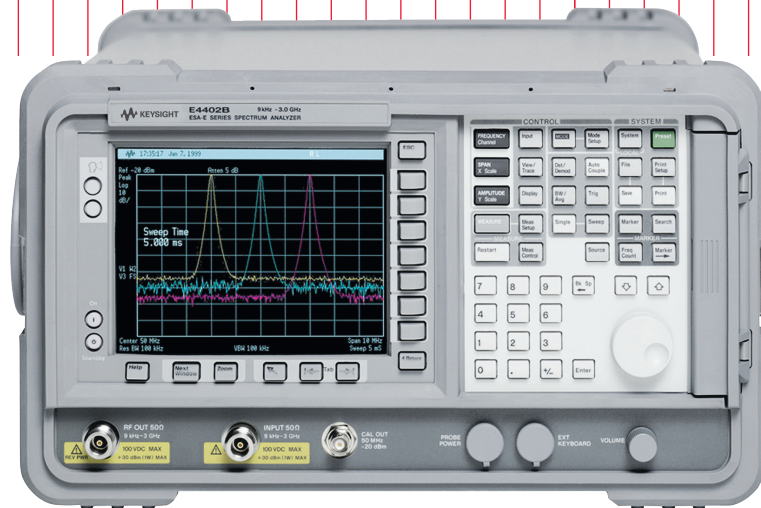


Keysight Technologies

ESA-E Series Spectrum Analyzer

Configuration Guide



Introduction

This ESA configuration guide will help you determine which performance options, measurement personalities, accessories, and services to include in your new ESA-E, or to add as upgrades to an existing ESA-E.

Options for the EXA X-Series signal analyzer are shown alongside the ESA to help customers who wish to migrate to the latest technology. Customers looking for increased speed, more application options, or modern connectivity will benefit by moving to the EXA signal analyzer.

Keysight ESA-E Spectrum Analyzer

This step-by-step guide will help you configure your ESA-E. Capabilities that are listed as standard come with the instrument at no additional charge. Tailor the performance, exterior, and service packages to meet your requirements.

The Keysight Technologies, Inc. ESA-E spectrum analyzer is available in three express configurations: standard (STD/STG) or communications test (COM). The express analyzers offer faster delivery by limiting the number of options that can be ordered together. The custom configuration allows for maximum flexibility in ordering the analyzer that best meets your needs by offering all of the ESA-E options; however, it increases the delivery timeframe.

For detailed specifications, refer to the ESA-E Spectrum Analyzer specification guide (E4401-90490). For a summary of specifications, refer to the ESA-E data sheet, literature number 5989-9815EN.

ESA-E Custom Configuration

Step 1. Select your frequency range

Description	ESA-E model number ¹	EXA option number
Frequency range, 9 kHz to 3.0 GHz	E4402B	N9010A-503, frequency range, 10 Hz to 3.6 GHz
Frequency range, 9 kHz to 6.7 GHz	E4404B	N9010A-507, frequency range, 10 Hz to 7.0 GHz
Frequency range, 9 kHz to 13.2 GHz	E4405B	N9010A-513, frequency range, 10 Hz to 13.6 GHz
Frequency range, 9 kHz to 26.5 GHz	E4407B	N9010A-526, frequency range, 10 Hz to 26.5 GHz
	Not available	N9010A-532, frequency range, 10 Hz to 32.0 GHz
	Not available	N9010A-544, frequency range, 10 Hz to 44.0 GHz

Step 2. Included options at no additional charge

Description	ESA-E spectrum analyzer	EXA signal analyzer
GPIB connection	Option A4H ²	Standard on all EXA signal analyzers; in addition, the EXA offers seven USB ports and LAN connectivity as standard.
IntuiLink PC connectivity software	Connects to Microsoft® Word and Excel	The PC-based EXA requires no additional software to connect to Microsoft applications

Step 3. Choose frequency reference

Description	ESA-E spectrum analyzer	EXA signal analyzer
Frequency reference (standard aging rate)	$\pm 2 \times 10^{-6}$ / year	$\pm 1 \times 10^{-6}$ / year
High-stability frequency reference (reduces frequency drift resulting in more accurate measurements; recommended option)	Option 1D5 Aging rate: $\pm 1 \times 10^{-7}$ / year	N9010A-PFR Aging rate: $\pm 1 \times 10^{-7}$ / year

