



ESA / EMC Upgrade Test Equipment Requirements

This document tries to capture all of the test equipment needs for upgrading your ESA or EMC analyzer, and will be updated as required.

While some of the tests listed are from manual procedures outlined in the individual option upgrade installation notes, most can also be found in either the instrument Calibration Guide and/or the N7811A Performance Verification & Adjustment Software as noted. More information from these sources can be found here:

- [ESA Calibration Guide](#)
- [EMC Calibration Guide](#)
- [N7811A Performance Verification & Adjustment Software](#)

Hardware Option Upgrades Included:

Option #	Description
060	Reduced Emissions
106	<i>Bluetooth</i> TM Demod
120	ACPR Dynamic Range Extension
1AX	RS-232/Parallel Interface
1D5	Precision Frequency Reference
1D6	Time Gating
1DN/1DQ	Tracking Generator
1DR	Narrow Resolution Bandwidths
1DS	RF Input Pre-Amp
219	Noise Figure Measurements
A4H	GPIB/Parallel Interface
A4J	IF, Sweep, and Video Outputs
AYX	Fast Time Domain Sweeps
AYZ	External Mixing
B72	Expanded Memory
B7B	TV Trigger & TV Picture
B7D/B7E	Digital Communication Hardware
BAA	FM Demodulation
BAB	APC3.5 Input Connector
UKB	Low Frequency Extension

Option 060 - Reduced Emissions Test Recommendations

Optional on:

- E4401B / E4402B / E4404B / E4405B / E4407B

Adjustments Required ^a:

- none

Performance Verification Tests ^p:

- Displayed Average Noise Level
- Residual Responses

Equipment Requirements:

Equipment Type	Description	Recommended Part #
Instruments	none	n/a
Cables	Cable, BNC, (48-in)	10503A
Adapters/Misc.	Adapter, Type-N(m) - BNC(f) Termination, 50Ω Type-N(m)	1250-1476 909A Option 012

Note: Refer to the [Agilent ESA Calibration Guide](#) for a list of critical specifications regarding each piece of test equipment.

a. [N7811A Software](#) Required

p. Refer to Cal Guide Procedure or [N7811A Software](#)

Option 106 - Bluetooth™ Demodulation Test Recommendations

Optional on:

- E4402B / E4404B / E4405B / E4407B

Adjustments Required ^a:

- none

Performance Verification Tests ^p:

- Displayed Average Noise Level
- Residual Responses

Equipment Requirements:

Equipment Type	Description	Recommended Part #
Instruments	none	n/a
Cables	Cable, BNC, (48-in)	10503A
Adapters/Misc.	Adapter, Type-N(m) - BNC(f) Termination, 50Ω Type-N(m)	1250-1476 909A Option 012

Note: Refer to the [Agilent ESA Calibration Guide](#) for a list of critical specifications regarding each piece of test equipment.

a. [N7811A Software](#) Required

p. Refer to Cal Guide Procedure or [N7811A Software](#)

Option 120 - ACPR Dynamic Range Extension Test Recommendations

Optional on:

- E4402B / E4404B / E4405B / E4407B

Adjustments Required ^a:

- none

Performance Verification Tests ^p:

- Displayed Average Noise Level
- Residual Responses
- Noise Sidebands
- Noise Sidebands – Wide Offsets

Equipment Requirements:

Equipment Type	Description	Recommended Part #
Instruments	Synthesized signal generator	8663A
Cables	Cable, BNC, (48-in)	10503A
	Cable, Type-N, (60-in)	11500D
Adapters/Misc.	Adapter, Type-N(m) - BNC(f)	1250-1476
	Termination, 50Ω Type-N(m)	909A Option 012
	Adapter, Type-N(f), - 3.5 (f) ¹	1250-1745

Note: Refer to the Agilent ESA Calibration Guide for a list of critical specifications regarding each piece of test equipment.

a. N7811A Software Required

p. Refer to Cal Guide Procedure or N7811A Software

1. If E4407B with Option BAB, APC-3.5 RF Input Connector

Option 1AX - RS-232/Parallel Interface Test Recommendations

Optional on:

- All Models

Adjustments Required ^a:

- none

Performance Verification Tests ^p:

- Displayed Average Noise Level
- Residual Responses

Equipment Requirements:

Equipment Type	Description	Recommended Part #
Instruments	none	n/a
Cables	Cable, BNC, (48-in)	10503A
Adapters/Misc.	Adapter, Type-N(m) - BNC(f) Termination, 50Ω Type-N(m)	1250-1476 909A Option 012

Note: Refer to the [Agilent ESA Calibration Guide](#) for a list of critical specifications regarding each piece of test equipment.

a. [N7811A Software](#) Required

p. Refer to Cal Guide Procedure or [N7811A Software](#)

Option 1D5 - Precision Frequency Reference Test Recommendations**Optional on:**

- E4401B / E7401A

Adjustments Required ^a:

- 10 MHz Reference Frequency Adjustment

Performance Verification Tests ^p:

- 10 MHz High-Stability Frequency Reference Output Accuracy
- Residual FM

Equipment Requirements:

Equipment Type	Description	Recommended Part #
Instruments	Universal Counter	53132A
	Frequency Standard	5071A
	Synthesized Signal Generator	8663A
Cables	Cable, BNC (48 in.)	10503A (Qty. 2)
	Cable, Type-N (60 in.)	11500D
Adapters/Misc.	Adapter, Type-N(m) - BNC(f)	1250-1476

Note: Refer to the Agilent ESA Calibration Guide for a list of critical specifications regarding each piece of test equipment.

a. N7811A Software Required

p. Refer to Cal Guide Procedure or N7811A Software



Option 1D5 - Precision Frequency Reference Test Recommendations

Optional on:

- E4402B / E4404B / E4405B / E4407B
- E7402A / E7403A / E7404A / E7405A

Adjustments Required ^a:

- 10 MHz Reference Frequency Adjustment
- 50 MHz Amplitude Reference Adjustment

Performance Verification Tests ^p:

- 10 MHz High-Stability Frequency Reference Output Accuracy
- Noise Sidebands
- Residual FM
- Absolute Amplitude Accuracy
- Frequency Response
- Displayed Average Noise Level
- Residual Responses

Equipment Requirements:

Equipment Type	Description	Recommended Part #
Instruments	Universal Counter	53132A
	Frequency Standard	5071A
	Power Meter	E4419A
	RF Power Sensor	8482A (Qty. 2)
	Microwave Power Sensor ²	8485A
	Synthesized signal generator	8663A
	Low-power power sensor ¹	8481D
	Synthesized Sweeper	83620/30/40/50B
	Function Generator	33120A or 3325B
	RF Power Splitter	11667A
	Microwave Power Splitter ²	11667B
Digital Multimeter	3458A	
Cables	Cable, BNC (48 in.)	10503A (Qty. 2)
	Cable, Type-N, (60-in)	11500D
	Cable, APC 3.5 ³	8120-4921
Adapters/Misc.	Adapter, Type-N(f) - BNC(m)	1250-1477
	Adapter, Type-N(f), - 3.5 (f) ¹	1250-1745
	Adapter, Type-N(f) - Type-N (f)	1250-1472
	Adapter, Type-N(m) - BNC(f)	1250-1476
	Dual banana plug - BNC(f)	1251-2277
	BNC Tee (f,m,f)	1250-0781
	Termination, 50Ω BNC(m)	11593A
	20 dB Fixed Attenuator ¹	8491A Opt. 020
	Adapter, 3.5(f) - 3.5(f) ³	1250-1749
	Termination, 50Ω Type-N(m)	909A Option 012



Note: Refer to the Agilent [ESA Calibration Guide](#) for a list of critical specifications regarding each piece of test equipment.

- a. [N7811A Software](#) Required
- p. Refer to Cal Guide Procedure or [N7811A Software](#)
 1. If instrument has Option 1DS, RF Pre-Amp
 2. E4407B or E7405A only
 3. E4407B or E7405B with Option BAB, APC3.5 Input Connector

Option 1D6 - Time Gating Test Recommendations

Optional on:

- All ESA-E & EMC Models

Adjustment Required ^a:

- none

Performance Verification Tests ^p:

- Gate Delay & Gate Length Accuracy
- Gate Mode Additional Amplitude Error

Equipment Requirements:

Equipment Type	Description	Recommended Part #
Instruments	Universal Counter	53132A
	Oscilloscope	54820A
	Synthesized Signal Generator	8663A
	Function Generator	33120A or 3325B
Cables	Cable, BNC (48in.)	10503A
	Cable, Type-N (24in.)	11500C
Adapters/Misc.	Adapter, BNC Tee(f,m,f)	1250-0781

