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We discuss the relationships that link the observed fluctuation spectra of the amplitude and phase of signals used for the radio occultation sounding of the Earth's atmosphere, with the spectra of atmospheric inhomogeneities. Our analysis employs the approximation of the phase screen and of weak fluctuations. We make our estimates for the following characteristic inhomogeneity types: 1) the isotropic Kolmogorov turbulence and 2) the anisotropic saturated internal gravity waves. We obtain the expressions for the variances of the amplitude and phase fluctuations of radio occultation signals, as well as their estimates for the typical parameters of inhomogeneity models. From the GPS/MET observations, we evaluate the spectra of the amplitude and phase fluctuations in the altitude interval from 4 to 25 km in the middle and polar latitudes. As indicated by theoretical and experimental estimates, the main contribution into the radio signal fluctuations comes from the internal gravity waves. The influence of the Kolmogorov turbulence is negligible. We derive simple relationships that link the parameters of internal gravity waves and the statistical characteristics of the radio signal fluctuations. These results may serve as the basis for the global monitoring of the wave activity in the stratosphere and upper troposphere.

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