Step 4. Choose an attenuator

Description	ESA-E spectrum analyzer	EXA signal analyzer
Mechanical attenuator (standard)	5 dB steps, 0 to 60 dB	10 dB steps, 0 to 60 dB
Fine-step mechanical attenuator	Not available	N9010A-FSA Allows 2 dB steps for the full 60 dB range of the mechanical attenuator
Electronic attenuator up to 3.6 GHz	Not available	N9010A-EA3 Add to the mechanical attenuator; 1 dB steps, 0 to 24 dB

Step 5. Add a preamplifier

Description	ESA-E spectrum analyzer	EXA signal analyzer
Preamplifier	Option 1DS 1 MHz to 3 GHz	N9010A-P03, frequency range, 100 kHz to 3.6 GHz N9010A-P07, frequency range, 100 kHz to 7.0 GHz N9010A-P13, frequency range, 100 kHz to 13.6 GHz N9010A-P26, frequency range, 100 kHz to 26.5 GHz N9010A-P32, frequency range, 100 kHz to 32.0 GHz N9010A-P44, frequency range, 100 kHz to 44.0 GHz

1. The E4402B has six available expansion slots for additional hardware options; the E4404/05/07B has five available expansion slots
2. Requires one expansion slot

ESA-E Custom Configuration – *continued*

Step 6. Add extra options¹

Description	ESA-E spectrum analyzer	EXA signal analyzer
Narrow resolution bandwidths (recommended option)	Option 1DR	Standard
Low-emissions shielding	Option 060 ²	Not available
Wide-offset phase noise improvement and ACPR dynamic range extension	Option 120 ³	Similar performance standard
Replace GPIB with serial port	Option 1AX ^{3,4}	Serial port unavailable; USB is standard
Time-gated spectrum analysis	Options 1D6	Standard
50 Ω tracking generator	Option 1DN, 9 kHz to 3 GHz	Not available (available on CXA)
Fast time domain sweep; IF, sweep, and video output ports	Option AYZ ³	Fast time domain sweep is standard
External mixing	Option AYZ ⁵	EXA Option EXM (available with EXA Option 532 or 544)
Digital demodulation hardware	Option B7D/B7E ⁶ (10 MHz analysis bandwidth)	25 MHz analysis bandwidth standard; 40 MHz optional
APC 3.5 mm input connector	Option BAB ⁵	Not available
Low frequency extension to 100 Hz	Option UKB ⁷	EXA operational from 10 Hz
EMI detectors and FM Demodulation	Option AYQ ^{3,7}	EXA Option EMC provides EMI detectors; N9063A provides analog demodulation including FM demodulation

1. If two or more ESA-E options are ordered, memory size may limit the number of options that may be loaded at any one time; for detailed information about memory size limitations, please see the Web site: <http://sa.tm.keysight.com/ESA/memory>
2. Not compatible with Option B7B
3. Requires one expansion slot
4. Not compatible with Option A4H
5. E4407B only
6. Requires Option 1D5; occupies two expansion slots, must be ordered jointly
7. Requires Option 1DR

ESA-E Custom Configuration – continued

Step 7. Choose measurement software

Description	ESA-E spectrum analyzer	EXA signal analyzer
AM demodulation	Standard	N9063A
FM demodulation/ deviation	Option BAA ^{1,2}	N9063A
Phase noise measurement	Option 226 ³	N9068A
Noise figure measurement	Option 219 ^{4,2}	N9069A
GSM/GPRS measurement	Option BAH ^{5,6}	N9071A
Edge upgrade to option BAH	Option 252 ⁷	N9071A
Cable fault location measurement	Option 225 ⁸	Not available
TV trigger on screen measurement	Option B7B ⁹	TV trigger (no picture on screen) available with Firmware rev. >A.11.00 (N9010AK-R2C required for existing units)
Cable TV field service and analog broadcast measurement	Option 227	Not available
Modulation analysis measurement	Option 229 ¹⁰	N9064A
Benchlink Web remote software	Option 230 ¹¹	Remote desktop comes standard with the PC-based EXA
ESA to 89600 VSA software link	Option 231 ¹²	Standard
89600 VSA software	89600 VSA software – runs on external PC	89600 VSA software – runs internal to the instrument or on an external PC
8566/68 programming code compatibility	Option 266 ¹³	N9061A-1FP
8590 series programming code compatibility	Option 290 ¹³	Not available
856xE/EC programming code compatibility	Not available	N9061A-2FP
Bluetooth® measurement analyzer bundle	Option 304 ¹⁴	N9081A
cdmaOne measurement	Option BAC ¹⁵	N9072A
cdma2000 measurement	Not available	N9072A
W-CDMA measurement	Not available	N9073A-1FP
HSDPA / HSUPA measurement	Not available	N9073A-2FP
802.16 OFDMA measurement	Not available	N9075A
TD-SCDMA measurement	Not available	N9079A-1FP
HSDPA/8PSK measurement	Not available	N9079A-2FP

