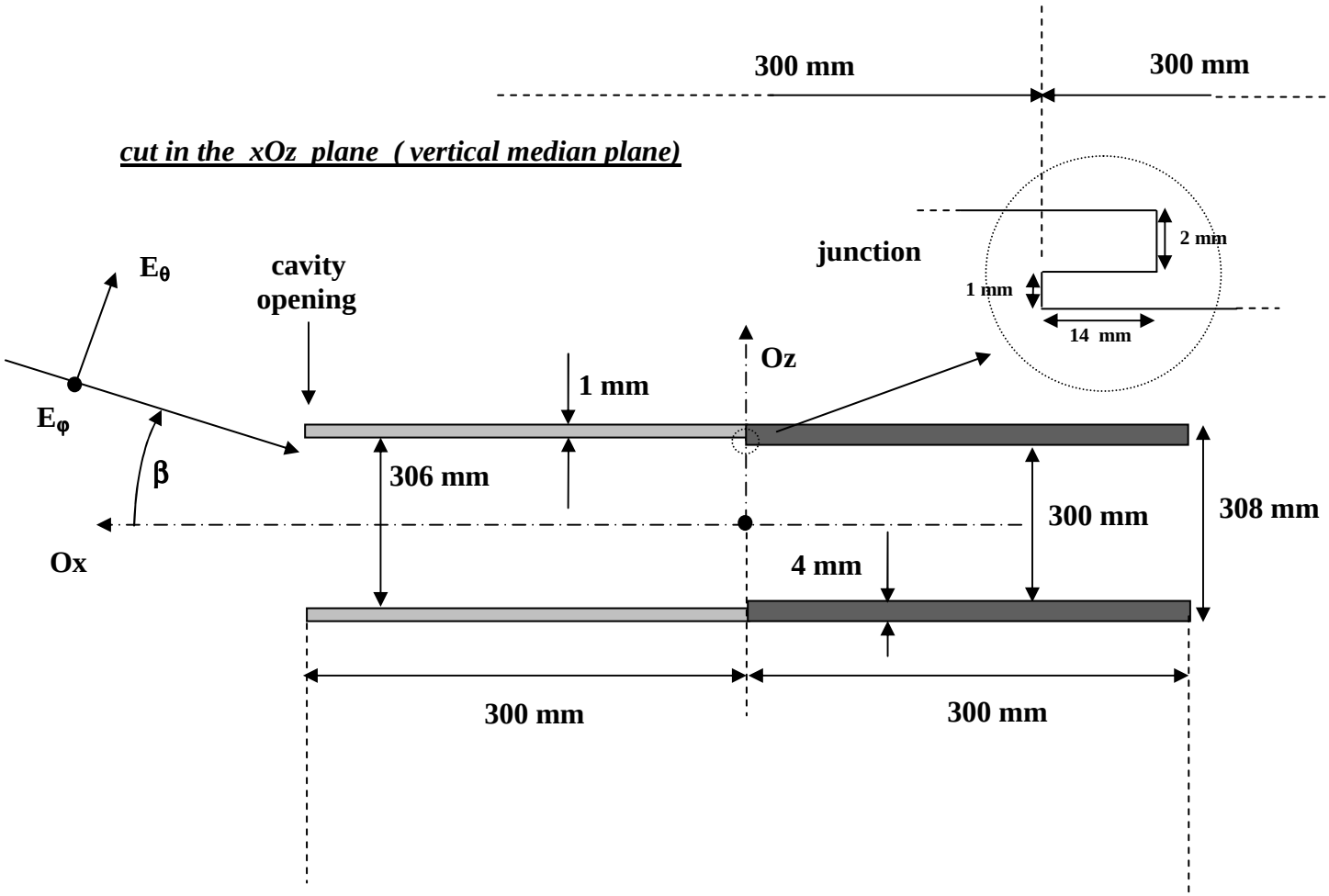
Case n° 5 : Cavity with Internal Obstacle

