



# Agilent ESA/EMC Spectrum Analyzer

## Configuration Guide



This configuration guide will help you select the right options to optimize the ESA or EMC analyzer for your application. In addition, it includes information for upgrading your existing ESA or EMC analyzer. For additional product and application information, please see the information listed at the end of this guide.

The ESA analyzer is available in three “express option” choices that each have a simplified set of the most frequently ordered options. Express options are favorably priced and provide faster delivery.

The EMC analyzer is available in two models, which include the most frequently ordered options.

For unique requirements, the ESA analyzer may be custom configured from the complete set of available options.



## Express Analyzers - best delivery and price

### Basic Analyzer – ESA-L Series (Express Option BAS/BTG)

Note: All basic analyzers include a 50 ohm RF input port.

| Available models                                    |     |  |
|---|-----|--|
| E4411B (9 kHz to 1.5 GHz)                           |     | The BAS express option is only available on the ESA-L Series models. For a basic analyzer with tracking generator, order Option BTG instead of Option BAS. |
| E4403B (9 kHz to 3.0 GHz)                           |     |  |
| E4408B (9 kHz to 26.5 GHz)                          |     |  |
| Included options                                    |     | Comments   |
| IF sweep, and video output ports                    | A4J | Occupies one expansion slot  |
| GPIO connection                                     | A4H | Occupies one expansion slot  |
| IntuiLink PC connectivity software                  | *** | Connects to Microsoft® Word and Excel  |
| Available options                                   |     | Comments   |
| Replace GPIO connection (A4H) with serial port      | 1AX | Not compatible with Option A4H; occupies one expansion slot  |
| Narrow resolution bandwidths                        | 1DR | 100 Hz minimum on ESA-L Series   |
| 50 ohm tracking generator (9 kHz to 3.0 GHz)        | BTG | TG operates to 1.5 GHz on E4411B; equivalent to Option BAS with 1DN  |
| 8590 Series programming code compatibility          | 290 | Free download on Web at <a href="http://www.agilent.com/find/esa">www.agilent.com/find/esa</a> ; no license required                                       |
| Accessories shown on page 6                         |     |  |
| Future upgrades                                     |     |  |
| Only limited upgrades are available on ESA-L Series |     | See page 8   |

## Express Analyzers - best delivery and price

### Standard Analyzer – ESA-E Series (Express Option STD/STG)

| Available models   |     |   |
|--|-----|---|
| E4402B (9 kHz to 3.0 GHz)  |     | The STD express option is only available on the ESA-E Series models. For a standard analyzer with tracking generator, order Option STG instead of Option STD. |
| E4404B (9 kHz to 6.7 GHz)  |     |   |
| E4405B (9 kHz to 13.2 GHz)   |     |   |
| E4407B (9 kHz to 26.5 GHz)   |     |   |
| Included options   |     | Comments  |
| Fast time domain sweep, IF and video output ports  | AYX |   |
| FM demodulation / deviation  | BAA | Occupies one expansion slot   |
| GPIO Connection  | A4H | Occupies one expansion slot   |
| IntuiLink PC connectivity software   | *** | Connects to Microsoft Word and Excel  |
| Available options  |     | Comments  |
| Performance option bundle  | B75 | Includes Options 1D5, 1DR, 1DS  |
| Replace GPIO connection (A4H) with serial port   | 1AX | Not compatible with Option A4H; occupies one expansion slot   |
| High stability frequency reference   | 1D5 |   |
| Time-gated spectrum analysis   | 1D6 |   |
| 50 ohm tracking generator (9 kHz to 3.0 GHz)   | STG | Equivalent to Option STD with 1DN   |
| Narrow resolution bandwidths   | 1DR | 10 Hz minimum with Option 1DR or 1 Hz minimum with Options 1DR and 1D5  |
| Preamplifier built-in for enhanced sensitivity   | 1DS |   |
| Noise figure measurement application   | 219 | See Option 219 Technical Overview for recommended options   |
| Cable fault location measurement application   | 225 | Requires Option 1DN or STG; recommended Option B7K  |
| Phase noise measurement application  | 226 | For phase noise measurements ≤ 10 kHz requires Option 1DR   |
| Cable TV service and installation application  | 227 |   |
| Benchlink Web remote control software  | 230 | Requires Option A4H   |
| HP 8566/68 programming code compatibility  | 266 | Free download on Web at <a href="http://www.agilent.com/find/esa">www.agilent.com/find/esa</a> ; no license required  |
| 8590 Series programming code compatibility   | 290 | Free download on Web at <a href="http://www.agilent.com/find/esa">www.agilent.com/find/esa</a> ; no license required  |
| Accessories shown on page 6  |     |   |
| Future upgrades  |     |   |
| Available expansion slots in the “standard” analyzer for future upgrades:<br>E4402B – 3 expansion slots<br>E4402B with Option 219 – 2 expansion slots<br>E4404/5/7B – 2 expansion slots<br>E4404/5/7B with Option 219 – 1 expansion slot |     | Future upgrades on the “standard” analyzer are available, given the necessary configuration requirements are met. See page 7.                                 |