Step 8. Add special options

Description	ESA-E spectrum analyzer	EXA signal analyzer
26.5 GHz uncalibrated built in preamplifier	Option H26 ¹⁸	N9010A-P26 (calibrated)
70 MHz IF output	Options H70 ^{2,16}	EXA Option CRP
FM deviation personality enhancement	Option J36 ¹⁷	N9063A

1. Not compatible with Option 304 or 106
2. Occupies one expansion slot
3. If two or more ESA-E options are ordered, memory size may limit the number of options that may be loaded at any one time; for detailed information about memory size limitations, please see the Web site: <http://sa.tm.keysight.com/ESA/memory>
4. See *ESA-E Series Spectrum Analyzers Noise Figure Measurements Personality - Technical Overview*, literature number 5989-0215EN, for recommended options
5. Requires Option B7D/B7E
6. Requires Option 1D5 and 1D6; includes capability of Option 225
7. Requires Option BAH
8. Requires Option 1DN; not compatible with Option BAH; recommended accessory Option B7K
9. Requires BAA; not compatible with Option 060
10. Requires Options B7D/B7E, A4H, and 1D5; includes capability of Option 231
11. Requires Option A4H
12. Requires Options B7D/B7E, A4H, and 1D5
13. Free download on the Web, no license required: <http://www.keysight.com/find/esa>
14. Includes Options 228, 106, B7D/B7E, 1DS, and 1D5; occupies three expansion slots
15. Requires Options B7D/B7E and 1D5
16. Recommended for use with 89600 VSA software
17. Requires Option BAA
18. Available at time of purchase only. Not upgradable.

ESA-E Standard Express Spectrum Analyzer (STD/STG)

The ESA-E express analyzers offer configurations that are typically ordered together to help speed instrument delivery. The EXA signal analyzer is not offered in an express configuration, however, the newer technology allows for faster delivery times, regardless of the configuration. If you wish to order an EXA configuration equivalent to the ESA-E express analyzer, please select the individual EXA options shown in the table below.

Step 1. Select your frequency range

Description	ESA-E model number ¹	EXA option number
Frequency range, 9 kHz to 3.0 GHz	E4402B E4402B-STD or E4402B-STG (adds tracking generator)	N9010A-503, frequency range, 10 Hz to 3.6 GHz
Frequency range, 9 kHz to 6.7 GHz	E4404B E4404B-STD or E4404B-STG (adds tracking generator)	N9010A-507, frequency range, 10 Hz to 7.0 GHz
Frequency range, 9 kHz to 13.2 GHz	E4405B E4405B-STD or E4405B-STG (adds tracking generator)	N9010A-513, frequency range, 10 Hz to 13.6 GHz
Frequency range, 9 kHz to 26.5 GHz	E4407B E4407B-STD or E4407B-STG (adds tracking generator)	N9010A-526, frequency range, 10 Hz to 26.5 GHz
	Not available	N9010A-532, frequency range, 10 Hz to 32.0 GHz
	Not available	N9010A-544, frequency range, 10 Hz to 44.0 GHz

Step 2. Included ESA-E options at no additional charge

Description	ESA-E spectrum analyzer	EXA signal analyzer
GPIB connection	Option A4H ²	Standard on all EXA signal analyzers; in addition, the EXA offers seven USB ports and LAN connectivity standard
FM demodulation/deviation	Option BAA ^{2,3}	N9063A
Fast time domain sweep; IF, sweep, and video output ports	Option AYX ²	Fast time domain sweep is standard
IntuiLink PC connectivity software	Connects to Microsoft® Word and Excel	The PC-based EXA requires no additional software to connect to Microsoft applications

