CONFIGURATION GUIDE

# E6640A EXM Wireless Test Set

## Solution for Device Manufacturing

## Solve Today, Evolve Tomorrow

The E6640A EXM wireless test set scales with your production needs and is in sync with the latest cellular and WLAN chipsets. Better yet, it delivers the speed, accuracy, and port density you need to ramp up rapidly and optimize full-volume manufacturing. It is optimized for multi-device testing with up to four transceivers: each is a complete vector signal analyzer (VSA) and vector signal generator (VSG). Multi-format devices are easily tested including 5G NR, LTE-Advanced, LTE FDD/TDD, HSPA+, W-CDMA, 1xEV-DO, CDMA2000®, GSM/EDGE/Evo, TD-SCDMA, 802.11a/b/g/n/j/p/af/ah/ac/ax, *Bluetooth*®, GNSS, and Zigbee.

This configuration guide contains a step-by-step process to help you configure your E6640A EXM with hardware, software, accessories, and services to meet your specific test requirements, or to add upgrades to an existing EXM.

## EXM base product

- 18-slot PXIe chassis
- PXIe embedded controller with quad-core Intel Core i7, Microsoft Windows Embedded Standard (WES) 10 operating system
- PXIe frequency reference with 10 and 100 MHz
- 40 MHz bandwidth on any transceiver (E6640A-B40)
- Test set measurement application, fixed perpetual license (V9060EM0E)
- Sequence analyzer device applications, fixed perpetual license (V9065EM1E)
- Three waveform 50-packs (E6640A-250, 251, and 252)
- Country-specific power cord
- Getting Started Guide

KEYSIGHT TECHNOLOGIES


Figure 1. Configure your EXM with 1 to 4 transceivers (TRX)

## Select Hardware

The EXM provides 1 to 4 TRX each with four full-duplex ports. Full-duplex ports act as input and output simultaneously. A full-duplex port can connect to both the VSA and VSG of a single TRX at the same time.

### Select TRX configuration and capabilities

Select the frequency range, bandwidth, and optional certificate with test data for each TRX.

| Ordering number | Description | Requirement |
|---|---|---|
| E6640A-001 | Add TRX1 to EXM | Required |
| • E6640A-5B0 | Frequency range for TRX1, 380 MHz to 6 GHz with 5G NR bands | Required |
| • E6640A-5LF | Extended frequency range for TRX1, 76 to 110 MHz, and 207 to 222 MHz (Tx only) | Optional |
| • E6640A-B1X | Bandwidth for TRX1, 160 MHz | Required |
| • E6640A-UK6 | Commercial calibration certificate with test data for TRX1 | Optional |
| E6640A-002 | Add TRX2 to EXM | Optional |
| • E6640A-5B0 | Frequency range for TRX2, 380 MHz to 6 GHz with 5G NR bands | Required for TRX2 |
| • E6640A-5LF | Extended frequency range for TRX2, 76 to 110 MHz, and 207 to 222 MHz (Tx only) | Optional |
| • E6640A-B1X | Bandwidth for TRX2, 160 MHz | Required for TRX2 |
| • E6640A-UK6 | Commercial calibration certificate with test data for TRX2 | Optional |

| Ordering number | Description | Requirement |
|---|---|---|
| E6640A-003 | Add TRX3 to EXM | Optional |
| • E6640A-5B0 | Frequency range for TRX3, 380 MHz to 6 GHz with 5G NR bands | Required for TRX3 |
| • E6640A-5LF | Extended frequency range for TRX3, 76 to 110 MHz, and 207 to 222 MHz (Tx only) | Optional |
| • E6640A-B1X | Bandwidth for TRX3, 160 MHz | Required for TRX3 |
| • E6640A-UK6 | Commercial calibration certificate with test data for TRX3 | Optional |
| E6640A-004 | Add TRX4 to EXM | Optional |
| • E6640A-5B0 | Frequency range for TRX4, 380 MHz to 6 GHz with 5G NR bands | Required for TRX4 |
| • E6640A-5LF | Extended frequency range for TRX4, 76 to 110 MHz, and 207 to 222 MHz (Tx only) | Optional |
| • E6640A-B1X | Bandwidth for TRX4, 160 MHz | Required for TRX4 |
| • E6640A-UK6 | Commercial calibration certificate with test data for TRX4 | Optional |

