ANTENNAS FOR WIRELESS DEVICES *(continued)*

Antennas for Wireless Access Point *(continued)*

Cable Assembly [1]

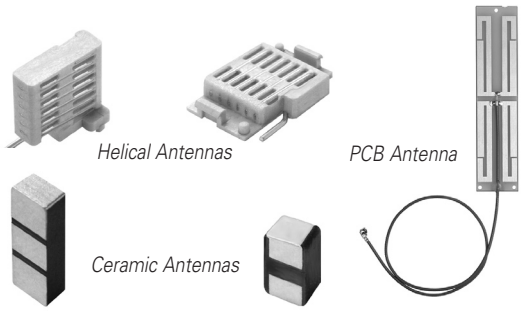
Part Number	VSWR 2.4 GHz/6 GHz	Insertion Loss 2.4 GHz/6 GHz	Cable Length [2]	Connector Types
W9003	1.2/1.3	0.4 dB/0.8 dB	3/76	R-SMA Female to I-PEX
W9006M	1.1/1.3	0.6 dB/1.1 dB	6/150	SMA Female to I-PEX
W9009	1.2/1.4	0.8 dB/1.4 dB	9/229	R-SMA Female to I-PEX
W9011M	1.2/1.2	0.9 dB/1.8 dB	11/280	SMA Female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

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 ceramic technology results in robust antenna designs that have outstanding performance. These antennas have an inherent immunity to surrounding antenna signals and hand-effect, which makes them exceptionally suitable solutions for small hand-held devices with multiple antennas. Pulse 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 Devic es [1, 2]

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)
Zigbee, ISM Monopole Ceramic **W30006 [6]**	7x1.6x1.6	SMD GC 11x6	2400, 868, 1575 and other	—	2.5 (peak)	75/-1.55	-18
Zigbee, ISM Monopole Ceramic **W3001 [6]**	10x3.2x4mm	SMD, GC 10.8x6.25	2400 and other	—	1.5 (peak)	75/-1.25	-6
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 **W3009**	10.0x3.2x4.0	SMD, GC area 10.80x6.25	1575.42 ±10	0.7 (peak) 0.3 (band edges)	3 (peak) 2,5 (band edges)	80/-1,25 (peak) 70/-1,25 (band edges)	-10

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*
6. ***Monopole*** *antenna performance is linked to different tuning circuit recommendations for the variety of applications. Consult the data sheet for more information*

**Table for "SMD 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)
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 (peawk) 70/-1,55 (band edges)	-18
GPS Ceramic **W3011/A**	3.2x1.6x1.1	SMD 4x4.25/6.25	1575.42 ±10	0.85 (peak) 0.5 (band edges)	3.4 (peak) 3.0 (band edges)	85/-0.7 (peak) 80/-1.0 (band edges)	-12
ISM 900 Ceramic **W3012**	10x3.2x4	SMD GC area 10.80x8.25	868-870	—	2 (peak) 0.5 (band edges)	70/- 1.55 (peak) 50/- 3 (band edges)	-6
ISM 900 Monopole Ceramic **W3014 [6]**	10x3.2x1.5	SMD GC area 40x16	868-870	—	1.55 (peak)	45/- 4.5 (peak)	-6
ISM 868 Ceramic **W3013**	10x3.2x4	SMD GC area 10.80x8.25	868-870	—	1.4 (peak) 1.4 (band edges)	65/- 1.9 (peak) 65/- 1.9 (band edges)	-10
ISM 868 Monpole Ceramic **W3016 [6]**	10x3.2x4	"SMD GC 11.5x7	868-870	—	1 (peak)	"45/- 4.5 (peak)	-10
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
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
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
Zigbee, ISM Monopole Ceramic **W3043 [6]**	3.2x1.6x1.1	SMD GC area , 17x20	2400, 1575 and other	—	4 (peak)	70/-1.55 (peak)	-12
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

Table for SMD Antennas for Wireless Devices continued on next page ➔

See table notes 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)
850 RX Diversity Helical Vertical **W3118A**	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 **W3112A**	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
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 & **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

