



# Installation and Maintenance of Microwave Links

The need for accurate and fast frequency measurements

Application Note

## Introduction

Microwave communication links covering large geographic footprints range from cell-site to base-station links, business to business communication, digital radio links (along railroads, pipelines or power lines), and satellite ground stations. Installation and maintenance of all types of point to point microwave links have a common need – to obtain accurate frequency, power and voltage measurements and achieve “lab results on site” while maximizing the test instrument portability for field service engineers.

## Point to point microwave communication links – frequency accuracy

Whether it’s a cell tower or satellite ground station, accurate and fast measurements are required. High resolution frequency measurements and/or rapid measurement times are required. A microwave counter will yield a 1 Hz resolution in 1 second – faster than any alternative. This speed and accuracy combined with ease of use, size, weight and portability are all considerations for a field-ready instrument.

The challenges of field frequency measurements:

### Achieving laboratory accuracy

- Reduce channel switching through maximum frequency coverage
- Make high resolution and accurate power measurements on site
- Check antenna alignment and DC power supplies
- Minimize the time to verify performance with a simple user model

### Field portability and easy transit

- Minimize the number of pieces of equipment to carry in the field
- Withstand the elements with a readable display in direct sunlight
- AC power availability and battery life
- Automation of instrument functions and test routines for simple set-up at each site



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## Agilent microwave frequency measurement solutions to meet your needs



Agilent 53140A Series – microwave frequency counter (ranges to 46 GHz), power meter and dc DVM.

### 53140A Series: (53147A, 53148A, 53149A)

Focus: I&M Technicians requiring microwave counter, voltmeter and accurate power measurement in a portable, rugged package.

- 10 Hz to 46 GHz
- Power measurement made via a separate input from the frequency input via a true power sensor, simultaneous frequency and power measurements not possible. Basic instrument power accuracy of  $\pm 0.02$  dB
- Included Standard: DC DVM, TCXO time base
- Lightweight, rugged, portable (optional battery)
- Options: Oven time base, battery, soft carrying case



Agilent 53150A Series – simultaneous frequency and power measurements with a single connection.

### 53150A Series: (53150A, 53151A, 53152A)

Focus: Field, bench, or ATE microwave frequency counter with simultaneous power measurement. If the convenience of measuring frequency and power with a single input is more important to you than power measurement accuracy, the 53150A Series of CW microwave counters may be for you.

- 10 Hz to 46 GHz
- Simultaneous frequency and power measurements via a single connection. Power accuracy of  $\pm 1.5$  dB -  $\pm 2.0$  dB (model dependent)
- Included Standard: TCXO timebase
- Lightweight, rugged, portable (optional battery)
- Options: Oven time base, battery, soft carrying case

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