



RANAdvisor

Wireless Network Optimization Platform — Configuration Guide

The RANAdvisor wireless network optimization platform performs RF coverage and service performance measurements for wireless communications networks. The Windows®-based software runs on a PC that interfaces with a JDSU digital RF receiver and with IS-95, cdma2000®, LTE, HSPA, UMTS, GSM, E-GPRS, WiMAX™, and TD-SCDMA phones. The system can be configured to include receivers and user equipment (UE) devices from one or a combination of technologies simultaneously and can control up to four UE devices.

This configuration guide can assist with ordering the correct system configuration for RANAdvisor applications.

Key Benefits

- Easy to use
 - Customizable GUI to view data as needed
 - Optimize efficiency in detecting and isolating problems
- LTE and WCDMA device auto-detection and configuration
- Platform stability improves user productivity
- Project files let users easily share test configurations improving consistency of collected results
- High-accuracy RF measurements reduce measurement uncertainty
- Click'n'Sync visualization simplifies troubleshooting to find problems faster
- Compatible with a broad choice of post-processing tools

Key Features

- Fully scalable solution from receiver or UE device to full combo
- Supports multiple devices on a single laptop
- Indoor and outdoor measurement capability
- Industry-leading data test support
- Fast, accurate receiver measurements
- Open architecture for post-processing
- User-definable events triggers

PC Specifications

Recommended PC hardware specifications:

- Intel® Core i7-2820QM (2.3 GHz) 8 GB RAM
- 250 GB 7200 rpm hard disk drive
- DVD RW drive
- USB 2.0 ports (for license key and multiple hardware support)
- 1280 by 800 resolution

Supported Windows versions:

- Windows 7 32/64-bit (Ultimate or Enterprise)*

Minimum PC hardware specifications:

- Intel Core™ i5-2520M (2.5 GHz) 4 GB RAM

Configuration Process

Before using this configuration guide, determine the following:

- Which applications will be tested?
- Which software measurements are required?
- Which UE devices and receivers are required?
- Which accessories are required?

This configuration guide is organized to reflect the decision process flow to use when choosing a system.

- Part 1: Technology Software Options
- Part 2: Platform Software Options
- Part 3: Receiver Hardware Options
- Part 4: Mobile Voice Quality and VoIP Testing
- Part 5: VoLTE Testing
- Part 6: Hardware Accessory Options
- Part 7: Support Update Service (SUS) Options
- Part 8: Post-Processing (Gladiator) Options
- Part 9: Ordering Examples

* Before starting the E6474A application, turn off the Windows User Account Control (UAC) feature accessible via Start>Control Panel>User Accounts. Installing from an encrypted folder requires first uninstalling all previous versions of the E6474A application.

Part 1: Technology Options

Select which software options match the existing technology and measurement requirements. Review the upgrade section for additional options.

| Technology | Measurements | |
|---------------------------------------|--------------|----------------------|
| | Phone | Receiver |
| cdma2000 | 101 | 050 |
| GSM | 200 | 050 |
| W-CDMA/UMTS ² | 300 | 050 |
| E-GPRS | 600 | 050 |
| WiMAX ³ | 656 | 655 |
| LTE UE base | 637 | |
| LTE UE base with Qualcomm chipset | 640 | 645 (FDD), 646 (TDD) |
| LTE Hi silicon chipset upgrade | 634 | 645 (FDD), 646 (TDD) |
| LTE - LG chipset upgrade | 641 | 645 (FDD), 646 (TDD) |
| LTE - Samsung chipset upgrade | 642 | 645 (FDD), 646 (TDD) |
| LTE - Altair chipset upgrade | 643 | 645 (FDD), 646 (TDD) |
| LTE - Sequans chipset upgrade | 644 | |
| TD-SCDMA | 550 | |
| WiFi ⁴ | 657 | |
| PCTel EX/EX+/EX mini receiver support | | 770 |
| iPhone measurements ⁷ | 960 | |

PCTel

PCTel receiver measurements can be added to RANAdvisor by ordering the E6473B-770 license. This provides support for all technology measurements. PCTel EX and EX-Flex receivers are supported. PCTel receiver hardware is technology-specific, unlike the W1314 which uses software licenses. Customer must ensure they own or buy the correct PCTel receiver hardware for the technology they require.

