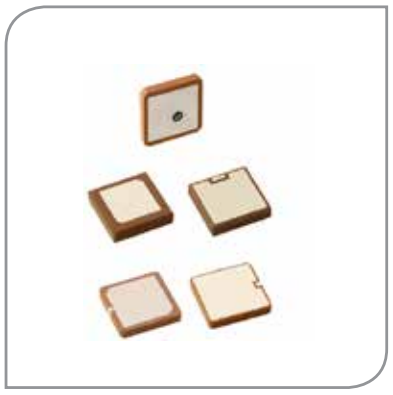
PulseLARSEN Antennas

Infotainment and Navigation



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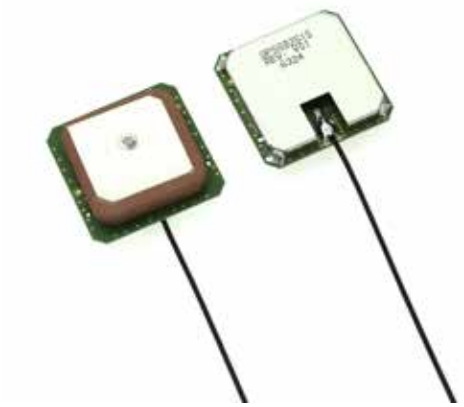
EMBEDDED ACTIVE SATCOM ANTENNA SOLUTIONS

App.	Type	Pulse Part number	RF Performance				
			Operating Frequency (MHz)	Antenna Element		LNA		
				VSWR	RHCP Gain (dBic)	Gain (dB)	NF (dB)	Current (mA)
GNSS (GPS, Glonass, BeiDou, and Galileo)	Ceramic patch with LNA	GPSGB1315	1561 +/- 2.046, 1575.42 +/- 10.23, and 1602.5625 +/- 4 MHz	2	-1 + 1	15 + 2	< 2.4	< 6
		GPSGB1330		2	-1 + 1	30 + 2	< 2.4	< 6
		GPSGB2515		2	1 + 1	15 + 2	< 2.4	< 6
		GPSGB2530		2	1 + 1	30 + 2	< 2.4	< 6

Note: 1. Further detailed specs such as 'Out of band rejection' of LNA can be found on a datasheet.

	ME requirement			
VCC (Vdc)	Antenna Dimension (mm)	Overall Dimension (mm)	Connector type	Coaxial Cable (Length; Diameter)
3.3-5 + 0.5	13x13x5	16x17x8.15	IPEX MHF 20278	L:100; D:1.13
3.3-5 + 0.5	13x13x5	16x17x8.15	IPEX MHF 20278	L:100; D:1.13
3.3-5 + 0.5	25x25x4	30x30x8	IPEX MHF 20278	L:100; D:1.13
3.3-5 + 0.5	25x25x4	30x30x8	IPEX MHF 20278	L:100; D:1.13



EMBEDDED SATCOM ANTENNA SOLUTIONS

App.	Type	Pulse Part number	RF Performance							
			Operating Frequency (MHz)	RL Min. (dB)	RHCP Gain (dBic)		Linear Gain (dBi)		Efficiency (%)/(dB)	
					Peak	Band edges	Peak	Band edges	Peak	Band edges
GPS Only	Ceramic chip	W3000	1575.42+1.023	-15	-3.9	-4.1	0.3	0	50/-3	45/-3.5
				-12	-3.5	-3.9	0.1	-0.2	50/-3	45/-3.5
		W3009		-11	0.2	-0.6	3	2.3	83/-0.8	70/-1.5
		W3011		-12	0.85	0.5	3.4	3	85/-0.7	80/-1
	Patch	W3213		-13	-1.5	-	-	-	-	-
		W3099		-14	3.5	-	-	-	-	-
	Helical	W3110		-16	-2.1	-2.4	1.3	0.7	47/-3.3	43/-3.7
GPS, Glonass, & Beidou	Ceramic chip	W3000	1561+2/ 1575.42+1.023/ 1602.56+4	-18	-0.2		2.4	1.5	70/-1.55	65/-1.9
		W3010		-12	1	0	3	2.2	75/-1.25	70/-1.5
				-12	1.5	0.4	3	1.8	70/-1.55	50/-3.0
		W3011A		-16	1	-0.4	3.7	2.5	88/-0.6	70/-1.5
		W3062A		-10	0	-0.5	2.5	2.0	80/-1	60/-2.1
	Patch	W3216	1575.42+1.023/ 1602.56+4	-7	-2	-	-	-	60	50
		W3223		-10	4	3.5	-	-	97/-0.2	93/-0.6
		W3224		-10	2.5	2.0	-	-	95/-0.5	79/-2
		W3225		-10	3	-	-	-	96/-0.3	92/-0.7
WiFi and GPS Combo	Ceramic chip	W3056	2400-2483.5	-8	-	-	3.2	2.5	80	70
			1575.42 + 1.023	-10			2.5	1.5	75	65
		W3064C	2400-2483.5	-11	-	-	-0.7	-1.7	80	70
			1575.42 + 1.023	-15				-2.0	70	60
		W3095	2400-2483.5	-10	-	-	2.7	1.5	85	80
			4950-5850	-6	-	-	3.7	1.0	73	53
			1575-1610	-8			1.7	0.7	75	62

NOTE: 1. Recommended minimum GND dimensions of PIFA type and Monopole are roughly 40x20mm and 30x20mm (or 40x11mm), respectively. Need to construct matching values to optimize antenna performance on surrounding mechanics and materials. 2. Pulse offers very unique GPS+WiFi combo antennas on single ceramic chip (10x3.2x1.5mm). There are three different types of combo antennas. W3056 (2.4G Wifi +GPS, single feed), W3064C (2.4G WiFi+GPS, dual feed), and W3095 (2.4G and 5G Wifi +GPS/Glonass/Beidou, dual feed). 3. "Stock" Stocked parts are typically available from Pulse distribution partners immediately.

