

# Keysight Wireless Test Platform

E7515B UXM 5G Wireless Test Platform

Getting Started  
Guide

# Notices

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2014-2019

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### CAUTION

A **CAUTION** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a CAUTION notice until the indicated conditions are fully understood and met.

### WARNING

A **WARNING** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a WARNING notice until the indicated conditions are fully understood and met.

## Where to Find the Latest Information

Documentation is updated periodically. For the latest information about these products, including instrument software upgrades, application information, and product information, browse to one of the following URLs, according to the name of your product:

<http://www.keysight.com/find/e7515B>

To receive the latest updates by email, subscribe to Keysight Email Updates at the following URL:

<http://www.keysight.com/find/MyKeysight>

Information on preventing instrument damage can be found at:

[www.keysight.com/find/PreventingInstrumentRepair](http://www.keysight.com/find/PreventingInstrumentRepair)

## Is your product software up-to-date?

Periodically, Keysight releases software updates to fix known defects and incorporate product enhancements. To search for software updates for your product, go to the Keysight Technical Support website at:

<http://www.keysight.com/find/techsupport>



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## Contents



# 1 Introduction

The following topics can be found in this section:

**“Overview” on page 10**

**“Instrument Information and Maintenance” on page 19**

**“UXM 5G Software Applications” on page 24**

## Overview

The purpose of this guide is to provide you with the basic steps for getting started with the Keysight E7515B UXM 5G Wireless Test Platform, and to tell you where you can go to get additional information. It also provides first-time power on instructions, licensing information, operating system information, and general hardware information.

**Figure 1-1** Keysight E7515B UXM 5G Wireless Test Platform



### Purpose and Function

The E7515B UXM 5G wireless test platform provides the signaling and measurement core for Keysight's 5G network emulation solution portfolio.

## Differences between E7515B and E7515E

The E7515B model of the UXM 5G differs from the economy version (E7515E) in that it includes circuit boards which the economy version omits., and it omits some internal circuit boards. Consequently, it has some limitations on functionality, and particularly on RF port usage, which are explained here for the benefit of users who may be familiar with the UXM 5G in its E7515B version.

The eight Tx/Rx ports on the front panel (RF 1-8) communicate with the instrument's interior source and analyzer by way of the RFIO board. Although the RFIO board is the essentially the same as the E7515E version, it must interface with the Mixed Signal and Radio Frequency boards, which in the case are different. The E7515B contains two Mixed Signal Boards (MSB 1 and MSB 2) rather than one, and also two Radio Frequency Boards (RFB 1 and RFB 2) rather than one. This expands the capacity of the RFIO board to exchange signals with the source and analyzer.

Figure 1-2 MSB 1/2 and RFB 1/2 interfacing to RFIO board

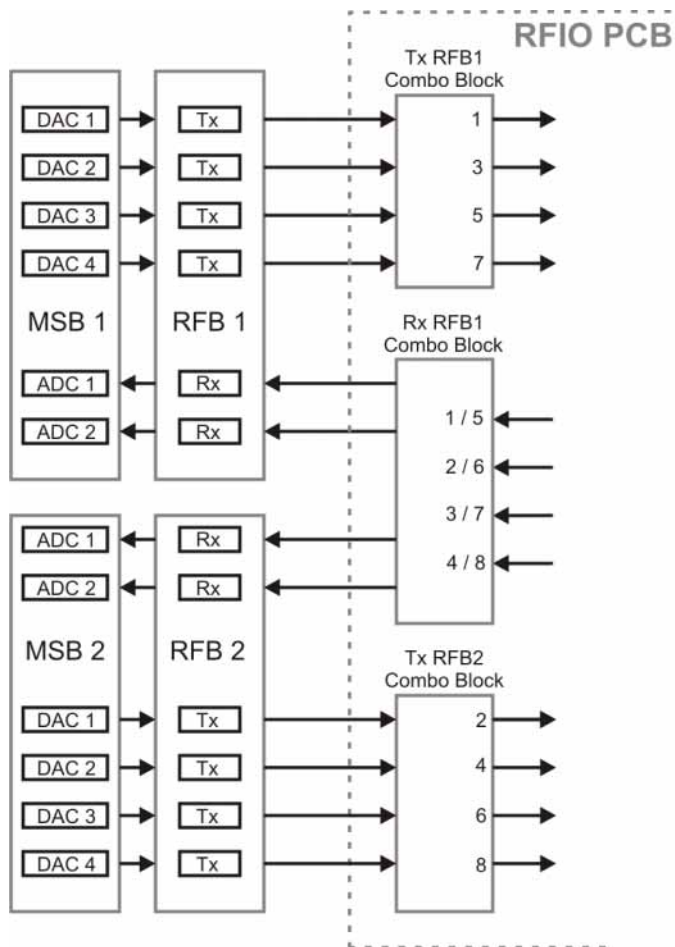
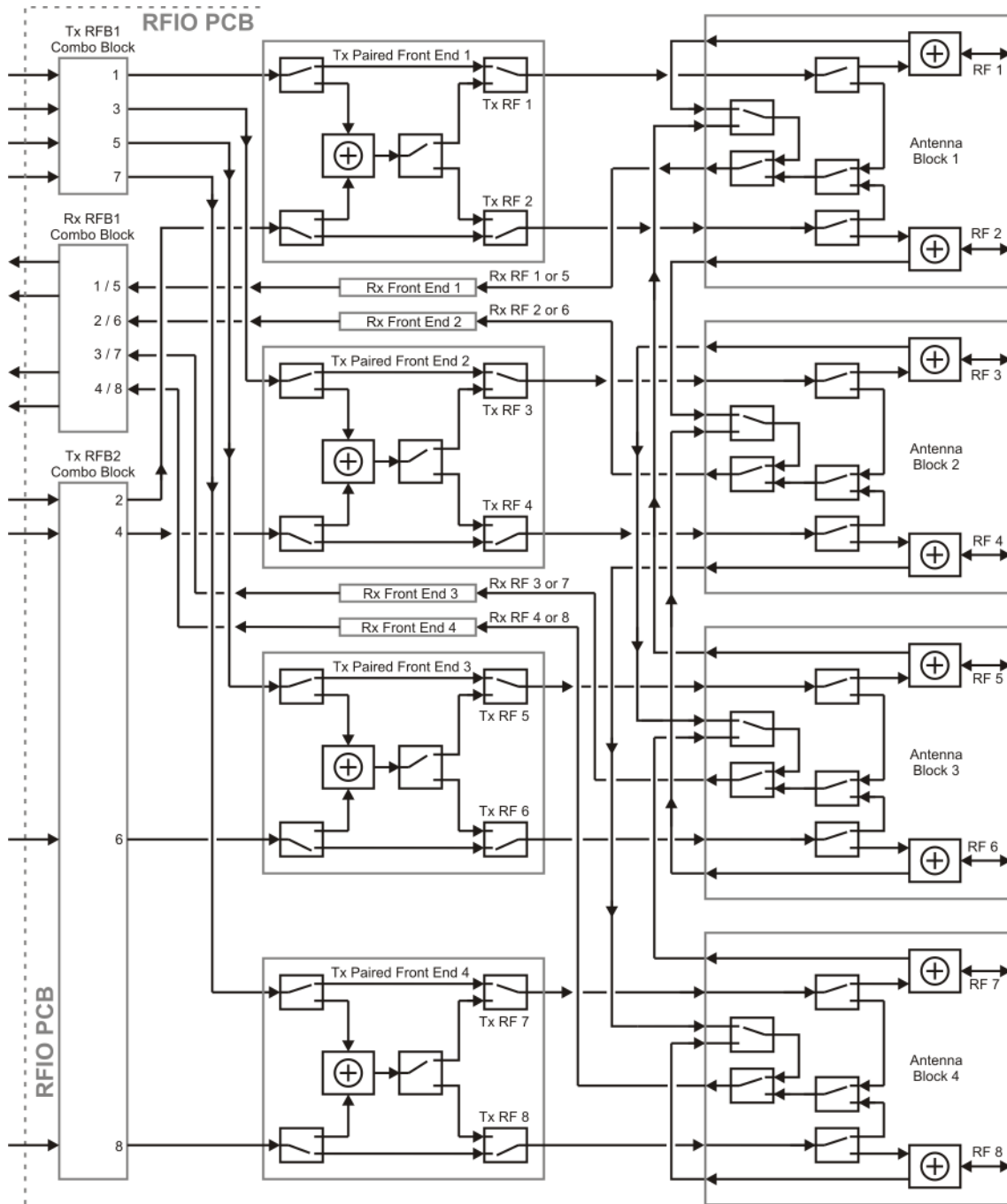


Figure 1-3 Overall block diagram of the RFIO board

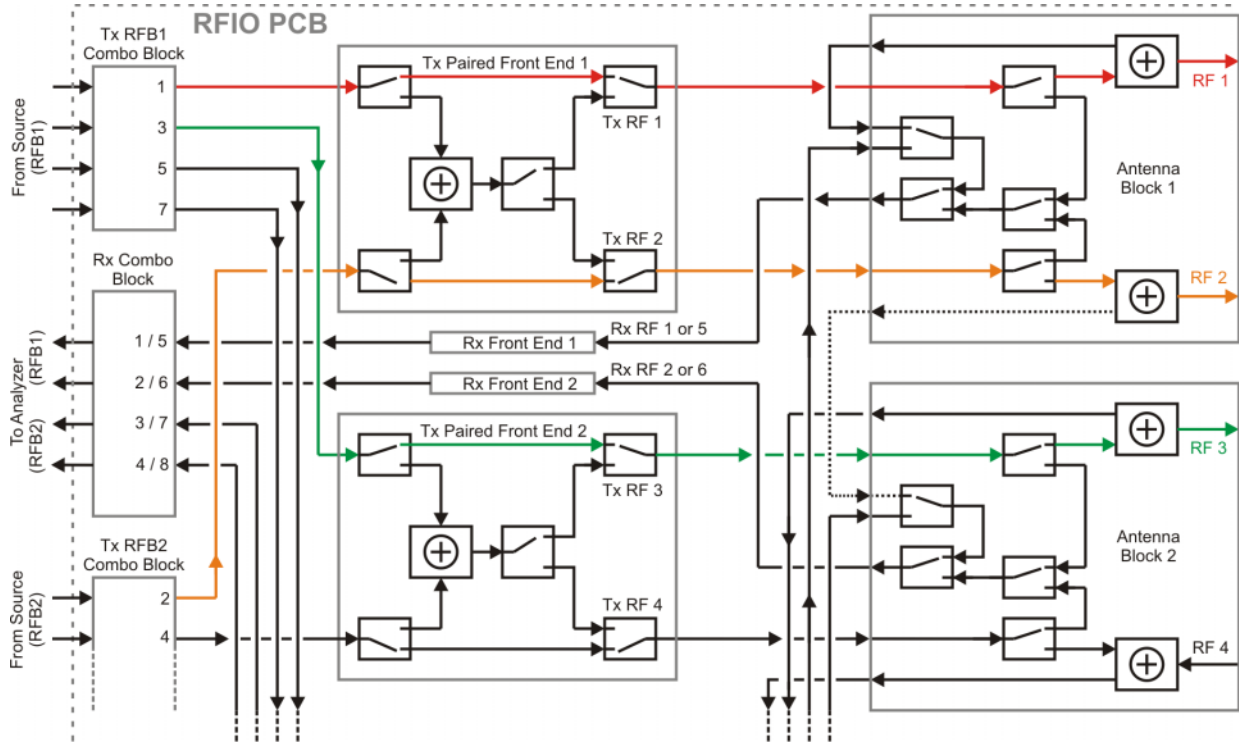


The diagram above shows signal routing through the RFIO board (it is simplified, omitting certain paths used for reference or calibration signals).

In the E7515E, a maximum of eight RF ports can be used at a time. All eight can be transmit ports, provided no ports are being used as receive ports. A maximum of four ports at a time can be used as receive ports.

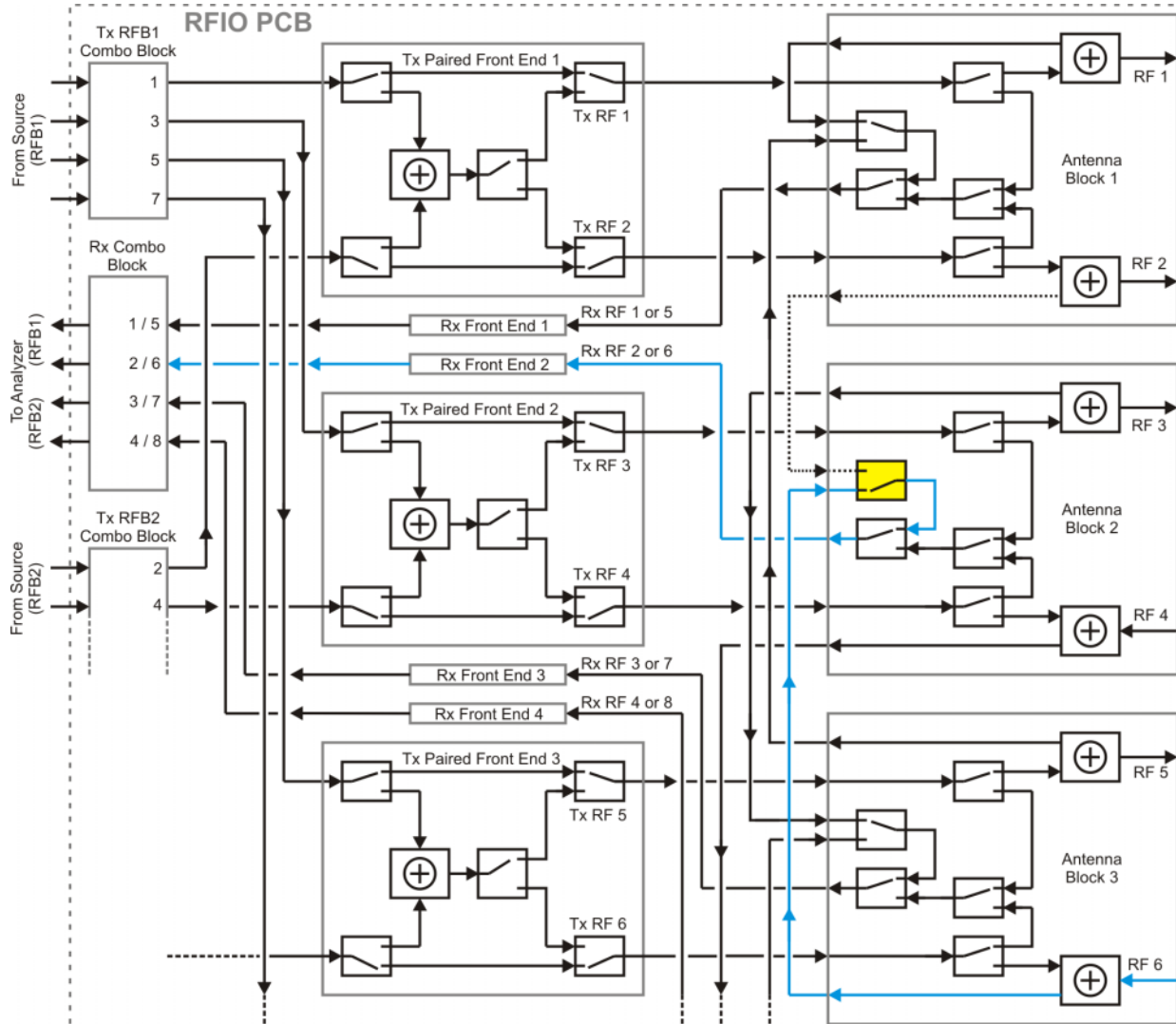
The diagram below shows how transmit signals are routed to the front panel RF ports. In this example, ports RF 1, RF 2, and RF 3 are used.

Figure 1-4 Tx paths to the front panel RF ports



The diagram below shows how receive signals are routed from the front panel RF ports. The signal routing is more complex than in the case of transmit signals. The receive path from either of two RF ports (RF 2 or RF 6, in this example) must go through the switch highlighted in yellow. The receive signal furnished to the Rx combination block must come from port RF 2 or port RF 6, but not both at once. That is why there cannot be more than four receive ports used at once.

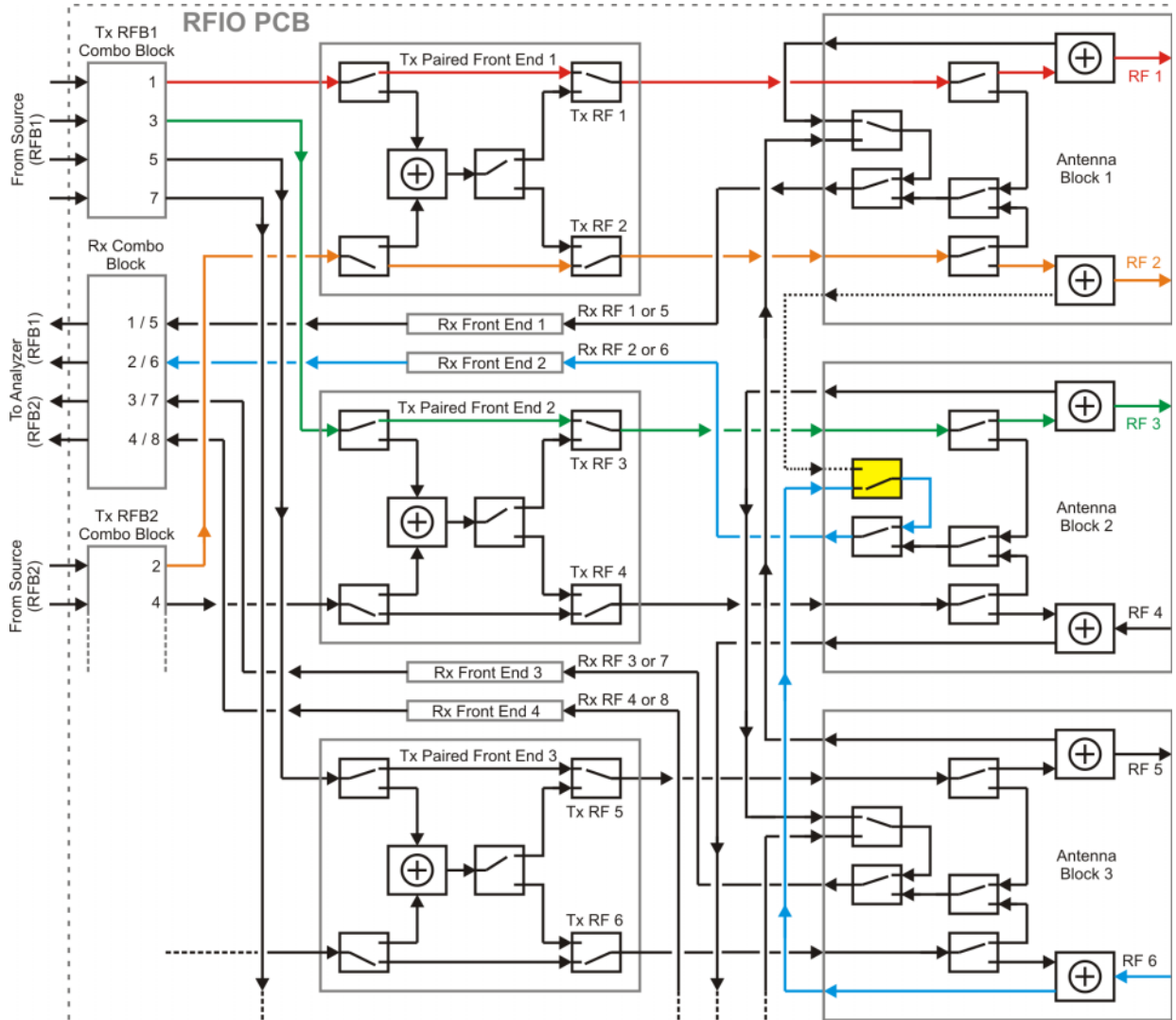
Figure 1-5 Rx path from the front panel RF ports



The remaining RF ports follow a similar pattern. The remaining receive paths to the Rx combination block can come from RF 1 or 5 (not both), RF 3 or 7 (not both), and RF4 or 8 (not both).

The RF paths involved in a simple port setup (output on RF 1/2/3, input on RF 6) are illustrated in **Figure 1-6**.

Figure 1-6 RF path example: RF 1 (Tx), RF 2 (Tx), RF 3 (Tx) and RF 6 (Rx)



## Millimeter-Wave Accessory Instruments

For testing at higher frequencies than the UXM itself can generate, two other instruments are commonly used with the UXM: the M1740A mmWave Transceiver (usually called the Remote Radio Head or RRH) and the E7770A Common Interface Unit (usually called the CIU).

