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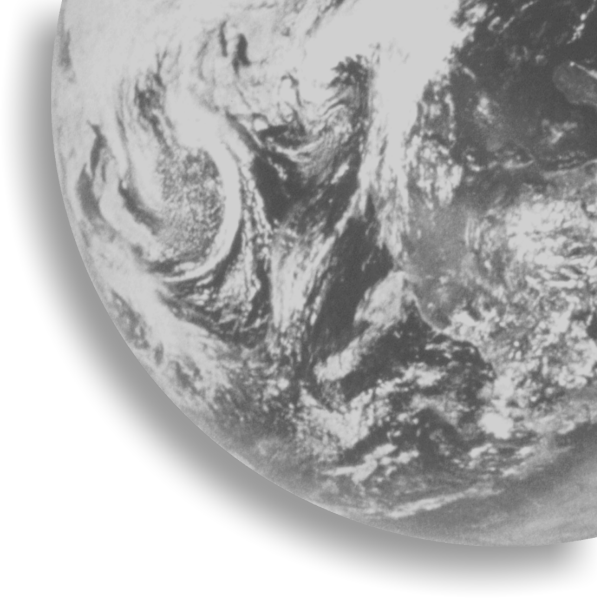
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Agilent Technologies
E7473A CDMA
Wireless Solutions

System Information Guide

Agilent Technologies

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System Information Guide

Agilent Technologies E7473A CDMA Wireless Solutions

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Welcome to Your System Information Guide

Thank you for choosing Agilent Technologies. In this Guide, you'll find the necessary information needed to support your Wireless Solutions system.

For Information on...	See This
Overview of the Agilent Wireless Solutions System	"Introduction" on page 7
Software Specifications	"General System Software Functionality" on page 12
Hardware Specifications	"General Hardware Specifications" on page 41
E7473A System Options	"Agilent E7473A System Options" on page 49
System Accessories	"Agilent 86154A, 86153A System Accessories" on page 57
System Part Number Summary	"Part Number Summary" on page 69

If You Need Help...

To Do This...	See This
View and Print this Guide	Additional Documentation, Chapter 3, *Getting Started Guide*
Contact Agilent Technologies and the Product Web site	**http://www.agilent.com/find/networks**

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Introduction

The E74xx drive test system is a scalable integrated air interface measurement system, used to obtain comprehensive RF measurement and call performance data versus location. Depending on the hardware options you have purchased, you will be able to make measurements on the following technology types:

- CDMA Cellular and PCS band
- TDMA Cellular and PCS band
- GSM900, DCS1800, GSM1900, or GSM900/DCS1800 Dual-band
- W-CDMA (UMTS) (currently not supporting phone measurements), or cdma2000

Receiver-based, phone-based, or combined measurement capabilities are selected via stackable software licenses that reside on a supplied software protection key. Measurement receivers, which can be supplied with or without an internal GPS receiver, are supplied with magnetic mounting antennas, car mounting brackets, and RS-232 connection cables to link to a laptop PC (available as an accessory). Phone software licenses are supplied with dual-port ruggedized PCMCIA serial I/O cards.

The E74xx drive test system is a scalable measurement system for wireless optimization. It has four basic configurations:

- Phone-based measurement system using a single or multiple test mobile phones
- Receiver-based measurement system using a single or multiple digital measurement receivers
- Combined phone and receiver measurement system using a single or multiple receivers and phones
- Basestation Over Air Testing (Model E7490A, CDMA only)

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All of the above configurations can be used for indoor measurement. Measurements are matched to an imported floor plan or map in the absence of GPS.

The system requires a PC with Windows 95/98 or NT 4.0 (or later) running the receiver and/or phone-based measurement software. A navigation system, such as a GPS receiver and GPS antenna, is required to obtain longitude and latitude information for logging the position at which the measurements are taken by the receiver or the phone. This type of measurement can also be accomplished by use of the indoor option in lieu of the GPS option. The GPS receiver may be integrated into the digital receiver or it may be an external device. A suitable laptop PC and external GPS receiver can be supplied as drive test accessory products. The complete system is transportable in a lightweight briefcase that can be supplied as an accessory product.

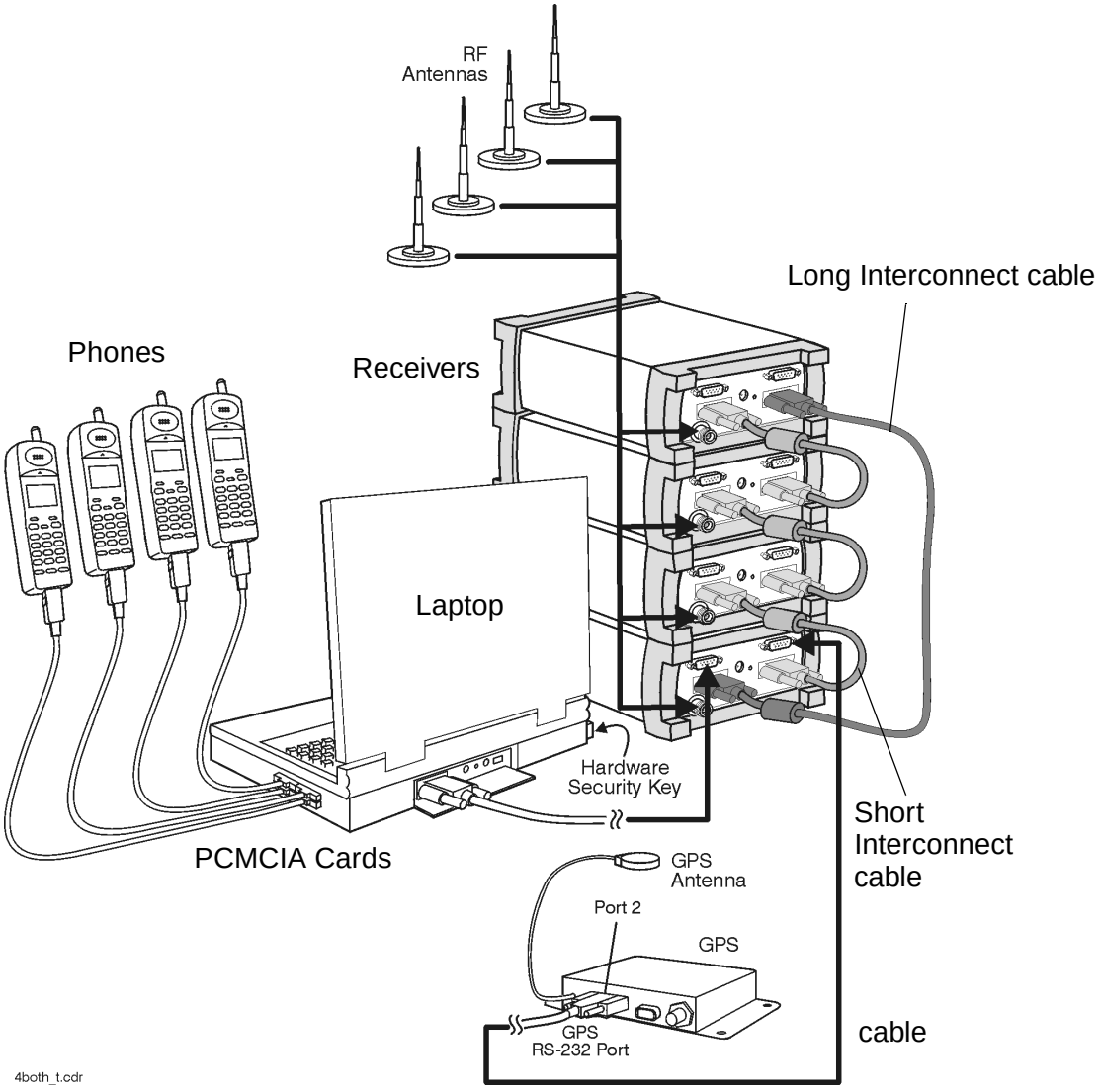
Figure 1 on page 9 illustrates a four phone and four receiver system.

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Figure 1 Four phone and four receiver system

.



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Specifications and Hardware Information

This section lists specifications and characteristics of the systems.

Specifications — Describes warranted performance over the temperature range 0°C to +55°C (unless otherwise noted) after the temperature of the Receiver has been stabilized by 30 minutes of continuous operation.

Typical — Provides useful information by giving non-warranted performance parameters. Typical refers to test data at the fiftieth percentile for a 25°C room temperature.

Characteristics — Provides useful information by giving non-warranted performance parameters. Characteristics describe product information for parameters that are either not subject to variation, non-measurable, verifiable through functional pass/fail tests, or as a matter of routine, not measured. *Characteristics are printed in italics.*

Calibration Cycle

Agilent Technologies warrants instrument specifications over the recommended calibration interval. To maintain specifications, periodic recalibrations are necessary. We recommend that the Receiver be calibrated at an Agilent Technologies service facility every 12 months.

