Agilent
N9322C Basic Spectrum Analyzer

Easy on your budget.

Tough to beat performance, efficiency, and simplicity.

Agilent Technologies

Easy on Your Budget Value

Achieve higher productivity on a smaller budget. That's the challenge you face whether you are fine-tuning a new design, balancing throughput and accuracy on the manufacturing floor, providing maintenance service, or verifying field equipment.

It also necessitates that your choice of equipment provides just the right balance between price and performance. The modestly-priced, general purpose Agilent N9322C basic spectrum analyzer (BSA) delivers.

Tough to Best Performance, Efficiency, and Simplicity

When it comes to spectrum analyzers, the Agilent N9322C BSA defines a new generation of value-priced, general purpose instruments for the 9 kHz to 7 GHz frequency range. Features like proven testing efficiency, best-in-class usability, and the flexibility to adapt to new requirements are just a few of the reasons using the N9322C means you can rely on results.
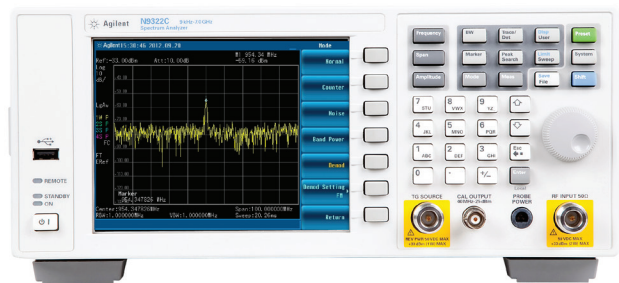
Key specifications and features

- 9 kHz to 7 GHz frequency range
- ±0.3 dB absolute amplitude accuracy
- 10 Hz to 3 MHz resolution bandwidth
- –152 dBm displayed average noise level (Freq at 1 GHz, 10 Hz minimum RBW)
- –90 dBc/Hz phase noise
- 50 dB input attenuator, with 1 dB steps
- +11 dBm TOI
- 2 ms to 1000 s sweep time (span ≥ 100 Hz)
- Optional 7 GHz tracking generator, and reflection measurement

General specifications

- 5 to 45 °C operating temperature
- 25 W nominal power consumption
- Dimension (H x W x D): 132.5 x 320 x 400 mm, (5.2 x 12.6 x 15.7 inch)
- Weight: 7.6 kg
- 1 year calibration cycle

Count on Performance

As market forces necessitate "cost down" programs, compromising quality is not an option and reliability is paramount. Whether your application is consumer electronics R&D, manufacturing bench repair, RF-related education, or spectrum management projects, you need an affordable spectrum analyzer that is equipped with the essential functionality and the required performance.

Best-in-class RF performance translates to precision for every measurement task with the Agilent N9322C spectrum analyzer. With an annual aging rate up to ±0.1 ppm, frequency drift is minimal so measurement accuracy is finely tuned. The typical displayed average noise level of up to −152 dBm makes identifying low-level signals quick and easy. Total absolute amplitude accuracy up to ±0.6 dB ensures you can trust power measurement results.

Work with ease

The N9322C has redefined the meaning of "ease-of-use" for a basic spectrum analyzer. User-definable softkeys mean up to seven of the engineer's most frequently used measurements setups are readily accessible. That makes switching between tasks more efficient and that helps improve higher throughput rates.

The optional task planner capability automates testing using pre-defined setup routines.

N9322C front panel

1. 6.5″ TFT color display with multiple language user interface
2. Multiple measurement modes
3. One-button PowerSuite
4. User key for quick access to 7 frequently-used measurement configurations
5. 7 GHz tracking generator (including a built-in bridge)
6. 40 MHz calibration output
7. Probe power
8. RF input, 50 Ω
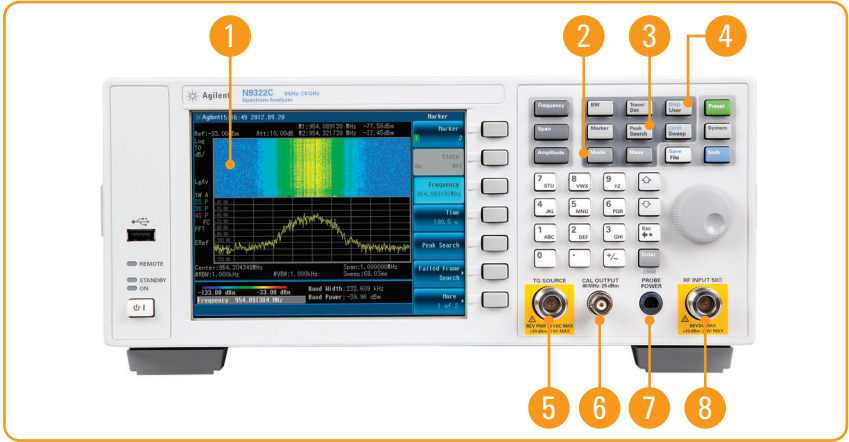
N9322C rear panel

