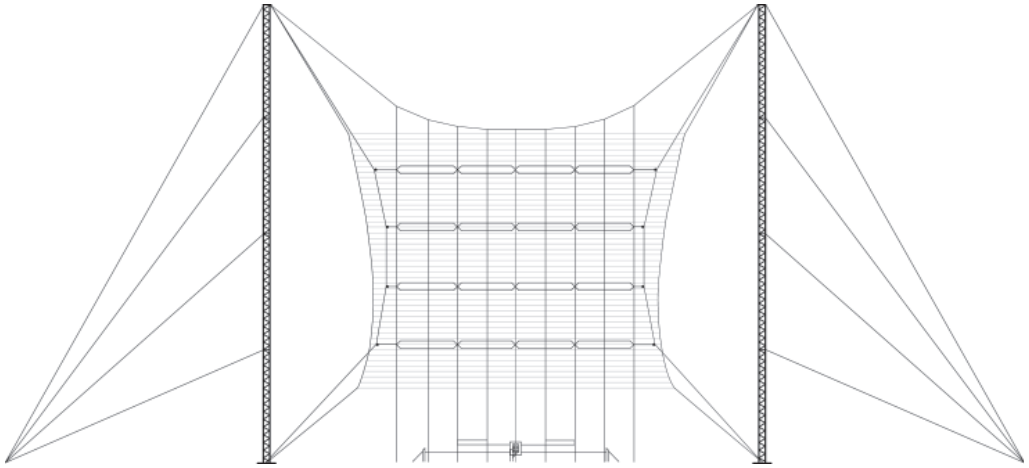
TCI

AN SPX COMPANY

MODEL **611**

Shortwave Broadcast Antenna



FEATURES

- High Power
- High Power Gain
- Wide Band
- Slewable
- Rugged Construction
- Factory Pre-Assembled for easy and quick installation

Dipole Curtain Antennas, Model 611

Dipole curtain antennas have long been favored for high-power shortwave broadcasting. Historically, these antennas have had several undesirable traits: narrow bandwidth, extensive fabrication necessary in the field, complicated and time-consuming installation, and materials being subject to corrosion.

Wide-band techniques using optimized half-wave folded dipoles developed at TCI make it possible to supply dipole curtain antennas with frequency bands in excess of 2:1. In most cases, this bandwidth encompasses 4 or 5 adjacent broadcast bands. One TCI four-band antenna replaces four single frequency antennas with the associated savings in land, antenna cost, transmission lines, switching, and installation cost.

As with all TCI antennas, complete fabrication and pre-assembly are accomplished in the factory. No measuring, cutting, swagging, welding, or other manufacture is required in the field. Installation consists of only the tower erection and hoisting the preassembled curtains. The few connections required are accomplished with nuts and bolts. Installation cost and time can be reduced by at least half that of the more conventional arrays. While each dipole curtain is usually designed for a specific application, TCI manufacturing technique maximizes the commonality of parts and allows fabrication using mass production.

Standard Broadcast Nomenclature

H R R S 4/4/1
- 1 — Height of lowest radiator above ground in wavelengths
- 4 — Number dipoles stacked vertically (one-half wave length spacing)
- 4 — Number dipoles (one-half wavelength) wide
- S — Array may be slewed
- R — Radiation direction is reversible
- R — Reflectors present
- H — Horizontal Polarization

Like other standard TCI antennas, the TCI broadcast antennas consist of high-quality, exhaustively tested components and materials. All radiators, feedlines, and supporting catenaries are of Alumoweld, a wire composed of a high strength steel core and a highly conductive, corrosion-resistant welded coating of aluminum. All insulators are made of high-strength glazed alumina or high quality porcelain. No organic or fiberglass material is used anywhere in the antenna. Dissimilar metal contacts, long a troublesome cause of corrosion, have been eliminated.

TCI has vast experience in high voltage technology, having antennas operating in excess of 4 megawatt. All components are thoroughly tested for voltage flash-over to ensure safety factors well in excess of the actual voltage stress experienced. Dipoles and reflecting screen are DC grounded for safety.

The Model 611 can be supplied in most configurations dependent on the particular application. Readily available are types HRS 4/4 and HR 2/2. Please contact your nearest TCI engineer to help you select the configuration for your application. Model 611 antennas, which are reversible and slewable, are also available. Model 611 antennas can be supplied with guyed or self-supporting towers that are made from hot-dip galvanized steel, or can be mounted on existing or customer-supplied towers.

TCI can supply components for your complete radiation system. Available are transmission line, switches, balun transformers and diplexers, which allow the simultaneous use of two transmitters on adjacent bands with only one TCI antenna.

