

ETS-Lindgren Software Bulletin

Date August, 2023

EMQuest Highlights

Uplink carrier aggregation now supported Extended the tools for near-field test methods Reverb TIS test methods added R&S CMX500 OBT now supported New R&S 5G location assist instruments supported

TILE! Highlights

TILE! Version 7.8.1.6 is current New drivers for SIWI SWSPA and ETS-Lindgren EMonitor Added power meter drivers for Boonton RTP, PMX, and AR PSP Tektronix MSO 4/5/6 series scopes supported Improvements to R&S ESU, Agilent PSA, Siglent SSA3000 and EMSense40 drivers

ETS-Lindgren Software Support Portal

Have you ever experienced a project that was at least double the effort expected? After several months of work and recovery, the new software support portal is open, stable, and fulfilling expected functionality. Two login areas are available, one for TILE! and a separate area for EMQuest. As you might expect, some resources are reserved for those with an active maintenance contract on their software product. But important tutorial documents and training videos are available for all on the top landing page found at https://support.ets-lindgren.com/.



We recommend visiting the *Downloads* and *Documents* areas where key basics and frequent troubleshooting topics are covered. Of particular note are the "TILE Training Basics" videos available for download, a key resource for your lab new



hires and cross training of staff members. Larry Sheridan has taken key topics from his vast TILE! training experience and made on-demand videos covering key functionality and frequent questions users have. Additional videos for VisionTRX, EMCenter, HASP key and NI Visa are also available in the *Downloads* section. Written documents on similar topics can be found in the *Documents* area for those who would rather read than watch the information.

Behind the Login sections users can create and view progress on submitted support tickets as well as download the latest versions, updates and drivers mentioned in this bulletin.



The vast majority of Support Tickets raised are addressed within 24 hours of submission by one of the twenty plus people that receive notice of a ticket. I can attest to the dedication of this group, I am one of the silent monitors of the troubleshooting sessions initiated by Support Tickets and from the support emails. Work continues on populating the *Links*, *News* and *Documents* areas as this new Portal matures.



EMQuest Version 1.16 Build 24234 and 14361

FR1 test case support has advanced to cover additional instruments and test methods with EMQuest Version 1.16 Build 24234 being the latest drop. The largest functionality addition occurred in build 14361 when uplink component carrier aggregation (CCA), in addition to downlink combinations, was made available. You are probably aware that carrier aggregation test scenarios have moved far beyond two LTE carriers or EN-DC, some test plans request up to 5 carrier combinations with a complex mix of LTE and 5GNR bands requested. Now uplink CCA could multiply the combinations once again. The possible band configurations and carrier aggregation scenarios are heavily instrument dependent, with RF front end and firmware version both impacting what combinations are possible. Note that higher order (above 2CA)



aggregation requires hardware upgrades to OTA systems in addition to the PRM files that drive these modes. Isolating the carrier-under-test from the other carriers being aggregated requires switching and path conditioning outside of the instrument, with each test system having slightly different hardware requirements. Uplink CCA may add additional complexity in hardware and software realms, so connect with your sales team member to explore what is possible on your OTA system. Uplink CCA is available for the UXM-5G and MT8000A currently, with CMX500 to follow in the next few months. A current snapshot of 5G FR1 test case support for each instrument is summarized in the table that follows. The table also notes the addition of 5G Location using Rohde & Schwarz instrumentation beginning with 5G GNSS as the first mode supported, and 4G and other satellite constellations to follow.

CTIA centered functionality for reverb chamber TIS measurements was added in build 14361. Specifically, the RSS based TIS post processing and Median Method for Reverb Fast TIS Test were added. Contact your sales representative if reverberation test methods for TRP and TIS measurements are of interest. This is an expanding area of support for CTIA, more information on the pros and cons of using reverb style chambers rather than anechoic chambers can be provided.

Overall test speed was improved with the addition of functionality to start single axis pattern tests at the closest limit, and support for sequential polarization while running triggered trace is present in 14361. Customized angle step sizes in the far-field is now available to allow additional flexibility in setting up specialized tests outside the CTIA prescribed methods.

