Agilent FieldFox RF Analyzer
N9912A 4/6 GHz
Technical Overview
With the proliferation of wireless communications, operating frequencies have soared from sub-GHz levels up to 5.8 GHz. As a result, service providers are required to build more base stations to cover the same size coverage area. This means you and your technicians need to deploy and maintain more cell sites than you previously did in the same amount of time. To do this efficiently, a multi-functional and reliable tool is required.

The Agilent FieldFox RF Analyzer is the tool to tackle today’s increasingly complex networks in less time.
FieldFox

World’s Most Integrated Handheld RF Analyzer

Key measurements
- Cable and antenna test (distance to fault, return loss, etc.)
- Cable loss measurement
- Insertion loss and transmission measurement
- Spectrum analyzer
- Power meter with USB power sensor
- Vector network analysis with Smith chart display
- Vector voltmeter

Key differentiators
- Integrated QuickCal calibrates without a calibration kit
- Immediate calibration with CalReady
- 50 percent faster than traditional handheld instruments
- Superior dynamic range (96 dB) and sensitivity (-148 dBm) in the spectrum analysis mode
- Easy-to-use, task-driven user interface
Task-driven Features

- Connector covers help keep dust out
- Anti-glare 6.5 inch LCD display with LED backlight
- Convenient side strap makes it easy to hold and carry
- Task-driven keys are grouped to easily and naturally perform standard field measurements
- Portrait design and large buttons for easy operation — even with gloves on
- Dedicated marker keys for quick marker function access
- Backlit keypad

7.4” W
188 mm

11.5” H
292 mm

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FieldFox

- Connector bay protects RF connectors
- Spacious connector design makes connections fast and simple
- Quick-connect shoulder strap clips
- Easily accessible battery compartment
- LAN port for fast data transfer
- SD flash card slot for additional data storage
- Built-in headphone jack
- Gasketed doors protect ports from moisture
- USB ports for convenient data transfer

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Key Measurements

Cable and antenna analyzer

Fifty to sixty percent of cell site problems are caused by faulty cables, connectors, and antennas. Degraded feed lines cause poor coverage, unnecessary handovers, paging failures, and access failures on uplink. To avoid service quality problems, it is critical to keep cell sites’ cable and antenna systems in good condition.

Use FieldFox to make return loss, VSWR, insertion loss/transmission, one-port cable loss, and distance to fault (DTF) measurements. You can test antennas, cables, filters, and amplifiers with a single instrument.

Return loss and DTF measurements

FieldFox can make both return loss and distance to fault measurements at the same time. This helps you correlate overall system degradation with specific faults in the cable and antenna system.
Measurements in the field without the need to manually calibrate

Each instrument is _CalReady_ at the RF Out port, immediately following power-on or preset. This means it’s already calibrated and ready to make accurate measurements such as one-port cable loss, VSWR, return loss, and DTF measurements at the test port.

*Industry’s first and only QuickCal*

The industry’s first and only built-in calibration system allows you to calibrate the cable/antenna tester without carrying a calibration kit into the field. As with any test instrument, when you add an additional device to the test port, such as a jumper cable or attenuator, you need to calibrate using a calibration kit (cal kit). _QuickCal_ eliminates the hassle of carrying and using a cal kit, plus provides worry-free accuracy and excellent repeatability every time.
Broadband calibration

FieldFox allows you to make broadband calibrations, which means the instrument is calibrated over the maximum frequency span. After a broadband calibration, you can change the frequency range or number of points without recalibrating the instrument.

Built-in spectrum analyzer

Interference is a major source of cell site problems. Interference can be internal or external, and uplink or downlink. Downlink interference reduces coverage, while uplink interference causes access failure. Interference has a direct impact on the quality of service of wireless communication services.

FieldFox has an optional built-in spectrum analyzer that covers frequency ranges from 100 kHz to 6 GHz. It provides a fast spectrum scan to detect interference and RF burst capture to measure intermittent signals. It displays four traces at the same time, and you can choose different detector modes.
Network analysis

FieldFox has an optional network analyzer mode that provides standard vector network analyzer measurements such as S11, S11 phase, a Smith chart display, and S21 magnitude (requires Option 110).

