

Beyond Drive Test: “Walk Test” with RANAdvisor Handheld



Indoor environments account for 70 percent of all mobile voice revenue and 90 percent of all mobile data-service revenue. As a mobile operator,

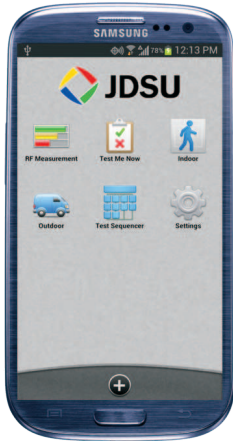
- how do you meet exponentially-increasing subscriber demand for services in malls, stadiums, and even skyscrapers?
- how do you test anywhere and ensure the best quality of service in order to reduce churn?
- what tools are available that are portable, easy-to-use, and safe that cover all my indoor testing needs?

Many of today’s newer data services/device applications, such as FaceTime, social networking, video, location-enabled apps, and multiplayer gaming, have a stationary/indoor use model. This, plus the density of subscribers in confined indoor areas, makes it crucial for operators to ensure adequate RF coverage and capacity for the indoor environments in their service area.

“Indoor demographics are stressing mobile networks, requiring both operators and NEMS to increase their focus on indoor testing to guarantee their services and revenues.”

No Matter the Location, JDSU Can Test It

JDSU is a market leader in traditional drive testing, and thousands of vehicles are equipped with our solution for network RF optimization and service testing. However, vehicle-only solutions mean you cannot test in some outdoor or indoor environments—where most of your subscribers are located and use your services. JDSU has the solution to address this growing challenge. It is simple: Anywhere you can walk, you can test, from the highway to the mallway.



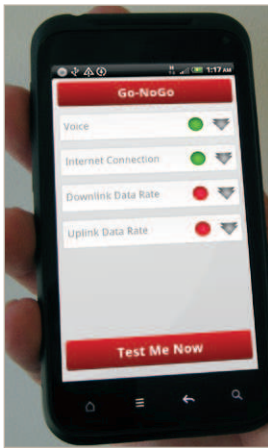
Users access all functionality via a simple GUI and can customize the startup screen to personalize their device.

Easy as 1-2-3

With three simple operating modes for testing and user flexibility, RANAdvisor lets absolutely anyone conduct tests, giving providers ultimate resource flexibility.

OneTouch

OneTouch mode lets anyone who can power on the phone perform pre-configured tests without any intervention. Results can be automatically transferred via FTP to a central server for detailed analysis.

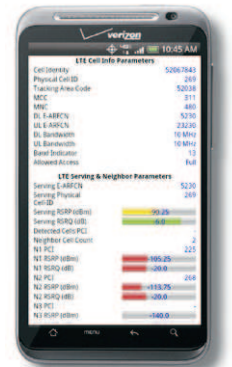


TestMeNow

The TestMeNow mode offers additional flexibility for users without requiring detailed knowledge of the actual RF. TestMeNow can be configured to perform three tests, a voice test, an HTTP test (connect to a website), and an FTP (Put and Get) test, so providers can test their network the way their customers use it. Users can preconfigure, or amend, these three simple tests to verify the three key services delivered to customers at the push of a button and simple pass/fail indicators. Again, all results are captured and stored and can be transferred via FTP to a central server for detailed analysis.

Engineering Mode

Engineering mode provides ultimate flexibility letting users execute any test while giving providers access to all the measurements and tests being performed. The flexible graphical sequencer lets providers pre-configure complex test scenarios that engineers can execute manually, or the device can be configured to execute them automatically.





RANAdvisor Handheld Analysis Options

Log files captured by RANAdvisor Handheld can be analyzed in several ways:

- Directly on the handheld device
- Using RANAdvisor PC software with post-processing tools such as Gladiator™ and Windcatcher™
- At a remote location via FTP upload

Ordering Options

To purchase compatible phone hardware from JDSU, ask your local representative about these options:

Part Number	Description	Frequency Bands (MHz)
E5643B-784	Nokia C5 UMTS/HSPA GPRS/EDGE quad-band test mobile	900/2100
E5643B-785	Nokia C7-00 UMTS/HSPA/GPRS/EDGE test mobile	850/900/1900/2100/AWS
E5643B-800	HTC Desire™ A8181	GSM: 850/900/1800/1900 WCDMA: 900/2100
E5643B-801	HTC Desire A8182 (NAM)	GSM: 850/900/1800/1900 WCDMA: 850/1900
E5643B-802	HTC Thunderbolt™	CDMA/EVDO: 850/1900 LTE: 700(13)
E5643B-804	HTC Vivid™ LTE/WCDMA/GSM	GSM: 850/900/1800/1900 WCDMA: 850/1900/2100 LTE: 700(17)/AWS(4)
E5643B-805	Samsung Skyrocket™ GSM/WCDMA/LTE	GSM: 850/900/1800/1900 WCDMA: 850/1900/2100 LTE: 700(17)/AWS(4)
E5643B-808	HTC Jetstream™ GSM/WCDMA/LTE	GSM: 850/900/1800/1900 WCDMA: 850/1900/2100 LTE: 700(17)/AWS(4)
E5643B-809	Samsung Galaxy S™ III I535 with FTA software for Verizon Wireless	CDMA/EVDO: 850/1900 LTE: 700(13)
E5643B-810	HTC One™ V for Taiwan	
E5643B-811	HTC EVO™ 4G for Sprint	CDMA/EVDO: 850/1900 LTE: 1900(25)
E5643B-812	Samsung Galaxy S III I747 with FTA software for AT&T	GSM: 850/900/1800/1900 WCDMA: 850/1900/2100 LTE: 700(17)/AWS(4)
E5643B-816	Samsung Galaxy S2 LTE (GT-i9210) GSM/WCDMA/LTE	GSM: 850/900/1800/1900 WCDMA: 850/900/1900/2100 LTE: 800(20)/1800(3)/2600(7)
E5643B-817	Samsung Galaxy S3 (GT-i9305) GSM/WCDMA/LTE	GSM: 850/900/1800/1900 WCDMA: 850/900/1900/2100 LTE: 800(20)/1800(3)/2600(7)
E5643B-821	LG Optimus (LGE971) GSM/WCDMA/LTE FTA software (customer-supplied phone)	GSM: 850/900/1800/1900 WCDMA: 850/1900/2100 LTE: 700(17)/2600(7)



Comprehensive test scenarios can be created and executed quickly, with failed tests indicated in red, passed tests in green, and tests being executed in grey.

Key Benefits

- Create serial, parallel, or a combination of serial and parallel sequences
- Share sequences between devices
- Clearly indicates running status

Features

- Unique graphical sequence editor
- Visual, easy-to-use editor

Supported Tests

- Voice
- E-mail
- FTP
- Video
- HTTP
- MT Voice Test
- SMS
- EVDOCH
- MMS
- TraceRT/
TraceRT
Change
- CSFB
- iPERF



Use a Handheld to Test the Network the Way Subscribers Use It

Customers use voice, web, and e-mail in parallel, so providers must be able to test their network the same way. That's why JDSU introduced the unique parallel test sequencer. The sequencer lets users create and run serial and parallel test sequences directly on the device which simplifies user test case setup when stress testing the network. The graphical display updates as the test is running to provide the status of every test. This capability clearly shows which tests are running as well as which tests have passed or failed. This highly graphical solution provides unforeseen flexibility and visibility on a handheld network test tool.

RANAdvisor Handheld supports complex serial and parallel test scenarios that can now be performed using handheld devices. A simple GUI lets users configure tests by simply touching the test and running it serially or in parallel, which was never possible in a handheld device until now. The easy-to-understand screen displays serial tests from top to bottom, with parallel tests shown in the same row.

Engineers can even share test sequences with other users to achieve consistent testing across dispersed teams.

Unattended Operation

Users can also remotely start and stop tests by sending an SMS from a controlling device to either single or multiple test devices. This capability allows for deploying RANAdvisor Handhelds at an unattended location and sending an SMS to start/stop recording with results sent (optionally) to a central server for analysis. JDSU also provides an application for Android phones that will send the start or stop SMS to one or multiple RANAdvisor Handhelds.