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General System Software Functionality

Some of the functionality of the system is common across all wireless solutions. The following sections describe these cross-solution features.

- "Data Export" on page 12
- "Alarms and Alerts" on page 16
- "Link Editor" on page 19
- "Real-time Mapping (Option 160)" on page 19
- "Report Generation" on page 20
- "Virtual Front Panel Printing" on page 21
- "Indoor Measurements (Option 180)" on page 21

Data Export

All measurement data can be exported from the Agilent Wireless Solutions database for display and post-processing. Any measurement data can be exported. The export function provides flexible filtering capability enabling you to define the specific data to be exported. Multiple data types can be exported to a single output file.

You can save export plans, and once saved, those plans can be quickly accessed for easy data export. An export plan is made up of:

Export Plan Element	Description
Data type	Defines which data will be exported. Column order is user-definable.
Alarm	Defines which alarms will be exported.
Note	Exports any user note or auto-note entered while recording data

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Export Plan Element	Description
Processing functions	Defines the functions that will be applied to the data during export.
Exclusion rules	Defines a set of conditions that, if true, the associated data will be excluded from the export.
Geographic binning	Defines data-reduction process in which the data is averaged based on geographic area or distance

Several different operations can be executed in order to extract the desired data in the desired format.

Processing functions

- None
- Choose
- Count - counts number of values above or below a specified threshold
- Field
- Match
- Maximum
- Minimum
- Sort - ascend or descend
- Value(x)

Conditionals

- Greater than (>) a threshold
- Less than (<) a threshold
- All values

Geographic binning methods

- **Bin size**

  User defines the size in meters of bin to be used.

- **Percentage of low and high values to discard**

  User defines the percentage of values to ignore from new raw data before calculating the bin.

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- **Bin by location (grid binning)**

  Define the reference bin and point of bin to be used, choices are:

  - Center of bin
  - Corner of bin

    Each bin then has the following secondary choices:

  - Southwest extent of drive data
    - Southeast extent of drive data
    - Northwest extent of drive data
    - Northeast extent of drive data
    - User-defined reference coordinates

- **Bin by distance travelled (linear binning)**

  Data is averaged based on the distance traveled.

Data Output Formats

The output formats supported by the Agilent Wireless Solutions are listed below. The system is designed to work with MapInfo®[1] in an integrated manner via an OLE (object link embedded) link to the MapInfo application (MapInfo via COM). With “Run MapBasic” checked, this exports the data, launches MapInfo, creates the necessary MapInfo table, and creates a thematic map display in MapInfo. This functionality requires MapInfo be present.

- Arcview®[2] compatible file
- MapInfo via COM (optional - run MapBasic program after export)
- MapInfo compatible file
- Planet ®[3] compatible file
- Text file

1. MapInfo® is a registered trademark of MapInfo Corp.
2. ArcView ® is a registered trademark of Environmental Systems Research Institute, Inc.
3. Planet ® is a registered trademark of Metapath.

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Export Column Data Delimiters

- Tab
- Comma
- Space

Optional Data Parameters

- Position
- Altitude
- Time
- Date

Optional Settings

- Fill column data
- Column headings
- Sequence Number

Position Formats

- Decimal degrees with direction
- Deg: Min: Sec with direction
- Signed decimal degrees
- Signed Deg: Min: Sec
- UTM (Universal Transverse Mercator)

Coordinate Datums

It is possible to change the coordinate datum being applied by the application. It can be changed during the plan configuration.

The following datums are available:

- AGD66
- AGD84
- European
- Hu-Tzu-Shan
- NAD27 (default) (North American)

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- NAD83 (North American)
- OS36 (GB)
- SAD69 (Brazil)
- SAD69 (Mean)
- Tokyo (J6)
- Tokyo-Korea
- WGS72 (World Geodetic System)
- WGS84 (World Geodetic System)

Alarms and Alerts

The Wireless Solutions Software has sophisticated alarm and alert capabilities. An alarm is a boolean expression made up of one or more conditions on single or multiple measurements, including comparisons of measurement results. An alert is a simplified alarm, defined as a single condition on a single measurement. An action, or actions, can be executed when an alarm or alert occurs. The re-trigger feature re-executes an alarm's actions if all the conditions have continuously been satisfied for a specified amount of time (alarm actions are normally executed only when the conditions transition from unsatisfied to satisfied). If an alert or alarm condition occurs, while data is being logged, each data record includes the alert/alarm information.

Alarm Wizard

The alarm wizard can be used to simplify setting up some of the more common alarms.

Features of the Alarm Wizard Set up

- Specify type of alarm required
- Receive notification of new or changed measurements
- Receive notification of resources required
- Customize settings, actions and other user-definable aspects
- Set default Male and Female voice alarm messages

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Actions (Alarms and Alerts)

- Play a .WAV audio file
- Display a text message
- Pause recording, Continue (resume) recording, or Stop recording measurements

Alert Conditions

- Greater than (>)
- Greater than or equal to (≥)
- Less than (<)
- Less than or equal to (≤)
- Equal to (=)
- Not equal to (≠)

Alert Operators

- Value
- Delta
- Maximum
- Minimum

Alarm Conditions

- Greater than (>)
- Greater than or equal to (≥)
- Less than (<)
- Less than or equal to (≤)
- Equal to (=)
- Not equal to (≠)
- Is a subset
- Is not a subset
- Sets intersect
- Sets do not intersect
- Range (inclusive)
- Range (exclusive)

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Alarm Preprocess Operators

- Value
- Maximum
- Minimum
- Subset
- Average
- Count
- Delta
- dField (a change in field value)
- Field
- MaxField
- MinField
- Median

Alarm Condition Operators

- OR
- AND
- XOR (exclusive OR)

Any measurement can be an operand in an alert or alarm. Below are some examples of alerts and alarms.

- **Alerts**

    1. Minimum (CW Power Trace) > -90 dBm
    2. Maximum(Spectrum) < -100 dBm

- **Alarms**

    3. (Heading < 300) and (GPS FIX Type = GPS 3D)
    4. Subset (CW Power Trace) NOT Subset (value Channel Power List)

System status parameters can also be used as operands in alerts and alarms. For example, an alert can be set to trigger when the available disk space on the PC drops below 10 MB or when the GPS position fix is lost.

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Link Editor

The Link Editor is available from the Tools menu and enables you to link controls in one virtual front panel (the source) with parameters in another virtual front panel (the destination). Links can be configured from either Configuration mode or Collection mode. You can:

- Link simple measurement results to parameters for other measurements.
- Link measurement parameters to parameters for other measurements.
- Invoke an action (such as a button click) on all virtual front panels of the same type.
- Invoke an action (such as a button click) on a select set of virtual front panels of the same type.

Real-time Mapping (Option 160)

Using the Positioning virtual front panel, you can display vector and raster-based maps against a real-time, plotted measurement result. The following features are available:

- Load and control map layers (TAB format).
- Add raster maps (GIF, TIF, and PNG format).
- Zoom in and Zoom out of map detail.
- Pan automatically and manually.
- Scale automatically and manually.
- Add labels and identify points.
- Display alarms or notes on map. Click on alarm or note symbol to display the message associated with the alarm or note.
- Link a measurement result, via the link editor for display on the map as a thematic value.

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- Map result values, in color, via the legend button. Pre-defined legends exist for most common measurement results.
- Specify base stations in StationInfo.txt to have them display on the map.
- Link the active server for a phone to the map and the program will draw a vector line from the current position to the appropriate base station.

Report Generation

The report generator is accessed using the **Tools > New Report** (Ctrl+R) menu option, or by clicking the report generator button in Collection mode. The reports generated are in HTML format with referenced images, which are captured in PNG format. The reports and images are stored in the report folder (if default installation was used:
C:\Program Files\Agilent Technologies\E74xx\Reports\reportname\). The following details can be entered by the user:

- Title (also used for the report folder name)
- User name
- Company name
- Time report generated. By default, this is the PC system time.
- Date. By default, this is the PC system date.
- Location. By default, these are the GPS coordinates identified at the time the report was generated.
- Comments. This is optional text, entered by the user.
- A report can include all opened Virtual Front Panels, or just those minimized.
- A report may also contain textual and/or table information for specific measurements.

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Once the report has been generated, it is displayed on the screen, using your default browser. Reports can be viewed by selecting the Reports tab while in Configuration mode. Reports can be imported and exported.

Virtual Front Panel Printing

It is possible to print virtual front panels. This feature is accessed from the File menu. There are two print commands:

- Print (Ctrl+P) prints the application main window and all other virtual front panels.
- Print VFP prints just the active virtual front panel.

The active virtual front panel is the window with the blue title bar (if default windows colors are used).