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ISO 9001:2000 CERTIFIED QUALITY MANAGEMENT SYSTEM

Specifications

Polarization ..... Horizontal

Frequency ..... 6–26 MHz, one, two, three, four and five band antennas available (6-11, 9-17, 11-21, 13-26 Mhz typical)

Input Impedance ..... 300 ohms balanced (others available on request)

VSWR ..... 1.35 nominal, 1.5:1 maximum

Power ..... Up to 500 kW carrier with 100% modulation (also compatible with two diplexed 250 kW transmitters)

Slew ..... 3 or 5 positions, maximum slew +30°

Other Options ..... Reversing switches available, 2-wide/4-wide switching available on 4/-/- models

Environmental Performance ..... Designed in accordance with EIA Spec. RS-222F for loading of 160 km/h (100 mi/h) wind. Wind loading up to 240 km/h (146 mi/h) available as an option

Gain ..... See Fig. 2 for gain figures of various options

Radiation Patterns ..... Take-off angle is shown in Fig.1. The radiation patterns for an HR 4/4/.5 three-band array at freqs. .78 f_o, f_o, and 1.22 f_o are shown at right. f_o is the center frequency.

Front-to-Back Ratio ..... 20 dB typical

Figure 1. Take-Off Angle – Dipole Curtain Array with reflecting screen

Number of elements in vertical stack (m) (1/2 wavelength spacing)	Height above ground of lowest element in wavelengths (h)			
	0.25	0.5	0.75	1.0
1	45°*	29°	19°	15° & 48°**
2	22°	17°	14°	11°
3	15°	12°	10°	9°
4	11°	10°	8°	7°
5	9°	8°	7°	6°
6	7°	7°	6°	5°

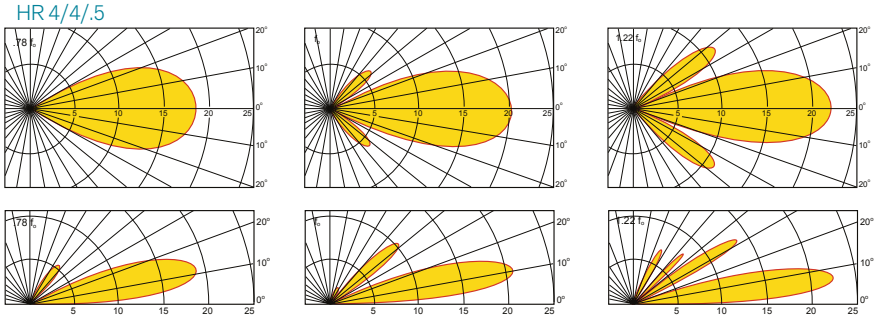
*90° w/o Reflector ** Two Lobes Present

Figure 2. Gain in dBi of Dipole Curtain Array with perfect reflecting screen spaced 0.3 wavelengths from elements

Number of elements in vertical stack (m) (1/2 wavelength spacing)	Number of half-wave elements wide (n)															
	1				2				3				4			
	Height above ground of lowest element in wavelengths (h).															
	0.25	0.50	0.75	1.0	0.25	0.50	0.75	1.0	0.25	0.50	0.75	1.0	0.25	0.50	0.75	1.0
1	12.5	13.2	14.0	13.6	13.5	14.4	15.3	14.8	15.4	16.4	17.1	16.8	16.1	17.2	17.9	17.5
2	14.0	15.0	15.6	15.8	15.4	16.5	17.0	17.2	17.5	18.4	19.0	19.2	18.2	19.3	19.8	20.0
3	15.6	16.4	16.9	17.2	17.1	17.9	18.4	18.7	19.0	19.8	20.3	19.6	19.8	20.7	21.2	21.5
4	16.7	17.3	17.9	18.2	18.2	18.9	19.4	19.7	20.1	20.8	21.3	21.6	21.0	21.7	22.2	22.5

Model 611 Elevation and Azimuth Patterns (over perfect earth) gain in dBi

HR 4/4/.5



HR 4/4/1.0

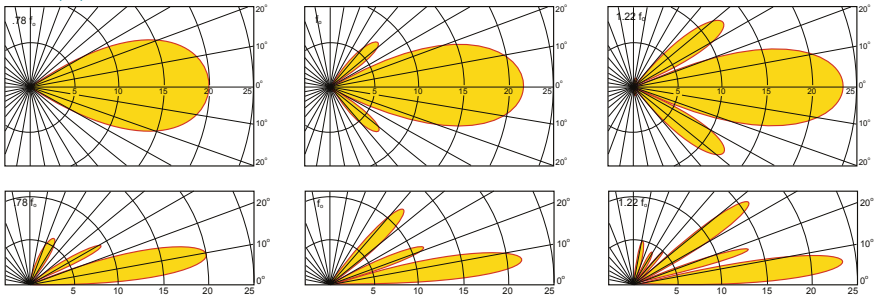
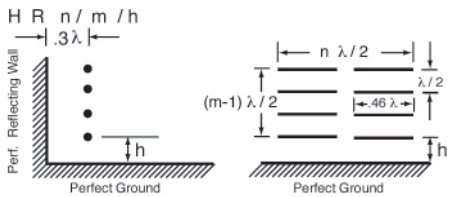


Figure 3. Azimuth Beamwidth*

Number of elements in vertical stack (m) (1/2 wavelength spacing)	Number of half-wave elements wide (n)		
	1	2	4
1	76°	54°	26°
2	74°	50°	24°
3	74°	49°	24°
4	73°	49°	24°

*between half power points



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