RIGOL

MHO/DHO5000 Series

Digital Oscilloscope

Performance Verification

Nov. 2025

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Section	Description	Page

1 Safety Requirement

1.1 General Safety Summary

Please review the following safety precautions carefully before putting the instrument into operation so as to avoid any personal injury or damage to the instrument and any product connected to it. To prevent potential hazards, please follow the instructions specified in this manual to use the instrument properly.

- **Use Proper Power Cord.**

  Only the power cord designed for the instrument and authorized for use within the local country could be used.

- **Ground the Instrument.**

  The instrument is grounded through the Protective Earth lead of the power cord. To avoid electric shock, connect the earth terminal of the power cord to the Protective Earth terminal before connecting any input or output terminals.

- **Connect the Probe Correctly.**

  If a probe is used, the probe ground lead must be connected to earth ground. Do not connect the ground lead to high voltage. Improper way of connection could result in dangerous voltages being present on the connectors, controls or other surfaces of the oscilloscope and probes, which will cause potential hazards for operators.

- **Observe All Terminal Ratings.**

  To avoid fire or shock hazard, observe all ratings and markers on the instrument and check your manual for more information about ratings before connecting the instrument.

- **Use Proper Overvoltage Protection.**

  Ensure that no overvoltage (such as that caused by a bolt of lightning) can reach the product. Otherwise, the operator might be exposed to the danger of an electric shock.

- **Do Not Operate Without Covers.**

  Do not operate the instrument with covers or panels removed.

- **Do Not Insert Objects into the Air Outlet.**

  Do not insert objects into the air outlet, as doing so may cause damage to the instrument.

- **Use Proper Fuse.**

  Please use the specified fuses.

- **Avoid Circuit or Wire Exposure.**

  Do not touch exposed junctions and components when the unit is powered on.

- **Do Not Operate With Suspected Failures.**

  If you suspect that any damage may occur to the instrument, have it inspected by RIGOL authorized personnel before further operations. Any maintenance, adjustment or replacement especially to circuits or accessories must be performed by RIGOL authorized personnel.

- **Provide Adequate Ventilation.**

  Inadequate ventilation may cause an increase of temperature in the instrument, which would cause damage to the instrument. So please keep the instrument well ventilated and inspect the air outlet and the fan regularly.

- **Do Not Operate in Wet Conditions.**

  To avoid short circuit inside the instrument or electric shock, never operate the instrument in a humid environment.

- **Do Not Operate in an Explosive Atmosphere.**

  To avoid personal injuries or damage to the instrument, never operate the instrument in an explosive atmosphere.

- **Keep Product Surfaces Clean and Dry.**

  To avoid dust or moisture from affecting the performance of the instrument, keep the surfaces of the instrument clean and dry.

- **Prevent Electrostatic Impact.**

  Operate the instrument in an electrostatic discharge protective environment to avoid damage induced by static discharges. Always ground both the internal and external conductors of cables to release static before making connections.

- **Proper Use of Battery.**

  Do not expose the battery (if available) to high temperature or fire. Keep it out of the reach of children. Improper change of battery (note: lithium battery) may cause explosion. Use the RIGOL specified battery only.

- **Handle with Caution.**

  Please handle with care during transportation to avoid damage to keys, knob interfaces and other parts on the panels.

1.2 Safety Notices and Symbols

Safety Notices in this Manual:

WARNING

Indicates a potentially hazardous situation or practice which, if not avoided, will result in serious injury or death.

CAUTION

Indicates a potentially hazardous situation or practice which, if not avoided, could result in damage to the product or loss of important data.

Safety Notices on the Product:

- **DANGER**

  It calls attention to an operation, if not correctly performed, could result in injury or hazard immediately.

- **WARNING**

  It calls attention to an operation, if not correctly performed, could result in potential injury or hazard.

- **CAUTION**

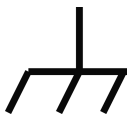
  It calls attention to an operation, if not correctly performed, could result in damage to the product or other devices connected to the product.

Safety Symbols on the Product:

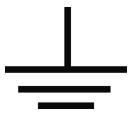
Hazardous Voltage

Safety Warning

Protective Earth Terminal



Chassis Ground



Test Ground

2 Specifications

This chapter lists the technical specifications of the MHO/DHO5000 series oscilloscope.

Its 4 GSa/s sample rate, 1,000,000 wfms/s waveform capture rate (in fast recording mode), 500 Mpts memory depth, 12-bit resolution, excellent noise floor and vertical measurement accuracy can meet the test demands for higher accuracy, bringing users with extraordinary test and measuring experience.

To ensure that the instrument performance meets the specifications, the instrument shall meet the following requirements.

- The instrument has been calibrated under the ambient temperature between 18°C and 28°C.
- The instrument is required to be operating within the specified environmental limits. For specific environment requirements, please refer to *MHO/DHO5000 Data Sheet*.
- The instrument must be powered from a source that meets the requirement. For the power specification, refer to *MHO/DHO5000 Data Sheet*.
- The instrument shall be warmed up for at least 30 minutes within the specified operating temperature range.

The following table lists some of the technical specifications of MHO/DHO5000 series digital oscilloscope. For other technical specifications of MHO/DHO5000, please refer to *MHO/DHO5000 Data Sheet*.

DHO5000 Series				
Model	DHO5058	DHO5054	DHO5108	DHO5104
Analog Bandwidth (50 Ω, -3 dB)	500 MHz		1 GHz	
Analog Bandwidth (1 MΩ, -3 dB)	500 MHz			
No. of Input Channels	DHO5058/DHO5108: 8 analog channels + 1 EXT channel DHO5054/DHO5104: 4 analog channels + 1 EXT channel			
Max. Sample Rate of Analog Channel	DHO5058/DHO5108: 4 GSa/s (single-channel[1] & half-channel[2]), 2 GSa/s (full-channel[3])			
	DHO5054/DHO5104:			

DHO5000 Series				
	4 GSa/s (single-channel[1] & half-channel[2] & full-channel[3])			
MHO5000 Series				
Model	MHO5056	MHO5054	MHO5106	MHO5104
Analog Bandwidth (50 Ω, -3 dB)	500 MHz		1 GHz	
Analog Bandwidth (1 MΩ, -3 dB)	500 MHz			
No. of Input Channels	MHO5054/MHO5104: 4 analog + 1 EXT channel + 16 digital channels			
	MHO5056/MHO5106: 6 analog channels + 1 EXT channel + 16 digital channels Note: The logic analyzer probe is required to be purchased to work with the digital channel.			
Max. Sample Rate of Analog Channel	4 GSa/s (single-channel[1] & half-channel[2]), 2 GSa/s (full-channel[3])			
Overview of the Technical Specifications				
Max. Memory Depth	500 Mpts (single-channel[1] & half-channel[2]), 250 Mpts (full-channel[3])			
Sampling Mode	Real-time sampling			
Max. Waveform Capture Rate	200,000 wfms/s (in Vector mode) 1,000,000 wfms/s (in Record mode)			
Vertical Resolution	12-bit (up to 16-bit in high resolution mode)			
Input Coupling	DC, AC, or GND			
Input Impedance	1 MΩ ± 1%, 50 Ω ± 1%			
Input Capacitance	19 pF ± 3 pF			
Bandwidth Limit (Typical)	20 MHz, 250 MHz, FULL; selectable for each channel			

Overview of the Technical Specifications	
	• The bandwidth limit is automatically set to 250 MHz when the vertical scale is ≤500 μV. • The bandwidth limit is automatically set to 20 MHz when the vertical scale is ≤200 μV.
DC Gain Accuracy	±2% (<5 mV); ±1% (≥5 mV)
DC Offset Accuracy	≤200 mV/div (±0.1 div ± 2 mV ± 1.5% of offset value) >200 mV/div (±0.1 div ± 2 mV ± 1.0% of offset value)
Time Base Accuracy	±1.5 ppm ± 1 ppm/year
Trigger Source	Analog channel (CH1-CH8), digital channel (D0-D15), EXT TRIG, AC Line

[1]: Single-channel mode: If any one of the channels is enabled, it is called single-channel mode.

[2]: Half-channel: when CH1, CH3, CH5, and CH7 are all enabled or when CH2, CH4, CH6, and CH8 are all enabled, it is called half-channel mode.

[3]: Full-channel mode: If all of the channels are enabled, it is called full-channel mode.

3 Document Overview

TIP

For the latest version of this manual, download it from the official website of RIGOL (*http://www.rigol.com*).

Publication Number

PVA43101-1110

Software Version

Software upgrade might change or add product features. Please acquire the latest version of the manual from RIGOL website or contact RIGOL to upgrade the software.

Format Conventions in this Manual

1. **Key**

   The front panel key is denoted by the menu key icon. For example, 

indicates the "DEFAULT" key.

2. **Menu**

   The menu item is denoted by the format of "Menu Name (Bold) + Character Shading" in the manual. For example, **Setup** indicates the "Setup" sub-menu under the "Utility" function menu. You can click or tap **Setup** to access the "Setup" menu.

3. **Operation Procedures**

   The next step of the operation is denoted by ">" in the manual. For example, 

   > **Storage** indicates first clicking or tapping  and then clicking or tapping **Storage**.

4. The front/rear panel connector is denoted by "Brackets + Connector Name (Bold)", for example, **[AUX OUT]**.

Content Conventions in this Manual

MHO/DHO5000 series digital oscilloscope includes the following models, which support different combinations of features.

Model	Max. Analog Bandwidth	Analog Channels	Function/ Arbitrary Waveform Generator Channels	Digital Channels	Bode Plot
DHO5054	500 MHz	4	-	-	-

Model	Max. Analog Bandwidth	Analog Channels	Function/ Arbitrary Waveform Generator Channels	Digital Channels	Bode Plot
DHO5104	1 GHz	4	-	-	-
MHO5054	500 MHz	4	2[1]	16	Supported[1]
MHO5104	1 GHz	4	2[1]	16	Supported[1]
MHO5056	500 MHz	6	-	16	-
MHO5106	1 GHz	6	-	16	-
DHO5058	500 MHz	8	-	-	-
DHO5108	1 GHz	8	-	-	-

Note: [1] The MHO5000-AWG option is required to be installed for use.

Unless otherwise specified, this manual takes DHO5108 as an example to illustrate the operation methods of MHO/DHO5000 series. The digital analysis, function/ arbitrary waveform generator and Bode plot are illustrated by the MHO5104 model.

4 Overview

4.1 To Prepare for the Test

Before the test, make the following preparations.

1. Self-test
2. Warm-up (keep the oscilloscope running for at least 30 minutes)
3. Self-calibration

Self-test

After the instrument is connected to the power source, press the power key at the lower-left corner of the front panel to power on the instrument. You can also click or tap > **Utility** > **Setup**. Then select "Switch On" for the **Power Status** menu. Once the settings are completed, the instrument will be initiated automatically when it is connected to the power source.

During the start-up process, the instrument performs a series of self-tests. After the self-test, the splash screen is displayed.

If the oscilloscope cannot start normally, refer to "Troubleshooting" section in *MHO/DHO5000 User Guide* to locate the problem and resolve it. Do not perform self-calibration or performance tests until the instrument passes the self-test.