1. Security Kensington lock
2. USB port (device)
3. LAN port 100Base-T
4. Trigger input, TTL level
5. Reference input, 10 MHz
6. Reference output, 10 MHz
7. GPIB interface (Option G01)
8. Precision frequency reference, 10 MHz, $\pm 1 \times 10^{-7}$/year aging rate (Option PFR)
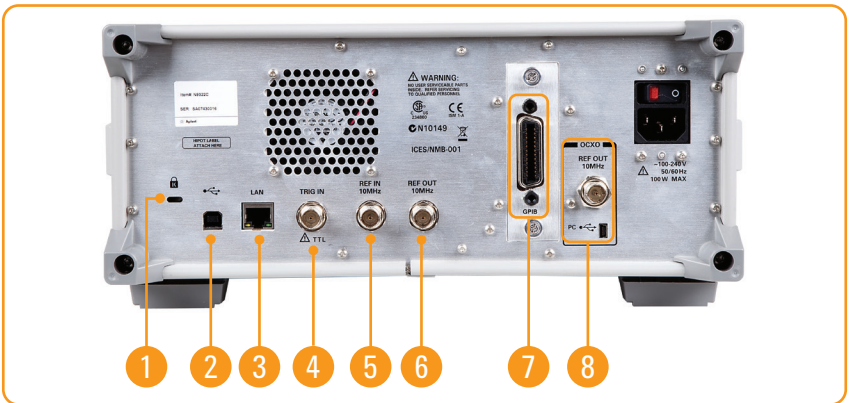
Work with Ease

Rich features for budget-driven applications

Whether your application is consumer electronics R&D, manufacturing, bench repair, or RF-related education or spectrum management projects, you need a spectrum analyzer that provides essential functionality and required performance at an affordable price. The N9322C BSA is designed to be the right answer for you.

General purpose R&D

If the pressure to deliver new products on a tight schedule rests with you, you recognize the importance of achieving faster verification without compromising the reliability of test results. The N9322C has the essential capability you need to look into your design so you can quickly overcome development obstacles. Add to that measurement repeatability you can trust and you have an affordable resource to help you reach those time-to-market and on-schedule-delivery goals—and that peace of mind can be invaluable.

You can also get more tests done with Agilent N9322C BSA:
- One-button power suite: CHP, OBW, ACPR, SEM, and spectrogram make signal measurements simple and intuitive

- 7 GHz tracking generator with built-in VSWR bridge, support transmission and reflection measurements

- Demodulation mode allows you to easily and cost-effectively gain more insight into AM/FM, and ASK/FSK signal analysis

- Supports Agilent U2000 Series and U2020 X-Series USB power sensors for precision amplitude accuracy

RF education

Every year a new crop of students rely on you to teach them the basic principles of spectrum analysis and you realize the most effective way for them to learn is with hands-on lab work. The constraint is often the number of available analyzers. Your solution is the N9322C. It has the basic functions students need to learn, at a price that allows you to get more spectrum analyzers than you thought possible.

Work with Ease (continued)

Spectrum monitoring

The rapid release of new mobile devices is placing unprecedented demand on spectrum availability. Glitches in the system mean lost revenue and unhappy customers. You need the ability to detect low-level RF signals while simultaneously resolving closely spaced frequencies. You can depend on the N9322C. Included in its capability is its spectrum monitoring feature that allows you to record and playback captured traces, so you can quickly identify interfering signals arising from unwanted or unexpected transmissions.