Indoor Measurements (Option 180)

The Agilent Wireless Solutions Software can be used for testing and measuring indoor coverage areas. These measurements are taken without reference to GPS or dead-reckoning position information.

An indoor system supports the following hardware:

- Phones
- Receivers (no PN correlation for CDMA)
- Pen tablet computer
- Computer pen input devices
- Full set of backpack accessories
- Portable power supply for computer and receiver

The measurement control virtual front panel has the following features

- Selection of data points, such as user features like CW sources

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- Waypoint information to specify distribution of data between two waypoints.
- Automatic interpolation of data between waypoints, during recording
- Imported maps converted to layer map files. Supports GIF, TIF, and PNG formats
- Zoom in and zoom out of map area.
- Automatic and manual pan.
- Automatic and manual scaling.
- Display alarms and notes on map. Click on alarm or note symbol to display the message associated with the alarm or note.
- Link measurements to display thematic values.
- Map result values in color via the legend button. Pre-defined legends exist for most common measurement results.

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Agilent E7473A Software Specifications

Software Measurement Specifications

The Agilent E7473A measurement software has the following measurement capabilities and functionality:

- "CDMA Pilot Channel Analysis" on page 23
- "CW Power Measurements" on page 26
- "Channel Power Measurements" on page 27
- "Spectrum Measurements" on page 29
- "CDMA Phone Call Control" on page 31
- "CDMA Phone Measurement Data" on page 33
- "CDMA Phone Messaging" on page 34
- "CDMA Code Domain Power (CDP) Analysis" on page 34
- "CDMA Base Station Spectrum Analysis" on page 36
- "CDMA Mobile Station Test Measurement (MOST)" on page 37
- "CDMA Post-Processing Software (Agilent E7480A)" on page 39

CDMA Pilot Channel Analysis

CDMA pilot channel analysis may be carried out using the Pilot virtual front panel. These measurements are part of Agilent E7473A Option 110, 120.

The Agilent E7473A system is capable of measuring IS-95, cdma2000, and J-STD-008 CDMA pilot channels using the Agilent digital receiver. These measurements are independent of network parameter settings. The system executes four different types of CDMA pilot channel measurements (listed below). Any or all of them can be executed simultaneously.

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Measurement Types

- **All pilots**

  The System measures the power, both Ec and Ec/Io for all 512 pilot channels. The results are displayed as a trace with one point for each of the 512 PN offsets.

- **Top N**

  The system measures all of the pilots in the network and returns the ‘N’ Strongest pilot channels received, where ‘N’ is a user definable integer from 1 to 20. The results are displayed in bar graph format.

- **Zoomed pilots**

  The user sets the center and span in terms of chips (or PN offsets). The results are displayed as a trace.

- **User list**

  The user manually inputs a list of up to 20 PN offsets to be measured. The measurements are displayed in a bar graph format. The user list frequencies can be imported from a text file. This allows regularly used sets of frequencies or channels to be stored for quick loading into the application.

Measurement Controls

- Averaging
- Carrier frequency
  - Frequency
  - Channel
- Measurement types
  - All pilots
  - TopN pilots
  - Zoomed pilots
  - User list of pilots
- Band
  - Uplink

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  - Downlink
- PN increment

Markers (Trace Displays only)

- Multiple markers
- Delta markers
- To Max function
- Point and click
- Marker to center

Display Controls

- Power display (Y-axis parameter)
  - Ec/Io
  - Ec
- Show value (bar graphs only)
  - Peak Ec/Io
  - Peak Ec
  - Aggregate Ec/Io
  - Aggregate Ec
  - Aggregate - Peak
  - Delay Spread(Chips)
  - Pilot delay (Chips)

Measurement Results

- Peak Ec/Io
- Peak Ec
- Io
- Aggregate Ec/Io
- Aggregate Ec
- Aggregate - Peak
- Delay spread
- Pilot delay
- Carrier frequency error

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Peak pilot power (both Ec and Ec/Io) are computed by selecting the strongest peak of the correlation for each pilot. **Io** is the total received power integrated across the entire 1.2288 MHz signal bandwidth.

Aggregate pilot power (both Ec and Ec/Io) is computed for a given pilot by integrating the power received over the time dispersion of that pilot. **Delay spread** is the duration of time over which this power is dispersed. Both aggregate pilot power and delay spread are determined with respect to an Ec/Io threshold of -17 dB. The system also reports the difference between the aggregate and peak pilot power (**Aggregate-Peak**). This difference along with the delay spread provides a characterization of the multipath effect on that pilot.

Pilot delay is defined as the difference in time between when a pilot signal is received and when it should have been transmitted, as defined by GPS timing. For example, a base station transmitting PN offset 0 is expected to start a new short-code pattern synchronous with the GPS even second clock. If the signal is received 3 chips after the GPS even second clock, then the pilot delay is said to be 3 chips (1 chip = 0.8 microseconds). Timing offsets can be due to both propagation delay and base station timing problems.

Carrier Frequency Error is defined as the difference between the measured carrier frequency and the user specified carrier frequency. The measured carrier frequency is of the dominant pilot signal. Carrier frequency error can be due to both base station carrier error and doppler shift (if moving).

CW Power Measurements

CW power measurements can be carried out using the Power virtual front panel. These measurements are part of Agilent E7473A Option 110, 120.

The Agilent E7473A can measure the peak power (CW Power) at user-defined frequencies within a user-defined resolution bandwidth. The user can define the frequencies to be measured in two different ways.

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Frequency Entry Methods

- **List**: Enter a list of up to 20 frequencies. The user list frequencies can be imported from a text file. This allows regularly used sets of frequencies or channels to be stored for quick loading into the application.
- **Trace**: Enter a start frequency, step size, and count. The system measures at the start frequency, at the (start + step) frequency, (start + (count - 1)*step) frequency. For example, if the start frequency is set to 1900 MHz, the step size is set to 1 MHz, and the count is set to 4; then measurements are made at 1900 MHz, 1901 MHz, 1902 MHz, and 1903 MHz. Frequencies can be specified in terms of frequency units or channel number.

Measurement Controls

- Band
  - Uplink
  - Downlink
- Averaging
- Frequency
  - Arbitrary list (list)
  - Start/step/count (trace)
- IF Bandwidth
  - 1.25 MHz in wideband mode
  - 30 kHz or 200 kHz in narrowband mode (options 390 and 391 only)
- Resolution Bandwidth (CW power, all other options)
  - 8.36 kHz to 1 MHz in wideband mode
  - 246 Hz to 28 kHz in narrowband mode
- Resolution bandwidth (CW power, Option 390 and 391 only)
  - 8.36 kHz to 950 kHz in wideband mode
  - 1.68 kHz to 190 kHz in narrowband mode

Channel Power Measurements

Channel power measurements can be carried out using the Power virtual front panel. These measurements are part of Agilent E7473A Option 110, 120.

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The Agilent E7473A system can measure the total power (Channel Power) within a user-defined bandwidth at a user-defined set of frequencies. This differs from the CW power measurement in that the total power is integrated across the specified channel width. The user can define frequencies to be measured in two different ways.

Frequency Entry Methods

- **List**: Enter an arbitrary list of frequencies. The user list frequencies can be imported from a text file. This allows regularly used sets of frequencies or channels to be stored for quick loading into the application.
- **Trace**: Enter a start frequency, step size, and count. The system measures at the start frequency, at the (start + step) frequency,..., (start + (count - 1)*step) frequency. For example, if the start frequency is set to 1900 MHz, the step size is set to 1 MHz, and the count is set to 4; the measurements are made at 1900 MHz, 1901 MHz, 1902 MHz and 1903 MHz.

Frequencies can be specified in terms of frequency units or channel number.

Measurement Controls

- Averaging
- Band
  - Uplink
  - Downlink
- Frequency
  - Arbitrary list (list)
  - Start/step/count (trace)
- IF Bandwidth
  - 1.25 MHz in wideband mode
  - 30 kHz or 200 kHz in narrowband mode (options 390 and 391 only)
- Resolution bandwidth (CW power only)
  - 8.36 kHz to 1 MHz in wideband mode
  - 246 Hz to 28 kHz in narrowband mode

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- Channel width (channel power only)
  - Agilent E7473A Option 320/330
    - 8.36 kHz to 60 MHz in wideband mode
    - 246 Hz to 60 MHz in narrowband mode
  - Agilent E7473A Option 300/310. 380/381
    - 8.36 kHz to 25 MHz in wideband mode
    - 246 Hz to 25 MHz in narrowband mode
  - Agilent E7473A Option 390/391
    - 30 kHz to 75 MHz in wideband mode
    - 5 kHz to 75 MHz in narrowband mode

Spectrum Measurements

These measurements are part of Agilent E7473A Option 110, 120.

The Spectrum virtual front panel can be used to quickly diagnose RF problems. The system operates in both the downlink and uplink bands. The spectrum display provides the controls listed below. Frequencies can be specified in terms of frequency units or channel number.

