

RF Interference Analysis

Keysight Technologies and X-COM Systems

Identify and eliminate RF interference with PXle data streaming and analysis

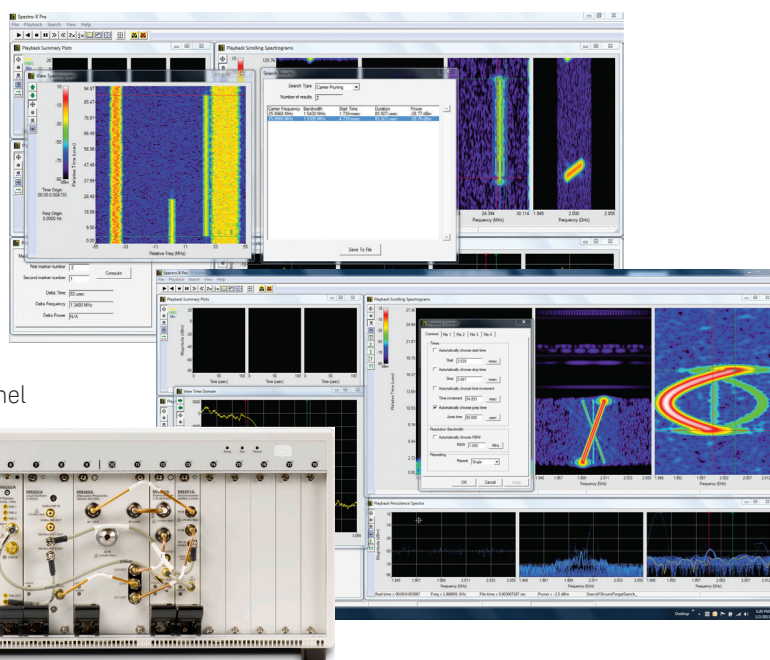
There are many potential sources of RF interference that can affect the operation of RF systems used in electronic warfare, surveillance, radar and wireless data communications. These can include multipath or adjacent channel interference, Rayleigh channel fading or scintillation or rogue carriers transmitting in the band either intentionally or erroneously. RF interference can be transitory and challenging to observe in the operational environment, however, by capturing the RF spectrum over an extended period of time you can identify and analyze potential sources of RF interference.

A PXle data streaming and analysis solution from X-COM and Keysight Technologies can be used to record and analyze the operational spectral environment of an RF system in order to identify events causing RF interference. The solution utilizes the Keysight M9392A PXle vector signal analyzer and M9202A PXle IF digitizer as the RF front end to capture the RF spectrum. This is streamed to a directly attached RAID storage array for subsequent analysis using X-COM's Spectro-X multi-channel signal analysis toolkit.

The Keysight M9392A vector signal analyzer and M9202A IF digitizer provide a compact cost effective solution for the streaming of RF spectrum with bandwidths up to 100 MHz and center frequencies up to 26.5 GHz. This economical, high performance capability, when combined with JMR Electronics' BluStor PCIe RAID0 storage arrays can provide more than 13 hours of spectrum memory allowing long sequences of RF data to be captured under operational conditions.

An RF bandwidth of 100 MHz requires 600 MB/s to be streamed to the disk array and the resulting files can be terabytes in length. The X-COM Spectro-X multi-channel signal analysis toolkit provides a comprehensive set of tools that

- Capture and analyze the operational RF spectrum
- Signal analysis software identifies potential causes of RF interference
- PXle data streaming and storage captures operational RF spectrum
- Large RAID0 storage array for data capture
- Uses Agilent PXle instrumentation with X-COM analysis software
- Accelerates the identification and elimination of RF interference



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allows the user to search through up to four capture files simultaneously in order to tag and compare the location of all carriers present, in time, frequency, duration and power. Using this data, an engineer can quickly parse the recording into time segments containing unknown carriers that may warrant further investigation.

There are four specific tools available in Spectro-X that facilitates this process. The first eliminates found carriers by applying user selected criteria such as power levels, center frequencies or time durations in combination with Boolean operators. This process can swiftly reduce the carrier list by discarding those far from the desired carrier in frequency or too low in power to cause interference.

Some of the remaining carriers can be identified by comparing their training sequences to those of known wireless standards or by correlating them to arbitrary waveforms that the user has either created in, for example MATLAB, or that the engineer has “clipped” and saved from the RF spectrum capture.

Finally, pulsed waveforms can be characterized in terms of pulse repetition rate and interval, rise time, fall time, pulse width and power levels. The remaining time segments containing unknown carriers of interest can then be further investigated, and their effects quantified, using the Keysight 89600B VSA software.

The combination of extended RF spectrum capture with the ability to search for, parse and demodulate carriers of interest provides a very powerful tool kit to diagnose communication system anomalies and identify potential sources of RF interference. The complementary features of the Keysight PXle data streaming solution and VSA software together with X-COM's Spectro-X multichannel signal analysis toolkit accelerates the identification and elimination of RF interference problems allowing you to determine rapidly the best path to a reliable, deployable system.

System Components

Keysight Technologies

M9392A	PXle vector signal analyzer
M9202A	PXle IF digitizer
89600B	VSA software

X-COM Systems

Spectro-X	Signal analysis toolkit
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JMR Electronics

BluStor PCIe direct attached RAID0 storage array
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To learn how this solution
can address your specific needs
please contact

Keysight's solutions partner,
X-COM

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Keysight and its Solutions Partners work together to help customers meet their unique challenges, in design, manufacturing, installation or support. To learn more about the program, our partners and solutions go to

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X-COM Systems designs RF signal recording, analysis and playback solutions for system design, signal simulation and test applications.

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Published in USA, August 3, 2014
5990-9243EN