## Select Software

All software applications, software options, and waveform pack licenses apply to all TRXs configured in the EXM. Measurement applications that start with “V” are measurement-only applications and require waveform pack licenses for waveform playback. Applications that start with “Y” are combined measurement and waveform applications and include the same measurement capability as the corresponding “V” application, as well as unlimited waveform playback capability for the technology selected. “V” and “Y” applications can co-exist in the same EXM.

“V” and “Y” applications ordered with the EXM are pre-installed before shipment. Pre-installed applications use node-locked, perpetual licenses with a 12-month support period.

### Software application license types and terms

Keysight offers additional license terms and types. If these are desired, order “V” and “Y” software applications separately from the EXM hardware. Licenses and redemption instructions are provided for installation on the EXM. Licenses other than perpetual, node locked with a 12-month support period cannot be pre-installed before shipment.

License terms:

- **Perpetual:** license can be used indefinitely. For perpetual license holders, a separate support contract is required to access Keysight technical support and software updates.
- **Subscription:** license is time limited to a defined period, 6, 12, 24, or 36 months. A valid support contract is included in the pricing for subscription licenses.

License types:

- **Node locked:** license can be used on one specified instrument/computer
- **Transportable**: license can be used on one instrument/computer at a time but can be transferred to another using Keysight Software Manager (Internet connection required)
- **Floating:** networked instruments/computers can access a license from a server one at a time. Multiple licenses may be purchased for concurrent usage. Three types of floating license are available:
  - **Single site:** 1-mile radius from the server
  - **Single region:**[1] Americas, Europe, Asia
  - **Worldwide** (export restriction identified in end user license agreement (EULA))
- **USB portable:** license can be used on one instrument/computer at a time but can be transferred to another using a certified USB dongle (available for additional purchase, Keysight part number E8900-D10)

For more information, see Software Terms and Types.

## Select software applications

| Ordering number | Description | Requirement |
|---|---|---|
| V9054EM0E | VMA digital modulation measurement application | Optional |
| V9054EM1E | VMA custom OFDM measurement application | Optional |
| V9064EM0D | VXA vector signal analysis measurement application | Optional |
| V9065EM0E | Sequence analyzer BTS applications | Optional, requires E6640A-BTS |
| V9065EM2E | Parallel analysis of multiple devices | Optional |
| V9071EM0E | GSM/EDGE/Evo measurement application | Optional |
| V9072EM0E | CDMA2000® measurement application | Optional |
| V9073EM0E | W-CDMA/HSPA+ measurement application | Optional |

[1] Americas (North, Central, and South America, Canada); Europe (European Continent, Middle Eastern Europe, Africa, India); Asia (North and South Asia Pacific Countries, China, Taiwan, Japan)

| Ordering number | Description | Requirement |
|---|---|---|
| V9076EM0E | 1xEV-DO measurement application | Optional |
| V9077EM0E | WLAN 802.11a/b/g/j/p/n/af/ah measurement application | Optional |
| V9077EM1E | WLAN 802.11ac/ax measurement application | Optional |
| V9079EM0E | TD-SCDMA/HSPA measurement application | Optional |
| V9080EM0E | LTE and LTE-Advanced FDD measurement application | Optional |
| V9080EM3E | NB-IoT and eMTC measurement application | Optional |
| V9080EM4E | LTE V2X measurement application | Optional |
| V9081EM0E | *Bluetooth*® measurement application | Optional |
| V9082EM0E | LTE and LTE-Advanced TDD measurement application | Optional |
| V9084EM0E | Short range communications measurement application | Optional |
| V9085EM0E | 5G NR measurement application | Optional |
| V9085EM1E | PaVT measurement application | Optional, requires V/Y9085EM0E |
| Y9071EM0E | GSM/EDGE/Evo waveform and measurement application | Optional |
| Y9072EM0E | CDMA2000® waveform and measurement application | Optional |
| Y9073EM0E | W-CDMA/HSPA+ waveform and measurement application | Optional |
| Y9076EM0E | 1xEV-DO waveform and measurement application | Optional |
| Y9077EM0E | WLAN 802.11a/b/g/j/p/n/af/ah waveform and measurement application | Optional |
| Y9077EM1E | WLAN 802.11ac/ax waveform and measurement application | Optional |
| Y9079EM0E | TD-SCDMA/HSPA waveform and measurement application | Optional |
| Y9080EM0E | LTE and LTE-Advanced FDD waveform and measurement application | Optional |
| Y9080EM3E | NB-IoT and eMTC waveform and measurement application | Optional |

