System Information Guide

Agilent Technologies E7475A GSM 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 drive test system.

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If You Need Help...

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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**

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
- GPRS (GSM) and Data (GSM)

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)

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.

Figure 1 Four phone and four receiver system

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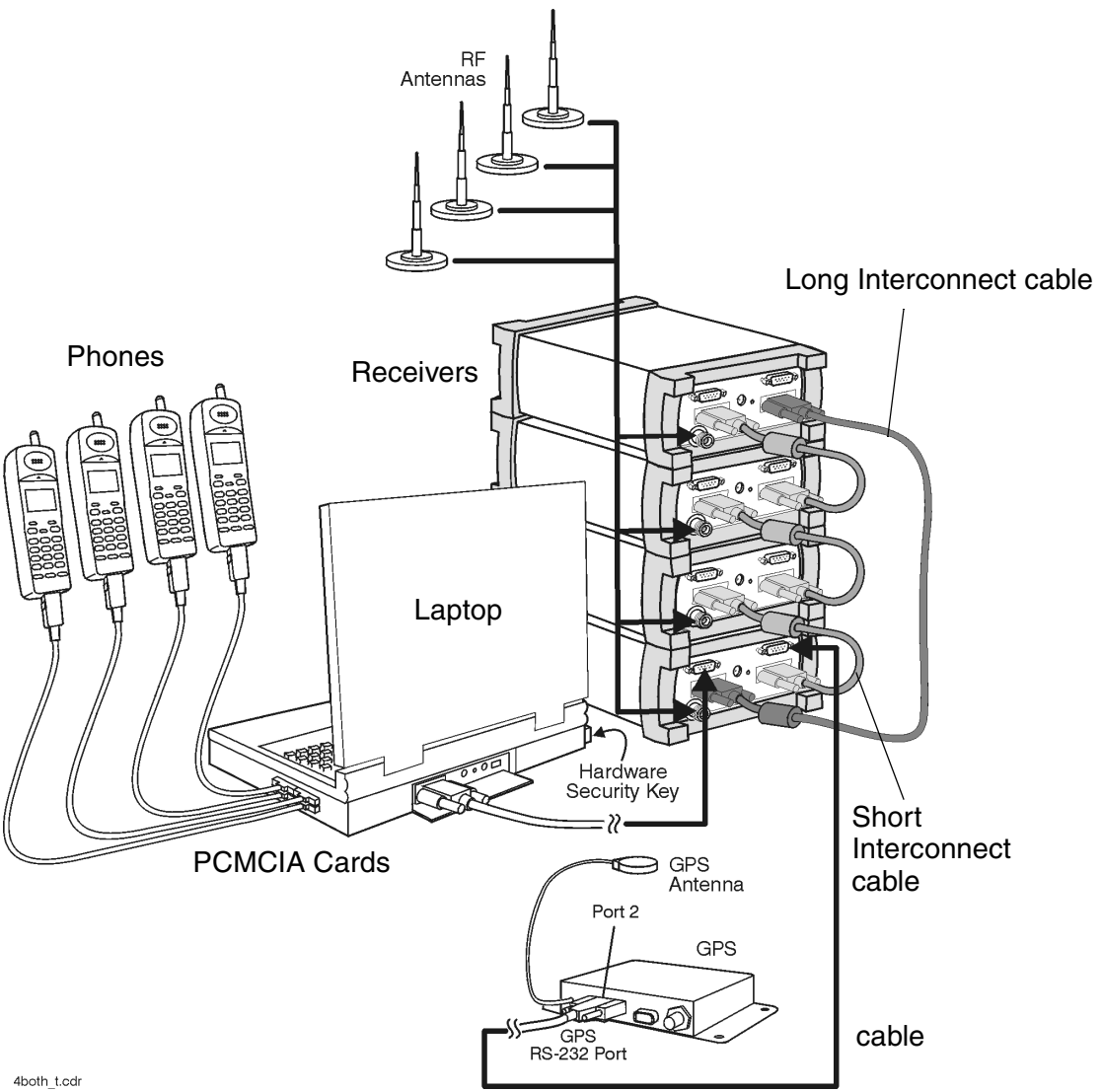

Specifications and Hardware Information

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.