Figure 1-7 UXM used with M1740A (bottom) and E7770A (top)

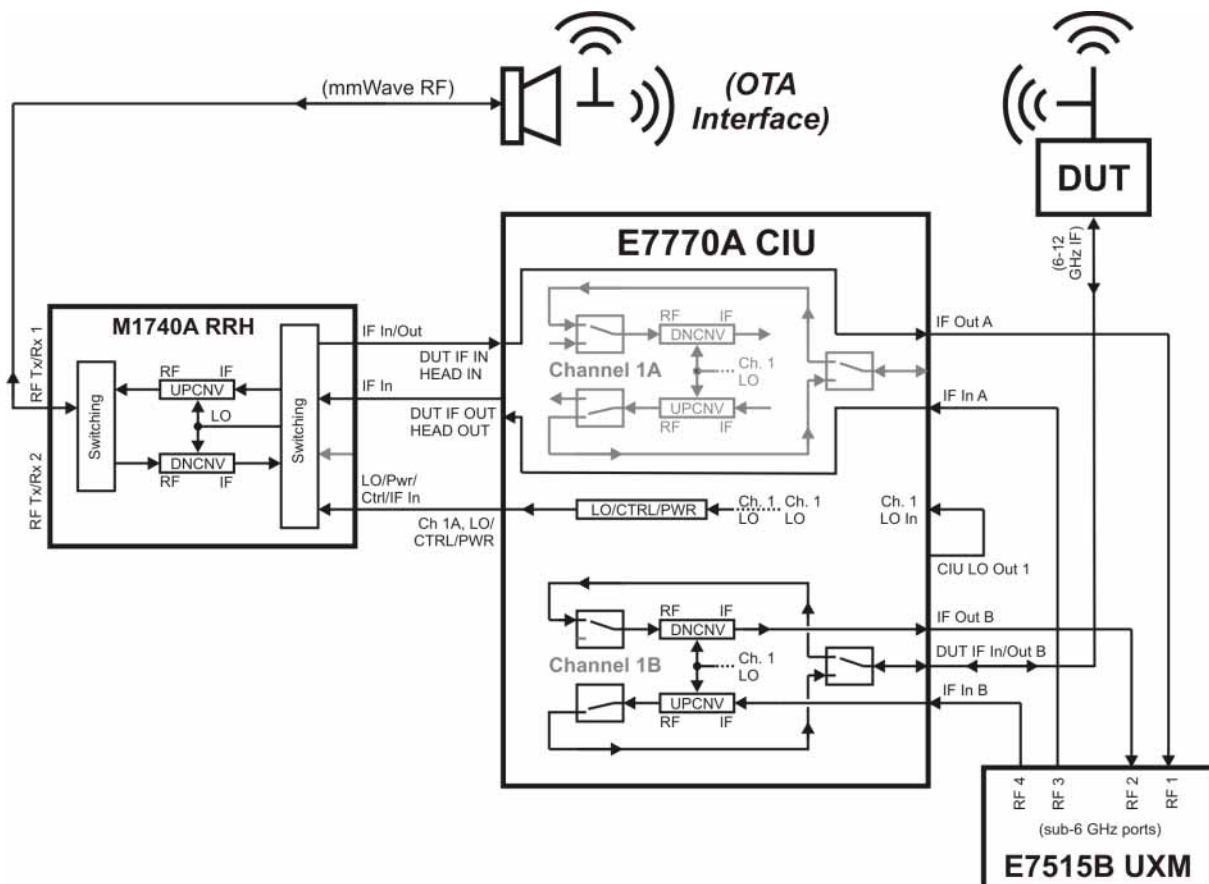




As illustrated below, the CIU is able to upconvert the RF output of the UXM to the 6-12 GHz range (the lower portion of the picture), and apply this signal to the DUT. On the same path, it also can accept a return signal from the DUT, downconvert it to the range of the UXM, and return it to an input port on the UXM.

For mmWave testing (the upper portion of the picture), the RF output of the UXM can pass through the CIU (bypassing the upconverter) to the M1740A remote radio head, where it is upconverted to a mmWave signal which is transmitted wirelessly to the DUT. The returned mmWave signal is received by the M1740A, downconverted, and passed back through the CIU to the UXM RF input. The CIU also supplies the combined LO, DC Power, and Control inputs which the M1740A requires. The LO/Ctrl/Pwr output of the CIU is the only essential connection between the CIU and M1740A, because the RF input and output from the UXM can be cabled directly between the UXM and the M1740A, rather than passing through the CIU as in this illustration.

Figure 1-8 Functional block diagrams of M1740A and E7770A



## Reference Documents

More detailed information about the test platform is available on the Document Library tab of this web page:

<http://www.keysight.com/find/E7515B>

Product documents included there include:

- E7515B UXM 5G Wireless Test Platform - User's and Programmer's Guide
- E7515B UXM 5G Wireless Test Platform - Configuration Guide
- 5G NR Online documentation (help files) for the UXM 5G Test Applications.

## Instrument Information and Maintenance

### Size and Weight

The weight and dimensions of the E7515B are as follows:

- Weight: 42.2 kg (with 2 cells)
- Height: 309 mm (323 mm with feet)
- Width: 436 mm (452.5 with lateral handles)
- Depth 554 mm

### Power Requirements

Voltage & frequency: 100-240V~, 50-60 Hz, nominal

Power consumption: 1400 W Max

#### NOTE

Mains supply voltage fluctuates up to +/- 10% of the nominal voltage. Transient over-voltages are typically present on the mains supply.

---

### Electrical Safety

#### WARNING

This is a Safety Class 1 Product (provided with a protective earth ground incorporated in the power cord). The mains plug shall only be inserted in a socket outlet provided with a protective earth contact. Any interruption of the protective conductor inside or outside of the instrument is likely to make the instrument dangerous. Intentional interruption is prohibited (IEC 61010-1).

---

#### WARNING

If this product is not used as specified, the protection provided by the equipment could be impaired. This product must be used in a normal condition (in which all means for protection are intact) only. Install the instrument so that the detachable power cord is readily identifiable and easily reached by the operator. The detachable power cord is the instrument disconnecting device. It disconnects the mains circuits from the mains supply before other parts of the instrument. The front panel switch is only a standby switch and is not a LINE switch. Alternatively, an externally installed switch or circuit breaker (which is readily identifiable and is easily reached by the operator) may be used as a disconnecting device.

---

**CAUTION**

This instrument has an auto-ranging line voltage input. Ensure the supply voltage is within the specified range and the rating for the service breaker is correct.

When installing the product in a cabinet the convection into and out of the product must not be restricted. The ambient temperature (outside the cabinet) must be less than the maximum operating temperature of the product by 4° C for every 100 watts dissipated in the cabinet. If the total power dissipated in the cabinet is greater than 800 watts, then forced convection must be used. It is your responsibility to ensure the ambient temperature does not exceed the rated ambient temperature stated in the specification.

---

**CAUTION**

The Mains wiring and connectors shall be compatible with the connector used in the premise electrical system. Failure, to ensure adequate earth grounding by not using the correct components may cause product damage, and serious injury.

---

**CAUTION**

Use the Keysight supplied power cord or one with the same or better electrical rating.

---

## Environmental Conditions

### CAUTION

This product is designed for use in Installation Category II and Pollution Degree 2 environment.

---

This product is designed for use in the following conditions:

- For indoor use only
- Operating Temperature 10° C to 40° C, 5% to 85% (non-condensing) relative humidity
- Storage Temperature -40° C to +70° C, 5% to 85% (non-condensing relative humidity)
- Altitude up to 2000 meters
- OVERVOLTAGE CATEGORY II and Pollution degree 2

## EMI and EMC Compliance

Complies with European EMC Directive 2004/108EC

- ICES/NMB-001  
This ISM device complies with Canadian ICES-001  
Cet appareil ISM est conforme a la norme NMB-001 du Canada.
- South Korean Class A EMC declaration: This equipment is Class A suitable for professional use and is for use in electromagnetic environments outside of the home.  
A 급 기기 ( 업무용 방송통신기 자재 )  
이 기기는 업무용 (A 급) 전자파 적합기기로서 판매자 또는 사용자는 이 점을 주의 하시기 바라며 ,  
가정외의 지역에서 사용하는 것을 목적으로 합니다

## Ventilation

### CAUTION

When installing the product in a cabinet the convection into and out of the product must not be restricted. The ambient temperature (outside the cabinet) must be less than the maximum operating temperature of the product by 4° C for every 100 watts dissipated in the cabinet. If the total power dissipated in the cabinet is greater than 800 watts, then forced convection must be used. It is your responsibility to ensure the ambient temperature does not exceed the rated ambient temperature stated in the specification.

---

## Instrument Maintenance

### Protecting Against Overpowering

The input circuitry of the test platform can be damaged by applying signals that exceed the maximum safe input level of +27 dBm average total power or +/- 30 VDC. Repairing damage to the input circuitry can be expensive. If the test platform will be used to measure signals which might be near the maximum safe input level, use external attenuators and/or limiters to help protect the test platform input. Always use the three-prong AC power cord supplied with this product. Failure to ensure adequate earth grounding by not using this cord can cause product damage.

### Cleaning the Instrument

#### WARNING

To prevent electrical shock, disconnect the Keysight Technologies Model E7515B from mains before cleaning. Use a dry cloth or one slightly dampened with water to clean the external case parts. Do not attempt to clean internally.

---

### Cleaning the Connectors

Cleaning connectors with alcohol shall only be done with the instrument power cord removed, and in a well-ventilated area. Allow all residual alcohol moisture to evaporate, and the fumes to dissipate prior to energizing the instrument.

#### WARNING

Keep isopropyl alcohol away from heat, sparks, and flame. Store in a tightly closed container. It is extremely flammable. In case of fire, use alcohol foam, dry chemical, or carbon dioxide; water may be ineffective.

Use isopropyl alcohol with adequate ventilation and avoid contact with eyes, skin, and clothing. It causes skin irritation, may cause eye damage, and is harmful if swallowed or inhaled. It may be harmful if absorbed through the skin. Wash thoroughly after handling. In case of spill, soak up with sand or earth. Flush spill area with water. Dispose of isopropyl alcohol in accordance with all applicable federal, state, and local environmental regulations.

---

## Protecting against electrostatic discharge

Electrostatic discharge (ESD) can damage or destroy electronic components (the possibility of unseen damage caused by ESD is present whenever components are transported, stored, or used).

### Test equipment and ESD

- Before connecting any coaxial cable to a test platform connector for the first time each day, momentarily short the center and outer conductors of the cable together.
- Personnel should be grounded with a 1 M $\Omega$  resistor-isolated wrist-strap before touching the center pin of any connector and before removing any assembly from the test platform.

Introduction  
Instrument Information and Maintenance

- Be sure that all instruments are properly earth-grounded to prevent build-up of static charge.

### **Additional information about ESD**

For more information about ESD and how to prevent ESD damage, contact the Electrostatic Discharge Association:

<http://www.esda.org>

The ESD standards developed by this agency are sanctioned by the American National Standards Institute (ANSI).

## UXM 5G Software Applications

The UXM 5G operates within the C8700200A 5G Test Application Framework. Different capabilities of this framework are licensed separately, as listed below:

### NOTE

You must purchase a Test Application license to use its features in the UXM 5G.

## Licenses

The license numbers given here are simplified; the actual numbers would include a suffix to specify the license type (for example, the suffix -1TP would designate that the license is transportable and perpetual).

Number	Description
C8700100A	5G Interactive Script Environment
C8700101A	5G Interactive Live
C8700200A	Test Application Framework
C8700300A	Host interface
C8701000A	Protocol R+D Tools
C8701400A	PRT Pre-5G TC-00: PROT interoperability test cases for 5GTF
C870240AA	RFT Pre-5G T-0A: Measurement tools for 5GTF
C87024AAA	RFT Pre-5G TC-AA: RF interoperability test cases for 5GTF
C87024ABA	RFT Pre-5G TC-AB: RF Tx and Rx test cases for 5GTF
C870250AA	RFT 5G NR T-0A: Measurement tools
C8703N0AA	KPI T-0A: Data Server tools
C87300P1A	LTE IP data
C87300R1A	LTE UL RF measurements
C8730115A	LTE Rel 15 – core signaling
C8730215A	LTE Rel 15 – advanced signaling
C8732114A	C-V2X Rel 14 – PC5 Signaling
C87340P1A	Pre-5G IP data for 5GTF
C87340R1A	Pre-5G UL RF measurements for 5GTF
C8734100A	Pre-5G - core signaling for 5GTF
C8734200A	Pre-5G - advanced signaling for 5GTF
C87350P1A	5G NR IP data



## About the Test Applications

The applications run on the embedded Windows controller present in the UXM 5G and use the provided touch-screen based interface, integrated fading, network emulation and measurement capabilities present in the test platform to provide you with a simple to use, bench-top design verification tool.

## Installing the Test Applications

This software comes already installed on your UXM 5G. If there is a problem and you need to re-install it, refer to Installing the Software on [“Updating the Keysight E7515B UXM 5G software” on page 99](#).



## 2 Quick Start

This section describes how to set up your UXM 5G, install product licenses, and provide test platform maintenance. You can also contact your Keysight representative to obtain on-site start-up assistance to help you with all steps outlined in this section, which is included with your UXM 5G purchase.

The following topics can be found in this section:

[“Initial Inspection” on page 28](#)

[“Turning On the Test Platform the First Time” on page 32](#)

[“Licensing” on page 38](#)

[LAN Connectivity on page 40](#)

[Anti-virus Protection and Firewalls on page 43](#)

## Initial Inspection

Inspect the shipping container and the cushioning material for signs of stress. Retain undamaged shipping materials for future use, as you may wish to ship the test platform to another location or to Keysight Technologies for service.




Verify the contents of the container against the table below.

**WARNING**


This instrument is heavy. Two people are required to lift this instrument.

**WARNING**

Please consult ergonomic guidelines regarding placement of the external keyboard when using it with the instrument. Using the keyboard in an uncomfortable or awkward environment could result in personal injury.

Item	Deliverable	Description
Getting Started Guide (this document)		Provides first-time power on instructions, licensing information, operating system information, and general hardware information.
Keysight E7515B UXM 5G Wireless Test Platform		
License entitlement certificate(s)		<p>You must register your instrument purchase using the included entitlement certificate.</p> <p>Follow the instructions on the Certificate. If this is your first visit to the license management website, you will be required to register.</p> <p>Refer to <b>“Licensing” on page 38</b> for more information.</p>

Quick Start  
Initial Inspection

Item	Deliverable	Description
Keysight Test USIM card, tri nano (E7515-10910)	See <a href="http://www.keysight.com/find/usim">www.keysight.com/find/usim</a> for details.	
Test USIM card, tri nano IM card (T1099-10001)		
Power Cable		Connection for Instrument Power

### Shipping Problems?

If the shipping materials are damaged or the contents of the container are incomplete:

- Contact the nearest Keysight Technologies office.
- Keep the shipping materials for the carrier's inspection.
- If you must return a test platform to Keysight Technologies, use the undamaged original or comparable shipping materials. See **“Returning Your Test Set for Service” on page 107.**

## Instrument Location and Rack Mounting Requirements

### Locating the Test Platform

Make sure that the left-side panel fan inlet and right-side panel exhaust vent areas are not obstructed. The minimal required clearance is 2.75 inches (7 cm).

#### NOTE

Install the instrument so that the detachable power cord is readily identifiable and is easily reached by the operator. The detachable power cord is the instrument disconnecting device. It disconnects the mains circuits from the mains supply before other parts of the instrument. The front-panel switch is only a standby switch and does not act as a LINE switch. The rear-panel switch is a LINE switch, however it is only to be relied upon as supplementary protection. If needed, an externally installed switch or circuit breaker (which is readily identifiable and is easily reached by the operator) may be used as a disconnecting device.

### Table Top Ambient Temperature

#### CAUTION

Do not exceed an ambient temperature of 45°C when operating the instrument on a table top.

### Rack Mounting: Hardware and Temperature

If you choose to locate your test platform in a rack, follow the guidelines provided in this section.

Based on the type of equipment rack you have, you must determine what rack rails you need. If you are using a Keysight System Test Rack, you can find information on what to order by referring to the Rack Mounting Flange Kit (Option E7515B-1CM) Installation Note.

#### CAUTION

When mounting instrument in a rack, do not exceed the level of:

- Outside rack ambient temperature of 35°C, or
- Internal rack air temperature of 45°C

Do not rack mount the test platform side-by-side with any other instrument with side ventilation. Make sure the exhaust air from the first instrument is directed away from the inlet of the second unit. If the pre-heated air from the first instrument is directed into the second instrument, it can cause excessive operating temperatures in the second unit and can cause instrument failures. The test platform draws air in from the left side and exhausts air from the right side. Do not mount other equipment immediately above the instrument. The minimal required clearance is 2.75 inches (7 cm).

**CAUTION**

VENTILATION REQUIREMENTS: When installing the instrument(s) into a cabinet consideration shall be given to the convection flow into and out of the cabinet. Consideration shall also be given to the individual instruments to avoid having the heated discharge of one instrument, now becoming the cooling intake air for another instrument.

Another area of concern is verification that the maximum ambient operating temperature of the instrument(s) is not exceeded by cabinet installation.

Keysight recommends forced air convection whenever instruments are installed in a cabinet and further recommends that the maximum operating temperature of the cabinet be reduced 10°C from the lowest maximum operating temperature of a single instrument.

If there are any concerns or special requirements a Keysight Field Engineer should be consulted to assure instrument(s) temperature compliance and performance.

---


## Turning On the Test Platform the First Time

**CAUTION**

DO NOT remove the AC power during boot-up/shutdown of the operating system or during the process of initializing the software. This can cause damage to the system files and prevent proper operation of the instrument.

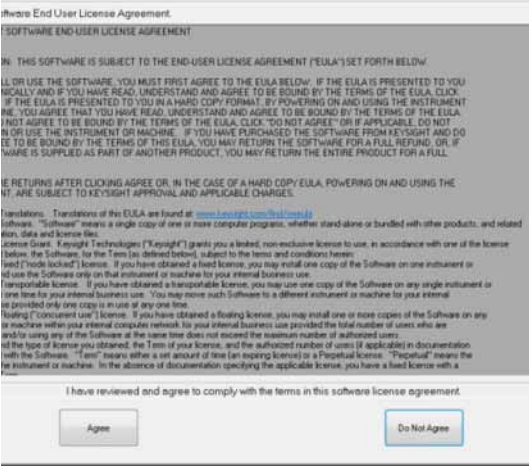

**CAUTION**

Before switching on this instrument, make sure the supply voltage is in the specified range.


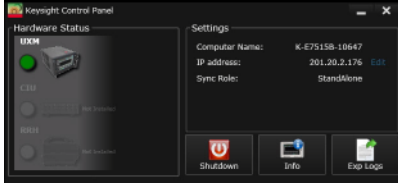


Step	Action	Notes
1. Connect power cable	Install the instrument so that the detachable power cord is easily reached by the operator.	Ensure power outlet is provided with a protective ground as specified.
2. Connect the mouse and the keyboard (Optional).	Connect the mouse and the keyboard to the test platform's USB ports.	
3. Power on the test platform	<p>Position the test platform so you have easy access to the power cord and plug it in.</p> <p>Select the On position for the rear-panel AC line power switch.</p> <p>Press the power button (bottom right of instrument front panel) when the LED above the power button illuminates in yellow. (It is best to wait at least 3 seconds after the LED is yellow before pressing the power button.)</p>	<p>See <b>“Instrument Location and Rack Mounting Requirements”</b> on page 30 and <b>“Power Requirements”</b> on page 19.</p> <p>Front-panel power button:</p> 



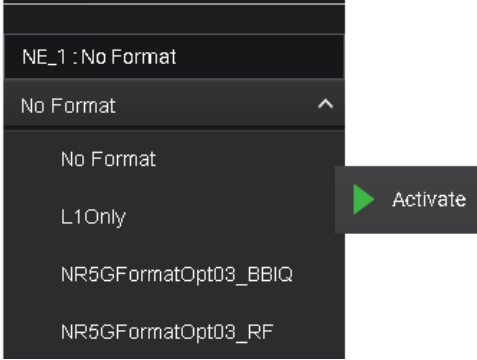



Quick Start  
Turning On the Test Platform the First Time

Step	Action	Notes
<p>4. You will be prompted to accept the End User License Agreement (EULA).</p>	<p>Select the <b>Agree</b> button to indicate that you accept the license agreement.</p>	 <p>After you agree to the EULA, the operating system boots-up and you see a black background with Keysight Technologies logo displayed on the screen. The E7515B Control Panel (shown below) is overlaid on top of this Keysight screen and remains visible while the internal hardware boards of the UXM 5G are booted-up.</p> 


Quick Start  
Turning On the Test Platform the First Time

Step	Action	Notes
<p>5. Wait until you see the green or red color displayed in the UXM 5G pictorial graphic, located in the upper left corner of the E7515B Control Panel.</p>	<p>The changing colors of the E7515B Control Panel pictorial graphic indicate the “ready-state” of the UXM 5G.</p>	
		<p>Yellow indicates the UXM 5G is in the process of becoming ready for operation.</p>
		<p>Green indicates the UXM 5G is ready for operation.</p>
		<p>Red indicates an error has occurred in the system and the unit is not ready for operation. (This requires troubleshooting, as the problem is not expected to resolve on its own.)</p>
<p>6. Make sure all required Windows updates are made.</p>	<p>Windows must be configured properly on your instrument to ensure this.</p>	<p>Windows updates are necessary to protect your E7515B instrument against the latest malware and viruses. See <b>“Windows Updates” on page 41</b>.</p>
<p>7. Run the HCCU.</p>		<p>Activate the Keysight NES Hardware Configuration Control Utility by double-clicking the Keysight HCCU icon on the desktop. (This utility runs within a browser window.)</p> <p>Microsoft Internet Explorer is <b>not</b> recommended as the browser for this utility, because of known compatibility issues. The recommended browser is Google Chrome.</p>
<p>8. If necessary, install the Google Chrome browser.</p>	<p>The browser can be downloaded from: <a href="https://www.google.com/chrome/browser/">https://www.google.com/chrome/browser/</a></p>	<p>After installation, set up Chrome as the default browser (Google provides setup instructions for this).</p>

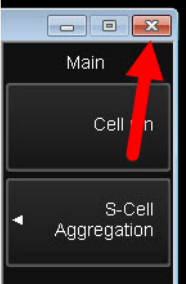

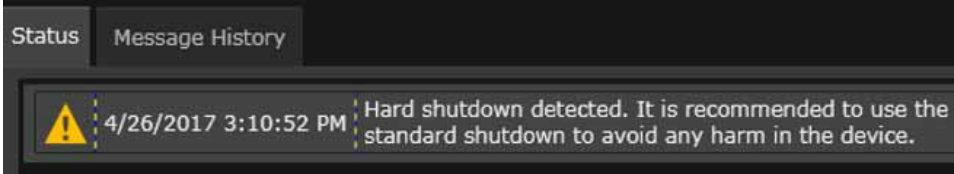
Quick Start  
Turning On the Test Platform the First Time

Step	Action	Notes
<p><b>9. Select a scenario.</b></p>	<p>In the HCCU, on the Scenarios tab, select a testing scenario (such as NR5GFormatOpt03_RF) and click the Activate icon. Wait while the selection is set up (an "in progress" message is displayed while the scenario is being activated).</p>	
<p><b>10. Run the test application.</b></p>	<p>Activate the test application by double-clicking on the 5G NR Test App icon on the desktop. (There is a lengthy delay while the software loads.)</p>	
<p><b>11. Run the HCCU.</b></p>	<p>Activate the Keysight NES Hardware Configuration Control Utility by double-clicking the Keysight HCCU icon on the desktop. (This utility runs within a browser window.)</p>	
<p><b>12. Wait for the application to load.</b></p>	<p>Later in the loading process, a splash-screen is displayed (with a progress indicator).</p>	

Quick Start  
Turning On the Test Platform the First Time

Step	Action	Notes																																																		
<p><b>13.</b> Begin using your new software after the splash screen disappears.</p>	<p>For detailed information on how to use the software, refer to the 5G NR Test Application Help.</p>	 <table border="1" data-bbox="917 493 1417 783"> <thead> <tr> <th></th> <th>Position 1</th> <th>Position 2</th> <th>Position 3</th> <th>Position 4</th> </tr> </thead> <tbody> <tr> <td>Cell</td> <td>Cell 1 (PCC)</td> <td>Cell 2</td> <td>Cell 3</td> <td>Cell 4</td> </tr> <tr> <td>Duplex Mode</td> <td>TDD</td> <td>TDD</td> <td>TDD</td> <td>TDD</td> </tr> <tr> <td>Band</td> <td>N257</td> <td>N257</td> <td>N257</td> <td>N257</td> </tr> <tr> <td>DL Bandwidth</td> <td>100 MHz</td> <td>100 MHz</td> <td>100 MHz</td> <td>100 MHz</td> </tr> <tr> <td>DL ARFCN</td> <td>2079451</td> <td>2081179</td> <td>2082907</td> <td>2084635</td> </tr> <tr> <td>DL Freq MHz</td> <td>28017.12</td> <td>28120.8</td> <td>28224.48</td> <td>28328.16</td> </tr> <tr> <td>UL Bandwidth</td> <td>100 MHz</td> <td>100 MHz</td> <td>100 MHz</td> <td>100 MHz</td> </tr> <tr> <td>UL ARFCN</td> <td>2079451</td> <td>2081179</td> <td>2082907</td> <td>2084635</td> </tr> <tr> <td>UL Freq MHz</td> <td>28017.12</td> <td>28120.8</td> <td>28224.48</td> <td>28328.16</td> </tr> </tbody> </table>		Position 1	Position 2	Position 3	Position 4	Cell	Cell 1 (PCC)	Cell 2	Cell 3	Cell 4	Duplex Mode	TDD	TDD	TDD	TDD	Band	N257	N257	N257	N257	DL Bandwidth	100 MHz	100 MHz	100 MHz	100 MHz	DL ARFCN	2079451	2081179	2082907	2084635	DL Freq MHz	28017.12	28120.8	28224.48	28328.16	UL Bandwidth	100 MHz	100 MHz	100 MHz	100 MHz	UL ARFCN	2079451	2081179	2082907	2084635	UL Freq MHz	28017.12	28120.8	28224.48	28328.16
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UL Freq MHz	28017.12	28120.8	28224.48	28328.16																																																

## Shutting Down the Test Platform

Step	Action	Notes
<p>1. Close the test application by clicking on the "X" button at the upper right.</p>		
<p>2. It is recommended that you press the front-panel power button, or select <b>Shutdown</b> from the MS Windows Start menu, or select the <b>Shutdown</b> icon on the E7515B Control Panel (as illustrated here).</p>	<p>The display will show the windows shut-down screen.</p>	
<p>To force power off: press and hold the front-panel power button for more than 5 seconds.</p>	<p style="text-align: center;"><b>CAUTION</b></p>	<p>Do not force power off in this way unless the normal procedure fails (a forced shutdown carries a risk of corrupting hard-drive data). If the last power shutdown was done in that way, the message shown below will be displayed on power-up as a reminder.</p>
		

## Licensing

All licenses required to operate your UXM 5G have been installed at the factory (except transportable licenses – see below) and can be recovered using one of the procedures outlined in **Chapter 6, “Test Platform Operating System”, on page 87**. Complete these steps if you need to add licensing to your UXM 5G:

1. Follow the directions located on the license entitlement certificate that you received with the delivery of your UXM 5G.