Power meter

FieldFox can connect with the Agilent U2000 Series USB power sensor to make RF/microwave power measurements up to 24 GHz.

FieldFox provides true average power measurements with a wide dynamic range from -60 dBm to +44 dBm.

The sensor has an internal zeroing function, and external calibration is not needed.

Transmission measurement

FieldFox provides a 2-port transmission measurement that measures insertion loss, amplifier gain, filter passband, and loss. It also makes a S21 scalar measurement if Option 303 is enabled. This option covers the 2 MHz to 6 GHz frequency range.

Vector voltmeter

Using FieldFox’s vector voltmeter (VVM), the phase shift and electrical length of a device can be measured.

By utilizing the “Zero” function, the phase and electrical length of one device can be measured relative to a “golden device”. View results on the large display which can be seen as far as ten feet away. Since every FieldFox is CalReady, no calibration is needed if VVM measurements are done at the test port.

FieldFox offers much of the VVM functionality of the popular HP/Agilent 8508A, in a handheld portable form factor, and without the need for the source/bridge/accessories required with the 8508A.
## Comprehensive measurement capabilities

<table>
<thead>
<tr>
<th>Feature and Benefit Summary</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cable and antenna test</strong></td>
<td>Return loss/VSWR measurements allow you to evaluate the impedance matching performance of the feed line across the frequency range of interest. Distance to fault measurements help you identify the faults along a feed line. Use these measurements to precisely pinpoint the location of damaged or degraded antennas, connectors, amplifiers, filters, and duplexers, etc. FieldFox provides up to 1001 data-point resolution to help accurately locate faults and extend measurement distance.</td>
</tr>
<tr>
<td><strong>Transmission test</strong></td>
<td>Transmission test is used to accurately measure cable loss, insertion loss (filters), and amplifier gain (tower mounted amplifier). FieldFox offers two-port transmission magnitude measurements with up to 72 dB dynamic range.</td>
</tr>
<tr>
<td><strong>One-port cable loss</strong></td>
<td>For already-installed cables, FieldFox accurately measures cable loss via the RF Out port. The instrument measures actual cable loss, without the need for additional computation.</td>
</tr>
<tr>
<td><strong>CalReady at test port</strong></td>
<td>Each instrument is calibrated at the RF Out port. When you power up the instrument, it is ready to make accurate measurements such as one-port cable loss, VSWR, return loss, and DTF at the test port.</td>
</tr>
<tr>
<td><strong>QuickCal</strong></td>
<td>The industry’s-first and only built-in calibration system allows you to calibrate the cable and antenna tester without carrying a calibration kit with you all the time. It provides worry-free accuracy and excellent repeatability. QuickCal also corrects drift errors caused by temperature changes during instrument operation.</td>
</tr>
<tr>
<td><strong>Mechanical calibration</strong></td>
<td>Open-short-load (OSL) is standard in FieldFox. There are four calibration kits defined in the instrument.</td>
</tr>
<tr>
<td><strong>Spectrum analysis</strong></td>
<td>The built-in spectrum analyzer allows you to scan up to 6 GHz and detect internal and external interference. FieldFox can detect signals as low as -148 dBm up to 6 GHz, with phase noise -88 dBc at 10 kHz, and a third order intercept (TOI) better than +18 dBm.</td>
</tr>
<tr>
<td><strong>Power meter</strong></td>
<td>Makes accurate true average power measurements without bringing a power meter along. The state-of-the-art Agilent USB power sensors provide measurements up to 24 GHz.</td>
</tr>
<tr>
<td><strong>Smith chart</strong></td>
<td>Smith charts can be used to display impedance matching characteristics in cable and antenna systems.</td>
</tr>
<tr>
<td><strong>Vector voltmeter</strong></td>
<td>The large vector voltmeter display makes it easy to match two or more device’s electric length and ensure signals that travel on different devices have the same delay.</td>
</tr>
</tbody>
</table>
## Field-proof usability