Consumer electronics manufacturing

Maintaining the production line and ensuring dependable operation is part of your domain, and the demands are numerous. Topping the list are typically goals aimed at lowering product costs and shortening the production process. One method to reach these expectations is to shorten test times, without compromising product quality. The N9322C is your solution. With "just right" functionality it gives you the performance, reliability, and efficiency you need—at an attractively frugal price.

Bench repair

Repairing handsets (such as mobile phones) demands fast, cost effective test solutions. The N9322C is a functional and indispensable in low-cost bench repair applications—and for general purpose RF development and verification test. Detecting low-level signals while simultaneously resolving closely spaced frequencies is a fundamental requirement for RF testing. Employing one of the best combinations of sensitivity and narrow resolution bandwidths (RBW) ensures that the N9322C BSA readily handles these tasks.

Outperform Basic Expectations

Power measurements made easy

One of the most fundamental measurements performed by spectrum analyzers is the frequency domain measurement of RF power. However, detailed analysis of a signal often requires standards-defined spectral masks or more complex power, bandwidth, and detector measurement combinations.

With its one-button PowerSuite the N9322C makes it easy to measure channel power, occupied bandwidth (OBW), adjacent channel power ratio (ACPR), spectrum emission mask (SEM).
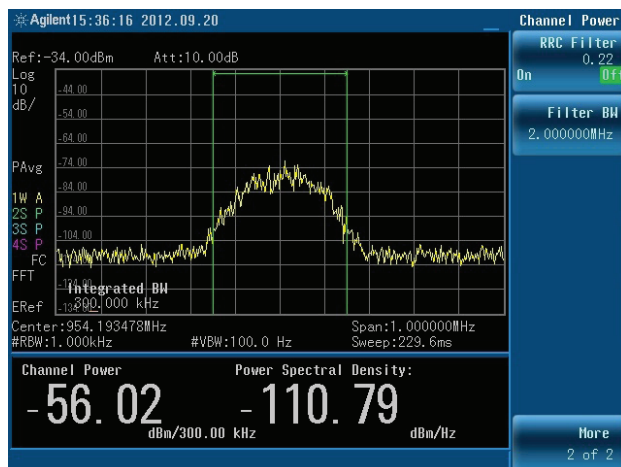

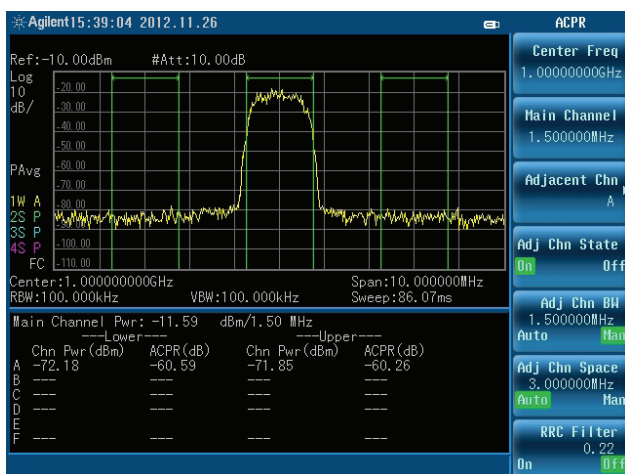Figure 1. Channel power measurement
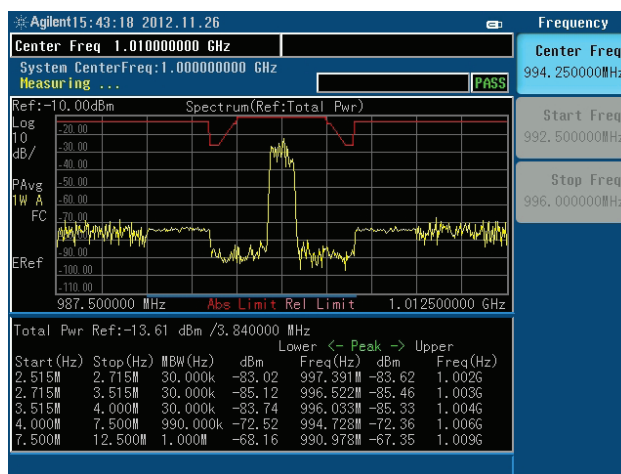

Figure 2. ACPR measurement

Figure 3. SEM measurement

The channel scanner (Option SCN) enables the N9322C BSA to simultaneously scan a maximum of 20 different channels, calculate each channel's power, and display the results in a bar or time chart.

