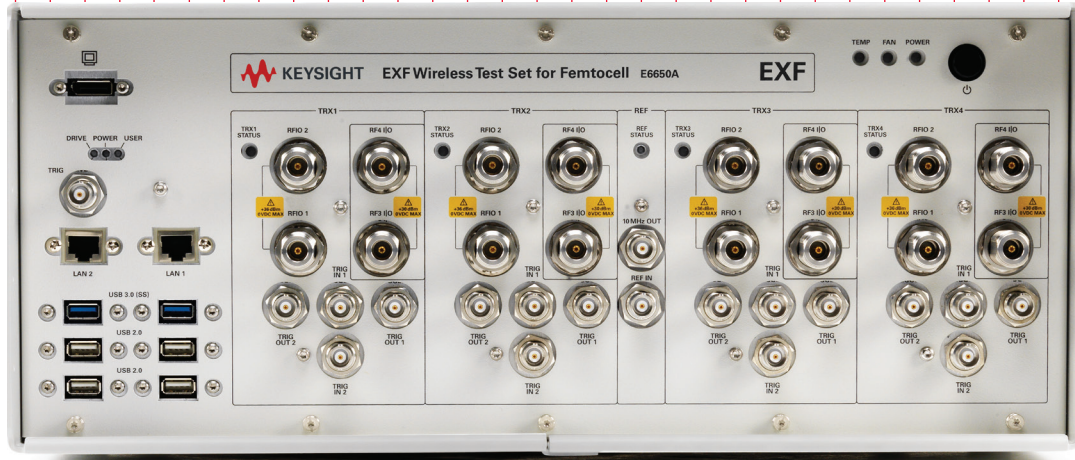


# Keysight Technologies

## EXF Wireless Test Set for Femtocell

### E6650A

## Configuration Guide



## Overview

This configuration guide provides a step-by-step process to help you configure your E6650A EXF wireless test set for femtocell with hardware, software, accessories, and services to meet your specific test requirements. It also covers how to add upgrades to an existing EXF.

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## What is Included in the Base Product

- PXIe chassis: 18 slot
- PXIe embedded controller: Quad-core Intel Core i7, Microsoft Windows Embedded Standard (WES) 7 operating system
- PXIe frequency reference: 10 and 100 MHz
- E6650A-B40: 40 MHz bandwidth on each TRX ordered
- V9060B-2FP: Test set measurement application, fixed perpetual license applies to all TRXs ordered
- Waveform 50-pack (quantity 3): E6650A-250, E6650A-251, and E6650A-252 apply to all TRXs ordered
- Country-specific power cord
- Display port to VGA adapter
- Getting Started Guide in hardcopy

## 1. Select Hardware (Required)

Each TRX is a complete VSA/VSG with integrated RFIO, two full duplex ports, and two half-duplex ports. Each TRX is configured separately for frequency and bandwidth.

<b>Select and configure from 1 to 4 TRXs</b>		
<b>Ordering number</b>	<b>Description</b>	<b>Requirement</b>
E6650A-001	Add TRX1 to EXF (required)	
<b>Choose frequency range for TRX1 (select one)</b>		
E6650A-504	380 MHz to 3.8 GHz (cellular communications)	
E6650A-5WC	1.1 to 1.8, 2.3 to 2.6, and 4.8 to 6 GHz (wireless connectivity)	
E6650A-506	380 MHz to 6 GHz (cellular communications and wireless connectivity)	
<b>Choose bandwidth for TRX1 (optional*, select one)</b>		
E6650A-B85	80 MHz bandwidth	
E6650A-B1X	160 MHz bandwidth	
E6650A-002	Add TRX2 to EXF (optional)	E6650A-001
<b>Choose frequency range for TRX2 (select one)</b>		
E6650A-504	380 MHz to 3.8 GHz (cellular communications)	
E6650A-5WC	1.1 to 1.8, 2.3 to 2.6, and 4.8 to 6 GHz (wireless connectivity)	
E6650A-506	380 MHz to 6 GHz (cellular communications and wireless connectivity)	
<b>Choose bandwidth for TRX2 (optional*, select one)</b>		
E6650A-B85	80 MHz bandwidth	
E6650A-B1X	160 MHz bandwidth	
E6650A-003	Add TRX3 to EXF (optional)	E6650A-002 and E6650A-001
<b>Choose frequency range for TRX3 (select one)</b>		
E6650A-504	380 MHz to 3.8 GHz (cellular communications)	
E6650A-5WC	1.1 to 1.8, 2.3 to 2.6, and 4.8 to 6 GHz (wireless connectivity)	
E6650A-506	380 MHz to 6 GHz (cellular communications and wireless connectivity)	
<b>Choose bandwidth for the third TRX3 (optional*, select one)</b>		
E6650A-B85	80 MHz bandwidth	
E6650A-B1X	160 MHz bandwidth	
E6650A-004	Add TRX4 to EXF (optional)	E6650A-003, E6650A-002, and E6650A-001
<b>Choose frequency range for TRX4 (select one)</b>		
E6650A-504	380 MHz to 3.8 GHz (cellular communications)	
E6650A-5WC	1.1 to 1.8, 2.3 to 2.6, and 4.8 to 6 GHz (wireless connectivity)	
E6650A-506	380 MHz to 6 GHz (cellular communications and wireless connectivity)	
<b>Choose bandwidth for TRX4 (optional*, select one)</b>		
E6650A-B85	80 MHz bandwidth	
E6650A-B1X	160 MHz bandwidth	

\*The standard bandwidth for all TRXs is 40 MHz.

