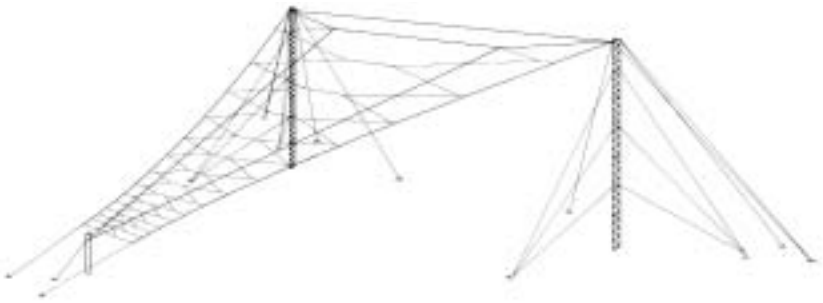
TCI
A Dielectric Company

MODELS

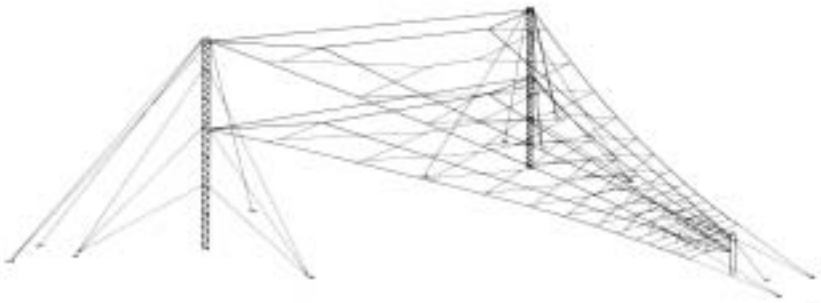
524, 527 and 527B

Super High Gain Log-Periodic Antennas

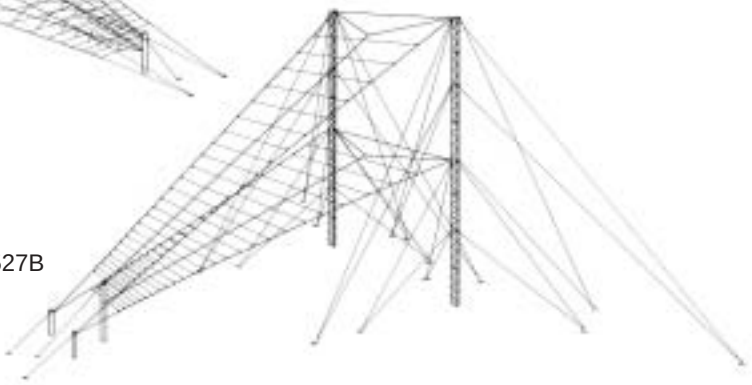
U.S. Patent No. 3,257,661



Model 524



Model 527



Model 527B

Highly reliable communications on long-range circuits require antennas with high power gain at low take-off angles. In addition, ionospheric variations resulting in frequent changes in frequency make it desirable for the antenna to have a wide frequency bandwidth. The conventional approach to achieve wide band, highly directive antennas has been to use multiple rhombic antennas which rely heavily on end-fire gain to achieve their directivity and hence are quite large. Typical installations exceed 300 meters in length and require large investments in land.

Log-periodic antennas have long been desired for their wide band characteristics, efficient land use, and modest price. Heretofore, increasing the gain of a log-periodic has been attempted through end-fire techniques. This approach results in very large structures which are difficult to support and install.

Small structures with very high gain are now possible with techniques developed at TCI which employ broadside gain. Use of the clamped mode technique* physically increases the width of the radiating aperture resulting in larger broadside gain. The width of the active region of the 524 and 527 is one and one half wavelengths.

Individual radiators resemble a saw-tooth and are the electrical equivalent of “fattened” radiators with low Q. The reduction in Q increases the power handling capability and lengthens the effective active region resulting in greater radiation efficiency.

- **Reliable Communications on Long Range Circuits**
- **High Power Gain – Over 18 dBi**
- **Wide Frequency Bandwidth – 4 to 30 MHz**
- **Small Land Area – Replaces Rhombic Twice the Size**
- **Low Take-Off Angle**

It is well known that vertically polarized antennas experience undesirable ground losses without the use of sizable ground screens. Because the TCI super high gain antennas are horizontally polarized, ground losses are negligible and the maximum possible antenna gain is actually achieved without ground screens.

