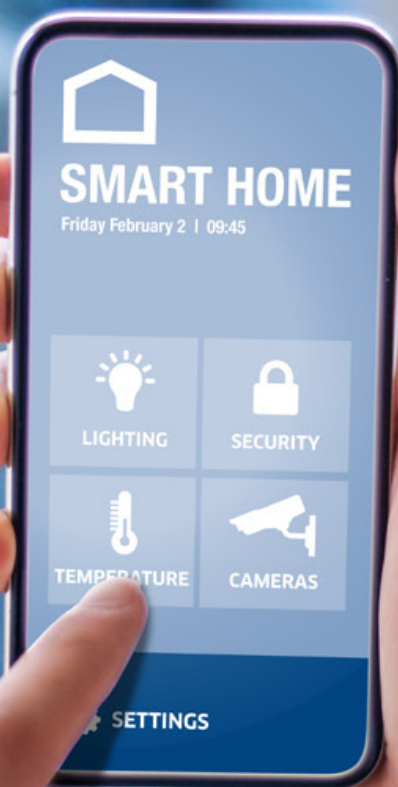


**molex**

**AVNET<sup>®</sup> ABACUS**



Molex  
antenna portfolio

# Molex antennas for the Smart Home

Intelligent and integrated smart home systems are bringing next generation connected devices into multiple consumer markets. Avnet Abacus offers an extensive portfolio of high performance Molex antennas for use across a broad spectrum of wireless applications in the Smart Home, as well as for industrial, medical and automotive markets. Molex incorporates the latest innovative technology into its antenna portfolio which includes Bluetooth/Wi-Fi, GNSS, Combo, Cellular and NFC.

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## FURTHER RESOURCES

Learn how to bring the future home with Molex and view the on-demand webinar 'Antenna design considerations for a Smart Home' by visiting [avnet-abacus.eu/molex](https://avnet-abacus.eu/molex)

# Bluetooth/Wi-Fi antennas

## 2.4, 5GHZ FLEXIBLE AND PCB ANTENNAS

SERIES	146153	146187	204281	208482	211996	212330	206994	206995
Key features	Balanced RF transmission, multiple cable lengths, centre-fed/side-fed cables, 1 or 2 ports				Designed for V2X/DSRC communication	Balanced RF transmission, multiple cable lengths, centre-fed/side-fed cables, 1 or 2 or 4 ports	Smallest flexible antenna	Direct mounting on metal surface
Size (mm)	34.9 x 9	40.95 x 9	35 x 11	40.4 x 15.4 x 0.1	16.4 x 7.6 x 0.16	70.00 x 20.00	15 x 6	20.5 x 20.5 x 30
Material	Flexible	PCB	Flexible	Flexible	Flexible	Flexible	Flexible	PCB
Frequency range (GHz)	2.4 to 2.5 5.15 to 5.85	2.4 to 2.5 5.15 to 5.85	2.4 to 2.5 5.15 to 5.85	2.4 to 2.5 5.15 to 5.85	5.85 to 5.925	2.4 to 2.5, 5.15 to 5.85	2.4 to 2.5 5.15 to 5.85	2.4 to 2.5 5.15 to 5.85
Return loss (dB)	-10	-10	< -10	< -8/< -13	< -10	≤-10	-10	< -8.5/< -10
Peak gain (dBi)	3/4	3.2/4.5	2/3.3	Port 1: 2.9/5 Port 2: 3.4/5.9	5.75	Port1:2.4 / 3.3, Port2: 2.6/2.3, Port 3: 3.0/3.4, Port4: 3.5/3.9	3.6	2.6/3.4
Total radiation efficiency	>75%	>80%/>75%	>65%/>68%	Port 1: 65%/75% Port 2: 75%/70%	>79%	Port1: 55%/70%, Port2: 55%/60%, Port3: 50%/70%, Port4: 55%/65%	>55%/>70%	>55%/>70%
Product image								

**Note:** Performance values above are based on 100mm cable

Designed for fast and easy integration into wireless devices at minimal implementation cost, side and centre-fed cable flexible antenna enable high-performance RF transmission for the most demanding Wi-Fi applications.

