Purpose:
To compare two 3D Gamma Index calculation schemes for VMAT plans.

Methods:
VMAT (Volumetric Modulated Arc Therapy) treatment technique was commissioned for our clinic on an Elekta Synergy machine. We selected to use ScandiDos Delta4TM system for our VMAT patient QAs. Delta4 is a pseudo 3D diode detector array which calculates Gamma index from 3D dose distributions. Delta4 offers two ways to calculate Gamma Index: global Gamma Index and local Gamma Index. The global gamma calculates the dose difference relative to the normalization dose, which can be iso-center dose, prescribed or maximum dose. The local gamma calculates the dose difference relative to the current measurement point under examination. Thirty two test plans for the treatments of different sites including prostates, HN, lung, abdomen, pancreas node, anus, brain post fossa, medium sternum and liver were selected for this study. Pass rates from the two Gamma Index calculation schemes with 3% and 3mm criterion were compared.

Results:
The pass rate from global Gamma Index calculation is high than those from the global Gamma Index (p<0.001). Correlation coefficient of the two pass rates is 0.78. The differences of pass rates range from 0% to 9.5%. The most dramatic differences happen for high modulated (more complex) plans and where there are some low dose plateau regions.

Conclusions:
Global Gamma Index doesn’t describe the details of high modulated plans with some low dose regions. Pass rate of local Gamma Index should be examined in addition to global Gamma Index. Pass rates of local Gamma Index for different structures are desired.