Keysight E7515A
UXM Wireless Test Set

Configuration Guide

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Make a Clear Call

The team looks to you: will a new chipset or UE pass the crucial tests? Clarity comes from accumulated insights — insights enabled by the Keysight Technologies, Inc. UXM wireless test set. The UXM is a highly integrated signaling test set created for functional and RF design validation in the 4.5G era and beyond. It provides the capabilities you need to test the newest designs, delivering LTE-Advanced Pro data rates up to 1 Gbps now and handling more complex requirements later. When the team counts on you, count on the UXM to help you make a clear call.

Overview

This configuration guide contains a step-by-step process to help you configure your E7515A UXM wireless test set with hardware, software, accessories, and services to meet your specific test requirements, or to upgrade your existing UXM.

1.0 Select UXM Wireless Test Set Platform Options

Configure the E7515A UXM wireless test set with functionality for your application requirements.
Each platform option applies to both TRX sets and to all formats licensed in the UXM.

1.1 Choose the operating frequency range

Option	Description
E7515A-504 (standard) [1]	Frequency range 300 MHz to 3.8 GHz
E7515A-506 [1]	Frequency range 300 MHz to 6 GHz

1.2 Choose between single transceiver (TRX) set and dual transceiver set

Single TRX set is included as standard.

Option	Description
E7515A-RA1 (standard)	RF up-down converter A
E7515A-BA1 (standard)	Digital baseband transceiver A

To enable two independent cells or carriers (for Carrier Aggregation), add a second TRX set.

Option	Description
E7515A-RB1	RF up-down converter B
E7515A-BB1	Digital baseband transceiver B

1.3 Channel emulation

E7515A-C01 enables fading [2]. E7515A-C02 adds support for SCME fading profiles and additional capabilities in support of Radiated Two Stage (RTS) MIMO OTA.

Option	Description	Requires
E7515A-C01 [1]	Channel emulator	
E7515A-C02 [1]	Enhanced downlink channel emulation	E7515A-C01

1.4 Dual IP device test [3]

Two-phone parallel RF test is included in the base TAs. However, for two IP connections in a single UXM (e.g. for end-to-end VoLTE connections or dual SIM test), an E7515A-D01 license is required (in addition to the E75xxA-FFP-0P1 IP data license(s)).

Option	Description
E7515A-D01 [1]	Dual IP device test

1.5 Protocol logging

Enables protocol information to be sent to a standalone logging application. A single E7515A-L01 license on any unit (main or auxiliary) in a UXM array enables logging of all test sets, cells, and formats in the array.

Option	Description
E7515A-L01 [1]	Protocol logging data source

1.6 Internal applications server

Add an embedded PC board into one of the UXM's rear expansion slots, e.g. to host an IMS-SIP server/client application.

Option	Description
E7515A-S01	Internal applications server

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1. This option provides a license only, no hardware.
2. Relevant fading profiles are provided in the TA installed on the test set. AWGN is included with any TA.
3. Two-phone parallel RF test and dual IP device test in a single test set require two TRX sets.

1.0 Select UXM Wireless Test Set Features (Continued)

1.7 Accessories and documentation

The following are included as standard.

Option	Description
E7515A-1BW	Getting Started Guide
E7515A-KYB	Keyboard, USB
E7515A-MSE	Mouse, USB
E7515A-1CM	Rackmount flange kit
E7515A-9xx	Powercord (15 A)
E7515-60023	USB audio interface
E7515-10910	Keysight test USIM card, tri nano
T1099-11200	Keysight 3GPP standard mini SIM card
T1099-11300	Keysight 3GPP standard micro SIM card
T1099-11400	Keysight 3GPP standard nano SIM card

The following is optional.

Option	Description
E7515A-AC1 [1]	Interconnectivity hardware kit

1.8 Calibration and startup assistance

1.8.1 Calibration

The recommended calibration cycle is one year.

Option	Description
Standard	Keysight factory calibration
E7515A-UK6 [2]	Commercial calibration certificate with test data, per cell
E7515A-AMG [2,3]	Calibration + Uncertainties + Guard-banding (accredited), per cell

1.8.2 Startup and productivity assistance

Option	Description
PS-S20 (standard)	1-day on site startup assistance
PS-S20-01	Recommended startup assistance
PS-S10	Remote scheduled productivity assistance. Select 1 to 999 hours
PS-X10	Custom services to be qualified by a Keysight technical consultant

1. AC1 is required to connect two UXMs together for 3CC carrier aggregation or higher configuration, or multi-unit handovers. The kit includes one SRIO cable, two SYNCH cables, and one LAN cable.
2. Applies to one TRX set only (must order quantity = 2 for unit with two TRX sets).
3. Provides ISO 17025 accredited calibration.

