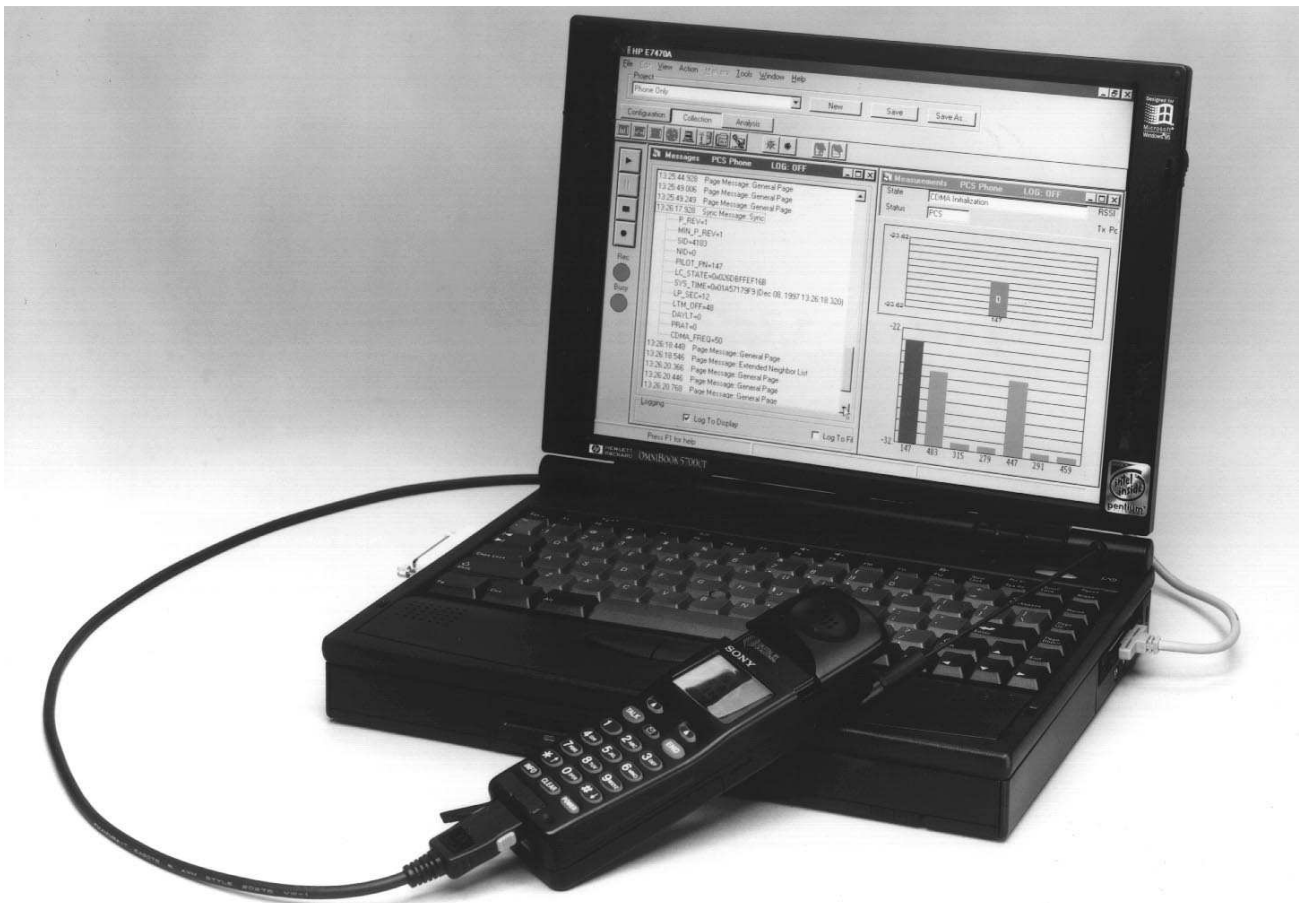


# Agilent E7460A

## CDMA Service Quality Analysis Systems

Data Sheet



The Agilent Technologies E7460A service quality analysis system is used to obtain call performance data versus location to assess the service coverage of wireless communications networks using IS-95 and J-STD-008 CDMA technologies. A PC interfaces to a CDMA mobile phone. Each system includes PC software, a PCMCIA serial port card to connect the phone to the PC. The system can be integrated with a GPS receiver and mapping software.



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## System software

The system software controls a CDMA mobile phone. Multiple measurements can be made simultaneously. All measurements can be displayed in real-time and logged to the database.

## Phone functionality

The E7460A system comprises three main functions. Each function has an associated control/display window called a virtual front panel.

- Phone control
- Measurement data
- Messaging display

## Multiple phone capability

The E7460A system can control up to four phones simultaneously. The software will control any combination of the supported handsets up to a total of four, (see “Handset compatibility” on page 6). Use of multiple phones can significantly improve optimization efficiency. For example, you can execute origination, termination, and dropped call testing simultaneously. Alternatively, you can execute measurements on your network and a competitive network simultaneously.