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transreflective display and backlit keys</td>
<td>The display is designed for easy viewing in indoor and outdoor settings and in direct sunlight and darkness. Access different display modes via softkeys.</td>
</tr>
<tr>
<td>Task-driven key design</td>
<td>Front-panel keys are grouped to easily and naturally perform standard field measurements.</td>
</tr>
<tr>
<td>Speaker and headphone jack</td>
<td>Used for future demodulated audio signal capability.</td>
</tr>
<tr>
<td>One-button measurement</td>
<td>Provides task-driven user interface to simplify the measurements.</td>
</tr>
</tbody>
</table>

## Rugged design

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water-resistant chassis, keypad and case design</td>
<td>The case is made from polycarbonates that withstand wide temperature ranges and salty, humid environments.</td>
</tr>
<tr>
<td>RF connector protection</td>
<td>A specially designed connector bay protects the RF connectors from damage during drops or other external impacts.</td>
</tr>
<tr>
<td>Dust-free design</td>
<td>With no vents or fans in the case, FieldFox resists dust for better equipment reliability.</td>
</tr>
<tr>
<td>Meets tough environmental standard</td>
<td>Meets MIL-PRF-28800F Class 2 specification.</td>
</tr>
<tr>
<td>Gasketed doors</td>
<td>Protects instrument interface from moisture.</td>
</tr>
</tbody>
</table>

## Modern connectivity

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>USB 2.0 ports</td>
<td>Two USB 2.0 ports can be used to transfer files.</td>
</tr>
<tr>
<td>LAN port</td>
<td>Used to transfer data in and out of the instrument.</td>
</tr>
<tr>
<td>SD flash card slot</td>
<td>Use as a data storage device.</td>
</tr>
<tr>
<td>FieldFox Data Link software</td>
<td>Transfer data remotely from the instrument to a PC for back-office applications such as baseline analysis and report generation.</td>
</tr>
</tbody>
</table>
**FieldFox**

A condensed version of the specifications is provided here. See the User’s Guide for the complete version; http://cp.literature.agilent.com/litweb/pdf/N9912-90001.pdf

**Specifications**

**Specification (spec.):**
Warranted performance. Specifications include guardbands to account for the expected statistical performance distribution, measurement uncertainties, and changes in performance due to environmental conditions. The following conditions must be met:

- FieldFox has been turned on at least 90 minutes
- FieldFox is within its calibration cycle
- Storage or operation at 25 °C ±5 °C range (unless otherwise stated)

**Typical (typ.):**
Expected performance of an average unit over a 20 °C to 30 °C temperature range, unless otherwise indicated; does not include guardbands. It is not covered by the product warranty. The FieldFox must be within its calibration cycle.

**Nominal (nom.):**
A general, descriptive term or design parameter. It is not tested, and not covered by the product warranty.

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**Cable and antenna analyzer (Option 104 or 106)**

**Frequency**

<table>
<thead>
<tr>
<th>Frequency range</th>
<th>Option 104</th>
<th>2 MHz(^1) to 4 GHz</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Option 106</td>
<td>2 MHz(^2) to 6 GHz</td>
</tr>
</tbody>
</table>

**Frequency reference**

<table>
<thead>
<tr>
<th>Accuracy</th>
<th>±2 ppm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aging rate</td>
<td>±1 ppm/yr</td>
</tr>
<tr>
<td>Temperature stability</td>
<td>±1 ppm over -10 to 55 °C</td>
</tr>
</tbody>
</table>

**Frequency resolution**

- 2 MHz to 1.6 GHz: 2.5 kHz
- > 1.6 GHz to 3.2 GHz: 5 kHz
- > 3.2 GHz to 6 GHz: 10 kHz

**Measurement speed**

- Return loss: 1.5 ms/point (nominal) 1.75 GHz to 3.85 GHz, 1001 points, Cal ON
- Distance to fault: 2.4 ms/point (nominal) 0 to 500 ft, 601 points, Cal ON

**Data points**

101, 201, 401, 601, 801, 1001

**Directivity**

- Corrected: > 42 dB
- *QuickCal (Option 111)*: > 42 dB (typical)

**Source match**

- Corrected: > 36 dB
- *QuickCal (Option 111)*: ≥ 35 dB (typical)

**Reflection tracking**

- Corrected: ± 0.06 dB
- *QuickCal (Option 111)*: ± 0.15 dB (typical)

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1. Spectrum analyzer (Option 230) start frequency is 100 kHz, usable to 5 kHz.
2. Spectrum analyzer (Option 231) start frequency is 100 kHz, usable to 5 kHz.

