RF Interference Analysis

Keysight Technologies and Bird

Identify and eliminate RF interference with PXIe data streaming and analysis

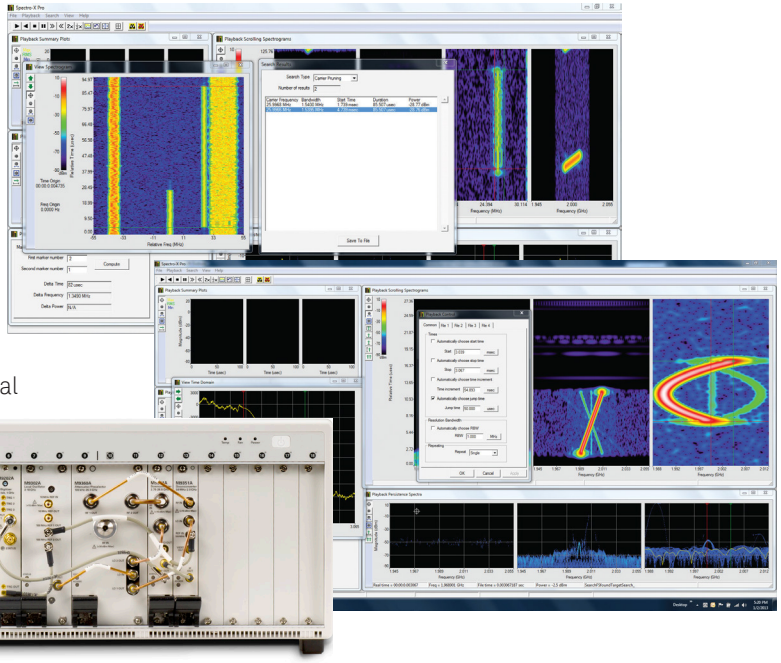
There are many potential sources of RF interference that can affect the operation of RF systems used in electronic warfare, surveillance, radar and wireless data communications. These can include multipath or adjacent channel interference, Rayleigh channel fading or scintillation or rogue carriers transmitting 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 PXIe data streaming and analysis solution from Bird 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 PXIe vector signal analyzer and M9202A PXIe 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 Bird'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. TheBird Spectro-X multi-channel signal analysis toolkit provides a comprehensive set of tools that allows the

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



KEYSIGHT TECHNOLOGIES

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 three 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 PXIe data streaming solution and VSA software together with Bird'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	PXIe vector signal analyzer
M9202A	PXIe IF digitizer
89600B	VSA software

Bird	
Spectro-X	Signal analysis toolkit

JMR Electronics
BluStor PCIe direct attached RAIDO storage array

To learn how this solution can address your specific needs please contact Keysight's solutions partner, Bird
www.keysight.com/find/bird

Bird

Keysight & Solutions Partners
Extending our solutions to meet your needs

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
www.keysight.com/find/solutionspartner

Bird manufactures systems that are used to help engineers better understand the challenges of the electromagnetic spectrum. These systems are used to assist engineers in the design, characterization, and/or validation of RF systems within several markets.
More information

For information on Keysight Technologies' products, applications and services, go to
www.keysight.com

KEYSIGHT TECHNOLOGIES

Published in USA, May 15, 2017
5990-9243EN
www.keysight.com