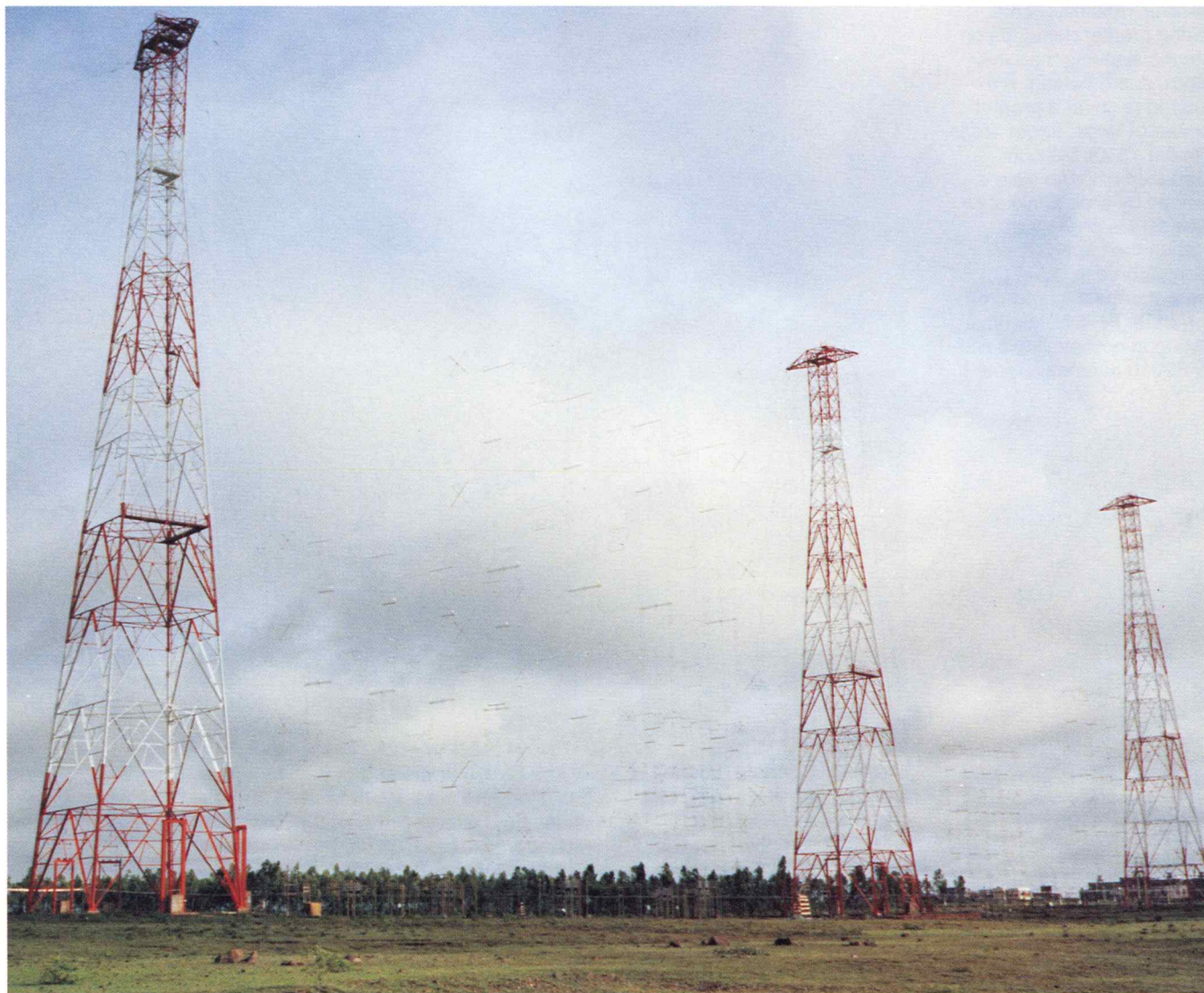


HF Broadcasting Antenna High Power, Wideband, Wideslew



FEATURES

- High Power
- High Gain
- Low VSWR
- Half Mode Operation
- Wide Azimuth Slew
- Vertical Slew
- 50 or 300 Ohm Inputs

Introduction

Since the very beginning of broadcasting, Marconi has been a world leader in the field of antenna systems. Evolutionary design over the last seventy years has led to the range of systems now available to broadcasters worldwide.