| Ordering number | Description | Requirement |
|---|---|---|
| Y9080EM4E | LTE V2X waveform and measurement application | Optional |
| Y9081EM0E | *Bluetooth*® waveform and measurement application | Optional |
| Y9082EM0E | LTE and LTE-Advanced TDD waveform and measurement application | Optional |
| Y9084EM0E | Short range communications waveform and measurement application | Optional |
| Y9085EM0E | 5G NR non-signaling waveform and measurement application | Optional |

## Select software options

Add capabilities using a license key. These options apply to all TRX configured in the EXM.

| Ordering number | Description | Requirement |
|---|---|---|
| E6640A-BTS | Downlink measurement capability | Optional, requires V9065EM0E if sequence analyzer is desired |
| E6640A-M22 | Up to 2x2 true MIMO | Optional, for WLAN |
| E6640A-M33 | Up to 3x3 true MIMO | Optional, for WLAN |
| E6640A-M44 | Up to 4x4 true MIMO | Optional, for WLAN |

# Select Accessories

| Ordering number | Description | Requirement |
|---|---|---|
| E6640A-1CP | Rack mount and front handle kit | Optional |
| E6640A-1CR | Rack mount and rack rail kit | Optional |
| E6640-KYB | Keyboard, USB | Optional |
| E6640A-MSE | Mouse, USB | Optional |

## Select Services

Hardware support through KeysightCare, warranty, calibration, and other services are available. Please contact your sales representative for options and pricing. Visit www.keysight.com/find/keysightcare for more information.

## Select Upgrades

Options can be added after an initial purchase of an EXM to increase product capabilities including hardware, software, and accessories according to your specific test requirements.

Three types of upgrades are available.

1. Upgrade an existing TRX from 4G to 5G.
2. Add new TRX hardware to an existing EXM, up to a maximum of four TRX per EXM.
3. Upgrade capabilities of an existing TRX (frequency range, bandwidth) using a license key. No additional hardware is required.

Software applications and software options can be ordered standalone as upgrades. These apply to all TRX configured in the EXM.

### Upgrade an existing TRX from 4G to 5G

Only existing M9433A 4FD wave 2 TRX can be upgraded to support 5G. Only M9433A modules with serial numbers lower than MY5903xxxx require this upgrade. Newer M9433A modules are ready to support 5G. The Show Hardware screen shows the type(s) of module(s) installed in an EXM and their serial number(s). This upgrade requires returning the EXM to a qualified Keysight service center.

| Ordering number | Description | Requirement |
|---|---|---|
| E6640AT-TR5 | Upgrade one 4FD wave 2 TRX from 4G to 5G | Required |
| E6640AT-5B0 | Upgrade any frequency range to 380 MHz to 6 GHz with 5G NR bands on 4FD wave 2 TRX | Required |
| E6640AT-B1X | Upgrade bandwidth from 80 MHz to 160 MHz on 4FD wave 2 TRX | One of these options is required if existing EXM bandwidth is less than 160 MHz |
| E6640AT-BU5 | Upgrade bandwidth from 40 MHz to 160 MHz on 4FD wave 2 TRX | |
| V9085EM0E | 5G NR measurement application | One of these software applications is required to test 5G |
| Y9085EM0E | 5G NR non-signaling waveform and measurement application | |

Order additional software applications, software options, and accessories as desired.