## Express Analyzers - best delivery and price

### Communications Test Analyzer – ESA-E Series (Express Option COM)

| Available models   |                  |   |
|--|------------------|---|
| E4402B (9 kHz to 3.0 GHz)<br>E4404B (9 kHz to 6.7 GHz)<br>E4405B (9 kHz to 13.2 GHz)<br>E4407B (9 kHz to 26.5 GHz)   |                  | The COM express option is only available on the ESA-E Series models.  |
| Included options   |                  | Comments  |
| High stability frequency reference   | 1D5              |   |
| Narrow resolution bandwidths   | 1DR              | 1 Hz minimum  |
| ESA to 89601A vector signal analysis software link utility   | 231              |   |
| FM demodulation /deviation   | BAA              | Occupies one expansion slot   |
| Digital demodulation hardware  | B7D/B7E          | Occupies two expansion slots  |
| GPIO connection  | A4H              | Occupies one expansion slot   |
| IntuiLink PC connectivity software   | ***              | Connects to Microsoft Word and Excel  |
| Available options  |                  | Comments  |
| Replace GPIO connection (A4H) with serial port   | 1AX              | Not compatible with Option A4 or Option 231; occupies one expansion slot  |
| Time-gated spectrum analysis   | 1D6              | Recommended selection   |
| Preamplifier built-in for enhanced sensitivity   | 1DS              | Recommended selection   |
| Noise figure measurement personality   | 219 <sup>1</sup> | See Option 219 Technical Overview for recommended options   |
| Phase noise measurement personality  | 226 <sup>1</sup> | For phase noise measurements $\leq 10$ kHz requires Option 1DR  |
| Cable TV service and installation personality  | 227 <sup>1</sup> |   |
| Modulation analysis personality  | 229 <sup>1</sup> |   |
| Benchlink Web remote control software  | 230              | Requires Option A4H   |
| EDGE upgrade to GSM measurement personality  | 252 <sup>1</sup> | Requires Option BAH   |
| cdmaOne measurement personality  | BAC <sup>1</sup> |   |
| GSM/GPRS measurement personality   | BAH <sup>1</sup> | Requires Option 1D6   |
| HP 8566/68 programming code compatibility  | 266 <sup>1</sup> | Free download on Web, <a href="http://www.agilent.com/find/esa">www.agilent.com/find/esa</a> ; no license required                      |
| 8590-Series programming code compatibility   | 290 <sup>1</sup> | Free download on Web, <a href="http://www.agilent.com/find/esa">www.agilent.com/find/esa</a> ; no license required                      |
| Accessories shown on page 6  |                  |   |
| Future upgrades  |                  |   |
| Available expansion slots in “communications test” analyzer for future upgrades:<br>E4402B – 2 expansion slots<br>E4402B with Option 219 – 1 expansion cardslots<br>E4404/5/7B – 1 expansion slot<br>E4404/5/7B with Option 219 - no expansion slots |                  | Future upgrades on the “communications test” analyzer are available given the necessary configuration requirements are met. See page 7. |

1. If more than two or three measurement personalities are ordered, memory size limitations may limit the number that may be loaded into the ESA at any one time. For detailed information about memory size limits, please see the web site:  
<http://sa.tm.agilent.com/ESA/memory/>

## Custom Configurations

### ESA-L Series

Note: All custom ESA-L Series configurations include a 75 ohm RF input port.

| Available models                                    |     |   |
|---|-----|---|
| E4411B (9 kHz to 1.5 GHz)                           |     | Custom configuration not available for E4403B or E4408B   |
| Included options                                    |     | Comments  |
| GPIB connection                                     | A4H | Standard on every instrument unless Option 1AX is ordered; occupies one expansion slot                          |
| IntuiLink PC connectivity software                  | *** | Connects to Microsoft Word and Excel  |
| 75 ohm impedance                                    | 1DP | Not compatible with Option 1DN  |
| Available options                                   |     | Comments  |
| Replace GPIB connection (A4H) with serial port      | 1AX | Not compatible with Option A4H; occupies one expansion slot   |
| IF sweep, and video output ports                    | A4J | Occupies one expansion slot   |
| Narrow resolution bandwidths                        | 1DR | 100 Hz minimum on ESA-L Series  |
| 75 ohm tracking generator (1 MHz to 1.5 GHz)        | 1DQ | Requires Option 1DP; not compatible with Option 1DN   |
| 8590 series programming code compatibility          | 290 | Free download from <a href="http://www.agilent.com/find/esa">www.agilent.com/find/esa</a> ; no license required |
| Accessories shown on page 6                         |     |   |
| Future Upgrades                                     |     | Comments  |
| Only limited upgrades are available on ESA-L Series |     | See page 8  |

