

ANTENNAS



Pulse's wide array of antenna selections provide solutions to GSM, CDMA, WCDMA, WiMax, WiFi™, GPS, ZigBee™, Bluetooth®, UWB, ISM, DVB-H, MediaFLO™, DMB-S, Satellite Radios, DECT and other custom applications. Please pick from the charts at <http://www.pulseeng.com/antennas>. Click on the part number to access the corresponding data sheet.

Contact Pulse for additional information on products not covered in this catalog.

ANTENNAS FOR MOBILE PHONES



Solutions for Mobile Phone Antennas

Pulse's customized antennas for mobile phones are based on a thorough knowledge of the design of modern handsets, the antenna requirements, and the challenges of devices functioning in multiradio environments.

Pulse has extensive experience in main antenna design and utilizes technologies such as sheet metals, flex radiators and ceramic solutions. Pulse products offer optimal and well-proven solutions for each application and form factor.

The product range for mobile phones includes main and complementary antennas and integrated antenna modules.

ANTENNAS FOR WIRELESS DEVICES



Antennas for Wireless Access Point

Pulse's new line of wireless access point antennas offers flexible and economical solutions for wireless device OEMs. These antennas offer superior transmission and reception between wireless access points. They are compatible with IEEE 802.11a/b/g/n, Bluetooth and ZigBee applications, as well as other products that utilize ISM frequency bands. All wireless access point antennas are RoHS compliant. For high-volume orders, Pulse can custom design antennas for OEMs. This includes alternative frequencies and a variety of cables/connectors for antenna assemblies. Pulse also manufactures build-to-print internal antennas that feature a variety of stamped metal and PCB configurations.

Single-Band ^{1, 2}				
Part Number	Frequency	Max Gain (dBi)	Mechanical Length ³	Application/Standard
W1063	900MHz	3.0	6.65/169	ISM 900MHz
W1010 ⁴	2.4GHz	2.0	3.3/83	802.11b/g/n, Bluetooth, ZigBee
W1030	2.4 GHz	2.0	3.25/82.5	802.11b/g/n, Bluetooth, ZigBee
W1034	2.4 GHz	2.0	4.21/107	802.11b/g/n, Bluetooth, ZigBee
W1037	2.4 GHz	3.2	6.65/169	802.11b/g/n, Bluetooth, ZigBee
W1038	2.4 GHz	4.9	6.65/169	802.11b/g/n, Bluetooth, ZigBee
W1027	2.4 GHz	3.2	4.88/124	802.11b/g/n, Bluetooth, ZigBee
SB24003	2.4 GHz	2.14	2.5/132	802.11b/g/n, Bluetooth, ZigBee
SPDA242400	2.4 GHz	—	6/152	802.11b/g/n, Bluetooth, ZigBee
SPDP242400	2.4 GHz	—	6.75/171	802.11b/g/n, Bluetooth, ZigBee

1. Antennas come standard with R-SMA male connectors, unless otherwise specified.

2. These part numbers are lead-free and RoHS compliant. No additional suffix or identifier is required.

3. Inches/millimeters

4. SMA male connector

Dual-Band ^{1, 2}				
Part Number	Frequency (GHz)	Max Gain (dBi)	Mechanical Length	Application/Standard
W1043	2.4 & 5.0	2.0	4.59/117	802.11a/b/g/n, Bluetooth, ZigBee
W1045	2.4 & 5.0	2.0	4.13/105	802.11a/b/g/n, Bluetooth, ZigBee
W1028	5.15 & 5.85	2.0	4.88/124	802.11a/b/g/n, ISM 5.8GHz
R380.500.314	2.4 & 4.9 & 5.8	1.6/5	7.15/1822	ISM 5.8 GHz, Public Safety, 4.9 GHz, 802.11b/g/n, Bluetooth, ZigBee

1. Antennas come standard with R-SMA male connectors, unless otherwise specified.

2. These part numbers are lead-free and RoHS compliant. No additional suffix or identifier is required.

3. Inches/millimeters

*Antennas for Wireless Access Point continued on next page →

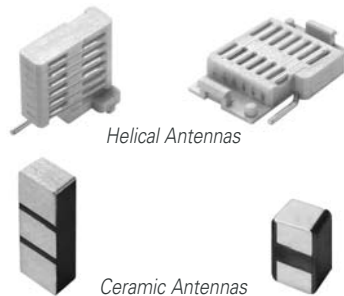
ANTENNAS FOR WIRELESS DEVICES (continued)

Antennas for Wireless Access Point (continued)

