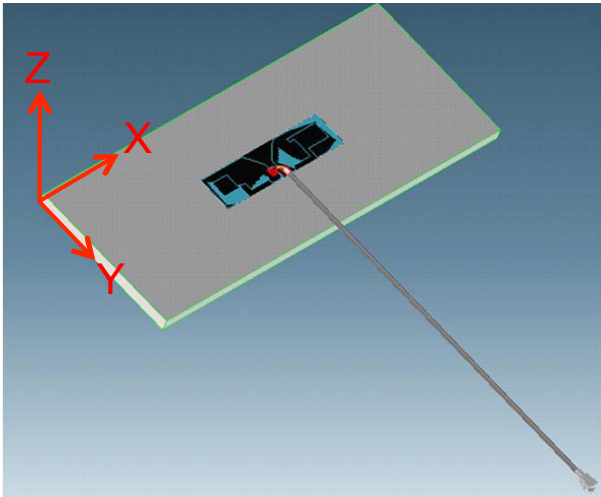


Figure 3a: Antenna on a 1mm-thick
PC/ABS material plate

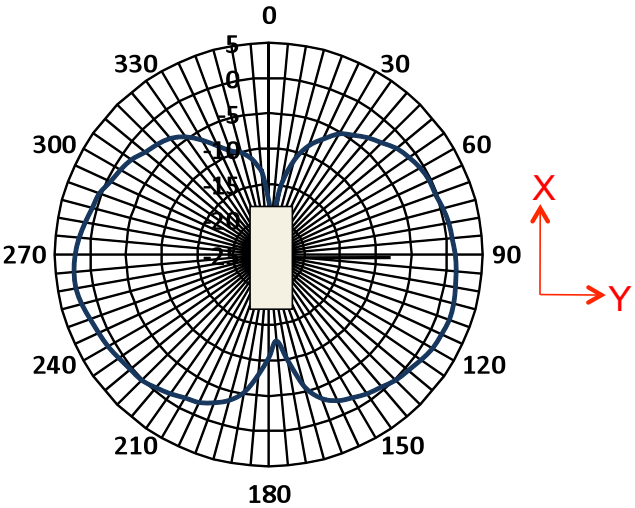


Figure 3b: Radiation diagram of X-Y plane
showing combined polarizations at 2.45 GHz

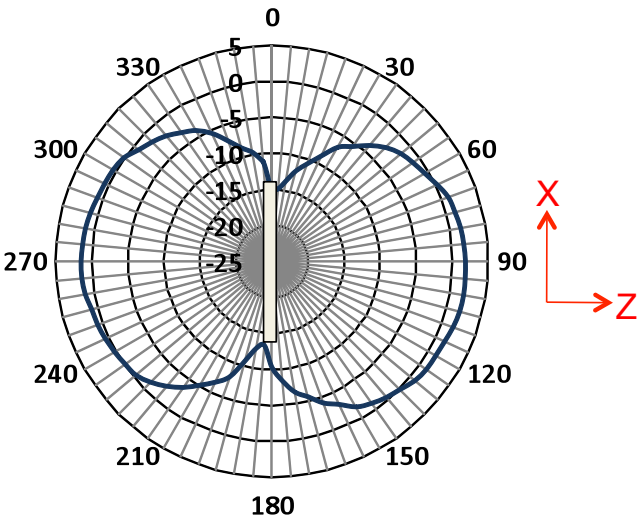


Figure 3c: Radiation diagram of X-Z plane
showing combined polarizations at 2.45 GHz

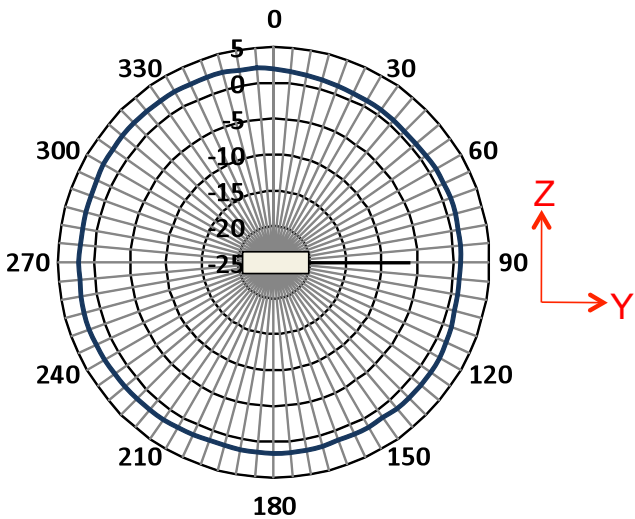


Figure 3d: Radiation diagram of Z-Y plane
showing combined polarizations at 2.45 GHz

2.4/5 GHz Standalone
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Radiation Plots 5 GHz

