Agilent Technologies
8563E Option K35
User's and Service Guide

Agilent Technologies
Model 8563E Option K35

User's and Service Guide

Use this manual with the following documents:

Agilent 8563E CDMA Test Set User's Guide

Agilent 8563E CDMA Test Set Service Guide

Agilent Technologies 8560 E-Series Firmware Upgrade Kit Installation Note

Agilent Part Number: 08563-90235
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Agilent Technologies

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Warranty Information

IMPORTANT

Certification

Agilent Technologies certifies that this product met its published specifications at the time of shipment from the factory. Agilent Technologies further certifies that its calibration measurements are traceable to the United States National Institute of Standards and Technology (NIST, formerly NBS), to the extent allowed by the Institute's calibration facility, and to the calibration facilities of other International Standards Organization members.

NOTE

The actual warranty on your instrument depends on the date it was ordered as well as whether or not any warranty options were purchased at that time. To determine the exact warranty on your instrument, contact Agilent Technologies with the model and serial number of your instrument. Refer to "Contacting Agilent" on page 18.

This Agilent Technologies instrument product is warranted against defects in material and workmanship for the warranty period. During the warranty period, Agilent Technologies will, at its option, either repair or replace products which prove to be defective.

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If the product is to be returned to Agilent Technologies for service or repair, it must be returned to a service facility designated by Agilent Technologies. Buyer shall prepay shipping charges to Agilent Technologies and Agilent Technologies shall pay shipping charges to return the product to Buyer. However, Buyer shall pay all shipping charges, duties, and taxes for products returned to Agilent Technologies from another country.

Agilent Technologies warrants that its software and firmware designated by Agilent Technologies for use with an instrument will execute its programming instructions when properly installed on that instrument. Agilent Technologies does not warrant that the operation of the instrument, software, or firmware will be uninterrupted or error-free.

Limitation of Warranty. The foregoing warranty shall not apply to defects resulting from improper or inadequate maintenance by Buyer, Buyer-supplied software or interfacing, unauthorized modification or misuse, operation outside of the environmental specifications for the product, or improper site preparation or maintenance.

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THE REMEDIES PROVIDED HEREIN ARE BUYER'S SOLE AND EXCLUSIVE REMEDIES. AGILENT TECHNOLOGIES SHALL NOT BE LIABLE FOR ANY DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, WHETHER BASED ON CONTRACT, TORT, OR ANY OTHER LEGAL THEORY.

Contents

Agilent Technologies Model 8563E Option K35

Agilent Technologies
8563E Option K35

This User’s and Service Guide contains information required for installing, operating and servicing the Agilent 8563E Option K35 W-CDMA test set.

Description

The Agilent 8563E Option K35 provides increased dynamic range of at least 73 dBc for W-CDMA ACPR measurements when used with an 856xE/EC Option H35. Adjacent Channel Power Ratio (ACPR) measurements with at least 900 kHz of guard band are optimized in the Option K35. The Option K35 also provides control menus integrated into the softkeys of the 856xE/EC for ACPR measurements through firmware. With a frequency range of 1.2 GHz to 3.0 GHz, the Option K35 meets the needs for the emerging W-CDMA specifications.