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

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

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.

- **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.

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)

- NAD83 (North American)
- OS36 (GB)
- SAD56 (North Chile)
- SAD56 (South Chile)
- 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

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)

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.

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.
- 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.

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
- 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.

Agilent E7475A Software Specifications

Software Measurement Specifications

The Agilent E7475A measurement software has the following measurement capabilities and functionality:

GSM Broadcast Channel Analysis

Part of Agilent E7475A Option 110, 120.

The Agilent E7475A system is capable of collecting comprehensive RF measurement data. These measurements are independent of network parameter settings. The systems execute three different types of broadcast channel measurements (listed below). Any or all of them can be executed simultaneously.

Measurement Types

- All BCH — The system measures the power of all GSM channels in the user selected range. The results are displayed as a trace with one point for each channel. If 20 or less channels are

found in the range, they are displayed as a bar graph with amplitude versus frequency.

- Top N — The system measures all of the GSM channels in the user selected range and returns the N strongest GSM channels received. N is a user-defined integer from 1 to 20. The results are displayed in a bar graph of amplitude versus frequency or a line graph of amplitude versus time. If a measured channel is a broadcast channel, the BSIC can be decoded and a BER measurement can be returned[1].
- User list: — Returns power measurements from a user-defined list of frequencies or channels. There can be up to 40 ARFCN defined in the list. The user inputs a list of up to 40 GSM channels to be measured. The measurements are displayed in a bar graph of amplitude versus frequency or a line graph of amplitude versus time. If a measured channel is a broadcast channel, the BSIC can be decoded. It is also possible to display the highest powers of the top N ARFCNs from this list.The user list frequencies can be imported from a text file. This allows regularly-used sets of channels to be stored for quick loading into the application.

Measurement Controls

- Frequency Units
  - Frequency
  - Channel
- Measurement types
  - All BCH
  - Top N
  - User list
  - Top N on User list

1. An estimated BER is calculated based on the number of the bit errors in the mid-amble of the synchronization burst.

- ARFCN (Absolute Radio Frequency Channel Number)
  - Start ARFCN, start of range
  - Stop ARFCN, end of range

Display Controls

- Markers (Trace Displays only)
  - Multiple markers
  - Delta Markers
  - To Max function
  - Drag and drop
- Power Display (Y-axis parameter)
  - dBm
  - RxLev
- Display Mode
  - Amplitude versus Frequency
  - Amplitude versus Time
- Show Value (bar graphs only)
  - Power (dBm)
  - Power in RxLev
  - BSIC (if BSIC decode selected)
  - BER (if BSIC decode selected)
  - Name of cell site (if BSIC decode selected)

Measurement Results

- GSM Carrier Power
- BSIC
- BER

GSM Interference Analysis

Part of Agilent E7475A Option 110, 120.

The Agilent E7475A can make adjacent channel and co-channel interference measurements. The measurement returns the ratios of the power at the

user-defined carrier frequencies and power of channels either adjacent or on the same channel.

Measurement types

- Adjacent Channel measurement:
  The system can make adjacent channel interference measurements. For two, user-selectable channels, it can return the ratio in dB of the power in each channel to that in the immediately adjacent channels.
- Co-Channel measurement:
  For a single-user, selectable channel, the system can return:
  - Total power in the channel
  - Carrier to interferer ratio
  - Fading
  - Bar graph of symbol delay spread (± 6 symbols).
  - Decoded BSIC of the primary signal in the channel.

