

# S5101 Handheld Radio Communication Analyzer

(2MHz~1GHz) Radio testers for laboratory, production, service and maintenance



S5101 Handheld Radio Communication Analyzer is the ideal radio tester for laboratory, production, service and maintenance use. It combines radio frequency emission, reception analysis, audio source, analyzer, etc. all into one unit. It can measure the performance of radio from 2MHz to 1GHz, interphone, audio equipment as well as testing communication cables and standing-wave ratio.

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## Excellent integrated test functions

S5101 Radio Communication Analyzer has more than 18 functions that can satisfy almost all radio emission and reception test requirements.

- RF Source
- Audio Source
- RF Power Meter
- RF Frequency Error Meter
- Strength Meter For Received Signal
- Spectrum Analyzer
- AM Depth Meter
- FM Deviation Meter
- Audio Frequency Meter
- Audio Voltmeter
- Distortion Meter
- SINAD Meter
- DVM Meter
- Oscilloscope
- Cable & Antenna Test

## Key Features

- Optional extensions enable the S5101 to satisfy almost all requirements of radio measurements and even to cover related fields.
- Light-weight handheld design with low power consumption.
- Built-in high power capacity battery for long field applications.
- Impact, dust, and splash resistant
- 7" high contrast, backlit LCD screen with high resolution.
- A clear menu structure allowing fast and direct access to all measurement facilities.
- Double RF sources and pure spectrum supplies a whole integrated solution for radio and interphone test.

## General Information

|                                |                                                                           |
|--------------------------------|---------------------------------------------------------------------------|
| <b>Operating Temperature</b>   | -10°C~+50°C (14°F~122°F)                                                  |
| <b>Storage temperature</b>     | -40°C~+70°C (-40°F~158°F)                                                 |
| <b>Dimensions (WxHxD)mm</b>    | 295x195x70                                                                |
| <b>Weight</b>                  | Approx.2.5kg (Battery included)                                           |
| <b>Power Consumption</b>       | ≤25W (While charging is disabled)                                         |
| <b>AC Power Supply</b>         | 100~240V, 50/60Hz                                                         |
| <b>DC Power Supply</b>         | 12V~18V (Without battery)<br>15V~18V (With battery)<br>Current: 4A (Min.) |
| <b>Build-in Battery Supply</b> | 10.8V, ≥7000mAh                                                           |

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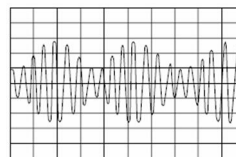
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## Features To Boost Your Efficiency

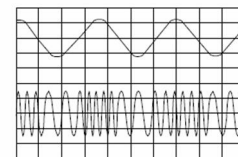
Multi interfaces, easily satisfies different requirements.



Built-in standard modulation source, AM/FM modulation



AM

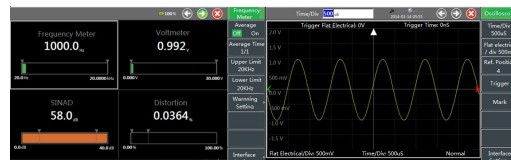


FM

Double RF signal sources make the test easier.

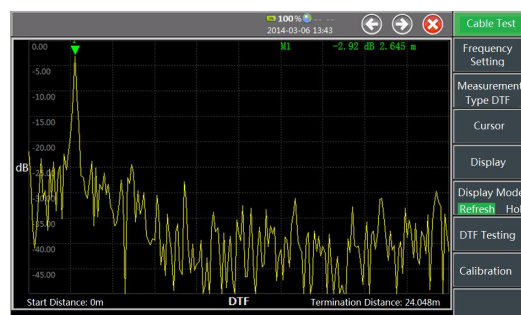
One RF source is 2MHz~1GHz and the other one is 2MHz~400MHz. It could be used separately or together.

Accurate audio analysis, together with oscilloscope function, gives whole analysis for low frequency signals.



Powerful RF signal analysis function and real-time spectrum monitor, that supplies a multi-faceted test for Transmitter.

