**C. TELEMETRY COMPONENT TESTS (Proposed IX.C.1 language for OP18 pilot)**

To ensure the accuracy of telemetered data, MPs shall do one of the following:

1. Use manual or computerized routines to check telemetered quantities (MW, MVAR & kV) against each other, revenue meter quantities and/or against derived values of a State Estimator, to identify unreasonable values at least one day once a calendar month. This option can only be used for equipment after the initial installation (or replacement) test where IX.C.2 (below) would apply for initial installation (or replacement).

* 1. Each single day check shall include 24 data samples for each telemetered point, 1 for each hour of the day.
  + While individual hour samples might have variations that exceed tolerances, noted below, where six or more consecutive samples exceed the tolerance in 1 day appropriate calibration, repairs or replacement actions shall be taken.
  + Each sample may be from a single point in time within the hour or averaged/integrated over the hour interval.
  + Voltage variance, as compared against below tolerances, is each telemetered phase-phase voltage\*\* compared against at least one of the two below:
    - * The average of all non-zero telemetered voltages that are phase-phase\* on the same nominal voltage level at the substation. Busses at the same voltage level that are not tied should be treated separately.
        1. When less than three voltages (of comparible phase relationship) are measured at the same substation bus then additional points of reference are needed for comparison. Other points of reference could include, but not limited to, adjacent bus voltages, nearby scheduled voltages or bus voltage in a state estimator.
      * The state estimator resultant bus voltage associated with the telemetered voltage, given in, or corrected to, phase-phase\*\*.

Note\*\*: measured or derived phase-phase voltage, see note in V.B.1

* 1. The tolerances for acceptable MW, MVAR and kV telemetered quantities are as follows:

Watts: +/- 10 MW or +/- 4.5% of the largest full scale value (whichever is smaller)

VARs: +/- 30 MVAR – for bus net will determine during the pilot whether a percentage of full scale, like on MW, could also be used.

Voltage: +/- 5 kV for 345 kV systems

+/- 4 kV for 230 kV systems

+/- 3 kV for 115 kV systems

+/- 2 kV for 69 kV systems

* 1. MVAR quantities will not require the above check if the MVAR quantities are measured from the same device that measures the telemetered MW quantities.
  + The purpose for this is that measurement drift of a device measuring both would cause errors in both MW and MVAR. Also MVAR variances are often obscured by transformer losses or SE solutions that are not perfect.
  + With the bus-net method, MVAR quantities which originate from a different device than the associated MW telemetry would not be exempt from a MVAR bus-net even if the other telemetry on the bus had its MW and MVAR quantities measured from the same device.
  + If a MVAR bus-net is needed VAR losses can be estimated based upon transformer test data to mitigate bus-net VAR error.