ME requirement			Note
Antenna DIM. (LxWxH,mm)	GC-area (L x W,mm)	Evaluation Board Size (L x W,mm)	
7 x 1.6 x 1.6	6 x 20	30 x 20	3 Matching components
	6 x 11	40 x 11	
10 x 3.2 x 4.0	10.80 x 6.25	80 x 37	On Ground shunt 3.3pF
3.2 x 1.6 x 1.1	4.00 x 4.25	80 x 37	w/o matching
13 x 13 x 4	-	30 x 30	
25 x 25 x 4	-	70 x 70	
5.0 x 2.5 x 5.5	7.50 x 5.50	100 x 40	Vertical SMD, @ Corner
7 x 1.6 x 1.6	6 x 10	80 x 37	3 Matching components, Horiz. Mount + @Corner
10 x 3.2 x 2	10.80 x 6.25	80 x 37	@ Position1 shunt 3.3pF
			@ Position2 shunt2.2pF
3.2 x 1.6 x 1.1	4.00 x 6.25	80 x 37	Shunt 1.8pF
7 x 1.6 x 1.6	7.80 x 5.25	80 x 37	Shunt 2.2pF
13 x 13 x 5	-	50 x 50	
25 x 25 x 4	-	70 x 70	TS 16949
18 x 18 x 4	-	70 x 70	SMD
25 x 25 x 4	-	70 x 70	SMD
10 x 3.2 x 1.5	10.80 x 6.25 (Notch)	100 x 40	Single feed and 2.4GHz+GPS
10 x 3.2 x 1.5	10.80 x 6.40 (Divided)	96 x 45	Dual feed and 2.4GHz+GPS
10 x 3.2 x 1.5	17.80 x 6.45	80 x 50	Dual feed and Dual WiFi+GPS/Glonass





EMBEDDED GPS/GLONASS/BEIDOU APPLICATIONS SELECTION GUIDE

App.	Type	Pulse Part Number	RF Performance				
			Operating Freuency (MHz)	RL Min. (dB)	RHCP Gain (dBic)		Linear Gain (dBi)	
					Peak	Band Edges	Peak	Band Edges
GPS Only	Ceramic chip	W3000	1575.42 + 1.023	-15	-3.9	-4.1	0.3	0
				-12	-3.5	-3.9	0.1	-0.2
		W3009		-11	0.2	-0.6	3	2.3
		W3011		-12	0.85	0.5	3.4	3
	Patch	W3213		-13	-1.5	-	-	-
		W3099		-14	3.5	-	-	-
	Helical	W3110		-16	-2.1	-2.4	1.3	0.7
GPS, Glonass, & Beidou	Ceramic chip	W3000	1561 + 2/ 1575.42 + 1.023/ 1602.56 + 4	-18	-0.2		2.4	1.5
		W3010		-12	1	0	3	2.2
				-12	1.5	0.4	3	1.8
		W3011A		-16	1	-0.4	3.7	2.5
		W3062A		-10	0	-0.5	2.5	2.0
	Patch	W3216	1575.42 + 1.023/ 1602.56 + 4	-7	-2	-	-	-
		W3223		-10	4	3.5	-	-
		W3224		-10	2.5	2.0	-	-
		W3225		-10	3	-	-	-
Iridium	Patch	W3228	1621 + 4	-15	4.8	4.3	-	-
Iridium/ GNSS		W3227	1559-1660	-10	4.2	0.0	-	-
WiFi and GPS Combo	Ceramic chip	W3056	2400-2483.5	-8	-	-	3.2	2.5
			1575.42 + 1.023	-10	-	-	2.5	1.5
		W3064C	2400-2483.5	-11	-	-	-0.7	-1.7
			1575.42 + 1.023	-15				-2.0
		W3095	2400-2483.5	-10	-	-	2.7	1.5
			4950-5850	-6	-	-	3.7	1.0
			1575-1610	-8			1.7	0.7

NOTE: 1. Recommended minimum GND dimensions of PIFA type and Monopole are roughly 40x20mm and 30x20mm (or 40x11mm), respectively. Need to construct matching values to optimize antenna performance on surrounding mechanics and materials. 2. Pulse offers very unique GPS+WiFi combo antennas on single ceramic chip (10x3.2x1.5mm). There are three different types of combo antennas. W3056 (2.4G Wifi +GPS, single feed), W3064C (2.4G WiFi+GPS, dual feed), and W3095 (2.4G and 5G Wifi +GPS/Glonass/Beidou, dual feed). 3. "Stock" Stocked parts are typically available from Pulse distribution partners immediately.