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### Dynamic range

#### Reflection (RF Out port)

<table>
<thead>
<tr>
<th>Frequency Range</th>
<th>Dynamic Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 MHz to 4 GHz</td>
<td>60 dB (typical)</td>
</tr>
<tr>
<td>&gt; 4 GHz to 6 GHz</td>
<td>55 dB (typical)</td>
</tr>
</tbody>
</table>

#### Transmission measurement (Option 110)

<table>
<thead>
<tr>
<th>Frequency Range</th>
<th>Dynamic Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 MHz to 2 GHz</td>
<td>72 dB (typical)</td>
</tr>
<tr>
<td>&gt; 2 GHz to 3 GHz</td>
<td>67 dB (typical)</td>
</tr>
<tr>
<td>&gt; 3 GHz to 5 GHz</td>
<td>58 dB (typical)</td>
</tr>
<tr>
<td>&gt; 5 GHz to 6 GHz</td>
<td>49 dB (typical)</td>
</tr>
</tbody>
</table>

#### Output power range

**High power**

<table>
<thead>
<tr>
<th>Frequency Range</th>
<th>Power Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 MHz to 4 GHz</td>
<td>&lt; +8 dBm, +6 dBm (nominal)</td>
</tr>
<tr>
<td>&gt; 4 GHz to 6 GHz</td>
<td>&lt; +7 dBm, +2 dBm (nominal)</td>
</tr>
</tbody>
</table>

**Low power**

<table>
<thead>
<tr>
<th>Frequency Range</th>
<th>Power Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 MHz to 4 GHz</td>
<td>&lt; -23 dBm, -25 dBm (nominal)</td>
</tr>
<tr>
<td>&gt; 4 GHz to 6 GHz</td>
<td>&lt; -24 dBm, -25 dBm (nominal)</td>
</tr>
</tbody>
</table>

#### Immunity to interference

+16 dBm (nominal)

#### Maximum input level (RF Out port)

+23 dBm

#### Maximum input DC voltage (RF Out port)

±50 VDC
# Cable and antenna measurements

## Return loss

<table>
<thead>
<tr>
<th>Display range</th>
<th>0 to 100 dB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution</td>
<td>0.01 dB</td>
</tr>
</tbody>
</table>

## VSWR

<table>
<thead>
<tr>
<th>Display range</th>
<th>0 to 100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution</td>
<td>0.01</td>
</tr>
</tbody>
</table>

## Distance to fault (DTF)

- **Range** = \((\text{number of points} - 1)/(\text{span}^2) \times V_f\) \((\text{velocity factor in cable}) \times c\) \((\text{light speed})\)
- **Resolution** = range/(number of points - 1)
- **Number of points**: 101, 201, 401, 601, 801, 1001
- **Distance to fault display**: Return loss, VSWR

## Cable loss (1-port)

- Terminated cable under test with short

## Insertion loss (2-ports)

- Requires Option 110

## Transmission measurement (Option 110)

### Frequency range

<table>
<thead>
<tr>
<th>Option</th>
<th>Frequency range</th>
</tr>
</thead>
<tbody>
<tr>
<td>104</td>
<td>2 MHz to 4 GHz</td>
</tr>
<tr>
<td>106</td>
<td>2 MHz to 6 GHz</td>
</tr>
</tbody>
</table>

### Dynamic range

<table>
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<td>58 dB (typical)</td>
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<td>&gt; 5 GHz to 6 GHz</td>
<td>49 dB (typical)</td>
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</tbody>
</table>
Network analysis (Option 303)

- **S11**: Vector measurement, S11 magnitude and S11 phase. Specification is listed under Cable and antenna analyzer section (S11/Return loss).
- **S21**: Scalar measurement, S21 magnitude. Specification is listed under transmission measurement. S21 requires Option 110 transmission measurement.
- **A**: Reflected power
- **R**: Source power
- **Display**: Log, linear, phase, VSWR, Smith chart