Measurement Controls

- Frequency Units
  - Frequency
  - Channel
- Measurement types
  - Adjacent channel analysis
  - Co-channel analysis

Display Controls

- Show Value (bar graphs only)
  - Power in dBm

Measurement Results

- Adjacent carrier (A)
  - Ratio of power C/C+1 (dB)
  - Ratio of power C/C-1 (dB)
- Adjacent carrier (B)
  - Ratio of power C/C+1 (dB)
  - Ratio of power C/C-1 (dB)

- Average power over 8 timeslots (default) - adjacent channel
- Peak power over 8 timeslots - adjacent channel
- Co-Channel
  - Total power received in channel (dBm)
  - Primary power of strongest signal path (dBm)
  - Peak deviation Fading from primary power (dB)
  - Ratio of primary power / interferer (dB)
  - Primary BSIC and cellsite name
  - Secondary BSIC and cellsite name
  - Status of measurement
- Symbol Delay Spread (multi-path) graph
  - Power at ± 6 symbol offsets

CW Power Measurements

Part of Agilent E7475A Option 110, 120.

The Agilent E7475A system 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.

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 900 MHz, the step size is set to 1 MHz, and the count is set to 4; the measurements are made at 900 MHz, 901 MHz, 902 MHz and 903 MHz. Frequencies can be specified in terms of frequency units or channel number.

Measurement Controls

- Frequency
  - Arbitrary list (List)

  - Start/Step/Count (Trace)
- IF Bandwidth
  - 1.25 MHz (wideband mode)
  - 200 kHz (narrowband mode)
- Resolution Bandwidth (CW Power only)
  - 8.36 kHz to 950 kHz in wideband mode
  - 1.68 kHz to 190 kHz in narrowband mode

Channel Power Measurements

Part of Agilent E7475A Option 110, 120.

The Agilent E7475A 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** The spectrum virtual front panel can be used to quickly diagnose RFproblems.Thesystemoperatesinboththedownlinkanduplink GSMbands. 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 900 MHz, the step size is set to 1 MHz, and the count is set to 4; the measurements are made at 900 MHz, 901 MHz, 902 MHz and 903 MHz.

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

Measurement Controls

- Frequency
  - Arbitrary list (List)
  - Start/Step/Count (Trace)
- IF Bandwidth
  - 1.25 MHz (wideband mode)
  - 200 kHz (narrowband mode)
- Channel Width (Channel Power only)
  - GSM900 (option 300, 305, 310)
    - 30 kHz to 35 MHz in wideband mode
    - 5 kHz to 35 MHz in narrowband mode
  - DCS1800 (option 320, 330)
    - 30 kHz to 75 MHz in wideband mode
    - 5 kHz to 75 MHz in narrowband mode
  - GSM1900 (option 340, 350)
    - 30 kHz to 60 MHz in wideband mode
    - 5 kHz to 60 MHz in narrowband mode

Spectrum Measurements

Part of Agilent E7475A Option 110, 120.

The spectrum virtual front panel can be used to quickly diagnose RF problems. 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]

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.

- GSM900 (option 300, 310)
  - 880 - 915 MHz [876 - 917 MHz]
  - 925 - 960 MHz [921 - 962 MHz]
- GSM-R (option 305)
  - 876 - 915 MHz [876 - 917 MHz]
  - 921 - 960 MHz [921 - 962 MHz]
- DCS1800 (option 320, 330)
  - 1710 - 1785 MHz [1705 - 1790 MHz]
  - 1805 - 1880 MHz [1800 - 1885 MHz]
- GSM1900 (option 340, 350)
  - 1850 - 1910 MHz [1845 - 1915 MHz]
  - 1930 - 1990 MHz [1925 - 1995 MHz]

- Frequency, maximum span
  - GSM900 (option 300, 310) - 41 MHz
  - GSM-R (option 305) - 41 MHz
  - DCS1800 (option 320, 330) - 85 MHz
  - GSM1900 (option 340, 350) - 70 MHz
- IF Bandwidth
  - 1.25 MHz (wideband mode)
  - 200 kHz (narrowband mode)
- Resolution Bandwidth
  - 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
- Drag and drop