## Add new TRX hardware to an existing EXM

Increase the number of TRX in an existing EXM chassis, up to a maximum of four TRX.

| Ordering number | Description | Requirement |
|---|---|---|
| E6640AU-TR3 | Add TRX with four full-duplex ports to EXM (4FD wave 2 hardware) | May only be added to an EXM with open slots |
| E6640AU-5B0 | Frequency range, 380 MHz to 6 GHz with 5G NR bands | Required |
| E6640AU-5LF | Extended frequency range, 76 to 110 MHz, and 207 to 222 MHz (Tx only) | Optional |
| E6640AU-B1X | Bandwidth, 160 MHz | Required |
| E6640AU-UK6 | Commercial calibration certificate with test data | Optional |

Order additional software applications, software options, and accessories as desired.

## Upgrade capabilities of an existing TRX

Add additional frequency range and/or bandwidth to an existing TRX using a license key. Each TRX requires its own frequency range and bandwidth upgrades. No hardware changes are required.

Four different types of TRX are available for upgrade. Each has their own set of upgrade options. The type of TRX installed in an existing EXM can be found on the Show Hardware screen of the EXM with product numbers as follows.

- Use E6640AK options for M9430A: 2FD TRX
- Use E6640AF options for M9431A: 4FD TRX
- Use E6640AW options for M9432A: 2HD/2FD wave 2 TRX
- Use E6640AT options for M9433A: 4FD wave 2 TRX

| Ordering number | Description | Requirement |
|---|---|---|
| E6640AF-516 | Upgrade frequency range from 3 GHz (504) to 6 GHz (506) on 4FD TRX | Optional |
| E6640AF-526 | Upgrade frequency range from banded WLAN (5WC) to 380 MHz to 6 GHz (506) on 4FD TRX | Optional |
| E6640AF-B1X | Upgrade bandwidth from 80 MHz to 160 MHz on 4FD TRX | Optional |
| E6640AF-BU5 | Upgrade bandwidth from 40 MHz to 160 MHz on 4FD TRX | Optional |

| Ordering number | Description | Requirement |
|---|---|---|
| E6640AK-516 | Upgrade frequency range from 3 GHz (504) to 6 GHz (506) on 2FD TRX | Optional |
| E6640AK-526 | Upgrade frequency range from banded WLAN (5WC) to 380 MHz to 6 GHz (506) on 2FD TRX | Optional |
| E6640AK-5FM | Extended frequency range, 76 to 110 MHz, and 207 to 222 MHz (Tx only) on 2FD TRX | Optional |
| E6640AK-B1X | Upgrade bandwidth from 80 MHz to 160 MHz on 2FD TRX | Optional |
| E6640AK-BU5 | Upgrade bandwidth from 40 MHz to 160 MHz on 2FD TRX | Optional |
| E6640AT-516 | Upgrade frequency range from 3 GHz (504) to 6 GHz (506) on 4FD wave 2 TRX | Optional |
| E6640AT-526 | Upgrade frequency range from banded WLAN (5WC) to 380 MHz to 6 GHz (506) on 4FD wave 2 TRX | Optional |
| E6640AT-5LF | Extended frequency range, 76 to 110 MHz, and 207 to 222 MHz (Tx only) on 4FD wave 2 TRX | Optional |
| E6640AT-B1X | Upgrade bandwidth from 80 MHz to 160 MHz on 4FD wave 2 TRX | Optional |
| E6640AT-BU5 | Upgrade bandwidth from 40 MHz to 160 MHz on 4FD wave 2 TRX | Optional |
| E6640AW-516 | Upgrade frequency range from 3 GHz (504) to 6 GHz (506) on 2HD/2FD wave 2 TRX | Optional |
| E6640AW-526 | Upgrade frequency range from banded WLAN (5WC) to 380 MHz to 6 GHz (506) on 2HD/2FD wave 2 TRX | Optional |
| E6640AW-5FM | Extended frequency range, 76 to 110 MHz, and 207 to 222 MHz (Tx only) on 2HD/2FD wave 2 TRX | Optional |
| E6640AW-B1X | Upgrade bandwidth from 80 MHz to 160 MHz on 2HD/2FD wave 2 TRX | Optional |
| E6640AW-BU5 | Upgrade bandwidth from 40 MHz to 160 MHz on 2HD/2FD wave 2 TRX | Optional |

Order additional software applications and accessories as desired.

