Satellite Network Emulation for 4G/5G Communications
Part 2: Signal Transport and Impairment with Microlab and Noisecom

Product Demo:

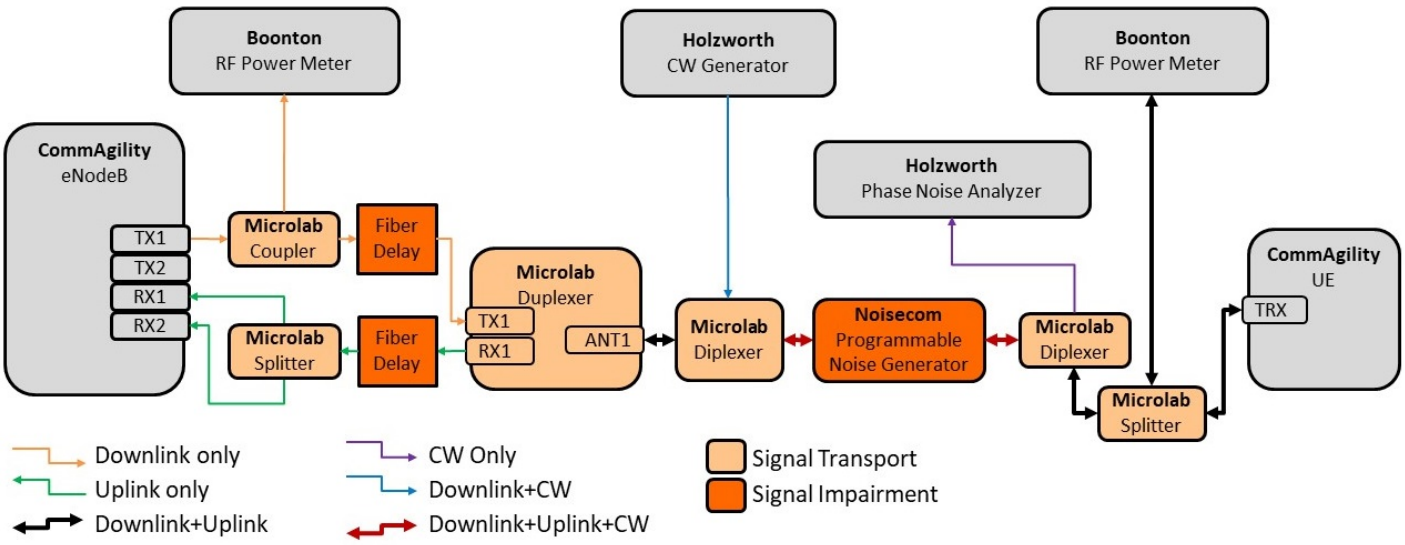
Part 2 of the test set-up utilizes a variety of Microlab products to combine, condition, and distribute the two signal paths generated in Part 1. Microlab provides a wide range of RF passive components that enable signal combining, signal conditioning, and signal distribution for satellite systems.

Before the signals are separated and routed to their appropriate location for testing, the combined signal is fed through the Noisecom UFX7000 AWGN Noise Generator, which stresses the RF signal integrity of the communication links in the presence of noise. By testing the robustness of the signal through controlled interference, designers can understand how the satellite network will perform in the presence of real-world interference challenges, such as signal jamming, carrier-to-noise impairments, and Eb/No. In addition, fiber optic delay lines are used to simulate and test the 4G/5G communication standards by stressing the timing of the signal.

Target Users:

Target users include communication engineers that design, implement, and test the deployment of hybrid networks; satellite network operators for private networks and defense; LEO developers and providers; and broadband communications to underserved markets.

Test Set-Up:



About Microlab Products:

The Microlab CK-751N is a 6-dB coupler that provides a tap point where the downlink signal from the eNodeB can be measured. Efficiently combining low- and high-band signals, the Microlab BK-26N Diplexer combines the CW signal and the LTE downlink signal on the same transmission line. After the combined signal travels through the simulated satellite network, the BK-26N splits the signals into their respective frequency bands for monitoring and analysis. The Microlab D2-69FF is a two-way Wilkinson used to split the uplink signal to the two receiver inputs of the eNodeB. All of the passive RF components are contained with a custom integrated assembly, which Microlab can provide to meet unique customer specifications.

Significant Features:

- Guaranteed specifications.
- Low passive intermodulation (PIM).
- Wide variety of products.
- Product availability (many products available in 3-5 days, direct or through distribution).
- System integration based on customer needs.

About Noisecom UFX7000 AWGN Noise Generator:

The UFX7000A Series instruments provide broadband Additive White Gaussian Noise (AWGN) with superior flatness. The output power can be attenuated up to 127 dB in 1 dB steps, and several connector types are available. In standby mode, the output RF switch is terminated into a 50-ohm load, while in the "on" state it is directed to the output connector. The UFX7000A Series flexible architecture allows several options, including an internal combiner, 0.1 dB attenuation steps, and internal switches for up to 4 filter paths. Standard units can be modified for specific customer requirements.

Significant Features:

- Precision carrier-to-noise insertion.
- Optional frequency filters and signal path attenuators.
- 127 dB attenuation in 1 dB, or optional 0.1 dB steps.

More Resources:

Visit the official websites of Microlab (www.microlabtech.com) and Noisecom (www.noisecom.com) to find out more about products, webinars, and application notes.