1.0 Select UXM Wireless Test Set Features (Continued)

1.9 UXM wireless test set upgrades

1.9.1 User-installable upgrade kits

Option	Description	Requires
E7515AK-506 [1]	Extend frequency range to 6 GHz [2]	E7515A-504
E7515AK-C01 [1]	Channel emulator	
E7515AK-C02 [1]	Enhanced downlink channel emulation	E7515A-C01 or E7515AK-C01
E7515AK-D01 [1]	Dual IP device test [5]	
E7515AK-L01 [1]	Protocol logging data source	
E7515AU-S01	Internal applications server upgrade [3]	
E7515AU-1CM	Rackmount flange kit upgrade [4]	
E7515AU-AC1	Interconnectivity hardware kit upgrade	

1.9.2 Return-to-Keysight upgrades

Option	Description
E7515AU-RB1	RF up-down converter B
E7515AU-BB1	Digital baseband transceiver B

1. This option provides a license only, no hardware.
2. Service Center install recommended after the first year (if unit has not been re-calibrated).
3. For more information about the internal applications server upgrade procedure, please refer to E7515-90013 installation guide.
4. For more information about the rackmount flange kit upgrade procedure, please refer to the installation guide, document number E7515-90014.
5. Two-phone parallel RF test and dual IP device test in a single test set require two TRX sets.

2.0 Select UXM Test Application Software

Choose one or more test application (TA) base options and additional feature options as desired. The base TA options include the key functionality required for RF design validation, including flexible receiver test and trusted X-Series transmitter measurement science. To add more capabilities such as multiple component carriers or advanced MIMO techniques, or functional test features including IP data and handovers, choose the appropriate feature option(s).

The "fixed" licenses shown below are tied to a specific UXM host instrument. "Transportable" licenses are also offered and allow licenses to be moved between different UXMs. For transportable licensing simply substitute -*TP instead of -*FP in the license part number. The license(s) provided by the transportable products are identical in appearance to their fixed equivalents in the Keysight License Manager (KLM)[1] except the "Type" is "Transportable".

2.1 E7530A LTE/LTE-Advanced Pro test application (TA)

To enable LTE/LTE-A you must choose an FDD or TDD base option (or both) and then choose any desired feature options for additional functionality.

Fixed perpetual	Transportable perpetual	Description	Requires
E7530A-1FP-FDD	E7530A-1TP-FDD	FDD	
E7530A-1FP-FES	N/A	FDD equivalent seat [2]	
E7530A-1FP-TDD	E7530A-1TP-TDD	TDD	
E7530A-1FP-TES	N/A	TDD equivalent seat [2]	
E7530A-AFP-FDD	E7530A-ATP-FDD	2CC DL carrier aggregation (FDD) [3]	
E7530A-AFP-TDD	E7530A-ATP-TDD	2CC DL carrier aggregation (TDD) [3]	
E7530A-BFP	E7530A-BTP	4x2 DL MIMO (FDD/TDD)	
E7530A-BFP-0D1	E7530A-BTP-0D1	4x4 DL MIMO (FDD/TDD) [4]	
E7530A-BFP-0D2	E7530A-BTP-0D2	8x2 DL MIMO (FDD/TDD)	E7530A-BFP or E7530A-BTP and E7530A-FFP-0T1 or E7530A-FTP-0T1
E7530A-BFP-0D3	E7530A-BTP-0D3	8x4 DL MIMO (FDD/TDD) [5]	E7530A-BFP-0D1 or E7530A-BTP-0D1 and E7530A-FFP-0T1 or E7530A-FTP-0T1
E7530A-CFP-FDD	E7530A-CTP-FDD	2CC UL carrier aggregation (FDD)	E7530A-AFP-FDD or E7530A-ATP-FDD
E7530A-CFP-TDD	E7530A-CTP-TDD	2CC UL carrier aggregation (TDD)	E7530A-AFP-TDD or E7530A-ATP-TDD
E7530A-DFP-FDD	E7530A-DTP-FDD	3CC DL carrier aggregation (FDD) [6]	E7530A-AFP-FDD or E7530A-ATP-FDD
E7530A-DFP-TDD	E7530A-DTP-TDD	3CC DL carrier aggregation (TDD) [6]	E7530A-AFP-TDD or E7530A-ATP-TDD
E7530A-EFP-FDD	E7530A-ETP-FDD	4CC DL carrier aggregation (FDD) [6]	E7530A-DFP-FDD or E7530A-DTP-FDD
E7530A-EFP-TDD	E7530A-ETP-TDD	4CC DL carrier aggregation (TDD) [6]	E7530A-DFP-TDD or E7530A-DTP-TDD
E7530A-EFP-FD5	E7530A-ETP-FD5	5CC DL carrier aggregation (FDD) [7]	E7530A-EFP-FDD or E7530A-ETP-FDD
E7530A-EFP-TD5	E7530A-ETP-TD5	5CC DL carrier aggregation (TDD) [7]	E7530A-EFP-TDD or E7530A-ETP-TDD
E7530A-FFP-0P1	E7530A-FTP-0P1	IP data (FDD/TDD)	
E7530A-FFP-0H1	E7530A-FTP-0H1	Handovers (FDD/TDD) [8]	
E7530A-FFP-0H2	E7530A-FTP-0H2	Enhanced handovers (FDD/TDD)	E7530A-FFP-0H1 or E7530A-FTP-0H1
E7530A-FFP-ESL	N/A	IP data and handovers equivalent seat [2]	

