The Periodicity theorem tells us that any finite spectrum supports a $v_n$-map for some $n$. We are interested in finding finite 2-local spectra that both support a $v_2$-map with a low power of $v_2$ and have few cells. Following the process outlined by Palmieri and Sadofsky, we study a related class of self-maps, known as $u_2$-maps, between stably finite spectra. We construct examples of spectra that might be expected to support $u_2^1$-maps, and then we use Margolis homology and homological algebra computations to show that they do not support $u_2^1$-maps. We also show that one example does not support a $u_2^2$-map. The nonexistence of $u_2$-maps on these spectra eliminates certain examples from consideration by this technique. (Received February 05, 2018)