

CB-15-111

October 15, 2015

Alfred Fritzingler
Lehigh University
29 Trembley Drive
Student Activities / WLVR
Bethlehem, PA 18015

**Re: Model 6810-1D-H/V- Directional Antenna Adjustment Certification
Iacocca Hall - 111 Research Drive, Mountain Top Campus
Bethlehem Pennsylvania 18015**

The method of establishing the azimuth is as follows:

- We set two control points on ground level using our Trimble R8 GPS rover unit using Keystone Precisions Keynet (VRN).
- These points were set to the UTM or Universal Transverse Mercator Grid.
- I reviewed the USGS Quadrangle maps for Hellertown which shows Lehigh's Research Center and the Nazareth Quad to the north.
- Both show a clockwise rotation of 0 degrees 12 minutes from UTM Grid North to True North.
- I then calculated the bearing of South 60 degrees East (which is 120 degree azimuth) minus the 12 minutes for a desired bearing of South 59 degrees 48 minutes East. This equals 120 degree azimuth from true north.
- We then used a Topcon GTS-233W from our ground control to shoot the antennae alignment. This is a 3 second accurate instrument.

Therefore, I (Gregory C. Noll) a Professional Land Surveyor of the Commonwealth of Pennsylvania, do hereby certify to Lehigh University, on this day October 15, 2015, the directional antenna Model #6810-1D- H/V, belonging to Lehigh University, located at 111 Research Drive, Mountain Top Campus, Bethlehem Pennsylvania, has been adjusted and is now pointed to an azimuth of 120° from true North, +/- 1°.

Keystone Consulting Engineers, Inc.



Gregory C. Noll, P.L.S.

Chief of Surveys

License # SU075048