For details visit www.keysight.com/find/e7530a

1. KLM is a free software utility that enables you to easily manage right-to-use licenses for software and hardware capabilities on Keysight instruments or systems.
2. Leverage your existing Keysight PXT and 8960 software investments with UXM Equivalent Seat License (ESL). ESL allows existing PXT and 8960 owners to purchase equivalent UXM software at a greatly reduced price. Each qualifying PXT or 8960 software license entitles a single equivalent UXM software license. Contact your local Keysight sales representative for more information.
3. 2CC requires at least two TRX sets except for intra-band CA with 2x2 or 4x2 DL MIMO.
4. 4x4 DL MIMO license also enables 1x4 and 2x4 DL MIMO. 1CC or 2CC intra-band 1x4/2x4/4x4 DL MIMO requires 2 TRX sets. 3CC or 4CC 1x4/2x4/4x4 DL MIMO (in 2 bands) requires 4 TRX sets (in two test sets), but only the main unit must have the CC and MIMO licenses.
5. 1CC 8x4 DL MIMO requires two TRX sets. 2CC 8x4 DL MIMO requires four TRX sets (in two sets), but only the main unit must have the CC and MIMO licenses.
6. 3CC/4CC require three/four TRX sets (in two test sets) except for intra-band CA using 2x2 and 4x2 DL MIMO, which can be supported with two TRX sets.
7. 5CC (intra-band CA) requires at least three TRX sets (in two test sets), but only the main unit must have the CC licenses.
8. Simple RF channel reconfigurations are included in the base TA. The handovers feature option is required to enable true mobility tests such as interRAT handovers.

2.0 Select UXM Test Application Software

2.1 E7530A LTE/LTE-Advanced Pro test application (TA) (continued)

Fixed perpetual	Transportable perpetual	Description	Requires
E7530A-FFP-001	E7530A-FTP-001	(F)eICIC (FDD/TDD)	
E7530A-FFP-002	E7530A-FTP-002	eDRX (FDD/TDD)	E7530A-GFP-0NB or E7530A-GTP-0NB
E7530A-FFP-0L1	E7530A-FTP-0L1	LTE-U/LAA (FDD/TDD)	E7530A-nFP-xDD or E7530A-nTP-xDD [3]
E7530A-FFP-0M1	E7530A-FTP-0M1	UL 64QAM (FDD/TDD)	
E7530A-FFP-0M2	E7530A-FTP-0M2	DL 256QAM (FDD/TDD)	
E7530A-FFP-0T1	E7530A-FTP-0T1	TM9 (FDD/TDD)	
E7530A-FFP-0W1	E7530A-FTP-0W1	WLAN calling/offload (FDD/TDD) [1]	E7530A-FFP-0H1 or E7530A-FTP-0H1
E7530A-GFP-0NB	E7530A-GTP-0NB	NB-IoT [2]	
E7530A-GFP-0M1	E7530A-GTP-0M1	eMTC CAT-M1 [2]	