Measurement Controls

- Frequency, tunable range[1]
  - Agilent E7473A Option 320/330
    - 1850 - 1910 MHz [1845 - 1915 MHz]
    - 1930 - 1990 MHz [1925 - 1995 MHz]
  - Agilent E7473A Option 300/310
    - 824 - 849 MHz [819 - 854 MHz]
    - 869 - 894 MHz [864 - 899 MHz]

1. Spectrum measurement allows some out of band tuning above and below specified frequency ranges. These extended ranges are shown in brackets - []. The performance is not specified in these ranges. Characteristic noise floor increase is 2 dB with respect to specified range. Characteristic amplitude accuracy is unchanged with respect to specified range.

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  - Agilent E7473A Option 380/381
    - 832 - 870 MHz [827 - 875 MHz]
    - 887 - 925 MHz [882 - 930 MHz]
  - Agilent E7473A Option 390/391
    - 1710 - 1785 MHz [1705 - 1790 MHz]
    - 1805 - 1880 MHz [1800 - 1885 MHz]
- Frequency, maximum span
  - Agilent E7473A Option 320/330
    - 70 MHz
  - Agilent E7473A Option 300/310
    - 35 MHz
  - Agilent E7473A Option 380/381
    - 48 MHz
  - Agilent E7473A Option 390/391
    - 85 MHz
- IF Bandwidth
  - 1.25 MHz in wideband mode
  - 30 kHz or 200 kHz in narrowband mode (options 390 and 391 only)
- Resolution bandwidth
  - 8.36 kHz to 1 MHz in wideband mode
  - 246 Hz to 28 kHz in narrowband mode
- Resolution bandwidth (Options 390/391 only)
  - 8.36 kHz to 950 kHz in wideband mode
  - 1.68 kHz to 190 kHz in narrowband mode

Markers

- Multiple markers
- Delta markers
- To Max function
- Point and click
- Marker to center

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CDMA Phone functionality

These measurements are part of Agilent E7473A Option 100, 120, 150.

The phone component of the Agilent E7473A system includes three main functions. Each one is associated with a control/display window called a virtual front panel.

- CDMA phone call control (see page 31)
- CDMA phone measurement data (see page 33)
- CDMA phone Messaging (see page 34)

CDMA Phone Call Control

This functionality provides automated control of the handset from the PC. The Phone call control virtual front panel provides the control functions listed below.

Call controls

- Call initiation mode
  - Sequence
  - Single (long) call
  - Termination
- Call initiation control
  - Start/continue
  - Pause
  - Stop
- Automatic call sequencing
  - Access time (duration of call)
  - Redial wait (duration between calls)
  - Total calls (number of calls to be executed)
- Automatic Redial
  - On a dropped call
  - On a blocked call (failed origination)
  - Redial interval (wait duration after drop or block)

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  - Maximum redial attempts
- Phone number entry
- Call type pick list
  - Voice (8 or 13 kbps)
  - Markov (set 1 or set 2)
  - Loopback (8 or 13 kbps)
  - Enhanced Variable Rate Codec (EVRC)

State Controls

- No analog (forces dual mode phone to stay in digital mode)
- Log to file (creates binary file)

Statistics logging controls

- Attempted calls
- Dropped calls
- Blocked calls (failed originations)
- Markov data

In addition to control functionality, the Phone Call Control virtual front panel displays the information listed below.

Display fields (text)

- Channel
- Call information
  - Access time counter
  - Redial time counter
  - Calls remaining
- Statistics
  - Dropped call rate
  - Blocked call rate
  - Total attempts
  - Total drops
  - Total blocks

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CDMA Phone Measurement Data

The Agilent E7473A system extracts various measurement data from the mobile handset. You control extraction of the specific measurement types with a set of check boxes. The Phone virtual front panel provides the data types are listed below.

Display fields (text)

- State
- Status (mode)
- SAT
- PN increment
- Tx Adj (Tx gain adjacent)
- RSSI (mobile received power)
- Tx Power (mobile transmit power)
- FER (frame erasure rate)
- Ec/Io
  - Aggregate
  - Dominant

Tabular displays

- PN list

Bar graph displays

- Finger data (TA fingers)
- Pilot data
  - Active
  - Candidate
  - Neighbor

Line graph displays

- Rx / Tx level
- Temporal analyzer (TA searcher)

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CDMA Phone Messaging

CDMA phone messaging display is carried out using the Phone messaging virtual front panel. The Agilent E7473A system extracts and decodes the layer 3 over-the-air messaging from the handset. The user can select any or all of the channel types listed below from which to extract and decode messaging.

Message logging controls

- Log to display
- Snapshot

Message type selection controls

- Access
- Paging
- Sync
- Forward traffic
- Reverse traffic

In the messaging display, the user can double-click on any message to expand it to the next level of detail. A snapshot function captures the last 50 messages to a separate display while the main display continues to update.

CDMA Code Domain Power (CDP) Analysis

This analysis can be carried out using the Code Domain Power virtual front panel. These measurements are part of Agilent E7473A option 111.

Measurement Types

- **Top N**

  The system measures all signals in the network and returns the ‘N’strongest power pilot signals received. Where ‘N’ is a user-definable integer from 1 to 20 (when options 110 or 120 are

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included). Otherwise the top 2 pilots are displayed to determine pilot dominance. The results are displayed in bar graph format.

- **CDP Trace**

  The system shows the power of each Walsh code and its relative status.

- **CDP Stats**

  The system reports the statistics from one or more predefined lists selected from the display controls. These lists are:

  - modulation stats
  - channel stats
  - All (both)

Measurement Controls

- Carrier frequency
  - Frequency
  - Channel
- Measurement types
  - Top N
  - CDP trace
  - CDP stats and CDP reset

Display Controls

- Power display (Y-axis parameter)
  - Ec/Io
  - Ec
- Show value (bar graphs only)
  - None
  - Delay (chips)
  - Ec (dBm)
  - Ec/Io (dB)
  - Aggregate Ec (dBm)
  - Aggregate Ec/Io (dB)
  - Delay spread(chips)

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- Aggregate - Peak (dB)

- CDP stats display list
  - Modulation statistics
    - PN
    - Delay
    - Estimated rho
    - Delta paging
    - Delta sync
    - Noise floor
    - Carrier feedthrough
    - Multiplath power
    - Pilot dominance
    - Pilot power, Ec
    - Channel power, Io
    - Channel, carrier
  - Channel Statistics
    - Multipath power
    - Pilot dominance
    - Percentage amplitude
    - Relative power of traffic channel
    - Average relative power of active traffic channel
    - Number of active traffic channels
    - Peak held across all active traffic channels
    - Average across all active channels
  - All lists

CDMA Base Station Spectrum Analysis

This analysis can be carried out using the Base Station Analysis virtual front panel. These measurements are part of Agilent E7473A option 111.

The spectral mask measurement enables you to visually determine whether the signals in your band meet the IS-97C specifications.

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Measurement Types

- Spectral mask
  - Frequency segments against which the spectrum is measured
  - Pass or fail of transmit power within each frequency segment
  - Frequency difference between center and spur of worst spurious signal
  - Amplitude difference from spur to limit line for worst spurious signal

Measurement Controls

- Frequency units
  - Frequency
  - Channel
- Carrier
- Band
  - Uplink
  - Downlink
- Span
- Averages

Display Controls - Markers

- Multiple markers
- Delta markers
- To Max function
- Drag and drop
- Marker to center

CDMA Mobile Station Test Measurement (MOST)

These measurements can be carried out using the CDMA Mobile Station Test (MOST) virtual front panel. These measurements are part of Agilent E7473A option 101.

The Mobile station test measurement (MOST) measures quality, automates the measurement actions, and records the results of the measurement. You

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enter the call number, the length of the call, and the code key sequence. The MOST test forces the phone to hand the call to the next channel element. It records data for the phone on the forward link, including notes, date, and time. FER, Walsh, and MOST messaging codes are recorded for every channel element tested.

Call Status Fields

- Channel
- Site
- Face
- Cluster control
- Channel unit
- Channel element
- FER
- Sequence number
- Walsh code

Automatic Redial

- On a dropped call
- On a blocked call (failed origination)
- Redial interval (wait duration after drop or block)
- Maximum redial attempts

Call Test Setup Fields

- Directory number
- Function code
- Test interval
- Number of iterations

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CDMA Post-Processing Software (Agilent E7480A)

You can import E7473A data directly from many post-processing software products, including Agilent E7480A post-processing software. The Agilent E7480A is an optimization and performance-monitoring tool designed to process large amounts of collected data to simplify the task of optimization. The Agilent E7480A software provides the ability to analyze one or multiple drives at a time through either separate maps, or together in a merged format.

