Agilent FieldFox Handheld Analyzers

4/6.5/9/14/18/26.5 GHz

Configuration Guide

N9913A

N9914A

N9915A

N9916A

N9917A

N9918A

N9925A

N9926A

N9927A

N9928A

N9935A

N9936A

N9937A

N9938A

This configuration guide describes configurations, options, and accessories for the FieldFox family of portable analyzers. This guide should be used in conjunction with the technical overviews and data sheets for a complete description of the analyzers.

Carry precision with you.

Anticipate ___Accelerate ___Achieve

Agilent Technologies

The FieldFox analyzer family

The table below shows a comparison of the functions available in the FieldFox family of analyzers.

Functionality	FieldFox RF and microwave analyzers (Combination or combo analyzers) N9913A, N9914A N9915A, N9916A N9917A, N9918A	FieldFox microwave vector network analyzers N9925A, N9926A N9927A, N9928A	FieldFox microwave spectrum analyzers N9935A, N9936A N9937A, N9938A
Cable and antenna analyzer (CAT)	Yes	Yes	No[1]
Vector network analyzer (VNA)	Yes	Yes	No
Spectrum analyzer (SA)	Yes	No	Yes
Built-in power meter	Yes	Yes	Yes
Vector voltmeter (VVM)	Yes	Yes	No

The table below shows a comparison of the functions available in the FieldFox family of analyzers.

Option	Description	N991x Combo	N992x VNA	N993x SA
233	Spectrum analyzer	√	-	Base model
235	Preamplifier	√	-	√
220	Tracking generator	Note 1	-	√
236	Interference analyzer and spectrogram	√	-	√
238	Spectrum analyzer time gating	√	-	√
305	Cable and antenna analyzer	Base model	√	Note 2
320	Reflection measurements (RL, VSWR)	Note 3	Note 4	√
210	VNA transmission/reflection	√	Base model	-
211	VNA full 2-port S-parameters	√	√	-
010	VNA time domain	√	√	-
112	QuickCal	√	√	-
308	Vector voltmeter	√	√	-
307	Built-in GPS receiver	√	√	√
302	USB power sensor support	√	√	√
309	DC bias variable-voltage source	√	√	√
310	Built-in power meter	√	√	√
330	Pulse measurements	√	√	√
030	Remote control capability	√	√	√

Notes:

Base model means that the functionality listed is the primary function of that instrument. For example, on the N991xA combo analyzers, cable and antenna analysis is the standard function included with every N991xA.

1. On the N991xA combination analyzers, order Options 233 and 210 to obtain a tracking generator with the spectrum analyzer. There is no Option 220 on the N991xA analyzers. To obtain tracking generator capability, you need Options 233 and 210. Option 233 provides the spectrum analyzer capability and Option 210 the "tracking" capability.

2. Option 305 cable and antenna analyzer, is not available on the N993xA. However, a subset of cable and antenna analyzer measurements return loss and VSWR, is available as Option 320.

3. Option 320 is not applicable to N991xA. The reflection measurements of return loss and VSWR are included with every N991xA. So there is no need for an Option 320 on the combo analyzers.

4. Option 320 is not applicable to N992xA. The reflection measurements of return loss and VSWR are included with every N992xA. So there is no need for an Option 320 on the N992xA.

[1] *Return loss and VSWR measurements available.*

FieldFox microwave combination analyzers

► **Step 1.** Select the model that provides the desired frequency range.

Model	Description	CAT and VNA frequency	SA frequency[1]	Test port connectors
N9913A	4 GHz FieldFox RF analyzer	30 kHz to 4 GHz	100 kHz to 4 GHz	Type-N (f)
N9914A	6.5 GHz FieldFox RF analyzer	30 kHz to 6.5 GHz	100 kHz to 6.5 GHz	Type-N (f)
N9915A	9 GHz FieldFox microwave analyzer	30 kHz to 9 GHz	100 kHz to 9 GHz	Type-N (f)
N9916A	14 GHz FieldFox microwave analyzer	30 kHz to 14 GHz	100 kHz to 14 GHz	Type-N (f)
N9917A	18 GHz FieldFox microwave analyzer	30 kHz to 18 GHz	100 kHz to 18 GHz	Type-N (f)
N9918A	26.5 GHz FieldFox microwave analyzer	30 kHz to 26.5 GHz	100 kHz to 26.5 GHz	3.5 mm (m)

All N991xA FieldFox combo analyzers include the cable and antenna analyzer as the base model. Additional functionality such as spectrum analysis or network analysis can be added using the options listed below.

The following accessories are included with every FieldFox: AC/DC adapter, battery, soft carrying case, LAN cable, Quick Reference Guide and User's Guide.

► **Step 2.** Select optional measurement capabilities. Note that any of the options can easily be added as software upgrades in the future.

Option	Description	Prerequisite options/notes
N991xA-233	Spectrum analyzer	-
N991xA-235	Preamplifier	Requires 233
N991xA-236	Interference analyzer and spectrogram	Requires 233
N991xA-238	Spectrum analyzer time gating	Requires 233
N991xA-210	Vector network analyzer transmission/reflection	Recommend ordering a cal kit
N991xA-211	Vector network analyzer full 2-port S-parameters	Requires 210, recommend ordering a cal kit
N991xA-010	Vector network analyzer time domain	Requires 210, recommend 211
N991xA-112	QuickCal	See page 4, FAQ #9
N991xA-308	Vector voltmeter	210 and 211 required to obtain full VVM functionality. See page 4, FAQ #8
N991xA-307	Built-in GPS receiver	Need to order GPS antenna
N991xA-302	External USB power sensor support	Need to order USB power sensor[2]
N991xA-309	DC bias variable-voltage source	-
N991xA-310	Built-in power meter	No power sensor required
N991xA-330	Pulse measurements	Need to order USB peak power sensor[2], see page 14, FAQs #7 and #8
N991xA-030	Remote control capability	Requires an iOS device

