

# 160 Meter Wire Antennas

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Center Frequency:	1.840 Mhz	5.43 Mhz 3rd Harmonic
Halfwave in space is:	267.39 feet	181.83 coax 219.26 twinlead
Quarterwave in space is:	133.70 feet	90.91 coax 109.63 twinlead
Quarterwave Vertical is:	127.17 feet	149.74 foot ground radials
Five Eights wave Vertical is:	327.72 feet	127.17 foot ground plane
Three Quarter wave Vertical:	394.57 feet	63.59 foot eighthwave
Halfwave Dipole/Vertical is:	254.35 feet	127.17 one side.
Halfwave Reflector is:	267.07 feet	242.90 for Director
Low Mount Halfwave is:	248.91 feet	124.46 one side.
Halfwave Folded Dipole is:	251.09 feet	125.54 one side.
Halfwave Inverted V is:	263.59 feet	131.79 one side.
Colinear Array is:	521.74 feet	260.87 one side.
Extended Double Zepp is:	655.43 feet	327.72 one side.
Fullwave Quad Loop is:	554.35 feet	138.59 one side.
Reflector Director:	582.07 529.40	145.52 132.35 one side.
Fullwave Delta Loop is:	554.35 feet	184.78 one side.
Reflector Director:	582.07 529.40	194.02 176.47 one side.
Waves 1: 521.74  1.5: 789.13  2:1056.52  2.5:1323.91  3:1591.30  4 :2126.09		
Waves 5:2660.87  6.0:3195.65  7:3730.43  8.0:4265.22  9:4800.00  10:5334.78		

Note: 10 waves is well over a mile long.

# 80/75 Meter Wire Antennas

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## 80 Meter CW

Center Frequency:	3.600 Mhz	10.648 Mhz 3rd Harmonic
Halfwave in space is:	136.67 feet	91.57 coax 120.27 twinlead
Quarter wave in space is:	68.33 feet	45.78 coax 60.13 twinlead
Quarter wave Vertical is:	65.00 feet	76.53 foot ground radials
Five eights wave Vertical is:	169.47 feet	65.00 foot ground plane
Three Quarter wave Vertical:	201.67 feet	32.50 foot eighthwave
Halfwave wire dipole is:	130.00 feet	65.00 one side.
Halfwave Reflector is:	136.50 feet	124.15 for Director
Low Mount Halfwave is:	127.22 feet	63.61 one side.
Halfwave folded dipole is:	128.33 feet	64.17 one side.
Halfwave inverted V is:	134.72 feet	67.36 one side.
Extended double Zepp is:	349.87 feet	174.93 one side.
Fullwave quad loop is:	283.33 feet	70.83 one side.
Reflector Director:	297.50 270.58	74.38 67.65 one side.
Fullwave delta loop is:	283.33 feet	94.44 one side.
Reflector Director:	297.50 270.58	99.17 90.19 one side.

Waves 1: 266.67 |1.5: 403.33 |2: 540.00 |2.5: 676.67 |3: 813.33 |4 :1086.67  
Waves 5:1360.00 |6.0:1633.33 |7:1906.67 |8.0:2180.00 |9:2453.33 |10:2726.67

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## 75 Meter SSB

Center Frequency:	3.875 Mhz	11.461 Mhz 3rd Harmonic
Halfwave in space is:	126.97 feet	85.07 coax 111.73 twinlead
Quarter wave in space is:	63.48 feet	42.53 coax 55.87 twinlead
Quarter wave Vertical is:	60.39 feet	71.10 foot ground radials
Five eights wave Vertical is:	157.44 feet	60.39 foot ground plane
Three Quarter wave Vertical:	187.35 feet	30.19 foot eighthwave
Halfwave wire dipole is:	120.77 feet	60.39 one side.
Halfwave Reflector is:	126.81 feet	115.34 for Director
Low Mount Halfwave is:	118.19 feet	59.10 one side.
Halfwave folded dipole is:	119.23 feet	59.61 one side.
Halfwave inverted V is:	125.16 feet	62.58 one side.
Extended double Zepp is:	325.04 feet	162.52 one side.
Fullwave quad loop is:	263.23 feet	65.81 one side.
Reflector Director:	276.39 251.38	69.10 62.85 one side.
Fullwave delta loop is:	263.23 feet	87.74 one side.
Reflector Director:	276.39 251.38	92.13 83.79 one side.