Noteworthy expansion for near-field test methods and post processing was made available in build 14361. Near-field measurements are another growing area of support for EMQuest, watch for significant additions for this test method in future releases, and contact sales with any requests for additional near-field tools. Three new tools were added for post processing near-field measurements to far-field equivalent results:

- 1. Near-field to far-field conversion can now utilize vector SADP corrections
- 2. Near-field to far-field conversion using polar extrapolation for cone cuts is supported
- 3. Probe corrections can be applied to the conversion results from a correction file

Brand	Model	Frequency	5GNR Modes	Carrier	MIMO
		Range	Supported	Aggregation	Mode
				Supported	Supported
Rohde &	CMW500 + CMX500	FR1 & FR2	NSA, EN-DC, SA	4 DL	4x4 FR1
Schwarz				2 UL	
Rohde &	CMX500 OBT (LTE+5G)	FR1	NSA, EN-DC, SA	in progress	in progress
Schwarz					
Keysight	UXM-5G	FR1 & FR2	NSA, EN-DC, SA	4 DL	4x4 FR1
				2UL	2x2 FR2
Anritsu	MT8821C + MT8000A	FR1 & FR2	NSA, EN-DC, SA	5 DL	4x4 FR1
				2 UL	2x2 FR2
Anritsu	MT8000A LTE+5G	FR1	NSA, EN-DC, SA	5 DL	4x4 FR1
	Single box			2 UL	2x2 FR2
Starpoint	SP9500	FR1	NSA & SA		
Spirent	GSS7000	L1, L2	4G and 5G		
			location assist		
Rohde &	CMX500+SMBV	L1, L2	5G location		
Schwarz			assist in		
			progress		

Test case functionality by instrument model

Anritsu MT8000A Driver Updates

Anritsu has released a new RF module option for the MT8000A called the 033 card, build 14361 extends support this RF card as well as legacy 020 and 021 modules. The MT8000A driver was expanded to cover uplink NR carrier aggregation, band 33, LAA pattern on band 46, and KSSB range up to 31. Power class 1.5 (PC 1.5) is now available for both TX Diversity and UL MIMO test scenarios on this instrument. Stand-alone (SA) signaling was verified for the MT8000A Single box setup along with a few fixes and interface improvements.

ETS•LINDG

An **ESCO Technologies** Company

Rohde & Schwarz CMX500 Driver Updates

EMQuest now supports the Rohde & Schwarz one box test (OBT) CMX500 unit. R&S engineers have worked hard over the last year to merge the 5G capabilities found in the R&S two instrument platform CMW500+CMX500 inside the so called "one box" version of CMX500. EMQuest support for the R&S CMX500 OBT has been added to cover most FR1 TIS and TRP test cases. Carrier aggregation and MIMO tests are active work items and will be verified in the next few months. Work is also underway on the new RF port switch matrix found in the CMX500 OBT, with the current driver version supporting manual RF port selection.

Bluetooth low energy received some upgrades and general improvements on the CMW500 platform, with BLE v5.2 now supported on properly equipped instruments. Another popular upgrade for test systems continues to be Wi-Fi 6E using the CMW500, your sales contact can provide additional information on the test packages for either BLE or Wi-Fi 6E.

5G Global Navigation Satellite System (GNSS) tests are now supported using the R&S SMBV and CMX500 platform combination. Currently the R&S implementation is limited to the 5G network, but 4G GNSS and additional satellite constellations will be added in the near future. L1 and L2 bands are available now with L5 to follow on as workflow allows.

Keysight UXM-5G Driver Updates

New carrier aggregation combinations were added in the driver for UXM-5G, including uplink carrier aggregation.

Starpoint SP9500 Driver Updates No updates.

EMQuest - 5G FR2 SISO Test Updates

You may have noticed that demand for FR2 testing has fallen significantly in your lab. This isn't likely a temporary lull, a dramatic shift has taken place since the early days of "first to offer 5G." Mobile phone buyers showed that seeing 5G bars was more important than the rare case of having a very high speed 5G FR2 data connection, and spoke by moving to carriers with 5G FR1 spectrum deployments even though 5G was only a slight speed improvement over 4G in FR1. Global network operators noticed and have prioritized FR1 coverage over the data speed claims offered by FR2. In the US, T-Mobile won millions of 5G subscribers from AT&T and Verizon by deploying 5G in C-band and claiming almost nationwide 5G coverage. AT&T and Verizon reacted by abandoning FR2 deployments in favor of enhancing FR1 coverage, massively impacting the market for FR2 capable handsets. Likewise, the South Korean government vacated U+ and KT leases for 28 GHz FR2 spectrum as the mobile network operators failed to build out the spectrum in the allotted time. European carriers never moved to deploy FR2 networks, and so mobile phone OEMs have left FR2 chipsets out of many new models. This shift is foundational, if there is no FR2 network, FR2 chipsets become complex, expensive, battery draining technology with very limited use. With enhanced mobile broadband (eMBB) failing to justify the massive investment in 5G FR2 networks, FR2 radio chipsets are being included only in the flagship and high-end mobile phone platforms, limiting the test demand in mid and low tier smartphones. Your lab may have all the capacity needed to serve the limited market for FR2 testing, and with slack demand, few changes to EMQuest or FR2 instrument drivers has taken place since mid-2022 and the associated software bulletin.