---

[1] *Usable to 5 kHz.*

[2] List of compatible power sensors available from www.agilent.com/find/fieldfoxsupport

FieldFox combo analyzer FAQ

Question	Answer
1. What is included with a base N991xA analyzer?	• The base model includes the cable and antenna analyzer • Measurements: DTF (dB, linear, VSWR), return loss & DTF, return loss (dB), and 1-port cable loss • Calibrations: CalReady, OSL, and response cal • Note: 2-port insertion loss is NOT included with the base model, if 2-port insertion loss is needed, order Option 210 • Note: There is no phase information with the base analyzer, to obtain S11 or S21 phase, order Option 210
2. What is included with N991xA Option 233?	• Basic spectrum analysis, four traces, different detector types, radio standard selection, limit lines • Channel power, occupied bandwidth, adjacent channel power • AM/FM tune and listen, field strength measurements, antenna factors, frequency counter marker Tracking generator (TG)/Independent source: • TG CW mode (source CW frequency can be set independent of SA frequency) - included • TG CW coupled mode (source CW frequency is autocoupled to SA's center frequency) - included • *TG tracking mode (traditional TG operation, swept SA coupled to swept source) - **(requires Option 210)***
3. What is included with N991xA Option 236?	• Interference analyzer and spectrogram • Trace playback and recording
4. What is included with N991xA Option 210?	• Option 210 adds a VNA with transmission/reflection (T/R) capability • Measurements: S21, S11, magnitude and phase • Additionally, in the CAT mode, you can measure 2-port insertion loss • Calibrations: CalReady, OSL, response, and enhanced response cal • If you need 2-port cal, order Option 211 • Adds tracking mode to the tracking generator/independent source included with Option 233, spectrum analyzer.
5. What is included with N991xA Option 211?	• Option 211 adds full 2-port S-parameter capability to the VNA mode • Measurements: All four S-parameters (S11, S21, S22, S12), magnitude and phase • Calibrations: CalReady, OSL, response, enhanced response, and full 2-port cal
6. Can I measure group delay on N991xA analyzers?	• If you have phase measurement capability, then you can measure group delay. Option 210 is required for any phase measurement capability. So if you do not have Option 210, you cannot measure group delay.
7. What is included with N991xA Option 010?	• S11/S21 in time domain, if Option 210 is ordered. To get time domain data for all four S-parameters and full 2-port cal, order Option 211. • View both time and frequency domain data at the same time • Low-pass, impulse, and band-pass modes • Minimum, medium, and maximum window • Gating
8. What is included with N991xA Option 308?	• N991xA with Option 308: 1-port cable trimming • N991xA with Options 308 and 210: 1-port cable trimming, 2-port transmission • N991xA with Options 308, 210, and 211: 1-port cable trimming, 2-port transmission, A/B and B/A • Note: A/B and B/A measurements require an external source
9. What is included with N991xA Option 112?	• QuickCal is included with Option 112. • 1-port QuickCal with a base analyzer. • 1-port and enhanced response QuickCal with a T/R analyzer (one that has Option 210). • 1-port, enhanced response, and 2-port QuickCal with a full 2-port analyzer (one that has Option 211). • QuickCal is most accurate for DUTs with 7/16 and Type-N connectors and measurement uncertainties are provided for frequencies ≤ 18 GHz. Reduced accuracy for DUTs with 3.5 mm (m), SMA (m), or other male coaxial connectors; performance is unspecified. QuickCal is not recommended for DUTs with 3.5 mm (f), SMA (f), or other similar female connectors. QuickCal is not applicable to waveguide.

FieldFox combo analyzer visual diagram

The diagrams below show the various modes in FieldFox combo analyzers and the option dependencies.

Modes	CAT	NA	SA	VVM	Power Meter (USB Sensor)	Power Meter (Built In)
	Standard	Option 210	Option 233	Option 308	Option 302	Option 310
	Pulse Measurements					
	Option 330					

CAT Measure	Distance To Fault (dB)	Return Loss & DTF	Return Loss (dB)	VSWR	DTF (VSWR)	More
	Standard					
	Cable Loss (1-Port)	Insertion Loss (2-Port)	DTF (Lin)			
	Standard	Option 210	Standard			

NA Measure	S11	S21	S12	S22	Format (Log Mag)	
	Option 210		Option 211		Standard	

NA Meas Setup	Settings	Calibration Settings	Power Level	Output Power High Low Man	Port Extensions	Transform
	Standard	Standard	Standard	Standard	Standard	Option 010

CAT or NA Cal	Response Cal	QuickCal	Mechanical Cal ECal	Cal OFF ON	View Cal	
	Standard	Option 112	Standard	Standard	Standard	

Response Cal	Open Response (Port 1)	Standard
	Short Response (Port 1)	Standard
	Normalization	Standard
	Open Response (Port 2)	Option 211
	Short Response (Port 2)	Option 211

QuickCal	1-port (Port 1)	Option 112
	1-port (Port 2)	Option 112 & 211
	Forward Enhanced Response	Option 112
	Reverse Enhanced Response	Option 112 & 211
	Full 2-port	Option 112 & 211

Mechanical Cal ECal	1-port OSL (Port 1)	Standard
	1-port OSL (Port 2)	Option 211
	Forward Enhanced Response	Standard
	Reverse Enhanced Response	Option 211
	Full 2-port	Option 211
	Full 2-port, QSOLT	Option 211
	TRL	Standard

Legend

Option	Description
010	VNA time domain
112	QuickCal
210	VNA transmission/reflection
211	VNA full 2-port S-parameters
233	Spectrum analyzer
235	Preamplifier
236	Interference analyzer and spectrogram
238	Spectrum analyzer time gating
302	External USB power sensor support
307	Built-in GPS receiver
308	Vector voltmeter
309	DC bias variable-voltage source
310	Built-in power meter
330	Pulse measurements

FieldFox combo analyzer visual diagram *continued*

The diagrams below show the various modes in FieldFox combo analyzers and the option dependencies.

