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| **Test Date** | May 19-22, 2017 |
| **Author(s)** | Liyuan Zhang, GariLynn Billingsley |
| **Approval(s)** |  |
| **Specification Doc.** | LIGO-E0900041 | Specification | Not specified in E0900041 |
| **Procedure Doc.** | LIGO-E1000863 |
| **1st Scan (Mean ± Error\*)** | 6.5 ± 2 ppm |
| **2nd Scan (Mean ± Error\*)** | 6.5 ± 2 ppm |
| **Conclusion** | Qualified. |

\*An estimated systematic error from previous multiple measurements with one LIGO-1 mirror.

**Discussions and Comments:**

 **Two scans of TIS measurement are carried out on HR surface with positioning the arrow on barrel at Y+ direction. One is a full coverage scan over a 48 mm diameter aperture with the beam and step sizes of 0.3 mm and other a sampling scan over a 160 mm diameter aperture with the same beam size of 0.3 mm and step size of 1.0 mm, as shown in Figs. 1 and 2 respectively. The system was checked and calibrated with a 1” HR mirror (No.8128).**

 **Each scan takes about 30 hrs. It was found that the room temperature increase of up to 1 degC during night had some influence on the measurement through mechanical alignment and/or PD and its electronics. The horizontal strips are most likely due to room temperature effect, though the room temperature was measured and a linear correction was applied.**

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**Fig. 1 ITM01 HR TIS measurement over a 48 mm diameter aperture.**

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**Fig. 2 ITM01 HR TIS measurement over a 160 mm diameter aperture.**