Self-calibration

The self-calibration program can quickly make the oscilloscope to work in an optimal state to get the precise measurement results. You can perform self-calibration at any time, especially when the temperature variation is ±5℃ from the ambient temperature. Make sure that the oscilloscope has been warmed up or operating for more than 30 minutes before the self-calibration.

1. Disconnect all the input channels.
2. In "Utility" menu, click or tap **SelfCal**, the following self-calibration interface is shown below.

Figure 4.1 Self-calibration Menu

- Click or tap **Start**, and then the oscilloscope will start to execute the self-calibration program.
- After starting the self-calibration program, you can click or tap **Exit** to cancel self-calibration operation at any time.

3. After completing the self-calibration, restart the oscilloscope. In the **Horizontal** system menu, select "Average" for the **Acquisition** menu. Then click or tap the input field of **Averages** to input 16.
4. Set the vertical scale of each channel to 2 mV/div. Then observe the offset of each channel. If the offset is greater than 0.5 div, check whether there are interference signals around the instrument and whether the power source is well grounded. If all these problems have been resolved, perform self-calibration again.
5. Click or tap **Close** to close the self-calibration information window.

4.2 Test Result Record

Record and keep the test result of each test. In the final chapter of this manual, a test result record form is provided. The form lists all the test items and their corresponding performance limits as well as spaces for users to record the test results.

TIP

It is recommended that users photocopy the test record form before each test and record the test results in the copy so that the form can be used repeatedly.

4.3 Specifications

The specification of each test item is provided in this manual. For other technical parameters, refer to *MHO/DHO5000 DataSheet* (available to download from RIGOL website: *http://www.rigol.com*).

TIP

All the specifications are only valid when the oscilloscope has been warmed up for more than 30 minutes under the specified operating temperature (18℃ to 28℃).

5 Performance Verification Test

This chapter takes DHO5108 as an example to illustrate the performance verification test methods and procedures of MHO/DHO5000 series digital oscilloscope. The recommended test devices in this manual are shown below. You can also use other devices that fulfill the "Specification" in *Table 5.1 Test Devices* .

Table 5.1 Test Devices

Device	Specification	Recommended Device Model
Oscilloscope Calibrator	DC: ±1 mV to ±200 V, ±(0.025% + 25 μV)	Fluke 9500B
	Steady-state Sinusoidal Wave: (5 mV-5 V)@(0.1 Hz-3.2 GHz), ±1.5%	
	Impedance: ±0.1%	
	Capacitance: 1 pF to 35 pF, ±2% ± 0.25 pF	

TIP

1. Before executing the performance verification test, ensure that the oscilloscope has passed the self-test and self-calibration.
2. Before performing each test item, ensure that the oscilloscope has been warmed up for at least 30 minutes.
3. Before and after performing each test item, restore the instrument to the factory setting.

5.1 Random Noise Test

This test tests the random noise for each channel in the Normal acquisition mode.

5.1.1 Specification

Random noise, typical (input impedance 50 Ω, sample rate 4 GSa/s, memory depth 1 Mpts, timebase 20 μs)	
Vertical Scale (V/div)	1 GHz Bandwidth
100 μV/div[1]	31 μV_{rms}
200 μV/div[1]	50 μV_{rms}
500 μV/div[2]	80 μV_{rms}
1 mV/div	158 μV_{rms}

Random noise, typical (input impedance 50 Ω, sample rate 4 GSa/s, memory depth 1 Mpts, timebase 20 μs)	
2 mV/div	159 μV_{rms}
5 mV/div	156 μV_{rms}
10 mV/div	407 μV_{rms}
20 mV/div	466 μV_{rms}
50 mV/div	660 μV_{rms}
100 mV/div	998 μV_{rms}
200 mV/div	4.92 mV_{rms}
500 mV/div	6.8 mV_{rms}
1 V/div	9.98 mV_{rms}

Random noise, typical (input impedance 1 MΩ, sample rate 4 GSa/s, memory depth 1 Mpts, timebase 20 μs)	
Vertical Scale (V/div)	500 MHz Bandwidth
100 μV/div[1]	54 μV_{rms}
200 μV/div[1]	52.8 μV_{rms}
500 μV/div[2]	78 μV_{rms}
1 mV/div	130.8 μV_{rms}
2 mV/div	127.2 μV_{rms}
5 mV/div	153.6 μV_{rms}
10 mV/div	270 μV_{rms}
20 mV/div	331.2 μV_{rms}
50 mV/div	614.4 μV_{rms}
100 mV/div	3 mV_{rms}
200 mV/div	3.6 mV_{rms}

Random noise, typical (input impedance 1 MΩ, sample rate 4 GSa/s, memory depth 1 Mpts, timebase 20 μs)	
500 mV/div	12.84 mV_{rms}
1 V/div	16.08 mV_{rms}
2 V/div	24.36 mV_{rms}
5 V/div	117.84 mV_{rms}
10 V/div	156.36 mV_{rms}

NOTE

[1]: tested under 20 MHz bandwidth limit.

[2]: tested under 250 MHz bandwidth limit.

5.1.2 Test Connection Diagram

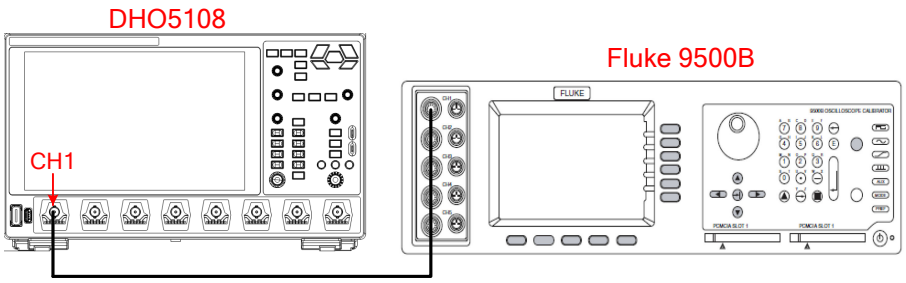


Figure 5.1 Test Connection Diagram

5.1.3 Test Procedures

TIP

Before test, disconnect the instrument from all the signal generators and keep the noise sources away from the instrument.

1. Press DEFAULT on the front panel to restore the oscilloscope to the default settings.
2. Click or tap the channel label at the bottom of the screen to activate CH1. The "Vertical" system menu is displayed. Click or tap to select 50 Ω for **Impedance** to set the input impedance of CH1 to 50 Ω. By default, the probe ratio is "1X".
3. Set the vertical scale to 100 μV/div, and the bandwidth limit will be enabled automatically to 20 MHz.
4. By default, the acquisition mode is Normal; the sample rate is 4 GSa/s. Set the horizontal timebase to 20 μs/div; set the memory depth to 1 Mpts.

5. Click or tap the trigger information label at the top of the screen. Set the trigger source to CH1. Set the trigger level to a max. value to avoid mis-triggering.
6. In the **Measure** menu, click or tap **Vertical** measurement item to select "AC.RMS". The AC.RMS measurement result list is displayed at the right section of the screen.
7. Click or tap the result list, then select **Setting**. Set **Count** to 100.
8. When the statistics count in the result list shows 100, read and record the AC.RMS value.
9. For the parameter setting, refer to *Test Record Form*. Repeat Step 1-8 and test the AC.RMS value under different vertical scale, bandwidth, and impedance values. The test results should be smaller than the max. value in the record form.

5.1.4 Test Record Form

Vertical Scale	Bandwidth	Test Result	Max. Value	Pass/Fail
50 Ω				
100 μV/div	20 MHz		31 μV_{rms}	
200 μV/div	20 MHz		50 μV_{rms}	
500 μV/div	250 MHz		80 μV_{rms}	
1 mV/div	Full BW		158 μV_{rms}	
2 mV/div			159 μV_{rms}	
5 mV/div			156 μV_{rms}	
10 mV/div			407 μV_{rms}	
20 mV/div			466 μV_{rms}	
50 mV/div			660 μV_{rms}	
100 mV/div			998 μV_{rms}	
200 mV/div			4.92 mV_{rms}	
500 mV/div			6.8 mV_{rms}	
1 V/div			9.98 mV_{rms}	
1 MΩ				
100 μV/div	20 MHz		54 μV_{rms}	
200 μV/div	20 MHz		52.8 μV_{rms}	
500 μV/div	250 MHz		78 μV_{rms}	
1 mV/div	Full BW		130.8 μV_{rms}	
2 mV/div			127.2 μV_{rms}	
5 mV/div			153.6 μV_{rms}	
10 mV/div			270 μV_{rms}	
20 mV/div			331.2 μV_{rms}	
50 mV/div			614.4 μV_{rms}	
100 mV/div			3 mV_{rms}	

Vertical Scale	Bandwidth	Test Result	Max. Value	Pass/Fail
200 mV/div			3.6 mV_{rms}	
500 mV/div			12.84 mV_{rms}	
1 V/div			16.08 mV_{rms}	
2 V/div			24.36mV_{rms}	
5 V/div			117.84mV_{rms}	
10 V/div			156.36mV_{rms}	

5.2 Impedance Test

5.2.1 Specification

Input Impedance	
Analog Channel	1 MΩ: 0.99 MΩ to 1.01 MΩ
	50 Ω: 49.5 Ω to 50.5 Ω

5.2.2 Test Connection Diagram

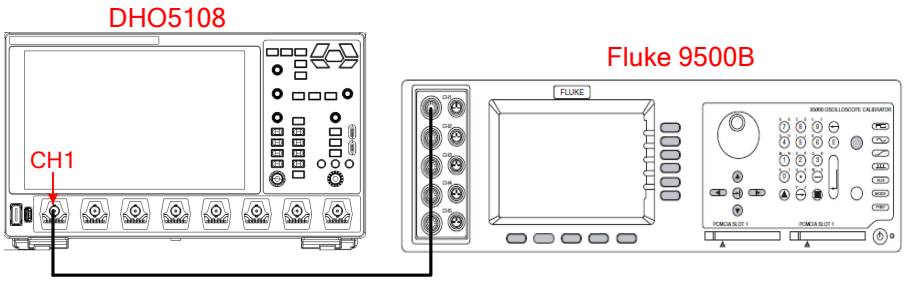


Figure 5.2 Test Connection Diagram

5.2.3 Test Procedures

WARNING

Before connecting, disconnecting, or moving the test devices, disable the output of the signal generator to avoid causing the dangerous voltage.

Impedance test when the input impedance is 1 MΩ

1. Connect the active head of Fluke 9500B to CH1 of the oscilloscope, as shown in *Figure 5.1* .
2. Configure the digital oscilloscope:
   a. Enable the channel:

- Click or tap the CH1 channel status label at the bottom of the screen to enable CH1.
- Press the front-panel key 1 to enable CH1.
- In the **Vertical** menu, select the CH1 tab. Select **ON** for the **Display** menu to enable CH1.

b. In the **Vertical** system menu, click or tap to select 1 MΩ under **Impedance** to set the input impedance of CH1 to 1 MΩ.

c. Set the CH1 vertical scale to 50 mV/div.

