



6-Day Workshop - Wireless LAN Technology RF training

3 Training events will be conducted, and each event will be for 2-days of duration. There will be a break between each event.

Date: To be announced
Time Duration: 9:30am to 5:00pm
Location: To Be decided as per customer request

Course Description

Customer's WLAN technology training requirements:

1. RF Fundamentals
2. WLAN Technology - Fundamentals
3. Wi-Fi RF Front End module – complete technical specifications for PA, LNA and Switch
4. Antenna Design, Simulation and positioning (placement) for performance
5. Test and measurement with RF test equipment including measurement of key parameters for PA, LNA and antenna
6. Key RF parameters and performance for compliance with FCC
7. WLAN Chipset architecture
8. DFS – Theory and concepts
9. **Test Equipment:** We will use VNA, Spectrum Analyzer, Signal Generator for hands on sessions, subject to availability and support from equipment manufacturers. Any additional cost, if manufacturer insist, will be to your account
10. **Design and Simulation tools:** We will request manufacturer to support with a free evaluation license for the duration of training.

Pre-requisite

Engineers with Electronics and Communication Engineering background

Learning Objectives

- Fundamentals of WLAN Technologies
- WLAN system – Technical Specifications
- Antenna – Fundamentals
- Test and Measurement

Finetuning Academy

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By taking this course, you will better understand

- Apply the application concepts for RF product design for WLAN, testing, validation and qualification

Deliverables for the training:

- customized training materials covering topics mentioned above
- demonstration of Software design tools and RF test equipment currently used by RF system designers for WLAN module design and testing

What we are not covering in this course

- Design for Digital baseband circuit and signal processing, software algorithms
- Protocols and stacks for WLAN wireless standards

Workshop Sessions & Schedule

To be published once date and schedule is finalized

Speaker

Bhupinder Singh received his Master's Degree in Microwave System Design from IIT- Kanpur, India. He has extensive experience in product design and development both in India and abroad. In his 25 years of experience he has designed, developed and tested numerous RF system / subsystem used by Govt, Military, and Cellular, VSAT industry.

He is currently Director-Technical at RF Specialities and Finetuning Academy. Previously he worked as a scientist at Aeronautical Development Establishment, Bangalore, from 1991-2001. Later, he was leading R&D team at HFCL, DMC-STRATEX in NZ, Blackbay in NZ, Technical Head-Telecom R&D at Astra MWP, Eminent Technology, Italy.

He is an advanced user of Simulation tools like ADS, SystemVue, EM Pro, MWO, ALTIUM and ACAD. He is skilled at using Spectrum Analyzer, NW Analyzer, Vector Signal Analyzers, signal generators.

Finetuning Academy LLP is focused in RF circuit and system design consulting and training services. Finetuning Academy is also training partner of Keysight Technologies (Agilent Technologies)

RF Specialities (RFS) is one of the leading companies in the design, development, servicing and maintenance of RF Equipment in India. RF Specialities is a leading supplier of customized RF Systems/ subsystems to Govt., military and commercial market. Boasting of a state-of-the-art RF laboratory at Bangalore and backed with experienced & well-trained manpower, it provides unique and cost-effective solutions in the shortest turnaround time for the satellite, broadcasting, telecom and military industry.

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ANNEXURE – A WLAN

Fundamentals:

IEEE 802 Network Technology

Types of 802.11 Networks (Ad-hoc (IBSS), BSS & ESS))

Industrial, Scientific, and Medical (ISM) Bands

Unlicensed National Information Infrastructure Bands (UNII)

802.11 standards overview

802.11 Legacy

802.11a

802.11b

802.11g

802.11n

802.11ac

802.11ad

Discussion on dB scale and conversion

802.11 FH PHY

Hop sequence

Channel allocation

Maximum throughput calculations

802.11 DS PHY

Baker Encoding

Channel allocation

Maximum throughput calculations

802.11b: HR/DSSS PHY

CCK

Data rate calculation

802.11a: 5-GHz OFDM PHY

Orthogonal Frequency Division Multiplexing (OFDM)

OFDM PLCP

OFDM PMD

802.11n and 802.11ac

PHY

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Radio Channels

MIMO operation, Spatial streams
Internal architecture of Radio chains
Transmission: Modulation, Coding, and Guard Interval
PHY-Level Framing
The Transmission and Reception Process
Data Rates
Wave 1 & Wave 2

MAC

Framing structure
Medium Access Procedures

Framing

Medium Access Procedures
Clear-Channel Assessment (CCA)
Security

Beamforming in 802.11ac

Beamforming Basics
Single-User (SU) Beamforming
Multi-User (MU) Beamforming

RF Training

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- RF fundamentals
 - Antenna simulation and design
 - MIMO & Beamforming simulation
 - Simulation of Placement of Antennas in a design
 - Measuring S-parameters in MIMO configuration and understanding
 - Selection of Power Amplifiers, LNA & RF switches for WLAN applications
 - Measurement of WLAN PHY Transmitter & receiver characteristics
 - RF PCB layout guidelines

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