## 2. Select Measurement Applications, Software, and License Types

All measurement application and waveform pack licenses apply to all TRXs configured in the EXF.

### Step 1. Choose measurement applications (required)

Fixed perpetual	Transportable perpetual	Description	Requirement
Cellular communications			
V9071B GSM/EDGE measurement application			
V9071B-2FP	V9071B-2TP	GSM/EDGE measurement application	
V9071B-3FP	V9071B-3TP	EDGE Evo measurement application	V9071B-2FP/2TP
V9073B W-CDMA measurement application			
V9073B-1FP	V9073B-1TP	W-CDMA measurement application	
V9073B-2FP	V9073B-2TP	HSDPA/HSUPA measurement application	V9073B-1FP/1TP
V9073B-3FP	V9073B-3TP	HSPA+ measurement application	V9073B-1FP/1TP and V9073B-2FP/2TP
V9079B TD-SCDMA measurement application			
V9079B-1FP	V9079B-1TP	TD-SCDMA measurement application	
V9079B-2FP	V9079B-2TP	TD-HSPA measurement application	V9079B-1FP/1TP
V9080B LTE FDD measurement application			
V9080B-1FP	V9080B-1TP	LTE FDD measurement application	
V9082B LTE TDD measurement application			
V9082B-1FP	V9082B-1TP	LTE TDD measurement application	
V9065B sequence analyzer application			
V9065B-1FP	V9065B-1TP	Downlink sequence analyzer	
Wireless connectivity			
V9077B WLAN measurement application			
V9077B-2FP	V9077B-2TP	WLAN 802.11a/b/g	
V9077B-3FP	V9077B-3TP	WLAN 802.11n	V9077B-2FP/2TP
V9077B-4FP <sup>1</sup>	V9077B-4TP	WLAN 802.11ac	V9077B-2FP/2TP and V9077B-3FP/3TP

### Step 2. Choose the Waveform 5 and 50-pack (optional)

Ordering number	Description
E6650A-221-229	Waveform license 5-pack 1 to 9
E6650A-253-259 <sup>2</sup>	Waveform license 50-pack 4 to 10

## 3. Select Accessories (Optional)

### Choose the accessories (optional)

Ordering number	Description
E6650A-KYB	Keyboard, USB
E6650A-MSE	Mouse, USB
E6650A-1CP	Rack mount and front handle kit
Y1217A	Rack rail kit

- V9077B-4FP/4TP requires at least E6650A-B85 for WLAN 802.11ac measurement for 80 MHz and E6650A-B1X for WLAN 802.11ac measurement for 160 MHz
- Waveform 50-pack (quantity 3): E6650A-250, 251, and 252 are included as standard in the base product.

## 4. Select Warranty, Calibration and Start-Up Assistance (Optional)

### Step 1. Choose a warranty plan (optional)

Ordering number	Description
Standard	Return-to-Keysight warranty: 3 years <sup>1</sup>
R-51B-001-5Z	Warranty Assurance Plan - Return to Keysight: 5 years

### Step 2. Choose a calibration service (optional)

Ordering number	Description
E6650A-UK6	Commercial calibration certificate with test data <sup>2</sup>

### Step 3. Choose services (optional)

Ordering number	Description
PS-S20	Startup assistance
PS-S20-01	Recommended startup assistance
PS-S10	Remote scheduled productivity assistance. Select 1 to 999 hours
PS-X10	Custom services to be qualified by an Keysight technical consultant

1. For more detailed information on the Keysight 3-year warranty go to [www.keysight.com/find/ThreeYearWarranty](http://www.keysight.com/find/ThreeYearWarranty).
2. Generated for an individual TRX. Order one E6650A-UK6 for each TRX in the EXF's configuration.

## 5. Select Upgrades (Optional)

These upgrade options can be added after your initial purchase to increase your product capabilities, including hardware, software, and accessories, according to your specific test requirements.

There are two types of hardware upgrades:

1. Add one or more TRX(s) to an existing EXF (up to four TRXs per EXF)
2. Upgrade existing TRX(s) capabilities (frequency range and/or bandwidth)

Measurement applications and Signal Studio waveforms can be ordered standalone as an upgrade. All measurement applications and waveform pack licenses apply to all TRXs configured in the EXF.

### Add a TRX to an EXF

Ordering number	Description
E6650AU-TRX	Add TRX to EXF

#### Choose frequency range for added TRX (select one)

E6650AU-504	380 to 3.8 GHz (cellular communications)
E6650AU-5WC	1.1 to 1.8, 2.3 to 2.6, and 4.8 to 6 GHz (wireless connectivity)
E6650AU-506	380 MHz to 6 GHz (cellular communications and wireless connectivity)

#### Choose bandwidth for added TRX (optional\*, select one)

E6650AU-B85	80 MHz bandwidth
E6650AU-B1X	160 MHz bandwidth

\*The standard measurement bandwidth for all TRXs is 40 MHz.

