Wi-Fi Flexible and PCB Antennas

molex

Contents

Customer Challenges

- Metal enclosures are widely used in home appliance, automotive and industrial applications. These application devices are getting smarter and are being connected to wireless networks more often; however, mounting an antenna directly on a metal surface often causes detuning issues.

- MU-MIMO in Wi-Fi 6 is supported on both uplink and downlink. It requires MIMO antennas on devices, to enhance the network's bandwidth, latency and capacity. To leverage the lately released 6GHz band, the antennas are required to support the new frequency at 6GHz together with the legacy 2.4, 5GHz bands.

Customer Challenges

- Wi-Fi product makers are often challenged with physical space limitations in their application devices. They need compact antennas that operate well with other electronic devices without compromising the device's overall performance.

- The growing range, sophistication and complexity of smartphones, e-books, tablets and wearable devices have made antenna design increasingly challenging. Where center-fed cable antennas do not fit processing applications, side-fed antenna designs are required.

- Customers developing specific Wi-Fi applications require standard dipole-style (center-fed) antennas that come in a variety of substrates (flexible material or PCB) for easy peel-and-stick applications. These antennas must deliver high RF performance regardless of varying cable lengths.

Molex Introduces the Wi-Fi Flexible and PCB Antennas

- Designed for fast and easy integration into wireless devices at minimal implementation cost, on-metal mount, MIMO, side and center-fed cable flexible antennas enable high-performance RF transmission for the most demanding Wi-Fi applications

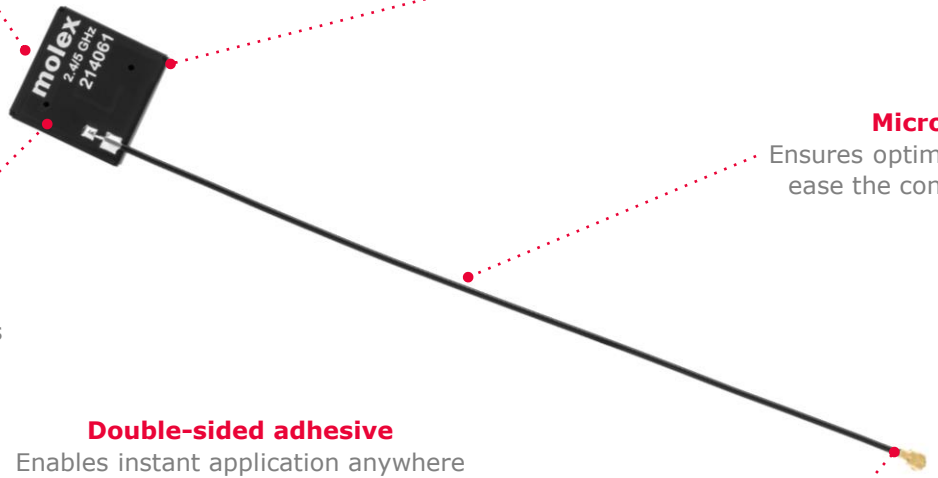
2.4, 5 GHz On-metal Mount Wi-Fi PCB Flexible Antenna

2.4, 5, 6 GHz Wi-Fi PCB Flexible Antennas (dipole, fully balanced)

Features and Advantages – on-metal antennas

Single (212498 series) and dual band (214061 series) options with customizable cable and connector
Supports the latest Wi-Fi standards (Wi-Fi 4/5/6) and provides design flexibility

Metal surface mount
Allows mounting directly on the metal surface without compromising RF performance



Micro-coaxial cable
Ensures optimum RF performance and ease the connectivity to RF devices

Small form factor
Provides space savings

Double-sided adhesive
Enables instant application anywhere on the device

2.4, 5, 6 GHz MIMO 2x2 Flexible Antenna (Series 208482)

UFL-type connector
Affords a secure connection to RF device

Features and Advantages – MIMO Antennas

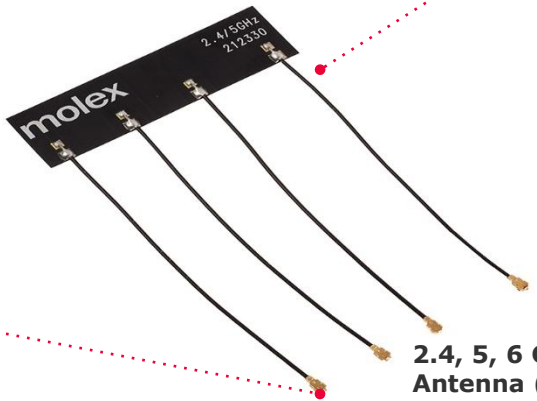
Double sided TESA adhesive
Enables easy "peel-and-stick" mounting