Step 3. Choose frequency reference

Description	ESA-E spectrum analyzer	EXA signal analyzer
Frequency reference (standard aging rate)	$\pm 2 \times 10^{-6}$ / year	$\pm 1 \times 10^{-6}$ / year
High-stability frequency reference (reduces frequency drift resulting in more accurate measurements; recommended option)	Option 1D5 Aging rate: $\pm 1 \times 10^{-7}$ / year	N9010A-PFR Aging rate: $\pm 1 \times 10^{-7}$ / year

1. The E4402B has three expansion slots for additional options; the E4404/5/7B have two expansion slots
2. Requires one expansion slot
3. Not compatible with Options 304 or 106

ESA-E Standard Express Spectrum Analyzer (STD/STG) – continued

Step 4. Add a preamplifier (preamplifiers are not standard)

Description	ESA-E spectrum analyzer	EXA signal analyzer
Preamplifier	Option 1DS 1 MHz to 3 GHz	N9010A-P03, frequency range 100 kHz to 3.6 GHz N9010A-P07, frequency range, 100 kHz to 7.0 GHz N9010A-P13, frequency range, 100 kHz to 13.6 GHz N9010A-P26, frequency range, 100 kHz to 26.5 GHz N9010A-P32, frequency range, 100 kHz to 32.0 GHz N9010A-P44, frequency range, 100 kHz to 44.0 GHz

Step 5. Add extra options¹

Description	ESA-E spectrum analyzer	EXA signal analyzer
Narrow resolution bandwidths (recommended option)	Option 1DR	Standard
Time-gated spectrum analysis	Options 1D6	Standard
Performance bundle	Option B75 ²	For equivalency, order N9010A-PFR
Replace GPIB with serial port	Option 1AX ^{3,4}	Serial port unavailable; USB comes standard
50 Ω tracking generator	Option 1DN, 9 kHz to 3 GHz	Not available (available on CXA)

Step 6. Choose measurement software

Description	ESA-E spectrum analyzer	EXA signal analyzer
Phase noise measurement	Option 226 ¹	N9068A
Noise figure measurement	Option 219 ^{5,6}	N9069A
Cable fault location measurement	Option 225 ⁷	Not available
Cable TV field service and analog broadcast measurement	Option 227	Not available
Benchlink Web remote software	Option 230 ⁸	Remote desktop come standard with the PC-based EXA
89600 VSA software	89600 VSA software – runs on external PC	89600 VSA software – runs internal to the instrument or on an external PC
8566/68 programming code compatibility	Option 266 ⁹	N9061A-1FP
8590 Series programming code compatibility	Option 290 ⁹	Not available
856xE/EC programming code compatibility	Not available	N9061A-2FP

Future upgrades for the ESA-E standard express spectrum analyzer (STD/SG)

Available future expansion slots	
E4402B – Three additional expansion slots	EXA - Two additional expansion slots
E4404/5/7B – Two additional expansion slots	

1. If more than two ESA-E options are ordered, memory size may limit the number of options that can be loaded at any one time; for detailed information about memory size limitations, please see the Web site: <http://sa.tm.keysight.com/ESA/memory>
2. Includes Options 1D5, 1DR and 1DS
3. Requires one expansion slot
4. Not compatible with Option A4H
5. See *ESA-E Series Spectrum Analyzers Noise Figure Measurements Personality – Technical Overview*, literature number 5989-0215EN, for recommended options
6. Requires one expansion slot
7. Requires Option 1DN; not compatible with Option BAH; recommended accessory Option B7K
8. Requires Option A4H
9. Free download on the Web, no license required: <http://www.keysight.com/find/esa>

ESA-E Communications Test Express Spectrum Analyzer (COM)

Step 1. Select your frequency range

Description	ESA-E model number ¹	EXA option number
Frequency range, 9 kHz to 3.0 GHz	E4402B E4402B-COM	N9010A-503, frequency range, 10 Hz to 3.6 GHz
Frequency range, 9 kHz to 6.7 GHz	E4404B E4404B-COM	N9010A-507, frequency range, 10 Hz to 7.0 GHz
Frequency range, 9 kHz to 13.2 GHz	E4405B E4405B-COM	N9010A-513, frequency range, 10 Hz to 13.6 GHz
Frequency range, 9 kHz to 26.5 GHz	E4407B E4407B-COM	N9010A-526, frequency range, 10 Hz to 26.5 GHz
	Not available	N9010A-532, frequency range, 10 Hz to 32.0 GHz
	Not available	N9010A-544, frequency range, 10 Hz to 44.0 GHz