Note: Refer to the Agilent ESA Calibration Guide for a list of critical specifications regarding each piece of test equipment.

a. N7811A Software Required

p. Refer to Cal Guide Procedure or N7811A Software

Option 1DN - 1.5 GHz 50Ω Tracking Generator Test Recommendations

Optional on:

- E4401B / E4411B / E7401A

Adjustment Required ^a:

- none

Performance Verification Tests ^p:

- Displayed Average Noise Level
- T.G. Absolute Amplitude and Vernier Accuracy
- T.G. Level Flatness
- T.G. Harmonic Spurious Outputs
- T.G. Non-Harmonic Spurious Outputs

Equipment Requirements:

Equipment Type	Description	Recommended Part #
Instruments	Microwave Analyzer	8563E
	Power Meter	E4419B
	RF Power Sensor	8482A
	Digital Multimeter	3458A
Cables	Cable, BNC, (48-in)	10503A
	Cable, BNC - BNC (9in.)	10502A
	Cable, Type-N (24in.)	11500C
Adapters/Misc.	Adapter, Type-N tee, (f,m,f)	1250-0559
	Adapter, Type-N(m) - BNC(f)	1250-1476
	Adapter, BNC(f) - banana plug	1251-2277
	Adapter, Type-N(m) - BNC(f)	1250-1476
	Termination, 50Ω Type-N(m)	909A Option 012
	Termination, 50Ω BNC(m)	11593A

Note: Refer to the Agilent ESA Calibration Guide for a list of critical specifications regarding each piece of test equipment.

a. N7811A Software Required

p. Refer to Cal Guide Procedure or N7811A Software

Option 1DQ - 1.5 GHz 75Ω Tracking Generator Test Recommendations

Optional on:

- E4401B / E4411B

Adjustments Required ^a:

- none

Performance Verification Tests ^p:

- Displayed Average Noise Level
- T.G. Absolute Amplitude and Vernier Accuracy
- T.G. Level Flatness
- T.G. Harmonic Spurious Outputs
- T.G. Non-Harmonic Spurious Outputs

Equipment Requirements:

Equipment Type	Description	Recommended Part #
Instruments	Power Meter	E4419B
	Power Sensor, 75Ω	8483A
	Power Sensor, 50Ω	8482A
	Digital Multimeter	3458A
	Microwave Analyzer	8563E
Cables	Cable, BNC, (48-in)	10503A
	Cable, Type-N (24in.)	11500C
	Cable, BNC - BNC (9in.)	10502A
	Cable, Type-N (24in.)	11500C
Adapters/Misc.	Termination, 75Ω Type (N)	909E Option 201
	Termination, 50Ω BNC(m)	11593A
	50Ω - 75Ω Minimum Loss Pad	11852B
	Adapter, Type-N Tee, (f,m,f)	1250-0559
	Adapter, BNC(f) - banana plug	1251-2277
	Adapter, 75Ω N(f) - BNC(m),	1250-1534
	Adapter, N(f),75Ω - N(m), 50Ω	1250-0597
Adapter, Type-N(m) - BNC(f)	1250-1476	

Note: Refer to the Agilent ESA Calibration Guide for a list of critical specifications regarding each piece of test equipment.

a. N7811A Software Required

p. Refer to Cal Guide Procedure or N7811A Software

Option 1DN - 3.0 GHz Tracking Generator Test Recommendations

Optional on:

- E4402B / E4404B / E4405B / E4407B
- E7402A/ E7403A / E7404A / E7405A

Adjustments Required ^a:

- none

Performance Verification Tests ^p:

- T.G. L.O. Feed-through Amplitude
- T.G. Abs. Amplitude & Vernier Accuracy
- T.G. Level Flatness
- T.G. Harmonic Spurious Outputs
- T.G. Non-Harmonic Spurious Outputs

Equipment Requirements:

Equipment Type	Description	Recommended Part #
Instruments	Microwave Analyzer	8563E
	Power Meter	E4419B
	Power Sensor, 50Ω	8482A
	Digital Multimeter	3458A
Cables	Cable, Type-N (24in.)	11500C
	Cable, BNC (9in.)	10502A
	Cable, BNC, (48-in)	10503A
	Cable, Type-N (24in.)	11500C
Adapters/Misc.	Adapter, Type-N(m) - BNC(f)	1250-1476
	Termination, 50Ω BNC(m)	11593A
	Adapter, Type-N tee, (f,m,f)	1250-0559
	Adapter, BNC(f) - banana plug	1251-2277

Note: Refer to the Agilent ESA Calibration Guide for a list of critical specifications regarding each piece of test equipment.

a. N7811A Software Required

p. Refer to Cal Guide Procedure or N7811A Software

Option 1DR - Narrow RBW Test Recommendations

Optional on:

- All ESA-E Models

Adjustments Required ^a:

- none

Performance Verification Tests ^p:

- Displayed Average Noise Level
- Resolution BW Switching Uncertainty

Equipment Requirements:

Equipment Type	Description	Recommended Part #
Instruments	none	n/a
Cables	Cable, BNC, (48-in)	10503A
Adapters/Misc.	Termination, 50Ω Type-N(m) Adapter, Type-N(m) - BNC(f)	909A Option 012 1250-1476

Note: Refer to the [Agilent ESA Calibration Guide](#) for a list of critical specifications regarding each piece of test equipment.

a. [N7811A Software](#) Required

p. Refer to Cal Guide Procedure or [N7811A Software](#)



Option 1DS - RF Input Pre-Amp Test Recommendations

Optional on:

- All ESA-E Models

Adjustments Required ^a:

- Frequency Response Adjustment

Performance Verification Tests ^p:

- Frequency Response
- Displayed Average Noise Level
- Residual Responses

Equipment Requirements:

Equipment Type	Description	Recommended Part #
Instruments	Synth Signal Generator ⁴	8663A
	Synthesized Sweeper ³	83620/30/40/50B
	Function Generator	33120A or 3325B
	Digital Multimeter	3458A
	Power Meter	E4419A
	RF Power Sensor	8482A (Qty. 2)
	75Ω Power Sensor ⁵	8483A
	Microwave Power Sensor	8485A
	RF Power Splitter	11667A
Microwave Power Splitter ²	11667B	
Cables	Cable, BNC, (48-in)	10503A (Qty. 2)
	Cable, Type-N, (60-in)	11500D
	Cable, APC 3.5	8120-4921
Adapters/Misc.	Adapter, N(m) - N(m)	1250-1472
	Adapter, Type-N(m) - BNC(f)	1250-1476
	Dual banana plug - BNC(f)	1251-2277
	BNC Tee (f,m,f)	1250-0781
	Termination, 50Ω BNC(m)	11593A
	20 dB Fixed Attenuator ¹	8491A Opt. 020
	Adapter, 3.5(f) - 3.5(f)	1250-1749
	Minimum Loss Pad ⁵	11852B
Adapter, 75Ω N(m) - BNC(m) ⁵	1250-1533	

Note: Refer to the Agilent ESA Calibration Guide for a list of critical specifications regarding each piece of test equipment.

a. N7811A Software Required

p. Refer to Cal Guide Procedure or N7811A Software

1. If instrument has Option 1DS, RF Pre-Amp

2. If E4407B or E7405A only

3. Signal source must have frequency range >= instrument frequency range

4. May be used instead of Synthesized Sweeper for E4401B, E4411B, or E7401A

5. If instrument has Option 1DP, 75Ω input

Option 219 – Noise Figure Measurements Test Recommendations

Optional on:

- E4401B / E4402B / E4404B / E4405B / E4407B

Adjustments Required ^a:

- none

Performance Verification Tests ^p:

- Displayed Average Noise Level
- Residual Responses

Equipment Requirements:

Equipment Type	Description	Recommended Part #
Instruments	none	n/a
Cables	Cable, BNC, (48-in)	10503A
Adapters/Misc.	Adapter, Type-N(m) - BNC(f) Termination, 50Ω Type-N(m)	1250-1476 909A Option 012

Note: Refer to the [Agilent ESA Calibration Guide](#) for a list of critical specifications regarding each piece of test equipment.

a. [N7811A Software](#) Required

p. Refer to Cal Guide Procedure or [N7811A Software](#)

Option A4H - GPIB/Parallel Interface Test Recommendations

Optional on:

- All Models

Adjustments Required ^a:

- none

Performance Verification Tests ^p:

- Displayed Average Noise Level
- Residual Responses

Equipment Requirements:

Equipment Type	Description	Recommended Part #
Instruments	none	n/a
Cables	Cable, BNC, (48-in)	10503A
Adapters/Misc.	Adapter, Type-N(m) - BNC(f) Termination, 50Ω Type-N(m)	1250-1476 909A Option 012

Note: Refer to the [Agilent ESA Calibration Guide](#) for a list of critical specifications regarding each piece of test equipment.

a. [N7811A Software](#) Required

p. Refer to Cal Guide Procedure or [N7811A Software](#)

Option A4J - IF, Sweep, and Video Output Test Recommendations

Optional on:

- All Models

Adjustments Required ^a:

- none

Performance Verification Tests ^p:

- Displayed Average Noise Level
- Residual Responses
- Manual Test as per Installation Note ⁱ

Equipment Requirements:

Equipment Type	Description	Recommended Part #
Instruments	Oscilloscope	54820A or equivalent
Cables	Cable, BNC, (48-in)	10503A
Adapters/Misc.	Adapter, Type-N(m) - BNC(f) Termination, 50Ω Type-N(m)	1250-1476 909A Option 012

Note: Refer to the Agilent ESA Calibration Guide for a list of critical specifications regarding each piece of test equipment.

a. N7811A Software Required

p. Refer to Cal Guide Procedure or N7811A Software

i. Installation Note Test

Option AYX - Fast Time Domain Sweeps Test Recommendations

Optional on:

- All ESA-E & EMC Models

Adjustments Required ^a:

- none

Performance Verification Tests ^p:

- Displayed Average Noise Level
- Residual Responses
- Sweep Time Accuracy

Equipment Requirements:

Equipment Type	Description	Recommended Part #
Instruments	Function Generator Synthesized Signal Generator	33120A or 3325B 8663A
Cables	Cable, BNC, (48-in) CableType-N, (60in.)	10503A 11500D
Adapters/Misc.	Adapter, Type-N(m) - BNC(f) Termination, 50Ω Type-N(m)	1250-1476 909A Option 012

Note: Refer to the Agilent ESA Calibration Guide for a list of critical specifications regarding each piece of test equipment.

a. N7811A Software Required

p. Refer to Cal Guide Procedure or N7811A Software



Option AYZ - External Mixing Test Recommendations

Optional on:

- E4407B

Adjustments Required ^a:

- LO Power Adjustment
- IF Input Adjustment

Performance Verification Tests ^p:

- System Related Sidebands
- Frequency Response
- Displayed Average Noise Level
- Residual Responses
- 1st LO Output Power Accuracy
- IF Input Accuracy

Equipment Requirements:

Equipment Type	Description	Recommended Part #
Instruments	Synthesized Sweeper	83620/30/40/50B
	Synthesized Signal Generator	8663A
	Function Generator	33120A or 3325B
	Power Meter	E4419A
	RF Power Sensor	8482A (Qty. 2)
	Microwave Power Sensor	8485A
	Low Power Sensor	8484A or 8481D
	RF Power Splitter	11667A
	Microwave Power Splitter	11667B
	Digital Multimeter	3458A
Cables	Cable, BNC, (48-in)	10503A (Qty. 2)
	Cable, APC 3.5 ²	8120-4921
	Cable, Type-N, (60-in)	11500D
Adapters/Misc.	20 dB Fixed Attenuator ¹	11593A
	Adapter, Type-N(m) - BNC(f)	1250-1476
	Termination, 50Ω Type-N(m)	909A Option 012
	Adapter, Type-N(f) – SMA(m)	1250-1562
	Adapter, Type-N(m) – 3.5(f) ³	1250-1744
	Adapter, Type-N(f) - 3.5(f) ²	1250-1745
	Adapter, N(m) - N(m)	1250-1472
	Dual banana plug - BNC(f)	1251-2277
	Adapter, BNC Tee (f,m,f)	1250-0781
Adapter, 3.5(f) - 3.5(f) ²	1250-1749	

Note: Refer to the Agilent ESA Calibration Guide for a list of critical specifications regarding each piece of test equipment.