Option SCN supports three scan modes:
• Top N
• Bottom N
• List

Depending on the number of channels, the N9322C display toggles between horizontal and vertical views, making it easier to read results. A one-button logging function saves results in a .csv file.
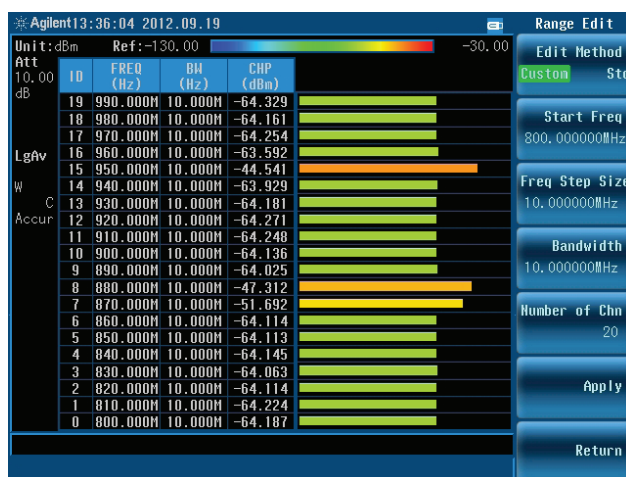

Figure 4. Option SCN (Channel scanner) for simultaneous channel power measurement

Outperform Basic Expectations (continued)

ASK/FSK demodulation analysis

The ASK/FSK modulation has been widely adopted in low power, low data rate RF communications, because it ties low cost, high performance wireless connectivity with long battery life. Today, ASK/FSK modulation technology is embedded in a variety of products and systems, ranging from personal consumer electronics, automotive electronics, RFID and automatic meter reading, to giant industrial devices.

The N9322C with Option DMA offers a cost-effective ASK/FSK demodulation analysis solution for you.

• It supports four display modes: symbol, waveform, ASK/FSK error, and eye diagram.

• The demodulation metrics include carrier power, ASK modulation depth, ASK modulation depth, FSK frequency deviation, ASK/FSK error, ASK index, and more.

Figure 5. FSK demodulation with waveform view
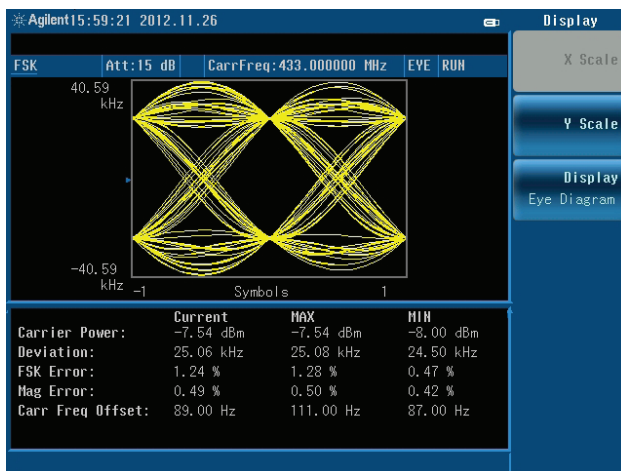
Figure 6. FSK demodulation with eye diagram view
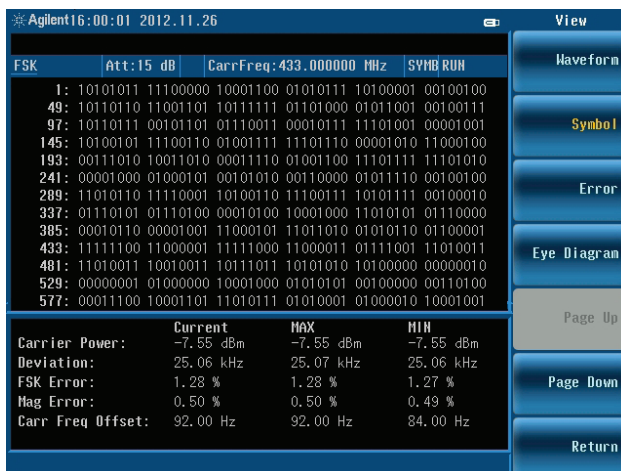
Figure 7. FSK demodulation with symbol view

Did you know FSK enables...