Step 2. Included ESA-E options at no additional charge

Description	ESA-E spectrum analyzer	EXA signal analyzer
GPIB connection	Option A4H ²	Standard on all EXA signal analyzers; in addition, the EXA offers seven USB ports and LAN connectivity standard
High-stability frequency reference (reduces frequency drift resulting in more accurate measurements; recommended option)	Option 1D5 Aging rate: $\pm 1 \times 10^{-7}$ / year	N9010A-PFR Aging rate: $\pm 1 \times 10^{-7}$ / year
Narrow resolution bandwidths (recommended option)	Option 1DR	Standard
ESA to 89600 VSA software link	Option 231 ^{3, 6}	Standard
FM demodulation/ deviation	Option BAA ^{2, 3, 4}	N9063A
Digital demodulation hardware	Option B7D/B7E ⁵	Standard
IntuiLink PC connectivity software	Connects to Microsoft® Word and Excel	The PC-based EXA requires no additional software to connect to Microsoft applications

Step 3. Add a preamplifier (preamplifiers are not standard)

Description	ESA-E spectrum analyzer	EXA signal analyzer
Preamplifier	Option 1DS 1 MHz to 3 GHz	N9010A-P03, frequency range 100 kHz to 3.6 GHz N9010A-P07, frequency range, 100 kHz to 7.0 GHz N9010A-P13, frequency range, 100 kHz to 13.6 GHz N9010A-P26, frequency range, 100 kHz to 26.5 GHz N9010A-P32, frequency range, 100 kHz to 32.0 GHz N9010A-P44, frequency range, 100 kHz to 44.0 GHz

Step 4. Add additional options

Description	ESA-E spectrum analyzer	EXA signal analyzer
Replace GPIB with serial port	Option 1AX ^{2, 7}	Serial port unavailable; USB is standard
Time-gated spectrum analysis	Options 1D6	Standard

1. The E4402B has two expansion slots for additional hardware options; the E4404/05/07B has one expansion slot
2. Requires one expansion slot
3. Requires Options B7D/B7E, A4H, and 1D5
4. Not compatible with Option 304 or 106
5. Occupies two expansion slots
6. If more than two or three ESA-E options are ordered, memory size may limit the number of options that can be loaded at any one time; for detailed information about memory size limitations, please see the Web site: <http://sa.tm.keysight.com/ESA/memory>
7. Not compatible with Option A4H

ESA-E Communications Test Express Spectrum Analyzer (COM) – *continued*

Step 5. Choose measurement software¹

Description	ESA-E spectrum analyzer	EXA signal analyzer
Phase noise measurement	Option 226	N9068A
Noise figure measurement	Option 219 ²	N9069A
GSM/GPRS measurement	Option BAH ^{3,4}	N9071A
EDGE upgrade to Option BAH	Option 252 ⁵	N9071A
Cable TV field service and analog broadcast measurement	Option 227	Not available
Modulation analysis measurement	Option 229 ⁶	N9064A
89600 VSA software	89600 VSA software – runs on external PC	89600 VSA software – runs internal to the instrument or on an external PC
8566/68 programming code compatibility	Option 2667	N9061A-1FP
8590 Series programming code compatibility	Option 2907	Not available
cdmaOne measurement	Option BAC ⁸	N9072A

Future upgrades for the ESA-E standard express spectrum analyzer (STD/SG)

Available future expansion slots

- E4402B – Three additional expansion slots
- E4404/5/7B – Two additional expansion slots

1. If more than two or three ESA-E options are ordered, memory size may limit the number of options that can be loaded at any one time; for detailed information about memory size limitations, please see the Web site: <http://sa.support.keysight.com/ESA/memory/>
2. See *ESA-E Series Spectrum Analyzers Noise Figure Measurements Personality – Technical Overview*, literature number 5989-0215EN, for recommended options
3. Requires Option B7D/B7E
4. Requires Options 1D5 and 1D6; includes capability of Option 225
5. Requires Option BAH
6. Requires Options B7D/B7E, A4H, and 1D5; includes capability of Option 231
7. Free download on the Web, no license required: <http://www.keysight.com/find/esa>
8. Requires Options B7D/B7E and 1D5

Express Analyzer and Bundle Equivalent Options

The table below shows equivalent options in each bundle offered for ESA-E spectrum analyzers.