Cable and connector can be customized
Provides design flexibility

2x2 MIMO design
Delivers superior connectivity for Wi-Fi 4/5/6/6E

2.4, 5, 6 GHz MIMO 2x2 Flexible Antenna (Series 208482)

Double-sided 3M adhesive
Enables easy "peel-and-stick" mounting



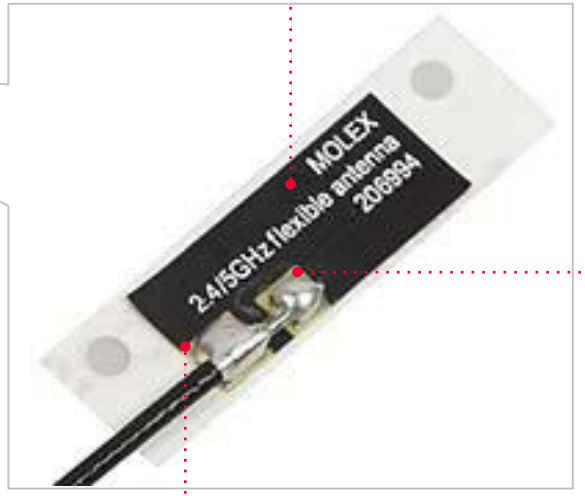
4x4 MIMO design
Delivers superior connectivity for Wi-Fi 4/5/6/6E

UFL-type connector
Secures to the application's device radio

2.4, 5, 6 GHz MIMO 4X4 Flexible Antenna (Series 212330)

Features and Advantages – Monopole Antennas

Highly compact, side-fed monopole antenna
Offers significant space savings while supporting high-performance needs



Micro-coaxial cable, 100mm
Ensures optimum RF performance for easy connectivity to radio devices

2.4, 5, 6 GHz Wi-Fi Flexible Antenna, 15.00 by 6.00mm, Monopole, Side-fed (Series 206994)

Solder pad for Core

Solder pad for Ground

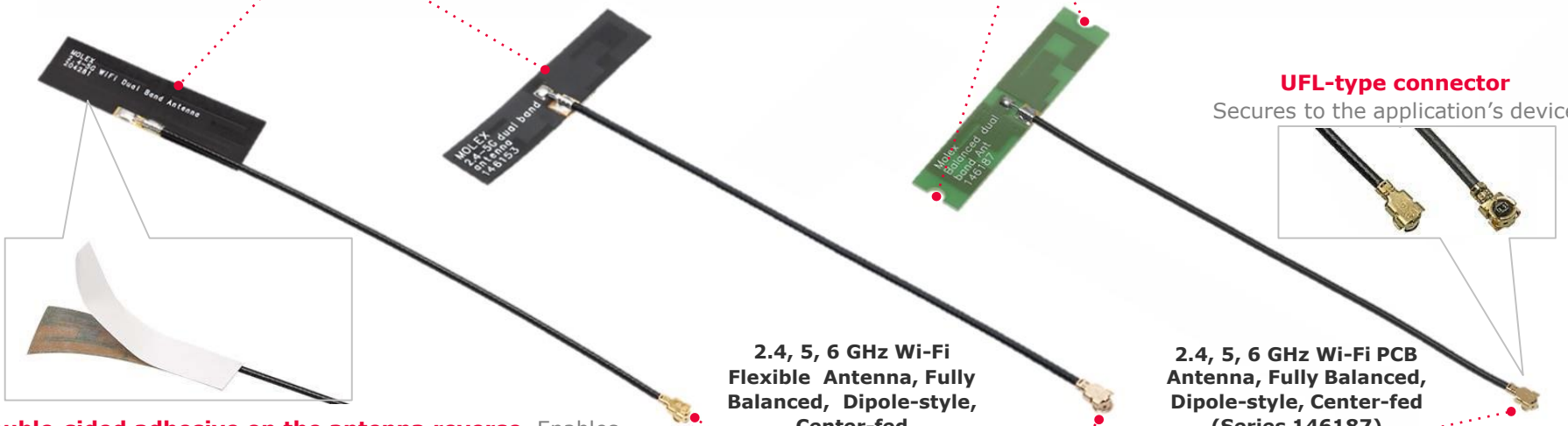
UFL-type connector
Secures to the application's device radio