**Calibration types**
- Mechanical cal
- **QuickCal**
- Normalization
- Automatic cal update with frequency change or number of points change

**IF bandwidth selections**
- 300 Hz, 1 kHz, 3 kHz, 10 kHz and 30 kHz

Spectrum analyzer (Option 230 or 231)

**Frequency**

**Frequency range**
- **Option 104**: 100 kHz to 4 GHz, usable to 5 kHz
- **Option 106**: 100 kHz to 6 GHz, usable to 5 kHz, tunable to 6.1 GHz

**Frequency reference**
- **Accuracy**: ±2 ppm
- **Frequency aging**: ±1 ppm/yr
- **Frequency reference temperature stability**: ±1 ppm over -10 to 55 °C

**Frequency readout accuracy**
- ± (readout frequency \times frequency reference accuracy + RBW centering + 0.5 \times horizontal resolution)

**Frequency span**
- **Range**: 0 Hz (zero span), 10 Hz to maximum frequency
- **Span accuracy**: ±(2 \times RBW centering + horizontal resolution)
- **Span resolution**: 1 Hz
### Resolution bandwidth (RBW)

**Range (-3 dB bandwidth)**

- **Zero span**: 300 Hz to 1 MHz in 1-3-10 sequence; 2 MHz
- **Non-zero span**: 10 Hz to 300 kHz in 1/1.5/2/3/5/7.5/10 sequence; 1 MHz, 2 MHz

**Accuracy**

- 1 kHz to 1 MHz: ± 5% (nominal)
- 10 Hz to 100 KHz non-zero span: ± 1% (nominal)
- 2 MHz: ± 10% (nominal)
- 300 Hz zero span: ± 10% (nominal)

**Selectivity (-60 dB/ -3 dB)**

4:1 (nominal)

### Video bandwidth (VBW)

**Range**

1 Hz to 2 MHz in 1/1.5/2/3/5/7.5/10 sequence

**Stability**

**Noise sidebands, CF = 1 GHz**

- 10 kHz offset: -88 dBc/Hz (typical)
- 30 kHz offset: -89 dBc/Hz, (typical)
- 100 kHz offset: -95 dBc/Hz, (typical)
- 1 MHz offset: -115 dBc/Hz, (typical)

### Sweep acquisition, span > 0 Hz

**Range**

1 to 5000, number of data acquisitions per trace point; value is normalized to the minimum required to achieve amplitude accuracy with CW signals

**Resolution**

1

**Readout**

Measured value representing time required to tune receiver, acquire data, and process trace

### Trace updates

- **Span = 20 MHz, RBW = 3 kHz**: 1.5 updates/second
- **Span = 100 MHz, RBW auto coupled**: 7 updates/second
- **Span = 6 GHz, RBW auto coupled**: 1 update/second

### Trace points

101, 201, 401, 601, 801, 1001 points, default is 401
### Amplitude

**Measurement range**

Display average noise level (DANL) to +20 dBm

**Input attenuator range**

0 to 31 dB, 1 dB steps

**Maximum DC voltage at RF In port**

±50 VDC

**Maximum input power at RF In port**

+27 dBm (0.5 W)

**Displayed average noise level (DANL)**

10 Hz RBW, 10 Hz VBW, 50 ohm termination on input, 0 dB attenuation, average detector

**Preamplifier OFF**

20 to 30 °C

<table>
<thead>
<tr>
<th>Frequency Range</th>
<th>Noise Level (dB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 MHz to 2.4 GHz</td>
<td>-130 dBm (typical)</td>
</tr>
<tr>
<td>&gt; 2.4 GHz to 5.0 GHz</td>
<td>-125 dBm (typical)</td>
</tr>
<tr>
<td>&gt; 5.0 GHz to 6.0 GHz</td>
<td>-119 dBm (typical)</td>
</tr>
</tbody>
</table>