Molex provides extensive experience in antenna technologies from concept to completion. Ready-To-Use RF antennas are compact, high performing and available in multiple form factors for all common antenna protocols and frequencies used in IoT, automotive, industrial and medical applications.

# Bluetooth/Wi-Fi antennas

## 2.4 AND 2.4, 5GHZ SMT ANTENNAS

SERIES	146175	47948	206513	206514	211964
Key Features	Highest performance in the market Lowest weight/size ratio		Lower cost than LDS plastic	Lower cost than LDS plastic	Low profile
Size (mm)	3 x 5 x 4	3 x 3 x 4	3 x 3 x 4	3 x 4 x 4	3.2 x 1.6 x 1.2
Material	LDS-MID	LDS-MID	Ceramic	Ceramic	Ceramic
PCB mounting recommendation	Corner mounting	Corner mounting	Corner mounting	Corner mounting	Centre-edge mounting
Frequency range (GHz)	2.4 to 2.5 5.15 to 5.85	2.4 to 2.5	2.4 to 2.5	2.4 to 2.5 5.15 to 5.85	2.4 to 2.5 5.15 to 5.85
Return loss (dB)	< -6	< -7	< -6	< -8/< -5	Config.1 (2.4GHz): < -6 Config.2 (2.4/5GHz): < -5
Peak gain (dBi)	3.0/4.2	3	3.6	3.5/6.2	Config.1: 2.7 Config.2: 2.1 /2.2
Total radiation efficiency	>70%	>70%	>55%	>75%	Config.1: >80% Config.2: >70%/>65%
Product image					

2.4 and 2.4, 5GHz ceramic and LDS-MID antennas offer outstanding performance and easy integration in connected city and home applications.

# Bluetooth/Wi-Fi antennas

## 2.4 AND 2.4, 5GHZ WI-FI/BLUETOOTH EXTERNAL ANTENNAS

SERIES	214415	212860	214428	214386
Key feature	Single- and dual-band connectors in straight and folded modes with I-PEX, SMA-J and RP-SMA-J mounting options.			
Size (mm)	108.40 x 9.35	108.40 x 9.35	104 x 9.4	104 x 9.4
Material	refer to sales drawing			
Frequency range (GHz)	2.4	2.4/5.0	2.4	2.4/5.0
Return loss (dB)	< -10	< -10	< -8	< -10
Peak gain (dBi)	5.3	5.3/4.5	3.1	5.2/3.3
Impedance (Ohms)	50	50	50	50
Total radiation efficiency	>80%	>80%/>75%	>75%	>80%/>65%
Operating temperature	-40°C to +85°C	-40°C to +85°C	-40°C to +85°C	-40°C to +85°C
Product image				

Off-the-shelf 2.4, 5GHz Wi-Fi/Bluetooth external antennas, available in various configurations, offer high RF performance and reliability for wireless and networking applications

# GNSS antennas





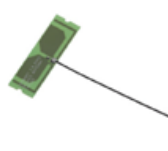
## CERAMIC GNSS ANTENNAS

SERIES	211624	212203	213602	206640	208890	146168	204286
Key features	Stacked ceramic patch for high precision navigation		Stacked ceramic patch for high precision navigation	Active patch with cable, two stage LNA	Ceramic patch, single feed pin, customized length options		
Frequency range (MHz)	L5: 1176.45/ L1: 1575.42/ GLONASS: 1602	L5: 1176.45/L1: 1575.42	L2: 1227.6/ L1: 1575.42	1561/1575/ 1602	1575	1575	1561/1575/ 1602
Size (mm)	36 x 36 x 7	25 x 25 x 8	36 x 36 x 7	25 x 25 x 6.5	18 x 18 x 2	25 x 25 x 4	25 x 25 x 4
Polarisation	RHCP	RHCP	RHCP	RHCP	RHCP	RHCP	Elliptic
Axial ratio	N.A.	N.A.	N.A.	N.A.	<2	<3	<13.0/<7/<12
Total radiation efficiency	>74%/>74%/ >75%	>65%/>75%	>50% / >80%	N.A.	>45%	>75%	>70%/>70%/ 75%
Product image							

Eliminating space and PCB real-estate constraints, ceramic GPS antennas combine ease of integration with reduced cost of implementation over a variety of wireless navigation device applications.