Instrument vendors have added little capability for FR2 in 2023, likewise reacting to slow demand, so please submit a Ticket on the EMQuest support portal for functional or feature requests as we all shift priorities. ETS-Lindgren will monitor the

market development of FR2 and the newly proposed spectrum between 6-18 GHz that is being targeted for 6G, presently being referred to as FR3. Time will tell if smartphone subscriber growth can continue to justify new spectrum and associated build-out, or if some other device and application comes along to continue the mobile wireless data demand growth seen over the prior ten years.

ETS·LINDGR

An ESCO Technologies Company

5G FR2 MIMO is still an active area and CTIA continues to work on a test standard involving channel models applied to the RF paths of an antenna array. ETS-Lindgren has a specialized chamber available for FR2 MIMO tests called AMS-5709 that is in final development. Test data for CTIA submission to certify AMS-5709 has been hindered by the lack of frequency converting mixers and associated semiconductors, a theme you are probably familiar with, but work continues and is progressing for commercial availability of a certified FR2 MIMO chamber.

TILE! Version 7.8

The latest TILE! Version is 7.8.1.7 and download media and the change log (Changes.txt) are available on the support portal found at <u>https://support.ets-lindgren.com/portal/tile/downloads</u>. The change log can also be provided upon request from your sales contact in case you want to verify an issue or bug you are seeing has been fixed in a later version. TILE! Version 7.7 was superseded by 7.8 issued in November, 2022 and three revisions since have occurred. Major changes are summarized in the following table.

TILE!	Release Date	Change Summary	
Version			
7.8.1.7	April, 2023	Updates to Siglent and CustomDriver, Scripting changes	
7.8.1.6	February, 2023	Driver for SIWI SWSPA amp, updates to many other drivers	
7.8.0.5	December, 2022	EMMonitor and Audio Precision module drivers added	
7.8.0.4	November, 2022	Many new features for Immunity Test Action, Tek MSO and Boonton PMX drivers added	
7.7.2.27	September, 2022	Added Fieldfox receiver driver; RX, SA, NA modes now supported	
7.7.2.24	August, 2022	Fixed core IVI driver functionality causing errors on Initialize	
7.7.2.18	August, 2022	New drivers for IFI amplifier, Signalhound_USB, HASP v8.43	
7.7.2.11	June, 2022	Extended support for EMSense40, EMSwitch cards	
7.7.2.4	April, 2022	Additional CWS500-N, Agilent X & S series scope driver changes	
7.7.2.3	March, 2022	CWS500-N, R&S LAN and USB power sensors updates	
7.7.2.2	February, 2022	DO160-G Reverb levels and methods added	

TILE!'s current Version 7.8.1.7

Enhanced the driver for Siglent_ssa_3000x and sva_1000x series analyzers, as well as fixing an issue when these models were used in power meter mode. A Monitor Driver Type was added that can be used in the EUT Monitor template, highly

useful in cases when TILE! needs to communicate with an external EUT software application. This version also added stopwatch functions to the scripting engine to improve the timing control and monitoring of consecutive scripts.

ETS · LINDGR

n **ESCO Technologies** Company

Version 7.8.1.6

TILE! version 7.8.1.6 improved the Agilent PSA, Signlent SSA3000x, EMSense40, Radisense40, and R&S SML drivers. New drivers for SIWI SWSPA tunable attenuation amplifier, Boonton RTP and AR_PSP USB power sensors were added. The Immunity Test action was enhanced with new Instrument Switching settings that impact the case when two signal generators are routed to an amplifier. This enhancement drove changes to the properties in Actions and Iterators groups to better organize the features made available. The Probe API was updated to support new triggering actions requested in Reverb Test, Reverb Cal, Immunity Test, and Immunity Cal.