## Custom Configurations

### ESA-E Series

| Available models   |                        |  |
|--|------------------------|--|
| E4402B (30 Hz to 3.0 GHz)  |                        | Frequency range shown is with Option UKB installed<br>The E4402B has six expansion slots<br>The E4404/5/7B have five expansion slots |
| E4404B (30 Hz to 6.7 GHz)  |                        |  |
| E4405B (30 Hz to 13.2 GHz)   |                        |  |
| E4407B (30 Hz to 26.5 GHz)   |                        |  |
| Included options   |                        | Comments   |
| GPIB connection  | A4H                    | Standard on every instrument unless 1AX is ordered; occupies one expansion slot  |
| IntuiLink PC connectivity software                                   | ***                    | Connects to Microsoft Word and Excel   |
| Available options  |                        | Comments   |
| High stability frequency reference                                   | 1D5                    | Recommended option   |
| Narrow resolution bandwidths   | 1DR                    | 1 Hz minimum; recommended option   |
| Low emissions shielding  | 060                    | Not compatible with Option B7B   |
| Wide offset phase noise improvement and ACPR dynamic range extension | 120                    | Occupies one expansion slot  |
| Replace GPIB connection (A4H) with serial port                       | 1AX                    | Not compatible with Option A4H; occupies one expansion slot  |
| Time-gated spectrum analysis   | 1D6                    |  |
| 50 ohm tracking generator (9 kHz to 3.0 GHz)                         | 1DN                    |  |
| Preamplifier built-in for enhanced sensitivity                       | 1DS                    |  |
| Noise figure measurement personality plus hardware                   | 219 <sup>1</sup>       | See Option 219 Technical Overview for recommended options  |
| Cable fault location measurement personality                         | 225 <sup>1</sup>       | Requires Option 1DN; not compatible with Option BAH; recommended accessory Option B7K  |
| Phase noise measurement personality                                  | 226 <sup>1</sup>       | For phase noise measurements ≤ 10 kHz requires Option 1DR  |
| Cable TV field service and analog broadcast measurement personality  | 227 <sup>1</sup>       |  |
| Modulation analysis personality                                      | 229 <sup>1</sup>       | Requires Options B7D, B7E, A4H,1D5; includes capability of Option 231 <sup>2</sup>   |
| Benchlink Web remote control software                                | 230                    | Requires Option A4H  |
| ESA to 89601A vector signal analysis software link utility           | 231                    | Requires Options B7D, B7E, A4H,1D5; Option 229 includes capability of Option 231 <sup>2</sup>  |
| EDGE upgrade to GSM measurement personality                          | 252 <sup>1</sup>       | Requires Option BAH  |
| HP 8566/68 programming code compatibility                            | 266                    | Free download on Web, <a href="http://www.agilent.com/find/esa">www.agilent.com/find/esa</a> ; no license required                   |
| 8590 Series programming code compatibility                           | 290                    | Free download on Web, <a href="http://www.agilent.com/find/esa">www.agilent.com/find/esa</a> ; no license required                   |
| Bluetooth measurement analyzer                                       | 304 <sup>1</sup>       | Includes Options 228, 106, B7D <sup>3</sup> , B7E, 1DS, 1D5; occupies three expansion slots  |
| FSK demodulator (Option 106)   |                        |  |
| Bluetooth measurement personality (Option 228)                       |                        |  |
| EMI detectors and FM demodulation                                    | AYQ                    | Occupies one expansion slot; requires Option 1DR   |
| Fast time domain sweep; IF, sweep, and video output ports            | AYX <sup>4</sup>       | Occupies one expansion slot  |
| External mixing  | AYZ                    | Available on E4407B only   |
| TV trigger and picture on screen                                     | B7B                    | Requires Option BAA; not compatible with Option 060  |
| Digital demodulation hardware  | B7D <sup>4</sup> / B7E | Requires Option 1D5; occupies two expansion slots  |
| FM demodulation / deviation  | BAA                    | Not compatible with Option 304, or 106; occupies one expansion slot  |
| APC 3.5 mm input connector   | BAB                    | Available on the E4407B only   |
| cdmaOne measurement personality                                      | BAC <sup>1</sup>       | Requires Options B7D, B7E, 1D5   |
| GSM/GPRS measurement personality                                     | BAH <sup>1</sup>       | Requires Options B7D, B7E, 1D5, 1D6; includes capability of Option 225   |
| 26.5 GHz uncalibrated built in preamp                                | H26                    | Performance not specified; available on E4407B only  |
| 70 MHz IF output   | H70                    | Recommended for use with 89611A VSA; occupies one expansion slot   |
| FM deviation personality enhancement                                 | J36                    | Requires Option BAA. Measure peak-to-peak deviation, positive and negative peaks   |
| 100 Hz (30 Hz usable) frequency range extension                      | UKB                    | Requires Option 1DR  |
| Accessories shown on page 6  |                        |  |