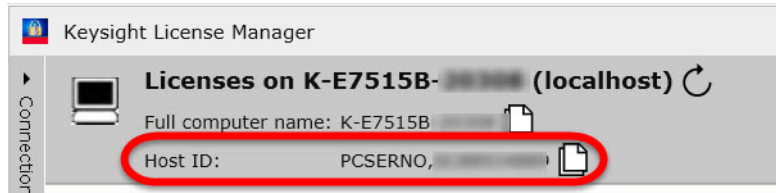
**NOTE**

You may register or sign in with your profile at:

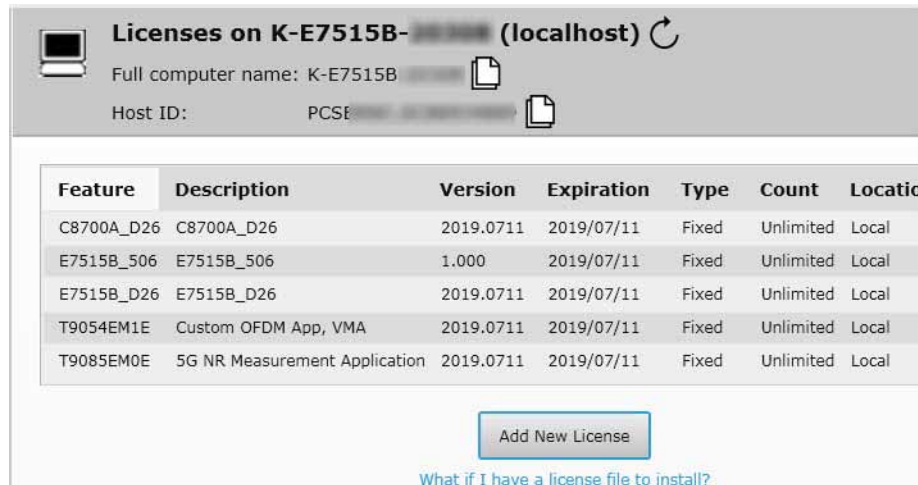
[www.keysight.com/find/softwaremanager](http://www.keysight.com/find/softwaremanager)

in order to obtain any software updates and/or new licenses using your entitlement details.

2. In order to redeem a license unique to your UXM 5G, you will need to enter the “Host ID”. To determine the Host ID of your UXM 5G, select the License Manager icon located on the E7515B Control Panel (see **“Control Panel Icons” on page 47**.) The Keysight License Manager (KLM) window opens and displays your Host ID:



3. After the registration/sign-in/filling in information, an e-mail with the generated license file will be sent to you. You need to copy the license file to the root directory of a USB memory stick and then insert the USB memory stick into the UXM 5G. It will automatically install any licenses that it finds on the USB memory stick for the test platform.



## Transportable Licenses

Transportable licenses are identifiable by the “T” included in their license number such as: E7530A-1TP-FDD or E7523A-1TP. This type of license enables you to move the license from one host instrument or PC to another, without the need to contact Keysight. Follow the steps above to install the transportable license for the first time.

To transport a license after that installation, run Keysight License Manager on the host that currently has the license, and transport the license. (Select **Help > Keysight License Manager Help** and search for “transport” to find detailed instructions.)

### NOTE

Transportable licenses for the E7515B UXM 5G allow you to transport licenses up to 30 times within the previous 10 days.

You can also save a transportable license to Keysight Software Manager (KSM) for later assignment to a host. To do so, review the Transporting Licenses section (found as described above) in the Keysight License Manager Help. When you are asked to choose a destination for the license, select **Save the license to Keysight Software Manager**.

When you are ready to assign the license to a host, come back to KSM and look for the action bubble entitled **You can request new licenses**. Click the bubble and follow the instructions given.

Other related topics for managing your software and licenses can be found by reviewing the Keysight License Manager Help available from the **Help** drop-down menu of the KSM software.

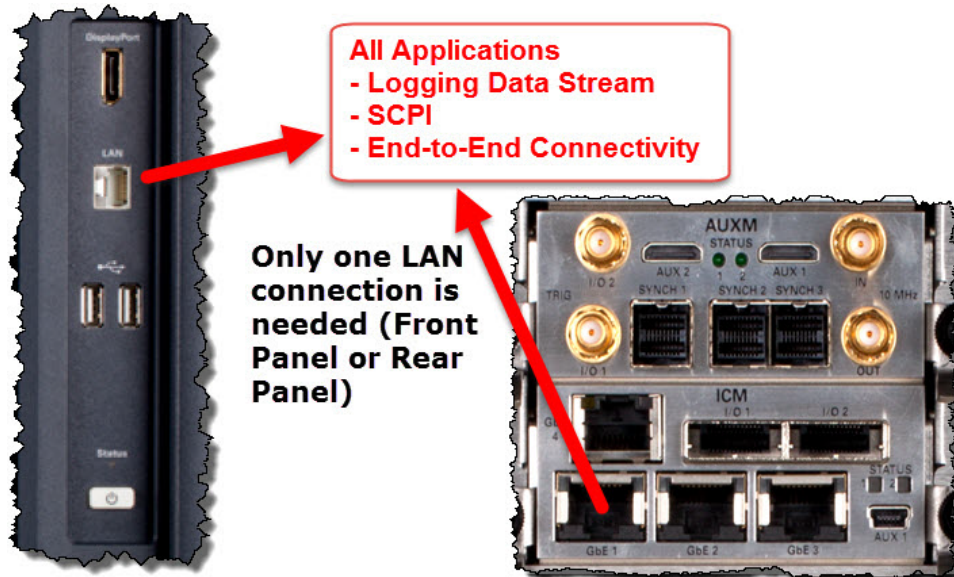
## LAN Connectivity

The UXM 5G has two network interface cards (NICs) that connect the instrument Host PC (embedded PC module) to external LAN outputs.

If your site network supports Dynamic Host Configuration Protocol (DHCP), these front and rear LAN ports are assigned IP addresses automatically when they are connected to the LAN.

Connect the LAN lines as shown below. (You need only one connection from the UXM 5G Host PC: either the front-panel LAN or the Rear-Panel LAN.)

Figure 2-1 LAN configuration



## Corporate Domains

### CAUTION

It is strongly recommended that the UXM 5G Host PC should not be added to any corporate domain. Doing so may result in undesirable operation procedures, or first-time test application software launch failures.

### CAUTION

Adding the Host PC to a domain may force installation of conflicting software (for example: firewalls or anti-virus software). In such cases adding to a domain must be avoided.

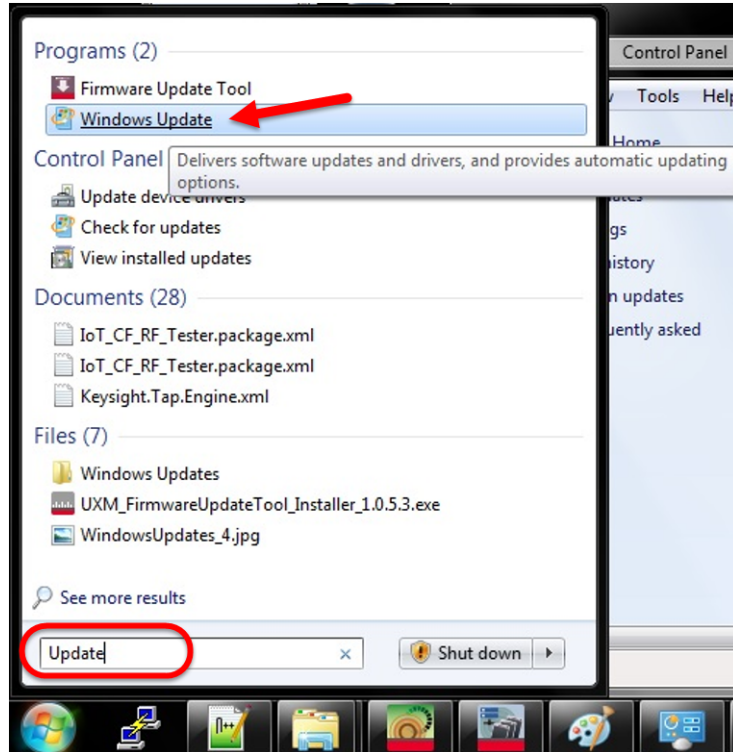
Once the UXM 5G Host PC has been added to a domain, the domain may enforce certain Windows security or user policies. If this occurs, it is not sufficient to remove the PC from the domain – a system recovery is required, to fully restore the settings to a known working condition. (See **“Disk Drive Recovery Process”** on page 92.)



## Windows Updates

To ensure that your E7515B instrument is protected against the latest malware and viruses, it is recommended to install all the Windows critical updates.

1. Go to **Windows/Start** and type "Update"; click on the displayed **Windows Update** link:



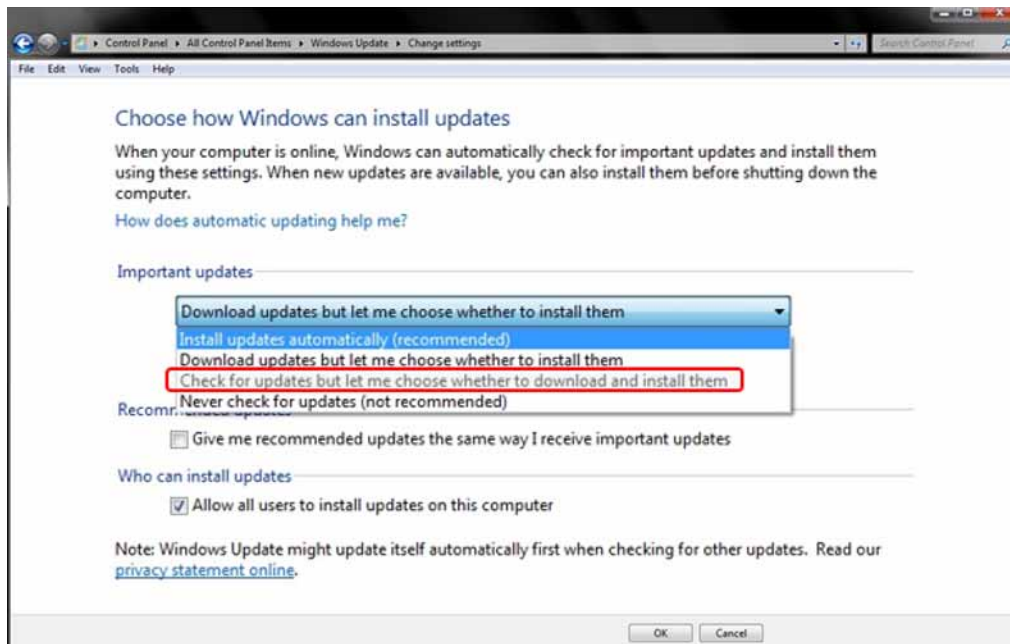
2. Select **Check for updates** in the left side menu, and follow the on-screen instructions to download and install the Windows updates.



3. In order to keep your instrument protected, select **Change settings** in the left side menu:



4. Under **Important updates**, select the option **Check for updates but let me choose whether to download and install them**.



**NOTE**

Current Keysight policy sets the Windows Update settings to “Check for updates but let me choose whether to download and install them” in “Important updates”. If your UXM 5G is not configured per the current Keysight policy, please set the Windows Update settings accordingly.

## Anti-virus Protection and Firewalls

The instrument is shipped with the Windows 7.0 firewall disabled. No anti-virus software is shipped with the instrument. It is recommended that you do not enable anti-virus protection for normal operation.

### CAUTION

Take care to verify that USB memory devices used with the UXM 5G are virus-free before using with the instrument.

---

Connecting the test platform directly to the public LAN is potentially insecure, because the test platform does not provide anti-virus protection. It is preferred that you connect the test platform to the public LAN by way of a PC with antivirus protection.

The instrument internally operates using fixed IP addresses for the following NICs. Do not modify the default network settings for the following connections, as this will cause problems with the operating system of the test platform:

– Host PC:

- Internal\_NIC

Quick Start  
Anti-virus Protection and Firewalls

## 3 Control Panel Functions

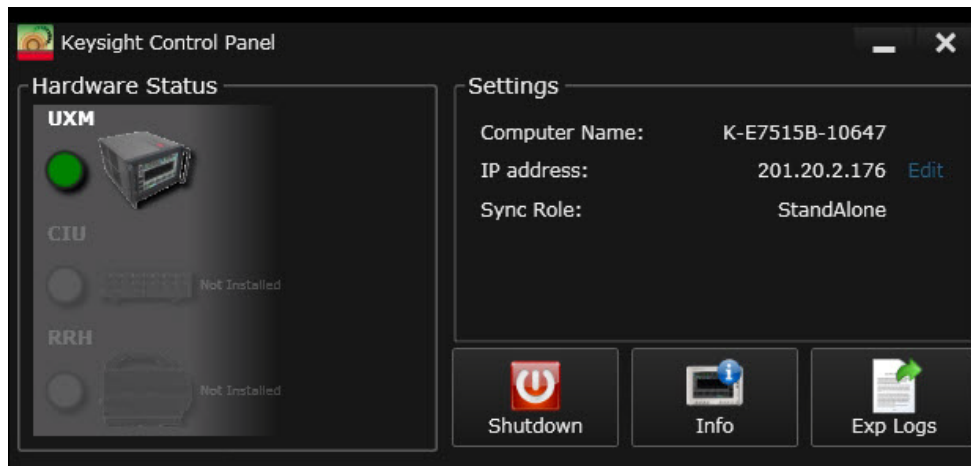
The following topics can be found in this section:

[“Viewing the Control Panel” on page 46](#)

[“Control Panel Icons” on page 47](#)

## The Control Panel

Figure 3-1 The UXM 5G Control Panel




The E7515B Control Panel enables you to interact with and manage the hardware components of the UXM 5G. It is always running if the test platform is turned on. If it is not displayed on the screen, it is minimized in either the lower left or right area of the Windows task bar.

**NOTE**


The control panel lists "Sync Role" information under **Settings** as shown above, but the current version of the control panel is no longer used to place the UXM in an array, or to remove it from an array and return it to StandAlone mode. See [“UXM Arrays” on page 67](#) for information on that topic.

## Viewing the Control Panel

Right-click on the E7515B Control Panel icon  from the task bar and select **Open Control Panel**.

**NOTE**

To access the Windows task bar from inside the test application, you can use the Application Switch tool to switch to the desktop and find the task bar, or you can connect the USB keyboard to the UXM 5G using one of the USB ports located on the front and rear panels of the UXM 5G. Press the key showing the Windows

icon , which is usually located in the lower-left corner of the keyboard.



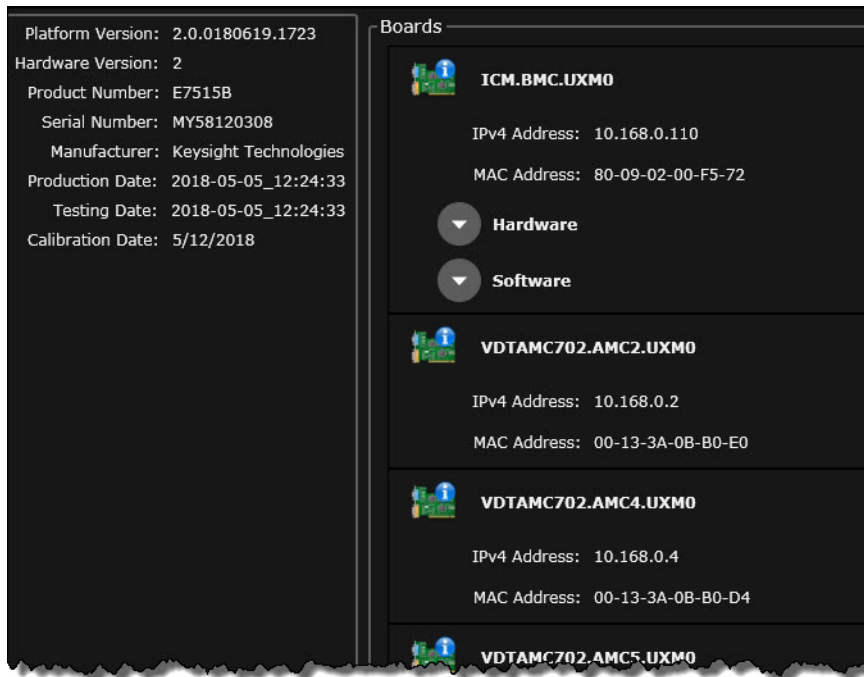

**NOTE**

If the E7515B Control Panel icon is not present in the task bar or on the desktop, it can be opened by selecting the Windows **Start Menu**, **All Programs**, **Keysight E7515B Platform**, **E7515B Control Panel**.

