

AV4992A Radio Test Set

(2MHz~1GHz/2.7GHz)



Product Overview

AV4992A Radio Test Set, which integrates multiple meters with the functions including RF transmitting and receiving analysis, audio source and analysis, can measure various performance of radios, interphones and audio equipment at the range of 2MHz~1GHz/2.7GHz, and test standing wave of communication cables and antennas. It is a comprehensive radio test set capable of overall functions at a small size.

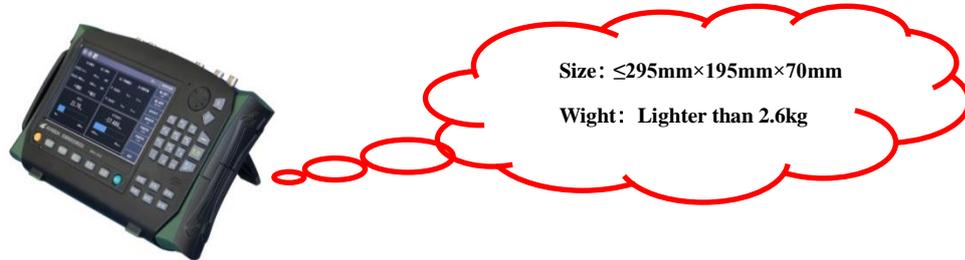
Featured with strong environment adaptability and rechargeable battery, the test set can be used for simple lab application, production and debugging of communication equipment, on-site installation, repair and maintenance in the sectors of civil communication, public security, military information technology construction, etc..

Main Characteristics

- **Handheld design, small size and light weight, easy for carry.**
- **Powerful environment adaptability, two supply modes, convenient outdoor tests at anywhere and anytime.**
- **Dual RF sources, superior spectrum purity, integrated solution of radio/interphone tests.**
- **Design of universal spectrum analysis modules, easier for signal search and analysis.**
- **USB and LAN interfaces, flexible remote control is available.**
- **Simplified Chinese/English menus, friendly and convenient for user operation.**

Small size, lightweight, on-site application can be easily accomplished

Implementing light plastic for shell, AV4992A Radio Test Set is the smallest and exquisite radio multimeter compared with other meters of the same performance. The built-in high-capacity rechargeable battery is easy for replacement. You can enjoy the performance of desktop equipment but at handheld convenience brought by the small size, large-capacity battery and multi-function carrying backpack. The test set is extremely suitable for on-site usage.



Super powerful capabilities of environmental adaption and dust-sand proof, handy for tests in sundry environments

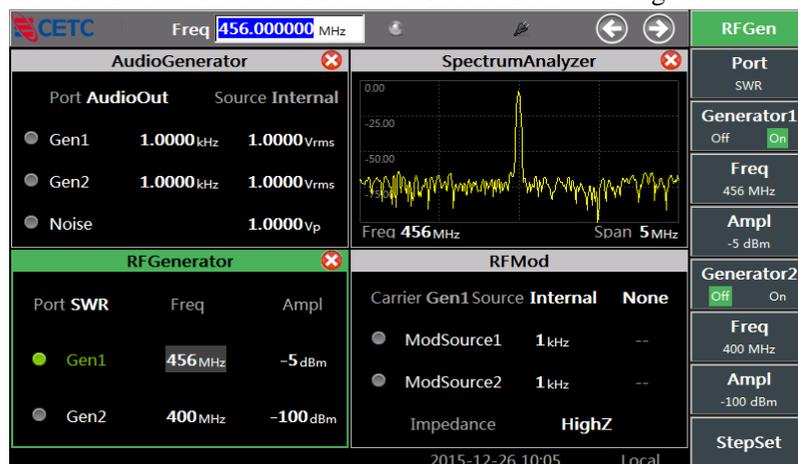
AV4992A applies the excellent design of low power consumption and heat radiation, which meets the third-class equipment standards regulated in GJB3947A, which are surpassed by the test set in several aspects in terms of the performance, such as usage in the outside temperature at $-10^{\circ}\text{C} \sim +50^{\circ}\text{C}$. It can maintain the high performance no matter how extreme the temperature is. Caps are used for protection of sensitive parts like connectors, which enables free operation.