For ordering instructions regarding multiple phone capability, please refer to the *Agilent E74XX Series CDMA Drive Test Solutions Configuration Guide*.

## Phone 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

- One-button originate (dial)/one-button end (hang-up)
- 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 type pick list
  - Voice (8 or 13 kbps)
  - Markov (set 1 or set 2)
  - Loopback (8 or 13 kbps)

### State controls

- No analog (forces dual mode phone to stay in digital mode)
- Channel
  - Channel number
  - Frequency units

## Statistics logging controls

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

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

### Display fields (text)

- Dropped call rate
- Blocked call rate
- Total attempts
- Total drops
- Total blocks
- Access time counter
- Redial time counter

## Measurement data

The E7460A system extracts various measurement data from the mobile handset. Extraction of the specific measurement types is controlled by a set of check boxes. The data types are listed below.

### CDMA display fields (text)

- Status (mode)
- RSSI (mobile received 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)

### Amps display fields (text)

- Status (mode)
- RSSI (mobile received power)
- Mobile transmit power
- Channel number

## Messaging

The Agilent E7460A extracts and decodes the over-the-air messaging from the handset. The user can select any or all of the channel types listed below to extract and decode messaging from.

### 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 next level of detail. A snapshot function captures the last 50 messages to a separate display while the main display continues to update with the new messages.

### Message logging controls

- Log to display
- Log to file (creates MDM binary file)
- Snapshot

## Alerts and alarms

The E7460A has sophisticated alarm capability. An alert is defined as a single condition on a single measurement. An alarm is a boolean expression made up of multiple conditions on multiple measurements. When an alert or alarm condition occurs, any or all of the actions listed below can be executed. If the alert or alarm condition occurs while data is being logged, each data record includes the alert/alarm information.

### Actions

- Play a .wav audio file
- Display a text message
- Pause or stop measurements

### Alert operators

- Value
- Maximum
- Minimum

### Alarm operators

- Value
- Maximum
- Minimum
- Sub-set
- OR
- AND
- XOR (exclusive OR)

### Alert conditions

- Greater than (>)
- Greater than or equal to ( $\geq$ )
- Less than (<)
- Less than or equal to ( $\leq$ )
- Equal to (=)
- Not equal to ( $\neq$ )

### Alarm conditions

- Greater than (>)
- Greater than or equal to ( $\geq$ )
- Less than (<)
- Less than or equal to ( $\leq$ )
- Equal to (=)
- Not equal to ( $\neq$ )
- Is a sub-set
- Is not a sub-set
- Sets intersect

Any measurement can be an operand in an alert or alarm. Below are two examples to illustrate alerts and alarms.

Alert: Value(FER) > 2.0%

Alarm: (Value(FER) > 2.0%) OR ((Value(Ec/Io) < -10 dB) AND (RSSI > -70 dBm))

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

## System status parameters

- Available disk space
- GPS fix
- Location
- Velocity
- Percent CPU usage
- PC battery level
- PC AC power
- Time of day

## Alarm wizard

Setting up alarms is fast and easy using the alarm wizard feature. Commonly desired alarms that are available via the alarm wizard are listed below.

- Dropped call
- High FER
- Low phone Ec/Io
- Lost GPS fix
- No location fix
- Low disk space
- Low battery
- No AC power
- High CPU usage

## Data recording and playback

Logging and playback of data are controlled by VCR-like buttons. While logging data the user can enter notes into the data. Two methods of user note entry are provided. One prompts the user to enter a text string, for example, "entering a tunnel". The other automatically enters a numbered note into the database requiring minimum interaction with the keyboard. A summary of record and playback features are listed below.

### Record features

- User note
- Automatically numbered note
- Display on/off
- Pause/resume

### Playback features

- Play forward
- Play reverse
- Step forward
- Step reverse
- Variable speed
- Advance to alert/alarm
- Advance to user note/auto-numbered note

In addition to logging to the database, the E7460A can also log to a binary file. The format of this binary file is equivalent to the binary output of the Qualcomm Mobile Diagnostic Monitor (MDM).

## Data export

Data can be exported from the E7460A database for display and post-processing. Any measurement data can be exported. The export function provides flexible filtering capability to define the specific data to be exported. Several different operations can be executed in order to provide the desired data in the desired format.

### Processing functions

- All values
- Count
- Count with summary
- Maximum
- Minimum
- Value(x)

### Conditionals

- Greater than (>) a threshold
- Less than (<) a threshold
- All values
- Qualified against another measurement

### Sorting

- Ascending
- Descending
- None

The output formats supported by the E7460A are listed below. The system is designed to work with MapInfo in an integrated manner via an object link embedded (OLE) link to the MapInfo application. This exports the data, launches MapInfo, creates the necessary MapInfo tables, and creates a thematic map display in MapInfo. This functionality does require MapInfo be present. MapInfo can be purchased as Option 310 on the 7460A or purchased separately.