Today, in the congested HF broadcast spectrum, more powerful transmitters are making greater demands on antenna systems than ever before, and antennas are required to cover a greater number of larger target areas.

In the 1930s Marconi introduced azimuth slew followed by wide angle slew in the 1960s giving the antenna the capability of being steered to cover different targets as required. For further flexibility vertical slewing is now available with the R9010 antenna.



Description

The R9010 curtain antenna is an array of half wave dipoles suspended in front of a reflecting screen of horizontal wires for uni-directional operation. The number and arrangement of the dipoles determine the gain and radiation pattern and allow the antenna to be adapted to suit a particular route. Varying the take off angle by altering the height above ground of the array determines the range of the transmission.

Being horizontally polarised, the radiation characteristics of the R9010 are virtually independent of the ground conductivity of the transmission site.

Reversible antennas with two curtains on opposite bearings can be supplied.

The R9010 antenna is designed and manufactured under strict quality control and delivered to site in kit form to minimize installation time. The latest in computer analysis and Computer Aided Design ensure that high levels of reliability and maintainability are incorporated and life cycle costs minimized. All materials are carefully chosen to suit the site environment, minimizing corrosion risks.

Azimuth Slewing

The introduction of a progressive phase shift to the vertical stacks of dipoles in the array allows the beam to be steered up to 30° either side of the straight ahead position. Balanced switches are used to introduce additional lengths of transmission lines into the dipole feeds.

Half Mode

Operation of only half the curtain is possible, providing further variations to the azimuth pattern.

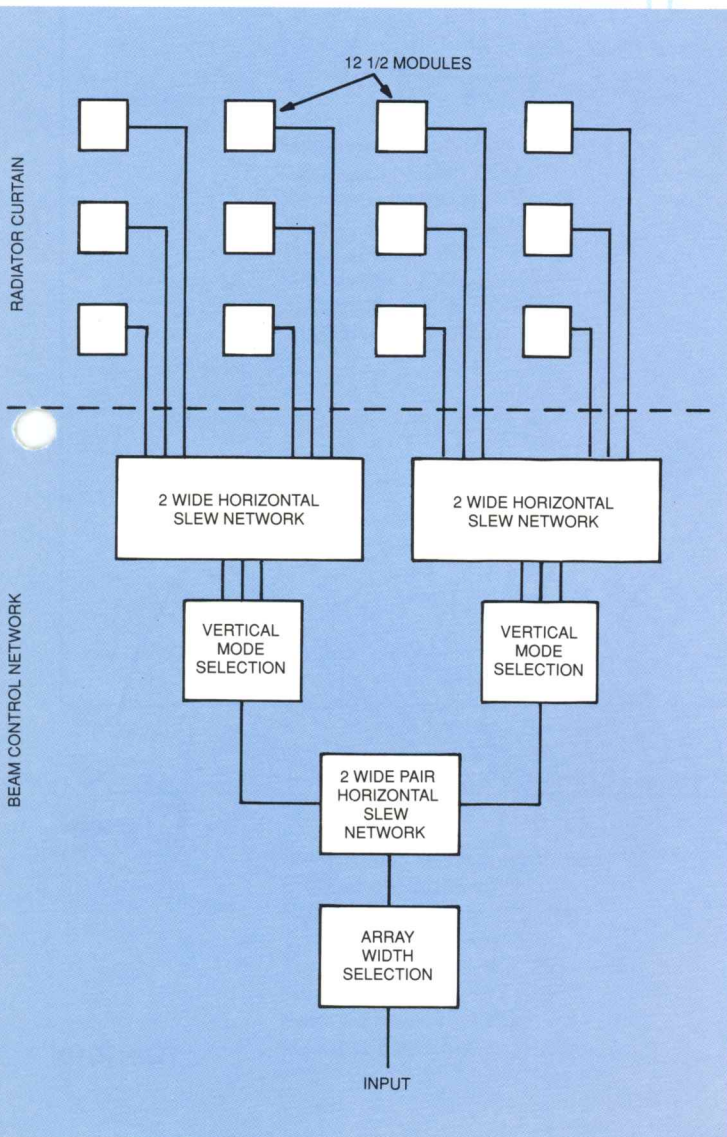
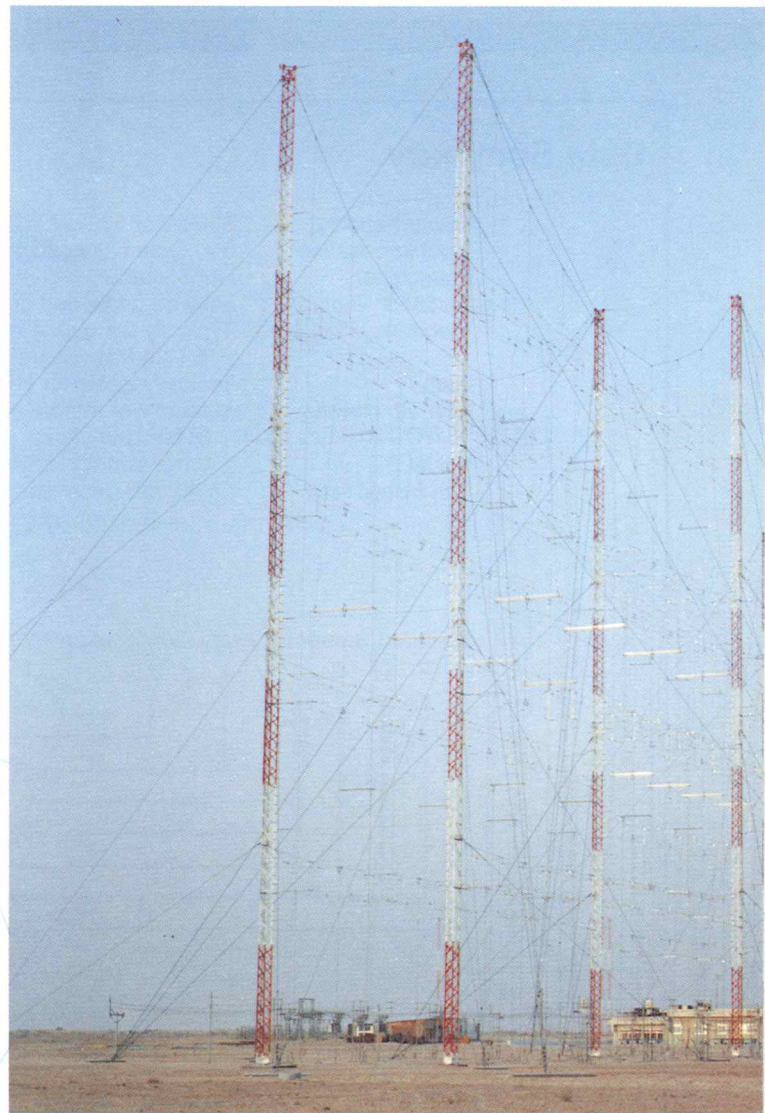
Reducing the horizontal aperture of the antenna greatly increases its beamwidth.

