SAGE Instruments UCTT 8901 Release Notes

Friday November 21, 2014, Sage Instruments is excited to announce a major new release for its wireless base station test tool, model 8901 UCTT.

Release Summary

This release serves to extend the UCTT's capabilities to include:

- Support for New Enhanced Radio Transceiver Module

  o Extended Frequency Coverage Range, down to 9 KHz and up to 3.8 GHz
  o Increased Broadband FFT Analysis Bandwidth to 25 MHz
  o Improved Noise Figure providing for an even better noise floor
  o Supports Signal Generation of Full Frame 20 MHz LTE & WCDMA

- New Capabilities added for Interference Detection & Mitigation

  o Forward Link (downlink) Interference Detection
  o LTE-TDD Uplink Interference Detection
  o Auto Detection of LTE-TDD Switch-point Periodicity

- LTE-Advanced Multi-band Aggregation Demodulation Channel Scanner

- Enhanced Vector Signal Generator

  o Simultaneous Signal Generation (i.e. LTE) and Demodulation
  o Added On-The-Fly Settable Signal Attributes (i.e. Burst Type)

- New Auto-Test Application

  o Provide Test Automation for Antenna and Cable Test with Test Template Generation and Pop-up dialogs to Guide Users.
  o Ensures repeatable tests and accurate reporting with Geo-tagging
  o New "Auto-Test" Application button added to Home Screen (Mode button)

- New Cloud-Based Remote Control & Monitor Service, RemoteAnywhere

- Enhanced Spectrum Analyzer Zero-Span with Synchronous Capture

- Added SMR Bands to Channel Plan Database

- Added Programmable Trace Reset Time for all Spectrum Analysis Applications that support Peak Hold Trace

Release Details

New Enhanced Radio Module (Purchase Option 8901-000-02 or Upgrade 8901-0001-01)

The UCTT's new radio module will be offered as an option on new units or as an upgrade to all existing units.

1. Extended Frequency Coverage Range *[See Figure 1]*

   o The new tranceiver will support frequencies down to 9 kHz and up to 3.8 GHz

2. Increased Broadband FFT Analysis Bandwidth to 25 MHz

   o The new transceiver module can operate with analysis bandwidths of 15 MHz or 25 MHz (Option 8901-0101-01)
   o 25 MHz Spectra sample speeds :   Normal Trace: 26x (Typ)
                                        Cont Peak Trace   1000x (Typ)
                                        Cont Burst Trace 2600x (Typ)

3. Improved Noise Figure providing an even better noise floor to help find low level interferers

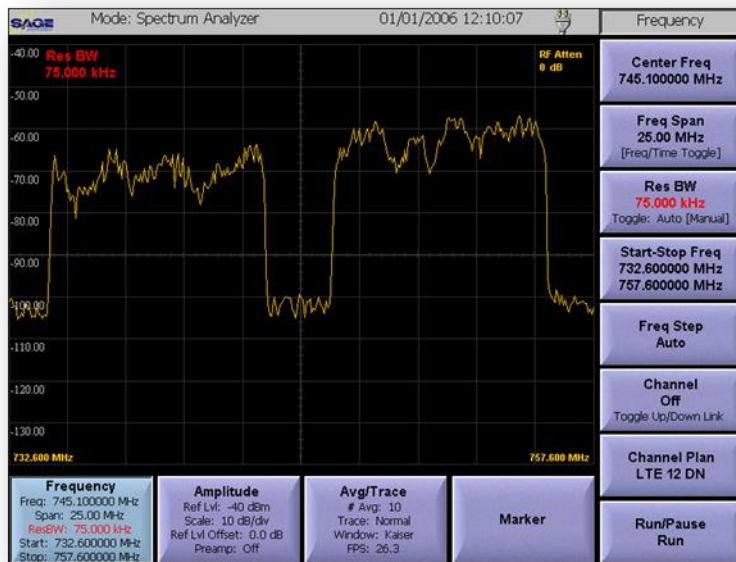   o Lowers typical usable noise floor 2-3 dB without sacrificing re-trace speed

Figure 1 Shows New 25 MHz Real-time Spectrum Capture – SA Mode – Normal Trace

New Transceiver Module Applications

- Extends all UCTT applications to UHF and VHF bands (i.e. Public Safety)
- Allows field personnel to quickly and accurately check and assess entire uplink spectrums or bands while retaining an exceptional low noise floor
- Assist with Spectral Clearing and Interference Activities

Release Details (Cont'd)

