Purpose: To evaluate breast CT with energy resolved detection. Methods and Materials: A new breast CT system with energy resolved x-ray detector and Scanning Multi-Slit (SMS) data acquisition was evaluated. The SMS CT provides efficient scatter rejection, and uses linear array of photon counting detectors. A breast CT phantom with 14 cm diameter and 50/50 adipose/glandular composition was used. The phantom included carcinoma, adipose, blood, iodine, and CaCO₃ as contrast elements. The x-ray technique was 90 kVp with 660 mR entrance exposure. Photon counting, charge (energy) integrating, and photon energy weighting CT images were generated. The CNR improvement with photon energy weighting was calculated. The CT images with calcium/tissue and iodine/tissue decomposition were generated with dual energy subtraction. The x-ray spectrum was electronically split into low and high energy parts by photon counting detector to perform dual energy subtraction. Results: CNR of the energy weighting CT images of carcinoma, blood, iodine, and CaCO₃ was higher by 19.3%, 19.9%, 29.7% and 40.4%, respectively, as compared to conventional CT. Photon counting dual energy subtraction provided 61% higher CNR as compared to conventional dual kVp dual energy subtraction. CNR of the photon counting dual energy subtracted CT images of CaCO₃ was increased by 69% when photon energy weighting was applied to CT projections prior subtraction. CNR improvement of SMS CT due to scatter rejection is 32% as compared to cone beam breast CT. Combination of photon energy weighting with scatter rejecting results in 50%-85% CNR improvement in SMS CT as compared to conventional CT. Conclusion: Photon counting CT has a potential for improved sensitivity due to higher CNR with scatter rejection, quantum limited detection, and photon energy weighting. It has a potential for improved specificity due to single kVp dual energy subtraction that enables calcium/tissue and iodine/tissue decomposition.