All TCI antennas share the same 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.

Fixed station log-periodic antennas traditionally have used fiberglass catenary and drop rod assemblies on the basis of excellent dielectric and tensile strength properties. However, field experience has shown that minute, difficult-to-detect flaws in the material, RF burning, small nicks incurred during installation handing which may result in catastrophic structural failure later on, and deterioration when stored for long periods of time at high temperature and humidity, all contribute toward a definite need for improvement. The TCI antennas use Alumoweld catenaries, broken up by fail-safe insulators.

The TCI towers are furnished with either 6061-T6 aluminum or galvanized steel. All bolts and nuts are of the same material as the tower thereby eliminating all dissimilar metal contacts.

Specifications

MODEL 524 ANTENNA
The Model 524 is a single curtain antenna utilizing the clamped mode fattened radiator design. The antenna is three half wavelengths wide resulting in a dramatic increase in the broadside radiating aperture. The antenna gain is 15.5 dBi minimum, 16 dBi nominal and the azimuth beamwidth is 38°. On a long point-to-point circuit where wide azimuth coverage is not required this antenna provides reliable communications with a single antenna curtain.

Polarization ..... Horizontal

VSWR ..... 2.0:1 maximum

Azimuth Beamwidth ..... 38° nominal

Front-to-Back Ratio & Side Lobe Level ..... 13 dB nominal

Environmental Performance ..... Designed in accordance with EIA Specification RS-222C for loading of 225 km/h (140 mi/h) wind, no ice, 145 km/h (90 mi/h) wind, 12 mm (1/2") radial ice
Optional: 160 km/h (100 mi/h) wind only, no ice

Size

Model Number	Frequency Range	Height ft.	Height mtr.	Length* ft.	Length* mtr.	Width* ft.	Width* mtr.
524-3-N	4–30 MHz	141	42.9	406	123.8	597	182.5
524-6-N	5–30 MHz	121	36.8	358	109	514	157
524-4-N	6.2–30 MHz	101	30.8	285	86.87	395	120.4

* Measured from extreme guy points.

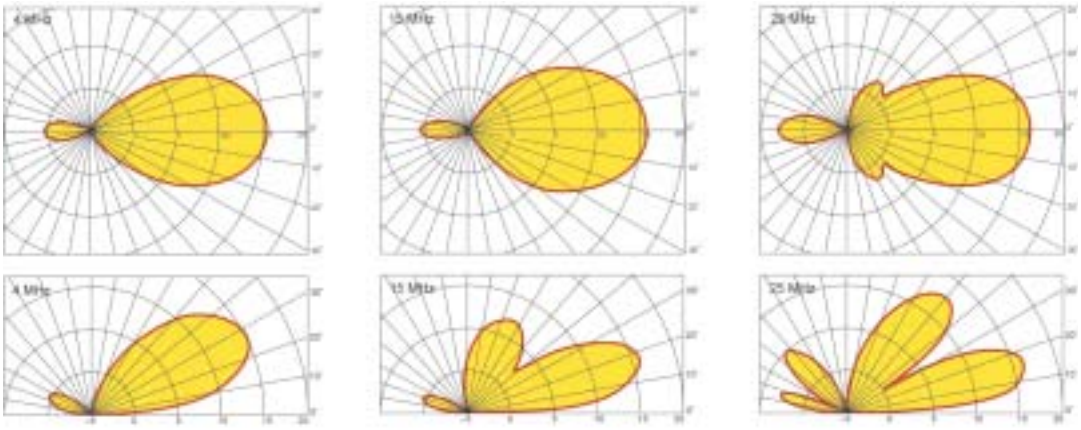
Gain and Pattern Data

Freq.	Gain	LHPP	TOA	UHPP
fo	15.5 dBi	15°	27°	42°
15 MHz	16.0 dBi	9°	19°	29°
21 MHz	16.5 dBi	9°	17°	27°
25 MHz	16.5 dBi	8°	15°	24°
30 MHz	16.5 dBi	8°	14°	23°

Power and Impedance Data

Model Number	Input Impedance	Power	Connector
524-N-02	50 ohm	Receive	Type N Female
524-N-03	50 ohm	10/50 kW	1-5/8" EIA Female
524-N-04	50 ohm	25/50 kW	1-5/8" EIA Female
524-N-06	50 ohm	1/2 kW	Type N Female

ELEVATION AND AZIMUTH PATTERNS (Azimuth pattern at elevation angle of beam maximum, gain in dBi)



NOTE: Front support poles, normally class 2,3, or 4 Douglas Fir, are required but not supplied by TCI. Check with TCI for specific requirements.