Cable & Antenna Test



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## Technical Specifications

|                        |                             |                                                          |                                                    |
|------------------------|-----------------------------|----------------------------------------------------------|----------------------------------------------------|
| <b>Frequency</b>       | Range                       | 2MHz~1000MHz (Source 1)                                  |                                                    |
|                        |                             | 2MHz~400MHz (Source 2,ANT output)                        |                                                    |
|                        | Resolution                  | 1Hz                                                      |                                                    |
| <b>Amplitude</b>       | Accuracy                    | Time base $\pm$ 2Hz                                      |                                                    |
|                        | Output level range          | -5dBm~-55dBm(SWR, Source 1)                              |                                                    |
|                        |                             | -5dBm~-100dBm(ANT, Source 1)                             |                                                    |
|                        |                             | -50dBm~-125dBm(T/R, Source 1)                            |                                                    |
| Level accuracy         | 0dBm~-100dBm(ANT, Source 2) |                                                          |                                                    |
|                        |                             | $\pm$ 2dB ( $\geq$ -100dBm)                              |                                                    |
| <b>Spectral Purity</b> | SSB phase noise             | $\leq$ -95dBc/Hz (Frequency offset 20kHz)                |                                                    |
|                        | Harmonic spurious           | $\leq$ -30dBc                                            |                                                    |
|                        | Non-harmonic spurious       | $\leq$ -35dBc (Frequency offset>20kHz)                   |                                                    |
| <b>Build-in AM</b>     | Frequency range             | 30Hz~5kHz (20Hz~20kHz can be set)                        |                                                    |
|                        | Amplitude range             | 0~100%                                                   |                                                    |
|                        | Accuracy                    | 5% (150Hz~5kHz Modulation rate,10%~90% Modulation depth) |                                                    |
| <b>Build-in FM</b>     | Frequency range             | 20Hz~20kHz                                               |                                                    |
|                        | Offset range                | Max.100kHz                                               |                                                    |
|                        | Accuracy                    | $\pm$ 5% (100kHz offset, 150Hz~5kHz modulation rate)     |                                                    |
| <b>External AM</b>     | Audio input                 | Switchable load                                          | 150 $\Omega$ , 600 $\Omega$ , 1k $\Omega$ , High Z |
|                        |                             | Input level                                              | 0.05Vp~3Vp                                         |
|                        |                             | Frequency range                                          | 300Hz~5kHz                                         |
|                        | Microphone input            | Level range                                              | 20mVrms~350mVrms                                   |
|                        |                             | Frequency range                                          | 300Hz~3kHz                                         |
|                        |                             | Amplitude range                                          | 0~80%                                              |
| <b>External FM</b>     | Audio input                 | Switchable load                                          | 150 $\Omega$ , 600 $\Omega$ , 1k $\Omega$ , High Z |
|                        |                             | Input level                                              | 0.05Vp~3Vp                                         |
|                        |                             | Frequency range                                          | 300Hz~5kHz                                         |
|                        |                             | Slope                                                    | Positive voltage positive offset                   |
|                        | Microphone input            | Level range                                              | 200mVrms~350mVrms                                  |
|                        |                             | Frequency range                                          | 300Hz~10kHz                                        |
|                        |                             | Offset range                                             | 0Hz~80kHz                                          |
|                        |                             | Slope                                                    | Positive voltage positive offset                   |

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## Double Audio Sources (Audio 1 & Audio 2)

|                          |                   |                                                    |
|--------------------------|-------------------|----------------------------------------------------|
| <b>Frequency</b>         | <b>Range</b>      | 20Hz~20kHz                                         |
|                          | <b>Resolution</b> | 0.1Hz                                              |
|                          | <b>Accuracy</b>   | Frequency standard $\pm$ 2Hz                       |
| <b>Output Level</b>      | <b>Range</b>      | 20mVrms~1.57Vrms                                   |
|                          | <b>Resolution</b> | 0.01Vrms                                           |
|                          | <b>Accuracy</b>   | $\pm$ (5% $\pm$ 5mV)                               |
| <b>Harmonic Spurious</b> |                   | <3% (1kHz,1Vrms)                                   |
| <b>Output Current</b>    |                   | <15mA                                              |
| <b>Output</b>            |                   | Single tone, Dual tone, Noise, Single tone & Noise |

## RF Power Meter (RF power input to T/R port broadband)

|                         |                                                         |
|-------------------------|---------------------------------------------------------|
| <b>Range</b>            | 0~43dBm (0~20W), External attenuation = 0               |
|                         | 0~53dBm (0~200W), External attenuation = 20             |
| <b>Min. Input Level</b> | 0.1W/20dBm                                              |
| <b>Max. Input Level</b> | 20W /43dBm (25°C, last 10mins or longer, no attenuator) |
| <b>Accuracy</b>         | $\pm$ 1dB (build-in attenuator)                         |