E6474A-050 W1314 Receiver Addition to Phone License

Receiver measurements can be added to any base-technology UE device measurements system with the E6474A-050 Receiver Addition to Phone Measurements license. This option will enable making receiver measurements for any of the base-technology phone measurements that are already licensed. For a phone-based technology like UMTS, which includes GSM, receiver measurements for both technologies will be enabled with the Receiver Addition to Phone Measurements License.

Base technologies include:

- GSM/E-GPRS
- UMTS/HSPA
- IS-95
- cdma2000
- 1xEV-DO
- 1xEV-DO Rev A

LTE and WiMAX receiver measurements are not part of the base technologies group and require their own licenses as shown in Table 1.

E6474A-055 W1314 Receiver-Only Measurements

For receiver-only measurements, independent of phones, the E6474A-055 Receiver-Only Measurement license provides all base-technology receiver measurements without the need for corresponding phone licenses. This capability enables receiver-based benchmarking of all technologies in a given region using the appropriate W1314 receiver hardware.

The following lists additional technology expansions that build on the base technology licenses.

| Software Upgrade Description | Part Number |
|---|-------------|
| UMTS to HSPA+ phone measurement upgrade license ⁵ | E6474A-327 |
| GPRS to UMTS phone measurements upgrade license | E6474A-625 |
| cdma2000 to 1xEV-DO phone measurement upgrade (Rev. A) license ⁶ | E6474A-137 |
| Upgrade from 1xEV-DO Rev A to 1xEV-DO Rev B | E6474A-138 |
| IS-95 over-the-air base station testing | E6474A-150 |
| cdma2000 over-the-air maintenance tool software upgrade (IS95) | E6474A-151 |

Each software order includes the following components:

- CD with software (which includes comprehensive training and reference information)
- User's guide
- USB license key (initialized with licenses)

1. TechTool is not required
2. UMTS Phone Measurement option includes support for GSM and E-GPRS phone measurements.
3. W1314A receiver only
4. Supports WiFi device measurements from tethered USB WiFi devices or the internal PC WiFi device.
5. This option includes HSDPA and HSUPA measurements.
6. HSPA, 1xEV-DO, and 1xEV-DO Rev A are all upgrades on base technologies. Please refer to "Part 8: Ordering"
7. Requires customer to provide their own engineering-enabled iPhone.

Part 2: Platform Software Options

Select the option that matches system needs.

| License Description | Option Number |
|---|------------------|
| Initialized parallel license key ¹ | 005 |
| Multiple phone license ² | 010 |
| MapX mapping software license | 040 ³ |
| Wireless application measurement software | 740 |
| Video streaming plus non-reference video MoS | 744 |

1. E6474A licenses are normally delivered on a USB key. A parallel key must be ordered separately if required.
2. Allows the use of more than one phone simultaneously for measurement collection.
3. MapX is required to support mapping features. Both indoor and outdoor mapping are included with this option.

Data and Application Test Software Options

The platform software can perform a variety of data and application tests. This table shows tests included with the standard phone-based software options and those that require additional licenses to enable them.

| Tests | E6474A Base Tests | E6474A Option 740 (WAMS) | Notes |
|-----------------------------------|-------------------|--------------------------|----------------------------------|
| AT_Command | Yes | | |
| Call_Control | Yes | | |
| Command_Line | Yes | | |
| Wait_Timer | Yes | | |
| Dialup | Yes | | |
| Disconnect | Yes | | |
| PING | Yes | | |
| Trace Route | Yes | | |
| FTP IPV4/6_2 | Yes | | Supports multi-segment and FTP-S |
| SMS_2 | Yes | | |
| Video_Connectivity_2 | Yes | | |
| iPERF | Yes | | |
| PLMN network search and selection | Yes | | LG LTE UE devices |
| Connect (LG LTE) | Yes | | LG LTE devices only |
| Disconnect (LG LTE) | Yes | | LG LTE devices only |
| Connect (Samsung) | Yes | | Samsung LTE devices only |
| Disconnect (Samsung) | Yes | | Samsung LTE devices only |
| Connect (Qualcomm) | Yes | | |
| Disconnect (Qualcomm) | Yes | | |
| WiMAX network entry | Yes | | WiMAX devices only |
| WiMAX network exit | Yes | | WiMAX devices only |
| WAP | | Yes | |
| E-Mail | Yes | | |
| HTTP upload/download | Yes | | |
| HTTP web browsing | Yes | | |
| MMS_2 | | Yes | |
| Video_Streaming_with_MoS | | | Order Option 744 license |