## 5. Select Upgrades (Optional) *(continued)*

These upgrade options can be added after your initial purchase to increase your product capabilities, including hardware, software, and accessories, according to your specific test requirements.

There are two types of hardware upgrades:

1. Add one or more TRX(s) to an existing EXF (up to four TRXs per EXF)
2. Upgrade existing TRX(s) capabilities (frequency range and/or bandwidth)

Measurement applications and Signal Studio waveforms can be ordered standalone as an upgrade. All measurement applications and waveform pack licenses apply to all TRXs configured in the EXF.

### Upgrade an existing TRX's capabilities

Ordering number	Description
<b>Upgrade frequency range of existing TRX (optional)</b>	
E6650AK-516	Upgrade from 504 to 506
E6650AK-526	Upgrade from 5WC to 506
<b>Upgrade bandwidth of existing TRX (optional)</b>	
E6650AK-B85	Upgrade from 40 to 80 MHz
E6650AK-B1X	Upgrade from 40 to 160 MHz
E6650AK-BU5	Upgrade from 80 to 160 MHz

\*If you need to add frequency range or measurement bandwidth capabilities for more than one TRXs, please upgrade each TRX individually.

### Waveform upgrades

Ordering number	Description
E6650AU-221 thru 229	Waveform license 5-pack 1 to 9 upgrades
E6650AU-253 thru 259	Waveform license 50-pack 4 to 10 upgrades

### Accessory upgrades

Ordering number	Description
E6650AU-KYB	Keyboard, USB
E6650AU-MSE	Mouse, USB
E6650AU-1CP	Rack mount and front handle kit

## 6. Example Configurations

### Quantity 4 TRX configuration for cellular communications

	Ordering	Description
Hardware	E6650A-001	Add TRX1 to EXF
Choose frequency range	E6650A-504	380 MHz to 3.8 GHz
	E6650A-002	Add TRX2 to EXF
Choose frequency range	E6650A-504	380 MHz to 3.8 GHz
	E6650A-003	Add TRX3 to EXF
Choose frequency range	E6650A-504	380 MHz to 3.8 GHz
	E6650A-004	Add TRX4 to EXF
Choose frequency range	E6650A-504	380 MHz to 3.8 GHz

	Options	Measurement application
Software	V9065B-1FP or 1TP	Downlink sequence analyzer
	V9071B-2FP or 2TP	GSM/EDGE
	V9071B-3FP or 3TP	EDGE Evo
	V9073B-1FP or 1TP	W-CDMA
	V9073B-2FP or 2TP	HSDPA/HSUPA
	V9073B-3FP or 3TP	HSPA+
	V9079B-1FP or 1TP	TD-SCDMA
	V9079B-2FP or 2TP	TD-HSPA
	V9080B-1FP or 1TP	LTE FDD
	V9082B-1FP or 1TP	LTE TDD

### Quantity 2 TRX configuration for WLAN 802.11a/b/g/n/ac and switched MIMO

	Ordering	Description
Hardware	E6650A-001	Add TRX1 to EXF
Choose frequency range	E6650A-5WC	1.1 to 1.8, 2.3 to 2.6, and 4.8 to 6 GHz
Choose bandwidth	E6650A-B1X	160 MHz bandwidth
	E6650A-002	Add TRX2 to EXF
Choose frequency range	E6650A-5WC	1.1 to 1.8, 2.3 to 2.6, and 4.8 to 6 GHz
Choose bandwidth	E6650A-B1X	160 MHz bandwidth
Software	V9077B-2FP or 2TP	WLAN 802.11a/b/g measurement application
	V9077B-3FP or 3TP	WLAN 802.11n measurement application
	V9077B-4FP or 4TP	WLAN 802.11ac measurement application

## 6. Example Configurations *(continued)*

### Hardware upgrade configuration – Example 1

Add two TRXs: One for wireless connectivity, the other for cellular communications

	Ordering	Description
	<b>E6650AU-TRX</b>	<b>Add TRX to EXF</b>
Choose frequency range	E6650AU-5WC	1.1 to 1.8, 2.3 to 2.6, and 4.8 to 6 GHz (wireless connectivity)
Choose bandwidth	E6650AU-B1X	160 MHz bandwidth
	<b>E6650AU-TRX</b>	<b>Add TRX to EXF</b>
Choose frequency	E6650AU-504	380 MHz to 3.8 GHz (cellular communications)

### Hardware upgrade configuration – Example 2

Add capabilities to your existing TRX

	Ordering	Description
Upgrade frequency range and bandwidth of an existing TRX		
	E6650AK-516	Upgrade from 504 to 506
	E6650AK-B1X	Upgrade from 40 to 160 MHz
Upgrade frequency range of an existing TRX		
	E6650AK-526	Upgrade from 5WC to 506



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