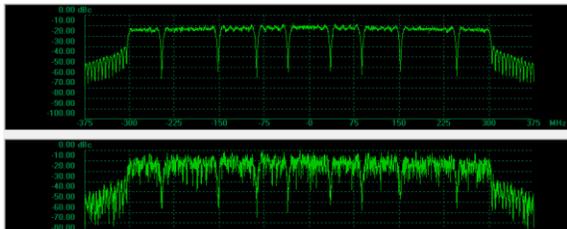


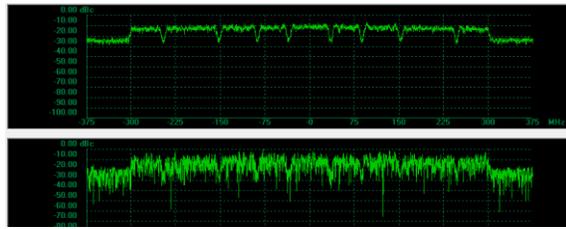
Satellite Link Channel Modeling with the ACE9000 GUI Payload Feature

Satellite communication links are influenced by various factors, including natural over-the-air effects, governmental restrictions, and radio hardware limitations. Within a satellite payload, filters such as IMUX and OMUX restrict the channel bandwidth, while RF hardware components such as amplifiers can introduce nonlinear distortion or compression. Emulating these effects is critical for evaluating and optimizing satellite link performance.

This demonstration applies IMUX/OMUX filtering and amplifier compression using the Payload feature in the Maury Microwave ACE9000 Advanced Channel Emulator GUI. A user-defined IMUX/OMUX filter profile is created to model the RF characteristics of the channel. A wideband AWGN signal generated by the Maury NGX1000 or UFX7000B is applied to the ACE9000 so the resulting filter response across the entire IF bandwidth can be clearly observed at the output. The GUI capture mode displays the signal spectrum before and after filtering. Amplifier compression is then applied using the ACE9000 non-linearity wizard to illustrate the resulting reduction in SNR and dynamic range.

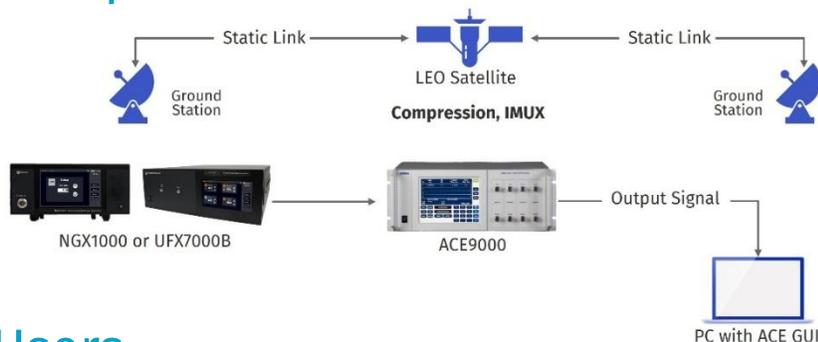


ACE GUI capture mode: filtered averaged power spectrum (top) and instantaneous filtered power spectrum (bottom).



ACE GUI capture mode with amplifier compression applied: filtered averaged power spectrum (top) and instantaneous spectrum showing reduced dynamic range (bottom).

Demo Setup



Target Users

Target users include design engineers and system integrators who need to analyze the impact of payload impairments on satellite system performance and NTN.

Product Overview

ACE9000 Advanced Channel Emulator

The ACE9000 Advanced Channel Emulator (ACE) is the most advanced non-terrestrial RF channel emulation solution to date. The emulated impairments include delay, signal Doppler, attenuation, phase offset, AWGN, frequency hopping, payload, and multipath fading. The instrument can house up to four 600 MHz instantaneous bandwidth channels. Impairment emulation can be set to fixed values in Static Mode or continuously changed in real time in Dynamic Mode without any phase discontinuities.

KEY SPECIFICATIONS AND FEATURES:

- 600 MHz of instantaneous bandwidth per channel
- Timing synchronization up to 16 channels
- Link emulation including:
 - Phase continuous delay, Doppler, and attenuation changes
 - AWGN and Eb/No
 - 12 tap (path) multipath fading with Rayleigh, Rician, and CW. Angle of Arrival (AOA), k-factor, and correlation controls
 - RF frequency-agile up/down converters
- Payload emulation including:
 - IMUX/OMUX amplitude and group delay distortion
 - Amplifier compression (AM/AM and AM/PM)
 - Phase noise
- Static and dynamic link emulation
- Ephemeris data generation using SATGEN
- Remote instrument control through ACE Client application

ACE Client GUI Application

The ACE Client GUI is a comprehensive application that enables the remote control of all ACE functions, graphically displays impairment file contents, and provides wizards for creating custom profiles for payload impairments. The ACE Client GUI enables signal capture in the time and frequency domain so graphic displays of the output signal can be seen before or after the application of impairments.

More Resources

Visit maurymw.com/info/satellite-2026 to learn more about Maury solutions.

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