Since ultrasonography has insufficient performance in depicting the vertebral surface, most examiners perform epidural anesthesia using landmarks on the back without ultrasonography. The final purpose of this study is to improve the performance by ultrasonography in depicting thoracic vertebral surface. RPM method is one of the bi-static imaging methods, it estimates the reflection point on a target surface by intersections of plural ellipses, where the focal points of an ellipse are the position of a transmit element and that of a receive element. We investigated the performance of the RPM method in an experimental study using a phantom with a concave surface of a 2 cm curvature radius. The depicted region of concave surface acquired using the conventional method and the RPM method was approximately 14.8% and 17.7% of the whole concave surface, respectively. This result indicates that the RPM method has high performance in depicting sloping target boundary.