Specifications

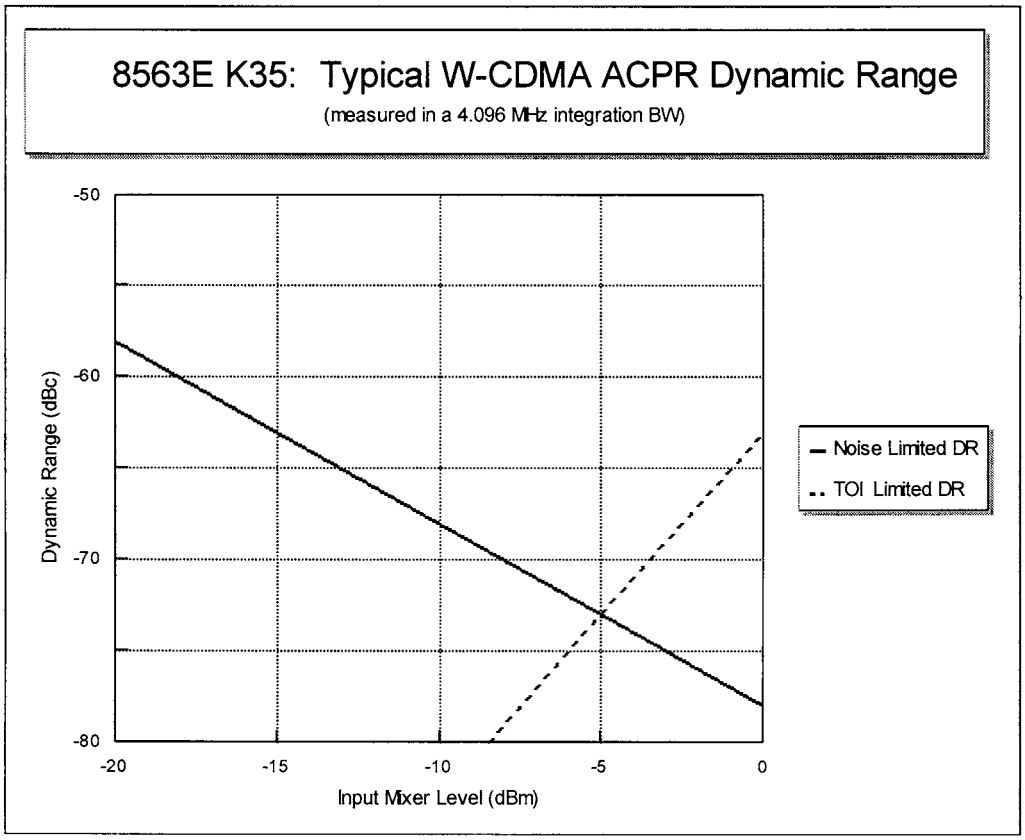
Frequency Range:	1.2 GHz to 3.0 GHz
W-CDMA ACPR:	73 dBc Dynamic Range*
Conversion Loss:	15 dB Nominal
Maximum Input Power:	0 dBm Unmodulated CW, 0 Vdc, Atten = 0 dB
Damage Input Power:	+30 dBm CW, 0 Vdc
LO Input Power:	3.0 GHz to 6.8 GHz
LO Input Power Range:	+9 dBm to +20 dBm
Environmental Temperature Range:	25° C ±5° C

*RF Input power = –5 dBm, Channel Width = 4.096 MHz, Channel Spacing = 5.000 MHz

In the following graph (Figure 1), the optimum W-CDMA ACPR dynamic range is calculated to be 73 dB with an optimum input power of –5 dBm at the input for the mixer. This data is calculated from typical performance data. The W-CDMA ACPR dynamic range is specified to be ≥70 dB at a mixer input level of –4.8 dBm.

NOTE The left (solid) curve indicates the dynamic range as limited by noise. The right (dotted) curve indicates the dynamic range when it is limited by third-order distortion products.

Figure 1 ACP Dynamic Range (dB) vs. Input Mixer Level (dBm)



Installation

The following installation instructions are specific to the Agilent 8561E/EC, 8562E/EC, 8563E/EC, 8564E/EC or 8565E/EC spectrum analyzer.
Refer to Figure 2.

