Guidelines for Signature Traces

Background

1. Signature Trace analysis is carried out when compliance of the installation has first been established by Light Source and Power Meter testing.

2. Signature Trace testing provides a graphical representation of the installed cabling and identifies individual embedded events within the Links or Channels in the direction tested.

3. The requirements for Signature Traces are not defined by Published National Standards but are invoked as part of contractual arrangements.

4. ORL requirements for mated connectors are specified within Published National Standards.

5. Optical Fibre traces taken at time of installation are often used for comparison over the life of the cabling system.

6. Signature Trace assessment is used to identify anomalies within Optical Links or channels. OTDR traces that indicate anomalies may erode the value of the optical fibre system.
    a. These anomalies could include:
        i. Length variation between LSPM and OTDR testing.
        ii. Additional connectors and or splices contained within the Link or Channel.
        iii. Damage, repairs, or stress on the cable.
        iv. Splices or mated connector events indicates high losses.
        v. Contaminates on Fibre ends.
        vi. Continuity and polarity mismatch.
        vii. Validity of test data.

7. Some anomalies are a result of testing methodologies and do not reflect the true status of the installed cabling, however, it is impossible to confirm the status of an installed cable when these anomalies exist.

Criteria for Compliance

Assessment criteria for compliance for a Signature Trace includes the following:

1. Correct Launch and Tail cables have been used.

2. Mated connector reflectance does not exceed -35dB for single-mode installations and -20dB for multimode installation.

3. Mated connector loss does not exceed 1.5 dB;
    a. Accurate optical attenuation from OTDR traces requires the averaging of bidirectional test results. Optical attenuation of a mated connector of 1.5dB is unlikely to be offset by a reading of suitable magnitude when tested in the opposite direction.
4. Range used for OTDR testing should not exceed more than fifty percent of the length of the launch, tail and cable under test.

5. Additional embedded events;
    a. Embedded splices within a link or channel do not exceed 0.6dB.
    b. Embedded events along the cable do not exceed 0.2dB loss;
        i. Events of 0.1 dB or greater can be as a result of damage, stress or repairs to a Fibre.
    c. No additional embedded connectors within a Link or Channel;
        i. Reflective events with reflectance more than -60dB and optical attenuation more than 0.1dB will be deemed as an embedded connector for the purposes of assessment of this report.
    d. Testing has been carried out at appropriate wavelengths.
    e. Test data provided is suitable and capable for establishing the status of all events along the cable.
    f. The dead zone of all reflective events shall not exceed 15m.
    g. Pulse width shall not exceed 20ns.
    h. Testing has been carried out at two appropriate wavelengths.

Criteria for Conditional Compliance

Assessment criteria for conditional compliance for a signature trace includes the following:

1. Mated connector loss exceeds 0.75dB but not 1.5dB.

2. Embedded events along the cable indicate apparent gains exceeding 0.1dB or losses exceeding 0.1dB but not exceeding 0.2dB;
    a. Events of 0.1dB can be as a result of damage, stress or repairs to a cable.
    b. Non reflective events of greater than 0.1dB may indicate a fusion splice.

3. Embedded splices within a link or channel exceeding 0.3 dB but does not exceed 0.6dB.

4. The reporting of ghosts between the two end connectors of the Link or Channel;
    a. Ghosts are false indicators of reflective events like incorrectly mated connectors.
    b. Ghosts have no optical attenuation (Loss).

Please Note:-
Empirical values of events were ascertained by OTDR Software event tables.
Readings outside of expectations are deemed to be caused by anomalies within the test equipment (including cords), test configuration, OTDR setup and/or user error.

- *Signature trace assessment covers the cable under test and five (5) metres of any test cable from the connection of the cable under test.*
- *Assessment of this limited portion of the test cord is to enable anomalies that may impact the validity of the test data*