Keyless Software Licensing

Server-based keyless software licensing is offered as an alternative to the default hardware key-based licensing. Keyless licensing provides the ability to maintain a pool of measurement licenses on a server and then distributes those licenses to client drive test PCs using a check-out process. Typically one server application is required per customer. This licensing option is aimed at customers managing more than 20 RANAdvisor systems.

Customers must supply a licensed server that meets these minimum specifications:

- Intel® Core™ i5-2520M (2.5 GHz) 4 GB RAM
- At least 10 GB free disk space on a 250 GB 7200 rpm hard disk drive
- DVD±RW drive
- USB ports (for license key and multiple hardware)

| License Description | Part Number |
|---|-------------|
| Software licensing server application | E6474A-081 |
| Software licensing option delivery | E6474A-080 |
| Hardware key to software license exchange | E6474A-083 |

An E6474A-083 purchase is required for every E6474A measurement license to be transferred from hardware dongles to server licenses.

Contact JDSU to discuss how to transfer your hardware dongle licenses.

Part 3: Receiver Hardware Options

The JDSU multitechnology and multiband receivers support up to eight RF bands in a single compact package. The combination of uplink and downlink bands depends upon the configuration chosen. All standard receivers include an integral high-sensitivity 50-channel GPS. The receivers are listed by option number and by technology with supported bands.

Please refer to the W1314B/L receiver data sheet for configuration information.

Ordering notes:

- JDSU receivers require related receiver measurement software as described in the Software Options section.
- JDSU receivers include an internal 50-channel GPS receiver although an alternative external GPS unit can be used if preferred.

Each receiver includes these components:

- Magnetic-mount RF antenna for the corresponding frequency band
- Adaptor for RF antenna connection to receiver
- USB cable for connection to PC
- AC/DC power supply
- DC power cord — cigarette lighter type
- Mounting kit — mounting plate and screws for mounting receiver in a vehicle

RANAdvisor Backpack

The JDSU custom-designed convenient, rugged backpack solution can accommodate a receiver and phones to enable testing in any environment that is inaccessible for a vehicle.

The backpack solution accommodates a receiver and up to six mobile devices and batteries.

| Backpack Descriptions | Part Number |
|--|-------------|
| RANAdvisor backpack with built-in USB hub and battery-charging power harness <ul style="list-style-type: none"> • Space for 2 batteries (optional extra, see below) • Charger (optional extra, see below) • Up to 6 UE devices (not supplied) | E6473B-930 |
| RANAdvisor battery pack for backpack Contains 2 batteries (one fitted with booster module) | E6473B-925 |
| RANAdvisor battery charger for backpack Optional extra. Only required if charging batteries externally from backpack. Useful when having more than 2 batteries. | E6473B-926 |
| Upgrade legacy option 920 backpack to new E6473B-930 backpack charging harness | E6473B-927 |
| RANAdvisor backpack without USB hub or cabling | E6473B-921 |

Indoor Solution — Timing Module Only (Option 073)

This hardware option includes:

- One timing module (1PP2S output)
- Cables and connections

The timing module provides a 1PP2S signal for the receiver measurements, which is useful for CDMA measurements that need a timing lock.

Part 4: Mobile Voice Quality and VoIP Testing Options

The system supports Mobile-to-PSTN and mobile-to-mobile voice-quality measurements and provides PESQ-LQO and POLQA mean opinion score (MOS) ratings. The mobile-to-PSTN measurement requires both mobile-side and office-side hardware in addition to the base drive-test system, requiring the purchase of at least one mobile unit, one office unit, and cables.

The mobile-to-mobile measurement requires the mobile-side hardware in addition to the base drive-test system, requiring the purchase of at least one multi-phone mobile unit and two cables.