Features and Advantages – Dipole Antennas

Topside of the poly-flexible antenna
Makes for easy peel-and-stick mounting anywhere within the device chassis

Rigid PCB antenna with two holes on both sides for screw-nut mounting
Offers more robust securing of antenna to device chassis in rugged applications

UFL-type connector
Secures to the application's device



Double-sided adhesive on the antenna reverse Enables instant application anywhere on the inner wall of the device chassis by just removing its tape liner

2.4, 5, 6 GHz Wi-Fi Flexible Antenna, Fully Balanced, Dipole-style, Side-fed (Series 204281)

2.4, 5, 6 GHz Wi-Fi Flexible Antenna, Fully Balanced, Dipole-style, Center-fed (Series 146153)

2.4, 5, 6 GHz Wi-Fi PCB Antenna, Fully Balanced, Dipole-style, Center-fed (Series 146187)

micro-coaxial cable
(50, 100, 150, 200, 250, 300mm options)
Extends connectivity for maximum design flexibility

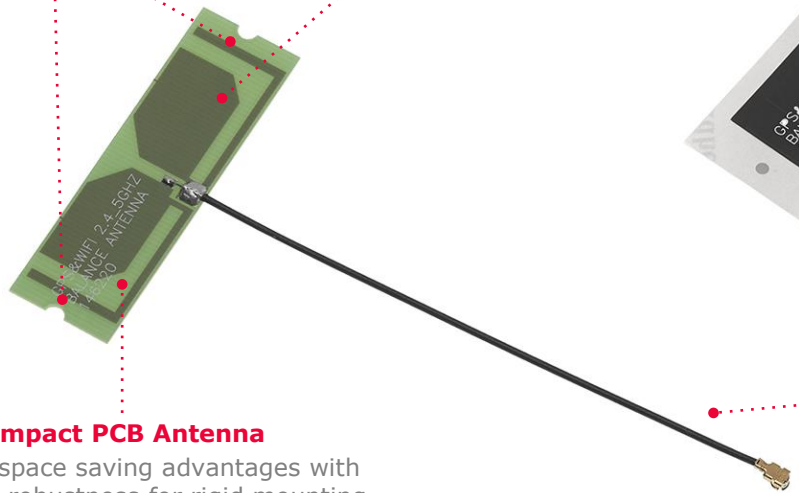
Features and Advantages – Combo Antennas

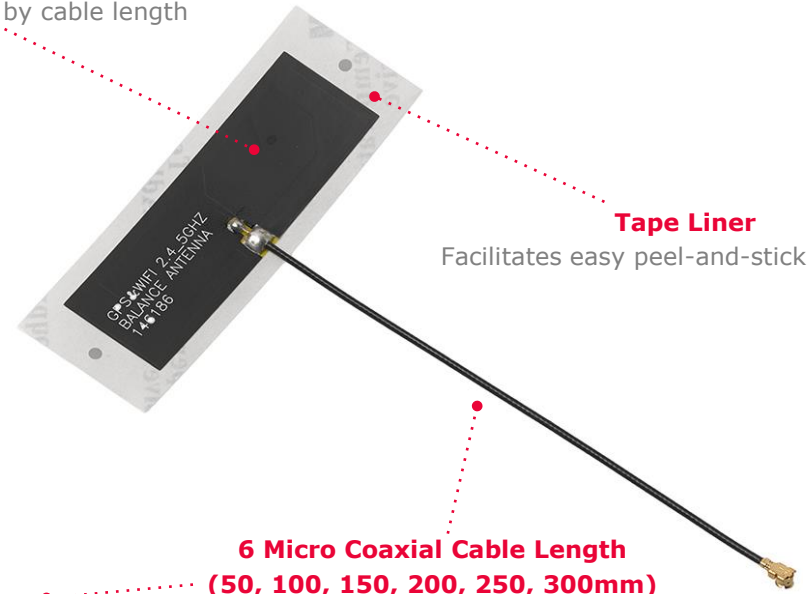
Balanced Antenna

Offers consistent performance throughout antenna; antenna resonance not affected by cable length