1. If more than two or three measurement personalities are ordered, memory size limitations may limit the number that may be loaded into the ESA at any one time. For detailed information about memory size limits, please see the web site: <http://sa.tm.agilent.com/ESA/memory/>
2. The 89601A software is available for download at: [www.agilent.com/find/89600](http://www.agilent.com/find/89600)
3. Option B7D has the same fast ADC capability as Option AYX. Only order Option AYX with Option 304 if you need the IF, sweep, and video output ports.
4. Option AYX and B7D both have the same fast ADC capability.

## Supplemental Option Information Equivalent Options and Bundles

| Option                            | Equivalent Option(s)         | Comments   |
|-----------------------------------|------------------------------|--|
| <i>ESA-L Series</i>               |                              |  |
| BAS - Basic analyzer              | A4J                          | Order BAS or BTG to get best delivery and price                        |
| BTG - Basic analyzer with TG      | A4J, 1DN                     |  |
| <i>ESA-E Series</i>               |                              |  |
| STD - Standard analyzer           | AYX, BAA                     | Order STD, STG, or COM to get best delivery and price                  |
| STG - Standard analyzer with TG   | AYX, BAA, 1DN                |  |
| COM - Communication test analyzer | B7D, B7E, 1D5, 1DR, BAA, 231 |  |
| B75 - Performance bundle          | 1DR, 1DS, 1D5                | Only available with Express Analyzer Option STD or STG                 |
| 304 - Bluetooth premium bundle    | 228, 106, B7D, B7E, 1DS, 1D5 | Options 106 and 228 are not available outside of the Option 304 bundle |

## Express Analyzers

### EMC Standard Analyzer - E7400A Series EMC Analyzer (Express Option STD/STG)

| Available models  |     |  |
|---|-----|--|
| E7402A (30 Hz to 3.0 GHz)   |     | The standard EMC analyzer (option STD) contains all the included options listed below. To receive a standard analyzer with a tracking generator order options STG. |
| E7405A (30 Hz to 26.5 GHz)  |     |  |
| Included options  |     | Comments   |
| GPIB connection   | A4H | Occupies one expansion slot  |
| EMI detectors and FM demodulation                                       | AYQ | Occupies one expansion slot  |
| Fast time domain sweep, IF and video output ports                       | AYX |  |
| 100 Hz (30 Hz usable) frequency range extension                         | UKB |  |
| Low emissions shielding   | 060 |  |
| Narrow resolution bandwidths  | 1DR | 1 Hz resolution  |
| Preamplifier built-in for enhanced sensitivity                          | 1DS | Operates to 3 GHz  |
| High stability frequency reference                                      | 1D5 |  |
| EMC measurement firmware  | *** | Automated EMC measurements   |
| IntuiLink PC connectivity software                                      | *** | Connects to Microsoft Word and Excel   |
| Available options   |     | Comments   |
| 50 ohm tracking generator (9 kHz to 3.0 GHz)                            | STG | Equivalent to Option 1DN   |
| Replace GPIB connection (A4H) with serial port                          | 1AX | Not compatible with Option A4H or E7415A EMI measurement software: occupies one expansion slot   |
| Time-gated spectrum analysis  | 1D6 |  |
| Accessories shown on page 6   |     |  |
| Future upgrades   |     |  |
| Available expansion slots in the standard analyzer for future upgrades: |     |  |
| E7402A - 3 expansion slots  |     |  |
| E7405A - 2 expansion slots  |     |  |