3. Turn on Fluke 9500B; set its impedance to 1 MΩ and select the resistance measurement function. Read and record the resistance measured.

4. Adjust the vertical scale of CH1 to 500 mV/div. Read and record the resistance measured.

5. Disable CH1. Test the resistance of CH2, CH3, CH4, CH5, CH6, CH7, and CH8 respectively. Read and record the measurement results.

Impedance test when the input impedance is 50 Ω

1. Connect the active head of Fluke 9500B to CH1 of the oscilloscope, as shown in *Figure 5.1* .

2. Configure the digital oscilloscope:

a. Use the method illustrated above to enable CH1.

b. Set the input impedance of CH1 to 50 Ω.

c. Set the vertical scale of CH1 to 100 mV/div.

3. Turn on Fluke 9500B; set its impedance to 50 Ω and select the resistance measurement function. Read and record the resistance measured.

4. Adjust the vertical scale of CH1 to 500 mV/div. Read and record the resistance measured.

5. Disable CH1. Test the resistance of CH2, CH3, CH4, CH5, CH6, CH7, and CH8 respectively. Read and record the measurement results.

5.2.4 Test Record Form

1 MΩ Input Impedance

Channel	Vertical Scale	Test Result	Limit	Pass/Fail
CH1	50 mV/div		0.99 MΩ to 1.01 MΩ	
	500 mV/div			
CH2	50 mV/div			
	500 mV/div			

Channel	Vertical Scale	Test Result	Limit	Pass/Fail
CH3	50 mV/div			
	500 mV/div			
CH4	50 mV/div			
	500 mV/div			
CH5	50 mV/div			
	500 mV/div			
CH6	50 mV/div			
	500 mV/div			
CH7	50 mV/div			
	500 mV/div			
CH8	50 mV/div			
	500 mV/div			

50 Ω Input Impedance

Channel	Vertical Scale	Test Result	Limit	Pass/Fail
CH1	50 mV/div		49.5 Ω to 50.5 Ω	
	500 mV/div			
CH2	50 mV/div			
	500 mV/div			
CH3	50 mV/div			
	500 mV/div			
CH4	50 mV/div			
	500 mV/div			
CH5	50 mV/div			
	500 mV/div			
CH6	50 mV/div			
	500 mV/div			
CH7	50 mV/div			
	500 mV/div			
CH8	50 mV/div			
	500 mV/div			

5.3 Input Capacitance Test

5.3.1 Specification

Input Capacitance	
Specification	19 pF ± 3 pF

5.3.2 Test Connection Diagram

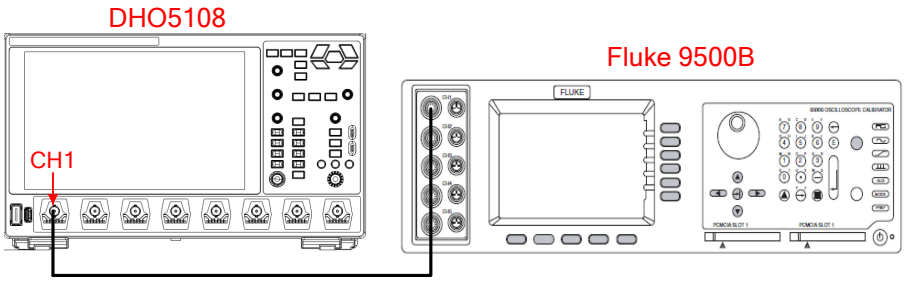


Figure 5.3 Test Connection Diagram

5.3.3 Test Procedures

WARNING

Before connecting, disconnecting, or moving the test devices, disable the output of the signal generator to avoid causing the dangerous voltage.

1. Connect the active head of Fluke 9500B to CH1 of the oscilloscope, as shown in *Figure 5.1* .
2. Configure the digital oscilloscope:
   a. Enable CH1.
      - Click or tap the CH1 channel status label at the bottom of the screen to enable CH1.
      - Press the front-panel key [1] to enable CH1.
      - In the **Vertical** menu, select the CH1 tab. Select **ON** for the **Display** menu to enable CH1.
   b. In the **Vertical** system menu, click or tap to select 1 MΩ under **Impedance** to set the input impedance of CH1 to 1 MΩ.
   c. Set the vertical scale of CH1 to 50 mV/div.
3. Turn on Fluke 9500B; set its impedance to 1 MΩ and select the capacitance measurement function. Read and record the capacitance measured.
4. Adjust the vertical scale of CH1 to 500 mV/div. Read and record the capacitance measured.
5. Disable CH1. Test the capacitance of CH2, CH3, CH4, CH5, CH6, CH7, and CH8 respectively. Read and record the measurement results.

5.3.4 Test Record Form

Channel	Vertical Scale	Test Result	Limit	Pass/Fail
CH1	50 mV/div		19 pF ± 3 pF	
	500 mV/div			
CH2	50 mV/div			
	500 mV/div			
CH3	50 mV/div			
	500 mV/div			
CH4	50 mV/div			
	500 mV/div			
CH5	50 mV/div			
	500 mV/div			
CH6	50 mV/div			
	500 mV/div			
CH7	50 mV/div			
	500 mV/div			
CH8	50 mV/div			
	500 mV/div			

5.4 DC Gain Accuracy Test

5.4.1 Specification

DC Gain Accuracy	
Specification	±2% (<5 mV)
	±1% (≥5 mV)

5.4.2 Test Connection Diagram

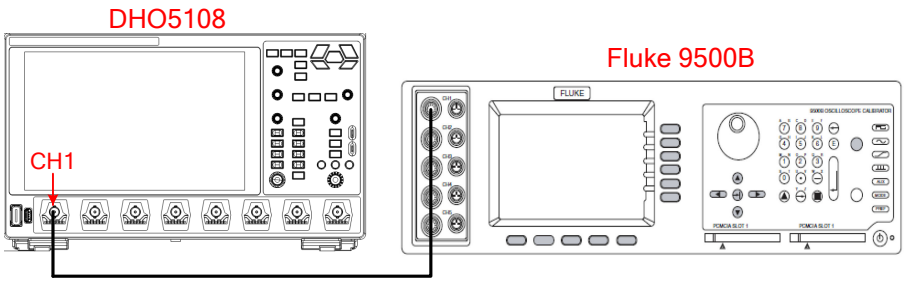


Figure 5.4 Test Connection Diagram

5.4.3 Test Procedures

WARNING

Before connecting, disconnecting, or moving the test devices, disable the output of the signal generator to avoid causing the dangerous voltage.

DC gain accuracy test when the input impedance is 1 MΩ

1. Connect the active head of Fluke 9500B to CH1 of the oscilloscope, as shown in *Figure 5.1* .
2. Set the impedance of Fluke 9500B to 1 MΩ.
3. Output a DC signal whose output voltage (V_{out}) is +3 mV_{dc}.
4. Configure the digital oscilloscope:
   a. Enable CH1.
      - Click or tap the CH1 channel status label at the bottom of the screen to enable CH1.
      - Press the front-panel key [1] to enable CH1.
      - In the **Vertical** menu, select the CH1 tab. Select **ON** for the **Display** menu to enable CH1.
   b. Click or tap the channel label at the bottom of the screen, the **Vertical** menu is displayed. Click or tap **Probe** to enter the **Probe** setting menu. Set the probe ratio to "1X".
   c. In the **Vertical** system menu, click or tap 1 MΩ under **Impedance** to set the input impedance of CH1 to 1 MΩ.
   d. Set the vertical scale to 1 mV/div.
   e. Set the horizontal timebase to 1 μs/div.
   f. Set the vertical offset to 0 V.
   g. In the Horizontal system menu, select "Average" for the **Acquisition** menu. Then click or tap the input field for the **Averages** menu item to set it to 32 by using the pop-up numeric keypad.
   h. Adjust the trigger level to avoid mis-triggering.
5. In the **Measure** menu, click or tap **Vertical** measurement item to select "Vavg". The Vavg measurement result list is displayed at the right section of the screen. Read the value from the "result" list and record the measurement result of $V_{avg}1$.
6. Adjust Fluke 9500B to make it output a DC signal whose output voltage ($V_{out}2$) is -3 mV_{dc}.

7. Enable the Vavg measurement function. Read and record $V_{avg}2$.
8. Calculate the relative error of the vertical scale: $|(V_{avg}1 - V_{avg}2) - (V_{out}1 - V_{out}2)|$ / 100% of full scale.
9. Remain other settings of the oscilloscope unchanged.
   a. Set the vertical scale to 2 mV/div, 5 mV/div, 10 mV/div, 20 mV/div, 50 mV/div, 100 mV/div, 200 mV/div, 500 mV/div, 1 V/div, 2 V/div, 5 V/div, and 10 V/div respectively.
   b. Set the output voltage of Fluke 9500B to (3 x the current vertical scale) and (-3 x the current vertical scale) respectively.
   c. Repeat Step 3-7 and record the test results.
   d. Calculate the relative error of each vertical scale: $|(V_{avg}1 - V_{avg}2) - (V_{out}1 - V_{out}2)|$ / 100% of full scale.
10. Disable CH1. Calculate the relative error of each vertical scale of CH2, CH3, CH4, CH5, CH6, CH7, and CH8 respectively according to the above test methods. Read and record the measurement results.

DC gain accuracy test when the input impedance is 50 Ω

1. Connect the active head of Fluke 9500B to CH1 of the oscilloscope, as shown in *Figure 5.1* .
2. Turn on Fluke 9500B; set its impedance to 50 Ω.
3. Output a DC signal with the output voltage $V_{out}1$ of +3 mV.
4. Configure the digital oscilloscope:
   a. Enable CH1.
   b. Set the probe ratio to "1X".
   c. Set the input impedance of CH1 to 50 Ω.
   d. Set the vertical scale to 1 mV/div.
   e. Set the horizontal timebase to 1 μs/div.
   f. Set the vertical offset to 0 V.
   g. In the Horizontal system menu, select "Average" for the **Acquisition** menu. Then click or tap the input field for the **Averages** menu item to set it to 32 by using the pop-up numeric keypad.
   h. Adjust the trigger level to avoid mis-triggering.

5. Test the relative error of each vertical scale of CH1 (except 2 V/div, 5 V/div, and 10 V/div vertical scale) according to Step 5-9 specified in *DC gain accuracy test when the input impedance is 1 MΩ* and record the test results.
6. Disable CH1. Calculate the relative error of each vertical scale of CH2, CH3, CH4, CH5, CH6, CH7, and CH8 respectively according to the above test methods. Read and record the measurement results.