## Control Panel Icons

The functions listed in the table below are available by selecting the various E7515B Control Panel icons. For more information about these functions, see the "E7515B UXM 5G Wireless Test Platform - User's and Programmer's Guide", which is available in the Document Library tab of this site:

<http://www.keysight.com/find/uxm>

Icon	Description
	<p>Shuts down the UXM 5G hardware and software. It is recommended that you close all application software before selecting this E7515B Control Panel option.</p> <p>As a shutdown is a "destructive" operation, you will be asked to click "Ok" in a confirmation window ("This action will shut down Windows. Do you want to continue?".)</p>
	<p>Opens window with two options for obtaining instrument traceability information. Use this information when you need to discuss your test platform with an authorized Keysight representative. Below is a partial example of what you might see displayed.</p> <div data-bbox="480 856 1339 1528"><p>The screenshot shows a window with two panes. The left pane lists platform and hardware information: Platform Version: 2.0.0180619.1723, Hardware Version: 2, Product Number: E7515B, Serial Number: MY58120308, Manufacturer: Keysight Technologies, Production Date: 2018-05-05_12:24:33, Testing Date: 2018-05-05_12:24:33, Calibration Date: 5/12/2018. The right pane is titled 'Boards' and lists three boards: ICM.BMC.UXM0 (IPv4: 10.168.0.110, MAC: 80-09-02-00-F5-72), VDTAMC702.AMC2.UXM0 (IPv4: 10.168.0.2, MAC: 00-13-3A-0B-B0-E0), and VDTAMC702.AMC4.UXM0 (IPv4: 10.168.0.4, MAC: 00-13-3A-0B-B0-D4). A fourth board, VDTAMC702.AMC5.UXM0, is partially visible at the bottom.</p></div>
	<p>Opens a file window at <code>C:\Users\Administrator\Desktop\ngp\fr1_celloff_2cc_error</code> which enables you to browse to a different location or to designate this location to save a zipped set of encrypted log files from the instrument. These files can be used to assist Keysight with remote diagnosis of instrument problems. The .zip file is password-protected; the password is: <b>Keysight4u!</b></p>

Control Panel Functions  
The Control Panel



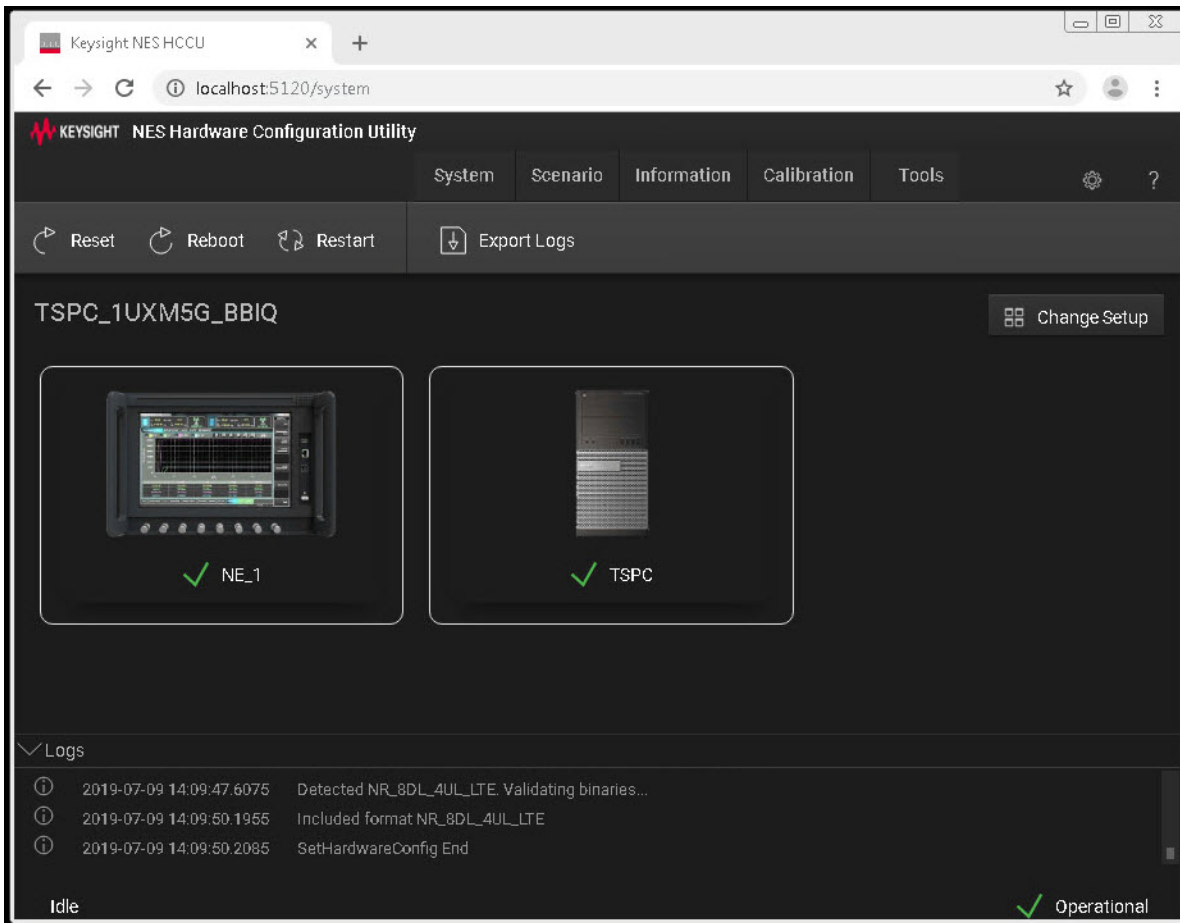
## 4 HCCU Functions

The following topics can be found in this section:

- **System** (system status information and operational controls)
- **Scenario** (measurement format management)
- **Information** (information on current hardware and software configuration)
- **Calibration** (path-loss correction)
- **Tools** (resource information)
- **Configuration Icon** (HCCU configuration settings)
- **Help Icon** (question-mark icon opens a documentation window)

## Hardware Configuration Control Utility (HCCU)

Figure 4-1 The HCCU Display



The HCCU enables you to control the hardware configuration of the E7515B and other equipment it is used with.

The HCCU (which appears in a browser window) is always running if the test platform is turned on. If it is not displayed on the screen, it is minimized in either the lower left or right area of the Windows task bar.


### NOTE

Microsoft Internet Explorer is **not** recommended as the browser for the HCCU utility, because of known compatibility issues. The recommended browser is Google Chrome, which can be downloaded from:

<https://www.google.com/chrome/browser/>


After installation, set up Chrome as the default browser (Google provides setup instructions for this).

## Viewing the HCCU

Right-click on the Keysight HCCU icon  from the task bar and select **Open HCCU**.

### NOTE

If you are unable to access the task bar, connect the USB keyboard to the UXM 5G using one of the USB ports located on the front and rear of the UXM 5G.

Press the key showing the windows icon , which is usually located in the lower-left corner of the keyboard.

### NOTE

If the HCCU icon is not present in the task bar or on the desktop, it can be opened by selecting the Windows **Start Menu, All Programs, Keysight E7515B Platform, E7515B HCCU**.

### NOTE

Microsoft Internet Explorer is **not** recommended as the browser for the HCCU utility, because of known compatibility issues. The recommended browser is Google Chrome, which can be downloaded from:

<https://www.google.com/chrome/browser/>

After installation, set up Chrome as the default browser (Google provides setup instructions for this).

## HCCU Tabs

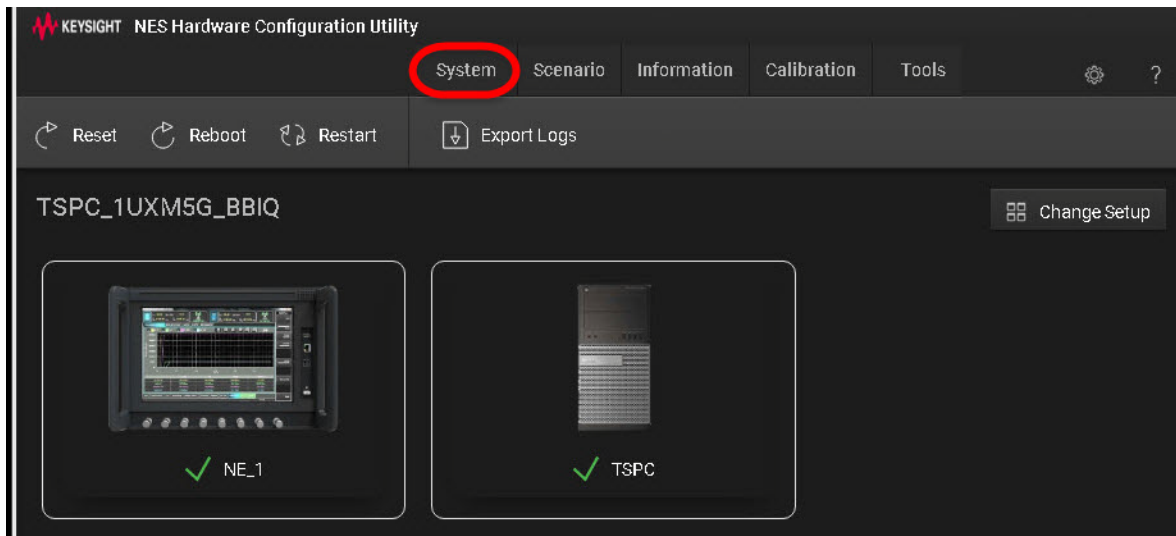
The HCCU window has a tabbed interface. The tabs are:

- **System** (system status information and operational controls)
- **Instruments** (information on current hardware configuration)
- **Setup** (hardware configuration selection)
- **Scenarios** (measurement format management)
- **Calibration** (path-loss correction)
- **Tools** (resource information)
- **Log** (message log)
- **Help** (information about the HCCU)

## System Tab

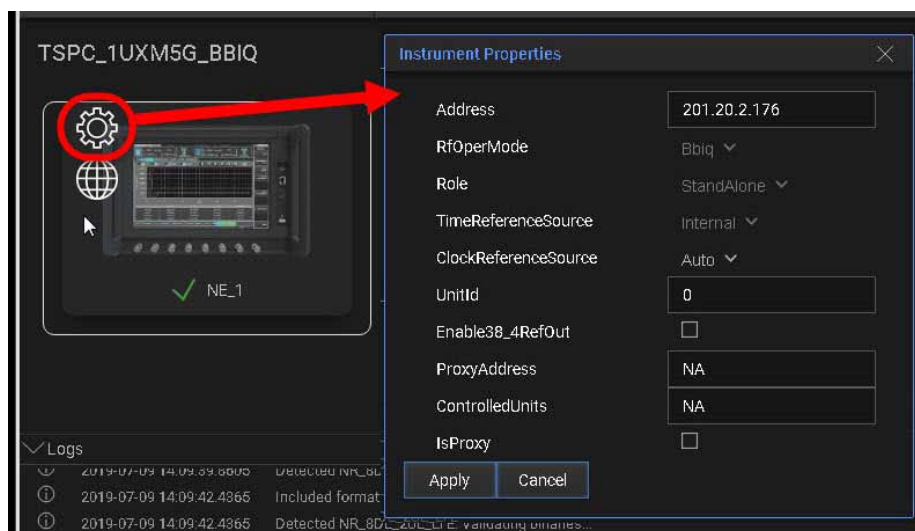
The **System** tab shows the hardware resources, represented as large icons (in the example illustrated below, a PC and an E7515E UXM 5G Base Wireless Test Platform).

Figure 4-2 The System tab



Using a mouse to move the cursor over a hardware icon causes two icons to appear, which provide access to additional information about the instrument represented. Clicking the gear-shaped icon brings up a display of Instrument Properties, as illustrated below.

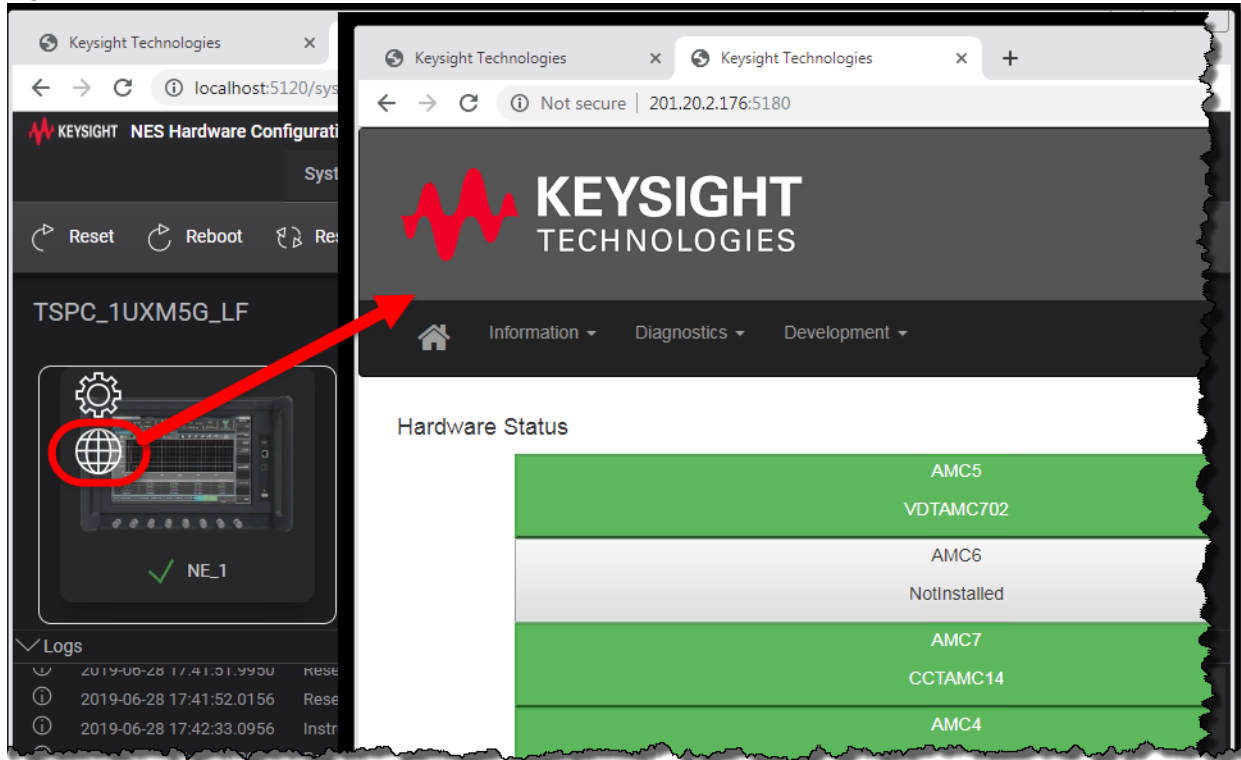
Figure 4-3 Instrument Properties



HCCU Functions  
System Tab

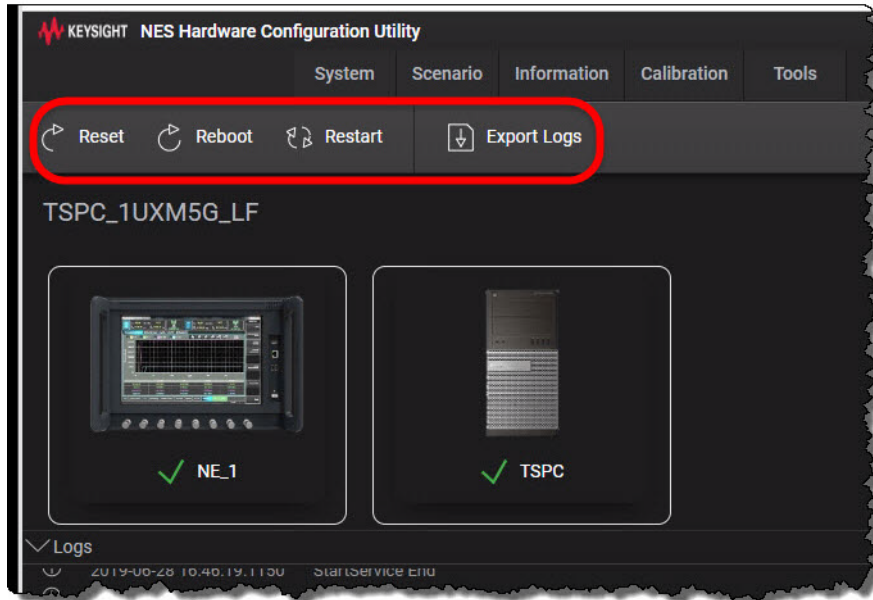
Clicking the globe-shaped icon brings up detailed hardware status in a browser window, as illustrated below.

Figure 4-4 Hardware Status



The **System** tab includes a **Reset** button (which can be used to reset all connected hardware resources) a **Reboot** button, and a **Restart** button.

Figure 4-5 Reset, Reboot, Restart, Export Logs

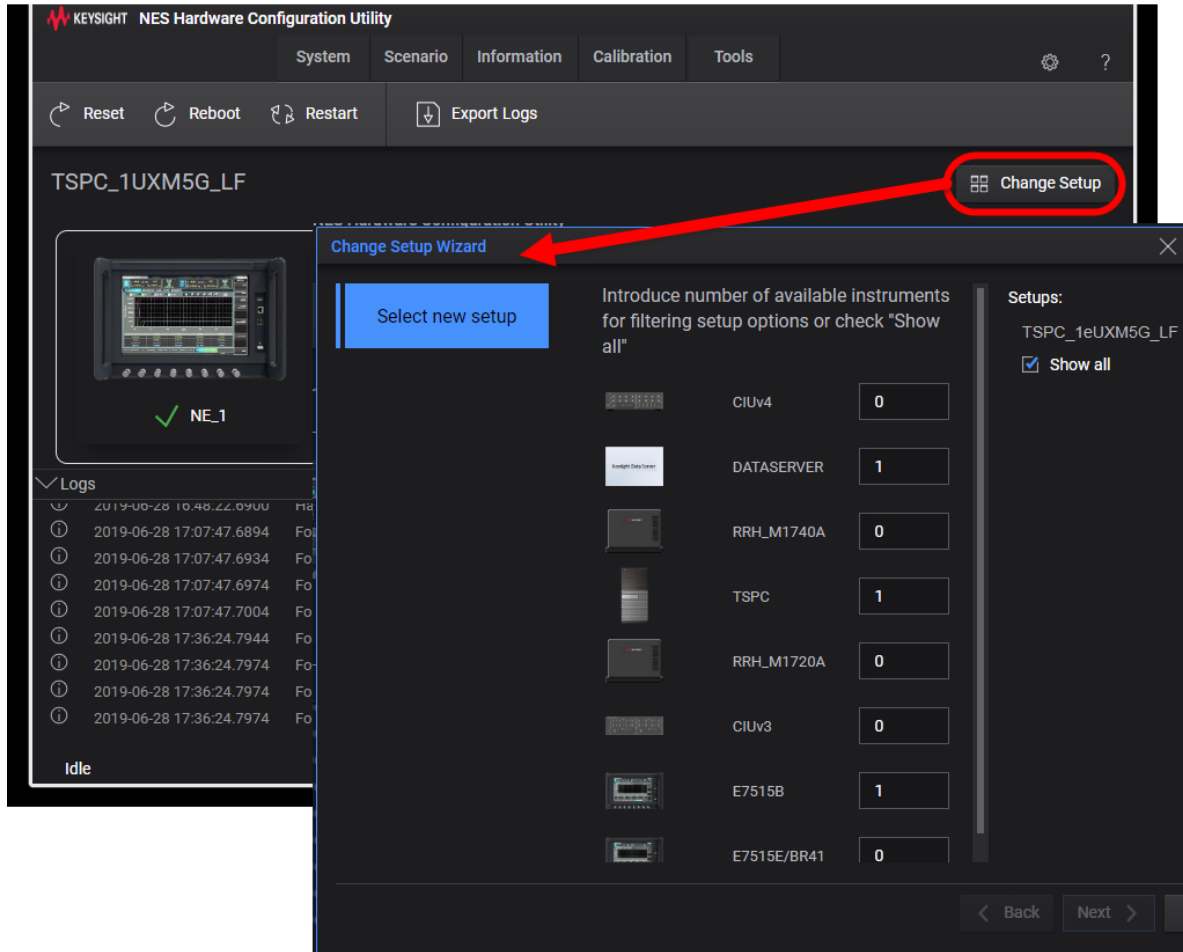


The **System** tab also includes an **Export Logs** button, which can be used to export logged information to a specified file location (proceeding with the export requires you to click **OK** in a confirmation window).

## Change Setup

The **System** tab also includes a **Change Setup** button, which opens a wizard window for selecting different hardware connections to the UXM 5G.

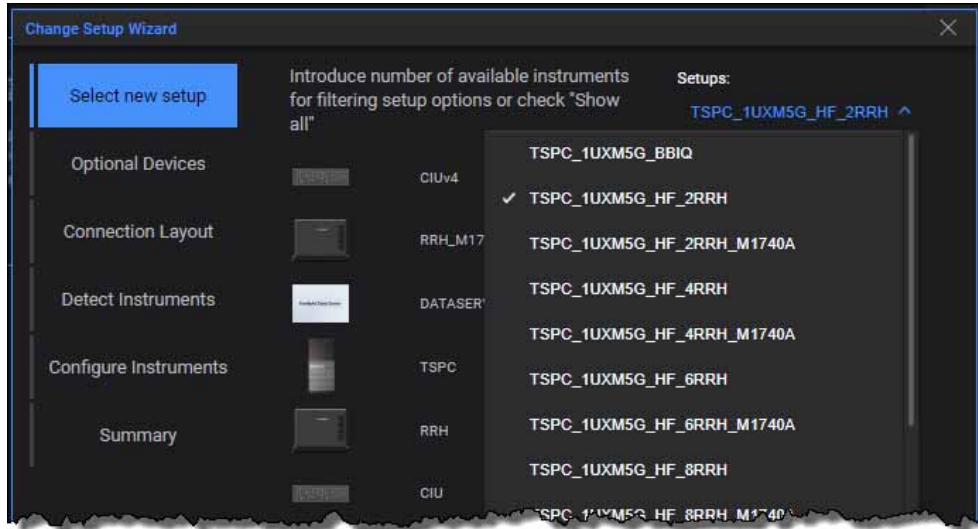
Figure 4-6 Change Setup wizard





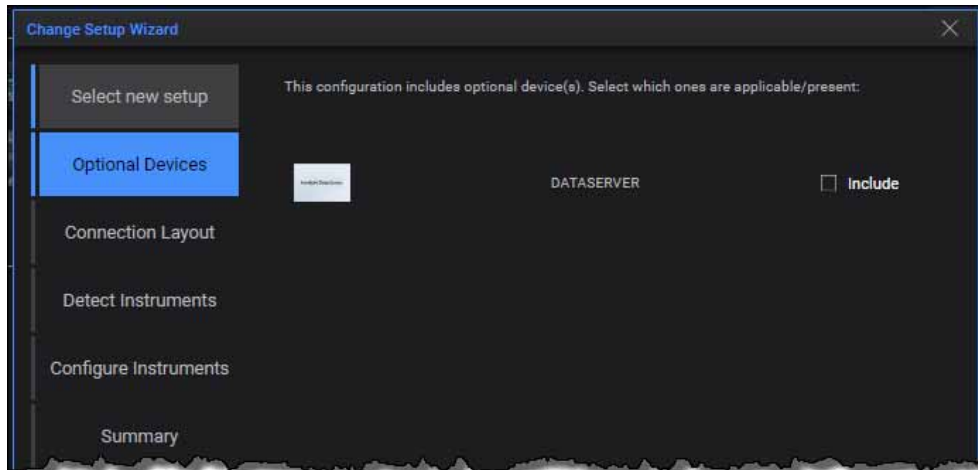
The wizard includes a dropdown selector for various possible setups.

Figure 4-7 Select new setup



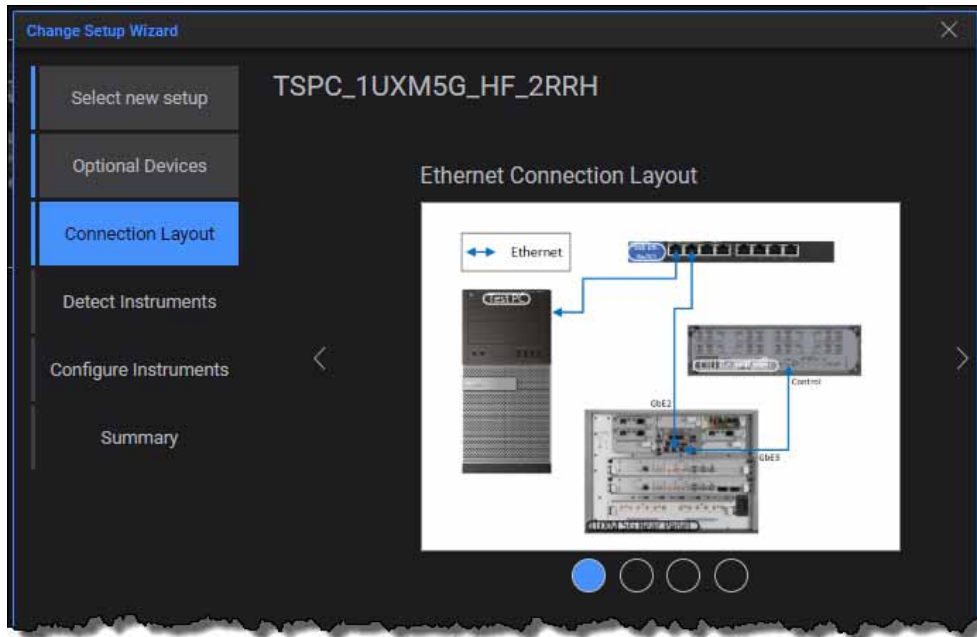
The wizard makes it possible to add optional devices.