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*
6. ***Monopole*** *antenna performance is linked to different tuning circuit recommendations for the variety of applications. Consult the data sheet for more information*

Printed Circuit Board Antenna Solutions

Part Number [1]	Application/ Standard	Frequency	Mechanical Dimensions (in/mm)	Cable Length (mm) /Connector Type	Gain [2] (dBi)	Efficiency (%/B)
W3501	GSM/GPRS	850/900/1800/1900	0.98 x 3.43 x .008 25 x 87 x 0.2	56/ I-PEX Connector	3.75 to 1.5	50 to 55 %
W3502	GSM/GPRS	850/900/1800/1901	1.69 x 0.67 x 0.02 43 x 17 x 0.5	27.5/ I-PEX Connector	2 to 1	40 to 60 %
W3525Bxxx	WiFi	2.4 GHz	0.42 x 1.88 x .031 10.7 x 47.7 x 0.8	Various cable lenghts/ I-PEX Connector	2	70%
W3513	WiFi	2.4 & 5 GHz	0.63 x 2.76 x 0.04 16 x 70 x 0.9	250/ I-PEXConnector	2	50 to 72 %

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

ANTENNAS

ANTENNAS FOR WIRELESS DEVICES *(continued)*

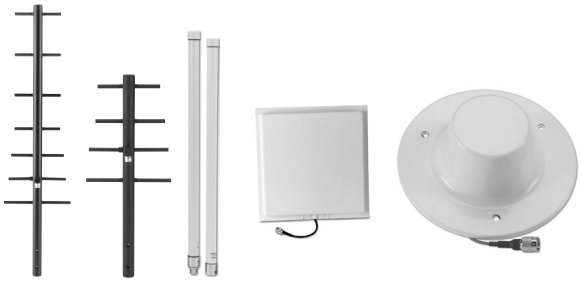
Alternative Wireless Solutions

Pulse offers a wide variety of alternative wireless solutions for applications including machine-to-machine, public safety, hand-held radios, and telematics.

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	7/177.8	—	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
SPDA24850/1900	824-894/1850-1990	—	Center Fed Dipole, Articulating Right Angle	6.75/171	—	SMA
SPWB23150	136-174	—	Wideband	6.75/171	—	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
SPDA17806/2170TNCLAR	806-960/1710-2170	5	Pentaband Swivel Mount Dipole	7.5/190.5	—	TNC Male
W1920G0915	806-960/1710-2170	1.5	Stealth Blade	4.3/110	3' RG-174	SMA Male
W1920G3658	806-960/1710-2170	1.5	Stealth Blade	4.3/110	9' RG-174	SMA Male

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]
YA5900W	890-960	11 dBi	Fully welded seven element Yagi	30/762	—	N Female
YA6900W	890 - 960	8 dBi	Fully welded four element Yagi	17.5/444.5	—	N Female
OC806/2170TNCLAR	806 - 960/1710 - 2170	1.5/2.5	Pentaband Omni Ceiling	7 dia/177 dia	8" RG-405	TNC Male
LP806/2170TNCLAR	806 - 960/1710 - 2170	0/1.5	Pentaband Low Profile	5.75 dia/146 dia	15' LMR-195	TNC Male
RO806/2170TNCWA	806 - 960/1710 - 2170	4/4	Pentaband Radome Omni	16.5/419	—	TNC Male
RO2408NF	2400 - 2500	8	Radome Omni	20/508	—	N Female
RO2408NM	2400 - 2500	8	Radome Omni	20/508	—	N Male
RO4910NF	4940 - 4990	10	Radome Omni	18/457	—	N Female
RO4910NM	4940 - 4990	10	Radome Omni	18/457	—	N Male