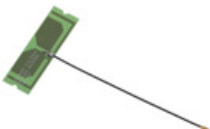


# GNSS antennas

## VARIOUS GNSS ANTENNAS

SERIES	146216	146235	206560	146186	146220
Key features	LDS plastic material, superior performance, and small form factor		Flexible with cable, multiple length options	Multiple bands in one antenna, small form, high performance	
Frequency range (MHz)	1561/1575/1602	1561/1575/1602	1561/1575/1602	1575/1602 and 2.4/5/3 to 6GHz	1575/1602 and 2.4/5/3 to 6GHz
Size (mm)	11.8 x 11.55 x 6	3 x 5 x 4	40.4 x 15.4	53 x 18	53.5 x 16.6
Polarisation	RHCP	Elliptic	Linear	Linear	Linear
Axial Ratio	<3.0	<6.0	N.A.	N.A.	N.A.
Total radiation efficiency	>55%/>57%/60%	>50%/>55%/50%	>74%/>74%/>75%	>70%/>75%/>70%/>80%	>82%/>80%/>83%/>78%
Product image					

Eliminating space and PCB real-estate constraints, LDS-MID and Flexi GPS antennas combine ease of integration with reduced cost of implementation over a variety of wireless navigation device applications.

# Combo antennas (Wi-Fi, GPS, ISM and cellular)

SERIES	146186	146220	201932	213353
Name	GPS/Wi-Fi combo balanced flexible antenna	GPS/Wi-Fi combo balanced pcb antenna	2.4/5GHz & 900 MHz triple band antenna	LTE/GPS combo flexible antenna
Size (mm)	53 x 18	53.5 x 16.6	20 x 5 x 4	120 x 20
Material	Flexible	PCB	Ceramic	Flexible
Antenna type	Dipole-type, balanced	Dipole-type, balanced	IFA	Cellular dipoles, GNSS monopole
PCB clearance	N.A.	N.A	30mm x 6mm	N.A.
Cable length (mm)	50, 100, 150, 200, 250, 300	50, 100, 150, 200, 250, 300	N.A.	100, 150, 200
Frequency range	1.575 to 1.602GHz 2.4 to 2.5GHz 5.15 to 5.85GHz 3 to 6GHz	1.575 to 1.602GHz 2.4 to 2.5GHz 5.15 to 5.85GHz 3GHz to 6GHz	900 to 924MHz 2.4 to 2.5GHz 5.15 to 5.85GHz	1400 to 1500MHz 1500 to 2700MHz 1700 to 2700MHz 3300 to 4200MHz 4400 to 5000MHz 5900 - 8500MHz 1561/1575/1605MHz bands
Return loss (dB)	<-10	<- 8	<- 5 <- 6 <- 5	<- 5
Peak gain (dBi)	3 3 4 4.7	2.4 2.9 3.8 3.5	0.7 4.2 4.5	2.3 2.3 5.4 5.4 4.5 7.0 1.9/2.1/2.4
Total radiation efficiency	>70% >75% >70% >80%	>82% >80% >83% >78%	>40% >65% >55%	>60% >45%/>50%/>50%
Polarisation	Linear	Linear	Linear	Linear
Input impedance	50ohms	50ohms	50ohms	50ohms
Product image				