**Preamplifier ON (Option 235)**

20 to 30 °C

<table>
<thead>
<tr>
<th>Frequency Range</th>
<th>Noise Level (dB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 MHz to 2.4 GHz</td>
<td>-148 dBm (typical)</td>
</tr>
<tr>
<td>&gt; 2.4 GHz to 5.0 GHz</td>
<td>-145 dBm (typical)</td>
</tr>
<tr>
<td>&gt; 5.0 GHz to 6.0 GHz</td>
<td>-138 dBm (typical)</td>
</tr>
</tbody>
</table>

-10 to 55 °C

<table>
<thead>
<tr>
<th>Frequency Range</th>
<th>Noise Level (dB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 MHz to 2.4 GHz</td>
<td>&lt; -141 dBm</td>
</tr>
<tr>
<td>&gt; 2.4 GHz to 5 GHz</td>
<td>&lt; -138 dBm</td>
</tr>
<tr>
<td>&gt; 5 GHz to 6 GHz</td>
<td>&lt; -130 dBm</td>
</tr>
</tbody>
</table>

**Total absolute amplitude accuracy**

Peak detector, 10 dB attenuation, preamplifier off, RBW < 2 MHz, input signal 0 dBm to -50 dBm, all settings auto-coupled

20 to 30 °C

<table>
<thead>
<tr>
<th>Frequency Range</th>
<th>Accuracy (dB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 MHz to 10 MHz</td>
<td>±1.8 dB</td>
</tr>
<tr>
<td>&gt; 10 MHz to 3.0 GHz</td>
<td>±1.5 dB</td>
</tr>
<tr>
<td>&gt; 3.0 GHz to 5.0 GHz</td>
<td>±1.9 dB</td>
</tr>
<tr>
<td>&gt; 5.0 GHz to 6.0 GHz</td>
<td>±2.1 dB</td>
</tr>
</tbody>
</table>

**Second harmonic distortion (SHI)**

-30 dBm signal at input mixer

<table>
<thead>
<tr>
<th>Frequency Range</th>
<th>Distortion (dBc)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 MHz to 1.35 GHz</td>
<td>&lt; -70 dBc</td>
</tr>
<tr>
<td>1.35 GHz to 3.0 GHz</td>
<td>&lt; -80 dBc</td>
</tr>
</tbody>
</table>
### Third order intermodulation distortion (TOI)
Two -30 dBm tones at input mixer

< -96 dBc, +18 dBm TOI (nominal)

### Residual responses
Input terminated, 0 dB attenuation, preamplifier off, RBW ≤ 1 kHz, VBW auto-coupled

<table>
<thead>
<tr>
<th>Range</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 MHz to 3 GHz</td>
<td>-90 dBm (nominal)</td>
</tr>
<tr>
<td>&gt; 3 GHz to 6 GHz</td>
<td>-85 dBm (nominal)</td>
</tr>
</tbody>
</table>

### Spurious responses

**Input mixer level -30 dBm**
- \( \text{RF}_{\text{sig}} = \text{RF}_{\text{tune}} + 417 \text{ MHz} \) -70 dBc (nominal)
- \( \text{RF}_{\text{sig}} = \text{RF}_{\text{tune}} + 1.716 \text{ GHz} \) -80 dBc (nominal)

**Input mixer level -10 dBm, first IF image response**
- \( \text{RF}_{\text{sig}} = \text{RF}_{\text{tune}} – 2 \times 0.8346 \text{ GHz}, \text{ for } \text{RF}_{\text{tune}} 5.7 \text{ to } 6.0 \text{ GHz} \) -50 dBc (nominal)
- **Sidebands** -80 dBc (nominal)
- -60 dBc (nominal) when battery charging, 260 kHz offset

### Preamplifier (Option 235 requires Option 230 or 231)

**Option 230**
- 100 kHz to 4 GHz

**Option 231**
- 100 kHz to 6 GHz

**Gain**
- 22 dB (nominal)

### Reference level

**Range**
- -170 dBm to +30 dBm

**Resolution**
- 0.1 dB

**Accuracy**
- 0 dB (no error)

### Traces
- 4 traces, data/max/average/min

### Detectors
- Normal, positive peak, negative peak, sample, average

### Markers

**Marker types**
- Normal, noise marker

**Number of markers or delta markers**
- 6

**Marker functions**
- Peak, next peak, peak left, peak right, marker to center, minimum search

### RF In VSWR
- 1.5:1 (50 ohm)
**Power meter measurement (Option 302)**

<table>
<thead>
<tr>
<th>Frequency range</th>
<th>9 kHz to 24 GHz (sensor dependent)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>USB power sensor</strong></td>
<td>9 kHz to 24 GHz, see Agilent U2000 Series USB power sensor specifications for details</td>
</tr>
</tbody>
</table>