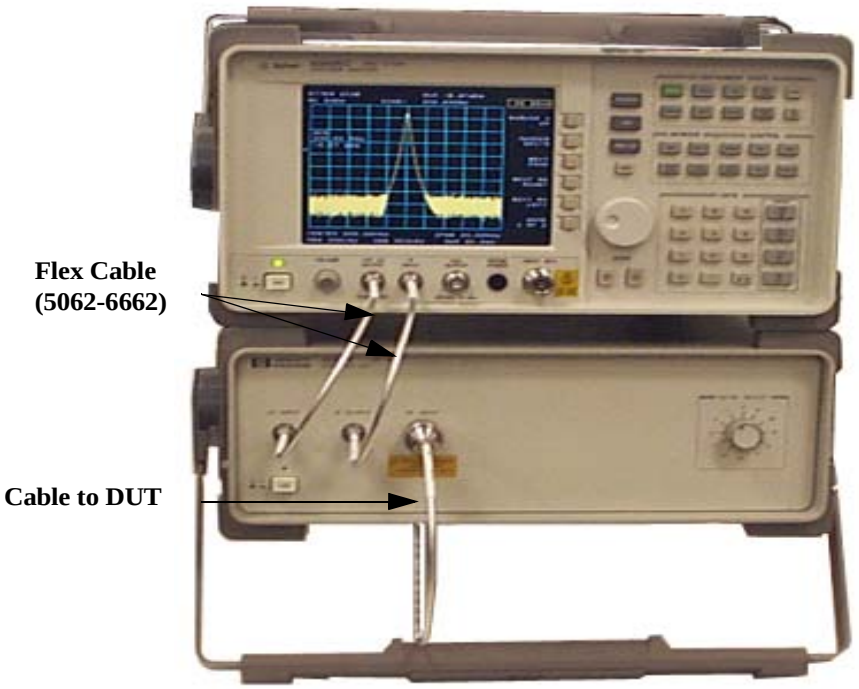
NOTE

The following key conventions are used throughout this document.

- [**HARDKEYS**] are labeled front panel keys
- **SOFTKEYS** are display defined keys (in the menus)

1. Position the spectrum analyzer on top of the Agilent 8563E Option K35.
2. Connect one flex cable (part number 5062-6662) from the LO OUT port on the spectrum analyzer to the LO IN port on the Option K35.
3. Connect one flex cable (part number 5062-6662) from the IF IN port on the spectrum analyzer to the IF OUT port on the Option K35.
4. Connect the DUT RF signal to the RF INPUT port of the Option K35 for ACPR measurements.

Figure 2 **Option K35 Installation**



Getting Started

Part 1: Option K35 Quick Check

Equipment Needed

- Signal Source, Frequency Range of 1.2 to 3.0 GHz
- Agilent Technologies 856xE/EC Option H35
- Agilent Technologies 8563E Option K35

Procedure

1. Set both the signal source and the spectrum analyzer to 2 GHz.
2. Connect the RF OUTPUT from the signal source to the RF IN of the signal analyzer. Observe the signal on the screen of the signal analyzer.
3. Move the RF signal from the signal analyzer and connect it to the RF IN port of the Option K35.
4. Select the Option K35 on the signal analyzer using the following instructions:
   a. If using front panel commands to turn on the Option K35, press the following keys:

      [Meas / User]

      ACP MENU

      K35 T/S

      ON OFF

   b. If using GPIB commands to turn on the Option K35 mode, enter the following sequence:

      ```
      ACPRTS ON
      or
      ACPRTS 1
      ```

NOTE The command to turn the test set off is `ACPRTS OFF` or `ACPRTS 0`. The command to query the current state is `ACPRTS ?`.

5. Observe the signal on the screen again and confirm that the Option K35 is functioning.

6. Using the mixer conversion efficiency information supplied with the instrument, enter the value of the Conversion Loss for the given frequency by pressing the following keys:

   [AUX CTRL]

   EXT MXR

   AMPTD CORRECT

   AVG CNV LOSS

   Enter the value and then press Enter (**Hz**).

   At this point, the signal analyzer will read in absolute amplitude.

Reference Level Settings

The maximum allowable Reference Level is:

RL = –30 dBm + Avg Conv Loss (dB)

The IF input maximum level is –30 dBm. Therefore, the combination of the Average Conversion Loss (seen as CL on screen) and the Reference Level (seen as RL on screen) will total –30 dB.

For example, if the Average Conversion Loss entered is 16.2 dB (CL = 16.2 dB) and the maximum IF input is –30 dBm, then the maximum Reference Level is –13.8 dB.

RL = –13.8 dB = –30 dBm + 16.2 dB

Known Bugs

Each time **[Instrument Preset]** (IP) is pressed, the Average Conversion Loss must be re-entered. Although the on-screen CL value has not changed from the previous settings, the internal Average Conversion Loss has been reset to an unknown value.

Part 2: Option K35 ACPR

1. With a CW signal connected to the RF INPUT port of the Option K35, set the center frequency of the spectrum analyzer to the same frequency.
2. Turn the K35 option on using the same key or GPIB sequence outlined in step 4 of Part 1.