Spectrum noise floor

- Narrowband mode, 300 kHz span
  - -139 dBm average
  - -138 dBm peak
- Wideband mode, 300 kHz span

  - -131 dBm average
  - -130 dBm peak
- Narrowband mode, 25 MHz span
  - -130 dBm average
  - -129 dBm peak
- Wideband mode, 25 MHz span
  - -125 dBm average
  - -123 dBm peak

GSM Power Measurements

The Agilent E7475A system is capable of measuring power using various methods. The following list describes how the techniques are used, calculated, and displayed.

- Spectrum and CW analyzer
  - Peak power measurement.
- Channel analyzer
  - Total channel power.
- Broadcast channel and adjacent channel analyzer
  - Power averaged over 8 timeslots.
  - Peak power measurement.
- Broadcast channel with BSIC decoding
  - Power is measured over 1 timeslot.
- Co-channel analyzer
  - Power of the dominant component over 1 timeslot.
- Adjacent Channel Analyzer
  - Power averaged over 8 timeslots.
  - Maximum (Peak) power over 8 timeslots.

GSM Phone functionality

Part of Agilent E7475A Option 100, 120, 150.

The phone component of the Agilent E7475A system includes four main functions.

- Phone Call Control (see page 32)
- Phone Measurement data (see page 34)
- Phone Messaging display (see page 35)
- Phone Scan Measurement data (see page 36)

GSM Phone Call Control

This functionality provides automated control of the handset from the PC. The phone 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)
  - Maximum redial attempts
- Phone number pick list
- Call option
  - Full rate of speech
  - Enhanced full rate of speech (if supported by network)

- Select channel
  - Force handover to an ARFCN
  - Prevent handover from an ARFCN
  - Force broadcast channel (BCH)
- Mobile behavior
  - Restrict timeslot to be used by the mobile (0-7)
  - Ignore cell barring

Statistics logging controls

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

In addition to control functionality, the phone control virtual front panel displays the information listed below.

Display fields (text)

- Call information
  - Access time counter
  - Redial time counter
  - Calls remaining
- Statistics
  - Dropped call rate
  - Blocked call rate
  - Total attempts
  - Total drops
  - Total blocks
- Handover Information
  - Successful handovers
  - Failed handovers
  - Attempted handovers
- Serving cell ARFCN

GSM Phone Measurement Data

The Agilent E7475A system extracts various measurement data from the mobile handset. You control extraction of the specific measurement types with a set of check boxes. The data types are listed below.

Display fields (text)

- State (No service, idle or dedicated)
- Serving cell information
  - BCH
  - BSIC (base station identity code)
  - Cell identity
  - Cell name
  - LAC (Location area code)
  - MNC (mobile network code)
  - MCC (mobile country code)
- Mobile measurement information
  - TCH (traffic) ARFCN
  - RxLev (full or sub)
  - RxQual (full or sub)
  - Mobile transmit power
  - Timing advance
  - Timeslot
  - Radio link timeout counter (RLTC)
  - Frame erasure rate (FER)

Tabular displays

- Frequency hopping sequence
- Neighbor cell list
- C1 and C2 path loss and re-selection parameters (not for Sagem OT-35G/D phones)

Graph displays

- Serving cell and neighbor cells amplitude versus frequency
- Serving cell and neighbor cells amplitude versus time

- Mobile measurements
  - RxQual versus time (displayed as RxQual-sub or RxQual-full)
  - RxLev versus time (Can be displayed as RxLev-sub or RxLev-full.)
  - Tx power versus time
  - Timing advance versus time

GSM Phone Messaging

The Agilent E7475A system extracts and decodes the Layer 3 and Layer 2 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 type selection controls

- Layer 3 messages
  - Call control
  - Radio resource
  - Mobility management
- Layer 2 messages
  - Sub-set of Layer 2 messages[1].

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.

