




## Spectator™ Protocol Analyzer

*Over-the-Air Interoperability Application for the 4101 platform*

### DESCRIPTION

The DRT Spectator Protocol Analyzer application provides cellular network interoperability testing capability using the 4101B Multi Measurement Platform. Passive observation of subscriber unit and BTS channel data in the field allows the real-world performance of both sides of the network link to be monitored. Spectator is effective for those concerned with interoperability of new mobile station deployments or software updates to base station air interfaces.

- Passive monitoring of user test mobiles and area base station dialog.
- Ability to follow layers 1 through 3 protocol transactions during registration, call establishment, holdovers, and take-down.
- Support for up to 6 GSM test mobile devices to be analyzed simultaneously.
- Live network testing as opposed to lab-only testing.
- Variety of data display and logging capabilities.
- Wideband architecture enables support for all popular bands and protocols.
- Exploits the software defined nature of the 4101B to provide flexible tools for wireless interoperability testing.
- 100 Mbps Ethernet interface to the host allows for high throughput of logged test data and remote operation.
- Current support for GSM with future versions available for EDGE/GPRS, cdma2000, and WCDMA.
- Better Alternative to ganged rack test equipment - requires less cabling and provides support for a single antenna.
- Small size and low weight for easy transportation.
- Low power for use with vehicle power.



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## Overview

As cellular networks become increasingly complex through the evolution of air interface features and rapid development of new devices with wireless capabilities, the interoperability between devices and network is becoming a growing concern for carriers and vendors of wireless services and devices.

When interoperability becomes an issue in the field, it can be difficult to determine what part of the system is causing problems, mostly due to the uncertainty that new devices or air interface revisions bring to the overall link.

Traditionally, it has been possible to look for problems with network interoperability on only one side or the other at any given time. Many times, this type of testing can only be done under controlled circumstances in a laboratory with ideal or simulated channel characteristics and perfect coverage.

Limitations in test equipment designed for direct mobile or base station capability do not allow true testing between actual devices that will be operating in the deployed network, and the test equipment becomes part of the equation of interoperability itself. It is also difficult for the numerous vendors of wireless equipment to have access to each others' product to determine the success of their interoperability.

The Spectator application addresses these issues by providing carriers and vendors alike, the tools to easily observe how their products work in the real world. The Spectator solution is enabled by DRT's advanced digital radio platforms running software defined tools for communications.

## Application

### **Configuration:**

A typical system for testing interoperability using Spectator includes the DRT4101B Multi Measurement System combined with a laptop providing the user interface, control, and logging features. The 4101B is loaded with SDR code for the Spectator function to provide all of the necessary signal processing features and interfaces.

The user wishing to perform interoperability testing enters the test mobile identity information through configuration steps involving a combination of setup screens and Wizard utilities. Once configured, the user then selects what type of interoperability testing is desired and what type of data is to be logged for post-processing analysis.

### **Operation:**

After configuration, the system is ready to observe interoperability by tracking the progress of air interface links as the test mobiles go through various operations such as power on registration and call attempts. Calls placed from one mobile to another show the operator the success of the subscriber unit receiving and operating upon paging signals originated from the BTS side.

As interoperability testing operates, the user can view activity of the message layers through a variety of data display tools as the calls progress. Screens showing direction and type of message, along with the underlying contents are viewable in raw as well as protocol partitioned form. Protocol information and events are viewable in both tabular as well as in graphical message sequence form.

### **Analysis:**

Problems with interoperability can be observed as they occur through a set of alarms and technician comments noted as testing progressed. The logged data also contains the actual detail and history of the wireless protocol transactions that occurred along with the time and place in the network the events took place.

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