



## **5 Series MSO MSO54, MSO56, MSO58, MSO58LP Specifications and Performance Verification**

### **Warning**

The servicing instructions are for use by qualified personnel only. To avoid personal injury, do not perform any servicing unless you are qualified to do so. Refer to all safety summaries prior to performing service.

Supports product Firmware V1.4 and above. Revision B; released February 10, 2020.



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- Worldwide, visit [www.tek.com](http://www.tek.com) to find contacts in your area.

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# Important safety information

This manual contains information and warnings that must be followed by the user for safe operation and to keep the product in a safe condition.

## General safety summary

Use the product only as specified. Review the following safety precautions to avoid injury and prevent damage to this product or any products connected to it. Carefully read all instructions. Retain these instructions for future reference.

This product shall be used in accordance with local and national codes.

For correct and safe operation of the product, it is essential that you follow generally accepted safety procedures in addition to the safety precautions specified in this manual.

The product is designed to be used by trained personnel only.

Only qualified personnel who are aware of the hazards involved should remove the cover for repair, maintenance, or adjustment.

Before use, always check the product with a known source to be sure it is operating correctly.

This product is not intended for detection of hazardous voltages.

Use personal protective equipment to prevent shock and arc blast injury where hazardous live conductors are exposed.

### To avoid fire or personal injury

**Use proper power cord.** Use only the power cord specified for this product and certified for the country of use. Do not use the provided power cord for other products.

**Ground the product.** This product is grounded through the grounding conductor of the power cord. To avoid electric shock, the grounding conductor must be connected to earth ground. Before making connections to the input or output terminals of the product, ensure that the product is properly grounded. Do not disable the power cord grounding connection.

**Power disconnect.** The power cord disconnects the product from the power source. See instructions for the location. Do not position the equipment so that it is difficult to operate the power cord; it must remain accessible to the user at all times to allow for quick disconnection if needed.

**Connect and disconnect properly.** Do not connect or disconnect probes or test leads while they are connected to a voltage source. Use only insulated voltage probes, test leads, and adapters supplied with the product, or indicated by Tektronix to be suitable for the product.

**Observe all terminal ratings.** To avoid fire or shock hazard, observe all rating and markings on the product. Consult the product manual for further ratings information before making connections to the product. Do not exceed the Measurement Category (CAT) rating and voltage or current rating of the lowest rated individual component of a product, probe, or accessory. Use caution when using 1:1 test leads because the probe tip voltage is directly transmitted to the product.

Do not apply a potential to any terminal, including the common terminal, that exceeds the maximum rating of that terminal.

**Do not operate without covers.** Do not operate this product with covers or panels removed, or with the case open. Hazardous voltage exposure is possible.

**Avoid exposed circuitry.** Do not touch exposed connections and components when power is present.

**Do not operate with suspected failures.** If you suspect that there is damage to this product, have it inspected by qualified service personnel.

Disable the product if it is damaged. Do not use the product if it is damaged or operates incorrectly. If in doubt about safety of the product, turn it off and disconnect the power cord. Clearly mark the product to prevent its further operation.

Before use, inspect voltage probes, test leads, and accessories for mechanical damage and replace when damaged. Do not use probes or test leads if they are damaged, if there is exposed metal, or if a wear indicator shows.

Examine the exterior of the product before you use it. Look for cracks or missing pieces.

Use only specified replacement parts.

**Do not operate in wet/damp conditions.** Be aware that condensation may occur if a unit is moved from a cold to a warm environment.

**Do not operate in an explosive atmosphere.**

**Keep product surfaces clean and dry.** Remove the input signals before you clean the product.

**Provide proper ventilation.** Refer to the installation instructions in the manual for details on installing the product so it has proper ventilation.

Slots and openings are provided for ventilation and should never be covered or otherwise obstructed. Do not push objects into any of the openings.

**Provide a safe working environment.** Always place the product in a location convenient for viewing the display and indicators.

Avoid improper or prolonged use of keyboards, pointers, and button pads. Improper or prolonged keyboard or pointer use may result in serious injury.

Be sure your work area meets applicable ergonomic standards. Consult with an ergonomics professional to avoid stress injuries.

Use care when lifting and carrying the product. This product is provided with a handle or handles for lifting and carrying.



**WARNING.** *The product is heavy. To reduce the risk of personal injury or damage to the device get help when lifting or carrying the product.*

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Use only the Tektronix rackmount hardware specified for this product.

## Probes and test leads

Before connecting probes or test leads, connect the power cord from the power connector to a properly grounded power outlet.

Keep fingers behind the protective barrier, protective finger guard, or tactile indicator on the probes.

Remove all probes, test leads and accessories that are not in use.

Use only correct Measurement Category (CAT), voltage, temperature, altitude, and amperage rated probes, test leads, and adapters for any measurement.

## Terms in the manual

These terms may appear in this manual:




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**WARNING.** *Warning statements identify conditions or practices that could result in injury or loss of life.*

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**CAUTION.** *Caution statements identify conditions or practices that could result in damage to this product or other property.*

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## Terms on the product

These terms may appear on the product:

- DANGER indicates an injury hazard immediately accessible as you read the marking.
- WARNING indicates an injury hazard not immediately accessible as you read the marking.
- CAUTION indicates a hazard to property including the product.

## Symbols on the product



When this symbol is marked on the product, be sure to consult the manual to find out the nature of the potential hazards and any actions which have to be taken to avoid them. (This symbol may also be used to refer the user to ratings in the manual.)

The following symbols may appear on the product:







# Specifications

This chapter contains specifications for the instrument. All specifications are guaranteed unless noted as "typical." Typical specifications are provided for your convenience but are not guaranteed. Specifications that are marked with the ✓ symbol are checked in this manual. All specifications apply to all models unless noted otherwise.

To meet specifications, these conditions must first be met:

- The instrument must have been calibrated in an ambient temperature between 18 °C and 28 °C (64 °F and 82 °F).
- The instrument must be operating within the environmental limits. (See [Environmental specifications](#) on page 29.)
- The instrument must be powered from a source that meets the specifications. (See [Power supply system](#) on page 29.)
- The instrument must have been operating continuously for at least 20 minutes within the specified operating temperature range.
- You must perform the Signal Path Compensation procedure after the warmup period. See the online help for instructions on how to perform signal path compensation. If the ambient temperature changes more than 5 °C (9 °F) , repeat the procedure.

## Analog channel input and vertical specification

### Number of input channels

MSO54	4 BNC
MSO56	6 BNC
MSO58	8 BNC
MSO58LP	8 BNC

Input coupling	DC, AC
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Input resistance selection	1 M $\Omega$ or 50 $\Omega$
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✓ Input impedance 1 M $\Omega$ DC coupled	1 M $\Omega$ $\pm$ 1%
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Input capacitance 1 M $\Omega$ DC coupled, typical	14.5 pF $\pm$ 1.5 pF, 2 GHz model 13 pF $\pm$ 1.5 pF, 1 GHz, 500 MHz, 350 MHz models 14 pF $\pm$ 1.5 pF, MSO58LP
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✓ Input impedance 50 $\Omega$ , DC coupled	50 $\Omega$ $\pm$ 1% (VSWR $\leq$ 1.5:1, typical)
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Maximum input voltage, 1 M $\Omega$	300 V <sub>RMS</sub> at the BNC. Installation Category II Derate at 20 dB/decade between 4.5 MHz and 45 MHz; derate 14 dB/decade between 45 MHz and 450 MHz. Above 450 MHz, 5.5 V <sub>RMS</sub> Maximum peak input voltage at the BNC: $\pm$ 425 V
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Maximum input voltage, 50 Ohm	5 V <sub>RMS</sub> , with peaks $\leq$ $\pm$ 20 V (DF $\leq$ 6.25%)
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<b>DC balance</b>	✓ 0.1 div with DC-50 $\Omega$ oscilloscope input impedance (50 $\Omega$ BNC terminated)
	✓ 0.2 div at 1 mV/div with DC-50 $\Omega$ oscilloscope input impedance (50 $\Omega$ BNC terminated)
	0.4 div at 500 $\mu$ V/div with DC-50 $\Omega$ oscilloscope input impedance (50 $\Omega$ BNC terminated)
	✓ 0.2 div with DC-1 M $\Omega$ oscilloscope input impedance (50 $\Omega$ BNC terminated)
	0.4 div at 500 $\mu$ V/div with DC-1 M $\Omega$ scope input impedance (50 $\Omega$ BNC terminated)

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**NOTE.** 500  $\mu$ V/div is a 2X digital zoom of 1 mV/div. As such, it is guaranteed by testing the 1 mV/div setting.

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<b>Number of digitized bits</b>	8 bits at 6.25 GS/s
	12 bits at 3.125 GS/s
	13 bits at 1.25 GS/s
	14 bits at 625 MS/s
	15 bits at 312.5 MS/s
	16 bits at 125 MS/s
	Displayed vertically with 25 digitization levels (DL <sup>1</sup> ) per division, (8-bits only) 10.24 divisions dynamic range.

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**Sensitivity range, coarse**

<b>1 M<math>\Omega</math></b>	500 $\mu$ V/div to 10 V/div in a 1-2-5 sequence
<b>50 <math>\Omega</math></b>	500 $\mu$ V/div to 1 V/div in a 1-2-5 sequence
	Note: 500 $\mu$ V/div is a 2X digital zoom of 1 mV/div.

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**Sensitivity range, fine**

<b>1 M<math>\Omega</math></b>	Allows continuous adjustment from 1 mV/div to 10 V/div, 1 M $\Omega$ and from 1 mV/div to 1 V/div, 50 $\Omega$
<b>50 <math>\Omega</math></b>	500 $\mu$ V/div to 10 V/div
	500 $\mu$ V/div to 1 V/div

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<b>Sensitivity resolution, fine</b>	$\leq 1\%$ of current setting
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**✓ DC gain accuracy**

<b>2 GHz model, Step Gain, 50 Ohm</b>	$\pm 1.2\%$ , ( $\pm 2.0\%$ at 1 mV/div and 500 $\mu$ V/div settings), de-rated at 0.100%/ °C above 30 °C
<b>2 GHz model, Step Gain, 1 Meg Ohm</b>	$\pm 1.0\%$ , ( $\pm 2.0\%$ at 1 mV/div and 500 $\mu$ V/div settings), de-rated at 0.100%/ °C above 30 °C
<b>1 GHz, 500 MHz, 350 MHz models, MSO58LP, Step Gain</b>	$\pm 1.0\%$ , ( $\pm 2.0\%$ at 1 mV/div and 500 $\mu$ V/div settings), de-rated at 0.100%/ °C above 30 °C
<b>Variable gain</b>	$\pm 1.5\%$ , derated at 0.100%/ °C above 30 °C.

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**NOTE.** 500  $\mu$ V/div is a 2X digital zoom of 1 mV/div. As such, it is guaranteed by testing the 1 mV/div setting.

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<sup>1</sup> DL is the abbreviation for digitization level. A DL is the smallest voltage level change that can be resolved by an 8-bit A-D Converter. This value is also known as an LSB (least significant bit).

**Offset ranges, maximum****2 GHz models**Input signal cannot exceed maximum input voltage for the 50  $\Omega$  input path.

Volts/div Setting	Maximum offset range, 50 $\Omega$ Input
500 $\mu$ V/div - 50 mV/div	$\pm 1$ V
51 mV/div - 99 mV/div	$\pm (-10 * (\text{Volts/div Setting}) + 1.5 \text{ V})$
100 mV/div - 500 mV/div	$\pm 10$ V
501 mV/div - 1 V/div	$\pm (-10 * (\text{Volts/div Setting}) + 15 \text{ V})$

Volts/div Setting	Maximum offset range, 1 M $\Omega$ Input
500 $\mu$ V/div - 63 mV/div	$\pm 1$ V
64 mV/div - 999 mV/div	$\pm 10$ V
1 V/div - 10 V/div	$\pm 100$ V

 **$\leq 1$  GHz models (including MSO58LP)**Input signal cannot exceed maximum input voltage for the 50  $\Omega$  input path.

Volts/div Setting	Maximum offset range	
	50 $\Omega$ Input	1 M $\Omega$ Input
500 $\mu$ V/div - 63 mV/div	$\pm 1$ V	$\pm 1$ V
64 mV/div - 999 mV/div	$\pm 10$ V	$\pm 10$ V
1 V/div - 10 V/div	$\pm 10$ V	$\pm 100$ V

**NOTE.** 500  $\mu$ V/div is a 2X digital zoom of 1 mV/div. As such, it is guaranteed by testing the 1 mV/div setting.

**Position range**  $\pm 5$  divisions

**✓ Offset accuracy**  $\pm(0.005 \text{ X } | \text{offset} - \text{position} | + \text{DC balance})$

**Number of waveforms for average acquisition mode** 2 to 10,240 Waveforms, default 16 waveforms

DC voltage measurement accuracy, Average acquisition mode	Measurement Type	DC Accuracy (In Volts)
	Average of $\geq 16$ waveforms	$\pm((\text{DC Gain Accuracy}) *  \text{reading} - (\text{offset} - \text{position})  + \text{Offset Accuracy} + 0.1 * \text{V/div setting})$
	Delta volts between any two averages of $\geq 16$ waveforms acquired with the same oscilloscope setup and ambient conditions	$\pm(\text{DC Gain Accuracy} *  \text{reading}  + 0.05 \text{ div})$

**DC voltage measurement accuracy, sample acquisition mode, typical**

Measurement Type	DC Accuracy (In Volts)
Any Sample	$\pm(\text{DC Gain Accuracy} *  \text{reading} - (\text{offset} - \text{position})  + \text{Offset Accuracy} + 0.15 \text{ div} + 0.6 \text{ mV})$
Delta Volts between any two samples acquired with the same scope setup and ambient conditions	$\pm(\text{DC Gain Accuracy} *  \text{reading}  + 0.15 \text{ div} + 1.2 \text{ mV})$

**Bandwidth selections**

20 MHz, 250 MHz, and the full bandwidth value for your model

**Bandwidth selections**

20 MHz, 250 MHz, and 1 GHz

**✓ Analog bandwidth 50  $\Omega$  DC coupled****2 GHz models**

Volts/Div Setting	Bandwidth
10 mV/div - 1 V/div	DC - 2.00 GHz
5 mV/div - 9.98 mV/div	DC - 1.50 GHz
2 mV/div - 4.98 mV/div	DC - 350 MHz
1 mV/div - 1.99 mV/div	DC - 175 MHz
500 $\mu$ V/div - 995 $\mu$ V/div	DC - 175 MHz

**1 GHz models**

Volts/Div Setting	Bandwidth
1 mV/div - 1 V/div	DC - 1.00 GHz
500 $\mu$ V/div - 995 $\mu$ V/div	DC - 250 MHz

**500 MHz models**

Volts/Div Setting	Bandwidth
1 mV/div - 1 V/div	DC - 500 MHz
500 $\mu$ V/div - 995 $\mu$ V/div	DC - 250 MHz

**350 MHz models**

Volts/Div Setting	Bandwidth
1 mV/div - 1 V/div	DC - 350 MHz
500 $\mu$ V/div - 995 $\mu$ V/div	DC - 250 MHz

**Analog bandwidth, 1 M $\Omega$ , typical****All model bandwidths except  
350 MHz**

Volts/Div Setting	Bandwidth
1 mV/div - 10 V/div	DC - 500 MHz
500 $\mu$ V/div - 995 $\mu$ V/div	DC - 250 MHz

**350 MHz models**

Volts/Div Setting	Bandwidth
1 mV/div - 10 V/div	DC - 350 MHz
500 $\mu$ V/div - 995 $\mu$ V/div	DC - 250 MHz

**Analog bandwidth with TPP0500  
and TPP1000 probe, typical**

The limits are for ambient temperature of  $\leq 30^{\circ}\text{C}$  and the bandwidth selection set to FULL. Reduce the upper bandwidth frequency by 1% for each  $^{\circ}\text{C}$  above  $30^{\circ}\text{C}$ .

Instrument	Volts/Div Setting	Bandwidth
2 GHz, 1 GHz	5 mV/div - 100 V/div	DC - 1GHz (TPP1000 Probe)
500 MHz	5 mV/div - 100 V/div	DC - 500 MHz (TPP0500 Probe)
350 MHz	5 mV/div - 100 V/div	DC - 350 MHz (TPP0500 Probe)

**Lower frequency limit, AC coupled,  
typical**

<10 Hz when AC 1 M $\Omega$  coupled. The AC coupled lower frequency limits are reduced by a factor of 10 (<1 Hz) when 10X passive probes are used.

**Upper frequency limit, 250 MHz  
bandwidth limited, typical**

250 MHz,  $\pm 25\%$

**Upper frequency limit, 20 MHz  
bandwidth limited, typical**

20 MHz,  $\pm 20\%$

**Calculated rise time, typical**

Model	50 $\Omega$	TPP0500 Probe	TP1000 Probe
Vertical	500 $\mu$ V-1 V	5 mV-10 V	5 mV-10 V
2 GHz	225 ps	800 ps	400 ps
1 GHz	400 ps	800 ps	400 ps
500 MHz	800 ps	800 ps	800 ps
350 MHz	1.15 ns	1.15 ns	1.15 ns

**Peak Detect or Envelope mode  
pulse response, typical**

Minimum pulse width is >640 ps (6.25 GS/s)

**Effective bits (ENOB), typical**

Typical effective bits for a 9-division p-p sine-wave input, 50 mV/div, 50-ohm

**2 GHz models, Sample mode,  
50  $\Omega$** 

Bandwidth	Input frequency	6.25 GS/s
2 GHz	10 MHz	6.20
2 GHz	600 MHz	6.20
250 MHz	10 MHz	7.30
250 MHz	200 MHz	7.30
20 MHz	10 MHz	7.60

**2 GHz models, High Res  
mode, 50  $\Omega$** 

Bandwidth	Input frequency	6.25 GS/s
1 GHz	10 MHz	7.00
1 GHz	300 MHz	7.00
250 MHz	10 MHz	7.80
250 MHz	100 MHz	7.80
20 MHz	10 MHz	8.70

**1 GHz, 500 MHz, 350 MHz  
models, Sample mode, 50  $\Omega$** 

Bandwidth	Input Frequency	6.25 GS/s
1 GHz	10 MHz	7.10
1 GHz	300 MHz	7.10
500 MHz	10 MHz	7.40
500 MHz	150 MHz	7.40
350 MHz	10 MHz	7.60
350 MHz	100 MHz	7.60
250 MHz	10 MHz	7.50
250 MHz	100 MHz	7.50
20 MHz	10 MHz	7.70

**1 GHz, 500 MHz, 350 MHz  
models, High Res mode, 50  $\Omega$** 

Bandwidth	Input frequency	6.25 GS/s
1 GHz	10 MHz	7.60
1 GHz	300 MHz	7.50
500 MHz	10 MHz	7.90
500 MHz	150 MHz	7.80
350 MHz	10 MHz	8.20
350 MHz	100 MHz	8.20
250 MHz	10 MHz	8.10
250 MHz	100 MHz	8.10
20 MHz	10 MHz	8.90

**Random noise, sample acquisition  
mode****✓ 2 GHz models, Sample  
mode (RMS)**

2 GHz models	50 $\Omega$			1 M $\Omega$		
V/div	2 GHz	250 MHz	20 MHz	500 MHz	250 MHz	20 MHz
1 mV/div <sup>7</sup>	89.8 $\mu$ V	89.8 $\mu$ V	39.6 $\mu$ V	270 $\mu$ V	158 $\mu$ V	85.5 $\mu$ V
2 mV/div <sup>8</sup>	152 $\mu$ V	114 $\mu$ V	50.6 $\mu$ V	291 $\mu$ V	158 $\mu$ V	90.1 $\mu$ V
5 mV/div <sup>9</sup>	456 $\mu$ V	155 $\mu$ V	88.9 $\mu$ V	315 $\mu$ V	185 $\mu$ V	121 $\mu$ V
10 mV/div	643 $\mu$ V	244 $\mu$ V	174 $\mu$ V	377 $\mu$ V	271 $\mu$ V	201 $\mu$ V
20 mV/div	1.06 mV	436 $\mu$ V	347 $\mu$ V	572 $\mu$ V	462 $\mu$ V	373 $\mu$ V
50 mV/div	2.51 mV	1.06 mV	869 $\mu$ V	1.32 mV	1.11 mV	922 $\mu$ V
100 mV/div	6.15 mV	2.38 mV	1.74 mV	2.75 mV	2.24 mV	1.88 mV

<sup>7</sup> Bandwidth at 1 mV/div is limited to 175 MHz in 50  $\Omega$ .<sup>8</sup> Bandwidth at 2 mV/div is limited to 350 MHz in 50  $\Omega$ .<sup>9</sup> Bandwidth at 5 mV/div is limited to 1.5 GHz in 50  $\Omega$ .

2 GHz models	50 $\Omega$			1 M $\Omega$		
V/div	2 GHz	250 MHz	20 MHz	500 MHz	250 MHz	20 MHz
1 V/div	39.6 mV	21.1 mV	17.4 mV	28.6 mV	23.5 mV	18.7 mV

**2 GHz models, Sample mode (RMS), typical**

2 GHz models	50 $\Omega$			1 M $\Omega$		
V/div	2 GHz	250 MHz	20 MHz	500 MHz	250 MHz	20 MHz
1 mV/div <sup>7</sup>	69.4 $\mu$ V	69.4 $\mu$ V	30.6 $\mu$ V	208 $\mu$ V	122 $\mu$ V	66 $\mu$ V
2 mV/div <sup>8</sup>	117 $\mu$ V	88.0 $\mu$ V	39.1 $\mu$ V	225 $\mu$ V	122 $\mu$ V	69.7 $\mu$ V
5 mV/div <sup>9</sup>	353 $\mu$ V	120 $\mu$ V	68.7 $\mu$ V	243 $\mu$ V	143 $\mu$ V	93.8 $\mu$ V
10 mV/div	497 $\mu$ V	188 $\mu$ V	125 $\mu$ V	291 $\mu$ V	209 $\mu$ V	156 $\mu$ V
20 mV/div	816 $\mu$ V	337 $\mu$ V	251 $\mu$ V	442 $\mu$ V	357 $\mu$ V	288 $\mu$ V
50 mV/div	1.94 mV	822 $\mu$ V	627 $\mu$ V	1.02 mV	857 $\mu$ V	712 $\mu$ V
100 mV/div	4.75 mV	1.84 mV	1.25 mV	2.13 mV	1.73 mV	1.45 mV
1 V/div	30.6 mV	16.3 mV	12.5 mV	22.1 mV	18.2 mV	14.5 mV

**✓ 2 GHz models, High Res mode (RMS)**

2 GHz models	50 $\Omega$			1 M $\Omega$		
V/div	1 GHz	250 MHz	20 MHz	500 MHz	250 MHz	20 MHz
1 mV/div <sup>7</sup>	86.5 $\mu$ V	86.5 $\mu$ V	35.2 $\mu$ V	269 $\mu$ V	152 $\mu$ V	83.6 $\mu$ V
2 mV/div <sup>8</sup>	125 $\mu$ V	100 $\mu$ V	36.9 $\mu$ V	290 $\mu$ V	152 $\mu$ V	86.3 $\mu$ V
5 mV/div <sup>9</sup>	261 $\mu$ V	140 $\mu$ V	48.4 $\mu$ V	308 $\mu$ V	172 $\mu$ V	88.9 $\mu$ V
10 mV/div	356 $\mu$ V	191 $\mu$ V	72.6 $\mu$ V	359 $\mu$ V	224 $\mu$ V	108 $\mu$ V
20 mV/div	607 $\mu$ V	325 $\mu$ V	137 $\mu$ V	538 $\mu$ V	360 $\mu$ V	162 $\mu$ V
50 mV/div	1.43 mV	763 $\mu$ V	327 $\mu$ V	1.19 mV	803 $\mu$ V	351 $\mu$ V
100 mV/div	3.56 mV	1.91 mV	779 $\mu$ V	2.45 mV	1.76 mV	780 $\mu$ V
1 V/div	23.8 mV	14 mV	6.05 mV	26.3 mV	18.9 mV	8.46 mV



**2 GHz models, High Res mode  
(RMS), typical**

<b>2 GHz models</b>	<b>50 <math>\Omega</math></b>			<b>1 M<math>\Omega</math></b>		
<b>V/div</b>	<b>1 GHz</b>	<b>250 MHz</b>	<b>20 MHz</b>	<b>500 MHz</b>	<b>250 MHz</b>	<b>20 MHz</b>
1 mV/div <sup>7</sup>	66.8 $\mu$ V	66.8 $\mu$ V	27.2 $\mu$ V	208 $\mu$ V	117 $\mu$ V	64.6 $\mu$ V
2 mV/div <sup>8</sup>	96.9 $\mu$ V	77.5 $\mu$ V	28.5 $\mu$ V	224 $\mu$ V	117 $\mu$ V	66.7 $\mu$ V
5 mV/div <sup>9</sup>	202 $\mu$ V	108 $\mu$ V	37.4 $\mu$ V	238 $\mu$ V	133 $\mu$ V	68.7 $\mu$ V
10 mV/div	275 $\mu$ V	147 $\mu$ V	56.1 $\mu$ V	277 $\mu$ V	173 $\mu$ V	83.6 $\mu$ V
20 mV/div	469 $\mu$ V	251 $\mu$ V	106 $\mu$ V	416 $\mu$ V	278 $\mu$ V	125 $\mu$ V
50 mV/div	1.10 mV	589 $\mu$ V	253 $\mu$ V	916 $\mu$ V	620 $\mu$ V	271 $\mu$ V
100 mV/div	2.75 mV	1.47 mV	602 $\mu$ V	1.90 mV	1.36 mV	603 $\mu$ V
1 V/div	18.4 mV	10.8 mV	4.68 mV	20.3 mV	14.6 mV	6.54 mV

**✓ 1 GHz, 500 MHz, 350 MHz  
models, Sample mode (RMS)**

<b>&lt; 2 GHz models</b>	<b>50 <math>\Omega</math></b>					<b>1 M<math>\Omega</math></b>			
<b>V/div</b>	<b>1 GHz</b>	<b>500 MHz</b>	<b>350 MHz</b>	<b>250 MHz</b>	<b>20 MHz</b>	<b>500 MHz</b>	<b>350 MHz</b>	<b>250 MHz</b>	<b>20 MHz</b>
1 mV/div	372 $\mu$ V	253 $\mu$ V	181 $\mu$ V	153 $\mu$ V	91.4 $\mu$ V	258 $\mu$ V	188 $\mu$ V	158 $\mu$ V	87.9 $\mu$ V
2 mV/div	376 $\mu$ V	262 $\mu$ V	190 $\mu$ V	164 $\mu$ V	102 $\mu$ V	254 $\mu$ V	193 $\mu$ V	158 $\mu$ V	92.0 $\mu$ V
5 mV/div	395 $\mu$ V	292 $\mu$ V	222 $\mu$ V	201 $\mu$ V	136 $\mu$ V	272 $\mu$ V	207 $\mu$ V	185 $\mu$ V	116 $\mu$ V
10 mV/div	449 $\mu$ V	359 $\mu$ V	284 $\mu$ V	272 $\mu$ V	197 $\mu$ V	319 $\mu$ V	264 $\mu$ V	251 $\mu$ V	188 $\mu$ V
20 mV/div	614 $\mu$ V	529 $\mu$ V	436 $\mu$ V	435 $\mu$ V	347 $\mu$ V	455 $\mu$ V	422 $\mu$ V	422 $\mu$ V	347 $\mu$ V
50 mV/div	1.26 mV	1.14 mV	962 $\mu$ V	982 $\mu$ V	869 $\mu$ V	1.03 mV	898 $\mu$ V	1.00 mV	869 $\mu$ V
100 mV/div	2.85 mV	2.50 mV	2.08 mV	2.09 mV	1.74 mV	2.18 mV	1.91 mV	2.06 mV	1.74 mV
1 V/div	24.6 mV	22.4 mV	18.9 mV	19.4 mV	17.4 mV	23.1 mV	21.1 mV	21.6 mV	17.4 mV

**1 GHz, 500 MHz, 350 MHz  
models, Sample mode (RMS),  
typical**

< 2 GHz models	50 $\Omega$					1 M $\Omega$			
V/div	1 GHz	500 MHz	350 MHz	250 MHz	20 MHz	500 MHz	350 MHz	250 MHz	20 MHz
1 mV/div	287 $\mu$ V	196 $\mu$ V	140 $\mu$ V	118 $\mu$ V	70.6 $\mu$ V	199 $\mu$ V	145 $\mu$ V	122 $\mu$ V	67.9 $\mu$ V
2 mV/div	290 $\mu$ V	202 $\mu$ V	147 $\mu$ V	127 $\mu$ V	78.9 $\mu$ V	196 $\mu$ V	149 $\mu$ V	122 $\mu$ V	71.1 $\mu$ V
5 mV/div	305 $\mu$ V	226 $\mu$ V	171 $\mu$ V	156 $\mu$ V	105 $\mu$ V	210 $\mu$ V	160 $\mu$ V	143 $\mu$ V	89.8 $\mu$ V
10 mV/div	347 $\mu$ V	277 $\mu$ V	219 $\mu$ V	210 $\mu$ V	153 $\mu$ V	246 $\mu$ V	204 $\mu$ V	194 $\mu$ V	146 $\mu$ V
20 mV/div	475 $\mu$ V	409 $\mu$ V	337 $\mu$ V	336 $\mu$ V	257 $\mu$ V	352 $\mu$ V	326 $\mu$ V	326 $\mu$ V	251 $\mu$ V
50 mV/div	977 $\mu$ V	883 $\mu$ V	743 $\mu$ V	758 $\mu$ V	627 $\mu$ V	796 $\mu$ V	694 $\mu$ V	775 $\mu$ V	627 $\mu$ V
100 mV/div	2.20 mV	1.93 mV	1.60 mV	1.61 mV	1.25 mV	1.68 mV	1.48 mV	1.59 mV	1.25 mV
1 V/div	19.0 mV	17.3 mV	14.6 mV	15.0 mV	12.5 mV	17.9 mV	16.3 mV	16.7 mV	12.5 mV

✓ 1 GHz, 500 MHz, 350 MHz  
models, High Res mode (RMS)

< 2 GHz models	50 $\Omega$					1 M $\Omega$			
V/div	1 GHz	500 MHz	350 MHz	250 MHz	20 MHz	500 MHz	350 MHz	250 MHz	20 MHz
1 mV/div	329 $\mu$ V	256 $\mu$ V	183 $\mu$ V	152 $\mu$ V	90.6 $\mu$ V	245 $\mu$ V	184 $\mu$ V	153 $\mu$ V	83.8 $\mu$ V
2 mV/div	330 $\mu$ V	256 $\mu$ V	185 $\mu$ V	157 $\mu$ V	91.2 $\mu$ V	251 $\mu$ V	188 $\mu$ V	156 $\mu$ V	85.4 $\mu$ V
5 mV/div	339 $\mu$ V	262 $\mu$ V	195 $\mu$ V	172 $\mu$ V	94.3 $\mu$ V	254 $\mu$ V	197 $\mu$ V	169 $\mu$ V	90.1 $\mu$ V
10 mV/div	367 $\mu$ V	282 $\mu$ V	218 $\mu$ V	205 $\mu$ V	103 $\mu$ V	274 $\mu$ V	216 $\mu$ V	200 $\mu$ V	101 $\mu$ V
20 mV/div	462 $\mu$ V	354 $\mu$ V	287 $\mu$ V	288 $\mu$ V	132 $\mu$ V	348 $\mu$ V	277 $\mu$ V	289 $\mu$ V	135 $\mu$ V
50 mV/div	876 $\mu$ V	667 $\mu$ V	564 $\mu$ V	595 $\mu$ V	254 $\mu$ V	634 $\mu$ V	530 $\mu$ V	621 $\mu$ V	268 $\mu$ V
100 mV/div	2.09 mV	1.60 mV	1.31 mV	1.34 mV	601 $\mu$ V	1.51 mV	1.25 mV	1.36 mV	615 $\mu$ V
1 V/div	16.8 mV	12.8 mV	10.9 mV	11.6 mV	4.88 mV	17.6 mV	13.7 mV	14.4 mV	7.08 mV

1 GHz, 500 MHz, 350 MHz  
models, High Res mode  
(RMS), typical

< 2 GHz models	50 $\Omega$					1 M $\Omega$			
V/div	1 GHz	500 MHz	350 MHz	250 MHz	20 MHz	500 MHz	350 MHz	250 MHz	20 MHz
1 mV/div	254 $\mu$ V	198 $\mu$ V	141 $\mu$ V	118 $\mu$ V	70.0 $\mu$ V	189 $\mu$ V	143 $\mu$ V	118 $\mu$ V	64.8 $\mu$ V
2 mV/div	255 $\mu$ V	198 $\mu$ V	143 $\mu$ V	121 $\mu$ V	70.4 $\mu$ V	194 $\mu$ V	145 $\mu$ V	121 $\mu$ V	66.0 $\mu$ V
5 mV/div	262 $\mu$ V	202 $\mu$ V	150 $\mu$ V	133 $\mu$ V	72.8 $\mu$ V	196 $\mu$ V	152 $\mu$ V	130 $\mu$ V	69.6 $\mu$ V
10 mV/div	283 $\mu$ V	218 $\mu$ V	169 $\mu$ V	158 $\mu$ V	79.8 $\mu$ V	212 $\mu$ V	167 $\mu$ V	154 $\mu$ V	78.2 $\mu$ V
20 mV/div	357 $\mu$ V	273 $\mu$ V	222 $\mu$ V	223 $\mu$ V	102 $\mu$ V	269 $\mu$ V	214 $\mu$ V	223 $\mu$ V	104 $\mu$ V
50 mV/div	677 $\mu$ V	516 $\mu$ V	436 $\mu$ V	460 $\mu$ V	196 $\mu$ V	490 $\mu$ V	410 $\mu$ V	480 $\mu$ V	207 $\mu$ V
100 mV/div	1.61 mV	1.23 mV	1.02 mV	1.04 mV	464 $\mu$ V	1.16 mV	964 $\mu$ V	1.05 mV	475 $\mu$ V
1 V/div	13.0 mV	9.88 mV	8.41 mV	8.94 mV	3.77 mV	13.6 mV	10.6 mV	11.1 mV	5.47 mV

**Delay between analog channels, full bandwidth, typical**  $\leq 100$  ps for any two channels with input impedance set to 50  $\Omega$ , DC coupling with equal Volts/div or above 10 mV/div

**Deskew range** -125 ns to +125 ns with a resolution of 40 ps

**Crosstalk (channel isolation), typical**  $\geq 200:1$  up to the rated bandwidth for any two channels having equal Volts/div settings

**Overdrive recovery time, typical****50  $\Omega$ , no probe, 1 GHz bandwidth**

Vertical scale	500% overdrive			5000% overdrive		
	5%	1%	0.2%	5%	1%	0.2%
1 mV/div	<1 $\mu$ s	2.0 ms	2.0 ms	---	---	---
10 mV/div	<1 $\mu$ s	3.0 ms	33 $\mu$ s	<1.2 $\mu$ s	<4.7 $\mu$ s	---
100 mV/div	<1 $\mu$ s	<1 $\mu$ s	5.8 $\mu$ s	---	---	---

**50  $\Omega$ , no probe, 2 GHz bandwidth**

Vertical scale	500% overdrive			5000% overdrive		
	5%	1%	0.2%	5%	1%	0.2%
1 mV/div	<1 $\mu$ s	110 $\mu$ s	2.0 ms	---	---	---
10 mV/div	<1 $\mu$ s	<1 $\mu$ s	2.0 ms	<1 $\mu$ s	<1 $\mu$ s	---
100 mV/div	<1 $\mu$ s	<1 $\mu$ s	2.3 ms	---	---	---

**TPP1000 Probe**

Vertical scale	500% overdrive			5000% overdrive		
	5%	1%	0.2%	5%	1%	0.2%
10 mV/div	20 $\mu$ s	2.0 ms	2.0 ms	30 $\mu$ s	50 $\mu$ s	2.2 ms
20 mV/div	14 $\mu$ s	2.0 ms	2.0 ms	30 $\mu$ s	50 $\mu$ s	110 $\mu$ s
50 mV/div	12 $\mu$ s	60 $\mu$ s	2.0 ms	---	---	---
100 mV/div	12 $\mu$ s	60 $\mu$ s	2.0 ms	---	---	---

**Total probe power**

TekVPI Compliant probe interfaces (8 per MSO58, 6 per MSO56, 4 per MSO54)

MSO58 and MSO56: 80 W maximum, (40 W maximum for channels 1 through 4, 40 W maximum for channels 5 through 8)

MDO54: 40 W maximum

**Probe power per channel**

Voltage	Max Amperage	Voltage Tolerance
5 V	60 mA	$\pm 10\%$
12 V	2 A (20 W maximum software limit)	$\pm 10\%$

**TekVPI interconnect**

All analog channel inputs on the front panel conform to the TEKVPI specification.

## Timebase system

Sample rate	Max HW Capability			Number of Channels				
	6.25 GS/s			1-8				
Interpolated waveform rate range								
500 GS/sec, 250 GS/sec, 125 GS/sec, 62.5 GS/sec, 25 GS/sec, and 12.5 GS/sec								
Record length range								
Standard								
1 kpoints to 125 Mpoints in single sample increments								
Standard								
1 kpoints to 62.5 Mpoints in single sample increments								
Option 5-RL-125M								
125 Mpoints								
Seconds/Division range								
Model		1 K	10 K	100 K	1 M	10 M	62.5 M	125 M
MSO5X Standard 62.5 M		200 ps - 64 s	200 ps - 640 s	200 ps - 1000 s				
MSO5X Option 5- RL-125M		200 ps - 64 s	200 ps - 640 s	200 ps - 1000 s				
Maximum triggered acquisition rate, typical								
Analog or digital channels: single channel [Analog or Digital 8-bit channel] on screen, measurements and math turned off. >40 wfms/sec								
FastAcq Update Rate (analog only): >500 K/second with one channel active and >100 K/second with all eight active.								
FastAcq Update Rate (analog and analog/digital): >400 K/second with two channels active and >100 K/second with all eight analog channels active.								
Digital channel: >40/second with one channel (8-bits) active. There is no FastAcq for digital channels, but they do not slow down FastAcq for active analog channels.								
Aperture uncertainty								
≤ 0.450 ps + (1 * 10 <sup>-11</sup> * Measurement Duration) <sub>RMS</sub> , for measurements having duration ≤ 100 ms								

## ✓ Timebase accuracy

±2.5 x 10<sup>-6</sup> over any ≥1 ms time interval

Description	Specification
Factory Tolerance	±5.0 x10 <sup>-7</sup> . At calibration, 23 °C ambient, over any ≥1 ms interval
Temperature stability	±5.0 x10 <sup>-7</sup> . Tested at operating temperatures
Crystal aging	±1.5 x 10 <sup>-6</sup> . Frequency tolerance change at 25 °C over a period of 1 year

## ✓ Delta-time measurement accuracy

The formula to calculate delta-time measurement accuracy (DTA) for a given instrument setting and input signal is as follows (assumes insignificant signal content above Nyquist frequency):

SR<sub>1</sub> = Slew Rate (1<sup>st</sup> Edge) around 1<sup>st</sup> point in measurement

SR<sub>2</sub> = Slew Rate (2<sup>nd</sup> Edge) around 2<sup>nd</sup> point in measurement

N = input-referred guaranteed noise limit (V<sub>RMS</sub>)

TBA = timebase accuracy or Reference Frequency Error

t<sub>p</sub> = delta-time measurement duration (sec)

(assume edge shape that results from Gaussian filter response)

$$DTA_{pp}(\text{typical}) = 10 \times \sqrt{\left(\frac{N}{SR_1}\right)^2 + \left(\frac{N}{SR_2}\right)^2 + (0.450 \text{ ps} + (1 \times 10^{-11} \times t_p))^2} + TBA \times t_p$$

$$DTA_{RMS} = \sqrt{\left(\frac{N}{SR_1}\right)^2 + \left(\frac{N}{SR_2}\right)^2 + (0.450 \text{ ps} + (1 \times 10^{-11} \times t_p))^2} + TBA \times t_p$$

The term under the square root sign is the stability and is due to TIE (Time Interval Error). The errors due to this term occur throughout a single-shot measurement. The second term is due to both the absolute center-frequency accuracy and the center-frequency stability of the timebase and varies between multiple single-shot measurements over the observation interval (the amount of time from the first single-shot measurement to the final single-shot measurement).

**NOTE.** The formulas assume negligible errors due to measurement interpolation, and apply only when the interpolated sample rate is 25 GS/s or higher.

## Trigger system

Trigger bandwidth (edge, pulse and logic), typical

2 GHz models, Edge	2 GHz
2 GHz models, Pulse and Logic	1 GHz
1 GHz models, MSO58LP	1 GHz
500 MHz models	500 MHz
350 MHz models	350 MHz

Edge-type trigger sensitivity, DC coupled, typical

### 5 Series MSO

Path	Range	Specification
1 M $\Omega$ path (all models)	0.5 mV/div to 0.99 mV/div	5 mV from DC to instrument bandwidth
	$\geq 1$ mV/div	The greater of 5 mV or 0.7 div from DC to lesser of 500 MHz or instrument BW, & 6 mV or 0.8 div from > 500 MHz to instrument bandwidth
50 $\Omega$ path, 1 GHz, 500 MHz, 350 MHz models		The greater of 5.6 mV or 0.7 div from DC to the lesser of 500 MHz or instrument BW, & 7 mV or 0.8 div from > 500 MHz to instrument bandwidth
50 $\Omega$ path, 2 GHz models	0.5 mV/div to 0.99 mV/div	3.0 div from DC to instrument bandwidth
	1 mV/div to 9.98 mV/div	1.5 divisions from DC to instrument bandwidth
	$\geq 10$ mV/div	< 1.0 division from DC to instrument bandwidth
Line		Fixed

### MSO58LP

Path	Range	Specification
1 M $\Omega$ path (all models)	0.5 mV/div to 0.99 mV/div	4.5 div from DC to instrument bandwidth
	$\geq 1$ mV/div	The greater of 5 mV or 0.7 div from DC to lesser of 500 MHz or instrument BW, & 6 mV or 0.8 div from > 500 MHz to instrument bandwidth
50 $\Omega$ path		The greater of 5.6 mV or 0.7 div from DC to the lesser of 500 MHz or instrument BW, & 7 mV or 0.8 div from > 500 MHz to instrument bandwidth
Line		Fixed
AUX Trigger in		200 mV <sub>pp</sub> , DC to 250 MHz

<b>Trigger jitter, typical</b>	$\leq 5 \text{ ps}_{\text{RMS}}$ for sample mode and edge-type trigger
	$\leq 7 \text{ ps}_{\text{RMS}}$ for edge-type trigger and FastAcq mode
	$\leq 40 \text{ ps}_{\text{RMS}}$ for non edge-type trigger modes
	$\leq 200 \text{ ps}_{\text{RMS}}$ for AUX trigger in, Sample acquisition mode, edge trigger (MSO58LP only)
	$\leq 220 \text{ ps}_{\text{RMS}}$ for AUX trigger in, FastAcq acquisition mode, edge trigger (MSO58LP only)

<b>AUX In trigger skew between instruments, typical (MSO58LP only)</b>	$\pm 100 \text{ ps}$ jitter on each instrument with $150 \text{ ps}$ skew; $\leq 350 \text{ ps}$ total between instruments. Skew improves for sinusoidal input voltages $\geq 500 \text{ mV}$
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<b>Edge-type trigger sensitivity, not DC coupled, typical</b>	<b>Trigger Coupling</b>	<b>Typical Sensitivity</b>
	NOISE REJ	2.5 times the DC Coupled limits
	HF REJ	1.0 times the DC Coupled limits from DC to 50 kHz. Attenuates signals above 50 kHz.
	LF REJ	1.5 times the DC Coupled limits for frequencies above 50 kHz. Attenuates signals below 50 kHz.

<b>Lowest frequency for successful operation of Set Level to 50% function, typical</b>	45 Hz
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<b>Logic-type, logic qualified trigger, or events-delay sensitivities, DC coupled, typical</b>	2.0 divisions, at vertical settings $\geq 5 \text{ mV/div.}$
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<b>Pulse-type runt trigger sensitivities, typical</b>	2.0 division at vertical settings $\geq 5 \text{ mV/div.}$
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<b>Pulse-type trigger width and glitch sensitivities, typical</b>	2.0 divisions at vertical settings $\geq 5 \text{ mV/div.}$
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<b>Logic-type triggering, minimum logic or rearm time, typical</b>	<b>Triggering type</b>	<b>Pulse width</b>	<b>Rearm time</b>	<b>Time skew needed for 100% and no triggering <sup>1</sup></b>
	Logic	$160 \text{ ps} + t_{\text{rise}}$	$160 \text{ ps} + t_{\text{rise}}$	$>360 \text{ ps} / <150 \text{ ps}$
	Time qualified logic	$320 \text{ ps} + t_{\text{rise}}$	$320 \text{ ps} + t_{\text{rise}}$	$>360 \text{ ps} / <150 \text{ ps}$

$t_{\text{rise}}$  is rise time of the instrument.

<sup>1</sup> For Logic, time between channels refers to the length of time a logic state derived from more than one channel must exist to be recognized. For Events, the time is the minimum time between a main and delayed event that will be recognized if more than one channel is used.



Minimum clock pulse widths for setup/hold time violation trigger, typical

Minimum pulsewidth, clock active <sup>2</sup>	Minimum pulsewidth, clock inactive <sup>3</sup>
320 ps + $t_{rise}$	320 ps + $t_{rise}$

$t_{rise}$  is rise time of the instrument.

Setup/hold violation trigger, setup and hold time ranges, typical

Feature	Min	Max
Setup Time	0 ns	20 s
Hold Time	0 ns	20 s
Setup + Hold Time	320 ps	22 s

Input coupling on clock and data channels must be the same.

For Setup Time, positive numbers mean a data transition before the clock.

For Hold Time, positive numbers mean a data transition after the clock edge.

Setup + Hold Time is the algebraic sum of the Setup Time and the Hold Time programmed by the user.

Pulse type trigger, minimum pulse, rearm time, transition time

Pulse class	Minimum pulse width	Minimum rearm time
Runt	160 ps + $t_{rise}$	160 ps + $t_{rise}$
Time-Qualified Runt	160 ps + $t_{rise}$	160 ps + $t_{rise}$
Width	160 ps + $t_{rise}$	160 ps + $t_{rise}$
Slew Rate (minimum transition time)	160 ps + $t_{rise}$	160 ps + $t_{rise}$

For trigger class width, pulse width refers to the width of the pulse being measured. Rearm time refers to the time between pulses.

For trigger class runt, pulse width refers to the width of the pulse being measured. Rearm time refers to the time between pulses.