Message logging controls

- Log to display
- Layer 2 messages
- Layer 3 messages
- Snapshot

1. The Layer 2 protocol decodes are dependent on the test mobile phone hardware used. Currently the Sagem OT35x, OT55x and OT75x provide only the Information (I) messages and the SABM messages. The Sagem OT95x and the Orbitel 907 test mobiles provide the full Layer 2 commands covered in GSM 04.06 version 5.2.1 table 4.

GSM Phone Scan Measurements

Part of Agilent E7475A Option 130.

The Agilent E7475A system enables the phone to switch into a scanning mode and to pass these measurements for display and recording. The mobile scans all broadcast channels[1].

Measurement Types

- All BCH The system will scan through and measure the power in all the frequency channels in its operating range. The results are displayed as a trace with one point for each of the channels.
- Top N The system will scan through and measure the power in all the frequency channels is its operating range. The Top N channels, where N is an integer between 1 and 20, are then displayed in either a bar graph of amplitude versus frequency or a line graph of amplitude versus time.
- User list The user inputs a list of up to 20 GSM channels to be measured. The results are displayed in a bar graph of amplitude versus frequency or a line graph of amplitude versus time.

Measurement Controls

- Frequency units
  - Frequency
  - Channel
- Measurement types
  - All BCH
  - Top N
  - User list

Markers (Trace Displays only)

- Multiple markers

1. When a test mobile is being used as a frequency scanner, it cannot be used to set up calls and log other data at the same time.

- Delta markers
- To Max function
- Drag and drop

Display Controls

- Power display (Y-axis parameter)
  - dBm
  - RxLev
- Display mode
  - Amplitude versus frequency
  - Amplitude versus Time
- Show value (bar graphs only)
  - Power (dBm)
  - Power in RxLev

Measurement Results

- GSM carrier power

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: 266 MHz Pentium II or III, 64 Mbytes RAM
  - Recommended: 500 MHz Pentium III, 128 Mbytes RAM
- Windows NT 4.0 +service pack 6 or later / Windows 2000
  - Minimum: 266 MHz Pentium II or III, 64 Mbytes RAM
  - Recommended: 500 MHz Pentium III, 128 Mbytes RAM

Multiple phone

- Windows 95/98
  - Minimum: 333 MHz Pentium II or III, 64 Mbytes RAM
  - Recommended: 500 MHz Pentium III, 128 Mbytes RAM
- Windows NT 4.0 +service pack 6 or later / Windows 2000
  - Minimum: 333 MHz Pentium II or III, 64 Mbytes RAM
  - Recommended: 500 MHz Pentium III, 128 Mbytes RAM

NOTE Windows 95 can not be used for Data and GPRS measurement systems. Also, Dial Up Networking needs to be installed on Windows 98 and Windows NT 4.0 for Data and GPRS measurement systems.

Common Requirements

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

- DCI RDS-3000

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

Antennas

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

Agilent E7475A Hardware Specifications

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

Agilent E7475A Options 300, 310, 320, 330, 340, and 350 Receiver Specifications

Model		Agilent E7475A Option 300, 310 (E6451A)	Agilent E7475A Option 320, 330 (E6453A)	Agilent E7475A Option 340, 350 (E6454A)
Frequency	Frequency range	880 to 915 MHz 925 to 960 MHz	1710 to 1785 MHz 1805 to 1880 MHz	1850 to 1910 MHz 1930 to 1990 MHz
	Frequency accuracy	±1 ppm		
	IF bandwidth	1.25 MHz, characteristic (wideband mode) 200 kHz, characteristic (narrowband mode)		
	Aging of TCXO	±1 ppm/year		
Amplitude	Accuracy, 1.25 MHz IF bandwidth	± 0.5 typical (-25 dBm to -100 dBm)		
	Accuracy, 200 kHz IF bandwidth	± 0.5 typical (-25 dBm to -100 dBm)		
	Noise figure	8 dB typical		
	Maximum safe input level	+10 dBm, 20V DC, characteristic		
	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		