Specifications

MODEL 527B ANTENNA

The Model 527B antenna consists of two standard transposed dipole arrays which are horizontally polarized and stacked in the vertical plane. The increase in vertical aperture decreases the H-plane beamwidth resulting in antenna gain of 15 dBi while retaining an azimuth beamwidth of 64°. This antenna is extremely useful in applications where high gain, low take-off angles are required over a broad azimuth.

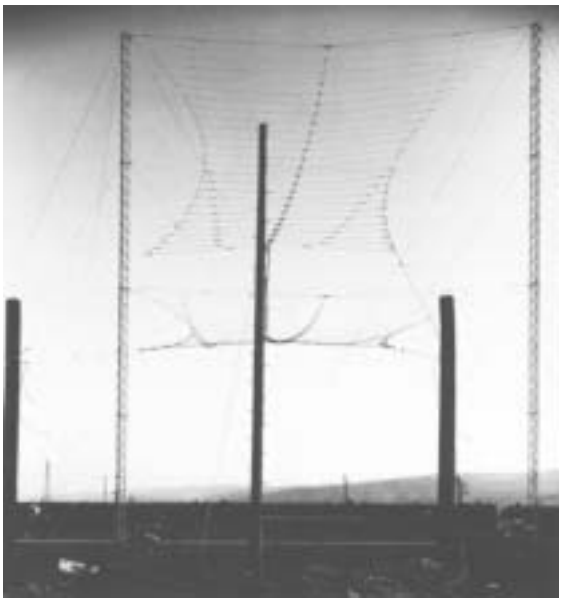
Polarization .....Horizontal

VSWR.....2.0:1 maximum

Azimuth Beamwidth .....64° nominal

Front-to-Back Ratio & Side Lobe Level .....13 dB nominal

Environmental Performance .....Designed in accordance with EIA Specification RS-222C for loading of 225 km/h (140 mi/h) wind, no ice, 145 km/h (90 mi/h) wind, 12 mm (1/2") radial ice
Optional: 160 km/h (100 mi/h) wind only, no ice



Gain and Pattern Data

Freq.	Gain	LHPP	TOA	UHPP
4.0 MHz	14.5 dBi	11°	22°	35°
6.2 MHz	14.7 dBi	10°	20°	34°
12.0 MHz	15.0 dBi	8°	17°	26°
25.0 MHz	15.2 dBi	6°	14°	21°
30.0 MHz	15.2 dBi	6°	13°	20°

