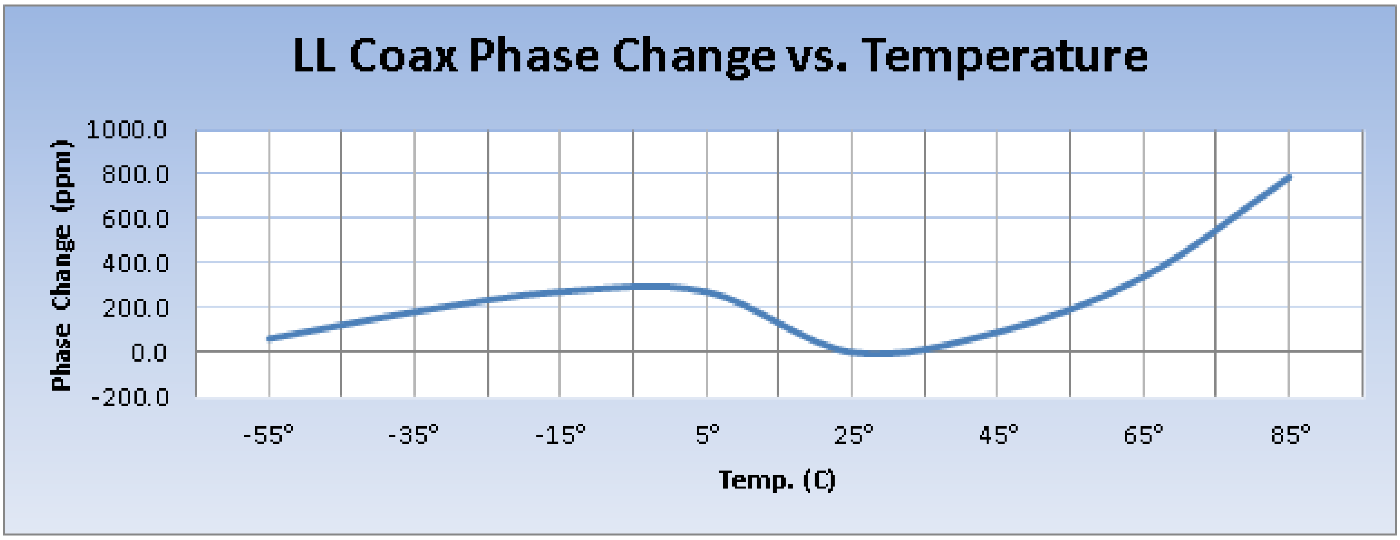
Neoflex ™

Phase Stability over Temperature for LLEF Cables



WE created the above graph by measuring the time delay change of a 10ft length of LL Low Loss coax when subjected to the following conditions:

- Place the assembly in a cold box and oven chamber and connect to a Network Analyzer
- Soak the assembly for 2hrs at 20°C and record the initial measurement. This is the reference value Td (ref)
- Decrease the temperature to -55°C and soak for 1 hour before recording measurement. Td (@ temp)
- Raise the temperature at 20°C intervals; soak the assembly for 1 hour before recording data. Td (@ temp)
- Calculate ppm with 2 equations: 1st calculate the difference from the reference: ΔTd = Td(ref)-Td (at temp) 2nd calculate ppm using the formula: ppm = ΔTd(ref) x 106 / Td (ref)

Phase change occurs as a result of environmental changes: mechanical stresses, connector torque, and thermal conditions. Phase change is expressed in change of the electrical length (EL). Using the above information, phase change can be predicted by using the formula:

Δ EL = EL x (ppm/106)

Before calculating the excepted phase shift, a few additional questions need to be answered:

- What is the mechanical length of the assembly (ft.)?
- What is the frequency of interest (GHz)?
- What is the dielectric constant of the insulation (E)?
- What is the temperature of interest (°C)?
- What is the electrical length at the frequency of interest (EL)?

EL = 365.7 x √E x (ft.) x (GHz)

For example, the phase change of a 10 ft. LL142 assembly at -35°C and at 18GHz is 15.32°
Step 1. Electrical length (EL) EL = 365.7 x √1.5 x 10 x 18 = 80,620°
Step 2. Using the chart above identify the ppm at -35°C ppm = 190
Step 3. Solve for the change in Phase (Δ EL) Δ EL = 80,620° x (190/106) = 15.32°

Construction at deg c temp and sea level power handling capability of coaxial cable.

EMfirst Fiber RF Systems