For details visit www.keysight.com/find/e7530a

1. WLAN calling requires an IMS-SIP server and client, such as the Keysight E6966B. For WLAN offload of a VoLTE call, note that VoLTE calls require E6966B as well as E7530A-FFP-0P1.
2. NB-IoT and eMTC CAT-M1 require presence of either the FDD or TDD base option (e.g. E7530A-1FP-FDD, E7530A-1FP-TDD, E7535A-1FP.
3. LTE-U/LAA requires E7515A-506 for component carriers in unlicensed spectrum, and carrier aggregation option(s) for the desired number of carriers. Also, LAA requires both FDD and TDD base options and FDD and TDD carrier aggregation options (as the PCC for LAA must be FDD, but the SCC are in a TDD band).

2.0 Select UXM Test Application Software (Continued)

2.2 E7535A test applicaton (TA) suite

Choose LTE FDD and TDD TA suite option which offers both FDD base TA and TDD base TA functionality. Add desired feature options for additional functionality.

Fixed perpetual	Transportable perpetual	Description
E7535A-1FP	E7535A-1TP	FDD/TDD test application suite

2.3 E7630A-MTP message editor

Message editor is PC-based software that allows flexible control of the UXM's system, network, and base station information settings, as well as the creation of custom Layer 3 (RRC and NAS) messages.

Fixed perpetual	Transportable perpetual	Description
N/A	E7630A-MTP	Message editor

2.4 E7523A W-CDMA/HSPA+ test application (TA)

To enable W-CDMA/HSPA+, you must choose a W-CDMA/HSPA+ base option and then choose any desired feature options for additional functionality.

Fixed perpetual	Transportable perpetual	Description
E7523A-1FP	E7523A-1TP	W-CDMA/HSPA+
E7523A-1FP-ESL	N/A	W-CDMA/HSPA+ equivalent seat [1]
E7523A-AFP	E7523A-ATP	HSDPA MIMO
E7523A-FFP-0P1	E7523A-FTP-0P1	IP data
E7523A-FFP-0H1	E7523A-FTP-0H1	Handovers [2]
E7523A-FFP-ESL	N/A	IP data and handovers equivalent seat [1]

2.5 E7521A GSM/GPRS/EGPRS test application (TA)

To enable GSM/GPRS/EGPRS, you must choose a GSM/GPRS/EGPRS base option and then choose any desired feature options for additional functionality.

Fixed perpetual	Transportable perpetual	Description
E7521A-1FP	E7521A-1TP	GSM/GPRS/EGPRS
E7521A-1FP-ESL	N/A	GSM/GPRS/EGPRS equivalent seat [1]
E7521A-FFP-0P1	E7521A-FTP-0P1	IP data
E7521A-FFP-0H1	E7521A-FTP-0H1	Handovers [2]
E7521A-FFP-ESL	N/A	IP data and handovers equivalent seat [1]

1. Leverage your existing Keysight PXT and 8960 software investments with UXM Equivalent Seat License (ESL). ESL allows existing PXT and 8960 owners to purchase equivalent UXM software at a greatly reduced price. Each qualifying PXT or 8960 software license entitles a single equivalent UXM software license. Contact your local Keysight sales representative for more information.
2. Simple RF channel reconfigurations are included in the base TA. The handovers feature option is required to enable true mobility tests such as interRAT handovers.

2.0 Select UXM Test Application Software (Continued)

2.6 E7529A TD-SCDMA/HSPA test application (TA)

To enable TD-SCDMA/HSPA, you must choose a TD-SCDMA/HSPA base option and then choose any desired feature options for additional functionality.

Fixed perpetual	Transportable perpetual	Description
E7529A-1FP	E7529A-1TP	TD-SCDMA/HSPA
E7529A-1FP-ESL	N/A	TD-SCDMA/HSPA equivalent seat [1]
E7529A-FFP-0P1	E7529A-FTP-0P1	IP data
E7529A-FFP-0H1	E7529A-FTP-0H1	Handovers [2]
E7529A-FFP-ESL	N/A	IP data and handovers equivalent seat [1]

2.7 UXM software upgrades

To add new capabilities to your existing UXM, simply order the base TA option or feature options that you desire. You will receive an entitlement certificate with the new license(s) to redeem against your UXM. Check **www.keysight.com/find/softwaremanager** frequently to ensure you are using the latest UXM software (the newest UXM software should always be run regardless of what license(s) are installed on your UXM).