Vertical Slewing

Control of the take off angle of the antenna can be accomplished in either of two ways depending on the specific pattern requirements of the broadcaster:

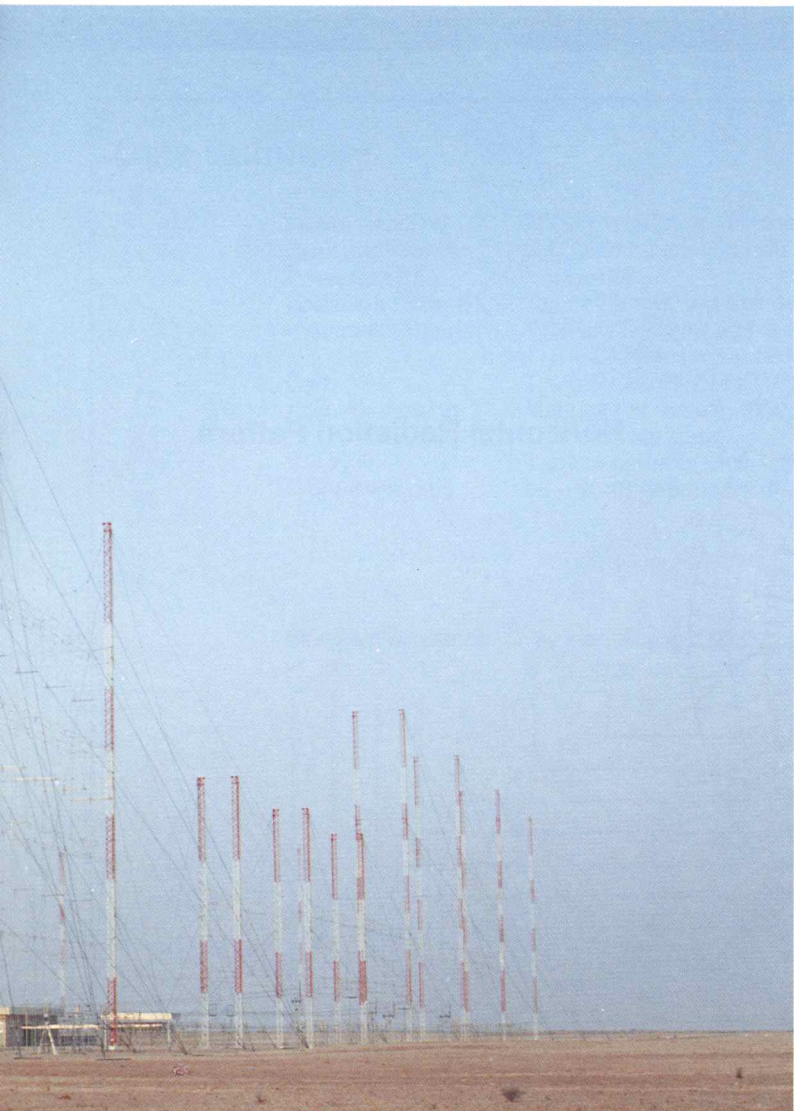
- i. Exciting only the lower part of the antenna curtain,
- ii. Exciting the upper part of the curtain in antiphase to the lower part.