Two holes on the sides of the antenna

Facilitates secure screw-nut mounting on application chassis





Tape Liner

Facilitates easy peel-and-stick mounting

Compact PCB Antenna

Combines space saving advantages with mechanical robustness for rigid mounting

2.4, 5, 6 GHz Wi-Fi Combo Flexible Antenna, Fully Balanced, Center-fed (Series 146220)

6 Micro Coaxial Cable Length (50, 100, 150, 200, 250, 300mm)

Ensures maximum design flexibility in meeting connectivity needs

2.4, 5, 6 GHz Wi-Fi Combo Flexible Antenna, Fully Balanced, Center-fed (Series 146186)

Markets and Applications

Consumer

- Connected Home
- Smart Home
- White goods
- Smart lightings

Industrial

- Smart Cities

Automotive

- Connected Vehicle
- Comfort and Infotainment

Medical

- Connected diagnostics
- Connected health

This is not a definitive list of applications for this product, it represents some of the more common uses

Competitive Analysis*

	Product and Technical Differences		
Attribute	Molex | 2.4 GHZ on-Metal Wi-Fi Antenna (212498 Series)	Molex | 2.4/5 GHZ on-Metal Wi-Fi Antenna (214061 Series)	Antenova | Zenon SR4W030
Closest Equivalent or Drop-In Replacement	N.A.	N.A.	Closest equivalent
Competitive URL (delete row for presentation usage)	-	-	https://www.antenova.com/product/2-4ghz-zenon-non-de-tuning-antenna/
Frequency range (GHz)	2.4-2.485	**2.4-2.485/5.15-5.85**	2.4
Return loss (dB)	<-6	<-9	< -8
Efficiency	**>60%**	**>60% @ 2.4 GHz** **>65% @ 5GHz**	>50% @2.4 GHz
Peak gain (dBi)	<3.7 @2.4GHz	<3.6 @2.4GHz < 6.2 @5GHz	3.3
Form factor (mm)	20.20 by 20.20 by 3.50		23.00 by 16.00 by 1.60

*Information gathered from the world wide web at the time of this product launch

Competitive Analysis*

	Product and Technical Differences				
Attribute	Molex | 2.4, 5, 6GHz Wi-Fi Flexible Antenna, 15.00 by 6.00mm, Monopole, Side-fed (Series 206994)			Taoglas | FXP840 Freedom Series Super Small Monopole Dual-band 2.4 GHz and 4.9 to 6 GHz Antenna (Part No. FXP840.07.0055B)	
Closest Equivalent or Drop-In Replacement	N.A.			Closest Equivalent	
Competitive URL	www.molex.com/link/standard_antennas.html			https://www.taoglas.com/wp-content/uploads/2016/01/FXP840.07.0055B.pdf	
Operating Frequency	2.4 to 2.5 GHz 5.15 to 5.85 GHz			2.4 and 4.9 to 6 GHz	
Dimensions (mm)	15.00 by 6.00			14.00 by 5.00	
Peak Gain (dBi)	2.4 to 2.5 GHz	5.15 to 5.85 GHz	5.925 to 7.125GHz	2.41 to 2.49 GHz	4.90 to 6.00 GHz
	4.0	3.6	2.7	2.0	2.5
Total Radiation Efficiency	>55%	>70%	>40%	40	53
Return Loss	-10	-5.0	-3.0	-10	-7.0
Cable Length (mm)	100			55	
Operating Temperature	-30 to +85°C			-40 to +85°C	

