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Propagation of 8.2 GHz electron cyclotron (EC) wave and the dependence on the electron density based on wave optics model. The propagation and the absorption of EC waves are analyzed for the density limit observed in a magnetospheric plasma device RT-1. For the vacuum magnetic field configuration and typical electron density distribution, the wave propagation is solved based on a cold plasma approximation. As the central electron density increases, the cutoff area grows up, and the wave is difficult to access the EC resonance layer. (Takahiro MORI *et al.*, Plasma and Fusion Research, Vol. 14, 3401134 (2019) <http://www.jspf.or.jp/>)