Synchronize Multiple RANAdvisor Handhelds via Bluetooth

The ability to control and synchronize up to seven handhelds, typically located in a backpack, from a control handheld is very useful for indoor collection. When recording is started on the controlling handheld, a Bluetooth message is sent to remote handhelds, instructing them to begin recording. This guarantees synchronization which is crucial during this type of testing. During outdoor collection, location information is synchronized via GPS.

During indoor collection, users can use pre-defined waypoint files that guide them through a pre-determined test route or use the "I-am-here" capability to follow a different route. Each waypoint or I-am-here action on the control handheld results in a message being sent via Bluetooth to all remote handhelds, synchronizing their position and test results within the test route with the controlling handheld.

This capability provides a scalable, portable test solution for recording with up to eight devices: one control device and up to seven devices in the backpack. This type of solution is useful to verify multiple operators in parallel, generate load at a specific location, test small cells, or test WiFi hotspots.



Faster Fault Location with Google Visualization

Users can view all measurements in Google maps so they can locate and resolve problems faster. Both street map and satellite views are supported indicating where you are, where you have been, and the signal strength of the area driven.

View Cells on a Map

A cell site database can be loaded into the device that shows the actual cell sites being communicated with on one display.

- Loads cell site files (compatible with drive test files)
- Shows site locations on indoor and outdoor maps
- Shows serving cell for current location
- Shows cell site name on parameter list view

Geo-Locate Indoor Testing

Increased testing of indoor environments requires the ability to locate measurements on a map without GPS satellites. Creating waypoints and using outside GPS measurements makes it easy to view indoor measurements on the mapping interface. Also, it allows for logging the height of the measurements to create complex views of multistory buildings.

- Create and use waypoints to direct collection routes
- Simplify indoor map location using GPS outside the building
- Log indoor map height when testing multiple floors

Lock to a Specific UARFCN

When deploying a new cell site, adding a new overlay frequency at an existing cell-site, or revalidating the existing frequencies deployed, it is sometimes necessary to lock to the selected frequency for testing..

The JDSU solution can lock the device to a specific frequency (UARFCN) guaranteeing that it will remain at that frequency despite network conditions so users can complete the test and validate the frequency band.

When testing an existing or deploying a new frequency, engineers must be able to force/lock their phone to the specific UARFCN under test, irrespective of where they are within the cell coverage area. Using only a commercial handset like the Samsung Galaxy SIII, JDSU can lock to a specific WCDMA frequency (UARFCN), eliminating any possibility of handovers to other UARFCNs or technologies helping providers generate revenues faster. Unlike other forcing solutions, JDSU uniquely offers this capability on popular commercial handsets like the Samsung Galaxy.

The key benefits are enhanced testing speeds and the ability to generate revenues faster from new frequencies.

Test a Specific LTE EARFCN

Similar to UARFCN testing, you can test a specific EARFCN for LTE on selected Samsung Galaxy devices. However, a current limitation in the Qualcomm chipset prevents locking, and handovers may still occur. When using EARFCN preference mode, testers remain at a fixed location within the cell coverage area.

Lock to a Specific CDMA Channel

Several occasions require deploying a new cell site, adding a new overlay frequency at an existing cell-site, or re-validating existing frequencies. RANAdvisor can lock a device to a specific CDMA channel, guaranteeing that it will remain on that channel despite network conditions. This eliminates handovers so users can complete tests without interruption.

Forcing Indicator

RANAdvisor will alert users when forcing is enabled. It is common for engineers to share devices, and this alert lets engineers decide if they want to remain locked to a specific channel/frequency or reset back into normal operation mode.

RRC/NAS Protocol Support

When performing data tests, all IP protocol is captured by the device and can be analyzed with the JDSU SART protocol analysis solution. PCAP files are Wireshark® compatible.

Key Benefits

- Users can customize their screen views
- Choose the number of parameters needed
- Save multiple screen layouts
- Recall saved screen layouts during recording or playback
- Share screen layouts with other users

Customize for the Needs of Each Engineer

Displaying hundreds of parameters helps engineers see everything they want; however, in many cases, they are only interested in specific parameters for each technology. The customizable GUI lets each engineer configure their device to display only the parameters they need to perform their work. For engineers who share devices, each engineer can save their customized view to a profile on the device that they can load when they use the device. Display customization does not impact data capture.



