

SpectralNet Appliance - Range

RF Spectrum Transport for Test and Launch Ranges



Overview

SpectralNet™ Appliance - Range from Kratos RT Logic eliminates the physical distance limitations in RF signal distribution, enabling the optimization of ground infrastructure to improve flexibility and reliability. SpectralNet performs real-time digitization of RF spectrum, lossless transport over arbitrary distances via private or public IP networks, and faithful analog signal reconstruction after transport. This simple ability to perform long-haul network transport and reconstruction of any RF signal brings disruptive changes to the ground segment architecture and enables significant benefits. SpectralNet's unique capabilities solve operational challenges while lowering capital and operational costs.

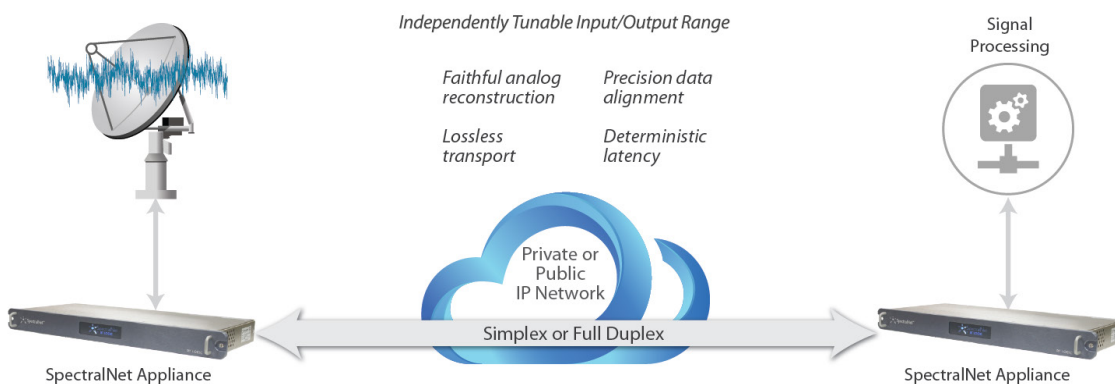
SpectralNet is the only commercially available product that not only digitizes and transports RF data but also reconstructs the RF signals, enabling reuse of your existing legacy analog equipment. SpectralNet brings analog RF data to the IP network world, unleashing the power of virtualization and centralization of ground architectures for test and ranges, while enhancing data processing used in diversity combining, spectral monitoring, testing, or simulation exercises.

Any Signal. Any Content. Anywhere.

SpectralNet's high-fidelity digital conversion and faithful reconstruction means that any signal, regardless of modulation type, error-correction coding method, encryption, or frequency spread scheme, can be reproduced after transport. This includes all standard and proprietary modulations such as TDMA, CDMA, carrier-in-carrier, frequency agile, PSK, QAM, and many others.

Key Features

- Fully digital frequency conversion supports wide-ranging capture and processing frequencies
- Digitization of user-selectable bandwidths from 125 KHz up to 54 MHz; instantaneous RF spectrum
- Input and Output frequencies independently tunable in bands spanning 70 to 6000 MHz
- Lossless transport over public or private IP networks with deterministic latency; VITA-49 standard data format
- Faithful reconstruction of digitized RF back to analog
- Simplex or full duplex transport
- User-selectable sampling depth from 4 to 12 bits per sample
- Precision time alignment of multi-source data. IRIG-B, 10 MHz and 1PPS reference inputs for precision timing
- Manual and automatic gain control and output power level control for interfacing with downstream equipment
- Simple to operate web GUI; enterprise-compatible management and status via SNMP REST API
- Optional analog record/playback
- Optional integrated diversity combiner (pre-detect)



Guaranteed Data Delivery and Timing

The power of IP data and networks can transform your business, but IP networks are notorious for inconsistent delays and dropped packets. This is acceptable for many applications but not for RF delivery, where deterministic timing and signal integrity are critical. SpectralNet's patent pending technology overcomes the limitations of IP network transport, including non-deterministic delay and packet loss, to deliver RF spectrum anywhere over an IP network. SpectralNet can transport your RF spectrum with a user-defined, deterministic latency over non-deterministic IP networks. Packet loss is overcome using DataDefender error correction technology controlled by the user based on protection need. SpectralNet guarantees the deterministic and lossless RF transport over IP networks regardless of whether it's your own MPLS infrastructure or the public Internet.

Spectrum Bandwidth Control and Frequency Conversion

SpectralNet provides multiple tools to put you in control of the amount of network bandwidth required to transport the digital IF signals. SpectralNet enables you to transport only the exact spectrum that you want using our Spectral Channel capabilities. Spectral Channels are selectable from 125 kHz to 54 MHz instantaneous bandwidth. Precise spectrum selection minimizes the amount network bandwidth required to transport your spectrum. Independent end to end frequency tuning allows RF/IF frequency conversion across the network.

SpectralNet also allows you to select a sample depth supporting the signal dynamic range required for your particular application while minimizing the transport bandwidth the required. SpectralNet supports sample precision selection between 4 and 12 bits providing for a dynamic range delivering the highest possible signal quality.

Precision Data Alignment

SpectralNet can align digital IF signals generated from the same RF source but captured at different locations. This precise data alignment combined with SpectralNet best source selection algorithms enables a host of use cases to minimize the impacts of signal loss at a particular RF reception site, or to support separate polarization paths used in diversity combining applications.

High Reliability for Your Mission Critical Data

The lightweight 1U rack-mount form factor minimizes space and power requirements. In addition, units can be connected in hot-swap pairs with high-speed (<10 ms) automated error detection and failover, built-in.

Real World Applications Examples

The elimination of the physical constraint of RF transport opens up a world of possibilities to optimize your operations and architecture, providing new services to your customers, including:

- Digital-based Diversity Combining enabling increased SNR
- Adaptive agile frequency tuning to offset interference
- Spectral monitoring, detection, and characterization
- Centralization of ground system operations to simplify operations and lower costs
- Virtualization of the processing portion of the ground segment to lower costs and increase operational flexibility
- Locating antennas in the most advantageous or low cost locations
- Transporting RF with noiseless signal distribution independent of distance
- Digital recording and analog playback

Band Options

SpectralNet is directly tunable from 50MHz to 2500MHz, covering 70MHz IF, P-band, lower and upper L-band, NATO E-band and S-band. C-, KU, KA and other bands supported with associated block converters.