VVM Measure	1-Port Cable Trimming	2-Port Transmission	B/A	A/B		
	Option 308	Option 308 & 210	Option 308 & 210 & 211	Option 308 & 210 & 211		

SA Measure	Radio Standard	Channel Measurements	Tune & Listen	Interference Analysis	Source	
	Option 233	Option 233	Option 233	Option 236	Option 233 & 210	

SA Source	Source Enable OFF ON	Source Mode [CW]	Normalize OFF ON	Source Power	Source CW Freq	
	Source Mode Tracking	Source Mode CW	Source Mode Coupled CW			
	Option 233 & 210	Option 233	Option 233	Standard	Standard	

SA Scale/ Amptd	Autoscale	Unit dBm	Corrections	External Gain	Preamp OFF ON	
	Standard	Standard	Standard	Standard	Option 235	

SA Trace	Trace 1 2 3 4	State [Clr/Wr]	Default All	Detector [Auto]	Record Playback Setup	Recorder Player
	Standard	Standard	Standard	Standard	Option 236	Option 236

SA Sweep	Trig Type [RF burst]	Trig Slope Pos Neg	Trig Delay	Trig Level	Auto Trigger OFF ON	FFT Gating Setup
	Standard	Standard	Standard	Standard	Standard	Option 238

System Config	Options (Licensing)	GPS	Frequency Ref	Voltage Source	Security Level None High	
		Standard & 307	Standard	Option 309	Standard	

GPS	GPS OFF	GPS Internal	GPS External			
		Option 307	Standard			

Legend

Option	Description
010	VNA time domain
112	QuickCal
210	VNA transmission/reflection
211	VNA full 2-port S-parameters
233	Spectrum analyzer
235	Preamplifier
236	Interference analyzer and spectrogram
238	Spectrum analyzer time gating
302	External USB power sensor support
307	Built-in GPS receiver
308	Vector voltmeter
309	DC bias variable-voltage source
310	Built-in power meter
330	Pulse measurements

FieldFox microwave vector network analyzers

▶ **Step 1.** Select the model that provides the desired frequency range.

Model	Description	Frequency	Test port connectors
N9925A	9 GHz FieldFox microwave VNA	30 kHz to 9 GHz	Type-N (f)
N9926A	14 GHz FieldFox microwave VNA	30 kHz to 14 GHz	Type-N (f)
N9927A	18 GHz FieldFox microwave VNA	30 kHz to 18 GHz	Type-N (f)
N9928A	26.5 GHz FieldFox microwave VNA	30 kHz to 26.5 GHz	3.5 mm (m)

A standard N992xA FieldFox microwave VNA includes transmission/reflection measurement capability. Additional functionality such as full 2-port S-parameters can be added using the options listed below.

The following accessories are included with every FieldFox: AC/DC adapter, battery, soft carrying case, LAN cable, Quick Reference Guide and User's Guide.

▶ **Step 2.** Select optional measurement capabilities. Note that any of the options can easily be added as software upgrades in the future.

Option	Description	Prerequisite options/notes
N992xA-211	Full 2-port S-parameters	-
N992xA-010	Time domain	Recommend 211
N992xA-305	Cable and antenna analyzer	-
N992xA-112	QuickCal	See page 8, FAQ #8
N992xA-308	Vector voltmeter	211 required to obtain full VVM functionality. See page 8, FAQ #6
N992xA-307	Built-in GPS receiver	Need to order antenna
N992xA-302	External USB power sensor support	Need to order USB power sensor[1]
N992xA-309	DC bias variable-voltage source	-
N992xA-310	Built-in power meter	No power sensor required
N992xA-330	Pulse measurements	Need to order USB peak power sensor[1], see page 14, FAQs #7 and #8
N992xA-030	Remote control capability	Requires an iOS device

Note: See FAQs for more information

---

[1] List of compatible power sensors available from www.agilent.com/find/fieldfoxsupport

FieldFox microwave vector network analyzer FAQ

Question	Answer
1. What is included with a base N992xA analyzer?	• Measurements: Transmission/reflection or S21 and S11, magnitude and phase • Calibrations: CalReady, OSL, response, and enhanced response cal
2. What is included with N992xA Option 211?	• Option 211 adds full 2-port S-parameter capability • Measurements: All four S-parameters (S11, S21, S22, S12), magnitude and phase • Calibrations: CalReady, OSL, response, enhanced response, and full 2-port cal
3. What is included with N992xA Option 010?	• S11/S21 in time domain, if Option 210 is ordered. To get time domain data for all four S-parameters and full 2-port cal, order Option 211. • View both time and frequency domain data at the same time • Low-pass, impulse, and band-pass modes • Minimum, normal, and maximum window • Gating
4. What is the difference between cable and antenna analyzer and time domain, in either the combo or the VNA analyzers?	DTF and time domain use the same iFT to transform frequency domain data to time domain. The DTF user interface is designed so users can find the location of cable faults easily, with an x-axis of distance. In time domain, they can have an x-axis of both time and distance, and also use gating to remove unwanted responses.