The B9990A-200 and B9990A-230 options both include a Maya USB+ sound module that can be used to connect up to four mobiles to the RANAdvisor measurement laptop. Each phone to be connected requires the purchase of an audio cable to connect the phone to the USB sound module. These cables are available as E6473B-885.

POLQA is the next-generation voice-quality testing technology for fixed, mobile, and IP-based networks. The International Telecommunication Union (ITU-T) standardized POLQA as new Recommendation P.863 to be applied for voice-quality analysis of HD voice, 3G, and 4G/LTE networks.

On-device POLQA MOS measurements — Some newer Android mobiles simplify POLQA MOS testing by removing the need for external sound card hardware. JDSU licenses POLQA measurement functionality in two ways: for use with or without an external sound card. Please consult JDSU for the latest list of devices that support this testing option.

QCHAT is a specific technology for PTT.

Voice Quality Mobile Unit

| Description | Part Number |
|---|-------------|
| For Use with an External Sound Card | |
| PESQ single-phone voice MOS test | B9990A-200 |
| PESQ multi-phone voice MOS test upgrade license | B9990A-300 |
| POLQA license for 2-phone measurements | B9990A-230 |
| POLQA upgrade from 2 to 4 phones | B9990A-231 |
| POLQA upgrade from 4 to 6 phones | B9990A-232 |
| POLQA upgrade from 6 to 8 phones | B9990A-233 |
| For Use without an External Sound Card | |
| POLQA for up to two devices | B9990A-210 |
| Push-to-Talk Voice Testing | |
| QCHAT measurement license | B9990A-505 |

The office-side hardware consists of a pre-configured computer unit with a modem/sound card that can support up to eight analog phone lines. The PESQ office unit is available in two options for up to 4 or 8 lines. The POLQA office unit is available as a single option for up to 8 lines. The office unit cannot be used with B9990A-210 on-device POLQA measurements which only operate between two mobile devices connected to the same laptop.

Voice Quality Office Unit

| Description | Part Number |
|--|-------------|
| PESQ voice quality office unit (4 lines) | B9990A-400 |
| PESQ voice quality office unit (8 lines) | B9990A-430 |
| POLQA voice quality office unit (8 lines) | B9990A-440 |
| PESQ to POLQA voice quality office unit software upgrade | B9990A-441 |

Voice Quality Mobile-Side Connecting Cables

| Description | Part Number |
|--|-------------|
| 3.5 mm TRS to RCA audio cable (one cable required per phone) | E6473B-885 |

Part 5: VoLTE Testing

E6474-746 VoLTE

RANAdvisor supports VoLTE testing between two supported VoLTE handsets. The VoLTE license provides IMS and RTP statistics. Audio MOS measurements require the appropriate number of POLQA licenses.

| Measurements | Benefit |
|-----------------|--|
| Call statistics | Confirm your network's call performance meets or exceeds setup and stability goals |
| R-Factor MOS | Identify call quality problems using a combination of packet loss and delay measurements (ITU-T G.107) |
| POLQA MOS | Evaluate user-perception call quality against ITU standards |
| RTP statistics | Quickly identify the impact that delay and jitter have on delivering high-quality voice services |

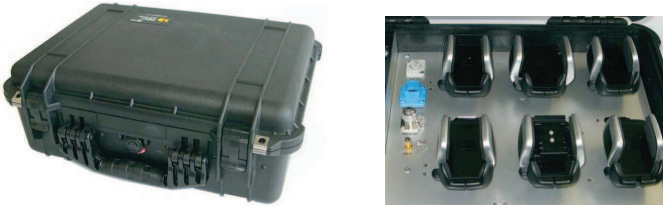
Supported KPIs

| IMS Signaling | VoLTE Call Control | RTP Metrics | User Experience |
|-----------------|----------------------|----------------------------|-----------------|
| SIP message log | CM call ID | Sequence number (packets) | POLQA Voice MOS |
| SDP presence | Call success/failure | RTP packet loss rate | R-Factor/MOS |
| | Call duration/hold | RTP packet jitter | |
| | Call drop | RTP packet delay variation | |
| | Codec type | RTP packet one-way delay | |
| | | SSRC | |
| | | Codec bit rate | |