Figure 4-8 Optional Devices



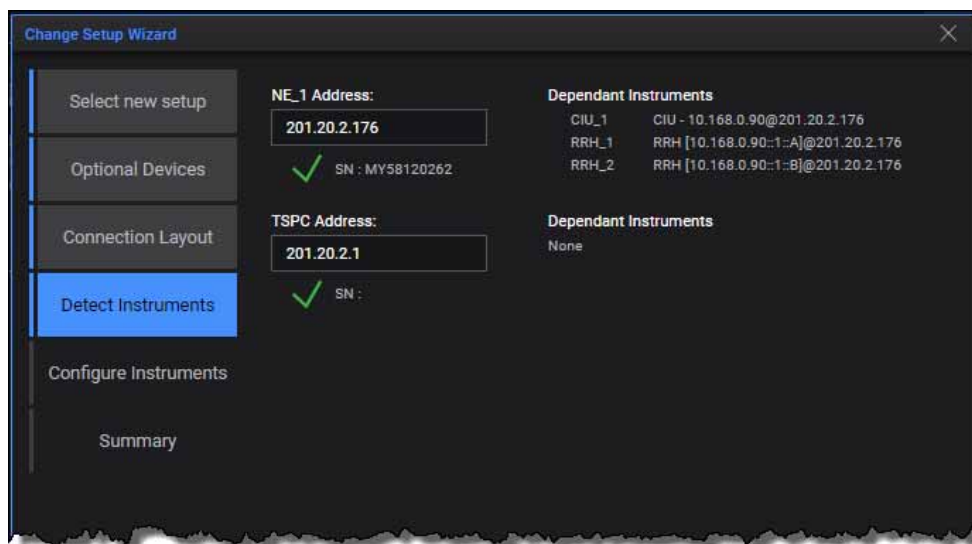
The wizard includes a large selection of connection layout diagrams.

Figure 4-9 Connection Layout



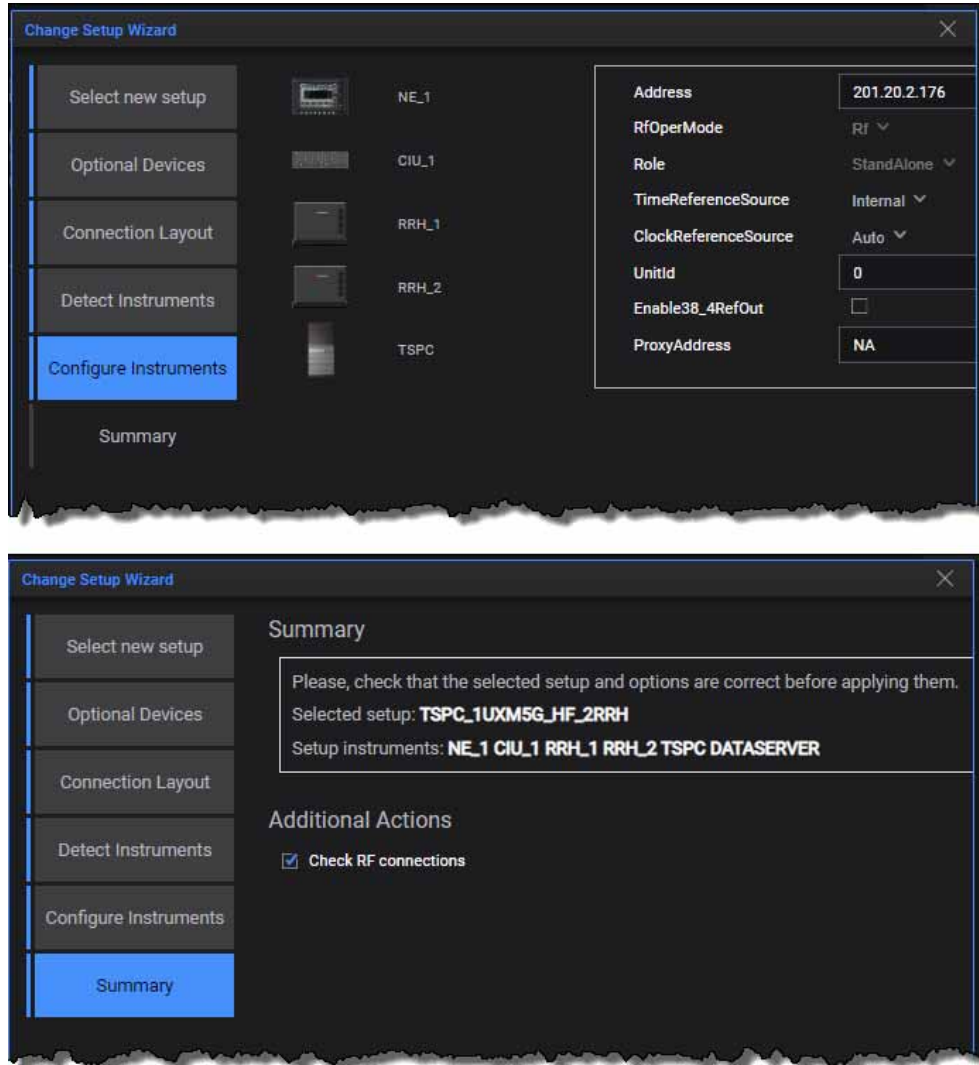
The wizard includes a Detect Instruments feature, which can be used for connectivity checking.

Figure 4-10 Detect Instruments



The wizard includes a Configure Instruments feature and a Summary page.

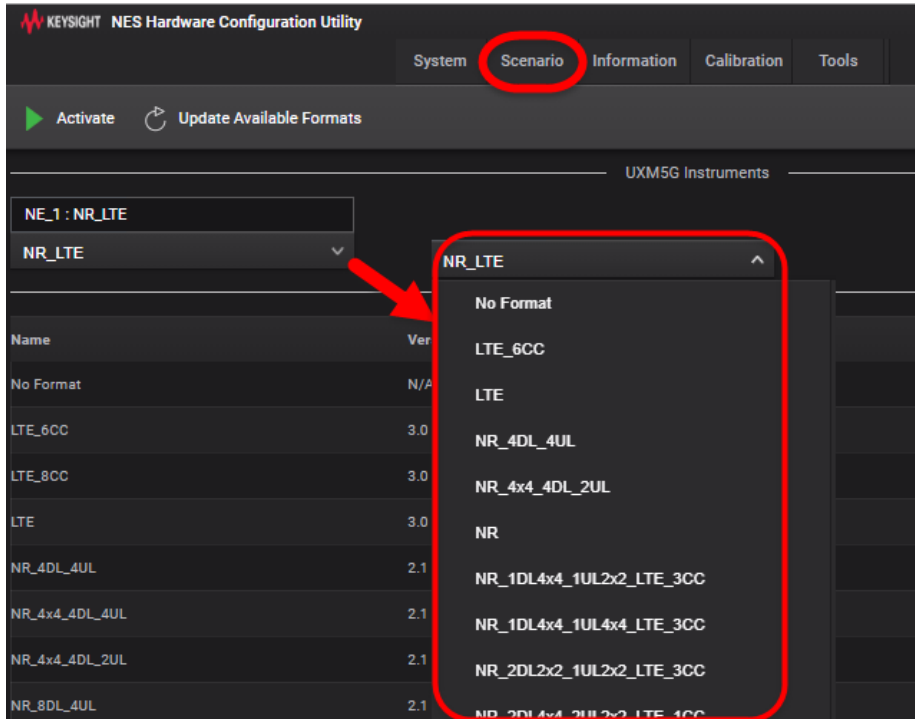
Figure 4-11 Configure Instruments and Summary



## Scenario Tab

The **Scenario** tab provides information about the connection scenarios available for the connected hardware.

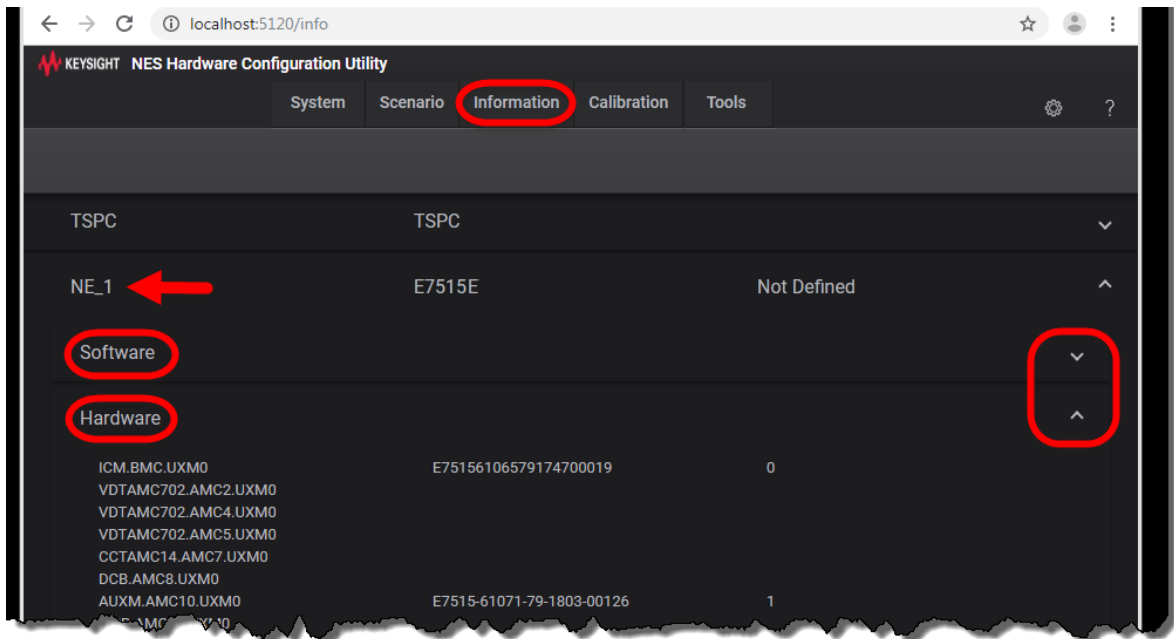
Figure 4-12 Scenario tab



## Information Tab

The **Information** tab provides access to Software and Hardware information about connected instruments. Use the up and down arrows to the right to show or hide particular information items.

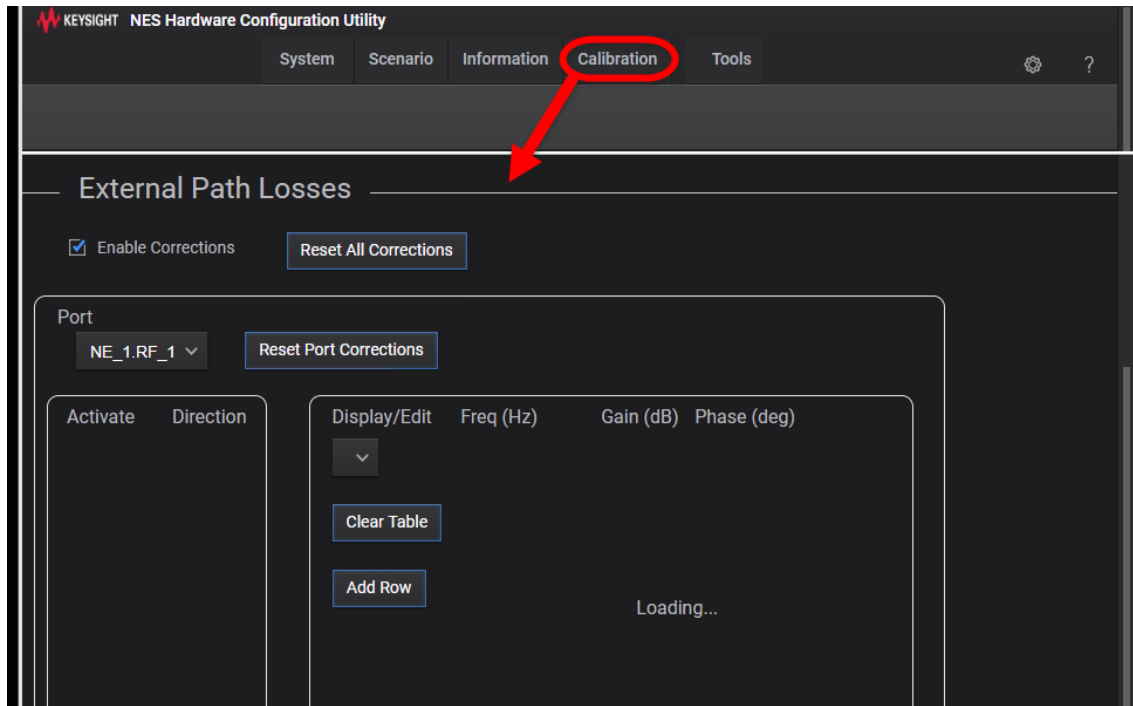
Figure 4-13 Information Tab



## Calibration Tab

The **Calibration** tab provides access to path loss corrections for the system.

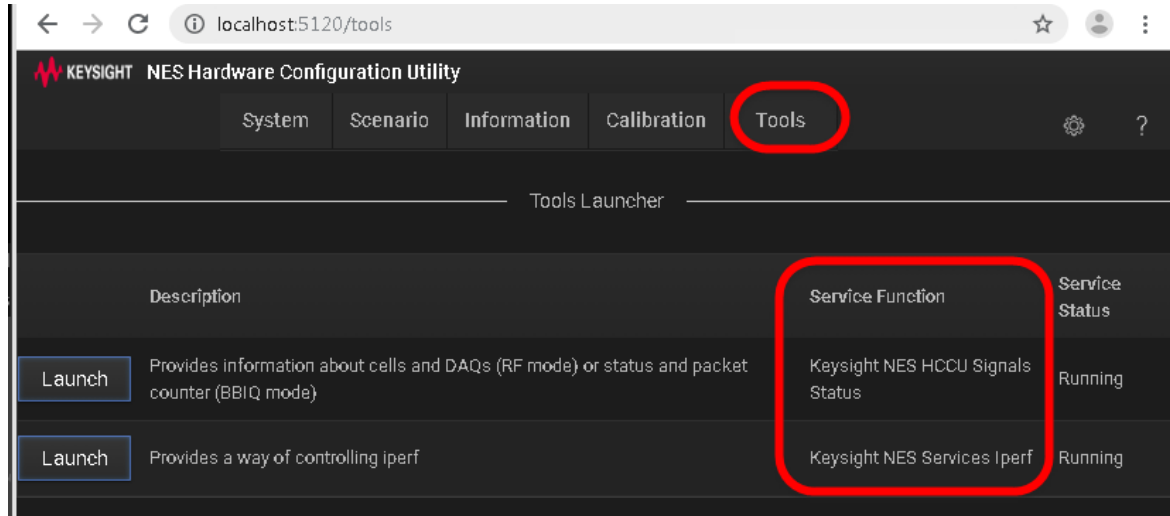
Figure 4-14 Calibration tab



## Tools Tab

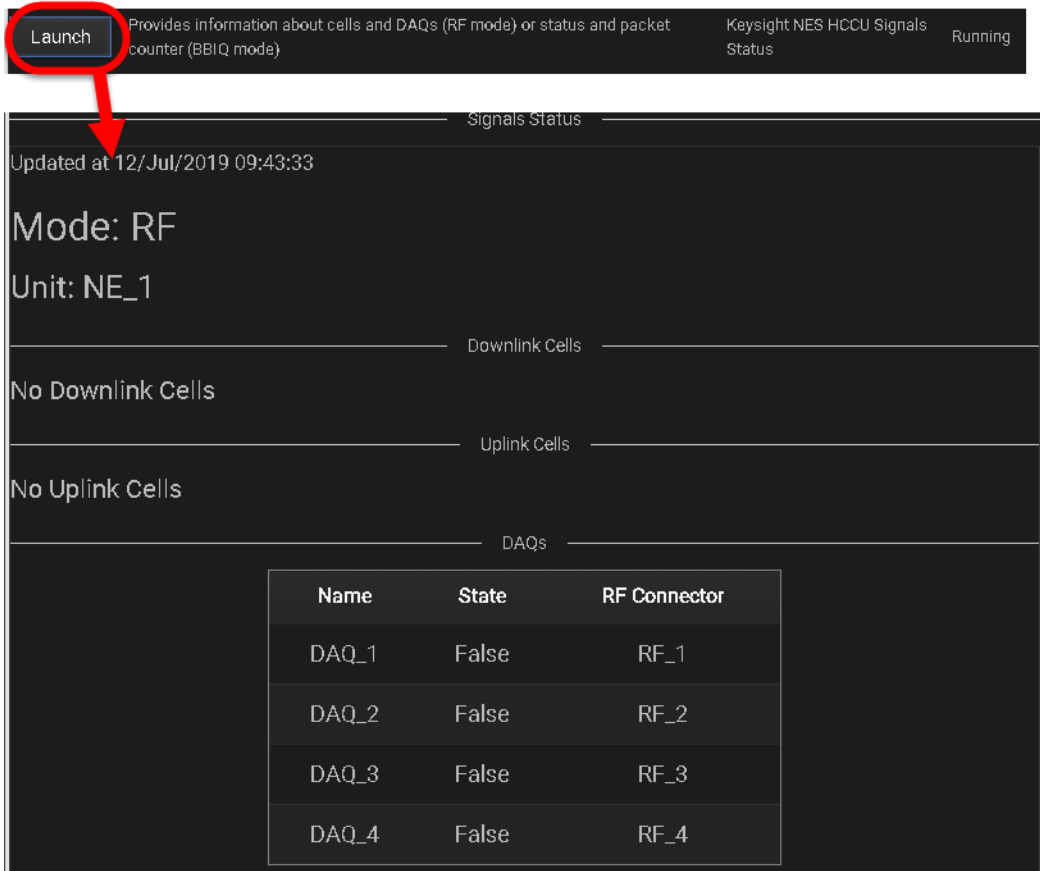
The **Tools** tab provides access to the **Signals Status** and **iPerf** tools.

Figure 4-15 Tools tab



The **Signals Status** tool provides information on NE mode, DL cells, UL cells, and DAQs.

Figure 4-16 Signals Status tool





The **iPerf** tool allows you to run the integrated traffic generator, a network testing tool used primarily to establish the maximum throughput of a client/server link.

Figure 4-17 iPerf tool

The screenshot displays the iPerf tool interface. At the top, a dark bar contains a 'Launch' button (circled in red) and the text 'Provides a way of controlling Iperf'. To the right, it says 'Keysight NES Services Iperf Running'. Below this are three buttons: 'Save Config', 'Load Config', and 'Export IPerf Logs'. The main area is divided into two sections: 'Iperf Client Configuration' and 'Iperf Servers Configuration'. Each section contains a table with configuration parameters and a 'Start' button for each entry.

Iperf Client Configuration												
	Id	Dest IP Address	IPv6	Port	Protocol	Max Len (B)	Window Size(KB)	Duration (secs)	BandwAverage (Mbps)(Mbps)	Current (Mbps)	Status	
Start	1	127.0.0.1	<input type="checkbox"/>	5001	TCP	1470	8	86400	1 0	Advanced		Show
Start	2	127.0.0.1	<input type="checkbox"/>	5002	TCP	1470	8	86400	1 0	Advanced		Show
Start	3	127.0.0.1	<input type="checkbox"/>	5003	TCP	1470	8	86400	1 0	Advanced		Show
Start	4	127.0.0.1	<input type="checkbox"/>	5004	TCP	1470	8	86400	1 0	Advanced		Show

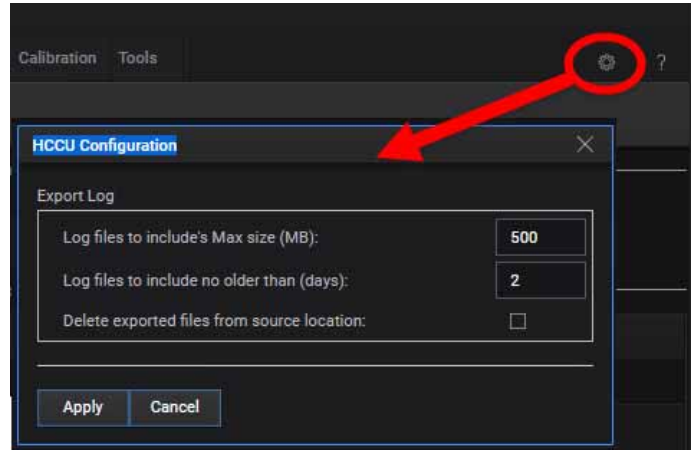
Iperf Servers Configuration												
	Id	IPv6	Port	Protocol	Max Len (B)	Window Size(KB)	Duration (secs)		Average (Mbps)	Current (Mbps)	Status	
Start	1	<input type="checkbox"/>	5001	TCP	1470	8	86400	Advanced	0	0		Show
Start	2	<input type="checkbox"/>	5002	TCP	1470	8	86400	Advanced	0	0		Show
Start	3	<input type="checkbox"/>	5003	TCP	1470	8	86400	Advanced	0	0		Show
Start	4	<input type="checkbox"/>	5004	TCP	1470	8	86400	Advanced	0	0		Show

HCCU Functions  
HCCU Configuration Icon (gear symbol)

## HCCU Configuration Icon (gear symbol)

This icon provides access to some settable properties of the HCCU interface.