Waves 1: 247.74 |1.5: 374.71 |2: 501.68 |2.5: 628.65 |3: 755.61 |4 :1009.55  
Waves 5:1263.48 |6.0:1517.42 |7:1771.35 |8.0:2025.29 |9:2279.23 |10:2533.16

# 40 Meter Wire Antennas

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## 40 Meter CW

Center Frequency:	7.025 Mhz	20.73 Mhz 3rd Harmonic
Halfwave in space is:	70.04 feet	47.62 coax 57.43 twinlead
Quarterwave in space is:	35.02 feet	23.81 coax 28.71 twinlead
Quarterwave Vertical is:	33.31 feet	39.22 foot ground radials
Five Eights wave Vertical is:	85.84 feet	33.31 foot ground plane
Three Quarter wave Vertical:	103.35 feet	16.65 foot eighthwave
Halfwave Dipole/Vertical is:	66.62 feet	33.31 one side.
Halfwave Reflector is:	69.95 feet	63.62 for Director
Low Mount Halfwave is:	65.20 feet	32.60 one side.
Halfwave Folded Dipole is:	65.77 feet	32.88 one side.
Halfwave Inverted V is:	69.04 feet	34.52 one side.
Colinear Array is:	136.65 feet	68.33 one side.
Extended Double Zepp is:	171.67 feet	85.84 one side.
Fullwave Quad Loop is:	145.20 feet	36.30 one side.
Reflector Director:	152.46 138.66	38.11 34.67 one side.
Fullwave Delta Loop is:	145.20 feet	48.40 one side.
Reflector Director:	152.46 138.66	50.82 46.22 one side.
Waves 1: 136.65  1.5: 206.69  2: 276.73  2.5: 346.76  3: 416.80  4 : 556.87		
Waves 5: 696.94  6.0: 837.01  7: 977.08  8.0:1117.15  9:1257.22  10:1397.30		

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## 40 Meter NOVICE / 41 Meter SWL AM Band

Center Frequency:	7.130 Mhz	21.04 Mhz 3rd Harmonic
Halfwave in space is:	69.00 feet	46.92 coax 56.58 twinlead
Quarterwave in space is:	34.50 feet	23.46 coax 28.29 twinlead
Quarterwave Vertical is:	32.82 feet	38.64 foot ground radials
Five Eights wave Vertical is:	84.57 feet	32.82 foot ground plane
Three Quarter wave Vertical:	101.82 feet	16.41 foot eighthwave
Halfwave Dipole/Vertical is:	65.64 feet	32.82 one side.
Halfwave Reflector is:	68.92 feet	62.68 for Director
Low Mount Halfwave is:	64.24 feet	32.12 one side.
Halfwave Folded Dipole is:	64.80 feet	32.40 one side.
Halfwave Inverted V is:	68.02 feet	34.01 one side.
Colinear Array is:	134.64 feet	67.32 one side.
Extended Double Zepp is:	169.14 feet	84.57 one side.
Fullwave Quad Loop is:	143.06 feet	35.76 one side.
Reflector Director:	150.21 136.62	37.55 34.15 one side.
Fullwave Delta Loop is:	143.06 feet	47.69 one side.
Reflector Director:	150.21 136.62	50.07 45.54 one side.

Waves 1: 134.64 |1.5: 203.65 |2: 272.65 |2.5: 341.65 |3: 410.66 |4 : 548.67  
Waves 5: 686.68 |6.0: 824.68 |7: 962.69 |8.0:1100.70 |9:1238.71 |10:1376.72

**Note:** As any novice knows, the 40 meter novice band has always been shared with international SW broadcast. Dodging AM heterodynes is what 40 meter Novice Operation is all about. The Russians have always had a special love for 41 meter AM broadcasting.