## Accessories

### ESA and EMC Accessories

| Options  | Description  | Comment   | Part number <sup>1</sup> |
|--|--|---|--------------------------|
| <b>ESA specific accessories</b>  |  |   |                          |
| A5D  | 12 VDC power cable                                       | DC power connection available on every ESA  | E4401-60066              |
| AXT  | Hard transit case  |   | E4401-60101              |
| AYT  | Gray soft carrying/operation case                        |   | E4401-60117              |
| AYU  | Yellow soft carrying/operation case                      |   | E4401-60118              |
| B7K  | Cable fault measurement kit (50 ohm)                     | Requires Option 1DN or STG, and Option 225 or BAH   |                          |
| 042  | Gray backpack carrying case                              |   | 9300-2465                |
| 044  | Yellow backpack carrying case                            |   | 9300-2470                |
| 1CP  | Rack mount kit with handles                              | This kit is designed to fit into Agilent racks only. For non-Agilent racks, additional end brackets are required and are available by ordering part number: 1494-0061 | E4401-60057              |
| 1D7  | 50 to 75 ohm minimum loss pad                            |   | 0955-1020                |
| E1779A   | Rechargeable snap-on battery and charger                 | Order as separate model number, not option number   |                          |
| UK9  | Front panel cover  |   | E4401-60193              |
| <b>Software / Firmware</b>   |  |   |                          |
| B70  | Benchlink spectrum analyzer, PC software                 | Also orderable as E4444A; requires A4H or 1AX   |                          |
| 230  | Benchlink Web remote control software                    | Requires A4H  |                          |
| ***  | IntuiLink software (shipped with every instrument)       | Available on Web site for download  |                          |
| UE2  | Firmware upgrade   | Firmware updates also available on Web site for free download <a href="http://www.agilent.com/find/esa_firmware">http://www.agilent.com/find/esa_firmware</a>         |                          |
| <b>Documentation</b>   |  |   |                          |
| OB1  | Add extra manual set                                     | Available for Web download  |                          |
| UK6  | Commercial calibration certificate with test data        |   |                          |
| OBO  | Delete manual set (retains CD-ROM version)               |   |                          |
| OBV  | Service documentation, component level CLIP              | Component level information package   |                          |
| OBW  | Service documentation, assembly level                    | Performance verification and adjustment software included   |                          |
| AB0  | Taiwan-Chinese user's guide                              | Available for Web download; <a href="http://www.agilent.com/find/esa">www.agilent.com/find/esa</a>  |                          |
| AB1  | Korea-Korean user's guide                                | Available for Web download; <a href="http://www.agilent.com/find/esa">www.agilent.com/find/esa</a>  |                          |
| AB2  | China-Chinese user's guide                               | Available for Web download; <a href="http://www.agilent.com/find/esa">www.agilent.com/find/esa</a>  |                          |
| ABD  | Germany-German user's guide                              | Available for Web download; <a href="http://www.agilent.com/find/esa">www.agilent.com/find/esa</a>  |                          |
| ABE  | Spain-Spanish user's guide                               | Available for Web download; <a href="http://www.agilent.com/find/esa">www.agilent.com/find/esa</a>  |                          |
| ABF  | France-French user's guide                               | Available for Web download; <a href="http://www.agilent.com/find/esa">www.agilent.com/find/esa</a>  |                          |
| ABJ  | Japan-Japanese user's guide                              | Available for Web download; <a href="http://www.agilent.com/find/esa">www.agilent.com/find/esa</a>  |                          |
| ABZ  | Italy-Italian user's guide                               | Available for Web download; <a href="http://www.agilent.com/find/esa">www.agilent.com/find/esa</a>  |                          |
| AKT  | Russia-Russian user's guide                              | Available for Web download; <a href="http://www.agilent.com/find/esa">www.agilent.com/find/esa</a>  |                          |
| <b>Warranty, service, and calibration (<a href="http://www.home.agilent.com/USeng/nav/-12217.0/pc.html">www.home.agilent.com/USeng/nav/-12217.0/pc.html</a>)</b> |  |   |                          |
| R-51B-001-C  | 1 year return-to-Agilent warranty and service            | Standard  |                          |
| R-51B-001-3C   | 3 year return-to-Agilent warranty and service            | Default   |                          |
| <b>General spectrum analyzer accessories</b>   |  |   |                          |
| 11970  | Harmonic mixer series (26.5, 40, 50, 60, 75, 110 GHz)    | For use in E4407B Option AYZ  |                          |
| 11974  | Preselected millimeter mixer series (40, 50, 60, 75 GHz) | For use in E4407B Option AYZ  |                          |
| 11909A   | Low noise amplifier to 1 GHz                             |   |                          |
| 8447A/D  | Amplifiers to 400 MHz and 1.3 GHz                        |   |                          |
| 8449B  | Preamplifier to 26.5 GHz                                 |   |                          |

Note: Pictures of certain accessories can be found in the ESA Series Brochure (5468-3278E).