2.7.1 E7535A-MEU minor enhancement update

Some capabilities are not enabled by a specific TA feature option, but rather by E7535A-MEU. Purchasing E7535A-MEU updates all formats installed on your existing UXM test set with the same minor enhancements that are included with new software purchases. For more details on which features are enabled by MEU, see www.keysight.com/find/uxmfeatures. The purchase of any base TA option or TA feature option includes the latest E7535A-MEU version license, as well as any new X-Series application enhancement licenses.

1. Leverage your existing Keysight PXT and 8960 software investments with UXM Equivalent Seat License (ESL). ESL allows existing PXT and 8960 owners to purchase equivalent UXM software at a greatly reduced price. Each qualifying PXT or 8960 software license entitles a single equivalent UXM software license. Contact your local Keysight sales representative for more information.
2. Simple RF channel reconfigurations are included in the base TA. The handovers feature option is required to enable true mobility tests such as interRAT handovers.

2.0 Select UXM Test Application Software (Continued)

2.7.2 Software upgrades for existing lab application (LA) owners

If you previously purchased an E7630A LTE/LTE-A lab application and would like to add additional capabilities, simply order the desired E7530A feature option(s) listed in Section 1.1. There is no A.05 LTE/LTE-A lab application; new capabilities are now available only via the E7530A product options. Once you install these new E7530A license(s) and download the latest UXM software, your existing E7630A lab application version license(s) will continue to enable the same functionalities as they did previously, and the new E7530A feature option license(s) will add the new capabilities you have purchased. The table below shows the equivalent E7530A licenses enabled by the E7630A lab application version licenses.

		FDD A.01	FDD A.02	FDD A.03	FDD A.04	TDD A.01	TDD A.02	TDD A.03	TDD A.04
E7530A-1FP-FDD	FDD	√	√	√	√				
E7530A-1FP-TDD	TDD					√	√	√	√
E7530A-FFP-0P1	IP Data	√	√	√	√	√	√	√	√
E7530A-FFP-0H1	Handovers	√	√	√	√	√	√	√	√
E7530A-BFP	4x2 DL MIMO		√	√	√		√	√	√
E7530A-AFP-FDD	2CC DL CA (FDD)		√	√	√				
E7530A-AFP-TDD	2CC DL CA (TDD)							√	√
E7530A-CFP-FDD	2CC UL CA (FDD)		√	√	√				
E7530A-CFP-TDD	2CC UL CA (TDD)							√	√
E7530A-FFP-0M1	UL 64QAM			√	√			√	√
E7530A-FFP-001	(F)eICIC			√	√			√	√
E7530A-DFP-FDD	3CC DL CA (FDD)			√	√				
E7530A-DFP-TDD	3CC DL CA (TDD)								√
E7530A-EFP-FDD	4CC DL CA (FDD)				√				
E7530A-EFP-TDD	4CC DL CA (TDD)								√
E7530A-FFP-0M2	DL 256QAM				√				√

3.0 Example Configurations [1]

3.1 LTE FDD and TDD RF design validation, single-cell

UXM wireless test set

Option	Description
E7515A-504 (standard)	Frequency range 300 MHz to 3.8 GHz
E7515A-RA1 (standard)	RF up-down converter A
E7515A-BA1 (standard)	Digital baseband transceiver A

Application software
If you are buying FDD and TDD at same time

Option	Description
E7535A-1FP [2]	FDD/TDD TA suite, fixed perpetual license

3.2 LTE-A FDD RF design validation, with 2CC DL CA, 4x2 DL MIMO, and fading

UXM wireless test set

Option	Description
E7515A-504 (standard)	Frequency range 300 MHz to 3.8 GHz
E7515A-RA1 (standard)	RF up-down converter A
E7515A-BA1 (standard)	Digital baseband transceiver A
E7515A-RB1	RF up-down converter B
E7515A-BB1	Digital baseband transceiver B
E7515A-C01	Channel emulator

Application software

Option	Description
E7530A-1FP-FDD	FDD, fixed perpetual license
E7530A-AFP-FDD	2CC DL carrier aggregation (FDD), fixed perpetual license
E7530A-BFP	4x2 DL MIMO (FDD/TDD), fixed perpetual license