### 40 Meter SSB

Center Frequency:	7.225 Mhz	21.32 Mhz 3rd Harmonic
Halfwave in space is:	68.10 feet	46.31 coax 55.84 twinlead
Quarterwave in space is:	34.05 feet	23.15 coax 27.92 twinlead

Quarterwave Vertical is:	32.39 feet	38.13 foot ground radials
Five Eights wave Vertical is:	83.46 feet	32.39 foot ground plane
Three Quarter wave Vertical:	100.48 feet	16.19 foot eighthwave

Halfwave Dipole/Vertical is:	64.78 feet	32.39 one side.
Halfwave Reflector is:	68.01 feet	61.86 for Director
Low Mount Halfwave is:	63.39 feet	31.70 one side.
Halfwave Folded Dipole is:	63.94 feet	31.97 one side.
Halfwave Inverted V is:	67.13 feet	33.56 one side.
Colinear Array is:	132.87 feet	66.44 one side.
Extended Double Zepp is:	166.92 feet	83.46 one side.

Fullwave Quad Loop is:	141.18 feet	35.29 one side.
Reflector Director:	148.24 134.82	37.06 33.71 one side.
Fullwave Delta Loop is:	141.18 feet	47.06 one side.
Reflector Director:	148.24 134.82	49.41 44.94 one side.

Waves 1: 132.87 |1.5: 200.97 |2: 269.07 |2.5: 337.16 |3: 405.26 |4 : 541.45  
Waves 5: 677.65 |6.0: 813.84 |7: 950.03 |8.0:1086.23 |9:1222.42 |10:1358.62

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# 30 Meter Wire Antennas

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## This Band CW Only

Center Frequency:	10.120 Mhz	29.87 Mhz 3rd Harmonic
Halfwave in space is:	48.62 feet	33.06 coax 39.87 twinlead
Quarterwave in space is:	24.31 feet	16.53 coax 19.93 twinlead
Quarterwave Vertical is:	23.12 feet	27.23 foot ground radials
Five Eights wave Vertical is:	59.58 feet	23.12 foot ground plane
Three Quarter wave Vertical:	71.74 feet	11.56 foot eighthwave
Halfwave Dipole/Vertical is:	46.25 feet	23.12 one side.
Halfwave Reflector is:	48.56 feet	44.16 for Director
Low Mount Halfwave is:	45.26 feet	22.63 one side.
Halfwave Folded Dipole is:	45.65 feet	22.83 one side.
Halfwave Inverted V is:	47.92 feet	23.96 one side.
Colinear Array is:	94.86 feet	47.43 one side.
Extended Double Zepp is:	119.17 feet	59.58 one side.
Fullwave Quad Loop is:	100.79 feet	25.20 one side.
Reflector Director:	105.83 96.25	26.46 24.06 one side.
Fullwave Delta Loop is:	100.79 feet	33.60 one side.
Reflector Director:	105.83 96.25	35.28 32.08 one side.
Waves 1:	94.86  1.5: 143.48  2: 192.09  2.5: 240.71  3: 289.33  4 : 386.56	
Waves 5:	483.79  6.0: 581.03  7: 678.26  8.0: 775.49  9: 872.73  10: 969.96	

This is a shared band. Expect to find Commercial RTTY and FAX, especially Weather FAX transmissions on this band. Most international HAM signals will be found near 10.105, but Japanese stations frequently cluster around 10.130 Mhz.