Advanced Capabilities for Interference Detection & Mitigation

1. Forward Link (Downlink) Intereference Detection

    o Added Power Spectral Density Trace Mode to the Spectrum Analyzer Mode.

    o The Power Spectral Density Trace Mode plots signal activity based on periodicity (how often a signal is present) providing another level of troubleshooting Time Domain Multiplexed signals (i.e. LTE) *[See Figures 2 & 3]*

    o The Power Spectral Density Trace along with the UCTT's other advanced traces like Continuous Peak, Continuous Burst, and Max Burst provide unparalleled interefence signal detection capability.
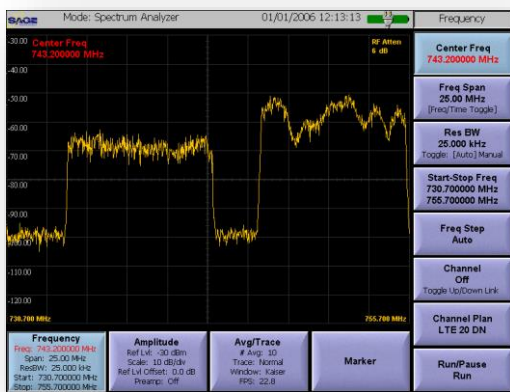
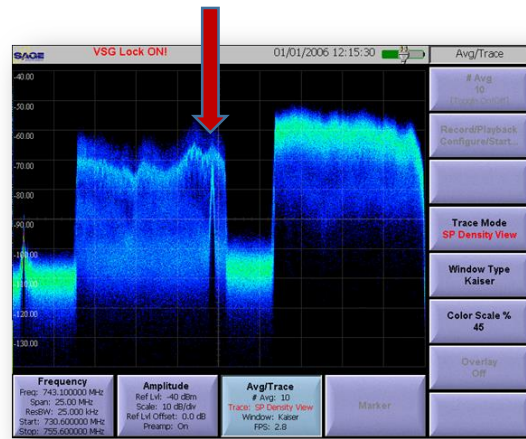
Figure 2 Seemingly two clean LTE Fwd Link channels

Figure 3 Shows a hidden Fwd Link Interferer using the UCTT's Spectral Power Density Trace

2. Auto Detection of LTE-TDD Switch-point Periodicity in the LTE-TDD submenu, RF View *[See Figure 4]*

    o Helps user identify which TDD Uplink/Downlink Configuration is in use.
    o Quickly shows users where to look for uplink and down link transmissions
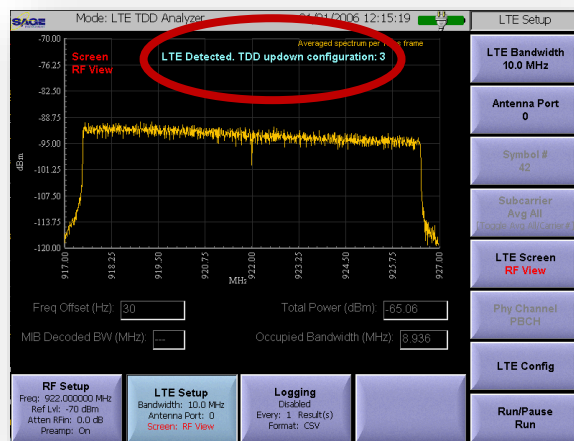
Figures 4 Shows LTE-TDD Signal with Auto-Detection of Switch-point Periodicity Configuration

3. LTE-TDD Uplink Interference Detection

    o Enhanced LTE-TDD Sub-menu Screens:

    Power Versus Time

    Plots Full LTE-TDD frame view using power amplitude and symbol period timing (7 symbols per timeslot, total = 7 x 20 or 140 Symbols). Users can specify Subcarrier (e.g. 1 to 600 for 10 MHz Channel) or specify average. "Average All" allows assessment of all Subcarriers over a full frame as shown in *Figures 5 & 6.*

    TDD Color Mapping

    The UCTT automatically detects uplink and downlink of the LTE-TDD signal
    Blue represents Uplink Transmission and Gold represents Downlink Transmission
    Figure 5 is an example of an idle (quiet) LTE-TDD uplink channel and
    Figure 6 shows an intermittent or time varying interferer
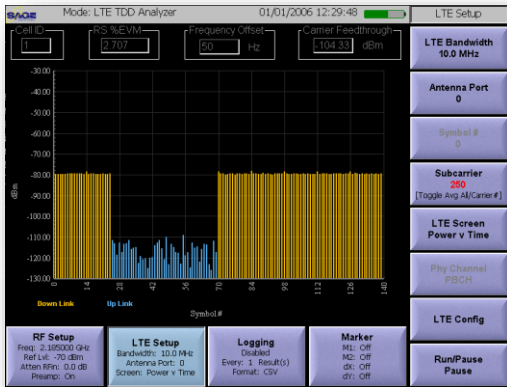