	CAT mode	Time domain
X-axis	Distance	Distance, time
Parameters	DTF (or S11)	S11, S21, S22, S12
Number of traces	1, DTF	Up to 4
Viewing of time & frequency domain	No (except DTF and RL, limited setting)	Yes, full flexibility for four traces
Velocity factor	Yes	Yes
Transform modes	Band-pass, low-pass impulse	Band-pass, low-pass impulse, low-pass step
Windowing	Minimum, medium, maximum	Full control, window %, Kaiser Beta, impulse width
Gating	No	Yes

5. What is included with N992xA Option 305?	• Measurements: DTF (dB, linear, VSWR), return loss & DTF, return loss (dB), and 1-port cable loss, 2-port insertion loss • Calibrations: CalReady, OSL, and response cal
6. What is included with N992xA Option 308?	• N992xA with Option 308: 1-port cable trimming, 2-port transmission • N992xA with Options 308 and 211: 1-port cable trimming, 2-port transmission, A/B and B/A • Note: A/B and B/A measurements require an external source
7. If I have the full 2-port VNA with time domain, why would I order Option 305? What additional functionality is available?	CAT mode's basic measurements are similar to VNA measurements. The features listed below are often used for distance-to-fault cable testing and are only available in CAT mode: • 3-peak marker tracking for finding faults for DTF measurements • 1-port cable loss • Cable type selection and editing, includes the cable's velocity factor and loss

8. What is included with N992xA Option 112?	• QuickCal is included with Option 112.
	    • 1-port and enhanced response QuickCal with a base analyzer
	    • 1-port, enhanced response, and 2-port QuickCal with a full 2-port analyzer (one that has Option 211).
	• QuickCal is most accurate for DUTs with 7/16 and Type-N connectors and measurement uncertainties are provided for frequencies ≤ 18 GHz. Reduced accuracy for DUTs with 3.5 mm (m), SMA (m), or other male coaxial connectors; performance is unspecified. QuickCal is not recommended for DUTs with 3.5 mm (f), SMA (f), or other similar female connectors. QuickCal is not applicable to waveguide.

FieldFox VNA visual diagram

The diagrams below show the various modes in FieldFox VNA analyzers and the option dependencies.

Modes	NA	CAT	VVM	Power Meter (USB Sensor)	Power Meter (Built In)	Pulse Measurements
	Standard	Option 305	Option 308	Option 302	Option 310	Option 330

NA Measure	S11	S21	S12	S22	Format (Log Mag)	
	Standard	Standard	Option 211	Option 211	Standard	

CAT Measure	Distance To Fault (dB)	Return Loss & DTF	Return Loss (dB)	VSWR	DTF (VSWR)	
	Option 305	Option 305	Option 305	Option 305	Option 305	
	Cable Loss (1-Port)	Insertion Loss (2-Port)	DTF (Lin)			
	Option 305	Option 305	Option 305			

NA Meas Setup	Settings	Calibration Settings	Power Level	Output Power High Low Man	Port Extensions	Transform
	Standard	Standard	Standard	Standard	Standard	Option 010

NA or CAT Cal	Response Cal	QuickCal	Mechanical Cal ECal	Cal OFF ON	View Cal	
	Standard	Option 112	Standard	Standard	Standard	

Response Cal	Open Response (Port 1)	Standard
	Short Response (Port 1)	Standard
	Normalization	Standard
	Open Response (Port 2)	Option 211
	Short Response (Port 2)	Option 211

QuickCal	1-Port (Port 1)	Option 112
	1-Port (Port 2)	Option 112 & 211
	Forward Enhanced Response	Option 112
	Reverse Enhanced Response	Option 112 & 211
	Full 2-Port	Option 112 & 211

Mechanical Cal ECal	1-Port OSL (Port 1)	Standard
	1-Port OSL (Port 2)	Option 211
	Forward Enhanced Response	Standard
	Reverse Enhanced Response	Option 211
	Full 2-Port	Option 211
	Full 2-Port, QSOLT	Option 211

Legend

Option	Description
010	VNA time domain
112	QuickCal
211	VNA full 2-port S-parameters
302	External USB power sensor support
305	Cable and antenna analyzer
307	Built-in GPS receiver
308	Vector voltmeter
309	DC bias variable-voltage source
310	Built-in power meter
330	Pulse measurements

FieldFox VNA visual diagram *continued*

The diagrams below show the various modes in FieldFox VNA analyzers and the option dependencies.

VVM Measure	1-Port Cable Trimming	2-Port Transmission	B/A	A/B		
	Option 308	Option 308	Option 308 & 211	Option 308 & 211		

System Config	Options (Licensing)	GPS	Frequency Ref	Voltage Source	Security Level None High	
	Standard	Standard & 307	Standard	Option 309	Standard	

System GPS	GPS OFF	GPS Internal	GPS External			
		Option 307	Standard			

Legend

Option	Description
010	VNA time domain
112	QuickCal
211	VNA full 2-port S-parameters
302	External USB power sensor support
305	Cable and antenna analyzer
307	Built-in GPS receiver
308	Vector voltmeter
309	DC bias variable-voltage source
310	Built-in power meter
330	Pulse measurements

FieldFox microwave spectrum analyzers

► **Step 1.** Select the model that provides the desired frequency range.

Model	Description	Frequency range[1]	Test port connectors
N9935A	9 GHz FieldFox microwave spectrum analyzer	100 kHz to 9 GHz	Type-N (f)
N9936A	14 GHz FieldFox microwave spectrum analyzer	100 kHz to 14 GHz	Type-N (f)
N9937A	18 GHz FieldFox microwave spectrum analyzer	100 kHz to 18 GHz	Type-N (f)
N9938A	26.5 GHz FieldFox microwave spectrum analyzer	100 kHz to 26.5 GHz	Type-N (f)[2]

The following accessories are included with every FieldFox: AC/DC adapter, battery, soft carrying case, LAN cable, Quick Reference Guide and User's Guide.

► **Step 2.** Select optional measurement capabilities. With the exception of Option 100 and 320, all other options can easily be added as software upgrades in the future.