a. N7811A Software Required

p. Refer to Cal Guide Procedure or N7811A Software

1. If instrument has Option 1DS, RF Pre-Amp

2. If instrument has Option BAB, APC3.5 Input Connector

3. Not required if instrument has Option BAB, APC3.5 Input Connector

Option B72 - Expanded Memory Test Recommendations

Optional on:

- All Models

Adjustments Required ^a:

- none

Performance Verification Tests ^p:

- Displayed Average Noise Level
- Residual Responses

Equipment Requirements:

Equipment Type	Description	Recommended Part #
Instruments	none	n/a
Cables	Cable, BNC, (48-in)	10503A
Adapters/Misc.	Adapter, Type-N(m) - BNC(f) Termination, 50Ω Type-N(m)	1250-1476 909A Option 012

Note: Refer to the [Agilent ESA Calibration Guide](#) for a list of critical specifications regarding each piece of test equipment.

a. [N7811A Software](#) Required

p. Refer to Cal Guide Procedure or [N7811A Software](#)

Option B7B - TV Trigger & TV Picture Test Recommendations

Optional on:

- All ESA-E Models

Adjustments Required ^a:

- none

Performance Verification Tests ^p:

- Manual Test as per Installation Note ⁱ

Equipment Requirements:

Equipment Type	Description	Recommended Part #
Instruments	TV Signal Generator	CATV or Off-Air
Cables	Cable, BNC, (48-in)	10503A
Adapters/Misc.	Adapter, Type-N(m) - BNC(f)	1250-1476

Note: Refer to the Agilent ESA Calibration Guide for a list of critical specifications regarding each piece of test equipment.

^a. N7811A Software Required

^p. Refer to Cal Guide Procedure or N7811A Software

ⁱ. Installation Note Test



Option B7D/B7E - Digital Communications Hardware Test Recommendations

Optional on:

- E4402B / E4404B / E4405B / E4407B

Adjustments Required ^a:

- 50 MHz Amplitude Reference Adjustment
- IF Amplitude Adjustment

Performance Verification Tests ^p:

- Displayed Average Noise Level
- Residual Responses
- Frequency Response
- Absolute Amplitude Accuracy
- Overall Amplitude Accuracy
- Comms Frequency Response
- Comms Absolute Power Accuracy

Equipment Requirements:

Equipment Type	Description	Recommended Part #
Instruments	Synthesized Sweeper ⁴	83620/30/40/50B
	Synthesized Signal Generator	8663A
	Function Generator	33120A or 3325B
	Digital Multimeter	3458A
	Power Meter	E4419A
	RF Power Sensor	8482A (Qty. 2)
	Low Power Sensor	8481D
	Microwave Power Sensor	8485A
	RF Power Splitter	11667A
	Microwave Power Splitter ³	11667B
	Atten/Switch Controller	11713A
	Attenuator, 1 dB Step	8494A/G
	Attenuator, 10 dB Step	8496A/G
Attenuator Interconnect Kit	11716A/C	
Cables	Cable, BNC, (48-in)	10503A (Qty. 2)
	Cable, Type-N, (60-in)	11500D
	Cable, Type-N, (24-in)	11500C (Qty. 2)
	Cable, APC 3.5	8120-4921
	Cable, Type-N, (72-in)	11500A
Adapters/Misc.	Adapter, Type-N(m) - BNC(f)	1250-1476
	Termination, 50Ω Type-N(m)	909A Option 012
	Termination, 50Ω BNC(m)	11593A
	20 dB Fixed Attenuator ¹	8491A Opt. 020
	Attenuator, 6 dB Fixed	8491A Option 010/H47
	Adapter, Type-N(f) - BNC(m)	1250-1477
	Adapter, Type-N(f) – SMA(m)	1250-1562
	Adapter, SMA(f) – SMB(m)	1250-0674
	Adapter, Type-N(f) - Type-N(f)	1250-1472
	Adapter, BNC Tee (f,m,f)	1250-0781
	Dual banana plug - BNC(f)	1251-2277
	Adapter, Type-N(f) – 3.5(f) ²	1250-1745
Adapter, 3.5(f) - 3.5(f)	1250-1749	



Note: Refer to the Agilent [ESA Calibration Guide](#) for a list of critical specifications regarding each piece of test equipment.