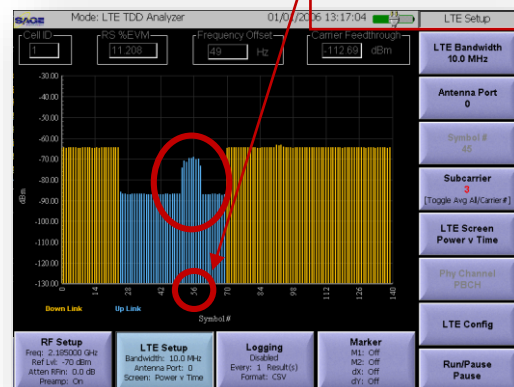**Figure 5** LTE-TDD Pwr vs. Time. [No Activity in uplink, Blue]   **Figure 6** LTE-TDD Pwr vs. Time [Interference on uplink]

    SubCarrier View

    Provides a full frame spectrum view - Amplitude (pwr) vs. Frequency (Subcarrier) transmission(s). Users can specify Symbol Time (Ts = 1 to 140) to quickly assess spectrum at a particular time during the LTE Frame. This is extremely useful when looking for interference during the uplink period(s) of the LTE frame *[See Figures 7 & 8]*

    Figures 7 and 8 show the Subcarrier View with for Symbol Times referenced from Power vs. Time screens above in *Figures 5 & 6*. Figure 7 shows LTE Channel Spectrum during Symbol Period 45 from Figure 5 above. As expected it shows the noise floor of an idle TDD uplink channel. Whereas Figure 8 shows the spectrum with interference at Symbol Period 53 from Figure 6

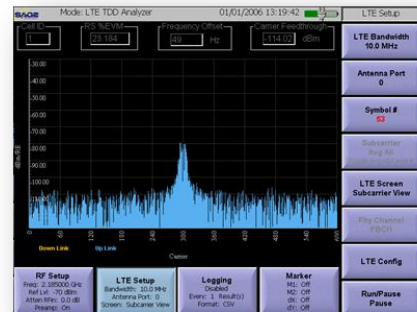**Figure 7** LTE-TDD SubCarrier View. [No Activity, SP 45]   **Figure 8** SubCarrier View. [Interference, SP 53]

LTE – Advanced Multi-band Aggregation Demodulation Scanner

- Users can setup upto 10 different LTE Carriers anywhere within the EUTRA defined bands monitor vitals and Geotag data for GoogleEarth mapping or post-test analysis.
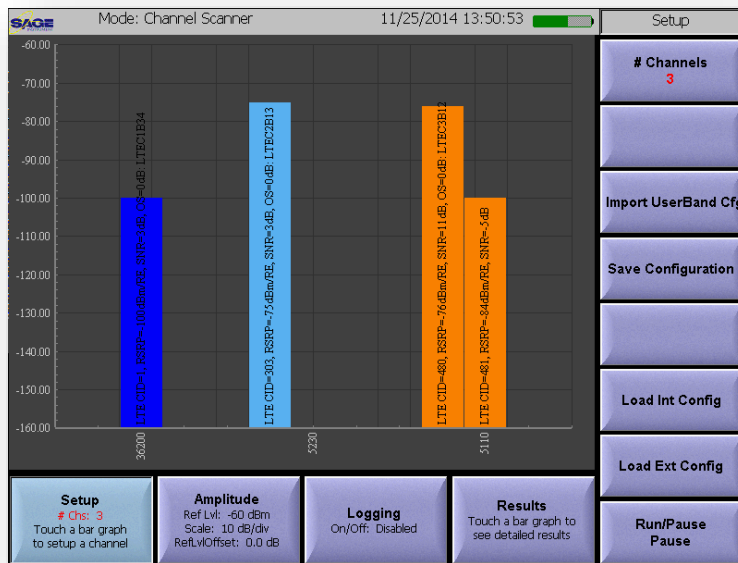

Figure 9 Advanced Channel Scanner Showing 3 Aggregate LTE Carriers

Enhanced Vector Signal Generator (Optional with new radio tranceiver)