## Strength Meter For Received Signal (IF Bandwidth RF Power)

|                                 |                                                      |
|---------------------------------|------------------------------------------------------|
| <b>Range</b>                    | -110dBm~43dBm (53dBm, External attenuation = 20dB)   |
|                                 | 10pW~20W (200W, External attenuation = 20dB)         |
| <b>Available RF Level Range</b> | -50dBm~43dBm (T/R port)                              |
|                                 | -90dBm~-10dBm (ANT port, RF amplifier not connected) |
|                                 | -110dBm~-10dBm (ANT port, RF amplifier connected)    |
| <b>Resolution</b>               | 0.01dB                                               |
| <b>Accuracy</b>                 | $\pm$ 3dB                                            |

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## Cable & Antenna Test

|                                                  |                                                      |                                                                                                |
|--------------------------------------------------|------------------------------------------------------|------------------------------------------------------------------------------------------------|
| <b>Frequency</b>                                 | <b>Range</b>                                         | 2MHz~1000MHz                                                                                   |
|                                                  | <b>Resolution</b>                                    | 0.1MHz                                                                                         |
| <b>DTF Test</b>                                  | <b>Range</b>                                         | 1m~100m                                                                                        |
|                                                  | <b>Resolution</b>                                    | 0.01m                                                                                          |
|                                                  | <b>Speed (Automatic Identification or by Manual)</b> | 0.00~1.00                                                                                      |
|                                                  | <b>Testing accuracy</b>                              | ± 10%                                                                                          |
| <b>Mark</b>                                      |                                                      | 3                                                                                              |
| <b>Test Type</b>                                 |                                                      | SWR, RL, LOSS, DTF                                                                             |
| <b>VSWR Testing Accuracy (20Ω airline check)</b> |                                                      | SWR reading ± 10%(Calibration value) ≤ 500MHz<br>SWR reading ± 20%(Calibration value) > 500MHz |

## Audio Oscilloscope (Optional)

|                        |                      |                                               |
|------------------------|----------------------|-----------------------------------------------|
| <b>Signal Sources</b>  |                      | External audio, DVM input, Demodulated signal |
| <b>Scan Line</b>       |                      | 1                                             |
| <b>Mark</b>            |                      | 2                                             |
| <b>Broadband</b>       |                      | 20kHz                                         |
| <b>Trigger</b>         | <b>Modes</b>         | Auto, Standard, Single                        |
|                        | <b>Pulse edge</b>    | Up edge, Down edge                            |
|                        | <b>Trigger level</b> | -60V~+60V (Set based on range)                |
| <b>Horizontal</b>      | <b>Range</b>         | 0.2ms/grid~50ms/grid, by 1/2/5                |
|                        | <b>Accuracy</b>      | ±3%                                           |
| <b>Vertical</b>        | <b>Range</b>         | 10mV~20V/grid, by 1/2/5                       |
|                        | <b>Accuracy</b>      | ±10%                                          |
| <b>Coupling</b>        | <b>Audio input</b>   | AC                                            |
|                        | <b>DVM input</b>     | AC, DC                                        |
| <b>Input Impedance</b> | <b>Audio input</b>   | 150Ω, 600Ω, 1kΩ, High Z                       |
|                        | <b>DVM input</b>     | 1mΩ                                           |