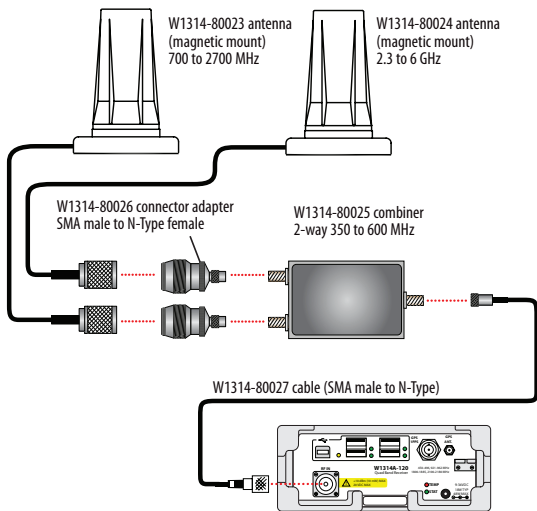
Part 6: Hardware Accessory Options

Select the hardware accessories needed for your system. Hardware accessory options are compatible with both the W1314B and W1314L receivers.

| Description | Part Number |
|---|-------------|
| Platform Accessories | |
| Receiver and phone system carrying case | E6473B-915 |



| Description | Part Number |
|---|-------------|
| Antenna Parts | |
| Mobile magnetic mount multiband antenna (700 to 2700 MHz) | W1314-80023 |
| Mobile magnetic mount multiband antenna (2.3 to 6 GHz) | W1314-80024 |
| Combiner unit | W1314-80025 |
| Connector adapter - SMA male to N-Type female | W1314-80026 |
| Cable (SMA male to N-Type) | W1314-80027 |
| GPS Option | |
| Globalsat BU 353 NMEA GPS | E6473B-035 |



Part 7: Software and Software Update Service (SUS)

The RANAdvisor software requires a SUS license to operate. Some new features do not require additional licenses as they are "SUS locked" and will only work on systems with current SUS licenses. Not having a valid SUS license prevents the taking of software upgrades and removes entitlement to technical support.

SUS Options

| Description | Part Number |
|--|-------------|
| 1-year standard | E6474A-060 |
| 1-year corporate (for greater than 50 systems) | E6474A-061 |
| 3-year standard | E6474A-063 |
| 3-year corporate (for greater than 50 systems) | E6474A-064 |
| 5-year standard | E6474A-066 |
| 5-year corporate (for greater than 50 systems) | E6474A-067 |

A SUS license is required per computer in use, not per technology. For example, for three laptops in use simultaneously, making RANAdvisor measurements requires three SUS licenses.

The SUS encompasses a comprehensive range of benefits and services. It helps:

- Maintain a competitive advantage by keeping systems current
- Increase productivity through new and enhanced software functionality
- Provide access to high-quality technical support to keep products running as they should

For full details on SUS, please refer to the SUS data sheet.

On-site training is available for E6474A and for its applications that provides:

- Telephone assistance and Web training on specific topics
- On-site training and start-up assistance

| On-Site Training | Part Number |
|--|-------------|
| E6474A first-day on-site training | H7211B-209 |
| Additional day on-site training | H7211B-232 |
| One-day extended hours remote assistance | H7211B-233 |
| Remote training session | H7211B-235 |

Part 8: Post-Processing (Gladiator)

The Analysis Solution software option lets you create post-processing configurations that are suitable for particular optimization needs. Three bundles PP/PP2/PP3 have been configured to meet most customers' specific needs. CDC and additional toolboxes can be added via the appropriate option. The Custom Design Center (CDC) lets you create custom reports through an easy-to-use GUI that can be output in Excel format. The technology-based Toolbox licenses provide protocol decoders and pre-defined reports for a chosen technology.