ESA-E express option or bundle	ESA-E equivalent option(s)	Additional information
STD- Standard analyzer	AYX, BAA	
STG- Standard analyzer with tracking generator	AYX, BAA, 1DN	
COM- Communication test analyzer	B7D/B7E, 1D5, 1DR, BAA, 231	
B75- Performance bundle	1DR, 1DS, 1D5	Only available with express analyzer STD or STG
304- <i>Bluetooth</i> [®] premium bundle	228, 106, B7D/B7E, 1DS, 1D5	Options 106 and 228 are not available outside the option bundle 304

ESA-E Accessory, Calibration, and Warranty Options

Step 6. Select accessories and calibration options

Description	ESA-E spectrum analyzer option	ESA-E notes	ESA-E part number	EXA signal analyzer option
12 VDC power cable	A5D	DC power connection available on every ESA	E4401-60066	Not available
Hard transit case	AXT		E4401-60101	N9010A-HTC
Gray soft carrying/operation case	AYT		E4401-60117	Not available
Yellow soft carrying/operation case	AYU		E4401-60118	Not available
Cable fault measurement kit (50 Ω)	B7K	Requires Option 1DN or STG and Option 225 or BAH		Not available
Gray backpack carrying case	042		9300-2465	Not available
Yellow backpack carrying case	044		9300-2470	Not available
Rack mount kit with handles	1CP	This kit is designed to fit into Keysight racks only; for non-Keysight racks, additional end brackets are required and are available by ordering part number 1494-0061	E4401-60057	N9010A-1CP
50 to 75 Ω minimum loss pad	1D7		0955-1020	N9010A-MLP
Rechargeable snap-on battery and charger	E1779B	Order as separate model number, not option number		Not available
Front panel cover	UK9		E4401-60193	Standard
Benchlink spectrum analyzer, PC software	B70	Also orderable as E4444A; requires Option A4H or 1AX		Remote desktop is a standard feature on EXA
Benchlink Web remote control software	230	Requires Option A4H		Remote desktop is a standard feature on EXA
IntuiLink software (shipped with every instrument)	***	Available on Web site for download		Remote desktop is a standard feature on EXA
Harmonic mixer series (26.5, 40, 50, 60, 75, 110 GHz)	11970	For use in E4407B Option AYZ		For use in mmW EXA (N9010A-532 or 544) with Option EXM
Preselected millimeter mixer series (40, 50, 60, 75 GHz)	11974	For use in E4407B Option AYZ		
Low noise amplifier to 1 GHz	11909A			
Firmware upgrade	UE2	Firmware updates also available on Web site for free download http://www.keysight.com/find/esa_firmware/		See http://www.keysight.com/find/exa
Add extra manual set	OB1	Available for Web download		Available for Web download
Commercial calibration certificate with test data	UK6			N9010A-UK6
Keysight Calibration + Uncertainties + Guardbanding (accredited cal)	AMG			N9010A-AMG
Calibration Assurance Plan, Return to Keysight, 3 years	R-50C-011-3			R-50C-011-3
Calibration Assurance Plan, Return to Keysight, 5 years	R-50C-011-5			R-50C-011-5
Keysight Calibration + Uncertainties + Guardbanding, 3 years	R-50C-016-3			R-50C-016-3
Keysight Calibration + Uncertainties + Guardbanding, 5 years	R-50C-016-5			R-50C-016-5
ANSI Z540-1-1994 Calibration	A6J			N9010A-A6J
ANSI Z540-1-1994 Calibration, 3 years	R-50C-021-3			R-50C-021-3
ANSI Z540-1-1994 Calibration, 5 years	R-50C-021-5			R-50C-021-5
Delete manual set (retains CD-ROM version)	OBO			
Service documentation, component level CLIP	OBV	Component level information package		
Service documentation, assembly level	OBW	Performance verification and adjustment software included		N9010-90002

For more information visit www.keysight.com/find/accessories

Step 7. Choose warranty length

Description	ESA-E spectrum analyzer	EXA signal analyzer
3-year warranty (return-to-Keysight), standard	Included	Included
Warranty Assurance Plan, Return to Keysight, 5 years	R-51B-001-5C	R51B-001-5C