Agilent E7475A Hardware Specifications

Model		Agilent E7475A Option 300, 310 (E6451A)	Agilent E7475A Option 320, 330 (E6453A)	Agilent E7475A Option 340, 350 (E6454A)
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	2.1 kg (4.6 lbs)		
	Power (options 300, 320, 340)	9 to 34 V DC, 9W		
	Power (internal GPS, Option 310, 330, 350)	9 to 34 V DC, 10W		
	Transformer AC Power (supplied with receiver)	100 - 240 Volts AC 50 - 60 Hz		
Internal GPS[d] (Option 310, 330, 350)	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 –25 dBm.
b. Adjacent channel desensitization applies to the 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 (200 kHz IF filter) and is defined as: Suppression of interfering signal ± 200 kHz from tuned signal.
d. Systems fitted with an internal GPS do not support connection to external GPS receivers.

Agilent E7475A Options 305 Receiver Specifications

Model		Agilent E7475A Option 305 (E6451A-E03)
Frequency	Frequency range	876 to 915 MHz 921 to 960 MHz
	Frequency accuracy	±1 ppm
	IF bandwidth	1.25 MHz, characteristic (wideband mode) 200 kHz, characteristic (narrowband mode)
	Aging of TCXO	±1 ppm/year
Amplitude	880 to 915 MHz and 925 to 960 MHz range:	
	Accuracy, 1.25 MHz IF bandwidth	± 0.5 dB typical (-25 dBm to -100 dBm)
	Accuracy, 200 kHz IF bandwidth	± 0.5 dB typical (-25 dBm to -100 dBm)
	Noise figure	8 dB typical
	876 to 880 MHz and 921 to 925 MHz range:	
	Accuracy, 1.25 MHz IF bandwidth	± 1 dB typical (-25 dBm to -100 dBm)
	Accuracy, 200 kHz IF bandwidth	± 1 dB typical (-25 dBm to -100 dBm)
	Noise figure	11 dB typical
	Maximum safe input level	+10 dBm, 20V DC, characteristic
	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

Agilent E7475A Hardware Specifications

Model		Agilent E7475A Option 305 (E6451A-E03)
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	2.1 kg (4.6 lbs)
	Power (option 305)	9 to 34 V DC, 9W
Internal GPS (Option 305)	Not supplied	

a. It is recommended the input signal level not exceed –25 dBm.
b. Adjacent channel desensitization applies to the 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 (200 kHz IF filter) and is defined as: Suppression of interfering signal ± 200 kHz from tuned signal.

Supported Phones

- Sagem OT-35G GSM900
- Sagem OT-35D DCS1800
- Sagem OT-55G GSM900
- Sagem OT-55D DCS1800
- Sagem OT-55P GSM1900
- Sagem OT-75M Dual Band
- Orbitel ST-907

Agilent E7475A System Options

For details on how to set up and configure 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	GSM Phone software license	page 50
110	GSM Receiver software license	page 50
120	GSM Receiver and Phone software license	page 50
130	GSM Scan Test Mobile software license	page 50
150	GSM Multiple Phone software license	page 51
160	Real-Time Mapping software license	page 51
180	Indoor Measurement software license	page 51
300	GSM 900 Digital Receiver (880-915 MHz and 925-960 MHz)	page 52
305	GSM-R Digital Receiver (876-915 MHz and 921-960 MHz)	page 52
310	GSM 900 Digital Receiver (880-915 MHz and 925-960 MHz) with internal GPS	page 53
320	DCS 1800 Digital Receiver (1710-1785 MHz and 1805-1880 MHz)	page 53
330	DCS 1800 Digital Receiver (1710-1785 MHz and 1805-1880 MHz) with internal GPS	page 54
340	GSM 1900 Digital Receiver (1850-1910 MHz and 1930-1990 MHz)	page 54
350	GSM 1900 Digital Receiver (1850-1910 MHz and 1930-1990 MHz) with internal GPS	page 55
500	GSM 900 Sagem Test Mobile Phone	page 55
510	DCS 1800 Sagem Test Mobile Phone	page 55