| Description | Part Number |
|---|-------------|
| Gladiator post-processing bundle for GSM/GPRS/EDGE/UMTS (includes Toolbox license -910, -915, -916) | E6474A-PP1 |
| Gladiator post-processing bundle for GSM/GPRS/EDGE/UMTS/LTE (includes Toolbox license -910, -915, -916, -919) | E6474A-PP2 |
| Gladiator post-processing bundle for CDMA/EV-DO/LTE (includes Toolbox license -910, -917, -919) | E6474A-PP3 |
| Analysis Solution including CDC (requires at least one Toolbox license) | E6474A-910 |
| GSM/GPRS/EDGE Toolbox license | E6474A-915 |
| UMTS/HSPA Toolbox license | E6474A-916 |
| CDMA2000/1xEV-DO Toolbox license | E6474A-917 |
| WiMAX Toolbox license | E6474A-918 |
| LTE Toolbox license | E6474A-919 |

On-site training is not available in all locations. Please contact your JDSU sales representative for further information. JDSU highly recommends that new users receive training.

Part 9: Ordering Examples

These examples show typical configurations to illustrate the ordering process. Every order must include an SUS license, 1-Year SUS has been added in the examples below. Refer to the SUS section for other options. Phones are listed in examples below for completeness; however, where phones are required, customers must supply them.

LTE

An LTE-FDD receiver measurements system to cover 2.6 GHz band for RF coverage measurements:

| Description | Quantity | Part Number |
|---------------------------------------|----------|-------------|
| LTE-FDD receiver measurements license | 1 | E6474A-645 |
| MapX mapping license | 1 | E6474A-040 |
| 1-year drive test SUS | 1 | E6474A-060 |
| Digital multi-band receiver | 1 | W1314B-E04 |

An LTE UE-based system that will support Qualcomm chipset and LG chipset UE for LTE only measurements:

| Description | Quantity | Part Number |
|---|----------|-------------|
| LTE phone measurements license | 1 | E6474A-640 |
| LTE phone measurements upgrade license for LG devices | 1 | E6474A-641 |
| MapX mapping license | 1 | E6474A-040 |
| 1-year drive test SUS | 1 | E6474A-060 |

An LTE UE-based system that will support Qualcomm chipset and LG chipset UE for LTE and UMTS measurements:

| Description | Quantity | Part Number |
|---|----------|-------------|
| LTE phone measurements license | 1 | E6474A-640 |
| LTE phone measurements upgrade license for LG devices | 1 | E6474A-641 |
| UMTS phone measurements license (includes GSM/E-GPRS) | 1 | E6474A-300 |
| MapX mapping license | 1 | E6474A-040 |
| 1-year drive test SUS | 1 | E6474A-060 |

An LTE UE-based system that will support an LG UE for LTE with FDD-LTE receiver measurements and Qualcomm and UMTS phone and receiver measurements:

| Description | Quantity | Part Number |
|---|----------|-------------|
| LTE phone measurements license | 1 | E6474A-640 |
| LTE phone measurements upgrade license for LG devices | 1 | E6474A-641 |
| LTE receiver measurements license (FDD) | 1 | E6474A-645 |
| UMTS phone measurements license (includes GSM/E-GPRS) | 1 | E6474A-300 |
| Receiver addition to phone measurements license | 1 | E6474A-050 |
| MapX mapping license | 1 | E6474A-040 |
| 1-year drive test SUS | 1 | E6474A-060 |
| Digital receiver 800/850/900/2500/1800/1900/2100/2600 | 1 | W1314B-E08 |

Adding a backpack with four batteries and an external charger to any order:

| Description | Quantity | Part Number |
|--|----------|-------------|
| RANAdvisor backpack with built-in USB hub and battery-charging power harness | 1 | E6473B-930 |
| RANAdvisor battery pack for backpack (2-batteries) | 2 | E6473B-925 |
| RANAdvisor battery charger for backpack | 1 | E6473B-926 |

cdma2000

A cdma2000 phone and receiver-based measurement system for the cellular and PCS bands requires users to provide the receiver GPS and a laptop.

| Description | Quantity | Part Number |
|--|----------|-------------|
| cdma2000 phone measurement license | 1 | E6474A-101 |
| Receiver addition to phone measurement license | 1 | E6474A-050 |
| MapX mapping license | 1 | E6474A-040 |
| 1-year SUS | 1 | E6474A-060 |
| GSM/CDMA/UMTS 850/1900 (UL/DL) | 1 | W1314B-E08 |

