

Radio Frequency Technology Principles

COURSE DESCRIPTION:

This course covers the basic principles of RF Technology. Over the three days, topics will be covered that will give the technician an understanding and a foundation on which to build their RF knowledge. During the 3 days, theory as well as practical work will be covered.

WHO SHOULD ATTEND:

RF Technicians that are either starting out in their career and have not had a formal training in RF technology, technicians that have migrated into the RF field from similar technologies or technicians that would like a refresher on the basics.

SOME COURSE BENEFITS:

- Have an understanding of the broader RF basics.
- Master the use of the dB in the RF engineering field and use it as a tool.
- Identify system losses and what affects them.
- Reduce downtime of radio systems.

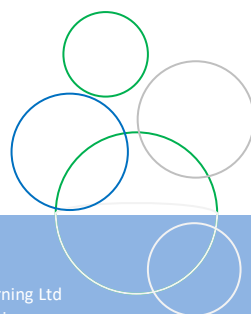
COURSE OBJECTIVES:

- To understand RF technology, terminology, components and operation
- To improve efficiency when fault finding
- To gain an understanding of RF system engineering so as to identify areas of concern.

FORMAT:

3-days, interactive classroom based, with lectures, discussions and hands on exercises

Maximum attendees 12 per course



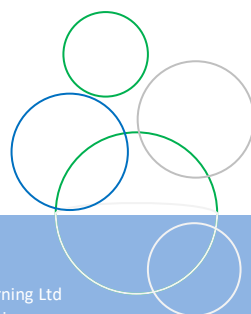
CONTENT:

Day 1

1. Radio waves – basic understanding
2. Measurements
 - a. The dB – what is dB and how do we use it. (dB or not dB, that is the question)
 - b. Engineering system gain or loss
 - c. Bandwidth, modulation, noise & distortion, SINAD,.....
 - d. Insertion loss and Return Loss
3. Impedance – basic understanding
4. Co Axial cables
 - a. Basics
 - b. Types
5. Antennae
 - a. Basics
 - b. Radiation patterns
 - c. Feed points
 - d. Using radiation patterns to your advantage
 - Gain
 - Null out the unwanted
 - Improve F to B ratio
 - e. Propagation
 - Path loss -Basic calculation
 - Field measurements – difference between Signal Strength and Field Strength
 - System engineering

Day 2

6. Filters
 - a. Types
 - b. Combining and splitting systems
 - Star
 - Hybrid
 - Duplexers
 - Resistive
 - Wilkinson Combiner
7. Impedance matching with cable
8. Circulators
9. Interference and how to overcome
 - a. In-band
 - b. Out of band
 - c. PIM and heterodyning
10. Smith Charts
11. S – Parameters
12. Amplification
13. Tuned circuits



Day 3

Practical

- Distance to fault measurements
- Tuning duplexers.
- How to determine *the velocity* factor of a RF cable.
- Making a $\frac{1}{4}$ wave stub to null out an unwanted signal
- Using a $\frac{1}{4}$ wave stub to create a mismatch so as to test a reflected power tripping point.
- $\frac{1}{2}$ wave and multiples of $\frac{1}{2}$ wave cable lengths in determining SWR measurements.

Assessment (Optional for in-house courses)

- Instructor led interactive quizzes
- Multiple choice written test
- Practical Assessment

Delivered in association with



Steve Williams