5.4.4 Test Record Form

50 Ω Input Impedance

Channel	Vertical Scale	Test Result			Limit	Pass/Fail
		$V_{avg}1$	$V_{avg}2$	Calculation Result[1]		
CH1	1 mV/div				≤2%	
	2 mV/div					
	5 mV/div				≤1%	
	10 mV/div					
	20 mV/div					
	50 mV/div					
	100 mV/div					
	200 mV/div					
	500 mV/div					
	1 V/div					
CH2	1 mV/div				≤2%	
	2 mV/div					
	5 mV/div				≤1%	
	10 mV/div					
	20 mV/div					
	50 mV/div					
	100 mV/div					
	200 mV/div					
	500 mV/div					
	1 V/div					
CH3	1 mV/div				≤2%	
	2 mV/div					
	5 mV/div				≤1%	
	10 mV/div					
	20 mV/div					
	50 mV/div					
	100 mV/div					
	200 mV/div					
	500 mV/div					

Channel	Vertical Scale	Test Result			Limit	Pass/Fail
		$V_{avg}1$	$V_{avg}2$	Calculation Result[1]		
	1 V/div					
CH4	1 mV/div				≤2%	
	2 mV/div					
	5 mV/div				≤1%	
	10 mV/div					
	20 mV/div					
	50 mV/div					
	100 mV/div					
	200 mV/div					
	500 mV/div					
	1 V/div					
CH5	1 mV/div				≤2%	
	2 mV/div					
	5 mV/div				≤1%	
	10 mV/div					
	20 mV/div					
	50 mV/div					
	100 mV/div					
	200 mV/div					
	500 mV/div					
	1 V/div					
CH6	1 mV/div				≤2%	
	2 mV/div					
	10 mV/div				≤1%	
	20 mV/div					
	50 mV/div					
	100 mV/div					
	200 mV/div					
	500 mV/div					
	1 V/div					
CH7	1 mV/div				≤2%	
	2 mV/div					
	10 mV/div				≤1%	
	20 mV/div					
	50 mV/div					
	100 mV/div					
	200 mV/div					
	500 mV/div					
	1 V/div					
CH8	1 mV/div				≤2%	

Channel	Vertical Scale	Test Result			Limit	Pass/Fail
		$V_{avg}1$	$V_{avg}2$	Calculation Result[1]		
	2 mV/div					
	5 mV/div				≤1%	
	10 mV/div					
	20 mV/div					
	50 mV/div					
	100 mV/div					
	200 mV/div					
	500 mV/div					
	1 V/div					

1 MΩ Input Impedance

Channel	Vertical Scale	Test Result			Limit	Pass/Fail
		$V_{avg}1$	$V_{avg}2$	Calculation Result[1]		
CH1	1 mV/div				≤2%	
	2 mV/div					
	5 mV/div				≤1%	
	10 mV/div					
	20 mV/div					
	50 mV/div					
	100 mV/div					
	200 mV/div					
	500 mV/div					
	1 V/div					
	2 V/div					
	5 V/div					
	10 V/div					
CH2	1 mV/div				≤2%	
	2 mV/div					
	5 mV/div				≤1%	
	10 mV/div					
	20 mV/div					
	50 mV/div					
	100 mV/div					
	200 mV/div					
	500 mV/div					
	1 V/div					
	2 V/div					
	5 V/div					
	10 V/div					

Channel	Vertical Scale	Test Result			Limit	Pass/Fail
		$V_{avg}1$	$V_{avg}2$	Calculation Result[1]		
CH3	1 mV/div				≤2%	
	2 mV/div					
	5 mV/div				≤1%	
	10 mV/div					
	20 mV/div					
	50 mV/div					
	100 mV/div					
	200 mV/div					
	500 mV/div					
	1 V/div					
	2 V/div					
	5 V/div					
	10 V/div					
CH4	1 mV/div				≤2%	
	2 mV/div					
	5 mV/div				≤1%	
	10 mV/div					
	20 mV/div					
	50 mV/div					
	100 mV/div					
	200 mV/div					
	500 mV/div					
	1 V/div					
	2 V/div					
	5 V/div					
	10 V/div					
CH5	1 mV/div				≤2%	
	2 mV/div					
	5 mV/div				≤1%	
	10 mV/div					
	20 mV/div					
	50 mV/div					
	100 mV/div					
	200 mV/div					
	500 mV/div					
	1 V/div					
	2 V/div					
	5 V/div					
	10 V/div					
CH6	1 mV/div				≤2%	

Channel	Vertical Scale	Test Result			Limit	Pass/Fail
		$V_{avg}1$	$V_{avg}2$	Calculation Result[1]		
	2 mV/div					
	5 mV/div					
	10 mV/div					
	20 mV/div					
	50 mV/div					
	100 mV/div					
	200 mV/div				≤1%	
	500 mV/div					
	1 V/div					
	2 V/div					
	5 V/div					
	10 V/div					
CH7	1 mV/div				≤2%	
	2 mV/div					
	5 mV/div					
	10 mV/div					
	20 mV/div					
	50 mV/div					
	100 mV/div					
	200 mV/div				≤1%	
	500 mV/div					
	1 V/div					
	2 V/div					
	5 V/div					
	10 V/div					
CH8	1 mV/div				≤2%	
	2 mV/div					
	5 mV/div					
	10 mV/div					
	20 mV/div					
	50 mV/div					
	100 mV/div					
	200 mV/div				≤1%	
	500 mV/div					
	1 V/div					
	2 V/div					
	5 V/div					
	10 V/div					

NOTE

[1]: The calculation formula is as follows: $|(V_{avg}1 - V_{avg}2) - (V_{out}1 - V_{out}2)|$ / 100% of full scale. Wherein, $V_{out}1$ and $V_{out}2$ are 3 x the current vertical scale and -3 x the current vertical scale respectively.

5.5 DC Offset Accuracy Test

5.5.1 Specification

DC Offset Accuracy	
Specification	≤200 mV/div (±0.1 div ± 2 mV ± 1.5% of the offset value) >200 mV/div (±0.1 div ± 2 mV ± 1.0% of the offset value)

5.5.2 Test Connection Diagram

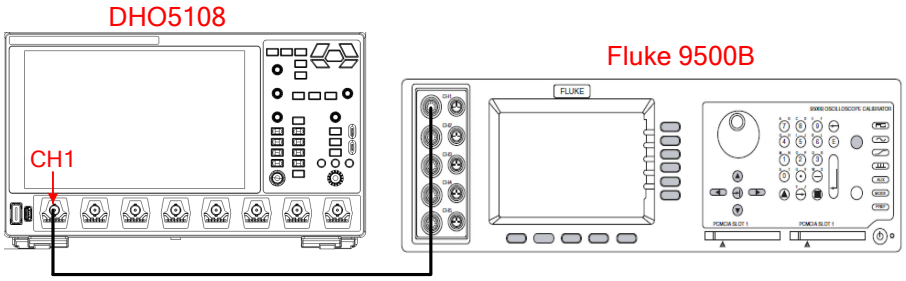


Figure 5.5 Test Connection Diagram

5.5.3 Test Procedures

WARNING

Before connecting, disconnecting, or moving the test devices, disable the output of the signal generator to avoid causing the dangerous voltage.

1. Connect the active head of Fluke 9500B to CH1 of the oscilloscope, as shown in *Figure 5.1* .
2. Set the impedance of Fluke 9500B to 1 MΩ.
3. Configure the digital oscilloscope:
   a. Press DEFAULT on the front panel to restore the oscilloscope to the default settings.
   b. Click or tap the channel status label at the bottom of the screen. The "Vertical" system menu is displayed. Click or tap to select 1 MΩ for **Impedance** to set the input impedance of CH1 to 1 MΩ.

c. Set the vertical scale to 10 mV/div.

d. Click or tap the drop-down button of the **BW Limit** menu to select "20M".

e. Set the offset to 1 V, as shown in *Test Record Form* of the DC offset accuracy test. Close the Vertical system menu.

f. Click or tap the horizontal menu at the top of the screen. Then the **Horizontal** system menu is displayed. In this menu, set the timebase to 1 ms/div. Select "Average" for the **Acquisition** menu. Then click or tap the input field for the **Averages** menu item to set it to 16 by using the pop-up numeric keypad. Close the Horizontal system menu.

g. Click or tap the trigger information label at the top of the screen. Set **Source** to "AC Line".

h. Adjust the trigger level to avoid mis-triggering.

4. Set the output of Fluke 9500B to -1 V.

5. In the **Measure** menu, click or tap **Vertical** measurement item to select "Vavg". The Vavg measurement result list is displayed at the right section of the screen. Read the value from the "result" list and record the measurement result.

6. Set the vertical offset of the oscilloscope to 0 V.

7. Set the output of Fluke 9500B to 0 V. Read the value from the "result" list and record the measurement result.

8. Repeat Step 2-7. Measure and record the results according to the given vertical scale, offset, and impedance in *Test Record Form* of the DC offset accuracy test.

5.5.4 Test Record Form

Channel Setting	Vertical Scale	Offset	Test Result	Min.	Max.
CH1, 1 MΩ, 20 MHz BW	10 mV/div	1 V		-1.02 V	-0.98 V
	10 mV/div	0 V		-3.00 mV	3.00 mV
	10 mV/div	-1 V		0.98 V	1.02 V
	200 mV/div	10 V		-10.17 V	-9.83 V
	200 mV/div	0 V		-22.00 mV	22.00 mV
	200 mV/div	-10 V		9.83 V	10.17 V
	1 V/div	20 V		-20.30 V	-19.70 V
	1 V/div	0 V		-102.00 mV	102.00 mV
	1 V/div	-20 V		19.70 V	20.30 V
	5 V/div	100 V		-101.50 V	-98.50 V
	5 V/div	0 V		-502.00 mV	502.00 mV
	5 V/div	-100 V		98.50 V	101.50 V

Channel Setting	Vertical Scale	Offset	Test Result	Min.	Max.
CH1, 50 Ω, 20 MHz BW	100 mV/div	1 V		-1.03 V	-0.97 V
	100 mV/div	0 V		-12.00 mV	12.00 mV
	100 mV/div	-1 V		0.97 V	1.03 V
	200 mV/div	4 V		-4.08 V	-3.92 V
	200 mV/div	0 V		-22.00 mV	22.00 mV
	200 mV/div	-4 V		3.92 V	4.08 V
CH2, 1 MΩ, 20 MHz BW	10 mV/div	1 V		-1.02 V	-0.98 V
	10 mV/div	0 V		-3.00 mV	3.00 mV
	10 mV/div	-1 V		0.98 V	1.02 V
	200 mV/div	10 V		-10.17 V	-9.83 V
	200 mV/div	0 V		-22.00 mV	22.00 mV
	200 mV/div	-10 V		9.83 V	10.17 V
	1 V/div	20 V		-20.30 V	-19.70 V
	1 V/div	0 V		-102.00 mV	102.00 mV
	1 V/div	-20 V		19.70 V	20.30 V
	5 V/div	100 V		-101.50 V	-98.50 V
	5 V/div	0 V		-502.00 mV	502.00 mV
	5 V/div	-100 V		98.50 V	101.50 V
CH2, 50 Ω, 20 MHz BW	100 mV/div	1 V		-1.03 V	-0.97 V
	100 mV/div	0 V		-12.00 mV	12.00 mV
	100 mV/div	-1 V		0.97 V	1.03 V
	200 mV/div	4 V		-4.08 V	-3.92 V
	200 mV/div	0 V		-22.00 mV	22.00 mV
	200 mV/div	-4 V		3.92 V	4.08 V
CH3, 1 MΩ, 20 MHz BW	10 mV/div	1 V		-1.02 V	-0.98 V
	10 mV/div	0 V		-3.00 mV	3.00 mV
	10 mV/div	-1 V		0.98 V	1.02 V
	200 mV/div	10 V		-10.17 V	-9.83 V
	200 mV/div	0 V		-22.00 mV	22.00 mV
	200 mV/div	-10 V		9.83 V	10.17 V
	1 V/div	20 V		-20.30 V	-19.70 V
	1 V/div	0 V		-102.00 mV	102.00 mV
	1 V/div	-20 V		19.70 V	20.30 V
	5 V/div	100 V		-101.50 V	-98.50 V
	5 V/div	0 V		-502.00 mV	502.00 mV
	5 V/div	-100 V		98.50 V	101.50 V
CH3, 50 Ω, 20 MHz BW	100 mV/div	1 V		-1.03 V	-0.97 V
	100 mV/div	0 V		-12.00 mV	12.00 mV
	100 mV/div	-1 V		0.97 V	1.03 V
	200 mV/div	4 V		-4.08 V	-3.92 V
	200 mV/div	0 V		-22.00 mV	22.00 mV