# 20 Meter Wire Antennas

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## 20 Meter CW

Center Frequency:	14.060 Mhz	41.586 Mhz 3rd Harmonic
Halfwave in space is:	34.99 feet	23.45 coax 30.79 twinlead
Quarter wave in space is:	17.50 feet	11.72 coax 15.40 twinlead
Quarter wave Vertical is:	16.64 feet	19.60 foot ground radials
Five eights wave Vertical is:	43.39 feet	16.64 foot ground plane
Three Quarter wave Vertical:	51.64 feet	8.32 foot eighthwave
Halfwave wire dipole is:	33.29 feet	16.64 one side.
Halfwave Reflector is:	34.95 feet	31.79 for Director
Low Mount Halfwave is:	32.57 feet	16.29 one side.
Halfwave folded dipole is:	32.86 feet	16.43 one side.
Halfwave inverted V is:	34.50 feet	17.25 one side.
Extended double Zepp is:	89.58 feet	44.79 one side.
Fullwave quad loop is:	72.55 feet	18.14 one side.
Reflector Director:	76.17 69.28	19.04 17.32 one side.
Fullwave delta loop is:	72.55 feet	24.18 one side.
Reflector Director:	76.17 69.28	25.39 23.09 one side.
Waves 1:	68.28  1.5: 103.27  2: 138.26  2.5: 173.26  3: 208.25  4 : 278.24	
Waves 5:	348.22  6.0: 418.21  7: 488.19  8.0: 558.18  9: 628.17  10: 698.15	

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## 20 Meter SSB

Center Frequency:	14.220 Mhz	42.059 Mhz 3rd Harmonic
Halfwave in space is:	34.60 feet	23.18 coax 30.45 twinlead
Quarter wave in space is:	17.30 feet	11.59 coax 15.22 twinlead
Quarter wave Vertical is:	16.46 feet	19.38 foot ground radials
Five eights wave Vertical is:	42.90 feet	16.46 foot ground plane
Three Quarter wave Vertical:	51.05 feet	8.23 foot eighthwave
Halfwave wire dipole is:	32.91 feet	16.46 one side.
Halfwave Reflector is:	34.56 feet	31.43 for Director
Low Mount Halfwave is:	32.21 feet	16.10 one side.
Halfwave folded dipole is:	32.49 feet	16.24 one side.
Halfwave inverted V is:	34.11 feet	17.05 one side.
Extended double Zepp is:	88.57 feet	44.29 one side.
Fullwave quad loop is:	71.73 feet	17.93 one side.
Reflector Director:	75.32 68.50	18.83 17.13 one side.
Fullwave delta loop is:	71.73 feet	23.91 one side.
Reflector Director:	75.32 68.50	25.11 22.83 one side.
Waves 1:	67.51  1.5: 102.11  2: 136.71  2.5: 171.31  3: 205.91  4 : 275.11	
Waves 5:	344.30  6.0: 413.50  7: 482.70  8.0: 551.90  9: 621.10  10: 690.30	

# 17 Meter Wire Antennas

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Center Frequency:	18.110 Mhz	53.45 Mhz 3rd Harmonic
Halfwave in space is:	27.17 feet	18.47 coax 22.28 twinlead
Quarterwave in space is:	13.58 feet	9.24 coax 11.14 twinlead
Quarterwave Vertical is:	12.92 feet	15.21 foot ground radials
Five Eights wave Vertical is:	33.30 feet	12.92 foot ground plane
Three Quarter wave Vertical:	40.09 feet	6.46 foot eighthwave
Halfwave Dipole/Vertical is:	25.84 feet	12.92 one side.
Halfwave Reflector is:	27.13 feet	24.68 for Director
Low Mount Halfwave is:	25.29 feet	12.64 one side.
Halfwave Folded Dipole is:	25.51 feet	12.76 one side.
Halfwave Inverted V is:	26.78 feet	13.39 one side.
Colinear Array is:	53.01 feet	26.50 one side.
Extended Double Zepp is:	66.59 feet	33.30 one side.
Fullwave Quad Loop is:	56.32 feet	14.08 one side.
Reflector Director:	59.14 53.79	14.78 13.45 one side.
Fullwave Delta Loop is:	56.32 feet	18.77 one side.
Reflector Director:	59.14 53.79	19.71 17.93 one side.
Waves 1:	53.01  1.5: 80.18  2: 107.34  2.5: 134.51  3: 161.68  4 : 216.01	
Waves 5:	270.35  6.0: 324.68  7: 379.02  8.0: 433.35  9: 487.69  10: 542.02	

