



Communicators have long needed a broadband, omnidirectional, HF antenna with the highest possible power gain. Vertically polarized antennas traditionally used for HF omnidirectional coverage suffer serious ground losses (up to 8 dB) or poor pattern directivity, or both.

The Model 540 is a horizontally polarized, omnidirectional log periodic antenna embodying a radical new design, and having remarkably high power gain. Horizontal polarization virtually eliminates ground losses, and arraying in elevation provides superior directivity. At 30 MHz power gain exceeds 10 dBi over average soil, decreasing to 7 dBi at 3.6 MHz. VSWR does not exceed 2.5:1 over the 3.6 to 30 MHz spectrum. Performance is virtually independent of the ground beneath the antenna, and no ground screen is required.

In addition to the Model 540's exceptional gain and omnidirectional pattern, its unique configuration provides a broad elevation plane lobe with high angle radiation at lower frequencies, and a narrow lobe with low angle radiation at higher frequencies. The actual take-off angles closely parallel the statistical ideal so that the Model 540 is superb for roll-call, shore-ship, and ground-air applications involving transmission paths greater than 1,000 km.

As a result of its high omnidirectional gain, a single Model 540 can replace up to 6 directional horizontal log-periodic antennas with enormous land and capital savings. It can also substitute for a rotatable log-periodic with almost no loss in performance and none of the mechanical maintenance or reliability problems normally associated with this type of antenna.

- **Medium to long range omnidirectional coverage**
- **Horizontally polarized to eliminate ground loss**
- **High true power gain**
- **Rugged construction**

As with all TCI antennas, the Model 540 employs high quality, exhaustively tested components and materials. All radiators, feedlines, and catenaries are of Alumoweld, a wire composed of a high strength steel core and a highly conductive, corrosion resistant, welded coating of aluminum. All feedline and radiator tip insulators are made of high strength glazed alumina, a material with an extremely low loss tangent (.001) and virtually impervious to the effects of ultraviolet radiation, dirt, and salt spray. No fiberglass is used in the antenna.

The antenna is supplied in preassembled kit form with all required materials including towers, guys, guy anchors, radiating curtain, feed hardware, balun, and steel mounting hardware to be imbedded in the concrete foundations, but not including concrete or concrete reinforcing steel.

# Specifications

	540-1	540-2
<b>Polarization</b> .....	Horizontal	Horizontal
<b>Frequency</b> .....	3.6–30 MHz	4.0–30 MHz
<b>VSWR</b> .....	2.0:1 nominal 2.5:1 maximum	2.0:1 nominal 2.5:1 maximum
<b>Power Gain</b> .....	7 dBi at 3.6 MHz 10.5 dBi at 30 MHz	6 dBi at 4 MHz 10 dBi at 30 MHz
<b>Take-Off Angle</b> .....	30° at 3.6 MHz 9° at 30 MHz	38° at 4 MHz 10° at 30 MHz
<b>Azimuth Plane</b>		
<b>Pattern</b> .....	Circular within 1 dB	Circular within 1 dB
<b>Height</b> .....	36.6 m (120 ft.)	30.2 m (99 ft.)
<b>Size</b> .....	87.6 m (287.2 ft.) by 87.6 m (287.2 ft.)	90.2 m (269 ft.) by 90.2 m (269 ft.)
<b>Ground Screen</b> .....	None	None
<b>Environmental</b> .....	All versions designed in accordance with EIA RS-222C for loading of:	
<b>Standard Towers</b> .....	193 Km/h (120 mi/h) wind, no ice; 112 Km/h (70 mi/h) wind, 12 mm (1/2") radial ice. Also complies with EIA specification EIA-222-E for the indicated wind speeds at the top of the masts.	
<b>Heavy Towers</b> .....	For Model 540-1, 225 Km/h (140 mi/h) wind no ice; 124 Km/h (90 mi/h) wind 12 mm (1/2") radial ice.	

Path Length	TOA	Power Gain at 3.6 MHz (dBi)†		Power Gain at 12 MHz (dBi)†		Power Gain at 22 MHz (dBi)†	
		540-1	505	540-1	505	540-1	505
1000 km	28°	+7	+1	+4	+1	+4	+2
1600 km	17°	+5	+2	+7	–4	+8	+1
2200 km	10°	+1	–2	+5	–3	+10	–3

†Gain calculated with antenna over average ground.

The table above compares performance of the Model 540 with that of a typical vertically polarized inverted cone, the TCI Model 505. The Model 540 significantly outperforms it.

## Power and Impedance Data

Model Number	Input Impedance	Power Handling Handling	Connector
540-N-02	50 ohms	Receive	Type N
540-N-06	50 ohms	1 kW Avg. / 2 kW PEP	Type N
540-N-28	50 ohms	5 kW Avg. / 10 kW PEP	7/8" EIA Female
540-N-03	50 ohms	10 kW Avg. / 50 kW PEP	1 5/8" EIA Female
540-N-09	50 ohms	20 kW Avg. / 40 kW PEP	1 5/8" EIA Female
540-N-04	50 ohms	25 kW Avg. / 50 kW PEP	1 5/8" EIA Female
540-N-05	50 ohms	25 kW Avg. / 100 kW PEP	3 1/8" EIA Female

Nomenclature, 540-2-05, AS-4133/F

NOTE: Balun support pole, normally class 1 Douglas Fir, is required for transmitting but not supplied by TCI. Check with TCI for specific requirements.

## ELEVATION PATTERNS power gain in dBi, Model 540-1