Channel Setting	Vertical Scale	Offset	Test Result	Min.	Max.
	200 mV/div	-4 V		3.92 V	4.08 V
CH4, 1 MΩ, 20 MHz BW	10 mV/div	1 V		-1.02 V	-0.98 V
	10 mV/div	0 V		-3.00 mV	3.00 mV
	10 mV/div	-1 V		0.98 V	1.02 V
	200 mV/div	10 V		-10.17 V	-9.83 V
	200 mV/div	0 V		-22.00 mV	22.00 mV
	200 mV/div	-10 V		9.83 V	10.17 V
	1 V/div	20 V		-20.30 V	-19.70 V
	1 V/div	0 V		-102.00 mV	102.00 mV
	1 V/div	-20 V		19.70 V	20.30 V
	5 V/div	100 V		-101.50 V	-98.50 V
	5 V/div	0 V		-502.00 mV	502.00 mV
	5 V/div	-100 V		98.50 V	101.50 V
CH4, 50 Ω, 20 MHz BW	100 mV/div	1 V		-1.03 V	-0.97 V
	100 mV/div	0 V		-12.00 mV	12.00 mV
	100 mV/div	-1 V		0.97 V	1.03 V
	200 mV/div	4 V		-4.08 V	-3.92 V
	200 mV/div	0 V		-22.00 mV	22.00 mV
	200 mV/div	-4 V		3.92 V	4.08 V
CH5, 1 MΩ, 20 MHz BW	10 mV/div	1 V		-1.02 V	-0.98 V
	10 mV/div	0 V		-3.00 mV	3.00 mV
	10 mV/div	-1 V		0.98 V	1.02 V
	200 mV/div	10 V		-10.17 V	-9.83 V
	200 mV/div	0 V		-22.00 mV	22.00 mV
	200 mV/div	-10 V		9.83 V	10.17 V
	1 V/div	20 V		-20.30 V	-19.70 V
	1 V/div	0 V		-102.00 mV	102.00 mV
	1 V/div	-20 V		19.70 V	20.30 V
	5 V/div	100 V		-101.50 V	-98.50 V
	5 V/div	0 V		-502.00 mV	502.00 mV
	5 V/div	-100 V		98.50 V	101.50 V
CH5, 50 Ω, 20 MHz BW	100 mV/div	1 V		-1.03 V	-0.97 V
	100 mV/div	0 V		-12.00 mV	12.00 mV
	100 mV/div	-1 V		0.97 V	1.03 V
	200 mV/div	4 V		-4.08 V	-3.92 V
	200 mV/div	0 V		-22.00 mV	22.00 mV
	200 mV/div	-4 V		3.92 V	4.08 V
CH6, 1 MΩ, 20 MHz BW	10 mV/div	1 V		-1.02 V	-0.98 V
	10 mV/div	0 V		-3.00 mV	3.00 mV
	10 mV/div	-1 V		0.98 V	1.02 V
	200 mV/div	10 V		-10.17 V	-9.83 V

Channel Setting	Vertical Scale	Offset	Test Result	Min.	Max.
	200 mV/div	0 V		-22.00 mV	22.00 mV
	200 mV/div	-10 V		9.83 V	10.17 V
	1 V/div	20 V		-20.30 V	-19.70 V
	1 V/div	0 V		-102.00 mV	102.00 mV
	1 V/div	-20 V		19.70 V	20.30 V
	5 V/div	100 V		-101.50 V	-98.50 V
	5 V/div	0 V		-502.00 mV	502.00 mV
	5 V/div	-100 V		98.50 V	101.50 V
CH6, 50 Ω, 20 MHz BW	100 mV/div	1 V		-1.03 V	-0.97 V
	100 mV/div	0 V		-12.00 mV	12.00 mV
	100 mV/div	-1 V		0.97 V	1.03 V
	200 mV/div	4 V		-4.08 V	-3.92 V
	200 mV/div	0 V		-22.00 mV	22.00 mV
	200 mV/div	-4 V		3.92 V	4.08 V
CH7, 1 MΩ, 20 MHz BW	10 mV/div	1 V		-1.02 V	-0.98 V
	10 mV/div	0 V		-3.00 mV	3.00 mV
	10 mV/div	-1 V		0.98 V	1.02 V
	200 mV/div	10 V		-10.17 V	-9.83 V
	200 mV/div	0 V		-22.00 mV	22.00 mV
	200 mV/div	-10 V		9.83 V	10.17 V
	1 V/div	20 V		-20.30 V	-19.70 V
	1 V/div	0 V		-102.00 mV	102.00 mV
	1 V/div	-20 V		19.70 V	20.30 V
	5 V/div	100 V		-101.50 V	-98.50 V
	5 V/div	0 V		-502.00 mV	502.00 mV
	5 V/div	-100 V		98.50 V	101.50 V
CH7, 50 Ω, 20 MHz BW	100 mV/div	1 V		-1.03 V	-0.97 V
	100 mV/div	0 V		-12.00 mV	12.00 mV
	100 mV/div	-1 V		0.97 V	1.03 V
	200 mV/div	4 V		-4.08 V	-3.92 V
	200 mV/div	0 V		-22.00 mV	22.00 mV
	200 mV/div	-4 V		3.92 V	4.08 V
CH8, 1 MΩ, 20 MHz BW	10 mV/div	1 V		-1.02 V	-0.98 V
	10 mV/div	0 V		-3.00 mV	3.00 mV
	10 mV/div	-1 V		0.98 V	1.02 V
	200 mV/div	10 V		-10.17 V	-9.83 V
	200 mV/div	0 V		-22.00 mV	22.00 mV
	200 mV/div	-10 V		9.83 V	10.17 V
	1 V/div	20 V		-20.30 V	-19.70 V
	1 V/div	0 V		-102.00 mV	102.00 mV
	1 V/div	-20 V		19.70 V	20.30 V

Channel Setting	Vertical Scale	Offset	Test Result	Min.	Max.
CH8, 50 Ω, 20 MHz BW	5 V/div	100 V		-101.50 V	-98.50 V
	5 V/div	0 V		-502.00 mV	502.00 mV
	5 V/div	-100 V		98.50 V	101.50 V
	100 mV/div	1 V		-1.03 V	-0.97 V
	100 mV/div	0 V		-12.00 mV	12.00 mV
	100 mV/div	-1 V		0.97 V	1.03 V
	200 mV/div	4 V		-4.08 V	-3.92 V
	200 mV/div	0 V		-22.00 mV	22.00 mV
	200 mV/div	-4 V		3.92 V	4.08 V

5.6 Bandwidth Test

5.6.1 Specification

Bandwidth			
Amplitude Loss[1]	DHO5054 DHO5058 MHO5054 MHO5056	500 MHz	-3 dB, full-channel mode
	DHO5104 DHO5108 MHO5104 MHO5106	1 GHz	-3 dB, full-channel mode

NOTE

[1]: Amplitude Loss (dB) = 20 × lg ($V_{rms}2/V_{rms}1$). Wherein, $V_{rms}1$ is the measurement result of amplitude effective value at 1 MHz and $V_{rms}2$ is the measurement result of amplitude effective value value at full bandwidth.

5.6.2 Test Connection Diagram

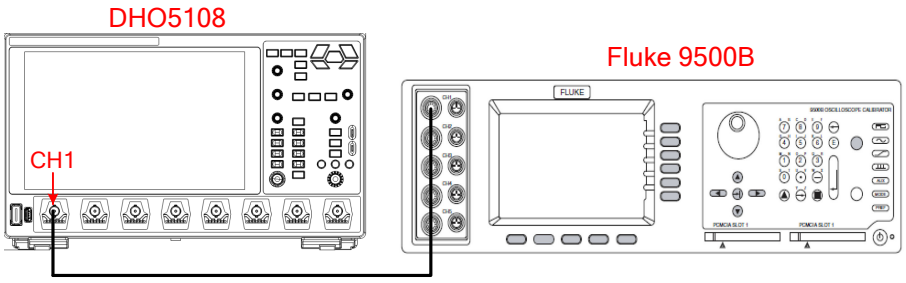


Figure 5.6 Test Connection Diagram

5.6.3 Test Procedures

WARNING

Before connecting, disconnecting, or moving the test devices, disable the output of the signal generator to avoid causing the dangerous voltage.

Bandwidth test when the input impedance is 1 MΩ

1. Connect the active head of Fluke 9500B to CH1 of the oscilloscope, as shown in *Figure 5.1* .
2. Turn on Fluke 9500B; set its impedance to 1 MΩ.
3. Configure the Digital Oscilloscope:
   a. Enable CH1.
      - Click or tap the CH1 channel status label at the bottom of the screen to enable CH1.
      - Press the front-panel key [1] to enable CH1.
      - In the **Vertical** menu, select the CH1 tab. Select **ON** for the **Display** menu to enable CH1.
   b. Click or tap the channel status label of CH1 at the bottom of the screen. Then the **Vertical** menu is displayed. Then click or tap **Probe** to enter the **Probe** setting menu. Set the probe ratio to "1X".
   c. In the **Vertical** system menu, click or tap to select 1 MΩ under **Impedance** to set the input impedance of CH1 to 1 MΩ.
   d. Set the vertical scale to 50 mV/div.
   e. Set the vertical offset to 0 V. Then close the **Vertical** system menu.

f. Click or tap the horizontal system menu at the top of the screen. Then the **Horizontal** system menu is displayed. In this menu, set the horizontal timebase to 500 ns/div.

g. Set the horizontal position to 0 s. Close the **Horizontal** system menu.

h. Set the trigger level to 0 V.