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Efficiency (%)/(dB)		ME requirement			Note
Peak	Band Edges	Antenna DIM. (LxWxH,mm)	GC-area (L x W,mm)	Evaluation Board Size (L x W,mm)	
50/-3	45/-3.5	7 x 1.6 x 1.6	6 x 20	30 x 20	3 Matching components
50/-3	45/-3.5		6 x 11	40 x 11	
83/-0.8	70/-1.5	10 x 3.2 x 4.0	10.80 x 6.25	80 x 37	On Ground shunt 3.3pF
85/-0.7	80/-1	3.2 x 1.6 x 1.1	4.00 x 4.25	80 x 37	w/o matching
-	-	13 x 13 x 4	-	30 x 30	
-	-	25 x 25 x 4	-	70 x 70	
47/-3.3	43/-3.7	5.0 x 2.5 x 5.5	7.50 x 5.50	100 x 40	Vertical SMD, @ Corner
70/-1.55	65/-1.9	7 x 1.6 x 1.6	6 x 10	80 x 37	3 Matching components, Horiz. Mount + @Corner
75/-1.25	70/-1.5	10 x 3.2 x 2	10.80 x 6.25	80 x 37	@ Position1 shunt 3.3pF
70/-1.55	50/-3.0				@ Position2 shunt2.2pF
88/-0.6	70/-1.5	3.2 x 1.6 x 1.1	4.00 x 6.25	80 x 37	Shunt 1.8pF
80/-1	60/-2.1	7 x 1.6 x 1.6	7.80 x 5.25	80 x 37	Shunt 2.2pF
60	50	13 x 13 x 5	-	50 x 50	
97/-0.2	93/-0.6	25 x 25 x 4	-	70 x 70	TS 16949
95/-0.5	79/-2	18 x 18 x 4	-	70 x 70	SMD
96/-0.3	92/-0.7	25 x 25 x 4	-	70 x 70	SMD
84	80	25 x 25 x 4	-	60 x 60	Iridium certified, AR < 2
91	70	40 x 40 x 6.6	-	63 x 63	Iridium certified, VSWR < 3.5 @ 1532-1709MHz
80	70	10 x 3.2 x 1.5	10.80 x 6.25 (Notch)	100 x 40	Single feed and 2.4GHz+GPS
75	65				
80	70	10 x 3.2 x 1.5	10.80 x 6.40 (Di-vided)	96 x 45	Dual feed and 2.4GHz+GPS
70	60				
85	80	10 x 3.2 x 1.5	17.80 x 6.45	80 x 50	Dual feed and Dual WiFi+GPS/Glonass
73	53				
75	62				




EMBEDDED SOLUTIONS FOR 2G/3G/4G

App.	Type	Pulse Part number	RF Performance			
			Frequency range (MHz)	RL Min. (dB)	Peak Gain (dBi)	
					Peak	Band edges
LTE	Composite	W3796	698-960	-6	1.5 (Avg. peak gain)	
			1427.9-1660.9	-5.5	2 (Avg. peak gain)	
			1695-2200	-6	5.5 (Avg. peak gain)	
			2300-2700	-6	5 (Avg. peak gain)	
Penta Band		W3544A	824-960	-3.7	0.5	1.8
			1710-1880	-4.6	2.9	2.3
			1850-1990	-8.6	2.4	1.7
			1920-2170	-5.6	2.2	1.1
		W3544B	824-960	-6.5	1	-0.7
			1710-1880	-5.7	2.7	1.7
			1850-1990	-9.3	2	1
			1920-2170	-5	1.8	0.2
Quad band (US)	Ceramic	W3073	824-894	-4.7	0.4	-2.6
			1710-1880	-3.5	2.3	0.7
			1850-1990	-5.9	2.5	1.6
			1920-2170	-3.3	2.2	0.9
Quad band (EU)		W3073	880-960	-3.8	1	-1.8
			1710-1880	-4.9	2.9	2
			1850-1990	-8	2.9	2.5
			1920-2170	-4.4	2.8	2.3
Dual band (EU)		W3070	880-960	-5.1	1.2	-0.4
			1710-1880	-5.7	2.5	1.5

NOTE: 1. “Stock” Stocked parts are typically available from Pulse distribution partners immediately.
2. * SE = Series and *SH = Shunt

Efficiency (%)/(dB)		ME requirement			Note
Peak	Band edges	Antenna DIM. (LxWxH,mm)	GC-area (L x W,mm)	Evaluation Board Size (L x W,mm)	
65 (Avg.)		40 x 7 x 3	40.6 x 15	120 x 40.6	- Top mount: Horizontal - Matching: SE3.3nH+SH0.7pF; SH6.8nH
55 (Avg.)					
75 (Avg.)					
70 (Avg.)					
65	44	7.65 x 26 x 3	21 x 33.5 (W3544A)	110 x 50	1. Corner mount (vertical). 2.matching: *SE12nH
74	45				
74	64				
68	60				
70	53	7.65 x 26 x 3	50 x 18 (W3544B)	110 x 50	1. Top mount (Horizontal) 2.matching: 10nH
77	59				
77	69				
71	58				
51	28	10 x 3.2 x 4	40 x 10	105 x 40	1. Matching: SE10nH+ SE12nH+SH12nH. 2.Tuning strip on PCB.
59	40				
59	54				
58	46				
60	34	10 x 3.2 x 4	40 x 10	105 x 40	1. Matching: *SE10nH+ *SE10nH+*SH15nH. 2.Tuning strip on PCB.
70	54				
71	62				
67	59				
65	47	10 x 3.2 x 2	40 x 10	95 x 40	Matching: *SE18nH+ *SE10nH
60	50				