3.3 LTE FDD and TDD RF design validation and functional performance test

UXM wireless test set (standard features)

Option	Description
E7515A-504 (standard)	Frequency range 300 MHz to 3.8 GHz
E7515A-RA1 (standard)	RF up-down converter A
E7515A-BA1 (standard)	Digital baseband transceiver A
E7515A-RB1	RF up-down converter B
E7515A-BB1	Digital baseband transceiver B
E7515A-L01	Protocol logging data source

Application software

Option	Description
E7535A-1FP [2]	FDD/TDD TA suite, fixed perpetual license
E7530A-FFP-0P1	IP data, fixed perpetual license
E7530A-FFP-0H1	Handovers, fixed perpetual license

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1. Standard accessories (powercord, SIM card, keyboard, and mouse) and documentation (Getting Started Guide) are provided for every UXM order, refer to Section 3.6 for more information.
2. Alternatively, you can buy E7530A-1FP-FDD and E7530A-1FP TDD licenses separately. For example, buy one with the instrument and buy the other at a later time with license upgrade.

3.0 Example Configurations (Continued)

3.4 LTE-A Pro FDD IP data throughput performance with 5CC CA and fading

5CC (component carrier) carrier aggregation requires two UXMs connected together, via the E7515A-AC1 interconnectivity hardware kit. The first UXM (with two TRX sets) acts as the main unit to offer the first and second component carriers and the second UXM acts as the auxiliary unit for the third and fourth component carriers. The fifth carrier (floating cell) can co-reside (with a fixed cell) on any TRX set on either test set. The downlink frequency offset between the floating cell and its associated fixed cell must be within 80 MHz.

UXM wireless test set (main UXM)

Option	Description
E7515A-504 (standard)	Frequency range 300 MHz to 3.8 GHz
E7515A-RA1 (standard)	RF up-down converter A
E7515A-BA1 (standard)	Digital baseband transceiver A
E7515A-RB1	RF up-down converter B
E7515A-BB1	Digital baseband transceiver B
E7515A-C01	Channel emulator
E7515A-L01	Protocol logging data source
E7515A-S01	Internal applications server

Application software (main UXM)

Option	Description
E7530A-1FP-FDD	FDD, fixed perpetual license
E7530A-AFP-FDD	2CC DL carrier aggregation (FDD), fixed perpetual license
E7530A-DFP-FDD	3CC DL carrier aggregation (FDD), fixed perpetual license
E7530A-EFP-FDD	4CC DL carrier aggregation (FDD), fixed perpetual license
E7530A-EFP-FD5	5CC DL carrier aggregation (FDD), fixed perpetual license
E7530A-FFP-0P1	IP data (FDD/TDD), fixed perpetual license
E7530A-FFP-0M2	DL 256QAM (FDD/TDD), fixed perpetual license
E7630A-MTP	Message editor, transportable perpetual license

If you want to use a UXM for carrier extension purposes only, below is an example of the minimum configuration.
UXM wireless test set (auxiliary UXM)

Option	Description
E7515A-504 (standard)	Frequency range 300 MHz to 3.8 GHz
E7515A-RA1 (standard)	RF up-down converter A
E7515A-BA1 (standard)	Digital baseband transceiver A
E7515A-RB1	RF up-down converter B
E7515A-BB1	Digital baseband tranceiver B
E7515A-C01	Channel emulator
E7515A-AC1	Interconnectivity hardware kit

Application software (auxiliary UXM)
Any UXM can be used for additional carriers in a multi-unit configuration. However, if you also want to use the auxiliary UXM as a standalone unit, configure the unit with the formats and features you want according to your test needs. The carrier aggregation capability is decided by the main UXM.

3.0 Example Configurations (Continued)

3.5 LTE and W-CDMA handover in one UXM

UXM supports LTE and W-CDMA interRAT handover functional test within one box or between two boxes. Below is a configuration example for testing both SRVCC1 and CSFB handover to UTRA with one UXM.

Note: Simple RF channel reconfigurations are included in the base TA. The handovers feature option is only required to enable true mobility tests such as interRAT handovers. The handovers option is required for each format for which you want to perform mobility handovers.

