Selective Radiation Meter for Collocated Sites

A long-standing issue that deals with the ability to accurately measure the contribution of each emitter at a site has been solved. Traditional measurement techniques were to turn off all emitters, then turn them back on one by one, measure their radiated emissions levels, and compute the percentage of standard radiated by each one. This requires the coordination and consent of many systems operators who likely have little or no interest in sacrificing revenue or their system's uptime by helping out some co-located service.

Solving the Problems

A portable, commercially available solution to the problems just described is Narda's SRM-3000 selective radiation meter. The SRM-3000 essentially eliminates the most formidable obstacle to making radiated emissions measurements at collocated sites &#151 identifying individual emitters &#151 and does so in a small, portable form factor. This instrument combines the measurement and analysis functions of a high-performance spectrum analyzer with the computational power of a Windows CE-based PC to perform frequency-selective analysis. The instrument will automatically measure all emitters in a user-selected frequency band, label their percentage of standard, add up and display the total radiation from all emitters, and even identify them based on supplied software that can be easily updated.

Device Architecture

The SRM-3000 probe is precision-calibrated to provide extremely linear performance from 80 MHz to 3 GHz. It consists of three, orthogonally mounted isotropic monopole antennas. The antennas are automatically switched at high speed, and the received signals are sent at their original frequency to the instrument via a special ferrite-shielded cable if the probe is mounted on a tripod or directly if the probe is attached to the instrument.

The signals then are processed by the spectrum analyzer section SRM-3000. Algorithms in the Windows CE-based instrument calculate the required values, and the results are displayed on a 480 &#215 320 pixel high-contrast, high-visibility monochrome display.

The SRM-3000's various options including resolution bandwidth selection, frequency span, markers, and input attenuation from 0 to 50 dB in 10 dB steps. The results can be displayed in either tabular form or as a graphic, either one of which can be exported to programs such as Microsoft Word or Excel. The displayed information depends on the operating mode of the system. The mode that truly sets the SRM-3000 apart is the safety evaluation mode, which provides a tabular listing of signals by name (such as a call sign or service type), their strength as a percentage of a specific standard, and the percentage of the standard that the signals achieve when their contributions are combined.

This mode allows the signals at a site to be sorted out by frequency, type of service,

and measured field strength along with its relation to standard-imposed limits. Since all emitters with a contribution of 5% of more must be called upon to bring a site into compliance, the SRM-3000 provides a way to identify them that is orders of magnitude faster than any other method. Accuracy is assured because three-axis samples are taken, which is not possible using any other type of equipment.

There are two other modes of operation: spectrum analysis and time analysis. In spectrum analysis mode, the SRM-3000 displays the measured spectrum with resolution bandwidth and other parameters selected by the user. In the time analysis mode, the user selects a center frequency and the resolution bandwidth corresponding to the bandwidth of the channel to be monitored. The display shows a large current field strength value along with a plot of field strength over time. In every mode, the SRM-3000 can show field strength in either V/m, A/m, W/m^2, or mW/cm^2.

The instrument is small and light, measuring 9.5 &#215 5.5 &#215 2.3 in. and weighing 4.2 lb., including batteries. It will operate for between 3 and 4 hours on a charge from its NiCad battery pack, and can also be operated from 120 to 240 VAC via a supplied combination charger/converter.

The instrument is heavily shielded to make it virtually impervious to interference. RF immunity is specified as 1000 V/m.

Other features include storage for 20 user-defined test setups and 200 spectral plots, as well as the ability to update its standards information via software. An RS-232C port provides data communications. The instrument is supplied with a calibration report, RS-232 cable, configuration software, the charger/converter, and a battery pack. The instrument and triaxial probe have a list price of $15,000.

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