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General Hardware Specifications

Personal Computer Recommendations, Minimum

The PC requirements differ depending on the operating system, and on whether you wish to collect data from a single phone or multiple phones.

Single phone

- Windows 95/98
  - Minimum: 233 MHz Pentium, 64 Mbytes RAM
  - Recommended: 266 MHz Pentium II or III, 64 Mbytes RAM
- Windows NT/2000
  - Minimum: 233 MHz Pentium, 64 Mbytes RAM
  - Recommended: 266 MHz Pentium II or III, 128 Mbytes RAM

Multiple phone

- Windows 95/98
  - Minimum: 266 MHz Pentium, 64 Mbytes RAM
  - Recommended: 366 MHz Pentium II or III, 64 Mbytes RAM
- Windows NT/2000
  - Minimum: 266 MHz Pentium, 64 Mbytes RAM
  - Recommended: 366 MHz Pentium II or III, 128 Mbytes RAM

Common Requirements

- RS-232 DB9 Serial Port
- Parallel port: 25-pin bidirectional
- 90 Mbytes disk space for software installation
- 200 Mbytes disk space for data (recommended)
- CD-ROM drive recommended
- 800 x 600 display resolution minimum

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- For multiple phone capability
  - Two PCMCIA slots
  - USB port with USB/serial hub (recommended)

External GPS Receiver Requirements[1]

- TSIP, TAIP, or NMEA communication protocol
- RS-232 (DB9) interface

GPS and Vehicle Fitted Navigation Systems Supported

- Bosch Travel Pilot RGS08 Professional
- Magneti Marelli RP Nav200
- GARMIN GPSII/III/IIIplus
- Trimble DR
- Trimble 455/DR and 450
- Trimble SVeeSix
- Trimble 400

Differential GPS Receiver Requirements

- DCI RDS-3000

Antennas

- Receiver RF input specifications:
  - Input impedance: 50Ω
  - Connector type: Type-N

1. For Agilent E7473A CDMA options 110, 111, or 120 and Agilent E7490A option 111, or Agilent E7476A option 110, any external GPS will have to output a GPS 1 pulse/second signal for improved frequency accuracy.

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E7473A and Hardware Specifications

For full details on receiver types and options, refer to the appropriate system options section in this guide.

Agilent E7473A and Option 300/310, 380/381 Cellular Receiver Specifications

Model		E6452A Receiver Options 300, 310	E6452A-H02 Options 380, 381
Frequency	Frequency range	824 to 849 MHz 869 to 894 MHz	832 to 870 MHz 887 to 925 MHz
	Frequency accuracy *With GPS time synchronization*	±1 ppm *±0.05 ppm, characteristic*	
	IF bandwidth	1.25 MHz, characteristic 30 kHz, characteristic	1.25 MHz, characteristic 30 kHz, characteristic
	Aging of TCXO	±1 ppm/year	
Amplitude	Accuracy, 1.25 MHz IF	±1 dB from –40 dBm to –100 dBm (20° to 30°C) ±2 dB from –40 dBm to –100 dBm (0° to 55°C)	±1 dB from –40 dBm to –100 dBm (20° to 30°C) ±2 dB from –50 dBm to –100 dBm (0° to 55°C) ±3 dB from –40 dBm to –50 dBm (0° to 55°C)
	Accuracy, 30 kHz IF	±1.5 dB from –40 dBm to –100 dBm (20° to 30°C) ±2.5 dB from –40 dBm to –100 dBm (0° to 55°C)	
	Noise figure	8.0 dB typical	
	Maximum safe input level	+10 dBm, 20V DC, characteristic	

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Model		E6452A Receiver Options 300, 310	E6452A-H02 Options 380, 381
	1 dB compression point [a]	–15 dBm, characteristic	
	Adjacent channel desensitization [b]	–25 dBm typical	
	Adjacent channel rejection[c]	45 dB typical	
	Internally generated spurious, input referred	–120 dBm	
Input/Output	RF input	50Ω Type-N	
Connectors	Computer	RS-232 (DB9) Male	
	GPS	RS-232 (DB9) Male	
	Power	DC power jack 100 mils, positive center	
Miscellaneous	Operating temperature range	0°C to 55°C	
	Maximum relative humidity	80% for temperatures up to 31°C, decreasing linearly to 50% relative humidity at 40°C	
	Storage temperature range	–40°C to +70°C	
	Dimensions	6 in × 3-5/8 in × 8 in 15.24 cm x 9.21 cm x 20.32 cm	
	Weight	4.6 lbs (2.1 kg)	
	Power (option 300, 380)	9 to 34 V DC, 9W	
	Power (internal GPS, option 310, 381)	9 to 34 V DC, 10W	
	Transformer AC Power (supplied with receiver)	100 - 240 Volts AC 50 - 60 Hz	
Internal GPS[d] (Option 310 & 381)	GPS Receiver	8 Channel internal GPS receiver	
	Connector type	SMA	
	Differential compatible without dead reckoning		

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a. It is recommended the input signal level not exceed –40 dBm.
b. Adjacent channel desensitization: 1 dB compression of tuned signal with interfering signal 1.25 MHz from tuned signal.
c. Adjacent channel rejection applies to the narrowband mode (30 kHz IF filter) and is defined as: Suppression of interfering signal ± 30 kHz from tuned signal for 30 kHz.
d. Systems fitted with an internal GPS do not support connection to external GPS receivers.

Agilent E7473A and Option 320/330, 390/391 PCS Receiver Specifications

Model		E6450B Receiver Options 320, 330	E6453A Receiver Options 390, 391
Frequency	Frequency range	1850 to 1910 MHz 1930 to 1990 MHz	1710 to 1785 MHz 1805 to 1880 MHz
	Frequency accuracy *With GPS time synchronization*	±1 ppm *±0.05 ppm, characteristic*	
	IF bandwidth (wideband mode)	1.25 MHz, characteristic	1.25 MHz characteristic
	IF bandwidth (narrowband mode)	30 kHz, characteristic	200 kHz, characteristic
	Aging of TCXO	±1 ppm/year	
Amplitude	Accuracy 1.25 MHz IF	±1 dB from –40 dBm to –100 dBm (20° to 30°C) ±2 dB from –40 dBm to –100 dBm (0° to 55°C)	± 0.5 typical (-25 dBm to -100 dBm)
	Accuracy, 30 kHz IF	±1.5 dB from –40 dBm to –100 dBm (20° to 30°C) ± 2.5 dB from –40 dBm to -100 dBm (0° to 55°C)	
	Accuracy, 200 kHz IF		± 0.5 typical (-25 dBm to -100 dBm)
	Noise figure	8.0 dB typical	
	Maximum safe input level	+10 dBm, 20V DC, characteristic	

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Model		E6450B Receiver Options 320, 330	E6453A Receiver Options 390, 391
	1 dB compression point [a]	–15 dBm, characteristic	
	Adjacent channel desensitization [b]	–25 dBm typical	
	Adjacent channel rejection[c]	45 dB typical	
	Internally generated spurious, input referred	–120 dBm	
Input/Output	RF input	50Ω Type-N	
Connectors	Computer	RS-232 (DB9) Male	
	GPS	RS-232 (DB9) Male	
	Power	DC power jack 100 mils, positive center	
Miscellaneous	Operating temperature range	0°C to 55°C	
	Maximum relative humidity	80% for temperatures up to 31°C, decreasing linearly to 50% relative humidity at 40°C	
	Storage temperature range	–40°C to +70°C	
	Dimensions	6 in x 3-5/8 in x 8 in 15.24 cm x 9.21 cm x 20.32 cm	
	Weight	4.6 lbs (2.1 kg)	
	Power (option 320, 390) Power (internal GPS option 330, 391)	9 to 34 V DC, 9W 9 to 34 V DC, 10W	
	AC Power	100 - 240 Volts AC 50 - 60 Hz	
Internal GPS[d] (Option 330 & 391)	GPS Receiver	8 Channel internal GPS receiver	
	Connector type	SMA	
	Differential compatible without dead reckoning		

a. It is recommended the input signal level not exceed –40 dBm.

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b. Adjacent channel desensitization applies to wideband mode (1.25 MHz IF filter) and is defined as: 1 dB compression of tuned signal with interfering signal 1.25 MHz from tuned signal.
c. Adjacent channel rejection applies to the narrowband mode (30 kHz and 200 kHz IF filter) and is defined as: Suppression of interfering signal ± 30 kHz from tuned signal and ± 200 kHz from tuned signal for 200 kHz.
d. Systems fitted with an internal GPS do not support connection to external GPS receivers.