A colorful touch screen with back-light sensors

AV4992A deploys a 7 inch colorful touch screen to follow the latest test demands and trends. One window supports simultaneous display of multiple meters in rolling. The windows can be zoomed as per your needs. Touch parameters to update parameter setting. The built-in back-light sensing can adjust display light intensity automatically according to environmental light, so that operation comfort is largely enhanced.

Complete test functions give you outstanding and comprehensive test results

AV4992A integrates numerous meters containing RF source, audio source, cable tester, RF meter, audio meter, oscilloscope, demodulation meter, digital voltmeter, spectrum analyzer, etc., which can perform tests on over 20 parameters. As an engineers' right-hand equipment, it can satisfy almost all test demands from measurements on universal radio transmitting and receiving devices.



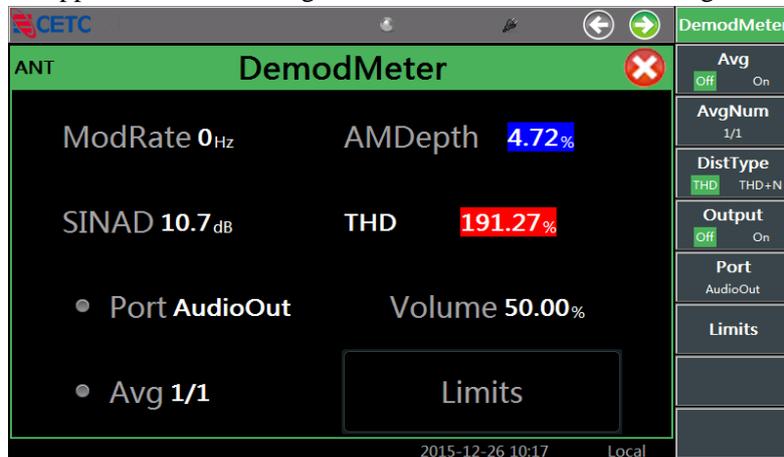
Flexible operation due to one-key integration/menu customization, provides you convenient test experience

AV4992A is capable of one-key integration to meet various testing needs of customers. You can configure it freely to eliminate complicated setup steps in relatively fixed test parts or conditions.

Instead, you can have a direct view on test results.

The built-in diagnosis “doctor”, offers you more direct and clear test outcomes

AV4992A sets up corresponding qualified test ranges against many test items based on application conditions. Once the test alarm function is on, the back-light color won't change if the result fits in the range, the back-light turns to blue if the result fails the lower limit and turns to red if the result is higher than the upper limit. Users can get clear and direct views of existing test results.



Chinese/English operation menu, on-line test support and breakdown analysis are available

The default menu of AV4992A is in Simplified Chinese. English version can also be set. Many shortcut keys lead you to the selection menu directly, which is simple for comprehension and operation. Without special training, users can master the test set through the rich functions of on-line support and trouble inquiries.

Manifold interfaces, handy for control

AV4992A Radio Test Set has a SD card slot besides RF and audio signals testing interfaces. Micro SD can extend the memory or copy internal data and documents. The interfaces available are LAN (local area network), Mini USB and USB Type-A. They can enable remote control over the whole equipment, data transmission and connection to SB peripheral devices, like USB storage devices, USB mouse, USB keyboards, etc..

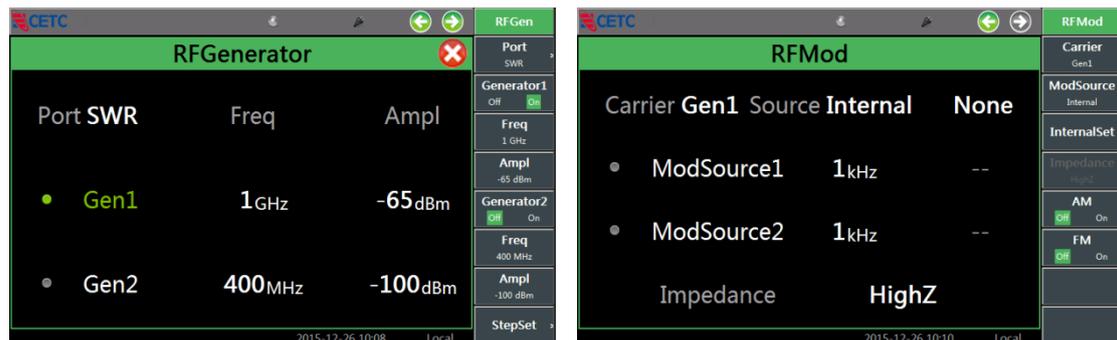


Main Functions

It offers fantastic solutions for performance and specification tests on equipment including radio, interphones and so on using the highly qualified RF source.