4. Output a Sine signal with 1 MHz frequency and 6 div amplitude (e.g. 50 mV/div vertical scale, 30 mVpp Sine signal) via Fluke 9500B. Adjust the timebase to display five cycles of the waveforms on the screen.
5. In the **Measure** menu, click or tap the **Vertical** tab to select "AC.RMS". The AC.RMS measurement result list is displayed at the right section of the screen. Read the value from the "result" list and record the measurement result as $V_{rms}1$.
6. Output a Sine signal with max. oscilloscope bandwidth (bandwidths are different for different models. Refer to *Specification*), 6 div amplitude via Fluke 9500B. Adjust the timebase to display five cycles of the waveforms on the screen.
7. View the "AC.RMS" result list at the right section of the screen. Read and record the data as $V_{rms}2$.
8. Calculate the amplitude loss according to the formula: Amplitude Loss (dB) = 20 x lg ($V_{rms}2/V_{rms}1$).
9. Repeat Step 2-7 to measure $V_{rms}1$ and $V_{rms}2$, and measure the amplitude loss at 500 mV/div vertical scale.
10. Disable CH1. Test the CH2, CH3, CH4, CH5, CH6, CH7, and CH8 respectively according to the above test methods. Read and record the measurement results.

Bandwidth test when the input impedance is 50 Ω

1. Connect the active head of Fluke 9500B to CH1 of the oscilloscope, as shown in *Figure 5.1* .
2. Turn on Fluke 9500B; set its impedance to 50 Ω.
3. Configure the digital oscilloscope:

   a. Enable CH1.

   - Click or tap the CH1 channel status label at the bottom of the screen to enable CH1.
   - Press the front-panel key [1] to enable CH1.
   - In the **Vertical** menu, select the CH1 tab. Select **ON** for the **Display** menu to enable CH1.

b. Click or tap the channel status label of CH1 at the bottom of the screen. Then the **Vertical** menu is displayed. Then click or tap **Probe** to enter the **Probe** setting menu. Set the probe ratio to "1X".

c. In the **Vertical** system menu, click or tap 50 Ω under **Impedance** to set the input impedance of CH1 to 50 Ω.

d. Set the vertical scale to 100 mV/div.

e. Set the vertical offset to 0 V. Then close the **Vertical** system menu.

f. Click or tap the horizontal menu at the top of the screen. Then the **Horizontal** system menu is displayed. In this menu, you can set the horizontal timebase to 500 ns/div.

g. Set the horizontal position to 0 s. Close the **Horizontal** system menu.

h. Set the trigger level to 0 V.

4. Output a Sine signal with 1 MHz frequency and 6 div amplitude (e.g. 100 mV/div vertical scale, 600 mVpp Sine signal) via Fluke 9500B. Adjust the timebase to display five cycles of the waveforms on the screen.
5. In the **Measure** menu, click or tap the **Vertical** tab to select "AC.RMS". The AC.RMS measurement result list is displayed at the right section of the screen. Read the value from the "result" list and record the measurement result as $V_{rms}1$.
6. Output a Sine signal with max. oscilloscope bandwidth (bandwidths are different for different models. Refer to *Specification*), 6 div amplitude via Fluke 9500B. Adjust the timebase to display five cycles of the waveforms on the screen.
7. View the "AC.RMS" result list at the right section of the screen. Read and record the data as $V_{rms}2$.
8. Calculate the amplitude loss according to the formula: Amplitude Loss (dB) = 20 x lg ($V_{rms}2/V_{rms}1$).
9. Repeat Step 2-7 to measure $V_{rms}1$ and $V_{rms}2$, and measure the amplitude loss at 500 mV/div vertical scale.
10. Disable CH1. Test the CH2, CH3, CH4, CH5, CH6, CH7, and CH8 respectively according to the above test methods. Read and record the measurement results.

5.6.4 Test Record Form

50 Ω Input Impedance

Channel	Vertical Scale	Test Result			Limit	Pass/Fail
		$V_{rms}1$	$V_{rms}2$	Amplitude Loss[1]		
CH1	100 mV/div				-3 dB to 3 dB	
	500 mV/div					

Channel	Vertical Scale	Test Result			Limit	Pass/Fail
		$V_{rms}1$	$V_{rms}2$	Amplitude Loss[1]		
CH2	100 mV/div					
	500 mV/div					
CH3	100 mV/div					
	500 mV/div					
CH4	100 mV/div					
	500 mV/div					
CH5	100 mV/div					
	500 mV/div					
CH6	100 mV/div					
	500 mV/div					
CH7	100 mV/div					
	500 mV/div					
CH8	100 mV/div					
	500 mV/div					

1 MΩ Input Impedance

Channel	Vertical Scale	Test Result			Limit	Pass/Fail
		$V_{rms}1$	$V_{rms}2$	Amplitude Loss[1]		
CH1	50 mV/div				-3 dB to 3 dB	
	500 mV/div					
CH2	50 mV/div					
	500 mV/div					
CH3	50 mV/div					
	500 mV/div					
CH4	50 mV/div					
	500 mV/div					
CH5	50 mV/div					
	500 mV/div					
CH6	50 mV/div					
	500 mV/div					
CH7	50 mV/div					
	500 mV/div					
CH8	50 mV/div					
	500 mV/div					

NOTE

[1]: Amplitude Loss (dB) = 20 × lg ($V_{rms}2/V_{rms}1$). Wherein, $V_{rms}1$ is the measurement result of amplitude effective value at 1 MHz and $V_{rms}2$ is the measurement result of amplitude effective value value at full bandwidth.

5.7 Time Base Accuracy Test

5.7.1 Specification

Timebase Accuracy[1]	
Specification	±(1.5 ppm + 1 ppm[2]/year x Number of Years that the Instrument Has Been Used[3])

NOTE

[1]: Typical.

[2]: Clock Drift.

[3]: For the number of years that the instrument has been used, please calculate according to the date in the verification certificate provided when the instrument leaves factory.

5.7.2 Test Connection Diagram

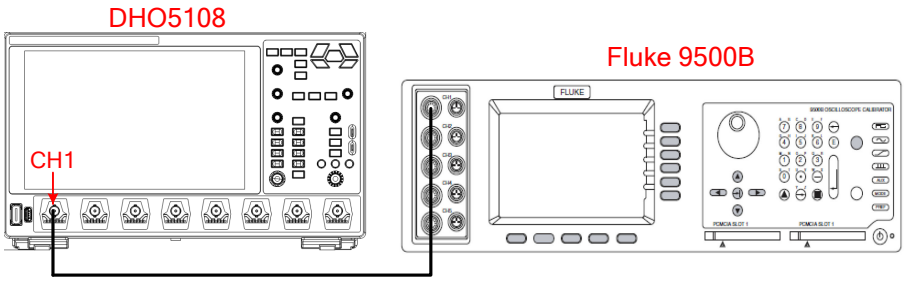


Figure 5.7 Test Connection Diagram

5.7.3 Test Procedures

WARNING

Before connecting, disconnecting, or moving the test devices, disable the output of the signal generator to avoid causing the dangerous voltage.

1. Connect the active head of Fluke 9500B to CH1 of the oscilloscope, as shown in *Figure 5.1* .
2. Output a Sine signal with 10 MHz frequency and 1 Vpp amplitude via Fluke 9500B.
3. Configure the digital oscilloscope:

a. Press DEFAULT on the front panel to restore the oscilloscope to the default settings.

b. Enable CH1.

- Click or tap the CH1 channel status label at the bottom of the screen to enable CH1.
- Press the front-panel key 1 to enable CH1.
- In the **Vertical** menu, select the CH1 tab. Select **ON** for the **Display** menu to enable CH1.

c. Click or tap the channel status label of CH1 at the bottom of the screen. Then the **Vertical** menu is displayed. Then click or tap **Probe** to enter the **Probe** setting menu. Set the probe ratio to "1X".

d. In the **Vertical** system menu, click or tap to select 1 MΩ under **Impedance** to set the input impedance of CH1 to 1 MΩ.

e. Set the vertical scale to 200 mV/div.

f. Set the vertical offset to 0 V. Then close the **Vertical** system menu.

g. Click or tap the horizontal system menu at the top of the screen. Then the **Horizontal** system menu is displayed. In this menu, set the horizontal timebase to 1 ns/div.

h. Set the horizontal position to 1 ms. Close the **Horizontal** system menu.

i. Click or tap the trigger information label at the top of the screen. Set the trigger level to 0 V.

4. Click or tap > **Cursors**. The "Result" list window is displayed at the right section of the screen. Click or tap the result list window, select **Setting**. Under the **Mode** menu item, select "Manual" to enable the manual mode of cursor measurement. Measure the offset (ΔT) of the middle point of the signal (namely the crossing point of the rising edge of the current signal and the trigger level line) from the screen center by using manual cursor measurement and record the measurement result.
5. Calculate the timebase accuracy; namely the ratio of ΔT to the horizontal position of the oscilloscope. For example, if the offset value in this test is 1 ns, then the timebase accuracy is 1 ns/1 ms = 1 ppm.
6. Calculate the timebase accuracy limit according to the formula "±(1.5 ppm + 1 ppm/year × Number of Years that the Instrument Has Been Used)".

5.7.4 Test Record Form

Channel	Test Result ΔT	Calculation Result[1]	Limit	Pass/Fail
CH1			±(1.5 ppm ± 1 ppm/year x Number of Years that the Instrument Has Been Used)[2])	

NOTE

[1]: Calculation Result = Test Result ΔT/1 ms.

[2]: For the number of years that the instrument has been used, please calculate according to the date in the verification certificate provided when the instrument leaves factory.

6 Appendix: Test Record Form

RIGOL MHO/DHO5000 Series Digital Oscilloscope Performance Verification Test Record Form

Model: _____ **Tested by:** _____ **Test Date:** _____

Random Noise Test Record Form

Vertical Scale	Bandwidth	Test Result	Max. Value	Pass/Fail
50 Ω				
100 μV/div	20 MHz		31 μV_{rms}	
200 μV/div	20 MHz		50 μV_{rms}	
500 μV/div	250 MHz		80 μV_{rms}	
1 mV/div	Full BW		158 μV_{rms}	
2 mV/div			159 μV_{rms}	
5 mV/div			156 μV_{rms}	
10 mV/div			407 μV_{rms}	
20 mV/div			466 μV_{rms}	
50 mV/div			660 μV_{rms}	
100 mV/div			998 μV_{rms}	
200 mV/div			4.92 mV_{rms}	
500 mV/div			6.8 mV_{rms}	
1 V/div			9.98 mV_{rms}	
1 MΩ				
100 μV/div	20 MHz		54 μV_{rms}	
200 μV/div	20 MHz		52.8 μV_{rms}	
500 μV/div	250 MHz		78 μV_{rms}	
1 mV/div	Full BW		130.8 μV_{rms}	
2 mV/div			127.2 μV_{rms}	
5 mV/div			153.6 μV_{rms}	
10 mV/div			270 μV_{rms}	
20 mV/div			331.2 μV_{rms}	
50 mV/div			614.4 μV_{rms}	
100 mV/div			3 mV_{rms}	
200 mV/div			3.6 mV_{rms}	
500 mV/div			12.84 mV_{rms}	
1 V/div			16.08 mV_{rms}	
2 V/div			24.36mV_{rms}	

Vertical Scale	Bandwidth	Test Result	Max. Value	Pass/Fail
5 V/div			117.84mV_{rms}	
10 V/div			156.36mV_{rms}	