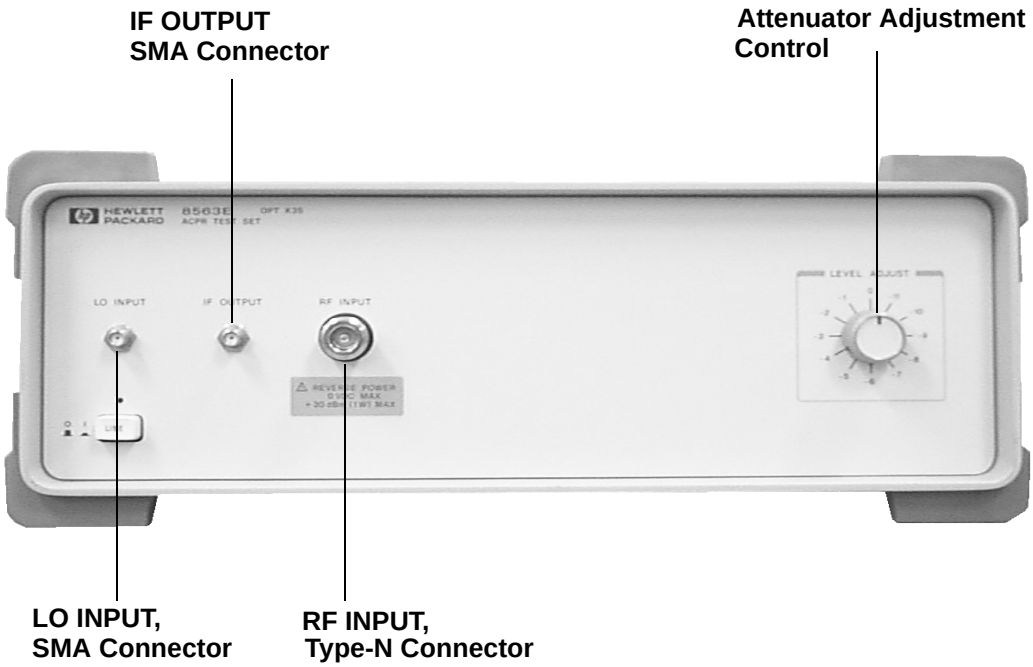
   The CW signal will be viewed on the screen with the appropriate settings to the reference level and span.

Typical W-CDMA ACPR Setup

Residual Bandwidth = 30 kHz
Video Bandwidth = 300 kHz
DET = SAMPLE
Channel Width = 4.096 MHz
Channel Spacing = 5.00 MHz

Front Panel

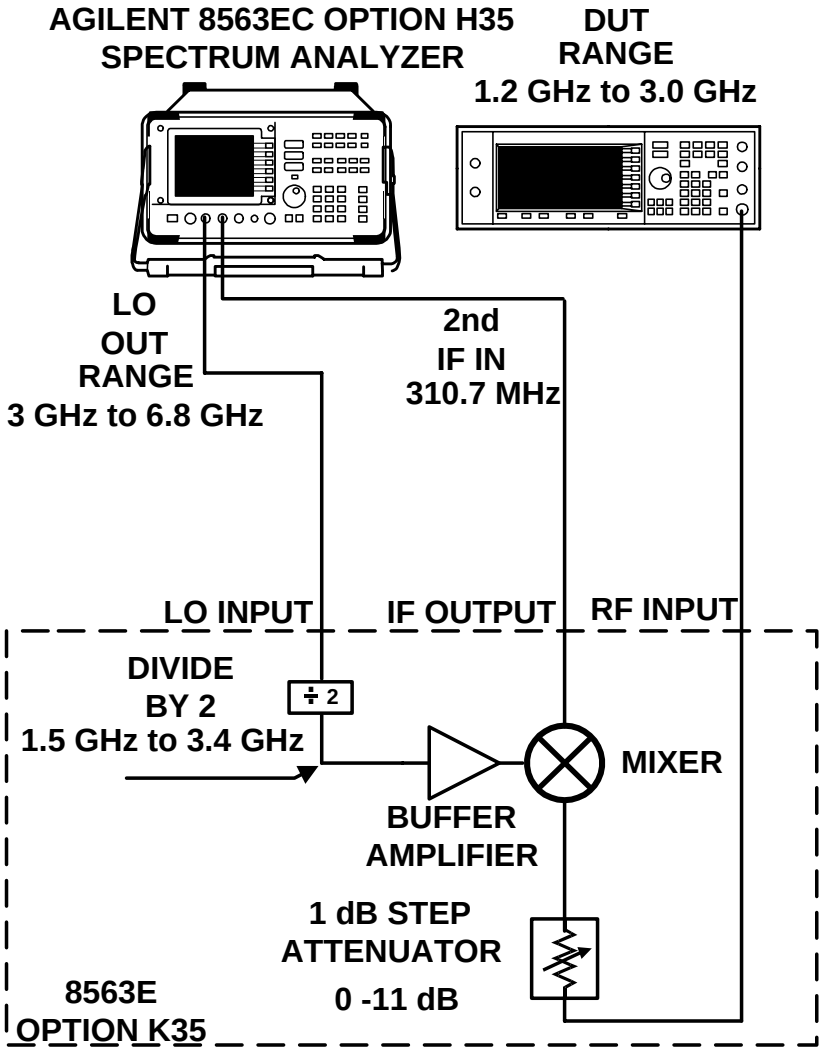
Figure 3 **Option K35 Front Panel Features**