INTERNAL FLEXIBLE ANTENNA SOLUTIONS

App.	Type	Pulse Part Number	RF Performance				
			Operating Frequency (MHz)	RL Min. (dB)	Peak Gain (dBi)		Efficiency (%)
					Max.	Min.	Max.
ISM	FPC	W3312B0100	860-930	-8	2.3	-	50 (Avg.)
ISM + WiFi Combo	PCB	W3332B0150	863-928	-5	0.2	-	55 (Avg.)
			2400-2500	-10	4.1	-	64 (Avg.)
GNSS	FPC	W3908B0100	1560-1610	-12	0.3	-0.2	36
WiFi, BT, Zigbee	PCB	W3525B039	2400-2483.5	-10	2	0.6	65
		W3593B0100	4900-5850	-10	2	0.5	70
		W3513B0212	2400-2500; 4900-5850	-13; -10	2;2.7	1.4; 0.4	70; 67
		W3919B0050	4900-5925	-10	3.7	2.5	72
	FPC	W3921B0100	2400-2500	-13	1.8	1	57
		W3920B0050	4900-5925	-10	3.7	2.2	75
		W3315B0100MHF1	2400-2500	-10	2	1	75
			4900-5875	-10	5.5	4	85
		W3334B0150	2400-2500	-10	4.8	3.4	53
			4900-5900	-10	5.5	3.5	90
		W3917B0050	2400-2500	-10	2.7	1.8	62
			4900-5925	-10	4.9	3	89
		W3918B0050	2400-2500	-10	3.8	3.4	73
			4900-5925	-10	5.3	3.3	90
MIMO WiFi	FPC	W6102B0100	2400-2500	-10	isolation: -20	2 (Avg.)	45 (Avg.)
			4900-5900	-10	isolation: -20	5 (Avg.)	75 (Avg.)
		W6103B0100	2400-2500	-10	isolation: -15	4.5 (Avg.)	70 (Avg.)
			4900-5900	-10	isolation: -15	5 (Avg.)	75 (Avg.)
3G	PCB	W3502B0020	824-960; 1710-1990	-6; -4	2; 2.4	0.8; -0.4	78; 80
		W3538B0200	824-960; 1710-2170	-6; -6	-	-	57; 71
	FPC	W3501B0140	824-960; 1710-1990	-7; -8	1.5; 4.2	0.8; 2.8	61; 71
3G + GNSS Combo	FPC	W3915	880-960; 1710-2170	-6; -8	3; 3.5	1; 2.8	73; 87
			1565-1605	-6	2	0.5	68
4G (LTE)		W3554B0140	698-960; 1710-2690	-5; -8	1.5; 3.9	-0.6; 1.9	75; 86
		W3907B0100	698-960; 1427-1610	-8; -7	2.2; 1.8	-0.5; 0	70; 65
			1695-2700; 3400-3600	-7; -10	3.5; 4	1; 2.5	72; 80
4G + GNSS Combo		W3906B0100	698-960; 1427-1610	-13; -8	2.6; 2.2	-0.6; 1.2	70; 60
			1695-2700; 3400-3600	-7; -10	3.6; 4	1.8; 3.5	76; 85
			1550-1625	-10	2	0.5	37
MIMO 4G (LTE)		W6112B0100	698-960; 1428-2170	-6; -7.5	isolation: -10; -15	4.3; 3.8 (Avg)	55; 68 (Avg.)
			2300-3600	-10	isolation: -15	4 (Avg.)	65 (Avg.)
MIMO 4G + GNSS Combo		W6113B0100	698-960; 1428-2200	-6; -7.5	isolation: -10; -13	2.9; 1.7; 3.4	55; 60; 65 (Avg.)
			2300-3600	-7.5	isolation: -13	3.8; 4.2	70; 65 (Avg.)
			1570-1610	-10	isolation: -13	0.8	35 (Avg.)

Note: 1. FPC antenna is measured on the 2mm PC plate. 2.Connector: Equivalent of I-PEX MHF 20278-11R-13 or compatible with U.FL connector. 3. Receptacle: Equivalent of I-PEX MHF 20279-001E (3pad), 20441-001E-01(4pad) or compatible with U.FL receptacles. 4.Cable length is a distance between the edge of PCB and the center of connector. 5. See datasheets for details. 6. Contact sales for available or custom cable lengths. Email: antennas.us@pulseelectronics.com. Phone: 800-ANTENNA (268-3662) or 360-944-7551.

	ME requirement				Note
Min.	Antenna DIM. (LxWxH,mm)	Cable Length from edge/ Diameter, mm	Connector Type	Cable Alignment w/ Antenna	
	75 x 15	L:100 / D:1.13	U.FL compatible	Perpendicular	Alternative: W3502, W3538 , W3501
	82 x 15 x 0.56	L:150 / D:1.13	U.FL compatible	Perpendicular	ISM 868/915 and 2.4GHz WiFi (two feed cables). Isolation: <-11dB.
33	20 x 26.80 x 0.1	L:93 / D:1.13	U.FL compatible	Parallel	
55	48 x 11 x 0.8	L:100 / D:1.13	U.FL compatible	Perpendicular	w/ adhesive: W3525BTWxxx
50	45 x 7 x 0.8	L:100 / D:1.13	U.FL compatible	Perpendicular	No adhesive
68; 52	16 x 70 x 0.9	L:212 / D:1.13	U.FL compatible	Parallel	No adhesive
50	15.9 x 7.6 x 0.45	L: 50 / D: 1.13	U.FL compatible	Perpendicular	W3919XXXXX (for custom cable length)
50	33 x 7.7 x 0.1	L: 100/ D:1.13	U.FL compatible	Perpendicular	W3921XXXXX (for custom cable length)
55	12.5 x 7.6 x 0.15	L: 50 / D: 1.13	U.FL compatible	Perpendicular	W3920XXXXX (for custom cable length)
65 62	45 x 6 x 0.1	L:100 / D:1.13	U.FL compatible	Parallel	W3315B0100 (MHF-A13) W3315B0100MHFIII (MHFIII 20367 or equivalent)) W3315B0100MHF4 (MHF4)
49 65	14 x 5 x 0.1	L:150 / D:1.13	U.FL compatible	Parallel	W3334XXXXX (for custom cable length)
53 69	42.6 x 8.6 x 0.15	L:50 / D:1.13	U.FL compatible	Parallel	W3917XXXX (for custom cable length)
60 70	35.2 x 8.5 x 0.15	L:50 / D:1.13	U.FL compatible	Perpendicular	W3918XXXX (for custom cable length)
	50 x 20 x 0.1	L:100 / D:1.13	U.FL compatible	Perpendicular	Two cables (2x Dual WiFi)
	80 x 20 x 0.1	L:100 / D:1.13	U.FL compatible	Perpendicular	Three cables (3x Dual WiFi)
55; 70	43 x 17 x 0.5	L:20 / D:1.13	U.FL compatible	Perpendicular	80mm ground plane with 5mm gap
41; 50	40 x 15 x 0.7	L:200 / D:1.13	U.FL compatible	Perpendicular	
50; 50	87 x 25 x 0.2	L:140 / D:1.13	U.FL compatible	Perpendicular	W/ adhesive: W3571B0140.
51; 75 55	74 x 19 x 0.2	L:100/ D:1.13	U.FL compatible	Perpendicular	Two cables (1x GSM900, 1x GPS/Glonass)
50; 65	120 x 30 x 0.2	L:140 / D:1.13	U.FL compatible	Perpendicular	W/ adhesive: W3554B0140T
50;50 52; 78	115.7 x 20 x 0.1	L:100 / D:1.13	U.FL compatible	Perpendicular	
50;50 52; 80 30	120.4 x 26.8 x 0.1	L:100 / D:1.13	U.FL compatible	Perpendicular	Two cables (1x LTE, 1x GNSS)
	224 x 20 x 0.1	L:100 / D:1.13	U.FL compatible	Perpendicular	Two cables (2x LTE)
	224 x 20 x 0.1	L:100 / D:1.13	U.FL compatible	Perpendicular	Three cables (2x LTE, 1x GNSS)

