Spontaneous emission of the quantum system driven by a high intensity high-frequency classical laser field is analyzed. The study is based on the accurate consideration of quantum system interaction with vacuum quantized field modes in the first order of perturbation theory, while the intense laser field is considered classically beyond the perturbation theory [1]. It is demonstrated that the spectrum of the spontaneous emission can be used for examination of the strong-field dynamics and the structure of atomic energy spectrum. Different types of transitions between discrete and continuum states during the laser pulse action and in the after-pulse regime were distinguished and analyzed. In particular, it is found that in high-frequency field (energy of laser quanta is greater than the ionization potential) atomic system manifests the features of the Kramers-Henneberger (KH) atom being stable against ionization above the threshold value of intensity. It is found that in stabilization regime atom emits both odd and even harmonics of laser radiation.

References