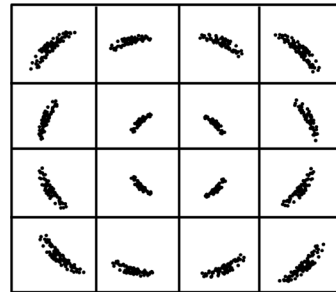
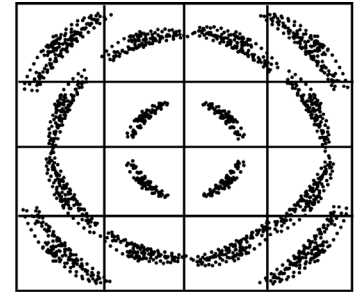


Phase Noise Measurements for Satellite Networks

Satellite communication systems that utilize higher order modulation schemes, such as those used in 5G applications, increase bit rate/bandwidth. While data rates increase, so does the network's vulnerability to symbol errors due to phase noise. The local oscillators (LO) in satellite communications systems can be the cause of excessive phase noise if the system is experiencing poor performance/symbol errors. The Holzworth HA7062D Real-Time Phase Noise Analyzer is an ideal solution for evaluating the absolute phase noise of a system's LOs.



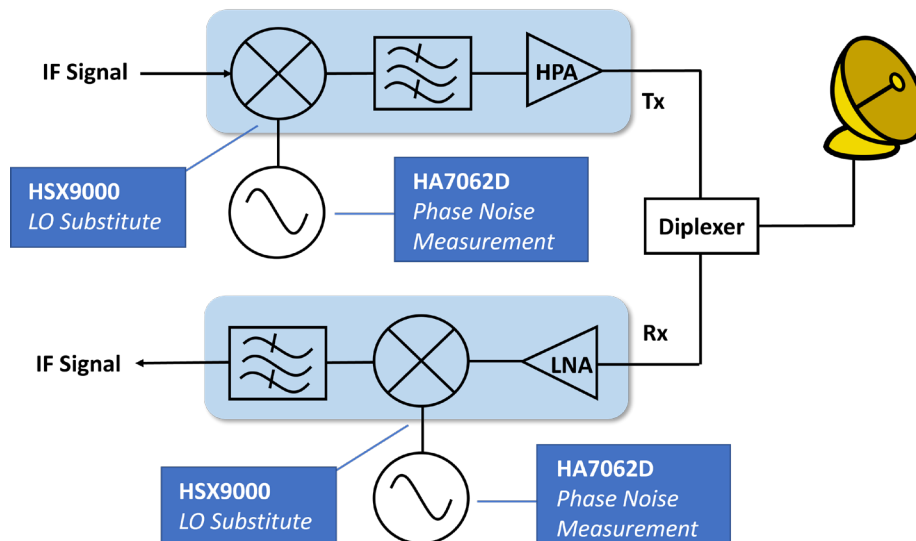
16-QAM MODULATION
 (LO with Low Phase Noise Performance)



16-QAM MODULATION
 (LO with Poor Phase Noise Performance)

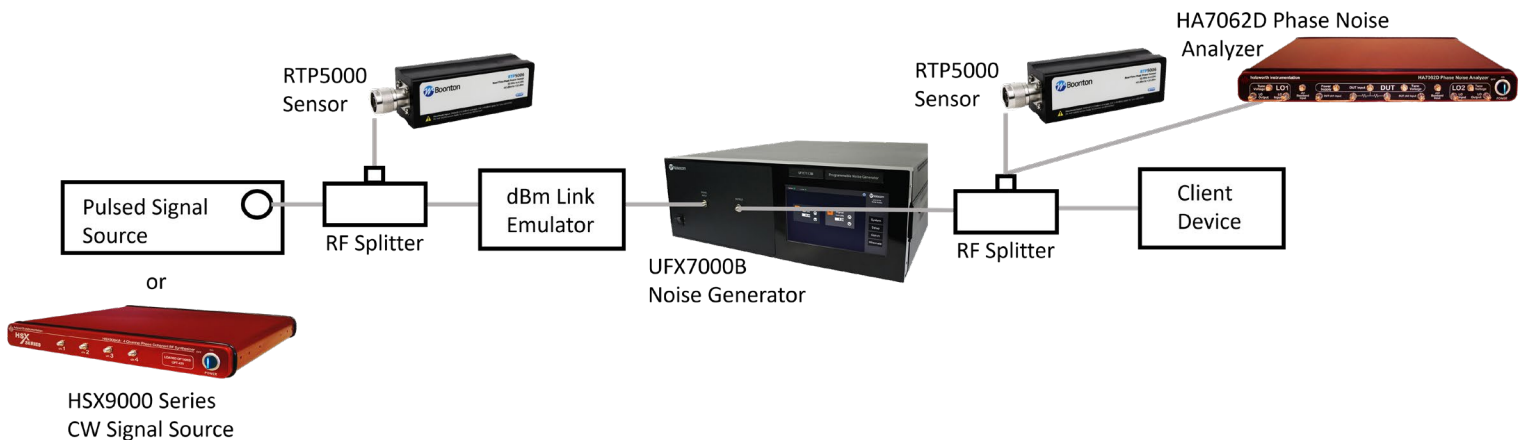
LO substitution, which replaces the LO with a high-quality, low phase noise signal generator, such as the Holzworth HSX9000 Series Multi-Channel RF Synthesizer, can determine if the LO itself is the cause of performance issues within the system. LO substitution can also isolate up/downconverter chains for more accurate testing without faulty LO characteristics distorting results.

Transmissions often go over multiple links, ranging from ground station uplinks, satellite-to-satellite links, and downlinks to receiving stations. Phase noise analysis with the HA7062D can also measure the additive phase noise of a signal as it travels through a satellite communications network.



SATELLITE 2023 Test Setup:

The HSX9000 Series generates a signal with exceptionally low phase noise. The dBm link emulator is used to inject phase noise onto the signal, which is later measured by the HA7062D phase noise analyzer. The HA7062D will also measure the phase noise of the dBm link emulator's LO, highlighting the impact excessive LO phase noise has on performance and the importance of LO substitution during satellite network testing.



Product Overviews:

Holzworth HSX9000 Series Multi-Channel RF Synthesizer:

The HSX9000 Series are broadband PLL based frequency sources that offer excellent noise and spectral purity performance coupled with a highly accurate dynamic range of up to +20 dBm and down to -110 dBm. The HSX9000 Series can be used as an LO substitute for fault diagnosis in up and downlink chains.

Holzworth HA7062D Real-Time Phase Noise Analyzer:

Holzworth Phase Noise Analyzers utilize real-time, dual core engines for cross correlation speed, which are coupled with a pair of high performance internal LOs from Holzworth HSX Series RF Synthesizers. It is an ideal instrument for absolute and additive phase noise measurements for satellite networks.

More Resources:

Visit info.wtcom.com/satellite-2023 to learn more about T&M solutions for satellite communications from Boonton, Holzworth, and Noisecom.