1xEV-DO Rev 0/A

A two-phone 1xEV-DO REV A measurement system with data-application tests for FTP requires users to provide a GPS, laptop, and test phone hardware.

| Description | Quantity | Part Number |
|---|----------|-------------|
| cdma2000 phone measurement license | 1 | E6474A-101 |
| cdma2000 to 1xEV-DO REV A measurement upgrade license | 1 | E6474A-137 |
| Multiple-phone license | 1 | E6474A-010 |
| MapX mapping license | 1 | E6474A-040 |
| 1-year SUS | 1 | E6474A-060 |

A 1xEV-DO REV A receiver and phone measurement system (single phone) with data-application tests for FTP requires users to provide a GPS, laptop, and test phone hardware.

| Description | Quantity | Part Number |
|---|----------|-------------|
| cdma2000 phone measurement license | 1 | E6474A-101 |
| Receiver addition to phone measurement license | 1 | E6474A-050 |
| cdma2000 to 1xEV-DO REV A measurement upgrade license | 1 | E6474A-137 |
| MapX mapping license | 1 | E6474A-040 |
| 1-year SUS | 1 | E6474A-060 |
| cdma 850/1900 (UL/DL) | 1 | W1314B-E08 |

GSM

A GSM phone-based measurement system for voice (up to four phones) requires users to provide a laptop and test phones.

| Description | Quantity | Part Number |
|--|----------|-------------|
| GSM phone measurement software license | 1 | E6474A-200 |
| Multiple-phone software license | 1 | E6474A-010 |
| MapX mapping software license | 1 | E6474A-040 |
| 1-year SUS | 1 | E6474A-060 |

E-GPRS

An E-GPRS phone-based measurement system requires two Samsung Galaxy S4 phones included with the system and users must provide a laptop and GPS.

| Description | Quantity | Part Number |
|---|----------|-------------------|
| E-GPRS phone measurement software license | 1 | E6474A-600 |
| Multiple-phone software license | 1 | E6474A-010 |
| MapX mapping software license | 1 | E6474A-040 |
| 1-year SUS | 1 | E6474A-060 |
| Samsung Galaxy S4 GT-i9506 | 2 | Customer supplied |

An E-GPRS phone-based measurement system (single phone) requires users to provide a GPS and laptop; however, they want to purchase a Samsung Galaxy S4 E-GPRS test phone.

| Description | Quantity | Part Number |
|---|----------|-------------------|
| E-GPRS phone measurement software license | 1 | E6474A-600 |
| MapX mapping software license | 1 | E6474A-040 |
| 1-year SUS | 1 | E6474A-060 |
| Samsung Galaxy S4 GT-i9506 | 1 | Customer supplied |

W-CDMA (UMTS)

A UMTS with E-GPRS phone and receiver measurements system (single phone) requires users to provide a GPS and laptop; however, they want to purchase a Samsung Galaxy S4 GSM/GPRS/EDGE/UMTS test mobile.

| Description | Quantity | Part Number |
|--|----------|-------------------|
| UMTS phone measurement license (includes GSM/E-GPRS) | 1 | E6474A-300 |
| Receiver addition to phone measurement license | 1 | E6474A-050 |
| MapX mapping license | 1 | E6474A-040 |
| 1-year SUS | 1 | E6474A-060 |
| UMTS 2100 (UL/DL) GSM 900/1800 (DL) | 1 | W1314B-E21 |
| Samsung Galaxy S4 GT-i9506 | 1 | Customer supplied |

A W-CDMA (UMTS) receiver and phone combination system (with multiRAT measurements for UMTS phone) requires that the user already own a UMTS test mobile.

| Description | Quantity | Part Number |
|--|----------|-------------|
| UMTS phone measurement license | 1 | E6474A-300 |
| Receiver addition to phone measurement license | 1 | E6474A-050 |
| MapX mapping software license | 1 | E6474A-040 |
| 1-year SUS | 1 | E6474A-060 |
| UMTS 2100 (UL/DL) GSM900/1800 (DL) | 1 | W1314B-E08 |

HSPA+

An HSUPA, HSDPA, and HSPA+ two phone measurements system with data-application measurements and video streaming with MOS measurements requires users to provide a GPS, laptop, and test phone hardware.