Option	Description	Prerequisite options/notes
N9938A-100	3.5 mm (m) connectors	3.5 mm (m) - only available on N9938A
N993xA-220	Full-band tracking generator	CW, CW coupled, and tracking
N993xA-235	Preamplifier	-
N993xA-236	Interference analyzer and spectrogram	-
N993xA-238	Spectrum analyzer time gating	-
N993xA-320	Reflection measurements	320 requires 220 on all N993xAs. On N9938A specifically, 320 also requires 100.
N993xA-307	Built-in GPS receiver	Need to order antenna
N993xA-302	External USB power sensor support	Need to order USB power sensor[3]
N993xA-309	DC bias variable-voltage source	-
N993xA-310	Built-in power meter	No power sensor required
N993xA-330	Power measurements	Need to order USB peak power senor[3], see page 14, FAQs #7 and #8
N993xA-030	Remote control capability	Requires an iOS device

FieldFox spectrum analyzer FAQ

Question	Answer
1. What is included with the basic spectrum analyzer?	• Basic spectrum analysis, four traces, different detector types, radio standard selection, limit lines • Channel power, occupied bandwidth, adjacent channel power • AM/FM tune and listen, field strength measurements, antenna factors, frequency counter marker
2. What is included with N993xA Option 236?	• Interference analyzer and spectrogram • Trace playback and recording
3. What is included with Option 320?	• Return loss and VSWR • Normalization using data/memory
4. What is the difference between Option 320 and the CAT mode on the N991xA combo base model?	Option 320 on the N993x SA offers RL and VSWR. CAT mode on the N991x combo analyzers offers RL and VSWR, DTF, insertion loss, and also various calibration capabilities such as QuickCal and OSL.

Notes:

1. The spectrum analyzer can be tuned to 5 kHz.
2. Order Option 100 for 3.5 mm (m) test port connectors. With N9938A-100, the spectrum analyzer is built with 3.5 mm test port connectors instead of the standard Type-N (f). Option 100 is a prerequisite for Option 320 for N9938A.
3. List of compatible power sensors available from www.agilent.com/find/fieldfoxsupport

FieldFox SA visual diagram

The diagrams below show the various modes in FieldFox SA analyzers and the option dependencies.

Modes	SA	Power Meter (USB Sensor)	Reflection Meas	Power Meter (Built In)	Pulse Measurements	
	Standard	Option 302	Option 320	Option 310	Option 330	

SA Measure	Radio Standard	Channel Measurements	Tune & Listen	Interference Analysis	Source	
	Standard	Standard	Standard	Option 236	Option 220	

SA Source	Source Enable OFF ON	Source Mode [CW]	Normalize OFF ON	Source Power	Source CW Freq	
	Source Mode Tracking	Source Mode CW	Source Mode Coupled CW			
	Option 220	Option 220	Option 220			

SA Scale/ Amptd	Autoscale	Unit dBm	Corrections	External Gain	Preamp OFF ON	
	Standard	Standard	Standard	Standard	Option 235	

SA Trace	Trace 1 2 3 4	State [Clr/Wr]	Default All	Detector [Auto]	Record Playback Setup	Recorder Player
	Standard	Standard	Standard	Standard	Option 236	Option 236

SA Sweep	Trig Type [RF burst]	Trig Slope Pos Neg	Trig Delay	Trig Level	Auto Trigger OFF ON	FFT Gating Setup
	Standard	Standard	Standard	Standard	Standard	Option 238

Reflection Meas	Return Loss (dB)	VSWR				
	Option 320	Option 320				

System Config	Options (Licensing)	GPS	Frequency Ref	Voltage Source	Security Level None High	
	Standard	Standard and 307	Standard	Option 309	Standard	

System GPS	GPS OFF	GPS Internal	GPS External			
	Standard	Option 307	Standard			

Legend

Option	Description
220	Full-band tracking generator
235	Preamplifier
236	Interference analyzer and spectrogram
238	Spectrum analyzer time gating
302	External USB power sensor support
307	Built-in GPS receiver
309	DC bias variable-voltage source
310	Built-in power meter
320	Reflection measurements
330	Pulse measurements

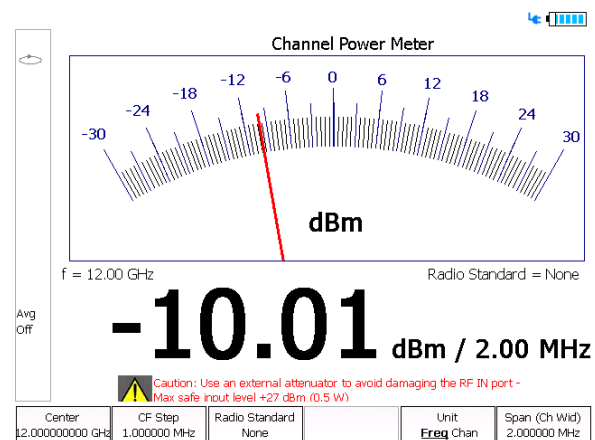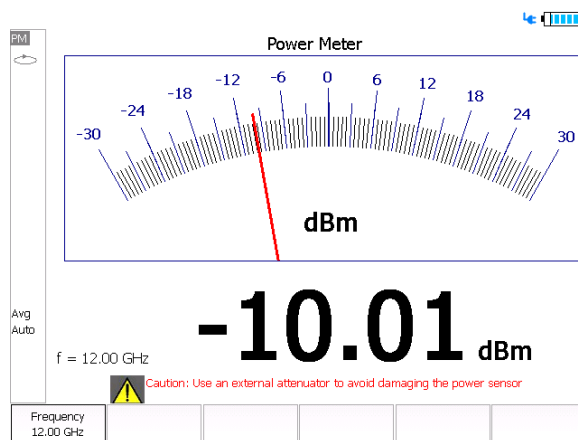# FAQ – Applicable to all FieldFox microwave analyzers

Question	Answer
1. What USB power sensors work with Option 302?	All Agilent U2000x Series USB power sensors are supported with FieldFox. Visit: www.agilent.com/find/fieldfoxsupport for an up-to-date listing.
2. What is the difference between USB power sensor (Option 302) and built-in power meter (Option 310)?	