For trigger class slew rate, pulse width refers to the delta time being measured. Rearm time refers to the time it takes the signal to cross the two trigger thresholds again.

$t_{rise}$  is rise time of the instrument.

Active pulsewidth is the width of the clock pulse from its active edge (as defined in the Clock Edge menu item) to its inactive edge

Inactive pulsewidth is the width of the pulse from its inactive edge to its active edge.

Transition time trigger, delta time range

160 ps to 20 s.

Time range for glitch, pulse width, timeout, time-qualified runt, or time-qualified window triggering

160 ps to 20 s.

<sup>2</sup> Active pulsewidth is the width of the clock pulse from its active edge (as defined in the Clock Edge menu item) to its inactive edge.

<sup>3</sup> Inactive pulsewidth is the width of the pulse from its inactive edge to its active edge.

Time accuracy for pulse, glitch, timeout, or width triggering	Time Range	Accuracy
	1 ns to 500 ns	$\pm(160 \text{ ps} + \text{Time Base Error} * \text{Setting})$ .
	520 ns to 1 s	$\pm(160 \text{ ps} + \text{Time Base Error} * \text{Setting})$ .

B trigger after events, minimum pulse width and maximum event frequency, typical	Minimum pulse width: $160 \text{ ps} + t_{\text{rise}}$
	Maximum event frequency: Instrument bandwidth.
	$t_{\text{rise}}$ is rise time of the instrument.

B trigger, minimum time between arm and trigger, typical	320 ps
	For trigger after time, this is the time between the end of the time period and the B trigger event.
	For trigger after events, this is the time between the last A trigger event and the first B trigger event.

B trigger after time, time range	160 ps to 20 seconds
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B trigger after events, event range	1 to 65,471
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Trigger level ranges	Source	Range
	Any Channel	$\pm 5$ divs from center of screen
	Line	Fixed at about 50% of line voltage

Source	Range
Any Channel	$\pm 5$ divs from center of screen
Aux In Trigger	$\pm 5 \text{ V}$
Line	Fixed at about 50% of line voltage

This specification applies to logic and pulse thresholds.

Trigger level accuracy, DC coupled, typical	For signals having rise and fall times $\geq 10 \text{ ns}$ :
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Source	Range
Any Input Channel	$\pm 0.20 \text{ div}$
Line	N/A

Trigger holdoff range	0 ns to 10 seconds
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## Serial Trigger specifications

**Maximum serial trigger bits** 128 bits

### Optional serial bus interface triggering

#### I<sup>2</sup>C

**Address Triggering:** 7 & 10 bits of user-specified addresses supported

**Data Trigger:** 1 - 5 Bytes of user-specified data

**Trigger on:** Start, Repeated Start, Stop, Missing Ack, Data, Address, or Address & Data

**Maximum Data Rate:** 10 Mb/s

#### SPI

**Data Trigger:** 1 - 16 Bytes of user-specified data

**Trigger on:** SS Active, Data

**Maximum Data Rate:** 20 Mb/s

#### CAN

**Data Trigger:** 1 - 8 Bytes of user-specified data, including qualifiers of equal to (=), not equal to (≠), less than (<), greater than (>), less than or equal to (<=), greater than or equal to (>=)

**Trigger on:** Start of Frame, Type of Frame, Identifier, Data, Identifier & Data, End of Frame, Missing Ack, or Bit Stuffing Errors

**Frame Type:** Data, Remote, Error, Overload

**Identifier:** Standard (11 bit) and Extended (29 bit) identifiers

**Maximum Data Rate:** 1 Mb/s

#### LIN

**Identifier Trigger:** 6 bits of user-specified data, equal to (=)

**Data Trigger:** 1 - 8 Bytes of user-specified data, including qualifiers of equal to (=), not equal to (≠), less than (<), greater than (>), less than or equal to (<=), greater than or equal to (>=), inside range, outside range

**Error Trigger:** Sync, Identifier Parity, Checksum

**Trigger on:** Sync, Identifier, Data, Identifier & Data, Wakeup Frame, Sleep Frame, or Error

**Maximum Data Rate:** 100 kb/s

**Flexray**

**Indicator Bits:** Normal (01XX), Payload (11XX), Null (00XX), Sync (XX10), Startup (XX11)

**Frame ID Trigger:** 11 bits of user-specified data, including qualifiers of equal to (=), not equal to (≠), less than (<), greater than (>), less than or equal to (<=), greater than or equal to (>=)

**Cycle Count Trigger:** 6 bits of user-specified data, including qualifiers of equal to (=), not equal to (≠), less than (<), greater than (>), less than or equal to (<=), greater than or equal to (>=)

**Header Fields Trigger:** 40 bits of user-specified data comprising Indicator Bits, Identifier, Payload Length, Header CRC, and Cycle Count, equal to (=)

**Data Trigger:** 1 - 16 Bytes of user-specified data, with 0 to 253, or "don't care" bytes of data offset, including qualifiers of equal to (=), not equal to (≠), less than (<), greater than (>), less than or equal to (<=), greater than or equal to (>=), Inside Range, Outside Range

**End Of Frame:** User-chosen types Static, Dynamic (DTS), and All

**Error Trigger:** Header CRC, Trailer CRC, Null Frame-static, Null Frame-dynamic, Sync Frame, Startup frame (No Sync)

**Trigger on:** Start of Frame, Frame ID, Indicator Bits, Cycle Count, Header Fields, Data, Identifier & Data, End of Frame, or Error

**Maximum Data Rate:** 40 Mb/s

**Audio (I<sup>2</sup>S)**

**Data Trigger:** 32 bits of user-specified data in a left word, right word, or either, including qualifiers of equal to (=), not equal to (≠), less than (<), greater than (>), less than or equal to (<=), greater than or equal to (>=), inside range, outside range

**Trigger on:** Word Select, Data

**Maximum Data Rate:** 12.5 Mb/s

Left Justified (LJ)

**Data Trigger:** 32 bits of user-specified data in a left word, right word, or either, including qualifiers of equal to (=), not equal to (≠), less than (<), greater than (>), less than or equal to (<=), greater than or equal to (>=), inside range, outside range

**Trigger on:** Word Select, Data

**Maximum Data Rate:** 12.5 Mb/s

Right Justified (RJ)

**Data Trigger:** 32 bits of user-specified data in a left word, right word, or either, including qualifiers of equal to (=), not equal to (≠), less than (<), greater than (>), less than or equal to (<=), greater than or equal to (>=), inside range, outside range

**Trigger on:** Word Select, Data

**Maximum Data Rate:** 12.5 Mb/s

TDM

**Data Trigger:** 32 bits of user-specified data in a channel 1-64, including qualifiers of equal to (=), not equal to (≠), less than (<), greater than (>), less than or equal to (<=), greater than or equal to (>=), inside range, outside range

**Trigger on:** Frame Sync, Data

**Maximum Data Rate:** 25 Mb/s

<b>RS232</b>	<p><b>Bit Rate:</b> 50 bps - 10 Mbps</p> <p><b>Data Bits:</b> 7, 8, or 9</p> <p><b>Parity:</b> None, Odd, or Even</p> <p><b>Trigger on:</b> Start, End of Packet, Data, Parity Error</p>
<b>MIL-STD-1553</b>	<p><b>Bit Rate:</b> 1 Mb/s</p> <p><b>Trigger on:</b></p> <p>Sync</p> <p>Word Type (Command, Status, Data)</p> <p>Command Word (set RT Address (<math>=</math>, <math>\neq</math>, <math>&lt;</math>, <math>&gt;</math>, <math>\leq</math>, <math>\geq</math>, inside range, outside range), T/R, Sub-address/Mode, Data Word Count/Mode Code, and Parity individually)</p> <p>Status Word (set RT Address (<math>=</math>, <math>\neq</math>, <math>&lt;</math>, <math>&gt;</math>, <math>\leq</math>, <math>\geq</math>, inside range, outside range), Message Error, Instrumentation, Service Request Bit, Broadcast Command Received, Busy, Subsystem Flag, Dynamic Bus Control Acceptance (DBCA), Terminal Flag, and Parity individually)</p> <p>Data Word (user-specified 16-bit data value)</p> <p>Error (Sync, Parity, Manchester, Non-contiguous data)</p> <p>Idle Time (minimum time selectable from 4 <math>\mu</math>s to 100 <math>\mu</math>s; maximum time selectable from 12 <math>\mu</math>s to 100 <math>\mu</math>s; trigger on <math>&lt;</math> minimum, <math>&gt;</math> maximum, inside range, outside range)</p> <p>For MIL-STD-1553, Trigger selection of Command Word will trigger on Command and ambiguous Command/Status words. Trigger selection of Status Word will trigger on Status and ambiguous Command/Status words</p>
<b>USB</b>	<p><b>Data Rates Supported:</b> High: 480 Mbs, Full: 12 Mbs, Low: 1.5Mbs</p> <p><b>Trigger On:</b> Sync, Reset, Suspend, Resume, End of Packet, Token Packet, Data Packet, Handshake Packet, Special Packet, Error</p>
<b>Ethernet</b>	<p><b>Bit Rate:</b> 10 BASE-T, 10 Mbps; 100 BASE-TX, 100 Mbps</p> <p><b>Trigger On:</b> Start of Frame, MAC Address, MAC Length/Type, IP Header, TCP Header, Client Data, End of Packet, Idle, FCS (CRC) Error, MAC Q-Tag control Information</p>

## Digital acquisition system

<b>Digital channel maximum sample rate</b>	6.25 GS/s
<b>Transition detect (digital peak detect)</b>	Displayed data at sample rates less than 6.25 GS/s (decimated data), that contains multiple transitions between sample points will be displayed with a bright white colored edge.
<b>Digital-To-Analog trigger skew</b>	1 ns
<b>Digital to digital skew</b>	320 ps from bit 0 of any TekVPI channel to bit 0 of any TekVPI channel.
<b>Digital skew within a FlexChannel</b>	160 ps within any TekVPI channel

## Digital volt meter (DVM)

<b>Measurement types</b>	DC, AC <sub>RMS</sub> +DC, AC <sub>RMS</sub>
<b>Voltage resolution</b>	4 digits
<b>✓ Voltage accuracy</b>	
<b>DC:</b>	$\pm((1.5\% *  \text{reading} - \text{offset} - \text{position} ) + (0.5\% *  (\text{offset} - \text{position}) ) + (0.1 * \text{Volts/div}))$ <p>De-rated at 0.100%/°C of  reading - offset - position  above 30 °C</p> <p>Signal ± 5 divisions from screen center</p>
<b>AC:</b>	<p>± 2% (40 Hz to 1 kHz) with no harmonic content outside 40 Hz to 1 kHz range</p> <p>AC, typical: ± 2% (20 Hz to 10 kHz)</p> <p>For AC measurements, the input channel vertical settings must allow the V<sub>PP</sub> input signal to cover between 4 and 10 divisions and must be fully visible on the screen</p>

## Trigger frequency counter

✓ <b>Accuracy</b>	$\pm(1 \text{ count} + \text{time base accuracy} * \text{input frequency})$ The signal must be at least 8 mV <sub>pp</sub> or 2 div, whichever is greater.
✓ <b>Maximum input frequency</b>	10 Hz to maximum bandwidth of the analog channel The signal must be at least 8 mV <sub>pp</sub> or 2 div, whichever is greater.
<b>Resolution</b>	8-digits

## Arbitrary Function Generator system

<b>Function types</b>	Arbitrary, sine, square, pulse, ramp, triangle, DC level, Gaussian, Lorentz, exponential rise/fall, sin(x)/x, random noise, Haversine, Cardiac
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<b>Amplitude range</b>	Values are peak-to-peak voltages
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Waveform	50 $\Omega$	1 M $\Omega$
Arbitrary	10 mV to 2.5 V	20 mV to 5 V
Sine	10 mV to 2.5 V	20 mV to 5 V
Square	10 mV to 2.5 V	20 mV to 5 V
Pulse	10 mV to 2.5 V	20 mV to 5 V
Ramp	10 mV to 2.5 V	20 mV to 5 V
Triangle	10 mV to 2.5 V	20 mV to 5 V
Gaussian	10 mV to 1.25 V	20 mV to 2.5 V
Lorentz	10 mV to 1.2 V	20 mV to 2.4 V
Exponential Rise	10 mV to 1.25 V	20 mV to 2.5 V
Exponential Fall	10 mV to 1.25 V	20 mV to 2.5 V
Sine(x)/x	10 mV to 1.5 V	20 mV to 3.0 V
Random Noise	10 mV to 2.5 V	20 mV to 5 V
Haversine	10 mV to 1.25 V	20 mV to 2.5 V
Cardiac	10 mV to 2.5 V	20 mV to 5 V

<b>Maximum sample rate</b>	250 MS/s
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<b>Arbitrary function record length</b>	128 K Samples
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### Sine waveform

<b>Frequency range</b>	0.1 Hz to 50 MHz
<b>Frequency setting resolution</b>	0.1 Hz
<b>Frequency accuracy</b>	130 ppm (frequency $\leq$ 10 kHz), 50 ppm (frequency $>$ 10 kHz) This is for Sine, Ramp, Square and Pulse waveforms only.
<b>Amplitude range</b>	20 mV <sub>pp</sub> to 5 V <sub>pp</sub> into Hi-Z; 10 mV <sub>pp</sub> to 2.5 V <sub>pp</sub> into 50 $\Omega$

<b>Amplitude flatness, typical</b>	$\pm 0.5$ dB at 1 kHz $\pm 1.5$ dB at 1 kHz for $< 20$ mV <sub>pp</sub> amplitudes
<b>Total harmonic distortion, typical</b>	1% for amplitude $\geq 200$ mV <sub>pp</sub> into 50 $\Omega$ load 2.5% for amplitude $> 50$ mV AND $< 200$ mV <sub>pp</sub> into 50 $\Omega$ load This is for Sine wave only.
<b>Spurious free dynamic range, typical</b>	40 dB ( $V_{pp} \geq 0.1$ V); 30 dB ( $V_{pp} \geq 0.02$ V), 50 $\Omega$ load
<b>Square and pulse waveform</b>	
<b>Frequency range</b>	0.1 Hz to 25 MHz
<b>Frequency setting resolution</b>	0.1 Hz
<b>Duty cycle range</b>	10% - 90% or 10 ns minimum pulse, whichever is larger  Minimum pulse time applies to both on and off time, so maximum duty cycle will reduce at higher frequencies to maintain 10 ns off time
<b>Duty cycle resolution</b>	0.1%
<b>Minimum pulse width, typical</b>	10 ns. This is the minimum time for either on or off duration.
<b>Rise/Fall time, typical</b>	5 ns, 10% - 90%
<b>Pulse width resolution</b>	100 ps
<b>Overshoot, typical</b>	$< 6\%$ for signal steps greater than 100 mV <sub>pp</sub>  This applies to overshoot of the positive-going transition (+overshoot) and of the negative-going (-overshoot) transition
<b>Asymmetry, typical</b>	$\pm 1\% \pm 5$ ns, at 50% duty cycle
<b>Jitter, typical</b>	$< 60$ ps TIE <sub>RMS</sub> , $\geq 100$ mV <sub>pp</sub> amplitude, 40%-60% duty cycle
<b>Ramp and triangle waveform</b>	
<b>Frequency range</b>	0.1 Hz to 500 kHz
<b>Frequency setting resolution</b>	0.1 Hz
<b>Variable symmetry</b>	0% - 100%
<b>Symmetry resolution</b>	0.1%
<b>DC level range</b>	$\pm 2.5$ V into Hi-Z $\pm 1.25$ V into 50 $\Omega$
<b>Gaussian pulse, Haversine, and Lorentz pulse</b>	
<b>Maximum frequency</b>	5 MHz
<b>Exponential rise fall maximum frequency</b>	5 MHz
<b>Sin(x)/x</b>	
<b>Maximum frequency</b>	2 MHz



<b>Random noise amplitude range</b>	20 mV <sub>pp</sub> to 5 V <sub>pp</sub> into Hi-Z 10 mV <sub>pp</sub> to 2.5 V <sub>pp</sub> into 50 Ω For both isolated noise signal and additive noise signal.
<b>✓ Sine and ramp frequency accuracy</b>	1.3 x 10 <sup>-4</sup> (frequency ≤10 kHz) 5.0 x 10 <sup>-5</sup> (frequency >10 kHz)
<b>✓ Square and pulse frequency accuracy</b>	1.3 x 10 <sup>-4</sup> (frequency ≤10 KHz); 5.0 x 10 <sup>-5</sup> (frequency >10 KHz)
<b>Signal amplitude resolution</b>	1 mV (Hi-Z) 500 μV (50 Ω)
<b>✓ Signal amplitude accuracy</b>	±[ (1.5% of peak-to-peak amplitude setting) + (1.5% of absolute DC offset setting) + 1 mV ] (frequency = 1 kHz)
<b>DC offset range</b>	±2.5 V into Hi-Z ±1.25 V into 50 Ω
<b>DC offset resolution</b>	1 mV (Hi-Z) 500 μV (50 Ω)
<b>✓ DC offset accuracy</b>	±[ (1.5% of absolute offset voltage setting) + 1 mV ] Add 3 mV of uncertainty per 10 °C change from 25 °C ambient

## Display system (MSO54, MSO56, MSO58)

<b>Display type</b>	Display area - 13.55 inches (344.16 mm) (H) x 7.62 inches (193.59 mm) (V), 15.55 inches (395 mm) diagonal, 6-bit RGB color, (1920 X 1080) TFT liquid crystal display (LCD).
<b>Display resolution</b>	1,920 horizontal × 1,080 vertical pixels (High Definition)
<b>Luminance, typical</b>	250 cd/m <sup>2</sup> , (Minimum: 200 cd/m <sup>2</sup> ) Display luminance is specified for a new display set at full brightness.
<b>Color support</b>	262K (6-bit RGB) colors.

## Processor system

<b>Host processor</b>	Intel i5-4400E, 2.7 GHz, 64-bit, dual core processor
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<b>Operating system</b>	Default instrument: Closed Linux Instrument with option 5-WIN installed: Microsoft Windows 10 <sup>1</sup>
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## Input/Output port specifications

<b>Ethernet interface</b>	An 8-pin RJ-45 connector that supports 10/100/1000 Mb/s
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<b>Video signal output</b>	A 15-pin, 3-row, D-sub VGA connector. Recommended resolution: 1920 x 1080 @ 60Hz
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<b>DVI connector</b>	A 29-pin DVI-D connector; connect to show the oscilloscope display on an external monitor or projector Maximum supported resolution, Windows: 1920 x 1200 @ 60 Hz Maximum supported resolution, Linux: 1920 x 1080 @ 60 Hz Only a single TMDS link is provided Analog VGA signaling is not provided
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<b>DisplayPort connector</b>	A 20-pin DisplayPort connector; connect to show the oscilloscope display on an external monitor or projector Maximum supported resolution, Windows: 2560 x 1440 @ 60Hz Maximum supported resolution, Linux: 1920 x 1080 @ 60 Hz DP++ adapter: Maximum supported resolution: 2560 x1440 @ 60 Hz
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<b>Simultaneous displays</b>	Up to 3 displays (including the internal display) with a maximum of 1 display per port.
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<b>USB interface (Host, Device ports)</b>	5 Series MSO Front panel USB Host ports: Two USB 2.0 Hi-Speed ports, one USB 3.0 SuperSpeed port MSO58LP Front panel USB Host ports: One USB 2.0 Hi-Speed port, one USB 3.0 SuperSpeed port All instruments, Rear panel USB Host ports: Two USB 2.0 Hi-Speed ports, two USB 3.0 SuperSpeed ports All instruments, Rear panel USB Device port: One USB 3.0 SuperSpeed Device port providing USBTMC support
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<sup>1</sup> Option 5-WIN is not available for MSO58LP instrument.

**Probe compensator signal output voltage and frequency, typical**

Characteristic	Value
Output Voltage	Default: 0-2.5 V amplitude
Impedance	1 k $\Omega$
Frequency	1 kHz

**✓ Auxiliary output, AUX OUT, Trigger Out, Event, or Reference Clock Out****Selectable output**

Acquisition Trigger Out

Reference Clock Out

AFG Trigger Out

**Acquisition Trigger Out**

User selectable transition from HIGH to LOW, or LOW to HIGH, indicates the trigger occurred. The signal returns to its previous state after approximately 100 ns

**Acquisition trigger jitter**

300 ps (peak-to-peak)

**Reference Clock Out**

Reference clock output tracks the acquisition system and can be referenced from either the internal clock reference or the external clock reference

**AFG Trigger Out**

The output frequency is dependent on the frequency of the AFG signal as shown in the following table:

AFG signal frequency	AFT trigger frequency
$\leq 4.9$ MHz	Signal frequency
$> 4.9$ MHz to 14.7 MHz	Signal frequency / 3
$> 14.7$ MHz to 24.5 MHz	Signal frequency / 5
$> 24.5$ MHz to 34.3 MHz	Signal frequency / 7
$> 34.3$ MHz to 44.1 MHz	Signal frequency / 9
$> 44.1$ MHz to 50 MHz	Signal frequency / 11

**AUX OUT Output Voltage**

Characteristic	Limits
V <sub>out</sub> (HI)	$\geq 2.5$ V open circuit; $\geq 1.0$ V into a 50 $\Omega$ load to ground
V <sub>out</sub> (LO)	$\leq 0.7$ V into a load of $\leq 4$ mA; $\leq 0.25$ V into a 50 $\Omega$ load to ground

**External reference input****Nominal input frequency** 10 MHz**Frequency Variation Tolerance** 9.99996 MHz to 10.00004 MHz ( $\pm 4.0 \times 10^{-6}$ )**Sensitivity, typical** V<sub>in</sub> 1.5 V<sub>p-p</sub> using a 50  $\Omega$  termination**Maximum input signal** 7 V<sub>pp</sub>**Impedance** 1.2 K Ohms  $\pm 20\%$  in parallel with 18 pf  $\pm 5$  pf at 10 MHz

## Data storage specifications

<b>Nonvolatile memory retention time, typical</b>	No time limit for front panel settings, saved waveforms, setups, product licensing, and calibration constants.
<b>Real-time clock</b>	A programmable clock providing time in years, months, days, hours, minutes, and seconds.
<b>Nonvolatile memory capacity</b>	
<b>Instrument S/N</b>	A 2 kbit EEPROM on the main board that stores the instrument serial number, instrument start up count, total uptime and administration passwords.
<b>Companion CvP</b>	A pair of 16 Mbit flash memory devices that stores a portion of the Companion FPGA image data. One device serves as a backup for the other device.
<b>AFG S/N</b>	A 2 kbit EEPROM on the AFG riser card that stores a copy of the instrument serial number which is used to validate the AFG calibration.
<b>Front Panel ID</b>	A 64 kbit EEPROM on the LED board that stores the USB vendor ID and device ID for the internal front panel controller.
<b>BIOS</b>	A 128 Mbit flash memory device that stores the firmware image and device configuration for the host processor and chipset sub-processors. This includes the Basic Input Output System (BIOS), Management Engine (ME), Embedded Controller (EC) and Network Interface Controller (NIC). The Ethernet MAC address is stored in this device.
<b>CMOS Memory</b>	The host processor chipset includes an integrated memory device, powered by the real-time clock (RTC) battery, which stores BIOS configuration settings. A customer accessible switch disconnects the RTC battery from the chipset which clears the contents of the integrated CMOS memory device.
<b>Memory SPD</b>	Each SODIMM (memory module) contains a serial presence detect (SPD) memory device implemented using an unspecified memory technology. Each SPD device contains the parameter data specific to its memory module. All SPD devices are treated by the instrument as read only. The size of a given SPD is unspecified. The 4 channel instrument includes 4 SPD devices. The 6 channel and 8 channel instruments include 6 SPD devices.
<b>UCD9248</b>	The instrument includes 3 UCD9248 power supply controllers. Each controller contains an <i>unspecified</i> quantity of nonvolatile memory that stores various power supply configuration settings.
<b>PMU</b>	A power management unit (PMU) microcontroller is used to manage instrument power supplies and hardware initialization. The PMU includes 32 KB of nonvolatile memory for storage of its own binary executable and redundant storage of UCD9248 device settings.
<b>Analog Board Controller</b>	A microcontroller is used to manage analog board operation. The PMU includes 64 KB of nonvolatile memory for storage of its own binary executable.
<b>Carrier FPGA</b>	The carrier FPGA stores its own configuration in its own internal 0.33 Mbit nonvolatile memory. The carrier FPGA implements simple "glue logic" for the instrument.
<b>Mass storage device capacity</b>	
<b>Linux</b>	≥80 GB. Form factor is an 80 mm m.2 card with a SATA-3 interface. Waveforms and setups are stored on a hard disk drive or solid state drive. Provides storage for saved customer data, all calibration constants and the Linux operating system. Not customer serviceable. A ~42 GB partition on the device is available for the storage of saved customer data.
<b>Windows (optional):</b>	≥ 480 GB. Form factor is a 2.5-inch SSD with a SATA-3 interface. This drive is customer installable and provides storage for the Windows operating system option, and saved customer data. Not available for MSO58LP.

## Power supply system

### Power

<b>Power consumption</b>	400 Watts maximum
<b>Source voltage</b>	100 - 240 V $\pm 10\%$ (50 Hz to 60 Hz)
<b>Source frequency</b>	50 Hz to 60 Hz $\pm 10\%$ , at 100 - 240 V $\pm 10\%$ 400 Hz $\pm 10\%$ at 115 V $\pm 10\%$
<b>Fuse Rating</b>	12.5 A, 250 V <sub>ac</sub>

## Safety characteristics

<b>Safety certification</b>	US NRTL Listed - UL61010-1. Canadian Certification - CAN/CSA-C22.2 No. 61010.1. EU Compliance - Low Voltage Directive 2014-35-EU and EN61010-1. International Compliance - IEC 61010-1.
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<b>Pollution degree</b>	Pollution degree 2, indoor, dry location use only
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## Environmental specifications

### Temperature

<b>Operating</b>	+0 °C to +50 °C (32 °F to 122 °F)
<b>Non-operating</b>	-20 °C to +60 °C (-4 °F to 140 °F)

### Humidity

<b>Operating</b>	5% to 90% relative humidity (% RH) at up to +40 °C 5% to 55% RH above +40 °C up to +50 °C, noncondensing, and as limited by a maximum wet-bulb temperature of +39 °C
<b>Non-operating</b>	5% to 90% relative humidity (% RH) at up to +40 °C 5% to 39% RH above +40 °C up to +50 °C, noncondensing, and as limited by a maximum wet-bulb temperature of +39 °C

### Altitude

<b>Operating</b>	Up to 3,000 meters (9,843 feet)
<b>Non-operating</b>	Up to 12,000 meters (39,370 feet)

### Random vibration

<b>Operating</b>	0.31 GRMS, 5-500 Hz, 10 minutes per axis, 3 axes (30 minutes total)
<b>Non-operating</b>	2.46 GRMS, 5-500 Hz, 10 minutes per axis, 3 axes (30 minutes total)

## Mechanical specifications

<b>Dimensions, 5 Series MSO</b>	Height: 12.2 in (309 mm), feet folded in, handle to back
	Height: 14.6 in (371 mm) feet folded in, handle up
	Width: 17.9 in (454 mm) from handle hub to handle hub
	Depth: 8.0 in (205 mm) from back of feet to front of knobs, handle up
	Depth: 11.7 in (297.2 mm) feet folded in, handle to the back
<b>Dimensions, MSO58LP</b>	Height: 3.44 in (87.3 mm)
	Width: 17.01 in (432 mm)
	Depth: 23.85 in (605.7 mm)
	Fits rack depths from 24 inches to 32 inches
<b>Weight, 5 Series MSO</b>	MSO54 1 GHz, 500 MHz, 350 MHz models: 22.7 lbs (10.3 kg)
	MSO54 2 GHz models: 23.6 lbs (10.7 kg)
	MSO56 1 GHz, 500 MHz, 350 MHz models: 23.5 lbs (10.7 kg)
	MSO56 2 GHz models: 24.3 lbs (11 kg)
	MSO58 1 GHz, 500 MHz, 350 MHz models: 23.8 lbs (10.8 kg)
	MSO58 2 GHz models: 24.7 lbs (11.2 kg)
	Front cover without pouch: 1.9 lbs (0.86 kg)
	Front cover with pouch: 3.1 lbs (1.4 kg)
<b>Weight, MSO58LP</b>	25.5 lbs (11.6 kg)
<b>Cooling, 5 Series MSO</b>	The clearance requirement for adequate cooling is 2.0 in (50.8 mm) on the right side of the instrument (when viewed from the front) and on the rear of the instrument
<b>Cooling, MSO58LP</b>	The clearance requirement for adequate cooling is 2.0 in (50.8 mm) on the left and right sides of the instrument (when viewed from the front). Air flows through the instrument from left to right

# Performance verification procedures

This chapter contains performance verification procedures for the specifications marked with the ✓ symbol. The following equipment, or a suitable equivalent, is required to complete these procedures.

The performance verification procedures verify the performance of your instrument. They do not adjust your instrument. If your instrument fails any of the performance verification tests, repeat the failing test, verifying that the test equipment and settings are correct. If the instrument continues to fail a test, contact Tektronix Customer Support for assistance.

These procedures cover all MSO58, MSO56, and MSO54 models, and the MSO58LP.

Print the test records on the following pages and use them to record the performance test results for your oscilloscope. Disregard checks and test records that do not apply to the specific model you are testing.

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**NOTE.** Completion of the performance verification procedure does not update the instrument time and date.

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Required equipment:

Required equipment	Minimum requirements	Examples
DC voltage source	3 mV to 4 V, $\pm 0.1\%$ accuracy	Fluke 9500B Oscilloscope Calibrator with a 9530 Output Module
Leveled sine wave generator	50 kHz to 2 GHz, $\pm 4\%$ amplitude accuracy	
Time mark generator	80 ms period, $\pm 1.0 \times 10^{-6}$ accuracy, rise time $< 50$ ns	
Logic probe	Low capacitance digital probe, 8 channels.	TLP058 probe
BNC-to-0.1 inch pin adapter to connect the logic probe to the signal source.	BNC-to-0.1 inch pin adapter; female BNC to 2x16 .01 inch pin headers.	Tektronix adapter part number 878-1429-00; to connect the Fluke 9500B to the TLP058 probe.
Digital multimeter (DMM)	0.1% accuracy or better	Tektronix DMM4020
One 50 $\Omega$ terminator	Impedance 50 $\Omega$ ; connectors: female BNC input, male BNC output	Tektronix part number 011-0049-02
One 50 $\Omega$ BNC cable	Male-to-male connectors	Tektronix part number 012-0057-01
Optical mouse	USB, PS2	Tektronix part number 119-7054-00
RF vector signal generator	Maximum bandwidth of instrument	Tektronix TSG4100A

You might need additional cables and adapters, depending on the actual test equipment you use.

## Test Records

### Instrument information, self test record

Model	Serial #	Procedure performed by	Date

Test	Passed	Failed
Self Test		

### Input Impedance test record

Input Impedance				
Performance checks	Vertical scale	Low limit	Test result	High limit
<b>All models</b>				
Channel 1 Input Impedance, 1 M $\Omega$	100 mV/div	990 k $\Omega$		1.01 M $\Omega$
Channel 1 Input Impedance, 50 $\Omega$	10 mV/div	49.5 $\Omega$		50.5 $\Omega$
	100 mV/div	49.5 $\Omega$		50.5 $\Omega$
Channel 2 Input Impedance, 1 M $\Omega$	100 mV/div	990 k $\Omega$		1.01 M $\Omega$
Channel 2 Input Impedance, 50 $\Omega$	10 mV/div	49.5 $\Omega$		50.5 $\Omega$
	100 mV/div	49.5 $\Omega$		50.5 $\Omega$
Channel 3 Input Impedance, 1 M $\Omega$	100 mV/div	990 k $\Omega$		1.01 M $\Omega$
Channel 3 Input Impedance, 50 $\Omega$	10 mV/div	49.5 $\Omega$		50.5 $\Omega$
	100 mV/div	49.5 $\Omega$		50.5 $\Omega$
Channel 4 Input Impedance, 1 M $\Omega$	100 mV/div	990 k $\Omega$		1.01 M $\Omega$
Channel 4, Input Impedance, 50 $\Omega$	10 mV/div	49.5 $\Omega$		50.5 $\Omega$
	100 mV/div	49.5 $\Omega$		50.5 $\Omega$
<b>MSO56, MSO58, MSO58LP models</b>				
Channel 5 Input Impedance, 1 M $\Omega$	100 mV/div	990 k $\Omega$		1.01 M $\Omega$
Channel 5 Input Impedance, 50 $\Omega$	10 mV/div	49.5 $\Omega$		50.5 $\Omega$
	100 mV/div	49.5 $\Omega$		50.5 $\Omega$



Input Impedance				
Performance checks	Vertical scale	Low limit	Test result	High limit
Channel 6 Input Impedance, 1 M $\Omega$	100 mV/div	990 k $\Omega$		1.01 M $\Omega$
Channel 6 Input Impedance, 50 $\Omega$	10 mV/div	49.5 $\Omega$		50.5 $\Omega$
	100 mV/div	49.5 $\Omega$		50.5 $\Omega$
<b>MSO58, MSO58LP models</b>				
Channel 7 Input Impedance, 1 M $\Omega$	100 mV/div	990 k $\Omega$		1.01 M $\Omega$
Channel 7 Input Impedance, 50 $\Omega$	10 mV/div	49.5 $\Omega$		50.5 $\Omega$
	100 mV/div	49.5 $\Omega$		50.5 $\Omega$
Channel 8 Input Impedance, 1 M $\Omega$	100 mV/div	990 k $\Omega$		1.01 M $\Omega$
Channel 8, Input Impedance, 50 $\Omega$	10 mV/div	49.5 $\Omega$		50.5 $\Omega$
	100 mV/div	49.5 $\Omega$		50.5 $\Omega$

### DC Balance test record

DC Balance				
Performance checks	Vertical scale	Low limit	Test result	High limit
<b>All models</b>				
Channel 1 DC Balance, 50 $\Omega$ , 20 MHz BW	1 mV/div	-0.2 mV		0.2 mV
	2 mV/div	-0.2 mV		0.2 mV
	5 mV/div	-0.5 mV		0.5 mV
	10 mV/div	-1 mV		1 mV
	20 mV/div	-2 mV		2 mV
	49.8 mV/div	-4.98 mV		4.98 mV
	50 mV/div	-5 mV		5 mV
	100 mV/div	-10 mV		10 mV
	200 mV/div	-20 mV		20 mV
	500 mV/div	-50 mV		50 mV
	1 V/div	-100 mV		100 mV
Channel 1 DC Balance, 1 M $\Omega$ , 20 MHz BW	1 mV/div	-0.2 mV		0.2 mV
	2 mV/div	-0.4 mV		0.4 mV
	5 mV/div	-1 mV		1 mV
	10 mV/div	-2 mV		2 mV
	20 mV/div	-4 mV		4 mV
	100 mV/div	-20 mV		20 mV
	500 mV/div	-100 mV		100 mV
	1 V/div	-200 mV		200 mV
	10 V/div	-2 V		2 V

DC Balance				
Performance checks	Vertical scale	Low limit	Test result	High limit
Channel 1 DC Balance, 50 $\Omega$ , 250 MHz BW	20 mV/div	-2 mV		2 mV
Channel 1 DC Balance, 1 M $\Omega$ , 250 MHz BW	20 mV/div	-4 mV		4 mV
Channel 1 DC Balance, 50 $\Omega$ , Full BW	20 mV/div	-2 mV		2 mV
Channel 1 DC Balance, 1 M $\Omega$ , Full BW	20 mV/div	-4 mV		4 mV
Channel 2 DC Balance, 50 $\Omega$ , 20 MHz BW	1 mV/div	-0.2 mV		0.2 mV
	2 mV/div	-0.2 mV		0.2 mV
	5 mV/div	-0.5 mV		0.5 mV
	10 mV/div	-1 mV		1 mV
	20 mV/div	-2 mV		2 mV
	49.8 mV/div	-4.98 mV		4.98 mV
	50 mV/div	-5 mV		5 mV
	100 mV/div	-10 mV		10 mV
	200 mV/div	-20 mV		20 mV
	500 mV/div	-50 mV		50 mV
	1 V/div	-100 mV		100 mV
Channel 2 DC Balance, 1 M $\Omega$ , 20 MHz BW	1 mV/div	-0.2 mV		0.2 mV
	2 mV/div	-0.4 mV		0.4 mV
	5 mV/div	-1 mV		1 mV
	10 mV/div	-2 mV		2 mV
	20 mV/div	-4 mV		4 mV
	100 mV/div	-20 mV		20 mV
	500 mV/div	-100 mV		100 mV
	1 V/div	-200 mV		200 mV
	10 V/div	-2 V		2 V
Channel 2 DC Balance, 50 $\Omega$ , 250 MHz BW	20 mV/div	-2 mV		2 mV
Channel 2 DC Balance, 1 M $\Omega$ , 250 MHz BW	20 mV/div	-4 mV		4 mV
Channel 2 DC Balance, 50 $\Omega$ , Full BW	20 mV/div	-2 mV		2 mV
Channel 2 DC Balance, 1 M $\Omega$ , Full BW	20 mV/div	-4 mV		4 mV

DC Balance				
Performance checks	Vertical scale	Low limit	Test result	High limit
Channel 3 DC Balance, 50 $\Omega$ , 20 MHz BW	1 mV/div	-0.2 mV		0.2 mV
	2 mV/div	-0.2 mV		0.2 mV
	5 mV/div	-0.5 mV		0.5 mV
	10 mV/div	-1 mV		1 mV
	20 mV/div	-2 mV		2 mV
	49.8 mV/div	-4.98 mV		4.98 mV
	50 mV/div	-5 mV		5 mV
	100 mV/div	-10 mV		10 mV
	200 mV/div	-20 mV		20 mV
	500 mV/div	-50 mV		50 mV
	1 V/div	-100 mV		100 mV
Channel 3 DC Balance, 1 M $\Omega$ , 20 MHz BW	1 mV/div	-0.2 mV		0.2 mV
	2 mV/div	-0.4 mV		0.4 mV
	5 mV/div	-1 mV		1 mV
	10 mV/div	-2 mV		2 mV
	20 mV/div	-4 mV		4 mV
	100 mV/div	-20 mV		20 mV
	500 mV/div	-100 mV		100 mV
	1 V/div	-200 mV		200 mV
	10 V/div	-2 V		2 V
Channel 3 DC Balance, 50 $\Omega$ , 250 MHz BW	20 mV/div	-2 mV		2 mV
Channel 3 DC Balance, 1 M $\Omega$ , 250 MHz BW	20 mV/div	-4 mV		4 mV
Channel 3 DC Balance, 50 $\Omega$ , Full BW	20 mV/div	-2 mV		2 mV
Channel 3 DC Balance, 1 M $\Omega$ , Full BW	20 mV/div	-4 mV		4 mV

DC Balance				
Performance checks	Vertical scale	Low limit	Test result	High limit
Channel 4 DC Balance, 50 $\Omega$ , 20 MHz BW	1 mV/div	-0.2 mV		0.2 mV
	2 mV/div	-0.2 mV		0.2 mV
	5 mV/div	-0.5 mV		0.5 mV
	10 mV/div	-1 mV		1 mV
	20 mV/div	-2 mV		2 mV
	49.8 mV/div	-4.98 mV		4.98 mV
	50 mV/div	-5 mV		5 mV
	100 mV/div	-10 mV		10 mV
	200 mV/div	-20 mV		20 mV
	500 mV/div	-50 mV		50 mV
	1 V/div	-100 mV		100 mV
Channel 4 DC Balance, 1 M $\Omega$ , 20 MHz BW	1 mV/div	-0.2 mV		0.2 mV
	2 mV/div	-0.4 mV		0.4 mV
	5 mV/div	-1 mV		1 mV
	10 mV/div	-2 mV		2 mV
	20 mV/div	-4 mV		4 mV
	100 mV/div	-20 mV		20 mV
	500 mV/div	-100 mV		100 mV
	1 V/div	-200 mV		200 mV
	10 V/div	-2 V		2 V
Channel 4 DC Balance, 50 $\Omega$ , 250 MHz BW	20 mV/div	-2 mV		2 mV
Channel 4 DC Balance, 1 M $\Omega$ , 250 MHz BW	20 mV/div	-4 mV		4 mV

<b>DC Balance</b>				
<b>Performance checks</b>	<b>Vertical scale</b>	<b>Low limit</b>	<b>Test result</b>	<b>High limit</b>
Channel 4 DC Balance, 50 $\Omega$ , Full BW	20 mV/div	-2 mV		2 mV
Channel 4 DC Balance, 1 M $\Omega$ , Full BW	20 mV/div	-4 mV		4 mV
<b>MSO56, MSO58, MSO58LP models</b>				
Channel 5 DC Balance, 50 $\Omega$ , 20 MHz BW	1 mV/div	-0.2 mV		0.2 mV
	2 mV/div	-0.2 mV		0.2 mV
	5 mV/div	-0.5 mV		0.5 mV
	10 mV/div	-1 mV		1 mV
	20 mV/div	-2 mV		2 mV
	49.8 mV	-4.98 mV/div		4.98 mV
	50 mV/div	-5 mV		5 mV
	100 mV/div	-10 mV		10 mV
	200 mV/div	-20 mV		20 mV
	500 mV/div	-50 mV		50 mV
	1 V/div	-100 mV		100 mV
Channel 5 DC Balance, 1 M $\Omega$ , 20 MHz BW	1 mV/div	-0.2 mV		0.2 mV
	2 mV/div	-0.4 mV		0.4 mV
	5 mV/div	-1 mV		1 mV
	10 mV/div	-2 mV		2 mV
	20 mV/div	-4 mV		4 mV
	100 mV/div	-20 mV		20 mV
	500 mV/div	-100 mV		100 mV
	1 V/div	-200 mV		200 mV
	10 V/div	-2 V		2 V
Channel 5 DC Balance, 50 $\Omega$ , 250 MHz BW	20 mV/div	-2 mV		2 mV
Channel 5 DC Balance, 1 M $\Omega$ , 250 MHz BW	20 mV/div	-4 mV		4 mV
Channel 5 DC Balance, 50 $\Omega$ , Full BW	20 mV/div	-2 mV		2 mV
Channel 5 DC Balance, 1 M $\Omega$ , Full BW	20 mV/div	-4 mV		4 mV

DC Balance				
Performance checks	Vertical scale	Low limit	Test result	High limit
Channel 6 DC Balance, 50 $\Omega$ , 20 MHz BW	1 mV/div	-0.2 mV		0.2 mV
	2 mV/div	-0.2 mV		0.2 mV
	5 mV/div	-0.5 mV		0.5 mV
	10 mV/div	-1 mV		1 mV
	20 mV/div	-2 mV		2 mV
	49.8 mV/div	-4.98 mV		4.98 mV
	50 mV/div	-5 mV		5 mV
	100 mV/div	-10 mV		10 mV
	200 mV/div	-20 mV		20 mV
	500 mV/div	-50 mV		50 mV
	1 V/div	-100 mV		100 mV
Channel 6 DC Balance, 1 M $\Omega$ , 20 MHz BW	1 mV/div	-0.2 mV		0.2 mV
	2 mV/div	-0.4 mV		0.4 mV
	5 mV/div	-1 mV		1 mV
	10 mV/div	-2 mV		2 mV
	20 mV/div	-4 mV		4 mV
	100 mV/div	-20 mV		20 mV
	500 mV/div	-100 mV		100 mV
	1 V/div	-200 mV		200 mV
	10 V/div	-2 V		2 V
Channel 6 DC Balance, 50 $\Omega$ , 250 MHz BW	20 mV/div	-2 mV		2 mV
Channel 6 DC Balance, 1 M $\Omega$ , 250 MHz BW	20 mV/div	-4 mV		4 mV
Channel 6 DC Balance, 50 $\Omega$ , Full BW	20 mV/div	-2 mV		2 mV
Channel 6 DC Balance, 1 M $\Omega$ , Full BW	20 mV/div	-4 mV		4 mV
<b>MSO58, MSO58LP models</b>				

DC Balance				
Performance checks	Vertical scale	Low limit	Test result	High limit
Channel 7 DC Balance, 50 $\Omega$ , 20 MHz BW	1 mV/div	-0.2 mV		0.2 mV
	2 mV/div	-0.2 mV		0.2 mV
	5 mV/div	-0.5 mV		0.5 mV
	10 mV/div	-1 mV		1 mV
	20 mV/div	-2 mV		2 mV
	49.8 mV/div	-4.98 mV		4.98 mV
	50 mV/div	-5 mV		5 mV
	100 mV/div	-10 mV		10 mV
	200 mV/div	-20 mV		20 mV
	500 mV/div	-50 mV		50 mV
	1 V/div	-100 mV		100 mV
Channel 7 DC Balance, 1 M $\Omega$ , 20 MHz BW	1 mV/div	-0.2 mV		0.2 mV
	2 mV/div	-0.4 mV		0.4 mV
	5 mV/div	-1 mV		1 mV
	10 mV/div	-2 mV		2 mV
	20 mV/div	-4 mV		4 mV
	100 mV/div	-20 mV		20 mV
	500 mV/div	-100 mV		100 mV
	1 V/div	-200 mV		200 mV
	10 V/div	-2 V		2 V
Channel 7 DC Balance, 50 $\Omega$ , 250 MHz BW	20 mV/div	-2 mV		2 mV
Channel 7 DC Balance, 1 M $\Omega$ , 250 MHz BW	20 mV/div	-4 mV		4 mV
Channel 7 DC Balance, 50 $\Omega$ , Full BW	20 mV/div	-2 mV		2 mV
Channel 7 DC Balance, 1 M $\Omega$ , Full BW	20 mV/div	-4 mV		4 mV

DC Balance				
Performance checks	Vertical scale	Low limit	Test result	High limit
Channel 8 DC Balance, 50 $\Omega$ , 20 MHz BW	1 mV/div	-0.2 mV		0.2 mV
	2 mV/div	-0.2 mV		0.2 mV
	5 mV/div	-0.5 mV		0.5 mV
	10 mV/div	-1 mV		1 mV
	20 mV/div	-2 mV		2 mV
	49.8 mV/div	-4.98 mV		4.98 mV
	50 mV/div	-5 mV		5 mV
	100 mV/div	-10 mV		10 mV
	200 mV/div	-20 mV		20 mV
	500 mV/div	-50 mV		50 mV
	1 V/div	-100 mV		100 mV
Channel 8 DC Balance, 1 M $\Omega$ , 20 MHz BW	1 mV/div	-0.2 mV		0.2 mV
	2 mV/div	-0.4 mV		0.4 mV
	5 mV/div	-1 mV		1 mV
	10 mV/div	-2 mV		2 mV
	20 mV/div	-4 mV		4 mV
	100 mV/div	-20 mV		20 mV
	500 mV/div	-100 mV		100 mV
	1 V/div	-200 mV		200 mV
Channel 8 DC Balance, 50 $\Omega$ , 250 MHz BW	20 mV/div	-2 mV		2 mV
	20 mV/div	-4 mV		4 mV
Channel 8 DC Balance, 1 M $\Omega$ , 250 MHz BW	20 mV/div	-2 mV		2 mV
Channel 8 DC Balance, 50 $\Omega$ , Full BW	20 mV/div	-4 mV		4 mV
Channel 8 DC Balance, 1 M $\Omega$ , Full BW	20 mV/div	-2 mV		2 mV
Channel 8 DC Balance, 50 $\Omega$ , Full BW	20 mV/div	-4 mV		4 mV