UXM wireless test set

Option	Description
E7515A-504 (standard)	Frequency range 300 MHz to 3.8 GHz
E7515A-RA1 (standard)	RF up-down converter A
E7515A-BA1 (standard)	Digital baseband transceiver A
E7515A-RB1	RF up-down converter B
E7515A-BB1	Digital baseband transceiver B
E7515A-L01	Protocol logging data source [1]

Application software

Option	Description
E7530A-1FP-FDD	FDD, fixed perpetual license
E7530A-FFP-0H1	Handovers (FDD/TDD), fixed perpetual license
E7530A-FFP-0P1	IP data (FDD/TDD), fixed perpetual license [2]
E7523A-1FP	W-CDMA/HSPA+, fixed perpetual license
E7523A-FFP-0H1	Handovers, fixed perpetual license
E7523A-FFP-0P1	IP data, fixed perpetual license [3]

1. E7515A-L01 license enables logging of all cells and formats in the test set.
2. VoLTE calls require IP data option and E6966B IMS/SIP server/client software.
3. Not required for CSFB or SRVCC, but is required if interRAT connected data handovers are also desired.

3.0 Example Configurations (Continued)

3.6 LTE and W-CDMA handover between two UXMs

You can establish a UXM array to perform LTE and W-CDMA interRAT handover[1] functional test between two boxes. Below is a configuration example for LTE FDD 3CC to W-CDMA handover.

Note: Simple RF channel reconfigurations are included in the base TA. The handovers feature option is only required to enable true mobility tests such as interRAT handovers. The handovers option is required for each format for which you want to perform mobility handovers.

UXM wireless test set (main UXM)
The main UXM in this example will host the primary cell on TRX A and one secondary cell of the 3CC configuration for LTE on TRX B.

Option	Description
E7515A-504 (standard)	Frequency range 300 MHz to 3.8 GHz
E7515A-RA1 (standard)	RF up-down converter A
E7515A-BA1 (standard)	Digital baseband transceiver A
E7515A-RB1	RF up-down converter B
E7515A-BB1	Digital baseband transceiver B
E7515A-L01	Protocol logging data source [2]

Application software (main UXM)

Option	Description
E7530A-1FP-FDD	FDD, fixed perpetual license
E7530A-AFP-FDD	2CC DL carrier aggregation (FDD), fixed perpetual license
E7530A-DFP-FDD	3CC DL carrier aggregation (FDD), fixed perpetual license
E7530A-FFP-0H1	Handovers (FDD/TDD), fixed perpetual license
E7530A-FFP-0P1	IP data (FDD/TDD), fixed perpetual license [1]

UXM wireless test set (auxiliary UXM)
The aux UXM in this example will host the third cell of the LTE FDD 3CC configuration on TRX A and W-CDMA application on TRX B. Option E7515A-1AC interconnectivity hardware kit is required to connect the main and auxiliary UXMs to establish the array.

Option	Description
E7515A-504 (standard)	Frequency range 300 MHz to 3.8 GHz
E7515A-RA1 (standard)	RF up-down converter A
E7515A-BA1 (standard)	Digital baseband transceiver A
E7515A-RB1	RF up-down converter B
E7515A-BB1	Digital baseband transceiver B
E7515A-1AC	Interconnectivity hardware kit

Application software (auxiliary UXM)

Important: You must install the W-CDMA license and application software on the auxiliary UXM.

Option	Description
E7523A-1FP	W-CDMA/HSPA+, fixed perpetual license
E7523A-FFP-0H1	Handovers, fixed perpetual license
E7523A-FFP-0P1	IP data, fixed perpetual license [3]

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1. VoLTE calls require IP data option and E6966B IMS/SIP server/client software.
2. A single E7515A-L01 license on any unit (main or auxiliary) enables logging of all test sets, cells, and formats in the array.
3. Not required for CSFB or SRVCC, but is required for interRAT connected data handovers.