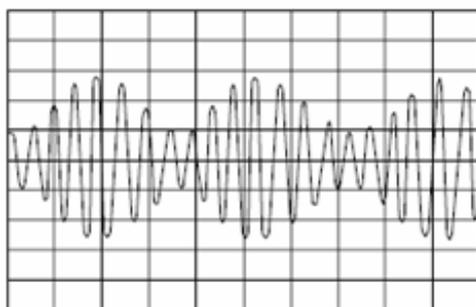
- **Integrates double RF sources and supplies a convenient integral test approach for evaluation of specifications covering inter-modulation of complete equipment, impedance, out-of-band suppression, etc..**

AV4992A owns two RF sources, 2MHz~1GHz/2.7GHz and 2MHz~400MHz, to respectively control output power in the modes of single output and combined output. Complexity and cost of tests can be greatly decreased when dual-source tests are required. Meanwhile, testing setup is facile.

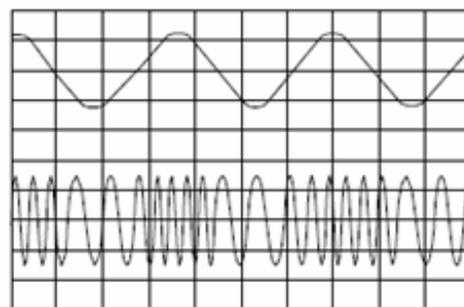


- **The built-in standard modulation source enables FM/AM modulation.**

AV4992A RF source can input modulation signals from outside and an internal modulation source is also accessible, and is equipped with AM and FM required by analog communication. Certain noise output can also be added to the internal modulation signals, to simulate actual signals more vividly and detect equipment performance.



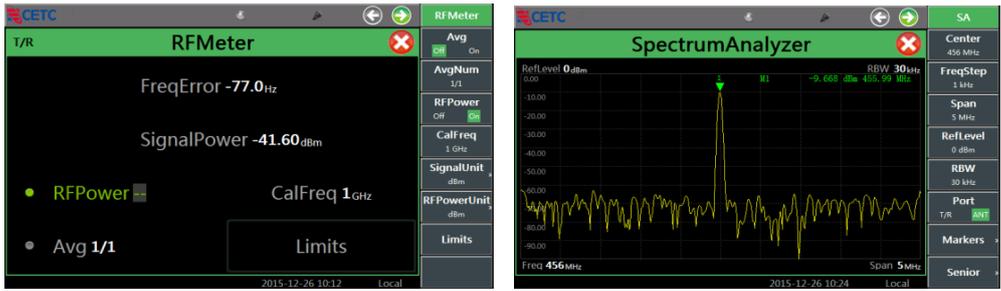
AM



FM

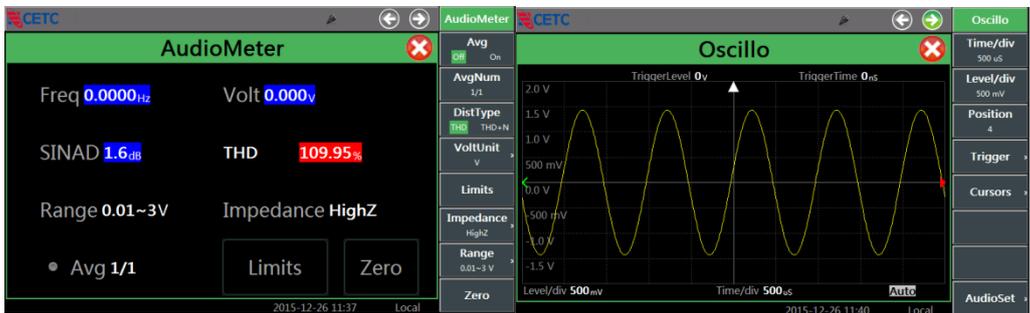
- **Effective RF signal analysis provides assessments over transmitter signals in several aspects.**

AV4992A RF analysis can carry out evaluation on transmission performance of your equipment in every aspect, such as monitoring and examination on transmission frequency error, RF power, signal receiving intensity, spectrum characteristics, etc.. RF signal measurement and analysis as well as spectrum monitoring are also available.