## DC Gain Accuracy test record

DC Gain Accuracy, 2 GHz models					
Performance checks	Bandwidth	Vertical scale	Low limit	Test result	High limit
Channel 1 DC Gain Accuracy, 0 V offset, 0 V vertical position, 50 $\Omega$	20 MHz	1 mV/div	-2%		2%
		2 mV/div	-1.2%		1.2%
		5 mV/div	-1.2%		1.2%
		10 mV/div	-1.2%		1.2%
		20 mV/div	-1.2%		1.2%
		50 mV/div	-1.2%		1.2%
		100 mV/div	-1.2%		1.2%
		200 mV/div	-1.2%		1.2%
		500 mV/div	-1.2%		1.2%
		1 V/div	-1.2%		1.2%
	250 MHz	20 mV/div	-1.2%		1.2%
	FULL	20 mV/div	-1.2%		1.2%
Channel 1 DC Gain Accuracy, 0 V offset, 0 V vertical position, 1 M $\Omega$	20 MHz	1 mV/div	-2%		2%
		2 mV/div	-1%		1%
		5 mV/div	-1%		1%
		10 mV/div	-1%		1%
		20 mV/div	-1%		1%
		50 mV/div	-1%		1%
		100 mV/div	-1%		1%
		200 mV/div	-1%		1%
		500 mV/div	-1%		1%
		1 V/div	-1%		1%
	250 MHz	20 mV/div	-1%		1%
	FULL	20 mV/div	-1%		1%
Channel 2 DC Gain Accuracy, 0 V offset, 0 V vertical position, 50 $\Omega$	20 MHz	1 mV/div	-2%		2%
		2 mV/div	-1.2%		1.2%
		5 mV/div	-1.2%		1.2%
		10 mV/div	-1.2%		1.2%
		20 mV/div	-1.2%		1.2%
		50 mV/div	-1.2%		1.2%
		100 mV/div	-1.2%		1.2%
		200 mV/div	-1.2%		1.2%
		500 mV/div	-1.2%		1.2%
		1 V/div	-1.2%		1.2%
	250 MHz	20 mV/div	-1.2%		1.2%
	FULL	20 mV/div	-1.2%		1.2%

DC Gain Accuracy, 2 GHz models					
Performance checks	Bandwidth	Vertical scale	Low limit	Test result	High limit
Channel 2 DC Gain Accuracy, 0 V offset, 0 V vertical position, 1 M $\Omega$	20 MHz	1 mV/div	-2%		2%
		2 mV/div	-1%		1%
		5 mV/div	-1%		1%
		10 mV/div	-1%		1%
		20 mV/div	-1%		1%
		50 mV/div	-1%		1%
		100 mV/div	-1%		1%
		200 mV/div	-1%		1%
		500 mV/div	-1%		1%
		1 V/div	-1%		1%
	250 MHz	20 mV/div	-1%		1%
	FULL	20 mV/div	-1%		1%
Channel 3 DC Gain Accuracy, 0 V offset, 0 V vertical position, 50 $\Omega$	20 MHz	1 mV/div	-2%		2%
		2 mV/div	-1.2%		1.2%
		5 mV/div	-1.2%		1.2%
		10 mV/div	-1.2%		1.2%
		20 mV/div	-1.2%		1.2%
		50 mV/div	-1.2%		1.2%
		100 mV/div	-1.2%		1.2%
		200 mV/div	-1.2%		1.2%
		500 mV/div	-1.2%		1.2%
		1 V/div	-1.2%		1.2%
	250 MHz	20 mV/div	-1.2%		1.2%
	FULL	20 mV/div	-1.2%		1.2%
Channel 3 DC Gain Accuracy, 0 V offset, 0 V vertical position, 1 M $\Omega$	20 MHz	1 mV/div	-2%		2%
		2 mV/div	-1%		1%
		5 mV/div	-1%		1%
		10 mV/div	-1%		1%
		20 mV/div	-1%		1%
		50 mV/div	-1%		1%
		100 mV/div	-1%		1%
		200 mV/div	-1%		1%
		500 mV/div	-1%		1%
		1 V/div	-1%		1%
	250 MHz	20 mV/div	-1%		1%
	FULL	20 mV/div	-1%		1%

DC Gain Accuracy, 2 GHz models					
Performance checks	Bandwidth	Vertical scale	Low limit	Test result	High limit
Channel 4 DC Gain Accuracy, 0 V offset, 0 V vertical position, 50 $\Omega$	20 MHz	1 mV/div	-2%		2%
		2 mV/div	-1.2%		1.2%
		5 mV/div	-1.2%		1.2%
		10 mV/div	-1.2%		1.2%
		20 mV/div	-1.2%		1.2%
		50 mV/div	-1.2%		1.2%
		100 mV/div	-1.2%		1.2%
		200 mV/div	-1.2%		1.2%
		500 mV/div	-1.2%		1.2%
		1 V/div	-1.2%		1.2%
	250 MHz	20 mV/div	-1.2%		1.2%
	FULL	20 mV/div	-1.2%		1.2%
Channel 4 DC Gain Accuracy, 0 V offset, 0 V vertical position, 1 M $\Omega$	20 MHz	1 mV/div	-2%		2%
		2 mV/div	-1%		1%
		5 mV/div	-1%		1%
		10 mV/div	-1%		1%
		20 mV/div	-1%		1%
		50 mV/div	-1%		1%
		100 mV/div	-1%		1%
		200 mV/div	-1%		1%
		500 mV/div	-1%		1%
		1 V/div	-1%		1%
	250 MHz	20 mV/div	-1%		1%
	FULL	20 mV/div	-1%		1%
MSO56 and MSO58 models					
Channel 5 DC Gain Accuracy, 0 V offset, 0 V vertical position, 50 $\Omega$	20 MHz	1 mV/div	-2%		2%
		2 mV/div	-1.2%		1.2%
		5 mV/div	-1.2%		1.2%
		10 mV/div	-1.2%		1.2%
		20 mV/div	-1.2%		1.2%
		50 mV/div	-1.2%		1.2%
		100 mV/div	-1.2%		1.2%
		200 mV/div	-1.2%		1.2%
		500 mV/div	-1.2%		1.2%
		1 V/div	-1.2%		1.2%
	250 MHz	20 mV/div	-1.2%		1.2%
	FULL	20 mV/div	-1.2%		1.2%

DC Gain Accuracy, 2 GHz models					
Performance checks	Bandwidth	Vertical scale	Low limit	Test result	High limit
Channel 5 DC Gain Accuracy, 0 V offset, 0 V vertical position, 1 M $\Omega$	20 MHz	1 mV/div	-2%		2%
		2 mV/div	-1%		1%
		5 mV/div	-1%		1%
		10 mV/div	-1%		1%
		20 mV/div	-1%		1%
		50 mV/div	-1%		1%
		100 mV/div	-1%		1%
		200 mV/div	-1%		1%
		500 mV/div	-1%		1%
		1 V/div	-1%		1%
	250 MHz	20 mV/div	-1%		1%
	FULL	20 mV/div	-1%		1%
Channel 6 DC Gain Accuracy, 0 V offset, 0 V vertical position, 50 $\Omega$	20 MHz	1 mV/div	-2%		2%
		2 mV/div	-1.2%		1.2%
		5 mV/div	-1.2%		1.2%
		10 mV/div	-1.2%		1.2%
		20 mV/div	-1.2%		1.2%
		50 mV/div	-1.2%		1.2%
		100 mV/div	-1.2%		1.2%
		200 mV/div	-1.2%		1.2%
		500 mV/div	-1.2%		1.2%
		1 V/div	-1.2%		1.2%
	250 MHz	20 mV/div	-1.2%		1.2%
	FULL	20 mV/div	-1.2%		1.2%
Channel 6 DC Gain Accuracy, 0 V offset, 0 V vertical position, 1 M $\Omega$	20 MHz	1 mV/div	-2%		2%
		2 mV/div	-1%		1%
		5 mV/div	-1%		1%
		10 mV/div	-1%		1%
		20 mV/div	-1%		1%
		50 mV/div	-1%		1%
		100 mV/div	-1%		1%
		200 mV/div	-1%		1%
		500 mV/div	-1%		1%
		1 V/div	-1%		1%
	250 MHz	20 mV/div	-1%		1%
	FULL	20 mV/div	-1%		1%
MSO58 models					

DC Gain Accuracy, 2 GHz models					
Performance checks	Bandwidth	Vertical scale	Low limit	Test result	High limit
Channel 7 DC Gain Accuracy, 0 V offset, 0 V vertical position, 50 $\Omega$	20 MHz	1 mV/div	-2%		2%
		2 mV/div	-1.2%		1.2%
		5 mV/div	-1.2%		1.2%
		10 mV/div	-1.2%		1.2%
		20 mV/div	-1.2%		1.2%
		50 mV/div	-1.2%		1.2%
		100 mV/div	-1.2%		1.2%
		200 mV/div	-1.2%		1.2%
		500 mV/div	-1.2%		1.2%
		1 V/div	-1.2%		1.2%
	250 MHz	20 mV/div	-1.2%		1.2%
	FULL	20 mV/div	-1.2%		1.2%
Channel 7 DC Gain Accuracy, 0 V offset, 0 V vertical position, 1 M $\Omega$	20 MHz	1 mV/div	-2%		2%
		2 mV/div	-1%		1%
		5 mV/div	-1%		1%
		10 mV/div	-1%		1%
		20 mV/div	-1%		1%
		50 mV/div	-1%		1%
		100 mV/div	-1%		1%
		200 mV/div	-1%		1%
		500 mV/div	-1%		1%
		1 V/div	-1%		1%
	250 MHz	20 mV/div	-1%		1%
	FULL	20 mV/div	-1%		1%
Channel 8 DC Gain Accuracy, 0 V offset, 0 V vertical position, 50 $\Omega$	20 MHz	1 mV/div	-2%		2%
		2 mV/div	-1.2%		1.2%
		5 mV/div	-1.2%		1.2%
		10 mV/div	-1.2%		1.2%
		20 mV/div	-1.2%		1.2%
		50 mV/div	-1.2%		1.2%
		100 mV/div	-1.2%		1.2%
		200 mV/div	-1.2%		1.2%
		500 mV/div	-1.2%		1.2%
		1 V/div	-1.2%		1.2%
	250 MHz	20 mV/div	-1.2%		1.2%
	FULL	20 mV/div	-1.2%		1.2%

DC Gain Accuracy, 2 GHz models					
Performance checks	Bandwidth	Vertical scale	Low limit	Test result	High limit
Channel 8 DC Gain Accuracy, 0 V offset, 0 V vertical position, 1 M $\Omega$	20 MHz	1 mV/div	-2%		2%
		2 mV/div	-1%		1%
		5 mV/div	-1%		1%
		10 mV/div	-1%		1%
		20 mV/div	-1%		1%
		50 mV/div	-1%		1%
		100 mV/div	-1%		1%
		200 mV/div	-1%		1%
		500 mV/div	-1%		1%
		1 V/div	-1%		1%
	250 MHz	20 mV/div	-1%		1%
	FULL	20 mV/div	-1%		1%

DC Gain Accuracy, < 2 GHz models, MSO58LP					
Performance checks	Bandwidth	Vertical scale	Low limit	Test result	High limit
<b>All models &lt; 2 GHz, MSO58LP</b>					
Channel 1 DC Gain Accuracy, 0 V offset, 0 V vertical position, 50 $\Omega$	20 MHz	1 mV/div	-2%		2%
		2 mV/div	-1%		1%
		5 mV/div	-1%		1%
		10 mV/div	-1%		1%
		20 mV/div	-1%		1%
		50 mV/div	-1%		1%
		100 mV/div	-1%		1%
		200 mV/div	-1%		1%
		500 mV/div	-1%		1%
		1 V/div	-1%		1%
	250 MHz	20 mV/div	-1%		1%
	FULL	20 mV/div	-1%		1%

DC Gain Accuracy, < 2 GHz models, MSO58LP					
Performance checks	Bandwidth	Vertical scale	Low limit	Test result	High limit
Channel 1 DC Gain Accuracy, 0 V offset, 0 V vertical position, 1 M $\Omega$	20 MHz	1 mV/div	-2%		2%
		2 mV/div	-1%		1%
		5 mV/div	-1%		1%
		10 mV/div	-1%		1%
		20 mV/div	-1%		1%
		50 mV/div	-1%		1%
		100 mV/div	-1%		1%
		200 mV/div	-1%		1%
		500 mV/div	-1%		1%
		1 V/div	-1%		1%
	250 MHz	20 mV/div	-1%		1%
	FULL	20 mV/div	-1%		1%
Channel 2 DC Gain Accuracy, 0 V offset, 0 V vertical position, 50 $\Omega$	20 MHz	1 mV/div	-2%		2%
		2 mV/div	-1%		1%
		5 mV/div	-1%		1%
		10 mV/div	-1%		1%
		20 mV/div	-1%		1%
		50 mV/div	-1%		1%
		100 mV/div	-1%		1%
		200 mV/div	-1%		1%
		500 mV/div	-1%		1%
		1 V/div	-1%		1%
	250 MHz	20 mV/div	-1%		1%
	FULL	20 mV/div	-1%		1%
Channel 2 DC Gain Accuracy, 0 V offset, 0 V vertical position, 1 M $\Omega$	20 MHz	1 mV/div	-2%		2%
		2 mV/div	-1%		1%
		5 mV/div	-1%		1%
		10 mV/div	-1%		1%
		20 mV/div	-1%		1%
		50 mV/div	-1%		1%
		100 mV/div	-1%		1%
		200 mV/div	-1%		1%
		500 mV/div	-1%		1%
		1 V/div	-1%		1%
	250 MHz	20 mV/div	-1%		1%
	FULL	20 mV/div	-1%		1%

DC Gain Accuracy, < 2 GHz models, MSO58LP					
Performance checks	Bandwidth	Vertical scale	Low limit	Test result	High limit
Channel 3 DC Gain Accuracy, 0 V offset, 0 V vertical position, 50 $\Omega$	20 MHz	1 mV/div	-2%		2%
		2 mV/div	-1%		1%
		5 mV/div	-1%		1%
		10 mV/div	-1%		1%
		20 mV/div	-1%		1%
		50 mV/div	-1%		1%
		100 mV/div	-1%		1%
		200 mV/div	-1%		1%
		500 mV/div	-1%		1%
		1 V/div	-1%		1%
	250 MHz	20 mV/div	-1%		1%
	FULL	20 mV/div	-1%		1%
Channel 3 DC Gain Accuracy, 0 V offset, 0 V vertical position, 1 M $\Omega$	20 MHz	1 mV/div	-2%		2%
		2 mV/div	-1%		1%
		5 mV/div	-1%		1%
		10 mV/div	-1%		1%
		20 mV/div	-1%		1%
		50 mV/div	-1%		1%
		100 mV/div	-1%		1%
		200 mV/div	-1%		1%
		500 mV/div	-1%		1%
		1 V/div	-1%		1%
	250 MHz	20 mV/div	-1%		1%
	FULL	20 mV/div	-1%		1%
Channel 4 DC Gain Accuracy, 0 V offset, 0 V vertical position, 50 $\Omega$	20 MHz	1 mV/div	-2%		2%
		2 mV/div	-1%		1%
		5 mV/div	-1%		1%
		10 mV/div	-1%		1%
		20 mV/div	-1%		1%
		50 mV/div	-1%		1%
		100 mV/div	-1%		1%
		200 mV/div	-1%		1%
		500 mV/div	-1%		1%
		1 V/div	-1%		1%
	250 MHz	20 mV/div	-1%		1%
	FULL	20 mV/div	-1%		1%



DC Gain Accuracy, < 2 GHz models, MSO58LP					
Performance checks	Bandwidth	Vertical scale	Low limit	Test result	High limit
Channel 4 DC Gain Accuracy, 0 V offset, 0 V vertical position, 1 M $\Omega$	20 MHz	1 mV/div	-2%		2%
		2 mV/div	-1%		1%
		5 mV/div	-1%		1%
		10 mV/div	-1%		1%
		20 mV/div	-1%		1%
		50 mV/div	-1%		1%
		100 mV/div	-1%		1%
		200 mV/div	-1%		1%
		500 mV/div	-1%		1%
		1 V/div	-1%		1%
	250 MHz	20 mV/div	-1%		1%
	FULL	20 mV/div	-1%		1%
MSO56 and MSO58 models < 2 GHz, MSO58LP					
Channel 5 DC Gain Accuracy, 0 V offset, 0 V vertical position, 50 $\Omega$	20 MHz	1 mV/div	-2%		2%
		1 mV/div	-1%		1%
		2 mV/div	-1%		1%
		5 mV/div	-1%		1%
		10 mV/div	-1%		1%
		20 mV/div	-1%		1%
		50 mV/div	-1%		1%
		100 mV/div	-1%		1%
		200 mV/div	-1%		1%
		500 mV/div	-1%		1%
		1 V/div	-1%		1%
	250 MHz	20 mV/div	-1%		1%
	FULL	20 mV/div	-1%		1%

DC Gain Accuracy, < 2 GHz models, MSO58LP					
Performance checks	Bandwidth	Vertical scale	Low limit	Test result	High limit
Channel 5 DC Gain Accuracy, 0 V offset, 0 V vertical position, 1 M $\Omega$	20 MHz	1 mV/div	-2%		2%
		2 mV/div	-1%		1%
		5 mV/div	-1%		1%
		10 mV/div	-1%		1%
		20 mV/div	-1%		1%
		50 mV/div	-1%		1%
		100 mV/div	-1%		1%
		200 mV/div	-1%		1%
		500 mV/div	-1%		1%
		1 V/div	-1%		1%
	250 MHz	20 mV/div	-1%		1%
	FULL	20 mV/div	-1%		1%
Channel 6 DC Gain Accuracy, 0 V offset, 0 V vertical position, 50 $\Omega$	20 MHz	1 mV/div	-2%		2%
		2 mV/div	-1%		1%
		5 mV/div	-1%		1%
		10 mV/div	-1%		1%
		20 mV/div	-1%		1%
		50 mV/div	-1%		1%
		100 mV/div	-1%		1%
		200 mV/div	-1%		1%
		500 mV/div	-1%		1%
		1 V/div	-1%		1%
	250 MHz	20 mV/div	-1%		1%
	FULL	20 mV/div	-1%		1%
Channel 6 DC Gain Accuracy, 0 V offset, 0 V vertical position, 1 M $\Omega$	20 MHz	1 mV/div	-2%		2%
		2 mV/div	-1%		1%
		5 mV/div	-1%		1%
		10 mV/div	-1%		1%
		20 mV/div	-1%		1%
		50 mV/div	-1%		1%
		100 mV/div	-1%		1%
		200 mV/div	-1%		1%
		500 mV/div	-1%		1%
		1 V/div	-1%		1%
	250 MHz	20 mV/div	-1%		1%
	FULL	20 mV/div	-1%		1%
MSO58 models < 2 GHz, MSO58LP					

DC Gain Accuracy, < 2 GHz models, MSO58LP					
Performance checks	Bandwidth	Vertical scale	Low limit	Test result	High limit
Channel 7 DC Gain Accuracy, 0 V offset, 0 V vertical position, 50 $\Omega$	20 MHz	1 mV/div	-2%		2%
		2 mV/div	-1%		1%
		5 mV/div	-1%		1%
		10 mV/div	-1%		1%
		20 mV/div	-1%		1%
		50 mV/div	-1%		1%
		100 mV/div	-1%		1%
		200 mV/div	-1%		1%
		500 mV/div	-1%		1%
		1 V/div	-1%		1%
	250 MHz	20 mV/div	-1%		1%
	FULL	20 mV/div	-1%		1%
Channel 7 DC Gain Accuracy, 0 V offset, 0 V vertical position, 1 M $\Omega$	20 MHz	1 mV/div	-2%		2%
		2 mV/div	-1%		1%
		5 mV/div	-1%		1%
		10 mV/div	-1%		1%
		20 mV/div	-1%		1%
		50 mV/div	-1%		1%
		100 mV/div	-1%		1%
		200 mV/div	-1%		1%
		500 mV/div	-1%		1%
		1 V/div	-1%		1%
	250 MHz	20 mV/div	-1%		1%
	FULL	20 mV/div	-1%		1%
Channel 8 DC Gain Accuracy, 0 V offset, 0 V vertical position, 50 $\Omega$	20 MHz	1 mV/div	-2%		2%
		2 mV/div	-2%		2%
		5 mV/div	-1%		1%
		10 mV/div	-1%		1%
		20 mV/div	-1%		1%
		50 mV/div	-1%		1%
		100 mV/div	-1%		1%
		200 mV/div	-1%		1%
		500 mV/div	-1%		1%
		1 V/div	-1%		1%
	250 MHz	20 mV/div	-1%		1%
	FULL	20 mV/div	-1%		1%

DC Gain Accuracy, < 2 GHz models, MSO58LP					
Performance checks	Bandwidth	Vertical scale	Low limit	Test result	High limit
Channel 8 DC Gain Accuracy, 0 V offset, 0 V vertical position, 1 M $\Omega$	20 MHz	1 mV/div	-2%		2%
		2 mV/div	-1%		1%
		5 mV/div	-1%		1%
		10 mV/div	-1%		1%
		20 mV/div	-1%		1%
		50 mV/div	-1%		1%
		100 mV/div	-1%		1%
		200 mV/div	-1%		1%
		500 mV/div	-1%		1%
		1 V/div	-1%		1%
	250 MHz	20 mV/div	-1%		1%
	FULL	20 mV/div	-1%		1%

## DC Offset Accuracy test record

Offset Accuracy					
Performance checks	Vertical scale	Vertical offset <sup>1</sup>	Low limit	Test result	High limit
All models					
Channel 1 DC Offset Accuracy, 20 MHz BW, 50 $\Omega$	1 mV/div	900 mV	895.3 mV		904.7 mV
	1 mV/div	-900 mV	-904.7 mV		-895.3 mV
	100 mV/div	5.0 V	4.965 V		5.035 V
	100 mV/div	-5.0 V	-5.035 V		-4.965 V
Channel 1 DC Offset Accuracy, 20 MHz BW, 1 M $\Omega$	1 mV/div	900 mV	895.3 mV		904.7 mV
	1 mV/div	-900 mV	-904.7 mV		-895.3 mV
	100 mV/div	1.0 V	0.975 V		1.025 V
	100 mV/div	-1.0 V	-1.025 V		-0.975 V
	500 mV/div	9.0 V	8.855 V		9.145 V
	500 mV/div	-9.0 V	-9.145 V		-8.855 V
	1.01 V/div	10.0 V	9.75 V		10.25 V
	1.01 V/div	-10.0 V	-10.25 V		-9.75 V
	5 V/div	10.0 V	8.95 V		11.05 V
	5 V/div	-10.0 V	-11.05 V		-8.95 V
Channel 2 DC Offset Accuracy, 20 MHz BW, 50 $\Omega$	1 mV/div	900 mV	895.3 mV		904.7 mV
	1 mV/div	-900 mV	-904.7 mV		-895.3 mV
	100 mV/div	5.0 V	4.965 V		5.035 V
	100 mV/div	-5.0 V	-5.035 V		-4.965 V

<sup>1</sup> Use this value for both the calibrator output and the oscilloscope offset setting.

Offset Accuracy					
Performance checks	Vertical scale	Vertical offset <sup>1</sup>	Low limit	Test result	High limit
Channel 2 DC Offset Accuracy, 20 MHz BW, 1 M $\Omega$	1 mV/div	900 mV	895.3 mV		904.7 mV
	1 mV/div	-900 mV	-904.7 mV		-895.3 mV
	100 mV/div	1.0 V	0.935 V		1.065 V
	100 mV/div	- 1.0 V	-1.065 V		-0.935 V
	500 mV/div	9.0 V	8.855 V		9.145 V
	500 mV/div	- 9.0 V	-9.145 V		-8.855 V
	1.01 V/div	10.0 V	9.3 V		10.7 V
	1.01 V/div	-10.0 V	-10.7 V		-9.3 V
	5 V/div	10.0 V	8.5 V		11.5 V
	5 V/div	-10.0 V	-11.5 V		-8.5 V
Channel 3 DC Offset Accuracy, 20 MHz BW, 50 $\Omega$	1 mV/div	900 mV	895.3 mV		904.7 mV
	1 mV/div	-900 mV	-904.7 mV		-895.3 mV
	100 mV/div	5.0 V	4.965 V		5.035 V
	100 mV/div	-5.0 V	-5.035 V		-4.965 V
Channel 3 DC Offset Accuracy, 20 MHz BW, 1 M $\Omega$	1 mV/div	900 mV	895.3 mV		904.7 mV
	1 mV/div	-900 mV	-904.7 mV		-895.3 mV
	100 mV/div	1.0 V	0.935 V		1.065 V
	100 mV/div	- 1.0 V	-1.065 V		-0.935 V
	500 mV/div	9.0 V	8.855 V		9.145 V
	500 mV/div	- 9.0 V	-9.145 V		-8.855 V
	1.01 V/div	10.0 V	9.3 V		10.7 V
	1.01 V/div	-10.0 V	-10.7 V		-9.3 V
	5 V/div	10.0 V	8.5 V		11.5 V
	5 V/div	-10.0 V	-11.5 V		-8.5 V
Channel 4 DC Offset Accuracy, 20 MHz BW, 50 $\Omega$	1 mV/div	900 mV	895.3 mV		904.7 mV
	1 mV/div	-900 mV	-904.7 mV		-895.3 mV
	100 mV/div	5.0 V	4.965 V		5.035 V
	100 mV/div	-5.0 V	-5.035 V		-4.965 V

<sup>1</sup> Use this value for both the calibrator output and the oscilloscope offset setting.

Offset Accuracy					
Performance checks	Vertical scale	Vertical offset <sup>1</sup>	Low limit	Test result	High limit
Channel 4 DC Offset Accuracy, 20 MHz BW, 1 M $\Omega$	1 mV/div	900 mV	895.3 mV		904.7 mV
	1 mV/div	-900 mV	-904.7 mV		-895.3 mV
	100 mV/div	1.0 V	0.935 V		1.065 V
	100 mV/div	- 1.0 V	-1.065 V		-0.935 V
	500 mV/div	9.0 V	8.855 V		9.145 V
	500 mV/div	- 9.0 V	-9.145 V		-8.855 V
	1.01 V/div	10.0 V	9.3 V		10.7 V
	1.01 V/div	-10.0 V	-10.7 V		-9.3 V
	5 V/div	10.0 V	8.5 V		11.5 V
	5 V/div	-10.0 V	-11.5 V		-8.5 V
<b>MSO56, MSO58, MSO58LP models</b>					
Channel 5 DC Offset Accuracy, 20 MHz BW, 50 $\Omega$	1 mV/div	900 mV	895.3 mV		904.7 mV
	1 mV/div	-900 mV	-904.7 mV		-895.3 mV
	100 mV/div	5.0 V	4.965 V		5.035 V
	100 mV/div	-5.0 V	-5.035 V		-4.965 V
Channel 5 DC Offset Accuracy, 20 MHz BW, 1 M $\Omega$	1 mV/div	900 mV	895.3 mV		904.7 mV
	1 mV/div	-900 mV	-904.7 mV		-895.3 mV
	100 mV/div	1.0 V	0.935 V		1.065 V
	100 mV/div	- 1.0 V	-1.065 V		-0.935 V
	500 mV/div	9.0 V	8.855 V		9.145 V
	500 mV/div	- 9.0 V	-9.145 V		-8.855 V
	1.01 V/div	10.0 V	9.3 V		10.7 V
	1.01 V/div	-10.0 V	-10.7 V		-9.3 V
	5 V/div	10.0 V	8.5 V		11.5 V
Channel 6 DC Offset Accuracy, 20 MHz BW, 50 $\Omega$	1 mV/div	900 mV	895.3 mV		904.7 mV
	1 mV/div	-900 mV	-904.7 mV		-895.3 mV
	100 mV/div	5.0 V	4.965 V		5.035 V
	100 mV/div	-5.0 V	-5.035 V		-4.965 V

<sup>1</sup> Use this value for both the calibrator output and the oscilloscope offset setting.

Offset Accuracy					
Performance checks	Vertical scale	Vertical offset <sup>1</sup>	Low limit	Test result	High limit
Channel 6 DC Offset Accuracy, 20 MHz BW, 1 M $\Omega$	1 mV/div	900 mV	895.3 mV		904.7 mV
	1 mV/div	-900 mV	-904.7 mV		-895.3 mV
	100 mV/div	1.0 V	0.935 V		1.065 V
	100 mV/div	- 1.0 V	-1.065 V		-0.935 V
	500 mV/div	9.0 V	8.855 V		9.145 V
	500 mV/div	- 9.0 V	-9.145 V		-8.855 V
	1.01 V/div	10.0 V	9.3 V		10.7 V
	1.01 V/div	-10.0 V	-10.7 V		-9.3 V
	5 V/div	10.0 V	8.5 V		11.5 V
	5 V/div	-10.0 V	-11.5 V		-8.5 V
<b>MSO58, MSO58LP models</b>					
Channel 7 DC Offset Accuracy, 20 MHz BW, 50 $\Omega$	1 mV/div	900 mV	895.3 mV		904.7 mV
	1 mV/div	-900 mV	-904.7 mV		-895.3 mV
	100 mV/div	5.0 V	4.965 V		5.035 V
	100 mV/div	-5.0 V	-5.035 V		-4.965 V
Channel 7 DC Offset Accuracy, 20 MHz BW, 1 M $\Omega$	1 mV/div	900 mV	895.3 mV		904.7 mV
	1 mV/div	-900 mV	-904.7 mV		-895.3 mV
	100 mV/div	1.0 V	0.935 V		1.065 V
	100 mV/div	- 1.0 V	-1.065 V		-0.935 V
	500 mV/div	9.0 V	8.855 V		9.145 V
	500 mV/div	- 9.0 V	-9.145 V		-8.855 V
	1.01 V/div	10.0 V	9.3 V		10.7 V
	1.01 V/div	-10.0 V	-10.7 V		-9.3 V
	5 V/div	10.0 V	8.5 V		11.5 V
	5 V/div	-10.0 V	-11.5 V		-8.5 V
Channel 8 DC Offset Accuracy, 20 MHz BW, 50 $\Omega$	1 mV/div	900 mV	895.3 mV		904.7 mV
	1 mV/div	-900 mV	-904.7 mV		-895.3 mV
	100 mV/div	5.0 V	4.965 V		5.035 V
	100 mV/div	-5.0 V	-5.035 V		-4.965 V

<sup>1</sup> Use this value for both the calibrator output and the oscilloscope offset setting.

Offset Accuracy					
Performance checks	Vertical scale	Vertical offset <sup>1</sup>	Low limit	Test result	High limit
Channel 8 DC Offset Accuracy, 20 MHz BW, 1 M $\Omega$	1 mV/div	900 mV	895.3 mV		904.7 mV
	1 mV/div	-900 mV	-904.7 mV		-895.3 mV
	100 mV/div	1.0 V	0.935 V		1.065 V
	100 mV/div	- 1.0 V	-1.065 V		-0.935 V
	500 mV/div	9.0 V	8.855 V		9.145 V
	500 mV/div	- 9.0 V	-9.145 V		-8.855 V
	1.01 V/div	10.0 V	9.3 V		10.7 V
	1.01 V/div	-10.0 V	-10.7 V		-9.3 V
	5 V/div	10.0 V	8.5 V		11.5 V
	5 V/div	-10.0 V	-11.5 V		-8.5 V

### Analog Bandwidth test record

Analog Bandwidth							
Performance checks							
Bandwidth at Channel	Impedance	Vertical scale	Horizontal scale	V <sub>in-pp</sub>	V <sub>bw-pp</sub>	Limit	Test result Gain = V <sub>bw-pp</sub> /V <sub>in-pp</sub>
2 GHz models							
Channel 1	50 $\Omega$	1 mV/div	5 ns/div (175 MHz)			$\geq 0.707$	
		2 mV/div	2.5 ns/div (350 MHz)			$\geq 0.707$	
		5 mV/div	1 ns/div (1.5 GHz)			$\geq 0.707$	
		10 mV/div	1 ns/div (Full BW)			$\geq 0.707$	
		50 mV/div	1 ns/div (Full BW)			$\geq 0.707$	
		100 mV/div	1 ns/div (Full BW)			$\geq 0.707$	
		1 V/div	1 ns/div (Full BW)			$\geq 0.707$	

<sup>1</sup> Use this value for both the calibrator output and the oscilloscope offset setting.



Analog Bandwidth							
Performance checks							
Bandwidth at Channel	Impedance	Vertical scale	Horizontal scale	$V_{in-pp}$	$V_{bw-pp}$	Limit	Test result Gain = $V_{bw-pp}/V_{in-pp}$
Channel 1	1 M $\Omega$ , typical	1 mV/div	5 ns/div (500 MHz)			$\geq 0.707$	
		2 mV/div	2.5 ns/div (500 MHz)			$\geq 0.707$	
		5 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		10 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		50 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		100 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		1 V/div	1 ns/div (500 MHz)			$\geq 0.707$	
Channel 2	50 $\Omega$	1 mV/div	5 ns/div (175 MHz)			$\geq 0.707$	
		2 mV/div	2.5 ns/div (350 MHz)			$\geq 0.707$	
		5 mV/div	1 ns/div (1.5 GHz)			$\geq 0.707$	
		10 mV/div	1 ns/div (Full BW)			$\geq 0.707$	
		50 mV/div	1 ns/div (Full BW)			$\geq 0.707$	
		100 mV/div	1 ns/div (Full BW)			$\geq 0.707$	
		1 V/div	1 ns/div (Full BW)			$\geq 0.707$	

Analog Bandwidth							
Performance checks							
Bandwidth at Channel	Impedance	Vertical scale	Horizontal scale	$V_{in-pp}$	$V_{bw-pp}$	Limit	Test result Gain = $V_{bw-pp}/V_{in-pp}$
Channel 2	1 M $\Omega$ , typical	1 mV/div	5 ns/div (500 MHz)			$\geq 0.707$	
		2 mV/div	2.5 ns/div (500 MHz)			$\geq 0.707$	
		5 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		10 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		50 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		100 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		1 V/div	1 ns/div (500 MHz)			$\geq 0.707$	
Channel 3	50 $\Omega$	1 mV/div	5 ns/div (175 MHz)			$\geq 0.707$	
		2 mV/div	2.5 ns/div (350 MHz)			$\geq 0.707$	
		5 mV/div	1 ns/div (1.5 GHz)			$\geq 0.707$	
		10 mV/div	1 ns/div (Full BW)			$\geq 0.707$	
		50 mV/div	1 ns/div (Full BW)			$\geq 0.707$	
		100 mV/div	1 ns/div (Full BW)			$\geq 0.707$	
		1 V/div	1 ns/div (Full BW)			$\geq 0.707$	

Analog Bandwidth							
Performance checks							
Bandwidth at Channel	Impedance	Vertical scale	Horizontal scale	$V_{in-pp}$	$V_{bw-pp}$	Limit	Test result Gain = $V_{bw-pp}/V_{in-pp}$
Channel 3	1 M $\Omega$ , typical	1 mV/div	5 ns/div (500 MHz)			$\geq 0.707$	
		2 mV/div	2.5 ns/div (500 MHz)			$\geq 0.707$	
		5 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		10 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		50 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		100 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		1 V/div	1 ns/div (500 MHz)			$\geq 0.707$	
Channel 4	50 $\Omega$	1 mV/div	5 ns/div (175 MHz)			$\geq 0.707$	
		2 mV/div	2.5 ns/div (350 MHz)			$\geq 0.707$	
		5 mV/div	1 ns/div (1.5 GHz)			$\geq 0.707$	
		10 mV/div	1 ns/div (Full BW)			$\geq 0.707$	
		50 mV/div	1 ns/div (Full BW)			$\geq 0.707$	
		100 mV/div	1 ns/div (Full BW)			$\geq 0.707$	
		1 V/div	1 ns/div (Full BW)			$\geq 0.707$	

Analog Bandwidth							
Performance checks							
Bandwidth at Channel	Impedance	Vertical scale	Horizontal scale	V <sub>in-pp</sub>	V <sub>bw-pp</sub>	Limit	Test result Gain = V <sub>bw-pp</sub> /V <sub>in-pp</sub>
Channel 4	1 MΩ, typical	1 mV/div	5 ns/div (500 MHz)			≥ 0.707	
		2 mV/div	2.5 ns/div (500 MHz)			≥ 0.707	
		5 mV/div	1 ns/div (500 MHz)			≥ 0.707	
		10 mV/div	1 ns/div (500 MHz)			≥ 0.707	
		50 mV/div	1 ns/div (500 MHz)			≥ 0.707	
		100 mV/div	1 ns/div (500 MHz)			≥ 0.707	
		1 V/div	1 ns/div (500 MHz)			≥ 0.707	
2 GHz MSO56 and MSO58 models							
Channel 5	50 Ω	1 mV/div	5 ns/div (175 MHz)			≥ 0.707	
		2 mV/div	2.5 ns/div (350 MHz)			≥ 0.707	
		5 mV/div	1 ns/div (1.5 GHz)			≥ 0.707	
		10 mV/div	1 ns/div (Full BW)			≥ 0.707	
		50 mV/div	1 ns/div (Full BW)			≥ 0.707	
		100 mV/div	1 ns/div (Full BW)			≥ 0.707	
		1 V/div	1 ns/div (Full BW)			≥ 0.707	

Analog Bandwidth							
Performance checks							
Bandwidth at Channel	Impedance	Vertical scale	Horizontal scale	$V_{in-pp}$	$V_{bw-pp}$	Limit	Test result Gain = $V_{bw-pp}/V_{in-pp}$
Channel 5	1 M $\Omega$ , typical	1 mV/div	5 ns/div (500 MHz)			$\geq 0.707$	
		2 mV/div	2.5 ns/div (500 MHz)			$\geq 0.707$	
		5 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		10 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		50 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		100 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		1 V/div	1 ns/div (500 MHz)			$\geq 0.707$	
Channel 6	50 $\Omega$	1 mV/div	5 ns/div (175 MHz)			$\geq 0.707$	
		2 mV/div	2.5 ns/div (350 MHz)			$\geq 0.707$	
		5 mV/div	1 ns/div (1.5 GHz)			$\geq 0.707$	
		10 mV/div	1 ns/div (Full BW)			$\geq 0.707$	
		50 mV/div	1 ns/div (Full BW)			$\geq 0.707$	
		100 mV/div	1 ns/div (Full BW)			$\geq 0.707$	
		1 V/div	1 ns/div (Full BW)			$\geq 0.707$	

Analog Bandwidth							
Performance checks							
Bandwidth at Channel	Impedance	Vertical scale	Horizontal scale	V <sub>in-pp</sub>	V <sub>bw-pp</sub>	Limit	Test result Gain = V <sub>bw-pp</sub> /V <sub>in-pp</sub>
Channel 6	1 MΩ, typical	1 mV/div	5 ns/div (500 MHz)			≥ 0.707	
		2 mV/div	2.5 ns/div (500 MHz)			≥ 0.707	
		5 mV/div	1 ns/div (500 MHz)			≥ 0.707	
		10 mV/div	1 ns/div (500 MHz)			≥ 0.707	
		50 mV/div	1 ns/div (500 MHz)			≥ 0.707	
		100 mV/div	1 ns/div (500 MHz)			≥ 0.707	
		1 V/div	1 ns/div (500 MHz)			≥ 0.707	
2 GHz MSO58 models							
Channel 7	50 Ω	1 mV/div	5 ns/div (175 MHz)			≥ 0.707	
		2 mV/div	2.5 ns/div (350 MHz)			≥ 0.707	
		5 mV/div	1 ns/div (1.5 GHz)			≥ 0.707	
		10 mV/div	1 ns/div (Full BW)			≥ 0.707	
		50 mV/div	1 ns/div (Full BW)			≥ 0.707	
		100 mV/div	1 ns/div (Full BW)			≥ 0.707	
		1 V/div	1 ns/div (Full BW)			≥ 0.707	

Analog Bandwidth							
Performance checks							
Bandwidth at Channel	Impedance	Vertical scale	Horizontal scale	$V_{in-pp}$	$V_{bw-pp}$	Limit	Test result Gain = $V_{bw-pp}/V_{in-pp}$
Channel 7	1 M $\Omega$ , typical	1 mV/div	5 ns/div (500 MHz)			$\geq 0.707$	
		2 mV/div	2.5 ns/div (500 MHz)			$\geq 0.707$	
		5 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		10 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		50 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		100 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		1 V/div	1 ns/div (500 MHz)			$\geq 0.707$	
Channel 8	50 $\Omega$	1 mV/div	5 ns/div (175 MHz)			$\geq 0.707$	
		2 mV/div	2.5 ns/div (350 MHz)			$\geq 0.707$	
		5 mV/div	1 ns/div (1.5 GHz)			$\geq 0.707$	
		10 mV/div	1 ns/div (Full BW)			$\geq 0.707$	
		50 mV/div	1 ns/div (Full BW)			$\geq 0.707$	
		100 mV/div	1 ns/div (Full BW)			$\geq 0.707$	
		1 V/div	1 ns/div (Full BW)			$\geq 0.707$	

Analog Bandwidth							
Performance checks							
Bandwidth at Channel	Impedance	Vertical scale	Horizontal scale	V <sub>in-pp</sub>	V <sub>bw-pp</sub>	Limit	Test result Gain = V <sub>bw-pp</sub> /V <sub>in-pp</sub>
Channel 8	1 MΩ, typical	1 mV/div	5 ns/div (500 MHz)			≥ 0.707	
		2 mV/div	2.5 ns/div (500 MHz)			≥ 0.707	
		5 mV/div	1 ns/div (500 MHz)			≥ 0.707	
		10 mV/div	1 ns/div (500 MHz)			≥ 0.707	
		50 mV/div	1 ns/div (500 MHz)			≥ 0.707	
		100 mV/div	1 ns/div (500 MHz)			≥ 0.707	
		1 V/div	1 ns/div (500 MHz)			≥ 0.707	
1 GHz models (MSO54, MSO56, MSO58, MSO58LP)							
Channel 1	50 Ω	1 mV/div	5 ns/div (1 GHz)			≥ 0.707	
		2 mV/div	2.5 ns/div (1.0 GHz)			≥ 0.707	
		5 mV/div	1 ns/div (1.0 GHz)			≥ 0.707	
		10 mV/div	1 ns/div (1.0 GHz)			≥ 0.707	
		50 mV/div	1 ns/div (1.0 GHz)			≥ 0.707	
		100 mV/div	1 ns/div (1.0 GHz)			≥ 0.707	
		1 V/div	1 ns/div (1.0 GHz)			≥ 0.707	



Analog Bandwidth							
Performance checks							
Bandwidth at Channel	Impedance	Vertical scale	Horizontal scale	$V_{in-pp}$	$V_{bw-pp}$	Limit	Test result Gain = $V_{bw-pp}/V_{in-pp}$
Channel 1	1 M $\Omega$ , typical	1 mV/div	5 ns/div (500 MHz)			$\geq 0.707$	
		2 mV/div	2.5 ns/div (500 MHz)			$\geq 0.707$	
		5 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		10 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		50 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		100 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		1 V/div	1 ns/div (500 MHz)			$\geq 0.707$	
Channel 2	50 $\Omega$	1 mV/div	5 ns/div (1 GHz)			$\geq 0.707$	
		2 mV/div	2.5 ns/div (1.0 GHz)			$\geq 0.707$	
		5 mV/div	1 ns/div (1.0 GHz)			$\geq 0.707$	
		10 mV/div	1 ns/div (1.0 GHz)			$\geq 0.707$	
		50 mV/div	1 ns/div (1.0 GHz)			$\geq 0.707$	
		100 mV/div	1 ns/div (1.0 GHz)			$\geq 0.707$	
		1 V/div	1 ns/div (1.0 GHz)			$\geq 0.707$	

Analog Bandwidth							
Performance checks							
Bandwidth at Channel	Impedance	Vertical scale	Horizontal scale	$V_{in-pp}$	$V_{bw-pp}$	Limit	Test result Gain = $V_{bw-pp}/V_{in-pp}$
Channel 2	1 M $\Omega$ , typical	1 mV/div	5 ns/div (500 MHz)			$\geq 0.707$	
		2 mV/div	2.5 ns/div (500 MHz)			$\geq 0.707$	
		5 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		10 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		50 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		100 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		1 V/div	1 ns/div (500 MHz)			$\geq 0.707$	
Channel 3	50 $\Omega$	1 mV/div	5 ns/div (1 GHz)			$\geq 0.707$	
		2 mV/div	2.5 ns/div (1.0 GHz)			$\geq 0.707$	
		5 mV/div	1 ns/div (1.0 GHz)			$\geq 0.707$	
		10 mV/div	1 ns/div (1.0 GHz)			$\geq 0.707$	
		50 mV/div	1 ns/div (1.0 GHz)			$\geq 0.707$	
		100 mV/div	1 ns/div (1.0 GHz)			$\geq 0.707$	
		1 V/div	1 ns/div (1.0 GHz)			$\geq 0.707$	

Analog Bandwidth							
Performance checks							
Bandwidth at Channel	Impedance	Vertical scale	Horizontal scale	$V_{in-pp}$	$V_{bw-pp}$	Limit	Test result Gain = $V_{bw-pp}/V_{in-pp}$
Channel 3	1 M $\Omega$ , typical	1 mV/div	5 ns/div (500 MHz)			$\geq 0.707$	
		2 mV/div	2.5 ns/div (500 MHz)			$\geq 0.707$	
		5 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		10 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		50 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		100 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		1 V/div	1 ns/div (500 MHz)			$\geq 0.707$	
Channel 4	50 $\Omega$	1 mV/div	5 ns/div (1 GHz)			$\geq 0.707$	
		2 mV/div	2.5 ns/div (1.0 GHz)			$\geq 0.707$	
		5 mV/div	1 ns/div (1.0 GHz)			$\geq 0.707$	
		10 mV/div	1 ns/div (1.0 GHz)			$\geq 0.707$	
		50 mV/div	1 ns/div (1.0 GHz)			$\geq 0.707$	
		100 mV/div	1 ns/div (1.0 GHz)			$\geq 0.707$	
		1 V/div	1 ns/div (1.0 GHz)			$\geq 0.707$	

