We consider mock modular forms whose shadows are both theta functions and eta-quotients (hereafter called eta-theta functions). Using Lemke Oliver’s classification of all eta-theta functions, and methods of Zwegers, we construct mock modular forms from the eta-theta functions with even character, whose shadows are one of the six eta-theta functions with odd character. We then prove quantum modularity properties for one canonical choice of mock modular form corresponding to each of the six shadows. (Received February 28, 2017)