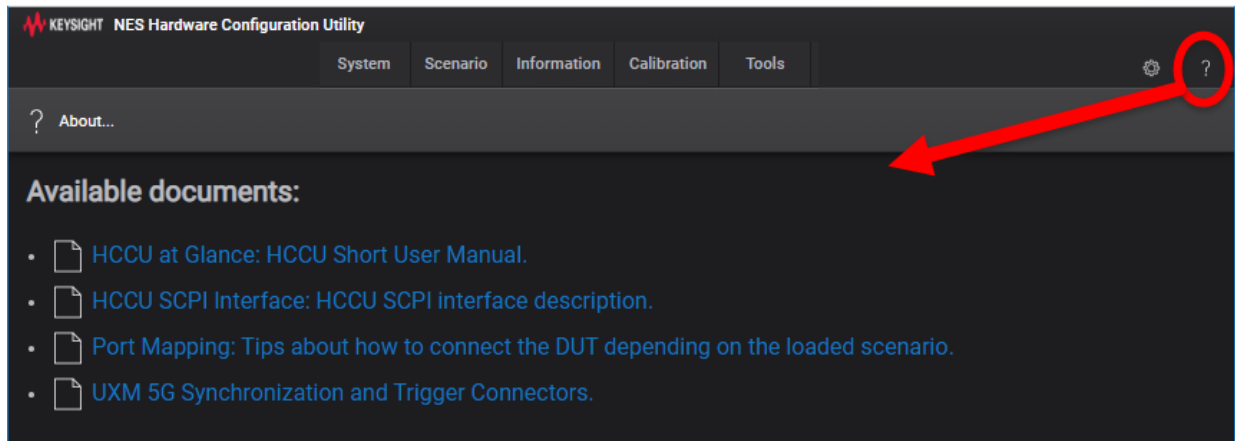
Figure 4-18 HCCU Configuration



## Help ("?" Icon)

The **Help** tab provides access to HCCU documentation.

Figure 4-19 Help tab

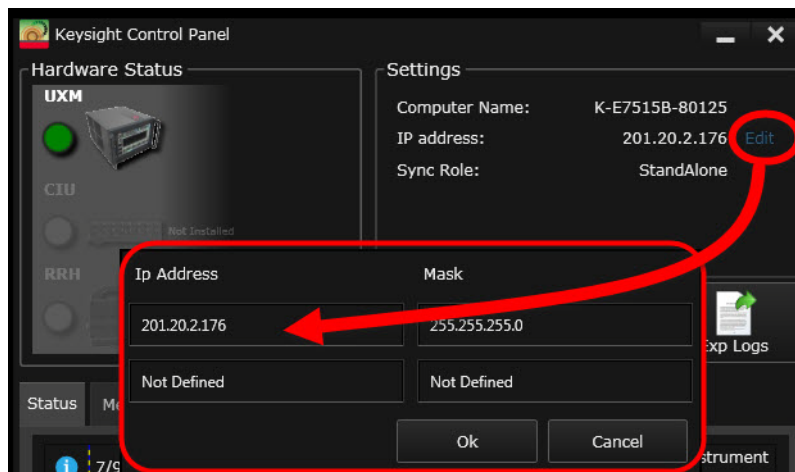


## UXM Arrays

The Control Panel was formerly used to add the UXM to an array ("Array Mode") containing a second UXM, or to run it independently of an array ("StandAlone Mode"). The HCCU now performs this type of configuration.

The UXM runs in "StandAlone" mode by default, and has a default IP address of **201.20.2.176**. The second UXM in the array should be given a different address (usually **201.20.2.177**). Use the Control Panel for the second E7515B to change the address, by clicking on Edit, as illustrated below.

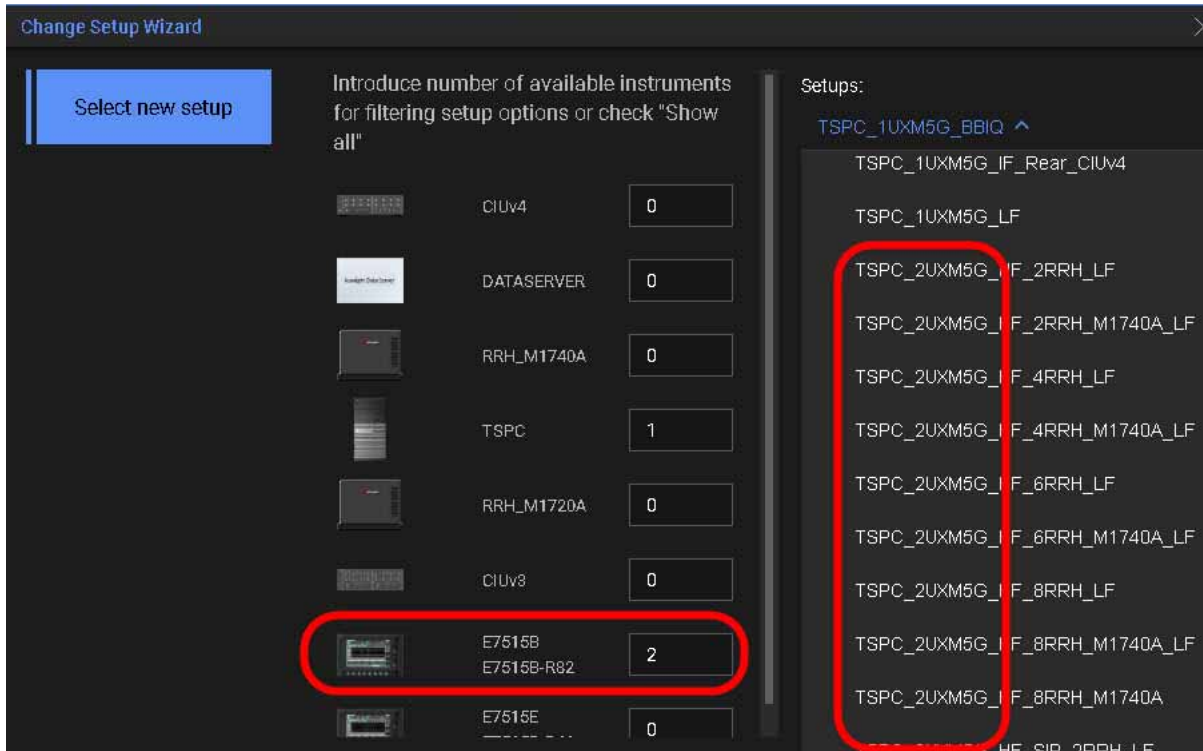
Figure 4-20 Editing the IP address of the second E7515B



To use the UXM in an array, begin by selecting a new setup in the **Change Setup** wizard on the **System** tab (see "**Change Setup**" on page 56).

In the new setup, is necessary to increase the number of E7515Bs from 1 to 2, and to select from the dropdown list a named setup beginning with "TSPC\_2UXM5G".

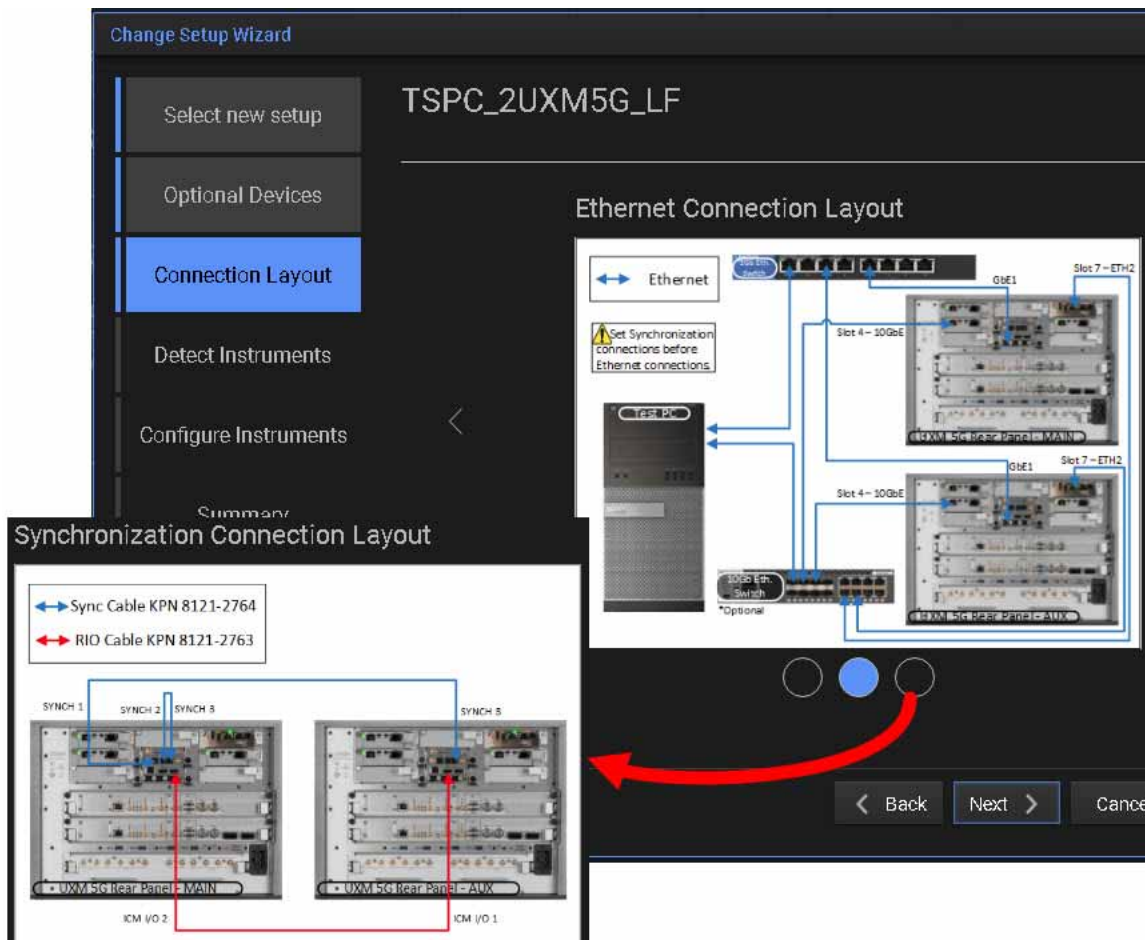
Figure 4-21 Selecting an array setup



Further requirements are described on the next page.

It is also necessary to connect the E7515Bs to the Test PC by way of Ethernet cables and Ethernet switches, and to connect the E7515Bs to each other using RIO and Sync cables. The **Change Setup** wizard illustrates the connection requirements, under **Connection Layout**.

Figure 4-22 Hardware connections for the array



It is not necessary to remove these cable connections if you revert to a "StandAlone" setup (one with a name which begins "TSPC\_1UXM5G"). So long as they are in place, the UXMs can be operated either in an array or separately.

HCCU Functions  
UXM Arrays

## 5 Front and Rear Panel Functions

The following topics can be found in this section:

[“Front Panel Features” on page 72](#)

[“Rear Panel Features” on page 75](#)

[“Front and Rear Panel Symbols” on page 84](#)

## Front Panel Features

Begin using the UXM 5G by becoming familiar with the layout of the Front Panel and the displayed user interface.

Figure 5-1 UXM 5G Front Panel





Front and Rear Panel Functions  
Front Panel Features

Number	Item Name	Description
1	Touch-screen	LCD Flat-Panel Display with single touch 15" capacitive touch-screen.
2	DisplayPort	This is a DisplayPort output, which transfers uncompressed video and audio data to an external display, such as a PC monitor or projector.
	<b>NOTE</b>	If a monitor is going to be connected to the DisplayPort, it is preferable to make this connection while instrument power is <b>off</b> . The monitor is normally detected by the E7515B's power-on routine; it can sometimes go undetected if the connection is made after power is on (if that happens, it will be necessary to cycle power on the E7515B so that the power-on routine is repeated).
3	Front LAN Connection	This RJ-45 connector provides front-panel access from the UXM 5G Host PC enabling a maximum Ethernet data rate of 1 Gigabit. This connector is used for downloading firmware upgrades, new test platform applications, saving data to an external memory drive and other reasons for which you may wish to connect to a local area network and/or to the internet. See <b>“LAN Connectivity” on page 40</b> . The IP address for this input is labeled “Front”.
4	2 - USB Inputs	Universal Serial Bus inputs for peripheral devices (mouse, keyboard, flash drives). These are USB version 2.0. (See the rear panel for USB 3.0 ports.)
5	Power button	The power button is the On/Off button for AC power. Pressing this button when the instrument is powered off turns it on. Pressing this button briefly will shut down the UXM 5G and Windows Operating System safely. (Pressing and holding this button down for more than 5 seconds forces a complete instrument shut-down, but this is not recommended, as it triggers an uncontrolled Windows shutdown).
	Status light	The Status light indicates the power status of the instrument (see <b>“Power Status Indicator” on page 74</b> ). The rear-panel switch must be turned On and line power must be connected in order for this light to illuminate.
6 -13	RF1 - RF8 Tx/Rx ports	These ports transmit and receive using the base station emulator of the UXM 5G.
	In/Out lights	For each port, two indicators are provided; they are lit when the port is configured to receive (In), to transmit (Out), or to operate in duplex mode (both).

**CAUTION**

For ports RF1 through RF8, the maximum RF power input levels are:  
+34 dBm MAX CW  
+42 dBm MAX Peak  
+20 VDC MAX

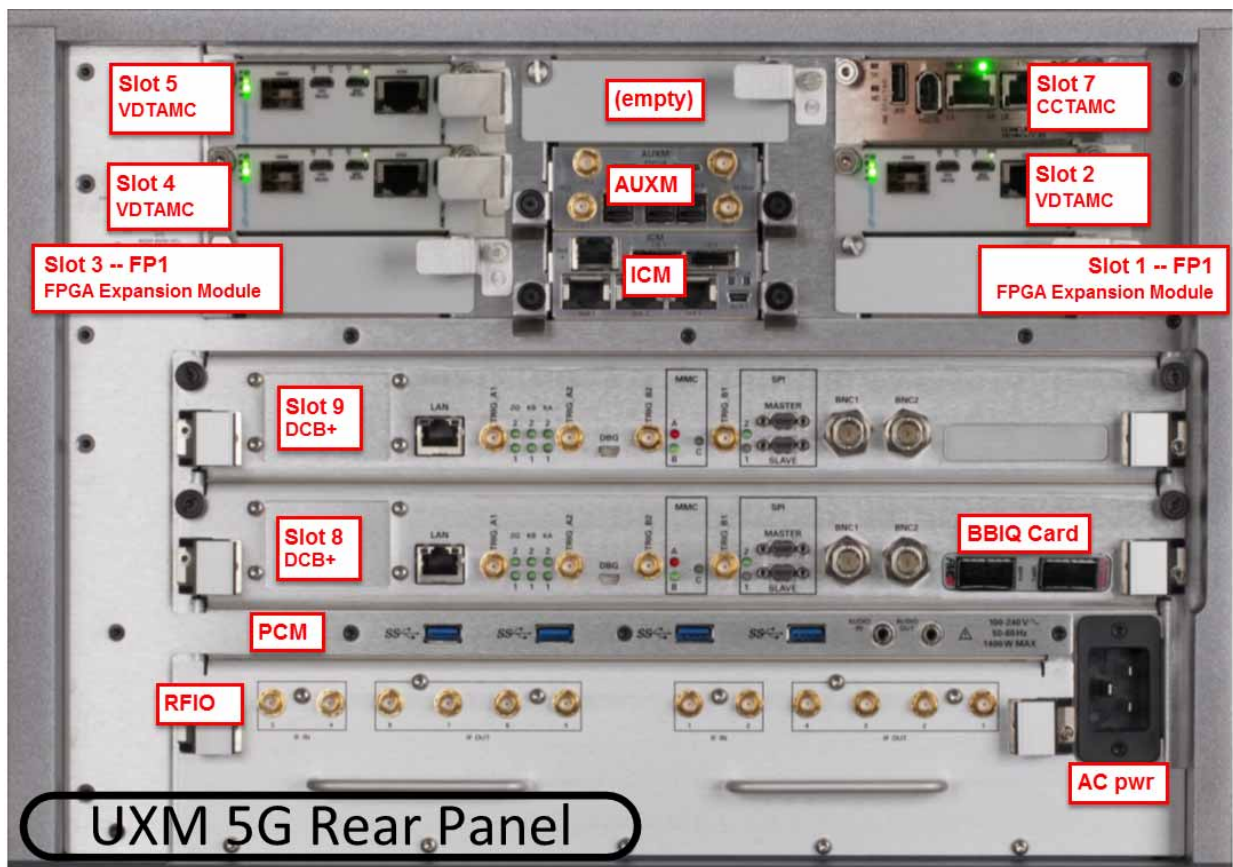
## Power Status Indicator

### UXM 5G Power Status

- **Off:** Back-panel power switch is off.
- **Yellow:** The rear power switch is on, but the UXM 5G is powered down. The first time the back-panel power switch is turned on (UXM 5G (front-panel switch is off). It may display as green when the Micro-Controller Unit is loading (~3 seconds) after which it remains yellow.
- **Green blinking:** The UXM 5G is booting up.
- **Green:** UXM 5G is available for use or in use.
- **Green/Yellow blinking:** Instrument Control Module (ICM) for the Micro-Controller Unit is downloading firmware. (Not the FPGA ICM.) When the FPGA-ICM is downloading firmware, the LED is green.
- **Yellow blinking:** UXM 5G is shutting down and the boards shutdown process has begun.
- **Yellow/Orange blinking:** UXM 5G is off after an abnormal shutdown.

## Rear Panel Features

Figure 5-2 UXM 5G Rear Panel



The regions of the rear panel that are outlined in the illustration are described in the following sections.

### CAUTION

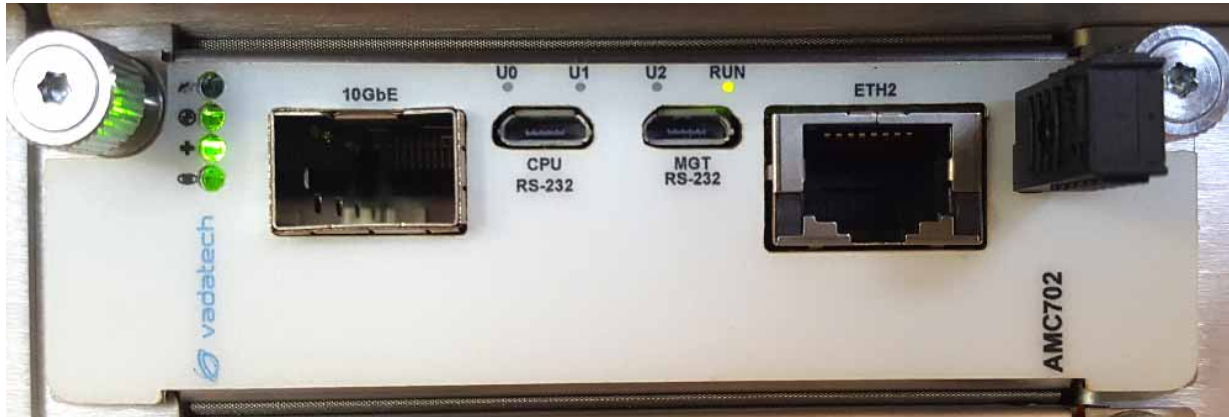
Do not cover or block the air flow vents. The test platform draws air in from the left side and exhausts air from the right side.

### NOTE

The main power cord can be used as the system disconnecting device. It disconnects the mains circuits from the mains supply.

## VDTAMC Cards

Figure 5-3 UXM 5G Rear Panel -- VDTAMC card connectors



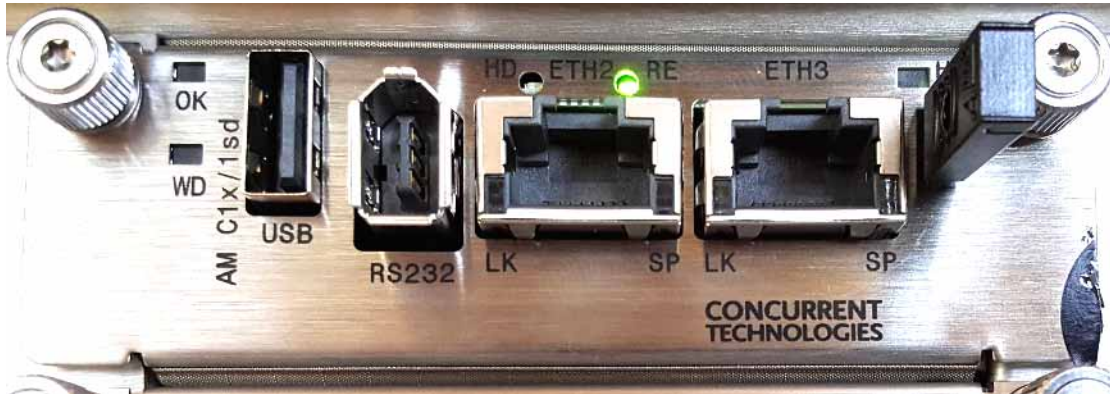
These connectors relate to the VDTAMC card (of which there are three, in slots 2, 4, and 5) within the UXM 5G.

The VDTAMC card (also known as the Vadatech AMC 702) handles processing of the PHY and PDCP layers in the simulated 5G NR stack.

Name	Description	Notes
10GBbE	SFP+ connector	Usage depends on the hardware configuration selected on the HCCU Setup tab.
U0, U1, U2, RUN	LEDs	(Reserved for future use.)
CPU RS-232	Micro-USB connector	(Reserved for future use.)
MGT RS-232	Micro-USB connector	(Reserved for future use.)
ETH2	RJ-45 connector	Usage depends on the hardware configuration selected on the HCCU Setup tab.

## CCTAMC Card

Figure 5-4 UXM 5G Rear Panel -- CCTAMC card connectors



These connectors relate to the CCTAMC card within the UXM 5G.

The CCTAMC card (also known as the Concurrent Technologies AMC14) handles processing of the RLC and MAC layers in the simulated 5G NR stack.

Name	Description	Notes
USB	USB 2.0 connector	(Reserved for future use.)
RS-232	IEEE 1394 connector	(Reserved for future use.)
ETH2	RJ-45 connector	Usage depends on the hardware configuration selected on the HCCU Setup tab.
ETH3	RJ-45 connector	Usage depends on the hardware configuration selected on the HCCU Setup tab.