**Note:** Performance values above are based on 100mm cable



# Cellular antennas

## CELLULAR FLEXIBLE ANTENNAS


SERIES	207235	146185	105263	209142	146234	207901	212570
Key features	Small size	Balanced antenna with high performance		Small size, side-fed cable	Balanced antenna with high performance		Small size, side-fed cable
Size (mm)	40.4 x 15.4 x 0.1	84 x 15	106.6 x 13	85 x 14.5 x 0.1	120 x 120	147 x 25 x 0.16	40.40 x 15.40
Material	Flexible	Flexible	Flexible	Flexible	Flexible	Flexible	Flexible
Frequency range	824 to 960 MHz /1.7 to 2.17 GHz	824 to 960 MHz /1.71 to 2.7 GHz	824 to 960 MHz /1.71 to 2.7 GHz	698 to 960 MHz/1.5 to 3 GHz/3 to 6 GHz	698 to 960 MHz/1.5 to 2.7 GHz/2.7 to 6 GHz	600 to 960 MHz/1.5 to 3 GHz/3 to 6 GHz	824 to 960 MHz 1.7 to 2.17 GHz
Return loss (dB)	< -4/< -6	< -4	< -6	< -10/< -5/< -5	< -4/< -5/< -5	< -3/< -5/< -5	< -4/< -3
Peak gain (dBi)	0/4.3	1.4/3.0	2.3/3.1	1.2/5.2/2.7	1.7/2.65/4.8	2.6/4.9/5.4	-0.45/1.76
Total radiation efficiency	30%/60%	>60%/>65%	>66%/>60%	>45%/>55%/>55%	>69%/>68%/>67%	>70%/>65%/>70%	>25%/>50%
Product image							

**Note:** Performance values above are based on 100mm cable

Molex provides best-in-class compact, high-gain 3G and 4G/LTE cellular antennas for connected smart devices and today's high-performance LTE networks

# Cellular antennas

## LTE/5G CELLULAR EXTERNAL ANTENNAS

SERIES	213523	214429
Key features	High efficiency and peak gain for all major cellular bands	
Size mm	171.5 x 19.4 (straight), 151.00 x 19.4 (folded)	171.5 x 19.4 (straight), 151.00 x 19.4 (folded)
Frequency range	698MHz-960MHz, 1.71GHz-2.69GHz	698-960MHz, 1.71-2.69GHz, 3.3-4.2GHz, 4.4-5GHz
Return loss (dB)	< -5, < -10	< -5, < -10, < -5, < -5
Peak gain (dBi)	1.6, 5.5	1.6, 5.5, 3.6, 3.5
Impedance (Ohms)	50	50
Total radiation efficiency	>55%, >70%	>55%, >70%, >60%, >55%
Operating temperature	-40°C to +85°C	-40°C to +85°C
Product image		

Off-the-shelf LTE/5G antennas, designed for 2G/3G/4G/5G modules and devices, offer superior coverage and reliability with high efficiency and peak gain, making them ideal for various wireless and networking applications

# Cellular antennas


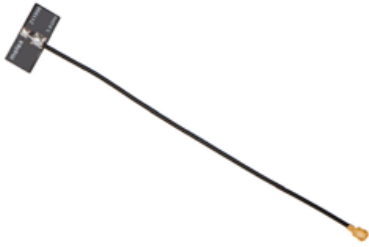
## CELLULAR CERAMIC SMT ANTENNAS

SERIES	204774	206649	206760	146200	208485
Key features	Small size, low profile	Tiny size, specifically designed for NB-IoT	Low profile, high performance	MIMO pair -0001 and -0011	Low profile, ultra wide band
Size (mm)	33 x 6 x 3	20 x 10 x 1.20	38 x 8 x 3	40 x 5 x 5	38 x 8 x 3
Frequency range	790 to 960 MHz / 1.71 to 2.17 GHz	698 to 869/791 to 862/824 to 960 / 698 to 960 MHz	698 to 960 MHz /1.7 to 2.7 GHz	698 to 960 MHz /1.71 to 2.7 GHz	617 to 894/1.71 to 2.69 GHz 3.3 to 3.8 GHz
Return loss (dB)	< -6	< -4 / < -6 / < -7 / < -5	< -5	< -5	< -6 / < -4 / < -4
Peak gain (dBi)	0.6/4.8	0.5/0.8/1.1/0.9	1.3/4.4	1.1/4.5	1.6/4.7/3.6
Total radiation efficiency	>50% / >70%	>50% / >50% / >55% / >55%	>60% / >70%	>60% / >70%	>70% / >65% / >65%
Product image					

**Note:** Performance values above are based on 100mm cable

Molex provides best-in-class compact, high-gain 3G and 4G/LTE cellular antennas for connected smart devices and today's high-performance LTE networks