1. For new instrument orders, accessories are ordered the same way as other options. For example, to order Option 1CP (rack mount and handle kit) for a new E4402B, order: E4402B-1CP.

There are two ways to order upgrades:

Method 1: Add the letter U to the end of the model number. For example, to order an Option 1CP for an existing E4402B, order: E4402BU-1CP

Method 2: Order the part number. For example, to order the rack mount and handle kit (equivalent to Option 1CP), order E4401-60057.

Depending on availability, faster delivery of upgrades may be possible by ordering the part number instead of the option number.

See [www.agilent.com/find/sa\\_upgrades](http://www.agilent.com/find/sa_upgrades) and [www.parts.agilent.com](http://www.parts.agilent.com) for more information.

# Upgrades ESA-E Series

| Available models:  |  | Customer upgradeable   | Customer upgradeable w/ test Self-maintainers with Option 0BW & N781A software <sup>4</sup> | Return to service center | Return to factory |
|--|--|--|---|--------------------------|-------------------|
| E4401BU (9 kHz to 1.5 GHz)<br>E4402BU (30 Hz to 3.0 GHz)<br>E4404BU (30 Hz to 6.7 GHz)<br>E4405BU (30 Hz to 13.2 GHz)<br>E4407BU (30 Hz to 26.5 GHz)           |  |  |   |                          |                   |
| Ordering instructions  |  |  |   |                          |                   |
| To upgrade an existing ESA-E Series spectrum analyzer, order the corresponding model number followed by a 'U' and the desired option number. (ie. E440xBU-xxx) |  | For more information see:<br><a href="http://www.agilent.com/find/esa-e_upgrades">http://www.agilent.com/find/esa-e_upgrades</a> |   |                          |                   |

| Hardware capabilities and performance                                |             |  |        |   |        |
|--|-------------|--|--------|---|--------|
| Replace GPIB connection (A4H) with serial port GPIB connection       | 1AX<br>A4H  | Not compatible with Option A4H; occupies one expansion slot<br>Not compatible with Option 1AX; occupies one expansion slot | X<br>X |   | X<br>X |
| Wide offset phase noise improvement and ACPR dynamic range extension | 120         | Occupies one expansion slot  | X      |   | X      |
| Time-gated spectrum analysis   | 1D6         |  | X      |   | X      |
| 50 ohm tracking generator (9 kHz to 3.0 GHz)                         | 1DN         | Operates to 1.5 GHz on E4401B  | X      |   | X      |
| Narrow resolution BW   | 1DR         |  | X      |   | X      |
| TV trigger and picture on screen                                     | B7B         | Requires BAA; not compatible with Option 060   | X      |   | X      |
| Cable fault location accessory kit (50 ohm)                          | B7K         | Requires Option 1DN and Option 225 or BAH  | X      |   |        |
| FM demodulation/deviation  | BAA         | Not compatible with Options 304, or 106; occupies one expansion slot   | X      |   | X      |
| Fast time domain sweep; IF, sweep, and video output ports            | AYX         | Not compatible with Options B7D, 304; occupies one expansion slot. Includes capability of Option A4J                       | X      |   | X      |
| Low emissions shielding  | 060         | Not compatible with B7B  | X      |   | X      |
| Preamplifier built-in for enhanced sensitivity                       | 1DS         | Operates to 3 GHz  |        | X | X      |
| 100 Hz (30 Hz usable) frequency range extension                      | UKB         | Requires Option 1DR  |        | X | X      |
| Digital demodulation hardware  | B7D/<br>B7E | Requires Option 1D5; not compatible with Option AYX; occupies two expansion slots  |        | X | X      |
| APC 3.5 mm input connector   | BAB         | Available on the E4407B only   |        | X | X      |
| Bluetooth FSK demodulator  | 106         | Requires Options B7D, 228; occupies one expansion slot   | X      |   | X      |
| External mixing  | AYZ         | Available on E4407B only   |        | X | X      |
| EMI detectors quasi-peak and FM demodulation                         | AYQ         | Occupies one expansion slot; requires Option 1DR   | X      |   | X      |
| 70 MHz IF out  | H70         | Occupies one expansion slot  | X      |   | X      |
| 26.5 GHz uncalibrated built in preamp                                | H26         | Occupies one expansion slot  |        |   | X      |
| Memory extension to 10 MB  | B72         | Included on all new instruments starting with SN US4144 or MY4144; required for firmware version A.08.00 or higher         | X      |   | X      |
| High stability frequency reference                                   | 1D5         | E4401B   |        | X | X      |
|  |             | E4402B/04B/05B/07B (SN prefix before 4421) <sup>2</sup>  |        |   | X      |
|  |             | SN prefixes US4421, MY4421, SG4421 or later <sup>3</sup>   |        | X | X      |
| IF sweep, video output ports   | A4J         | Not compatible with AYX; occupies one expansion slot   | X      |   | X      |