## FPGA Expansion Module (E7515B-FP1)

Figure 5-5 UXM 5G Rear Panel -- E7515B-FP1 card connectors

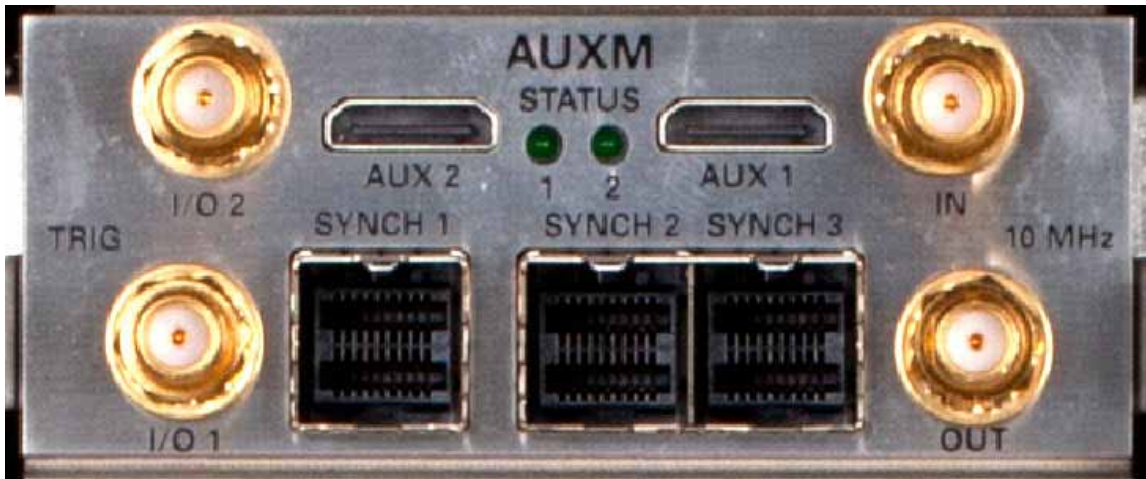


These connectors relate to the optional FPGA expansion module (E7515B-FP1), of which there are potentially two, located in slots 1 and 3. These modules expand the FPGA capacity of the E7515B, for certain kinds of 5G testing which require this.

Name	Description	Notes
QSFP1	Kintex-A QSFP Interface	Reserved for future use.
QSFP0	Kintex-A QSFP Interface	Reserved for future use.
TRIG 1	TBD	Reserved for future use.
DEBUG	TBD	Reserved for future use.
TRIG 0	TBD	Reserved for future use.

## AUXM Connectors

Figure 5-6 UXM 5G Rear Panel -- AUXM Connectors



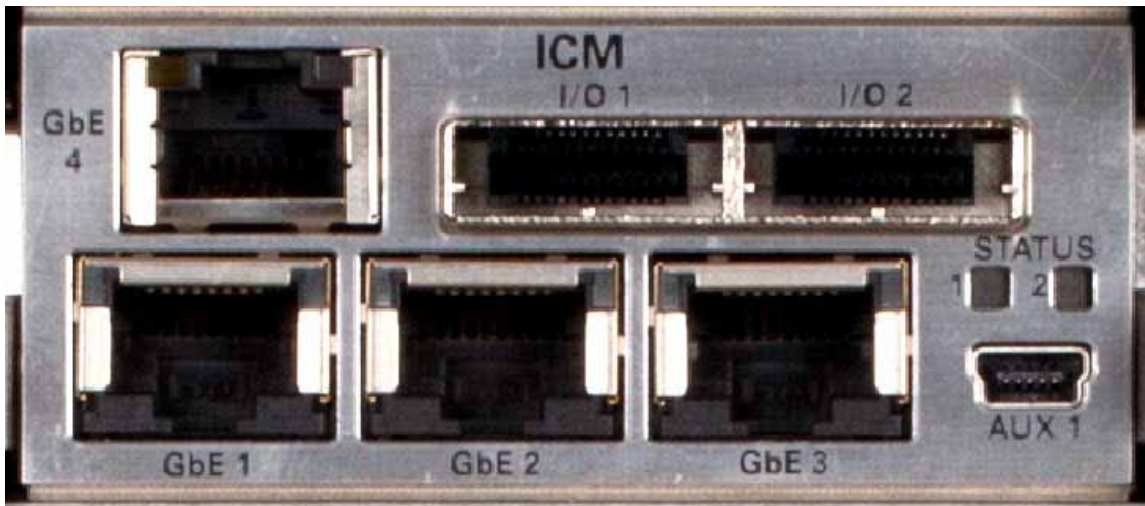
These connectors relate to the AUXM circuit board within the UXM 5G.

Name	Description	Notes
I/O 1 I/O 2	SMA connectors	(Reserved for future use.)
AUX 1 AUX 2	SMA connectors	(Reserved for future use.)
STATUS 1 STATUS 2	LEDs	(Reserved for future use.)
10 MHz IN 10 MHz OUT	SMA Input/Output 10 MHz clock reference	Do not modify connections to the internal and/or external references while this instrument is transmitting or receiving RF signals.
SYNCH 1 SYNCH 2 SYNCH 3	Mini-SAS HD 4x	Synchronizes the internal clocks between arrays of UXM 5G units.



## ICM Connectors

Figure 5-7 UXM 5G Rear Panel -- ICM Connectors



These connectors relate to the AUXM circuit board within the UXM 5G.

Name	Description	Notes
GbE 4	This is the Ethernet port that is connected internally to the UXM 5G Host PC. Use this port to connect the UXM 5G to the LAN.	The IP address for this input is labeled "ICM GbE4".
I/O 1 I/O 2	Mini-SAS 28AWG	Used to interconnect multiple UXM units.
STATUS 1 STATUS 2	LEDs	(Reserved for future use.)
AUX 1		(Reserved for future use.)
GbE 1 GbE 2 GbE 3	Ethernet GbE 1, GbE 2, and GbE 3	Used only by Keysight during production or maintenance..



## DCB+ Connectors

Figure 5-8 UXM 5G Rear Panel -- DCB+ Connectors



These connectors relate to the DCB+ circuit board within the UXM 5G. (There is a second board, with an identical set of connectors for it.)

Name	Description	Notes
LAN	RJ-45	(Reserved for future use.)
TRIG_B1	SMA	Input/output triggers
ZQ, KB, KA Indicators	LEDs	(Reserved for future use.)
TRIG_B2	SMA	Input/output triggers
DBG		(Reserved for future use.)
TRIG_A1	SMA	Input/output triggers
MMC A, B, C Indicators	LEDs	(Reserved for future use.)
TRIG_A2	SMA	Input/output triggers
SPI MASTER SPI SLAVE		Synchronism ports
BNC1 BNC2		Input/output triggers
FMC	BBIQ connectors	(Optional)

## PCM

Figure 5-9 UXM 5G Rear Panel -- PCM Connectors



These connectors relate to the DCB+ circuit board within the UXM 5G.

Name	Description	Notes
SS USB	Four USB 3.0 ports.	(The front-panel USB ports are USB 2.0.)
Audio In	3.5 mm stereo	Audio jack connector for input.
Audio Out	3.5 mm stereo	Audio jack connector for output.

## RFIO

Figure 5-10 UXM 5G Rear Panel -- RFIO Connectors












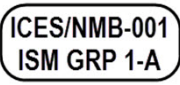


These connectors relate to the RFIO circuit board within the UXM 5G.

Name	Description	Notes
IF IN 3	SMA	(Reserved for future use.)
IF IN 4	SMA	(Reserved for future use.)
IF OUT 8	SMA	(Reserved for future use.)
IF OUT 7	SMA	(Reserved for future use.)
IF OUT 6	SMA	(Reserved for future use.)
IF OUT 5	SMA	(Reserved for future use.)
IF IN 1	SMA	(Reserved for future use.)
IF IN 2	SMA	(Reserved for future use.)
IF OUT 4	SMA	(Reserved for future use.)
IF OUT 3	SMA	(Reserved for future use.)
IF OUT 2	SMA	(Reserved for future use.)
IF OUT 1	SMA	(Reserved for future use.)



## AC Power

Removing the main power cord disconnects the mains circuits from the mains supply, and can be used as the system disconnecting device.

## Front and Rear Panel Symbols

Symbol	Description
	This symbol is used to indicate power ON.
	This symbol is used to indicate power OFF.
	This symbol is used to indicate power STANDBY mode (yellow in standby, green when instrument is ON).
	This symbol indicates the input power required is AC.
	This symbol indicates earth ground.
	The instruction documentation symbol. The product is marked with this symbol when it is necessary for the user to refer to instructions in the documentation.
	The CE mark is a registered trademark of the European Community.
	The RCM Mark is a Compliance Mark according to the ACMA Labeling Requirement.
	South Korean Certification (KC) mark; includes the marking's identifier code which follows this format: MSIP-REM-YYY- <u>ZZZZZZZZZZZZ</u>
	ICES / NMB-001 Cet appareil ISM est conforme a la norme NMB du Canada. This is a marking to indicate product compliance with the Industry Canadian Interference-Causing Equipment Standard (ICES-001). This is also a symbol of an Industrial Scientific and Medical Group 1 Class A product (CISPR 11, Clause 4).
	The CSA mark is a registered trademark of the CSA International.
	This symbol indicates separate collection for electrical and electronic equipment mandated under EU law as of August 13, 2005. All electric and electronic equipment are required to be separated from normal waste for disposal (Reference WEEE Directive 2002/96/EC).

Front and Rear Panel Functions  
Front and Rear Panel Symbols

Symbol	Description
 A circular icon with the number '40' in the center, surrounded by two curved arrows forming a circle.	Indicates the time period during which no hazardous or toxic substance elements are expected to leak or deteriorate during normal use. Forty years is the expected useful life of the product.
 A standard recycling symbol consisting of three chasing arrows forming a triangle.	This symbol on all primary and secondary packaging indicates compliance to China standard GB 18455-2001.

Front and Rear Panel Functions  
Front and Rear Panel Symbols

## 6 Test Platform Operating System

The following topics can be found in this section:

[“Keysight Software Installed” on page 88](#)

[“User Accounts” on page 89](#)

[“System Maintenance” on page 93](#)

[Updating the Keysight E7515B UXM 5G software on page 99](#)

[Updating the Keysight 5G NR Test Application on page 101](#)

## Keysight Software Installed

Your test platform has a software application already installed: the C8700200A Test Application Framework.

### Customer Installation of Software

If for some reason you need to re-install any software you purchased, go to [www.keysight.com/find/softwaremanager](http://www.keysight.com/find/softwaremanager) to obtain the latest version.

Refer to **Chapter , “Updating the Keysight E7515B UXM 5G software”, on page 99** for software installation instructions.

### Uninstalling Keysight Software

Uninstallation is a dialog driven process. You can access the uninstall dialog of the Keysight Test Application software within the Windows **Start** menu, or by using the **Start > Control Panel\All Control Panel Items\Programs and Features** dialog within Windows.

### Installation of Third Party Software

It is recommended that you do not install any non-approved software on the UXM 5G. Installation of third party software on the UXM 5G may render the system inoperative and is not supported by Keysight Technologies.



## User Accounts

The E7515B ships with only one account set up (the Administrator account). Setting up additional user accounts is not recommended, as this would likely create problems of compatibility with the installed firmware.

### Administrator Account

Using the Administrator account you can perform the following operations:

- Install software
- Configure network and printer access
- Access all files on the instrument
- Add or change user accounts and passwords (see **“Changing Account Passwords” on page 90**).
- Change Firewall settings
- Change Windows settings (e.g., using Device Manager)
- Change the time and date
- Run Keysight applications

For instruments with a Keysight Technologies disk image, the Administrator account ships from the factory with the password set as:

**Keysight4u!**

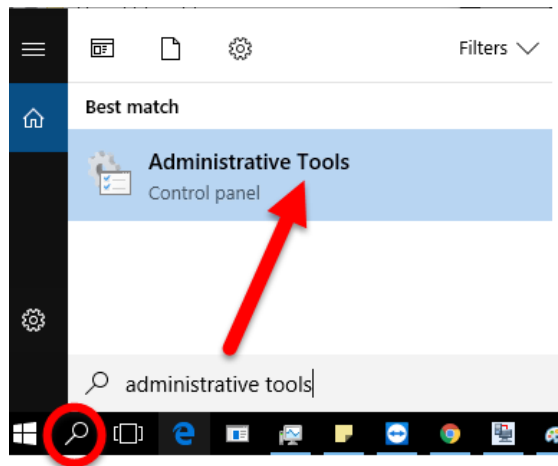
## Changing Account Passwords

In order to minimize an “unnoticed” or “involuntary” change of the Administrator account password, the account properties have been set to restrict password change. If you need to change the password for this account, proceed as follows:

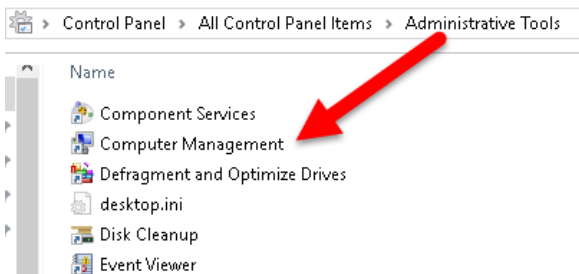
Step	Notes
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1. Log in to the instrument as Administrator.

2. Use the Windows Search icon in the lower left of the desktop to search for (and select) **Administrative Tools**.

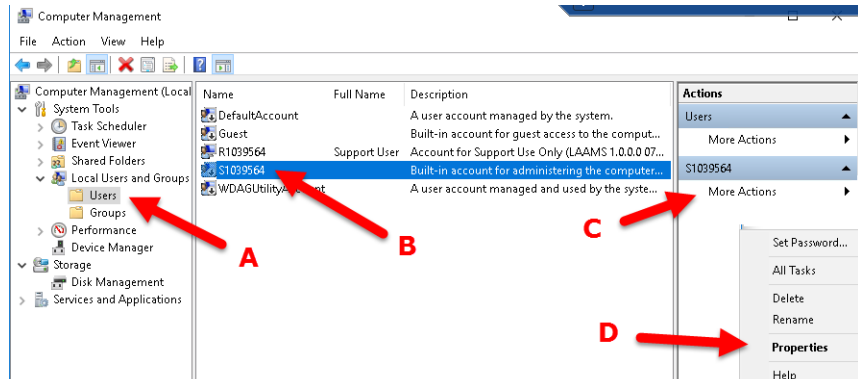


3. Locate and select **Computer Management**.

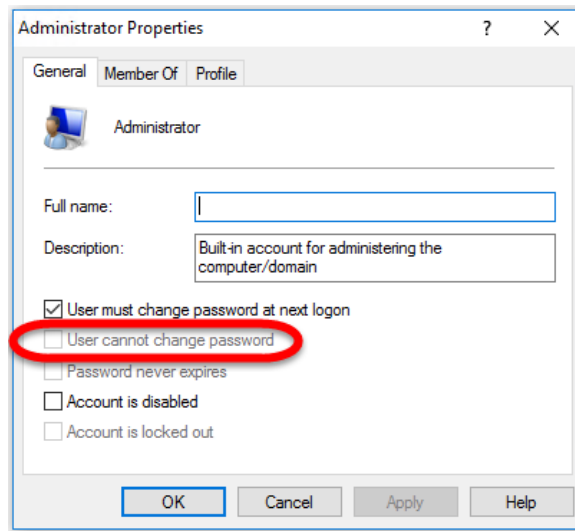


Step	Notes
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- 4. Locate and select
  - a. **Users**
  - b. **Administrator**
  - c. **More Actions**
  - d. **Properties**

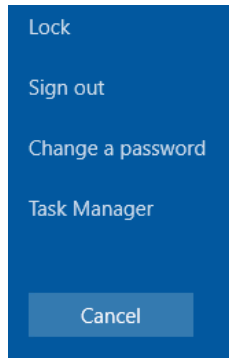


- 5. Clear the check box next to "User cannot change password" and then select **OK**.

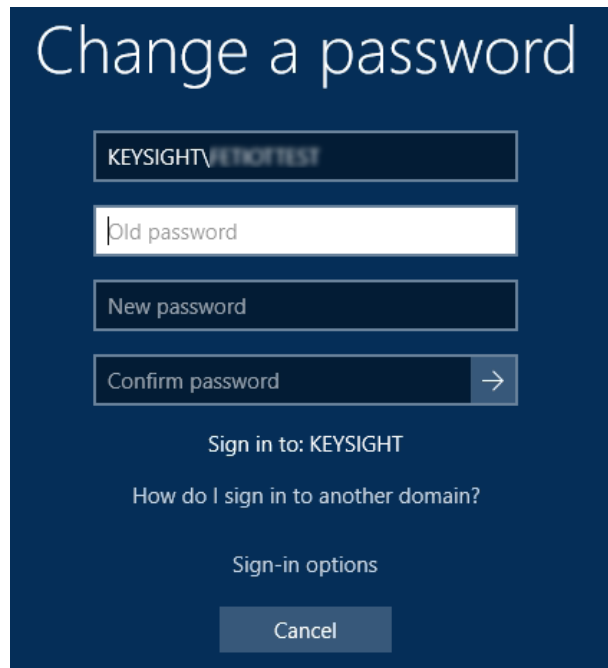


Step	Notes
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6. After you have changed the Administrator Properties, change your password by pressing **Ctrl+Alt+Del** then **Change Password**.



7. Enter the password change information.  
a. The account to be changed ("Administrator").  
b. The old password.  
c. The new password.  
d. Re-enter the new password to confirm. (Complete the operation by pressing Enter or clicking the arrow icon.)



8. After changing the password(s), repeat steps 2 through 8.

After changing the password(s), it is recommended that you restore the "User cannot change password" Administrator property (see step 8).

## System Maintenance

### Back-up

It is recommended that you have a regular back-up strategy. Your IT department may already have a back-up strategy in place which is suitable for the test platform and its data.

The Windows 10 operating system has a Backup utility that you can use to archive files and folders in case of a hard disk drive failure. See the Microsoft Windows Help and Support Center for more information on this utility.

When performing back-ups, we recommend that you back-up the data to an external storage device connected to your company's internal network or one of the test platform's USB connectors. Also, you should perform back-ups at times when the Server PC is not being used for normal operations as it may impact the test platform's overall performance.

### System Restore

Windows 10 contains the capability to restore the system to a previous point in time. System Restore is enabled with default settings as provided by Microsoft. However, System Restore is not 100% successful. Therefore, it is not the recommended method to back-up the instrument. System Restore has not been tested to verify successful restoring. It is best to use the procedure described in **“Disk Drive Recovery Process” on page 95.**

## Hard Drive Partitioning and Use

The drive is partitioned into 3 sections: C:, D: and E:

- The **C:** partition contains the Windows 10 operating system and software installed by Keysight. This is an Open System which means you can install additional software. However it is recommended that you use an external PC to host all additional software applications that you wish to use in conjunction with the UXM 5G. The installation and/or use of other software is not warranted and could interfere with the operation of the test platform software. If instrument repair is ever needed, the Keysight version of the C: drive is the only part of the instrument software that is restored by the Instrument Image Recovery System. You must reload any other software that you have added in the instrument.

### NOTE

It is recommended that you use an external PC to host software applications you wish to use in conjunction with the UXM 5G. Installing applications on the instrument Host PC may result in a compromised performance of the UXM 5G including decreased throughput and/or measurement performance.

---

- The **D:** partition is reserved for data storage. This is for the convenience of backing-up the test platform measurement data. You should always back-up the data on the D: drive to an external device. This enables you to restore the data should the hard drive need to be replaced.

### NOTE

Data on the desktop will be deleted during system recovery. Therefore it is recommended that you always store your data in another folder on the D: drive, for example **D:\MyData**

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- The **E:** partition is reserved for Keysight's use. The primary use of the E: drive is for storing the Calibration and Alignment data, the configuration files for the Platform Boards and Host PC. Do not change or overwrite the files on this drive. This could cause your instrument to not meet specifications, or even to stop functioning correctly. Do not use this drive for data storage. It is also recommended that you back-up the contents of this drive by using an external device.

## Disk Drive Recovery Process

The Instrument Image Recovery System can be used to repair errors on the instrument's C: drive or to restore the original factory configuration of the system software. Repairing errors on the hard disk drive may result in loss of data or files. If you need more information about the Windows "chkdsk" error repair process, see the chkdsk documentation in the Microsoft Windows 10 Help and Support Center.

### NOTE

This recovery process should only be used for the repair/restoration purposes described above. It is **not** suitable for performing an instrument software update; see ["Updating the Keysight E7515B UXM 5G software" on page 99](#) for the appropriate procedure.

---

Restoring the original factory system software does not restore any of the following items:

- Windows system configurations that were made after the instrument was shipped from the factory. For example, Windows and Service Pack updates, user accounts, and Windows configuration settings. After an Instrument Image Recovery System, these configurations need to be redone.
- Additional software that was installed after the instrument was shipped from the factory. After an Instrument Image Recovery System, that software needs to be re-installed.
- Any upgrades that were made to the Keysight Test Application software.

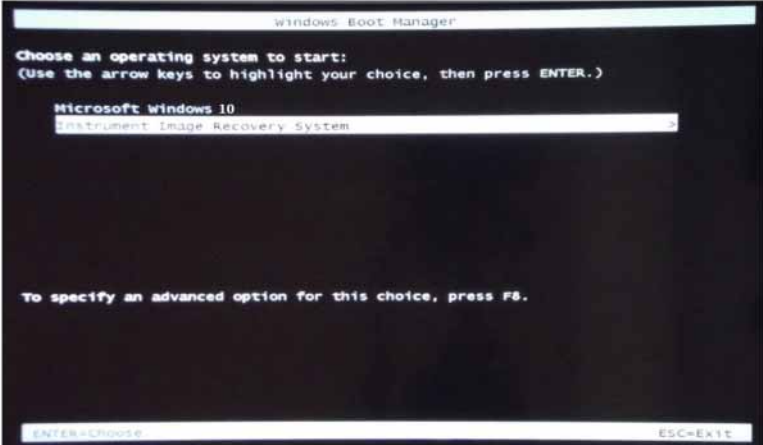
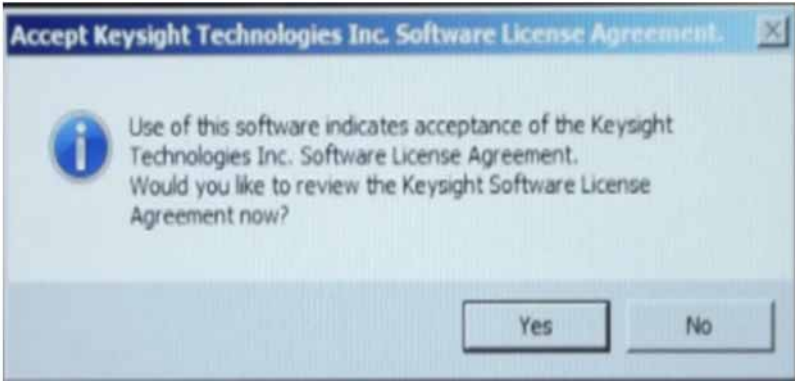
### NOTE

It is recommended that you use a regular back-up strategy. Your IT department may already have a back-up strategy in place which is suitable for the Internal Applications Server and its data. See ["User Accounts" on page 89](#). Using the Instrument Image Recovery System in conjunction with a regular back-up strategy should allow you to fully recover the Internal Applications Server software and data.