3.0 Example Configurations (Continued)

3.7 NB–IoT functional test

UXM wireless test set

Option	Description
E7515A-504 (standard)	Frequency range 300 MHz to 3.8 GHz
E7515A-RA1 (standard)	RF up-down converter A
E7515A-BA1 (standard)	Digital baseband transceiver A

Application software

Option	Description
E7530A-1FP-FDD [1]	FDD, fixed perpetual license
E7530A-GFP-0NB	NB–IoT, fixed perpetual license
E7530A-FFP-002	eDRX (FDD/TDD), fixed perpetual license
E7530A-FFP-0P1 [2]	IP data (FDD/TDD), fixed perpetual license

1. FDD or TDD base option is required.
2. Only required if NB–IoT IP data connections are desired.

4.0 UXM Array Configuration and Licensing

Some test functionality requires two UXM test sets, such as
  – 5CC
  – 3CC with 4x4 DL MIMO
  – Handovers between more than two cells in different bands
  – Handovers involving carrier aggregation in different bands
  – (F)eICIC with more than one aggressor cell in different bands

Two UXMs can be connected in an "array," wherein one unit is the main UXM and the other is an auxiliary or aux UXM. The requirements for array configurations are outlined in this section.

4.1 UXM requirements for an array

  – Each UXM requires its own frequency range and channel emulator (fading) platform options. Note: The platform option applies to both TRX sets in the UXM.
  – A single –L01 logging license on any unit (main or aux) enables logging of all test sets and cells in the array (i.e. –L01 on main or on aux enables logging of all test sets and cells in the array, of any licensed format). Protocol logging and analysis (PLA) software provides a single, time-aligned software interface for evaluating all protocol messaging in the array.
  – Units are connected via E7515A-AC1 interconnectivity hardware kit (SRIO, 2x SYNCH, LAN). All cables must be connected for an array to be established.
  – All UXMs require 1.3.1.0 or newer software to be connected in an array.
  – All units in an array must be at the same revision of platform software.

4.1.1 Main requirements

  – Must have two TRX sets. The main unit with only a single TRX set is not a valid array configuration.

4.1.2 Auxiliary consideration

  – An auxiliary unit can have one or two TRX sets.

4.1.3 Application licensing in an array

  – A single LTE UI controls all LTE cells/carriers. LTE capabilities are determined solely by the licenses on the UXM running the LTE UI (any LTE application licenses on the other UXM are ignored).
  – The 2G/3G licenses, application software (UI) and utilized TRX sets must all be on the same unit. For example, if the W-CDMA application is utilizing hardware on the auxiliary UXM, the W-CDMA license and application software must be installed on the auxiliary UXM.

4.1.4 Co-resident (fixed and floating) cells

  – A single TRX set can support a maximum of two cells: one fixed cell and one floating cell.
  – The downlink frequency offset between a floating cell and its associated fixed cell must be within 80 MHz.
  – Floating cells can only be configured as an SCC and have no uplink capabilities.

5.0 Related Software Applications

5.1 VoLTE testing with IMS–SIP network emulator

Transportable perpetual	Description	Requires
E6966B-1TP	IMS-SIP server emulator	
E6966B-2TP	IMS-SIP client emulator	
E6966B-3TP	IMS-SIP conference server emulator	E6966B-1TP
E6966B-5TP	Enhanced voice services (EVS) codec	E6966B-1TP or -2TP

For further details visit www.keysight.com/find/e6966b

5.2 Battery drain analysis

Feature license	Description
14585A	Control and analysis software for advanced power supplies

The Keysight 14585A control and analysis software is designed to control the advanced functions of, as well as analyze the data taken from, a Keyisght N6705A/B DC power analyzer.

For further details visit
– www.keysight.com/find/14585a
– www.keysight.com/find/n6705

5.3 Wireless Test Manager

Transportable perpetual	Description
E6567F-1TP	cdma2000®/1xEV-DO/LTE Wireless Test Manager developer license
E6568F-1TP	UMTS/HSPA/LTE-LTE-A Wireless Test Manager developer license
E6569F-1TP	Wireless Test Manager suite, includes E6567F and E6568F development licenses
E6571F-1TP	Wireless Test Manager suite, includes E6567F and E6568F run-time licenses

For further details visit www.keysight.com/find/wtm

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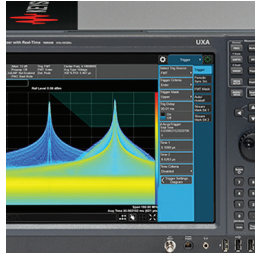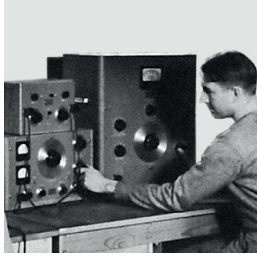www.keysight.com/find/free_trials

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