Cavity with Internal Blades

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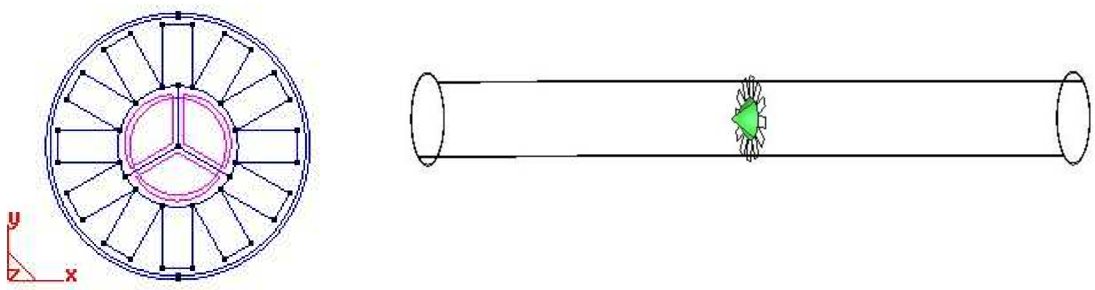

Figure 1 : Test case viewing

The external structure is a cylinder of length 0.5 meter. The external wall (radius 7 cm) is a perfect conductor.

The internal wall (radius 6.4 cm) is made of two parts. On the left hand side (z > 0), it is perfectly conducting. On the right hand side (z < 0), it is an absorbing material (epsilon = 1.5 – 2 j). In that case, the external PC wall is zero thickness.

The blades, located at z = 0, are perfectly conducting, of zero thickness, and have a width of 6 x sin (15°) cm
The distance along a diameter from the extremity of one blade to the cylinder center is 6 cm.

In the middle is a perfectly conducting cone of radius and height equal to 3 cm.

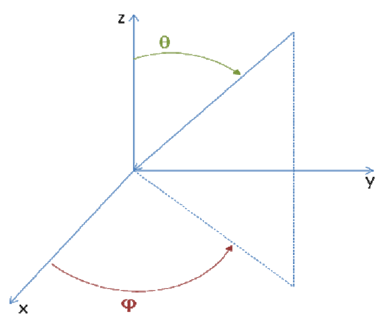

Figure 2 : Angles definition

The site (theta) and azimuth (phi) angles here after referenced are the angles with respect to the z vector and to the x vector. They are positive, when considering under clockwise rotations (nominal notation).

Three results shall be given :

1) Depending on the wave vector at azimuth 0°.

The RCS (VV & HH) in the xOz plane from theta = 0° to theta = 180°, with theta the angle between the z axis and the wave vector at frequency 12 GHz. The angular step will be 1°.

2) Depending on the wave vector varying the blades orientation

For Theta = 45°, the azimuth angle phi will increase from 0° to 30° with a step angle of 1°. The calculation will provide the complex value of the backscattered field.

3) Depending on the frequency

The RCS (VV & HH) for theta = 45°, and azimuth 0°. Theta is the angle with the z axis. The azimuth angle is the angle with the x axis. The wave vector is consequently in the xOz plane. For this second calculation, the frequency will vary from 6 to 18 GHz. The frequency step will be 50 MHz.