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It is recommended that routine back-ups of the instrument information be performed to keep current archives of the instrument information. This allows a full recovery of the instrument information after the instrument recovery system operations are performed. See ["Back-up" on page 93](#) for more details.

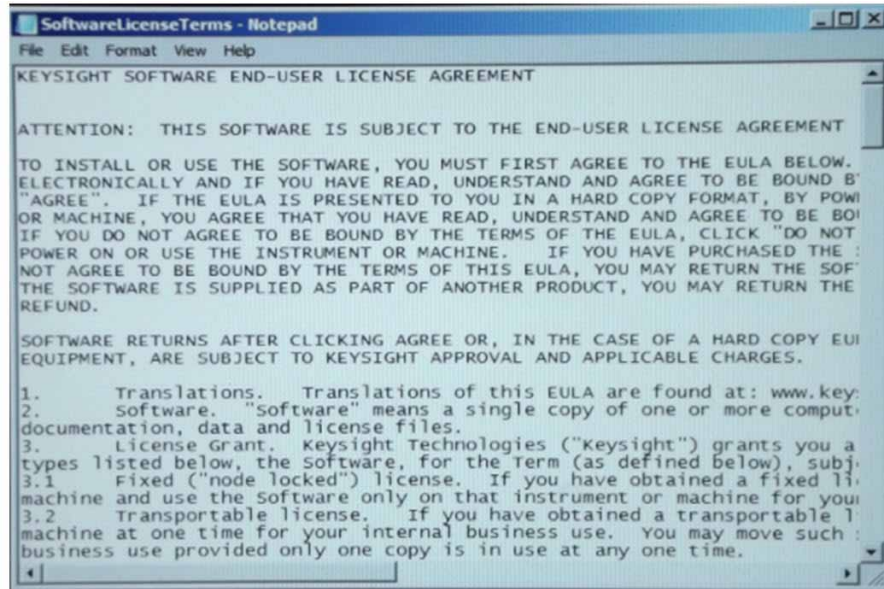
## Using the Instrument Image Recovery System - Test Platform Operating System

Step	Notes
<p>1. Turn on the instrument.</p> <p>Press the down arrow key to move the highlight to <b>Instrument Image Recovery System</b>, and then press <b>Enter</b>.</p>	<p>The Windows Boot Manager Screen is displayed.</p> 
<p>2. After selecting the <b>Instrument Image Recovery System</b>, the instrument boots the <b>Instrument Image Recovery System</b> for 2 or 3 minutes. Finally, the instrument displays a message asking if you would like to review the Keysight license agreement. Select <b>Yes</b>.</p>	

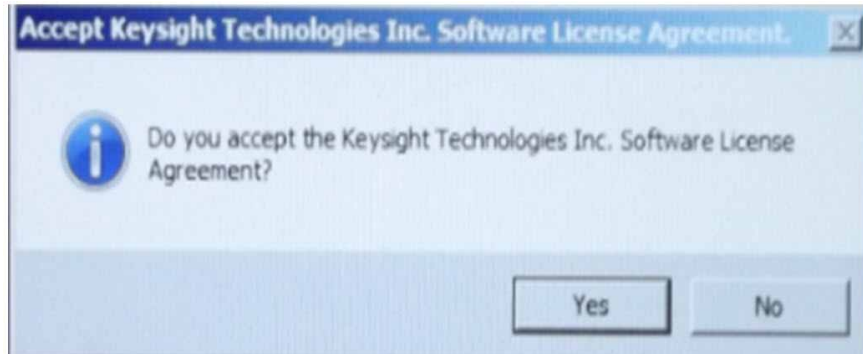


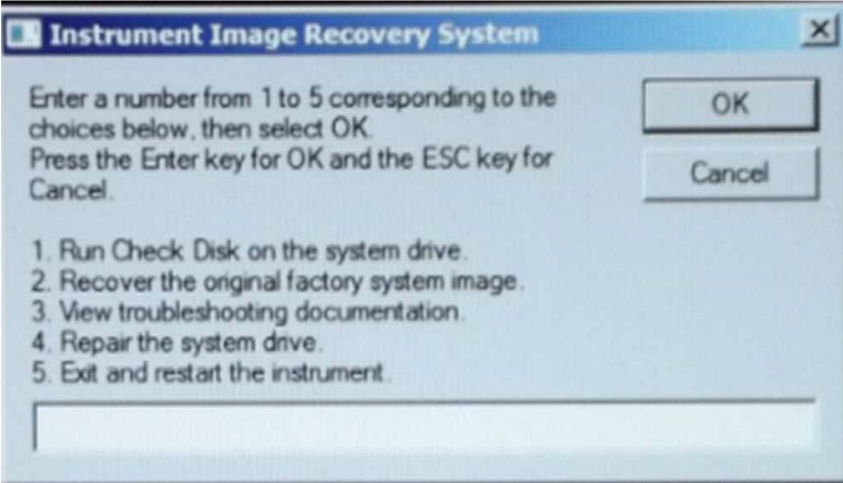
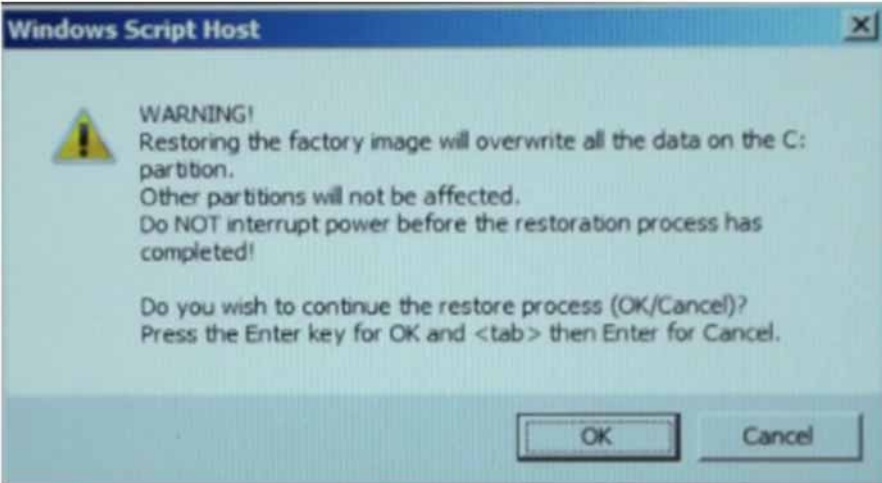
Step	Notes
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3. Review the terms.  
Select the "X" in the upper right corner to close this window.



4. Accept the license agreement by selecting **Yes**.

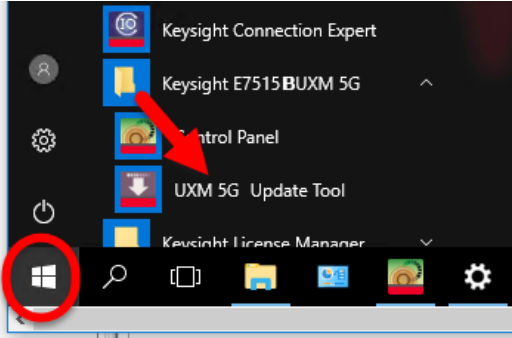


Step	Notes
<p>5. When the <b>Instrument Image Recovery System</b> has booted, follow the on-screen instructions to recover the image of the C: drive.</p> <p>Type in the number <b>2</b>, then press <b>OK</b> to select “Recovery of the original factory system image”.</p>	
<p>6. A warning message appears. Press <b>OK</b> to start the recovery, which may take up to 45 minutes to complete.</p>	
<p>7. The instrument then re-executes the process described under: <b>“Turning On the Test Platform the First Time”</b> on page 30.</p>	

## Updating the Keysight E7515B UXM 5G software

The following steps are required to upgrade your Keysight E7515B UXM 5G firmware. Downgrading to an earlier version is also possible, using the same process.

### Using the E7515B/E7515B UXM 5G Firmware Update Tool

Step	Notes
1. Connect a USB keyboard and mouse to the instrument	
2. Log in as follows: User Name: administrator Password: Keysight4u!	
3. Obtain the latest version of software installer.	Download it from the site: <a href="http://www.keysight.com/find/softwaremanager">www.keysight.com/find/softwaremanager</a>
4. Launch <b>Firmware Upgrade Tool</b> from the Windows menu at the lower left corner of the desktop (it should be under <b>Keysight E7515B UXM 5G</b> ).	
	If this application is not installed, download the latest recommended version of “Keysight E7515B/E7515B UXM 5G Firmware UpdateTool” from the site: <a href="http://www.keysight.com/find/softwaremanager">www.keysight.com/find/softwaremanager</a>
5. In the “UXM 5G Update Tool” add the software installer program obtained in the step 4.	Right-click on the Windows “Select firmware version:” and Add it.
6. Select the desired software installer and click the <b>Update UXM5G Firmware</b> button.	If the instrument belongs to an Array, the instrument is exited from Array.
7. When prompted to continue with the Firmware update, select <b>Yes</b> .	The Firmware Update Tool will warn if a system restart is required for completing the uninstallation/installation.
8. If a system restart is required, a confirmation message will appear when restart is needed. In that case, when prompted to continue with the restart, select <b>Yes</b> .	This typically happens when Microsoft .NET Framework must be updated.

Step	Notes
<b>9.</b> The “UXM5G Update Tool” will continue by itself after the instrument restarts, and will finish the update. Then a confirmation button will be shown.	
<b>10.</b> In case of an error during upgrade, the “UXM5G UpdateTool” will inform the user. In that case, you can try to repair it manually or contact Support team.	To manually repair the software upgrade, go to “Control Panel\Programs\Programs and Features” and: (a) Uninstall Keysight E7515B Application (b) Uninstall Keysight E7515B UXM 5G (c) Repeat the upgrade from step 5 above. If this is not successful, you must contact the Support team.

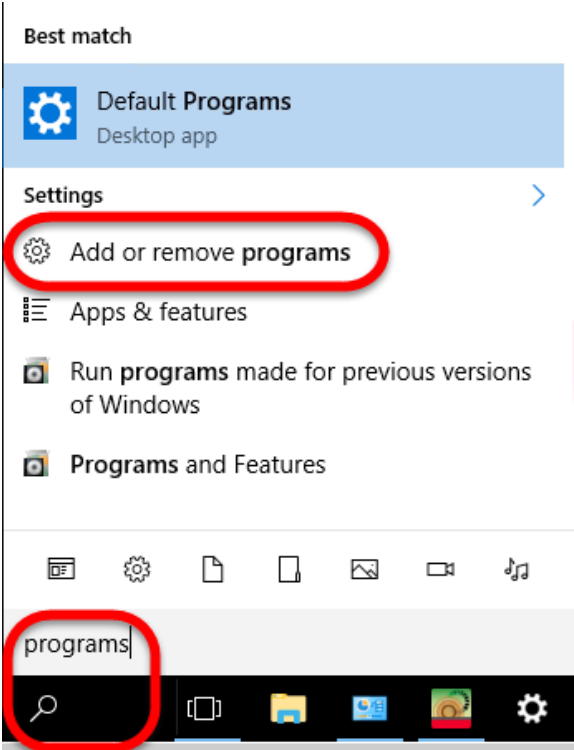
## Updating the Keysight 5G NR Test Application

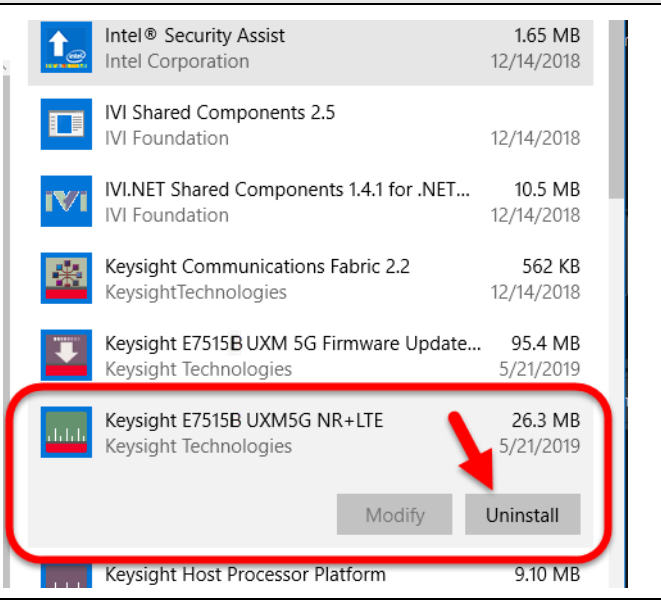
The following steps are required to update your Keysight UXM 5G software with the Keysight 5G NR Test Application.

This software is licensed. Look for latest software versions at:

<http://www.keysight.com/find/softwaremanager>

### Updating the Application

Step	Notes
1. Connect a USB keyboard and mouse to the instrument	
2. At the log in prompt enter: User Name: Administrator Password: Keysight4u!	
3. Close the UXM 5G Control Panel.	Click the "X" icon in the upper right corner of Control Panel.
4. Use the Windows Search icon in the lower left of the desktop to search for "programs". Select <b>Add or remove programs</b> in the matches displayed..	 A screenshot of the Windows search interface. The search bar at the bottom left contains the text "programs" and is circled in red. Below the search bar, a list of search results is displayed. The first result is "Default Programs" with a gear icon and the text "Desktop app". Below this is a "Settings" section with a right-pointing arrow. The first item in the settings list is "Add or remove programs" with a gear icon, which is circled in red. Other items in the settings list include "Apps & features", "Run programs made for previous versions of Windows", and "Programs and Features". At the bottom of the search results, there is a row of icons for various system settings and applications.

Step	Notes																																
<p>5. Scroll to find the <b>Keysight E7515B</b> application, and select <b>Uninstall</b>.</p>	 <table border="1"> <thead> <tr> <th>Application Name</th> <th>Size</th> <th>Company</th> <th>Date</th> </tr> </thead> <tbody> <tr> <td>Intel® Security Assist</td> <td>1.65 MB</td> <td>Intel Corporation</td> <td>12/14/2018</td> </tr> <tr> <td>IVI Shared Components 2.5</td> <td></td> <td>IVI Foundation</td> <td>12/14/2018</td> </tr> <tr> <td>IVI.NET Shared Components 1.4.1 for .NET...</td> <td>10.5 MB</td> <td>IVI Foundation</td> <td>12/14/2018</td> </tr> <tr> <td>Keysight Communications Fabric 2.2</td> <td>562 KB</td> <td>KeysightTechnologies</td> <td>12/14/2018</td> </tr> <tr> <td>Keysight E7515B UXM 5G Firmware Update...</td> <td>95.4 MB</td> <td>Keysight Technologies</td> <td>5/21/2019</td> </tr> <tr> <td><b>Keysight E7515B UXM5G NR+LTE</b></td> <td><b>26.3 MB</b></td> <td><b>Keysight Technologies</b></td> <td><b>5/21/2019</b></td> </tr> <tr> <td>Keysight Host Processor Platform</td> <td>9.10 MB</td> <td></td> <td></td> </tr> </tbody> </table>	Application Name	Size	Company	Date	Intel® Security Assist	1.65 MB	Intel Corporation	12/14/2018	IVI Shared Components 2.5		IVI Foundation	12/14/2018	IVI.NET Shared Components 1.4.1 for .NET...	10.5 MB	IVI Foundation	12/14/2018	Keysight Communications Fabric 2.2	562 KB	KeysightTechnologies	12/14/2018	Keysight E7515B UXM 5G Firmware Update...	95.4 MB	Keysight Technologies	5/21/2019	<b>Keysight E7515B UXM5G NR+LTE</b>	<b>26.3 MB</b>	<b>Keysight Technologies</b>	<b>5/21/2019</b>	Keysight Host Processor Platform	9.10 MB		
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<p>6. When prompted to completely remove the selected application and all of its features, select <b>Yes</b>.</p> <p>When the software uninstall is complete, select <b>Finish</b>.</p>	<p>The UXM 5G Control Panel should be closed at the beginning of the uninstallation. You must launch it manually at the end of this process.</p>																																
<p>7. Obtain the latest version of software installer.</p>	<p>Download it from the site: <a href="http://www.keysight.com/find/softwaremanager">www.keysight.com/find/softwaremanager</a></p>																																
<p>8. Locate the software installer program obtained in the step above.</p>																																	
<p>9. Follow the on-screen prompts to continue the installation.</p>	<p><b>CAUTION</b> The installation process takes about 2 minutes. Do not turn the instrument power off or serious damage may occur. If any pop-up windows appear, click OK or Ignore to proceed.</p>																																
<p>10. When the installation has finished, you must manually launch the UXM 5G Control Panel (from <b>Desktop</b> or <b>Windows &gt; Start</b>).</p>																																	
<p>11. Verify the UXM 5G is operational.</p>	<p>If the Control Panel shows a Faulty state, restart the UXM 5G or power cycle the UXM 5G as follows:</p> <ol style="list-style-type: none"> <li>Power off the UXM 5G and disconnect the power cord for 15 seconds.</li> <li>Power on the UXM 5G.</li> </ol>																																

Once the application software has been installed, you must follow the instructions provided in **“Licensing” on page 35** in order to install the license required (if not previously installed), and select and start up the application as described in the procedure **“Turning On the Test Platform the First Time” on page 30**.

### **Installation of Third Party Software**

It is recommended that you do not install any non-approved software on the UXM 5G. Installation of third party software on the UXM 5G may render the system inoperative and is not supported by Keysight Technologies.





## 7 Troubleshooting

The following topics can be found in this section:

[“Identifying Problems” on page 106](#)

[“Returning Your Test Set for Service” on page 107](#)

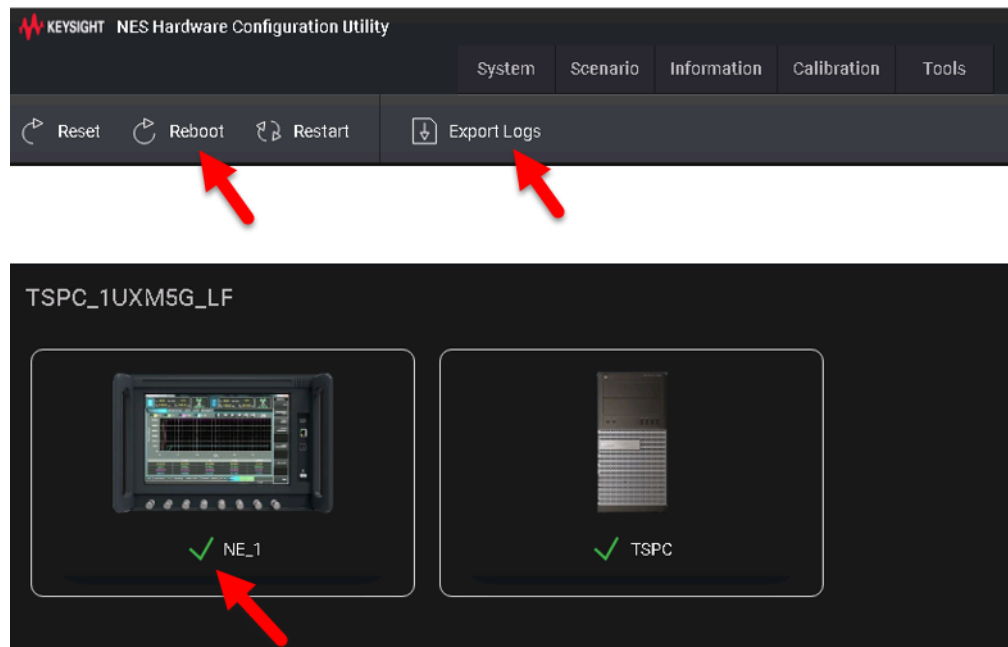
## Identifying Problems

**WARNING**

No operator serviceable parts inside. Refer servicing to qualified personnel. To prevent electrical shock do not remove covers.

1. Select the **Reboot** button on the **System** tab of the HCCU utility whenever the UXM 5G hardware and/or software appear to be in a faulty state. Once the UXM 5G image shows a green check mark, the UXM 5G is in the ready state and you can proceed with your testing. Note that you may need to perform this reboot more than once to obtain the green display indicator condition. Note that the Restart and Shutdown affect the test set and Windows.
2. If you need to refer the problem to your Keysight representative, use the **Export Logs** feature on the **System** tab of the **HCCU**, and send the resulting file to Keysight for reference.


Figure 7-1 Using the HCCU utility in troubleshooting




## Returning Your Test Set for Service

### Calling Keysight Technologies


Keysight Technologies has offices around the world to provide you with complete support for your wireless test set. To obtain servicing information, or to order replacement parts, contact the nearest Keysight Technologies office listed under **“Locations for Keysight Technologies” on page 108**. In any correspondence or telephone conversations, refer to your test set by its product number, full serial number, and software revision.

To access your product information, select the Info icon  in the E7515B Control Panel view after switching to the E7515B Control Panel via the Application Switch tool or after performing both or only the second action described below:

1. To access the Windows task bar from inside the TA/LA software application, you can use the Application Switch tool to switch to the desktop and find the task bar, or you can connect the USB keyboard to the UXM 5G using one of the USB ports located on the front and rear panels of

the UXM 5G. Press the key showing the windows icon , which is usually located in the lower-left corner of the keyboard.

2. Once you have access to the windows task bar, double-click the E7515B

Control Panel icon  to maximize the E7515B Control Panel view.

## Locations for Keysight Technologies

For online assistance: <http://www.keysight.com/find/assist>

To contact Keysight Technologies: <http://www.keysight.com/find/contactus>

Alternately, contact the nearest Keysight sales office:

<b>Americas</b>		
Canada (877) 894 4414	Brazil 55 11 3351 7010	Mexico 001 800 254 2440
United States (800) 829 4444		
<b>Asia &amp; Pacific</b>		
Australia 1 800 629 485	China 800 810 0189	Hong Kong 800 938 693
India 1 800 112 929	Japan 0120 (421) 345	Korea 080 769 0800
Malaysia 1 800 888 848	Singapore 1 800 375 8100	Taiwan 0800 047 866
Other Asia-Pacific countries: (65) 6375 8100		
<b>Europe &amp; Middle East</b>		
Austria 0800 001122	Belgium 0800 58580	Finland 0800 523252
France 0805 980333	Germany 0800 6270999	Ireland 1800 832700
Israel 1 809 343051	Italy 800 599100	Luxembourg +32 800 58580
Netherlands 0800 0233200	Russia 8800 5009286	Spain 0800 000154
Sweden 0200 882255	Switzerland 0800 805353 Opt. 1 (DE), Opt. 2 (FR), Opt. 3 (IT)	United Kingdom 0800 0260637



This information is subject to change without notice.

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[www.keysight.com](http://www.keysight.com)