- a. [N7811A Software](#) Required
- p. Refer to Cal Guide Procedure or [N7811A Software](#)
 1. If instrument has Option 1DS, RF Pre-Amp
 2. If instrument has Option BAB, APC3.5 Input Connector
 3. If E4407B only
 4. Sweeper must have frequency range \geq instrument frequency range

Option BAA - FM Demodulation Test Recommendations

Optional on:

- All ESA-E Models

Adjustments Required ^a:

- none

Performance Verification Tests ^p:

- Displayed Average Noise Level
- Residual Responses

Equipment Requirements:

Equipment Type	Description	Recommended Part #
Instruments	none	n/a
Cables	Cable, BNC	10503A
Adapters/Misc.	Adapter, Type-N(m) - BNC(f) Termination, 50Ω Type-N(m)	1250-1476 909A Option 012

Note: Refer to the [Agilent ESA Calibration Guide](#) for a list of critical specifications regarding each piece of test equipment.

a. [N7811A Software](#) Required

p. Refer to Cal Guide Procedure or [N7811A Software](#)

Option BAB - APC3.5 RF Input Connector Test Recommendations

Optional on:

- E4407B / E7405A

Adjustments Required ^a:

- Frequency Response Adjustment

Performance Verification Tests ^p:

- Frequency Response
- Displayed Average Noise Level
- Residual Responses

Equipment Requirements:

Equipment Type	Description	Recommended Part #
Instruments	Synthesized Sweeper	83620/30/40/50B
	Function Generator	33120A or 3325B
	Power Meter	E4419A
	RF Power Sensor	8482A (Qty. 2)
	Microwave Power Sensor	8485A
	RF Power Splitter	11667A
	Microwave Power Splitter	11667B
	Digital Multimeter	3458A
Cables	Cable, BNC, (48-in)	10503A (Qty. 2)
	Cable, Type-N, (60-in)	11500D
	Cable, APC 3.5	8120-4921
Adapters/Misc.	Adapter, Type-N(m) - BNC(f)	1250-1476
	Termination, 50Ω Type-N(m)	909A Option 012
	Termination, 50Ω BNC(m)	11593A
	20 dB Fixed Attenuator ¹	8491A Opt. 020
	Adapter, N(m) - N(m)	1250-1472
	Dual banana plug - BNC(f)	1251-2277
	Adapter, BNC Tee (f,m,f)	1250-0781
Adapter, 3.5(f) - 3.5(f)	1250-1749	

Note: Refer to the Agilent ESA Calibration Guide for a list of critical specifications regarding each piece of test equipment.

a. N7811A Software Required

p. Refer to Cal Guide Procedure or N7811A Software

1. If instrument has Option 1DS, RF Pre-Amp



Option UKB - Low Frequency Extension Test Recommendations

Optional on:

- E4402B / E4404B / E4405B / E4407B
- E7402A / E7403A / E7404A / E7405A

Adjustments Required ^a:

- Frequency Response Adjustment

Performance Verification Tests ^p:

- Frequency Response
- Displayed Average Noise Level
- Residual Responses

Equipment Requirements:

Equipment Type	Description	Recommended Part #
Instruments	Synthesized Sweeper ³	83620/30/40/50B
	Function Generator	33120A or 3325B
	Digital Multimeter	3458A
	Power Meter	E4419A
	RF Power Sensor	8482A (Qty. 2)
	Microwave Power Sensor	8485A
	RF Power Splitter	11667A
	Microwave Power Splitter ²	11667B
Cables	Cable, BNC, (48-in)	10503A (Qty. 2)
	Cable, Type-N, (60-in)	11500D
	Cable, APC 3.5	8120-4921
Adapters/Misc.	Adapter, Type-N(m) - BNC(f)	1250-1476
	Termination, 50Ω Type-N(m)	909A Option 012
	Adapter, N(m) - N(m)	1250-1472
	Dual banana plug - BNC(f)	1251-2277
	BNC Tee (f,m,f)	1250-0781
	Termination, 50Ω BNC(m)	11593A
	20 dB Fixed Attenuator ¹	8491A Opt. 020
	Adapter, 3.5(f) - 3.5(f)	1250-1749

Note: Refer to the Agilent ESA Calibration Guide for a list of critical specifications regarding each piece of test equipment.

a. N7811A Software Required

p. Refer to Cal Guide Procedure or N7811A Software

1. If instrument has Option 1DS, RF Pre-Amp

2. If E4407B or E7405A only

3. Sweeper must have frequency range >= instrument frequency rang