# 15 Meter Wire Antennas

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## 15 Meter CW

Center Frequency:	21.060 Mhz	62.290 Mhz 3rd Harmonic
Halfwave in space is:	23.36 feet	15.65 coax 20.56 twinlead
Quarter wave in space is:	11.68 feet	7.83 coax 10.28 twinlead
Quarter wave Vertical is:	11.11 feet	13.08 foot ground radials
Five eights wave Vertical is:	28.97 feet	11.11 foot ground plane
Three Quarter wave Vertical:	34.47 feet	5.56 foot eighthwave
Halfwave wire dipole is:	22.22 feet	11.11 one side.
Halfwave Reflector is:	23.33 feet	21.22 for Director
Low Mount Halfwave is:	21.75 feet	10.87 one side.
Halfwave folded dipole is:	21.94 feet	10.97 one side.
Halfwave inverted V is:	23.03 feet	11.51 one side.
Extended double Zepp is:	59.81 feet	29.90 one side.
Fullwave quad loop is:	48.43 feet	12.11 one side.
Reflector Director:	50.85 46.25	12.71 11.56 one side.
Fullwave delta loop is:	48.43 feet	16.14 one side.
Reflector Director:	50.85 46.25	16.95 15.42 one side.
Waves 1:	45.58  1.5:	68.95  2: 92.31  2.5: 115.67  3: 139.03  4 : 185.75
Waves 5:	232.48  6.0:	279.20  7: 325.93  8.0: 372.65  9: 419.37  10: 466.10

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## 15 Meter SSB

Center Frequency:	21.300 Mhz	63.000 Mhz 3rd Harmonic
Halfwave in space is:	23.10 feet	15.48 coax 20.33 twinlead
Quarter wave in space is:	11.55 feet	7.74 coax 10.16 twinlead
Quarter wave Vertical is:	10.99 feet	12.94 foot ground radials
Five eights wave Vertical is:	28.64 feet	10.99 foot ground plane
Three Quarter wave Vertical:	34.08 feet	5.49 foot eighthwave
Halfwave wire dipole is:	21.97 feet	10.99 one side.
Halfwave Reflector is:	23.07 feet	20.98 for Director
Low Mount Halfwave is:	21.50 feet	10.75 one side.
Halfwave folded dipole is:	21.69 feet	10.85 one side.
Halfwave inverted V is:	22.77 feet	11.38 one side.
Extended double Zepp is:	59.13 feet	29.57 one side.
Fullwave quad loop is:	47.89 feet	11.97 one side.
Reflector Director:	50.28 45.73	12.57 11.43 one side.
Fullwave delta loop is:	47.89 feet	15.96 one side.
Reflector Director:	50.28 45.73	16.76 15.24 one side.
Waves 1:	45.07  1.5:	68.17  2: 91.27  2.5: 114.37  3: 137.46  4 : 183.66
Waves 5:	229.86  6.0:	276.06  7: 322.25  8.0: 368.45  9: 414.65  10: 460



# 12 Meter Wire Antennas

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Center Frequency:	24.920 Mhz	73.54 Mhz 3rd Harmonic
Halfwave in space is:	19.74 feet	13.43 coax 16.19 twinlead
Quarterwave in space is:	9.87 feet	6.71 coax  8.09 twinlead
Quarterwave Vertical is:	9.39 feet	11.06 foot ground radials
Five Eights wave Vertical is:	24.20 feet	9.39 foot ground plane
Three Quarter wave Vertical:	29.13 feet	4.70 foot eighthwave
Halfwave Dipole/Vertical is:	18.78 feet	9.39 one side.
Halfwave Reflector is:	19.72 feet	17.93 for Director
Low Mount Halfwave is:	18.38 feet	9.19 one side.
Halfwave Folded Dipole is:	18.54 feet	9.27 one side.
Halfwave Inverted V is:	19.46 feet	9.73 one side.
Colinear Array is:	38.52 feet	19.26 one side.
Extended Double Zepp is:	48.39 feet	24.20 one side.
Fullwave Quad Loop is:	40.93 feet	10.23 one side.
Reflector Director:	42.98 39.09	10.74  9.77 one side.
Fullwave Delta Loop is:	40.93 feet	13.64 one side.
Reflector Director:	42.98 39.09	14.33 13.03 one side.
Waves 1:	38.52  1.5: 58.27  2: 78.01  2.5: 97.75  3: 117.50  4 : 156.98	
Waves 5:	196.47  6.0: 235.96  7: 275.44  8.0: 314.93  9: 354.41  10: 393.90	