	Option 302 USB powers sensor	Option 310 Built-in power meter (or channel power meter)
Description	Option 302 allows users to connect a USB power sensor to FieldFox's USB port and make *broadband* power measurements.	Option 310 is a *channelized* power measurement capability built into FieldFox analyzers. Maximum bandwidth is 100 MHz.
External hardware	U2000x power sensor required	None. Uses internal receiver.
Power measurement	Broadband diode detector, measures all frequencies	Tuned receiver, so measures frequencies within defined channel bandwidth
Frequency range	Depends on USB sensor	Frequency range of the analyzer
Settings	Set CW frequency	Set CW frequency, Set channel width/span
Power range	Depends on USB sensor	Depends on channel width and attenuator setting.
Warm-up time	30 minutes to meet accuracy specifications	No warm-up time required
Accuracy	Depends on USB sensor	InstAlign accuracy: ± 0.5 dB typical for a CW signal. Since the measurement is within a certain frequency channel or bandwidth, to make an accurate measurement, the user needs to know the exact center frequency and the signal's characteristics and set those accurately.
Programmable	Yes, via SCPI	No
Physical connection	The power sensor can easily be moved to the measurement point, with a USB cable connecting the detector to FieldFox.	The measurement point needs to be connected to FieldFox's RF input port. If a RF jumper cable is used, the user needs to account for the loss of the cable with an offset value (can be entered into the analyzer).
FieldFox source control	Yes, on/off, and nominal power level control	No access to FieldFox's source from the built-in power meter mode

Question	Answer
3. What do I need to get GPS information?	(1) The recommended GPS solution is to order: • Option 307 - built-in GPS receiver • A GPS antenna such as N9910X-825 • Other GPS antennas can also be used • The GPS connector on the instrument is SMA (f) (2) Alternatively, you can purchase a USB-based GPS receiver, such as Microsoft's Streets & Trips (need the u-blox chip set). You do not need to purchase any FieldFox options for the USB-based GPS to work. However, the USB-based GPS only provides time and location data, and time synchronization capability. It cannot be used to increase the frequency accuracy of the instrument.
4. What is the connector for Option 309, DC output?	The DC output has a SMB (m) connector. Recommend ordering N9910X Option 713 bias-tee power cable SMB (f) to BNC (m).
5. What are the connectors for the Reference/Trigger In and Reference/Trigger Out?	The connector for the Ref/Trig In is SMA (f). Recommend ordering N9910X Option 712 Trig/Ref in SMA (m) to BNC (f) cable. The connector for the Ref/Trig Out is SMB (m). Recommend ordering N9910X Option 713 bias-tee power cable SMB (f) to BNC (m).
6. What is Option 030 Remote control capability?	(1) Option 030 provides a license for FieldFox to allow remote control via an iOS device. (2) Not supplied by user, but necessary for operation of Option 030 are: • iOS device: iPad, iPhone, or iPod Touch with iOS 5.1 or higher with free FieldFox app • A WiFi or 3G/4G network connection between FieldFox and iOS device
7. What USB sensor is required for Option 330?	Option 330 or pulse measurements requires an Agilent USB peak power sensor. Visit www.agilent.com/find/usbsensorsforfieldfox for a list of supported peak power sensors. Average power sensors cannot be used with Option 330, only peak power sensors. The peak power sensor needs to be purchased separately.
8. What measurement capabilities are included with Option 330?	• Average power, peak power, and peak to average ratio • Analog gauge display and digital display, dBm and watts • Relative/absolute measurements, dB or %, minimum and maximum limits • Trace graph for pulse profiling with gating • Rise time, fall time, pulse width, pulse period, pulse repetition frequency

Warranty and service

All FieldFox analyzers come standard with a 3 year warranty.

Documentation

A printed copy of the User's Guide is included with all FieldFox orders. If you do not wish to receive the printed User's Guide, order N99xxA Option 0B0.

Option	Description	Notes
N99xxA-0B0	Do not include User's Guide	
N99xxA-ABA	Printed User's Guide in English	Default option

The latest FieldFox User's Guide (manual) is available online from: www.agilent.com/find/fieldfoxsupport

The Service Guide, SCPI Programming Guide, Quick Reference Guide, and Data Link software help file can also be found via the website above.

Upgrades

Information on upgrades is available from: www.agilent.com/find/fieldfoxsupport

N9913A, N9914A, N9915A, N9916A, N9917A, N9918A FieldFox combo upgrades

Option	Description	Order as	Upgrade contents	Additional requirements
010	VNA time domain analysis	N991xAU-010	License key	210
112	Enable QuickCal	N991xAU-112	License key	None
210	VNA transmission and reflection	N991xAU-210	License key	None
211	VNA full 2-port S-parameters	N991xAU-211	License key	210
233	Spectrum analyzer	N991xAU-233	License key	None
235	Preamplifier	N991xAU-235	License key	233
236	Interference analyzer and spectrogram	N991xAU-236	License key	233
238	Spectrum analyzer time gating	N991xAU-238	License key	233
302	External USB power sensor support	N991xAU-302	License key	None
307	GPS receiver	N991xAU-307	License key	None
308	Vector voltmeter	N991xAU-308	License key	None
309	DC bias variable-voltage source	N991xAU-309	License key	None
310	Built-in power meter	N991xAU-310	License key	None
030	Remote control capability	N991xAU-030	License key	None
330	Pulse measurements	N991xAU-330	License key	None