EXTERNAL MULTI-BAND ANTENNA SOLUTIONS

App.	Type	Pulse Part Number	RF Performance			
			Frequency Range (MHz)	RL Min. (dB)	Peak Gain (dBi)	Height (mm) Straight (Bent)
ISM	Stick/Swivel	W1063	868-928	-8	3	195 (172)
		W1063M	902-928	-8	3	195 (172)
	Stick/ no Swivel	W5012	868-928	-8	2	179
		W5017	868-928	-8	2	179
		W5021	868-928	-8	2	171
WiFi (2.4GHz)	Stick/Swivel	W1010	2400-2500	-10	2	108 (86)
		W1030	2400-2500	-10	2	108 (86)
		W1027	2400-2500	-11	3.2	136 (110)
		W1037	2400-2500	-10	3.2	197 (170)
		W1038	2400-2500	-10	3.2	197 (170)
		W1059	2400-2500	-10	5	195 (154)
	Stick/ no Swivel	W5001	2400-2500	-10	1.5	128
		W5010	2400-2500	-10	1.5	130
		W5011	2400-2500	-10	1.5	130
		W5039	2400-2500	-10	1.3	94
WiFi (5GHz)	Stick/Swivel	W1028B	5150-5850	-9	2	136 (114)
Dual WiFi (2.4/5GHz)	Blade/ Swivel	W1043	2400-2500; 5150-5850	-10	2	157 (130)
		W1044	2400-2500; 5150-5850	-10	2	157 (126)
		SPDA17RP2400/5900	2400-2500; 4900-5900	-10	0.8; 5.9	175 (150)
	Stick/ no Swivel	W5028	2400-2500; 5150-5850	-10	0	128
2G	Blade/ Swivel	SPDA24850/1900	824-894; 1850-1990	-7.5	0; 1.5	176 (147)
		SPDA17850/1900	824-894; 1850-1990	-10	0; 1.2	176 (147)
3G	Stick/ no Swivel	W1900	824-960, 1710-2170	-4;-6	0.5; 2.5	49
		W1902	824-960, 1710-2170	-4;-6	0.5; 2.5	49
		W1910	824-960, 1710-2170	-4;-6	0.5; 2.5	49
		W1911	824-960, 1710-2170	-4;-6	0.5; 2.5	49
	Blade/ Swivel	SPDA17806/2170	806-960; 1710-2170	-7.5	0.5; 0.5	192 (159)
4G	Blade/ Swivel	SPDA24700/2700	698-960; 1710-2170; 2500-2700	-7.5	0.6; 1.5; 3.4	223 (192)
		W5095X	698-960; 1447-1510; 1710-2170; 2500-2700	-7.5	1.5; 2.5	229 (198)
		W5084X		-7.5	2.0; 4.0	229 (198)

Mechanical requirement				Note
Diameter(mm) Max (Min)	Package type	Connector	IP-rate	
13 (6)	B	RP-SMA		
13 (6)	B	SMA (m)		See W1063 datasheet
10	A	RP-SMA		
10	A	SMA (m)	IP65	
10	G	RP-SMA (Right angle)		
10 (7.8)	B	SMA(m)		
10 (7.8)	B	RP-SMA		W1030W (White)
10 (6)	C	RP-SMA		
13.2 (7.4)	C	RP-SMA		
13.2 (7.4)	C	RP-SMA		Color option (Grey)
13 (6)	C	SMA (m)		
10 (6)	G	RP-SMA (Right angle)		
10 (6)	A	RP-SMA	IP65	
10 (6)	A	SMA (m)		
10 (6)	F	RP-SMA	IP67	
9.2 (6)	C	RP-SMA		
17.6 (13)	E	RP-SMA		
17.6 (13)	E	SMA (m)		See W1043 datasheet
21.8 (13.7)	H	RP-TNC		
10 (6)	G	RP-SMA (Right angle)	IP65	
21.8 (13.7)	H	SMA (m)		
21.8 (13.7)	H	TNC		
8	D	SMA (m) (Right angle)		
8	D	RP-SMA (Right angle)		Tested on ground plane (70x50mm)
10.4	F	SMA (m)		
10.4	F	RP-SMA		
23.8 (15.7)	H	TNC		Medium Grey
23.8 (15.6)	H	SMA (m)		
29 (15.5)	H	SMA (m): W5095K TNC: W5095	IP65	
44 (15.5)	H	SMA (m): W5084K TNC: W5084	IP65	

GPS

GPS single band direct mount antennas have the following specifications:

Frequency: 1575.4
Gain: 5 dBic
Gain: 28 dB ± 2 dB
Pattern: Hemispherical
Mounting: Direct Feed: 5/8” hole

Polarization: Right-Hand Circular
Coax: 17’ RG-174 LNA
Voltage: 5 V DC
Color: Black
Size: .7” H x 2.5” Dia

GPS DIRECT MOUNTS		
Model	**Connector**	**Color**
GPSDM02	MCX	Black
GPSDM04	MMCX	Black
GPSDM06	SMB	Black
GPSDM08	SMA	Black

GPSDM

Contact factory for upcoming GNSS models covering GPS, Glonass, Beidou/Compass and Galileo.

