

ANTENNAS

A wide array of Pulse antennas provide solutions to GSM, CDMA, WCDMA, LTE, TD-SCDMA, WiMax, WiFi, GPS, ZigBee, Bluetooth, ISM, DVB-H, MediaFLO, DMB-S, Satellite Radios, DECT, NFC and other custom applications.

Please pick from the charts at <http://www.pulseelectronics.com/antennas/applications>. Click on a part number to access the corresponding data sheet. Contact Pulse for more information on products that are not covered in this catalog.

ANTENNAS FOR MOBILE DEVICES



Pulse Mobile Device Antennas Delight End Users

Pulse Electronics boosts appealing mobile devices by providing intelligent antenna design and manufacturing solutions for handsets, tablets and laptops.

Our aim is to optimize antenna radiator and mechanics designs for complex multi-radio environments under all circumstances without limiting the industrial design. The carefully developed Pulse solutions truly delight end users.

Pulse has track-record of delivering antenna solutions to all mobile device segments and categories. Pulse understands fully customers' specific needs and is capable to offer the most suitable total solution to each customized design.

Our wide product range covers standalone antennas, standalone antenna modules and antenna integration to structural and visual mechanics. Pulse utilizes manufacturing technologies such as LDS, Flex, Sheet Metal and Ceramics.

More information: http://www.pulseelectronics.com/products/mobile_devices_antennas

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 868 & 915MHz
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
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

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	Max Gain (dBi)	Mechanical Length ³	Application/Standard
W1043	2.4 & 5.0	2.0	4.59/117	802.11a/b/g/n, Bluetooth, ZigBee
W1028B	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 table is continued on next page

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ANTENNAS FOR WIRELESS DEVICES (continued)

Antennas for Wireless Access Point (continued)

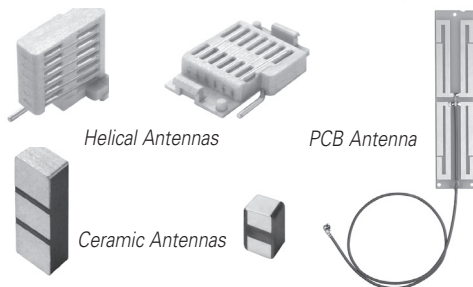
Single-Band Antenna with I-PEX Cable Assembly ^{1, 2}				
Part Number ⁴	Frequency	Mechanical Length ³	Cable Length ³	Application Standard
W1049B030	2.4GHz	3.25/82.5	3/76	802.11b/g/n, Bluetooth, ZigBee
W1049B050	2.4GHz	3.25/82.5	5/127	802.11b/g/n, Bluetooth, ZigBee
W1049B070	2.4GHz	3.25/82.5	7/178	802.11b/g/n,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

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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 (peak) 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
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

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)
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
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
W3544A/B	26x7.65x3	SMD	824-960/1710-2170	—	-1	50%	-6 ave
W3073	10x3.2x4	SMD	824-894/1710-2170 or 880-960/1710-2170	—	2.9	50%	-6 ave

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 →
See table notes on next page.

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ANTENNAS FOR WIRELESS DEVICES *(continued)*

Internal and Surface Mount Antenna Solutions *(continued)*

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	275/ 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 lengths/ 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 %
W3554B0143	LTE	698-960 / 1710-2710 / 2300-2700	120 x 30 x 0.2	143 / IPX	2.5	60%
W3593B0100	5 GHz Dipole	4900-5850	45 x 7 x 0.8	109mm / IPX	2	50%

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

Antennas for Near Field Communications									
Part Number	Frequency (MHz)*	Impedance (Ω)*	Read Distance (mm)*	Size (mm)	SRF (MHz)**	Inductance (μH)**	Resistance (Ω)**	Q **	Matched Q ***
W3579	13.56	50 / 80	40	35 x 50 x 0.30	42	1.6	3.6	37.8	5-30
W3580	13.56	50 / 80	20	35 x 50 x 0.45	58	0.95	3.9	20	5-15
W7001	13.56	51 / 80	40	25 x 25 x 0.12	100	0.9	1.55	49	5-30
W7002	13.56	52 / 80	40	94.6 x 56.8 x 3.65	89	0.65	0.95	57	5-30
W7013	13.56	53 / 80	20	25 x 30 x 0.23	-	-	-	-	-