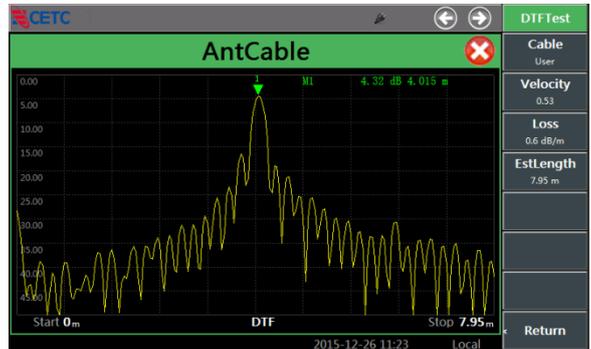
➤ **Accurate audio analysis, simple for overall analysis on LF signals**

The complete analysis of AV4992A on audio can accurately analyze audio frequency, voltage, SINAD, THD, etc.. The embedded DVM meter can measure signals containing DC component. We offer audio oscilloscope options for your direct observation and analysis on various signals under test.



➤ **Multiple cable specification testing functions, quickly locate breakdowns**

The antenna feeder test of AV4992A can examine performance of cable voltage-SW ratio, insertion loss, and return loss through measurement on SW ratio at SWR port. The ability of Distance-To-Fault (DTF) helps further isolate breakdowns during radio system repair.



Typical Applications

Out-field installation, debugging and maintenance of radio equipment

Highly integrated in design, AV4992A Radio Test Set intensively combines functions of several meters with the max. size of 295mm (W)×195mm (H)×70mm (D) and the total weight even lighter than 2.6kg. The rechargeable battery with large capacity is imbedded to give you a longer working duration. It is especially suitable for out-field installation, testing and maintenance of radio transmitting/receiving equipment. As a multimeter for RF measurement, the test set will surely become a necessity for radio engineers.



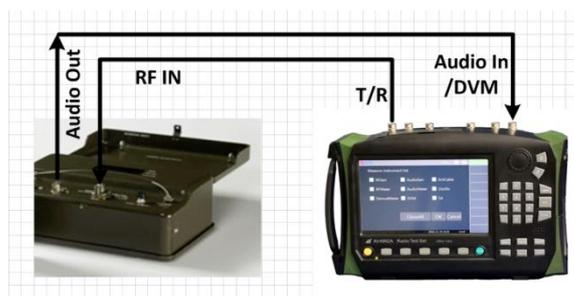
Examination on performance and mass production of radio stations/interphones

As the extensive application of radio communication, various military and civil stations and diversified communication tools, different test equipment is required for development and mass production, for instance, signal generators, spectrum analyzers, power meters, frequency meters, oscilloscopes and audio meters. A complete radio/interphone consists of a transmitter and a receiver. Users need to switch frequently between multiple devices to accomplish tests on whole performance and specifications, which consumes manpower, resources and a great amount of time.

AV4992A Radio Test Set gathers multifold meters for performance examination on various vehicle/commercial stations and wireless interphones. Test processes are simplified, which lowers cost and improves working efficiency. The built-in “Doctor” establishes corresponding qualified ranges against certain objectives under test; the back-light of data displayed will turn to different colors based on the limits set beforehand. The ability behaves a big advantage for mass production and routine maintenance of meters.

AM Sensitivity test of radio stations

Set up AV4992 Test Set to generate RF AM signals and arrange the frequency together with receiving frequency, output frequency, modulation frequency and modulation depth of the radio station under test as per specific requirement. Choose T/R port as the RF output port. In this case, the radio station can get low power RF signals of -125dBm. Connect the audio output port of the station to the audio input port of AV4992A. Enable the Audio Meter to observe SINAD of the output signals from the station. Adjust power of the RF output signals until SINAD of the audio signals under test gets close to the requirement. Following such procedure, you can easily test sensitivity of the radio station under test.