Impedance Test Record Form: 1 MΩ Input Impedance

Channel	Vertical Scale	Test Result	Limit	Pass/Fail
CH1	50 mV/div		0.99 MΩ to 1.01 MΩ	
	500 mV/div			
CH2	50 mV/div			
	500 mV/div			
CH3	50 mV/div			
	500 mV/div			
CH4	50 mV/div			
	500 mV/div			
CH5	50 mV/div			
	500 mV/div			
CH6	50 mV/div			
	500 mV/div			
CH7	50 mV/div			
	500 mV/div			
CH8	50 mV/div			
	500 mV/div			

Impedance Test Record Form: 50 Ω Input Impedance

Channel	Vertical Scale	Test Result	Limit	Pass/Fail
CH1	50 mV/div		49.5 Ω to 50.5 Ω	
	500 mV/div			
CH2	50 mV/div			
	500 mV/div			
CH3	50 mV/div			
	500 mV/div			
CH4	50 mV/div			
	500 mV/div			
CH5	50 mV/div			
	500 mV/div			
CH6	50 mV/div			
	500 mV/div			
CH7	50 mV/div			
	500 mV/div			
CH8	50 mV/div			
	500 mV/div			

Input Capacitance Test Record Form

Channel	Vertical Scale	Test Result	Limit	Pass/Fail
CH1	50 mV/div		19 pF ± 3 pF	
	500 mV/div			
CH2	50 mV/div			
	500 mV/div			
CH3	50 mV/div			
	500 mV/div			
CH4	50 mV/div			
	500 mV/div			
CH5	50 mV/div			
	500 mV/div			
CH6	50 mV/div			
	500 mV/div			
CH7	50 mV/div			
	500 mV/div			
CH8	50 mV/div			
	500 mV/div			

DC Gain Accuracy Test Record Form: 1 MΩ Input Impedance

Channel	Vertical Scale	Test Result			Limit	Pass/Fail
		$V_{avg}1$	$V_{avg}2$	Calculation Result[1]		
CH1	1 mV/div				≤2%	
	2 mV/div					
	5 mV/div				≤1%	
	10 mV/div					
	20 mV/div					
	50 mV/div					
	100 mV/div					
	200 mV/div					
	500 mV/div					
	1 V/div					
	2 V/div					
	5 V/div					
	10 V/div					
CH2	1 mV/div				≤2%	
	2 mV/div					
	5 mV/div				≤1%	
	10 mV/div					
	20 mV/div					

Channel	Vertical Scale	Test Result			Limit	Pass/Fail
		$V_{avg}1$	$V_{avg}2$	Calculation Result[1]		
	50 mV/div					
	100 mV/div					
	200 mV/div					
	500 mV/div					
	1 V/div					
	2 V/div					
	5 V/div					
	10 V/div					
CH3	1 mV/div				≤2%	
	2 mV/div					
	5 mV/div				≤1%	
	10 mV/div					
	20 mV/div					
	50 mV/div					
	100 mV/div					
	200 mV/div					
	500 mV/div					
	1 V/div					
	2 V/div					
	5 V/div					
	10 V/div					
CH4	1 mV/div				≤2%	
	2 mV/div					
	5 mV/div				≤1%	
	10 mV/div					
	20 mV/div					
	50 mV/div					
	100 mV/div					
	200 mV/div					
	500 mV/div					
	1 V/div					
	2 V/div					
	5 V/div					
	10 V/div					
CH5	1 mV/div				≤2%	
	2 mV/div					
	5 mV/div				≤1%	
	10 mV/div					
	20 mV/div					
	50 mV/div					

Channel	Vertical Scale	Test Result			Limit	Pass/Fail
		$V_{avg}1$	$V_{avg}2$	Calculation Result[1]		
	100 mV/div					
	200 mV/div					
	500 mV/div					
	1 V/div					
	2 V/div					
	5 V/div					
	10 V/div					
CH6	1 mV/div				≤2%	
	2 mV/div					
	5 mV/div				≤1%	
	10 mV/div					
	20 mV/div					
	50 mV/div					
	100 mV/div					
	200 mV/div					
	500 mV/div					
	1 V/div					
	2 V/div					
	5 V/div					
	10 V/div					
CH7	1 mV/div				≤2%	
	2 mV/div					
	5 mV/div				≤1%	
	10 mV/div					
	20 mV/div					
	50 mV/div					
	100 mV/div					
	200 mV/div					
	500 mV/div					
	1 V/div					
	2 V/div					
	5 V/div					
	10 V/div					
CH8	1 mV/div				≤2%	
	2 mV/div					
	5 mV/div				≤1%	
	10 mV/div					
	20 mV/div					
	50 mV/div					
	100 mV/div					

Channel	Vertical Scale	Test Result			Limit	Pass/Fail
		$V_{avg}1$	$V_{avg}2$	Calculation Result[1]		
	200 mV/div					
	500 mV/div					
	1 V/div					
	2 V/div					
	5 V/div					
	10 V/div					

NOTE

[1]: The calculation formula is as follows: $|(V_{avg}1 - V_{avg}2) - (V_{out}1 - V_{out}2)|$ / 100% of full scale. Wherein, $V_{out}1$ and $V_{out}2$ are 3 x the current vertical scale and -3 x the current vertical scale respectively.

DC Gain Accuracy Test Record Form: 50 Ω Input Impedance

Channel	Vertical Scale	Test Result			Limit	Pass/Fail
		$V_{avg}1$	$V_{avg}2$	Calculation Result[1]		
CH1	1 mV/div				≤2%	
	2 mV/div					
	5 mV/div				≤1%	
	10 mV/div					
	20 mV/div					
	50 mV/div					
	100 mV/div					
	200 mV/div					
	500 mV/div					
	1 V/div					
CH2	1 mV/div				≤2%	
	2 mV/div					
	5 mV/div				≤1%	
	10 mV/div					
	20 mV/div					
	50 mV/div					
	100 mV/div					
	200 mV/div					
	500 mV/div					
	1 V/div					
CH3	1 mV/div				≤2%	
	2 mV/div					
	5 mV/div				≤1%	

Channel	Vertical Scale	Test Result			Limit	Pass/Fail
		$V_{avg}1$	$V_{avg}2$	Calculation Result[1]		
	10 mV/div					
	20 mV/div					
	50 mV/div					
	100 mV/div					
	200 mV/div					
	500 mV/div					
	1 V/div					
CH4	1 mV/div				≤2%	
	2 mV/div					
	5 mV/div				≤1%	
	10 mV/div					
	20 mV/div					
	50 mV/div					
	100 mV/div					
	200 mV/div					
	500 mV/div					
	1 V/div					
CH5	1 mV/div				≤2%	
	2 mV/div					
	5 mV/div				≤1%	
	10 mV/div					
	20 mV/div					
	50 mV/div					
	100 mV/div					
	200 mV/div					
	500 mV/div					
	1 V/div					
CH6	1 mV/div				≤2%	
	2 mV/div					
	10 mV/div				≤1%	
	20 mV/div					
	50 mV/div					
	100 mV/div					
	200 mV/div					
	500 mV/div					
	1 V/div					
CH7	1 mV/div				≤2%	
	2 mV/div					
	10 mV/div				≤1%	
	20 mV/div					

Channel	Vertical Scale	Test Result			Limit	Pass/Fail
		$V_{avg}1$	$V_{avg}2$	Calculation Result[1]		
	50 mV/div					
	100 mV/div					
	200 mV/div					
	500 mV/div					
	1 V/div					
CH8	1 mV/div				≤2%	
	2 mV/div					
	5 mV/div				≤1%	
	10 mV/div					
	20 mV/div					
	50 mV/div					
	100 mV/div					
	200 mV/div					
	500 mV/div					
	1 V/div					

NOTE

[1]: The calculation formula is as follows: $|(V_{avg}1 - V_{avg}2) - (V_{out}1 - V_{out}2)|$ / 100% of full scale. Wherein, $V_{out}1$ and $V_{out}2$ are 3 x the current vertical scale and -3 x the current vertical scale respectively.

DC Offset Accuracy Test Record Form

Channel Setting	Vertical Scale	Offset	Test Result	Min.	Max.
CH1, 1 MΩ, 20 MHz BW	10 mV/div	1 V		-1.02 V	-0.98 V
	10 mV/div	0 V		-3.00 mV	3.00 mV
	10 mV/div	-1 V		0.98 V	1.02 V
	200 mV/div	10 V		-10.17 V	-9.83 V
	200 mV/div	0 V		-22.00 mV	22.00 mV
	200 mV/div	-10 V		9.83 V	10.17 V
	1 V/div	20 V		-20.30 V	-19.70 V
	1 V/div	0 V		-102.00 mV	102.00 mV
	1 V/div	-20 V		19.70 V	20.30 V
	5 V/div	100 V		-101.50 V	-98.50 V
	5 V/div	0 V		-502.00 mV	502.00 mV
	5 V/div	-100 V		98.50 V	101.50 V
CH1, 50 Ω, 20 MHz BW	100 mV/div	1 V		-1.03 V	-0.97 V
	100 mV/div	0 V		-12.00 mV	12.00 mV
	100 mV/div	-1 V		0.97 V	1.03 V

Channel Setting	Vertical Scale	Offset	Test Result	Min.	Max.
	200 mV/div	4 V		-4.08 V	-3.92 V
	200 mV/div	0 V		-22.00 mV	22.00 mV
	200 mV/div	-4 V		3.92 V	4.08 V
CH2, 1 MΩ, 20 MHz BW	10 mV/div	1 V		-1.02 V	-0.98 V
	10 mV/div	0 V		-3.00 mV	3.00 mV
	10 mV/div	-1 V		0.98 V	1.02 V
	200 mV/div	10 V		-10.17 V	-9.83 V
	200 mV/div	0 V		-22.00 mV	22.00 mV
	200 mV/div	-10 V		9.83 V	10.17 V
	1 V/div	20 V		-20.30 V	-19.70 V
	1 V/div	0 V		-102.00 mV	102.00 mV
	1 V/div	-20 V		19.70 V	20.30 V
	5 V/div	100 V		-101.50 V	-98.50 V
	5 V/div	0 V		-502.00 mV	502.00 mV
	5 V/div	-100 V		98.50 V	101.50 V
CH2, 50 Ω, 20 MHz BW	100 mV/div	1 V		-1.03 V	-0.97 V
	100 mV/div	0 V		-12.00 mV	12.00 mV
	100 mV/div	-1 V		0.97 V	1.03 V
	200 mV/div	4 V		-4.08 V	-3.92 V
	200 mV/div	0 V		-22.00 mV	22.00 mV
	200 mV/div	-4 V		3.92 V	4.08 V
CH3, 1 MΩ, 20 MHz BW	10 mV/div	1 V		-1.02 V	-0.98 V
	10 mV/div	0 V		-3.00 mV	3.00 mV
	10 mV/div	-1 V		0.98 V	1.02 V
	200 mV/div	10 V		-10.17 V	-9.83 V
	200 mV/div	0 V		-22.00 mV	22.00 mV
	200 mV/div	-10 V		9.83 V	10.17 V
	1 V/div	20 V		-20.30 V	-19.70 V
	1 V/div	0 V		-102.00 mV	102.00 mV
	1 V/div	-20 V		19.70 V	20.30 V
	5 V/div	100 V		-101.50 V	-98.50 V
	5 V/div	0 V		-502.00 mV	502.00 mV
	5 V/div	-100 V		98.50 V	101.50 V
CH3, 50 Ω, 20 MHz BW	100 mV/div	1 V		-1.03 V	-0.97 V
	100 mV/div	0 V		-12.00 mV	12.00 mV
	100 mV/div	-1 V		0.97 V	1.03 V
	200 mV/div	4 V		-4.08 V	-3.92 V
	200 mV/div	0 V		-22.00 mV	22.00 mV
	200 mV/div	-4 V		3.92 V	4.08 V