| Applications and firmware                                  |                  |   |   |   |   |
|--|------------------|---|---|---|---|
| Noise figure measurement personality and hardware          | 219 <sup>1</sup> | See Option 219 Technical Overview for recommended options   |   | X | X |
| Cable fault location measurement personality               | 225 <sup>1</sup> | Requires Option 1DN; recommended accessory Option B7K; firmware available on Web, requires license key  | X |   |   |
| Phase noise measurement personality                        | 226 <sup>1</sup> | Firmware available on Web, requires license key   | X |   |   |
| Cable TV service and installation personality              | 227 <sup>1</sup> | Firmware available on Web, requires license key   | X |   |   |
| Bluetooth measurement personality                          | 228 <sup>1</sup> | Requires Option B7D; requires Option 106 for full functionality   | X |   |   |
| Modulation analysis personality                            | 229 <sup>1</sup> | Requires Options B7D/B7E, A4H,1D5; includes capability of Option 231; firmware available on Web, requires license key   | X |   |   |
| ESA to 89601A vector signal analysis software link utility | 231 <sup>1</sup> | Requires Options B7D/B7E, A4H,1D5; Option 229 included capability of Option 231; free download from Web; <a href="http://www.agilent.com/find/esa">www.agilent.com/find/esa</a> | X |   |   |
| EDGE upgrade on GSM  | 252 <sup>1</sup> | Requires Options BAH, B7D/B7E, A4H, 1D5; requires Option 1DN for cable fault test   | X |   |   |
| HP 8566/68 programming code compatibility                  | 266 <sup>1</sup> | Free download from Web; <a href="http://www.agilent.com/find/esa">www.agilent.com/find/esa</a>  | X |   |   |
| 8590 Series programming code compatibility                 | 290 <sup>1</sup> | Free download from Web; <a href="http://www.agilent.com/find/esa">www.agilent.com/find/esa</a>  | X |   |   |
| GSM/GPRS measurement personality                           | BAH <sup>1</sup> | Requires Options B7D/B7E, A4H,1D5; 1D6 firmware available on Web, requires license key  | X |   |   |
| cdmaOne measurement personality                            | BAC <sup>1</sup> | Requires Options B7D/B7E, A4H,1D5; firmware available on Web, requires license key  | X |   |   |
| FM deviation personality enhancement                       | J36 <sup>1</sup> | Requires Option BAA   | X |   |   |

1. If more than two or three measurement personalities are ordered, memory size limitations may limit the number that may be loaded into the ESA at any one time. For detailed information about memory size limits, please see the web site: <http://sa.tm.agilent.com/ESA/memory/>
2. For serial number prefixes less than US4421, MY4421, or SG4421, order E440xBK-1D5
3. For serial number prefixes US4421, MY4421, or SG4421 and later, order E440xBL-1D5
4. Self-maintainers are customers who service and calibrate their own instruments. Information about the N781A software can be found at: <http://calsw.tm.agilent.com/>