# 10 Meter Wire Antennas

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## 10 Meter CW

Center Frequency:	28.050 Mhz	82.964 Mhz 3rd Harmonic
Halfwave in space is:	17.54 feet	11.75 coax 15.44 twinlead
Quarter wave in space is:	8.77 feet	5.88 coax  7.72 twinlead
Quarter wave Vertical is:	8.34 feet	9.82 foot ground radials
Five eights wave Vertical is:	21.75 feet	8.34 foot ground plane
Three Quarter wave Vertical:	25.88 feet	4.17 foot eighthwave
Halfwave wire dipole is:	16.68 feet	8.34 one side.
Halfwave Reflector is:	17.52 feet	15.93 for Director
Low Mount Halfwave is:	16.33 feet	8.16 one side.
Halfwave folded dipole is:	16.47 feet	8.24 one side.
Halfwave inverted V is:	17.29 feet	8.65 one side.
Extended double Zepp is:	44.90 feet	22.45 one side.
Fullwave quad loop is:	36.36 feet	9.09 one side.
Reflector Director:	38.18 34.73	9.55  8.68 one side.
Fullwave delta loop is:	36.36 feet	12.12 one side.
Reflector Director:	38.18 34.73	12.73 11.58 one side.
Waves 1:	34.22  1.5:	51.76  2: 69.30  2.5: 86.84  3: 104.39  4 : 139.47
Waves 5:	174.55  6.0:	209.63  7: 244.71  8.0: 279.79  9: 314.87  10: 349.95

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## 10 Meter SSB

Center Frequency:	28.450 Mhz	84.147 Mhz 3rd Harmonic
Halfwave in space is:	17.29 feet	11.59 coax 15.22 twinlead
Quarter wave in space is:	8.65 feet	5.79 coax  7.61 twinlead
Quarter wave Vertical is:	8.22 feet	9.68 foot ground radials
Five eights wave Vertical is:	21.44 feet	8.22 foot ground plane
Three Quarter wave Vertical:	25.52 feet	4.11 foot eighthwave
Halfwave wire dipole is:	16.45 feet	8.22 one side.
Halfwave Reflector is:	17.27 feet	15.71 for Director
Low Mount Halfwave is:	16.10 feet	8.05 one side.
Halfwave folded dipole is:	16.24 feet	8.12 one side.
Halfwave inverted V is:	17.05 feet	8.52 one side.
Extended double Zepp is:	44.27 feet	22.14 one side.
Fullwave quad loop is:	35.85 feet	8.96 one side.
Reflector Director:	37.64 34.24	9.41  8.56 one side.
Fullwave delta loop is:	35.85 feet	11.95 one side.
Reflector Director:	37.64 34.24	12.55 11.41 one side.
Waves 1:	33.74  1.5:	51.04  2: 68.33  2.5: 85.62  3: 102.92  4 : 137.50
Waves 5:	172.09  6.0:	206.68  7: 241.27  8.0: 275.85  9: 310.44  10: 345.03

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## 10 Meter FM

Center Frequency:	29.600 Mhz	87.549 Mhz 3rd Harmonic
Halfwave in space is:	16.62 feet	11.14 coax 14.63 twinlead
Quarter wave in space is:	8.31 feet	5.57 coax  7.31 twinlead
Quarter wave Vertical is:	7.91 feet	9.31 foot ground radials
Five eights wave Vertical is:	20.61 feet	7.91 foot ground plane
Three Quarter wave Vertical:	24.53 feet	3.95 foot eighthwave
Halfwave wire dipole is:	15.81 feet	7.91 one side.
Halfwave Reflector is:	16.60 feet	15.10 for Director
Low Mount Halfwave is:	15.47 feet	7.74 one side.
Halfwave folded dipole is:	15.61 feet	7.80 one side.
Halfwave inverted V is:	16.39 feet	8.19 one side.
Extended double Zepp is:	42.55 feet	21.28 one side.
Fullwave quad loop is:	34.46 feet	8.61 one side.
Reflector Director:	36.18 32.91	9.05  8.23 one side.
Fullwave delta loop is:	34.46 feet	11.49 one side.
Reflector Director:	36.18 32.91	12.06 10.97 one side.
Waves 1:	32.43  1.5: 49.05  2: 65.68  2.5: 82.30  3: 98.92  4 : 132.16	
Waves 5:	165.41  6.0: 198.65  7: 231.89  8.0: 265.14  9: 298.38  10: 331.62	