Technical Specifications

Double independent RF Signal Sources

Double RF sources (you can choose one signal source for independent output, or combine the double sources inside then output them)

| | | Option 001 (default) | Option 002 | |
|-----------------------------|------------------------------|--|--|--|
| Frequency characteristics | Frequency Range | 2MHz~1000MHz (Source 1) | 2MHz~2700MHz (Source 1) | |
| | | 2MHz~400MHz (Source 2, ANT output) | 2MHz~400MHz (Source 2, ANT Output) | |
| | Frequency Resolution | 1Hz | | |
| | Precision | Identical frequency standard | | |
| Amplitude characteristics | Output Level Range | -5dBm~-55dBm (SWR, Source 1) | -5dBm~-65dBm (SWR, Source 1, 2MHz~2.2GHz) | |
| | | | -10dBm~-65dBm (SWR, Source 1, 2.2GHz~2.7GHz) | |
| | | -5dBm~-100dBm (ANT, Source 1) | -5dBm~-100dBm (ANT, Source 1, 2MHz~1.8GHz) | |
| | | | -15dBm~-100dBm (ANT, Source 1, 1.8GHz~2.7GHz) | |
| | | -50dBm~-125dBm (T/R, Source 1) | -50dBm~-120dBm (T/R, Source 1, 2MHz~2.2GHz) | |
| | | | -55dBm~-120dBm (T/R, Source 1, 2.2GHz~2.7GHz) | |
| | 0dBm~-100dBm (ANT, Source 2) | -5dBm~-100dBm (ANT, Source 2) | | |
| Spectrum purity | Sideband Phase Noise | ≤ -95 dBc/Hz (Frequency offset 20kHz) | ≤ -90 dBc/Hz (1GHz@20KHz) ≤ -80 dBc/Hz (2.7GHz@20KHz) | |
| | Harmonic Spurious | ≤ -30 dBc | | |
| Internal AM characteristics | Frequency Range | 30Hz~5kHz (20Hz~20kHz is available) | | |
| | AM Range | 0~100% | | |
| | Modulation Accuracy | $\pm (5\% \times \text{modulation depth} + 2\%)$ (150Hz~5kHz modulation rate, 10%~90% modulation depth) | | |
| External AM characteristics | Audio Input | Switching Load | 150 Ω , 600 Ω , 1k Ω , High Z | |
| | | Input Level | 0.05Vp~3Vp | |
| | | Frequency Range | 300Hz~5kHz | |
| | Micro phone Input | Level Range | 20mVrms~350mVrms | |
| | | Frequency Range | 300Hz~3kHz | |
| | | AM Range | 0~80% | |
| Internal FM | Frequency Range | 30Hz~5kHz (20Hz~20kHz is available) | | |

| | | | |
|-----------------------------|------------------------|------------------|--|
| characteristics | Frequency Offset Range | | Max. 100kHz |
| | Precision | | ±5% (100kHz Frequency offset, 150Hz~5kHz modulation rate) |
| External FM characteristics | Audio Input | Switching Load | 150Ω, 600Ω, 1kΩ, High Z |
| | | Input Level | 0.05Vp~3Vp |
| | | Frequency Range | 300Hz~5kHz |
| | | Gradient | Positive voltage generates positive Frequency offset |
| | Micro phone Input | Level Range | 20mVrms~350mVrms |
| | | Frequency Range | 300Hz~3kHz |
| | | Frequency Offset | 0Hz~80kHz |
| | | Gradient | Positive voltage generates positive Frequency offset |

Double audio sources (Audio 1and Audio 2)

| | |
|-------------------------|--|
| Frequency range | 20Hz~20kHz |
| Frequency resolution | 0.1Hz |
| Frequency precision | Frequency standard ±2Hz |
| Output level | 20mVrms~1.57Vrms |
| Output level resolution | 0.01Vrms |
| Output level precision | ± (5%+5mV) |
| Harmonic distortion | <3% (1kHz, 1Vrms) |
| Output current | <15mA |
| Output | Single-tone, dual-tone, noise, single-tone + noise |

RF meter

| | |
|-------------------------------------|---|
| RF Power Meter | (T/R broadband input RF power) |
| Measurement Range | 10dBm~43dBm (0.01~20W) |
| Max. Input Level | At +25°C and 20W/43dBm, continues for 10 min., or sends out alarm when overheat |
| Precision | ±1dB(20~43dBm)(Built-in attenuator) |
| RF Frequency Error Meter | |
| Capture Range | ±200kHz |
| Resolution | 1Hz |
| Accuracy | Time base ±2Hz |
| Intensity Meter Of Signals Received | |

| | | | |
|--------------------------|----------|----------------|----------------------------|
| Measurement Range | dBm | -110dBm~+43dBm | |
| Available RF Level Range | T/R port | -50dBm~+43dBm | |
| | ANT port | Option 001 | Option 002 |
| | | -110dBm~-10dBm | -110dBm~-10dBm (2MHz~1GHz) |
| Precision | ±3dB | | |