Size

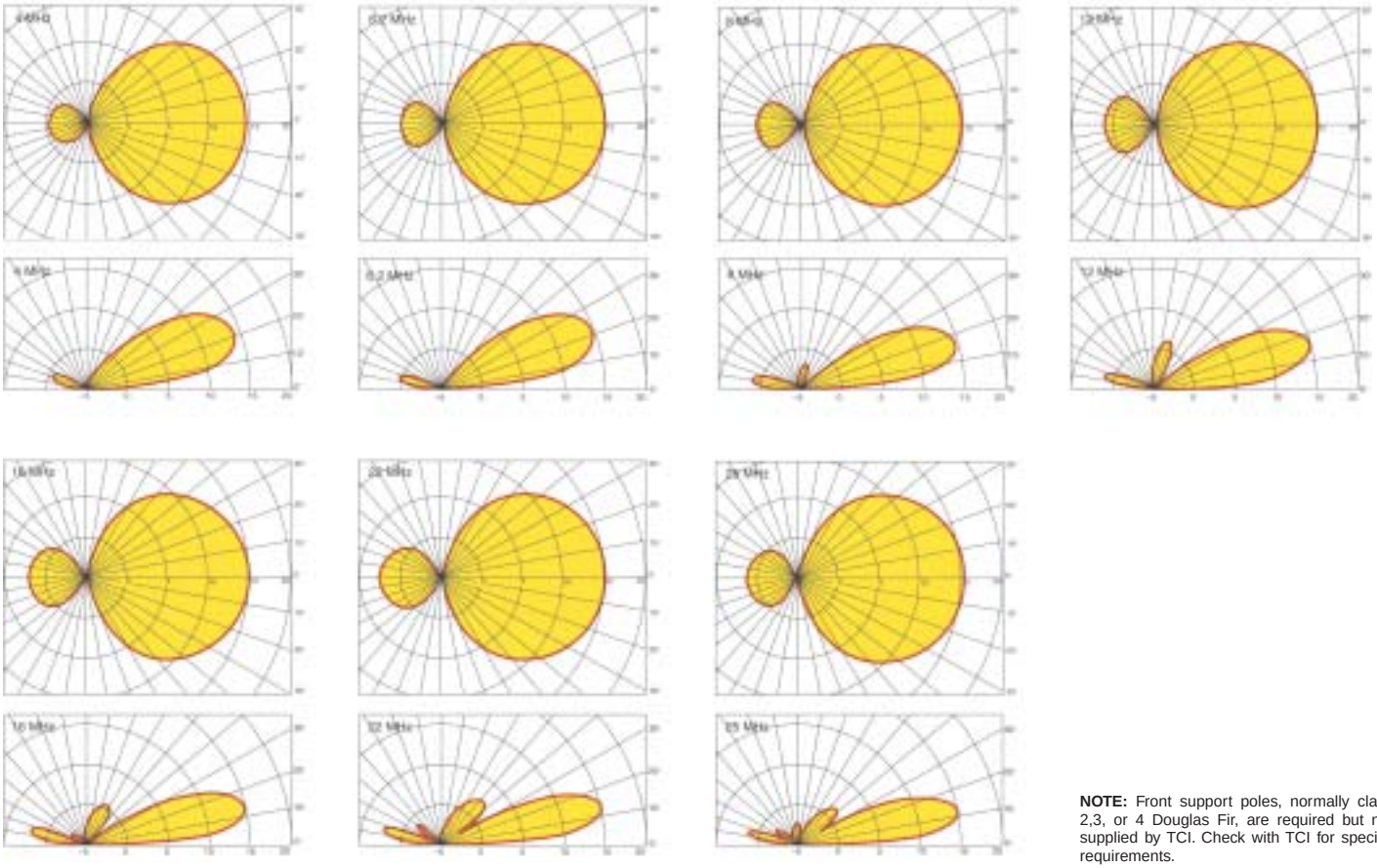
Model Number	Frequency Range	Height ft.	Height mtr.	Length* ft.	Length* mtr.	Width* ft.	Width* mtr.
527B-2-N	4–30 MHz	220	67.2	487	148.4	600	183
527B-8-N	6.2–30 MHz	151	46	330	101	410	125

* Measured from extreme guy points.

Power and Impedance Data

Model Number	Input Impedance	Power	Connector
527B-N-02	50 ohm	Receive	Type N Female
527B-N-03	50 ohm	10/50 kW	1-5/8” EIA Female
527B-N-04	50 ohm	25/50 kW	1-5/8” EIA Female
527B-N-06	50 ohm	1/2 kW	Type N Female

ELEVATION AND AZIMUTH PATTERNS (Azimuth pattern at elevation angle of beam maximum, gain in dBi)



NOTE: Front support poles, normally class 2,3, or 4 Douglas Fir, are required but not supplied by TCI. Check with TCI for specific requirements.

Specifications

MODEL 527 ANTENNA

The Model 527 consists of two 524 curtains stacked vertically. On long range point-to-point circuits where extremely high power gain and low take-off angle are required, the 527 will provide highly reliable communications. Performance will exceed that of a rhombic more than twice the size. The 527 provides antenna gain in excess of 18 dBi and at a take-off angle of 12°.

Polarization ..... Horizontal

VSWR ..... 2.0:1 maximum

Azimuth Beamwidth ..... 38° nominal

Front-to-Back Ratio & Side Lobe Level ..... 13 dB nominal

Environmental Performance ..... Designed in accordance with EIA Specification RS-222C for loading of 225 km/h (140 mi/h) wind, no ice, 145 km/h (90 mi/h) wind, 12 mm (1/2") radial ice
Optional: 160 km/h (100 mi/h) wind only, no ice

Size

Model Number	Frequency Range	Height ft.	Height mtr.	Length* ft.	Length* mtr.	Width* ft.	Width* mtr.
527-2-N	4–30 MHz	221	67.5	598	182.2	781	238.1
527-3-N	6.2–30 MHz	170	51.8	388	118.3	545	166
527-6-N	4.95–26 MHz	184	56	442	135	610	183

* Measured from extreme guy points.