Agilent E7475A System Options

Option	Description	More Details On Page
520	GSM 1900 Sagem Test Mobile Phone	page 55
530	GSM 900/DCS 1800 Dual Band Sagem Test Mobile Phone	page 55
A1X to ARS	Country Specific Power Localization	page 56

Software License Options

Option	Part Number	Description
100		• GSM Phone software license • Software CD • Software License security key • Dual port PCMCIA serial I/O card
	E7474-90035	• Getting Started Guide
	E7475-90011	• E7475A GSM System Information Guide
110		• GSM Receiver software license • Software CD • Software License security key
	E7474-90035	• Getting Started Guide
	E7475-90011	• E7475A GSM System Information Guide
120		• GSM Receiver and Phone software license • Software CD • Software License security key • Dual port PCMCIA serial I/O card
	E7474-90035	• Getting Started Guide
	E7475-90011	• E7475A GSM System InformationGuide
130		• GSM Scan Test Mobile software license • Software CD • Software License security key

Agilent E7475A System Options

Option	Part Number	Description
150[a]		• GSM 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
	E7474-90038	• Indoor Getting Started Guide
	E7475-90011	• E7475A GSM 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 floorplan/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 floorplan import.

Receiver Options

Option	Part Number	Description
300		GSM 900 Digital (E6451A) Receiver (880-915 MHz and 925-960 MHz)
	0950-2679	AC/DC Power supply for receiver
	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)
	E7475-60006	Magnetic Mount GSM 900 RF Antenna
	86154-60033	Vehicle Mounting Kit
305		GSM-R Digital (E6451A H03) Receiver (876-915 MHz and 921-960 MHz)
	0950-2679	AC/DC Power supply for receiver
	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)
	E7471-60009	Magnetic Mount GSM 900 RF Antenna
	86154-60033	Vehicle Mounting Kit

Agilent E7475A System Options

Option	Part Number	Description
310		GSM 900 Digital (E6451A) Receiver (880-915 MHz and 925-960 MHz)
	0950-2679	AC/DC Power Supply for receiver
	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
	E7471-60009	Magnetic Mount GSM 900 RF Antenna
320		DCS 1800 Digital (E6453A) Receiver (1710-1785 MHz and 1805-1880 MHz)
	0950-2679	AC/DC Power Supply for receiver
	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
	E7475-60006	Magnetic Mount DCS 1800 RF Antenna

Agilent E7475A System Options

Option	Part Number	Description
330		DCS 1800 Digital (E6453A) Receiver (1710 -1785 MHz and 1805 - 1880 MHz)with Internal GPS
	0950-2679	AC/DC Power Supply for receiver
	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
	E7475-60006	Magnetic Mount DCS 1800 RF Antenna
340		GSM 1900 Digital (E6454A) Receiver (1850-1910 MHz and 1930-1990 MHz)
	0950-2679	AC /DC Power supply for receiver
	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
	E7475-60007	Magnetic Mount GSM 1900 RF Antenna

Agilent E7475A System Options

Option	Part Number	Description
350		GSM 1900 Digital (E6454A) Receiver (1850-1910 MHz and 1930-1990 MHz) with internal GPS
	0950-2679	AC /DC Power supply for receiver
	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
	E7475-60007	Magnetic Mount GSM 1900 RF Antenna

Phone Options

All phone options include a standard and extended battery, interface cable[1], and an AC/DC charger..

Option	Description	
500	GSM 900 Sagem test mobile phone	Sagem OT-55G
510	DCS 1800 Sagem test mobile phone	Sagem OT-55D
520	GSM 1900 Sagem test mobile phone	Sagem OT-55P
530	GSM 900/DCS 1800 Dual Band Sagem test mobile phone	Sagem OT-75M

1.Standard interface data cable - E7471-62005, Power interface data cable - E7475-62010

Power Localization Opions

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	S. Africa - English	
ACD	Switzerland - English	
AKL	Thailand	
ABA	U.S. - English	
ABU	United Kingdom - English	

Agilent 86154A General 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.