Cable Assembly ¹				
Part Number	VSWR 2.4 GHz/6 GHz	Insertion Loss 2.4 GHz/6 GHz	Cable Length ²	Connector Types
W9003	1.2/1.3	0.4dB/0.8 dB	3/76	R-SMA Female to I-PEX
W9006M	1.1/1.3	0.6dB/1.1 dB	6/150	SMA Female to I-PEX
W9009	1.2/1.4	0.8dB/1.4 dB	9/229	R-SMA Female to I-PEX
W9011M	1.2/1.2	0.9dB/1.8 dB	11/280	SMA Female to I-PEX
W9063B170	1.1/1.9	1.3dB/2.4 dB	17/431	I-PEX to R-TNC Female

1. **These** part numbers are lead-free and RoHS compliant. No additional suffix or identifier is required.

2. **Inches/millimeters**



Helical Antennas

Ceramic Antennas

Single-Band Antenna with I-PEX Cable Assembly ^{1, 2}				
Part Number ⁴	Frequency	Mechanical Length ³	Cable Length ³	Application Standard
W1049B030	2.4GHz	3.25/82.5	3/76	802.11b/g/n, Bluetooth, ZigBee
W1049B050	2.4GHz	3.25/82.5	5/127	802.11b/g/n, Bluetooth, ZigBee
W1049B070	2.4GHz	3.25/82.5	7/178	802.11b/g/n, Bluetooth, ZigBee
W1049B090	2.4GHz	3.25/82.5	9/229	802.11b/g/n, Bluetooth, ZigBee
W1049B120	2.4GHz	3.25/82.5	12/305	802.11b/g/n, Bluetooth, ZigBee

1. **Antennas** DO NOT come with bushing holders. Order separately if required. Part Number: P4208-02A202

2. **These** part numbers are lead-free and RoHS compliant. No additional suffix or identifier is required.

3. **Inches/millimeters**

4. **Max Gain** (2 dBi)

Internal and Surface Mount Antenna Solutions

Pulse offers a wide range of standardized internal and surface mount antennas (SMD) for wireless device applications. Pulse's ceramic technology results in robust antenna designs that have outstanding performance. These antennas have an inherent immunity to surrounding antenna signals and hand-effect, making them exceptionally suitable solutions for small hand-held devices with multiple antennas. Pulse's helical antenna technology provides high-performance antennas in a small package that can be easily deployed. These ceramic and helical antennas require minimal ground plane removal for operation, which means saved board space and economical implementation. The SMD compatibility of Pulse's antenna products makes them simple and easy to mount.

Surface Mount Antennas for Wireless Devices ^{1, 2}

Application/ Part Number	Antenna Size ⁴	Mount Type ³ (mm)	Frequency Range (MHz)	RHCP Gain ⁵ (dBi)	Max Gain (dBi)	Efficiency (%/dB)	Return Loss (dB MIN)
WLAN Dualband Ceramic W3006	10.0x3.2x1.5	SMD, GC area 11.60x6.00	2400-2483.5 5150-5850	—	3,2 (peak) 2,7 (band edges) 4,2 (peak) 3,0 (band edges)	70/-1,55 (peak) 65/-1,85 (band edges) 80/-0,95 (peak) 70/-1,55 (band edges)	-8 -10
Bluetooth Ceramic W3008	3.2x1.6x1.1	SMD, GC area 4.00x4.25	2400-2483.5	—	1,7 (peak) 0,7 (band edges)	70/-1,6 (peak) 55/-2,6 (band edges)	-8
Bluetooth/ WLAN/WiFi Ceramic W3008c	3.2x1.6x1.1	SMD, GC area 4.00x6.25	2400-2483.5	—	2,2 (peak) 1,9 (band edges)	75/-1,3 (peak) 70/-1,6 (band edges)	-11
GPS Ceramic W3010	10.0x3.2x2.0	SMD, GC area 10.80x6.25	1575.42 ±10	-0,2 (peak) -0,7 (band edges)	2,8 (peak) 2,3 (band edges)	75/-1,25 (peak) 70/-1,55 (band edges)	-18
Satellite Radio Ceramic W3017	3.2x1.6x1.1	SMD, GC area 4.00x4.25	2320-2345	-0,1 (peak) -0,6 (band edges)	2,7 (peak) 2,4 (band edges)	80/-1,0 (peak) 75/-1,2 (band edges)	-12
DMB-S Ceramic W3018	3.2x1.6x1.1	SMD, GC area 4.00x4.25	2605-2655	—	3 (peak) 2,5 (band edges)	85/-0,7 (peak) 80/-1 (band edges)	-10
WiMAX Ceramic W3020	3.2x1.6x1.1	SMD, GC area 4.00x6.25	2500-2690	—	2,8 (peak) 1 (band edges)	80/-1 (peak) 60/-2,25 (band edges)	-5.5

