SAGE Instruments **UCTT 8901** Differentiators

This brief covers the significant advantages of Sage's UCTT 8901 Base Station Tester over its direct competitors.

Internally, the UCTT is constructed of a broadband FFT software radio transceiver. Whereas competitors utilize swept based legacy receiver designs that are inefficient (use multiple RF components) and are not in-tune with today's modern broadband radio transmitters (i.e. LTE). Legacy receiver designs were sufficient for narrowband steady-state RF signals (AMPS) but are not fast enough to captures intermittent interferers nor capture enough signal to ascertain a real picture of wideband modulated signals in both frequency and time domains. Also, legacy designs use many components to assess performance (antenna test module, SA module, and demodulation module) which is more akin to setting up a testbed with dedicated instruments for each measurement. Of course, this can be accurate but requires more knowledge and lots of time for calibration. Thus, having a highly integrated instrument like the UCTT significantly reduces test time, reduces measurement error, and provides a more robust and enjoyable tool.

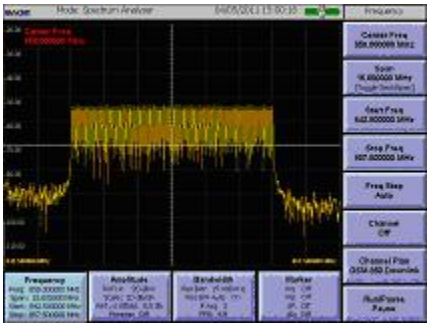
Broadband FFT Spectrum Analyzer

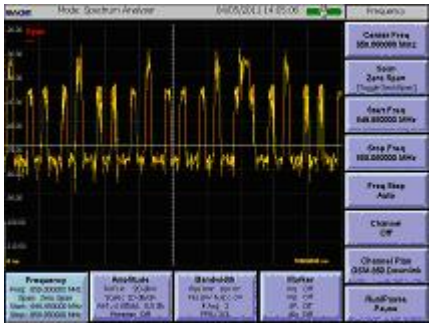
At the core of the UCTT lies its heart and sole, the FFT Spectrum Analyzer (SA).

The advantages of a FFT SA is its ability to sample its analysis bandwidth (20 MHz) in real-time at hundreds of times per second compared to legacy designs that sample according to their resolution bandwidth (RBW) setting. For example: To view 10 MHz of spectrum on screen, a legacy SA with a RBW of 10 KHz will require 1000 (samples) measurements as it sweeps from left to right (low to high freq) as fast as it can just to populate the screen one time. Whereas the UCTT's SA will capture the entire 10 MHz of interest in a single sample in real-time, 100's of times a second.

Since over-the-air RF signals are changing instantaneously due to fading, antenna placement, or signal technology, legacy designs cannot keep-up and constantly mix past and present signal samples to populate the spectrum display. Thus, legacy SA designs can provide inaccurate results. More importantly, legacy designs are too slow and can miss signals of interest. Here are some advantages of the UCTT's broadband FFT design:

- Capture wideband signals as they really are (Spectral Characteristics) to quickly assess performance (Fig 1.0)
- 100's to 1000's of times faster, providing superior interference hunting
- Using smart RBW auto-mode displays 1000 data all the time providing more resolution and lower noise floor. No missing spectrum or data alteration using video bandwidth filtering (smoothing).
- Switch to zero-span to quickly look at the time domain characteristics of long period signals (i.e. View full LTE frame or all 20 LTE timeslots!)





Sweep Speed Comparisons		**Full Spectrum/Sweep Update Rate**		
Freq Span	RBW	UCTT FFT	Competitive SA	Comments
250 MHz	100 KHz	60 msec	10.0 Sec	RBW man-mode
25 MHz	25 KHz	55 msec	8.0 Sec	RBW auto-mode
10 MHz	1 KHz	200 msec	4.7 Sec	RBW man-mode
5 MHz	500 Hz	200 msec	1.6 Sec	RBW man-mode
1 MHz	100 Hz	300 msec	2.8 Sec	RBW man-mode

Integrated, High Accuracy Power Meter

- No more dongles or discrete power meters to obtain 0.25-0.5 dB accuracy.
- No test setup calibration necessary! Calibrated for amplitude, frequency and temperature.

Antenna Testing

New innovative method that tests your antenna like it is used for 4G technologies with a self-calibrating design. Provides insight into the antenna assembly performance that may go undetected with conventional techniques.

- Simpler, faster, and more accurate.
- Perpetual calibration - requires only a single calibration
- High density resolution with 1000's of data points all the time!
- Save lots of time - No more messing with points, distance, and frequency ranges! No need for complex equipment training!
- Reduces the need for very expensive and complicated PIMs testing

Physical Advantages

The UCTT was designed to operate in bad weather, but we saw that competitors did not work well in good weather either (direct sunlight) and suffered from insufficient battery power.

- Provides the largest LCD display and super bright LED backlight to overpower direct sunlight, glare and reflection issues.
- Provides 20 to 30% more runtime with a single battery, or 160% more with 2 batteries (7-8 Hrs).
- Super responsive touchscreen providing unparalleled ease of use (See Fig 3 & 4)
- US Military Standard water tolerant and rugged design (MIL-STD-810)

Touch Screen Navigation

Expanded View

Software Radio, Clock Stability Design, and Software Architecture

- The UCTT software radio design provides greater sensitivity thus making the UCTT more robust for over-the-air measurements including demodulation
- Frequency Stability is an order of magnitude better at 5 ppb with an average holdover > 1 week (< 50 ppb)
- UCTT's innovative software architecture provides unrivaled speed and performance. No more downtime when switching measurement modes!