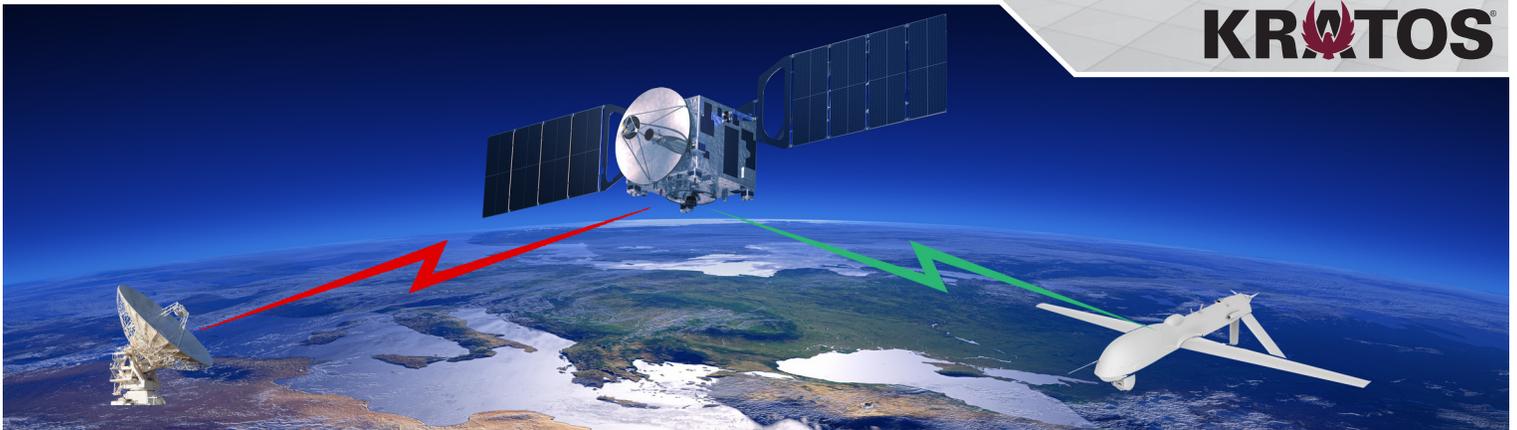# Channel Simulator Options

Kratos offers a suite of advanced Channel Simulator options for enhanced simulation, monitoring, and control capabilities. These options extend system functionality far beyond the simulation of RF propagation effects and create a multi-purpose instrument for test and training applications.

FIR Filter

The programmable Finite Impulse Response (FIR) Filter option provides precise control over the amplitude and group delay response at the system output. This customizable filter enables operators to model the behavior of equipment in an RF link, such as a satellite transponder with input and output filters. This option is implemented in firmware as a complex, 41-tap filter, providing a 2.6 MHz resolution or transition region across the bandwidth. These settings allow the flexibility and power to create a wide range of real-world frequency responses, modeling almost any behavior that may be encountered in an over-the-air communication scenario.
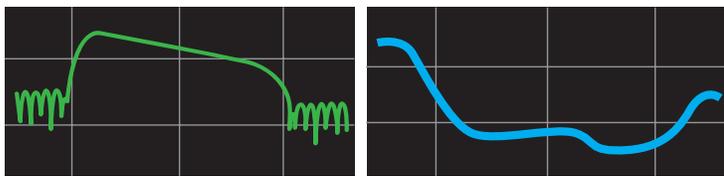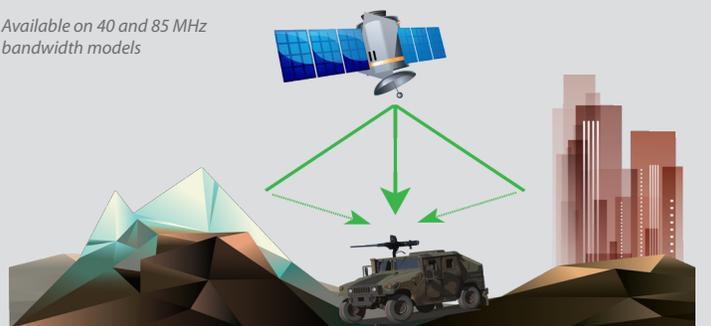

AMPLITUDE RESPONSE GROUP DELAY

Available on 40 and 85 MHz bandwidth models

*Available on 40 and 85 MHz bandwidth models*

Multipath

The multipath option provides statistical and finite ray fading models that effectively represent the impact of RF signal reflections. Using Rician and Rayleigh statistical models with up to 6 paths of finite ray combination, the system imparts dynamic constructive and destructive interference on the signal. The feature can simulate a wide range of realistic fast fading multipath environments, from densely-packed urban centers to low look-angle receptions over water.
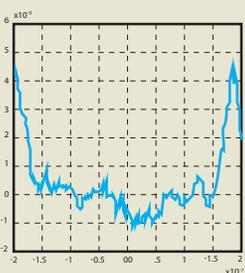
BEFORE EQUALIZER   AFTER EQUALIZER
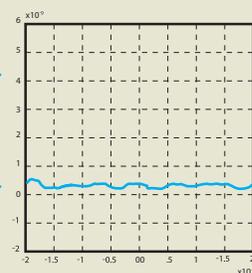
RF Equalizer

Standard RF communication equipment imparts undesirable distortions to the flatness of the signals it processes. Using internal compensation filters, the optional Channel Simulator equalizer feature corrects for distortions caused by frequency converters, amplifiers, filters, and other RF equipment, providing exceptional phase and magnitude flatness across the entire system bandwidth. With this option enabled, typical performance is below 0.4 dB amplitude and 3 ns group delay variation. The RF equalizer can be applied for Kratos equipment that is internal to the Channel Simulator to achieve a high performance system response. Additionally, this option can compensate for many external RF components that are not manufactured by Kratos, but connect before or after the Channel Simulator in the RF equipment chain. *Available on 40 and 85 MHz bandwidth models*

