

## Course 603 – BDA/DAS Advanced Topics

### Scope

This one-day seminar explains advanced topics applicable to the design, operation, and troubleshooting of Bi-Directional Amplifiers and Distributed Antenna Systems. The basic principles governing the traffic capacity of BDA/DAS systems is explained. Particular attention is given to Intermodulation and Conventional interference including detection, source identification, and mitigation. Considerations of MIMO and diversity are also explained.

### Target Audience

Designers of BDA/DAS systems, system and test equipment, as well as system design engineers, operating engineers and technicians, consultants, and allied professionals.

### Course Presentation Setting and Methods

Presented in a classroom setting using computer projection with student workbooks.

### Topical Outline

#### Traffic Capacity of BDA/DAS Systems

- ◆ Parameter Relationships influencing Capacity
  - ◆ Bandwidth, Noise dynamics, Interference

#### Intermodulation Distortion and Interference

- ◆ How intermodulation occurs
- ◆ Intermodulation sources and products; predicting Intermod Frequencies
- ◆ Nonlinear devices and nonlinearities in Amplifiers, Connectors, antennas
- ◆ Detecting the presence of Intermodulation and isolating its source(s)
- ◆ Eliminating or mitigating intermodulation sources
- ◆ Spectrum Analyzer and filter application techniques

#### External Interference Interference Sources

- ◆ BDA systems with external donors and exposure
- ◆ External donor and user devices in a nonlinear environment
- ◆ Identifying interfering signals and isolating their origin
- ◆ Dealing with external interference sources: mitigation and legal remedies
- ◆ Spectrum Analyzer and filter application techniques

#### MIMO – Multiple Input-Output Broadband Data Systems

- ◆ Benefits of MIMO in broadband data systems
- ◆ Implementation Techniques for Diversity and/or MIMO in BDA/DAS Systems
- ◆ Testing the effectiveness of MIMO and Diversity Systems

## **Prerequisites**

None.

## **Course Documentation and Materials**

Student guide

CD with various individual resources

## **Facilities and Hardware Requirements**

Classroom suitable for student note-taking and a screen or other light surface for projection.