## Upgrades ESA-L Series

| Available models:  |     |  | Customer upgradeable | Customer upgradeable w/ test | Self-maintainers with Option 0BW & N7811A software <sup>1</sup> | Return to service center | Return to factory |
|--|-----|--|----------------------|------------------------------|---|--------------------------|-------------------|
| E4411BU (9 kHz to 1.5 GHz)   |     | Options not listed are not available for upgrade on the ESA-L Series Analyzer  |                      |                              |   |                          |                   |
| E4403BU (9 kHz to 3.0 GHz)   |     |  |                      |                              |   |                          |                   |
| E4408BU (9 kHz to 26.5 GHz)  |     |  |                      |                              |   |                          |                   |
| Ordering instructions  |     |  |                      |                              |   |                          |                   |
| To upgrade an existing ESA-L Series spectrum analyzer, order the corresponding model number followed by a 'U' and the desired option number. Ex. E44xxBU-xxx |     | For more information see:<br><a href="http://www.agilent.com/find/esa-l_upgrades">http://www.agilent.com/find/esa-l_upgrades</a> |                      |                              |   |                          |                   |
| HW capabilities and performance  |     |  |                      |                              |   |                          |                   |
| Color display upgrade  | 049 | Requires B72 plus firmware version A11.00 or higher  | X                    |                              |   |                          |                   |
| Replace GPIB connection (A4H) with serial port   | 1AX | Not compatible with A4H; occupies one expansion slot   |                      | X                            |   | X                        |                   |
| GPIB connection  | A4H | Not compatible with 1AX; occupies one expansion slot   |                      | X                            |   | X                        |                   |
| 50 ohm tracking generator ( 9 kHz to 3.0 GHz)  | 1DN | Incompatible with 1DP;<br>Operates to 1.5 GHz on E4411B; included in Option BTG  |                      | X                            |   | X                        |                   |
| 75 ohm tracking generator (1 MHz to 1.5 GHz)   | 1DQ | E4411B only, requires Option 1DP   |                      | X                            |   | X                        |                   |
| Narrow resolution bandwidths   | 1DR | Requires B72 plus firmware version A11.00 or higher;<br>100 Hz minimum on ESA-L Series   |                      | X                            |   | X                        |                   |
| Memory extension to 10 MB  | B72 | Included on instrument prefixes ≥ US4144 or MY4144<br>Required for firmware version A.08.00 or higher                            | X                    |                              |   | X                        |                   |
| IF sweep, video output ports   | A4J | Included in all ESA-L analyzers with Option BAS or BTG;<br>occupies one expansion slot   |                      | X                            |   | X                        |                   |
| APC 3.5 mm input connector   | BAB | E4408B only  |                      |                              | X   | X                        |                   |
| Applications and firmware  |     |  |                      |                              |   |                          |                   |
| 8590-series programming code compatibility   | 290 | Available for Web download; <a href="http://www.agilent.com/find/esa">www.agilent.com/find/esa</a>                               | X                    |                              |   |                          |                   |

## Upgrades E7400A series EMC analyzer

| Available models:   |     |  | Customer upgradeable | Customer upgradeable w/ test | Self-maintainers with Option 0BW & N7811A software <sup>1</sup> | Return to service center | Return to factory |
|---|-----|--|----------------------|------------------------------|---|--------------------------|-------------------|
| E7401AU (9 kHz to 1.5 GHz)  |     | Options not listed are not available for upgrade on the EMC analyzers  |                      |                              |   |                          |                   |
| E7402AU (30 Hz to 3.0 GHz)  |     |  |                      |                              |   |                          |                   |
| E7403AU (30 Hz to 6.7 GHz)  |     |  |                      |                              |   |                          |                   |
| E7404AU (30 Hz to 13.2 GHz)   |     |  |                      |                              |   |                          |                   |
| E7405AU (30 Hz to 26.5 GHz)   |     |  |                      |                              |   |                          |                   |
| Ordering instructions   |     |  |                      |                              |   |                          |                   |
| To upgrade an existing EMC Series spectrum analyzer, order the corresponding model number followed by a 'U' and the desired option number. Ex. E740AU-xxx |     | For more information see:<br><a href="http://www.agilent.com/find/emc_upgrades">http://www.agilent.com/find/emc_upgrades</a> |                      |                              |   |                          |                   |
| HW capabilities and performance   |     |  |                      |                              |   |                          |                   |
| Replace GPIB connection (A4H) with serial port  | 1AX | Not compatible with A4H or E7415A; occupies one expansion slot   |                      | X                            |   | X                        |                   |
| GPIB connection   | A4H | Not compatible with 1AX; occupies one expansion slot   |                      | X                            |   | X                        |                   |
| Time-gated spectrum analysis  | 1D6 |  |                      | X                            |   | X                        |                   |
| IF sweep, video output ports  | A4J | Occupies one expansion slot  |                      | X                            |   | X                        |                   |
| 50 ohm tracking generator ( 9 kHz to 3.0 GHz)   | 1DN | Operates to 1.5 GHz on E7401A;   |                      | X                            |   | X                        |                   |
| Fast time domain sweep; IF, sweep, and video output ports   | AYX | Occupies one expansion slot, standard in all E7400 analyzers with Option STD or STG  |                      | X                            |   | X                        |                   |
| 100 Hz (30 Hz usable) frequency range extension   | UKB | Included in all E7400 analyzers with Option STD or STG   |                      |                              | X   | X                        |                   |
| APC 3.5 mm input connector  | BAB | Available on the E7405A only   |                      |                              | X   | X                        |                   |
| High stability frequency reference  | 1D5 | Included in all E7400 analyzers with Option STD or STG   |                      |                              |   | X                        |                   |

1. Self-maintainers are customers who service and calibrate their own instruments.  
Information about the N7811A software can be found at: <http://calsw.tm.agilent.com/>



# Agilent ESA Product and Application Information

## Product literature

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*Optimizing Spectrum Analyzer Measurement Speed,*

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*Spectrum Analysis Basics-150,*

literature number 5952-0292

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