Rugged Storage Case

For the ultimate in portability and outstanding protection, JDSU introduces a new rugged pelican case design to securely cover and store valuable drive test equipment.

Key Benefits

- Rugged design for maximum protection
- Full receiver and device capabilities
- Easily transports wired configurations

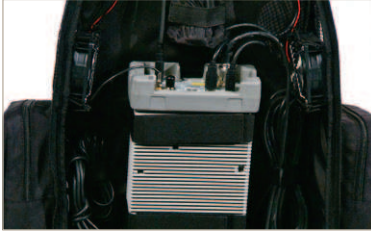
Features

- Integrated 7-port USB hub
- Six devices and one receiver
- Power and USB connections for car cigarette lighter and laptop

Product Options

Option	Description
E6473B-915	Hard carrying case for six phones and one W1214A receiver, including cable and integral 7-port USB hub
E6473B-035	GlobalSat® BU353 GPS receiver
E6473B-036	Trimble® GPS receiver with dead reckoning





Receiver purchased separately

Key Benefits

- Quickly confirm that revenues can be generated from any indoor environment
- Get a faster ROI with a single, multi-technology solution: GSM, UMTS, CDMA, LTE
- Test both RF conditions and services using the devices that subscribers use
- Ensures engineer health and safety with an ergonomic design
- Test where vehicles cannot go, such as stadiums, malls, buildings, and airports
- Easy connection with a laptop/ tablet PC and software

Features

- Lightest, most-comfortable solution for indoor testing: <25 lb
- Supports six handsets, four dongles, and one receiver
- Includes cabling, fans, and battery holders
- All-day testing capability: up to four hot-swap batteries for up to 8 hours of power
- Fast indoor RF coverage mapping with point-and-click waypoints on floor plan
- Supports iBwave file format import

Backpack Solution for RF Optimization

The new JDSU backpack uses the same receiver (ordered separately) and mobile devices that are part of our traditional drive-test solution. However, the fully equipped backpack weighs less than 25 pounds! With a single receiver and up to six mobile devices, the backpack lets users satisfy all their testing needs and ensure all indoor subscribers are served equally as well as those outdoors. The backpack lets users roam where cars cannot—in escalators, stairwells, and other difficult-to-reach places.

Product Options

Option	Description
E6473B-921	Backpack
E6473B-925	Battery pack
E6473B-926	Battery charger
E6474A-627	Lets existing backpack customers upgrade their current backpack system to the cable harness E6474A-930
E6473B-930	Drive test backpack with built-in hub and battery charging power harness



Phones and tablet PC not included

“We’re delighted with our backpack solution—it is the most comfortable, smallest, and lightest on the market.”

Major North American operator

Other Key Capabilities

- LibPCAP support
- Qualcomm DLF format logging
- CDMA/EVDO, RRC/NAS protocol decode support

Sequencer tests

- Circuit switch fall back (CSFB) — key for evaluating LTE and 3G service delivery
- PING — test simple network connectivity, round-trip time, and PING connectivity
- HTTP — configurable to connect to any URL
- FTP — uploads and downloads files from any FTP site, for example, YouTube
- iPERF — measures maximum TCP and UDP bandwidth.
- SMS — tests if an SMS can be sent to itself within a certain time.
- MMS — tests if an MMS can be sent to itself within a certain time.
- E-mail — tests if an e-mail can be sent to itself within a certain time.
- EVDOCH — checks the current EVDO channel and compares it with the requested channel.
- MT Voice
- Video
- Trace RT/Trace RT Change — in normal mode, this test runs a trace route on a data connection and diagnostically determines the route taken to a destination by sending Internet control message protocol (ICMP) echo packets with varying time-to-live (TTL) values to the destination. When configured in change mode, it will alert to any changes in the IP route from the normal test.

Why JDSU?

JDSU is committed to continuously evolving its industry-leading LTE test solutions for end-to-end testing and real-time monitoring. We understand your customers and can help you deploy LTE services quickly, cost-effectively, and in compliance with SLAs.

We can help monetize your network with:

- Control and confidence to meet revenue goals and demanding subscriber requirements
- The most commonly used commercial tool set in LTE networks
- Complete life-cycle support.

Contact your local JDSU salesperson for more information or visit us at www.jdsu.com/lte.

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