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In our previous work we obtained a lower bound for the number of real solutions for some families of real polynomial systems in terms of the Newton polytope of the system. The key idea was to formulate the system as a fiber of a linear projection of a toric subvariety of the sphere. Then the topological degree of this projection gives a lower bound on the number of real solutions. Our current work strengthens those results by characterizing when the toric subvariety of the sphere is orientable. This is based on work of Nakayama and Nishimura, who characterized the orientability of smooth real toric varieties. (Received September 04, 2012)