| Description | Quantity | Part Number |
|--|----------|-------------|
| UMTS phone measurement license (includes GSM/GPRS) | 1 | E6474A-300 |
| UMTS to HSPA+ phone measurement upgrade license | 1 | E6474A-327 |
| Multiple-phone license | 1 | E6474A-010 |
| MapX mapping license | 1 | E6474A-040 |
| Wireless application measurements license | 1 | E6474A-740 |
| Video streaming and Non-ref MOS license | 1 | E6474A-744 |
| 1-year SUS | 1 | E6474A-060 |

Adding PESQ or POLQA to an Order

Mobile-to-Mobile PESQ

Performing PESQ measurements between two mobile units connected to the same PC requires these options as well as the multi-phone license and the appropriate technology licenses installed on the PC. You must also have the mobile phones.

| Description | Quantity | Part Number |
|--|-------------|-------------|
| PESQ single-phone voice MOS test | 1 | B9990A-200 |
| PESQ multi-phone voice MOS test upgrade license | 1 | B9990A-300 |
| 3.5 mm TRS to RCA audio cable (one cable required per phone) | 1 per phone | E6473B-885 |

Multi-Phone Mobile-to-Office Unit PESQ

Performing PESQ measurements between four mobiles connected to the same PC and an office unit requires these options as well as the multi-phone license and the appropriate technology licenses installed on the PC. You must also have the mobile phones. The B9000A-300 supports up to four mobile phones.

| Description | Quantity | Part Number |
|--|-------------|-------------|
| PESQ single-phone voice MOS test | 1 | B9990A-200 |
| PESQ multi-phone voice MOS test upgrade license | 1 | B9990A-300 |
| 3.5 mm TRS to RCA audio cable (one cable required per phone) | 1 per phone | E6473B-885 |
| Voice quality office unit PESQ MOS test solution (4 lines) | 1 | B9990A-400 |

Add POLQA to Mobile-to-Mobile PESQ (example)

This option will enable POLQA measurements for up to two phones.

| Description | Quantity | Part Number |
|--|----------|-------------|
| POLQA license for two-phone measurements | 1 | B9990A-230 |

Add POLQA to Multi-Phone Mobile-to-Office Unit PESQ (example)

This option will enable POLQA measurements for up to four phones. Because POLQA licenses are incremental, both options 230 and 231 must be ordered.

| Description | Quantity | Part Number |
|--|----------|-------------|
| POLQA license for two-phone measurements | 1 | B9990A-230 |
| POLQA upgrade from two phones to four phones | 1 | B9990A-231 |
| POLQA voice quality office unit software upgrade from PESQ | 1 | B9990A-441 |

Mobile-to-Mobile POLQA

Performing POLQA measurements between two mobiles connected to the same PC requires these options as well as the multi-phone license and the appropriate technology licenses installed on the PC. You must also have the mobile phones.

| Description | Quantity | Part Number |
|--|-------------|-------------|
| POLQA license for two-phone measurements | 1 | B9990A-230 |
| 3.5 mm TRS to RCA audio cable (one cable required per phone) | 1 per phone | E6473B-885 |

Multi-Phone Mobile-to-Office Unit POLQA

To make POLQA measurements between four mobiles connected to the same PC and an office unit requires these options as well as the multi-phone license and the appropriate technology licenses installed on the PC. You must also have the mobile phones. The B9000A-440 can support up to eight mobile phones.

| Description | Quantity | Part Number |
|--|-------------|-------------|
| POLQA license for two-phone measurements voice MOS test | 1 | B9990A-230 |
| POLQA license upgrade from two to four phones | 1 | B9990A-231 |
| 3.5 mm TRS to RCA audio cable (one cable required per phone) | 1 per phone | E6473B-885 |
| POLQA voice quality office unit (8 lines) | 1 | B9990A-440 |



North America
Latin America
Asia Pacific
EMEA

Toll Free: 1 855 ASK-JDSU
Tel: +1 954 688 5660
Tel: +852 2892 0990
Tel: +49 7121 86 2222

(1 855 275-5378)
Fax: +1 954 345 4668
Fax: +852 2892 0770
Fax: +49 7121 86 1222