ESA-E Upgrade Options

Add additional options or upgrade your existing ESA-E spectrum analyzer

Available models:			Customer upgradable	Customer upgradable w/test	Self-maintainers with Option 0BW & N7811A software ⁴	Return to service center	Return to factory
E4401BU (9 kHz to 1.5 GHz) E4402BU (30 Hz to 3.0 GHz) E4404BU (30 Hz to 6.7 GHz) E4405BU (30 Hz to 13.2 GHz) E4407BU (30 Hz to 26.5 GHz)							
Ordering instructions			Customer upgradable	Customer upgradable w/test	Self-maintainers with Option 0BW & N7811A software ⁴	Return to service center	Return to factory
To upgrade an existing ESA-E Series spectrum analyzer, order the corresponding model number followed by a 'U' and the desired option number. (E440xBU-xxx)		For more information see: http://www.keysight.com/find/esa-e_upgrades/					
Hardware capabilities and performance							
Replace GPIB connection (A4H) with serial port	1AX	Not compatible with Option A4H; occupies one expansion slot		X		X	
GPIB connection	A4H	Not compatible with Option 1AX; occupies one expansion slot		X		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 Ω 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 Ω)	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/ B7E	Requires Option 1D5; not compatible with Option AYX; occupies two expansion slots, must be ordered jointly			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	X
Memory extension to 10 MB X	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			X	X	
		E4402B/04B/05B/07B (SN prefix before 4421) ²				X	
		SN prefixes US4421, MY4421, SG4421 or later ³			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 ¹	See Option 219 Technical Overview for recommended options		X		X	
Cable fault location measurement personality	225 ¹	Requires Option 1DN; recommended accessory Option B7K; firmware available on Web, requires license key	X				
Phase noise measurement personality	226 ¹	Firmware available on Web, requires license key	X				
Cable TV service and installation personality	227 ¹	Firmware available on Web, requires license key	X				
Bluetooth measurement personality	228 ¹	Requires Option 106, AYX requires Option 106 for full functionality	X				
Modulation analysis personality	229 ¹	Requires Options B7D/B7E, 1D5; includes capability of Option 231; firmware available on Web, requires license key	X				
ESA to 89601A vector signal analysis software link utility	231 ¹	Requires Options B7D/B7E, A4H, 1D5; Option 229 included capability of Option 231; free download from Web; www.keysight.com/find/esa	X				
EDGE upgrade on GSM	252 ¹	Requires Options BAH, B7D/B7E, A4H, 1D5; requires Option 1DN for cable fault test	X				
HP 8566/68 programming code compatibility	266 ¹	Free download from Web; www.keysight.com/find/esa	X				
8590 Series programming code compatibility	290 ¹	Free download from Web; www.keysight.com/find/esa	X				
GSM/GPRS measurement personality	BAH ¹	Requires Options 1D6 firmware available on Web, requires license key	X				
cdmaOne measurement personality	BAC ¹	Firmware available on Web, requires license key	X				
FM deviation personality enhancement	J36 ¹	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.keysight.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 N7811A software can be found at: <http://calsw.tm.keysight.com>

Related Literature

Keysight ESA-E Series Spectrum Analyzer, Configuration Guide, literature number 5989-9953EN

Modulation Analysis Measurement Personality for the ESA-E Series Spectrum Analyzers, Technical Overview, literature number 5988-2116EN

ESA-E Series Spectrum Analyzers Cable Fault Location Personality, Technical Overview, literature number 5980-1915E

Cable TV Service and Installation Analyzer, Product Overview, literature number 5980-0845E

8560 EC Series Spectrum Analyzers, Data Sheet, literature number 5968-8156E

E4444A BenchLink Spectrum Analyzer PC Software for Portable Spectrum EMC, and Sweep/Ingress Analyzers, Technical Overview, literature number 5966-0676E

BenchLink Web Remote Control Software for the PSA Series Spectrum Analyzers, ESA-E and ESA-L Series Spectrum Analyzers, E7400A Series EMC Analyzers, Technical Overview, literature number 5988-2610EN

E1779B Rechargeable Battery Pack, Technical Overview, literature number 5966-1851E

ESA Series Spectrum Analyzers, Demonstration Guide and Application Note, literature number 5968-3658E

ESA-E Series Spectrum Analyzers TV Transmission Quality Measurements, Technical Overview, literature number 5968-6874E

ESA-E Series Spectrum Analyzers Measuring signals above 26.5 GHz, Technical Overview, literature number 5968-6873E

Spectrum Analyzer and Signal Analyzer Selection Guide, literature number 5968-3413E

Phase Noise Measurement Personality for the Keysight ESA-E Series Spectrum Analyzers, Technical Overview, literature number 5988-4348EN

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