1. **All** antennas are RoHS Compliant

2. **Impedance** 50 Ω, operating temperature -40°C to +85°C

3. **GC** = Ground Clearance, mm

4. **Millimeters** (mm)

5. — = NA

*Surface Mount Antennas for Wireless Devices" continued on next page →

ANTENNAS FOR WIRELESS DEVICES (continued)

Internal and Surface Mount Antenna Solutions (continued)

Surface Mount Antennas for Wireless Devices ^{1,2} (continued)

Application/ Part Number	Antenna Size ⁴	Mount Type ³ (mm)	Frequency Range (MHz)	RHCP Gain ⁵ (dBic)	Max Gain (dBi)	Efficiency (%/dB)	Return Loss (dB MIN)
MediaFLO Ceramic W3024	10x3.2x4	SMD, GC area 10.60x10.25	716-722	—	2 (peak) 1.5 (band edges)	75/-1.25 (peak) 70/-1.55 (band edges)	-8
1800 RX Diversity Ceramic W3028	10x3.2x2	SMD, GC area 10.60x6.25	1805-1880	—	2.5 (peak) 2 (band edges)	80/-1 (peak) 70/-1.55 (band edges)	-9
1900 RX Diversity Ceramic W3029	10x3.2x2	SMD, GC area 10.60x6.25	1930-1990	—	2 (peak) 1.3 (band edges)	80/-1 (peak) 70/-1.55 (band edges)	-10
2100 RX Diversity Ceramic W3030	10x3.2x2	SMD, GC area 10.60x6.25	2110-2170	—	2 (peak) 1.5 (band edges)	80/-1 (peak) 70/-1.55 (band edges)	-10
850 RX Diversity Ceramic W3031	10x3.2x4	SMD, GC area 10.60x8.25	869-894	—	2.3 (peak) 0.2 (band edges)	75/-1.25 (peak) 45/-3.5 (band edges)	-5.5
900 RX Diversity Ceramic W3032	10x 3.2x4	SMD, GC area 10.60x8.25	925-960	—	2 (peak) 0 (band edges)	65/-1.9 (peak) 45/-3.5 (band edges)	-5
850 RX Diversity Helical Horizontal W3117	12.4x8x2.5	SMD, GC area 8.00x40.00	869-894	—	0 (peak) -1.3 (band edges)	55/-2.6 (peak) 40/-4 (band edges)	-9
850 RX Diversity Helical Vertical W3118	2.5x8x8	SMD, GC area 6.00x11.00	869-894	—	0 (peak) 1.4 (band edges)	52/-2.9 (peak) 38/-4.2 (band edges)	-9
WiFi Helical W3108	5.0x2.5x5.5	SMD, GC area 7.50x5.50	2400-2483.5	—	1.5	50/-3	-8
GPS Helical W3110	5.0x2.5x5.5	SMD, GC area 7.50x5.50	1575.42 ±10	-2.1 (peak) -2.4 (band edges)	1.3 (peak) 0.7 (band edges)	47/-3.3 (peak) 43/-3.7 (band edges)	-16
ISM Helical W3112	2.5x8.0x8.0	SMD, GC area 6.00x11.00	902-928	—	0.9 (peak) -0.3 (band edges)	67/-1.7 (peak) 50/-3 (band edges)	-10
ISM Helical W3113	12.4x8.0x2.5	SMD, GC area 8.00x40.00	902-928	—	0.8 (peak) -0.3 (band edges)	66/-1.8 (peak) 51/-2.9 (band edges)	-10
DVB-H EU Planar W3510	45x6.6x5	Clearance to ground 5 mm	470-750	—	-9 @ 470 -6 @ 750	—	-3
DVB-H EU External W3520	50.5x10.5x3.0	—	470-750	—	-4.5 @ 470 -3.5 @ 750	—	-3
DECT Ceramic W3022	10x3.2x2	SMD, GC area 10.60x7.25	1800-1930	—	2.5 (peak) 2 (band edges)	80/-1 (peak) 70/-1.55 (band edges)	-12
WCDMA Ceramic W3040	10x3.2x2	SMD, GC area 10.60x8.25	1920-2170	—	2.3 (peak) 1.5 (band edges)	80/-1 (peak) 70/-1.55 (band edges)	-10
4-band GSM and W-CDMA 2100 W3530	40x8 x6	—	824-894 880-960 1710-1880 1850-1990 1920-1980 2110-2170	—	—	-1.0 - -2.5 -1.0 - -2.5 -2.0 - -3.5 -2.0 - -3.5 -3.0 - -3.5 -2.5 - -3.5	-6 -6 -6 -6 -6 -6