Theory of Operation

The following block diagram illustrates the theory of operation for the Agilent 8563E Option K35.

Figure 4 **Option K35 Block Diagram**



Service Information

- There are no adjustable parts in this instrument.
- If your instrument requires service or if you need to remove or replace a component, contact Agilent Technologies. Refer to "Contacting Agilent" on page 18.
- All TORX-drive screws are metric-threaded. All pozi-drive screws are inch-threaded.

Enabling Option K35

NOTE Option Enable must be performed at an Agilent Service Center.

To enable Option K35 to work with the 8560 E/EC series spectrum analyzer, Option H35 must be enabled in the instrument. Send the 8560 E/EC series analyzer to be upgraded, the firmware and this manual to an Agilent Service Center to add Option H35 to the 8560 E/EC series analyzer.

Service Center Instructions

Remove the Analyzer Cover Assembly

1. Disconnect the line-power cord, remove any adapters from the front panel connectors, and place the analyzer on its front panel.
2. If an 85620A mass memory module is mounted on the rear panel, remove it. Loosen (but do not remove) the four rear bumper screws using a 4 mm hex wrench. Pull the cover assembly off towards the rear of the instrument.

Download the Serial Number and ID String

1. Move the **WR PROT/WR ENA** jumper on the A2 controller assembly to the **WR ENA** position.
2. Set up the computer as described in the operation verification chapter of the calibration guide (or the installation and verification manual, shipped with earlier instruments). Connect a GPIB (HP-IB) cable between the computer and the spectrum analyzer.
3. Connect a power cord to the spectrum analyzer and set the LINE switch to ON. Wait for the power-on adjustments to complete. Ignore any error messages.
4. On the spectrum analyzer, press **[CONFIG] ANALYZER ADDRESS**. If the current address is not 18, press **[18] ENTER** (the Hz key), and **STORE HPIB ADR**.

5. Download the LD_SERID program and run the program. This program is used to download the spectrum analyzer serial number and ID string into its EEROM. This information must be present for the spectrum analyzer to function correctly. With the 856xE/EC series analyzer connected via GPIB, add the new option "H35" to the existing list of options. This will turn on the option to work with the 8563E Option K35 test set.

   a. The software will prompt you to enter the serial number prefix and the serial number suffix. For example, if the complete serial number is 3221A00129, enter **3321** for the prefix (the program will automatically append the **A**) and enter **00129** for the suffix.

   b. Next, you will be prompted to enter the spectrum analyzer model number. A list of valid model numbers will be displayed. Enter the model number exactly as it appears in the list. All alphabetic characters must be upper-case.

   c. You will then be prompted to indicate if there are any options installed. Answer "Y" (yes). Enter Option H35. If the serial prefix is 3305A or below, enter Option 008; these analyzers have the signal identification hardware. Enter a Q (quit) if there are no more options to add to the ID string.

6. After successfully downloading the new ID string, turn the spectrum analyzer power off and on. Some error messages will still appear; these will be cleared later.

7. Press **[CONFIG] DATECODE &OPTIONS**. Under `Options:` should appear the spectrum analyzer model number and `008` (if the serial prefix is 3305A or less) along with any other installed options.