• Wireless medical telemetry (patient monitoring)

• Railway temperature monitoring

• Wireless peripherals: speakers, headphones, mice, and keyboards

• Auto vehicle access

• Tire pressure monitoring systems

• Garage door openers
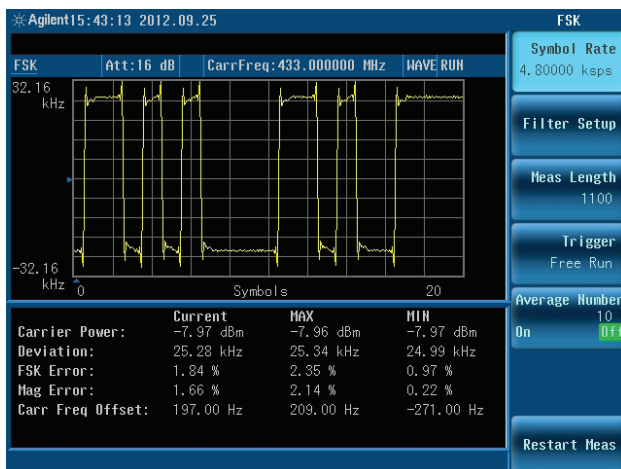
• Crane control

• More...

Outperform Basic Expectations (continued)

More stimulus/response measurements covered

Varieties of RF components are used as building blocks for larger systems. A designer counts on certain specifications being met, such as filter cutoff frequency, amplifier power output, and antenna match. These specifications must be verified by the component manufacturer and often by the R&D designer as well.

The N9322C with Option TG7 offers a 7 GHz tracking generator to help you cost-effectively implement scalar network analysis (magnitude versus frequency).

Often it is also important to measure the reflection of a component to ensure efficient transfer of RF energy. Measuring antenna match is a good example. The N9322C's Option TG7 and Option RM7 combined with the tracking generator, built-in VSWR bridge, and reflection measurement capability, easily covers one-port return loss, VSWR, insertion loss, and distance-to-fault measurement capabilities for frequencies up to 7 GHz.

Figure 8. Option TG7 (tracking generator) provides scalar network analysis capability up to 7 GHz

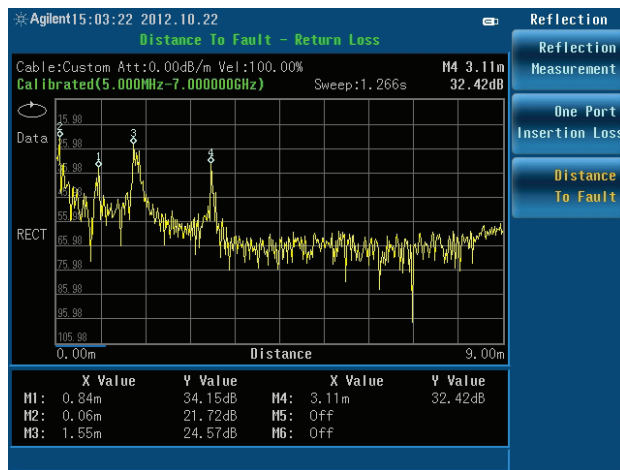*Figure 9. Option RM7 provides reflection measurement capability up to 7 GHz*

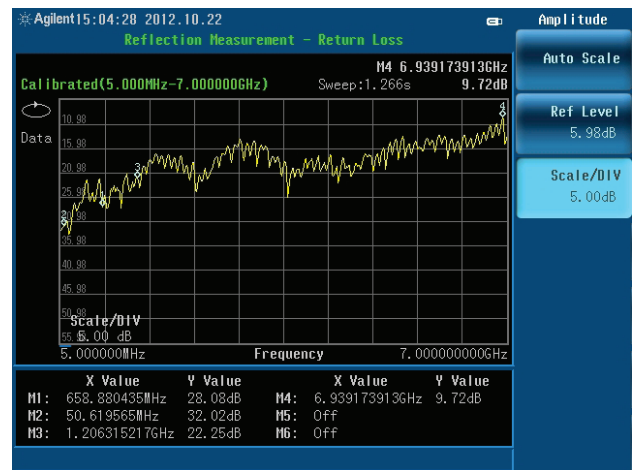*Figure 10. Measuring distance-to-fault with N9322C*