1. All antennas are RoHS Compliant

2. Impedance 50 Ω, operating temperature -40°C to +85°C

3. GC = Ground Clearance, mm

4. Millimeters (mm)

5. — = NA

ANTENNAS

ANTENNAS FOR WIRELESS DEVICES (continued)

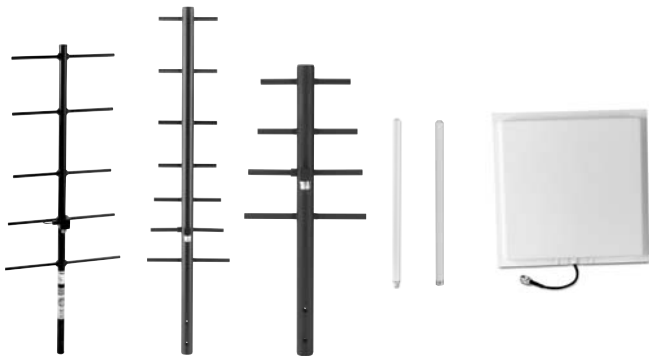
Pulse offers a wide variety of alternative wireless solutions for applications including Machine-to-Machine, Public Safety, Handheld Radios, and Telematics.



Alternative Wireless Solutions

Alternative						
Part Number	Frequency (MHz)	Gain (dBi)	Description	Length (in / mm)	Coax ¹	Connector ¹
R380.500.314	2400-2500/4900-5900	1.6/5	Swivel Mount Dipole	7.15/1822.2	—	RPTNC
SB450FME3	450-470	2.14	Stealth Blade	10/254	3' RG-316	FME
SB8003	806-896	2.14	Stealth Blade	2.5/132	3' RG-174	No Conn
SB9003	890-960	2.14	Stealth Blade	2.5 / 132	3' RG-174	No Conn
SPDA24832	824-894	—	Center Fed Dipole, Articulating Right Angle	9/229	—	SMA
SPDA24918	890-960	—	Center Fed Dipole, Articulating Right Angle	8/203	—	SMA M T2
SPDA241800	1710-1880	—	Center Fed Dipole, Articulating Right Angle	6.5/165	—	SMA M T2
SPDA241900	1850-1990	—	Center Fed Dipole, Articulating Right Angle	6.5/165	—	SMA M T2
SPDA24850/1900	824-894/1850/1990	—	Center Fed Dipole, Articulating Right Angle	7.5/191	—	SMA
SPDP24832	824-894	—	Center Fed Dipole, Straight	8/203	—	SMA M T2
SPDP24918	890-960	—	Center Fed Dipole, Straight	2.75/70	—	SMA M T2
SPDP242400	2400-2500	—	Center Fed Dipole, Straight	3.5/89	—	SMA M T2
SPWB23150	136-174	—	Helical, Standard, ¼ Wave	6.75/171	—	SMA F T3
SPWB23425	380-470	—	Helical, Standard, ¼ Wave	6.5/165	—	SMA F T3
SPWH23832	782-882	—	Whip, Standard, ¼ Wave	3/76	—	SMA F T3
SPWH23918	863-973	—	Whip, Standard, ¼ Wave	3/76	—	SMA F T3
SPHS24832	800-864	—	Helical, Standard, ¼ Wave	3/76	—	SMA F T2

1. UHF and VHF portable/terminal antennas also available.



Infrastructure Solutions

Single-Band Infrastructure Antennas

Part Number	Frequency (MHz)	Gain (dBi)	Description	Length (in / mm)	Coax ¹	Connector ¹
YA3540WN	406-430	9 dBd/ 11	Fully welded five element UHF Yagi	36.25/920.75	—	N Female
YA5900W	890-960	9 dBd/11 dBi	Fully welded seven element Yagi	29.5/749.3	—	N Female
YA6900W	890-960	6 dBd/8 dBi	Fully welded four element Yagi	17.5/444.5	—	N Female
R380.500.220	2400-2500	8	Radome Omni	20.75/527	—	N Female
R380.500.226	2400-2500	8	Radome Omni	20.75/527	—	N Male
R380.200.223	4940 - 4990	10	Radome Omni	16.5/419	—	N Female

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ANTENNAS FOR WIRELESS DEVICES (continued)

Infrastructure Solutions (continued)