Supported Phones

- Qualcomm QCP-800, QCP-820, QCP-860, QCP-1900, QCP-1920, QCP-1960, QCP-2700, QCP-2760
- Sony CM-D500, CM-D600, CM-M1300, CM-B1201SPR, CM-S1101SPR
- Samsung SCH-1000
- Samsung CDMA 2000
- Lucky Goldstar LG1300 Korean PCS
- Toshiba CM10 for Cellular J-CDMA

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Agilent E7473A System Options

For details on the measurement capabilities and setting up your system, refer to the *Getting Started Guide* shipped with your system. Contact your local Agilent sales and service office for information about ordering these options

.

Option	Description	More Details On Page
100	CDMA Phone software license	page 50
101	CDMA Phone Mobile Station Test (MOST) software license	page 50
110	CDMA Receiver software license	page 50
111	CDMA Code Domain and Spectrum Mask software license	page 51
120	CDMA Receiver and Phone software license	page 51
150	CDMA Multiple Phone software license	page 51
160	Real-Time Mapping software license	page 51
180	Indoor Measurement software license	page 51
300	Cellular Band Receiver (824-849 MHz and 869-894 MHz)	page 52
310	Cellular Band Receiver (824-849 MHz and 869-894 MHz) with internal GPS	page 52
320	PCS Band Receiver (1850-1910 MHz and 1930-1990 MHz)	page 53
330	PCS Band Receiver (1850-1910 MHz and 1930-1990 MHz) with internal GPS	page 53
380	J-CDMA Band Receiver (832-870 MHz and 887-925 MHz)	page 54

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Agilent E7473A System Options

Option	Description	More Details On Page
381	J-CDMA Band Receiver (832-870 MHz and 887-925 MHz) with internal GPS	page 54
390	Korean PCS Band Receiver (1710-1785 MHz and 1805-1880 MHz)	page 55
391	Korean PCS Band Receiver (1710-1785 MHz and 1805-1880 MHz) with internal GPS	page 55

Software License Options

Option	Part Number	Description
100		• CDMA Phone software license • Software CD • Software License security key • Dual port PCMCIA serial I/O card
	E7474-90009	• Getting Started Guide
	E7473-90019	• System Information Guide
101		• CDMA Phone Mobile Station Test (MOST) software license • Software CD • Software License security key • Single Port I/O Card or Dual Port I/O Card
	E7474-90009	• Getting Started Guide
	E7473-90019	• System Information Guide
110		• CDMA Receiver software license • Software CD • Software License security key
	E7474-90009	• Getting Started Guide
	E7473-90019	• System Information Guide

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Agilent E7473A System Options

Option	Part Number	Description
111		• CDMA Code Domain and Spectrum Mask softrware license • Software CD • Software License security key
	E7474-90009	• Getting Started Guide
	E7473-90019	• System Information Guide
120		• CDMA Receiver and Phone software license • Software CD • Software License security key • Dual port PCMCIA serial I/O card
	E7474-90009	• Getting Started Guide
	E7473-90019	• System Information Guide
150[a]		• CDMA Multiple Phone software license • Software License security key • Dual port PCMCIA serial I/O card
160		• Real-Time Mapping software license • Software CD • Software License Security Key
180[b]		• Indoor Measurement software license • Software CD • Software License security key
	E7474-90010	• Indoor Getting Started Guide
	E7473-90019	• System Information Guide

a. Option 150 may be purchased as an upgrade software license with options 100 or 120, or it may be purchased separately. For more information on transferring licenses between security keys, refer to the License Manager online help.

b. Enables indoor measurement correlation to an imported floor plan/map in the absence of GPS. Indoor option must operate with other, 100-series, measurement software options in order to collect and record measurement data. Supports *.tab, *.gif, *.tif formats for floor plan import.

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Receiver Options

Option	Part Number	Description
300		Cellular Band (E6452A) Receiver (824-849 MHz and 869-894 MHz)
	0950-2679	AC/DC Power Supply for Receiver
	1150-2061	Magnetic Mount Cellular Band Antenna
	1200-1897	Antenna Adapter Connector (N Type to TNC)
	5182-4794	Receiver RS-232 9-pin to 9-pin Cable
	E6450-60007	Firmware Write Enable Key
	E6450-60010	Cigarette Lighter Power Adapter
	E7450-60001	15-pin Interconnection Cable 380mm (15in) (short)
	86154-60033	Vehicle Mounting Kit
310		Cellular Band (E6452A) Receiver (824-849 MHz and 869-894 MHz) with internal GPS
	0950-2679	AC/DC Power Supply for Receiver
	1150-2061	Magnetic Mount Cellular Band Antenna
	1150-2085	Magnetic Mount GPS Antenna for internal GPS
	1200-1897	Antenna Adapter Connector (N Type to TNC)
	5182-4794	Receiver RS-232 9-pin to 9-pin Cable
	E6450-60007	Firmware Write Enable Key
	E6450-60010	Cigarette Lighter Power Adapter
	E7450-60001	15-pin Interconnection Cable 380mm (15in) (short)
	86154-60033	Vehicle Mounting Kit

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Agilent E7473A System Options

Option	Part Number	Description
320		PCS Band (E6450B) receiver (1850-1910 MHz and 1930-1990 MHz)
	0950-2679	AC/DC Power Supply for Receiver
	E7475-60007	Magnetic Mount PCS Band Antenna
	1200-1897	Antenna Adapter Connector (N Type to TNC)
	5182-4794	Receiver RS-232 9-pin to 9-pin Cable
	E6450-60007	Firmware Write Enable Key
	E6450-60010	Cigarette Lighter Power Adapter
	E7450-60001	15-pin Interconnection Cable 380mm (15in) (short)
	86154-60033	Vehicle Mounting Kit
330		PCS Band (E6450B) receiver (1850-1910 MHz and 1930-1990 MHz) with internal GPS
	0950-2679	AC/DC Power Supply for Receiver
	E7475-60007	Magnetic Mount PCS Band Antenna
	1150-2085	Magnetic Mount GPS antenna for internal GPS
	1200-1897	Antenna Adapter Connector (N Type to TNC)
	5182-4794	Receiver RS-232 9-pin to 9-pin Cable
	E6450-60007	Firmware Write Enable Key
	E6450-60010	Cigarette Lighter Power Adapter
	E7450-60001	15-pin Interconnection Cable 380mm (15in) (short)
	86154-60033	Vehicle Mounting Kit

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Agilent E7473A System Options

Option	Part Number	Description
380		J-CDMA Band (E6452A-H02) Receiver (832-870 MHz and 887-925 MHz)
	0950-2679	AC/DC Power Supply for Receiver
	E7450-80005	Magnetic Mount 900 MHz Band Antenna Assembly
	5182-4794	Receiver RS-232 9-pin to 9-pin cable
	E6450-60007	Firmware Write Enable Key
	E6450-60010	Cigarette Lighter Power Adapter
	E7450-60001	15-pin Interconnection Cable 380mm (15in) (short)
	86154-60033	Vehicle Mounting Kit
381		J-CDMA Band (E6452A-H02) Receiver (832-870 MHz and 887-925 MHz) with internal GPS
	0950-2679	AC/DC Power Supply for Receiver
	E7450-80005	Magnetic Mount 900 MHz Band Antenna Assembly
	1150-2085	Magnetic Mount GPS Antenna for internal GPS
	5182-4794	Receiver RS-232 9-pin to 9-pin Cable
	E6450-60007	Firmware Write Enable Key
	E6450-60010	Cigarette Lighter Power Adapter
	E7450-60001	15-pin Interconnection Cable 380mm (15in) (short)
	86154-60033	Vehicle Mounting Kit

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Agilent E7473A System Options

Option	Part Number	Description
390		Korean-CDMA (E6453A) Receiver (1710-1785 MHz and 1805-1880 MHz)
	0950-2679	AC/DC Power Supply for Receiver
	E7450-80004	Magnetic Mount 1.7-1.9 MHz PCS Band Antenna
	5182-4794	Receiver RS-232 9-pin to 9-pin Cable
	E6450-60007	Firmware Write Enable Key
	E6450-60010	Cigarette Lighter Power Adapter
	E7450-60001	15-pin Interconnection Cable 380mm (15in) (short)
	86154-60033	Vehicle Mounting Kit
391		Korean-CDMA (E6453A) Receiver (1710-1785 MHz and 1805-1880 MHz) with internal GPS
	0950-2679	AC/DC Power Supply for Receiver
	E7450-80004	Magnetic Mount 1.7-1.9 MHz Band Antenna
	1150-2085	Magnetic Mount GPS Antenna for internal GPS
	5182-4794	Receiver RS-232 9-pin to 9-pin Cable
	E6450-60007	Firmware Write Enable Key
	E6450-60010	Cigarette Lighter Power Adapter
	E7450-60001	15-pin Interconnection Cable 380mm (15in) (short)
	86154-60033	Vehicle Mounting Kit

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Agilent 86154A, 86153A, and N3419A System Accessories

The following options are offered by Agilent Technologies. By following the general setup and specifications, you can build your own system according to your needs, based on the standard system. The system can be integrated with a GPS receiver and mapping software. The digital receiver is not intended for stand-alone usage and does not function unless properly connected to one of the Agilent Wireless Solutions Systems.