**General specifications**

<table>
<thead>
<tr>
<th>Connector type</th>
<th>Type-N (female)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Input impedance</strong></td>
<td>50 ohm</td>
</tr>
<tr>
<td><strong>External reference</strong></td>
<td></td>
</tr>
<tr>
<td>Input type</td>
<td>BNC female</td>
</tr>
<tr>
<td>Reference frequency</td>
<td>10 MHz</td>
</tr>
<tr>
<td>Required level</td>
<td>-5 dBm to 10 dBm</td>
</tr>
<tr>
<td><strong>Display</strong></td>
<td>6.5” transflective, color VGA LED backlit 640 x 480 with anti-glare coating</td>
</tr>
<tr>
<td><strong>Speaker</strong></td>
<td>Built-in speaker</td>
</tr>
<tr>
<td><strong>Headphone jack</strong></td>
<td>Built-in headphone jack</td>
</tr>
<tr>
<td><strong>Connectivity</strong></td>
<td>2 x USB 2.0; 1 x mini USB; 1 x LAN</td>
</tr>
<tr>
<td><strong>Internal storage</strong></td>
<td>Minimum 16 MB, up to 1000 traces</td>
</tr>
<tr>
<td><strong>External storage</strong></td>
<td>1 x mini SD slot and 2 x USB 2.0</td>
</tr>
<tr>
<td><strong>EMC</strong></td>
<td>Complies with European EMC Directive 2004/108/EC</td>
</tr>
<tr>
<td></td>
<td>• IEC/EN 61326-2-1)</td>
</tr>
<tr>
<td></td>
<td>• CISPR Pub 11 Group 1, Class A</td>
</tr>
<tr>
<td></td>
<td>• AS/NZS CISPR 11</td>
</tr>
<tr>
<td></td>
<td>• ICES/NMB-001</td>
</tr>
</tbody>
</table>
### ESD
- IEC/EN 61000-4-2, functional up to 20 kV test

### Safety
Complies with European Low Voltage Directive 2006/95/EC
- IEC/EN 61010-1 2nd Edition
- Canada: CSA C22.2 No. 61010-1-04
- USA: UL 61010-1 2nd Edition

### Environmental
- Meets MIL-PRF-28800F Class 2 specification
  - **Humidity**: 95% at 40 °C
  - **Temperature**
    - Operating: -10 °C to +55 °C
    - Non-operating: -51 °C to 71°C

### Weight
6.2 lbs / 2.8 kg including battery

### Dimensions (H x W x D)
11.5” x 7.4” x 2.8” (292 x 188 x 72 mm)

### Power
- **Power supply**
  - External DC input: 15 to 19 VDC
- **External AC power adapter**
  - Input: 100 to 250 VAC, 50 to 60 Hz; 1.25 to 0.56 A
  - Output: 15 VDC, 4 A
- **Power consumption**: 12 W
- **Battery**: 6 cell Lithium Ion, 10.8 V, 4.6 A-h
- **Battery operating time**: 4 hours

### Languages
- English, Chinese, French, Spanish, Japanese, Russian, German, and Italian
N9912A FieldFox RF analyzer

FieldFox RF Analyzer base functions: One port cable and antenna analyzer (4 GHz), broadband calibration, CalReady, standard mechanical cal kit support. Measurements include: return loss, distance to fault (DTF), one port cable loss and VSWR.