Single-Band Infrastructure Antennas						
Part Number	Frequency (MHz)	Gain (dBi)	Description	Length (in / mm)	Coax ¹	Connector ¹
R380.500.227	4940 - 4990	10	Radome Omni	16.5/419	—	N Male
R380.700.212	5725-5875	10	Radome Omni	16.5/419	—	N Male
R380.600.200	5150-5350	10	Radome Omni	16.5/419	—	N Female
R380.600.204	5150-5350	10	Radome Omni	16.5/419	—	N Male
R380.700.205	5725-5875	10	Radome Omni	16.5/419	—	N Female
R380.500.217	2400-2500	14	Planar Array - Vertical Polarization	12/304.8	8" Low-loss SHF-142	N Female
R380.500.218	2400-2500	14	Planar Array - Horizontal Polarization	12/304.8	8" Low-loss SHF-142	N Female
R380.700.203	5725-5825	20	Planar Array - Vertical Polarization	12/304.8	8" Low-loss SHF-142	N Female
R380.700.204	5725-5825	20	Planar Array - Horizontal Polarization	12/304.8	8" Low-loss SHF-142	N Female

1. Variety of Coax available. Order separately.

ANTENNAS FOR AUTOMOTIVE APPLICATIONS

Pulse's antenna product line offers the highest quality, most reliable antennas in the automotive industry. The Pulse antennas combine premium materials with high efficiency designs, that deliver antennas with superior mechanical durability and electrical performance. UV, chemical and impact resistant Makroblend® bases help ensure the highest performance for all your mobile applications. "Traditional-style" mobile antennas are available from 27 MHz to 5.9 GHz, as well as many "multi-band" designs. Whether you need communication interoperability, radio communication, data transmission, increased cellular/PCS coverage or GPS tracking, these antennas are the solution.

Vehicular Mount
Single-Band Solutions

Single-Band ¹						
Part Number	Frequency (MHz)	Gain (dBi)	Description	Length (in / mm)	Coax ²	Connector ³
NMOWB150C	135-174	2	NMO Wide Band ⁴	51.75 / 1314	—	—
NMO450C	450-750	5.6	NMO UHF Field Tunable ⁴	33 / 838	—	—
LP800NMO	806-960	2	NMO Low Profile ⁴	1.25 / 32	—	—
NMOQW900	890-970	2	NMO 1/4 Wave ⁴	3 / 76	—	—
GPSGM	1575.4	5 dBic	GPS Glass Mount	1.7 / 43	RG-174	—
NMO5E2400B	2400-2500	5	NMO Whip ⁴	8.54 / 217	—	—
NMO4E4900B	4900-5350	4	NMO Whip ⁴	4.5 / 114.30	—	—

1. Antennas available in multiple frequencies and mounting options.

2. Variety of coax available. Order separately.

3. Variety of connectors available. Order separately.

4. All NMO antennas require an NMO mount for installation.

ANTENNAS FOR AUTOMOTIVE APPLICATIONS (continued)



Vehicular Mount Multi-Band Solutions

Multi-Band ¹

Part Number	Frequency (MHz)	Gain (dBi)	Description	Length (in/mm)	Coax ²	Connector ³
NMO150/450/800	150-165/450-470/806-940	-7/0/1	NMO Tri Band ⁴	16.5/419	—	—
MMC/P3EFME	824-960/1850-1990	4/4	Dual Band Magnetic Mount	5/127	RG-58 Low Loss Dual Shield	FME
NMOC/P3E	824-960/1850-1990	4/4	Dual Band NMO Mount ⁴	4.7/119	—	—
GPSCPOO	824-960/1710-1990/1575.42	2/2/4.5 dBi	Direct Feed GPS Tri Band	7.6/193	RG-174	TNC/SMA
GPSCWCPPO	824-960/1710-1990/1575.42	2/1.5/4.5 dBi	Roof Mount GPS Tri Band	3.9/99	RG-174	TNC/SMA

1. Antennas available in multiple frequencies and mounting options.

2. Variety of coax available. Order separately.

3. Variety of connectors available. Order separately.

4. All NMO antennas require an NMO mount for installation.



NMO Mounting Kits

NMO Mounting Kits ¹

Part Number	Description	Cable Length (ft/m)	Coax Type	Connector
NMOKHFUD	NMO Low/High Frequency Mount	17/5.18	RG-58/U Dual Shield, Low Loss Cable	NO CONN
NMOKHFUDTHK	NMO Low/High Frequency Thick Mount	17/5.18	RG-58/U Dual Shield, Low Loss Cable	NO CONN
NMOMMRNOCONN	NMO Low/High Frequency Magnetic Mount	12/3.66	RG-58 A/U cable	NO CONN

1. All NMO mounting kits are available with a variety of cables and connectors.