N9925A, N9926A, N9927A, N9928A FieldFox VNA upgrades

Option	Description	Order as	Upgrade contents	Additional requirements
010	VNA time domain analysis	N992xAU-010	License key	None
112	Enable QuickCal	N992xAU-112	License key	None
211	VNA full 2-port S-parameters	N992xAU-211	License key	None
302	External USB power sensor support	N992xAU-302	License key	None
305	Cable and antenna analyzer	N992xAU-305	License key	None
307	GPS receiver	N992xAU-307	License key	None
308	Vector voltmeter	N992xAU-308	License key	None
309	DC bias variable-voltage source	N992xAU-309	License key	None
310	Built-in power meter	N992xAU-310	License key	None
030	Remote control capability	N992xAU-030	License key	None
330	Pulse measurements	N992xAU-330	License key	None

---

[1] On N9938A, Option 320 is only available as a software upgrade if the spectrum analyzer is already equipped with Option 100, which is 3.5 mm connectors on the test port. Option 100 must have been ordered at the time of original purchase. It cannot be upgraded later.

Upgrades continued

Information on upgrades is available from: www.agilent.com/find/fieldfoxsupport

N9935A, N9936A, N9937A, N9938A FieldFox SA upgrades

Option	Description	Order as	Upgrade contents	Additional requirements
100	3.5 mm connectors	No upgrade available for Option 100. Only available with original N9938A order.	Not applicable	Not applicable
220	Full-band tracking generator	N993xAU-220	License key	None
235	Preamplifier function	N993xAU-235	License key	None
236	Interference analyzer and spectrogram	N993xAU-236	License key	None
238	Spectrum analyzer time gating	N991xAU-238	License key	None
302	External USB power sensor support	N993xAU-302	License key	None
307	GPS receiver	N993xAU-307	License key	None
309	DC bias variable-voltage	N993xAU-309	License key	None
310	Built-in power meter	N993xAU-310	License key	None
320	Reflection measurements	N993xAU-320	License key[1]	* Option 220 for N9935A, N9936A and N9937A. * Option 100 and 220 for N9938A.
030	Remote control capability	N993xAU-030	License key	None
330	Pulse measurements	N993xAU-330	License key	None

[1] On N9938A, Option 320 is only available as a software upgrade if the spectrum analyzer is already equipped with Option 100, which is 3.5 mm connectors on the test port. Option 100 must have been ordered at the time of original purchase. It cannot be upgraded later.

Accessories

Calibration kits[1]	
Type-N, 50 ohm	
N9910X-800	3-in-1 OSL calibration kit, DC to 6 GHz, Type-N (m) 50 ohm
N9910X-801	3-in-1 OSL calibration kit, DC to 6 GHz, Type-N (f) 50 ohm
85514A	4-in-1 OSLT mechanical calibration kit, DC to 9 GHz, Type-N (m) 50 ohm
85515A	4-in-1 OSLT mechanical calibration kit, DC to 9 GHz, Type-N (f) 50 ohm
85518A	4-in-1 OSLT mechanical calibration kit, DC to 18 GHz, Type-N (m) 50 ohm
85519A	4-in-1 OSLT mechanical calibration kit, DC to 18 GHz, Type-N (f) 50 ohm
85054D	Economy calibration kit, DC to 18 GHz, Type-N (male and female) 50 ohm
Type-N, 75 ohm[2]	
85036E	Economy calibration kit, DC to 3 GHz, Type-N (m) 75 ohm
3.5 mm	
85520A	4-in-1 OSLT mechanical calibration kit, DC to 26.5 GHz, 3.5 mm (m)
85521A	4-in-1 OSLT mechanical calibration kit, DC to 26.5 GHz, 3.5 mm (f)
85033E	Mechanical calibration kit, DC to 9 GHz, 3.5 mm (male and female)
85052D	Economy calibration kit, DC to 26.5 GHz, 3.5 mm (male and female)
7-16	
N9910X-802	3-in-1 OSL calibration kit, DC to 6 GHz, 7/16 DIN (m)
N9910X-803	3-in-1 OSL calibration kit, DC to 6 GHz, 7/16 DIN (f)
Waveguide	
X11644A	WR-90 Waveguide calibration kit, 8.2 to 12.4 GHz
P11644A	WR-62 Waveguide calibration kit, 12.4 to 18 GHz
K11644A	WR-42 Waveguide calibration kit, 18 to 26.5 GHz
N9911X	WR-137, WR-90, WR-62, and WR-42 Economical waveguide calibration kits

Cables

All cables listed below are rugged phase-stable cables.

Model	Cable connector	Other cable connector	Max frequency	Length (ft)	Length (m)
N9910X-700	Type-N (m)	Type-N (f)	18 GHz	3.28 ft	1 m
N9910X-701	Type-N (m)	Type-N (m)	18 GHz	3.28 ft	1 m
N9910X-704	Type-N (m)	TNC (f)	13 GHz	5 ft	1.5 m
N9910X-705	Type-N (m)	TNC (m)	13 GHz	5 ft	1.5 m
N9910X-708	3.5 mm (m)	3.5 mm (f)	26.5 GHz	3.28 ft	1 m
N9910X-709	3.5 mm (f)	3.5 mm (f)	26.5 GHz	3.28 ft	1 m
N9910X-810	Type-N (m)	Type-N (m)	6 GHz	5 ft	1.5 m
N9910X-811	Type-N (m)	Type-N (f)	6 GHz	5 ft	1.5 m
N9910X-812	Type-N (m)	Type-N (m)	8 GHz	12 ft	3.6 m
N9910X-813	Type-N (m)	Type-N (f)	8 GHz	12 ft	3.6 m
N9910X-814	Type-N (m)	7/16 (m)	6 GHz	5 ft	1.5 m
N9910X-815	Type-N (m)	7/16 (m)	6 GHz	12 ft	3.6 m
N9910X-816	Type-N (m)	Type-N (f)	6 GHz	3.28 ft	1 m
N9910X-817	Type-N (m)	Type-N (m)	6 GHz	3.28 ft	1 m

[1] FieldFox analyzers support most standard HP/Agilent mechanical calibration kits.
[2] Recommend ordering quantity 2 of N9910X Option 846, 50 to 75 ohm adapter.