Standard accessories included N9912A: AC/DC adapter; battery; soft carrying case comes with backpack and shoulder straps; Quick Reference Guide; CD ROM with FieldFox Data Link software and full manual

N9912A FieldFox options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Option 104</td>
<td>4 GHz cable and antenna analyzer</td>
</tr>
<tr>
<td>Option 106</td>
<td>6 GHz cable and antenna analyzer</td>
</tr>
<tr>
<td>Option 110</td>
<td>Transmission measurement</td>
</tr>
<tr>
<td>Option 111</td>
<td>QuickCal</td>
</tr>
<tr>
<td>Option 230</td>
<td>4 GHz spectrum analyzer (requires Option 104)</td>
</tr>
<tr>
<td>Option 231</td>
<td>6 GHz spectrum analyzer (requires Option 106)</td>
</tr>
<tr>
<td>Option 235</td>
<td>Preamplifier for spectrum analyzer (requires Option 230 or 231)</td>
</tr>
<tr>
<td>Option 302</td>
<td>External USB power sensor support</td>
</tr>
<tr>
<td>Option 303</td>
<td>Network analysis capability</td>
</tr>
<tr>
<td>Option 308</td>
<td>Vector voltmeter</td>
</tr>
</tbody>
</table>

N9910X RF/MW handheld analyzer accessories

| N9910X-800 | T-Calibration Kit, DC-6 GHz, Type-N(m)            |
| N9910X-801 | T-Calibration Kit, DC-6 GHz, Type-N(f)            |
| N9910X-802 | T-Calibration Kit, DC-6 GHz, 7/16 DIN(m)         |
| N9910X-803 | T-Calibration Kit, DC-6 GHz, 7/16 DIN(f)         |
| N9910X-810 | Rugged phase stable cable, Type-N(m) to Type-N(m), 5 ft |
| N9910X-811 | Rugged phase stable cable, Type-N(m) to Type-N(f), 5 ft |
| N9910X-812 | Rugged phase stable cable, Type-N(m) to Type-N(m), 12 ft |
| N9910X-813 | Rugged phase stable cable, Type-N(m) to Type-N(f), 12 ft |
| N9910X-820 | Antenna, directional, multiband, 800 to 2500 MHz, 10 dBi |
| N9910X-821 | Antenna, telescopic whip, 70 MHz to 1 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-860 | Fixed attenuator, 40 dB, 100 W, DC-3 GHz, Type-N(m) to Type-N(f) |
| N9910X-861 | Fixed attenuator, 40 dB, 50 W, DC-8.5 GHz, Type-N(m) to Type-N(f) |
| N9910X-870 | Extra battery                                    |
| N9910X-872 | External battery charger                         |
| N9910X-873 | AC/DC adapter                                    |
| N9910X-874 | External bias-tee, 2.5 MHz to 6 GHz, 1 W, 0.5 A  |
| N9910X-880 | Extra soft carrying case with backpack and shoulder strap |
| N9910X-881 | Hard transit case                                |
| N9910X-884 | Extra N9912A shoulder strap                      |

For more information go to: www.agilent.com/find/fieldfox

www.valuetronics.com
FieldFox Accessories

- Directional antenna, N9910X-820
- Antenna, N9910X-821
- Bias-tees, N9910X-874
- External battery charger, N9910X-872
- Phase stable cable, N9910X-819
- AC/DC adapter, N9910X-873
- 100 Watt attenuator, N9910X-860
- Adapter kit, N9910X-845
- T-Cal kits
  - N9910X-800
  - N9910X-801
  - N9910X-802
  - N9910X-803

www.valuetronics.com
Soft carrying case with backpack and shoulder straps included with a standard N9912A. For an extra soft carrying case order N9910X-880

Hard transit case, N9910X-881

FieldFox fits inside hard transit case
Remove all doubt

Our repair and calibration services will get your equipment back to you, performing like new, when promised. You will get full value out of your Agilent equipment throughout its lifetime. Your equipment will be serviced by Agilent-trained technicians using the latest factory calibration procedures, automated repair diagnostics and genuine parts. You will always have the utmost confidence in your measurements.

Agilent offers a wide range of additional expert test and measurement services for your equipment, including initial start-up assistance, onsite education and training, as well as design, system integration, and project management.

For more information on repair and calibration services, go to:

www.agilent.com/find/removealldoubt

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Thailand 1 800 226 008

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