NOTE To order any of the following options and accessories, specify model number 86154A and the option number, unless otherwise stated

General System Accesories

Agilent Order Number	Option	Description	More Details On Page
N3419A		Agilent N3419A vehicle-mounted display system	page 64
86153A		Retrofit internal GPS to Digital Receiver	page 64
86154A	**010**	Laptop PC Omnibook 4150 series model	page 60
86154A	**020**	Extra dual port ruggedized PCMCIA serial I/O card	page 60
86154A	**030**	Fujitsu Pen Tablet PC	page 61
86154A	**032**	Standard Pen Tablet PC Accessories	page 61
86154A	**034**	Pen Tablet PC Battery Kit	page 61

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Agilent 86154A, 86153A, and N3419A System Accessories

Agilent Order Number	Option	Description	More Details On Page
86154A	**036**	Universal Serial Bus (USB) 4 port adapter	page 62
86154A	**099**	Multi-Receiver Connection Kit	page 60
86154A	**210**	Trimble Placer 455-DR GPS Receiver	page 59
86154A	**211**	Adapter Cable for use with a Trimble Placer GPS/DR Receiver	page 59
86154A	**212**	Adapter Box for use with Trimble Placer GPS 455 Receiver	page 59
86154A	**230**	Differential GPS Receiver Kit	page 59
86154A	**425**	Multiband Antenna	page 62
86154A	**500**	Receiver Power Kit	page 63
86154A	**510**	Vehicle Mounting Kit	page 63
86154A	**507**	Indoor Backpack	page 63
86154A	**531**	Briefcase Carrier	page 58
86154A	**ABA to ARS**	Country specific power localization	page 66

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External GPS Receiver Options

Option	Part Number	Description
210		Trimble Placer 455-DR GPS Receiver[a] with:
	E6450-80002	Magnetic Mount GPS Antenna for Trimble Placer
	8120-8650	Interconnect Cable (3) RS-232 DB9-M to DB9-F
	5182-1290	GPS Cigarette Lighter Power Adapter
	E7450-60005	Adapter Box Trimble Placer Receiver
		Documentation and software to calibrate the gyroscope and odometer is available on the Web at **http://www.trimble.com**
211		GPS/DR Receiver Adapter Cable
	E7450-60003	Adapter Cable
212	E7471-60007	Adapter Box for GPS/DR 455 Receiver with:
	E7450-60005	Adapter Box
	8120-8650	Interconnect Cables (3) RS-232 DB9-M to DB9-F
230	1150-5057	Differential GPS Receiver, RDS 3000 manufactured by DCI (Differential Corrections, Inc.). Includes utilities disk and Installation and Operator's Manual and:
	0960-0979	FM Antenna
	8120-8650	Serial Cable DB9-M to DB9-F
	5182-4794	Interconnect Cable RS-232 DB9-F to DB9-F

a. The Trimble Placer GPS 455 provides Dead Reckoning for use when the GPS signal cannot be received.

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Laptop PC Option

Option	Part Number	Description
010	E7450-60014	Laptop PC with a minimum specification of:
		Pentium II Processor
		Windows 95/98 (loaded)
		64 Mbytes RAM
		6 Gbytes Hard Disc
		24 x CD-ROM
		Enhanced lithium ion battery pack
	F1445A	Auto power adapter
		14.1 inch XGA TFT display

Miscellaneous Accessories

Option	Part Number	Description
020		Dual Port Ruggedized PCMCIA Serial I/O Card
	E7471-80004	Socket dual port ruggedized serial I/O card connects to two phones to the computer through the PCMCIA slot. Connecting four phones requires two PCMCIA slots on the computer and two dual port ruggedized serial I/O cards.
099		Receiver Interconnect Cable Kit
	E7450-60001	15-pin Interconnection Cable 380mm (15in) (short)
	E7450-60002	15-pin Interconnection Cable 635mm (24in) (long)

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Fujitsu Pen Tablet PC Options

Option	Part Number	Description
030	86154-60007	Pen Computer Kit including Pen Tablet PC Stylistic 2300 with a 1 year warranty and the following minimum specification and parts.
		Note: More information on the Stylistic 2300 pen computer can be found on the Fujitsu web site, **http://www.fpsi.fujitsu.com/product/st2300.htm**
		Pentium II Processor
		4 Gbytes Hard Drive
		64 Mbytes RAM
		Windows 98 (loaded)
	86154-60012	External 3.5” Floppy Disc Drive
	86154-90009	Pen Tablet Stylus
	86154-60008	AC Adapter
	E7474-90010	Pen Tablet Getting Started Guide
	86154-60055	Travel Case
	86154-60009	In Service Case
	86154-60056	Harness for Service Case
	86154-60054	Hands Free Platform
	86154-60015	PCMCIA LAN Card
032	86154-60016	Car Auto Power System (12-24 VDC input)
034		Pen Tablet PC Battery Kit, consisting of:
	86154-60010	Lithium Ion Battery Pack (spare)
	86154-60011	External Battery Charger
	86154-60008	AC Adapter

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Agilent 86154A, 86153A, and N3419A System Accessories

Option	Part Number	Description
036	86154-60004	Universal Serial Bus (USB) 4 Port Adapter kit
	86154-60021	4 Port USB Hub
	8121-0136	Extension Cable

Indoor Antenna Options

Option	Part Number	Description
425	86154-60047	Multiband Antenna Kit
	86154-60059	PCS/Cellular/JCDMA Antenna (green)
	86154-60058	GSM/DCS/Korean CDMA Antenna (orange)
	86154-60061	3GPP Antenna (yellow)
	E6450-00013	Ground Plane
	E6450-60057	Cable: Antenna to Receiver
	1250-1753	F SMA Connector

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Portable Accessory Options

Option	Part Number	Description
500	86154-60005	Receiver Power Kit
	E6450-60051	Receiver Battery and Cable
	86154-60019	Receiver Battery Charger
507	86154-60006	Indoor Backpack and Accessories
	86154-60020	Indoor System Backpack
	86154-60057	Phone Pouch
	E7474-90010	Pen Computer Getting Started Guide
	E7474-90024	Back Pack Packing Information Sheet
510	86154-60033	Vehicle Mounting Kit
		Mounting Screws
507	86154-60006	Indoor Backpack and Accessories
	86154-60020	Indoor System Backpack
	86154-60057	Phone Pouch

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86153A Retrofit Option

It is possible to have an internal GPS receiver retrofitted to your Agilent digital receiver. These are ordered using the **86153A** Internal GPS retrofit products. You will need to return your receiver to the address shown below to have the retrofit carried out.

The internal GPS retrofit includes:

Magnetic Mount GPS Antenna for internal GPS (Part Number: 1150-2085)

The process for obtaining an internal GPS retrofit is as follows:

- Order the **86153A** upgrade.
- Include the **serial and model number** of your existing digital receiver on the order to ensure that the retrofit is performed on the correct receiver.
- Ship your digital receiver to:

Agilent Technologies
1212 Valley House Drive
Rohnert Park, CA 94928
Attn: Factory Repair

For more information on packing and sending the receiver, refer to “Returning the Instrument for Service” in Chapter 5 of the *Getting Started Guide.*

Agilent N3419A vehicle-mounted display system

All N3419A vehicle-mounted display system components are independent of wireless access technology. They work with any Agilent wireless solutions.

Display

- 12.1-inch diagonal, flat-panel color LCD display with 800 x 600 resolution
- View multiple virtual front panels (VFPs) at the same time

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- Power cords included for use with both 120 V ac from a power inverter, or 12 V dc from a vehicle
- Laptop connections - RS232
- Large, bright display for use in direct sunlight, with adjustable brightness for nighttime viewing
- Pedastal mounted
- Application-specific keypad
- Transmission hump mounting (typical in sport utility vehicles)
- Flat floor mounting (typical in minivans)

Functions during the drive including:

- "Freeze" and re-start measurements
- Start and stop recording
- Maximize, normalize and minimize measurement (VFPs)
- Navigate between VFPs
- Start and stop calls
- Show or hide measurement and display controls
- Show or hide toolbars
- Add an auto-numbered note to the measurement data
- Open and navigate the window menu in the drive-test software
- Create a report
- Perform a tools re-configure
- Clear alarms and other dialog boxes
- Move between open windows applications
- Turn alarms on and off
- Enable/disable links

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Power Localization Options

In order that the correct power supplies and mains cables are supplied with your system, it is necessary to have the correct power localization. The localization options listed below only change the power cord and charger types supplied. They do not affect the software or manual language, which is U.S. English.