## Example Configurations

Following are example configurations for 5G FR1 device, WLAN, automotive, 5G FR1 small cell, and IoT applications, and 4G to 5G upgrades.

### New 4-TRX EXM for 5G FR1 devices

| Ordering number | Description |
|---|---|
| E6640A-001 | Add TRX1 to EXM |
| • E6640A-5B0 | Frequency range for TRX1, 380 MHz to 6 GHz with 5G NR bands |
| • E6640A-B1X | Bandwidth for TRX1, 160 MHz |
| E6640A-002 | Add TRX2 to EXM |
| • E6640A-5B0 | Frequency range for TRX2, 380 MHz to 6 GHz with 5G NR bands |
| • E6640A-B1X | Bandwidth for TRX2, 160 MHz |
| E6640A-003 | Add TRX3 to EXM |
| • E6640A-5B0 | Frequency range for TRX3, 380 MHz to 6 GHz with 5G NR bands |
| • E6640A-B1X | Bandwidth for TRX3, 160 MHz |
| E6640A-004 | Add TRX4 to EXM |
| • E6640A-5B0 | Frequency range for TRX4, 380 MHz to 6 GHz with 5G NR bands |
| • E6640A-B1X | Bandwidth for TRX4, 160 MHz |
| Y9085EM0E | 5G NR non-signaling waveform and measurement application |
| • + R-C5Q-001-A | Node-locked perpetual license |
| • + R-C6R-001-L | KeysightCare software support subscription, node-locked - 12 months |

### New 2-TRX EXM for WLAN devices with MIMO

| Ordering number | Description |
|---|---|
| E6640A-001 | Add TRX1 to EXM |

| Ordering number | Description |
|---|---|
| • E6640A-5B0 | Frequency range for TRX1, 380 MHz to 6 GHz with 5G NR bands |
| • E6640A-B1X | Bandwidth for TRX1, 160 MHz |
| E6640A-002 | Add TRX2 to EXM |
| • E6640A-5B0 | Frequency range for TRX2, 380 MHz to 6 GHz with 5G NR bands |
| • E6640A-B1X | Bandwidth for TRX2, 160 MHz |
| E6640A-M22 | Up to 2x2 true MIMO |
| Y9077EM0E | WLAN 802.11a/b/g/j/p/n/af/ah waveform and measurement application |
| • + R-C5Q-001-A | Node-locked perpetual license |
| • + R-C6R-001-L | KeysightCare software support subscription, node-locked - 12 months |
| Y9077EM1E | WLAN 802.11ac/ax waveform and measurement application |
| • + R-C5Q-001-A | Node-locked perpetual license |
| • + R-C6R-001-L | KeysightCare software support subscription, node-locked - 12 months |
| Y9081EM0E | *Bluetooth*® waveform and measurement application |
| • + R-C5Q-001-A | Node-locked perpetual license |
| • + R-C6R-001-L | KeysightCare software support subscription, node-locked - 12 months |

## New 1-TRX EXM for automotive devices

| Ordering number | Description |
|---|---|
| E6640A-001 | Add TRX1 to EXM |
| • E6640A-5B0 | Frequency range for TRX1, 380 MHz to 6 GHz with 5G NR bands |
| • E6640A-B1X | Bandwidth for TRX1, 160 MHz |
| Y9071EM0E | GSM/EDGE/Evo waveform and measurement application |
| • + R-C5Q-001-A | Node-locked perpetual license |