In each case the switching is carried out in the bayfeeder with standard switches.



Control

The switches required to slew the antenna can be controlled locally from the bayfeeder area or remotely from panels mounted in the transmitter building. Fully integrated systems bringing together transmitter, switching matrix and antenna controls are engineered, supplied and installed by Marconi.



Support Structures

The antenna can be supported by pairs of lightweight guyed masts, by self supporting towers with crossarms or by guyed masts with spreaders. The choice of structure type, unless specified by the broadcaster, would be made by Marconi on the basis of the environmental conditions, available land area, fabrication and maintenance costs in order to ensure the most economic solution.

If required, the support structures can be designed, supplied and installed by Marconi.

The Complete Capability

Marconi offers a full system capability from the propagation study, system design, site survey and civil works, to equipment supply, installation, commissioning and maintenance. Any or all of these tasks can be undertaken by Marconi anywhere in the world. An engineer can be provided to supervise the customer's personnel if required.

Full turnkey systems including a switching matrix and cross site feeder can be undertaken.

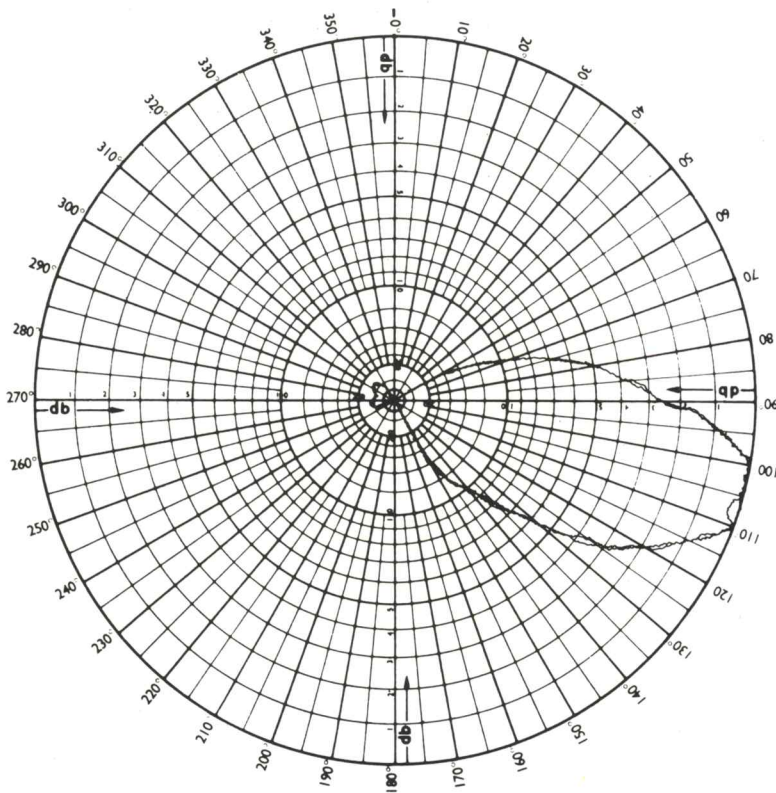
Flexibility in Design

The flexibility in the Marconi system design allows complex broadcast schedules to be met with the minimum antenna complement. Slewing and reversing curtains can reduce the number of antennas required on site. The use of discrete switches gives great flexibility in the design of the bayfeeder. More than one antenna on the same bearing can often be constructed in the same bay greatly reducing the costs of structures and civil works.