Accessories continued

Antennas	
N9910X-820	Antenna, directional, multiband, 800 to 2500 MHz, 10 dBi, Type-N (f)
N9910X-821	Antenna, telescopic whip, 70 MHz to 1 GHz, BNC (m)
N9910X-823	Antenna, cellular narrowband, 824 to 869 MHz, Type-N (f)
N9910X-824	Antenna, cellular narrowband, PCS 1850 to 1990 MHz, Type-N (f)
N9910X-825	Antenna, GPS, active, SMA (m)

RF and microwave adapters	
83059A	Coaxial adapter, 3.5 mm (m) to 3.5 mm (m), 26.5 GHz
83059B	Coaxial adapter, 3.5 mm (f) to 3.5 mm (f), 26.5 GHz
83059C	Coaxial adapter, 3.5 mm (m) to 3.5 mm (f), 26.5 GHz
N9910X-843	Coaxial adapter, Type-N (m) to 7/16 DIN (f)
N9910X-845	Adapter kit: Type-N (f) to 7/16 DIN (f), Type-N (f) to 7/16 DIN (m), Type-N (f) to Type-N (f)
N9910X-846	Coaxial adapter, Type-N (m) 50 ohm to Type-N (f) 75 ohm
N9910X-847	Adapter kit: Type-N (f) to TNC (m) adapter, Type-N (f) to TNC (f) adapter, 13 GHz
N9910X-848	Coaxial adapter, Type-N (f) to 3.5 mm (f), 18 GHz
N9910X-849	Coaxial adapter, Type-N (f) to 3.5 mm (m), 18 GHz
N9910X-850	Coaxial adapter, Type-N (m) to Type-N (m), 18 GHz
N9910X-851	Coaxial adapter, Type-N (f) to Type-N (f), 18 GHz
N9910X-852	Coaxial adapter, Type-N (m) to Type-N (f), 18 GHz

Other RF and microwave accessories	
N9910X-860	Fixed attenuator, 40 dB, 100 W, DC to 3 GHz, Type-N (m) to Type-N (f)
N9910X-861	Fixed attenuator, 40 dB, 50 W, DC to 8.5 GHz, Type-N (m) to Type-N (f)
N9910X-874	External bias-tee, 2.5 MHz to 6 GHz, 1 W, 0.5 A
N9910X-712	Trig/Ref in Cable SMA (m) to BNC (f), 1 m or 3.28 ft
N9910X-713	Bias-tee power cable SMB (f) to BNC (m), 1 m or 3.28 ft

Other FieldFox accessories	
N9910X-870	Extra battery
N9910X-872	External battery charger
N9910X-873	AC/DC adapter
N9910X-875	DC car charger and adapter
N9910X-880	Extra soft carrying case with backpack and shoulder strap
N9910X-881	Hard transit case

Reference Web Links	
FieldFox family page	www.agilent.com/find/fieldfox
All FieldFox user's guides and manuals	www.agilent.com/find/fieldfox_manuals
FieldFox firmware	www.agilent.com/find/fieldfoxsupport
FieldFox upgrades	www.agilent.com/find/fieldfoxsupport
FieldFox RF and microwave accessories, N9910X	www.agilent.com/find/n9910x
USB power sensors	www.agilent.com/find/u2000

Carry precision with you.

Every piece of gear in your field kit had to prove its worth. Measuring up and earning a spot is the driving idea behind Agilent's FieldFox analyzers. They're equipped to handle routine maintenance, in-depth troubleshooting and anything in between. Better yet, FieldFox delivers Agilent-quality measurements - wherever you need to go. Add FieldFox to your kit and carry precision with you.

Literature	Number
FieldFox Handheld Analyzers, Brochure	5990-9779EN
FieldFox Combination Analyzers, Technical Overview	5990-9780EN
FieldFox Spectrum Analyzers, Technical Overview	5990-9782EN
FieldFox Vector Network Analyzers, Technical Overview	5990-9781EN
FieldFox Handheld Analyzers, Data Sheet	5990-9783EN
FieldFox Handheld Analyzers, Configuration Guide	5990-9836EN
FieldFox RF Analyzer, Technical Overview	5989-8618EN
FieldFox RF Analyzer, Data Sheet	N9912-90006
FieldFox RF Vector Network Analyzer, Technical Overview	5990-5087EN
FieldFox RF Vector Network Analyzer, Data Sheet	5990-5363EN

Download application notes, watch videos, and learn more:
www.agilent.com/find/fieldfox

myAgilent

www.agilent.com/find/myagilent
A personalized view into the information most relevant to you.

Agilent Channel Partners

www.agilent.com/find/channelpartners
Get the best of both worlds: Agilent's measurement expertise and product breadth, combined with channel partner convenience.

FROST & SULLIVAN

2013 BEST PRACTICES AWARD

GLOBAL HANDHELD GENERAL PURPOSE TEST EQUIPMENT NEW PRODUCT INNOVATION LEADERSHIP AWARD

3 WARRANTY Three-Year Warranty

www.agilent.com/find/ThreeYearWarranty
Agilent's combination of product reliability and three-year warranty coverage is another way we help you achieve your business goals: increased confidence in uptime, reduced cost of ownership and greater convenience.

Agilent Advantage Services

www.agilent.com/find/AdvantageServices
Accurate measurements throughout the life of your instruments.

Agilent Electronic Measurement Group
DEKRA Certified
ISO 9001:2008
Quality Management System
www.agilent.com/quality

Agilent Technologies