## Six Meter Wire Antennas

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### Six Meter CW/SSB

Center Frequency:	50.100 Mhz	147.86 Mhz 3rd Harmonic
Halfwave in space is:	9.82 feet	6.68 coax  8.05 twinlead
Quarterwave in space is:	4.91 feet	3.34 coax  4.03 twinlead
Quarterwave Vertical is:	4.67 feet	5.50 foot ground radials
Five Eights wave Vertical is:	12.04 feet	4.67 foot ground plane
Three Quarter wave Vertical:	14.49 feet	2.34 foot eighthwave
Halfwave Dipole/Vertical is:	9.34 feet	4.67 one side.
Halfwave Reflector is:	9.81 feet	8.92 for Director
Low Mount Halfwave is:	9.14 feet	4.57 one side.
Halfwave Folded Dipole is:	9.22 feet	4.61 one side.
Halfwave Inverted V is:	9.68 feet	4.84 one side.
Colinear Array is:	19.16 feet	9.58 one side.
Extended Double Zepp is:	24.07 feet	12.04 one side.
Fullwave Quad Loop is:	20.36 feet	5.09 one side.
Reflector Director:	21.38 19.44	5.34  4.86 one side.
Fullwave Delta Loop is:	20.36 feet	6.79 one side.
Reflector Director:	21.38 19.44	7.13  6.48 one side.
Waves 1:	19.16  1.5: 28.98  2: 38.80  2.5: 48.62  3: 58.44  4 : 78.08	
Waves 5:	97.72  6.0: 117.37  7: 137.01  8.0: 156.65  9: 176.29  10: 195.93	

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### Six Meter FM

Center Frequency:	52.525 Mhz	155.01 Mhz 3rd Harmonic
Halfwave in space is:	9.37 feet	6.37 coax  7.68 twinlead
Quarterwave in space is:	4.68 feet	3.18 coax  3.84 twinlead
Quarterwave Vertical is:	4.46 feet	5.25 foot ground radials
Five Eights wave Vertical is:	11.48 feet	4.46 foot ground plane
Three Quarter wave Vertical:	13.82 feet	2.23 foot eighthwave
Halfwave Dipole/Vertical is:	8.91 feet	4.46 one side.
Halfwave Reflector is:	9.36 feet	8.51 for Director
Low Mount Halfwave is:	8.72 feet	4.36 one side.
Halfwave Folded Dipole is:	8.80 feet	4.40 one side.
Halfwave Inverted V is:	9.23 feet	4.62 one side.
Colinear Array is:	18.28 feet	9.14 one side.
Extended Double Zepp is:	22.96 feet	11.48 one side.
Fullwave Quad Loop is:	19.42 feet	4.85 one side.
Reflector Director:	20.39 18.55	5.10  4.64 one side.
Fullwave Delta Loop is:	19.42 feet	6.47 one side.
Reflector Director:	20.39 18.55	6.80  6.18 one side.
Waves 1:	18.28  1.5:	27.64  2: 37.01  2.5: 46.38  3: 55.74  4 : 74.48
Waves 5:	93.21  6.0:	111.95  7: 130.68  8.0: 149.41  9: 168.15  10: 186.88

**Note:** At Six meters the diameter of elements in terms of wavelength starts to become large, even with heavy wire like 10 gauge. With tubing elements, an additional shortening factor starts to become important. As elements get fat, the resonant frequency goes down for a given length. This is not a problem on the lower frequencies where even one inch tubing is still small diameter relative to wavelength, but at six meters and above it starts to become more and more significant.