The R9010 can be supplied with either 300 Ohm balanced or 50 Ohm unbalanced inputs to suit the broadcast system requirement. The 50 Ohm version contains a balun to match the curtain to the cross site feeder.

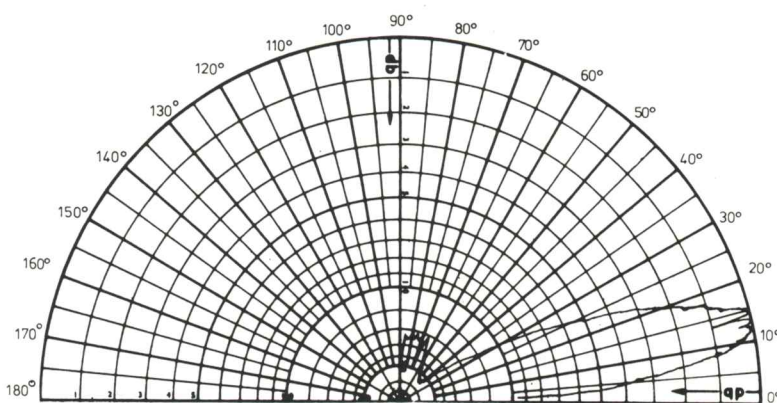
Typical Measured Patterns

Horizontal Radiation Pattern



Measured at elevation angle 14 deg.
 Frequency: 6.055 MHz
 Radiation direction: 105 deg
 Type of antenna: 4/4/.5
 Transmitter power: 430 kW
 Measured: 14000 kW ERP
 Antenna gain: 15.1 dBd
 Measured at 2500 m

Vertical Radiation Pattern



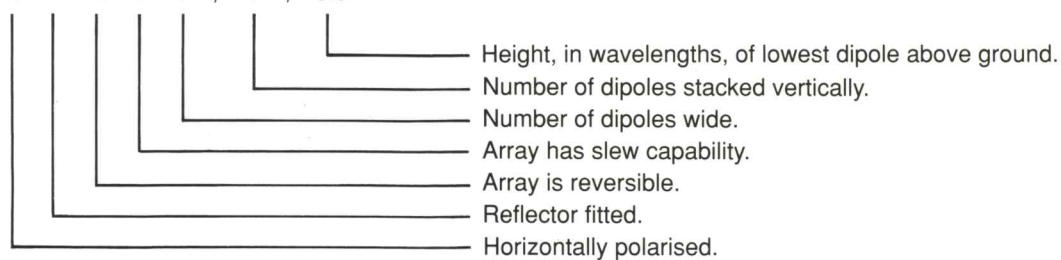
Measured in azimuth: 105 deg
 Frequency: 6.055 MHz
 Radiation direction: 105 deg
 Type of antenna: 4/4/.5
 Transmitter power: 430 kW
 Measured: 14000 kW ERP
 Antenna gain: 15.1 dBd
 Measured at: 2500 m

Data Summary

Power handling	: 300kW or 500kW 100% modulated.
Input impedance	: 300 Ohm balanced or 50 Ohm unbalanced.
Polarization	: Horizontal.
Radiation Pattern	: Take off angle and beamwidth to suit route.
Frequency Range	: Typically 2:1 over 4 or 5 adjacent broadcast bands within the range 6 – 26 MHz (ie 6 – 12 MHz, 11 – 21 MHz, 13 – 26 MHz).
Gain	: Typically 22dBi for HR4/4, 16dBi for HR2/2
Azimuth slewing	: Manually or remote controlled as required ± 30 degrees in discrete steps.
V.S.W.R.	: 1.4:1 or better in broadcast bands.
Front/Back ratio	: 15 – 23dB dependent on screen edition.

Standard Broadcast Array identification

H R R S 4 / 4 / 0.5



Marconi

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TD-R9010