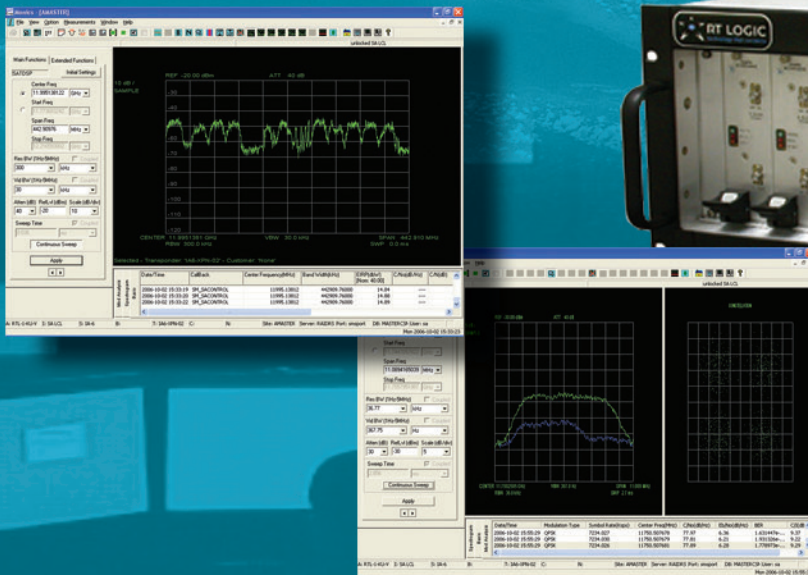




RT LOGIC
technology that connects

Sentinel™

- Spectrum Monitoring
- Interference Detection, Characterization, and Geolocation
- Digital Spectrum Analyzer (DSA)
- Network Management (Terminal M&C)



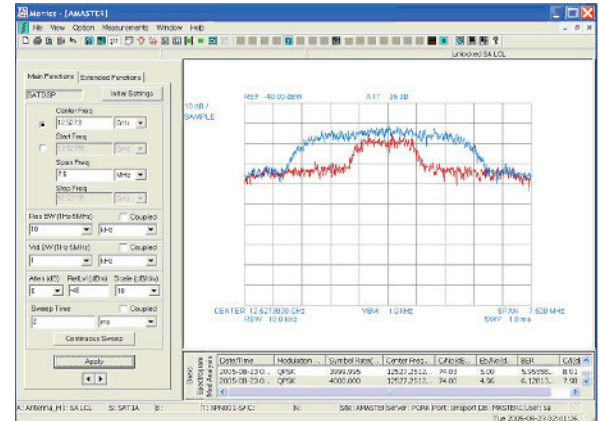
Spectrum Analysis and Interference Detection

A Digital Spectrum Analyzer (DSA) is available as an integrated Sentinel option. The DSA provides a digitally implemented replacement for the traditional analog spectrum analyzer. In addition, the DSA provides significant capabilities which cannot be achieved with traditional implementations including:

- Carrier-under-carrier interference detection
- I/Q constellation diagrams with vector signal processing
- Automatic signal characterization
 - Modulation type (BPSK, QPSK, 8PSK, 16QAM, MSK)
 - Symbol rate
 - Carrier frequency
 - C/No, Eb/No, and bit error rate

These capabilities are achieved with time domain signal processing over instantaneous bandwidths of up to 85 MHz. This allows complete transponders to be fully characterized without any apriori knowledge of the signals being transmitted by the transponder.

The carrier-under-carrier interference detection is a powerful tool to ensure link performance is not being degraded by unauthorized transmissions. The DSA determines the modulation type and symbol rate of the desired carrier and uses this information to determine the Eb/No. The measurement provides the ability to subtract the desired signal from the measured spectrum and reveal the underlying, residual spectrum. This capability allows the operator to see underneath the desired carriers without having to bring the link down. The following screen-shot illustrates this feature.



Uplink Power Control

Uplink Power Control (UPC) is available as an integrated option of the Sentinel. This provides a highly reliable method of minimizing downlink power variations at the earth station terminal. These variations are typically due to rain fades and/or HPA output power fluctuations. A centralized data server controls multiple measurement sites allowing power control in multiple links.

The following capabilities are available:

- Automated rain fade compensation
- Downlink spectrum monitoring
- Uplink spectrum monitoring
- Automated diversity site selection
- Beacon monitoring

This system manages each link such that the link parameters remain within the user-defined limits. Each link's Eb/No is used to manage link performance in real time. The UPC system automatically detects whether the Eb/No reduction is due to lower received downlink power or due to interference/jamming. The uplink power adjustments are discontinued if interference/jamming is detected.

Power monitoring measurements are provided over any selected RF frequency with an instantaneous measurement bandwidth of 85 MHz. The system monitors individual carrier power as well as total integrated power within a transponder.

The system can support single or redundant HPA configurations and automatically switch to the redundant equipment or to a dummy load in the event of an HPA malfunction.

Typically an earth terminal transmits sufficient power to achieve the link budget under worst case environmental conditions. Accurate and real time power control often allows the transmission of lower power under nominal conditions. This reduces HPA intermodulation distortion and potentially enables the earth terminal to transmit additional low priority traffic. This maximizes the bandwidth and power efficiency of the earth terminal.

Additional information on the Uplink Power Control option is available upon request.

Transportable Applications

The Sentinel chassis was designed for rugged, transportable applications. The inner card cage is vibration/shock isolated from Sentinel chassis. Compressive gasket material with urethane foam center is utilized to cushion the inner chassis. This gasket is conductive for EMI shielding.

The internal 10 MHz reference oscillator is vibration/shock isolated. The modules are mounted vertically to minimize flexure due to up/down vibration and shock. There is continuous support along top and bottom of each module. The face plate handles latch the modules into the card slots and captive screws are used to secure module into card cage.

Additionally, the compact form factor, modularity, and ease of maintenance are key benefits for transportable applications.

Fixed Sites

At fixed sites, the Sentinel provides space and power savings by replacing stacks of traditional rack-mount converters, test loop translators, spectrum analyzers, etc. The remote control/status capability enables lights-out operation. The modularity of the architecture provides significant logistics, sparing, and life cycle cost benefits.

Automatic carrier monitoring is an integrated option available for the Sentinel. This system allows a centralized Network Operations Center to monitor performance of numerous satellite links to ensure proper and efficient operation. This system automatically compares the measured performance of each link with the expected and desired performance.

Teleports

For teleports, the modularity also allows new frequency bands or different balances of uplinks and downlinks to be achieved quickly and easily without having to install new chassis and racks. The hot-swappability permits these changes to be made without link downtime. These features enable the teleport to maximize flexibility in services with minimal effort.

The ease of maintenance, dual redundancy, and hot swap features virtually eliminate link downtime. The DSA and interference detection/location options ensure availability by continuously monitoring link conditions. The Compass M&C network management option provides the ability to control the teleport equipment and network with a centralized, configurable, and easy to use system.

Sentinel Specifications

- Physical
 - 5RU rack-mount - 8.75-inch H x 17-inch W x 21-inch D
 - 55 pounds fully populated
- Power
 - 100W
 - 120VAC
 - 50/60Hz
- Environmental
 - Operating temperature 5 to 50 °C
 - Four fans at rear of chassis
 - Three fans in a removable tray in bottom of chassis
 - Air inlet from each side of chassis and exhausted at the rear
 - Replaceable air filters on left and right sides
 - Over temp warning LED on fan tray and remotely via remote interface indicates possible fan failure or air flow restriction