Channel Setting	Vertical Scale	Offset	Test Result	Min.	Max.
CH4, 1 MΩ, 20 MHz BW	10 mV/div	1 V		-1.02 V	-0.98 V
	10 mV/div	0 V		-3.00 mV	3.00 mV
	10 mV/div	-1 V		0.98 V	1.02 V
	200 mV/div	10 V		-10.17 V	-9.83 V
	200 mV/div	0 V		-22.00 mV	22.00 mV
	200 mV/div	-10 V		9.83 V	10.17 V
	1 V/div	20 V		-20.30 V	-19.70 V
	1 V/div	0 V		-102.00 mV	102.00 mV
	1 V/div	-20 V		19.70 V	20.30 V
	5 V/div	100 V		-101.50 V	-98.50 V
	5 V/div	0 V		-502.00 mV	502.00 mV
	5 V/div	-100 V		98.50 V	101.50 V
CH4, 50 Ω, 20 MHz BW	100 mV/div	1 V		-1.03 V	-0.97 V
	100 mV/div	0 V		-12.00 mV	12.00 mV
	100 mV/div	-1 V		0.97 V	1.03 V
	200 mV/div	4 V		-4.08 V	-3.92 V
	200 mV/div	0 V		-22.00 mV	22.00 mV
	200 mV/div	-4 V		3.92 V	4.08 V
CH5, 1 MΩ, 20 MHz BW	10 mV/div	1 V		-1.02 V	-0.98 V
	10 mV/div	0 V		-3.00 mV	3.00 mV
	10 mV/div	-1 V		0.98 V	1.02 V
	200 mV/div	10 V		-10.17 V	-9.83 V
	200 mV/div	0 V		-22.00 mV	22.00 mV
	200 mV/div	-10 V		9.83 V	10.17 V
	1 V/div	20 V		-20.30 V	-19.70 V
	1 V/div	0 V		-102.00 mV	102.00 mV
	1 V/div	-20 V		19.70 V	20.30 V
	5 V/div	100 V		-101.50 V	-98.50 V
	5 V/div	0 V		-502.00 mV	502.00 mV
	5 V/div	-100 V		98.50 V	101.50 V
CH5, 50 Ω, 20 MHz BW	100 mV/div	1 V		-1.03 V	-0.97 V
	100 mV/div	0 V		-12.00 mV	12.00 mV
	100 mV/div	-1 V		0.97 V	1.03 V
	200 mV/div	4 V		-4.08 V	-3.92 V
	200 mV/div	0 V		-22.00 mV	22.00 mV
	200 mV/div	-4 V		3.92 V	4.08 V
CH6, 1 MΩ, 20 MHz BW	10 mV/div	1 V		-1.02 V	-0.98 V
	10 mV/div	0 V		-3.00 mV	3.00 mV
	10 mV/div	-1 V		0.98 V	1.02 V
	200 mV/div	10 V		-10.17 V	-9.83 V
	200 mV/div	0 V		-22.00 mV	22.00 mV

Channel Setting	Vertical Scale	Offset	Test Result	Min.	Max.
	200 mV/div	-10 V		9.83 V	10.17 V
	1 V/div	20 V		-20.30 V	-19.70 V
	1 V/div	0 V		-102.00 mV	102.00 mV
	1 V/div	-20 V		19.70 V	20.30 V
	5 V/div	100 V		-101.50 V	-98.50 V
	5 V/div	0 V		-502.00 mV	502.00 mV
	5 V/div	-100 V		98.50 V	101.50 V
CH6, 50 Ω, 20 MHz BW	100 mV/div	1 V		-1.03 V	-0.97 V
	100 mV/div	0 V		-12.00 mV	12.00 mV
	100 mV/div	-1 V		0.97 V	1.03 V
	200 mV/div	4 V		-4.08 V	-3.92 V
	200 mV/div	0 V		-22.00 mV	22.00 mV
	200 mV/div	-4 V		3.92 V	4.08 V
CH7, 1 MΩ, 20 MHz BW	10 mV/div	1 V		-1.02 V	-0.98 V
	10 mV/div	0 V		-3.00 mV	3.00 mV
	10 mV/div	-1 V		0.98 V	1.02 V
	200 mV/div	10 V		-10.17 V	-9.83 V
	200 mV/div	0 V		-22.00 mV	22.00 mV
	200 mV/div	-10 V		9.83 V	10.17 V
	1 V/div	20 V		-20.30 V	-19.70 V
	1 V/div	0 V		-102.00 mV	102.00 mV
	1 V/div	-20 V		19.70 V	20.30 V
	5 V/div	100 V		-101.50 V	-98.50 V
	5 V/div	0 V		-502.00 mV	502.00 mV
	5 V/div	-100 V		98.50 V	101.50 V
CH7, 50 Ω, 20 MHz BW	100 mV/div	1 V		-1.03 V	-0.97 V
	100 mV/div	0 V		-12.00 mV	12.00 mV
	100 mV/div	-1 V		0.97 V	1.03 V
	200 mV/div	4 V		-4.08 V	-3.92 V
	200 mV/div	0 V		-22.00 mV	22.00 mV
	200 mV/div	-4 V		3.92 V	4.08 V
CH8, 1 MΩ, 20 MHz BW	10 mV/div	1 V		-1.02 V	-0.98 V
	10 mV/div	0 V		-3.00 mV	3.00 mV
	10 mV/div	-1 V		0.98 V	1.02 V
	200 mV/div	10 V		-10.17 V	-9.83 V
	200 mV/div	0 V		-22.00 mV	22.00 mV
	200 mV/div	-10 V		9.83 V	10.17 V
	1 V/div	20 V		-20.30 V	-19.70 V
	1 V/div	0 V		-102.00 mV	102.00 mV
	1 V/div	-20 V		19.70 V	20.30 V
	5 V/div	100 V		-101.50 V	-98.50 V

Channel Setting	Vertical Scale	Offset	Test Result	Min.	Max.
	5 V/div	0 V		-502.00 mV	502.00 mV
	5 V/div	-100 V		98.50 V	101.50 V
CH8, 50 Ω, 20 MHz BW	100 mV/div	1 V		-1.03 V	-0.97 V
	100 mV/div	0 V		-12.00 mV	12.00 mV
	100 mV/div	-1 V		0.97 V	1.03 V
	200 mV/div	4 V		-4.08 V	-3.92 V
	200 mV/div	0 V		-22.00 mV	22.00 mV
	200 mV/div	-4 V		3.92 V	4.08 V

Bandwidth Test Record Form: 1 MΩ Input Impedance

Channel	Vertical Scale	Test Result			Limit	Pass/Fail
		$V_{rms}1$	$V_{rms}2$	Amplitude Loss[1]		
CH1	50 mV/div				-3 dB to 3 dB	
	500 mV/div					
CH2	50 mV/div					
	500 mV/div					
CH3	50 mV/div					
	500 mV/div					
CH4	50 mV/div					
	500 mV/div					
CH5	50 mV/div					
	500 mV/div					
CH6	50 mV/div					
	500 mV/div					
CH7	50 mV/div					
	500 mV/div					
CH8	50 mV/div					
	500 mV/div					

NOTE

[1]: Amplitude Loss (dB) = 20 × lg ($V_{rms}2/V_{rms}1$). Wherein, $V_{rms}1$ is the measurement result of amplitude effective value at 1 MHz and $V_{rms}2$ is the measurement result of amplitude effective value value at full bandwidth.

Bandwidth Test Record Form: 50 Ω Input Impedance

Channel	Vertical Scale	Test Result			Limit	Pass/Fail
		$V_{rms}1$	$V_{rms}2$	Amplitude Loss[1]		
CH1	100 mV/div				-3 dB to 3 dB	

Channel	Vertical Scale	Test Result			Limit	Pass/Fail
		$V_{rms}1$	$V_{rms}2$	Amplitude Loss[1]		
	500 mV/div					
CH2	100 mV/div					
	500 mV/div					
CH3	100 mV/div					
	500 mV/div					
CH4	100 mV/div					
	500 mV/div					
CH5	100 mV/div					
	500 mV/div					
CH6	100 mV/div					
	500 mV/div					
CH7	100 mV/div					
	500 mV/div					
CH8	100 mV/div					
	500 mV/div					

NOTE

[1]: Amplitude Loss (dB) = 20 × lg ($V_{rms}2/V_{rms}1$). Wherein, $V_{rms}1$ is the measurement result of amplitude effective value at 1 MHz and $V_{rms}2$ is the measurement result of amplitude effective value value at full bandwidth.

Time Base Accuracy Test Record Form

Channel	Test Result ΔT	Calculation Result[1]	Limit	Pass/Fail
CH1			±(1.5 ppm ± 1 ppm/year x Number of Years that the Instrument Has Been Used)[2])	

NOTE

[1]: Calculation Result = Test Result ΔT/1 ms.

[2]: For the number of years that the instrument has been used, please calculate according to the date in the verification certificate provided when the instrument leaves factory.

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HEADQUARTER

RIGOL TECHNOLOGIES CO., LTD.
No.8 Keling Road, New District,
Suzhou,JiangSu, P.R.China
Tel: +86-400620002
Email: info-cn@rigol.com

EUROPE

RIGOL TECHNOLOGIES EU GmbH
Friedrichshafener Str. 5
82205 Gilching
Germany
Tel: +49(0)8105-27292-21
Email: info-europe@rigol.com

NORTH AMERICA

RIGOL TECHNOLOGIES, USA INC.
10220 SW Nimbus Ave.
Suite K-7
Portland, OR 97223
Tel: +1-877-4-**RIGOL**-1
Email: sales@rigol.com

JAPAN

RIGOL JAPAN CO., LTD.
5F,3-45-6,Minamiotsuka, Toshima-Ku,
Tokyo,170-0005,Japan
Tel: +81-3-6262-8932
Fax: +81-3-6262-8933
Email: info.jp@rigol.com

KOREA

RIGOL KOREA CO,. LTD.
5F, 222, Gonghang-daero,
Gangseo-gu, Seoul, Republic of Korea
Tel: +82-2-6953-4466
Fax: +82-2-6953-4422
Email: info.kr@rigol.com

For Assistance in Other Countries

Email: info.int@rigol.com