

# iBwave CERTIFICATION COURSE SYLLABUS

LEVEL 2: PROPAGATION, COLLECTION AND ORTHOGORIAL

Note: Course syllabus is subject to change

#### LEARNING OBJECTIVES

At the end of this certification program, you will be able to:

- Plan for network scalability and expansion with reference to cables, connectors, and network components in Active DAS
- ✓ Run predictions using the Propagation Module
- ✓ Import and modify survey data using the Collection Module
- ✓ Calibrate and validate Fast Ray Tracing model parameters
- Import an outdoor prediction and use outdoor maps to visualize outdoor signals
- Optimize the network design by running predictions using the Optimization module
- ✓ Verify the project design to ensure accuracy and quality

## PRE-COURSE FUNDAMENTALS

- ✓ Radio wave propagation basics
- ✓ Basic propagation models
- ✓ Antenna characteristics
- ✓ In-Building Propagation Models
- ✓ In-Building Propagation Measurement Guidelines

## **ACTIVE DAS/POWER SHARING**

- ✓ Active DAS vs Passive DAS
- ✓ Active DAS Architecture
- ✓ Types of components
- Active DAS component examples
- ✔ Designing an active DAS fiber network
- ✔ Power sharing

### **PROPAGATION**

- ✔ Propagation models
  - Fast Ray Tracing (FRT)
- ✔ Empirical (COST231)
- ✔ Variable Path Loss Exponent (VPLE)
  - Free Space Path Loss (FSPL)
- Process of running predictions
  - Prediction settings: configuring prediction and propagation properties
  - Defining prediction areas, environment types, and body loss zones
  - Propagation output maps: Signal Strength, RSCP, Handoff, Best Server, LTE RSRP, Service Count, and Field Strength
  - Output map reports

# COLLECTION

- ✓ Data Collection
  - Importing survey data: from iBwave mobile or third party collection tools
  - Collecting data manually
  - Displaying and editing survey trace routes
  - Interpolating surveys
  - Survey data reports
- ✓ Calibration
  - Measurements required for model calibration
  - Identification of appropriate measurements to improve model accuracy
  - Propagation model calibration
- ✓ Validation
  - Calibrated model exponents
  - Calibrated versus uncalibrated projects
  - Coverage threshold planning

#### OPTIMIZATION

- ✓ Importing Outdoor Prediction
  - Defining building properties and coordinates
  - Importing outdoor predictions
  - Comparing outdoor and indoor predictions maps
- ✓ Optimization output maps
  - Setting up network optimization parameters
  - Integrating outdoor (neighboring) signals
  - Types of optimization output maps: Nature of Path, Interpolation Signal Strength, SNIR, MADR, Total Received Power, Handoff, Active Set, Eb/No Achievable Service Coverage, Dominance over Macro, Optimal Antenna Placement, LTE maps, and Uplink maps

## ADVANCED DESIGN VALIDATION

- ✓ Validation checklist
  - Project property parameters
  - Systems
  - Debug message list errors and warnings
  - PIM calculations
  - Building materials
  - Floor plan scale and referent point
  - Floor plan order
  - Output map parameters
  - Comparison of predicted versus measured data
  - Report data

# **DESIGN FROM SCRATCH WORKSHOP**

- Creating a new project: set up project properties; add floors, walls and surfaces according to specifications
- Designing a network: add systems and Active DAS components according to specifications
- ✔ Running predictions: create and run output maps according to specification

# **FINAL EXAM**

(3 hours)