GPSCW

GPSCW3E

GPS combi whip direct mount antennas have the following specifications:

LNA Gain: 26 dB ± 2 dB
Polarization: Right-Hand Circular/Vertical
Mounting: Direct Feed 5/8” hole
Color: Black

Pattern: Hemispherical / Omni
Coax: 16.4’ RG-174 / 16.4’ RG-174
Voltage: 5 V DC
Base Size: Size: 2” W x 2.3” L x 0.7” H

GPS COMBI WHIP DIRECT MOUNTS				
Model	**Frequency (MHZ)**	**Gain (dBi/dBic)**	**Whip Length (In)**	**Connector**
GPSCW1502	136-174 / 1575.42	2.14/5	22	SMA/SMB
GPSCW4501	406-512 / 1575.42	2.14/5	6.25	SMA/SMA
GPSCW4502	406-512 / 1575.42	2.14/5	6.25	SMA/SMB
GPSCW3E8001	806-896 / 1575.42	5/5	11.5	SMA/SMA
GPSCW3E8003	806-896 / 1575.42	5/5	11.5	FME/SMA

GPS single band direct mount antennas have the following specifications:

Frequency: 1575.4
Gain: 4 dBic
LNA Gain: 25 dB ± 2 dB
Pattern: Hemispherical
Mounting: Direct Feed 5/8” hole

Polarization: Right-Hand Circular
Coax: LMR-195
Voltage: 3V-5V DC
Color: GRAY (PANTONE 427)
Size: .87” H x 1.97” Dia

GPS DIRECT MOUNT		
Model	**Cable Length**	**Connector**
GPSDM26B0500	19.68” (500mm)	SMA

GPSDM26B0500

Contact factory for upcoming GNSS models covering GPS, Glonass, Beidou/Compass and Galileo.

GPS

GPS glass mount single band antennas have the following specifications:

Frequency: 1575.4 MHz
Pattern: Hemispherical LNA
Polarization: Right-Hand Circular
Mounting: Double Sided Tape
Gain: 1.5 dBi
Gain: 26 dB ± 2 dB
VSWR: 1.5:1
Voltage: 3V or 5V DC

GLASS MOUNT				
Model	**Size H x L x W (In)**	**Color**	**Cable**	**Connector**
GPSGMSMA	.2 x 3 x 1.2	Black	16.4' RG-174	SMA
GPSGMSMB	.2 x 3 x 1.2	Black	16.4' RG-174	SMB

GPSGM

GPS low profile single band antennas have the following specifications:

Frequency: 1575.4 MHz
Pattern: Hemispherical LNA Gain: 28 dB ± 2 dB
Polarization: Right-Hand Circular
Mounting: NMO Mount
Gain: 5 dBic
VSWR: 2.0:1
Voltage: 5V DC

GPS LOW PROFILE

GPS LOW PROFILE SINGLE BAND				
Model	**Size H x L x W (In)**	**Color**	**Cable**	**Connector**
GPSNMO01	1.3 x 2.9	White	Order Separately	Order Separately
GPSNMO02	1.3 x 2.9	Black	Order Separately	Order Separately
GPSNMO07	1.3 x 2.9	White	17' RG-58/U	SMB
GPSNMO08	1.3 x 2.9	Black	17' RG-58/U	SMB
GPSNMO09	1.3 x 2.9	White	17' RG-58/U	SMA
GPSNMO10	1.3 x 2.9	Black	17' RG-58/U	SMA

GPS0015

GPS TIMING ANTENNA							
Model	**Frequency (MHz)**	**Dimensions H x W (In)**	**Polarization**	**Voltage**	**Color**	**Mounting**	**Connector**
GPS0015	1575.42 ± 1.023	25	4 x 4.5	RHCP 4V-15V DC	White	Bracket	N Male

GPS

NMOHFGPS mount have the following specifications:

Frequency: 1575.4 - 1576.4 MHz
Polarization: Right-Hand Circular / Vertical
Cable: 16.4' RG-174 (GPS)
(NMOHF)
Size: .5 x 2 x 4.5
Mounting: 5/8" Hole

Gain: 5 dBic
LNA Gain: 26 dB ± 2 dB
VSWR: Less than 2:1 16.4' RG-58
Voltage: 3V or 5V DC
Color: Black

GPS DIRECT MOUNT		
Model	**Connectors (Mount / GPS)**	**Color**
NMOHFGPSFMENOCONN	FME/No Connector	Black
NMOHFGPSFMESMA	FME/SMA	Black
NMOHFGPSNOCONN	No Connectors	Black
NMOHFGPSSMASMA	SMA/SMA	Black

NOTE: Specifications listed refer to GPS performance. Additional antenna specifications are dependent on the antenna mounted on the NMO side.

