# *ANTENNA SYSTEM DESIGN BASIC INFORMATION:*

**1)** Transmitting antenna system for the TV broadcasting bands comprise a number of basic radiating panels, dipole array, arranged in various configurations.

**2)** The panels may be designed for either horizontal or vertical polarisation of radiation; the former being more usual. Each panel normally has a horizontal half-power (-3dB) beam width of about 60°; for -6dB it is about 90°. The vertical -3dB beam width is some 30°.

**3)** Using more panels stacked in vertical tiers (or bays, one under the other) the vertical spread of the beam becomes narrower, while the horizontal beam width is unchanged. The gain in the maximum radiation direction increases of about 3 dB when the number of the panels doubles, assuming that all the panels radiate in the same direction.

**4)** The ‘gain’ in the direction of maximum radiation direction increases by about 3 dB when the number of the panels is doubled, assuming that all the panels radiate in the same direction and are co-phased.

**5)** To obtain a horizontal omnidirectional radiation pattern (360°), it is necessary to use panels on all four faces of the array, arranged orthogonally (90° one from another). Similarly, to secure coverage over a 270° arc, panels are arranged on 3 faces; or over 180°, on 2 faces. Panels on one face only produce a horizontal radiation pattern (HRP) extending over 90°.

**6)** It is possible to obtain a narrower horizontal radiation beam width (e.g.; 30° at -3 dB), but it is necessary to co-phase more panels horizontally.

**7)** Stacking panels on the same face, with a common orientation (ie; on the same bearing) reduces the vertical beam width but, by varying slightly the lengths of the feeders to the individual panels, it is possible electrically to incline or ‘tilt’ the main beam vertically. This can improve the ‘illumination’ of the main coverage area.

**8)** If the number of panels stacked on a face exceeds 2, as well as arranging for beam-tilt, it is possible also to increase the level of radiation in the minima which occur between the lobes of the vertical radiation pattern (VRP). This is called ‘null filling’ and is useful to optimise coverage in the vicinity of the transmitter.



ABE Elettronica SpA
Via Leonardo da Vinci, 92
24043 Caravaggio (BG) Italy
☎ +39 0363 351007
Fax +39 0363 50756
www.abe.it - mail@abe.it

# *DATA REQUIRED FOR ANTENNA SYSTEM DESIGN*

| | |
|---|---|
| COMPANY NAME: | |
| TRANSMITTING SITE (PLACE NAME & LOCATION MAP REFERENCE): | |
| FREQUENCY (MHz) & CHANNEL NUMBER: | TRANSMITTER POWER (W): |
| ANTENNA HEIGHT (AMSL IN METRES): | POLARISATION: |
| N° OF SIDES: | TOTAL N° OF PANELS: |
| BRAND AND TYPE: | CONNECTOR TYPE: |

| FACE (SIDE) | NUMBER OF PANELS | BEARING (RELATIVE TO TRUE NORTH) | DISTANCE TO THE NEAREST POINT OF SERVICE AREA (Km) | ALTITUDE OF THE NEAREST POINT OF SERVICE AREA (AMSL IN METRES) | DISTANCE OF THE FARTHEST LIMIT OF SERVICE AREA (Km) | ALTITUDE AT LIMIT OF SERVICE AREA (AMSL IN METRES) | DISTANCE TO THE MOST IMPORTANT POINT IN SERVICE AREA (Km) | ALTITUDE OF THE MOST IMPORTANT POINT IN SERVICE AREA (AMSL IN METRES) | NAME OF THE SERVICE AREA LOCALITY |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | |
| 2 | | | | | | | | | |
| 3 | | | | | | | | | |
| 4 | | | | | | | | | |

Notes: (Possible remarks, areas to be protected, major obstruction to coverage, restrictions, etc.)

**Attention**: Please enclose a map of the whole area, including the transmitter site, complete with labelled altitude contours, marked up to show the proposed service area for coverage. The site location may be in latitude & longitude coordinates or specified by means of a national grid reference system. 'AMSL' means **metres** above mean sea level.

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