- New Full Frame emulation of 20 MHz LTE
  On-demand settable parameter:
  Cell-ID, Freq, channel size, Pwr , and TDD/FDD configurations.
- New Full Frame emulation of WCDMA
  On=demand settable parameters:
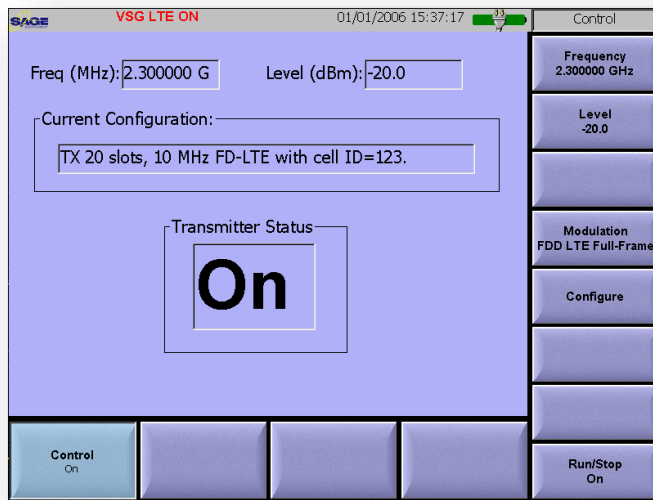 Center Freq, Power, and Scambling Code

Figure 10 Shows Enhanced LTE with new Configure Button

Enhanced Vector Signal Generator (Cont'd)

- Now supports simultaneous generation and demodulation for LTE and WCDMA signal types.
  - Great for testing BDA's, Extender Sub-Systems (i.e. In-building setups)
  - Validate signal path to isolate signal distortion problems

- Added Signal Configuration button to set more parameters for each signal type.
  - Supports selectable GSM burst type and number of active timeslots [i.e. EDGE, Sync, Acdcess, Dummy, Frequency]

New Auto-Test Application (Standard Option: 8901-0860-01)

Auto-Test is a new standard option that was developed to help wireless carriers and contractors streamline and standardize BTS field certification & troubleshooting processes, providing repeatable test methodology using automated test scripts. Test scripts are pre-generated using the UCTT's PTAT PC utility software. PTAT's new Auto-Test Configure screen (See *Figure 11*) provides a simple interface to generate test scripts; set parameters such as Frequency band, Test Type, and Pass/Fail criteria. Test script(s) are saved to a thumb (USB) drive.
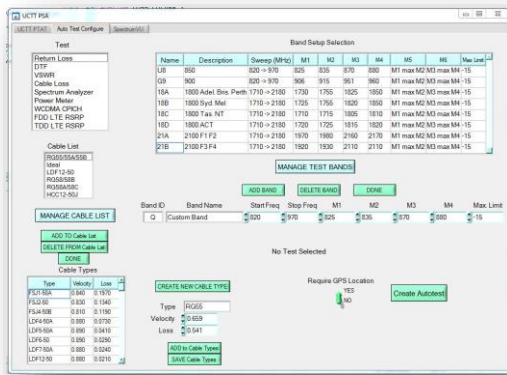

Figure 11 UCTT PTAT S/W Auto-Test Configure Screen

Figure 12 New Auto-Test Application Button

With the thumb drive installed, UCTT Users can select the new Auto-Test application button from the UCTT's home screen (Mode button) and will be guided with dialogs prompts to confirm and/or make selections to ensure tests are conducted correctly and recorded with the correct coded filename. Tabulated data and graphical results are both displayed(See *Figures 13 & 14*) and recordered to the thumb drive with the appropriate filename format.
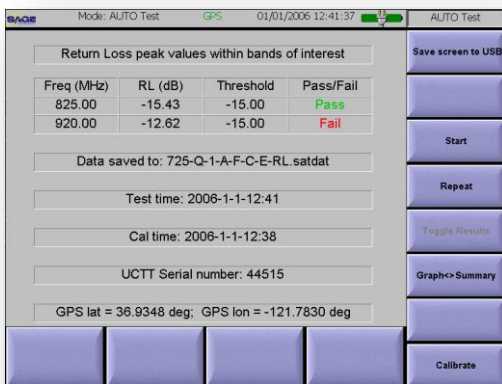

Figure 13 Auto-Test Tabulated Result Screen

Figure 14 Auto-Test Graphical Results Screen

RemoteAnywhere, New Cloud-Based Remote Control (Purchased Option 8901-0850-01)

- This new cloud-based remote control option allows field personnel to share their UCTT screen and control with others without requiring a PC.
- The supporting cloud service is sold as a multi-year license with this option. Thus, customers will be offered an extension upon expiration.
- Connection of Wifi/Bluetooth or Wireless Data Service modem is required and sold separately.

