Purpose: This study is to evaluate the difference between two QA IMRT techniques (single-gantry-angle composite and patient-gantry angle) of patient delivery plan.

Methods: 7 Head-and-Neck (H&N) and 4 Brain IMRT patient plan generated by Varian-Eclipse treatment planning system are used in this study. Each patient plan was measured using MapCheck diode array (MapCheck2, SunNuclear) with 1527 diode detector. MapCheck array is mounted on the isocentric mounting fixture (IMF) attached to the gantry used for measuring dose. All measurement of two QA IMRT technique with single-gantry-angle composite at 0 degree gantry position and patient gantry angle were compared to the TPS dose plane using gamma evaluation. Gamma criteria are set to 3% dose difference and 3 mm distance to agreement (DTA) and 10% threshold criteria for dose comparison. Difference between two QA techniques was evaluated by using the percentage of passing point between measurement and TPS dose plan.

Results: The percentage of passing point are different between two QA IMRT technique in the same patient plan. The difference of both relative and absolute pass rate range between 0 to 3% for Head and neck plan and 0-1.5% for brain plan respectively. Almost all the relative pass rate and absolute pass rate of single-gantry-angle composite are higher than patient-gantry angle technique in the same plan. The different result of pass rate between two techniques due to the effect of gantry machine and MLC moving in gravity. Other issues might relate to set-up uncertainty of measurement. The dominant gantry angle dependence is larger in complex H&N IMRT plan with large high dose gradient and smaller in brain IMRT plan.

Conclusions: Because of gantry angle dependence, in complex IMRT patient plan should be verified by using patient gantry angle technique in order to achieve the QA result with real situation of patient IMRT treatment.