Replace the Analyzer Cover Assembly

1. Move the **WR PROT/WR ENA** jumper on the A2 controller assembly to the **WR PROT** position.
2. Disconnect the power cord and GPIB cable from the spectrum analyzer.
3. Slide the cover onto the instrument from the rear. Be sure to locate the cover air vent holes on the bottom side of the spectrum analyzer.

CAUTION When replacing the spectrum analyzer cover, use caution to avoid damaging any cables.

4. Attach the cover with the four screws loosened earlier, and tighten the four screws gradually to ensure that the cover is seated in the front frame gasket groove.
5. Torque each screw to 40 to 50 in-lb. to ensure proper EMI gasket compression.

Verifying the Option K35 Operation

Equipment Needed

- Power Meter and Sensor
- Signal Generator
- Miscellaneous RF cables

Procedure

1. Set the frequency of the signal generator to a level within the range of the Agilent 8563E Option K35.
2. Set the power level of the signal generator to –20 dBm.
3. Measure the power level using the power meter and sensor. Note the power level.
4. Set the Agilent 856xEC spectrum analyzer to the same frequency as the signal generator by pressing the following softkeys:

   ZERO SPAN

   K35 T/S ON

5. Connect the signal source to the Option K35 RF IN. Make sure that the LO OUT of the spectrum analyzer is connected to the LO IN of the Option K35.
6. Connect the power meter and sensor to the IF OUT of the Option K35. Note the power level.

The difference between the two measured power levels should be approximately the same as the value in the Mixer Conversion Efficiency information supplied with the Option K35.

Troubleshooting

Use the following guide to troubleshoot through the listed possible problems involving the operation of the Agilent 8563E Option K35. If problems persist or cannot be corrected using this information provided, contact Agilent Technologies.

Table 1 **Troubleshooting Guide**

Problem	**Check for the following:**
No signal on screen	1. The standard configuration as described in the installation section is used 2. The RF signal is between 1.2 GHz and 3.0 GHz 3. Option K35 menu item is turned ON **[User Menu]>ACP>K35 ON** 4. Use the following configuration: Use two separate RF sources, one for the LO IN and the other for RF IN. Set the LO source frequency to (RF IN Frequency + 310.7 MHz)*2 The screen should show approximately 15 dB insertion loss thru Option K35
Amplitude is low, signal is on the screen, but amplitude is low	1. Connections are at their proper torque settings 2. Attenuator is set to 0 dB 3. The standard configuration is used (as described in the installation section)
Power ON LED is not illuminated	1. Power is applied to the Option K35 2. Fuse is OK
Center frequency reads >3 GHz after pressing K35 ON OFF	1. Ensure that the 856xEC is in the unpreselected mode: **[CONFIG]>EXT MXR>UNPR**

Replaceable Parts

The following table shows the replaceable parts for this instrument.

Table 2 **Replaceable Parts List**

Description	Agilent Part Number	Quantity
Front panel knob	0370-3215	1
Screw- rear frame	0515-0169	3
Screw - heatsink to deck	0515-0372	7
Screw - pc board to deck	0515-0374	5
Screw - PC board to heatsink	0515-1044	8
Screw - power supply to deck	0515-1079	3
Screw - bumper	0515-1146	8
Screw - attenuator bracket to deck	0515-1227	2
Screw - front/rear frame	0515-1367	8
Screw - power supply cover	0515-1459	2
Screw - power switch	0515-1460	2
Screw - power supply	0515-1585	4
Nut - dress panel	0535-0082	9
LO Connector-front panel	1250-1666	2
RF Output Connector	1250-2191	1
Tie wrap	1400-0249	2
Cable clip - line switch cable	1400-0774	4
Cap - conductive, SMA	1401-0245	2
Ca p - conductive, Type-N	1401-0247	1
Washer - star interior	2190-0014	4
Washer - LO connector, rear	2190-0421	1
Flat Washers - heatsink	2190-0572	8
Washer - LO connector, front	2190-0761	1
Screw - attenuator to bracket	2200-0105	2
Set Screw - for knobs and shaft	3030-0007	4
Cover - power supply	5002-0611	1
Front Frame	5021-8693	1