Option	Description	
ARM	Argentina - English	
ARS	Asia Pacific (UK Cord) / English	
ABG	Australia - English	
A1X	Chile - English	
AKM	China - English	
ACE	Denmark - English	
ABB	Europe - English	
AKJ	Israel - English	
ACQ	South Africa / India - English	
ACD	Switzerland - English	
AKL	Thailand	
ABA	U.S. - English	
ABU	United Kingdom - English	

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Agilent E7473A System Accesories

Agilent Order Number	Option	Description	More Details On Page
86154A	**410**	Magnetic Mount PCS Band Antenna	page 67
86154A	**430**	Magnetic Mount Cellular Band Antenna	page 67
86154A	**710**	Interconnect Cable for QCP-800, QCP-1900, Sony CM-D500, Sony CM-D600 phones	page 68
86154A	**711**	Interconnect cable for QCP 2700, QCP 820, QCP-1920, Sony CM-M1300, Sony CM-B1201SPR, and Sony CM-S1101STR phones	page 68
86154A	**712**	Interconnect cable for the Samsung SCH-1000 phone	page 68
86154A	**713**	Powered interface cable for QCP-800, QCP-1900, Sony CM-D500, Sony CM-D600 phones	page 68
86154A	**714**	Powered interface cable for QCP 2700, QCP 820, QCP-1920, Sony CM-M1300, Sony CM-B1201SPR, and Sony CM-S1101STR phones	page 68
86154A	**715**	Interface cable for Toshiba CD-10T J-CDMA Phone	page 68
86154A	**716**	Powered interface cable for Toshiba CD-10T J-CDMA Phone	page 68
86154A	**717**	Interconnect cable for QCP 2760, QCP 860, QCP-1960 Phones	page 68
86154A	**718**	Powered interface cable for QCP 2760, QCP 860, QCP-1960 Phones	page 68

Antenna Options

Option	Part Number	Description
410	1150-5059	Magnetic Mount PCS Band Antenna
430	1150-2061	Magnetic Mount Cellular Band Antenna

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CDMA Phone Parts Options

Option	Part Number	Description
710	E6450-60029	Interconnect Cable for QCP-800, QCP- 1900, Sony CM-D500, Sony CM-D600 phones
711	E6450-60030	Interconnect Cable for QCP 2700, QCP 820, QCP-1920, Sony CM-M1300, Sony CM-B1201SPR, and Sony CM-S1101STR phones
712	8120-8754	Interconnect Cable for the Samsung SCH-1000 phone
713	E6450-60034	Powered Interface Cable for QCP-800, QCP-1900, Sony CM-D500, Sony CM-D600 phones
714	E6450-60033	Powered Interface Cable for QCP 2700, QCP 820, QCP-1920, Sony CM-M1300, Sony CM-B1201SPR, and Sony CM-S1101STR phones
715	E7452-60003	Interface Cable for Toshiba CD-10T J-CDMA Phone
716	E7474-60008	Powered interface cable kit for Toshiba CD-10T J-CDMA Phone
717	E7474-60023	Cable Kit for QCP-860, 1960, 2760 Phones
718	E7474-60031	Powered Cable Kit for QCP-860, 1960, 2760 Phones

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Part Number Summary

The following list summarizes the part numbers that can be ordered from Agilent Technologies.

NOTE

When ordering parts from Agilent Technologies, it is recommended that you **order using the system option numbers**
CDMA Systems - Agilent E7473A
TDMA Systems - Agilent E7474A
GSM Systems - Agilent E7475A
W-CDMA Systems - Agilent E7476A
cdma2000 Systems - Agilent E7477A
Over Air Systems - Agilent E7490A
Accessories - see Agilent 86154A and 86153A options.

However, if you have a need for a specific part, the following numbers can be used.

For more information on ordering parts or options, contact your local Agilent Technologies sales and service office.

Description		Part Number
Receiver	AC/DC Power Supply for receiver	0950-2679
	Magnetic Mount Cellular Band Antenna	1150-2061
	Magnetic Mount Mini GPS Antenna for internal GPS – SMA	1150-2085
	Magnetic Mount Mini GPS Antenna for internal GPS (Obsolete) – SMB	E6450-80002
	Magnetic Mount PCS Band Antenna	E7475-60007

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Part Number Summary

Description		Part Number
Receiver (continued)	Antenna Adapter Connector (N Type to TNC)	1200-1897
	Firmware Write Enable Key	E6450-60007
	Cigarette Lighter Power Adapter	E6450-60010
	2 AMP, 32 V, FB fuse for Cigarette Power Adapter	2110-0002
	15-pin Interconnection Cable 380mm (15in) (short)	5182-4794
	15-pin Interconnection Cable 635mm (24in) (long)	E7450-60002
	Pulse trigger interface cable	E7450-60015
	Magnetic Mount 1.7-1.9 GHz Band Antenna	E7450-80004
	Magnetic Mount 1.9 - 2.1 GHz Band Antenna	E6455-80003
	Magnetic Mount 900 MHz Band Antenna	E7450-80005
	Magnetic Mount GSM 900 RF Antenna	E7471-60009
	Vehicle Mounting Kit	86154-60033
	Universal Adapter (TNC) for RF Antenna	1200-1897
	Magnetic Mount DCS 1800 RF Antenna	E7475-60006
	Magnetic Mount GSM/PCS 1900 RF Antenna	E7475-60007
	Universal Adapter for RF Antenna	E7475-80005
External GPS	Bulkhead Mount GPS antenna for Trimble Placer (Obsolete)	1150-5061
	Trimble Placer 455 GPS Receiver	1150-5058
	GPS Cigarette Lighter Power Adapter	5182-1290
	Interconnect Cable RS-232 DB9-M to DB9-F	8120-8650
	Magnetic Mount Mini GPS Antenna for internal GPS	E6450-80002
	Adapter Cable for use with a Trimble Placer GPS/DR Receiver	E7450-60003
	Adapter Box for use with Trimble Placer GPS 455 Receiver	E7450-60005

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Part Number Summary

Description		Part Number
	Adapter Box and RS-232 Interconnect Cables (quantity 3)	E7471-60007
Differential GPS	FM Antenna	0960-0979
	Differential GPS Receiver, RDS 3000 manufactured by DCI (Differential Corrections, Inc.). Includes utilities disk and Installation and Operator's Manual.	1150-5057
	Interconnect Cable RS-232 DB9-F to DB9-F	5182-4794
Phone Parts	Interconnect Cable for QCP 2700, QCP 820, QCP-1920, Sony CM-M1300, Sony CM-B1201SPR, and Sony CM-S1101STR phones	E6450-60029
	Interconnect Cable for QCP-800, QCP-1900, Sony CM-D500, Sony CM-D600 phones	E6450-60030
	Interconnect Cable for the Samsung SCH-1000 phone	8120-8754
	Powered Interface Cable for QCP-800, QCP-1900, Sony CM-D500, Sony CM-D600 phones	E6450-60034
	Powered Interface Cable for QCP 2700, QCP 820, QCP-1920, Sony CM-M1300, Sony CM-B1201SPR, and Sony CM-S1101STR phones	E6450-60033
	Interface Cable for Toshiba CD-10T J-CDMA Phone	E7452-60003
	Powered Interface Cable for Toshiba CD-10T J-CDMA Phone	E7474-60008
	GSM Phone Data Cable	E7471-62005
	GSM Car phone and data kit	E7475-60028
	Interface Cable for Motorola StarTAC TDMA Phone	E7474-60004
	Powered Interface Cable for Motorola StarTAC TDMA Phone	E7474-60006
	Power Interface Cable for Sagem Test Mobile	E7475-62010
	Interface Cable for QCP-860, 1960, 2760 Phones	E7474-60023
	Powered Interface Cable for QCP-860, 1960, 2760 Phones	E7474-60031
Accessories	Extra Dual Port Ruggedized PCMCIA Serial I/O Card	1150-2067

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Part Number Summary

Description		Part Number
	Dual Port PCMCIA Serial I/O Card	E7471-80004
	Single Port PCMCIA Serial I/O Card	0960-0992
	Auto Power Adapter	86154-85001
	Blank Software License Security Key	E7474-10007
Documentation	Getting Started Guide	E7474-90035
	Indoor Getting Started Guide	E7474-90038
	E7473A CDMA System Information Guide	E7473-90019
	E7474A TDMA System Information Guide	E7474-90034
	E7475A GSM System Information Guide	E7475-90011
	E7476A W-CDMA (UMTS) System Information Guide	E7476-90004
	E7477A cdma2000 System Information Guide	E7477-90004
	E7490A Over Air Test System Information Guide	E7490-90003

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RF Connectors and Antennas

Options	Receiver Type	RF Connector Adapter	RF Antenna Part Number
300, 310	Cellular Band	1200-1897	1150-2061
320, 330	PCS Band GPS	1200-1897	E7475-60007
380, 381	J-CDMA Band	NA	E7450-80005
390, 391	Korean Band	NA	E7450-80004

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