

Trends in Test & Measurement: New Test Requirements, New Technologies

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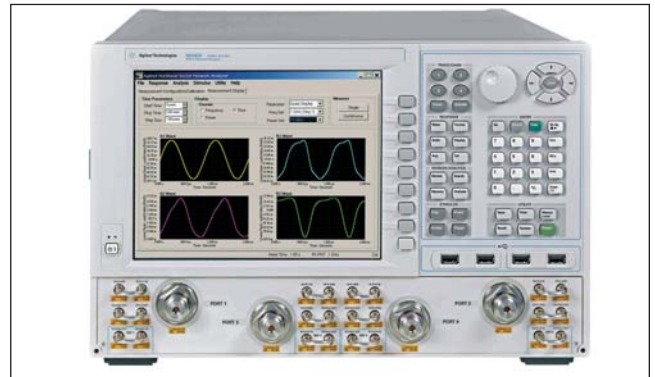
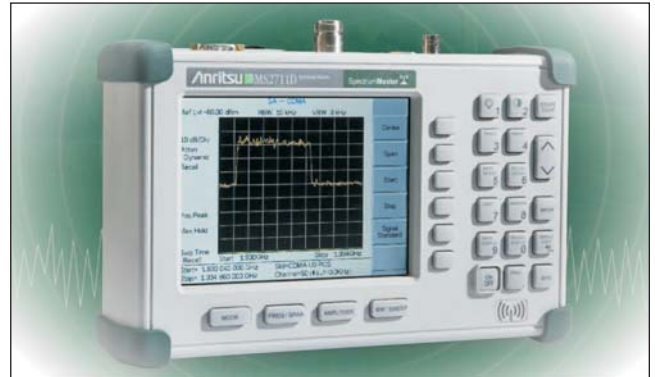
The development of new instrumentation technologies is driven by the needs of the users—the measurements and analyses required to support new technologies and applications. Among today's needs are measurement speed, broadband signal measurements, modulation and demodulation capabilities within instruments, and greater integration with computer simulation and analysis. There are also increasing needs for high performance portable instruments, flexible and fast production test systems and a continuing push for the high-end performance in laboratory instruments.

The single biggest recent advance in test equipment is the inclusion of digitization of signals and computer analysis capabilities. Many instruments now have internal PC platforms that operate the instrument and perform the calculations necessary to process the measurement data (FFT, modulation/demodulation, BER analysis, etc.) and deliver detailed displays and reports to the user.

Production testing is a significant challenge, with today's complex modulation types, spectral mask-defined emissions limits, and ever-higher frequencies of operation. Current production test systems must have performance approaching that of high-end laboratory instruments. With evolving standards and deployment of new systems, the flexibility of production testing has also become an important issue, with the goal of reducing the cost to reconfigure test systems for new products.

High performance portable instruments is a growing area of interest. The construction and commissioning of new wireless, industrial, automotive and medical systems can be considered an extension of the manufacturing process, including testing. Once they are operating, maintenance of these systems must use instruments that are capable of verifying that performance is fully compliant with the operating specifications.

Finally, the nature of the signals themselves drives the requirements of test instruments. Complex digital modulation (such as OFDM), and wide occupied bandwidths are just two factors that have only recently become commonplace. The technical article that follows this report expands on issues related to new requirements in the analysis of broadband signals.



Three examples of important test instrument types for current applications—Portable instruments: Anritsu Spectrum Master (top); advanced measurements: Agilent Nonlinear Vector Network Analyzer (center); and flexible production testing: Keithley Instruments MIMO test system (bottom).