### Data output formats

- MapInfo OLE
- MapInfo text file
- ArcView text file
- Plain text file (no headers)
- PlaNET result
- Raw binary

Geographic binning can be applied to the data as part of the export function. Binning is a data-reduction process in which the driven area is overlaid by a grid of user-definable size, and the average of the data over each square is reported.

## GPS

The Agilent E7460A system has the ability to work with several types of GPS interfaces. The system is compatible with the communications protocols listed below.

### Compatible protocols

- TAIP
- TSIP
- NMEA

If you wish to purchase a GPS receiver with the system, Option 210 adds a Trimble Placer GPS 455 receiver with dead reckoning, 2 GPS antennas, and interconnection cables.

### Option 210: GPS receiver with DR

- Trimble Placer GPS 455 with dead reckoning
- Heading sensor
- Interconnect adapter (for use with E6450B or E6452A receivers)
- Interconnect cables
- Bulkhead mount antenna with cable
- Magnetic mount antenna with cable
- Differential compatible

The E7460A software includes a virtual front panel for the GPS receiver. This window displays a bar graph with the individual satellite signal strengths, a text display of the GPS statistics and a map of location history. This map will display the base station locations, names, and PN offsets.

Differential GPS can be used with the E7460A system, provided the GPS receiver being used is differential compatible. Option 230 adds a differential GPS receiver to the system.

### Option 230: differential GPS receiver

- Differential corrections, incorporated RDS-3000
- Magnetic mount antenna
- Interconnect cables

## Handset compatibility

The E7460A can interface with the handsets listed below. This list is complete as of the time of printing. Also, at the time of printing handsets are not available from Agilent Technologies. Contact your Agilent representative regarding handset compatibility and availability plans.

### Compatible handsets

- Qualcomm QCP-800
- Qualcomm QCP-820
- Qualcomm QCP-1900
- Qualcomm QCP-2700
- Samsung SCH-1000
- Sony CM-D500
- Sony CM-D600
- Sony CM-M1300
- Sony CM-S1100
- Sony CM-B1200

Option 700 must be ordered when using phones based on Qualcomm chip sets, including all of the phones listed above. Options 710, 711, and 712 provide interface cables for the supported handsets. The table below lists the phone cable options and the corresponding handsets. These cables can be purchased from Agilent or provided by the customer.

Cable	Handsets
Option 710	QCP-800, QCP-1900, CM-D500, CM-D600
Option 711	QCP-820, QCP-2700, CM-S1100, CM-B1200, CM-M1300
Option 712	SCH-1000

## Computer hardware

The E7460A systems require a PC. The minimum PC requirements are listed. If you wish to purchase a laptop computer with the system, Option 010 adds an HP Omnibook laptop PC.

### Minimum PC requirements

- Pentium processor (clock rate  $\geq$  120 MHz)
- Windows 95® or Windows NT® (4.0 or later)
- RS-232 (DB9) serial port
- 32 MB RAM
- 40 MB disk space for software installation
- 200 MB disk space recommended for data
- CD-ROM drive recommended
- 800 x 600 display resolution

### Option 010 PC specifications

- Pentium processor (266 MHz)
- Windows 95
- 48 MB RAM
- 4 GB hard disk
- 20x CD-ROM drive
- Enhanced lithium ion battery pack
- 13.3 in. active matrix display
- 1024 x 768 display resolution

More information on the HP Omnibook can be found at [www.hp.com](http://www.hp.com) or contact your Hewlett-Packard representative.

## Mapping software

MapInfo can be launched from within the E7460A, providing transparent integration between mapping information and measurement data. In addition, the E7460A can output data in ASCII format, allowing the user to import data into other applications (see data export section). MapInfo can be purchased with the system as Option 310, and if a laptop computer is ordered, the software will be installed on the laptop.

## Portability accessories

The E7460A is a lightweight, portable system. Option 530 provides a carry case for the system.

### Option 530: briefcase carrier

For transporting an E7460A system. System is not intended to be operated from within case. Dimensions: 17 3/4 in. x 14 in. x 5 in.

## Training

Training is provided with the E7460A system. For training information, please consult our website at [www.agilent.com/find/drive\\_test](http://www.agilent.com/find/drive_test) or contact your Agilent Technologies representative.

## Related literature

*Agilent E7450A*, Brochure

## Pub. Number

5965-7426E

*Agilent E7450B and E7452A*,  
Data Sheet

5966-3852E

*Agilent E7470A and E7472A*,  
Data Sheet

5966-3851E

*Agilent E74XX Series*,  
Configuration Guide

5966-2976E

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