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|                                 |                                                      |                                           |                                            |
|---------------------------------|------------------------------------------------------|-------------------------------------------|--------------------------------------------|
| <b>RF Frequency Error Meter</b> |                                                      | <b>Distortion Meter (THD)</b>             |                                            |
| <b>Capture Range</b>            | ± 200kHz                                             | <b>Signal Sources</b>                     | Audio input, Demodulated signal            |
| <b>Resolution</b>               | 1Hz                                                  | <b>Audio Frequency</b>                    | 1kHz                                       |
| <b>Accuracy</b>                 | Time base ± 2Hz                                      | <b>Range</b>                              | 0~100%                                     |
| <b>AM Depth Meter</b>           |                                                      | <b>Resolution</b>                         | 0.10%                                      |
| <b>Range</b>                    | 5%~100%                                              | <b>Accuracy</b>                           | ± (5% x test data+0.1%) (Range 1%~20%)     |
| <b>Resolution</b>               | 1%                                                   | <b>SINAD Meter (1kHz Audio Frequency)</b> |                                            |
| <b>Accuracy</b>                 | ±5%, 1kHz modulation rate<br>30%~90% depth, 3kHz LPF | <b>Signal Sources</b>                     | Audio input, Demodulated signal            |
| <b>FM Deviation Meter</b>       |                                                      | <b>Frequency</b>                          | 1kHz                                       |
| <b>Range</b>                    | 500Hz~100kHz                                         | <b>Range</b>                              | 0~40dB                                     |
| <b>Resolution</b>               | 1Hz                                                  | <b>Resolution</b>                         | 0.1dB                                      |
| <b>Accuracy</b>                 | ±5%, 1kHz~10kHz offset<br>150Hz~1kHz modulation rate | <b>Accuracy</b>                           | ±1.5dB (Range 8~35dB)                      |
| <b>Audio Frequency Meter</b>    |                                                      | <b>DVM Meter</b>                          |                                            |
| <b>Signal Sources</b>           | Audio input, Demodulated signal                      | <b>Input Frequency Range</b>              | DC~20kHz                                   |
| <b>Resolution</b>               | 0.1Hz                                                | <b>Input Impedance</b>                    | 1MΩ                                        |
| <b>Accuracy</b>                 | ±1Hz                                                 | <b>Coupling</b>                           | AC, DC                                     |
| <b>Audio Voltmeter</b>          |                                                      | <b>Input level</b>                        | 20mVp~3Vp (Range 1),<br>1Vp~60Vp (Range 2) |
| <b>Signal Sources</b>           | Audio input, Demodulated signal                      | <b>Accuracy</b>                           | ± 10% (Range 1)                            |
| <b>Audio input level</b>        | 20mVp~3Vp (Range 1)<br>1Vp~30Vp (Range 2)            | <b>Spectrum Analyzer (Optional)</b>       |                                            |
| <b>Accuracy</b>                 | ± (5% x test data+5mV) (Range 1)                     | <b>Range</b>                              | 2MHz~1GHz                                  |
| <b>Internal Time Base</b>       |                                                      | <b>Span</b>                               | 10kHz~998MHz                               |
| <b>Aging</b>                    | 1x10 <sup>-6</sup> /Year                             | <b>Ref. Level Range</b>                   | -80dBm~50dBm                               |
| <b>Temperature Stability</b>    | 1x10 <sup>-6</sup>                                   | <b>Resolution Bandwidth Range</b>         | 10Hz~30kHz(step by 1,3,10)                 |
|                                 |                                                      | <b>Average Noise Level</b>                | -120dBm(Typical, 10kHz bandwidth)          |

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## Input & Output Port

| Name         | Mark         | Type |
|--------------|--------------|------|
| RF Output    | ANT          | BNC  |
|              | T/R          |      |
|              | SWR          |      |
| RF Input     | ANT          |      |
|              | T/R          |      |
| Audio Output | AUDIO OUT    |      |
| Audio Input  | AUDIO/DVM IN |      |
| DVM Input    | AUDIO/DVM IN |      |
| GPS Input    | GPS          |      |
| Audio Box    | AUDIO SET    |      |

## Standard Package:

| Item | Name                            | Qty  |
|------|---------------------------------|------|
| 1    | AC Adaptor                      | 1 PC |
| 2    | Standard three-phase power cord | 1 PC |
| 3    | Built-in rechargeable battery   | 1 PC |
| 4    | USB cable                       | 1 PC |
| 5    | User guide                      | 1 PC |
| 6    | PC software CD                  | 1 PC |
| 7    | Car-mount charger               | 1 PC |
| 8    | Soft Carrying Bag               | 1 PC |

## Optional Accessories

|                 |                                    |                                                         |
|-----------------|------------------------------------|---------------------------------------------------------|
| <b>S5101-01</b> | Audio Oscilloscope                 |                                                         |
| <b>S5101-02</b> | Spectrum Analyzer                  |                                                         |
| <b>S5101-03</b> | 20dB Attenuator-50W                | High-power measurements extended Connector Type N (J,K) |
| <b>S5101-04</b> | 20dB Attenuator-150W               |                                                         |
| <b>S5101-05</b> | 20dB Attenuator-200W               |                                                         |
| <b>S5101-06</b> | BNC/SMA-JK 1PC                     | BNC/SMA Adapter                                         |
|                 | BNC/SMA-JJ 1PC                     |                                                         |
| <b>S5101-07</b> | N/BNC-JJ 1PC                       | N/BNC Adapter                                           |
|                 | N/BNC-KJ 1PC                       |                                                         |
| <b>S5101-08</b> | Audio Box Set                      | Build-in Speaker, Microphone and Cable                  |
| <b>S5101-09</b> | High Z Passive Oscilloscope Probes | Audio input/DVM test                                    |
| <b>S5101-10</b> | Type N Male Calibration Kit        |                                                         |
| <b>S5101-11</b> | Type N Female Calibration Kit      |                                                         |
| <b>S5101-12</b> | External GPS cable                 |                                                         |
| <b>S5101-13</b> | BNC Cable (80cm)                   |                                                         |