* With Matching Network

** Coil Without Matching Network

*** With Matching Network (adjustable range)

Infrastructure Solutions						
Part Number	Frequency	Gain	Description	Length	Coax	Connector
YA5740W	740-806	9 / 11	Fully welded seven element Yagi	32.75 / 831.85	-	N Female
YA5800W	806-866	9 / 11	Fully welded seven element Yagi	32.75 / 831.85	-	N Female
R0806 / Z1704NM	806-960 / 1710-2170	3 / 4	Radome Omni	16.5 / 419.1	-	N Female
SLPT2400 / 5900DDMN	2400-2500 / 4900-5900	4.3 / 5.5	Direct Mount Antenna	3 / 76.2	-	-
SLPT698 / Z170DDMN	698-960 / 1710-2170/ 2400-2700	4.5 / 5.6 / 4	Mount Antenna	3 / 76.2	-	-

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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-174	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
SPDA24700/2700	698-960 / 1710-2710 / 2500-2700	2	LTE Dipole	9 / 228	—	SMA Male
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

Infrastructure Antennas						
Part Number	Frequency (MHz)	Gain (dBi)	Description	Length (in/mm)	Coax ¹	Connector ¹
YA6900W	890 - 960		Fully welded four element Yagi	17.5/444.5	—	N Female
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
YA5740W						
YA5800W						
RO806/2170NM						
SLPT2400/5900DMN						
SLPT698/2170DMN						

1. Variety of Coax available. Order separately.

* Table for Infrastructure Antennas, continued on next page. →

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ANTENNAS FOR WIRELESS DEVICES *(continued)*

Infrastructure Solutions *(continued)*

Infrastructure Antennas <i>(continues)</i>						
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

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. 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	—	—
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	—	—
GPSGMSMA	1575.42	26	Active GPS Glass Mount Antenna	1.18/30	16' 4" RG-174	SMA Male
SLPT698/960NMO	698-960	4.5	LTE External Vehicle or Enclosure NMO Mounted Antenna	3/762	—	—
SLPT698/869DMN	698-869	4.5	LTE External Vehicle or Enclosure Mounted Antenna	3/762	—	—
SLPT806DMN	806-960	4.5	800 MHz LTE External Vehicle or Enclosure Direct Mount Antenna	3/762	—	—
SLPT2400NMOHF	2400-2500	4.3	2.4 GHz LTE External Vehicle or Enclosure NMOHF Mount Antenna	3/762	—	—
SLPT4900NMOHF	4900-5900	5.5	4.9 GHz LTE External Vehicle or Enclosure NMOHF Mount Antenna	3/762	—	—
SLPT2400DM	2400-2500	4.3	2.4 GHz LTE External Vehicle or Enclosure Direct Mount Antenna	3/762	—	—
SLPT4900DMN	4900-5900	5.5	4.9 GHz LTE External Vehicle or Enclosure Direct Mount Antenna	3/762	—	—

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.

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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	—
GPSCPO0	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)	—
GPSDM700/2500FFS	698-960/1710-2170/2300-2700/1575.72	3/6	LTE Multi Band/Active GPS Roof Mount Antenna	3.5/88.3	17'RG-58/17'RG-58 /17R-174	FME Female/FME Female/SMA Male (GPS)
WA700/2700SMA	700-960/1710-1990/2110-2170/2500-2700	2.5/3.5	Omnidirectional Wireless LTE/MIMO Antenna	5.85/149	19.7'RG-174	SMA Male
SLPT698/2170NMOHF	698-906/1710-2170/2400-2700	4.5/5.6/4	LTE Multi Band External Vehicle or Enclosure NMOHF Mount Antenna	3/76.2	—	—
SLPT2400/5900NMOHF	2400-2500/4900-5900	4.3/5.5	2.4/4.9 GHz Multi Ban External Vehicle or Enclosure NMOHF Mount Antenna	3/76.2	—	—
SLPT698/2170DM	698-960/1710-2170/2400-2700	4.5/5.6/4	LTE Multi Band External Vehicle or Enclosure Direct Mount Antenna	3/76.2	—	—
SLPT2400/5900DMN	2400-2500/4900-5900	4.3/5.5	2.4/4.9 GHz Multi Band External Vehicle or Enclosure Direct Mount Antenna	3/76.2	—	—

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	175.18	RG-58,U Dual Shield, Low Loss Cablew	NO CONN
NMOKHFUDTHK	NMO Low/High Frequency Thick Mount	175.18	RG-58,U Dual Shield, Low Loss Cable	NO CONN
NMOMMRNOCONN	NMO Low/High Frequency Magnetic Mount	123.66	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.