These accessory options can ordered for any technology.

NOTE To order any of the following options and accessories, specify model number 86154A and the option number, unless otherwise stated. For some accessories, such as Options 010, 030, 034, it is also necessary to indicate the Power Localization Options as shown on Page 48.

General System Accessories

Agilent Order Number	Option	Description	More Details On Page
86154A	**010**	Laptop PC Omnibook 6000 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**	Fujitsu Pen Tablet PC Accessories	page 61
86154A	**034**	Fujitsu Pen Tablet PC Battery Kit	page 61
86154A	**036**	Universal Serial Bus (USB) 4 port adapter	page 62

Agilent 86154A General System Accessories

Agilent Order Number	Option	Description	More Details On Page
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[a]	page 59
86154A	**410**	Magnetic Mount PCS Band Antenna	page 62
86154A	**425**	Multiband Antenna	page 62
86154A	**430**	Magnetic Mount Cellular Band Antenna	page 62
86154A	**500**	Receiver Power Kit	page 63
86154A	**507**	Indoor Backpack	page 63
86154A	**510**	Vehicle Mounting Kit	page 63
86154A	**531**	Briefcase Carrier	page 58
86154A	**540**	Vehicle Based Drive Test Display System	page 63
86154A	**ABA to ARS**	Country specific power localization	page 65

a. Not available for the E7476A, which uses a receiver that only ships with internal GPS.

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.

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
	F1455A	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)

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

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

Antenna Options

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

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

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

Agilent 86154A Option 540 Vehicle Based Drive Test Display System

The 86154A Option 540 is only available for order in the USA and Latin America.

All 86154A Option 540 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
- 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
- Pedestal 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

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	
AKM	China - English	
ACE	Denmark - English	
ABB	Europe - English	
AKJ	Israel - English	
ACD	Switzerland - English	
AKL	Thailand	
ABA	U.S. - English	
ABU	United Kingdom - English	

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 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	1150-5059

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

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	Kyocera QCP-2035.3035 Phone Data Cable	5060-8785
	Kyocera QCP 3035 Power Charger Adapter	5060-8786
	Interconnect Cable for QCP 2700, QCP 820, QCP-1920, Sony CM-M1300, Sony CM-B1201SPR, and Sony CM-S1101STR phones	E6450-60030
	Interconnect Cable for QCP-800, QCP-1900, Sony CM-D500, Sony CM-D600 phones	E6450-60029
	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

Part Number Summary

Description		Part Number
	Powered Interface Cable for QCP-860, 1960, 2760 Phones	E7474-60031
	Samsung SCH-X100 Phone Data Cable	86154-60050
	Samsung SCH-X100 Battery Charger Adapter	86154-80005
Accessories	Extra Dual Port Ruggedized PCMCIA Serial I/O Card	1150-2067
	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
	E7478A GPRS and Data System Information Guide	E7478-90006
	E7490A Over Air Test System Information Guide	E7490-90003

RF Connectors and Antennas

Options	Receiver Type	RF Connector Adapter	RF Antenna Part Number
300, 310	GSM900 Band	E7475-80005	E7475-80001
305	GSM-R Band	NA	NA
320, 330	DCS1800 Band	E7475-80005	E7475-80001
340, 350	GSM1900 Band	1200-1897	E7475-80002

For system Agilent E7475A Options 300, 310, 320, and 330 (GSM 900 and DCS 1800), the connection of the RF antenna to the receiver is made using one type of connection adapter. For Agilent E7475A Option 340 and 350 (GSM 1900) the connection is made using only the 1200-1897 connection adapter. The following diagram illustrates the connector types.