Analog Bandwidth							
Performance checks							
Bandwidth at Channel	Impedance	Vertical scale	Horizontal scale	V <sub>in-pp</sub>	V <sub>bw-pp</sub>	Limit	Test result Gain = V <sub>bw-pp</sub> /V <sub>in-pp</sub>
Channel 4	1 MΩ, typical	1 mV/div	5 ns/div (500 MHz)			≥ 0.707	
		2 mV/div	2.5 ns/div (500 MHz)			≥ 0.707	
		5 mV/div	1 ns/div (500 MHz)			≥ 0.707	
		10 mV/div	1 ns/div (500 MHz)			≥ 0.707	
		50 mV/div	1 ns/div (500 MHz)			≥ 0.707	
		100 mV/div	1 ns/div (500 MHz)			≥ 0.707	
		1 V/div	1 ns/div (500 MHz)			≥ 0.707	
1 GHz MSO56, MSO58, MSO58LP models							
Channel 5	50 Ω	1 mV/div	5 ns/div (1 GHz)			≥ 0.707	
		2 mV/div	2.5 ns/div (1.0 GHz)			≥ 0.707	
		5 mV/div	1 ns/div (1.0 GHz)			≥ 0.707	
		10 mV/div	1 ns/div (1.0 GHz)			≥ 0.707	
		50 mV/div	1 ns/div (1.0 GHz)			≥ 0.707	
		100 mV/div	1 ns/div (1.0 GHz)			≥ 0.707	
		1 V/div	1 ns/div (1.0 GHz)			≥ 0.707	

Analog Bandwidth							
Performance checks							
Bandwidth at Channel	Impedance	Vertical scale	Horizontal scale	$V_{in-pp}$	$V_{bw-pp}$	Limit	Test result Gain = $V_{bw-pp}/V_{in-pp}$
Channel 5	1 M $\Omega$ , typical	1 mV/div	5 ns/div (500 MHz)			$\geq 0.707$	
		2 mV/div	2.5 ns/div (500 MHz)			$\geq 0.707$	
		5 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		10 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		50 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		100 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		1 V/div	1 ns/div (500 MHz)			$\geq 0.707$	
Channel 6	50 $\Omega$	1 mV/div	5 ns/div (1 GHz)			$\geq 0.707$	
		2 mV/div	2.5 ns/div (1.0 GHz)			$\geq 0.707$	
		5 mV/div	1 ns/div (1.0 GHz)			$\geq 0.707$	
		10 mV/div	1 ns/div (1.0 GHz)			$\geq 0.707$	
		50 mV/div	1 ns/div (1.0 GHz)			$\geq 0.707$	
		100 mV/div	1 ns/div (1.0 GHz)			$\geq 0.707$	
		1 V/div	1 ns/div (1.0 GHz)			$\geq 0.707$	

Analog Bandwidth							
Performance checks							
Bandwidth at Channel	Impedance	Vertical scale	Horizontal scale	V <sub>in-pp</sub>	V <sub>bw-pp</sub>	Limit	Test result Gain = V <sub>bw-pp</sub> /V <sub>in-pp</sub>
Channel 6	1 MΩ, typical	1 mV/div	5 ns/div (500 MHz)			≥ 0.707	
		2 mV/div	2.5 ns/div (500 MHz)			≥ 0.707	
		5 mV/div	1 ns/div (500 MHz)			≥ 0.707	
		10 mV/div	1 ns/div (500 MHz)			≥ 0.707	
		50 mV/div	1 ns/div (500 MHz)			≥ 0.707	
		100 mV/div	1 ns/div (500 MHz)			≥ 0.707	
		1 V/div	1 ns/div (500 MHz)			≥ 0.707	
1 GHz MSO58, MSO58LP models							
Channel 7	50 Ω	1 mV/div	5 ns/div (1 GHz)			≥ 0.707	
		2 mV/div	2.5 ns/div (1.0 GHz)			≥ 0.707	
		5 mV/div	1 ns/div (1.0 GHz)			≥ 0.707	
		10 mV/div	1 ns/div (1.0 GHz)			≥ 0.707	
		50 mV/div	1 ns/div (1.0 GHz)			≥ 0.707	
		100 mV/div	1 ns/div (1.0 GHz)			≥ 0.707	
		1 V/div	1 ns/div (1.0 GHz)			≥ 0.707	

Analog Bandwidth							
Performance checks							
Bandwidth at Channel	Impedance	Vertical scale	Horizontal scale	$V_{in-pp}$	$V_{bw-pp}$	Limit	Test result Gain = $V_{bw-pp}/V_{in-pp}$
Channel 7	1 M $\Omega$ , typical	1 mV/div	5 ns/div (500 MHz)			$\geq 0.707$	
		2 mV/div	2.5 ns/div (500 MHz)			$\geq 0.707$	
		5 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		10 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		50 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		100 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		1 V/div	1 ns/div (500 MHz)			$\geq 0.707$	
Channel 8	50 $\Omega$	1 mV/div	5 ns/div (1 GHz)			$\geq 0.707$	
		2 mV/div	2.5 ns/div (1.0 GHz)			$\geq 0.707$	
		5 mV/div	1 ns/div (1.0 GHz)			$\geq 0.707$	
		10 mV/div	1 ns/div (1.0 GHz)			$\geq 0.707$	
		50 mV/div	1 ns/div (1.0 GHz)			$\geq 0.707$	
		100 mV/div	1 ns/div (1.0 GHz)			$\geq 0.707$	
		1 V/div	1 ns/div (1.0 GHz)			$\geq 0.707$	

Analog Bandwidth							
Performance checks							
Bandwidth at Channel	Impedance	Vertical scale	Horizontal scale	V <sub>in-pp</sub>	V <sub>bw-pp</sub>	Limit	Test result Gain = V <sub>bw-pp</sub> /V <sub>in-pp</sub>
Channel 8	1 MΩ, typical	1 mV/div	5 ns/div (500 MHz)			≥ 0.707	
		2 mV/div	2.5 ns/div (500 MHz)			≥ 0.707	
		5 mV/div	1 ns/div (500 MHz)			≥ 0.707	
		10 mV/div	1 ns/div (500 MHz)			≥ 0.707	
		50 mV/div	1 ns/div (500 MHz)			≥ 0.707	
		100 mV/div	1 ns/div (500 MHz)			≥ 0.707	
		1 V/div	1 ns/div (500 MHz)			≥ 0.707	
500 MHz models (MSO54, MSO56, MSO58)							
Channel 1	50 Ω	1 mV/div	5 ns/div (500 MHz)			≥ 0.707	
		2 mV/div	2.5 ns/div (500 MHz)			≥ 0.707	
		5 mV/div	1 ns/div (500 MHz)			≥ 0.707	
		10 mV/div	1 ns/div (500 MHz)			≥ 0.707	
		50 mV/div	1 ns/div (500 MHz)			≥ 0.707	
		100 mV/div	1 ns/div (500 MHz)			≥ 0.707	
		1 V/div	1 ns/div (500 MHz)			≥ 0.707	



Analog Bandwidth							
Performance checks							
Bandwidth at Channel	Impedance	Vertical scale	Horizontal scale	$V_{in-pp}$	$V_{bw-pp}$	Limit	Test result Gain = $V_{bw-pp}/V_{in-pp}$
Channel 1	1 M $\Omega$ , typical	1 mV/div	5 ns/div (500 MHz)			$\geq 0.707$	
		2 mV/div	2.5 ns/div (500 MHz)			$\geq 0.707$	
		5 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		10 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		50 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		100 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		1 V/div	1 ns/div (500 MHz)			$\geq 0.707$	
Channel 2	50 $\Omega$	1 mV/div	5 ns/div (500 MHz)			$\geq 0.707$	
		2 mV/div	2.5 ns/div (500 MHz)			$\geq 0.707$	
		5 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		10 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		50 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		100 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		1 V/div	1 ns/div (500 MHz)			$\geq 0.707$	

Analog Bandwidth							
Performance checks							
Bandwidth at Channel	Impedance	Vertical scale	Horizontal scale	$V_{in-pp}$	$V_{bw-pp}$	Limit	Test result Gain = $V_{bw-pp}/V_{in-pp}$
Channel 2	1 M $\Omega$ , typical	1 mV/div	5 ns/div (500 MHz)			$\geq 0.707$	
		2 mV/div	2.5 ns/div (500 MHz)			$\geq 0.707$	
		5 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		10 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		50 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		100 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		1 V/div	1 ns/div (500 MHz)			$\geq 0.707$	
Channel 3	50 $\Omega$	1 mV/div	5 ns/div (500 MHz)			$\geq 0.707$	
		2 mV/div	2.5 ns/div (500 MHz)			$\geq 0.707$	
		5 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		10 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		50 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		100 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		1 V/div	1 ns/div (500 MHz)			$\geq 0.707$	

Analog Bandwidth							
Performance checks							
Bandwidth at Channel	Impedance	Vertical scale	Horizontal scale	$V_{in-pp}$	$V_{bw-pp}$	Limit	Test result Gain = $V_{bw-pp}/V_{in-pp}$
Channel 3	1 M $\Omega$ , typical	1 mV/div	5 ns/div (500 MHz)			$\geq 0.707$	
		2 mV/div	2.5 ns/div (500 MHz)			$\geq 0.707$	
		5 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		10 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		50 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		100 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		1 V/div	1 ns/div (500 MHz)			$\geq 0.707$	
Channel 4	50 $\Omega$	1 mV/div	5 ns/div (500 MHz)			$\geq 0.707$	
		2 mV/div	2.5 ns/div (500 MHz)			$\geq 0.707$	
		5 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		10 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		50 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		100 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		1 V/div	1 ns/div (500 MHz)			$\geq 0.707$	

Analog Bandwidth							
Performance checks							
Bandwidth at Channel	Impedance	Vertical scale	Horizontal scale	V <sub>in-pp</sub>	V <sub>bw-pp</sub>	Limit	Test result Gain = V <sub>bw-pp</sub> /V <sub>in-pp</sub>
Channel 4	1 MΩ, typical	1 mV/div	5 ns/div (500 MHz)			≥ 0.707	
		2 mV/div	2.5 ns/div (500 MHz)			≥ 0.707	
		5 mV/div	1 ns/div (500 MHz)			≥ 0.707	
		10 mV/div	1 ns/div (500 MHz)			≥ 0.707	
		50 mV/div	1 ns/div (500 MHz)			≥ 0.707	
		100 mV/div	1 ns/div (500 MHz)			≥ 0.707	
		1 V/div	1 ns/div (500 MHz)			≥ 0.707	
500 MHz models (MSO56, MSO58)							
Channel 5	50 Ω	1 mV/div	5 ns/div (500 MHz)			≥ 0.707	
		2 mV/div	2.5 ns/div (500 MHz)			≥ 0.707	
		5 mV/div	1 ns/div (500 MHz)			≥ 0.707	
		10 mV/div	1 ns/div (500 MHz)			≥ 0.707	
		50 mV/div	1 ns/div (500 MHz)			≥ 0.707	
		100 mV/div	1 ns/div (500 MHz)			≥ 0.707	
		1 V/div	1 ns/div (500 MHz)			≥ 0.707	

Analog Bandwidth							
Performance checks							
Bandwidth at Channel	Impedance	Vertical scale	Horizontal scale	$V_{in-pp}$	$V_{bw-pp}$	Limit	Test result Gain = $V_{bw-pp}/V_{in-pp}$
Channel 5	1 M $\Omega$ , typical	1 mV/div	5 ns/div (500 MHz)			$\geq 0.707$	
		2 mV/div	2.5 ns/div (500 MHz)			$\geq 0.707$	
		5 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		10 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		50 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		100 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		1 V/div	1 ns/div (500 MHz)			$\geq 0.707$	
Channel 6	50 $\Omega$	1 mV/div	5 ns/div (500 MHz)			$\geq 0.707$	
		2 mV/div	2.5 ns/div (500 MHz)			$\geq 0.707$	
		5 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		10 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		50 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		100 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		1 V/div	1 ns/div (500 MHz)			$\geq 0.707$	

Analog Bandwidth							
Performance checks							
Bandwidth at Channel	Impedance	Vertical scale	Horizontal scale	V <sub>in-pp</sub>	V <sub>bw-pp</sub>	Limit	Test result Gain = V <sub>bw-pp</sub> /V <sub>in-pp</sub>
Channel 6	1 MΩ, typical	1 mV/div	5 ns/div (500 MHz)			≥ 0.707	
		2 mV/div	2.5 ns/div (500 MHz)			≥ 0.707	
		5 mV/div	1 ns/div (500 MHz)			≥ 0.707	
		10 mV/div	1 ns/div (500 MHz)			≥ 0.707	
		50 mV/div	1 ns/div (500 MHz)			≥ 0.707	
		100 mV/div	1 ns/div (500 MHz)			≥ 0.707	
		1 V/div	1 ns/div (500 MHz)			≥ 0.707	
500 MHz models (MSO58)							
Channel 7	50 Ω	1 mV/div	5 ns/div (500 MHz)			≥ 0.707	
		2 mV/div	2.5 ns/div (500 MHz)			≥ 0.707	
		5 mV/div	1 ns/div (500 MHz)			≥ 0.707	
		10 mV/div	1 ns/div (500 MHz)			≥ 0.707	
		50 mV/div	1 ns/div (500 MHz)			≥ 0.707	
		100 mV/div	1 ns/div (500 MHz)			≥ 0.707	
		1 V/div	1 ns/div (500 MHz)			≥ 0.707	

Analog Bandwidth							
Performance checks							
Bandwidth at Channel	Impedance	Vertical scale	Horizontal scale	$V_{in-pp}$	$V_{bw-pp}$	Limit	Test result Gain = $V_{bw-pp}/V_{in-pp}$
Channel 7	1 M $\Omega$ , typical	1 mV/div	5 ns/div (500 MHz)			$\geq 0.707$	
		2 mV/div	2.5 ns/div (500 MHz)			$\geq 0.707$	
		5 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		10 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		50 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		100 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		1 V/div	1 ns/div (500 MHz)			$\geq 0.707$	
Channel 8	50 $\Omega$	1 mV/div	5 ns/div (500 MHz)			$\geq 0.707$	
		2 mV/div	2.5 ns/div (500 MHz)			$\geq 0.707$	
		5 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		10 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		50 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		100 mV/div	1 ns/div (500 MHz)			$\geq 0.707$	
		1 V/div	1 ns/div (500 MHz)			$\geq 0.707$	

Analog Bandwidth							
Performance checks							
Bandwidth at Channel	Impedance	Vertical scale	Horizontal scale	V <sub>in-pp</sub>	V <sub>bw-pp</sub>	Limit	Test result Gain = V <sub>bw-pp</sub> /V <sub>in-pp</sub>
Channel 8	1 MΩ, typical	1 mV/div	5 ns/div (500 MHz)			≥ 0.707	
		2 mV/div	2.5 ns/div (500 MHz)			≥ 0.707	
		5 mV/div	1 ns/div (500 MHz)			≥ 0.707	
		10 mV/div	1 ns/div (500 MHz)			≥ 0.707	
		50 mV/div	1 ns/div (500 MHz)			≥ 0.707	
		100 mV/div	1 ns/div (500 MHz)			≥ 0.707	
		1 V/div	1 ns/div (500 MHz)			≥ 0.707	
350 MHz models (MSO54, MSO56, MSO58)							
Channel 1	50 Ω	1 mV/div	5 ns/div (350 MHz)			≥ 0.707	
		2 mV/div	2.5 ns/div (350 MHz)			≥ 0.707	
		5 mV/div	1 ns/div (350 MHz)			≥ 0.707	
		10 mV/div	1 ns/div (350 MHz)			≥ 0.707	
		50 mV/div	1 ns/div (350 MHz)			≥ 0.707	
		100 mV/div	1 ns/div (350 MHz)			≥ 0.707	
		1 V/div	1 ns/div (350 MHz)			≥ 0.707	



Analog Bandwidth							
Performance checks							
Bandwidth at Channel	Impedance	Vertical scale	Horizontal scale	$V_{in-pp}$	$V_{bw-pp}$	Limit	Test result Gain = $V_{bw-pp}/V_{in-pp}$
Channel 1	1 M $\Omega$ , typical	1 mV/div	5 ns/div (350 MHz)			$\geq 0.707$	
		2 mV/div	2.5 ns/div (350 MHz)			$\geq 0.707$	
		5 mV/div	1 ns/div (350 MHz)			$\geq 0.707$	
		10 mV/div	1 ns/div (350 MHz)			$\geq 0.707$	
		50 mV/div	1 ns/div (350 MHz)			$\geq 0.707$	
		100 mV/div	1 ns/div (350 MHz)			$\geq 0.707$	
		1 V/div	1 ns/div (350 MHz)			$\geq 0.707$	
Channel 2	50 $\Omega$	1 mV/div	5 ns/div (350 MHz)			$\geq 0.707$	
		2 mV/div	2.5 ns/div (350 MHz)			$\geq 0.707$	
		5 mV/div	1 ns/div (350 MHz)			$\geq 0.707$	
		10 mV/div	1 ns/div (350 MHz)			$\geq 0.707$	
		50 mV/div	1 ns/div (350 MHz)			$\geq 0.707$	
		100 mV/div	1 ns/div (350 MHz)			$\geq 0.707$	
		1 V/div	1 ns/div (350 MHz)			$\geq 0.707$	

Analog Bandwidth							
Performance checks							
Bandwidth at Channel	Impedance	Vertical scale	Horizontal scale	$V_{in-pp}$	$V_{bw-pp}$	Limit	Test result Gain = $V_{bw-pp}/V_{in-pp}$
Channel 2	1 M $\Omega$ , typical	1 mV/div	5 ns/div (350 MHz)			$\geq 0.707$	
		2 mV/div	2.5 ns/div (350 MHz)			$\geq 0.707$	
		5 mV/div	1 ns/div (350 MHz)			$\geq 0.707$	
		10 mV/div	1 ns/div (350 MHz)			$\geq 0.707$	
		50 mV/div	1 ns/div (350 MHz)			$\geq 0.707$	
		100 mV/div	1 ns/div (350 MHz)			$\geq 0.707$	
		1 V/div	1 ns/div (350 MHz)			$\geq 0.707$	
Channel 3	50 $\Omega$	1 mV/div	5 ns/div (350 MHz)			$\geq 0.707$	
		2 mV/div	2.5 ns/div (350 MHz)			$\geq 0.707$	
		5 mV/div	1 ns/div (350 MHz)			$\geq 0.707$	
		10 mV/div	1 ns/div (350 MHz)			$\geq 0.707$	
		50 mV/div	1 ns/div (350 MHz)			$\geq 0.707$	
		100 mV/div	1 ns/div (350 MHz)			$\geq 0.707$	
		1 V/div	1 ns/div (350 MHz)			$\geq 0.707$	

Analog Bandwidth							
Performance checks							
Bandwidth at Channel	Impedance	Vertical scale	Horizontal scale	$V_{in-pp}$	$V_{bw-pp}$	Limit	Test result Gain = $V_{bw-pp}/V_{in-pp}$
Channel 3	1 M $\Omega$ , typical	1 mV/div	5 ns/div (350 MHz)			$\geq 0.707$	
		2 mV/div	2.5 ns/div (350 MHz)			$\geq 0.707$	
		5 mV/div	1 ns/div (350 MHz)			$\geq 0.707$	
		10 mV/div	1 ns/div (350 MHz)			$\geq 0.707$	
		50 mV/div	1 ns/div (350 MHz)			$\geq 0.707$	
		100 mV/div	1 ns/div (350 MHz)			$\geq 0.707$	
		1 V/div	1 ns/div (350 MHz)			$\geq 0.707$	
Channel 4	50 $\Omega$	1 mV/div	5 ns/div (350 MHz)			$\geq 0.707$	
		2 mV/div	2.5 ns/div (350 MHz)			$\geq 0.707$	
		5 mV/div	1 ns/div (350 MHz)			$\geq 0.707$	
		10 mV/div	1 ns/div (350 MHz)			$\geq 0.707$	
		50 mV/div	1 ns/div (350 MHz)			$\geq 0.707$	
		100 mV/div	1 ns/div (350 MHz)			$\geq 0.707$	
		1 V/div	1 ns/div (350 MHz)			$\geq 0.707$	

Analog Bandwidth							
Performance checks							
Bandwidth at Channel	Impedance	Vertical scale	Horizontal scale	V <sub>in-pp</sub>	V <sub>bw-pp</sub>	Limit	Test result Gain = V <sub>bw-pp</sub> /V <sub>in-pp</sub>
Channel 4	1 MΩ, typical	1 mV/div	5 ns/div (350 MHz)			≥ 0.707	
		2 mV/div	2.5 ns/div (350 MHz)			≥ 0.707	
		5 mV/div	1 ns/div (350 MHz)			≥ 0.707	
		10 mV/div	1 ns/div (350 MHz)			≥ 0.707	
		50 mV/div	1 ns/div (350 MHz)			≥ 0.707	
		100 mV/div	1 ns/div (350 MHz)			≥ 0.707	
		1 V/div	1 ns/div (350 MHz)			≥ 0.707	
350 MHz models (MSO56, MSO58)							
Channel 5	50 Ω	1 mV/div	5 ns/div (350 MHz)			≥ 0.707	
		2 mV/div	2.5 ns/div (350 MHz)			≥ 0.707	
		5 mV/div	1 ns/div (350 MHz)			≥ 0.707	
		10 mV/div	1 ns/div (350 MHz)			≥ 0.707	
		50 mV/div	1 ns/div (350 MHz)			≥ 0.707	
		100 mV/div	1 ns/div (350 MHz)			≥ 0.707	
		1 V/div	1 ns/div (350 MHz)			≥ 0.707	

Analog Bandwidth							
Performance checks							
Bandwidth at Channel	Impedance	Vertical scale	Horizontal scale	$V_{in-pp}$	$V_{bw-pp}$	Limit	Test result Gain = $V_{bw-pp}/V_{in-pp}$
Channel 5	1 M $\Omega$ , typical	1 mV/div	5 ns/div (350 MHz)			$\geq 0.707$	
		2 mV/div	2.5 ns/div (350 MHz)			$\geq 0.707$	
		5 mV/div	1 ns/div (350 MHz)			$\geq 0.707$	
		10 mV/div	1 ns/div (350 MHz)			$\geq 0.707$	
		50 mV/div	1 ns/div (350 MHz)			$\geq 0.707$	
		100 mV/div	1 ns/div (350 MHz)			$\geq 0.707$	
		1 V/div	1 ns/div (350 MHz)			$\geq 0.707$	
Channel 6	50 $\Omega$	1 mV/div	5 ns/div (350 MHz)			$\geq 0.707$	
		2 mV/div	2.5 ns/div (350 MHz)			$\geq 0.707$	
		5 mV/div	1 ns/div (350 MHz)			$\geq 0.707$	
		10 mV/div	1 ns/div (350 MHz)			$\geq 0.707$	
		50 mV/div	1 ns/div (350 MHz)			$\geq 0.707$	
		100 mV/div	1 ns/div (350 MHz)			$\geq 0.707$	
		1 V/div	1 ns/div (350 MHz)			$\geq 0.707$	

Analog Bandwidth							
Performance checks							
Bandwidth at Channel	Impedance	Vertical scale	Horizontal scale	V <sub>in-pp</sub>	V <sub>bw-pp</sub>	Limit	Test result Gain = V <sub>bw-pp</sub> /V <sub>in-pp</sub>
Channel 6	1 MΩ, typical	1 mV/div	5 ns/div (350 MHz)			≥ 0.707	
		2 mV/div	2.5 ns/div (350 MHz)			≥ 0.707	
		5 mV/div	1 ns/div (350 MHz)			≥ 0.707	
		10 mV/div	1 ns/div (350 MHz)			≥ 0.707	
		50 mV/div	1 ns/div (350 MHz)			≥ 0.707	
		100 mV/div	1 ns/div (350 MHz)			≥ 0.707	
		1 V/div	1 ns/div (350 MHz)			≥ 0.707	
350 MHz models (MSO58)							
Channel 7	50 Ω	1 mV/div	5 ns/div (350 MHz)			≥ 0.707	
		2 mV/div	2.5 ns/div (350 MHz)			≥ 0.707	
		5 mV/div	1 ns/div (350 MHz)			≥ 0.707	
		10 mV/div	1 ns/div (350 MHz)			≥ 0.707	
		50 mV/div	1 ns/div (350 MHz)			≥ 0.707	
		100 mV/div	1 ns/div (350 MHz)			≥ 0.707	
		1 V/div	1 ns/div (350 MHz)			≥ 0.707	

Analog Bandwidth							
Performance checks							
Bandwidth at Channel	Impedance	Vertical scale	Horizontal scale	$V_{in-pp}$	$V_{bw-pp}$	Limit	Test result Gain = $V_{bw-pp}/V_{in-pp}$
Channel 7	1 M $\Omega$ , typical	1 mV/div	5 ns/div (350 MHz)			$\geq 0.707$	
		2 mV/div	2.5 ns/div (350 MHz)			$\geq 0.707$	
		5 mV/div	1 ns/div (350 MHz)			$\geq 0.707$	
		10 mV/div	1 ns/div (350 MHz)			$\geq 0.707$	
		50 mV/div	1 ns/div (350 MHz)			$\geq 0.707$	
		100 mV/div	1 ns/div (350 MHz)			$\geq 0.707$	
		1 V/div	1 ns/div (350 MHz)			$\geq 0.707$	
Channel 8	50 $\Omega$	1 mV/div	5 ns/div (350 MHz)			$\geq 0.707$	
		2 mV/div	2.5 ns/div (350 MHz)			$\geq 0.707$	
		5 mV/div	1 ns/div (350 MHz)			$\geq 0.707$	
		10 mV/div	1 ns/div (350 MHz)			$\geq 0.707$	
		50 mV/div	1 ns/div (350 MHz)			$\geq 0.707$	
		100 mV/div	1 ns/div (350 MHz)			$\geq 0.707$	
		1 V/div	1 ns/div (350 MHz)			$\geq 0.707$	

Analog Bandwidth							
Performance checks							
Bandwidth at Channel	Impedance	Vertical scale	Horizontal scale	$V_{in-pp}$	$V_{bw-pp}$	Limit	Test result Gain = $V_{bw-pp}/V_{in-pp}$
Channel 8	1 M $\Omega$ , typical	1 mV/div	5 ns/div (350 MHz)			$\geq 0.707$	
		2 mV/div	2.5 ns/div (350 MHz)			$\geq 0.707$	
		5 mV/div	1 ns/div (350 MHz)			$\geq 0.707$	
		10 mV/div	1 ns/div (350 MHz)			$\geq 0.707$	
		50 mV/div	1 ns/div (350 MHz)			$\geq 0.707$	
		100 mV/div	1 ns/div (350 MHz)			$\geq 0.707$	
		1 V/div	1 ns/div (350 MHz)			$\geq 0.707$	



## Random Noise, sample acquisition mode test record

Random Noise, sample acquisition mode: 2 GHz models						
Performance checks			1 M $\Omega$		50 $\Omega$	
	V/div	Bandwidth <sup>2</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
<b>2 GHz models (MSO54, MSO56, MSO58)</b>						
<b>Channel 1</b>	1 mV/div	Full		0.270		0.090
		250 MHz limit		0.158		0.090
		20 MHz limit		0.086		0.040
	2 mV/div	Full		0.291		0.152
		250 MHz limit		0.158		0.114
		20 MHz limit		0.090		0.051
	5 mV/div	Full		0.315		0.456
		250 MHz limit		0.185		0.155
		20 MHz limit		0.121		0.089
	10 mV/div	Full		0.377		0.643
		250 MHz limit		0.271		0.244
		20 MHz limit		0.201		0.174
	20 mV/div	Full		0.572		1.06
		250 MHz limit		0.462		0.436
		20 MHz limit		0.373		0.347
	50 mV/div	Full		1.32		2.51
		250 MHz limit		1.11		1.06
		20 MHz limit		0.922		0.869
	100 mV/div	Full		2.75		6.15
		250 MHz limit		2.24		2.38
		20 MHz limit		1.88		1.74
	1 V/div	Full		28.6		39.6
		250 MHz limit		23.5		21.1
		20 MHz limit		18.7		17.4

<sup>2</sup> Full = the highest bandwidth setting you can select.

Random Noise, sample acquisition mode: 2 GHz models						
Performance checks			1 M $\Omega$		50 $\Omega$	
	V/div	Bandwidth <sup>2</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
Channel 2	1 mV/div	Full		0.270		0.090
		250 MHz limit		0.158		0.090
		20 MHz limit		0.086		0.040
	2 mV/div	Full		0.291		0.152
		250 MHz limit		0.158		0.114
		20 MHz limit		0.090		0.051
	5 mV/div	Full		0.315		0.456
		250 MHz limit		0.185		0.155
		20 MHz limit		0.121		0.089
	10 mV/div	Full		0.377		0.643
		250 MHz limit		0.271		0.244
		20 MHz limit		0.201		0.174
	20 mV/div	Full		0.572		1.06
		250 MHz limit		0.462		0.436
		20 MHz limit		0.373		0.347
	50 mV/div	Full		1.32		2.51
		250 MHz limit		1.11		1.06
		20 MHz limit		0.922		0.869
	100 mV/div	Full		2.75		6.15
		250 MHz limit		2.24		2.38
		20 MHz limit		1.88		1.74
	1 V/div	Full		28.6		39.6
		250 MHz limit		23.5		21.1
		20 MHz limit		18.7		17.4

<sup>2</sup> Full = the highest bandwidth setting you can select.

Random Noise, sample acquisition mode: 2 GHz models						
Performance checks			1 M $\Omega$		50 $\Omega$	
	V/div	Bandwidth <sup>2</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
Channel 3	1 mV/div	Full		0.270		0.090
		250 MHz limit		0.158		0.090
		20 MHz limit		0.086		0.040
	2 mV/div	Full		0.291		0.152
		250 MHz limit		0.158		0.114
		20 MHz limit		0.090		0.051
	5 mV/div	Full		0.315		0.456
		250 MHz limit		0.185		0.155
		20 MHz limit		0.121		0.089
	10 mV/div	Full		0.377		0.643
		250 MHz limit		0.271		0.244
		20 MHz limit		0.201		0.174
	20 mV/div	Full		0.572		1.06
		250 MHz limit		0.462		0.436
		20 MHz limit		0.373		0.347
	50 mV/div	Full		1.32		2.51
		250 MHz limit		1.11		1.06
		20 MHz limit		0.922		0.869
	100 mV/div	Full		2.75		6.15
		250 MHz limit		2.24		2.38
		20 MHz limit		1.88		1.74
	1 V/div	Full		28.6		39.6
		250 MHz limit		23.5		21.1
		20 MHz limit		18.7		17.4

<sup>2</sup> Full = the highest bandwidth setting you can select.

Random Noise, sample acquisition mode: 2 GHz models						
Performance checks			1 MΩ		50 Ω	
	V/div	Bandwidth <sup>2</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
Channel 4	1 mV/div	Full		0.270		0.090
		250 MHz limit		0.158		0.090
		20 MHz limit		0.086		0.040
	2 mV/div	Full		0.291		0.152
		250 MHz limit		0.158		0.114
		20 MHz limit		0.090		0.051
	5 mV/div	Full		0.315		0.456
		250 MHz limit		0.185		0.155
		20 MHz limit		0.121		0.089
	10 mV/div	Full		0.377		0.643
		250 MHz limit		0.271		0.244
		20 MHz limit		0.201		0.174
	20 mV/div	Full		0.572		1.06
		250 MHz limit		0.462		0.436
		20 MHz limit		0.373		0.347
	50 mV/div	Full		1.32		2.51
		250 MHz limit		1.11		1.06
		20 MHz limit		0.922		0.869
	100 mV/div	Full		2.75		6.15
		250 MHz limit		2.24		2.38
		20 MHz limit		1.88		1.74
	1 V/div	Full		28.6		39.6
		250 MHz limit		23.5		21.1
		20 MHz limit		18.7		17.4
2 GHz models (MSO56, MSO58)						

<sup>2</sup> Full = the highest bandwidth setting you can select.

Random Noise, sample acquisition mode: 2 GHz models						
Performance checks			1 M $\Omega$		50 $\Omega$	
	V/div	Bandwidth <sup>2</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
Channel 5	1 mV/div	Full		0.270		0.090
		250 MHz limit		0.158		0.090
		20 MHz limit		0.086		0.040
	2 mV/div	Full		0.291		0.152
		250 MHz limit		0.158		0.114
		20 MHz limit		0.090		0.051
	5 mV/div	Full		0.315		0.456
		250 MHz limit		0.185		0.155
		20 MHz limit		0.121		0.089
	10 mV/div	Full		0.377		0.643
		250 MHz limit		0.271		0.244
		20 MHz limit		0.201		0.174
	20 mV/div	Full		0.572		1.06
		250 MHz limit		0.462		0.436
		20 MHz limit		0.373		0.347
	50 mV/div	Full		1.32		2.51
		250 MHz limit		1.11		1.06
		20 MHz limit		0.922		0.869
	100 mV/div	Full		2.75		6.15
		250 MHz limit		2.24		2.38
		20 MHz limit		1.88		1.74
	1 V/div	Full		28.6		39.6
		250 MHz limit		23.5		21.1
		20 MHz limit		18.7		17.4

<sup>2</sup> Full = the highest bandwidth setting you can select.

Random Noise, sample acquisition mode: 2 GHz models						
Performance checks			1 MΩ		50 Ω	
	V/div	Bandwidth <sup>2</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
Channel 6	1 mV/div	Full		0.270		0.090
		250 MHz limit		0.158		0.090
		20 MHz limit		0.086		0.040
	2 mV/div	Full		0.291		0.152
		250 MHz limit		0.158		0.114
		20 MHz limit		0.090		0.051
	5 mV/div	Full		0.315		0.456
		250 MHz limit		0.185		0.155
		20 MHz limit		0.121		0.089
	10 mV/div	Full		0.377		0.643
		250 MHz limit		0.271		0.244
		20 MHz limit		0.201		0.174
	20 mV/div	Full		0.572		1.06
		250 MHz limit		0.462		0.436
		20 MHz limit		0.373		0.347
	50 mV/div	Full		1.32		2.51
		250 MHz limit		1.11		1.06
		20 MHz limit		0.922		0.869
	100 mV/div	Full		2.75		6.15
		250 MHz limit		2.24		2.38
		20 MHz limit		1.88		1.74
	1 V/div	Full		28.6		39.6
		250 MHz limit		23.5		21.1
		20 MHz limit		18.7		17.4
2 GHz models (MSO58)						

<sup>2</sup> Full = the highest bandwidth setting you can select.

Random Noise, sample acquisition mode: 2 GHz models						
Performance checks			1 M $\Omega$		50 $\Omega$	
	V/div	Bandwidth <sup>2</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
Channel 7	1 mV/div	Full		0.270		0.090
		250 MHz limit		0.158		0.090
		20 MHz limit		0.086		0.040
	2 mV/div	Full		0.291		0.152
		250 MHz limit		0.158		0.114
		20 MHz limit		0.090		0.051
	5 mV/div	Full		0.315		0.456
		250 MHz limit		0.185		0.155
		20 MHz limit		0.121		0.089
	10 mV/div	Full		0.377		0.643
		250 MHz limit		0.271		0.244
		20 MHz limit		0.201		0.174
	20 mV/div	Full		0.572		1.06
		250 MHz limit		0.462		0.436
		20 MHz limit		0.373		0.347
	50 mV/div	Full		1.32		2.51
		250 MHz limit		1.11		1.06
		20 MHz limit		0.922		0.869
	100 mV/div	Full		2.75		6.15
		250 MHz limit		2.24		2.38
		20 MHz limit		1.88		1.74
	1 V/div	Full		28.6		39.6
		250 MHz limit		23.5		21.1
		20 MHz limit		18.7		17.4

<sup>2</sup> Full = the highest bandwidth setting you can select.

Random Noise, sample acquisition mode: 2 GHz models						
Performance checks			1 M $\Omega$		50 $\Omega$	
	V/div	Bandwidth <sup>2</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
Channel 8	1 mV/div	Full		0.270		0.090
		250 MHz limit		0.158		0.090
		20 MHz limit		0.086		0.040
	2 mV/div	Full		0.291		0.152
		250 MHz limit		0.158		0.114
		20 MHz limit		0.090		0.051
	5 mV/div	Full		0.315		0.456
		250 MHz limit		0.185		0.155
		20 MHz limit		0.121		0.089
	10 mV/div	Full		0.377		0.643
		250 MHz limit		0.271		0.244
		20 MHz limit		0.201		0.174
	20 mV/div	Full		0.572		1.06
		250 MHz limit		0.462		0.436
		20 MHz limit		0.373		0.347
	50 mV/div	Full		1.32		2.51
		250 MHz limit		1.11		1.06
		20 MHz limit		0.922		0.869
	100 mV/div	Full		2.75		6.15
		250 MHz limit		2.24		2.38
		20 MHz limit		1.88		1.74
	1 V/div	Full		28.6		39.6
		250 MHz limit		23.5		21.1
		20 MHz limit		18.7		17.4

<sup>2</sup> Full = the highest bandwidth setting you can select.



Random Noise, sample acquisition mode: 1 GHz models						
Performance checks			1 M $\Omega$		50 $\Omega$	
	V/div	Bandwidth <sup>3</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
1 GHz models (MSO54, MSO56, MSO58, MSO58LP)						
Channel 1	1 mV/div	Full		0.258		0.372
		250 MHz limit		0.158		0.153
		20 MHz limit		0.088		0.091
	2 mV/div	Full		0.254		0.376
		250 MHz limit		0.158		0.164
		20 MHz limit		0.092		0.102
	5 mV/div	Full		0.272		0.395
		250 MHz limit		0.185		0.201
		20 MHz limit		0.116		0.136
	10 mV/div	Full		0.319		0.449
		250 MHz limit		0.251		0.272
		20 MHz limit		0.188		0.197
	20 mV/div	Full		0.455		.614
		250 MHz limit		0.422		0.435
		20 MHz limit		0.347		0.347
	50 mV/div	Full		1.03		1.26
		250 MHz limit		1.00		0.982
		20 MHz limit		0.869		0.869
	100 mV/div	Full		2.18		2.85
		250 MHz limit		2.06		2.09
		20 MHz limit		1.74		1.74
	1 V/div	Full		23.1		24.6
		250 MHz limit		21.6		19.4
		20 MHz limit		17.4		17.4

<sup>3</sup> Full = the highest bandwidth setting you can select.

Random Noise, sample acquisition mode: 1 GHz models						
Performance checks			1 M $\Omega$		50 $\Omega$	
	V/div	Bandwidth <sup>3</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
Channel 2	1 mV/div	Full		0.258		0.372
		250 MHz limit		0.158		0.153
		20 MHz limit		0.088		0.091
	2 mV/div	Full		0.254		0.376
		250 MHz limit		0.158		0.164
		20 MHz limit		0.092		0.102
	5 mV/div	Full		0.272		0.395
		250 MHz limit		0.185		0.201
		20 MHz limit		0.116		0.136
	10 mV/div	Full		0.319		0.449
		250 MHz limit		0.251		0.272
		20 MHz limit		0.188		0.197
	20 mV/div	Full		0.455		.614
		250 MHz limit		0.422		0.435
		20 MHz limit		0.347		0.347
	50 mV/div	Full		1.03		1.26
		250 MHz limit		1.00		0.982
		20 MHz limit		0.869		0.869
	100 mV/div	Full		2.18		2.85
		250 MHz limit		2.06		2.09
		20 MHz limit		1.74		1.74
	1 V/div	Full		23.1		24.6
		250 MHz limit		21.6		19.4
		20 MHz limit		17.4		17.4

<sup>3</sup> Full = the highest bandwidth setting you can select.

Random Noise, sample acquisition mode: 1 GHz models						
Performance checks			1 M $\Omega$		50 $\Omega$	
	V/div	Bandwidth <sup>3</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
Channel 3	1 mV/div	Full		0.258		0.372
		250 MHz limit		0.158		0.153
		20 MHz limit		0.088		0.091
	2 mV/div	Full		0.254		0.376
		250 MHz limit		0.158		0.164
		20 MHz limit		0.092		0.102
	5 mV/div	Full		0.272		0.395
		250 MHz limit		0.185		0.201
		20 MHz limit		0.116		0.136
	10 mV/div	Full		0.319		0.449
		250 MHz limit		0.251		0.272
		20 MHz limit		0.188		0.197
	20 mV/div	Full		0.455		.614
		250 MHz limit		0.422		0.435
		20 MHz limit		0.347		0.347
	50 mV/div	Full		1.03		1.26
		250 MHz limit		1.00		0.982
		20 MHz limit		0.869		0.869
	100 mV/div	Full		2.18		2.85
		250 MHz limit		2.06		2.09
		20 MHz limit		1.74		1.74
	1 V/div	Full		23.1		24.6
		250 MHz limit		21.6		19.4
		20 MHz limit		17.4		17.4

<sup>3</sup> Full = the highest bandwidth setting you can select.

Random Noise, sample acquisition mode: 1 GHz models						
Performance checks			1 MΩ		50 Ω	
	V/div	Bandwidth <sup>3</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
Channel 4	1 mV/div	Full		0.258		0.372
		250 MHz limit		0.158		0.153
		20 MHz limit		0.088		0.091
	2 mV/div	Full		0.254		0.376
		250 MHz limit		0.158		0.164
		20 MHz limit		0.092		0.102
	5 mV/div	Full		0.272		0.395
		250 MHz limit		0.185		0.201
		20 MHz limit		0.116		0.136
	10 mV/div	Full		0.319		0.449
		250 MHz limit		0.251		0.272
		20 MHz limit		0.188		0.197
	20 mV/div	Full		0.455		.614
		250 MHz limit		0.422		0.435
		20 MHz limit		0.347		0.347
	50 mV/div	Full		1.03		1.26
		250 MHz limit		1.00		0.982
		20 MHz limit		0.869		0.869
	100 mV/div	Full		2.18		2.85
		250 MHz limit		2.06		2.09
		20 MHz limit		1.74		1.74
	1 V/div	Full		23.1		24.6
		250 MHz limit		21.6		19.4
		20 MHz limit		17.4		17.4
1 GHz models (MSO56, MSO58, MSO58LP)						

<sup>3</sup> Full = the highest bandwidth setting you can select.

Random Noise, sample acquisition mode: 1 GHz models						
Performance checks			1 M $\Omega$		50 $\Omega$	
	V/div	Bandwidth <sup>3</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
Channel 5	1 mV/div	Full		0.258		0.372
		250 MHz limit		0.158		0.153
		20 MHz limit		0.088		0.091
	2 mV/div	Full		0.254		0.376
		250 MHz limit		0.158		0.164
		20 MHz limit		0.092		0.102
	5 mV/div	Full		0.272		0.395
		250 MHz limit		0.185		0.201
		20 MHz limit		0.116		0.136
	10 mV/div	Full		0.319		0.449
		250 MHz limit		0.251		0.272
		20 MHz limit		0.188		0.197
	20 mV/div	Full		0.455		.614
		250 MHz limit		0.422		0.435
		20 MHz limit		0.347		0.347
	50 mV/div	Full		1.03		1.26
		250 MHz limit		1.00		0.982
		20 MHz limit		0.869		0.869
	100 mV/div	Full		2.18		2.85
		250 MHz limit		2.06		2.09
		20 MHz limit		1.74		1.74
	1 V/div	Full		23.1		24.6
		250 MHz limit		21.6		19.4
		20 MHz limit		17.4		17.4

<sup>3</sup> Full = the highest bandwidth setting you can select.

Random Noise, sample acquisition mode: 1 GHz models						
Performance checks			1 MΩ		50 Ω	
	V/div	Bandwidth <sup>3</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
Channel 6	1 mV/div	Full		0.258		0.372
		250 MHz limit		0.158		0.153
		20 MHz limit		0.088		0.091
	2 mV/div	Full		0.254		0.376
		250 MHz limit		0.158		0.164
		20 MHz limit		0.092		0.102
	5 mV/div	Full		0.272		0.395
		250 MHz limit		0.185		0.201
		20 MHz limit		0.116		0.136
	10 mV/div	Full		0.319		0.449
		250 MHz limit		0.251		0.272
		20 MHz limit		0.188		0.197
	20 mV/div	Full		0.455		.614
		250 MHz limit		0.422		0.435
		20 MHz limit		0.347		0.347
	50 mV/div	Full		1.03		1.26
		250 MHz limit		1.00		0.982
		20 MHz limit		0.869		0.869
	100 mV/div	Full		2.18		2.85
		250 MHz limit		2.06		2.09
		20 MHz limit		1.74		1.74
	1 V/div	Full		23.1		24.6
		250 MHz limit		21.6		19.4
		20 MHz limit		17.4		17.4
1 GHz models (MSO58, MSO58LP)						

<sup>3</sup> Full = the highest bandwidth setting you can select.

Random Noise, sample acquisition mode: 1 GHz models						
Performance checks			1 M $\Omega$		50 $\Omega$	
	V/div	Bandwidth <sup>3</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
Channel 7	1 mV/div	Full		0.258		0.372
		250 MHz limit		0.158		0.153
		20 MHz limit		0.088		0.091
	2 mV/div	Full		0.254		0.376
		250 MHz limit		0.158		0.164
		20 MHz limit		0.092		0.102
	5 mV/div	Full		0.272		0.395
		250 MHz limit		0.185		0.201
		20 MHz limit		0.116		0.136
	10 mV/div	Full		0.319		0.449
		250 MHz limit		0.251		0.272
		20 MHz limit		0.188		0.197
	20 mV/div	Full		0.455		.614
		250 MHz limit		0.422		0.435
		20 MHz limit		0.347		0.347
	50 mV/div	Full		1.03		1.26
		250 MHz limit		1.00		0.982
		20 MHz limit		0.869		0.869
	100 mV/div	Full		2.18		2.85
		250 MHz limit		2.06		2.09
		20 MHz limit		1.74		1.74
	1 V/div	Full		23.1		24.6
		250 MHz limit		21.6		19.4
		20 MHz limit		17.4		17.4

<sup>3</sup> Full = the highest bandwidth setting you can select.

Random Noise, sample acquisition mode: 1 GHz models						
Performance checks			1 M $\Omega$		50 $\Omega$	
	V/div	Bandwidth <sup>3</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
Channel 8	1 mV/div	Full		0.258		0.372
		250 MHz limit		0.158		0.153
		20 MHz limit		0.088		0.091
	2 mV/div	Full		0.254		0.376
		250 MHz limit		0.158		0.164
		20 MHz limit		0.092		0.102
	5 mV/div	Full		0.272		0.395
		250 MHz limit		0.185		0.201
		20 MHz limit		0.116		0.136
	10 mV/div	Full		0.319		0.449
		250 MHz limit		0.251		0.272
		20 MHz limit		0.188		0.197
	20 mV/div	Full		0.455		.614
		250 MHz limit		0.422		0.435
		20 MHz limit		0.347		0.347
	50 mV/div	Full		1.03		1.26
		250 MHz limit		1.00		0.982
		20 MHz limit		0.869		0.869
	100 mV/div	Full		2.18		2.85
		250 MHz limit		2.06		2.09
		20 MHz limit		1.74		1.74
	1 V/div	Full		23.1		24.6
		250 MHz limit		21.6		19.4
		20 MHz limit		17.4		17.4

<sup>3</sup> Full = the highest bandwidth setting you can select.