GPS single band magnetic mount antennas have the following specifications:

Frequency: 1575.4 MHz
Pattern: Hemispherical
Polarization: Right-Hand Circular
Cable: 17' RG-174

Gain: 5 dBic
LNA Gain: 26 dB ± 2 dB
VSWR: Less than 2:1
Voltage: 5V DC

GPS Single Band Mag Mount

GPS MAGNETIC MOUNT			
Model	**Size H x L x W (In)**	**Color**	**Color**
GPS0002	0.5 x 1.75 x 1.5	Black	MCX
GPS0006	0.5 x 1.75 x 1.5	Black	SMB
GPS0008	0.5 x 1.75 x 1.5	Black	No Conn
GPS0010	0.5 x 1.75 x 1.5	Black	SMA
GPS0012	0.5 x 1.75 x 1.5	Black	BNC

Contact factory for upcoming GNSS models covering GPS, Glonass, Beidou/Compass and Galileo

GPS single band direct mount antennas have the following specifications:

Frequency: 1575.4
Gain: 4 dBic
LNA Gain: 25 dB ± 2 dB
Pattern: Hemispherical
Mounting: Direct Feed 5/8" hole

Polarization: Right-Hand Circular
Coax: LMR-195
Voltage: 3V-5V DC
Color: Gray (Pantone 427)
Size: .87" H x 1.97" Dia

GPSDM26B0500

GPS DIRECT MOUNT			
Model	**Cable Length**	**Color**	**Color**
GPSDM26B0500	9.68" (500mm)	Gray (Pantone 427)	SMA

EXTERNAL ANTENNAS


GPSSB


W4165


GPSLMB

GPS & CELLULAR COMBO STEALTH BLADES ADHESIVE MOUNT								
Model	**Frequency (MHz)**	**Gain (dBi)**	**Dimensions L x W x D (In)**	**Polarization**	**Voltage**	**Color**	**Coax**	**Connector**
GPSSB800/2170FS	806 - 960	0 dBi	5.4 x 1.5 x .6	Linear Vert	3V or 5V DC	Black	16.4' RG-174	FME
	1710 - 2170	0 dBi					16.4' RG-174	SMA
	1575.4	26 (LNA)		RHCP			16.4' RG-174	SMA

Contact factory for upcoming GNSS models covering GPS, Glonass, Beidou/Compass and Galileo

GPS, and 3G (or ISM) combination antenna in a low-profile direct mount package.

Size: 3.94" (Dia.) x 1.38" (H) [100mm Dia. x 35mm height]

Mounting: Direct Feed ; 3/4" dia. hole required. [19mm dia. hole required]

W4165 SERIES - MULTIBAND DIRECT MOUNT ANTENNAS : GPS + 3G/ISM					
Model	**Application**	**Frequency (MHz)**	**Gain (Typical)**	**Cable**	**Connection**
W4165 (Direct Mount)	GPS	1575.42 +/- 1.023	Antenna RHCP gain: 1 dBic typ. LNA Gain: 26 dB +/- 2dB	RG-174	See Datasheet
	3G (or ISM)	824 - 960	2 dBi	RG-174	See Datasheet
		1710-2170	2 dBi		
W4165MM (Magnetic Mount)	GPS	1575.42 +/- 1.023	Antenna RHCP gain: 1 dBic typ. LNA Gain: 26 dB +/- 2dB	RG-174	See Datasheet
	3G (or ISM)	824 - 960	2 dBi	RG-174	See Datasheet
		1710-2170	2 dBi		

Note: Contact factory for additional configurations of LTE, WiFi, and GPS.
Note: Contact factory for models which include Glonass, Beidou/Compass and Galileo navigation.

GPS, LTE and WiFi combination antenna in a low-profile mobile package.

Size: 5.7" (L) x 5.3" (W) x 0.98" (H) [145mm x 135mm x 25mm] Mounting: Adhesive Mount

Jaguar Series - Multiband Antennas : GPS/GNSS + MIMO LTE + WiFi					
Model	**Application**	**Frequency (MHz)**	**Gain**	**Filtering; LNA Voltage**	**Connection**
GPSLPMB401	GNSS	1561.098 +/- 2.046 (Beidou) 1575.42 +/- 1.023 (GPS) 1602.563 +/- 4.0 (GLONASS)	Antenna RHCP gain: 1 dBic typ. LNA Gain: 30 dB +/- 2dB	OOB Rej.: 60-70dB LNA Input: 3.3 - 5 Vdc Input	See Datasheet
	LTE 1	698-960	4.4 dBi (peak)	--	See Datasheet
		1710 - 2690	5.4 dBi (peak)		
	LTE 2	698-960	4.4 dBi (peak)	--	See Datasheet
		1710 - 2690	5.4 dBi (peak)		
	WiFi	2400-2500	4.5 dBi (peak)	--	See Datasheet
		4900 - 5950	6 dBi (peak)		
LPMB401	LTE 1	698-960	4.4 dBi (peak)	--	See Datasheet
		1710 - 2690	5.4 dBi (peak)		
	LTE 2	698-960	4.4 dBi (peak)	--	See Datasheet
		1710 - 2690	5.4 dBi (peak)		
	WiFi 1	2400-2500	5 dBi (peak)	--	See Datasheet
		4900 - 5950	6 dBi (peak)		
	WiFi 2	2400-2500	5 dBi (peak)	--	See Datasheet
		4900 - 5950	5 dBi (peak)		

Note: Contact factory for additional configurations of LTE, WiFi, and GPS. Contact factory for magnetic mount and direct mount configurations.