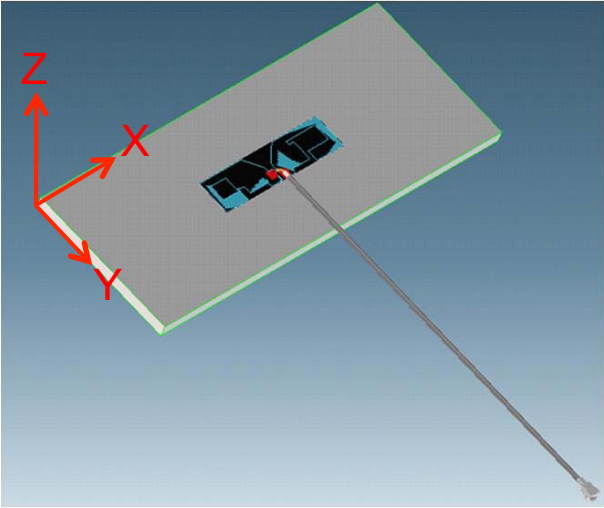


Figure 3e: Antenna on a 1mm-thick
PC/ABS material plate

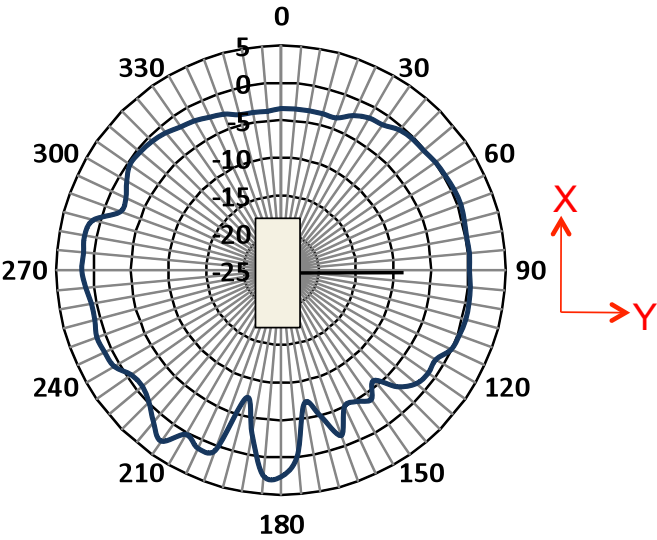


Figure 3f: Radiation diagram of X-Y plane
showing combined polarizations at 5.45 GHz

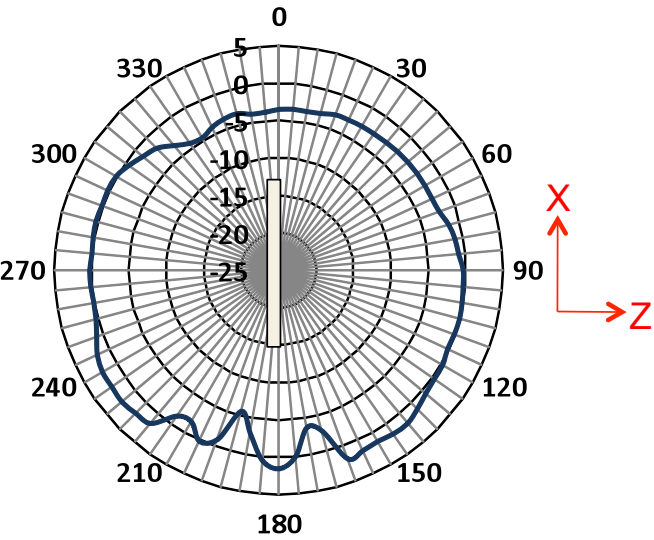


Figure 3g: Radiation diagram of X-Z plane
showing combined polarizations at 5.45 GHz

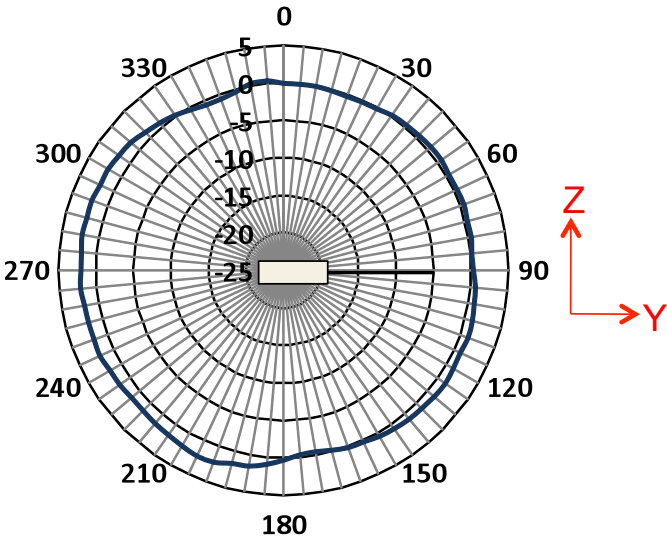


Figure 3h: Radiation diagram of Z-Y plane
showing combined polarizations at 5.45 GHz

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,
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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	< -6	3.0	> 75
			4.8 - 5.85		2.7	> 60
		200.0mm (7.87")	5.0 - 5.85	< -10	3.7	> 70
47950-2001			2.4 - 2.5		2.9	> 75
	35.90 by 15.90mm (1.41" by 0.61")	100.0mm (3.94")	4.8 - 5.85		5.9	> 70
			2.4 - 2.5		2.6	> 80
47950-0011		150.0mm (5.91")	4.8 - 5.85		4.4	> 75
			2.4 - 2.5		3.0	> 80
47950-1011		200.0mm (7.87")	4.8 - 5.85		4.8	> 70
			2.4 - 2.5		3.4	> 80
47950-2011			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