STK Control Plugin

Analytical Graphics, Inc.'s Systems Tool Kit® (STK) is a powerful modeling and simulation software package. With the Kratos plugin for STK, the hardware-inthe-loop simulation effects of the Channel Simulator are controlled seamlessly in real time as a scenario is modeled in STK. STK provides intuitive visual development of real-world communication link environments without requiring user expertise in channel models, propagation effects, or orbital/flight analysis. This exclusive combination of hardware and software provides the most comprehensive RF simulation system on the market.
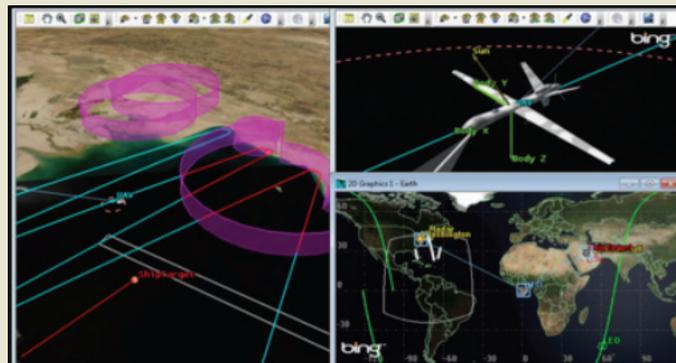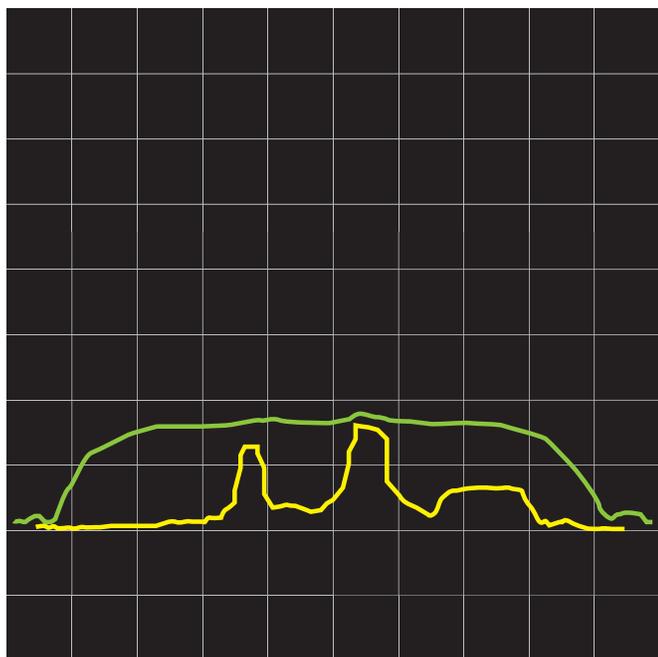
Spectrum Analyzer

The Spectrum Analyzer feature provides complete signal analysis and automated spectrum monitoring capabilities. Housed on a signal processing card in the Channel Simulator, the Spectrum Analyzer packs all of the features found in a standard benchtop spectrum analyzer, allowing system operators to visualize the channel simulation effects applied to their signals. Additionally, this processing package characterizes signals and displays metrics such as C/No, Eb/No, BER, C/I, carrier standards, and inner coding schemes. Sophisticated monitoring and interference analysis allows identification and characterization of jammers and quantifies their impact on signals of interest, even when interfering power levels are below those of the primary signal.
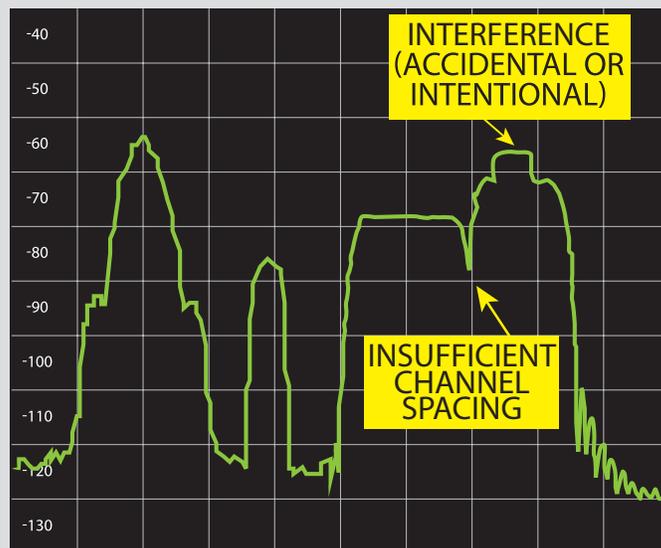
REF -30.00 dBm   ATT 40 dB

INTERFERENCE (ACCIDENTAL OR INTENTIONAL)

INSUFFICIENT CHANNEL SPACING

CENTER 69.9378 MHz   VBW 11.1 Hz   SPAN 789.2 Hz
REW 577.7 Hz   SWP 94.5 ms

REF -30.00 dBm   ATT 40 dB

CENTER 70.0296 MHz   VBW 67.8 Hz   SPAN 789.2 Hz
RBW 8.7 Hz   SWP 94.5 ms

Signal Generator

The Signal Generator modules provide test and interference signal generation capability. Each Signal Generator card is capable of producing up to eight signals with independently adjustable center frequency, modulation type, data rate, PRN code, amplitude, and filtering. These signals can be used as nominal test signals, can be positioned to test channel spacing limitations, or can be configured at worst-case levels for comprehensive receiver system testing. They can also be configured to model interfering signals to test avoidance or mitigation capabilities.