*Information gathered from the world wide web at the time of this product launch

Competitive Analysis*

	Product and Technical Differences		
Attribute	Molex | 2.4, 5, 6 GHz Wi-Fi Flexible Antenna, Fully Balanced, Dipole-style, Side-fed (Series 204281)	Taoglas | Freedom Series Super Small Monopole Dual-band 2.4 GHz and 4.9 to 6GHz Antenna (Part No. FXP840.07.0055B)	PulseLarsen | Internal FPC Dual-Band Wi-Fi (Part No. W3315B0100)
Closest Equivalent or Drop-In Replacement	N.A.	Drop-in-replacement	Drop-in-replacement
Competitive URL	www.molex.com/link/standard_antennas.html	https://www.taoglas.com/wp-content/uploads/2016/01/FXP840.07.0055B.pdf	http://productfinder.pulseeng.com/products/datasheets/W3315BXXXX.pdf
Dimensions (mm)	35.00 by 11.00 by 0.10	14 by 5 by 0.1	
Peak Gain	1.9 dBi at 2.4 GHz 5.8 dBi at 5.8 GHz 4.6 dBi at 6 GHz	2.5dBi at 2.4 GHz and 5.8 GHz	(2±1)dBi at 2.4 GHz (5±1)dBi at 5.8 GHz
Radiation Efficiencies	>65 % at 2.4 GHz >70 % at 5.8 GHz >50 % at 6 GHz	40% at 2.4 GHz 53% at 5.8 GHz	70% average
Return Loss	<-10 dB at 2.4 GHz <-10 dB at 5.8 GHz <-5 dB at 6 GHz	-10 at 2.4 GHz; -7.0 at 5.8 GHz	No published data
Cable Length options	6 (50 to 300mm) for 1.13mm diameter micro-coaxial cables	1 (55mm) with 0.81mm diameter micro-coaxial cable	3 (65, 100, 200) for selected 1.13 and 0.81mm diameter micro-coaxial cables

*Information gathered from the world wide web at the time of this product launch

Competitive Analysis*

	Product and Technical Differences	
Attribute	Molex | 2.4, 5, 6 GHz Wi-Fi Flexible Antenna, Fully Balanced, Dipole-style, Center-fed (Series 146153)	Taoglas | FXP830 Freedom Wi-Fi 2.4, 5 GHz Dipole Antenna (Part No. FXP830.24.0100B and FXP830.07.0100C)
Closest Equivalent or Drop-In Replacement	N.A.	Drop-in-replacement
Competitive URL	www.molex.com/link/standard_antennas.html	http://taoglas.com/images/product_images/original_images/FXP830.24.0100B.pdf https://taoglas.com/images/product_images/original_images/FXP830.07.0100C.pdf
Dimensions (mm)	34.90 by 9.00 by 0.10	42.00 by 7.00
Peak Gain (range for 6 cable lengths)	3.0/4.0/5.5 dBi at 2.4/5.8/6 GHz on PC/ABS housing through OTA chamber	1.8/3.6dBi (2.4, 5 GHz) (free space) 2.6/5dBi (2.4, 5 GHz) (on 1mm thick plastic)
Radiation Efficiencies	>75%/>75%/>70% at 2.4/5/6 GHz	50/86% (free space); 50/84% (on plastic)
Return Loss	<-10 dB at 2.4/5.8/6 GHz	<-10 dB
Cable Length options	6 (50 to 300mm) for 1.13mm diameter micro-coaxial cables	FXP830.24.0100B: 100mm 0.81mm dia. co-axial FXP830.07.0100C: 100mm 1.37mm dia. co-axial
Cable Connector	IPEX MHF1 connector (U.FL Compatible) are used for standard parts; other micro-coaxial cable and connector types are configurable upon request	FXP830.24.0100B: IPEX MHF4 Connector (HSC compatible) FXP830.07.0100C: IPEX MHF1 Connector (U.FL Compatible)