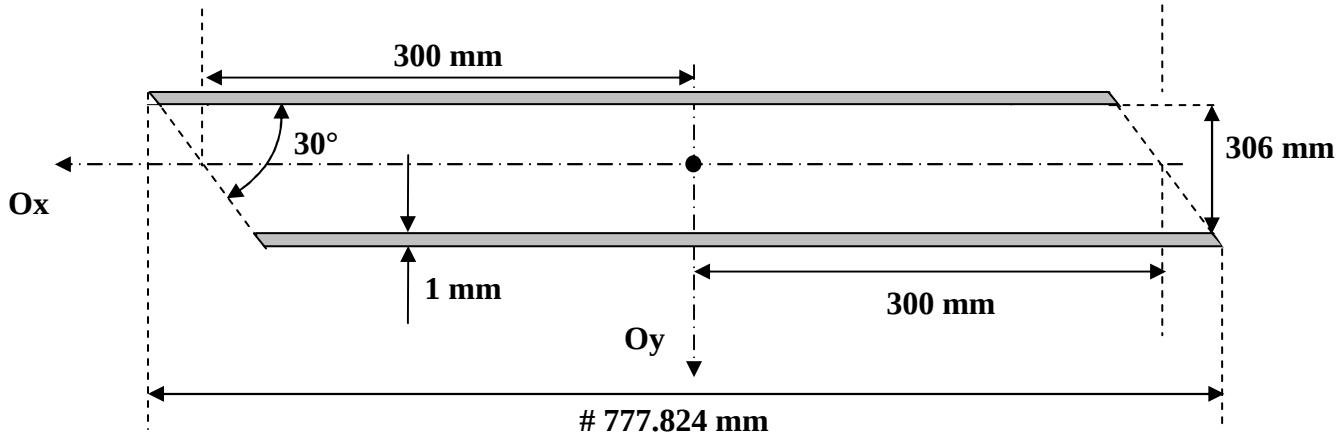
The aim : to evaluate the effect of a discontinuity inside a waveguide.

Proposed test case : a metallic rectangular cavity opened at each of its two ends, and comprising a junction. A cut of the junction is given below. The total object width is 308 mm, the cavity opening itself being a square of a 306 mm height (along Oz axis) et 306 mm width (along Oy axis). The junction is localized in the yOz transversal plane. The cavity edges are straight in the xOz plane and chamfered in the xOy plane (cf cuts x0z and x0y). The length of the object is 777.824 mm.

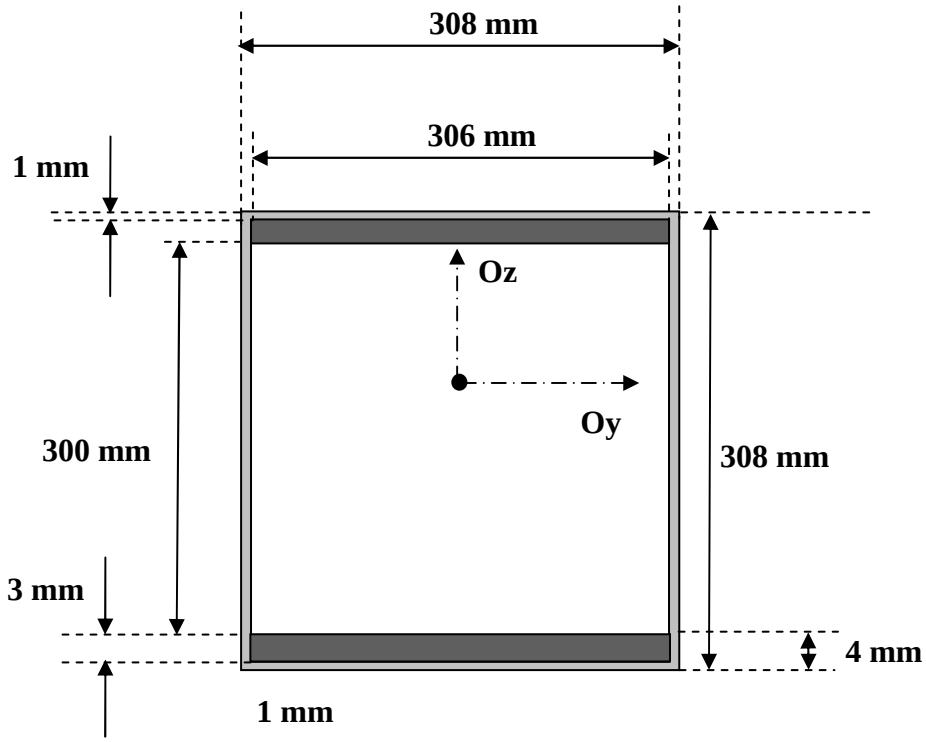
cut in the xOz plane (vertical median plane)



cut in the xOy plane (horizontal median plane)



In front view, we have the following situation :



Front view

RCS Computations :

Computations will be realized at 4.5 and 13.5 GHz, in both polarizations θθ and φφ, in a monostatic configuration. The direction of incidence is moving in the (Oxz) plane, the angle of incidence β going from 0° (axial incidence) to 60°, with a 0.25° step.

We define the polarizations in the following manner :

θθ polarization: Electric field $\mathbf{E}_{\theta}$ in the (xOz) plane

φφ polarization: Electric field $\mathbf{E}_{\varphi}$ in the (xOy) plane

Remark : The geometry is available in IGES format.