Random Noise, sample acquisition mode: 500 MHz models						
Performance checks			1 M $\Omega$		50 $\Omega$	
	V/div	Bandwidth <sup>4</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
500 MHz models (MSO54, MSO56, MSO58)						
Channel 1	1 mV/div	Full		0.258		0.253
		250 MHz limit		0.158		0.153
		20 MHz limit		0.088		0.091
	2 mV/div	Full		0.254		0.262
		250 MHz limit		0.158		0.164
		20 MHz limit		0.092		0.102
	5 mV/div	Full		0.272		0.292
		250 MHz limit		0.185		0.201
		20 MHz limit		0.116		0.136
	10 mV/div	Full		0.319		0.359
		250 MHz limit		0.251		0.272
		20 MHz limit		0.188		0.197
	20 mV/div	Full		0.455		.529
		250 MHz limit		0.422		0.435
		20 MHz limit		0.347		0.347
	50 mV/div	Full		1.03		1.14
		250 MHz limit		1.00		0.982
		20 MHz limit		0.869		0.869
	100 mV/div	Full		2.18		2.5
		250 MHz limit		2.06		2.09
		20 MHz limit		1.74		1.74
	1 V/div	Full		23.1		22.4
		250 MHz limit		21.6		19.4
		20 MHz limit		17.4		17.4

<sup>4</sup> Full = the highest bandwidth setting you can select.

Random Noise, sample acquisition mode: 500 MHz models						
Performance checks			1 M $\Omega$		50 $\Omega$	
	V/div	Bandwidth <sup>4</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
Channel 2	1 mV/div	Full		0.258		0.253
		250 MHz limit		0.158		0.153
		20 MHz limit		0.088		0.091
	2 mV/div	Full		0.254		0.262
		250 MHz limit		0.158		0.164
		20 MHz limit		0.092		0.102
	5 mV/div	Full		0.272		0.292
		250 MHz limit		0.185		0.201
		20 MHz limit		0.116		0.136
	10 mV/div	Full		0.319		0.359
		250 MHz limit		0.251		0.272
		20 MHz limit		0.188		0.197
	20 mV/div	Full		0.455		.529
		250 MHz limit		0.422		0.435
		20 MHz limit		0.347		0.347
	50 mV/div	Full		1.03		1.14
		250 MHz limit		1.00		0.982
		20 MHz limit		0.869		0.869
	100 mV/div	Full		2.18		2.5
		250 MHz limit		2.06		2.09
		20 MHz limit		1.74		1.74
	1 V/div	Full		23.1		22.4
		250 MHz limit		21.6		19.4
		20 MHz limit		17.4		17.4

<sup>4</sup> Full = the highest bandwidth setting you can select.

Random Noise, sample acquisition mode: 500 MHz models						
Performance checks			1 M $\Omega$		50 $\Omega$	
	V/div	Bandwidth <sup>4</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
Channel 3	1 mV/div	Full		0.258		0.253
		250 MHz limit		0.158		0.153
		20 MHz limit		0.088		0.091
	2 mV/div	Full		0.254		0.262
		250 MHz limit		0.158		0.164
		20 MHz limit		0.092		0.102
	5 mV/div	Full		0.272		0.292
		250 MHz limit		0.185		0.201
		20 MHz limit		0.116		0.136
	10 mV/div	Full		0.319		0.359
		250 MHz limit		0.251		0.272
		20 MHz limit		0.188		0.197
	20 mV/div	Full		0.455		.529
		250 MHz limit		0.422		0.435
		20 MHz limit		0.347		0.347
	50 mV/div	Full		1.03		1.14
		250 MHz limit		1.00		0.982
		20 MHz limit		0.869		0.869
	100 mV/div	Full		2.18		2.5
		250 MHz limit		2.06		2.09
		20 MHz limit		1.74		1.74
	1 V/div	Full		23.1		22.4
		250 MHz limit		21.6		19.4
		20 MHz limit		17.4		17.4

<sup>4</sup> Full = the highest bandwidth setting you can select.

Random Noise, sample acquisition mode: 500 MHz models						
Performance checks			1 MΩ		50 Ω	
	V/div	Bandwidth <sup>4</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
Channel 4	1 mV/div	Full		0.258		0.253
		250 MHz limit		0.158		0.153
		20 MHz limit		0.088		0.091
	2 mV/div	Full		0.254		0.262
		250 MHz limit		0.158		0.164
		20 MHz limit		0.092		0.102
	5 mV/div	Full		0.272		0.292
		250 MHz limit		0.185		0.201
		20 MHz limit		0.116		0.136
	10 mV/div	Full		0.319		0.359
		250 MHz limit		0.251		0.272
		20 MHz limit		0.188		0.197
	20 mV/div	Full		0.455		.529
		250 MHz limit		0.422		0.435
		20 MHz limit		0.347		0.347
	50 mV/div	Full		1.03		1.14
		250 MHz limit		1.00		0.982
		20 MHz limit		0.869		0.869
	100 mV/div	Full		2.18		2.5
		250 MHz limit		2.06		2.09
		20 MHz limit		1.74		1.74
	1 V/div	Full		23.1		22.4
		250 MHz limit		21.6		19.4
		20 MHz limit		17.4		17.4
500 MHz models (MSO56, MSO58)						

<sup>4</sup> Full = the highest bandwidth setting you can select.

Random Noise, sample acquisition mode: 500 MHz models						
Performance checks			1 M $\Omega$		50 $\Omega$	
	V/div	Bandwidth <sup>4</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
Channel 5	1 mV/div	Full		0.258		0.253
		250 MHz limit		0.158		0.153
		20 MHz limit		0.088		0.091
	2 mV/div	Full		0.254		0.262
		250 MHz limit		0.158		0.164
		20 MHz limit		0.092		0.102
	5 mV/div	Full		0.272		0.292
		250 MHz limit		0.185		0.201
		20 MHz limit		0.116		0.136
	10 mV/div	Full		0.319		0.359
		250 MHz limit		0.251		0.272
		20 MHz limit		0.188		0.197
	20 mV/div	Full		0.455		.529
		250 MHz limit		0.422		0.435
		20 MHz limit		0.347		0.347
	50 mV/div	Full		1.03		1.14
		250 MHz limit		1.00		0.982
		20 MHz limit		0.869		0.869
	100 mV/div	Full		2.18		2.5
		250 MHz limit		2.06		2.09
		20 MHz limit		1.74		1.74
	1 V/div	Full		23.1		22.4
		250 MHz limit		21.6		19.4
		20 MHz limit		17.4		17.4

<sup>4</sup> Full = the highest bandwidth setting you can select.

Random Noise, sample acquisition mode: 500 MHz models						
Performance checks			1 MΩ		50 Ω	
	V/div	Bandwidth <sup>4</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
Channel 6	1 mV/div	Full		0.258		0.253
		250 MHz limit		0.158		0.153
		20 MHz limit		0.088		0.091
	2 mV/div	Full		0.254		0.262
		250 MHz limit		0.158		0.164
		20 MHz limit		0.092		0.102
	5 mV/div	Full		0.272		0.292
		250 MHz limit		0.185		0.201
		20 MHz limit		0.116		0.136
	10 mV/div	Full		0.319		0.359
		250 MHz limit		0.251		0.272
		20 MHz limit		0.188		0.197
	20 mV/div	Full		0.455		.529
		250 MHz limit		0.422		0.435
		20 MHz limit		0.347		0.347
	50 mV/div	Full		1.03		1.14
		250 MHz limit		1.00		0.982
		20 MHz limit		0.869		0.869
	100 mV/div	Full		2.18		2.5
		250 MHz limit		2.06		2.09
		20 MHz limit		1.74		1.74
	1 V/div	Full		23.1		22.4
		250 MHz limit		21.6		19.4
		20 MHz limit		17.4		17.4
500 MHz models (MSO58)						

<sup>4</sup> Full = the highest bandwidth setting you can select.

Random Noise, sample acquisition mode: 500 MHz models						
Performance checks			1 M $\Omega$		50 $\Omega$	
	V/div	Bandwidth <sup>4</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
Channel 7	1 mV/div	Full		0.258		0.253
		250 MHz limit		0.158		0.153
		20 MHz limit		0.088		0.091
	2 mV/div	Full		0.254		0.262
		250 MHz limit		0.158		0.164
		20 MHz limit		0.092		0.102
	5 mV/div	Full		0.272		0.292
		250 MHz limit		0.185		0.201
		20 MHz limit		0.116		0.136
	10 mV/div	Full		0.319		0.359
		250 MHz limit		0.251		0.272
		20 MHz limit		0.188		0.197
	20 mV/div	Full		0.455		.529
		250 MHz limit		0.422		0.435
		20 MHz limit		0.347		0.347
	50 mV/div	Full		1.03		1.14
		250 MHz limit		1.00		0.982
		20 MHz limit		0.869		0.869
	100 mV/div	Full		2.18		2.5
		250 MHz limit		2.06		2.09
		20 MHz limit		1.74		1.74
	1 V/div	Full		23.1		22.4
		250 MHz limit		21.6		19.4
		20 MHz limit		17.4		17.4

<sup>4</sup> Full = the highest bandwidth setting you can select.

Random Noise, sample acquisition mode: 500 MHz models						
Performance checks			1 M $\Omega$		50 $\Omega$	
	V/div	Bandwidth <sup>4</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
Channel 8	1 mV/div	Full		0.258		0.253
		250 MHz limit		0.158		0.153
		20 MHz limit		0.088		0.091
	2 mV/div	Full		0.254		0.262
		250 MHz limit		0.158		0.164
		20 MHz limit		0.092		0.102
	5 mV/div	Full		0.272		0.292
		250 MHz limit		0.185		0.201
		20 MHz limit		0.116		0.136
	10 mV/div	Full		0.319		0.359
		250 MHz limit		0.251		0.272
		20 MHz limit		0.188		0.197
	20 mV/div	Full		0.455		.529
		250 MHz limit		0.422		0.435
		20 MHz limit		0.347		0.347
	50 mV/div	Full		1.03		1.14
		250 MHz limit		1.00		0.982
		20 MHz limit		0.869		0.869
	100 mV/div	Full		2.18		2.5
		250 MHz limit		2.06		2.09
		20 MHz limit		1.74		1.74
	1 V/div	Full		23.1		22.4
		250 MHz limit		21.6		19.4
		20 MHz limit		17.4		17.4

<sup>4</sup> Full = the highest bandwidth setting you can select.



Random Noise, sample acquisition mode: 350 MHz models						
Performance checks			1 M $\Omega$		50 $\Omega$	
	V/div	Bandwidth <sup>5</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
350 MHz models (MSO54, MSO56, MSO58)						
Channel 1	1 mV/div	Full		0.188		0.181
		250 MHz limit		0.158		0.153
		20 MHz limit		0.088		0.091
	2 mV/div	Full		0.193		0.190
		250 MHz limit		0.158		0.164
		20 MHz limit		0.092		0.102
	5 mV/div	Full		0.207		0.222
		250 MHz limit		0.185		0.201
		20 MHz limit		0.116		0.136
	10 mV/div	Full		0.264		0.284
		250 MHz limit		0.251		0.272
		20 MHz limit		0.188		0.197
	20 mV/div	Full		0.422		0.436
		250 MHz limit		0.422		0.435
		20 MHz limit		0.347		0.347
	50 mV/div	Full		0.898		0.962
		250 MHz limit		1.00		0.982
		20 MHz limit		0.869		0.869
	100 mV/div	Full		1.91		2.08
		250 MHz limit		2.06		2.09
		20 MHz limit		1.74		1.74
	1 V/div	Full		21.1		18.92
		250 MHz limit		21.6		19.4
		20 MHz limit		17.4		17.4

<sup>5</sup> Full = the highest bandwidth setting you can select.

Random Noise, sample acquisition mode: 350 MHz models						
Performance checks			1 M $\Omega$		50 $\Omega$	
	V/div	Bandwidth <sup>5</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
Channel 2	1 mV/div	Full		0.188		0.181
		250 MHz limit		0.158		0.153
		20 MHz limit		0.088		0.091
	2 mV/div	Full		0.193		0.190
		250 MHz limit		0.158		0.164
		20 MHz limit		0.092		0.102
	5 mV/div	Full		0.207		0.222
		250 MHz limit		0.185		0.201
		20 MHz limit		0.116		0.136
	10 mV/div	Full		0.264		0.284
		250 MHz limit		0.251		0.272
		20 MHz limit		0.188		0.197
	20 mV/div	Full		0.422		0.436
		250 MHz limit		0.422		0.435
		20 MHz limit		0.347		0.347
	50 mV/div	Full		0.898		0.962
		250 MHz limit		1.00		0.982
		20 MHz limit		0.869		0.869
	100 mV/div	Full		1.91		2.08
		250 MHz limit		2.06		2.09
		20 MHz limit		1.74		1.74
	1 V/div	Full		21.1		18.92
		250 MHz limit		21.6		19.4
		20 MHz limit		17.4		17.4

<sup>5</sup> Full = the highest bandwidth setting you can select.

Random Noise, sample acquisition mode: 350 MHz models						
Performance checks			1 M $\Omega$		50 $\Omega$	
	V/div	Bandwidth <sup>5</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
Channel 3	1 mV/div	Full		0.188		0.181
		250 MHz limit		0.158		0.153
		20 MHz limit		0.088		0.091
	2 mV/div	Full		0.193		0.190
		250 MHz limit		0.158		0.164
		20 MHz limit		0.092		0.102
	5 mV/div	Full		0.207		0.222
		250 MHz limit		0.185		0.201
		20 MHz limit		0.116		0.136
	10 mV/div	Full		0.264		0.284
		250 MHz limit		0.251		0.272
		20 MHz limit		0.188		0.197
	20 mV/div	Full		0.422		0.436
		250 MHz limit		0.422		0.435
		20 MHz limit		0.347		0.347
	50 mV/div	Full		0.898		0.962
		250 MHz limit		1.00		0.982
		20 MHz limit		0.869		0.869
	100 mV/div	Full		1.91		2.08
		250 MHz limit		2.06		2.09
		20 MHz limit		1.74		1.74
	1 V/div	Full		21.1		18.92
		250 MHz limit		21.6		19.4
		20 MHz limit		17.4		17.4

<sup>5</sup> Full = the highest bandwidth setting you can select.

Random Noise, sample acquisition mode: 350 MHz models						
Performance checks			1 MΩ		50 Ω	
	V/div	Bandwidth <sup>5</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
Channel 4	1 mV/div	Full		0.188		0.181
		250 MHz limit		0.158		0.153
		20 MHz limit		0.088		0.091
	2 mV/div	Full		0.193		0.190
		250 MHz limit		0.158		0.164
		20 MHz limit		0.092		0.102
	5 mV/div	Full		0.207		0.222
		250 MHz limit		0.185		0.201
		20 MHz limit		0.116		0.136
	10 mV/div	Full		0.264		0.284
		250 MHz limit		0.251		0.272
		20 MHz limit		0.188		0.197
	20 mV/div	Full		0.422		0.436
		250 MHz limit		0.422		0.435
		20 MHz limit		0.347		0.347
	50 mV/div	Full		0.898		0.962
		250 MHz limit		1.00		0.982
		20 MHz limit		0.869		0.869
	100 mV/div	Full		1.91		2.08
		250 MHz limit		2.06		2.09
		20 MHz limit		1.74		1.74
	1 V/div	Full		21.1		18.92
		250 MHz limit		21.6		19.4
		20 MHz limit		17.4		17.4
350 MHz models (MSO56, MSO58)						

<sup>5</sup> Full = the highest bandwidth setting you can select.

Random Noise, sample acquisition mode: 350 MHz models						
Performance checks			1 M $\Omega$		50 $\Omega$	
	V/div	Bandwidth <sup>5</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
Channel 5	1 mV/div	Full		0.188		0.181
		250 MHz limit		0.158		0.153
		20 MHz limit		0.088		0.091
	2 mV/div	Full		0.193		0.190
		250 MHz limit		0.158		0.164
		20 MHz limit		0.092		0.102
	5 mV/div	Full		0.207		0.222
		250 MHz limit		0.185		0.201
		20 MHz limit		0.116		0.136
	10 mV/div	Full		0.264		0.284
		250 MHz limit		0.251		0.272
		20 MHz limit		0.188		0.197
	20 mV/div	Full		0.422		0.436
		250 MHz limit		0.422		0.435
		20 MHz limit		0.347		0.347
	50 mV/div	Full		0.898		0.962
		250 MHz limit		1.00		0.982
		20 MHz limit		0.869		0.869
	100 mV/div	Full		1.91		2.08
		250 MHz limit		2.06		2.09
		20 MHz limit		1.74		1.74
	1 V/div	Full		21.1		18.92
		250 MHz limit		21.6		19.4
		20 MHz limit		17.4		17.4

<sup>5</sup> Full = the highest bandwidth setting you can select.

Random Noise, sample acquisition mode: 350 MHz models						
Performance checks			1 MΩ		50 Ω	
	V/div	Bandwidth <sup>5</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
Channel 6	1 mV/div	Full		0.188		0.181
		250 MHz limit		0.158		0.153
		20 MHz limit		0.088		0.091
	2 mV/div	Full		0.193		0.190
		250 MHz limit		0.158		0.164
		20 MHz limit		0.092		0.102
	5 mV/div	Full		0.207		0.222
		250 MHz limit		0.185		0.201
		20 MHz limit		0.116		0.136
	10 mV/div	Full		0.264		0.284
		250 MHz limit		0.251		0.272
		20 MHz limit		0.188		0.197
	20 mV/div	Full		0.422		0.436
		250 MHz limit		0.422		0.435
		20 MHz limit		0.347		0.347
	50 mV/div	Full		0.898		0.962
		250 MHz limit		1.00		0.982
		20 MHz limit		0.869		0.869
	100 mV/div	Full		1.91		2.08
		250 MHz limit		2.06		2.09
		20 MHz limit		1.74		1.74
	1 V/div	Full		21.1		18.92
		250 MHz limit		21.6		19.4
		20 MHz limit		17.4		17.4
350 MHz models (MSO58)						

<sup>5</sup> Full = the highest bandwidth setting you can select.

Random Noise, sample acquisition mode: 350 MHz models						
Performance checks			1 M $\Omega$		50 $\Omega$	
	V/div	Bandwidth <sup>5</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
Channel 7	1 mV/div	Full		0.188		0.181
		250 MHz limit		0.158		0.153
		20 MHz limit		0.088		0.091
	2 mV/div	Full		0.193		0.190
		250 MHz limit		0.158		0.164
		20 MHz limit		0.092		0.102
	5 mV/div	Full		0.207		0.222
		250 MHz limit		0.185		0.201
		20 MHz limit		0.116		0.136
	10 mV/div	Full		0.264		0.284
		250 MHz limit		0.251		0.272
		20 MHz limit		0.188		0.197
	20 mV/div	Full		0.422		0.436
		250 MHz limit		0.422		0.435
		20 MHz limit		0.347		0.347
	50 mV/div	Full		0.898		0.962
		250 MHz limit		1.00		0.982
		20 MHz limit		0.869		0.869
	100 mV/div	Full		1.91		2.08
		250 MHz limit		2.06		2.09
		20 MHz limit		1.74		1.74
	1 V/div	Full		21.1		18.92
		250 MHz limit		21.6		19.4
		20 MHz limit		17.4		17.4

<sup>5</sup> Full = the highest bandwidth setting you can select.

Random Noise, sample acquisition mode: 350 MHz models						
Performance checks			1 M $\Omega$		50 $\Omega$	
	V/div	Bandwidth <sup>5</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
Channel 8	1 mV/div	Full		0.188		0.181
		250 MHz limit		0.158		0.153
		20 MHz limit		0.088		0.091
	2 mV/div	Full		0.193		0.190
		250 MHz limit		0.158		0.164
		20 MHz limit		0.092		0.102
	5 mV/div	Full		0.207		0.222
		250 MHz limit		0.185		0.201
		20 MHz limit		0.116		0.136
	10 mV/div	Full		0.264		0.284
		250 MHz limit		0.251		0.272
		20 MHz limit		0.188		0.197
	20 mV/div	Full		0.422		0.436
		250 MHz limit		0.422		0.435
		20 MHz limit		0.347		0.347
	50 mV/div	Full		0.898		0.962
		250 MHz limit		1.00		0.982
		20 MHz limit		0.869		0.869
	100 mV/div	Full		1.91		2.08
		250 MHz limit		2.06		2.09
		20 MHz limit		1.74		1.74
	1 V/div	Full		21.1		18.92
		250 MHz limit		21.6		19.4
		20 MHz limit		17.4		17.4

<sup>5</sup> Full = the highest bandwidth setting you can select.



## Random Noise, High Res mode test record

Random Noise, High Res mode: 2 GHz models						
Performance checks			1 M $\Omega$		50 $\Omega$	
	V/div	Bandwidth <sup>6</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
<b>2 GHz models (MSO54, MSO56, MSO58)</b>						
<b>Channel 1</b>	1 mV/div	Full		0.269		0.087
		250 MHz limit		0.152		0.087
		20 MHz limit		0.084		0.035
	2 mV/div	Full		0.290		0.125
		250 MHz limit		0.152		0.100
		20 MHz limit		0.086		0.037
	5 mV/div	Full		0.308		0.261
		250 MHz limit		0.172		0.140
		20 MHz limit		0.089		0.048
	10 mV/div	Full		0.359		0.356
		250 MHz limit		0.224		0.191
		20 MHz limit		0.108		0.073
	20 mV/div	Full		0.538		0.607
		250 MHz limit		0.360		0.325
		20 MHz limit		0.162		0.137
	50 mV/div	Full		1.19		1.43
		250 MHz limit		0.803		0.763
		20 MHz limit		0.351		0.327
	100 mV/div	Full		2.45		3.56
		250 MHz limit		1.76		1.91
		20 MHz limit		0.780		0.779
	1 V/div	Full		26.3		23.8
		250 MHz limit		18.9		14.0
		20 MHz limit		8.46		6.05

<sup>6</sup> Full = the highest bandwidth setting you can select.

Random Noise, High Res mode: 2 GHz models						
Performance checks			1 M $\Omega$		50 $\Omega$	
	V/div	Bandwidth <sup>6</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
Channel 2	1 mV/div	Full		0.269		0.087
		250 MHz limit		0.152		0.087
		20 MHz limit		0.084		0.035
	2 mV/div	Full		0.290		0.125
		250 MHz limit		0.152		0.100
		20 MHz limit		0.086		0.037
	5 mV/div	Full		0.308		0.261
		250 MHz limit		0.172		0.140
		20 MHz limit		0.089		0.048
	10 mV/div	Full		0.359		0.356
		250 MHz limit		0.224		0.191
		20 MHz limit		0.108		0.073
	20 mV/div	Full		0.538		0.607
		250 MHz limit		0.360		0.325
		20 MHz limit		0.162		0.137
	50 mV/div	Full		1.19		1.43
		250 MHz limit		0.803		0.763
		20 MHz limit		0.351		0.327
	100 mV/div	Full		2.45		3.56
		250 MHz limit		1.76		1.91
		20 MHz limit		0.780		0.779
	1 V/div	Full		26.3		23.8
		250 MHz limit		18.9		14.0
		20 MHz limit		8.46		6.05

<sup>6</sup> Full = the highest bandwidth setting you can select.

Random Noise, High Res mode: 2 GHz models						
Performance checks			1 M $\Omega$		50 $\Omega$	
	V/div	Bandwidth <sup>6</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
Channel 3	1 mV/div	Full		0.269		0.087
		250 MHz limit		0.152		0.087
		20 MHz limit		0.084		0.035
	2 mV/div	Full		0.290		0.125
		250 MHz limit		0.152		0.100
		20 MHz limit		0.086		0.037
	5 mV/div	Full		0.308		0.261
		250 MHz limit		0.172		0.140
		20 MHz limit		0.089		0.048
	10 mV/div	Full		0.359		0.356
		250 MHz limit		0.224		0.191
		20 MHz limit		0.108		0.073
	20 mV/div	Full		0.538		0.607
		250 MHz limit		0.360		0.325
		20 MHz limit		0.162		0.137
	50 mV/div	Full		1.19		1.43
		250 MHz limit		0.803		0.763
		20 MHz limit		0.351		0.327
	100 mV/div	Full		2.45		3.56
		250 MHz limit		1.76		1.91
		20 MHz limit		0.780		0.779
	1 V/div	Full		26.3		23.8
		250 MHz limit		18.9		14.0
		20 MHz limit		8.46		6.05

<sup>6</sup> Full = the highest bandwidth setting you can select.

Random Noise, High Res mode: 2 GHz models						
Performance checks			1 MΩ		50 Ω	
	V/div	Bandwidth <sup>6</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
Channel 4	1 mV/div	Full		0.269		0.087
		250 MHz limit		0.152		0.087
		20 MHz limit		0.084		0.035
	2 mV/div	Full		0.290		0.125
		250 MHz limit		0.152		0.100
		20 MHz limit		0.086		0.037
	5 mV/div	Full		0.308		0.261
		250 MHz limit		0.172		0.140
		20 MHz limit		0.089		0.048
	10 mV/div	Full		0.359		0.356
		250 MHz limit		0.224		0.191
		20 MHz limit		0.108		0.073
	20 mV/div	Full		0.538		0.607
		250 MHz limit		0.360		0.325
		20 MHz limit		0.162		0.137
	50 mV/div	Full		1.19		1.43
		250 MHz limit		0.803		0.763
		20 MHz limit		0.351		0.327
	100 mV/div	Full		2.45		3.56
		250 MHz limit		1.76		1.91
		20 MHz limit		0.780		0.779
	1 V/div	Full		26.3		23.8
		250 MHz limit		18.9		14.0
		20 MHz limit		8.46		6.05
2 GHz models (MSO56, MSO58)						

<sup>6</sup> Full = the highest bandwidth setting you can select.

Random Noise, High Res mode: 2 GHz models						
Performance checks			1 M $\Omega$		50 $\Omega$	
	V/div	Bandwidth <sup>6</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
Channel 5	1 mV/div	Full		0.269		0.087
		250 MHz limit		0.152		0.087
		20 MHz limit		0.084		0.035
	2 mV/div	Full		0.290		0.125
		250 MHz limit		0.152		0.100
		20 MHz limit		0.086		0.037
	5 mV/div	Full		0.308		0.261
		250 MHz limit		0.172		0.140
		20 MHz limit		0.089		0.048
	10 mV/div	Full		0.359		0.356
		250 MHz limit		0.224		0.191
		20 MHz limit		0.108		0.073
	20 mV/div	Full		0.538		0.607
		250 MHz limit		0.360		0.325
		20 MHz limit		0.162		0.137
	50 mV/div	Full		1.19		1.43
		250 MHz limit		0.803		0.763
		20 MHz limit		0.351		0.327
	100 mV/div	Full		2.45		3.56
		250 MHz limit		1.76		1.91
		20 MHz limit		0.780		0.779
	1 V/div	Full		26.3		23.8
		250 MHz limit		18.9		14.0
		20 MHz limit		8.46		6.05

<sup>6</sup> Full = the highest bandwidth setting you can select.

Random Noise, High Res mode: 2 GHz models						
Performance checks			1 MΩ		50 Ω	
	V/div	Bandwidth <sup>6</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
Channel 6	1 mV/div	Full		0.269		0.087
		250 MHz limit		0.152		0.087
		20 MHz limit		0.084		0.035
	2 mV/div	Full		0.290		0.125
		250 MHz limit		0.152		0.100
		20 MHz limit		0.086		0.037
	5 mV/div	Full		0.308		0.261
		250 MHz limit		0.172		0.140
		20 MHz limit		0.089		0.048
	10 mV/div	Full		0.359		0.356
		250 MHz limit		0.224		0.191
		20 MHz limit		0.108		0.073
	20 mV/div	Full		0.538		0.607
		250 MHz limit		0.360		0.325
		20 MHz limit		0.162		0.137
	50 mV/div	Full		1.19		1.43
		250 MHz limit		0.803		0.763
		20 MHz limit		0.351		0.327
	100 mV/div	Full		2.45		3.56
		250 MHz limit		1.76		1.91
		20 MHz limit		0.780		0.779
	1 V/div	Full		26.3		23.8
		250 MHz limit		18.9		14.0
		20 MHz limit		8.46		6.05
2 GHz models (MSO58)						

<sup>6</sup> Full = the highest bandwidth setting you can select.

Random Noise, High Res mode: 2 GHz models						
Performance checks			1 M $\Omega$		50 $\Omega$	
	V/div	Bandwidth <sup>6</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
Channel 7	1 mV/div	Full		0.269		0.087
		250 MHz limit		0.152		0.087
		20 MHz limit		0.084		0.035
	2 mV/div	Full		0.290		0.125
		250 MHz limit		0.152		0.100
		20 MHz limit		0.086		0.037
	5 mV/div	Full		0.308		0.261
		250 MHz limit		0.172		0.140
		20 MHz limit		0.089		0.048
	10 mV/div	Full		0.359		0.356
		250 MHz limit		0.224		0.191
		20 MHz limit		0.108		0.073
	20 mV/div	Full		0.538		0.607
		250 MHz limit		0.360		0.325
		20 MHz limit		0.162		0.137
	50 mV/div	Full		1.19		1.43
		250 MHz limit		0.803		0.763
		20 MHz limit		0.351		0.327
	100 mV/div	Full		2.45		3.56
		250 MHz limit		1.76		1.91
		20 MHz limit		0.780		0.779
	1 V/div	Full		26.3		23.8
		250 MHz limit		18.9		14.0
		20 MHz limit		8.46		6.05

<sup>6</sup> Full = the highest bandwidth setting you can select.

Random Noise, High Res mode: 2 GHz models						
Performance checks			1 M $\Omega$		50 $\Omega$	
	V/div	Bandwidth <sup>6</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
Channel 8	1 mV/div	Full		0.269		0.087
		250 MHz limit		0.152		0.087
		20 MHz limit		0.084		0.035
	2 mV/div	Full		0.290		0.125
		250 MHz limit		0.152		0.100
		20 MHz limit		0.086		0.037
	5 mV/div	Full		0.308		0.261
		250 MHz limit		0.172		0.140
		20 MHz limit		0.089		0.048
	10 mV/div	Full		0.359		0.356
		250 MHz limit		0.224		0.191
		20 MHz limit		0.108		0.073
	20 mV/div	Full		0.538		0.607
		250 MHz limit		0.360		0.325
		20 MHz limit		0.162		0.137
	50 mV/div	Full		1.19		1.43
		250 MHz limit		0.803		0.763
		20 MHz limit		0.351		0.327
	100 mV/div	Full		2.45		3.56
		250 MHz limit		1.76		1.91
		20 MHz limit		0.780		0.779
	1 V/div	Full		26.3		23.8
		250 MHz limit		18.9		14.0
		20 MHz limit		8.46		6.05

<sup>6</sup> Full = the highest bandwidth setting you can select.



Random Noise, High Res mode: 1 GHz models						
Performance checks			1 M $\Omega$		50 $\Omega$	
	V/div	Bandwidth <sup>7</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
1 GHz models (MSO54, MSO56, MSO58, MSO58LP)						
Channel 1	1 mV/div	Full		0.245		0.329
		250 MHz limit		0.153		0.152
		20 MHz limit		0.084		0.091
	2 mV/div	Full		0.251		0.330
		250 MHz limit		0.156		0.157
		20 MHz limit		0.085		0.091
	5 mV/div	Full		0.254		0.339
		250 MHz limit		0.169		0.172
		20 MHz limit		0.090		0.094
	10 mV/div	Full		0.274		0.367
		250 MHz limit		0.200		0.205
		20 MHz limit		0.101		0.103
	20 mV/div	Full		0.348		0.462
		250 MHz limit		0.289		0.288
		20 MHz limit		0.135		0.132
	50 mV/div	Full		0.634		0.876
		250 MHz limit		0.621		0.595
		20 MHz limit		0.268		0.254
	100 mV/div	Full		1.51		2.09
		250 MHz limit		1.36		1.34
		20 MHz limit		0.615		0.601
	1 V/div	Full		17.6		16.8
		250 MHz limit		14.4		11.6
		20 MHz limit		7.08		4.88

<sup>7</sup> Full = the highest bandwidth setting you can select.

Random Noise, High Res mode: 1 GHz models						
Performance checks			1 M $\Omega$		50 $\Omega$	
	V/div	Bandwidth <sup>7</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
Channel 2	1 mV/div	Full		0.245		0.329
		250 MHz limit		0.153		0.152
		20 MHz limit		0.084		0.091
	2 mV/div	Full		0.251		0.330
		250 MHz limit		0.156		0.157
		20 MHz limit		0.085		0.091
	5 mV/div	Full		0.254		0.339
		250 MHz limit		0.169		0.172
		20 MHz limit		0.090		0.094
	10 mV/div	Full		0.274		0.367
		250 MHz limit		0.200		0.205
		20 MHz limit		0.101		0.103
	20 mV/div	Full		0.348		0.462
		250 MHz limit		0.289		0.288
		20 MHz limit		0.135		0.132
	50 mV/div	Full		0.634		0.876
		250 MHz limit		0.621		0.595
		20 MHz limit		0.268		0.254
	100 mV/div	Full		1.51		2.09
		250 MHz limit		1.36		1.34
		20 MHz limit		0.615		0.601
	1 V/div	Full		17.6		16.8
		250 MHz limit		14.4		11.6
		20 MHz limit		7.08		4.88

<sup>7</sup> Full = the highest bandwidth setting you can select.

Random Noise, High Res mode: 1 GHz models						
Performance checks			1 M $\Omega$		50 $\Omega$	
	V/div	Bandwidth <sup>7</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
Channel 3	1 mV/div	Full		0.245		0.329
		250 MHz limit		0.153		0.152
		20 MHz limit		0.084		0.091
	2 mV/div	Full		0.251		0.330
		250 MHz limit		0.156		0.157
		20 MHz limit		0.085		0.091
	5 mV/div	Full		0.254		0.339
		250 MHz limit		0.169		0.172
		20 MHz limit		0.090		0.094
	10 mV/div	Full		0.274		0.367
		250 MHz limit		0.200		0.205
		20 MHz limit		0.101		0.103
	20 mV/div	Full		0.348		0.462
		250 MHz limit		0.289		0.288
		20 MHz limit		0.135		0.132
	50 mV/div	Full		0.634		0.876
		250 MHz limit		0.621		0.595
		20 MHz limit		0.268		0.254
	100 mV/div	Full		1.51		2.09
		250 MHz limit		1.36		1.34
		20 MHz limit		0.615		0.601
	1 V/div	Full		17.6		16.8
		250 MHz limit		14.4		11.6
		20 MHz limit		7.08		4.88

<sup>7</sup> Full = the highest bandwidth setting you can select.

Random Noise, High Res mode: 1 GHz models						
Performance checks			1 MΩ		50 Ω	
	V/div	Bandwidth <sup>7</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
Channel 4	1 mV/div	Full		0.245		0.329
		250 MHz limit		0.153		0.152
		20 MHz limit		0.084		0.091
	2 mV/div	Full		0.251		0.330
		250 MHz limit		0.156		0.157
		20 MHz limit		0.085		0.091
	5 mV/div	Full		0.254		0.339
		250 MHz limit		0.169		0.172
		20 MHz limit		0.090		0.094
	10 mV/div	Full		0.274		0.367
		250 MHz limit		0.200		0.205
		20 MHz limit		0.101		0.103
	20 mV/div	Full		0.348		0.462
		250 MHz limit		0.289		0.288
		20 MHz limit		0.135		0.132
	50 mV/div	Full		0.634		0.876
		250 MHz limit		0.621		0.595
		20 MHz limit		0.268		0.254
	100 mV/div	Full		1.51		2.09
		250 MHz limit		1.36		1.34
		20 MHz limit		0.615		0.601
	1 V/div	Full		17.6		16.8
		250 MHz limit		14.4		11.6
		20 MHz limit		7.08		4.88
1 GHz models (MSO56, MSO58, MSO58LP)						

<sup>7</sup> Full = the highest bandwidth setting you can select.

Random Noise, High Res mode: 1 GHz models						
Performance checks			1 M $\Omega$		50 $\Omega$	
	V/div	Bandwidth <sup>7</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
Channel 5	1 mV/div	Full		0.245		0.329
		250 MHz limit		0.153		0.152
		20 MHz limit		0.084		0.091
	2 mV/div	Full		0.251		0.330
		250 MHz limit		0.156		0.157
		20 MHz limit		0.085		0.091
	5 mV/div	Full		0.254		0.339
		250 MHz limit		0.169		0.172
		20 MHz limit		0.090		0.094
	10 mV/div	Full		0.274		0.367
		250 MHz limit		0.200		0.205
		20 MHz limit		0.101		0.103
	20 mV/div	Full		0.348		0.462
		250 MHz limit		0.289		0.288
		20 MHz limit		0.135		0.132
	50 mV/div	Full		0.634		0.876
		250 MHz limit		0.621		0.595
		20 MHz limit		0.268		0.254
	100 mV/div	Full		1.51		2.09
		250 MHz limit		1.36		1.34
		20 MHz limit		0.615		0.601
	1 V/div	Full		17.6		16.8
		250 MHz limit		14.4		11.6
		20 MHz limit		7.08		4.88

<sup>7</sup> Full = the highest bandwidth setting you can select.

Random Noise, High Res mode: 1 GHz models						
Performance checks			1 MΩ		50 Ω	
	V/div	Bandwidth <sup>7</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
Channel 6	1 mV/div	Full		0.245		0.329
		250 MHz limit		0.153		0.152
		20 MHz limit		0.084		0.091
	2 mV/div	Full		0.251		0.330
		250 MHz limit		0.156		0.157
		20 MHz limit		0.085		0.091
	5 mV/div	Full		0.254		0.339
		250 MHz limit		0.169		0.172
		20 MHz limit		0.090		0.094
	10 mV/div	Full		0.274		0.367
		250 MHz limit		0.200		0.205
		20 MHz limit		0.101		0.103
	20 mV/div	Full		0.348		0.462
		250 MHz limit		0.289		0.288
		20 MHz limit		0.135		0.132
	50 mV/div	Full		0.634		0.876
		250 MHz limit		0.621		0.595
		20 MHz limit		0.268		0.254
	100 mV/div	Full		1.51		2.09
		250 MHz limit		1.36		1.34
		20 MHz limit		0.615		0.601
	1 V/div	Full		17.6		16.8
		250 MHz limit		14.4		11.6
		20 MHz limit		7.08		4.88
1 GHz models (MSO58, MSO58LP)						

<sup>7</sup> Full = the highest bandwidth setting you can select.

Random Noise, High Res mode: 1 GHz models						
Performance checks			1 M $\Omega$		50 $\Omega$	
	V/div	Bandwidth <sup>7</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
Channel 7	1 mV/div	Full		0.245		0.329
		250 MHz limit		0.153		0.152
		20 MHz limit		0.084		0.091
	2 mV/div	Full		0.251		0.330
		250 MHz limit		0.156		0.157
		20 MHz limit		0.085		0.091
	5 mV/div	Full		0.254		0.339
		250 MHz limit		0.169		0.172
		20 MHz limit		0.090		0.094
	10 mV/div	Full		0.274		0.367
		250 MHz limit		0.200		0.205
		20 MHz limit		0.101		0.103
	20 mV/div	Full		0.348		0.462
		250 MHz limit		0.289		0.288
		20 MHz limit		0.135		0.132
	50 mV/div	Full		0.634		0.876
		250 MHz limit		0.621		0.595
		20 MHz limit		0.268		0.254
	100 mV/div	Full		1.51		2.09
		250 MHz limit		1.36		1.34
		20 MHz limit		0.615		0.601
	1 V/div	Full		17.6		16.8
		250 MHz limit		14.4		11.6
		20 MHz limit		7.08		4.88

<sup>7</sup> Full = the highest bandwidth setting you can select.

Random Noise, High Res mode: 1 GHz models						
Performance checks			1 M $\Omega$		50 $\Omega$	
	V/div	Bandwidth <sup>7</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
Channel 8	1 mV/div	Full		0.245		0.329
		250 MHz limit		0.153		0.152
		20 MHz limit		0.084		0.091
	2 mV/div	Full		0.251		0.330
		250 MHz limit		0.156		0.157
		20 MHz limit		0.085		0.091
	5 mV/div	Full		0.254		0.339
		250 MHz limit		0.169		0.172
		20 MHz limit		0.090		0.094
	10 mV/div	Full		0.274		0.367
		250 MHz limit		0.200		0.205
		20 MHz limit		0.101		0.103
	20 mV/div	Full		0.348		0.462
		250 MHz limit		0.289		0.288
		20 MHz limit		0.135		0.132
	50 mV/div	Full		0.634		0.876
		250 MHz limit		0.621		0.595
		20 MHz limit		0.268		0.254
	100 mV/div	Full		1.51		2.09
		250 MHz limit		1.36		1.34
		20 MHz limit		0.615		0.601
	1 V/div	Full		17.6		16.8
		250 MHz limit		14.4		11.6
		20 MHz limit		7.08		4.88

<sup>7</sup> Full = the highest bandwidth setting you can select.



Random Noise, High Res mode: 500 MHz models						
Performance checks			1 M $\Omega$		50 $\Omega$	
	V/div	Bandwidth <sup>8</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
500 MHz models (MSO54, MSO56, MSO58)						
Channel 1	1 mV/div	Full		0.245		0.256
		250 MHz limit		0.153		0.152
		20 MHz limit		0.084		0.091
	2 mV/div	Full		0.251		0.256
		250 MHz limit		0.156		0.157
		20 MHz limit		0.085		0.091
	5 mV/div	Full		0.254		0.262
		250 MHz limit		0.169		0.172
		20 MHz limit		0.090		0.094
	10 mV/div	Full		0.274		0.282
		250 MHz limit		0.200		0.205
		20 MHz limit		0.101		0.103
	20 mV/div	Full		0.348		0.354
		250 MHz limit		0.289		0.288
		20 MHz limit		0.135		0.132
	50 mV/div	Full		0.634		0.667
		250 MHz limit		0.621		0.595
		20 MHz limit		0.268		0.254
	100 mV/div	Full		1.51		1.60
		250 MHz limit		1.36		1.34
		20 MHz limit		0.615		0.601
	1 V/div	Full		17.6		12.8
		250 MHz limit		14.4		11.6
		20 MHz limit		7.08		4.88

<sup>8</sup> Full = the highest bandwidth setting you can select.

Random Noise, High Res mode: 500 MHz models						
Performance checks			1 M $\Omega$		50 $\Omega$	
	V/div	Bandwidth <sup>8</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
Channel 2	1 mV/div	Full		0.245		0.256
		250 MHz limit		0.153		0.152
		20 MHz limit		0.084		0.091
	2 mV/div	Full		0.251		0.256
		250 MHz limit		0.156		0.157
		20 MHz limit		0.085		0.091
	5 mV/div	Full		0.254		0.262
		250 MHz limit		0.169		0.172
		20 MHz limit		0.090		0.094
	10 mV/div	Full		0.274		0.282
		250 MHz limit		0.200		0.205
		20 MHz limit		0.101		0.103
	20 mV/div	Full		0.348		0.354
		250 MHz limit		0.289		0.288
		20 MHz limit		0.135		0.132
	50 mV/div	Full		0.634		0.667
		250 MHz limit		0.621		0.595
		20 MHz limit		0.268		0.254
	100 mV/div	Full		1.51		1.60
		250 MHz limit		1.36		1.34
		20 MHz limit		0.615		0.601
	1 V/div	Full		17.6		12.8
		250 MHz limit		14.4		11.6
		20 MHz limit		7.08		4.88

<sup>8</sup> Full = the highest bandwidth setting you can select.

Random Noise, High Res mode: 500 MHz models						
Performance checks			1 M $\Omega$		50 $\Omega$	
	V/div	Bandwidth <sup>8</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
Channel 3	1 mV/div	Full		0.245		0.256
		250 MHz limit		0.153		0.152
		20 MHz limit		0.084		0.091
	2 mV/div	Full		0.251		0.256
		250 MHz limit		0.156		0.157
		20 MHz limit		0.085		0.091
	5 mV/div	Full		0.254		0.262
		250 MHz limit		0.169		0.172
		20 MHz limit		0.090		0.094
	10 mV/div	Full		0.274		0.282
		250 MHz limit		0.200		0.205
		20 MHz limit		0.101		0.103
	20 mV/div	Full		0.348		0.354
		250 MHz limit		0.289		0.288
		20 MHz limit		0.135		0.132
	50 mV/div	Full		0.634		0.667
		250 MHz limit		0.621		0.595
		20 MHz limit		0.268		0.254
	100 mV/div	Full		1.51		1.60
		250 MHz limit		1.36		1.34
		20 MHz limit		0.615		0.601
	1 V/div	Full		17.6		12.8
		250 MHz limit		14.4		11.6
		20 MHz limit		7.08		4.88

<sup>8</sup> Full = the highest bandwidth setting you can select.

Random Noise, High Res mode: 500 MHz models						
Performance checks			1 MΩ		50 Ω	
	V/div	Bandwidth <sup>8</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
Channel 4	1 mV/div	Full		0.245		0.256
		250 MHz limit		0.153		0.152
		20 MHz limit		0.084		0.091
	2 mV/div	Full		0.251		0.256
		250 MHz limit		0.156		0.157
		20 MHz limit		0.085		0.091
	5 mV/div	Full		0.254		0.262
		250 MHz limit		0.169		0.172
		20 MHz limit		0.090		0.094
	10 mV/div	Full		0.274		0.282
		250 MHz limit		0.200		0.205
		20 MHz limit		0.101		0.103
	20 mV/div	Full		0.348		0.354
		250 MHz limit		0.289		0.288
		20 MHz limit		0.135		0.132
	50 mV/div	Full		0.634		0.667
		250 MHz limit		0.621		0.595
		20 MHz limit		0.268		0.254
	100 mV/div	Full		1.51		1.60
		250 MHz limit		1.36		1.34
		20 MHz limit		0.615		0.601
	1 V/div	Full		17.6		12.8
		250 MHz limit		14.4		11.6
		20 MHz limit		7.08		4.88
500 MHz models (MSO56, MSO58)						

<sup>8</sup> Full = the highest bandwidth setting you can select.