Demodulation meter

| | |
|---------------------------|--|
| AM Modulation Depth Meter | |
| Range | 5%~100% |
| Resolution | 1% |
| Precision | ±5%, 1kHz modulation rate, 30%~90% modulation, 3kHz LPF |
| FM Frequency offset meter | |
| Frequency offset range | 500Hz~100kHz |
| Resolution | 1Hz |
| Precision | ±5%, 1kHz~10kHz Frequency offset, 150Hz~1kHz modulation rate |

Spectrum analyzer (options)

| | | |
|-------------------------------|--|---------------|
| | Option 001 (Default) | Option 002 |
| Frequency Range | 2MHz~1GHz | 2MHz~2.7GHz |
| Sweep Width | 10kHz~998MHz | 10kHz~2698MHz |
| Reference Level Range | -80dBm~+50dBm | |
| Resolution Bandwidth Range | 10Hz~30kHz (1, 3, 10 steps) | |
| Average Noise Level Displayed | -120dBm (typical value, 10kHz Frequency width) | |

Audio meter

| | |
|---------------------------------|--|
| Signal source under measurement | Audio input, demodulation signals |
| Audio Frequency | |
| Resolution | 0.1Hz |
| Precision | ±1Hz |
| Audio voltage | |
| Audio input level | 20mVp~3Vp (Measurement range 1) |
| | 2Vp~30Vp (Measurement range 2) |
| Precision | ± (5%×measurement value+5mV) (Measurement range 1) |
| Distortion (THD) | |
| Display range | 0~100% |
| Resolution | 0.1% |
| Precision | ± (5%× measurement value +0.1%), (within 1%~20%) |
| SINAD | |

| | |
|---------------|---------------------------|
| Display Range | 0~40dB |
| Resolution | 0.1dB |
| Precision | ±1.5dB, (within 8dB~35dB) |

DVM meter

| | |
|-----------------------|---------------------------------|
| Input Frequency Range | DC~20kHz |
| Input Impedance | 1MΩ |
| Coupling | AC, DC |
| Input Level | 20mVp~3Vp (Measurement range 1) |
| | 2Vp~30Vp (Measurement range 2) |
| Precision | ±10% (Measurement range 1) |

Audio oscilloscope (option)

| | | |
|-----------------|---|---|
| Signal source | External audio, DVM input, demodulation signals | |
| Sweep line | 1 | |
| Marker | 2 | |
| Trigger | Type | Auto, standard, single |
| | Pulse edge | Rising edge, falling edge |
| | Level can be triggered | -60V~+60V (setting depends on measurement range) |
| Horizontal | Range | 0.2ms/lattice to 50ms/lattice, in the sequence of 1/2/5 |
| | Precision | ±3% |
| Vertical | Range | 10mV~20V/lattice, in the sequence of 1/2/5 |
| | Precision | ±10%, within the whole range |
| Coupling | Audio input | AC |
| | DVM input | AC, DC |
| Input Impedance | Audio input | 150Ω, 600Ω, 1kΩ, high impedance |
| | DVM input | 1MΩ |
| Bandwidth | 20kHz | |

Cable test

| | |
|----------------------|--|
| Frequency resolution | 0.1MHz |
| Marker | 3 |
| Test Type | Measurement on standing-wave ratio (SWR), return loss (RL), cable loss (LOSS), Distance-To-Fault (DTF) |
| DTF Measurement | Range: 1m~100m Resolution: 0.01m Speed rate: 0.00~1.00, auto choice or manual input based on cable types Measurement accuracy: ±10% |

Internal time base

| | |
|-----------------------|--------------------------|
| Aging Rate | 1×10^{-6} /year |
| Temperature Stability | 1×10^{-6} |

Universal characteristics

➤ Working characteristics

| | | |
|-----------------------|-----------------------------------|--|
| Operating Temperature | -10°C~+50°C | |
| Storage Temperature | -40°C~+70°C | |
| Size | 295mm (W)×195mm (H)×70mm (D) | |
| Weight | ≤2.6kg | |
| Power Consumption | ≤25W (exclude battery recharging) | |
| Type of Power Input | AC, Standard Adapter | Input of the adapter: 100~240V, DC of 50/60Hz |
| | DC | Voltage: 12V~18V (without the battery) 15V~18V (with the battery) Current: 4A (min.) |
| | Built-In Battery(Standard) | Nominal voltage: 10.8V Nominal capacity: ≥7000mAh |

