Many models of new physics beyond the Standard Model, e.g. grand unified theories, predict extra high-mass dilepton resonances, possibly at the TeV scale. I describe the results of a search with the CMS detector for such resonances in the $\mu^+\mu^-$ & $e^+e^-$ mass spectra, highlighting the experimental challenges and the differences between the two channels. The search was conducted using 1.1 fb$^{-1}$ of pp collision data delivered by the LHC at $\sqrt{s} = 7$ TeV in the first half of 2011. The results of the resonant peak search and exclusion limits for a few benchmark models are included.