Random Noise, High Res mode: 500 MHz models						
Performance checks			1 M $\Omega$		50 $\Omega$	
	V/div	Bandwidth <sup>8</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
Channel 5	1 mV/div	Full		0.245		0.256
		250 MHz limit		0.153		0.152
		20 MHz limit		0.084		0.091
	2 mV/div	Full		0.251		0.256
		250 MHz limit		0.156		0.157
		20 MHz limit		0.085		0.091
	5 mV/div	Full		0.254		0.262
		250 MHz limit		0.169		0.172
		20 MHz limit		0.090		0.094
	10 mV/div	Full		0.274		0.282
		250 MHz limit		0.200		0.205
		20 MHz limit		0.101		0.103
	20 mV/div	Full		0.348		0.354
		250 MHz limit		0.289		0.288
		20 MHz limit		0.135		0.132
	50 mV/div	Full		0.634		0.667
		250 MHz limit		0.621		0.595
		20 MHz limit		0.268		0.254
	100 mV/div	Full		1.51		1.60
		250 MHz limit		1.36		1.34
		20 MHz limit		0.615		0.601
	1 V/div	Full		17.6		12.8
		250 MHz limit		14.4		11.6
		20 MHz limit		7.08		4.88

<sup>8</sup> Full = the highest bandwidth setting you can select.

Random Noise, High Res mode: 500 MHz models						
Performance checks			1 MΩ		50 Ω	
	V/div	Bandwidth <sup>8</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
Channel 6	1 mV/div	Full		0.245		0.256
		250 MHz limit		0.153		0.152
		20 MHz limit		0.084		0.091
	2 mV/div	Full		0.251		0.256
		250 MHz limit		0.156		0.157
		20 MHz limit		0.085		0.091
	5 mV/div	Full		0.254		0.262
		250 MHz limit		0.169		0.172
		20 MHz limit		0.090		0.094
	10 mV/div	Full		0.274		0.282
		250 MHz limit		0.200		0.205
		20 MHz limit		0.101		0.103
	20 mV/div	Full		0.348		0.354
		250 MHz limit		0.289		0.288
		20 MHz limit		0.135		0.132
	50 mV/div	Full		0.634		0.667
		250 MHz limit		0.621		0.595
		20 MHz limit		0.268		0.254
	100 mV/div	Full		1.51		1.60
		250 MHz limit		1.36		1.34
		20 MHz limit		0.615		0.601
	1 V/div	Full		17.6		12.8
		250 MHz limit		14.4		11.6
		20 MHz limit		7.08		4.88
500 MHz models (MSO58)						

<sup>8</sup> Full = the highest bandwidth setting you can select.

Random Noise, High Res mode: 500 MHz models						
Performance checks			1 M $\Omega$		50 $\Omega$	
	V/div	Bandwidth <sup>8</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
Channel 7	1 mV/div	Full		0.245		0.256
		250 MHz limit		0.153		0.152
		20 MHz limit		0.084		0.091
	2 mV/div	Full		0.251		0.256
		250 MHz limit		0.156		0.157
		20 MHz limit		0.085		0.091
	5 mV/div	Full		0.254		0.262
		250 MHz limit		0.169		0.172
		20 MHz limit		0.090		0.094
	10 mV/div	Full		0.274		0.282
		250 MHz limit		0.200		0.205
		20 MHz limit		0.101		0.103
	20 mV/div	Full		0.348		0.354
		250 MHz limit		0.289		0.288
		20 MHz limit		0.135		0.132
	50 mV/div	Full		0.634		0.667
		250 MHz limit		0.621		0.595
		20 MHz limit		0.268		0.254
	100 mV/div	Full		1.51		1.60
		250 MHz limit		1.36		1.34
		20 MHz limit		0.615		0.601
	1 V/div	Full		17.6		12.8
		250 MHz limit		14.4		11.6
		20 MHz limit		7.08		4.88

<sup>8</sup> Full = the highest bandwidth setting you can select.

Random Noise, High Res mode: 500 MHz models						
Performance checks			1 M $\Omega$		50 $\Omega$	
	V/div	Bandwidth <sup>8</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
Channel 8	1 mV/div	Full		0.245		0.256
		250 MHz limit		0.153		0.152
		20 MHz limit		0.084		0.091
	2 mV/div	Full		0.251		0.256
		250 MHz limit		0.156		0.157
		20 MHz limit		0.085		0.091
	5 mV/div	Full		0.254		0.262
		250 MHz limit		0.169		0.172
		20 MHz limit		0.090		0.094
	10 mV/div	Full		0.274		0.282
		250 MHz limit		0.200		0.205
		20 MHz limit		0.101		0.103
	20 mV/div	Full		0.348		0.354
		250 MHz limit		0.289		0.288
		20 MHz limit		0.135		0.132
	50 mV/div	Full		0.634		0.667
		250 MHz limit		0.621		0.595
		20 MHz limit		0.268		0.254
	100 mV/div	Full		1.51		1.60
		250 MHz limit		1.36		1.34
		20 MHz limit		0.615		0.601
	1 V/div	Full		17.6		12.8
		250 MHz limit		14.4		11.6
		20 MHz limit		7.08		4.88

<sup>8</sup> Full = the highest bandwidth setting you can select.



Random Noise, High Res mode: 350 MHz models						
Performance checks			1 M $\Omega$		50 $\Omega$	
	V/div	Bandwidth <sup>9</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
350 MHz models (MSO54, MSO56, MSO58)						
Channel 1	1 mV/div	Full		0.184		0.329
		250 MHz limit		0.153		0.152
		20 MHz limit		0.084		0.091
	2 mV/div	Full		0.188		0.185
		250 MHz limit		0.156		0.157
		20 MHz limit		0.085		0.091
	5 mV/div	Full		0.197		0.195
		250 MHz limit		0.169		0.172
		20 MHz limit		0.090		0.094
	10 mV/div	Full		0.216		0.218
		250 MHz limit		0.200		0.205
		20 MHz limit		0.101		0.103
	20 mV/div	Full		0.277		0.287
		250 MHz limit		0.289		0.288
		20 MHz limit		0.135		0.132
	50 mV/div	Full		0.530		0.564
		250 MHz limit		0.621		0.595
		20 MHz limit		0.268		0.254
	100 mV/div	Full		1.25		1.31
		250 MHz limit		1.36		1.34
		20 MHz limit		0.615		0.601
	1 V/div	Full		13.7		10.9
		250 MHz limit		14.4		11.6
		20 MHz limit		7.08		4.88

<sup>9</sup> Full = the highest bandwidth setting you can select.

Random Noise, High Res mode: 350 MHz models						
Performance checks			1 M $\Omega$		50 $\Omega$	
	V/div	Bandwidth <sup>9</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
Channel 2	1 mV/div	Full		0.184		0.329
		250 MHz limit		0.153		0.152
		20 MHz limit		0.084		0.091
	2 mV/div	Full		0.188		0.185
		250 MHz limit		0.156		0.157
		20 MHz limit		0.085		0.091
	5 mV/div	Full		0.197		0.195
		250 MHz limit		0.169		0.172
		20 MHz limit		0.090		0.094
	10 mV/div	Full		0.216		0.218
		250 MHz limit		0.200		0.205
		20 MHz limit		0.101		0.103
	20 mV/div	Full		0.277		0.287
		250 MHz limit		0.289		0.288
		20 MHz limit		0.135		0.132
	50 mV/div	Full		0.530		0.564
		250 MHz limit		0.621		0.595
		20 MHz limit		0.268		0.254
	100 mV/div	Full		1.25		1.31
		250 MHz limit		1.36		1.34
		20 MHz limit		0.615		0.601
	1 V/div	Full		13.7		10.9
		250 MHz limit		14.4		11.6
		20 MHz limit		7.08		4.88

<sup>9</sup> Full = the highest bandwidth setting you can select.

Random Noise, High Res mode: 350 MHz models						
Performance checks			1 M $\Omega$		50 $\Omega$	
	V/div	Bandwidth <sup>9</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
Channel 3	1 mV/div	Full		0.184		0.329
		250 MHz limit		0.153		0.152
		20 MHz limit		0.084		0.091
	2 mV/div	Full		0.188		0.185
		250 MHz limit		0.156		0.157
		20 MHz limit		0.085		0.091
	5 mV/div	Full		0.197		0.195
		250 MHz limit		0.169		0.172
		20 MHz limit		0.090		0.094
	10 mV/div	Full		0.216		0.218
		250 MHz limit		0.200		0.205
		20 MHz limit		0.101		0.103
	20 mV/div	Full		0.277		0.287
		250 MHz limit		0.289		0.288
		20 MHz limit		0.135		0.132
	50 mV/div	Full		0.530		0.564
		250 MHz limit		0.621		0.595
		20 MHz limit		0.268		0.254
	100 mV/div	Full		1.25		1.31
		250 MHz limit		1.36		1.34
		20 MHz limit		0.615		0.601
	1 V/div	Full		13.7		10.9
		250 MHz limit		14.4		11.6
		20 MHz limit		7.08		4.88

<sup>9</sup> Full = the highest bandwidth setting you can select.

Random Noise, High Res mode: 350 MHz models						
Performance checks			1 MΩ		50 Ω	
	V/div	Bandwidth <sup>9</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
Channel 4	1 mV/div	Full		0.184		0.329
		250 MHz limit		0.153		0.152
		20 MHz limit		0.084		0.091
	2 mV/div	Full		0.188		0.185
		250 MHz limit		0.156		0.157
		20 MHz limit		0.085		0.091
	5 mV/div	Full		0.197		0.195
		250 MHz limit		0.169		0.172
		20 MHz limit		0.090		0.094
	10 mV/div	Full		0.216		0.218
		250 MHz limit		0.200		0.205
		20 MHz limit		0.101		0.103
	20 mV/div	Full		0.277		0.287
		250 MHz limit		0.289		0.288
		20 MHz limit		0.135		0.132
	50 mV/div	Full		0.530		0.564
		250 MHz limit		0.621		0.595
		20 MHz limit		0.268		0.254
	100 mV/div	Full		1.25		1.31
		250 MHz limit		1.36		1.34
		20 MHz limit		0.615		0.601
	1 V/div	Full		13.7		10.9
		250 MHz limit		14.4		11.6
		20 MHz limit		7.08		4.88
350 MHz models (MSO56, MSO58)						

<sup>9</sup> Full = the highest bandwidth setting you can select.

Random Noise, High Res mode: 350 MHz models						
Performance checks			1 M $\Omega$		50 $\Omega$	
	V/div	Bandwidth <sup>9</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
Channel 5	1 mV/div	Full		0.184		0.329
		250 MHz limit		0.153		0.152
		20 MHz limit		0.084		0.091
	2 mV/div	Full		0.188		0.185
		250 MHz limit		0.156		0.157
		20 MHz limit		0.085		0.091
	5 mV/div	Full		0.197		0.195
		250 MHz limit		0.169		0.172
		20 MHz limit		0.090		0.094
	10 mV/div	Full		0.216		0.218
		250 MHz limit		0.200		0.205
		20 MHz limit		0.101		0.103
	20 mV/div	Full		0.277		0.287
		250 MHz limit		0.289		0.288
		20 MHz limit		0.135		0.132
	50 mV/div	Full		0.530		0.564
		250 MHz limit		0.621		0.595
		20 MHz limit		0.268		0.254
	100 mV/div	Full		1.25		1.31
		250 MHz limit		1.36		1.34
		20 MHz limit		0.615		0.601
	1 V/div	Full		13.7		10.9
		250 MHz limit		14.4		11.6
		20 MHz limit		7.08		4.88

<sup>9</sup> Full = the highest bandwidth setting you can select.

Random Noise, High Res mode: 350 MHz models						
Performance checks			1 MΩ		50 Ω	
	V/div	Bandwidth <sup>9</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
Channel 6	1 mV/div	Full		0.184		0.329
		250 MHz limit		0.153		0.152
		20 MHz limit		0.084		0.091
	2 mV/div	Full		0.188		0.185
		250 MHz limit		0.156		0.157
		20 MHz limit		0.085		0.091
	5 mV/div	Full		0.197		0.195
		250 MHz limit		0.169		0.172
		20 MHz limit		0.090		0.094
	10 mV/div	Full		0.216		0.218
		250 MHz limit		0.200		0.205
		20 MHz limit		0.101		0.103
	20 mV/div	Full		0.277		0.287
		250 MHz limit		0.289		0.288
		20 MHz limit		0.135		0.132
	50 mV/div	Full		0.530		0.564
		250 MHz limit		0.621		0.595
		20 MHz limit		0.268		0.254
	100 mV/div	Full		1.25		1.31
		250 MHz limit		1.36		1.34
		20 MHz limit		0.615		0.601
	1 V/div	Full		13.7		10.9
		250 MHz limit		14.4		11.6
		20 MHz limit		7.08		4.88
350 MHz models (MSO58)						

<sup>9</sup> Full = the highest bandwidth setting you can select.

Random Noise, High Res mode: 350 MHz models						
Performance checks			1 M $\Omega$		50 $\Omega$	
	V/div	Bandwidth <sup>9</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
Channel 7	1 mV/div	Full		0.184		0.329
		250 MHz limit		0.153		0.152
		20 MHz limit		0.084		0.091
	2 mV/div	Full		0.188		0.185
		250 MHz limit		0.156		0.157
		20 MHz limit		0.085		0.091
	5 mV/div	Full		0.197		0.195
		250 MHz limit		0.169		0.172
		20 MHz limit		0.090		0.094
	10 mV/div	Full		0.216		0.218
		250 MHz limit		0.200		0.205
		20 MHz limit		0.101		0.103
	20 mV/div	Full		0.277		0.287
		250 MHz limit		0.289		0.288
		20 MHz limit		0.135		0.132
	50 mV/div	Full		0.530		0.564
		250 MHz limit		0.621		0.595
		20 MHz limit		0.268		0.254
	100 mV/div	Full		1.25		1.31
		250 MHz limit		1.36		1.34
		20 MHz limit		0.615		0.601
	1 V/div	Full		13.7		10.9
		250 MHz limit		14.4		11.6
		20 MHz limit		7.08		4.88

<sup>9</sup> Full = the highest bandwidth setting you can select.

Random Noise, High Res mode: 350 MHz models						
Performance checks			1 M $\Omega$		50 $\Omega$	
	V/div	Bandwidth <sup>9</sup>	Test result (mV)	High limit (mV)	Test result (mV)	High limit (mV)
Channel 8	1 mV/div	Full		0.184		0.329
		250 MHz limit		0.153		0.152
		20 MHz limit		0.084		0.091
	2 mV/div	Full		0.188		0.185
		250 MHz limit		0.156		0.157
		20 MHz limit		0.085		0.091
	5 mV/div	Full		0.197		0.195
		250 MHz limit		0.169		0.172
		20 MHz limit		0.090		0.094
	10 mV/div	Full		0.216		0.218
		250 MHz limit		0.200		0.205
		20 MHz limit		0.101		0.103
	20 mV/div	Full		0.277		0.287
		250 MHz limit		0.289		0.288
		20 MHz limit		0.135		0.132
	50 mV/div	Full		0.530		0.564
		250 MHz limit		0.621		0.595
		20 MHz limit		0.268		0.254
	100 mV/div	Full		1.25		1.31
		250 MHz limit		1.36		1.34
		20 MHz limit		0.615		0.601
	1 V/div	Full		13.7		10.9
		250 MHz limit		14.4		11.6
		20 MHz limit		7.08		4.88

### Long term sample rate through AFG DC offset accuracy test records

Long Term Sample Rate			
Performance checks	Low limit	Test result	High limit
Long Term Sample Rate	-2 divisions		+2 divisions

Delta Time Measurement Accuracy, 2 GHz models	
Performance checks	
All 2 GHz models (MSO54, MSO56, MSO58)	

<sup>9</sup> Full = the highest bandwidth setting you can select.



Delta Time Measurement Accuracy, 2 GHz models					
Channel 1	Sample rate = 25 GS/s, 10 ns/Div, Sample mode				
	V/Div	Source V <sub>pp</sub>	Source freq	Test result	High limit
	5 mV 1.5 GHz BW	40 mV	847.5 MHz		6.17 ps
	10 mV 2 GHz BW	80 mV	1.13 GHz		3.33 ps
	20 mV 2 GHz BW	160 mV	1.13 GHz		2.77 ps
	50 mV 2 GHz BW	400 mV	1.13 GHz		2.64 ps
	Sample rate = 25 GS/s, 10 ns/Div, High Res mode				
	5 mV 1 GHz BW	40 mV	565 MHz		5.79 ps
	10 mV 1 GHz BW	80 mV	565 MHz		4.125 ps
	20 mV 1 GHz BW	160 mV	565 MHz		3.6 ps
	50 mV 1 GHz BW	400 mV	565 MHz		3.42 ps
Channel 2	Sample rate = 25 GS/s, 10 ns/Div, Sample mode				
	5 mV 1.5 GHz BW	40 mV	847.5 MHz		6.17 ps
	10 mV 2 GHz BW	80 mV	1.13 GHz		3.33 ps
	20 mV 2 GHz BW	160 mV	1.13 GHz		2.77 ps
	50 mV 2 GHz BW	400 mV	1.13 GHz		2.64 ps
	Sample rate = 25 GS/s, 10 ns/Div, High Res mode				
	5 mV 1 GHz BW	40 mV	565 MHz		5.79 ps
	10 mV 1 GHz BW	80 mV	565 MHz		4.125 ps
	20 mV 1 GHz BW	160 mV	565 MHz		3.6 ps
	50 mV 1 GHz BW	400 mV	565 MHz		3.42 ps

Delta Time Measurement Accuracy, 2 GHz models					
Channel 3	Sample rate = 25 GS/s, 10 ns/Div, Sample mode				
	5 mV 1.5 GHz BW	40 mV	847.5 MHz		6.17 ps
	10 mV 2 GHz BW	80 mV	1.13 GHz		3.33 ps
	20 mV 2 GHz BW	160 mV	1.13 GHz		2.77 ps
	50 mV 2 GHz BW	400 mV	1.13 GHz		2.64 ps
	Sample rate = 25 GS/s, 10 ns/Div, High Res mode				
	5 mV 1 GHz BW	40 mV	565 MHz		5.79 ps
	10 mV 1 GHz BW	80 mV	565 MHz		4.125 ps
	20 mV 1 GHz BW	160 mV	565 MHz		3.6 ps
	50 mV 1 GHz BW	400 mV	565 MHz		3.42 ps
Channel 4	Sample rate = 25 GS/s, 10 ns/Div, Sample mode				
	5 mV 1.5 GHz BW	40 mV	847.5 MHz		6.17 ps
	10 mV 2 GHz BW	80 mV	1.13 GHz		3.33 ps
	20 mV 2 GHz BW	160 mV	1.13 GHz		2.77 ps
	50 mV 2 GHz BW	400 mV	1.13 GHz		2.64 ps
	Sample rate = 25 GS/s, 10 ns/Div, High Res mode				
	5 mV 1 GHz BW	40 mV	565 MHz		5.79 ps
	10 mV 1 GHz BW	80 mV	565 MHz		4.125 ps
	20 mV 1 GHz BW	160 mV	565 MHz		3.6 ps
	50 mV 1 GHz BW	400 mV	565 MHz		3.42 ps
2 GHz models (MSO56, MSO58)					
	Sample rate = 25 GS/s, 10 ns/Div, Sample mode				

Delta Time Measurement Accuracy, 2 GHz models					
Channel 5	V/Div	Source V <sub>pp</sub>	Source frequency	Test result	High limit
	5 mV 1.5 GHz BW	40 mV	847.5 MHz		6.17 ps
	10 mV 2 GHz BW	80 mV	1.13 GHz		3.33 ps
	20 mV 2 GHz BW	160 mV	1.13 GHz		2.77 ps
	50 mV 2 GHz BW	400 mV	1.13 GHz		2.64 ps
Sample rate = 25 GS/s, 10 ns/Div, High Res mode					
	5 mV 1 GHz BW	40 mV	565 MHz		5.79 ps
	10 mV 1 GHz BW	80 mV	565 MHz		4.125 ps
	20 mV 1 GHz BW	160 mV	565 MHz		3.6 ps
	50 mV 1 GHz BW	400 mV	565 MHz		3.42 ps
Channel 6	Sample rate = 25 GS/s, 10 ns/Div, Sample mode				
	V/Div	Source V <sub>pp</sub>	Source frequency	Test result	High limit
	5 mV 1.5 GHz BW	40 mV	847.5 MHz		6.17 ps
	10 mV 2 GHz BW	80 mV	1.13 GHz		3.33 ps
	20 mV 2 GHz BW	160 mV	1.13 GHz		2.77 ps
	50 mV 2 GHz BW	400 mV	1.13 GHz		2.64 ps
	Sample rate = 25 GS/s, 10 ns/Div, High Res mode				
	5 mV 1 GHz BW	40 mV	565 MHz		5.79 ps
	10 mV 1 GHz BW	80 mV	565 MHz		4.125 ps
	20 mV 1 GHz BW	160 mV	565 MHz		3.6 ps
	50 mV 1 GHz BW	400 mV	565 MHz		3.42 ps
	2 GHz models (MSO58)				

Delta Time Measurement Accuracy, 2 GHz models					
Channel 7	Sample rate = 25 GS/s, 10 ns/Div, Sample mode				
	V/Div	Source V <sub>pp</sub>	Source frequency	Test result	High limit
	5 mV 1.5 GHz BW	40 mV	847.5 MHz		6.17 ps
	10 mV 2 GHz BW	80 mV	1.13 GHz		3.33 ps
	20 mV 2 GHz BW	160 mV	1.13 GHz		2.77 ps
	50 mV 2 GHz BW	400 mV	1.13 GHz		2.64 ps
	Sample rate = 25 GS/s, 10 ns/Div, High Res mode				
	5 mV 1 GHz BW	40 mV	565 MHz		5.79 ps
	10 mV 1 GHz BW	80 mV	565 MHz		4.125 ps
	20 mV 1 GHz BW	160 mV	565 MHz		3.6 ps
	50 mV 1 GHz BW	400 mV	565 MHz		3.42 ps
Channel 8	Sample rate = 25 GS/s, 10 ns/Div, Sample mode				
	V/Div	Source V <sub>pp</sub>	Source frequency	Test result	High limit
	5 mV 1.5 GHz BW	40 mV	847.5 MHz		6.17 ps
	10 mV 2 GHz BW	80 mV	1.13 GHz		3.33 ps
	20 mV 2 GHz BW	160 mV	1.13 GHz		2.77 ps
	50 mV 2 GHz BW	400 mV	1.13 GHz		2.64 ps
	Sample rate = 25 GS/s, 10 ns/Div, High Res mode				
	5 mV 1 GHz BW	40 mV	565 MHz		5.79 ps
	10 mV 1 GHz BW	80 mV	565 MHz		4.125 ps
	20 mV 1 GHz BW	160 mV	565 MHz		3.6 ps
	50 mV 1 GHz BW	400 mV	565 MHz		3.42 ps

Delta Time Measurement Accuracy, 1 GHz models
Performance checks
1 GHz models (MSO54, MSO56, MSO58, MSO58LP)

Delta Time Measurement Accuracy, 1 GHz models					
Channel 1	Sample rate = 25 GS/s, 10 ns/Div				
	V/Div	Source V <sub>pp</sub>	Source frequency	Test result	High limit
	5 mV	40 mV	565 MHz		8.41 ps
	10 mV	80 mV	565 MHz		5.04 ps
	20 mV	160 mV	565 MHz		3.63 ps
	50 mV	400 mV	565 MHz		3.1 ps
	Sample rate = 25 GS/s, 10 ns/Div, High Res				
	5 mV	40 mV	565 MHz		7.3 ps
	10 mV	80 mV	565 MHz		4.22 ps
	20 mV	160 mV	565 MHz		2.88 ps
	50 mV	400 mV	565 MHz		2.33 ps
Channel 2	Sample rate = 25 GS/s, 10 ns/Div				
	V/Div	Source V <sub>pp</sub>	Source frequency	Test result	High limit
	5 mV	40 mV	565 MHz		8.41 ps
	10 mV	80 mV	565 MHz		5.04 ps
	20 mV	160 mV	565 MHz		3.63 ps
	50 mV	400 mV	565 MHz		3.1 ps
	Sample rate = 25 GS/s, 10 ns/Div, High Res				
	5 mV	40 mV	565 MHz		7.3 ps
	10 mV	80 mV	565 MHz		4.22 ps
	20 mV	160 mV	565 MHz		2.88 ps
	50 mV	400 mV	565 MHz		2.33 ps
Channel 3	Sample rate = 25 GS/s, 10 ns/Div				
	V/Div	Source V <sub>pp</sub>	Source frequency	Test result	High limit
	5 mV	40 mV	565 MHz		8.41 ps
	10 mV	80 mV	565 MHz		5.04 ps
	20 mV	160 mV	565 MHz		3.63 ps
	50 mV	400 mV	565 MHz		3.1 ps
	Sample rate = 25 GS/s, 10 ns/Div, High Res				
	5 mV	40 mV	565 MHz		7.3 ps
	10 mV	80 mV	565 MHz		4.22 ps
	20 mV	160 mV	565 MHz		2.88 ps
	50 mV	400 mV	565 MHz		2.33 ps

Delta Time Measurement Accuracy, 1 GHz models					
Channel 4	Sample rate = 25 GS/s, 10 ns/Div				
	V/Div	Source V <sub>pp</sub>	Source frequency	Test result	High limit
	5 mV	40 mV	565 MHz		8.41 ps
	10 mV	80 mV	565 MHz		5.04 ps
	20 mV	160 mV	565 MHz		3.63 ps
	50 mV	400 mV	565 MHz		3.1 ps
	Sample rate = 25 GS/s, 10 ns/Div, High Res				
	5 mV	40 mV	565 MHz		7.3 ps
	10 mV	80 mV	565 MHz		4.22 ps
	20 mV	160 mV	565 MHz		2.88 ps
	50 mV	400 mV	565 MHz		2.33 ps
1 GHz models (MSO56, MSO58, MSO58LP)					
Channel 5	Sample rate = 25 GS/s, 10 ns/Div				
	V/Div	Source V <sub>pp</sub>	Source frequency	Test result	High limit
	5 mV	40 mV	565 MHz		8.41 ps
	10 mV	80 mV	565 MHz		5.04 ps
	20 mV	160 mV	565 MHz		3.63 ps
	50 mV	400 mV	565 MHz		3.1 ps
	Sample rate = 25 GS/s, 10 ns/Div, High Res				
	5 mV	40 mV	565 MHz		7.3 ps
	10 mV	80 mV	565 MHz		4.22 ps
	20 mV	160 mV	565 MHz		2.88 ps
	50 mV	400 mV	565 MHz		2.33 ps
Channel 6	Sample rate = 25 GS/s, 10 ns/Div				
	V/Div	Source V <sub>pp</sub>	Source frequency	Test result	High limit
	5 mV	40 mV	565 MHz		8.41 ps
	10 mV	80 mV	565 MHz		5.04 ps
	20 mV	160 mV	565 MHz		3.63 ps
	50 mV	400 mV	565 MHz		3.1 ps
	Sample rate = 25 GS/s, 10 ns/Div, High Res				
	5 mV	40 mV	565 MHz		7.3 ps
	10 mV	80 mV	565 MHz		4.22 ps
	20 mV	160 mV	565 MHz		2.88 ps
	50 mV	400 mV	565 MHz		2.33 ps
1 GHz models (MSO58, MSO58LP)					

Delta Time Measurement Accuracy, 1 GHz models					
Channel 7	Sample rate = 25 GS/s, 10 ns/Div				
	V/Div	Source V <sub>pp</sub>	Source frequency	Test result	High limit
	5 mV	40 mV	565 MHz		8.41 ps
	10 mV	80 mV	565 MHz		5.04 ps
	20 mV	160 mV	565 MHz		3.63 ps
	50 mV	400 mV	565 MHz		3.1 ps
	Sample rate = 25 GS/s, 10 ns/Div, Source freq = 565 MHz, High Res				
	5 mV	40 mV	565 MHz		7.3 ps
	10 mV	80 mV	565 MHz		4.22 ps
	20 mV	160 mV	565 MHz		2.88 ps
	50 mV	400 mV	565 MHz		2.33 ps
Channel 8	Sample rate = 25 GS/s, 10 ns/Div, Source freq = 565 MHz				
	V/Div	Source V <sub>pp</sub>	Source frequency	Test result	High limit
	5 mV	40 mV	565 MHz		8.41 ps
	10 mV	80 mV	565 MHz		5.04 ps
	20 mV	160 mV	565 MHz		3.63 ps
	50 mV	400 mV	565 MHz		3.1 ps
	Sample rate = 25 GS/s, 10 ns/Div, High Res				
	5 mV	40 mV	565 MHz		7.3 ps
	10 mV	80 mV	565 MHz		4.22 ps
	20 mV	160 mV	565 MHz		2.88 ps
	50 mV	400 mV	565 MHz		2.33 ps

Delta Time Measurement Accuracy, 500 MHz models					
Performance checks					
500 MHz models (MSO54, MSO56, MSO58)					
Channel 1	Sample rate = 25 GS/s, 10 ns/Div, Source freq = 282.5 MHz, 500 MHz BW				
	V/Div	Source V <sub>pp</sub>	Source frequency	Test result	High limit
	5 mV	40 mV	282.5 MHz		11.55 ps
	10 mV	80 mV	282.5 MHz		6.95 ps
	20 mV	160 mV	282.5 MHz		5.32 ps
	50 mV	400 mV	282.5 MHz		4.69 ps
	Sample rate = 25 GS/s, 10 ns/Div, Source freq = 282.5 MHz, 500 MHz BW, High Res				
	5 mV	40 mV	282.5 MHz		10.85 ps
	10 mV	80 mV	282.5 MHz		6.48 ps
	20 mV	160 mV	282.5 MHz		3.97 ps
	50 mV	400 mV	282.5 MHz		3.23 ps

Delta Time Measurement Accuracy, 500 MHz models					
Channel 2	<b>Sample rate = 25 GS/s, 10 ns/Div, Source freq = 282.5 MHz, 500 MHz BW</b>				
	<b>V/Div</b>	<b>Source V<sub>pp</sub></b>	<b>Source frequency</b>	<b>Test result</b>	<b>High limit</b>
	5 mV	40 mV	282.5 MHz		11.55 ps
	10 mV	80 mV	282.5 MHz		6.95 ps
	20 mV	160 mV	282.5 MHz		5.32 ps
	50 mV	400 mV	282.5 MHz		4.69 ps
	<b>Sample rate = 25 GS/s, 10 ns/Div, Source freq = 282.5 MHz, 500 MHz BW, High Res</b>				
	5 mV	40 mV	282.5 MHz		10.85 ps
	10 mV	80 mV	282.5 MHz		6.48 ps
	20 mV	160 mV	282.5 MHz		3.97 ps
	50 mV	400 mV	282.5 MHz		3.23 ps
Channel 3	<b>Sample rate = 25 GS/s, 10 ns/Div, Source freq = 282.5 MHz, 500 MHz BW</b>				
	<b>V/Div</b>	<b>Source V<sub>pp</sub></b>	<b>Source frequency</b>	<b>Test result</b>	<b>High limit</b>
	5 mV	40 mV	282.5 MHz		11.55 ps
	10 mV	80 mV	282.5 MHz		6.95 ps
	20 mV	160 mV	282.5 MHz		5.32 ps
	50 mV	400 mV	282.5 MHz		4.69 ps
	<b>Sample rate = 25 GS/s, 10 ns/Div, Source freq = 282.5 MHz, 500 MHz BW, High Res</b>				
	5 mV	40 mV	282.5 MHz		10.85 ps
	10 mV	80 mV	282.5 MHz		6.48 ps
	20 mV	160 mV	282.5 MHz		3.97 ps
	50 mV	400 mV	282.5 MHz		3.23 ps
Channel 4	<b>Sample rate = 25 GS/s, 10 ns/Div, Source freq = 282.5 MHz, 500 MHz BW</b>				
	<b>V/Div</b>	<b>Source V<sub>pp</sub></b>	<b>Source frequency</b>	<b>Test result</b>	<b>High limit</b>
	5 mV	40 mV	282.5 MHz		11.55 ps
	10 mV	80 mV	282.5 MHz		6.95 ps
	20 mV	160 mV	282.5 MHz		5.32 ps
	50 mV	400 mV	282.5 MHz		4.69 ps
	<b>Sample rate = 25 GS/s, 10 ns/Div, Source freq = 282.5 MHz, 500 MHz BW, High Res</b>				
	5 mV	40 mV	282.5 MHz		10.85 ps
	10 mV	80 mV	282.5 MHz		6.48 ps
	20 mV	160 mV	282.5 MHz		3.97 ps
	50 mV	400 mV	282.5 MHz		3.23 ps
<b>500 MHz models (MSO56, MSO58)</b>					



Delta Time Measurement Accuracy, 500 MHz models					
Channel 5	Sample rate = 25 GS/s, 10 ns/Div, Source freq = 282.5 MHz, 500 MHz BW				
	V/Div	Source V <sub>pp</sub>	Source frequency	Test result	High limit
	5 mV	40 mV	282.5 MHz		11.55 ps
	10 mV	80 mV	282.5 MHz		6.95 ps
	20 mV	160 mV	282.5 MHz		5.32 ps
	50 mV	400 mV	282.5 MHz		4.69 ps
	Sample rate = 25 GS/s, 10 ns/Div, Source freq = 282.5 MHz, 500 MHz BW, High Res				
	5 mV	40 mV	282.5 MHz		10.85 ps
	10 mV	80 mV	282.5 MHz		6.48 ps
	20 mV	160 mV	282.5 MHz		3.97 ps
	50 mV	400 mV	282.5 MHz		3.23 ps
Channel 6	Sample rate = 25 GS/s, 10 ns/Div, Source freq = 282.5 MHz, 500 MHz BW				
	V/Div	Source V <sub>pp</sub>	Source frequency	Test result	High limit
	5 mV	40 mV	282.5 MHz		11.55 ps
	10 mV	80 mV	282.5 MHz		6.95 ps
	20 mV	160 mV	282.5 MHz		5.32 ps
	50 mV	400 mV	282.5 MHz		4.69 ps
	Sample rate = 25 GS/s, 10 ns/Div, Source freq = 282.5 MHz, 500 MHz BW, High Res				
	5 mV	40 mV	282.5 MHz		10.85 ps
	10 mV	80 mV	282.5 MHz		6.48 ps
	20 mV	160 mV	282.5 MHz		3.97 ps
	50 mV	400 mV	282.5 MHz		3.23 ps
500 MHz models (MSO58)					
Channel 7	Sample rate = 25 GS/s, 10 ns/Div, Source freq = 282.5 MHz, 500 MHz BW				
	V/Div	Source V <sub>pp</sub>	Source frequency	Test result	High limit
	5 mV	40 mV	282.5 MHz		11.55 ps
	10 mV	80 mV	282.5 MHz		6.95 ps
	20 mV	160 mV	282.5 MHz		5.32 ps
	50 mV	400 mV	282.5 MHz		4.69 ps
	Sample rate = 25 GS/s, 10 ns/Div, Source freq = 282.5 MHz, 500 MHz BW, High Res				
	5 mV	40 mV	282.5 MHz		10.85 ps
	10 mV	80 mV	282.5 MHz		6.48 ps
	20 mV	160 mV	282.5 MHz		3.97 ps
	50 mV	400 mV	282.5 MHz		3.23 ps

Delta Time Measurement Accuracy, 500 MHz models					
Channel 8	Sample rate = 25 GS/s, 10 ns/Div, Source freq = 282.5 MHz, 500 MHz BW				
	V/Div	Source V <sub>pp</sub>	Source frequency	Test result	High limit
	5 mV	40 mV	282.5 MHz		11.55 ps
	10 mV	80 mV	282.5 MHz		6.95 ps
	20 mV	160 mV	282.5 MHz		5.32 ps
	50 mV	400 mV	282.5 MHz		4.69 ps
	Sample rate = 25 GS/s, 10 ns/Div, Source freq = 282.5 MHz, 500 MHz BW, High Res				
	5 mV	40 mV	282.5 MHz		10.85 ps
	10 mV	80 mV	282.5 MHz		6.48 ps
	20 mV	160 mV	282.5 MHz		3.97 ps
	50 mV	400 mV	282.5 MHz		3.23 ps

Delta Time Measurement Accuracy, 350 MHz models					
Performance checks					
350 MHz models (MSO54, MSO56, MSO58)					
Channel 1	Sample rate = 25 GS/s, 10 ns/Div, Source freq = 197.75 MHz, 350 MHz BW				
	V/Div	Source V <sub>pp</sub>	Source frequency	Test result	High limit
	5 mV	40 mV	197.75 MHz		13.2 ps
	10 mV	80 mV	197.75 MHz		8.65 ps
	20 mV	160 mV	197.75 MHz		6.31 ps
	50 mV	400 mV	197.75 MHz		5.59 ps
	Sample rate = 25 GS/s, 10 ns/Div, Source freq = 197.75 MHz, 350 MHz BW, High Res				
	5 mV	40 mV	197.75 MHz		11.78 ps
	10 mV	80 mV	197.75 MHz		6.84 ps
	20 mV	160 mV	197.75 MHz		4.7 ps
	50 mV	400 mV	197.75 MHz		3.82 ps
Channel 2	Sample rate = 25 GS/s, 10 ns/Div, Source freq = 197.75 MHz, 350 MHz BW				
	V/Div	Source V <sub>pp</sub>	Source frequency	Test result	High limit
	5 mV	40 mV	197.75 MHz		13.2 ps
	10 mV	80 mV	197.75 MHz		8.65 ps
	20 mV	160 mV	197.75 MHz		6.31 ps
	50 mV	400 mV	197.75 MHz		5.59 ps
	Sample rate = 25 GS/s, 10 ns/Div, Source freq = 197.75 MHz, 350 MHz BW, High Res				
	5 mV	40 mV	197.75 MHz		11.78 ps
	10 mV	80 mV	197.75 MHz		6.84 ps
	20 mV	160 mV	197.75 MHz		4.7 ps
	50 mV	400 mV	197.75 MHz		3.82 ps

Delta Time Measurement Accuracy, 350 MHz models					
Channel 3	Sample rate = 25 GS/s, 10 ns/Div, Source freq = 197.75 MHz, 350 MHz BW				
	V/Div	Source V <sub>pp</sub>	Source frequency	Test result	High limit
	5 mV	40 mV	197.75 MHz		13.2 ps
	10 mV	80 mV	197.75 MHz		8.65 ps
	20 mV	160 mV	197.75 MHz		6.31 ps
	50 mV	400 mV	197.75 MHz		5.59 ps
	Sample rate = 25 GS/s, 10 ns/Div, Source freq = 197.75 MHz, 350 MHz BW, High Res				
	5 mV	40 mV	197.75 MHz		11.78 ps
	10 mV	80 mV	197.75 MHz		6.84 ps
	20 mV	160 mV	197.75 MHz		4.7 ps
Channel 4	Sample rate = 25 GS/s, 10 ns/Div, Source freq = 197.75 MHz, 350 MHz BW				
	V/Div	Source V <sub>pp</sub>	Source frequency	Test result	High limit
	5 mV	40 mV	197.75 MHz		13.2 ps
	10 mV	80 mV	197.75 MHz		8.65 ps
	20 mV	160 mV	197.75 MHz		6.31 ps
	50 mV	400 mV	197.75 MHz		5.59 ps
	Sample rate = 25 GS/s, 10 ns/Div, Source freq = 197.75 MHz, 350 MHz BW, High Res				
	5 mV	40 mV	197.75 MHz		11.78 ps
	10 mV	80 mV	197.75 MHz		6.84 ps
	20 mV	160 mV	197.75 MHz		4.7 ps
350 MHz models (MSO56, MSO58)					
Channel 5	Sample rate = 25 GS/s, 10 ns/Div, Source freq = 197.75 MHz, 350 MHz BW				
	V/Div	Source V <sub>pp</sub>	Source frequency	Test result	High limit
	5 mV	40 mV	197.75 MHz		13.2 ps
	10 mV	80 mV	197.75 MHz		8.65 ps
	20 mV	160 mV	197.75 MHz		6.31 ps
	50 mV	400 mV	197.75 MHz		5.59 ps
	Sample rate = 25 GS/s, 10 ns/Div, Source freq = 197.75 MHz, 350 MHz BW, High Res				
	5 mV	40 mV	197.75 MHz		11.78 ps
	10 mV	80 mV	197.75 MHz		6.84 ps
	20 mV	160 mV	197.75 MHz		4.7 ps

Delta Time Measurement Accuracy, 350 MHz models					
Channel 6	Sample rate = 25 GS/s, 10 ns/Div, Source freq = 197.75 MHz, 350 MHz BW				
	V/Div	Source V <sub>pp</sub>	Source frequency	Test result	High limit
	5 mV	40 mV	197.75 MHz		13.2 ps
	10 mV	80 mV	197.75 MHz		8.65 ps
	20 mV	160 mV	197.75 MHz		6.31 ps
	50 mV	400 mV	197.75 MHz		5.59 ps
	Sample rate = 25 GS/s, 10 ns/Div, Source freq = 197.75 MHz, 350 MHz BW, High Res				
	5 mV	40 mV	197.75 MHz		11.78 ps
	10 mV	80 mV	197.75 MHz		6.84 ps
	20 mV	160 mV	197.75 MHz		4.7 ps
	50 mV	400 mV	197.75 MHz		3.82 ps
	350 MHz MSO58 models:				
Channel 7	350 MHz models (MSO58)				
	V/Div	Source V <sub>pp</sub>	Source frequency	Test result	High limit
	5 mV	40 mV	197.75 MHz		13.2 ps
	10 mV	80 mV	197.75 MHz		8.65 ps
	20 mV	160 mV	197.75 MHz		6.31 ps
	50 mV	400 mV	197.75 MHz		5.59 ps
	Sample rate = 25 GS/s, 10 ns/Div, Source freq = 197.75 MHz, 350 MHz BW, High Res				
	5 mV	40 mV	197.75 MHz		11.78 ps
	10 mV	80 mV	197.75 MHz		6.84 ps
	20 mV	160 mV	197.75 MHz		4.7 ps
	50 mV	400 mV	197.75 MHz		3.82 ps
Channel 8	Sample rate = 25 GS/s, 10 ns/Div, Source freq = 197.75 MHz, 350 MHz BW				
	V/Div	Source V <sub>pp</sub>	Source frequency	Test result	High limit
	5 mV	40 mV	197.75 MHz		13.2 ps
	10 mV	80 mV	197.75 MHz		8.65 ps
	20 mV	160 mV	197.75 MHz		6.31 ps
	50 mV	400 mV	197.75 MHz		5.59 ps
	Sample rate = 25 GS/s, 10 ns/Div, Source freq = 197.75 MHz, 350 MHz BW, High Res				
	5 mV	40 mV	197.75 MHz		11.78 ps
	10 mV	80 mV	197.75 MHz		6.84 ps
	20 mV	160 mV	197.75 MHz		4.7 ps
	50 mV	400 mV	197.75 MHz		3.82 ps

Digital Threshold Accuracy, typical						
Performance checks:						
Digital channel	Threshold	$V_{S-}$	$V_{S+}$	Low limit	Test result	High limit
All models (MSO54, MSO56, MSO58, MSO58LP)						
<b>Channel 1</b>						
D0	0 V			-0.1 V		0.1 V
D1	0 V			-0.1 V		0.1 V
D2	0 V			-0.1 V		0.1 V
D3	0 V			-0.1 V		0.1 V
D4	0 V			-0.1 V		0.1 V
D5	0 V			-0.1 V		0.1 V
D6	0 V			-0.1 V		0.1 V
D7	0 V			-0.1 V		0.1 V
<b>Channel 2</b>						
D0	0 V			-0.1 V		0.1 V
D1	0 V			-0.1 V		0.1 V
D2	0 V			-0.1 V		0.1 V
D3	0 V			-0.1 V		0.1 V
D4	0 V			-0.1 V		0.1 V
D5	0 V			-0.1 V		0.1 V
D6	0 V			-0.1 V		0.1 V
D7	0 V			-0.1 V		0.1 V
<b>Channel 3</b>						
D0	0 V			-0.1 V		0.1 V
D1	0 V			-0.1 V		0.1 V
D2	0 V			-0.1 V		0.1 V
D3	0 V			-0.1 V		0.1 V
D4	0 V			-0.1 V		0.1 V
D5	0 V			-0.1 V		0.1 V
D6	0 V			-0.1 V		0.1 V
D7	0 V			-0.1 V		0.1 V
<b>Channel 4</b>						
D0	0 V			-0.1 V		0.1 V
D1	0 V			-0.1 V		0.1 V
D2	0 V			-0.1 V		0.1 V
D3	0 V			-0.1 V		0.1 V
D4	0 V			-0.1 V		0.1 V
D5	0 V			-0.1 V		0.1 V

Digital Threshold Accuracy, typical						
Performance checks:						
Digital channel	Threshold	V <sub>S-</sub>	V <sub>S+</sub>	Low limit	Test result	High limit
D6	0 V			-0.1 V		0.1 V
D7	0 V			-0.1 V		0.1 V
MSO56, MSO58, MSO58LP models						
Channel 5						
D0	0 V			-0.1 V		0.1 V
D1	0 V			-0.1 V		0.1 V
D2	0 V			-0.1 V		0.1 V
D3	0 V			-0.1 V		0.1 V
D4	0 V			-0.1 V		0.1 V
D5	0 V			-0.1 V		0.1 V
D6	0 V			-0.1 V		0.1 V
D7	0 V			-0.1 V		0.1 V
Channel 6						
D0	0 V			-0.1 V		0.1 V
D1	0 V			-0.1 V		0.1 V
D2	0 V			-0.1 V		0.1 V
D3	0 V			-0.1 V		0.1 V
D4	0 V			-0.1 V		0.1 V
D5	0 V			-0.1 V		0.1 V
D6	0 V			-0.1 V		0.1 V
D7	0 V			-0.1 V		0.1 V
MSO58, MSO58LP models						
Channel 7						
D0	0 V			-0.1 V		0.1 V
D1	0 V			-0.1 V		0.1 V
D2	0 V			-0.1 V		0.1 V
D3	0 V			-0.1 V		0.1 V
D4	0 V			-0.1 V		0.1 V
D5	0 V			-0.1 V		0.1 V
D6	0 V			-0.1 V		0.1 V
D7	0 V			-0.1 V		0.1 V
Channel 8						
D0	0 V			-0.1 V		0.1 V
D1	0 V			-0.1 V		0.1 V
D2	0 V			-0.1 V		0.1 V
D3	0 V			-0.1 V		0.1 V

Digital Threshold Accuracy, typical						
Performance checks:						
Digital channel	Threshold	V <sub>S-</sub>	V <sub>S+</sub>	Low limit	Test result	High limit
D4	0 V			-0.1 V		0.1 V
D5	0 V			-0.1 V		0.1 V
D6	0 V			-0.1 V		0.1 V
D7	0 V			-0.1 V		0.1 V