1. ***Variety*** *of Coax availble. Order separately.*

** Table for Single-Band Infrastructure Antennas, continued on next page.* ➔

ANTENNAS FOR WIRELESS DEVICES *(continued)*

Infrastructure Solutions *(continued)*

Single-Band Infrastructure Antennas *(continues)*

Part Number	Frequency (MHz)	Gain (dBi)	Description	Length (in/mm)	Coax [1]	Connector [1]
RO4910NF	4940 - 4990	10	Radome Omni	18/457	—	N Female
RO4910NM	4940 - 4990	10	Radome Omni	18/457	—	N Male
RO5810NM	5725 - 5875	10	Radome Omni	16.5/419	—	N Male
RO5210NF	5150 - 5350	10	Radome Omni	16.5v419	—	N Female
RO5210NM	5150 - 5350	10	Radome Omni	16.5/419	—	N Male
RO5810NF	5725 - 5875	10	Radome Omni	16.5/419	—	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	5720-5820	20	Planar Array - Vertical Polarization	12/304.8	8" Low-loss SHF-142	N Female

***1. Variety** of Coax availble. Order separately.*

ANTENNAS FOR AUTOMOTIVE APPLICATIONS

Pulse's antenna product line offers the highest quality, most reliable antennas in the automotive industry. Pulse antennas combine premium materials with high-efficiency designs, delivering 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	51.75 /1314	—	—
NMO450C	450-750	5.6	NMO UHF Field Tunable	33/838	—	—
LP800NMO	806-960	2	NMO Low Profile	1.25/32	—	—
NMOQW900	890-970	2	NMO 1/4 Wave	3/76	—	—
GPSMM	1575.4	5 dBic	GPS Magnetic Mount	1.7/43	RG-174	—
GPSDM	1575.4	5 dBic	GPS Direct Mount	2.5 dia/63.5	RG-174	—
GPSNMO	1575.4	5 dBic	GPS NMO Mount	2.9 dia/73.66	—	—
EF2405NMO	2400-2500	5	NMO Mount Elevated Feed	13/260.4	—	—
EF4905NMO	4900-5000	5	NMO Mount Elevated Feed	10/254	—	—
NMO5E2400B	2400-2500	5	NMO Whip	8.54/ 217	—	—
NMO4E4900B	4900-5350	4	NMO Whip	4.5 /114.30	—	—
W4000D197	1575.4	1.5dBi/26dBi	Glass mount	1.97x1.18/50x30 oval	RG-174	MMCX
W4000G197	1575.4	1.5dBi/26dBi	Glass mount	1.97x1.18/50x30 oval	RG-174	SMA
W4000J197	1575.4	1.5dBi/26dBi	Glass mount	1.97x1.18/50x30 oval	RG-174	MCX
W4000L197	1575.4	1.5dBi/26dBi	Glass mount	1.97x1.18/50x30 oval	RG-174	FME

***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

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	50-165/450-470/806-940	-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	—	—
GPSCW1502	136-174/1575.4	2.14/5 dBic	Direct Feed Dual Band VHF/GPS Combi Whip	22/558.8	RG-174	SMA/SMB
GPSCW450	406-512/1575.4	2.14/5 dBic	Direct Feed Dual Band UHF/GPS Combi Whip	6.5/165.1	RG-174	—
GPSCW3E800	806-896/175.4	5/5 dBic	Direct Feed Dual Band GSM/GPS Combi Whip	11.5/292.1	RG-174	—
GPSCW3E900	890-960/1575.4	2.14/5 dBic	Direct Feed Dual Band GSM/GPS Combi Whip	10.25/260.4	RG-174	—
GPSCP00	824-960/1710-2170/1575.42	2/2/5 dBic	Direct Feed GPS Tri Band	7.6/193	RG-174	—
GPSCWCP00	824-960/1710-2170/1575.42	2/2/5 dBic	Roof Mount GPS Tri Band	3.9/99	RG-174	—
NMOHFGPS	Any NMO mount antenna plus GPS	Dependent on antenna/5dBic	Direct Feed NMO Mount with GPS	202/5130.8	RG-58/RG-174 (GPS)	—

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

NMO Mounting Kits [1]

Part Number	Description	Cable Length	Coax Type	Connector
NMOKHFUD	NMO Low/High Frequency Mount	17/5.18	RG-58/U Dual Shield, Low Loss Cablew	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
NMOHFGPSNOCONN	Any NMO mount antenna plus GPS	202/5130.8	RG-58 /RG-174(GPS)	NO CONN

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