*Information gathered from the world wide web at the time of this product launch

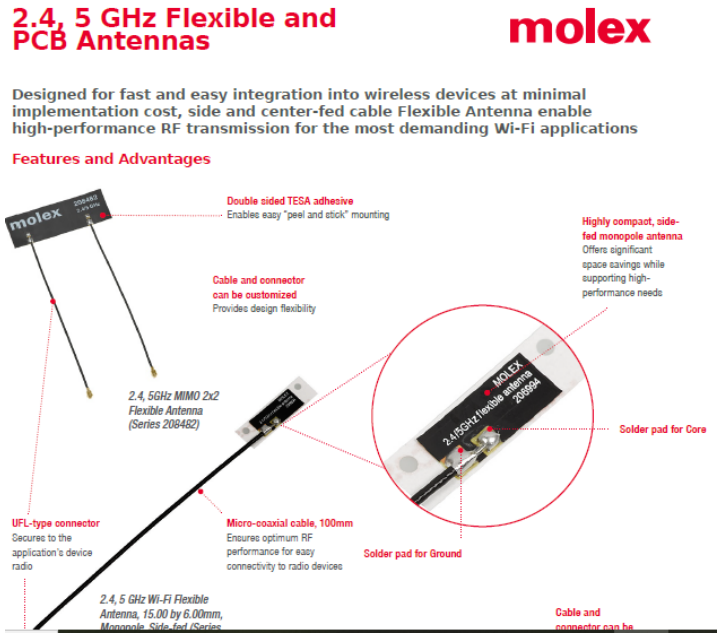
Competitive Analysis*

	Product and Technical Differences	
Attribute	Molex | 2.4, 5, 6 GHz Wi-Fi PCB Antenna, Fully Balanced, Dipole-style, Center-fed (Series 146187)	Taoglas | TheStripe PCB Dual-band 2.4, 5.2 GHz antenna (Part No. PC11.07.0100A)
Closest Equivalent or Drop-In Replacement	N.A.	Drop-in-replacement
Competitive URL	www.molex.com/link/standard_antennas.html	http://www.taoglas.com/wp-content/uploads/2015/06/PC11.07.0100A.pdf
Dimensions (mm)	40.95 by 9.00 by 0.70mm	66.0 by 16.0 by 0.8
Peak Gain (range for 6 cable lengths)	3.0/4.0/4.3 dBi at 2.4/5.8/6 GHz on PC/ABS housing through OTA chamber	3dBi (2.4, 5 GHz) (free space) 4.5dBi (2.4, 5 GHz) (on 1mm thick plastic)
Radiation Efficiencies	>75%/ >75% / >70% at 2.4/5.8/6 GHz with 100mm Cable	85% (free space); 88% (on plastic) for 100mm cable
Return Loss	<-10dB/<-10dB/<-5dB at 2.4/5.8/6 GHz (all cable lengths)	<-10dB
Cable Length options	6 (50 to 300mm) for 1.13mm diameter micro-coaxial cables	Black 100mm 1.13mm diameter co-axial cable
Cable Connector	IPEX MHF1 connector (U.FL Compatible) are used for standard parts; other micro-coaxial cable and connector types are configurable upon request	IPEX MHF Connector (U.FL compatible)

*Information gathered from the world wide web at the time of this product launch

Further Information

Datasheet



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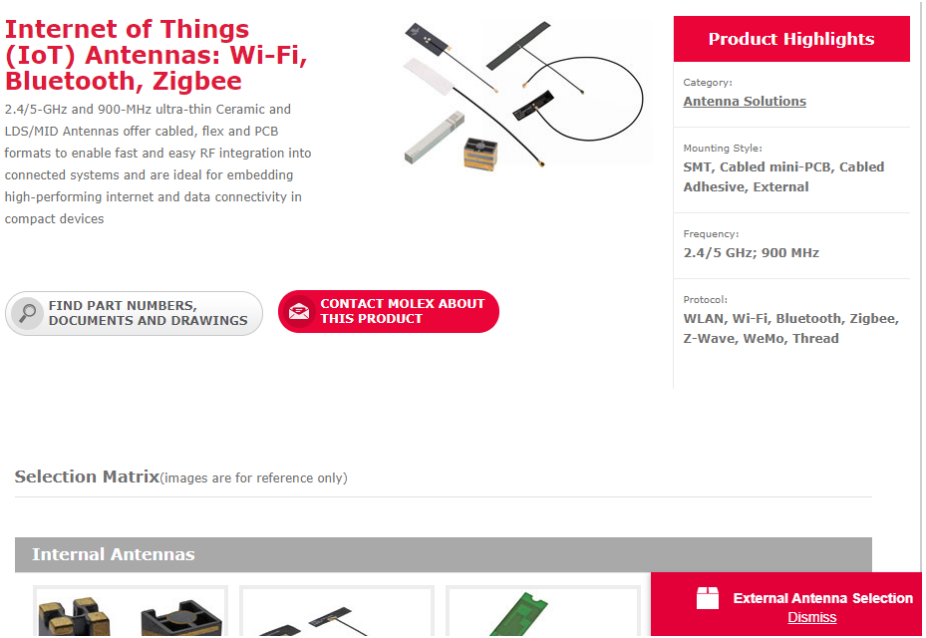
Overview



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