Figure 11. Measuring return loss with N9322C

N9322C Measurement Capabilities Overview

Description	Option	Additional information
Swept-tuned and FFT	Standard	Allows selection of swept-tuned or FFT to be made manually or defer to the mode determined by the N9322C BSA. Note: the FFT mode can be turned on when RBW is set to 30 kHz or lower
Auto tune	Standard	Finds, tunes, and zoms-in on the signal automatically (level > –50 dBm)
Trace math	Standard	Provides true power calculations with results displayed in dBm
Simultaneous detectors	Standard	Features a total of four traces and support simultaneous detectors. Four different detectors can be used on four different traces in a single sweep
Marker zoon-in/out	Standard	Moves the marker to the signal of interest, zooms in to see more details with one button push, and zooms out to see the whole frequency band
Noise marker	Standard	Measures noise level in dBm/Hz or dBuV/Hz
Marker logging	Standard	Records the marker readout over time to a .csv file
Band power	Standard	Measures both power and power spectral density in a specified channel bandwidth
Peak table	Standard	Displays a list of up to 10 signal peaks from the selected trace. Exporting the peak table to .csv file is supported
User key	Standard	Customer-definable softkeys for express access to 7 of the most frequently used measurement setups
AM/FM tune and listen	Standard	Supplies AM/FM demodulated audio that can be heard with the internal speaker. The speaker volume and demodulation delay time are adjustable
Channel power	Standard	Computes and displays the power between the reference marker and the associated delta marker. Results can be displayed in a bar chart, or a meter graphical user interface (GUI)
Adjacent channel power radio (ACPR)	Standard	Finds the transmitter's potential for interfering with a receiver on an adjacent channel (upper or lower). Up to six pairs of adjacent channels can be set up
Occupied bandwidth (OBW)	Standard	Determines the band of frequencies that contain a specified percentage of the total power within the measurement span
Channel table	Standard	Includes the major wireless communication standards and can be customized
AM/FM demodulation metrics	Option AMA	Shows the demodulation metrics: carrier power, modulation rate, AM depth/FM deviation, SINAD, and carrier frequency offset
ASK/FSK demodulation metrics	Option DMA	Shows the modulation metrics: carrier power, carrier frequency offset, ASK modulation depth/index, and FSK deviation. Displays the demodulated signal in any of four formats: waveform, symbol, error, and eye diagram
Channel scanner	Option SCN	Measures channel power for up to 20 channels simultaneously
Tracking generator	Option TG7	Measures two-port transmission of filters, amplifiers, and other devices
Reflection measurement	Option RM7	Measures one-port reflection of antenna, cable and other components or devices. Requires Option TG7 be installed on the instrument
Time-gated spectrum analysis	Option TMG	Obtains spectral information about signals in the frequency domain, that are separated in the time domain using an internal timer or external trigger signal to separate these time-varying signals
Task planner	Option TPN	Implements up to 20 pre-defined measurements automatically. Reduces test setup time by 95%, delivers test automation and consistency, and makes it easy to capture test results, generate reports and share task plans from one instrument to another
User data sanitation	Option SEC	Performs user data sanitation process, and overwrites instrument memory with "1"s
Spectrum monitoring	Option MNT	Monitors the spectrum and identifies interfering signals arising from unwanted or unexpected transmissions. Allows recording and playback of captured traces
High accuracy average power measurement	Option PWM	Makes true average power measurements with Agilent U2000 Series USB power sensors
High accuracy peak power measurement	Option PWP	Makes the true peak power measurement with Agilent U2020 X-Series USB power sensors

For more information on N9322C options, refer to:

- *N9322C Configuration Guide*, literature number 5991-1168EN

- *N9322C Data Sheet*, literature number 5991-1167EN

- Visit N9322C Web site at **www.agilent.com/find/n9322c**

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