Digital Broadcasting Audio

Shared Aperture Antennas

Introduction

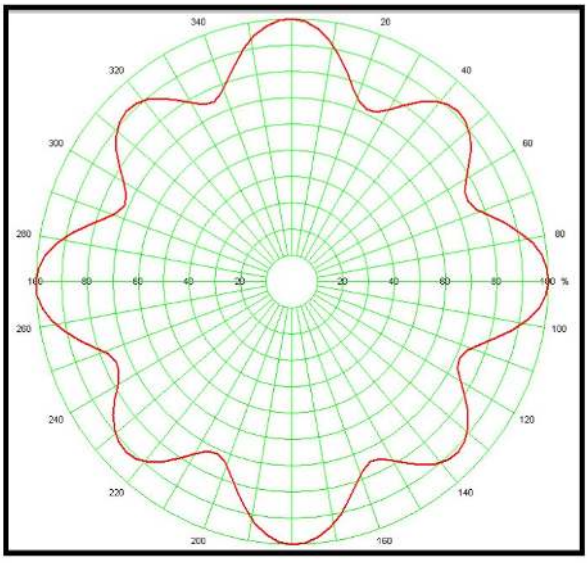
The current FM Radio broadcasting Services in Europe are typically transmitted from a relatively small number of high power stations. This provides the most cost-effective way of providing a nationwide service. In the UK for example five programmes are transmitted from each antenna, each being of 10 or 20kW per channel. Initially these programmes will be duplicated on the DAB Transmission together with some new services.

Space Availability

The current surge in activity in mobile radio as well as broadcasting has shown the true economic value that can be put on “vertical real estate”, and has highlighted the difficulty in finding available space on existing structures. Environmental considerations mean that local Zoning or Planning Authorities are reluctant to permit the building of ever more structures.

Shared Aperture Antennas

Some years ago the BBC approached Alan Dick Broadcast with a request to design an antenna that could be fitted into the space occupied by the existing FM antennas. We then embarked on a development project to find a way of achieving this without any serious effect on the FM antenna. The antenna had to be easy to install, with minimum downtime for the FM services, minimum impact on the FM antenna radiation pattern, and minimum effect on the return loss of the FM. All this while meeting the specification for the DAB antenna! The FM antennas supplied by Alan Dick Broadcast to the BBC are of two types depending on the structure they are mounted on.



Square Arrays (FM Crossbow)

The FM Crossbow antenna was designed for square structures. This provides an omni directional Horizontal Radiation Pattern from an array of 4 panels mounted around a square structure.

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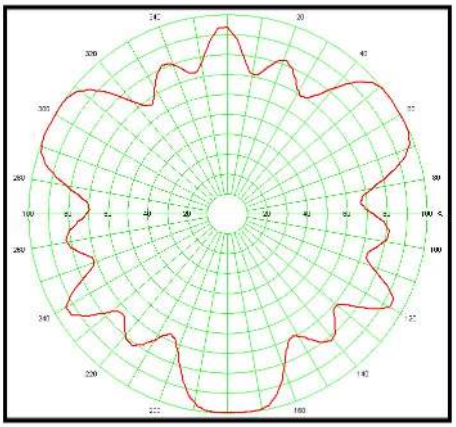

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Triangular Arrays (FM spearhead)
The FM Spearhead antenna was designed for triangular structures. This provides an omni directional Horizontal Radiation Pattern from an array of panels mounted around a triangular structure.

The above FM antenna types required different solutions because of the fundamental nature of the FM antennas involved. Fortunately ADB had supplied all the original antennas and the mechanical arrangement of each antenna was readily duplicated. Extensive range testing was carried out to optimise the RF performance of the combined DAB/FM antenna.

The DAB antenna elements were designed in such a way that they could be fitted onto the existing FM antenna without disturbing the FM antenna installation. The installation has now been successfully carried out on over 25 antennas.

Self-supporting
In addition to the shared aperture DAB antenna alternative standalone antennas are available: The simplest is an array of Vertical dipoles fitted on a pole mounted on the top of a structure. We also have Broadband Band III Panel antennas, which are suitable for DAB transmission.