| Ordering number | Description |
|---|---|
| • + R-C6R-001-L | KeysightCare software support subscription, node-locked - 12 months |
| Y9073EM0E | W-CDMA/HSPA+ waveform and measurement application |
| • + R-C5Q-001-A | Node-locked perpetual license |
| • + R-C6R-001-L | KeysightCare software support subscription, node-locked - 12 months |
| Y9080EM0E | LTE and LTE-Advanced FDD waveform and measurement application |
| • + R-C5Q-001-A | Node-locked perpetual license |
| • + R-C6R-001-L | KeysightCare software support subscription, node-locked - 12 months |
| Y9080EM4E | LTE V2X waveform and measurement application |
| • + R-C5Q-001-A | Node-locked perpetual license |
| • + R-C6R-001-L | KeysightCare software support subscription, node-locked - 12 months |
| Y9085EM0E | 5G NR non-signaling waveform and measurement application |
| • + R-C5Q-001-A | Node-locked perpetual license |
| • + R-C6R-001-L | KeysightCare software support subscription, node-locked - 12 months |

## New 1-TRX EXM for 5G FR1 small cells

| Ordering number | Description |
|---|---|
| E6640A-001 | Add TRX1 to EXM |
| • E6640A-5B0 | Frequency range for TRX1, 380 MHz to 6 GHz with 5G NR bands |
| • E6640A-B1X | Bandwidth for TRX1, 160 MHz |
| E6640A-BTS | Downlink measurement capabilities |
| V9065EM0E | Sequence analyzer BTS applications |
| + R-C5Q-001-A | Node-locked perpetual license |
| + R-C6R-001-L | KeysightCare software support subscription, node-locked - 12 months |

| Ordering number | Description |
|---|---|
| Y9085EM0E | 5G NR non-signaling waveform and measurement application |
| • + R-C5Q-001-A | Node-locked perpetual license |
| • + R-C6R-001-L | KeysightCare software support subscription, node-locked - 12 months |

## New 1-TRX EXM for IoT devices

| Ordering number | Description |
|---|---|
| E6640A-001 | Add TRX1 to EXM |
| • E6640A-5B0 | Frequency range for TRX1, 380 MHz to 6 GHz with 5G NR bands |
| • E6640A-B1X | Bandwidth for TRX1, 160 MHz |
| • Y9084EM0E | Short range communications waveform and measurement application |
| • + R-C5Q-001-A | Node-locked perpetual license |
| • + R-C6R-001-L | KeysightCare software support subscription, node-locked - 12 months |

## Upgrade an existing TRX from 4G to 5G FR1 (available for M9433A 4FD wave 2 TRX)

| Ordering number | Description |
|---|---|
| E6640AT-TR5 | Upgrade one 4FD wave 2 TRX from 4G to 5G |
| E6640AT-5B0 | Upgrade any frequency range to 380 MHz to 6 GHz with 5G NR bands on 4FD wave 2 TRX |
| E6640AT-BU5 | Upgrade bandwidth from 40 MHz to 160 MHz on 4FD wave 2 TRX |
| Y9085EM0E | 5G NR non-signaling waveform and measurement application |
| • + R-C5Q-001-A | Node-locked perpetual license |
| • + R-C6R-001-L | KeysightCare software support subscription, node-locked - 12 months |

## Optimal Solution for sub-6 GHz Device Manufacturing Test

The E6640A EXM uses Keysight's industry-proven platform for multi-device and multi-format non-signaling manufacturing test in a compact configuration. Integrated state-of-the-art automation and efficient sequencing for optimized speed of execution help reduce device manufacturing cost of test and speed up time to market.

- Optimize testing of multiple devices
- Test multi-format devices
- Maximize throughput and yield
- Efficiently verify chipset RF performance
- Create flexible systems for high-volume manufacturing of wireless devices

For more information about the E6640A EXM wireless test set, visit:

www.keysight.com/find/exm

www.keysight.com/find/xseriesapps

Non-signaling solutions are available to test 5G FR2 and Wi-Fi 6E and 802.11be.

For 5G FR2 test at mmWave frequencies, visit:

www.keysight.com/find/e6681a

www.keysight.com/find/rrh

For Wi-Fi 6E and 802.11be test at frequencies above 6 GHz, visit www.keysight.com/find/e6680a.



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