➤ Input and output ports

| Description | Sign | Interface type |
|----------------------------|--------------|---------------------------|
| RF Input /Output Interface | ANT | BNC |
| | T/R | BNC |
| RF Output Interface | SWR | BNC |
| Audio Output Interface | Audio Out | BNC |
| Audio/DVM Input Interface | Audio In/DVM | BNC |
| GPS Signal Input Interface | GPS | BNC |
| Audio Cassette Interface | Audio set | Special 10-core interface |

Ordering information

Main Unit: AV4992A Radio Test Set (2MHz~1GHz/2.7GHz)

Standard Package

| No. | Description | Remarks |
|-----|---|---|
| 1 | Power Cord Assembly | Standard tri-prong power cord Power adapter (15.0V/4.0A) |
| 2 | Quick Start Guide | 2 copies |
| 3 | CD | 1 pc |
| 4 | USB Cable | 1 pc |
| 5 | Built-In Rechargeable Lithium-Ion Battery | Included in the main unit |
| 6 | Car-Mounted Charger | 1 pc |
| 7 | Certificate of Conformity | 1 pc |

Options

| Serial No. | Description | Functions | Diagram |
|-------------|--|--|---|
| AV4992A-001 | 1GHz Option | Frequency range: 2MHz~1GHz Defaulted option | |
| AV4992A-002 | 2.7GHz Option | Frequency range: 2MHz~2.7GHz | |
| AV4992A-003 | English Option | Language multiplication (with keys, tags, and software) | |
| AV4992A-S01 | Function of an oscilloscope | | |
| AV4992A-S02 | Function of a spectrum analyzer | | |
| AV4992A-H01 | User Manual in Simplified Chinese | | |
| AV4992A-H02 | User Manual in English | | |
| AV4992A-H03 | Programming Manual in Simplified Chinese | | |
| AV4992A-H04 | Programming Manual in English | | |
| AV4992A-H05 | 20dB Attenuator -50W | To extend high power measurement (connector type: N (J, K)) |  |
| AV4992A-H06 | 20dB Attenuator -150W | To extend high power measurement (connector type: N (J, K)) |  |
| AV4992A-H07 | 20dB Attenuator -200W | To extend high power measurement (connector type: N (J, K)) |  |
| AV4992A-H08 | Audio Cassette Option | For conversation to the outside, built-in speaker, microphone and cable. |  |

(To be continued)

| Serial No. | Description | Functions | Diagram |
|-------------|--|---|---|
| AV4992A-H09 | AV20201Ae Type N Low-Cost Male Cal Kit | Tests and calibration of cables |  |
| AV4992A-H10 | AV20201Be Type N Low-Cost Female Cal Kit | Tests and calibration of cables |  |
| AV4992A-H11 | BNC/SMA Adapter | Interface extension (BNC/SMA-JK,BNC/SMA-JJ: one for each) |  |
| AV4992A-H12 | N/BNC Adapter | Interface extension (N/BNC-JJ,N/BNC-KJ: one for each) |  |
| AV4992A-H13 | High Impedance Passive Oscilloscope Sensor | For tests of audio input /DVM |  |
| AV4992A-H14 | External GPS Antenna | GPS localization |  |
| AV4992A-H15 | BNC Cable (80cm) | Extension of testing port |  |
| AV4992A-H16 | Purple UTP Cable | Network interface control, 2M, point-to-point cable |  |
| AV4992A-H17 | MicroSD Class4 | Storage extension (capacity:8G) |  |
| AV4992A-H18 | Rechargeable Lithium-Ion Battery | Spare battery group |  |
| AV4992A-H19 | Power Adapter | Spare power adapter |  |
| AV4992A-H20 | Multifunction Bag | Protects the equipment. The harnesses fix the equipment at the neck and the waist, and free hands for equipmentoperation. |  |
| AV4992A-H21 | Backpack | Contain the main equipment, power adapter, power cord, testing cable, and various adapters; it is a backpack and handbag. |  |
| AV4992A-H22 | Safe transit case | To fix packing during transportation. |  |