Enhanced Spectrum Analyzer's Zero-Span (Standard with new radio transceiver)

This release adds synchronized capture (trigger) to Zero-span. This allows the UCTT's zero-span mode to frame-up with a target time domain signal with little or no expertise.
Users just need to know the signal period (frame length), and frequency bandwidth (channel size) to get useable traces.

- Serves as an excellent option to spot interfering signals hidden within a TDD modulated signal such as LTE-TDD as shown in Figure 15 & 16
- Zero-span provides a quick way to identify or determine if interfering signals themselves are time vary signals

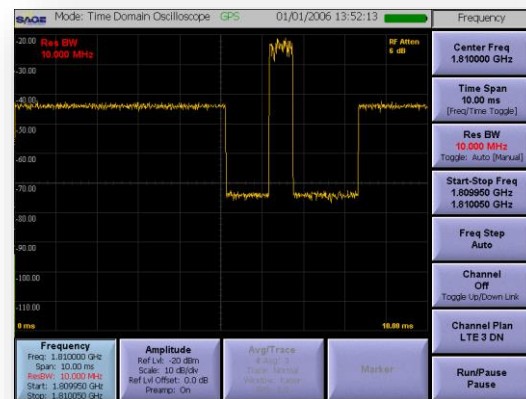*Figure 15* *Shows Zero-Span of 10 MHz LTE-TDD*   *Figure 16 Shows Zero-span with Interferer during Uplink*

Added Peak Trace Reset for all Spectrum Analysis Screen

- o All spectrum analysis screens now support programmable reset.
- o This feature automatically refreshes Peak Hold and Continuous Peak Traces to help and assist visual detection of interfering signals [See *Figure 17*]

Support Tools, Utilities and Accessories

- o The UCTT's Remote Control software with support for RemoteAnywhere Cloud-Based connection is now available for download.
- o The UCTT's PTAT Utility with support for Auto-Test is now available for download.

To get download access for this release please contact Sage Sales (sales@sageinst.com) or Technical Support (technicalsupport@sageinst.com).
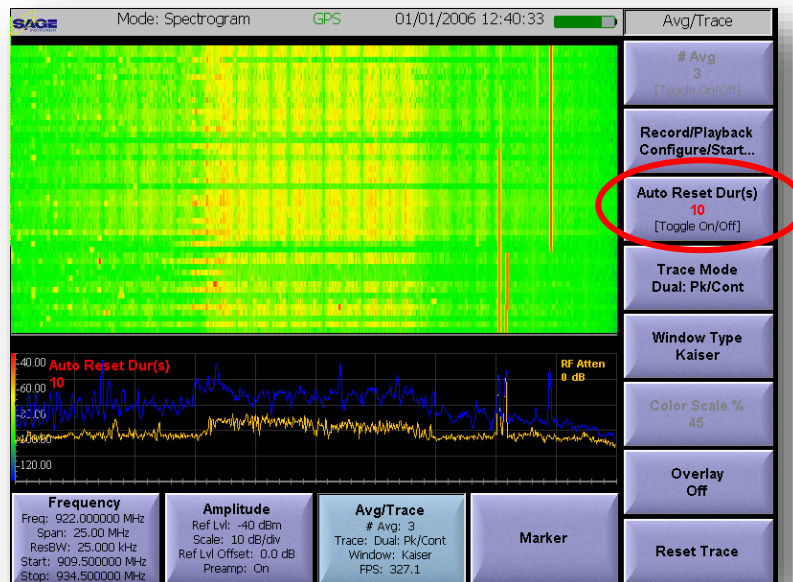
Figure 17 *Spectrogram with Dual Trace (Peak Hold and Continuous Peak)*
showing new programmable Reset button

About Sage Instruments

Sage Instruments is a leader in the telecommunications and wireless test industry. Building test sets, automated test systems, local loop test systems, and automated wireless test systems used worldwide by leading telecom and wireless providers, manufacturers, and end users. Each of our products provide customers with the value, performance, and reliability demanded in the dynamic and competitive telecommunications and wireless industries. The company offers innovative solutions for the development, installation, management and maintenance of converged, IP fixed and mobile networks from the core to the edge. Key technologies supported include 2G/3G/4G/LTE, IMS, and VoIP supporting more than 20,000 telecom customers worldwide. For more information, visit www.sageinst.com.