Table 2 **Replaceable Parts List**

Description	Agilent Part Number	Quantity
Rear Frame	5021-8694	1
Adapter	5021-8695	1
Bumpers - corners	5041-8928	4
Feet	5041-8929	4
Cable Assembly - line switch	5062-4853	1
Instrument Cover Assembly	5062-4854	1
RF Cables	5062-6656	1
RF Cables	5062-6662	6
Hole Plug - chrome SMA	6960-0023	2
Hole Plug - black BNC	6960-0149	3
Warning Label - power supply	7120-4293	3
Warning Label - metric	7121-2527	1
Gasket - metallized	8160-0520	1
Cable, LED power ON	08563-60126	1
Downconverter Board	08563-60129	1
ROM - U306 (Option K37 Only)	08563-80057	1
ROM - U307 (Option K37 Only)	08563-80058	1
ROM - U308 (Option K37 Only)	08563-80059	1
Panel - dress, rear	85640-00002	1
Panel - dress front	85640-00005	1
Bracket - attenuator	85640-00006	1
Center Deck	85640-00007	1
Heatsink	85640-20005	1
Power Supply Assembly	85640-60006	1
Attenuator	08494-60012	1
Calibration Certificate	9320-6288	1
User’s and Service Guide	08563-90235	1

Safety and Regulatory Information

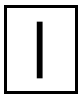
General

The following safety symbols are used throughout this manual. Familiarize yourself with the symbols and their meaning before operating this instrument.

WARNING **Warning denotes a hazard. It calls attention to a procedure which, if not correctly performed or adhered to, could result in injury or loss of life. Do not proceed beyond a warning note until the indicated conditions are fully understood and met.**

CAUTION *Caution* denotes a hazard. It calls attention to a procedure that, if not correctly performed or adhered to, could result in damage to or destruction of the instrument. Do not proceed beyond a caution sign until the indicated conditions are fully understood and met.

The instruction documentation symbol. The product is marked with this symbol when it is necessary for the user to refer to the instructions in the documentation.



This symbol is used to mark the on position of the power line switch.

This symbol is used to mark the standby position of the power line switch.

This symbol indicates that the input power required is ac.

Safety Earth Ground

WARNING **This is a Safety Class 1 Product (provided with a protective earthing ground incorporated in the power cord). The mains plug shall only be inserted into a socket outlet provided with a protected earth contact. Any interruption of the protective conductor inside or outside of the product is likely to make the product dangerous. Intentional interruption is prohibited.**

WARNING **If this product is not used as specified, the protection provided by the equipment could be impaired. This product must be used in a normal condition (in which all means for protection are intact) only.**

Before Applying Power

Verify that the product is configured to match the available main power source as described in the input power configuration instructions in the standard manual.

If this product is to be powered by an autotransformer, make sure the common terminal is connected to the neutral (grounded) side of the ac power supply.

Contacting Agilent

Online assistance: www.agilent.com/find/assist			
United States *(tel)* 1 800 452 4844	**Latin America** *(tel)* (305) 269 7500 *(fax)* (305) 269 7599	**Canada** *(tel)* 1 877 894 4414 *(fax)* (905) 282-6495	**Europe** *(tel)* (+31) 20 547 2323 *(fax)* (+31) 20 547 2390
New Zealand *(tel)* 0 800 738 378 *(fax)* (+64) 4 495 8950	**Japan** *(tel)* (+81) 426 56 7832 *(fax)* (+81) 426 56 7840	**Australia** *(tel)* 1 800 629 485 *(fax)* (+61) 3 9210 5947	**Singapore** *(tel)* 1 800 375 8100 *(fax)* (65) 836 0252
Malaysia *(tel)* 1 800 828 848 *(fax)* 1 800 801 664	**Philippines** *(tel)* (632) 8426802 *(tel) (PLDT subscriber only):* 1 800 16510170 *(fax)* (632) 8426809 *(fax) (PLDT subscriber only):* 1 800 16510288	**Thailand** *(tel) outside Bangkok:* (088) 226 008 *(tel) within Bangkok:* (662) 661 3999 *(fax)* (66) 1 661 3714	**Hong Kong** *(tel)* 800 930 871 *(fax)* (852) 2506 9233
Taiwan *(tel)* 0800-047-866 *(fax)* (886) 2 25456723	**People's Republic of China** *(tel) (preferred):* 800-810-0189 *(tel) (alternate):* 10800-650-0021 *(fax)* 10800-650-0121	**India** *(tel)* 1-600-11-2929 *(fax)* 000-800-650-1101	

Appendix A:
Firmware Installation Note Modifications

The following modifications are made to the *Agilent Technologies 8560 E-Series Firmware Upgrade Kit Installation Note* with instruments with firmware revision prior to 971024.