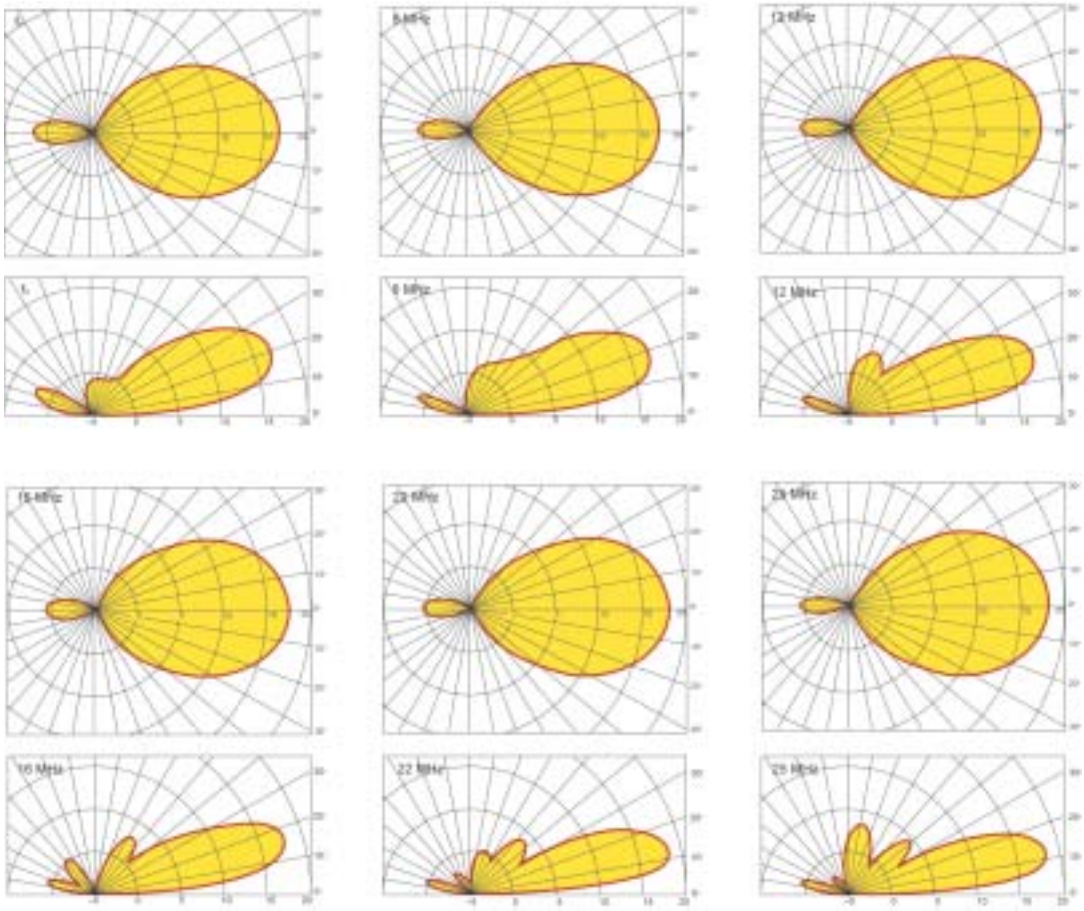
Gain and Pattern Data

Freq.	Gain	LHPP	TOA	UHPP
fo	16.5 dBi	10°	20°	33°
12 MHz	17.5 dBi	9°	18°	28°
25 MHz	18.2 dBi	6°	13°	20°
30 MHz	18.2 dBi	6°	12°	19°

Power and Impedance Data

Model Number	Input Impedance	Power	Connector
527-N-02	50 ohm	Receive	Type N Female
527-N-03	50 ohm	10/50 kW	1-5/8" EIA Female
527-N-04	50 ohm	25/50 kW	1-5/8" EIA Female
527-N-06	50 ohm	1/2 kW	Type N Female
527-4-100	300 ohm Balanced	100 kW AM (150 kW Avg/ 400 kW Peak)	Balanced Terminals

ELEVATION AND AZIMUTH PATTERNS (Azimuth pattern at elevation angle of beam maximum, gain in dBi)



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