

**Keywords:**

Tri-Shield  
Braid Coverage  
Coaxial Cable  
LTE Interference  
RF Interference  
Shielding Effectiveness

## Tri-Shield Braid Optimization

### *Description*

Shielding performance of coaxial drop cable has become more important with new sources of radio frequency interference, such as the LTE mobile communication standard. The tri-shield design offers an excellent balance of many factors including shielding effectiveness (S.E.), flexibility, cost and installer ease of use. Optimization of tri-shield cable designs has been studied for many years and here is what we have learned regarding the braid:

1. Increasing braid coverage above 77% provides diminishing improvement in S.E.
2. Braid angle of 23 degrees is optimum for canceling the inductive coupling mechanisms of the interfering field to provide the lowest possible transfer impedance and highest S.E.
3. Braid angles above 30 degrees increase the force required to install “F” connectors increasing the chance of improper fitting and bunching up of the braids.

### *How It Works*

When a radio signal, such as LTE, illuminates the cable, it causes small currents to flow on the shield surface parallel to the cable axis. Maintaining low resistance to ground for those currents translates into better shielding. Why does a high braid angle, or tight weave, provide less shielding? Because as the angle is increased, the resistance increases. High braid angle means the individual braid wires travel a longer helical path around the axis of the cable. Forcing the interference current to take this long spiral path increases the amount of signal that penetrates the shield.

The optimized 77% braid with 23 degree braid angle uses six (6) strands of wire per carrier. The same 77% coverage can be achieved with 40 degree braid angle using only five (5) strands of wire per carrier. This fewer number of strands means there are many more openings or holes in the braid – about twice as many. This is another reason why a tight braid angle of 40 degrees leaks more LTE signal or other interference into the cable.

### *Conclusion*

PCT 77% tri-shield coaxial cable designs with 23 degree braid angle are optimal for high shielding performance, and lowest connector insertion force.