MULTI-BAND DATA ANTENNAS

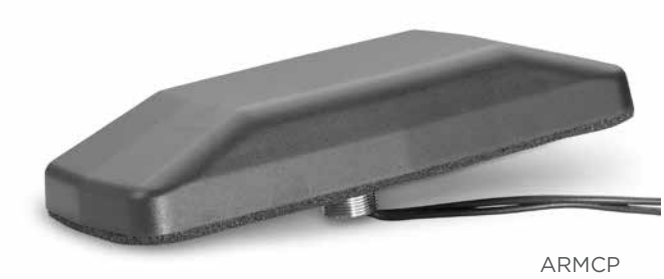
GPS & Cellular combo magnetic mount antennas have the following specifications:

Frequency: 824-960 / 1710-2170 / 1575.4 MHz
Gain: 2 dBi / 2 dBi / 5 dBic
LNA Gain: 26 dB ± 2 dB
Pattern: Omni / Omni / Hemispherical
Polarization: Vertical / Vertical / Right-Hand Circular
VSWR: Less than 2:1
Cable: 17' RG-174
Voltage: 3V or 5V DC

GPS Multi Band Mag Mount

GPS MAGNETIC MOUNT			
Model	**H x L x W (In)**	**Color**	**Connector**
GPSCPMM00	1.3 x 7.6 x 3.4	Black	TNC/SMA
GPSCPMM02	1.3 x 7.6 x 3.4	Black	No Conn/SMA

Contact factory for LTE versions.



ARMCP

GPS, LTE and WiFi combination antenna in a low-profile mobile package.
Size: 7.6" (L) x 3.4" (W) x 1.32" (H) [193mm x 86.4mm x 33.5mm]
Mounting: Direct Feed ; 3/4" hole required.

Armadillo Series - Multiband Vehicular Direct Mount Antennas : GPS + LTE + WiFi				
Model	**Application**	**Frequency (MHz)**	**Gain (Typical)**	**Connection**
ARMCP402	GPS/Glonass/Beidou	1559-1607	Antenna RHCP gain: 1 dBic typ. LNA Gain: 30 dB +/- 2dB	SMA (m)
	LTE1, LTE2	698-960	2 dBi	SMA (m)
		1710-2690	4 dBi	
	WiFi	2400-2500	4 dBi	RP-SMA (m)
		5150-5925	6 dBi	

Note: Contact factory for additional configurations of LTE, WiFi, and GPS. Contact factory for magnetic mount and adhesive mount configurations. White Housing is available.

GPS LTE WI-FI MULTI BAND DIRECT MOUNTS									
Model	Frequency (MHz)	Gain (dBi)	Polarization	VSWR	Mounting	Voltage	Size H x Dia (in)	Cable	Connector
GPSDM700/2500FFS (3 cable)	698-960/1710-2170/2300-2700	3	Linear Vertical	2.0:1	3/4" Hole	3 or 5	3.5 x 4.16	17' RG-58	FME
	2400-2485/5150-5850	6	Linear Vertical					17' RG-58	FME
	1575.42	5 dBic	RHCP					17' RG-174	SMA

GPSDM700/2500
GPSDM700/5800

ALTERNATE CABLE/CONNECTOR CONFIGURATIONS						
MODEL	LTE		WIFI		GPS	
	CABLE	CONN.	CABLE	CONN.	CABLE	CONN.
GPSDM700/5800SSS	17' RG-58	SMA	17' RG-58	SMA	17' RG-174	SMA

GPSMB501

GPSMB Panther (White)

GPSMB301

PANTHER SERIES - DIRECT MOUNTS								
Model	Application	Frequency (MHz)	Gain (dBi)	VSWR	Mount	Size (in.)	Cable	Conn.
	LTE1, LTE2	698-960 1695-2170 2300-2700 2900-3600	4 (LB) 5 (UB)	1.5:1	7/8" Hole (M22 Nut)	6.5x6x3	17' RG-58	SMA SMA
GPSMB501 (5 CABLES)	WIFI1, WIFI2	2400-2500 4900-5900	4.5 / 5	1.5:1	7/8" Hole (M22 Nut)	6.5x6x3	17' RG-58	RP-SMA RP-SMA
	GPS, GLONASS	1564-1610	1.5 (dBic)	1.5:1	7/8" Hole (M22 Nut)	6.5x6x3	17' RG-174	SMA
GPSMB301	LTE, LTE2	698-960 1695-2170 2300-2700 2900-3600	6 (LB) 5.5 (UB)	1.7:1	7/8" Hole (M22 Nut)	6.5x6x3	17' RG-58 17' RG-58	SMA SMA
	GPS, GLONASS	1575-1609	1.5 (dBic)	1.7:1	7/8" Hole (M22 Nut)	6.5x6x3	17' RG-174	SMA

NOTE: GPSMBMM is a magnetic base for GPSMB501 and GPSMB301. White and black colors available.

PulseLARSEN Antennas

Worldwide Headquarters
San Diego, CA, USA
15255 Innovation Drive #100
San Diego, CA 92128
+1-858-674-8100

PulseLarsen Antennas Headquarters
Vancouver, WA, USA
18110 SE 34th Street
Suite 250, Building 2
Vancouver, WA 98683
Tel: **+1-360-944-7551**
antennas.us@pulseelectronics.com

Europe - Finland
Automaatiotie 1, FI-90440 Oulunsalo.
Tel: **+358-20-7935-500**
antennas.eu@pulseelectronics.com

Europe - Germany
Campus Berliner Allee
Berliner Allee 65 D-64295
Darmstadt Germany
Tel: **+49.173.659.85.21**
antennas.eu@pulseelectronics.com

ISO Manufacturing Site
No 99. Huo Ju road, Suzhou new District,
Jiangsu Province, Suzhou, China, PRC.
Tel: **+86-512-69206053**
antennas.as@pulseelectronics.com

CONTACT US TODAY!

Call us at **+1.800.ANTENNA**

Visit our website at: **pulselarsenantennas.com**

Connect with us on twitter: **PulseLarsen1**