# Ultra wide band (UWB) antennas

SERIES	146184	211996
Name	Ultra wide band PCB antenna	
Size (mm)	47 x 17.6	16.4 x 7.6
Material	PCB	PCB
Antenna type	Dipole, balanced	Dipole, balanced
Cable length (mm)	50, 100, 150, 200, 250, 300	50, 100, 150, 200, 250, 300
Frequency range (GHz)	3 to 6	5.8 to 8.5
Return loss (dB)	<-6	<-10
Total radiation efficiency	70%	>70%
Peak gain (dBi)	4.5	<6.4
Polarisation	Linear	Linear
Input impedance (ohms)	50	50
Product image		

# Industrial, scientific and medical (ISM) antennas

SERIES	FLEXIBLE ANTENNAS				SMT ANTENNA
	105262	206764	211140	204287	208142
Key features	Balanced, multiple cable length options	Dipole-type, balanced, multiple cable length options	Small size	Dipole-type, balanced, multiple cable length options	Small footprint, low profile
Frequency range (MHz)	863 to 928	863 to 928	863 to 928	433	868 or 915 (by different matching)
Size (mm)	79 x 10	87.40 x 12.40	38 x 10 x 0.10	90 x 40	9 x 3 x 0.63
Return loss (dB)	< -6	< -9	< -5	< -10	< -10/< -5
Peak gain (dBi)	0.4/1.4	1.2	0.3/1.0	0.7	1.5/1.8
Total radiation efficiency	50%/>66%	>70%	>55%/>60%	>55%	70%/65%
Product image					


**Note:** Performance values above are based on 100mm cable



ISM standalone antennas combine high RF performance with ease of integration over 433, 868 and 915MHz bands for advanced industrial, scientific and medical devices.

# Near field communication (NFC) antennas

SERIES	146236		
Name	NFC antenna without ferrite	NFC antenna with ferrite	NFC antenna with ferrite and cable
Sizes (mm)	15 x 15 23 x 27 34 x 46 45 x 55		
Material	FPC	FPC + ferrite	FPC + ferrite + cable
Antenna type	Near field coupling		
Frequency range	13.56 MHz		
Inductor @ 13.56MHz	2.11μH 2.09μH 2.76μH 2.59μH	3.32μH 3.22μH 4.25μH 3.92μH	2.4μH 3.3μH 4.2μH 4.1μH
Product image			

# External antennas

	LTE/GPS 2-IN-1 EXTERNAL ANTENNAS		
SERIES	213500		
Key features	High-performance GPS and a cellular antenna, designed for reliable asset tracking and remote monitoring applications		
Size (mm)	75 by 14.9		
Frequency range (MHz)	824 to 960	1710 to 2690	1575.42
Return loss (dB)	< -5	< -5	<1.5
Peak gain (dB)	0.77	3.73	0.77
Total radiation efficiency	>55%	>60%	>40%
RF power (Watt)	2		N.A.
Impedance (Ohms)	50		
Operating temperature (°C)	-40 to +85		
Product image			

	COMBO EXTERNAL ANTENNAS (4G/WI-FI/GPS)	
SERIES	206866	211297
Key features	Fully balanced, IP66-rated antenna offers high 4G, Wi-Fi and GPS signal performance in telematics, remote monitoring and other applications	
Size (mm)	77 x 15 x 3000	
Frequency range	<b>GPS:</b> 1575.42 ± 1.023 MHz <b>4G:</b> 824 to 960 MHz, 1.71 to 2.60 GHz <b>Wi-Fi:</b> 2.4 to 2.5 GHz"	<b>GPS:</b> 1561.098±2.046 MHz 1575.42 ± 1.023 MHz <b>4G:</b> 824 to 960 MHz 1.71 to 2.60 GHz
Peak gain (dBi)	3dB, -0.5 dBi type (824 to 960 MHz), 0 dBi type (1.71 to 2.60 GHz), -2.7 dBi"	-2.1dBi, -0.8dBi type (824 to 960 MHz), 0.4 dBi type (1.71 to 2.60 GHz)
Average total radiation efficiency	26%, 21.6% (824 to 960MHz)27.2% (1.71 to 2.60GHz), 23.3%	
Impedance (Ohms)	50	
Size (mm)	77 x 15 x 3000 (dxhxl)	
Product image		

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