AUX Out output voltage levels				
Performance checks	Vout	Low limit	Test result	High limit
Output levels, 1 M $\Omega$ input impedance	Max	$\geq 2.5$ V		n/a
	Min	n/a		$\leq 700$ mV
Output levels, 50 $\Omega$ Input Impedance,	Max	$\geq 1.0$ V		n/a
	Min	n/a		$\leq 250$ mV

DVM voltage accuracy (DC)					
Channel 1					
Vertical Scale	Input Voltage	Offset Voltage	Low limit	Test result	High limit
1	-5	-5	-5.125		-4.875
0.5	-2	-2	-2.06		-1.94
0.5	-1	-0.5	-1.06		-0.94
0.2	-0.5	-0.5	-0.5225		-0.4775
0.01	0.002	0	0.00097		0.00303
0.2	0.5	0.5	0.4775		0.5225
0.5	1	0.5	0.94		1.06
0.5	2	2	1.94		2.06
1	5	5	4.875		5.125
Channel 2					
Vertical Scale	Input Voltage	Offset Voltage	Low limit	Test result	High limit
1	-5	-5	-5.125		-4.875
0.5	-2	-2	-2.06		-1.94
0.5	-1	-0.5	-1.06		-0.94
0.2	-0.5	-0.5	-0.5225		-0.4775
0.01	0.002	0	0.00097		0.00303
0.2	0.5	0.5	0.4775		0.5225
0.5	1	0.5	0.94		1.06
0.5	2	2	1.94		2.06

DVM voltage accuracy (DC)					
1	5	5	4.875		5.125
Channel 3					
Vertical Scale	Input Voltage	Offset Voltage	Low limit	Test result	High limit
1	-5	-5	-5.125		-4.875
0.5	-2	-2	-2.06		-1.94
0.5	-1	-0.5	-1.06		-0.94
0.2	-0.5	-0.5	-0.5225		-0.4775
0.01	0.002	0	0.00097		0.00303
0.2	0.5	0.5	0.4775		0.5225
0.5	1	0.5	0.94		1.06
0.5	2	2	1.94		2.06
1	5	5	4.875		5.125
Channel 4					
Vertical Scale	Input Voltage	Offset Voltage	Low limit	Test result	High limit
1	-5	-5	-5.125		-4.875
0.5	-2	-2	-2.06		-1.94
0.5	-1	-0.5	-1.06		-0.94
0.2	-0.5	-0.5	-0.5225		-0.4775
0.01	0.002	0	0.00097		0.00303
0.2	0.5	0.5	0.4775		0.5225
0.5	1	0.5	0.94		1.06
0.5	2	2	1.94		2.06
1	5	5	4.875		5.125
Channel 5					
Vertical Scale	Input Voltage	Offset Voltage	Low limit	Test result	High limit
1	-5	-5	-5.125		-4.875
0.5	-2	-2	-2.06		-1.94
0.5	-1	-0.5	-1.06		-0.94
0.2	-0.5	-0.5	-0.5225		-0.4775
0.01	0.002	0	0.00097		0.00303
0.2	0.5	0.5	0.4775		0.5225
0.5	1	0.5	0.94		1.06
0.5	2	2	1.94		2.06
1	5	5	4.875		5.125
Channel 6					
Vertical Scale	Input Voltage	Offset Voltage	Low limit	Test result	High limit
1	-5	-5	-5.125		-4.875
0.5	-2	-2	-2.06		-1.94



DVM voltage accuracy (DC)					
0.5	-1	-0.5	-1.06		-0.94
0.2	-0.5	-0.5	-0.5225		-0.4775
0.01	0.002	0	0.00097		0.00303
0.2	0.5	0.5	0.4775		0.5225
0.5	1	0.5	0.94		1.06
0.5	2	2	1.94		2.06
1	5	5	4.875		5.125
Channel 7					
Vertical Scale	Input Voltage	Offset Voltage	Low limit	Test result	High limit
1	-5	-5	-5.125		-4.875
0.5	-2	-2	-2.06		-1.94
0.5	-1	-0.5	-1.06		-0.94
0.2	-0.5	-0.5	-0.5225		-0.4775
0.01	0.002	0	0.00097		0.00303
0.2	0.5	0.5	0.4775		0.5225
0.5	1	0.5	0.94		1.06
0.5	2	2	1.94		2.06
1	5	5	4.875		5.125
Channel 8					
Vertical Scale	Input Voltage	Offset Voltage	Low limit	Test result	High limit
1	-5	-5	-5.125		-4.875
0.5	-2	-2	-2.06		-1.94
0.5	-1	-0.5	-1.06		-0.94
0.2	-0.5	-0.5	-0.5225		-0.4775
0.01	0.002	0	0.00097		0.00303
0.2	0.5	0.5	0.4775		0.5225
0.5	1	0.5	0.94		1.06
0.5	2	2	1.94		2.06
1	5	5	4.875		5.125

DVM voltage accuracy (AC)				
All models (MSO54, MSO56, MSO58, MSO58LP)				
Channel 1				
Vertical Scale	Input Signal	Low limit	Test result	High limit
5 mV	20 mV <sub>pp</sub> at 1 kHz	9.800 mV		10.200 mV
10 mV	50 mV <sub>pp</sub> at 1 kHz	24.5 mV		25.500 mV
100 mV	0.5 V <sub>pp</sub> at 1 kHz	245.000 mV		255.000 mV

DVM voltage accuracy (AC)				
200 mV	1 V <sub>pp</sub> at 1 kHz	490.000 mV		510.000 mV
1 V	5 V <sub>pp</sub> at 1 kHz	2.450 mV		2.550 mV
Channel 2				
Vertical Scale	Input Signal	Low limit	Test result	High limit
5 mV	20 mV <sub>pp</sub> at 1 kHz	9.800 mV		10.200 mV
10 mV	50 mV <sub>pp</sub> at 1 kHz	24.5 mV		25.500 mV
100 mV	0.5 V <sub>pp</sub> at 1 kHz	245.000 mV		255.000 mV
200 mV	1 V <sub>pp</sub> at 1 kHz	490.000 mV		510.000 mV
1 V	5 V <sub>pp</sub> at 1 kHz	2.450 mV		2.550 mV
Channel 3				
Vertical Scale	Input Signal	Low limit	Test result	High limit
5 mV	20 mV <sub>pp</sub> at 1 kHz	9.800 mV		10.200 mV
10 mV	50 mV <sub>pp</sub> at 1 kHz	24.5 mV		25.500 mV
100 mV	0.5 V <sub>pp</sub> at 1 kHz	245.000 mV		255.000 mV
200 mV	1 V <sub>pp</sub> at 1 kHz	490.000 mV		510.000 mV
1 V	5 V <sub>pp</sub> at 1 kHz	2.450 mV		2.550 mV
Channel 4				
Vertical Scale	Input Signal	Low limit	Test result	High limit
5 mV	20 mV <sub>pp</sub> at 1 kHz	9.800 mV		10.200 mV
10 mV	50 mV <sub>pp</sub> at 1 kHz	24.5 mV		25.500 mV
100 mV	0.5 V <sub>pp</sub> at 1 kHz	245.000 mV		255.000 mV
200 mV	1 V <sub>pp</sub> at 1 kHz	490.000 mV		510.000 mV
1 V	5 V <sub>pp</sub> at 1 kHz	2.450 mV		2.550 mV
MSO56, MSO58, MSO58LP models				
Channel 5				
Vertical Scale	Input Signal	Low limit	Test result	High limit
5 mV	20 mV <sub>pp</sub> at 1 kHz	9.800 mV		10.200 mV
10 mV	50 mV <sub>pp</sub> at 1 kHz	24.5 mV		25.500 mV
100 mV	0.5 V <sub>pp</sub> at 1 kHz	245.000 mV		255.000 mV
200 mV	1 V <sub>pp</sub> at 1 kHz	490.000 mV		510.000 mV
1 V	5 V <sub>pp</sub> at 1 kHz	2.450 mV		2.550 mV
Channel 6				
Vertical Scale	Input Signal	Low limit	Test result	High limit
5 mV	20 mV <sub>pp</sub> at 1 kHz	9.800 mV		10.200 mV
10 mV	50 mV <sub>pp</sub> at 1 kHz	24.5 mV		25.500 mV
100 mV	0.5 V <sub>pp</sub> at 1 kHz	245.000 mV		255.000 mV

DVM voltage accuracy (AC)				
200 mV	1 V <sub>pp</sub> at 1 kHz	490.000 mV		510.000 mV
1 V	5 V <sub>pp</sub> at 1 kHz	2.450 mV		2.550 mV
MSO58, MSO58LP models				
Channel 7				
Vertical Scale	Input Signal	Low limit	Test result	High limit
5 mV	20 mV <sub>pp</sub> at 1 kHz	9.800 mV		10.200 mV
10 mV	50 mV <sub>pp</sub> at 1 kHz	24.5 mV		25.500 mV
100 mV	0.5 V <sub>pp</sub> at 1 kHz	245.000 mV		255.000 mV
200 mV	1 V <sub>pp</sub> at 1 kHz	490.000 mV		510.000 mV
1 V	5 V <sub>pp</sub> at 1 kHz	2.450 mV		2.550 mV
Channel 8				
Vertical Scale	Input Signal	Low limit	Test result	High limit
5 mV	20 mV <sub>pp</sub> at 1 kHz	9.800 mV		10.200 mV
10 mV	50 mV <sub>pp</sub> at 1 kHz	24.5 mV		25.500 mV
100 mV	0.5 V <sub>pp</sub> at 1 kHz	245.000 mV		255.000 mV
200 mV	1 V <sub>pp</sub> at 1 kHz	490.000 mV		510.000 mV
1 V	5 V <sub>pp</sub> at 1 kHz	2.450 mV		2.550 mV

Trigger frequency accuracy and trigger frequency counter maximum input frequency				
All models (MSO54, MSO56, MSO58, MSO58LP)				
Channel 1				
	Hz	Low limit	Test result	High limit
	100 Hz	99.99974 Hz		100.00026 Hz
	1 kHz	999.9974 Hz		1.0000026 KHz
	10 kHz	9.999974 KHz		10.000026 kHz
	100 kHz	99.99974 kHz		100.00026 kHz
	1 MHz	999.9974 kHz		1.0000026 MHz
	10 MHz	9.999974 kHz		10.000026 MHz
	100 MHz	99.99974 MHz		100.00026 MHz
	1 GHz <sup>1</sup>	999.9974 MHz		1.0000026 GHz
	2 GHz <sup>2</sup>	1.999994 GHz		2.0000051 GHz
Channel 2				

<sup>1</sup> 1 GHz models only, including MSO58LP.

<sup>2</sup> 2 GHz models only.

Trigger frequency accuracy and trigger frequency counter maximum input frequency				
	Hz	Low limit	Test result	High limit
	100 Hz	99.99974 Hz		100.00026 Hz
	1 kHz	999.9974 Hz		1.0000026 KHz
	10 kHz	9.999974 KHz		10.000026 kHz
	100 kHz	99.99974 kHz		100.00026 kHz
	1 MHz	999.9974 kHz		1.0000026 MHz
	10 MHz	9.999974 kHz		10.000026 MHz
	100 MHz	99.99974 MHz		100.00026 MHz
	1 GHz <sup>10</sup>	999.9974 MHz		1.0000026 GHz
	2 GHz <sup>11</sup>	1.999994 GHz		2.0000051 GHz
<b>Channel 3</b>				
	Hz	Low limit	Test result	High limit
	100 Hz	99.99974 Hz		100.00026 Hz
	1 kHz	999.9974 Hz		1.0000026 KHz
	10 kHz	9.999974 KHz		10.000026 kHz
	100 kHz	99.99974 kHz		100.00026 kHz
	1 MHz	999.9974 kHz		1.0000026 MHz
	10 MHz	9.999974 kHz		10.000026 MHz
	100 MHz	99.99974 MHz		100.00026 MHz
	1 GHz <sup>10</sup>	999.9974 MHz		1.0000026 GHz
	2 GHz <sup>11</sup>	1.999994 GHz		2.0000051 GHz
<b>Channel 4</b>				
	Hz	Low limit	Test result	High limit
	100 Hz	99.99974 Hz		100.00026 Hz
	1 kHz	999.9974 Hz		1.0000026 KHz
	10 kHz	9.999974 KHz		10.000026 kHz
	100 kHz	99.99974 kHz		100.00026 kHz
	1 MHz	999.9974 kHz		1.0000026 MHz
	10 MHz	9.999974 kHz		10.000026 MHz
	100 MHz	99.99974 MHz		100.00026 MHz
	1 GHz <sup>10</sup>	999.9974 MHz		1.0000026 GHz
	2 GHz <sup>11</sup>	1.999994 GHz		2.0000051 GHz
<b>MSO56, MSO58, MSO58LP models</b>				
<b>Channel 5</b>				

Trigger frequency accuracy and trigger frequency counter maximum input frequency				
	Hz	Low limit	Test result	High limit
	100 Hz	99.99974 Hz		100.00026 Hz
	1 kHz	999.9974 Hz		1.0000026 KHz
	10 kHz	9.999974 KHz		10.000026 kHz
	100 kHz	99.99974 kHz		100.00026 kHz
	1 MHz	999.9974 kHz		1.0000026 MHz
	10 MHz	9.999974 kHz		10.000026 MHz
	100 MHz	99.99974 MHz		100.00026 MHz
	1 GHz <sup>10</sup>	999.9974 MHz		1.0000026 GHz
	2 GHz <sup>11</sup>	1.999994 GHz		2.0000051 GHz
<b>Channel 6</b>				
	Hz	Low limit	Test result	High limit
	100 Hz	99.99974 Hz		100.00026 Hz
	1 kHz	999.9974 Hz		1.0000026 KHz
	10 kHz	9.999974 KHz		10.000026 kHz
	100 kHz	99.99974 kHz		100.00026 kHz
	1 MHz	999.9974 kHz		1.0000026 MHz
	10 MHz	9.999974 kHz		10.000026 MHz
	100 MHz	99.99974 MHz		100.00026 MHz
	1 GHz <sup>10</sup>	999.9974 MHz		1.0000026 GHz
	2 GHz <sup>11</sup>	1.999994 GHz		2.0000051 GHz
<b>MSO58, MSO58LP models</b>				
<b>Channel 7</b>				
	Hz	Low limit	Test result	High limit
	100 Hz	99.99974 Hz		100.00026 Hz
	1 kHz	999.9974 Hz		1.0000026 KHz
	10 kHz	9.999974 KHz		10.000026 kHz
	100 kHz	99.99974 kHz		100.00026 kHz
	1 MHz	999.9974 kHz		1.0000026 MHz
	10 MHz	9.999974 kHz		10.000026 MHz
	100 MHz	99.99974 MHz		100.00026 MHz
	1 GHz <sup>10</sup>	999.9974 MHz		1.0000026 GHz
	2 GHz <sup>11</sup>	1.999994 GHz		2.0000051 GHz
<b>Channel 8</b>				

**Trigger frequency accuracy and trigger frequency counter maximum input frequency**

	Hz	Low limit	Test result	High limit
	100 Hz	99.99974 Hz		100.00026 Hz
	1 kHz	999.9974 Hz		1.0000026 KHz
	10 kHz	9.999974 KHz		10.000026 kHz
	100 kHz	99.99974 kHz		100.00026 kHz
	1 MHz	999.9974 kHz		1.0000026 MHz
	10 MHz	9.999974 kHz		10.000026 MHz
	100 MHz	99.99974 MHz		100.00026 MHz
	1 GHz <sup>10</sup>	999.9974 MHz		1.0000026 GHz
	2 GHz <sup>11</sup>	1.999994 GHz		2.0000051 GHz

**AFG sine and ramp frequency accuracy****Performance checks**

	Waveform type	Minimum	Test result	Maximum
	Sine	0.999950 MHz		1.000050 MHz
	Ramp	499.975 kHz		500.025 kHz

**AFG square and pulse frequency accuracy****Performance checks**

	Waveform type	Minimum	Test result	Maximum
	Square	0.999950 MHz		1.000050 MHz
	Pulse	0.999950 MHz		1.000050 MHz

**AFG signal amplitude accuracy****Performance checks**

	Amplitude	Minimum	Test result	Maximum
	30.0 mV <sub>PP</sub>	28.55 mV <sub>PP</sub>		31.45 mV <sub>PP</sub>
	300.0 mV <sub>PP</sub>	294.5 mV <sub>PP</sub>		305.5 mV <sub>PP</sub>
	800.0 mV <sub>PP</sub>	787.0 mV <sub>PP</sub>		813.0 mV <sub>PP</sub>
	1.500 V <sub>PP</sub>	1.4765 V <sub>PP</sub>		1.5235 V <sub>PP</sub>
	2.000 V <sub>PP</sub>	1.9690 V <sub>PP</sub>		2.0310 V <sub>PP</sub>
	2.500 V <sub>PP</sub>	2.4615 V <sub>PP</sub>		2.5385 V <sub>PP</sub>

**AFG DC offset accuracy****Performance checks**

	Offset	Minimum	Test result	Maximum
	1.25 V	1.23025 Vdc		1.26975 Vdc
	0 V	- 0.001 Vdc		+ 0.001 Vdc
	-1.25 V	- 1.26975 Vdc		- 1.23025 Vdc

## Performance tests

This section contains a collection of manual procedures for checking that the instrument performs as warranted. They check all the characteristics that are designated as checked in *Specifications*. (The characteristics that are checked appear with a ✓ in *Specifications*).

## Prerequisites

The tests in this section comprise an extensive, valid confirmation of performance and functionality when the following requirements are met:

- The instrument must be in its normal operating configuration (no covers removed).
- You must have performed and passed the procedures under *Self Test*. (See [Self test](#) on page 175.)
- A signal-path compensation must have been done within the recommended calibration interval and at a temperature within  $\pm 5^{\circ}\text{C}$  ( $\pm 9^{\circ}\text{F}$ ) of the present operating temperature. (If the temperature was within the limits just stated at the time you did the prerequisite *Self Test*, consider this prerequisite met). A signal-path compensation must have been done at an ambient humidity within 25% of the current ambient humidity and after having been at that humidity for at least 4 hours.
- The instrument must have been last adjusted at an ambient temperature between  $+18^{\circ}\text{C}$  and  $+28^{\circ}\text{C}$  ( $+64^{\circ}\text{F}$  and  $+82^{\circ}\text{F}$ ), must have been operating for a warm-up period of at least 20 minutes, and must be operating at an ambient temperature as listed in the specifications. The warm-up requirement is usually met in the course of meeting the Self Test prerequisites listed above.
- The instrument must be powered from a source maintaining voltage and frequency within the limits described in the *Specifications* section.
- The instrument must be in an environment with temperature, altitude, humidity, and vibration within the operating limits described in the *Specifications* section.
- To access the user interface on the MSO58LP, connect a monitor to a video port on the rear of the instrument, and connect a mouse to any USB Host port. You do not need to connect a mouse if your remote monitor is touch-capable. You can also remotely access the user interface of a network-connected instrument by entering the instrument's IP address in a web browser that has access to the same network, and selecting the **Instrument Control (e\*Scope)** link on the displayed page.
- To programmatically run performance verification procedures on an MSO58LP, see the *5 Series MSO MSO54, MSO56, MSO58, MSO58LP Programmer Manual* (Tektronix part number 077-1305-xx) for command syntax information.

## Self test

This procedure verifies that the instrument passes the internal diagnostics and performs signal path compensation. No test equipment or hookups are required.

Equipment required	Prerequisites
None	Power on the instrument and allow a 20 minute warm-up period before performing this procedure.

To access the MSO58LP user interface, see [Prerequisites](#) on page 175.

1. *Run the System Diagnostics (may take a few minutes):*
  - a. Disconnect all probes and/or cables from the oscilloscope inputs.
  - b. Tap **Utility > Self Test**. This displays the **Self Test** configuration menu.
  - c. Tap the **Run Self Test** button.

- d. The internal diagnostics perform an exhaustive verification of proper instrument function. This verification may take several minutes. When the verification is finished, the status of each self test is shown in the menu.
  - e. Verify that the status of all tests is **Passed**.
  - f. Tap anywhere outside the menu to exit the menu.
2. Run the signal-path compensation routine (may take 5 to 15 minutes per channel):
  - a. Tap **Utility > Calibration**. This displays the **Calibration** configuration menu.
  - b. Tap the **Run SPC** button to start the routine.
  - c. Signal-path compensation may take 5 to 15 minutes to run per channel.
  - d. Verify that the **SPC Status** is **Passed**.
3. Return to regular service: Tap anywhere outside the menu to exit the **Calibration** menu.

The self test procedures are completed. If any of the above tests failed, run the tests again. If there are still failures, contact Tektronix Customer Support.

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**NOTE.** You cannot run the remaining performance tests until the self tests pass and the SPC has successfully run.

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## Check input impedance

This test checks the input impedance on all channels.

To access the user interface on the MSO58LP, see [Prerequisites](#) on page 175.

1. Connect the output of the oscilloscope calibrator (for example, Fluke 9500) to the oscilloscope channel 1 input, as shown in the following illustration.




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**WARNING.** Be sure to set the generator to Off or 0 volts before connecting, disconnecting, and/or moving the test hookup during the performance of this procedure. The generator is capable of providing dangerous voltages.

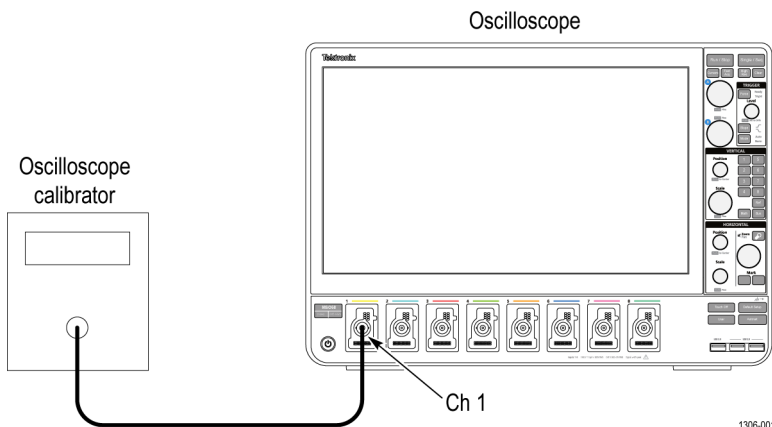
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**NOTE.** Impedance measuring equipment that produces a voltage across the channel that exceeds the measurement range of the instrument may report erroneous impedance results. A measurement voltage exceeds the measurement range of the instrument when the resulting trace is not visible on the graticule.

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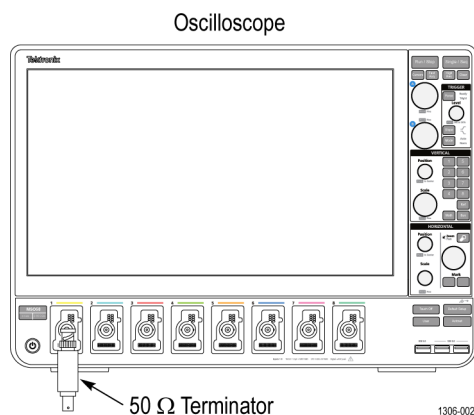
2. Set the calibrator to measure 1 MΩ impedance.



3. Tap **File > Default Setup**.
4. *Test 1 M $\Omega$  input impedance as follows:*
  - a. Tap the channel 1 button on the Settings bar.
  - b. Double tap the **Ch 1** badge to open its menu.
  - c. Set **Termination** to **1 M $\Omega$** .
  - d. Set the **Vertical Scale** to the value to test in the test record (first value is **10 mV/div**).
5. Use the calibrator to measure the input impedance of the oscilloscope and enter the value in the test record.
6. Repeat steps 4.d and 5 for all vertical scale settings in the test record for the channel.
7. *Test 50  $\Omega$  input impedance as follows:*
  - a. Set the calibrator impedance to measure 50  $\Omega$  impedance.
  - b. Double-tap the **Ch 1** badge and set **Termination** to **50  $\Omega$** .
  - c. Repeat steps 4.d through 6 for all vertical scale settings in the test record for the channel.
8. *Repeat the procedures for all remaining channels as follows:*
  - a. Turn the calibrator output Off.
  - b. Move the calibrator connection to the next channel to test.
  - c. Double-tap the channel badge of the channel that you have finished testing and set **Display** to **Off**.
  - d. Tap the channel button on the Settings bar of the next channel to test.
  - e. Starting from step 2, repeat the procedures until all channels have been tested.

## Check DC balance

This test checks the DC balance. You do not need to connect any test equipment (other than the 50  $\Omega$  terminator) to the oscilloscope to perform this check.



To access the user interface on the MSO58LP, see [Prerequisites](#) on page 175.

1. Attach a 50  $\Omega$  terminator to the oscilloscope channel 1 input.
2. Tap **File > Default Setup**.
3. Double-tap the **Horizontal** badge on the Settings bar and set the **Horizontal Scale** to **1 ms/div**.

4. Tap the channel 1 button on the oscilloscope Settings bar to display a channel badge.
5. Double tap the **Ch 1** badge to open its menu.
6. Set the **Vertical Scale** to **1 mV/div**.
7. Set the channel 1 **Termination** to **50  $\Omega$** .
8. Tap the **Bandwidth Limit** field and select **20 MHz**.
9. Tap outside the menu to close it.
10. Double-tap the **Acquisition** badge and set the **Acquisition Mode** to **Average**.
11. Set the **Number of Waveforms** to **16**.
12. Tap outside the menu to close it.
13. Double-tap the **Trigger** badge and set the **Source** to **AC line**.
14. Tap outside the menu to close it.
15. Add a Mean amplitude measurement for channel 1 to the Results bar:
  - a. Tap the **Add New... Measure** button to open the **Add Measurements** menu.
  - b. Set the **Source** to **Ch 1**.
  - c. In the **Amplitude Measurements** panel, double-tap the **Mean** button to add the **Mean** measurement badge to the Results bar.
16. Tap outside the menu to close it.
17. Double-tap the **Mean** results badge.
18. Tap **Show Statistics in Badge**.
19. Tap **FILTER/LIMIT RESULTS** to open the panel.
20. Tap **Limit Measurement Population** to toggle it to **On**.
21. Tap outside the menu to close it.
22. Enter the mean value as the test result in the test record.
23. Repeat steps 6 through 22 for each vertical scale setting in the test record.
24. Repeat steps 3 through 23 for each bandwidth setting in the test record table.
25. *Repeat the channel tests at 1 M $\Omega$  impedance as follows:*
  - a. Double-tap the channel 1 badge.
  - b. Set the **Termination** to **1M  $\Omega$** .
  - c. Repeat steps 8 through 24.
26. *Repeat the procedure for all remaining channels as follows:*
  - a. Move the 50  $\Omega$  terminator to the next channel input to be tested.
  - b. Double-tap the channel badge of the channel that you have finished testing and set **Display** to **Off**.

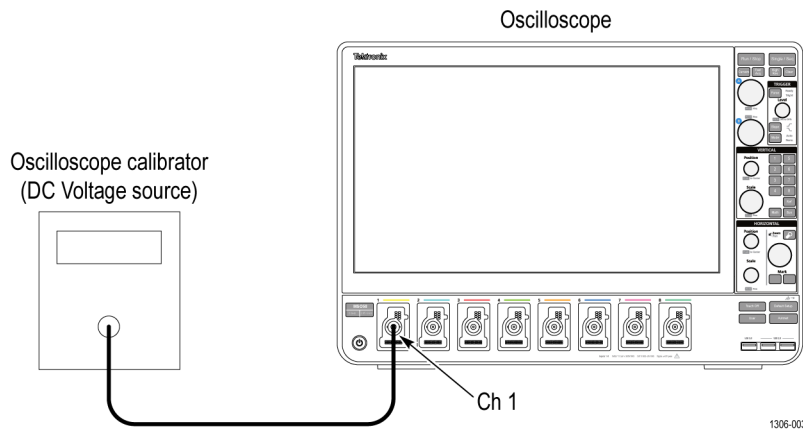
- c. Tap the channel button on the Settings bar of the next channel to test.
  - d. Starting from step 6, repeat the procedures until all channels have been tested. To change the source for the Mean measurement for each channel test:
    - a. Double-tap the **Mean** measurement badge.
    - b. Tap the **Configure** panel.
    - c. Tap the **Source 1** field and select the next channel to test.
27. Tap outside the menu area to close the configuration menu.

## Check DC gain accuracy

This test checks the DC gain accuracy.

To access the user interface on the MSO58LP, see [Prerequisites](#) on page 175.

1. Connect the oscilloscope to a calibrated DC voltage source. If you are using the Fluke 9500 calibrator, connect the calibrator head to the oscilloscope channel to test.



**WARNING.** Set the generator output to Off or 0 volts before connecting, disconnecting, and/or moving the test hookup during the performance of this procedure. The generator is capable of providing dangerous voltages.

2. Tap **File > Default Setup**.
3. Double-tap the **Acquisition** badge and set **Acquisition Mode** to **Average**.
4. Set the **Number of Waveforms** to **16**.
5. Tap outside the menu to close the menu.
6. Double-tap the **Trigger** badge and set the trigger **Source** to **AC line**.
7. Tap outside the menu to close it.
8. Add the **Mean** measurement to the Results bar:
  - a. Tap the **Add New... Measure** button to open the **Add Measurements** menu.
  - b. Set the **Source** to **Ch 1**.
  - c. In the **Amplitude Measurements** panel, double-tap the **Mean** button to add the Mean measurement badge to the Results bar.

9. Tap outside the menu to close it.
10. Double-tap the **Mean** results badge.
11. Tap **Show Statistics in Badge**.
12. Tap **FILTER/LIMIT RESULTS** to open the panel.
13. Tap **Limit Measurement Population** to toggle it to **On**.
14. Tap outside the menu to close it.
15. Tap the channel button of the channel to test, to add the channel badge to the Settings bar.
16. Double tap the channel to test badge to open its menu and set the channel settings:
  - a. Set **Vertical Scale** to **1 mV/div**.
  - b. Set **Termination** to **50  $\Omega$** .
  - c. Tap **Bandwidth Limit** and set to **20 MHz**.
  - d. Tap outside the menu to close it.
17. Record the negative-measured and positive-measured mean readings in the *Gain expected worksheet* as follows:
  - a. On the calibrator, set the DC Voltage Source to the  $V_{\text{negative}}$  value as listed in the 1 mV row of the worksheet.
  - b. Double-tap the **Acquisition** badge and tap **Clear** to reset the measurement statistics.
  - c. Enter the **Mean** reading in the worksheet as  $V_{\text{negative-measured}}$ .
  - d. On the calibrator, set the DC Voltage Source to  $V_{\text{positive}}$  value as listed in the 1 mV row of the worksheet.
  - e. Double-tap the **Acquisition** badge (if not open) and tap **Clear**.
  - f. Enter the **Mean** reading in the worksheet as  $V_{\text{positive-measured}}$ .

**Table 3: Gain expected worksheet**

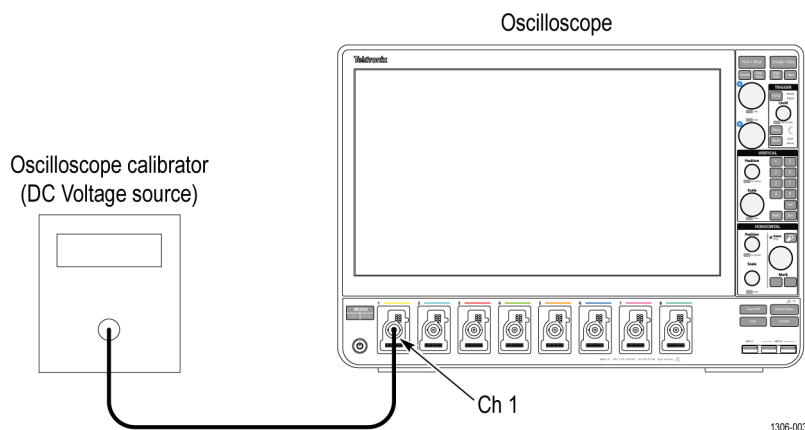
Oscilloscope Vertical Scale Setting	$V_{\text{diffExpected}}$	$V_{\text{negative}}$	$V_{\text{positive}}$	$V_{\text{negative-measured}}$	$V_{\text{positive-measured}}$	$V_{\text{diff}}$	Test Result (Gain Accuracy)
1 mV/div	9 mV	-4.5 mV	+4.5 mV				
2 mV/div	18 mV	-9 mV	+9 mV				
5 mV/div	45 mV	-22.5 mV	+22.5 mV				
10 mV/div	90 mV	-45 mV	+45 mV				
20 mV/div	180 mV	-90 mV	+90 mV				
50 mV/div	450 mV	-225 mV	+225 mV				
100 mV/div	900 mV	-450 mV	+450 mV				
200 mV/div	1800 mV	-900 mV	+900 mV				
500 mV/div	4900 mV	-2450 mV	+2450 mV				
1.0 V/div	9000 mV	-4500 mV	+4500 mV				
20 mV/div at 250 MHz	180 mV	-90 mV	+90 mV				
20 mV/div at Full bandwidth	180 mV	-90 mV	+90 mV				

18. Calculate Gain Accuracy as follows:
  - a. Calculate  $V_{diff}$  as follows:
 
$$V_{diff} = |V_{negative-measured} - V_{positive-measured}|$$
  - b. Enter  $V_{diff}$  in the worksheet.
  - c. Calculate *Gain Accuracy* as follows:
 
$$Gain\ Accuracy = ((V_{diff} - V_{diffExpected}) / V_{diffExpected}) \times 100\%$$
  - d. Enter the *Gain Accuracy* value in the worksheet and in the test record.
19. Repeat steps 16 through 18 for all vertical scale settings in the work sheet and the test record.
20. Repeat tests at 1 MΩ impedance as follows:
  - a. Set the calibrator to 0 volts and 1 MΩ output impedance.
  - b. Double-tap the badge of the channel being tested.
  - c. Set the **Termination** to 1 MΩ
  - d. Repeat steps 16 through 19 for all vertical scale settings in the test record.
21. Repeat the procedure for all remaining channels:
  - a. Set the calibrator to 0 volts and 50 Ω output impedance.
  - b. Move the calibrator output to the next channel input to be tested.
  - c. Double-tap the channel badge of the channel that you have finished testing and set **Display** to **Off**.
  - d. Double-tap the **Mean** measurement badge.
  - e. Tap the **Configure** panel.
  - f. Tap the **Source 1** field and select the next channel to test.
  - g. Starting from step 16, set the values from the test record for the channel under test, and repeat the above steps until all channels have been tested.
22. Touch outside a menu to close the menu.

## Check DC offset accuracy

This test checks the offset accuracy at 50 Ω and 1 MΩ input impedances.

1. Connect the oscilloscope to a calibrated DC voltage source. If you are using the Fluke 9500B calibrator as the DC voltage source, connect the calibrator head to the oscilloscope channel 1.



**WARNING.** Set the generator output to Off or 0 volts before connecting, disconnecting, or moving the test hookup during the performance of this procedure. The generator is capable of providing dangerous voltages.

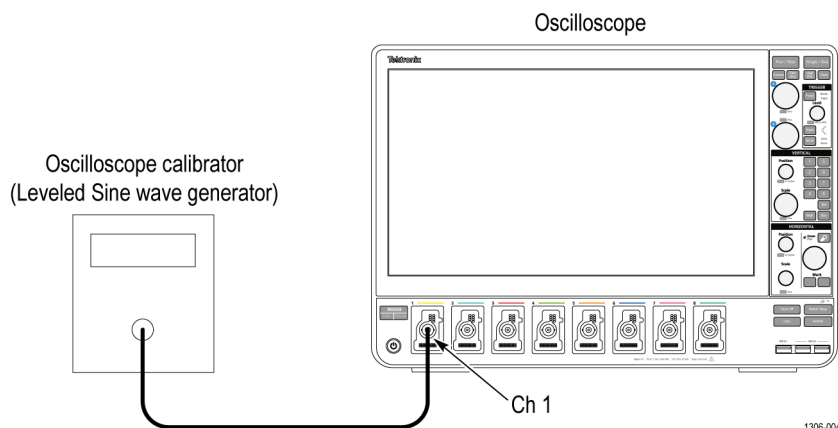
2. Tap **File > Default Setup**.
3. Double-tap the **Acquisition** badge and set **Acquisition Mode** to **Average**.
4. Set the **Number of Waveforms** to **16**.
5. Tap outside the menu to close the menu.
6. Double-tap the **Trigger** badge and set the trigger **Source** to **AC line**.
7. Add the **Mean** measurement to the Results bar:
  - a. Tap the **Add New... Measure** button to open the **Add Measurements** menu.
  - b. Set the **Source** to **Ch 1**.
  - c. In the **Amplitude Measurements** panel, double-tap the **Mean** button to add the Mean measurement badge to the Results bar.
8. Tap outside the menu to close it.
9. Double-tap the **Mean** results badge.
10. Tap **Show Statistics in Badge**.
11. Tap **FILTER/LIMIT RESULTS** to open the panel.
12. Tap **Limit Measurement Population** to toggle it to **On**.
13. Tap outside the menu to close it.
14. Tap the channel button (starting with channel 1) on the Settings bar to add the channel under test to the Settings bar.
15. Double-tap the channel under test badge to open its configuration menu and change the vertical settings:
  - a. Set **Vertical Scale** to **1 mV/div**.
  - b. Set **Offset** to **900 mV**.
  - c. Set **Position** to 0 by tapping **Set to 0**.
  - d. Set **Termination** to **50  $\Omega$** .

- e. Tap **Bandwidth Limit** and set to **20 MHz**.
  - f. Tap outside the menu to close it.
16. Set the calibrator output to **+900 mV**, as shown in the test record, and turn the calibrator output On.
  17. Enter the Mean measurement value in the test record.
  18. Double-tap the channel under test badge to open its configuration menu and change the **Offset** to **-900 mV**.
  19. Set the calibrator output to **-900 mV**, as shown in the test record.
  20. Enter the Mean measurement value in the test record.
  21. Repeat step 15 through 20, changing the channel vertical settings and the calibrator output as listed in the test record for the channel under test.
  22. *Repeat the channel tests at 1 M $\Omega$  impedance as follows:*
    - a. Set the calibrator output to Off or 0 volts.
    - b. Change the calibrator impedance to **1 M $\Omega$**  and voltage to **+900 mV**.
    - c. Turn the calibrator output On.
    - d. Repeat steps 15 through 20, changing the channel **Termination** to **1 M $\Omega$**  and the vertical Offset value and the calibrator output as listed in the 1 M $\Omega$  test record for the channel under test.
  23. *Repeat the procedure for all remaining channels as follows:*
    - a. Double-tap the **Mean** measurement badge.
    - b. Tap the **Configure** panel.
    - c. Tap the **Source 1** field and select the next channel to test.
    - d. Set the calibrator to **0** volts and **50  $\Omega$**  output impedance.
    - e. Move the calibrator output to the next channel input to test.
    - f. Double-tap the channel badge of the channel that you have finished testing and set **Display** to **Off**.
    - g. Tap the channel button on the oscilloscope Settings bar of the next channel to test.
    - h. Starting from step 2, repeat the procedure until all channels have been tested.

## Check analog bandwidth

This test checks the bandwidth at 50  $\Omega$  and 1 M $\Omega$  terminations for each channel. The typical bandwidth at 1 M $\Omega$  termination is checked on the products as a functional check.

1. Connect the output of the calibrated leveled sine wave generator to the oscilloscope channel 1 input as shown in the following illustration.



**WARNING.** Set the generator to off or 0 volts before connecting, disconnecting, and/or moving the test hookup during the performance of this procedure. The generator is capable of providing dangerous voltages.

2. Tap **File > Default Setup** to reset the instrument and add the channel 1 badge and signal to the display.
3. Add the peak-to-peak measurement as follows:
  - a. Tap the **Add New. Measure** button.
  - b. Set the **Source** to the channel under test.
  - c. In the **Amplitude Measurements** panel, double-tap the **Peak-to-Peak** measurement button to add the measurement badge to the Results bar.
  - d. Tap outside the menu to close it.
  - e. Double-tap the **Peak-to-Peak** results badge.
  - f. Tap **Show Statistics in Badge**.
  - g. Tap **FILTER/LIMIT RESULTS** to open the panel.
  - h. Tap **Limit Measurement Population** to toggle it to **On**.
  - i. Tap outside the menu to close it.
4. Set the channel under test settings:
  - a. Double-tap the badge of the channel under test to open its configuration menu.
  - b. Set **Vertical Scale** to **1 mV/div**.
  - c. Set **Termination** to **50 Ω**.
  - d. Tap outside the menu to close it.
5. Adjust the leveled sine wave signal source to display a waveform of 8 vertical divisions at the selected vertical scale with a set frequency of **10 MHz**. For example, at 5 mV/div, use a  $\geq 40$  mV<sub>p-p</sub> signal; at 2 mV/div, use a  $\geq 16$  mV<sub>p-p</sub> signal.

**NOTE.** At some V/div settings, the generator may not provide 8 vertical divisions of signal. Set the generator output to obtain as many vertical divisions of signal as possible.

6. Double-tap the **Horizontal** badge in the Settings bar.



7. Set the **Horizontal Scale** to **1 ms/division**.
8. Tap outside the menu to close it.
9. Record the **Peak-to-Peak** measurement in the  $V_{in-pp}$  entry of the test record.
10. Double-tap the **Horizontal** badge in the Settings bar.
11. Set the **Horizontal Scale** to **4 ns/division**.
12. Adjust the signal source to the maximum bandwidth frequency for the bandwidth and model being tested, as shown in [Table 4: Maximum bandwidth frequency worksheet](#) on page 186.
13. *Record the peak-to-peak measurement as follows:*

- a. Record the **Peak-to-Peak** measurement at the new frequency in the  $V_{bw-pp}$  entry of the test record.

**NOTE.** For more information on the contents of this table, refer to the bandwidth specifications.

**Table 4: Maximum bandwidth frequency worksheet**

Impedance	Vertical Scale	Maximum bandwidth
<b>2 GHz models</b>		
50 $\Omega$	10 mV/div - 1 V/div	2 GHz
	5 mV/div - 9.95 mV/div	1.5 GHz
	2 mV/div - 4.98 mV/div	350 MHz
	1 mV/div - 1.99 mV/div	175 MHz
1 M $\Omega$	5 mV/div - 1 V/div	500 MHz, typical
	2 mV/div - 4.98 mV/div	500 MHz, typical
	1 mV/div - 1.99 mV/div	500 MHz, typical
<b>1 GHz models (including MSO58LP)</b>		
50 $\Omega$	5 mV/div - 1 V/div	1 GHz
	2 mV/div - 4.98 mV/div	1 GHz
	1 mV/div - 1.99 mV/div	1 GHz
1 M $\Omega$	5 mV/div - 1 V/div	500 MHz, typical
	2 mV/div - 4.98 mV/div	500 MHz, typical
	1 mV/div - 1.99 mV/div	500 MHz, typical
<b>500 MHz models</b>		
50 $\Omega$	5 mV/div - 1 V/div	500 MHz
	2 mV/div - 4.98 mV/div	500 MHz
	1 mV/div - 1.99 mV/div	500 MHz
1 M $\Omega$	5 mV/div - 1 V/div	500 MHz, typical
	2 mV/div - 4.98 mV/div	500 MHz, typical
	1 mV/div - 1.99 mV/div	500 MHz, typical
<b>350 MHz models</b>		
50 $\Omega$	2 mV/div - 1 V/div	350 MHz
	1 mV/div - 1.99 mV/div	350 MHz
1 M $\Omega$	5 mV/div - 1 V/div	350 MHz, typical
	2 mV/div - 4.98 mV/div	350 MHz, typical
	1 mV/div - 1.99 mV/div	350 MHz, typical

14. Use the values of  $V_{bw-pp}$  and  $V_{in-pp}$  recorded in the test record, and the following equation, to calculate the Gain at bandwidth:

$$Gain = V_{bw-pp} / V_{in-pp}.$$

To pass the performance measurement test, Gain should be  $\geq 0.707$ . Enter *Gain* in the test record.

15. Repeat steps 4 through 14 for all combinations of Vertical Scale and Horizontal Scale settings listed in the test record.

16. Repeat the tests at 1 M $\Omega$  impedance as follows:
  - a. Set the calibrator output to Off or 0 volts.
  - b. Change the calibrator impedance to 1 M $\Omega$ .
  - c. Double-tap the badge of the channel under test to open its menu.
  - d. Set the **Termination** to 1 M $\Omega$ .
  - e. Repeat steps 4 through 16, but leave the termination set to 1 M $\Omega$ .
17. Repeat the test for all remaining channels as follows:
  - a. Set the calibrator to 0 volts and 50  $\Omega$  output impedance.
  - b. Move the calibrator output to the next channel input to be tested.
  - c. Double-tap the channel badge of the channel that you have finished testing and set **Display** to Off.
  - d. Tap the channel button on the oscilloscope Settings bar of the next channel to test.
  - e. Double-tap the **Peak-to-Peak** measurement badge.
  - f. Tap the **Configure** panel.
  - g. Tap the **Source 1** field and select the next channel to test.
  - h. Starting from step 4, repeat the procedure until all channels have been tested.

## Check random noise, sample acquisition mode

This test checks random noise at 1 M $\Omega$  and 50  $\Omega$  for each channel, in Sample acquisition mode. You do not need to connect any test equipment to the oscilloscope for this test.

1. Disconnect everything from the oscilloscope inputs.
2. Tap **File > Default Setup**.
3. Add the **AC RMS** measurement:
  - a. Tap the **Add New... Measure** button.
  - b. Set the **Source** to the channel being tested.
  - c. In the **Amplitude Measurements** panel, double-tap the **AC RMS** measurement button to add the measurement badge to the Results bar.
  - d. Tap outside the menu to close it.
  - e. Double-tap the **AC RMS** measurement badge and tap **Show Statistics in Badge** to display statistics in the measurement badge.
  - f. Tap the **Filter / Limit Results** panel.
  - g. Turn on **Limit Measurement Population**.
  - h. Set the limit to 100.
  - i. Tap outside the menu to close it.
4. Set up the Horizontal mode:
  - a. Double-tap the **Horizontal** setting badge.
  - b. Set **Horizontal Mode** to **Manual**.
  - c. Set the **Sample Rate** to 6.25 GS/s.

