CLAIMS

1 – Wideband or ultra-wideband Sector antenna (1) having a height H, a depth D and a width W, including a first ground plane (2) acting as a reflector plane, at least one antenna array comprising at least one first element (101) and at least one second element (102), the antenna operating in a frequency range [f_1, f_2], characterized in that:

- One element (101, 102) has a folded shape, an inside curvature F_1, F'_1 starting from a point A, A' positioned towards the centre O of the antenna, and an outside curvature F_2, F'_2 located in the extension of the first inside curvature F_1, F'_1;
- The inside curvature F_1, F'_1 is defined in order to guarantee the stability of the radiation pattern at the maximum operating frequency of the antenna;
- The outside curvature F_2, F'_2 is defined in order to guarantee the stability of the impedance that the antenna exhibits across its supply terminals at the minimum operating frequency; and
- The first element (101) and the second element (102) are supplied in phase opposition,

wherein the curvature of one element is characterized in the following way:

If the Cartesian coordinates of three points A, B and C, A-B belonging to the inside curvature F_1, F'_1, B-C belonging to the outside curvature F_2, F'_2, the origin 0 of the Cartesian coordinate system corresponding to the centre of the ground plane, are

$$A = \begin{pmatrix} x_A \\ 0 \\ z_A \end{pmatrix}, B = \begin{pmatrix} x_B \\ 0 \\ z_B \end{pmatrix} \text{ and } C = \begin{pmatrix} x_c \\ 0 \\ z_C \end{pmatrix}$$

then the inside curve F_1 of one element is defined by:

$$(F_1) : X = x_B + (x_A - x_B)\frac{e^{zc_1} - e^{z_B c_1}}{e^{z_A c_1} - e^{z_B c_1}}, \forall z \in [z_A, z_B]$$

and the outside curve F_2 of one element is defined by:

$$(F_2) : X = x_B + (x_C - x_B)\frac{e^{zc_2} - e^{z_B c_2}}{e^{z_C c_2} - e^{z_B c_2}}, \forall z \in [z_B, z_C]$$

where x_A, x_B, x_C, z_A, z_B and z_C are the coordinates of the points A, B and C in a Cartesian coordinate system and c_1 and c_2 are two curvature parameters.

2 – Sector antenna according to Claim 1, characterized in that the shape of one element seen from the front corresponds to the intersection of a first ellipse E_1 having a first radius R_1 corresponding to the major axis and a second radius R_2 corresponding to the minor axis, with a second ellipse E_2 having a first radius R_2 corresponding to the major axis substantially identical to the radius of the minor axis of the first ellipse, and a second radius R_3, the value of R_2 being chosen depending on the width of the antenna, and the ratio R_1/R_3 being chosen in order to optimize transitions in the supply of the antenna and the terminal fold of the element.

3 – Sector antenna according to either of Claims 1 and 2, characterized in that the parameters of one antenna are such that for an operating frequency range $[f_1, f_2]$ and a central frequency f_0:
D is comprised in the interval $[\lambda_0/5, \lambda_0/3]$;
H is substantially equal to λ_0;
W is comprised in the interval $[\lambda_0/3, \lambda_0/2]$;
R_3 is comprised between $0.6*R_1$ and $0.8*R_1$;
$R_2 \approx W/2$; and
c_1 $-20/\lambda_0$ to $-15/\lambda_0$ and $c_2 \approx 30/\lambda_0$.

4 – Sector antenna according to Claim 3, characterized in that the depth of the antenna D is substantially equal to one quarter of the wavelength λ_0, the height H of the antenna is substantially equal to the wavelength λ_0, and the width W of the antenna is substantially equal to $2*\lambda_0/5$.

5 – Sector antenna according to one of Claims 2 to 4, characterized in that:

- The ground plane includes two folds forming two capacitive roofs (31, 32);

- The two elliptical elements (101), (102) are folded towards the ground plane (2) at the centre of the antenna (1);
- A first end (101a) of the first element (101) is located at a first point A in proximity to the ground plane (2) and a first end (102a) of the second element (102) are level with a second point A' in proximity to the ground plane (2);
- A second end (101b) of the first element (101) and a second end (102b) of the second element (102) are respectively positioned at two points C, C' corresponding to a point the position of which is such that z_C is substantially equal to 0.48 λ_0;
- R_1+R_3 is equal to z_C-z_A; and
- R_2 is substantially equal to W/2.

6 – Sector antenna according to one of the preceding claims, characterized in that it includes a plurality of arrays composed of two elements having an elliptical shape.

7 – Sector antenna according to one of Claims 1 to 6, characterized in that it is supplied via connecting means (30) that are supplied in phase opposition by virtue of a balun or a 0/180° hybrid coupler.

8 – Sector antenna according to Claim 7, characterized in that it includes at least two RF connectors (30) chosen depending on the operating frequency range of the antenna and on the desired power rating, the connectors being supplied in phase opposition.

9 – Sector antenna according to one of the preceding claims, characterized in that the operating frequency belongs to the VHF/UHF domain with, for the emission, powers of a few tens to a few hundred watts, and a reception in the VHF/UHF bands of linearly polarized electromagnetic waves.

10 – Sector antenna according to one of the preceding claims, characterized in that it is adapted for integration into a mobile unit or a fixed infrastructure.