Version 7.8.0.5

This version added a driver that supports the new EMMonitor APx500 add-on module for the Audio Precision analysis software application.

Version 7.8.0.4

Major additions to the Immunity Test, Immunity Cal, and Immunity Reverb test actions were included in this first 7.8 version. A new setting for Read Monitors with modulation on was added, along with several field probe leveling options. In the Immunity Cal action, live display of current_index, current_freq, forward_power, and reverse_power values is now available. Use and display of these values in Immunity Test and Reverb Test was provided with some changes to initialization to allow the scripts to run without starting values. A new power meter driver supporting Boonton's PMX40 was added and the R&S ESU spectrum analyzer driver was enhanced. Finally, the tek_scope_universal.ins driver adds support for the MSO 2/4/5/6 series with the driver tested on model MSO44 using firmware 1.20.7.6859.

Version 7.7.2.27 (final 7.7)

Additions in the Keysight FieldFox driver set can be found in this version, along with some name changes to identify spectrum analyzer (SA), receiver (RX), and network analyzer (NA) modes for this model. R&S FSL and NRX model drivers were expanded with new features and a CSV file export error for tables that include blank rows was included.

Version 7.7.2.24

Many ivi_scope driver features were implemented, including Probe Ratio, Trigger Source selection, and a Vertical Autoscale loop. A persistent initialization error in the core IVI driver functionality was solved in this version. A graphing and table view issue that prevented saving these items when loaded from an older profile was fixed, and further notes are in the release notes that are important for the load action if this has happened to your profile. Extra steps are needed to fully clear this error on some profiles. SCPI getprop (get property) and setprop (set property) commands were implemented, and the Simulation tool version 2.3.1 received enhancements.

Version 7.7.2.18

A new driver for the IFI_custom_bands.ini was built to use the modern IFI amp API used by the SMX models. Drivers for R&S analyzer models FPC, ESU, and FSV received updates along with the Keysight (Agilent) MXE. Lastly a driver for SignalHound's USB spectrum analyzer USB-SA44B was added in this version.

Version 7.7.2.11

Gif export format was added for Picture, XferData, SaveWindow functions. SiteAttn action was converted from a signalthreaded to a multi-threaded architecture, along with some alignment of property labels to match their Edit Mode tab names. C_Peaks action fixed span_min and span_max variables causing incorrect values being sent to the measurement receiver. ETS_EMSwitch and SwitchChassis support the new high frequency switch modules (7001-02x). All the above TILE! drivers, fixes and enhancements are available on the Support Portal for customers in maintenance. Quick and trackable technical support is handled via Tickets on the Support Portal, and additional training documents and videos are available with your Portal login.

The State of Contract of Cont

An **ESCO Technologies** Company

TILE![™] User Resources

Larry Sheridan administers the TILE! LinkedIn page. We continue to build up this resource area for TILE! users, in combination with the YouTube page. Video highlights communicate software Q&A quicker than written documents, so just link to the page and hit "request to join." <u>https://www.linkedin.com/groups/2040739/</u>

ETS-Lindgren's YouTube channel is another source of software information, training resources and short videos. Expect some TILE! short topic videos in the coming months to appear on this channel. Instead of writing we plan to shift to voice narrated screen grabs and other ways to highlight important software related items. They can be found here: https://www.youtube.com/c/etslindgrenvideo

TILE![™] User Group Meeting

The next TILE! Users Group (TUG) meeting is planned for October, 2023. The virtual format will be preserved as it allows much better participation compared to holding this at the IEEE EMC Symposium as was done in the past. TUG presentations, meeting notes, action items, and even a recording will be posted on the TILE! Support Portal when possible. We hope more TILE! gurus can participate in the next TUG wherever you may be. The agenda and discussion topics are firming up now, so feel free to email <u>tilesupport@ets-lindgren.com</u> with your suggestions.

TILE! [™] Basics University

The TILE! on-demand TILE! Software Basics Training Series was mentioned in the Support Portal opening section, but a reminder that these are 100% free and online! The courses are perfect for new hire lab technicians, cross training your team, or those looking for a refresher of the basics.

For those times when you just need to speak to someone: Technical Support can be reached at +1.512.531.2609 Technical Support Email: tilesupport@ets-lindgren.com