- d. Set the **Record Length** to **2 Mpts**.
  - e. Tap outside the menu to close it.
5. Double-tap the Channel badge of the channel being tested.
6. Set the **Vertical Scale** value to **1 mV**.
7. *Check 1 M  $\Omega$  termination as follows:*
  - a. In the Channel badge menu, tap **1 M  $\Omega$  termination**.
  - b. Tap the **Bandwidth Limit** field and select the highest frequency listed.
  - c. Set the channel **Position** value to **340 mdivs**.
  - d. Once the measurement count (N) in the AC RMS measurement badge reaches 100, record the AC RMS Mean value (the  $\mu$  readout).
  - e. Set the channel vertical **Position** value to **360 mdivs**.
  - f. Once the measurement count (N) in the measurement badge reaches 100, record the AC RMS Mean value (the  $\mu$  readout).
  - g. Average the two values and record the result in the **1 mV/div > Full** row of the **1 M  $\Omega$**  column of the Test Result record.
  - h. In the channel badge menu, tap the **Bandwidth Limit** field and select **250 MHz**.
  - i. Set the channel vertical **Position** value to **340 mdivs**.
  - j. Once the measurement count (N) in the measurement badge reaches 100, record the AC RMS Mean value (the  $\mu$  readout).
  - k. Set the channel vertical **Position** value to **360 mdivs**.
  - l. Once the measurement count (N) in the measurement badge reaches 100, record the AC RMS Mean value (the  $\mu$  readout).
  - m. Average the two values and record the result in the **1 mV/div > 250MHz limit** row of the **1 M  $\Omega$**  column of the Test Result record.
  - n. Tap the **Bandwidth Limit** field and select **20 MHz**.
  - o. Set the channel vertical **Position** value to **340 mdivs**.
  - p. Once the measurement count (N) in the measurement badge reaches 100, record the AC RMS Mean value (the  $\mu$  readout).
  - q. Set the channel vertical **Position** value to **360 mdivs**.
  - r. Once the measurement count (N) in the measurement badge reaches 100, record the AC RMS Mean value (the  $\mu$  readout).
  - s. Average the two values and record the result in the **1 mV/div > 20MHz limit** row of the **1 M  $\Omega$**  column of the Test Result record.
8. *Check 50  $\Omega$  termination as follows:*
  - a. In the Channel badge, set **Termination** to **50  $\Omega$** .
  - b. Tap the **Bandwidth Limit** field and select the highest frequency listed.
  - c. Set the channel vertical **Position** value to **340 mdivs**.
  - d. Once the measurement count (N) in the measurement badge reaches 100, record the AC RMS Mean value (the  $\mu$  readout).
  - e. Set the channel vertical **Position** value to **360 mdivs**.

- f. Once the measurement count (N) in the measurement badge reaches 100, record the AC RMS Mean value (the  $\mu$  readout).
- g. Average the two values and record the result in the **1 mV/div > Full** row of the **50  $\Omega$**  column of the Test Result record.
- h. Tap the **Bandwidth Limit** field and select **250 MHz**.
- i. Set the channel vertical **Position** value to **340 mdivs**.
- j. Once the measurement count (N) in the measurement badge reaches 100, record the AC RMS Mean value (the  $\mu$  readout).
- k. Set the channel vertical **Position** value to **360 mdivs**.
- l. Once the measurement count (N) in the measurement badge reaches 100, record the AC RMS Mean value (the  $\mu$  readout).
- m. Average the two values and record the result in the **1 mV/div > 250MHz limit** row of the **50  $\Omega$**  column of the Test Result record.
- n. Tap the **Bandwidth Limit** field and select **20 MHz**.
- o. Set the channel vertical **Position** value to **340 mdivs**.
- p. Once the measurement count (N) in the measurement badge reaches 100, record the AC RMS Mean value (the  $\mu$  readout).
- q. Set the channel vertical **Position** value to **360 mdivs**.
- r. Once the measurement count (N) in the measurement badge reaches 100, record the AC RMS Mean value (the  $\mu$  readout).
- s. Average the two values and record the result in the **1 mV/div > 20MHz limit** row of the **50  $\Omega$**  column of the Test Result record.
9. *Repeat 1 M $\Omega$  and 50  $\Omega$  tests at all V/div settings for the current channel:*
  - a. In the Channel badge, set the **Vertical Scale** setting to the next value in the test record (2 mV, 5 mV, and so on, up to 1 V/div).
  - b. Repeat steps 7 through 8.
10. *Repeat all tests for the remaining input channels:*
  - a. Double-tap the **AC RMS** measurement badge.
  - b. Tap the **Configure** panel.
  - c. Tap the **Source 1** field and select the next channel to test.
  - d. Double-tap the channel badge of the channel that you have finished testing and set **Display** to **Off**.
  - e. Tap the channel button on the oscilloscope Settings bar of the next channel to test.
  - f. Double-tap the channel badge for the channel being tested.
  - g. Starting at step 6, repeat these procedures for each input channel.

## Check random noise, High Res mode

This test checks random noise at 1 M  $\Omega$  and 50  $\Omega$  for each channel in High Res acquisition mode. You do not need to connect any test equipment to the oscilloscope for this test.

1. Disconnect everything from the oscilloscope inputs.
2. Tap **File > Default Setup**.
3. Double-tap the **Acquisition** badge and set **Acquisition Mode** to **High Res**.

4. Add the **AC RMS** measurement:
  - a. Tap the **Add New... Measure** button to open the **Add Measurements** menu.
  - b. Set the **Source** to the channel being tested.
  - c. In the **Amplitude Measurements** panel, double-tap the **AC RMS** button to add the measurement badge to the Results bar.
  - d. Tap outside the menu to close it.
  - e. Double-tap the **AC RMS** measurement badge and tap **Show Statistics in Badge** to display statistics in the measurement badge.
  - f. Tap the **Filter/Limit Results** panel.
  - g. Turn on **Limit Measurement Population**.
  - h. Set the limit to **100**.
  - i. Tap outside the menu to close it.
5. Set up the Horizontal mode:
  - a. Double-tap the **Horizontal** setting badge.
  - b. Set Horizontal Mode to **Manual**.
  - c. Set the Sample rate to **6.25 GS/s**.
  - d. Set the Record Length to **2 Mpts**.
  - e. Tap outside the menu to close it.
6. Check **1 M  $\Omega$**  termination as follows:
  - a. Double-tap the Channel badge of the channel being tested.
  - b. Set the **Vertical Scale** value to **1 mV**.
  - c. Set **Termination** to **1 M  $\Omega$** .
  - d. Tap the **Bandwidth Limit** field and select the highest frequency listed.
  - e. Set the channel **Position** value to **340 mdivs**.
  - f. Once the measurement count (N) in the measurement badge reaches 100, record the AC RMS Mean value (the  $\mu$  readout).
  - g. Set the channel **Position** value to **-340 mdivs**.
  - h. Once the measurement count (N) in the measurement badge reaches 100, record the AC RMS Mean value (the  $\mu$  readout).
  - i. Average the two values and record the result in the **1 mV/div > Full** row of the **1 M  $\Omega$**  column of the random noise, High Res mode Test Result record.
  - j. Tap the **Bandwidth Limit** field and select **250 MHz**.
  - k. Set the channel **Position** value to **340 mdivs**.
  - l. Once the measurement count (N) in the measurement badge reaches 100, record the AC RMS Mean value (the  $\mu$  readout).
  - m. Set the channel **Position** value to **-340 mdivs**.
  - n. Once the measurement count (N) in the measurement badge reaches 100, record the AC RMS Mean value (the  $\mu$  readout).

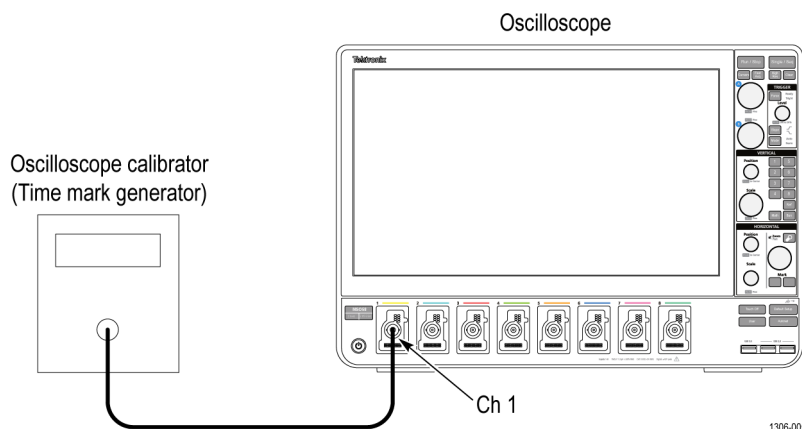
- o. Average the two values and record the result in the **1 mV/div > 250MHz limit** row of the **1 M $\Omega$**  column of the random noise, High Res mode Test Result record.
  - p. Tap the **Bandwidth Limit** field and select **20 MHz**.
  - q. Set the channel **Position** value to **340 mdivs**.
  - r. Once the measurement count (N) in the measurement badge reaches 100, record the AC RMS Mean value (the  $\mu$  readout).
  - s. Set the channel **Position** value to **-340 mdivs**.
  - t. Once the measurement count (N) in the measurement badge reaches 100, record the AC RMS Mean value (the  $\mu$  readout).
  - u. Average the two values and record the result in the **1 mV/div > 20MHz limit** row of the **1 M $\Omega$**  column of the random noise, High Res mode Test Result record.
7. Check **50  $\Omega$**  termination as follows:
- a. In the Channel badge, set **Termination** to **50  $\Omega$** .
  - b. Tap the **Bandwidth Limit** field and select the highest frequency listed.
  - c. Set the channel **Position** value to **340 mdivs**.
  - d. Once the measurement count (N) in the measurement badge reaches 100, record the AC RMS Mean value (the  $\mu$  readout).
  - e. Set the channel **Position** value to **-340 mdivs**.
  - f. Once the measurement count (N) in the measurement badge reaches 100, record the AC RMS Mean value (the  $\mu$  readout).
  - g. Average the two values and record the result in the **1 mV/div > Full** row of the **50  $\Omega$**  column of the random noise, High Res mode Test Result record.
  - h. Tap the **Bandwidth Limit** field and select **250 MHz**.
  - i. Set the channel **Position** value to **340 mdivs**.
  - j. Once the measurement count (N) in the measurement badge reaches 100, record the AC RMS Mean value (the  $\mu$  readout).
  - k. Set the channel **Position** value to **-340 mdivs**.
  - l. Once the measurement count (N) in the measurement badge reaches 100, record the AC RMS Mean value (the  $\mu$  readout).
  - m. Average the two values and record the result in the **1 mV/div > 250MHz limit** row of the **50  $\Omega$**  column of the random noise, High Res mode Test Result record.
  - n. Tap the **Bandwidth Limit** field and select **20 MHz**.
  - o. Set the channel **Position** value to **340 mdivs**.
  - p. Once the measurement count (N) in the measurement badge reaches 100, record the AC RMS Mean value (the  $\mu$  readout).
  - q. Set the channel **Position** value to **-340 mdivs**.
  - r. Once the measurement count (N) in the measurement badge reaches 100, record the AC RMS Mean value (the  $\mu$  readout).
  - s. Average the two values and record the result in the **1 mV/div > 20MHz limit** row of the **50  $\Omega$**  column of the random noise, High Res mode Test Result record.

8. Repeat 1 M $\Omega$  and 50  $\Omega$  tests at all V/div settings for the current channel:
  - a. In the Channel badge, set the **Vertical Scale** setting to the next value in the test record (2 mV, 5 mV, and so on, up to 1 V/div).
  - b. Repeat steps 6 through 7.
9. Repeat all tests for the remaining input channels:
  - a. Double-tap the **AC RMS** measurement badge.
  - b. Tap the **Configure** panel.
  - c. Tap the **Source 1** field and select the next channel to test.
  - d. Double-tap the channel badge of the channel that you have finished testing and set **Display** to **Off**.
  - e. Tap the channel button on the oscilloscope Settings bar of the next channel to test.
  - f. Double-tap the channel badge for the channel being tested.
  - g. Starting at step 6, repeat these procedures for each input channel.

## Check long term sample rate

This test checks the sample rate and delay time accuracy (time base).

1. Connect the output of a time mark generator to the oscilloscope channel 1 input using a 50  $\Omega$  cable, as shown in the following illustration.



**WARNING.** Set the generator output to off or 0 volts before connecting, disconnecting, and/or moving the test hookup during the performance of this procedure. The generator is capable of providing dangerous voltages.

2. Set the time mark generator period to **80 ms**. Use a time mark waveform with a fast rising edge.
3. If it is adjustable, set the time mark amplitude to approximately **2 V<sub>p.p.</sub>**.
4. Tap **File > Default Setup**.
5. Tap the channel **1** button on the Settings bar.
6. Double-tap the Channel 1 badge to open its Configuration menu.



7. Set **Termination** to **50  $\Omega$** .
8. Set **Vertical Scale** to **500 mV**.
9. Set the **Position** value to center the time mark signal on the screen.
10. Tap outside the menu area to close it.
11. Double-tap the **Horizontal** settings badge.
12. Set the **Horizontal Scale** to **100 ns/div**.
13. Tap outside the menu area to close it.
14. Double-tap the **Trigger** settings badge.
15. Set **Source** to the channel being tested.
16. Set the **Level** as necessary for a triggered display.
17. Tap outside the menu area to close it.
18. Double-tap the **Horizontal** settings badge.
19. Adjust the **Position** value to move the trigger point to the center of the screen.
20. Turn **Delay** to **On** and set **Position** to **80 ms**.
21. Set the **Horizontal Scale** to **100 ns/div**.
22. Observe where the rising edge of the marker crosses the center horizontal graticule line. The rising edge should cross within  $\pm 2$  divisions of the vertical center graticule. Enter the deviation in the test record.

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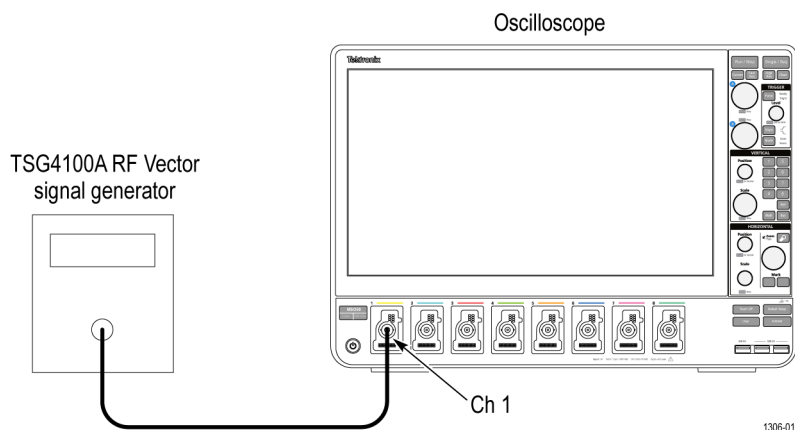
**NOTE.** A  $2.5 \times 10^{-6}$  time base error is 2 divisions of displacement.

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## Check delta time measurement accuracy

This test checks the Delta-time measurement accuracy for a given instrument setting and input signal.

1. Connect a 50  $\Omega$  coaxial cable from the signal source to the oscilloscope channel 1, as shown in the following illustration.



**WARNING.** Set the generator output to Off or 0 volts before connecting, disconnecting, or moving the test hookup during the performance of this procedure. The generator is capable of providing dangerous voltages.

2. Tap **File > Default Setup**.

3. Double-tap the badge of the channel under test to open its configuration menu.
4. Set the **Vertical Scale** to **5 mV/div**.
5. Set **Termination** to **50  $\Omega$** .
6. Tap outside the menu to close it.
7. Double-tap the **Horizontal** badge in the Settings bar.
8. Set the **Horizontal Scale** to **10 ns/div**.
9. Set the **Horizontal Mode** to **Manual**.
10. Set the **Sample Rate** to an unchecked value listed in the test record. Adjust the **Record Length** value until the correct **Horizontal Scale** value is set.
11. Tap outside the menu to close it.
12. Add a **Delay** measurement for the channel under test:
  - a. Tap the **Add New... Measure** button.
  - b. Tap the **Time Measurements** panel.
  - c. Double-tap the **Delay** measurement to add the measurement badge to the Results bar.
  - d. Tap outside the menu to close it.
13. Set the Delay measurement settings:
  - a. Double-tap the **Delay** measurement badge.
  - b. Check **Show Statistics in Badge**.
  - c. Tap the **Configure** panel.
  - d. Set both **Source 1** and **Source 2** to the channel under test.
  - e. Set **From Edge** to the rising edge button.
  - f. Set **To Edge** to the falling edge button.
  - g. Tap the **Reference Levels** panel.
  - h. Tap % in the **Set Levels In** control.
  - i. Tap the **Filter/Limit Results** panel.
  - j. Tap **Limit Measurement Population** to turn it on.
  - k. Set the **Limit** field to **500**.
  - l. Tap outside the menu to close it.
14. Check the performance as follows:
  - a. Set the calibrator signal source to the frequency and amplitude as shown in the test record.

---

**NOTE.** To provide consistent results, set the signal source frequency such that the zero crossing does not occur very close to the beginning or end of the record.

---

- b. Wait 5 - 10 seconds for the oscilloscope to acquire 500 samples before taking the reading.

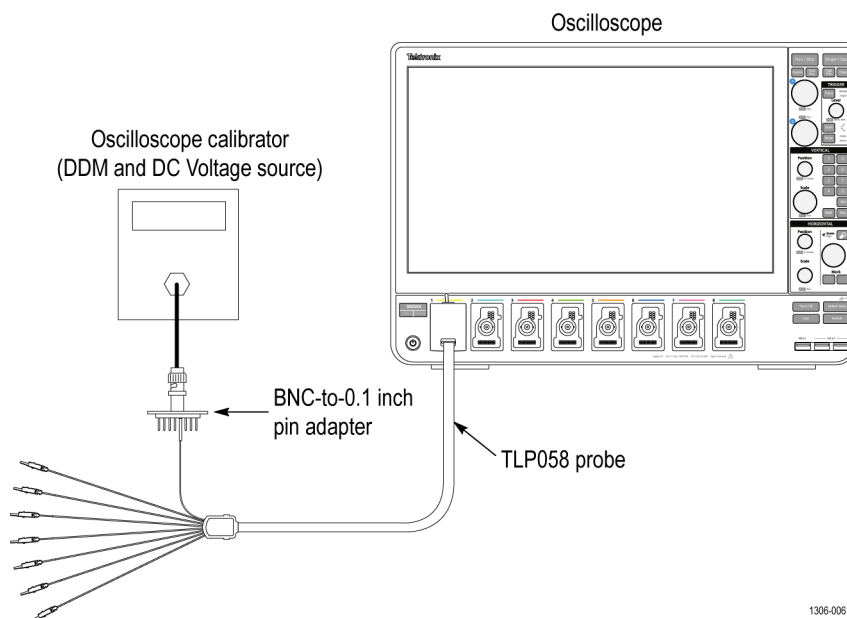
- c. Enter the standard deviation readout in the **Delay** measurement badge in the test record. The value should be less than the upper limit shown in the test record.
  - d. Repeat the check for each combination of oscilloscope and source signal settings in the test record.
15. Repeat tests for the remaining channels:
- a. Double-tap the channel badge of the channel that you have finished testing and set **Display** to **Off**.
  - b. Tap the channel button of the next channel to test.
  - c. Set the calibrator to **0** volts.
  - d. Move the calibrator output to the next channel input to be tested.
  - e. Repeat the procedure from step 3 until all channels have been tested. To change the source for the Delay measurement for each channel test:
    - a. Double-tap the **Delay** measurement badge.
    - b. Tap the **Configure** panel label.
    - c. Set the **Source 1** and **Source 1** fields to the next channel to test.

## Check digital threshold accuracy

This test checks the threshold accuracy of the logic probe digital channels D0-D7 at 0 V and 25 °C, for all oscilloscope input channels.

**NOTE.** Threshold Accuracy is a function of the logic probe only. It is a typical specification. The Threshold Accuracy test checks the typical logic probe performance, and may be considered a functional check of the oscilloscope digital input.

1. Connect the TLP058 digital probe to channel 1.



2. Connect the DC voltage source to digital channel **D0**.



**WARNING.** Set the generator output to Off or 0 volts before connecting, disconnecting, or moving the test hookup during the performance of this procedure. The generator is capable of providing dangerous voltages.

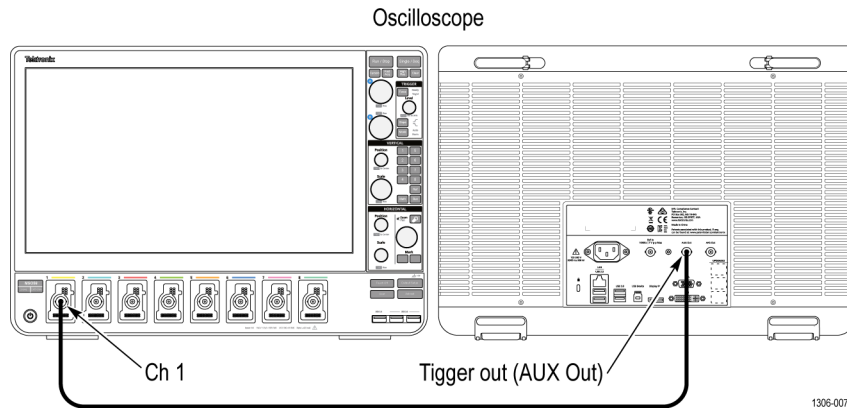
If you are using the Fluke 9500 calibrator as the DC voltage source, connect the calibrator head to the digital channel D0, using the BNC-to-0.1 inch pin adapter listed in the [Required equipment](#) table. Be sure to connect channel D0 to both the corresponding signal pin and to a ground pin on the adapter.

3. Tap **File > Default Setup**. This resets the instrument and adds the channel 1 badge and signal to the display.
4. *Display the digital channels and set the thresholds as follows:*
  - a. Double-tap the badge of the channel under test on the Settings bar.
  - b. Double-tap the **Threshold** field at the bottom of the menu and set the value to **0 V**.
  - c. Tap **Set All Thresholds**. All thresholds are now set for the 0 V threshold check.
  - d. Tap outside the menu to close it.
5. Double-tap the **Horizontal** badge in the Settings bar.
6. Set the **Horizontal Scale** to **10 ns/div**.
7. Tap outside the menu to close it.
8. Set the calibrator DC voltage output (Vs) to **-400 mV**.
9. Wait 1 second. Verify that the logic level is low on **D0**.
10. Increment Vs by **+10 mV**. Wait 1 second and check the logic level of the channel D0 signal display.  
If the signal level is a logic low or is alternating between high and low, continue to increment Vs by +10 mV, wait 1 second, and check the logic level until the logic state is a steady high.
11. Record this Vs value as **Vs-** for D0 of the test record.
12. Double-tap the **Trigger** badge and set the **Slope** to **Falling** edge.
13. Set the DC voltage source (Vs) to **+400 mV**.
14. Wait 1 second. Verify that the logic level is high.
15. Decrement Vs by **-10 mV**. Wait 1 second and check the logic level of the channel D0 signal display.  
If the signal level is a logic high or is alternating between high and low, continue to decrement Vs by -10 mV, wait 1 second, and check the logic level until the logic state is a steady low.
16. Record this Vs value as **Vs+** for D0 of the test record.
17. Find the average using this formula:  $V_{sAvg} = (V_{s-} + V_{s+})/2$ .
18. Record the average as the test result for D0 in the test record. The test result should be between the low and high limits.
19. *Repeat the procedure for all remaining digital channels as follows:*
  - a. Connect the next digital channel to be tested (D1, D2, and so on) to the DC voltage source.
  - b. Repeat steps 8 through 19, until all digital channels have been tested for this input channel.
20. *Repeat the procedure for all remaining input channels as follows:*
  - a. Move the TLP058 digital probe from channel 1 to channel 2.
  - b. Set the generator output to 0 volts and Off.
  - c. Repeat steps starting at 2 for the channel being tested (channel 2, channel 3, and so on).

## Check AUX Out output voltage levels

This test checks the output voltage levels from the AUX Out connector.

1. Use a 50  $\Omega$  cable to connect the AUX Out signal from the rear of the instrument to the channel 1 input of the same instrument, as shown in the following illustration.



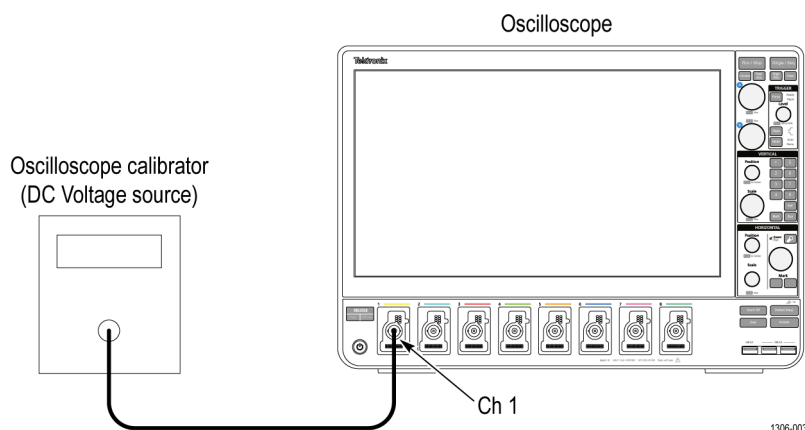
2. Tap **File > Default Setup**. This resets the instrument and adds the channel 1 badge and signal to the display.
3. Double-tap the badge of the channel 1 badge to open its configuration menu.
4. Set the **Vertical Scale** to **1 V/div**.
5. Tap outside the menu to close it.
6. Double-tap the **Horizontal** badge in the Settings bar.
7. Set the **Horizontal Scale** to **400 ns/div**.
8. Tap outside the menu to close it.
9. *Record the Maximum and Minimum measurements at 1 M $\Omega$  termination as follows:*
  - a. Tap the **Add New... Measure** button.
  - b. In the Amplitude Measurements panel, set the **Source** to **Ch 1**.
  - c. Double-tap the **Maximum** button to add the measurement badge to the Results bar.
  - d. Double-tap the **Minimum** button to add the measurement badge to the Results bar.
  - e. Tap outside the menu to close it.
  - f. Double-tap the **Maximum** results badge.
  - g. Tap **Show Statistics in Badge**.
  - h. Tap **FILTER/LIMIT RESULTS** to open the panel.
  - i. Tap **Limit Measurement Population** to toggle it to **On**.
  - j. Tap outside the menu to close it.
  - k. Double-tap the **Minimum** results badge.
  - l. Tap **Show Statistics in Badge**.
  - m. Tap **FILTER/LIMIT RESULTS** to open the panel.
  - n. Tap **Limit Measurement Population** to toggle it to **On**.

- o. Tap outside the menu to close it.
  - p. Enter the Maximum and Minimum measurement readings in the 1 M $\Omega$  row of the test record.
10. Record the Maximum and Minimum measurements at 50  $\Omega$  termination as follows:
- a. Double-tap the **Ch 1** badge to open its configuration menu.
  - b. Set **Termination** to 50  $\Omega$ .
  - c. Tap outside the menu to close it.
  - d. Enter the Maximum and Minimum measurement readings in the 50  $\Omega$  row of the test record.

## Check DVM voltage accuracy (DC)

This test checks the DC voltage accuracy of the Digital Volt Meter (DVM) option. The DVM option is available for free when you register the instrument at tek.com.

1. Connect the oscilloscope to a DC voltage source to run this test. If using the Fluke 9500 calibrator as the DC voltage source, connect the calibrator head to the oscilloscope channel to test.



**WARNING.** Set the generator output to Off or 0 volts before connecting, disconnecting, or moving the test hookup during the performance of this procedure. The generator is capable of providing dangerous voltages.

2. Set the calibrator impedance to 1 M $\Omega$ .
3. Tap **File > Default Setup**. This resets the instrument and adds the channel 1 badge and signal to the display.
4. Set the channel settings:
  - a. Double tap the badge of the channel under test to open its menu.
  - b. Check that **Position** is set to 0 divs. If not, set the position to 0 divisions.
  - c. Confirm that **Termination** is set to 1 M $\Omega$ .
  - d. Set the **Bandwidth Limit** to 20 MHz.
5. Set the calibrator impedance to 1 M $\Omega$ .
6. Double-tap the **Horizontal** badge and set **Horizontal Scale** to 1 ms/div.
7. Tap outside the menu to close it.
8. Double-tap the **Acquisition** badge and set the **Acquisition Mode** to **Average**.

9. Verify or set the **Number of Waveforms** to 16.
10. Tap outside the menu to close it.
11. Double-tap the **Trigger** badge and set the **Source** to **AC Line**.
12. Tap outside the menu to close it.
13. Tap the **DVM** button to add the DVM badge to the Results bar.
14. In the **DVM** menu, set **Source** to the channel to be tested.
15. Set **Mode** to **DC**.
16. Tap outside the menu to close it.
17. Set the calibrator to the input voltage shown in the test record (for example, –5 V for a 1V/div setting).
18. In the channel under test menu, set the **Offset** value to that shown in the test record (for example, –5 V for –5 V input and 1 V/div setting).
19. Set the **Vertical Scale** field to match the value in the test record (for example, 1 V/div).
20. Enter the measured value on the DVM badge into the DVM Voltage Accuracy Tests record.
21. Repeat the procedure (steps 17, 18, 19 and 20) for each volts/division setting shown in the test record.
22. Repeat all steps, starting with step 4, for each oscilloscope channel to check. To set the next channel to test:
  - a. Double tap the badge of the channel under test to open its menu.
  - b. Set **Display** to **Off**.
  - c. Tap the channel button in the Settings bar of the next channel to test to add that channel badge and signal to the display.

## Check DVM voltage accuracy (AC)

This test checks the AC voltage accuracy of the Digital Volt Meter (DVM) option. The DVM option is available for free when you register the instrument at tek.com.

1. Connect the output of the leveled square wave generator (for example, Fluke 9500) to the oscilloscope channel 1 input.



**WARNING.** Set the generator output to Off or 0 volts before connecting, disconnecting, or moving the test hookup during the performance of this procedure. The generator is capable of providing dangerous voltages.

2. Set the generator to **50  $\Omega$**  output impedance (50  $\Omega$  source impedance).
3. Set the generator to produce a square wave of the amplitude and frequency listed in the test record (for example, 20 mV<sub>pp</sub> at 1 kHz).
4. Tap **File > Default Setup** to reset the instrument and add the channel 1 badge and signal to the display.
5. Tap the **DVM** button to add the DVM badge to the Results bar.
6. Set the DVM **Mode** to **AC RMS**.
7. In the DVM menu, set **Source** to the channel to be tested.
8. Double-tap the channel badge of the channel being tested to open its configuration menu.
9. Set **Termination** to **50  $\Omega$** .
10. Use the **Vertical Scale** controls to set the signal height so that the signal covers between 4 and 8 vertical divisions on the screen.

11. Enter the DVM measured value in the test record.
12. Repeat steps 10 and 11 for each voltage and frequency combination shown in the record.
13. Repeat all steps to test all remaining oscilloscope channels. To set the next channel to test:
  - a. Double tap the badge of the channel under test to open its menu.
  - b. Set **Display** to **Off**.
  - c. Tap the channel button in the Settings bar of the next channel to test to add that channel badge and signal to the display.

## Check trigger frequency accuracy and maximum input frequency

This test checks trigger frequency counter accuracy. The trigger frequency counter is part of the free DVM and trigger frequency option that is available when you register the instrument at tek.com.

1. Tap **File > Default Setup** to reset the instrument and add the channel 1 badge and signal to the display.
2. Connect the **10 MHz Reference out** from the time mark generator to the **Ref In** connector on the back of the oscilloscope.
3. Connect the output of the time mark generator to the oscilloscope channel input being tested using a 50  $\Omega$  cable.

Set the time mark generator to a 50  $\Omega$  source and a fast rising edge waveform ( $\geq 3$  mV/ns).

4. Set the time mark generator frequency to the first value shown in the test record, starting at **100 Hz**.
5. Set the mark amplitude to **1 V<sub>pp</sub>**, which makes a 2 divisions high waveform.
6. Double-tap the channel badge being tested (starting with channel 1) and set **Termination** to **50  $\Omega$** .
7. Set the channel **Vertical Scale** to **500 mV/div**.
8. Tap outside the menu to close it.
9. Double-tap the **Acquisition** badge and set the **Timebase Reference Source** to **External (10 MHz)**.
10. Tap outside the menu to close it.
11. Double-tap the **Horizontal** badge and use the **Horizontal Scale** controls to display at least 2 cycles of the waveform.
12. Tap outside the menu to close it.
13. Double-tap the **Trigger** badge to open its menu.
  - a. Set the **Source** field to the input channel being tested.
  - b. Tap the **Set to 50%** button to obtain a stable display.
  - c. Tap the **Mode & Holdoff** panel to open the **Mode & Holdoff** configuration menu.
  - d. In the **Mode & Hold Off** menu, set the **Trigger Frequency Counter** to **On**. The trigger frequency readout is at the bottom of the Trigger badge.
  - e. Tap outside the menu to close it.
14. Double-tap the channel badge being tested (starting with channel 1) and use the **Position** controls to vertically center the time mark in the waveform graticule.
15. Enter the value of the trigger frequency (**F** readout in the **Trigger** badge) in the test record for that frequency.
16. Repeat this procedure for each frequency setting shown in the record. Make sure to adjust the Horizontal scale after each calibrator frequency change to show at least two cycles of the waveform on the screen.
17. Repeat all these steps to test each oscilloscope channel.

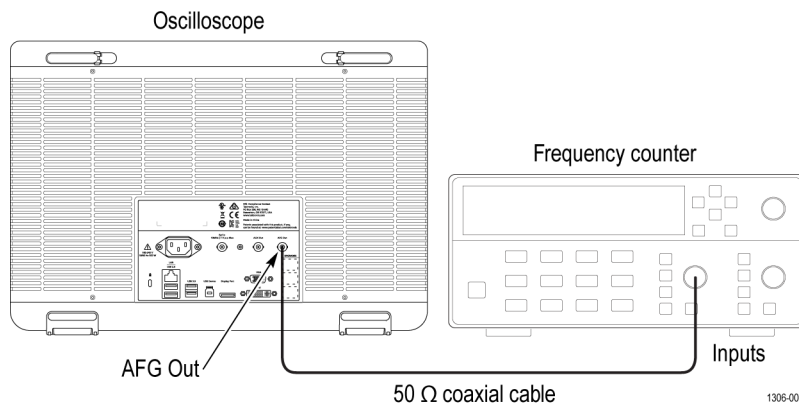


## Arbitrary function generator

### Check AFG sine and ramp frequency accuracy

This test verifies the frequency accuracy of the arbitrary function generator. All output frequencies are derived from a single internally generated frequency. Only one frequency point of channel 1 is required to be checked.

1. Connect a 50  $\Omega$  cable from the **AFG Out** connector to the frequency counter input as shown in the following figure.



**Figure 1: Frequency/period test**

2. Tap **File > Default Setup** to set the instrument to the factory default settings.
3. Tap the **AFG** button to open the **AFG** menu.
4. Set the arbitrary function generator output as follows:

Select menu	Setting
Output	On
Waveform Type	Sine
Frequency	1.000000 MHz
Amplitude	1.00 V <sub>PP</sub>

5. Turn on the frequency counter:
  - a. Double-tap the **Trigger** badge to open its menu.
  - b. Set the **Source** field to the input channel being tested.
  - c. Tap the **Set to 50%** button to obtain a stable display.
  - d. Tap the **Mode & Holdoff** panel to open the Mode & Holdoff configuration menu
  - e. In the Mode & Hold Off menu, set the **Trigger Frequency Counter** to **On**. The trigger frequency readout is at the bottom of the Trigger badge.
  - f. Tap outside the menu to close it.
6. Check that the reading of the frequency counter is between **0.999950 MHz** and **1.000050 MHz**. Enter the value in the Test record.
7. Set the arbitrary function generator output as follows:

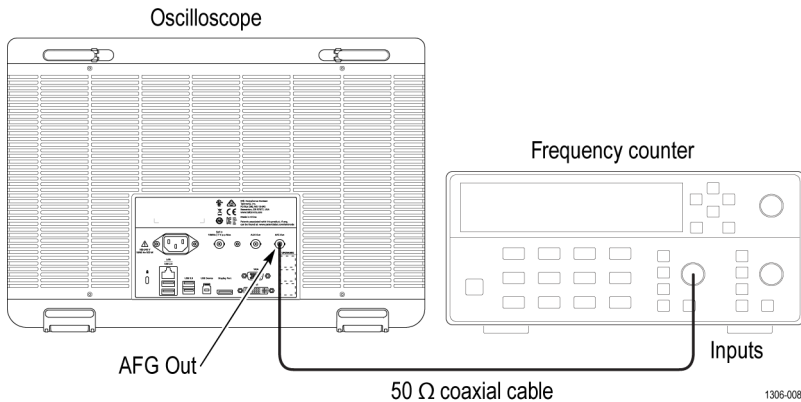
Select menu	Setting
Waveform Type	Ramp
Frequency	500 kHz

8. Check that reading of the frequency counter is between **499.975 kHz** and **500.025 kHz**. Enter the value in the Test record.

### Check AFG square and pulse frequency accuracy

This test verifies the frequency accuracy of the arbitrary function generator. All output frequencies are derived from a single internally generated frequency. Only one frequency point of channel 1 is required to be checked.

1. Connect the arbitrary function generator to the frequency counter as shown in the following figure.



**Figure 2: Frequency/period test**

2. Tap **File > Default Setup** to set the instrument to the factory default settings.
3. Tap the **AFG** button to open the AFG menu.
4. Set the arbitrary function generator as follows:

Select menu	Setting
Waveform Type	Square
Frequency	1.000000 MHz
Amplitude	1.00 V <sub>PP</sub>
Output	On

5. Turn on the frequency counter:
- a. Double-tap the **Trigger** badge to open its menu.
  - b. Set the **Source** field to the input channel being tested.
  - c. Tap the **Set to 50%** button to obtain a stable display.
  - d. Tap the **Mode & Holdoff** panel to open the Mode & Holdoff configuration menu
  - e. In the Mode & Hold Off menu, set the **Trigger Frequency Counter** to **On**. The trigger frequency readout is at the bottom of the Trigger badge.
  - f. Tap outside the menu to close it.
6. Check that the frequency counter readout is between **0.999950 MHz** and **1.00005 MHz**. Enter the value in the Test record.
7. Set up the arbitrary function generator as follows:

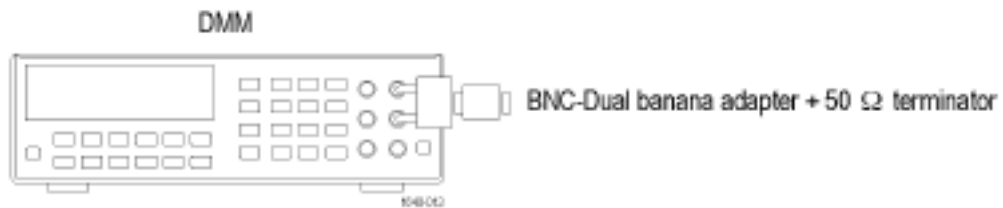
Select menu	Setting
Waveform Type	Pulse

- Check that reading of the frequency counter is between **0.999950 MHz** and **1.000050 MHz**. Enter the value in the Test record.

### Check AFG signal amplitude accuracy

This test verifies the amplitude accuracy of the arbitrary function generator. All output amplitudes are derived from a combination of attenuators and 3 dB variable gain. Some amplitude points are checked. This test uses a 50  $\Omega$  terminator. It is necessary to know the accuracy of the 50  $\Omega$  terminator in advance of this amplitude test. This accuracy is used as a calibration factor.

- Connect the 50  $\Omega$  terminator to the DMM as shown in the following figure and measure the resistance value.



**Figure 3: 50  $\Omega$  terminator accuracy**

- Calculate the 50  $\Omega$  calibration factor (CF) from the reading value and record as follows:

**Table 5: CF (Calibration Factor) =  $1.414 \times ((50 / \text{Measurement } \Omega) + 1)$**

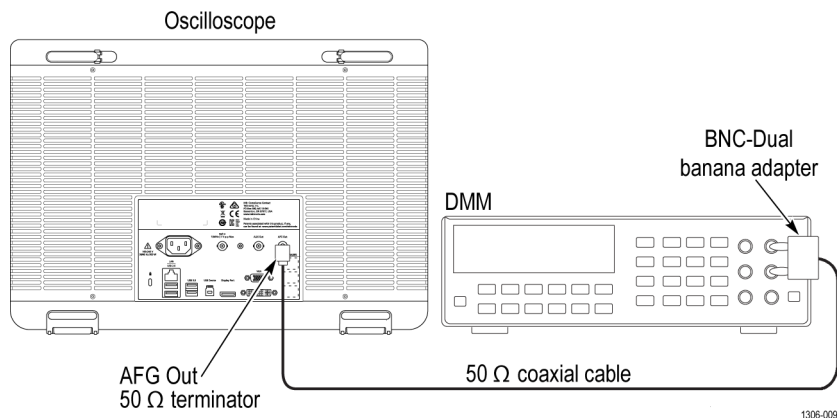
Measurement (reading of the DMM)	Calculated CF

Examples:

For a measurement of 50.50  $\Omega$ , CF =  $1.414 (50 / 50.50 + 1)$  = **2.814**.

For a measurement of 49.62  $\Omega$ , CF =  $1.414 (50 / 49.62 + 1)$  = **2.839**.

- Connect the arbitrary function generator output to the DMM as shown in the following figure. Be sure to connect the 50  $\Omega$  terminator to the **AFG Out** connector.



**Figure 4: Amplitude test**

- Tap the **AFG** button and set up the arbitrary function generator output as follows:

Select menu	Setting
Waveform Type	Sine
Frequency	1.000000 kHz
Amplitude	30 mV <sub>PP</sub>
Load Impedance	50 $\Omega$
Output	On

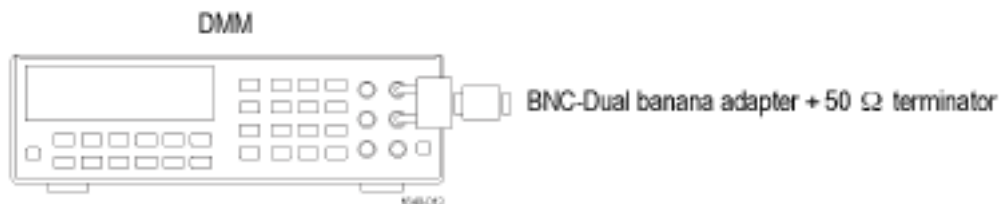
- Measure the **AC RMS** voltage readout on the DMM.
- Multiply the DMM voltage by the calculated CF to get the corrected peak to peak voltage. Enter the resulting value in the Measurement field in the following table.
- Change the AFG output amplitude to the next value in the table.
- Repeat steps 5 through 7 for each amplitude value. Check that the peak to peak voltages are within the limits in the table below. Enter the values in the test record.

Waveform Type	Frequency	Amplitude	Measurement	Range
Sine	1.000 kHz	30.0 mV <sub>PP</sub>		28.55 mV <sub>PP</sub> - 31.45 mV <sub>PP</sub>
Sine	1.000 kHz	300.0 mV <sub>PP</sub>		294.5 mV <sub>PP</sub> - 305.5 mV <sub>PP</sub>
Sine	1.000 kHz	800.0 mV <sub>PP</sub>		787.0 mV <sub>PP</sub> - 813.0 mV <sub>PP</sub>
Sine	1.000 kHz	1.500 V <sub>PP</sub>		1.4765 V <sub>PP</sub> - 1.5235 V <sub>PP</sub>
Sine	1.000 kHz	2.000 V <sub>PP</sub>		1.969 V <sub>PP</sub> - 2.031 V <sub>PP</sub>
Sine	1.000 kHz	2.500 V <sub>PP</sub>		2.4615 V <sub>PP</sub> - 2.5385 V <sub>PP</sub>

### Check AFG DC offset accuracy

This test verifies the DC offset accuracy of the arbitrary function generator. This test uses a 50  $\Omega$  terminator. It is necessary to know the accuracy of the 50  $\Omega$  terminator in advance of this test. This accuracy is used as a calibration factor.

- Connect the 50  $\Omega$  terminator to the DMM as shown in the following figure and measure the resistance value.



**Figure 5: 50  $\Omega$  terminator accuracy**

- Calculate the 50  $\Omega$  calibration factor (CF) from the reading value and record as follows:

**Table 6: CF (Calibration Factor) =  $0.5 \times ((50 / \text{Measurement } \Omega) + 1)$** 

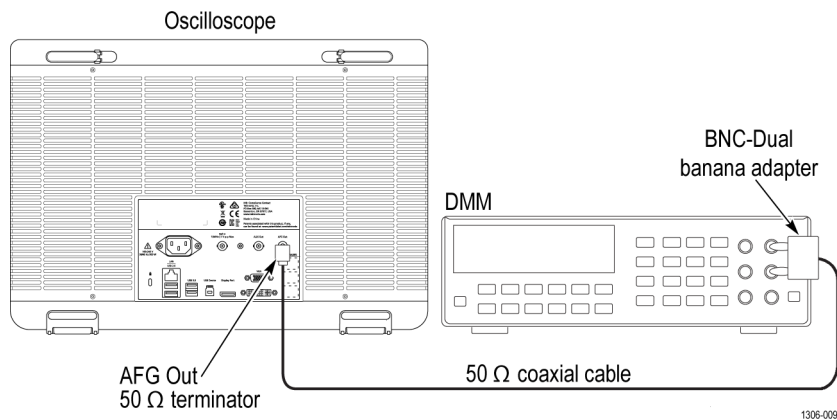
Measurement (reading of the DMM)	Calculated CF

Examples:

For a measurement of 50.50  $\Omega$ , CF =  $0.5 (50 / 50.50 + 1) = \mathbf{0.9951}$ .

For a measurement of 49.62  $\Omega$ , CF =  $0.5 (50 / 49.62 + 1) = \mathbf{1.0038}$ .

3. Connect the arbitrary function generator output to the DMM as shown in the following figure. Be sure to connect the 50  $\Omega$  terminator to the arbitrary function generator **AFG Output** connector.

**Figure 6: DC offset tests**

4. Tap the **AFG** button and set up the arbitrary function generator as follows:

Select menu	Setting
Waveform Type	DC
Offset	+ 1.25 V
Output	On

5. Measure the voltage readout on the DMM.
6. Multiply the DMM voltage by the calculated CF to get the corrected offset voltage. Enter the resulting value in the Measurement field in the following table.

Function	Offset	Measurement	Range
DC	+ 1.25 Vdc	Vdc	1.23025 Vdc to 1.26975 Vdc
DC	0.000 Vdc	Vdc	- 0.001 Vdc to + 0.001 Vdc
DC	- 1.25 Vdc	Vdc	-1.26975 Vdc to -1.23025 Vdc

7. Change the AFG output amplitude to the next value in the table, measure the voltage readout on the DMM, multiply the DMM readout by the calculated CF to get the corrected offset voltage, and enter the resulting value in the Measurement field in the table.
8. Verify that the corrected offset measurements are within the range.

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