NOTE

The *Agilent Technologies 8560 E-Series Firmware Upgrade Kit Installation Note*, is sent only when Agilent 8560 E/EC series spectrum analyzers have not had Option K35 compatibility firmware installed at the factory (as in Options H35) The modifications to the Agilent 856xE/EC must be performed at an Agilent Technologies approved service center for those instrument with firmware revision prior to 971024.

Replace **Table 1-1. Firmware Upgrade Kit Parts List** with the following table:

Description	Agilent Part Number	Quantity
EPROM, programmed U306	08564-80057	1
EPROM, programmed U307	08564-80058	1
EPROM, programmed U308	08564-80059	1
EPROM, programmed U309	08564-80060	1
8560 E-Series Firmware Upgrade Kit Installation Note	08560-90164	1

Remove the Analyzer Cover Assembly

1. Disconnect the line-power cord, remove any adapters from the front panel connectors, and place the analyzer on its front panel.
2. If an 85620A mass memory module is mounted on the rear panel, remove it. Loosen (but do not remove) the four rear bumper screws using a 4 mm hex wrench. Pull the cover assembly off towards the rear of the instrument.

Download the Serial Number and ID String

The following modifications are made to the *Agilent Technologies 8560 E/EC-Series Firmware Upgrade Kit Installation Note* with instuments with firmware revisions after 971024..

1. Move the **WR PROT/WR ENA** jumper on the A2 controller assembly to the **WR ENA** position.
2. Set up the computer as described in the operation verification chapter of the calibration guide (or the installation and verification manual, shipped with earlier instruments). Connect a GPIB cable between the computer and the spectrum analyzer.
3. Connect a power cord to the spectrum analyzer and set the LINE switch to ON. Wait for the power-on adjustments to complete. Ignore any error messages.
4. On the spectrum analyzer, press **[CONFIG] ANALYZER ADDRESS**. If the current address is not 18, press **[18] ENTER** (the Hz key), and **STORE HPIB ADR**.
5. Download the LD_SERID program and run the program. This program is used to download the spectrum analyzer serial number and ID string into its EEROM. This information must be present for the spectrum analyzer to function correctly. With the 856xE/EC series analyzer connected via GPIB, add the new option “H35” to the existing list of options. This will turn on the option to work with the 8563E Option K35 test set.
   a. The software will prompt you to enter the serial number prefix and the serial number suffix. For example, if the complete serial number is 3221A00129, enter **3321** for the prefix (the program will automatically append the **A**) and enter **00129** for the suffix.
   b. Next, you will be prompted to enter the spectrum analyzer model number. A list of valid model numbers will be displayed. Enter the model number exactly as it appears in the list. All alphabetic characters must be upper-case.
   c. You will then be prompted to indicate if there are any options installed. Answer “Y” (yes). Enter Option H35. If the serial prefix is 3305A or below, enter Option 008; these analyzers have the signal identification hardware. Enter a Q (quit) if there are no more options to add to the ID string.
6. After successfully downloading the new ID string, turn the spectrum analyzer power off and on. Some error messages will still appear; these will be cleared later.
7. Press **[CONFIG] DATECODE &OPTIONS**. Under `Options:` should appear the spectrum analyzer model number and `008` (if the serial prefix is 3305A or less) along with any other installed options.

Replace the Analyzer Cover Assembly

1. Move the **WR PROT/WR ENA** jumper on the A2 controller assembly to the **WR PROT** position.
2. Disconnect the power cord and GPIB cable from the spectrum analyzer.
3. Slide the cover onto the instrument from the rear. Be sure to locate the cover air vent holes on the bottom side of the spectrum analyzer.

CAUTION When replacing the spectrum analyzer cover, use caution to avoid damaging any cables.

4. Attach the cover with the four screws loosened earlier, and tighten the four screws gradually to ensure that the cover is seated in the front frame gasket groove.
5. Torque each screw to 40 to 50 in-lb. to ensure proper EMI gasket compression.